VDOT
Virginia Department of Transportation

ELECTRONIC COPY

DESIGN-BUILD PROJECT FOR

I-64

SOUTHSIDE WIDENING AND HIGH RISE BRIDGE, PHASE 1

STATE PROJECT NO

0064-131-811, P101,
R201, C501, B662-B670
D637, D638

REQUEST FOR PROPOSAL

TECHNICAL PROPOSAL VOLUME I

RFP Submission Date: August 8, 2017

Federal Project No. NHPP-064-3(488)
Contract ID Number: C00106692DB93

GPC
GRANITE · PARSONS · CORMAN JOINT VENTURE

4.1 Letter of Submittal

GRANITE · PARSONS · CORMAN JOINT VENTURE

Jeffrey A. Roby, P.E., DBIA
Alternate Project Delivery Division
Virginia Department of Transportation
1401 East Broad Street, Annex Building, 8th Floor
Richmond, VA 23219

August 8, 2017

RE: I-64 Southside Widening and High Rise Bridge, Phase 1 Design-Build
State Project No.: 0064-131-811, P101, R201, C501, B662-B670, D637, D638
Federal Project No. NHPP-064-3(488)
Contract ID No.: C00106692DB93

Dear Mr. Roby,

Granite/Parsons/Corman, a Joint Venture (GPC), in association with Parsons Transportation Group, Inc., has formed an integrated team with the local resources, expertise, and experience in innovative bridge and maintenance of traffic solutions to deliver the I-64 Southside Widening and High Rise Bridge Project. The enclosed proposal presents the result of our efforts over the past six months to develop innovative solutions that provide VDOT with the highest value for this project. GPC will not submit ATCs with our proposal.

4.1.1 Offeror's Full Legal Name and Address: Granite/Parsons/Corman, a Joint Venture (GPC) is the Offeror and legal entity who will execute the contract with VDOT. GPC is composed of Granite Construction Company (Granite), Parsons Construction Group, Inc. (PCG), and Corman Construction, Inc. (Corman) and is located at 120 White Plains Road, Suite 310, Tarrytown, NY 10591.

4.1.2 Declaration of Intent: If selected, GPC intends to enter into contract with VDOT for this project in accordance with the terms of the RFP for the referenced project.

4.1.3 120 Day Declaration: Pursuant to Part 1, Section 8.2, GPC declares the offer presented by the Technical and Price Proposals will remain in full force and effect for 120 days after Technical Proposal Submission Date.

4.1.4 Point of Contact	Secondary Point of Contact	4.1.5 Principal Officer
Peter Temple, Project Executive Granite Construction Company 120 White Plains Road, Suite 310 Tarrytown, NY 10591 tel: (914) 606-3639 fax: (914) 631-1403 Peter.Temple@gcinc.com	Brian Quinlan, Project Executive Parsons Construction Group, Inc. 1499 W. 120th Avenue, Suite 200 Westminster, CO 80234 tel: (202) 775-3328 fax: (303) 566-1141 Brian.Quinlan@parsons.com	Dale Swanberg, Senior Vice President Granite Construction Company 585 West Beach Street Watsonville, CA 95076 tel: (972) 353-6231 fax: (831) 768-4021 Dale.Swanberg@gcinc.com

4.1.6 Final Completion Date: GPC's proposed final completion date is July 30, 2021.

4.1.7 Unique Milestone Dates: GPC proposes the following unique milestone dates: Tide Gate complete: September 28, 2019; High Rise Bridge opening: November 21, 2020; ITS integration contract increased from 180 to 210 days.

4.1.8 Proposal Payment Agreement: An executed Proposal Payment Agreement (Attachment 9.3.1) is found in the Volume 1 Appendix.

4.1.9 Certification Regarding Debarment: Certifications Regarding Debarment forms (Attachments 11.8.6(a) and 11.8.6(b)) are found in the Volume 1 Appendix.

Sincerely,

Robert McTavish, Attorney-in-Fact and GPC Authorized Representative
Vice President of Granite Construction Company

4.2 Offeror's Qualifications

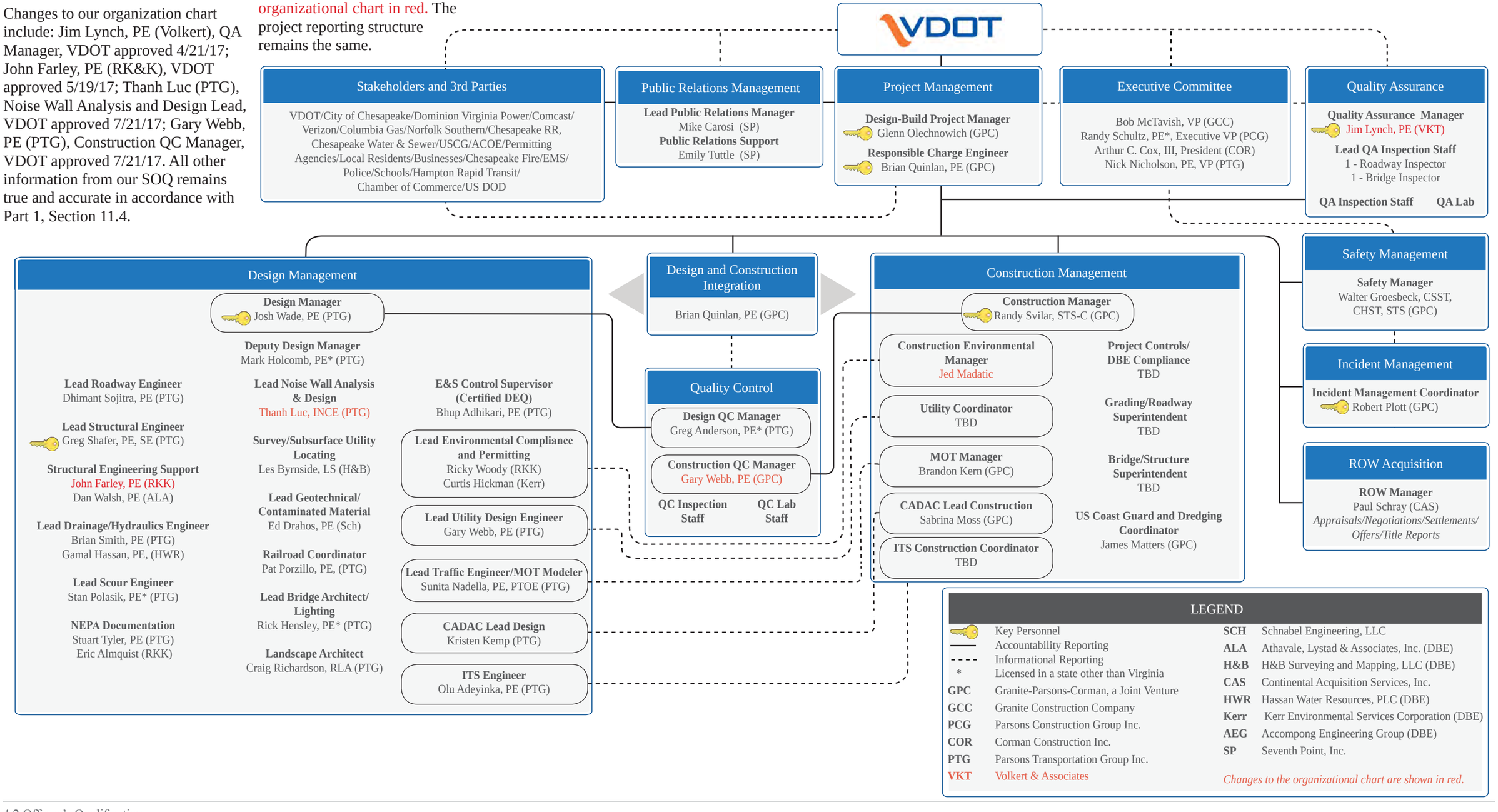
4.2 OFFEROR'S QUALIFICATIONS

4.2.1 Confirmation of SOQ Information

Changes to our organization chart include: Jim Lynch, PE (Volkert), QA Manager, VDOT approved 4/21/17; John Farley, PE (RK&K), VDOT approved 5/19/17; Thanh Luc (PTG), Noise Wall Analysis and Design Lead, VDOT approved 7/21/17; Gary Webb, PE (PTG), Construction QC Manager, VDOT approved 7/21/17. All other information from our SOQ remains true and accurate in accordance with Part 1, Section 11.4.

4.2.2 Organization Chart

Changes are reflected in the organizational chart in red. The project reporting structure remains the same.



4.3 Design Concept

4.3 DESIGN CONCEPT

One critical factor influencing the success of design-build projects from an owner's perspective is the degree to which the selected team can work together to deliver high-quality design and construction. Our integrated team sets us apart because GPC team member Parsons is member of the construction joint venture and leads the design team. In other words, we are a true design-build joint venture. This alignment of interests positions us to deliver the management and production resources to design and construct the Project, as the success of our design-build team is tied to delivering the project on time and on budget.

This proposal section demonstrates how our team structure and procedures will deliver an efficient design and showcases our proposed concept that:

- Increases functionality
- Enhances capacity and mobility
- Improves roadway and marine safety
- Resolves operational deficiencies
- Reduces future inspection and maintenance costs

In addition to demonstrating compliance with the RFP, this section will detail how we improved and enhanced the RFP Conceptual Plans. Key areas of improvement and added value are:

- Facilitating permitting process by reducing wetland impacts and avoiding channel bottom agitation
- Easing traffic flow during construction by improved maintenance of traffic phasing
- Minimizing utility relocations through creative design solutions
- Shortening the High Rise Bridge by over 638 ft.
- Adjusting the alignment and improving compatibility with future corridor improvements
- Adding extra drainage capacity in the vicinity of new tide gate at the Gilmerton Canal
- Minimizing utility impacts and ROW requirements by refining drainage solutions

GPC's design team has experience working on multiple VDOT design-build projects. Led by the Parsons Transportation Group, it includes RK&K, ALA, Schnabel Engineering, Hassan Water Resources, and H&B Surveying and Mapping.

We have worked together throughout the proposal phase as an integrated design and construction team, to classify, calculate, and cultivate design solutions that offer VDOT the most value for the Project.

Design Approach. Design coordination, provided by Design Manager Josh Wade, is an essential part of managing design-build projects. On this project, as on many other successful design-build projects, Josh provides hands-on leadership. He will rely on Parsons' design best practices to deliver a timely and quality design. Josh, who has completed design-build projects such as Intercounty Connector Contract B and the nearby Military Highway, will be supported by permitting and geotechnical teams with unmatched local expertise and a bridge group that combines nationally-recognized talent for major bridge design with an extensive pool of local bridge design knowledge.

Design Quality Management Plan (DQMP). Our proven design QC/QA process is an important part of effective internal communications and design development. Discussed more fully in Section 4.4.4, it is critical to minimizing the potential for design changes after construction plans are released. Significant formal processes include:

- Interdisciplinary reviews to eliminate design conflicts between disciplines, (e.g., structures interfering with drainage)
- Constructability reviews by the contractor for a design that is constructible and complementary to preferred means and methods
- Environmental compliance reviews to meet project commitments
- Design checklists to confirm compliance with the RFP, other VDOT design criteria, design codes, project commitments, and general requirements (CADD, file formats, etc.)
- Comment resolution process to track, resolve, and incorporate comments made by VDOT and their designees into the design.

Task Force Meetings (TFMs). The core I-64 Project team will include VDOT and its consultants, GPC and its construction subcontractors, and Parsons and its design subconsultants. This project team must have open and ongoing communications to resolve issues and incorporate resolutions into the design. This is accomplished by establishing discipline-oriented task forces (e.g., structures, drainage, etc.), made up of designers, contractors, and VDOT representatives, whose purpose it is to Advance, Assess, and Approve a compliant set of construction documents.

Our task forces have jump-started the process by meeting regularly throughout the proposal phase. Following award, we will conduct an ongoing regimen of weekly meetings, or as necessary, throughout design and construction. Since everyone should be part of the decision-making, we feel it is important that VDOT participate in these task force meetings as we work through issues and options while optimizing the project solution. VDOT participation will also facilitate design reviews and eliminate any surprises when final plans are delivered for review.

Third parties will be invited to participate in TFMs, when applicable, including:

- Utility owners to resolve conflicts and establish agreements
- City of Chesapeake departments to ensure that local design requirements for all crossing roadways (signals, lighting, drainage, etc.) are being observed
- Other VDOT specialized departments, such as maintenance, ITS, and permitting experts regarding relevant subject matter

Post Design Process. No matter how diligently we work as a team to avoid and minimize design changes, the nature of fast-tracked, design-build work means that there will likely be some design changes. Scenarios include unforeseen field conditions, ongoing design developments that trigger a change to work that has already been released for construction (RFC), or changes in sequence of construction.

Our Design Quality Management Plan (DQMP) lays out the formal procedures for handling design changes, including:

- **RFIs.** Requests for Information about and clarification of the design to field personnel
- **NDCs.** Notice of Design Changes are necessary design changes initiated by the Designer of Record
- **FDCs.** Field Design Changes are design changes requested by construction staff resulting from field conditions

DQMP procedures for these post design activities communicate late design changes to all parties, and most importantly, ensure that the changes are reviewed and approved by VDOT in accordance with requirements. These procedures include tracking logs that are reviewed regularly with staff and included in pre-activity check lists.

All the above design practices have proven successful on past design-build projects, and have been previously employed by this design team, including the nearby Military Highway CFI project and the MSHA Maryland Intercounty Connector – Contracts A and B.

Design to Achieve VDOT Priorities. Throughout the proposal process, we focused on developing a solution that meets or exceeds the Design Criteria Table requirements. This included evaluating multiple design concepts against each project priority, weighing the benefits, and in some cases, concluding that the RFP concept plans provided the best value. As a result, our design strategy meets each VDOT project priority:

- **Cost.** We identified and implemented cost-saving enhancements that reduce project cost. For example, avoiding utility impacts (our 12 design enhancements: R4, R9, R11, R15, R18 and U1 through U7), reducing infrastructure (design enhancement R3 that shortens HRB by 638 ft.), and many more enhancements described in Sections 4.3.1 through 4.3.6.
- **Design Concept.** Our design philosophy will deliver a project that supports future Phase II corridor upgrades, minimizes future inspections and maintenance, performs well for its entire

design life, and meets the needs of the traveling public. Our experiences on design-build projects, such as VDOT's Military Highway CFI (where Corman is teamed with Parsons) and MSHA's Maryland Intercounty Connector (where Granite and Corman teamed as lead design-build JV partners and Parsons was lead designer) solidifies what works well and provides lessons-learned and opportunities for improvement. Many of the Design Enhancements presented in Sections 4.3.1 through 4.3.6 demonstrate how we used this design-build experience to meet VDOT priorities.

- **Project Approach and Construction.** Our design and construction approach mitigates risks to the traveling public and stakeholders. We developed an initial risk register, shown in Figure 4.3-1 to address risks and challenges early, when they can most easily be avoided or mitigated. This risk register will be updated, monitored, and reviewed with VDOT throughout the project. We performed preliminary constructability, environmental, and safety reviews on the designs developed to date for optimization, constructability, and reduced impacts. The sections that follow describe the means and methods, resources and management approach we will deliver to the project. GPC's tools, coupled with our wealth of design-build experiences and innovative approach, will result in a quality project being delivered on schedule.

Partnering Philosophy. Our team believes in the value of partnering from project start up to close out. This builds an open and honest environment where concerns can be enhanced to meet stakeholder and traveling public expectations. This approach achieves early buy-in and facilitates the Project schedule. It also includes a task order approach to developing solutions using over-the-shoulder reviews to reduce redesign and rework.

As a testament to partnering, the Corman Joint Venture and Lead Designer Parsons won the MdQI Award of Excellence Partnering Silver Award on the $558 Million Design-Build Intercounty Connector Contract B project, which included 7.1 miles of six-lane divided highway and 15 bridges.

GPC Design Enhancements. Volume 2 of this proposal contains our conceptual plans for improving I-64, as well as related bridges, retaining walls, and the seven other roadways that are part of this Project. Our design (a) meets or exceeds all requirements listed in the Design Criteria Table including compliance with AASHTO and VDOT Standards, (b) defines limits of construction, including all stormwater management facilities, that are within the existing/proposed right-of-way limits shown in the RFP Conceptual Plans except for permanent and temporary easements, and (c) does not include any design elements that require additional Design Exceptions and/or Design Waivers. Our design does, however, include a wide range of enhancements.

The sections that follow describe many of the innovative enhancements our team engineered as we prepared our preliminary design. After award, the GPC team will continue to improve the design and provide VDOT and the traveling public a top-quality design that has enhancements to safety, operations,

Figure 4.3-1: Sample Risk Matrix.

Risk	Probable Direct Cost	Probability of Occurring	B x C	Schedule Impact (Calendar Days)	Mitigation Plan or Notes
Risk of Corps of Engineers (USACE) non-acceptance of wetlands impacts in route to identifying a different preferred alternative (Least Environmentally Damaging Preferred Alternative- LEDPA).	$ 250,000.00	50%	$ 125,000.00	60	To avoid redesign and potential additional wetland bank costs we will coordinate early and often with the agencies and submit the permit as early as possible.
Vessel Impact Analysis impact on final design of HRB.	$ 500,000.00	20%	$ 100,000.00	90	To minimize this risk we will coordinate early with the VDOT, USCG and the maritime stake holders on the methodology and rely on our extensive experience with thi process from other similar bridge projects.

schedule, construction, public acceptance, and long-term asset performance of the project corridor.

- Section 4.3.1 includes GPC's roadway, drainage and utility design enhancements
- Section 4.3.2 through 4.3.5 contain our bridge design enhancements
- Section 4.3.6 includes Tide Gate enhancements
- Section 4.4.3 includes our geotechnical design enhancements

4.3.1 Conceptual Roadway Plans

We are widening I-64 within the project limits to include a HOT Lane, two General Purpose Lanes, and Hard Shoulder Running (HSR) in each direction. Our Conceptual Plans contain all required design information for this upgrade. The pages that follow describe various enhancements included in our design and the resulting benefits to VDOT and the travelling public.

Roadway Enhancements

See summary of GPC Roadway Enhancements in Figure 4.3-2 on the following page.

R1 Improved I-64 Roadway Baseline

GPC improved the I-64 EB and I-64 WB baseline to better accommodate a HOT Lane, two General Purpose Lanes, and Hard Shoulder Running (HSR) on the exterior shoulder.

Benefits:

- Maintained the current exterior (right) edge of road to minimize overall project footprint.
  - **Schedule.** Simplifies permitting..
  - **Public Acceptance.** Smaller environmental impact, requiring less ROW.
- Smoothed a problematic transition from I-64 WB to the existing HRB at the eastern abutment.
- Ensured that the crown of the roadway was not in vehicular wheel path.
- Simplified overall project MOT phasing, as typical full depth pavement for widening will now take place primarily in a barrier-protected long-term work zone in existing "median".
  - **Safety.** Fewer major traffic switches are required.
  - **Schedule.** Accomplishing work in fewer MOT phases, enhancing the likelihood of meeting Substantial Completion Milestone to open the entire project length to eight lanes of traffic (includes I-64 EB and WB HSR).

Our revised alignment maintains required lane configurations while avoiding impacts beyond the environmental limits of disturbance compared to the RFP concept.

R2 Reduce High Rise Bridge Length at Western and Eastern Approaches

GPC reduced the bridge length approximately 585 ft. on the west end by shifting the west abutment of High Rise Bridge and 53 ft. on the east end by shifting the east abutment, for a total length of 638 ft. MSE walls on both sides of the river will support additional fill in these areas.

Benefits:

- **Safety.** Since bridge decks tend to freeze quicker than at grade roadways, in winter storms there will be less frozen surface on which to drive.
- **Operations.** River water quality will improve as there will be less untreated runoff entering the Elizabeth River due to smaller surface area of bridge deck.
- **Schedule.** A decrease in surface area reduces construction duration.
- **Inspection and Maintenance.** At grade roads are easier to inspect and maintain than bridge structures.

R3 Improved Vertical Alignment of HRB and Approaches

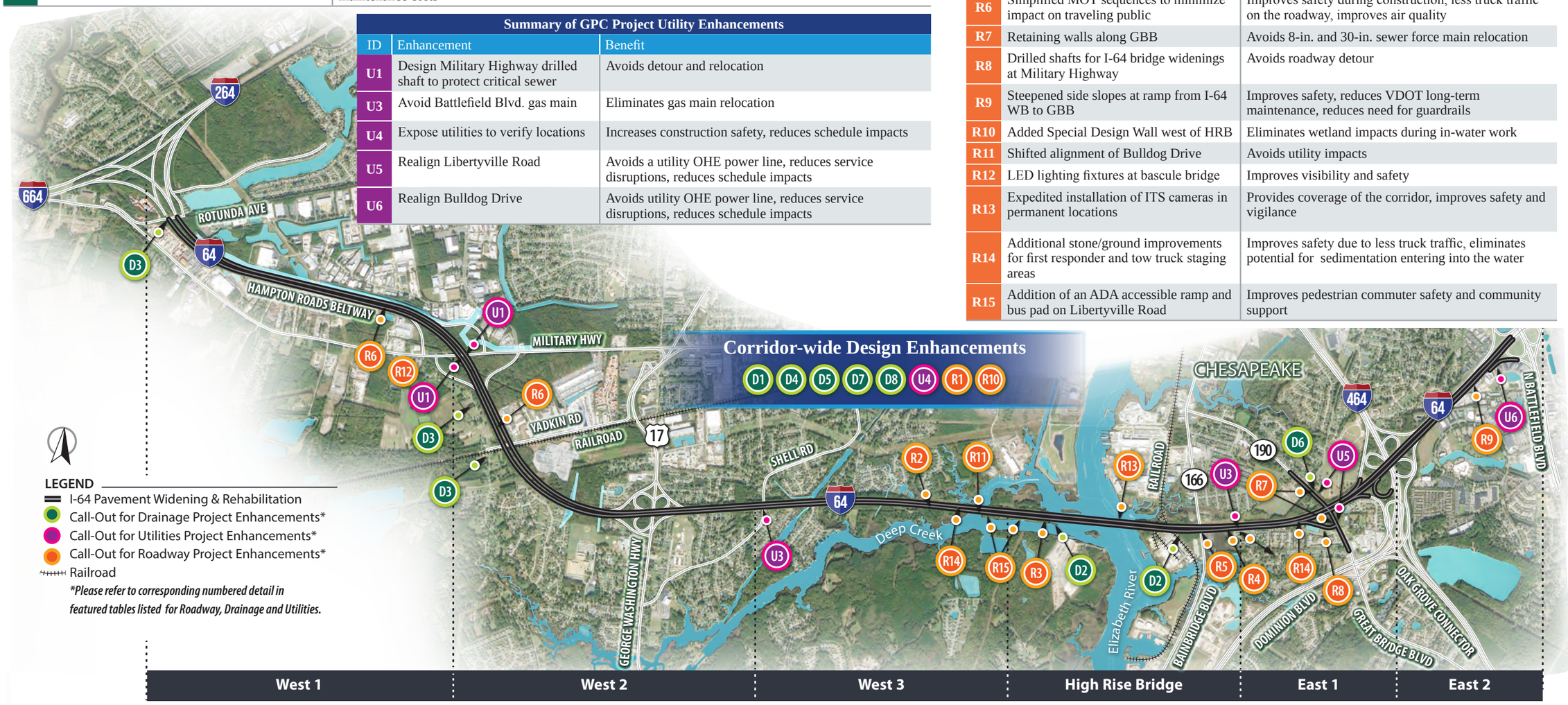
We improved the RFP Conceptual Plan design by revising the roadway profile of the High Rise Bridge and its approaches. Our revised vertical alignment creates a smooth spline grade that matches cross slope correction by extending superelevation into the existing lanes on both directions of I-64. Our HRB design facilitated this effort as the apex of the bridge was lowered approximately one foot while still maintaining the required navigational clearance.

Figure 4.3-2: GPC Roadway, Drainage and Utility Enhancements

Summary of GPC Project Drainage Enhancements		
ID	Enhancement	Benefit
D1	Use weir walls as stormwater management outlets	Reduces VDOT long-term maintenance costs
D2	Use grass channels adjacent to HRB	Stormwater treatment for bridge scupper discharge, reduces VDOT long-term maintenance costs
D3	Employ natural channel designs	Improves stream channels, meets stormwater permitting requirements, reduces permitting schedule impacts
D4	Drainage slots in noise walls	Improves drainage, reduces VDOT long-term maintenance costs
D5	Provide rolling shoulders on flat roadway profiles	Efficient stormwater conveyance, reduces VDOT long-term maintenance costs
D6	Adjust GBB roadway alignment	Avoids stormwater impact to existing drainage system, reduces VDOT long-term maintenance costs
D7	Replace I-64 cross culverts with a less than “good” inspection rating	Lengthens VDOT drainage system design life, improves drainage, reduces VDOT long-term maintenance costs
D8	Provide maintenance access doors in noise walls	Gains access to new VDOT stormwater management swales, improves drainage, reduces VDOT long-term maintenance costs

Summary of GPC Project Utility Enhancements		
ID	Enhancement	Benefit
U1	Design Military Highway drilled shaft to protect critical sewer	Avoids detour and relocation
U3	Avoid Battlefield Blvd. gas main	Eliminates gas main relocation
U4	Expose utilities to verify locations	Increases construction safety, reduces schedule impacts
U5	Realign Libertyville Road	Avoids a utility OHE power line, reduces service disruptions, reduces schedule impacts
U6	Realign Bulldog Drive	Avoids utility OHE power line, reduces service disruptions, reduces schedule impacts

Summary of GPC Project Roadway Enhancements		
ID	Enhancement	Benefit
R1	Improved I-64 roadway baseline	Improves roadway safety, reduces drainage conflicts, minimizes environmental impacts
R2	Reduced HRB length by 638 feet	Reduces VDOT’s initial and long-term bridge maintenance costs
R3	Improved vertical alignment of HRB and approaches	Improves drainage
R4	Improved horizontal roadway alignment at western approach to new HRB	Improves safety and mobility and reduces VDOT maintenance, wetland impacts, schedule impacts
R5	Improved alignment of Libertyville Road	Eliminates potential tidal wetland bank impact during construction, increases safety, avoids utility relocations
R6	Simplified MOT sequences to minimize impact on traveling public	Improves safety during construction, less truck traffic on the roadway, improves air quality
R7	Retaining walls along GBB	Avoids 8-in. and 30-in. sewer force main relocation
R8	Drilled shafts for I-64 bridge widenings at Military Highway	Avoids roadway detour
R9	Steepened side slopes at ramp from I-64 WB to GBB	Improves safety, reduces VDOT long-term maintenance, reduces need for guardrails
R10	Added Special Design Wall west of HRB	Eliminates wetland impacts during in-water work
R11	Shifted alignment of Bulldog Drive	Avoids utility impacts
R12	LED lighting fixtures at bascule bridge	Improves visibility and safety
R13	Expedited installation of ITS cameras in permanent locations	Provides coverage of the corridor, improves safety and vigilance
R14	Additional stone/ground improvements for first responder and tow truck staging areas	Improves safety due to less truck traffic, eliminates potential for sedimentation entering into the water
R15	Addition of an ADA accessible ramp and bus pad on Libertyville Road	Improves pedestrian commuter safety and community support



West of I-64 High Rise Bridge: We revised the RFP profile grade slope from 0.04% to 0.5% between Stations 1271+09 to 1277+50 and 0.2% to 0.5% between Stations 1277+50 to 1292+78.

GPC is enhancing the RFP profile grade slope to meet VDOT's preferred minimum of 0.5%.

East of I-64 High Rise Bridge: We lowered the bridge profile on the eastern half of the bridge by revising grade from 2.92% to 2.9%, reducing bridge height by approximately one foot at the apex, while maintaining minimum vertical clearance from the main channel. We made a corresponding adjustment to the I-64 WB profile east of the new HRB.

Benefits:

- **Safety.** During construction, decreasing asphalt overbuild reduces differential height disparities that create unsafe situations. The revised profile grade improves the speed at which the road sheds water, increasing the traveling public's safety during and immediately after a rain event.
- **Operations.** Less wedging will be required during construction, so roadway durability will be enhanced.
- **Schedule.** Reduction in asphalt quantities is conducive to meeting Interim Milestone for opening new HRB.
- **Construction.** Reduced asphalt build-up over existing pavements, with corresponding decreases in construction traffic and work durations.
- **Public Acceptance.** Decrease in construction traffic (asphalt trucks) will ease congestion and improve mobility.

R4 Improved Horizontal Roadway Alignment at Western Approach to New HRB

GPC adjusted the horizontal alignment at the western approach to HRB using two 25,000-ft. reverse curves, both designed above VDOT minimum standards. In the process, we eliminated cross slope transitions and tightened the construction limits by up to 14 ft. over 622 linear ft. We also adjusted the vertical profile to secure minimum 0.5% longitudinal slopes and achieve required sight distance and "K" values.

Benefits:

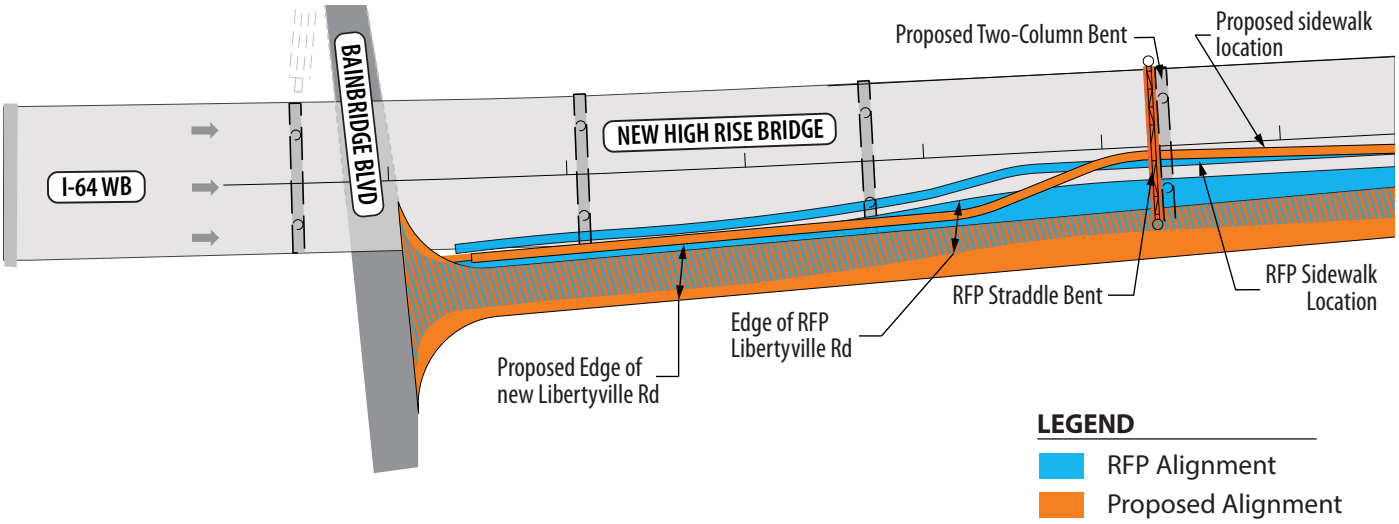
- **Safety.** The revised profile grade improves the speed at which the road sheds water, increasing the traveling public's safety during and immediately after a rain event.
- **Operations.** The revised alignment will facilitate MOT phasing on future I-64 Southside Widening and High Rise Bridge Phase II.
- **Schedule.** The revised horizontal alignment reduces wetland impacts by as much as 16,300 sf west of the HRB, which will reduce the related permitting schedule risks. Also simplifies construction of the Special Design Wall and the western bridge abutment.
- **Construction.** Reduces the need for pavement demolition and the amount of new full depth pavement.
- **Public Acceptance.** Generates goodwill due to reduced impacts to wetlands and reduction of 0.25 acres in the amount of proposed additional ROW.

R5 Improved Alignment of Libertyville Road

The RFP Conceptual Plans show HRB straddle bents spanning Libertyville Road with the southern columns close to the tidal wetland bank. We moved Libertyville Road to the south using larger radius horizontal curves, which allowed us to replace the HRB straddle bents with typical two column pile bents on the north side of the road. See Figure 4.3-3 on the following page.

- **Safety.** Elimination of straddle bents creates safer conditions due to column repositioning to protected area on north side of roadway. Moving Libertyville Road to the south reduced the amount of HRB overhang, which decreases likelihood of future bridge strikes related to activities on roadway.
- **Operations.** Conventional pile bents are likely to require less maintenance than straddle bents.
- **Schedule.** Conventional pile bents require less time to build than straddle bents.
- **Construction.** Simplifies construction by minimizing bridge work above roadway.

Figure 4.3-3: Libertyville Rd Horizontal Shift



- **Public Acceptance.** Elimination of straddle bents eliminated the possibility, whether planned or inadvertent, of impacting the tidal wetland bank.

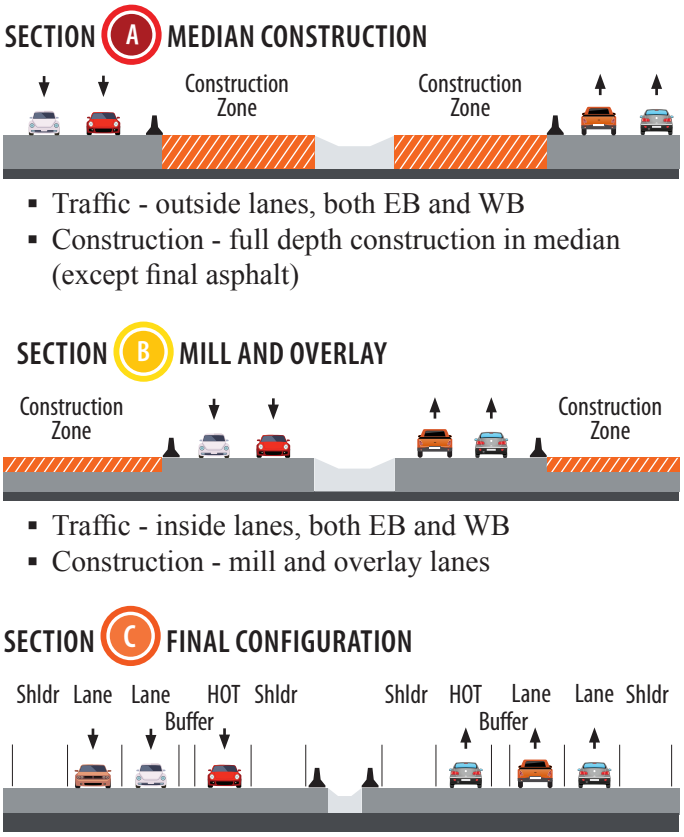
R6 Simplified MOT Sequences to Minimize Impact on Traveling Public

As discussed in Enhancement R1 and Section 4.5.1, we developed a simplified MOT scheme with the goal of constructing the project in as few MOT Phases as possible. In general terms, after some preparatory work, we set up a barrier-protected work zone in the "median" of I-64. Typically, once work in the median work zone is completed, we set up concurrent northern and southern barrier-protected work zones encompassing the exterior of the existing roadway. Once work in these exterior work zones is complete, we conduct final paving and permanent striping in transient work zones across the full width of the roadway. The exception is between the HRB and Great Bridge Boulevard, where the exterior work zones are sequential rather than concurrent, with setup of the southern work zone happening first. The east side also has the complication of on and off ramps that require localized MOT accommodations. See Figure 4.3-4.

Benefits:

- **Safety.** The minimum number of traffic switches creates a more predictable, and therefore safer, environment. In addition, executing the majority of construction activities in barrier-protected work zones is also safer for workers and the traveling public.
- **Operations.** Traffic throughput during construction will be maximized due to relatively long-term traffic patterns with predictable lane configurations and good lines of sight.

Figure 4.3-4: MOT Phasing West to HRB



- Traffic - outside lanes, both EB and WB
- Construction - full depth construction in median (except final asphalt)
- Traffic - inside lanes, both EB and WB
- Construction - mill and overlay lanes
- Traffic - all traffic in final configuration
- Construction - surface course and final striping

- **Schedule.** The efficiency of this approach to MOT enhances the likelihood of achieving the Substantial Completion Milestone for opening I-64 to eight lanes of traffic.
- **Construction.** Construction will be more efficient in static work zones than in transient lane closures.
- **Public Acceptance.** The predictability of traffic movement through the project will engender goodwill.

R7 Retaining walls along Great Bridge Boulevard (GBB)

We are providing two retaining walls, each about 300 ft. in length, parallel to GBB and tying into the west wingwall of the bridge abutments. These retaining walls will ensure that the roadway embankment has minimal impact on existing force mains that lie west of and parallel to the road. These force mains, an 8-in. and a 30-in, are reported to be in poor condition, so unlikely to respond well to additional overburden loading or to settlement.

Benefits:

- **Safety.** Eliminates risk of a ruptured sanitary pipeline.
- **Operations.** Constructing retaining walls to avoid placing embankment over the pipes ensures that the utility company will have access for future maintenance.
- **Schedule.** Construction of the retaining walls eliminates the need to relocate or strengthen the existing pipelines. This is important as relocation of GBB is on the Critical Path to the Substantial Completion Milestone for opening I-64 to eight lanes of traffic.
- **Construction.** GPC will control construction, avoiding relying on a utility for timely action.
- **Public Acceptance.** Avoid relocating and/or damaging the pipelines to eliminate service outages.

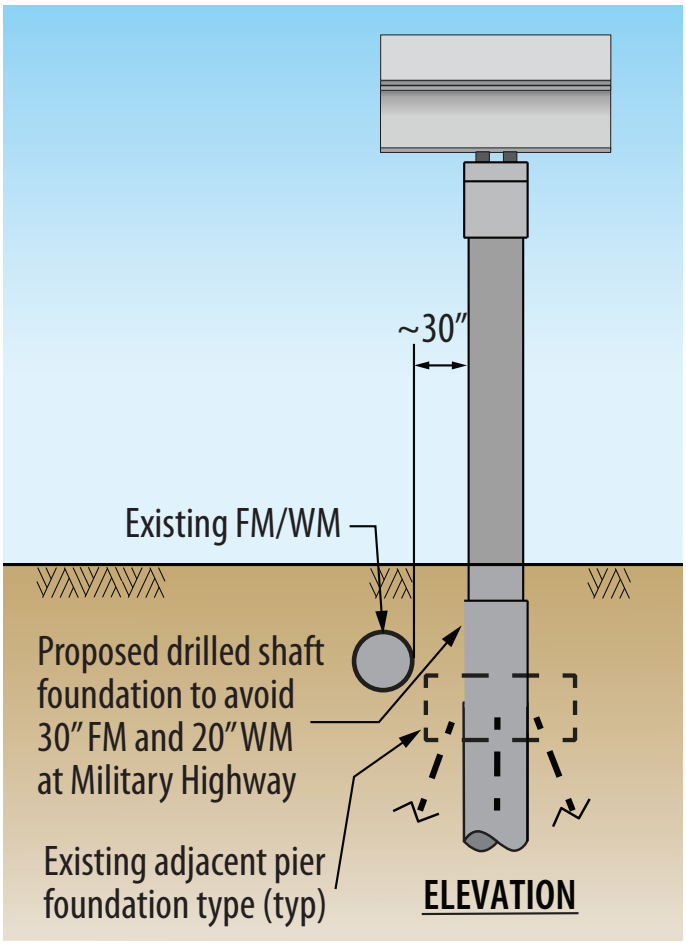
R8 Drilled shafts for I-64 bridge Widenings at Military Highway

The RFP Conceptual Plans depict a variety of public and private utilities near the pier foundations for the dual I-64 bridges over Military Highway, including a 30-inch SFM and a 20-inch water main. In lieu of relocation, we plan to protect the utilities in place as we install drilled shafts for the bridge widenings.

Benefits:

- **Safety.** Drilled shafts avoid the need for relocations that would require considerable trenchwork in traffic, including street plating, lane closures, and maybe a detour.
- **Operations.** Installation of drilled shafts will avoid utility relocations that would disrupt traffic on Military Highway and cause service interruptions.
- **Schedule.** This work is not on the critical path, but any relocation would cause a considerable extension to the period of work on Military Highway.
- **Construction.** GPC will have control of construction instead of having to rely on timely action by a utility.

Figure 4.3-5: Drilled Shaft Foundations



- **Public Acceptance.** Motorists and pedestrians on Military Highway will want the shortest possible period of disruption due to construction.

R9 Steepened side slopes at ramp from I-64 WB to GBB

GPC will modify the side slopes on the GBB ramp embankment to avoid impacts to the adjacent archaeological area, as depicted in Figure 4.3-6. We will do so by constructing a retaining wall at the base of the slope or by installing MGS-1A guardrail with lengthened posts (allows a smaller shoulder behind the guardrail while maintaining the proper shoulder or guardrail offset). Our concept at this location shifts the sidewalk and curb along the southwest quadrant of the intersection with Libertyville Road and includes a retaining wall to avoid a potential utility relocation, while meeting design standards.

Benefits:

- **Schedule.** Addressing impacts on archaeological areas is unpredictable and time consuming, which could be problematic. This work is important as relocation of GBB is on the Critical Path to the Substantial Completion Milestone for opening I-64 to eight lanes of traffic.
- **Construction.** GPC will have control of construction of the steepened slope instead of having to rely on timely action by the permitting agency. Pulling the toe of slope away from the archeological area reduces the possibility of unexpected finds during construction that could result in lengthy delays.

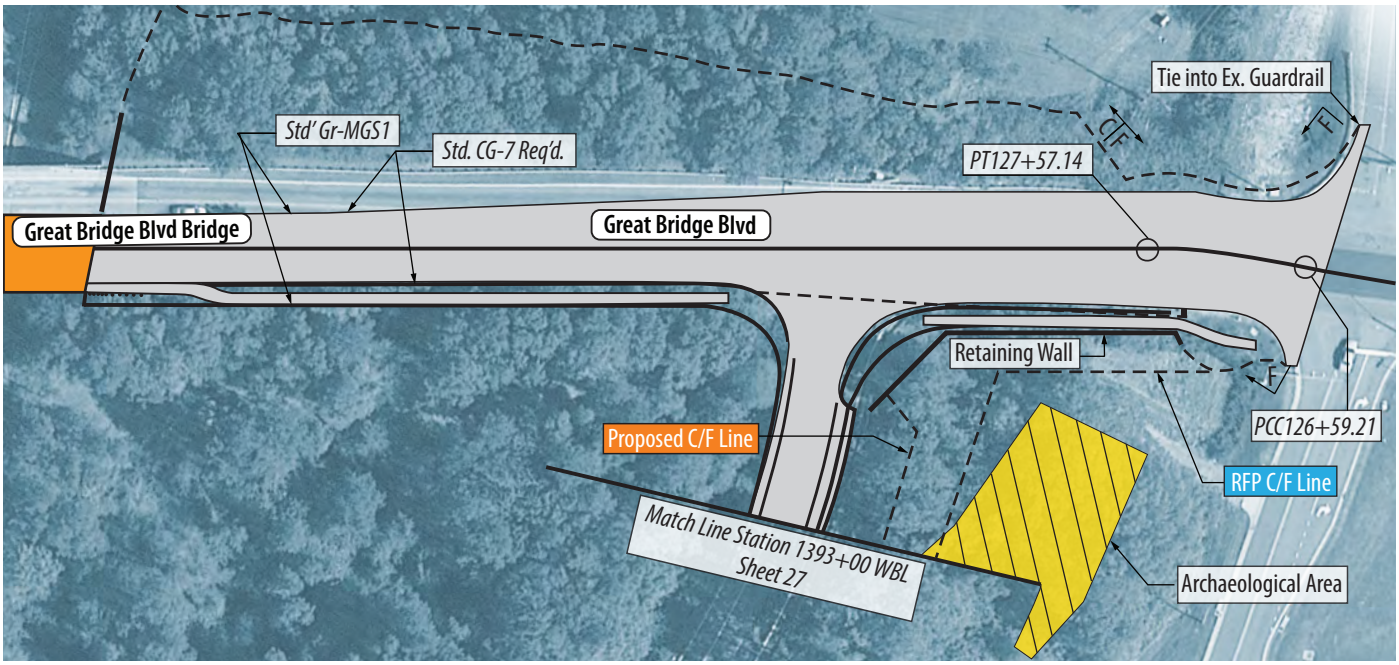
R10 Added Special Design Wall west of HRB

As depicted in Figure 4.3-7, GPC will build a special retaining wall with sheet pile adjacent to I-64 WB just west of the new HRB, from approximately Station 1279+50 to Station 1287+80 on the right side of WB I-64. This wall will define the boundary between the roadway corridor and the adjacent wetlands. The sheet pile will protect the fill, although the fill will be stabilized by layers of geotextile fabric and settlement will be expedited by wick drains.

Benefits:

- **Safety.** Land-based work is historically safer than marine work and this means and methods would allow for this wall to be built from landside.
- **Operations.** The design life of the wall and the geotextile reinforced embankment would create no special maintenance considerations. Location

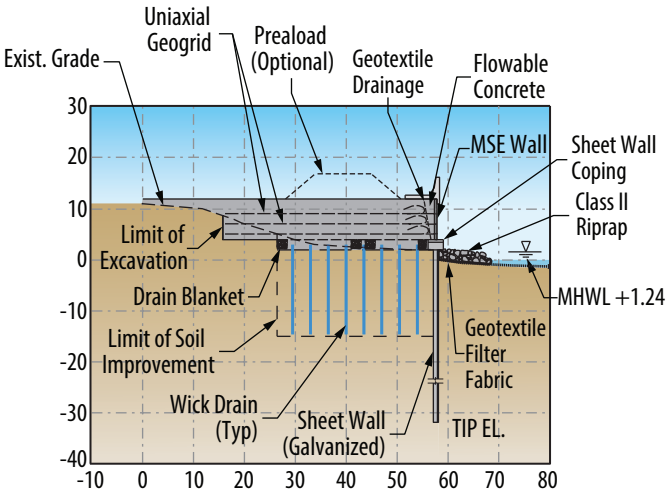
Figure 4.3-6: Steepened Side Slopes at Ramp from I-64 WB to GBB



will support additional roadway widening in Phase II.

- **Schedule.** This work is not on the critical path, but timely completion improves access to the HRB activities like trestle installation and pile driving.
- **Construction.** GPC will have control of construction of the retaining walls instead of having to resolve permitting issues caused by impacting the adjacent wetlands. Also, GPC decision to work from landside avoids barge access that is tide-dependent and would be likely to stir considerable river bottom sediment.
- **Public Acceptance.** Demonstrates proactive environmental stewardship.

Figure 4.3-7: Special Design Walls for HRB



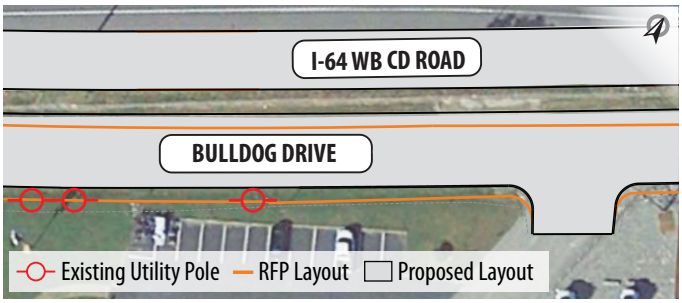
R11 Shifted Alignment of Bulldog Drive

As depicted in Figure 4.3-8 GPC shifted Bulldog Drive about 4 ft. to the north to avoid impacting DVP poles on the south side of the road. These utility poles were not identified in the RFP Conceptual Plans or other RFP documents; and the RFP design is in direct conflict with three poles. Although owned by DVP, the poles support multiple other utility lines.

Benefits:

- **Safety.** Elimination of relocation work results in less exposure to mishap.
- **Operations.** Moving road so poles remain results in no potential relocation-related service outages.
- **Schedule.** This work is not on the critical path, but can be completed much quicker if pole relocation is not required and dependent on the utility relocation.
- **Construction.** GPC can focus on adjusting wet utilities since pole relocation will not be needed.
- **Public Acceptance.** No risk of complaints about loss of electrical, telephone, cable, or internet service.

Figure 4.3-8: Shifted Alignment of Bulldog Drive



R12 LED Lighting Fixtures at Bascule Bridge

The RFP allows for all current lighting fixtures to remain on the existing High Rise Bridge since none will be impacted by construction. GPC proposes to replace the four light fixtures directly adjacent to the bascule bridge and warning gates with Light Emitting Diodes (LEDs) like the ones being installed on all new and relocated light poles.

Benefits:

- **Safety.** LEDs have an advantage over High Pressure Sodium (HPS) fixtures in directionality and color. They emit a white light that is more concentrated so they would improve visibility at the warning gates. This increases safety by reducing the potential for rear end collisions and for motorists not seeing the warning gates at night. The change in light to a more vivid hue also gives advance-warning to approaching motorists.
- **Operations.** Due to their reliability, the high efficiency and low maintenance LED fixtures are more suitable for this highly-critical area.

- **Public Acceptance.** The improved lighting will be seen as beneficial.

R13 Expedited Installation of ITS Cameras in Permanent Locations

The ITS design package will be developed early in the design phase to allow ITS infrastructure installation to precede or coincide with roadway construction. ITS infrastructure such as cameras will begin to be installed in the first major MOT setup to take advantage of tree removal in the median work zone.

Benefits:

- **Safety.** Early installation will provide improved monitoring capabilities due to updated equipment and lines of sight.
- **Operations.** Incremental cutover to new cameras is likely to be smoother than rushing to cutover near end of contract.
- **Schedule.** Installing the ITS infrastructure early will allow the system integrator to begin their work prior to completion of the roadway construction, so they are not rushed to complete tasks in the months leading up to the 7/30/21 Final Completion Date.
- **Construction.** Installing the ITS infrastructure while the median work zone is in place avoids having to return to do the work using lane closures.
- **Public Acceptance.** Improved monitoring of corridor should result in improved response times and therefore less public aggravation.

R14 Additional Stone/Ground Improvements for First Responder and Tow Truck Staging Areas

GPC will provide staging areas in addition to the mandated emergency pull offs at no more than one mile intervals along the exterior shoulder while the median work zone is in place.

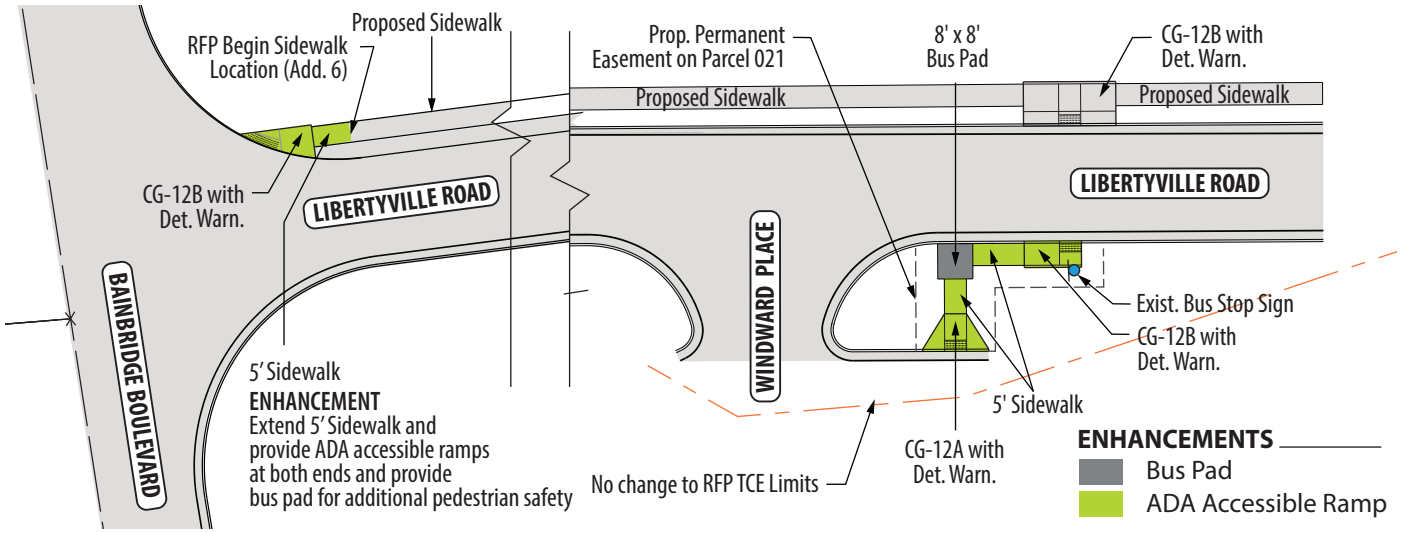
Benefits:

- **Safety.** This is a proactive measure to improve response time should incidents occur.
- **Operations.** Traffic flow will be improved by faster clearing of incidents.
- **Construction.** Staging areas will also improve efficiency of MOT and E&S Control crews.
- **Public Acceptance.** Faster incident remediation will reduce traffic jams.

R15 Addition of an ADA Acessible Ramp and Bus Pad on Libertyville Road

Libertyville is a commuter bus route with one bus stop within the project limits. Although the RFP Conceptual Plans depict a new sidewalk, the plans do not show a bus pad (queuing area) for customers. As depicted in Figure 4.3-9, (1) GPC will install two ADA ramps, one of which is an enhancement, at the intersection of Libertyville Road and Windward Place and one ADA ramp at the intersection of

Figure 4.3-9: Addition of an ADA Accessible Ramp and Bus Pad on Libertyville Road



Libertyville Road and Bainbridge Blvd. (2) GPC will install an 8-ft. by 8-ft. concrete bus pad adjacent to the grassed swale, where customers currently wait and queue for buses.

Benefits:

- **Safety.** ADA ramp make sidewalks available for the handicapped.
- **Operations.** Better pedestrian flow on Libertyville Rd and greater comfort for bus riders.
- **Public Acceptance.** Residents of Riverside Apartment Community will appreciate enhanced connectivity to the community, so more likely to tolerate construction activities such as temporary closure of Libertyville Road for HRB construction.

Drainage Enhancements

Our Team developed multiple design enhancements related to drainage and stormwater management. Our focus was to minimize future maintenance by simplifying the design and eliminating drainage structures where possible, to improve water quality by using grass ditches and channels instead of pipe systems where applicable, and to ensure easy access to project stormwater facilities.

D1 Use Weir Walls as Stormwater Outlets

Among our drainage enhancements are weir walls used as outlets for new stormwater management facilities. With two exceptions, our ponds and constructed wetlands include weir walls, rather than risers with outfall pipes.

Benefits:

- **Operations.** As a principle, surface stormwater conveyance has superior performance compared to piped stormwater conveyance in areas of flat topography like the Tidewater region. Using weir walls as stormwater management facility outlets reduces VDOT's future maintenance and eliminates the siltation tendency that comes with riser outfall pipes. Weir walls have commendable precedent, per our successful use of them for other Hampton Roads District projects and throughout Virginia.

Use weir walls to reduce VDOT maintenance costs

D2 HRB Grass Channels to Provide Stormwater Treatment for Bridge Scupper Discharge

Over land, bridge deck runoff will discharge from scupper outlet pipes to grass-lined channels located parallel to the new High Rise Bridge. We will design these channels as stormwater management best practices. Where the swales cross rail lines on the east side of the river, we will install RCP under the tracks. At both approaches to the bridge, the channels will qualify for an assigned level of stormwater runoff reduction treatment. The swale design is VDOT-approved and conforms to Virginia Department of Environmental Quality Specification No. 3 Facility (Grass Channel).

Benefits:

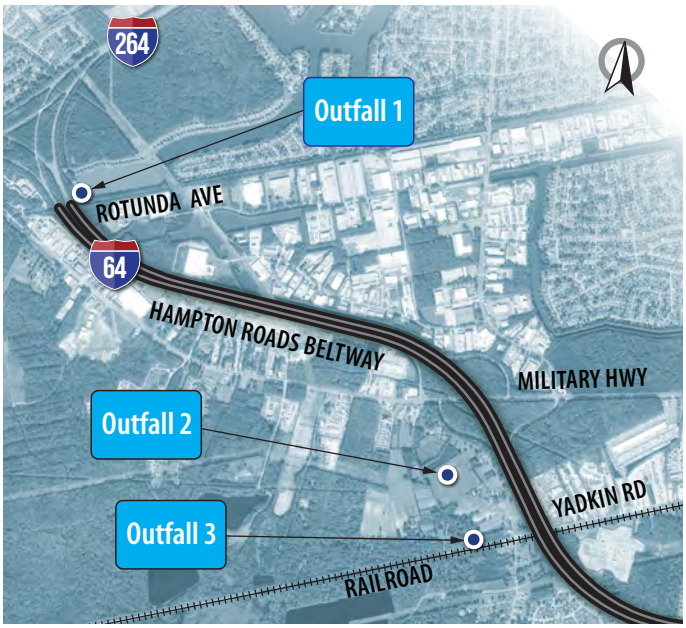
- **Operations.** The channels will tie in to both banks of the Elizabeth River, allowing clear discharge paths for bridge scupper drainage while contributing to the Virginia Stormwater Management Program requirements. A grass channel consists of simple construction which reduces future VDOT maintenance burden relative to a more complex stormwater management facility design. Incorporating these channels into the stormwater management treatment strategy will allow the project to take a stormwater runoff reduction credit, while reducing the need for additional infrastructure and possible additional right-of-way.

D3 Channel Designs to Improve Existing Stream Channels and meet Stormwater Permitting Requirements

For Outfall Nos. 1, 2, and 3, as shown in Figure 4.3-10, all of which are located south of I-64 and west

of George Washington Highway, we incorporated natural channel design as part of the stormwater management strategy.

Figure 4.3-10: Natural Channel Designs, to Improve Existing Stream Channels



Benefits:

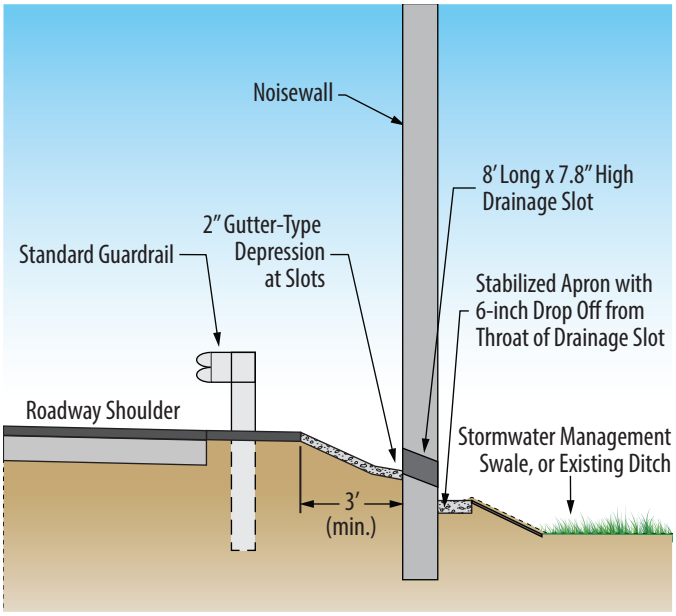
- **Operations.** The natural channel improvements will enhance stream morphology at the three outfalls, and mitigate the project's downstream environmental impacts per USACE and Virginia Stormwater Management Program requirements. The improvements are self-maintained in terms of wetland and waterway permits, eliminating future VDOT maintenance and carrying a net-positive benefit on the overall impacts to jurisdictional resources. They will reduce erosion, sediment transport, and flooding, while benefiting the hydraulic condition of downstream communities.

D4 Drainage Slots in Noise Walls

When the outside grading and topographical features permit, GPC will prioritize using hydraulically-efficient drainage slots through the bottom of noise walls adjacent to I-64 to safely discharge roadway runoff to the back side of the wall. Such slots are an acceptable drainage treatment per the FHWA Highway Noise Barrier Design Handbook (February 2000). Tentatively 7.8 in. high and 8 ft. long, the slots will simulate curb drop inlet openings. The FHWA Highway Noise Barrier Design Handbook states in Section 7.1.2 ~ Accommodating Water Flow Through a Barrier, page 117: "The effect of a continuous gap of up to 20 cm (7.8 in) at the base of a noise barrier is usually within 1 dB(A)". We will design the slotted noise walls to be structurally sound without reducing acoustic performance. The drainage slots will conform to design guidance presented in the FHWA Highway Noise Barrier Design Handbook.

As depicted in Figure 4.3-11, in front of the noise wall, we will pave the area between the guardrail and the wall's face, preventing unwanted vegetation and slow-moving water. Furthermore, we will include a 2-in. "gutter depression" treatment in the paving adjacent to the noise wall slots, like VDOT curb drop inlets, with a 4-in.-drop through the slot throat. Behind the noise wall, a stabilized apron will prevent unwanted vegetation growth that could potentially obscure the openings. Here, we will provide a 6-in. drop-off from the back of the throats to account for any siltation on the aprons.

Figure 4.3-11:Drainage Slots in Noise Walls



Benefits:

- **Safety.** Noise wall slots will be a far more reliable drainage system than trench drains, so less likely to result in dangerous standing water on the interstate.

- **Operations.** Surface stormwater conveyance performs better than closed drainage systems in areas of flat topography. This enhancement forgoes the need for maintenance-intensive storm inlets and connecting storm drain piping at many noise walls. Our innovative design will replicate the self-cleaning hydraulic efficiency found in a VDOT standard curb drop inlet opening. Furthermore, the noise wall drainage slots are a better solution than maintenance-intensive trench drains along the pavement edge of flat sections of I-64, as they will significantly reduce future VDOT maintenance costs.

D5 Rolling shoulders to Provide Efficient Stormwater Conveyance

Where the longitudinal profile of I-64 offers minimal or no slope adjacent to concrete barriers or to VDOT Standard No. MC-3B asphalt curbing, GPC will promote drainage efficiency and minimize hydroplaning risks by designing and constructing a rolling shoulder profile. This type of treatment is often applicable at noise walls, for cases where the design requires barrier or curb installation. GPC will generate rolling flowlines at the barrier/curb faces, by warping the shoulder cross slope in conformance with AASHTO and VDOT criteria for shoulder rollover, minimum cross slope, and maximum cross slope. As directed by the RFP, our design flowline profiles will be included in the final construction plans. Our default target minimum flowline is a grade of 0.5% with an absolute minimum flowline grade of 0.3%.

Benefits:

- **Safety.** Rolling shoulders will minimize standing water on the shoulders that could create unsafe driving conditions.
- **Operations.** Using rolling shoulders gives VDOT a superior design since it foregoes maintenance-intensive trench drains along the barrier face and reduces future VDOT maintenance costs.

D6 Roadway Realignment at GBB to Avoid Stormwater Impact

The RFP Conceptual Plans showed the northern GBB tie-in just south of the intersection with Campostella Road. As a result, the RFP project limit would require a tie-in to an existing city-maintained public drainage system to the north of the project, which happens to be highly- substandard in multiple ways.

Issues with this problematic city drainage system include an obvious lack of positive drainage, inadequate capacity for storm drains and pipe systems, and insufficient right-of-way to make any improvements to the existing drainage systems.

To address these deficiencies beyond the project limits, GPC redesigned the GBB alignment on the north side of the bridge, so that the project can tie just south of Tennyson Street. See Figure 4.3-13 on the following page. This design reduces impacts to the local streets, and more importantly, eliminates the need for the drainage system to tie into a substandard receiving drainage system.

Figure 4.3-12: Location of drainage slots in noise walls and rolling shoulders

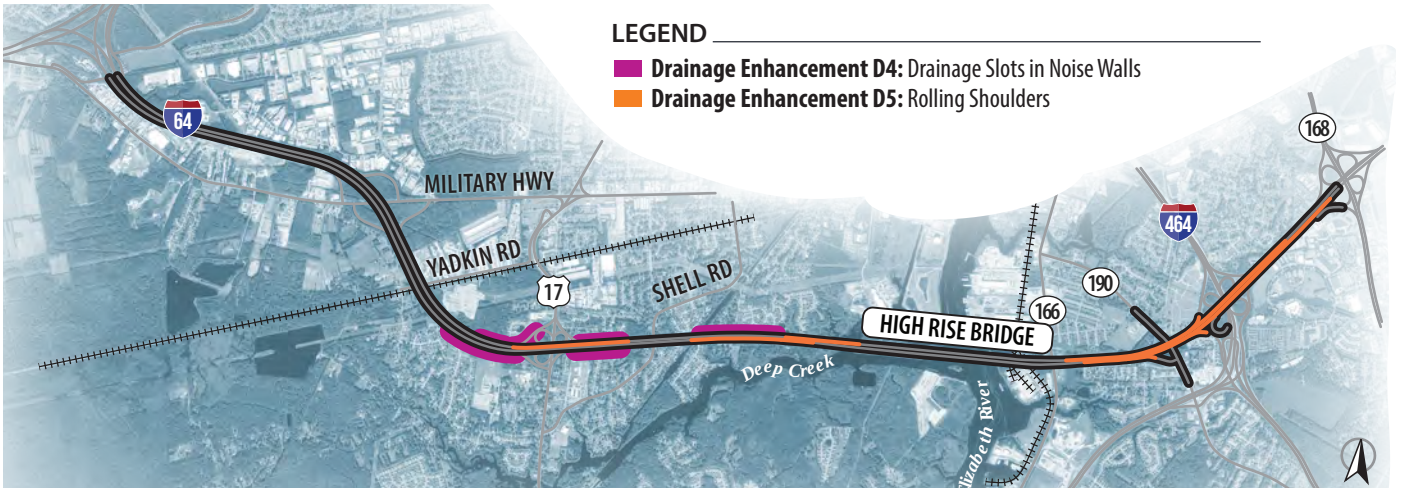
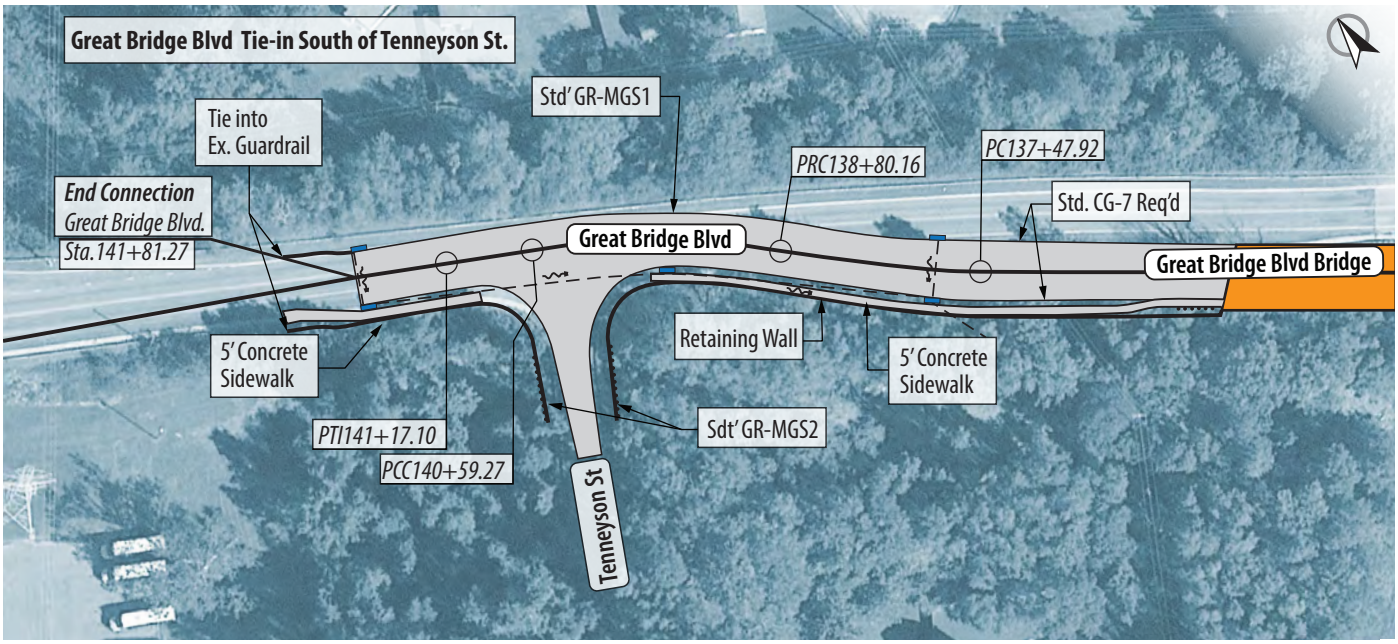


Figure 4.3-13: Roadway Realignment at GBB to avoid Stormwater Impact



Benefits:

- **Safety.** Changing the GBB tie-in point avoids the possibility of contributing to flooding north of Campostella Road.
- **Operations.** Our design avoids impacts to the substandard drainage system beyond VDOT right-of-way, since any infrastructure retrofit beyond the project limits could cause undue impacts to private property, city systems, project schedule, and budget.
- **Public Acceptance.** In this case, we avoid the ill will from the flooding that might result from the RFP Conceptual Plans.

