

## Appendix F. Scope of Work

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### Scope of Work Commentary

Some of the sections in the Scope of Work are self-explanatory or will require little consideration by the Project Team. This Commentary provides comment to those sections of the Scope of Work that have specific considerations for the Project Team.

### SECTION 100 - GENERAL INFORMATION

Section 100 of the Scope of Work contains the detailed Project Description. This appendix contains two examples of a Project Description. The section is not intended to define contract requirements but instead to describe project intent. The summary of the project allows interpretation of how the individual Contract Provisions fit into the complete contract.

### SECTION 200 - DESIGN REFERENCES

The relevant references are listed in Section 200 of the Scope of Work. The lists provided are intended to be inclusive of all relevant references. Since the final design is performed by the Design-Builder, the Department cannot define the exact reference list prior to contract execution. The Design-Builder is responsible for determining which references are relevant. Require the Project Team to review the list to ensure it is complete, relevant, and current.

The rule of precedence within the Scope of Work is stated in the second paragraph of the section and must be followed by the Project Team to ensure the desired design procedure is defined. Avoid duplication of requirements; references should only be listed in a single location, either in the Section 400 or 200.

#### 205 Design Reports and Studies

Design documentation and studies are defined as project-specific references created by the Project Team. The documents are split into two groups: those that specify requirements, and those that provide information and data. Determine if the information in the design documentation is to be extracted and placed directly into Section 400 of the Scope of Work or referenced as an attached document.

#### 210 DOT&PF Design Manuals and Guidelines

This section contains the listing of current DOT&PF Manuals and Guidelines. DOT&PF documents have precedence over general references listed in Section 220. The list is ordered with manuals and guidelines first followed by standard plans and construction documents. The standard plans are derived from the information in the guidelines and manuals and thus cannot have precedence over them.

#### 220 General References and Publications

The general references are intended to cover the national, local, and other requirements that designs and studies must adhere to. The list is intended to be complementary to Section 210, providing requirements that the DOT&PF documents don't cover. Duplication or conflict is handled through the order of precedence. If documents are obviously inapplicable, eliminate them to avoid confusion.

## SECTION 400 – PROFESSIONAL SERVICES

Section 400 describes in detail how the professional service tasks are to be conducted. The services include activities that occur during design and construction and some are non-design-oriented tasks. Review the subsections and determine if all technical areas are addressed and whether the described functions are appropriately defined.

### 405 Design Deviations

The project development detail must support deviation requests that describe what can be met, not just what can't be met. A complete detailed design is not required for this determination. Support the deviation request conceptually rather than with the completed design typically used in the design-bid-build process.

If required for the project, the Department should approve deviations prior to solicitation of Proposers. The Proposer's Final Proposal may include other deviations. These deviations would be evaluated and approved or rejected by the Department as part of the proposal evaluation. Final design during contract execution might discover other necessary geometric design deviations for which the Design-Builder must prepare appropriate documentation and application materials. During contract execution, the Department will process the geometric deviation requests and approve if warranted. The impacts of the Department's deviation review and acceptance must be absorbed by the Design-Builder without contract adjustment.

When investigating the project concepts, consider geometric deviations first on a "broad-brush" basis, without considering all possible variations in design alignments and impacts. This set of deviations establishes a basis for comparing the value of Proposer requested deviations. As design-build is intended to foster innovation in design, it may be in the Department's, and the public's, best interest to consider innovative ideas requiring deviations within the context of the performance specifications.

Accept and evaluate deviations during the solicitation process according to the following categories:

1. necessary for DOT&PF design decisions;
2. potentially advantageous to the Department, or not, but will need to be requested formally by Proposers for evaluation;
3. necessary for individual Proposers, requested formally by Proposers for evaluation and approved or not during proposal preparation.

Consider all contract deviations during the selection process individually and on a "blind" basis, so that evaluators do not know who is making the request, thus eliminating the possibility of favoritism.

Acceptance of a design deviation from geometric design standards would not be accepted just to save costs because cost cannot be the only reason to deviate. If an environmental reason noted in the NEPA phase, or a limit in scope and the design matrices make a deviation necessary, every Proposer should be made aware of the acceptable deviation.

### 410 Surveys and Mapping

Specify survey information to be provided by the Department as part of the design criteria of this section. The Department will establish survey control as part of the preliminary site work to

prepare the contract documents. Additional survey work required to complete the final design will be provided by the Design-Builder. Define project-specific requirements related to completing the final survey work that are not included in the referenced Highway Surveying Manual.

### 415 Geotechnical Design

Specify any geotechnical information or reports provided by or required by the Department. The Department will perform some preliminary geotechnical work in the preparation of the contract documents and possibly during the selection process (see Revision Section 1-04 Supplemental Boring Program) to provide information necessary to develop the design as envisioned by the Scope of Work. Any additional geotechnical work necessary for the Design-Builder's specific proposal will be conducted by the Design-Builder. Provide copies of any existing geotechnical information that is available to all short-listed Proposers in order to save time and expense. See Guidebook Section 3.7 for a detailed discussion on this topic.

### 416 Pavement Design

The Resurfacing Report, will address the pavement section design. The Resurfacing Report's use should be flexible depending on the project type. On "Improvement" projects, where the pavement section is not dependent on existing subgrade, DOT&PF may prefer to use a warranty and the report would provide design criteria, a reference pavement section design for proposal evaluation, and warranty provisions.

On "Preservation" projects, the actual design is best determined by DOT&PF due to the liability associated with the condition of the existing subgrade. In either case, use the report as an internal backup reference document for DOT&PF evaluation of proposals and/or designs. Place information from the report within this section of the Scope of Work or reference it for use by the Proposers in proposal preparation.

### 420 Environmental

The Environmental Section of the Scope of Work must define the requirements of all environmental-related processes allocated to the Design-Builder. Allocated responsibility may include additional data collection, environmental studies, mitigation measures, reports, or permits required to complete regulatory compliance procedures. As discussed in Guidebook Section 3.9, the NEPA processes will be completed in the preparation of the contract documents, except in some unique individual cases where it may be possible to include portions of this step in the Scope of Work. Provide all data and analysis performed by the Department to all short-listed Proposers.

The Department will officially apply for the permits when the owner is required to be the applicant, but the Design-Builder will prepare all necessary permit application information when the design is well defined. Splitting the responsibilities of a task requires communication and coordination between the Department and the Design-Builder. Review and modify the coordination process defined in the Scope of Work. Clearly define the responsibility of the Department and Design-Builder in determining permit requirements, time allowed for permit decisions, and application responsibilities. Especially note all known permit requirements affecting construction options and costs. Coordinate delineation of necessary permits with the relevant section of the Revisions to the Standard Specifications and Special Provisions. The language should not alleviate the Design-Builder's responsibility to prepare the necessary

permit information or to modify existing project permits as necessary, nor should it indemnify the Design-Builder from thoroughly investigating additional permit requirements.

Pre-emptive discussions between DOT&PF and the regulatory agencies will benefit the project by setting expectations and refining contract language to meet the expectations of the agencies. Regulatory familiarity with the project prior to receiving permit applications will also aid in expediting the review and approval process. Contact all resource and regulatory agencies and introduce the project and intended process to them. Prior contact also helps alert the regulatory agency and Design-Builder to project-specific issues that should be addressed by the design to expedite the approval process.

## 425 Public Information and Public Involvement Plan

During the execution of the design-build contract the second phase of the Department's Public Involvement Program will be executed. As described in Guidebook Section 3.12, DOT&PF will maintain responsibility for required and optional public involvement activities. The generic section contains language that requires the Design-Builder to provide relevant documents to the Department for dissemination. Primarily, the Department is requiring design documentation and traffic staging information to share with interested public entities.

## 430 Utilities

In the design-bid-build process, either the utility performs relocations by a predetermined time or the contractor relocates them as part of the contract. The Department determines the extent of utility impacts during final design and requests relocation. If the work cannot be accomplished in time, DOT&PF will include the utility work on the bid list. Having all bidders propose costs for the utility work meets the statutory requirement of soliciting low bids. Although the utility line item may not be the lowest among bidders, the process involved competitive bid.

In design-build contracting, utilities are third party entities that introduce an unknown risk to the project. In some cases extensive utility contacts by DOT&PF prior to contract award is advised. Minor utility conflicts may be best handled by the Design-Builder during proposal preparation.

To properly conduct a risk assessment to the contract from utility impacts, physically identify all existing utilities within the right-of-way, anticipate the affects on utilities, and discuss significant impacts and relocations with utility companies. Clearly specify all utility efforts required including utility concerns, relocation arrangements, constraints, temporary power needs, and agreements in the Scope of Work. If the Design-Builder is expected to use the Region's standard practices in coordinating with utility companies, then the requirements must be detailed in the scope or referenced. In responding to the RFP, the Proposers must address utility impacts, relocations, and coordination activities with the affected parties as part of their proposed approach.

The approach described in the generic Scope of Work allocates the work of coordination and construction of the impacted utility to the Design-Builder. The intent is to have the Design-Builder contract with the utility to perform the work. If this approach is maintained, the cost of relocating the utility will be paid by the utility to the Design-Builder directly. Consider the following summary points in devising the utility strategy:

1. Determine how and who will pay for the work, either by DOT&PF, passing the monies through the Department, or by directly to Design-Builder by utility.

2. If by or through the Department, the utility costs must be included in the Proposal, whether in the bid list or in the Schedule of Values by individual utility.
3. The Design-Builder must be informed that the utilities have the option to perform their own solicitation if Design-Builder prices are too high.
4. If DOT&PF is maintaining control and responsibility for utility relocations, a time frame for utility relocation must be included in the Contract Provisions. Schedule impacts can then be negotiated with the Design-Builder.

## 475 Right-of-Way

DOT&PF's aim is to acquire all necessary rights-of-way prior to advertisement or by a prescribed time. However, to not limit Proposers or Design-Builder innovation in project configurations, provisions are included that allow project improvements to impact the right-of-way. The generic Scope of Work allows the Proposers the opportunity to develop a design proposal without right-of-way constraints. DOT&PF considers this flexibility beneficial to the project. The Department will weigh the impacts of this flexibility on a case-by-case basis.

A plan to manage the risk of rights-of-way costs and the time of procurement is necessary to control these unknowns. If a proposal requires right-of-way beyond the defined limits, and is determined acceptable by the Department, the Design-Builder will prepare the necessary documents and the Department will acquire the property (within pre-established cost limits for the project). See Guidebook Section 3.7 for further discussion on ways to define the terms and Department processes that must be considered.

## 480 Construction (Special) Provisions

The Design-Builder is responsible for developing the technical Special Provisions (Divisions 2 through 9) in support of their design. To avoid confusion the Special Provisions developed by the Design-Builder are called Construction Provisions.

# SECTION 1000 CONTRACT ADMINISTRATION

## Section 1022 Responsibility Chart

The Responsibility Chart delineates the responsibility allocation for the project. Appendix J contains a generic version. The chart is redundant to the Contract Provisions and must be reviewed carefully for accuracy. Use the chart either as an index and instrument in designing the Contract Provisions, filling it out first, or as a review document, filling it out last. The chart is not intended to be inclusive of all provisions, but a highlight of significant high-risk areas.

## Section 1026 Design-Builder Personnel

This provision is redundant to one contained in the RFQ, see Guidebook Section 4.3, but the RFQ is not a Contract Provision. This provision provides some leverage for the Department in keeping the proposed team members on the project.

## Section 1065 Design Reviews and Oversight Visits

The design review process is defined by Revisions to the Standard Specifications Section 1-05.3 Plans and Working Drawings, and Scope of Work Sections 1130.05 and 1065. In combination, these provisions define authority, the process, and the documents to be submitted. The Revision and Scope of Work provisions are considered to be complete and should not require

modification. Thoroughly review the provisions for context and understanding so the project's Design and Construction Document requirements are described appropriately.

DOT&PF will not perform an official review that might be interpreted as acceptance or approval of the design, after the acceptance of the proposal. The word "approval" is not to be used or implied in any section of the Scope of Work, Revisions to the Standard Specifications, or Special Provisions. Refer to Scope of Work Section 1100 for details related to the Department's role in checking the design for contract compliance. The Department review will confirm that the project elements meet Scope of Work and other Contract Provisions. Licensed design professionals prepare the design and their seal on the drawing represents certification that the design meets all applicable codes, is correct, and accurate. The Scope of Work clearly defines the responsibility of the Design-Builder to check and certify Design and Construction Documents.

The defined review process provides the Department with sets of submittals on a delivery schedule updated on a daily basis to the Project Manager. The Department has every opportunity to scrutinize the design prior to construction of the facility. However, construction is not required to wait for Department responses to submittals. The review teams must understand that timely reviews, checking for contract compliance, are in everyone's best interest.

Comments from the review team should be categorized as being "required" and "preferential or advisory." Required changes are those necessary to bring the design into compliance with the Contract Provisions. The Design-Builder must address preferential or advisory comments, but incorporation of changes is not required. If the reviewer wants a preferential or advisory change made to the design, be prepared to negotiate a change to the contract.

## Section 1100 Design-Build QC/QA Plan Requirements

This section relates to the policies and procedures for ascertaining if products delivered under Design-Build meet the quality expectations and requirements of the Department. One of the key goals of DOT&PF's Design-Build process is to transfer the responsibility for Quality Control (QC) and performance of the project to the Design-Builder.

The Project Team must become familiar with the provision with respect to the relevant project components. Specifically, ensure hold point and witness points are appropriate. Little if any modification is expected or advised without thorough review by an appropriate panel of experts.

## Section 1300 Product Warranty Provisions

This section discusses the formulation of a product warranty for a constructed feature of the project, in contrast to a manufactured feature of the project.

In the design-build process, the Department intends to consider the use of product warranties to minimize QA involvement during design and construction. To maintain quality and reduce DOT&PF involvement in the design-build process, evaluate each project for necessary critical reviews or hold points in the design and construction phases to determine if they can be replaced by a product or component warranty.

To begin the warranty investigation process, review the project items that could carry a warranty and discuss the pros, cons, and limitations for each of the identified products. Be very specific about the warranty terms and conditions to facilitate bonding coverage by the Design-

**Builder.** The terms and conditions define what is warrantied, how it is measured, when it is measured, who measures it, when a remedy is required, and how a remedy is to be administered. A dispute resolution process is also needed for the warranty process; review the DOT&PF Dispute Resolution process contained in the generic Special Provisions found in Appendix 9.

Warranty provisions for selected items must be coordinated with the respective Scope of Work provisions. If a warranty is required on an item (e.g., asphalt paving), the Design-Builder must have control over the design. Responsibility for the performance of an item or product cannot be allocated to another party without also allocating authority. In addition, the performance of a product must be completely related to the actions of the responsible party. Warranties without complete responsibility and authority will probably be disputable, since a claim could be made that the Department's design and/or pre-existing conditions caused the failure.

Each product or component evaluated may have a different warranty term; for example, pavement 5 years, bridge joint 10 years, landscaping 2 years. For each of the warranty items, develop terms specifically based on aspects of the product that the Design-Builder has complete control over; e.g., smoothness and rutting in asphalt pavement rather than pre-existing elements such as subgrade. Stay away from items that the Design-Builder does not have complete control over (e.g., reflective cracking in asphalt paving and paving over pre-existing subgrade). The performance of the product should be monitored using specific criteria that can be measured and/or tested; for example, base the measurement of pavement condition deterioration on total equivalent wheel loads rather than a time increment such as years.

Federal funding may be used on warranty items but FHWA must concur as discussed in Guidebook Section 2.4. However, federal funds may not be applied to a warranty that includes work not normally eligible for federal-aid funds. For example, maintenance activities would be non-participatory.

Extended warranties on constructed products are an evolving aspect of construction contracting. Research current trends in warranty terms and conditions during the development of these provisions. Before inclusion in the draft RFP, allow time for review and comment by sureties, AGC, and applicable trade associations .

## Warranty Development Efforts

The generic provisions contained in the Scope of Work Section 1300 are believed to be a good compromise between Department expectations and industry capabilities. The external stakeholders involved in the development process include representatives from:

Alaska Attorney General's Office  
Asphalt Paving Association of Alaska  
AIG Surety  
Reliance Surety  
AGC  
Safeco Surety  
Reliance Surety  
Risk Management  
DOT&PF Materials Laboratory  
DOT&PF Construction Office

# SCOPE OF WORK

## SECTION 100 - GENERAL INFORMATION

This Scope of Work contains certain requirements relating to design and construction of the project, including requirements for providing professional services, contract administration, and Quality Control/Quality Assurance (QC/QA) for the project, and shall be interpreted as provided in the General Requirements to the Standard Specifications. Definitions of words and phrases contained in the General Requirements, as revised by the Amendments to the Standard Specifications, shall also apply to the Scope of Work. This Scope of Work is intended to provide clear requirements of finished Work while allowing the Design-Builder flexibility in selecting the design, means, materials, components, and construction methods used.

The project will use Federal funding and is subject to all requirements applicable to federal-aid highway projects.

**[The following Sections: 110, 120, and 130 are the Project Description. Two project descriptions are provided as examples, so sections numbers repeat.]**

### **Example No. 1**

#### **“110 Location**

*This project consists of a contract for the design and construction of a grade separation structure for the Thurston Way Intersection with State Route 500 (SR 500), and the realignment of the eastbound on ramp from Andresen Rd. and westbound off ramp to Andresen Rd. in Vancouver, Washington. In addition, the SR 500 mainline will be overlaid with asphalt concrete pavement from Milepost (MP) 3.51 to MP 4.73*

*A vicinity map is attached in Appendix G.*

#### **120 Purpose**

*The purpose of this project is to improve the safety of the intersection and meet the Highway System Plan Highway Improvement service objective of eliminating major at-grade intersections on multi-lane highways with a speed of 45 mph (72 kph) or higher.*

#### **130 Description**

*SR 500 is an important east/west link in the Vancouver area, connecting I-5 and I-205 before heading east to Camas. The Thurston Way intersection is within the portion of SR 500 that has been determined to be a High Accident Corridor. The declining Level of Service (LOS) and increasing accident rate can be attributed to the growing volumes of traffic on SR 500 and particularly the high left-turn volumes at this present at-grade intersection. Thurston Way is one of the more congested north-south arterials in Clark County as it serves as direct access to Vancouver Mall, Vancouver Plaza, and other satellite shops, stores, restaurants, as well as high density housing.*

*The interchange is proposed as a safety strategy for a conceptual safety solution in the State Highway System Plan. Due to limited right-of-way and high left turn volumes, a preliminary investigation indicated that a single point urban interchange was feasible at this location. Retaining walls will be required to gain the height necessary for a grade separation.*

*The complex geographical features in the immediate proximity of the project site require*

*consideration including:*

- *Andresen Road is approximately 0.77 miles (1.24 km) to the west of Thurston Way.*
- *I-205 is approximately 0.87 miles (1.40 km) to the east of Thurston Way.*
- *Access control design for existing property owners along Thurston Way and impacts during construction.*
- *The existing right-of-way is narrow in the project area.*
- *Wetlands exist on the north side of SR 500 between Andresen Road and Thurston Way.*

*The project must be built in conformance with DOT&PF requirements. The Design-Builder shall be responsible for including all Work items necessary to fully address these requirements.*

*This project will require design and construction work items in public involvement, design and construction survey, roadway, signing, delineation, illumination, signalization, bridge and structures, hydrology/hydraulics, environmental, QC/QA for both design and construction, and contract administration.*

*The existing mainline pavement and shoulders beyond the limits of the interchange and Thurston Way will be overlaid with asphalt concrete pavement. The mainline, ramps and shoulder pavement will be designed meeting DOT&PF minimum pavement structure requirements. Surface drainage will be reconfigured for the additional impervious surface area. Water quality and quantity treatment will be required for an area exceeding the added impervious surface.*

*The following items have been identified by DOT&PF through the conceptual investigations. Other items may be required to fulfill the requirements of the contract.*

- *Bridge*
- *Retaining walls in numerous locations to avoid right-of-way impacts.*
- *Noise walls as described in the environmental documentation.*
- *Conduits throughout the length of the project for SC&DI. Vaults will also be needed.*
- *Ramp meters and a surveillance camera.*
- *Lane striping.*
- *Continuous temporary and permanent lighting between the interchanges*
- *Temporary and permanent signals.*
- *Drainage Facilities*
- *Pedestrian Facilities*

*Avoiding right-of-way impacts while improving the ramp connections requires the addition of retaining walls near the interchange.*

## **Example No. 2**

### **" 110 Location**

*This project consists of rehabilitation of the Portland cement concrete pavement (PCCP) and asphalt concrete pavement (ACP) in the NB and SB lanes and shoulders of Interstate 5 (SR5) in Bellingham, Washington between Mileposts 252.26 and 255.36, to be performed on a design-build basis.*

*Location and vicinity maps are attached in Appendix D.*

## **120 Purpose**

*The purpose of this project is to improve the pavement structural integrity and surface smoothness of the mainline, shoulders and ramps. Required safety improvements include upgrading the interchange on and off-ramp connections and other minor safety items.*

## **130 Description**

*The project must be built in conformance with DOT&PF requirements. The Design-Builder shall be responsible for including all Work items necessary to fully address these requirements. DOT&PF has recognized that major work items are likely to include but are not limited to:*

### **130.01 Roadway**

- *Dowel bar retrofit of structurally adequate PCCP panels in both the right and left lanes of the NB and SB I-5 mainline.*
- *Repair or replace of distressed or structurally inadequate PCCP panels.*
- *Ride quality improvement of the mainline PCCP in both the right and left lanes of the NB and SB I-5 mainline.*
- *Reconstruct or repair and overlay the ramps at the Lakeway Drive and Iowa Street Interchanges.*
- *Clean and seal all longitudinal, transverse and diagonal pavement joints and all cracks.*
- *Remove and rebuild the mainline ACP shoulders, which include removal of existing rolled concrete gutters.*
- *Lengthen non-standard on and off ramp connections at the Lakeway Drive, Iowa Street and SR 542 interchanges.*
- *Add weave lane between Iowa and Lakeway interchanges on S.B. I-5.*
- *Upgrade non-standard shoulder widths.*
- *Flatten slopes.*
- *Upgrade non-standard guardrail the full length of the project.*

### **130.02 Signing, Delineation, Illumination**

- *Install delineation.*
- *Evaluate and replace permanent signing.*
- *Update ramp taper illumination.*
- *Install sign and bridge lighting.*

### **130.03 Bridge and Structures**

- *Replace non-standard bridge rail on Bridge 5/814.*
- *Remove the existing ACP overlay from the deck of Bridge 5/820E, perform bridge deck repair and overlay it with a Modified Concrete overlay.*
- *Add bridge approach slabs at approaches to bridges 5/809 E & W, 5/810 E & W, 5/811, 5/812, 5/813, and 5/820 E & W.*
- *Widen Bridges 5/809E, 5/810E, 5/811E, and 5/812 (southbound side).*
- *Remove superstructure and center pier of abandoned railroad Bridge 5/816.*
- *Construct retaining walls at Lakeway Drive Interchange (NB off, NB on, and SB off ramps), SR 542 Interchange (SB on-ramp), and Iowa Street Interchange (NB off, NB on, SB off, and SB on ramps) which may include replacement or repair of the existing retaining wall along Lincoln St. between Kentucky St. and Iowa St.*

### **130.04 Hydrology/Hydraulics**

- *Remove rolled concrete gutters and replace with new surface and enclosed drainage.*

- *Construct storm water treatment and detention facilities.*

### **130.05 Environmental**

- *Mitigate wetland impacts.*
- *Construct noise mitigation on the west side of southbound I-5 between the Lakeway and Iowa Street interchanges.*

### **130.06 Roadside Restoration**

*Restore roadside impacts to landscaping*

### **130.07 Work Item Relationships**

*The identified deficiency initiating the need for this project is the aged and deteriorated condition of the PCCP in the mainline and ACP in the shoulders of Interstate 5.*

*Rehabilitation of the shoulder pavement will consist of removing all existing rolled concrete gutter and rebuilding the shoulders. ACP is proposed as the shoulder replacement material.*

*Rehabilitation of the mainline PCCP will require repair or replacement of distressed or structurally inadequate panels; dowel bar retrofit of intact, structurally adequate panels; and ride improvement of the PCCP surface by removing ruts and existing bumps caused by the wear and differential faulting between the existing PCCP panels.*

*A number of safety issues shall be addressed as required by the DOT&PF Design Matrices for this type of project. Many of the identified work items stem from Design Matrices requirements and other inter-related causes. This section discusses the inter-relationships of the work items.*

#### **130.07.1 Pavement Rehabilitation**

*The existing shoulders are in need of repair and are not structurally adequate to carry mainline traffic loads. Rebuilding of the shoulders will be needed prior to their being used to carry any increase in traffic loading from any staging. In addition, surface drainage on the shoulders will need to be reconfigured from the existing rolled concrete gutter to sheet flow to the outside edge of the paved shoulder.*

*The existing drainage system flows predominantly to Whatcom Creek near the center of the project section. The existing drainage system has been a maintenance problem for the Region. Whatcom Creek is a recognized water quality sensitive area and is a salmon bearing stream. Water quality and quantity treatment will be required for an area exceeding the added impervious surface.*

*Additional run-off concerns exist for the capture and disposal of slurry that may result from any cutting or grinding of the PCCP during construction. Equipment capable of limiting and capturing the slurry will be required.*

#### **130.07.2 Design Safety Requirements**

*DOT&PF and FHWA have agreed on required safety upgrades for highway projects of this type using Federal funding. These agreements will require lengthening acceleration and deceleration lanes at on/off ramp connections where the existing acceleration/deceleration lanes are non-standard.*

*Avoiding right-of-way impacts while improving the ramp connections requires the addition of retaining walls and bridge widenings in numerous locations near the interchanges. Wetlands will be impacted in areas adjacent to Whatcom Creek, and Sunset Drive as well.*

*The Design-Builder will be required to perform mitigation measures for these impacts. Widening the Whatcom Creek Bridge will create additional environmental impacts to the creek area which must be mitigated by the Design-Builder.”*

## SECTION 200 - DESIGN REFERENCES

Design references developed and published by DOT&PF and other agencies and required to be used in the design of this project are listed in this Section.

