

Route 220 Corridor Safety Improvements

A Design-Build Project

From: 0.129 miles south of Route 43 To: Intersection with Route 727

Botetourt County, Virginia

State Project No.: 0220-011-786

Federal Project No.: NH-5128 (326)

Contract ID Number: C00105543DB88



Submitted to: Virginia Department of Transportation

Submitted by: W.C. English, Incorporated

In association with:

A. Morton Thomas and Associates, Inc.

January 18, 2017

4.1 Letter of Submittal



January 18, 2017

Commonwealth of Virginia
Department of Transportation (VDOT)
Central Office Mail Center,
Loading Dock Entrance
1401 East Broad Street
Richmond, VA 23219
Joseph A. Clarke, PE, (APD Division)

LETTER OF SUBMITTAL
Route 220 Corridor Safety Improvements
Botetourt County, VA
State Project No. 0220-011-786 and 0220-011-788
Contract ID Number: C00105543DB88

Dear Mr. Clarke:

W. C. English, Incorporated (English), along with our Design-Build Team (D-B Team), is pleased to submit ten (10) copies of our Technical Proposal, Volumes I and II, and one (1) CD-ROM containing the entire Technical Proposal in a PDF file to provide design-build (DB) services for the Route 200 Corridor Safety Improvements project. The English D-B Team acknowledges Addenda Number (s) 1 dated November 04, 2016 and Addenda Number 2, date December 20, 2016, to the RFP, respectively, and is included in the Technical proposal, appendices (section b).

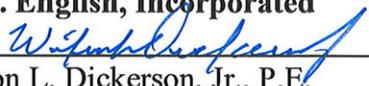
As requested in section 4.1 of the RFP, the English team offers the following information:

- 4.1.2 Intent to Enter in Contract:** If selected, it is the intention of English to enter into a contract with VDOT for the Project in accordance with the terms of the RFP.
- 4.1.3 Proposal Validity:** English declares that the offer represented by this proposal will remain in full force and effect for 120 days after the proposal due date of February 21, 2017.
- 4.1.4 Point of Contact:** Wilson L. Dickerson, Jr., PE, Senior Vice President, W.C. English, Incorporated, 615 Church Street, Lynchburg, VA 24504; (phone) 434.845.0301 (fax) 434.845.0306 (email) wdickerson@englishconst.com
- 4.1.5 Principal Officer:** Wilson L. Dickerson, Jr., PE, Senior Vice President, W.C. English, Incorporated, 615 Church Street, Lynchburg, VA 24504; (phone) 434.845.0301 (fax) 434.845.0306 (email) wdickerson@englishconst.com
- 4.1.6 Final Completion Date:** Pursuant to the RFP date set forth in Part 1, Section 2.3.2, English estimates a completion date of August 31, 2021.
- 4.1.7 Proposal Payment Agreement:** Signed and included in the appendix is the form set forth in Attachment 9.3.1.
- 4.1.8 Certification Regarding Debarment:** Signed and included in the appendix is the form set forth in Part 1, Section 11.8.6.

The English DB team is 100% committed to delivering a successful quality project to VDOT on-time and on-budget. We appreciate the opportunity to submit our technical proposal to you and look forward to being selected to exceeding it expectations for quality of the design and construction of the Route 220 Corridor Safety Improvements Project. If you have any questions or need further information, please contact me.

Respectfully submitted,

W. C. English, Incorporated



Wilson L. Dickerson, Jr., P.E.
Senior Vice President

4.2 Offeror's Qualifications



4.2 OFFEROR’S QUALIFICATIONS

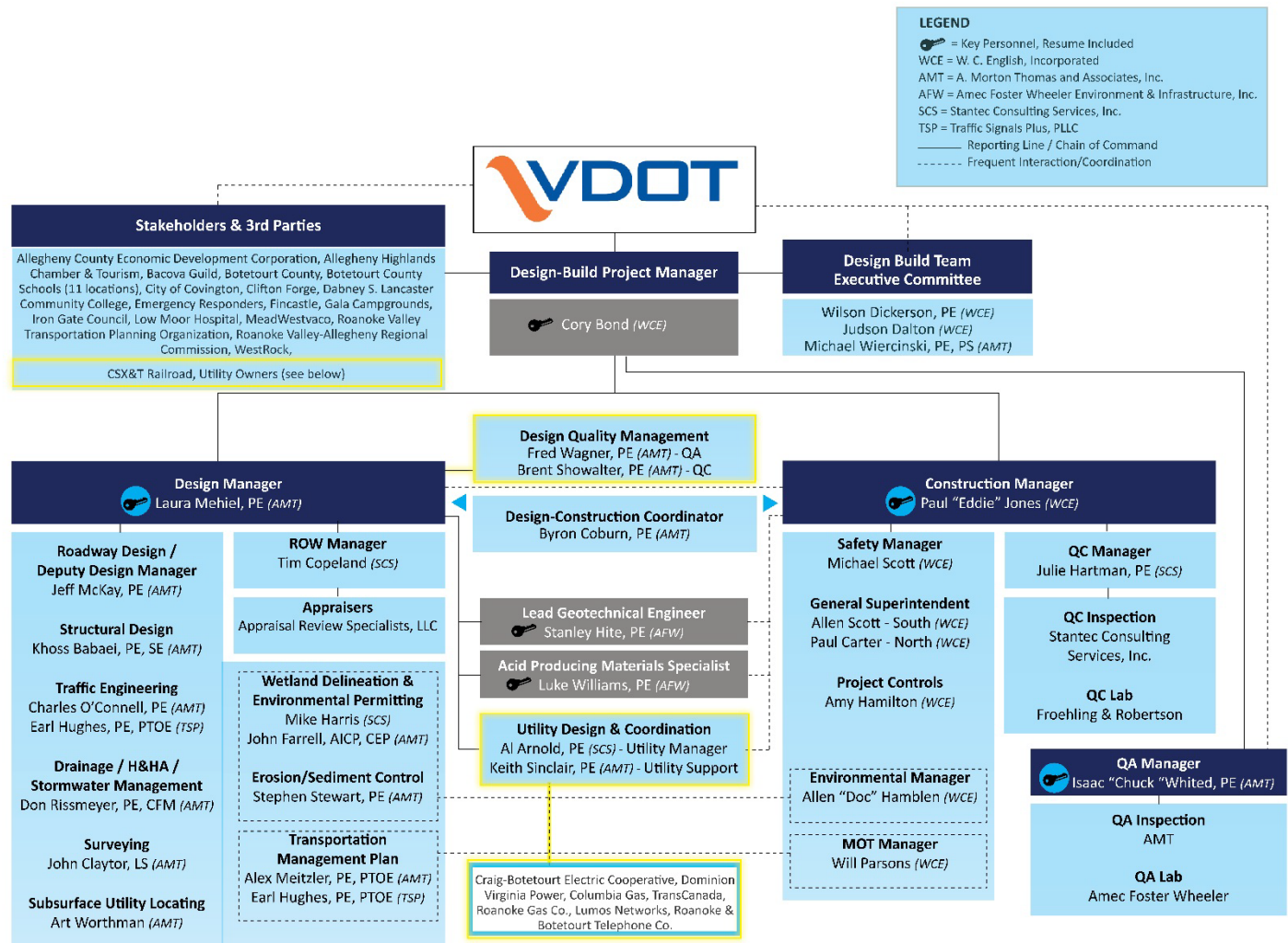
4.2.1 SOQ Confirmation

The information in our Statement of Qualifications dated June 8, 2016 remains true and accurate. There have been no changes to our team’s organizational framework, lead contractor, lead designer, key personnel or other individuals identified our Statement of Qualifications since its submission that would warrant prior VDOT written approval.

4.2.2 Organization Chart & Narrative

Organizational Chart

The English D-B team organization chart shown below illustrates our reporting and functional structure and notes the key and support personnel. Although there have been no changes to our Key Personnel, we have made several modifications to the organizational chart, as highlighted in yellow below, and described further in the narrative.



Narrative

We have modified our organization chart in the following ways:

- ▶ The design quality management team has been expanded and clarified. Frederick Wagner, PE will serve as our design quality assurance manager, and Brent Showalter, PE will serve as our design quality control manager. Both staff will report to the Design Manager, as required in VDOT's *Minimum Requirements for Quality Assurance and Quality Control on Design Build and P3 Projects*, January 2012.
- ▶ We have clarified the utility team, naming the Utility Manager as Al Arnold, PE.
- ▶ We have expanded the list of utility owners to include Craig-Botetourt Electric Cooperative, TransCanada, Roanoke Gas Co., Lumos Networks, Roanoke & Botetourt Telephone Co. In addition, the list of utility owners has been relocated on the organization chart.
- ▶ We have added CSX&T to the 3rd Party/Stakeholder list.
- ▶ The dashed line between the Quality Assurance team and the Construction team, which had represented frequent interaction, has been eliminated. Although there may be communication between the QA team and construction personnel, this change has been made to reinforce the independence of the QA team, as required in VDOT's *Minimum Requirements for Quality Assurance and Quality Control on Design Build and P3 Projects*, January 2012.

DESIGN QA MANAGER

Frederick Wagner, PE, has over 34 years in the management and design of transportation improvement projects in the mid-Atlantic region, including several Virginia Mega and Design/Build projects. As Design QA Manager Fred will ensure that all independent reviews, checking procedures, and documentation processes are properly completed. Fred and his QA support team, who will be independent from the original design team, shall evaluate whether the designer assessed the design issues correctly, applied the appropriate analyses, and assigned qualified personnel to the tasks. He will familiarize and verify the use of VDOT's 2016 LD-436 *Quality Control Checklist* specific to design build with the entire design team in the QC procedures and require sign-off from all staff that they understand and will follow the procedures.

Reporting Relationships: Fred will report to the Design Manager.

DESIGN QC MANAGER

As Design QC Manager, Brent Showalter, PE and his support team will review math and engineering computations, technical accuracy, conformance to contract requirements, review of form content and spelling, and verify coordination with other design disciplines as well construction (interdisciplinary reviews and constructability reviews). Brent has recently performed in this same role on major projects including the \$70M Route 1 D/B in Fairfax County, Virginia.

Reporting Relationships: Brent will report to the Design Manager.

UTILITY MANAGER

As Utility Manager, Al Arnold, PE will manage and coordinate all utility interaction during design and construction. He will maintain and monitor the utility tracking logs, (including VDOT "RUMS"), and actively engage the utilities to ensure their work is in agreement with the needs of the project and VDOT specifications. He will lead the UFI, ensure timely completion of VDOT's Utility Status Reports and UT-9's. Al will ensure that P&E's for utility relocations are submitted to and approved by VDOT.

Reporting Relationships: Al will report to the Design Manager and will have frequent interaction with the Construction Manager throughout design and construction.

4.3 Design Concepts



4.3 DESIGN CONCEPT

Design Strategy

The English team’s approach to developing a well thought-out technical concept began with a thorough review of the RFP and accompanying materials, research of other available public information, numerous trips to and

VDOT’s Route 220 Corridor Project Priorities
› Providing the best price for the scope of work identified in the RFP
› Preparing efficient design of the Project to meet or exceed the RFP requirements
› Utilizing construction means and methods that aim to reduce impacts to the facility users
› Managing all aspects of the Project such that the potential risks for all stakeholders are limited

through the project corridor, and the experience we have gained both designing and building projects in the Salem District. The concept we have developed meets the requirements of the RFP and is consistent with the conceptual plans provided with the RFP, but also incorporates enhancements which aim to address the Commonwealth’s overarching project priorities.

Immediately upon release of the RFP, our Team established regular coordination meetings with construction and design personnel to identify project challenges, and develop solutions to eliminate risks. A

number of enhancements included in our Team’s concept have been made. Our review of the project constraints, issues and potential risks led us to focus on two key elements as we developed our concept design:

- Objective 1.** *Minimize earthwork, especially in areas of potential Category 1 Acid Producing Materials*
- Objective 2.** *Optimize Construction Phasing, with a goal of constructing the bulk of Phase 1 in just two construction phases*
- Objective 3.** *Maximize salvage of existing materials, such as pavement and drainage, subject to meeting VDOT specifications*

By focusing on these overarching objectives, numerous benefits are achieved. Overall construction cost is reduced as compared to the RFP design concept with the reduction in earthwork. Right of way is reduced, also lowering overall cost, as well as environmental impacts such as potential acid runoff, cleared forest land and wetland impacts. A streamlined construction sequence will minimize disruption to the motoring public using the corridor as the project is built. Methods to achieve this design approach, as well as other design and construction techniques which we consider the English team’s project enhancements are summarized in the table on the following page.

Moreover, the concept developed by our Team specifically:

- ▶ Meets or exceeds all requirements listed in the Design Criteria Table;
- ▶ Is wholly contained within the right of way limits shown on the RFP Conceptual Plans, with the exception of temporary construction, permanent drainage, and utility easements (other than permanent drainage easements for stormwater management facilities). Stormwater management facilities are wholly contained within the right of way limits shown on the RFP Conceptual Plans, and
- ▶ Does not include elements which require approval of design exceptions or design waivers beyond those already identified in the RFP or Addendum.

ENGLISH DESIGN-BUILD TEAM ENHANCEMENTS	Reduces Grading Impacts and/or ROW	Reduces Exposure of Pyritic Materials	Reduces Cost	Supports Safety Goals	Maximizes Clear Zone	Improves Traffic Operations	Minimizes Impact to Community / Facility Usage	Facilitates Faster Construction	Reduces Long term Maintenance
Shift in the Rte 220 horizontal alignments in Phase 1 through the areas where VDOT's concept resulted in high cuts	•	•	•					•	•
Shift in the horizontal alignments away from Category 1 Acid Producing Materials areas in Phase 1	•	•	•					•	•
Modification of vertical alignment to be closer in elevation to the existing roadway in areas where the shifted horizontal alignment moves closer to the existing roadway	•	•	•				•	•	
Lengthening the vertical curve at STA 585 as compared to VDOT's concept, to provide improved sight distance meeting passing zone requirements				•		•			
Utilizing temporary pavement on the new SB graded shoulder to allow 2 lanes of traffic while constructing the new NB lane, thus creating 2-staged construction				•			•	•	
Flattening embankment along SB Lane to 4:1 in the southern section of Phase 1 while meeting FEMA floodplain encroachment criteria – eliminating the need for guardrail and avoids hauling excess material			•	•	•				•
Designing cross pipes at key locations to attain 1% minimum ditch slope while still minimizing extent of cut	•		•						•
Utilizing the "1% Rule" and MS-19 criteria for Stormwater Management to avoid need for detention ponds in Phase 2, along 4 miles in Phase 1, and along 1.5 Miles in Phase 3.	•		•					•	•
Incorporating pull-off areas along NB Lane at three locations in Phase 1				•		•	•		

4.3.1 Conceptual Roadway Design

Design Overview

The Route 220 Safety Improvement Project in Botetourt County generally consists of revising the geometry of horizontal and vertical curves of the two lane roadway to eliminate substandard sight distance, and providing improved travel lane and shoulder widths, resulting in a safer facility. The project will incorporate safety and functional measures including centerline and/or edge-line rumble strips, raised centerline pavement markers, paved shoulders, and turn lanes at various intersections. Improvements to Route 220 will be designed in accordance with the Design Criteria of the RFP (Attachment 2.2) and VDOT standards for a GS-1 (Rural Principal Arterial) facility in rolling terrain, with curve widening where required. In the case of Option 1, VDOT Standard GS-5 will apply in Phase 2 through Gala. The design speed is 60 mph for Phases 1 and 2, and matches existing for Phase 3. Two design waivers, for reduced shoulder width and reduced paved shoulder width, have already been approved by VDOT and are incorporated into our design concept. Two additional design waivers, for steepened ditch front slope and reduced clear zone in Phase 2 North, are currently being processed by VDOT for approval and are also incorporated into our design concept.

Concept Plans (Volume 2)

The Conceptual Plans summarize the individual design elements and conform to all AASHTO, VDOT and RFP requirements, including those listed in RFP Part 2, Attachment 2.2.1. Enhancements to the RFP Plans are highlighted in our Conceptual Roadway Plans.

(a) Roadway Geometry (*including number and width of lanes, shoulders*)

BASE CONTRACT

As shown in the concept plan drawings in Volume 2, proposed geometry follows VDOT standards for a GS-1 (Rural Principal Arterial) facility in rolling terrain, with two (2) 12.5 foot wide through lanes. The shoulder width is 8 feet, of which 4 feet is paved in Phases 1 and 2, and 2 to 3 feet of which is paved in Phase 3. At the intersections with Route 43, Route 622 (Prices Bluff Rd), and Route 696, turn lanes are proposed on Route 220 onto the connecting roadways, consistent with the RFP plans. Approximately 1 to 2 feet of curve widening is anticipated at the following locations in accordance with VDOT Standard TC-5.11, based on a curve radius of 1272 feet and 1458.5 feet, respectively:

- STA 104+06.45 to STA 118+24.71 (Phase 2, South)
- STA 612+90.98 to STA 621+68.52 (Phase 3, South)

OPTION 1

In Phase 2, Option 1 consists of a modified typical section meeting Geometric Design Standard GS-5, implemented through Gala. The typical section consists of two, 12-foot wide through lanes, a shared 13-foot wide left turn lane, 4-foot wide paved shoulders on both sides with mountable curb and gutter (CG-7), and six feet of green space backing behind the curb.

In Phase 3, Option 1 includes improving the roadway typical section in the northern section as defined in the RFP. Superelevation/cross slope will match VDOT Standards from Station 693+00 to Station 707+00, and will match existing cross slope for the remainder of roadway. The shoulder will be 8 feet wide total, of which 4' is paved. Curve widening will be provided as required at the following locations in accordance with VDOT Standard TC-5.11:

- STA 612+90.98 to STA 621+68.52 (Phase 3 North)
- STA 695+24.32 to STA 702+21.05 (Phase 3 North)

(b) Horizontal Alignments & (c) Vertical Alignments (*including Grading Limits*)

BASE CONTRACT

The conceptual roadway plan geometry, shown in the exhibits included in Volume 2 of this proposal which depict both plan and profile for Phases 1 and 2, and plan only for Phase 3, reflect the following approach:

- Horizontal curvature meeting an e-max of 8%.
- In phases 1 and 2, a minimum curve radius of 1,482 feet, consistent with the RFP concept plans, for which the super-elevation is 7.7%.

- Improvements to connecting roadway skewers to more closely match 90 degree intersection angle.
- In phases 1 and 2, vertical curves (sag and crest) meeting or exceeding the minimum for 60 MPH.

Our team’s geometry in Phases 2 and 3 closely follows the RFP Concept Plans, however for Phase 1, we have made several alignment modifications:

1. We shifted the horizontal alignment closer to the existing alignment between Route 622 and STA 447+00, both to reduce overall cut volume, and to reduce the amount of potential acid-producing material that would be exposed.
2. In these shifted locations, we modified the vertical alignment to optimize the differential between existing and proposed elevations, in an effort salvage existing pavement and to simplify maintenance of traffic.
3. We modified the alignment from STA 450+00 to STA 468+00 where a deficient curve is being corrected. Our version of the alignment is not as far from the existing alignment, again in an effort to reduce the amount of potential acid-producing material that is exposed.

Benefits of English D/B Team Unique Geometric Design
> Reduction in excavation by approximately 156,000 CY > Focused reduction of excavation in the Category 1 Acid Producing Material areas > Lower overall cost and construction duration, as a result of the excavation reductions > MUTCD compliant Passing Zones through 56% of Phase 1

In Phase 3, our design approach will strive to slightly offset the alignment from current centerline to widen on one side only, since it is not feasible to construct widenings as narrow as 6” to 12”, the required increase in lane width on both sides of the roadway. The design will assess the amount of wedge required to shift the baseline as compared to the separate widenings on each side, as well as extent of grading impacts prior to using this shifted centerline approach.

Passing Zones

Our concept creates passing zones at the following locations:

<p><u>Phase 1:</u> STA 407+74 to STA 415+67 STA 430+35 to STA 456+50 STA 461+24 to STA 473+27 STA 481+27 to STA 561+00 STA 580+00 to STA 589+00</p> <p>TOTAL: 13,484 Feet (56% of Project)</p>	<p><u>Phase 2 South:</u> STA 118+00 to STA 123+72</p> <p>TOTAL: 572 Feet (27% of Project)</p> <p><u>Phase 2 North:</u> STA 200+00 to STA 227+50</p> <p>TOTAL 2,750 Feet (20% of Project)</p>
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The passing zone totals of our concept design exceed the requirements of the RFP by 40 % in Phase 1, 35% in Phase 2 South, while meeting the requirement in Phase 2 North. For final design, the passing zones may be assigned to one direction only, however the passing zone lengths will still exceed the RFP criteria.

OPTION 1

In Phase 2, the intersection of Route 622 (Gala Loop Road) and the entrance to Columbia Gas/Public Boat Launch will be modified to better align, allowing two design vehicles to turn left simultaneously without encroaching on the other’s turning path. The design vehicle for the entrance will be an AASHTO 2011 P-B (Car – Boat) and the design vehicle for Route 622 will be an AASHTO 2011 SU-40 (Heavy Truck).

(d) Maximum Grade for Segments/Connectors

The maximum grade used in our concept design for the three segments of Route 220 (Phases 1, 2 and 3) and all connecting roadways is provided in the table at right.

These maximum grades apply to both the base contract, and for Option 1 improvements.

(e) Typical Section Elements

Our team’s concept design typical sections, which include overall roadway and shoulder widths, clear zones, retaining walls, traffic barriers, and other cross sectional elements are shown in Volume 2.

Roadway	Proposed Max. Grade %	Max. Allowable Grade %	GS Stand.
PHASE 1			
Rte. 220	4.00	4.00	GS-1
Rte. 622 (Prices Bluff Rd)	4.00	10.00	GS-4
Rte. 722 (Chatham Rd)	5.72	10.00	GS-4
Rte. 696 (Locust Bottom Rd)	6.71	10.00	GS-4
Rte. 696 (Buhrman Rd)	4.12	10.00	GS-4
PHASE 2			
Rte. 220	4.00	4.00	GS-1
Rte. 43 (Narrow Passage Rd.)	2.50	8.00	GS-3
Rte. 694 (Gala Loop Rd)	3.00	10.00	GS-4
Rte. 622 (Gala Loop Rd)	6.79	10.00	GS-4
PHASE 3			
Rte. 220	4.20	Existing	RRR
Rte. 633 (McKinney Hollow Rd/ Glen Wilton Rd)	7.00	10.00	GS-4
Rte. 700 (Simmons Ln)	10.00	10.00	GS-4

BASE CONTRACT

The Route 220 roadway is designed with 2 lanes, each 12.5 feet wide, open shoulders with a total width of 8 feet and varying paved width depending on location, and 30 foot wide clear zones other than in design waiver areas. In deep cut sections (greater than 8 feet in height) the total clear zone will be a minimum of fourteen (14) feet as allowed by Design Waiver No. 1.

Retaining Walls

There are two locations in our concept design which incorporate VDOT RW-2 or RW-3 retaining walls:

1. STA 389+20 to STA 390+15
2. STA 396+75 to STA 398+65

Walls are proposed at these locations in order to avoid stream impacts and to keep grading within the established right of way. Based on our concept design, wall height are no more than five feet in these locations. All three walls are within the clear zone limits, and thus guard rail will be used adjacent to the shoulder in these areas.

W-Beam Guard Rail Design

Guard rail will be provided only where clear zones are infeasible due to undesirable environmental impacts or lack of right of way as prescribed in the RFP Plans. The use of guard rail is limited to no more than 7,000 feet in Phase 1 limits, and 6,500 feet in Phase 2 North. Guard rail is proposed at the following locations in our team’s concept design, totaling 6,361 feet in Phase 1 and 5,615 feet in Phase 2 North:

Guard Rail in Phase 1	Length (including End Treatments)	Guard Rail in Phase 1	Length (including End Treatments)
STA 348+87 to 350+81, SB side	254	STA 393+22 to 398+34, NB side	563
STA 369+50 to 371+00, SB side	252	STA 399+35 to 403+50, NB side	466
STA 559+73 to 563+90, SB side	417	STA 417+50 to 425+75, NB side	876
TOTAL SB	914	STA 430+11 to 434+78, NB side	518
STA 348+87 to 349+33, NB side	117	STA 558+92 to 563+00, NB side	408
STA 350+57 to 353+00, NB side	294	TOTAL NB	5078
STA 369+87 to 375+50, NB side	614		
STA 380+50 to 392+21, NB side	1222	PHASE 1 TOTAL:	6,361 LF

Guard Rail in Phase 2 North, SB Side	Length (including End Treatments)	Guard Rail in Phase 2 North, NB Side	Length (including End Treatments)
STA 200+00 to STA 209+73	1024	STA 208+81 to STA 210+00	170
STA 211+33 to STA 242+22	3191	STA 250+51 to STA 252+22	245
STA 251+63 to STA 252+37	145	STA 253+78 to STA 254+56	150
STA 253+93 to STA 254+44	122	STA 264+89 to STA 267+17	300
STA 265+20 to STA 267+17	268	TOTAL NB	865
TOTAL SB	4750	PHASE 2 NORTH TOTAL:	5,615 LF

OPTION 1

In the Phase 2 project limits, Option 1 consists of a modified typical section meeting Geometric Design Standard GS-5, implemented through Gala. The typical section will consist of two 12-foot through lanes, a shared, 13-foot wide left turn lane, 4’ wide paved shoulders with mountable curb and gutter (CG-7), and six feet of green space backing behind the curb. The minimum lateral offset to obstructions will be 1.5 feet, and slopes will be 3:1 maximum unless protected by barrier.

In Phase 3, Option 1 includes improving the northern section. Superelevation/cross slope will match VDOT Standards from Station 693+00 to Station 707+00, and will match existing cross slope for the remainder of roadway. Curve widening will be provided as required. The shoulder will be 8 feet wide total of which 4 feet is paved. VDOT Standard MC-4 (Asphalt Paving under Guardrail) will be provided at all proposed guardrail locations, and a 2-foot Centerline Rumble Strip is included.

Retaining Walls

In Phase 2, Option 1 creates the need for an additional small retaining wall using VDOT RW-3 at STA 258+15 to STA 258+75.

(f) Conceptual Hydraulic and Stormwater Management Design

Ditches

New surface drainage will be installed throughout the limits of the Project in order to properly convey flow from the travel lanes and shoulders via drainage ditches with a minimum slope of 1% to stormwater management basins, large culverts, and adequate outfalls. In addition, concrete berm ditches will be placed along the top of all cut slopes with heights of fifteen (15) ft. or greater where there is in excess of one (1) acre of offsite drainage area. Conveyance of runoff from the berm ditches and concentrated flows down cut slopes to adequate outfalls will be via paved flumes or storm sewer systems. Where EG-1 energy dissipaters are required, English will dowel them into concrete receiving ditches according to the VDOT 2008 Road and Bridge Standards. Roadside ditch linings will be designed to prevent erosion for a 2-year event using VDOT approved materials in accordance with VDOT EC-2 and EC-3 standards, as required. Ditches will be over-excavated and lined with clay in areas where the cut through Category 1 APM.

Based on our Team's unique horizontal alignment concept and strategic drainage layout, we significantly reduced ditch grading requirements, and the associated clearing and grading which was required by the RFP concept. In addition, we are able to direct only what requires detention treatment to ponds as described further in the Stormwater Management section of this proposal, by using the 1% Rule, MS-19 provisions, and Nutrient Credits. These grading and drainage enhancement offer several benefits, as reflected in the chart on the right.

Benefits of English Team's Unique Drainage Design

- › Reduces the extent of cut, thus less exposed earth flowing toward streams and channels
- › Reduces the need for berm ditches, thus reducing right of way limits and asset maintenance
- › Leverages allowable SWM "1% Rule", MS-19 procedures, and Nutrient Credit Bank to reduce SWM facilities, thus limiting cost, ROW and maintenance

Pipes

Storm Drain Pipes will be sized to collect runoff from the grate inlets, and convey that runoff to approved outfalls and stormwater treatment areas. The storm drain layout will be closely coordinated with other design elements, such as existing utilities, to minimize impacts. Preliminary design has been performed, and in each case, the hydraulic grade lines are contained within the system for a 25-year event (Q25). Additionally, the capacity of each pipe based on Manning's equation was used to confirm pipe size and the availability of a minimum cleansing velocity for the design event (Q10). Preliminary calculations were prepared using PipeSoftVA, in accordance with VDOT procedures for determining minor losses at inlets/junctions. The preliminary hydraulics utilized reinforced concrete pipe for the first round of calculations, however during final design, the Team will consider use of RCP, Smooth Wall Corrugated Steel, PVC, and HDPE for storm sewer pipes. However, **in areas of known or suspected Acid Producing Material Category 1, HDPE pipe** will be the material of choice.

Major Culverts

A detailed H&HA will be completed for all structures (major culvert crossings) that have a total 100 year design discharge greater than 500 cfs. Based on this criteria, major culvert crossings are required at Station 561+35,

and Station 569+30, both in Phase 1. An additional large culvert is near these two crossings at STA 557+28, and a large culvert approximately 60” in diameter is anticipated in Phase 2, South.

Our team will design and construct these cross culverts to allow existing streams and drainage ditches to cross the new Route 220 location. They will be designed to convey the 25 year storm event with a maximum headwater to diameter ratio of 1.5. During design development, we will size and locate the drainage culverts to minimize disruption to the flow both upstream and downstream of the culvert. As required by VDOT or by Permit, culverts will be countersunk 6 to 12 inches to facilitate fish passage. The crossings will be built during the appropriate construction phase to minimize traffic impacts.

Preliminary design already performed for the major culverts were prepared using HY-8, in accordance with HDS-5 and VDOT procedures for determining inlet and outlet control hydraulics. Results are summarized in the table below:

Preliminary Major Culvert Design Summary							
Location	Drainage Area (Ac.)	25 Year Q (CFS)	Lowest E/R Elevation	U/S Invert Elevation	Preliminary Culvert Type/Size	Allowable 25 Year HW Elev	Concept Design 25 Year HW
STA 557+28	185	194	1071.6	1064.08	4' x 4' Box	1070.6	1068.70
STA 561+35 (Struct. 1072)	1,489	746	1067.95	1056.83	2-Cell, 8' x 8' Box	1066.95	1066.24
STA 569+30 (Struct. 1071)	297	319	1067.95	1059.85	1-Cell, 10' x 7' Box	1066.95	1066.37

Upon award, the English D/B Team will confirm all other required parameters are met, such as 50 year storm not inundating the roadway, limiting rise in 100 year storm HW elevation, and acceptable tolerances for construction deviation.

Stormwater Management Facilities

In project segments Phase 1 and Phase 2, the land disturbance activity, as described in Part 2, Section 1.2, is grandfathered under the Part IIC technical criteria in Section 9VAC25-870-93 et seq. of the VSMP Regulations. The final design of post construction stormwater management will follow the VDOT BMP Design Manual of Practice, April 2013, and the latest VDOT IIM LD-195. For the purposes of determining the required removal rate for the project, the site area to be used will be defined as the limits of the total R/W and permanent drainage easements.

Any land disturbance activity associated with Phase 3 will utilize Part IIB technical criteria (i.e., Runoff Reduction Method, Energy Balance Equation, etc.) in Section 9VAC25-870-62 et seq. of the VSMP Regulations. The final design of facilities in Phase 3 locations will follow the technical criteria for the development of the post construction stormwater management from the Virginia Stormwater BMP Clearinghouse, and the Runoff Reduction Spreadsheet.

BASE CONTRACT

In Phase 1, there are three detention ponds and in Phase 3, one tentative SWM pond in our team’s concept design layout, consistent with the pond locations shown in the RFP. As per the RFP instructions, the easement limits for the ponds in our proposal concept does not deviate from the easement limits in the

VDOT RFP plans. The ponds are located at STA 354+00 Right, STA 452+00 Right, and STA 505+00, Right

The Phase 1 ponds collect site runoff between STA 351 and STA 369 (Pond 1), STA 451 and STA 464 (Pond 2), and STA 504 and STA 520 (Pond 3), and will be designed to address both quantity control of peak discharges, and quality control for phosphorous load reduction. Additional water quality treatment may be added in side ditches via use of bio-retention, water quality dry swales, vegetative buffers, or other methods approved by VDOT to supplement that provided in the ponds.

Phase 1 - Preliminary Pond Design Summary			
ID #	Site Area (Ac.)	Paved Area (Ac.)	Volume (CY)
Pond 1	4.18	1.58	2,400
Pond 2	3.82	0.93	1,100
Pond 3	4.11	1.32	1,750

Phase 3 will potentially contain a 4th Pond (Pond 4) at STA 696+00, which will receive runoff from approximately STA 681+50 to STA 697+00. The disturbed area (“site area”) flowing into this pond is predominantly regraded turf area, with a small amount of new impervious pavement.

A significant portion of the project area, beyond what reaches these three ponds, will flow from the project site directly into one of several major waterways - Sinking Creek, Mud Run, or Big Creek. We have

1% Rule Preliminary Analysis			
Waterway	Watershed (Ac.)	Site Area (Ac.)	Percent
Sinking Creek	14,080	16.5	0.12% - ok
Mud Run	1,344	51.4	3.82%
Big Creek	1,786	14.4	0.81% - ok

determined that VDOT’s “1% rule” will apply to the portion of the project site that flows into two of these waterways – Sinking Creek, and Big Creek. Although the percentage of site area is more than 1% of the watershed area for Mud Run, our preliminary analysis shows that project flows can be stably conveyed to Mud Run, and that Mud Run will also not be

adversely impacted by the site runoff. This is because the nature of the site runoff to Mud Run is very similar to the existing runoff, since the paved area is not increasing significantly for the project. For Mud Run, and for the remainder of the project area discharging into culverts with smaller watershed areas than the aforementioned streams, we will use MS-19 procedures to ensure that natural channels will not erode or overtop during a 2-year storm event, and manmade channels will not erode or overtop during a 10-year storm event.

Water quality treatment for site area that flows directly into these streams and channels will be provided in graded areas adjacent to Route 220 and/or connector roads prior to reaching the channels, by use of bio-retention, water quality dry swales, vegetative buffers, or other methods approved by VDOT.

APM Stilling Basin Prior to Sinking Creek - Due to the presence of Category 1 APM in the excavated areas from STA 371+00 to 387+00, we have identified a need for a stilling basin to allow to settle the precipitated Iron from the runoff. The ditches collecting this excavated area have been designated in the VDOT Concept to drain directly into Sinking Creek, and through a wetland and flood plain area prior to reaching Sinking Creek. We have selected a site in the old roadbed of the Route 622, at STA 370+00 left, for this basin.

OPTION 1

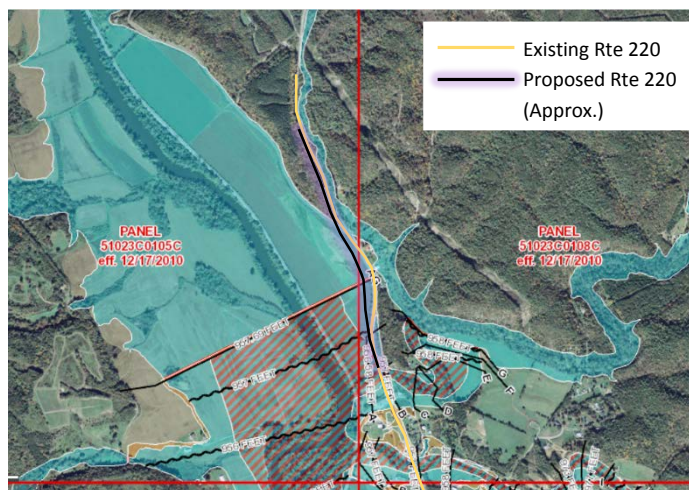
Option 1 creates additional impervious area in both Phase 2 and Phase 3, which in turn creates the need for additional drainage and stormwater management infrastructure.

In Phase 2, although the additional turning lanes will increase runoff volume and peak discharge values, the flow will be conveyed direction into Sinking Creek, thus the 1% rule will still apply and no stormwater detention will be required. Water quality treatment in to achieve require phosphorous load reduction will be addressed in the side ditches via use of bio-retention, water quality dry swales, vegetative buffers, or other methods approved by VDOT.

In Phase 3, the added “curve widening” in tight curves and widened shoulders also will increase runoff volume and peak discharge values. The pond at STA 696+00 (discussed in Base Contract section above) will be implemented to meet stormwater management requirements as necessary. The pond could also achieve water quality treatment for phosphorous load reduction, which may be supplemented by bio-retention, water quality dry swales, vegetative buffers, sand filters, or other methods approved by VDOT.

FEMA Floodplain Encroachments

The southernmost portion of Phase 1 relocates Route 220 into the 100 year floodplain of the James River. The VDOT concept design resulted in a maximum of 0.07 feet of floodplain rise due to the encroachment. Our concept design slightly modifies the design in this area, in order to achieve additional clear zone along Southbound 220. The elimination of guard rail in along these limits, and use of a 4:1 slope to achieve a 30 clear zone for 60 MPH, marginally increases the volume of the encroachment as compared to the VDOT design. Our preliminary assessment of the impact on the 100 year water surface elevation is a 0.09 foot increase, still well within the allowable impact. During final design, the FEMA Encroachment Model will be prepared, and design will be modified to ensure compliance with this criteria.



FEMA Floodplain Map (No Scale)

Mud Run runs parallel to Route 220 along the NB lane for most of the project length. The English Team’s design encroaches into the Mud Run FEMA floodplain, similar to that of the VDOT Concept Design. We will also perform the necessary design calculations to ensure encroachments meet required criteria.

(g) Utility Impacts

Numerous utilities exist within and adjacent to the project corridor. Our design has considered impacts to utilities and has already coordinated with the utility companies to obtain regarding as-built information and information regarding utility relocations and timelines. Utility owners include:

- Craig-Botetourt Electric Cooperative (CBEC)

- Dominion Virginia Power (DOM)
- Columbia Gas of Virginia (CGV)
- Columbia Pipeline Group (CGT)
- Roanoke Gas Company (RGC)
- Lumos Networks (LMS) / Roanoke & Botetourt Telephone Company (R&B)

BASE CONTRACT

Our team’s concept design results in a number of impacts to utilities as summarized in the Utility Assessment Matrix on the following page. We have noted in the matrix where our design has avoided or minimized an impact as compared to the RFP concept design plans.

UTILITY ASSESSMENT

Utility Type / Size	Approximate Location	Known/Potential Conflict	Relocation Plan / Avoidance Strategy
Craig-Botetourt Electric Cooperative (CBEC)			
Utility Poles	STA. 253+82.19 to STA. 266+00, STA. 360+00 to STA. 388+00, STA. 500+00 to STA. 589+75, STA. 701+00 to STA. 723+95	62 poles	
Roanoke & Botetourt Telephone Company (R&B)			
Utility Poles	STA. 120+25 to STA. 123+71.92, STA. 239+00 to STA. 246+00, STA. 259+00 to STA. 266+00, STA. 367+00 to STA. 374+00, STA. 381+00 to STA. 395+00, STA. 402+00 to STA. 409+00, STA. 444+00 to STA. 472+00, STA. 486+00 to STA. 528+00, STA. 556+00 to STA. 563+00, STA. 568+75 to STA. 575+75	42 poles	
NTELOS	STA. 535+00 to STA. 549+00	2 poles	
TransCanada			
20" Gas	STA. 259+00 to STA. 266+00	Impact Avoided	Design surface drainage ditch to maintain 36" minimum cover of the gas line and carrier pipe
24.5" Casing	STA. 259+00 to STA. 266+00	Impact Avoided	
Columbia Gas of Virginia (CGV)			
1.25" Gas	STA. 259+00 to STA. 266+00, STA. 360+00 to STA. 374+00	450 lf	
6" Gas	STA. 259+00 to STA. 266+00, STA. 266+00 to STA. 374+00, STA. 513+50 to STA. 528+00, STA. 568+75 to STA. 575+75	2265 lf	
2" Gas	STA. 589+75 to STA. 596+00	60 lf	
4" Gas (AATFI)	STA. 353+00 to STA. 360+00, STA. 367+00 to STA. 374+00, STA. 437+00 to STA. 444+00, STA. 513+50 to STA. 528+00, STA. 568+75 to STA. 575+75	570 lf	
GV, Regulator & Vertical Pipes	STA. 259+00 – STA. 266+00	8 locations	

OPTION 1

Option 1 may potentially result in additional utility impacts in Phase 2 and Phase 3, based on the expanded typical sections in these locations. However, the overall footprint of construction for each option appears

to create no greater impact than the Base Scope Contract to both utility poles and gas lines. It is possible that additional impacts will occur, which can be confirmed with additional utility test holes. With the available information in the RFP, the differences in impacts to utilities for Option 1 appears to be marginal.

Minimizing Utility Impacts

Concurrent with the conflict evaluation of each utility, we will look at design changes to minimize or eliminate the impact to the facility and coordinate with the roadway designer. When utility relocations are unavoidable we will work with the utility to minimize the length of the relocation and recommend alignments to avoid conflicts with the project and other utilities.

Where possible utilities without prior rights will be relocated within the existing or establish ROW. Utilities usually request a minimum width easement. The use of joint easements with assigned locations for each utility within it can minimize the total width needed and reduce the impact to the affected property owner.

(h) Proposed Right of Way Limits

Proposed right of way limits shown in our Concept Design are the limits defined with the RFP. All of our Team's design is contained within the limits of the proposed fee taking, permanent, and temporary easements defined by VDOT. We note the following locations where the proposed right of way can be reduced based on our concept design, as shown on our Concept Plans:

- > Sta. 451+00 to 473+00 RT.
- > Sta. 488+50 to 503+00 RT.
- > Sta. 506+50 to 522+00 RT.
- > Sta. 533+00 to 548+00 RT.
- > Sta. 570+50 to 572+00 LT.
- > Sta. 703+50 to 710+00 RT.

Our team notes that there were no utility easements defined in the VDOT conceptual design plans. Based on our review and initial discussion with the Utility Owners, we anticipate that some utility easements will be required. In other locations, utility relocations may be located inside of VDOT's right of way, for example the 6" Columba Gas line along SB Route 220 in the southern portion of Phase 1, where the right of way is nearly 300 feet wide and where the existing gas line is already inside the right of way.

(i) Other Key Project Features

Pavement Design

Pavement will be designed using AASHTO's Guide for Design of Pavement Structures (Rigid Pavement and Flexible Pavement), 1993 Edition. We anticipate a combination of new pavement; salvaging existing with milling, build-up and overlay; and demolition and replacement of pavement sections.

All new pavement will provide a minimum 30-year design-life. New full depth pavement will follow, at a minimum, the minimum pavement sections stipulated in the RFP. Our conceptual design and analysis indicates that the minimum pavement sections will be sufficient. These sections are:

Travel Way

- Surface – 1.5 inches Asphalt Concrete, Type SM-9.5D @ 175 lbs/SY
- Intermediate – 2.0 inches Asphalt Concrete, Type IM-19.0D @ 235 lbs/SY
- Base – 7.0 inches Asphalt Concrete, Type BM-25.0A
- Subbase – 8.0 inches Aggregate Base Material Type I, No. 21B

Shoulder

- Surface – 1.5 inches Asphalt Concrete, Type SM-9.5D @ 175 lbs/SY
- Intermediate – 2.0 inches Asphalt Concrete, Type IM-19.0D @ 235 lbs/SY
- Base – 3.0 inches Asphalt Concrete, Type BM-25.0A
- Subbase – 6.0 inches Aggregate Base Material Type I, No. 21B
- Stabilization – 12.0 inches No. 1 Aggregate

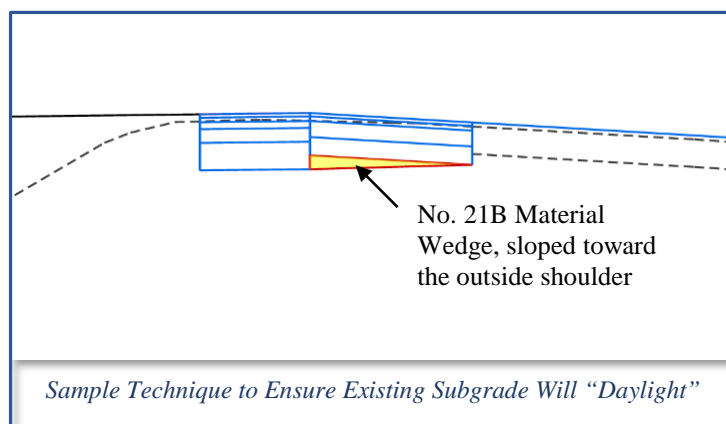
Salvaging pavement with milling and overlay will be designed for a 15-year service life. The primary section where pavement salvage may take place are:

Phase 1 (Station 375+00 to Station 450+00 and Station 465+00 to Station 475+00) – Our concept design salvages existing pavement incorporating the mill and replace with the same depths and materials note in the Route 220 Mainline Minimum Rehabilitation Recommendations, modified to mill an additional one inch and replace that additional inch of milling with an additional inch of Asphalt Base BM-25.0A.

Phase 2 South –Our concept design salvages existing pavement using the same rehabilitation method recommended for Phase 1.

Phase 2 North – Our concept design salvages existing pavement incorporating the mill and replace with the same depths and materials noted in the Route 220 Mainline Minimum Rehabilitation Recommendations.

In locations where we will salvage and widen existing pavement, the subbase elevations will be designed to align in such a way that subgrade drainage will not be inhibited. If necessary, CD-2 underdrains will be used to facilitate drainage. Other techniques include modifying the slope of the No. 21B subbase material (always meeting or exceeding the minimum pavement design depth), or deepening the depth of No 21B.



Sound Walls

The Noise Scoping Decision for this project was that this is a Type III project and that a noise study is not required. This decision is based on the Conceptual Plans. The Noise Scoping Decision will be verified by the English team based on the final plans. If ‘substantial’ deviations of the roadway alignment (horizontal or vertical) are proposed by our team, then additional noise analyses will be provided to the Department for review and approval prior to construction, at our cost. The word ‘substantial’ is defined below:

- a) Substantial Horizontal Alteration - A project that halves the distance between the traffic noise source and the closest receptor between the existing condition to the future build condition; or,
- b) Substantial Vertical Alteration - A project that removes shielding therefore exposing the line-of-sight between the receptor and the traffic noise source. This is done by either altering the vertical alignment of the highway or by altering the topography between the highway traffic noise source and the receptor.

English's design does not result in a substantial deviation of the roadway alignment. In fact, our alignment creates less of a shift in alignment than VDOT's RFP plans except for one location, from STA 407 to STA 415 where the shift increase by a maximum of eleven feet. However, should a substantial deviation occurs during final design, we will perform additional noise analyses and include a detailed Noise Abatement Design Report (NADR) that follows the VDOT Noise Abatement Guidance Manual (Version 7), dated July 14, 2015. A justification of the deviation will be included with the plan set.

Temporary Construction Condition Drainage Design

With extensive shifting of the US 220 alignment from its existing location, and the slope condition of cut on one side and fill on the other in most areas, transitioning the conveyance of drainage across the roadway with live traffic may become challenging. The extensive grading associated with the project alignments shifts will create major earth moving, requiring the need for temporary drainage conveyance. Approximately 65 existing cross pipe culverts of varying sizes will require replacement (or extension if allowable) while maintaining flow, and maintaining traffic on the roadway. Ponding of water in and around the roadway, or on private property, must not occur, requiring staged drainage construction. Furthermore, the high cuts in the northern section of the project require top ditches, which must be conveyed "non-erosively" down the slope. This design element requires close attention to interim conditions - the stages between initial and final - that are often overlooked during design, and if not addressed can result in significant safety, cost, schedule and environmental implications. The English Team will address interim condition drainage items as part of MOT submittals where needed, to include:

- Drainage conveyance adjacent to new construction directly abutting, and higher than, existing lanes.
- Maintaining flow across the roadway while replacing pipes, through use of offset pipes, staging with pump-arounds, or diversions from existing to partially constructed proposed pipes
- Sump conditions in temporary traffic barrier service locations

Right of Way Acquisition

Right of way acquisition for Phase 1 of the US Route 220 Safety Corridor Improvements design-build project currently consists of 59 tax map parcels with 49 different owners. Nearly all the owners are local to Botetourt County which enables more face-to-face meetings with property owners which typically leads to a higher settlement percentage. There are only three negotiations with corporation-owned properties which can often be more complex and protracted.