D7 Replacement of all I-64 Cross Culverts that Carry an As-Inspected Condition of Less Than "Good"

The RFP presents the option for the Design-Builder to rehabilitate inspected pipes whose inspection reports indicate a condition which is not "good" or "excellent". GPC proposes to replace all cross-culvert with such inspection results underneath I-64 with new pipe within the project limits.

Benefits:

- **Operations.** Placing new cross-culverts presents a better design, since the new pipes will typically have more hydraulic capacity than a rehabilitated pipe because rehabilitation will often reduce a pipe's cross-sectional area. Also, a newly-installed culvert will have a longer design life than a rehabilitated cross-culvert, thus mitigating the risk of future maintenance and replacement.

D8 Maintenance Access doors in Noise Walls, to Facilitate Access to new VDOT Stormwater Management Swales

GPC proposes to provide access doors in noise walls, so that VDOT maintenance forces can easily access proposed stormwater management swales located "behind" the noise walls along I-64. Even though the RFP does not require access for these swales, these facilities will need occasional mowing and maintenance, and access from I-64 tends to be the only convenient access point. GPC will ensure that each stormwater management swale has at least one access door that will allow mowing equipment to pass through from the I-64 shoulders.

Benefits:

- **Operations.** VDOT can regularly provide easy maintenance to stormwater management swales in accordance with their permit requirements, without having to go through private property. Easy access also helps ensure that maintenance does not get deferred, thereby contributing to unintended failure of the facilities' functionality.

Utility Enhancements

We contacted Hampton Roads Sanitation District (HRSD) and the City of Chesapeake Department of Public Utilities, as well as Virginia Natural Gas, Columbia Gas, Verizon, Cox Communications, Level 3 Communications, Qwest/CenturyLink, and Lightower Fiber Network, and we reviewed their utility files and available as-built drawings. We also discussed potential utility conflicts, including conflict details and costs associated with relocating utility facilities as needed. Below is a discussion of the utilities in the corridor and our proposed enhancements:

U1 Military Highway Drilled Shaft Designed to Protect Critical Sewer

GPC has designed a drilled shaft alternative at the Military Highway bridge widening to protect a 30-in. HRSD sanitary force main currently less than six inches from the existing bridge pier foundation cap on the south side of Military Highway. This 40-year-old reinforced concrete pipe's condition is suspect because this type of pipe is highly-susceptible to sanitary sewage gas corrosion. Dynamic vibrations from pile driving for the new pier foundations near the main could rupture it. The pipe conveys sewage from the City of Chesapeake to a treatment plant in North Suffolk and, according to HRSD, cannot be shut down.

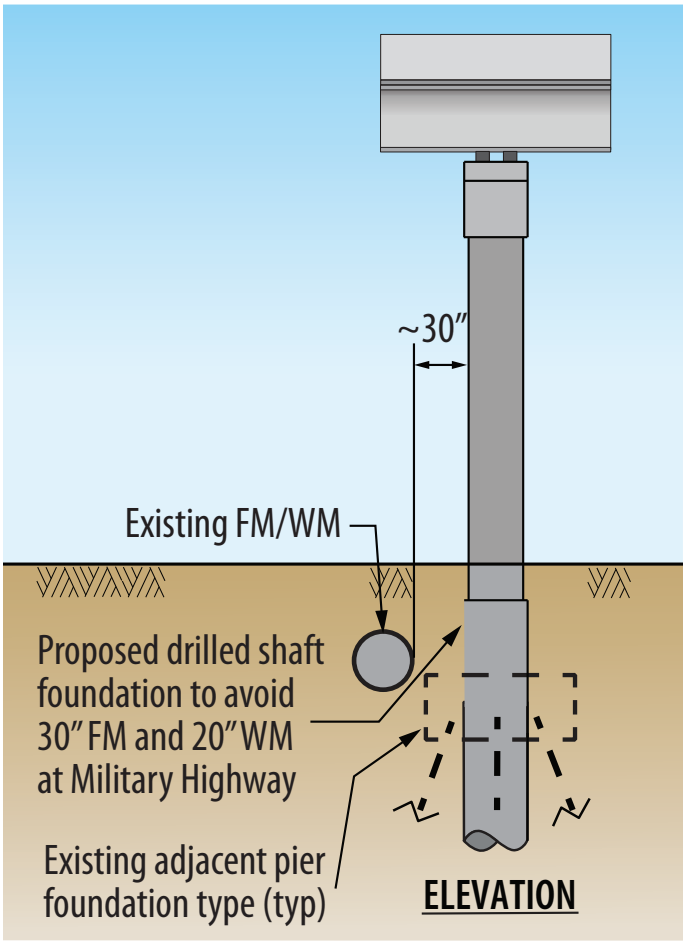
This enhancement, as depicted in Figure 4.3-14, allows for drilled shaft construction with at least 2.5 ft. of horizontal clearance to the existing RCP force main. This construction method will also protect the force main during construction.

A City of Chesapeake 20-in. water main in the Military Highway median also encroaches on the other bridge pier foundations, similar to the 30-in. force main. We will minimize impacts to the ductile iron pipe using the same construction methods.

Benefits:

- **Operations.** Drilled shaft installation reduces vibrations and minimizes risk of construction damaging the pipes, as compared to the installation of driven piles.
- **Schedule.** The alternative to our drilled shaft design is to relocate sections of the force main or water main into the travel lanes of Military Highway. Relocation would require additional coordination with the utility company and could cause delays.
- **Construction.** A drilled shaft operation with positive protection measures allows GPC to maintain control of the work instead of being dependent on completion of a relocation.
- **Public Acceptance.** Avoids customer service interruptions associated with a shutdown during relocation, reduces work along Military Highway, eliminates the need for detour around the work, and reduces project schedule impacts.

Figure 4.3-14: Drilled Shaft Foundations



U2 Avoid Gas Main near Battlefield Boulevard

A 20-in. gas main crossing I-64 just west of Battlefield Boulevard posed a conflict to the proposed stormwater pond north of the road. We redesigned the grading of the pond to avoid the gas main.

Benefits:

- **Safety.** GPC is avoiding the gas main by keeping the gas main outside the excavation limits.
- **Operations.** Eliminating the need to relocate the gas line avoids shutdowns.
- **Schedule.** Avoiding the relocation allows GPC to maintain control of its schedule.

U3 Expose Utilities to Verify Locations

GPC will test pit utilities as part of the design phase, scheduling this work to occur during the 120 Day Scope Validation Period. Subsequently, during the construction phase GPC will relocate and expose all utilities prior to excavation work to ensure that subsurface Level A data is accurate. Additionally, we will attempt to verify all subsurface Level B designations.

Benefits:

- **Safety.** Minimizes risk of utility strikes and outages.
- **Operations.** Avoids loss of service.
- **Schedule.** Reduces potential schedule impact by verifying subsurface utility data early in the project, off the critical path, and under GPC control.
- **Public Acceptance.** Reduced risk of outages that will cause ill will.

U4 Realign Libertyville Road to Avoid Utility Poles

The RFP Conceptual Plans for Libertyville Road would impact the utility poles located on the south side of the roadway. Relocation would be required and this could generate costly underground work and/or lengthy rerouting along Bainbridge Boulevard. GPC realigned Libertyville Road to eliminate impacts to these utility poles.

Benefits:

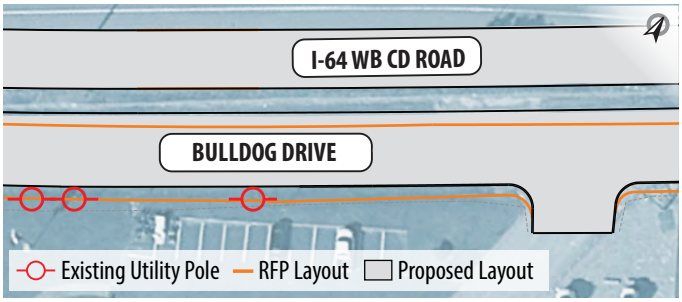
- **Operations.** Avoids service outages that would be required during relocations.
- **Schedule.** Eliminating impacts to the utility poles minimizes schedule impacts and need for additional easements.

Utility Poles at Libertyville Rd.

U5 Shifted alignment of Bulldog Drive

As depicted in Figure 4.3-15, GPC shifted Bulldog Drive approximately 4 ft. to the north to avoid impacting DVP poles on the south side of the road. These utility poles were not identified in the RFP Conceptual Plans or other RFP documents; and the RFP design is in direct conflict with three poles. Although owned by DVP, the poles support multiple other utility lines. (There are other wet utilities along Bulldog Drive that will require relocation.)

Figure 4.3-15: Shifted Alignment of Bulldog Drive



Benefits:

- **Safety.** Elimination of relocation work results in less exposure to mishap.
- **Operations.** Moving road so poles remain results in no potential relocation-related service outages.
- **Schedule.** This work is not on the critical path, but can be completed much quicker if pole relocation is not required and dependent on the utility relocation.
- **Construction.** GPC can focus on adjusting wet utilities since pole relocation will not be needed.

- **Public Acceptance.** No risk of complaints about loss of phone, cable, or internet service.

U6 Retaining walls along Great Bridge Boulevard

We are providing two retaining walls, each about 300 ft. in length, parallel to GBB and tying into the west wingwall of the bridge abutments. These retaining walls will ensure that the roadway embankment has minimal impact on two existing sanitary force mains (SFM) that lie west of and parallel to the road. These SFMs, an 8-in. and a 30-in, are reported to be in poor condition, so unlikely to respond well to additional overburden loading or to settlement.

Benefits:

- **Safety.** Eliminates the risk of a ruptured SFM.
- **Operations.** Constructing retaining walls to avoid placing embankment over the pipes ensures that the utility company will have good access for future maintenance.
- **Schedule.** Construction of the retaining walls eliminates the need to relocate or strengthen the existing pipelines, which is on the critical path for GBB reconstruction. Timely relocation of GBB is essential to meeting the Interim Milestone for opening the new HRB before Thanksgiving in 2020.
- **Construction.** GPC will have control of construction of the retaining walls instead of relying on timely action by HRSD and the City of Chesapeake.
- **Public Acceptance.** Relocating and/or damaging the pipelines would certainly entail service outages.

4.3.2 Conceptual Bridge Plans (New High Rise Bridge)

GPC's new High Rise Bridge conceptual plans, which include enhancements (See Figure 4.3-16), give VDOT a low-maintenance design that exceeds durability and safety requirements. We take advantage of offline bridge construction to minimize impacts to Hampton Roads District residents and visitors, as well as marine traffic on the Elizabeth River. Our approach focuses on:

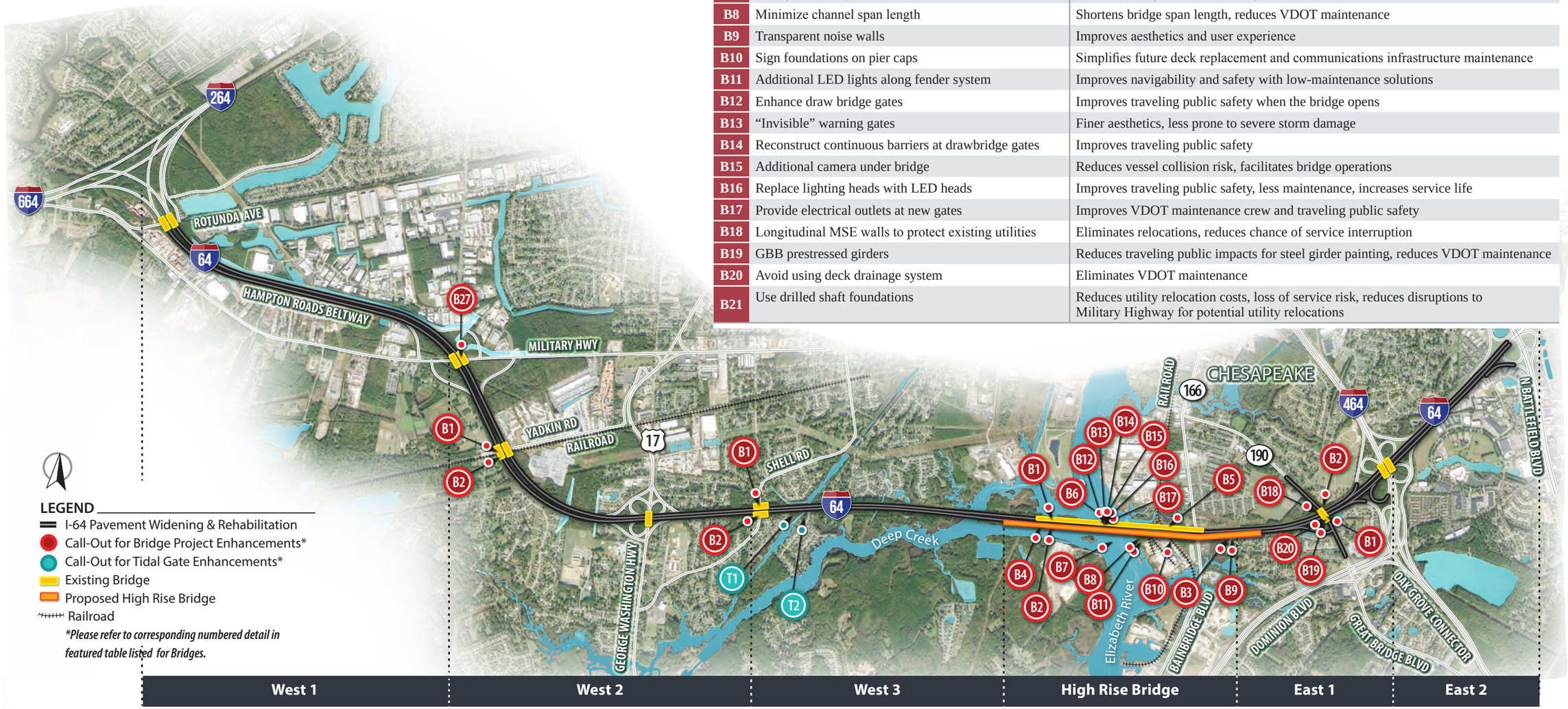
- Meeting our interim milestone for opening the new HRB before Thanksgiving 2020 using schedule-efficient methods, such as precast concrete elements (See Enhancements B1 and B2);
- Reducing bridge length by 638 ft. to a structure length of approximately 6,289 ft. comprising of 38 spans, 23 land piers, and 14 water piers, shortening construction time and reducing maintenance (See Enhancement B7);
- Increasing durability and reducing VDOT's lifecycle costs in conformance with current VDOT practices, such as maximizing low permeability concrete and corrosion resistance reinforcement, and through enhancements, such as using pre-tensioned concrete beams, pre-tensioned concrete piles with stainless steel strands, and weathering steel girders and diaphragms (See Enhancements B1);
- Eliminating the straddle bents near Libertyville Road found in the RFP Conceptual Plan as they typically pose concerns regarding lack of redundancy and durability issues associated with post-tensioning (See Enhancement B9);
- Reducing vessel bridge strike risk through pier realignment with navigation channel (See Enhancements B3 and B4); and
- Minimizing construction impacts on marine traffic by integrating a thorough constructability review of the permanent design with the selection of planned means-and-methods, producing optimal solutions such as the structural steel plate girders in the three-span unit at the navigation channel (See Enhancement B3).

Our concept bridge plans in Volume 2 include plan and elevation drawings, along with transverse sections. The lane numbers, widths, and shoulders comply with the RFP requirements. We meet all RFP design criteria and exceed the RFP requirements for several structural design elements. The proposed design is elegant in its clean lines and functionality; improving on the RFP Concept Plans by reducing the number of spans, piers, and bearings, reducing

Figure 4.3-16: GPC Bridge and Tide Gate Enhancements

Summary of GPC Tidal Gate Enhancements		
ID	Enhancement	Benefit
T1	Bypass culvert that runs parallel to the Gilmerton Canal box culvert	Decreases upstream flooding
T2	Redundant system that avoids manual activation during power outages	Avoids manual activation during power outages

Summary of GPC Bridge Project Enhancements		
ID	Enhancement	Benefit
B1	Pre-stressed foundation piles	Reduces lifecycle costs and VDOT maintenance
B2	Pre-stressed concrete girders	Reduces VDOT maintenance
B3	Eliminate straddle bents at Libertyville Road	Minimizes wetland and hazardous waste impacts, increases traveling public safety, reduces VDOT maintenance
B4	Reduce bridge length and lower profile	Reduces VDOT inspection and maintenance costs
B5	Eliminate pile caps	Improves durability, reduces environmental impacts
B6	Structural steel plate girders to maintain marine traffic	Short duration to erect steel beam over navigation channel
B7	Realign fender system	Increases bridge and vessel safety
B8	Minimize channel span length	Shortens bridge span length, reduces VDOT maintenance
B9	Transparent noise walls	Improves aesthetics and user experience
B10	Sign foundations on pier caps	Simplifies future deck replacement and communications infrastructure maintenance
B11	Additional LED lights along fender system	Improves navigability and safety with low-maintenance solutions
B12	Enhance draw bridge gates	Improves traveling public safety when the bridge opens
B13	“Invisible” warning gates	Finer aesthetics, less prone to severe storm damage
B14	Reconstruct continuous barriers at drawbridge gates	Improves traveling public safety
B15	Additional camera under bridge	Reduces vessel collision risk, facilitates bridge operations
B16	Replace lighting heads with LED heads	Improves traveling public safety, less maintenance, increases service life
B17	Provide electrical outlets at new gates	Improves VDOT maintenance crew and traveling public safety
B18	Longitudinal MSE walls to protect existing utilities	Eliminates relocations, reduces chance of service interruption
B19	GBB prestressed girders	Reduces traveling public impacts for steel girder painting, reduces VDOT maintenance
B20	Avoid using deck drainage system	Eliminates VDOT maintenance
B21	Use drilled shaft foundations	Reduces utility relocation costs, loss of service risk, reduces disruptions to Military Highway for potential utility relocations



the total deck surface area, eliminating pile caps (footings) on 13 land piers in Units 1, 6, and 7, making efficient use of waterline footings in the design analysis for vessel impact, using precast piling for predictable quality, and minimizing drainage piping.

In summary, our internal cross-disciplinary collaboration resulted in a value-engineered maintenance-friendly optimization of the bridge, which dramatically improves long-term asset performance, durability, and accessibility.

B1 Prestressed Foundation Piles

GPC will construct bridge foundations with low permeability concrete piling prestressed with stainless steel strands and reinforcing for high durability and in conformance with VDOT's standards. Our concept uses 24-in. square piles at the abutments, with 36-in. square piles and 66-in. diameter spun-cast cylinder piles supporting pier columns.

Benefits:

- **Operations.** Precast piles are an optimum solution for reducing maintenance requirements because of tight quality control during production and the reliability of installation results. In addition, precast piles use stainless steel tensioning strand and reinforcing to provide a highly durable structure. The spun-cast cylinder piles in particular have an excellent performance history in extreme environments due to the ultra-low water/cement ratio and intense compaction.
- **Schedule.** Installation of precast piling elements provides an optimal blend of ease of installation and predictability of outcomes.
- **Construction.** Predictable production results from standardization of piling types and sizing accomplished thru constructability reviews.

Using precast concrete elements will minimize on-site work, expediting bridge completion to accommodate opening before Thanksgiving 2020. Designed to eliminate cracking, precast piles are more durable than cast-in-place piles due to concrete pre-compression, enhanced material quality and the controlled factory environment during fabrication.

B2 Prestressed Concrete Girders

Each bridge span, except for the 3-span navigation channel unit, will feature low permeability, high-strength prestressed concrete bulb-tee girders ranging in length from 137 ft. to 196 ft. Temporary and permanent loading conditions will be independently verified (See Section 4.4.4).

Benefits:

- **Operations.** Prestressed concrete girders have a demonstrated history of extremely low maintenance combined with excellent structural performance. For example, in comparison to structural steel, which requires regular painting and more rigorous inspection, and segmental concrete box girders, where post-tensioning requires additional specialized maintenance and long-term provisions for access that add to the maintenance requirements, prestressed girders provide ultra-low maintenance over their service life. Using spans up to 196 ft. in length reduces the number of piers and foundations, which also reduces VDOT's maintenance costs.
- **Schedule.** Fabrication of precast beams is much quicker than structural steel. Erection is also much quicker because there are simpler bearings, no splice plates, fewer diaphragms, and no field-installed shear studs. Plus, precast beams do not require final painting after installation. This will expedite bridge completion to accommodate opening before Thanksgiving 2020.
- **Construction.** Handling of long precast beams takes special precautions, but is not technically difficult (See Section 4.4.4 QA/QC).

B3 Eliminate Straddle Bents

As previously detailed in Section 4.3.1 Roadway and depicted in Figure 4.3-17 on the following page, our concept optimizes the alignment of Libertyville Road, shifting it slightly to the south while moving the sidewalk to the north. This optimization allows use of the typical two-column bent used elsewhere on the new HRB.

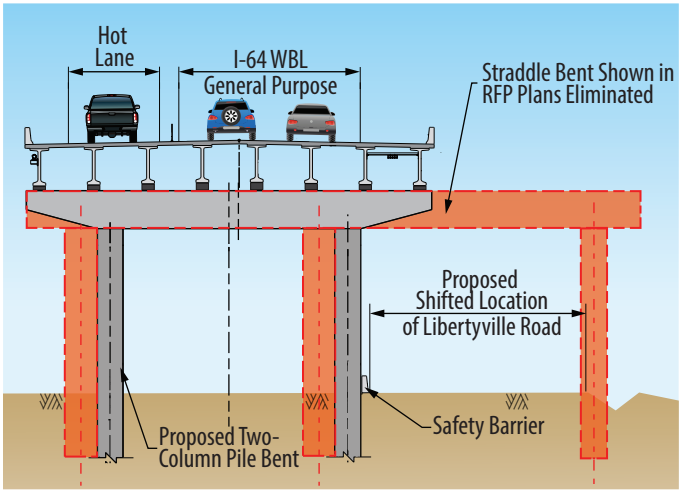
Benefits:

- **Safety.** By eliminating straddle bents, we avoid the possibility of encountering hazardous

materials on the south side of the road. We also no longer have columns close enough to Libertyville Road to be susceptible to vehicle strikes. And finally, we have a safer structure design with higher system redundancy.

- **Operations.** It minimizes ongoing inspection and maintenance costs associated with critical straddle bents.
- **Schedule.** Construction duration for two-column bents is considerably shorter than straddle bents, so the Libertyville Road detour will be required for less time.
- **Public Acceptance.** The switch to two-column bents delivers a uniform HRB aesthetic form that is pleasing to eye. Eliminating straddle bents also avoids likely construction impacts to the wetland bank on the south side of the road.

Figure 4.3-17: Shifted Alignment of Libertyville Dr.



B4 Reduced bridge length and lower profile

As described in Section 4.3.1 Roadway and depicted in Figure 4.3-18, our concept shortens the High Rise Bridge approximately 585 ft. on the west side and 53 ft. on the east side of the Elizabeth River. This is made feasible in part by reducing structure depth associated with a shorter main span and lowering the profile, as well as by extending the RFP concept MSE walls on both sides of the river.

Benefits:

- **Safety.** Building less bridge is safer, since bridge construction is statistically more dangerous than roadway construction.
- **Operations.** A shorter bridge reduces VDOT's long-term maintenance and inspection costs. These savings are preserved by an MSE wall design that is ultra-low maintenance. The west side wall, in particular has free draining backfill and corrosion resistant reinforcing in the potential flood zone and scour and erosion protection along its toe to protect against sea level rise and storm surge.
- **Schedule.** Shortening the bridge shortens the critical path to achieving our Interim Milestone to open the new HRB before Thanksgiving 2020.
- **Construction.** The shorter main span and decreased steel girder depths will reduce the maximum pick sizes during erection, simplifying work over the navigation channel.

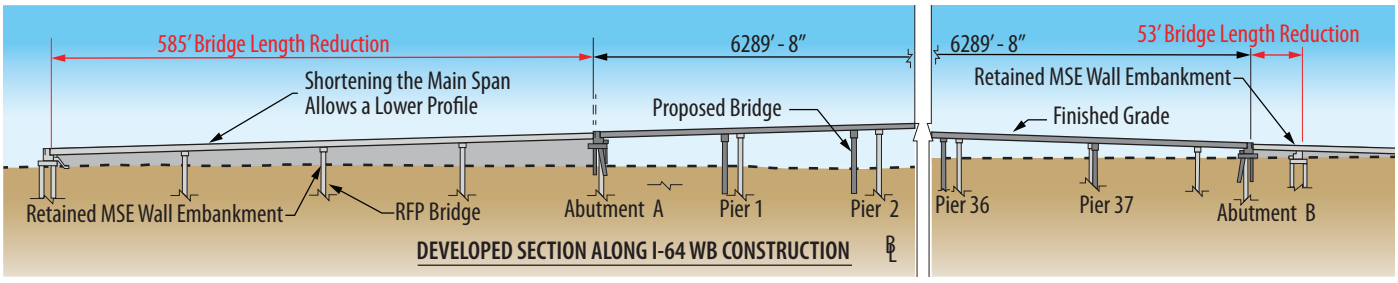
B5 Eliminate Pile Caps

For land piers on both sides of the Elizabeth River, we use two-column pile bents supported on 66-in. diameter prestressed concrete spun-cast cylinder piles to eliminate 13 pile caps.

Benefits:

- **Operations.** Eliminating pile caps on land improves durability.
- **Schedule.** Elimination of pile caps reduces the resource demands for construction of these piers,

Figure 4.3-18: Reduced Bridge length and lower profile



freeing labor and equipment for other work that is critical to our interim milestone for opening the new HRB before Thanksgiving 2020.

- **Construction.** Eliminating pile caps reduces potential excavation of hazardous material.
- **Environmental.** Eliminates excavation for pile caps.
- **Public Acceptance.** Eliminating pile caps minimizes environmental impacts by reducing structure footprint.

B6 Structural Steel Plate Girders at the Navigation Channel

Achieving the minimum horizontal clearance over the navigational channel requires a span of 250 ft. or more. Since this precludes using unspliced prestressed concrete girders, we propose structural steel plate girders instead. The size of the proposed steel girders was reduced by adjusting the pier layout in relation to the navigation channel.

Benefits:

- **Safety.** Smaller girder sizes will simplify critical picks over the navigation channel.
- **Operations.** Using weathering steel because this superstructure unit is above the splash zone will reduce future maintenance such as repainting. The decrease reductions in length and height of the steel girders will proportionally reduce the scope of future inspection and maintenance.
- **Schedule.** Reduction in the tonnage of structural steel should improve delivery date in support of the Interim Milestone for opening the new HRB before Thanksgiving 2020.
- **Construction.** The shorter main span and decreased steel girder depths will reduce the maximum pick sizes during erection, simplifying work over the navigation channel.
- **Public Acceptance.** Smaller member sizes will shorten period of construction, reducing impacts to marine traffic.

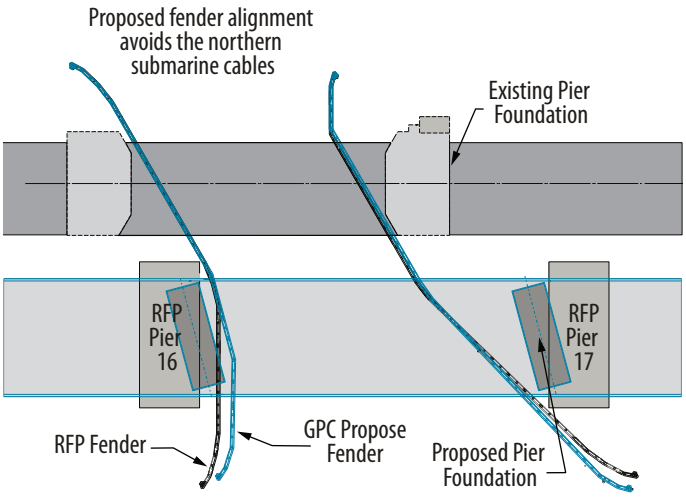
B7 Fender System Alignment

As depicted in Figure 4.3-19, GPC optimized pier and fender placement by skewing them so they better align with the navigation channel centerline.

Benefits:

- **Safety.** Enhances safety for both bridge and vessels by reducing the pier and fender areas that are exposed to vessels and improves the structure's resilience to a vessel strike. The proposed alignment also minimizes conflict with submarine cables by limiting the area of overlap to the cables that are directly below the existing movable span.
- **Operations.** Better channel definition and alignment will improve flow of commercial marine traffic. Will also decrease future maintenance by reducing the likelihood and severity of future vessel strikes.

Figure 4.3-19: Fender System Alignment



B8 Minimize Channel Span Length

The skewed pier alignment described above also allowed us to decrease the channel span length by 50 ft. from the RFP Conceptual Plans. See Figure 4.3-20 on the following page. This results in a shallower superstructure depth and a lower bridge profile, which in turn led to a reduced bridge length because of a lower apex.

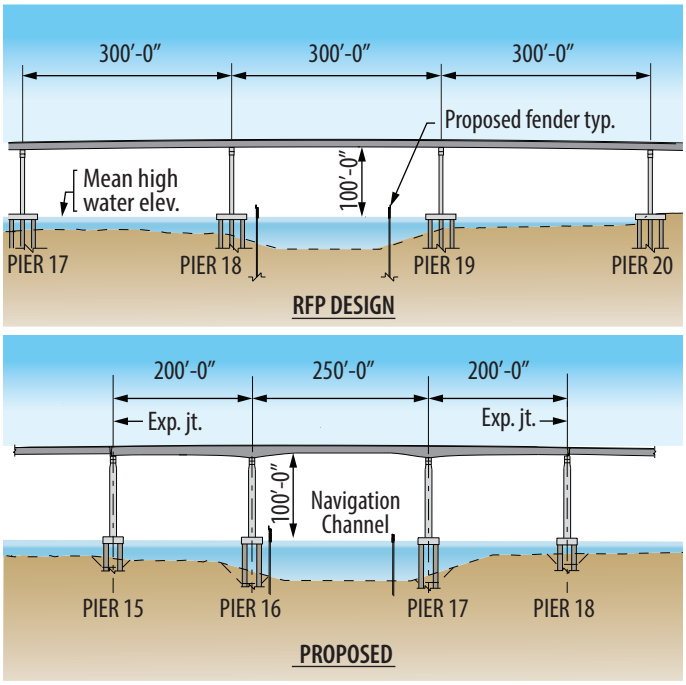
Benefits:

- **Safety.** Lighter girder sizes will simplify critical picks over the navigation channel.
- **Operations.** Less structural steel will reduce future inspection and maintenance requirements.

Elimination of fatigue prone details is also a maintenance benefit.

- **Schedule.** Decreased tonnage of structural steel should improve delivery date.
- **Construction.** Less structural steel to handle and erect.
- **Public Acceptance.** Less friction due to shorter closures of the navigation channel for girder erection.

Figure 4.3-20: Minimize Channel Span Length



B9 Transparent Noise Walls

In coordination with VDOT, we will provide transparent noise walls on the new High Rise Bridge. A similar system was successfully designed by Parsons and constructed by Granite and Corman on the new Woodrow Wilson Bridge over the Potomac River in Washington, DC.

Benefits:

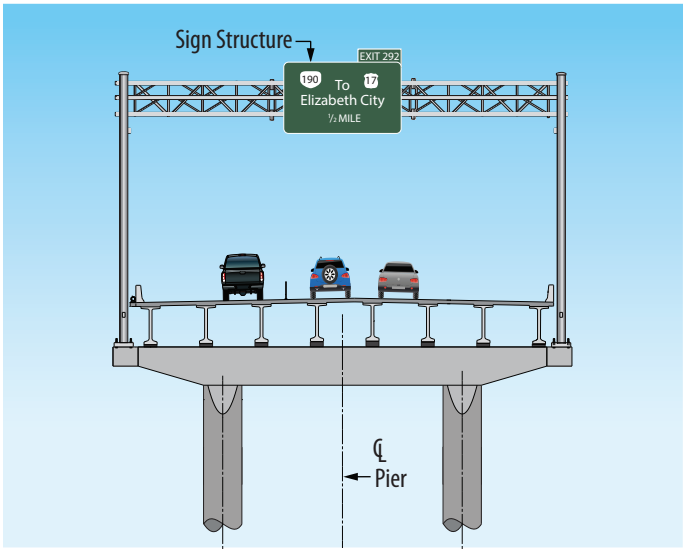
- **Safety.** Enhances safety as transparent noise walls have been crash tested.
- **Operations.** VDOT experience has established that transparent noise barrier requires less maintenance than available opaque options.
- **Public Acceptance.** This will greatly enhance the "openness" of the bridge and user experience.

Transparent Noise Walls

B10 Sign Foundations on Pier Caps

As depicted in Figure 4.3-21, ll new bridge-mounted static and dynamic message signs will be supported by sign gantries with foundations on the pier caps.

Figure 4.3-21: Sign Foundations on Pier Caps



Benefits:

- **Operations.** Improves redundancy of sign support system; while making it easier to replace the bridge deck, route conduit, and maintain communications infrastructure (i.e. ITS) over the life of the structure.

B11 Additional Lights at the Fender System

In coordination with VDOT and US Coast Guard, we will install additional LED lights at the fender system to improve the lighting provided in the RFP Conceptual Plans.

Benefits:

- **Safety.** Enhanced navigational aids and visibility.
- **Operations.** LEDs are low maintenance.
- **Public Acceptance.** Improved lighting will hasten acclimation to new channel alignment.

Ease of Maintenance

The proposed GPC design eases maintenance thru numerous design refinements and enhancements:

- Reducing bridge length by 638 ft. **(B4)**, resulting in approximately 10% less bridge to maintain.
- Using precast prestressed concrete beams and piles **(B1/B2)** provides a durable and nearly zero maintenance structure. The prestressed beams are accessible for inspection by conventional inspection methods. (Eliminating segmental box girder avoids the need for access openings, interior lighting, and entry security features.)
- Using solid concrete columns and pier caps for all piers eliminates interior access to hollow box columns. Two-column pile bents **(B5)** eliminates any maintenance associated with pile caps at these locations and provides a fully prestressed concrete section at the ground line for maximum column durability.
- Using standard Virginia Abutments at both ends of the new HRB provides an easily maintained expansion joint at these locations. The detailing of the Virginia Abutment also helps protect the bearings from water, hence reducing the maintenance at these locations.
- Using a realignment of Libertyville Road to eliminate maintenance-prone straddle bents **(B3)**.
- Using structural steel plate girders at the navigation span eliminated the need for post-tensioning and maintenance. GPC's proposed three-span steel plate girder **(B6/B8)** also reduces the length of the channel span and uses weathering steel to minimize future painting.
- Using laminated elastomeric bearings for all prestressed concrete girder spans. These bearings require no maintenance under normal conditions.

GPC's enhanced durability solutions using low permeability concrete, corrosion resistant reinforcing, and limited use of structural steel and no post-tensioning, except in spun-cast cylinder piles, will provide VDOT with a high value structure that performs well for an extended period. It can be easily accessed using conventional means to facilitate routine inspection and maintenance.

4.3.3 Existing Bridge Modification Conceptual Plans

GPC's proposal details our plans to maintain, modify, and upgrade the existing Drawbridge Traffic Management System (DBTMS) as the existing the High Rise Bridge (HRB) is converted from bi-directional I-64 traffic to dedicated use as I-64 EB. The plans also address structural modifications to accommodate this reconfiguration of usage. This includes removal of the median barrier, patching of deck with low shrinkage concrete, modification of expansion joints, addition of steel grating on movable span including a traffic rated access door, and rebalancing of the bascule leaves.

A new DBTMS will be installed to accommodate the roadway changes on the existing HRB. A new gantry will be placed across the entire roadway to support new drawbridge message signs, traffic signal heads, and warning gongs. New warning and barrier gates will also be installed as required by the new roadway lane configuration, which is solely I-64 EB with a HOT Lane, two General Purpose Lanes, and HSR. These warning and barrier gates will be located near the existing barrier gate system to facilitate cut-over from the existing to the proposed system.

All supplemental static signs will be placed on new poles or overhead structures. The new DBTMS will use new devices in accordance with the VDOT Special Provisions, with old devices returned to the Department when they are removed from service. To optimize the system, devices are co-located, sharing poles where effective. Vibration impacts on all devices will be evaluated and addressed so that they are reduced or eliminated as appropriate.

The new gantry columns that will support the existing drawbridge message sign will be supported on cantilevered concrete slabs located behind the traffic barrier. Construction of these bump-outs will require localized demolition and reconstruction of deck slab, curb, and barrier. The top of the concrete

bump-outs, where the gantry column base plate will be supported, will be at the same level as the top of the concrete traffic barrier.

As per the RFP and VDOT's latest standards and specifications, the entirely new DBTMS system components will be integrated into the existing VDOT Advanced Traffic Management System (ATMS) and tested. In the interim, to ensure the DBTMS and ITS remain operational and effective during construction, temporary devices will be installed, as needed, subject to agency approval. The new system will go live once I-64 WB traffic is switched onto the new High Rise Bridge.

B12 Enhanced Drawbridge Gates

Structural modifications will be made on the existing bridge to accommodate the DBTMS system, including localized demolition of the deck, curb, and traffic barrier and reconstruction with a cantilevered concrete slab for mounting new warning and resistance gates.

For the resistance gates, two cantilevered steel brackets framed into the existing steel fascia girder will support the cantilevered slab. The housing for all four gates will be located behind the traffic barrier. Two feet minimum clearance will be provided on the sides and behind the opened gate for maintenance crew access. Footholds in the traffic barrier will be included for easy access to the gate housing units. The traffic barriers will be continuous in front of the gate housing.

Benefits:

- **Safety.** Keeping mechanical equipment behind the traffic barrier results in a safer roadway for the public and it protects maintenance workers. Providing footholds facilitates safer crossing of the traffic barrier for maintenance workers.
- **Operations.** Providing a work platform simplifies gate maintenance.

B13 "Invisible" Warning Gates

Warning gates that store in a horizontal position behind the traffic barrier will be provided. This innovation was successfully utilized by Parsons on the Woodrow Wilson Bridge to eliminate the visual impact of vertical 50-ft. gates at the edge of the bridge deck.

Benefits:

- **Safety.** Horizontal gates are less exposed to damage in traffic accidents or weather events, so less susceptible to dangerous gaps in functionality.
- **Operations.** Invisible gates are protected from heavy winds during storm events because the gate is supported at two locations and shielded by the traffic barrier.
- **Public Acceptance.** System is aesthetically appealing because it reduces visual impacts.

"Invisible" Warning Gates

B14 Reconstruction of Continuous Barriers at Existing Drawbridge Gate Locations

Construct a traffic barrier at gaps created by removing warning and barrier gates. Benefits:

- **Safety.** Provision of a continuous barrier will eliminate the dangerous condition that currently exists by eliminating exposed blunt end.

B15 Additional Camera under Bridge for Vessel Traffic

A camera will be provided under the existing moveable span and monitored in the operator's house.

Benefits:

- **Safety.** This gives an added view of marine traffic in the immediate vicinity of the bridge, heightening awareness for vessels traversing beneath the bridge by improving communications with the bridge operator. It also enhances safety for the traveling public by reducing the possibility of vessel collisions with the bridge.

B16 Replace Existing Lighting Heads with LED Heads

Upgrade lights adjacent to the gates to LEDs, which will make the gates more visible to the public.

Benefits:

- **Safety.** Enhanced lighting improves visibility.
- **Operations.** LED fixtures are more durable and require less maintenance.

B17 Provide Electrical Outlets at New Gates

GPC will add weatherproof GFCI electrical outlets at all new gate locations.

Benefits:

- **Safety.** Enhances safety by providing a fixed power source, simplifying mobilization for repairs and maintenance.
- **Operations.** This will provide commercial power for maintenance so there will be no need for portable generators.

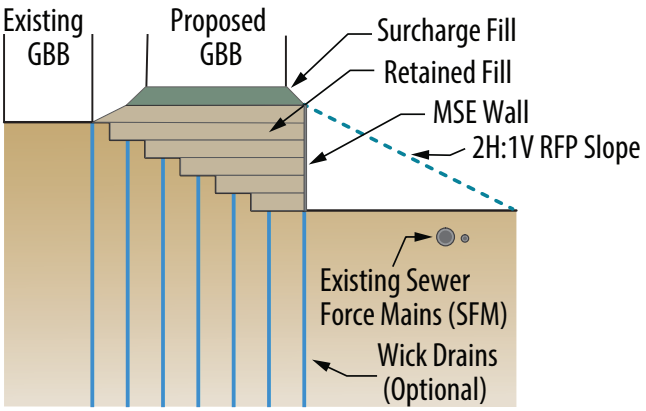
4.3.4 Conceptual Bridge Replacement Plans (GBB)

GPC proposes constructing a two-span bridge over I-64. The superstructure will incorporate 85-in. precast concrete beams and the foundations will employ 18-in. precast piles. The approach embankments will be truncated on the western side by 300-ft. long MSE walls that tie to the western wingwalls, reducing the Project footprint. This uncomplicated design produces a user-friendly structure that is accessible, durable, and easy to maintain.

B18 Longitudinal MSE Walls to Protect Existing Utilities

The RFP Conceptual Plans include roadway approach embankments at the Great Bridge Boulevard bridge that surcharge fragile, existing sanitary sewer force mains. To prevent the undesirable loading and settlement that this would create, about 300 feet of MSE wall parallel to the sewer will be provided on the west side of the roadway at each abutment. These MSE walls, depicted in Figure 4.3-22, will eliminate any surcharging of the force mains and reduce anticipated total settlement to acceptable levels.

Figure 4.3-22: Longitudinal MSE Walls



Benefits:

- **Safety.** Construction of MSE walls allows the existing pipes to remain in place because they eliminate additional dead load on the pipes and induce minimal settlement. This shortens the construction period for this critical bridge, avoids relocation or reconstruction of the pipelines, and provides access for future pipe maintenance.
- **Operations.** Requires minimal maintenance, and preserves maintenance access to the pipelines.
- **Schedule.** Avoiding relocation shortens the GBB construction period is support of meeting the Interim Milestone for opening the new HRB by Thanksgiving 2020.
- **Public Acceptance.** The traveling public avoid coping with service interruptions, flooding, and emergency repairs that might result from damage to the sewer force mains.

B19 GBB Prestressed Girders

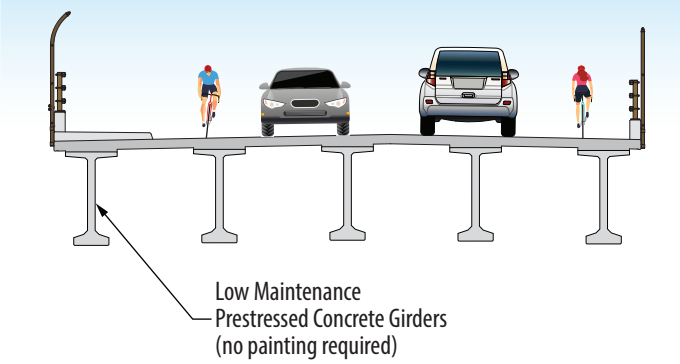
In lieu of steel plate girders, our optimized concept uses durable, low maintenance, prestressed beams for the Great Bridge Boulevard bridge over I-64.

Benefits:

- **Safety.** I-64 nighttime traffic impacts will be reduced since precast beams are quicker to erect than steel beams, and they have the added benefit of not requiring finish painting or life-cycle repainting.
- **Operations.** Long term, concrete beams require less rigorous inspection and are not as maintenance intensive as steel beams.

- **Schedule.** Precast beams have an earlier delivery date than steel girder and can be erected quicker.
- **Public Acceptance.** Erection of precast beams instead of steel girders will impose fewer nighttime lane restrictions creating fewer traffic issues. This also avoids lane restrictions during final painting and maintenance repainting.

Figure 4.3-23: Prestressed Girders for GBB



B20 Superstructure Design does not Require a Deck Drainage System

The deck cross-slopes and profile, shoulders, and abutments for the GBB bridge are designed to accommodate storm runoff without any drainage inlet structures on the bridge.

Benefits:

- **Operations.** Providing gutter line runoff of storm waters means not having to maintain a deck drainage system.

4.3.5 Conceptual Bridge Plans (Bridge Widenings)

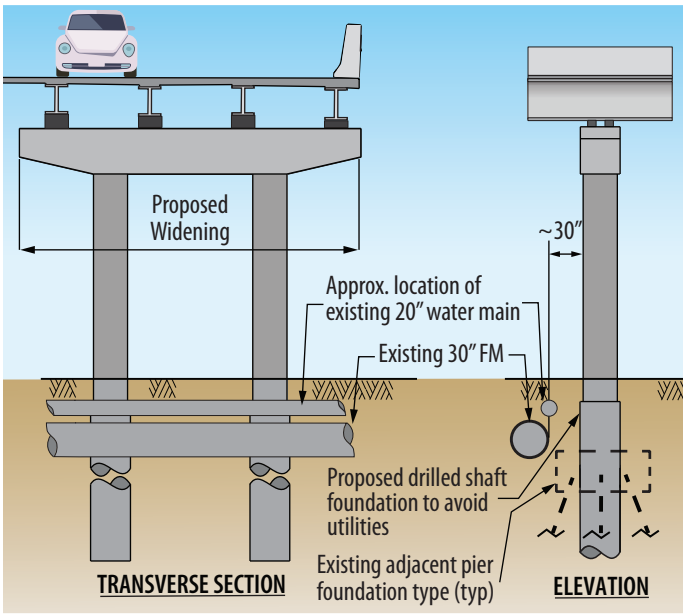
The project widens mainline I-64 bridges at Military Highway, Yadkin Road, and Shell Road. Our optimized concepts at these locations minimize potential impacts to these bridges, while reducing long-term maintenance requirements. Our concepts also minimize the risk of service interruption for utilities crossing beneath I-64 at these locations.

Our plans limit the reconstruction effort to one side of the existing bridge, as all the widening work will occur in or below a work zone in the median of I-64. We will be using structural steel girders at Military Highway and concrete beams at Yadkin Road and Shell Road to match the existing superstructures. For the substructure, 12-in. precast concrete piles will be the norm, except for drilled shafts supporting new piers for the bridge at Military Highway.

B21 Use Drilled Shaft Foundations

As discussed in Section 4.4.2 Utilities and depicted in Figure 4.3-24, we optimized our design by using single drilled shafts under the pier columns for widening the I-64 EB and I-64 WB bridges at Military Highway.

Figure 4.3-24: Use Drilled Shaft Foundations



Benefits:

- **Safety.** GPC decided to use drilled shafts to avoid time consuming and expensive utility relocations. Any exposure will be further mitigated by inserting vertical one-inch road plates as a robust physical barrier between the drilling operation and existing pipes.
- **Operations.** Avoiding relocation eliminates service disruptions associated with relocation. The drilled shaft operation will also create less vibration that might impact the existing bridge structure or other utilities.
- **Schedule.** The bridge widenings will not be subject to third party delays with relocating the utilities, so more predictable and efficient.
- **Public Acceptance.** Motorists and pedestrian will not have to endure lane closures and work zones in Military Highway as the pipes will not be relocated.

4.3.6 Tide Gate at Gilmerton Canal

GPC will install a new tide gate and appurtenances at the downstream end of an existing box culvert at I-64 WB Station 1234+00. This box culvert underneath I-64 conveys the Gilmerton Canal, which the City of Chesapeake and the residential community report causes periodic tidal flooding. The community has requested that VDOT address this flooding predicament with the design and construction of the I-64 improvements. As a structural measure to help manage this flooding, GPC will design and construct a Tide Gate Facility at the same location shown in the RFP plans, but with design enhancements that include a bypass culvert to provide additional functionality and stormwater conveyance.

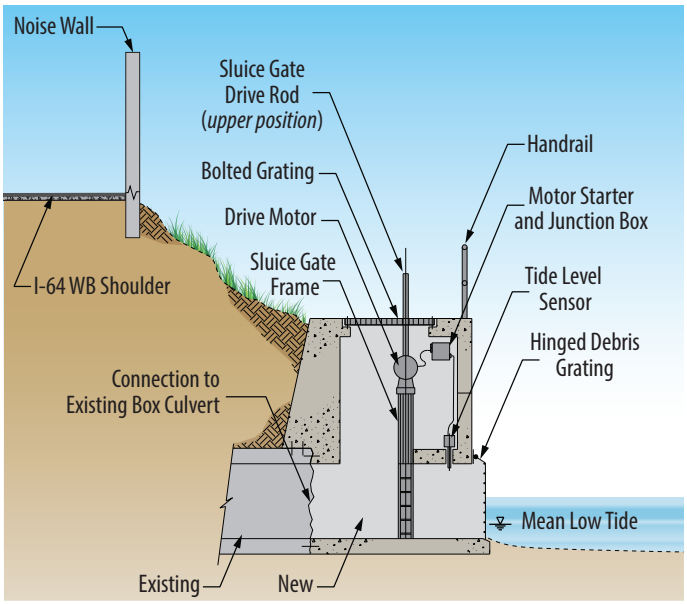
To withstand corrosion and to ensure long-term operation in the marine environment, the GPC design will employ 316 Stainless Steel for elements in direct contact with the marine environment, such as the tide gate and structural frame, electrical conduit, electrical cabinets and enclosures.

Sluice Gate

The Tide Gate Facility at the Gilmerton Canal box culvert outfall will incorporate a sluice gate, which GPC will install in a new cast-in-place structure integrally-cast with a new culvert headwall. GPC selected the SS Model 250 Series Sluice Gate, fabricated by Waterman Industries, LLC. It will be an electrically-actuated slide gate consisting of 316 (marine grade) stainless steel construction, permitting the natural ebb and flow of the tide through the Gilmerton Canal box culvert without any hindrance, yet providing relief for flows coming upstream through the box culvert during abnormally high tides.

The sluice gate, depicted in Figure 4.3-25, includes sacrificial anodes to mitigate the long-term corrosion expected in the Gilmerton Canal environment. The continually self-adjusting seal system integral to the tide gate provides leakage rates that are lower than the AWWA C561/C62 specification. The manufacturer has tested the system for 100,000 cycles, four times greater than the leading competitor, and the system continually outperformed the leakage specification.

Figure 4.3-25: Sluice Gate



Tide Gate Operation

Under normal tidal conditions in the Gilmerton Canal, the sluice gate will remain fully open to allow natural estuary fluctuations; a condition that promotes aquatic and plant life, reduces mosquito breeding, and improves water quality. When abnormally high tidal flows rise towards the pre-established maximum NAVD88 Geoid 2012A elevation of +1.5 ft., the sluice gate will begin to close, slowing backflows upstream (per RFP requirement, the design closing elevation is adjustable within a range of elevations between elevation 0.0 to elevation +3.5). As tide elevations continue to rise and meet the maximum flood elevation, the sluice gate will fully close, allowing the tide elevation to rise without increasing the estuary water elevation. The tide gate will automatically open when the downstream water surface elevation is one-inch less than the upstream water surface elevation.

Connection to Existing Box Culvert

To install the new sluice gate, GPC will first cast a new integrally-cast sluice gate and headwall structure on the downstream end of the existing box culvert, removing enough of the existing box to accommodate the new cast-in-place structure. GPC will dispose of the existing headwall and install wingwalls on the new headwall to accommodate

sluice gate mounting, while safely retaining the I-64 roadway embankment and the new noise wall along the outside shoulder. GPC will connect a secondary bypass culvert (described in the enhancement section below), with a check valve, to one of the new wingwalls. Per the RFP, GPC will remove and permanently close the existing median inlet connection on the existing box culvert, and vent the box culvert to mitigate the effects of a potential water hammer if the new tide gate close too quickly.

Tide Gate Facility Access

GPC's Tide Gate Facility design includes maintenance access from Firman Street. We selected this low-volume local public street instead of I-64 for easier, safer access due to the new noise wall and limited-access nature of I-64. Furthermore, existing overhead electric lines on Firman Street provide a convenient power source for the new Tide Gate Facility. GPC will provide the Tide Gate Facility's ancillary items on a new concrete pad, which will be readily accessible from the shoulder of Firman Street and will stay beyond the clear zone of any high-speed traffic. Per the RFP, GPC will install instructional and informational signage along Firman Street.

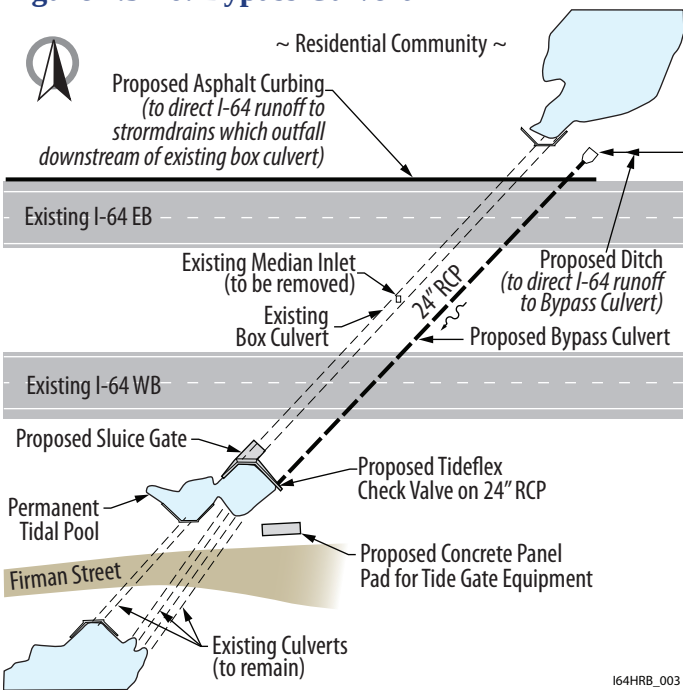
Tide Gate Enhancements

T1 Bypass Culvert that Runs Parallel to the Gilmerton Canal Box Culvert

GPC will provide a new 24-in. diameter reinforced concrete pipe (RCP) bypass culvert, depicted in Figure 4.3-26, parallel to the existing Gilmerton Canal box culvert, using trenchless installation methods. This new bypass culvert directs VDOT stormwater runoff from the north side of the I-64 corridor to the south side, effectively bypassing the existing box culvert. By directing VDOT stormwater runoff away from the noted flooding area, this auxiliary drainage system ensures that the VDOT property at this location does not contribute to any amount of post-project periodic flooding to the adjacent community. GPC has further enhanced the RFP plans by including drainage paths to the canal that avoid the flow of pavement runoff to the downstream side of the tide gate and box culvert. To prevent unwanted backflows while still allowing upstream flows to discharge downstream, GPC will install a Tideflex check valve on the downstream end of the bypass culvert. The bypass culvert invert elevation will be below the max flood elevation, allowing water to drain from the estuary during a low tide cycle, even if the tide gate is closed.

- **Benefits.** The bypass culvert reduces flows coming to the north side of I-64 and decreases upstream flooding instead of requiring all flow to utilize the existing culvert. With its backflow prevention device, the bypass culvert acts as a redundant drainage system, allowing for estuary dewatering. This feature is an added value during heavy rain events and power outages making it a superior solution for VDOT and the community.

Figure 4.3-26: Bypass Culvert



T2 Redundant System that Avoids Manual Activation during Power Outages

GPC will deliver a redundant system that avoids manual activation during power outages by providing a battery backup and solar recharging.

- **Benefits.** This redundant system exceeds the RFP requirements by avoiding manual activation during power outages. The battery system is sized to provide a minimum protection of 96 hours. The solar panels will extend this duration, thereby reducing the likelihood that VDOT will have to manually raise/lower the floodgates during an extended power outage.

4.4 Project Approach

4.4 PROJECT APPROACH

The foundation of GPC's approach to managing the Project is that we are a true design-build joint venture, ensuring that the design and the construction teams' interests and goals are fully integrated. This alignment is the key to an efficient and effective design-build process.

The integrated nature of our team facilitated our task force approach to developing our Proposal Conceptual Plans, which focused on finding the right balance between innovative, compliant design and efficient, quality construction. We looked for creative solutions that:

- minimized VDOT's future maintenance or subsequent project phase costs;
- reduced public and environmental impacts;
- avoided service disruptions for neighbors, businesses, and utilities;
- maximized project quality, safety, mobility and value; and
- proactively ensured positive stakeholder relationships and perceptions.

To achieve these goals, we drew heavily on our team's collective experience and successful teaming track record. For instance, our team benefited from lessons-learned and regional third party relationships garnered from our Military Highway, Zion's Crossroads, Woodrow Wilson Bridge, and ICC Contract A projects. As a result of those projects, our team includes an array of talented professionals with relevant experience and relationships that will continue the development and implementation of our winning project approach. Specific examples of their expertise include the following:

- **Environmental Management.** Curtis Hickman, Stuart Tyler, and Ricky Woody are preeminent regional experts on environmental and permitting matters.
- **Utilities.** Gary Webb and Scott Armstrong have extensive local utility experience, including personal relationships with key personnel from public and private utilities throughout the Hampton Roads district.
- **Geotechnical.** Ed Drahos is unmatched in terms of local geotechnical engineering knowledge and experience.
- **QA/QC.** In addition to his locally-oriented utility expertise, Gary Webb had primary responsibility for QC on portions of the new Midtown Tunnel project.

The pages that follow demonstrate that GPC offers VDOT not just the best project approach but also the best team for this Project.

4.4.1 Environmental Management

GPC has developed an Environmental Management Plan (EMP) that outlines environmental goals, ensures satisfaction of permit requirements, addresses schedule requirements for permitting and environmental compliance, and institutes robust procedures for compliance, monitoring, reporting, and continuous improvement of our processes. The plan focuses on avoiding and reducing environmental impacts during design and construction by establishing proven procedures to address environmental issues, provide mitigations, and reduce risk.

A. Approach to Environmental Management and Permitting

GPC's approach to environmental management is founded on:

- A focus on complying with the environmental commitments made in the National Environmental Policy Act (NEPA) documents that have been prepared for the project
- A collaborative relationship with appropriate agencies for proactive, regular, and timely coordination
- A philosophy of minimizing environmental impacts throughout design and construction
- A culture that dictates that site maintenance is everyone's responsibility, beginning with training at the crew level, similar to our directives on safety and quality

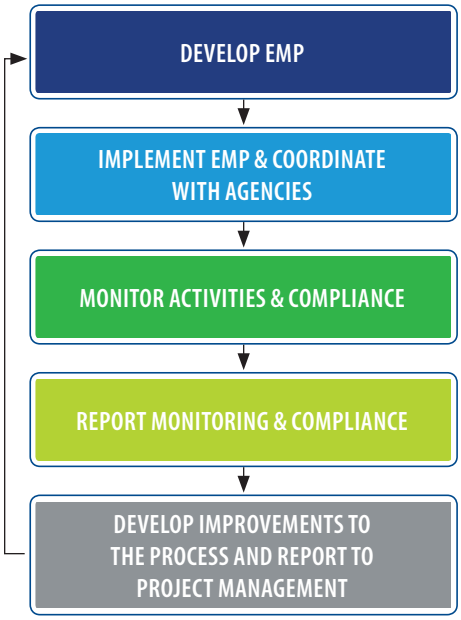
The EMP will be integrated in the Project Management Plan (PMP) for the project, as an integral component of design and construction processes and schedules. The EMP consists of:

- Environmental goals and commitments, consistent with the approved NEPA and supporting related environmental documents, and with permitting requirements
- Roles and responsibilities
- Synopsis of Environmental Issues and Concerns on the Project
- Monitoring plan and process (including Environmental Commitment Checklist and an Environmental Management Database)
- Reporting plan and process (explicitly addressing responsibilities of quality assurance (QA) and quality control (QC))
- Environmental Management Improvement Mechanism

The GPC team has assigned Ricky Woody as Lead for Environmental Compliance and Permitting, who will oversee environmental management and compliance for GPC. As part of his responsibilities, he will update the EMP as necessary and work with the design and construction teams to ensure it is successfully implemented. Ricky will also ensure that all environmental issues are coordinated regularly with the Construction Manager, Design Manager, Task Leads, VDOT environmental staff, and key agencies such as the US Army Corps of Engineers (USACE), Virginia Department of Environmental Quality (DEQ), US Coast Guard (USCG), and Virginia Marine Resources Commission (VMRC). The GPC team has successfully used this process on other design-build projects, including the Military Highway Continuous Flow Interchange (CFI) project.

GPC will leverage existing relationships with key agencies and the local wetlands board (LWB) to rapidly secure permits. We understand that compliance with the requirements of NEPA, National Historic Preservation Act (NHPA) Section 106, Endangered Species Act, and related environmental laws and regulations are USACE and USCG prerequisites for permits issuance. Our team will ensure that the project's Environmental Assessment (EA)/Finding of No Significant Impact (FONSI) related documents and other necessary information are provided to the agencies to conduct their NEPA and related laws compliance review such that the federal agencies can adopt these NEPA documents and issue their decisions expeditiously.

Figure 4.4-1: Environmental Management Process for the Project



Our team has reviewed the EA, its appendices, and the wetland delineation reports in detail, and created a database of environmental resources, which is being used to develop Geographic Information System (GIS) maps and analysis. Based on this review and analysis, we have identified key environmental permits needed for this Project and their timeline for acquisition, as shown in Table 4.4-1. The GPC team will use the Joint Permit Application (JPA) process for wetlands and streams permits to develop and submit the Coastal Zone Consistency Determination request early.

Table 4.4-1 includes the RHA Sec 9 Permit from USCG, which is sometimes considered environmental permit. It is included because it requires close coordination with the USACE Section 404/408 Permits and compliance with NEPA and associated laws and regulations. Our team will also identify and track mitigation credit availability to ensure the credits can be purchased as needed.

With successful performance on several VDOT design-build projects, the GPC team has the experience, knowledge, and relationships to successfully navigate the challenges of the environmental permit process.

Table 4.4-1: Environmental Permits			
Permit	Permitting Agency	Description	Timeline*
Clean Water Act (CWA) Section 404	USACE	Permit for impacts to Waters of the US and wetlands. (Certain earthwork, in-water bridge pier foundations, trestles, dredging, etc.) Individual permit.	420 days
River & Harbors Act (RHA) Section 10	USACE	Permit for obstruction or alteration of navigable waters of the US. Normally coordinated and obtained in concert with the Section 404 permit process.	420 days
River & Harbors Act (RHA) Section 14 (30 USC 408)	USACE	Permission for alterations to USACE constructed public works project (including channels, navigation channels, levees, dams, seawalls, etc.).	420 days
US Coast Guard (USCG) RHA Section 9	USCG	Permit for the new/modifications to bridge on navigation channel (Elizabeth River).	435 days
Dept. of Environmental Quality (DEQ) CWA Section 401, Water Quality Certification (WQC)	DEQ	WQC for Section 404 and Section 402 permits.	420 days
Virginia Pollution Discharge Elimination System (VPDES) (CWA Section 402)	DEQ	Construction General Permit (CGP) for discharges to waterbodies from construction activities and Stormwater Management (SWM) Plan approval needed upon approval of CGP Stormwater Pollution Prevention Plan (SWPPP) (incorporating Erosion & Sediment (E&C) Control, SWM, and Pollution Prevention (P2) Plans).	180 days
Virginia Marine Resource Commission (VMRC)	VMRC	Permit for impacts to State-owned subaqueous bottom for the Elizabeth River Crossing (High Rise Bridge).	350 days

**Permit timeline is calculated as days elapsed from Notice as Apparent Low Bidder to Issuance of Permit*

Drawing on GPC team members' existing local presence, we have already reached out to the permitting agencies during this RFP stage to refine our project-specific permitting knowledge base, nurture relationships, and set the stage to jump start the permitting process.

