

TECHNICAL PROPOSAL

Volume I

Revised September 20, 2012

I-581/VALLEY VIEW BOULEVARD INTERCHANGE PHASE II

From: ~0.240 Mi. S. Route 101 (Hershberger Road)
To: ~1.561 Mi. S. Route 101 (Hershberger Road)
City of Roanoke, Virginia



State Project No.: 0581-128-109, P101, RW201, C501, B627
Federal Project No.: NH-581-5(035)
Contract ID Number: C00016595DB45

This proposal has been prepared by:



Key Construction Company, Inc.



July 18, 2012



Section 4.1
Letter of Submittal



Key Construction Co., Inc.

P.O. Box 698 • Clarksville, Virginia 23927 • Tel. (434) 374-2125 • Fax # (434) 374-4360

Revised September 20, 2012

July 18, 2012

Mr. Joseph A. Clarke, P.E.
Alternate Project Delivery Office
Virginia Department of Transportation
1401 East Broad Street
Richmond, VA 23219

RE: **Request for Proposals**

I-581/Valley View Boulevard Interchange Phase II
City of Roanoke, Virginia
Design-Build (D-B) Solicitation
State Project No.: 0581-128-109, P101, RW201, C501, B627
Federal Project No.: NH-581-5 (035)
Contract ID Number: C00016595DB45

Dear Mr. Clarke:

Key Construction Company, Inc. (Key) is pleased to resubmit ten (10) identical paper copies of our Technical Proposal, one (1) of which bears original signatures, and one (1) CD-ROM containing the entire proposal in a single cohesive Adobe PDF file to the Virginia Department of Transportation (VDOT) to provide Design-Build (D-B) services for the I-581/Valley View Interchange Phase II Project in the City of Roanoke, VA. **Changes in this new Technical Proposal from the original Technical Proposal submission are identified using red text.** We have carefully reviewed the Request for Proposal (RFP), Addendum No. 1 and 2, **VDOT's letters to Short-Listed Offerors dated September 5 and 13, 2012 describing Changes to RFP Requirements and the Interim Milestone**, RFP Information Package, RFP Questions and Answers, attended the Pre-Proposal Meeting, Utility Meeting, Proprietary Meeting and visited the project site on several occasions as part of the development of this technical proposal.

Section 4.1.1 Offeror's Official Representative Information

Key's **official representative and designated point-of-contact** for all project-related communications is Key's **Vice President, Timothy B. Nunn**. Mr. Nunn can be reached as follows:

Address	Direct	Mobile	Fax	Email
P. O. Box 698 11453 Highway 15 South Clarksville, VA 23927	434-374-2125	804-314-0046	434-374-4360	tim.nunn@key-construction.com

Section 4.1.2 Declaration of Intent

If selected, Key will enter into a contract with VDOT for the I-581/Valley View Interchange Phase II Project in accordance with the terms of the RFP and Addendum No. 1 and 2, **and VDOT's letters to Short-Listed Offerors dated September 5 and 13, 2012 describing Changes to RFP Requirements and the Interim Milestone.**

Section 4.1.3 Declaration of Proposal

Key Construction Company, Inc. declares that the offer represented by the Technical and Price Proposals will remain in full force and effect beginning on ~~July 18, 2012~~ **September 20, 2012** and for one hundred twenty(120) days thereafter.

Section 4.1.4 Principal Officer Information

The principal officer of Key with whom a D-B contract with VDOT would be written is Key’s principal officer and **President , Mr. David W. Lyle** .Mr. Lyle can be reached as follows:

Address	Direct	Mobile	Fax	Email
P.O. Box 698 11453 Highway 15 South Clarksville, VA 23927	434-374-2125	804-731-3707	434-374-4360	david.lyle@key-construction.com

Section 4.1.5 Proposal Payment Agreement

Key has included the completed Proposal Payment Agreement (Attachment 9.3.1) for the I-581/Valley View Interchange Phase II project in the Appendix under the tab “Attachment 9.3.1” of this submittal.

Why Select the Key/JMT Team

The Key/JMT Team is uniquely qualified and ideally suited for this project by virtue of the following factors:

- ✓ 100 years of combined team experience designing, constructing, and inspecting VDOT projects
- ✓ Team knowledge and extensive experience with large roadway and bridge projects involving extreme sensitivity to the environment, citizens of the community and the traveling public.
- ✓ Team knowledge and experience performing multi-staged roadway and bridge construction projects.
- ✓ Team cohesiveness and personnel longevity
 - Design Build Project Manager, Lead Design Engineer and Construction Manager have a 5-year relationship
 - Design Build Project Manager, Construction Manager and Highway Superintendent have a 6-year working relationship
 - Design Build Project Manager and QA Manager have a 4+-year working relationship

Key and JMT have long and successful histories of serving VDOT on countless projects such as this. Together with all of our coordinating companies, we will design and construct the I-581/Valley View Interchange Phase II Project in a manner to ensure the greatest opportunity for success. We will create a transparent working relationship with VDOT and 3rd party stakeholders to promote trust, confidence, and collaboration.

Respectfully Submitted,
Key Construction Company, Inc.

David W. Lyle
President



Section 4.2 Offeror's Qualifications



Key Construction Company, Inc.





Section 4.2 Offeror's Qualifications

4.2.1 (a) Confirmation of information contained in Sections 3.2 and 3.4 of original SOQ submittal

Information contained in Sections 3.2 (Letter of Submittal) and 3.3 (Offeror's Team Structure), including the organizational chart, submitted by the Key/JMT Team in their SOQ dated December 09, 2011 remains true and accurate.

4.2.1 (b) Updated information

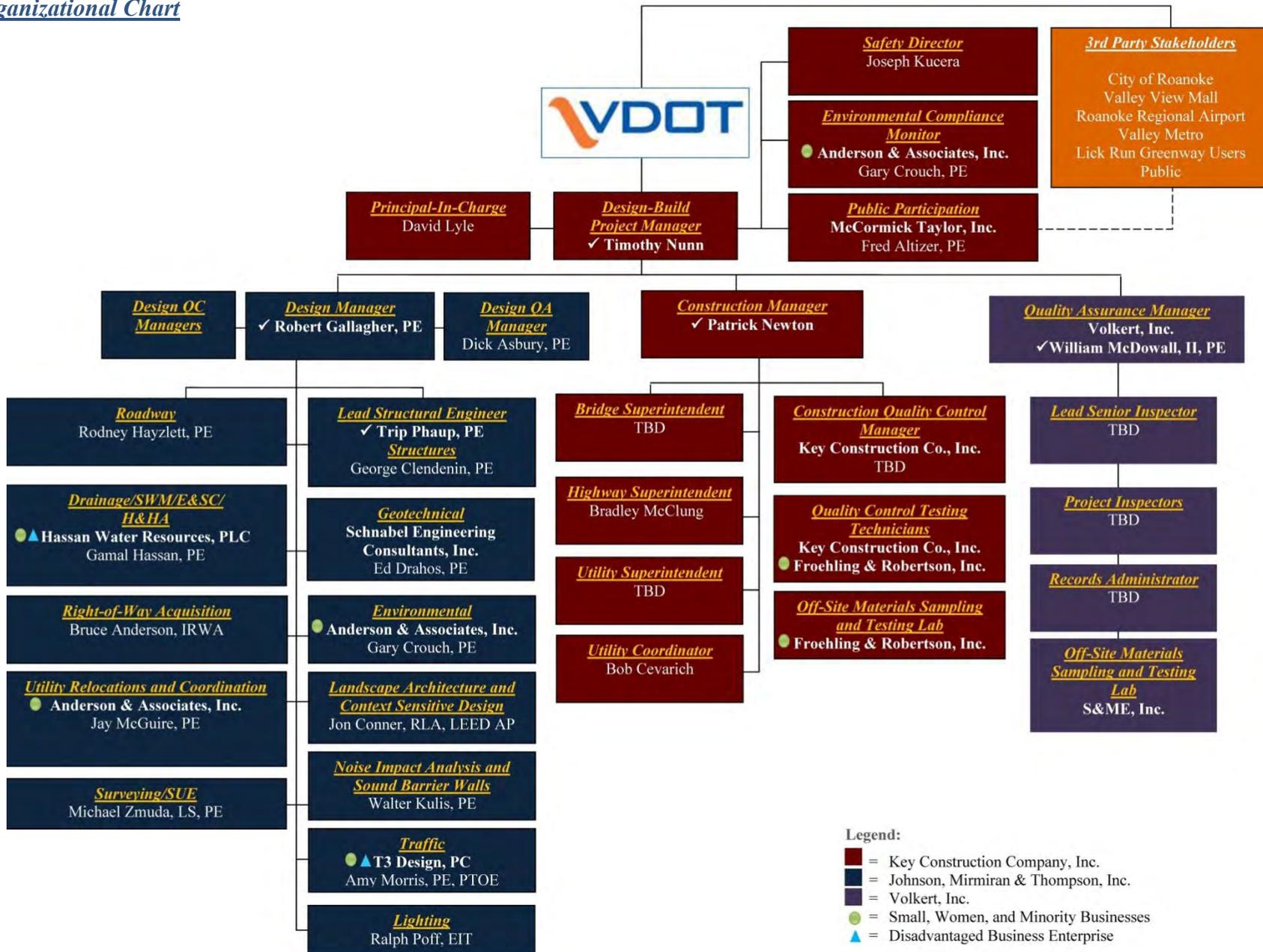
Since the information contained in Sections 3.2 (Letter of Submittal) and 3.3 (Offeror's Team Structure) remain true and accurate, there are no changes to be identified in this sub section.

4.2.2 Updated Organizational Chart

The organizational chart on the following page shows the "chain of command", identifies the major functions to be performed by each member of the Key/JMT Team, and identifies the reporting relationships in managing, designing, and constructing the Project including quality control/quality assurance.



Organizational Chart



- Legend:
- = Key Construction Company, Inc.
 - = Johnson, Mirmiran & Thompson, Inc.
 - = Volkert, Inc.
 - = Small, Women, and Minority Businesses
 - ▲ = Disadvantaged Business Enterprise



Section 4.3 Design Concept



Key Construction Company, Inc.



Section 4.3 Design Concept

The Key/JMT Team has evaluated the preliminary roadway and bridge plans and project information provided in the RFP documents and has developed a concept for the Project that meets or exceeds the design standards and design criteria for the project and addresses the following **project priorities**:

- Cost – provide the best price for the scope of work identified in the RFP,
- Design Concept – cost-effective and efficient design of the Project, and
- Project Approach – proposed approach to managing all aspects of designing and constructing the Project such that the potential risks for all stakeholders are limited.

The Key/JMT Team understands that the purpose of this Federal Oversight Project is to complete the current partial interchange of Valley View Boulevard with I-581/U.S. Route 220 in the City of Roanoke. The work will be accomplished by the addition of the southbound exit and northbound entry ramps serving I-581/U.S. Route 220 north of the interchange and accompanying auxiliary lanes along I-581/U.S. Route 220 to the Hershberger Road interchange. The existing southbound entry and northbound exit ramps will be adjusted and lengthened to facilitate the other improvements. Valley View Boulevard and the bridge over I-581/U.S. Route 220 will be widened to provide two (2) through lanes in each direction, dual left turn lanes for both the northbound and southbound movements to I-581 through the interchange and a right turn lane onto the northbound I-581/U.S. Route 220 entry ramp.

Following is a discussion that provides sufficient information to enable VDOT to understand and evaluate the Key/JMT Team's concept to designing the Project.

4.3.1 Conceptual Roadway Plans

Roadway and Survey

The Key/JMT Team has evaluated the preliminary road plans, survey data and information provided in the RFP documents and has developed a concept for the roadway that meets or exceeds the design standards for the project and addresses the **key project elements** listed above. JMT will advance the design from the current completion level, in addition to incorporating new design elements into final design and construction documents. The Key/JMT team will **supplement existing surveys** provided by VDOT in accordance with RFP Part 2 Section 2.7 in support of design, right-of-way acquisition, preparation of limited access revisions, utility designation and design, and construction stakeout. Surveys will include updates of property owner information and adjacent topography changes that occur due to adjacent development by property owners. The **roadway design effort** will include finalizing typical sections; refining horizontal and vertical alignment and ties to existing roadways; preparing curb geometry tables; detailing traffic barrier design, identifying geotechnical boring needs; developing right-of-way plans; developing special design details; preparing plan and profile details, notes, and call-outs. These efforts will be coordinated with other design disciplines including hydraulic, utilities, traffic, geotechnical, environmental and bridge design disciplines. **The conceptual plans for the roadway are included in Volume II of this Technical Proposal.** Following is a discussion of the Key/JMT Team's concept for the I-581/Valley View Boulevard interchange and all related connections to the approaches.

General Geometry. The Key/JMT Team currently proposes to design ~~this roadway~~ Valley View Boulevard as an Urban Major Collector using the VDOT GS-7, rolling terrain geometric standard with a minimum design speed of 30 mph as defined in RFP Part 2 Section 2.3 Roadway and Addendum No. 1 and 2. The Valley View Boulevard typical section includes widening to provide two ~~continuous~~ through lanes in each direction, a 4' minimum raised concrete median, a ~~17.5'~~ shared use path and ~~double-lane~~ dual left turn lanes for both the northbound and southbound ramps to I-581 through the interchange and a right turn lane onto the northbound on ramp to I-581. The clear width of the outside lanes will be a 14' (12' lane plus 2' gutter pan) minimum ~~width to be bicycle-compatible~~. Interior lanes immediately adjacent to the median will be a minimum width of 13', consisting of a 12' lane and 1' offset to the proposed curb. All other lane widths will be set as depicted on the plans. Cut and fill slopes will not exceed 2:1 slopes. Traffic barrier ~~or guardrail~~ will protect any areas where fixed object hazards must remain within clear zone in accordance with RFP requirements. Appropriate end treatments will be provided for each terminus of roadway barrier.

I-581/U.S. Route 220 is classified as Urban Principal Arterial (~~Interstate Freeway~~) and will be designed to VDOT GS-5 (Freeway), rolling terrain geometric standard with a minimum design speed of 60 mph. The existing typical section including median and through lanes will be maintained, auxiliary lanes will be added on the outside as depicted on the RFP plans with full-depth pavement shoulders. A minimum bridge clearance of 16'-6" shall be maintained over the roadway and shoulders.

All ramps are functionally classified as Interchange Ramps and will be designed to the VDOT GS-R, rolling terrain geometric standard with minimum design speeds of 30 mph. All intersections and ramp terminals will be designed to accommodate AASHTO WB-67 design vehicles in each turning movement.

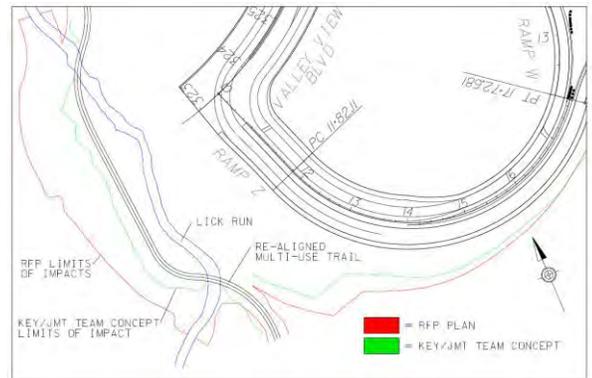
Horizontal Alignment. The Key/JMT Team reviewed the roadway geometrics provided in the RFP plans. The evaluation focused on determining whether the project complies with VDOT and AASHTO design criteria and other project requirements. **The following table summarizes the design speed, functional classification, minimum ~~criteria~~ required and provided radius of curvature, and superelevation standards for each roadway on the project:**

Location	Design Speed (MPH)	VDOT Functional Classification	Minimum Curve Radius		Super Elevation FT./FT.
			(Required) (FT)	(Provided) (FT)	
I-581/U.S. Route 220	60	GS-5	1204	2864	TC-5.01R
I-581/U.S. Route 220	60	GS-5	1204	5729	TC-5.01R
I-581/U.S. Route 220	60	GS-5	1204	2792	TC-5.01R
Valley View Boulevard	30	GS-7	251 333	555	TC-5.04 ULS-NC
Valley View Boulevard	30	GS-7	251 273	500	TC-5.04 ULS
NB Off-Ramp	30	GS-R	251*	2500	TC-5.01R
NB On-Ramp	30	GS-R	251*	6000	TC-5.01R
SB Off-Ramp	30	GS-R	251*	251	TC-5.01R
SB On/Off-Ramp	30	GS-R	251*	277	TC-5.01R
SB On-Ramp	30	GS-R	251*	300	TC-5.01R

* Current VDOT Geometric Design Standard for Interchange Ramps (GS-R) dated 07/12 depicts 215'

The Key/JMT Team concept maintains the horizontal alignment for each roadway on the project as depicted on the RFP Plans without modification. Horizontal curves will be superelevated in accordance with VDOT standards as noted in the chart above.

Vertical Geometry. In general, significant refinements to RFP profiles on I-581 and the connecting ramps are impractical due to the proximity of bridge approaches to the I-581 limit of work. However, the profile of Valley View Boulevard and the profile of Ramp Z has been lowered to reduce impacts to the stream. The reduction in the profile also simplifies the maintenance of traffic shifts needed to construct the Ramp Z roadway, keeping the proposed roadway closer to the elevations of the existing roadway. Also, by lowering the profile, the fill slope limits will be reduced, reducing the embankment material required and potentially minimizing impacts to the stream.



The vertical alignment grades have been verified for each roadway based on function classification, design speed, and terrain type. The “K” values, ~~and~~ Stopping Sight Distances (SSD), and Intersection Sight Distances have also been verified for each roadway according to the criteria provided in Attachment 2.3 Design Criteria Table, Table 2-5, Page F-34 in Appendix F of the VDOT Road Design Manual, and Table 2-7, Page F-35 in Appendix F of the VDOT Road Design Manual. The table on the following page summarizes the design speed, functional classification, maximum allowable profile grade, and the maximum actual profile grade for each roadway:

Location	Design Speed (MPH)	VDOT Functional Classification	Maximum Grade Allowed %	Maximum Grade Actual %
I-581/U.S. Route 220	60	GS-5	4	Match Existing 2.5* **
Valley View Boulevard	30	GS-7	11	3.25
SB Off-Ramp	30	GS-R	5-7	5 4.26
SB On-Ramp	30	GS-R	5-7	5 0.5
SB On/Off-Ramp	30	GS-R	5-7	5
NB Off-Ramp	30	GS-R	5-7	3.60**
NB On-Ramp	30	GS-R	5-7	2.85**

*Based on information provided in the RFP plans, the maximum calculated grade.

The proposed profiles for I-581/U.S. Route 220, the NB Off-Ramp **and the NB On-Ramp **and the Shared Use Path** maintain the profiles depicted on the RFP plans without modification. **The proposed maximum grade for the Shared Use Path will not exceed the maximum 5% grade depicted on the RFP Plans.**

Design Waivers and Design Exceptions. Design Waiver and Design Exception requests are timely processes that can affect the project schedule or costs. Identifying deficiencies early in the project development will enable the Team to assemble the packages for processing early and avoid any impacts to the project schedule or costly over runs.

The Department has identified a single Design Waiver for the project. The RFP plans depict a substandard curve along the Shared Use Path and the RFP documents provide the Design Waiver Request (Form LD-448) with supporting documentation to justify approval of the Design Waiver. The provided Form LD-448 has been approved by the District Location and Design Engineer but has not been recommended for Approval by the Assistant State Location and Design Engineer. The Key/JMT Team will work with the Department to receive final approval of this Design Waiver.

The Key/JMT Team has identified additional potential Design Exceptions or Design Waivers that will need to be addressed during final design prior to receiving plan approval as described below:

1. Design Exception: The RFP plans depict a substandard superelevation at Ramp Z (Southbound On Ramp) Sta. 17+72.68. The RFP alignment has a Point of Reverse Curve with a superelevation of 0% with no tangent section between curves which is undesirable.
2. Design Exception: The RFP plans depict a substandard superelevation at Ramp Z (Southbound On Ramp) Sta. 11+82.11. This is a Point of Curve with a superelevation of 1.25%, only a portion of the required superelevation, which is undesirable.
3. Design Exception: The RFP plans depict a curve on Ramp Z (Southbound On Ramp) that reaches full superelevation of 8% for only a short distance of 11 feet.
4. Design Exception: The RFP plans depict the PT of the curve in the gore area of Ramp Z (Southbound On Ramp) and I-581 having a superelevation of 2.00% which is less than the minimum 60% of Full Superelevation for the curve at the PT required by AASHTO. Using this reduced superelevation decreases the rollover between the ramp and the mainline.
5. Design Exception: The RFP plans depict the PC of the curve in the gore area of Ramp W (Southbound Off Ramp) and I-581 having a superelevation of 2.00% which is less than the minimum 60% of Full Superelevation for the curve at the PC required by AASHTO. Using this reduced superelevation decreases the rollover between the ramp and the mainline.
6. Design Exception: The RFP plans depict an inadequate stopping sight distance along Ramp Z (Southbound On Ramp).

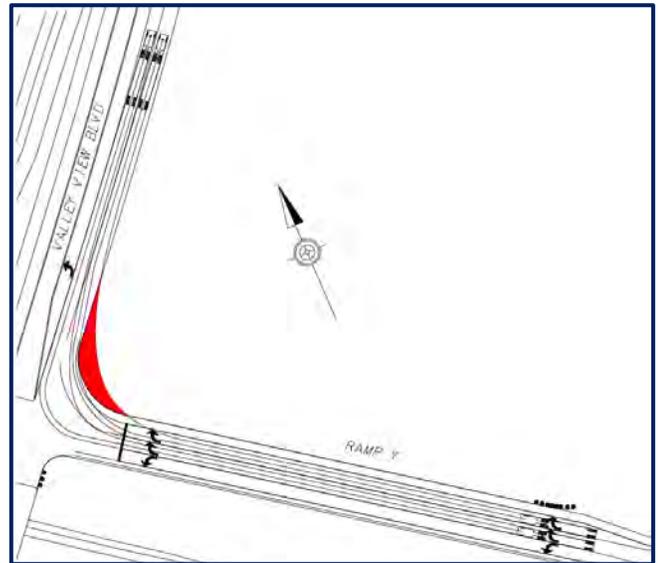
The Key/JMT Team will work with the Department to eliminate, mitigate, or develop acceptable solutions to these Design Exceptions or Design Waivers in accordance with requirements in the following documents:

- VDOT IIM-LD-227.5, S&B-70.3
- [FHWA Mitigation Strategies for Design Exceptions, July 2007](#)
- AASHTO Highway Safety Manual, 2010

The Key/JMT Team also calls attention to several additional design deficiencies that have been identified and addressed in the concept plans:



1. Truck turning movement from Valley View Boulevard westbound to Ramp X (Northbound On Ramp) as depicted on the RFP plans will leave the edge of pavement. The Key/JMT Team concept depicts an increase in pavement area such that a WB-67 can make the turn.
2. Truck turning movement from Ramp Y (Northbound Off Ramp) to Valley View Boulevard eastbound as shown in the RFP plans will leave the edge of pavement. The Key/JMT Team concept depicts an increase in pavement area such that a WB-67 can make the turn as shown in red in the figure to the right.
3. Truck turning movement from Valley View Boulevard westbound to Ramp Z (Southbound On Ramp) as depicted in the RFP plans will impact the median barrier of the ramp. The Key/JMT Team concept depicts a decrease in the median barrier length in this area, such that a WB-67 can make the turn.
4. The recovery area in the Ramp Y (Northbound Off Ramp) gore area is deficient in length. The Key/JMT Team concept extends this area an additional 40' to meet AASHTO criteria.
5. The two (2) Off Ramps, Ramp Y and Ramp W, do not have the proper taper along the inside edge of shoulder in the gore area. The Key/JMT Team concept adds to this taper to meet AASHTO criteria.



Typical Sections. The Key/JMT Team has developed typical sections of the roadway segments that **meet the minimum design criteria** as required by the RFP, depicting the number and widths of vehicle lanes, bicycle-compatible lanes, shoulders, sidewalks, traffic barrier, handrail placement, typical fill slopes, pavements, and retaining walls. The typical sections are shown in the project concept plans within this proposal. Other typical sections not provided in the concept plans are intended to match the typical sections depicted in the RFP plans.

Retaining Walls. A retaining wall will be required along the I-581 southbound lanes at the bottom of the fill slope for the proposed widening in order to prevent fill material from impacting Lick Run. The 1,100 linear feet of retaining wall between I-581 and Lick Run will be up to 10 feet high. The Key/JMT Team has evaluated a number of retaining wall types including a conventional concrete gravity wall similar to VDOT's St'd. RW-3, a concrete cantilever retaining wall, and a mechanically stabilized earth (MSE) wall. Based on the Team's constructability review, a conventional concrete gravity wall will be the most economical solution for this location. During final design of the project, the Team will confirm this assumption in selecting the final wall type. Depending on results of the geotechnical field work and the hydraulic model and scour analysis, both shallow and deep foundations will be evaluated. Regardless of selected wall type, the retaining wall will be designed in accordance with VDOT and AASHTO specifications, will be a type which FHWA has developed guidelines, will be listed on VDOT's Approved Retaining Wall System List, and will have a concrete facing with an architectural treatment presenting an appearance of rock facing.

Sound Walls. Three sound walls will be designed and constructed in conjunction with the project in accordance with the Special Provision for Sound Barrier Walls included in the RFP documents. The sound walls will be located as depicted on the RFP plans and include Sound Barrier Wall 1 north of the Valley View Boulevard Interchange along SB I-581, Sound Barrier Wall 6 and 7 south of the Valley View Boulevard Interchange along SB I-581, and Sound Barrier Wall 4 and 5 south of the Valley View Boulevard Interchange along NB I-581. The specific location and dimensions for each sound wall will be as depicted on the RFP plans and as described in the Noise Abatement Design Report included in the RFP documents with wall heights measured from the top of finished grade for the ground-mounted walls.

Shared Use Path and Timber Shared Use Path Bridge. A shared use path, part of the Lick Run Greenway recreation facility, will be designed and constructed in conjunction with the project. The horizontal alignment and vertical profile, with a 5.00% maximum grade, will match the geometry depicted on the RFP plans. An existing timber bridge is located on the project site and provides access for pedestrians, bicyclists and other non-motorized users between Norris Drive, across Lick Run, to the Lick Run Greenway. In conjunction with the relocation of Lick Run, the existing timber bridge will require relocation, and a new timber shared use path bridge will be designed and constructed in accordance with the Timber Pedestrian Shared Use Path Bridge Special Provision

included in the RFP documents. The Key/JMT Team will dismantle, remove and deliver the existing bridge to City of Roanoke property. The final location and design of the proposed timber bridge will meet all applicable hydraulic and environmental requirements such as additional Section 4(f) coordination with the official jurisdiction and FHWA.

Hydraulics

The Key/JMT Team has reviewed the proposed drainage to construct the roadways as shown on the RFP plans. The drainage design for culverts, open channels, storm sewers, underdrains, and bridge deck drainage assemblies and structures will be designed in accordance with the VDOT 2002 Drainage Manual, Revised September 2011 (VDOT Drainage Manual) and all current VDOT Hydraulic Design Advisories. The layout of these storm drainage systems are provided on the Technical Proposal plans and have been modified from the RFP plans to **maintain existing drainage patterns as feasible, maximize project drainage to the proposed Stormwater Management (SWM) Basins and to facilitate constructability.** During final design, the detailed hydrologic and hydraulics analysis and studies will be performed and will include comprehensive roadway and bridge drainage, SWM and BMP designs, river mechanics models and analysis, and phased and post-construction erosion and sediment control (E&SC) designs. The various tasks associated with this project shall be based on the procedures and regulations summarized in Table 1, as applicable:

Table 1 - Hydrologic and Hydraulics Analysis Tasks and Associated Governing Standards

Task	Governing Standards, Reference Manual and Applicable VDOT Approved Software
Hydrology	<ol style="list-style-type: none"> 1. VDOT Drainage Manual (2002) including all Errata sheets, Chapter 6 2. NOAA Atlas 14
Roadway Drainage	<ol style="list-style-type: none"> 1. VDOT Drainage Manual (2002) including all Errata sheets, Chapter 7 for ditch design, and Chapter 9 for Storm Drains 2. Ditch Soft, Inlet Soft, and Pipe Soft computer Programs
Stormwater Management (SWM) & Water Quality (BMP)	<ol style="list-style-type: none"> 1. VDOT Drainage Manual (2002) including Errata sheets, Chapter 11 2. Virginia Stormwater Management Regulation. 3. VDCR Storm Water Management Handbook. 4. VDOT Annual Storm Water Management Standards and Specifications approved by the Department of Conservation and Recreation. 5. HydroCAD-8 computer program for pond sizing and routing routine. 6. Performance Based Water Quality & BMP calculation procedures.
Erosion & Sediment Control	<ol style="list-style-type: none"> 1. VDOT Drainage Manual (2002) including Errata sheets, Chapter 10 2. Virginia Erosion and Sediment Control Regulations 3. VDCR Erosion and Sediment Control Handbook 4. DCR, Technical Bulletin 1, for use in MS19 application related to outfall channel and pipe adequacy.
Culvert Design Or Cross Pipes	<ol style="list-style-type: none"> 1. VDOT Drainage Manual (2002) including Errata sheets, Chapter 8 2. FHWA, HY8, Culvert Analysis computer program.
Bridge and Culvert Hydraulics And Stream Modification/Relocation Hydraulic model	<ol style="list-style-type: none"> 1. VDOT Drainage Manual, Chapter 12 2. HEC-RAS 4.0, US Army Corps of Engineers 3. Evaluating Scour at Bridges, HEC 18 (FHWA). 4. Stream Stability at Highway Structures, HEC 20 (FHWA) 5. Bridge Scour and Stream Stability Countermeasures, HEC 23 (FHWA)

The Key/JMT Team will provide the necessary additional field surveys to accommodate final design of the proposed drainage systems including a site inventory, conducted during the scope validation period, of all existing drainage structures to determine whether rehabilitation or replacement of a specific drainage facility is warranted.

Hydrology

Drainage areas will be compiled using available project survey and supplemented by geo-referenced USGS 7.5-minute Quadrangle topographic maps and additional field survey. Land use and land cover will be based on field visits, in addition to digitized USGS maps for the project location. Wherever available, rainfall and stream data will be collected from NOAA Atlas 14 and published FEMA Flood Insurance Study for the project location. Peak flow discharges for the various storm events (2-, 5-, 10-, 25-, 50-, 100-, and 500-year) will be computed using:

- Rational Method for drainage areas that are less than 200 acres.
- Applicable methods detailed in VDOT Drainage Manual for drainage areas that are greater than 200 acres.

Roadway Drainage System

The roadway drainage runoff calculations will be based on the governing specifications included in the VDOT Drainage Manual, as described in the RFP documents, and as shown in Table 1 above. The roadway drainage runoff calculation will incorporate the existing and proposed roadway corridor within the project's limits. Wherever possible, the existing drainage system will be used after checking its capacity and integrity. The capacity and performance of the existing and proposed drainage systems located within the project limits will be optimized using the computed roadway runoff.

The design of the roadway drainage system will use a combination of roadside ditches, closed conduit systems, and curb and gutter wherever applicable. The roadway drainage system design will be based on the proposed roadway widening plans and will use VDOT approved methodologies and software. The Team will complete the necessary VDOT LD229 and LD439 forms for storm sewer design computations and drainage information sheet, respectively.

The Team will ensure proper freeboard depth in each ditch segment to ensure roadway overtopping protection. The Team will revise profile grades, ditch typical sections, etc. as necessary to meet freeboard requirements within the projects limits. Ditch velocities will be calculated and, wherever applicable, proper ditch lining will be used to prevent erosion and minimize future maintenance.

Stormwater Management (SWM) Plan and Erosion and Sediment Control (E&SC)

The purpose of the SWM design is to ensure compliance with applicable VDOT and DCR regulatory requirements. The design of the proposed SWM facilities will be based on the Performance Based methodology using the calculated roadway runoff for the project. In order to ensure compliance with Stormwater Pollution Prevention Plan (SWPPP) and Water Quality (BMP) requirements, the Team will:

- Provide temporary E&SC during the proposed construction phases.
- Design permanent post-construction SWM and water quality facilities in accordance with the most recent VDOT Stormwater Program regulations and Information and Instructional Memoranda (IIM).

The Key/JMT Team will accomplish this by isolating the project site from the surrounding area, controlling the sediment and preventing its transport from the site. Each work site will be evaluated to determine the best means to prevent sediment from leaving the project. Acceptable E&SC practices will be employed before, during, and sufficiently after project construction as directed by all Federal, State, and Local Agencies. This process will be guided by BMP Practices where applicable.

Proper outfalls and downstream channel capacities will be investigated to satisfy Minimum Standards (MS-19) in addition to applicable Virginia E&SC requirements. VDOT's Drainage Manual, Road and Bridge Standards, IIM's, and Road Design Manual will be used in the preparation of the E&SC Plan. This plan will provide a narrative and comprehensive plan employing various E&SC practices as required to stabilize the disturbed areas while retaining the sediment on the construction site. The Team's certified DCR Plan Reviewer will provide an independent review of the proposed E&SC items and will ultimately certify the E&SC plans for construction. The Team will work with the Department to obtain all necessary permits and certifications necessary for E&SC, SWM, and SWPPP for this project. The Team will provide proper maintenance of silt fence, inlet protection, sediment basins/traps and stabilized construction entrances to meet or exceed E&SC measures required for the project.

Stormwater Management (SWM) and Water Quality (BMP) Facilities:

The SWM and water quality basin design, where applicable, will be in accordance with the DCR Virginia Storm Water Management Handbook, VDOT 2002 Drainage Manual, and applicable VDOT Stormwater Program Advisories. Table 2 shows the preliminary SWM and BMP calculations for the project:



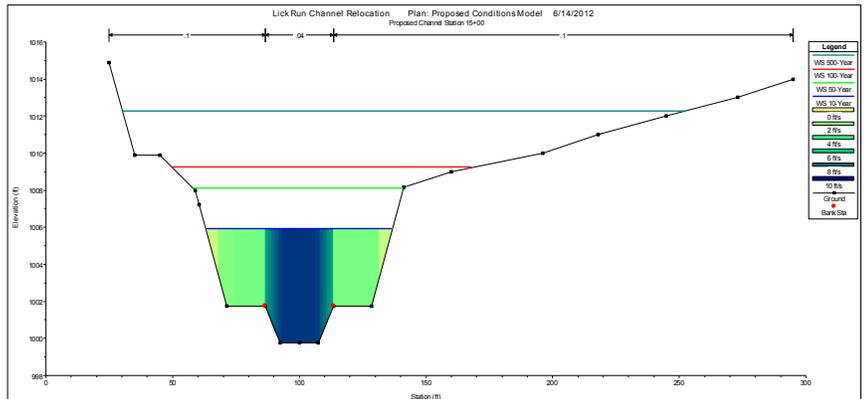
Table 2 - Preliminary Stormwater Management and BMP Calculations

Total project's land disturbance area	60.3 acres	
SWM and Water Quality Requirement	Yes	
Existing Impervious Area	28.50 acres	
Percent Existing Impervious Area	47.26 %	
Post-Construction Impervious Area	31.0 acres	
Percent Post-Construction Impervious Area	51.41 %	
Pollutant Removal Required (Situation 3)	11.67 pounds/year	
Number of proposed SWM/BMP pond	2	
Proposed pond locations	Sta. 182+50, RT.	Sta. 214+00, RT.
Proposed pond type	Extended Detention	Extended Detention
Drainage Area draining to the proposed pond	11.3 acres	19 acres
Post-Construction impervious area draining to the pond	6.3 acres	9 acres
Required Water Quality Volume = 2 x 1/2" x 1/12 x impervious area	22,869cf	32,670cf
Available Water Quality Volume in the proposed pond	27,782cf	236,413cf
Required Pollutant Removal	11.67 pounds/year	
Proposed Pollutant Removal	12.20 pounds/year > 11.67 pounds/year ok	
Proposed ponds use a standard riser assembly with 3" water quality orifice providing a 30 hour drawdown.		

Culvert and Bridge Hydraulics - River Mechanics, FEMA Studies and Scour Depth Study

The Key/JMT Team will use the exiting FEMA hydraulic models (HEC-RAS) and the Flood Insurance Rate Map (FIRM No. 51161C0162G, September 28, 2007) to perform the necessary river mechanics and stream re-location hydraulic models. FEMA's FIRM shows the 100-year flood elevations and floodplain for Lick Run. Furthermore, it shows the floodway limits throughout the FIRM map. Any encroachment onto the floodway and relocation of Lick Run channel will require submitting a Letter of Map Revision (LOMR) application to FEMA. In accordance with VDOT regulations (Drainage Manual, Chapter 12), the following hydraulic models will be developed using available FEMA HEC-RAS models:

- Existing condition (Revised Effective FEMA model) using field survey data to supplement FEMA's hydraulic model.
- Post-Construction (Proposed) conditions which will be based on the Revised Effective hydraulic model and showing the impact of the proposed relocation of Lick Run channel within the project limits. The Team will incorporate the project's field survey, proposed Lick Run relocation, and the proposed roadway embankment designs into the HEC-RAS hydraulic model. Output data from the Proposed Conditions hydraulic model will ensure that the backwater impact is within VDOT and FEMA permissible limits.



Due to the relocation of Lick Run, the output data from the Proposed Conditions hydraulic model will be used in completing the LOMR application for submittal to FEMA including Post-Construction floodplain maps and necessary comparison tables. In addition, VDOT's LD293 forms will be prepared and submitted for review and approval.

Scour Analysis

The Team will use the procedures in HEC-20 and HEC-23 to ensure stability of the relocated Lick Run channel and banks. Output data from the Proposed Conditions hydraulic model, especially stream power data, will be used to compute the erosive forces at the relocated Lick Run banks. Should protection be required, the Team will use the procedures detailed in HEC-11 to design the appropriate riprap protection to achieve stream bank stabilization.

Traffic Control Devices

Signs- Existing signing within and immediately adjacent to the project limits will be inventoried prior to starting design in accordance with the VDOT Traffic Engineering Design Manual. The project will include all new guide, warning and regulatory signing for the proposed improvements to the I-581/Valley View Boulevard Interchange. Specific travel service signs within the project limits will also be included. The signs will be designed in accordance with the Manual on Uniform Traffic Control Devices (MUTCD) as well as VDOT standards. GUIDSIGN software will be used to design the sign face layouts of any non-standard signs.

As noted in the *Interchange Modification Report for I-581/Valley View Boulevard* provided in the RFP documents, all guide signs referencing Exits 3E and 3W at Hershberger Road will be modified to reference Exits 3A and 3B in compliance with the latest MUTCD and VDOT Supplement to the MUTCD.

All street name signs and lane control signs at signalized intersections will be mounted on the mast arm poles as applicable. Mast arm street name signs will be 12" in height, 8' long maximum. The supplemental street name signs shall have 9" white letters on green background. The suffix lettering on the street name signs will be 5" white letters. Block numbers will also be included per the City's requirements.

Any salvageable City of Roanoke owned signs will be delivered to the City Transportation Division. Existing City wayfinding signs, including hospital signing, will be maintained through construction. If temporary relocation of the wayfinding signs is necessary, the temporary relocation will be coordinated with the City Transportation Division. Any salvageable VDOT signing to be removed will be delivered to the VDOT Salem District Sign Shop.

An existing digital message sign (DMS) is located approximately 1,050 feet downstream of the ramp gore from Valley View Boulevard to SB I-581. If possible, the proposed sound wall will be designed to accommodate the existing DMS structure. If the sound wall cannot be designed to accommodate the existing structure, the DMS may be relocated to a new structure in the median, along with the appropriate guardrail. Relocation of the DMS to a new location on the right side of the southbound travel lanes either prior to or beyond the sound wall is not feasible due to geometric and sight distance constraints. Final location of the DMS will be approved by VDOT. Power and communication feeds to the DMS will be maintained during construction and redesigned as needed per VDOT's latest ITS Special Provisions.

Guardrail -- Guardrail, concrete traffic barrier and standard end terminal treatments will meet the requirements of RFP Part 2 Section 2.10.5. All existing sub-standard guardrail within the Project Limits will be upgraded to meet current standards in accordance with the latest VDOT Instructional and Informational Memorandum 220.3 for replacement and/or upgrade of guardrail to the nearest logical termination point which may be beyond the current Project limits. No existing guardrail will be re-used.

Signals – Three signalized intersections are located within the project limits:

1. Valley View Boulevard at Valley View Crossing Shopping Center Entrance.
2. Valley View Boulevard at NB I-581 Ramps.
3. Valley View Boulevard at SB I-581 Ramps.

The intersection at Valley View Crossing Shopping Center Entrance will be designed as a complete rebuild with new signal equipment. The existing signal and its associated detection and communication connections will be maintained through all construction phases. The intersection of Valley View Boulevard at the NB I-581 Ramps will be designed as a new installation. The intersection of Valley View Boulevard at the SB I-581 Ramps will be designed to provide signalization for the future third leg. The design will include conduit, junction boxes and signal pole foundations. Conduit and wiring, as appropriate, will be installed between all three intersections for signal interconnection. The signal design and construction, including temporary signalization, will be in conformance with the items identified in Part 2 Technical Requirements of the RFP.

Pavement Markings and Markers- Pavement markings and markers will be installed through the project area to promote safe and efficient travel along the roadways impacted by the project. All edge lines, centerlines and skip lines along Valley View Boulevard and the I-581/U.S. Route 220 ramps will be Type B, Class I thermoplastic. Pavement markings on the bridge will be Type B, Class VI with contrast markings. New pavement markings along I-581/U.S. Route 220 will be six (6) inch Type B, Class VI, per VDOT Traffic Engineering memorandum TE-261. All pavement markings will be in accordance with the VDOT Traffic Engineering Design Manual, dated 2011. The continental crosswalks will be in accordance with applicable MUTCD standards for markings and traffic control for bicycle facilities, including but not limited to retroreflectivity and nonslip guidance.

Public Involvement / Relations

The Key/JMT Team has evaluated the existing and proposed right-of-way limits depicted on the RFP plans and does not anticipate additional right-of-way to be required for the project. However, during plan development, if additional right-of-way is determined to be required, the Key/JMT Team will follow the requirements listed in VDOT's *Policy Manual for Public Participation in Transportation Projects*.

Right-of-Way and Fencing

The most important time element involving right-of-way for this project are the relocations of the dwellings needed in order to relocate Lick Run. This includes the properties owned by John D. Childs, Howard Lee and Faye Barnes, Willie L. & Wanda P. Hughes, Joseph and Phyllis R. Mack and Vera E. McLaughlin. The work on these relocations must begin as soon as possible in order to have the time needed to successfully move these displaces and is dependent on the amount of inventory in the area of similar properties for sale.

The second important element is to clear property needed for storm water management facilities. This is particularly true on the properties owned by Fincastle Equipment Company LLC and Peter Huff Ring, Etals. Negotiations on these types of acquisitions usually are complex in nature and take some time to complete due to the engineering involved.

Possession of the remaining partial ROW acquisitions, permanent easement acquisitions, and temporary easement acquisitions can be completed either through amicable negotiations or after using VDOT's Eminent Domain authority. There appear to be large portions of the project that already contain enough right of way to accomplish the work needed,

Preliminary ROW activities will begin soon after receiving Notice to Proceed. It should be noted that it is critical that all right of way work start with the properties that will require relocation assistance and should begin immediately upon notice to proceed. The Key/JMT Team will begin performing the legal research for the identified parcels on the preliminary plans at the same time that our survey crew is validating the survey information provided in the RFP package. After preliminary designs have been performed for the bridge, roadway, drainage, and utilities, the Key/JMT Team will evaluate the proposed ROW, permanent easements, and temporary easements as shown on the plans. If changes are required, either due to a change in the required ROW or a change based on the results of legal research, the Team will prepare updated preliminary ROW plans and a ROW data sheet and will submit to VDOT for review and approval.

Final ROW activities will begin immediately after receiving preliminary plan approval from VDOT particularly on the relocation assistance properties. At this point in the design, the "footprint" for the project will be firmly established and the Key/JMT Team will identify the final ROW, permanent easements, temporary easements, and utility easements required to construct the project. The Team will prepare final ROW plans and submit to VDOT for review and approval. After receiving final ROW plan approval from VDOT, the Key/JMT Team will perform acquisition activities as described below:

Right-of-Way Estimate. JMT's ROW staff will provide ROW cost estimate services and supply the estimated compensation for all land, improvements, and all easements within the proposed ROW in accordance with the approved final ROW plans. Potential damages will be identified and their accrue costs as the result of any ROW acquisition. Hazardous waste removal, if required, will be identified with through a Phase I environmental study completed by a certified specialist. JMT's ROW staff will estimate the costs associated with the acquisition and relocation of utility easements within the proposed ROW and will also estimate the demolition and removal costs of any onsite improvement within the existing ROW. The Key/JMT Team will offer suggestions to reduce costs associated with ROW acquisitions. JMT's ROW staff is knowledgeable of all VDOT forms and the associated Right-of-Way, Utilities, Management System (RUMS). All cost estimates will be completed within a timely and efficient manner.