The list of references is intended only to assist the Design-Builder in identifying the relevant references.

The design of the project work shall be in accordance with this Scope of Work and the references listed herein. The order of precedence of the Contract Provisions is defined in Section 1-04.2 of the Amendments. The order of precedence for the Scope of work is defined as follows. References specifically cited in Section 400 of this Scope of Work shall take precedence over references generally listed in Section 200. Conflicts among references listed in Section 200 will be resolved by the order in which the reference appears in Section 200, i.e. the reference listed first in the section shall take precedence. It is the responsibility of the Design-Builder to obtain clarification on ambiguities and conflicts prior to proceeding with design and construction.

Standard Plans are listed as a source of information for a preferred and acceptable means of performing redundant type work. The Design-Builder may use the Standard Plans as appropriate for the specific design for the project. If Standard Plans are specified in Scope of Work Section 400 as a project requirement, the Design-Builder shall use the Standard Plans as provided with no modification.

### 205 Project Specific Reports, Studies and Informational Documents

**[List all project documents created by the Project Team that contain relevant information about the project.]**

The following documents are applicable to this project and are either attached or available as noted. The Design-Builder is responsible for verifying the accuracy of the information.

Basemap hardcopy, Survey Electronic Data Files <ul style="list-style-type: none"> <li>• Basemap file (.dgn)</li> <li>• CAiCE Archive file (.arc)</li> </ul>	Appendix \$\$\$?\$\$\$ and on the Design-build Web Page at: <a href="http://www.dot.state.ak.us">http://www.dot.state.ak.us</a>
Record of Survey	Available Upon Request
Baseline Geotechnical Report -	Appendix \$\$\$?\$\$\$
Noise Technical Report -	Appendix \$\$\$?\$\$\$ (Electronically Available on the Design-Build Web Site)
Ramp and Mainline Traffic Counts, Traffic Forecasts	Appendix \$\$\$?\$\$\$ (Electronically Available on the Design-Build Web Site)
Wetland Delineation Report -	Available Upon Request
Biological Assessment -	Available Upon Request
Air Quality Report -	Available Upon Request
Draft NEPA Checklist - Available Upon Request	(Electronically Available on the Design-Build Web Site)
Draft Design File; Draft Project Definition, Draft Design Decision, Environmental	Available Upon Request

Review Summary -	
Available "As Built" plans of existing conditions -	Available Upon Request
Available right-of-way plans of existing conditions -	Available Upon Request
Other site specific reports and design letters referenced in the reports in this section -	Available Upon Request
Pavement Rehabilitation Report.	Appendix \$\$\$?\$\$\$
Construction Zone Responsibility Worksheet.	Appendix \$\$\$?\$\$\$
Hydraulic Basin Analysis and Existing Conditions Report	Available on request
Other site specific reports and design letters referenced in the reports in this section	Available on request
Pile driving records	Available on request

## 210 DOT&PF Design Manuals And Guidelines

- DOT&PF Highway Surveying Manual
- DOT&PF Soil and Rock Classification Guidelines, Geotechnical Branch
- DOT&PF Preconstruction Manual
- DOT&PF Highway Engineering Field Formulas
- DOT&PF Right of Way Manual
- Endangered Species Act (ESA) §7(d) Project List And Stormwater Effects Guidance (IL-4020.00)
- DOT&PF Hydraulics Manual
- DOT&PF Highway Runoff Manual
- DOT&PF Bridge Design Manual, Volumes 1 & 2
- DOT&PF Maintenance Manual
- DOT&PF Sign Design Guide
- DOT&PF Sign Fabrication Manual
- DOT&PF Utility Accommodation Policy
- DOT&PF Environmental Procedures Manual
- DOT&PF Protection of Wetlands Action Plan
- DOT&PF Roadside Manual
- DOT&PF Roadside Classification Plan
- DOT&PF Pavement Guide
- DOT&PF Pavement Surface Condition Rating Manual
- DOT&PF Time Standard Manual
- DOT&PF Traffic Manual
- Alaska State Modifications to MUTCD

- DOT&PF Manual of Approved Signs
- DOT&PF Traffic Group's Sign Sheeting Guidelines
- DOT&PF Traffic Control Guidelines for Survey Operations
- DOT&PF Work Zone Traffic Control Guidelines
- DOT&PF Plans Preparation Manual
- DOT&PF CADD Manual
- DOT&PF Construction Manual
- DOT&PF Materials Manual
- DOT&PF Safety Manual
- DOT&PF Incident Response Guide
- DOT&PF Asbestos Abatement Manual
- Traffic Control Assistance in Work Zones
- DOT&PF Standard Plans for Roads, Bridge and Municipal Construction
- DOT&PF Qualified Products List
- DOT&PF Standard Item Table

## **220 General References And Publications**

The Construction Documents shall define the project requirements using DOT&PF references and publications, with any necessary supplementation provided by appropriate AASHTO and/or FHWA references. The following general regulations, references, and publications supplement the preceding references and those specifically referenced in the Scope of Work and shall be selected by the Design-Builder, as appropriate, to control the work described in the Contract Provisions. Inquiries concerning inconsistencies and conflicts shall be directed to the DOT&PF Project Manager.

### **220-01 Environmental**

- National Environmental Policy Act of 1969
- 36 CFR 800 - Protection of Historical and Cultural Properties
- 23 CFR 771 - Environmental Impact and Related Procedures
- 23 CFR 772 - Procedures for the Abatement of Highway Traffic Noise and Construction Noise
- FHPM 7-7-9 - Air Quality Guidelines
- Endangered Species Act of 1973, and supplements
- Executive Order 11990 (Protection of Wetlands)
- Executive Order 11988 (Floodplain Management)
- National Historic Preservation Act of 1966
- Section 4(f) of the Department of Transportation Act
- Section 404 of the Clean Water Act of 1977 (33CFR320-330)
- FHWA Technical Advisory T6640.8, "Guidance Material for the Preparation of Environmental Documents"
- Section 1424(e) of the Safe Drinking Water Act (Sole Source Aquifer Review)
- 36 CFR 60 - Determinations of Eligibility for Inclusion in the National Register of Historic Places
- Public Law 91-646 - Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970
- Resource Conservation and Recovery Act (RCRA)
- Comprehensive Environmental Response, Compensation and Liability Act of 1980 (CERCLA)

- Superfund Amendments and Reauthorization Act (SARA)
- Section 402 Clean Water (NPDES)
- Alaska State Water Quality Law (Section 401)
- Alaska State Hydraulic Code (Ch. 220-110 WAC)
- Noise Abatement Policy for State-Funded Projects
- Hazardous Waste Management Act (HWMA)
- Underground Storage Tank Act of 1986
- Local codes and ordinances relating to air quality, noise, dust abatement, light, drainage, etc.

#### **220-02 Drainage-Hydraulics-Hydrology**

- The State of Alaska Stormwater Ordinance
- Stormwater Management Manual

#### **220-03 Roadway Geometrics**

- Guide for the Design of High Occupancy Vehicles and Public Transfer Facilities (1983)
- AASHTO - A Policy on Geometric Design of Highway and Streets
- AASHTO - Roadside Design Guide
- Manual Uniform Traffic Control Devices
- Highway Capacity Manual, Transportation Research Board (TRB)

#### **220-04 Materials**

- Annual Book of American Society for Testing and Materials Standards
- AASHTO Guide for Design of Pavement Structures
- AASHTO Materials Specifications and Tests
- DARWin Pavement Design Software
- American Concrete Pavement Associations Pavement Analysis Software

#### **220-05 Geotechnical**

- AASHTO Manual on Subsurface Investigations (1988)
- AASHTO Standard Specifications for Highway Bridges, 16th Edition, 1996, with current interim addenda
- Checklist and Guidelines for Review of Geotechnical Reports and Preliminary Plans and Specifications, FHWA-ED-88-053, 1988
- Drilled Shafts: Construction Procedures and Design Methods, HI-88-042, FHWA, 1988
- Handbook on the Design and Construction of Drilled Shafts under Lateral Load, IP-84-11, FHWA, 1984
- Ground Anchors and Anchored Systems, Geotechnical Engineering Circular No. 4, SA-99-018, FHWA, May 1999
- Recommendations for Prestressed Rock and Soil Anchors, Post Tensioning Institute, 3rd Edition, 1996
- Design and Construction of Driven Pile Foundations, Vol. 1 & 2, HI-97-013 & HI-97-014, FHWA, 1997
- Manual for Design and Construction of Soil Nail Walls, SA-96-069, FHWA, 1996
- Soil Nailing Field Inspectors Manual - Soil Nail Walls, SA-93-068, FHWA, 1993
- Mechanically Stabilized Earth Walls and Reinforced Soil Slopes Design and Construction Guidelines, SA-96-071, FHWA, 1997

- Corrosion/Degradation of Soil Reinforcements for Mechanically Stabilized Earth Walls and Reinforced Soil Slopes, SA-96-072, FHWA, 1997
- Drilled and Grouted Micropiles: State-of-Practice Review, Vol. 1 - 4, RD-96-017, FHWA, 1997
- Geosynthetic Design and Construction Guidelines, FHWA HI-95-038, 1995
- Slope Stability Reference Guide for National Forests in the United States, Vol. 1, 2, and 3, US Forest Service, 1995
- Rockslopes: Design, Excavation, and Stabilization, TS-89-045, FHWA, 1989
- Rock Blasting and Overbreak Control, HI-92-01, FHWA, 1992
- Design and Construction of Stone Columns, RD-83-026, FHWA, 1983.
- Load and Resistance Factor Design (LRFD) for Highway Bridge Substructures, HI-98-032, FHWA, 1998
- AASHTO LRFD Bridge Design Specification, Second Edition, 1998

#### **220-06 Water Quality**

- National Pollutant Discharge Elimination System (NPDES) Storm Water General Permit for Construction Activity for the State of Alaska.
- Evaluation and Management of Highway Runoff Water Quality, FHWA, June 1996.
- AASHTO Highway Drainage Guidelines, Volume III (Federal Funds)
- Implementing Agreement with Department of Ecology on water quality

#### **220-07 Traffic Design (Highway Lighting, Signing, Traffic Control)**

- AASHTO Informational Guide to Roadway Lighting
- AASHTO Roadside Design Guide
- National Electrical Code
- Manual of Uniform Traffic Control Devices
- Standard Highway Signs, Federal Highway Administration

#### **220-09 Bridges/Structures**

- AASHTO Standard Specifications for Highway Bridges, Sixteenth Edition, 1996 and Interim Revisions through 1998.
- AASHTO Guide Specification for Fatigue Design of Steel Bridges
- AASHTO Guide Specification for Structural Supports for Highway Signs, Luminaries, and Traffic Signals.
- AASHTO Guide Specification for Structural Design of Sound Walls
- ANSI/AASHTO/AWS D1.5-XX Bridge Welding Code
- AWS D1.1-XX Structural Welding Code.
- AASHTO Manual for Condition Evaluation of Bridges, 1994.

#### **220-10 Landscape**

- Roadside Classification Plan (1996)

## SECTION 400 – PROFESSIONAL SERVICES

This Section sets forth requirements to be met by the Design-Builder in designing the project and preparing Construction Documents. The Design-Builder shall perform all work in accordance with the policies and procedures in effect at the time the RFP is issued, unless otherwise directed.

### 401 Design Features

The Design-Builder shall provide the engineering services required to furnish the work products identified in the Project Scope of Work. The services include the tasks of data preparation, data interpretation, Design Document and Construction Document preparation. Design and Construction Documents shall be prepared by (or under the direction of) a Professional Engineer, licensed by the State of Alaska, and shall carry the Professional Engineer's signature and seal.

Design of this project shall be based on the:

- Draft Project Definition,
- Draft Design Decisions Summary,
- Specific design criteria listed below.

The design criteria listed in this Section are specific requirements that take precedence over other references. When specific requirements are not listed, design references listed in Section 200 shall be used to formulate the basis for the design of the project work.

### 405 Design Deviations

#### 405.01 Pre-Approved Deviations

\$\$\$?\$\$\$ design deviations were approved prior to issuance of the RFP and may be used by the Design-Builder. Following are the design deviations that have been approved as a result of preliminary investigations.

- A. \$\$\$?\$\$\$
- B. \$\$\$?\$\$\$

#### 405.02 Additional Deviations

The Design-Builder may also implement any additional deviations approved by DOT&PF in accordance with Section 3.4 of the FINAL PROPOSAL General Requirements. The Design-Builder is encouraged not to create additional design deviations as there is no assurance that they will be approved.

### 410 Surveys and Mapping

The meaning of words and terms used in this Section 410 and not otherwise defined in the Contract Provisions 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.

#### 410.01 DOT&PF Provided Surveys and Mapping

DOT&PF has prepared mapping for [Project Name] from MP \$\$\$?\$\$\$ to MP \$\$\$?\$\$\$.

Primary and secondary survey horizontal control was established by DOT&PF with GPS equipment in the Alaska coordinate system,  $AAA?AAA$  zone, North American Datum of 1983 (NAD 83/91) with a data set accuracy is  $<AAA?AAA$  M @ 2 Sigma. The DOT&PF photogrammetric digital map data set accuracy is  $<0.1$  M @ 2 Sigma, which could also be stated as, well defined visible detail points in the digital file are within 0.1 M if true ground position at the 95 percent confidence level.

The initial primary and secondary control coordinates were converted from State Plane coordinates to Project Ground coordinates. The State Plane control coordinates were divided by the combined factor of  $AAA?AAA$ . The combined factor was derived by multiplying the elevation factor of  $AAA?AAA$  by the scale factor of  $AAA?AAA$ . To ensure that the Project Ground coordinates are not mistaken for State Plane coordinates, 100,000 meters were added to both the northings and eastings.

Vertical control is based on North American Vertical Datum of 1988 (NAVD 88).

The 3D Microstation .DGN file comprised of photogrammetric data was transformed from State Plan coordinates to Project Ground datum.

Supplemental field survey data of utility locates, drainage and other hidden features were obtained with an electronic 3 second total station, using single angles and single distances with and error ellipse of 0.02 M at 95 percent confidence level. The field survey work was merged into the 3D Microstation .DGN file.

All field survey work, design and construction will be done in project ground datum.

Any conversion from Metric to English shall use the U.S. Survey foot definition: 1 meter = 39.37 inches exactly.

Areas that were obscured due to dense trees, brush or dark shadows may contain weak x, y, z data which may require a field survey check or verification.

#### **410.02 Design Survey Work**

The Design-Builder shall review data provided by DOT&PF. The Design-Builder shall be responsible for additional field survey work. All field survey work shall be suitable for Design and Construction Document preparation and meet the technical requirements of DOT&PF and the State Board of Technical Registration.

- A. The Design-Builder shall obtain any permits that may be required prior to beginning field work. A traffic control plan should be prepared, if required. Preparation of surveys shall conform to requirements referenced in Section 200, including (but not necessarily limited to) procedures, record-keeping requirements, equipment use, and safety precautions.
- B. The Design-Builder shall delineate the right-of-way so that utility companies may prepare relocation plans. Delineation with strips of plastic flagging attached to lath located at intervals shall provide a clear delineation of the right-of-way. This work shall be completed immediately prior to the date that utility company personnel are scheduled to conduct a field survey of the project.
- C. The Design-Builder shall utilize the Preconstruction Manual for modifying the monumentation.

### **410.03 Construction Surveying - Bridge**

Copies of DOT&PF provided primary survey control data are available for the Proposer's inspection at the office of the Project Manager.

The Design-Builder shall be responsible for all surveying necessary to complete the work. Except for the survey control data to be furnished by DOT&PF, calculations, surveying, and measuring required for setting and maintaining the necessary lines and grades shall be the Design-Builder's responsibility.

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 business days after the end of the shift.

The survey work by the Design-Builder shall include but not be limited to the following:

- A. Verify the primary horizontal and vertical control furnished by DOT&PF, 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 DOT&PF.
- B. Establish, by placing hubs and/or marked stakes, the location with offsets of foundation shafts and piles.
- C. Establish offsets to footing centerline of bearing for structure excavation.
- D. Establish offsets to footing centerline of bearing for footing forms.
- E. Establish wing wall, retaining wall, and noise wall horizontal alignment.
- F. Establish retaining wall top of wall profile grade.
- G. Establish elevation benchmarks for all substructure formwork.
- H. Check elevations at top of footing concrete line inside footing formwork immediately prior to concrete placement.
- I. Check column location and pier centerline of bearing at top of footing immediately prior to concrete placement.
- J. Establish location and plumbness of column forms, and monitor column plumbness during concrete placement.
- K. Establish pier cap and crossbeam top and bottom elevations and centerline of bearing.
- L. Check pier cap and crossbeam top and bottom elevations and centerline of bearing prior to and during concrete placement.
- M. Establish grout pad locations and elevations.
- N. Establish structure bearing locations and elevations, including locations of anchor bolt assemblies.
- O. Establish box girder bottom slab grades and locations.
- P. Establish girder and/or web wall profiles and locations.
- Q. Establish diaphragm locations and centerline of bearing.
- R. Establish roadway slab grades and provide dimensions from top of girder to top of roadway slab. Compute elevations at top of bridge roadway decks at one-tenth points

along centerline of each girder web and set elevations for deck paving machine rails. All form grades and other working grades shall be calculated by the Design-Builder.

- S. Establish traffic barrier and curb profile and alignment on roadway slab.

The Design-Builder shall provide DOT&PF copies of all calculations and staking data prior to staking.

To facilitate the establishment of these lines and elevations, DOT&PF will provide the Design-Builder with the following primary survey and control information:

- A. 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, DOT&PF will supply horizontal coordinates for the beginning and ending points and for each Point of Intersection (PI) on each right-of-way alignment included in the project.

The Design-Builder shall ensure a surveying accuracy within the following tolerances:

	<u>Vertical</u>	<u>Horizontal</u>
1. Stationing on structures		±5 millimeters
2. Alignment on structures		±5 millimeters
3. Superstructure elevations	±3 millimeters variation from plan elevation	
4. Substructure	±5 millimeters variation from plan grades	

DOT&PF may spot-check the Design-Builder's surveying. These spot-checks will not change the requirements for normal checking by the Design-Builder.

When staking the following items, the Design-Builder 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 Design-Builder shall calculate coordinates for the points associated with piles, shafts, footings and columns.

Contract work to be performed using Design-Builder-provided stakes shall not begin until DOT&PF has been given the opportunity to review the staking. Such review shall not relieve the Design-Builder of responsibility for the accuracy of the stakes.

#### **410.04 Contractor Surveying - Roadway**

Copies of DOT&PF provided primary survey control data are available for the Proposer's inspection at the office of the Project Manager.

The Design-Builder shall be responsible for all surveying necessary to complete the work. Except for the survey control data to be furnished by DOT&PF, calculations, surveying, and measuring required for setting and maintaining the necessary lines and grades shall be the Design-Builder's responsibility.

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 business 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 Design-Builder shall include but not be limited to the following:

- A. Verify the primary horizontal and vertical control furnished by DOT&PF, 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 DOT&PF.
- B. Establish and maintain 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 20 meters.
- C. Establish clearing limits, placing stakes at all angle points and at intermediate points not more than 20 meters apart.
- D. Establish grading limits, placing slope stakes at centerline increments not more than 20 meters apart. Establish offset reference to all slope stakes.
- E. 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 10 meters.
- F. 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 20 meters in tangent sections, 10 meters in curve sections with a radius less than 100 meters, and at 3-meter intervals in intersection radii with a radius less than 3 meters. 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 4 meters.
- G. Establish intermediate elevation benchmarks as needed to check work throughout the project.
- H. Provide references for paving pins at 10 meter intervals or provide simultaneous surveying to establish location and elevation of paving pins as they are being placed.
- I. 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.

The Design-Builder shall provide DOT&PF copies of all calculations and staking data 5 days prior to staking.

To facilitate the establishment of these lines and elevations, DOT&PF will provide the Design-Builder 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 5 kilometers 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, DOT&PF will supply horizontal coordinates for the beginning and ending points and for each Point of Intersection (PI) on each right-of-way alignment included in the project.

The Design-Builder shall ensure a surveying accuracy within the following tolerances:

	<u>Vertical</u>	<u>Horizontal</u>
Slope stakes	±60 millimeters	±300 millimeters
Subgrade grade stakes set 15 millimeters below grade	0 high	±150 millimeters
		15 millimeters low (parallel to alignment)
		±30 millimeters (normal to alignment).
Stationing on roadway	N/A	±30 millimeters
Alignment on roadway	N/A	±15 millimeters
Surfacing grade stakes	±5 millimeters	±150 millimeters(parallel to alignment)
		±30 millimeters(normal to alignment)
Roadway paving pins for surfacing or paving	±5 millimeters	±60 millimeters (parallel to alignment)
		±30 millimeters (normal to alignment)

DOT&PF may spot-check the Design-Builder's surveying. These spot-checks will not change the requirements for normal checking by the Design-Builder.

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

Contract work to be performed using Design-Builder-provided stakes shall not begin until DOT&PF has been given the opportunity to review the staking. Such review shall not relieve the Design-Builder of responsibility for the accuracy of the stakes.

## 415 Geotechnical Design

### 415.01 Design Criteria

Geotechnical design shall be done in accordance with the criteria in this section and in “Section \$\$\$?\$\$\$ Geotechnical Design Criteria” of the Geotechnical Report in Appendix \$\$\$?\$\$\$.

#### 425.01.01 Foundations

The following minimum factors of safety for bearing capacity and uplift design of foundations, to be applied to the ultimate foundation capacity, shall apply for Load Factor Design (LFD):

Load Group	Minimum Factor of Safety FS		
	Spread Footings	Shafts	Piles
Unfactored DL + LL, Groups I-IV, V, VI, VIII, and IX	3.0	2.5	2.5
Group VII	1.0	1.3	1.0

Auger cast piles shall not be used for support of walls and bridge structures.

If liquefiable soils are determined to be present, and it has been determined that they will in fact liquefy under the design earthquake for the site, the soil shall be stabilized to protect the bridge from damage due to lateral deformation and downdrag caused by the liquefaction or the structure shall be designed to withstand the forces and moments resulting from the lateral and vertical movements caused by the liquefaction. Additionally, the design of the foundations shall be evaluated with the soil in a liquefied state.

#### 415.01.02 Retaining Walls, Reinforced Soil Slopes, and Noise Wall

Proprietary wall systems may be used only if they are DOT&PF preapproved systems. Wall systems currently preapproved are as follows:

Manufacturer	System Name	System Description	Max. Height Approved
Reinforced Earth Company	Reinforced Earth	Steel strip soil reinforcing with precast concrete facing panels	10 m (33 ft)
VSL Corporation	Retained Earth	Steel bar mat soil reinforcing with precast concrete facing panels	10 m (33 ft)
Hilfiker Walls	Reinforced Soil Wall	Welded wire soil reinforcing with welded wire or precast concrete panel facing units	10 m (33 ft)
Tensar Earth Technologies	Tensar Ares Wall	Tensar geogrid soil reinforcement with precast concrete facing panels	10 m (33 ft)

Manufacturer	System Name	System Description	Max. Height Approved
Criblock Retaining Walls, NW	Criblock	Precast concrete crib box gravity system	10 m ( 33 ft)
Stresswall, International	Stresswall	Precast counterforts with precast concrete panels between	10 m ( 33 ft)
The Neel Company	T-Wall	Precast T sections stacked vertically	3 m (10 ft)
Intecor, Inc.	Nelson Retaining Wall	CIP spread footing with precast panels and CIP counterforts	9 m (28 ft)
Con-Tech Systems	Green Wall	Precast concrete facing elements with tiebacks	10 m (33 ft)

Non-preapproved proprietary wall systems can be used subject to approval from the Geotechnical Branch, Bridge and Structures Office. All non-preapproved proprietary wall systems shall have been reviewed by the Highway Innovative Technology Evaluation Center (HITEC, 1015 15<sup>th</sup> St. NW, Suite 600, Washington D.C. 20005) and shall be submitted to DOT&PF for approval prior to inclusion in the project. The submittal shall include the HITEC report plus example design hand calculations at 3 m (10 ft), 6 m (20 ft), and 10 m (33 ft). The calculations must include seismic design. DOT&PF's approval of HITEC reviewed walls for this project will not place that wall system into preapproved status for future projects.

Special Provisions for proprietary walls shall be developed in accordance with Section 480 of the Scope of Work.

If geosynthetic retaining walls or reinforced slopes are used, the long-term geosynthetic design strength shall be determined using DOT&PF Test Method 925 "Determination of Long-Term Strength for Geosynthetic Reinforcement." For temporary geosynthetic walls and reinforced slopes, the design strength of the geosynthetic shall be equal to  $T_{ult}/RF$ , where  $T_{ult}$  is the minimum average roll value (MARV) of the ultimate wide width tensile strength of the geosynthetic and RF is a reduction factor, or the long-term geosynthetic strength as determined from DOT&PF Test method 925, whichever is less. If the design life of the wall is 1.5 to 3 years, use  $RF = 3.5$ . If the design life is less than 1.5 years but greater than or equal to one year, use  $RF = 3.0$ . If the design life is less than one year, use  $RF = 2.5$ .

Soil nails in soil nail walls shall be double corrosion protected (i.e., fully encapsulated) in the portion of the wall which supports loading from adjacent structures. Epoxy coating for soil nails is acceptable elsewhere as a minimum. All permanent tieback and deadman anchors shall be double corrosion protected.

#### *415.01.03 Cuts, Fills, Excavation, and Other Geotechnical Features*

Shredded tires shall not be used for roadway fills.

The minimum factor of safety for the stability design of slopes shall be 1.25. A higher factor of safety, per the AASHTO Standard Specifications for Highway Bridges, 1996 with current interims, shall be used where the slope supports a wall or other structure.