Our team has found that the three parcels shown in the RFP plans as being owned by a trust company transferred into local ownership in December 2015. Several additional properties were identified in the RFP plans as having "unknown" ownership. These properties will be thoroughly investigated by our legal team prior to right-of-way notice to proceed in an attempt to determine ownership. Should ownership remain in question after

right-of-way NTP these properties will be posted in accordance with Chapter 5 of the VDOT Right of Way and Utilities Manual.

DEFINING ACQUISITION TYPES

The VDOT concept plans depict a number of temporary easements for supporting slopes. In our experience, defining slope easements as temporary should be done with extreme caution, since at the conclusion of construction the easement is no longer accessible by VDOT, and the property owner is free to modify the ground within the easement (subject to local permits). The English team will carefully review all easement definitions in the preliminary design stage and coordinate with VDOT to define the final acquisition type for each construction area.

APPRAISALS AND PROPERTY EVALUATIONS

The proposed acquisitions have been reviewed as part of the preliminary scoping phase for property valuations. Based on assessment data and the local real estate market it is believed the following property valuation reports could be utilized:

[Basic Administrative Reports \(BARs\) – 26](#)

Many of the proposed acquisitions consist of minimal fee or temporary construction easement acquisitions. VDOT and FHWA requirements allow the use of BARs for non-complex acquisitions up to \$25,000; however, if a BAR valuation exceeds \$10,000 then the landowner has the right to request an appraisal. For that reason, BARs have only been scoped where we feel there is reasonable certainty the BAR value is below \$10,000. Unacceptable schedule delays could occur if BARs were used to value acquisitions in excess of \$10,000 should the landowner ultimately request an appraisal.

[Acquisition Appraisals – 22](#)

For acquisitions above \$10,000 with no anticipated damages beyond cost to cure, we have scoped Simple Acquisition Appraisals.

[Narrative Appraisals – 1](#)

Parcel 119 is scoped as a narrative appraisal for several reasons. A shift in the proposed right of way should be evaluated for proximity damages. Additionally, the property contains a small outdoor advertising sign that is scheduled for removal as well as a small shed.

[Appraisal Reviews – 23](#)

Each of the acquisition or narrative appraisals will be reviewed by an independent, third-party reviewer. We are proposing Appraisal Review Specialists, a VDOT-approved review firm that has the experience and resources necessary to maintain an aggressive appraisal schedule.

NEGOTIATIONS

Our right of way team will be based in Stantec's Roanoke, Virginia office, approximately 45 minutes from the project. With nearly all the landowners living in Botetourt County we can conduct face-to-face negotiations in nearly every instance. This allows the negotiation team to be responsive to landowners'

concerns and questions and should help facilitate voluntary conveyances. While we will use our best efforts to settle negotiations with landowners amicably, VDOT will make the ultimate determination in each case as to whether settlement is appropriate or whether the filing of a condemnation action is necessary. We will not request the filing of a certificate until the landowner has been given a minimum of thirty (30) days to consider the offer, landowner's counsel requests the filing or impasse has been clearly established. We will prepare all necessary paperwork and supporting documentation required for the proceeding and deliver it to English Construction. VDOT will review the submitted documentation for compliance with VDOT's rules and regulations, and when approved we will then file the certificate in accordance with Right of Way and Utilities Division Manual.

RELOCATIONS

As mentioned previously, a small shed located on Parcel 119 is slated for demolition. The contents of that shed are unknown; however, it could create the need for minor relocation assistance advisory services in the form of a personal property move. Ownership of the advertising sign will also should be determined as quickly as possible to gauge any possible appraisal or relocation impacts.

OPTION 1

If Option 1 in Phase 2 North (Gala Intersection) is implemented, a dwelling will be impacted, requiring a residential relocation. This relocation will be performed in accordance with the Uniform Relocation Act and Real Property acquisition Policies Act of 1970, as amended; Code of Virginia, Titles 25.1 and 33.1, as amended; Uniform Federal and Commonwealth Procedures. This includes full relocation and advisory services.

If Option 1 in Phase 3 North is implemented, there may be additional ROW impacts due to the widened typical section. No new property owner will be impacted, however.

WORK PROGRAM/SCHEDULE

Prior to VDOT issuing Notice to Commence Acquisitions following the 300/301 review, the design-build team will initiate title work. It is understood that the title reports will most likely have to be updated prior to making offers; however, having these title reports in hand will allow us to identify any liens or other clouds on title that could delay acquisition. Also during this time, the appraisal team will develop its market analysis and comparable sales information. The Design-Builder will submit a scope of work detailing the type of appraisal to be prepared for each parcel and the name of the proposed appraiser for VDOT review and approval in writing prior to commencing the individual parcel appraisal. All appraisers assigned to this project are on VDOT's Senior Appraiser list making them qualified to complete both the simple acquisition and narrative appraisal reports.

Immediately after receiving Notice to Commence Acquisitions, appraisal inspection letters will be sent to all landowners and appointments will be scheduled. Appraisals will be coordinated with the construction schedule allowing for critical path parcels to be cleared first.

4.4 Project Approach



4.4 PROJECT APPROACH

The English D-B Team has developed a comprehensive approach for managing the project through design and construction. The following pages provide an in-depth description of four (4) key elements which are the predominant areas of risk management for design/build transportation projects:

- ▶ Approach to **ENVIRONMENTAL MANAGEMENT**, including planned efforts during design and construction to avoid and minimize impacts to environmental resources. In addition, we describe our approach and potential solutions for addressing environmental conditions and areas of concern within the Project footprint.
- ▶ Approach for **UTILITY COORDINATION, ADJUSTMENTS, AND RELOCATIONS**. We have identified which utilities we believe to be in conflict with the design, as well as potential solutions for accommodating those utilities. We also discuss mitigation strategies to offset the potential impacts of utility relocations exceeding estimated timeframes, or unidentified/non-located utilities being discovered during construction.
- ▶ Approach to identifying and mitigating **GEOTECHNICAL** risks, including those related to Acid Producing Materials (APM) through knowledgeable application of geotechnical design and analysis practices and construction methods; and
- ▶ Approach to **QUALITY ASSURANCE AND QUALITY CONTROL** during both design and construction, including our staffing plan to meet the QA/QC requirements for the Project. Specifically, we address the QA/QC procedures for a unique Project element from each the design perspective and the construction perspective, which our team deems most critical.

4.4.1 Environmental Management

The English D-B Team is committed to the successful Project completion in a manner that avoids and/or minimizes impacts to the environment, ensures full compliance with applicable laws, regulations, and contract requirements, and honors VDOT's Project environmental commitments. **The English D-B Team's overall approach to environmental risk management is 100% compliance following a detailed avoidance, minimization, and mitigation process.** This process is built upon a foundation of accurate resource identification and thorough understanding of the rules and regulations protecting each resource. Early resource identification and Rare Threatened and Endangered Species (RTE) coordination will ensure we are aware of all the environmental design issues and inclusion of realistic permitting timeframes and Time-of Year (TOY) restrictions in the design and construction schedule will substantially reduce the possibility of delays.

Environmental Management Plan

Our Team's Environmental Management Plan defines environmental management roles/responsibilities, resources and mitigation strategies, and compliance documentation, developed from a thorough understanding of applicable federal, state, and local agency regulations. Our environmental team, listed in Table 4-4.1, brings a wealth of design-build and design-bid-build experience working on past projects for VDOT, including many in the Salem District. We will use this knowledge and experience to ensure compliance with applicable laws and regulations affecting this Project. We will implement the following strategies in our plan to guide Project environmental decisions:

- ▶ Accurately identify and designate environmental resources that occur within the Project limits;
- ▶ Apply our thorough understanding of applicable federal, state, and local agency regulations to avoid, minimize, and mitigate environmental impacts to the greatest extent practicable;
- ▶ Incorporate project environmental commitments into design processes, plans preparation, preconstruction planning, and construction activities;
- ▶ Maintain an environmental compliance program, including standards, procedures and audits, by conducting staff education, site inspections, and clear record keeping; and
- ▶ Construct the project in an environmentally responsible manner.

Table 4-4.1 Environmental Team Roles and Responsibilities

Role	Responsibilities Related to Environmental Management and Compliance
<i>Design-Build Project Manager (DBPM)</i> Cory Bond	<ul style="list-style-type: none"> ▶ Ensure the project compliance with laws and regulations, permits, contact requirements, and “approved for construction” plan and specifications ▶ Ensures adequate allocation of staff to meet environmental commitments
<i>Design Manager (DM)</i> Laura Mehiel	<ul style="list-style-type: none"> ▶ Working with EM, ensures that the design incorporates all regulatory requirements / commitments ▶ Ensures environmental commitments/requirements are part of the “approved for construction” plans
<i>Permitting Lead (PL)</i> Mike Harris	<ul style="list-style-type: none"> ▶ Manages water quality permitting efforts, WOUS delineations, T&E species studies and clearances, avoidance and minimization efforts, agency coordination, and compensatory mitigation compliance ▶ Provides QA assurance for water quality permit application and oversight for permit field inspections ▶ Working with the DBPM, facilitates coordination with regulatory agencies and working with the DM, ensures that the design team is provided and incorporates environmental requirements/commitments into the plans
<i>Environmental Manager (EM)</i> Allen “Doc” Hamblen	<ul style="list-style-type: none"> ▶ Tracks environmental commitments through design and construction, performs QA reviews on “approved for construction” plans, and coordinates with the environmental team throughout the project ▶ Working with the CM, facilitates the proper installation and maintenance of all field implementation of the “approved for construction” plan ▶ Working with the DM, ensures that the design team is provided and incorporates all necessary plan revisions.

Design Phase

Efforts to Avoid/Minimize Impacts to Environmental Resources

The English D-B Team has reviewed the NEPA documentation and supporting technical studies for the project, followed by a site review for a full understanding of the environmental commitments to design and construct this project as outlined by the environmental documents and current regulations. Table 4-4.2 on the following summarizes the identified environmental issues, our understanding, and our approach to mitigation.

Our Team will use an environmental commitments database, perform periodic monitoring of the project to assess and document performance, and confirm that the environmental compliance commitment requirements are met. Commitment compliance will be achieved through regular communication between the Environmental Manager and roadway and utility design engineers to ensure compliance.

Table 4-4.2 Relative Levels of Project Impacts on the Environment

Element/ Project Limits	PHASE I: Rte. 626 (Gala Loop Rd) to north of Rte. 696 (Buhrman Rd)	PHASE II: Rte. 43 (Narrow Passage Rd) to north of Rte. 622 (Gala Loop Rd)	PHASE III: Rte. 696 (Buhram Rd) to Route 727 (Farm Fork Rd)
Cultural Resources	○ No Historic Properties	● 44BO0048, 44BO0065 <i>Adverse Effects Mitigated by Prog. Agreement (VDOT has completed Stipulations 1 and 2)</i>	○ No Historic Properties
Threatened/Endangered Species	● Potential Species Present: Atlantic pigtoe mussel; orangefin madtom; little brown bat; tri-colored bat; Indiana bat; Northern long eared bat FWS determined as not present: James spiny mussel		
Wetlands/Waters of the U.S.	● 5,100 LF Stream, 0.48 Acres Wetlands	● 62 LF Stream / 0.18 Acres Wetlands (North Section) 185 LF Stream / 0.05 Acres Wetlands (South Section)	● 628 LF Stream / 0.26 Acres Wetlands (North Section) 0 LF Stream / 0 Acres Wetlands (South Section)
Air Quality	Project is located in a volatile organic compounds (VOC) and nitrogen oxides (NOx) Emissions Control Area. Project will take measures to limit the emissions of VOC and NOx during construction and follow all DEQ Pollution Control requirements.		
Noise	○ No Noise Impact	○ No Noise Impact	○ No Noise Impact
Hazardous Materials	● Asbestos Abatement may be required at dwelling to be demolished in Option 1	● Asbestos Abatement may be required at shed to be demolished	○ No Known Issues
Legend: ○ No Significant Impact ● Minor Impact ● Potential Impact ● Moderate Impact			

Environmental Permitting - The English D-B Team has successfully secured environmental permits on numerous other VDOT transportation projects and has a complete understanding of the required documentation, evaluation, analysis, and coordination necessary to secure critical environmental permits as quickly as possible.

Following a design approach of avoidance first and minimization second, the English D-B Team looked for ways to reduce impacts below the thresholds of 1/3 acre and 300 linear feet per stream crossing in order to qualify for Virginia Water Protection General Permit 3 (Linear Transportation). However, due to the length of impact to Waters of the U.S. linear feature designated in the RFP survey as “S-1” far exceeding 300-feet, we have confirmed that individual permits will be required from both USACE and VDEQ. Mitigation bank credits from primary banks in the same watershed will be sought to compensate for any unavoidable impacts to wetlands and streams. A listing of the anticipated required environmental evaluations and permits follow along with the approving agency and their approximate review period.

- Individual Clean Water Act Sections 404 permit from the USCOE;
 - Timeframe Approximately 6 months
- Individual Virginia Water Protection (VWP) permit from the VDEQ;
 - Timeframe Approximately 6 months
- Virginia Stormwater Management Program (VSMP) construction general permit;
 - Timeframe Approximately 2 months

Environmental Team Meetings - During the design phase, the design engineers, construction personnel, environmental staff, Acid Producing Material (APM) Specialist as well as any other key staff necessary will participate in regular design and constructability reviews to analyze all environmentally sensitive areas within and adjacent to the project. This allows the English D-B Team to understand the actual impacts of the project and all requirements associated with those impacts to include schedule constraints as well as operational constraints. The sensitive areas adjacent to the project will be reviewed to insure that impact to those areas is avoided and the proper controls are included in the design to control any construction activities that may have an impact on those areas. For this project particular attention will be directed toward the areas of APM to implement proper controls during design to the extent possible to mitigate and treat any runoff that will be created.

Construction Phase

After the plans are complete and approved, the construction team will take over the lead for avoidance, minimization, and mitigation. The design and environmental staff however, will be engaged for the duration of the project's construction. All preconstruction personnel will be engaged throughout the construction to assist in monitoring, mitigation and avoidance as necessary. During construction all field efforts for avoidance and minimization will be led by Doc Hamblen the Construction Environmental Manager. He will ensure that all environmental constraints are identified and protected throughout the project.

Prior to the beginning of construction in any area, all environmentally sensitive areas will be discussed with and identified for all field personnel. Prior to any field operation, all flagging of Jurisdictional Areas will be inspected and reflagged as necessary. Additional areas of concern and constraint will be identified in the field with a perimeter of safety fence; examples will include septic systems, cemeteries, areas of TOYR restrictions, etc. Doc will ensure that the team will continue to monitor and improve the plans in actual field conditions to ensure that all avoidance measures implemented as outlined in the project plans and modified based on field conditions as necessary. During the preconstruction meetings, field personnel will be made aware of the location of all known environmental resources that require protection as well as the location of all APM material. Instruction will include the restrictions regarding avoidance, the mitigation of, and operational constraints that are required, while working with or in areas of exposed APM. All personnel will be trained about the basic visual aspects of APM so that they can alert the appropriate staff member as to potential APM previously not identified that has been exposed during construction.

At the initiation of construction, all E&S measures will be installed in accordance with the approved plans and all environmental monitoring will commence in accordance with applicable permits, standards, and specifications. Also, in addition to field implementation of plan measures for avoidance and treatment, these measures will be reviewed to ensure not only proper installation and maintenance, but also to identify additional measures that should be installed to guarantee avoidance, minimization, and mitigation. Doc will constantly monitor all operations for compliance with all requirements enhancing our team's ability to avoid and minimize project impacts. At a minimum the project will be reviewed weekly and after each weather event for environmental compliance.

Acid Producing Materials - During construction, the areas of APM will be reviewed in accordance with the Design-Builder's approved APM Management Plan. All operations that involve the excavation of this material will be monitored to make sure all excavation is being handled appropriately for its respective category. Also, all surface runoff in these areas will be monitored in accordance with the APM Management Plan to ensure

that any water leaving the project site has a pH between 6-9 as required. Part of the construction review of APM will include evaluation of all excavated material to confirm the design geotechnical work identifying the locations. Also, the review of excavated material will be conducted to identify APM that may have not been unidentified during the geotechnical field work.

Environmental Permit Scheduling

Reasonable anticipated timeframes to obtain required permits are reflected in our Proposal Schedule. The starting dates for each anticipated permit is also tied to the appropriate timeline in the development of the design plans, ensuring that enough detail for grading, drainage, temporary construction access, and utility relocations are available to ensure limits of permits are adequate for completion of the project. Our Baseline Project Schedule, that will be submitted after award will include activities for all permit submittals, reviews, and approvals. It will also include activities for all mitigation necessary to be in compliance with permit requirements. The schedule will also include any agency reviews required that are not part of any permit. All of our work plan submissions, reviews, and approvals will be included in our Baseline Project Schedule, i.e. our APM Management Plan including a detailed all-inclusive list of activities required will allow us to track all environmental requirements to manage and minimize these risks throughout the project and identify when additional actions or adjustments will be needed to mitigate any potential delays to the overall completion of the project.

4.4.2 Utilities

Conflicts with existing utilities can create the potential to significantly impact the project schedule and cost. On Design-Build projects this risk is even greater for several reasons. At the RFP stage, the design is “preliminary” and it is not always feasible to determine the full extent of utility impacts. Plus, the majority of the utility owners/companies have not developed a design, cost analysis, or schedule for the potential relocations. Finally, the design-builder has limited leverage to motivate the utility owners to complete their efforts within the project schedule. The English D-B team’s experience managing this risk through the successful completion of several design-build projects has allowed us to develop proven strategies to implement a successful project plan in order to coordinate with both public and private utilities impacted by this project.

To be properly prepared for the utility relocation design and construction work, our utility engineering staff has begun communication with each utility owner and developed our specific plan and strategy to address the utility work plan, schedule, and cost. The following represents our understanding of the relocation plans, nature of the work, our schedule, an

d the utility company requirements. The English D-B Team has held meetings with the utility companies during the proposal preparation period to fully understand the issues with utilities within the Route 220 Corridor, for all three phases. We gained extensive knowledge of the magnitude of the utility impacts that each phase will encounter, and determined the sensitivity that each relocation will have on the schedule. For this reason, in our design concept we have attempted to mitigate utility impacts wherever possible, and factored the relocation design and construction timelines obtained from the communications, gas and electric companies into our construction phasing.

The English D-B Team has the experience and existing relationships with the various companies that gives us a working knowledge of their standards and specs that enables our team to “step in” and accelerate the design of acceptable relocation plans. Our Team member, Stantec, has a long history of providing design projects in the Salem District and Botetourt County, and is intimately knowledgeable of key utility standards, policies, and practices. They have hands-on experience with gas distribution design, communications design, and underground electrical design. Having experience on the D-B Team with design of the relocation plans will bring an added value in there being no “learning curve” for monitoring and/or developing the relocation design that is needed for the P&E packages.

Utilities in Conflict with Design

The English D-B Team has performed in depth conflict analysis of all utilities in the corridor, as well as developed strategies to address the conflicts. Due to the limited work area and the proximity of the new alignment to the existing 220 alignment, there are few chances to mitigate conflicts; however, we focused on minimizing the conflicts where possible and creating solutions that would best benefit the schedule. Utility assessment summaries are shown below, and noted conflicts are further detailed in 4.3 Design Concepts in our Utility Matrix.

Craig-Botetourt Electric Cooperative (CBE)

CBE is the owner of a utility pole line located in a 40’ wide existing utility easement along Route 220. The English D-B Team coordinated with Mack McCaleb of CBE, who had driven the project with Mr. Bowles of VDOT and reviewed the English Design-Build Team’s plans for impacts. Approximately 48 poles will be impacted by grading and the new alignment, about half of which are in Phase 1.

Dominion Virginia Power (DVP)

The English D-B Team coordinated with Adam Maguire, Robert Setzer (Transmission ROW Management) and Andrew Clark (Customer Solutions Distribution) in reference to any potential conflicts with the proposed project. Dominion has two (2) locations on the project corridor (Sheets 24 & 56 of VDOT’s concept plans) where Transmission / Distribution lines cross Route 220. Neither appear to be impacted by our design concept. Both locations are located within existing easements.

Columbia Gas of Virginia

There are several potential conflict areas anticipated with Columbia Gas of Virginia as a result of the proposed roadway safety improvements, primarily located in Phase 2 North and Phase 1. The English D-B team spoke with Erinn Kenline who indicated they are looking at relocation of existing older gas lines (especially the 6” line coming from the Gala Station location, running north along the corridor) that may be affected by this project. We met with their consultant, Eric Ertzner of Coastal Consultants, to review the proposed Route 220 plans and any proposed plans that Columbia Gas of Virginia (CGV) is currently working on for future replacement. Potentially, 2,200-feet of the 6” gas line that leaves Gala Station and runs cross country (to the north) will be in conflict with the Route 220 roadway improvements, as shown on VDOT Concept plans, sheets 16, 17, 18, 19, 20, and possibly sheets 41, 42 and 49. The English D-B Team will review these three (3) locations to minimize impacts. Where impacts can be avoided and Columbia Gas still elects to replace the line, the relocation will be determined as a betterment. In addition, approximately 500-feet of 1.25-inch line, 60-feet of 2-inch line are likely impacted, as well as 570-feet of abandoned 4-inch line.

Roanoke Gas Company (RGC)

RGC is the owner of a 12” gas line and 8” gas line in Phase 2 north. These existing lines are located at the rear of the Gala Station/Columbia Gas location on the southwest side of the property. The English D-B team coordinate with Mr. C.L. Boothe of Roanoke Gas, who indicated that the project will not impact the RGC distribution lines.

TransCanada

The English D-B team spoke with Mike Radford and William Pearson in reference to the existing 20” gas line crossing on Route 220 at Station 263+42+/- and how it may be impacted by the roadway improvements. We met with Andy Kvasnicka with TransCanada, and based on the proposed improvements (with no grade change) they are comfortable with the existing protection in place (steel casing), however they do have some concerns in the areas of the proposed ditch lines shown on the current plans and how we propose to maintain minimum cover (36”), or can achieve preferred cover (48”) over the existing 20” HP Gas line. Our team’s ditch design will maintain a minimum cover and provide protection in place as needed. TransCanada plans some upgrades on the site beginning in April, 2017 thru October, 2017, which should be coordinated closely with the 220 Project.

Lumos Networks (LMS)/R&B Telephone Company (R&B)

The English D-B Team coordinated with Ray Lipes and John Vanlew regarding project impacts to the joint pole line, owned by Lumos. LMS has claimed they are located in utility easements/agreements along Route 220, though all of these easements cannot yet be confirmed with documentation. Approximately 37 overhead utility poles will be impacted by the project improvements, predominantly in Phase 1. Some of the impacted poles are within the existing VDOT Right of Way, not in defined easements. The new pole lines will be located in new easements located as shown in the Concept Plans in Volume 2.

Minimizing Utility Impacts - Concurrent with the conflict evaluation of each utility, we will look at design changes to minimize or eliminate the impact to the facility and coordinate with the roadway designer. When utility relocations are unavoidable we will work with the utility to minimize the length of the relocation and recommend alignments to avoid conflicts with the project and other utilities.

Where possible, utilities without prior rights will be relocated within the existing or establish ROW. Utilities usually request a minimum width easement. The use of joint easements with assigned locations for each utility within it can minimize the total width needed and reduce the impact to the affected property owner.

Coordination with Utility Owners

Utility Coordination Team - English’s D-B Utility Coordination Team, led by Utility Manager Al Arnold, PE will be convened and meet regularly in the form of Utility Task force meetings. Through these meetings and monitoring of the design, potential impacts will be identified, to be shared with the utility owners. The need for additional utility locating, including test holes, will be initiated by the Team or in response to a request by a utility owner. The first effort will be to redesign to avoid the utility if at all possible. Where not possible, the plans will be given to the Utility Companies as an update to the coordination which has already begun in the proposal phase, through early coordination meetings (pre-UFI).

Early Utility Coordination Meetings - The English D-B Utility Coordination Team will schedule early coordination meetings with each utility company to share project information including scope of work, sequence of construction and schedule milestones. At these meetings we will inform the utilities that the project will be following relocation procedures of VDOT's Utility Manual regarding cost sharing and submittal requirements. We will review the preliminary scope of required relocations and will discuss permanent and temporary easement requirements, prior rights agreements and any special conditions related to the relocation such as work methods, lead times for material and crews, permits, outage requirements and seasonal demands. Identification of the condition of the facilities will be discussed and the potential of having to replace sections encountered during construction of the project. We will also request any as-built information that may be available. The as-built information will be incorporated into the project design files as existing conditions.

The most current plans will be provided at the early coordination meetings and updated plans will be distributed as the design proceeds to the preliminary and intermediate design submittals. We will meet with the utilities as design progresses to review and discuss any special design elements or concerns. Plans from each submittal will be provided to the utilities for use in preparing their relocation plans.

Continued Utility Coordination: Prior Rights - We will supplement our utility assessment with any additional information obtained from the early coordination meetings. Additional utility surveys, utility designation and test holes will be obtained, by the Design-Builder Survey Team, to identify and confirm potential conflicts. Using this evaluation, the cost sharing responsibility will be documented on VDOT form UT-9 and shared with each utility company. Each utility company will be requested to submit documentation confirming prior rights to substantiate the cost sharing percentage determined on the UT-9. The cost sharing percentage will be updated based on documentation received from each utility company supporting their prior rights.

We will verify the prior rights of each utility owner's facilities if claimed by a utility owner. If there is a dispute over prior rights with a utility, the Design-Builder will be responsible for resolving the dispute. We will prepare and submit to VDOT a Preliminary Utility Status Report within one hundred and twenty (120) days from the Date of Notice to Proceed that includes a listing of all utilities located within the Project Limits and a conflict evaluation and cost responsibility determination for each utility. This report will include copies of existing easements, As-Built plans or other supporting documentation that substantiates any compensable rights of the utility owner.

Continued Utility Coordination: UFI and Relocation Plans - Following the early coordination meetings, we will conduct a preliminary review meeting (VDOT Utility Field Inspection Meeting) with all utilities to review the overall project scope, milestones and utility relocation schedule and preliminary cost responsibility determination. We will continue to monitor the progress of each utility company, prepare a relocation plan and estimate to ensure they are meeting the schedule milestones and have the required project information needed to support their design.

We will obtain relocation plans including letters of no cost where the utility owner does not have a compensable right, utility agreements including cost estimates and relocation plans where the utility owner has a compensable right, or letters of no conflict where the utility owner's facilities will not be impacted by the Project.

Having met with VDOT's Regional Utilities Manager / Design-Build Projects Utility Coordinator within forty-five (45) days from the date of Notice to Proceed, we will confirm our full understanding of what is required with each P&E submittal. We will review the relocation plans and estimates prepared by the utility companies to

ensure that all relocations comply with the current editions of the VDOT Utilities Manual of Instruction, Utility Relocation Policies and Procedures and the VDOT Land Use Permit Manual. Each relocation plan will be reviewed to ensure no conflict with the proposed roadway improvements and other utility owner's relocation plans. We will also review quantities and cost estimates and any adjustments to the UT-9 cost determination. All relocation plans will be assembled and submitted to VDOT in a manner that VDOT can approve the submittals with minimal review. Once approved, we will notify the utility company to proceed with their relocations.

Relocations and Adjustments – All proposed utility relocations and adjustments will conform to the Design Builder's Utility Scope of Work as defined within Request for Proposal for the Route 220 Corridor Safety Improvements, Phases 1, 2 and 3. In addition, we will follow the guidelines provided in the VDOT Utilities Manual of Instructions (Tenth Edition, Published 1/1/2011, or as amended) to establish the general framework for addressing the utility issues, responsibilities, terms and conditions under which the work (relocations and adjustments) will be performed within the Project affecting each Utility Owner.

Betterments – Possible upgrades of gas lines as mentioned above, by Columbia Gas and/or TransCanada, will be treated as betterments in accordance with VDOT Utility Manual policy. The same will be true for any other betterment encountered during the utility assessment and relocation process.

Mitigation Strategies to Offset Potential Impacts of Utility Relocations Exceeding Timeframes or Unidentified/Non-Located Utilities Being Discovered During Construction

We have multiple strategies to mitigate impacts of delays associated with utility relocations going beyond schedule timeframes, and discovery of unknown utilities.

Mitigate Utility Relocations Exceeding Timeframes

- Utility Task Force to monitor and push the process
- Members of our D-B Team who can design overhead pole lines and gas distribution
- Utility Tracking Matrix updated weekly and reviewed by Project Manager (design and construction)
- Effective UFI Meeting with the right attendees
- In-Depth knowledge of VDOT Utility Manual, RUMS, and VDOT requirements for Utility P&E's
- Schedule appropriate construction activities to be completed concurrently with utility relocations
- Grade new areas while leaving existing poles in place, if needed

The key to safeguarding against potential schedule problems with the utility companies is consistent, ongoing communications. The English D-B Team will continually track and communicate with the companies involved throughout the entire relocation phase. Through our experience coordinating utility relocation projects, we have developed a tracking system that will be updated regularly and allow us to look ahead to prepare for the coming stages.

The relocation tracking begins at the UFI, setting the dates for the easement requests, P&E submissions, start of field work, and the target completion dates for each utility. As easement requests are completed, the needed parcels will be listed and tracked as they progress through the acquisition process, and the final documentation supplied to the utility(s) needing the easement when received. This allows us to quickly see how many parcels remain and keep close communications with the ROW staff for forecasts on closings to better allow the utilizes involved to start preparing to mobilize to the field and be ready to proceed at the earliest point in time.

As construction begins, English field personnel will track the progress of the relocations as well as communications with the company field supervisors themselves. Progress meetings will be held with all utilities involved onsite on a bi-weekly basis. If it is apparent that a utility is falling behind, meetings will be held more often to partner in solutions to get back on track.

Mitigate Discovery of Unidentified/Non-Located Utilities

During the proposal phase, we have contacted every utility company we have identified that could possibly be in the corridor and also confirmed that the RFP plans appear to list all the utilities that claim facilities in the corridor. However, if we should encounter an unidentified utility, we will bring in AMT's SUE group as well as Miss Utility to help track the line down to a point of identification (hand-hole, marker post etc.). Once identified, we will immediately contact the company to come to the field and verify it is theirs and if it is active or abandoned.

Lastly, our utility field staff, led by Al Arnold who has 43 years of experience, has a clear understanding in solving field issues and finding solutions to complicated problems. Their oversight of the utility relocations in the field will help foresee possible problems and greatly aid in overcoming any unforeseen problems.

4.4.3 Geotechnical

The English D-B Team has reviewed the minimum geotechnical requirements. We are prepared to meet and exceed the project requirements through our team design approach by identifying and mitigating geotechnical risks for this project. The varying geological conditions of the Valley and Ridge Physiographic Province of Virginia present challenging geotechnical conditions throughout the project alignment. Specific items within the project limits that demonstrate construction challenges include pyritic shale rock units that are identified as acid-producing materials, regional soft soil profiles with alluvial soils and compressible soil layers, asphalt pavement stability, moderate adverse dip sections, and karst geologic bedrock units. The English D-B Team has demonstrated experience in successfully resolving similar construction issues; wherein we mitigated acid producing bedrock and limited environmental impacts while maintaining economical constructability of roadway cuts and fill, utility alignments, stormwater management structures and roadway subgrade. This makes us uniquely qualified to support this project.

Geotechnical Approach

Our D-B Team's project approach to identifying and mitigating the geotechnical risks will be led by Amec Foster Wheeler (Amec). Our approach is based on our experience and our understanding of project requirements set forth within the Chapter 3 of the VDOT, Material Division Manual of Instructions (MOI); the current AASHTO LRFD Bridge Design Specifications 7th Edition, 2014 and VDOT Modification's; Section 400.04 of the VDOT 2016 Road and Bridge Specifications; and the minimum requirements in Section 2.6.4.2 of the RFP. Our approach will include a thorough evaluation of the existing geotechnical data and information, an additional geotechnical exploration based upon the anticipated final design, a complete engineering analysis to support the final design, establishment of geotechnical recommendations incorporated into the final design, and implementation of these recommendations within the final design and construction of the project.

Our geotechnical design assumptions, as depicted on our drawings and in this Technical Proposal, are based on the information presented in the preliminary geotechnical evaluations previously conducted for this project and included within the RFP package. We have reviewed the following documents provided by VDOT for this RFP:

- Geotechnical Data Report (GDR), Phase 1 & 2, dated June 22, 2016
- Geotechnical Report Addendum, Phase 3, dated October 21, 2016
- UPC 105543, Pyritic Material Report, dated July 19, 2016
- UPC 105545, Addendum to Acid-Producing Materials Evaluation, dated October 2016
- 2016 gINT Logs
- 2006 Geotechnical Investigation and gINT Logs
- Preliminary Pavement Recommendations Report, dated July 1, 2016
- Addendum to Preliminary Pavement Report dated October 18, 2016
- Subsurface Investigation for Minor Structures, Dated December 13, 2006
- Addendum to subsurface Investigation for Minor Structures, Dated Dec 13, 2006

Once awarded the project, we will conduct a formal review of all provided and available relevant documents to assess existing geotechnical information to tailor our geotechnical exploration to confirm design elements, support alignment (vertical and horizontal) changes, and to address geotechnical issues relative to the final design.

Subsurface Exploration Program Overview – We have identified that approximately 385 additional geotechnical borings are necessary to provide sufficient subsurface data, adequately identify Acid Producing Material (APM) and comply with Chapter 3 of VDOT’s MOI requirements and Section 2.6.4.2 of the RFP The following list summarizes these additional borings:

Design Element	Borings
Roadway alignments	110
Cuts and fills	81
Acid Producing Material	147
Storm Water Management	16
Culverts and Drainage Structures	21
Retaining Wall Structures	10

Our geotechnical exploration will be sequenced to provide timely information to the English D-B Team for critical path items. We feel the most significant geotechnical risk for this project is APM. We will begin our exploration within the sections known to contain APM so that the D-B team can identify and advance mitigating design measures to reduce the impact it has on the project cost and schedule.

In addition to continuous SPT sampling within the top 10-feet of the boring and 5-foot intervals thereafter, we will obtain bulk samples, undisturbed samples and NQ size rock core samples during our exploration to support settlement calculations, global stability analyses, and structure foundation designs. Upon completion of the geotechnical field exploration and laboratory testing, we will utilize available geotechnical information (existing VDOT data and additional subsurface exploration) to evaluate soils parameters, perform engineering

analyses, and provide geotechnical recommendations for the design and construction of cut slopes, embankments, drainage structures, retaining walls, roadway subgrades pavements, and stormwater management (SWM) facilities. Temporary groundwater monitoring is planned in the potential SWM Basins, and along cuts and embankments greater than 25-feet, and where water is anticipated to be present within the geologic unit.

Amec will provide full time geotechnical engineering management for all geotechnical field operations and will maintain full time geotechnical engineering support with each drill crew to provide continuous geotechnical logging of each boring in the field. During field work all boring logs will be reviewed and samples selected for laboratory testing by our Field Geotechnical Manager. These samples will be shipped to the laboratory on a weekly basis to reduce schedule impacts. Amec maintains a fully functional and AASHTO accredited soils and aggregate laboratory wherein we will perform the prescribed geotechnical lab tests including soil classifications, compaction, permeability and strength testing.

Upon completion of the geotechnical field exploration and laboratory testing, we will utilize available geotechnical information (existing VDOT data and additional subsurface exploration) to evaluate soils parameters, and perform engineering analyses. We will provide geotechnical recommendations for the final design and construction of culvert foundations, drainage structures, retaining walls, slopes, roadway embankment, roadway subgrade, pavements, and storm water management (SWM) facilities. Geotechnical design of these features will be completed in accordance with the guiding documents previously cited. The exploration and testing data, with our recommendations and design will be presented in the Geotechnical Engineering Report (GER) and incorporated into the project plans and specifications.

Key Geotechnical Issues

The English D-B Team is keenly aware of the geotechnical issues associated with this project and proposed alignment. Review of existing project information indicates there are areas within the project limits that pose significant geotechnical challenges and risk that may have adverse impacts to quality and schedule. We have developed an approach to the following items that will be addressed during design and implemented during construction.

Acid-Producing Materials

- Millboro Shale geologic unit contains specific strata with high Pyritic contents that are identified within specific roadway cut sections.
- All sections identified will be evaluated and designed for segregation and treatment as outlined within the project documents.

Regional Soft Soil Profiles

- Alluvial soils were identified in preliminary borings along the James River, Mill Creek, Sinking Creek and Mud Run
- These sections will be analyzed for settlement and stability concerns. We anticipate that these areas can be mitigated with typical construction methods to limit impacts.

Pavement Stability

- Existing pavement sections are in moderate condition with some alligator cracking.

- To clear 15-year stability requirement, we will mill 1-inch more than the provided minimum pavement design suggests when using existing pavement and increase the base course (BM025.0A) mix depth by 1-inch in Phase 2 South. All other areas will use of 3.5-inches and paving as outlined in the minimum pavement design outlined in the RFP.
- The provided pavement data report includes boring logs that show a wide variation of pavement structure in the areas of the shoulders; the author noted that work was performed in the project area in 2012 to rehabilitate the shoulder pavement for the whole length of the project. Therefore, shoulder pavement may be required to be reworked to assure consistency of structure.

Karst

- No maintenance history of sinkholes has been provided or discovered
- GDR reports did not indicate that severe karst conditions were encountered. Further field evaluation of areas that contain carbonate bedrock will be performed.

Slope stability

- Not steeper than 2:1
- The majority of the cuts have an adverse dip (the dip is toward the excavated slope). The team will evaluate both circular arc and block failure surfaces. The lack of definitive strike and dip information in the preliminary reports preclude a complete evaluation at this stage. The team will evaluate this during our geotechnical investigation as to whether this is a concern.
- No visible landslides (neither sliver nor deep slips, i.e. no visible scarps).
- Treatment detail for low lying areas (south end of project) are standard details that is part of VDOT practice for areas like this and have worked successfully.

Pyritic Materials

The site is located in the Millboro shale formation that contains pyritic zones which produce acidic runoff and pose potential hazard to the surrounding environment. Amec's Acid Producing Material Specialist (APMS), Mr. Luke Williams, P.E. will lead the English D-B Team's approach for mitigation of APM. Based upon our experience with similar projects throughout the Appalachian Region we will begin our geotechnical exploration specifically targeting areas that are known to contain APM. Our approach to managing and mitigating geotechnical risks associated with this project is to determine the extents of APM strata early in the design process, developing a mitigation plan to segregate or adequately mix the APM during construction. Once this plan is developed, the English D-B Team will evaluate the cost impacts associated with mitigation of the APM and provide this plan to VDOT for review.

With this experience, we can bring innovative and successful APM handling techniques to this project. The primary factor for mitigating the risks of APM is identifying the APM prior to construction and developing grading plans (essentially mining plans) to segregate or adequately mix the APM during construction.

While the Pyritic Materials report was helpful in identifying the areas containing APM, without strike and dip information, we cannot provide correlations of the strata of interest (APM or blending material) to develop excavation plans at this stage, these plans will be developed during the design phase of the project. The Pyritic

report listed three areas that contain APM, which are discussed below to provide our understanding of the available information.

Stations 371 to 387

The APM was identified in three holes (CS-01, SS-28, and SS-30) in the preliminary reports. The zone identified by the boring CS-01 is comprised of approximately 12.6 feet of Category 1 material overlain by 9-feet of Category 2 material. SS-28 contains approximately 7-feet of Category 1 material overlain by Category 4 materials. SS-30 has approximately 10-feet of Category 1 material overlain by an un-sampled reddish sandy silt. The latter color indication was above the APM in each of the holes and may be used to direct efforts during excavation. It does indicate that the APM is variable laterally and it is evident that close monitoring of the excavation will have to be performed by the AMPS to direct segregation of the materials.

It is desired to segregate the Category 2 and 4 materials during the excavation so that the former are not wasted to the special fill areas and the latter can be used to amend the Category 2 materials. However, additional information is needed to determine where visible or physical breaks are occurring in the lithologic sections and will be obtained during our geotechnical investigation.

Moreover, the dip information provided at the SS holes (5 degrees) is flatter than the regional dip of around 17 degrees as recorded on the Eagle Point Geologic Quadrangle Map. During our geotechnical investigation the actual dip will be verified. The 5-degree dip indicates that the APM in each hole is the same stratum and it will be exposed throughout the proposed ditch line. The steeper dip indicates that each occurrence of the strata is separate on the exposure along the ditch line will be shorter requiring less mitigation.

Stations 408 to 414

Boring SS-42 was located at approximately Station 418+90, and revealed Category 1 material at 18.5 to 20 feet (17 to 20 feet based on sampling intervals in preliminary reports) below existing grade, overlain by Category 2 material in two zones at 8- to 10-feet and 13.5 to 15-feet (6- to 17-feet based on sampling intervals). Differentiation between the categories appears to be difficult and both materials may have been removed as one lift. If it cannot be segregated, both zones will be placed in an encapsulation fill area (located within the permanent easement), limed and covered. Otherwise the category 2 material will be excavated as a lift and placed with amendments as fill material throughout Stations 408+00 to 414+00.

Stations 457 to 461

The APM was identified in six borings (SS-59, SS-60, SS-61, SS-62, CS-20, CS-21) in the preliminary reports. The zone identified by the boring SS-59 which is on the southern portion of this section is comprised of approximately 5-feet of Category 2 material overlain by 12-feet of material that is a potential blending material for the Category 2 materials. Another small zone of Category 2 material is found in SS-61 that correlates with that found in CS-20. CS-21 contains approximately 20- to 25-feet of Category 1 material. To better correlate the materials in this section we propose to place more borings in between the existing holes that have already been drilled. This will give a 100-feet interval plus we will be able to use the strike and dip orientation equipment in order to “chase” the hotter zones during analysis.

Design Phase APM Work Plan - During our geotechnical investigation, we propose to drill approximately 97 holes between Station 371+00 and 461+00 (total drilling footage approximately 1900-feet) to augment the available information for APM. The multiple holes at one station will be used to satisfy the Addendum 2 specification of at least one hole every 100-feet of station, in the potential acid producing cut areas as defined by the preliminary study. Data validation for the cuts beyond Station 461+00 could not be obtained. The cut sections in this area are still within the Millboro Shale and therefore, approximately 55 locations (total drilling footage approximately 660-feet) will be explored and tested between Station 461+00 and 589+00. These holes in addition to the alignment holes and the preliminary drilling will satisfy the requirements of the MOI.

To accurately capture strike and dip orientations we will utilize a downhole core orientation instrument (Reflex Act 3) to determine strike and dip during the drilling. This data allows for better mapping of the strata of interest which will be shown in the cut cross sections to direct the construction activities. In addition, the field geologist will utilize the data to redirect drilling and plan offset holes to trace the strata of interest.

We have designed our APM sampling program to begin coring attempts when blow counts (N-values) exceed 50 regardless of penetration depth. To reduce washout during the coring attempts we will utilize HQ coring and reduced water. This additional step will provide relatively intact samples that can be examined and sampled in small discrete units. The previous drilling auguring was used to explore the Highly Weathered Rock and then sampled from split spoons. When auguring through weathered materials, not meeting the above criteria, bag samples will be taken for each 5-foot increment of auguring. This material will then be split and sampled as one unit.

After the cores are retrieved they will be field logged and tested for the following parameters immediately after the sample is removed from the ground and at its natural moisture content:

- Paste pH (per Sobek, et. al., 1978, Field and Laboratory Methods Applicable to Overburden and Minesoils, EPA-600/2-78-54)
- Fizz rating (per Sobek, et. al., 1978, Field and Laboratory Methods Applicable to Overburden and Minesoils, EPA-600/2-78-54)
- Munsell color identification (per Sobek, et. al., 1978, Field and Laboratory Methods Applicable to Overburden and Minesoils, EPA-600/2-78-54)

Following logging the samples will be stored in core boxes in a sheltered location. The entire cores will then be periodically transported to REIC Laboratories for analysis. At the laboratory, the cores will again be examined and divided into sampling sections. The cores will be sampled on minimum 5-foot centers and at lithological breaks to provide ABA for the total column and aid in segregation of the materials during construction. We have estimated that approximately 400 samples will be tested for the following analyses

- Maximum potential acidity (MPA) based on total sulfur content (ASTM D4329).
- Neutralization potential (NP) (by titration as per Sobek, et. al., 1978, Field and Laboratory Methods Applicable to Overburden and Minesoils, EPA-600/2-78-54 modified with hydrogen peroxide step to reduce siderite interference as referenced in Skousen, Renton, Brown, Evans, Leavitt, Brady, Cohen and Ziemkiewicz, 1997, Neutralization Potential of Overburden Samples Containing Siderite, Journal of Environmental Quality, v. 26, p. 673-681. For high carbonate contents (rating 2 or 3) as indicated

by fizz rating, NP determination by ASTM C25-99.33 (employing higher acid strength) will be performed.

- Net neutralization potential (NNP) in tons of calcium carbonate equivalent (CCE) needed to fully neutralize the maximum potential acidity contained in 1000 tons of the material being tested.

Following laboratory analyses, the APM and blending materials will be categorized and identified on the geologic logs for input into the 3-D excavation model. The model will provide the area of cut and the relative amounts of the materials of interest. These values will then be input into a spreadsheet to calculate the weighted NNP of each cut.

APM Treatment and Handling Plans – The design team will prepare the APM Management Plan that meets and exceeds the requirements of the RFP and present it to VDOT prior to implementation. Except as provided below the D-B team is not proposing Alternative treatment options.

CATEGORY 1 MATERIAL

APM Category 1 material requires special treatment and/or handling including segregation, blending with alkaline materials and/or encapsulation.

Category 1 Material	Material will be identified prior to excavation and will be segregated from other materials during excavation and immediately transported to the final alkaline-blending and encapsulation site where it will be thoroughly blended and placed. No exceptions to Part 2 requirements.
Alkaline Material	On-site calcareous shale will not be used as the alkaline material for treating Category 1 Materials. Lime rates for Category 1 materials will be based on a weighted average of the potential acidity of Category 1 materials removed in a lift with a target value of 24 ppt. When adjacent materials removed with the category 1 materials destined for encapsulation only the potential acidity will be included in the weighted average.
Alkaline Material Application Rate	No exceptions to Part 2 requirements.
Alkaline Material Gradation	No exceptions to Part 2 requirements.
Exposed Excavated Cuts	Cuts containing Category 1 Material exposed will have a minimum 10 tons of Alkaline Material applied per acre of slope face. Alkaline Material will be evenly applied over the entire slope. After application of Alkaline Material, 6-inches of top soil will be placed on the slope face and be covered with EC-2. No exceptions to Part 2 requirements.
Blending	No exceptions to Part 2 requirements.
Prompt Application of Alkaline Material and Encapsulation	No exceptions to Part 2 requirements.
Encapsulation Soil	No exceptions, except that alternate encapsulation materials that meet the permeability requirements, as set forth above, will be considered as a substitute for the permeability requirements of the soil; however, three (3) feet of soil will still be required around the APM and vegetation and geotechnical stability of the encapsulation site will also be maintained and ensured if with the use of alternative materials are used.