Immediately upon Notice of Apparent Low Bidder, the environmental team listed in Table 4.4-2 will initiate internal weekly task force meetings, to which VDOT will be invited. Our team will also set up individual meetings with each permitting agency to review project scope and schedule. Combined meetings with all permitting agencies will also be conducted to confirm jurisdiction and permit requirements, gain buy-in amongst all parties, and foster interagency coordination. Subsequently, there will be regularly scheduled monthly permit meetings with all agencies until permits are issued. GPC will also engage appropriate agencies such as the DEQ, US Fish and Wildlife Service (USFWS), and Virginia Department of Games and Inland Fisheries (DGIF) to develop concurrence on protocols for implementing Time-of-Year Restrictions (TOYR) for sensitive species, including coordination with DGIF and the Center for Conservation Biology regarding the peregrine falcon to prevent disturbance to nests while accommodating construction.

The GPC environmental leads will draw on their strong local relationships and experience obtaining environmental permits from USACE, DEQ, VMRC for projects throughout the Tidewater/Hampton Roads area, including the Military Highway CFI project.

Design Efforts to Avoid/Minimize Impacts to Environmental Resources

The GPC design team has made avoiding and minimizing impacts to environmental resources a priority. Our environmental team will co-locate with the design team, and their joint focus will be full compliance with all project commitments. Our team has started developing a database for environmental resources, incorporating this database in GIS so design files can be overlaid with environmental resources layers, facilitating compliance as the design process progresses.

Table 4.4-2: Environmental Team Roles and Responsibilities	
Team Member	Roles and Responsibilities
Ricky Woody: Environmental Management & Compliance	▪ Develop and implement the EMP ▪ Coordinate with federal, state, and local environmental resource agencies ▪ Respond to agency requests for additional information to facilitate reviews ▪ Ensure compliance with environmental requirements and commitments as detailed in NEPA and related documents and in environmental permits ▪ Ensure compliance with mitigation requirements ▪ Develop reports and corrective actions for environmental management
Curtis Hickman: Environmental Permitting	▪ Develop and submit environmental permit applications ▪ Coordinate with federal, state, and local permitting and review agencies to obtain permits ▪ Respond to agency requests for additional information to speed reviews ▪ Manage the permit application process
Stuart Tyler PE and Erik Almquist: NEPA	▪ Lead NEPA reviews and documentation ▪ Provide NEPA re-evaluations or additional requested documentation ▪ Coordinate with federal and state environmental agencies ▪ Lead development/revisions of environmental documents
Bhup Adhikari PE: Erosion & Sediment (E&S) Control Designer	▪ As a certified DEQ SWM Reviewer, ensure SWPPP complies with statutory, permitting, and contract requirements ▪ As a certified DEQ E&S Control Plan Reviewer, develop comprehensive E&S Control Plans and revise/update as needed
Jed Madatic: Construction Environmental Manager (CEM)	▪ Maintain DEQ Responsible Land Disturber (RLD) and VDOT E&S Control Certification accreditations ▪ Manage construction portion of EMP, plus SWPPP compliance ▪ Conduct and track daily inspections to ensure correct E&S Control installation and maintenance ▪ Monitor and document compliance with TOYR and protections for endangered species ▪ Lead environmental portion of QC Preparatory Meetings involving ground disturbance ▪ Prepare a Hurricane Preparedness Plan ensuring appropriate plans are in place (including checklists) to mitigate the impacts of a severe weather event ▪ Ensure borrow and waste activities comply with VDOT requirements
Chris Coryell: QA E&S Control Inspector	▪ Maintain DEQ E&S Control Inspector certification ▪ Participate in preparatory meetings for activities requiring ground disturbance ▪ Verify adherence to permitting hold points and TOYR in project schedule ▪ Conduct weekly or post rain event (>1/4 in.) E&S Control inspections to verify SWPPP compliance

The GPC preliminary design reduces the footprint of improvements from existing right-of-way (ROW) and VDOT-anticipated takings. Our design effort also focuses on refinements to stormwater management basins to reduce wetland impacts. Examples of where the GPC design minimizes environmental impacts include:

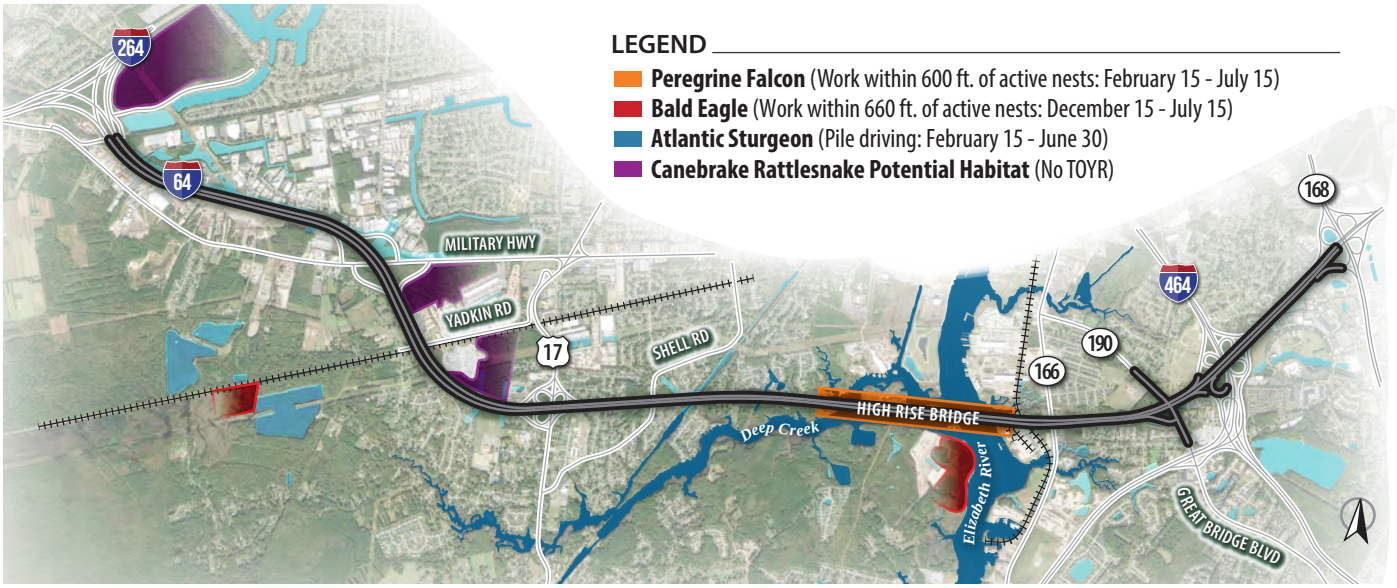
- Enhanced grading limits of stormwater management basins at Parcels 013 and 015 resulted in smaller basin footprints than the RFP Conceptual Plans, which ***reduces wetland impact and ROW acquisition.***
- Designing embankment around a loop-ramp pond at the southwest quadrant of the I-64/ George Washington Interchange, which ***minimized wetland impacts.***
- Designing special walls at various locations, which will ***reduce impacts to wetlands and other natural resources.***

GPC was able to modify our overall concept to accommodate the additional Hard Shoulder Lanes footprint with no increase in wetland impacts over the original RFP concept plan.

Construction Efforts to Avoid/Minimize Impacts

GPC's EMP details restrictions and controls to avoid and minimize impacts to environmentally-sensitive areas during construction. It incorporates and implements mitigation measures and commitments made in the EA/FONSI document and

Figure 4.4-2: TOYR for Endangered Species. *We understand the TOYR for endangered species that must be considered in project planning. We will develop, track, and update our schedule to avoid delays to project completion.*



environmental approval processes and establishes protocols for reporting compliance to VDOT.

Compliance during construction starts with awareness, so the GPC team will emphasize formal environmental training for key individuals.

- Quality Assurance Manager (QAM) and QA inspection staff will be certified as DEQ E&S Control Inspectors
- CEM, Construction Manager, QC Manager, general superintendent, civil superintendents, and construction engineers will be RLD certified and have VDOT E&S Control certification

The CEM ensures environmental compliance during construction. As part of this effort, the CEM will compile a project-specific environmental checklist and conduct weekly inspections for compliance during construction. The checklist will be consistent with the Environmental Compliance Tracking Database the design team uses to document and track permitting and compliance milestones. The CEM will participate in preparatory meetings in advance of construction activities, ensuring that environmental considerations are routinely addressed during work planning and execution.

The CEM will assist with developing and monitoring implementation of the SWPPP. A copy of the SWPPP will be kept in the jobsite office, as it is the governing document for managing and documenting environmental compliance. The CEM will also assist with preparation of other E&S Control-related plans, such as the Hurricane Preparedness Plan.

GPC will implement the following best practices and methods during construction to enhance environmental compliance and stewardship:

- Implement an "Environmental Compliance Incentive Program" to encourage and reward field staff for practicing a high standard of environmental stewardship
- Use top-down construction to erect/remove trestle and avoid barges/push boats in shallows, minimizing bottom disturbance
- Conduct daily E&S Control inspections, supplemented by QA inspections that occur weekly or when weather events exceed a quarter inch of rain
- Install appropriate E&S Control measures such as silt fences and turbidity curtains
- Maintain E&S Control on a routine basis, within seven days of noted deficiency or prior to next anticipated measurable storm event
- Delineate environmentally-sensitive areas such as wetlands or protected habitat prior to starting work and review these areas with crews as part of pre-activity planning
- Incorporate TOYR in the Baseline Schedule and strictly enforce those restrictions in the field

- Make appropriate preparations for storm events, particularly hurricanes and other severe weather events, and expedite storm impact remediation
- Use spill prevention measures, such as double-wall fuel containers, metal gas cans, and designated fueling and concrete wash-out areas (and stock cleanup materials)
- Plan and execute maintenance of marine equipment to prevent petroleum products and other pollutants from spilling/leaking into the Elizabeth River
- Address environmental issues in pre-activity planning with crews to promote awareness and compliance
- Work from landside to construct sheet pile Special Design Wall on the western HRB approach to avoid environmental issues with in-water work
- Stabilize in-situ materials to produce acceptable subgrade in lieu of undercut and replacement
- Properly dispose of creosote-treated debris from the existing fender system
- Host a "Clean the River" event to promote workforce awareness and public good will

Experience Anticipating and Mitigating Impacts and Potential Delays

The local experience of PTG, RK&K, and KES will allow us to anticipate where "surprises" may occur in the permitting process. All of our permit activities and E&S Control activities are integrated into the schedule. Allowances are made for weather delays where inspection and maintenance of our temporary stormwater management system is required.

On VDOT's Military Highway CFI project, PTG and Corman coordinated permits from USACE, VMRC, and DEQ within 10 months from NTP and six months of the JPA submittal. Tools used:

- *Scheduling and tracking each agency's regulatory review process*
- *Pre-application and post-application agency meetings with an emphasis on cooperation and schedule agreement for permit reissuance*
- *Internal schedule reviews and updates, communicated to the permitting agencies*

B. Approach and Solutions to Environmental Conditions and Areas of Concern

We will use the following strategies to address environmental conditions and areas of concern:

- Expedite permits using weekly task force meetings and monthly meetings with agencies to communicate timelines and resolve concerns
- Joint consultation with agencies for Endangered Species Act compliance
- JPA for wetlands and stream permits
- Include personnel from the construction team that are formally trained in environmental protections to deliver the benefits of our EMP

Based on our review of project documents and our previous experience in the Tidewater region, our environmental team has identified environmental concerns for the project and design approaches to mitigate these concerns, as shown in Table 4.4-3. These approaches will keep the design consistent with NEPA and related approvals, minimizing delays. Design solutions for environmental mitigation include:

- Driven piles in lieu of drilled shafts to avoid generating spoils from river bottom
- Means and methods (temporary trestle for access to river piers) to avoid dredging

C. Integrating Environmental Management and Permitting into Schedule

The GPC team has developed a timeline for acquiring environmental permits, as depicted in Table 4.4-1 and Figure 4.4-3. The permit acquisition timeline will be integrated with the Baseline Schedule through related predecessor and successor activities, including key meetings, incremental submittals, agency review efforts, and appropriate hold points for design and construction.

Our team has performed an in-depth review of the various permitting processes needed for the project, developing realistic permit application timelines, allocating adequate agency review time, and incorporating each step of agency review protocols (including public notice periods). We will assign a permit tracker to work with the project scheduler to track anticipated and actual dates for package

Table 4.4-3: Overview of GPC's Design Approach to Avoid/Minimize Impacts to Environmental Resources	
Environmental Concern	GPC Design Approach
Limiting Overall Environmental Impact	▪ Limit impacts to equal or less than approved in the EA/FONSI ▪ Manage project footprint to ensure "no adverse effect" on Section 106 properties ▪ Manage project footprint for "no use" or "*de minimis* use" of Section 4(f) properties ▪ Use existing ROW for stormwater management consistent with NEPA documents ▪ Specify limitations on construction activities to avoid impacts to Deep Creek Broodstock Oyster Reef
Wetlands	▪ Minimize wetland impacts by maximizing use of existing ROW ▪ Design retaining walls such as the Special Design Wall to minimize wetland impacts ▪ Design embankments and refine grading limits to reduce impacts ▪ Provide for control of surface water runoff during construction with emphasis on advantageous interim use of permanent retention ponds
Time-of-Year Restrictions (TOYR)	▪ Engage resource agencies to develop concurrence on appropriate constraints for TOYR ▪ Identify TOYR in the Environmental Management Plan and in the Baseline Schedule ▪ Schedule design development to best take advantage of non-TOYR work windows
Endangered Species - Northern Long-Eared Bat, Peregrine Falcon, and Atlantic Sturgeon	▪ Minimize impacts to sensitive habitat through TOYR ▪ Monitor known and identified protected species ▪ Develop management practices that prevent disturbance to protected species without undue impacts on construction
USACE - Least Environmentally Damaging Practicable Alternative (LEDPA)	▪ Coordinate with USACE early and often ▪ Keep wetland impacts within the NEPA and RFP Concept Plans range (< 13.83 acres) ▪ Minimize and mitigate impacts to wetlands, Elizabeth River, and other bodies of water by construction within existing ROW and by using design and construction best practices such as maximizing span lengths
Noise Analysis and Monitoring	▪ Complete noise analysis in compliance with the Virginia State Noise Abatement Policy and the Highway Traffic Noise Impact Analysis Guidance Manual
Contaminated Materials Resulting from Turbidity, Particularly in Vicinity of New High Rise Bridge Foundations	▪ Avoid dredging using barges in deep water and temporary causeway/trestle in shallow ▪ Use efficient bridge span lengths to minimize the number of in-water foundations ▪ Maximize use of precast in-water foundation elements (precast square piles, precast cylinder piles, precast waterline footing shell) to avoid generating spoils ▪ Provide Special Design Wall design that accommodates landside construction

submissions, comments, and resubmissions. We rely on our experience on other local projects to assign baseline durations to these permitting activities, allowing time to address agency comments or concerns. The GPC environmental team is prepared to manage the extensive coordination necessary to stay on top of the permit processes and minimize the possibility of delays due to permit issuance.

We used realistic durations for permit durations, based on our experience in Hampton Roads and integrated them into our schedule.

GPC has taken a disciplined stance with project scheduling to ensure permit issuance dates are realistic so we can meet construction start dates. We have also identified areas where only SWPPP permits are required. For those areas, our design team will develop early work packages to accommodate the earliest possible construction start. TOYR for various endangered species will also be integrated into the schedule. All of these factors give us the confidence that our permitting schedule is realistic and reasonable, and will not result in construction delays.

Figure 4.4-3: Timeline of Enivronmental Permitting Process. *GPC will manage and track permitting milestones, using key milestones as hold points, to avoid schedule delays.*

	Activity	2017 Sept	Oct	Nov	Dec	2018 Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec
Start	Contract Awarded																
Interagency Mtgs	Pre-App (Kick Off) Mtg																
	Post-App Agency Meeting																
T & E Species	Agency Coord. (Bat/Falcon/Canebrake)																
Draft JPA	Prep Permit Drawings																
Final JPA	Including Reviews & Revisions																
	JPA Submission																
USACE Review & Permitting	Completeness Review & Comment																
	GPC Response & Agency Review Period																
	Public Notice & GPC Comment Resp.																
	Reviewing Agency Coord. (NOAA, etc.)																
	Draft Permit & Submit for JV Rev.																
	Final Permit Writing																
	Permit Issuance																
VADEQ Review & Permitting	Completeness Review & Comment																
	GPC Response & Agency Review Period																
	Coastal Zone Consist. Submit & Dtrm.																
	Reviewing Agency Coord.																
	Application Fee Form Issued																
	Draft Permit Writing																
	DEQ Issues Draft Permit																
	Draft Permit Review by JV																
	Coordinate Draft Permit Comments																
	Public Notice (*Virginian Pilot*)																
	Finalize Permit Writing																
	Permit Issuance																
VMRC Review & Permitting	Completeness Review & Comment																
	GPC Response & Agency Review Period																
	VMRC Hearing (Aug 2018)																
	Public Notice (Virginian Pilot)																
	Get on Aug. VMRC Agenda (last Tues.)																
	VMRC Prep & Hearing (Aug. 2018)																
	Permit Writing																
	Permit Issued (Aug. VMRC Hearing)																
	Contingency VMRC Hearing																
	Get on Sept. VMRC Agenda (last Tues.)																
	VMRC Prep and Hearing (Sept 2018)																
	Permit Writing																
	Permit Issued (Sept. VMRC Hearing)																

LEGEND
- GPC Tasks
- Agency Actions
- Agency Permit Issuance and Float
- Milestones

4.4.2 Utilities

There are many potential utility conflicts in the project corridor. GPC's utility mitigation strategy focuses on finding the best solution to accommodate each potential conflict, generally in this order: avoidance, minor adjustments, protection (in place), or relocation. To implement this strategy, GPC has established a utility task force comprised of design and construction personnel, including our dedicated dry utilities coordination firm, Cardno, that has the experience and resources to successfully manage the project's utility relocation program. Throughout the proposal process, the task force has conducted an in-depth utility conflict analysis and initiated coordination with the many different utility owners in order to fully understand the existing utility landscape and develop a plan to mitigate potential conflicts. Our efforts during this proposal phase have allowed GPC to present a construction scheme that fully accounts for our role as design-builder to coordinate, avoid, protect, or relocate in accordance with all RFP and Contract requirements.

A. Approach for Utility Coordination, Adjustments, and Relocations

Coordinating early and often with utility owners is key to successful utility conflict and relocation management. Immediately following Notice of Apparent Low Bidder, GPC will initiate the following early activities:

- Schedule weekly utility task force meetings and expand the task force to include VDOT's Regional Utility Manager.
- Schedule an initial review meeting with each utility owner to introduce the utility task force, review project scope and schedule, and confirm processes, procedures, and protocols. This initial consultation will also serve as the forum to schedule regularly occurring monthly meetings with each utility where individual conflicts, mitigation measures, schedule, and costs can be reviewed in further detail.
- Work with the utility companies to explore additional mitigation measures to reduce the number of utilities that will require relocation.

Figure 4.4-4: Sample Utility Tracking Matrix. *Our utility task force has already begun tracking known and potential conflicts to avoid "ramp up" time following contract award using our standard utility tracking matrix.*

STATIONS	UTILITY	COMMENTS	PRIOR RIGHTS?	MITIGATION	Records Review
EB 1578+00 - 1592+00	VDOT/DVP	East Bound Lighting and conduits north side		Include in lighting for roadway design	No
EB 1589+50	VDOT	Camera and Electric Panel		Include in electrical and ITS for roadway design	No
WB 1093+00 - 1106+00	VDOT/DVP	West Bound Lighting and conduits south side		Include in lighting for roadway design	No
WB 1104+75	VDOT	Camera and Electric Panel		Include in electrical and ITS for roadway design	No
Military Highway	Verizon	72-Fiber in isol. Conduit West bound lanes under bridge near bridge piers		Private Utility - Will need to relocate	Yes
Military Highway	Verizon	AFTW-6 in isol. Conduit 2-Transite under I-64 West bound lanes under bridge near bridge piers		Private Utility - Will need to relocate	Yes
Military Highway	Chesapeake	Median - 20" Water main under bridge near piers		Relocate into roadway (500')	Yes
Military Highway	HRSD	East bound 30" San FM under bridge near piers south side		Relocate into roadway (500')	Yes
Military Highway	Cable TV (COX)	East bound behind piers under slope protection		Private Utility - Will need to relocate	Yes
Military Highway	Century Link	Fiber crossing parallel to and along railroad		Private Utility - Will need to relocate	Yes
Military Highway	Level 3	Fiber Crossing		Private Utility - Will need to relocate	Yes

- Begin Subsurface Utility Engineering (SUE) efforts and mobilize for test holes. GPC acknowledges that field work cannot commence until formal NTP has been granted.
- Evaluate project CPM Baseline Schedule for each utility relocation to identify all possible pinch points and long start-to-finish relocations, and establish utility-specific mitigation plans and interim milestone dates to maintain schedule.
- Using the information gained through the above tasks, expand the utility conflict matrix prepared during the proposal phase.
- Prepare Preliminary Utility Status Report, including a conflict evaluation and cost responsibility determination for each utility, submitted to VDOT 120 days from NTP.
- Obtain early access for VDOT's Right of Way and Utilities Management System (RUMS) to manage and track the utility relocation process, if agreeable to VDOT.

Corman and Parsons successfully coordinated with Dominion Virginia Power (DVP), Virginia Natural Gas (VNG), Cox, Verizon, and Level-3 on the ongoing VDOT Military Highway CFI project, and Corman worked successfully with DVP, CenturyLink, and Qwest on the VDOT Design-Build Route 29 Solutions project and HRSD on the Lafayette River Crossing and York River Treatment Plant Outfall and Diffuser Modifications projects using the processes and activities that we will implement for this project.

GPC team members will leverage existing relationships and experience with the utility owners to ensure coordination throughout the design and construction phases. We will implement the following proven processes and activities:

- Conduct monthly review meetings with each utility company
- Hold weekly progress meetings with utility owners during construction
- Invite utility owners to attend design task force and coordination meetings, which will eliminate "surprises" from formal design reviews and expedite the design review process
- Establish minimum horizontal and vertical clearance requirements, backed by written confirmation from utility owners, for underground and overhead utilities
- Provide utility owners with advanced notice of design deliverables and expectations for review and comment periods
- Continuously update tracking matrix to maintain current information on dates for ROW acquisition, permits, design submittals, start of field work, and target completion dates
- Advance and/or separate design by utility company for critical relocation(s) to expedite schedule
- Advance and/or separately process a Plan and Estimate (P&E) package for specific critical relocations and for each utility company
- Conduct early planning and coordination with utility owners on milestone dates required to maintain schedule, such as design completion and approval, long-lead material procurements, and identify utility relocations that require right-of-way acquisition or additional permits
- Complete and execute a Master Utility Agreement with each utility company that outlines rights and responsibilities of both parties, along with establishing baselines and expectations for performance, including weekly construction coordination meeting attendance
- Update RUMS with pertinent documents, approvals, and dates

B. Solutions to Utilities in Conflict with Design

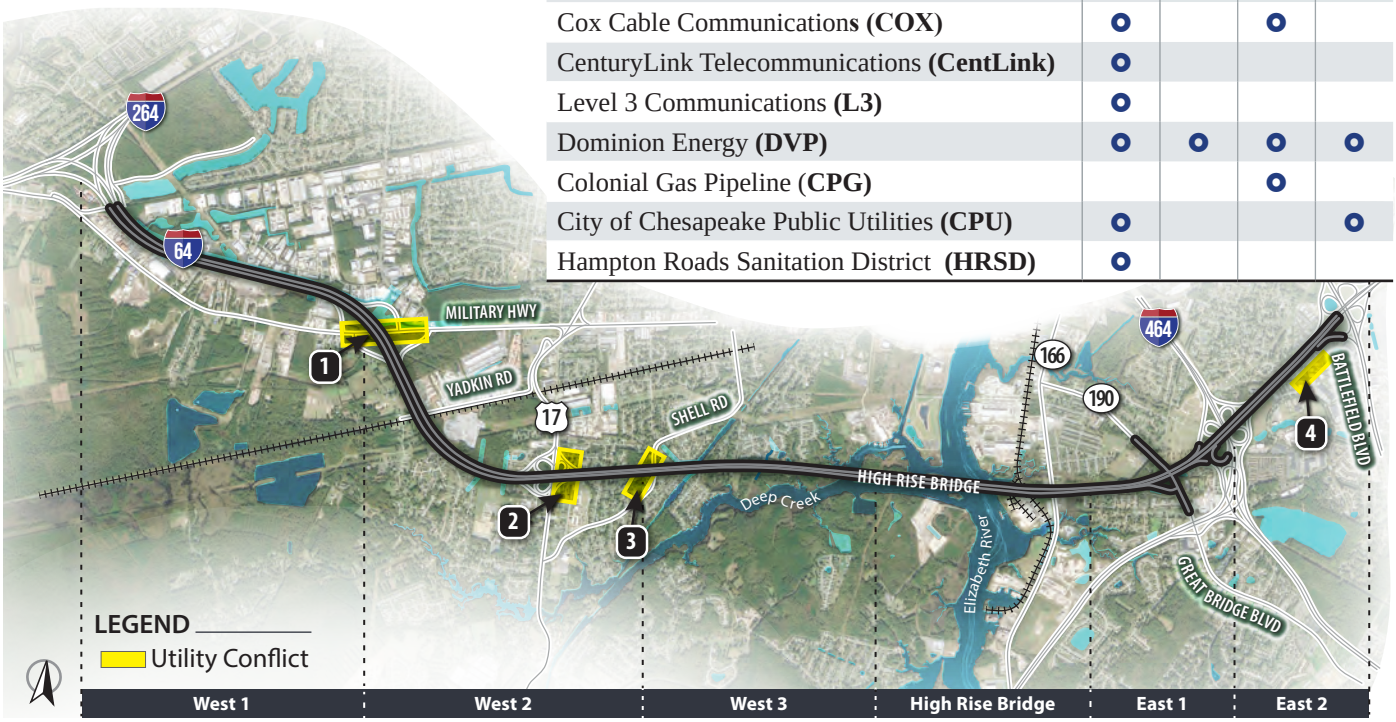
With our utility coordination efforts complete for this proposal phase, GPC has compiled a list of existing utilities expected to be in conflict with our proposed preliminary design. Figure 4.4-5 indicates the conflicts by location and utility owner.

When dealing with utility conflicts, avoidance is the best strategy. The GPC team places an emphasis on avoiding utility conflicts through design and construction methods, and via the proposal process, has mitigated the majority of potential conflicts through avoidance. Following Notice of Apparent Low Bidder, GPC will work with the utility companies to explore additional options to further avoid conflicts and reduce the magnitude of required

Figure 4.4-5: Potential Utility Conflicts along Project Corridor. *GPC will work with utilities to mitigate conflicts on the Project.*

Utility Conflicts

Utilities	ID 1	2	3	4
Verizon Communications **(VZN)**	●		●	●
Cox Cable Communications **(COX)**	●		●	
CenturyLink Telecommunications **(CentLink)**	●			
Level 3 Communications **(L3)**	●			
Dominion Energy **(DVP)**	●	●	●	●
Colonial Gas Pipeline **(CPG)**			●	
City of Chesapeake Public Utilities **(CPU)**	●			●
Hampton Roads Sanitation District **(HRSD)**	●			



relocations to lesser adjustments. Additionally, when working near known utilities, construction means and methods will focus on avoidance by: calling Miss Utility, confirming utilities are properly marked, implementing checklists and sign-off for field personnel, and using soft dig techniques for test pits (where appropriate). GPC has already identified several opportunities to avoid potential utility conflicts, including the following critical ones, which are also listed as design enhancements in Section 4.3.1.

U1 30-in. HRSD Sanitary Sewer Force Main at Military Highway Bridge

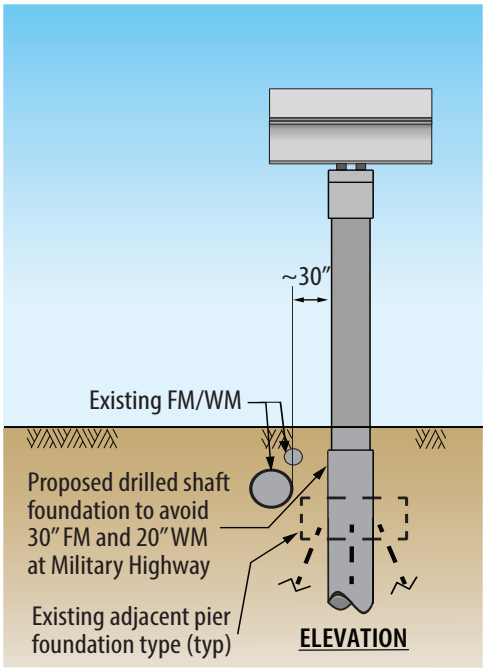
To meet the RFP bridge deflection requirements for the I-64 EB and I-64 WB bridges over Military Highway, the piers for the proposed bridge widenings must be in line with the existing piers. Satisfying this design criterion is complicated by a 30-in. sanitary sewer force main adjacent and parallel to the south piers of the existing bridges as shown in Figure 4.4-6. This force main is a Reinforced Concrete Pressure Pipe (RCCP) that was installed almost 40 years ago. Relocation would be technically difficult because the existing pipe needs to be kept in service using a flow-through linestop system and then cut over with DI-RCP adapters, all while considering large thrust forces due to horizontal bends near the tie-ins. Plus, there is potential for impacts beyond the tie-in locations due to the pipework excavation, construction, and thrust restraint measures. Given these risk factors and design constraints, GPC developed a pier design that avoids disturbing the force main because it uses drilled shafts to eliminate footings and driven piles. ***HRSD provided as-built information and advice that was instrumental to developing this design.***

Benefits:

- **Safety.** Avoids lane closures associated with a relocation effort. Also, the drilled shaft operation will cause less vibration than pile-driving, so less stress on existing RCCP.
- **Operations.** Avoids service outages associated with relocation.
- **Schedule.** Avoids the schedule impact of relocation.

- **Construction.** Constructing a pier cap without footings will shorten the duration for substructure work adjacent to Military Highway.
- **Public Acceptance.** Shortening the construction period on Military Highway reduces the length and severity of disruption to vehicle and pedestrian traffic.

Figure 4.4-6: Avoiding HRSD's 30-in. Sanitary Force Main. *GPC developed a pier design to avoid disturbing the force main adjacent to Military Highway.*



U4 Pole Line along Libertyville Road

There is an existing line of utility poles on the south side of Libertyville Road that carries multiple utilities, including DVP and Verizon. The RFP Conceptual Plans showed the new alignment of Libertyville Road interfering with these existing poles, as an accommodation for the new HRB. In lieu of relocation, GPC adjusted the Libertyville Road alignment so the poles can remain in place.

Benefits:

- **Safety.** Avoids utility crew work on Libertyville Rd.
- **Operations.** Avoids service outages associated with relocation.
- **Schedule.** Avoids the schedule impact of relocation, especially if that work would have required undergrounding or easement acquisition.
- **Public Acceptance.** Eliminating work by the utility companies on Libertyville Road minimizes disruption for residents of adjacent apartments.

GPC realigned Libertyville Road so the existing pole line can remain as-is; reducing delay risks and disruptions due to easement acquisitions and/or utility relocations.

U5 Pole Line along Bulldog Drive

There is an existing line of utility poles on the south east side of Bulldog Drive that carries multiple utilities, including DVP and Cox shown in Figure 4.4-7. The RFP Conceptual Plans for widening I-64 WB showed the new alignment of Bulldog Drive interfering with this existing pole line. In lieu of relocation, GPC adjusted the Bulldog Drive alignment so the poles can remain in place.

Benefits:

- **Safety.** Avoids utility crew work on Bulldog Drive.
- **Operations.** Avoids service outages associated with relocation.
- **Schedule.** Avoids the schedule impact of relocations, especially if that work requires undergrounding or easement acquisition.
- **Public Acceptance.** Eliminating work by the utility companies on Bulldog will minimize disruption for residents.

Figure 4.4-7: Bulldog Drive Pole Lines. *GPC was able to realign Bulldog Drive so the existing pole line can remain as-is, saving valuable time and money, and reducing risk of delays due to easement acquisitions and/or utility relocations.*

GPC realigned Bulldog Drive so the existing pole line can remain as-is; reducing delay risks and disruptions due to easement acquisitions and/or utility relocations.

U6 Sanitary Force Mains at Great Bridge Blvd

There is an existing 30-in. sanitary sewer force (SFM) main that parallels the realigned roadway in the RFP Conceptual Plans for Great Bridge Blvd. This SFM and two connecting 8-in. SFMs owned by the City of Chesapeake fall within the anticipated limits of embankments for the GBB bridge approaches. Due to the age and design of the 30-in. pipe, it would be prone to failure if subjected to differential settlement or additional loading. GPC elected to leave the pipes in place after consultation with HRSD and the city, but avoided fill over the pipes by adding to the design an MSE wall that truncates the footprint of the roadway embankment.

Benefits:

- **Safety.** Maintaining the pipes in place avoids utility crew work on GBB. Building the MSE Wall ensures the pipes are not surcharged, thereby eliminating the need to strengthen and/or protect the pipes.
- **Operations.** Maintaining the pipes in place avoids service outages associated with relocation. Avoiding fill over the pipelines alleviates HRSD and City concerns that the 30-in. and 8 in. SFMs would have been subject to embankment-related damage.
- **Schedule.** Avoiding any impact to the pipes means the schedule will not include time to relocate, protect, or upgrade the pipes or to make deep ground improvements to prevent settlement.
- **Construction.** Eliminating relocation of the pipes takes this work out of the total scope of the project, expediting the rerouting of GBB.
- **Public Acceptance.** Eliminating utility company work on GBB and shortening the duration of the realignment effort minimizes disruption for residents, schoolchildren, and businesses.

GPC will install retaining walls that tie into the western bridge wingwalls; eliminating concerns about fill over existing force mains and making it unnecessary to protect or upgrade the pipes because of surcharging.

C. Utility Relocation Mitigation Strategies

Strategies to Offset Impacts of Utility Relocations Exceeding Estimated Timeframes

GPC understands there is risk on this project that utility relocations may exceed our time frame. GPC has placed an emphasis on avoiding utility conflicts through design and construction methods, and via the proposal process, has already avoided all potential conflicts between the existing HRSD and City of Chesapeake wet utilities and our design. These were conflicts that our team would otherwise have to design and relocate "in-contract" as part of our scope of responsibilities. Our expected relocation work for these utilities is limited to adjustment of appurtenances, such as valve boxes, meters, hydrants, and sewer manhole covers. ***GPC's approach to avoid utility relocations mitigate the risk of exceeding time frames for relocation work.***

GPC will work with the utility companies throughout the design process to establish an agreed upon timeline for each necessary relocation. During construction, each utility relocation schedule will be reviewed at the weekly utility coordination meetings. GPC's utility task force and utility construction team have the experience and relationships necessary to identify potential schedule slippage ***before*** it occurs, and will react immediately to work with the utility owner to bring it back into schedule and mitigate any project impacts.

A total of 19 VNG offsets were required throughout the VDOT Military Highway CFI project, and VNG's initial schedule would have caused tremendous delays to the project schedule. The Corman/Parsons utility task force and utility construction team identified this issue and held meetings with VNG and their subcontractor. Through these efforts, additional crews were brought in and the phasing was modified to decrease the time required to complete the offsets.

Preparedness and Strategies to Avoid Impacts with Unidentified/Non-Located Utilities

The first step to avoid impacts with unidentified/non-located utilities is to make sure the utility locations, types, and sizes are correctly mapped. GPC has already coordinated with the utility companies during the proposal phase to obtain as-built data and other information used to supplement the base file. Upon formal NTP, one of the first actions completed will be SUE, including Quality Level 'B' services for the entire project corridor. Potential utility conflict points will be refined, and corresponding test holes completed prior to final design. ***GPC understands how critical proper identification of existing utilities is, and is committed to compiling the most complete and accurate subsurface utility plan possible.***

Once the project reaches the construction phase, the GPC team will schedule weekly utility construction coordination meetings. Utilities that have upcoming/on-going relocations, or facilities in proximity to active (or soon to be active) work zones, will be required to attend these meetings, as agreed to in the Master Utility Agreements. These meetings will provide a final opportunity for the utilities to advise of any undocumented or previously unknown utilities in upcoming work zones. Our crews will look for patches, cleared corridors, utility markers, valve covers, and underground utility pole wires. Additionally, GPC will notify utility owners a minimum of three days in advance of work in proximity to their facilities.

Prior to construction commencing, Miss Utility will be notified so the utilities can be marked again in the field. Miss Utility field markings will be compared to the base file, and any discrepancies reviewed and resolved accordingly. ***In addition, a second test pit for known utilities will be excavated just prior to construction to confirm the location. Any issues will be brought back to the utility task force, designers, and the affected utility and resolved accordingly.*** GPC will also have a full time surveyor on site, and will compile and maintain real time as-built drawings of relocated utilities to minimize the risk of impacting a relocated utility in a future phase.

Though every effort will be taken to locate and identify existing utilities, there may be unverifiable utilities encountered underground. Should an unknown utility be encountered, GPC crews will stop work immediately and notify the on-call GPC utility coordinator. After identifying the utility owner using pipe markings or other indicators, GPC will immediately notify the VDOT Utility Manager and utility owner. Additionally, GPC will request that all affected parties meet in the field as soon as possible to review the situation. Unanticipated encountered utilities are often abandoned, but GPC will make no assumptions. ***No excavation besides test pits will be done in or around the utility until the utility owner confirms it is abandoned and safe to remove.*** Should the utility be live or unable to be removed by GPC crews, all parties will agree to a critical relocation plan, implemented immediately to minimize project delays, safety concerns, and public inconvenience. Should outages occur, GPC will work with utility repair crews to restore service outages as quickly as possible, including assisting with MOT, excavation work, etc.

D. Integration of Utility Coordination, Adjustments, and Relocations In Schedule

Anticipated utility relocations have been identified in our tracking matrix, and our experience has demonstrated that it is critical to consider the time necessary to implement these relocations when developing project sequencing and the CPM schedule. The GPC team is knowledgeable and experienced in the VDOT design-build utility relocation process, and has integrated the necessary steps and time frames in the CPM schedule to complete these relocations, including utility coordination, the P&E process, and the relocations themselves (by others). In areas where utility relocations are required prior to certain construction elements occurring, appropriate time for the relocation has been provided. This is evident when looking at the construction schedule for the Military Highway bridge work.

Our utility task force approach involves VDOT and the utility owners early and often in the design phase to expedite relocation designs and allow maximum construction time. Following Notice of Apparent Low Bidder, GPC will work with the utility companies to further refine the matrix, including identifying those relocations that have a long start-to-finish timeframe due to right of way acquisitions, environmental permits, long design lead time, material procurement, and/or construction. GPC will prepare a specific mitigation plan for each of these long start-to-finish conflicts, which can include:

- working with the utility companies to prepare advanced relocation packages, including separate P&Es for specific relocations;
- revising the CPM schedule to re-sequence the construction activities that are reliant on long start-to-finish utility relocations to allocate adequate time for the corresponding long lead items; and/or
- taking the work off the critical path.

The GPC utility task force will work with the utility companies to establish a full schedule and corresponding milestone dates for any advanced relocation packages, and monitor/manage the utilities' progress on design and procurement to make sure they stay on schedule. To expedite critical relocations, GPC will assist the utility companies with field activities such as MOT, E&S, clearing, survey, etc., as permissible.

Utility relocations are a critical item on any VDOT design-build project, and GPC has the experience, relationships, and resources to successfully manage them. Through the proposal phase, the utility task force has been formed, and initiated contact and coordination with all utilities present in the project. Early and often coordination with the utilities is the key to starting a successful utility relocation program, and initial meetings will be scheduled prior to formal NTP. Potential conflicts have been identified early in the design process and avoided where possible. Required relocations are noted and will be tracked on the utility conflict matrix, and long start-to-finish relocations have been removed from the project schedule's critical path. Weekly utility construction coordination meetings will ensure open and frequent communication with the utility companies. Every critical relocation plan will be assigned a GPC team champion and will be an agenda item at the weekly utility construction coordination meetings. Plans are in place to minimize impacts should an unknown or unanticipated utility or conflict be encountered, and to ensure work can progress in a safe and timely manner. This approach has proven successful on past VDOT design-build projects and will prove successful on this one.

4.4.3 Geotechnical

We have reviewed the available geotechnical information for the I-64 High Rise Bridge Project contained in the RFP documents, specifically the Geotechnical Data Report (GDR) and Pavement Report, and will continue to perform further investigations upon Notice of Successful Bidder. These efforts will validate and confirm our proposed design and reduce VDOT's construction costs.

A. Approach to Identifying Geotechnical Risks

We will perform soil borings, in-situ testing, and soil laboratory testing to identify geotechnical risks in accordance with the RFP. This effort will be integrated in the Baseline Schedule, with the objective that all accessible borings and in-situ tests completed within the first 120 days after NTP.

Tests we will administer in our mitigation approach are those required by Chapter III of the VDOT Materials Manual of Instructions on Geotechnical Engineering (MMOI Chapter III), and were successfully applied in VDOT's Hampton Roads District and other similar areas. In particular, we plan to perform classification, index, California Bearing Ratio (CBR), shear strength, and consolidation tests as needed to identify particular geotechnical risks that are anticipated based on our local experience.

We determined from the boring and test date in the GDR that these clay layers are probably not present at key locations on the project, including the approach embankments to the High Rise Bridge and the mainline bridge widenings at Military Highway and Yadkin Road. The absence of these clay layers suggests that construction-related settlements in these areas will be smaller and quicker than is normally expected in this locality. This finding, if accurate, is beneficial as it shortens settlement periods in the project schedule and any additional costs that might have been incurred to accelerate or reduce the expected settlement. An important focus of the subsurface exploration we perform during the scope validation period will be confirming the favorable geologic conditions at these locations.

We have found that in-situ tests are particularly helpful in measuring the soil parameters needed to identify geotechnical risks and for our analysis of settlement and slope stability. These in-situ tests include the Flat Plate Dilatometer (DMT) and Cone Penetrometer with Pore Pressure Measurements (CPTu). While MMOI Chapter III anticipates the use of conventional borings and soil laboratory testing, it allows in-situ testing when appropriate. In-situ test exploration can be used at up to 50% of the exploration points as long as 10% of the in-situ testing locations are immediately adjacent to conventional borings.

We plan to use in-situ testing as much as possible in order to obtain soil information equal to or better than that obtained with conventional borings and testing. We believe these tests can be performed at a lower cost and much faster than conventional borings and testing, which will be a key factor in completing the accessible exploration points during scope validation. In addition, seismic shear wave testing and pore-pressure dissipation tests will be performed in the CPTu soundings. These tests will be critical in evaluating seismic conditions on site and for the design of prefabricated vertical drains (aka wick drains) used to accelerate embankment settlements.

Conventional soil laboratory tests are still needed for many aspects of geotechnical design. In particular, consolidation tests with time-settlement readings are critical for evaluating the magnitude and time-rate of embankment settlements. The consolidation tests will be performed per MMOI Chapter III including holding each load increment at least four hours past the preconsolidation pressure so that the coefficient of secondary compression can be obtained. This is critical for the evaluation and mitigation of long-term settlement if it is expected to exceed the tolerances in the RFP, and also for it to mitigate possible downdrag on existing bridge foundations.

B. Approach to Mitigating Geotechnical Risks

The GPC team understands the site geotechnical characteristics and has used and refined methods to mitigate similar risks. Our geotechnical design subconsultant, Schnabel Engineering, LLC (Schnabel), will use its extensive geotechnical design experience in VDOT's Hampton Roads District to identify and help mitigate geotechnical risks. Table 4.4-4 shows the risks GPC has identified and our approach to mitigating them.

C. Geotechnical Design and Analysis Practices and Construction Methods, including Improvements Related to Soft Ground

We considered a number of potential solutions to optimize design and use ground improvements on this Project, several of which will be incorporated into our design, as described below. Several of these solutions are considered enhancements to the Project that exceed the RFP evaluation criteria and will provide additional benefit to VDOT.

Back-to-Back MSE Walls at High Rise Bridge West End

We will use MSE walls up to 35 ft. high to shorten the bridge and reduce cost to VDOT. MSE walls are feasible because the GDR borings indicate this portion of the site is underlain by sand with isolated, thin layers of clay. The sandy soils encountered in the borings will settle faster than if thick layers of soft clay were present. Our geotechnical subsurface exploration during scope validation will focus on this area to locate clay layers that could affect the magnitude and time rate of MSE wall settlement.

Bridge Pile Foundation Design

The High Rise Bridge will use 24-in. and 36-in. precast concrete piles and 66-in. cylinder piles. The Great Bridge Boulevard bridge and bridge widenings at Military Highway, Yadkin Road, and Shell Road will be supported on square prestressed concrete piles up to 18 inches. These friction piles were selected for reasons of economy and schedule, and in the case of the cylinder piles, to support particularly high vessel impact loads. The piles will develop most of their capacity in the Yorktown Formation. The GDR borings indicate that portions of the Yorktown Formation on this site are extremely dense, so drivability is an important factor in the design, especially for larger pile sizes. We performed preliminary drivability analyses to find appropriate size hammers to install the various pile sizes and determine the cranes required on land and river.

Table 4.4-4: Overview of GPC's Approach to Mitigating Geotechnical Risks		
Risk	GPC Mitigation Approach	Successful Previous Application
Inadequate foundation support for the High Rise Bridge	Complete the final geotechnical engineering study and analyze precast concrete piles up to 66 in., steel pipe piles up to 72 in., and drilled shafts up to 96 in. for bridge support.	Schnabel provided similar analyses for the Dominion Boulevard Bridge over the Elizabeth River in Chesapeake 1.5 miles south of this Project. **Result:** Optimized foundation design in similar subsurface conditions.
Inadequate lateral capacity of High Rise Bridge foundations designed for vessel impact loads	Use cone penetrometer tests (CPTu) and dilatometer (DMT) soundings to optimize lateral soil parameters for analysis and lateral load design.	Schnabel used cone penetrometers and dilatometers to develop lateral soil parameters for the Dominion Boulevard Bridge 1.5 miles from the Project with similar subsurface conditions. **Result:** Saved money by optimizing the lateral load design.
Difficult driving in dense Yorktown Formation soils for relatively long, large diameter piles at the High Rise Bridge	Perform drivability analyses for a variety of pile hammer sizes to avoid overstressing the piles during installation to achieve the required penetration depth and geotechnical resistance.	Schnabel provided similar analyses on the Dominion Boulevard Bridge. **Result:** Confirmed feasibility of driving large piles into dense Yorktown Formation sand for bridge support.
Settlement and slope instability at the Special Design Wall and western approach to the High Rise Bridge	Use a combination of galvanized sheet pile wall and back-to-back MSE walls for High Rise Bridge approach support and to shorten the bridge.	Schnabel provided geotechnical analyses for the design of back-to-back MSE walls for the Richmond Airport Connector to Route 895 Project. **Result:** Avoided right-of-way issues.
Undermining and scour of the western approach to the High Rise Bridge from Deep Creek and Elizabeth River flooding	Design back-to-back MSE walls, including scour and erosion protection (i.e. rip-rap), and implement a Soil Erosion Plan specifically addressing surface water and potential flooding.	Corman and Schnabel implemented scour countermeasures to protect two bridges over Accotink Creek on Route 1 at Fort Belvoir in Fairfax County. **Result**: Scour depth reduced and money saved on foundation construction.
Additional undercut and replacement of low CBR soils discussed in the GDR and Pavement Report	Use cement stabilized subgrade as an alternative to undercutting and replacement; more cost effective and schedule efficient than removing and replacing unsuitable soil.	Corman with PTG and Schnabel implemented cement stabilization on a portion of Intercounty Connector Project B in Montgomery County, MD. **Result:** Saved money by improving soils in place.
Damage to existing structures from construction of I-64 mainline bridge widenings near existing foundations at Military Highway, Yadkin Road, and Shell Road	Review as-built plans, develop a vibration and settlement monitoring program, make site inspections and pre/post demolition surveys of the structures, and design support of excavation at bridge locations.	As part of JV, Granite is reconstructing 15 interchanges on the I-4 Ultimate P3 in Orlando, FL, requiring a robust monitoring plan and extensive support of excavation at the existing bridges. Corman and Granite with PTG and Schnabel developed a similar mitigation plan on the ICC-A project when widening several bridges on I-370. **Result**: Widenings constructed as planned without damage to the existing bridges.
Bridge widening impacting existing slope instability at Military Highway, Yadkin Road, and Shell Road	Design structure support of excavation above the slope and instrumentation monitoring for structure settlement and lateral movement.	Corman used soldier pile and timber lagging support of excavation for their I-64 Widening Project in Henrico and Goochland Counties. **Result:** Limited the project's extent of excavation.

Table 4.4-4: Overview of GPC's Approach to Mitigating Geotechnical Risks

Risk	GPC Mitigation Approach	Successful Previous Application
Embankment settlement at Great Bridge Boulevard that could damage the existing HRSD 30-in. sewer force main (SFM) located parallel to the west side of the bridge	Design MSE wall parallel to Great Bridge Boulevard and use of wick drains to control and minimize 30-in. SFM settlement.	Use wick drains to control settlement on the Military Highway CFI project, designed by the Parsons team with Schnabel and installed by the contractor JV with Corman. **Result**: Settlement was controlled to within tolerances and within schedule requirements. Schnabel calculated settlement of existing 12- and 16-in. gas lines due to the placement of embankment fill on Corman's Military Highway CFI project in Norfolk. **Result:** Relocated the gas lines to avoid potential settlement.
Embankment settlement at Military Highway, Yadkin Road, and Shell Road could result in downdrag on the existing foundations	The GDR borings indicate sandy soils underlie the bridges at Military Highway and Yadkin Road without thick compressible clay layers. Schnabel's analyses show that widening the embankments should not result in enough settlement to cause downdrag. Embankment fill at Shell Road is limited, so minimal settlement is anticipated.	Schnabel provided similar analysis and design recommendations for the widening of I-264 Mainline Bridges over the NPBL railroad in Portsmouth, VA as part of the Martin Luther King, Jr. Expressway Extension from the Midtown Tunnel to I-264. **Result:** Optimized design and saved money.

Ground Improvement Related to Soft Ground Using Wick Drains and Surcharges for GBB Embankments

We will use these techniques to accelerate settlement and reduce long-term (secondary) settlement at Great Bridge Boulevard. The alluvial clays at this location are very deep and extremely long piles are needed if the foundations are designed for downdrag. By including a surcharge, the long-term (secondary) embankment settlement can be reduced so that the piles are not subject to downdrag. The settlement period and the potential impact on the adjacent 30-in. SFM were major factors in our approach for this bridge. These techniques are not needed at Military Highway and Yadkin Road because the soils consist of sand and settlements will be moderate and occur relatively quickly. At Shell Road, only a small amount of fill is needed and relatively minor settlements are anticipated.

MSE Walls at GBB to Reduce Settlement of Adjacent Sewer Force Main

The RFP plans show a significant amount of embankment fill at this location, with the fill extending over an existing 30-in. SFM parallel to the west side of the new bridge. Construction of this embankment could possibly damage the SFM from more than four inches of ground settlement below the sewer. To reduce embankment settlement and its effect on the SFM, our team will construct MSE walls parallel to Great Bridge Boulevard to move the settlement source as far as possible from the SFM, thus reducing the magnitude of settlement.

Drilled Foundations Adjacent to Sewer Force Main at Military Highway

There is another 30-in. SFM below I-64 and adjacent to the southernmost row of bridge piers at this location. Available reports show that this force main is older than the sewer at Great Bridge Boulevard and more susceptible to damage from pile driving. We will use drilled foundations to reduce risks associated with settlement and damage from pile driving in the predominantly sandy soils supporting

Figure 4.4-8: MSE Walls with Surcharge. *GPC team member Schnabel used MSE walls and surcharge in similar soil conditions to reduce long-term settlement.*

the SFM. Vibrations from pile driving could densify the sandy soils, resulting in settlement and potentially damage the SFM. This alternative will reduce vibrations and avoid costly sewer relocation.

Cement Stabilization to Strengthen Subgrade

Based on the existing boring information, nearly all of the pavement subgrade soils consist of sand. However, the CBR results in the GDR and Pavement Report results are extremely variable, with several values less than the RFP minimum CBR of 10. Soils with lower value CBR results could be stabilized with cement to provide a stronger subgrade, thereby reducing extensive haul-off and borrow. This alternative will be thoroughly investigated during scope validation.

4.4.4 QA/QC

The GPC approach to quality management uses proven, effective procedures for design and construction quality management. Our approach will instill VDOT with confidence that it will not incur unexpected oversight and administrative costs during the project and it can look forward to long term benefits from reduced maintenance costs over the service life of this I-64 upgrade. GPC will deliver the highest standards of quality through the following actions:

- partnering with VDOT to address all viewpoints and commitments and to reach mutually agreeable issue resolutions;
- implementing "lessons learned" from VDOT projects such as Military Highway CFI and I-395 HOV Ramp at Seminary Road;
- using interdisciplinary quality, safety, and environmental reviews for optimized solutions to ensure timely procurement of permits and safety while reducing design conflicts and rework;
- engaging the Responsible Charge Engineer (RCE) in the construction engineering effort, particularly where it supports technically-challenging field operations like long-span precast concrete beams;
- implementing a comprehensive QA/QC plan that generates well-structured documentation in accordance with VDOT policies and procedures is easily audited;
- dedicating an independent Quality Assurance Manager (QAM) and an autonomous Quality Control Manager (QCM) with authority to stop work at any time; and
- implementing clear provisions for tracking and correcting non-conforming work.

GPC will perform a comprehensive review of the plans, specifications, and referenced requirements and identify all testing, submittals, and quality requirements for each construction operation or item, as we did on the Granite/Corman ICC Contract A in Maryland. This list will be developed in a sortable Excel spreadsheet and used by the construction, QC, and QA teams to confirm strict compliance with all specified requirements. The list will be used as a tool to establish the submittal log, agenda for pre-activity meetings, and hold and witness points.

GPC will not start construction activities without Released for Construction (RFC) plans and appropriate pre-activity meetings to include task-specific work plans, job hazard analysis, and discussion of quality requirements (hold points and testing/inspection requirements).

A. Staffing Plan

Glenn Olechnowich, Design-Build Project Manager, has overall responsibility for the project, including the quality management effort. The RCE, Brian Quinlan, will assist Glenn in his quality duties. In the GPC organization, Glenn and Brian delegate responsibilities to the Design Manager, the Construction Manager, and the QAM. Within their jurisdictions, the three legs to the Quality Management Plan (QMP) are (1) design quality management, (2) construction quality control, and (3) construction quality assurance, respectively. Overall assurance and auditing of the program will be performed by Brian Quinlan, the RCE.

Our Design QA/QC Plan, based on VDOT's *Minimum Requirements for QA and QC on Design-Build and PPTA Projects,* follows the successful plans that Parsons developed for other VDOT design-build projects. It will be implemented by Design Manager, Josh Wade, with direct input from RCE, Brian Quinlan, and assistance from our Design Quality Manager, Greg Anderson. Josh will establish design criteria and checklists, using effective tools developed for the Military Highway CFI project.

Construction QC Manager, Gary Webb, will oversee GPC compliance with VDOT's construction quality standards, as well as our own internal high quality standards. Gary will be on-site full time and report directly to Construction Manager, Randy Svilar, and have no assigned duties other than QC. He will manage the QC process and supervise the on-site QC staff of inspectors, technicians, and material testing specialists, placing precedence on critical issues and issuing Non-Conformance Notices (NCN) to Randy when necessary. He will also verify that QC inspection and testing staff are appropriately certified in accordance with VDOT requirements.

As proven on past projects, 80% of project issues result from only 20% of work activities. Gary Webb, our experienced QC Manager, will identify the activities that historically cause issues on design-build contracts and concentrate his resources on those items.

To staff our QC efforts, GPC will break the project into three sections: east, center, west. Experienced chief inspectors, who report directly to Gary, will lead each section. They will have dedicated inspection and technician teams to provide QC in each section. The eastern section extends from the eastern terminus of the project to the eastern HRB approach. The center section includes the new HRB and repairs to the existing structure. The western section extends from the HRB to the project's western terminus. In addition, one project-wide traffic/MOT inspector is responsible for the TMP.

Quality Assurance Manager, Jim Lynch, PE of Volkert Associates, will manage the independent Construction QA program. He will oversee a team of inspectors and technicians, as well as the QA materials testing lab. The QA inspection team will feature full-time lead QA inspectors for bridge work and for roadway work, supplemented as needed with comparable lead inspection personnel for multiple-shift work. The QA leads will supervise the fieldwork of the QA testing technicians.

Figure 4.4-9 outlines the roles and responsibilities of key quality team members.

Staffing Plan to Meet QA/QC Requirements for Specialty Structures

The new High Rise Bridge (HRB) will include different types of high-capacity precast piling, unusually long precast concrete beams, and moderately long structural steel beams that require precise planning and careful execution. Based on our experience with long span structures over navigable waterways, we will supplement standard VDOT design-build QC and QA procedures:

- GPC QA and QC personnel will supplement VDOT and vendor quality personnel for precasting concrete beams offsite.
- A specialty subconsultant will provide PDA and similar precast piling documentation.
- An independent Professional Engineer will provide a peer review of precast girder fabrication, transportation, and erection work plan construction engineering components.
- An independent Professional Engineer will provide a peer review of the structural steel erection plan spanning the navigation channel.

B. Approach to QA/QC During Design

GPC's design QA/QC plan will be based on the refined and proven process that Parsons and Corman are using on the Military Highway CFI project. Those processes have been approved and vetted by VDOT District personnel. They will be additionally tailored to address specific design quality concerns on the Project.

Key elements of our design QA/QC program are described below:

- Design quality management plan (DQMP)
- Design schedule
- File structure and setup
- Design criteria and standards validation and setup
- Protocols, processes, and procedures development
- Design quality program training
- Implementation (include flow chart of process)
- Post design and tracking logs

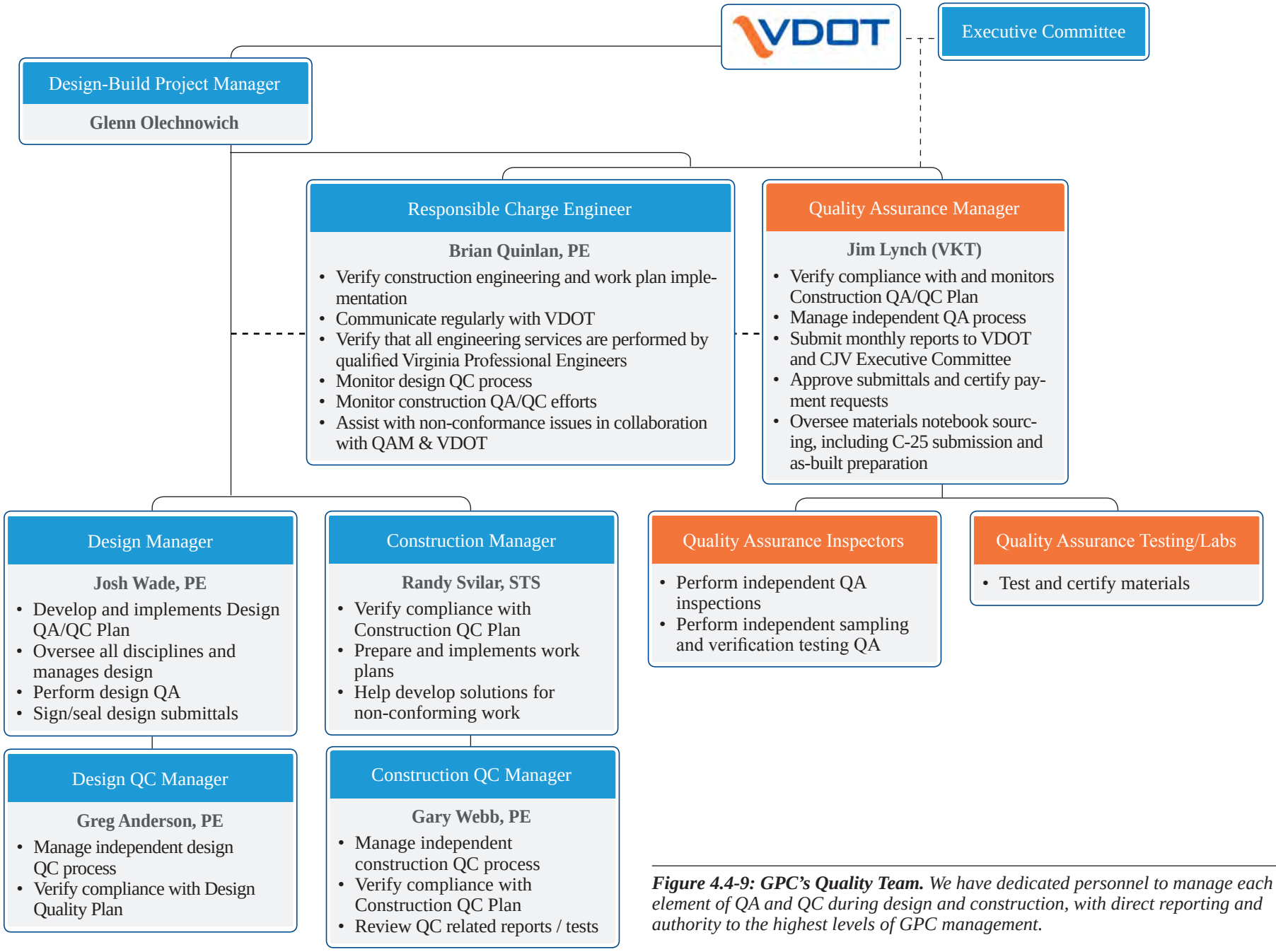


Figure 4.4-9: GPC's Quality Team. *We have dedicated personnel to manage each element of QA and QC during design and construction, with direct reporting and authority to the highest levels of GPC management.*

The **Design Quality Management Plan** is a VDOT requirement on all design-build projects and Parsons has developed DQMPs for multiple projects. GPC will build on those successful efforts and improve them with lessons learned, tailoring its DQMP to project-specific requirements and needs. This document will detail the quality process, describe roles and responsibilities, and tie to construction and the project quality program.

An accurate **Design Schedule** is critical to the success of the project. The GPC design schedule will document anticipated durations and work flow for design elements, including review times, comment periods, and permitting requirements. As a fragnet of the Baseline Schedule, the Design Schedule will be a major element of progress reporting and meetings. To ensure continued relevance, it will be continually monitored and adjusted.

The project design **File Structure and Setup** uses standardized MicroStation Workspaces to improve project quality, minimize potential errors, unify staff efforts, and simplify communication and collaboration across the team. The use of web-based document control tools simplifies archival processes, especially for QC documents and record sets.

Our experience has shown that proper dissemination of **Design Criteria and Standards Validation and Setup** is critical to selecting correct assumptions, software, and validation methods. This is also where independent design needs will be identified for critical items.

Protocols, Processes, and Procedures Development drive GPC's weekly meetings, submittal processes, conflict resolution, and communication protocols to streamline planning and project development. They ensure timely communication, facilitate complete submittals, and reduce issue resolution delays. This helps to develop an open and honest partnering atmosphere, where every idea and concern is fairly considered when developing mutually-agreeable solutions.

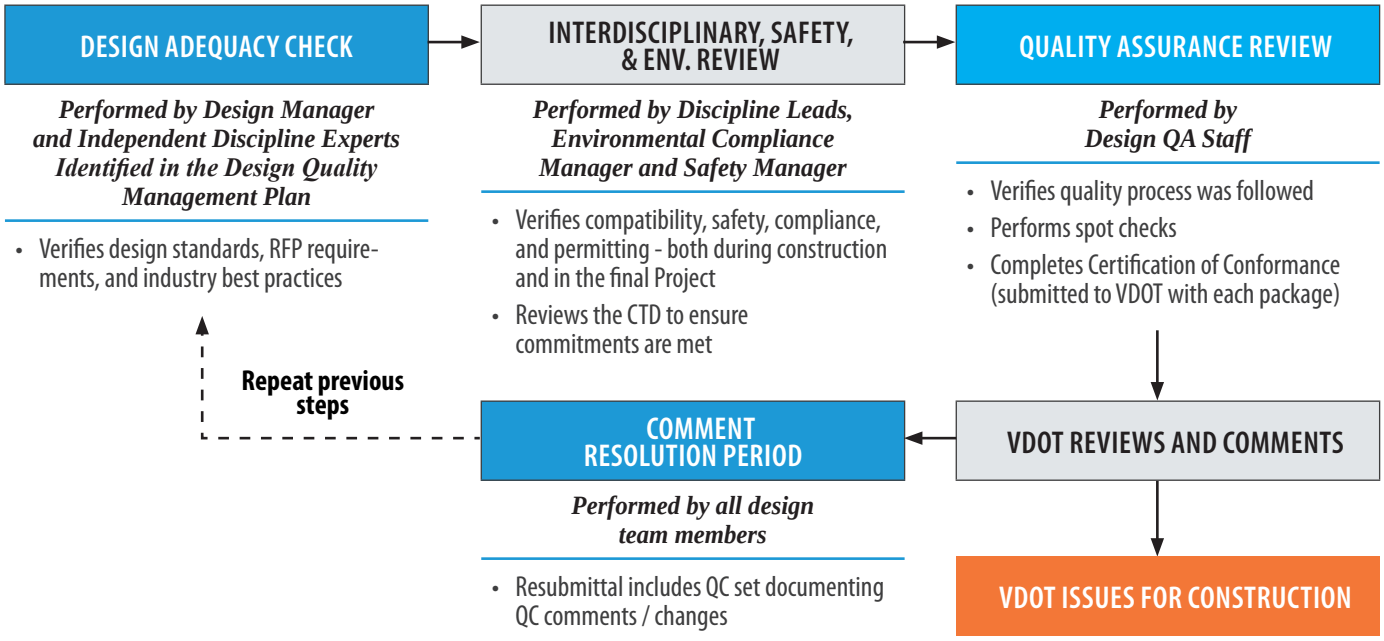
A successful quality program requires 100% commitment from all involved parties; therefore, GPC will institute **Design Quality Program Training**. This will ensure all designers, especially those new to the team, know every detail of the quality plan and the standards for compliance.