#### **415.02 Qualifications**

**[Consider incorporating this section into the RFQ or RFP]**

*The Design-Builder Geotechnical Design Manager is the individual with overall responsibility for development of the geotechnical design and adherence to the Design-Build RFP. This individual shall be a Professional Engineer licensed by the State of Washington having a minimum of seven years supervisory experience in geotechnical design as applied to roadway or bridge design.*

*The individual responsible for installation and monitoring of any instrumentation used to verify the performance or integrity of the geotechnical feature, including CSL Testing, inclinometer measurements, piezometers, settlement indicating devices, SPT testing, Becker Hammer testing (BPT), electronic cone testing, etc., shall have a minimum of 2 years of experience with the specific type of instrumentation the individual will be using.*

#### **415.03 Geotechnical Investigation**

The Design-Builder shall conduct additional explorations as determined necessary by the Design-Builder at bridge foundation locations, along the alignment of planned retaining walls, at locations of significant cuts and fills, at minor structures such as culverts, signs, signals, and luminaires, and at the locations of stormwater retention-detention structures to supplement the geotechnical baseline data available. The Design-Builder shall plan and conduct a subsurface investigation program as determined necessary by the Design-Builder utilizing exploratory borings, test pits, geophysical methods, and in-situ tests to provide information relative to soil, groundwater, and other geologic conditions along the project alignment for final design. The investigation shall be in accordance with DOT&PF Design Manual Division 5, Investigation of Soils, Rock, and Surfacing Materials. All boring locations shall be surveyed, and station, offset, elevation, and state plane coordinates shall be determined and included on the boring logs.

Geotechnical requirements contained in the AASHTO Manual (Reference Section 200) on Subsurface Investigations (1988) and the Checklist and Guidelines for Review of Geotechnical Reports and Preliminary Plans and Specifications, ED-88-053, FHWA, 1988 shall be considered as minimum requirements. These are not intended to preclude innovative methods of Geotechnical investigations and testing that may be proposed by the Design-Builder. Soil properties used for design shall be determined in accordance with the DOT&PF Materials Manual and the AASHTO Standard Specifications for Transportation Materials and Methods of Sampling and Testing. Field tests shall be conducted in general accordance with appropriate American Society for Testing Materials (ASTM) and DOT&PF standards. Laboratories selected by the Design-Builder to perform geotechnical testing and analyses must meet the DOT&PF requirements in the DOT&PF Materials Manual. All test results shall be included in the Geotechnical Report.

The Design-Builder shall secure an access permit from the appropriate agency, if required, which may require the preparation of an equipment access plan, description of equipment types, a plan of the test hole locations, etc. The Design-Builder shall adhere to all traffic control requirements when taking samples on existing roadways. A traffic control plan may be required.

The Geotechnical Report shall summarize the results of the field exploration and all of the equipment used. Down hole hammers or wire line operated hammers shall not be used for

Standard Penetration Tests (SPT). Boring logs with station, offset, elevation, state plane coordinates, groundwater elevations, uncorrected SPT test results with blows per 150 mm shall be provided. For cone penetrometers, a plot showing tip resistance, friction, friction ratio, pore water pressure, and inclination with depth shall be provided. Soil units encountered in the field exploration shall be described and their extent and limits shall be identified. Soils profiles shall be developed and shown for all structures and significant cut and fill slopes. Plan views shall be prepared that show the actual locations of the borings in relation to project elements.

The Design-Builder shall provide and install field instrumentation in the exploratory borings of the project conducted by the Design-Builder to monitor water levels and slope movements during both design and construction as needed to satisfy the design and quality control requirements. Instrumentation for quality control on construction may include, but not be limited to, the monitoring of slope movement, wall movement, pore pressure, settlement, and settlement rates. The Design-Builder shall identify the recommended instrument types, locations, installation requirements, zones of influence, and critical readings or levels in the geotechnical report. All instruments shall be installed and monitored by the Design-Builder. Instrumentation readings shall be included in the geotechnical report, and included in supplemental instrumentation monitoring reports as needed for additional readings, including monitoring done during and after construction as part of the QA/QC plan.

#### **415.04 Geotechnical Studies**

The Design-Builder shall perform necessary geotechnical engineering analysis to identify critical design elements and provide a basis for geotechnical recommendations. Descriptions of the analysis and/or calculations shall be provided at DOT&PF's request. The Design-Builder shall provide comprehensive geotechnical engineering design recommendations for the project. The recommendations shall be detailed and complete for the design of structures, cut slopes, fill slopes, embankments, and drainage facilities. At a minimum the Design-Builder shall address the following:

- A. Overall stability for cut slopes, embankments, and structures shall be assessed. For structures, minimum foundation widths, embedment, overexcavation, and ground improvement shall be addressed to satisfy overall stability requirements. Maximum cut and fill slope inclinations shall be determined. Any mitigating measures needed to obtain the required level of safety for slopes shall be fully developed for the project.
- B. For structures, suitable foundation types shall be assessed and alternate foundation types recommended. For spread footings, allowable bearing capacity and settlement shall be provided. For seismic design of spread footings, ultimate bearing capacity and shear modulus values shall be determined for strain levels likely to occur in the design seismic event. For piles and shafts, ultimate capacity figures shall be developed that show the capacity in relation to tip elevation for both compression and tension. Settlement shall be assessed and group reduction factors shall be determined. Downdrag and lateral squeeze shall be reviewed. Parameters for P-y curve development shall be developed. Minimum tip elevations, casing requirements, and estimates of overdrive shall be provided.
- C. Suitable retaining wall types shall be recommended. For all walls (including standard, preapproved proprietary, and non-preapproved proprietary walls), bearing capacity, settlement, construction considerations, and external stability shall be addressed. For non-standard, non-proprietary walls, internal stability shall be addressed.
- D. Earthwork recommendations shall be provided including subgrade preparation, material requirements, compaction criteria, and settlement estimates. In areas where compressible soils are encountered, overexcavation, staged construction,

instrumentation, settlement, and creep characteristics and estimates shall be addressed as well as details of any mitigating measures needed to keep embankment performance within project constraints.

- E. Seismic hazards shall be assessed and recommendations shall be provided to mitigate the effects of the identified seismic hazards.
- F. At stream crossings, evaluation of alternatives and recommendations shall be provided for extending the existing culvert, pipe jacking a new culvert, installing a bottomless culvert, or constructing of a bridge structure. Pipe bedding, subgrade preparation, bearing capacity, and settlement shall be addressed. For pipe jacking, jacking pit construction shall be assessed along with the potential for caving soils.
- G. General drainage, groundwater, pH, and resistivity values as they apply to the project shall be provided. Drainage studies shall involve reviewing soil conditions and field data at the locations of major drainage structures. Potential impacts of drainage facilities on slope stability shall be evaluated. Recommendations shall be provided for erosion protection at outlets and for materials to be used in pond or ditch linings.
- H. For signals, illumination, and sign structures, allowable lateral bearing capacity shall be evaluated. Where poor soils are present that preclude the use of a DOT&PF standard foundation design as provided in the DOT&PF Standard Plans and the DOT&PF Design Manual, design recommendations for special foundation designs shall be prepared. Foundation designs for these types of structures shall address bearing capacity, lateral capacity, rotational capacity, settlement, and construction of the foundations.
- I. Where possible, design recommendations shall be provided in tabular or graphical form.
- J. Construction considerations shall be addressed. Temporary slopes and shoring limits shall be the responsibility of the Design-Builder. Special Provisions shall be prepared for elements that may encounter difficult ground conditions or that may require non-typical construction methods. Overexcavation recommendations and backfill requirements shall be discussed and details prepared for the project. Construction staging requirements, where applicable, shall be addressed. Wet weather construction and temporary construction water control shall be evaluated.

#### **415.05 Geotechnical Report**

The Design-Builder shall prepare a Geotechnical Report that summarizes the results of the exploration and engineering studies described above. The report shall present:

- A. A summary of field exploration methods, results, and interpretations, including boring and test pit logs, descriptions of soil conditions and water levels encountered during drilling, and soil profiles and cross-sections.
- B. A summary of laboratory testing methods and tabulated results.
- C. A summary of engineering studies, including material property assumptions, descriptions of computational methods, results of computations, and conclusions regarding design. The conclusions regarding design shall include recommendations for feasible and prudent foundations for each overcrossing foundation, for each wall location, and for each drainage facility.
- D. A summary of recommendations for earthwork factors (shrink and swell), cut and fill slope rates/stability, geologic unit locations (rock blasting, etc.), and suitability for embankment and/or aggregate.

- E. A summary of special foundation construction considerations and advisory specification requirements.
- F. Design methods for proposed or recommended foundations.
- G. Design alternatives based on Geotechnical findings.

The report shall be organized so that bridge designers and others can refer to pertinent sections. A separate bridge foundation report shall not be prepared.

The Design-Builder shall provide five (5) copies of a draft version of the Geotechnical Report to DOT&PF for review and comment. Upon receipt of written review comments from DOT&PF, the Design-Builder shall finalize the draft report. The Design-Builder shall deliver ten (10) copies of the finalized report to the Engineer.

Upon completion of the final Geotechnical report the Design-Builder may proceed with preparation of the pavement and/or foundation designs.

The Design-Builder shall include in the Special Provisions all notes related to materials found on the final construction plans and not already covered by the Standard Specifications or General Special Provisions.

Design-Builder shall not be relieved of obligations to perform the Work in accordance with the Contract Provisions by reviews, tests, inspections or approvals performed by any persons, or by any failure of any person to take such action. The reviews, inspections, tests and approvals conducted by DOT&PF and others do not constitute acceptance of the materials or Work reviewed, tested or inspected, and DOT&PF may reject or accept any Work or materials, request changes and/or identify additional Work which must be done at any time, whether or not previous reviews, inspections, tests or approvals were conducted by DOT&PF.

## **416 Pavement Design**

The pavement design and construction for mainline, collectors/distributors, auxiliary lanes shall, at a minimum, provide for a [40] year service life. The Design-Builder shall design a pavement section that provides for surface and subsurface drainage giving full consideration to frost effect and the elimination of trapped water. Pavement design and construction for ramps, frontage roads, cross streets, and local streets shall, at a minimum, be designed to provide a [20] year service life. The pavement design shall be in accordance with the AASHTO Guide for the Design of Pavement Structures, [1993] and the DOT&PF Pavement Guide– Volume 1, and for the conditions listed below.

### **416.01 Qualifications**

**[Consider placing this criteria in the RFQ and/or RFP]**

*The pavement designer shall be a qualified and licensed engineer having at least 10 years experience in pavement design.*

### **416.02 Design Criteria: General** **[The following is an example.]**

- “A. SR 500 shall be overlaid with 60 mm of Asphalt Concrete Pavement (ACP) Class A PG 64-22 (minimum) from MP 3.51 to the beginning of the new pavement section at the west end of the interchange, and shall be either overlaid, or planed and inlaid with*

45 mm of ACP Class A PG 64-22 (minimum) from the end of the new pavement section at the east end of the interchange to the SR 205 overcrossing (MP 4.73). These overlay/inlay pavement sections shall match into the adjacent pavement sections at either end with a butt joint (See the Plans Preparation Manual for a Butt Joint Planing Detail).

- B. *Thurston Way shall be overlaid so that the minimum ACP depth is 195 mm. Overlays on Thurston Way shall be with ACP Cl. A PG 64-22 (minimum), and shall be a minimum of 45 mm. Any overlay sections on Thurston Way shall match into the adjacent pavement sections at either end with a butt joint (See the Plans Preparation Manual for a Butt Joint Planing Detail). New pavement sections on Thurston Way shall be 105 mm of ACP Cl. A PG 64-22 (minimum), over 90 mm of ACP CL. A or E PG 84-22 (minimum), over 165 mm (minimum) of Crushed Surfacing Base Coarse.*
- C. *New pavement sections on the mainline and ramps shall be designed by the Design-Builder in accordance with the criteria listed in this section. The new shoulder sections on mainline shall be paved at the same depth as the lanes.*
- D. *The shoulder sections on the ramps shall have a minimum ACP depth of 90 mm. The surfacing depth for the shoulders shall be based on the total depth of the ramp lane; the pavement section depth for the ramp lane shall equal the pavement section depth of the shoulder.*
- E. *If the shoulders of the highway are utilized as temporary detour/staging routes then the Design-Builder shall construct or reconstruct them to accommodate the anticipated ESAL's to avoid incurring asphalt distress.*
- F. *The pavement sections for mainline, ramps, collectors/distributors, auxiliary lanes shall be either asphalt concrete pavement or cement concrete pavement."*

#### **416.03 Design Criteria: Asphalt Concrete Pavement**

- A. The base material shall not be cement treated base.
- B. The base material, if crushed stone, shall contain less than 7 percent passing the 0.075 millimeter (No. 200) sieve.
- C. The Design-Builder shall make adjustments to the minimum layer thicknesses to accommodate climatic conditions such as frost depth. A total minimum pavement structure of 300 millimeters (12 inches) is required to minimize the effects of freeze-thaw cycles.
- D. Pavement sections shall be designed based on a 40 year design life of 26 million ESAL's.
- E. Asphalt mix design shall be based on either Hveem or Superpave mix design procedures.

#### **416.04 Design Criteria: Portland Cement Concrete Pavement**

- A. The Design-Builder shall make adjustments to the minimum layer thicknesses to accommodate climatic conditions such as frost depth. A total minimum pavement structure of 300 millimeters (12 inches) is required to minimize the effects of freeze-thaw cycles.
- B. Concrete pavement shall not be continuously reinforced.
- C. The base material shall not be cement treated base.
- D. The base material, if crushed stone, shall contain less than 7 percent passing the 0.075 millimeter (No. 200) sieve.

- E. Pavement sections shall be designed for the following anticipated traffic loadings: Mainline: [125,000,000] ESALs [40]-year; Ramps: [4,000,000] ESALs; [40]-years.
- F. Concrete pavements shall have maximum joint spacing of [4.6] meter (15 feet) or match existing joint spacing, whichever is less.
- G. The Design-Builder shall design the concrete pavement joints with load transfer devices (i.e., dowels) to ensure a minimum of 80 percent load transfer at the joints
- H. ACI 211.1 shall be used as a guide to determine concrete mix proportions.

#### **416.05 Design Criteria: Existing PCC Pavement Rehabilitation**

- A. If grinding is used to meet the ride quality requirements in Section 1340.01, the equipment specified for grinding the cement concrete pavement shall use diamond embedded blades or grinding heads.
- B. All PCCP panels that are showing medium to high severity cracking as defined in DOT&PF's Pavement Surface Condition Rating Manual, and as discussed in the Pavement Rehabilitation Report in Appendix \$\$\$?\$\$\$, shall be replaced with new PCCP panels that match the existing panel depths. These replacement panels shall be installed using tie bars and dowel bars as shown on Standard Plan A-1.
- C. The existing PCCP shall be rehabilitated by retrofitting all transverse joints and cracks with epoxy coated dowel bars. DOT&PF has provided a 100 percent design for the dowel bar retrofit. Said retrofit shall be constructed in accordance with the Special Provisions and the Dowel Bar Plans attached in Appendix \$\$\$?\$\$\$.
- D. All existing rolled concrete gutters shall be removed and replaced with a minimum section of 150 mm ACP, over 150 mm of CSBC.
- E. All existing shoulder pavement shall be removed and replaced with a minimum of 105 mm of ACP, over the existing material.

### **420 Environmental and Other Permits**

#### **420.01 Noise**

Preliminary investigations by DOT&PF have concluded that noise impacts will result from the realignment of SR 500 and the eastbound on-ramp at Thurston Way. The SR 500, Thurston Way Noise Technical Report describes the investigation, conclusions, and a conceptual solution. The required reduction in traffic noise at the impacted residences is 10 dBA. Changes to the preliminary alignment shown in the Noise Report will affect the analysis performed by DOT&PF. Alternatives to the preliminary alignment or the noise wall concept shown will be analyzed by DOT&PF during the preparation of proposals and execution of the contract. DOT&PF will require five (5) business days to reanalyze any change to the concepts shown in the Noise Report.

#### **420.02 Permits**

It is the responsibility of the Design-Builder to determine which permits are required for construction of this project. Applications for permits for which DOT&PF is required to be the applicant shall be prepared by the Design-Builder. Draft permit applications for these permits shall be submitted to DOT&PF for review at least 14 days prior to the date the application is to be submitted. The Design-Builder shall be responsible for providing DOT&PF with all necessary information, including environmental data and technical data for the roadway cross drainage-ways (i.e. typical sections, location and approximate areas of cut and fill within each drainage way) to support the determination of need for a permit and/or the permit application. If a permit

is required from the Corps of Engineers, the plans shall be on 8-1/2" x 11" sheets. The plans for all other permits shall be on 11"x17" sheets.

DOT&PF, in coordination with the affected federal, state and local agencies and jurisdictions, will obtain the permits listed below, if required, upon receipt of acceptable draft permit applications and back-up information from the Design-Builder. The Design-Builder shall allow time in the project schedule for processing the applications, after completed applications are received by DOT&PF. Permit approvals requiring longer than the stated time will be considered a delay in accordance with Section 1-08.8.

The following permits require DOT&PF to be the applicant (the length of time required for each permit after receipt of a completed package by DOT&PF is indicated in the column on the right):

<i>Permit</i>	<i>Estimated Time To Process Application And Obtain Approval</i>
A. Hydraulic Permit Approval (HPA)	\$\$\$?\$\$\$ Months
B. Shoreline Permit	6 Months
C. Corps Permit	\$\$\$?\$\$\$ Months
D. NPDES	\$\$\$?\$\$\$ Weeks
E. Local Agency Permits	\$\$\$?\$\$\$ Weeks

Permits for which DOT&PF is not required to be the applicant shall be the responsibility of the Design-Builder.

Construction activities may not begin until the appropriate environmental permits are issued. This project will add greater than 465 square meters (5000 square feet) impervious surface and will require a Temporary Erosion and Sediment Control Plan as part of the Stormwater Site Plan. A National Pollutant Discharge Elimination System (NPDES) permit will be required if there are more than five (5) acres of clearing and grubbing.

**[Include local agency requirements as well as others that impact the project. Following is a pilot project example.]**

*The City of Vancouver will require a review of the plans to insure compliance with their Stormwater Control and Erosion Control Ordinances. The Design-Builder shall coordinate with the City of Vancouver, Stormwater Services during the design process. A letter of Approval from the City of Vancouver is required prior to construction of the proposed drainage system.*

The Design-Builder shall be responsible for incorporating any mitigation measures into the design of the project that are mentioned in the final Biological Assessment for this project, as well as in any other final environmental documents.

A delineation of the wetlands within the existing drainage facility is shown on the basemap. DOT&PF has developed a wetland mitigation site. The wetland mitigation site will accommodate the elimination of [\$\$\$?\$\$\$] acres wetlands, based on a [\$\$\$?\$\$\$] mitigation rate. DOT&PF will be submitting a Permit to the Corp of Engineers for this mitigation; this Corp Permit shall be obtained by [\$\$\$?\$\$\$]. The Design-Builder shall develop the project to minimize impacts to the wetlands. Should the Design-Builder eliminate more than [\$\$\$?\$\$\$] acres of wetlands, then the

Design-Builder shall be responsible for the additional mitigation required. Note, additional mitigation can occur at the site in the disturbed wetland area. The Design-Builder shall mitigate for the additional wetlands disturbed at a [\$\$\$?\$\$\$] rate for creation, and a [\$\$\$?\$\$\$] rate for enhancement.

A Biological Assessment (BA) has been completed, and approved by National Marine Fisheries Service (NMFS) with a requirement that it maintains the authority to review and approve the stormwater site plan. The Design-Builder shall supply a stormwater site plan to DOT&PF to obtain approval from NMFS. The Design-Builder shall allow two months in the project schedule for obtaining approval of the storm water site plan by NMFS, after completed applications are received by DOT&PF. The stormwater site plan for NMFS approval shall include the following:

1. The existing pavement area in square feet within the limits of [\$\$\$?\$\$\$]
2. The additional pavement area in square feet at the locations (see no. 1 above for locations)
3. The area in square feet to be treated at the locations (see no. 1 above for locations)
4. The location of treatment facilities, and
5. The description of treatment for each of the sub-basins

#### **420.03 Hazardous Material**

No Hazardous Material Survey has been conducted nor is anticipated to be necessary. The project is predominately contained within the existing right-of-way.

#### **425 Public Information and Public Involvement Plan**

##### **425.01 General**

DOT&PF's goal is to minimize the emotional and physical impact on highway users, businesses and neighborhoods that abut, or are serviced by, the highways that comprise this project. It will be the responsibility of the Design/Builder to provide the following services for the well-being of the affected highway users, residents, and businesses.

The Design-Builder shall provide a public information specialist responsible for managing public information and public involvement activities outlined below. This staff member shall be experienced in all aspects of providing the public with information on public works projects, including newsletter writing, design and production, direct mailing, telecommunications, news release writing and public speaking. This public information specialist will be expected to work with DOT&PF staff in a team effort to help promote public satisfaction with the project.

The public information specialist shall have "real-time" access to all project details that may be relevant to the public, public agencies, emergency service providers, businesses, and other interested groups. The public information specialist is expected to provide that "real-time" information to DOT&PF's public information staff located in the [\$\$\$?\$\$\$] Regional Office at (**Phone number**) on a weekly basis at a minimum, and more frequently if deemed necessary by DOT&PF.

Although media interviews will mainly be the responsibility of DOT&PF, on request the Design-Builder or the public information specialist may be asked to provide the media with an interview or other information on short notice. In such a case, the Design-Builder or the public information

specialist shall deliver a message consistent with DOT&PF's message. The Design-Builder or designee shall inform and coordinate this activity with DOT&PF prior to the interview.

In addition, all written audio and video materials produced by the Design-Builder's staff for public dissemination shall comply with DOT&PF's standards. A copy of all such materials shall be provided to DOT&PF for preapproval at least seven (7) calendar days prior to scheduled distribution.

The goal of written, audio or video materials should be to increase stakeholder satisfaction of the project by educating and informing the public about the project, including long-term, short-term and daily disruptions or changes to traffic conditions, project benefits, project staging when appropriate, and other relevant issues.

At least two weeks before construction activities begin, DOT&PF's public information staff will meet with the Design-Builder and public information specialist to review the following requirements.

## **425.02 Strategies and Responsibilities**

Reference to DOT&PF or the Design-Builder in the following list of tasks designates the leadership and responsibility for the task described.

### **425.02.01 Signage**

Design-Builder shall post project signs on mainline [\$\$\$?\$\$\$], affected ramps and detours.

- A. Design-Builder shall update the signs as appropriate
- B. Design-Builder shall post project information telephone number at construction site on appropriate signs

### **425.02.02 Media Contact**

DOT&PF shall write and distribute an initial news release announcing project, communicating message that emphasizes unique benefits of design/build projects

Design-Builder shall prepare newspaper articles and radio and TV announcements. The purpose of these communiqués shall be to provide the media and public with the latest information on the project scope, details and schedule of the project.

Design-Builder shall provide primary spokesperson with one backup spokesperson to answer media inquiries and explain issues associated with project.

Design-Builder shall distribute news releases on planned closures, detour routes, rechannelization plans and other relevant issues to local media. Specific details and text shall be provided by Design-Builder's public information specialist in a timely manner that provides advanced public notification and meets local broadcast and print media deadlines. The Design-Builder public information specialist should provide notice on intersection closures at least one week in advance.

### **425.02.03 Speaker's Bureau**

The Design-Builder shall have well-trained and informed speakers available for public meetings, community and civic organizations, neighborhoods associations, private businesses, and other stakeholders.

#### 425.02.04 Interaction With Businesses and Large Employers

The Design-Builder shall contact businesses [*within a one (1.0) mile radius of the project*]; [*companies that employ more than 100 persons*], and provide them with information on potential traffic disruptions and alternate transportation options in advance of closures.

The Design-Builder shall provide a contact person to answer public inquiries and commuter questions.

#### 425.02.05 Interactive

The Design-Builder shall create a project-specific design-build web page to link with DOT&PF's Home Page, content and design to be preapproved by DOT&PF. The site shall be maintained and updated by the Design-Builder.

The Design-Builder shall include information in that web page on lane and ramp closures, detour routes, rechannelization plans, and other construction-related issues relevant to the motoring public. The information shall be updated as appropriate.

The Design-Builder shall include sections for public education, benefits to design/build projects in general and this project in particular, and ongoing project status.

The Design-Builder shall include an e-mail contact on the web page to respond to public e-mail inquiries or complaints. The original e-mail inquiry and the Design-Builder's response shall be forwarded to DOT&PF Project Manager and/or designee(s) at the same time the response is sent. The Design-Builder shall respond to all e-mail inquiries within one working day of receipt.

#### 425.02.06 Telephone Hotline

The Design-Builder shall provide timely advanced closure information to DOT&PF so DOT&PF staff can include that information in its Commuter Information Line recordings.

The Design-Builder shall establish a complaint telephone hotline and post the phone number on an appropriate motorist sign at the project site. Design-Builder shall advertise this number on community flyers, the design/build web page, and other avenues of communication. Design-Builder shall respond to all complaint calls within one business day. All complaints and responses shall be logged. The log shall include the complainant's name, telephone number, nature of complaint, date received and resolution steps taken by Design-Builder. A copy of that log shall be provided to the DOT&PF Project Manager with the weekly summary listed below.

#### 425.02.07 Weekly Progress Reports

The Design-Builder shall provide weekly updates to the [\$\$\$?\$\$\$ Office, 907.XXX.XXXX], by [\$\$\$?\$\$\$] on [\$\$\$?\$\$\$]. That information should specify details of the following week's closures, detours, general project status and other information relevant to the motoring public. The [\$\$\$?\$\$\$ staff will include that information in the department's weekly [\$\$\$?\$\$\$ (*Travel Advisory/Construction Update Report*)].

The Design-Builder shall provide DOT&PF Project Manager a weekly summary of public inquiries, complaints and comments that includes general categories and trends of comments and an explanation of how Design-Builder has responded to those comments.

