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PART 2

TECHNICAL INFORMATION & REQUIREMENTS

1.0 DESIGN-BUILDER'S SCOPE OF WORK

1.1 Project Description

The Project is located on Rte. 29 NBL at the Amherst/Nelson County Line, Virginia. The purpose of this Project is to replace the existing structurally deficient NBL bridge with a new two-lane bridge, along with the reconstruction of the roadway approaches on both ends of the proposed structure. The elevation of the roadway profile shall increase to approximately match that of the Rte. 29 existing SBL bridge. The limits of the proposed project begin approximately 650 feet from the south end of the existing NBL bridge and end approximately 900 feet from the north end of the existing NBL bridge. The length of the project is approximately 0.4 miles. However, it is noted that this description and length are approximate only and based on the preliminary design shown in the RFP Information Package. The final project length may vary depending on the Design-Builder's final design and this fact shall be taken into account in the Offeror's proposal. During construction, traffic traveling on Rte. 29 NBL shall be detoured to Rte. 29 SBL.~~ The minimum traffic lane widths shall be 12 feet in each direction. The design speed for the detour shall be 50 miles per hour and the detour shall be posted for 45 miles per hour during construction. The detour may extend outside the proposed construction limits as long as it remains within the limits of existing Right-of-Way.~~ (detour requirements moved to Section 2.7 of this document)

The elements detailed in the preliminary plans contained in the RFP Information Package are considered to be the basic Project configuration. Modifications such as additional right-of-way requirements, design exceptions/waivers, and environmental impacts due to adjustments of this design may be required as described elsewhere in this document. However, the Offerors should note that they are solely responsible for any schedule and cost impacts due to these modifications and National Environmental Policy Act ("NEPA") document re-evaluations associated with the Offeror's design changes.

A design exception for grade has been approved for the Project and is listed on the Title Sheet of the preliminary road plans (Included in the RFP Information Package – CD-ROM).

The Typical Section shown in the preliminary road plans for Sta. 229+50 to Sta. 232+00 is based on a shoulder width and ditch configuration that meets AASHTO standards but does not meet VDOT GS-1 design standards and will require a design waiver. If the Design-Builder utilizes the same shoulder width and ditch configuration as shown in the preliminary plans for this section, the Design-Builder shall submit a design waiver for both the shoulder width and ditch. The design waiver will be reviewed and approved by VDOT's Lynchburg District Location and Design Engineer.

1.2 Anticipated Scope of Work

The anticipated scope of work to be undertaken by the Design-Builder under the design-build contract for this Project will be identified in the RFP. This work is anticipated to include, among other things: (a) completing design, (b) supporting VDOT in acquiring all environmental permits and approvals, (c) performing roadway and bridge construction, (d) providing quality assurance and quality control for design and construction, and (e) providing overall project management. Brief descriptions of this anticipated work are set forth below. Design-Builders should note that all work performed on this Project shall be completed using Imperial Units.

1.3 Anticipated Design Services

Design services shall address all items necessary for construction and operation of the completed facility. Design services are anticipated to include but are not limited to: surveying, roadway design, bridge design, traffic control devices, maintenance of traffic plans, signs, guardrail, pavement markings and marker plans, drainage design, design of stormwater management facilities, geotechnical investigation including borings and analysis, materials analysis, hydraulic and hydrologic analysis, scour analysis and pavement design. Other data collection and technical studies anticipated include: geotechnical investigation, borings and analysis, and materials analysis.

A required minimum pavement section has been provided by VDOT in the RFP for bidding purposes. The Design-Builder will be required to validate the suitability of the minimum pavement section, and if deemed inadequate increase the pavement layer thicknesses subject to VDOT approval. The Design-Builder will be responsible for the final design and construction of the pavement. A preliminary survey has been performed for this Project, however any additional information that the Design-Builder may need for their particular design shall be included in the Design-Builder's scope of work. Any survey, design and subsurface information provided by VDOT is subject to the limitations as stated therein and must be validated and augmented as necessary to provide the final design.

VDOT has completed a Federal Highway Administration ("FHWA") approved Programmatic Categorical Exclusion ("PCE") dated August 25, 2009 in accordance with the requirements of the NEPA. The Design-Builder will comply with all environmental commitments as identified in the PCE, Environmental Certification, and Plans, Specifications and Estimates re-evaluation.

Any changes in scope or footprint (as expressed in the PCE) proposed by the Design-Builder, that are acceptable to VDOT, may require additional environmental technical studies and analysis. The Design-Builder would be responsible for necessary environmental studies or analysis to support a re-evaluation of the PCE. VDOT would be responsible for preparation of the re-evaluation documentation and coordinating with FHWA.

1.4 Anticipated Right-of-Way and Utilities

All right-of-way and easements required for the construction of the project have been acquired by VDOT. It is anticipated that no additional right-of-way and/or easements are necessary. The Design-Builder shall be responsible for assuming all risks associated with the

acquisition of additional right-of-way or easements (to accommodate its unique solution), including any public hearings that may be required, and no modifications to the Contract Price or Contract Time will be granted or considered. Any additional easements for the convenience of construction access shall be the responsibility of the Design-Builder. Any additional right-of-way acquisition costs (compensation paid to landowners for right-of-way or easements and administrative expenses) will be paid by the Design-Builder and should be included in the design-build price proposal. These costs are specifically payments to the landowner for land, damages, relocation of displaced people and businesses and do include administrative expenses incurred by the Design-Builder. Access shall be maintained at all times to properties during construction. Design-Builder's Right-of-Way team shall be a member of the VDOT prequalified contracting consultant list, and include a VDOT prequalified Fee Appraiser.

1.5 Anticipated Construction Services

Construction services are anticipated to include, but are not limited to, temporary detour of Rte. 29 NBL traffic to existing Rte. 29 SBL including crossovers of the median, earthwork, roadway, bridge and structures (including all necessary excavation, foundation work, substructure work, and superstructure work), the demolition and removal of portions of the existing roadways, demolition and removal of existing structure, drainage, storm water management, transportation management plan, traffic control devices, erosion and sediment control and all other environmental requirements and commitments including those from the regulatory approvals and permits secured by VDOT, as well as all other environmental commitments from the PCE and as indicated in the Forms EQ-200 and the EQ-103 (Included in the RFP Information Package – CD-ROM). Design-Builders will also be expected to provide construction engineering inspection and management, quality assurance and quality control, including plant quality assurance inspection and testing, but excluding items listed under Section 2.11.2 below.

1.6 Anticipated Environmental Services

The Lynchburg District Environmental Section will obtain all necessary environmental clearances, permits, and approvals required to accomplish the work as noted in Part 4 (General Conditions of Contract), Section 2.6. The Design-Builder shall support VDOT's acquisition of necessary water quality permits by providing (but not limited to) design details, utility relocations, project descriptions, permit sketches and quantities information to be used in the Interagency Coordination Meeting ("IACM") process. The IACM is typically held on the second Tuesday of every month. The Design-Builder must provide completed IACM application and all supporting documentation six (6) weeks prior to the IACM date (see VDOT's Water Quality Permit Manual and the IACM Application Included in the RFP Information Package – CD-ROM).

The Design-Builder shall be responsible for compliance with pre-construction and construction-related environmental commitments and permit conditions. The Design-Builder shall assume all obligations and costs incurred by complying with the terms and conditions of the permits and certifications. Any fines associated with environmental permit or regulatory violations shall be the responsibility of the Design-Builder.

Design-Builder will be responsible for notifying VDOT of plan revisions, scope changes, and providing any necessary studies and other necessary information to support VDOT's completion and updating of NEPA and Section 4(f) environmental clearances. Design-Builder should note that they are solely responsible for any costs or schedule delays due to VDOT's permit acquisition, modifications and NEPA document and/or 4(f) re-evaluations associated with Design-Builder's design changes and no time extensions will be granted.

2.0 PROJECT TECHNICAL INFORMATION & REQUIREMENTS

2.1 Standards and Reference Documents

The design and construction work for the Project shall be performed in accordance with the applicable federal and state laws and VDOT Standards, Specifications and Reference Documents to include, but not limited to the documents listed herein. The Design-Builder must verify and use the latest version of the documents listed herein. The Design-Builder must meet or exceed the minimum roadway design standards and criteria.

If during the course of the design, the Design-Builder determines specific Standard, Specification or Reference Documents required are not listed herein, it is the responsibility of the Design-Builder to identify the pertinent Standard, Specification or Reference Document and submit to VDOT for review and approval prior to inclusion in the Contract Documents.

- VDOT 2002 Drainage Manual (including current Errata Sheet)
- VDOT Hydraulic Design Advisories (all current)
- VDOT CADD Manual (Version 2004)
- VDOT Construction Manual (2005)
- VDOT Post Construction Manual (2009 Edition)
- VDOT Construction Inspection Manual (April 2008)
- VDOT Traffic Engineering Design Manual
- VDOT 2003 Minimum Standards of Entrances to State Highways
- VDOT Right-of-way and Utilities Division Manuals, Vol. I (July 1999) and II (November 2003)
- VDOT Current Land Use Permit Manual
- VDOT Policy Manual for Public Participation in Transportation Projects (updated September 2004)
- VDOT Instructional & Information Memorandums ("I&IM"), All Divisions
- VDOT Policy for Integrating Bicycle and Pedestrian Accommodations
- VDOT Road and Bridge Standards, Vol. 1 and Vol. 2 (2008)
- VDOT Road and Bridge Specifications (2007) (all except Section 100), including all revisions
- VDOT Guardrail Installation Training Manual ("GRIT") February 2006
- VDOT Road Design Manual, Vol. I
- VDOT Guidelines for 1993 AASHTO Pavement Design, Revised – May 2003
- VDOT Survey Manual (2002 Edition)