Finally, **Implementation** of the program ensures a successful project. During the design phase, relevant disciplines, clients, and stakeholders are involved through over-the-shoulder reviews, task force meetings, and other collaboration methods to optimize potential solutions. Next, the design QC is handled by a senior independent engineer in the same discipline as the package. If changes arise from this review, the package goes back to design to restart the process. After going through QC review, the package goes through interdisciplinary, environmental, safety, and constructability reviews. This review cycle allows for formal checks (completed in addition to the over-the-shoulder reviews, task force efforts, and other methods used early on) and documents compliance with all requirements, accounts for all potential conflicts, and ensures a safe, environmentally compliant, and constructible solution. Once past this stage, the package is submitted to VDOT and goes through the formal VDOT review and comment resolution process, resulting in an approved package.

After the design phase is complete, the design staff provides Engineering Services during Construction (ESDC), including maintenance of **Post Design and Tracking Logs**. Seeking continual improvement, the design team will track NDCs and respond to RFIs using proven tracking processes and logs to ensure all staff are informed of ongoing questions and potential changes to drawings to eliminate rework. This process was successfully deployed on Military Highway CFI and has proven effective for reducing rework and ensuring everyone has up to date information.

During the design development phase, the design effort will follow the steps presented in Figure 4.4-10. Once packages have been reviewed and released for construction, the design team will remain engaged through construction as field conditions change, schedules evolve, and revisions to approved designs or approaches are warranted. In addition to participation in progress meetings, reviewing shop drawings and certain work plans, evaluating subgrades and foundation elements, and compiling as-built drawings, the following give insight into other ESDC that will be provided:

Figure 4.4-10: Quality Process for Design Package Development. *Our quality process ensures smooth and efficient reviews and packages have been reviewed for consistency, accuracy, compliance, constructability, safety, and permitting before sending to VDOT for milestone reviews.*



- **RFI Tracking.** RFIs are tracked in logs, including a log for VDOT and one for GPC questions. Questions may result in design changes that require revisions to the approved plans, which will be tracked as an NDC.
- **NDC Log Maintenance.** The NDC log will alert team members of upcoming changes to approved drawings upon initiation of a revision, and track these revisions through approval. The log will identify sheets being modified, the elements being modified, the reasons for the changes, and the approval notice and date.
- **Design Team Progress Review Visits.** The design team will periodically perform site visits during construction to review progress and discuss potential improvements with the construction team. The design team's ongoing engagement leads to collaboration on implementation, enhancements, and problem-solving; ultimately promoting jobsite safety and improving the quality and timeliness of the finished product. An example of these services will include visits by the Geotechnical Engineer of Record to approve subgrade or recommend undercut or soil modifications.

C. Approach to QA/QC During Construction

GPC will provide a Construction QA/QC effort that focuses on complying with the plans and specifications, ensuring quality workmanship, and producing easily auditable documentation; thereby obviating the need for VDOT intervention. We will develop our Construction QMP during the design phase, using feedback from quality, safety, field, and design personnel to tailor a project-specific plan that uses Corman QMPs from past VDOT design-build projects as a template. Key elements of our Construction QMP are described below.

Dedicated Quality Control Manager (QCM)

Our project team includes an independent, full-time QCM, Gary Webb, whose sole responsibility will be construction QC program management. Gary is a Professional Engineer with extensive Tidewater region experience. He is familiar with VDOT requirements and local construction methods. ***Adding an on-site full time QCM to our project staff is a quality management enhancement that will produce a better project and better documentation of the final product.***

Figure 4.4-11: Sample QR Code for Design Drawings. *GPC will include a QR code on design drawings as well as any construction engineering-related work plans. Using a smart phone or tablet, field personnel, QA, QC, and VDOT staff will be able to confirm use of approved documents, including whether drawings are impacted by RFIs or updates. Parsons has successfully used this technology on the MnDOT St. Croix Crossing project.*

Independent Quality Assurance (QA)

While contractual QA requirements are generally prescriptive, GPC will expand QA's role by involving QA in aspects of construction planning and oversight such as work plan reviews, preparatory meetings, and casting yard inspections. The extensive "mega" project experience of the QAM will also help to ensure that construction documentation will be consistent and compliant with current VDOT procedures.

Detailed Work Plans

GPC will assemble work plans for each major construction element, including task-oriented construction engineering, as necessary. While the primary purpose of these plans is to ensure proper planning and execution of the work based on RFC drawings, the work plans outline QA and QC pre-work, inspection, testing, acceptance requirements, and hold points. These plans will be communicated to construction personnel in preparatory meetings, led by our QCM, and then monitored and reinforced through the inspection process.

Document Control

A simple way to avoid mistakes is to ensure current documents are used. GPC will include a QR code on all plans and working drawings, which can be scanned with a smart phone to verify status. This ensures outdated drawings are not used for construction.

Documenting Changes to Approved Construction Plans

We will document and track any changes made to RFC plans through detailed RFI, NDC, and FDC procedures, and thoroughly review such changes to ensure conformance with contract documents. In addition, a set of redline drawings will be maintained in the project office to track clarifications of and variations from the RFC drawings.

While developing as-built drawings, the QC staff will do contemporaneous updates and forward them to the design team to compile in the official set of electronic as-built drawings at the end of the project.

Documenting Non-Conforming Work

GPC will document and track any non-conforming work through Non-Conformance Reports (NCR). Our QAM will formally initiate NCRs and track them through resolution. Construction Manager, Randy Svilar, will work with the QCM and QAM to develop and implement agreeable and effective NCR solutions.

Inspection and Testing Requirements

The QMP will incorporate applicable inspection and testing requirements per the VDOT *Minimum Requirements for QA and QC on DB and PPTA Projects* issued in January 2012, as well as additional testing that is pertinent to specific work plans. An example of such a requirement would be early cylinder-breaks to verify concrete has attained adequate strength before stripping falsework.

D. QA/QC Procedures for Most Critical HRB Element

Critical HRB Design Element

One of the critical and unusual aspects of the design is the potential for vessel impacts to HRB piers. While vessel impact load analysis is not unique, it is an unusual aspect of bridge design because it is typically relevant to a limited number of major structures that cross navigable waterways with commercial maritime traffic. The proper stochastic approach to determining the load magnitude, distribution, and resistance in the event of a significant sized vessel impact can be vital to the long-term performance and maintenance requirements of the bridge.

The GPC design team features Lead Structural Engineer, Greg Shafer, whose resume includes vessel impact designs for major bridges like the Woodrow Wilson Bridge in Maryland and the Audubon Bridge in Louisiana. His team includes engineers who are familiar with collecting and analyzing the statistical data necessary to perform this evaluation, and practical application of the results.

Figure 4.4-12: James J. Audubon Bridge over the Mississippi River. *We will use the same independent checking program on the new High Rise Bridge as Granite/Parsons used for the vessel impact analysis on the Audubon Bridge project.*

As proven during the design of Granite/Parsons' award winning James J. Audubon cable-stayed bridge over the Mississippi River, the independent checking program Greg Anderson, Design QC Manager, will utilize on the new High Rise Bridge is instrumental in the early reconciliation of design assumptions and approach, keeping the design process on schedule while designing a reliable foundation with limited chance of future maintenance issues from vessel collisions.

The Parsons DQMP allows either line-by-line calculation checks or independent calculation checks. While line-by-line checking is the normal approach for structural calculations, for complex structures and unusual loadings, Parsons has found that independent checking is the more effective approach. This is because a peer review provides a check not only on the process and mathematics, but on the engineering assumptions. Moreover, while Parsons performs software validation on all commercial software programs used in design calculations, independent checking with different software provides an additional check on the results of the structural analysis software. For these reasons, Parsons will often engage an independent checker for marine substructure element designs; and that will be the case for the HRB vessel impact analysis.

The HRB piers and foundations will be one of the first design packages released for construction, so schedule reliability is paramount. Independent checking will start at the same time as the design to ensure that the proper approach is used from the beginning and will be checked at each submittal stage to verify results. The interaction between the design engineer and the independent checking engineer on this task will ensure quick closure of open issues and provide VDOT with a structure that is safe and durable and meets performance expectations in the event of a vessel collision.

In addition to the detailed independent QC check described above, GPC will perform the following:

- Interdisciplinary reviews (utilities, roadway, drainage, e.g.) will verify there are no identifiable conflicts.
- An Environmental Compliance Review will verify the design complies with permitting requirements.
- A Constructability review will confirm and finalize means and methods for construction.

During construction, design quality efforts continue in the same fashion as described above for any NDC, RFI or FDC that may be required. By strictly following the above formal procedures through the design and construction phases, we accomplish the following:

- Future VDOT maintenance is minimized because the potential for design or construction issues that could affect long term asset performance and durability is minimized.
- The processes are totally transparent and documented thoroughly; minimizing the effort VDOT must expend to audit our design work.

Critical HRB Construction Element

From a construction standpoint, perhaps the most challenging elements of the new HRB are the long span concrete beams. The design selected results in a more economical structure in terms of capital cost. It also sets the stage for long-term savings on maintenance because fewer spans are needed and concrete beams require a less rigorous inspection and maintenance program than structural steel.

QA/QC Plans: GPC will develop separate detailed work plans for the fabrication, transportation, and erection of the precast concrete beams, incorporating QA/QC testing and inspection requirements. ***Prior starting work, these plans will be reviewed and accepted by the RCE, QAM, QCM, and Lead Structural Engineer, as well as the Safety Manager and Incident Management Coordinator, where appropriate. An independent Professional Engineer***

will also provide a peer review of precast girder fabrication, transportation, and erection work plan construction engineering components.

Special care will be taken when developing work plansto comply with relevant sections of the PCI Bridge Design Manual as it relates to handling, storage, and transport of precast beams, especially guidance given on preventing excessive lateral deflection, which can result in beam damage up to and including catastrophic failure. To ensure beam stability and minimize cracking due to lifting and hauling stresses, the work plans will include PCI-recommended analysis of all beams, particularly the PCBT-95 that are 196 feet long. Factors affecting stability and cracking that will be evaluated as part of this process include:

- Actual compressive concrete strength
- Tolerance on beam sweep (built-in lateral deflection)
- Allowable variation from true plumb during storage and transport (variables to consider include roadway superelevation and bogie flexibility)
- Position of support point during storage and transport relative to beam end
- Position of lifting points relative to beam end
- Lateral tolerance on lifting point position from beam centerline
- Limitation of wind speeds during transport and lifting operations
- Minimizing impact loads from lifting/hauling

This level of planning is essential due to the beam size, work zone space constraints for cranes, trucks, and barges, nearby pedestrian, vehicular, rail, and marine traffic, and existing HRB proximity.

Fabrication Work Plan: The fabricator and the GPC team (including the Lead Designer) will jointly develop this detailed casting plan. It will address formwork, rebar, embeds, pre-stressing, placement, curing, handling and storage, etc. The plan will include stamped shop drawings that were prepared by a Virginia PE on behalf of the supplier and reviewed by the Lead Structural Engineer prior to the QAM's acceptance. In addition to structural details, these shop drawings will depict engineered embeds for handling the beams in the casting yard, for tie-downs during transport, and for handling beams during erection. The plans will also specify minimum concrete strengths for stripping, pick points for handling, and support points for storage. The QCM and the QAM or Lead QA Bridge Beam Inspector will visit the casting yard to verify compliance at the outset of casting operations and periodically thereafter.

The fabrication procedure will include the following quality controls:

- Layout of beam details provided by an experienced foreman working with approved working drawings
- QC approval of bed layout prior to start of work
- QC monitoring and approval of pre-tensioning activities
- QC pre-pour signoff based on Approved Working Drawings
- Concrete testing by ACI-certified technician (including stripping cylinders)
- QC verification of release strength (stripping cylinder breaks) prior to form removal
- QC verifies as-cast embed locations and of girder length, camber, and sweep; documenting poor workmanship and anomalies with formal NCRs that go to the Design Manager for disposition
- QC verifies use of correct hoisting and support points during handling and storage

Delivery Work Plan: This plan will address site delivery procedures including handling and transportation requirements. It will incorporate the supplier's shop drawings, supplemented by stamped working drawings addressing barge delivery specifics of approximately 196-ft. beams and truck delivery of shorter beams. The bracing and handling components of this plan will undergo a peer review by an independent PE to ensure compliance with the PCI Bridge Design Manual, as well as for accuracy and completeness.

The delivery plan will address the following, whether delivery is by barge or truck:

- QC checklist for verification that beams are properly fabricated and approved for shipment
- Concrete strength requirements for transportation
- Engineered restraining devices to ensure stability and lateral support during shipment
- Engineered support locations and pick points
- Sequence for jobsite delivery and erection (to avoid off-loading delays and double-handling)

In addition to the standard requirements, the following will be included for truck delivery:

- Prerequisites and preconditions for shipping, such as oversize load permitting, escort requirements, route, vehicle speed restrictions, and maximum allowable wind speed
- Instructions on proper beam positioning on the bogies (to ensure the beam is not damaged and the transport vehicle is neither unsafe nor unstable)

Erection and Setting Work Plan: Approved erection plans will include CADD drawings depicting details like crane locations and sizes, transport spotting locations, beam final locations, temporary bracing requirements, wind restrictions, traffic restrictions, and crane working radii. If necessary, the erection plan will include a special critical pick checklist if the pick requires two cranes or exceeds 75% of a single crane lift capacity. This plan will undergo an independent peer review.

GPC will use a 3-D modeling software program to develop the beam erection plan. The plan ensures that all bridge member and component stresses are within permissible limits during erection.

Other items addressed in the erection plan will include:

- Sequence and detailed schedule for the erection operation
- Pre-erection surveys for proper positioning of beams and equipment, as well as marking of utilities and other features that must be protected during the erection operation
- Site limitations restricting or governing work access
- Designated lay down areas for tools and materials
- Adequate lighting for night work
- OSHA-compliant provisions for working over water
- OSHA-compliant and RR-compliant provisions for working over or near tracks
- OSHA-compliant provisions for working over roadways including identification of any temporary detours, pacing, or stoppages
- Crane and/or beam lifter sizes, type, and positioning
- Rigging details and pick points
- Support equipment such as manlifts and generators
- Details of temporary falsework, including provisions to ensure stability of the beams through all stages of the erection sequence (ending with installation of permanent diaphragms and anchor bolts)

GPC will also ensure proper training and certifications for all operators, riggers, captains, drivers, and other craft personnel involved in the erection process.

4.5 Construction of the Project

4.5 CONSTRUCTION OF THE PROJECT

4.5.1 Sequence of Construction

The GPC approach to project phasing generates an efficient sequence of construction that will lead to timely project completion, while minimizing construction impacts on the traveling public. It considers and accommodates RFP requirements; environmental, permitting, ROW, and geotechnical constraints; safety; transportation operations; the public/stakeholder interface; and joint venture resources and expertise.

Construction, which is preceded by concurrent permitting and design efforts, has three geographical focus areas: (1) the roadway widening work west of the Elizabeth River, (2) the bridgework over the river, and (3) the roadway widening work east of the river. GPC's general philosophy for the roadway widening is to maximize the amount of work done in long term barrier-protected work zones and to complete the work in the minimum number of phases. For the new High Rise Bridge (HRB), to the maximum extent possible, we will execute the marine work concurrently with the overland work to the east and west of the river. Other guiding principles in planning the work include:

- Identify project areas that require the least time for permitting for early construction
- Sequence the design effort to prioritize submission packages consistent with permitting expectations and critical path priorities
- Accommodate existing utilities in place to avoid time-consuming relocations or upgrades
- Make maximum use of existing subgrades and pavement
- Allow adequate time for settlement in embankment areas
- Employ means and methods for the HRB that are least likely to cause additional permitting issues
- Maximize the use of prefabricated bridge elements for all bridgework
- Provide access to the follow-on ITS contractor as early as possible

A. General Sequence of Activities

The GPC Traffic Management Plan subdivides the west and east roadway widening efforts into three and two segments, respectively. The phasing for these five roadway segments and for the HRB segment are depicted in Figure 4.5-1 and described in detail below.

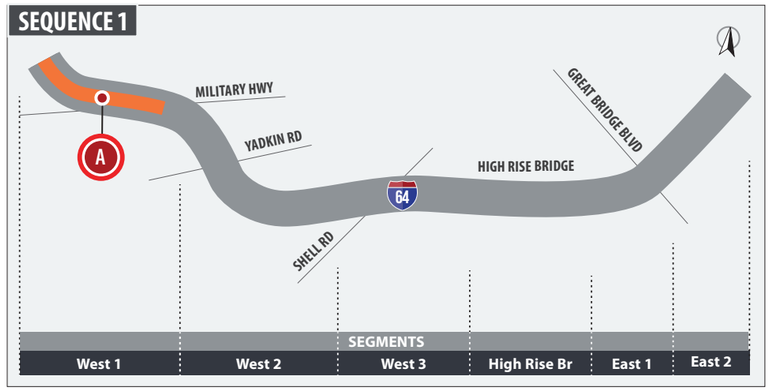
Roadway Widening

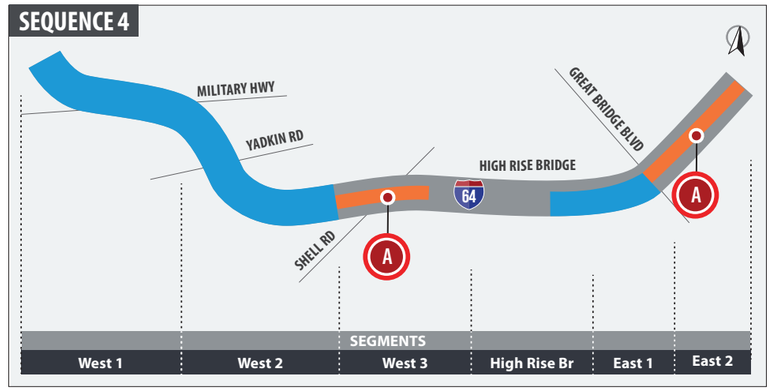
Roadway work will typically start with temporary traffic controls along the exterior of the ROW for activities such as building pull-off areas or installing temporary facilities for stormwater management. Once this preliminary work is completed, the first major traffic shift will take place as a barrier-protected work zone is established in the median. Within this long-term work zone, the construction effort will focus on building full-depth pavement, installing ITS infrastructure, and widening the six I-64 mainline bridges over local roads. After all pavement except the wearing surface is completed in the first MOT phase, a second major traffic shift will move traffic onto this new pavement to create space for exterior work zones for mill-and-overlay reconstruction of existing travel lanes and exterior shoulders on I-64 EB and I-64 WB. Concurrent with the exterior roadwork in this MOT phase, GPC will construct longitudinal off-road features such as noise walls, guardrail, ITS infrastructure, overhead signs, lighting, and permanent SWM facilities. An exception to this approach occurs on the east side of the river in the East 1 Segment between the HRB and Great Bridge Boulevard (GBB) bridge. In this segment, the southern and northern roadway work will be done in sequential phases due to space constraints. In all segments, the final phase of roadway widening will not deploy long-term work zones, but will feature limited mill-and-overlay operations coupled with lane by lane placement of wearing surface asphalt and permanent striping that progresses from the exterior shoulder thru the GP/HOT lanes to the inner shoulder.

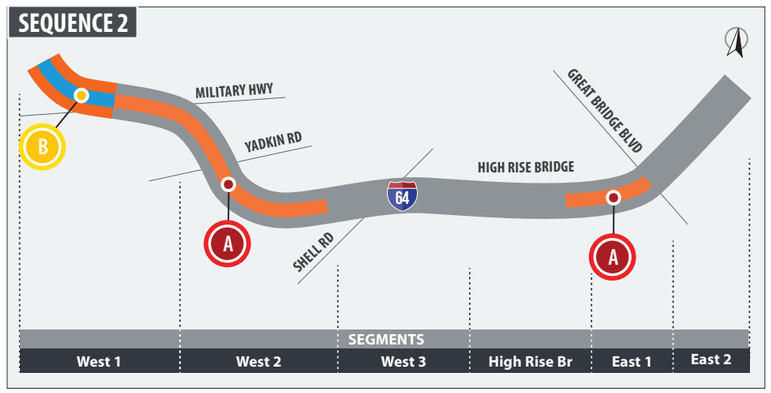
Sequence of Construction:

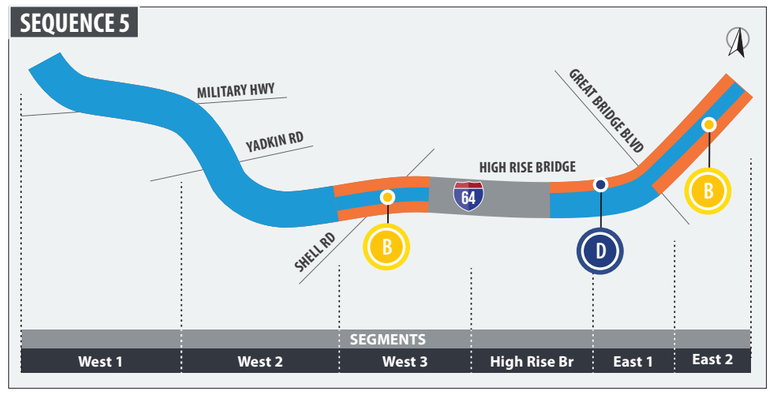
The following is the sequence of construction for the Project. Work will start (Sequence 1) on the west side of the Project with the median construction (Section A) and then proceed towards the High Rise Bridge. In Sequence 2 to 6, work will be done concurrently on the west side and east side of HRB. The work performed in each section is shown on the right hand side of the page.

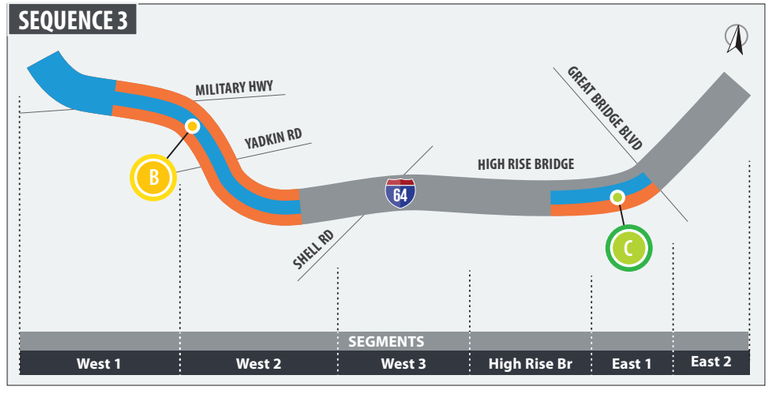
Figure 4.5-1: MOT Typical Sections. *Reducing the phasing and maximizing the work zone reduces the impact on motorists and allows for zones to be opened early in their final configuration.*

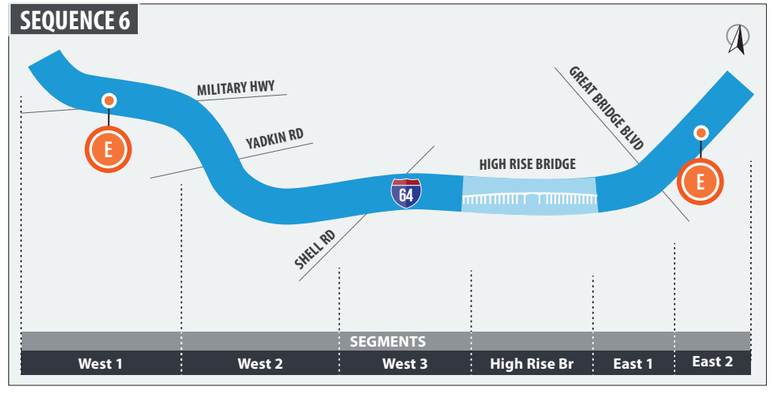


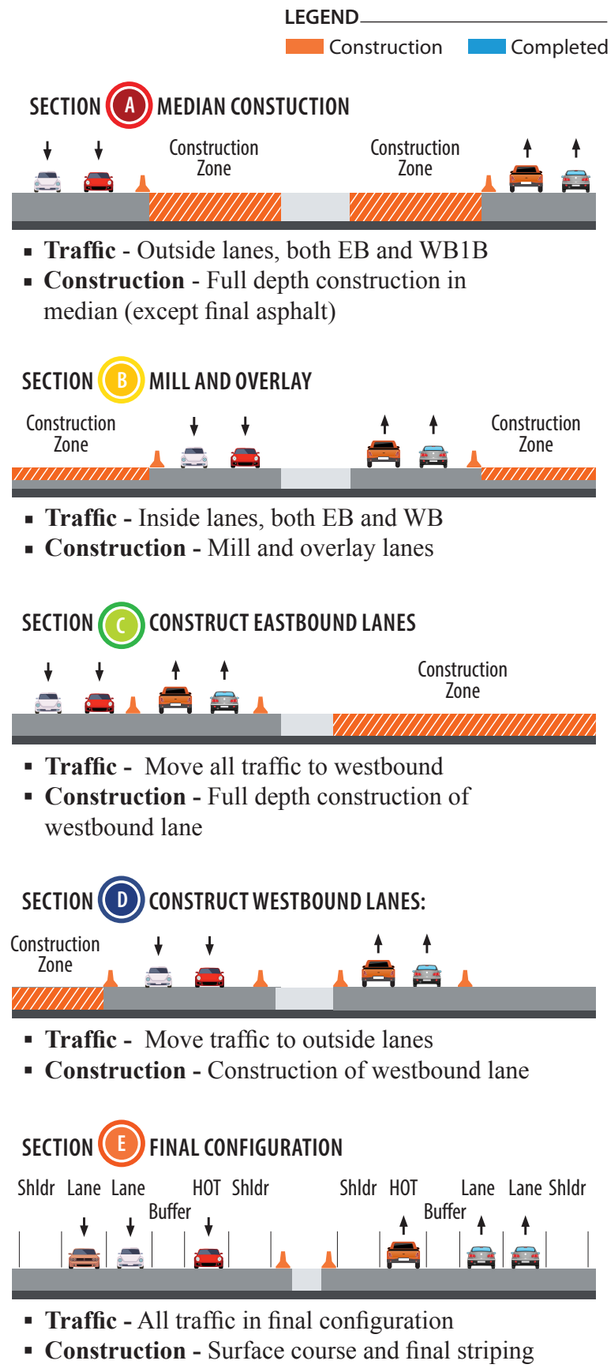












Great Bridge Boulevard Reconstruction

The reconstruction of GBB will be a noteworthy feature of roadway work on the east side of the river. This effort will be largely off-line in terms of its impact on GBB traffic, as the new roadway and replacement bridge will be on a separate alignment. However, GBB lane closures for nighttime construction will be required at the tie-ins between the new alignment and the existing road. Similarly, nighttime I-64 lane closures will be necessary for installation of new GBB bridge beams and for demolition of the existing bridge.

High Rise Bridge Construction

Construction of the new HRB does not require phasing since the new bridge is being built adjacent and parallel to the existing bridge, although work will be executed on three distinct fronts. Overland work on the west side of the river is not encumbered by constraints from a public interface, but permitting will be time-consuming due to the presence of wetlands. Work over the river also has extensive permitting restrictions, as well as the added complications of crossing a navigable waterway and wildlife Time of Year Restrictions (TOYR). Overland work on the east side of the river will require the most interaction with the traveling public and other stakeholders, as the new bridge will cross Bainbridge Boulevard and two rail lines and require the realignment of Libertyville Road. Notwithstanding the extensive coordination that these interactions will entail, the overland work east of the river will have the earliest start date because it has the least environmental restrictions. Figures 4.5-2 thru 4.5-5 provide an overview of the sequence and the means and methods for building overwater portions of the HRB. The overland work will follow a similar sequence.

Work on the river crossings will enter a second phase when I-64 WB traffic is moved to the new HRB, at which time the focus of HRB work will shift to reconfiguring the existing bridge to accommodate "four" lanes of I-64 EB traffic. GPC will take advantage of the existing median barrier to establish a static work zone on what was previously I-64 WB to facilitate updates to the Drawbridge Traffic Management Systems (DBTMS) and to implement required bridge modifications on the south side of the bridge. While in this configuration, certain portions of the new I-64 EB DBTMS will

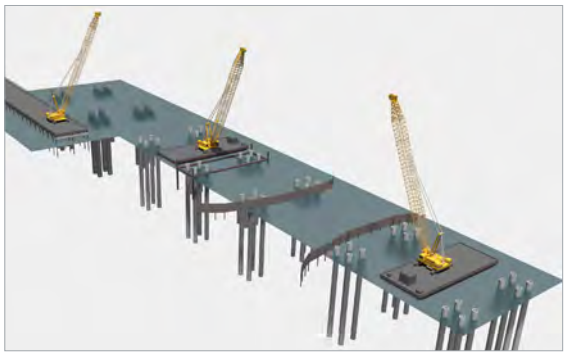


Figure 4.5-2: HRB Sequence Step 1. *Start HRB foundation work east of the river, then expand effort to prosecute work in the river and west of it. Expedite new fender system installation to guide and protect marine traffic so fenders are in place prior to driving piles for adjacent bridge foundations. In deeper waters, employ barge-mounted crane for pile-driving. In shallow waters near the west riverbank, install a causeway and/or trestle for crane access.*

Figure 4.5-3: HRB Sequence Step 2. *Construct bridge footings, columns, and caps on land and water piers concurrently. Each of the three areas – east bank, river, and west bank – will typically have dedicated equipment resources, but share labor resources. A unique feature of the marine "waterline footings" is that GPC will use precast stay-in-place forms to facilitate construction.*

Figure 4.5-4: HRB Sequence Step 3. *Install bridge beams and diaphragms. Beams erected from the water will be delivered by barge, including structural steel for three spans at the navigable channel and the 196-ft. precast concrete beams. Beams erected by land-based equipment will be delivered by truck. GPC will coordinate structural steel installation with the USCG, while PCBT installation over Bainbridge Boulevard, Libertyville Road, and rail lines require in-depth coordination.*

Figure 4.5-5: HRB Sequence Step 4. *Deck and parapet concrete placement. The HRB deck and parapets will be cast-in-place. The deck concrete will typically be pumped and the parapet will be placed directly from redi-mix trucks. All work over the navigable channel, Bainbridge Blvd, Libertyville Blvd, and the rail lines will require coordination to protect the traveling public, but the emphasis will be on shielding and other precautions to isolate the construction work.*

also be updated as a night operation. To complete the existing bridge makeover, the median barrier will be removed to allow shifting I-64 EB traffic to the south side of the bridge. This accommodates daytime work to complete bridge modifications on the north side of the bridge and to finish updating the DBTMS. Once this work is complete, all temporary traffic control devices on the existing bridge will be removed as I-64 EB is reconfigured from two to four lanes, i.e. a HOT Lane, two General Purpose lanes, and a Hard Shoulder Running (HSR)-compliant exterior shoulder.

Geotechnical Constraints

Poor soil conditions are a large geotechnical concern for roadway work. We will stabilize the subgrade to the maximum extent possible with cement to mitigate this risk under the widened roadway footprint. In embankment areas, we will address poor soils with prescribed measures including wick drains and monitored settlement periods.

The foundations are a geotechnical challenge for the HRB. Our design emphasizes pile type consistency across multiple adjacent spans to enhance construction efficiency, using square precast piles as much as possible due to their reliability and ease of installation. Where larger capacities are required for the longer spans, we used precast spun piles as we believe this is a more predictable high-capacity solution than drilled shafts.

Environmental Impacts

One goal of our design effort has been to minimize project environmental impacts in a way that is consistent with the EA/FONSI documents. This philosophy carries over to our means and methods, as shown by these examples:

- The temporary SWM plan for construction generates schedule savings by incorporating permanent SWM facilities to the maximum extent possible.
- Successful use of soil-cement for subgrade stabilization reduces time-consuming waste and borrow operations.
- HRB construction solutions will minimize river bottom disturbances that might occur with dredging or cofferdams, using techniques like a temporary trestle in shallower waters near the west bank, driven piles in lieu of drilled shafts, waterline footings, and longer spans.
- Incorporation of settlement periods and TOYR in the Baseline Schedule ensures proper consideration in project planning.

ROW Acquisition

We have designed the project consistent with the RFP requirements. During final design, we will work to reduce the ROW required.

Staging and Storage Areas

GPC planned four major staging/storage areas for the Project, three of which are on the corridor and one south of the corridor on the Elizabeth River. The criteria for selecting these areas were:

- Proximity to the work
- Capacity (useable space)
- Safe and reasonable access and egress

Staging Area 1, HRB: The staging and storage area for HRB marine operations will be on the Elizabeth River (Figure 4.5-6) south of the project. In addition to its convenient location and suitable physical characteristics, it has the added benefit of being south of the existing HRB. (Access is not blocked by existing bridge or restricted by need to schedule bridge openings.)

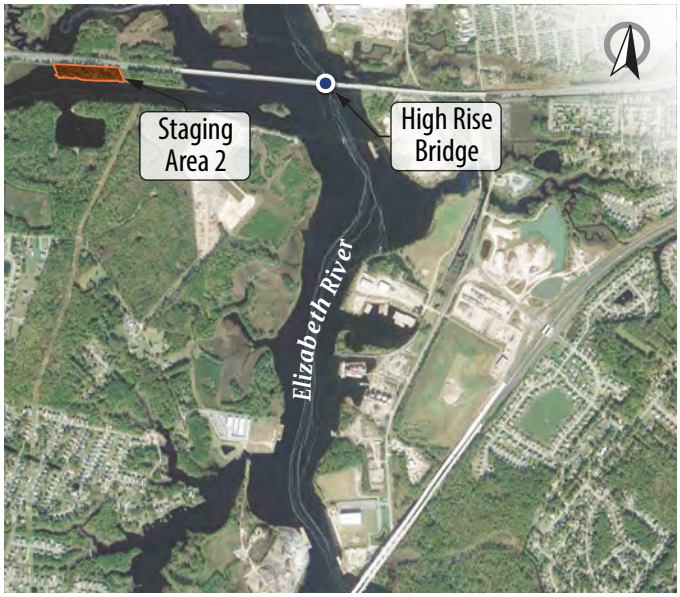
Staging Area 2, HRB: The second staging area will be just west of the new bridge (Figure 4.5-7). Access will be by land from the west side of the river. (GPC

rejected a staging area under the HRB on the eastern shore because it entailed railroad coordination and/or impacts.)

Staging Area 3, Roadway West Side: The I-64 median near Military Highway will serve as the west side staging and storage area for roadway widening operations. The staging area will feature acceleration and deceleration lanes to minimize impacts to I-64 traffic flow. The MOT Plan will address any warning signs, channeling devices, flaggers, additional signage, etc.

Figure 4.5-6: Staging Area 1.*For marine operations, GPC will use a Corman property that is located less than a mile south of the existing High Rise Bridge. This site is functional and has a bulkhead for water access.*

Figure 4.5-7: Staging Area 2. *GPC will use a staging area at the western end of the new bridge. We do not anticipate staging on the eastern shore under the HRB because of likely railroad impacts.*



Staging Area 4, Roadway including GBB: An infield area in the I-464/I-64 interchange will become the east side roadway work staging/storage area. This location offers construction and delivery vehicles optimum access and egress with minimal impact/disruption to the public.

Government Approvals

GPC included conservative durations in its proposal schedule for obtaining government approvals for permits from agencies such as the USACE, USCG, and Virginia DEQ. The Baseline Schedule will do the same, while adding other required approvals such as FHWA approval of permanent noise mitigation measures (sound walls). At a more granular level, GPC work plans and three-week schedules will also address local requirements governing things like nighttime operations, noise control, and roadway detours, closures, and shifts.

Construction Staffing to Ensure Adequate Resources in Each Phase

Our integrated construction joint venture will draw staff resources from each member firm. As for craft personnel, the majority will be hired locally, although many are expected to transfer from the Military Highway CFI project as it winds down to completion. To facilitate recruiting and to reduce labor shortage likelihood and severity, we intend to pay higher than prevailing wage rates to attract skilled crafts personnel. We also expect that most of our subcontractor teammates will be locally based with established workforces.

B. Public Safety

GPC focused on public safety during technical proposal development and will continue to make it a project priority during construction. The following are examples of design solutions to enhance safety during construction:

- MOT plan maximizes use of barrier-protected long term work zones and minimizes the number of major traffic switches. The concrete barrier provides a positive separation between motorists and construction activities, while minimizing switches avoids motorist confusion from unexpected road changes and reconfigurations.

- HRB design eliminates straddle bents on Libertyville Road to better isolate vehicle traffic from bridge structural elements.
- Alignment of HRB piers and fender system at navigation channel reduces collision risk.
- Additional cameras will be added on and around the navigable channel of the Elizabeth River for real time monitoring of movable bridge and construction activities.
- Drainage plans will address stormwater runoff during construction to avoid standing water in travel lanes – using permanent detention ponds where possible as a BMP.
- Protective measures for existing utilities including an SWM pond embankment that protects a gas main, a permanent retaining wall along GBB to avoid surcharging the 30-in. force main, and foundation designs that considered the proximity of utilities (i.e. drilled shafts in lieu of driven piles near force mains on Military Highway).

The following are examples of how GPC will promote public safety during construction:

- Extensive public outreach will educate traveling public about upcoming activities. This outreach will be part of a communications plan that uses meetings and notifications to the public, stakeholders, and emergency responders to inform them about our sequence of construction, traffic control, and upcoming work activities. This plan is described in greater detail in Section 4.5.2 Transportation Management Plan.
- Safe access and egress were considered in selection and design of staging areas including provisions for acceleration/deceleration, dust control, and warning signage.
- A formal Hurricane Preparedness Plan will be in place addressing external lane-reversal requirements for police-directed evacuations and internal requirements to protect the workforce, safeguard the work, minimize potential debris, and implement rapid cleanup.
- The Incident Manager will be engaged in planning and delivery of oversize loads, such as bridge beams to enhance police coordination.

Figure 4.5-8: Marine Bridge Construction Experience. *Granite, Corman, and Parsons teamed up to develop solutions that minimized impacts on marine and vehicular traffic on the Woodrow Wilson Bridge VA Approach Spans Project.*

- HRB fender system reconstruction will be prioritized to provide separation between maritime traffic and construction activities.
- Libertyville Road detour is a static solution to isolate construction activities from local traffic and to shorten the period of impact (includes temporary relocation of bus stop).
- Temporary lane closures and detours, typically at night, are transient solutions to eliminate public exposure to superstructure construction activities at GBB and other surface streets, while small static work zones will be used to protect substructure work.
- Construction personnel will receive safety training on topics such as flagging, railroad safety, rigging, defensive driving, and housekeeping.
- Delivery of large steel and precast concrete beams for HRB river spans by barge to avoid over-the-road hauling.
- MOT crew will carry gasoline and jumper cables to assist stranded motorists.

C. Limiting Disruptions to Vehicular, Marine, and Railroad Traffic

Vehicular

Our approach to phasing and sequencing limits roadway traffic disruptions by:

- Completing longitudinal roadway work within long-term barrier-protected work zones with infrequent traffic stages/switches minimizes driver confusion

- Accessing new HRB construction from the riverside staging area to south of the existing bridge eliminates construction requests to open the existing I-64 moveable bridge
- Detouring Libertyville Road traffic will expedite construction of the new HRB in that area, so that the total period of disruption is shortened
- Using nighttime lane closures and flagging operations to minimize traffic disruption on Bainbridge Boulevard and other surface streets
- Dedicating resources to substantially complete updated DBTMS installation and modification to deck/parapet on existing HRB prior to removal of median barrier to ensure a safe and uneventful cutover from two to four I-64 EB lanes
- Providing marker buoys and no anchorage areas to protect the HRB submarine cable and avoid disrupting the existing HRB moveable span

Marine

Our approach to phasing and sequencing limits disruptions to vessels and marine traffic by:

- Constructing the new fender system prior to nearby HRB foundation work to define the channel and separate marine traffic from construction activities
- Using trestles in shallow water where boating is not feasible to avoid impacts to recreational boating activities
- Using conventional precast piling to positively impact the HRB schedule, decrease impacts on marine traffic, and avoid encountering riverbed contaminated materials
- Coordinating with US Coast Guard and making appropriate use of Local Notice to Mariner system to avoid conflicts and unexpected (unannounced) boating restrictions, especially during night erection of structural steel over the navigation channel

Railroad

This Project requires coordination with three railroads that have one track each:

- Norfolk Southern (NS) under the I-64 bridge widening at Yadkin Road
- Norfolk and Portsmouth Belt Line Railroad (NPBL) under the new HRB
- Private railroad for Hampton Roads Integrated BioEnergy Complex under the new HRB

GPC will use the following general coordination strategies to minimize railroad impacts:

- Provide at least 45 days for NPBL and NS to review all construction submissions
- Coordinate work activities on or over railroads directly with the railroad flagman or with designated NPBL, HRIBC, and NS representatives
- Schedule required flagging personnel services with designated NPBL and NS personnel to ensure no lost schedule time
- Arrange installation of a positively-controlled track crossing when flaggers are present
- Provide proper rail and ballast protection during demolition and beam-erection activities

GPC's standard approach to work near railroad tracks will be to perform substructure work in small static barrier-protected work zones and to erect the superstructure beams within railroad-prescribed windows using railroad-approved erection plans. The use of pre-stressed concrete beams will simplify these erection operations and minimize the impact on railroad operations. As a standard practice, GPC will also maximize concurrent work near tracks to limit railroad impacts and to minimize the total flagging effort.

D. Installation of ITS for Monitoring Traffic and Safety

Our ITS construction sequencing plan will preserve, reconfigure, or replace VDOT's existing equipment, including video monitoring, vehicle detection, and Dynamic Messaging Sign (DMS) systems to accommodate new structures and roadways.

We will install power and communications conduit in close coordination with the roadway and structures construction. As a precautionary measure, we will perform existing fiber trunk relocation, as well as other utilities applicable to ITS systems, ahead of major construction operations that encroach on the existing utility path. Consistent with this approach, the fiber optic trunk installation will be one of our earliest RFC packages so it can be in place for cut-over and to support the new device installations. Foundation installation for poles and sign structures will be coordinated with the roadway

and structures construction to potentially integrate with retaining walls, barriers, or grading operations.

The ITS Inventory provided as Attachment 2.8.2 of the RFP includes 45 existing CCTV cameras, 15 existing DMS signs, and 15 existing vehicle detectors. As the center median is cleared for the new HOT lanes, the CCTV sight lines will open and allow a reduced number of cameras along the corridor. The concept level estimate for CCTV placement providing full coverage is 14 camera locations. There are also estimated to be 12 DMS locations on the existing roadway, 53 GP lane and ramp detectors, and new signs and devices to support the new lanes and hard shoulder running.

GPC's design will model the new roadway configuration in the permanent condition. We will review sightlines for monitoring traffic during construction and prioritize existing device relocaton within the construction zones, maintaining system functionality throughout construction. Our design will look for opportunities to make permanent installations early so they may be used during construction, and where this is not possible, we will install temporary cameras to provide overlapping coverage without occlusion by stationary objects such as signs, overpasses, and trees.

The transition from the existing to the new network of cameras will be augmented and facilitated by a temporary wireless camera operating system.

Overhead signs will typically be installed after communications, power, and cabinets are completed and available for system integration, testing, and start up, avoiding long periods of inactive devices. Where the functionality of existing signs is required but conflicts with construction, we will provide temporary signage.

We will schedule the completion of the drawbridge management system, including DMS signs, gates, claxons, and signals, to deliver a completely tested system prior to decommissioning the existing system. This work will largely take place after the new HRB is opened to I-64 WB traffic, as that will free up half of the existing bridge for use as a work zone. Using the existing median barrier to protect workers and the full width of the bridge for phasing will promote a safe and orderly incremental expansion from two to four lanes of eastbound traffic (1-HOT, 2-GP, and 1-HSR) on the existing HRB.

E. Installation of Civil Infrastructure for the HOT Lanes Facility

HOT lanes infrastructure construction will be synchronized with MOT setups for roadway and HRB construction, with much of the work taking place in the initial long term work zone in the existing median. Installation of toll gantry foundations, technical shelters, communication and power conduit, cabling and toll zone conduit, and specialized pavement in the median work zone will support early access to this civil infrastructure for the HOT Lanes by VDOT's tolling system integrator. Subsequent staggered completion of final paving and striping in each of the six MOT segments will provide phased access for system integration and testing, such that VDOT's system integrator will not have to deal with one-time turnover of the end-to-end HOT Lanes 180 days before the Final Completion Date in the RFP.

4.5.2 Transportation Management Plan

The Traffic Management Plan (TMP) will comply with VDOT's Work Area Protection Manual and with Instructional and Information Memorandum LD-241.7, under which this Project is classified as Type C, Category V, anticipated to have a sustained and substantial work zone impact. Consistent with that classification, GPC will prioritize safety and mobility of the traveling public throughout its design and construction effort. As the first step in this effort, risks related to the anticipated phasing and sequencing plans will be identified and evaluated during the design phase. Those that cannot be eliminated through further design refinements will be mitigated in the TMP. Examples of mitigation efforts include the following:

- Packaging mainline work in a limited number of long term barrier-protected work zones
- Preparing communications tools such as weekly lane closure reports, travel advisories, social media updates, and website updates to alert the public to traffic pattern changes and to encourage the use of alternate routes to decrease volume through the work zone
- Developing a comprehensive advertising campaign plan in collaboration with VDOT

- Formulating contingency plans that include pre-approved detours that can be implemented quickly in response to incidents within the project limits
- Scheduling short-term activities like bridge demolition, beam erection, and asphalt surface course placement at night to avoid complicated MOT sequencing and long term detours
- Minimizing temporary pavement markings to avoid unwanted ghost markings
- Constructing the new fender system before High Rise Bridge (HRB) foundation work to guide and protect marine traffic during bridge construction

The MOT Plan is the part of the TMP that determines the physical interface between the construction effort and the traveling public. Working within the RFP-established constraints on ROW and schedule, our MOT Plans will strive to maximize safety in and around our work zones and minimize construction impacts on the traveling public and neighbors. They will be based on proven design strategies for safe and effective traffic control. The MOT Plans will conform to the latest versions of the Virginia Work Area Protection Manual (VAWAPM) and the FHWA Manual on Uniform Traffic Control Devices (MUTCD).

MOT implementation is a critical aspect of effective interaction with the traveling public during construction. Our MOT team will be led by a full-time, knowledgeable MOT Manager, Brandon Kern. He will supervise the installation and maintenance of traffic control devices and ensure compliance with the approved MOT Plans. The MOT Manager will report directly to Construction Manager, Randy Svilar. The efforts of the MOT team will be complemented by Robert Platt, our Incident Management Coordinator (IMC). Robert has over 36 years of regional experience working with law enforcement and emergency management services. He will oversee development and manage implementation of our Incident Management Plan (IMP), acting as our liaison to first responders and helping to expedite recovery from traffic incidents.

A second critical aspect of effective interaction with the traveling public, as well as neighbors and other stakeholders, is public outreach. We have partnered with Seventh Point to ensure the effectiveness of this component of the TMP. Seventh Point has been a trusted VDOT partner for communications, public involvement, and media plans for large, high visibility projects.

A. Maintenance of Traffic through All Phases of Construction

GPC will properly maintain traffic, including vehicular, rail, marine, and pedestrian/bicycle traffic, throughout the project limits. Our RFP-compliant MOT Plans and the six GPC-established project segments were described previously in Section 4.5.1 Sequence of Construction. Our geographically-segmented approach to the work will allow us to incrementally restore full-width travel lanes and shoulders and to achieve full restoration prior to the Contract Milestone for Final Completion, in the process earning the Early Completion Bonus.

The predominant MOT theme for the I-64 roadway widening effort is to minimize traffic switches by providing long-term work zones to (1) construct new full-depth pavement in the I-64 median and (2) reconstruct existing I-64 pavement. In addition to these mainline MOT setups, I-64 widening will include offline work to construct the new HRB and its approaches, as well as an assortment of short-term lane closures and flagging operations on side streets, the existing HRB, its the approaches.

B. Proposed Lane and Ramp Closures

Our Transportation Management Plan limits lane and ramp closures through the sequencing approach described in Section 4.5.1 Sequence of Construction. For example, the only anticipated long-term interim closure is Libertyville Road, which will be detoured to accommodate adjacent HRB work. Potential lane and ramp closures for major areas of construction are detailed below.

I-64 Mainline West of the HRB

The first major MOT phase is a long term stationary work zone on I-64 for the interior roadway work, ITS infrastructure work, and bridge widenings. To protect this median work zone, GPC will install temporary concrete barrier runs along the entire work area. One run of barrier will be atop existing I-64 EB pavement and the second will be on I-64 WB. The barrier placement will accommodate two 11-foot travel lanes in each direction (typical) along the right (exterior) side of the existing roadway.

The second major MOT phase is a long term stationary work zone for roadway work and other improvements along the exterior of the ROW. To protect this work zone, GPC will relocate temporary concrete barrier onto the newly constructed full-depth pavement in the interior of the ROW. Once again, the barrier will be positioned to provide two 11-foot travel lanes in each direction with all traffic now in the interior of the corridor on new pavement. Major work activities in this phase will include a mill-and-overlay operation, noise walls, stormwater management facilities, and ITS infrastructure.

The third phase of roadway widening will not require establishment of a long-term work zone since the primary activities will be placement of asphalt wearing surface and permanent pavement markings. This will be a brief blend of daytime and nighttime work, typically using barrels, arrow boards, and message boards for traffic control in accordance with the MUTCD.

Although the bulk of the work west of the river will take place in two long-term work zones as described above, special phasing will be required due to space restrictions near the river.

I-64 WB Special Design Wall and Western HRB Approach Embankment

As noted above, special I-64 WB MOT phasing is required for widening work in the area encompassed by the Special Design Wall and the western approach to the HRB. After some minor prep work in the existing median, I-64 WB traffic will be shifted north towards the I-64 EB lanes to create space to establish a long-term, barrier-protected work zone for construction of the Special Design Wall and the MSE walls and embankment for the western approach to the HRB. After completion of the Special Design Wall and the approach embankment and of the overlying roadway, I-64 WB traffic will be placed in its permanent alignment crossing the new HRB. The timing of this shift will determine whether GPC is successful in achieving its interim milestone date for the opening of the new High Rise Bridge. Once I-64 WB traffic is on the new HRB, two minor phases will follow as the adjacent I-64 roadway just east of the existing HRB is transformed into the new I-64 EB configuration. Figure 4.5-9 illustrates this phasing.

I-64 Mainline East of the HRB

Constructing (widening) the roadway in Segment East 1 on the east side of the HRB will be done in three major phases, followed by a short phase for final paving. Segment East 2 will be consolidated into two major phases that generally follow the MOT phasing that was used west of the river.

Duplicating the approach taken west of the HRB, in East 1 and East 2, the first major MOT phase is a long term stationary work zone for construction of roadway in the existing median. Once again, the barrier placement will accommodate two 11-foot travel lanes in each direction (typical) along the exterior of the existing I-64 roadway. Work accomplished in this setup will include the interior full depth pavement, and ITS infrastructure, as well as construction of the new GBB bridge and demolition of three superstructure spans and two central piers of the existing GBB bridge. In East 2 it will also include reconstruction of most of the I-64 WB off-ramp to go south on I-464.

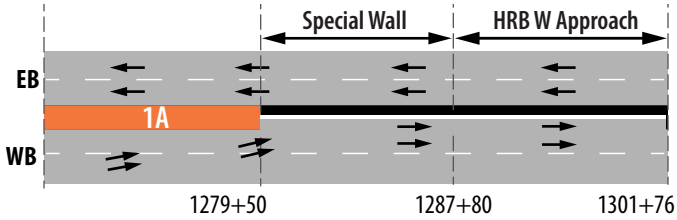
The second major MOT phase in East 1 is a long term stationary work zone for exterior roadway work and other improvements along the southern side of the corridor. This work zone setup will be contiguous with a now fully-developed work zone for construction of the abutment and seven spans of the new HRB, since portions of this HRB work zone have been previously established during the first major MOT phase. To establish a work zone along the south side of the corridor, GPC will shift I-64 WB traffic to the north onto new pavement in what was previously the median. In addition to the overland portions of the HRB, work in this roadway phase will feature widespread full depth pavement, limited mill and overlay operations, demolition of one span, the southernmost pier, and the south abutment of the existing GBB bridge, noise barriers, ITS infrastructure, and widening in the gore area of the I-64 WB off-ramp.

The third MOT phase in East 1 will shift traffic to the south to accommodate existing roadway reconstruction on the north side of the alignment. This shift will coincide with opening the new HRB to I-64 WB traffic. Work in this phase will include limited full depth pavement, widespread mill and overlay operations, remaining span demolition, the northernmost pier, and the north abutment of the GBB Bridge, noise barriers, and ITS infrastructure.

Figure 4.5-9: Special Wall MOT Phasing. *MOT phasing at special wall and west approach to bridge.*

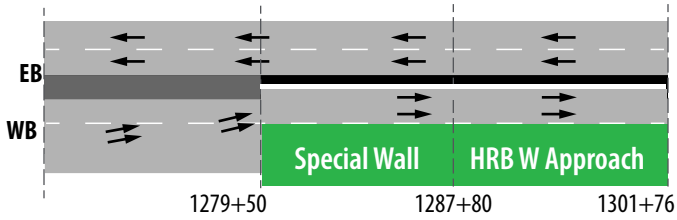
PRELIMINARY WORK

- Construct full depth pavement in sections 1A
- Shift WB traffic (North) towards EB lanes



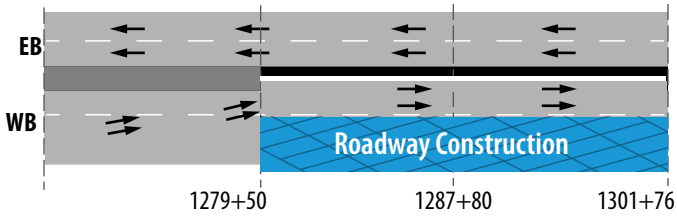
SPECIAL WALL CONSTRUCTION AND HRB WEST APPROACH

- Construct Special Wall from station 1279+50 to station 1287+80
- Construct West Approach embankment from station 1278+00 to station 1301+76



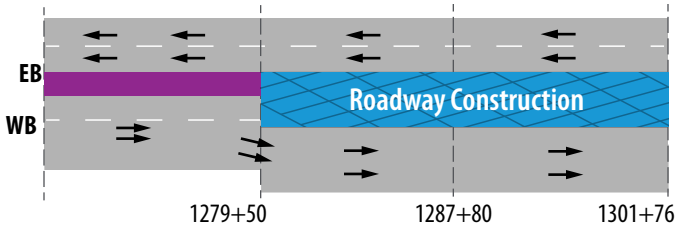
I-64 WESTBOUND ROADWAY CONSTRUCTION

- Construct new approach roadway from 1278+00 to new HRB



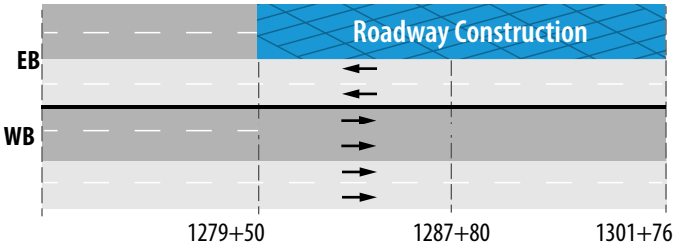
I-64 EASTBOUND ROADWAY RECONSTRUCTION

- Shift I-64 WB traffic into permanent alignment
- Reconstruct half-width of I-64 EB roadway



I-64 ROADWAY FINISH RECONSTRUCTION

- Shift I-64 EB traffic to south
- Reconstruct remainder of I-64 EB roadway



As noted previously, the second MOT phase for East 2 will provide northern and southern work zones for limited areas of full depth pavement, mill and overlay operations, noise barriers, stormwater management facilities, and ITS infrastructure. It will also include completion of the I-64 WB off-ramp to go southbound on I-464. (The anticipated concurrence of work on the north and south side of the corridor in this segment is made possible by the decreasing magnitude of scope near the western limits of the project.)

The final MOT phase for the entire east side will accommodate a localized mill-and-overlay operation at the pinch point on the approach to the existing HRB, as well as incremental completion of all east side asphalt wearing course and permanent pavement markings.

This east side phasing will typically include a dedicated auxiliary lane on I-64 WB for traffic entering and exiting I-64 at GBB and I-464, which will reduce unnecessary traffic crisscrossing and potential backups at entrance and exit ramps. While construction on the ramps or collector/distributor roads is underway, we will meet or exceed the minimum lane and shoulder widths proscribed by the RFP, with no need for interim ramp closures.

Replacement of the bridge at GBB will take maximum advantage of the first major MOT setup, except that nighttime I-64 lane closures will be needed for certain bridge activities.

Great Bridge Boulevard

The GBB bridge and the demolition of the interior piers and spans of the existing bridge is best executed when the median work zone is in place, so GBB reconstruction must be concurrent with the first MOT setup on the east side of the river. As noted above, bridgework like beam erection and

Figure 4.5-10: Minimizing Traffic Impacts during Full Closures. *Corman accelerated construction with a full closure to demolish the existing Frederick Douglass Bridge, and jack and lower the new bridge, using detours to minimize impacts. Corman worked 20-hour days, seven days a week to reopen the bridge and South Capitol Street to traffic eight days ahead of schedule during this critical period.*

superstructure demolition will require nighttime I-64 traffic restrictions, including lane closures, since this work spans multiple travel lanes. Installed shielding will ensure that other GBB superstructure construction activities will have minimal impact on I-64 traffic. Demolition of the existing GBB abutments, end spans, and outer piers can coincide with the exterior roadway work in the second and third East 1 MOT phases.

The GBB roadway work will be done offline, as the reconstructed road will follow a new alignment. Some nighttime work will be necessary at the tie-ins to minimize traffic disruption on the existing GBB roadway. The bulk of this tie-in work will occur during summer months when the Crestwood Intermediate and Middle Schools are not in session. Regardless of whether schools are in session, temporary pedestrian and bicycle access will be provided around the construction area while the tie-ins are completed. The HRT Route 058 bus line will not be impacted by tie-in work as bus service is suspended at night. The final GBB cutover will be a one-shift operation completed in off-peak hours.

Bulldog Drive

Work on Bulldog Drive will employ flagging operations in off-peak hours, so lane closures will be short term and intermittent. ***Traffic disruption on Bulldog Drive has also been minimized because the GPC design avoids relocation of existing overhead power lines.***

Libertyville Road

The MOT Plan for Libertyville Road includes an interim period of full closure from Bainbridge Boulevard to Windward Place for HRB construction and roadway reconstruction. There are no existing sidewalks within the limits of this interim closure, so pedestrian impacts will be minimal. The only abutter within the closure limits is the Diggers Pick & Pull junkyard facility, which will temporarily lose its direct access to Libertyville Road. This is not expected to be problematic, as the business will retain unimpeded access at the main entrance on Bainbridge Boulevard and special access could be provided through the work zone when warranted. HRT buses will be detoured as described below. The roadway closure will substantially reduce construction time, shortening the overall duration of disruption. It is also a safer approach, since it separates traffic from construction activities, in the process eliminating multiple lane shifts and flagging operations that are typical of a shared roadway. ***We also plan to shift Libertyville Road to the south. The new alignment eliminates the need for straddle bents that have a pier and foundation on the south side of Libertyville Road, in the process completely avoiding the impacts to the wetland identified in the RFP Typical Sections.***

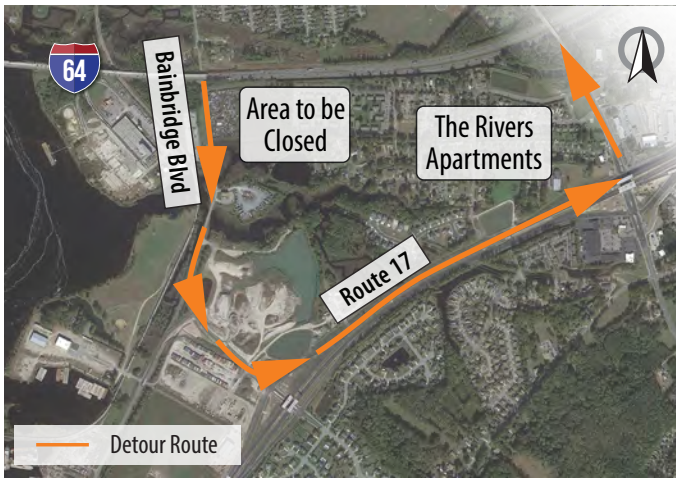
C. Temporary Detours

GPC's MOT design includes an interim closure and detour of Libertyville Road for HRB construction. It also includes temporary nighttime detours of Great Bridge Boulevard during tie-in work for the new roadway and of I-64 during GBB beam erection and demolition.

We do not anticipate that detours will be required for bridge beam erection at Bainbridge Blvd, Shell Road, Yadkin Road, and Military Highway because the work can be done at night with minimal disruption of traffic.

On the Frederick Douglass Bridge and South Capitol Street Design-Build projects, construction sequencing required completely closing the structure for up to 62 days in the middle of the project. Traffic detours accelerated construction to facilitate demolishing a section of the bridge, hydraulically lowering four spans to form a new approach, and reconstructing six blocks of South Capitol Street, as depicted in Figure 4.5-10.

Figure 4.5-11: Libertyville Road Detour. *During construction on Libertyville Road, we will use Bainbridge Boulevard and Great Bridge Boulevard as a detour.*



Libertyville Road Traffic Shift

While Libertyville Road between Bainbridge Boulevard and Windward Place is closed, traffic will be detoured along Bainbridge Boulevard to Route 17, then to Great Bridge Boulevard, and back to Libertyville Road. This 2.5-mile detour, shown in Figure 4.5-11, works for westbound and eastbound traffic on Libertyville Road.

At present, there is no pedestrian access along Libertyville Road through the project area. If it becomes necessary to provide a footpath, it will be routed along the southern edge of the work zone. A newly built sidewalk will provide a permanent footpath when Libertyville is reopened.

The HRT Route 058 bus currently travels though the project area along Libertyville Road and Great Bridge Boulevard. While Libertyville Road is closed, temporary bus stops will be provided as the bus route will follow the detour. There will be no HRT impact along GBB, as there are no bus stops on the boulevard within the project area and pavement tie-ins will be completed at night when the bus is not in service. ***GPC team members have had a successful relationship with HRT on past projects when implementing similar temporary detours and bus stops, and are currently working with HRT on the Military Hwy CFI project.***

Direct access to The Rivers Apartments will be maintained from Great Bridge Boulevard during the entire construction period.

D. Time-of-Day Restrictions

The MOT plans in the GPC TMP are compatible with the time-of-day restrictions listed in the RFP, with no deviations.

E. Flagging Operations

As described in Section 4.5.1, GPC will use flaggers for work at the following locations:

- Norfolk Southern (NS) Railroad at I-64 bridge over Yadkin Road*
- Norfolk and Portsmouth Belt Line (NPBL) Railroad beneath new High Rise Bridge*
- Railroad spur serving Hampton Roads Integrated BioEnergy Complex beneath new High Rise Bridge*
- Libertyville Road between Bainbridge Boulevard and Windward Place
- Great Bridge Boulevard at tie-ins between existing and new roadways
- Bulldog Drive
- Bainbridge Boulevard, Yadkin Road, Shell Road, and Military Highway (beneath I-64 bridge construction)
- Miscellaneous ramp construction

*Note: These locations require the use of railroad (NS and NPBL) personnel to provide flagger and/or watchperson services to protect train operations from construction activity near the tracks. GPC coordination with the railroad shall be in accordance with the RFP.

F. Minimum Lane Widths

Temporary lane widths during construction will follow the RFP requirements; minimum I-64 travel lane widths are 11 feet and exterior shoulder width are nine feet.

GPC has developed a project-specific MOT Plan that includes installing and removing all temporary pavement markings during each phase. The I-64 wearing surface and final pavement markings will only be installed when I-64 is in its final configuration, which will mark the transition from RFP-specified minimum lane widths to permanent lane widths.

G. Work Zone Speed Restrictions

Per the RFP, GPC will use work zone speed restrictions with police enforcement to keep the traveling public and construction personnel safe through the construction area. We will develop and design work zone speed restrictions in accordance with Figure TTC-52.1 of the VAWAPM.

Speed limits will be reduced to 55 mph through the work zone on I-64 and the collector/distributor roads, as allowed by the RFP for the duration of long-term stationary work. Speed limits on other project roadways will not be impacted.

H. Public Outreach to Support TMP

The preceding sections addressed traffic conditions that will be present during construction. This section will address communication of those conditions to the traveling public and major stakeholders; and how that communication will mitigate related impacts.

Seventh Point will serve as GPC's public involvment firm on the Project, conducting outreach and communication, while honoring VDOT's prescription outreach plan. They are currently working successfully with Corman and Parsons on the Military Highway CFI project using a similar program to the one they will use on this project.

Communication with the Traveling Public and Major Stakeholders

GPC's communications program will create an environment of sustained, region-wide public awareness. To achieve this, our communications team will inform key stakeholders and the public about project progress, notable construction activities, traffic shifts, detours, closures, and openings at the direction of VDOT and in collaboration with the City of Chesapeake.

Our public involvement firm Seventh Point has collaborated with VDOT and the City of Chesapeake on past high-profile projects like I-64/I-264 Pavement Rehabilitation. Seventh Point has established positive relationships with the media throughout the Hampton Roads District to support VDOT's public outreach activities for the public and stakeholders.

Communicating with the Traveling Public: We will create a Public Information and Communications Plan detailing the Project's communications goals, tactics, and tools for communicating impacts and Project Updates in accordance with Section 2.11.1 of the RFP. Tools to inform the public include:

- Quarterly emailed newsletters for stakeholders
- Monthly emailed Project updates for stakeholders
- Project updates for elected officials
- Weekly lane closure reports
- Travel advisories regarding construction activities
- Printed collateral handouts (fact sheets, maps)
- Media buys and advertising (radio, social and interactive print)
- VDOT project website updates
- Social media content
- Live traffic cameras accessible via internet
- Portable VMS boards

Our team will maintain a master contacts list for the project, placing special emphasis on available channels for reaching the traveling public in Hampton Roads, such as:

- Quarterly community meetings with civic leagues and neighborhood associations
- Local news outlets
- Major employer networks
- Trucking associations
- Military, hospital, school district, university networks
- USCG Local Notice to Mariners
- Railroad contact list

Communicating with Major Project Stakeholders: In addition to measures listed in the preceding section, our communications approach will target major stakeholders with real-time, comprehensive outreach. This emphasis on timely dissemination of complete and accurate information will engender support for the Project.