#### 425.02.08 Open Houses or Public Meetings

The Design-Builder shall be available, on ten (10) workdays' notice, to attend meetings or make presentations at DOT&PF's request. The purpose of these meetings shall be to inform the public of and answer questions regarding the scope, details, and anticipated schedule of the project. Such meetings and presentations may be held at any hours between 8:00 AM and 9:00 PM on any day of the week except Sundays and legal holidays. Design-Builder will be responsible, as applicable, for the preparation of graphics, hand-out materials, minutes of the meetings, audiovisual displays and similar material for such meetings. All such materials shall prominently identify DOT&PF and be pre-approved by DOT&PF staff. The Design-Builder shall work with DOT&PF to finalize the agenda for any public meetings.

Design-Builder's public information specialist will create, reproduce and distribute flyers advertising public meetings or open houses to stakeholders identified in previous sections at least two weeks in advance of such meetings. The written notices of such meetings will be pre-approved by DOT&PF staff. DOT&PF will secure the meeting locations and advertise the meetings in the local newspaper. DOT&PF will provide a meeting moderator and provide any liability insurance required.

#### 425.02.09 Company and Stakeholder Database

*[DOT&PF has established a database of businesses, community groups, neighborhood associations, local government officials, and other parties interested in the project.] [The Design-Builder shall create and maintain an accurate database of the large employers (defined in section entitled Interaction with Businesses and Large Employers).]* The Design-Builder shall update and accurately maintain the database. New entries shall include the name of the company, a key contact person, and a mailing address. The database shall have the ability to print the information in a mailing label format. The Design-Builder shall, with one workday's notice, provide this database, in mail label format or form otherwise requested, to DOT&PF staff. This database shall be used when mailing informational or educational materials about the project.

The above database shall also include appropriate stakeholders, including but not limited to, emergency service providers, school districts, local governmental jurisdictions, local legislators, open house attendees, and local offices of the Alaska Trucking Association, Alaska State Patrol and Automobile Association of America. Citizens requesting information or complaining about the project shall be given the option to be included in the database as well. If so, their names and addresses shall be immediately added to the database. DOT&PF staff may also request that names be added to the database.

## 430 Utilities

### 430.01 Known Utilities

Existing utilities within the project limits have been identified and information collected by DOT&PF from utility companies and municipalities for type, and approximate location. Utility contact information is listed in the Special Provisions Section 1-07.17. DOT&PF will provide this "as-built" utility information on the electronic basemap. DOT&PF does not guarantee the accuracy of the information provided by the Utility. Therefore, this information shall be confirmed by the Design-Builder through site investigations and be placed on the project base map by the Design-Builder.

**[The following provisions are provided here as example.]**

*“Potential utility conflicts consist of a City of Vancouver waterline and sanitary sewer line, Clark Public Utility underground powerline, NW Natural gas line, and DOT&PF irrigation lines. All utility design, utility relocation, extension, addition or betterment accomplished by the Design-Builder shall be reimbursed by the Utility, and those costs shall not be included in the lump sum contract amount for this project.*

#### ***430.01.01 City of Vancouver Sanitary Sewer Main***

*Owner: The City of Vancouver, Engineering Services Department, Sewer System Planning and Design Division*

*The Design-Builder shall perform an engineering study to evaluate the impacts of the interchange construction on the existing sanitary sewer main(s). This study may include measurement of the pipe thickness where the pipe enters manholes and potholing to determine existing bedding. An Engineer’s stamped report of such impacts based on the proposed interchange design, or a stamped declaration there are no adverse impacts; and an Engineer’s stamped design for modifying the sanitary sewer line, per City of Vancouver standards, to protect it from the interchange construction, if such protection is determined to be needed, shall be submitted to the City of Vancouver for review. The City will review and respond to the design within three (3) weeks of receipt of the stamped design.*

*The City of Vancouver, Engineering Services Department, prefers the Design-Builder perform any relocation or protection of the sanitary sewer line as required by the Design-Builder’s stamped design. The City may competitively bid the relocation or protection work, or perform the work with City forces if the proposed cost from the Design-Builder is considered to be non-competitive. If required, the City of Vancouver would require four months to relocate or modify the sanitary sewer line upon receipt and acceptance of the Design-Builder’s stamped design, as described in this section.*

#### ***430.01.02 City of Vancouver Waterline***

*Owner: The City of Vancouver, Water System Engineering Division.*

*The City of Vancouver, Water System Engineering Division prefers the Design-Builder perform the relocation of their waterline, as required by the proposed design. If relocation of the waterline is required, then relocation shall include an increase to a 20-inch waterline. The limits of this work shall extend to the State right of way line to the north and south. The City may competitively bid the relocation work, or perform the work with City forces if the proposed cost from the Design-Builder is considered to be non-competitive. If required, the City of Vancouver would require four months to relocate the waterline upon receipt of the information from the Design-Builder, as described in this section. The Design-Builder shall coordinate with the City of Vancouver to insure continuous water service to the area.*

*If it is agreed that Design-Builder will relocate the waterline as required by the project, then the Design Builder shall design the relocation for the waterline, per City of Vancouver standards. If required, the City of Vancouver would require four months to relocate the waterline upon receipt of a preliminary design of the proposed interchange from the Design-Builder. Upon review and approval by the City, the Design-Builder may proceed with the modifications to the waterline per City of Vancouver standards. The City will review and respond to the design within two weeks of receipt of the stamped design.*

#### ***430.01.03 NW Natural Gas Line***

*Owner: NW Natural*

*NW Natural will relocate their gas line as required by the design of the interchange. Prior to the gas line relocation, the Design-Builder shall stake out any proposed objects that the gas line is to avoid, such as footings. NW Natural will require two months to relocate the gas line upon receipt of the information from the Design-Builder, as described in this section.*

*The Design-Builder shall adjust the gas line valve lids to match the finished grade of the new pavement. Adjustment of the valve lids shall require valve box spacers to be installed for raising the lids. NW Natural will supply the spacers for installation by the Design-Builder during paving operations. NW Natural will require two weeks notice prior to paving for delivery of the spacers. If NW Natural fails to deliver the required materials prior to paving, then NW Natural will adjust the valve lids. The valves shall remain accessible at all times.*

#### **430.01.04 Clark Public Utility Power Line** *Owner Clark Public Utility*

*Clark Public Utility will perform any necessary relocations. Clark Public Utility will require two months to relocate the power line upon receipt of the information from the Design-Builder, as described in this section, if the relocation can occur within the existing State right-of-way. Clark Public Utility will require twelve months to relocate the power line upon receipt of the information from the Design-Builder, as described in this section, if the relocation falls outside the existing State right-of-way.”*

### **430.02 Location of Existing Utilities**

The Design-Builder shall identify potential conflicts between new roadway and bridge features (i.e., drainage and sign bridge foundations, etc.), and existing utilities. The Design-Builder shall communicate and coordinate with utility companies planned relocations on construction plans and determine and resolve utility construction conflicts and Control Zone compliance issues.

A technical memorandum, including a map, shall be developed by the Design-Builder summarizing the conflicts and the relocation arrangements with the affected utility.

All work shall be performed in accordance with DOT&PF's *Utility Manual*.

### **430.03 Utility Conflicts and Adjustments**

The Design-Builder shall determine any utility construction conflicts and/or Control Zone compliance issues, which require the utility to be relocated or adjusted, and shall advise DOT&PF. The Design-Builder shall arrange and conduct utility coordination meetings to identify and resolve of conflicts. The Design-Builder shall review relocation plans produced by utility companies to assure that utility conflicts are eliminated and that proposed utility installations conform to DOT&PF's *Utility Manual*.

### **430.04 Utility Plans**

The Design-Builder shall prepare reproducible plans showing the locations of all existing aerial and buried utility facilities and shall indicate the potential areas of conflict between the utility facilities and the roadway improvements. Vertical locations of underground utilities shall be shown on sections or details only when the actual elevation has been determined by physically exposing the utility and surveying its location.

The base map shall contain matching ground controls at intervals of no more than one hundred fifty (150) meters together with a description of the desired area for utility horizontal designation. Where elevations are necessary for the determination of conflicts, the Design-Builder shall furnish a list of the possible conflict locations and conflicting utilities. This list will be used by the

Design-Builder for identification of potholing locations to provide accurate horizontal and vertical location of the utility.

The Design-Builder shall furnish copies of the plans to each utility company that has facilities in the area, and shall also furnish copies of cross sections upon request from the utility companies or DOT&PF. The size of the plans, 1/2 size or full size, shall be as requested by the utility companies. In all cases, the plans shall be scaleable i.e., full size or true half-size. The Design-Builder shall send the plans to the utility companies, receive responses, and provide to DOT&PF copies of all correspondence to and from the utility companies.

The Design-Builder shall include planned utility relocations on the final plans.

The Design-Builder shall send a Utility Object Relocation Record (UORR), identifying above ground utility objects which must be corrected in order to meet Control Zone requirements, to any Utility with such above ground facilities and request that such Utility provide plans showing how the correction is to be done. The Design-Builder shall, upon receipt of the response from the Utility on their planned corrections, verify that the planned relocation or mitigation of the Utility's facilities complies with Control Zone requirements, and the Design-Builder shall supply copies of the UORR with the planned corrections to the DOT&PF Region Utilities Engineer for review and approval.

#### **430.05 Utility Relocations and Adjustments**

Where a utility relocation may be required:

- A. The Design-Builder shall identify possible alternatives to minimize utility conflicts.
- B. The Design-Builder shall notify DOT&PF promptly upon determination that relocation of a utility company facility is required.
- C. DOT&PF will notify the utility company to relocate conflicting utilities at the utility owner's expense.
- D. Additions, extensions, and betterment of an existing utilities facility are the financial responsibility of the utility owner. In the case of a request for addition, extension or betterment, the Design-Builder shall advise DOT&PF of utility company's request, for additions, extensions, and/or betterment and shall advise the utility company that approval of its request is subject to concurrence by DOT&PF.

Any utility design, utility relocation, extension, addition or betterment accomplished by the Design-Builder shall be reimbursed by the Utility via DOT&PF.

#### **430.06 Utility Clearance Letter**

The Design-Builder shall prepare a utility clearance letter and submit it, together with copies of correspondence from utility companies verifying the information, to DOT&PF for review and concurrence.

If there are no conflicts, the clearance letter shall state that there are no utilities in conflict with construction (i.e. when there are no utility facilities needing adjustment or when all adjustments have been completed prior to writing the clearance letter).

If adjustments are needed, the clearance letter shall list each utility company separately, showing:

- A. The name of the company

- B. The nature of required adjustment
- C. The status of Agreements and permits between Design-Builder and Utility
- D. The status of the utility adjustment
  - 1) Completed
  - 2) To be done by Design-Builder during construction
  - 3) To be done by utility company during construction, with estimated completion date or number of working days
  - 4) In progress, with estimated completion date

## **440 Roadway Design**

The Design-Builder shall design all roadway geometrics including horizontal alignment, vertical alignment, cross section elements and superelevation in accordance with the Scope of Work.

Deviations listed in the Scope of Work Section 405 shall be shown on the plan sheets under Deviation Notes as shown in the Plan Checklist.

Any significant change to the intent of the design may require right-of-way and also may require a review of the Environmental documents that have been approved for this project. If any such changes are proposed, the Design-Builder shall bear the responsibility for the cost and schedule adjustments made necessary by the change.

### **440.01 Design Criteria**

**[Two approaches to specifying design criteria are shown below as alternative approaches]**

*“The Design-Builder shall utilize the Design Criteria listed in the Draft Design File in developing the design of the project. If the Design Criteria are not achievable, the Design-Builder shall submit to DOT&PF clear documentation of what can not be achieved and a proposed alternative for review.”*

*“The Design-Builder shall utilize the Design Criteria listed below in developing the design of the project. If the Design Criteria listed below are not achievable, the Design-Builder shall submit to DOT&PF clear documentation of what cannot be achieved and a proposed alternative for review.*

- A. *Design Speed = 100 KPH for designing the mainline, and 80 KPH for the ramps,*
- B. *Design vehicle = WB -15 for the turning movements,*

*The following design requirements are based on a single point urban interchange. The minimum LOS is indicated should the Design-Builder develop another type of interchange.*

- A. *Minimum lane configurations:*
  - 1. *SR 500 Mainline; two lanes in each direction with a 6.7 meter median with one exception: The existing third lane westbound shall be maintained from the westbound off ramp at Thurston Way to the east.*
  - 2. *Auxiliary lanes east and westbound between Thurston Way and Andresen Rd. and Thurston Way and SR 205 to accommodate the weaving movement between the interchanges. The eastbound auxiliary lane shall begin at the eastbound on ramp*

- from Andresen Rd. and shall end at the eastbound off ramp to Thurston Way. The eastbound auxiliary lane shall begin again at the eastbound on ramp from Thurston Way and shall end at the eastbound off ramp to southbound SR 205. The westbound auxiliary lane shall begin at the westbound on ramp from Thurston Way and shall end at the westbound off ramp to Andresen Rd. The existing third westbound lane, east of Thurston Way shall end at the Thurston Way westbound off ramp.*
- 3. Eastbound off ramp to Thurston Way shall be a two lane off ramp tapering into three lanes, two left turn lanes and a right turn lane. The channelization for the off ramp shall be developed to accommodate the maximum queue length described below.*
  - 4. Westbound off ramp to Thurston Way shall be a two lane off ramp tapering into three lanes, two left turn lanes and a right turn lane. The channelization for the off ramp shall be developed to accommodate the maximum queue length described below.*
  - 5. Eastbound on ramp from Thurston Way shall require two lanes at the intersection of Thurston Way for the southbound left turn movement. The northbound right turn movement shall be a merge. The right lane for the left turn movements shall extend 150 meters east of the radius return, and then taper from two lanes to one lane. The taper rate shall be 35 to 1 to allow for increased weaving distance between the proposed Thurston Way Interchange and the existing SR 205 Interchange, and to reduce the impacts to the existing berm east of the intersection.*
  - 6. Westbound on ramp from Thurston Way shall require two lanes at the intersection of Thurston Way, one for the left turn movement with one for the right turn movement. The two lanes shall extend 90 meters from the radius return, prior to tapering to one lane.*
  - 7. Thurston Way: The existing lane configuration shall remain on Thurston Way with three exceptions; the northbound right turn lane to the eastbound on ramp shall be extended back to within 20 meters of the Vancouver Plaza Drive Intersection, one of the northbound left turn lanes shall be eliminated, and a 1.5 meter bicycle path shall be created on either side of Thurston Way within the limits of the project*
- B. Maximum queue lengths based on 2019 DDHV, a 75-25 split for the southbound left turn movement, and 130 second cycle:*
- 1. Eastbound off ramp, left turn lanes = 100 meters (2 lanes)*
  - 2. Westbound off ramp, left turn lanes = 110 meters (2 lanes)*
  - 3. Northbound left turn lane = 80 meters (2 lanes)*
  - 4. Northbound through lanes = 100 meters (2 lanes)*
  - 5. Southbound left turn lanes = 160 meters (2 lanes)*
  - 6. Southbound through lanes = 70 meters (2 lanes)*

*The northbound and southbound left turn lane lengths shall be modified to fit the existing conditions, accommodating the left turn lane lengths for the signals to the north and south. Any revisions to the left turn lane lengths for the adjacent intersections shall be coordinated with the City of Vancouver.*

*Note, under the existing conditions, the maximum attainable lane length is approximately 40 meters. Under the existing conditions, the maximum attainable lane length is approximately 90 meters.*

*The minimum level of service (LOS) for the signalized intersection at Thurston Way shall be LOS D for the design year.*

- C. *The weaving length between the interchanges shall be as follows:*

<i>Weaving Section</i>	<i>Length</i>
<i>Eastbound between Andresen Rd. and Thurston Way</i>	<i>640 meters*</i>
<i>Eastbound between Thurston Way and SR 205, southbound on ramp</i>	<i>550 meters</i>
<i>Westbound between SR 205, southbound off ramp, and Thurston Way</i>	<i>640 meters</i>
<i>Westbound between Thurston Way and Andresen Rd.</i>	<i>500 meters*</i>
<i>*Distances require the realignment of the eastbound on ramp from Andresen Rd. and the westbound off ramp to Andresen Rd.</i>	

*The required weaving length shall be based on the detail on page 940-24 of the Design Manual, which shows the beginning and ending points of the weaving section.*

*The weaving lengths are based on obtaining a minimum of LOS B for the weaving movements westbound between Thurston Way and Andresen Rd. and a minimum LOS D for the other weaving movements. Alternate designs shall meet this same LOS.*

- D. *Raised traffic islands shall be constructed between the right turn and left turn lanes in all four corners of the interchange. The raised traffic islands shall be either concrete brick or imprinted sidewalk by Bomenite.*
- E. *A 2.4 meter sidewalk along with cast-in-place curb and gutter shall be designed and constructed on both sides of Thurston Way, and shall match into the existing sidewalk to the north and south of the interchange. The sidewalk shall be either concrete brick or imprinted sidewalk by Bomenite that matches the same color, texture and pattern of the Andresen Rd. interchange. This material shall be placed in the areas, consistent with those areas at the Andresen rd. Interchange.*
- F. *The existing bicycle/pedestrian facility on the south side of SR 500 between Andresen Rd. and Thurston Way shall be retained and be reconnected into the sidewalk on Thurston Way as required to accommodate the interchange. Concrete median barrier shall be installed between the eastbound off ramp to Thurston Way and the existing bicycle/pedestrian facility for a distance of 150 meters from the sidewalk on Thurston Way.”*

## **440.02 Design and Plan Preparation**

### *440.02.01 Index and Vicinity Map*

The Design-Builder shall prepare an index listing of plan sheet titles as they appear on the plan sheets and in accordance with the Preconstruction Manual. The Design-Builder shall also prepare a vicinity map showing the Project limits in accordance with the PPM. The plan shall include without limitation mileposts of the project, beginning of and ending of construction, equations and exceptions, distance in miles to nearest cities or towns, location of railroads, waterways and underpassing roadways.

### *440.02.02 Roadway Sections*

The Design-Builder shall prepare the roadway section plans in accordance with the DOT&PF Preconstruction Manual. Roadway sections shall provide the geometric

information on the roadway cross section to be constructed.

#### ***440.02.03 Site Preparation Plans***

The Design-Builder shall prepare the site preparation plans in accordance with the Preconstruction Manual. The site preparation plans shall be used to depict removal and demolition and other such related items that cannot be clearly addressed on other required plan sheets.

#### ***440.02.04 Alignment and Right-of-Way Plans***

The Design-Builder shall prepare the alignment and right-of-way plans in accordance with the Preconstruction Manual. The Design-Builder shall develop the alignment data and display the information in the alignment tables, showing the curve data and coordinates necessary to construct the Project. The Design-Builder shall calculate the alignments for incorporation into the alignment plans. The alignment and right-of-way plans shall show existing and proposed alignments, existing right-of-way with stationing and distance ties, construction permits and easements, proposed fencing, monumentation, and other applicable items as described in the Preconstruction Manual.

#### ***440.02.05 Profiles***

The Design-Builder shall prepare mainline, ramp and other roadway profile sheets in accordance with the PPM as necessary. The Design-Builder shall calculate the profiles and super-elevation diagrams to be incorporated into the profile sheets. The profiles shall show existing and proposed profile alignment data along with proposed superelevation diagrams, embankment quantities, excavation quantities, roadway section references, clearing and grubbing quantities, and other applicable items as described in the Preconstruction Manual.

#### ***440.02.06 Paving and Grading Plans***

The Design-Builder shall prepare the paving plans, grading plans, and details in accordance with the roadway sections Preconstruction Manual and other DOT&PF provided information. The paving plans shall include, without limitation, paving limits, grinding locations, (roadway section item, barrier type and location, guard rail type and location, guard rail anchor type and location, ramp gore and intersection grading, interchange contour grading, and other applicable items). The Design-Builder shall prepare quantity takeoffs, tabulations, and backup calculations in accordance with the PPM to support the Schedule of Values and quantity needs of the QC/QA Plan, see Section 1140 of the Scope of Work.

The Design-Builder shall prepare roadway Construction Documents on DOT&PF standard sheets for the roadway improvements.

Design-Builder shall provide cross sections for review when requested. Horizontal and vertical scales shall be the same. Each cross section shall show the plotted roadway template superimposed on the plotted natural terrain. Cross sections shall normally be prepared at 20 meter intervals, as a minimum, with additional sections at breaks in the terrain unless otherwise directed by the DOT&PF Project Manager. (Cross sections shall be included in all submittals to utility companies).

All designs shall conform to the latest Americans with Disabilities Act Accessibility Guidelines Title I and II.

#### ***440.02.07 Intersection Plan for Approval***

The Design-Builder shall prepare and furnish Intersection Plans for Approval in accordance

with the Preconstruction Manual.

#### 440.02.08 Interchange Plan for Approval

The Design-Builder shall prepare and furnish an Interchange Plans for Approval in accordance with our standard practices for developing this plan.

#### 440.02.9 Clear Zone Inventory

The Design-Builder shall develop and furnish a Clear Zone Inventory, according to the Preconstruction Manual based on the design of the interchange. All objects within the clear zone shall be addressed.

### 440.03 Quantities

The Design-Builder shall prepare quantity takeoffs, tabulations, and backup calculations in accordance with the Preconstruction Manual to support items listed in the Schedule of Values and quantity needs of the QC/QA Plan.

## 445 Bridge and Structures Design

This section covers the design of permanent bridges, retaining walls, noise walls, barriers, drainage structures, sign structures and other structures in the project.

The Design-Builder shall perform structural analyses and design of the bridges, retaining walls, noise walls, and other structures included in the Project, following applicable regulations, codes, and professional practices, and prepare plans, specifications and estimates in accordance with the Geotechnical Report, the Bridge Design Manual, the AASHTO 16th. Edition, and applicable DOT&PF and AASHTO design and construction specifications.

Prior to preparation of final design and construction documents, the Design-Builder shall submit preliminary plans for the bridge and walls. The preliminary plans shall be prepared in accordance with the Bridge Design Manual.

### 445.01 Design Criteria

Bridge shall be designed and constructed using the following criteria:

- A. The bridge shall be designed using an AASHTO [HS 25] design truck or two [24 Kip axles at 4 foot] centers.
- B. Bridge barrier and railings shall be selected and designed according to DOT&PF Bridge Group memo; "A General Guideline for Selection of Bridge Railings", dated May 7, 1998.
- C. Longitudinal expansion joints shall not be used.
- D. Bridge expansion bearings shall be designed to provide for maintenance accessibility and future removal and replacement.
- E. The superstructure shall not be designed to be fracture critical.
- F. The bridge roadway deck shall be cast in place concrete.
- G. Abutment walls shall be cast-in-place concrete with a fractured fin form-liner incorporated with a design pattern. The design pattern shall be furnished by DOT&PF.
- H. For a multispan bridge the superstructure shall be box girders.
- I. Pigmented sealer for concrete shall match the color Gray Revised.

- J. Slope protection shall be consistent with aesthetic treatments within the corridor and conform to details contained in DOT&PF Standard Plan drawings.

#### **445.02 Aesthetics**

The structures shall have clean lines and form, compatibility with adjacent structures in the corridor, and an attractive pleasing finish, shape and texture of concrete.

#### **445.03 Approach Slabs**

An approach slab shall be provided at the end of each bridge, and shall be the same width as the bridge deck.

#### **445.04 Sign Structures**

The need for overhead signs and sign support structures shall be carefully considered. Existing sign support structures may be used for new signs or replacement signs where practical. However the integrity of existing sign support structures must be verified with the HQ. Sign structures shall be designed and constructed in accordance AASHTO Standard Specifications for Structural Supports for Highway Signs, Luminaires, and Traffic Signals, dated 1994. Monotube type structures shall be used for new sign bridges and cantilevers. DOT&PF Standard Sign Structures are acceptable.

Only cast-in-place retaining walls may be used to support signs and lighting. All other wall types must isolate the loads from signs and lighting.

The bottom of the signs that are mounted on bridges shall be at least 75 mm above the bottom of the bridge superstructure. Details of bridge mounted signs shall be included with the bridge drawings. Drilling into prestressed concrete will not be permitted; use concrete inserts or embedded bolts.

#### **445.05 Retaining Walls**

The following criteria shall apply to permanent wall structures. The Design-Builder will have sole responsibility for the type, material, performance, and safety of temporary retaining structures, subject to accepted engineering practice.

Retaining wall layout shall address slope maintenance above and below the wall and provide returns into the retained fill or cut at retaining wall ends where possible. Final tolerances shall be 12mm in 3 meters for level and plumb. Design and construction shall consider surface and subsurface drainage. A system shall be provided to intercept or prevent surface water from entering behind walls. A fence or pedestrian railing shall be provided at the top of walls over 1.3 meters high where access is open to the public or where there is a need for maintenance access.

#### **445-06 Calculations**

Calculations shall be bound and numbered with a table of contents. Reference computer programs in the calculations. Computer documentation shall include: name of program, vendor, version and release date.

#### **450 Drainage Design**

The Design-Builder shall provide a well-drained corridor and a safe environment for the individuals who use and maintain the highway. The design and construction of all drainage structures and appurtenances shall adequately address functionality, durability, ease of maintenance, maintenance access, safety, aesthetics and protection against vandalism according to the contract specifications and standards. In fulfilling the requirements for drainage,

the Design-Builder shall abide by and fulfill the requirements related to drainage features or systems while at the same time meeting the requirements of other required design elements on the project.

#### **450.01 Hydrology**

The Design-Builder shall conduct hydrologic and hydraulic analysis and/or obtain available public information to identify flood plains and probable flood plain impacts. The Design-Builder shall determine existing and developed conditions, discharges for all pertinent drainage systems, and existing flow patterns; assess possible drainage problems, identify possible solutions, and propose tentative hydraulic improvements.

The drainage system shall be designed in accordance with Chapter 1 of the DOT&PF Hydraulics Manual. The Design-Builder shall design the drainage facility utilizing the more restrictive criteria among the DOT&PF Hydraulics Manual and the DOT&PF Preconstruction Manual.

The Design-Builder shall perform the drainage design for all drainage features on the project. All design work shall be documented in a Hydraulics Report including the size and location of drainage and stormwater treatment structures.