- VDOT Manual of Instruction for Material Division
- VDOT's Minimum Quality Control and Quality Assurance Requirements for Design-Build and Public-Private Transportation Act Projects (August 2008)
- VDOT Materials Division Memorandum Number MD299-07 for Materials Acceptance – October 4, 2007 (Included in the RFP Information Package)
- VDOT Manual of Structure and Bridge Division, Vol. V
- VDOT 2005 Virginia Work Area Protection Manual
- VDOT Mobility Management Division Memoranda
- VDOT Water Quality Permit Manual, Revised - March 28, 2006 (Included in the RFP Information Package – CD-ROM)
- AASHTO Manual of Bridge Evaluation, 2008
- 23CFR650 Subpart C - National Bridge Inspection Standards ("NBIS"), Subsection 650.301 or the latest revision(s)
- AASHTO LRFD Bridge Design Specifications, 4th Edition, 2007; 2008 and 2009 Interim Specifications; and VDOT Modifications
- AASHTO Fracture Critical Non-Redundant Steel Bridge Members Current Spec. with all Interim Specifications
- AASHTO A Policy on Geometric Design of Highways and Streets (2004)
- AASHTO Standard Specifications for Structural Supports for Highway Signs, Luminaries, and Traffic Signals, 1994 Edition
- AASHTO Guide Design Specifications for Bridge Temporary Works
- AASHTO Construction Handbook for Bridge Temporary Works
- AASHTO Guide for the Development of Bicycle Facilities (1999)
- AASHTO Guide for the Planning, Design, and Operation of Pedestrian Facilities (2004)
- AASHTO Guide for Design of Pavement Structures (Rigid Pavement and Flexible Pavement) (1993 Edition)
- USDOT FHWA Standard Highway Signs Book 2004 Edition
- Corps of Engineers laboratory testing procedures EM-1110-2-1906
- Manual of Uniform Traffic Control Devices ("MUTCD") 2003 Edition with Revisions 1 and 2
- Virginia Supplement to MUTCD
- Traffic Engineering Division Memorandums ("TDM")
- Virginia Department of Conservation and Recreation ("DCR") Virginia Stormwater Management Handbook (First Edition – 1999)
- DCR Virginia Erosion and Sediment Control Handbook (Third Edition – 1992)
- Americans with Disabilities Act Accessibility Guidelines for State and Local Government Facilities
- Transportation Research Board Highway Capacity Manual – HCM 2000
- Duncan, J.M. (April 2000) Factor of Safety And Reliability In Geotechnical Engineering, Journal of Geotechnical and Geoenvironmental Engineering, ASCE, Discussions and Closure August 2001

Special Provision Copied Notes ("SPCN"):

- SPCN c100ai02-0609 General Project Requirements, Supplemental Specifications (SSs), Special Provisions (SPs) and Special Provision Copied Notes (SPCNs)
- SPCN c100b01-0908 Labor
- SPCN c105hf1-0309 Section 105.06 Subcontracting
- SPCN c211gg0-0609 Warm Mix Asphalt Pavement
- SPCN c223ag1-0309 Section 223 Steel Reinforcement
- SPCN c315gg0-0609 Warm Mix Asphalt Pavement
- SPCN for PG 76-22 Asphalt Cement Adjustment – Design-Build Projects (Included in RFP Information Package – CD-ROM), dated October 7, 2009

Special Provisions:

- S107G01-0309 C-45
- S704E01-0309 Type B, Class VI Pavement Line Marking
- Special Provision for Density Control of Embankments and Backfill (Included in the RFP Information Package – CD-ROM), Revised – November 26, 2006
- Special Provision for Section 301 – Clearing and Grubbing (Included in RFP Information Package – CD-ROM), dated November 15, 2006
- Special Provision for Low Permeability Concretes For Design-Build Projects (Included in the RFP Information Package – CD-ROM), dated September 6, 2009
- Special Provision for Hydraulic Cement Concrete Operations for Massive Construction (Included in the RFP Information Package – CD-ROM), dated September 14, 2004
- Special Provision for the Quality Assurance/Quality Control ("QA/QC") for the Construction of Deep Foundation Systems for Design~~-~~Build and PPTA Contracts~~Projects (Included in the RFP Information Package – CD-ROM)~~, dated ~~July 15, 2008~~November 10, 2009
- Special Provision for Drilled Shafts (Included in the RFP Information Package – CD-ROM), dated September 28, 2009
- Special Provision for Lime Modification of Soils (Included in the RFP Package – CD-ROM), dated May 31, 2000
- Special Provision for Design-Build Tracking ("DBT") Numbers (Included in the RFP Information Package – CD-ROM), dated February 8, 2008
- Special Provision for Personnel Requirements for Work Zone Traffic Control (Included in RFP Information Package – CD-ROM), dated June 11, 2009
- Special Provision for Project Communication and Decision Making for Design-Build Projects (Included in RFP Information Package – CD-ROM), dated August 2009
- Special Provision for Asbestos Removal for Road Construction Demolition Projects (Included in the RFP Information Package – CD-ROM), dated March 18, 2009
- Special Provision for Asbestos Removal and NESHAP-Related Demolition Requirements for Structures on Design-Build Projects (Included in RFP Information Package – CD-ROM) dated June 22, 2009
- Special Provision for Inspection of Structures for Asbestos Containing Materials (ACM) on Design-Build Projects (Included in RFP Information Package – CD-ROM), dated June 22, 2009

- Special Provision for Limitation of Operations Protection of Green Floater Mussel (Included in the RFP Information Package – CD-ROM), dated August 26, 2009
- Special Provision for Limitation of Operations Protection of Nesting Migratory Birds (Included in the RFP Information Package – CD-ROM), dated August 26, 2009
- Approved Retaining Wall Systems List (Included in the RFP Information Package – CD-ROM), dated July 6, 2009
- Guidelines for Preparation of Alternate Retaining Wall Plans (Included in the RFP Information Package – CD-ROM), dated March 6, 2008
- General Notes for Alternate Retaining Wall Plans (Included in the RFP Information Package – CD-ROM), dated April 10, 2009
- Special Provision for Mechanically Stabilized Earth Walls (Concrete Panel Facing) (Included in the RFP Information Package – CD-ROM), dated September 18, 2008
- Special Provision for Mechanically Stabilized Earth Walls (Segmental Block Facing) (Included in the RFP Information Package – CD-ROM), dated October 17, 2008
- Special Provision for Mechanically Stabilized Earth Walls (Modular Cantilever Facing) (Included in the RFP Information Package – CD-ROM), dated July 9, 2009
- Special Provision for T-Wall Retaining Wall System (Included in the RFP Information Package – CD-ROM), dated May 1, 2002
- Special Provision for Controlled Blasting for Design-Build and PPTA Contracts dated November 24, 2009

Supplemental Specifications:

- SS1D005-0909 Supplemental Division 1 – General Provisions
- SS21101-0609 Supplemental Section 211 – Asphalt Concrete
- SS21402-0908 Supplemental Section 214 – Hydraulic Cement
- SS21501-0908 Supplemental Section 215 – Hydraulic Cement Concrete Admixtures
- SS21701-0609 Supplemental Section 217 – Hydraulic Cement Concrete
- SS22401-0908 Supplemental Section 224 – Castings
- SS22601-0609 Supplemental Section 226 – Structural Steel
- SS31502-0609 Supplemental Section 315 – Asphalt Concrete Pavement
- SS40501-0609 Supplemental Section 405 – Prestressed Concrete
- SS51202-0909 Supplemental Section 512 – Maintaining Traffic
- SS51401-0609 Supplemental Section 514 – Field Office

- VDOT Permit Determination (Included in the RFP Information Package – CD-ROM), dated September 2, 2009
- Programmatic Categorical Exclusion ("PCE") (Included in the RFP Information Package – CD-ROM), dated August 25, 2009
- Document Reevaluation for PSE Authorization (EQ-200) (Included in the RFP Information Package – CD-ROM), dated September 3, 2009
- Environmental Certification/Commitments Checklist (EQ-103) (Included in the RFP Information Package – CD-ROM), dated September 3, 2009
- FHWA publications HDS-6, HEC-11, HEC-14, HEC-15, and HEC-20

In the event that there is a discrepancy between VDOT and non-VDOT Standards and References listed herein, the VDOT specifications, design standards, and manuals shall take precedence. Design Waivers will be required for any element that does meet AASHTO minimum design criteria, but not VDOT minimum standards. Design Exceptions will be required for any design element that does not meet AASHTO minimum design criteria. See IIM-LD-227.3, S&B 70.1 for more information regarding Design Exceptions and Design Waivers. Special Provisions included in this contract document or other Special Provisions selected for use in design and construction of this Project that have been approved by VDOT will govern over the VDOT specifications, design standards and manuals. Special Provision Copied Notes approved by VDOT and requirements specified within the text of this RFP will govern over both the Special Provisions and VDOT specifications, design standards and manuals.

Specific design requirements described in the Technical Requirements (Part 2) shall supersede the design depicted in the preliminary plans included in the RFP Information Package. In the event that there is a discrepancy between the preliminary plans and the Technical Requirements (Part 2) herein, the Technical Requirements (Part 2) shall take precedence.

2.2 Proposed Bridge

The proposed bridge for this Project shall be designed using AASHTO *LRFD Bridge Design Specifications,* 4th Edition, 2007; 2008 and 2009 Interim Specifications; VDOT Modifications (IIM-S&B-80) and the Additional Foundation Criteria attachment (Attachment 2.2). AASHTO HL-93 loading shall be used. The Design-Builder shall submit a preliminary type, size and location plan of the proposed bridge to VDOT for review and approval prior to proceeding with final design.

Bridge type and layout shall be based on reducing long term maintenance costs for VDOT. Expansion joints in the bridge deck at pier locations shall not be permitted. The use of continuous span units and jointless bridge design technologies shall be used as outlined in the VDOT *Manual of the Structure and Bridge Division*, Volume V – Part 2 (VDOT Office Practice). The proposed bridge shall not be designed as fracture critical.

The proposed structure shall utilize low permeability concrete in accordance with the Special Provision for Low Permeability Concretes For Design-Build Projects (Included in the RFP Information Package – CD-ROM). The proposed structure shall utilize corrosion resistant reinforcement in accordance with IIM-S&B 81.1. Epoxy coated reinforcing steel shall not be used. When choosing corrosion resistant reinforcing steel, precautions shall be made to prevent any decomposition due to dissimilar metal properties. Acceptable types of corrosion resistant reinforcing steel includes; stainless steel and MMFX-2. If MMFX-2 is used, the reinforcing steel should meet the specification for ASTM A1035; however, a maximum allowable design stress should be limited to 60 ksi.

Plain deformed reinforcing bars shall conform to ASTM A615 Grade 60.