As an example of this targeted outreach, in the month before construction, meetings will be held with businesses and residents directly impacted by the Project. Attendees will receive informational

materials and be added to the distribution list for project-related communication. A well-advertised groundbreaking ceremony will also be held before the start of construction to inform and answer questions from local media about the Project, as described in Section 2.11.3 of the RFP. Once construction is underway, the project team will hold quarterly meetings with impacted businesses, and be available for presentations to identified partners and key stakeholders, including elected officials, local businesses, major employers, churches, civic leagues, communities, municipalities, and attraction and tourism groups.

Mitigating Impacts to the Traveling Public and Major Stakeholders

GPC has embraced a holistic approach to mitigating the impacts of this design-build project on the traveling public and major stakeholders. Following identification of potential impacts, we will work to eliminate or reduce the impacts through design changes and enhancements. After exhausting all viable design mitigations and ensuring that our selection of construction means and methods does not exacerbate anticipated problems, we will mitigate residual impacts through public outreach.

After several months of advertising closure schedules for the Downtown/Midtown/MLK Project, the closure schedules drastically changed. This updated schedule created significant impacts to nearby stakeholders. To communicate the revised schedules, Seventh Point engaged The Port of Virginia, CHKD, EVMS, The Naval Medical Center Portsmouth, Virginia Maritime Association, International Longshoreman's Association, and Tidewater Motor Truck Association. With direct communications to a single representative from each of these key stakeholders, our team was equipped to provide immediate awareness to tens of thousands of motorists in a matter of weeks, minimizing impact and building lasting relationships for the project.

Mitigating Construction Impacts to the Traveling Public

Mitigation of construction impacts on traffic requires an effective plan to reach the targeted audience and influence their behavior. It must also expedite problem resolution when they occur.

Project Advertising Strategy: We will collaborate with VDOT to develop a comprehensive advertising and media campaign that reaches the affected local audience. We will also work with VDOT to explore out-of-market advertising programs in Richmond, Washington, DC, and North Carolina to create awareness for vacationers and visitors.

The regional media and advertising campaign for this Project will include radio, social and interactive, and print ads. Adhering to VDOT Guidelines and aligned with the Project's messaging, such advertising will notify the public of construction activities, new traffic patterns, detour information, and work zone safety messaging. A dedicated HOT/Express Lanes education advertising campaign will also be implemented at the frequency outlined in RFP Section 2.11.2.

Seventh Point earned positive project media coverage on VDOT projects, such as Gilmerton Bridge Replacement, Military Highway CFI, and I-64/I-264 Pavement Rehabilitation.

This effort will draw on lessons-learned by Seventh Point in managing advertising and media buys for VDOT on the I-64 Widening Segments I and II that included radio, online digital advertising, and outdoor billboards. These media buys targeted the Hampton Roads region, Richmond, and Washington, DC. Additional noteworthy Seventh Point media buying experience for VDOT's Hampton Roads District includes the Downtown/Midtown Tunnels/MLK, I-64/I-264 Pavement Rehabilitation, I-64/I-264 Ramp Project; Military Highway CFI, Gilmerton Bridge, Terminal Boulevard, I-264 Lynnhaven Ramp Closures, and Courtland Bridge.

Incident Management Plan

Our IMP will include a graduated program of responses, including hurricane evacuation procedures that are consistent with the Hampton Roads Public Affairs Hurricane Response Plan. The Plan will identify the crisis communications team and the Project team's respective roles and responsibilities, particularly in respect to the IMC. It will classify crises by level of significance and detail appropriate ranges of response, identify internal and external audiences, and stipulate policies and procedures for dealing with the media. A guiding principle will be that VDOT will directly supervise our crisis communications.

Our Incident Management Coordinator will leverage his experience in law enforcement and emergency services management, to coordinate onsite implementation of GPC's program, ensure proper procedures and communication protocols are in place, and coordinate and communicate with local first responders. Once CCTV cameras are installed, he will actively monitor the project site for incidents so he can expedite resolution.

Our IMP will include the following measures:

- Tow truck available to remove disabled vehicles
- MOT resources available to assist traffic flow in the event of an incident
- Pre-identified alternate detour routes for use in the event of an accident
- Protocols for communications with emergency personnel, including a roster of key project personnel and their contact information for 24/7 availability
- Requirements for employee training and emergency liaisons
- Contact info and procedures likely to result in cooperative police enforcement

Our IMP will also include the following motorist and marine traffic communication measures:

- Contact info for radio stations that provide traffic news and updates
- Contact info for highway advisory radio
- Contact info for USCG for marine incidents
- Contact info for railroads
- Links to web-based highway information network
- Procedures for supplying information to travelers via mobile phone updates
- Strategically located changeable message signs, dynamic speed limit signs, and extinguishable signs
- Live traffic cameras providing coverage to project website, including live cameras beneath the existing High Rise Bridge for marine traffic
- Project information hotline
- Email alerts

A trusted VDOT partner, Seventh Point is experienced with incident-related communications. The firm is currently on VDOT's Communications on-call rotation; managing district-wide incident communications for VDOT from the Transportation Operations Center (TOC) and disseminating information to key stakeholders, the public, and the media. Seventh Point also rotates shifts with the VDOT Communications Team in the Hampton Roads Area Command Center during severe storms. The firm participates in Hurricane Evacuation Table Top Exercises, where communications are rehearsed before, during, and after named storms. Seventh Point's established relationships and experience with the transportation agencies, stakeholders, and local media will prove invaluable to creating a seamless and successful project.

Figure 4.5-12: Media Experience and Existing Relationships. *Seventh Point has helped VDOT implement successful media advertising plans on previous projects, such as the I-64 Segments I and II Project.*

Mitigating Construction Impacts to Project Stakeholders

The project has a long list of stakeholders, each with their own concerns and priorities. Table 4.5-1 is a compilation of potential construction-related impacts to certain key stakeholders and GPC plans to eliminate or mitigate the impacts.

Table 4.5-1: Stakeholder Impacts and Mitigation Strategies		
Key Stakeholder	**Nature of Impact**	**GPC Measures to Mitigate Impact**
VDOT	Degraded relationship due to external pressure and complaints	▪ Establish clear communication and close coordination with VDOT ▪ Minimize openings of existing HRB by staging marine work from yard on south side of bridge
City of Chesapeake	Long-term closure of Libertyville Road Short-term closures of Shell, Yadkin, and Military Highway Traffic congestion on Great Bridge Boulevard during construction and cutover	▪ Provide briefing material to explain need and duration for closures ▪ Provide routine updates on progress of work ▪ Minimize work during periods of peak traffic ▪ Coordinate detours with City in advance ▪ Provide adequate and timely detour signage
Utility companies	Potential loss of service during facility relocation Cost of facility relocation	▪ Assign Utility Coordinator to manage interface ▪ Sequence construction to afford ample time for relocation ▪ Make effective use of Miss Utility and SUE to locate and protect existing utilities
Neighborhood Association(s)	Chronic flooding in vicinity of Gilmerton Canal	▪ Expedite installation of tide gate and other drainage infrastructure to alleviate problem
Adjacent construction projects	Construction delays and traffic impacts through the work zone Schedule slippage	▪ Weekly meetings to coordinate work activities and lane closures
Crestwood Intermediate School Crestwood Middle School Deep Creek Elementary School Deep Creek Middle School Deep Creek High School	Noise pollution and traffic disruptions during reconstruction of Great Bridge Boulevard Safety concerns related to construction traffic	▪ Kickoff meeting to brief school administrators on project schedule and work ▪ Conduct construction activities without impacting school buses and pedestrians ▪ Provide flaggers at construction entrances when children are present ▪ Maintain uninterrupted pedestrian access along Great Bridge Boulevard ▪ Construct pavement tie-ins and cutover in summer months when school is not in session
Churches and other community facilities including Grace Baptist Temple, Indiana United Methodist Church, St. Benedict's Church, and First Baptist Church South Hill	Construction-related delays and traffic impacts Noise pollution	▪ Regular communication of all work activities and lane closures ▪ Avoid work on Sundays and days of religious observance(s)
Local businesses such as Hampton Roads Integrated BioEnergy Complex and Diggers Pick & Pull	Traffic disruption due to road and lane closures Restricted access due to construction activities	▪ Coordinate and inform businesses before closing any entrances ▪ Provide and maintain at least one access during business hours ▪ Coordinate track outages in advance
Environmental agencies	Threats to endangered species	▪ Schedule all work to accommodate TOYR
U.S. Coast Guard	Disruption of Navigable Channel	▪ Provide schedule updates on construction activities over or near Federal Channel ▪ Secure pre-approved mooring areas for barges and workboats

Table 4.5-1: Stakeholder Impacts and Mitigation Strategies		
Key Stakeholder	Nature of Impact	GPC Measures to Mitigate Impact
Commercial and Recreational Marine Traffic	Access under and around existing and proposed HRB during construction	▪ Construct the new fender system early to provide safe, well delineated access through the work zone ▪ Install a camera beneath existing HRB to provide live feed of construction activity and marine traffic to movable bridge operators ▪ Provide 24-hour warning lights on transient river obstructions such as barges and trestles ▪ Provide construction updates to USCG for inclusion in Local Notice to Mariners
Residential neighborhoods - Libertyville Road	Lack of access due to closure of Libertyville Road near Bainbridge Blvd. Noise and dust from construction	▪ Kickoff meeting for neighborhood to review construction schedule and work ▪ Issue news releases and provide PCMS boards in advance of work ▪ Expedite construction of HRB with precast piling and girders ▪ Expedite noise wall construction east of river ▪ Conduct daytime HRB pile driving on spans east of river ▪ Employ frequent use of street sweepers/pavement cleaning
HRT	Temporary detours and bus stop closures	▪ Provide temporary bus stop locations to replace those affected by construction ▪ Provide detour route in proximity to existing route during Libertyville Road closure ▪ Include on distribution of planned lane closures, detours, and traffic switches to facilitate driver education and route planning
First Responders including police, EMS, and firemen	Closures of local roads Impacts to existing crossovers	▪ Provide signing in advance of existing crossovers to alert police/EMS to location ▪ Post identification signs for all work zones ▪ Monthly coordination and direct line of communication with IMC and MOT Manager, including review of upcoming schedule and MOT patterns

4.6 Disadvantaged Business Enterprises (DBE)

4.6 DISADVANTAGED BUSINESS ENTERPRISES (DBE)

GPC is committed to meeting or exceeding VDOT's 8% Disadvantaged Business Enterprise (DBE) participation goal for the entire value of the contract. Although not required by the RFP, we will also encourage participation from Small, Women, and Minority-owned (SWaM) firms in support of VDOT's program.

DBE Participation

We have partnered with the following DBE firms to deliver the design and construction of this project:

- Athavale, Lystad & Associates, Inc. - Structural engineering support
- H&B Surveying and Mapping, LLC - Survey and subsurface utility locating
- Hassan Water Resources, PLC - Drainage and hydraulics
- Accompong Engineering Group - Engineering and design support

Each of these firms, as well as others that will be selected following Notice of Intent to Award, will perform meaningful roles on our team.

All subconsultants and subcontractors will be selected on the basis of capabilities, past successful performance, capacity to complete the work on schedule, safety and quality records, and price, in order to ensure the best value.

Goal Achievement

We have committed resources, tools, recruitment strategies, training programs, and support staff to achieve the project's 8% goal. Our early outreach and recruitment efforts will include:

- Identification and tracking of DBEs
- Balancing self-performed and subcontracted construction work to maximize opportunities for DBE firms during construction
- Holding DBE targeted outreach events to inform firms about upcoming opportunities
- Helping expand DBE firms' capabilities to perform work on future contracts
- Developing tailored work plans to create smaller scopes of work for DBE and SWaM firms

We will continue to expand upon our network of DBE subconsultants and subcontractors, with whom we have successful working relationships based on previous VDOT projects such as the I-64 to Route 623 Design-Build and the Military Highway Continuous Flow Intersection in Hampton Roads. We will continue to use our outreach efforts to seek more firms to add to our DBE and SWaM databases and expand our network.

Potential DBE Subcontractor Packages

Through analysis and due diligence during the proposal stage, we have identified the following scopes of work that we anticipate could be performed, at least partially, by DBE firms.

Design Engineering	Fencing
Trucking	Guardrail
Traffic Control	Landscaping
Pavement Markings	Clearing and Grubbing
Rebar	QA Technicians
Noise Wall	Barrier Work
Concrete Flatwork	Utilities

Subcontracting Plan

We will implement a subcontracting plan to help DBEs perform according to VDOT's standards, maximize their opportunities on the project, and expand future capabilities.

As part of the subcontracting plan, subcontractors will be required to follow the safety and quality standards set by GPC team members, and will be subject to safety and quality audits.

4.7 Proposal Schedule

4.7 PROPOSAL SCHEDULE

4.7.1 Proposal Schedule

Our GPC team has evaluated the RFP documents, performed site visits, attended pre-proposal and proprietary meetings, and conducted working sessions among our design and construction teams. Through this progression, we developed a work plan to deliver the project on or before the contractual Final Completion milestone of July 30, 2021.

Our proposal schedule addresses all RFP requirements, including assumptions for ROW acquisition, permitting, submittal reviews, utility relocations, weather, and systems integration coordination.

GPC Key Schedule Dates	
Notice of Intent to Award	9/20/2017
NTP	11/17/2017
Complete Roadway Design	1/31/2019
Complete High Rise Bridge Design	12/28/2018
Acquire Wetland Permits	12/19/2018
Start Roadwork	12/3/2018
Start High Rise Bridge Construction	8/1/2018
Complete High Rise Bridge Construction	11/21/2020
Final Completion	7/30/2021

In addition to the key schedule dates listed above, our team proposes to add the following unique milestones:

- Construct the new tide gate and make operational: September 28, 2019
- Open the new High Rise Bridge to traffic: November 21, 2020
- ITS integration contract increased from 180 to 210 days

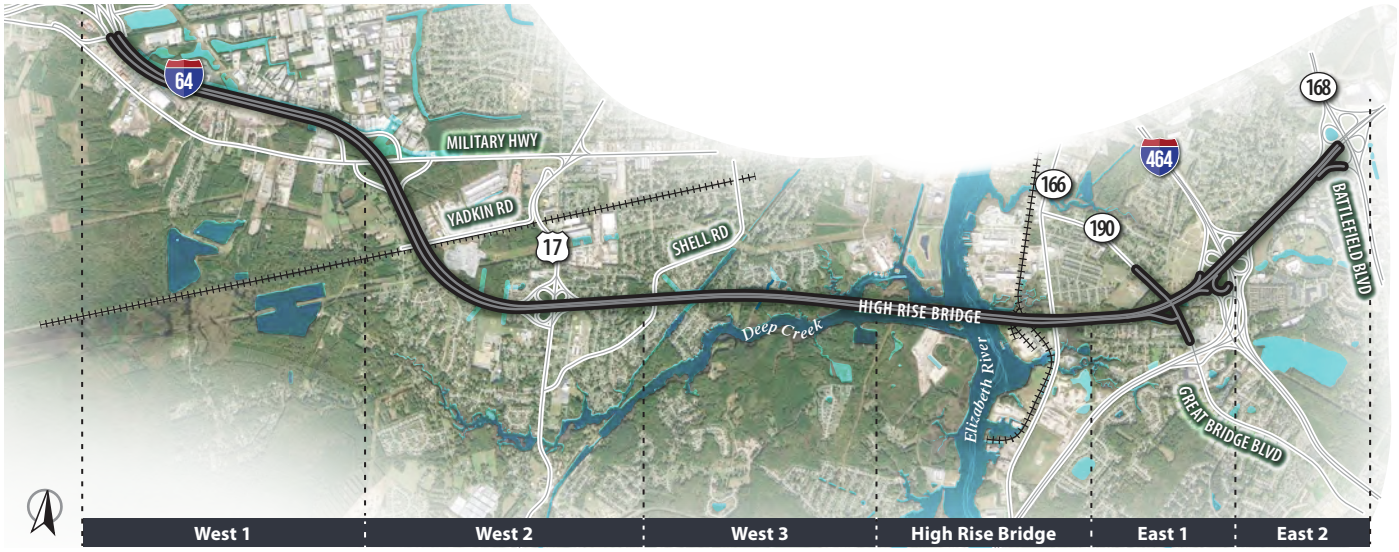
4.7.2 Proposal Schedule Narrative

Our proposal schedule is arranged with a hierarchical Work Breakdown Structure (WBS) as shown in Table 4.7-1.

Table 4.7-1: Major features of the project schedule

WBS Level 1	WBS Level 2
1.Project Management	
	1.1 Milestones
	1.2 Interim Milestones
	1.3 Scope Validation
	1.4 Permits
	1.5 ROW Acquisition
	1.6 Key Submittals
	1.7 Mobilization
2. Design	
	2.1 Corridor Wide
	2.2 East 1 Segment
	2.3 East 2 Segment
	2.4 West 1 Segment
	2.5 West 2 Segment
	2.6 West 3 Segment
	Noise Walls / Retaining Walls & Misc. Structures
	2.7 Special Wall
	2.8 Widening Bridges
	2.9 Geotech / Foundation/Substructure Design
	2.10 Upgrades to Existing High Rise Bridge
	2.11 New High Rise Bridge
3. Construction	
	3.1 Trestle Access
	3.2 West Side – Unit 1
	3.3 West Abutment HRB
	3.4 East Abutment HRB
	3.5 Fender System
	3.6 In-water Section
	3.7 On-land Early Work
	3.8 East Side

Figure 4.7-1: Construction Sequencing. *We have divided the project into six segments which will allow concurrent construction to minimize schedule impacts from environmental permit acquisition and utility relocations.*



SEGMENT	2018		2019				2020				2021			
	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
WEST 1														
WEST 2														
WEST 3														
HIGH RISE BR														
EAST 1 & 2														

A. Overall Plan to Accomplish the Work

Our team has divided this project into six segments based on type of work, length of work zones, permit requirements, and ROW considerations. Three segments are on the west side of the Elizabeth River, two segments are on the east side. The High Rise Bridge is the final segment.

- **Segment West 1 (W1)** – Includes all work from the western project limits to the west side of Military Highway
- **Segment West 2 (W2)** – Incudes all work from the West side of Military Highway to the east side of Yadkin Road
- **Segment West 3 (W3)** – East of Yadkin Road to western abutment of the High Rise Bridge
- **High Rise Bridge Segment (HRB)**
- **Segment East 1 (E1)** – Eastern abutment of the High Rise Bridge to Great Bridge Blvd, including replacement of the GBB
- **Segment East 2 (E2)** – East of Great Bridge Blvd to the eastern project limits

Mobilization and Early Design Work

Glenn Olechnowich will manage the overall day to day design-build operations of the Project. Upon notification of award, Glenn will immediately mobilize key personnel from the design-build team to our start-up CJV office in Chesapeake, VA. Working from that location, our team will focus on preparation of key submittals, work plans, and preparation for project mobilization activities. Once NTP is received, Glenn will begin the process of mobilizing on-site offices and yards, attending VDOT coordination meetings, coordinating public outreach activities, preparation of contracts for key subcontractors and vendors, design development, and more.

For early design work, our Design Manager, Josh Wade, will concentrate his design team's efforts on scope validation activities, permit applications, and early plan development. Key early activities include:

- Site surveys
- Geotechnical borings
- Phase 1 and 2 Environmental Site Assessments (ESAs)
- Plan development required for ROW verification and permit application
- Erosions control earthwork plans for segments W1 and E1
- MOT plans for segments W1 and E1
- High Rise Bridge sub-structure design

Construction

For field construction operations, our project team will be organized in a manner that will allow construction to occur in the east, west, and High Rise Bridge segments concurrently. The west sub-segments will be constructed sequentially; W1 will be constructed in the first construction season, followed by segment W2 and segment W3. The east sub-segments will be constructed sequentially, but some overlap of segments E1 and E2 will occur for crew efficiency.

Our over-arching construction sequence for each major segment is described below.

West Segment Sequence

Segment W1 will start before any other roadway segment on the project. It is the only substantial roadway work area that is not affected by long lead-time wetland permits, allowing our team to begin work as soon as roadway designs are approved. Segment W1 also contains the two toll gantry structures; focusing our efforts on completing the toll gantries early in the project assures a timely hand-off to VDOT's Systems Integration contractor.

Segment W1 includes approx. 70,000 cy of embankment, 2 miles of paving, and 18,000 lf of noise walls. It will start in December 2018 and will be substantially complete by November 2019.

Once all wetland permits have been acquired, roadway and structures crews will start work in Segment W2. Segment W2 contains a significant amount of work with over 90,000 cy of embankment, bridge widenings for Military Highway and Yadkin Road, 1.6 miles of paving, and 20,000 lf of noisewall. Work in W2 will be complete by August 2020.

Segment W3 is the last segment to be constructed on the west side of the High Rise Bridge. It includes 150,000 cy of embankment, two miles of paving, and over 7,000 lf of noise walls. A portion of Segment W3 will be linked directly to the completion of the High Rise Bridge and will not be completed until traffic is switched onto the new bridge.

Segment W3 will begin by May 2019 and will finish by April 2021, four months after opening of the High Rise Bridge.

High Rise Bridge Sequence

We have divided the HRB into seven design units. Unit 1 is on land on the western shore. Units 2, 3 and 4 are in the water. Units 5, 6 and 7 are on the land on the eastern shore. GPC will have crews working each of the three main areas concurrently.

Units 5, 6 and 7 (eastern shore) – The vast majority of Units 5 and 6 are located away from wetlands and therefore are not subjected to the lengthy permit process. GPC will begin work on Units 5 and 6 by August 2018 while work on Unit 7 will not start until December 2018. All work on the eastern shore, including the eastern abutment, will complete by August 2020.

Unit 1 (western shore) – Construction of Unit 1 will begin after the wetland permits have been acquired. GPC will begin work in Unit 1 starting by January 2019 and completing by December 2019.

Units 2, 3 and 4 (in-water work) – GPC will access the vast majority of the in-water work from floating equipment including barge mounted cranes, work skiffs, and material barges. A trestle will be needed to access two bents of Unit 2 located in shallow water. The in-water work will take the longest to complete; work will start in February 2019 and will be completed by December 2020.

Managing the Work and Schedule

The project will have a field management team for the west segments, east segments, and High Rise Bridge segment. Each field management team will include their own superintendent(s), field engineers,

and crews, providing the resources required to perform work in each segment concurrently. Each of the segment superintendents will report to a single Construction Manager, Randy Silvar.

Randy will be supported by a construction engineering staff which will assist him with preparation of work plans, scheduling, subcontractor coordination, material deliveries, and more. Randy is also supported by our design team throughout the duration of construction activities to assist with any design related questions.

There are a number of proven processes and procedures that the GPC team will implement to ensure effective communication between all stakeholders regarding schedule requirements and milestones. One of the main tools our team will use for monitoring and coordinating the work is the 3-week schedule. The 3-week schedule is a detailed planning tool which ties directly to the main project CPM. The 3-week schedule is updated during a weekly planning meeting. Examples of some of the items reviewed during the weekly planning meeting are listed below.

- Material requirements and delivery schedules
- Subcontractor coordination requirements
- Labor and equipment requirements
- Potential risks and mitigation measures
- Notification/coordination with QC/QA personnel for upcoming activities
- Notification/coordination with public outreach personnel for upcoming activities

Our team uses other regular meetings designed to keep everyone informed and aware of the projects schedule status, potential additional requirements for manpower and equipment, potential upcoming rocks in the road, and long-term notification requirements to stakeholders. Other meetings used to monitor progress of the project schedule include:

- Monthly CPM update meeting
- Monthly executive committee CPM review meeting
- Monthly progress/partnering meetings
- Monthly risk matrix update meeting
- Weekly and monthly cost review meetings, where work quantities and percent complete data are analyzed
- Quarterly (every three months) forecast meeting, where all costs, schedule, and upcoming risks are fully evaluated

B. Description and Explanation of the Critical Path

The summary schedule in Figure 4.7-2 illustrates the critical path of the project in red.

The critical path of our schedule progresses through three main phases; Design/Permitting phase, Construction phase, and final project close out phase. A description of the critical activities within these phases is detailed below:

- **Design / Permitting Phase** – The most critical series of activities in the early stages of the project is the acquisition of the permits required to work in wetland areas. This process includes some initial design work, preparation of permit applications for the VMRC, COE, the US Coast Guard, followed by review and approval of the appropriate permitting agency. In total, we have allowed 14 months for this process.
- **Construction Phase** – Once all permits have been acquired, critical construction activities begin with the fender system and driving piles in the river (Units 3 and 4) for the High Rise Bridge (HRB), and continue through the substructure and superstructure work on the HRB (Units 3 and 4), switching traffic onto the new HRB, and completing final roadway tie-ins to the HRB.
- **Final Project Close-out** – Critical project close-out activities include final testing and burn-in of the ITS systems.

C. Proposed Means and Methods

The construction means and methods described in our technical proposal represent the best value to VDOT, following our careful consideration and evaluation of both traditional and innovative approaches. The list below highlights some of our means and methods and describes our rationale for selecting them.

Use of Floating Equipment and Trestles

We will start in-water work using trestles until construction has progressed to the point in the channel where it is deep enough to use floating equipment, such as barges with cranes. Our decision

Figure 4.7-2: Summary Schedule. *Project critical path is shown in red.*

Description	4th Qtr	1st Qtr	2nd Qtr	3rd Qtr	4th Qtr	1st Qtr	2nd Qtr	3rd Qtr	4th Qtr	1st Qtr	2nd Qtr	3rd Qtr	4th Qtr	1st Qtr	2nd Qtr	3rd Qtr
	2018					2019				2020				2021		
MILESTONES																
Notice of Intent to Award	★ 9/20/2017															
NTP	★ 11/17/2017															
Project Final Completion																★ 7/30/2021
DESIGN																
Design																
a) Roadway Segment W1																
b) Roadway Segment W2 & W3																
c) Roadway Segment E1 & E2																
d) HRB Substructure																
e) HRB Superstructure																
Permits (wetland)						★ 12/27/2018										
Permits (non-wetland)																
CONSTRUCTION																
START WORK - Roadway																
START WORK - HRB						★ 12/3/2018										
Section W1																
Section W2																
Section W3																
Section E1 & E2																
START WORK - HRB																
High Rise Bridge			★ 8/1/18													
Unit 5&6 (non-wetland work)																
Unit 1,2,3,4,7,8 (wetland work)																
Systems Int (VDOT contractor)																
HRB ITS & Retrofit																
Final ITS testing & burn-in																
Final Roadway Tie-in after traffic switch onto HRB																
Final Punchlist & Closeout																
Complete Tide Gate Installation Interim Milestone							★ 9/28/2019									
Open New High Rise Bridge Interim Milestone											★ 11/21/2020					
Proposed Final Completion																★ 7/30/2021

LEGEND
Roadway — Anticipated Critical Path
Structures — Milestones

to rely heavily on floating equipment has several distinct schedule advantages:

- Barges and cranes are readily available and owned by the CJV, providing a cost and schedule advantage.
- Floating equipment allows GPC to prosecute multiple operations in the water concurrently (driving pile with one crew while we are placing footing concrete with another crew).

Minimizing the number of construction vehicles on I-64 and adjacent roads

GPC has maximized deliveries of concrete and steel beams material deliveries for the High Rise Bridge via barge in lieu of land based delivery options. Our delivery methods minimize impacts to local traffic by minimizing the number of heavy haul trucks on the road. They also provide greater schedule certainty for deliveries by avoiding over-the-road permit restrictions.

For the Special Design Wall located on the west abutment of the High Rise Bridge, our team has selected a sheetpile design that eliminates the need to excavate and replace the poor in-situ soils. Our methods of construction eliminate the need to remove and replace 20,000 cy of poor material, resulting in a reduction of impacts to local traffic by eliminating over 3,300 truck-loads over the road.

Our team has selected a retaining wall design at Great Bridge Boulevard bridge, which minimizes embankment quantities; eliminating the need to import over 10,000 cy of material over the road to this location (a reduction of over 800 truck-loads over the road).

D. Assumptions on Which the Proposal Schedule Is Based

The GPC proposal schedule is based on the following assumptions.

Notice to Proceed: We anticipate and assume a Notice to Proceed date of November 17, 2017, as specified in the RFP.

Right-of-Way Acquisition: Our proposal includes 21 parcels requiring acquisition through either permanent or temporary easements. Our proposal schedule assumes completing these acquisitions by February 2019. Our schedule assumes that we will begin coordinating with VDOT once comment resolution is complete for the critical parcels 30% drawings.

VDOT Design Reviews: We assume that design coordination with VDOT will be weekly through co-location, task force meetings, and over-the-shoulder reviews. Our schedule provides a total of 21 days for VDOT to review and approve the initial submittal. We have also included an additional 29 days for any potential resubmittal review required.

Other Agency Design Review: We have allowed a 45-day submittal review period for the railroad agencies.

Construction Shifts and Overtime: Our schedule assumes that both single and multiple shifts will be used during construction, depending on the activity. We plan to work five days per week throughout construction and increase to six or seven days per week if schedule recovery is needed. We will perform certain safety critical activities, such as girder erection, at night when traffic volumes are lowest. We will also perform certain roadway paving operations at night to take advantage of low night-time traffic volumes on I-64.

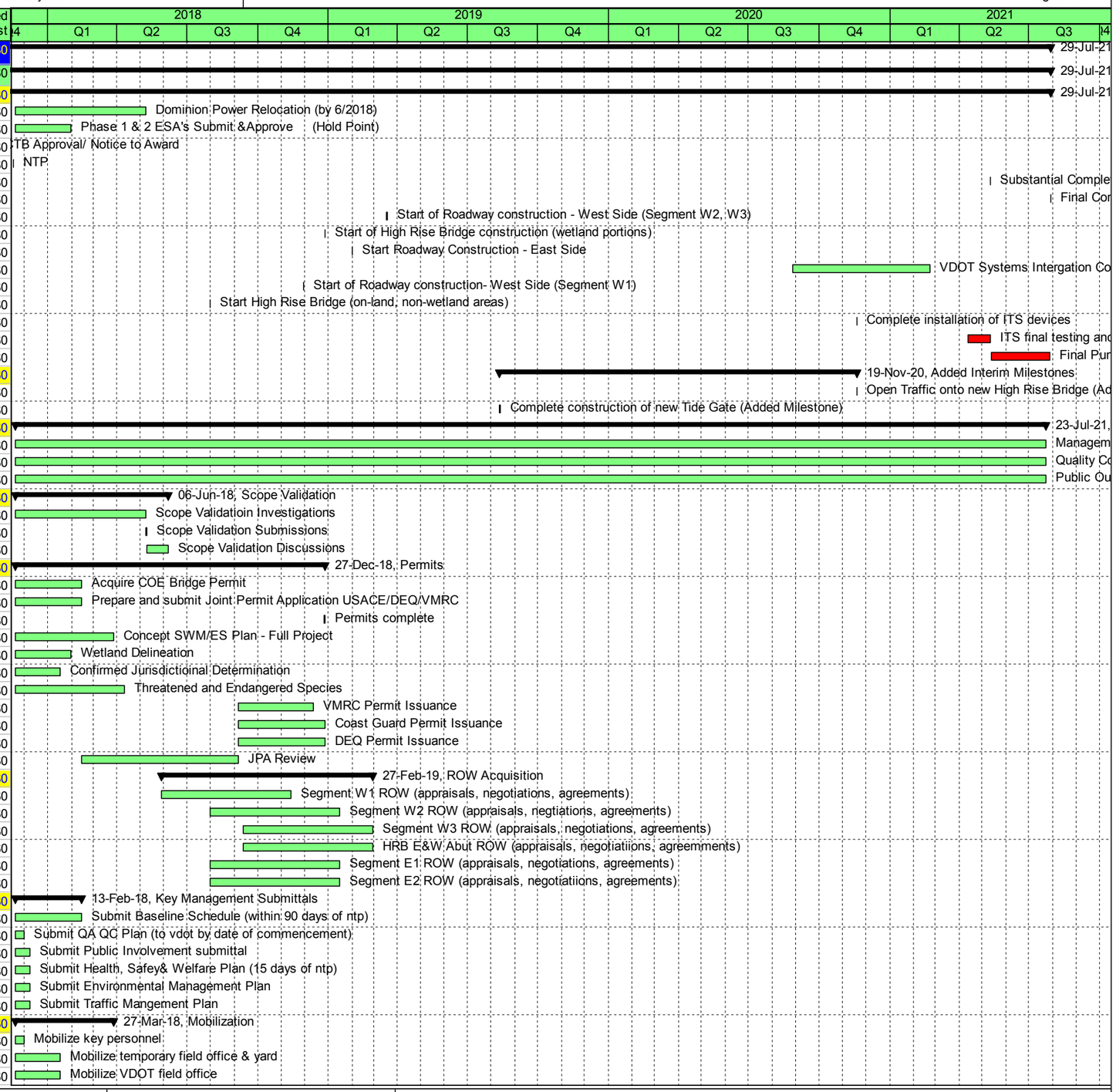
Permit Acquisition: The permits with the most schedule risk include the VMRC, COE, Coast Guard, 401, and 404 permits. In total we have allotted 14 months to acquire all project permits. Our CPM also includes the assumption that we will be able to obtain a waiver for the fish time-of-year work restriction period, as we have done on other regional projects.

Work Calendars: Our CPM includes the following calendars

- 5 day per week calendar with standard holidays
- 7 day per week calendar
- Time of Year environmental restriction calendar
- Paving calendar with weather and standard holidays
- Earthwork calendar with weather and standard holidays
- Structures calendar with weather and standard holidays

Systems Integrator Installation and Testing: Our schedule assumes that the Systems Integrator will begin installation and testing by June 2020 and will have a total of 210 days to complete all work. We have assumed the systems integrator will start installation and testing in Segment W1 of the project while we are completing construction activities in other areas of the project.

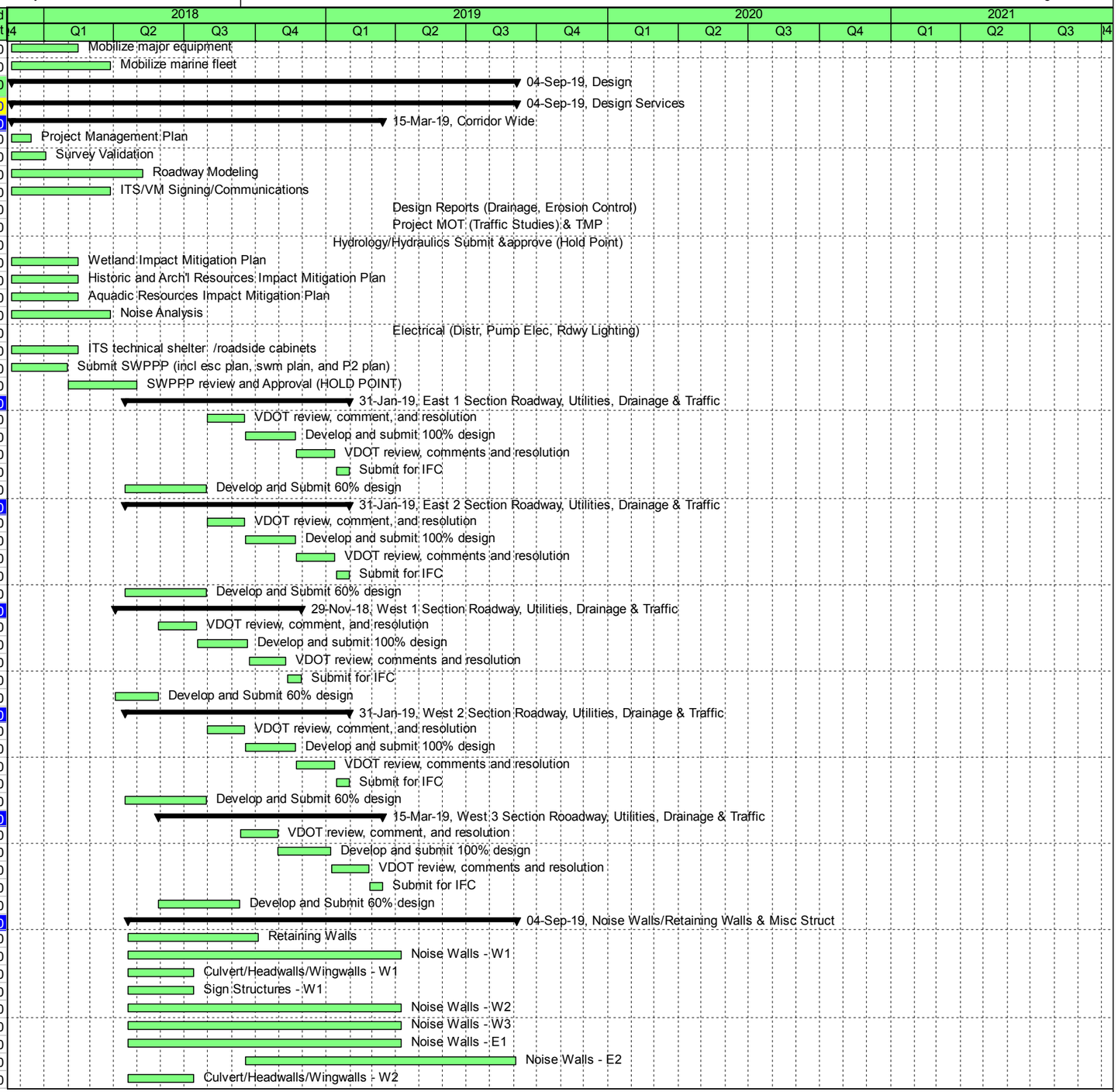
Activity ID	Activity Name	Original	Start	Finish	Total	Budgeted Total Cost
I-64 High Rise Project		979	23-Oct-17	29-Jul-21	0	$0
Project Management		979	23-Oct-17	29-Jul-21	0	$0
Milestones		979	23-Oct-17	29-Jul-21	0	$0
A1010	Dominion Power Relocation (by 6/2018)	120	20-Nov-17	08-May-18*	18	$0
A1030	Phase 1 & 2 ESA's Submit &Approve (Hold Point)	50	20-Nov-17	30-Jan-18	149	$0
A1060	CTB Approval/ Notice to Award	1	23-Oct-1	23-Oct-17	0	$0
A1070	NTP	1	17-Nov-1	17-Nov-17	1	$0
A1080	Substantial Completion	1	12-May-2	12-May-21	0	$0
A1090	Final Completion (Milestone - 7/30/2021)	1	29-Jul-21	29-Jul-21	0	$0
A1240	Start of Roadway construction - West Side (Segment W2	1	18-Mar-19	18-Mar-19	38	$0
A1280	Start of High Rise Bridge construction (wetland portions)	1	28-Dec-18	28-Dec-18	1	$0
A2310	Start Roadway Construction - East Side	1	01-Feb-19	01-Feb-19	9	$0
A2390	VDOT Systems Intergation Contract	180	27-Aug-20	22-Feb-21	78	$0
A1300	Start of Roadway construction- West Side (Segment W1)	1	30-Nov-18	30-Nov-18	70	$0
A1290	Start High Rise Bridge (on-land, non-wetland areas)	1	31-Jul-18	31-Jul-18	35	$0
A2210	Complete installation of ITS devices	1	19-Nov-20	19-Nov-20	101	$0
A2360	ITS final testing and 30 day burn-in	30	12-Apr-21	11-May-21	0	$0
A1190	Final Punchlist	55	13-May-2	28-Jul-21	0	$0
Added Interim Milestones		334	12-Aug-19	19-Nov-20	0	$0
A2160	Open Traffic onto new High Rise Bridge (Added Milestone)	1	19-Nov-20	19-Nov-20*	0	$0
A1170	Complete construction of new Tide Gate (Added Mileston	1	12-Aug-19	12-Aug-19*	34	$0
Project Management		955	20-Nov-17	23-Jul-21	3	$0
A4770	Management & Coordination	955	20-Nov-17	23-Jul-21	3	$0
A4780	Quality Control & Assurance	955	20-Nov-17	23-Jul-21	3	$0
A4790	Public Outreach	955	20-Nov-17	23-Jul-21	3	$0
Scope Validation		141	20-Nov-17	06-Jun-18	65	$0
A3420	Scope Validatioin Investigations	120	20-Nov-17	08-May-18	65	$0
A3430	Scope Validation Submissions	1	09-May-1	09-May-18	65	$0
A3440	Scope Validation Discussions	20	10-May-1	06-Jun-18*	65	$0
Permits		284	20-Nov-17	27-Dec-18	29	$0
A1840	Acquire COE Bridge Permit	60	20-Nov-17	13-Feb-18	254	$0
A3340	Prepare and submit Joint Permit Application USACE/DE(	60	20-Nov-17	13-Feb-18	1	$0
A3350	Permits complete	1	27-Dec-18	27-Dec-18	1	$0
A3450	Concept SWM/ES Plan - Full Project	90	20-Nov-17	27-Mar-18	196	$0
A3460	Wetland Delineation	50	20-Nov-17	30-Jan-18	236	$0
A3470	Confirmed Jurisdictioinal Determination	40	20-Nov-17	16-Jan-18	246	$0
A3480	Threatened and Endangered Species	100	20-Nov-17	10-Apr-18	186	$0
A3490	VMRC Permit Issuance	70	06-Sep-18	12-Dec-18	11	$0
A3870	Coast Guard Permit Issuance	80	06-Sep-18	27-Dec-18	1	$0
A3880	DEQ Permit Issuance	80	06-Sep-18	27-Dec-18	1	$0
A3380	JPA Review	145	14-Feb-18	05-Sep-18	1	$0
ROW Acquisition		195	29-May-1	27-Feb-19	206	$0
A2040	Segment W1 ROW (appraisals, negotiations, agreements)	120	29-May-1	13-Nov-18	82	$0
A2050	Segment W2 ROW (appraisals, negtiations, agreements)	120	31-Jul-18	15-Jan-19	81	$0
A2060	Segment W3 ROW (appraisals, negotiations, agreements)	120	12-Sep-18	27-Feb-19	50	$0
A2070	HRB E&W Abut ROW (appraisals, negotiatiions, agreem	120	12-Sep-18	27-Feb-19	206	$0
A2080	Segment E1 ROW (appraisals, negotiations, agreements)	120	31-Jul-18	15-Jan-19	21	$0
A2090	Segment E2 ROW (appraisals, negotiatiions, agreements)	120	31-Jul-18	15-Jan-19	21	$0
Key Management Submittals		60	20-Nov-17	13-Feb-18	226	$0
A2100	Submit Baseline Schedule (within 90 days of ntp)	60	20-Nov-17	13-Feb-18	226	$0
A2120	Submit QA QC Plan (to vdot by date of commencement)	10	20-Nov-17	01-Dec-17	276	$0
A2940	Submit Public Involvement submittal	15	20-Nov-17	08-Dec-17	271	$0
A3390	Submit Health, Safey& Welfare Plan (15 days of ntp)	15	20-Nov-17	08-Dec-17	271	$0
A3400	Submit Environmental Management Plan	15	20-Nov-17	08-Dec-17	271	$0
A2110	Submit Traffic Mangement Plan	15	20-Nov-17	08-Dec-17	271	$0
Mobilization		90	20-Nov-17	27-Mar-18	224	$0
A1100	Mobilize key personnel	10	20-Nov-17	01-Dec-17	203	$0
A1110	Mobilize temporary field office & yard	40	20-Nov-17	16-Jan-18	173	$0
A1120	Mobilize VDOT field office	40	20-Nov-17	16-Jan-18	173	$0



Actual Work | Remaining Work | Critical Remaining Work | Milestone | Summary

TASK filter: All Activities

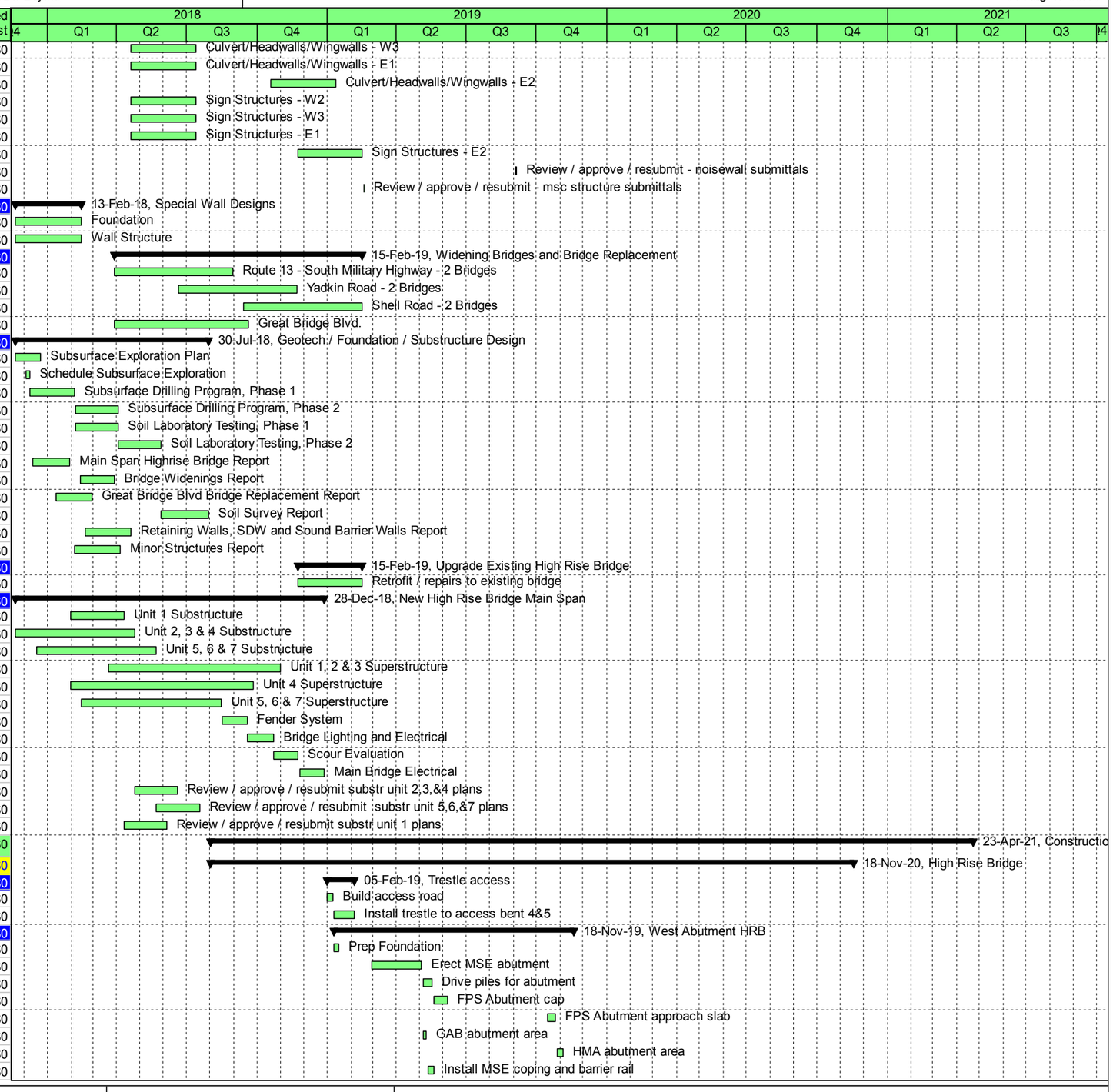
Activity ID	Activity Name	Original	Start	Finish	Total	Budgeted Total Cost
A1130	Mobilize major equipment	60	20-Nov-17	13-Feb-18	153	$0
A1140	Mobilize marine fleet	90	20-Nov-17	27-Mar-18	224	$0
Design		463	20-Nov-17	04-Sep-19	439	$0
Design Services		463	20-Nov-17	04-Sep-19	439	$0
Corridor Wide		340	20-Nov-17	15-Mar-19	38	$0
070 0	Project Management Plan	20	20-Nov-17	15-Dec-17	193	$0
070 0	Survey Validation	30	20-Nov-17	02-Jan-18	183	$0
070 0	Roadway Modeling	120	20-Nov-17	08-May-18	93	$0
070 0	ITS/VM Signing/Communications	90	20-Nov-17	27-Mar-18	123	$0
070 1	Design Reports (Drainage, Erosion Control)	341	20-Nov-17	15-Mar-19	38	$0
070 1	Project MOT (Traffic Studies) & TMP	341	20-Nov-17	15-Mar-19	38	$0
070 1	Hydrology/Hydraulics Submit &approve (Hold Point)	285	20-Nov-17	27-Dec-18	1	$0
070 2	Wetland Impact Mitigation Plan	60	20-Nov-17	13-Feb-18	153	$0
070 2	Historic and Arch'l Resources Impact Mitigation Plan	60	20-Nov-17	13-Feb-18	153	$0
070 3	Aquadic Resources Impact Mitigation Plan	60	20-Nov-17	13-Feb-18	153	$0
070 4	Noise Analysis	90	20-Nov-17	27-Mar-18	123	$0
070 5	Electrical (Distr, Pump Elec, Rdwy Lighting)	341	20-Nov-17	15-Mar-19	38	$0
070 5	ITS technical shelter /roadside cabinets	60	20-Nov-17	13-Feb-18	153	$0
070 3	Submit SWPPP (incl esc plan, swm plan, and P2 plan)	50	20-Nov-17	31-Jan-18	98	$0
070 6	SWPPP review and Approval (HOLD POINT)	90	01-Feb-18	01-May-18	138	$0
East 1 Section Roadway, Utilities, Drainage & Traffic		207	16-Apr-18	31-Jan-19	9	$0
065 1	VDOT review, comment, and resolution	35	31-Jul-18	17-Sep-18	9	$0
065 1	Develop and submit 100% design	48	18-Sep-18	22-Nov-18	9	$0
065 1	VDOT review, comments and resolution	35	23-Nov-18	11-Jan-19	9	$0
065 1	Submit for IFC	14	14-Jan-19	31-Jan-19	9	$0
065 9	Develop and Submit 60% design	75	16-Apr-18	30-Jul-18	9	$0
East 2 Section Roadway, Utilities, Drainage & Traffic		207	16-Apr-18	31-Jan-19	9	$0
065 3	VDOT review, comment, and resolution	35	31-Jul-18	17-Sep-18	9	$0
065 4	Develop and submit 100% design	48	18-Sep-18	22-Nov-18	9	$0
065 5	VDOT review, comments and resolution	35	23-Nov-18	11-Jan-19	9	$0
065 6	Submit for IFC	14	14-Jan-19	31-Jan-19	9	$0
065 8	Develop and Submit 60% design	75	16-Apr-18	30-Jul-18	9	$0
West 1 Section Roadway, Utilities, Drainage & Traffic		172	03-Apr-18	29-Nov-18	70	$0
065 2	VDOT review, comment, and resolution	35	29-May-1	17-Jul-18	70	$0
065 2	Develop and submit 100% design	48	18-Jul-18	21-Sep-18	70	$0
065 2	VDOT review, comments and resolution	35	24-Sep-18	09-Nov-18	70	$0
065 2	Submit for IFC	14	12-Nov-18	29-Nov-18	70	$0
065 2	Develop and Submit 60% design	40	03-Apr-18	28-May-18	38	$0
West 2 Section Roadway, Utilities, Drainage & Traffic		207	16-Apr-18	31-Jan-19	69	$0
065 2	VDOT review, comment, and resolution	35	31-Jul-18	17-Sep-18	69	$0
065 2	Develop and submit 100% design	48	18-Sep-18	22-Nov-18	69	$0
065 2	VDOT review, comments and resolution	35	23-Nov-18	11-Jan-19	69	$0
065 2	Submit for IFC	14	14-Jan-19	31-Jan-19	69	$0
065 1	Develop and Submit 60% design	75	16-Apr-18	30-Jul-18	69	$0
West 3 Section Rooadway, Utilities, Drainage & Traffic		207	29-May-1	15-Mar-19	38	$0
065 1	VDOT review, comment, and resolution	35	12-Sep-18	30-Oct-18	38	$0
065 1	Develop and submit 100% design	48	31-Oct-18	07-Jan-19	38	$0
065 1	VDOT review, comments and resolution	35	08-Jan-19	25-Feb-19	38	$0
065 1	Submit for IFC	14	26-Feb-19	15-Mar-19	38	$0
065 1	Develop and Submit 60% design	75	29-May-1	11-Sep-18	38	$0
Noise Walls/Retaining Walls & Misc Struct		357	20-Apr-18	04-Sep-19	281	$0
044 0	Retaining Walls	120	20-Apr-18	05-Oct-18	59	$0
044 1	Noise Walls - W1	250	20-Apr-18	08-Apr-19	204	$0
044 1	Culvert/Headwalls/Wingwalls - W1	60	20-Apr-18	13-Jul-18	317	$0
044 2	Sign Structures - W1	60	20-Apr-18	13-Jul-18	317	$0
044 1	Noise Walls - W2	250	20-Apr-18	08-Apr-19	204	$0
044 1	Noise Walls - W3	250	20-Apr-18	08-Apr-19	387	$0
044 1	Noise Walls - E1	250	20-Apr-18	08-Apr-19	387	$0
044 1	Noise Walls - E2	250	18-Sep-18	03-Sep-19	281	$0
044 1	Culvert/Headwalls/Wingwalls - W2	60	20-Apr-18	13-Jul-18	317	$0



Actual Work | Remaining Work | Critical Remaining Work | Milestone | Summary

TASK filter: All Activities

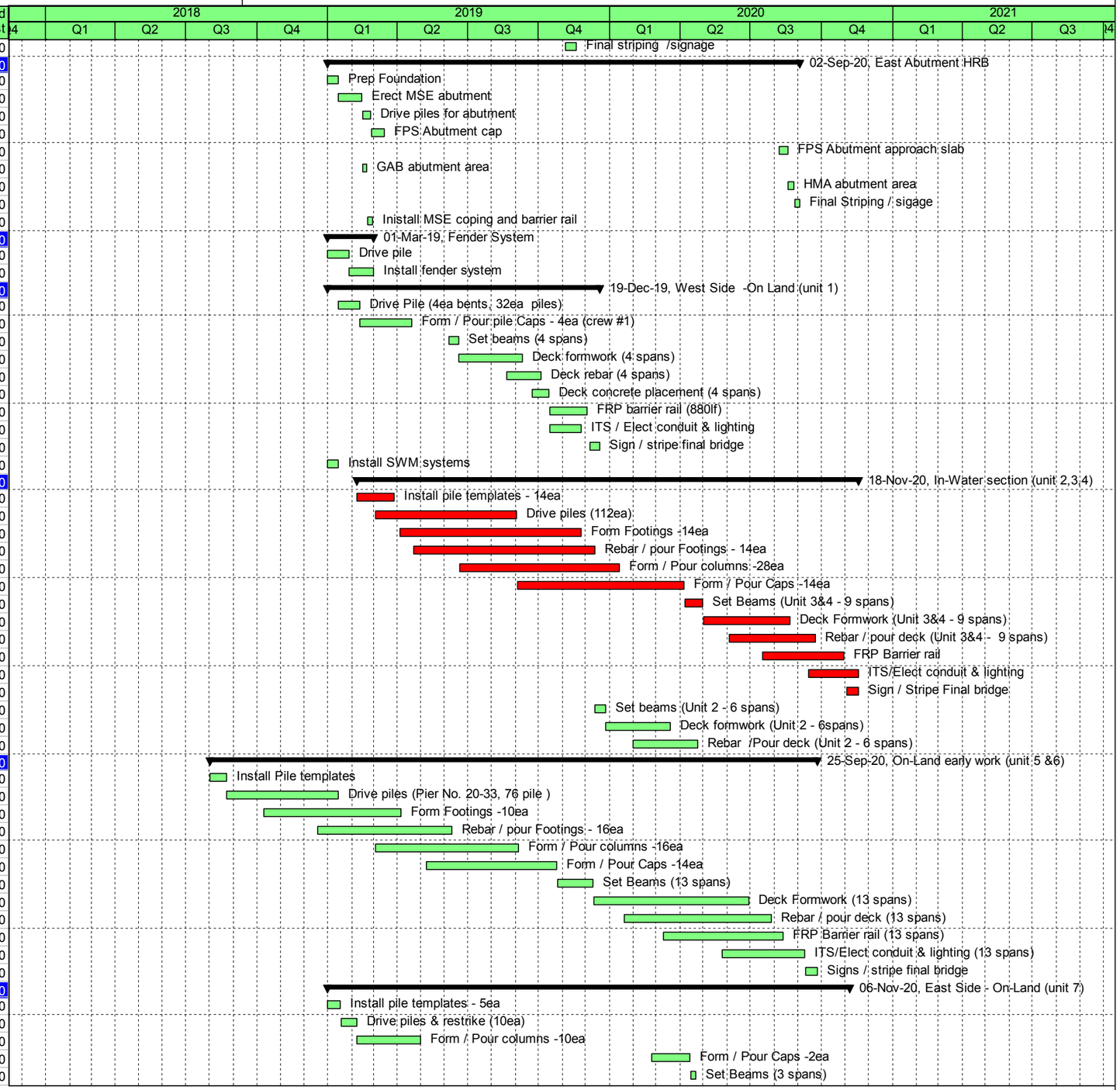
Activity ID	Activity Name	Original	Start	Finish	Total	Budgeted Total Cost
044 1	Culvert/Headwalls/Wingwalls - W3	60	20-Apr-18	13-Jul-18	317	$0
044 1	Culvert/Headwalls/Wingwalls - E1	60	20-Apr-18	13-Jul-18	317	$0
044 1	Culvert/Headwalls/Wingwalls - E2	60	19-Oct-18	11-Jan-19	188	$0
044 2	Sign Structures - W2	60	20-Apr-18	13-Jul-18	317	$0
044 2	Sign Structures - W3	60	20-Apr-18	13-Jul-18	317	$0
044 2	Sign Structures - E1	60	20-Apr-18	13-Jul-18	317	$0
044 2	Sign Structures - E2	60	23-Nov-18	15-Feb-19	163	$0
044 1	Review / approve / resubmit - noisewall submittals	1	04-Sep-19	04-Sep-19	281	$0
044 2	Review / approve / resubmit - msc structure submittals	1	18-Feb-19	18-Feb-19	163	$0
Special Wall Designs		60	20-Nov-17	13-Feb-18	723	$0
043 0	Foundation	60	20-Nov-17	13-Feb-18	723	$0
043 1	Wall Structure	60	20-Nov-17	13-Feb-18	723	$0
Widening Bridges and Bridge Replacement		230	29-Mar-18	15-Feb-19	582	$0
040 0	Route 13 - South Military Highway - 2 Bridges	110	29-Mar-18	30-Aug-18	350	$0
040 1	Yadkin Road - 2 Bridges	110	21-Jun-18	22-Nov-18	582	$0
040 1	Shell Road - 2 Bridges	110	14-Sep-18	15-Feb-19	582	$0
040 2	Great Bridge Blvd.	125	29-Mar-18	20-Sep-18	104	$0
Geotech / Foundation / Substructure Design		178	20-Nov-17	30-Jul-18	246	$0
030 0	Subsurface Exploration Plan	25	20-Nov-17	22-Dec-17	9	$0
030 1	Schedule Subsurface Exploration	5	04-Dec-17	08-Dec-17	9	$0
030 1	Subsurface Drilling Program, Phase 1	40	08-Dec-17	05-Feb-18	9	$0
030 2	Subsurface Drilling Program, Phase 2	40	06-Feb-18	02-Apr-18	59	$0
030 2	Soil Laboratory Testing, Phase 1	40	06-Feb-18	02-Apr-18	9	$0
030 3	Soil Laboratory Testing, Phase 2	40	03-Apr-18	28-May-18	9	$0
030 3	Main Span Highrise Bridge Report	33	12-Dec-1	29-Jan-18	124	$0
030 4	Bridge Widenings Report	33	12-Feb-1	28-Mar-18	104	$0
030 4	Great Bridge Blvd Bridge Replacement Report	33	12-Jan-1	27-Feb-18	250	$0
030 5	Soil Survey Report	44	29-May-1	30-Jul-18	9	$0
030 5	Retaining Walls, SDW and Sound Barrier Walls Report	44	19-Feb-1	19-Apr-18	59	$0
030 6	Minor Structures Report	44	05-Feb-1	05-Apr-18	327	$0
Upgrade Existing High Rise Bridge		60	23-Nov-18	15-Feb-19	582	$0
025 0	Retrofit / repairs to existing bridge	60	23-Nov-18	15-Feb-19	582	$0
New High Rise Bridge Main Span		285	20-Nov-17	28-Dec-18	398	$0
020 0	Unit 1 Substructure	50	31-Jan-18	10-Apr-18	73	$0
020 1	Unit 2, 3 & 4 Substructure	110	20-Nov-17	24-Apr-18	43	$0
020 1	Unit 5, 6 & 7 Substructure	110	18-Dec-17	22-May-18	43	$0
020 2	Unit 1, 2 & 3 Superstructure	160	21-Mar-18	31-Oct-18	165	$0
020 2	Unit 4 Superstructure	170	31-Jan-18	26-Sep-18	165	$0
020 3	Unit 5, 6 & 7 Superstructure	130	14-Feb-18	15-Aug-18	165	$0
020 3	Fender System	24	16-Aug-18	18-Sep-18	398	$0
020 4	Bridge Lighting and Electrical	24	19-Sep-18	22-Oct-18	398	$0
020 4	Scour Evaluation	24	23-Oct-18	23-Nov-18	398	$0
020 5	Main Bridge Electrical	24	26-Nov-18	28-Dec-18	398	$0
020 5	Review / approve / resubmit substr unit 2,3,&4 plans	40	25-Apr-18	19-Jun-18	136	$0
020 6	Review / approve / resubmit substr unit 5,6,&7 plans	40	23-May-1	18-Jul-18	43	$0
020 7	Review / approve / resubmit substr unit 1 plans	40	11-Apr-18	05-Jun-18	73	$0
Construction		712	01-Aug-18	23-Apr-21	69	$0
High Rise Bridge		600	01-Aug-18	18-Nov-20	181	$0
Trestle access		27	31-Dec-18	05-Feb-19	1	$0
A2130	Build access road	7	31-Dec-18	08-Jan-19	1	$0
A3020	Install trestle to access bent 4&5	20	09-Jan-19	05-Feb-19	1	$0
West Abutment HRB		198	09-Jan-19	18-Nov-19	332	$0
A2410	Prep Foundation	5	09-Jan-19	16-Jan-19	206	$0
A2420	Erect MSE abutment	40	28-Feb-19	03-May-19	180	$0
A2430	Drive piles for abutment	8	06-May-1	17-May-19	180	$0
A2440	FPS Abutment cap	12	20-May-1	06-Jun-19	180	$0
A2450	FPS Abutment approach slab	8	15-Oct-19	25-Oct-19	332	$0
A2460	GAB abutment area	4	06-May-1	10-May-19	436	$0
A2470	HMA abutment area	6	28-Oct-19	04-Nov-19	332	$0
A3920	Install MSE coping and barrier rail	5	13-May-1	20-May-19	436	$0