Title Reports. Title Reports will be completed according to the standards and guidelines established by VDOT. A sixty year title search will be completed on each impacted property by an attorney approved by VDOT. All title reports will be updated prior to the start of negotiations with each property owner. Title insurance will be obtained for each property acquisition that exceeds \$25,000. Title reports will be signed and certified by an attorney with all judgments, liens, or out conveyances documented with all relevant copies supplied. Final title reports signed copies will be delivered within thirty (30) days upon request.

Appraisals. JMT ROW staff will secure any necessary appraisal whether the property is income producing, commercial, industrial, residential, improved or unimproved by a licensed and pre-approved VDOT appraiser. Plans and plats will be red-lined, area tabulations will be verified for each affected parcel, and easements will be identified before property owner contacts are commenced. JMT ROW staff will verify each chain of title for at least the last five (5) years in the absence of a Title Report. All appraisal work will comply with the licensing requirements of the Code of Virginia, Section 406 of Title 54.1.

Appraisal Review. The appraisals will be completed by a certified review appraiser as a quality control check to ensure that the Uniform Act requirements have been accomplished. All appraisals and appraisal reviews will then be submitted to VDOT for review and approval. The appraisals will contain all necessary and pertinent information to support the appraiser's valuation. The appraisals will include only compensable items and non-compensable items will not be included. The resulting value of the property will be fair and represent the true market value of the property. Any and all uneconomic remnants will be identified within the appraisal.

Negotiations. JMT's experienced ROW staff will negotiate with all affected property owners, presenting the offer and explaining all acquisition details. All property owner negotiations will be performed in strict compliance with the standards of the Uniform Act, the Code of Virginia, and VDOT's Right-of-Way and Utilities Division. Each affected parcel will be tracked by the Team's ROW Manager from start to finish with all milestone dates and schedules adhered to and followed. A project Parcel/Property Owner Contact list will be created and maintained by the Team's ROW Manager. A thirty (30) day negotiation window will be afforded each property owner to complete the clearance of the ROW. All property owners will be contacted and an on-site meeting arranged to explain the acquisition and to facilitate a favorable settlement. JMT's ROW staff will negotiate with each property owner with a minimum of three contacts, obtaining any agreements, right of entries, and utility agreements. JMT's ROW staff will also facilitate the delivery of all negotiation packages that have been approved by VDOT.

Relocation. JMT's ROW staff will relocate all displaced residents and businesses according to the standards of the Uniform Relocation Act. The staff will perform housing replacement studies and compute a Replacement Housing Payment (RHP), moving costs, moving expenses, utility hookup fees, last resort housing payments, mortgage differential costs, home inspection costs, and applicable settlement and closing fees. All claims will be processed according to the Uniform Relocation Act, the Code of Virginia, and VDOT's Right-of-Way and Utilities Division guidelines and regulations. All Relocation Claims will be submitted to VDOT for approval and payment. JMT's ROW staff will send all necessary ninety (90) day notices to each displaced Owner, Tenant, or Business entity as required by the Uniform Relocation Act and the Code of Virginia. **In the RFP, VDOT has indicated that the team may consider requesting that special incentives be utilized in the relocation assistance process. This involves offering the displaced property owner an incentive such as a percentage increase in the RHP amount if they move more quickly in order to clear the property. The incentive would require VDOT and Federal Highway Administration approval. The team will consider this incentive program immediately upon Notice to Proceed.**

Closing Services. JMT's ROW staff will conduct property closing and settlements including the preparation of closing documents and obtaining releases. The staff will order all check requests and disperse all proceeds to the property owners and any lien holders of record. Checks will be delivered and deeds will be recorded as directed by the VDOT's Attorney. All closing work will be completed in strict coordination with the VDOT's legal staff.

The Key/JMT Team will submit a request for concurrence for clearance of ROW package to VDOT for review and approval prior to beginning construction activities on acquired ROW.

Project Lighting

The roadway lighting design will include complete interchange lighting, including underbridge lighting. This includes lighting along I-581/U.S. Route 220 within the limits of the interchange, the ramps from Valley View Boulevard intersection to the freeway gore and along the travel way under the Valley View Boulevard bridge. This lighting will be installed by the Key/JMT Team and owned by VDOT. The designer will coordinate with APCO for the service connection for this proposed lighting. Electrical service to pole mounted lighting will be unmetered while electrical service for traffic signals and underbridge lighting will be metered separately.

The design will also include replacement of the lighting along Valley View Boulevard and Lick Run Greenway. This lighting will be installed and maintained by APCO through an existing agreement with the City. The designer

will refer to the conceptual lighting layout provided by APCO in the RFP for completing this design. Critical to the success of this task will be successful coordination with APCO which will install all light poles, luminaires, wiring and will energize the system. The Key/JMT Team will stake proposed pole locations, install conduit and be responsible for coordinating all aspects of installation with APCO.

Roadway lighting calculations will be completed in accordance with the American National Standard Practice for Roadway Lighting ANSI/IESNA RP-8-00. These lighting designs will meet the Illuminance Criteria outlined in the Technical Requirements of the RFP. Point-to-point lighting analysis and calculations will be provided in accordance with the VDOT Traffic Engineering Design Manual. This will be completed using AGi-32 and will be submitted to VDOT for review and approval. The Team has extensive experience providing roadway lighting calculations using AGi-32 and will provide photometric analysis consistent with standard practices.

The roadway lighting design will be completed in accordance with all applicable VDOT, City of Roanoke and APCO Standards, Specifications and Reference Documents listed in the RFP. The roadway lighting plan will be prepared in compliance with the requirements outlined in the RFP. The roadway lighting plan will be included as a planned work package and be submitted for final approval.

Coordination will be completed with APCO and will commence early in the design process. The Key/JMT Team has experience working with APCO on time sensitive Design-Build projects with roadway lighting, including the Route 61 Bridge Replacement Design Build Project in the Town of Narrows, VA. This experience will allow the Team to work quickly and efficiently to ensure effective communication and timely implementation of roadway lighting elements. The Team will also coordinate with APCO and the City of Roanoke to transfer account ownership of the Street Lighting once a section of roadway is complete, open to traffic, and street lighting is operational.

Landscaping and Roadside Development

The Key/JMT Team's Landscape Architects will design the roadside landscaping for the Valley View Boulevard and the Lick Run Greenway within the project limits. The landscape will be designed in accordance with the policies and guidelines set forth in the City of Roanoke's Complete Streets Policy and their Street Design Guide. Emphasis will be placed on the use of a sustainable plant palette that focuses on native species and species that are indigenous to the area. The Team will employ the principles of Context Sensitive Design and Crime Prevention through Environmental Design (CPTED) to enable the landscape to thrive in the roadside environment, conform to the local and historical context of the area, and to maximize safety for all users of the public space.

JMT is a corporate sponsor of the National Complete Streets coalition and fully supports the ideas and philosophies of the Complete Streets movement. We will incorporate those ideas into the roadway design to ensure that all users of the transportation facilities can be safely accommodated in the design. JMT's project Landscape Architect, Mr. Jon Conner ASLA, LEED AP is on the National Complete Streets Coalition's National Speakers Bureau, and frequently meets with cities and communities to help develop and implement Complete Streets Policies and projects. VDOT can be assured that the Team's design will fully implement these policies as part of the proposed solution.

4.3.2 Conceptual Structure Plans

Bridge

The Key/JMT Team has evaluated the preliminary bridge plans and project information provided in the RFP documents and has developed a structural concept for the bridge that meets or exceeds the design standards and design criteria for the project and addresses the **project priorities** listed above. The bridge will be designed for the AASHTO HL-93 live loading in accordance with AASHTO *LRFD Bridge Design Specifications*, 5th Edition, 2010; 2010 Interim Specifications; the most current version of VDOT Modifications to AASHTO (IIM-S&B-80.3); and the Additional Substructure and Foundation Criteria included in the RFP documents. **The conceptual plans for the bridge are included in Volume II of this Technical Proposal.** Following is a discussion of the Key/JMT Team's structural concept for the proposed bridge structure:

Span Configuration and Overall Geometry. The bridge improvements for the project include providing a rehabilitated and widened structure that meets the functional and operational requirements set forth in the Interchange Modification Report (IMR) included in the RFP documents. The proposed improvements for the existing structure consist of partial demolition and modifications to the superstructure, extending the abutments,

making repairs to the superstructure and substructure, and construction of new piers to provide support for the widened superstructure. As shown on the conceptual plans, the proposed span configuration matches the existing span configuration for the bridge and consists of a two (2) span continuous, structural steel plate girder (SSPG) superstructure elements.

The construction baseline alignment matches the horizontal alignment provided in the RFP preliminary plans. Similar to the existing bridge, substructure units will be oriented on a slight skew in order to parallel the I-581 baseline. Since the pier is located within 30' of the edge of a roadway, it will need to be investigated for collision in accordance with AASHTO LRFD Section 3.6.5 and addressed by either providing structural resistance or by redirecting or absorbing the collision load. Standard suggested details for collision force as shown in VDOT's Design Aids, Volume V – Part 2 – File No. 15.05 will be evaluated and incorporated into the final plans if required.

The profile for the bridge matches the vertical curve geometry provided in the RFP preliminary plans. The vertical clearance provided from the top of roadway surface to bottom of superstructure is 16'-7" and is greater than the 16'-6" minimum required for the project. The vertical curve geometry (grades and point of vertical curve location) depicted on the "As-Built" plans for the existing bridge is different than the vertical curve geometry depicted on the RFP preliminary plans. The Key/JMT Team understands that it is the Design-Builder's responsibility to obtain and verify any required as-built field dimensions needed for purposes of design and construction. In addition to other items, we will certainly need to verify the existing vertical curve geometry of the existing bridge deck.

Transverse Section. The bridge will be designed to meet the VDOT GS-7, urban major collector, urban low speed geometric standard for design of the transverse section and will use VDOT TC-5.04ULS-NC superelevation standard that results in a normal crown section along the entire length of the bridge. In addition, the bridge will be designed to meet VDOT S&B Division geometric standards for urban collector street systems as depicted in VDOT S&B Design Aid, Volume V, Part 2, File No. 06.02-9 and 10. Looking upstation from left to right, the bridge transverse section provides a 17'-6" shared use path, a 2'-0" gutter, four (4) – 12'-0" lanes, a 1'-0" shy distance, a 4'-0" raised median, a 1'-0" shy distance, four (4) – 12'-0" lanes, and a 2'-0" gutter resulting in a face-of-rail to face-of-rail dimension of 123'-6". The VDOT S&B Standard BR27D bridge railing system, 4'-6" high, will be used adjacent to the shared use path and the VDOT S&B Standard BR27C bridge railing system, 3'-6" high will be used on the other side of the bridge adjacent to the travel lane. Pedestrian fencing will be provided adjacent to the shared use path. The steel railing will be galvanized and powder-coated **coal black** and the pedestrian fencing will be black, vinyl coated in accordance with the RFP documents.

Superstructure. As shown on conceptual plans, the superstructure will consist of a composite, cast-in-place, reinforced concrete deck supported by continuous structural steel plate girder (SSPG) superstructure elements. All superstructure concrete, including shared use path, median, and rails, will be low permeability concrete and all superstructure reinforcing steel will be corrosion resistant reinforcing steel in accordance with VDOT S&B IIM-81.4. All structural steel including cross frames and bearings will be weathering steel. In order to minimize long term maintenance costs for VDOT, the superstructure will be a single, continuous unit without a joint at the pier. In order to eliminate the joints at the abutments, the proposed bridge widening will incorporate the Deck Slab Extension Details with Buried Approach Slabs at each abutment in accordance with standard details depicted in VDOT S&B Design Aid, Volume V, Part 2, File No. 17.08 series. The existing concrete deck and abutment backwall will be modified to also incorporate the Deck Slab Extension Details with Buried Approach Slabs. All structural steel plate girders will be supported on laminated elastomeric bearing pads. The bearings at the center pier will be fixed and the bearings at the abutments will be expansion.

Abutments. The proposed widened portions of the abutments will consist of a cast-in-place, reinforced concrete, stub abutment founded on two (2) rows of steel H-piles placed behind a mechanically stabilized earth (MSE) retaining wall. MSE retaining wall panels will be attached to the front face of the stem of the existing abutment in order to provide an aesthetic appearance for the entire abutment units. At the junction between the existing abutment and proposed widened abutment, vertical MSE retaining wall slip joints will be installed and preformed joint filler will be installed between the cast-in-place concrete elements to accommodate any differential settlement. As mentioned above, the proposed widening portion of the abutments and the existing abutments will incorporate Deck Slab Extension Details with Buried Approach Slabs in order to eliminate joints at the abutments. All abutment concrete will be low permeability concrete and all reinforcing steel in the abutment network (above the footing pour) will be corrosion resistant reinforcing steel in accordance with VDOT S&B IIM-81.4. Reinforcing steel in the abutment footing will be plain deformed reinforcing bars.

The Geotechnical Engineer for the Team has reviewed the boring logs and as-built driven pile lengths from the original bridge construction and reviewed the additional borings provided in the RFP documents. The borings suggest that the widened portions of the abutments and MSE retaining wall locations have rock of variable quality and depth, with seams of weathered shale and clay. The boring logs suggest that the soil below the proposed MSE retaining walls is soft to very hard, and is likely prone to some consolidation settlement. In addition, softer compressible soils may occur in narrow slots or pockets, although they are not expected to be predominating. In order to reduce settlement effects, the following sequence of construction will be used for the design and construction of the on the MSE retaining wall and abutments:

1. Excavate existing material down to the top of leveling pad in the area of the reinforced soil backfill. The Geotechnical Engineer for the Team will then observe the area to identify whether slots or pockets of soft soils exist that should be removed to mitigate the risk of differential settlement. Any areas of additional excavation will be properly backfilled with aggregate or other suitable backfill.
2. Drive steel H-piles. The piles will be designed to accommodate expected downdrag forces from settlement of the ground supporting the MSE retaining wall and embankment. Predrilling the piles may be necessary to meet minimum pile length requirements in some areas.
3. Construct the MSE retaining wall and embankment up to the last wall panel with the last panel and coping to be set later. Approximately 2 to 3 inches of settlement (mostly elastic compression) could occur during construction of the MSE retaining wall. Slip joints, in addition to those described above, may be needed to accommodate total and differential settlements. Settlement indicators will be placed on or in the front face of the lower panels slightly above the finished grade to monitor settlement as determined by the geotechnical investigation and analysis.
4. Place the top row of MSE retaining wall panels and adjust the coping to account for actual settlement.
5. Construct remaining portions of abutment.

By constructing the abutments in this fashion, most of the settlement will occur before the girders and other superstructure elements are placed. Long term settlement (secondary or creep) of the MSE retaining wall after the bridge construction is complete is expected to be less than 1 inch.

Piers. The proposed widened portions of the piers will consist of a cast-in-place, reinforced concrete column, cap, and footing pier founded on steel H-piles. The proposed widened portions of the piers will match the existing piers in both type of structural system and in aesthetic appearance. All pier concrete will be low permeability concrete and since there are no superstructure joints at the piers, reinforcing steel will be plain deformed reinforcing bars. As mentioned above, since the pier is located within 30' of the edge of a roadway, it will need to be investigated for collision in accordance with AASHTO LRFD Section 3.6.5 and addressed by either providing structural resistance or by redirecting or absorbing the collision load.

MOT and Sequence of Construction. The Key/JMT Team has developed a maintenance of traffic plan and sequence of construction that benefits VDOT and minimizes impacts to vehicular and pedestrian traffic. During Stage I of construction, vehicular and pedestrian traffic will remain in its' current location and the existing bridge will be widened on the south side to accommodate the final bridge geometry. Repairs to a portion of the existing abutment on the south side to accommodate the deck slab extension with buried approach slab will also be performed. During Stage II and III of construction, vehicular and pedestrian traffic will be shifted to the center of the existing bridge and the existing bridge will be widened on the north side to accommodate the final bridge geometry. Temporary traffic barriers will be installed across the bridge as required to protect traffic. Repairs to a portion of the existing abutment on the north side to accommodate the deck slab extension with buried approach slab will also be performed. During Stage IV of construction, vehicular and pedestrian traffic will be shifted to the north onto the Stage II and III constructed bridge in order to perform the remaining repairs to the center portion of the existing abutment to accommodate the deck slab extension with buried approach slab. Traffic can then be shifted to the final location across the bridge. **The proposed MOT and sequence of construction provides** for one lane of traffic and accommodates pedestrians in all stages of construction and minimizes impacts to the traveling public.

Utilities. The proposed bridge will be designed to accommodate lighting on the bridge and under the bridge and to also accommodate conduit and cable as required in the overall project design including a minimum of four (4) – 3" diameter conduits. A bridge conduit system, including 2" diameter conduits, junction chambers, and light pole anchorages, will be provided along both sides of the bridge for on-bridge lighting. Final locations of the light pole

anchorages will be coordinated with the Appalachian Power Company (APCO) to meet the requirements for the lighting design along Valley View Boulevard.

Repairs. The Key/JMT Team has reviewed the latest bridge inspection report and RFP documents and understands that a number of superstructure and substructure repairs will be required for the existing bridge. Superstructure repairs will include placing a VDOT approved thin bonded epoxy overlay to the completed deck riding surface; checking and tightening loose bolts on existing girder splices and cross frames; replacing damaged or short bolts in splices and diaphragms; and strengthening existing girders by adding transverse stiffeners, installing additional cross frames, and retrofitting bearing stiffeners to provide a satisfactory LRFR load rating. Substructure repairs will include sealing cracks in concrete, repairing spalls and delaminations in concrete, installing galvanic anode units in spall and delamination repair areas, and cleaning and washing bearing seats.

Considers Materials, Methods, and Functionality to Reduce Future Inspection and Maintenance. The Key/JMT Team's proposed bridge concept considers the types of materials, methods, and functionality used to reduce the need for future inspection and maintenance and provides VDOT full confidence in the Project's long-term asset performance and durability as highlighted below:

- All concrete will be low permeability resulting in a more durable, long lasting structure.
- All reinforcing steel in the superstructure and abutment neat areas (exposed to de-icing chemicals) will be corrosion resistant reinforcing (CRR) steel.
- All structural steel (girders, cross frames, and bearing sole plates) will be unpainted weathering steel to avoid future painting cost.
- Other structural steel (bridge railing, anchor bolts, etc...) will be galvanized minimizing the potential for corrosion and avoiding future painting cost.
- The bridge railing will be powder-coated **coal black** and the pedestrian fencing will be black, vinyl coated to provide an aesthetic appearance as well to provide additional corrosion protection.
- All bearings will be laminated elastomeric bearings eliminating the concern about bearings not functioning over time as happens with steel bearings.
- Bridge superstructure will be continuous from end of slab to end of slab eliminating the joint at the pier.
- Bridge abutments will be detailed to incorporate Deck Slab Extension Details with Buried Approach Slabs in order to eliminate joints at the abutments.
- Buried approach slabs will be placed at each end of the bridge to provide a smooth transition from the approach roadway asphalt pavement to the concrete bridge deck.
- Backfill behind both abutments in and above the MSE retaining wall reinforced soil zone will meet the VDOT Special Provision for MSE Walls using select backfill material that is higher quality material and placed in a controlled manner that will minimize approach fill settlement.
- MSE retaining wall sections will be separated by slip joints to allow initial and long-term settlements to occur and to allow differential settlements to occur.
- All bridge foundations will be "deep foundation elements" consisting of steel H-piles driven to refusal and will be designed for anticipated settlements resulting in a long lasting, low maintenance, foundation system.
- All structural components of the proposed bridge will be detailed to incorporate standard VDOT details simplifying future inspection activities by eliminating the number and types of structural details to inspect.

Renderings. The Key/JMT Team has developed renderings of the proposed bridge including a standard VDOT bridge plan front sheet showing plan, elevation view (developed section along baseline), and general notes; a sequence of construction and transverse section; abutment configurations and typical sections; and the pier configuration and typical section. The renderings are included with the conceptual plans in Volume II of this Technical Proposal.

Conclusion

The Key/JMT Team has developed a project concept that meets or exceeds the Project's intended scope of work and benefits end users, particularly in terms of safety and operations, construction impacts, and public acceptance. In addition, the proposed project concept considers the types of materials, methods, and functionality used to reduce the need for future inspection and maintenance and provides VDOT full confidence in the Project's long-term asset performance and durability.



Section 4.4 Project Approach



Key Construction Company, Inc.





Section 4.4 Project Approach

The Key/JMT Team will take a proactive versus reactive approach to managing the Project through design and construction. Critical elements of the project include environmental management, utilities, geotechnical, and quality assurance/quality control. Following is a discussion of the Key/JMT Team’s approach to these critical project elements.

Section 4.4.1 Environmental Management

Approach to Environmental Management for the Project

As the environmental lead for the Key/JMT Team, Anderson & Associates, Inc. (A&A) will provide all environmental services on the Project. A&A will coordinate with the regulatory agencies in order to obtain the required permits and environmental clearances. VDOT will be kept informed of progress at the regular project coordination meetings and may be asked to provide support on specific issues with the regulatory agencies. The Key/JMT Team recognizes the importance of environmental management and compliance to the project success. Our approach will be to:

- Carry out the environmental commitments during design, right of way acquisition, and construction, as identified in the Categorical Exclusion (CE), the Document Re-evaluations for RW Authorization and PS&E Authorization, and the Environmental Certification/Commitments Checklist.
- Work towards completion of the project in accordance with specifications, special provisions, and all applicable local, state, and federal environmental regulations.
- Prepare an environmental management plan (EMP) that integrates design and construction elements to eliminate and/or minimize impacts to recognized environmental conditions/areas of concern. The EMP will include procedures to minimize environmental risk and reduce the likelihood of unforeseen schedule delays.
- Integrate environmental management and key environmental milestones into the project schedule.
- Assist with environmental compliance monitoring during construction to ensure that environmental commitments and conditions are followed.
- Work pro-actively with VDOT to identify solutions to address recognized environmental conditions, prevent the release of contaminants to the environment, and provide for the safety of individuals near the work site.
- Provide training to the contractor on the special provisions to eliminate and reduce the environmental risk associated with hazardous environmental conditions and environmental protection.

Approach to Addressing Specific Environmental Scope Areas

The Key/JMT Team has carefully considered environmental management of the project during the development of this Technical Proposal. The Team has made it a priority to analyze various design options to avoid or minimize impacts to protected environmental resources, such as streams and wetlands, which will be impacted as a result of the proposed construction. The Team recognizes that any alternatives to the design must achieve the desired results as outlined by VDOT in the RFP and clarified by the Proprietary Meeting Minutes. The Team will continue to develop a detailed environmental management plan during the design phase. The Team will implement the environmental management plan to meet the National Environmental Policy Act (NEPA) Categorical Exclusion (CE) environmental requirements and minimize and avoid project impacts to environmental resources. Emphasis will be placed on the development of a schedule for environmental management activities that will integrate with the overall project schedule to avoid delays related to environmental activities. The Team has considered and will continue to develop management approaches for the following environmental scope areas:

- | | |
|-------------------------------------|---------------------------------|
| • NEPA environmental commitments | • Water quality permitting |
| • Cultural resources | • Hazardous materials |
| • Threatened and endangered species | • Asbestos and lead-based paint |

A&A will serve as the lead environmental consultant on the Key/JMT Team to address these areas of environmental management. A&A will work with Team members and VDOT in a collaborative approach to facilitate a successful project without unanticipated environmental impacts or delays to the design or construction processes. A&A’s review of the RFP documents has identified that water quality permitting will represent the key challenge related to environmental project impacts. Each of the environmental scope areas is discussed below:

NEPA Environmental Commitments: A&A will develop clear procedures for documenting the environmental commitments outlined in the NEPA CE document, provided in the RFP documents. A&A will work closely with the Key/JMT Team to assist in the execution and documentation of environmental commitments. A&A will utilize



the regularly schedule progress/coordination meetings to keep VDOT and the Key/JMT Team informed and to identify any specific environmental concerns that would benefit from VDOT support to help complete the NEPA environmental commitments. A&A will provide training to the Key/JMT Team members as needed to assist them with understanding, implementing, and documenting the environmental commitments.

Cultural Resources: VDOT staff conducted cultural resources reviews for multiple archaeological and architectural resources along the proposed project corridor. Based on the documented correspondence between VDOT and the Virginia Department of Historic Resources (DHR), which was provided by VDOT in the RFP documents, archaeological sites 44RN314, 44RN315, 44RN316, and 44RN317 are not eligible for the National Register of Historic Places (NRHP). Additional documentation indicates that DHR has issued a determination of “no effect on historic properties” associated with the proposed improvements. Other cultural resources were not identified by VDOT, however, upon further review of the DHR Data Sharing System (DSS), A&A staff have noted the presence of archaeological sites 44RN0019 and 44RN0020 in the vicinity of the proposed sediment basins adjacent to the south bound lane of I-581. A&A staff will coordinate with DHR to determine potential impacts to these archaeological sites. A&A will provide VDOT with documentation of the DHR determination and will coordinate with VDOT and DHR to minimize impacts to cultural resources and avoid delays in the project schedule. Should unknown cultural resources be discovered during project implementation, A&A staff will be available to coordinate with DHR and VDOT to achieve a resolution and minimize associated project delays.

Threatened and Endangered (T&E) Species: VDOT staff coordinated T&E species reviews with the Virginia Department of Conservation and Recreation (DCR), the Virginia Department of Game and Inland Fisheries (DGIF) and the United States Fish and Wildlife Service (USFWS). Documentation of this coordination was provided in the RFP documents. Based on the information provided there are no anticipated impacts to T&E species associated with this project. A&A staff will continually monitor the T&E status of species within the project area over the course of the project. If a change in T&E status is noted over the course of the project A&A will assist the Team with avoidance and minimization of impacts to T&E species and with regulatory coordination. A review of T&E databases revealed that the Bigeye Jumprock, a fish, could potentially advance to T&E status over the course of the project. However, it does not appear at this time that Lick Run would be considered as suitable habitat.

Water Quality Permitting: According to the VDOT Permit Determination document provided in the RFP, the proposed project will require water quality permits from the Virginia Department of Environmental Quality (DEQ), the Virginia Marine Resources Commission (VMRC), and the United States Army Corps of Engineers (USCOE). All of these permits would normally be required when stream impact is proposed. The Key/JMT Team has already begun considering design options to avoid and minimize impacts to waters of the United States. A&A is aware of the nature of permitting schedules and the ripple effect that delays and scope changes can cause. With this awareness, A&A will continue to assist the Key/JMT Team in its efforts to minimize the impacts to water resources through the design phase in order to minimize potential delays related to permitting and mitigation requirements.

A&A conducted a preliminary assessment of the site during preparation of the Technical Proposal. No significant wetlands were observed and the emphasis of the water quality permitting efforts will concentrate on the stream relocation. The Key/JMT Team has already spent a considerable amount of time evaluating design alternatives which could avoid or minimize stream impact. These alternatives warrant additional consideration during design and may be considered in value engineering of the project. Regardless of whether any of these alternatives are adopted, documentation of avoidance and minimization alternatives that have already been considered will speed the preparation and review of the Joint Permit Application. Blue Ridge Ecological Services (BRES) will assist A&A with assessment of the existing stream and determination of credits required using the Unified Stream Methodology (USM). Our goal will be to minimize stream impact to fall under the State Programmatic General Permit administered by the VDEQ and minimize involvement with the Corps of Engineers (CoE). Mr. Leedom of BRES, the retired CoE regional biologist for the project area, will assist the Key/JMT Team with CoE coordination should CoE involvement become unavoidable.

Through experience, A&A has developed a step by step plan to navigate the water quality permitting process. The initial steps will include preliminary stream and wetland delineations that will be used to obtain a jurisdictional determination (JD) from the CoE. The JD will be used to quantify the impacts to waters of the United States associated with the proposed project. Once the impacts are quantified, A&A will complete and submit a Joint Permit Application to obtain permits from the DEQ, VMRC and possibly the CoE. A&A anticipates that part of the permit application will be a mitigation plan to offset the impacts to Lick Run. One option for mitigation is the purchase of credits from stream and wetland mitigation banks. A&A has had preliminary discussions with two



local stream and wetland mitigation banks to assess the feasibility of this mitigation option for the I-581/Valley View Boulevard Interchange project. It appears that sufficient mitigation credits would be available from the Blue Ridge Land Preservation and/or Graham David Mitigation Banks. A&A will also implement the public notification process as required by the regulatory agencies. Final approval of the permits may require modifications to the permit application. A&A will work with the Key/JMT Team and VDOT in addressing regulatory issues that may arise during the permitting process. A&A will track and report progress throughout the permitting process.

Hazardous Materials: VDOT completed a Hazardous Materials Technical Report for the project area in June of 2011. The report, which was provided in the RFP, states that “With the exception of potential asbestos containing materials and lead-based paint in the three residential dwellings slated for demolition, no potential hazardous materials sites were discovered within the project area.” During a site visit conducted by A&A staff, it was noted that there are no obvious concerns related to hazardous materials within the project area. A&A will be available to respond to unanticipated discovery of hazardous material and develop plans to manage contaminated media if necessary. A&A will develop a hazardous materials management plan during the preliminary design phase to address any hazardous materials that may be introduced as part of the construction process.

Asbestos and Lead-Based Paint: The VDOT Hazardous Materials Technical Report indicates that there is potential for asbestos containing materials (ACM) and lead-based paint associated with the residential dwellings that will be demolished during the construction phase. Key will use a state certified specialty sub-contractor to conduct asbestos and lead-based paint surveys to determine the presence of these hazardous materials. If ACM and/or lead-based paint are discovered, the sub-contractor will adapt the demolition plans for these structures to account for the presence of hazardous materials.

Approach to Compliance During Construction

The Team’s approach to compliance during construction will include the following:

- Prepare a comprehensive environmental management plan that includes: environmental compliance requirements, identifies responsible party(s), summarizes requirements, and regulatory contacts.
- Include critical environmental milestones in the project schedule, so that environmental milestones are tracked and met.
- Prepare the registration statement for a Virginia Stormwater Management Permit for Construction from the Virginia Department of Conservation and Recreation and prepare a Stormwater Pollution Prevention Plan required by the Virginia Stormwater Management Permit. Provide a half day training course on the SWPPP for the contractor prior to initiation of construction activities.

Section 4.4.2 Utilities

Approach for Utility Coordination, Adjustments, and Relocations

One of the most crucial aspects of the I-581/Valley View Boulevard Interchange Improvement project with respect to project schedule involves the utility coordination, adjustments, and relocations for the proposed design. The Key/JMT Team approach will focus on the following **key goals** for utility activities during development of the Projects:

- Initiate early coordination with all utilities located within the Project limits to minimize schedule delays.
- Make all reasonable efforts during design to avoid conflicts with utilities, and minimize impacts to utilities where conflicts cannot be avoided, keeping relocations located within existing Right-of-Way or easements.
- Self perform the design and construction of the relocations when possible to maintain control of the cost and scheduling of relocation work.

Based on information contained in the RFP documents and interviews with utility owners, the Key/JMT Team identified utilities that may be impacted during construction. The project challenges include:

Coordinating and working with multiple utility types and utility owners including water, sanitary sewer, gas, telephone, cable television, electric, traffic control devices, and lighting. In addition, the Project involves public (local government entities) and private utility owners.

Beginning construction as early as possible to meet the Department’s project schedule. In order to meet the Department’s project schedule, construction activities must begin as soon as possible making the utility coordination, adjustment, and relocation process challenging and the schedule critical.



In order to minimize or eliminate utility impacts, the Key/JMT Team has a dedicated Utility Coordinator during the design phase to address all preliminary engineering activities and a Utility Superintendent during the construction phase to address all utility adjustments and relocations. These individuals will focus on all aspects of the utility coordination efforts of private and public utilities to expedite the project schedule.

Knowledge of VDOT Requirements

All utility coordination, adjustments and relocations will be performed in accordance with VDOT’s Right of Way Manual of Instructions, VDOT’s Utility Manual of Instructions including the Utility Relocation Policies and Procedures, and VDOT’s Land Use Permit Manual. The Key/JMT Team is very familiar with the VDOT requirements and has worked on many projects involving utility coordination, adjustments, and relocations for the Department. In addition, the Team has worked with all of the utility companies located within the project limits. Utility coordination will occur during all design and construction phases. These utility related activities include:

Preliminary Design Activities

The Key/JMT Team will perform a preliminary assessment of the site and provide initial utility reconnaissance information including existing utility conditions, potential conflicts, identifiable challenges, and right-of-way needs. The Team will collect utility as-built plans and system design maps, and develop utility coordination schedules. The Team will develop or coordinate a preliminary utility design including a schematic design of a conceptual plan for the adjustment or relocation of the existing utilities, locations of potential easements, cost estimates, and schedules for the work. The Team will file a “Preliminary Utility Design Package” with all parties.

Impacts to water, sanitary sewer, gas, telecommunications, and electric utility facilities, including the relocation and reworking of traffic control device signalization, signage, and other service feeds may be encountered. The Team will perform title research and will review surveys, easements, agreements, licenses, and any other documents provided by the utility owner describing their rights and obligations. The Team has also developed a utility-standard, recordation-ready, easement plat for relocated facilities.

Preliminary Design Tasks include:

- Meet with VDOT’s District Utilities Office within 45 days of the Date of Commencement (DOC)
- Prepare, submit, and obtain permission to perform utility designations and test holes
- Contact Miss Utility and request a “Design Ticket” to mark all existing utilities
- Perform utility designations
- Initiate early coordination with all utilities located within the Project limits
- Perform conflict evaluations and perform utility locates (test holes)
- Provide roadway plans to utility owners to allow them to fully understand project impacts
- Coordinate and conduct a preliminary utility field inspection with utility owners and VDOT
- Determine cost responsibility including verifying prior rights and resolving disputes
- Prepare and submit a Preliminary Utility Status Report to VDOT within 120 days of the DOC

Final Design Activities

After review and approval of the preliminary plans by VDOT and the utility owners, the Team will develop the final utility design plans, trench details, cost estimates, specifications, and schedules for the work. The Team will file with all affected parties a “Final Utility Design Package” including all utility relocation and service re-feed details.

Final Design Tasks include:

- Perform utility relocation designs OR request utility owners to perform utility relocation designs
- Perform identifications and acquisitions for replacement land rights
- Obtain from utility owners
 - ✓ Relocation plans AND a letter of “No Cost” where the utility does not have a compensable right
 - ✓ Relocation plans AND utility agreements AND cost estimates where the utility has a compensable right
 - ✓ Letter of “No Conflict” where the utility will not be impacted by the project
- Review all relocation plans to ensure that relocations comply with VDOT Right of Way and Utilities Division Manual and VDOT Land Use Permit Manual
- Review all relocation plans to ensure that there are NO conflicts with proposed roadway improvements and other utilities existing locations and/or relocations
- Prepare and submit all relocation plans to VDOT for review and approval
- Provide VDOT certification stating that the proposed relocation will not conflict with proposed roadway improvements and will not conflict with another utility’s relocation plan



- Receive written approval from VDOT prior to authorizing utilities to commence relocation construction

Construction Activities

The Key/JMT Team will manage the utility relocation construction process including preparing in-plan utility relocation plans for water and sewer facilities. The Team will review all utility designs and cost estimates for least-cost-method design practices, and will challenge line items and practices found to be inaccurately or inappropriately charged to the Project. The Team will coordinate installation inspections with the required utility owners and perform compliance inspections during construction process. Record (As-Built) Plans and closeout documentation, utility release documents, and quit claims will be developed after completion of the utility relocation.

Construction Tasks include:

- Perform utility relocations and/or authorize utility owner’s to begin and perform their utility relocations
- Reimburse appropriate utility owner costs
- Certify to VDOT that all utilities have been identified, conflicts have been resolved, utilities have been relocated, and utility owners claims and compensable rights have been satisfied
- Show final location of all utilities on the Record (As-Built) Plans

Capability to Mitigate or Eliminate Risks and Potential to Minimize Unforeseen Delays

Requesting utility owner’s to perform relocation work, using their construction forces or subcontractor, presents a challenge for project scheduling and coordination. If this challenge can be minimized or eliminated, some of the risks and delays related to the utility work can be avoided. As a wholly-owned subsidiary of Utility Services Associates (USA), **Key brings the unique ability and capability to mitigate or eliminate risks and to minimize delays during the utility coordination, adjustment, and relocation process by having the ability to perform many of the utility relocations required for the project.** During discussions with each utility owner, they have stated that they will consider allowing Key to self-perform parts or all of the relocation work for the project. Key has identified the following utility relocations as potential self-performed work: **water, sanitary sewer, and some of the electrical and lighting items.**

Utilities in Conflict with Design and Solutions for Accommodating Impacted Utilities

The Key/JMT Team, including Paul Phillips of Key Construction Company and Jay McGuire of Anderson and Associates, **conducted intensive “due diligence” investigations** relating to the utility conditions for the Project. The Team evaluated the preliminary plans provided in the RFP, conducted multiple site visits, attended the utility coordination meeting with the Department, and coordinated with representatives of each utility owner. **During the meetings with the utility owners, the main topics of discussion were early coordination, conflict evaluations, cost responsibility determination, risk mitigation and the minimization of delays.** The following is a summary of the highlights of these meetings.



Appalachian Power (AEP). Mr. Paul Phillips and Mr. Jay McGuire met with Mr. Jeff Perdue, Senior Engineering Technician; Mr. Dave Barger, Project Coordinator; and Mr. Todd McMillian of AEP on April 12, 2012 at the project site. These three gentlemen represented both the general electrical concerns of Appalachian Power as well as the lighting concerns. The main topics of discussion were early coordination, conflict evaluations, and cost responsibility determination. The Key/JMT Team and AEP discussed the primary conflicts associated with the overhead power and the potential corrective measures, which are as follows:

- The existing guy wires for the power pole right of Sta. 176+00 on southbound I-581 will be in conflict with the fill and the new retaining wall. AEP will be able to install new guy wires in an area that will ultimately be 5’ to 10’ away from the exterior face-of-wall location as shown. AEP has requested that the new guy wires be installed prior to any construction activity being performed at this location. The existing guy wires will be removed and the anchors cut off below ground level. Since their work will be performed within the VDOT Right-of-Way, they feel that the cost incurred by the contractor will be discounted. Mr. Perdue will confirm. AEP has requested a four (4) week timeframe to design, acquire the materials, and install the new guy wires for the existing pole on I-581. Work will take approximately two (2) days.
- The SWM basin right of Sta. 182+00 on southbound I-581 is shown immediately adjacent to the existing power pole. AEP has requested that the SWM basin be shifted up-station approximately 18’. This would put the top of the cut slope at the requested 12’ minimum distance from their current pole location.



- The Sediment Trap right of Sta. 185+00 on southbound I-581 is immediately adjacent to the existing power pole. AEP has requested that the Sediment Trap be shifted up-station approximately 12' to put the top of cut slope at the requested 12' minimum distance from their current pole location.
- The VDOT message board on I-581 does have a metered power feed. When it is relocated, AEP will have to be provided with the location information for pricing.

AEP is not requesting any betterments to be included with their facilities.



Verizon. Mr. Paul Phillips met with Mr. Allen Asbury of Verizon’s Outside Plant Engineering on April 5, 2012 at the project site. The Key/JMT Team reviewed the overall scope of the project including the design and construction processes. Mr. Asbury indicated that the existing lines to both the traffic counters and the message board will be their responsibility and cost to replace. A one-week notice is required prior to performing any work in the area in order to disconnect the lines. Once relocations are complete, Verizon will be responsible for running new service lines to the equipment, which will require approximately four weeks for installation. Mr. Asbury confirmed that there are no Verizon betterments requested.



Western Virginia Water Authority (MVWA). Mr. Paul Phillips and Mr. Jay McGuire met with Mr. David Vogel song of WVWA on April 12, 2012 at Western’s office located at 601 South Jefferson Street Roanoke, VA. The Key/JMT Team reviewed the overall project scope, design, and construction processes. We reviewed the water and sanitary sewer conflicts and corrective measures based on the plans and identified some features that were not represented on the plans through the internal GIS system. There were several sanitary manholes on the 24” gravity main that were not shown on the plans. There is an 8” waterline loop that extends along Frederick Drive and 19th Street with a blow-off valve at the end of 19th Street that was not shown on the plans. Other laterals not shown on the plans are noted in the potential impacts and corrective measures below:

- The major impact is to the existing 24” sanitary sewer main that extends along Lick Run southwest of the proposed Interchange from SSMH 090 to SSMH 101. The existing line is composed of ductile iron and concrete in various sections, which is approximately 10 to 12 feet depth. There will be approximately 30 feet of additional fill over the system once the interchange is developed, therefore relocation will be required. The ideal relocation will be further to the southwest to extend parallel to the proposed Lick Run stream relocation. Service can be uninterrupted by using a “Straddle” Manhole” to tie the proposed system into the existing system. Ductile iron pipe coated with Protecto will be required for depths over 10 feet.
- There is an 8” sanitary sewer along Norris Drive that ties to the 24” sanitary sewer along Lick Run that will be impacted by the relocation of Lick Run. Relocation will involve extending under the Lick Run stream relocation and tie to existing SSMH 101.
- There is an 8” sanitary sewer along 19th Street that ties to the 24” sanitary sewer along Lick Run that will be impacted by the relocation of Lick Run. Relocation will involve extending under the Lick Run stream relocation and tie to the relocated 24” sanitary sewer main.
- There is an 8” water line and fire hydrant along Norris Drive that will be impacted by the relocation of Lick Run. The line will need to be terminated approximately 80’ before the current termini and the fire hydrant relocated accordingly.
- There is an 8” water line and blow off valve along 19th Street that will be impacted by the relocation of Lick Run. The water line will need to be terminated approximately 50’ before the current termini and the blow off valve relocated accordingly.
- There are several water and sanitary sewer mains that cross I-581 that could be affected by the roadway fill and retaining wall construction. The lines will need to be protected during construction and potentially encased in concrete. If steel encasement is in place then the steel encasement will be extended outside of the proposed construction limits.
- There is a 12” concrete sanitary sewer on the south side of I-581 Sta. 181+50 (approximately 125’ offset from I-581 centerline and approximately 50’ west of the proposed SWM basin), which could be impacted by the 24” outlet pipe from the SWM basin. The sanitary line is approximately 6’ deep. Care will be taken to preserve the sewer line during construction.
- There is a 10” ductile iron sanitary sewer line right of Ramp Z Constr. Centerline Sta. 17+00 starting at the FCD – Shenandoah Limited property line and flowing southwest to the 24” sanitary main along Lick Run. This line is not shown on the plans. There is a 8’ deep SSMH located 50’ right of Ramp Z CL Sta. 16+50, that will need to be raised approximately 6’ to finished grade of the fill slope.



All water and sewer costs for relocations and adjustments will be at the Project’s expense other than any improvements in the existing right of way. The betterment request below will be at the utility owner’s expense.

- The Western Virginia Water Authority has requested a betterment to design and construct a 12” ductile iron water main connecting the 8” water line on Norris Drive to the 12” water main at the end of the project on Valley View Boulevard within the signalized intersection at the shopping area entrance. Two existing valves in close proximity can be closed off without interrupting service. A new 12” tee should be incorporated with a 12” valve. WVWA also requested that a 4” gray PVC electric duct be installed parallel to the 12” main for future fiber optic service for their service. The duct will hang from under the bridge but not lower than the girders using pre-manufactured hangers with rollers for expansion and contraction.

As requested, we will perform all design and construction in accordance with the new “2012 Western Virginia Design and Construction Standards” and applicable VDOT standards. Plan review will be an iterative process, but initial review could be done in two weeks.

Utilities not mentioned have minimal or no potential impacts based on the RFP plans.

The Key/JMT Team has made extensive efforts to identify all utility conflict and relocation issues for the Project; however, a complete re-evaluation for utility conflicts will be performed after project award including verifying the utility designations, determining cost responsibilities, and completing VDOT Forms UT-9 and UT-9A.

Integration of Utility Coordination, Adjustments, and Relocations into Project Sequencing

The Key/JMT Team is extremely aware of the importance of expediting the utility coordination, adjustment, and relocation activities for the Project and has developed a plan to integrate the utility work into the sequence of project development so that schedule delays are avoided. The Key/JMT Team understands the importance of early coordination and, as described in detail above, has spent a considerable amount of time meeting with EVERY utility owner located within the Project that may be impacted. These meetings with the utility owners have provided the Key/JMT Team with an excellent understanding of the requirements and to establish a working relationship with each owner.

As part of the detailed project design schedule, critical utility coordination, adjustment, and relocation activities are included so that the possibility of schedule delays is minimized. Utility activities will occur during each of the design phases and the construction phase. By identifying these activities, the Key/JMT Team will be able to monitor and track not only the important utility coordination, adjustment, and relocation tasks but also the other related, design tasks required for progressing the utility work.

Section 4.4.3 Geotechnical

Following is a description of the Key/JMT Team’s approach to identifying and mitigating geotechnical risks through knowledgeable application of geotechnical design and analysis practices and proposed construction methods.

The I-581/Valley View Boulevard Interchange project will provide on and off ramps along I-581 near Valley View Mall. In order to accomplish the new access and egress, extensive reshaping of existing ramps and construction of new fill embankments will be required. Further, existing Valley View Boulevard and the overpass will be widened to make room for the new southbound off ramp traffic. Improvements and widening along southbound I-581 will also require construction of a new retaining wall. Approximately 5,700 feet of sound walls are anticipated along the interstate from the Valley View Boulevard Interchange to Liberty Avenue to the southeast.