#### **450.02 Hydraulic Report**

The Design-Builder shall be responsible for preparing the Draft and Final Hydraulics Report. The Hydraulics Report shall contain detailed calculations as well as rationale for selecting all drainage system. The Hydraulics Report shall be stamped by a professional engineer registered in the State of Alaska and shall transmit three (3) copies of the Report to the Engineer prior to preparing the drainage plans.

#### **450.03 Drainage Designs**

The Design-Builder shall prepare drainage plans, profiles, details, and structure notes in accordance with the Hydraulics Manual, the Preconstruction Manual. The facilities shall be designed to effectively drain the Project. The Design-Builder shall prepare plans and details for stormwater detention/treatment facilities for runoff from within the Project limits in accordance with Instructional Letter 4020.00 (IL-4020.00) titled "Endangered Species Act (ESA) §7(d) Project List And Stormwater Effects Guidance" and the Hydraulics Manual. The Design-Builder shall prepare structure note sheets and backup calculations for these sheets in accordance with the Preconstruction Manual.

Pipe sizes, lengths and other summary data shall be provided on the DOT&PF standard new pipe summary sheet. Drainage plan and profile drawings shall be developed which cover the entire project limits. Additional drawings shall be provided to document drainage details that are not defined in the DOT&PF Standard Plans. All drainage design drawings shall conform to DOT&PF PPM.

Design reviews shall be in accordance with the QC/QA Plan Requirements. The final design submittal shall include the location of catch basins, manholes, and profiles or details showing all invert elevations, proposed finished grade elevations above the top of pipe.

The Design-Builder shall prepare design and construction documents for drainage features including, but not limited to:

- A. Drainage culverts and underpass structures
- B. Catch basins, manholes and connector pipes

- C. Drainage Pipe and Concrete Box Culvert Summary Sheets
- D. Drainage details
- E. Drainage culvert profiles
- F. Biofiltration Swales
- G. Retention/Detention Basins/Wet ponds

#### *450.03.1 Bridge Deck Drainage*

Runoff from bridge decks shall be carried off the bridge and into the adjacent roadway drainage system.

#### *450.03.2 Bridge Approach Drains*

The design shall intercept gutter flow at both ends of bridges. Stormwater flowing toward the bridge shall be intercepted prior to the approach slab. The inlets and catch basins shall conform to requirements of this Scope of Work.

#### *450.03.3 Storm Drain Systems*

Runoff falling within the limits of the project, storm water draining into the project site, and additional drainage identified in the drainage documents for inclusion with the project shall be collected and conveyed to an existing storm drain system, or an on-site system.

Any connector pipes requiring lengthening shall be extended in kind by the Design-Builder. Shallow connector pipe installations shall be encased with a lean concrete backfill per the DOT&PF Standard Specifications.

#### *450.03.4 Inlets, Catch Basins and Pipes*

Any inlet, or pipe that will not become part of the final drainage system can be removed or abandoned in place. Any such abandonment shall be done in accordance with Section 2-02 of the Standard Specifications with the following addition: Any void that may remain as a result of abandoning a drainage feature shall be filled with lean concrete or an equivalent material to guarantee that no settlement will occur as a result of the void. Catch basins that will not become part of the final drainage system shall be removed.

#### *450.03.5 Connections to Existing Systems*

The Design-Builder shall develop plans and specifications for connections with existing storm drain systems. These details shall be reviewed prior to making any connections. The existing drainage pattern shall not be impeded in any way that would impact the safety of the traveling public during the construction of the project.

#### *450.03.6 Pipe*

Pipe alternates shall be in accordance with the DOT&PF Hydraulics Manual.

## **455 Roadside Restoration Design**

The Design-Builder shall design and construct roadside restoration for restoring roadside impacts in accordance with the special provisions. The Design-builder shall install an irrigation system in accordance with the special provisions.

## 460 Traffic Engineering Design

### 460.01 Roadway Illumination

This section covers the illumination of the route mainline and all entrance and exit ramps, intersections and crossroads for the entire project. The Design-Builder shall submit to DOT&PF a preliminary set of illumination plans showing existing illumination, existing electrical hardware locations, proposed locations for the new luminaires, underdeck illumination and sign lighting, wiring diagrams, and electrical hardware.

#### *460.01.01 Design Criteria*

The design shall be based on the following criteria:

- A. Illumination shall be furnished and installed per all State and local codes, and per DOT&PF Design Manual standards, DOT&PF Traffic Manual, and Standard Specifications.
- B. Illumination shall be shielded where there are adjacent business or residential concerns. The required illumination density for mainline, ramps, intersections, gore areas and below the structure shall be per DOT&PF Standards.
- C. Temporary illumination shall be furnished and installed per current DOT&PF Design Standards and Standard specifications.
- D. The designer shall comply with DOT&PF's current illumination policy and provide a complete set of roadway illumination Construction Documents including, but not limited to:
  - 1) Complete freeway illumination including mainline, entrance and exit gore areas, ramps, and crossroads.
  - 2) Sign Lighting.
- E. Existing electrical services shall be upgraded, as needed, for new illumination. If a new or upgraded existing electrical service is needed, the Design-Builder shall coordinate with DOT&PF and submit the necessary design information for the new or upgraded electrical service to the Engineer. DOT&PF will obtain any Service Agreements from the electrical company. The time required for DOT&PF to obtain the service agreement once the Design-Builder submits the required information will be 21 calendar days.
- F. The Design-Builder shall design and construct the illumination system with consideration to future maintenance. The illumination system shall be designed to minimize lane closures required for maintenance.

#### 460.01.2 Illumination Design

The Design-Builder shall prepare preliminary plans for the illumination. The plans shall be drawn to DOT&PF standards. The plans shall include the following minimum information:

- A. Luminaire pole locations.
- B. Load center locations.
- C. Power source.
- D. Conductor schedule.
- E. Voltage drop calculations.
- F. Breaker Schedule

### G. Luminaire Schedule

### H. Photometric Data

All existing above and below ground utilities are also to be included in the preliminary illumination plan.

In addition, lighting calculations utilizing AGI Lighting Design Software available from Lighting Analysts, Inc. Littleton, Colorado 303.972.8851 shall be submitted in hard copy and computer disc.

DOT&PF Electrical Design shall review the preliminary design before the Design-Builder may commence final design in accordance with Section 1060.

#### *460.01.03 Construction*

The Design-Builder shall submit as-built plans, product manuals and shop drawings for the illumination system after construction is complete. Final acceptance will not be granted until this material is submitted.

## **460.02 Signing and Delineation Plans**

The Design-Builder shall take a sign inventory, using the DOT&PF approved sign inventory sheet, to aid in preparing signing plans, signing specifications, and signing details for this project (including sign legend layouts, overhead sign structure details, and sign light power supply details). The signing plans, specifications, and details shall be prepared using the DOT&PF Traffic Manual M51-02, DM, MUTCD, DOT&PF Sign Fabrication Manual M55-05 and the Preconstruction Manual. The Design-Builder shall submit to DOT&PF preliminary sets of signing plans and signing specifications showing existing signing, signs to be removed or relocated, and proposed locations for new signing.

The Design-Builder shall design, furnish and install all signing on the project to provide guidance ensuring the safe and efficient movement of traffic. In addition, the Design-Builder shall design, furnish and install new replacement signs as part of a sign rehabilitation effort on this corridor.

The Design-Builder shall prepare designs for signing that are consistent with current signing practice and in conformance with the Manual on Uniform traffic control Devices (MUTCD), the Traffic Engineering Design Manual, the Manual of Approved Signs (MOAS), and Traffic Group's Sign Sheeting Guidelines.

Non-standard signs shall be detailed on the project plans following the layouts given in the above referenced documents.

#### *460.02.01 Design Criteria*

- A. Stop bars, cross walk stripes, 8-inch gore stripes, and traffic arrows shall be plastic. Raised pavement markers shall be utilized per our Standard Plans for the delineation of the mainline auxiliary lanes, the ramps and Thurston Way. Paint stripe for the mainline centerline skip stripe shall be installed per the Special Provision, Metric Methylmethacrylate.
- B. Construction Signing shall be per Part VI of the Manual on Uniform Traffic Control Devices (MUTCD), Alaska State Modifications to the MUTCD and the guidelines found within the DOT&PF Traffic Manual. Work Zone Traffic Control Plans shall be submitted and approved by the DOT&PF Project Manager prior to implementation.
- C. Overhead sign structures shall match the existing corridor sign structures.

#### ***460.02.2 Signing***

The Design-Builder shall take a sign inventory using the approved signing inventory form provided by DOT&PF. The Design-Builder shall develop a signing plan for the corridor which includes all necessary signs for the mainline, frontage road, ramps and interchanges including but not limited to guide, regulatory, warning and MIS signs. This plan shall also include signing for areas outside of the project limits that will be affected by the construction.

#### ***460.02.3 Sign Mounting***

Minimum sign clearance for overhead signs shall be a minimum of 5.35 meter over the entire width of pavement including gutters, as measured from the bottom of the sign to the roadway surface.

#### ***460.02.4 Sign Layout***

Guide signs layouts shall be done in accordance with the Freeway Signing Guide section of the DOT&PF Sign Design Manual.

#### ***460.02.5 Design***

The design shall include a signing plan and sign specification sheets giving the location of the sign, the size of the sign, the legend of the sign, and the mounting type. In addition signing details plan sheets shall be developed for all signs that are not included in DOT&PF's manual of approved signs. For overhead signs, sign elevation sheets showing the sign position in relation to the travel lanes and the position of the sign lighting fixtures in relation to the sign panel shall be provided.

Prior to fabrication of any sign elements, a guide sign concept plan with proposed formats shall be submitted to DOT&PF for review. In addition, any modifications made to "R" and "W" series signs shall be submitted to the State Traffic Engineer for approval. This process should take one to two weeks. The remainder of the Design-Builder's design will be reviewed in accordance with Section 1130.02.

#### ***460.02.6 Construction***

Positive guidance by the use of existing, interim and new signing shall be provided for the traveling public at all times during construction to ensure safe and informed operation while traffic is maintained on the roadway. The traffic control plan submitted by the Design-Builder shall address the use of interim signing and pavement markings during the transition from existing to new signing.

### **460.03 Intersection Signalization**

The Design-Builder shall prepare Construction Documents for installation of traffic signals.

The Design-Builder shall design the intersection and traffic signals to optimize vehicle levels of service, minimize delay, and accommodate pedestrians, as necessary. The signal shall be constructed within existing right-of-way limits. The design of the signals shall be performed in conjunction with the roadway geometric design to minimize the stop bar separation on the single point urban interchange.

Traffic signal designs shall include the means to optimize the complex traffic flow issues at the interchange areas. For example, such designs may include traffic responsive operation, and the use of queue detection on the freeway exit ramps and cross roads. All preformed loop detection shall be placed in new pavement per the technical specifications.

The Design-Builder shall upgrade existing electrical services, as needed, for the new signals. If a new or upgraded existing electrical service is needed, the Design-Builder shall coordinate with DOT&PF and submit the necessary design information for the new or upgraded electrical service to the Engineer. DOT&PF will obtain any Service Agreements from the electrical company. The time required for DOT&PF to obtain the service agreement once the Design-Builder submits the required information will be 21 calendar days.

#### *460.03.01 Design Criteria*

Traffic signals shall be designed using the following criteria:

- A. Signals shall be furnished and installed per current DOT&PF Design Standards and Standard specifications.
- B. Temporary signals shall be furnished and installed per current DOT&PF Design Standards and Standard specifications.
- C. The Design-Builder shall furnish and install all signal equipment. ALL signal equipment shall be new and conform to DOT&PF standards and specifications. The Design-Builder shall only use DOT&PF pre approved signal poles. No special pole designs shall be used for this project. Light Emitting Diodes (LED's) shall be utilized for all vehicle/pedestrian heads except under the structure. The signal heads under the structure shall be programmable.
- D. The Design Builder shall furnish and install a battery backup or Uninterruptible Power System (UPS) that shall power the traffic signals in the event of normal power failure.
  - 1) The Traffic UPS shall be capable of producing - simultaneously - fully regenerated, conditioned and true sine wave, standby and continuous AC outputs.
  - 2) Suggested operating mode for respective outputs during power failure: Continuous output provided for signal controllers and modems; Standby output provided for signals in flash mode operation (optional delay timer available for short-term battery run under full cycling operation).
  - 3) Up to the maximum rating, the Traffic UPS shall be capable of running any combination of signal heads, whether Incandescent, LED or Neon, by any manufacturer, regardless of power factor, without overdriving the poorer power factor LED heads which may cause early degradation, low luminosity or early signal failure.
  - 4) Upon loss of utility power the Traffic UPS shall insert battery power into the system via a supplied Power Interface Module (PIM). In case of UPS failure and/or battery depletion, the PIM will ensure that the UPS will drop out and, upon return of utility power, the traffic control system will default to normal operating mode.
  - 5) The Power Interface Module shall enable removal and replacement of the Traffic UPS without shutting down the traffic control system (i.e. "hot swap" capability). Connectors shall be equipped with a "safety interlock" feature.
  - 6) For 170 or "California" style cabinets, upon loss of power the Traffic UPS shall actuate the existing Flash Transfer Relays (FTRs) and Mercury Contactor (MC) to force the traffic control system into Flash Mode operation.
  - 7) Existing Flasher Modules and Flash Transfer Relays shall be utilized.
  - 8) To facilitate emergency crews and police activities, the Traffic UPS shall be compatible with police panel functions (i.e. "Signals OFF" switch must kill power to the field wiring even when on UPS/Battery power).

- 9) The Traffic UPS shall not duplicate or take over flash operation or flash transfer relay functions.
- 10) The Traffic UPS shall be capable of providing continuous, fully conditioned, regulated, sinusoidal (AC) power to selected devices such as signal controllers, modems, communications hubs, NTCIP adapters and video equipment.

#### *460.03.02 Design*

The Design-Builder shall prepare preliminary design plans for the traffic signals. The plans shall be drawn to DOT&PF Standards. The plans shall include the following minimum information:

- A. Lane geometry, striping and queue lengths.
- B. Signal pole locations.
- C. Signal head locations.
- D. Types of signal faces (F, R, etc.).
- E. Controller location.
- F. Power source.
- G. Type and location of detection.
- H. Pole and conductor schedule.

The Design-Builder shall submit the preliminary design for review as outlined in Section 1065 prior to purchasing equipment.

The 100 percent Design shall contain full plans as required to construct and operate the signalized intersections. This shall include all requirements for the efficient operation of the traffic signal.

#### *460.03.03 Construction*

The Design-Builder shall conduct burn-in and testing of all traffic signal hardware and assure its functionality prior to field installation.

The Design-Builder shall notify DOT&PF fourteen (14) calendar days prior to scheduled start of operation of any traffic signal. The Design-Builder shall inspect the traffic signal installation. The start of operation of the traffic signal does not constitute final acceptance of the traffic signal installation. Final acceptance will be made after satisfactory field inspection by DOT&PF and receipt of as-built documentation.

## **470 Work Zone Traffic Control**

The Design-Builder shall prepare construction staging plans, Phasing and Construction Sequence Reports, and coordinate Work Zone Traffic Control Meetings. The Phasing and Construction Sequence report shall address items such as construction stage limits, earthwork volumes, construction sequencing, and traffic control.

### **470.01 Construction Staging and Traffic Control Plans**

The Design-Builder shall prepare construction staging plans, detour plans, site specific traffic control plans, typical plans, and details in accordance with the Preconstruction Manual, Traffic Manual, MUTCD, and other DOT&PF provided information. Construction staging shall be

developed, along with detour and signing plans. Construction signing and temporary illumination systems shall be shown on site specific traffic control plans.

Traffic control plans shall be approved by an engineer licensed in the State of Alaska with traffic expertise, prior to actual construction that will affect traffic. The Design-Builder shall submit a preliminary set of traffic control plans to the Project Manager for review and comment 10 business days prior to implementation. Traffic control plans for local agency roadways shall be approved by the local agency prior to submittal to the Project Manager for review and comment.

#### **470.02 Detour Plans**

The Design-Builder shall prepare any detour plans required for detouring mainline traffic onto local roadways. It shall be the Design-Builder's responsibility to obtain detour agreements from local agencies for use of local roadways for mainline traffic detours. All detours shall be on paved roadways.

#### **470.03 Work Zone Traffic Control Meeting**

The Design-Builder shall schedule a Work Zone Traffic Control (WZTC) Meeting per the Design Manual. At a minimum, the following personnel shall be invited to the Work Zone Traffic Control Meeting:

1. Local Agency Transportation Engineer,
2. Emergency Services,
3. Local Law Enforcement,
4. DOT&PF's Regional Traffic Engineer,
5. DOT&PF's Area Maintenance Superintendent, and
6. DOT&PF's Project Manager.

The personnel invited to the WZTC Meeting shall be notified two weeks in advance of the Meeting. Issues raised in the WZTC Meeting shall be addressed by the Design Builder.

#### **475 Right-Of-Way**

The Design Builder shall verify right-of-way boundaries prior to utilization of right-of-way areas outside of existing fenceline. Areas that are not fenced shall be verified as right-of-way if work is to be done outside of the existing roadway prism.

If additional right-of-way is requested by the Design-Builder as a value added element of the project, DOT&PF will review a request, prepared in accordance with General Requirement subsection 1-04.4. The cost of additional value added right-of-way shall be borne by the Design-Builder. Schedule impacts shall also be borne by the Design-Builder unless DOT&PF determines that it is in the best interests of the public to change the contract terms.

#### **475.01 Right-of-Way Requirements Determination**

The Design-Builder shall determine the requirements for new right-of-way rights. Right-of-way rights can include, but are not limited to, new roadway, access rights, slope or temporary construction easements, waste sites, borrow pits, and haul roads.

The Design-Builder shall submit to DOT&PF, in writing, the preliminary right-of-way requirements. The new right-of-way requirements shall be submitted in triplicate to DOT&PF for review and shall include the following:

- A. A letter indicating the project name, contract number, project location, originator of report

(Firm's Name), submittal date and submittal type.

- B. A plan of sufficient scale and detail to show the existing and proposed roadway right-of-way and proposed easements.
- C. Type of acquisition required including estimates of the final right-of-way with enough definition to identify all ownership's that will be affected. The preliminary requirements should be large enough to cover all possible right-of-way needs.

#### **475.02 Right-of-Way Acquisition**

If new right-of-way is required or determined to be acceptable for the project, DOT&PF will acquire all necessary rights for right-of-way and easements. Based on the requirements provided by the Design-Builder, DOT&PF will:

- A. Approve final right-of-way plans and associated documents prepared by the Design-Builder necessary for right-of-way acquisition
- B. Acquire necessary right-of-way including easements, material sites and waste sites.
- C. Obtain the necessary authority to proceed with the various phases of property acquisition.
- D. Prepare the necessary data for project clearance letters.

After revised Right of Way Plans have been approved by DOT&PF, DOT&PF will require five (5) months to acquire additional right-of-way that does not require relocation, or litigation, and nine (9) months to acquire right-of-way that does require relocation, or litigation.

Right-of-way Plan approval by DOT&PF will take six (6) weeks after receipt of a completed revised Right of Way Plan from the Design-Builder.

#### **475.03 Temporary Right of Entry Documents**

A temporary right of entry document for entry to each parcel for any or all of the following activities is required to be obtained by the Design-Builder: Geotechnical investigations, design or construction survey work, and any construction activities. The Design-Builder shall notify DOT&PF of the need for any temporary right of entry documents no later than thirty (30) days after the notice to proceed. The Design-Builder may not enter any such property prior to the property owner signing the right of entry document

#### **480 Construction Specifications**

The DOT&PF Standard Specifications for Highway Construction, 2004, including DOT&PF Amendments and General Special Provisions (Divisions 2 through 9) and Bridge Special Provisions, shall be used by the Design-Builder as a minimum requirement for materials and construction requirements modified as necessary by the Design-Builder to address project specific needs. The Design-Builder shall prepare the construction specifications for Materials and Construction items and procedures not adequately covered by DOT&PF's Standard Specifications, Bridge Special Provisions (BSP) and General Special Provisions (GSP) library, maintaining or improving the level of quality represented therein. Measurement and payment provisions of the GSPs or BSPs will be per these Contract Provisions. All references to the roles of the parties described in the Standard Specifications and GSPs and BSPs are understood to be as described in the Contract Provisions. Final construction specifications shall be prepared by (or under the direction of) a Professional Engineer registered in the State of Alaska. DOT&PF will review and provide over-the-shoulder comments on all submittals of construction specifications.

## SECTION 1000 -- CONTRACT ADMINISTRATION

The work in this contract shall be administered in accordance with this section of the Scope of Work.

### 1010 Alaska Department of Transportation

DOT&PF's Project Manager shall:

- A. Conduct ongoing reviews of the Design-Builder's progress in performing the work and ensure timely comments from the technical units.
- B. Review the Design-Builder's billings
- C. Review and evaluate the Design-Builder's requests for extension of time and supplemental agreements
- D. Review all correspondence with public agencies prior to the Design-Builder's mailing of any correspondence.
- E. Coordinate/monitor the distribution of public information
- F. Provide a focal-point contact for all questions, requests, and submittals
- G. Coordinate project scheduling between the Design-Builder and DOT&PF, coordinate DOT&PF oversight of QA/QC activities, and coordinate documentation reviews by DOT&PF.
- H. Other duties as agreed upon by the Design-Builder and DOT&PF

### 1020 Design-Builder

The Design-Builder shall:

- A. Establish, furnish and maintain suitable design and construction office facilities in the vicinity of the project, to serve as the project office for the duration of the project in the location specified in the Design-Builder's Technical Proposal
- B. Maintain an adequate staff of qualified support personnel to perform the work necessary to complete the project
- C. Establish internal accounting methods and procedures for documenting and monitoring project costs
- D. Provide project costs as required to DOT&PF or to DOT&PF's agent, for purposes of monitoring Design-Build projects
- E. Establish and maintain contract administration procedures, which shall include preparation of supplemental agreements and requests for time extensions as well as administration of subcontracts
- F. Include the complete project name and number on all correspondence related to this contract.
- G. Participate in design consensus, status and team building meetings with all appropriate participants at the start, on a monthly basis during the project development period and as needed to maintain the design schedule. If requested by the DOT&PF Project Manager, the Design-Builder shall act as the lead.
- H. Assume complete responsibility for the accuracy and completeness of Construction

Documents and related design prepared under this project.

I. Other duties as agreed upon by the Design-Builder and DOT&PF.

## **1021 PROJECT CONTROL**

The expected completion date for this project is listed in the Special Provisions. Submittal dates for Construction and Design Documents shall be included in the Progress Schedule described in contract provisions Standard Specification Amendments Subsection 1-08.3. Dates of required and/or expected DOT&PF design reviews and the required review times in accordance with Section 1065 and 1130.05 of this Scope of Work shall also be included. Schedule changes in the design elements that impact the review times of DOT&PF shall be updated and the progress schedule re-submitted.

For each design item, segment, or phase of construction designated by the Design-Builder, the Design-Builder shall include the design reviews, and, through day to day communications, keep DOT&PF up to date on exact timing of reviews. The Design-Builder shall allow design review days specified in the QC/QA Plan Requirements (Scope of Work section 1130) in its schedule for design review including design review of 100 percent designs. The 100 percent design is defined as completion of design products listed in the design scope of work.

The Design-Builder shall provide data upon request to monitor costs and manpower and to report progress.

The project control system shall include features to:

- A. Determine and highlight critical path work from initial plans as work progresses
- B. Identify progress against schedule for each identified work item
- C. Forecast completion dates from current progress
- D. Highlight rescheduled work in any area that is out of the required sequence
- E. Determine any physical area that requires more resources than originally allocated
- F. Forecast future conflicts in any area
- G. Provide estimates of time, manpower, and dollars required at the lowest work element tracked, based upon current expenditures versus schedule
- H. Provide the capability of random inquiry concerning the status of any work element in terms of schedule, manpower, and dollars

## **1022 Responsibility Chart**

Appendix A is a chart indicating the division of responsibilities between the Design-Builder, DOT&PF and other stakeholders. This chart is intended as a quick reference only. In the event of conflict the written Scope of Work shall take precedence.

## **1023 Project Related Correspondence**

The Design-Builder shall furnish written documentation of communications between the Design-Builder and any party pertaining specifically to this project to DOT&PF for their records within one week of the communication. The Design-Builder is responsible for recording and distributing to the participants the minutes of all meetings pertaining to this project within two (2) days of the meeting.

## **1025 Quality Control Plan Requirements**

The Design-Builder is responsible for the accuracy and completeness of the plans and related design prepared under this contract and shall provide QC/QA measures defined in Section 1100 of this Scope of Work.

## **1026 Design-Builder Personnel**

The Design-Builder's work shall be performed and/or directed by the key persons identified in the Technical Proposal. Any changes in the indicated key persons shall be subject to review and approval by DOT&PF prior to making the change.

## **1027 Pre-Contract Meeting and Site Visit**

As soon as practicable after the award of the contract, the Design-Builder shall hold a meeting with DOT&PF to discuss the project and exchange information as outlined in Section 1-2.1C of the Construction Manual.

The Design-Builder shall visit the project site within fifteen (15) business days of the receipt of written Notice to Proceed, or as otherwise approved by the DOT&PF Project Manager. The Design-Builder shall make arrangements for the site visit with agency representatives as appropriate (DOT&PF, FHWA, and other interested persons), at least two (2) weeks prior to the visit. Within seven (7) calendar days after the site visit, the Design-Builder shall issue to DOT&PF a brief written report including observations, discussions, and any questions pertaining to the scope or level of effort of the project. The purpose of this visit is to acquaint key personnel with the details and features of the project to facilitate the design process.

## **1040 Design Documentation**

The Design-Builder shall document engineering and design progress and changes in its Progress Schedule (including work on any design change).