Actual Work | Remaining Work | Critical Remaining Work | Milestone | Summary

TASK filter: All Activities

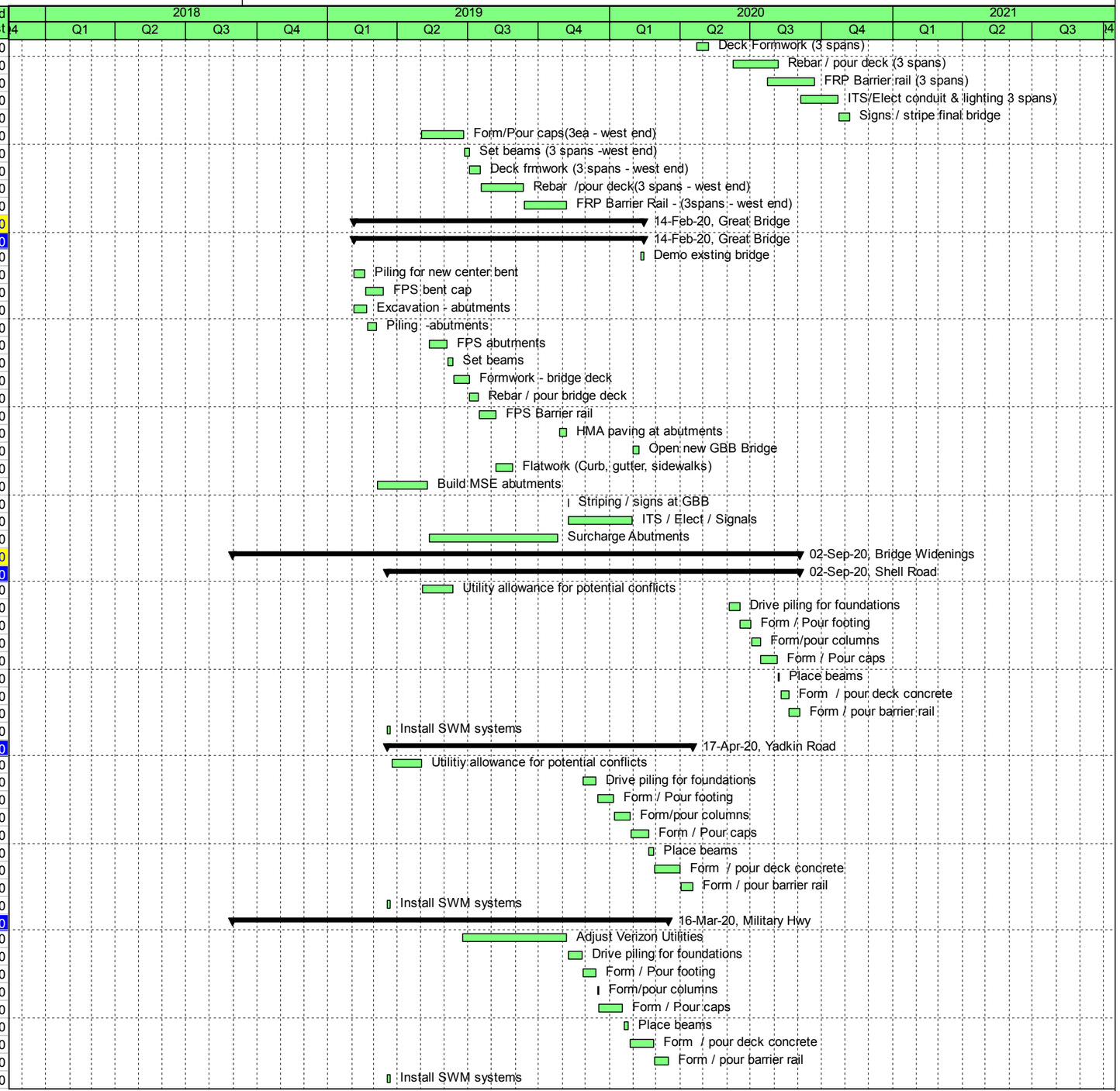
Activity ID	Activity Name	Original	Start	Finish	Total	Budgeted Total Cost
A3930	Final striping /signage	8	05-Nov-19	18-Nov-19	332	$0
East Abutment HRB		376	31-Dec-18	02-Sep-20	156	$0
A2950	Prep Foundation	5	31-Dec-18	14-Jan-19	470	$0
A2960	Erect MSE abutment	20	15-Jan-19	13-Feb-19	470	$0
A2970	Drive piles for abutment	6	15-Feb-19	25-Feb-19	470	$0
A2990	FPS Abutment cap	12	26-Feb-19	15-Mar-19	470	$0
A3000	FPS Abutment approach slab	8	07-Aug-20	18-Aug-20	156	$0
A2980	GAB abutment area	4	15-Feb-19	20-Feb-19	487	$0
A3010	HMA abutment area	6	19-Aug-20	26-Aug-20	156	$0
A3940	Final Striping / sigage	5	27-Aug-20	02-Sep-20	156	$0
A3950	Inistall MSE coping and barrier rail	5	22-Feb-19	28-Feb-19	487	$0
Fender System		35	31-Dec-18	01-Mar-19	388	$0
A4240	Drive pile	15	31-Dec-18	28-Jan-19	388	$0
A4250	Install fender system	20	29-Jan-19	01-Mar-19	388	$0
West Side -On Land (unit 1)		218	31-Dec-18	19-Dec-19	205	$0
A1770	Drive Pile (4ea bents, 32ea piles)	18	15-Jan-19	11-Feb-19	190	$0
A1780	Form / Pour pile Caps - 4ea (crew #1)	40	12-Feb-19	19-Apr-19	210	$0
A1790	Set beams (4 spans)	9	07-Jun-19	19-Jun-19	180	$0
A1800	Deck formwork (4 spans)	56	20-Jun-19	10-Sep-19	180	$0
A1810	Deck rebar (4 spans)	30	20-Aug-19	04-Oct-19	180	$0
A1920	Deck concrete placement (4 spans)	14	23-Sep-19	14-Oct-19	180	$0
A2150	FRP barrier rail (880lf)	30	15-Oct-19	02-Dec-19	205	$0
A2170	ITS / Elect conduit & lighting	25	15-Oct-19	25-Nov-19	180	$0
A2320	Sign / stripe final bridge	10	06-Dec-19	19-Dec-19	205	$0
A1940	Install SWM systems	5	31-Dec-18	14-Jan-19	190	$0
In-Water section (unit 2,3,4)		465	07-Feb-19	18-Nov-20	0	$0
A1820	Install pile templates - 14ea	30	07-Feb-19	28-Mar-19	0	$0
A1830	Drive piles (112ea)	118	04-Mar-19	02-Sep-19	0	$0
A1850	Form Footings -14ea	150	04-Apr-19	25-Nov-19	0	$0
A1860	Rebar / pour Footings - 14ea	150	22-Apr-19	12-Dec-19	0	$0
A1870	Form / Pour columns -28ea	125	21-Jun-19	13-Jan-20	0	$0
A1880	Form / Pour Caps -14ea	125	03-Sep-19	06-Apr-20	0	$0
A1890	Set Beams (Unit 3&4 - 9 spans)	15	07-Apr-20	30-Apr-20	0	$0
A1900	Deck Formwork (Unit 3&4 - 9 spans)	75	01-May-2	21-Aug-20	0	$0
A1910	Rebar / pour deck (Unit 3&4 - 9 spans)	75	03-Jun-20	22-Sep-20	0	$0
A2140	FRP Barrier rail	70	17-Jul-20	30-Oct-20	0	$0
A2180	ITS/Elect conduit & lighting	40	14-Sep-20	18-Nov-20	0	$0
A2340	Sign / Stripe Final bridge	10	02-Nov-20	18-Nov-20	0	$0
A1950	Set beams (Unit 2 - 6 spans)	10	13-Dec-19	26-Dec-19	101	$0
A1960	Deck formwork (Unit 2 - 6spans)	60	27-Dec-19	19-Mar-20	101	$0
A1970	Rebar /Pour deck (Unit 2 - 6 spans)	60	31-Jan-20	23-Apr-20	101	$0
On-Land early work (unit 5 &6)		481	01-Aug-18	25-Sep-20	32	$0
A4120	Install Pile templates	15	01-Aug-18	22-Aug-18	32	$0
A4130	Drive piles (Pier No. 20-33, 76 pile)	80	23-Aug-18	14-Jan-19	32	$0
A4140	Form Footings -10ea	100	10-Oct-18	05-Apr-19	32	$0
A4150	Rebar / pour Footings - 16ea	100	19-Dec-18	10-Jun-19	32	$0
A4160	Form / Pour columns -16ea	120	04-Mar-19	05-Sep-19	32	$0
A4170	Form / Pour Caps -14ea	110	09-May-1	24-Oct-19	32	$0
A4180	Set Beams (13 spans)	26	25-Oct-19	10-Dec-19	32	$0
A4190	Deck Formwork (13 spans)	120	11-Dec-19	29-Jun-20	32	$0
A4200	Rebar / pour deck (13 spans)	120	20-Jan-20	28-Jul-20	32	$0
A4210	FRP Barrier rail (13 spans)	100	10-Mar-20	12-Aug-20	32	$0
A4220	ITS/Elect conduit & lighting (13 spans)	75	25-May-2	09-Sep-20	32	$0
A4230	Signs / stripe final bridge	10	10-Sep-20	25-Sep-20	32	$0
East Side - On-Land (unit 7)		485	31-Dec-18	06-Nov-20	189	$0
A2190	Install pile templates - 5ea	8	31-Dec-18	17-Jan-19	187	$0
A2200	Drive piles & restrike (10ea)	13	18-Jan-19	07-Feb-19	187	$0
A2240	Form / Pour columns -10ea	50	08-Feb-19	01-May-19	187	$0
A2250	Form / Pour Caps -2ea	30	24-Feb-20	13-Apr-20	6	$0
A2260	Set Beams (3 spans)	5	15-Apr-20	21-Apr-20	6	$0



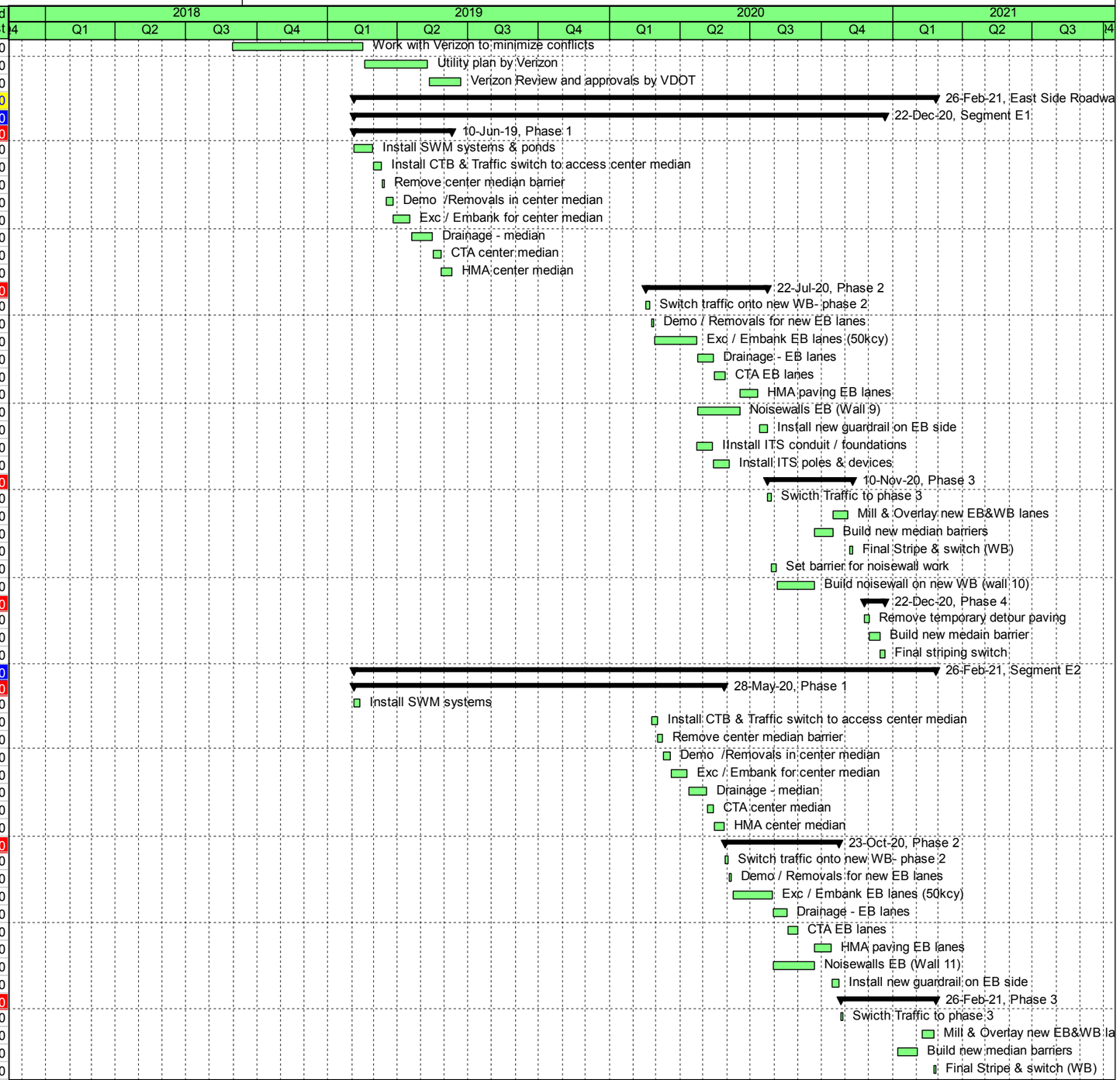
Actual Work | Remaining Work | Critical Remaining Work | Milestone | Summary

TASK filter: All Activities

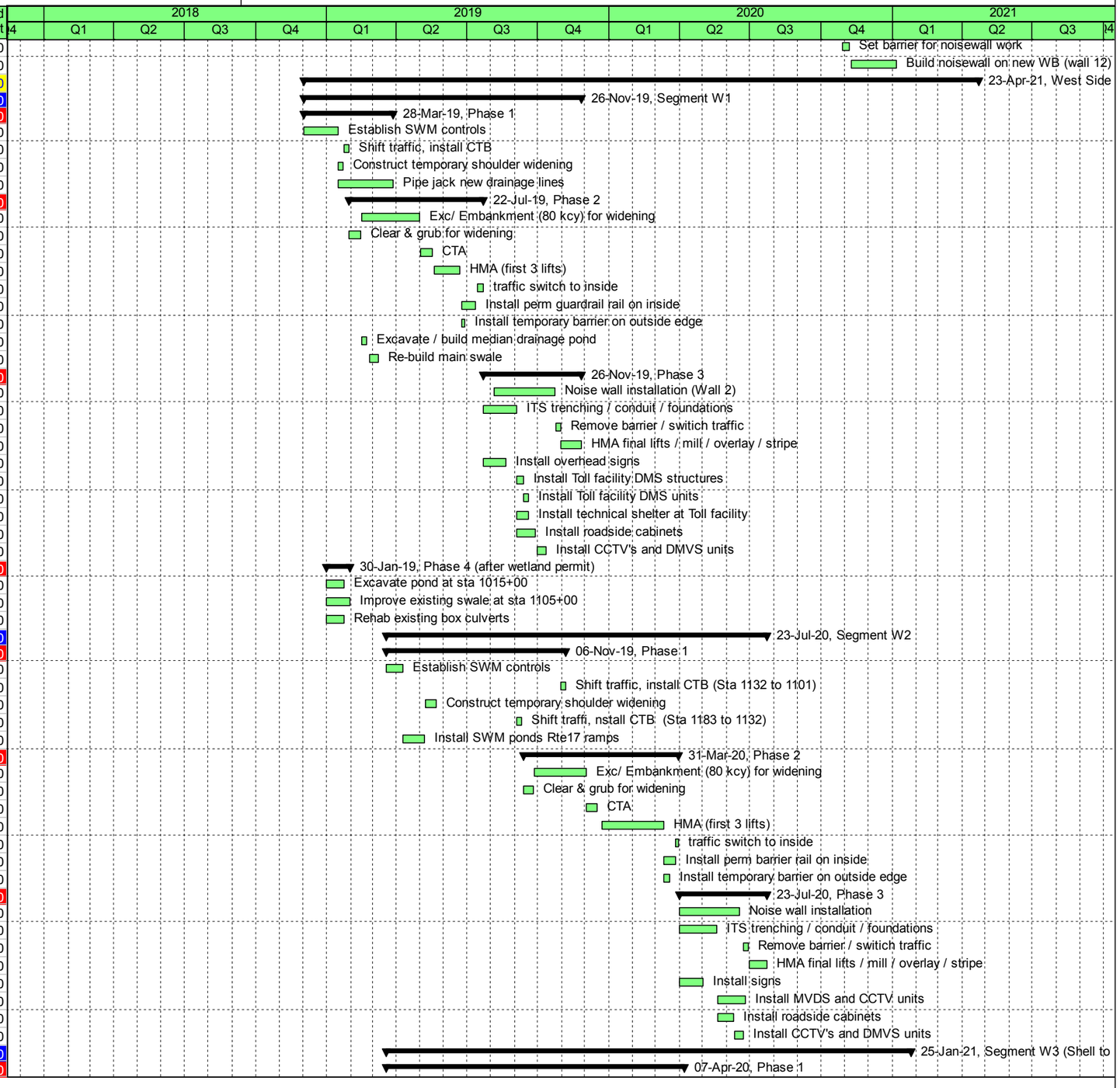
Activity ID	Activity Name	Original	Start	Finish	Total	Budgeted Total Cost
A2270	Deck Formwork (3 spans)	10	22-Apr-20	07-May-20	6	$0
A2280	Rebar / pour deck (3 spans)	40	09-Jun-20	06-Aug-20	6	$0
A2290	FRP Barrier rail (3 spans)	40	23-Jul-20	21-Sep-20	6	$0
A2300	ITS/Elect conduit & lighting 3 spans)	30	04-Sep-20	22-Oct-20	6	$0
A2350	Signs / stripe final bridge	10	23-Oct-20	06-Nov-20	6	$0
A2370	Form/Pour caps(3ea - west end)	40	02-May-1	26-Jun-19	451	$0
A2380	Set beams (3 spans -west end)	5	27-Jun-19	03-Jul-19	451	$0
A2400	Deck frmwork (3 spans - west end)	10	04-Jul-19	17-Jul-19	451	$0
A2480	Rebar /pour deck(3 spans - west end)	40	18-Jul-19	11-Sep-19	451	$0
A2490	FRP Barrier Rail - (3spans - west end)	40	12-Sep-19	06-Nov-19	451	$0
Great Bridge		270	04-Feb-19	14-Feb-20	8	$0
Great Bridge		270	04-Feb-19	14-Feb-20	8	$0
A3110	Demo exsting bridge	4	10-Feb-20	14-Feb-20	7	$0
A3120	Piling for new center bent	8	04-Feb-19	18-Feb-19	8	$0
A3130	FPS bent cap	15	19-Feb-19	14-Mar-19	93	$0
A3170	Excavation - abutments	10	04-Feb-19	20-Feb-19	6	$0
A3180	Piling -abutments	8	22-Feb-19	05-Mar-19	6	$0
A3190	FPS abutments	15	13-May-1	04-Jun-19	43	$0
A3200	Set beams	5	06-Jun-19	12-Jun-19	43	$0
A3210	Formwork - bridge deck	15	13-Jun-19	03-Jul-19	43	$0
A3220	Rebar / pour bridge deck	8	04-Jul-19	15-Jul-19	43	$0
A3230	FPS Barrier rail	15	16-Jul-19	06-Aug-19	43	$0
A3240	HMA paving at abutments	8	28-Oct-19	06-Nov-19	7	$0
A3250	Open new GBB Bridge	5	31-Jan-20	07-Feb-20	7	$0
A3260	Flatwork (Curb, gutter, sidewalks)	15	07-Aug-19	28-Aug-19	43	$0
A3310	Build MSE abutments	40	06-Mar-19	10-May-19	6	$0
A3360	Striping / signs at GBB	1	08-Nov-19	08-Nov-19	51	$0
A3370	ITS / Elect / Signals	45	08-Nov-19	30-Jan-20	7	$0
A3320	Surcharge Abutments	120	13-May-1	25-Oct-19	7	$0
Bridge Widenings		523	31-Aug-18	02-Sep-20	236	$0
Shell Road		332	19-Mar-19	02-Sep-20	213	$0
A1500	Utility allowance for potential conflicts	25	03-May-1	12-Jun-19	429	$0
A1510	Drive piling for foundations	10	03-Jun-20	17-Jun-20	213	$0
A1520	Form / Pour footing	10	18-Jun-20	01-Jul-20	213	$0
A1530	Form/pour columns	8	02-Jul-20	13-Jul-20	213	$0
A1540	Form / Pour caps	15	14-Jul-20	04-Aug-20	213	$0
A1550	Place beams	2	06-Aug-20	07-Aug-20	213	$0
A1560	Form / pour deck concrete	8	10-Aug-20	19-Aug-20	213	$0
A1570	Form / pour barrier rail	10	20-Aug-20	02-Sep-20	213	$0
A1580	Install SWM systems	3	19-Mar-19	22-Mar-19	454	$0
Yadkin Road		241	19-Mar-19	17-Apr-20	304	$0
A1600	Utilitiy allowance for potential conflicts	25	25-Mar-19	02-May-19	429	$0
A1610	Drive piling for foundations	10	27-Nov-19	13-Dec-19	304	$0
A1620	Form / Pour footing	10	16-Dec-19	06-Jan-20	304	$0
A1630	Form/pour columns	12	07-Jan-20	27-Jan-20	304	$0
A1640	Form / Pour caps	15	28-Jan-20	20-Feb-20	304	$0
A1650	Place beams	4	21-Feb-20	26-Feb-20	304	$0
A1660	Form / pour deck concrete	20	28-Feb-20	01-Apr-20	304	$0
A1670	Form / pour barrier rail	10	02-Apr-20	17-Apr-20	304	$0
A1590	Install SWM systems	3	19-Mar-19	22-Mar-19	429	$0
Military Hwy		401	31-Aug-18	16-Mar-20	358	$0
A1690	Adjust Verizon Utilities	90	24-Jun-19	06-Nov-19	304	$0
A1700	Drive piling for foundations	10	08-Nov-19	26-Nov-19	304	$0
A1710	Form / Pour footing	10	27-Nov-19	13-Dec-19	324	$0
A1720	Form/pour columns	2	16-Dec-19	17-Dec-19	324	$0
A1730	Form / Pour caps	15	18-Dec-19	17-Jan-20	324	$0
A1740	Place beams	4	20-Jan-20	24-Jan-20	324	$0
A1750	Form / pour deck concrete	20	27-Jan-20	26-Feb-20	324	$0
A1760	Form / pour barrier rail	10	28-Feb-20	16-Mar-20	324	$0
A1680	Install SWM systems	3	19-Mar-19	22-Mar-19	361	$0



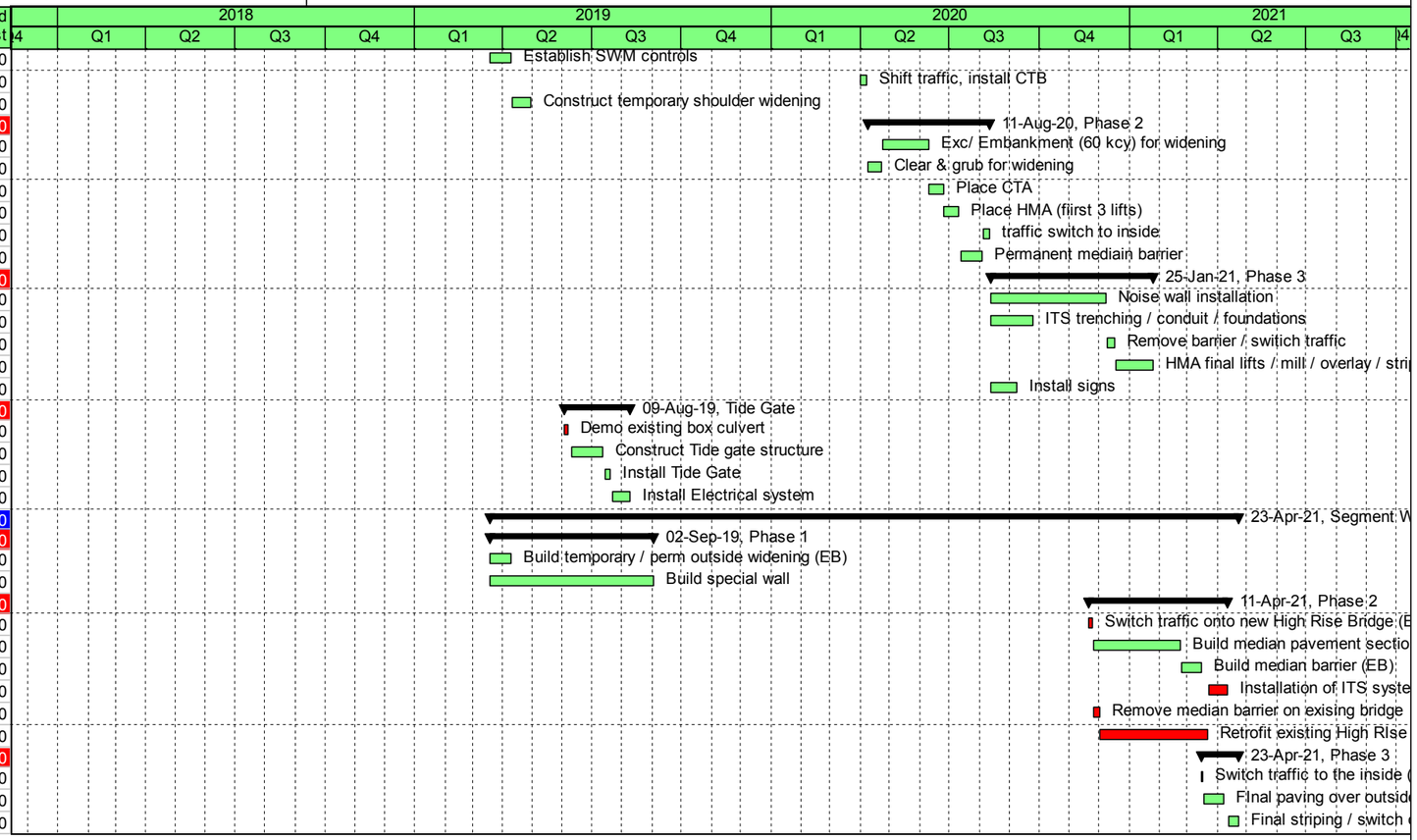
Activity ID	Activity Name	Original	Start	Finish	Total	Budgeted Total Cost
A2000	Work with Verizon to minimize conflicts	120	31-Aug-18	15-Feb-19	350	$0
A2010	Utility plan by Verizon	60	18-Feb-19	10-May-19	350	$0
A2020	Verizon Review and approvals by VDOT	30	13-May-1	21-Jun-19	350	$0
East Side Roadway		540	04-Feb-19	26-Feb-21	52	$0
Segment E1		492	04-Feb-19	22-Dec-20	100	$0
Phase 1		91	04-Feb-19	10-Jun-19	188	$0
A2	Install SWM systems & ponds	15	04-Feb-19	28-Feb-19	137	$0
A2	Install CTB & Traffic switch to access center median	5	01-Mar-19	11-Mar-19	137	$0
A2	Remove center median barrier	4	12-Mar-19	15-Mar-19	137	$0
A2	Demo /Removals in center median	6	18-Mar-19	26-Mar-19	137	$0
A2	Exc / Embank for center median	15	27-Mar-19	17-Apr-19	137	$0
A2	Drainage - median	15	19-Apr-19	16-May-19	137	$0
A2	CTA center median	6	17-May-1	27-May-19	137	$0
A2	HMA center median	9	28-May-1	10-Jun-19	137	$0
Phase 2		113	17-Feb-20	22-Jul-20	137	$0
A2	Switch traffic onto new WB- phase 2	3	17-Feb-20	21-Feb-20	6	$0
A2	Demo / Removals for new EB lanes	3	24-Feb-20	27-Feb-20	105	$0
A2	Exc / Embank EB lanes (50kcy)	35	28-Feb-20	22-Apr-20	105	$0
A2	Drainage - EB lanes	12	24-Apr-20	14-May-20	119	$0
A2	CTA EB lanes	10	15-May-2	29-May-20	119	$0
A2	HMA paving EB lanes	15	18-Jun-20	10-Jul-20	107	$0
A2	Noisewalls EB (Wall 9)	35	24-Apr-20	17-Jun-20	105	$0
A3	Install new guardrail on EB side	8	13-Jul-20	22-Jul-20	137	$0
A2	IInstall ITS conduit / foundations	15	23-Apr-20	13-May-20	172	$0
A2	Install ITS poles & devices	15	14-May-2	03-Jun-20	172	$0
Phase 3		79	23-Jul-20	10-Nov-20	130	$0
A2	Swicth Traffic to phase 3	3	23-Jul-20	27-Jul-20	113	$0
A2	Mill & Overlay new EB&WB lanes	12	16-Oct-20	03-Nov-20	95	$0
A2	Build new median barriers	15	22-Sep-20	15-Oct-20	113	$0
A2	Final Stripe & switch (WB)	3	06-Nov-20	10-Nov-20	113	$0
A2	Set barrier for noisewall work	5	28-Jul-20	03-Aug-20	113	$0
A2	Build noisewall on new WB (wall 10)	32	04-Aug-20	21-Sep-20	113	$0
Phase 4		20	25-Nov-20	22-Dec-20	100	$0
A4	Remove temporary detour paving	5	25-Nov-20	01-Dec-20	100	$0
A4	Build new medain barrier	10	02-Dec-20	15-Dec-20	100	$0
A4	Final striping switch	5	16-Dec-20	22-Dec-20	100	$0
Segment E2		540	04-Feb-19	26-Feb-21	52	$0
Phase 1		344	04-Feb-19	28-May-20	45	$0
A4	Install SWM systems	5	04-Feb-19	11-Feb-19	263	$0
A4	Install CTB & Traffic switch to access center median	5	24-Feb-20	02-Mar-20	43	$0
A4	Remove center median barrier	4	03-Mar-20	09-Mar-20	43	$0
A4	Demo /Removals in center median	6	10-Mar-20	19-Mar-20	43	$0
A4	Exc / Embank for center median	15	20-Mar-20	10-Apr-20	43	$0
A4	Drainage - median	15	13-Apr-20	05-May-20	43	$0
A4	CTA center median	6	06-May-2	14-May-20	42	$0
A4	HMA center median	9	15-May-2	28-May-20	42	$0
Phase 2		106	29-May-2	23-Oct-20	70	$0
A4	Switch traffic onto new WB- phase 2	3	29-May-2	02-Jun-20	42	$0
A4	Demo / Removals for new EB lanes	3	03-Jun-20	05-Jun-20	42	$0
A4	Exc / Embank EB lanes (50kcy)	35	08-Jun-20	29-Jul-20	42	$0
A4	Drainage - EB lanes	12	30-Jul-20	17-Aug-20	56	$0
A4	CTA EB lanes	10	18-Aug-20	31-Aug-20	57	$0
A4	HMA paving EB lanes	15	22-Sep-20	13-Oct-20	44	$0
A4	Noisewalls EB (Wall 11)	35	30-Jul-20	21-Sep-20	42	$0
A4	Install new guardrail on EB side	8	14-Oct-20	23-Oct-20	70	$0
Phase 3		90	26-Oct-20	26-Feb-21	52	$0
A4	Swicth Traffic to phase 3	3	26-Oct-20	28-Oct-20	53	$0
A4	Mill & Overlay new EB&WB lanes	12	08-Feb-21	23-Feb-21	52	$0
A4	Build new median barriers	15	08-Jan-21	02-Feb-21	53	$0
A4	Final Stripe & switch (WB)	3	24-Feb-21	26-Feb-21	52	$0



Activity ID	Activity Name	Original	Start	Finish	Total	Budgeted Total Cost
A4	Set barrier for noisewall work	5	29-Oct-20	06-Nov-20	53	$0
A4	Build noisewall on new WB (wall 12)	32	09-Nov-20	06-Jan-21	53	$0
West Side Roadway		624	03-Dec-18	23-Apr-21	69	$0
Segment W1		256	03-Dec-18	26-Nov-19	380	$0
Phase 1		60	03-Dec-18	28-Mar-19	58	$0
A3	Establish SWM controls	15	03-Dec-18	15-Jan-19	48	$0
A3	Shift traffic, install CTB	5	23-Jan-19	29-Jan-19	48	$0
A3	Construct temporary shoulder widening	5	16-Jan-19	22-Jan-19	48	$0
A4	Pipe jack new drainage lines	45	16-Jan-19	28-Mar-19	58	$0
Phase 2		124	30-Jan-19	22-Jul-19	52	$0
A3	Exc/ Embankment (80 kcy) for widening	45	15-Feb-19	01-May-19	48	$0
A3	Clear & grub for widening	10	30-Jan-19	14-Feb-19	48	$0
A3	CTA	10	02-May-1	17-May-19	46	$0
A3	HMA (first 3 lifts)	23	20-May-1	21-Jun-19	46	$0
A3	traffic switch to inside	5	15-Jul-19	22-Jul-19	48	$0
A3	Install perm guardrail rail on inside	15	24-Jun-19	12-Jul-19	48	$0
A3	Install temporary barrier on outside edge	5	24-Jun-19	28-Jun-19	58	$0
A4	Excavate / build median drainage pond	4	15-Feb-19	21-Feb-19	134	$0
A4	Re-build main swale	8	25-Feb-19	08-Mar-19	134	$0
Phase 3		91	23-Jul-19	26-Nov-19	380	$0
A3	Noise wall installation (Wall 2)	50	06-Aug-19	23-Oct-19	91	$0
A3	ITS trenching / conduit / foundations	30	23-Jul-19	03-Sep-19	48	$0
A3	Remove barrier / switich traffic	5	24-Oct-19	30-Oct-19	318	$0
A3	HMA final lifts / mill / overlay / stripe	16	31-Oct-19	26-Nov-19	285	$0
A3	Install overhead signs	20	23-Jul-19	20-Aug-19	363	$0
A3	Install Toll facility DMS structures	5	04-Sep-19	12-Sep-19	48	$0
A3	Install Toll facility DMS units	5	13-Sep-19	19-Sep-19	48	$0
A4	Install technical shelter at Toll facility	10	04-Sep-19	19-Sep-19	328	$0
A4	Install roadside cabinets	15	04-Sep-19	27-Sep-19	323	$0
A4	Install CCTV's and DMVS units	8	30-Sep-19	11-Oct-19	323	$0
Phase 4 (after wetland permit)		15	31-Dec-18	30-Jan-19	506	$0
A4	Excavate pond at sta 1015+00	10	31-Dec-18	23-Jan-19	511	$0
A4	Improve existing swale at sta 1105+00	15	31-Dec-18	30-Jan-19	506	$0
A4	Rehab existing box culverts	10	31-Dec-18	23-Jan-19	511	$0
Segment W2		353	19-Mar-19	23-Jul-20	265	$0
Phase 1		167	19-Mar-19	06-Nov-19	451	$0
A1	Establish SWM controls	15	19-Mar-19	09-Apr-19	486	$0
A1	Shift traffic, install CTB (Sta 1132 to 1101)	5	31-Oct-19	06-Nov-19	386	$0
A3	Construct temporary shoulder widening	10	08-May-1	22-May-19	492	$0
A1	Shift traffi, nstall CTB (Sta 1183 to 1132)	5	04-Sep-19	10-Sep-19	124	$0
A1	Install SWM ponds Rte17 ramps	20	10-Apr-19	07-May-19	567	$0
Phase 2		144	12-Sep-19	31-Mar-20	84	$0
A1	Exc/ Embankment (80 kcy) for widening	40	27-Sep-19	02-Dec-19	91	$0
A1	Clear & grub for widening	10	12-Sep-19	25-Sep-19	91	$0
A1	CTA	10	03-Dec-19	16-Dec-19	74	$0
A1	HMA (first 3 lifts)	21	23-Dec-19	11-Mar-20	74	$0
A2	traffic switch to inside	3	27-Mar-20	31-Mar-20	76	$0
A3	Install perm barrier rail on inside	10	12-Mar-20	26-Mar-20	76	$0
A3	Install temporary barrier on outside edge	5	12-Mar-20	19-Mar-20	81	$0
Phase 3		82	01-Apr-20	23-Jul-20	192	$0
A1	Noise wall installation	50	01-Apr-20	17-Jun-20	169	$0
A1	ITS trenching / conduit / foundations	30	01-Apr-20	19-May-20	166	$0
A1	Remove barrier / switich traffic	5	23-Jun-20	29-Jun-20	166	$0
A1	HMA final lifts / mill / overlay / stripe	16	30-Jun-20	23-Jul-20	149	$0
A3	Install signs	20	01-Apr-20	01-May-20	204	$0
A1	Install MVDS and CCTV units	25	20-May-2	24-Jun-20	178	$0
A4	Install roadside cabinets	15	20-May-2	09-Jun-20	166	$0
A4	Install CCTV's and DMVS units	8	11-Jun-20	22-Jun-20	166	$0
Segment W3 (Shell to 1274)		485	19-Mar-19	25-Jan-21	76	$0
Phase 1		228	19-Mar-19	07-Apr-20	76	$0



Activity ID	Activity Name	Original	Start	Finish	Total	Budgeted Total Cost
A3	Establish SWM controls	15	19-Mar-19	09-Apr-19	31	$0
A3	Shift traffic, install CTB	5	01-Apr-20	07-Apr-20	76	$0
A3	Construct temporary shoulder widening	10	11-Apr-19	29-Apr-19	274	$0
Phase 2		90	08-Apr-20	11-Aug-20	84	$0
A3	Exc/ Embankment (60 kcy) for widening	30	24-Apr-20	09-Jun-20	76	$0
A3	Clear & grub for widening	10	08-Apr-20	22-Apr-20	76	$0
A3	Place CTA	10	10-Jun-20	24-Jun-20	77	$0
A3	Place HMA (fiirst 3 lifts)	10	25-Jun-20	10-Jul-20	77	$0
A3	traffic switch to inside	5	04-Aug-20	11-Aug-20	74	$0
A3	Permanent mediain barrier	15	13-Jul-20	03-Aug-20	74	$0
Phase 3		96	12-Aug-20	25-Jan-21	74	$0
A3	Noise wall installation	75	12-Aug-20	08-Dec-20	74	$0
A3	ITS trenching / conduit / foundations	30	12-Aug-20	24-Sep-20	117	$0
A3	Remove barrier / switich traffic	5	09-Dec-20	17-Dec-20	74	$0
A3	HMA final lifts / mill / overlay / stripe	16	18-Dec-20	25-Jan-21	74	$0
A3	Install signs	20	12-Aug-20	08-Sep-20	134	$0
Tide Gate		50	03-Jun-19	09-Aug-19	34	$0
A4	Demo existing box culvert	5	03-Jun-19	07-Jun-19	0	$0
A4	Construct Tide gate structure	25	10-Jun-19	12-Jul-19	34	$0
A4	Install Tide Gate	5	15-Jul-19	19-Jul-19	34	$0
A4	Install Electrical system	15	22-Jul-19	09-Aug-19	34	$0
Segment W3 (1274 to 1295)		549	19-Mar-19	23-Apr-21	12	$0
Phase 1		120	19-Mar-19	02-Sep-19	441	$0
A4	Build temporary / perm outside widening (EB)	15	19-Mar-19	09-Apr-19	356	$0
A4	Build special wall	120	19-Mar-19	02-Sep-19	441	$0
Phase 2		101	20-Nov-20	11-Apr-21	0	$0
A4	Switch traffic onto new High Rise Bridge (EB)	3	20-Nov-20	24-Nov-20	0	$0
A4	Build median pavement section (EB &WB)	30	25-Nov-20	22-Feb-21	14	$0
A4	Build median barrier (EB)	15	23-Feb-21	15-Mar-21	14	$0
A4	Installation of ITS systems on existing HRB	20	23-Mar-21	11-Apr-21	0	$0
A4	Remove median barrier on exising bridge	5	25-Nov-20	01-Dec-20	0	$0
A4	Retrofit existing High RIse bridge	45	02-Dec-20	22-Mar-21	0	$0
Phase 3		29	16-Mar-21	23-Apr-21	12	$0
A4	Switch traffic to the inside (EB)	2	16-Mar-21	17-Mar-21	14	$0
A4	FInal paving over outside widening (EB &WB)	15	18-Mar-21	07-Apr-21	14	$0
A4	Final striping / switch onto new High Rise bridge (EB)	10	12-Apr-21	23-Apr-21	12	$0



Actual Work | Critical Remaining Work | Summary
Remaining Work | Milestone

TASK filter: All Activities

Appendix

Technical Proposal Checklist

ATTACHMENT 4.0.1.1 (REV 1)

I-64 SOUTHSIDE WIDENING AND HIGH RISE BRIDGE, PHASE 1

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	A-1 – A-4
Acknowledgement of RFP, Revisions, and/or Addenda	Attachment 3.7 (Form C-78-RFP)	Sections 3.7, 4.0.1.1	no	A-5
List of Approved ATCs form	Attachment 3.6.7	Sections 3.6.7	no	A-10
Letter of Submittal	NA	Sections 4.1		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(s)	NA	Section 4.1.6	yes	1
Provide any Unique Milestone dates	NA	Section 4.1.7	yes	1
Proposal Payment Agreement or Waiver of Proposal Payment	Attachment 9.3.1 or 9.3.2	Section 4.1.8	no	A-6 – A-9
Certification Regarding Debarment Forms	Attachment 11.8.6(a) Attachment 11.8.6(b)	Section 4.1.9	no	A-11 – A-25

ATTACHMENT 4.0.1.1 (REV 1)

I-64 SOUTHSIDE WIDENING AND HIGH RISE BRIDGE, PHASE 1

TECHNICAL PROPOSAL CHECKLIST AND CONTENTS

Technical Proposal Component	Form (if any)	RFP Part 1 Cross Reference	Included within page limit?	Technical Proposal Page Reference
Offeror's Qualifications	NA	Section 4.2		2
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	2
Design Concept	NA	Section 4.3		3-31, 78-163
Conceptual Roadway Plans and description	NA	Section 4.3.1	yes	6-20, 78-123
Conceptual Bridge Plans and description - B662, I-64 (WB) over Southern Branch of the Elizabeth River, NPBL RR, and Route 166 (High Rise Bridge)	NA	Section 4.3.2	yes	20-26, 78-79, 124-140
Narrative for New High Rise Bridge addressing ease of maintenance.	NA	Section 4.3.2	yes	26, 20-26
Conceptual Bridge Plans and description -Existing Bridge Modification Conceptual Plans – B670, I-64 (EB) over Southern Branch Elizabeth River, NPBL RR, and Route 166	NA	Section 4.3.3	yes	21, 26-28 78-79, 141-146
Conceptual Bridge Replacement Plans - B663, Route 190 (Great Bridge Blvd.) over I-64	NA	Section 4.3.4	yes	21, 28-29, 78-79, 147-151

ATTACHMENT 4.0.1.1 (REV 1)

I-64 SOUTHSIDE WIDENING AND HIGH RISE BRIDGE, PHASE 1

TECHNICAL PROPOSAL CHECKLIST AND CONTENTS

Technical Proposal Component	Form (if any)	RFP Part 1 Cross Reference	Included within page limit?	Technical Proposal Page Reference
Conceptual Bridge Plans and description – For Bridge Widenings	NA	Section 4.3.5	yes	21, 29, 78-79, 152-162
Conceptual Plans – Tide Gate at Gilmerton Canal	NA	Section 4.3.6	yes	21, 30-31 78-79, 163
Project Approach	NA	Section 4.4		32-58
Environmental Management	NA	Section 4.4.1	yes	32-39
Utilities	NA	Section 4.4.2	yes	40-46
Geotechnical	NA	Section 4.4.3	yes	46-50
Quality Assurance/ Quality Control (QA/QC)	NA	Section 4.4.4	yes	50-58
Construction of Project	NA	Section 4.5		59-76
Sequence of Construction	NA	Section 4.5.1	yes	59-66
Transportation Management Plan	NA	Section 4.5.2	yes	66-76
Disadvantaged Business Enterprises (DBE)	NA	Section 4.6		77
Written statement of 8% DBE participation goal	NA	Section 4.6	yes	77
Proposal Schedule	NA	Section 4.7		S-1 – S-14

ATTACHMENT 4.0.1.1 (REV 1)

I-64 SOUTHSIDE WIDENING AND HIGH RISE BRIDGE, PHASE 1

TECHNICAL PROPOSAL CHECKLIST AND CONTENTS

Technical Proposal Component	Form (if any)	RFP Part 1 Cross Reference	Included within page limit?	Technical Proposal Page Reference
Proposal Schedule	NA	Section 4.7	no	S-1, S-7 – S-14
Proposal Schedule Narrative	NA	Section 4.7	no	S-1 – S-6
Proposal Schedule in electronic format (CD-ROM)	NA	Section 4.7	no	See CD

Form C-78-RFP

ATTACHMENT 3.7

COMMONWEALTH OF VIRGINIA
DEPARTMENT OF TRANSPORTATION

RFP NO. C00106692DB93

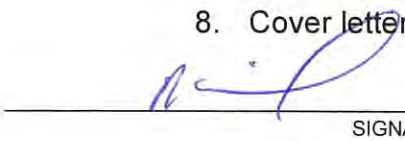
PROJECT NO.: 0064-131-811, P101, R201, C501, B662-B670, D637, D638

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 – December 14, 2016**
2. Cover letter of **Jan. 10, 2017 – Addendum No. 1**
3. Cover letter of **Feb. 8, 2017 – Addendum No. 2**
4. Cover letter of **March 17, 2017 – Addendum No. 3**
5. Cover letter of **April 24, 2017 – Addendum No. 4**
6. Cover letter of **May 23, 2017 – Addendum No. 5**
7. Cover letter of **June 19, 2017 – Addendum No. 6**
8. Cover letter of **July 10, 2017 – Addendum No. 7**
8. Cover letter of **August 4, 2017 – Addendum No. 8**



SIGNATURE

August 4, 2017
DATE

Robert McTavish
PRINTED NAME

Attorney-in-Fact
TITLE

Proposal Payment Agreement

ATTACHMENT 9.3.1
PROPOSAL PAYMENT AGREEMENT

THIS PROPOSAL PAYMENT AGREEMENT (this "Agreement") is made and entered into as of this 8 day of August, 20 17, by and between the Virginia Department of Transportation ("VDOT"), and Granite/Parsons/Corman a Joint Venture (GPC) ("Offeror").

WITNESSETH:

WHEREAS, Offeror is one of the entities who submitted Statements of Qualifications ("SOQs") pursuant to VDOT's August 16, 2016 Request for Qualifications ("RFQ") and was invited to submit proposals in response to a Request for Proposals ("RFP") for the **I-64 Southside Widening and High Rise Bridge, Phase 1, Project No. 0064-131-811, P101, R201, C501, B662-B670, D637, D638** ("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 or in writing during proprietary meetings or interviews; (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; and (c) conveyed verbally or in writing as Alternative Technical Concepts, as such term is defined in the RFP, that are made known to VDOT through (a) and (b) above, regardless of whether the Alternative Technical Concept has been approved by VDOT or included as part of Offeror's Proposal (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 **four hundred and seventy five thousand dollars ($~~400,000~~475,000)** ("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: _____

Granite/Parsons/Corman a Joint Venture (GPC)

By: _____

Name: Yigisha Desai

Title: Attorney-in-Fact

List of Approved ATCs

ATTACHMENT 3.6.7
LIST OF APPROVED ATCs INCLUDED IN TECHNICAL PROPOSAL

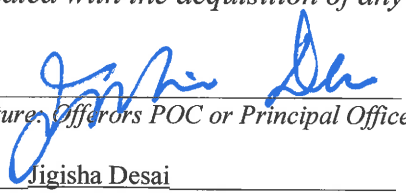
OFFEROR:

List all approved ATCs included in the Technical Proposal along with the page number references from Technical Proposal.

ATC ID Number	ATC Name Description	Date ATC Approved	Technical Proposal Reference Page(s) #
	NONE		

By signing this document, the Offeror hereby confirms that they are agreeing to all conditions that may have accompanied the ATC approval(s). The Offerors shall make a note of RFP Part 4 Section 2.1.10

"If the Contract Documents incorporate any ATCs and Design-Builder, for whatever reason: (a) does not comply with one or more Department conditions of pre-approval for the ATC; (b) does not obtain required third-party approval for the ATC; or (c) fails to implement the ATC, then Design-Builder shall: (1) provide written notice thereof to Department; and (2) comply with the requirements in the Contract Documents that would have applied in the absence of such ATC. Such compliance shall be without any increase in the Contract Price or extension to the Contract Time(s). For the avoidance of doubt, Design-Builder shall not be entitled to any increase in the Contract Price or extension of the Contract Time(s) as a result of any delay, inability or cost associated with the acquisition of any property that may be required to implement any ATC".



[Signature: Offerors POC or Principal Officer]

Jigisha Desai
[Printed Name]

Attorney in Fact
[Title]

DATE: July 25, 2017

Debarment Forms

ATTACHMENT 11.8.6(a)
CERTIFICATION REGARDING DEBARMENT
PRIMARY COVERED TRANSACTIONS

Project No.: 0064-131-811, P101, R201, C501, B662-B670, D637, D638

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 proposal.

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.

July 25, 2017	Attorney-in-Fact
Signature Jigisha Desai — Date	Title

Granite/Parsons/Corman, a Joint Venture (GPC)
Name of Firm

ATTACHMENT 11.8.6(a)
CERTIFICATION REGARDING DEBARMENT
PRIMARY COVERED TRANSACTIONS

Project No.: 0064-131-811, P101, R201, C501, B662-B670, D637, D638

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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 Jigisha Desai	July 25, 2017 Date	Vice President Title

Granite Construction Company
Name of Firm

GRANITE CONSTRUCTION COMPANY CORPORATE SEAL Jan. 4, 1922 CALIFORNIA

ATTACHMENT 11.8.6(a)
CERTIFICATION REGARDING DEBARMENT
PRIMARY COVERED TRANSACTIONS

Project No.: 0064-131-811, P101, R201, C501, B662-B670, D637, D638

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

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

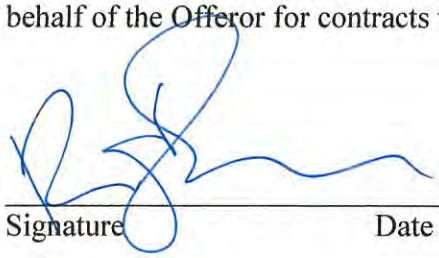
b) X Have not within a three-year period preceding this proposal been convicted of or had a civil judgment rendered against them for commission of fraud or a criminal offense in connection with obtaining, attempting to obtain, or performing a public (Federal, State or local) transaction or contract under 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) X 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) X 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 proposal.

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	7/26/2017 Date	Executive Vice President Title

Parsons Construction Group Inc.
Name of Firm

ATTACHMENT 11.8.6(a)
CERTIFICATION REGARDING DEBARMENT
PRIMARY COVERED TRANSACTIONS

Project No.: 0064-131-811, P101, R201, C501, B662-B670, D637, D638

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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 proposal.

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	7/20/17 Date	President Title

Corman Construction, Inc.
Name of Firm

ATTACHMENT 11.8.6(b)
CERTIFICATION REGARDING DEBARMENT
LOWER TIER COVERED TRANSACTIONS

Project No.: 0064-131-811, P101, R201, C501, B662-B670, D637, D638

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) **X*** 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 proposal.

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.

7/26/2017 Vice President
Signature Date Title

Parsons Transportation Group Inc.
Name of Firm

*On February 20, 2017, Parsons Transportation Group Inc. received a notice of termination from the Peninsula Corridor Joint Power Board (the JPB) for a project in California. Parsons believes that the termination was wrongful and without merit, as no default in the performance of services by Parsons under the contract had occurred. Accordingly, Parsons has filed a legal action against the JPB for wrongful termination and breach of contract, and we believe that we will prevail in any such action).

ATTACHMENT 11.8.6(b)
CERTIFICATION REGARDING DEBARMENT
LOWER TIER COVERED TRANSACTIONS

Project No.: 0064-131-811, P101, R201, C501, B662-B670, D637, D638

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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	Date	Title
[signature]	7/11/17	President

Accompany Engineering Group LLC
Name of Firm

ATTACHMENT 11.8.6(b)
CERTIFICATION REGARDING DEBARMENT
LOWER TIER COVERED TRANSACTIONS

Project No.: 0064-131-811, P101, R201, C501, B662-B670, D637, D638

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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	7/11/17 Date	President Title

Athavale, Lystad & Associates, Inc.
Name of Firm

ATTACHMENT 11.8.6(b)
CERTIFICATION REGARDING DEBARMENT
LOWER TIER COVERED TRANSACTIONS

Project No.: 0064-131-811, P101, R201, C501, B662-B670, D637, D638

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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.

Paul Silvey 7-11-17 PROGRAM MANAGER
Signature Date Title

CONTINENTAL ACQUISITION SERVICES, INC., dba CONTINENTAL FIELD SERVICE
Name of Firm

ATTACHMENT 11.8.6(b)
CERTIFICATION REGARDING DEBARMENT
LOWER TIER COVERED TRANSACTIONS

Project No.: 0064-131-811, P101, R201, C501, B662-B670, D637, D638

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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	July 11, 2017	Vice President
	Date	Title

H&B Surveying and Mapping, LLC
Name of Firm

ATTACHMENT 11.8.6(b)
CERTIFICATION REGARDING DEBARMENT
LOWER TIER COVERED TRANSACTIONS

Project No.: 0064-131-811, P101, R201, C501, B662-B670, D637, D638

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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	7/11/2017 Date	President Title

Hassan Water Resources, PLC
Name of Firm

ATTACHMENT 11.8.6(b)
CERTIFICATION REGARDING DEBARMENT
LOWER TIER COVERED TRANSACTIONS

Project No.: 0064-131-811, P101, R201, C501, B662-B670, D637, D638

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Signature	Date	Title
		President

Kerr Environmental Services Corp.
Name of Firm

ATTACHMENT 11.8.6(b)
CERTIFICATION REGARDING DEBARMENT
LOWER TIER COVERED TRANSACTIONS

Project No.: 0064-131-811, P101, R201, C501, B662-B670, D637, D638

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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	Date	Title
[signature]	7/12/17	Partner

RK&K

Name of Firm

ATTACHMENT 11.8.6(b)
CERTIFICATION REGARDING DEBARMENT
LOWER TIER COVERED TRANSACTIONS

Project No.: 0064-131-811, P101, R201, C501, B662-B670, D637, D638

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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.

Edward G. Drahos — July 11, 2017 — Senior Vice President
Signature — Date — Title

Schnabel Engineering, LLC
Name of Firm

ATTACHMENT 11.8.6(b)
CERTIFICATION REGARDING DEBARMENT
LOWER TIER COVERED TRANSACTIONS

Project No.: 0064-131-811, P101, R201, C501, B662-B670, D637, D638

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7/11/2017	President
Signature Date	Title

Seventh Point

Name of Firm

ATTACHMENT 11.8.6(b)
CERTIFICATION REGARDING DEBARMENT
LOWER TIER COVERED TRANSACTIONS

Project No.: 0064-131-811, P101, R201, C501, B662-B670, D637, D638

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Dennis C. Morrison July 20, 2017 Senior Vice President
Signature Date Title

Volkert, Inc.
Name of Firm

VDOT
Virginia Department of Transportation

ELECTRONIC COPY

DESIGN-BUILD PROJECT FOR

I-64

SOUTHSIDE WIDENING
AND HIGH RISE BRIDGE,
PHASE 1

STATE PROJECT NO

0064-131-811, P101,
R201, C501, B662-B670
D637, D638

TECHNICAL PROPOSAL VOLUME II

REQUEST FOR PROPOSAL

RFP Submission Date: August 8, 2017

Federal Project No. NHPP-064-3(488)
Contract ID Number: C00106692DB93

GPC
GRANITE · PARSONS · CORMAN JOINT VENTURE

REVISED	STATE	STATE ROUTE	STATE PROJECT	SHEET NO.
	VA.	64	0064-131-811	

KEY MAP

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

CORRIDOR WIDE ENHANCEMENTS:

ROADWAY ENHANCEMENT

Improved I-64 Roadway Baseline:
GPC improved the I-64 EB and I-64 WB baseline to better accommodate a HOT Lane, two General Purpose Lanes, and Hard Shoulder Running (HSR) Lane on the exterior shoulder.

ROADWAY ENHANCEMENT

Expedited installation of ITS Cameras in permanent locations

ROADWAY ENHANCEMENT

Simplified MOT sequences to minimize impact on traveling public

DRAINAGE ENHANCEMENT

Replacement of all I-64 Cross Culverts that Carry an As-Inspected Condition of Less Than "Good"

UTILITY ENHANCEMENT

Expose utilities to verify locations:
GPC will expose all utilities prior to excavation to ensure that subsurface Level A data is accurate.

SCALE	PROJECT	SHEET NO.
0 4000' 8000'	0064-131-811	

d106692000.dgn
Plotted By: p0075834

REVISED	STATE	STATE ROUTE	STATE PROJECT	SHEET NO.
	VA.	64	0064-131-811	0

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

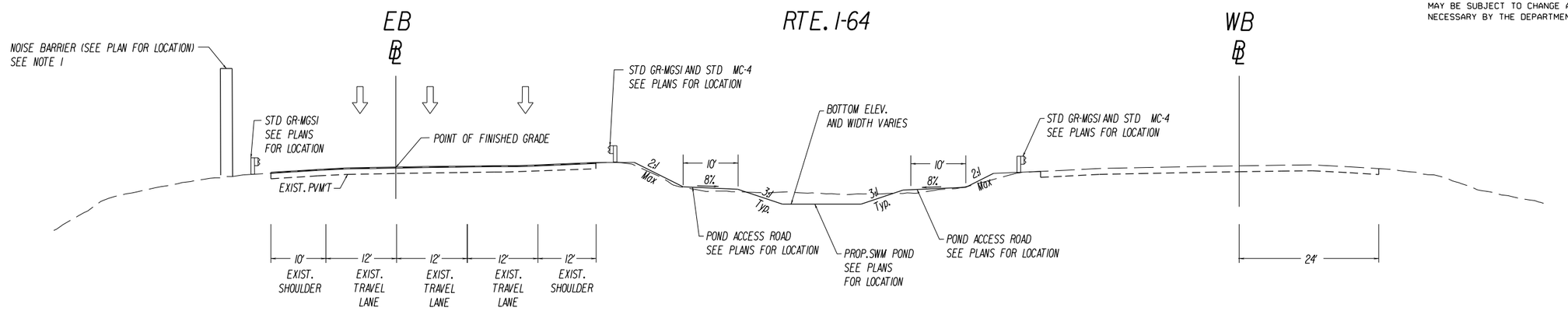
INDEX OF SHEETS

	PROJECT	SHEET NO.
	0064-131-811	0

TYPICAL SECTIONS

REVISED	STATE	STATE ROUTE	STATE PROJECT	SHEET NO.
	VA.	64	0064-131-811	1

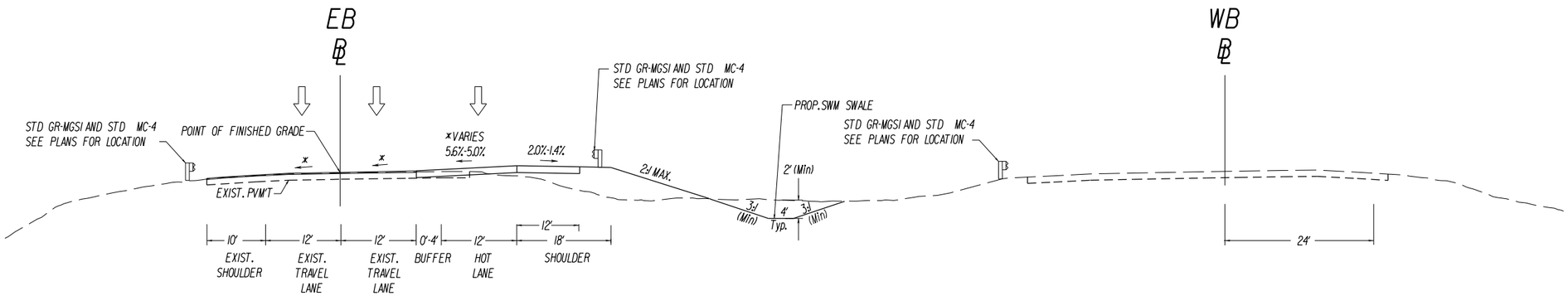
DESIGN FEATURES RELATING TO CONSTRUCTION OR TO REGULATION AND CONTROL OF TRAFFIC MAY BE SUBJECT TO CHANGE AS DEEMED NECESSARY BY THE DEPARTMENT



* EXISTING SLOPE

STATION 1491+27.83 TO STATION 1506+76.16

STATION 1003+26.01 TO STATION 1019+60.61



STATION 1506+76.16 TO STATION 1517+41.35

STATION 1019+60.61 TO STATION 1030+57.96

ROADWAY ENHANCEMENT

Improved I-64 Roadway Baseline:
GPC improved the I-64 EB and I-64 WB baseline to better accommodate a HOT Lane, two General Purpose Lanes, and Hard Shoulder Running (HSR) Lane on the exterior shoulder.

MAINLINE I-64,
EB AND WB - GENERAL PURPOSE LANES, HOT LANES AND SHOULDER PAVEMENT SECTION

ROADWAY	LIMITS	BUILD-UP	WIDENING
I-64 EB	STA.1491+27.83 TO STA.1506+76.16	MILL 1" 2" SMA-12.5 (76-22) 2" SMA-19.0 (76-22)	
I-64 EB	STA.1506+76.16 TO STA.1517+41.35	MILL 1" 2" SMA-12.5 (76-22) 2" SMA-19.0 (76-22)	2" SMA-12.5 (76-22) 2" SMA-19.0 (76-22) 5" BM-25.0D 2" OGDL 6" CTA 36" CBR-10 (EXISTING BORROW)

* STA.1506+76.16 TO STA.1509+29.00 (5.60%)
STA.1509+29.00 TO STA.1509+56.00 (5.60% TO 5.00%)
STA.1509+56.00 TO STA.1519+85.47 (5.00%)
STA.1519+85.47 TO STA.1523+00.47 (5.00% TO -2%)

NOTE FOR ALL SHEETS :
HARD SHOULDER RUNNING IS LABELED AS "SHOULDER LANE"

NOTE:
1. SEE SHEET NO. 3 FOR NOISE BARRIER DETAILS
SEE SHEET NO. 5 FOR GUARDRAIL DETAILS

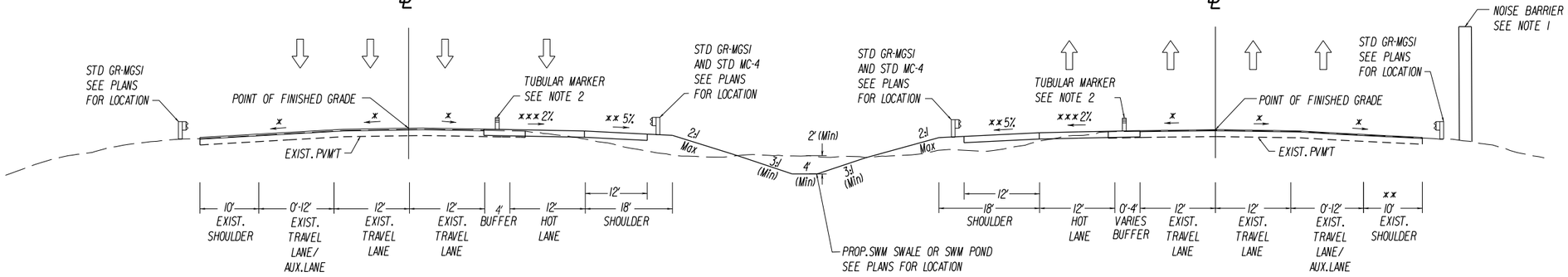
NOT TO SCALE	PROJECT 0064-131-811	SHEET NO. 1

REVISED	STATE	STATE ROUTE	STATE PROJECT	SHEET NO.
	VA.	64	0064-131-811	2

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

TYPICAL SECTIONS

EB



x EXISTING SLOPE

STATION	TO	STATION
1517+41.35		1563+75.18
1596+56.55		1620+24.36 (Yadkin Rd. Br.)

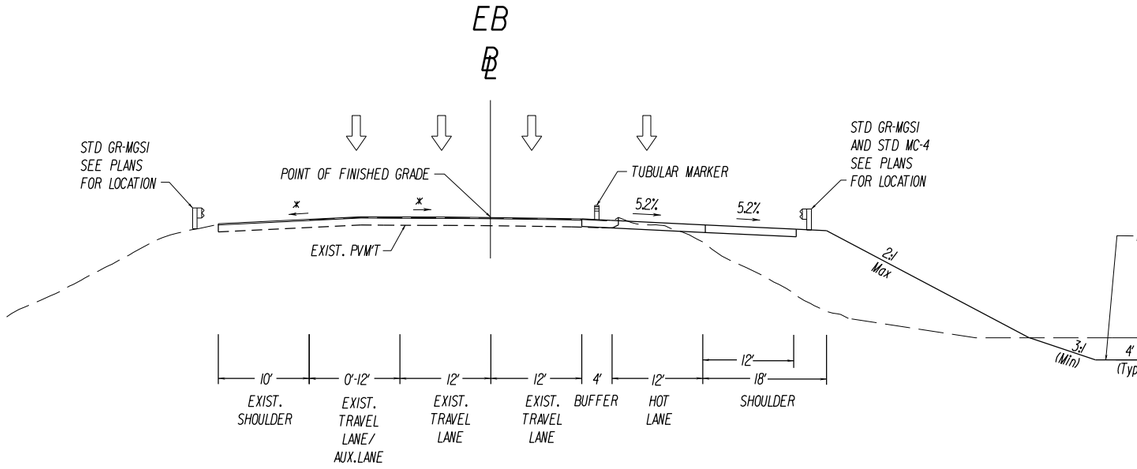
xxx STA. 1562+31.18 TO STA. 1563+75.18 (-2% TO -5.20%)
STA. 1596+56.55 TO STA. 1598+00.55 (-5.20% TO -2%)

WB

STATION	TO	STATION
1030+57.96		1076+28.22
1109+49.79		1131+50.86 (Yadkin Rd. Br.)

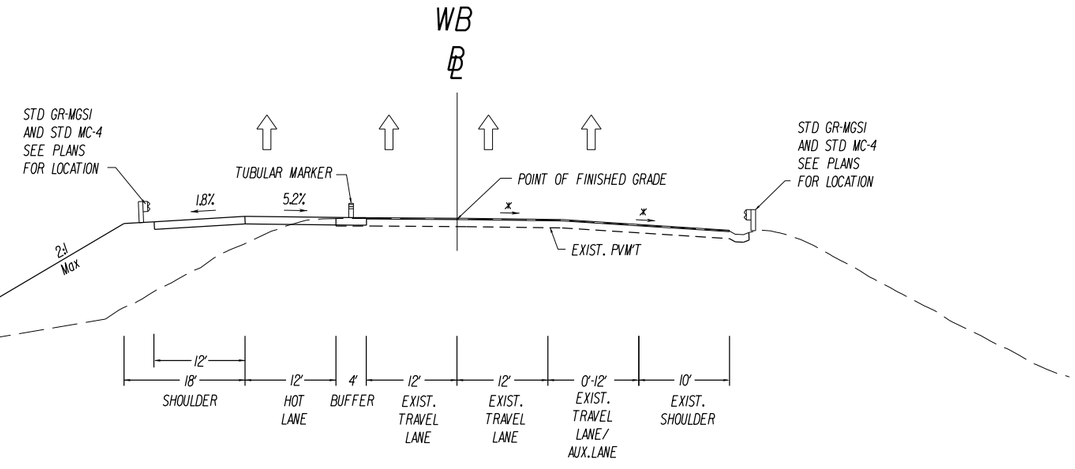
xxx STA. 1073+04.22 TO STA. 1076+28.22 (-2% TO -5.20%)
STA. 1109+49.79 TO STA. 1112+73.7 (-5.20% TO -2%)

EB



STATION	TO	STATION
1563+75.18		1589+10.77 (Military Hwy. Br.)
1591+22.77 (Military Hwy. Br.)		1596+56.55

WB



STATION	TO	STATION
1076+28.22		1099+97.54 (Military Hwy. Br.)
1102+09.54 (Military Hwy. Br.)		1109+49.79

ROADWAY ENHANCEMENT

Improved I-64 Roadway Baseline: GPC improved the I-64 EB and I-64 WB baseline to better accommodate a HOT Lane, two General Purpose Lanes, and Hard Shoulder Running (HSR) Lane on the exterior shoulder.