Existing Geologic and Geotechnical Conditions: VDOT has provided a Geotechnical Data Report (GDR) with the RFP documents. The GDR was prepared by HDR Engineering, Inc. (HDR) for VDOT. Eighty three (83) standard penetration test (SPT) borings and 20 pavement cores were drilled as part of the GDR, as summarized below for the major areas of study:

- Bridge Widening: Six borings from 15 to 65 feet with 10 to 35 feet of rock core drilling.
- Valley View Boulevard: Five borings from 12.7 to 50 feet.
- Ramp W: Two borings from 7 to 17.5 feet.
- Ramp X: Six borings from 14 to 50 feet.
- Ramp Y: Six borings from 5.9 to 40 feet.



- Ramp Z: Six borings to 15 to 50 feet.
- Retaining Wall: Four borings from 21 to 31 feet.
- Soundwalls: 17 borings from 10 to 40 feet.

The GDR also contained a discussion of the site geology referencing the “Geology of the Roanoke and Stewartsville Quadrangles, Virginia” (Commonwealth of Virginia Department of Conservation and Economic Development / Division of Mineral Resources, 1981). According to this reference, the project site is underlain by the Cambrian Age Rome and Elbrook Formations. The Rome formation consists primarily of maroon to gray, phyllitic mudstone (siltstone and shale) with isolated carbonate rock (dolostone and limestone) intervals up to about 50 ft thick. The Elbrook formation consists primarily of carbonate rock, limestone and dolostone.

Karst topography describes a landscape formed by the dissolution of soluble carbonate [bedrock](#) such as [limestone](#). Many karst regions display distinctive surface features with [sinkholes](#) being the most common. However, these features may be absent where the soluble rock is covered by other geologic deposits such as alluvium or fill. Typical karst indicators include a wide variation in rock surface elevations, very soft residual clays weathered from the rock (a.k.a. epi-karst), and solution features in the rock such as sinkholes, caverns, and soil, water or air-filled voids. The geology map indicates a significant number of sinkholes or otherwise karst land in the Elbrook Formation.

The geology map also indicates the presence of alluvial soils above the rock and associated residual soils. Alluvial soils are found in old stream beds and the weathering of underlying carbonate rock is often more severe in this situation leading to the increased likelihood of karst features.

Another publication not referenced in the GDR is a map titled “Select Karst Features of the Central Valley and Ridge Province, Virginia” (Commonwealth of Virginia Department of Mines Minerals and Energy, Division of Mineral Resources, 1988). This reference indicates similar geology to that described above and indicates relatively high sinkhole density in the site vicinity.

Based on a review of the GDR and as-built bridge plans, the existing structure to be widened is supported by 12x53 steel H-piles. According to the borings performed as part of the GDR, there is a highly variable rock surface along the bridge alignment. The rock surface varies from approximately El. 1020 feet to El. 1040 feet. The rock coring performed also indicates a highly fractured and weathered rock. Several borings only three feet apart indicated rock elevation differences of 10 feet. These borings illustrate the variability of the rock surface and the difficulty in estimating pile lengths in both the Elbrook and Rome Formations.

Karst Risks Specific to the Project: The carbonate rock underlying the site may contain solution channels and voids. These features present potential obstacles to the development of the proposed project as they may impact construction or future performance of the project. Solution features could develop into sinkholes and lead to excessive settlement of the proposed structures and embankments. Solution features are formed because water is stored in and moves through interconnected openings in carbonate rocks. Most of the openings present within the rock are created along bedding planes, joint fractures and faults. These openings are enlarged by the solvent action of slightly acidic water coming in contact with the rock. The process generally creates voids and cavities within otherwise competent, hard limestone rock strata. Overburden soils above such cavities can collapse into the voids forming sinkholes.

The primary risks associated with karst topography in the site vicinity include the following:

- *Highly variable rock surface elevation.* The borings in the GDR indicated rock elevations varied from about El. 1020 to El. 1040 over short distances at the I-581 overpass. Accordingly, a variable rock surface is anticipated at this site.
- *Zones of epi-karst (soft clay) above or within the rock.* The GDR borings also indicated the presence of epi-karst in several borings. These layers were less than 10 ft thick and the soils were very soft to firm with Standard Penetration Test N values from 0 to 5 blows per foot.
- *Solution features such as sinkholes and caves.* The GDR and the geologic mapping indicate sinkhole activity in the site vicinity. According to the GDR, VDOT personnel provided HDR with discussions related to sinkhole repairs along the I-581 corridor in the drainage ditches and stormwater management pond. Finally, the GDR recommends “a more detailed karst evaluation be considered during final design phase for the project”.



Additional Geotechnical Risks Specific to the Project: We have identified several other geotechnical-related risks as follows:

- **Deep Existing Fills:** To construct the current southbound on-ramp, up to 44 feet of fill was placed at the site. Based on the SPT N-values (some as low as 3 blows per foot), portions of this fill are likely to be compressible. Placement of up to 55 feet of new fill will likely cause additional settlement of the existing embankment. Delay periods of months, surcharge loading, and the use of ground improvement may be required. Schedule delays and long-term performance are risks associated with the new and existing fills.
- **Existing Bridge Abutments:** Construction of the new fill embankments at the abutments for this bridge will impose additional fill loads on the underlying soils. Fill settlement could result in downdrag on the piles supporting the bridge. Accordingly, the existing abutments to remain in place may require additional structural support. Preliminary estimates indicate settlements of about 2 to 3 inches immediately adjacent to the existing abutments and up to 15 to 20 inches along the embankment. Consolidation tests and settlement evaluation are planned for this area. It is also understood that the bridge engineer will evaluate whether the existing piles have the capacity to handle downdrag.
- **New Bridge Foundations:** The new bridge abutments and piers can likely be supported on piles similar to the original construction. A highly variable rock surface is expected for pile tip grades.
- **Pavements:** The California Bearing Ratio (CBR) test performed for the pavement design exhibited low CBR values of 2.7 to 7.7 with a moderate swell during the test of up to 1.7%. Materials with swell greater than 5% will be unsuitable for pavement subgrade and will have to be undercut or modified, where encountered. The minimum pavement design appears to have been designed based on these CBR values. The Key/JMT Team will confirm whether the minimum pavement sections depicted in the RFP documents are adequate for actual design and construction conditions during the Scope Validation process after additional field exploration and laboratory tests have been performed.
- **Global Stability of Retaining Walls and Slopes:** Soft clay soils will likely be present below proposed retaining walls. Soil shear strength and consolidation testing will be needed to evaluate settlement and global stability of gravity or MSE type walls. The proposed 2H:1V fill embankments will also require evaluation. Previous studies indicated marginal factors of safety for the embankments based on updated VDOT Materials Division Manual of Instructions requirements (increased required factor of safety of 1.5). Risks include the need for flatter slopes or benches requiring acquisitions of more land; undercut and replacement; or ground improvement. Each of these responses will contribute to time and cost.
- **Retaining Wall Foundations:** The 1,100 linear feet of retaining wall between I-581 and Lick Run will be up to about 10 feet high. The wall will have a 2H:1V backslope and similar front slope. The backslope adds additional pressure to the wall while the front slope reduces the sliding resistance available for the wall. Both of these factors impact global stability. Furthermore, the creek in front of the wall presents scour concerns. Deep foundations or other considerations may be required.
- **Fill Materials:** The GDR indicates that much of the on-site soils, classified as CH and MH, may be not suitable for reuse as fill materials if they have excessive moisture contents or high swell potential. It is possible that some of these materials can be reused as fill but will require moisture conditioning and may also require further altering through the use of lime or cement. Off-site borrow material will be necessary to construct the larger embankments. It may be possible to use on-site soils in non-critical embankments. However, we will likely have to evaluate fully-softened shear strengths in order to use these soils in any embankments.

The impacts on the project from the potential geotechnical issues include additional cost and time to complete the project. Additional costs could result from foundations due to a variable rock surface; modified design of retaining walls or stabilization of underlying soils if global stability analyses result in low factors of safety; backfilling of sinkholes; and undercutting or modifying pavement subgrades that have low CBR values. Additional time would be required to mitigate all of the above.

Mitigation Strategies: Mitigation strategies implemented during the design phase will reduce the number of unknowns and incorporate these measures into the design, and those implemented during the construction phase to minimize costs and delays. A summary of these strategies is as follows:

- Perform additional subsurface exploration to better delineate the risks related to karst.
- Provide additional laboratory CBR testing to confirm the low value in the GDR, estimate the necessary amount of undercut and replacement, and/or evaluate the amount of lime that might be necessary to



stabilize these soils in place. We will also perform the CBR testing using appropriate surcharges to better simulate the pavement section weight as allowed by the VTM-8 test procedure.

- Provide triaxial shear strength testing and direct shear testing on soft to firm residual clays for global slope stability analyses.
- Provide consolidation testing on soft residual clays for embankment settlement evaluation.
- Provide a thorough evaluation of the geotechnical data in order to properly characterize the subsurface conditions, and perform the necessary calculations to evaluate if the potential risks described herein are likely to occur.
- Include standardized remedial design information on the plans to illustrate how risks should be mitigated during construction.

Planned Geotechnical Exploration and Report: A geotechnical exploration will be carried out by the Key/JMT Team, which at a minimum will satisfy the guidelines outlined in Table 3-1 provided in Chapter 3 (Geotechnical Engineering) of the VDOT Materials Division Manual of Instructions. The full geotechnical engineering study will supplement the GDR. Emphasis will be given to the evaluation of the existing abutment and pier foundations for the bridge over I-581 and the impacts that the settlements will have on the structure as a result of the new fill embankment. Furthermore, extensive stability analysis will be performed to evaluate the proposed embankment slopes and retaining wall along I-581.

Analysis of the I-581 overpass bridge will utilize the GDR provided test boring logs at each end of the proposed new center pier and abutments. No additional exploration is planned for the bridge as the GDR meets the MOI and appears adequate for design.

For the retaining wall along the south side of I-581, additional soil test borings with SPT sampling will be performed to auger refusal, to supplement the borings in the GDR. The existing borings that were drilled approximately 40 feet north of the proposed retaining wall at the top of the existing embankment, suggest the presence of 16 to 20 feet of soft to firm lean to fat clay over rock. The Key/JMT Team will position proposed additional borings closer to the wall alignment and in front of the wall to better assess global stability of the wall. In conjunction with the drilling, undisturbed Shelby tube samples will be collected from the cohesive soil deposits for soil laboratory testing to assist in settlement and global stability analyses. The tube samples of clays will undergo both one-dimensional consolidation tests and consolidated undrained (CU) triaxial shear test in order to better correlate actual test data with the SPT empirical data.

It is anticipated because of slopes in front and behind the wall, coupled with the creek in front of the wall, that a deep foundation system may be required to address stability, as well as mitigate scour concerns. Preliminary global stability analysis indicates that adequate factors of safety **are may not be** achievable based on available data with either a RW-3 or MSE wall option. Additional borings at the front of the wall near the creek will help to evaluate the depth of rock which may allow for elimination of a deep foundation option.

Along Valley View Boulevard and Ramp Z additional borings will be necessary to meet MOI requirements to adequately analyze the stability of the embankments. Temporary groundwater monitoring wells area also planned to assess groundwater conditions. As with the retaining wall, undisturbed tubes samples will be obtained for one-dimensional consolidation tests in addition to both consolidated and unconsolidated (CU, UU) triaxial shear tests.

As mentioned previously, it is anticipated that consolidation settlement of the existing fill and residual soils under the weight of the new fill embankments as well as stability of the embankment will be key geotechnical related concerns on this project. Preliminary stability results indicate that select import fill materials may be necessary to achieve an adequate factor of safety. Furthermore, select undercut and replacement of soft to firm clays at the toe of the existing embankments will be required to construct a toe key for the embankment. Select import fill materials will require a minimum drained friction angle of 33 degrees for the embankment fill and key materials. Our initial stability analysis estimates a toe key of approximately 10 feet deep and 18 feet wide with 1:1 to 2:1 side slopes to achieve a required factor of safety of 1.5.

Settlement estimates include upwards of 12 to 15 inches of long term settlement which may require surcharge loading, delay periods and settlement monitoring. Additional consolidation testing is planned that will aid in refining settlement magnitude and time rate estimates.



For the remaining ramps, additional borings will be required to supplement the current data to meet MOI requirements. Other areas of planned construction such as stormwater management basins will be explored with borings. A temporary groundwater observation well will be installed to assess the groundwater level in each basin. Numerous additional borings will also be required to address the sound wall barriers.

Our Geotechnical Report for the project will include all of the analyses needed to support our design recommendations. These recommendations include bridge foundations, MSE wall abutments, retaining walls, global stability, earthwork, pavements, storm water management basins, and karst mitigation.

Section 4.4.4 Quality Assurance / Quality Control (QA/QC)

The following discussion and information is provided to enable VDOT to understand and evaluate the Key/JMT Team’s approach to managing Quality Assurance and Quality Control (QA/QC) for the project. A goal of the Team’s approach is to minimize the likelihood of additional QA/QC effort needed by VDOT. The discussion in this section demonstrates the Key/JMT Team’s comprehensive understanding of the design-build QA/QC process and a thorough knowledge of VDOT’s QA/QC guidance documents.

Design Element QA/QC Description

JMT’s DM and Design QAM will develop and implement a Design QA/QC Plan that meets all requirements outlined in the Department’s *Minimum Requirements for Quality Assurance and Quality Control on Design Build and Public-Private Transportation Act Projects, January 2012* and in Part 2, Section 2.16.1 Design Management of the Request for Proposals. The Design QA/QC Plan will specify the process to be used by the Team to ensure design quality including the identification of QA/QC personnel, the roles and responsibilities of QA/QC personnel, the steps of the quality review process, checklists for each discipline and element review, the procedure for reviewing and resolving comments, and the process for obtaining and issuing “Approved for Construction” plans.

The following is a project specific description of how the Design QA/QC process will be conducted for one unique Project element – **bridge foundation design in a karst environment including approach embankments and Mechanically Stabilized Earth (MSE) retaining wall design** - incorporating the requirements of Section 4 Design QA/QC Requirements of the Department’s *Minimum Requirements for Quality Assurance and Quality Control on Design Build and Public-Private Transportation Act Projects, January 2012*. A goal of the Key/JMT Team’s approach to Design Quality Management is to ensure well structured, easily audited, design documents that minimize the likelihood of needing to expand VDOT's contract administration efforts. The description demonstrates the Key/JMT Team’s capability to perform effective design-quality management, incorporates formal constructability reviews prior to final plan development, and incorporates designers at appropriate stages of construction.

The Design QA/QC Plan will define the quality review process for all design elements of the project, including the **bridge foundation design in karst environment and approach embankment and MSE retaining wall design**, and will identify the planned schedule of interim and final submissions to VDOT for review and approval. The interim and final submissions will generally correspond to VDOT’s project development and delivery process and will include a Preliminary Plan submission, a Final Plan submission, and an Approved for Construction Plan submission. The quality review process will require the design documents go through a nine (9) step quality review prior to receiving approval for construction as described below:

Step 1 - Design Document Preparation – The DM will assign experienced, discipline specific designers to prepare documents for the design including a bridge and a geotechnical engineer. Documents include plans, specifications, estimates, engineering computations, reports, and studies. As discussed elsewhere in this technical proposal, performing an appropriate geotechnical investigation, material laboratory tests, and geotechnical analysis will be an important component of the design process in order to address the varied rock and void conditions encountered in a karst environment. The DM will provide the designers the specific design requirements for the project included in the contract documents. Using this information, the designers will prepare the documents in accordance with the contract requirements, VDOT design standards and specifications, special provisions, and generally accepted engineering principles and practices. In particular, the designers will perform the design in accordance with Part 2 – Section 2.8 Geotechnical Work of the RFP, AASHTO’s *LRFD Bridge Design Specifications* with VDOT Modifications, VDOT’s S&B Volume V-Part 11 *Geotechnical Manual for Structures*, VDOT’s Manual of Instruction for Materials Division, VDOT’s *Special Provision for Quality Assurance/Quality*



Control (QA/QC) for the Construction of Deep Foundation Systems for Design-Build and PPTA Contracts, VDOT's Special Provision for Wave Equation Analysis, VDOT's Special Provision for Dynamic Pile Testing for End Bearing Piles, VDOT's Special Provision for Mechanically Stabilized Earth Walls, and VDOT's Density Control of Embankments and Backfill included in the RFP documents.

Step 2 - Constructability Review – The DM will coordinate with the D-B PM and the CM to conduct constructability reviews of the design. Construction personnel including the CM and Superintendents will review the documents focusing on the following items relating to the bridge foundation design and approach embankment and MSE retaining wall design:

- Reviewing the plans for constructability, compatibility of materials, accuracy and clarity of plan details and typical sections, and the location of existing versus proposed features.
- Studying the documents for adherence to contract requirements, VDOT design standards and specifications, and special provisions.
- Reviewing the special provisions for any issues or restrictions unique to the project and for acceptance criteria for inspections and test of unique project elements.
- Verifying that there are no underground or overhead utility conflicts, and if present, verifying that unavoidable conflicts are sufficiently addressed by the design.
- Reviewing the plans for coordination between design disciplines including roadway, hydraulics, structure and bridge, and geotechnical activities.

Step 3 - Quality Control Review – The DM will assign qualified, discipline specific, design QC Managers to perform a detailed QC review of the documents including a bridge QC Manager and a geotechnical QC Manager. During the QC review, VDOT and project specific checklists for each discipline will be used to assist the reviewers. In particular, VDOT's S&B Volume V-Part 11 Geotechnical Manual for Structures and FHWA Publication No. FHWA ED-88-053 Checklist and Guidelines for Review of Geotechnical Reports and Preliminary Plans and Specifications will be used as a guideline during the review. Elements of the detailed QC review will include:

- Checking engineering computations and corresponding design assumptions.
- Checking math, geometry, and spelling.
- Checking technical accuracy.
- Reviewing form, content, and organization.
- Evaluating the suitability and compatibility of materials.
- Reviewing for coordination with other design disciplines.
- Verifying conformance to contract requirements, VDOT design standards and specifications, and special provisions.

MSE WALL CONTRACT DRAWING (3-LINE DRAWING) REVIEW CHECKLIST					
Project name: _____					
Drawing number: _____					
Sheet: _____					
Revision: _____					
	Yes	No	N/A	Comments	
A. GENERAL INFORMATION					
1	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Is the wall system listed in the plan pre-approved within the contract or the agreement?	
2	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Is the entire wall (including the vertical mass) located within the Department's right-of-way?	
3	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Is the wall design as specified?	
4	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Is full-scale treatment of wall face required?	
B. CALCULATIONS					
1	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Have bearing capacity calculations been performed to determine the maximum allowable bearing capacity at the maximum bearing stress?	
2	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Is the maximum applied bearing pressure imposed on the bearing capacity less than the calculated maximum allowable bearing capacity?	
3	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Have soil and differential settlements been calculated?	
4	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Has time rate of settlement been determined?	
5	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Have appropriate safety factors been determined per VDOT's Requirements for Preparation of Alternative Retaining Wall Plans based on the magnitude of estimated settlement?	
6	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Is testing planned for installing, curing, compact, curing, treatment and, testing also covered after wall completion?	
7	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Is the maximum of maximum stress within allowable limit?	
8	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Is safety factor of sliding acceptable?	
9	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Has global stability calculation been performed?	
C. DETAILS/CONSTRUCTION					
1	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Has the designer shown the correct slope and end conditions and proposed offset for wall?	
2	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Is the wall in horizontal curve, has actual wall length been adjusted based on curve geometry?	
3	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Has the designer noted the correct design grades in both of wall top, wing and ground elevations or proposed grades for wall design?	
4	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Has the designer used the correct design grades at the top of wall for wall design?	
5	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Is the wall reinforcement adequate?	

Step 4 - Quality Assurance Review – The DM will direct the Design QAM to perform a design QA review of the documents and to confirm that the constructability and quality controls reviews and comment resolution processes are complete. The Design QAM will review the “Big Picture” items such as:

- Assessing if qualified personnel were assigned to the design and quality control tasks.
- Evaluating if the designer used the proper design methods and applied the correct analyses.
- Evaluating if the solution is practical and cost effective.
- Evaluating if the design is within an appropriate range based on experience and preliminary estimates.
- Assessing if the design, plans, specifications, and special provisions are complete.
- Verifying adherence to the contract requirements and stated design objectives and goals.

Step 5 – Design Manager Review – Upon satisfactory completion of the internal design quality review process including the resolution of any review comments and corrections, a set of Interim Documents will be presented to VDOT for review and comment. Prior to submission to VDOT, the discipline leaders and the DM will review the Interim Documents and will verify that the constructability, QC, and QA reviews have been completed and that all comments have been reviewed and addressed.



Step 6 - VDOT Interim Document Review – Interim Documents will be submitted to VDOT for review and comment. The D-B Team will assist VDOT with the review by attending meetings, responding to questions, and providing additional information as requested. At the completion of VDOT’s review, the DM will forward all comments back to the discipline specific designer for resolution. If changes are incorporated into the documents, the review cycle (constructability, QC, QA) will be repeated. Responses to all VDOT comments will be prepared by the D-B Team and the DM will review the responses with VDOT and work with VDOT to develop acceptable resolutions to the comments.

Step 7 – Design Manager Review – After all VDOT comments are resolved and prior to resubmission to VDOT for review and approval, each discipline specific Engineer of Record (the bridge engineer for structural design of the bridge foundations and MSE walls, and the geotechnical engineer for geotechnical design of the bridge foundations, approach embankment, and MSE walls) will seal, sign, and date the Final Documents. The discipline leaders and the DM will review the Final Documents and will verify that the subsequent constructability, QC, QA reviews have been completed and that all comments have been reviewed and addressed.

Step 8 – VDOT Final Document Review – Final Documents will be submitted to VDOT for review and approval for construction activities. Again, the D-B Team will assist VDOT with the review by attending meetings, responding to questions, and providing additional information as requested. Comments at this stage should be minor if prior steps are completed as described above, however, minor comments received during this review will be addressed as described in Step 6.

Step 9 - Approved for Construction Documents – After all VDOT reviews are complete and all comments are resolved, VDOT will approve the Final Documents. The quality review process will culminate with the DM issuing “Approved for Construction” Documents to the D-B Team and VDOT.

Comment and Comment Resolution – A comment resolution process between discipline specific designers and reviewers will occur after each step in the quality review process. During the reviews, comments will be recorded using red ink on hard copies of the documents (plans, specifications, estimates, engineering computations, reports, and studies) and will be summarized in writing in electronic format using Microsoft Word or Excel. Discipline specific designers will review and prepare responses to the comments. The responses to the comments will be recorded on the summarized comment list and will be included with the document resubmission packages for use in subsequent reviews and future auditing exercises. Comments will be addressed by the designer and confirmed by the reviewer prior to advancing the documents to the next step in the review cycle. *If any changes are made to the documents based on comments received, the review cycle (constructability, QC, QA) will be repeated to ensure that the changes are reviewed and approved by the entire quality review team.*

Changes to Approved for Construction Documents – During construction, the DM will expeditiously review and process any plan revisions required by the permitting process, field changes due to unexpected conditions, work orders requested by VDOT, or value engineering improvements proposed by the D-B Team. Proposed modifications to the “Approved for Construction” Documents during the construction phase will be directed to the original discipline specific Engineer of Record and designer for incorporation. *After the proposed modifications are made, the revised documents will begin the review and approval process as described above consisting of constructability, QC and QA reviews, discipline specific designers and DM reviews and VDOT review and approval.* The DM will issue “Revised Approved for Construction” Documents to the D-B Team and VDOT. These revised documents will be incorporated into the project Record Drawings.

Design Quality Assurance Independent of Quality Control - The Design QA and QC Process described above clearly describe how the QA activities will be performed independently of QC activities. QC Managers will perform detailed reviews prior to any QA activities. The Design QAM will perform subsequent, broad reviews to confirm that QC reviews and the comment and resolution process are complete. Prior to submission to VDOT, the DM will perform a final review to ensure that all QA and QC activities have been performed.

Construction Element QA/QC Description

Volkert’s QAM and Key Construction Company’s QC Manager will develop a written Construction QA/QC Plan for the project that will provide an organizational structure, processes, and procedures to ensure proper inspection coverage and documentation, and to ensure quality work is sustained throughout construction with minimal VDOT involvement. Our plan will follow the quality requirements outlined in the Department’s



Minimum Requirements for Quality Assurance and Quality Control on Design Build and Public-Private Transportation Act Projects, January 2012 and in Part 2, Section 2.16.2 Construction Management and Section 2.16.3 Geotechnical Coordination and QA/QC of the RFP. The Construction QA/QC Plan will outline the procedures and responsibilities for construction quality control and quality assurance, including inspections, sampling, testing, documentation and document control, management control, change management, communications, and non-compliant corrective action plans. The Construction QA/QC Plan will identify the QA/QC staff and organization, and cover the roles, responsibilities, and interface between the QA, QC, and VDOT personnel. Our organization chart clearly shows the separation of the design, construction QC, and construction QA staff.

The following is a project specific description of how the Construction QA/QC process will be conducted for one unique Project element – **bridge foundation construction in a karst environment including approach embankments and Mechanically Stabilized Earth (MSE) retaining wall construction** - incorporating the requirements of Section 5 Construction QA/QC Requirements of the Department’s *Minimum Requirements for Quality Assurance and Quality Control on Design Build and Public-Private Transportation Act Projects, January 2012*. A goal of the Key/JMT Team’s approach to Construction Quality Management is to provide confidence to VDOT that the construction will be carried out in accordance with the RFP requirements with minimal VDOT intervention. The description demonstrates how the Key/JMT Team’s QA/QC process guarantees contract compliance, minimizes VDOT oversight efforts, and provides minimal risk that VDOT would need to perform beyond its limited IA/IV efforts.

During each monthly progress meeting, the Key/JMT Team will look ahead several months to identify new work activities. The baseline project schedule will show the approximate date for the starting construction activities for the bridge foundation, approach embankment, and MSE wall. The quality review process will require all construction activities to go through the quality review prior to receiving approval as described below:

Step 1 - Monthly Progress Meeting – At the monthly progress meeting three to four months prior to the bridge foundation, approach embankment, and MSE wall activity, the CM will review the submittals required for and ensure the following documents are completed:

- Approved for construction plans, and review acceptance criteria for pile foundations provided by designer.
- Written review comments for working drawings, shop plans, and design calculations for the foundation, embankment, and MSE wall have been received from the Contractor’s Geotechnical Engineer.
- Storage area for panels has been identified, and meets all requirements.
- Identify any piles that may require pre-drilling, and identify specific piles for PDA testing.
- C-25 Source of Materials for concrete, facing elements, reinforcing strips/mesh, joint materials, geotextile, select backfill material, regular backfill material and other necessary components.
- Approvals and certifications for concrete mix designs, geotextiles, reinforcing steel/strips, and joint materials.
- Check with panel fabricator to ensure panels will be fabricated and cured on time, and that the required testing and inspections will be made.
- Identify and complete C-31’s for any subcontractors.
- Certificate of Compliance and test results for the select backfill material.
- Identify witness and hold points, such as pile driving, foundation examination, density testing, etc.
- Discuss potential issues that may occur during foundation work activities due to the karst geology, including identifying potential issues, developing alternative solutions, and developing a communication plan so the key team members will be prepared to resolve any issues quickly.



The QAM will identify inspection checklists required for the activity and will ensure all QA, QC, IA, and IV testing and inspection requirements and frequencies are included as outlined in VDOT’s Road and Bridge Specifications, Special Provisions, and RFP Documents. Checklists will include *MOT, E&S Controls, Structural Excavation, Piling Driving, Concrete Placement and Curing, MSE Wall Installation (including foundation preparation, wall erection, and select backfill placement), and embankment installation*. The QAM will set the date for the Preparatory Meeting for one month prior to start of the work activity.

Step 2 – Preparatory Meeting - One month prior to the bridge foundation, approach embankment, and MSE wall activity, a Preparatory Meeting will be held in conjunction with the monthly progress meeting. This purpose of



this meeting is to ensure all project personnel have a thorough understanding of the upcoming activity, and to provide coordination and communication between the D-B Team’s production personnel, materials suppliers, QC personnel, QA personnel, and VDOT personnel. During this meeting the QAM will address the following items:

- Review design documents and geotechnical information, and review foundation acceptance requirements.
- Review pile driving operation and PDA process and requirements.
- Review the required specifications and special provisions.
- Review the bridge foundation and MSE wall installation plan prepared by the CM including the scope, sequence of work, schedule of work activities, location, crew, subcontractors involved, equipment, access, materials needed, activity steps, and expected outcomes for each step of the activity.
- Identify the environmental controls needed.
- Identify any staging area and ingress/egress required for the activity.
- Review the safety plans for all facets of the activity.
- Review the MOT plan.
- Review the QC and QA pre-checks and testing frequencies for each material required to meet the QA/QC plan.
- Ensure that QC and QA staff have all pertinent checklists, QA/QC testing requirements and frequencies, specification, special provisions, standards, and other VDOT manuals and I&IM’s required for this activity.
- Ensure C-25’s, certifications, etc. for the materials have been processed, and ensure all materials, equipment, and methods have been approved prior to the work, including the certification of compliance for the select backfill material.
- Determine what material invoices and tickets will be coming in before, during, or after the operation and who will be responsible for receiving them.
- Confirm that the Certificate of Compliance certifying the furnished select backfill material complies with the contract requirements.
- Confirm witness points for the activity with the VDOT PM.
- Review the QA/QC checklists, listed above, that will be used.
- Discuss the roles and responsibilities of the construction crew, QC, QA, and VDOT’s IA and IV staff.
- Obtain written approval from the VDOT PM for starting this activity.



The QAM will prepare and distribute minutes of the meeting within two (2) business days.

Step 3 - Weekly Meeting - At the weekly meeting prior to the bridge foundation, approach embankment, and MSE wall activity, the Construction Manager and superintendent will determine the date for starting this activity. QC, QA, and VDOT staff will attend, and any appropriate materials suppliers should be in attendance in order to review the testing requirements, quality expectations, safety plan features, and any information on access for equipment, testing, etc. A review of materials documentation, submittal approvals, and safety and environmental control plans will be made to verify that all documentation is approved and on file.

The construction superintendent will walk through the installation plan and will assign roles and responsibilities for the construction crew members. Information regarding each element of the activity will be provided to the crew members so that each person will understand their role and expectations for work quality and for safety.

The QAM will review the Preliminary Inspection section of all pertinent QA/QC checklists in detail with the group. The QAM will also review the inspection checklists for the intermediate and final inspection requirements and identify the QC, QA, and IA and IV testing types and frequencies for the activity, and will schedule inspection and testing with the QC, QA, and IA and IV staff. The following will be performed at this weekly meeting:

- Ensure there are no changes to the design or site conditions.
- Ensure materials used in the MSE system are from the approved sources.
- Ensure panels have been tested and approved for use and that there is no damage during storage or handling.
- Ensure that the select backfill material is from the approved source.
- Identify any roadway report information that will need to be submitted to VDOT.



Step 4 – Daily Meeting - At the daily meeting prior to the bridge foundation, approach embankment, and MSE wall activity starting, the construction superintendent will confirm the starting time, ensure that the qualified personnel and



appropriate equipment and resources are available to perform the work, review the roles and expectations for each crew member, review the appropriate QA/QC checklists with the crew, review the safety plan for the operation, and ensure that the QAM is notified that the work will begin the next day. The construction superintendent will confirm that any plant manufactured materials delivered to the project have been tested at the plant in accordance with VDOT’s current QA/QC program, and that all materials acceptance documentation is on hand. The QAM will confirm with the QC, QA, and VDOT staff the activity, date, time, and inspection and testing requirements, and ensure that the testing and inspection staff are all certified and qualified according to the contract requirements.

Step 5 - Day of Activity - In accordance with the project QA/QC Plan, the QC Inspectors and Testing Technicians, the QA Inspectors and Testing Technicians, and VDOT’s IA and IV Staff will independently perform inspections and tests using the checklists and at intervals outlined in the QA/QC Plan testing matrix. Intermediate inspections and testing using approved QA/QC checklists will be performed and will be documented on the approved Daily Work Report form. The QA Inspectors will observe testing procedures and results, and will note any discrepancies, and will discuss with the QAM and construction superintendent. The QA Inspector may take tests side by side of the QC inspector in order to confirm test results.

One PDA will be required for each of the pile groups. The QC and QA inspectors will independently ensure that the piles are driven to the design minimum tip elevation, and will verify that the piles conform to the design acceptance requirements. The QC inspector will ensure that materials tickets are received. Daily reports will be written by both QA and QC inspectors. Any deficiencies or nonconforming issues will be documented and reported on the AR Plan tracking log, with proper notification to the QAM and VDOT. VDOT involvement may include IA testing, IV testing, and review of witness points, and VDOT may review any and all operations as desired. The QC and QA inspectors will independently inspect the remaining bridge foundation, approach embankment, and MSE wall activities as the work progresses.

With the amount of traffic through the work zone, MOT and all personal protective safety equipment will be monitored and maintained continuously by the Contractor’s staff.

Step 6 - Day After Activity - At the daily meeting after the bridge foundation, approach embankment, and MSE wall activity, the construction superintendent will review the operation from the previous day to identify what went well and what can be improved the next time. An improvement plan for the next phase will be developed. Test and inspection reports will be provided to the QAM, who will develop the daily report for the previous day. The QAM will review test reports and identify any discrepancies between QC and QA, and will follow the QA/QC plan to resolve. Any deficiencies will be reviewed and a plan developed to prevent them from happening in future work activities. Any nonconforming issues will be discussed and a resolution determined. The geotechnical engineer will certify that the necessary testing and inspection requirements were met and were complete.



Construction Quality Assurance Independent of Quality Control - The Team organization, structure, chain of command, and reporting requirements will ensure QA and QC remain independent throughout construction. As depicted on the organizational chart provided in Section 4.2 of this Technical Proposal, the QA and QC staffs are from different firms with the QAM and the QA staff reporting directly to the D-B PM and the QCM and QC staff reporting directly to the CM. Also, the QAM will have the authority to suspend activities in the event the QA/QC tasks or issues are not complete or found to be nonconforming. The D-B Team and Project QA/QC Plan will ensure independence at all times throughout construction.



Section 4.5 Construction of Project



Key Construction Company, Inc.





Section 4.5 Construction of the Project

Key will direct the construction process in its entirety through the managed coordination of in-house resources and qualified subcontractors. With the knowledge garnered from successfully completed, as well as ongoing, projects similar to the I-581/Valley View Boulevard Interchange, Key understands the inherent challenges of providing a safe environment and of minimizing disruptions to the travelling public during urban construction and construction widening type projects. Similarly, Key recognizes the challenges of incorporating elements particular to a design build project, such as right of way acquisition, utility relocations, and environmental permitting, into the construction sequence and schedule. Our construction approach to the Sequence of Construction considers each of the aforementioned challenges and addresses each in a manner that provides the safest possible work area for all involved parties; the least inconveniences to the public and adjoining private and business property owners; and solutions that mitigate potential construction schedule delay risks.

Section 4.5.1 Sequence of Construction

Following is a description of the Key/JMT Team's approach to construction phasing including a general sequence of activities to complete the Project. In developing our sequence of construction, the Team has considered public safety and has included measures to limit disruptions to vehicular and pedestrian traffic through the work area and adjacent public transportation facilities and roadways. The approach to sequencing construction activities addresses safety and operations, as well as geotechnical constraints, environmental impacts, right-of-way acquisition, staging and storage areas, public involvement/stakeholder coordination and QA/QC reviews, and maximizes the probability of anticipating and mitigating any potential delays to construction or expediting completion of the Project.

Stage I:

- Install advanced warning construction signs and traffic control devices in accordance with the 2011 Virginia Work Area Protection Manual for all roadways impacted by the project.
- Maintain all existing vehicular and pedestrian traffic patterns including the shared use path. Take special precautions to notify the pedestrians that construction is in progress and any encroachment into the direct work area is not allowed under any circumstances.
- Install temporary concrete barrier service a minimum of two feet from the edge of the travel lane on inside median shoulder of northbound and southbound I-581 from stations 208+40 to 215+00. This will allow pier construction to begin on the South side of the Valley View Boulevard bridge.
- Begin construction of the South side Valley View Boulevard bridge widening including pier work at this time. Construct eastbound Valley View Boulevard bridge approaches (both ends) including the northbound I-581 off-ramp terminal stub from stations 329+11 to 330+30 in areas outside of the existing traffic patterns.
- Using temporary concrete barrier, begin the widening of the outside shoulder of northbound I-581 from station 223+50 to 236+00. Closing of the outside northbound lane of I-581 will be done utilizing temporary concrete barrier which will tie in to the barrier that is used for the Ramp Y work. All work associated with the widening of the outside shoulder will be done in its entirety at this time including the removal and replacement of 1' of the existing travel lane as required by Part 2, Section 2.8.2 of the RFP. The temporary concrete barrier will be installed in accordance with the 2011 Virginia Work Area Protection Manual including warning signs, electronic arrows, and proper tapers. Any necessary temporary restriping of I-581 including the off-ramp for Valley View Boulevard will also be done at this time. Sound Barrier Wall construction can also begin at this time and can continue up the northbound I-581 side to station 267+50.
- After starting the northbound I-581 shoulder work, begin construction of the outside lane of the northbound I-581 off-ramp (Ramp Y) from station 10+00 to the point just before it intersects with the existing off-ramp at station 22+75. Utilizing temporary asphalt pavement, start at station 22+75 of Ramp Y and construct a temporary connector ramp that will tie into the existing off-ramp just before it merges with existing Valley View Boulevard. This will allow for traffic flow in a later stage of construction. The proposed northbound I-581 off-ramp deceleration lane widening will also be constructed at this time and will be tied in to the Ramp Y outside lane construction for traffic flow in a later stage.



- Once the excavation on the northbound I-581 shoulder work is completed, use temporary concrete barrier and close the outside travel lane of southbound I-581 from station 163+00 up to station 213+00. The temporary concrete barrier will be installed in accordance with the 2011 Virginia Work Area Protection Manual including warning signs, electronic arrows, and proper tapers. Construct the retaining wall, sound barrier wall, and shoulder widening along I-581 southbound from station 163+00 up to station 213+00 in its entirety including the removal and replacement of 1' of the existing travel lane as required by Part 2, Section 2.8.2 of the RFP.
- After completing the Ramp Y outside lane, the widening of the existing southbound I-581 on-ramp (Ramp Z) inside shoulder can begin. Temporary asphalt pavement and temporary concrete barrier will be used to allow traffic to be switched inside the existing traffic pattern. A temporary tie from the eastbound Valley View Boulevard bridge approach to the widened southbound I-581 on-ramp will also be constructed for future traffic movements.
- Begin the Stream Relocation in areas that are accessible at this time.
- Construct the shared use path in areas that do not impact the existing path.

Stage II:

- Install advanced warning construction signs and traffic control devices in accordance with the 2011 Virginia Work Area Protection Manual to allow for the traffic switch onto the newly constructed northbound I-581 deceleration lane and outside lane of the northbound I-581 off-ramp (Ramp Y) including the temporary pavement area.
- Shift the northbound I-581 off-ramp traffic onto the new one lane off-ramp widening and temporary ramp connector to eastbound Valley View Boulevard.
- Utilizing temporary concrete barrier, complete the northbound I-581 off-ramp (Ramp Y) in areas that do not impact the newly shifted traffic.
- At the same time, extend the existing northbound I-581 outside lane closure through the location where the old northbound I-581 off-ramp tied-in and up to northbound I-581 station 217+00. Complete the outside shoulder widening in its entirety up to station 217+00 including the removal and replacement of 1' of the existing travel lane as required by Part 2, Section 2.8.2 of the RFP.
- Install advanced warning construction signs and traffic control devices in accordance with the 2011 Virginia Work Area Protection Manual to allow for the traffic switch onto the temporary asphalt pavement widening for the southbound I-581 on-ramp (Ramp Z) as well as for the lane closure on southbound I-581 from stations 213+00 to 236+00. Close the southbound I-581 outside travel lane from stations 213+00 to 236+00 and utilize temporary concrete barrier from stations 220+00 to 236+00 to allow for shoulder widening. Sound Barrier Wall construction can begin at this time also and can continue up the southbound I-581 side to station 267+50.
- Shift the southbound I-581 on-ramp traffic onto the inside westbound Valley View Boulevard lane and onto the south side of the bridge and temporary ramp. Install temporary barrier service parallel to the outside of the newly shifted travel lane and shift the shared use path users to a location behind the barrier service. Use part of the closed southbound I-581 outside travel lane to allow traffic to merge.
- Complete the proposed southbound I-581 acceleration lane and the outside shoulder widening on southbound I-581 in its entirety from stations 220+00 to station 236+00 including the removal and replacement of 1' of the existing travel lane as required by Part 2, Section 2.8.2 of the RFP.
- Construct temporary shared use path.

Stage IIA:

- Install advanced warning construction signs and traffic control devices in accordance with the 2011 Virginia Work Area Protection Manual to allow for the traffic shift of the northbound I-581 off-ramp traffic (Ramp Y) onto the new off-ramp from stations 19+00 to the intersection of Valley View Boulevard.
- Shift the northbound I-581 off-ramp traffic onto the new off-ramp starting at station 19+00 and keep them in the left travel lane.
- Demolish the temporary ramp connector and the rest of the existing northbound off-ramp while traffic stays in the left lane. Complete the remaining I-581 off-ramp (Ramp Y) from stations 22+75 to the intersection of Valley View Boulevard.



- Install advanced warning construction signs and utilize Group II traffic control devices in accordance with the 2011 Virginia Work Area Protection Manual to reduce the eastbound Valley View Boulevard traffic to one lane and complete the outside lane from stations 330+30 to 339+36.

Stage III:

- Begin construction of the North side of the Valley View Boulevard bridge and westbound approaches, including any remainder of the shared use path and the NB I-581 on-ramp terminal stub outside of current traffic patterns.
- Install advanced warning construction signs and utilize Group II traffic control devices in accordance with the 2011 Virginia Work Area Protection Manual to reduce the westbound Valley View Boulevard traffic to one lane, shifting traffic to the inside, and move the current transition onto the Valley View Boulevard bridge to the West beginning at station 330+75 and ending at station 332+25. Maintain shared use path access at all times and protect pedestrians from construction. Complete the Valley View Boulevard westbound outside lane and shared use path from station 339+36 back to the westbound bridge approach.
- While maintaining existing traffic patterns for vehicles and shared use path users, construct Valley View Boulevard West of the Valley View Boulevard bridge from station 326+00 back to station 322+94. Maintain access for shared use path users at all times.
- Shift shared use path users onto finished path.
- Demolish the remaining portions of the temporary and existing shared use path that are no longer needed and construct the I-581 on-ramp (Ramp Z) outside of the existing traffic pattern from station 10+00 to station 22+00 where it ties in to the new I-581 southbound acceleration lane.

Stage IV:

- Install advanced warning construction signs and traffic control devices in accordance with the 2011 Virginia Work Area Protection Manual to allow for the westbound Valley View Boulevard, southbound I-581 on-ramp traffic, and the shared use path users to shift onto the completed outside portions of the roadway including the bridge.
- Construct the center median on the bridge and any remaining portions of Valley View Boulevard west of the bridge.
- Utilizing Group II traffic control devices, construct the median and inside lanes of Valley View Boulevard from stations 329+80 to 339+36. Demolish the asphalt that was used for the temporary widening on the southbound I-581 on-ramp as well as the remaining original southbound I-581 on-ramp.
- Construct the proposed southbound I-581 off-ramp (Ramp W) and tie into the shoulder widening previously done on southbound I-581 at station 213+00 and any remaining portions of SB I-581 on-ramp (Ramp Z) that were left out for construction access.
- Utilizing temporary concrete barrier, close the outside travel lane of northbound I-581 from station 206+00 down to station 166+50. The temporary concrete barrier will be installed in accordance with the 2011 Virginia Work Area Protection Manual including warning signs, electronic arrows, and proper tapers. Construct the northbound I-581 on-ramp (Ramp X) from the stub out at Valley View Boulevard down to station 27+59 where it ties in to I-581.
- Construct the shoulder widening along I-581 northbound from station 205+25 down to station 166+50 in its entirety including the removal and replacement of 1' of the existing travel lane as required by Part 2, Section 2.8.2 of the RFP.
- ~~Utilizing temporary concrete barrier, close the outside travel lane of southbound I-581 from station 163+00 up to station 213+00. The temporary concrete barrier will be installed in accordance with the 2011 Virginia Work Area Protection Manual including warning signs, electronic arrows, and proper tapers. Construct the shoulder widening along I-581 southbound from station 163+00 up to station 213+00 in its entirety including the removal and replacement of 1' of the existing travel lane as required by Part 2, Section 2.8.2 of the RFP. Tie into the widening and I-581 southbound off-ramp work previously completed.~~



Stage V:

- Maintain the existing traffic patterns for vehicles and shared use path users from Stage IV.
- Perform final paving, guardrail installation, striping, and signage on Valley View Boulevard, Ramps W, X, Y, and Z.
- As final striping and signage is completed, place traffic in its proposed permanent location. Remove all remaining temporary traffic control devices and signage in accordance with the 2011 Virginia Work Area Protection Manual.