Isolation from Water	The special encapsulation sites for disposal of category 1 material will be located near the top of the watershed or on moderately sloped side hill areas. Diversion ditches will be installed above these fills to keep the materials “high and dry”. Runoff from these areas will be routed to the appropriate treatment facilities.
Geotextile	No exceptions to Part 2 requirements.
Cut Slope Ditches	Ditches receiving drainage from excavated cuts in Category 1 Material will be constructed as open limestone channels. No exceptions to Part 2 requirements.

Where cut slope ditches discharge to a receiving stream or wetland, settling basins will be used to provide final settling, filtration and neutralization before release. The settling basin design will be submitted for review by the VDOT Environmental Section. The cut sections containing Category 1 materials currently discharge to a sediment basin. Due to the potentially large amount of exposed Category 1 material between Stations 371 to 387, and the ditch section invert potentially in this material an additional settling pond can be located at the inlet to the culvert at station 373+50.

CATEGORY 2 MATERIAL

APM Category 2 material requires treatment and/or blending with alkaline materials.

Alkaline Material	Will be processed limestone, lime kiln dust (LKD), hydrate tailings, agricultural limestone / limestone sand or CaCO ₃ equivalent material source reviewed and approved by VDOT. On-site calcareous shale may be used as the alkaline material for treating Category 2 Materials.
Alkaline Material Application Rate	Will be based on a target NNP of 24 ppt.
Placement	Blended material may be utilized in general fill construction and will follow the requirements of the Special Provision for Processing and Placement of Shale Fill.
Exposed Excavated Cuts	Cuts containing Category 2 Material exposed will have a minimum 10 tons of Alkaline Material applied per acre of slope face. Alkaline Material will be evenly applied over the entire slope. After application of Alkaline Material, 6-inches of top soil will be placed on the slope face and be covered with EC-2. Alkaline Material treatment will not be required if an existing cut remains undisturbed by construction activities.

Category 3 Material – will not be used as an alkaline material.

Category 4 Material – will be used, where necessary, as alkaline material for treatment of Category 2 APM.

4.4.4 Quality Assurance/Quality Control

The Team’s approach to Design and Construction QA/QC follows the DBIA paradigm of having an integrated development of the design and construction program. In essence, the construction staff provides support and input during the design process while the design staff provides support and input during construction. Construction staff is engaged to ensure designs are constructible and tailored to support the most efficient sequence of work. Design staff continue support during construction to ensure design intent is achieved. This approach creates a partnership between the designers, the contractor’s field staff, the QC staff, and the QA staff for the duration of the project. Forming this partnering environment with a proactive QC testing and inspection

program as well as an adequate level of QA is key to the successful implementation of a proactive Construction QA/QC program that will be effective and efficient.

It is in every project participant’s interest that the QA/QC program is effective, as it reduces rework and ensures the constructed product is done safely, and that all materials and methods meet the design intent and VDOT requirements. The result is an end product that will meet the intended function and provide the Department and the public a safe and long lasting roadway. Its implementation during construction will determine the success of the project. To carry out these important functions we have developed the staffing plan below.

Staffing Plan

Team Member	Role and Responsibility
<i>Design-Build Project Manager</i> Cory Bond	<ul style="list-style-type: none"> › Responsible for the overall project design, construction quality management, and contractor administration for the project; partners with VDOT to resolve issues and disputes
<i>Quality Assurance Manager (QAM)</i> Isaac “Chuck” Whited	<ul style="list-style-type: none"> › Reports to Cory and VDOT and is completely independent of construction operations/production; responsible for QA inspection/testing materials used and work performed on the project, oversight of the construction QC program, develop, implement, and adjust the projects’ s QA/QC Plan, maintain materials notebook and punch list
<i>Lead Quality Assurance Inspector</i>	<ul style="list-style-type: none"> › Reports to Chuck and manages a team of qualified/VDOT certified QA inspectors to execute the QA program; works closely with CM to verify QC staff qualifications and verify QC activities conform to the contract, QC program, and “approved for construction” plans
<i>QA Inspection Technicians</i>	<ul style="list-style-type: none"> › Report to Chuck, completely independent from production, execute QA program and maintain authority/responsibility to initiate actions to prevent nonconforming work

Team Member	DESIGN QA/QC Role and Responsibility
<i>Design Manager (DM)</i> Laura Mehiel	<ul style="list-style-type: none"> › Reports to Cory and is responsible for coordinating individual design disciplines (including design subconsultants), and ensuring the overall project design is in conformance with the contract; Laura will develop the Design QA/QC plan, and will present the QA/QC plan to VDOT with Chuck, and perform QA on design documents prior to signing/sealing
<i>Design QA Manager</i> Fred Wagner	<ul style="list-style-type: none"> › Reports to Laura, verifies the QC review, and evaluate whether the designer assessed the problem appropriately, applies the correct analysis, and was completed by qualified staff
<i>Design QC Manager</i> Brent Showalter	<ul style="list-style-type: none"> › Reports for Laura and oversees the independent design QC processes to ensure adherence to the Design QA/QC plan and the QA/QC plan; assigns/manages independent QC technical reviewers and ensures that Design QA/QC plan reviews are completed
<i>Interdisciplinary Reviewers</i>	<ul style="list-style-type: none"> › Senior professionals from each discipline will review the work of other disciplines to ensure that potential conflicts are identified and resolved

Team Member	CONSTRUCTION QA/QC Role and Responsibility
<i>Construction Manager (CM)</i> Paul “Eddie” Jones	<ul style="list-style-type: none"> › Reports to Cory and is on-site full-time for the duration of construction; manages the construction process, including QC activities, to ensure the materials used and work performed meets contract requirements and the approved plans; Eddie will communicate daily with Chuck to manage APM, utility, MOT, and other project risks.
<i>Quality Control Manager (QCM)</i> Julie Hartman	<ul style="list-style-type: none"> › Reports to Eddie, is responsible for QC inspection and inspectors, and ensures that QC requirements are completed in accordance with the QA/QC plan and the contract
<i>Construction Team Superintendents</i> Allen Scott (South) Paul Carter (North)	<ul style="list-style-type: none"> › Reports to Eddie, support detailed operation planning/production, and are empowered to stop or slow down production to quickly correct any defects that may arise; frequently consult with QCM and QC inspectors to coordinate inspection/testing for witness and hold points
<i>Quality Control Inspectors</i> Stantec Consulting Services	<ul style="list-style-type: none"> › Report to Julie, and are dedicated, full-time AC roadway and bridge inspectors that conduct required QC inspections/tests and report results/issues, if any, to Julie, Eddie, and Chuck

Design Quality Management

Design Quality begins with the Design Manager, Laura Mehiel, P.E. and is overseen by the Design QA Manager, Fred Wagner, P.E. The primary goal of a comprehensive and functional Design QA/QC program is to make sure that appropriate Quality Control measures have been taken, and assure that the design team’s approach to the assignment is correct. Laura will oversee the design process and is ultimately responsible that the QC program is followed. Fred will train the team in the QC procedures and require sign-off from all staff that they understand and will follow the procedures. There are three levels in our Design Quality Plan:

LEVEL 1 - PRODUCTION QUALITY CONTROL

The Designer for each work element and the supporting project engineers, planners, and designers working under his/her direct supervision will originate the designs, plans and/or reports utilizing the project’s completion checklist and perform the normal self-checking. Prior to each submittal review, the Designers for each work element will use standard checking procedures and the applicable elements of VDOT Checklist LD-436 (based

Our Quality Plan has a requirement for interdisciplinary reviews as part of the Level 1 QC Process. A multi-disciplinary team, including a Constructability Reviewer from the English, will review each design package to confirm compatibility among design elements, and capture the necessary modifications such that all design disciplines properly ‘converge’ in the final design.

on milestone) to document the detailed checking of all work prepared under their direction. This checking will include review against the Contract Documents /RFP Requirements; Project-Specific Design Criteria; VDOT Road Design Manual, Standards and Specifications; and Review Comments/ Resolutions.

Level 1 production quality also requires close coordination with other disciplines and with the construction team to create a design that is compatible among disciplines and is constructible, efficient and cost effective. A formal interdisciplinary review and sign-off procedure is part of this process.

LEVEL 2 - INDEPENDENT QUALITY CONTROL CHECK

Once a design is generated, it will be forwarded for an in-house QC review overseen by QC Manager, Brent Showalter, PE. Brent will assign independent engineers that did not perform the original design, who will develop a list of recommended items for design refinement, correction, or clarification. He will ensure that this QC process is performed on each design package during each phase of the design process. Each QC comment will be responded to by the designer, and sent back to the QC reviewer for concurrence. The QC reviewers will utilize VDOT Checklist LD-436, and will also check the following items:

- Math and engineering computations
- Technical accuracy
- Conformance to RFP / Contract requirements
- Review of form, content, and spelling
- Coordination with other disciplines
- Sequence of construction logic

LD-436 from Route 1 (NOVA) D/B Project

VDOT LOCATION & DESIGN

2013 LD-436 Quality Control Checklist

ROADWAY DESIGN

LDC Number: 10273 State Project Number: 01-029-01

VDOT District: Northern Region Project Location: Route 1 - Police Rd to Mt Vernon Highway

Project Type: Tier 2

Review Date: Reviewer Initials:

Rating Methodology

- Y Applicable and Correct
- N Applicable and Incorrect or Not Reviewed
- N/A Not Applicable

I. ALL SHEETS

- Y A. Project # (if Route Number) is shown where applicable (Verify against: PM) (ROM - 2C)
- Y B. Sheet Numbers are shown correctly (ROM - 2C)
- Y C. North Arrow and Scale are shown where applicable (ROM - 2C)
- Y D. Applicable legends are shown (Plotting, Easement L, notes, etc.) (CADD Manual - App. D)
- Y E. Project Manager/Supervisor/Designer/Reviewer names, District, if applicable, and phone numbers are shown (ROM - 2C)
- N/A F. Limited Access note (ROM - 2B)
- Y G. Stationing shown correctly and in agreement with plans (ROM - 2C)
- Y H. Match Lines and Stationing are properly indicated (ROM - 2C)
- Y I. Design intent is legible and clearly shown (ROM - 2C)
- Y K. Check project links on plan sheets (ROM - 2D)
- N/A L. CADD Note (RM - 236)

II. TITLE SHEET

- Y A. Federal Aid Number and Project Title is agreed with PM (ROM - 2B)
- Y B. Construction Type Code, LDC, and FHWA 554 Data Numbers are correctly indicated on the sheet (RM - 181; ROM - 2E)
- Y C. Functional Classification, Design Speed and ACFT of each roadway and correction (with contractor) past the radius return
- Y D. is correctly indicated (ROM - 2E, App. A)
- Y E. Project Description corresponds with project tabulation block, PM and Description/Reference Block (ROM - 2E)

- › Verification that the drawings have been stamped, signed, and dated by a professional engineer licensed to perform work in Virginia

LEVEL 3 - QUALITY ASSURANCE CHECK

Once all items in the design are acceptable to the designer and QC reviewer, the design will be advanced to the Design QA Manager, Fred Wagner, P.E., for verification that established quality procedures have been followed. QA audits may be performed, which will include but are not limited to a discipline-by-discipline review of the qualifications of the design staff, a design analysis, a check on the adequacy of design discipline coordination, and a review of constructability issues. In addition, it will be the Quality Assurance Team's responsibility to confirm that the design quality control review procedures are in place and being followed by each design discipline throughout each design phase.

QA comments will be given to the designer and Laura for resolution and/or comment. Once all comments made by QC and QA reviewers have been satisfied the design will be certified by the Design Manager and sent to VDOT for review.

A more detailed Quality Plan will be prepared for review by the Department within the first month after NTP. The Quality Plan will be in conformance with VDOT's Minimum Requirements for QA/QC on Design Build and PPTA Projects (2012), and will address specific protocols and minimum standards such as:

- › Identifying and correcting design non-conformances
- › Written certifications of design quality control prior to submissions and with monthly progress reports
- › Qualification requirements for independent reviewers/checkers
- › Quality Control Stamp and "red yellow blue" mark up procedures
- › Participation by the Department in QC Reviews
- › Quality control records retention

Design QC Functions – including identification of the drawings, specifications, and other submittals to be delivered to the Department for review at each stage of the design phase will be described in the our submitted Quality Plan. Prior to submittal at any stage, a formal QC check of all design generated calculations, plans, specifications and reports will be conducted. Comprehensive checking procedures as generally described above will be established and documented in the Quality Plan. Design nonconformance reports will be issued for any design that fails to follow the documented checking procedures. Quality Assurance will be implemented throughout the design process, as outlined in our Quality Plan.

Design QC and QA Tools & Technology

Assuring QC and QA throughout the project design lifecycle is paramount. AMT's ProjectWise Integration Server, combined with a SharePoint interface, is deployed in accordance with our internal, and project based quality processes. The ProjectWise Integration Server provides our Project Team with tools and resources to QC and QA our documents and CAD standards to ensure the English D-B Team creates consistent work. QC and QA comments are tracked as part of the check in check out process through ProjectWise during the creation of all documents. This includes the ability to enforce file naming standards on documents created inside ProjectWise based on a number of user-configurable factors such as project, type, discipline, orientation, category, etc. We also associate project workspaces to project folders which cache manages the workspace for the entire D-B team. This ensures quality project documents throughout the project lifecycle.

Critical Project Element

Based on our review of the project requirements, scope, and RFP, we have identified Hydrologic/Hydraulic design as a critical design element. There are several reasons we have chosen this item to highlight:

- The RFP has stipulated that instances of “should” and “may” in the VDOT Drainage Design Manual to mean “shall” and “will”. This requirement elevates the design criteria beyond the traditional interpretation of the manual, and requires very close attention to detail to ensure it is understood by all.
- The HH&A Report is a hold point for all construction, thus approval of the report is critical to allow construction to commence.
- The presence of APM material also influences drainage design and creates the need for design items such as specific pipe materials, stilling basins, and limed ditches.

The preliminary QA/QC procedures we have developed for Hydrologic/Hydraulic Design is provided below.

Element	Description	Indented Result
<i>Include Detailed Design Criteria in Design QA/QC Plan</i>	The special criteria of the RFP will not simply be cross referenced, it will be copied into the body of the Design QA/QC Plan	Prevent rework that may happen if the designer and/or checker were not aware of the special criteria
<i>Supplement LD 436 to “flag” special criteria</i>	Add the 1% ditch design slope criteria, “should” to “shall” terminology, APM requirements, etc. to the comment area of the LD 436.	Prevent rework that may happen if the designer was not aware of the special criteria
<i>Assign experienced engineers to prepare HH&A culvert models</i>	Engineers with experience on design-build projects, trained in HEC-RAS, and with at least 15 years of experience will both <u>develop</u> and <u>review</u> the models.	Expedites the completion of the HH&A model and helps ensure quality product
<i>Develop Acceptable Tolerance Levels for Culvert Construction Variance with VDOT prior to Design</i>	The RFP requires a tolerance level to ensure hydraulic performance should construction deviate from design. This will be an early discussion and consensus item with VDOT personnel.	Prevent rework should VDOT disagree with tolerance levels
<i>Construction Reviews (standard QA/QC Item)</i>	English staff will review all designs for conformity with RFP and for constructability	Prevent issues with constructability that would jeopardize the design concept and cause re-design
<i>Interdisciplinary Reviews (standard QA/QC item)</i>	Other design disciplines will review the HH&A designs to ensure compatibility with other design – e.g. structural staff to review culvert HH&A for TSL verification	Prevent inconsistencies/incorrect design parameters that would jeopardize the design schedule and cause rework

Our team’s QA/QC procedures for Hydrologic/Hydraulic Design will help prevent re-work, which in turn keeps the project on schedule. These provisions also allow VDOT to spend less time making comments on the design plans and calculations.

Construction Quality Management

Staffing Narrative - The Design Build Project Manager (DBPM) will be ultimately responsible for the quality of the construction. The Construction QA staff is separate and independent from the QC staff. Reporting to the DBPM will be the Construction Manager (CM) who will manage the construction quality control program. In full compliance with VDOT's requirements, the QC organization will be distinct and separate from the production staff. All personnel performing QA/QC functions will be exclusively designated as such and will not be assigned to perform conflicting duties or production work.

Our staffing plan assigns an on-site QCM supplemented by experienced and certified QC inspectors to meet operation needs. Likewise, the QAM will be on-site as needed and at a minimum of two full days per week with full-time QA inspectors as operations dictate. For both QA and QC, inspection staffing levels will fluctuate throughout the project life cycle as ongoing operations progress. The QAM will develop a Quality Management System Plan (QMSP) which defines the organization, work processes, and systems necessary to provide objective evidence that the constructed work meets the contract requirements.

Weekly Coordination meetings with the QA/QC staff will be held to ensure each individual understands his or her respective responsibilities and that work is covered and properly documented. VDOT's project personnel will be invited to attend these meetings. Outstanding NCRs or any other quality issues will also be discussed at these meetings. Daily communication between the CM, Lead QA Inspector (and/or QAM) and the QC Manager and will occur to review the project activities and ensure proper coordination of QA and QC activities. The CM will provide a look ahead schedule for this meeting to ensure that both the QAM and the QCM can plan for adequate staffing to cover the planned work giving all parties confidence that the program can be properly implemented with team staff and not creating a situation of concern by VDOT of having to implement any additional efforts of its own.

Design Coordination - Starting in the design phase through construction staff reviews and confirmed upon receipt of construction documents, each item of work will be reviewed to determine what significant characteristics of the item need to be monitored during construction in the field. This review is to ensure that the completed project will function in accordance with the design intent over its expected lifetime. The inspection plans will include the appropriate criteria, tests, and inspection requirements identified in the Contract and requirements as set forth herein. The following elements will be addressed within each item inspection plan:

- › **Identification** – Work items included in the plan.
- › **Characteristics** – What characteristics of the item(s) will be inspected and to identify design team members that are required to be involved in the inspection.
- › **Acceptance Criteria** – Directly or by reference, provide sufficient information for the inspector to use to determine if the item or activity is acceptable or not.

Records – A key component to QA\QC is adequate record keeping and verification of work performed. To ensure all required elements have been addressed, the QA\QC plan will include Inspection Checklists that cover all phases of work (Preparatory, Intermediate, and Completion). These checklists will be utilized by both the QA and QC staff and the QCM and QAM, as appropriate, will review these checklists as part of the verification and documentation process. To document the inspection and testing activities during construction, all QA/QC staff will complete a daily report which will include test results, copies of completed checklists, and a summary of the day's activities. These daily reports will be reviewed and approved by the QCM on a daily basis and posted on

SharePoint or other database that the team uses. All QA/QC documents will be prepared and stored such that any auditing entity could have easy access and understanding that the requirements of the contract are being met.

Verification – An important function of the QCM will be to ensure that the construction quality is verified at or exceeding the minimum required in VDOT’s Minimum QA/QC for Design-Build and PPTA Projects. The QCM will confirm that all materials sampling and testing is consistent with the QA/QC plan and meets the minimum requirements, the QCM will provide a report to the QAM that lists by activity how much material has been installed, how many and what type of tests should have been performed and were performed, and identify any materials that required re-testing due to failing tests, what was done to correct the situation, and the corresponding passing retest. This information will be provided to the QAM on a weekly basis who will then review to ensure the appropriate number of corresponding QA tests have been performed.

The QAM will communicate daily with the CM and QCM to ensure that all inspections and tests are coordinated with construction activities. The QAM and his staff will monitor the QC field testing and will maintain a daily diary of construction activities which will include all testing performed by QA staff. The QAM will review all field and lab testing reports produced by QA and QC to monitor materials testing and construction activity documentation. While performing the appropriate duties of the QAM, if he finds that the project is not being constructed with the quality required and the corrections to that work are not being performed as needed, the QAM has full authority to shut down the project until the issues have been resolved and procedures put in place to eliminate future issues.

Audits – During the course of the project, the QAM will audit the QC records on a monthly basis for completeness and accuracy and to ensure the QCM is keeping an up to date record of all materials used on the project in the Materials Notebook. In addition, the QAM will confirm that the QC team has performed materials testing at the frequencies set forth in the QA/QC plan.

Materials – Before materials can be used on the project, they will be pre-approved following the standard VDOT C-25 process. The “Materials Notebook” (form TL-142) will be maintained in a designated folder on the *SharePoint* site in the Construction QA/QC directory. In the Materials Notebook, material item number, type, size, quantity, source, date received and/or method of verification used to demonstrate compliance with Department standards will be recorded. The Materials Notebook will be maintained according to VDOT Materials Division requirements and will be updated as necessary during construction by the Quality Assurance Manager (QAM), reviewed weekly by the QC Manager, and jointly reviewed on a monthly basis by VDOT’s Project Manager, the QC Manager and the QAM (or as requested). The monthly review will consist of spot checking at least 5 materials and their source documentation, using the audit form provided in the appendix. The Materials Notebook will be provided to VDOT upon project completion. Materials on this project will comply with the Buy America Act. In addition, to conform with Certification Tracking Numbers, the QAM will assign Design-Build Tracking (DBT) numbers for those items which require CT number assignments. This information will be recorded and tracked in the Materials Notebook.

Project Document Control and Maintenance – The QA/QC plan will define the procedure for document control. In general terms, the QAM will monitor the QC teams daily records which includes daily reports, inspection and materials test reports, submittal, RFI, and photo logs is maintained on the *Sharepoint*, or similar database, to include preparatory meeting minutes, inspection checklists, test reports, daily reports, materials notebook, and corresponding materials test reports, invoices, and TL weigh sheets. The QAM will also document and track

changes identified during construction. Field changes will be documented on a control (as-built) set of drawings maintained in the project field office. The QAM will approach the review of QA and QC documents much in the manner of preparing for final submission such that the project can, in essence, be closed out on a monthly basis. This ensures that the project files are audit ready and in a near completed state.

Non-Conformance Reports – “Nonconformance Reports” will be issued and tracked for work identified through the QC & QA process which do not meet contract requirements. When the non-conforming work has been corrected, re-inspected and the results are satisfactory, a “Notice of Correction” will be issued for record purposes. Non-conformance reports issued on the project will be tracked on the “NCR Log” and filed in a designated folder on the *Sharepoint* site. Supporting documentation for NCRs will also be included in the file relative to the NCR, and the status of each NCR will be noted on the required “NCR Log.”

Critical Project Element – One unique project element that our D-B team deems as most critical for the project is Maintenance of Traffic. The TMP will need to include incident management components for incidents that occur along Route 220 in and out of the project limits and incidents that occur on I-81 or I-64 that would cause Route 220 to be an alternate/detour route increasing traffic through the project. The MOT plan will address all users and how they will be accommodated in the TMP, to include pedestrians, bicyclists, transit vehicles, maintenance operations such as winter weather pretreatment as well as snow removal, and any other motorists.

From a Design perspective the following QA/QC procedures will be implemented. Design QA/QC will review the TMP and MOT to make sure that it is in compliance with all contract requirements. They will also review the plans collectively with construction staff in our mandatory “Page Turn Meetings,” to analyze and adjust any issues that construction operations may recognize as a constrain or safety issue. A check list of all users will be created so that they can be appropriately addressed within the TMP. This checklist will also serve as the identification list for all stakeholders as required in the TMP Communication Plan.

Once under construction our QA/QC team will deploy the following tools to minimize any issues related to the implementation of the TMP and MOT. First, we will **include as part of the all scheduled meetings**, to include preconstruction and progress meeting, discussion about the incident management plan by the MOT Manager Will Parsons outlining the requirements should there be an issue that would require action on site by project personnel. Also, as part of the regularly scheduled meetings, **incident responses will be analyzed** to allow the team to improve during any future events. During the weekly progress meetings the **stakeholders listed in the TMP Communication Plan will be reviewed** to allow for any additions to be made if a group needs to be added that was not previously included. **MOT site checklists will be created** and reviews will be done by all necessary QA/QC staff as well as the construction team’s MOT Manager to **verify that all devices are being used, placed and maintained properly** throughout the project. The site MOT Manager will make at a **minimum a daily review of all traffic control** on site. Should any issue arise that needs corrective measure the MOT Manager will be notified immediately and have it corrected as soon as possible. If the TMP and MOT need adjustment that the design staff needs to address on the plans, they will be made available for those revisions. Finally, the TMP will include an Incident Management Plan (IMP), and as part of our QA/QC procedures the **IMP will be reviewed on a monthly basis or whenever field conditions/construction sequencing changes**.

We feel our approach to MOT will minimize the likelihood of safety and traffic issues within or around the project site. It will also reduce the likelihood that VDOT will have to add any additional resources or administration to the project to overcome any issues that arise.

4.5 Construction of Project



4.5 CONSTRUCTION OF THE PROJECT

4.5.1 Sequence of Construction

The project is divided geographically into three phases as developed by VDOT, which correspond to the three distinct UPC numbers. The English D-B Team maintains these three phases for clarity, and also due to some distinct requirements for each phase – for example, the separate regulatory requirements in Phase 3 for stormwater management. We have further subdivided the phases into smaller geographic areas, based primarily on differing work activities associated with the first stage of construction for each area. An exhibit of the work areas and phases is shown on the following page. The sequences for each phase are presented in the tables below. Aside from minor shifts onto the existing shoulder after strengthening, the construction sequence generally requires two traffic shifts for each work area.

For Phase 1, Areas 1 to 4
 Represent roadway construction, and **Areas 5 to 7** are for major culverts. Areas 1 through 4 will be constructed concurrently, and traffic switches within areas will need to be coordinated with adjacent areas of work. Traffic switches can be handled in some areas independently of others, while others will have to be in concert with adjacent area traffic switches.

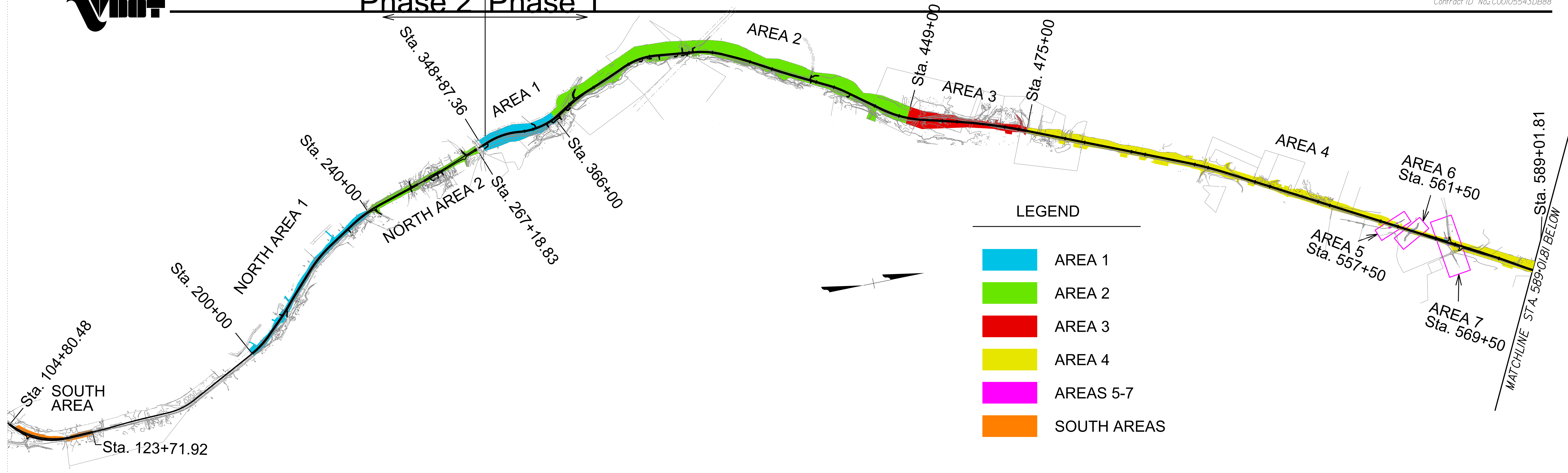
All stages described below will include a phased approach to all drainage pipes crossing both the existing alignment and the proposed alignment. Review of temporary drainage will dictate if a phased approach is appropriate or if the entire length of a proposed cross pipe will need to be constructed with the first stage in order to facilitate appropriate temporary drainage throughout the construction of all stages. Non-erodible cofferdams may be required for stream pump around to facilitate this work in some locations.

BASE CONTRACT

PHASE 1 – SEQUENCE OF CONSTRUCTION	
Area 1 – Sta. 348+87.36 to 366+00	
Stage 1	Build all new alignment paralleling the existing alignment away from traffic from approximately sta. 353+00 to 366+00. Traffic will remain in its existing condition during this stage with little impact to the existing roadway. Minimal temporary concrete barrier service will have to be placed. Barrier will only be required at either end of this area where the old alignment and new alignment are in close proximity, placing the work zone within the clear zone of the exiting traffic. This work will also include the construction of SWM BMP #1 to the extent it does not impact the existing alignment.
Stage 2	Construction and tie in of the new roadway, roadway shoulders, as well as buildup with mill and overlay operations for the transition from sta. 348+87.36 to approximately sta. 353+00. This section will have to be built under traffic with daily lane closures utilizing flagging operations and will only be constructed when traffic is ready to be shifted onto all of Area 1.
Stage 3	All work associated with the demolition / obscuring of the old roadway alignment to include any remaining grading for drainage required. Any remaining work required for SWM BMP #1 will be constructed in this stage and all temporary measures removed.

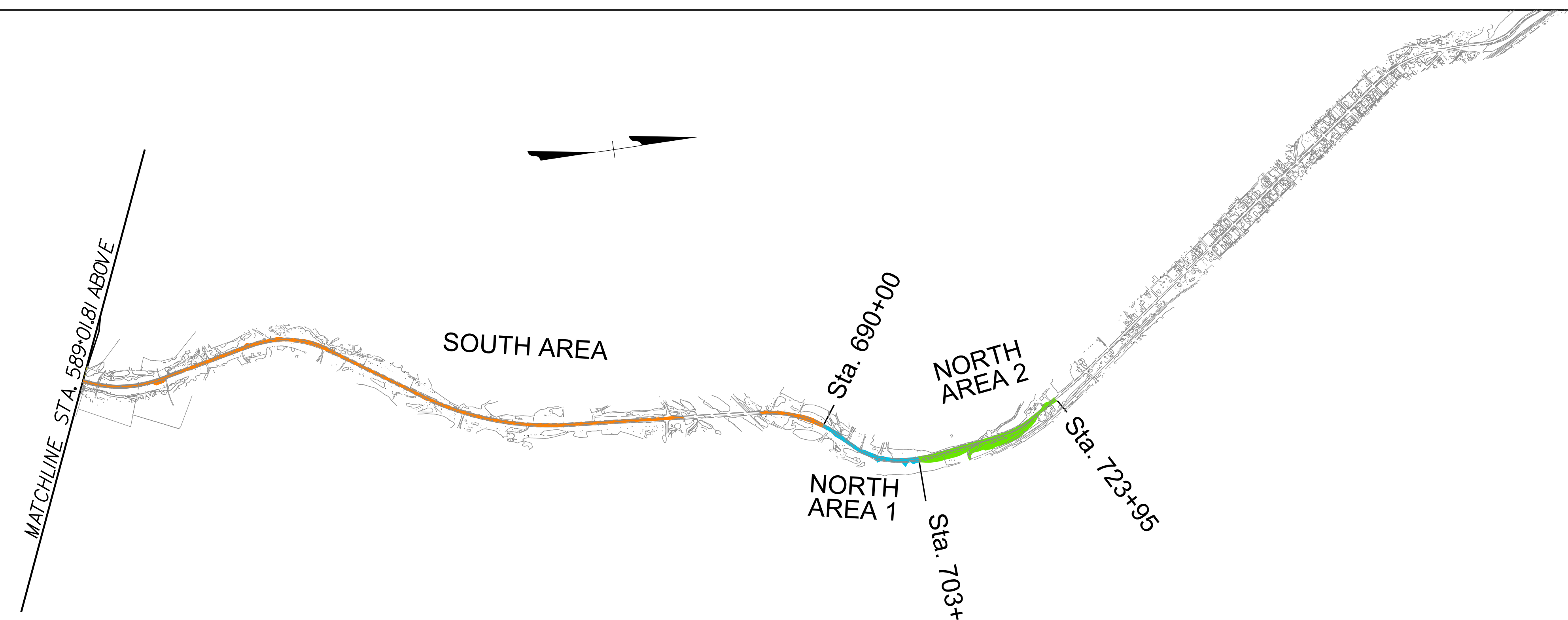


Phase 2 | Phase 1



LEGEND

- AREA 1
- AREA 2
- AREA 3
- AREA 4
- AREAS 5-7
- SOUTH AREAS



Phase 3

PHASE 1 – SEQUENCE OF CONSTRUCTION

Area 2 – Sta. 366+00 to 449+00

Stage 1	Perform shoulder strengthening as needed on the existing NB shoulder. Then, traffic will be shifted onto the strengthened NB shoulder.
Stage 2	Begin by placing temporary concrete barrier adjacent to the existing SBL per the Virginia Work Area Protection Manual. Traffic will remain in its existing traffic pattern and lanes widths. After the barrier is placed the remainder of Stage 2 will consist of building the available new proposed roadway in its new alignment with the exception of the outside NB shoulder. This stage will also include the installation of temporary shoring at locations where the profile elevation changes require it for Maintenance of Traffic. During this stage the only impact to the traveling public will be the placement of the concrete barrier adjacent to the SBL.
Stage 3	Begin by shifting the barrier from its Stage 1 position along the existing SBL to the new position along the outside of the new NBL. Then the traffic will be switched from the original traffic pattern in Stage 2 to the new alignment constructed in Stage 2. Once the traffic is in its new pattern then the remaining portions of the NB outside shoulder will be constructed behind the temporary barrier. Also, all the pavement demolition, roadway obscuring and remaining grading will be conducted in this stage. Any temporary measures installed will also be removed at the completion of this stage.

Area 3 – Sta. 449+00 to 475+00

Stage 1	Build new alignment paralleling the existing alignment away from traffic from approximately sta. 452+00 to 463+00. Traffic will remain in its existing condition during this stage with little impact to the existing roadway. Minimal temporary concrete barrier service will have to be placed. Barrier will only be required at either end of this area where the old alignment and new alignment are in close proximity, placing the work zone within the clear zone of the exiting traffic. This work will also include the construction of SWM BMP #2.
Stage 2	Construction of the new roadway transition from sta. 449+00 to approximately sta. 452+00 where the new alignment and old alignment cross. This stage will also include the construction of the new roadway transition from sta. 463+00 to 475+00 where the new alignment and old alignment cross. Both the northern transition and the southern transition can be constructed simultaneously or independent of each other. The existing traffic will be placed into one lane controlled by a temporary traffic signal. This temporary signal can be utilized to cover the entire length of both alignment crossovers at once or be utilized for each independently. But, in no case will the temporary signal be in place for a total duration to exceed 80 calendar days. This section will have to be built under traffic and will only be constructed when traffic is ready to be shifted onto all of Phase 1 - Area 1.
Stage 3	All work associated with the demolition / obscuring of the old roadway alignment to include any remaining grading for drainage required. Any remaining work required for SWM BMP #2 will be constructed in this stage.

Area 4 – Sta. 475+00 to 589+01.81

Stage 1	Perform shoulder strengthening as needed on the existing NB shoulder. Then, traffic will be shifted onto the strengthened NB shoulder.
Stage 2	Begin by placing temporary concrete barrier adjacent to the existing SBL. Traffic will remain in its existing traffic pattern and lane widths. After the barrier is placed, the remainder of Stage 2 will consist of building the available new proposed roadway in its new alignment with the exception of the outside NB shoulder. During this stage the only impact to the traveling public will be the placement of the concrete barrier adjacent to the SBL. This stage will also include the installation of temporary shoring at locations where the profile elevation changes require it for Maintenance of Traffic. Temporary SWM will be constructed during this phase unless ROW precedes enough prior to the start of construction for SWM BMP#3 to be partially constructed in this stage.

PHASE 1 – SEQUENCE OF CONSTRUCTION

Stage 3 (Area 4)	Begin by shifting the barrier from its Stage 1 position along the existing SBL to the new position along the outside of the new NBL. Then traffic will be switched from the original Stage 2 traffic pattern. Once the traffic is in its new pattern, the remaining portions of the NB outside shoulder will be constructed behind the temporary barrier. Also, all of the pavement demolition, roadway obscuring, and remaining grading will be conducted in this stage. This stage will include the construction of all portions of SWM BMP #3 that do not impact the existing roadway alignment.
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Area 5 – Box Culvert Sta. 557+50

Stage 1	Construct the entire western end of the box culvert. The limits will include all available construction that does not impact the existing roadway and traffic patterns. This work will be done in conjunction with work in Area 4, Stage 2 behind concrete barrier. The existing stream will be diverted using a temporary pipe and non-erodible cofferdams.
Stage 2	Construct all remaining portion of the box culvert not constructed in Stage 1. The removal of the existing box culvert will be done in this stage. This work will be done in conjunction with work in Area 4, Stage 3 behind concrete barrier. A non-erodible cofferdam will be used at inlet end.

Area 6 – Double Box Culvert Sta. 561+50

Stage 1	Construct the entire western end of the box culvert to include both barrels. This work will be done in conjunction with work in Area 4, Stage 2 behind concrete barrier. This culvert will be constructed one barrel at a time, using non-erodible cofferdams to divert stream flow.
Stage 2	Construct all remaining portion of the box culvert not constructed in Stage 1. The removal of the existing box culvert will be done in this stage. This work will be done in conjunction with work in Area 4, Stage 3 behind concrete barrier.

Area 7 – Double Box Culvert Sta. 569+50

Stage 1	Construct the entire western end of the box culvert to include both barrels. This work will be done in conjunction with work in Area 4, Stage 2 behind concrete barrier. This culvert will be constructed one barrel at a time, using non-erodible cofferdams to divert steam flow.
Stage 2	Construct all remaining portion of the box culvert not constructed in Stage 1. The removal of the existing box culvert will be done in this stage. This work will be done in conjunction with work in Area 4, Stage 3 behind concrete barrier.

OPTION 1

Phase 1 – Option 1

If selected by the Department, all work associated with Option 1, item (c) will be done within each area and stage as outlined above.

BASE CONTRACT

PHASE 2 – SEQUENCE OF CONSTRUCTION

South Sta. – 104+80.48 to 123+71.92

Stage 1	Perform shoulder strengthening on the existing NB shoulder. Then, traffic will be shifted onto the strengthened NB shoulder.
Stage 2 (South)	Start by placing temporary concrete barrier adjacent to the SBL. Once concrete barrier is in place, the SB outside shoulder will be removed. The embankment will be widened and the SBL reconstructed in its new position with new outside shoulder.
Stage 3	Removal of temporary concrete barrier and milling and overlaying the entire footprint of the remaining roadway to include the newly created SB left turn movement.

North – Area 1 Sta. 200+00 to 240+00

Stage 1	Stage 1 will begin by placing temporary concrete barrier adjacent to the existing SB travel way. Traffic will remain in its existing traffic pattern and lane widths. After the barrier is placed, the remainder of Stage 1 will consist of building the entire new proposed roadway in its new alignment with the exception of the outside NB shoulder. During this stage the only impact to the traveling public will be the placement of the concrete barrier adjacent to the SBL.
Stage 2	Stage 2 will consist of removing the temporary concrete barrier and milling and overlaying the entire footprint of the remaining roadway to include the newly created SB left turn movement.
Stage 3	Stage 3 will include all work associated with the demolition / obscuring of the old roadway alignment to include any remaining grading for drainage required.

North – Area 2 Sta. 240+00 to 267+18.83

Stage 1	Stage 1 will be to perform shoulder strengthening on the existing NB shoulder. Then, traffic will be shifted onto the strengthened NB shoulder.
Stage 2	Stage 2 will start by placing temporary concrete barrier adjacent to the SBL. Once concrete barrier is in place the SB outside shoulder will be removed. The embankment will be widened and the SBL reconstructed in its new position with a new outside shoulder.
Stage 3	Stage 3 will consist of removing the temporary concrete barrier and milling and overlaying the entire footprint of the remaining roadway to include the newly created SB left turn movement.

OPTION 1

Phase 2 North Option 1

All work associated with Phase 2 Option 1, item (c) will be done within areas and stages as outlined above. Option 1, item (a) work along Route 220 will be performed as outlined above in Area 2, with additional widening of Route 220 SB performed during Stage 2. An additional stage (2A) will construct Option 1, item (a) for widening adjacent to the NBL. The added work for the Columbia Gas entrance will be done in conjunction with Stage 2 work and the realignment of Gala Loop Road will be done in tandem with all other Stage 2A work, subject to the relocation of the improved structure mentioned in the ROW constraints section below. All connecting road work will be performed under traffic utilizing lane closures via flagging operations.

BASE CONTRACT

PHASE 3 – SEQUENCE OF CONSTRUCTION

South

Stage 1 The work in this stage will consist of milling and overlaying the entire footprint of the remaining roadway under traffic.

North – Area 1 Sta. 690+00 to 703+80

Stage 1 The work in this stage will consist of milling and overlaying the entire footprint of the remaining roadway under traffic. The construction of SWM BMP #4 will be constructed in this stage in conjunction with all other work. The SWM construction will take place behind temporary concrete barrier away from traffic.

North – Area 2 Sta. 703+80 to 723+95

Stage 1 Stage 1 will consist of removing the existing outside SB shoulder and installing temporary pavement to allow for traffic to be shifted to the west. This stage will be constructed under traffic utilizing lane closures with flagging operations.

Stage 2 Stage 2 will begin by installing temporary concrete barrier along the outside of the newly aligned NBL. Once barrier is placed the proposed NBL and shoulder will be constructed completely behind barrier. This stage will include all work associated with the outfall at sta. 721+00, the jack & bore under the CSX railroad, and the outfall pipe into the James River.

Stage 3 Stage 3 will begin with the removal of concrete barrier and all of the existing pavement will be milled and overlaid and traffic placed in its final configuration. This stage will be conducted under traffic utilizing lane closures with flagging operations.

OPTION 1

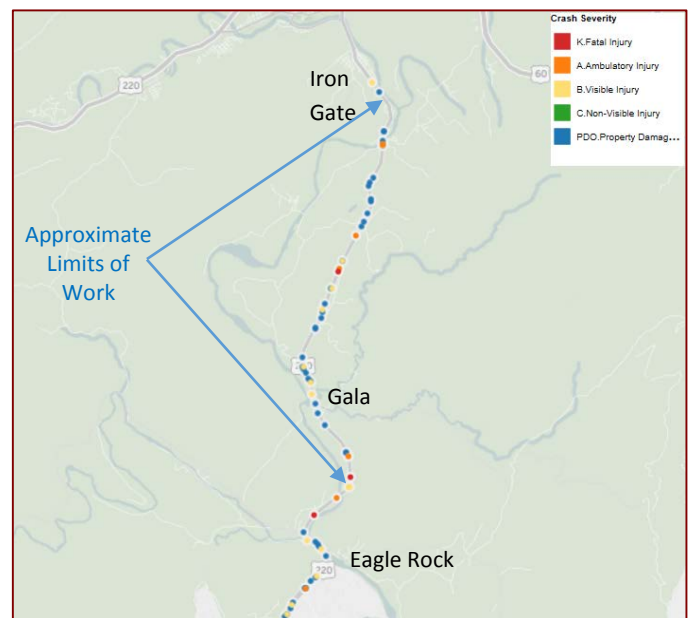
Phase 3 North Option 1(b)

All work along Route 220 will be performed for Option 1, item (b) as outlined above in Phase 3 North, Area 1 & 2. All work associated with Option 1, item (c) will be done within each Area and Stage as outlined above.

Considering Safety & Operations / Minimizing Disruptions

The English D-B Team recognizes that the primary reason for the Route 220 Project is to improve safety. This stretch of 220 has a history of automobile crashes, and areas of sharp horizontal curves or crest vertical curves limit sight lines, thus compounding the problem. The map at right depicts a three-year crash history, from September 2013 through September 2016. In this period, there were 73 crashes within the corridor, two (2) of which had fatalities, and 22 of which were injury crashes.

The sequence we have developed carefully considers safety and traffic operations, with a goal of limiting disruptions to traffic and maintaining safety through the



Route 220 Corridor Crash Map (3 Years)

construction area. The primary ways that Route 220 construction will affect safety and operations include: shifting traffic, flagging, changes in lane and shoulder widths, work zone separation, and changes to access points/intersections.

Along the corridor, safety is increased by utilizing temporary barrier protection, using 11-foot wide lanes and 2-foot wide offsets to barriers once traffic is shifted (an increase from the existing dimensions in some areas), enhanced temporary warning devices, and careful phasing at intersections.

One of the biggest challenges regarding the safety of the traveling public, no matter which mode of travel they use, is to constantly change access points and travel routes, including emergency responders. Great care will be used to identify not only the best access for adjacent stakeholders and those utilizing the corridor, including emergency responders but the access that will allow the least changes and the least disruption. This coordination along with our construction sequence will maintain safety for vehicular and pedestrian traffic thru the project, in/out of adjacent properties, and adjacent facilities. We will work with affected property owners to appropriately maintain access to their property for all modes of travel in a way that satisfies their needs and creates safe access. Plans will be reviewed in the field with VDOT and the stakeholders to ensure that all changes will accommodate the needs of construction as well as the landowner.

When lane closures with flagging operations are required for activities such as shoulder strengthening, pavement resurfacing, new rumble strip and pavement marking installation, we strive to limit the work to the hours of least disruption within the allowable lane closure “windows” as detailed Section 4.5.2. For utmost safety, flaggers will be located where sufficient sight lines of at least 570 feet exist between the flagger and the oncoming vehicle, based on MUTCD 2009 Table 6E-1.

Worker Safety – English established its **Safety and Health Policy** to demonstrate our commitment to the safety and health of our employees. It is our intention to comply with all relevant safety and health laws, regulations, requirements and, make modifications to fit real time on site situations, both planned and unplanned. The elimination of accidents is one of our greatest responsibilities, and should be treated in the same manner as our business procedures related to quality, volume, and cost control.

It is company policy that all employees, including superintendents, foremen, and individual employees are responsible for safety at all times. This includes all subcontractors and visitors on our site. Superintendents and foreman are responsible for conducting our operations in a safe manner, and to see that health and safety rules are followed. It is the responsibility of each employee to carry out his/her duties in a safe manner.

Safety Training: *The safety director and project managers provide training, and direction to assist supervisors in carrying out their duties, to include OSHA 10, OSHA 30, and First Aid / CPR. Additional training includes specific emphasis on fall protection, excavation safety, and confined spaces.*

Safety training is the foundation for all successful safety programs. Without training, a safe and healthy workplace is difficult to maintain. Safety is not just “common” sense. To work safely, employees have to be made aware of the hazards on a job site, and how to deal with them. Safety training begins with an orientation program, before the employee enters the job site, and continues until he/she is no longer employed. Safety orientation training consists of an orientation video and a lecture on site-specific safety rules from the superintendent or the site safety officer. Each new employee must receive this training before starting work on the job. To strengthen the lessons learned during orientation, all employees

will participate in weekly tool box training sessions that contain general topics, but also specifically tailored topics relevant to the upcoming tasks to be performed. Subcontractors are required to adhere to English’s safety policies.

Anticipating and Mitigating Delays

We’ve developed our sequence with the understanding of various external and internal elements that can have an impact on the ability to work certain areas. Upon award, we will refine the sequence and schedule as necessary after further in-depth review. Elements which can often create a risk of delay include availability of new right-of-way, geotechnical challenges, environmental impacts, government approvals, and public/ stakeholder input. Staging and storage areas must also be carefully planned to ensure efficiency of work areas.