- A. The Design-Builder shall, upon DOT&PF request, submit to DOT&PF for review all design notes, sketches, worksheets, and computations to document the design conclusions reached during the development of the Design Documents.
- B. Structural calculations shall be submitted to DOT&PF for all elements.
- C. At the project completion, a set of project documentation sheets, sealed by a Professional Engineer, registered in the State of Alaska, shall be submitted with the record set of plans and tracings.
- D. Project Documentation shall include, but is not necessarily limited to, the following data:
  1. Supplemental design criteria used by the Design-Builder for the project Final Design.
  2. Right-of-Way calculations (including easements)
  3. Geotechnical reports for the pavement and/or foundation design
  4. Documentation of decisions reached as a result of meetings, telephone conversations or site visits
  5. Drainage reports

## 6. Bridge Selection Report and Preliminary Plan

- E. Computer-Aided Drafting and Design (CADD): Computer Aided Drafting (CAD) files shall be prepared using DOT&PF methodologies and standards as defined in the Preconstruction Manual. The Design-Builder shall submit the computer design files, including end area cross sections, to DOT&PF in CAiCE format. All CADD data shall be provided to DOT&PF in a format that can be used directly by Microstation with no translation and that when accessed within Microstation is organized on the DOT&PF standard levels, symbologies, colors, weights and basemap/sheet file organization.

All documents, exhibits, and related files including photographic negatives used in the project, shall become and remain the property of DOT&PF as appropriate and may be used by DOT&PF without restriction. Such unrestricted use, unrelated to the design basis and intent of this project, will be without liability or legal exposure to the Design-Builder.

### 1065 Design Reviews and Oversight Visits

The plans will be reviewed by the project team including representatives of DOT&PF technical sections for conformity with DOT&PF procedures and the terms of the contract according to the QC/QA Plan requirements (Scope of Work subsection 1130). Review by DOT&PF does not include detailed review or checking of design of major components and related details or the accuracy with which such designs are depicted on the plans.

DOT&PF may also make periodic visits to the designer(s) offices to discuss and verify design progress and the designers' QC/QA plan. DOT&PF will give the Design-Builder two (2) calendar days advance notice of intent to make an oversight visit.

Throughout the design process, the Design-Builder may request additional oversight visits by DOT&PF to discuss and verify design progress and to assist the Design-Builder and/or its designer(s) in resolving design questions and issues. The Design-Builder shall give DOT&PF two (2) calendar days notice of any requested oversight visit.

#### 1065.10 Early Construction

The Design-Builder's schedule and work plan shall identify the items, segments, or phases that the Design-Builder plans to release for early construction (i.e., construction that is to start prior to completion of 100 percent Construction Documents). Design reviews will be conducted for items or segments of permanent construction work identified by the Design-Builder for early construction. The Design-Builder may start construction of any element of the project only after all the following bulleted items have occurred:

- A. The designer has completed its design QC checks and certifies in writing that the design is ready to be released for early construction.
- B. The Design-Builder's Design QA Manager has also stated in writing that the design of the item, segment, or phase of work has been designed in accordance with Contract requirements.
- C. The design has been checked in accordance with the Design-Builder's approved Design Quality Control Plan.
- D. The design has been subjected to a constructability review to determine that construction can proceed safely (from the aspects of public and worker safety).

- E. The project has progressed to the point that the work may be released for early construction and not require subsequent change in design affecting construction.
- F. The responsible Alaska licensed professional engineer has stamped, signed and dated the plans and specifications for early construction.
- G. Adequate stakes, lines and grades shall have been established in the field to control the work.
- H. Design-Builder has obtained all necessary permits for such work.
- I. Has submitted 100 Percent Construction/Final Construction Documents for the segment, (Scope of Work Section 1065.40).

The Design-Builder may start work at its own risk on permanent construction at the time the early construction design review begins. Non-permanent construction work may proceed without reviews.

DOT&PF will participate in design reviews for early construction work. If DOT&PF, in its review, observes that the Design-Builder is not complying with Contract requirements and/or that the QC/QA checks are not complete, it will notify the Design-Builder in writing. DOT&PF's design review and comments will not constitute approval or acceptance of the design or subsequent construction.

The construction on the item, segment, or phase covered by the Design QA Managers statement approving early construction shall only progress to the point covered by the design documents included in that statement. Prior to construction progressing further, the Design-Builder shall complete the next phase of design or complete the 100 percent design, in which case construction could proceed under Section 1065.40.

Subsequent phases of design being released for construction shall be checked and released by the Design-Builder's Design QA Manager as indicated above for the initial item or segment of work. A design review will be conducted as described above, as each phase of design is released for construction.

If there is evidence that the Design-Builder's QC/QA procedures are not adequate, for example, if a problem is spotted during the design reviews or becomes evident during construction, DOT&PF may, at its sole discretion, suspend future early construction until sufficient QC/QA procedures are in place. Such a suspension shall be considered a suspension for cause. If the deficiency affects construction in progress, DOT&PF has the right to require correction of the design and/or construction defects before construction can proceed further.

## **1065.20 Other Interim Design Reviews**

For any designs for which early construction reviews will not be conducted, at least one design review shall be conducted before completion of 100 percent design. The percentage of design will be mutually agreed upon between the Design-Builder and DOT&PF, but should be near the mid-point of design.

Prior to DOT&PF's participation in a design review, the Design-Builder's Design QA Manager shall certify that the item or segment of work 1) has been designed in accordance with Contract requirements, and 2) has been checked in accordance with the Design-Builder's approved QC/QA Plan. DOT&PF will participate in a design review of all elements specifically stated in the Scope of Work. The Design-Builder may request that DOT&PF participate in other interim design reviews.

### 1065.30 Design Changes

Either the Design-Builder or DOT&PF may initiate design changes. Design changes may occur on items or segments undergoing early construction or may occur after final design. All design changes shall undergo the same QA/QC checks as the original design. See Design QC/QA Plan, Scope of Work Section 1130.05 and Section 1-04.4 of the Standard Specifications.

Design changes during early construction, before final designs are complete, or design changes to final designs, shall be approved in writing by the engineer in responsible charge of the original design. All design change plans, specifications, calculations, and reports shall be stamped, signed and dated by an Alaska licensed professional engineer. In both cases, the Design-Builder's Design QA Manager shall certify in writing that the design change 1) conforms to all applicable Contract requirements, 2) has been checked in accordance with the Design-Builder's Approved Design Quality Control Plan and 3) is consistent with all other elements of the design. The Design-Builder shall request and schedule interim and 100 percent oversight review(s) by DOT&PF for all design changes.

The final plans shall reflect the most current design standards, specifications and DOT&PF policy. Therefore, the Design-Builder shall be responsible for studying revisions to the plans made during the development of the project and ascertaining how the design will be affected. The Design-Builder shall work with the DOT&PF Project Manager, who will give the final authorization, in determining the propriety of modifying the design to accommodate the revised standards, specifications, and DOT&PF policy. The Design-Builder will be compensated by Contract Modification for any significant redesign and additional construction costs resulting from this requirement.

For changes initiated by the Design-Builder, the Design-Builder shall bear all costs associated with making the design change and obtaining concurrence of the original designer. For changes initiated by DOT&PF, DOT&PF will bear all such costs.

### 1065.40 Review of 100 Percent Design

When the Design-Builder has completed the 100 percent design of the entire project, the Design-Builder's Design QA Manager shall certify that the work:

- A. Has been designed in accordance with Contract requirements.
- B. Has been checked in accordance with the Design-Builder's approved Design Quality Control Plan.
- C. Is ready for construction to 100 percent completion.

The Design-Builder may proceed at its own risk with construction at the time the 100 percent design review is started if they certify that the provisions of Scope of Work Section 1065.10 are met.

DOT&PF will review the 100 percent design. The Design-Builder shall develop a method to redline the design package to document the Design QA Manager's and DOT&PF's comments given at the 100 percent review and shall provide a method to document the incorporation of these comments, in the formal final design submittal. After the Design-Builder has incorporated the 100 percent design review comments in its design and/or resolved any contract issues with DOT&PF, the Design-Builder shall prepare a formal final design submittal to DOT&PF that shall include:

- A. all design plans
- B. design calculations
- C. design reports
- D. specifications
- E. estimated quantities

All submittals shall be in accordance with the QC/QA Plan Requirements.

All plans, reports, and specifications shall be sealed and signed by the engineer in responsible charge. DOT&PF will check to see that the required changes given at the 100 percent design review were incorporated to DOT&PF's satisfaction. If necessary, the Design-Builder shall resubmit revised final design documents to DOT&PF. DOT&PF will provide any comments on the final design within seven (7) calendar days of receipt of the final design documents.

### **1070 Quantity Estimates**

The Design-Builder shall provide quantity estimates for work covered by early construction plans and for work covered by 100 percent plans. The quantity estimates shall be in units that facilitate quality assurance sampling and testing; i.e., the units shall be consistent with the units used to determine frequency of sampling and testing. For example, if X number of compaction tests are specified to be taken for every Y cubic meters of embankment, the quantity estimate would need to be in cubic meters of embankment. See the QC/QA Plan Requirements Scope of Work subsection 1140.

### **1080 Pre-Construction Meeting and Construction Documentation**

The Design-Builder is responsible for obtaining, maintaining, and monitoring for compliance all documents and records required in the contract provisions. Prior to start of construction work, an orientation meeting will be held between the Design-Builder and DOT&PF to address documentation requirements.

#### **1080.01 Documentation Reviews**

DOT&PF will perform formal documentation reviews at approximately 25 percent, 75 percent, and 100 percent completion of construction. Items to be reviewed are randomly selected by the documentation reviewer. These reviews are to ensure the Design-Builder is maintaining all the necessary documentation and records. A separate review will be performed at the completion of the project to review all materials documentation.

In addition to the formal reviews, DOT&PF on-site personnel will perform daily documentation reviews. Examples of these daily reviews include materials documentation, payrolls, DBE documentation, etc.

#### **1080.02 Underground Facilities**

All underground facilities (culverts, drains, catch basins, grate inlets, conduit, water lines, irrigation lines, etc.) shall be documented to show the location and elevation. The Design-Builder shall use DOT Form 422-637, Field Note Record for Drainage or a similar format to document the items. An example of how the form is completed is shown on page 10-22 of the DOT&PF Construction Manual.

**1080.03 Progress Estimate Documentation**

The Design-Builder will provide DOT&PF a certified invoice showing amounts due for monthly progress estimates. The Design-Builder will include a lump sum breakdown and supporting documents (such as load counts, daily construction reports, drainage notes, etc.) in sufficient detail to substantiate the invoice amount. A summary of material acceptance documentation shall be included with the invoice to verify that material incorporated in the monthly progress estimate has met all materials requirements.

**1080.04 Project Diaries and Inspector's Daily Report**

The Design-Builder shall maintain daily records of construction activities in the form of a Construction Project Diary and an Inspector's Daily Report. Sections 10-3.5A and 10-3.5B of the Construction Manual describe what these reports shall consist of. Diaries shall also contain the information required in DOT&PF Form 422-004A and shall be in a similar format. Together they shall provide a complete word picture of the project, covering both the normal work process and anything unusual that occurs on the project.

**1080.05 Design-Builder's Record of Accidents and Traffic Control Surveillance**

The Design-Builder shall maintain a record of all traffic accidents and a daily record of all traffic control signing that is within the limits of construction as outlined in Sections 1-2.3 F and J of the Construction Manual. DOT Forms 421-040A, Contractor's Daily Report of Traffic Control - Summary and 421-040B, Contractor's Daily Report of Traffic Control - Traffic Control Log shall be used to document the traffic control activity and signing.

**1080.06 Final Records**

The Design-Builder will submit the final records to DOT&PF within 90 days of physical completion. The final records shall include without limitation:

1. Final Record Book No. 1
2. Project diary records
3. Design-Builder's Daily Report of Traffic Control
4. Materials Certification
5. As-built plans
6. Pile driving records (if applicable)
7. Post tensioning records (if applicable)

**1080.07 Final Record Book No. 1**

This book consists of documents bound in a semi-rigid, water resistant cover. Each page shall be numbered consecutively. The following documents shall be included and the order in which it is to be arranged is given below. No other material is to be included in this book.

1. Index sheet - containing the detailed index for Final Record Book No.1 and also the listing of the other final records contained in each book.
2. Design-Builder personnel list - containing the name and classification of managers, supervisors, foremen, testers and any other Design-Builder personnel who were responsible for signing documents or forms or were responsible for decision making on the project. Each person shall sign his or her identifying initials after his or her name on this list in the same manner as it appears in other project documents.

3. Comparison of Quantities - DOT&PF will provide this report to the Design-Builder for inclusion in Final Record Book No. 1.
4. Final Contract Voucher Certification, Form 134-146 - including the Design-Builder's authorized signature and the DOT&PF Region Administrator's signature.
5. Contract Estimate Payment Totals report - to be provided by DOT&PF
6. Affidavit of Wages Paid, State L & I Form F700-007-000 - the original or copy of the approved affidavits.
7. List of Change Orders - showing the change order numbers, a brief description of each and the change order cost.
8. Record of construction materials - tabulating the source of the construction materials.

### **1080.8 Project Diaries and Contractor's Daily Report of Traffic Control**

The Construction Project Diaries and Inspector's Daily Reports shall be organized in chronological order and bound in books similar to Final Record Book No. 1. The pages of these books do not require numbering, however the books themselves shall be numbered consecutively starting with Final Record Book No. 2. The Design-Builder's Daily Report of Traffic Control shall be bound in the same manner and the books numbered consecutively after the diaries books.

### **1080.9 Materials Certification**

The Design-Builder shall submit a materials certification package to DOT&PF which contains a checklist and supporting documentation. The Design-Builder may use DOT form 350-115, Contract Materials Checklist or develop one of its own with the same information. The supporting documentation shall consist of a summary of all documentation practices utilized for material acceptance and explanations of any deficiencies noted on the checklist. The summary should be organized in the order similar to Division 9 of the Standard Specifications for Highway Construction.

### **1080.10 As-Built Plans**

As-built plans shall be full size, 22" x 34", blackline prints. Each plan sheet shall have lettering or a stamp identifying it as as-built plans.

As-builts are a record of how the project was actually constructed and shall reflect the same degree of detail as the Final Plan drawings. Underground features need to be documented showing the location and elevation. Also the Design-Builder must provide reproducible originals of the shop drawings for prestressed structural elements and all other structural steel components.

### **1080.11 Pile Driving Records**

The Design-Builder shall complete the Pile Driving Record Book DOT&PF, Form 450-004, and Test Pile record DOT&PF Form 410-027 as outlined in Section 6-5.7C of the Construction Manual. This record shall be available to the Project Manager when requested and it shall be turned over to DOT&PF upon completion of the contract.

### **1080.12 Post-Tensioning Records**

The Design-Builder shall complete the Post-Tensioning Record DOT&PF Form 450-005 as outlined in Section 6-2.8 of the Construction Manual. This record shall be available to the Project Manager when requested and it shall be turned over to DOT&PF upon completion of the contract.

**1080.13 Test Reports for Storm Sewers, Sanitary Sewers, and Water Mains**

The Design-Builder shall develop and complete a report for the testing of Storm Sewers, Sanitary Sewers, and Water Mains. This report shall include the type of pipe, the location of the pipe, all of the calculated factors for the testing, the test results, and whether it passes or fails. This record shall be available to the Project Manager when requested and it shall be turned over to DOT&PF upon completion of the contract.

**1080.14 Design-Builder Construction Survey**

Copies of all survey calculations and survey notes including grade books and cross section notes shall be kept and provided to DOT&PF when requested and turned over to DOT&PF upon completion of the project.

**1080.15 Temporary Final Records**

Temporary final records are comprised of all relevant records not included in the final records. Copies of these records must be submitted to DOT&PF to be retained for a 3 year period following acceptance of the project as required by **AS XXXX**. Examples of these records include but are not limited to the following:

1. Quantity delivery tickets
2. Material acceptance test reports
3. Concrete pour records
4. Source of materials documentation
5. Prints of shop drawings
6. Copies of certified payrolls
7. Horizontal and vertical alignment data
8. Drainage notes
9. Earthwork calculation data
10. Computer listings and summaries
11. Falsework and formwork plans
13. Scalemen's report
14. Scale test report
15. Grade books
16. Cross section notes

**1080.16 DBE and EEO Documentation**

An overall Disadvantaged Business Enterprise (DBE) goal has been established for this project. The goal is found in the Special Provision, "Equal Employment Opportunity Responsibilities - Disadvantaged Business Enterprise Participation (DBE)" The Design-Builder will be responsible for meeting this goal. The Design-Builder will be responsible for providing all the documentation required for DBE and EEO compliance, including but not limited to DBE Utilization Certification DOT Form 272-056A or 272-056, the Affidavit of Amounts Paid DBE/MBE/WBE Participants (Form 421-023) and Monthly Employment Utilization Report (Form 820-10).

## SECTION 1100 DESIGN-BUILD QC/QA PLAN REQUIREMENTS

### 1110 Description

The Design-Build QC/QA plan, submitted as part of the Final Proposal, must be approved by DOT&PF prior to contract execution. This approval will occur after selection in order to allow minor modifications to the plan if necessary. No Work activities may proceed until the Design-Builder's Quality Control Plan has been approved in writing by DOT&PF.

The plan shall detail how the Design-Builder will provide quality control (QC) and quality assurance (QA) for both the design and construction elements of the project, obtain samples for Design-Builder (D-B) quality control testing, perform tests for Design-Builder quality control, provide inspection, and exercise management control (i.e. quality assurance testing) to ensure that work conforms to the contract requirements. The following DOT&PF and AASHTO publications should be consulted in preparing the Design-Build QC/QA Plan:

- A. Preconstruction Manual (M22-01),
- B. Bridge Design Manual (M 23-50),
- C. Plans Preparation Manual (M 22-31),
- D. Construction Manual (M47-01)
- E. Standard Specifications for Road, Bridge, and Municipal Construction (M41-10),
- F. AASHTO - Standard Specifications for Highways and Bridges (16th Edition)
- G. Materials Manual (M46-01)

The Design-Build QC/QA Plan shall include a description of the quality control and quality assurance organization, including the number of full-time equivalent employees with specific Quality Control and/or Quality Assurance responsibilities and including a chart showing lines of authority and reporting responsibilities. The persons and organizations performing Quality Control and/or Quality Assurance functions shall have sufficient authority and organizational autonomy to identify quality problems, and to initiate, recommend, and verify implementation of solutions. Persons performing Quality Control and/or Quality Assurance functions shall be at an organizational level which ensures that they are not influenced by the impact of implementation of Quality Control and/or Quality Assurance measures on the Project schedule, performance or cost. To ensure the above organizational independence, at the very least, the QC/QA organization shall be established as a separate entity operating under a separate profit center from the design and production organization. All key personnel performing Quality Control and/or Quality Assurance functions shall be exclusively designated to such and shall not be assigned to perform conflicting duties.

Partnering should be considered an integral part of the Design Quality Control/Quality Assurance program. A partnering agreement is recommended to handle disputes. In addition a separate procedure for conflict resolution should be developed and agreed to by the partnering participants. The procedure should include, but is not limited to, the following elements.

- 1 Disputes should be delegated to the lowest appropriate level of authority on the project team to resolve within a specified timeframe.
- 2 A timeframe for each level of authority should be established before the project begins for a list of typical disputes that could occur on a project.

- 3 If the dispute is not resolved to the satisfaction of both parties within the specified time frame, the dispute would be automatically escalated to the next level of authority on the project team.
- 4 If left unresolved, the process would then continue to escalate to the highest level of authority where a final resolution would be arbitrated by an unbiased third party, whose selection would be agreed upon in advance as part of the QC/QA Plan.
- 5 A written report describing the dispute, all subsequent actions, and final disposition of the dispute should be submitted to the project records.
- 6 If subsequent disputes arise on the same issue, the written report should be included as a resource during the resolution process.

Disputes not resolved informally through the partnering process may be brought by either party to the Disputes Review Board.

### **1120 Design-Builder QC/QA Staff**

At a minimum, Design-Builder QC/QA staff shall include the following:

#### **1120.01 Design-Builder Quality System Manager**

The Design-Builder Quality System Manager is the individual with overall responsibility for development of and adherence to the Design-Build QC/QA Plan. This individual shall be a Professional Engineer licensed by the State of Alaska having a minimum of ten years supervisory experience in roadway or bridge design or ten years supervisory experience in inspection or materials testing on highway transportation construction projects or a combination thereof.

#### **1120.02 Design-Builder Design QC/QA Manager**

The Design-Builder Design QC/QA Manager is the individual with overall responsibility for the Design portion of the Design-Build QC/QA Plan. This individual shall have a minimum of five years supervisory experience in either roadway or bridge design on highway transportation construction projects.

#### **1120.03 Design-Builder Construction QC/QA Manager**

The Design-Build Construction QC/QA manager is the individual with overall responsibility for the Construction portion of the Design-Build QC/QA Plan. This individual will be responsible for implementing, monitoring and, as necessary, adjusting the processes to assure acceptable quality. This individual shall have a minimum of five years supervisory experience in inspection or documentation or testing materials or combination thereof on highway transportation construction projects, and shall meet one of the following additional requirements:

- A. A Professional Engineer registered in the State of Alaska with at least two years of highway materials and/or inspection experience acceptable to the Department, or
- B. A Construction Technician certified at NICET level IV with at least five years of highway materials or inspection experience acceptable to the Department, or
- C. A Bachelor of Science Degree in Civil Engineering, Civil Engineering Technology, or Construction with at least six years of highway materials and/or inspection experience acceptable to the Department.

In addition the Construction QC/QA Manager or his designated representative shall be available or on the project within four hours of being notified of a problem regarding the quality control of any work being done by the Design-Builder, or any of its subcontractors or agents.

**1120.04 Quality Testing Supervisor**

The Quality Testing Supervisor may be an employee of the Design-Builder's laboratory, and shall be on the site during testing. The Quality Testing Supervisor shall meet one of the following requirements:

- A. A Professional Engineer, registered in the State of Alaska, with at least one year of highway materials testing experience acceptable to the Department, or
- B. An Engineer-In-Training, certified by the State of Alaska, with at least two years of highway materials testing experience acceptable to the Department, or
- C. A Bachelor of Science Degree in Civil Engineering, Civil Engineering Technology, Construction, or related field acceptable to the Department; and at least three years of highway materials testing experience acceptable to the Department, or
- D. Certification by the National Institute for Certification in Engineering Technologies (NICET) in the Construction Materials Testing field as an Engineering Technician (Level III) or higher in the appropriate subfield in which sampling and testing is being performed, or
- E. Certification by NICET in the Transportation Engineering Technology field as an Engineering Technician (Level III) or higher in the Highway Materials subfield, or
- F. Certification by NICET as an Engineering Technician, or higher, in Civil Engineering Technology with at least five years of highway materials testing experience acceptable to the Department, or
- G. An individual with at least eight years of highway materials testing and construction experience acceptable to the Department.

In addition to the above, technicians and inspectors shall be employed when necessary. The Testing Technicians and Inspection Technicians shall have the following qualifications:

**1120.05 Testing Technicians**

Only those technicians who have satisfactorily completed instructional courses conducted by the Western Alliance for Quality Transportation Construction (WAQTC) or have completed the necessary evaluation in the DOT&PF Modules by DOT&PF to become qualified in the testing procedures may be used by the Design-Builder for Quality Control Testing. DOT&PF will provide initial evaluation of each testing technician designated in the QC/QA Plan for qualification in the WAQTC Modules. Evaluation of these testing technicians will be provided at a laboratory's customary cost recovery rate for code S831. These costs will be deducted from moneys due or become due the Design-Builder on the next progress estimate. See Appendix B, table 5 for a listing of DOT&PF test modules and methods. A testing technician currently qualified by the American Concrete Institute (ACI) (Level I) will be considered qualified in the DOT&PF Concrete module. The qualifications of laboratory technicians employed by a laboratory accredited by the AASHTO Accreditation Program (AAP) will be accepted for AASHTO test methods when confirmed by the laboratory's training and evaluation records.

The testing technicians performing the field and laboratory sampling and testing shall be employed by the Design-Builder or agents laboratory and supervised by the Quality Testing Supervisor.

## **1120.06 Inspection Technicians**

The Design-Builder's QC/QA Inspection Technicians shall have a minimum of three years roadway construction inspection experience in the work activity being inspected. Inspection of electrical systems for acceptance will be conducted by DOT&PF electrical inspectors.

## **1130 Design QC/QA Plan Requirements**

### **1130.01 General**

The quality control and quality assurance procedures for each type of Design Document and Construction Document shall be organized by engineering discipline (such as structural, civil and utilities). These procedures shall specify measures to be taken by the Design-Builder (1) to ensure that appropriate quality standards are specified and included in the Design Documents and Construction Documents and to control deviations from such standards, it being understood and agreed that no deviations from such standards shall be made unless they have been previously approved by DOT&PF at DOT&PF's sole discretion, and (2) for the selection of suitability of materials, and elements of the Work that are included in the Project.

The Design QC/QA Plan shall include the following:

Quality control and quality assurance procedures for preparing and checking all plans, calculations, drawings and other items submitted, to ensure that they are independently checked and back-checked in accordance with generally accepted architectural and engineering practices, by experienced architects and engineers, respectively. The originator, checker and back-checker shall be clearly identified on the face of all submittals. Specific procedures for verifying computer programs used shall also be included. Plans, reports and other documents shall be stamped, signed and dated by the responsible Alaska registered architect or engineer where required under the Contract Provisions, under generally accepted architectural or engineering practices or by applicable laws.

The plan shall set forth the level, frequency and methods of review of the adequacy of the design of the Project, including the methods by which all final Design Documents and Construction Documents shall be independently reviewed and verified for adequacy of design and back-checked in accordance with generally accepted design and engineering practice by experienced architects and engineers not involved with the preparation of such Documents.

The plan shall set forth the procedures for coordinating Work performed by different persons in the same area, or in adjacent areas or in related tasks to ensure that conflicts, omissions or misalignments do not occur between drawings or between the drawings and the specifications and to coordinate the review, approval, release, distribution and revision of documents involving such persons.

The plan shall identify those elements of the Contract Provisions, Design Documents or Construction Documents, if any, requiring special Quality Control and/or Quality Assurance attention or emphasis, including applicable standards of quality or practice to be met, level of completeness and/or extent of detailing required.

The plan shall identify by discipline, the name, qualifications, duties, responsibilities and authorities for all persons proposed to be responsible for QC/QA.