Considerations used in sequence development: The phased construction approach, as presented, highlights the major construction sequencing activities necessary to complete the I-581/Valley View Boulevard project in a timely, productive, and safe manner. Alternate routes or detours should not be required. The phased construction in conjunction with specific lane closures will allow traffic to flow at all times (except specific traffic flagging activities described below in the Transportation Management Plan). The phased construction will greatly limit the disruptions to vehicular and pedestrian traffic through the work area as well as allow adjacent public transportation facilities and roadways to remain unaffected due to the fact that no detours or closures will be implemented. A list of specific traffic control considerations and devices and their role in the sequence of construction is as follows:

- Traffic Signals – The construction sequence will utilize the existing signal on the project with minor adjustments during phases. Temporary signals will be used if needed for the intersection of Valley View Boulevard with the northbound and southbound I-581 ramps.
- Utility Requirements – The impact to the existing utilities has also been taken into account for the sequencing and no major interruptions in service will be anticipated. All electrical, sanitary sewer, and waterline work can be done outside of traffic with very minimal interruptions for crossings.
- Signs – Signs will be a vital tool in the execution of our construction sequence. Current signs as well as temporary signs will be utilized to inform, warn, and direct the public. A complete inventory will be made of existing signs prior to any demolition or relocation. Line of sight and sight distance will be considered for the placement of all signs on the project. A number of signs on the project belong to the City of Roanoke and Virginia Logos Inc. and special care will be given to those for reuse or salvage. The Key/JMT Team will coordinate all sign related activity with the VDOT Integrated Directional Sign Program (IDSP) Manager and the City Transportation Division.
- Guardrail – Guardrail will be widely used throughout the construction process and it plays a large role in the sequencing by providing adequate protection where the clear zone is encroached upon. All guardrail will be designed and installed in accordance with NCHRP 350 or the AASHTO Manual for Assessing Safety Hardware, First Edition. All existing substandard guardrail on the project will be upgraded to meet current standards in accordance with the latest VDOT Location and Design Instructional and Informational Memorandum 220.3 for replacement and/or upgrade of guardrail. The limits of guardrail will be coordinated with VDOT prior to installation.
- Pavement Markings/Markers – Pavement markings will be a critical part of the construction sequencing and will play a vital role in directing the traffic through each individual phase. All pavement markings will be in accordance with the VDOT Traffic Engineering Design Manual dated 2011. The use of temporary pavement markings and markers will follow the MUTCD standards and will be coordinated with VDOT prior to placement.
- Temporary Concrete Barrier – Temporary concrete barrier will be used in a number of phases to protect the public as well as workers. The use of temporary concrete barrier will allow work to progress in a much safer environment and will also increase productivity by allowing construction practices that would normally be limited due to safety concerns and requirements when interfacing directly with traffic. All barrier applications will follow the MUTCD standards with proper tapers, clearances, and end treatments.

Safety and Operations: Public safety played an integral part in the development of the Sequence of Construction and was the major factor in how the Key/JMT Team approached the project. The shoulder widening along I-581 involves a significant amount of work directly adjacent to the travel lanes which presents safety challenges for the traveling public and construction personnel. There are a number of parameters that must be taken into account when considering the safest and most productive means to accomplish the work. In order to protect the traveling



public and the workers, the Key/JMT Team determined that the safest way to perform this work was behind concrete barrier. Closing the outside lane and performing all of the work necessary at one time eliminates many of the dangers associated with this work. This allows all of the shoulder widening as well as removal and replacement of the additional 1’ of travel lane to be constructed behind concrete barrier in its entirety and eliminates the risk of working directly against an active lane of traffic without adequate protection. It also allows for the work to be done quickly which will decrease the exposure of the public to the distractions and dangers that come along with road construction in general as well as serving to expedite the project schedule

Safe Construction Zone: During construction, Key will incorporate measures to assure that the safest, least disruptive, and most productive construction zone will be afforded to the travelling public and construction personnel. Such measures include:

- All work will be performed in accordance with the 2011 Work Area Protection Manual.
- All necessary traffic control devices will be installed prior to the start of **any** construction; and will be monitored and maintained continuously throughout the life of the project.
- Variable message boards will be utilized as necessary to inform the public in advance of planned activities, e.g. traffic pattern changes, lane closures, pipe crossing installations, dates of informational meetings, etc. A more informed knowledgeable public creates a safer environment.
- Key’s corporate safety director will regularly, at least twice a month, visit the project to encourage and assure that safe practices are being followed. He will report any deficiencies to the onsite superintendent and jobsite safety director; and he will have the authority to stop work until such deficiencies are corrected if he deems it necessary.
- Key will divide the project into phases and smaller work segments within these phases. Smaller work zones inherently create a higher level of safety because they are less distractive, disruptive, and confusing to the public.

Right-of-Way Acquisition: The procurement of needed right of way parcels for construction and utility relocation are a vital, yet time consuming processes that **must preclude precede** “actual” construction and will begin as soon as practical following the Notice to Proceed. To assist in the mitigation of the time risk factor while these activities are being completed throughout the project, the Key/JMT team used the proposed five stages Sequence of Construction (SOC) provided in the RFP plans and then modified it to maximize productivity and minimize impacts to the public. The modifications will allow for construction in areas that require no right of way or parcel acquisition for construction or utility relocations to start first. This allows for construction in one area to occur simultaneously while right of way acquisition, permit procurement, utility relocations, etc. are ongoing in other areas.

Access Management: One of the main uses of Valley View Boulevard is to provide access to local businesses. The Key/JMT Team recognizes that it is crucial to provide private and business property owners, their patrons, and pedestrians, maximum usage and minimum disruption during construction. Our construction sequence was developed with this in mind and the following are ways in which the Key/JMT Team intends to achieve this goal:

- Erect signs to identify ingress and egress locations to the businesses where applicable.
- Provide sufficient markings to direct the pedestrians using the shared use path through the construction zone.
- Develop and execute a phased and segmented construction process that expedites construction and thus shortens durations of affected areas, as described elsewhere in this section.
- Minimize areas where construction traffic and the traveling public will interact by strategic placement of construction access locations.
- Perform construction at business entrances and walkways in stages to allow access at all times in any direction.

Public Involvement and Communication: The key to successful public outreach and communication plan is bridging the gap between those who design, construct, and implement transportation solutions and the people who will live with the temporary impacts that typically occur each day of the construction project. The



Key/JMT Team is fully aware that public involvement and communication is vital when considering any construction sequencing plan. A construction sequencing plan will only work if all entities involved are made aware of what is currently taking place as well as what to expect in the future. The only way to make the public aware is through involvement and communication. Notifying them of expected traffic changes and familiarizing them with the overall project will allow this awareness to become a reality. The tools that will be used to create this awareness are discussed below in the Transportation Management Plan section.

Staging and Storage: As with any large construction project, an area sufficient for staging and storage is vital to productivity. The phased construction sequence provides an advantage when considering material and equipment storage and handling. Material deliveries will be scheduled after the proper traffic shifts have been implemented for each phase. This will eliminate the need to disrupt traffic while attempting to off-load equipment or materials by providing enough area outside of the current traffic pattern to allow for these operations to take place. There will also be a need for a more permanent staging area for the duration of the project. The close proximity to businesses and available commercial properties will provide an adequate source for a staging area that will not impact the traveling public or the retail businesses directly adjacent to the project.

Geotechnical Constraints: The main geotechnical constraint that could be encountered on the project is settlement of the existing fill on the southbound I-581 on-ramp. This area will require a substantial amount of fill to be placed on top of it and settlement could be an issue. The Key/JMT Team is aware of this potential issue and has taken this into account in the sequence of construction. Proper fill material will have to be used to promote slope stability and scheduling the work early in the project will minimize the potential impact.

QA/QC Reviews: The Key/JMT Team is made up of members that are very familiar with the current VDOT QA/QC requirements. Their experience level with standard VDOT projects, as well as Design-Build projects, allows the QA/QC reviews to be something that can be integrated into the sequence of construction with confidence. All team members are aware of what is required of them and the amount of time that needs to be designated for each activity.

Section 4.5.2 Transportation Management Plan

The Key/JMT Team will develop a Transportation Management Plan (TMP) that maintains traffic through all phases of construction. The TMP will detail any proposed lane or ramp closures, temporary detours, time of day restrictions, flagging operations, minimum lane widths and work zone speed reductions required to construct the Project. The TMP will also identify major project stakeholders located near the Project and will discuss how any impacts during construction will be mitigated. A goal of the Key/JMT Team TMP is to communicate and mitigate impacts to the traveling public and major Project stakeholders during construction. The I-581/Valley View Boulevard Interchange Project requires a TMP that meets the criteria for a Type B, Category III project. The Key/JMT Team will develop a thorough and complete TMP in accordance with the requirements of VDOT Location and Design Instructional and Informational Memorandum 241.5 with sufficient detail to avoid unexpected field revisions.

The Key/JMT Team will evaluate the sequence of construction and ensure that conflicts are minimized and efficiency is emphasized. Particular consideration will be given to how the construction sequencing affects the traveling public and emphasis will be placed on minimizing interruptions while maximizing safety and productivity. The Key/JMT TMP will also be developed in conjunction with an effective and coordinated Public Communications Plan. In addition, the TMP will also be integrated with the Project's construction phasing plan and Project schedule. The plan will include descriptions and details of all major traffic shifts, temporary traffic signal modifications, access modifications to businesses or residences, and the effective and safe maintenance of existing pedestrian and bicycle access through the work zones. The duration of each construction phase will also be noted on the plan.

The Key Construction team recognizes the importance of not only improving long-term operations, but also ensuring that motorists and pedestrians are provided a safe means of passing through the work zone during



construction. The proximity of the Shared Use Path throughout the Valley View Boulevard corridor provides a safety challenge. Our designers will continue to refine the temporary traffic control concept to provide an optimal balance between work zone safety and motorist/pedestrian/bicycle accessibility through each stage of construction. Traffic operations will be monitored during construction by our on-site traffic management person and the Team will quickly respond to any issues to improve any operational concerns.

A Transportation Management Plan (TMP) will be developed for the project including three main components – a Temporary Traffic Control Plan, a Public Communications Plan, and a Transportation Operations Plan – as described below.

Temporary Traffic Control Plan

The Key/JMT Team’s approach to developing the TMP includes getting input from all shareholders early in the design process to ensure that all concerns are addressed in the development of the TMP. The goal of the TMP is to minimize disruptions to existing traffic patterns and to complete the construction as safely and quickly as possible. We will ensure that access is provided to all local residences, facilities and businesses, and pedestrians in the area during all phases of construction.

Special emphasis will be placed on one of the more challenging aspects of the project which is the construction of a shared use path that runs the entire length of Valley View Boulevard. Access to the path will be maintained at all times during construction and safety will be the number one priority. The Key/JMT Team will develop a TMP that takes into consideration the pedestrian traffic and potential safety issues that come along with having an “unpredictable human element” introduced directly into the work zone. Standard construction practices will be amended and current thought processes will be directed towards ensuring public safety while still maintaining a high level of quality and productivity.

The Key/JMT Team’s approach to maintain traffic through work zones is to minimize disruptions to existing traffic patterns while completing the construction as expeditiously as possible. Normally, these two goals are generally in conflict with each other. The Team is proposing phased construction that best balances these two interests. Any necessary lane and shoulder closures on roadways within the project limits will be in accordance with Part 2, Section 2.11 Transportation Management Plan of the RFP including all Addendums. Complying with these requirements will ensure that access to vehicular, pedestrian and bicyclist traffic will be maintained through the construction limits and to local residences, facilities, businesses, etc. throughout construction, which is critical in this **urban environment**.

The construction sequencing should not require any detours or road closures for this project. As mentioned above in Section 4.5.1 Sequence of Construction, the TMP will be effectively executed by the use of phased construction and will minimize the overall impact to the public. The phased construction allows traffic to continue in its normal pattern by the use of traffic shifts and lane closures. The project design allows enough room to work in specific areas while maintaining at least one lane of traffic in each direction. Specifically, Valley View Boulevard will be reduced to single lane traffic in each direction and I-581 will be reduced to two lanes in each direction for specific phases. The use of lane closures will be the most effective tool we have to promote safety to our employees, inspection staff, and the public while also increasing productivity and decreasing the overall time impact to the traveling public.

Major components of the Temporary Traffic Control Plan will consist of General Notes, Detail Plans, Typical Sections, Special Details, Cross Sections, and Profiles and will provide information per construction phase. A Temporary Traffic Control Plan will be developed containing the following information presented in a narrative format and detailed plan format with illustrations and sketches as necessary.

- General Notes which:
 - Identify the project’s TMP Type
 - Identify the work zone location.



- Identify the length and width of the work zone.
- Identify the lanes affected by the project work.
- Note the hours the work zone will be active.
- Identify potential locations, within the R/W, for construction equipment and material storage.
- Define the proposed traffic control by referencing the specific Typical Traffic Control Standards listed in Virginia’s Work Area Protection Manual and by referencing Special Details.
- Note any entrances, intersections or pedestrian access points that will be affected by the work zone or by the traffic control devices.
- Identify the major types of travelers such as truckers, commuters, residents, etc.
- Detail Plans which:
 - Identify the project’s TMP Type
 - Narrative describing the sequence of construction
 - Type and location of all temporary signs for the work zone and all detour routes
 - Type and location of all temporary pavement markings
 - Type and location of all temporary pavement
 - Type and location of all temporary barriers
 - Type and location of all impact attenuator/end treatments/Fixed-Object-Attachments (FOA)
 - Locations of safe access into and out of the work space by work vehicles.
 - Document and detail how all entrances, intersections or pedestrian access points and routes that will be affected by the work zone or by the traffic control devices will be maintained or by providing acceptable alternate routes.
 - Identify all roads to be used as a detour route.
 - Provide notes regarding all traffic control changes such as temporary signals or signal timing changes required within the work zone or the detour route.
- Typical Sections which:
 - Illustrate lane configurations in the work zone.
- Special Details which:
 - Show schematically the placement of all traffic control devices and locations of safe access into and out of the work space by work vehicles.
 - Place all traffic control devices in accordance with the standards contained in Virginia’s Work Area Protection Manual and the Manual on Uniform Traffic Control Devices. Detail for any traffic control device not illustrated in the Virginia Work Area Protection Manual will be included in the plan.
 - Follow symbol conventions for identifying traffic control devices per Virginia’s Work Area Protection Manual and the Manual on Uniform Traffic Control Devices.
 - Show all details, dimensions and explanatory notes required to execute the traffic control plan.

Proper execution of the Temporary Traffic Control Plan requires that qualified and knowledgeable field personnel are responsible for implementing the plan. Key will provide dedicated traffic control crews for this project. These crews will be fully staffed and equipped with all the necessary equipment and supplies to maintain the highest level of performance and safety of the implemented temporary traffic control plans. All proposed personnel are experienced and have received the necessary training and certifications such as the Advanced Work Zone Training Course. Provisions will be made for on-call personnel that will respond to traffic related issues during holiday periods and/or non-working hours. The Temporary Traffic Control Manager will have the following roles:

- Coordinate temporary traffic control activities with VDOT and the City of Roanoke.
- Coordinate with local emergency responders prior to initiating sequence of construction phases.
- Implement traffic management strategies.
- Provide updates to VDOT and the City of Roanoke with each change in traffic phasing, including expected queue lengths and delays, a summary of expected operations, and construction phase durations.
- Be continuously available during construction until Final Completion of the Project and removal of all temporary traffic control devices.



VDOT certified traffic flaggers will be utilized during instances where work will directly impact the current traffic flow such as pipe crossings, asphalt paving operations, traffic signal modifications, and pavement marking applications. Flaggers may also be used in instances where material deliveries require off-loading at a specific location where space is limited. As discussed above, the use of phased construction will greatly minimize the need for traffic flaggers and therefore minimize the impact to the traveling public.

Public Communications Plan

Public communication and involvement is another key component of the TMP. The Key/JMT Team will specify strategies for both public awareness and motorist information strategies. This will include defining a notification process to notify appropriate VDOT personnel of work plans and both scheduled and unscheduled traffic delays, as well as to notify public safety, emergency response, and mass transit organizations of detour routes and available alternate routes through the duration of construction. Motorist information strategies will include fixed and variable message signing, as well as a public awareness campaign.

Clear communication between Key, JMT, subcontractors and suppliers, VDOT, City of Roanoke and affected neighbors is vital to the success of the TMP as well as the overall project. The construction schedule is a tool for Key to communicate the construction plan to its own Team and to shareholders. The schedule will identify timelines for each work package (with accompanying MOT phasing) that will be monitored for adherence to the phases of construction identified in the TMP. This information will be essential to the execution of the Public Communication Plan and the Transportation Operations Plan for advance notification to shareholders and the public of upcoming traffic pattern changes.

The most important element of an effective communication effort is to first identify the **project stakeholders** and to support VDOT by helping maintain trust and integrity during the entire construction process. The Key/JMT Team, in coordination with VDOT, will develop and maintain a complete list of project stakeholders and appropriately inform them of stakeholder meetings. If requested, individual meetings can be held with stakeholders to address concerns and answer questions. VDOT will have the opportunity to review the stakeholder list and make additions or deletions as they feel necessary. The project stakeholders list will include:

- Traveling public
- City of Roanoke
- VDOT
- Other contractors with project corridor
- Local Media – newspaper, TV, radio
- Valley View Mall retail businesses
- Major employers and business owners
- Chamber of Commerce
- Emergency service providers
- Local law enforcement agencies
- Local schools
- Utility companies
- Roanoke Regional Airport
- Valley View Metro and other transit companies
- Surrounding county Governments
- Pedestrian and bike groups

The Key/JMT Team proposes to use a combination of several communication methods promote public involvement and communication and to keep the public informed of project status, upcoming traffic shifts, and alternate routes as construction progresses including the following:

- **Public Meetings.** The Team will coordinate with VDOT to prepare and conduct an **introductory public meeting** for the purpose of familiarizing project stakeholders with the project objectives, key players, and the construction schedule. If necessary, additional public meetings may be scheduled with a more limited number of stakeholders to focus on a limited number of follow-up actions. Additionally, the Design Build Team will also offer to meet individually with any appropriate grouping of the stakeholders identified above as either a standalone meeting or as part of existing meetings scheduled by community or business organizations. This allows the intended message to be specifically tailored for the audience, provides better opportunities for one-on-one interaction, and promotes open communication between the Team and the stakeholders.



Prior to each meeting with external stakeholders, the Key/JMT Team will prepare and review all information that will be presented or released with VDOT personnel to secure approval of public information releases by the VDOT Salem District Public Affairs Office. As each meeting is conducted, the Team will inform meeting participants of additional communication methods and update the project stakeholder list with the following information: stakeholder name, role in the project, phone numbers, email address, mailing address and desired communication preferences. Feedback will be valued by VDOT and the Key/JMT Team. If VDOT determines that scope changes are warranted to resolve public concerns via this project, the Team will partner with VDOT to negotiate resolution through the change control process.

- **E-bulletins.** Emails will be sent to those stakeholders that indicate interest in being kept informed via email of project status updates, upcoming lane and shoulder closures, upcoming changes in traffic patterns, and alternate routes to avoid the project. We expect this to be an effective means of communication for the local media, emergency responders, and government agencies. We will encourage area employers and the Chamber of Commerce to provide single points of contacts, so that they may then distribute information to their employees, clients and business members as they deem appropriate.
- **Newspaper Advertisements.** Full and half page newspaper advertisements with project information are anticipated to be a very effective means of communicating information to commuters from the Roanoke area and in the surrounding counties. We will work to establish this relationship with the media very early and maintain this relationship throughout the entire design and construction process.
- **Project Website.** In conjunction with VDOT, a project website will be developed to allow project stakeholders to periodically visit to be kept informed of project schedule, project status updates, upcoming lane and shoulder closures, upcoming traffic patterns, and alternate routes. The website will also provide the appropriate contact information for project inquiries and comments. This means of communication is particularly accessible to the greatest cross-section of stakeholders, and will be particularly more effective as a means of communicating information to motorists that are traveling from outside of the Roanoke Valley area through the project corridor. The website information can be communicated to the public via meetings, e-bulletins, VDOT website links, and signage. Other real time information sites such as Twitter, Facebook, and YouTube will also be low-cost alternative methods that will be considered to exchange information between a project team and the public.
- **Weekly Updates.** Our team will provide to VDOT Salem District Public Affairs Office and the City of Roanoke a weekly update regarding the project including status, scheduled meetings, and other pertinent project information in a format suitable for placement on the VDOT website.
- **Correspondence.** Communications specific to a single representative of a stakeholder may more effectively be performed through a separate email or letter. The Team will prepare correspondence for the appropriate VDOT Project Manager for their signature and distribution unless requested otherwise. Emails may be used as an alternative contact method for emergencies when appropriate parties cannot be reached by phone.
- **Phone Calls.** Phone calls will be the primary method of communication in emergencies. In addition to phone calls, conference calls and video conference “GOTO Meetings” may also be an effective means of communicating with stakeholders when time is of the essence and meeting participants are unable to meet in one single location. The Key/JMT Team will maintain an emergency contact list of project personnel and will include with the Incident Management Plan described below.



A Public Communications Plan is required for roadways when traffic volumes exceed the minimum number of vehicles/hour/lane or delay times established by the Regional Traffic Engineer for lane closure periods. The Public Communications Plan will provide the following information in a narrative format:

- A process to notify the VDOT Project Manager and Residency Administrator of scheduled work plans and traffic delays.
- A process to notify the VOT Project Manager, Residency Administrator, Regional Operations Manager, and the Public Affairs staff of any unscheduled traffic delays.
- A process for notifying Public Safety, Emergency Management and mass transit organizations of detour routes and available alternate routes during construction.

Transportation Operations Plan

A Transportation Operations Plan is recommended for roadways when the work zone is greater than ½ mile in length or with reduced-width travel lanes. The Transportation Operations Plan will provide the following information presented in a narrative format:

- A process to notify the Regional Transportation Operations Center (TOC) to place lane closure information on the 511 system and VA-Traffic.
- A contact list of local emergency response agencies.
- Procedures to respond to traffic incidents that may occur in the work zone including:
 - 24/7 point of contact for emergency notification of incident by TOC.
 - Coordination with local agencies and other contractors performing work within the I-581/U.S. Route 220 corridor.
 - Equipment to be utilized in the event a detour is necessary.
 - Pre-staged detour equipment and materials needed.
 - Coordination with VDOT Salem District Maintenance Section.
 - Signage of detour routes.
 - Safety Service Patrol (SSP) route and responsibilities.
 - Coordination with Virginia State Police (VSP) and Roanoke City Police Department (RCPD).
- A process to notify the VDOT Project Maintenance of Traffic Coordinator, Project Manager, Resident Administrator, District Work Zone Safety Coordinator, Regional Traffic Engineer, Regional Operations Manager, and Public Affairs Manager of any incidents and expected traffic delays.
- Procedures to clear the incident and restore normal project traffic operations.
- Details of the process to review incidents for the purpose of modifying the Temporary Traffic Control Plan to reduce the frequency and severity of such incidents.



Section 4.7
**Disadvantaged Business
Enterprise**



Key Construction Company, Inc.





Section 4.7 Disadvantaged Business Enterprises (“DBE”)

Key Construction Company, Inc. (Key) formally commits to achieving VDOT’s sixteen percent (16%) Disadvantaged Business Enterprise (DBE) participation goal during design and construction of the I-581/Valley View Interchange Phase II Project.

DBE Subcontracting Plan

Key’s commitment to engage DBE firms on all of our projects has been a standard policy for thirty plus years. The firm actively sponsors several DBE firms in both formal and informal mentor/protégé programs, providing coaching to develop the management and technical skills required to take on and successfully complete even greater levels of project responsibility. We seek out promising DBE firms and assign them meaningful, challenging work that stretches their current capabilities, but prepares them for continued growth in their business area. The established contracting processes and subcontractor databases used by Key will allow VDOT to benefit from this record of success.

Key Construction Company, Inc. will employ practical methods in this plan of identifying potential sources for solicitation purposes. These methods include, but are not limited to:

1. Use the VDOT DBE vendor tools located on the VDOT website to search for qualified Virginia DBEs.
2. Submit inquiries to local Virginia DBE contacts, chambers of commerce, and professional organizations.
3. Use VDOT’s Business Opportunity and Workforce Development Center to identify DBE firms.
4. Engage DBE firms previously used with high quality workmanship and reliability characteristics.

Embracing the spirit of the DBE program policy, Key will draw heavily upon the firm’s existing programs to adopt a comprehensive policy on DBE subcontracting and document it in our procurement policies and procedures.

Key Construction Company, Inc. will ensure compliance by structuring subcontracts to allow the largest number of qualified DBE firms to compete. Key has worked diligently in the past to build strong DBE subcontracting relationships and will continue this policy on the I-581/Valley View Interchange Phase II Project. Key will be taking competitive quotes from multiple DBE firms and each potential DBE subcontractor will be afforded every opportunity to participate with our firm to construct this project.



Appendix



Key Construction Company, Inc.





Attachment 4.0.1.1
**Technical Proposal
Checklist and Contents**

ATTACHMENT 4.0.1.1
I-581/Valley View Boulevard Interchange Phase II
TECHNICAL PROPOSAL CHECKLIST AND CONTENTS

Offerors shall furnish a copy of this Technical Proposal Checklist, including page references, with the Technical Proposal.

Technical Proposal Component	Form (if any)	RFP Part 1 Cross Reference	Included within page limit?	Technical Proposal Page Reference
Technical Proposal Checklist and Contents	Attachment 4.0.1.1	Section 4.0.1.1	no	Appendix Tab
Acknowledgement of RFP, Revisions, and/or Addenda	Attachment 3.6 (Form C-78-RFP)	Sections 3.6, 4.0.1.1	no	Appendix Tab
Letter of Submittal	NA	Sections 4.1		1-2
Letter of Submittal on Offeror's letterhead	NA	Section 4.1.1	yes	1
Offeror's official representative information	NA	Section 4.1.1	yes	1
Authorized representative's original signature	NA	Section 4.1.1	yes	1-2
Declaration of intent	NA	Section 4.1.2	yes	1
120 day declaration	NA	Section 4.1.3	yes	42
Principal Officer information	NA	Section 4.1.4	yes	2
Proposal Payment Agreement or Waiver of Proposal Payment	Attachment 9.3.1 or 9.3.2	Section 4.1.5	no	2/Appendix Tab
Offeror's Qualifications	NA	Section 4.2		3-4
Confirmation that the information provided in the SOQ submittal remains true and accurate or indicates that any requested changes were previously approved by VDOT	NA	Section 4.2.1	yes	3
Organizational chart with any updates since the SOQ	NA	Section 4.2.2	yes	3-4

ATTACHMENT 4.0.1.1

I-581/Valley View Boulevard Interchange Phase II

TECHNICAL PROPOSAL CHECKLIST AND CONTENTS

Technical Proposal Component	Form (if any)	RFP Part 1 Cross Reference	Included within page limit?	Technical Proposal Page Reference
submittal clearly identified				
Revised narrative when organizational chart includes updates since the SOQ submittal	NA	Section 4.2.2	yes	3
Design Concept	NA	Section 4.3		5-18
Conceptual Roadway Plans and description	NA	Section 4.3.1	yes	5-15
Conceptual Structural Plans, description, and renderings	NA	Section 4.3.2	yes	15-18
Project Approach	NA	Section 4.4		19-34
Environmental Management	NA	Section 4.4.1	yes	19-21
Utilities	NA	Section 4.4.2	yes	21-25
Geotechnical	NA	Section 4.4.3	yes	25-29
Quality Assurance/ Quality Control (QA/QC)	NA	Section 4.4.4	yes	29-34
Construction of Project	NA	Section 4.5		35-45
Sequence of Construction	NA	Section 4.5.1	yes	35-40
Transportation Management Plan	NA	Section 4.5.2	yes	40-45
Proposal Schedule	NA	Section 4.6		
Proposal Schedule	NA	Section 4.6.1	no	Appendix

ATTACHMENT 4.0.1.1

I-581/Valley View Boulevard Interchange Phase II

TECHNICAL PROPOSAL CHECKLIST AND CONTENTS

Technical Proposal Component	Form (if any)	RFP Part 1 Cross Reference	Included within page limit?	Technical Proposal Page Reference
				Tab
Proposal Schedule Narrative	NA	Section 4.6.2	no	Appendix Tab
Proposal Schedule in electronic format (CD-ROM)	NA	Section 4.6	no	
Disadvantaged Business Enterprises (DBE)	NA	Section 4.7		46
Written statement of percent DBE participation	NA	Section 4.7	yes	46
DBE subcontracting narrative	NA	Section 4.7	yes	46



Attachment 3.6
Form C-78-RFP
Acknowledgement of RFP,
Revisions, and/or Addenda

ATTACHMENT 3.6

(Date Issued: September 14, 2012)

**COMMONWEALTH OF VIRGINIA
DEPARTMENT OF TRANSPORTATION**

RFQ NO. C00016595DB45
 PROJECT NO.: 0581-128-109, P101, RW201, C501, B627

ACKNOWLEDGEMENT OF RFP, REVISION AND/OR ADDENDA

Acknowledgement shall be made of receipt of the Request for Proposals (RFP) and/or any and all revisions and/or addenda pertaining to the above designated project which are issued by the Department prior to the Letter of Submittal submission date shown herein. Failure to include this acknowledgement in the Letter of Submittal may result in the rejection of your proposal.

By signing this Attachment 3.6, the Offeror acknowledges receipt of the RFP and/or following revisions and/or addenda to the RFP for the above designated project which were issued under cover letter(s) of the date(s) shown hereon:

1. Cover letter of March 2, 2012 - RFP
2. Cover letter of June 21, 2012 - Addendum No. 1
3. Cover letter of July 10, 2012 – Addendum No. 2
4. Cover letter of Sept. 5, 2012 – Changes to RFP Requirements (Letter)
5. Cover letter of Sept. 13, 2012 – Interim Milestone (Letter)



 SIGNATURE

September 20, 2012

 DATE

David W. Lyle, President

 PRINTED NAME AND TITLE



Attachment 9.3.1
**Proposal Payment
Agreement**

ATTACHMENT 9.3.1
PROPOSAL PAYMENT AGREEMENT

THIS PROPOSAL PAYMENT AGREEMENT (this "Agreement") is made and entered into as of this 20th day of September, 2012 by and between the Virginia Department of Transportation ("VDOT"), and Key Construction Co., Inc. ("Offeror").

WITNESSETH:

WHEREAS, Offeror is one of the entities who submitted Statements of Qualifications ("SOQs") pursuant to VDOT's **October 11, 2011** Request for Qualifications ("RFQ") and was invited to submit proposals in response to a Request for Proposals ("RFP") for the **I-581/Valley View Boulevard Interchange Phase II, Project No. 0581-128-109, P101, RW201, C501, B627** ("Project"), under a design-build contract with VDOT ("Design-Build Contract"); and

WHEREAS, as part of the procurement process for the Project, Offeror has already provided and/or furnished to VDOT, and may continue to provide and/or furnish to VDOT, certain intellectual property, materials, information and ideas, including, but not limited to, such matters that are: (a) conveyed verbally and in writing during proprietary meetings or interviews; and (b) contained in, related to or associated with Offeror's proposal, including, but not limited to, written correspondence, designs, drawings, plans, exhibits, photographs, reports, printed material, tapes, electronic disks, or other graphic and visual aids (collectively "Offeror's Intellectual Property"); and

WHEREAS, VDOT is willing to provide a payment to Offeror, subject to the express conditions stated in this Agreement, to obtain certain rights in Offeror's Intellectual Property, provided that Offeror submits a proposal that VDOT determines to be responsive to the RFP ("Offeror's Proposal"), and either (a) Offeror is not awarded the Design-Build Contract; or (b) VDOT cancels the procurement or decides not to award the Design-Build Contract to any Offeror; and

WHEREAS, Offeror wishes to receive the payment offered by VDOT, in exchange for granting VDOT the rights set forth in this Agreement.

NOW, THEREFORE, in consideration of the mutual covenants and agreements set forth in this Agreement and other good and valuable consideration, the receipt and adequacy of which are acknowledged by the parties, the parties agree as follows:

1. **VDOT's Rights in Offeror's Intellectual Property.** Offeror hereby conveys to VDOT all rights, title and interest, free and clear of all liens, claims and encumbrances, in Offeror's Intellectual Property, which includes, without restriction or limitation, the right of VDOT, and anyone contracting with VDOT, to incorporate any ideas or information from Offeror's Intellectual Property into: (a) the Design-Build Contract and the Project; (b) any other contract awarded in reference to the Project; or (c) any subsequent procurement by VDOT. In receiving all rights, title and interest in Offeror's Intellectual Property, VDOT is deemed to own all intellectual property rights, copyrights, patents, trade secrets, trademarks, and service marks in Offeror's Intellectual Property, and Offeror agrees that it shall, at the request of VDOT, execute all papers and perform all other acts that may be necessary to ensure that VDOT's rights, title and interest in Offeror's Intellectual Property are protected. The rights conferred herein to VDOT include, without limitation, VDOT's ability to use Offeror's Intellectual Property without the obligation to notify or seek permission from Offeror.

2. **Exclusions from Offeror's Intellectual Property.** Notwithstanding Section 1 above, it is understood and agreed that Offeror's Intellectual Property is not intended to include, and Offeror does not convey any rights to, the Escrow Proposal Documents submitted by Offeror in accordance with the RFP.

3. **Proposal Payment.** VDOT agrees to pay Offeror the lump sum amount of **Fifty Thousand and 00/100 Dollars (\$50,000.00)** ("Proposal Payment"), which payment constitutes payment in full to Offeror for the conveyance of Offeror's Intellectual Property to VDOT in accordance with this Agreement. Payment of the Proposal Payment is conditioned upon: (a) Offeror's Proposal being, in the sole discretion of VDOT, responsive to the RFP; (b) Offeror complying with all other terms and conditions of this Agreement; and (c) either (i) Offeror is not awarded the Design-Build Contract, or (ii) VDOT cancels the procurement or decides not to award the Design-Build Contract to any Offeror.

4. **Payment Due Date.** Subject to the conditions set forth in this Agreement, VDOT will make payment of the Proposal Payment to the Offeror within forty-five (45) days after the later of: (a) notice from VDOT that it has awarded the Design-Build Contract to another Offeror; or (b) notice from VDOT that the procurement for the Project has been cancelled and that there will be no Contract Award.

5. **Effective Date of this Agreement.** The rights and obligations of VDOT and Offeror under this Agreement, including VDOT's ownership rights in Offeror's Intellectual Property, vests upon the date that Offeror's Proposal is submitted to VDOT. Notwithstanding the above, if Offeror's Proposal is determined by VDOT, in its sole discretion, to be nonresponsive to the RFP, then Offeror is deemed to have waived its right to obtain the Proposal Payment, and VDOT shall have no obligations under this Agreement.

6. **Indemnity.** Subject to the limitation contained below, Offeror shall, at its own expense, indemnify, protect and hold harmless VDOT and its agents, directors, officers, employees, representatives and contractors from all claims, costs, expenses, liabilities, demands, or suits at law or equity (“Claims”) of, by or in favor of or awarded to any third party arising in whole or in part from: (a) the negligence or wilful misconduct of Offeror or any of its agents, officers, employees, representatives or subcontractors; or (b) breach of any of Offeror’s obligations under this Agreement, including its representation and warranty under Section 8 hereof. This indemnity shall not apply with respect to any Claims caused by or resulting from the sole negligence or wilful misconduct of VDOT, or its agents, directors, officers, employees, representatives or contractors.

7. **Assignment.** Offeror shall not assign this Agreement, without VDOT’s prior written consent, which consent may be given or withheld in VDOT’s sole discretion. Any assignment of this Agreement without such consent shall be null and void.

8. **Authority to Enter into this Agreement.** By executing this Agreement, Offeror specifically represents and warrants that it has the authority to convey to VDOT all rights, title, and interest in Offeror’s Intellectual Property, including, but not limited to, those any rights that might have been vested in team members, subcontractors, consultants or anyone else who may have contributed to the development of Offeror’s Intellectual Property, free and clear of all liens, claims and encumbrances.

9. **Miscellaneous.**

a. Offeror and VDOT agree that Offeror, its team members, and their respective employees are not agents of VDOT as a result of this Agreement.

b. Any capitalized term used herein but not otherwise defined shall have the meanings set forth in the RFP.

c. This Agreement, together with the RFP, embodies the entire agreement of the parties with respect to the subject matter hereof. There are no promises, terms, conditions, or obligations other than those contained herein or in the RFP, and this Agreement shall supersede all previous communications, representations, or agreements, either verbal or written, between the parties hereto.

d. It is understood and agreed by the parties hereto that if any part, term, or provision of this Agreement is by the courts held to be illegal or in conflict with any law of the Commonwealth of Virginia, validity of the remaining portions or provisions shall not be affected, and the rights and obligations of the parties shall be construed and enforced as if the Agreement did not contain the particular part, term, or provisions to be invalid.

e. This Agreement shall be governed by and construed in accordance with the laws of the Commonwealth of Virginia.

IN WITNESS WHEREOF, this Agreement has been executed and delivered as of the day and year first above written.

VIRGINIA DEPARTMENT OF TRANSPORTATION

By: _____

Name: _____

Title: _____

[Insert Offeror's Name]

By: Key Construction Co., Inc.

Name: David W. Lyle 

Title: President



Section 4.6.1 **Proposal Schedule**



Schedule

Activity ID	Activity Name	Original Duration	Start	Finish	Total Float	Gantt Chart (N D J F M A M J J A S O N D J F M A M J J A S O N D J F M A M J J A S O N D J F M A M J J A S)																															
I-581 / Valley View Boulevard Interchange Phase II						888	14-Jan-13	01-Jul-16	0	01-Jul-16																											
1	Notice to Proceed	0	14-Jan-13*		0	◆ Notice to Proceed																															
13540	NTP Level of Effort	772	14-Jan-13	30-Oct-15	0	NTP Level of Effort																															
DESIGN ACTIVITIES						380	14-Jan-13	09-Jul-14	346	09-Jul-14, DESIGN ACTIVITIES																											
Preliminary Design						104	14-Jan-13	10-Jun-13	612	10-Jun-13, Preliminary Design																											
Bridge						45	14-Jan-13	15-Mar-13	0	15-Mar-13, Bridge																											
4	Perform Superstructure Design	10	14-Jan-13	25-Jan-13	15	■ Perform Superstructure Design																															
5	Perform Substructure Design	10	28-Jan-13	08-Feb-13	15	■ Perform Substructure Design																															
6	Prepare Preliminary Bridge Plans	10	04-Mar-13	15-Mar-13	0	■ Prepare Preliminary Bridge Plans																															
Roadway						45	14-Jan-13	15-Mar-13	0	15-Mar-13, Roadway																											
8	Establish Horizontal and Vertical Geometry and Typical Sections	10	14-Jan-13	25-Jan-13	15	■ Establish Horizontal and Vertical Geometry and Typical Sections																															
9	Prepare Cross Sections and Establish Limits of Construction	10	28-Jan-13	08-Feb-13	15	■ Prepare Cross Sections and Establish Limits of Construction																															
10	Prepare Preliminary Roadway Plans	10	04-Mar-13	15-Mar-13	0	■ Prepare Preliminary Roadway Plans																															
Retaining Wall						5	11-Feb-13	15-Feb-13	20	15-Feb-13, Retaining Wall																											
12	Prepare Preliminary Retaining Wall Plan	5	11-Feb-13	15-Feb-13	20	■ Prepare Preliminary Retaining Wall Plan																															
Timber Shared Use Path Bridge						5	11-Feb-13	15-Feb-13	20	15-Feb-13, Timber Shared Use Path Bridge																											
14	Prepare Preliminary Timber Shared Use Path Bridge Plan	5	11-Feb-13	15-Feb-13	20	■ Prepare Preliminary Timber Shared Use Path Bridge Plan																															
Environmental						30	14-Jan-13	22-Feb-13	25	22-Feb-13, Environmental																											
16	Perform Environmental Surveys	15	14-Jan-13	01-Feb-13	25	■ Perform Environmental Surveys																															
17	Meet with Regulatory Agencies	5	04-Feb-13	08-Feb-13	25	■ Meet with Regulatory Agencies																															
18	Prepare Environmental Survey Report	10	11-Feb-13	22-Feb-13	25	■ Prepare Environmental Survey Report																															
Survey						35	14-Jan-13	01-Mar-13	0	01-Mar-13, Survey																											
20	Mail Land Owner Letters	0	14-Jan-13		0	◆ Mail Land Owner Letters																															
21	Perform Survey	20	14-Jan-13	08-Feb-13	0	■ Perform Survey																															
22	Perform Legal Research	5	14-Jan-13	18-Jan-13	15	■ Perform Legal Research																															
23	Prepare Updated Survey File	15	11-Feb-13	01-Mar-13	0	■ Prepare Updated Survey File																															
Geotechnical						55	14-Jan-13	29-Mar-13	0	29-Mar-13, Geotechnical																											
25	Perform Geotechnical Investigations	30	14-Jan-13	22-Feb-13	0	■ Perform Geotechnical Investigations																															
26	Perform Materials Analysis and Laboratory Investigations	10	25-Feb-13	08-Mar-13	0	■ Perform Materials Analysis and Laboratory Investigations																															
27	Perform Preliminary Geotechnical Engineering	10	11-Mar-13	22-Mar-13	0	■ Perform Preliminary Geotechnical Engineering																															
28	Prepare Prepare Preliminary Geotechnical Report	5	25-Mar-13	29-Mar-13	0	■ Prepare Prepare Preliminary Geotechnical Report																															
Hydraulics						40	14-Jan-13	08-Mar-13	5	08-Mar-13, Hydraulics																											
30	Perform Drainage Design and MS 19 Analysis	20	14-Jan-13	08-Feb-13	5	■ Perform Drainage Design and MS 19 Analysis																															
31	Perform SWM Design	10	14-Jan-13	25-Jan-13	15	■ Perform SWM Design																															
34	Perform H & H Analysis and Scour Analysis	20	14-Jan-13	08-Feb-13	15	■ Perform H & H Analysis and Scour Analysis																															
32	Perform E&SC Design	10	11-Feb-13	22-Feb-13	5	■ Perform E&SC Design																															
35	Prepare Preliminary H & H Analysis and Scour Analysis Report	10	11-Feb-13	22-Feb-13	15	■ Prepare Preliminary H & H Analysis and Scour Analysis Report																															
33	Prepare Preliminary Hydraulic Plans (Drainage, SWM, and E&SC)	10	25-Feb-13	08-Mar-13	5	■ Prepare Preliminary Hydraulic Plans (Drainage, SWM, and E&SC)																															
Traffic Control Devices						10	11-Feb-13	22-Feb-13	15	22-Feb-13, Traffic Control Devices																											
37	Prepare Preliminary Traffic Control Devices Plans	10	11-Feb-13	22-Feb-13	15	■ Prepare Preliminary Traffic Control Devices Plans																															
Transportation Management Plan						10	11-Feb-13	22-Feb-13	25	22-Feb-13, Transportation Management Plan																											
39	Prepare Preliminary Transportation Management Plan	10	11-Feb-13	22-Feb-13	25	■ Prepare Preliminary Transportation Management Plan																															
Right-of-Way						10	18-Mar-13	29-Mar-13	0	29-Mar-13, Right-of-Way																											
41	Evaluate Proposed Right-of-Way, Permanent Easements, Tempor	5	18-Mar-13	22-Mar-13	0	■ Evaluate Proposed Right-of-Way, Permanent Easements, Temporary Easements																															
42	Prepare Preliminary Right-of-Way Plans and Right-of-Way Data S	5	25-Mar-13	29-Mar-13	0	■ Prepare Preliminary Right-of-Way Plans and Right-of-Way Data Sheet																															
Utilities						40	14-Jan-13	08-Mar-13	15	08-Mar-13, Utilities																											
44	Perform SUE Designations	15	14-Jan-13	01-Feb-13	15	■ Perform SUE Designations																															
45	Prepare Updated Subsurface Utility File	10	04-Feb-13	15-Feb-13	15	■ Prepare Updated Subsurface Utility File																															

█ Actual Work
 █ Critical Remaining Work
 ▼ Summary
 █ Remaining Work
 ◆ Milestone