Consideration of ROW Acquisition Constraints

All Right-of-Way (ROW) acquisitions will be prioritized based on the sequence of construction that they impact. The charts below and at right identify specific right-of-way constraints for each Phase. Areas that are constrained by acquisition of ROW will be sequenced so that work in that area can begin prior to ROW acquisition in adjacent areas that are contained within the existing ROW. This will also be applicable to the existing utilities that must be relocated. Work will be sequenced around the existing facilities to the extent possible or sequenced in such a manner that the work can progress after each affected utility is relocated.

PHASE 1 – ROW CONSTRAINTS	
Area 3 Sta. 449+00 to 474+00	
Stage 1	Cannot be constructed until the additional ROW is available for construction of new roadway prism.
Area 4 SWM BMP #3	
Stage 2	Cannot be constructed until ROW acquisition is complete in this area. Temporary SWM measures must be implemented for construction to begin prior to acquisition of ROW.
Area 4 Sta. 514+50 to 576+50	
Stage 1	Cannot be constructed until the additional ROW is available for construction of the new roadway prism to include the box culverts in Area 6 sta. 561+50 and Area 7 sta. 569+00.

PHASE 2 – ROW CONSTRAINTS	
Phase 2 North – Sta. 250+00 to 252+35	
	Drainage Improvements. Around Gala Loop Road right of centerline
OPTION 1 – Phase 2 North – Sta. 250+00 to 252+35	
	Realignment of Gala Loop Road to align with the Columbia Gas Entrance will result in a displacement/ relocation on an improved parcel.

PHASE 3 – ROW CONSTRAINTS	
Ph. 3 North: Area 1 - Permanent SWM BMP #4	
	SWM BMP #4 cannot be constructed in its entirety until ROW acquisition is complete in this area. Temporary SWM measures must be implemented for construction to begin prior to acquisition of ROW.
Ph. 3 North: Area 2 – Sta. 703+00 to 723+95	
Stage 2	Cannot be completed until the additional ROW is available for construction of new roadway prism.
Ph. 3 North: Area 2 – Sta. 721+00	
Stage 2	Drainage improvements under the CSX railroad and drainage outfalls will be constrained by a Railroad Agreement and the acquisition of the permeant drainage easements.

Consideration of Geotechnical Constraints

Geotechnical constraints will primarily revolve around the plan for excavation of Category 1 and 2 APM within the project site, specifically STA 371 to 387 that falls within Phase 1 – Area 1 & 2, STA 415 to 419 within Phase 1 – Area 2, and STA 457 to 461 that is within Phase 1 – Area 3. The effective management of each Category will have the greatest impact on the overall project sequence. Phase 3 – Area 2 also includes the potential for Category 1 & 2 APM at STA 710+17, 717+81, and 720+33, however the depths of this material appear to be below anticipated excavation limits.

Category 1 material excavated that cannot be placed into onsite embankments will be managed with proper treatment and encapsulation. The encapsulation location and process will have been managed so that the proper bedding and cover is prepared and available for placement of the

Proper planning in advance of excavation in both Category 1 and 2 material locations must take place to ensure that all additional materials, locations, and resources are adequate for a seamless operation minimizing the unprotected exposure of any Category 1 or 2 material to potential rain events.

Category 1 material. The excavation duration of Category 1 material will have to be implemented to avoid undue exposure during forecasted rain events and, once begun, pursued in the quickest possible manner to minimize the duration of exposure reducing the risk of acid-laden runoff. In concert with the encapsulation operation, the excavation end must be properly controlled so that all mitigation measures are implemented on the exposed slopes of the remaining undisturbed Category I material.

Category 2 material must be managed in very much the same way as Category 1 material with the exception that this material can be placed in the project embankments. This would include treatment of lime or mixing with Category 4 materials, and covered by top-soiling and EC-2 fabric.

Environmental Impacts

Monitoring and inspection conducted in compliance with all permits, commitments and regulatory requirements will go far in preventing construction delays. Environmentally sensitive areas will be identified on the plans, and all permits approved by the appropriate agencies before commencing construction which impacts the environmental resource. Per permit requirements, all sensitive areas will be flagged and/or surrounded by protection fence, to identify them as protected areas to the construction personnel. Our Environmental Manager will participate in preconstruction meetings and discuss with field personnel all issues and constraints that exist within or adjacent to the work area. Once construction begins the Environmental Manager will monitor the project to improve field conditions and ensure that required measures are implemented appropriately. Weekly inspections of mitigation and protection measures will be performed by the QA/QC staff. These inspections will be more frequent as appropriate after weather events. All findings will be reported promptly to the construction staff so that appropriate maintenance and correction can be completed. The QAM will have the authority to shut down the project if inaction becomes an issue.

Staging and Storage Areas

To avoid delays to the schedule, staging and storage areas must be well-planned and integrated into the overall sequence of work. When planning these areas, the objectives are to establish locations that do not impact public traffic, do not create a public nuisance, do not have to be relocated during construction, and are close enough to the work area to assure production efficiencies. English has reviewed the corridor multiple times and assessed available areas for staging and storage. Although areas are very limited due to the terrain, we have tentatively identified areas as shown on the map at right, which could include area for APM materials.

Government Approvals, Stakeholder and Public Involvement

To avoid the risk of delays to the schedule due to government approvals and stakeholder buy-in, it is imperative that the English D-B Team understand all of the parties that have input, their procedures and timeframes for approval, and the affect they have on sequence of work. We identified stakeholders in our Organization Chart in section 4.2.2 of this proposal and in the TMP Section, and will refine this list as the Project moves forward. At this preliminary stage, we have included those government agencies beyond VDOT from which approvals are required (FHWA, permitting agencies, etc.) and stakeholders that could impact the completion milestones on the Proposal Schedule. Immediately after award, the Team will meet with stakeholders to discuss the Project, understand their issues and concerns, and explain the schedule and sequence of work. Input is incorporated in the schedule based on these discussions, and the schedule will in turn be communicated to them.

The English D-B Team personnel understands the importance of distributing correct and timely information to all stakeholders. This information only becomes easier to distribute and explain once construction has started. On-site personnel will create real relationships with the stakeholders, assisting with day to day modifications to property access or travel routes, to include changes to both vehicular traffic and pedestrian traffic.

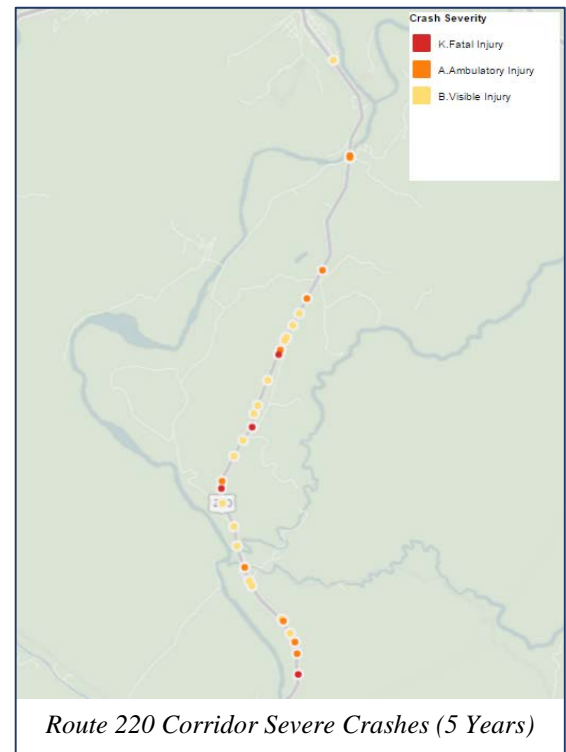
During Construction, the English D-B Team will continue to provide all the information and hold “Pardon our Dust” meetings as necessary, to communicate Project details, our sequence of construction, planned impacts to adjacent property and travel patterns, and the overall schedule. We also use this forum to solicit feedback and establish lines of communication with those affected. VDOT, along with Botetourt County, will be provided with regular updates along with all other 3rd party stakeholders. Because traffic patterns change as the work progresses, it is imperative that we coordinate directly with police, fire and rescue, local schools, and public transportation by establishing points of contact, distributing flyers, and presenting project details directly to them. Traffic changes are communicated on site through the effective use of signs and VMS boards. Information will be provided to the VDOT Project Manager about all new impacts to motorists so that appropriate traffic alerts can be issues, which we anticipate will be used to support VDOT’s updates to the Route 220 Project website. The English D-B Team will also maintain a log of all questions and complaints received via any forum or other method.



4.5.2 Transportation Management Plan

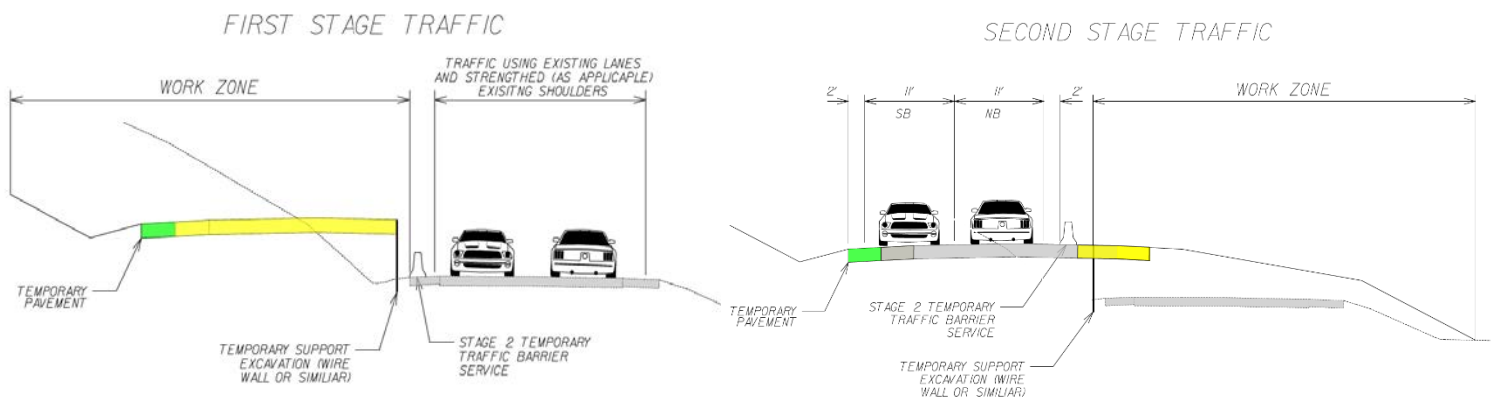
The Route 220 project requires a TMP Type B, Category III in accordance with VDOT I&IM-241/TE-351. During the Proposal Phase, we have already begun preparation of the TMP, which is tied directly to our Sequence of Construction. One of our initial tasks was performing an investigation of existing crash statistics and safety concerns within the corridor, as one of the many ways we are committed to maximizing safety, and to identify possible safety enhancements throughout work zones and MOT set-ups. We found that injury and fatality crashes over the past 5 years (32 in total) occurred not just in isolated locations, but throughout the majority of Phases 1 and 2. As such, we concluded that the best approach to maximize safety is the following strategy:

- › Priority Work Areas – To the extent possible, accelerate construction activities in Phases 1 and 2.
- › Maximize Visibility – Using proper signage, reflective markings and delineators, and lighting where warranted.
- › Work Zone Speed Reduction – To facilitate the safety of the traveling public and our workers, we will request a work zone speed reduction to 45 mph. This speed mirrors the work zone speed utilized for the adjacent exception project between Phase 2 South and Phase 2 North, Structure Replacement on Route 220 – Botetourt Road (UPC 103210) and appears to match safe traveling speed along the sharper curves in the corridor.



Maintenance of Traffic Plan - MITIGATING IMPACTS ON THE TRAVELING PUBLIC

Traffic will be maintained during all phases of construction. As part of our TMP, we will include a Maintenance of Traffic (MOT) plan that will detail all aspects of work and the accompanying traffic control required to include personnel certifications, lane closures, temporary detours, flagging operations, shoulder closures, temporary traffic signals, and the use of police officers. The plan, in conjunction with our public involvement approach outlined above in Section 4.5.1, will include the coordination with all local agencies as well as any other construction projects in the vicinity on or off of Route 220.



Our current plan for MOT consists of the following major elements, as depicted in the MOT sections above.

- ▶ Maintain traffic in existing lanes and shoulders while building as much work as possible “off-line”
- ▶ Once the western portion of the new roadway is built, shift traffic onto new construction, entailing:
 - Two 11-foot wide lanes with 2-foot wide shoulders/buffers
 - Temporary barrier service between work zone and travel lane
 - Temporary pavement markings and signing to adequately inform to the traveling public
- ▶ Once the remainder of the roadway is built, allow traffic to use the ultimate roadway configuration
- ▶ Minimum lane widths and shoulder widths as shown in the Minimum Lane Widths Table (*Right*)
- ▶ Temporary one-lane, two-way traffic through use of temporary signal(s) in Phase 1, and approved flagging

Our Team recognizes common shortfalls with the temporary traffic control plans (TTC) in work zones, and we are committed to avoiding these conditions with carefully designed site specific TTC plans. For example, it is critical to ensure that barrier ends and impact attenuators are flared away from traffic, as collisions with impact attenuators can result in high-severity crashes. Also, we know that temporary traffic barrier placement must be reviewed to ensure all turning movements and sight distances are maintained and that construction equipment will not prohibit any movements. Long continuous runs of temporary traffic barrier will be avoided ensuring adequate drainage and snow removal capabilities are maintained, and barrier will be promptly removed when it is no longer required. As a specific enhancement to our TMP there will be three (3) emergency pull off locations created within Phase 1 during the construction to allow for disabled vehicles to clear the road.

Minimum Lane Widths

Area	Stage	Existing Lane Width	Min. 11' Lane Width	Existing Shld. & 2' Buffer	Min. 2ft Shoulder
Phase 1					
Area 1	Stage 1	●		●	
	Stage 2	●		●	
	Stage 3		●		●
Area 2	Stage 1	●			
	Stage 2		●		●
	Stage 3		●		●
Area 3	Stage 1	●		●	
	Stage 2	●		●	
	Stage 3		●		●
Area 4	Stage 1	●		●	
	Stage 2		●		●
	Stage 3		●		●
Phase 2					
South	Stage 1	●		●	
	Stage 2		●		●
	Stage 3		●		●
North Area 1	Stage 1	●		●	
	Stage 2		●		●
	Stage 3		●		●
North Area 2	Stage 1	●		●	
	Stage 2		●		●
	Stage 3		●		●
Phase 3					
South	All Stages	●		●	
North Area 1	All Stages	●		●	
North Area 2	Stage 1	●		●	
	Stage 2		●		●
	Stage 3		●		●

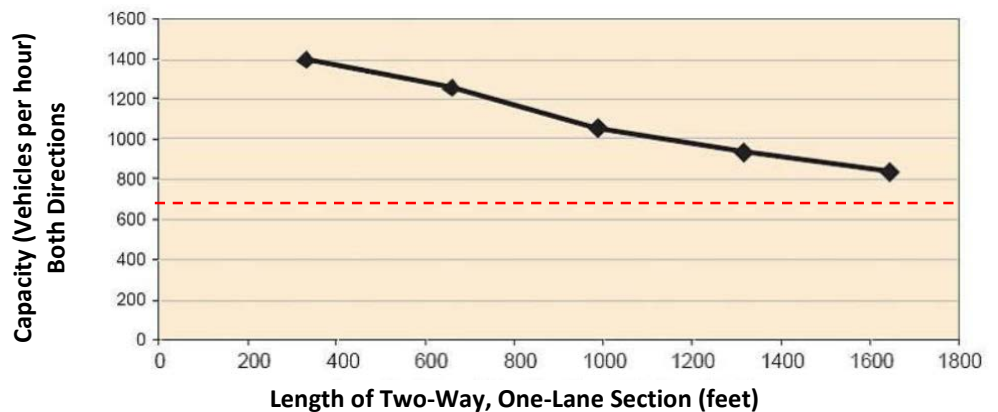
Coordination with Adjacent Projects – A specific example of coordination with work activities by other entities in or near the 220 Project site will include the planning for winter weather treatment and snow removal by state forces during construction while traffic control devices are deployed. Other projects we will coordinate with include structure replacement on Rte. 220 – Botetourt Road, Project No.: 0220-011-743, P-101, RW-201, C-501, D-623 & D-624 (UPC # 103210), Bridge Painting Contract, Project No.: (NFO) BR02-962-269, B646, (UPC # 105344), and Burham Road Paving, Project No.: 0696-011-792, N-501 (UPC # 107252). Coordination with these projects will become even more critical should our MOT Plan implement a restricted width within our work zone of less than 14’. In this instance, we will coordinate directly with the Point of Contact for those projects as well as Mr. Jackson with the DMV to make sure that proper notification is given to all parties that may be impacted by the load width restriction.

Related MOT Details and Sequencing – Included in the MOT plan will be accompanying information and details regarding temporary shoring that will be needed around new box culvert construction in Phase 1 – Areas 5, 6, & 7. Details will also be included for all temporary shoring needed between stages of construction to accommodate elevation changes between the proposed profile and the existing profile, specifically in Phase 1 – Areas 2 & 4.

Our MOT plan will also layout all needed storm drain systems that will either have to be maintained, installed in advance of a stage, or in a temporary condition to ensure proper drainage during all phases of construction. Finally, in our MOT plan we will include all necessary access and traffic control devices to provide safe access of construction personnel and equipment to any immediately adjacent staging and storage areas within the project.

Lane Closures via Flagging – Proposed short term or rolling lane closures -- used only after approved by VDOT -- would consist of closures necessary to facilitate the installation, relocation, and removal of temporary concrete barrier, shoulder strengthening, and mill / overlay operations as outlined in the sequence of construction above in 4.5.1. These lane closures would be accomplished by flagging operation. Additional lane restrictions would be requested for approved use on connecting routes and entrances to facilitate the construction of portions of these connections under traffic. As per the RFP Section 2.10 Part 2, English construction staff will cease flagging operation and two lanes restored to traffic within 30 minutes in response to incidents, such as due to the closure on I-81 or I-64 that would divert traffic to Route 220.

Our request for one-lane flagger operation will set length of closures to comply with VDOT and FHWA guidelines. Based on a conservative peak hour traffic volume of 650 vehicles (both NB and SB combined), the length of closure recommended by FHWA is a maximum of 1,800 feet. The length of each closure will also be evaluated to ensure that its length would not prevent the closure from being removed in the appropriate amount of time. When requesting lane and/or shoulder closures from the VDOT TOC and the VDOT Project Manager, the Team will identify the location, purpose, date, time and duration of the closure. When preparing this



information, we will analyze what the best times of day/night and the best day of the week and select a date and time that will allow for the safest construction and the least impact on the traffic flow. The English D-B Team will also look to VDOT for their opinion of the date, time, and duration identified in the request.

Temporary Detours – In some instances, temporary detours will be installed to assist with the construction of connections from adjoining routes. One example could be to temporarily detour through traffic along Route 722, Chatham Road and construct one connection at a time while traffic utilizes the opposite connection. The same detour tactics could be used for the construction of connections for Route 622, Prices Bluff Road, as it is known at its southern connection, Route 633, Glen Wilton Road at its northern connection, and also for Gala Loop Road. At no time will temporary detours of Route 220 be utilized. We will develop an Incident Management Plan (IMP) for each type of operation and MOT concept that will include emergency detour routes and sign layout plans as necessary should something trigger the need to install a temporary detour due to an unforeseen issue. The Incident Management Plan will also have 24-hour points of contact, Agency/Stakeholder Checklist, required list of personnel to be contacted that would include VDOT Salem and Staunton TOC’s, law enforcement, fire and rescue and all other appropriate stakeholders.

Night Work – In addition to the lane closure impact minimization plan, our Team will pay special attention to minimize noise during night hours due to close proximity to local communities. Construction activities that generate excessive noise will be scheduled during daytime allowable working hours, and night time operations can be provided for quiet operations such as temporary traffic barrier placement.

Mitigating Impacts on Stakeholders - (Base Scope and Option 1)

Our Team recognizes that proactive communication with all project stakeholders (with assistance from VDOT) is essential. We have already identified the major project stakeholders, and we have devised specific mitigation strategies that exceed the Project requirements. These are summarized in the table below.

Stakeholders	Impacts	Communication/Mitigation Strategies
Traveling Public	Minimal travel time delays for temporary operations	<ul style="list-style-type: none"> All work operations behind barrier and will maximize lane widths Optimization of lane closure hours, as approved by VDOT, will limit flagging closures to allowable hours of lowest volume Portable Changeable Message Signs and Twitter for public notices
Property Owners	Possible construction noise; construction activities on their property which will impact their access	<ul style="list-style-type: none"> Access to all properties maintained at all times Coordination of construction activities via notification and “Pardon Our Dust” meetings Work on each side street will be coordinated with residents and/or business so that work can be scheduled for hours of least impacts
Schools (11 within proximity)	Potential delays to school buses	<ul style="list-style-type: none"> Coordination of construction activities directly with school staff No lane closures during school bus operating hours when possible Temporary alignments will be analyzed to ensure buses are accommodated using Auto-Turn software Advance notification of traffic pattern changes
Police, Fire & Rescue	Potential response time impact	<ul style="list-style-type: none"> Advance notification of temporary lane restrictions, changes to traffic patterns Representatives will be notified of approved lane closure requests Pre-switch emergency responder meetings for response planning 24/7 points of contact
Nearby Projects (described previously)	Construction coordination impacts between Projects	<ul style="list-style-type: none"> Temporary lane closures will be coordinated internally Long-term traffic control set-ups will be coordinated internally to ensure seamless traffic flow between projects Resources such as PCMS signs coordinated and shared for major events

Communicating Impacts to Traveling Public & Stakeholders *(Base Scope & Option 1)*

During the design phase, the English D-B Team will hold informational meetings with all affected stakeholders to keep them informed of the overall project schedule and the potential impacts to adjacent property and travel patterns. Information will also be provided and updated on a routine basis in order for VDOT to post appropriate and accurate information on its website. This information will include the project overview, plan of work, overall project schedule and progress, planning impacts to traffic, to include lane closures, shoulder closures, and planned traffic switches.

If the plan is perfect and the execution flawless, communication is the greatest tool to mitigate any issue that arises on the project site when it comes to traffic patterns, temporary impacts due to closures or restrictions and even surprise unforeseen issues. The English D-B Team will begin at the earliest opportunity, during design and public meetings with all stakeholders, to address all issues to include the planned, the temporary, and the unforeseen.

Our communication strategy will continue throughout the construction, with face to face interaction by our onsite personnel and the impacted parties and continued public meetings. It will also continue routinely with Portable Changeable Message Signs (PEMS) that will be deployed, one (1) on either end of the project on Route 220, two (2) along the I-64 corridor and two (2) along the I-81 corridor. The PCMS's will update all those traveling in and around the project of anticipated traffic switches, lane and/or shoulder closures, and any restrictions to include width restrictions as planned. The PCMS's will also be programmed with emergency messages that can be utilized for any unforeseen conditions notifying travelers of potential delay and alternate routes.

Other TMP Elements

Additional required components of the TMP which will be developed as one of the first deliverables of the project include the following:

- › Fully Developed Public Information Plan
- › Traffic Analysis to Support MOT (Traffic Impact Analysis)
- › Pedestrian & Other Mode Maintenance of Traffic Provisions, as applicable
- › Incident Management Plan
- › Use of Virginia State Police
- › Placement of Limit of Work Advance Signage

4.6 DBE



4.6 DISADVANTAGED BUSINESS ENTERPRISES

W. C. English, Incorporated is committed to meeting the 7% DBE participation goal for the entire value of the contract.

4.7 Schedule



4.7 PROPOSAL SCHEDULE

4.7.1 Proposal Schedule

The English D-B Team has prepared a Proposal Schedule and Proposal Schedule Narrative that depict our overall plan to accomplish the Base Scope and Option 1 work as required by Section 4.7 of the RFP. The Proposal Schedule includes activities for all work required to be accomplished in order to successfully complete the project on time. Our Proposal Schedule has taken into account all internal plan review, VDOT plan review and approvals, environmental permitting and constraints, right of way acquisition, utility relocation, construction activities and QA/QC inspection and testing. Our overall schedule approach allows us to achieve Final Completion by August 31, 2021.

The Proposal Schedule is included in Volume 2.

4.7.2 Proposal Narrative

The following summarizes key dates included in our Proposal Schedule:

Milestones

Notice to Proceed	21-Apr-17
Notice to Commence Construction within ROW	01-May-18
Notice to Commence Construction in new ROW	30-Jul-18
Phase 1 Area 1 Complete	08-Oct-19
Phase 1 Area 2 Complete	18-Aug-20
Phase 1 Area 3 Complete	29-Jun-19
Phase 1 Area 4 Complete	31-Aug-21
Phase 2 Complete	06-Nov-19
Phase 3 Complete	01-Oct-20
Final Completion	31-Aug-21

Work Breakdown Structure

The proposed schedule integrates design and construction into a Work Breakdown Structure (WBS) per below.

- Level 1. Milestones
- Level 2. Scope Validation Period
- Level 3. Design – this also includes permitting, utility relocation designs and ROW acquisition activities. QA/QC checks are built into the durations shown for the activities prior to submittal.
- Level 4. Public Involvement
- Level 5. Construction – this also includes utility relocations

The Work Breakdown Structure has been developed and detailed to a sufficient level to allow for the proper management and reporting of all elements of the project throughout both design and construction. As defined by VDOT and the project scoping requirements, the project approach and the project schedule have been developed by identifying all work elements required to accomplish the design and construction of Phase 1, Phase 2, and Phase 3 as concurrent independent project components. To accomplish this, each phase was constructed independently with the appropriate schedule logic and subsequently tied and linked to the other phases to show the overall complete project approach.

WBS PATH	WBS NAME
Route 220 - Proposal Schedule	
1	PROJECT MILESTONES
3	SCOPE VALIDATION PERIOD
5	DESIGN
5.5	Subsurface Exploration & Analysis
5.6	Concept SWM and ESC Plan
5.7	Transportation Management Plan
5.1 PHASE 1	
5.1.9	Geotechnical Analysis and Report
5.1.8	Right-of-Way Plans – HHA/Culverts
5.1.10	Construction Plans – Roadway and Geotechnical – Early Stage Maintenance of Traffic (MOT) – Culvert and Erosion and Sediment Control – Stormwater Management and Drainage
5.1.11	Environmental Permits & Clearances – Re-evaluation (VDOT) – Water Quality Permit (wetland/stream) – FEMA
5.1.12	Right-of-Way Acquisition
5.1.13	Utilities
5.2 PHASE 2	
5.2.9	Geotechnical Analysis and Report
5.2.8	Right-of-Way Plans
5.2.10	Construction Plans – Roadway and Geotechnical – Early Stage Maintenance of Traffic (MOT) – Culvert and Erosion and Sediment Control – Stormwater Management and Drainage
5.2.11	Environmental Permits & Clearances – Re-evaluation (VDOT)
5.2.12	Right-of-Way Acquisition
5.2.13	Utilities
5.3 PHASE 3	
5.3.9	Geotechnical Analysis and Report

WBS PATH	WBS NAME
5.3.8	Right-of-Way Plans
5.3.10	Construction Plans <ul style="list-style-type: none"> - Roadway and Geotechnical - Early Stage Maintenance of Traffic (MOT) - Culvert and Erosion and Sediment Control - Stormwater Management and Drainage
5.3.11	Environmental Permits & Clearances <ul style="list-style-type: none"> - Re-evaluation (VDOT)
5.3.12	Right-of-Way Acquisition
5.3.13	Utilities

4.1 PHASE 1	
4.1.1	Area 1 (Sta. 348+87.36 to 366+00) <ul style="list-style-type: none"> - Stage 1 New Alignment - Stage 2 Tie-In South-End - Stage 3 Pavement Demolition
4.1.2	Area 2 (Sta. 366+00 to 449+00) <ul style="list-style-type: none"> - Stage 1 Shoulder Strengthening - Stage 2 New Alignment - Stage 3 Alignment Completion
4.1.3	Area 3 (Sta. 449+00 to 475+00) <ul style="list-style-type: none"> - Stage 1 New Alignment - Stage 2 Tie-In South & North End (80 cal. days/signal one-lane restrictions) - Stage 3 Pavement Demolition
4.1.4	Area 4 (Sta. 475+00 to 589+01) <ul style="list-style-type: none"> - Stage 1 Shoulder Strengthening - Stage 2 New Alignment - Stage 3 Alignment Completion
4.1.5	Area 5 – Box Culvert (Sta. 557+50) <ul style="list-style-type: none"> - Stage 1 Construction Box Culvert Left - Stage 2 Construction Box Culvert Right
4.1.6	Area 6 – Double Box (Sta. 561+50) <ul style="list-style-type: none"> - Stage 1 Construction Box Culvert Left - Stage 2 Construction Box Culvert Right
4.1.7	Area 7 – Double Box (Sta. 569+50) <ul style="list-style-type: none"> - Stage 1 Construction Box Culvert Left - Stage 2 Construction Box Culvert Right

4.2 PHASE 2	
4.2.1	South (Sta. 104+80.48 to 123+71.92) <ul style="list-style-type: none"> - Stage 1 Shoulder Strengthening - Stage 2 Southbound Lane Shoulder Widening - Stage 3 Mill and Overlay
4.2.2	North (Sta. 200+00 to 267+18.83)
4.2.2.1	Area 1 (Sta. 200+00 to 240+00) <ul style="list-style-type: none"> - Stage 1 New Alignment - Stage 2 Mill and Overlay - Stage 2 Pavement Demolition
4.2.2.2	Area 2 (Sta. 240+00 + 267+18.83) <ul style="list-style-type: none"> - Stage 1 Shoulder Strengthening

	– Stage 2 Southbound Lane Shoulder Widening
	– Stage 3 Mill and Overlay
4.2.2.3	Option - 1(A)

4.3 PHASE 3	
4.3.1	South (Sta. 589+01 to 690+00)
4.3.1.1	– Stage 1 Mill and Overlay
4.3.2	North (Sta. 690+00 to 723+95) Base or Option 1B
4.3.2.1	Area 1 (Sta. 690+00 to 703+80) – Stage 1 Mill and Overlay
4.3.2.3	Area 2 (Sta. 703+80 to 723+95) – Stage 1 Shoulder Strengthening – Stage 2 Northbound Lane Shoulder Widening – Stage 3 Mill and Overlay

Work Shifts

English has scheduled the work based on utilizing one (1) shift working 10-hour work days five (5) days per week from 7:00am to 5:30pm, and has scheduled activity durations on that basis. Work will be performed on Saturdays and Sundays as necessary. Additionally, the Transportation Management Plan (TMP) allows for night operations to be utilized to minimize impacts to the travelling public and improve construction productivity when appropriate. The Proposal Schedule purposely did not incorporate utilizing weekends and nights in the initial development to allow flexibility for the team to adjust the schedule as work progresses to overcome any impacts as necessary to deliver the project on time. Additional resources may be added to recover time lost on the schedule as well, if necessary. Subcontractor schedules will vary depending on their typical practice, available work areas, crew/resource constraints and schedule status and will managed for the betterment of the entire project schedule.

Calendars

The schedule is built using four (4) calendars.

Calendar 1: 5-Day Work Week - This is the primary calendar for design and administrative activities and utilizes the holiday schedule listed below.

Calendar 2: 7 Day Week – The primary use for this calendar is to allow review activities to reflect the calendar day review per specifications.

Calendar 3: NOAA Weather – This is the primary calendar for construction activities. This very essential calendar incorporates 30-year weather means for measurable precipitation and freezing temperatures compiled from the National Oceanic and Atmospheric Administration (NOAA) from the nearest weather station in relation to the project. The purpose for this calendar is to accurately reflect the impact that weather typically has on a project.

Calendar 4: Winter Impact Calendar – Assigned to activities that are not typically allowed to be performed from mid-December through mid-March during the colder months of the year.

Weather – Weather data was obtained from the National Oceanic and Atmospheric Administration (NOAA) for the nearest weather station to the project site. Adverse weather is defined as measurable precipitation (MP) of 0.1 " or more, or 1.0" or more of snow or ice pellets. Only measurable precipitation can be claimed for any one calendar day. The ten (10) year averages for adverse weather as defined herein are reflected in the table above. The abbreviation “FT” stands for Freezing Temperatures.

ADVERSE WEATHER – 10 YEAR AVERAGES			
MONTH	MP/FT	MONTH	MP/FT
January	07/01	July	08/00
February	06/01	August	05/00
March	07/00	September	06/00
April	06/00	October	05/00
May	07/00	November	07/00
June	05/00	December	07/01

Holidays – The non-working holidays incorporated into the Proposal Schedule are New Year’s Day, Memorial Day, Independence Day, Labor Day, Thanksgiving, the day after Thanksgiving, and Christmas. During the development of the Baseline Schedule the non-working days will be further refined by adding additional non-working days before or after the standard holiday non-working days as necessary to agree with typical VDOT extended holiday work restrictions to ensure there is minimal impact on the traveling public.

Schedule Timing and Critical Path

Design – The Design critical path begins with the Notice to Proceed and then goes to sending out notification letters, topo/RW surveys, geotechnical/APM investigation, plan approval and scope validation. Then the focus will shift to the F.I. roadway design, culverts, hydraulic models and approval. At that point the Impact determination, relocation design, and the definition of utility easements, and ROW approval will be performed. Once the ROW has been approved the roadway/geotechnical, early stage MOT plans, SWM/drainage plans, and final floodplain modeling and the VSMP/SWPPP permitting and clearances will be completed.

Construction – The Construction critical path is driven by the VSMP and SWPPP clearances. Once this has been obtained the clearing and grubbing work will begin in Phase 1. Concurrently with clearing the site the focus will also be establishing erosion and sediment control measures so regular excavation/APM excavation/APM mitigation and storm drainage work can commence. Once the majority of the regular excavation and storm drainage is complete we will be able to focus on the fine grading, stone base, asphalt, pavement marking and guardrail installations. The box culverts will run concurrently with these Stage 2 activities. After completion of the Stage 2 work and the box culverts the Stage 3 work will begin with fine grading, installing base stone and pavement. Then we will perform the final stages of pavement marking, signage, and guardrail installation.

Construction Area Description

The construction is divided into three (3) phases, further subdivided into areas:

PHASE 1 (Sta. 348+87.36 to 589+01.00)	
Area 1	Sta. 348+87.36 to 366+00.00
Area 2	Sta. 366+00.00 to 449+00.00
Area 3	Sta. 449+00.00 to 475+00.00
Area 4	Sta. 475+00.00 to 589+01.00
Area 5	Box Culvert Sta. 557+50.00
Area 6	Box Culvert Sta. 561+50.00
Area 7	Box Culvert Sta. 569+50.00

PHASE 1 (Sta. 104+80.48 to 267+18.83)	
South	104+80.48 to 123+71.92
N. Area	Sta. 200+00.00 to 240+00.00
N. Area	Sta. 240+00.00 to 267+18.83
PHASE 3 (Sta. 589+01.00 to 723+95.00)	
South	Sta. 589+01.00 to 690+00.00
N. Area 1	Sta. 690+00.00 to 703+80.00
N. Area 2	Sta. 703+80.00 to 723+95.00

Overall Plan to Accomplish the Work

Our overall plan to accomplish the work, including our expected means and methods, is outlined in detail in Section 4.5 of the Technical Proposal. This Proposal Schedule was built and developed based upon our written project plan to accomplish the work.

Key Assumptions

For this project we have made the following assumptions:

- Utility Company Reasonable Response Times and Cooperation
- 20" Gas Line near Gala is not impacted
- Potential property condemnations would not extend the ROW acquisition timeline
- Wetlands Jurisdictional Determination approval obtained by VDOT prior to NTP
- TIME OF YEAR RESTRICTIONS - no clearing restrictions due to bats, and no TOY for stream impacts (as per information provided with the RFP)
- Potential archeological findings would not affect critical path
- VDOT review times and VDOT activities in conformance with RFP timeframes

Schedule Compliance

In accordance with the RFP requirements for the Route 220 Safety Corridor Improvements Phases 1, 2 and 3, we are in compliance with Section 4.7 regarding development and inclusion of a Proposal Schedule. Our Design/Build Team has developed a Proposal Schedule that details the necessary interrelationships between all necessary stakeholders involved for the successful execution of the project. We have incorporated all reviews, permitting, right-of-way acquisitions, utility relocations, etc. to adhere to the required steps for obtaining an acceptable design.

APPENDICES



APPENDICES

- a. Technical Proposal Checklist and Contents**
- b. Acknowledgement of RFP, Revision & Addenda**
- c. Proposal payment agreement**
- d. Certification regarding Debarment**
- e. Certification Regarding Debarment LTC**
- f. Change in Key Personnel Acceptance Letter**

APPENDICES

a. Technical Proposal Checklist

ATTACHMENT 4.0.1.1
ROUTE 220 CORRIDOR SAFETY IMPROVEMENTS, PHASES 1 - 3
TECHNICAL PROPOSAL CHECKLIST AND CONTENTS

Offerors shall furnish a copy of this Technical Proposal Checklist, with the page references added, 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	Appendices
Acknowledgement of RFP, Revisions, and/or Addenda	Attachment 3.6 (Form C-78-RFP)	Sections 3.6, 4.0.1.1	no	Appendices
Letter of Submittal	NA	Sections 4.1		
Letter of Submittal on Offeror's letterhead	NA	Section 4.1.1	yes	1
Identify the full legal name and address of Offeror	NA	Section 4.1.1	yes	1
Authorized representative's original signature	NA	Section 4.1.1	yes	1
Declaration of intent	NA	Section 4.1.2	yes	1
120 day declaration	NA	Section 4.1.3	yes	1
Point of Contact information	NA	Section 4.1.4	yes	1
Principal Officer information	NA	Section 4.1.5	yes	1
Final Completion Date	NA	Section 4.1.6	yes	1
Proposal Payment Agreement or Waiver of Proposal Payment	Attachment 9.3.1 or 9.3.2	Section 4.1.7	no	Appendices
Certification Regarding Debarment Forms	Attachment 11.8.6(a) Attachment 11.8.6(b)	Section 4.1.8	no	Appendices
Offeror's Qualifications	NA	Section 4.2		

ATTACHMENT 4.0.1.1

ROUTE 220 CORRIDOR SAFETY IMPROVEMENTS, PHASES 1 - 3

TECHNICAL PROPOSAL CHECKLIST AND CONTENTS

Technical Proposal Component	Form (if any)	RFP Part 1 Cross Reference	Included within page limit?	Technical Proposal Page Reference
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	2
Organizational chart with any updates since the SOQ submittal clearly identified	NA	Section 4.2.2	yes	2
Revised narrative when organizational chart includes updates since the SOQ submittal	NA	Section 4.2.2	yes	3
Design Concept	NA	Section 4.3		
Conceptual Roadway Plans and description	NA	Section 4.3.1.1	yes	5
Project Approach	NA	Section 4.4		
Environmental Management	NA	Section 4.4.1	yes	20
Utilities	NA	Section 4.4.2	yes	24
Geotechnical	NA	Section 4.4.3	yes	29
Quality Assurance/ Quality Control (QA/QC)	NA	Section 4.4.4	yes	
Construction of Project	NA	Section 4.5		
Sequence of Construction	NA	Section 4.5.1	yes	44
Transportation Management Plan	NA	Section 4.5.2	yes	54

ATTACHMENT 4.0.1.1
ROUTE 220 CORRIDOR SAFETY IMPROVEMENTS, PHASES 1 - 3
TECHNICAL PROPOSAL CHECKLIST AND CONTENTS

Technical Proposal Component	Form (if any)	RFP Part 1 Cross Reference	Included within page limit?	Technical Proposal Page Reference
Disadvantaged Business Enterprises (DBE)	NA	Section 4.6		
Written statement of percent DBE participation	NA	Section 4.6	yes	59
Proposal Schedule	NA	Section 4.7		
Proposal Schedule	NA	Section 4.7	no	
Proposal Schedule Narrative	NA	Section 4.7	no	
Proposal Schedule in electronic format (CD-ROM)	NA	Section 4.7	no	

APPENDICES

b. Acknowledgement of RFP, Revision(s) & Addenda(s)

ATTACHMENT 3.6**COMMONWEALTH OF VIRGINIA
DEPARTMENT OF TRANSPORTATION**

PROJECT: Route 220 Corridor Safety Improvements, Phases 1 - 3
RFP NO.: C000105543DB88
PROJECT NO.: 0220-011-786

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 RFP – September 28, 2016
(Date)
2. Cover letter of RFP Addendum 1 – November 4, 2016
(Date)
3. Cover letter of RFP Addendum 2 – December 20, 2016
(Date)


SIGNATURE

January 18, 2017

DATE

Wilson L. Dickerson, Jr., PE,

PRINTED NAME

Senior Vice President

TITLE

APPENDICES

c. Proposal Payment Agreement

ATTACHMENT 9.3.1
PROPOSAL PAYMENT AGREEMENT

THIS PROPOSAL PAYMENT AGREEMENT (this “Agreement”) is made and entered into as of this 18th day of January, 2017, by and between the Virginia Department of Transportation (“VDOT”), and W. C. English, Incorporated (“Offeror”).

WITNESSETH:

WHEREAS, Offeror is one of the entities who submitted Statements of Qualifications (“SOQs”) pursuant to VDOT’s April 25, 2016 Request for Qualifications (“RFQ”) and was invited to submit proposals in response to a Request for Proposals (“RFP”) for the **Route 220 Corridor Safety Improvements, Phases 1-3** project, **Project No. 0220-011-786** (“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] W. C. English, Incorporated

By: Wilson L. Dickerson, Jr.

Name: Wilson L. Dickerson, Jr., P.E.

Title: Senior Vice President

APPENDICES

d. Certification Regarding Debarment

ATTACHMENT NO. 11.8.6(a)

**CERTIFICATION REGARDING DEBARMENT
PRIMARY COVERED TRANSACTIONS**

Project No.: 0220-011-786
Contract ID: C00105543DB88

1) The prospective primary participant certifies to the best of its knowledge and belief, that it and its principals:

a) Are not presently debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded from covered transactions by any Federal department or agency.

b) Have not within a three-year period preceding this proposal been convicted of or had a civil judgment rendered against them for commission of fraud or a criminal offense in connection with obtaining, attempting to obtain, or performing a public (Federal, State or local) transaction or contract under a public transaction; and have not been convicted of any violations of Federal or State antitrust statutes or commission of embezzlement, theft, forgery, bribery, falsification, or destruction of records, making false statements, or receiving stolen property;

c) Are not presently indicted for or otherwise criminally or civilly charged by a governmental entity (Federal, State or local) with commission of any of the offenses enumerated in paragraph 1) b) of this certification; and

d) Have not within a three-year period preceding this application/proposal had one or more public transactions (Federal, State or local) terminated for cause or default.

2) Where the prospective primary participant is unable to certify to any of the statements in this certification, such prospective participant shall attach an explanation to this form.

The undersigned makes the foregoing statements to be filed with the proposal submitted on behalf of the Offeror for contracts to be let by the Commonwealth Transportation Board.

 January 18, 2017
Signature Date

Wilson L. Dickerson, Jr., P.E.
Senior Vice President
Title

W. C. ENGLISH, Incorporated
Name of Firm

APPENDICES

e. Certification Regarding Debarment Lower Tier Covered Transactions

ATTACHMENT NO. 11.8.6(b)

**CERTIFICATION REGARDING DEBARMENT
LOWER TIER COVERED TRANSACTIONS**

Project No.: 0220-011-786

Contract ID: C00105543DB88

1) The prospective lower tier participant certifies, by submission of this proposal, that neither it nor its principals is presently debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded from participation in this transaction by any Federal department or agency.

2) Where the prospective lower tier participant is unable to certify to any of the statements in this certification, such prospective participant shall attach an explanation to this form.

The undersigned makes the foregoing statements to be filed with the proposal submitted on behalf of the Offeror for contracts to be let by the Commonwealth Transportation Board.



Signature

November 16, 2016

Date

Senior Principal

Title

Stantec Consulting Services Inc.

Name of Firm

ATTACHMENT NO. 11.8.6(b)

**CERTIFICATION REGARDING DEBARMENT
LOWER TIER COVERED TRANSACTIONS**

Project No.: 0220-011-786

Contract ID: C00105543DB88

1) The prospective lower tier participant certifies, by submission of this proposal, that neither it nor its principals is presently debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded from participation in this transaction by any Federal department or agency.

2) Where the prospective lower tier participant is unable to certify to any of the statements in this certification, such prospective participant shall attach an explanation to this form.

The undersigned makes the foregoing statements to be filed with the proposal submitted on behalf of the Offeror for contracts to be let by the Commonwealth Transportation Board.



Signature

January 13, 2017

Date

Managing Member

Title

Traffic Signals Plus, PLLC

Name of Firm

ATTACHMENT NO. 11.8.6(b)

**CERTIFICATION REGARDING DEBARMENT
LOWER TIER COVERED TRANSACTIONS**

Project No.: 0220-011-786

Contract ID: C00105543DB88

1) The prospective lower tier participant certifies, by submission of this proposal, that neither it nor its principals is presently debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded from participation in this transaction by any Federal department or agency.

2) Where the prospective lower tier participant is unable to certify to any of the statements in this certification, such prospective participant shall attach an explanation to this form.

The undersigned makes the foregoing statements to be filed with the proposal submitted on behalf of the Offeror for contracts to be let by the Commonwealth Transportation Board.



1/13/2017

Office Manager

Signature

Date

Title

Amec Foster Wheeler Environment & Infrastructure, Inc.

Name of Firm

ATTACHMENT NO. 11.8.6(b)

**CERTIFICATION REGARDING DEBARMENT
LOWER TIER COVERED TRANSACTIONS**

Project No.: 0220-011-786

Contract ID: C00105543DB88

1) The prospective lower tier participant certifies, by submission of this proposal, that neither it nor its principals is presently debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded from participation in this transaction by any Federal department or agency.

2) Where the prospective lower tier participant is unable to certify to any of the statements in this certification, such prospective participant shall attach an explanation to this form.

The undersigned makes the foregoing statements to be filed with the proposal submitted on behalf of the Offeror for contracts to be let by the Commonwealth Transportation Board.



1/13/2017

Office Manager

Signature

Date

Title

Amec Foster Wheeler Environment & Infrastructure, Inc.

Name of Firm

APPENDICES

f. Change in Key Personnel Acceptance Letter (if any)

Route 220 Corridor Safety Improvements

A Design-Build Project

From: 0.129 miles south of Route 43 To: Intersection with Route 727

Botetourt County, Virginia

State Project No.: 0220-011-786

Federal Project No.: NH-5128 (326)

Contract ID Number: C00105543DB88



Submitted to:
Virginia Department of Transportation

Submitted by:
W.C. English, Incorporated

In association with:
A. Morton Thomas and Associates, Inc.