The plan shall state any requirement for, and the name, qualifications, duties, responsibilities and authorities of, external technical experts necessary to ensure the quality of the design of the

Project, the anticipated timing of use of, the expected availability of, and any coordination required with respect to any such experts.

The plan shall describe the required design quality control and assurance functions, including scheduled activities for Design QC/QA identifying the Design Documents and Construction Documents to be delivered to DOT&PF for its review at each stage of the design or work phase of the Project.

All documents shall be maintained by the Design-Builder for the duration of the Contract and shall be organized, indexed and delivered to DOT&PF (1) upon Final Acceptance unless required to be delivered earlier pursuant to the Contract Provisions, or (2) even if incomplete, within seven days of receipt of request from DOT&PF. These documents should include but not be limited to the following items: design criteria, reports and notes, calculations, drawings, schematics, supporting materials, etc.

### **1130.02 DOT&PF Review of Design Work**

DOT&PF will not officially approve Design Work after initial acceptance of the Design-Builder's Proposal, except as noted for requests for deviations, right of way plans, and permit documents. DOT&PF will reach agreement with the Design-Builder on dates and times for design reviews, and will comment on Design Work, but will not require comment responses unless work is deemed to be outside the provisions of the contract. If DOT&PF at any time determines that the Design Work is proceeding which does not conform to Contract requirements, DOT&PF reserves the right to suspend work for cause until resolution of the issue.

### **1130.03 Design Quality Review**

Prior to the release of final Design Documents and Construction Documents, the Design-Builder shall complete review with architects and engineers experienced in the appropriate disciplines(s). The review shall verify that the Design Documents and Construction Documents were prepared in such a manner as to ensure that they will be acceptable to DOT&PF, as well as the Design-Build Team. The criteria used in such review shall include (1) conformity of the final Design documents and Construction Documents with the Contract Provisions; (2) assurance that all materials, equipment and elements of the Work provided for in such documents which shall be incorporated into the Project have been provided for and designed to perform satisfactorily for the purpose intended; (3) the appearance, organization, technical and grammatical accuracy of such documents; (4) verification that such documents have been checked and signed by the drafter, designer, checker and reviewers; (5) where required under the Contract, generally accepted architectural or engineering practices or applicable law, verification that such documents have been stamped, signed and dated by the responsible Alaska registered civil engineer or architect; and (6) assurance that such documents fully provide for constructability, compatibility of materials and conformity to acceptance criteria for inspections and tests as provided in the Contract.

### **1130.05 Plan Approvals by DOT&PF**

Right of way plans and permit drawings shall be developed to DOT&PF standards as described in the Plans Preparation Manual (M 22-31). DOT&PF shall approve these drawings after a thorough review for completeness and conformance to standards. DOT&PF will return all non-conforming drawings to the Design-Builder for corrective action.

#### *1130.05.1 Plans Distribution*

The Design-Builder shall provide to DOT&PF copies of the following documents, with all design changes and revisions shown, upon their being stamped "Released for

Construction”. These documents will be used by DOT&PF to facilitate their administration and inspection responsibilities:

- A. All Design and Construction Documents
- B. All shop or fabrication drawings which have been approved by the Design-Builder
- C. All forming plans which have been approved by the Design-Builder
- D. All traffic control plans which have been approved by the Design-Builder

#### *1130.05.2 QC/QA of Design Changes*

Changes, including field changes, in the design of the project or any portion thereof as shown on the Design and Construction Documents, shall be subject to design QC/QA measures and procedures commensurate with those applied to the original design of the portion of the Project being changed. Furthermore, all changes described in this Section shall be approved in writing by the organization that performed the original design, with the written approval of DOT&PF. Any change affecting the basic configuration of the Project shall also be subject to the requirements contained in this Section. Documents containing design and /or field changes shall be distributed according to the requirements set forth in the section entitled “Plans Distribution”.

#### *1130.05.3 Submittals for Review by Department*

Design and Construction Documents relating to the following construction phases shall be submitted to DOT&PF for review. DOT&PF approval of these submittals is not required and will not be provided. Any review comments made by DOT&PF will be provided, in writing, to the Design-Builder within 10 business days, or as agreed to in writing. The following table indicates the submittals for review.

The Design-Builder shall be fully responsible for the schedule impacts and costs of revisions arising from DOT&PF’s review of the Construction Documents for consistency with the requirements of the Contract Provisions and caused by the Design-Builder’s non-compliance with Contract requirements.

<b><u>Construction Phase</u></b>	<b><u>Documents</u></b>
Earthwork	Roadway Geometrics (Plan and Profile) Channelization Plan Intersection Plan Interchange Plan Traffic Control Plan Erosion Control Plan Clearing & Grubbing Removal of Structures and Obstructions Hazardous Waste Disposal Roadway Quantities * Geotechnical Report (slopes, geotextiles and wall designs) Construction Specifications
Geotechnical	Draft Geotechnical Report Final Geotechnical Report
Surfacing and	Preliminary Surfacing Report

<b><u>Construction Phase</u></b>	<b><u>Documents</u></b>
Pavements	Final Surfacing Report Roadway Geometrics Roadway Sections Superelevation diagrams Surfacing Quantities * Pavement Quantities * Paving Plan Construction Specifications
Structures	Bridge Selection Report and Preliminary Plan Roadway Geometrics Structure Design Drawing and calculations Rebar Bending diagrams & quantities Hydraulics Report Geotechnical Report (structure foundation, Walls, shoring, falsework, ground improvements, drainage features etc.) Construction Specifications
Drainage Structures & Water Distribution	Design Criteria for Conveyance, Detention and Treatment Facilities Hydraulics Report Stormwater Site Plan Design calculations Locations Drainage Plans & Profiles Drawing & Special Details Construction Specifications
Landscape, Irrigation	Planting Plan Irrigation Plan Construction Specifications
Safety and Traffic Items	Phasing and Construction Sequence Report Sign Inventory Traffic Markings and Delineation Guardrail Fencing Illumination System Signal System Permanent Signing Work Zone Traffic Control Construction Specifications
Misc. Construction	Plans and Plan Details Construction Specifications

\*Quantities are for the purpose of identifying QC/QA requirements for both the Design-Builder and DOT&PF as described in Section 1070 of the Scope of Work.

## **1140 Construction QC/QA Plan Requirements**

### **1140.01 General**

The plan must at a minimum address the following:

- A. Describe the Design-Builder's quality control organization, including the number of full-time equivalent employees with specific Quality Control and/or Quality Assurance responsibilities and including a chart showing lines of authority and reporting responsibilities;
- B. List by discipline the name, qualifications, duties, responsibilities and authorities for all persons proposed to be responsible for Construction Quality Control and/or Quality Assurance;
- C. Project progress schedule;
- D. Submittal schedule;
- E. Inspection requirements;
- F. Quality control sampling, testing, and analysis plan with frequencies, location and methods;
- G. Instrumentation and survey monitoring for verification of the performance of the project geotechnical features;
- H. Load testing and integrity testing required to verify adequacy of the foundation capacity, soil reinforcement elements, or adequacy of ground stabilization;
- I. Identify the laboratory(s) to be used;
- J. Specify documentation for QC/QA activities, including control charts; and
- K. DOT&PF requirements for corrective action when quality control and/or acceptance criteria are not met.

The Contract Provisions may also require specific quality control measures for certain materials. When so required the Design-Builder shall provide all personnel, equipment, supplies, and facilities necessary to perform quality control, obtain samples, and perform tests required in the Contract Provisions.

### **1140.02 Design-Builder Responsibilities**

The Design-Builder shall be responsible for the quality of construction and materials incorporated into the project. The Design-Builder's Quality Control measures are to insure that operational techniques and activities provide material of acceptable quality. Design-Builder sampling and testing shall be performed to control the processes and determine the degree of material compliance with the Contract Provisions.

### **1140.03 Department Responsibilities**

Verification sampling and testing will be performed by DOT&PF to validate Design-Builder sampling and testing as well as the quality of the material produced. An Independent Assurance Program will also be conducted by DOT&PF to evaluate all sampling and testing used in the acceptance of material.

DOT&PF shall be solely responsible for determining the acceptability of materials incorporated into the project. The acceptance decision will consider results of Design-Builder sampling and testing at specified frequencies and locations, verification sampling and testing at specified frequencies and locations, inspection by DOT&PF of the attributes and processes that may affect the quality of the finished product, and a dispute resolution system to resolve discrepancies between the verification sampling and testing and the Design-Builder sampling and testing.

The persons and organizations performing Quality Control and/or Quality Assurance functions shall have sufficient authority and operational independence to identify quality problems, and to initiate, recommend, and verify corrective actions. Persons performing Quality Control and/or Quality Assurance functions shall be at an organizational level that reports directly to upper level management of the Design-Build firm to assure independence from the influences of the project production staff. All key personnel performing Quality Control and/or Quality Assurance functions shall be designated as such and shall not be assigned to perform any conflicting duties.

#### **1140.04 Activities Meetings**

Prior to the start of any work activity the Design-Builder shall hold an Activity Meeting to ensure that all project personnel have a thorough understanding of work to be done. Work activities generally correspond to the sections of the Standard Specifications, such as clearing and grubbing, earthwork, aggregate base, and asphaltic concrete, or a definable feature of work such as pre-paving conference, pre-pour conferences for bridge decks. The Activity Meeting should include discussions relating to what will be accomplished, by whom it will be performed, and where, when, and how the work will be done. The Activity Meetings are to ensure that all parties have the same understanding of the design intent, have the appropriate plans, specifications and any special details, and are aware of safety regulations and procedures that need to be followed. At this time the QC inspection checklist for this activity should be reviewed. Activity Meetings shall be scheduled several days in advance of the actual work beginning on an activity to allow for additional preparation if necessary. The Activity Meetings shall be planned and conducted by the Design-Builder Construction QC/QA Manager. Minutes of the meeting shall be taken to document any clarifications and understandings related to the construction of the item that are not documented elsewhere. Activity Meetings are classified as hold points and shall be identified in the Design-Builder's QC/QA plan.

#### **Typical Activity Meeting Content**

<b>Item</b>
Scope (Design Criteria and Intent, Constraints)
Applicable Documents
Work Activity Outline and Schedule (What, Where, Who, When, and How)
Staking Plan
Safety Regulations and Procedures
Traffic Control Plan
Coordination with Utilities

<b>Item</b>
Inspection Plan/Quality Control Procedures
Status of Submittals
Acceptance Criteria
Basis of Payment
Examination of Work Area
Examination of Stored Material
Open Discussion

#### **1140.05 Design-Builder Sampling and Testing**

Design-Builder field and laboratory sampling and testing shall be performed as specified in the Standard Specifications and the Material Manual (M46-01). Sampling and testing shall be performed by qualified testing personnel defined in this specification. Representative samples shall be randomly obtained by the Design-Builder at specified frequencies and locations as shown in Appendix B, Table 2. The Design-Builder shall furnish copies of all test results to DOT&PF within 24 hours of acquiring the sample or the next day of business.

The Design-Builder shall provide to DOT&PF a testing plan for each material. The testing plan shall be developed using the Random Numbers Table (Appendix B, Table 3) or a comparable random selection process such as ASTM D 3665 and reflect the proposed total project quantity. The sampling location and subplot quantity (testing lot quantity) shall be as shown in Appendix B, Table 2 for the material being tested. The testing plan shall be submitted prior to the beginning of production or placement of the material.

#### **1140.06 Design-Builder Laboratories**

All sampling and testing shall be performed by a laboratory that is either:

- A. accredited in the applicable AASHTO procedures by the AASHTO Accreditation Program (AAP): or
- B. complies with the requirements of AASHTO R18 (18<sup>th</sup> Edition) for those tests to be performed.

All Design-Builder testing laboratories shall be inspected and approved by DOT&PF for conformance with the requirements of AASHTO R18 and all applicable procedures.

The laboratory shall be properly equipped, staffed, and fully operational for an inspection by DOT&PF Materials Quality Systems Manager a minimum of five (5) days prior to start of work. The Construction QC/QA Manager will be advised in writing of any deficiencies noted during DOT&PF inspection and must take immediate action to correct the noted deficiencies. Work will not be permitted to proceed until the laboratory and staff are inspected and have received written approval from the DOT&PF Materials Engineer.

Test equipment for certain test procedures shall be the same as listed below so that proper correlation between test results may be established. The tests and required equipment are:

- A. AASHTO TP53-95 Asphalt Content by Ignition Method (Barnstead Thermolyne Model F85938 or other approved ignition furnace with internal balance).

- B. DOT&PF Test Methods 613 and 715 In-place Densities by Nuclear Method (Troxler 3400 Series Moisture/Density Gauge)

### **1140.07 Records**

The Design-Builder shall prepare test reports meeting the requirements of AASHTO R18. The Design-Builder shall also prepare, maintain, and submit to the Project Manager completed test records and final materials certification in accordance with the requirements of Chapter 9 and 10 of DOT&PF Construction Manual (M47-01).

Linear control charts shall be maintained for all tests by the Design-Builder, shall be posted in a location satisfactory to the Project Manager and shall be kept up to date at all times. As a minimum, the control charts shall identify the project number, the material identification, the test number, each test parameter, the upper and/or lower specification limits applicable to each test parameter, the Design-Builder's test results, and DOT&PF's correlation and verification test results. The Design-Builder's failure to maintain up to date records may be cause for DOT&PF to suspend the Design-Builder's operation of the affected material.

DOT&PF will provide the test results of its verification test results to the Design-Builder within 24 hours of acquiring the sample or the next day of business. Test results shall be immediately posted on the linear control charts by the Design-Builder.

### **1140.08 Independent Assurance Inspection (IAI)**

The Design-Builder's laboratory shall participate in DOT&PF's Independent Assurance Sampling and Testing Program as described in Chapter 9-5 of the DOT&PF Construction Manual (M47-01). Findings of all Independent Assurance observations and test results will be provided to the Design-Builder's QC/QA Manager by the Project Manager. The Design-Builder shall immediately take corrective action for any noted deficiencies.

### **1140.09 Acceptance**

#### *1140.09.1 Statistical Acceptance*

For materials with proposed quantities greater than two (2) Quality Control sublots as defined in Appendix B, table 2, statistical evaluation shall be the method of evaluation for acceptance decisions. The Design-Builder test results shall be statistically evaluated for quality level and price adjustment, if applicable, in accordance with this Section. The maximum allowable Composite Pay Factor (CPF) for materials accepted under this Section shall be 1.00.

Acceptance of materials shall be based on statistical evaluation for the applicable elements such as gradation, fracture, sand equivalent, asphalt content, optimum moisture, etc. The applicable "Adjustment Factor" for various materials is shown in Appendix B, table 7. The material shall be sampled at the point of acceptance in accordance with the applicable test procedure listed in Appendix B, table 2

For the purpose of acceptance sampling and testing, a lot is defined as the total quantity of material to be used that was produced from the same operation such as a designated stockpile, crushing or screening operation, concrete mix design or hot mix asphalt job mix formula. All of the test results obtained from the same material shall be evaluated collectively and shall constitute a lot. The quantity represented by each sample will constitute a subplot. Sampling and testing for statistical acceptance shall be performed on a random basis at the frequency of one sample per subplot. Sublot size shall be determined to the nearest 100 tonnes to provide not less than three uniform sized sublots with a

maximum subplot size as stated in Appendix B, table 2 for the material being sampled and tested.

**Test Results:** The Design-Builder shall furnish DOT&PF with a copy of the results of all Quality Control testing within 24 hours of acquiring the sample or the next day of business. The Design-Builder shall compute the Composite Pay Factor (CPF) of the completed sublots after the first three sublots have been tested.

#### *1140.09.2 Rejected Material*

The following action shall be undertaken with regard to defective materials:

- A. **Rejected by Design-Builder:** The Design-Builder may elect to remove any defective material and replace it with new material at no expense to DOT&PF. Any such new material will be sampled, tested and statistically evaluated for acceptance.
- B. **Partial Sublot:** In addition to the preceding random acceptance sampling and testing, DOT&PF may also isolate from a normal subplot any material that is suspected of being defective in gradation, fracture, sand equivalent, asphalt content. A minimum of three random samples of the suspect material will be obtained and tested. The material will then be evaluated for a price adjustment in accordance with the statistical acceptance section. This material will be considered a separate lot.
- C. **An Entire Sublot:** If an entire subplot is rejected in accordance with Section 1-06.2, two additional random samples from this subplot will be obtained and the subplot evaluated as an independent lot with the original test result included.
- D. **A Lot In Progress:** The Design-Builder shall shut down operations whenever:
  - 1) the CPF drops below 0.90 and in such event shall not resume production or placement of the material until such time as the Design-Builder has demonstrated that specification material can be produced for the lot in progress: or
  - 2) the CPF drops below 1.00 unless the Design-Builder is taking appropriate corrective action.

When the material in question is from a stockpile which was produced without process quality control, (i.e. sampling and testing at a defined frequency by qualified technicians using verified equipment) the entire stockpile of material will be considered to be a source. Additional processing such as rescreening or other means may be necessary to provide specification material.

- E. **An Entire Lot:** If an entire lot has a CPF of less than 0.75, the entire lot shall be rejected.

The Price Adjustment will be calculated according to Section 1-06.2(2). Since these specifications designate the payment of the material by other than a unit bid price basis, the unit price for calculating a "Price Adjustment" as stated in Appendix B, table 7 will be used. The payment for the Price Adjustment shall be made under the item "Non-specification Material Price Adjustment" and "Non-specification Material Compaction Price Adjustment".

The calculation of a Price Adjustment for non-specification concrete strength shall be in accordance with Section 6-02.3(5)L of the Standard Specifications. The payment of the "Price Adjustment shall be made under the item "Non-specification Material Price Adjustment"

The calculation of a Price Adjustment for non-specification hot mix asphalt concrete pavement shall be in accordance with Section 5-4.5(1) of the Standard Specifications. The payment of the Price Adjustment shall be made under the item “Non-specification Material Price Adjustment” and “Non-specification Material Compaction Price Adjustment.”

#### *1140.09.4 Non-Statistical Acceptance of Small Quantities of Materials*

DOT&PF may elect to accept small quantities of materials without normal sampling and testing frequencies. The determination to accept materials using this provision rests solely with DOT&PF. Structural Concrete will not be considered under the small quantity definition.

An item can be accepted as a small quantity if the proposed project quantity for a specific material is less than the one subplot as defined in Appendix B, table 2 or less than one-half of a subplot as defined in Appendix B, table 2 for mainline paving.

For materials not listed in Appendix B, table 2 DOT&PF may use the acceptance criteria for small quantities stated in the Qualified Product List.

Questions that the Engineer will consider prior to use of small quantity acceptance are:

- A. Has the material been previously approved?
- B. Is the material certified?
- C. Is there a current mix design or reference design?
- D. Has it been recently tested with satisfactory results?
- E. Is the material structurally significant?

Small quantity acceptance may be accomplished by visual, certification, or other methods. Acceptance of small quantities of materials by these methods must be fully documented. Documentation of materials under these methods must be provided by the Design-Builder accepting the material. For visual documentation, an entry should be made in the Inspectors Daily Report, or noted on field records, with a statement as to the basis of acceptance of the material approximate quantity involved.

Small quantity acceptance may be used for any proposal quantity of the following uses:

- A. Driveways
- B. Road approaches
- C. Paved ditches and slopes

#### *1140.09.5 Verification Sampling and Testing*

Sampling and splitting of materials for verification and referee testing shall be performed by DOT&PF or its designated agent. Verification and referee split samples shall be randomly obtained at a frequency stated in Appendix B, table 2. The verification sample test results will be statistically evaluated with the resultant Composite Pay Factor (CPF) compared to the Composite Pay Factor (CPF) of the Design-Builder's tests.

For material represented by the Design-Builder's Quality Control tests, test results may be used for acceptance decisions when the accumulative Composite Pay Factor (CPF) is:

- A. Above 0.90 and
- B. the difference between the computed CPF's for the Design-Builder's QC tests and DOT&PF's verification tests is less than 0.05.

When the CPF for the Design-Builder Quality Control tests drops below 0.90, production or placement of the material shall be halted until the Design-Builder can demonstrate that specification material can be produced from the material source in question.

When the differences between the Design-Builder Quality Control tests and DOT&PF verification tests is greater than or equal to 0.05 the disputes resolution process for Tested Materials described in Section 1140.10.03 shall be initiated.

To facilitate the statistical evaluation of the verification samples, one verification sample will be obtained from each of the first three Design-Builder's sublots and then one verification sample for each subplot quantity stated in Appendix B, table 2.

When certain attributes of a material are not statistically evaluated for acceptance, such as concrete slump, entrained air content, and temperature for concrete, and the differences between the Design-Builder's test results and DOT&PF's verification test results exceed the values shown in Appendix B, table 1, placement shall be halted until the Design-Builder can demonstrate that the material is within the required specifications.

#### *1140.10.03 Tested materials*

A cooperative effort by DOT&PF and Design-Builder to identify the cause of the non-specification material or the discrepancy in the test results will include the following actions:

- A. A check of test data, calculations and results;
- B. Observation of the Design-Builder's sampling and testing by the DOT&PF Region Independent Assurance Inspector; and
- C. Check of test equipment by the DOT&PF Region Independent Assurance Inspector.

When the source of test result discrepancies between the Design-Builder and DOT&PF laboratories cannot be resolved, testing of the referee split sample shall be performed by DOT&PF's Regional Materials Lab. The testing of the sample will be performed in duplicate by the laboratory without knowledge of the specific project conditions such as the identity of the Design-Builder, the test results of DOT&PF or Design-Builder, or the specification targets. The results of these tests will be binding on both the Design-Builder and DOT&PF. The Design-Builder or its representative may witness the testing if requested. Costs incurred for referee testing will be paid by the party found in error, at the established laboratory rates.

## **1150 Quality Control Inspections**

### **1150.01 Witness and Hold Points**

Witness and Hold Points are to be established where notification of DOT&PF is required for DOT&PF's option of observing or visually examining a specific work operation or test. Witness Points are points identified within the inspection plan which require notification of DOT&PF. Work may proceed beyond a witness point with or without participation by DOT&PF provided proper notification has been given. Hold Points are mandatory verification points identified within the inspection plan beyond which work cannot proceed until mandatory verification is performed and a written release is granted by DOT&PF. Witness and Hold Points should be identified in the construction process where critical characteristics are to be measured and maintained, and

at points where it is nearly impossible to determine the adequacy of either materials or workmanship once work proceeds past this point. All Activity Meetings shall be included in the Design-Builder's QC/QA Plan as Hold Points.

### **1150.02 Coordination and Notification**

The Design-Builder's Construction QC manager shall designate a primary point of contact for notifications for inspection at hold points and witness points. An alternate individual may be designated to function in this capacity in his/her absence. DOT&PF will also designate one individual to handle responses to the Design-Builder with written reports or releases for hold and witness points.

The time necessary to respond to the notification for inspection at hold and witness points shall be stated in the Design-Builder's QC Plan and mutually agreed to by both the Design-Builder and DOT&PF.

### **1150.03 Hold Points**

The following are mandatory hold points for inspections to be performed by DOT&PF. The Design-Builder may wish to include others.

#### **1150.03.01 Bridges and Structures (incl. all foundations)**

##### **1. Prior to all concrete placements**

- a) DOT&PF will check that the Design-Builder has completed the following:
  - (1) Documentation is present for rebar (Mill Cert. or Mfg. Cert.)
  - (2) Critical rebar clearances have been checked.
  - (3) Rebar size, spacing and splices have been checked.
  - (4) Roadway deck steel is properly supported

DOT&PF will perform the following independent inspections or checks.

- (1) Spot check deck steel for proper clearance to finish deck elevations
- (2) Spot check form dimensions
- (3) Check that concrete mix design has been reviewed by DOT&PF
- (4) Pre-placement meeting held
- (5) Curing procedures agreed on and equipment available, including backups

##### **2. Post-Tensioning**

- a) DOT&PF will perform the following independent inspections or checks.
  - (1) Spot check condition (rust) of post-tension strand or bar
  - (2) Spot check that bar or strand has been tested by DOT&PF and test reports are available, incl. "e" values, "area", stress-strain curve is present
  - (3) Spot check that proper size and quantity of post tensioning has been installed
  - (4) Check that jack has current calibrations

- (5) Check that proper jacking force is applied and proper data entered for calculations
3. Prestressed Girders
    - a. Check that girders have been inspected and released for shipment by DOT&PF
    - b. Spot check that camber of each has been field determined and properly calculated in final grades
  4. For shaft foundations, DOT&PF will review the CSL test results after the first shaft constructed at each bridge or wall to verify shaft integrity
  5. For spread footings and walls, DOT&PF will inspect footing excavation base prior to concrete pour to verify that soil/rock encountered is consistent with the Geotechnical Report

#### 1150.03.02 Pavements & Bridge Decks

##### 1. Concrete - Pre-pour conference

The following elements will be discussed:

- a) Mix Design reviewed for conformance with specifications,
  - b) Aggregate sources have proper qualifications i.e. LA Wear, gradation, etc.
  - c) Proper equipment available, i.e. screed, broom and curing bridges
  - d) Each lot of curing compound has been tested by DOT&PF
  - e) Proper testing equipment available, beam molds, stinger, etc.
  - f) Provisions for checking grade lines ahead of paving operation
  - g) Date and station stamps available and layout properly marked
  - h) Dowel bar and tie bar placement
  - i) Emergency covering material available in case of sudden rain
- ##### 2. Asphalt Paving - Pre-paving conference

The following elements will be discussed:

- a) Mix Design developed in conformance with specifications,
- b) Calibration factor developed using production furnace, factor provided to DOT&PF for verification, IAI, and Dispute Resolution testing,
- c) Aggregate sources used have proper qualifications i.e. LA Wear, degradation, etc.
- d) Stockpile of tested aggregate necessary to pave the project
- e) QC sampling and testing by random method discussed
- f) Compaction test sites determined on random basis
- g) Traffic control, flagging & temp. striping

- h) Hours of operation
- i) Weather & surface temperature limitations
- j) Paving methods - pick up machine, trucks, load transfer device
- k) Load limits
- l) Clear zones
- m) Adjust drainage apertures and utilities
- n) Tack Coat applications
- o) Statistical evaluation policies
- p) Options on use of rollers
- q) Grade control, transverse and longitudinally
- r) QC sampling and testing

#### **1150.04 Witness Points**

The following are witness points for inspections or checks that DOT&PF may elect to perform. The Design-Builder may wish to include others.