Activity ID	Activity Name	Original Duration	Start	Finish	Total Float	Gantt Chart (Days: N, D, J, F, M, A, M, J, J, A, S, O, N, D, J, F, M, A, M, J, J, A, S, O, N, D, J, F, M, A, M, J, J, A, S)																											
94	Obtain Comments from Project Team	10	06-May-13	17-May-13	217	■ Obtain Comments from Project Team																											
95	Draft Conceptual Riparian Planting Mitigation Plan	10	20-May-13	03-Jun-13	217	■ Draft Conceptual Riparian Planting Mitigation Plan																											
96	Draft Conceptual Stream Restoration Mitigation Plan	10	20-May-13	03-Jun-13	217	■ Draft Conceptual Stream Restoration Mitigation Plan																											
97	Submit Plans to VDOT	0	04-Jun-13		217	◆ Submit Plans to VDOT																											
98	VDOT Review Period	21	04-Jun-13	24-Jun-13	310	■ VDOT Review Period																											
99	Revise Conceptual Plans	10	25-Jun-13	09-Jul-13	217	■ Revise Conceptual Plans																											
Purchase Mitigation Credits		296	08-Apr-13	05-Jun-14	360	▼ 05-Jun-14, Purchase Mitigation Credits																											
101	Negotiate Stream Credits with Mitigation Banks	10	08-Apr-13	19-Apr-13	594	■ Negotiate Stream Credits with Mitigation Banks																											
105	Finalize Agreement	10	24-Jan-14	06-Feb-14	433	■ Finalize Agreement																											
106	Finalize Credit Purchase	10	21-May-14	05-Jun-14	360	■ Finalize Credit Purchase																											
Administer Purchase Agreement		32	22-Apr-13	05-Jun-13	594	▼ 05-Jun-13, Administer Purchase Agreement																											
103	Coordinate Draft	22	22-Apr-13	21-May-13	594	■ Coordinate Draft																											
104	Solicit Comments	10	22-May-13	05-Jun-13	594	■ Solicit Comments																											
Prepare Joint Permit Application (JPA)		118	10-Jul-13	25-Dec-13	219	▼ 25-Dec-13, Prepare Joint Permit Application (JPA)																											
108	Lead Pre-Application Field Meeting with City, USACOE, VDEQ	15	10-Jul-13	30-Jul-13	217	■ Lead Pre-Application Field Meeting with City, USACOE, VDEQ																											
109	Incorporate Regulatory Comments and Complete JPA	10	31-Jul-13	13-Aug-13	217	■ Incorporate Regulatory Comments and Complete JPA																											
110	Prepare and Submit JPA	10	14-Aug-13	27-Aug-13	217	■ Prepare and Submit JPA																											
Obtain Agency Completeness Review		120	28-Aug-13	25-Dec-13	313	▼ 25-Dec-13, Obtain Agency Completeness Review																											
112	Monitor and Respond to Comments - Month 1	30	28-Aug-13	26-Sep-13	313	■ Monitor and Respond to Comments - Month 1																											
113	Monitor and Respond to Comments - Month 2	30	27-Sep-13	26-Oct-13	313	■ Monitor and Respond to Comments - Month 2																											
114	Monitor and Respond to Comments - Month 3	30	27-Oct-13	25-Nov-13	313	■ Monitor and Respond to Comments - Month 3																											
115	Monitor and Respond to Comments - Month 4	30	26-Nov-13	25-Dec-13	313	■ Monitor and Respond to Comments - Month 4																											
Prepare Final Stream Plans		104	26-Dec-13	21-May-14	218	▼ 21-May-14, Prepare Final Stream Plans																											
117	Prepare Final Riparian Planting Mitigation Plan	20	26-Dec-13	23-Jan-14	219	■ Prepare Final Riparian Planting Mitigation Plan																											
118	Prepare Final Stream Mitigation Plan	20	26-Dec-13	23-Jan-14	219	■ Prepare Final Stream Mitigation Plan																											
119	Prepare Final Stream Relocation Plan	20	24-Jan-14	20-Feb-14	219	■ Prepare Final Stream Relocation Plan																											
120	Submit Final Stream Relocation Plan	0	21-Feb-14		219	◆ Submit Final Stream Relocation Plan																											
Respond to Agency Comments		90	21-Feb-14	21-May-14	314	▼ 21-May-14, Respond to Agency Comments																											
122	Monitor and Respond to Comments - Month 1	30	21-Feb-14	22-Mar-14	314	■ Monitor and Respond to Comments - Month 1																											
123	Monitor and Respond to Comments - Month 2	30	23-Mar-14	21-Apr-14	314	■ Monitor and Respond to Comments - Month 2																											
124	Monitor and Respond to Comments - Month 3	30	22-Apr-14	21-May-14	314	■ Monitor and Respond to Comments - Month 3																											
Obtain Water Quality Permits		49	22-May-14	09-Jul-14	492	▼ 09-Jul-14, Obtain Water Quality Permits																											
126	Review Draft Permits	14	22-May-14	04-Jun-14	314	■ Review Draft Permits																											
127	Obtain USACOE Permit	14	05-Jun-14	18-Jun-14	513	■ Obtain USACOE Permit																											
128	Obtain VDEQ Permit	14	05-Jun-14	18-Jun-14	513	■ Obtain VDEQ Permit																											
129	Obtain VMRC Permit	35	05-Jun-14	09-Jul-14	314	■ Obtain VMRC Permit																											
Survey		5	20-May-13	24-May-13	97	▼ 24-May-13, Survey																											
131	Perform Supplemental Survey and Update Survey File	5	20-May-13	24-May-13	97	■ Perform Supplemental Survey and Update Survey File																											
Geotechnical		59	20-May-13	13-Aug-13	75	▼ 13-Aug-13, Geotechnical																											
133	Prepare and Submit Final Geotechnical Report	20	20-May-13	17-Jun-13	75	■ Prepare and Submit Final Geotechnical Report																											
134	First VDOT Review Period	21	18-Jun-13	08-Jul-13	107	■ First VDOT Review Period																											
135	Revise and Resubmit Geotechnical Report	10	09-Jul-13	22-Jul-13	76	■ Revise and Resubmit Geotechnical Report																											
136	Second VDOT Review Period	21	23-Jul-13	12-Aug-13	107	■ Second VDOT Review Period																											
137	Final Geotechnical Report Approval	0	13-Aug-13		75	◆ Final Geotechnical Report Approval																											
Hydraulics		65	20-May-13	20-Aug-13	125	▼ 20-Aug-13, Hydraulics																											
139	Perform Drainage Design and MS 19 Analysis	30	20-May-13	01-Jul-13	77	■ Perform Drainage Design and MS 19 Analysis																											
140	Perform SWM Design and Develop Storm Water Pollution Preven	30	20-May-13	01-Jul-13	77	■ Perform SWM Design and Develop Storm Water Pollution Prevention Plan (SWPPP)																											
143	Perform H & H Analysis and Scour Analysis	15	20-May-13	10-Jun-13	131	■ Perform H & H Analysis and Scour Analysis																											

■ Actual Work
 ■ Critical Remaining Work
 ▼ Summary
■ Remaining Work
 ◆ Milestone

Activity ID	Activity Name	Original Duration	Start	Finish	Total Float	Gantt Chart (Days: N, D, J, F, M, A, M, J, J, A, S, O, N, D, J, F, M, A, M, J, J, A, S, O, N, D, J, F, M, A, M, J, J, A, S)																											
190	Final Utility Plan Approval	0	04-Oct-13		94	◆ Final Utility Plan Approval																											
Final Plan Submission		54	12-Sep-13	28-Nov-13	56	◆ 28-Nov-13, Final Plan Submission																											
Roadway Plans		50	12-Sep-13	22-Nov-13	60	◆ 22-Nov-13, Roadway Plans																											
193	Assemble and Submit Final Roadway Plans	5	12-Sep-13	18-Sep-13	62	▮ Assemble and Submit Final Roadway Plans																											
194	First VDOT Review Period	21	19-Sep-13	09-Oct-13	89	▮ First VDOT Review Period																											
195	Revise and Resubmit Final Plans	15	10-Oct-13	30-Oct-13	60	▮ Revise and Resubmit Final Plans																											
196	Second VDOT Review Period	21	31-Oct-13	20-Nov-13	89	▮ Second VDOT Review Period																											
197	Final Roadway Plan Approval	0	22-Nov-13		60	◆ Final Roadway Plan Approval																											
Bridge Plans		44	26-Sep-13	28-Nov-13	0	◆ 28-Nov-13, Bridge Plans																											
199	Assemble and Submit Final Bridge Plans	5	26-Sep-13	02-Oct-13	0	▮ Assemble and Submit Final Bridge Plans																											
200	First VDOT Review Period	21	03-Oct-13	23-Oct-13	0	▮ First VDOT Review Period																											
201	Revise and Resubmit Final Plans	10	24-Oct-13	06-Nov-13	0	▮ Revise and Resubmit Final Plans																											
202	Second VDOT Review Period	21	07-Nov-13	27-Nov-13	0	▮ Second VDOT Review Period																											
203	Final Bridge Plan Approval	0	28-Nov-13		0	◆ Final Bridge Plan Approval																											
CONSTRUCTION ACTIVITIES		748	31-Jul-13	01-Jul-16	0	◆ Milestone: BEGIN ROADWAY CONSTRUCTION																											
13550	Grading Level of Effort	632	31-Jul-13	30-Oct-15	0	▮ Grading Level of Effort																											
13510	Grading Mobilization	10	22-Nov-13	05-Dec-13	61	▮ Grading Mobilization																											
M13300	MILESTONE: BEGIN ROADWAY CONSTRUCTION	0	22-Nov-13		60	◆ MILESTONE: BEGIN ROADWAY CONSTRUCTION																											
13520	Traffic Control	552	22-Nov-13	30-Oct-15	0	▮ Traffic Control																											
13530	Erosion Control	552	22-Nov-13	30-Oct-15	0	▮ Erosion Control																											
13560	Grading Level of Effort 2	552	22-Nov-13	30-Oct-15	0	▮ Grading Level of Effort 2																											
M13310	MILESTONE: BEGIN BRIDGE CONSTRUCTION	0	28-Nov-13		0	◆ MILESTONE: BEGIN BRIDGE CONSTRUCTION																											
Stream Relocation		116	10-Jul-14	22-Dec-14	220	◆ 22-Dec-14, Stream Relocation																											
13330	Survey/Layout Stream	4	10-Jul-14	15-Jul-14	220	▮ Survey/Layout Stream																											
13340	Demo Structures	10	16-Jul-14	29-Jul-14	220	▮ Demo Structures																											
13350	Erosion Control	3	30-Jul-14	01-Aug-14	220	▮ Erosion Control																											
13360	Clear & Grub	8	04-Aug-14	13-Aug-14	220	▮ Clear & Grub																											
13370	Temporary Pedestrian Bridge & Pathway	15	14-Aug-14	04-Sep-14	220	▮ Temporary Pedestrian Bridge & Pathway																											
13380	Utility Relocation	10	05-Sep-14	18-Sep-14	220	▮ Utility Relocation																											
13390	Demolition	3	19-Sep-14	23-Sep-14	220	▮ Demolition																											
13400	Storm Drainage	4	24-Sep-14	29-Sep-14	220	▮ Storm Drainage																											
13410	Traffic Control	1	30-Sep-14	30-Sep-14	220	▮ Traffic Control																											
13420	Excavation	40	01-Oct-14	26-Nov-14	220	▮ Excavation																											
13500	New Pedestrian Bridge & Path	45	01-Oct-14	03-Dec-14	233	▮ New Pedestrian Bridge & Path																											
13430	Rip Rap	5	27-Nov-14	03-Dec-14	220	▮ Rip Rap																											
13440	Landscaping/Planting	4	04-Dec-14	09-Dec-14	220	▮ Landscaping/Planting																											
13450	Curb & Gutter	2	10-Dec-14	11-Dec-14	220	▮ Curb & Gutter																											
13460	Asphalt Paving	2	12-Dec-14	15-Dec-14	220	▮ Asphalt Paving																											
13470	Demo Sidewalk	1	16-Dec-14	16-Dec-14	220	▮ Demo Sidewalk																											
13480	Sidewalk	2	17-Dec-14	18-Dec-14	220	▮ Sidewalk																											
13490	Base Stone	2	19-Dec-14	22-Dec-14	220	▮ Base Stone																											
Phase I		198	22-Nov-13	05-Sep-14	295	◆ 05-Sep-14, Phase I																											
I-581 NB Sta. 223+50 - 236+00		198	22-Nov-13	05-Sep-14	295	◆ 05-Sep-14, I-581 NB Sta. 223+50 - 236+00																											
11400	Clear & Grubb (NB I-581)	4	22-Nov-13	27-Nov-13	60	▮ Clear & Grubb (NB I-581)																											
11410	Install Temporary Concrete Barrier I-581 (Bridge & Shoulder)	2	28-Nov-13	29-Nov-13	60	▮ Install Temporary Concrete Barrier I-581 (Bridge & Shoulder)																											
11420	Demolition Asphalt/Guardrail (I-581)	5	02-Dec-13	06-Dec-13	60	▮ Demolition Asphalt/Guardrail (I-581)																											
11440	Grading/Excavation (I-581)	13	09-Dec-13	26-Dec-13	60	▮ Grading/Excavation (I-581)																											

█ Actual Work
 █ Critical Remaining Work
 ▾ Summary
 █ Remaining Work
 ◆ Milestone



Critical Path Schedule

Activity ID	Activity Name	Original Duration	Start	Finish	Total Float	Gantt Chart (Days: N, D, J, F, M, A, M, J, J, A, S, O, N, D, J, F, M, A, M, J, J, A, S, O, N, D, J, F, M, A, M, J, J, A, S)																															
I-581 / Valley View Boulevard Interchange Phase II						905	14-Jan-13	01-Jul-16	0	01-Jul-16																											
1	Notice to Proceed	0	14-Jan-13*		0	◆ Notice to Proceed																															
DESIGN ACTIVITIES						228	14-Jan-13	28-Nov-13	58	▶ 28-Nov-13, DESIGN ACTIVITIES																											
Preliminary Design						90	14-Jan-13	17-May-13	0	▶ 17-May-13, Preliminary Design																											
Bridge						10	04-Mar-13	15-Mar-13	0	▼ 15-Mar-13, Bridge																											
6	Prepare Preliminary Bridge Plans	10	04-Mar-13	15-Mar-13	0	■ Prepare Preliminary Bridge Plans																															
Roadway						10	04-Mar-13	15-Mar-13	0	▼ 15-Mar-13, Roadway																											
10	Prepare Preliminary Roadway Plans	10	04-Mar-13	15-Mar-13	0	■ Prepare Preliminary Roadway Plans																															
Retaining Wall						0			0																												
Timber Shared Use Path Bridge						0			0																												
Environmental						0			0																												
Survey						35	14-Jan-13	01-Mar-13	0	▼ 01-Mar-13, Survey																											
20	Mail Land Owner Letters	0	14-Jan-13		0	◆ Mail Land Owner Letters																															
21	Perform Survey	20	14-Jan-13	08-Feb-13	0	■ Perform Survey																															
23	Prepare Updated Survey File	15	11-Feb-13	01-Mar-13	0	■ Prepare Updated Survey File																															
Geotechnical						55	14-Jan-13	29-Mar-13	0	▼ 29-Mar-13, Geotechnical																											
25	Perform Geotechnical Investigations	30	14-Jan-13	22-Feb-13	0	■ Perform Geotechnical Investigations																															
26	Perform Materials Analysis and Laboratory Investigations	10	25-Feb-13	08-Mar-13	0	■ Perform Materials Analysis and Laboratory Investigations																															
27	Perform Preliminary Geotechnical Engineering	10	11-Mar-13	22-Mar-13	0	■ Perform Preliminary Geotechnical Engineering																															
28	Prepare Prepare Preliminary Geotechnical Report	5	25-Mar-13	29-Mar-13	0	■ Prepare Prepare Preliminary Geotechnical Report																															
Hydraulics						0			0																												
Traffic Control Devices						0			0																												
Transportation Management Plan						0			0																												
Right-of-Way						10	18-Mar-13	29-Mar-13	0	▼ 29-Mar-13, Right-of-Way																											
41	Evaluate Proposed Right-of-Way, Permanent Easements, Tempor	5	18-Mar-13	22-Mar-13	0	■ Evaluate Proposed Right-of-Way, Permanent Easements, Temporary Easements																															
42	Prepare Preliminary Right-of-Way Plans and Right-of-Way Data S	5	25-Mar-13	29-Mar-13	0	■ Prepare Preliminary Right-of-Way Plans and Right-of-Way Data Sheet																															
Utilities						0			0																												
Landscaping and Roadside Development						0			0																												
Quality Assurance and Quality Control						0			0																												
Scope Validation						0			0																												
Preliminary Plan and Reports Submission						35	01-Apr-13	17-May-13	0	▼ 17-May-13, Preliminary Plan and Reports Submission																											
61	Assemble and Submit Preliminary Plans and Reports	10	01-Apr-13	12-Apr-13	0	■ Assemble and Submit Preliminary Plans and Reports																															
62	First VDOT Review Period	21	13-Apr-13	03-May-13	2	■ First VDOT Review Period																															
63	Revise and Resubmit Preliminary Plans and Reports	10	06-May-13	17-May-13	0	■ Revise and Resubmit Preliminary Plans and Reports																															
Final Design						138	20-May-13	28-Nov-13	58	▶ 28-Nov-13, Final Design																											
Bridge						90	20-May-13	25-Sep-13	0	▼ 25-Sep-13, Bridge																											
68	Perform Superstructure Design	30	20-May-13	01-Jul-13	0	■ Perform Superstructure Design																															
69	Perform Substructure Design	30	02-Jul-13	13-Aug-13	0	■ Perform Substructure Design																															
70	Prepare Final Bridge Plans	30	14-Aug-13	25-Sep-13	0	■ Prepare Final Bridge Plans																															
Roadway						60	20-May-13	13-Aug-13	62	▼ 13-Aug-13, Roadway																											
72	Finalize Horizontal and Vertical Geometry and Typical Sections	20	20-May-13	17-Jun-13	62	■ Finalize Horizontal and Vertical Geometry and Typical Sections																															
73	Finalize Cross Sections and Limits of Construction	20	18-Jun-13	16-Jul-13	62	■ Finalize Cross Sections and Limits of Construction																															
74	Prepare Final Roadway Plans	20	17-Jul-13	13-Aug-13	62	■ Prepare Final Roadway Plans																															
Retaining Wall						0			0																												
Timber Shared Use Path Bridge						0			0																												
Environmental						0			0																												
Review Existing Conditions						0			0																												
Determine Mitigation Requirements						0			0																												
Prepare Conceptual Stream Relocation Plans						0			0																												

█ Actual Work
 █ Critical Remaining Work
 ▼ Summary
 █ Remaining Work
 ◆ Milestone

Activity ID	Activity Name	Original Duration	Start	Finish	Total Float	N D J F M A M J J A S O N D J F M A M J J A S O N D J F M A M J J A S O N D J F M A M J J A S											
						Gantt Chart											
11080	Abutment B Shoring	5	24-Jan-14	30-Jan-14	0	■ Abutment B Shoring											
11090	Pier 1 Cofferdam	5	31-Jan-14	06-Feb-14	0	■ Pier 1 Cofferdam											
11100	Structure Excavation	5	07-Feb-14	13-Feb-14	0	■ Structure Excavation											
11110	Drive Piles	5	14-Feb-14	20-Feb-14	0	■ Drive Piles											
11120	MSE Wall	20	21-Feb-14	20-Mar-14	0	■ MSE Wall											
11130	FRP Substructure	10	21-Mar-14	03-Apr-14	0	■ FRP Substructure											
11140	Girder Erection	8	04-Apr-14	15-Apr-14	0	■ Girder Erection											
11150	FRP Superstructure	20	16-Apr-14	13-May-14	0	■ FRP Superstructure											
11160	FRP Permanent Barrier Wall/Rail	10	14-May-14	28-May-14	0	■ FRP Permanent Barrier Wall/Rail											
11170	FRP Slope Protection	5	29-May-14	04-Jun-14	0	■ FRP Slope Protection											
11180	FRP Approach Slabs	5	05-Jun-14	11-Jun-14	0	■ FRP Approach Slabs											
Phase II		59	12-Jun-14	02-Sep-14	0	▼ 02-Sep-14, Phase II											
I-581 NB Shoulder Sta. 217+00 - 223+50		0			0												
I-581 SB Sta. 220+00 - 236+00		59	12-Jun-14	02-Sep-14	0	▼ 02-Sep-14, I-581 SB Sta. 220+00 - 236+00											
11630	Install Portable Concrete Barrier (I-581 SB)	2	12-Jun-14	13-Jun-14	0	Install Portable Concrete Barrier (I-581 SB)											
11640	Demolition Asphalt/Guardrail (I-581 SB)	5	16-Jun-14	20-Jun-14	0	Demolition Asphalt/Guardrail (I-581 SB)											
11650	Grading/Excavation (I-581 SB)	19	23-Jun-14	18-Jul-14	0	■ Grading/Excavation (I-581 SB)											
11660	Storm Drainage (I-581 SB)	20	02-Jul-14	30-Jul-14	0	■ Storm Drainage (I-581 SB)											
11670	Fine Grading (I-581 SB)	4	31-Jul-14	05-Aug-14	0	■ Fine Grading (I-581 SB)											
11680	Stone Base Course (I-581 SB)	4	06-Aug-14	11-Aug-14	0	■ Stone Base Course (I-581 SB)											
11690	Underdrain (I-581 SB)	4	12-Aug-14	15-Aug-14	0	Underdrain (I-581 SB)											
11700	Asphalt Base Course (I-581 SB)	4	18-Aug-14	21-Aug-14	0	Asphalt Base Course (I-581 SB)											
11710	Asphalt Intermediate Course (I-581 SB)	2	22-Aug-14	25-Aug-14	0	Asphalt Intermediate Course (I-581 SB)											
11720	Asphalt Surface Course (I-581 SB)	1	26-Aug-14	26-Aug-14	0	Asphalt Surface Course (I-581 SB)											
11730	Guardrail (I-581 SB)	2	27-Aug-14	28-Aug-14	0	Guardrail (I-581 SB)											
11740	Striping/Signage (I-581 SB)	2	29-Aug-14	02-Sep-14	0	Striping/Signage (I-581 SB)											
Sound Barrier Walls #6 and #7		0			0												
Ramp Y Sta. 19+00 - 24+70 Left		45	12-Jun-14	14-Aug-14	0	▼ 14-Aug-14, Ramp Y Sta. 19+00 - 24+70 Left											
11820	Install Portable Concrete Barrier (Ramp Y)	3	12-Jun-14	16-Jun-14	0	Install Portable Concrete Barrier (Ramp Y)											
11830	Demolition Guardrail/Asphalt (Ramp Y)	5	17-Jun-14	23-Jun-14	0	Demolition Guardrail/Asphalt (Ramp Y)											
11840	Grading/Excavation (Ramp Y)	13	24-Jun-14	11-Jul-14	0	■ Grading/Excavation (Ramp Y)											
11850	Storm Drainage (Ramp Y)	15	27-Jun-14	18-Jul-14	0	■ Storm Drainage (Ramp Y)											
11860	Fine Grading (Ramp Y)	4	21-Jul-14	24-Jul-14	0	Fine Grading (Ramp Y)											
11870	Stone Base Course (Ramp Y)	4	25-Jul-14	30-Jul-14	0	■ Stone Base Course (Ramp Y)											
11880	Underdrain (Ramp Y)	2	31-Jul-14	01-Aug-14	0	Underdrain (Ramp Y)											
11890	Asphalt Base Course (Ramp Y)	3	04-Aug-14	06-Aug-14	0	Asphalt Base Course (Ramp Y)											
11900	Asphalt Intermediate Course (Ramp Y)	2	07-Aug-14	08-Aug-14	0	Asphalt Intermediate Course (Ramp Y)											
11910	Guardrail (Ramp Y)	2	11-Aug-14	12-Aug-14	0	Guardrail (Ramp Y)											
11920	Striping/Signage (Ramp Y)	2	13-Aug-14	14-Aug-14	0	Striping/Signage (Ramp Y)											
Valley View Tie-In at Sta. 329+90		12	15-Aug-14	02-Sep-14	0	▼ 02-Sep-14, Valley View Tie-In at Sta. 329+90											
11750	Grading/Excavation (Valley View)	3	15-Aug-14	19-Aug-14	0	Grading/Excavation (Valley View)											
11760	Demolition Guardrail/Concrete Barrier (Valley View)	2	20-Aug-14	21-Aug-14	0	Demolition Guardrail/Concrete Barrier (Valley View)											
11770	Fine Grade (Valley View)	2	22-Aug-14	25-Aug-14	0	■ Fine Grade (Valley View)											
11780	Stone Base Course (Valley View)	2	26-Aug-14	27-Aug-14	0	Stone Base Course (Valley View)											
11790	Asphalt Base Course (Valley View)	2	28-Aug-14	29-Aug-14	0	Asphalt Base Course (Valley View)											
11800	Asphalt Intermediate Course (Valley View)	2	29-Aug-14	02-Sep-14	0	Asphalt Intermediate Course (Valley View)											
Phase IIA		35	03-Sep-14	21-Oct-14	0	▼ 21-Oct-14, Phase IIA											
Ramp Y Sta. 22+75 - 25+62		0			0												

█ Actual Work
 █ Critical Remaining Work
 ▼ Summary
█ Remaining Work
 ◆ Milestone

Activity ID	Activity Name	Original Duration	Start	Finish	Total Float	N D J F M A M J J A S O N D J F M A M J J A S O N D J F M A M J J A S O N D J F M A M J J A S																															
						Gantt Chart Area																															
Valley View Blvd Sta. 331+00 - 339+36 Eastbound Outside Lane						35	03-Sep-14	21-Oct-14	0	▼ 21-Oct-14, Valley View Blvd Sta. 331+00 - 339+36 Eastbound Outside Lane																											
12060	Clear & Grubb (Valley View)	3	03-Sep-14	05-Sep-14	0	Clear & Grubb (Valley View)																															
12070	Demolition Curb/Asphalt (Valley View)	3	08-Sep-14	10-Sep-14	0	Demolition Curb/Asphalt (Valley View)																															
12080	Grading/Excavation (Valley View)	12	11-Sep-14	26-Sep-14	0	■ Grading/Excavation (Valley View)																															
12090	Storm Drainage (Valley View)	6	23-Sep-14	30-Sep-14	0	■ Storm Drainage (Valley View)																															
12100	Fine Grading (Valley View)	2	01-Oct-14	02-Oct-14	0	Fine Grading (Valley View)																															
12110	Stone Base Course (Valley View)	2	03-Oct-14	06-Oct-14	0	Stone Base Course (Valley View)																															
12120	Underdrain (Valley View)	2	07-Oct-14	08-Oct-14	0	Underdrain (Valley View)																															
12130	Curb & Gutter (Valley View)	5	09-Oct-14	15-Oct-14	0	■ Curb & Gutter (Valley View)																															
12140	Asphalt Base Course (Valley View)	2	16-Oct-14	17-Oct-14	0	Asphalt Base Course (Valley View)																															
12150	Asphalt Intermediate Course (Valley View)	1	20-Oct-14	20-Oct-14	0	Asphalt Intermediate Course (Valley View)																															
12160	Temporary Pavement Markings (Valley View)	1	21-Oct-14	21-Oct-14	0	Temporary Pavement Markings (Valley View)																															
Phase III						151	22-Oct-14	20-May-15	0	▼ 20-May-15, Phase III																											
Valley View Blvd Sta. 331+00 - 339+36 Westbound Outside Lane						0			0																												
Ramp Z/Trail Sta. 10+00 - 22+05 Right						0			0																												
Bridge Construction Phase III						148	22-Oct-14	20-May-15	0	▼ 20-May-15, Bridge Construction Phase III																											
13020	Install Portable Concrete Barrier	5	22-Oct-14	28-Oct-14	0	■ Install Portable Concrete Barrier																															
13030	Superstructure Demolition	20	29-Oct-14	26-Nov-14	0	■ Superstructure Demolition																															
13040	Abutment A Shoring	8	27-Nov-14	08-Dec-14	0	■ Abutment A Shoring																															
13050	Abutment B Shoring	8	09-Dec-14	18-Dec-14	0	■ Abutment B Shoring																															
13060	Pier 1 Cofferdam	10	19-Dec-14	05-Jan-15	0	■ Pier 1 Cofferdam																															
13070	Structure Excavation	7	06-Jan-15	14-Jan-15	0	■ Structure Excavation																															
13080	Drive Piles	5	15-Jan-15	21-Jan-15	0	■ Drive Piles																															
13090	MSE Wall	20	22-Jan-15	18-Feb-15	0	■ MSE Wall																															
13100	FRP Substructure	15	19-Feb-15	11-Mar-15	0	■ FRP Substructure																															
13110	Girder Erection	8	12-Mar-15	23-Mar-15	0	■ Girder Erection																															
13120	FRP Superstructure	25	24-Mar-15	27-Apr-15	0	■ FRP Superstructure																															
13130	FRP Permanent Barrier Wall/Rail	7	28-Apr-15	06-May-15	0	■ FRP Permanent Barrier Wall/Rail																															
13140	FRP Slope Protection	5	07-May-15	13-May-15	0	■ FRP Slope Protection																															
13150	FRP Approach Slabs	5	14-May-15	20-May-15	0	■ FRP Approach Slabs																															
Phase IV						101	21-May-15	08-Oct-15	0	▼ 08-Oct-15, Phase IV																											
Bridge Construction Phase IV						0			0																												
Valley View Blvd Sta. 331+00 - 339+36 Center Lane						44	21-May-15	22-Jul-15	0	▼ 22-Jul-15, Valley View Blvd Sta. 331+00 - 339+36 Center Lane																											
12640	Demolition Asphalt/Curb (Valley View)	6	21-May-15	29-May-15	0	■ Demolition Asphalt/Curb (Valley View)																															
12650	Grading/Excavation (Valley View)	12	01-Jun-15	16-Jun-15	0	■ Grading/Excavation (Valley View)																															
12660	Storm Drainage (Valley View)	6	10-Jun-15	17-Jun-15	0	■ Storm Drainage (Valley View)																															
12670	Fine Grading (Valley View)	7	18-Jun-15	26-Jun-15	0	■ Fine Grading (Valley View)																															
12680	Stone Base Course (Valley View)	4	29-Jun-15	02-Jul-15	0	Stone Base Course (Valley View)																															
12690	Underdrain (Valley View)	3	03-Jul-15	07-Jul-15	0	Underdrain (Valley View)																															
12700	Curb & Median (Valley View)	4	08-Jul-15	13-Jul-15	0	■ Curb & Median (Valley View)																															
12710	Asphalt Base Course (Valley View)	3	14-Jul-15	16-Jul-15	0	Asphalt Base Course (Valley View)																															
12720	Asphalt Intermediate Course (Valley View)	2	17-Jul-15	20-Jul-15	0	Asphalt Intermediate Course (Valley View)																															
12730	Striping/Signage (Valley View)	2	21-Jul-15	22-Jul-15	0	Striping/Signage (Valley View)																															
Ramp W Sta. 10+00 - 14+02, Ramp Z Sta. 10+00 - 17+73						19	23-Jul-15	18-Aug-15	0	▼ 18-Aug-15, Ramp W Sta. 10+00 - 14+02, Ramp Z Sta. 10+00 - 17+73																											
12740	Demolition Asphalt (Ramp W/Z)	2	23-Jul-15	24-Jul-15	0	Demolition Asphalt (Ramp W/Z)																															
12750	Grading/Excavation (Ramp W/Z)	11	27-Jul-15	10-Aug-15	0	■ Grading/Excavation (Ramp W/Z)																															
12760	Storm Drainage (Ramp W/Z)	8	04-Aug-15	13-Aug-15	0	■ Storm Drainage (Ramp W/Z)																															
12770	Fine Grading (Ramp W/Z)	3	14-Aug-15	18-Aug-15	0	■ Fine Grading (Ramp W/Z)																															

█ Actual Work
 █ Critical Remaining Work
 ▼ Summary
█ Remaining Work
 ◆ Milestone



Section 4.6.2
**Proposal Schedule
Narrative**



Appendix Section 4.6 Proposal Schedule

Section 4.6.1 Proposal Schedule

The Key/JMT Team has developed a Proposal Schedule that represents the plan to execute the Work in accordance with the contract documents. The Proposal Schedule includes a detailed work plan depicting the overall sequence of the full scope of Work on the Project. The detailed work plan also includes a Work Breakdown Structure (WBS), activity durations, Critical Path (based on the longest path), milestones, Scope Validation Period, permitting and right-of-way acquisition activities, utility relocations, and design and construction. Additionally, the detailed work plan depicts reviews by VDOT, FHWA and other regulatory agencies and provides sufficient float for these Owner-resourced activities to minimize risk of VDOT delay. **The Proposal Schedule is included in this section of the Appendix.**

Section 4.6.2 Proposal Schedule Narrative

The Key/JMT Team has developed a Proposal Schedule Narrative that describes the plan to execute the Work in accordance with the contract documents and includes a description and explanation of the Critical Path and significant assumptions relative to productivity and critical activities.

Plan to Execute the Work

Overview

The Proposal Schedule has been developed utilizing Primavera P6 Version 6.2. This software and version is compatible with the Department’s scheduling software. The following software settings (standard default settings) have been utilized:

- Schedule units are work days (8 hours)
- Retained Logic scheduling methodology
- Calculates start to start lags from early start
- Critical Path is set to longest path
- Total Float equals late finish minus early finish

The Proposal Schedule utilizes two calendars as follows:

- 5 Day workweek
- 7 Day Calendar for Submittals

The Baseline Schedule will include additional calendars as necessary.

The durations included in the schedule reflect time lost due to normal weather. The work day durations have been increased to reflect lost days.

Work has been scheduled so as to achieve the following completion dates:

- ~~Substantial Completion – November 13, 2015~~
- **Interim Milestone – October 30, 2015**
- **Final Completion – November 13, 2015-July 1, 2016**

The completion dates provided above comply with the RFP requirements.



Schedule Details

The schedule utilizes the following abbreviations:

- *Temp – Temporary*
- *POL – Property Owner Letter*
- *E&SC – Erosion and Sediment Control*
- *QAQC – Quality Assurance Quality Control*
- *SWM – Storm Water Management*
- *SUE – Subsurface Utility Engineering*
- *WB – West Bound*
- *EB – East Bound*
- *Exc - Excavate*
- *FRP – Form, Rebar & Pour*

The schedule has one constraint:

- Activity M13270 ~~Substantial Completion~~ *Interim Milestone* has been constrained to finish or before ~~November 13, 2015~~ *October 30, 2015*

The following Milestones have been included:

- *Activity M13300 Milestone – Begin Roadway Construction*
- *Activity M13310 Milestone – Begin Bridge Construction*
- *Activity M13520 Milestone – Traffic Switch, New Ramp Y*
- *Activity M13521 Milestone – Traffic Shift Ramp Y Sta. 19+00 to 24+70*
- *Activity M13522 Milestone – Traffic Shift Ramp Z*
- *Activity M13270 Milestone – ~~Substantial Completion~~ Interim Milestone*
- *Activity M13640 Milestone – Final Completion*

It is significant to note for purposes of clarification that the WBS header bars indicate a start date that in most cases is earlier than the start of that phase. This is due to the procurement activities, applicable to the phase, starting in an earlier phase.

The Proposal schedule utilizes a work breakdown structure (WBS) to organize the project activities. The WBS will include the following first and second level activities:

- Preliminary Design
 - Bridge
 - Roadway
 - Retaining Wall
 - Timber Shared Use Path Bridge
 - Environmental
 - Survey
 - Geotechnical
 - Hydraulics
 - Traffic Control Devices
 - Transportation Management Plan
 - Right-of-Way



- Utilities
- Landscaping and Roadside Development
- Quality Assurance and Quality Control
- Scope Validation
- Preliminary Plans and Reports Submissions
- Final Design
 - Bridge
 - Roadway
 - Retaining Wall
 - Timber Shared Use Path Bridge
 - Environmental
 - Survey
 - Geotechnical
 - Hydraulics
 - Traffic Control Devices
 - Transportation Management Plans
 - Right-of-Way
 - Utilities
 - Final Submission Plan
- Phase I Construction
 - Ramp Y Stations 10+00 to 22+75 (Right)
 - Ramp Z Temporary Asphalt Widening
 - I-581 Northbound Stations 223+50 to 236+00
 - Sound Barrier Walls #4 and #5
 - I-581 Southbound Stations 163+00 to 213+00
 - Sound Barrier Wall #1
 - Valley View Boulevard Bridge Repairs
 - Valley View Boulevard Bridge Construction Phase I
- Phase II Construction
 - Ramp Y Stations 19+00 to 24+70 (Left)
 - Valley View Tie-in Station 329+90
 - I-581 Northbound Stations 217+00 to 223+50
 - I-581 Southbound Stations 220+00 to 236+00
 - Sound Barrier Walls #6 and #7
- Phase IIA Construction
 - Ramp Y Stations 22+75 to 25+62
 - Valley View Boulevard Stations 331+00 to 339+36 Eastbound Outside Lane
- Phase III Construction
 - Valley View Boulevard Bridge Construction Phase III
 - Valley View Boulevard Stations 331+00 to 339+36 Westbound Outside Lane
 - Ramp Z Stations 10+00 to 22+05 Right
- Phase IV Construction
 - Valley View Boulevard Stations 331+00 to 339+36 Center Lane



- Ramp W Stations 10+00 to 14+02
- Ramp Z Stations 10+00 to 17+73
- Ramp X Stations 10+00 to 27+59
- Valley View Boulevard Bridge Construction Phase IV
- I-581 Northbound Stations 166+50 to 205+25
- ~~○ I-581 Southbound Stations 163+00 to 213+00~~
- ~~○ Sound Barrier Wall #1~~
- Phase V Construction
 - Surface Asphalt
 - Permanent Pavement Marking
- Completion Activities

No Activity Codes have been utilized in the Proposal Schedule. The Proposal schedule provides summary level detail based on the information currently available. Appropriate Activity Codes will be utilized in the Baseline Schedule. The Baseline Schedule level of detail will be significantly greater than that of the Proposal Schedule resulting in a greater number of activities with shorter durations. This is compatible with the method of payment on the project in that 20% of the assigned value to an activity is earned at the time the activity starts and the remainder when the activity is completed.

Preliminary and Final Design

The following is a description of the Key/JMT Team's plan to execute the engineering activities including a discussion of design, right-of-way, environmental coordination and approvals, and utility activities.

Design

JMT will advance the design from the current completion level and will incorporate new design elements into final design and construction documents. Design activities will include bridge, roadway, retaining walls, shared us path and bridge, sound walls, survey, geotechnical, hydraulics, traffic control devices, transportation management plan, lighting, and landscaping and roadside development as described in Part 2 Technical Requirements of the RFP. The project will be delivered by completing two phases of design – preliminary design and final design – followed by the construction phase. Design related activities to be performed during each phase are as follows:

Preliminary design activities will focus on expanding the Technical Proposal plans and preparing a set of preliminary plans and reports for submission to VDOT for review and approval. The Key/JMT Team will perform a number of independent studies of the information contained in the RFP documents to confirm that the information provided to date is correct and suitable for use in designing the project. The additional studies will include performing supplemental field surveying to confirm horizontal and vertical control of key project features, verifying type and location of existing subsurface utilities, performing legal research to confirm existing right-of-way and property limits, performing additional environmental surveys to confirm the findings presented in RFP environmental reports, and performing a thorough geotechnical field investigation to confirm geotechnical conditions for the bridge foundation and roadway design. The findings of these additional studies will be summarized in a series of reports and, if discrepancies occur between the information in the RFP documents and the Key/JMT Team studies, these results will be presented to VDOT for review and evaluation as outlined in the Scope Validation process for the project. After confirming the information provided in the RFP documents are valid or after receiving agreement from VDOT of any discovered changes, JMT will prepare preliminary roadway plans including performing geometric design; preparing cross sections and defining limits of construction; finishing drainage, stormwater management, and erosion and sediment control design; preparing plans for traffic control devices and lighting plans; and preparing a Transportation Management Plan; and completing the



preliminary bridge plans working closely with the geotechnical engineers. Required right-of-Way limits will be evaluated and depicted on the plans and preliminary utility relocation plans will be prepared as discussed in detail below. The Key/JMT Team will submit the entire preliminary plan package to VDOT for review and approval.

Final design activities will begin immediately after receiving preliminary plan approval from VDOT. The right-of-way, environmental coordination and approval, and utility relocation plan activities will be separated and developed for individual submissions to VDOT and other regulatory agencies for review and approval as described in detail below. The preliminary bridge and roadway plans will be fully detailed into final plans ready for construction. A Geotechnical Report for the geotechnical recommendations for the project will also be completed during the final design phase. The Key/JMT Team will submit the final plans and reports to VDOT for review and approval.

Right-of-Way

After preliminary designs have been performed for the roadway, bridge, drainage, and utilities, the Key/JMT Team will evaluate the proposed ROW, permanent easements, and temporary easements as shown on the plans. If changes are required, either due to a change in the required ROW or a change based on the results of legal research, the Team will prepare updated preliminary ROW plans and a ROW data sheet and will submit to VDOT for review and approval.

Preliminary ROW activities will begin soon after receiving Notice to Proceed. It should be noted that it is critical that all right of way work start with the properties that will require relocation assistance and should begin immediately upon notice to proceed. The Key/JMT Team will begin performing the legal research for the identified parcels on the preliminary plans at the same time that our survey crew is validating the survey information provided in the RFP package. After preliminary designs have been performed for the bridge, roadway, drainage, and utilities, the Key/JMT Team will evaluate the proposed ROW, permanent easements, and temporary easements as shown on the plans. If changes are required, either due to a change in the required ROW or a change based on the results of legal research, the Team will prepare updated preliminary ROW plans and a ROW data sheet and will submit to VDOT for review and approval.

Final ROW activities will begin immediately after receiving preliminary plan approval from VDOT particularly on the relocation assistance properties. At this point in the design, the “footprint” for the project will be firmly established and the Key/JMT Team will identify the final ROW, permanent easements, temporary easements, and utility easements required to construct the project. The Team will prepare final ROW plans and submit to VDOT for review and approval. After receiving final ROW plan approval from VDOT, the Key/JMT Team will perform acquisition activities as described below:

Right-of-Way Estimate. JMT’s ROW staff will provide ROW cost estimate services and supply the estimated compensation for all land, improvements, and all easements within the proposed ROW in accordance with the approved final ROW plans. Potential damages will be identified and their accrue costs as the result of any ROW acquisition. Hazardous waste removal, if required, will be identified with through a Phase I environmental study completed by a certified specialist. JMT’s ROW staff will estimate the costs associated with the acquisition and relocation of utility easements within the proposed ROW and will also estimate the demolition and removal costs of any onsite improvement within the existing ROW. The Key/JMT Team will offer suggestions to reduce costs associated with ROW acquisitions. JMT’s ROW staff is knowledgeable of all VDOT forms and the associated Right-of-Way, Utilities, Management System (RUMS). All cost estimates will be completed within a timely and efficient manner.



Title Reports. Title Reports will be completed according to the standards and guidelines established by VDOT. A sixty year title search will be completed on each impacted property by an attorney approved by VDOT. All title reports will be updated prior to the start of negotiations with each property owner. Title insurance will be obtained for each property acquisition that exceeds \$25,000. Title reports will be signed and certified by an attorney with all judgments, liens, or out conveyances documented with all relevant copies supplied. Final title reports signed copies will be delivered within thirty (30) days upon request.

Appraisals. JMT ROW staff will secure any necessary appraisal whether the property is income producing, commercial, industrial, residential, improved or unimproved by a licensed and pre-approved VDOT appraiser. Plans and plats will be red-lined, area tabulations will be verified for each affected parcel, and easements will be identified before property owner contacts are commenced. JMT ROW staff will verify each chain of title for at least the last five (5) years in the absence of a Title Report. All appraisal work will comply with the licensing requirements of the Code of Virginia, Section 406 of Title 54.1.

Appraisal Review. The appraisals will be completed by a certified review appraiser as a quality control check to ensure that the Uniform Act requirements have been accomplished. All appraisals and appraisal reviews will then be submitted to VDOT for review and approval. The appraisals will contain all necessary and pertinent information to support the appraiser's valuation. The appraisals will include only compensable items and non-compensable items will not be included. The resulting value of the property will be fair and represent the true market value of the property. Any and all uneconomic remnants will be identified within the appraisal.

Negotiations. JMT's experienced ROW staff will negotiate with all affected property owners, presenting the offer and explaining all acquisition details. All property owner negotiations will be performed in strict compliance with the standards of the Uniform Act, the Code of Virginia, and VDOT's Right-of-Way and Utilities Division. Each affected parcel will be tracked by the Team's ROW Manager from start to finish with all milestone dates and schedules adhered to and followed. A project Parcel/Property Owner Contact list will be created and maintained by the Team's ROW Manager. A thirty (30) day negotiation window will be afforded each property owner to complete the clearance of the ROW. All property owners will be contacted and an on-site meeting arranged to explain the acquisition and to facilitate a favorable settlement. JMT's ROW staff will negotiate with each property owner with a minimum of three contacts, obtaining any agreements, right of entries, and utility agreements. JMT's ROW staff will also facilitate the delivery of all negotiation packages that have been approved by VDOT.