Either prestressed concrete or structural steel beams/girders may be used and shall be designed as composite with the cast-in-place deck. A minimum future wearing surface load of

15 psf shall be applied to the deck areas of the composite section. A minimum construction tolerance load of 20 psf shall be applied to the non-composite sections of beam/girder spans having cast-in-place decks. No timber bridge elements of any kind will be acceptable in the proposed structure. Asphalt concrete pavement over corrugated metal forms shall not be used.

For structural steel alternatives, the material shall be weathering steel if the conditions meet the requirements of the Federal Highway Administration Technical Advisory T5140.22, "Uncoated Weathering Steel in Structures." The use of HPS (high performance steel) 70 ksi will be permitted. The use of HPS 100 ksi will not be permitted. Cover plates on continuous rolled beam sections in the negative moment areas and longitudinal stiffeners shall not be used. Other fatigue prone details shall be minimized and/or not used. No field welding to structural steel members, primary or secondary, shall be permitted except as allowed by VDOT Office Practice.

For prestressed concrete alternatives, the precast concrete Bulb-T sections adopted by VDOT shall be used. AASHTO shapes will not be permitted. The use of HPC (high performance concrete) for prestressed concrete beams in excess of 8,000 psi concrete strength will be considered but will require approval by the State Structure and Bridge Engineer.

The use of parapets/railings other than cast-in-place F-shape parapet shall be approved by VDOT. Parapets/railings shall be crash tested and approved as FHWA/NCHRP Test Level-4.

Dismantling and removing the existing structure shall be in accordance with Section 413 of the Road and Bridge Specifications. The use of blasting to remove or construct piers ~~footings~~ shall not be permitted. Reuse of the existing structure including all substructure units shall not be permitted. The existing abutments shall not be used in the new bridge or be left in place as a retaining structure.

The use of multi-column piers will not be permitted. When spread footings are proposed, the Design-Builder shall conform to Section 401 of VDOT Road and Bridge Specifications 2007, Structure Excavation. All pier spread footings shall be keyed into bedrock a minimum of two feet. The Design-Builder shall ensure that all recommendations related to the suitability of foundation material for spread footings at the time of construction shall be made in the field by a qualified geotechnical engineer. As part of VDOT's requirements, foundation recommendations for the proposed bridge shall be submitted for review and approval prior to the submittal of final foundation construction plans. A minimum horizontal clearance of 10 feet to any substructure face or toe of slope shall be maintained to the centerline of abandoned railroad bed as depicted in the preliminary bridge plans. Accommodations for access along the existing trail on the abandoned railroad bed shall be provided for during construction of the Project.

The preferred type of Elastomeric Expansion Dam (VDOT Standard BEJ-3) is the Type F2 Dam, the use of other types of expansion dams shall be approved by VDOT. Structural steel in Elastomeric Expansion Dams and/or Tooth Expansion Joints shall be ASTM A709 Grade 36 and shall be fabricated in accordance with Section 407 and galvanized in accordance with Section 233 of the Specifications.

Structural approach slabs will be required at each end of the bridge on this Project. Approach slabs and sleeper pads, if the latter is required, shall conform to the requirements of the VDOT *Manual of the Structure and Bridge Division*, Volume V – Parts 2 and 3. A sleeper pad will be required when the bridge abutment is either integral or semi-integral.

The proposed structure shall be designed to meet all applicable hydraulic requirements, including current FEMA and VDOT guidelines as described in the latest edition of the VDOT Drainage Manual. The Design-Builder shall deliver to VDOT a final Hydrologic and Hydraulic Analysis and a final Scour Analysis for the proposed bridge design as noted in Section 2.6.1 herein. These analyses shall be submitted to the Department for review and approval prior to the commencement of bridge construction**.** Adequate drainage for the bridge structures must be provided; in particular, the designed system must be able to drain and control water that is on the deck. Bridge deck drainage analysis and design shall be performed in accordance with the latest version of FHWA Publication HEC21- Design of Bridge Deck Drainage, and the VDOT Drainage Manual.

2.2.1 Structure Load Ratings

The Design-Builder shall perform a load rating using the As-Built drawings of the completed bridge. Structure load ratings shall be performed in accordance with VDOT Structure and Bridge Division Instructional and Informational Memorandum ("I&IM") Number IIM-S&B-27.6 or the latest revision; AASHTO Manual of Bridge Evaluation, 1st Edition, 2008; and 23CFR650 Subpart C – National Bridge Inspection Standards ("NBIS"), Subsection 650.301. The Design-Builder shall perform load ratings on bridge superstructures using Load and Resistance Factor Rating method for NBIS rating for the AASHTO HL-93 design loading, the blanket permit vehicle (90K and 115K) and Virginia's Legal Load vehicles as specified in IIM-S&B-27.6 or the latest revision.

All load ratings for the completed structure other than steel curved girders/beams shall be performed using AASHTOWare VIRTIS software.

The Design-Builder shall prepare and deliver to VDOT a load rating report for the completed structure. This report shall contain a completed copy of VDOT's current load rating summary sheet referencing the controlling structural element(s) signed by a professional engineer licensed in Virginia, rating assumptions, pertinent analysis calculations and VIRTIS, DESCUS or other approved computer input as appropriate. In addition, a compact disk ("CD") containing the load rating input files for VIRTIS, DESCUS or other approved computer programs shall be delivered to the Department with the report. The report shall be submitted not later than thirty days after completion of the bridge and in accordance with IIM-S&B-27.6 or the latest revision.

No structure shall be placed into service if a Load Restriction (Posting) is required based upon the load rating analysis. The Design-Builder is responsible for all remedial measures to make corrections to the design or as-built bridge.

2.2.2 Shop Drawings

The Design-Builder shall review and approve working/shop drawings and submit three approved sets to VDOT for the proposed bridge structure. Reference should be made to Article 105.10 of VDOT Road & Bridge Specifications 2007. The working/shop drawings shall be approved by a registered, licensed, Professional Engineer.

2.2.3 FHWA Bridge Construction Unit Cost Report

For the proposed bridge structure, the Design-Builder shall submit Estimated Quantities along with the associated unit costs for all standard and non-standard items in the final bridge plan submittal. The bridge unit cost data is required to complete VDOT's annual Bridge Construction Unit Cost Report which is provided to FHWA.

2.2.4 Safety and Acceptance Inspection for the Proposed Bridge

Acceptance of a bridge structure will require the following two independent inspections by VDOT:

1. A satisfactory safety/inventory inspection by VDOT as described below is required prior to Substantial Completion and opening the structure to public traffic. This safety/inventory inspection by VDOT will serve as the initial inspection of the structure. Data gathered will include location, date completed, alignment, description, horizontal/vertical clearances, stream data, structure element description and condition data, and traffic safety features.

2. A satisfactory final construction inspection by VDOT is required prior to Final Acceptance of the structure.

While it is suggested that these two inspections be held simultaneously, simultaneous inspection is not a requirement since it may not be practical.

To facilitate inspection of the structure by VDOT, the Design-Builder shall ensure that all structural elements are accessible and shall provide adequate resources including:

- Man-lifts, bucket trucks, under bridge inspection vehicles, boats, or other equipment necessary to inspect the structure as well as properly trained staff of sufficient composition to support the inspections.
- Plans, procedures, personnel, and equipment to implement traffic control measures.

The Design-Builder shall provide a minimum of thirty (30) days notice to VDOT whenever it requires VDOT to undertake an inspection. The Design-Builder's notice to VDOT shall include as-built drawings, traffic control procedures, a description of the items to be inspected and an anticipated schedule for the inspections, all in accordance with the requirements contained in Section 2.2.

Unless otherwise approved by VDOT, structures shall be substantially complete (i.e. roadway, and slopes on the approaches and underneath the structure are already in place) before the inspection will be performed.

2.3 Environmental

2.3.1 Environmental Document

In accordance with the requirements of the NEPA, a PCE, dated August 25, 2009, has been completed for the Project. Preliminary Plans, Specifications, and Estimates ("PS&E") re-evaluation and Environmental Certification have also been completed by VDOT. These documents are included in the RFP Information Package – CD-ROM.

The Design-Builder shall carry out the environmental commitments during design and construction, as applicable, as identified in the PCE, the PS&E re-evaluation, and the Environmental Certification forms. All commitment compliance shall be supported by appropriate documentation, to be provided by the Design-Builder to VDOT. VDOT shall then complete the final PS&E re-evaluation and Environmental Certification forms prior to the VDOT Project Manager releasing the project for construction.

Any changes in scope or footprint proposed by the Design-Builder that are acceptable to VDOT may require additional environmental technical studies and analysis. The Design-Builder will be responsible for any additional environmental technical studies and analysis. VDOT will be responsible for the preparation and coordination of any revised environmental documents. The Design-Builder shall carry out any additional environmental commitments that result from such coordination at its sole expense and no additional cost to the Project.

2.3.2 Water Quality Permits and Compensatory Mitigation

VDOT shall be responsible for the tasks involved with determining the need for water quality permits and performing the associated tasks to secure water quality permits, permit modifications and/or permit extensions; VDOT shall be the Permittee. This will be done in accordance with the VDOT's Water Quality Permit Manual (RFP Information Package – CD-ROM).

A State Program General Permit ("SPGP") from the US Corps of Engineers, a VWP General Permit No. WP3 from VDEQ, and a Virginia General Permit #1 ("VGP-1") from the Virginia Marine Resource Commission ("VMRC") are anticipated for the project. VDOT's preliminary permit determination for the project (dated September 2, 2009) is included in the RFP Information Package – CD-ROM. The Design-Builder should note that VDOT's preliminary permit determination represents a worse case and is provided for scheduling purposes.

The Design-Builder shall support VDOT's permit acquisition efforts by providing (but not limited to) design details, utility relocations, project descriptions, permit sketches and quantities information which shall include information such as limits of jurisdiction, square feet

of impact below OHW (or MLW) both permanent and temporary, cubic yards of impact below OHW (or MLW) both permanent and temporary and broken out by excavation, permanent fill and temporary fill quantity calculations, plan views, section views, construction notes, construction phasing details, temporary construction measures, erosion and sediment controls, hydraulic commentary, and access requirements. VDOT shall utilize this information to complete a Joint Permit Application. Water quality permits shall be acquired by VDOT within six (6) months from the time the above required information is complete and provided by the Design-Builder to VDOT.