MAINLINE I-64,
EB AND WB - GENERAL PURPOSE LANES, HOT LANES AND SHOULDER PAVEMENT SECTION

ROADWAY	LIMITS	BUILD-UP	WIDENING
I-64 EB/WB	STA. 1517+41.35 TO STA. 1620+24.36 STA. 1030+57.96 TO STA. 1131+50.86	MILL 1" 2" SMA-12.5 (76-22) 2" SMA-19.0 (76-22)	2" SMA-12.5 (76-22) 2" SMA-19.0 (76-22) 5" BM-25.0D 2" OGDL 6" CTA 36" CBR-10 (EXISTING BORROW)

NOTE:
1. SEE SHEET NO. 3 FOR NOISE BARRIER DETAILS
   SEE SHEET NO. 5 FOR GUARDRAIL DETAILS
2. TUBULAR MARKER TO END AT STA. 1539+50.00 EB AND BEGIN AT STA. 1063+00.00 WB.

NOT TO SCALE	PROJECT 0064-131-811	SHEET NO. 2

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Plotted By: p0075834

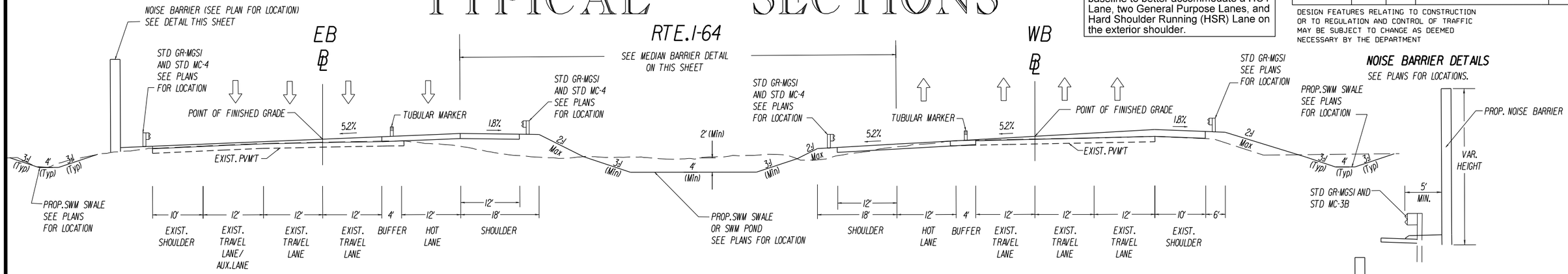
REVISED	STATE	STATE ROUTE	STATE PROJECT	SHEET NO.
	VA.	64	0064-131-811	3

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

TYPICAL SECTIONS

ROADWAY ENHANCEMENT

Improved I-64 Roadway Baseline: GPC improved the I-64 EB and I-64 WB baseline to better accommodate a HOT Lane, two General Purpose Lanes, and Hard Shoulder Running (HSR) Lane on the exterior shoulder.



STATION 1622+90.53 (Yadkin Rd. Bridge) **TO STATION** 1665+55.62

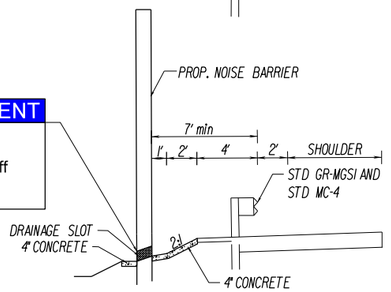
STATION 1134+15.05 (Yadkin Rd. Bridge) **TO STATION** 1177+44.73

NOISE BARRIER DETAILS

SEE PLANS FOR LOCATIONS.

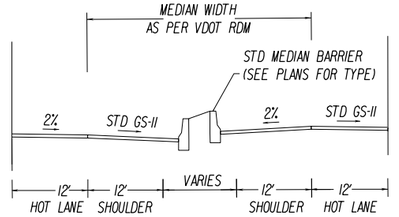
DRAINAGE ENHANCEMENT

Drainage slots in noise walls to provide an innovative drainage design to convey stormwater runoff from roadway profiles with little or no slope.

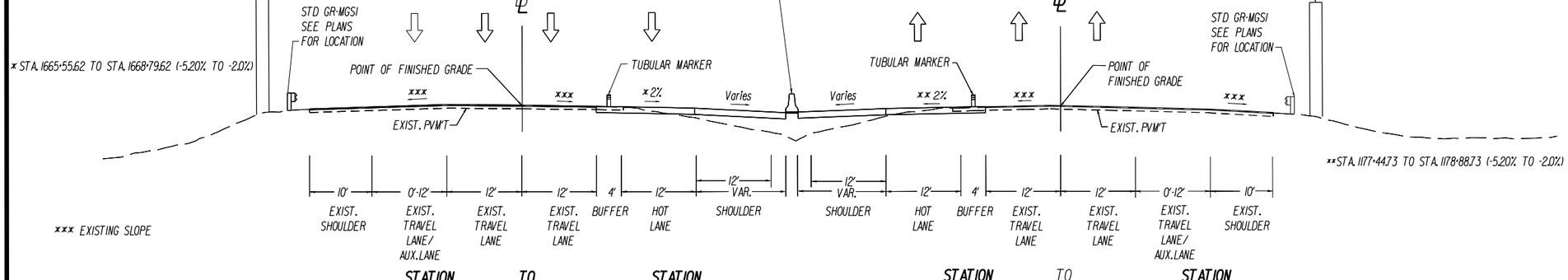


MEDIAN BARRIER DETAIL

SEE PLANS FOR LOCATIONS.

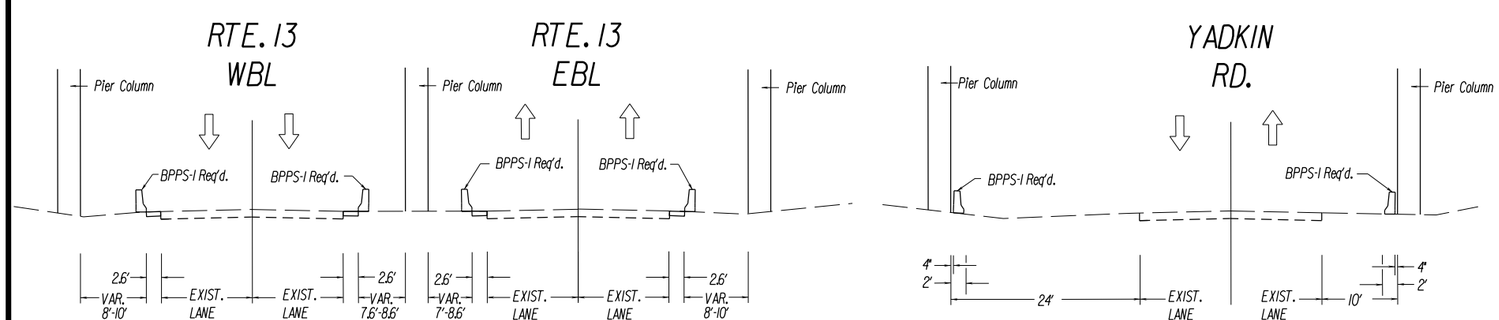


STA. 1660+95.67 TO STA. 1734+52.00 EB
STA. 1761+73.00 TO STA. 1772+78.00 EB



STATION 1665+55.62 **TO STATION** 1690+00.00 (END SHOULDER LANE)

STATION 1177+44.73 TO **STATION** 1201+00.00 (BEGIN SHOULDER LANE)



MAINLINE I-64,
EB AND WB - GENERAL PURPOSE LANES, HOT LANES AND SHOULDER PAVEMENT SECTION

ROADWAY	LIMITS	BUILD-UP	WIDENING
I-64 EB/WB	STA. 1622+90.53 TO STA. 1671+52.10 STA. 1674+52.10 TO STA 1690+00.00 STA. 1134+15.05 TO STA. 1201+00.00	MILL 1" 2" SMA-12.5 (76-22) 2" SMA-19.0 (76-22)	2" SMA-12.5 (76-22) 2" SMA-19.0 (76-22) 5" BM-25.0D 2" OGDL 6" CTA 36" CBR-10 (EXISTING BORROW)
I-64 EB/WB	STA. 1671+52.10 TO STA. 1674+52.10 STA. 1185+28.47 TO STA. 1187+78.47	DEMOLISH EXISTING AC/CRCP AND REPLACE WITH 2" SMA-12.5 (76-22) 2" SMA-19.0 (76-22) 7.5" BM-25.0D 36" CBR-10 (EXISTING BORROW)	2" SMA-12.5 (76-22) 2" SMA-19.0 (76-22) 5" BM-25.0D 2" OGDL 6" CTA 36" CBR-10 (EXISTING BORROW)

NOTE:
1.- SEE SHEET NO.5 FOR GUARDRAIL DETAILS

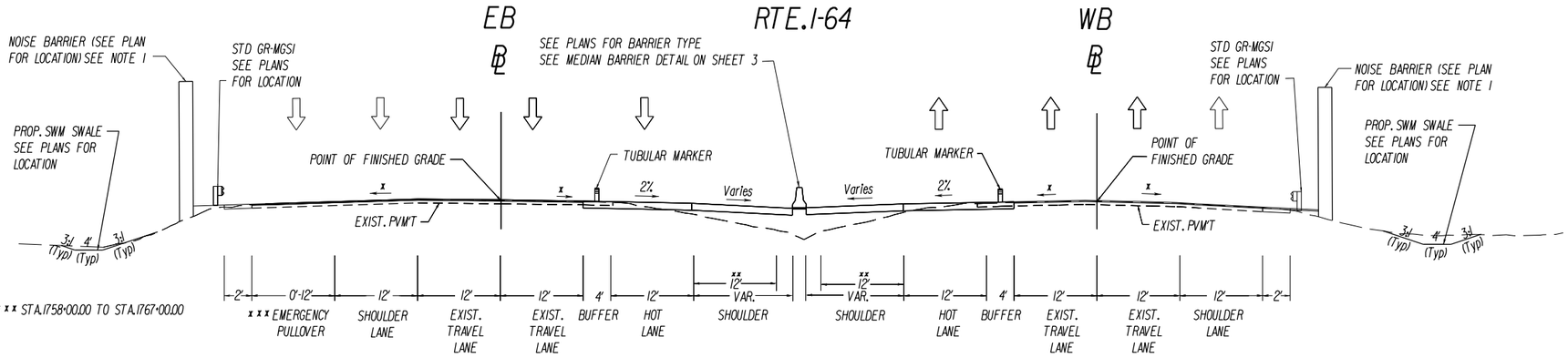
NOT TO SCALE	PROJECT 0064-131-811	SHEET NO. 3

d106692004.dgn
Plotted By: p0075834

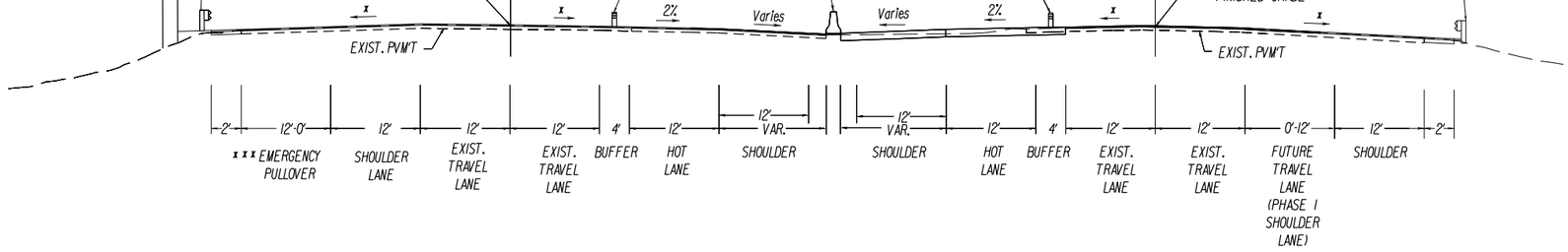
REVISED	STATE	STATE ROUTE	STATE PROJECT	SHEET NO.
	VA.	64	0064-131-811	4

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

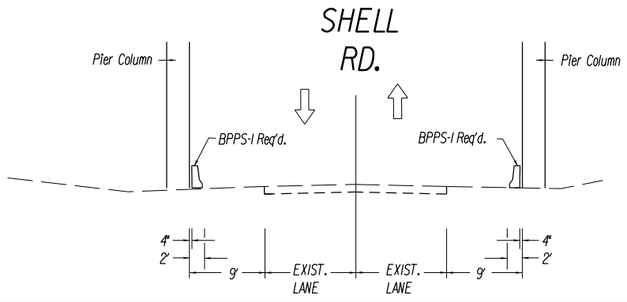
TYPICAL SECTIONS



STATION	TO	STATION	STATION	TO	STATION
1690+00.00		1706+00.64 (Shell Rd. Br.)	1201+00.00		1219+61.10 (Shell Rd. Br.)
1707+22.14 (Shell Rd. Br.)		1760+77.06	1220+82.60 (Shell Rd. Br.)		1273+99.10



STATION	TO	STATION	STATION	TO	STATION
1760+77.06		1772+78.21	1273+99.10		1277+03.46



ROADWAY ENHANCEMENT

Improved I-64 Roadway Baseline:
GPC improved the I-64 EB and I-64 WB baseline to better accommodate a HOT Lane, two General Purpose Lanes, and Hard Shoulder Running (HSR) Lane on the exterior shoulder.

MAINLINE I-64,
EB AND WB - GENERAL PURPOSE LANES, HOT LANES AND SHOULDER PAVEMENT SECTION

ROADWAY	LIMITS	BUILD-UP	WIDENING
I-64 EB/WB	STA. 1690+00.00 TO STA. 1760+77.06 STA. 1177+44.73 TO STA. 1185+29.37 STA. 1201+00.00 TO STA. 1242+04.34	MILL 1" 2" SMA-12.5 (76-22) 2" SMA-19.0 (76-22)	2" SMA-12.5 (76-22) 2" SMA-19.0 (76-22) 5" BM-25.0D 2" OGDL 6" CTA 36" CBR-10 (EXISTING BORROW)
I-64 EB/WB	STA. 1185+29.37 TO STA. 1187+79.37	DEMOLISH EXISTING AC/CRCP AND REPLACE WITH 2" SMA-12.5 (76-22) 2" SMA-19.0 (76-22) 7.5" BM-25.0D 36" CBR-10 (EXISTING BORROW)	2" SMA-12.5 (76-22) 2" SMA-19.0 (76-22) 5" BM-25.0D 2" OGDL 6" CTA 36" CBR-10 (EXISTING BORROW)
I-64 EB	STA. 1760+77.06 TO STA. 1772+78.21	MILL 1" 2" SMA-12.5 (76-22) 2" SMA-19.0 (76-22)	MILL 1" 2" SMA-12.5 (76-22) 2" SMA-19.0 (76-22)
I-64 WB	STA. 1242+04.34 TO STA. 1277+03.46	DEMOLISH EXISTING AC/CRCP AND REPLACE WITH 2" SMA-12.5 (76-22) 2" SMA-19.0 (76-22) 5" BM-25.0D 2" OGDL 6" CTA 36" CBR-10 (EXISTING BORROW)	DEMOLISH EXISTING AC/CRCP AND REPLACE WITH 2" SMA-12.5 (76-22) 2" SMA-19.0 (76-22) 5" BM-25.0D 2" OGDL 6" CTA 36" CBR-10 (EXISTING BORROW)

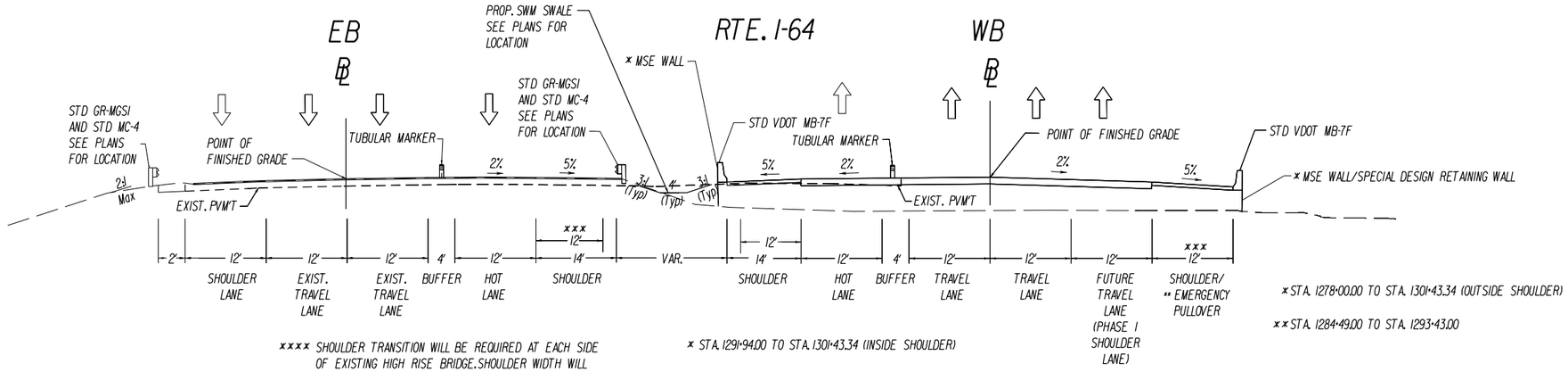
NOTE:
1.- SEE SHEET NO. 3 NOISE BARRIER DETAILS

NOT TO SCALE	PROJECT 0064-131-811	SHEET NO. 4

REVISED	STATE	STATE ROUTE	STATE PROJECT	SHEET NO.
	VA.	64	0064-131-811	5

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

TYPICAL SECTIONS



xxxx SHOULDER TRANSITION WILL BE REQUIRED AT EACH SIDE OF EXISTING HIGH RISE BRIDGE. SHOULDER WIDTH WILL TRANSITION FROM 12' TO 7' AND 7' TO 12'. STANDARD TRANSITION RATE TO BE APPLIED

* STA. 1291+94.00 TO STA. 1301+43.34 (INSIDE SHOULDER)

* STA. 1278+00.00 TO STA. 1301+43.34 (OUTSIDE SHOULDER)

** STA. 1284+49.00 TO STA. 1293+43.00

xxx SHOULDER TRANSITION WILL BE REQUIRED AT EACH SIDE OF STRUCTURE B-662. SHOULDER WIDTH WILL TRANSITION FROM 12' TO 15' AND 15' TO 12'. STANDARD TRANSITION RATE TO BE APPLIED

STATION	TO	STATION
1772+78.21		1792+41.51 (EXIST. High Rise Bridge)
1277+03.46		1301+61.67 (High Rise Bridge)

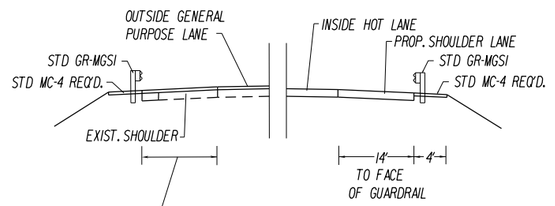
ROADWAY ENHANCEMENT
Improved I-64 Roadway Baseline:
GPC improved the I-64 EB and I-64 WB baseline to better accommodate a HOT Lane, two General Purpose Lanes, and Hard Shoulder Running (HSR) Lane on the exterior shoulder.

ROADWAY ENHANCEMENT
Improved Horizontal roadway alignment at western approach to new HRB

GUARDRAIL DETAILS

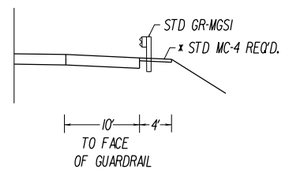
SEE PLANS FOR LOCATIONS

MAINLINE



SHOULDER LANE ONLY: 14' WHEN BARRIER IS BEING APPILED. 13' WHEN NO BARRIER IS APPLIED. WHEN THE SHOULDER IS NOT CONSIDERED A SHOULDER LANE THE PAVED PORTION OF THE SHOULDER WILL MATCH THE EXISTING WIDTH.

RAMP



* STD MC-4 REQ'D WHERE NEW OR REPLACEMENT SHOULDER IS FULL DEPTH PAVEMENT.

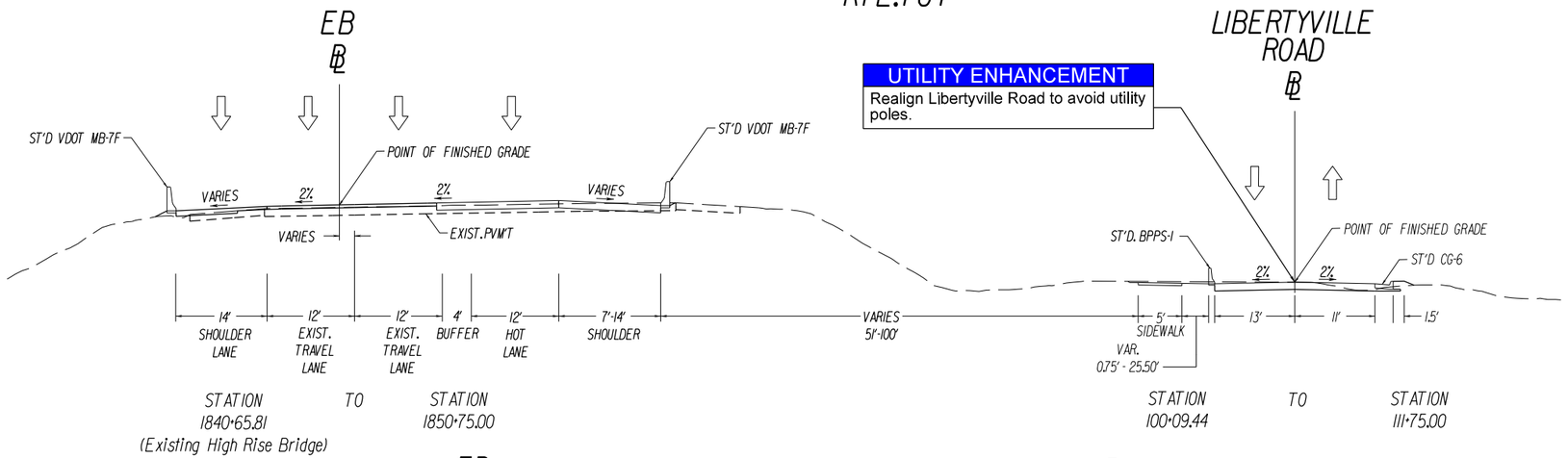
MAINLINE I-64,
EB AND WB - GENERAL PURPOSE LANES, HOT LANES AND SHOULDER PAVEMENT SECTION

ROADWAY	LIMITS	BUILD-UP	WIDENING
I-64 EB	STA. 1772+78.21 TO STA. 1792+41.51	MILL 1" 2" SMA-12.5 (76-22) 2" SMA-19.0 (76-22)	MILL 1" 2" SMA-12.5 (76-22) 2" SMA-19.0 (76-22)
I-64 WB	STA. 1277+03.46 TO STA. 1301+61.67	2" SMA-12.5 (76-22) 3" SMA-19.0 (76-22) 5" BM-25.0D 2" OGDL 6" CTA 36" CBR10 (EXISTING BORROW)	2" SMA-12.5 (76-22) 3" SMA-19.0 (76-22) 5" BM-25.0D 2" OGDL 6" CTA 36" CBR10 (EXISTING BORROW)

NOT TO SCALE	PROJECT 0064-131-811	SHEET NO. 5

TYPICAL SECTIONS

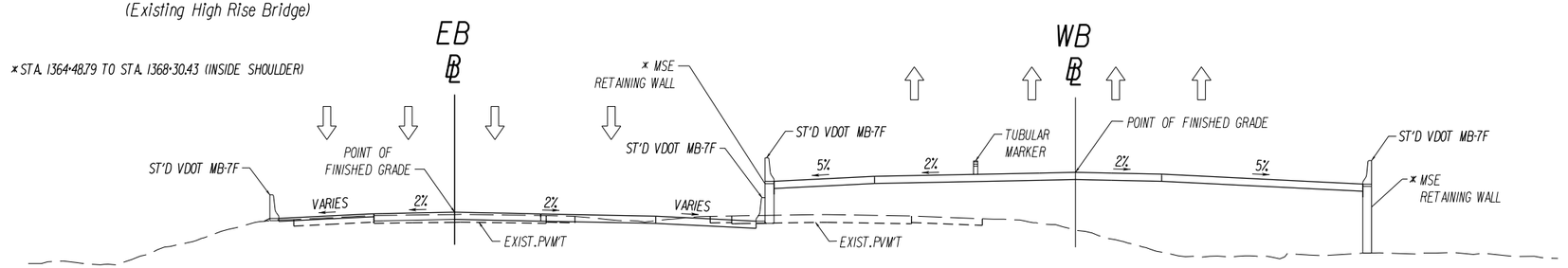
RTE. I-64



UTILITY ENHANCEMENT
Realign Libertyville Road to avoid utility poles.

STATION 1840+65.81 (Existing High Rise Bridge) TO STATION 1850+75.00

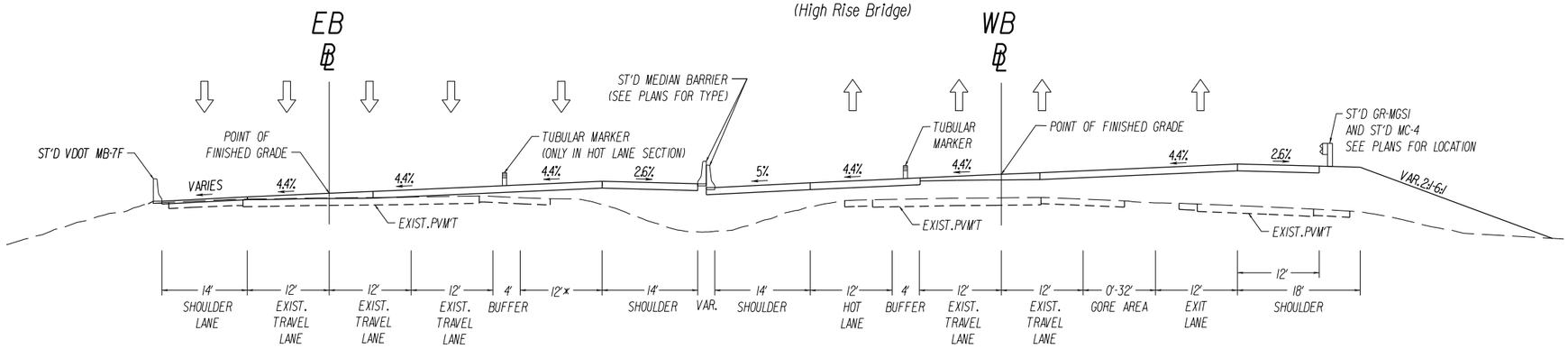
STATION 100+09.44 TO STATION 111+75.00



* STA. 1364+48.79 TO STA. 1368+50.00 (OUTSIDE SHOULDER)

STATION 1850+75.00 TO STATION 1863+50.17

STATION 1364+51.34 (High Rise Bridge) TO STATION 1368+52.84



STATION 1863+50.17 TO STATION 1865+70.17 * HOT LANE
1865+70.17 1882+00.00 * HOV LANE

STATION 1368+52.84 TO STATION 1389+25.52

NOTE: FULL DEPTH PAVEMENT REQ'D. BETWEEN STA. 1368+52.84 TO 1384+75.00

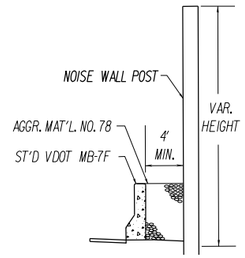
REVISED	STATE	STATE ROUTE	STATE PROJECT	SHEET NO.
	VA.	64	0064-131-811	6

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

NOTE:
ROLLING SHOULDERS ARE BEING UTILIZED TO IMPROVE DRAINAGE AT THE FOLLOWING LOCATIONS:

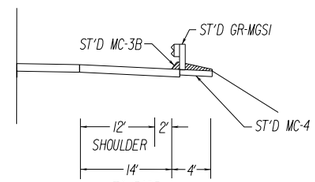
I-64 EB STA.1846+00 TO 1887+00 (LT. OF CENTERLINE)
I-64 EB STA.1846+00 TO 1857+50 (RT. OF CENTERLINE)
I-64 EB STA.1860+50 TO 1874+50 (RT. OF CENTERLINE)
I-64 EB STA.1876+50 TO 1882+00 (RT. OF CENTERLINE)
I-64 WB STA.1365+00 TO 1371+50 (RT. OF CENTERLINE)
I-64 WB STA.1373+00 TO 1379+00 (RT. OF CENTERLINE)
I-64 WB STA.1371+50 TO 1374+50 (LT. OF CENTERLINE)
I-64 WB STA.1377+00 TO 1389+25.52 (LT. OF CENTERLINE)

NOISE WALL DETAIL
SEE PLANS FOR LOCATIONS.



SEE SHEET 3 FOR NOISE WALL DETAIL WHERE GUARDRAIL IS LOCATED

STD. MC-3B DETAIL



	STATION	TO	STATION
I-64 WB	1372+58 RT		1380+11 RT

NOTE: PAVEMENT SECTION TABLE IS LOCATED ON SHEET 8 FOR STATION RANGES ON THIS SHEET

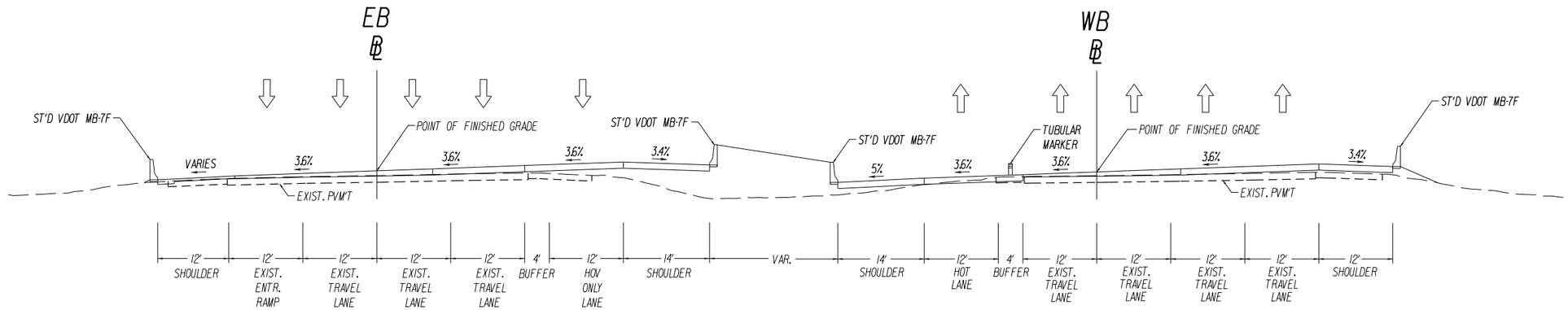
NOT TO SCALE	PROJECT 0064-131-811	SHEET NO. 6

TYPICAL SECTIONS

RTE.I-64

REVISED	STATE	STATE ROUTE	STATE PROJECT	SHEET NO.
	VA.	64	0064-131-811	7

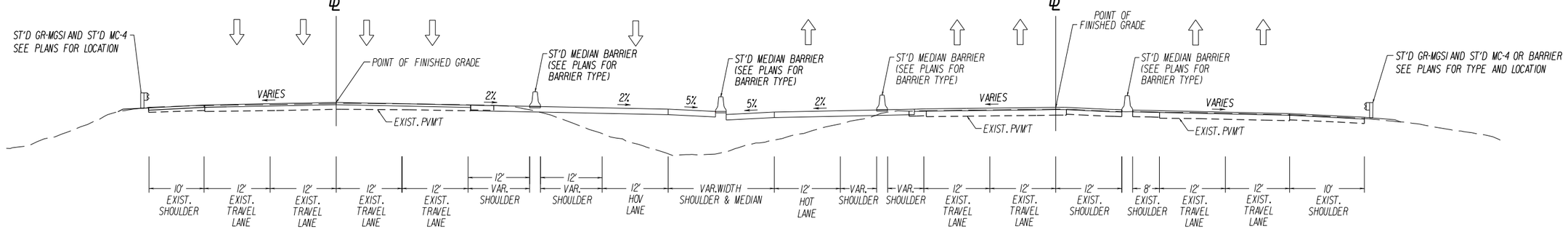
DESIGN FEATURES RELATING TO CONSTRUCTION OR TO REGULATION AND CONTROL OF TRAFFIC MAY BE SUBJECT TO CHANGE AS DEEMED NECESSARY BY THE DEPARTMENT



STATION 1882+00.00 TO STATION 1890+06.88

STATION 1389+25.52 TO STATION 1403+00.00

NOTE: EB & WB BASELINES ARE NOT CONCENTRIC THEREFORE STATIONS SHOWN ON TYPICAL SECTION MAYBE OFFSET FROM ONE ANOTHER



STATION 1890+06.88 TO STATION 1927+52.33

STATION 1403+00.00 TO STATION 1442+12.84

NOTE:
ROLLING SHOULDERS ARE BEING UTILIZED TO IMPROVE DRAINAGE AT THE FOLLOWING LOCATIONS:

I-64 EB STA.1882+00 TO 1887+00 (LT. OF CENTERLINE)
I-64 EB STA.1882+00 TO 1895+50 (RT. OF CENTERLINE)
I-64 EB STA.1898+50 TO 1902+00 (RT. OF CENTERLINE)
I-64 EB STA.1905+50 TO 1925+00 (RT. OF CENTERLINE)
I-64 WB STA.1389+25.52 TO 1394+00 (LT. OF CENTERLINE)
I-64 WB STA.1396+00 TO 1413+00 (LT. OF CENTERLINE)
I-64 WB STA.1414+50 TO 1417+50 (LT. OF CENTERLINE)
I-64 WB STA.1421+00 TO 1426+00 (LT. OF CENTERLINE)
I-64 WB STA.1428+00 TO 1440+00 (LT. OF CENTERLINE)
I-64 WB STA.1432+50 TO 1437+50 (RT. OF CENTERLINE, INNER BARRIER)
I-64 WB STA.1441+50 TO 1442+12.84 (RT. OF CENTERLINE, INNER BARRIER)

MAINLINE I-64,
EB AND WB - GENERAL PURPOSE LANES, HOT LANES AND SHOULDER PAVEMENT SECTION

ROADWAY	LIMITS	BUILD-UP	WIDENING
I-64 EB I-64 EB I-64 WB I-64 WB	STA.1882+00.00 TO STA.1901+02.06 STA.1905+77.06 TO STA.1927+52.33 STA.1389+25.25 TO STA.1415+44.36 STA.1419+54.36 TO STA.1442+12.84	MILL 1" 2" SMA-12.5 (76-22) 2" SMA-19.0 (76-22)	MILL 1" 2" SMA-12.5 (76-22) 3" SMA-19.0 (76-22) 3" BM-25.0D 7" 21B 36" CBR-10 (EXISTING BORROW)
I-64 EB I-64 WB	STA.1901+02.06 TO STA.1905+77.06 STA.1415+44.36 TO STA.1419+54.36	DEMOLISH EXISTING AC/ CRCP AND REPLACE WITH 2" SMA-12.5 (76-22) 2" SMA-19.0 (76-22) 7.5" BM-25.0D 36" CRB 10 (EXISTING BORROW)	2" SMA-12.5 (76-22) 3" SMA-19.0 (76-22) 3" BM-25.0D 7" 21B 36" CBR-10 (EXISTING BORROW)

SEE SHEET 3 FOR GUARDRAIL TYPICAL.

NOT TO SCALE	PROJECT 0064-131-811	SHEET NO. 7

TYPICAL SECTIONS

REVISED	STATE	STATE ROUTE	STATE PROJECT	SHEET NO.
	VA.	64	0064-131-811	8

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

NOTE:
ROLLING SHOULDERS ARE BEING UTILIZED TO IMPROVE DRAINAGE AT THE FOLLOWING LOCATIONS:

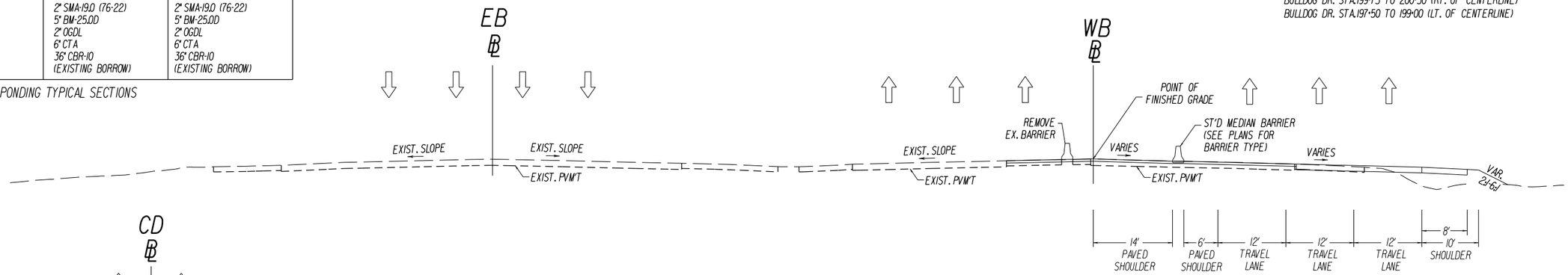
I-64 WB STA.1442+12.84 TO 1448+50 (RT. OF CENTERLINE, INNER BARRIER)
I-64 WB STA.1455+50 TO 1461+00 (RT. OF CENTERLINE, OUTER BARRIER)
I-64 WB STA.1463+00 TO 1466+00 (RT. OF CENTERLINE, OUTER BARRIER)
CD ROAD STA.5000+00 TO 5001+50 (RT. OF CENTERLINE, OUTER BARRIER)
CD ROAD STA.5008+00 TO 5010+00 (RT. OF CENTERLINE, OUTER BARRIER)
BULLDOG DR. STA.196+00 TO 198+50 (RT. OF CENTERLINE)
BULLDOG DR. STA.199+75 TO 200+50 (RT. OF CENTERLINE)
BULLDOG DR. STA.197+50 TO 199+00 (LT. OF CENTERLINE)

MAINLINE I-64,
EB AND WB - GENERAL PURPOSE LANES, HOT LANES AND SHOULDER PAVEMENT SECTION

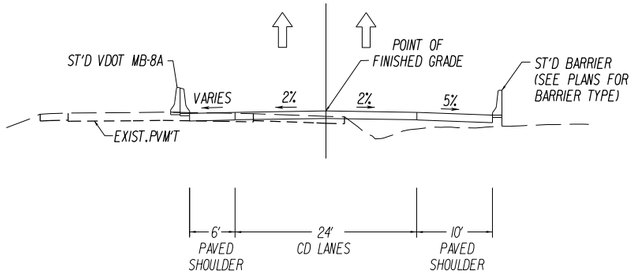
ROADWAY	LIMITS	BUILD-UP	WIDENING
I-64 EB I-64 WB	STA.1840+65.81 TO STA.1882+00.00 STA.1384+75.00 TO STA.1389+25.52	MILL 1" 2" SMA-12.5 (76-22) 3" SMA-19.0 (76-22)	2" SMA-12.5 (76-22) 3" SMA-19.0 (76-22) 3" BM-25.0D 7" 21B 36" CBR-10 (EXISTING BORROW)
I-64 WB	STA.1364+48.79 TO STA.1381+79.36	2" SMA-12.5 (76-22) 3" SMA-19.0 (76-22) 5" BM-25.0D 2" OGDL 6" CTA 36" CBR-10 (EXISTING BORROW)	2" SMA-12.5 (76-22) 3" SMA-19.0 (76-22) 5" BM-25.0D 2" OGDL 6" CTA 36" CBR-10 (EXISTING BORROW)
I-64 WB	STA.1381+79.36 TO STA.1384+75.00	DEMOLISH EXISTING AC/CRCP AND REPLACE WITH 2" SMA-12.5 (76-22) 2" SMA-19.0 (76-22) 5" BM-25.0D 2" OGDL 6" CTA 36" CBR-10 (EXISTING BORROW)	DEMOLISH EXISTING AC/CRCP AND REPLACE WITH 2" SMA-12.5 (76-22) 2" SMA-19.0 (76-22) 5" BM-25.0D 2" OGDL 6" CTA 36" CBR-10 (EXISTING BORROW)

NOTE: SEE SHEET 6 FOR CORRESPONDING TYPICAL SECTIONS

RTE.I-64



STATION 1442+12.84 TO STATION 1466+78.99

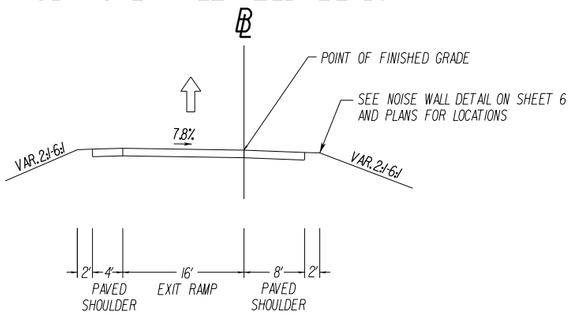


STATION 5000+00.00 TO STATION 5017+92.99

MAINLINE I-64 WB GENERAL PURPOSE LANES AND SHOULDER, CD ROAD, CD TO BATTLEFIELD BLVD.RAMP AND PRIVATE ENTRANCE/BULLDOG DRIVE PAVEMENT SECTION

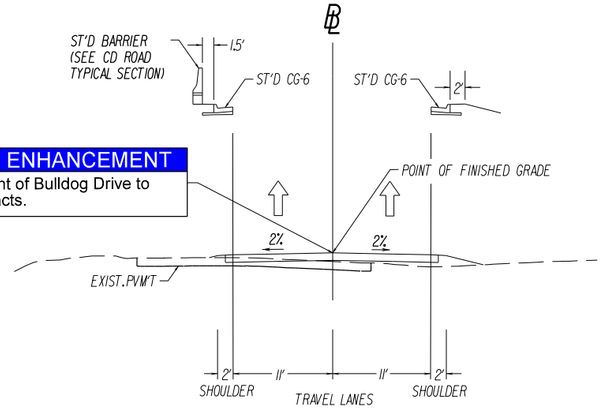
ROADWAY	LIMITS	BUILD-UP	WIDENING
I-64 WB	STA.1442+12.84 TO STA.1466+78.99	MILL 1" 2" SMA-12.5 (76-22) 3" SMA-19.0 (76-22)	2" SMA-12.5 (76-22) 3" SMA-19.0 (76-22) 3" BM-25.0D 7" 21B 36" CBR-10 (EXISTING BORROW)
CD ROAD	STA. 5000+00.00 TO STA. 5017+92.99 CD ROAD SHOULDERS (LT.& RT.) STA.1431+52.92 TO STA.1449+41.32 (I-64 WB)	DEMOLISH EXISTING AC 1.5" SMA-12.5 (76-22) 3" SMA-19.0 (76-22) 4" BM-25.0D 2" OGDL 6" CTA 36" CBR-10 (EXISTING BORROW)	1.5" SMA-12.5 (76-22) 3" SMA-19.0 (76-22) 4" BM-25.0D 2" OGDL 6" CTA 36" CBR-10 (EXISTING BORROW)
ROADWAY	LIMITS	TRAVEL LANES & SHOULDER	
CD TO BATTLEFIELD BLVD.RAMP	STA. 770+00.00 TO STA. 776+75.00	1.5" SM-12.5A 2" IM-19.0A 2.5" BM-25.0D 6" 21B	
LIBERTYVILLE RD.	STA. 100+09.44 TO STA. 111+75.00		
BULLDOG DRIVE	STA. 190+19.46 TO STA. 200+81.12		

CD TO BATTLEFIELD BLVD.RAMP



STATION 770+00.00 TO STATION 776+75.00

PRIVATE ENTRANCE/BULLDOG DRIVE



STATION 190+19.46 TO STATION 200+81.12

NOT TO SCALE	PROJECT 0064-131-811	SHEET NO. 8

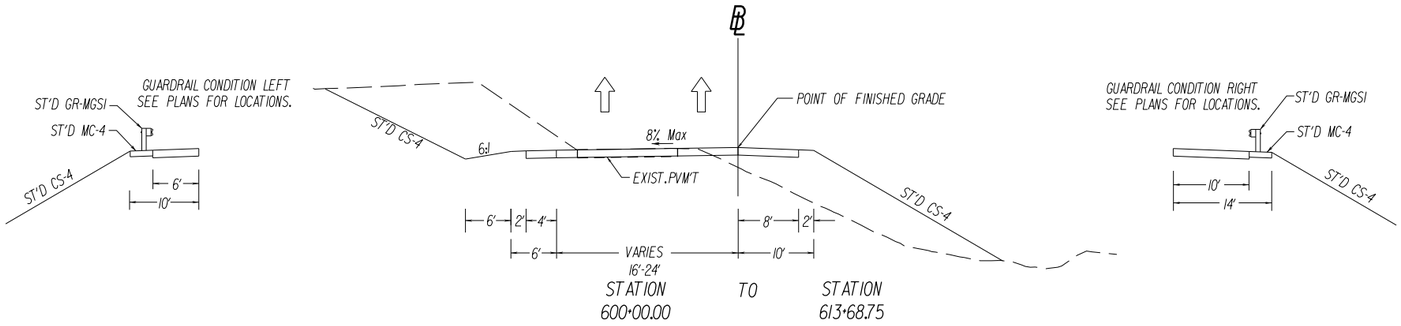
REVISED	STATE	STATE ROUTE	STATE PROJECT	SHEET NO.
VA.	VA.	64	0064-131-811	9

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

TYPICAL SECTIONS

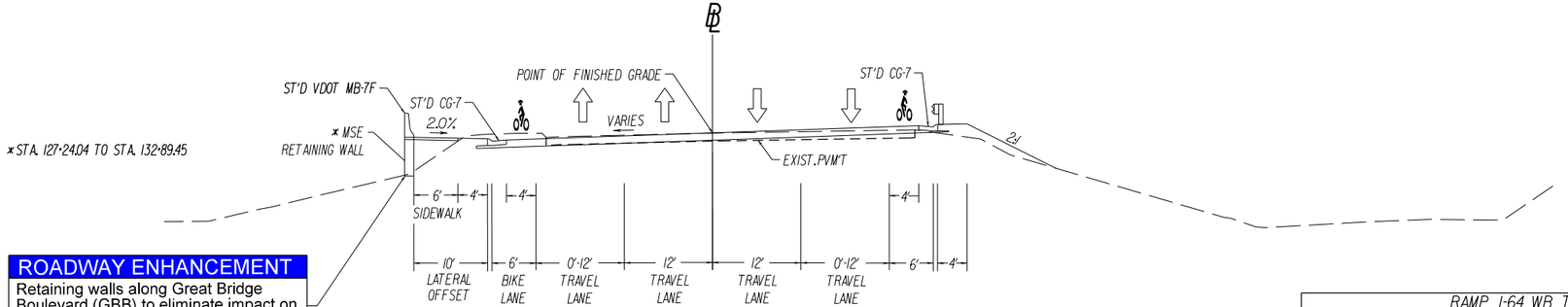
RTE.I-64

RAMP I-64 WB TO GREAT BRIDGE BLVD.



STATION 600+00.00 TO STATION 613+68.75

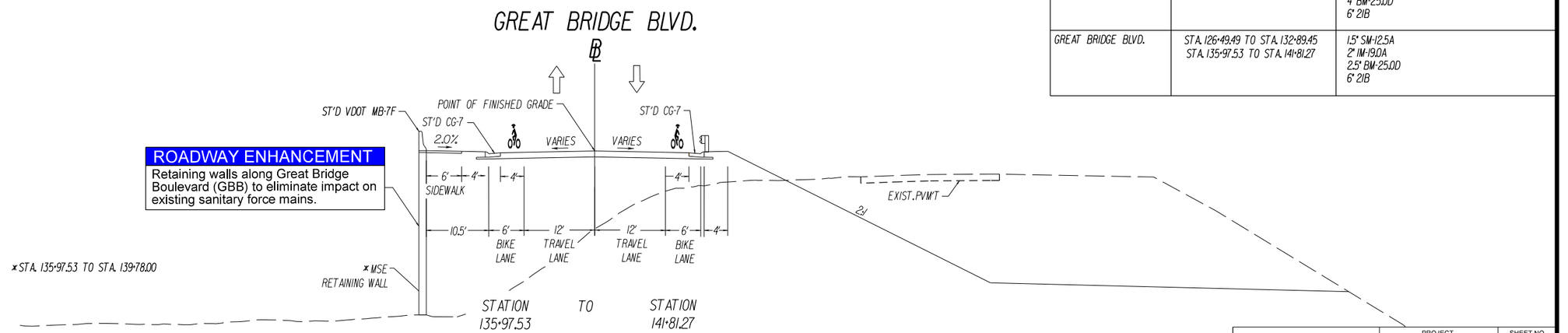
GREAT BRIDGE BLVD.



ROADWAY ENHANCEMENT
Retaining walls along Great Bridge Boulevard (GBB) to eliminate impact on existing sanitary force mains.

STATION 126+49.49 TO STATION 132+89.45
(GREAT BRIDGE BLVD. BRIDGE)

GREAT BRIDGE BLVD.



ROADWAY ENHANCEMENT
Retaining walls along Great Bridge Boulevard (GBB) to eliminate impact on existing sanitary force mains.

STATION 135+97.53 TO STATION 141+81.27
(GREAT BRIDGE BLVD. BRIDGE)

RAMP I-64 WB TO GREAT BRIDGE BLVD. (GBB)
AND GREAT BRIDGE BLVD.
PAVEMENT SECTION

ROADWAY	LIMITS	TRAVEL LANES & SHOULDER
I-64 RAMP TO GREAT BRIDGE BLVD.	STA.600+00.00 TO STA.613+68.75	1.5" SM-12.5A 3" IM-19.0A 4" BM-25.0D 6" 21B
GREAT BRIDGE BLVD.	STA. 126+49.49 TO STA. 132+89.45 STA. 135+97.53 TO STA. 141+81.27	1.5" SM-12.5A 2" IM-19.0A 2.5" BM-25.0D 6" 21B

NOT TO SCALE	PROJECT 0064-131-811	SHEET NO. 9

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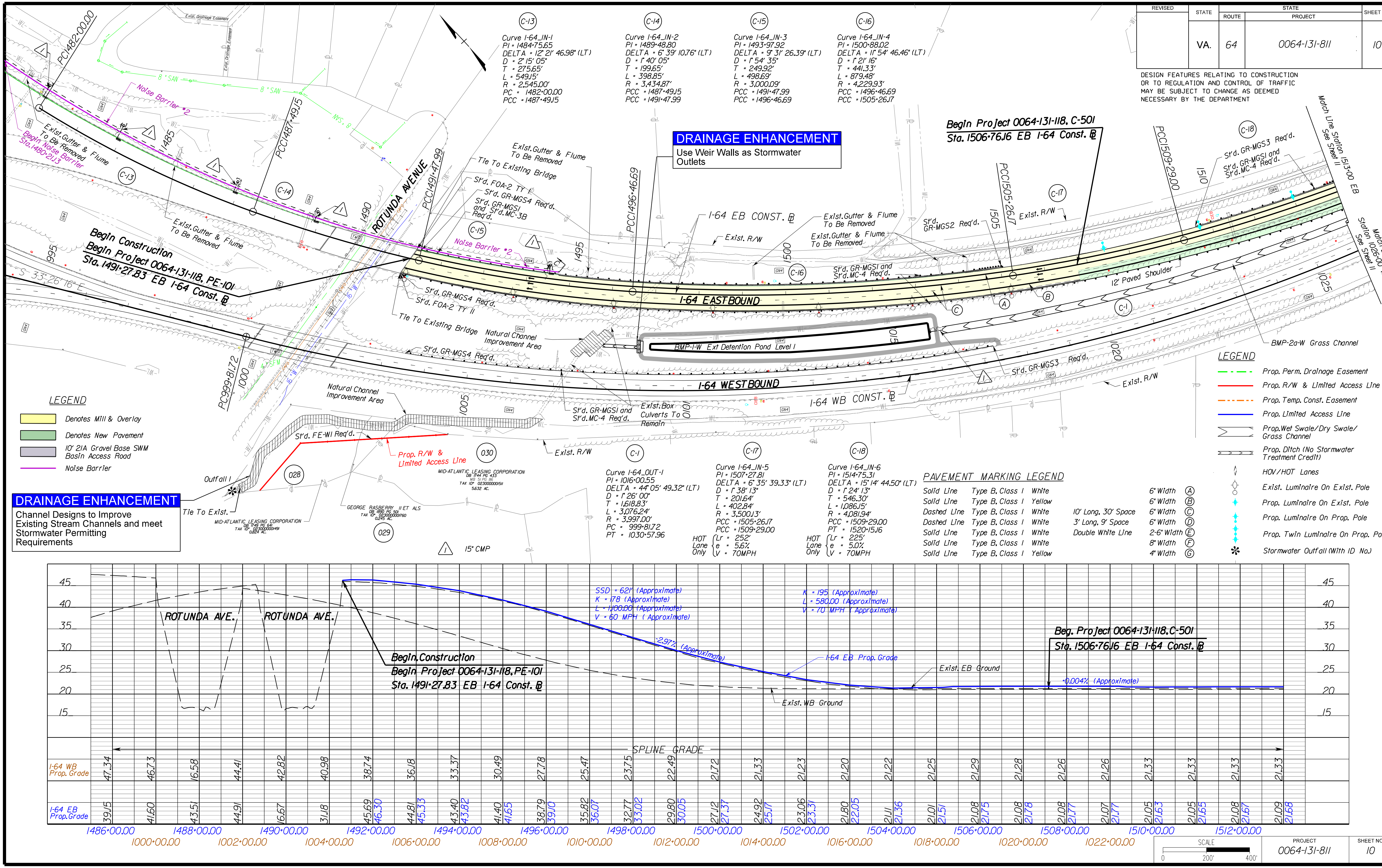
Plotted By: p0075834



REVISED	STATE	STATE ROUTE	STATE PROJECT	SHEET NO.
	VA.	64	0064-131-811	11

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

C-18
Curve I-64_IN-6
PI = 1514+75.31
DELTA = 15° 14' 44.50" (LT)
D = 1° 24' 13"
T = 546.30'
L = 1,086.15'
R = 4,081.94'
PCC = 1509+29.00
PT = 1520+15.16
HOT Lane Only { Lr = 225' e = 5.0% V = 70MPH

Match Line Station 1513+00 EB - See Sheet 10
Match Line Station 1026+00 WB - See Sheet 10
Match Line Station 1540+00 EB - See Sheet 12
Match Line Station 1053+00 WB - See Sheet 12
PT 1520+15.16
PT 1030+57.96
BMP-2a-W Grass Channel
Exist. R/W
Std. GR-MGS2 Req'd.
12' Paved Shoulder
Maintenance Crossover
I-64 EB CONST. ℄
Std. GR-MGS3 Req'd.
Std. GR-MGS1 and Std. MC-4 Req'd.
I-64 EASTBOUND
I-64 WESTBOUND
End EB HOT Lane Sta. 1539+50.00
40' Drainage Easement
Caution: Overhead Electric Transmission Lines
S 77° 59' 32" E
S 77° 32' 05" E
Std. GR-MGS4 Req'd.
Begin HOT Lanes Sta. 1036+00.00
I-64 WB CONST. ℄
BMP-2b-W Dry Swale Level 1
Std. MC-4 Req'd.
Begin I-64 WB Construction
Sta. 1030+57.96, I-64 WB Const. ℄
1515 1520 1525 1530 1535 1540 1030 1035 1040 1045 1050

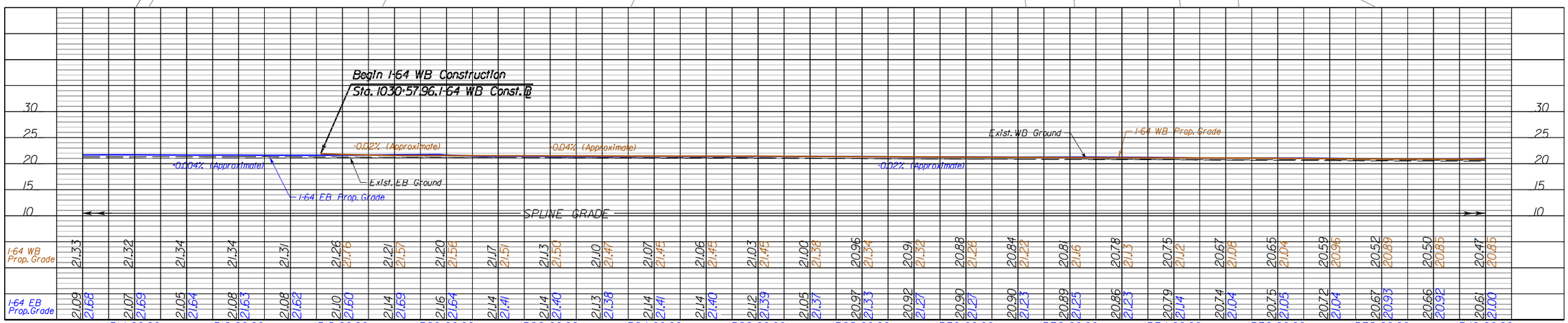
C-1
Curve I-64_OUT-1
PI = 1016+00.55
DELTA = 44° 05' 49.32" (LT)
D = 1° 26' 00"
T = 1,618.83'
L = 3,076.24'
R = 3,997.00'
PC = 999+81.72
PT = 1030+57.96

LEGEND
- Denotes Mill & Overlay
- Denotes New Pavement
- Noise Barrier
- Prop. Perm. Drainage Easement
- Prop. R/W & Limited Access Line
- Prop. Temp. Const. Easement
- Prop. Limited Access Line
- Prop. Wet Swale/Dry Swale/ Grass Channel
- Prop. Ditch (No Stormwater Treatment Credit)
- HOV/HOT Lanes
- Exist. Luminaire On Exist. Pole
- Prop. Luminaire On Exist. Pole
- Prop. Luminaire On Prop. Pole
- Prop. Twin Luminaire On Prop. Pole
- Stormwater Outfall (With ID No.)

PAVEMENT MARKING LEGEND

Solid Line	Type B, Class I	White		6" Width (A)
Solid Line	Type B, Class I	Yellow		6" Width (B)
Dashed Line	Type B, Class I	White	10' Long, 30' Space	6" Width (C)
Dashed Line	Type B, Class I	White	3' Long, 9' Space	6" Width (D)
Solid Line	Type B, Class I	White	Double White Line	2-6" Width (E)
Solid Line	Type B, Class I	White		8" Width (F)
Solid Line	Type B, Class I	Yellow		4" Width (G)

5 24" RCP
12 24" Jacked RCP

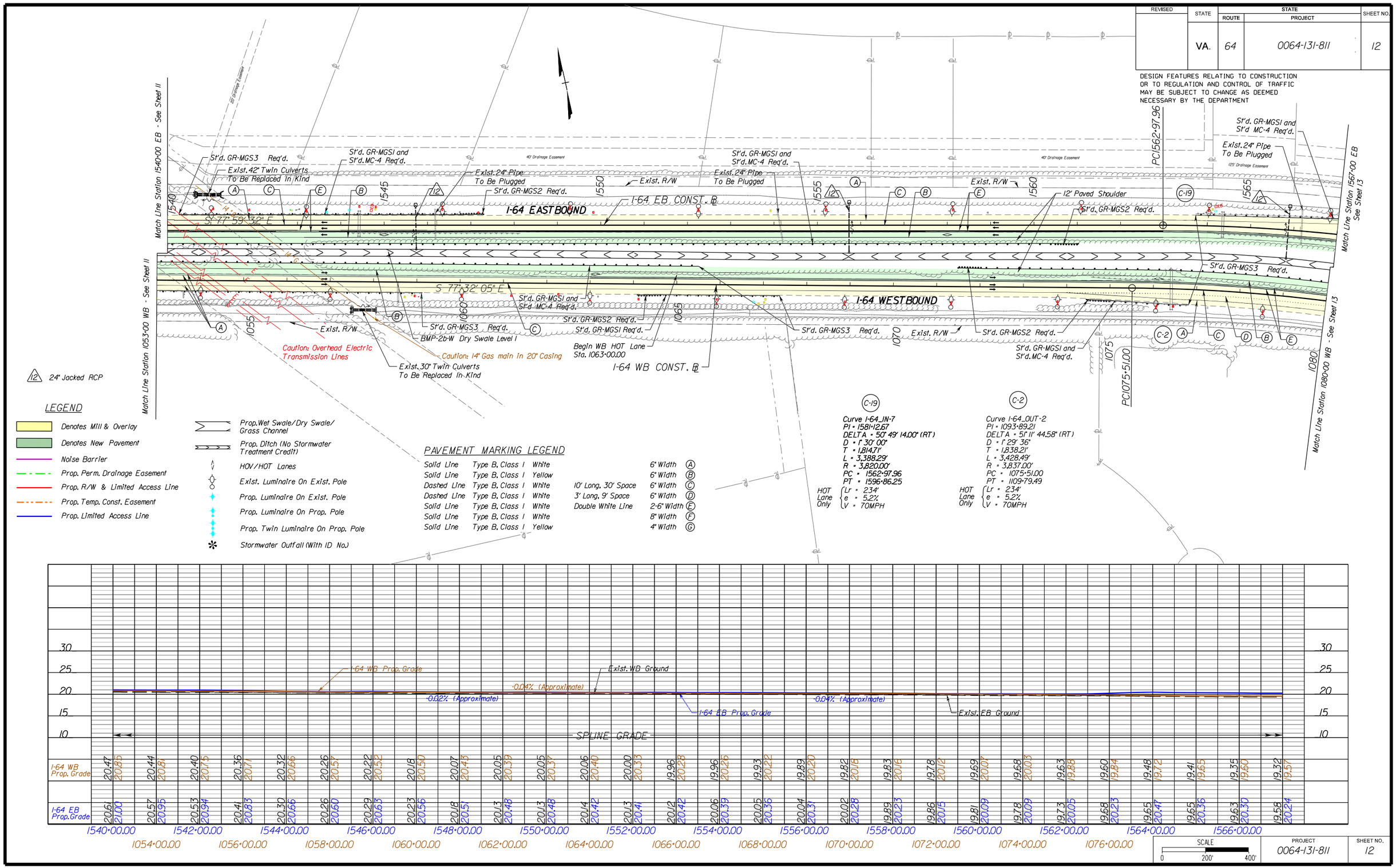


SCALE 0 200' 400'

PROJECT	SHEET NO.
0064-131-811	11

REVISED	STATE	STATE ROUTE	STATE PROJECT	SHEET NO.
	VA.	64	0064-131-811	12

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



℄ 24" Jacked RCP

LEGEND

- Denotes Mill & Overlay
- Denotes New Pavement
- Noise Barrier
- Prop. Perm. Drainage Easement
- Prop. R/W & Limited Access Line
- Prop. Temp. Const. Easement
- Prop. Limited Access Line
- Prop. Wet Swale/Dry Swale/ Grass Channel
- Prop. Ditch (No Stormwater Treatment Credit)
- HOV/HOT Lanes
- Exist. Luminaire On Exist. Pole
- Prop. Luminaire On Exist. Pole
- Prop. Luminaire On Prop. Pole
- Prop. Twin Luminaire On Prop. Pole
- Stormwater Outfall (With ID No.)

PAVEMENT MARKING LEGEND

Solid Line	Type B, Class I	White		6" Width (A)
Solid Line	Type B, Class I	Yellow		6" Width (B)
Dashed Line	Type B, Class I	White	10' Long, 30' Space	6" Width (C)
Dashed Line	Type B, Class I	White	3' Long, 9' Space	6" Width (D)
Solid Line	Type B, Class I	White	Double White Line	2-6" Width (E)
Solid Line	Type B, Class I	White		8" Width (F)
Solid Line	Type B, Class I	Yellow		4" Width (G)

SCALE 0 200' 400'

PROJECT	SHEET NO.
0064-131-811	12

REVISED	STATE	STATE ROUTE	STATE PROJECT	SHEET NO.
	VA.	64	0064-131-811	13

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

PAVEMENT MARKING LEGEND

Solid Line	Type B, Class I	White	6" Width	(A)
Solid Line	Type B, Class I	Yellow	6" Width	(B)
Dashed Line	Type B, Class I	White, 10' Long, 30' Space	6" Width	(C)
Dashed Line	Type B, Class I	White, 3' Long, 9' Space	6" Width	(D)
Solid Line	Type B, Class I	White, Double White Line	2-6" Width	(E)
Solid Line	Type B, Class I	White	8" Width	(F)
Solid Line	Type B, Class I	Yellow	4" Width	(G)

(12) 24" Jacked RCP

LEGEND

- Denotes Mill & Overlay
- Denotes New Pavement
- Proposed Bridge
- Existing Bridge
- Noise Barrier
- Prop. Perm. Drainage Easement
- Prop. R/W & Limited Access Line
- Prop. Temp. Const. Easement
- Prop. Limited Access Line
- Prop. Wet Swale/Dry Swale/ Grass Channel
- Prop. Ditch (No Stormwater Treatment Credit)
- HOV/HOT Lanes
- Exist. Luminaire On Exist. Pole
- Prop. Luminaire On Exist. Pole
- Prop. Luminaire On Prop. Pole
- Prop. Twin Luminaire On Prop. Pole
- Stormwater Outfall (With ID No.)

Match Line Station 1567+00 EB - See Sheet 12

Match Line Station 1080+00 WB - See Sheet 12

I-64 EB CONST. ℄

I-64 WB CONST. ℄

I-64 WESTBOUND

I-64 EASTBOUND

ROUTE 13 SOUTH MILITARY HWY. WBL

ROUTE 13 SOUTH MILITARY HWY. EBL

Exist. R/W

Exist. 24" Pipe To Be Plugged

Unblock Existing 50' Drainage Easement Pipe

12' Paved Shoulder

BMP-2b-W Dry Swale Level I

BMP-2c-W Grass Channel

Exist. Gutter & Flume To Be Removed

Std. GR-MGS2 Req'd.

Std. GR-MGS3 Req'd.

Std. GR-MGS1 and Std. MC-4 Req'd.

Std. GR-MGS1 Req'd.

Std. GR-MGS4 Req'd.

Std. BPPS-1 Req'd.

Std. FOA-2.TY.-I Req'd.

Std. FOA-2.TY.-II Req'd.

Std. BPPS Req'd.