Relocation. JMT's ROW staff will relocate all displaced residents and businesses according to the standards of the Uniform Relocation Act. The staff will perform housing replacement studies and compute a Replacement Housing Payment (RHP), moving costs, moving expenses, utility hookup fees, last resort housing payments, mortgage differential costs, home inspection costs, and applicable settlement and closing fees. All claims will be processed according to the Uniform Relocation Act, the Code of Virginia, and VDOT's Right-of-Way and Utilities Division guidelines and regulations. All Relocation Claims will be submitted to VDOT for approval and payment. JMT's ROW staff will send all necessary ninety (90) day notices to each displaced Owner, Tenant, or Business entity as required by the Uniform Relocation Act and the Code of Virginia. **In the RFP, VDOT has indicated that the team may consider requesting that special incentives be utilized in the relocation assistance process. This involves offering the displaced property owner an incentive such as a percentage increase in the RHP amount if they move more quickly in order to clear the property. The incentive would require VDOT and Federal Highway Administration approval. The team will consider this incentive program immediately upon Notice to Proceed.**



Closing Services. JMT’s ROW staff will conduct property closing and settlements including the preparation of closing documents and obtaining releases. The staff will order all check requests and disperse all proceeds to the property owners and any lien holders of record. Checks will be delivered and deeds will be recorded as directed by the VDOT’s Attorney. All closing work will be completed in strict coordination with the VDOT’s legal staff.

The Key/JMT Team will submit a request for concurrence for clearance of ROW package to VDOT for review and approval prior to beginning construction activities on acquired ROW.

Environmental Coordination and Approvals

Preliminary environmental activities will begin soon after receiving Notice to Proceed and will include a thorough environmental evaluation and confirmation of the information provided in the RFP documents. Environmental evaluations will include review and evaluation of the environmental document, cultural resources, recreational facilities, water quality permits, threatened and endangered species, hazardous materials, noise mitigation, air quality, and environmental compliance. The Key/JMT Team will prepare a comprehensive environmental management plan that includes a matrix of environmental commitments and environmental compliance requirements; identifies milestone dates and integrates those into the project schedule; identifies the responsible party; and summarizes requirements. Details of our approach to Environmental Management are provided in Section 4.4.1 of this Technical Proposal. The Key/JMT Team will provide VDOT with the results of the initial environmental evaluations.

Final environmental activities will begin immediately after receiving Notice to Proceed and, where required, preliminary plan approval from VDOT. At this point in the design, the “footprint” for the project will be firmly established and the Key/JMT Team will identify the final environmental impacts required to construct the project. Assuming the information provided in the RFP documents is correct, little environmental work will be required during final design with one exception – water quality permits. Obtaining the water quality permits for relocating Lick Run in a timely manner will be extremely critical for project success.

Through experience, the Team’s environmental subconsultant, Anderson and Associates, Inc. (A&A) has developed a step by step plan to navigate the water quality permitting process. The initial steps will include preliminary stream and wetland delineations that will be used to obtain a jurisdictional determination (JD) from the CoE. The JD will be used to quantify the impacts to waters of the United States associated with the proposed project. Once the impacts are quantified, A&A will complete and submit a Joint Permit Application to obtain permits from the DEQ, VMRC and possibly the CoE. A&A anticipates that part of the permit application will be a mitigation plan to offset the impacts to Lick Run. One option for mitigation is the purchase of credits from stream and wetland mitigation banks. A&A has had preliminary discussions with two local stream and wetland mitigation banks to assess the feasibility of this mitigation option for the I-581/Valley View Boulevard Interchange project. It appears that sufficient mitigation credits would be available from the Blue Ridge Land Preservation and/or Graham David Mitigation Banks. A&A will also implement the public notification process as required by the regulatory agencies. Final approval of the permits may require modifications to the permit application. A&A will work with the Key/JMT Team and VDOT in addressing regulatory issues that may arise during the permitting process. A&A will track and report progress throughout the permitting process.

The Key/JMT Team will assist VDOT during the Document Re-evaluations for Right-of-Way Authorization, the Document Re-evaluations for PS&E Authorization, and the preparation of the Environmental Certification/Commitments Checklist. The Key/JMT Team will also conduct compliance monitoring and



reporting during the construction as required by VDOT and DCR. All monitoring reports will be submitted to VDOT.

Utilities

The utility activities for the project will be performed in two phases of design – preliminary design and final design – followed by the construction phase. The Key/JMT Team will perform a preliminary assessment of the site and provide initial utility reconnaissance information including existing utility conditions, potential conflicts, identifiable challenges, and right-of-way needs. The Team will collect utility as-built plans and system design maps, and develop utility coordination schedules. The Team will develop or coordinate a preliminary utility design including a schematic design of a conceptual plan for the adjustment or relocation of the existing utilities, locations of potential easements, cost estimates, and schedules for the work. The Team will file a “Preliminary Utility Design Package” with all parties.

Impacts to water, sanitary sewer, gas, telecommunications, and electric utility facilities, including the relocation and reworking of traffic control device signalization, signage, and other service feeds may be encountered. The Team will perform title research and will review surveys, easements, agreements, licenses, and any other documents provided by the utility owner describing their rights and obligations. The Team has also developed a utility-standard, recordation-ready, easement plat for relocated facilities.

Preliminary Design Tasks include:

- Meet with VDOT’s District Utilities Office within 45 days of the Date of Commencement (DOC)
- Prepare, submit, and obtain permission to perform utility designations and test holes
- Contact Miss Utility and request a “Design Ticket” to mark all existing utilities
- Perform utility designations
- Initiate early coordination with all utilities located within the Project limits
- Perform conflict evaluations and perform utility locates (test holes)
- Provide roadway plans to utility owners to allow them to fully understand project impacts
- Coordinate and conduct a preliminary utility field inspection with utility owners and VDOT
- Determine cost responsibility including verifying prior rights and resolving disputes
- Prepare and submit a Preliminary Utility Status Report to VDOT within 120 days of the DOC

After review and approval of the preliminary plans by VDOT and the utility owners, the Team will develop the final utility design plans, trench details, cost estimates, specifications, and schedules for the work. The Team will file with all affected parties a “Final Utility Design Package” including all utility relocation and service re-feed details.

Final Design Tasks include:

- Perform utility relocation designs OR request utility owners to perform utility relocation designs
- Perform identifications and acquisitions for replacement land rights
- Obtain from utility owners
 - ✓ Relocation plans AND a letter of “No Cost” where the utility does not have a compensable right
 - ✓ Relocation plans AND utility agreements AND cost estimates where the utility has a compensable right
 - ✓ Letter of “No Conflict” where the utility will not be impacted by the project
- Review all relocation plans to ensure that relocations comply with VDOT Right of Way and Utilities Division Manual and VDOT Land Use Permit Manual



- Review all relocation plans to ensure that there are NO conflicts with proposed roadway improvements and other utilities existing locations and/or relocations
- Prepare and submit all relocation plans to VDOT for review and approval
- Provide VDOT certification stating that the proposed relocation will not conflict with proposed roadway improvements and will not conflict with another utility's relocation plan
- Receive written approval from VDOT prior to authorizing utilities to commence relocation construction

Sequence of Construction

The bridge and roadway work will be performed in five phases as described in general below:

Phase I will include a portion of the I-581 off ramp (Ramp Y) to Valley View Boulevard that is currently outside of the existing traffic pattern. Work will also begin on the South side of the Valley View Boulevard Bridge widening including the pier work in the median. While working the I-581 off ramp, the shoulder widening will also be done on Northbound I-581 from stations 223+50 to 236+00 in its entirety. A temporary lane will be constructed on the inside of the existing I-581 on ramp (Ramp Z) to allow for the proposed Ramp Z construction to begin in a later phase. **The retaining wall, Sound Barrier Wall #1, and the Southbound I-581 shoulder widening from stations 163+00 to 213+00 will all be done at this time while the traffic control is in place for this area.**

Phase II includes switching traffic onto the newly constructed portion of the I-581 off ramp (Ramp Y) which will allow the existing ramp to be demolished and the majority of the proposed Ramp Y construction to be completed. The shoulder widening on Northbound I-581 from stations 217+00 to 223+50 can also be completed at this time. Work on the South side of the Valley View Boulevard Bridge will be completed and traffic will be shifted onto the temporary I-581 on ramp constructed in Phase I. After traffic is shifted, the proposed Southbound I-581 acceleration lane and shoulder widening from stations 220+00 to 236+00 will be completed.

Phase II A includes shifting the I-581 off ramp (Ramp Y) traffic onto the newly completed section from earlier in Phase II and constructing the outside portion of Eastbound Valley View Boulevard from stations 330+30 to 339+36. Traffic on Eastbound Valley View Boulevard will be reduced to one lane at this time.

Phase III will include the North side of the Valley View Boulevard bridge construction. While the bridge work is ongoing, Westbound Valley View Boulevard will be reduced to one lane and the outside lane from stations 331+00 to 339+36 will be constructed. Following the Westbound Valley View Boulevard work, the I-581 Southbound on-ramp (Ramp Z) will be constructed from stations 10+00 to 22+05.

Phase IV includes the center section of Valley View Boulevard from stations 331+00 to 339+36. Eastbound and Westbound Valley View Boulevard will remain one lane and will be switched to the newly constructed outside lanes during this phase. Valley View Boulevard Bridge Construction Phase IV will be completed along with Ramp W from stations 10+00 to 14+02 and the left portion of Ramp Z from stations 10+00 to 17+73. Ramp X from stations 10+00 to 27+59 and the Northbound I-581 shoulder widening from stations 166+50 to 205+25 will be completed simultaneously. ~~The retaining wall, Sound Barrier Wall #1, and the Southbound I-581 shoulder widening will all be done while the traffic control is in place for this area.~~

Phase V will include placing the surface course of asphalt on all roadways (except the I-581 shoulder widening which was completed while traffic control was in place) and the pavement marking. Permanent signage will also be completed and the temporary construction signs will be removed.



Utility Relocation Activities

The Key/JMT Team will manage the utility relocation construction process including preparing in-plan utility relocation plans for water and sewer facilities. The Team will review all utility designs and cost estimates for least-cost-method design practices, and will challenge line items and practices found to be inaccurately or inappropriately charged to the Project. The Team will coordinate installation inspections with the required utility owners and perform compliance inspections during construction process. Record (As-Built) Plans and closeout documentation, utility release documents, and quit claims will be developed after completion of the utility relocation.

Construction Tasks include:

- Perform utility relocations and/or authorize utility owner’s to begin and perform their utility relocations
- Reimburse appropriate utility owner costs
- Certify to VDOT that all utilities have been identified, conflicts have been resolved, utilities have been relocated, and utility owners claims and compensable rights have been satisfied
- Show final location of all utilities on the Record (As-Built) Plans

Work By Others

Installation of the lighting on the Shared Use Path and along Valley View Boulevard will be performed by Appalachian Power Company.

Potential Delays

The following risk issues have been identified as having the potential to cause delays:

- Problematic subsurface geology (karst limestone formations)
- Severe winter weather
- Utility relocation issues
- Conflicts with unknown utilities
- Delays in the acquisition of regulatory agency approvals or permits
- Delays in the acquisition of required right-of-way
- Heavy traffic

The above described items will be closely monitored and included in the schedule updates. Potential delays will be acted upon at the earliest possible time.

DBE Participation

The Baseline Schedule will identify activities performed or partially performed by DBE entities.

Explanation of the Critical Path

The project critical path flows through the following design activities:

- Prepare Preliminary Bridge Plans
- Prepare Preliminary Roadway Plans
- Perform Survey
- Prepare Updated Survey File
- Perform Geotechnical Investigation
- Perform Materials Analysis and Laboratory Investigations
- Perform Preliminary Geotechnical Engineering
- Prepare Preliminary Geotechnical Report
- Evaluate Proposed ROW



- Prepare Preliminary ROW Data Sheet
- Assemble and Submit Preliminary Plans and Reports
- First VDOT Review Period
- Revise and Resubmit Preliminary Plans and Reports
- Finalize Horizontal and Vertical Geometry and Typical Sections
- Finalize Cross Sections and Limits of Construction
- Prepare Final Roadway Plans
- Perform Signal, Sign, and Pavement Marking Design
- Prepare Final Traffic Control Devices Plan
- Assemble and Submit Final Roadway Plans
- First VDOT Review Period
- Revise and Resubmit Final Plans
- Second VDOT Review Period
- Final Roadway Plan Approval

Once the design activities have completed, the critical path moves into the construction phase of the project. The critical path begins in Phase I with the construction of the South side of the Valley View Boulevard bridge. Once these bridge construction activities are completed, the critical path then moves into Phase II with the construction of Ramp Y and the Valley View Boulevard tie-in at station 329+90. After the tie-in is complete, the critical path moves into Phase IIA with the construction of the outside lane of Eastbound Valley View Boulevard from stations 331+00 to 339+36. Once this is completed, the critical path moves into Phase III and follows the North side of the Valley View Boulevard bridge construction. After the bridge work is complete, the critical path then moves into Phase IV with the construction of the center lane of Valley View Boulevard from stations 331+00 to 339+36, then follows Ramp Z and into the Ramp X construction. The critical path completes in Phase V with the installation of the final asphalt surface course and permanent pavement markings.

A critical path report is attached.

Significant Assumptions Relative to Productivity and Critical Activities

There are a number of activities on this project that will not be on the critical path and are currently scheduled to be done in the later phases. As the design phase continues, we anticipate having the ability to perform some of these activities earlier in the project by incorporating materials and methods that are more readily available and better suited for the specific requirements of each activity. As our work progresses, we are continually searching for ways to improve constructability and productivity through strategic planning and design.

Summary

The Key/JMT Team has developed a Proposal Schedule and Proposal Schedule Narrative that demonstrates our understanding of the complexities and interrelationships of the technical elements of the Project. Additionally, our Proposal Schedule takes into account: internal plan reviews, VDOT plan reviews and approvals, environmental permitting and constraints, right of way acquisition, utility relocation, construction activities, and QA/QC inspection and testing.



Key Construction Company, Inc.

P.O. Box 698
11453 Hwy 15 South
Clarksville, VA 23927



JOHNSON, MIRMIRAN & THOMPSON
Engineering A Brighter Future®

9201 Arboretum Parkway
Suite 310
Richmond, VA 23236

TECHNICAL PROPOSAL

Revised September 20, 2012

Volume II

I-581/VALLEY VIEW BOULEVARD INTERCHANGE PHASE II

From: ~0.240 Mi. S. Route 101 (Hershberger Road)
To: ~1.561 Mi. S. Route 101 (Hershberger Road)
City of Roanoke, Virginia



State Project No.: 0581-128-109, P101, RW201, C501, B627
Federal Project No.: NH-581-5(035)
Contract ID Number: C00016595DB45

This proposal has been prepared by:



PROJECT MANAGER _____
SURVEYED BY _____
DESIGN SUPERVISED BY _____
DESIGNED BY _____

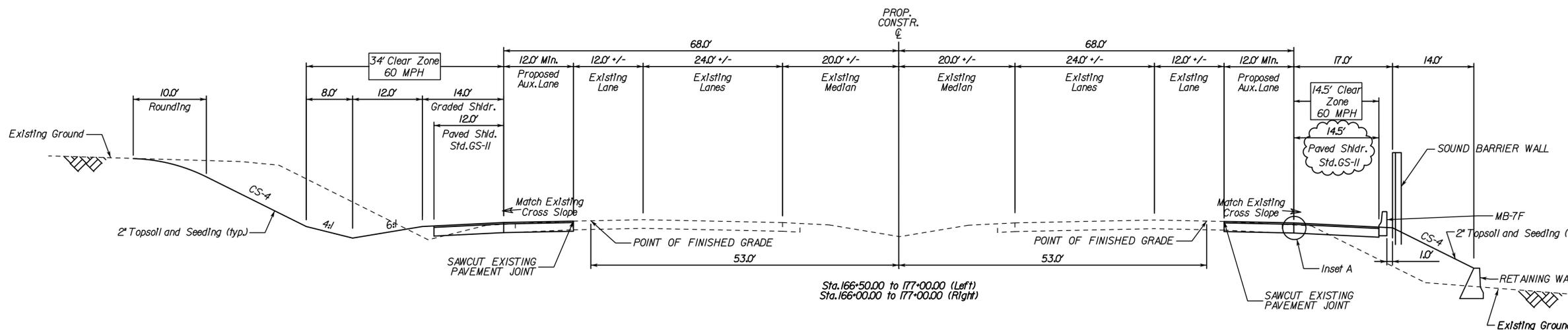
TYPICAL SECTIONS

Denotes Changes Associated with the Technical Proposal Plans Dated July 18, 2012

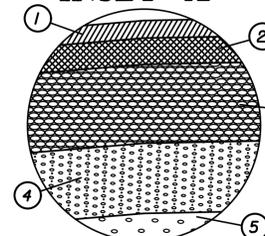
REVISED	STATE	ROUTE	PROJECT	SHEET NO.
	VA.	581	0581-128-109, RW-201, C-501	

DESIGN FEATURES RELATING TO CONSTRUCTION OR TO REGULATION AND CONTROL OF TRAFFIC MAY BE SUBJECT TO CHANGE AS DEEMED NECESSARY BY THE DEPARTMENT

INTERSTATE 581 RETAINING WALL NEAR LICK RUN

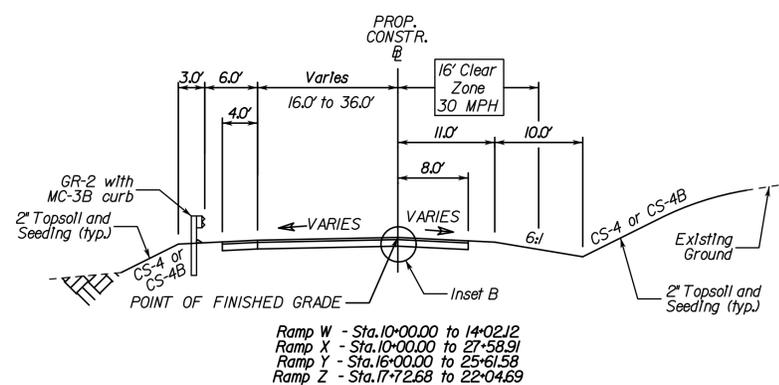


INSET A



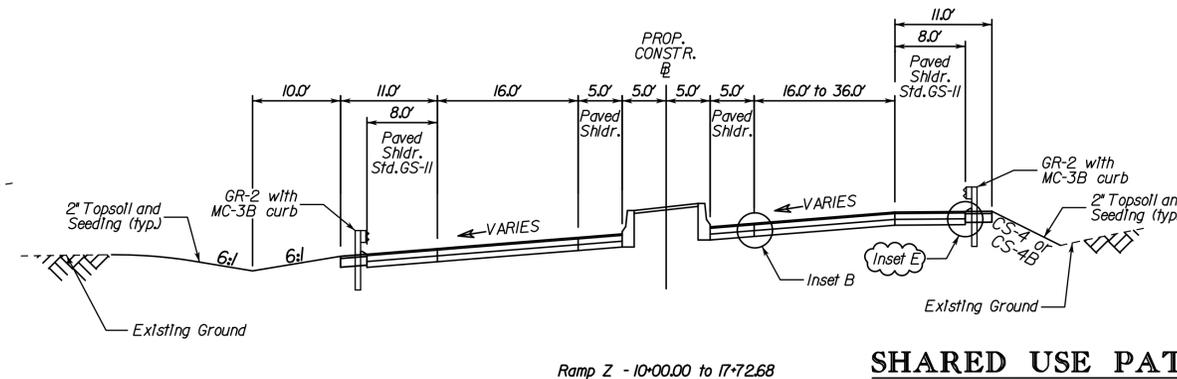
- 1 ASPHALT CONCRETE SURFACE COURSE, TYPE SMA-12.5 (76-22) @ 220 LBS.PER SQ.YD.
- 2 3\"/>

RAMPS



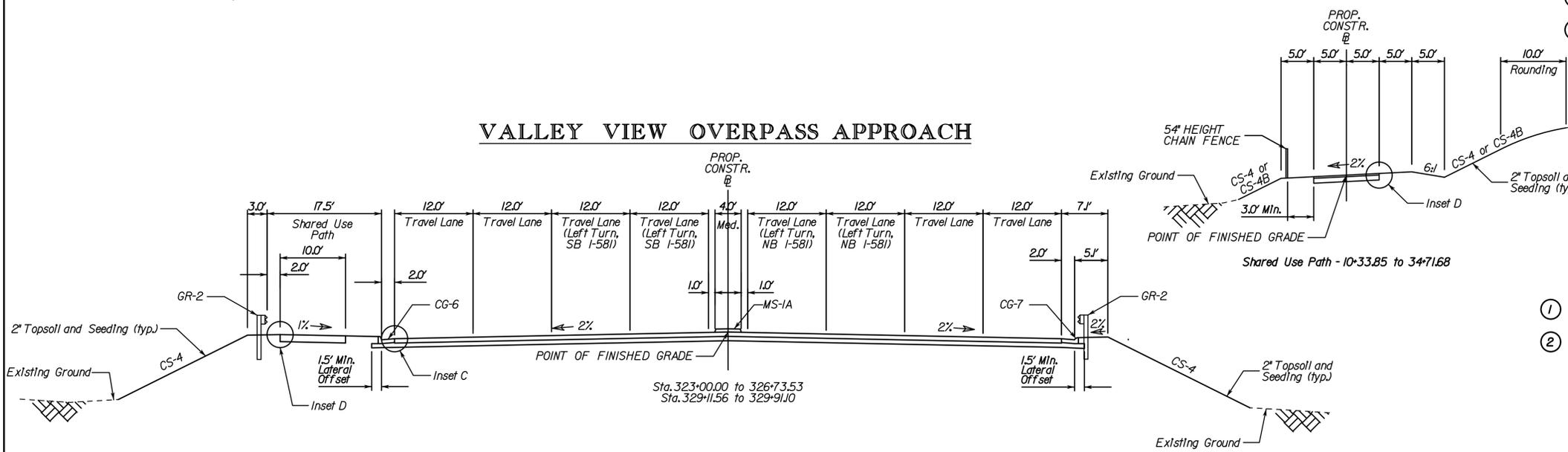
Ramp W - Sta.10+00.00 to 14+02.12
Ramp X - Sta.10+00.00 to 27+58.91
Ramp Y - Sta.16+00.00 to 25+61.58
Ramp Z - Sta.17+72.68 to 22+04.69

RAMP W & Z



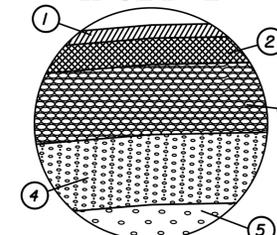
Ramp Z - 10+00.00 to 17+72.68

SHARED USE PATH



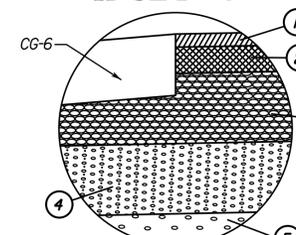
Sta.323+00.00 to 326+73.53
Sta.329+11.56 to 329+91.10

INSET B



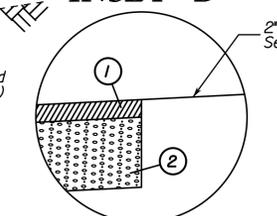
- 1 ASPHALT CONCRETE SURFACE COURSE, TYPE SM-9.5D @ 165 LBS.PER SQ.YD.
- 2 2\"/>

INSET C



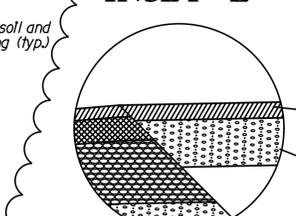
- 1 ASPHALT CONCRETE SURFACE COURSE, TYPE SM-9.5D @ 165 LBS.PER SQ.YD.
- 2 2\"/>

INSET D



- 1 ASPHALT CONCRETE SURFACE COURSE, TYPE SM-9.5AL @ 220 LBS.PER SQ.YD.
- 2 8\"/>

INSET E



- 1 ASPHALT CONCRETE SURFACE COURSE, TYPE SM-9.5D @ 220 LBS.PER SQ.YD.
- 2 6\"/>

NOTE:
FOR AREAS NOT COVERED ON THIS SHEET TYPICAL SECTIONS WILL MATCH THOSE DEPICTED IN THE RFP PLANS.

PROJECT	SHEET NO.
0581-128-109	

REVISION	STATE	ROUTE	PROJECT	SHEET NO.
	VA.	581	0581-128-109, RW-201, C-501	3

DESIGN FEATURES RELATING TO CONSTRUCTION OR TO REGULATION AND CONTROL OF TRAFFIC MAY BE SUBJECT TO CHANGE AS DEEMED NECESSARY BY THE DEPARTMENT

Company Name
(Location), Virginia
ROADWAY ENGINEER

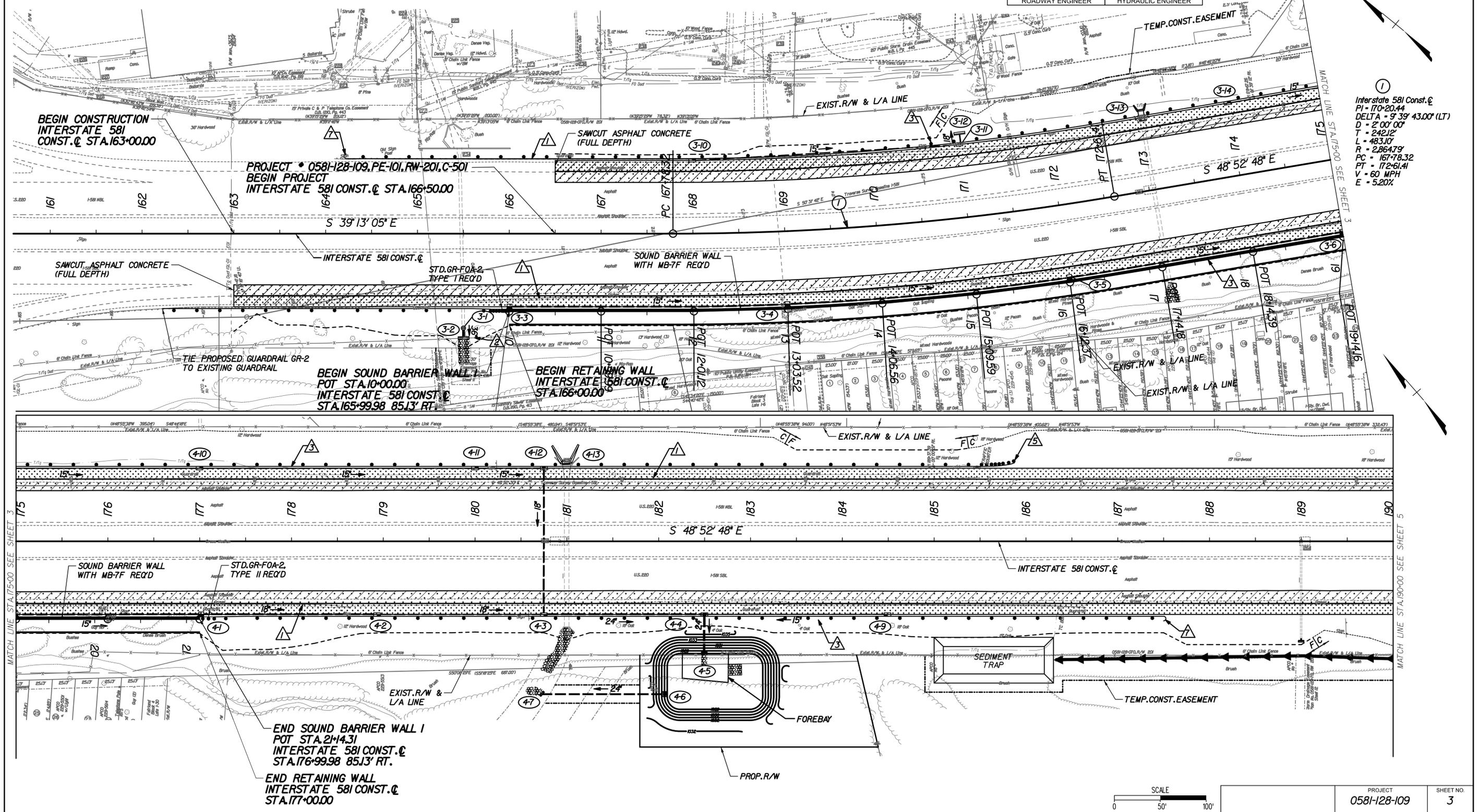
Company Name
(Location), Virginia
HYDRAULIC ENGINEER

LEGEND

Note: Figures in parentheses and dot-dash lines denote Temporary Easements.
Note: Figures in brackets and dot-dash lines denote Permanent Easements.
C --- Denotes Construction Limits In Cuts
F --- Denotes Construction Limits In Fills

Denotes Demolition of Pavement
 Denotes Proposed Asphalt Pavement
 Denotes Proposed Asphalt Shoulder

- DENOTES REMOVAL OF EXISTING GUARDRAIL
- DENOTES REMOVAL OF EXISTING FENCE
- DENOTES STD.GR-2 REQ'D.
- DENOTES STD.RADIAL GR-2 REQ'D.
- DENOTES STD.GR-7 REQ'D.
- DENOTES STD.GR-9 REQ'D.
- DENOTES STD.GR-11 REQ'D.
- DENOTES STD.CG-3 REQ'D.
- DENOTES STD.CG-6 REQ'D.
- DENOTES STD.CG-7 REQ'D.
- DENOTES STD.MS-1A REQ'D.
- DENOTES STD.MS-2 REQ'D.
- DENOTES DRAINAGE STRUCTURE TO BE REMOVED.
- DENOTES DRAINAGE STRUCTURE TO BE RETAINED.



①
Interstate 581 Const. @
PI = 170+20.44
DELTA = 9° 39' 43.00" (LT)
D = 2'00' 00"
T = 242.12'
L = 483.10'
R = 2,864.79'
PC = 167+78.32
PT = 172+61.41
V = 60 MPH
E = 5.20%



PROJECT	SHEET NO.
0581-128-109	3

REVISION	STATE	ROUTE	PROJECT	SHEET NO.
	VA.	581	0581-128-109, RW-201, C-501	5

DESIGN FEATURES RELATING TO CONSTRUCTION OR TO REGULATION AND CONTROL OF TRAFFIC MAY BE SUBJECT TO CHANGE AS DEEMED NECESSARY BY THE DEPARTMENT

Company Name
(Location), Virginia
ROADWAY ENGINEER

Company Name
(Location), Virginia
HYDRAULIC ENGINEER

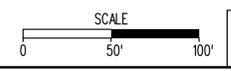
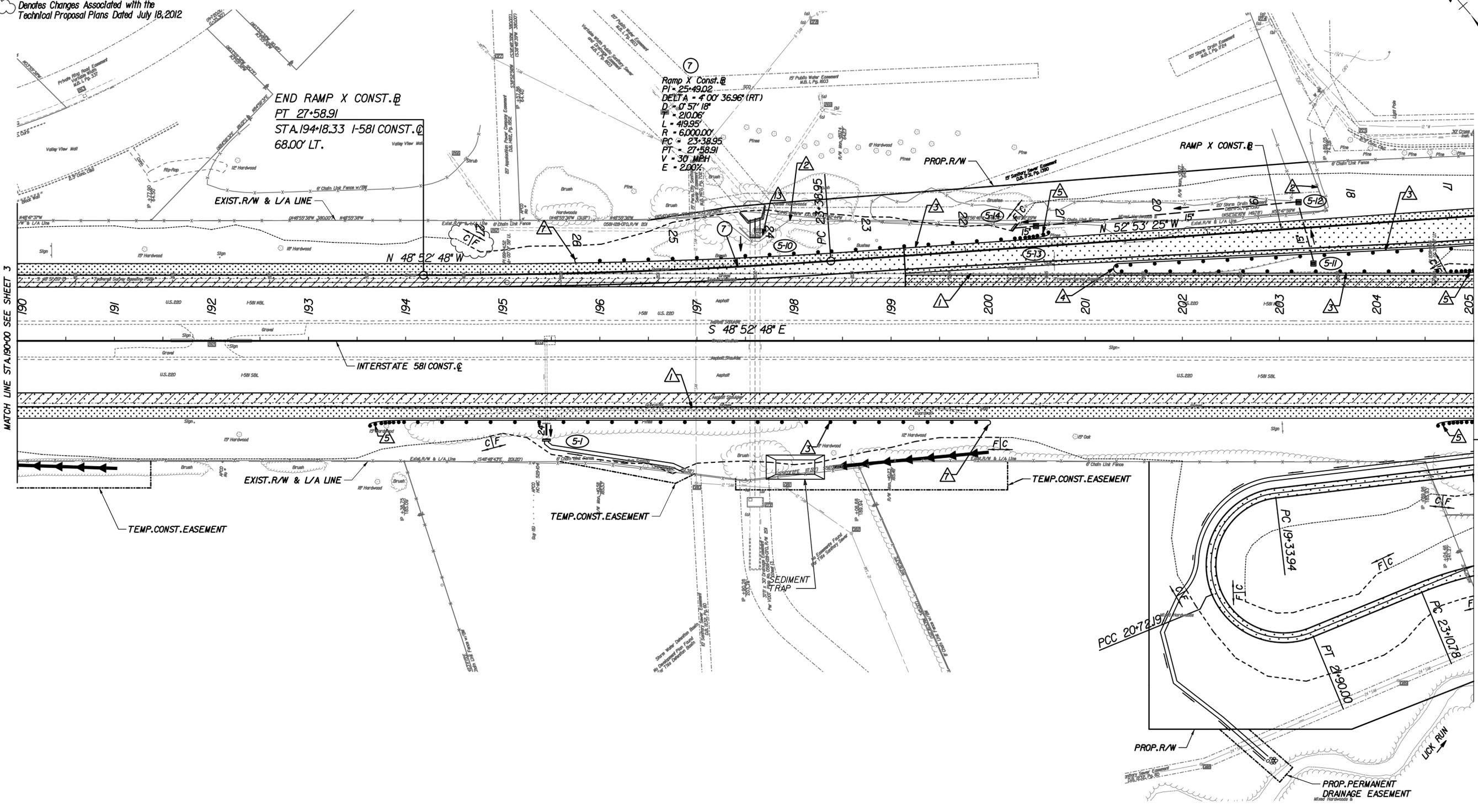
LEGEND

Note: Figures in parentheses and dot-dashed lines denote Temporary Easements.
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C Denotes Construction Limits In Cuts
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- DENOTES STD.GR-7 REQ'D.
- DENOTES STD.GR-9 REQ'D.
- DENOTES STD.GR-11 REQ'D.
- DENOTES STD.CG-3 REQ'D.
- DENOTES STD.CG-6 REQ'D.
- DENOTES STD.CG-7 REQ'D.
- DENOTES STD.MS-1A REQ'D.
- DENOTES STD.MS-2 REQ'D.
- DENOTES DRAINAGE STRUCTURE TO BE REMOVED.
- DENOTES DRAINAGE STRUCTURE TO BE RETAINED.



PROJECT	SHEET NO.
0581-128-109	5

MATCH LINE STA. 205+00 SEE SHEET 6

MATCH LINE SEE SHEET 11

PROJECT MANAGER _____
SURVEYED BY _____
DESIGN SUPERVISED BY _____
DESIGNED BY _____

LEGEND

Note: Figures in parentheses and dot-dot-dashed lines denote Temporary Easements.
Note: Figures in brackets and dot-dashed lines denote Permanent Easements.

C Denotes Construction Limits In Cuts
F Denotes Construction Limits In Fills

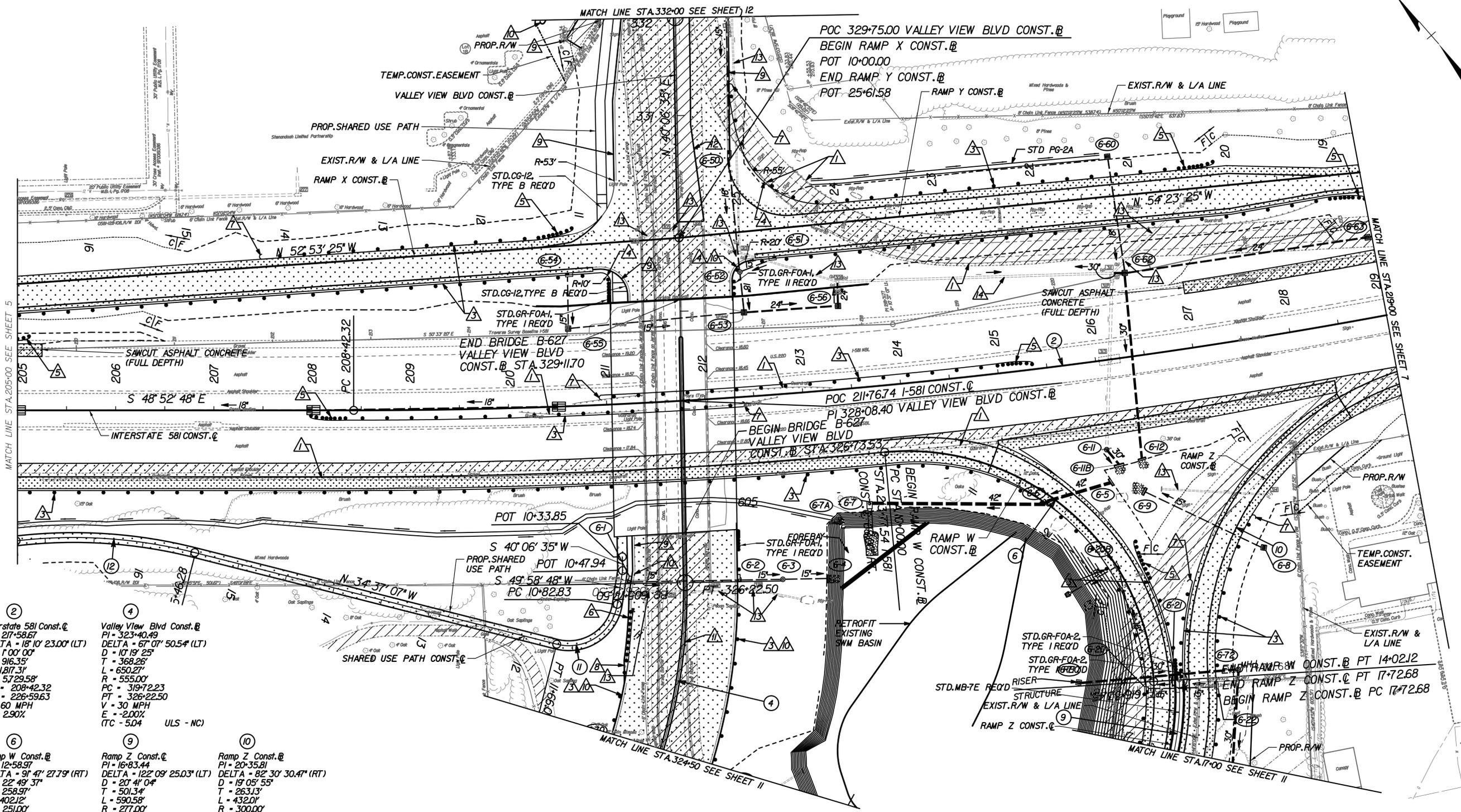
Denotes Demolition of Pavement
Denotes Proposed Asphalt Pavement
Denotes Proposed Asphalt Shoulder

- △ DENOTES REMOVAL OF EXISTING GUARDRAIL
- △ DENOTES REMOVAL OF EXISTING FENCE
- △ DENOTES STD.GR-2 REQ'D.
- △ DENOTES STD.RADIAL GR-2 REQ'D.
- △ DENOTES STD.GR-7 REQ'D.
- △ DENOTES STD.GR-9 REQ'D.
- △ DENOTES STD.GR-II REQ'D.
- △ DENOTES STD.CG-3 REQ'D.
- △ DENOTES STD.CG-6 REQ'D.
- △ DENOTES STD.CG-7 REQ'D.
- △ DENOTES STD.MS-1A REQ'D.
- △ DENOTES STD.MS-2 REQ'D.
- △ DENOTES DRAINAGE STRUCTURE TO BE REMOVED.
- △ DENOTES DRAINAGE STRUCTURE TO BE RETAINED.