In addition the Design-Builder shall support/attend VDOT's presentation if requested at the IACM, address agency comments/concerns, evaluate and/or incorporate design changes for avoidance and minimization, attend regulatory agency field reviews, etc as requested by VDOT. The Design-Builder's lump sum price shall not include costs for VDOT's tasks associated with water quality permit acquisition. However, all costs associated with the Design-Builder's support of VDOT's permit determination and/or permit acquisition shall be included in the Design-Builder's lump sum price.

If VDOT determines that wetlands and/or stream mitigation is required to secure the permit authorization, VDOT will provide the required compensatory mitigation. The Design-Builder shall not include that cost in their lump sum price.

The Design-Builder shall note that avoidance, minimization, and mitigation measures associated with permit acquisition will require close coordination between the Design-Builder and VDOT. However, if permit issuance is delayed or permits are denied, the Design-Builder will be responsible for any schedule delays and/or associated costs.

The Design-Builder shall be responsible for coordination with VDOT to ensure that project schedules accommodate any Special Provisions, Time of Year Restrictions ("TOYR"), and the duration of permit acquisition from the regulatory agencies. The Design-Builder shall be responsible for adhering to permit conditions and Special Provisions, as identified in the permit authorizations including but not limited to TOYR, avoidance and minimization recommendations, restoration of temporary impact areas, and countersinking culverts.

The Design-Builder shall not proceed with work covered by the water quality permits until the VDOT Project Manager releases the work in writing. The VDOT Project Manager may release a portion or all of such work not in jurisdictional areas, but may order a suspension of the same work after its release. The Design-Builder shall not be allowed to begin work that pre-determines the work required in the jurisdictional areas until the permits are secured.

After receiving the VDOT Project Manager release of the work, the Design-Builder shall notify in writing the VDOT Project Manager 14 days prior to beginning work in the jurisdictional areas covered by the water quality permits so the required agency notifications can be made by VDOT.

The Design-Builder shall allow environmental compliance inspections by VDOT, and/or regulatory agencies as required by permits and/or to facilitate any interim compliance reviews/assessments.

At the conclusion of the project, the Design-Builder shall notify in writing the VDOT Project Manager of compliance with the permit conditions and the completion of the work in the jurisdictional areas covered by the water quality permits so the required agency notifications can be made by VDOT.

Any changes proposed by the Design-Builder in either the footprint and/or scope of the Project as provided in design details and/or construction sketches/plans and quantities information provided by the Design-Builder and used by VDOT to determine the applicability of water quality permits and/or information provided to VDOT to secure the necessary water quality permits will require additional coordination with VDOT and may necessitate the acquisition of additional or modified water quality permits to meet the change in footprint and/or scope. The Design-Builder shall carry out any additional environmental commitments that result from change in footprint and/or scope at its sole expense and no additional cost to the Project; additionally the Design-Builder will be responsible for any schedule delays and associated costs.

All permitted construction activities shall be identified as hold points in the Design-Builder's CPM Schedule.

2.3.3 Threatened and Endangered Species / Nesting Migratory Birds

2.3.3.1 Green Floater Mussel

The Design-Builder shall adhere to the Special Provision on the Limitation of Operations for the Protection of the Green Floater Mussel included in the RFP Information Package – CD-ROM.

VDOT has coordinated with US Fish and Wildlife Service ("FWS"), Virginia Department of Game and Inland Fisheries ("VDGIF"), Virginia Department of Conservation and Recreation ("VDCR"), and Virginia Department of Agriculture and Consumer Services ("VDACS") regarding the Green Floater (*Lasmigona subviridis*) .

The Tye River is known to provide unique and important habitat for the Green Floater. This mussel is protected by the Federal Endangered Species Act of 1973 et seq. and the Virginia Endangered Species Act (29.1-563 et seq.) and occurs in close proximity to the project site.

A TOYR protective of Green Floater applies from 15-April through 15-June, and from 15-August through 30-September of any given year. The Design-Builder must adhere to VDGIF's standard recommendations for instream work, to implement measures to ensure concrete and debris do not enter the water, and adhere to strict E&S controls.

VDOT will coordinate a Green Floater mussel survey from 66 feet upstream and 131 feet downstream of the work area within 45 days of instream work, in accordance with the

Freshwater Mussel Guidelines for Virginia, by a qualified biologist that has been pre-approved by VDGIF. Mussel surveys must be done between April 1 and October 31. Mussels tend to burrow deeper into substrate during cooler months, making them more difficult to see and collect. Surveys conducted outside this time period will require prior approval by VDGIF. The Design-Builder shall notify the VDOT Project Manager at least 45 days prior to instream work. The costs associated with the Green Floater mussel survey and relocations shall not be included in the Design-Builder's lump sum price. The Design-Builder will be responsible for coordination with VDOT to ensure that project schedules accommodate the mussel survey and any potential relocation.

If Green Floaters are found in this area, VDOT will coordinate the standard relocation in accordance with the Freshwater Mussel Guidelines for Virginia. The first relocation survey must occur within 30-45 days of instream construction activities and at least 7 days prior to the second relocation survey. The second relocation survey shall occur within 30 days of the instream construction activities and at least 7 days after the first relocation survey. All relocation surveys shall include at a minimum, two passes. The Design-Builder is responsible for notifying VDOT at least 45 days prior to instream work.

VDOT will coordinate exceptions to the Special Provision for Limitation of Operations for the Protection of Green Floater Mussel included in the RFP Information Package – CD ROM. This coordination will include, but may not be limited to, the United States Fish and Wildlife Service and the Virginia Department of Game and Inland Fisheries, U.S. Army Corps of Engineers, Virginia Department of Environmental Quality, and the Virginia Marine Resource Commission.

The Design-Builder shall monitor continuously all construction activities within the construction footprint of each side of the Tye River to prevent releases of soil, sediment, concrete, petroleum products and other hazardous materials. All areas of exposed and potentially erodible soil including stockpiles and access roads shall be stabilized with applications of stone, seeding, straw mulch, retention blankets, and other geotextile materials, in an effort to minimize erosion and eliminate siltation. The Design-Builder shall prepare and submit to the VDOT Project Manager for approval their plan and sequence of demolition of the Rte. 29 NBL bridge over the Tye River. The plan shall include all measures that will be implemented to prevent earth, concrete, and debris from entering the waterway.

In the event the activities of the Design-Builder at the Tye River cause the taking of Green Floaters or physically diminish the habitat as determined by the VDOT Project Manager or any agency having jurisdiction over the waterway, all in-stream work shall cease pending an investigation into the cause and extent of damage. No compensation or claim for time or damages will be valid should such investigation reveal responsibility or negligence on the part of the Design-Builder.

2.3.3.2 Nesting Migratory Birds

The Design-Builder shall adhere to the Special Provision on the Limitation of Operations for the Protection of Nesting Migratory Birds included in the RFP Information Package – CD-ROM.

The Rte. 29 NBL bridge over the Tye River is known to provide nesting habitat for the migratory barn swallow (*Hirundo rustica*) and cliff swallow (*Petrochelidon pyrrhonota*). These migratory birds are protected by the Migratory Bird Treaty Act of 1918 et seq ("MBTA"). The MBTA prohibits the harming and destruction of birds, eggs, nests, or parts thereof.

Swallows found to be nesting on the bridge to be demolished shall not be disturbed or displaced by demolition activities or other construction practices which would cause a direct effect to brooding birds from 1-May through 31-August of any given year. VDOT will take actions to preempt nesting activity prior to May 1st if necessary. This may include the placement of netting, planking, tarpaulins, and other means that prevent the birds from accessing former nests or building new ones as long as these methods do not result in death or injury to adults. No removal of inactive nests of migratory birds should be accomplished prior to consultation with the US Fish and Wildlife Service ("USFWS") office with local jurisdiction. The Design-Builder shall notify the VDOT Project Manager when ready to perform these activities in the vicinity of identified nests. The Design-Builder shall not proceed with activities resulting in violation of the MBTA until an on-site inspection for the presence or absence of nesting migratory birds has been performed by VDOT. The Design-Builder will be advised of the results of this inspection and may be given clearance to proceed subject to a determination of its findings. All costs associated with actions to preempt nesting activities shall not be included in the Design-Builder's lump sum price.

Activities that cannot avoid nests or nesting activities by taking the preceding actions may require a permit from the Region 5 Bird Permit Office, Division of Migratory Bird Management, USFWS. The Region 5 contact information is presented below:

U.S. Fish and Wildlife Service
Migratory Bird Permit Office
P.O. Box 779
Hadley, MA 01035-0779
Tel.: (413) 253-8643
Fax: (413) 253 8424
Email: permitsR5MB@fws.gov

In the event the activities of the Design-Builder cannot adhere to the Special Provision on the Limitation of Operations for the Protection of Nesting Migratory Birds included in the RFP Information Package – CD ROM, the Design-Builder shall notify the VDOT Project Manager and cease all activity until a permit is obtained by the Design-Builder. No compensation or claim will be paid to the Design-Builder for time or damages for failure to meet the conditions of the Special Provision.

2.3.4 Hazardous Materials

The Design-Builder shall have asbestos inspections performed by an independent Asbestos Inspector licensed by the Virginia Department of Professional and Occupational Regulation ("DPOR") for all structures (including bridges) to be acquired for the Project right of way. Asbestos abatement shall be performed for all structures found to contain regulated asbestos materials ("ACM") prior to demolition. The Design-Builder shall conform to the Special Provision for Asbestos Removal for Road Construction Projects. If a structure is found to contain non-friable (non-regulated) asbestos containing materials, the Design-Builder shall conform to the Special Provision for Demolition of Structures Containing Non-Friable Asbestos Containing Materials. All bridge structures shall be inspected according to the Special Provision for Inspection of Bridge Structures for ACM. Where ACM are identified, the Design-Builder shall provide for abatement in accordance with VDOT Special Provision for Removal of Asbestos from Bridge Structures and with all Federal and State regulations. Copies of all inspection results shall be provided to VDOT.

Asbestos abatements shall not be performed by an asbestos contractor who has an employee/employer relationship with, or financial interest in, the laboratory utilized for asbestos sample analysis nor shall the asbestos contractor have an employee/employer relationship with, or financial interest in, the asbestos inspector and project designer working on the project. The Design-Builder shall provide monitoring services associated with asbestos abatement and demolition activities.