January 18, 2017

4.3 CONCEPT PLANS

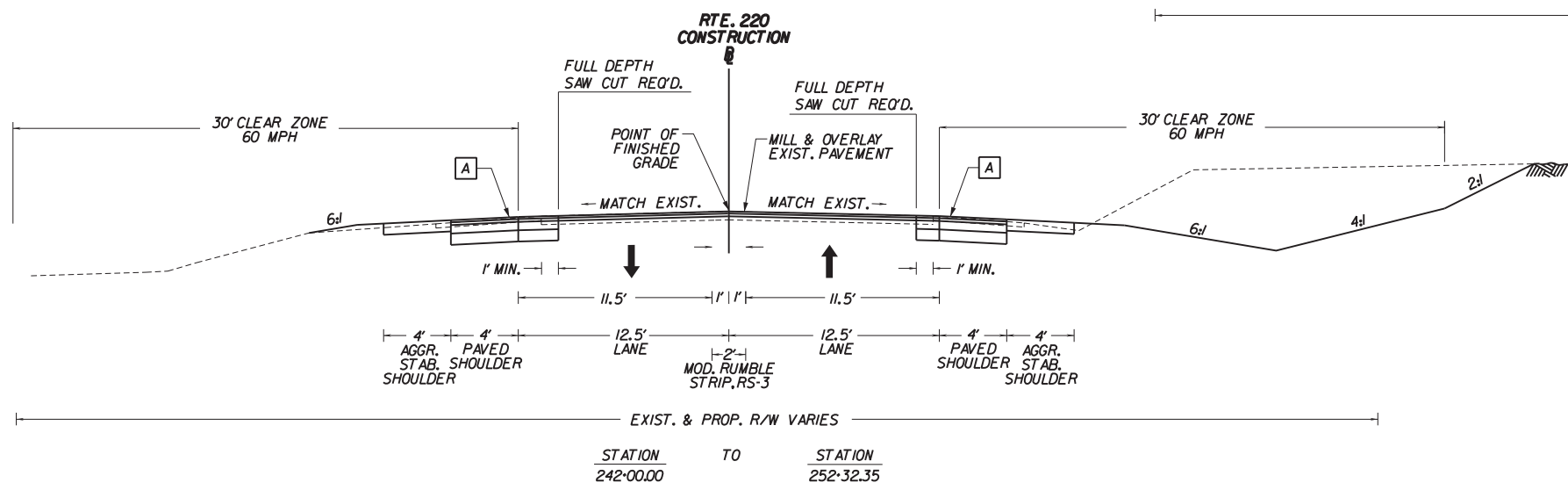
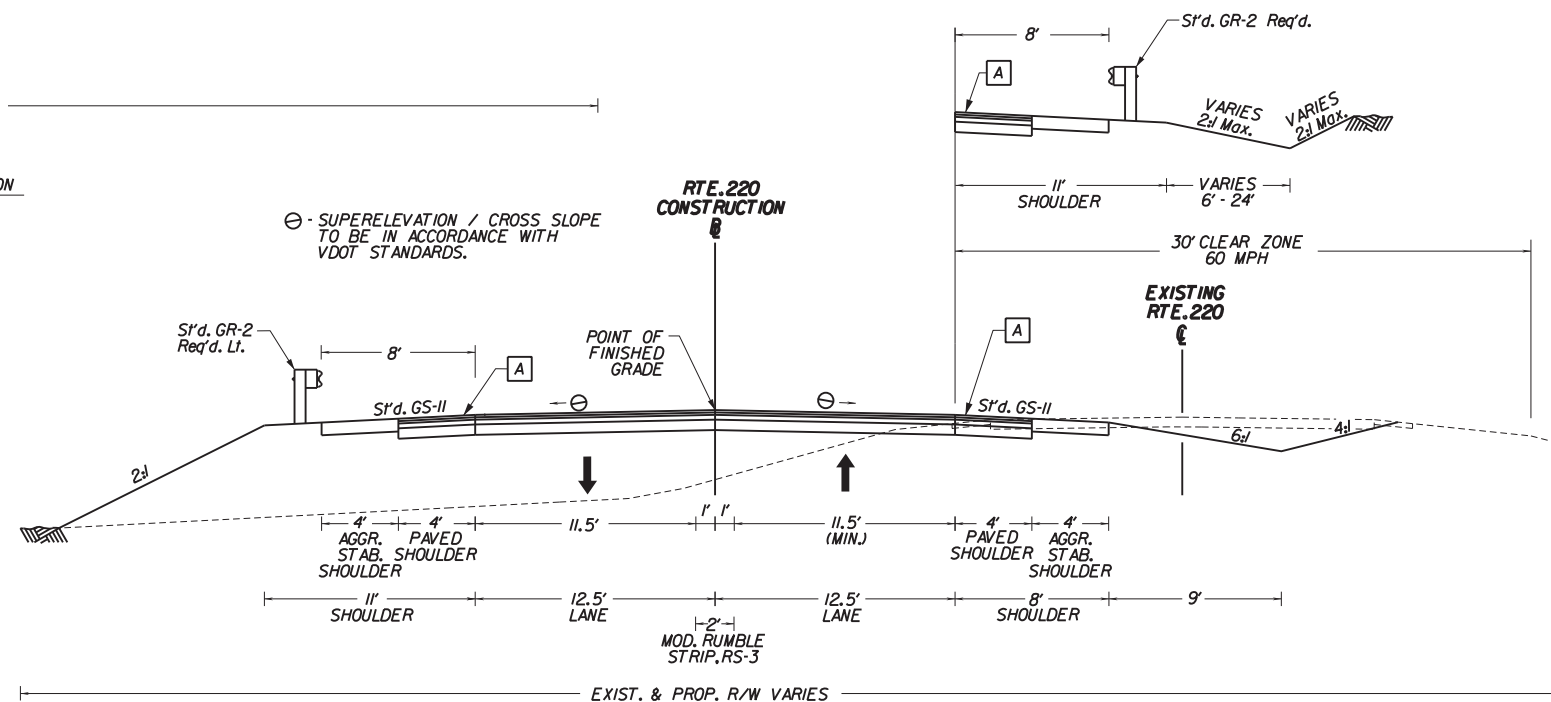
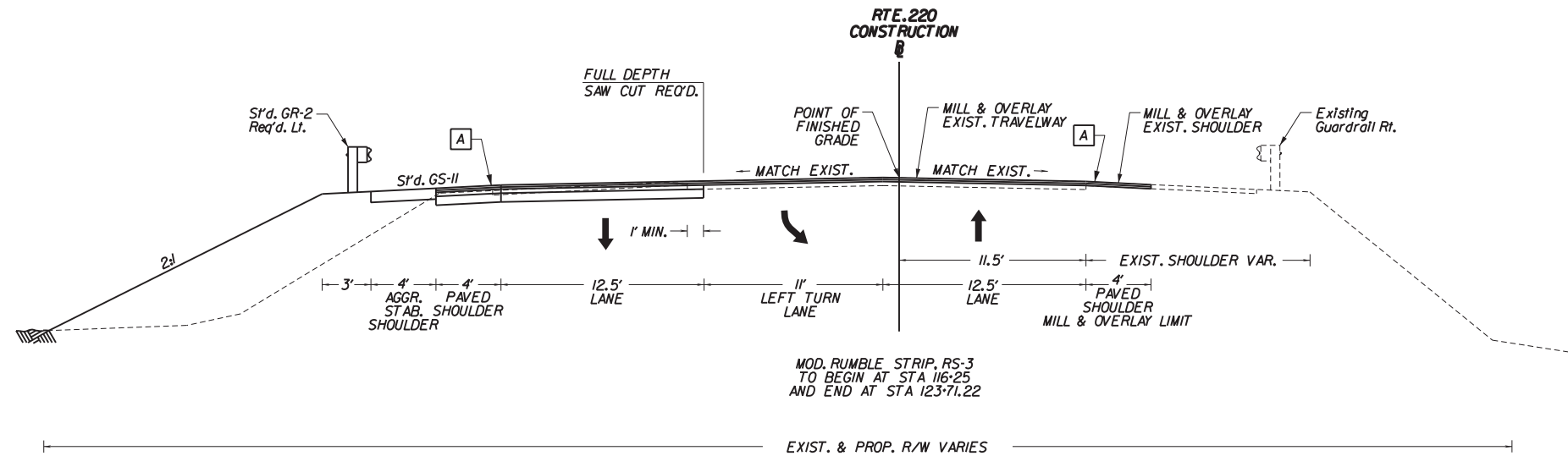


PRELIMINARY TYPICAL SECTIONS

NOTE: SEE PLANS FOR LOCATION OF TURN LANES AND TRANSITIONS

NOTE: ST'D. TC-5.11 CURVE WIDENING NOT SHOWN IN TYPICAL SECTION.

NOTE: 10' SLOPE ROUNDING REQUIRED AT ALL CUT SECTIONS. SEE APPLICABLE CS ST'D. FOR DETAIL.

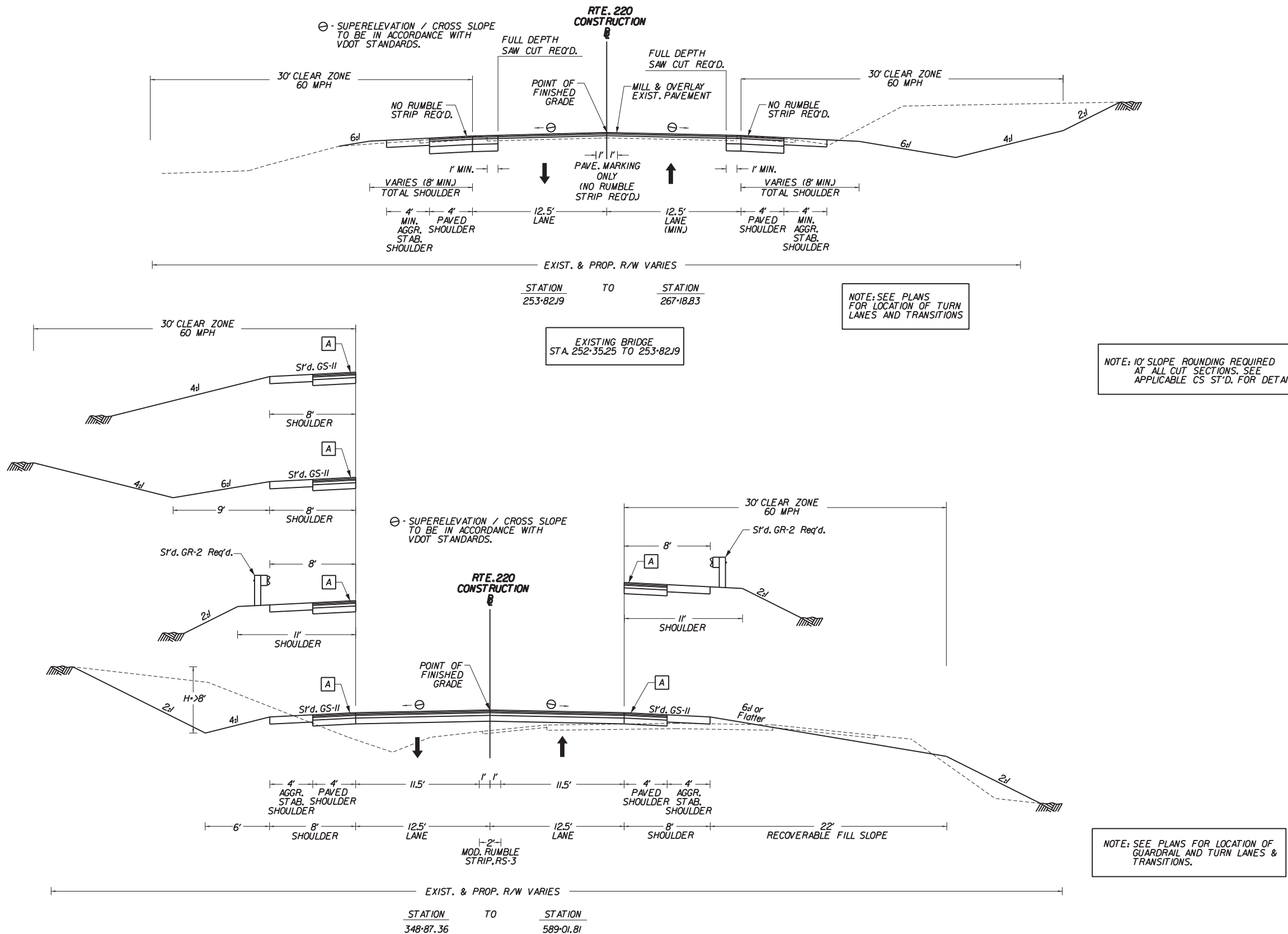


[A] - INTERMITTENT SHOULDER RUMBLE STRIP (MODIFIED TYPE RS-5) REQ'D.

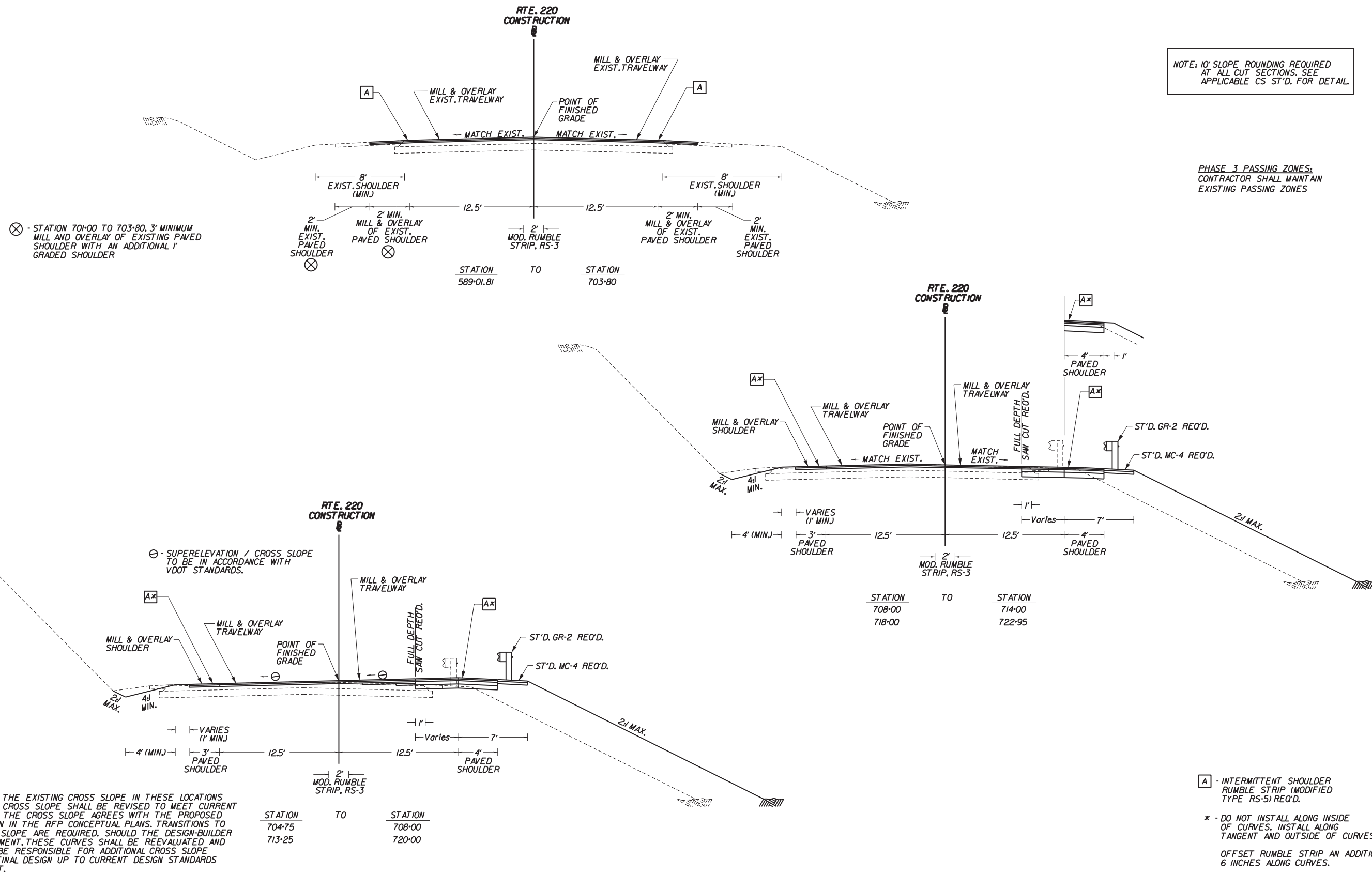
NOT TO SCALE

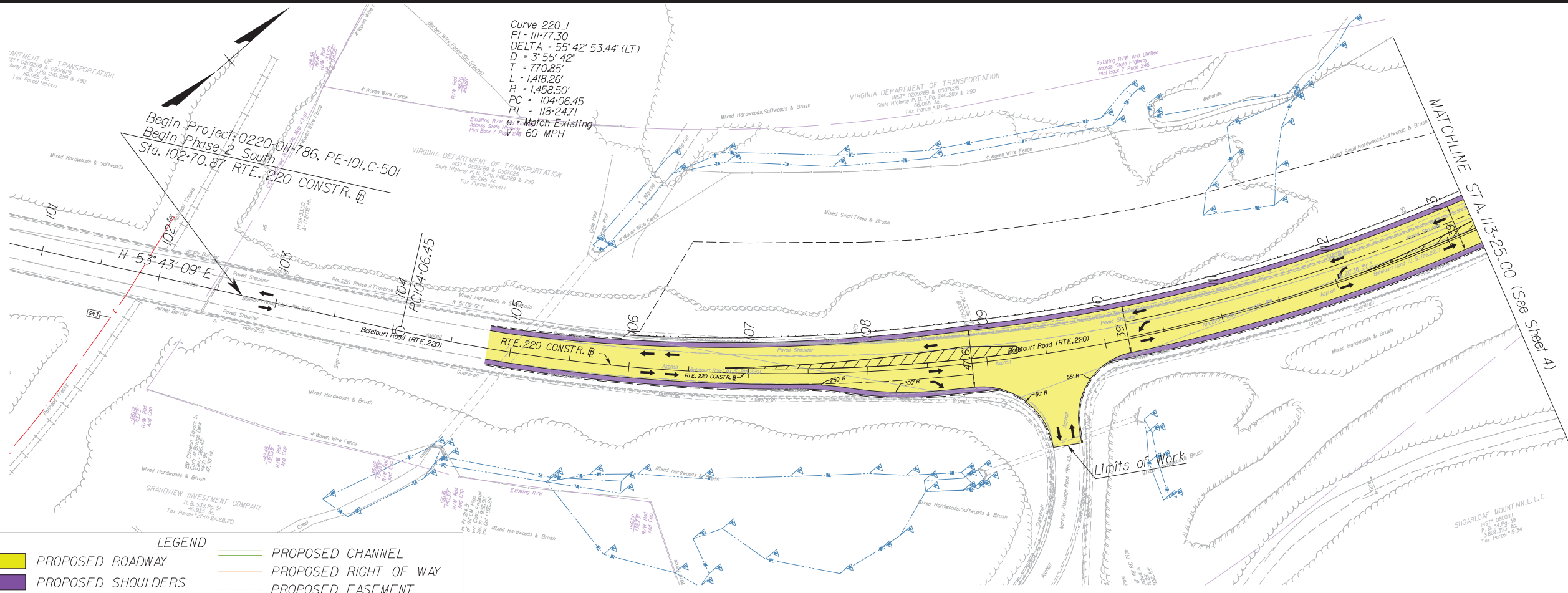
NOTE: SIDE SLOPES (LEFT & RIGHT) VARY AT STORMWATER MANAGEMENT BMP'S.

PRELIMINARY TYPICAL SECTIONS



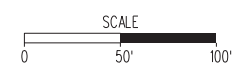
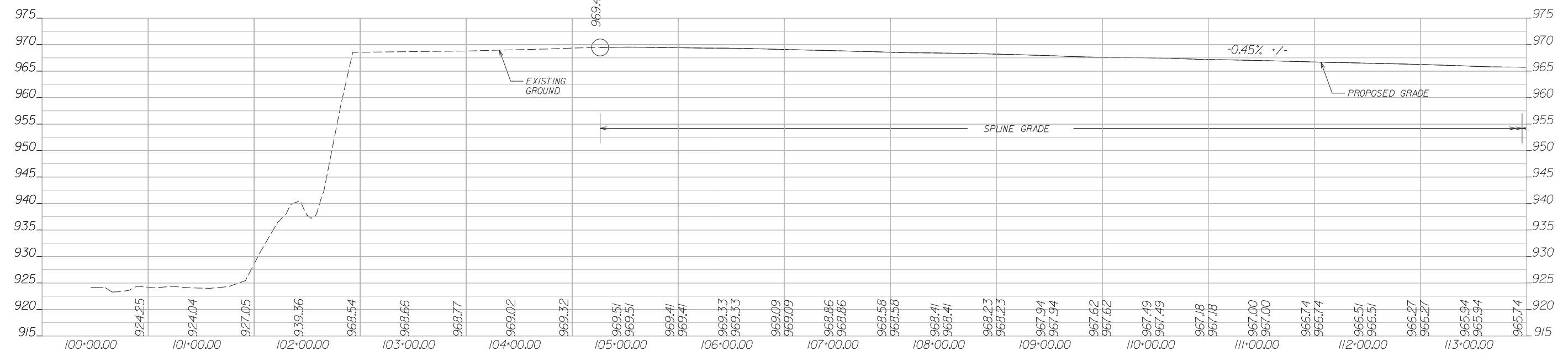
PRELIMINARY TYPICAL SECTIONS

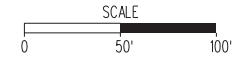
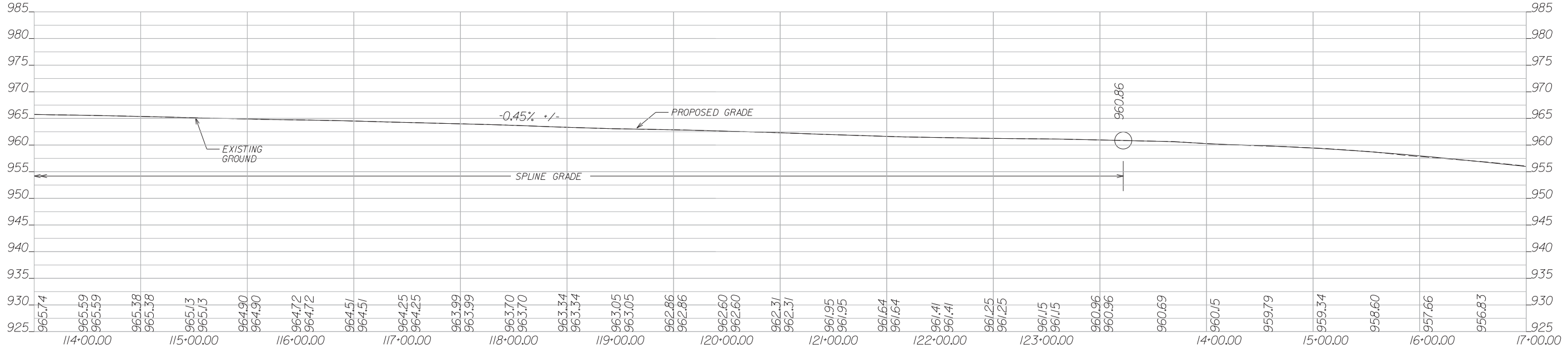
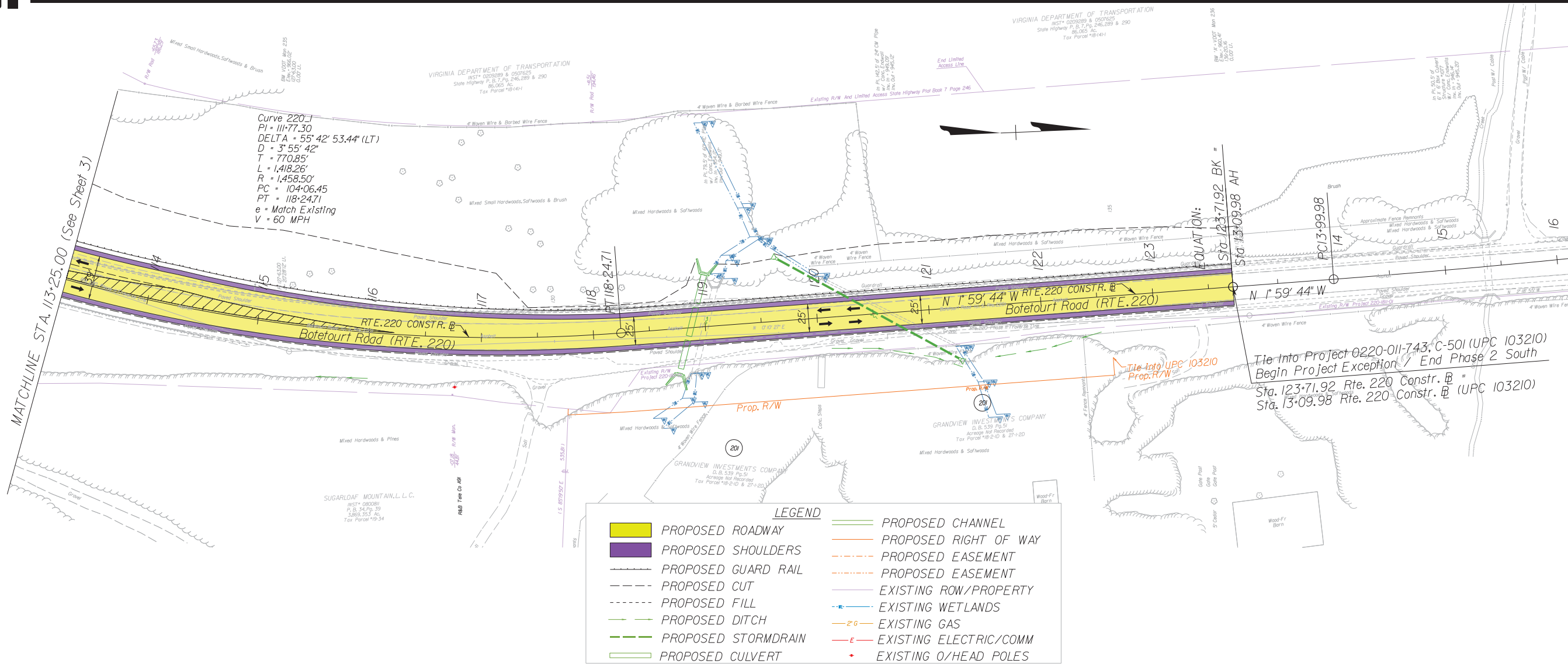


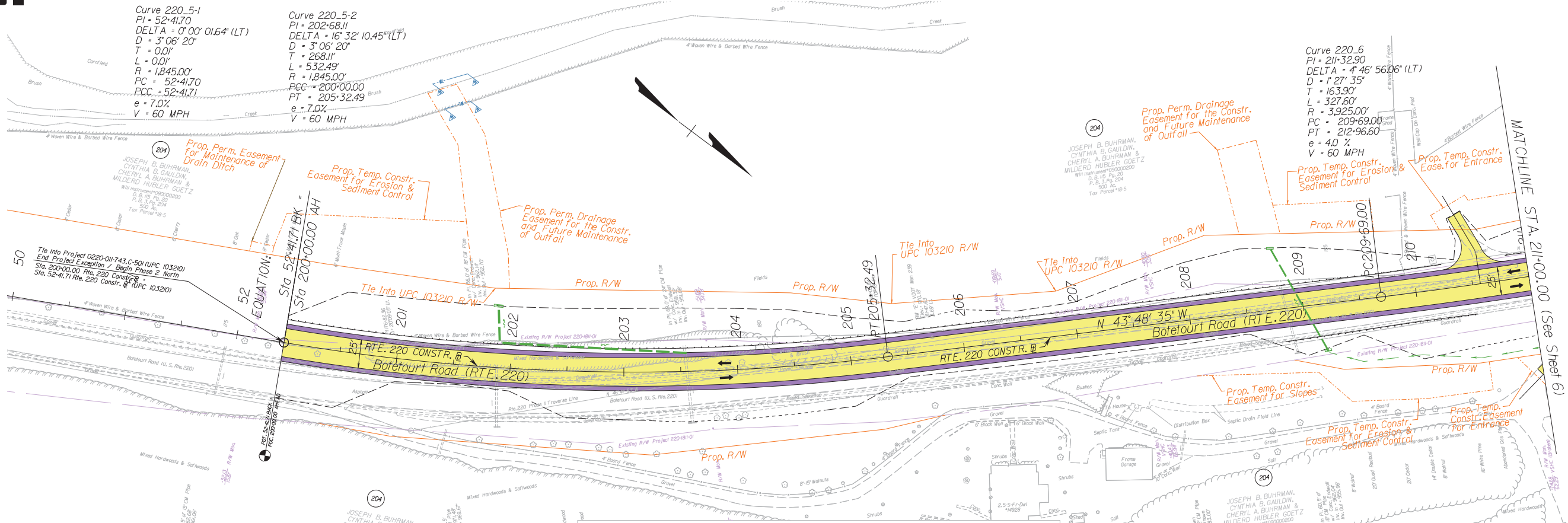


LEGEND

	PROPOSED ROADWAY		PROPOSED CHANNEL
	PROPOSED SHOULDERS		PROPOSED RIGHT OF WAY
	PROPOSED GUARD RAIL		PROPOSED EASEMENT
	PROPOSED CUT		EXISTING ROW/PROPERTY
	PROPOSED FILL		EXISTING WETLANDS
	PROPOSED DITCH		EXISTING GAS
	PROPOSED STORMDRAIN		EXISTING ELECTRIC/COMM
	PROPOSED CULVERT		EXISTING O/HEAD POLES

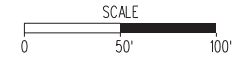
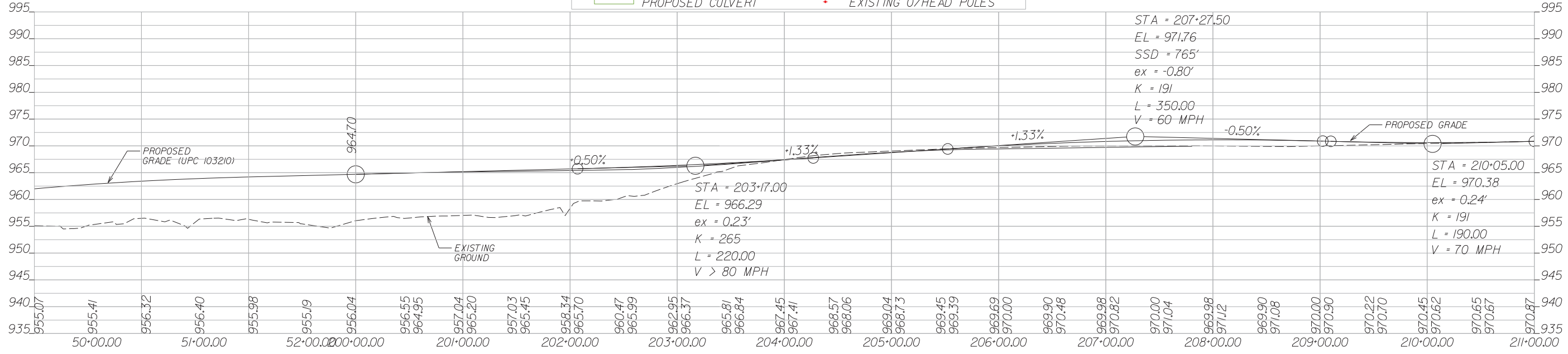


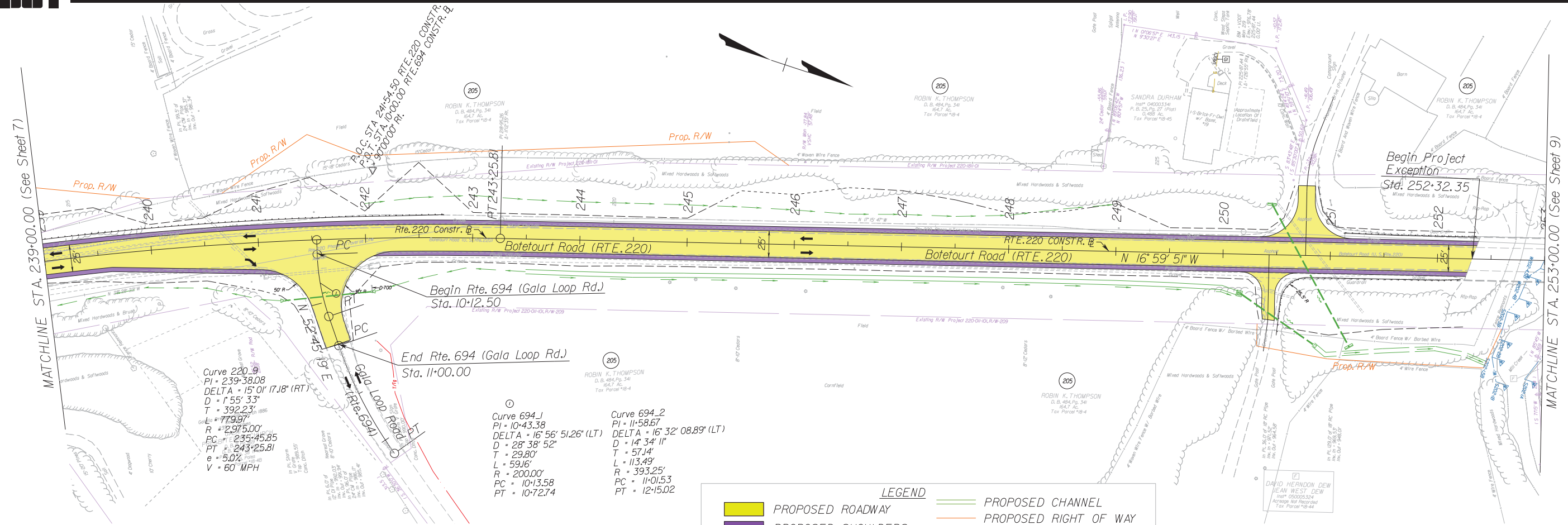




LEGEND

	PROPOSED ROADWAY		PROPOSED CHANNEL
	PROPOSED SHOULDERS		PROPOSED RIGHT OF WAY
	PROPOSED GUARD RAIL		PROPOSED EASEMENT
	PROPOSED CUT		EXISTING ROW/PROPERTY
	PROPOSED FILL		EXISTING WETLANDS
	PROPOSED DITCH		EXISTING GAS
	PROPOSED STORMDRAIN		EXISTING ELECTRIC/COMM
	PROPOSED CULVERT		EXISTING O/HEAD POLES





Curve 220_9
 PI = 239+38.08
 DELTA = 15° 01' 17.8" (RT)
 D = 1' 55' 33"
 T = 392.23'
 L = 779.97'
 R = 2,975.00'
 PC = 235+45.85
 PT = 243+25.81
 e = 5.0%
 V = 60 MPH

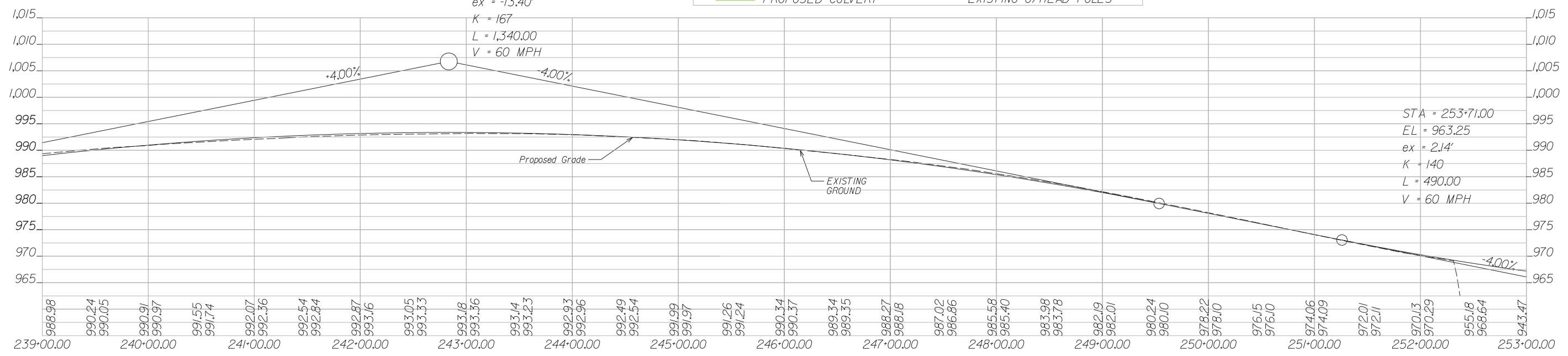
Curve 694_1
 PI = 10+43.38
 DELTA = 16° 56' 51.26" (LT)
 D = 28° 38' 52"
 T = 29.80'
 L = 59.16'
 R = 200.00'
 PC = 10+13.58
 PT = 10+72.74

Curve 694_2
 PI = 11+58.67
 DELTA = 16° 32' 08.89" (LT)
 D = 14° 34' 11"
 T = 57.14'
 L = 113.49'
 R = 393.25'
 PC = 11+01.53
 PT = 12+15.02

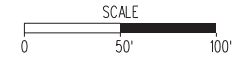
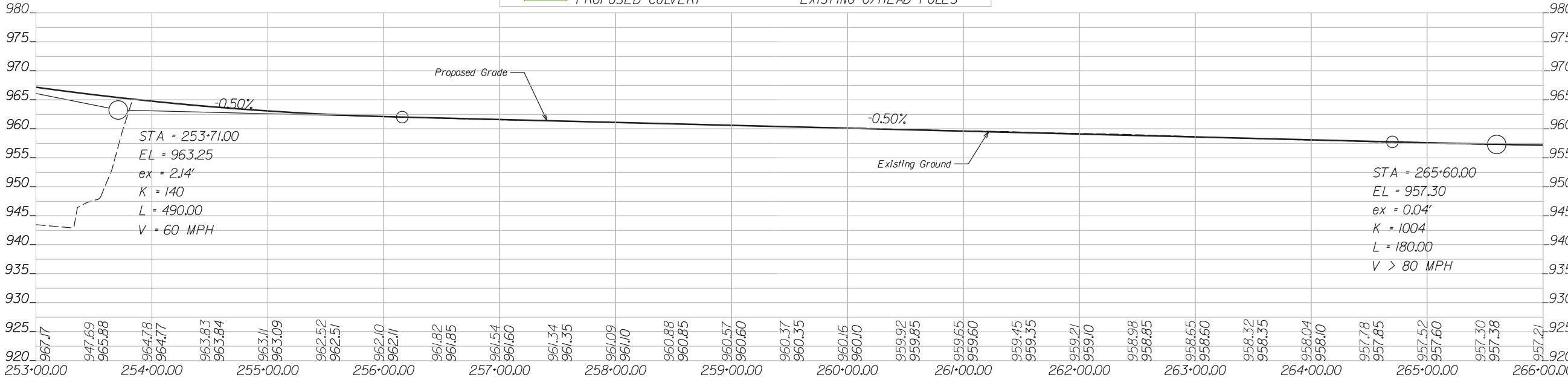
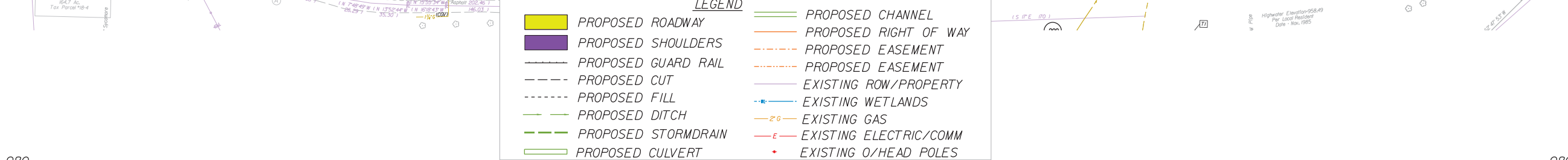
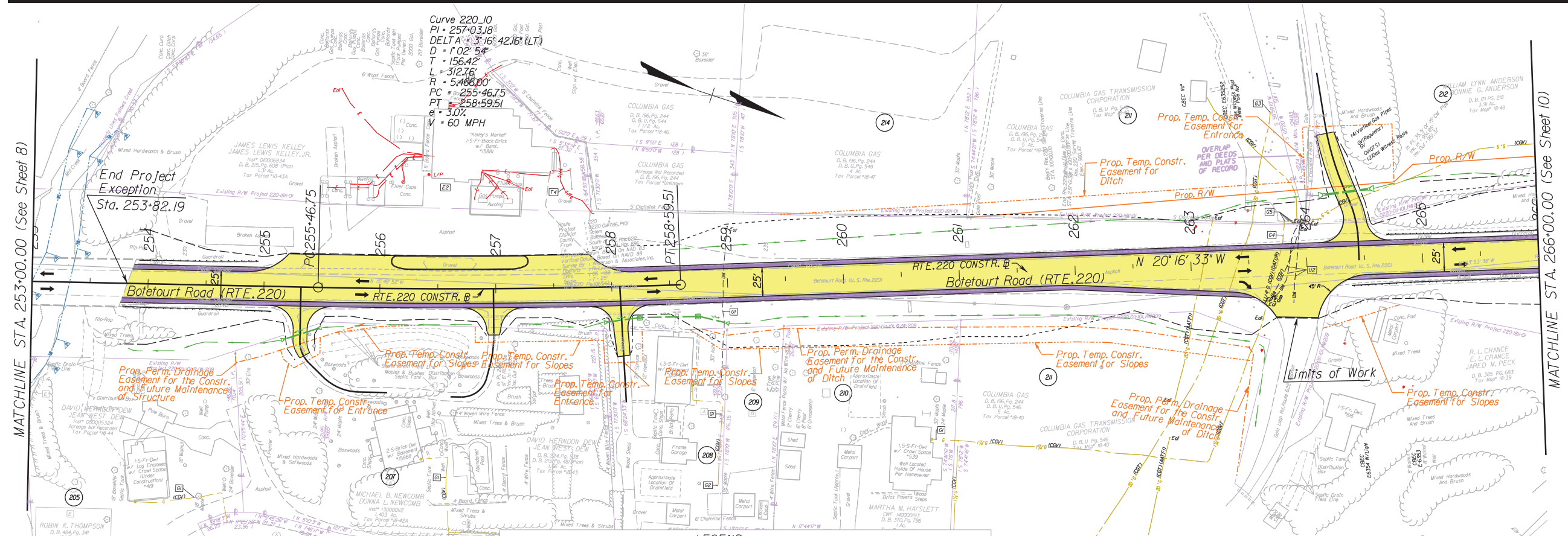
LEGEND

	PROPOSED ROADWAY		PROPOSED CHANNEL
	PROPOSED SHOULDERS		PROPOSED RIGHT OF WAY
	PROPOSED GUARD RAIL		PROPOSED EASEMENT
	PROPOSED CUT		PROPOSED EASEMENT
	PROPOSED FILL		EXISTING ROW/PROPERTY
	PROPOSED DITCH		EXISTING WETLANDS
	PROPOSED STORMDRAIN		EXISTING GAS
	PROPOSED CULVERT		EXISTING ELECTRIC/COMM
			EXISTING O/HEAD POLES

STA = 242+83.50
 EL = 1,006.77
 SSD = 60'
 ex = -13.40'
 K = 167
 L = 1,340.00
 V = 60 MPH

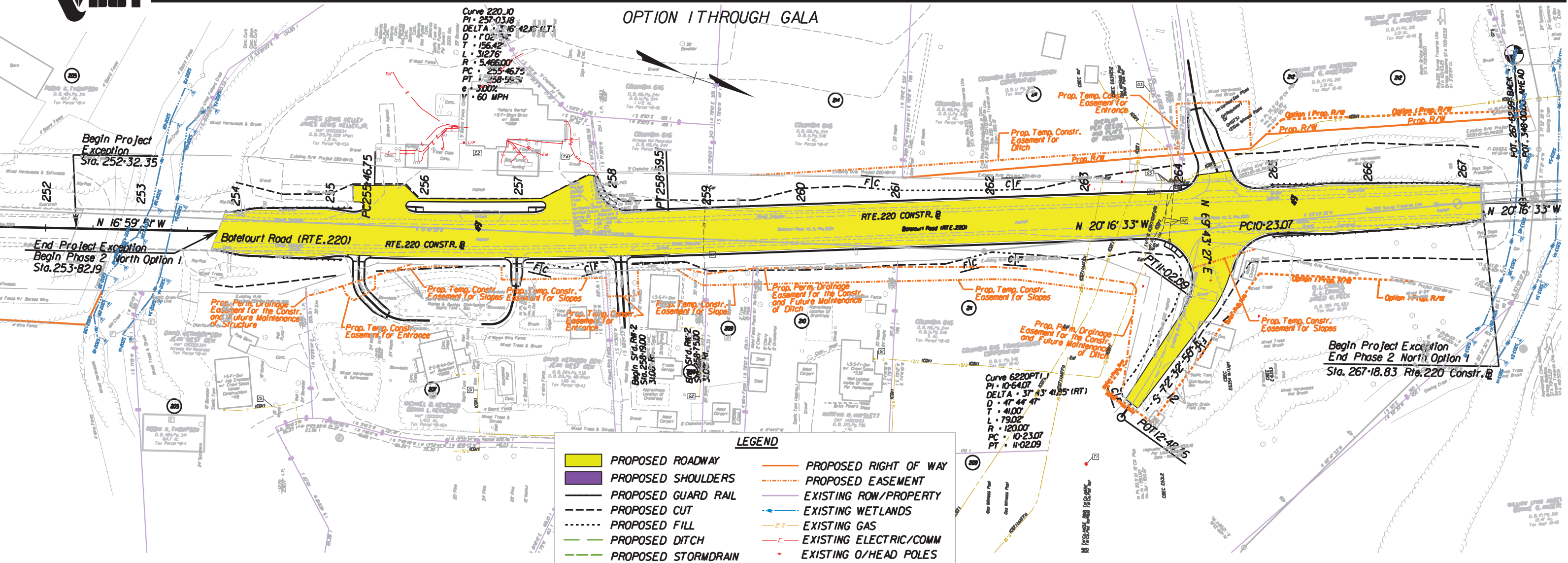


STA = 253+71.00
 EL = 963.25
 ex = 2.14'
 K = 140
 L = 490.00
 V = 60 MPH



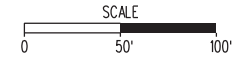
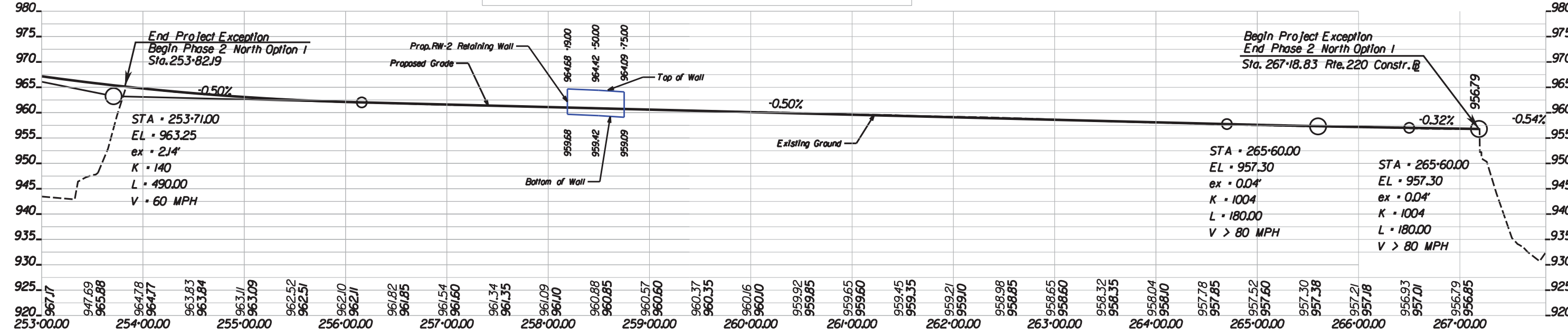