REVISED	STATE	ROUTE	PROJECT	SHEET NO.
	VA.	581	0581-128-109, RW-201, C-501	6

DESIGN FEATURES RELATING TO CONSTRUCTION OR TO REGULATION AND CONTROL OF TRAFFIC MAY BE SUBJECT TO CHANGE AS DEEMED NECESSARY BY THE DEPARTMENT

Company Name (Location), Virginia ROADWAY ENGINEER	Company Name (Location), Virginia HYDRAULIC ENGINEER
---	---



2 Interstate 581 Const. C
PI = 217+58.67
DELTA = 18° 10' 23.00" (LT)
D = 100' 00"
T = 916.35'
L = 187.31'
R = 5729.58'
PC = 208+42.32
PT = 226+59.63
V = 60 MPH
E = 2.90%

4 Valley View Blvd Const. B
PI = 323+40.49
DELTA = 67° 07' 50.54" (LT)
D = 10' 19' 25"
T = 368.28'
L = 650.27'
R = 555.00'
PC = 319+72.23
PT = 326+22.50
V = 30 MPH
E = -2.00%
(TC = 5.04 ULS - NC)

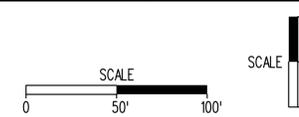
6 Ramp W Const. B
PI = 12+58.97
DELTA = 91° 47' 27.79" (RT)
D = 22° 49' 37"
T = 258.97'
L = 402.12'
R = 251.00'
PC = 10+00.00
PT = 14+02.12
V = 30 MPH
E = 8.00%

9 Ramp Z Const. C
PI = 16+83.44
DELTA = 122° 09' 25.03" (LT)
D = 20° 41' 04"
T = 501.34'
L = 590.58'
R = 277.00'
PC = 11+82.11
PT = 17+72.68
V = 30 MPH
E = 8.00%

10 Ramp Z Const. B
PI = 20+35.81
DELTA = 82° 30' 30.47" (RT)
D = 19° 05' 55"
T = 263.13'
L = 432.01'
R = 300.00'
PC = 17+72.68
PT = 22+04.69
V = 30 MPH
E = 7.90%

PROJECT MANAGER: _____
SURVEYED BY: _____
DESIGN SUPERVISED BY: _____
DESIGNED BY: _____

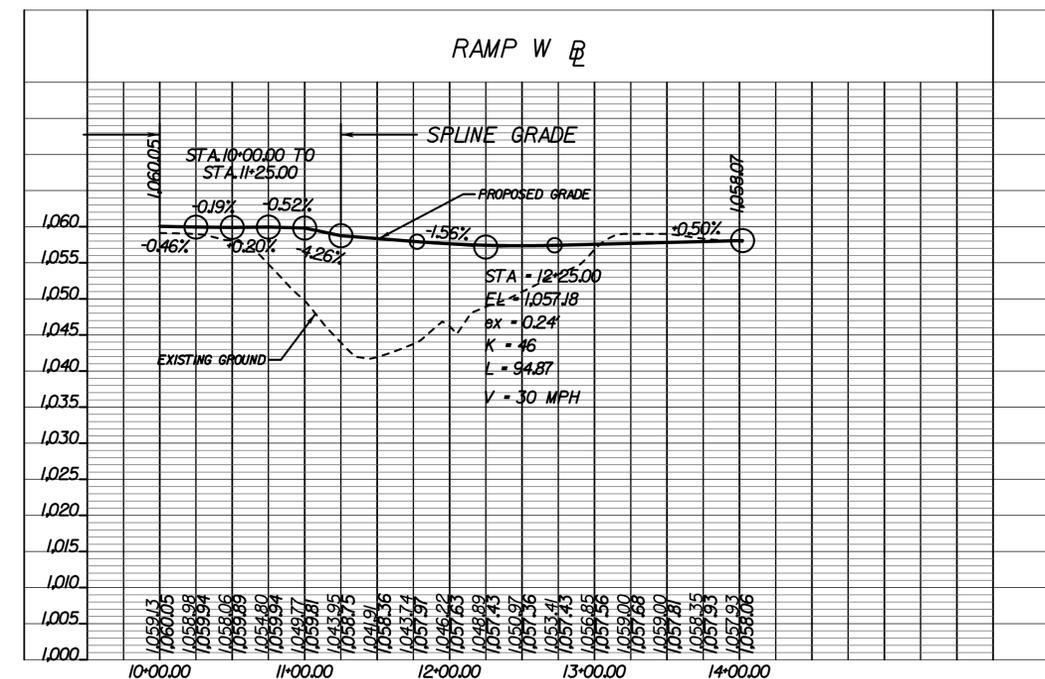
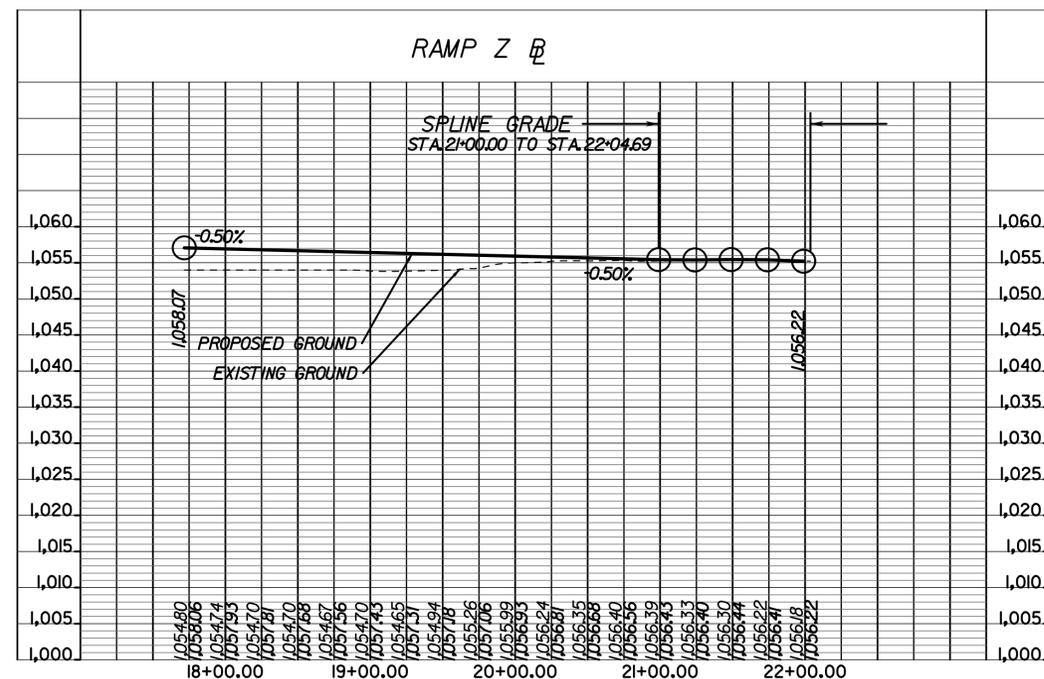
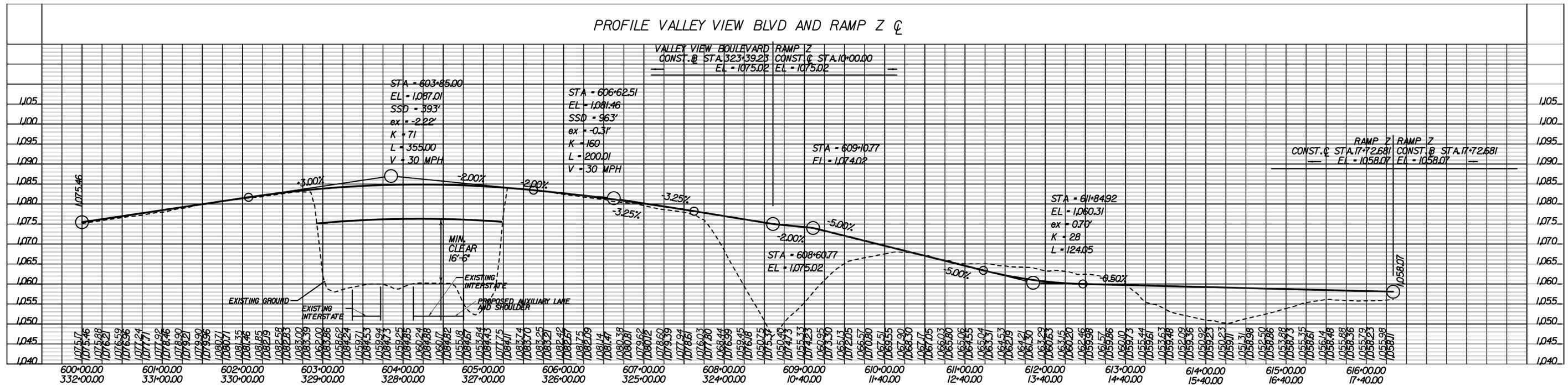
PROFILE AND PROPOSED GRADE



REVISED	STATE	ROUTE	STATE PROJECT	SHEET NO.
	VA.	581	0581-128-109, RW-201, C-501	6A

DESIGN FEATURES RELATING TO CONSTRUCTION OR TO REGULATION AND CONTROL OF TRAFFIC MAY BE SUBJECT TO CHANGE AS DEEMED NECESSARY BY THE DEPARTMENT

Company Name
(Location), Virginia
ROADWAY ENGINEER



Note: Figures in parenthesis and dot-dashed lines denote Temporary Easements.
Note: Figures in brackets and dot-dashed lines denote Permanent Easements.
C --- Denotes Construction Limits In Cuts
F --- Denotes Construction Limits In Fills
Denotes Changes Associated with the Technical Proposal Plans Dated July 18, 2012

Denotes Demolition of Pavement
Denotes Proposed Asphalt Pavement
Denotes Proposed Asphalt Shoulder

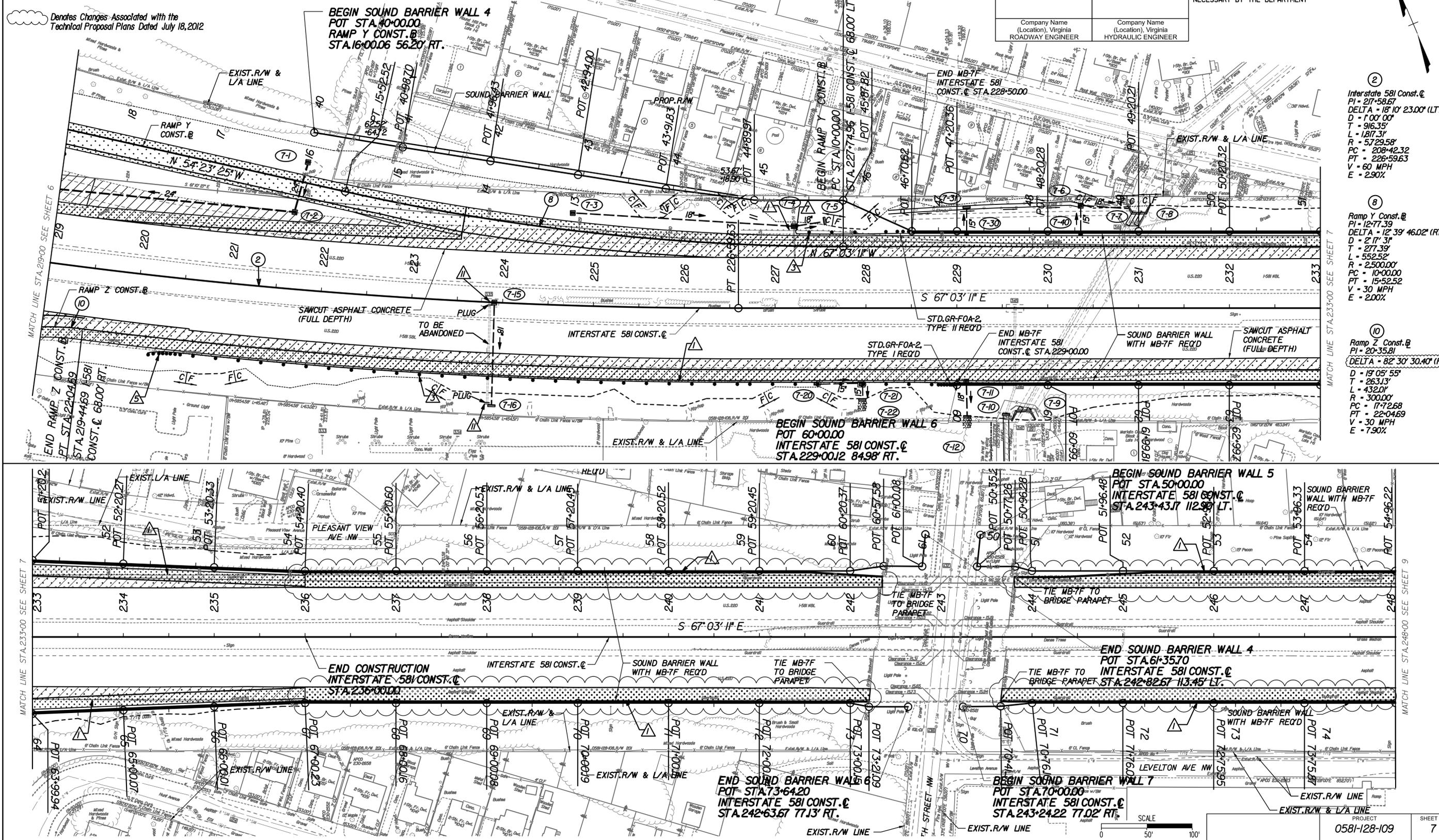
- LEGEND**
- ▲ DENOTES REMOVAL OF EXISTING GUARDRAIL
 - ▲ DENOTES REMOVAL OF EXISTING FENCE
 - ▲ DENOTES STD.GR-2 REQ'D.
 - ▲ DENOTES STD.RADIAL GR-2 REQ'D.
 - ▲ DENOTES STD.GR-7 REQ'D.
 - ▲ DENOTES STD.GR-9 REQ'D.
 - ▲ DENOTES STD.GR-11 REQ'D.
 - ▲ DENOTES STD.CG-3 REQ'D.
 - ▲ DENOTES STD.CG-6 REQ'D.
 - ▲ DENOTES STD.GR-7 REQ'D.
 - ▲ DENOTES STD.MS-1A REQ'D.
 - ▲ DENOTES STD.MS-2 REQ'D.
 - ▲ DENOTES DRAINAGE STRUCTURE TO BE REMOVED.
 - ▲ DENOTES DRAINAGE STRUCTURE TO BE RETAINED.

REVISED	STATE	ROUTE	PROJECT	SHEET NO.
	VA.	581	0581-128-109, RW-201, C-501	7

DESIGN FEATURES RELATING TO CONSTRUCTION OR TO REGULATION AND CONTROL OF TRAFFIC MAY BE SUBJECT TO CHANGE AS DEEMED NECESSARY BY THE DEPARTMENT

Company Name (Location), Virginia
ROADWAY ENGINEER

Company Name (Location), Virginia
HYDRAULIC ENGINEER



② Interstate 581 Const. C
PI = 27+58.67
DELTA = 18° 10' 23.00" (LT)
D = 1'00' 00"
T = 916.35'
L = 1817.31'
R = 5729.58'
PC = 208+42.32
PT = 226+59.63
V = 60 MPH
E = 2.90%

⑧ Ramp Y Const. B
PI = 12+77.39
DELTA = 123° 39' 46.02" (RT)
D = 217' 31"
T = 277.39'
L = 552.52'
R = 2500.00'
PC = 10+00.00
PT = 15+52.52
V = 30 MPH
E = 2.00%

⑩ Ramp Z Const. B
PI = 20+35.81
DELTA = 82° 30' 30.40" (RT)
D = 19' 05' 55"
T = 263.13'
L = 432.01'
R = 300.00'
PC = 17+72.68
PT = 22+04.69
V = 30 MPH
E = 7.90%



PROJECT	SHEET NO.
0581-128-109	7

REVISED	STATE	ROUTE	STATE	PROJECT	SHEET NO.
	VA.	581		0581-128-109, RW-201, C-501	9

DESIGN FEATURES RELATING TO CONSTRUCTION OR TO REGULATION AND CONTROL OF TRAFFIC MAY BE SUBJECT TO CHANGE AS DEEMED NECESSARY BY THE DEPARTMENT

Company Name (Location), Virginia
ROADWAY ENGINEER

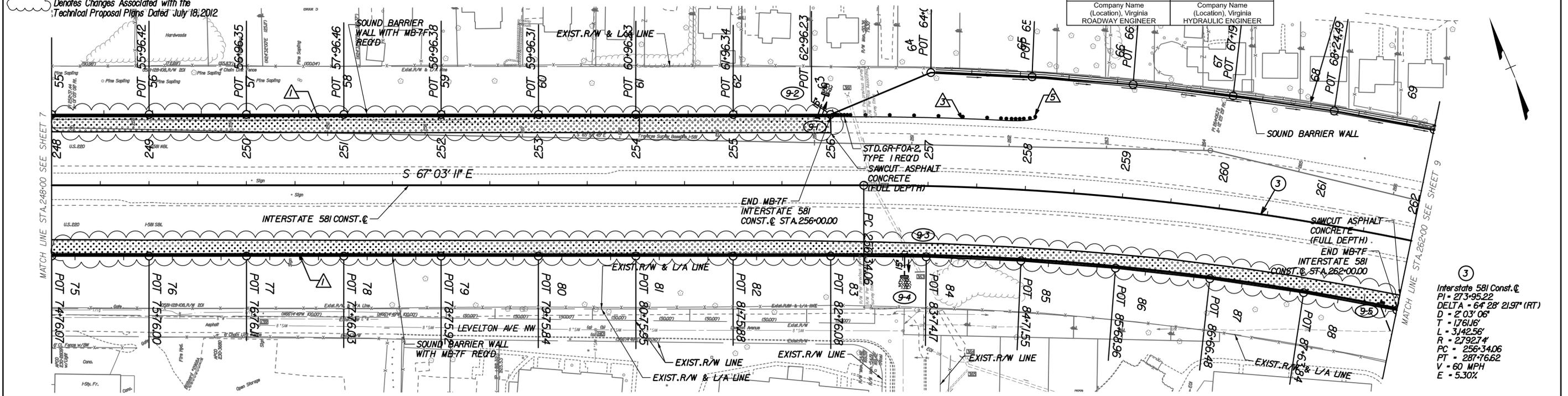
Company Name (Location), Virginia
HYDRAULIC ENGINEER

Note: Figures in parenthesis and dot-dot-dashed lines denote Temporary Easements.
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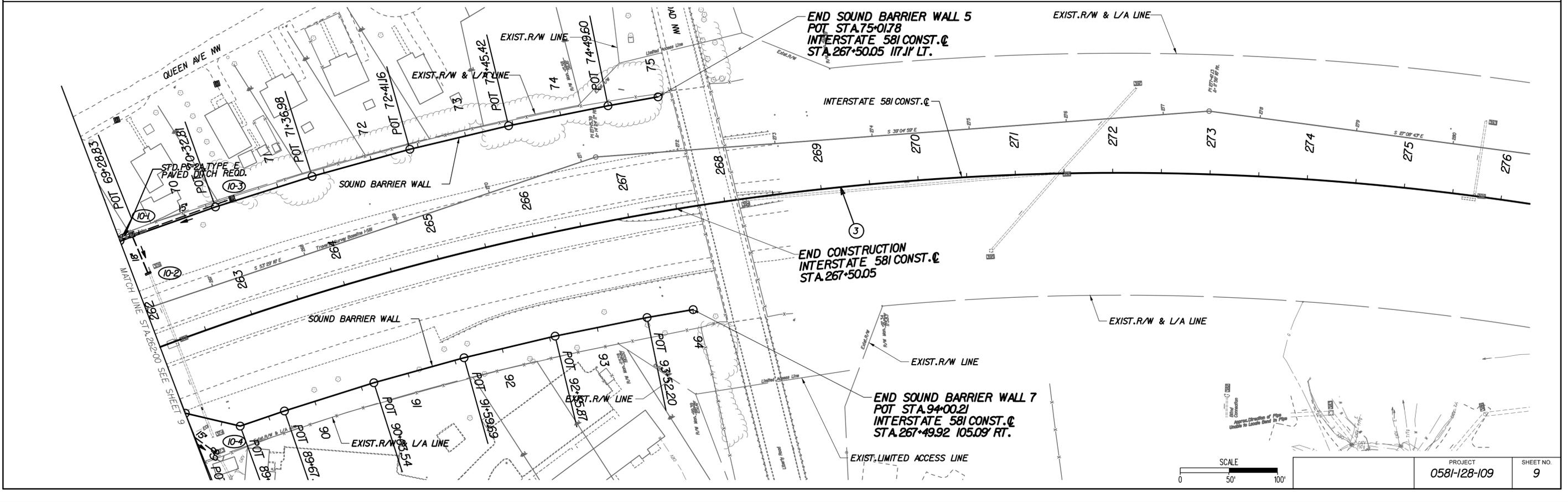
C --- Denotes Construction Limits In Cuts
F --- Denotes Construction Limits In Fills

Denotes Changes Associated with the Technical Proposal Plots Dated July 18, 2012

- LEGEND**
- △ DENOTES REMOVAL OF EXISTING GUARDRAIL
 - △ DENOTES STD.GR-9 REQ'D.
 - △ DENOTES STD.GR-11 REQ'D.
 - △ DENOTES STD.GR-2 REQ'D.
 - △ DENOTES STD.RADIAL GR-2 REQ'D.
 - △ DENOTES STD.GR-7 REQ'D.
 - △ DENOTES STD.GR-11 REQ'D.
 - △ DENOTES STD.GR-3 REQ'D.
 - △ DENOTES STD.CG-6 REQ'D.
 - △ DENOTES STD.CG-7 REQ'D.
 - △ DENOTES STD.MS-1A REQ'D.
 - △ DENOTES STD.MS-2 REQ'D.
 - △ DENOTES DRAINAGE STRUCTURE TO BE REMOVED.
 - △ DENOTES DRAINAGE STRUCTURE TO BE RETAINED.
- Denotes Demolition of Pavement
- Denotes Proposed Asphalt Pavement
- Denotes Proposed Asphalt Shoulder



Interstate 581 Const. @
PI = 273+95.22
DELTA = 64° 28' 21.97" (RT)
D = 2' 03' 06"
L = 176.16'
R = 2792.74'
PC = 256+34.06
PT = 287+76.62
V = 60 MPH
E = 5.30%



PROJECT	SHEET NO.
0581-128-109	9

REVISED	STATE	ROUTE	PROJECT	SHEET NO.
	VA.	581	0581-128-109, RW-201, C-501	11

DESIGN FEATURES RELATING TO CONSTRUCTION OR TO REGULATION AND CONTROL OF TRAFFIC MAY BE SUBJECT TO CHANGE AS DEEMED NECESSARY BY THE DEPARTMENT

Company Name (Location), Virginia ROADWAY ENGINEER	Company Name (Location), Virginia HYDRAULIC ENGINEER
--	--

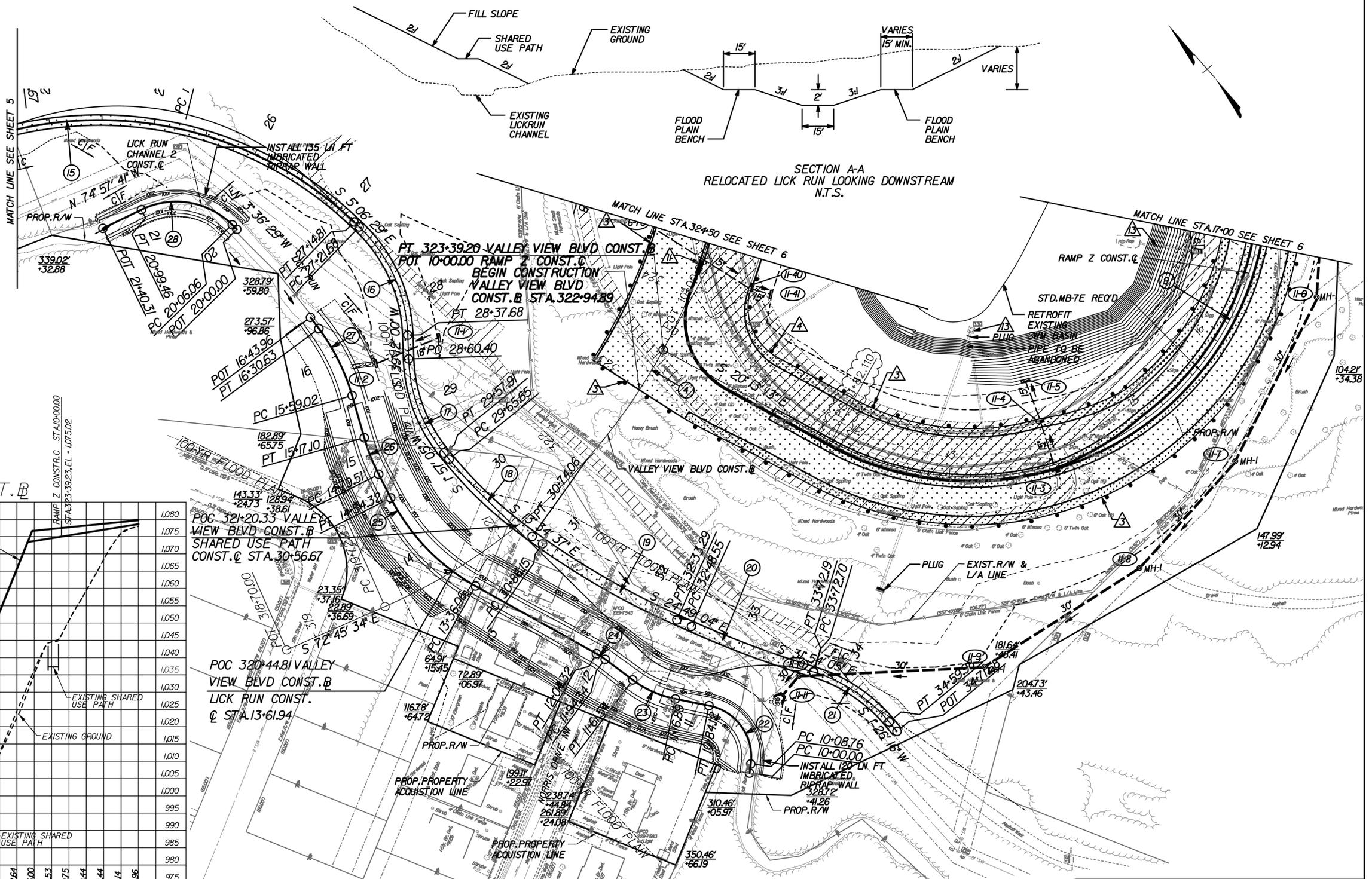
LEGEND

Note: Figures in parentheses and dot-dot-dashed lines denote Temporary Easements.
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C --- Denotes Construction Limits In Cuts
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Denotes Changes Associated with the Technical Proposal Plans Dated July 18, 2012

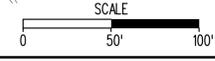
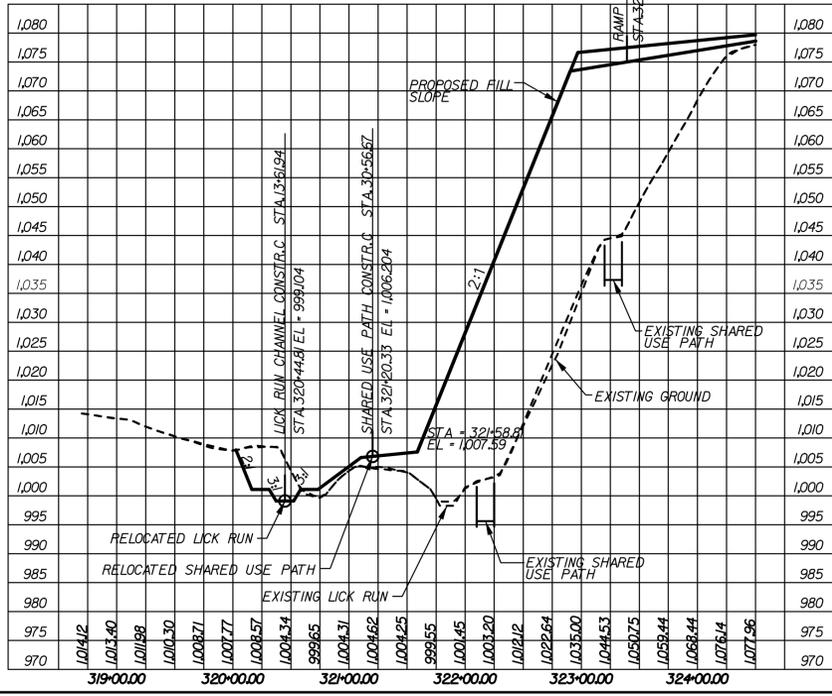
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- Denotes Proposed Asphalt Shoulder
- DENOTES REMOVAL OF EXISTING GUARDRAIL
- DENOTES REMOVAL OF EXISTING FENCE
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- DENOTES STD.RADIAL GR-2 REQ'D.
- DENOTES STD.GR-7 REQ'D.
- DENOTES STD.GR-9 REQ'D.
- DENOTES STD.GR-11 REQ'D.
- DENOTES STD.CG-3 REQ'D.
- DENOTES STD.CG-6 REQ'D.
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- DENOTES STD.MS-2 REQ'D.
- DENOTES DRAINAGE STRUCTURE TO BE REMOVED.
- DENOTES DRAINAGE STRUCTURE TO BE RETAINED.

4
Valley View Blvd Const. B
PI = 323+40.49
DELTA = 67° 07' 50.54" (LT)
D = 10' 18' 25"
T = 368.26'
L = 650.27'
R = 555.00'
PC = 319+72.23
PT = 326+22.50
V = 30 MPH
E = -2.00%
(TC = 5.04 ULS - NC)

9
Ramp Z Const. C
PI = 16+83.44
DELTA = 122° 09' 25.03" (LT)
D = 20' 4' 0"
T = 501.34'
L = 590.58'
R = 277.00'
PC = 11+82.11
PT = 17+72.68
V = 30 MPH
E = 8.00%



VALLEY VIEW BOULEVARD CONST. B



PROJECT	SHEET NO.
0581-128-109	11

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Note: Figures in brackets and dot-dashed lines denote Permanent Easements.

C.....Denotes Construction Limits In Cuts
F.....Denotes Construction Limits In Fills

☁ Denotes Changes Associated with the Technical Proposal Plans Dated July 18, 2012

Diagonal lines: Denotes Demolition of Pavement
Dotted pattern: Denotes Proposed Asphalt Pavement
Stippled pattern: Denotes Proposed Asphalt Shoulder

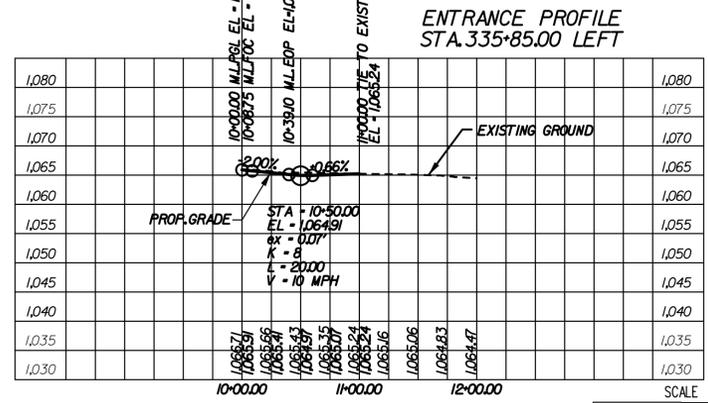
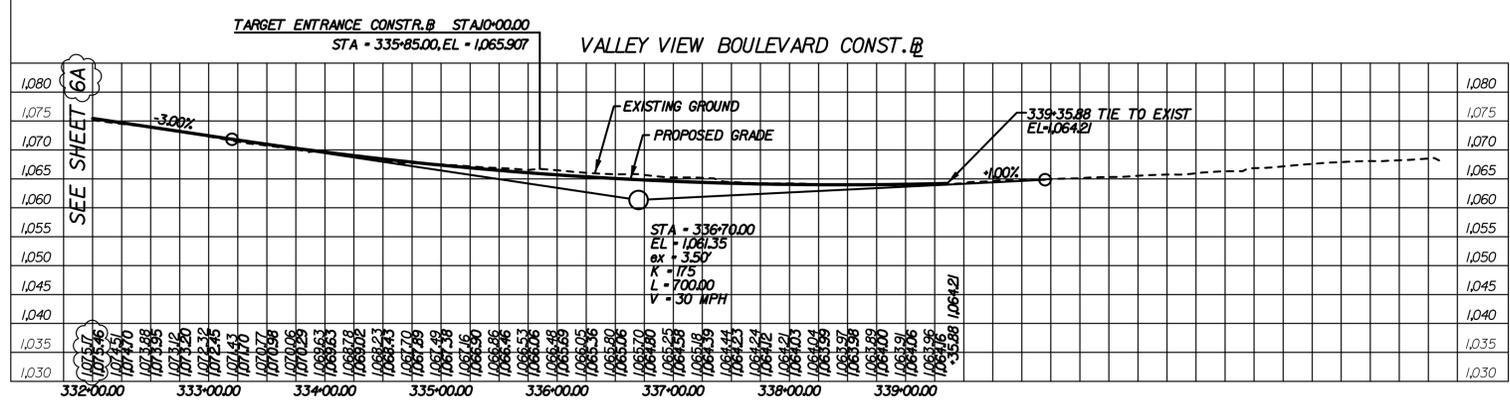
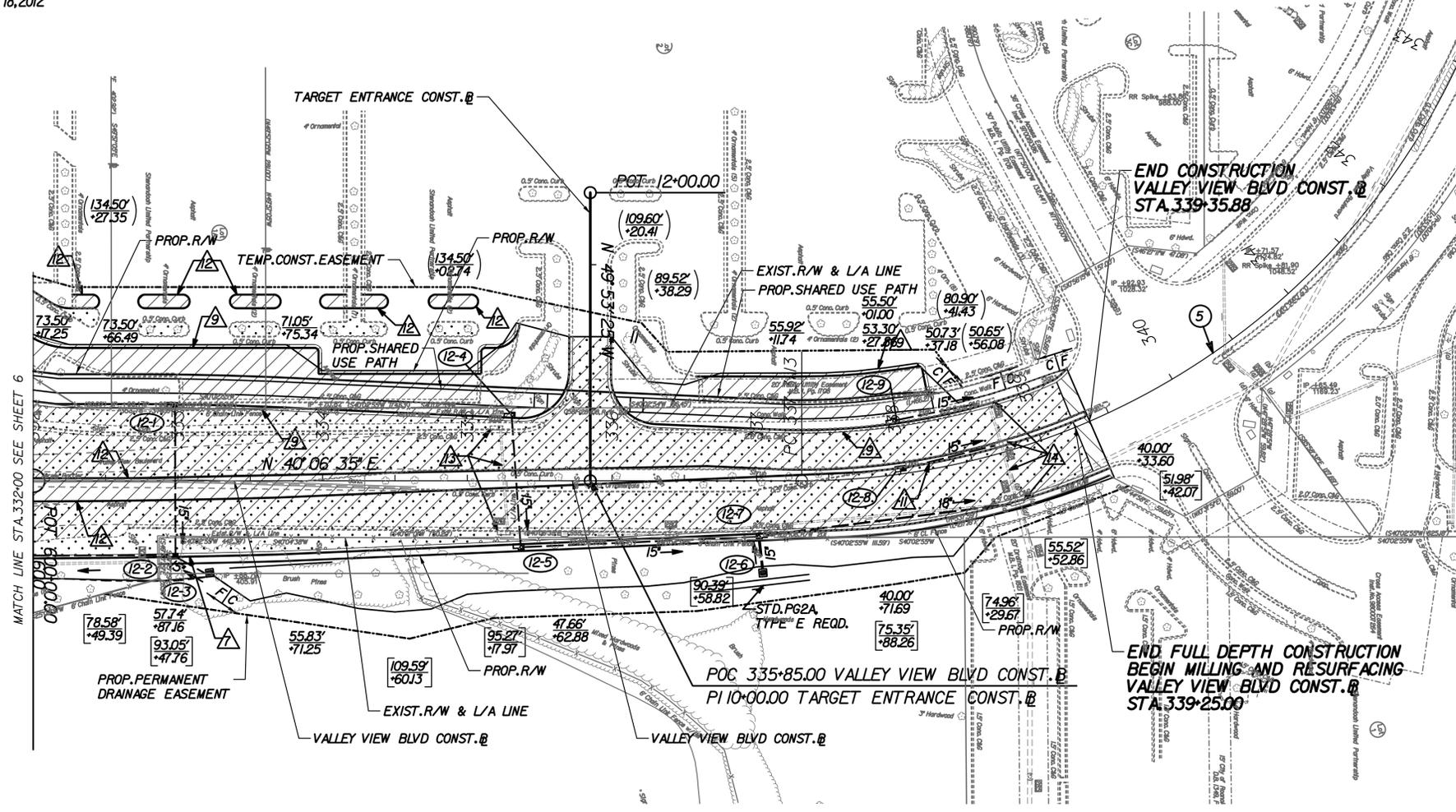
LEGEND

- △ DENOTES REMOVAL OF EXISTING GUARDRAIL
- △ DENOTES REMOVAL OF EXISTING FENCE
- △ DENOTES STD.GR-2 REQ'D.
- △ DENOTES STD.RADIAL GR-2 REQ'D.
- △ DENOTES STD.GR-7 REQ'D.
- △ DENOTES STD.GR-9 REQ'D.
- △ DENOTES STD.GR-11 REQ'D.
- △ DENOTES STD.CG-3 REQ'D.
- △ DENOTES STD.CG-6 REQ'D.
- △ DENOTES STD.CG-7 REQ'D.
- △ DENOTES STD.MS-1A REQ'D.
- △ DENOTES STD.MS-2 REQ'D.
- △ DENOTES DRAINAGE STRUCTURE TO BE REMOVED.
- △ DENOTES DRAINAGE STRUCTURE TO BE RETAINED.

REVISED	STATE	ROUTE	STATE	PROJECT	SHEET NO.
			VA.		
		581		0581-128-109, RW-201, C-501	12

DESIGN FEATURES RELATING TO CONSTRUCTION OR TO REGULATION AND CONTROL OF TRAFFIC MAY BE SUBJECT TO CHANGE AS DEEMED NECESSARY BY THE DEPARTMENT

Company Name (Location), Virginia ROADWAY ENGINEER	Company Name (Location), Virginia HYDRAULIC ENGINEER
--	--



⑤
Valley View Blvd Const. @
PI = 341+04.15
DELTA = 73° 26' 58.49" (LT)
D = 11' 27.33"
T = 373.03'
L = 640.97'
R = 500.00'
PC = 337+31.13
PT = 343+72.10
V = 30 MPH
E = 2.00%
(TC = 5.04 ULS)

STA. 336+85.00
24' STD. CG-II REQ'D.
TYPE N, GRADE = 1%
R=33'



PROJECT	SHEET NO.
0581-128-109	12

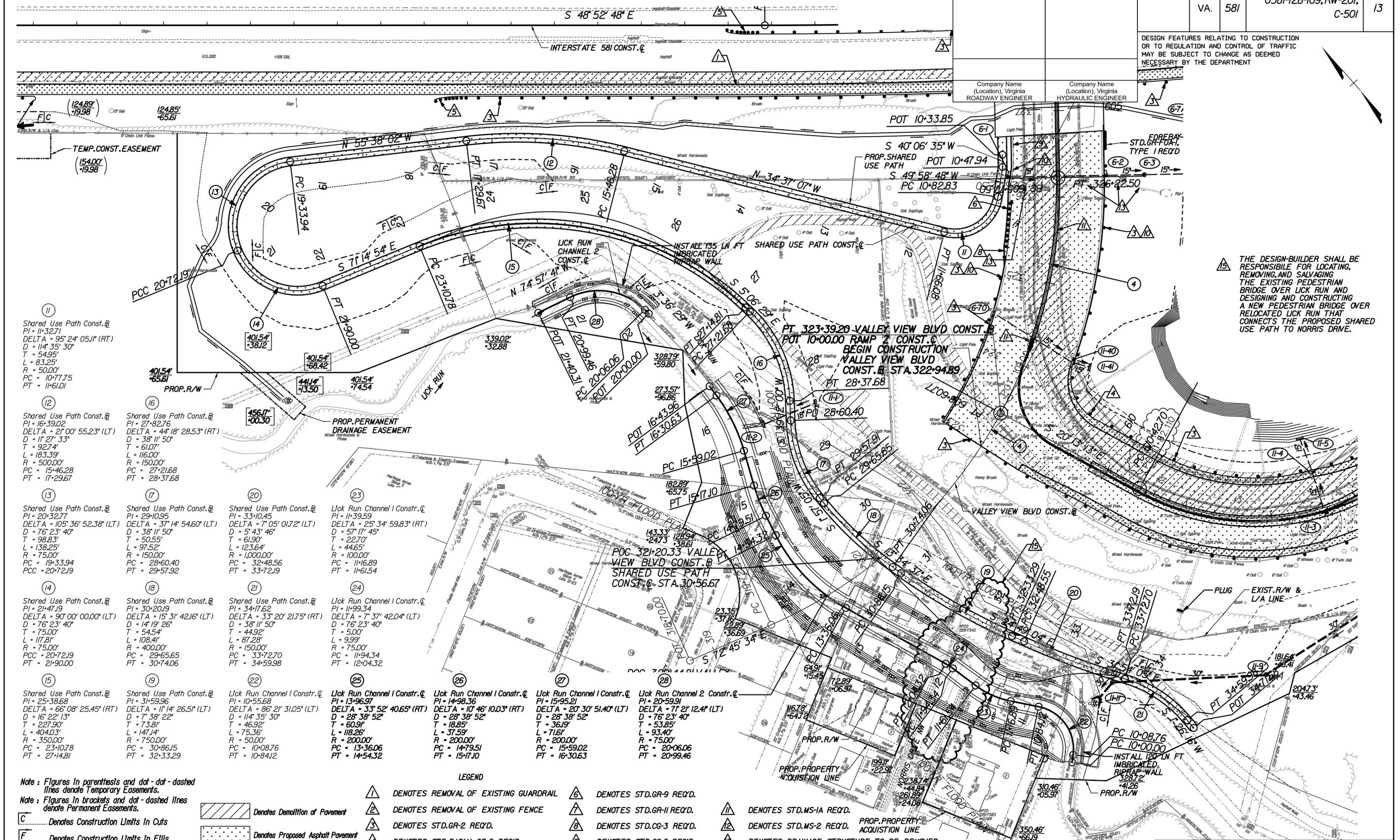
SHARED USE PATH AND LICK RUN RELOCATION DETAIL

STATE	ROUTE	PROJECT	SHEET NO.
VA.	581	0581-128-109, RW-201, C-501	13

DESIGN FEATURES RELATING TO CONSTRUCTION OR TO REGULATION AND CONTROL OF TRAFFIC MAY BE SUBJECT TO CHANGE AS DEEMED NECESSARY BY THE DEPARTMENT

Company Name
(Location), Virginia
ROADWAY ENGINEER

Company Name
(Location), Virginia
HYDRAULIC ENGINEER



THE DESIGN-BUILDER SHALL BE RESPONSIBLE FOR LOCATING, REMOVING AND SALVAGING THE EXISTING PEDESTRIAN BRIDGE OVER LICK RUN AND DESIGNING AND CONSTRUCTING A NEW PEDESTRIAN BRIDGE OVER RELOCATED LICK RUN THAT CONNECTS THE PROPOSED SHARED USE PATH TO NORRIS DRIVE.

11 Shared Use Path Const. @
PI = 11-32.71
DELTA = 95° 24' 05.1" (RT)
D = 114' 35" 30"
T = 54.95'
L = 83.25'
R = 500.00'
PC = 10-77.75
PT = 11-61.01

12 Shared Use Path Const. @
PI = 16-39.02
DELTA = 21° 00' 55.23" (LT)
D = 11' 27" 33"
T = 92.74'
L = 183.39'
R = 500.00'
PC = 15-46.28
PT = 17-29.67

13 Shared Use Path Const. @
PI = 20-32.77
DELTA = 105° 36' 52.38" (LT)
D = 76' 23" 40"
T = 98.83'
L = 138.25'
R = 75.00'
PC = 19-33.94
PCC = 20-72.19

14 Shared Use Path Const. @
PI = 21-47.19
DELTA = 90° 00' 00.00" (LT)
D = 76' 23" 40"
T = 75.00'
L = 117.81'
R = 75.00'
PC = 20-72.19
PT = 21-90.00

15 Shared Use Path Const. @
PI = 25-38.68
DELTA = 66° 08' 25.45" (RT)
D = 16' 22" 13"
T = 227.90'
L = 404.03'
R = 350.00'
PC = 23-10.78
PT = 27-14.81

16 Shared Use Path Const. @
PI = 27-82.76
DELTA = 44° 18' 28.53" (RT)
D = 38' 11" 50"
T = 61.07'
L = 116.00'
R = 150.00'
PC = 27-21.68
PT = 28-37.68

17 Shared Use Path Const. @
PI = 29-10.95
DELTA = 37° 14' 54.60" (LT)
D = 14' 19" 26"
T = 54.54'
L = 108.41'
R = 400.00'
PC = 29-65.65
PT = 30-74.06

18 Shared Use Path Const. @
PI = 31-59.96
DELTA = 11° 14' 26.51" (LT)
D = 7' 38" 22"
T = 73.81'
L = 147.14'
R = 750.00'
PC = 30-86.15
PT = 32-33.29

19 Shared Use Path Const. @
PI = 33-10.45
DELTA = 7° 05' 01.72" (LT)
D = 5' 43" 46"
T = 61.90'
L = 97.52'
R = 1500.00'
PC = 32-48.56
PT = 33-72.19

20 Lick Run Channel 1 Constr. @
PI = 11-39.59
DELTA = 25° 34' 59.83" (RT)
D = 57' 17" 45"
T = 22.70'
L = 44.65'
R = 100.00'
PC = 11-16.89
PT = 11-61.54

21 Lick Run Channel 1 Constr. @
PI = 34-17.62
DELTA = 33° 20' 21.75" (RT)
D = 38' 11" 50"
T = 44.92'
L = 87.28'
R = 150.00'
PC = 33-72.70
PT = 34-59.98

22 Lick Run Channel 1 Constr. @
PI = 10-55.68
DELTA = 86° 21' 31.05" (LT)
D = 114' 35" 30"
T = 46.92'
L = 75.36'
R = 500.00'
PC = 10-08.76
PT = 10-84.12

23 Lick Run Channel 1 Constr. @
PI = 13-96.97
DELTA = 10° 46' 10.03" (RT)
D = 28' 38" 52"
T = 18.85'
L = 118.26'
R = 200.00'
PC = 13-36.06
PT = 14-54.32

24 Lick Run Channel 1 Constr. @
PI = 14-98.36
DELTA = 10° 46' 10.03" (RT)
D = 28' 38" 52"
T = 18.85'
L = 118.26'
R = 200.00'
PC = 14-79.51
PT = 15-17.10

25 Lick Run Channel 1 Constr. @
PI = 15-95.21
DELTA = 20° 30' 51.40" (LT)
D = 28' 38" 52"
T = 36.19'
L = 71.61'
R = 200.00'
PC = 15-59.02
PT = 16-30.63

26 Lick Run Channel 1 Constr. @
PI = 20-59.91
DELTA = 77° 21' 12.41" (LT)
D = 76' 23" 40"
T = 53.85'
L = 93.40'
R = 75.00'
PC = 20-06.06
PT = 20-99.46

27 Lick Run Channel 2 Constr. @
PI = 20-59.91
DELTA = 77° 21' 12.41" (LT)
D = 76' 23" 40"
T = 53.85'
L = 93.40'
R = 75.00'
PC = 20-06.06
PT = 20-99.46

LEGEND

- ▲ DENOTES REMOVAL OF EXISTING GUARDRAIL
- ▲ DENOTES REMOVAL OF EXISTING FENCE
- ▲ DENOTES STD. GR-2 REQ'D.
- ▲ DENOTES STD. RADIAL GR-2 REQ'D.
- ▲ DENOTES STD. GR-7 REQ'D.
- ▲ DENOTES STD. GR-9 REQ'D.
- ▲ DENOTES STD. GR-11 REQ'D.
- ▲ DENOTES STD. CG-3 REQ'D.
- ▲ DENOTES STD. CG-6 REQ'D.
- ▲ DENOTES STD. CG-7 REQ'D.
- ▲ DENOTES STD. MS-1A REQ'D.
- ▲ DENOTES STD. MS-2 REQ'D.
- ▲ DENOTES DRAINAGE STRUCTURE TO BE REMOVED.
- ▲ DENOTES DRAINAGE STRUCTURE TO BE RETAINED.