The Design-Builder shall make all appropriate notifications as required by the Special Provision for Removal of Asbestos from Bridge Structures, the Special Provision Copied Note regarding demolition notifications for structures not requiring asbestos removal and all Federal and State regulations. Special Provisions are included in the RFP Information Package CD-ROM.

All solid waste, hazardous waste, and hazardous materials shall be managed in accordance with all applicable federal, state, and local environmental regulations. The Design-Builder shall notify the VDOT Project Manager immediately of all instances involving the spill, discharge, dumping or any other releases of hazardous materials into the environment and shall provide all required notifications and response actions.

The Design-Builder shall include in the lump sum price all costs associated with complying with these requirements.

2.3.5 Environmental Compliance

The Design-Builder is responsible for compliance with all applicable state and federal environmental laws, regulations, and permits. Should any non-compliant item(s) be identified during construction, immediate and continuous corrective action shall be taken by the Design-Builder to bring the item(s) back into compliance.

The Design-Builder shall be responsible for any schedule delays and associated costs as a result of any delays and/or shut downs associated with non-compliance. Any monetary fines associated with violations shall be the responsibility of the Design-Builder.

2.4 Survey

VDOT has completed a field survey according to VDOT Survey Manual, conforming to VDOT Standards, including, but not limited to the following:

- Horizontal control
- Vertical control
- Notification of property owners*
- Post photography control
- Photogrammetry
- Field data
- Topography
- Property data
- Utilities
- Levels
- Digital Terrain Model
- Bridge Site Plan

*Design-Builders should be aware that Virginia Code 33.1-94 requires that notice "*be sent to the owner by certified mail, at the address recorded in the tax records, return receipt requested, or delivered by guaranteed overnight courier or otherwise delivered to the owner in person with proof of delivery not less than 15 days prior to the first date of the proposed entry. Notice of intent to enter shall be deemed made on the earlier of the date of mailing, if mailed, or on the date delivered.*" Advance notification of property owners is required for all data collection efforts related to the development of highway plans.

The Design-Builder will be responsible for obtaining any additional survey needed to accommodate their final design. Additionally, the Design-Builder will be responsible for any update (property owner changes, subdivisions, etc.) that may occur and needs to be reflected on the plans in order to acquire right-of-way and complete the final design. Any additional Survey changes will be verified and certified and submitted in final documentation.

2.5 Geotechnical Work

The subsurface data shown on the existing Rte. 29 SBL bridge plans included in this RFP is being provided for Offeror's information in accordance with Section 102.04 of Division I Amendments to the Standard Specifications (Part 5). No additional borings were performed at the proposed bridge site during development of this RFP. The Design-Builder shall perform a design-level geotechnical investigation to validate and augment the geotechnical information included in this RFP. The geotechnical engineering investigation performed by the Design-Builder shall meet or exceed both Chapter 3 of the VDOT Manual of Instructions ("MOI") for Materials Division and the current AASHTO *LRFD Bridge Design Specifications*, 4th Edition, 2007; 2008 and 2009 Interim Specifications; and VDOT Modifications.

The Design-Builder shall collect appropriate data for geotechnical evaluation of embankments, soil and rock cuts, bridge structures, storm water management facilities, minor structures including drainage pipes, and any other earth supported structures or elements of highway design and construction. The Design-Builder will be responsible for obtaining water quality permit(s) required for any borings needed in performance of the Design-Builder's geotechnical investigation for this Project. The Design-Builder shall complete laboratory tests in accordance with pertinent ASTM or AASHTO standards and analyze the data to provide design and construction requirements. Soils, aggregate, concrete and other materials tests shall be performed by a laboratory accredited through the AASHTO Accreditation Program (AMRL and CCRL) for each test it conducts for the Project, unless otherwise approved by VDOT.

The Design-Builder shall provide all records of subsurface explorations and describe the soils encountered and their depth limits in accordance with the requirements outlined in Chapter 3 of the VDOT MOI's for Materials Division. The Design-Builder shall provide electronic copies of all subsurface explorations in accordance with the boring log template available on the website address included in Chapter 3 of the VDOT's MOI for Materials Division. The electronic files shall be provided by a certified professional geologist or a suitably qualified registered professional engineer in the Commonwealth of Virginia, in gINT© software. Upon request, VDOT will provide its gINT and ACCESS file structures for the Geotechnical Database Management System ("GDBMS").

Where applicable, the Design-Builder shall incorporate reliability assessments in conjunction with standard analysis methods. An acceptable method for evaluation of reliability is given by Duncan, J.M. (April 2000) *Factors Of Safety And Reliability In Geotechnical Engineering*, Journal of Geotechnical and Geoenvironmental Engineering, ASCE, Discussions and Closure August 2001. A suitable design will provide a probability of success equal to or greater than 99 percent. The aspects of this Project for which reliability assessments shall be made include: (1) the selection of soil parameters used in the design of all foundations and retaining walls, (2) the factors of safety for slope stability, and (3) the settlement and bearing capacity of embankments. Except as mentioned in (1) above, reliability assessments need not be performed for structural foundations and retaining walls, which will be evaluated based on the required limit states in LRFD. The Design-Builder may propose to identify specific, non-critical features, and alternative methods for evaluating variability of subsurface conditions, reliability and minimum factors of safety, prior to submission of its design calculations and drawings. VDOT may, in its sole discretion, accept or reject such proposed methods.

The Design-Builder shall submit to VDOT for its review all geotechnical design and construction memoranda and/or reports that summarize pertinent subsurface investigations, test, and geotechnical engineering evaluations and recommendations utilized in support of their design/construction documents. This submittal shall be made at least 90 days in advance of the submittal of any final design/construction documents that is dependent upon the geotechnical evaluations and recommendations. Technical specifications for construction methods that are not adequately addressed in the standard specifications shall be provided by the Design-Builder as part of the final design/construction documentation. Prior to submittal of any final design/construction documentation, the Design-Builder shall review the final design/construction documents to assure that it appropriately incorporated the geotechnical components and shall

submit evidence of this review to accompany the final design/construction documentation. The Design-Builder shall reference the drawings that incorporate the pertinent results. The Design-Builder's Quality Assurance and Quality Control Plan shall document how each specific geotechnical recommendation or requirement will be addressed in the final design/construction documentation. The results of the geotechnical investigation and laboratory results shall support design and construction efforts to meet the requirements outlined in this Section.

2.5.1 Minimum Pavement Sections

A minimum pavement section is being provided for proposal preparation purposes only. If the Design-Builder confirms that the minimum pavement section is inadequate for actual design/construction conditions, it shall notify VDOT during the Scope Validation Period of the necessary changes and proposed price adjustments, if any. Acceptable changes are limited to increasing the thickness of the base or subbase layers specified below. Any changes to the minimum pavement section noted below must be approved by VDOT. The Design-Builder will be responsible for the final design and construction of the pavements for this Project in accordance with the Contract Documents.

The Design-Builder shall prepare and incorporate into the plans, typical sections, profiles and cross-sections of the validated pavement sections in accordance with the applicable manuals noted in Section 2.1. This includes drainage and subdrainage requirements to ensure positive drainage both within the pavement structure and on the pavement surface. The minimum pavement section is as follows:

- **Surface - 1.5" Asphalt Concrete, Type SM-9.5D**
- **Intermediate - 2" Asphalt Concrete, Type IM-19.0D**
- **Base - 10" Asphalt Concrete, Type BM-25.0A**
- **Subbase - 6" Aggregate Base Material, Type I, Size No. 21B**

The paved shoulder typical section shall be the same as the mainline pavement section.

The minimum pavement design is based upon the following criteria:

- A minimum soil CBR value of 5 (therefore all imported borrow shall have a minimum CBR value of 5).
- All subgrade is compacted in accordance with the applicable sections of the Road and Bridge specifications and applicable special provisions.
- All unsuitable materials must be removed or modified in accordance with Part 5 of the RFP.

Traffic loadings considered in the development of the minimum pavement section provided above are **based on a current ADT of 12,500 with 15% truck traffic and 1.3% growth rate for a service life of 30 years for new construction.** The Design-Builder shall confirm through VDOT that the traffic loading is valid for use in final pavement design during the Scope Validation Period.

Adequate control of surface and ground water will be a very important consideration for the overall performance of this pavement design. The area surrounding pavements should be graded to direct surface water away from paved areas. Any utility excavations or excavations for storm drains within pavement areas must be backfilled with compacted structural fill in accordance with applicable sections of the Road and Bridge specifications and applicable special provisions.

2.5.2 Geotechnical Requirements

The Design-Builder shall analyze methods to minimize differential settlement of the approach to the bridge (bump at the bridge) for new construction and provide construction recommendations to address soil-structure interaction to accommodate the unique construction methods applied to this Project. All geotechnical work shall be completed to satisfy baseline and post-construction contract performance requirements.

Design and construct pavements, subgrades, and embankments to meet the following post-construction settlement tolerances:

- Total vertical settlement less than two inches over the initial 20-years, and less than one inch over the initial 20-years within 100' of bridge abutments.

- Settlement that will not impede positive drainage of the pavement surface especially within the travel lanes nor subject the roadway to flooding in area where it is applicable;

- Settlement that does not result in damage to adjacent or underlying structures, including utilities.

- For pavement sections of approach slabs, bridge decks, and tie-ins to the Project, grade tolerances shall be measured with a 10-foot straightedge. The variation of the surface from the testing edge of the straightedge between any two contacts with the surface shall not be more than plus (+) 0.25-inch to minus (-) 0.125 -inch at structures and (+/-) 0.25-inch at project tie-ins.

- Humps, depressions and irregularities exceeding the specified tolerance will be subject to correction by the Design-Builder. Design-Builder shall notify the Quality Assurance Manager ("QAM") and VDOT for any non-conformance items.

The Design-Builder shall consider settlement and design foundations (bridges, retaining walls, and other structures) based upon the Additional Foundation Criteria attachment (Attachment 2.2).

In summary, the Additional Foundation Criteria attachment outlines two options for managing settlement of structures; a) limit total settlement to 0.5 inch and subsequently limits the need for a refined analysis of the superstructure and substructure or b) allow the Design-Builder to design the structure for their estimates of elastic, consolidation and secondary settlement (total settlement) and subsequently communicate the total and differential settlement in a the General Note. In either case a General Note is placed on the plans which communicate

the amount of settlement evaluated and accommodated by the structure. Specific General Note language along with Notes to Designer are included in the Additional Foundation Criteria attachment.