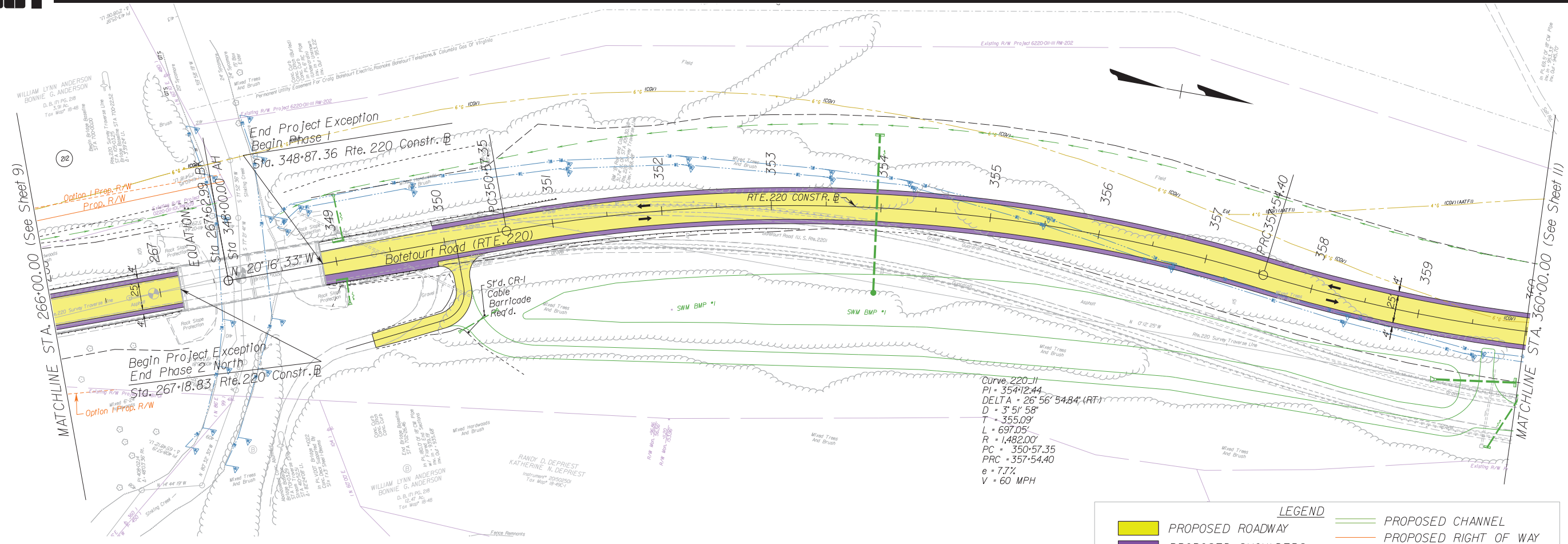
OPTION 1 THROUGH GALA



LEGEND

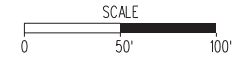
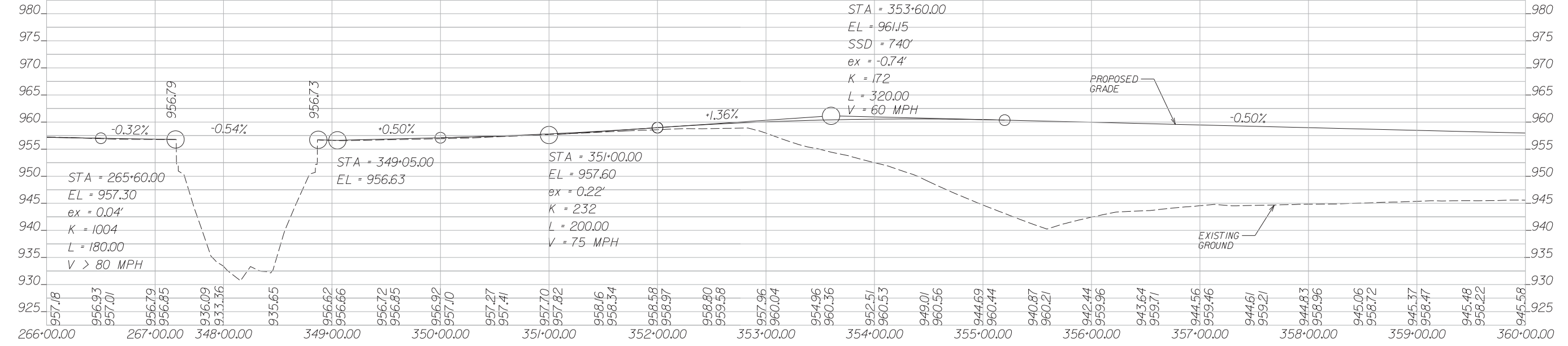
PROPOSED ROADWAY	PROPOSED EASEMENT
PROPOSED SHOULDERS	EXISTING ROW/PROPERTY
PROPOSED GUARD RAIL	EXISTING WETLANDS
PROPOSED CUT	EXISTING GAS
PROPOSED FILL	EXISTING ELECTRIC/COMM
PROPOSED DITCH	EXISTING O/HEAD POLES
PROPOSED STORMDRAIN	

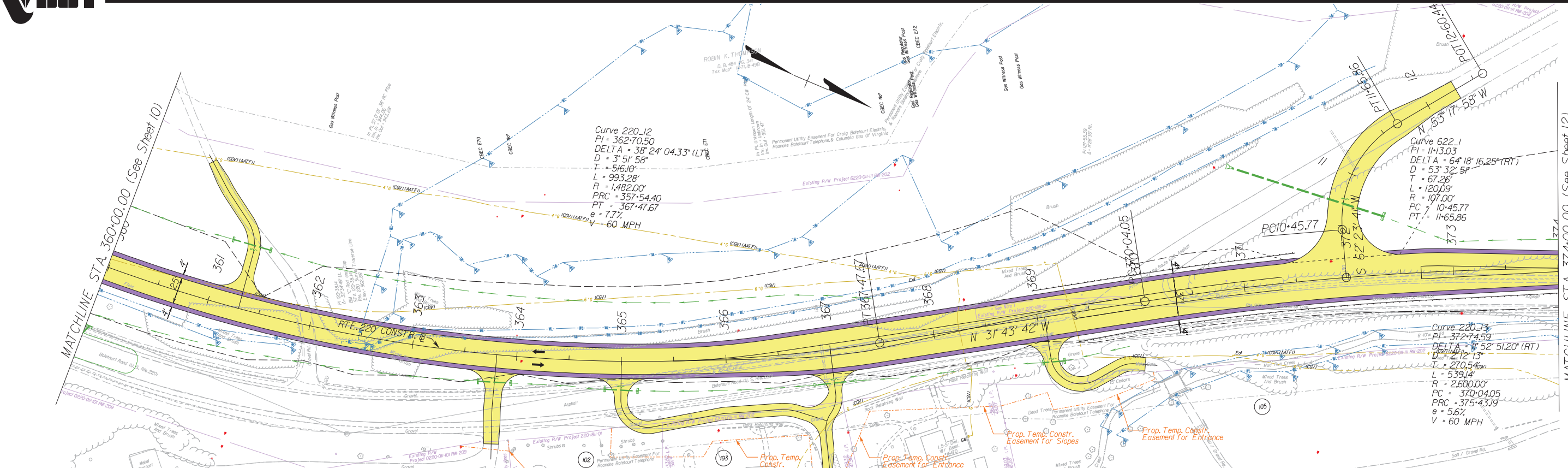




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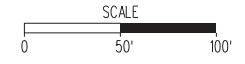
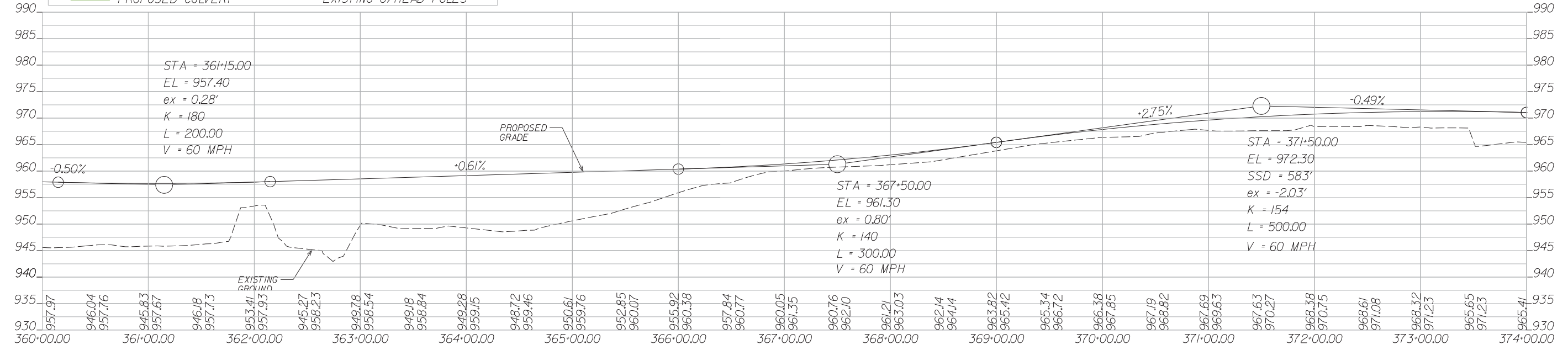
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	PROPOSED SHOULDERS		PROPOSED RIGHT OF WAY
	PROPOSED GUARD RAIL		PROPOSED EASEMENT
	PROPOSED CUT		PROPOSED EASEMENT
	PROPOSED FILL		EXISTING ROW/PROPERTY
	PROPOSED DITCH		EXISTING WETLANDS
	PROPOSED STORMDRAIN		EXISTING GAS
	PROPOSED CULVERT		EXISTING ELECTRIC/COMM
			EXISTING O/HEAD POLES

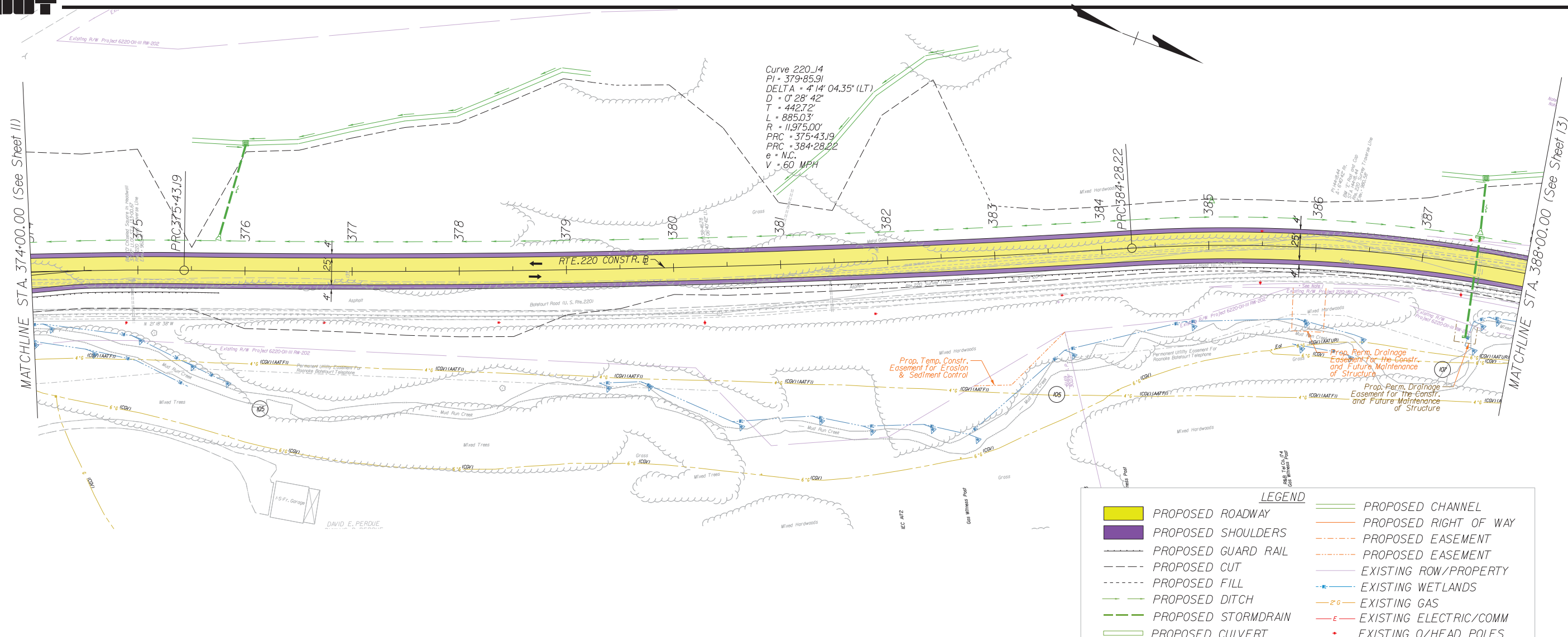




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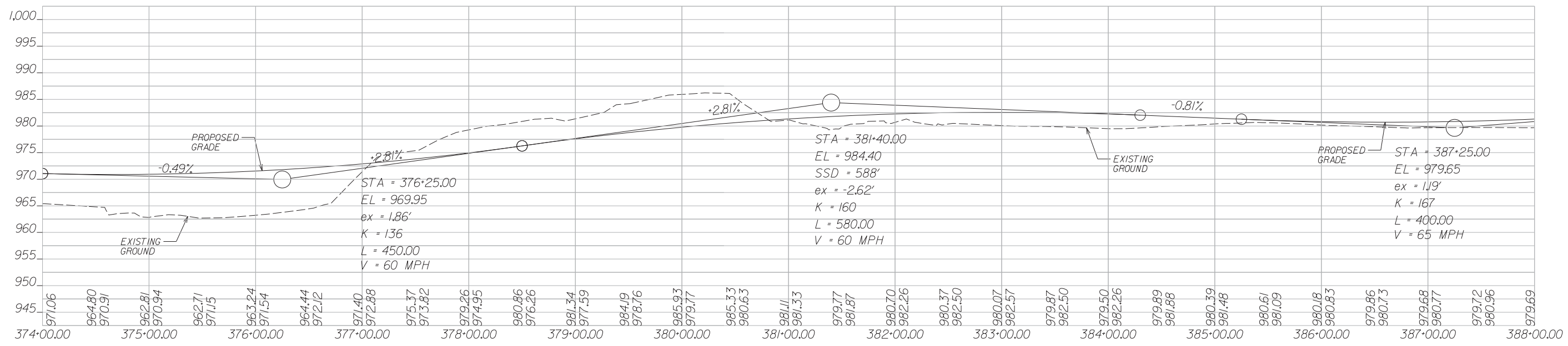
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	PROPOSED SHOULDERS		PROPOSED RIGHT OF WAY
	PROPOSED GUARD RAIL		PROPOSED EASEMENT
	PROPOSED CUT		EXISTING ROW/PROPERTY
	PROPOSED FILL		EXISTING WETLANDS
	PROPOSED DITCH		EXISTING GAS
	PROPOSED STORMDRAIN		EXISTING ELECTRIC/COMM
	PROPOSED CULVERT		EXISTING O/HEAD POLES

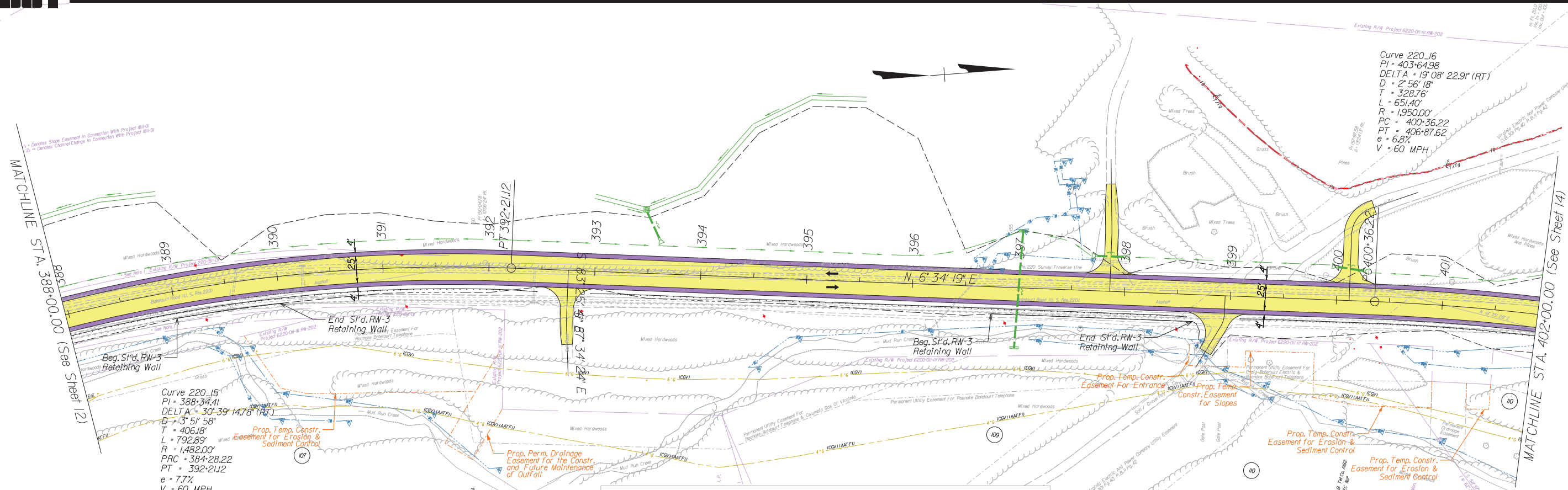




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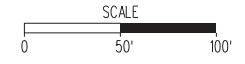
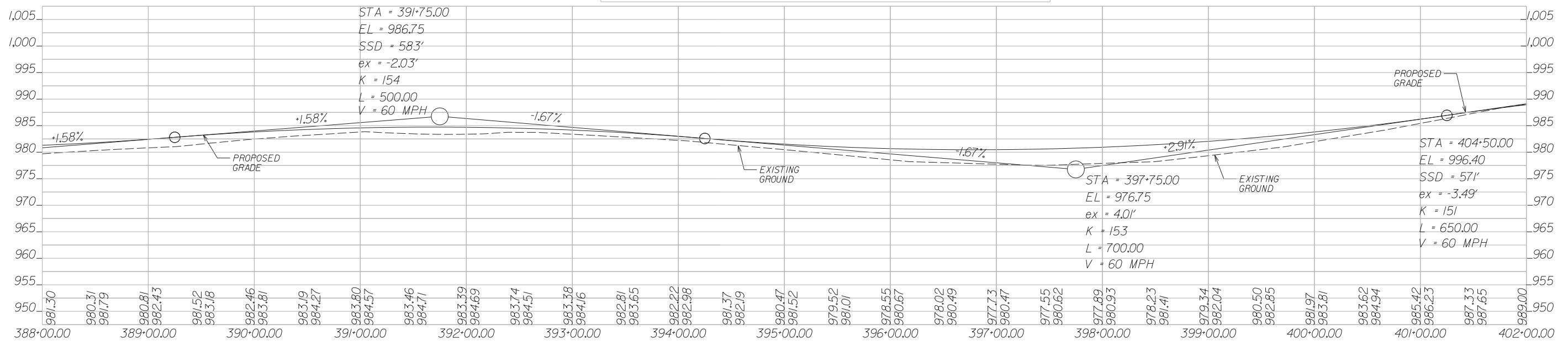
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	PROPOSED GUARD RAIL		PROPOSED EASEMENT
	PROPOSED CUT		PROPOSED EASEMENT
	PROPOSED FILL		EXISTING ROW/PROPERTY
	PROPOSED DITCH		EXISTING WETLANDS
	PROPOSED STORMDRAIN		EXISTING GAS
	PROPOSED CULVERT		EXISTING ELECTRIC/COMM
			EXISTING O/HEAD POLES

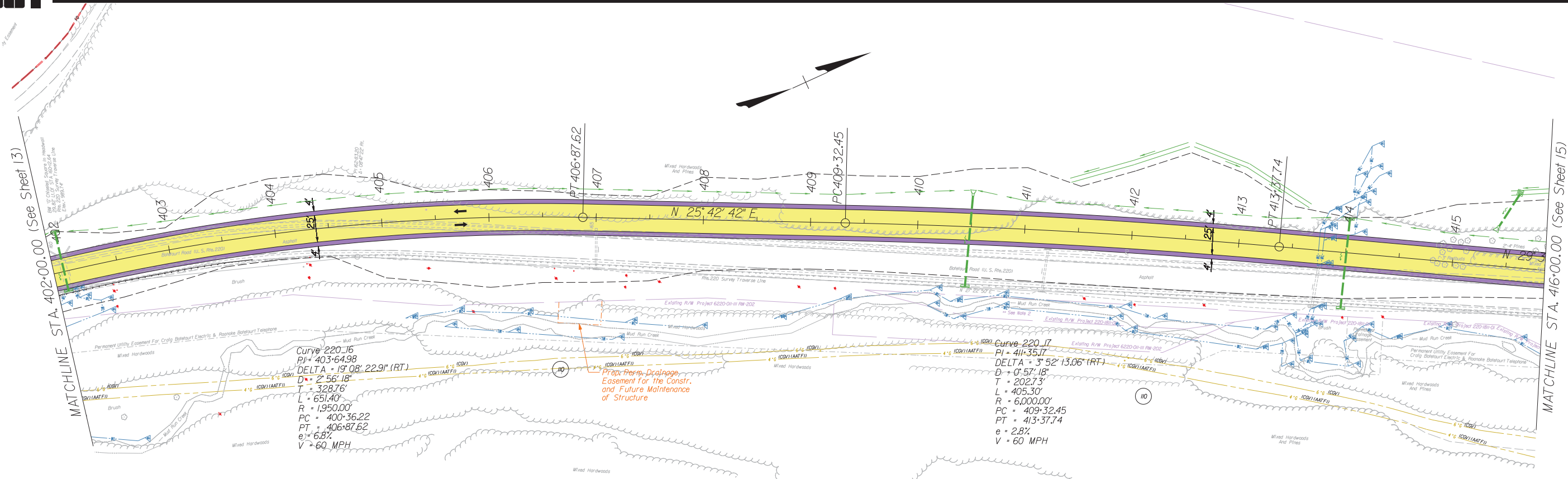




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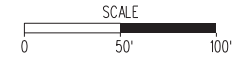
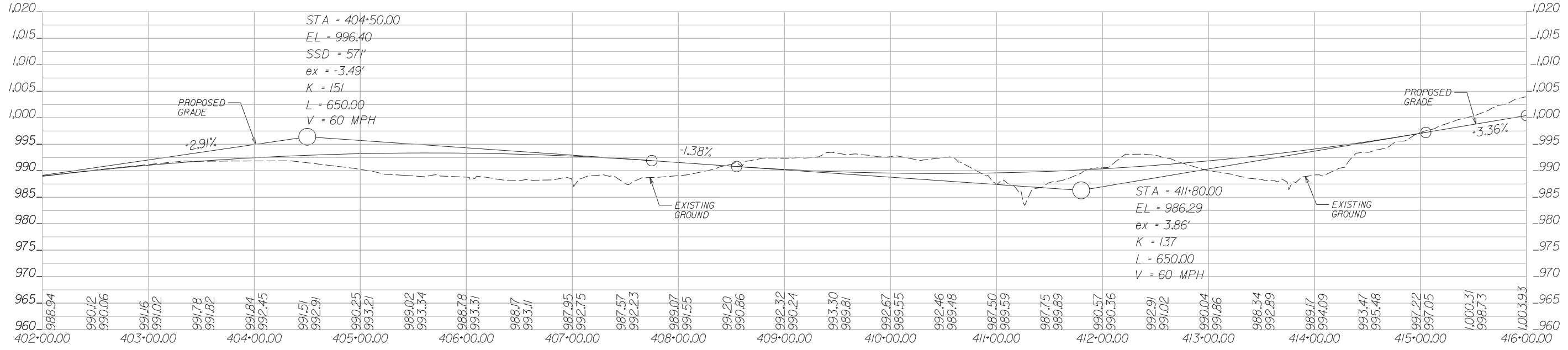
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	PROPOSED SHOULDERS		PROPOSED RIGHT OF WAY
	PROPOSED GUARD RAIL		PROPOSED EASEMENT
	PROPOSED CUT		PROPOSED EASEMENT
	PROPOSED FILL		EXISTING ROW/PROPERTY
	PROPOSED DITCH		EXISTING WETLANDS
	PROPOSED STORMDRAIN		EXISTING GAS
	PROPOSED CULVERT		EXISTING ELECTRIC/COMM
			EXISTING O/HEAD POLES





LEGEND

	PROPOSED ROADWAY		PROPOSED CHANNEL
	PROPOSED SHOULDERS		PROPOSED RIGHT OF WAY
	PROPOSED GUARD RAIL		PROPOSED EASEMENT
	PROPOSED CUT		PROPOSED EASEMENT
	PROPOSED FILL		EXISTING ROW/PROPERTY
	PROPOSED DITCH		EXISTING WETLANDS
	PROPOSED STORMDRAIN		EXISTING GAS
	PROPOSED CULVERT		EXISTING ELECTRIC/COMM
			EXISTING O/HEAD POLES

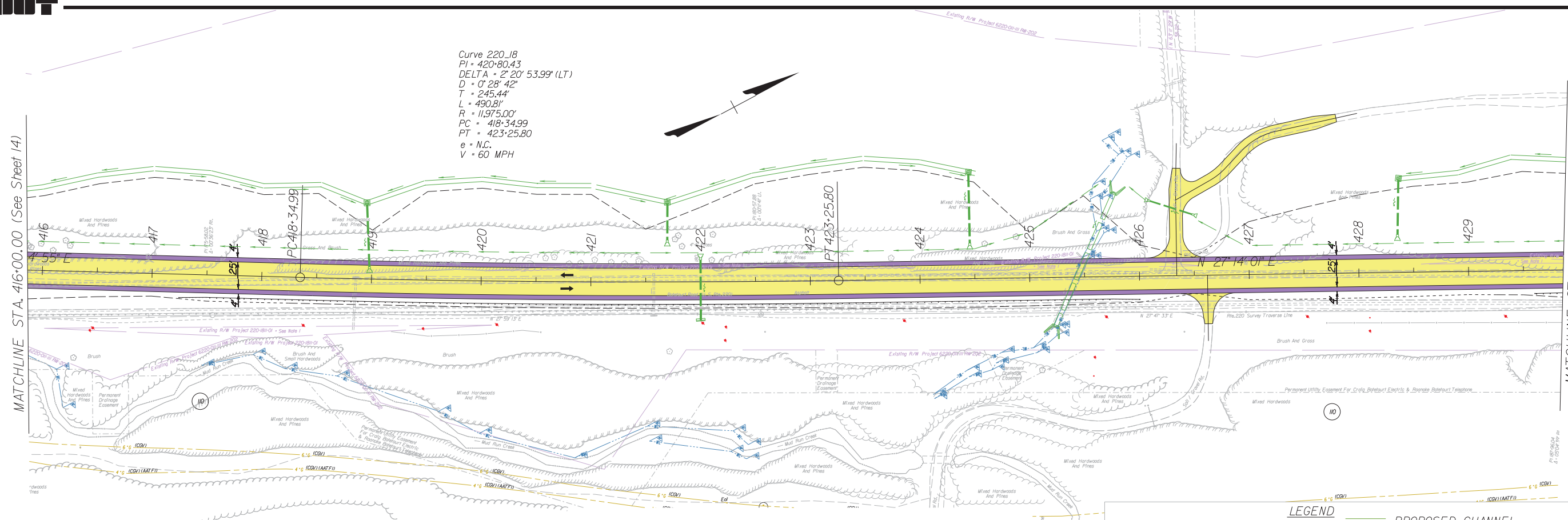




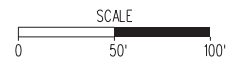
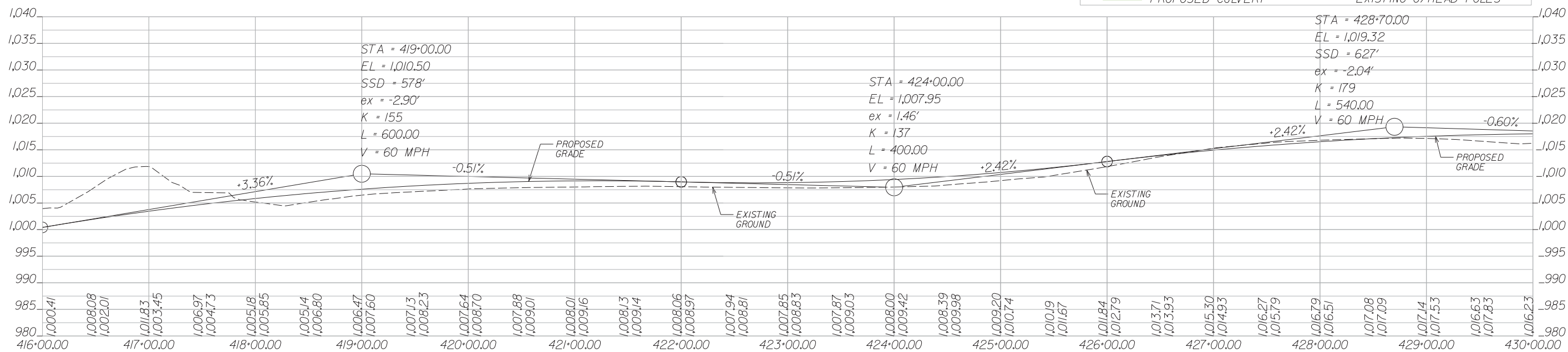
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 L = 490.81'
 R = 11,975.00'
 PC = 418+34.99
 PT = 423+25.80
 e = N.C.
 V = 60 MPH

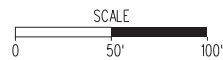
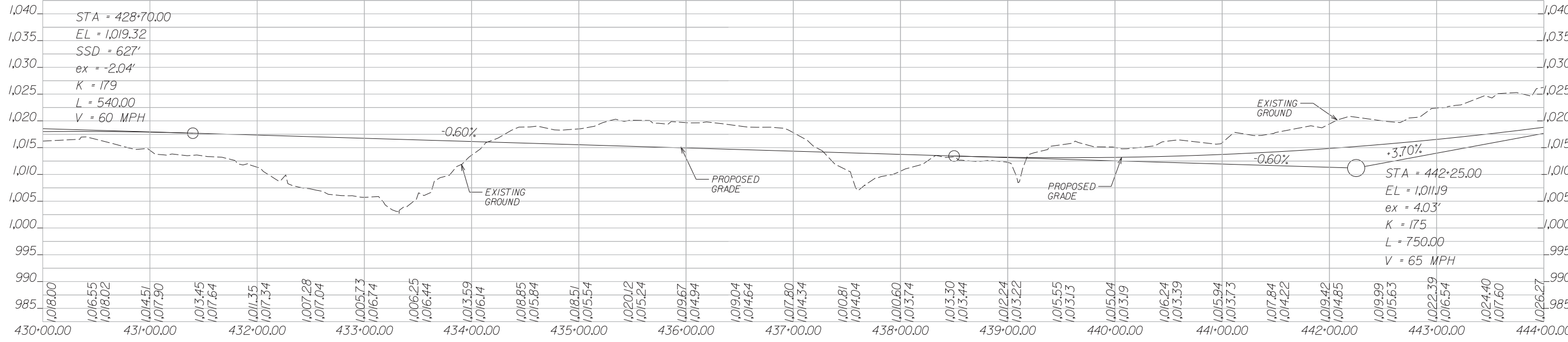
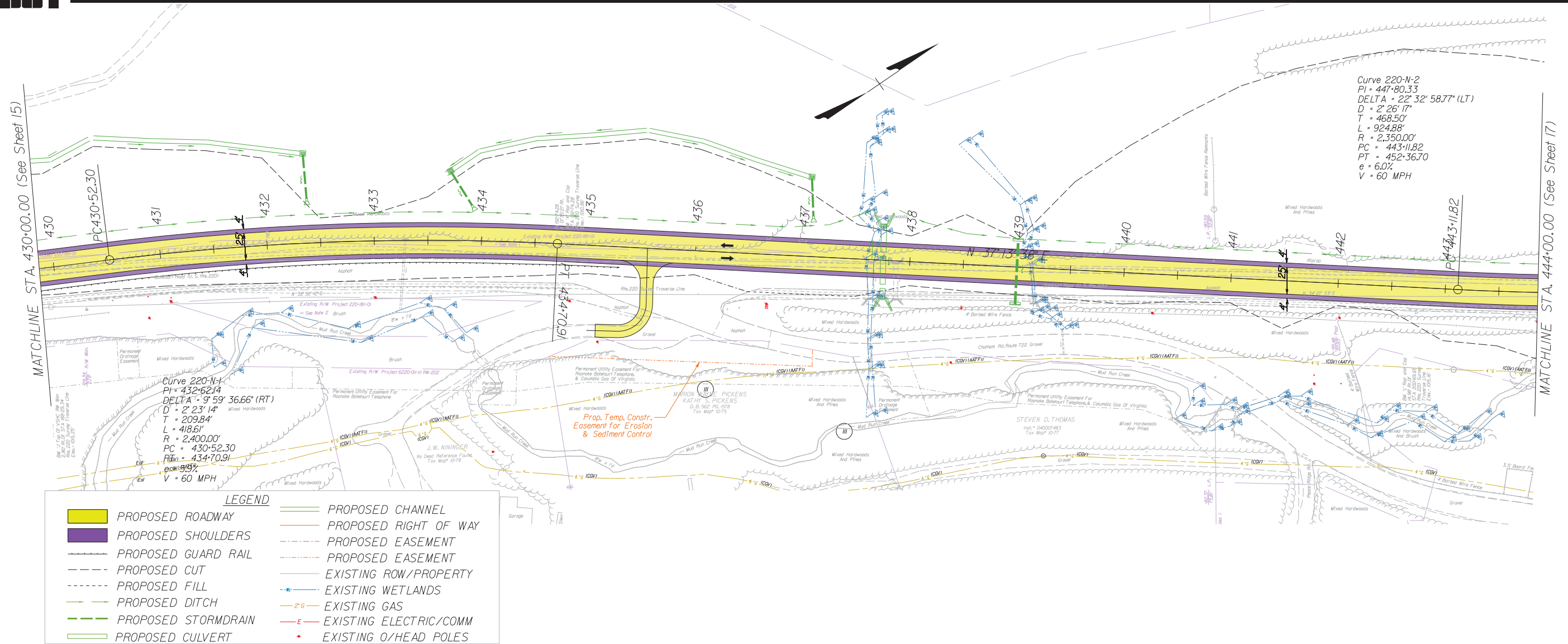
MATCHLINE STA. 416+00.00 (See Sheet 14)

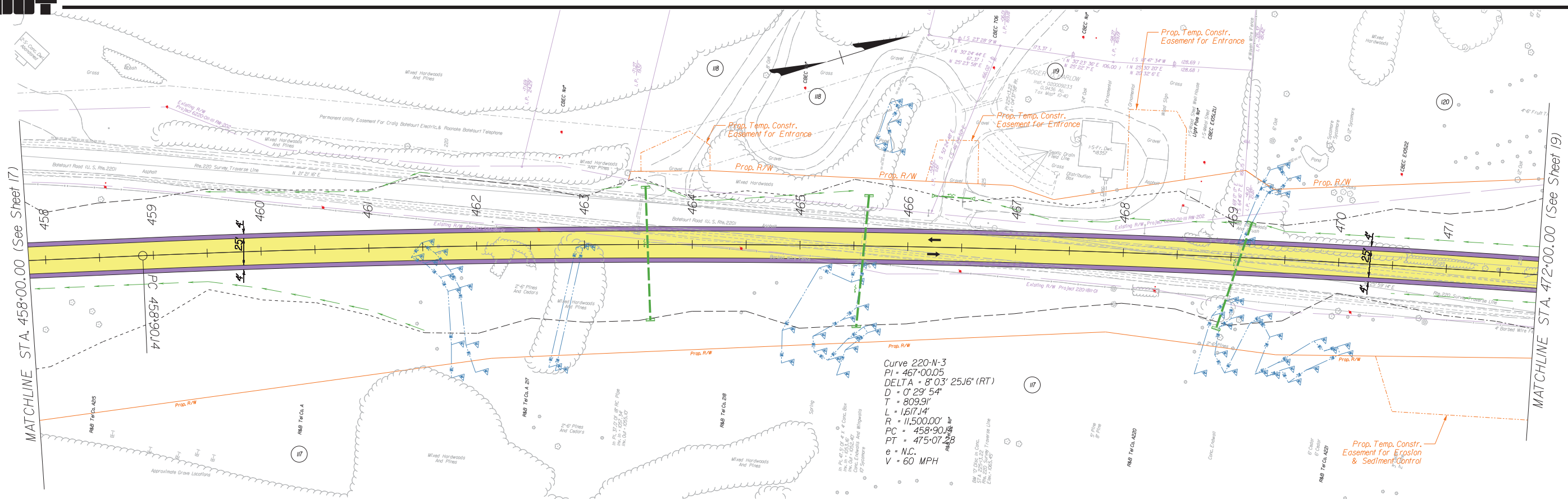
MATCHLINE STA. 430+00.00 (See Sheet 16)



LEGEND	
	PROPOSED ROADWAY
	PROPOSED SHOULDERS
	PROPOSED GUARD RAIL
	PROPOSED CUT
	PROPOSED FILL
	PROPOSED DITCH
	PROPOSED STORMDRAIN
	PROPOSED CULVERT
	PROPOSED CHANNEL
	PROPOSED RIGHT OF WAY
	PROPOSED EASEMENT
	PROPOSED EASEMENT
	EXISTING ROW/PROPERTY
	EXISTING WETLANDS
	EXISTING GAS
	EXISTING ELECTRIC/COMM
	EXISTING O/HEAD POLES

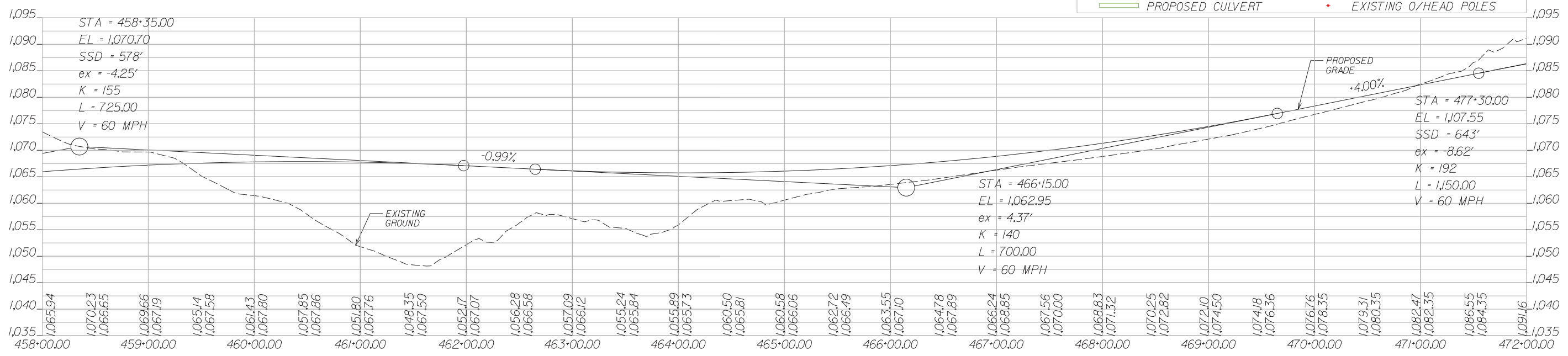


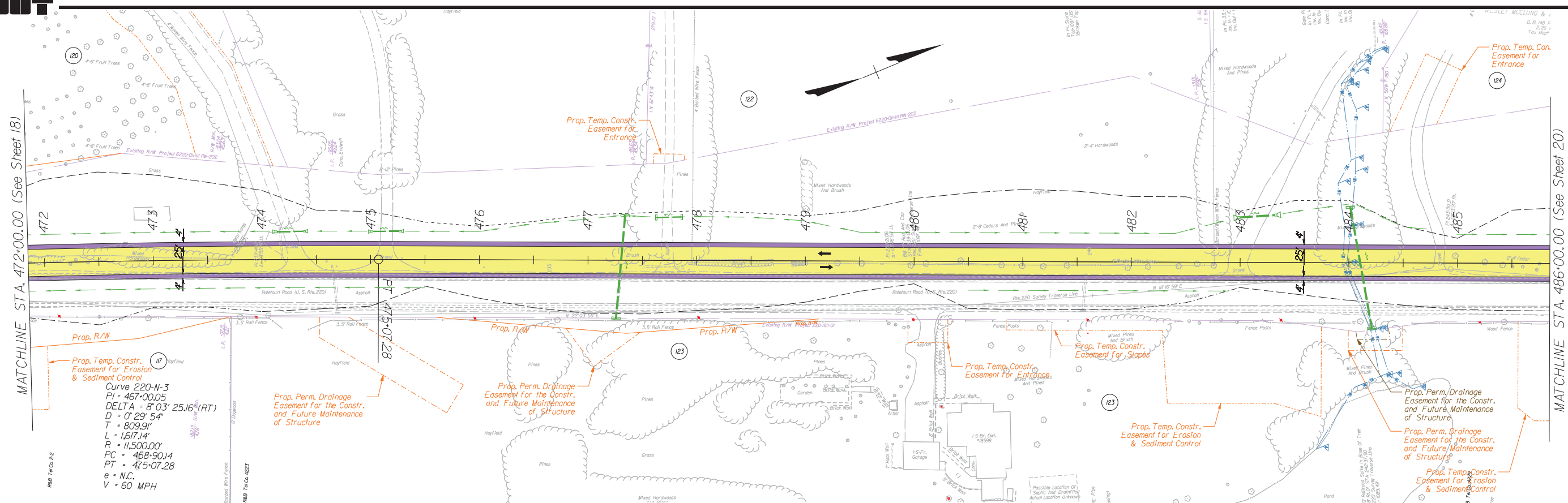




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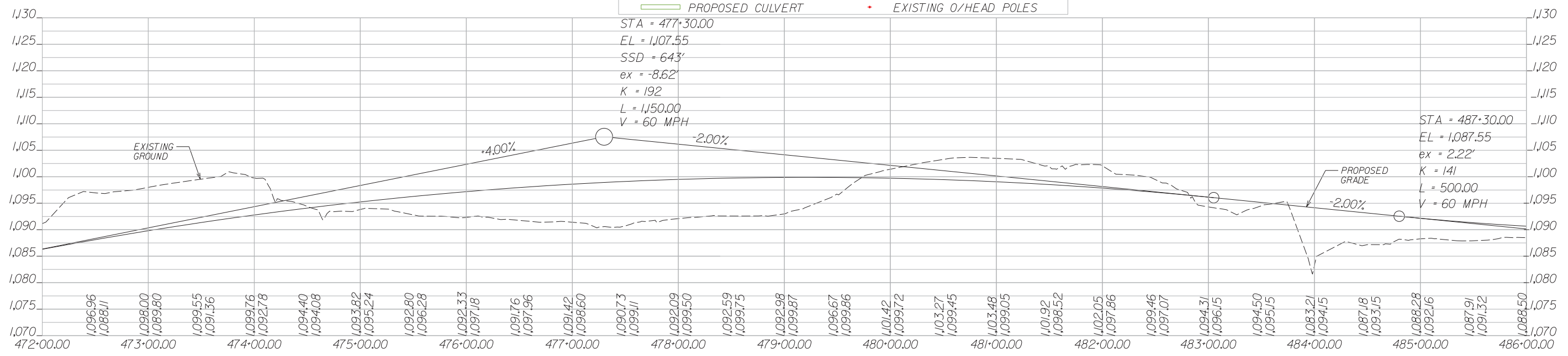
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	PROPOSED SHOULDERS		PROPOSED RIGHT OF WAY
	PROPOSED GUARD RAIL		PROPOSED EASEMENT
	PROPOSED CUT		PROPOSED EASEMENT
	PROPOSED FILL		EXISTING ROW/PROPERTY
	PROPOSED DITCH		EXISTING WETLANDS
	PROPOSED STORMDRAIN		2" G EXISTING GAS
	PROPOSED CULVERT		EXISTING ELECTRIC/COMM
			EXISTING O/HEAD POLES

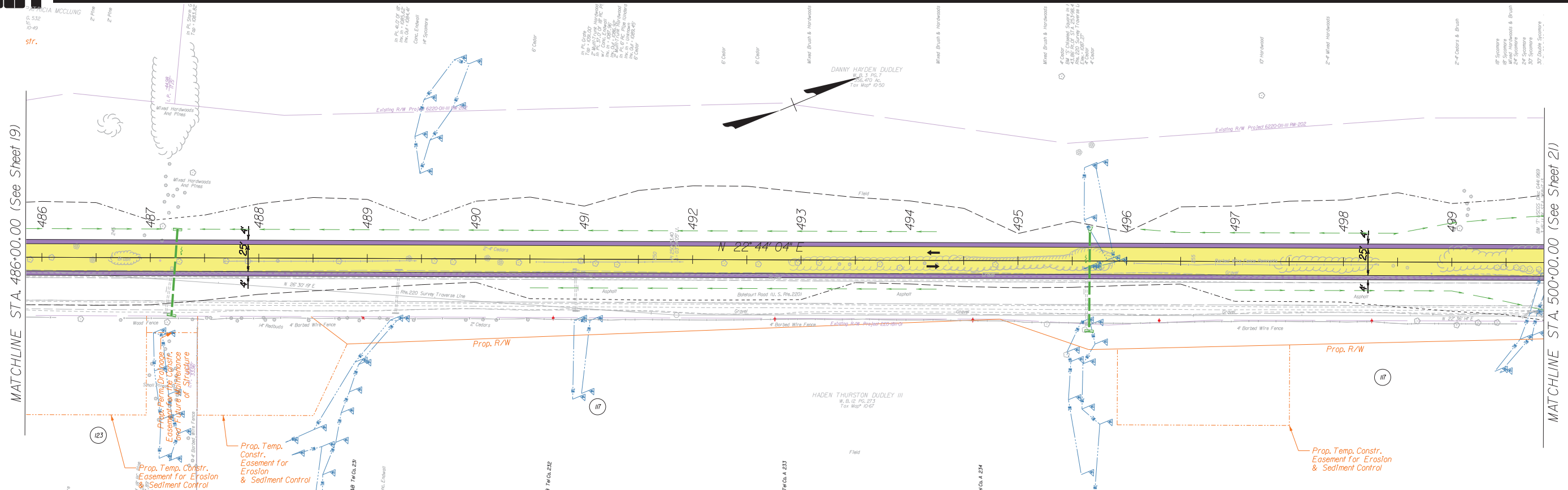




Prop. Temp. Constr. Easement for Erosion & Sediment Control
 Curve 220-N-3
 PI = 467+00.05
 DELTA = 8° 03' 25.16" (RT)
 D = 0' 29' 54"
 T = 809.91'
 L = 1617.14'
 R = 11500.00'
 PC = 458+90.14
 PT = 475+07.28
 e = N.C.
 V = 60 MPH