##### **1150.04.01 Pipe Installations**

DOT&PF shall be given the opportunity to check that the Design-Builder has completed the following:

1. Water Mains
  - a) Hydrants meet using agency approval
  - b) Bolted connections properly torqued
  - c) Thrust blocks are of proper mass and location
  - d) Compaction tests reports for bedding and backfill zones available
  - e) Material Certificates for materials where appropriate
2. Sewers
  - a) Check that leak tests performed (air and/or exfiltration or infiltration tests)
  - b) Compaction tests reports for bedding and backfill zones available
  - c) Material Certificates for materials where appropriate
3. Culverts
  - a) Compaction tests reports for bedding and backfill zones available
  - b) Material Certificates for materials where appropriate

##### **1150.04.01 Compaction**

DOT&PF shall be given the opportunity to check that the Design-Builder has completed the following:

1. Embankment

- a) Compaction - minimum one test / lift
- b) Optimum Moisture
2. Backfill Zones
  - a) Compaction - minimum one test / lift / installation
3. Surfacing
  - a) Compaction - minimum one test / lift

#### **1150.05 Performance Verification of Project Geotechnical Elements/Features**

The Design-Builder's QC/QA plan shall include inspection and verification tests to determine the integrity of foundation structures and elements and to verify that their performance is as anticipated from the design. For drilled shaft foundations where water or slurry is present above the base of the shaft, Crosshole Sonic Logging (CSL) testing shall be conducted to verify the integrity of the shaft.

Walls shall be designed for expected total and differential settlements based on site geotechnical analyses. The Design-Builder's QC/QA plan shall include inspection, wall face tolerance and deflection measurements, and verification and proof tests for anchors and soil nails, to determine the integrity of foundation structures and wall elements, and to verify that the wall performance is as anticipated from the design.

The Design-Builder shall utilize geotechnical instrumentation as necessary and as recommended in the Geotechnical Report to verify the performance of areas of significant cuts or fills regarding deformation and stability, in particular where soft or otherwise unstable ground is present, or to control filling or cutting rates to maintain stability. An instrumentation and monitoring plan, including criteria which will be used to determine acceptance, shall be included in the Design-Builder's QC/QA plan.

If soil densification or other foundation soil stabilization techniques are used, the Design-Builder's QC/QA plan shall address how the integrity and success of the soil densification technique will be investigated, monitored, and compared to the intended design.

#### **1150.06 Surveillance Inspection**

DOT&PF shall have the right to conduct surveillance inspection to verify the adequacy of the Design-Builder's inspection activities. Unacceptable work, whether the result of poor workmanship, use of defective materials, damage through carelessness or any other cause shall be removed immediately and replaced in an acceptable manner when found.

#### **1150.07 Fabrication Inspection**

The inspection of project specific fabricated items will be accomplished by DOT&PF using its own forces. To facilitate these inspections the Design-Builder will promptly notify DOT&PF of the intended fabricator and provide 2 copies of the "Approved" Shop Drawings. The fabricated items to be inspected include but are not limited to the following:

1. Treated timber and lumber except guardrail post and blocks
2. Treated piling
3. Epoxy coated rebar
4. Anchor bolts shipment
5. Type 1 raised pavement markers
6. Bridge bearings

7. Miscellaneous items that are shop welded
8. Miscellaneous galvanized steel items
9. Concrete and metal culvert pipe over 700 mm (27 inches) in diameter
10. Precast concrete panels
11. Prestressed concrete girders
12. Permanent precast concrete median barrier
13. Steel for bridges
14. Traffic signal and illumination standards
15. Utility vaults
16. Metal drainage castings

### **1150.08 State Inspected and Tested Items**

DOT&PF using its own resources will provide inspection and testing of the following off-site fabricated materials.

#### **1150.08.01 Highway Traffic Signs**

All traffic signs will be inspected at the point of fabrication by a representative of the DOT&PF. All signs so inspected will be tagged by the inspector prior to shipment with a Sign Acceptance report sent to the Engineer.

#### **1150.08.02 Traffic Signal Controllers**

All traffic signal controllers will be tested by DOT&PF. The Design-Builder is advised that the time necessary to test a controller is dependent upon the quality of the product submitted and the response time of the vendor in correcting deficiencies in the programming or circuitry. Only controllers tested by DOT&PF shall be installed.

### **1150.09 Quality Control Inspection**

The QC Plan shall contain inspection plans for each construction work item included in the project whether performed by the Design-Builder or a subcontractor or vendor. Work items may be definable features or items of work defined by DOT&PF's Standard Specifications.

### **1150.10 Work Activities**

The Design-Builder shall provide inspection for all work activities for conformance with the construction requirements in the Contract Provisions. The work activities to be inspected include but are not limited to the following types of work:

Clearing, Grubbing and Roadside Cleanup  
Removal of Structure and Obstruction  
Roadway Excavation and Embankment  
Haul  
Subgrade Preparation  
Watering  
Structure Excavation  
Ditch Excavation  
Trimming and Cleanup  
Construction Geotextiles  
Stockpiling Aggregates  
Site Reclamation  
Gravel Base  
Ballast and Crushed Surfacing  
Asphalt Treated Base  
Subsealing  
Bituminous Surface Treatment  
Asphalt Concrete Pavement  
Concrete Structures  
Steel Structures  
Piling  
Bridge Railing  
Painting  
Waterproofing  
Cribbing  
Concrete Barrier  
Precast Concrete Retaining Wall Stems  
Drains  
Culverts  
Structural Plate Pipe, Pipe Arch, Arch and Underpass  
Storm Sewers  
Manholes, Inlets, Catch Basins, and Drywells  
Cleaning Existing Drainage Structures  
Pipe and Fittings for Water Mains  
Trench Excavation, Bedding, and Backfill for Water Mains  
Pipe Installations for Water Mains

Hydrants  
Service Connections  
Sanitary Sewers  
Side Sewers  
Sewer Cleanouts  
Erosion Control  
Roadside Planting  
Irrigation System  
Curb, Gutter and Spillways  
Integral Cement Concrete Curbs  
Precast Traffic Curbs & Block Traffic Curbs  
Raised Pavement Markers  
Guide Posts  
Guardrail  
Chain Link and Wire Fence  
Monument Cases  
Cement Concrete Sidewalks  
Riprap  
Concrete Slope Protection  
Impact Attenuator System  
Mailbox Support  
Redirectional Land Form  
Illumination, Traffic Signal System, and Electrical  
Permanent Signing  
Pavement Marking  
Temporary Pavement Markings  
Rock Wall  
Glare Screens  
Rock Protection Fence  
Wire Mesh Slope Protection  
Material Quality Controls  
Aggregates  
Hot Mix Asphalt  
Portland Cement Concrete

The Design-Builder's Quality Control Plan shall use the inspection procedures outlined in the DOT&PF Construction Manual (M47-01).

The inspection of electrical items by the Design-Builder shall be limited to the inspection of: foundation for illuminaires, signal poles, and service and controller cabinets; erection of the illuminaires and signal poles; underground conduit placement; and detector loop placement. The inspection of the electrical circuitry will be accomplished by DOT&PF's Electrical Inspectors.

During the design of the project, each item of work shall be reviewed to determine what significant characteristics of the item need to be monitored during the construction phase to ensure that the completed project will function in accordance with the design intent over its expected lifetime. The inspection plans shall include the appropriate criteria, tests, and inspection requirements identified in DOT&PF's Standard Specifications, Construction Manual and Materials Manual. The following elements are to be addressed within each item inspection plan:

1. Identification - Work items included in the plan.
2. Characteristics - What characteristics of the item will be inspected.
3. Acceptance Criteria - Directly or by reference, provide sufficient information for the inspector to use to determine if the item or activity is conforming or nonconforming. Maximum use of checklists shall be made for this purpose. See Scope of Work, Section Construction Inspection Checklists, for requirements for construction inspection checklists. The plan should indicate what action will be taken for items found to be non conforming.

### **1150.11 Inspection Guidelines**

Inspections shall be performed during all phases of the project from start to completion in order to assure that the work meets, and is being performed in accordance with the Contract Provisions, plans, specifications, approved submittals, and any requirements of local jurisdictions.

An examination of the quality of workmanship shall also be conducted to confirm that all work is being performed in accordance with all construction documents and any understandings reached at the Activity Meeting for that item.

Appropriate follow-up inspections, and sampling and testing of materials shall be performed continuously as each item of work progresses to assure consistency in workmanship, compliance with contract requirements and design and construction documents, and to assure satisfactory performance of the work in service.

#### ***1150.11.01 Inspection Documentation***

Each of the Design-Builder's QC inspectors shall summarize their daily inspections, tests and material sampling activities in a daily report. DOT&PF's Inspectors Daily Report or a similar form shall be used for maintaining a written record of inspection results. Copies of the inspector's diaries shall be provided to DOT&PF daily. The report shall consist of the following key points of record:

1. Work performed by the firm, subcontractor, or material supplier.
2. Weather conditions.

3. Inspections performed and their results. Identify any corrective actions taken.
4. Communications.
5. Type, location, and results of all tests performed.
6. Delays encountered.
7. Identify any safety related problems and corrective action taken.
8. Identify all non-conforming work and the corrective action taken.
9. Signature of inspector.

#### *1150.11.02 Construction Inspection Checklists*

The Design-Builder's QC/QA Plan shall include inspection checklists for all anticipated construction operations and/or processes. These checklists are to be used by the Design-Builder's inspection personnel and other with responsibility for quality control such as foreman and individual workers.

The individual checklists shall be approved by DOT&PF as part of the overall approval of the Design-Builder's QC/QA Plan. The checklist for each work activity shall include the construction requirements stated in the standard specifications or Contract Provisions for that work activity. As a minimum each checklist shall address the following:

<b>Date</b>	
<b>Time</b>	
<b>Location</b>	1. Pier or structure component 2. Drainage Code #, 3. Compaction Report (referenced to centerline station and subgrade elevation etc.)
<b>Type of Inspection</b>	Completion of drainage code, final check pre-pour check, etc.
<b>Specification requirement</b>	List of applicable specifications for this item
<b>Frequency</b>	Indicated test or inspection frequency if any (see Appendix B, table 2 for material test requirements)
<b>Items Inspected</b>	List elements or items inspected(i.e. rebar, chair placement or pipe size and type, grate box, pipe bedding, etc.)
<b>Conformation to Specifications</b>	Check that work and materials meet the appropriate specifications
<b>Deficiencies noted</b>	Note any deficiencies to specifications
<b>Individual notified</b>	Individual notified for corrective action
<b>Corrective action noted</b>	What form of corrective action is recommended to

	bring item into conformance with specifications
<b>Action taken</b>	What corrective action was taken
<b>Material documentation</b>	List and attach a copy of all required documentation (test reports – such as compaction test, aggregate gradation; mill tests; manufacture's certificates of compliance: catalog cut or product specifications, etc.)
<b>Responsible Party Notified</b>	Name of foreman or worker responsible for work.
<b>Signature of Inspector</b>	

## **SECTION 1200 CONSTRUCTION MAINTENANCE**

### **1210 General**

This section pertains to maintenance responsibilities during the contract time.

### **1220 DOT&PF Responsibility**

The highway section will be properly maintained with all drainage clean and operational prior to the start of contract time. Hard surface areas throughout the project will be swept and clean of debris. DOT&PF will complete a Pre/Post Construction Project Review Checklist prior to the start of construction.

### **1230 Design-Builder Responsibility**

The Design-Builder shall be responsible for maintaining the highway section during the life of the project. Specific responsibilities for the Design-Builder are listed in the Special Provision, Public Convenience and Safety/Construction Under Traffic.

## SECTION 1300 PRODUCT WARRANTY PROVISIONS

The Design-builder shall warrant the new pavement sections for the mainline and ramps.

### 1310 General

The Design-Builder shall furnish, as part of the Final Proposal, a letter signed by an authorized representative stating that the Design-Builder shall warrant materials, work, and performance as described by this specification. The Design-Builder shall be responsible for the pavement performance and warranty work for a period of five years following final acceptance of the project by DOT&PF. The term Final Acceptance as used in this specification does not include the warranty period.

Upon final acceptance of the project, the necessary warranty bond for the pavement item(s) shall be in effect for the total five year warranty period. The warranty bond shall be in the amount of **[\$200,000]**. The bond shall insure the proper and prompt completion of required warranty work following completion of the pavement, including payments for all work performed, equipment and materials used in accordance with this specification. The extent of warranty work and the Design-Builder's liability for the work that may be required by these warranty provisions is not limited by the warranty bond amount.

The warranty bonds shall be one of the following:

- A. A single term five year warranty bond that will be in effect for the entire warranty period
- B. Certification from the Design-Builder and its bonding agency that the contract bond for the project will remain in effect for a period of one year beyond final acceptance of the project and will include warranty work as described herein. Warranty bonds extending beyond that period will be supplied by the Design-Builder. The Design-Builder will provide a two year renewable, non-cumulative warranty bond for two consecutive terms. Failure on behalf of the contractor or its surety to renew this warranty bond will result in a 20 percent payment of the face amount of the contract bond to DOT&PF and the Design-Builder shall be considered in default.

### 1320 Performance

The parameters that will be used by DOT&PF to evaluate performance of all constructed pavements for this project are ride quality, pavement friction, pavement surface condition, structural capacity and material quality. These parameters will be measured and evaluated by DOT&PF after construction, annually (February through May) and prior to expiration of the warranty period. DOT&PF will supply the Design Builder, in writing, the results of the pavement condition survey within 30 days of survey completion.

At least 60 days prior to the expiration of the warranty or at any time deemed necessary by the Engineer, the Engineer will notify the Design-Builder in writing if the pavement distress exceeds the criteria outlined in Tables 2, 3, or 4 below, as applicable. The Design-Builder will not be held responsible for distresses that are caused by factors beyond the control of the Design-Builder. A finding that the distress is due to factors outside the control of the Design-Builder shall be based on evidence submitted by the Design-Builder to the Engineer. If the Engineer does not agree with the Design-Builder

then the Dispute Resolution provisions as outlined in Special Provision Section 1-04.5 will be followed. Within 45 days of receiving notice, the Design-Builder shall commence to undertake the warranty work, submit a plan for completing the work within the following nine months, and/or provide written objection if the need for warranty work is contested. Disagreement between the Design-Builder and the Engineer shall be resolved in accordance with the dispute resolution provisions as outlined in Special Provision Section 1-04.5. If the Design-Builder fails to undertake warranty work within 45 days after receiving written notice from the Engineer or Dispute Resolution Team, DOT&PF will complete the warranty work or contract to have it completed and the Design-Builder shall be responsible for the total cost of the warranty work.

Coring, milling, or other destructive procedures may not be performed by the Design-Builder, without prior consent of the Engineer. The Design-Builder will not be responsible for damages as a result of coring, milling or other destructive procedures conducted by DOT&PF, utility companies or other entities not under the control of the Design-Builder.

All repair, maintenance, and warranty work performed as part of this warranty provision, except as excluded elsewhere in this provision, shall be covered by the warranty provision for the remainder of the warranty term.

During the warranty period, the warranty work shall be performed at no cost to DOT&PF. Maintenance (elective and preventative action) work that the Design-Builder elects to perform during the warranty period shall be at no cost to DOT&PF. If corrective action needs to be taken, the Design-Builder shall coordinate all such activities to minimize disruption to the traffic, with prior approval of DOT&PF.

Maintenance or Warranty work that requires a resurfacing of the pavement shall not be performed later than October 15 without written approval from the Region Administrator. In addition, asphalt concrete shall not be placed on any wet surface, or when the average surface temperatures are less than those specified in table 1, below, or when weather conditions otherwise prevent the proper handling or finishing of the bituminous mixtures:

<b>Table 1 AC Placement</b>	
Compacted Thickness (mm)	Surface Course Temperature
Less than 30	13°C
31 to 60	7°C
61 to 105	2°C
More than 105	DNA

### **1330 Asphalt Concrete Pavement**

#### **1330.01 Ride Quality**

Baseline measure of the International Roughness Index (IRI) will be conducted using DOT&PF's South Dakota Type Profiler. Ride quality will be evaluated using a profilograph as indicated in the 1998 Standard Specifications for Road, Bridge and

Municipal Construction and as follows:

- A. The requirement for final acceptance will be a ride quality value of less than 100 centimeters per kilometer (60 inches per mile). If this limit is exceeded the Design-Builder shall replace the defective pavement (minimum depth of 45 millimeters) for the full lane width over the section at the Design-Builder's expense.
- B. The ride quality value at the end of five years following project completion shall not exceed 150 centimeters per kilometers (95 inches per mile). If this criterion is not met, the Design-Builder shall take corrective action as indicated above to bring this parameter within the limits.

### **1330.02 Pavement Friction**

Pavement friction shall meet the following performance criteria:

- A. The requirement for final acceptance is a friction number greater than 50. Pavement exhibiting values less than 50 will require corrective action to provide values that exceed 50.
- B. The friction value at the end of five years after the project has been completed shall be no less than 40. Pavements with a friction number less than 40 will require corrective action within six months. If at any time during said five-year period DOT&PF determines, in accordance with ASTM E274-90, that this criterion is not met, upon receipt of notice to such effect from DOT&PF, the Design-Builder shall take corrective action to provide values that meet or exceed 40, within six months after receipt of the notice.

### **1330.03 Pavement Surface Condition**

Pavement surface condition shall meet the following performance criteria:

- A. Final acceptance will permit no identifiable distress as defined by the DOT&PF Pavement Surface Condition Rating Manual. If these criteria are not met, the Design-Builder shall take corrective action as outlined in Table 2.
- B. Distress types exceeding the allowable level of severity at the end of five years after Final Acceptance shall require corrective action as outlined in Table 2.

### **1330.04 Structural Capacity**

The structural capacity (thickness, strength) of pavement sections shall be evaluated during the construction phase through the Design-Builder's approved QC/QA program. The parameters that will be evaluated include thickness, strength, and quality of materials. Load transfer capacity of new concrete pavements will be verified to comply with design assumptions. The strength, thickness, and quality of materials will be evaluated to ensure compliance with the approved design.

The requirement for final acceptance shall be to meet or exceed the design criteria.

### **1330.05 Material Quality**

Material quality shall be evaluated prior to and during construction through the Design-Builder's approved QC/QA program. Materials specified in the design and meeting the requirements outlined in the Standard Specifications shall be evaluated to meet or exceed requirements. Materials not meeting these specifications shall be removed immediately and replaced with acceptable material.

## 1340 Portland Cement Concrete

### 1340.01 Ride Quality

A baseline measure of the International Roughness Index (IRI) will be conducted using DOT&PF's South Dakota Type Profiler. Ride quality will be evaluated using a profilograph as indicated in the 2004 Standard Specifications for Highway Construction and as follows:

- A. The requirement for final acceptance on newly constructed concrete pavement will be satisfaction of Standard Specification Section 5-05.3(12). If said criteria are not met, the Design-Builder shall diamond grind the profile back to acceptable limits provided the area requiring grinding does not exceed five percent of the surface area of a day's production and does not compromise the structural capacity of the section. If this limit is exceeded or the section thickness is reduced by more than five percent, the Design-Builder shall replace the defective pavement for the full lane width over the section at the Design-Builder's expense.
- B. The requirements for Final acceptance for ride quality on concrete pavements that have been retrofitted with dowel bars are as follows:
  1. The cross section shall not vary from true plane to permit a 6 millimeter (1/4 inch) thick shim, 75 millimeter (3 inches) in width, to pass under a 3 meter (10 foot) straight edge laid on the roadway surface perpendicular to the centerline.
  2. The cross section shall not vary from a true plane to permit a 3 millimeter (1/8-inch) thick shim, 75 millimeters (3 inches) in width, to pass under a 3 meter (10 foot) straight edge laid on the roadway surface parallel to the centerline.
  3. The high points and profile index shall be determined by an electronic profilograph using procedures described in DOT&PF Test Number 807. The profile index shall not exceed metric **\$\$\$?\$\$\$** per mile section or have any high points in excess of 6 millimeter (1/4-inch).

If these criteria are not met, the Design-Builder shall diamond grind the profile to acceptable limits provided the area requiring grinding does not reduce the structural capacity of the pavement section. If this limit is exceeded or the pavement thickness is reduced by more than five percent, the Design-Builder shall, upon receipt of notice to such effect from DOT&PF, replace the defective pavement for the full lane width over the section at the Design-Builder's expense.

- C. The IRI value at the end of five years following Final Acceptance shall not increase by more than 25 percent from the IRI value determined after project completion. If at any time during said five-year period DOT&PF determines that this criterion is not met, upon receipt of notice to such effect from DOT&PF, the Design-Builder shall take corrective action as indicated above to bring this parameter within the limits.

### 1340.02 Pavement Friction

Pavement friction shall meet the following performance criteria:

- A. The requirement for Final acceptance is a friction value greater than 50. Pavement exhibiting values less than 50 will require corrective action to provide values that exceed 50.
- B. The friction value at the end of five years after the project has been completed shall be no less than 40. If at any time during said five-year period DOT&PF determines, in accordance with ASTM D274-90, that this criterion is not met, upon receipt of notice to such effect from DOT&PF, the D-B shall take corrective action to provide values that meet or exceed 40, within six months after receipt of the notice.

### **1340.03 Pavement Surface Condition**

Pavement shall meet the following performance criteria:

- A. Final acceptance will permit no identifiable distress as defined by the DOT&PF Pavement Surface Condition Rating Manual. If this criterion is not met, the Design-Builder shall take corrective action as outlined in Table 3.
- B. Distress types exceeding the allowable level of severity at the end of five years after Final Acceptance shall require corrective action as outlined in Table 3.

### **1340.04 Structural Capacity**

The structural capacity (thickness, strength) of pavement sections shall be evaluated during the construction phase through the Design-Builder's approved QC/QA program. The parameters that will be evaluated include thickness, strength, and quality of materials. Load transfer capacity of new concrete pavements will be verified to comply with design assumptions. The strength, thickness, and quality of materials will be evaluated to ensure compliance with the approved design.

The requirements for final acceptance shall be to meet or exceed the design criteria.

If the structural capacity is determined to be deficient by DOT&PF, the Design-Builder shall take corrective action to rectify the deficiency.

### **1340.05 Material Quality**

Material quality shall be evaluated prior to and during construction through the Design-Builder's approved QC/QA program. Materials specified in the design and meeting the requirements outlined in the Standard Specifications shall be evaluated to establish that they meet or exceed requirements. Materials not meeting these specifications shall be removed immediately and replaced with acceptable material. DOT&PF verification testing shall in no way relieve the Design-Builder of responsibility under this warranty.

## **1350 Required Corrective Actions**

**TABLE 2. Required Corrective Actions for Pavement Distress Levels – Asphalt Concrete Pavements**

<b>Distress Type</b>	<b>Allowable Level of Severity</b>	<b>Allowable Extent of Severity</b>	<b>Corrective Action</b>
Rutting and Wear	Less than 6 mm (1/4 inch)	Project length	Mill and fill with 50 mm (2 inches) of asphalt concrete pavement required
Alligator Cracking	Less than 6 mm (1/4 inch)	Less than ten percent of project length of both wheel paths	Pavement repair required
Longitudinal Cracking	Less than 6 mm (1/4 inch)	Less than 100 percent of project length (single crack)	Crack seal required
Transverse Cracking	Less than 6 mm (1/4 inch)	Less than 4 cracks per 30 m (100 feet)	Crack seal required

**TABLE 3. Required Corrective Actions for Pavement Distress Levels – New Concrete Pavement**

<b>Distress Type</b>	<b>Allowable Level of Severity</b>	<b>Allowable Extent of Severity</b>	<b>Corrective Action</b>
Cracking	One crack per panel	Less than ten percent of project length	Full depth repair required
Joint and Crack Spalling	Spalls less than 6 mm (1/4 inch) wide	Less than ten percent of joints and cracks	Partial depth repair required
Pumping and Blowing	Slight shoulder depression, no staining	Less than ten percent of joints and cracks	Full depth panel replacement and repair of underlying base material required
Faulting	Less than 3 mm (1/8 inch)	Less than ten percent of joints	Diamond grinding back to zero tolerance without compromising pavement section. If the structural integrity of the pavement section is compromised then full depth slab replacement is required.
Patching	Less than ten percent of panel area is patched	Less than ten percent of all panels in travel lane are patched	Full depth panel repair required
Scaling	Pavement appears slightly rough	Less than ten percent of pavement surface	Diamond grinding back to zero tolerance without compromising pavement section. If the structural integrity of the pavement section is compromised then full depth slab replacement

			required.
Wear	Less than 6 mm (1/4 inch)	Less than ten percent of one lane mile	Diamond grinding back to zero tolerance without compromising pavement section. If the structural integrity of the pavement section is compromised then full depth slab replacement required.
Joint Seal Damage	Hardening, adhesive failure, cohesive failure, complete loss of sealant	Less than ten percent of joint length per one lane mile	Joint resealing required

**TABLE 4. Required Corrective Actions for Pavement Distress Levels – Dowel Bar Retrofit**

Distress Type	Allowable Level of Severity	Allowable Extent of Severity	Corrective Action
Cracking within slot	Not acceptable	Not acceptable	Replace pour back material and dowel bar (if crack is full depth) required
Wear within slot	Less than 6 mm (1/4 inch)	Less than five percent of one lane mile	Partial depth repair required
Bond failure within slot	Not acceptable	Not acceptable	Replace pour back material required
Faulting	Less than 3 mm (1/8 inch)	Less than ten percent of panels	Full depth panel replacement of adjacent slabs at each joint location required
Spalling within slot	Spalls less than 6 mm (1/4 inch) wide	Less than ten percent of joints and cracks	Partial depth repair required