In either case the total vertical and/or differential settlements of the proposed structures shall not exceed the performance tolerance noted above for pavements and of the bridge decking. In addition, angular distortion between adjacent foundations greater than 0.008 radians in simple span and 0.004 radians in continuous span structures in not permitted unless first approved by VDOT.

Design stable cut slopes and embankment slopes and evaluate stability for interim construction stages, for the end of construction condition, and for design-life conditions. Design shall satisfy the following criteria:

- The maximum slope ratio to be used for cut and/or roadway embankment fill slopes should not be steeper than 2H:1V.

The following factors of safety are to be used with limit equilibrium methods of analysis to determine factors of safety for representative sections of all soil cut and soil embankment fill slope areas greater than 10 feet in height and/or where slopes are supporting, or are supported by, retaining structures. The factors of safety listed in Table 1 below are valid for subsurface investigations performed in accordance with Chapter 3 of the Materials Division's Manual of Instructions or for site specific investigation plans approved by the District Materials Engineer. Approval of site specific investigation plans with reduced boring frequency may require higher factors of safety.

Table 1: Minimum Factors of Safety for Soil Cut/Fill Slopes

Slope analysis parameters based on:	Factor of Safety	
	Involves Structure or Critical Slope[1]	Non-Critical Slope
In-situ or lab. tests and measurements[2,3]	1.5	1.3
No site specific tests	N/A[3]	1.5

Notes:

1. A critical slope is defined as any slope that is greater than 25 feet in height, affects or supports a structure, impounds water or whose failure would result in significant cost for repair, or damage to private property
2. Site specific in-situ tests include both ground water measurements and SPT testing but may also include CPT or DMT
3. Parameters for critical slopes involving structures must be based on specific laboratory testing
4. Problem soils (very soft soils, very loose soils, fissured or heavily over-consolidated soils), must be analyzed using shear strength parameters determined from appropriate laboratory strength tests in accordance with accepted local engineering practice
5. Problem soils such as silts shall be analyzed for short- and long-term stability using residual strength parameters determined from laboratory shear testing. These parameters shall be determined by drained direct shear tests using sufficient stress reversals to obtain large strains as discussed in the Corps of Engineers laboratory testing procedures EM-1110-2-1906. Many reversals are required to reach residual strengths and some references suggest using a pre-split sample (Ref. Engineering properties of Clay Shales, Report No. 1 by W. Haley and B.N. MacIver).
6. Construction plans shall specify use of soil types consistent with the parameters used in slope analyses

- Incorporate reliability assessments as referenced above.

2.6 Hydraulics

2.6.1 Hydrologic and Hydraulic (H&H) Analysis

The proposed structure shall be designed by the Design-Builder to meet all applicable hydraulic requirements, including current FEMA, FHWA, and VDOT guidelines as described in the 2002 VDOT Drainage Manual (including current Errata Sheet), Hydraulic Design Advisories and applicable I&IMs. The Design-Builder shall deliver to VDOT a final Hydrologic and Hydraulic Analysis and a final Scour Analysis for the proposed bridge design. The Scour Analysis shall be performed in accordance with accepted design and analysis procedures outlined in FHWA publications HEC-18, HEC-20, and HEC-23. Once scour countermeasures and armoring are identified, if any, the H&H analysis shall be updated to account for the scour countermeasures and armoring placement. These analyses shall be submitted to VDOT for review and approval prior to the commencement of bridge construction.

These analyses shall also be accompanied by a completed VDOT LD-293 form. The Design-Builder shall provide VDOT four (4) paper and two (2) electronic copies (Adobe PDF format) of the final H&H Analysis, Scour Analysis, HEC-RAS Files and LD-293.

2.6.2 Drainage

The drainage design work shall include the design of culverts, open channels, storm sewers, bridge drainage assemblies and structures, adequate outfall analysis (in accordance with DCR Minimum Standard 19), stormwater management facilities, and erosion and sediment control in compliance with the standards and reference documents listed previously in Section 2.1 and the VDOT Erosion and Sediment Control & Stormwater Management Program.

The Design-Builder will be responsible for the drainage design work and the design of stormwater management facilities within the project limits. This may include modifications and/or adjustments to existing drainage structures as part of the proposed roadway design including the temporary detour.

2.6.3 Stormwater Management Plan and Erosion and Sediment Control

An Erosion and Sediment Control ("ESC") Plan and a Stormwater Management Plan must be prepared and implemented in compliance with the Virginia Erosion and Sediment Control Law, the Virginia Erosion and Sediment Control Regulations, the Virginia Stormwater Management Act, the Virginia Stormwater Management Regulations. The Design-Builder must certify that the Erosion and Sediment Control and Stormwater Management Plans have been designed and reviewed in accordance with Virginia Department of Conservation and Recreation ("DCR") regulations and VDOT policies and procedures, including applicable I&IM. A qualified person, other than the designer, who is a certified DCR Plan Reviewer, must independently review and certify the ESC Plans. The Design-Builder shall complete and submit

the ESC and SWM Plan Certification form (LD-445C) to the VDOT Project Manager certifying the ESC and SWM plan for the Project is in accordance with VDOT's Approved ESC and SWM Standards and Specifications. The Design-Builder will be responsible for compliance with construction-related permit conditions and shall assume all obligations and cost incurred by complying with the terms and conditions of the permit. Any fines associated with permit or regulatory violations shall be the responsibility of the Design-Builder.

As the land-disturbing activity is greater than one acre, coverage under the VSMP General Construction Permit is required. The Design-Builder shall coordinate and submit required information to the VDOT Project Manager. The Design-Builder shall complete the applicable sections of the VSMP Permit Registration form (LD-445), Permanent BMP Information form (LD-445A), VSMP Permit Fee Registration form (LD-445B), ESC and SWM Plan Certification form (LD-445C) and submit this assembly to the VDOT Project Manager. The VDOT Project Manager will review the submitted information and request coverage under the VSMP General Construction Permit in accordance with VDOT's guidelines. The Design-Builder shall not proceed with work covered by the permit until the VDOT Project Manager releases the work in writing. This represents a hold point in the Design-Builder's CPM Schedule. Upon completion of the regulated land disturbing activity, the Design-Builder shall complete and sign the VSMP Permit Termination Notice form (LD-445D) and submit it to the VDOT Project Manager for processing. The Design-Builder shall also have on-site during land disturbing operations an individual or individuals holding a DCR Inspector Certification, a DCR Responsible Land Disturber ("RLD") Certification and a VDOT Erosion and Sediment Control Contractor Certification ("ESCCC") to ensure compliance with all requirements.

2.6.4 Stormwater Management Facilities

Design-Builder must identify acceptable location(s) to meet the stormwater management requirements of the Project. The Design-Builder, as part of their final design, shall develop a final design in accordance with the Standards and Reference Documents listed in Section 2.1.

2.7 Traffic Control Devices

The Project shall include all temporary and permanent signs, variable signs for time of day lane use, guardrail, pavement markings, and pavement markers,. Signing and Striping Plans, Transportation Management Plan ("TMP"), and Temporary Traffic Control/ Public Information/ Traffic Operations Plans are required from the Design-Builder for final approval by VDOT and shall be included as a planned work package. The Design-Builder shall comply with the Special Provision for Personnel Requirements for Work Zone Traffic Control (Included in RFP Information Package – CD-ROM) All existing traffic control devices within the Project limits shall be modified, upgraded, or replaced to meet current VDOT standards.

The design speed for the detour which includes the cross-overs shall be 50 miles per hour ("mph") and the detour shall be posted for 45 mph. South bound traffic shall be separated from the north bound traffic by a VDOT approved barrier or Temporary Asphalt Median with flexible post delineators in accordance with IIM-LD-93.14. During construction of the crossovers for the detour and placement of the VDOT approved barrier or Temporary Asphalt Median, the posted

speed limit may be reduced during daylight hours to a value that allows the use of channelizing devices (cones or drums) in conformance with the May 2005 Virginia Work Area Protection Manual. Once the construction of the detour is complete and traffic has been switched from the NBL to the SBL, the posted speed limit shall be 45 mph.

The minimum traffic lane widths for the detour shall be 12 feet in each direction. At locations where the existing pavement structure cannot support 12 foot lanes in each direction, pavement widening will be required. The detour may extend outside the proposed construction limits as long as it remains within the limits of existing Right of Way.

2.7.1 Signs

The Project shall include all required modifications to existing signs and sign structures and all required new temporary and permanent signs and structures. Any signs on adjacent roadways that require relocation/replacement due to construction activities shall be the responsibility of the Design-Builder.

An existing sign inventory shall be completed prior to site demolition in accordance with the VDOT Traffic Engineering Design Manual. This existing information shall be submitted at the same time as the first plan submittal for proposed signing. The Design-Builder shall accomplish the sign panel design using GUIDSIGN software.

2.7.2 Guardrail

The Design-Builder shall make reasonable effort to ensure that the clear zone within the project limit is free from hazards and fixed objects. In the event that removal or relocation of hazard and fixed objects from the clear zone is not feasible, the Design-Builder shall design and install appropriate barrier system for protect in accordance with NCHRP 350. The same requirement applies to existing conditions affected by this project where guardrail upgrade will be required. All existing sub-standard guardrail within the Project Limits must be upgraded by the Design-Builder to meet current standards.

2.7.3 Pavement Markings / Markers

The Design-Builder shall include all required pavement markings and markers**.** All edge lines, centerlines and skip lines shall be Type B, Class VI, patterned preformed tape.

All pavement markings shall be in accordance with VDOT Traffic Engineering Guidelines, dated January 2005.

2.8 Transportation Management Plan

The Design-Builder shall prepare a Transportation Management Plan ("TMP") in accordance with IIM 241 and TED-351 for all proposed work associated with the Project. This Project is classified as a Type B in terms of the TMP.

The Design-Builder shall develop and deliver a TMP, detailing the temporary traffic control plan, the public communications plan, traffic operations analyses (including incident management) for all phases of work, with proposed lane/road closures, and all construction accesses for approval by VDOT. This plan shall be prepared based on traffic/crash analysis and implemented to promote safe and efficient operation of adjacent public transportation facilities and State Highways in accordance with IIM 241.