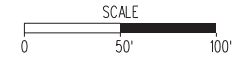
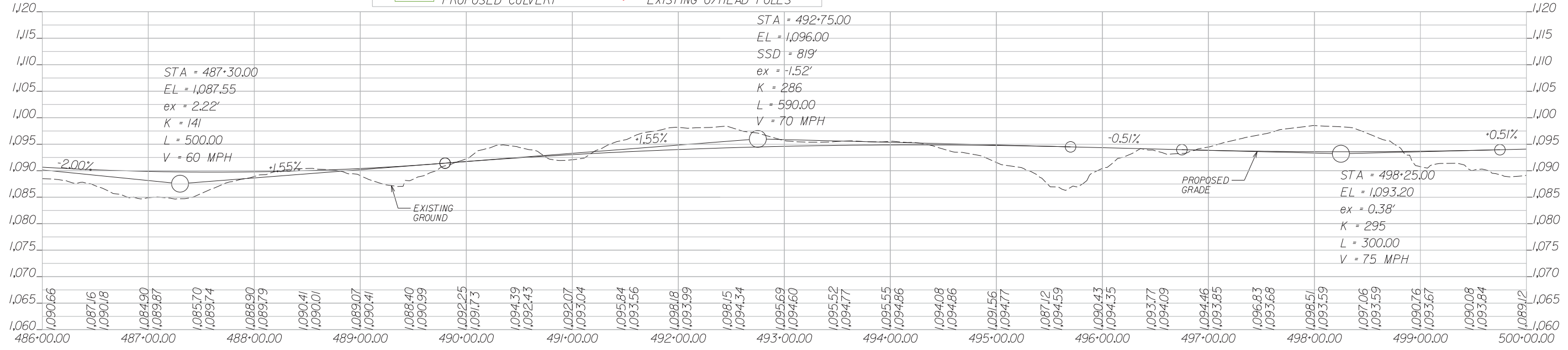
LEGEND	
	PROPOSED ROADWAY
	PROPOSED SHOULDERS
	PROPOSED GUARD RAIL
	PROPOSED CUT
	PROPOSED FILL
	PROPOSED DITCH
	PROPOSED STORMDRAIN
	PROPOSED CULVERT
	PROPOSED CHANNEL
	PROPOSED RIGHT OF WAY
	PROPOSED EASEMENT
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	EXISTING WETLANDS
	EXISTING GAS
	EXISTING ELECTRIC/COMM
	EXISTING O/HEAD POLES

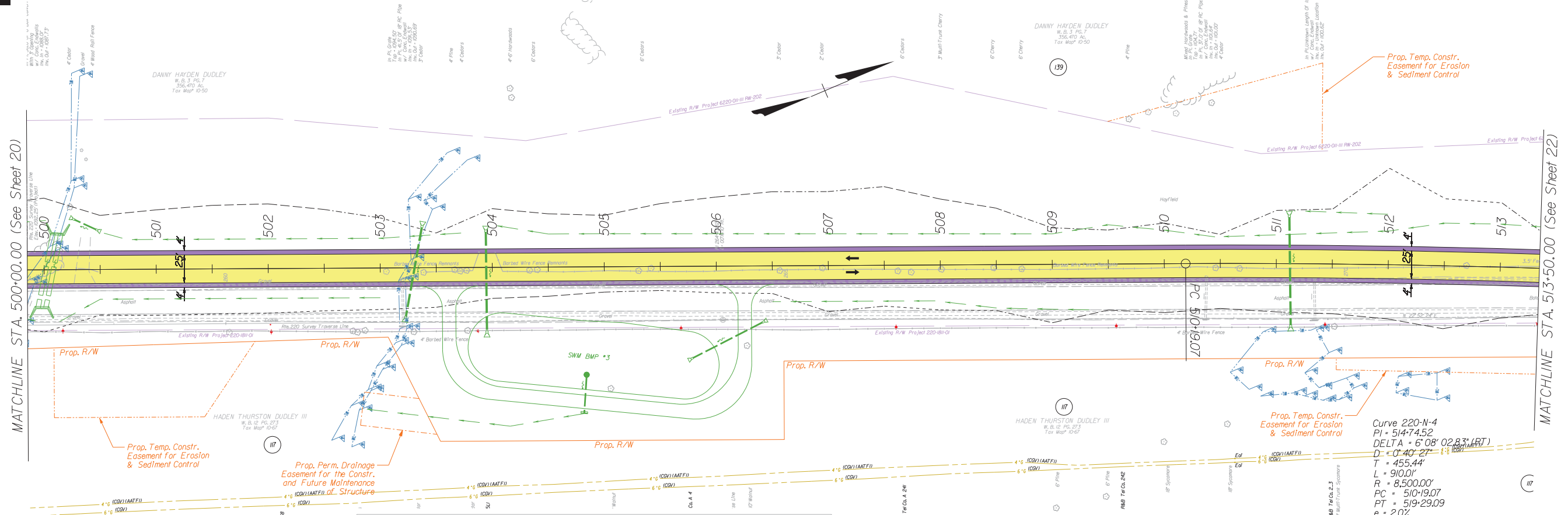




LEGEND

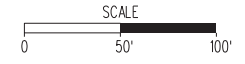
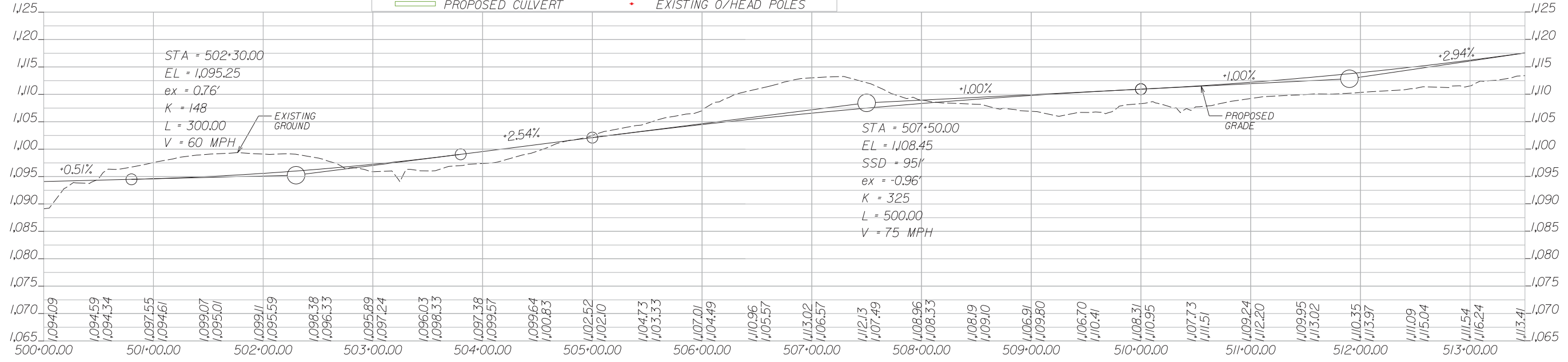
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	PROPOSED SHOULDERS		PROPOSED EASEMENT
	PROPOSED GUARD RAIL		PROPOSED EASEMENT
	PROPOSED CUT		EXISTING ROW/PROPERTY
	PROPOSED FILL		EXISTING WETLANDS
	PROPOSED DITCH		EXISTING GAS
	PROPOSED STORMDRAIN		EXISTING ELECTRIC/COMM
	PROPOSED CULVERT		EXISTING O/HEAD POLES

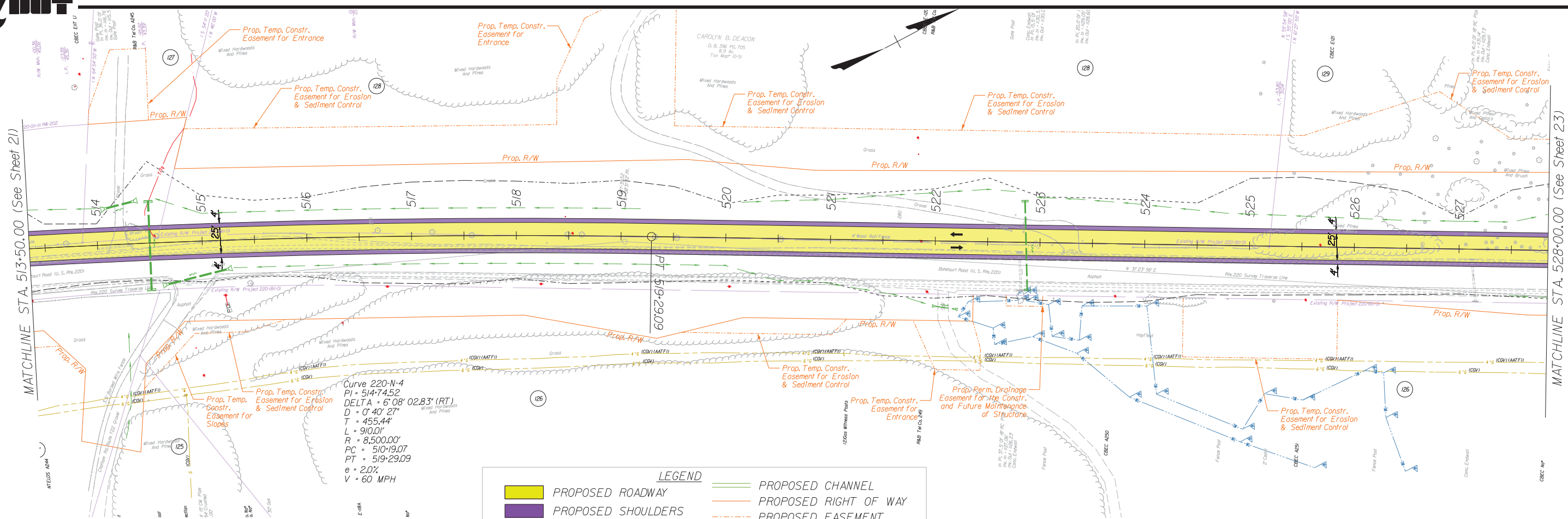




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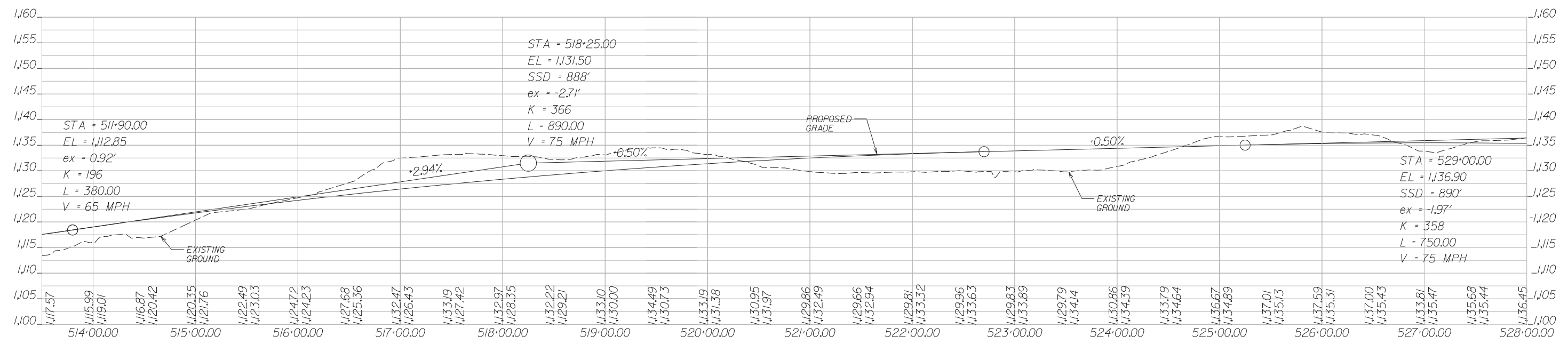
	PROPOSED ROADWAY		PROPOSED CHANNEL
	PROPOSED SHOULDERS		PROPOSED RIGHT OF WAY
	PROPOSED GUARD RAIL		PROPOSED EASEMENT
	PROPOSED CUT		EXISTING ROW/PROPERTY
	PROPOSED FILL		EXISTING WETLANDS
	PROPOSED DITCH		EXISTING GAS
	PROPOSED STORMDRAIN		EXISTING ELECTRIC/COMM
	PROPOSED CULVERT		EXISTING O/HEAD POLES

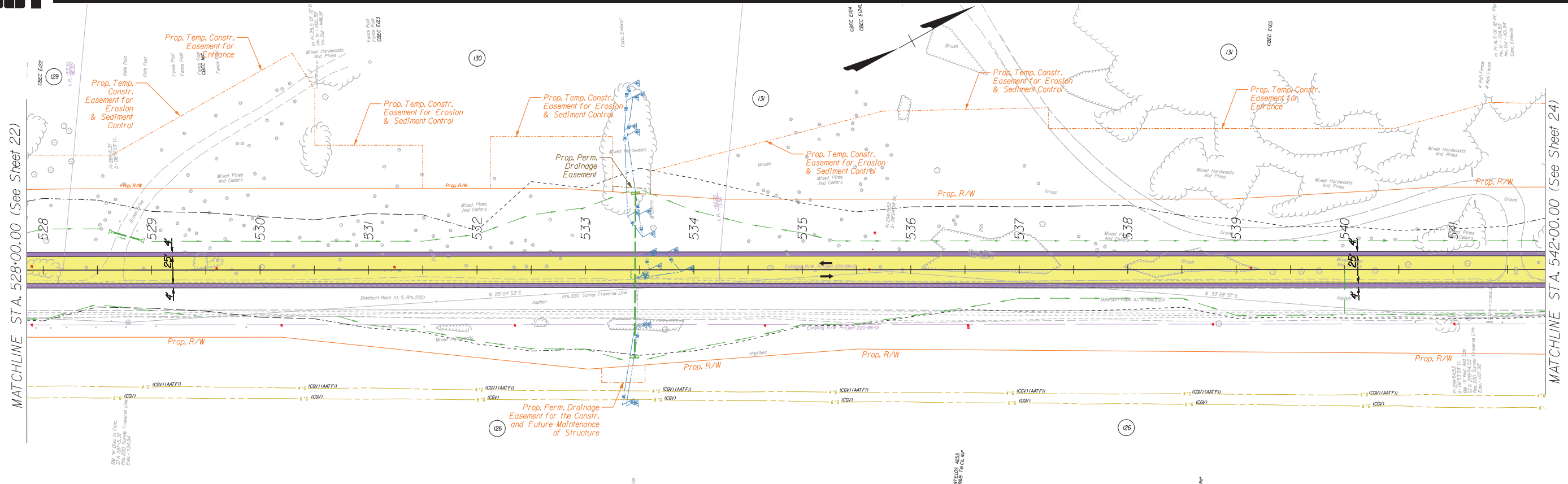




Curve 220-N-4
 PI = 5147.452
 DELTA = 6° 08' 02.83" (RT)
 D = 0° 40' 27"
 T = 455.44'
 L = 910.01'
 R = 8,500.00'
 PC = 51019.07
 PT = 51929.09
 e = 2.0%
 V = 60 MPH

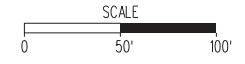
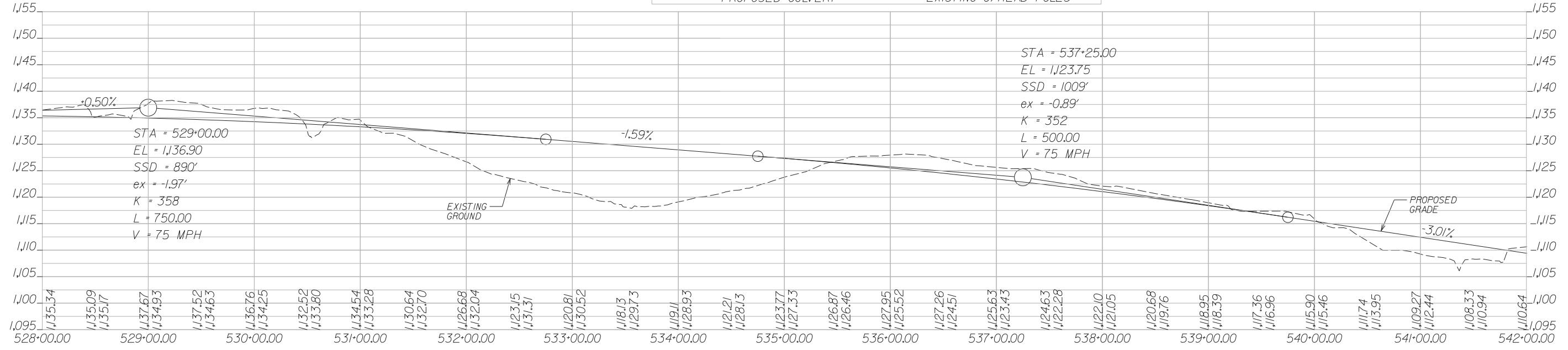
LEGEND	
	PROPOSED ROADWAY
	PROPOSED SHOULDERS
	PROPOSED GUARD RAIL
	PROPOSED CUT
	PROPOSED FILL
	PROPOSED DITCH
	PROPOSED STORMDRAIN
	PROPOSED CULVERT
	PROPOSED CHANNEL
	PROPOSED RIGHT OF WAY
	PROPOSED EASEMENT
	PROPOSED EASEMENT
	EXISTING ROW/PROPERTY
	EXISTING WETLANDS
	EXISTING GAS
	EXISTING ELECTRIC/COMM
	EXISTING O/HEAD POLES

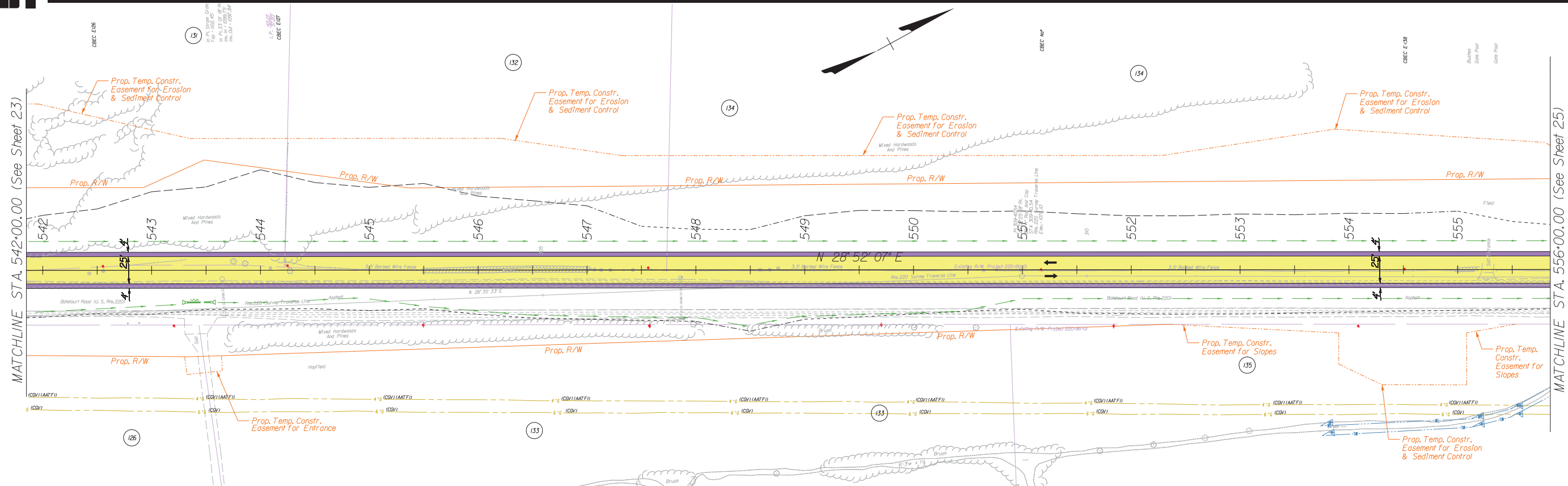




LEGEND

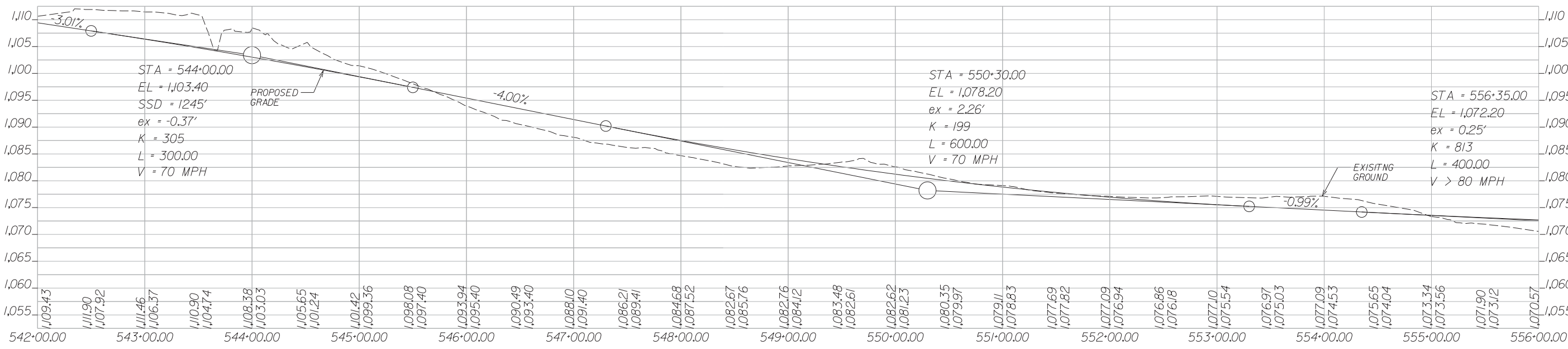
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	PROPOSED SHOULDERS		PROPOSED RIGHT OF WAY
	PROPOSED GUARD RAIL		PROPOSED EASEMENT
	PROPOSED CUT		PROPOSED EASEMENT
	PROPOSED FILL		EXISTING ROW/PROPERTY
	PROPOSED DITCH		EXISTING WETLANDS
	PROPOSED STORMDRAIN		EXISTING GAS
	PROPOSED CULVERT		EXISTING ELECTRIC/COMM
			EXISTING O/HEAD POLES

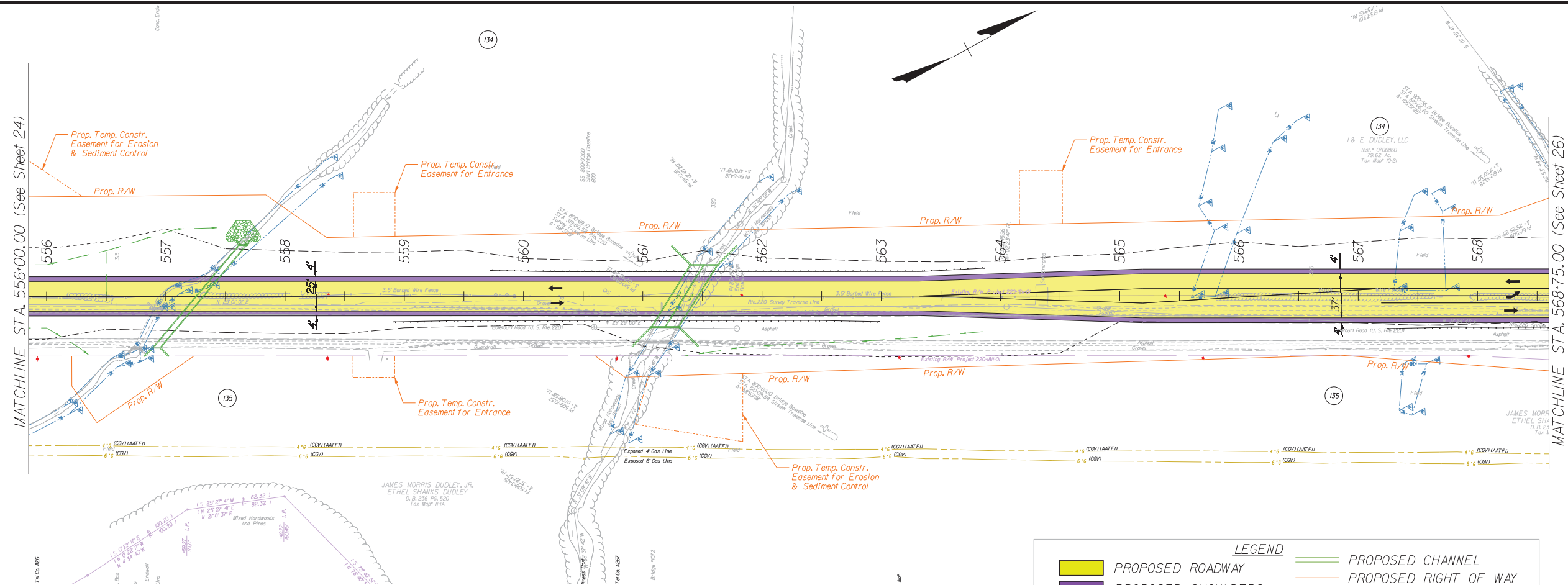




LEGEND

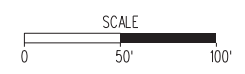
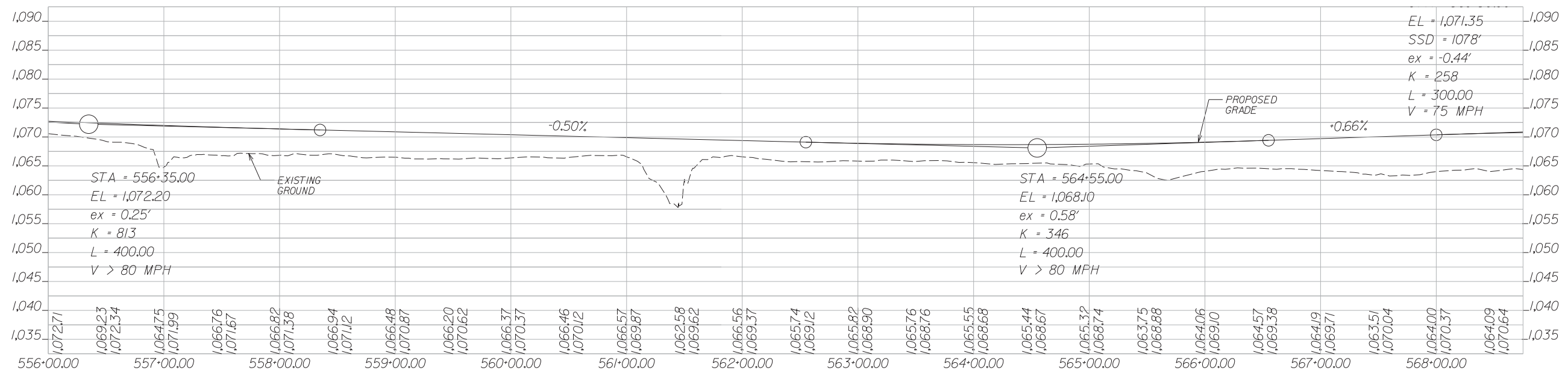
	PROPOSED ROADWAY		PROPOSED CHANNEL
	PROPOSED SHOULDERS		PROPOSED RIGHT OF WAY
	PROPOSED GUARD RAIL		PROPOSED EASEMENT
	PROPOSED CUT		PROPOSED EASEMENT
	PROPOSED FILL		EXISTING ROW/PROPERTY
	PROPOSED DITCH		EXISTING WETLANDS
	PROPOSED STORMDRAIN		EXISTING GAS
	PROPOSED CULVERT		EXISTING ELECTRIC/COMM
			EXISTING O/HEAD POLES

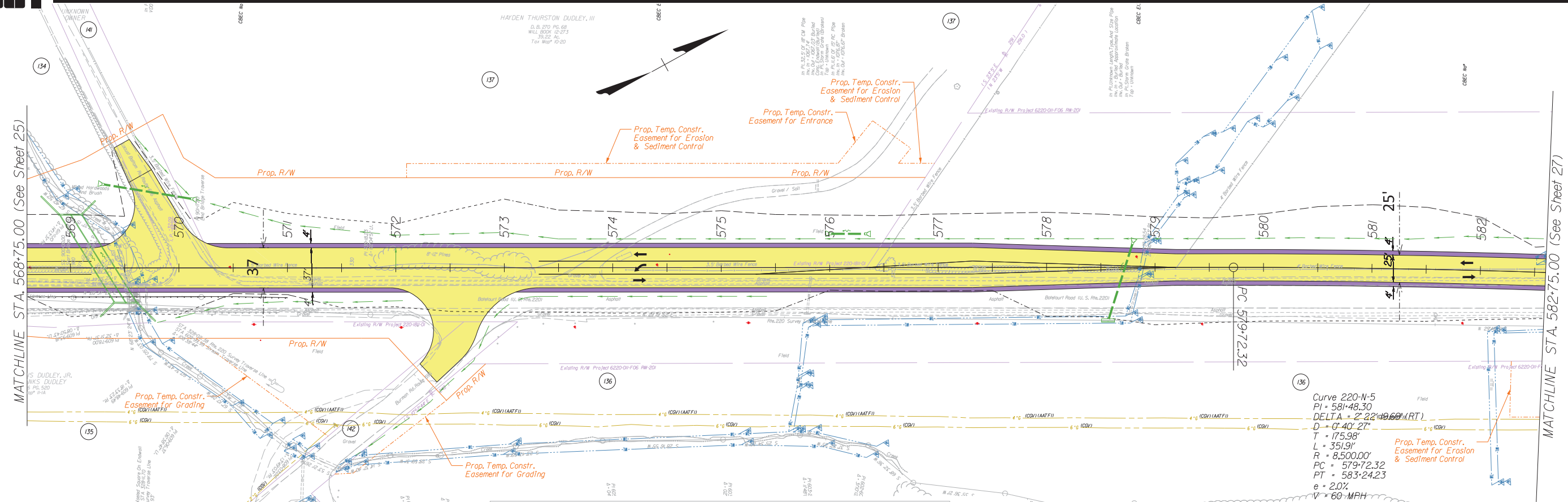




LEGEND

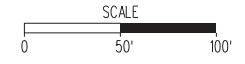
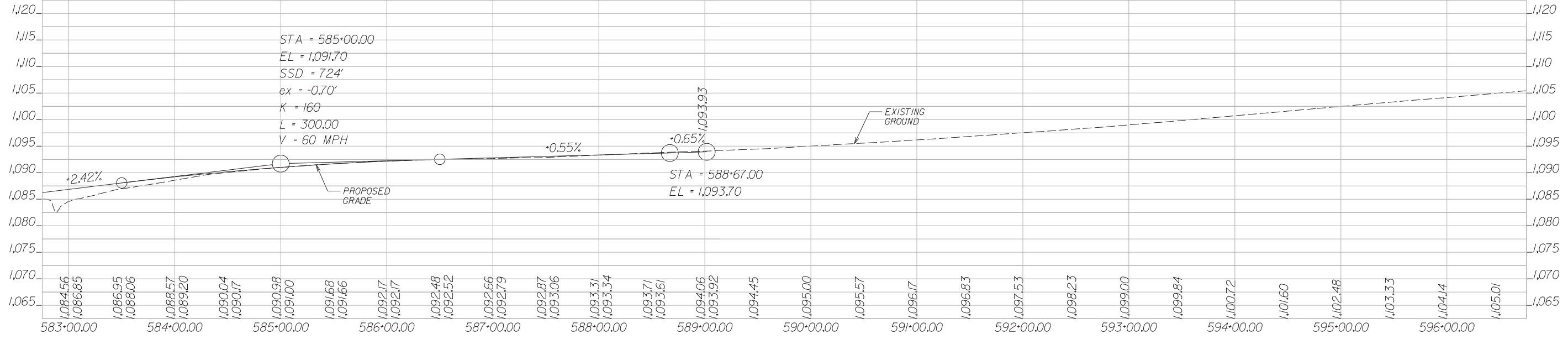
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	PROPOSED SHOULDERS		PROPOSED RIGHT OF WAY
	PROPOSED GUARD RAIL		PROPOSED EASEMENT
	PROPOSED CUT		PROPOSED EASEMENT
	PROPOSED FILL		EXISTING ROW/PROPERTY
	PROPOSED DITCH		EXISTING WETLANDS
	PROPOSED STORMDRAIN		EXISTING GAS
	PROPOSED CULVERT		EXISTING ELECTRIC/COMM
			EXISTING O/HEAD POLES

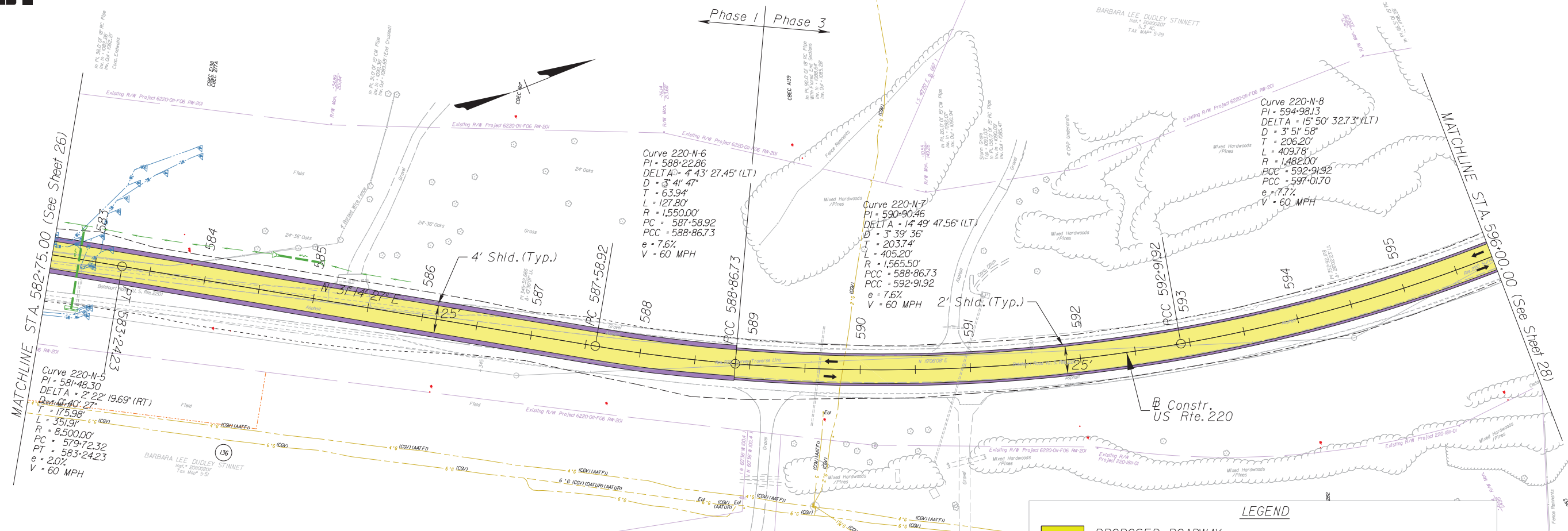




LEGEND

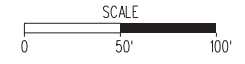
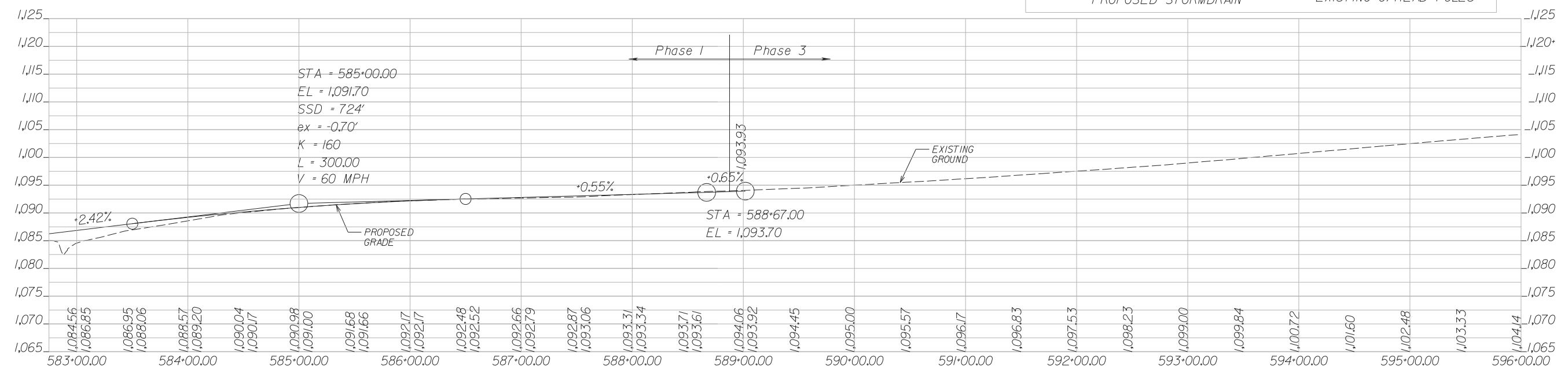
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	PROPOSED SHOULDERS		PROPOSED RIGHT OF WAY
	PROPOSED GUARD RAIL		PROPOSED EASEMENT
	PROPOSED CUT		EXISTING ROW/PROPERTY
	PROPOSED FILL		EXISTING WETLANDS
	PROPOSED DITCH		EXISTING GAS
	PROPOSED STORMDRAIN		EXISTING ELECTRIC/COMM
	PROPOSED CULVERT		EXISTING O/HEAD POLES

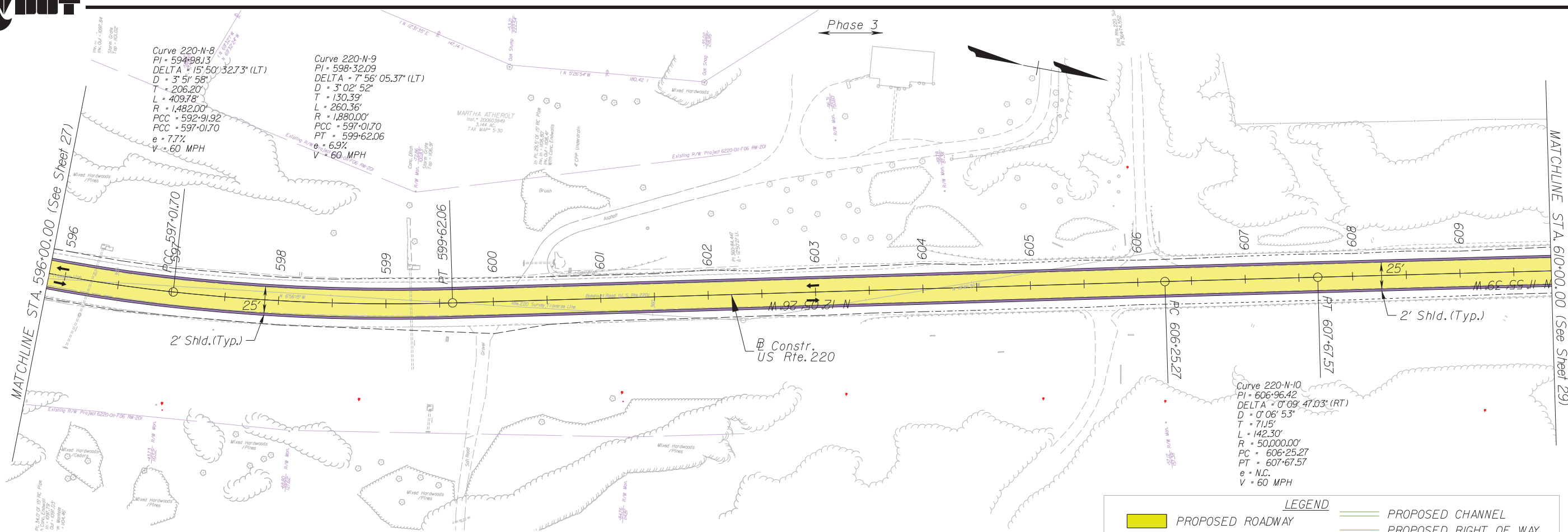




LEGEND

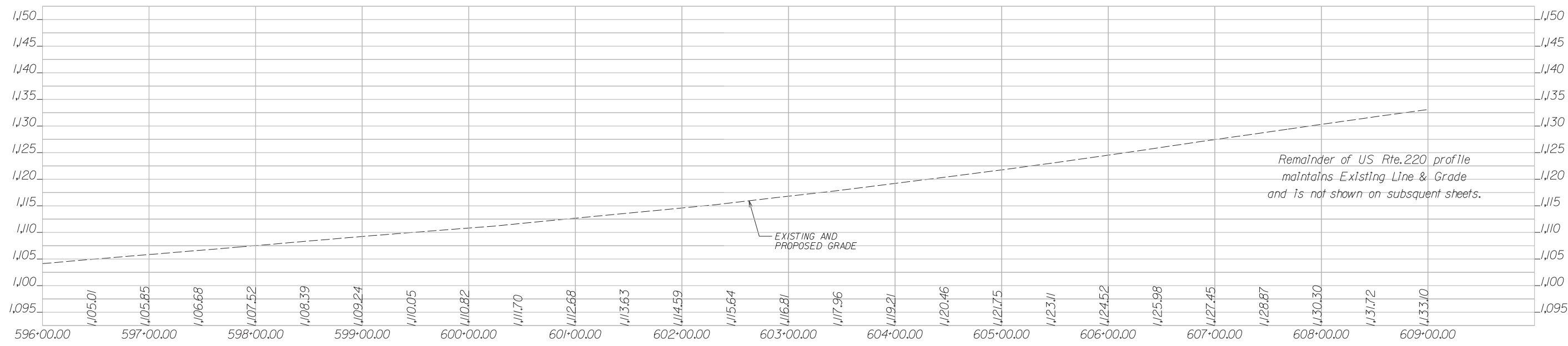
	PROPOSED ROADWAY		PROPOSED EASEMENT
	PROPOSED SHOULDERS		EXISTING ROW/PROPERTY
	PROPOSED GUARD RAIL		EXISTING WETLANDS
	PROPOSED CUT		EXISTING GAS
	PROPOSED FILL		EXISTING ELECTRIC/COMM
	PROPOSED DITCH		EXISTING O/HEAD POLES
	PROPOSED STORMDRAIN		

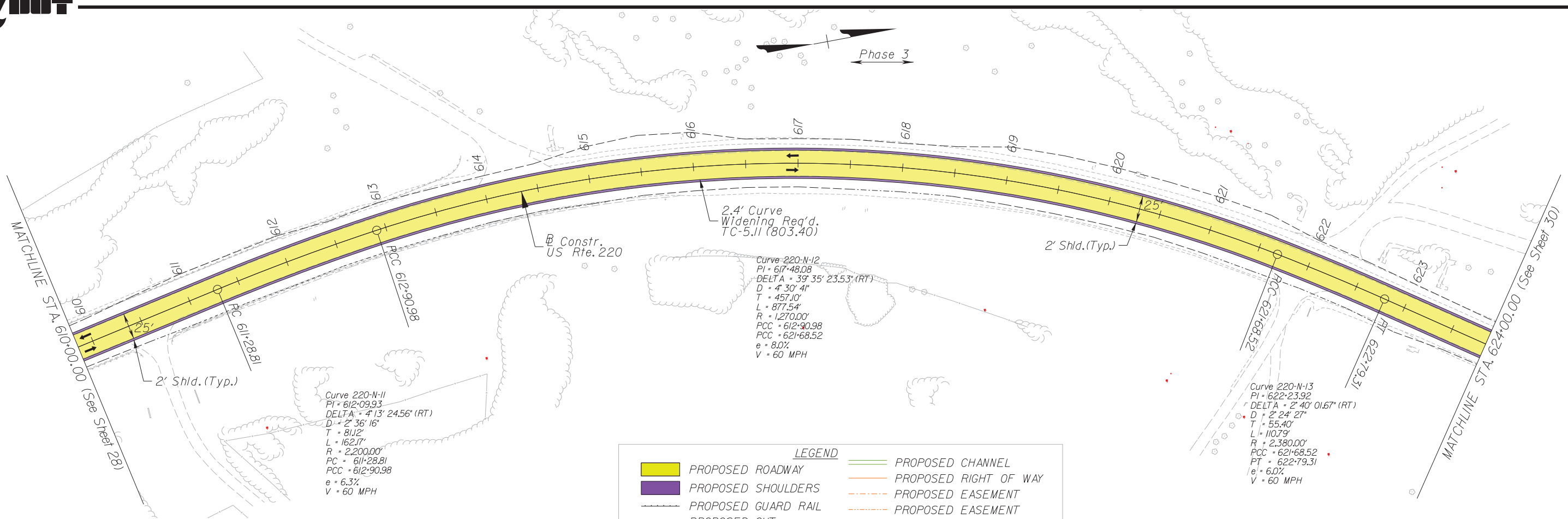




LEGEND

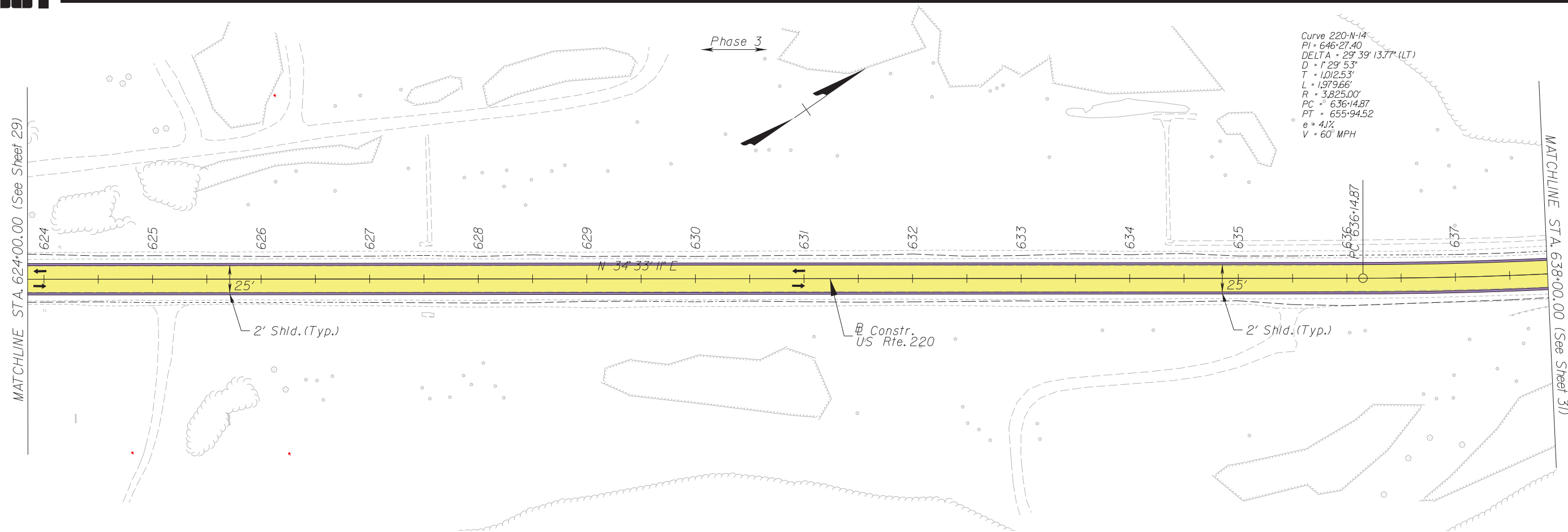
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	PROPOSED SHOULDERS		PROPOSED RIGHT OF WAY
	PROPOSED GUARD RAIL		PROPOSED EASEMENT
	PROPOSED CUT		PROPOSED EASEMENT
	PROPOSED FILL		EXISTING ROW/PROPERTY
	PROPOSED DITCH		EXISTING WETLANDS
	PROPOSED STORMDRAIN		EXISTING GAS
	PROPOSED CULVERT		EXISTING ELECTRIC/COMM
			EXISTING O/HEAD POLES