Note: Figures in parenthesis and dot-dot-dashed lines denote Temporary Easements.
Note: Figures in brackets and dot-dashed lines denote Permanent Easements.
C..... Denotes Construction Limits In Cuts
F..... Denotes Construction Limits In Fills
Denotes Changes Associated with the Technical Proposal Plans Dated July 18, 2012

- Denotes Demolition of Pavement
- Denotes Proposed Asphalt Pavement
- Denotes Proposed Asphalt Shoulder



PROJECT	SHEET NO.
0581-128-109	13

SEQUENCE OF CONSTRUCTION STAGE I

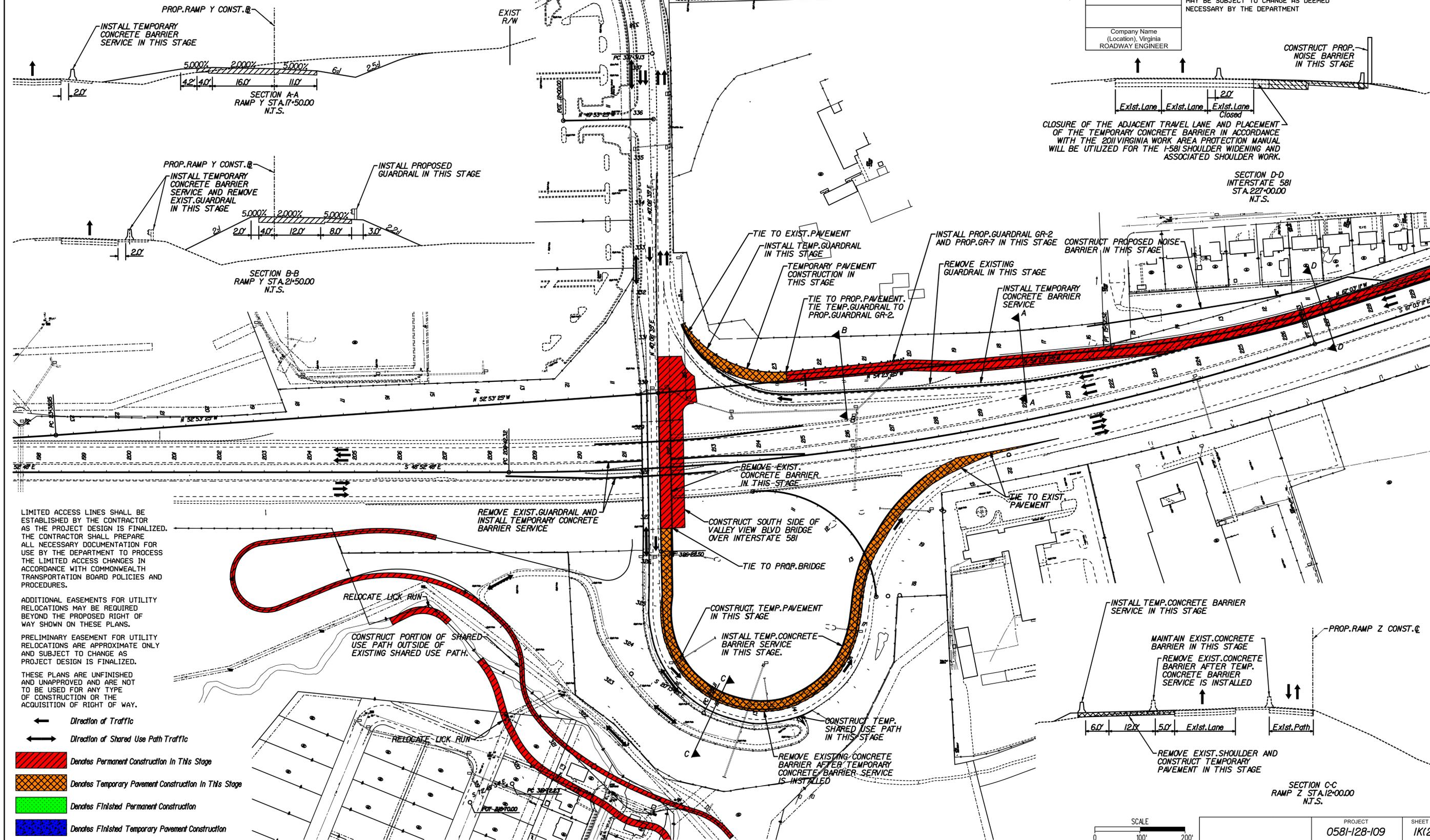
PROJECT MANAGER _____
SURVEYED BY _____
DESIGN SUPERVISED BY _____
DESIGNED BY _____

REVISED	STATE	ROUTE	STATE	PROJECT	SHEET NO.
	VA.	581		0581-128-109, RW-201, C-501	1K(2)

DESIGN FEATURES RELATING TO CONSTRUCTION OR TO REGULATION AND CONTROL OF TRAFFIC MAY BE SUBJECT TO CHANGE AS DEEMED NECESSARY BY THE DEPARTMENT

Company Name
(Location), Virginia
ROADWAY ENGINEER

CONSTRUCT PROP. NOISE BARRIER IN THIS STAGE



LIMITED ACCESS LINES SHALL BE ESTABLISHED BY THE CONTRACTOR AS THE PROJECT DESIGN IS FINALIZED. THE CONTRACTOR SHALL PREPARE ALL NECESSARY DOCUMENTATION FOR USE BY THE DEPARTMENT TO PROCESS THE LIMITED ACCESS CHANGES IN ACCORDANCE WITH COMMONWEALTH TRANSPORTATION BOARD POLICIES AND PROCEDURES.

ADDITIONAL EASEMENTS FOR UTILITY RELOCATIONS MAY BE REQUIRED BEYOND THE PROPOSED RIGHT OF WAY SHOWN ON THESE PLANS.

PRELIMINARY EASEMENT FOR UTILITY RELOCATIONS ARE APPROXIMATE ONLY AND SUBJECT TO CHANGE AS PROJECT DESIGN IS FINALIZED.

THESE PLANS ARE UNFINISHED AND UNAPPROVED AND ARE NOT TO BE USED FOR ANY TYPE OF CONSTRUCTION OR THE ACQUISITION OF RIGHT OF WAY.

← Direction of Traffic
↔ Direction of Shared Use Path Traffic

- Denotes Permanent Construction In This Stage
- Denotes Temporary Pavement Construction In This Stage
- Denotes Finished Permanent Construction
- Denotes Finished Temporary Pavement Construction

SCALE
0 100' 200'

PROJECT	SHEET NO.
0581-128-109	1K(2)

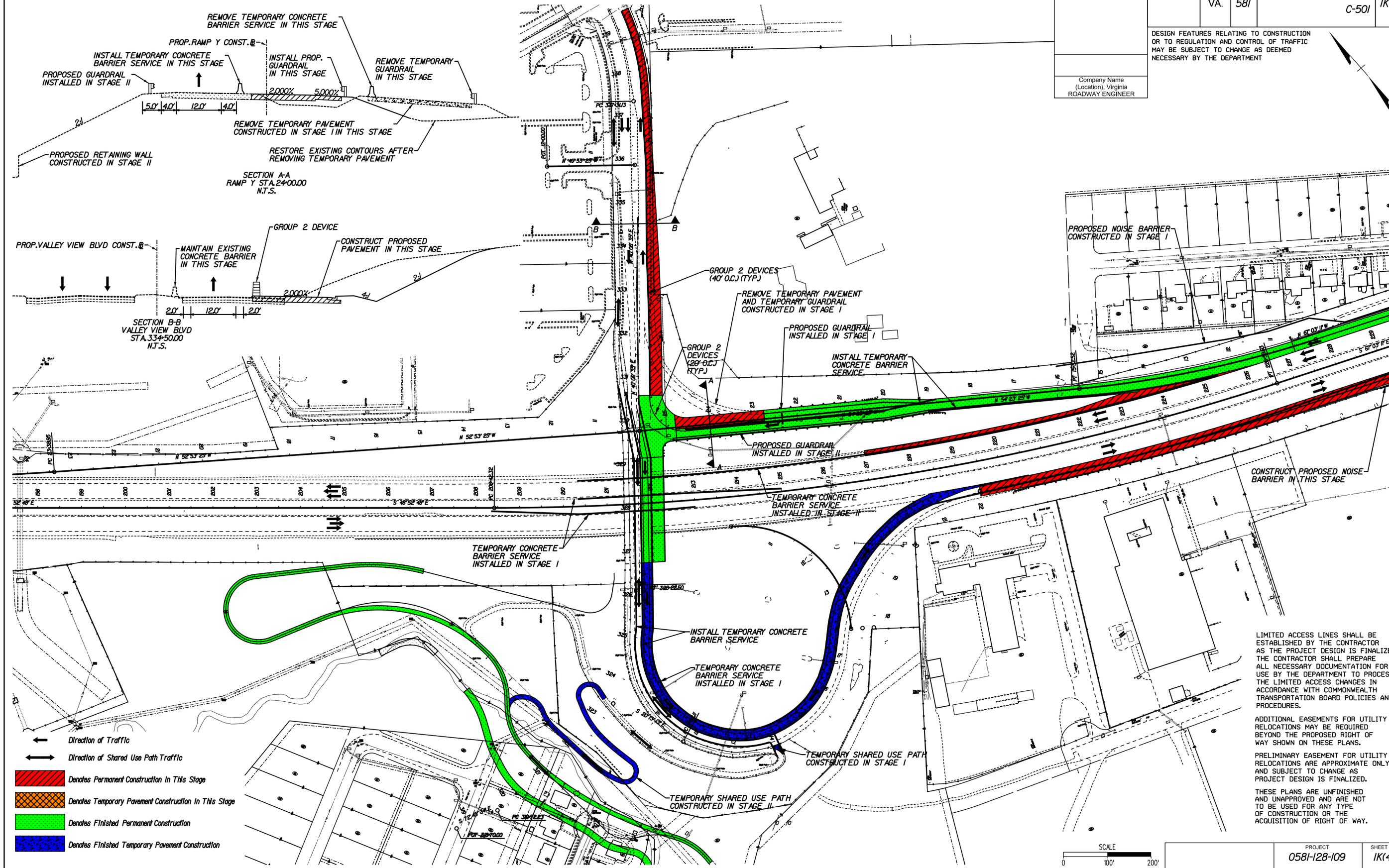
PROJECT MANAGER _____
SURVEYED BY _____
DESIGN SUPERVISED BY _____
DESIGNED BY _____

SEQUENCE OF CONSTRUCTION STAGE IIA

REVISED	STATE	ROUTE	PROJECT	SHEET NO.
	VA.	581	0581-128-109, RW-201, C-501	1K(4)

DESIGN FEATURES RELATING TO CONSTRUCTION OR TO REGULATION AND CONTROL OF TRAFFIC MAY BE SUBJECT TO CHANGE AS DEEMED NECESSARY BY THE DEPARTMENT

Company Name
(Location), Virginia
ROADWAY ENGINEER



- ← Direction of Traffic
- ↔ Direction of Shared Use Path Traffic
- Denotes Permanent Construction In This Stage
- Denotes Temporary Pavement Construction In This Stage
- Denotes Finished Permanent Construction
- Denotes Finished Temporary Pavement Construction

LIMITED ACCESS LINES SHALL BE ESTABLISHED BY THE CONTRACTOR AS THE PROJECT DESIGN IS FINALIZED. THE CONTRACTOR SHALL PREPARE ALL NECESSARY DOCUMENTATION FOR USE BY THE DEPARTMENT TO PROCESS THE LIMITED ACCESS CHANGES IN ACCORDANCE WITH COMMONWEALTH TRANSPORTATION BOARD POLICIES AND PROCEDURES.

ADDITIONAL EASEMENTS FOR UTILITY RELOCATIONS MAY BE REQUIRED BEYOND THE PROPOSED RIGHT OF WAY SHOWN ON THESE PLANS.

PRELIMINARY EASEMENT FOR UTILITY RELOCATIONS ARE APPROXIMATE ONLY AND SUBJECT TO CHANGE AS PROJECT DESIGN IS FINALIZED.

THESE PLANS ARE UNFINISHED AND UNAPPROVED AND ARE NOT TO BE USED FOR ANY TYPE OF CONSTRUCTION OR THE ACQUISITION OF RIGHT OF WAY.



PROJECT	SHEET NO.
0581-128-109	1K(4)

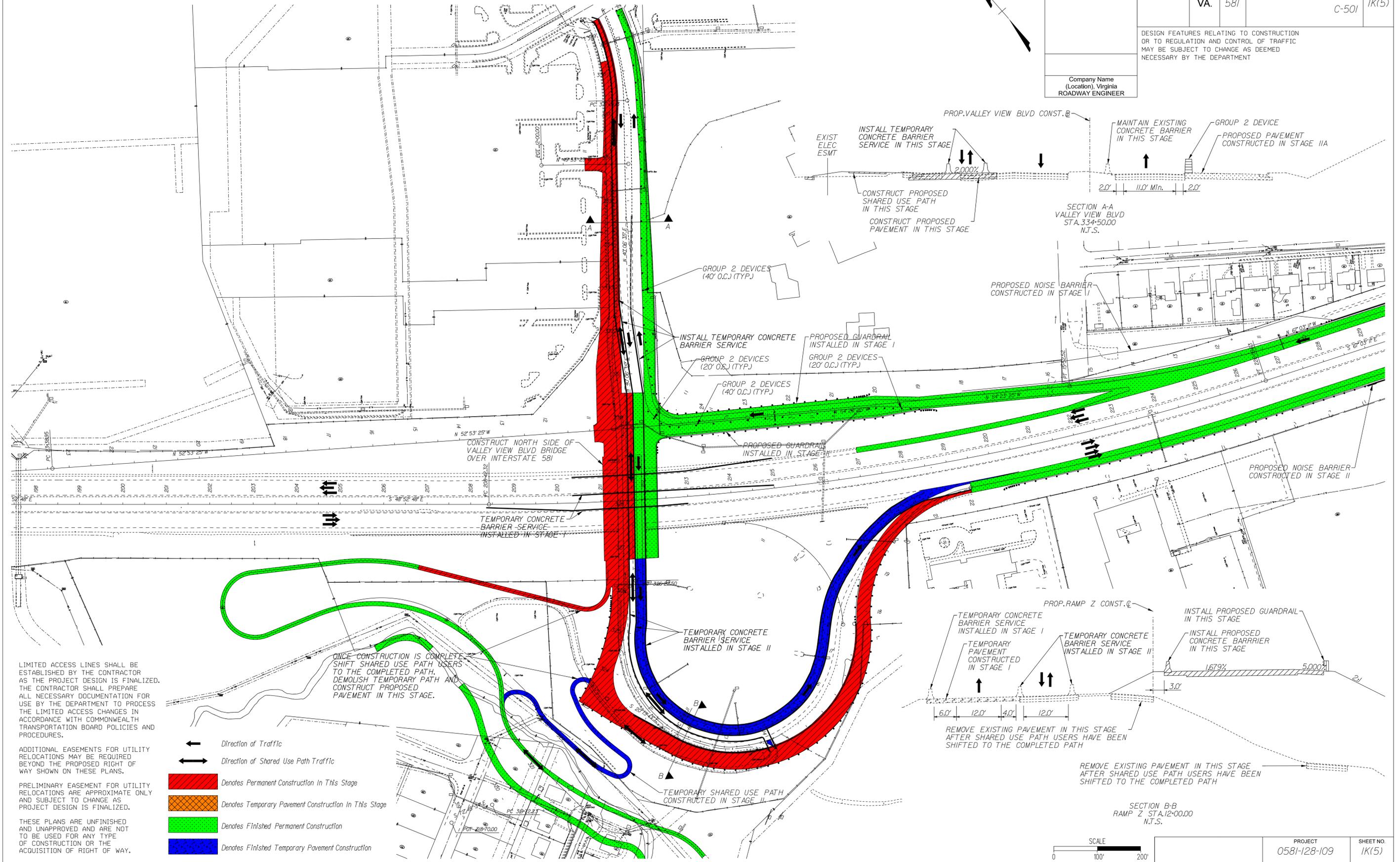
SEQUENCE OF CONSTRUCTION STAGE III

PROJECT MANAGER _____
SURVEYED BY _____
DESIGN SUPERVISED BY _____
DESIGNED BY _____

REVISED	STATE	ROUTE	STATE PROJECT	SHEET NO.
	VA.	581	0581-128-109, RW-201, C-501	1K(5)

DESIGN FEATURES RELATING TO CONSTRUCTION OR TO REGULATION AND CONTROL OF TRAFFIC MAY BE SUBJECT TO CHANGE AS DEEMED NECESSARY BY THE DEPARTMENT

Company Name
(Location), Virginia
ROADWAY ENGINEER



LIMITED ACCESS LINES SHALL BE ESTABLISHED BY THE CONTRACTOR AS THE PROJECT DESIGN IS FINALIZED. THE CONTRACTOR SHALL PREPARE ALL NECESSARY DOCUMENTATION FOR USE BY THE DEPARTMENT TO PROCESS THE LIMITED ACCESS CHANGES IN ACCORDANCE WITH COMMONWEALTH TRANSPORTATION BOARD POLICIES AND PROCEDURES.

ADDITIONAL EASEMENTS FOR UTILITY RELOCATIONS MAY BE REQUIRED BEYOND THE PROPOSED RIGHT OF WAY SHOWN ON THESE PLANS.

PRELIMINARY EASEMENT FOR UTILITY RELOCATIONS ARE APPROXIMATE ONLY AND SUBJECT TO CHANGE AS PROJECT DESIGN IS FINALIZED.

THESE PLANS ARE UNFINISHED AND UNAPPROVED AND ARE NOT TO BE USED FOR ANY TYPE OF CONSTRUCTION OR THE ACQUISITION OF RIGHT OF WAY.

- ← Direction of Traffic
- ↔ Direction of Shared Use Path Traffic
- Denotes Permanent Construction In This Stage
- Denotes Temporary Pavement Construction In This Stage
- Denotes Finished Permanent Construction
- Denotes Finished Temporary Pavement Construction



PROJECT	SHEET NO.
0581-128-109	1K(5)

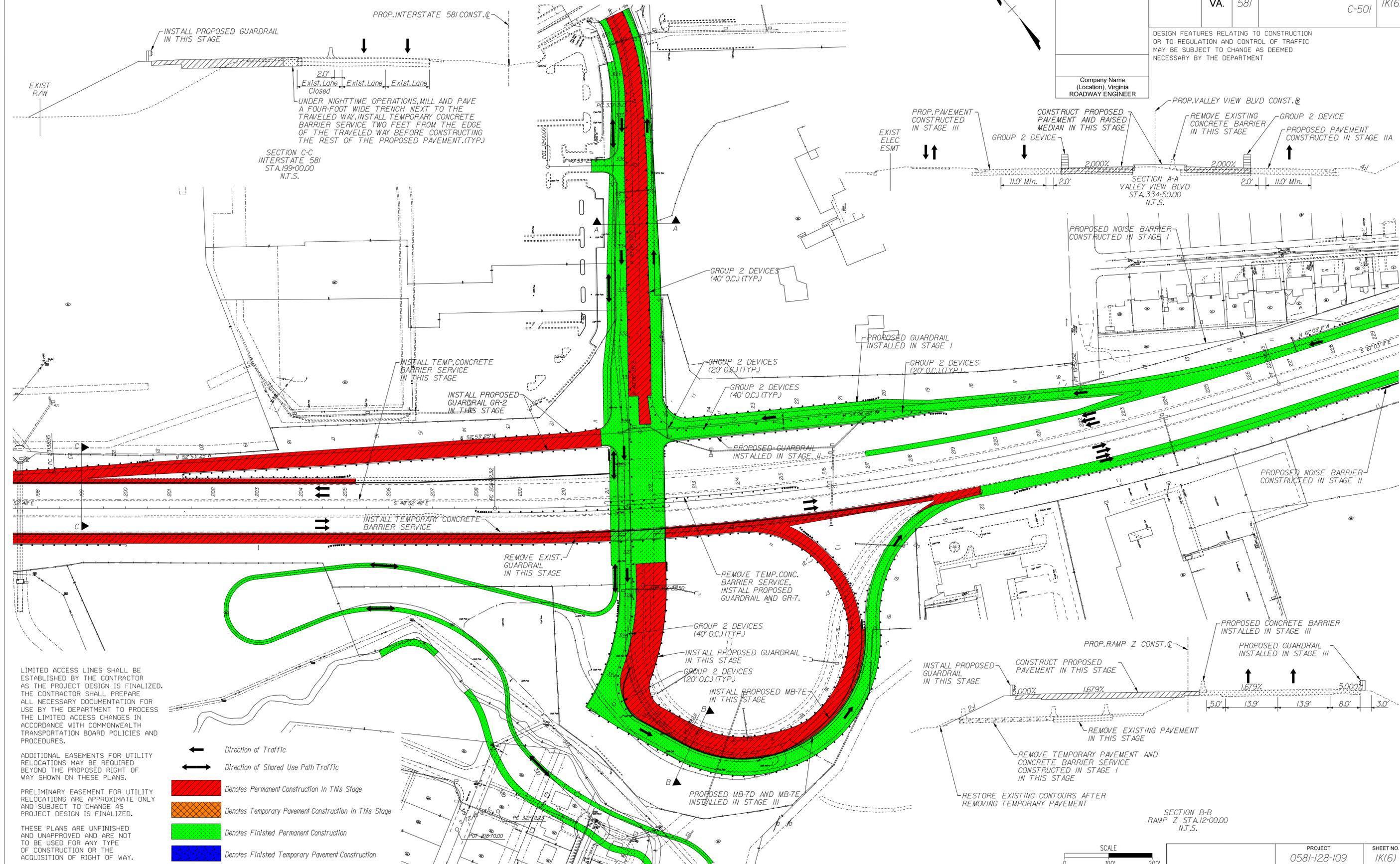
PROJECT MANAGER _____
SURVEYED BY _____
DESIGN SUPERVISED BY _____
DESIGNED BY _____

SEQUENCE OF CONSTRUCTION STAGE IV

REVISED	STATE	ROUTE	STATE	PROJECT	SHEET NO.
	VA.	581		0581-128-109, RW-201, C-501	1K(6)

DESIGN FEATURES RELATING TO CONSTRUCTION OR TO REGULATION AND CONTROL OF TRAFFIC MAY BE SUBJECT TO CHANGE AS DEEMED NECESSARY BY THE DEPARTMENT

Company Name
(Location), Virginia
ROADWAY ENGINEER



UNDER NIGHTTIME OPERATIONS, MILL AND PAVE A FOUR-FOOT WIDE TRENCH NEXT TO THE TRAVELED WAY. INSTALL TEMPORARY CONCRETE BARRIER SERVICE TWO FEET FROM THE EDGE OF THE TRAVELED WAY BEFORE CONSTRUCTING THE REST OF THE PROPOSED PAVEMENT. (TYP.)

SECTION C-C
INTERSTATE 581
STA. 199+00.00
N.T.S.

SECTION A-A
VALLEY VIEW BLVD
STA. 334+50.00
N.T.S.

LIMITED ACCESS LINES SHALL BE ESTABLISHED BY THE CONTRACTOR AS THE PROJECT DESIGN IS FINALIZED. THE CONTRACTOR SHALL PREPARE ALL NECESSARY DOCUMENTATION FOR USE BY THE DEPARTMENT TO PROCESS THE LIMITED ACCESS CHANGES IN ACCORDANCE WITH COMMONWEALTH TRANSPORTATION BOARD POLICIES AND PROCEDURES.

ADDITIONAL EASEMENTS FOR UTILITY RELOCATIONS MAY BE REQUIRED BEYOND THE PROPOSED RIGHT OF WAY SHOWN ON THESE PLANS.

PRELIMINARY EASEMENT FOR UTILITY RELOCATIONS ARE APPROXIMATE ONLY AND SUBJECT TO CHANGE AS PROJECT DESIGN IS FINALIZED.

THESE PLANS ARE UNFINISHED AND UNAPPROVED AND ARE NOT TO BE USED FOR ANY TYPE OF CONSTRUCTION OR THE ACQUISITION OF RIGHT OF WAY.

- ← Direction of Traffic
- ↔ Direction of Shared Use Path Traffic
- Denotes Permanent Construction In This Stage
- Denotes Temporary Pavement Construction In This Stage
- Denotes Finished Permanent Construction
- Denotes Finished Temporary Pavement Construction

SCALE
0 100' 200'

PROJECT	SHEET NO.
0581-128-109	1K(6)

FHWA REGION	STATE	FEDERAL AID	STATE	SHEET NO.
3	VA.	PROJECT	PROJECT	1
Federal Oversight Code: N/A		UPC No. 0581-128-109, PE-101		16595
FHWA Construction and Scour Code: X271-SN				

GENERAL NOTES:

- Width: 17'-6" sidewalk, 51'-0" roadway, 4'-0" median, 51'-0" roadway. Overall width 123'-6" face-to-face of rails. Includes widening of 33'-7/4" on left side of traffic and 27'-7" on right side of traffic.
- Span layout: 135'-103' continuous steel plate girder spans.
- Capacity: HL-93 loading.
- Specifications: Construction: Virginia Department of Transportation Road and Bridge Specifications, 2007.
Design: AASHTO LRFD Specifications for Highway Bridges, 5th Edition, 2010, VDOT Modifications.
Standards: Virginia Department of Transportation Road and Bridge Standards, 2008.

These plans are incomplete unless accompanied by the Supplemental Specifications and Special Provisions included in the contract documents.

Design loading includes 20 PSF allowance for construction tolerances and construction methods.

The use of prestressed deck panels as stay-in-place forms will not be permitted.

All structural steel, except in bearings and sole plates, shall be ASTM A709 grade 50W. Structural steel in bearings and sole plates shall be ASTM A709 grade 36. Finished paint color on weathering steel shall be Gray, 595-26081.

Concrete in superstructure, parapets and terminal walls shall be Class A4 in piers and abutments shall be Class A3.

All reinforcing steel shall be deformed and shall conform to ASTM 615, Grade 60 except for reinforcing steels noted as CRR (corrosion resistant reinforcement) which shall conform to the applicable specifications noted in the special provisions. All reinforcing bar dimensions on the detailed drawings are to centers of bars except where otherwise noted and are subject to fabrication and construction tolerances.

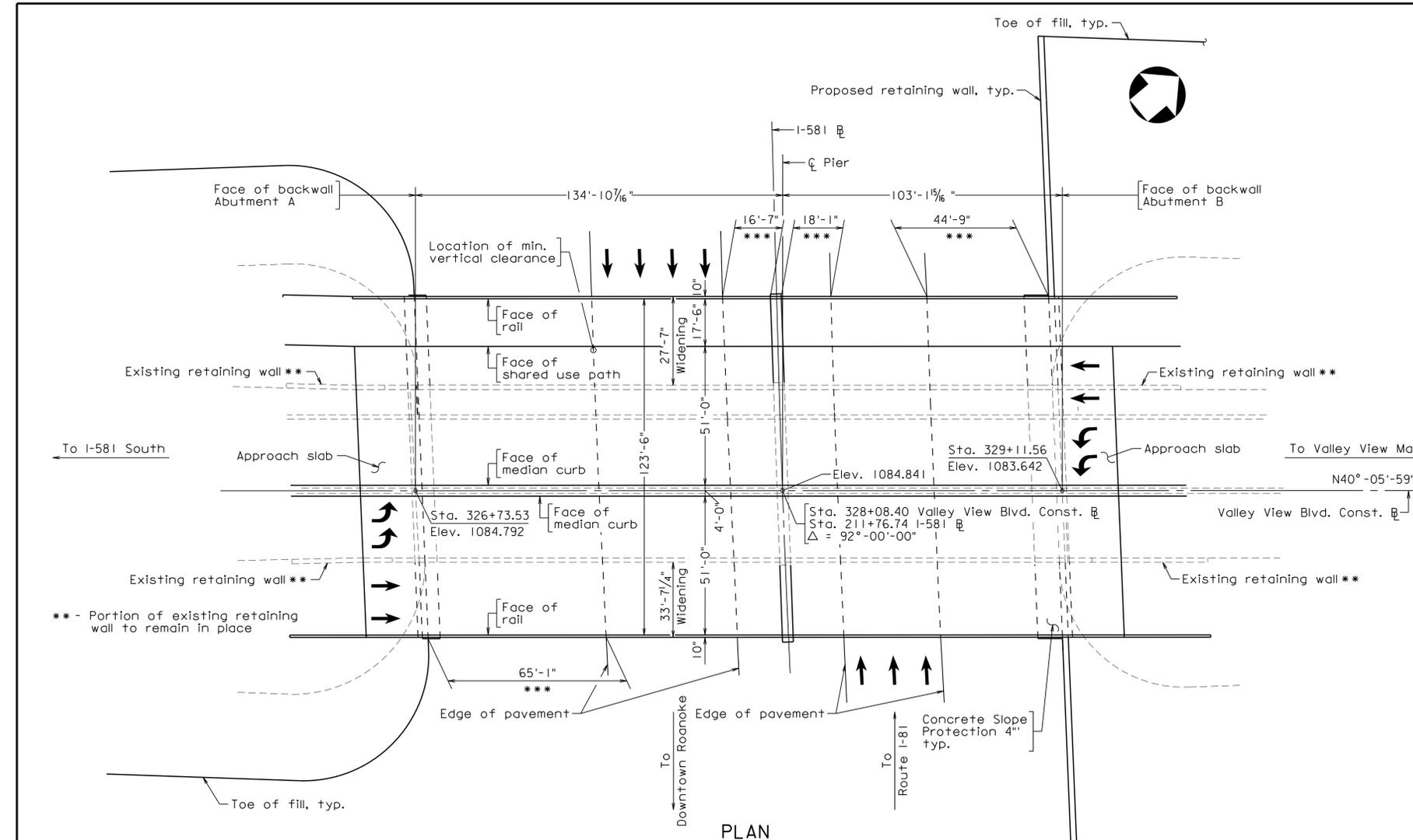


**COMMONWEALTH OF VIRGINIA
DEPARTMENT OF TRANSPORTATION
PROPOSED BRIDGE WIDENING ON
VALLEY VIEW BOULEVARD OVER INTERSTATE 581
CITY OF ROANOKE - 4.0 MI. S. OF RTE. I-81
PROJ. 0581-128-109, B-627**

Recommended for Approval: _____
State Structure and Bridge Engineer Date

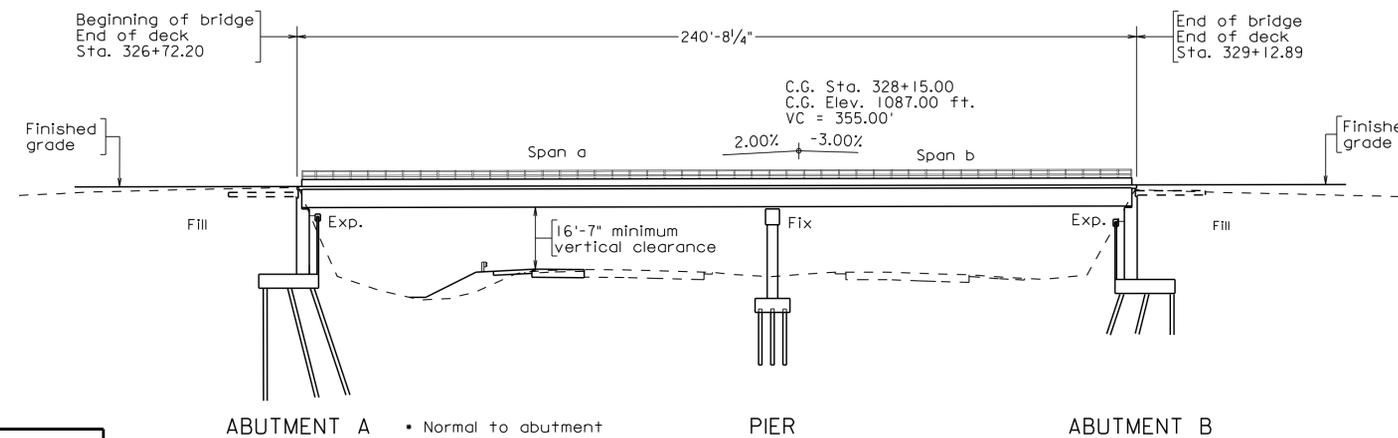
Approved: _____
Chief Engineer Date

Date: July 2012 © 2012, Commonwealth of Virginia Sheet 1 of 4



PLAN

*** Minimum horizontal clearance



DEVELOPED SECTION ALONG CONST. LINE

Scale: not to scale

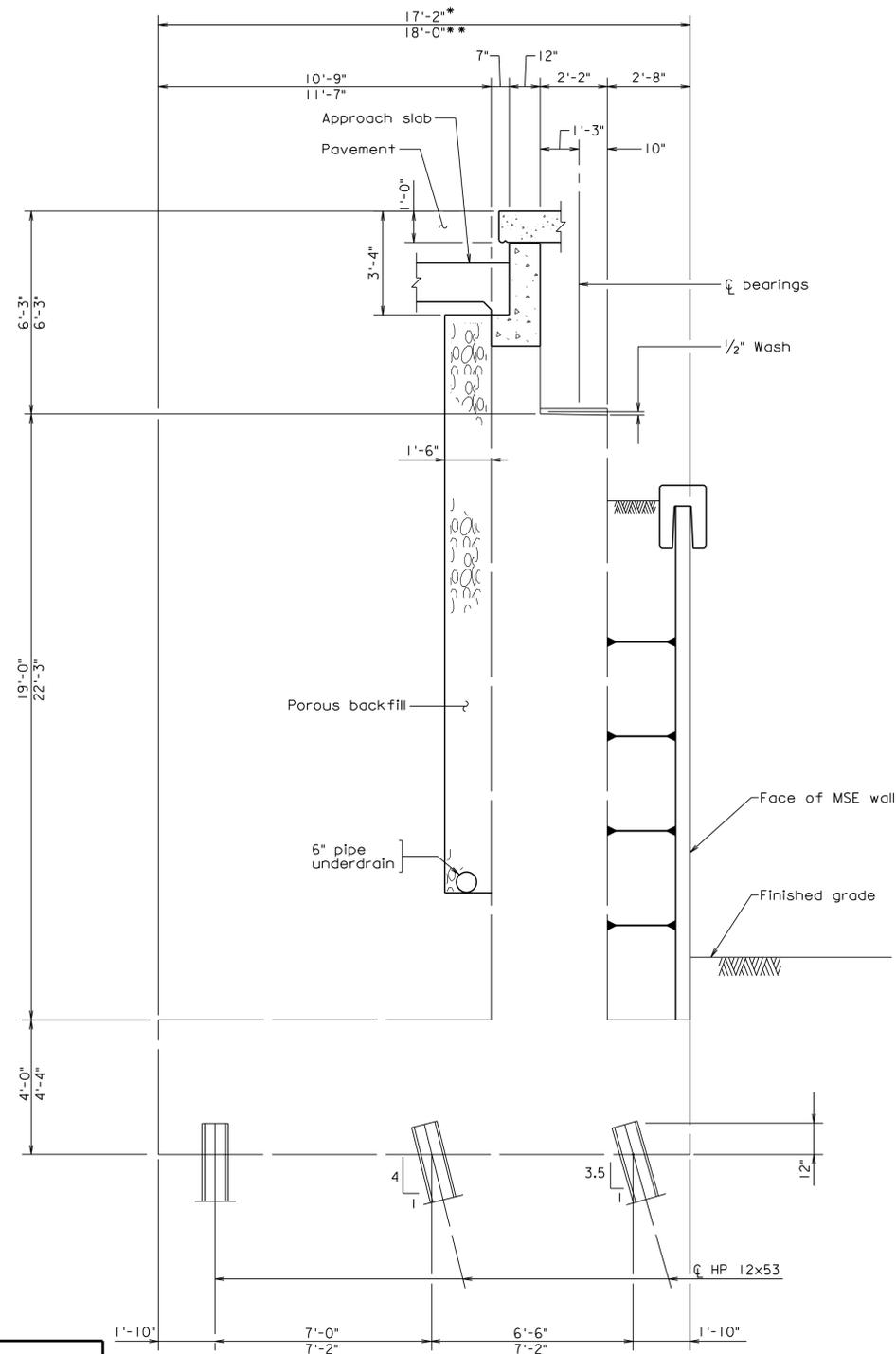
RECOMMENDED FOR APPROVAL FOR CONSTRUCTION	DATE	DATE
	VDOT PROJECT MANAGER	REGIONAL TRANSPORTATION PROGRAM DIRECTOR

PLANS BY:	
COORDINATED:	
SUPERVISED:	
DESIGNED:	
DRAWN:	
CHECKED:	

No.	Description	Date
REVISIONS		
For Table of Revisions, see Sheet 2.		

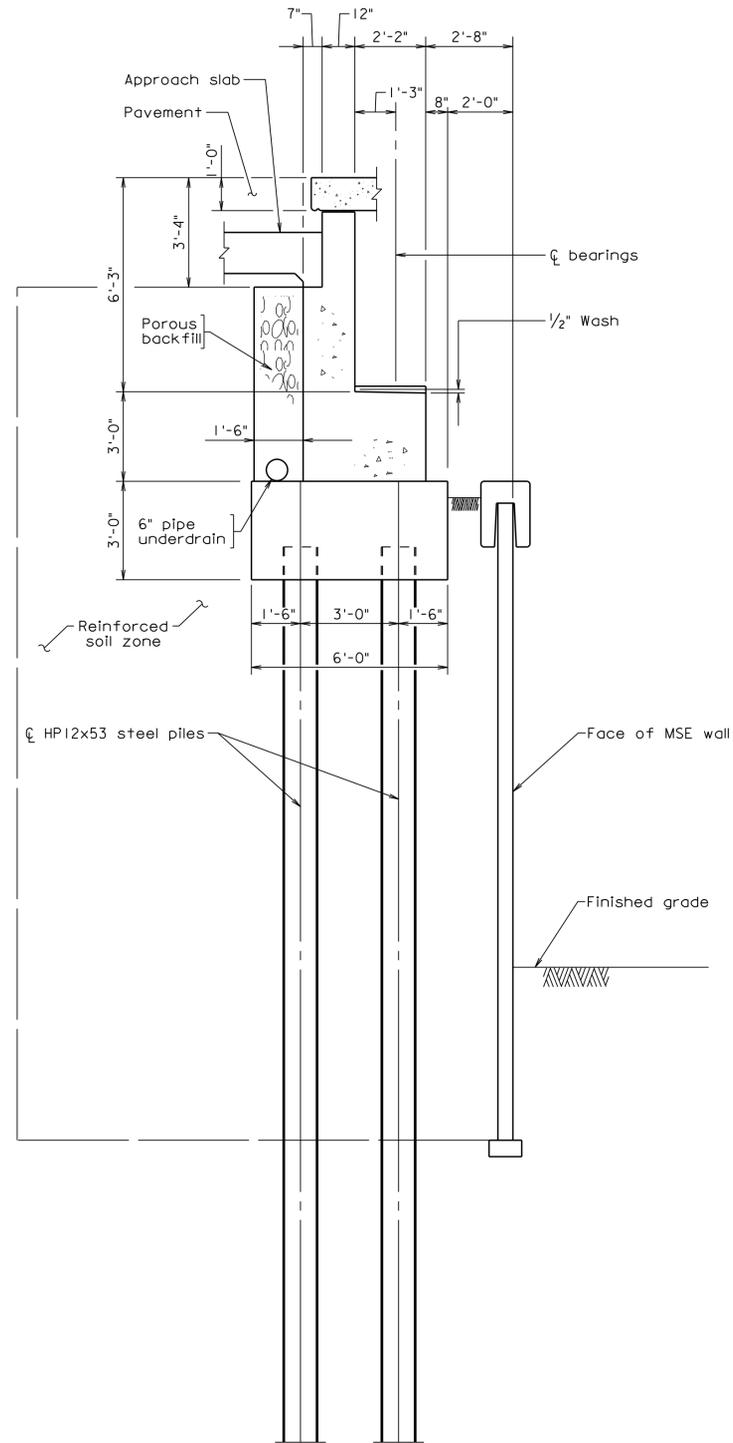
b27684001

FHWA REGION	STATE	FEDERAL AID PROJECT	STATE PROJECT	SHEET NO.
3	VA.		0581-128-F09, PE-101	3



* Abutment A dimensions are depicted above line, typ.
 ** Abutment B dimensions are depicted below line, typ.

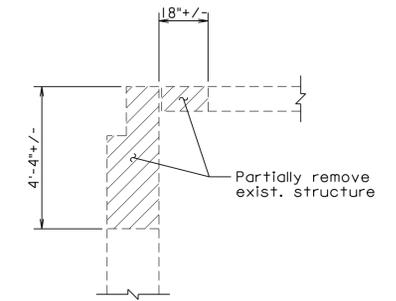
EXISTING ABUTMENT A AND ABUTMENT B



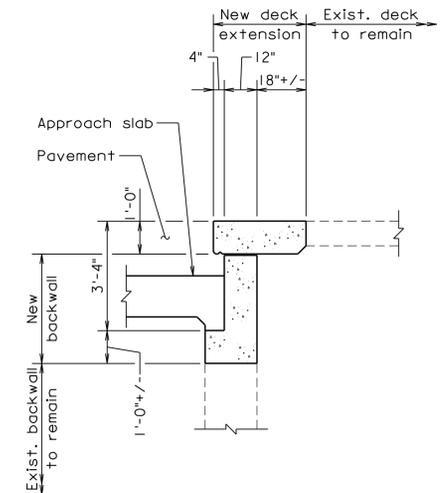
WIDENED ABUTMENT A AND ABUTMENT B

Scale: not to scale

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ABUTMENT DEMOLITION SECTION

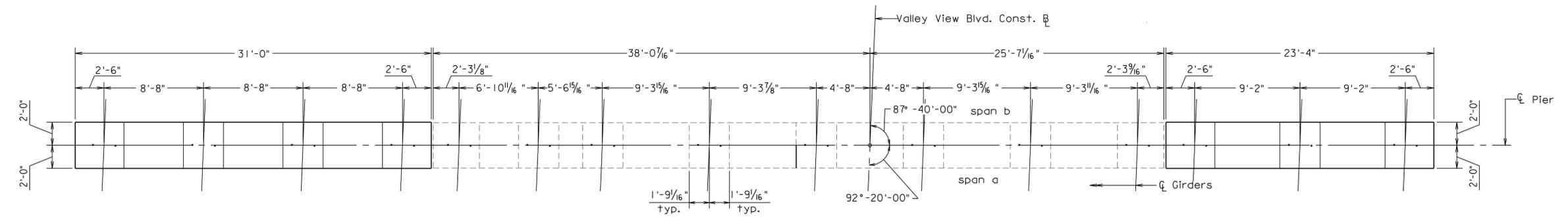


EXISTING ABUTMENT RETROFIT

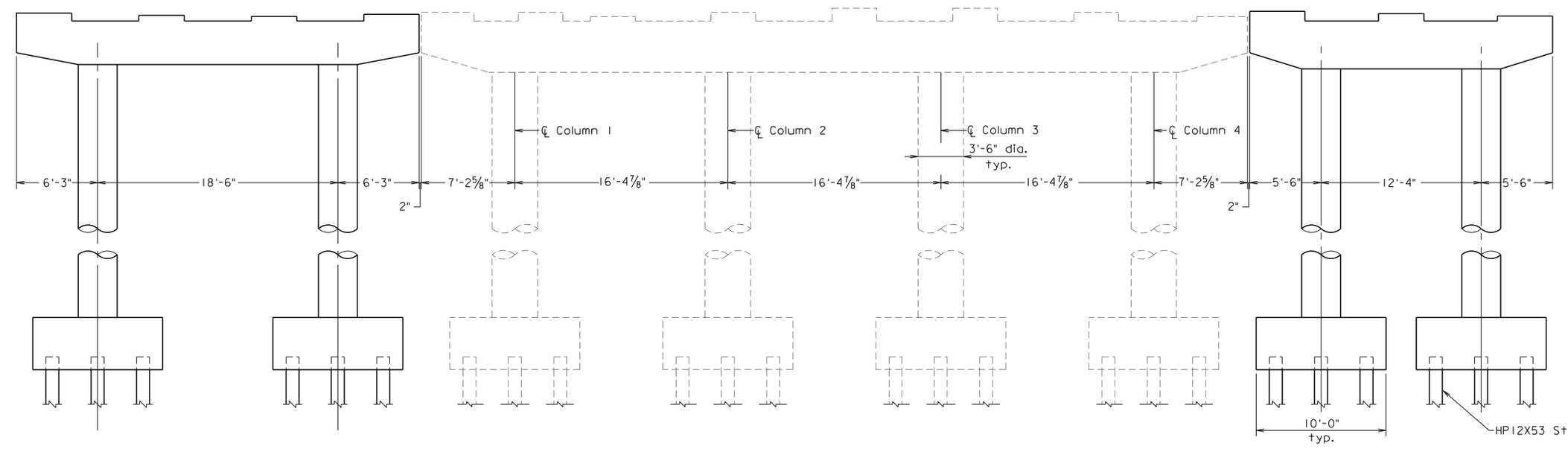
COMMONWEALTH OF VIRGINIA DEPARTMENT OF TRANSPORTATION STRUCTURE AND BRIDGE DIVISION			
ABUTMENT A AND B DETAILS			
No.	Description	Date	Revisions
Designed:	Date	Plan No.	Sheet No.
Drawn:	July 2012	276-84A	3 of 4
Checked:			

b27684008

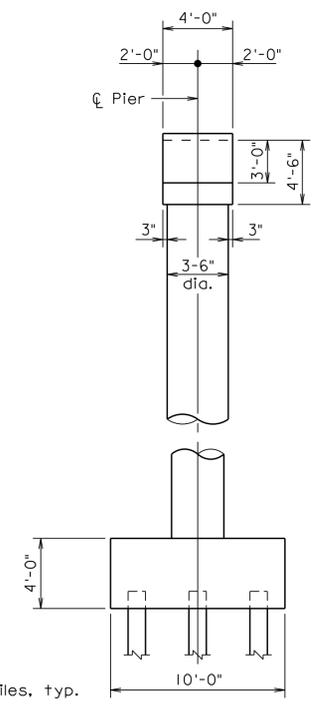
FHWA REGION 3	STATE VA.	FEDERAL AID		STATE		SHEET NO. 4
		ROUTE	PROJECT	ROUTE	PROJECT	
					0581-128-109, PE-101	



PLAN OF CAP



ELEVATION



END VIEW

b27684009

Scale= 1" : 10'

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COMMONWEALTH OF VIRGINIA DEPARTMENT OF TRANSPORTATION					
STRUCTURE AND BRIDGE DIVISION					
PIER DETAILS					
No.	Description	Date	Designed:	Date	Plan No.
			Drawn:	July 2012	276-84A
			Checked:		4 of 4
Revisions					

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Key Construction Company, Inc.

P.O. Box 698
11453 Hwy 15 South
Clarksville, VA 23927



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Engineering A Brighter Future[®]

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Suite 310
Richmond, VA 23236