The TMP shall reflect the noted Scope of Work and all applicable VDOT Standards and Specifications and Amherst/Nelson County ordinances regarding time of work. This plan shall, unless otherwise directed by VDOT, also incorporate a regular weekly update to VDOT regarding any scheduled lane closures and identification of work areas for the two weeks following the update.

Provisions for left turn movements from Route 29 NB to Route 662 and from Route 662 to Route 29 NB will not be permitted during all phases of construction. VDOT will not approve a Transportation Management Plan with left-turn movements from Route 29 NB to Route 662 and from Route 662 to Route 29 NB.

2.8.1 Holiday Restrictions

Unless otherwise approved by VDOT as part of the TMP, no temporary lane restrictions shall take place between 12:00 noon on the Friday preceding and 12:00 noon Tuesday following Memorial Day and Labor Day; or any State or Federal holiday if these holidays occur on Saturday, Sunday or Monday. If any State or Federal holiday falls on a week day other than Monday, there shall be no temporary lane restrictions between 12:00 noon the day before and 12:00 noon the day after each of these holidays. No lane restriction shall take place between 12:00 noon Wednesday preceding and 12:00 noon the Monday following Thanksgiving Day. The detour on Rte. 29 SBL, once open to traffic, is not considered a temporary lane restriction.

2.9 Public Involvement / Relations

The Design-Builder shall be responsible for providing a point of contact and phone number for the public to use in calling to request information or express concerns during the project. All information to be released to the public shall be approved and controlled by VDOT. The Design-Builder shall also be responsible for coordinating preparation and release of public information with VDOT's Lynchburg District Office of Public Affairs:

During the Design and Construction Phases, the Design-Builder shall:

- hold informal meetings with affected stakeholders as necessary and as directed by VDOT. Any meetings held will be in accordance with the VDOT Policy Manual for Public Participation in Transportation Projects, updated September 2004.

- provide to VDOT's Lynchburg District Office of Public Affairs written information about the project suitable for posting by VDOT on its Web site. Such

information will include a project overview, plan of work for the two-week outlook, overall project schedule, and potential impacts to traffic, up–to-date project photos, and contact information.

During the Construction Phase, the Design-Builder shall:

- provide an emergency contact list of project personnel and have sufficient manpower and resources available to respond to any onsite emergency including any work zone incidents.

- operate as a liaison between VDOT and the Design-Builder's Construction Manager to ensure compliance with local ordinances and provide appropriate notification to affected property owners.

2.10 Utilities

There are no utility impacts and no relocations of utilities on this project.

2.11 Quality Assurance / Quality Control (QA/QC)

Design-Builder shall submit its QA/QC Plan for both design and construction to VDOT for review and approval at the meeting held after the Date of Commencement as set forth in Part 4 General Conditions under Section 2.1.2. Along with the QA/QC Plan submittal, the Design Manager and Quality Assurance Manager ("QAM") shall provide a presentation of the QA/QC Plan for both design and construction utilizing Project related scenarios. Project scenarios shall include but not limited to:

1. Preparatory Inspection Meeting requirement, including incorporation of at least one each, Witness and Hold Point, as set forth in Sections 105.04, 105.05 and 105.10, Department's guidance document for Minimum Quality Assurance and Control Requirements for Design-Build and Public-Private Transportation Act Projects, August 2008 (August 2008 QA/QC Guide);
2. At least one (1) material which VDOT retains responsibility for testing as identified in Table 105-1, (August 2008 QA/QC Guide);
3. Situation arising requiring the issuance of a Non-conformance Report, subsequent review of the report, including completion of corrective measures and the issuance of a Notice of Correction of non-conformance work with proper log entries and proper interface with auditing and recovery requirements as set forth in Section 105.09.01.01 for nonconforming Work resulting from:
    a. defective equipment
    b. construction activities/materials which fail to conform as specified;
4. Inspection documentation capturing requirements as set forth in Section 105.13 (VDOT's Minimum Requirements for Quality Control and Quality Assurance for Design-Build and PPTA Projects dated August 2008); as well as inspection of foundation and pavement subgrades that are to be performed and certified by a qualified license geotechnical engineer in accordance with the special provisions referenced in this Document.

5. Application for payment for Work Package which includes work element, including review and approval by Quality Assurance Manager;
6. Detail two (2) sample entries in Materials Notebook showing completion of Form C-25, including subsequent submission and review by Department Project Manager as set forth in Section 105.13.01 (see Section 803.73 of Manual of Instruction, Form TL-142S, an example of a completed Materials Notebook and VDOT Materials Division Memorandum Number MD299-07 for Materials Acceptance – October 4, 2007)

2.11.1 Design Management

The Design-Builder is responsible for design quality. The Design Manager, assigned by the Design-Builder, shall be responsible for overall management of the QA/QC programs for design. This individual shall report directly to the Design-Builder's Project Manager and is responsible for all of the design QA/QC activities. The Design Manager shall maintain close communication with Design-Builder's Project Manager and shall ensure the Project is completed in accordance with the requirements of the Contract Documents. The Design Manager shall perform all of the design oversight reviews. VDOT will participate in these reviews. The FHWA will be given the opportunity to participate in these reviews as well. VDOT holds the ultimate approval and disapproval authority. Under this procedure, the Design Manager will provide VDOT with draft design plans for review and approval to confirm that the design work complies with the requirements of the Contract Documents, especially Section 2.4 of the General Conditions (Part 4) and the Standard and Reference Documents listed in Section 2.1 herein prior to initiation of construction activities on the Project.

Plans to be reviewed shall be submitted to VDOT's Project Manager in accordance with Section 2.13.6 below. VDOT's Project Manager will distribute plans to appropriate VDOT and FHWA staff for review and/or approval. VDOT and FHWA shall have the right to review and comment on all Draft Plans and Specifications for compliance with the requirements of the Contract Documents and Reference Documents. The Design-Builder shall be responsible to satisfy all such requirements and acknowledge that VDOT and FHWA maintains the right to disapprove any design approach that it is not in compliance with the requirements of the Contract Documents and Referenced Documents unless said approach was previously approved in writing by VDOT or FHWA.

The written approval of the modifications should be attached with the draft plans submitted for review. The Design-Builder shall revise and modify all draft design plans so as to fully reflect all comments and shall deliver the revised submittal to VDOT's Project Manager, who will distribute plans to appropriate VDOT and FHWA staff for review and comments.

Construction Plans are to be submitted to VDOT for review and approval by the Chief Engineer prior to construction of that element. The time frame for plan review and approval shall be in accordance the requirements of the Contract Documents. Any Construction Plans requiring FHWA approval shall be submitted to VDOT and VDOT will coordinate with FHWA. The Design-Builder shall be responsible for the design details and ensuring that the design and construction work are properly coordinated. The Design-Builder shall be responsible for documenting any design exceptions or waivers that may be needed. VDOT will submit the

design waivers and design exceptions to the appropriate reviewing authority for review and approval. VDOT formal acceptance of the design will occur at the time of final acceptance as provided in the Contract Documents.

2.11.2 Construction Management

The plan requires that the Design-Builder shall have the overall responsibility for both the Quality Control ("QC") and Quality Assurance ("QA") activities. The Design-Builder shall be responsible for 100% QA work and QA sampling and testing for all materials used and work performed on the Project. These QA functions shall be performed by an independent firm that has no involvement in the construction QC program/activities. There shall be a clear separation between QA and construction including separation between QA inspection and testing operations and construction QC inspection and testing operations including testing laboratories. Two independent testing laboratories will be required, one for QA testing and one for QC testing. The Design-Builder will also be responsible for providing quality assurance and quality control testing for all materials manufactured off-site, excluding the items listed below:

- Prestressed Concrete Structural Elements (beams, girders (VDOT adopted Bulb-T sections), and piles).
- Structural Steel Elements (beams and girders).
- Pipe (concrete, steel, aluminum and high density polyethylene) for culverts, storm drains and underdrains.
- Precast Concrete Structures.
- Asphalt Concrete Mixtures.
- Aggregate (dense and open graded mixes).
- Metal Traffic Signal and Light Poles and Arms

VDOT will provide plant quality assurance and plant testing of these items. In the event that VDOT determines that materials fail to meet the tolerances in the Road and Bridge specifications, a Non-Compliance Report ("NCR") will be issued by the VDOT Project Manager and addressed to the Design-Builder's QAM for resolution. The Design-Builder is responsible to submit a Source of Materials, Form C-25, for all materials VDOT retains responsibility for testing. The C-25 is for informational purposes only for VDOT for the purpose of performing QA inspections. The C-25 will not be approved or rejected by VDOT since it is the Design-Builder's responsibility to obtain materials that meet the contractual requirements. The Design-Builder will be responsible for providing quality assurance and quality control testing of all off-site materials that are not identified above, to include materials obtained from off-site soil borrow pits.

The Design-Builder's QAM shall report directly to the Design-Builder's Project Manager and be independent of the Design-Builder's roadway, bridge and otherwise physical construction operations. The QAM shall establish quantities prior to commencing construction, and provide VDOT a total number of QC, QA, Independent Assurance ("IA") and Independent Verification ("IV") tests required as a result of the quantities and the sampling and testing requirements as set forth in Sections 105.4 and 105.5 (August 2008 QA/QC Guide). VDOT will provide all IA

and IV tests and therefore final determination of the actual number of IA and IV tests to be performed will be made by VDOT based on these quantities.

The QAM will be responsible for the QA inspection and testing of all materials used and work performed on the Project to include monitoring of the Contractor's QC activities, maintaining the Materials Notebook, documentation of all materials, sources of materials and method of verification used to demonstrate compliance with VDOT Standards. This includes all materials where QA testing is to be performed by VDOT. The QAM shall be vested with the authority and responsibility to stop any work not being performed according to the Contract requirements. The construction QA and QC inspection personnel shall perform all of the construction inspection and sampling and testing work that is normally performed by VDOT, as prescribed in the Construction Manual, Inspection Manual, Materials Manual of Instructions and all other applicable Reference Documents. This includes the documentation of construction activities and acceptance of manufactured materials.

Two independent testing laboratories will be required, one for QA testing and one for QC testing. The entity(ies) performing QA operations, inspections, sampling and laboratory testing and the entity(ies) performing QC operations, inspections, sampling and laboratory testing shall be unique and independent from one another.