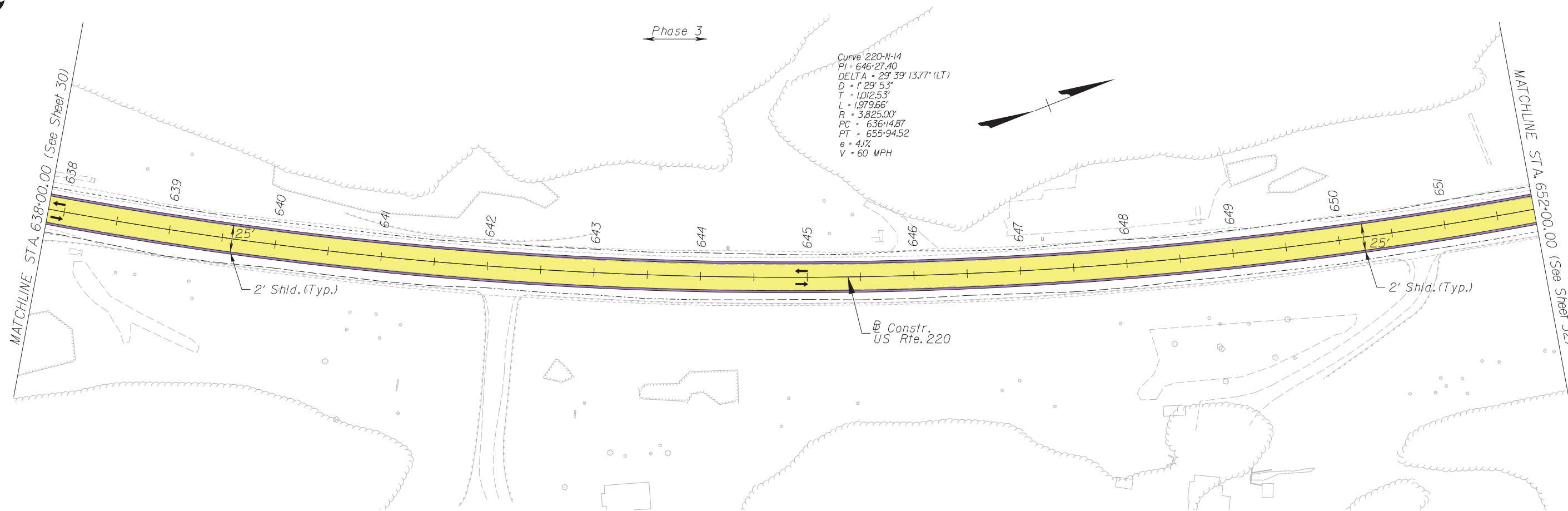
LEGEND

PROPOSED ROADWAY	PROPOSED CHANNEL
PROPOSED SHOULDERS	PROPOSED RIGHT OF WAY
PROPOSED GUARD RAIL	PROPOSED EASEMENT
PROPOSED CUT	PROPOSED EASEMENT
PROPOSED FILL	EXISTING ROW/PROPERTY
PROPOSED DITCH	EXISTING WETLANDS
PROPOSED STORMDRAIN	EXISTING GAS
PROPOSED CULVERT	EXISTING ELECTRIC/COMM
	EXISTING O/HEAD POLES

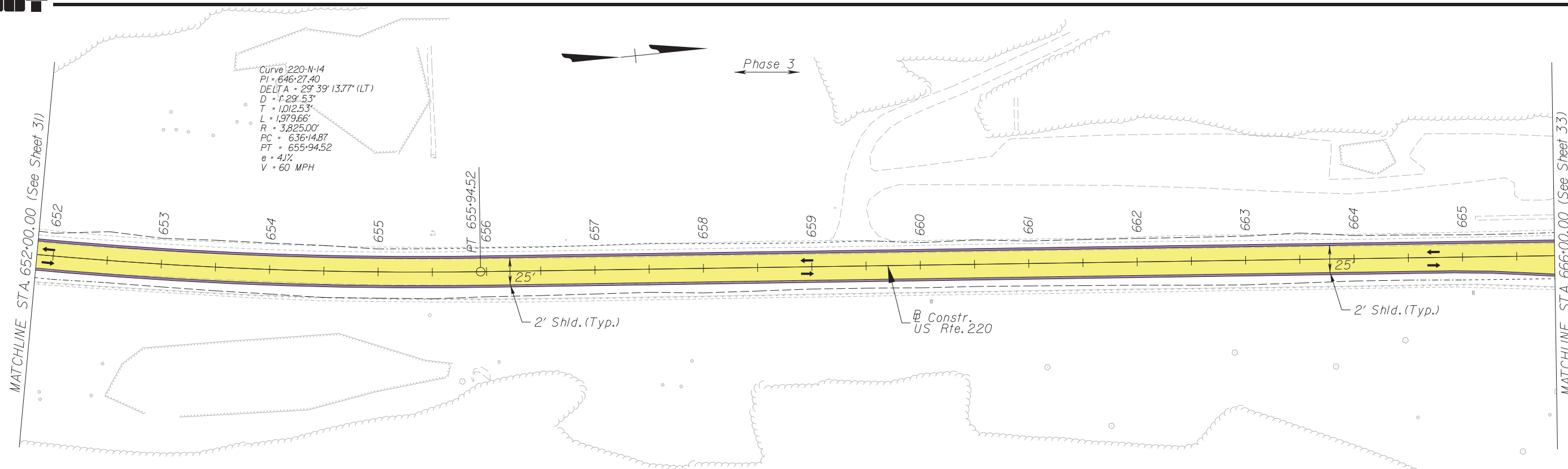


Curve 220-N-14
 PI = 646+27.40
 DELTA = 29° 39' 13.77\"/>

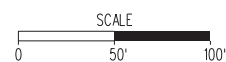
LEGEND	
	PROPOSED ROADWAY
	PROPOSED SHOULDERS
	PROPOSED GUARD RAIL
	PROPOSED CUT
	PROPOSED FILL
	PROPOSED DITCH
	PROPOSED STORMDRAIN
	PROPOSED CULVERT
	PROPOSED CHANNEL
	PROPOSED RIGHT OF WAY
	PROPOSED EASEMENT
	PROPOSED EASEMENT
	EXISTING ROW/PROPERTY
	EXISTING WETLANDS
	EXISTING GAS
	EXISTING ELECTRIC/COMM
	EXISTING O/HEAD POLES

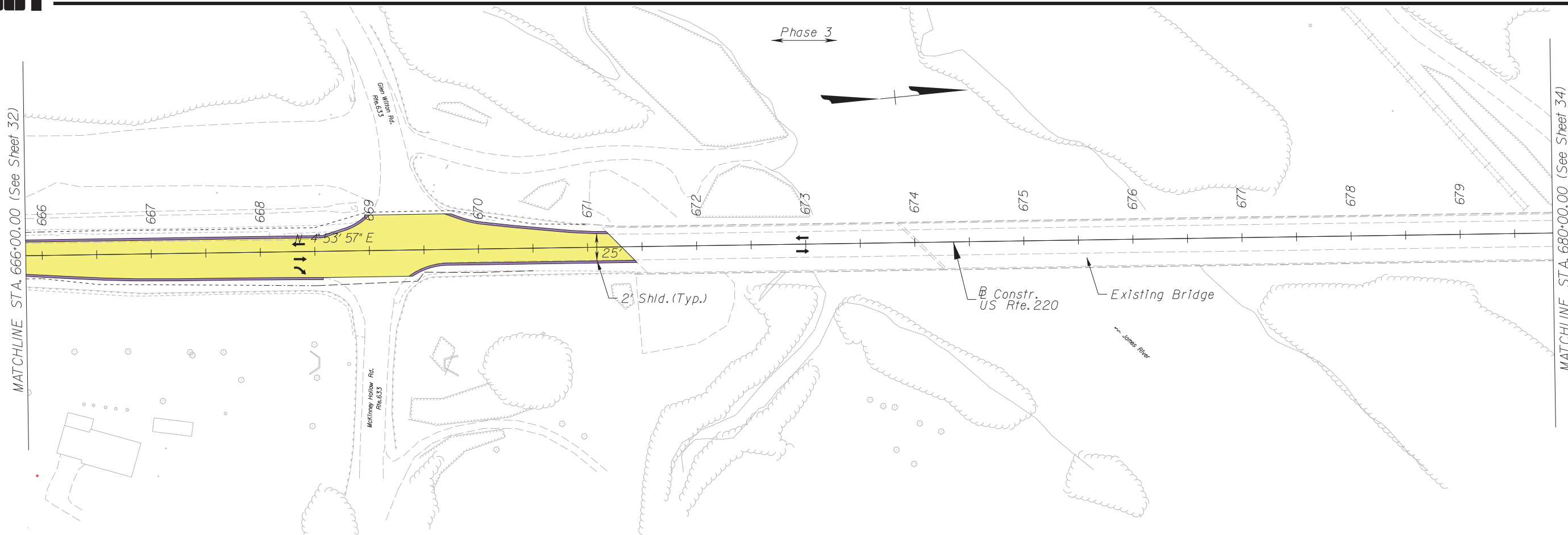


LEGEND			
	PROPOSED ROADWAY		PROPOSED CHANNEL
	PROPOSED SHOULDERS		PROPOSED RIGHT OF WAY
	PROPOSED GUARD RAIL		PROPOSED EASEMENT
	PROPOSED CUT		PROPOSED EASEMENT
	PROPOSED FILL		EXISTING ROW/PROPERTY
	PROPOSED DITCH		EXISTING WETLANDS
	PROPOSED STORMDRAIN		EXISTING GAS
	PROPOSED CULVERT		EXISTING ELECTRIC/COMM
			EXISTING O/HEAD POLES

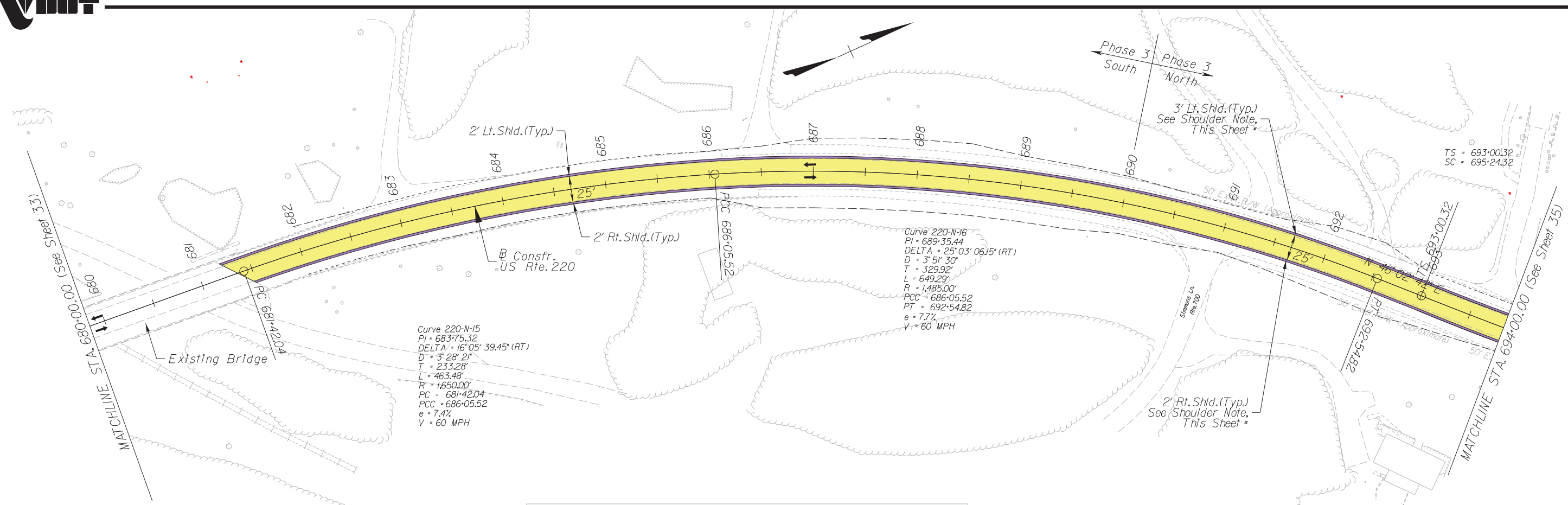


LEGEND			
	PROPOSED ROADWAY		PROPOSED CHANNEL
	PROPOSED SHOULDERS		PROPOSED RIGHT OF WAY
	PROPOSED GUARD RAIL		PROPOSED EASEMENT
	PROPOSED CUT		PROPOSED EASEMENT
	PROPOSED FILL		EXISTING ROW/PROPERTY
	PROPOSED DITCH		EXISTING WETLANDS
	PROPOSED STORMDRAIN		EXISTING GAS
	PROPOSED CULVERT		EXISTING ELECTRIC/COMM
			EXISTING O/HEAD POLES





LEGEND			
	PROPOSED ROADWAY		PROPOSED CHANNEL
	PROPOSED SHOULDERS		PROPOSED RIGHT OF WAY
	PROPOSED GUARD RAIL		PROPOSED EASEMENT
	PROPOSED CUT		PROPOSED EASEMENT
	PROPOSED FILL		EXISTING ROW/PROPERTY
	PROPOSED DITCH		EXISTING WETLANDS
	PROPOSED STORMDRAIN		EXISTING GAS
	PROPOSED CULVERT		EXISTING ELECTRIC/COMM
			EXISTING O/HEAD POLES



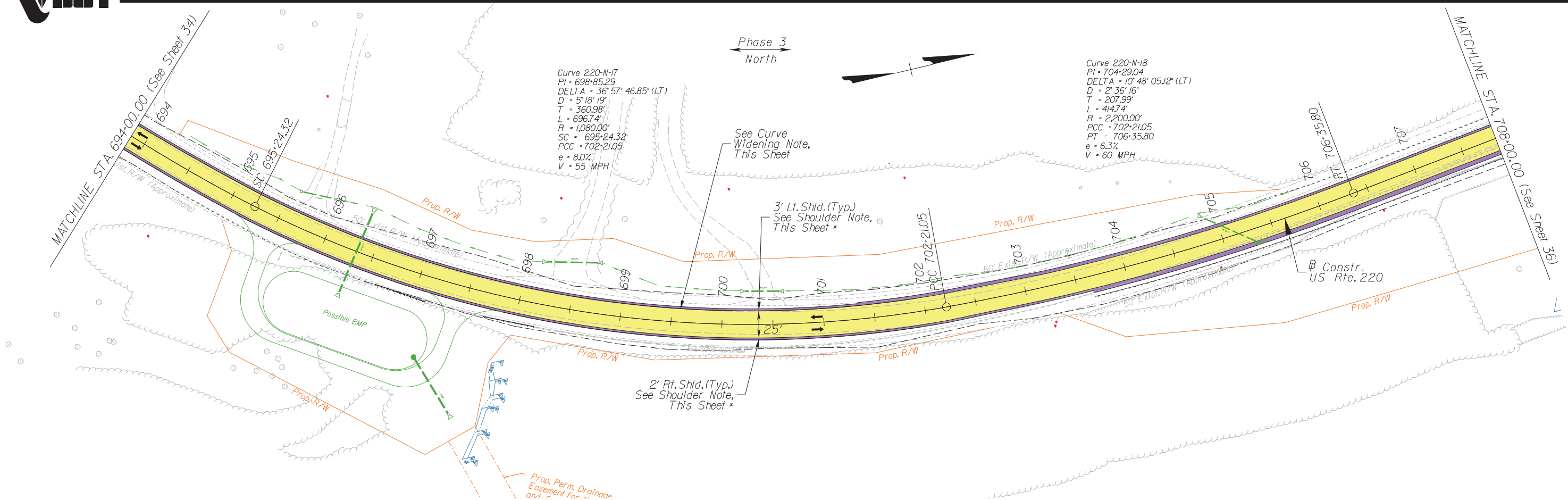
LEGEND

	PROPOSED ROADWAY		PROPOSED CHANNEL
	PROPOSED SHOULDERS		PROPOSED RIGHT OF WAY
	PROPOSED GUARD RAIL		PROPOSED EASEMENT
	PROPOSED CUT		EXISTING ROW/PROPERTY
	PROPOSED FILL		EXISTING WETLANDS
	PROPOSED DITCH		EXISTING GAS
	PROPOSED STORMDRAIN		EXISTING ELECTRIC/COMM
	PROPOSED CULVERT		EXISTING O/HEAD POLES

Shoulder Note *

Phase 3 North, Option I requires 4' Paved Shoulder with 4' Stabilized Shoulder beyond the paved shoulder (Both Sides, Typ.)

Total shoulder width is 8' for both Phase 3 North and Phase 3 North, Option I; therefore, construction limits shown reflect both options.



LEGEND

	PROPOSED ROADWAY		PROPOSED CHANNEL
	PROPOSED SHOULDERS		PROPOSED RIGHT OF WAY
	PROPOSED GUARD RAIL		PROPOSED EASEMENT
	PROPOSED CUT		PROPOSED EASEMENT
	PROPOSED FILL		EXISTING ROW/PROPERTY
	PROPOSED DITCH		EXISTING WETLANDS
	PROPOSED STORMDRAIN		2" G EXISTING GAS
	PROPOSED CULVERT		EXISTING ELECTRIC/COMM
			EXISTING O/HEAD POLES

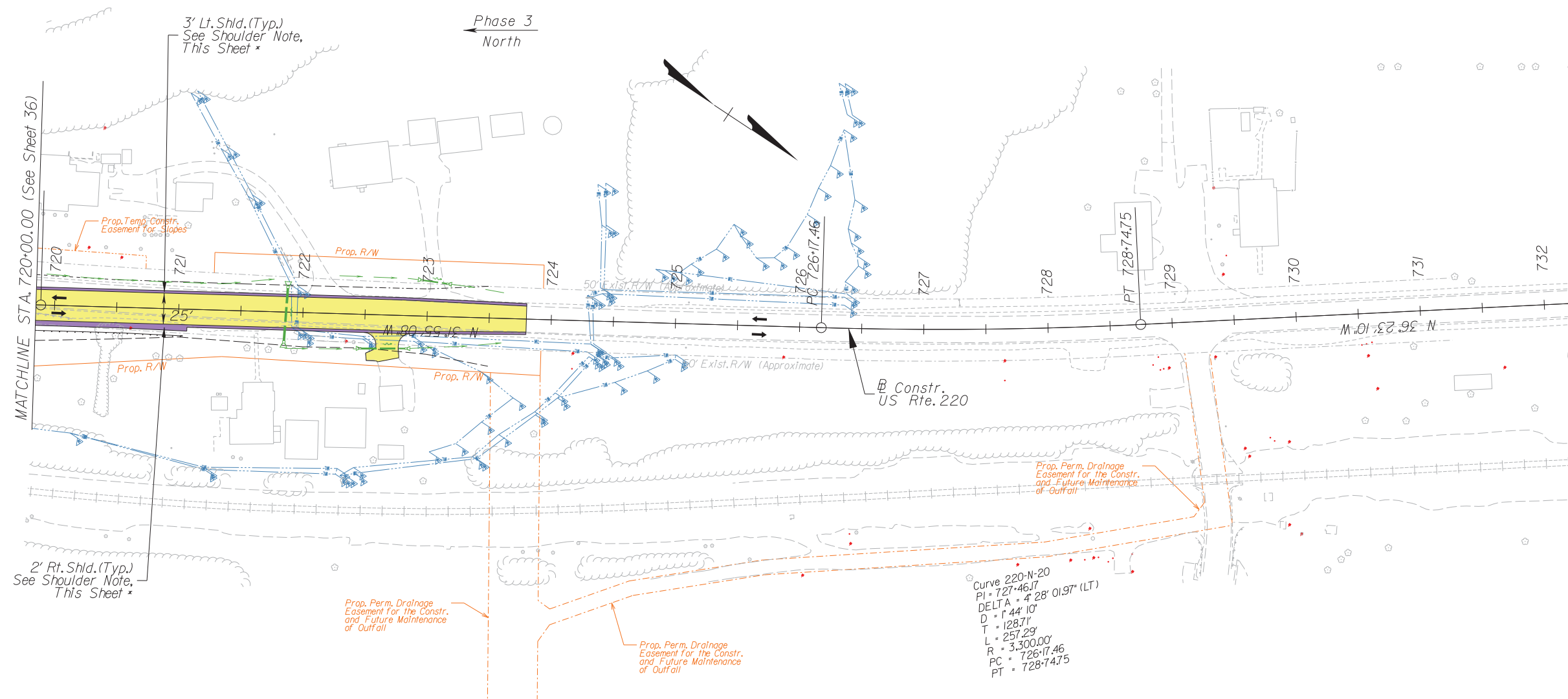
Shoulder Note *

Phase 3 North, Option 1 requires 4' Paved Shoulder with 4' Stabilized Shoulder beyond the paved shoulder (Both Sides, Typ.)

Total shoulder width is 8' for both Phase 3 North and Phase 3 North, Option 1; therefore, construction limits shown reflect both options.

Curve Widening Note

Phase 3 North, Option 1 requires 2.5' Curve Widening TC-5J1(803.40)



LEGEND			
	PROPOSED ROADWAY		PROPOSED CHANNEL
	PROPOSED SHOULDERS		PROPOSED RIGHT OF WAY
	PROPOSED GUARD RAIL		PROPOSED EASEMENT
	PROPOSED CUT		EXISTING ROW/PROPERTY
	PROPOSED FILL		EXISTING WETLANDS
	PROPOSED DITCH		EXISTING GAS
	PROPOSED STORMDRAIN		EXISTING ELECTRIC/COMM
	PROPOSED CULVERT		EXISTING O/HEAD POLES

Shoulder Note *

Phase 3 North, Option 1 requires 4' Paved Shoulder with
 4' Stabilized Shoulder beyond the paved shoulder (Both Sides, Typ.)

Total shoulder width is 8' for both Phase 3 North and Phase 3 North, Option 1;
 therefore, construction limits shown reflect both options.

4.7 SCHEDULE





Activity ID	Activity Name	Original Duration	Activity % Complete	Start	Finish	Total Float	2017												2018												2019												2020												2021												2022																							
							D	J	F	M	A	M	J	J	A	S	O	N	D	D	J	F	M	A	M	J	J	A	S	O	N	D	D	J	F	M	A	M	J	J	A	S	O	N	D	D	J	F	M	A	M	J	J	A	S	O	N	D	D	J	F	M	A	M	J	J	A	S	O	N	D	D	J	F	M	A	M	J	J	A	S	O	N	D	D	J	F	M	A	M
Rt. 220 - Proposal Schedule							31-Aug-21, R																																																																																			
PROJECT MILESTONES							31-Aug-21, P																																																																																			
M4020	NOTICE OF AWARD	0	0%	28-Feb-17*		11	◆ NOTICE OF AWARD																																																																																			
M4030	DESIGN BUILD CONTRACT EXECUTION	0	0%	05-Apr-17*		12	◆ DESIGN BUILD CONTRACT EXECUTION																																																																																			
M4040	NOTICE TO PROCEED	0	0%	21-Apr-17*		0	◆ NOTICE TO PROCEED																																																																																			
M4070	E & S	989	0%	17-Oct-17	31-Aug-21	0	E & S																																																																																			
M4080	MOT	989	0%	17-Oct-17	31-Aug-21	0	MOT																																																																																			
M4090	QA/QC	989	0%	17-Oct-17	31-Aug-21	0	QA/QC																																																																																			
M4060	FINAL COMPLETION	0	0%		31-Aug-21*	0	◆ FINAL COMP																																																																																			
SCOPE VALIDATION PERIOD							18-Aug-17, SCOPE VALIDATION PERIOD																																																																																			
SV1000	Scope Validation	120	0%	21-Apr-17	18-Aug-17*	3	Scope Validation																																																																																			
DESIGN							31-Aug-21, D																																																																																			
DESG220-120	Notification Letters	3	0%	21-Apr-17	25-Apr-17	0	Notification Letters																																																																																			
DESG220-140	Topo / RW Survey	43	0%	16-May-17	17-Jul-17	0	Topo / RW Survey																																																																																			
DESG220-160	Utility Designation	29	0%	27-Jun-17	07-Aug-17	35	Utility Designation																																																																																			
DESG220-180	Release for Construction - Utility Relocates in Ex. ROW	0	0%	21-Feb-18		46	◆ Release for Construction - Utility Relocates in Ex. ROW																																																																																			
DESG220-200	Notice to Commence Construction within ROW	0	0%	22-Mar-18		25	◆ Notice to Commence Construction within ROW																																																																																			
DESG220-220	Release for Construction - work allowed in wetlands/floodplains	0	0%	10-Apr-18		0	◆ Release for Construction - work allowed in wetlands/floodplains																																																																																			
DESG220-240	Notice to Commence Construction in new ROW	0	0%	20-Jul-18		61	◆ Notice to Commence Construction in new ROW																																																																																			
DESG220-260	Release for Construction - Utility Relocates in New ROW/Easement	0	0%	20-Jul-18		61	◆ Release for Construction - Utility Relocates in New ROW/Easement																																																																																			
Subsurface Exploration & Analysis							07-Aug-17, Subsurface Exploration & Analysis																																																																																			
DESG220-14540	Geotechnical Exploratory Plan & Approval	30	0%	21-Apr-17	02-Jun-17	10	Geotechnical Exploratory Plan & Approval																																																																																			
DESG220-14560	APM Exploration	45	0%	05-Jun-17	07-Aug-17	10	APM Exploration																																																																																			
DESG220-14580	Geotechnical/Borings	35	0%	05-Jun-17	24-Jul-17	20	Geotechnical/Borings																																																																																			
Concept SWM and ESC Plan							29-Nov-17, Concept SWM and ESC Plan																																																																																			
DESG220-14620	Prepare & Submit Plan	40	0%	29-Jun-17	24-Aug-17	74	Prepare & Submit Plan																																																																																			
DESG220-14640	VDOT Review	21	0%	25-Aug-17	25-Sep-17	74	VDOT Review																																																																																			
DESG220-17470	Revise and Resubmit	24	0%	26-Sep-17	27-Oct-17	74	Revise and Resubmit																																																																																			
DESG220-17480	VDOT Review/Approval	21	0%	30-Oct-17	29-Nov-17	74	VDOT Review/Approval																																																																																			
Transportation Management Plan							13-Oct-17, Transportation Management Plan																																																																																			
DESG220-14680	Team Kickoff Meeting	0	0%	26-May-17		122	◆ Team Kickoff Meeting																																																																																			
DESG220-14700	TMP Strategies, Alts, SOC/MOT Plans	45	0%	26-May-17	31-Jul-17	122	TMP Strategies, Alts, SOC/MOT Plans																																																																																			
DESG220-14720	Prep/Submit Report	6	0%	01-Aug-17	08-Aug-17	122	Prep/Submit Report																																																																																			
DESG220-14740	VDOT Review	21	0%	09-Aug-17	29-Aug-17	178	VDOT Review																																																																																			
DESG220-14760	TMP Approval	0	0%		13-Oct-17	121	◆ TMP Approval																																																																																			
Phase 1							31-Aug-21, P																																																																																			
Ph 1 Geotech Analysis & Report							17-Oct-17, Ph 1 Geotech Analysis & Report																																																																																			
DESG220-15230	Prepare & Submit	35	0%	08-Aug-17	26-Sep-17	73	Prepare & Submit																																																																																			
DESG220-15220	VDOT Review	21	0%	27-Sep-17	17-Oct-17	108	VDOT Review																																																																																			

█ Remaining Level of Effort **▬** Summary
█ Actual Work
█ Remaining Work
█ Critical Remaining Work
◆ Milestone



Activity ID	Activity Name	Original Duration	Activity % Complete	Start	Finish	Total Float	2017												2018												2019												2020												2021												2022											
							D	J	F	M	A	M	J	J	A	S	O	N	D	D	J	F	M	A	M	J	J	A	S	O	N	D	D	J	F	M	A	M	J	J	A	S	O	N	D	D	J	F	M	A	M	J	J	A	S	O	N	D	D	J	F	M	A	M	J	J	A	S	O	N	D	D	J	F	M	A	M	J
Ph 1 ROW Plans							27-Dec-17, Ph 1 ROW Plans																																																																							
DESG220-14800	F.I. Roadway Design	45	0%	20-Jun-17	22-Aug-17	0	F.I. Roadway Design																																																																							
DESG220-15040	F.I. MOT Plans	31	0%	01-Aug-17	13-Sep-17	26	F.I. MOT Plans																																																																							
DESG220-14940	F.I. Drainage & SWM	30	0%	02-Aug-17	13-Sep-17	16	F.I. Drainage & SWM																																																																							
DESG220-14980	F.I. Signing/Striping	30	0%	11-Aug-17	22-Sep-17	25	F.I. Signing/Striping																																																																							
DESG220-14960	F.I. Culverts	22	0%	23-Aug-17	22-Sep-17	19	F.I. Culverts																																																																							
DESG220-15000	F.I. ESC	15	0%	07-Sep-17	27-Sep-17	16	F.I. ESC																																																																							
DESG220-15100	Drainage Report (ditches/pipes)	5	0%	14-Sep-17	20-Sep-17	42	Drainage Report (ditches/pipes)																																																																							
DESG220-15020	F.I. Landscape	5	0%	21-Sep-17	27-Sep-17	22	F.I. Landscape																																																																							
DESG220-15060	F.I. Specs	5	0%	28-Sep-17	04-Oct-17	22	F.I. Specs																																																																							
DESG220-15080	RW Sheets	21	0%	28-Sep-17	26-Oct-17	16	RW Sheets																																																																							
DESG220-15120	Contractor Review	10	0%	05-Oct-17	18-Oct-17	22	Contractor Review																																																																							
DESG220-15140	VDOT Review	21	0%	27-Oct-17	16-Nov-17	23	VDOT Review																																																																							
DESG220-15160	Phase 1 Approved ROW Plans	0	0%	27-Dec-17		61	Phase 1 Approved ROW Plans																																																																							
HHA/Culverts							17-Oct-17, HHA/Culverts																																																																							
DESG220-14840	Hydraulic Models	22	0%	17-Jul-17	15-Aug-17	0	Hydraulic Models																																																																							
DESG220-14860	Prepare/Submit Report	5	0%	16-Aug-17	22-Aug-17	0	Prepare/Submit Report																																																																							
DESG220-14880	VDOT Review	21	0%	23-Sep-17	13-Oct-17	0	VDOT Review																																																																							
DESG220-14920	HHA Report Approval	0	0%	17-Oct-17		100	HHA Report Approval																																																																							
Ph 1 Construction Plans							20-Mar-18, Ph 1 Construction Plans																																																																							
Roadway & Geotech							15-Mar-18, Roadway & Geotech																																																																							
DESG220-15360	Roadway & Geotech Plans	30	0%	27-Nov-17	10-Jan-18	17	Roadway & Geotech Plans																																																																							
DESG220-15365	Contractor and Government Review	21	0%	11-Jan-18	08-Feb-18	19	Contractor and Government Review																																																																							
DESG220-15380	Release for Construction	22	0%	14-Feb-18	15-Mar-18	17	Release for Construction																																																																							
Early Stage MOT							13-Mar-18, Early Stage MOT																																																																							
DESG220-15420	Early Stage MOT Plans	18	0%	11-Dec-17	08-Jan-18	32	Early Stage MOT Plans																																																																							
DESG220-15375	Contractor and Government Review	21	0%	09-Jan-18	06-Feb-18	32	Contractor and Government Review																																																																							
DESG220-15440	Release for Construction	22	0%	12-Feb-18	13-Mar-18	32	Release for Construction																																																																							
Culvert & ESC							20-Mar-18, Culvert & ESC																																																																							
DESG220-15480	Culvert & ESC Plans	26	0%	11-Dec-17	18-Jan-18	20	Culvert & ESC Plans																																																																							
DESG220-15385	Contractor and Government Review	21	0%	19-Jan-18	16-Feb-18	20	Contractor and Government Review																																																																							
DESG220-15500	Release for Construction	22	0%	19-Feb-18	20-Mar-18	27	Release for Construction																																																																							
SWM & Drainage							14-Mar-18, SWM & Drainage																																																																							
DESG220-15300	SWM & Drainage Plans	22	0%	11-Dec-17	12-Jan-18	17	SWM & Drainage Plans																																																																							
DESG220-15395	Contractor and Government Review	21	0%	15-Jan-18	12-Feb-18	17	Contractor and Government Review																																																																							
DESG220-15320	Release for Construction	22	0%	13-Feb-18	14-Mar-18	31	Release for Construction																																																																							
Ph 1 Environ. Permits & Clearances							31-Aug-21, Ph 1 Environ. Permits & Clearances																																																																							
DESG220-15880	VSMP & SWPPP (SWM & E/S)	16	0%	19-Feb-18	12-Mar-18	20	VSMP & SWPPP (SWM & E/S)																																																																							
Re-Evaluation (VDOT)							06-Mar-18, Re-Evaluation (VDOT)																																																																							
DESG220-15680	EQ-201 (RW Auth)	16	0%	27-Dec-17	18-Jan-18	120	EQ-201 (RW Auth)																																																																							

█ Remaining Level of Effort Summary
█ Actual Work
█ Remaining Work
█ Critical Remaining Work
◆ Milestone



Activity ID	Activity Name	Original Duration	Activity % Complete	Start	Finish	Total Float	2017												2018												2019												2020												2021												2022																																									
							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	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	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M
STAGE I SHOULDER STRENGTHENING							5	0%	21-May-20	29-May-20	135																																					▼ 29-May-20, STAGE I SHOULDER STRENGTHENING																																																												
C2610	SHOULDER SOUTHBOUND	5	0%	21-May-20	29-May-20	135																																					■ SHOULDER SOUTHBOUND																																																																	
STAGE II NORTHBOUND LANE SHOULDER WIDENING							668	0%	20-Jul-18	02-Mar-21	117																																					▼ 02-Mar-21, STAGE II NORTHBOUND																																																												
C3340	CBEC UTILITY RELOCATION	60	0%	20-Jul-18	12-Oct-18	589													■ CBEC UTILITY RELOCATION																																																																																									
C2630	TRAFFIC CONTROL	5	0%	01-Jun-20	05-Jun-20	135																																					■ TRAFFIC CONTROL																																																																	
C2650	CLEAR & GRUB	5	0%	08-Jun-20	16-Jun-20	135																																					■ CLEAR & GRUB																																																																	
C2670	INSTALL E&S MEASURES	10	0%	18-Jun-20	06-Jul-20	135																																					■ INSTALL E&S MEASURES																																																																	
C2710	REGULAR EXCAVATION	10	0%	07-Jul-20	23-Jul-20	135																																					■ REGULAR EXCAVATION																																																																	
C2720	JACK AND BORE UNDER CSX RAILROAD	20	0%	07-Jul-20	10-Aug-20	135																																					■ JACK AND BORE UNDER CSX RAILROAD																																																																	
C2750	INSTALL STORM DRAINAGE	10	0%	24-Jul-20	10-Aug-20	135																																					■ INSTALL STORM DRAINAGE																																																																	
C2800	FINE GRADE	15	0%	11-Aug-20	08-Sep-20	135																																					■ FINE GRADE																																																																	
C2830	INSTALL/GRADE STONE BASE	20	0%	09-Sep-20	13-Oct-20	135																																					■ INSTALL/GRADE STONE BASE																																																																	
C2910	INSTALL UNDERDRAIN	5	0%	15-Oct-20	22-Oct-20	135																																					■ INSTALL UNDERDRAIN																																																																	
C2940	PAVE ASPHALT	10	0%	23-Oct-20	09-Nov-20	80																																					■ PAVE ASPHALT																																																																	
C2980	INSTALL GUARDRAIL	5	0%	10-Nov-20	17-Nov-20	135																																					■ INSTALL GUARDRAIL																																																																	
C3000	INSTALL DRIVEWAY ENTRANCES	5	0%	19-Nov-20	30-Nov-20	135																																					■ INSTALL DRIVEWAY ENTRANCES																																																																	
C3010	PLACE PAVEMENT MARKINGS	1	0%	02-Mar-21	02-Mar-21	87																																					■ PLACE PAVEMENT MARKINGS																																																																	
STAGE III MILL AND OVERLAY							14	0%	03-Mar-21	22-Mar-21	116																																					▼ 22-Mar-21, STAGE III MILL AND OVERLAY																																																												
C3020	REMOVE TRAFFIC CONTROL	5	0%	03-Mar-21	10-Mar-21	87																																					■ REMOVE TRAFFIC CONTROL																																																																	
C3030	MILL AND OVERLAY	5	0%	12-Mar-21	19-Mar-21	87																																					■ MILL AND OVERLAY																																																																	
C3040	PLACE PAVEMENT MARKINGS	1	0%	22-Mar-21	22-Mar-21	87																																					■ PLACE PAVEMENT MARKINGS																																																																	
C3050	PHASE 3 COMPLETE	0	0%		22-Mar-21	116																																					◆ PHASE 3 COMPLETE																																																																	

■ Remaining Level of Effort ▼ Summary
■ Actual Work
■ Remaining Work
■ Critical Remaining Work
◆ Milestone



Route 220 Corridor Safety Improvements A Design-Build Project

From: 0.129 miles south of Route 43 To: Intersection with Route 727

Botetourt County, Virginia

State Project No.: 0220-011-786

Federal Project No.: NH-5128 (326)

Contract ID Number: C00105543DB88



Submitted to:
Virginia Department of Transportation

Submitted by:
W.C. English, Incorporated

In association with:
A. Morton Thomas and Associates, Inc.

January 18, 2017

4.3 CONCEPT PLANS



4.7 SCHEDULE





Activity ID	Activity Name	Original Duration	Activity % Complete	Start	Finish	Total Float	2017												2018												2019												2020												2021												2022																							
							D	J	F	M	A	M	J	J	A	S	O	N	D	D	J	F	M	A	M	J	J	A	S	O	N	D	D	J	F	M	A	M	J	J	A	S	O	N	D	D	J	F	M	A	M	J	J	A	S	O	N	D	D	J	F	M	A	M	J	J	A	S	O	N	D	D	J	F	M	A	M	J	J	A	S	O	N	D	D	J	F	M	A	M
Rt. 220 - Proposal Schedule							31-Aug-21, R																																																																																			
PROJECT MILESTONES							31-Aug-21, P																																																																																			
M4020	NOTICE OF AWARD	0	0%	28-Feb-17*		11	◆ NOTICE OF AWARD																																																																																			
M4030	DESIGN BUILD CONTRACT EXECUTION	0	0%	05-Apr-17*		12	◆ DESIGN BUILD CONTRACT EXECUTION																																																																																			
M4040	NOTICE TO PROCEED	0	0%	21-Apr-17*		0	◆ NOTICE TO PROCEED																																																																																			
M4070	E & S	989	0%	17-Oct-17	31-Aug-21	0	E & S																																																																																			
M4080	MOT	989	0%	17-Oct-17	31-Aug-21	0	MOT																																																																																			
M4090	QA/QC	989	0%	17-Oct-17	31-Aug-21	0	QA/QC																																																																																			
M4060	FINAL COMPLETION	0	0%		31-Aug-21*	0	◆ FINAL COMP																																																																																			
SCOPE VALIDATION PERIOD							18-Aug-17, SCOPE VALIDATION PERIOD																																																																																			
SV1000	Scope Validation	120	0%	21-Apr-17	18-Aug-17*	3	Scope Validation																																																																																			
DESIGN							31-Aug-21, D																																																																																			
DESG220-120	Notification Letters	3	0%	21-Apr-17	25-Apr-17	0	Notification Letters																																																																																			
DESG220-140	Topo / RW Survey	43	0%	16-May-17	17-Jul-17	0	Topo / RW Survey																																																																																			
DESG220-160	Utility Designation	29	0%	27-Jun-17	07-Aug-17	35	Utility Designation																																																																																			
DESG220-180	Release for Construction - Utility Relocates in Ex. ROW	0	0%	21-Feb-18		46	◆ Release for Construction - Utility Relocates in Ex. ROW																																																																																			
DESG220-200	Notice to Commence Construction within ROW	0	0%	22-Mar-18		25	◆ Notice to Commence Construction within ROW																																																																																			
DESG220-220	Release for Construction - work allowed in wetlands/floodplains	0	0%	10-Apr-18		0	◆ Release for Construction - work allowed in wetlands/floodplains																																																																																			
DESG220-240	Notice to Commence Construction in new ROW	0	0%	20-Jul-18		61	◆ Notice to Commence Construction in new ROW																																																																																			
DESG220-260	Release for Construction - Utility Relocates in New ROW/Easement	0	0%	20-Jul-18		61	◆ Release for Construction - Utility Relocates in New ROW/Easement																																																																																			
Subsurface Exploration & Analysis							07-Aug-17, Subsurface Exploration & Analysis																																																																																			
DESG220-14540	Geotechnical Exploratory Plan & Approval	30	0%	21-Apr-17	02-Jun-17	10	Geotechnical Exploratory Plan & Approval																																																																																			
DESG220-14560	APM Exploration	45	0%	05-Jun-17	07-Aug-17	10	APM Exploration																																																																																			
DESG220-14580	Geotechnical/Borings	35	0%	05-Jun-17	24-Jul-17	20	Geotechnical/Borings																																																																																			
Concept SWM and ESC Plan							29-Nov-17, Concept SWM and ESC Plan																																																																																			
DESG220-14620	Prepare & Submit Plan	40	0%	29-Jun-17	24-Aug-17	74	Prepare & Submit Plan																																																																																			
DESG220-14640	VDOT Review	21	0%	25-Aug-17	25-Sep-17	74	VDOT Review																																																																																			
DESG220-17470	Revise and Resubmit	24	0%	26-Sep-17	27-Oct-17	74	Revise and Resubmit																																																																																			
DESG220-17480	VDOT Review/Approval	21	0%	30-Oct-17	29-Nov-17	74	VDOT Review/Approval																																																																																			
Transportation Management Plan							13-Oct-17, Transportation Management Plan																																																																																			
DESG220-14680	Team Kickoff Meeting	0	0%	26-May-17		122	◆ Team Kickoff Meeting																																																																																			
DESG220-14700	TMP Strategies, Alts, SOC/MOT Plans	45	0%	26-May-17	31-Jul-17	122	TMP Strategies, Alts, SOC/MOT Plans																																																																																			
DESG220-14720	Prep/Submit Report	6	0%	01-Aug-17	08-Aug-17	122	Prep/Submit Report																																																																																			
DESG220-14740	VDOT Review	21	0%	09-Aug-17	29-Aug-17	178	VDOT Review																																																																																			
DESG220-14760	TMP Approval	0	0%		13-Oct-17	121	◆ TMP Approval																																																																																			
Phase 1							31-Aug-21, P																																																																																			
Ph 1 Geotech Analysis & Report							17-Oct-17, Ph 1 Geotech Analysis & Report																																																																																			
DESG220-15230	Prepare & Submit	35	0%	08-Aug-17	26-Sep-17	73	Prepare & Submit																																																																																			
DESG220-15220	VDOT Review	21	0%	27-Sep-17	17-Oct-17	108	VDOT Review																																																																																			

█ Remaining Level of Effort **▬** Summary
█ Actual Work
█ Remaining Work
█ Critical Remaining Work
◆ Milestone



Activity ID	Activity Name	Original Duration	Activity % Complete	Start	Finish	Total Float	2017												2018												2019												2020												2021												2022																	
							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	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
Ph 1 ROW Plans							27-Dec-17, Ph 1 ROW Plans																																																																													
DESG220-14800	F.I. Roadway Design	45	0%	20-Jun-17	22-Aug-17	0	F.I. Roadway Design																																																																													
DESG220-15040	F.I. MOT Plans	31	0%	01-Aug-17	13-Sep-17	26	F.I. MOT Plans																																																																													
DESG220-14940	F.I. Drainage & SWM	30	0%	02-Aug-17	13-Sep-17	16	F.I. Drainage & SWM																																																																													
DESG220-14980	F.I. Signing/Striping	30	0%	11-Aug-17	22-Sep-17	25	F.I. Signing/Striping																																																																													
DESG220-14960	F.I. Culverts	22	0%	23-Aug-17	22-Sep-17	19	F.I. Culverts																																																																													
DESG220-15000	F.I. ESC	15	0%	07-Sep-17	27-Sep-17	16	F.I. ESC																																																																													
DESG220-15100	Drainage Report (ditches/pipes)	5	0%	14-Sep-17	20-Sep-17	42	Drainage Report (ditches/pipes)																																																																													
DESG220-15020	F.I. Landscape	5	0%	21-Sep-17	27-Sep-17	22	F.I. Landscape																																																																													
DESG220-15060	F.I. Specs	5	0%	28-Sep-17	04-Oct-17	22	F.I. Specs																																																																													
DESG220-15080	RW Sheets	21	0%	28-Sep-17	26-Oct-17	16	RW Sheets																																																																													
DESG220-15120	Contractor Review	10	0%	05-Oct-17	18-Oct-17	22	Contractor Review																																																																													
DESG220-15140	VDOT Review	21	0%	27-Oct-17	16-Nov-17	23	VDOT Review																																																																													
DESG220-15160	Phase 1 Approved ROW Plans	0	0%	27-Dec-17		61	Phase 1 Approved ROW Plans																																																																													
HHA/Culverts							17-Oct-17, HHA/Culverts																																																																													
DESG220-14840	Hydraulic Models	22	0%	17-Jul-17	15-Aug-17	0	Hydraulic Models																																																																													
DESG220-14860	Prepare/Submit Report	5	0%	16-Aug-17	22-Aug-17	0	Prepare/Submit Report																																																																													
DESG220-14880	VDOT Review	21	0%	23-Sep-17	13-Oct-17	0	VDOT Review																																																																													
DESG220-14920	HHA Report Approval	0	0%	17-Oct-17		100	HHA Report Approval																																																																													
Ph 1 Construction Plans							20-Mar-18, Ph 1 Construction Plans																																																																													
Roadway & Geotech							15-Mar-18, Roadway & Geotech																																																																													
DESG220-15360	Roadway & Geotech Plans	30	0%	27-Nov-17	10-Jan-18	17	Roadway & Geotech Plans																																																																													
DESG220-15365	Contractor and Government Review	21	0%	11-Jan-18	08-Feb-18	19	Contractor and Government Review																																																																													
DESG220-15380	Release for Construction	22	0%	14-Feb-18	15-Mar-18	17	Release for Construction																																																																													
Early Stage MOT							13-Mar-18, Early Stage MOT																																																																													
DESG220-15420	Early Stage MOT Plans	18	0%	11-Dec-17	08-Jan-18	32	Early Stage MOT Plans																																																																													
DESG220-15375	Contractor and Government Review	21	0%	09-Jan-18	06-Feb-18	32	Contractor and Government Review																																																																													
DESG220-15440	Release for Construction	22	0%	12-Feb-18	13-Mar-18	32	Release for Construction																																																																													
Culvert & ESC							20-Mar-18, Culvert & ESC																																																																													
DESG220-15480	Culvert & ESC Plans	26	0%	11-Dec-17	18-Jan-18	20	Culvert & ESC Plans																																																																													
DESG220-15385	Contractor and Government Review	21	0%	19-Jan-18	16-Feb-18	20	Contractor and Government Review																																																																													
DESG220-15500	Release for Construction	22	0%	19-Feb-18	20-Mar-18	27	Release for Construction																																																																													
SWM & Drainage							14-Mar-18, SWM & Drainage																																																																													
DESG220-15300	SWM & Drainage Plans	22	0%	11-Dec-17	12-Jan-18	17	SWM & Drainage Plans																																																																													
DESG220-15395	Contractor and Government Review	21	0%	15-Jan-18	12-Feb-18	17	Contractor and Government Review																																																																													
DESG220-15320	Release for Construction	22	0%	13-Feb-18	14-Mar-18	31	Release for Construction																																																																													
Ph 1 Environ. Permits & Clearances							31-Aug-21, Ph 1 Environ. Permits & Clearances																																																																													
DESG220-15880	VSMP & SWPPP (SWM & E/S)	16	0%	19-Feb-18	12-Mar-18	20	VSMP & SWPPP (SWM & E/S)																																																																													
Re-Evaluation (VDOT)							06-Mar-18, Re-Evaluation (VDOT)																																																																													
DESG220-15680	EQ-201 (RW Auth)	16	0%	27-Dec-17	18-Jan-18	120	EQ-201 (RW Auth)																																																																													

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