VDOT's role during construction operations will be limited to verification sampling and testing, independent assurance, review and processing progress payments, and oversight of the Design-Builder's construction management scheduling, document control and other Project control and Project management/administration efforts necessary to properly administer and manage the Project. All construction QA and QC personnel shall hold current VDOT materials certifications when testing hydraulic cement concrete, asphalt concrete, soils and aggregate, pavement markings and for the safety and use of nuclear testing equipment, as required by the Road and Bridge Specifications. The QA programs must be performed under the direction of the QAM. The QC programs should be performed under the direction of the Construction Manager. Substitution of Construction Manager and the QAM shall require VDOT approval. In addition, VDOT shall have the right to order the removal of any construction QA and QC personnel to include the QAM and the Construction Manager for poor performance at the sole discretion of the VDOT Project Manager. The QA/QC plan shall include rapid reporting of non-compliance to the VDOT Project Manager, and the remedial actions to be taken as discussed in Section 105.12 of the Division 1 Amendments to the Standard Specifications (Part 5).

The Design-Builder shall provide, prior to Final Application for Payment, a complete set of Project records that included, but are not limited to the following:

- Project correspondence
- Project diaries
- Test reports
- Invoices
- Materials books
- Certified survey records

- DBE/EEO records
- Warranties
- Special Tools, etc.

2.12 Field Office

The Design-Builder shall provide office space, equipment, and services consistent with requirements for a Type I Field Office. This field office should be configured and equipped for joint operations by Design-Builder and VDOT staff. The configuration and equipping of the field office shall be coordinated between the Design-Builder and the VDOT Project Manager prior to on-site placement of the field office. The field office will be operational throughout the duration of the project and shall be removed upon final project acceptance.

2.13 Plan Preparation

2.13.1 Geopak and MicroStation

When the Design-Builder is given the Date of Commencement, they will be furnished with the following software and files which run in WindowsNT or WindowsXP only: Geopak (current version used by VDOT), MicroStation (current version used by VDOT) and VDOT Standard Resources Files, and all the design files used to develop the preliminary roadway and bridge plans including aerial images and updated survey files.

2.13.2 Software License Requirements

VDOT shall furnish license(s) for all the software products VDOT makes available to the Design-Builder. The License(s) will be supplied upon request by the Design-Builder, based on the data provided on a completed Software License Form, LD-893, and subsequently reviewed and approved by the VDOT Project Manager.

All License(s) are provided for use on the Project detailed on the request only for the duration specified for that Project. Any adjustment made to the Project schedule will be taken into consideration in adjusting the time the license(s) are available. Justification for the number of license(s) requested **MUST** include the estimated number of total computer hours for the task of design, detailing, relating Project management and other computer based engineering functions requiring the software requested.

The appropriate use of all license(s) provided to the Design-Builder will become the responsibility of the Design-Builder regardless of who on the team uses the license(s). The Design-Builder will be responsible for keeping track of the license(s) provided to them or a team member and the prompt return of the license(s) and removal of the software from any system used solely for the Project for which it was obtained.

2.13.3 Drafting Standards

All plans shall be prepared in U.S. customary units and in accordance with the most recent version of the VDOT's Road Design Manual, Vol I, VDOT's CADD Manual and VDOT's I&IM and VDOT's Manual of Structure and Bridge Division, Vol. V, Part 2, Design Aids and Typical Details.

The approved plans shall be furnished by the Design-Builder with appropriate signature blocks and Professional Engineer seal on each sheet indicating approval for construction.

2.13.4 Electronic Files

All plans shall also be submitted in electronic format using the provided versions of MicroStation CADD software. Files shall be submitted in both DGN & PDF formats. VDOT will furnish electronic files of all applicable standard detail sheets upon request by Design-Builder. The files will use standard VDOT cell libraries, level structures, line types, text fonts, and naming conventions as described in the most recent version of the VDOT CADD Manual and VDOT's Manual of the Structure and Bridge Division, Vol. V- Part 2, Design Aids and Typical Details. Files furnished to Design-Builder in electronic format shall be returned to VDOT and removed from Design-Builder and its designer's computer equipment upon completion of this Project.

2.13.5 Bridge Plans

Each sheet of the contract plans shall be completely dimensioned, and all elevations necessary for construction purposes shall be shown. An Estimated Quantities table shall be included on the final bridge plans. The Design-Builder shall provide complete details for steel structures or steel components, showing all sizes and overall dimensions of members, number and arrangement of all fasteners at joints, type and size of welds.

Plan sets should contain sheets which are arranged and detailed as outlined in the VDOT Office Practice. To the extent possible, the bridge plans must use the standard sheets in Volume V (all parts) of the VDOT Manual of Structure and Bridge Division. Structural elements that have a corresponding standard sheet in Volume V must be detailed using the appropriate standard sheet.

Dead load deflections shall be computed and shown on the drawings. In addition, a camber diagram shall be shown. The deflections are those anticipated to occur in the girders/beams upon placement of the concrete deck and parapet. In the event prestressed concrete beams are used, the expected net camber at release for beams shall be shown on the plans. The net camber at release is the amount of upward deflection that should occur at mid-span when stress transfer is made and the member is freely resting on storage supports.

The sequence of concrete deck placement operations for beams or girder construction shall be given for continuous structures, and all erection stresses shall be computed where necessary for design. A summary table of moments, shears, reactions and stresses for primary load carrying members shall be included in the plans.

2.13.6 Construction Plans

Construction Plans are those that are issued for construction and approval by VDOT's Chief Engineer. This plan milestone includes plans that may be submitted as soon as sufficient information is available to develop Construction Plans for certain portions or elements of the Project. The Design-Builder shall meet commitments for review and approval by other entities/agencies as specified in other portions of the RFP and its attachments. These plans will be issued for construction following approval by VDOT's Chief Engineer. The roadway or bridge plans may be submitted for approval in logical subsections (such as from bridge to bridge) and consisting of work packages such as: 1) clearing and grubbing along with erosion and siltation control, grading and drainage, 2) paving, and 3) traffic control. Individual bridge plans may be submitted in logical components such as: 1) foundation, 2) remaining substructure, and 3) superstructure. A submittal schedule and planned breakdown of work packages shall be submitted to VDOT for approval as part of their planned Project schedule.

In addition, the construction plans shall include the following: 1) for all proposed and relocated waterline and sanitary sewer lines provide plan and profiles prepared at 1 inch = 5 feet vertical and 1 inch = 25 feet horizontal and all calculation charts and models, 2) for all proposed and existing storm systems utilized for adequate outfall, provide plan and profiles prepared at 1 inch = 5 feet vertical and 1 inch = 25 feet horizontal and all associated calculation charts (capacity, inlet sizing, and HGL), and 3) provide adequate outfall cross sections and calculations.

The roadway or bridge plans described above shall be submitted to VDOT**. VDOT shall receive five (5) full-size sets and five (5) half-size sets of each submission**. The plan submissions shall be delivered, in accordance with Section 2.13.8 below, to the following addresses:

Virginia Department of Transportation
Attention - Mr. Brian Henschel, P.E., PMP, Area Construction Engineer
4219 Campbell Ave.
Lynchburg, VA 24501

2.13.7 Record (As-Built) Plans

The final plan milestone is Record (As-Built) Plans. As-Built Plans shall be prepared, certified and submitted to VDOT with the final application for payment. These plans will show all adjustments and revisions to the Construction Plans made during construction and serve as a permanent record of the actual location of all constructed elements. The Design-Builder shall submit the Record (As-Built) Plans in both hard copy and electronic (DGN & PDF) formats.

2.13.8 Plan Deliverables

- The Design-Builder shall prepare Hard Copy paper plans and Electronic plans (DGN & PDF) formats on CD or other approved media for each of the following deliverables:
    - Construction Plans
    - Design Calculations

- Final Hydrologic and Hydraulic Analysis including Scour Analysis
- Working/Shop Drawings
- Record Plans (As-Built)
- Bridge Load Rating Report

2.14 Virginia Occupational Safety and Health Standards

The Project shall comply with Virginia Occupational Safety and Health Standards in accordance with Section 110.05 of the Division I Amendments to the Standard Specifications.

At a minimum, all Contractor personnel shall comply with the following, unless otherwise determined unsafe or inappropriate in accordance with OSHA regulations:

2.14.1 Hard hats shall be worn while participating in or observing all types of field work when outside of a building or outside of the cab of a vehicle, and exposed to, participating in or supervising construction.

2.14.2 Respiratory protective equipment shall be worn whenever an individual is exposed to any item listed in the OSHA Standards as needing such protection unless it is shown the employee is protected by engineering controls.

2.14.3 Adequate eye protection shall be worn in the proximity of grinding, breaking of rock and/or concrete, while using brush chippers, striking metal against metal or when working in situations where the eyesight may be in jeopardy.

2.14.4 Approved high visibility Safety apparel shall be worn by all exposed to vehicular traffic and construction equipment.

2.14.5 Standards and guidelines of the current Virginia Work Area Protection Manual shall be used when setting, reviewing, maintaining, and removing traffic controls.

2.14.6 Flaggers shall be certified in accordance with the Virginia Flagger Certification Program.

2.14.7 No person shall be permitted to position themselves under any raised load or between hinge points of equipment without first taking steps to support the load by the placing of a safety bar or blocking.

2.14.8 Explosives shall be purchased, transported, stored, used and disposed of by a Virginia State Certified Blaster in possession of a current criminal history record check and a commercial driver's license with hazardous materials endorsement and a valid medical examiner's certificate. All Federal, State and local regulations pertaining to explosives shall be strictly followed.

2.14.9 All electrical tools shall be adequately grounded or double insulated. Ground Fault Circuit Interrupter ("GFCI") protection must be installed in accordance with the National Electrical Code ("NEC") and current Virginia Occupational Safety and Health agency

("VOSH"). If extension cords are used, they shall be free of defects and designed for their environment and intended use.

2.14.10 No person shall enter a confined space without training, permits and authorization.

2.14.11 Fall protection is required whenever an employee is exposed to a fall six feet or greater.

3.0 ATTACHMENTS

3.1 The following attachments are specifically made a part of, and incorporated by reference into, these Technical Information & Requirements:

ATTACHMENT 2.2 -- ADDITIONAL FOUNDATION CRITERIA

All additional information is included in the RFP Information Package – CD-ROM referred to in Part 1, Section 2.7.4 of this RFP.

END OF PART 2
TECHNICAL INFORMATION & REQUIREMENTS