Protect Underground Verizon F/O

Relocate Underground Verizon Cable

Protect Underground Electric

Protect Underground Electric Under Bridges

Protect 20" Water Main Under Bridges

Protect 30" SFM Under Bridges

Beg. Project 0064-131-811,B-664
Sta. 1589+10.77 EB I-64 Const. ℄

End Project 0064-131-811,B-664
Sta. 1591+22.77 EB I-64 Const. ℄

Beg. Project 0064-131-811,B-665
Sta. 1099+97.54 WB I-64 Const. ℄

End Project 0064-131-811,B-665
Sta. 1102+09.54 WB I-64 Const. ℄

Match Line Station 1592+00 EB See Sheet 14

Match Line Station 1104+00 WB - See Sheet 14

Curve I-64_OUT-2
PI = 1093+89.21
DELTA = 51° 11' 44.58" (RT)
D = 1° 29' 36"
T = 1,838.21'
L = 3,428.49'
R = 3,837.00'
PC = 1075+51.00
PT = 1109+79.49
HOT Lane Only: Lr = 234', e = 5.2%, V = 70MPH

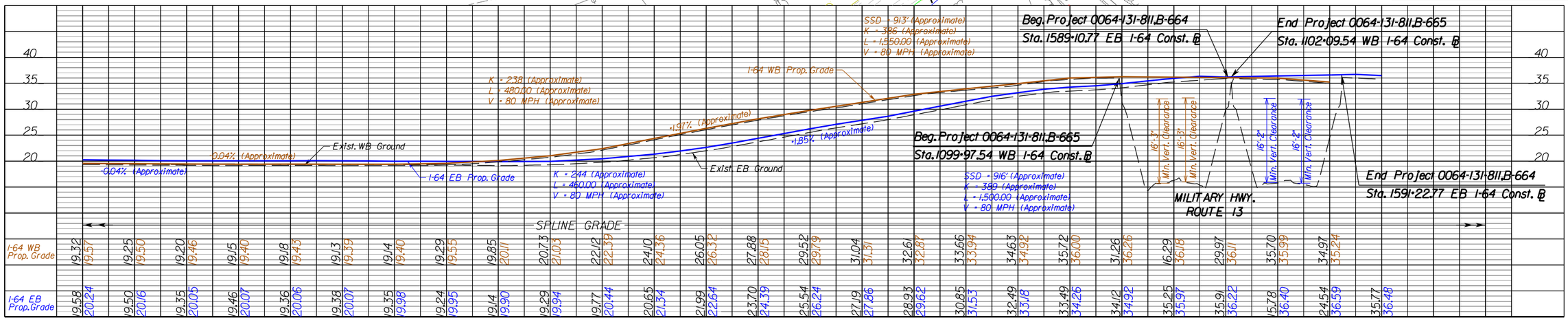
Curve I-64_IN-7
PI = 1581+12.67
DELTA = 50° 49' 14.00" (RT)
D = 1° 30' 00"
T = 1,814.71'
L = 3,388.29'
R = 3,820.00'
PC = 1562+97.96
PT = 1596+86.25
HOT Lane Only: Lr = 234', e = 5.2%, V = 70MPH

ROADWAY ENHANCEMENT

Drilled shafts for I-64 Bridge Widenings at Military Highway

UTILITY ENHANCEMENT

Military Highway drilled shaft designed to protect critical sewer:
GPC has designed a drilled shaft alternative at the Military Highway bridge widening to protect a 30 inch HRSD sanitary force main currently less than six inches from the existing bridge pier foundation cap on the south side of Military Highway.



SCALE	PROJECT	SHEET NO.
0 200' 400'	0064-131-811	13

REVISED	STATE	STATE ROUTE	STATE PROJECT	SHEET NO.
	VA.	64	0064-131-811	14

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

RTE. 13 SOUTH MILITARY HWY. WBL

RTE. 13 SOUTH MILITARY HWY. EBL

Match Line Station 1592+00 EB - See Sheet 13

Match Line Station 1104+00 WB See Sheet 13

Match Line Station 1616+00 EB - See Sheet 15

Match Line Station 1131+00 WB - See Sheet 15

Exist. R/W

Caution: Protect 14" Gas Main

BMP-3a-W Dry Swale Level I

BMP-3b-W Grass Channel

St'd. GR-MGSI and St'd. MC-4 Req'd.

Exist. Gutter & Flume To Be Removed

PT 1596+86.25

St'd. GR-MGS2 Req'd.

Exist. 27" Pipe To Be Plugged

St'd. GR-MGS3 Req'd.

Curve I-64_OUT-2
PI = 1093+89.21
DELTA = 51° 11' 44.58" (RT)
D = 1° 29' 36"
T = 1,838.21'
L = 3,428.49'
R = 3,837.00'
PC = 1075+51.00
PT = 1109+79.49
HOT Lane Only: Lr = 234', e = 5.2%, V = 70MPH

Curve I-64_IN-7
PI = 1581+12.67
DELTA = 50° 49' 14.00" (RT)
D = 1° 30' 00"
T = 1,814.71'
L = 3,388.29'
R = 3,820.00'
PC = 1562+97.96
PT = 1596+86.25
HOT Lane Only: Lr = 234', e = 5.2%, V = 70MPH

Exist. 42" Pipe To Be Plugged

Exist. 15" Pipe To Be Removed

St'd. GR-MGSI and MC-3B Req'd.

Caution: 12" And 16" Gas Mains Crossing I-64

Exist. Gutter & Flume To Be Removed

BMP-6a-W Grass Channel

BMP-6b-W Dry Swale Level I

I-64 EASTBOUND

S 27° 10' 18" E

I-64 EB CONST. B

I-64 WB CONST. B

BMP-4-W Ext Detention Pond Level I

BMP-5-W Ext Detention Pond Level I

St'd. GR-MGS3 Req'd.

St'd. GR-MGS2 Req'd.

St'd. GR-MGSI and St'd. MC-4 Req'd.

12' Paved Shoulder

I-64 WESTBOUND

S 26° 20' 20" E

PT 1109+79.49

Noise Barrier #4-5

Exist. Gutter & Flume To Be Removed

Twin 53"x34" HERCP Special Detail Headwall Design

Exist. 36" Pipe To Be Plugged

Exist. 15" Pipe To Be Removed

Exist. R/W

St'd. GR-MGSI and St'd. MC-3B Req'd.

Exist. Gutter & Flume To Be Removed

St'd. GR-MGS4 Req'd.

Caution: Overhead Electric Transmission Lines

Remove Exist. Twin 24" Pipes With Prop. Pipe Installation

Special Detail Headwall Design

Prop. R/W

Outfall Improvement

Outfall 2

DONALD A BLY II & KRISTYN S BLY
DB 6921 PG 361
Tax ID# 033000002460
4.596 AC.

024

ROBERT KIRK CULPEPPER
DB 7098 PG 49
Tax ID# 033000002440
0.889 AC.

022

DRAINAGE ENHANCEMENT

Use Weir Walls as Stormwater Outlets

DRAINAGE ENHANCEMENT

Channel Designs to Improve Existing Stream Channels and meet Stormwater Permitting Requirements

LEGEND

- Denotes Mill & Overlay
- Denotes New Pavement
- 10' 21A Gravel Base SWM Basin Access Road
- Noise Barrier
- Prop. Perm. Drainage Easement
- Prop. R/W & Limited Access Line
- Prop. Temp. Const. Easement
- Prop. Limited Access Line

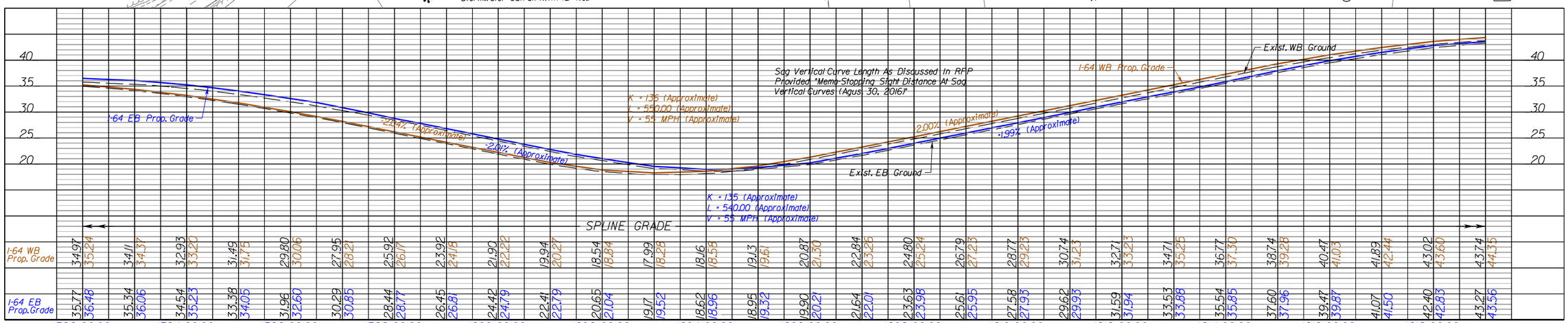
LEGEND

- Prop. Wet Swale/Dry Swale/ Grass Channel
- Prop. Ditch (No Stormwater Treatment Credit)
- HOV/HOT Lanes
- Exist. Luminaire On Exist. Pole
- Prop. Luminaire On Exist. Pole
- Prop. Luminaire On Prop. Pole
- Prop. Twin Luminaire On Prop. Pole
- Stormwater Outfall (With ID No.)

PAVEMENT MARKING LEGEND

Solid Line	Type B, Class I	White		6" Width (A)
Solid Line	Type B, Class I	Yellow		6" Width (B)
Dashed Line	Type B, Class I	White	10' Long, 30' Space	6" Width (C)
Dashed Line	Type B, Class I	White	3' Long, 9' Space	6" Width (D)
Solid Line	Type B, Class I	White	Double White Line	2-6" Width (E)
Solid Line	Type B, Class I	White		8" Width (F)
Solid Line	Type B, Class I	Yellow		4" Width (G)

1	15" CMP
3	15" RCP
5	24" RCP
12	24" Jacked RCP
13	30" Jacked RCP
15	42" Jacked RCP
18	54" Jacked RCP



SCALE 0 200' 400'

PROJECT	SHEET NO.
0064-131-811	14

REVISED	STATE	STATE ROUTE	STATE PROJECT	SHEET NO.
	VA.	64	0064-131-811	15

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

LEGEND

- Denotes Mill & Overlay
- Denotes New Pavement
- 10' 21A Gravel Base SWM Basin Access Road
- Proposed Bridge
- Existing Bridge
- Noise Barrier
- Prop. Perm. Drainage Easement
- Prop. R/W & Limited Access Line
- Prop. Temp. Const. Easement
- Prop. Limited Access Line
- Prop. Wet Swale/Dry Swale/ Grass Channel
- Prop. Ditch (No Stormwater Treatment Credit)
- HOV/HOT Lanes
- Exist. Luminaire On Exist. Pole
- Prop. Luminaire On Exist. Pole
- Prop. Luminaire On Prop. Pole
- Prop. Twin Luminaire On Prop. Pole
- Stormwater Outfall (With ID No.)

1 15" CMP
3 15" RCP
5 24" RCP
8 42" RCP
12 24" Jacked RCP
15 42" Jacked RCP

Begin Project 0064-131-811, B-666
Sta. 1620+24.36 EB I-64 Const. ℄

End Project 0064-131-811, B-666
Sta. 1622+90.53 EB I-64 Const. ℄

End Project 0064-131-811, B-667
Sta. 1134+15.05 WB I-64 Const. ℄

Begin Project 0064-131-811, B-667
Sta. 1131+50.86 WB I-64 Const. ℄

C-3
Curve I-64_OUT-3
PI = 1158+06.16
DELTA = 68° 46' 42.89" (LT)
D = 1° 30' 14"
T = 2,607.72'
L = 4,573.57'
R = 3,810.00'
PC = 1131+98.44
PT = 1177+72.01
Lr = 234'
e = 5.2%
V = 70MPH

C-20
Curve I-64_IN-8
PI = 1646+30.30
DELTA = 67° 56' 45.14" (LT)
D = 1° 30' 00"
T = 2,574.00'
L = 4,530.06'
R = 3,820.00'
PC = 1620+56.31
PT = 1665+86.36
Lr = 234'
e = 5.2%
V = 70MPH

DRAINAGE ENHANCEMENT
Channel Designs to Improve Existing Stream Channels and meet Stormwater Permitting Requirements

DRAINAGE ENHANCEMENT
Use Weir Walls as Stormwater Outlets

DRAINAGE ENHANCEMENT
Drainage slots in noise walls to provide an innovative drainage design to convey stormwater runoff from roadway profiles with little or no slope.

Match Line See This Sheet

Match Line Station 1645+00 EB See Sheet 16

Match Line Station 1158+00 WB - See Sheet 16

Match Line Station 1630+00 EB - See Sheet 14

Match Line Station 1131+00 WB - See Sheet 14

Caution: Overhead Electric Trasmission Lines

Caution: Underground T/FO Near Bridge Piers

Caution: Overhead Electric Trasmission Lines

Caution: Overhead Electric Trasmission Lines

Exist. Culvert To Remain

Prop. R/W

Outfall 3

Tie To Exist.

Natural Channel Improvement Area

Outfall 4

I-64 EASTBOUND

I-64 WESTBOUND

I-64 EB CONST. ℄

I-64 WB CONST. ℄

Crash Wall

12' Paved Shoulder

BMP-7a-W Dry Swale Level I

BMP-7b-W Grass Channel

Exist. Gutter & Flume To Be Removed

BMP-8-W Ext Detention Pond Level I

BMP-9-W Ext Detention Pond Level I

BMP-10-W Grass Channel

42" RCP Pipe Extension

42" RCP Pipe Extension Exist. R/W

Noise Barrier •4-5

Std. GR-MGS1 and Std. MC-3B Req'd.

Std. GR-MGS1 and Std. MC-4 Req'd.

Std. GR-MGS3 Req'd.

Std. GR-MGS4 Req'd.

Std. FOA-2, TY.-I Req'd.

Std. FOA-2, TY.-II Req'd.

Std. BPPS-1 Req'd.

Std. GR-MGS2 Req'd.

Exist. R/W

Exist. Pipes To Remain (No Noted Flows & No Impact)

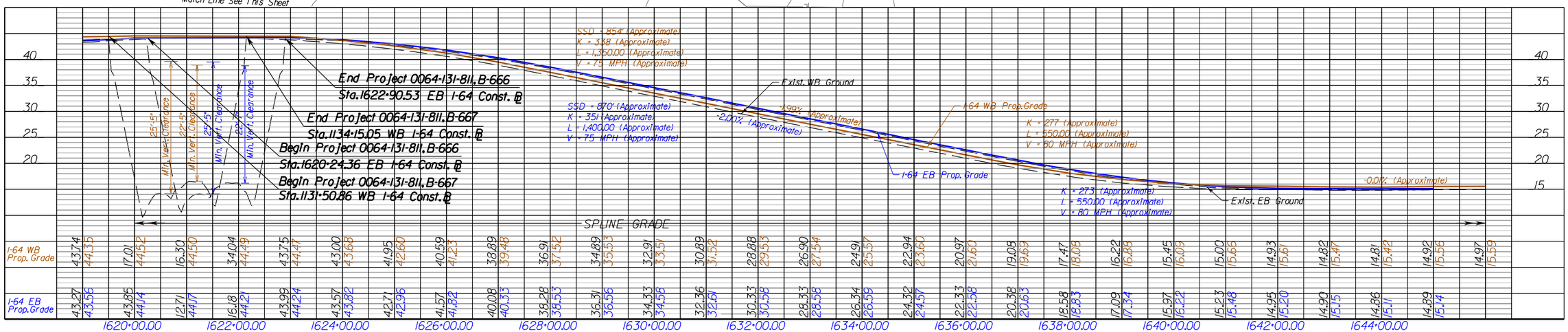
Regrade All 3 Exist. Pipes To Remain (No Noted Flows & No Impact)

YADKIN RD.

HANCOCK DR.

PAVEMENT MARKING LEGEND

Solid Line	Type B, Class I	White		6" Width (A)
Solid Line	Type B, Class I	Yellow		6" Width (B)
Dashed Line	Type B, Class I	White	10' Long, 30' Space	6" Width (C)
Dashed Line	Type B, Class I	White	3' Long, 9' Space	6" Width (D)
Solid Line	Type B, Class I	White	Double White Line	2-6" Width (E)
Solid Line	Type B, Class I	White		8" Width (F)
Solid Line	Type B, Class I	Yellow		4" Width (G)



SCALE	PROJECT	SHEET NO.
0 200' 400'	0064-131-811	15

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Plotted By: p0075834

REVISED	STATE	STATE ROUTE	STATE PROJECT	SHEET NO.
	VA.	64	0064-131-811	16

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

PAVEMENT MARKING LEGEND

Solid Line	Type B, Class I	White		6" Width (A)
Solid Line	Type B, Class I	Yellow		6" Width (B)
Dashed Line	Type B, Class I	White	10' Long, 30' Space	6" Width (C)
Dashed Line	Type B, Class I	White	3' Long, 9' Space	6" Width (D)
Solid Line	Type B, Class I	White	Double White Line	2-6" Width (E)
Solid Line	Type B, Class I	White		8" Width (F)
Solid Line	Type B, Class I	Yellow		4" Width (G)

LEGEND

- Denotes Mill & Overlay
- Denotes New Pavement
- 10' 21A Gravel Base SWM Basin Access Road
- Noise Barrier
- Prop. Perm. Drainage Easement
- Prop. R/W & Limited Access Line
- Prop. Temp. Const. Easement
- Prop. Limited Access Line
- Prop. Wet Swale/Dry Swale/ Grass Channel
- Prop. Ditch (No Stormwater Treatment Credit)
- HOV/HOT Lanes
- Exist. Luminaire On Exist. Pole
- Prop. Luminaire On Exist. Pole
- Prop. Luminaire On Prop. Pole
- Prop. Twin Luminaire On Prop. Pole
- Stormwater Outfall (With ID No.)

- 1 — 15" CMP
- 3 — 15" RCP
- 4 — 18" RCP
- 5 — 24" RCP
- 13 — 30" Jacked RCP
- 14 — 36" Jacked RCP

C-20
Curve 1-64_IN-8
PI = 1646+30.30
DELTA = 67° 56' 45.14" (LT)
D = 1° 30' 00"
T = 2,574.00'
L = 4,530.06'
R = 3,820.00'
PC = 1620+56.31
PT = 1665+86.36
Lr = 234'
e = 5.2%
V = 70MPH

Match Line Station 1645+00 EB - See Sheet 15

Match Line Station 1668+00 EB - See Sheet 17

Match Line Station 1158+00 WB - See Sheet 15

Match Line Station 1182+00 WB - See Sheet 17

1-64 EASTBOUND

1-64 WESTBOUND

1-64 EB CONST. ℄

1-64 WB CONST. ℄

Exist. R/W

36" RCP Pipe Extension

BMP-14-W Grass Channel

BMP-10-W Grass Channel

BMP-13-W Grass Channel

Twin 36" Jacked RCP

BMP-12-W Grass Channel

BMP-16-W Grass Channel

BMP-15-W Grass Channel

Noise Barrier #6
12' Paved Shoulder

Noise Barrier #4-5

Std. GR-MGS1 and Std. MC-4 Req'd.

Std. GR-MGS2 Req'd.

Std. GR-MGS1 Req'd.

Std. GR-MGS4 Req'd.

Std. MB-7F. Req'd.

Std. GR-FOA-2, TY-II Req'd.

Std. GR-FOA-2, TY-I Req'd.

Std. GR-MGS1 and Std. MC-3B Req'd.

PT 1665+86.36

PT 1177+72.01

Exist. 36" Pipe To Be Plugged

Exist. 30" Pipe To Be Plugged

SHEILA S ELLIOTT
DB 4200, PG 194
TAX ID# 0330000000290
1704 AC

MARION VAN COLLEY
DB 2017, PG 2333
TAX ID# 0330000000280
.483 AC

BMP-11-W Extended Detention Pond Quantity Only

Outfall 5

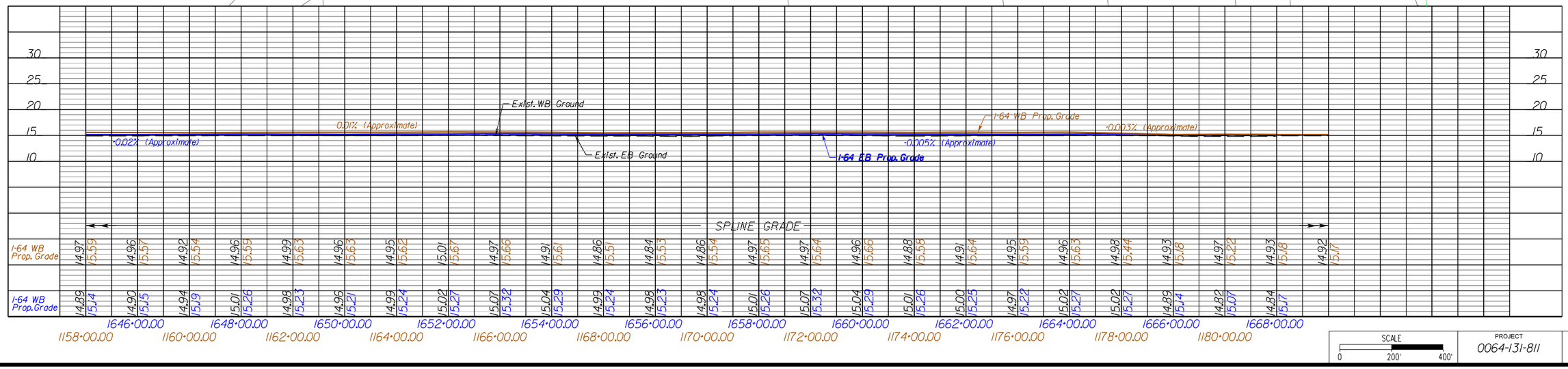
Prop. R/W

Curve 1-64_OUT-3
PI = 1158+06.16
DELTA = 68° 46' 42.89" (LT)
D = 1° 30' 14"
T = 2,607.72'
L = 4,573.57'
R = 3,810.00'
PC = 1131+98.44
PT = 1177+72.01
Lr = 234'
e = 5.2%
V = 70MPH

DRAINAGE ENHANCEMENT
Maintenance Access Doors in Noise Walls, to Facilitate Access to new VDOT Stormwater Management Swales

DRAINAGE ENHANCEMENT
Use Weir Walls as Stormwater Outlets

DRAINAGE ENHANCEMENT
Drainage slots in noise walls to provide an innovative drainage design to convey stormwater runoff from roadway profiles with little or no slope.



SCALE 0 200' 400'

PROJECT	SHEET NO.
0064-131-811	16

REVISED	STATE	STATE ROUTE	STATE PROJECT	SHEET NO.
	VA.	64	0064-131-811	17

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

LEGEND

- Denotes Mill & Overlay
- Denotes New Pavement
- 10' 21A Gravel Base SWM Basin Access Road
- Existing Bridge
- Noise Barrier
- Prop. Perm. Drainage Easement
- Prop. R/W & Limited Access Line
- Prop. Temp. Const. Easement
- Prop. Limited Access Line
- Prop. Wet Swale/Dry Swale/ Grass Channel
- Prop. Ditch (No Stormwater Treatment Credit)
- HOV/HOT Lanes
- Exist. Luminaire On Exist. Pole
- Prop. Luminaire On Exist. Pole
- Prop. Luminaire On Prop. Pole
- Prop. Twin Luminaire On Prop. Pole
- Stormwater Outfall (With ID No.)

DRAINAGE ENHANCEMENT
Maintenance Access Doors in Noise Walls, to Facilitate Access to new VDOT Stormwater Management Swales

DRAINAGE ENHANCEMENT
Drainage slots in noise walls to provide an innovative drainage design to convey stormwater runoff from roadway profiles with little or no slope.

DRAINAGE ENHANCEMENT
Use Weir Walls as Stormwater Outlets

Match Line See This Sheet

Match Line Station 1668+00 EB - See Sheet 16

Match Line Station 1182+00 WB - See Sheet 16

Match Line Station 1695+00 EB - See Sheet 19

Match Line Station 1208+00 WB - See Sheet 19

ROUTE 17 NBL

ROUTE 17 SBL

I-64 EAST BOUND

I-64 WEST BOUND

I-64 EB CONST. B

I-64 WB CONST. B

HOYT DR.

TRENT AVE.

St'd. GR-MGS1 and St'd. MC-3B Req'd.

St'd. GR-MGS1 and St'd. MC-4 Req'd.

St'd. GR-MGS4 Req'd.

St'd. GR-MGS3 Req'd.

St'd. GR-MGS2 Req'd.

St'd. FOA-2, Ty.-II Req'd.

St'd. FOA-2, Ty.-I Req'd.

St'd. BPPS-1 Req'd.

St'd. MB-7F Req'd.

Noise Barrier *4-5

Noise Barrier *6

Noise Barrier *7

Noise Barrier *8

Exist. R/W

Outfall 6

Outfall 7

Outfall Improvements

Proposed DI2B Inlet Connecting To Exist. 18" Pipe

BMP-17-W Ext. Detention Pond Quantity Only

Exist. Gutter & Flume To Be Removed

BMP-19-W Constructed Wetland Level I

BMP-18-W Constructed Wetland Level I

BMP-20-W Dry Swale Level I

Exist. 24" Pipe To Be Plugged

Exist. 27" Pipe To Be Plugged

Exist. 54" Pipe To Be Plugged

Caution: Underground Communications Line

Caution 12" Water In 24" Casing

Caution 6" Gas In 12" Casing

Relocate Overhead Electric Lines Underground

End Shoulder Lane EB Sta. 1690+00.00

Begin Shoulder Lane WB Sta. 1201+00.00

PAVEMENT MARKING LEGEND

Solid Line	Type B, Class I	White		6" Width (A)
Solid Line	Type B, Class I	Yellow		6" Width (B)
Dashed Line	Type B, Class I	White	10' Long, 30' Space	6" Width (C)
Dashed Line	Type B, Class I	White	3' Long, 9' Space	6" Width (D)
Solid Line	Type B, Class I	White	Double White Line	2-6" Width (E)
Solid Line	Type B, Class I	White		8" Width (F)
Solid Line	Type B, Class I	Yellow		4" Width (G)
Message	Type B, Class I	Pvmt Msg Mrkg Text - "SHOULDER LANE"		(H)

1	15" CMP
3	15" RCP
4	18" RCP
5	24" RCP
6	30" RCP
7	36" RCP
12	24" Jacked RCP
13	30" Jacked RCP
14	36" Jacked RCP
20	60" Jacked RCP

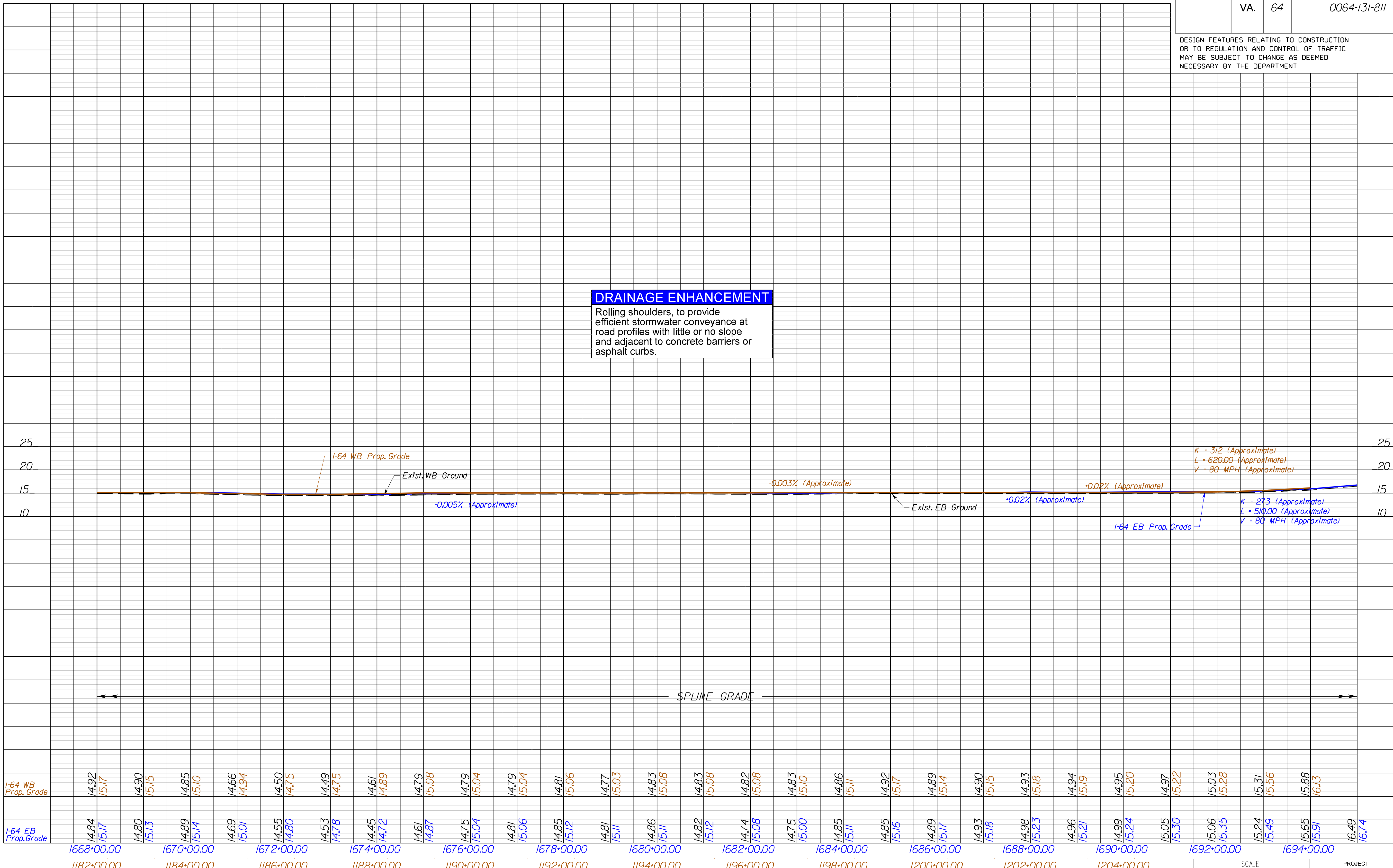
SCALE	PROJECT	SHEET NO.
0 200' 400'	0064-131-811	17

REVISED	STATE	STATE ROUTE	STATE PROJECT	SHEET NO.
	VA.	64	0064-131-811	18

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

DRAINAGE ENHANCEMENT

Rolling shoulders, to provide efficient stormwater conveyance at road profiles with little or no slope and adjacent to concrete barriers or asphalt curbs.



SCALE	PROJECT	SHEET NO.
0 100' 200'	0064-131-811	18

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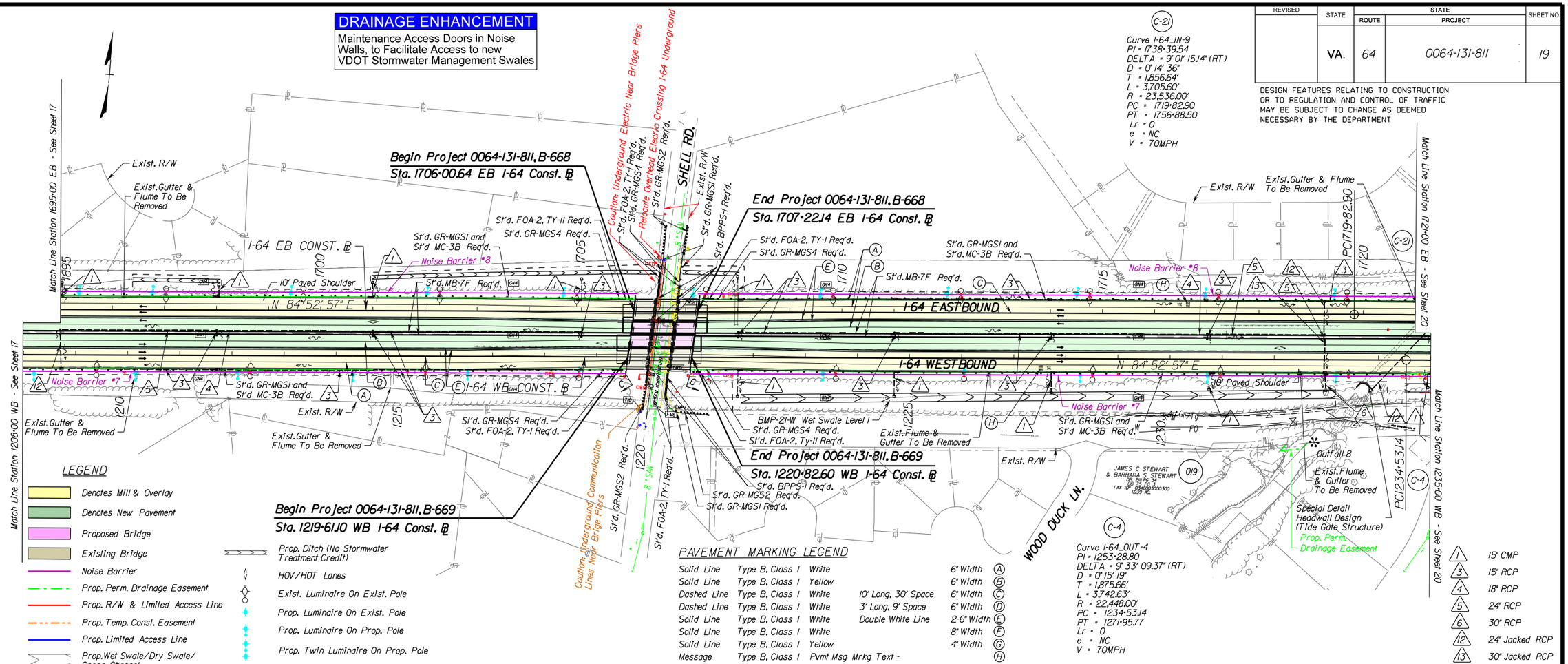
Plotted By: p0075834

REVISED	STATE	STATE ROUTE	STATE PROJECT	SHEET NO.
	VA.	64	0064-131-811	19

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

DRAINAGE ENHANCEMENT
Maintenance Access Doors in Noise Walls, to Facilitate Access to new VDOT Stormwater Management Swales



C-21
Curve 1-64_IN-9
PI = 1738+39.54
DELTA = 9° 01' 15.14" (RT)
D = 0° 14' 36"
T = 1,856.64'
L = 3,705.60'
R = 23,536.00'
PC = 1719+82.90
PT = 1756+88.50
Lr = 0
e = NC
V = 70MPH

C-4
Curve 1-64_OUT-4
PI = 1253+28.80
DELTA = 9° 33' 09.37" (RT)
D = 0° 15' 19"
T = 1,875.66'
L = 3,742.63'
R = 22,448.00'
PC = 1234+53.14
PT = 1271+95.77
Lr = 0
e = NC
V = 70MPH

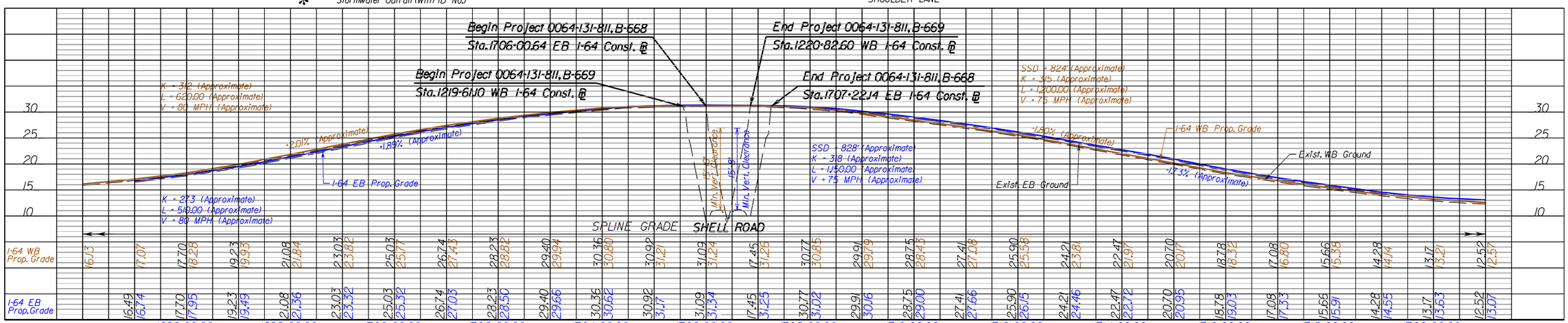
LEGEND

- Denotes Mill & Overlay
- Denotes New Pavement
- Proposed Bridge
- Existing Bridge
- Noise Barrier
- Prop. Perm. Drainage Easement
- Prop. R/W & Limited Access Line
- Prop. Temp. Const. Easement
- Prop. Limited Access Line
- Prop. Wet Swale/Dry Swale/ Grass Channel
- Prop. Ditch (No Stormwater Treatment Credit)
- HOV/HOT Lanes
- Exist. Luminaire On Exist. Pole
- Prop. Luminaire On Exist. Pole
- Prop. Luminaire On Prop. Pole
- Prop. Twin Luminaire On Prop. Pole
- Stormwater Outfall (With ID No.)

PAVEMENT MARKING LEGEND

Solid Line	Type B, Class I	White		6" Width (A)
Solid Line	Type B, Class I	Yellow		6" Width (B)
Dashed Line	Type B, Class I	White	10' Long, 30' Space	6" Width (C)
Dashed Line	Type B, Class I	White	3' Long, 9' Space	6" Width (D)
Solid Line	Type B, Class I	White	Double White Line	2-6" Width (E)
Solid Line	Type B, Class I	White		8" Width (F)
Solid Line	Type B, Class I	Yellow		4" Width (G)
Message	Type B, Class I	Pvmt Msg Mrkg Text - "SHOULDER LANE"		(H)

- 1 — 15" CMP
- 3 — 15" RCP
- 4 — 18" RCP
- 5 — 24" RCP
- 6 — 30" RCP
- 12 — 24" Jacked RCP
- 13 — 30" Jacked RCP



SCALE	PROJECT	SHEET NO.
0 200' 400'	0064-131-811	19

REVISED	STATE	STATE ROUTE	STATE PROJECT	SHEET NO.
	VA.	64	0064-131-811	20

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

DRAINAGE ENHANCEMENT
Drainage slots in noise walls to provide an innovative drainage design to convey stormwater runoff from roadway profiles with little or no slope.

DRAINAGE ENHANCEMENT
Maintenance Access Doors in Noise Walls, to Facilitate Access to new VDOT Stormwater Management Swales

DRAINAGE ENHANCEMENT
Rolling shoulders, to provide efficient stormwater conveyance at road profiles with little or no slope and adjacent to concrete barriers or asphalt curbs.

Match Line Station 1721+00 EB - See Sheet 19

Match Line Station 1235+00 WB - See Sheet 19

Match Line Station 1749+00 EB - See Sheet 21

Match Line Station 1262+00 WB - See Sheet 21

C-21
Curve I-64_IN-9
PI = 1738+39.54
DELTA = 9° 01' 15.14" (RT)
D = 0° 14' 36"
T = 1,856.64'
L = 3,705.60'
R = 23,536.00'
PC = 1719+82.90
PT = 1756+88.50
Lr = 0
e = NC
V = 70MPH

C-4
Curve I-64_OUT-4
PI = 1253+28.80
DELTA = 9° 33' 09.37" (RT)
D = 0° 15' 19"
T = 1,875.66'
L = 3,742.63'
R = 22,448.00'
PC = 1234+53.14
PT = 1271+95.77
Lr = 0
e = NC
V = 70MPH

Noise Barrier *8
10' Paved Shoulder
BMP-23-W Grass Channel
Std. MB-7F Req'd.
Exist. R/W
Std. GR-MGSI and Std. MC-4 Req'd.
I-64 WESTBOUND
I-64 EASTBOUND
I-64 EB CONST. ℄
I-64 WB CONST. ℄
BMP-24-W Wet Swale Level 1
Outfall 9A
Outfall 9B
Outfall 9C
Outfall 9D
Outfall 9E
Std. GR-MGSI and Std MC-3B Req'd.
BMP-22-W Wet Swale Level 1
Noise Barrier *7
Std. FE-WI Req'd.
Caution: Overhead Electric Crossing I-64
Prop. R/W & Limited Access Line
FRANK L HOLLOWELL DB 894 PG 606 WB 71.75 SF TAX ID# 0340000000755 LDBB AC
EDWILYN VIRGINIA HOLLOWELL ET AL WB 57.75 SF TAX ID# 0340000000756 0.68 AC
E C HOLLOWELL JR DB 874 PG 134 WB 0.25 SF TAX ID# 0340000000770 0.85 AC
005
006
007
FIRMAN ST.
10' Paved Shoulder
BMP-25-W Wet Swale Level 1
8" SAW

LEGEND

	Prop. Wet Swale/Dry Swale/ Grass Channel
	Prop. Ditch (No Stormwater Treatment Credit)
	HOV/HOT Lanes
	Exist. Luminaire On Exist. Pole
	Prop. Luminaire On Exist. Pole
	Prop. Luminaire On Prop. Pole
	Prop. Twin Luminaire On Prop. Pole
✻	Stormwater Outfall (With ID No.)

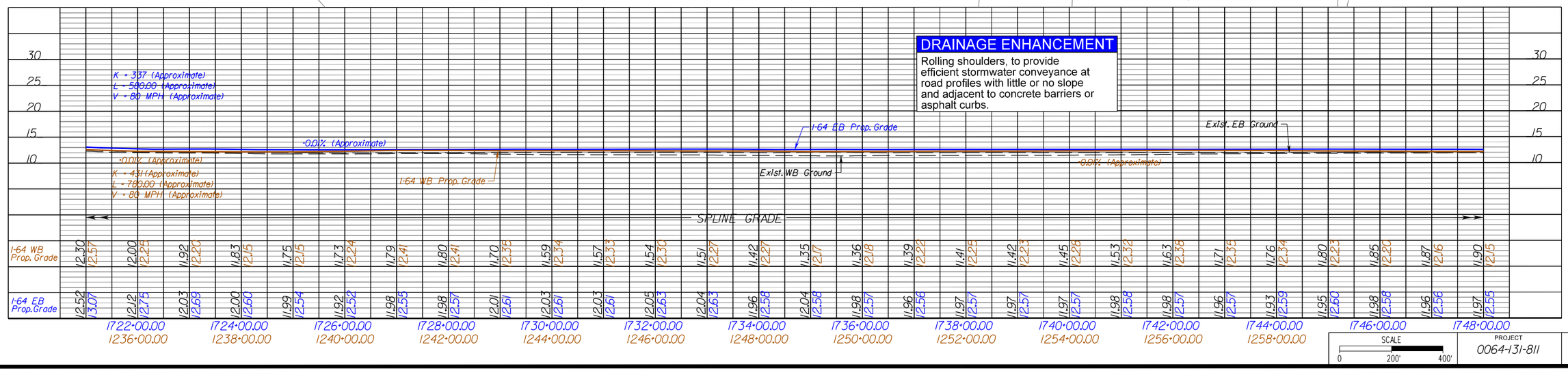
LEGEND

	Denotes Mill & Overlay
	Denotes New Pavement
	Noise Barrier
	Prop. Perm. Drainage Easement
	Prop. R/W & Limited Access Line
	Prop. Temp. Const. Easement
	Prop. Limited Access Line

△3 15" RCP
△4 18" RCP
△5 24" RCP
△6 30" RCP
△7 36" RCP
△8 42" RCP
△12 24" Jacked RCP
△15 42" Jacked RCP

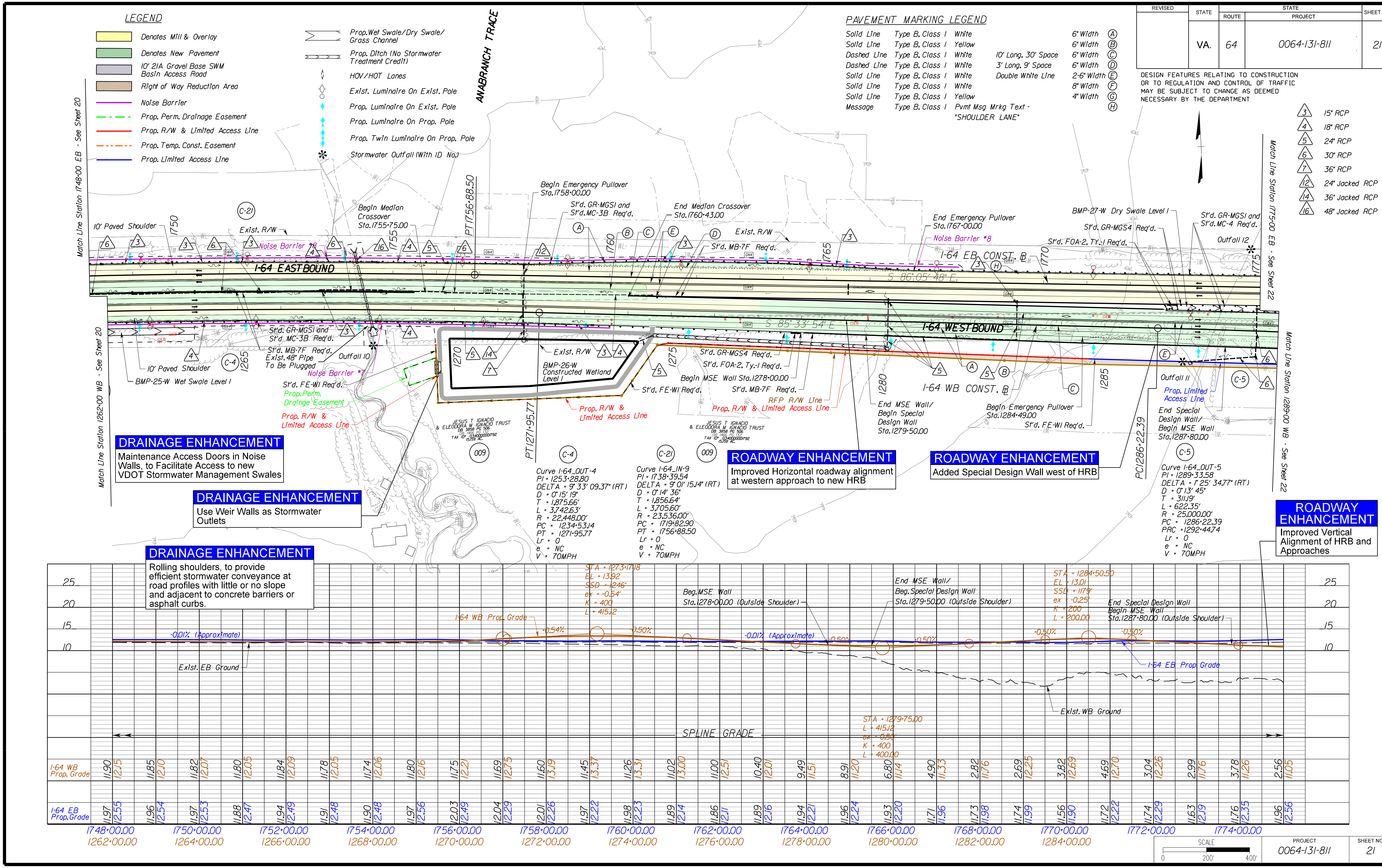
PAVEMENT MARKING LEGEND

Solid Line	Type B, Class I	White		6" Width Ⓐ
Solid Line	Type B, Class I	Yellow		6" Width Ⓑ
Dashed Line	Type B, Class I	White	10' Long, 30' Space	6" Width Ⓒ
Dashed Line	Type B, Class I	White	3' Long, 9' Space	6" Width Ⓓ
Solid Line	Type B, Class I	White	Double White Line	2-6" Width Ⓔ
Solid Line	Type B, Class I	White		8" Width Ⓕ
Solid Line	Type B, Class I	Yellow		4" Width Ⓖ
Message	Type B, Class I	Pvmt Msg Mrkg Text - "SHOULDER LANE"		Ⓗ



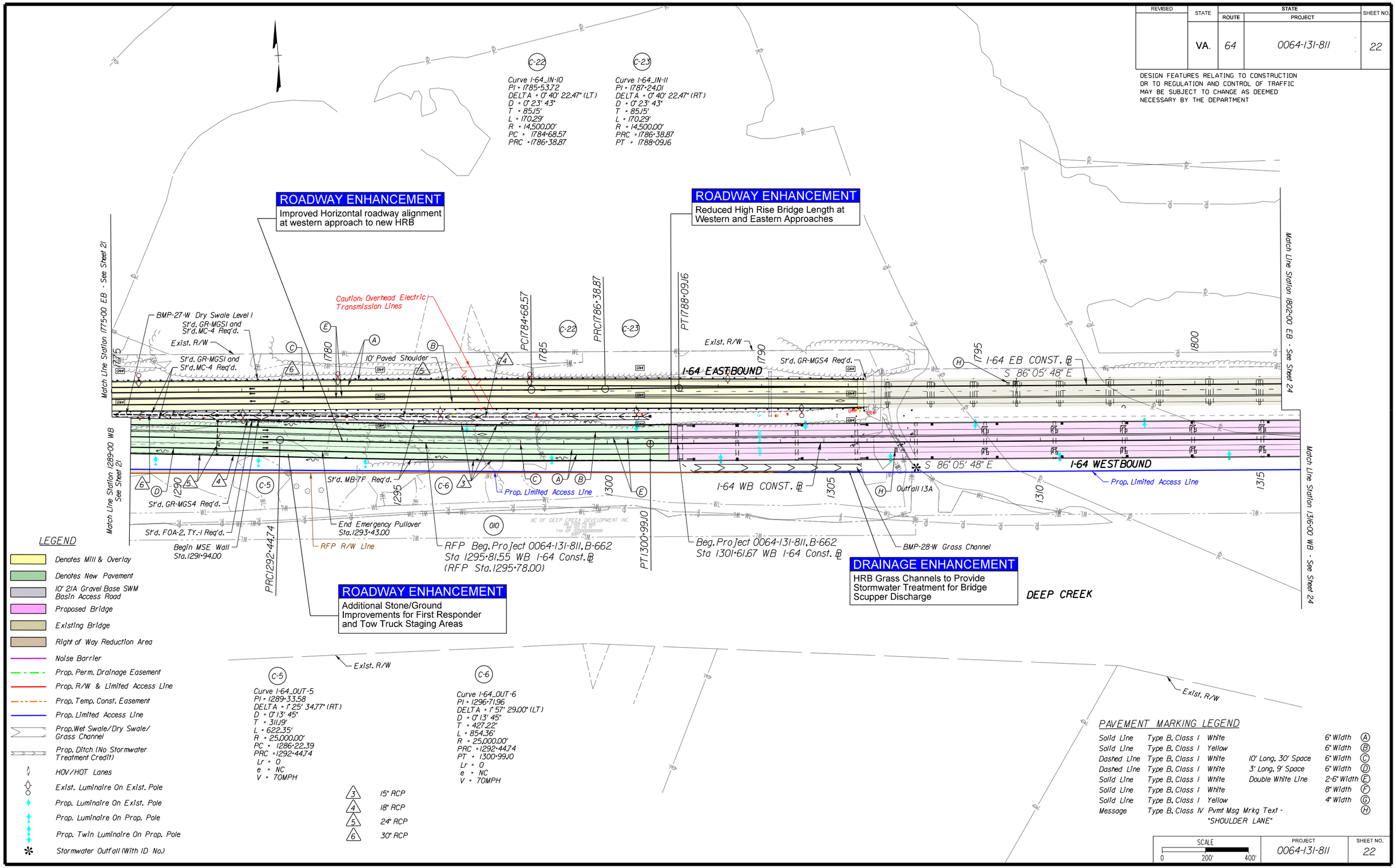
SCALE 0 200' 400'

PROJECT	SHEET NO.
0064-131-811	20


REVISED | STATE | STATE ROUTE | PROJECT | SHEET NO.
VA. | 64 | 0064-131-811 | 21
DESIGN FEATURES RELATING TO CONSTRUCTION OR TO REGULATION AND CONTROL OF TRAFFIC MAY BE SUBJECT TO CHANGE AS DEEMED NECESSARY BY THE DEPARTMENT
LEGEND
Denotes Mill & Overlay
Denotes New Pavement
10' 21A Gravel Base SWM Basin Access Road
Right of Way Reduction Area
Noise Barrier
Prop. Perm. Drainage Easement
Prop. R/W & Limited Access Line
Prop. Temp. Const. Easement
Prop. Limited Access Line
Prop. Wet Swale/Dry Swale/ Grass Channel
Prop. Ditch (No Stormwater Treatment Credit)
HOV/HOT Lanes
Exist. Luminaire On Exist. Pole
Prop. Luminaire On Exist. Pole
Prop. Luminaire On Prop. Pole
Prop. Twin Luminaire On Prop. Pole
Stormwater Outfall (With ID No.)
PAVEMENT MARKING LEGEND
Solid Line Type B, Class I White 6" Width (A)
Solid Line Type B, Class I Yellow 6" Width (B)
Dashed Line Type B, Class I White 10' Long, 30' Space 6" Width (C)
Dashed Line Type B, Class I White 3' Long, 9' Space 6" Width (D)
Solid Line Type B, Class I White Double White Line 2-6" Width (E)
Solid Line Type B, Class I White 8" Width (F)
Solid Line Type B, Class I Yellow 4" Width (G)
Message Type B, Class I Pvmt Msg Mrkg Text - "SHOULDER LANE" (H)
3 15" RCP
4 18" RCP
5 24" RCP
6 30" RCP
7 36" RCP
12 24" Jacked RCP
14 36" Jacked RCP
16 48" Jacked RCP
ANABRANCH TRACE
Match Line Station 1748+00 EB - See Sheet 20
Match Line Station 1262+00 WB - See Sheet 20
Match Line Station 1775+00 EB - See Sheet 22
Match Line Station 1289+00 WB - See Sheet 22
I-64 EASTBOUND
I-64 WESTBOUND
I-64 EB CONST. B
I-64 WB CONST. B
S 86°05'48" E
S 85°33'54" E
Begin Emergency Pullover Sta.1758+00.00
End Emergency Pullover Sta.1767+00.00
Begin Median Crossover Sta.1755+75.00
End Median Crossover Sta.1760+43.00
Begin Emergency Pullover Sta.1284+49.00
Begin MSE Wall Sta.1278+00.00
End MSE Wall/ Begin Special Design Wall Sta.1279+50.00
End Special Design Wall/ Begin MSE Wall Sta.1287+80.00
BMP-26-W Constructed Wetland Level I
BMP-25-W Wet Swale Level I
BMP-27-W Dry Swale Level I
Exist. 48" Pipe To Be Plugged
Outfall 10
Outfall 11
Outfall 12
10' Paved Shoulder
Noise Barrier *8
Prop. R/W & Limited Access Line
Prop. Perm. Drainage Easement
RFP R/W Line
Prop. Limited Access Line
JESUS T IGNACIO & ELEODORA M IGNACIO TRUST
DRAINAGE ENHANCEMENT
Maintenance Access Doors in Noise Walls, to Facilitate Access to new VDOT Stormwater Management Swales
DRAINAGE ENHANCEMENT
Use Weir Walls as Stormwater Outlets
DRAINAGE ENHANCEMENT
Rolling shoulders, to provide efficient stormwater conveyance at road profiles with little or no slope and adjacent to concrete barriers or asphalt curbs.
ROADWAY ENHANCEMENT
Improved Horizontal roadway alignment at western approach to new HRB
ROADWAY ENHANCEMENT
Added Special Design Wall west of HRB
ROADWAY ENHANCEMENT
Improved Vertical Alignment of HRB and Approaches
Curve I-64_OUT-4
PI = 1253+28.80
DELTA = 9° 33' 09.37" (RT)
D = 0° 15' 19"
T = 1,875.66'
L = 3,742.63'
R = 22,448.00'
PC = 1234+53.14
PT = 1271+95.77
Lr = 0
e = NC
V = 70MPH
Curve I-64_IN-9
PI = 1738+39.54
DELTA = 9° 01' 15.14" (RT)
D = 0° 14' 36"
T = 1,856.64'
L = 3,705.60'
R = 23,536.00'
PC = 1719+82.90
PT = 1756+88.50
Lr = 0
e = NC
V = 70MPH
Curve I-64_OUT-5
PI = 1289+33.58
DELTA = 1° 25' 34.77" (RT)
D = 0° 13' 45"
T = 311.19'
L = 622.35'
R = 25,000.00'
PC = 1286+22.39
PRC = 1292+44.74
Lr = 0
e = NC
V = 70MPH
I-64 WB Prop. Grade
I-64 EB Prop. Grade
Exist. EB Ground
Exist. WB Ground
SPLINE GRADE
STA = 1273+17.18 EL = 13.92 SSD = 1246' ex = 0.54' K = 400 L = 415.12
STA = 1284+50.50 EL = 13.01 SSD = 1179' ex = 0.25' K = 200 L = 200.00
STA = 1279+75.00 L = 415.12 ex = 0.50' K = 400 L = 400.00
Beg. MSE Wall Sta.1278+00.00 (Outside Shoulder)
End MSE Wall/ Beg. Special Design Wall Sta.1279+50.00 (Outside Shoulder)
End Special Design Wall Begin MSE Wall Sta.1287+80.00 (Outside Shoulder)
-0.01% (Approximate)
0.54%
0.50%
1748+00.00 1262+00.00
1750+00.00 1264+00.00
1752+00.00 1266+00.00
1754+00.00 1268+00.00
1756+00.00 1270+00.00
1758+00.00 1272+00.00
1760+00.00 1274+00.00
1762+00.00 1276+00.00
1764+00.00 1278+00.00
1766+00.00 1280+00.00
1768+00.00 1282+00.00
1770+00.00 1284+00.00
1772+00.00
1774+00.00
SCALE 0 200' 400'
PROJECT 0064-131-811
SHEET NO. 21

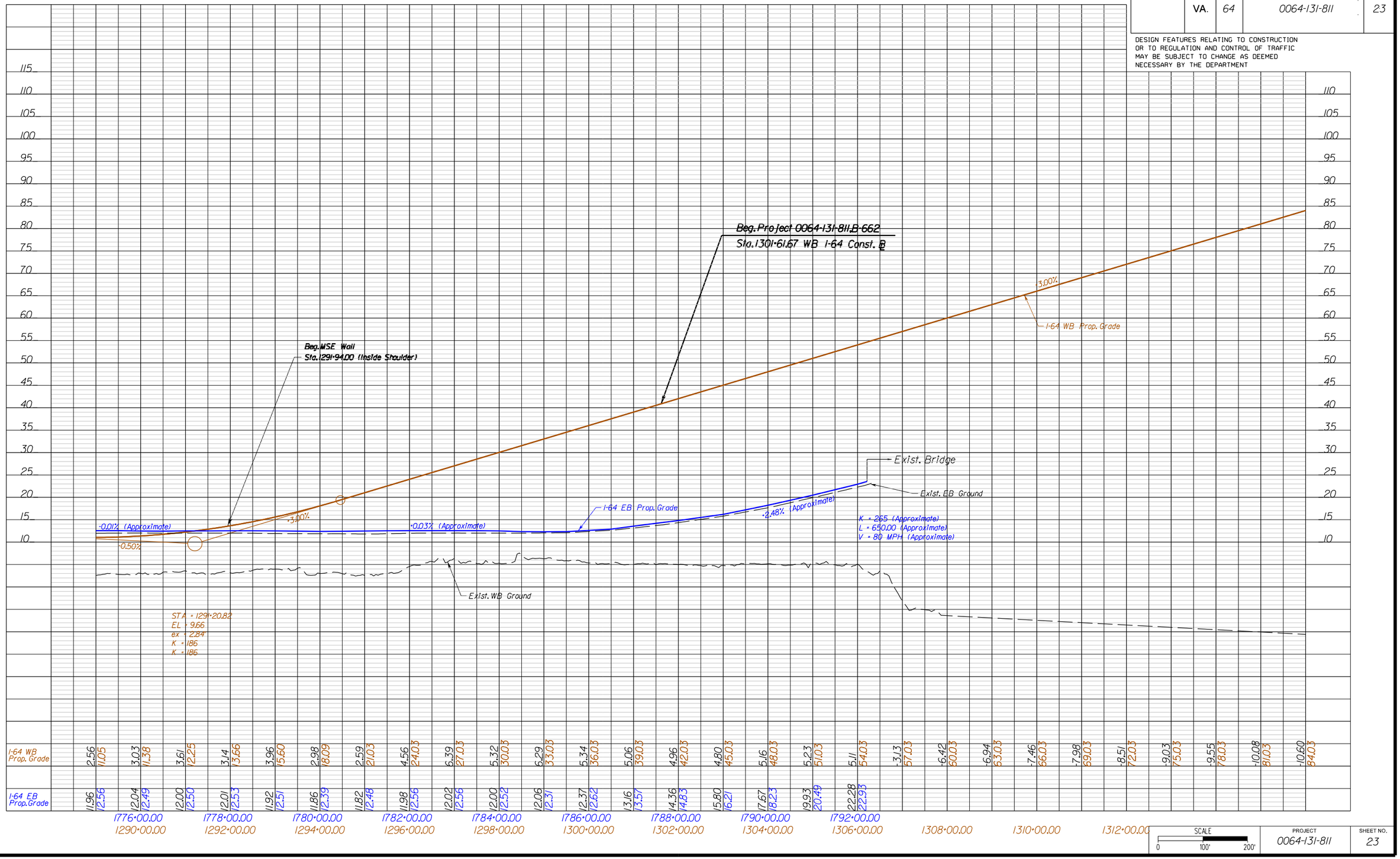
REVISED	STATE	STATE ROUTE	STATE PROJECT	SHEET NO.
	VA.	64	0064-131-811	22

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



REVISED	STATE	STATE ROUTE	STATE PROJECT	SHEET NO.
	VA.	64	0064-131-811	23

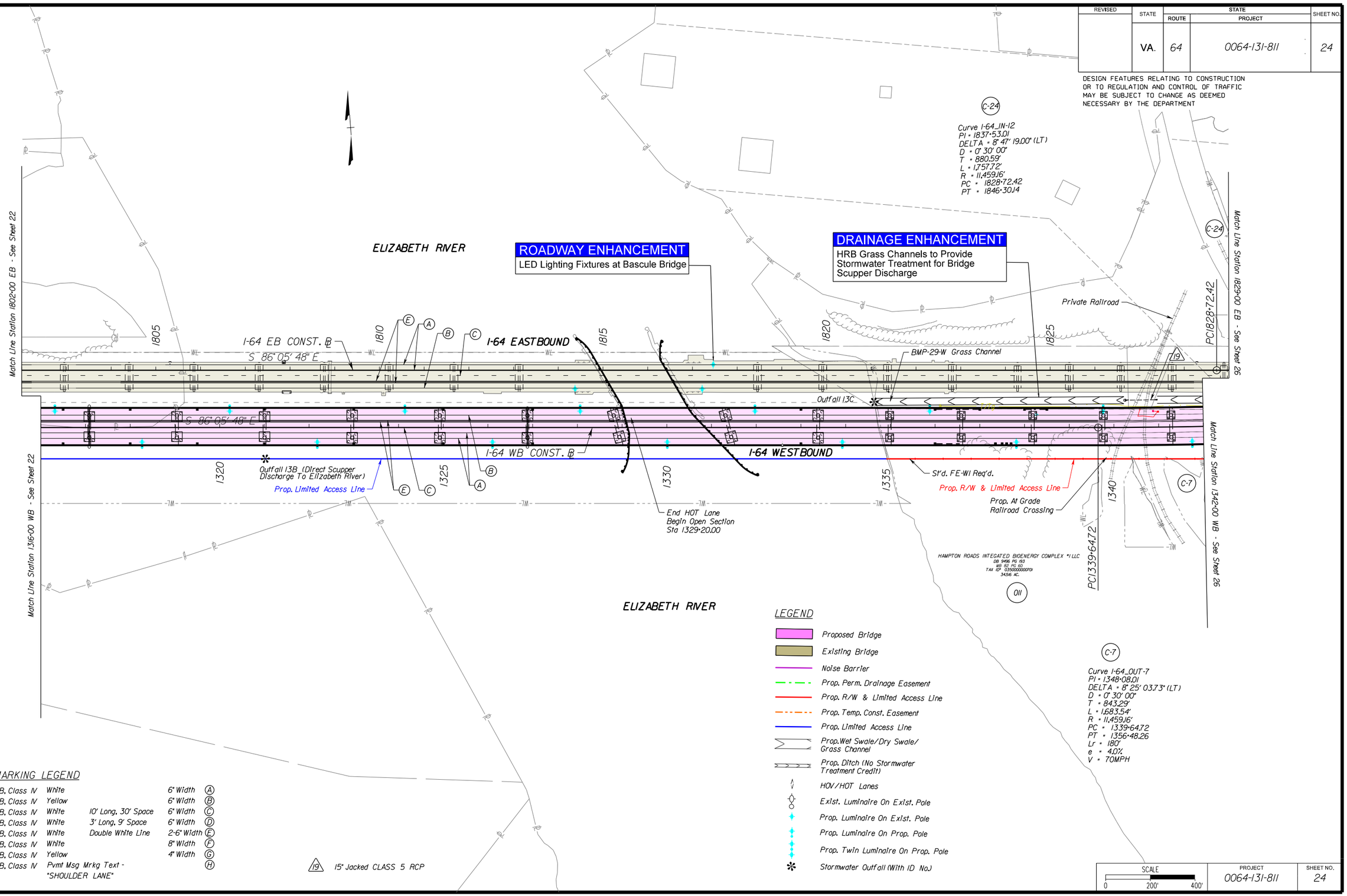
DESIGN FEATURES RELATING TO CONSTRUCTION OR TO REGULATION AND CONTROL OF TRAFFIC MAY BE SUBJECT TO CHANGE AS DEEMED NECESSARY BY THE DEPARTMENT



SCALE	PROJECT	SHEET NO.
0 100' 200'	0064-131-811	23

REVISED	STATE	STATE ROUTE	STATE PROJECT	SHEET NO.
	VA.	64	0064-131-811	24

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



PAVEMENT MARKING LEGEND

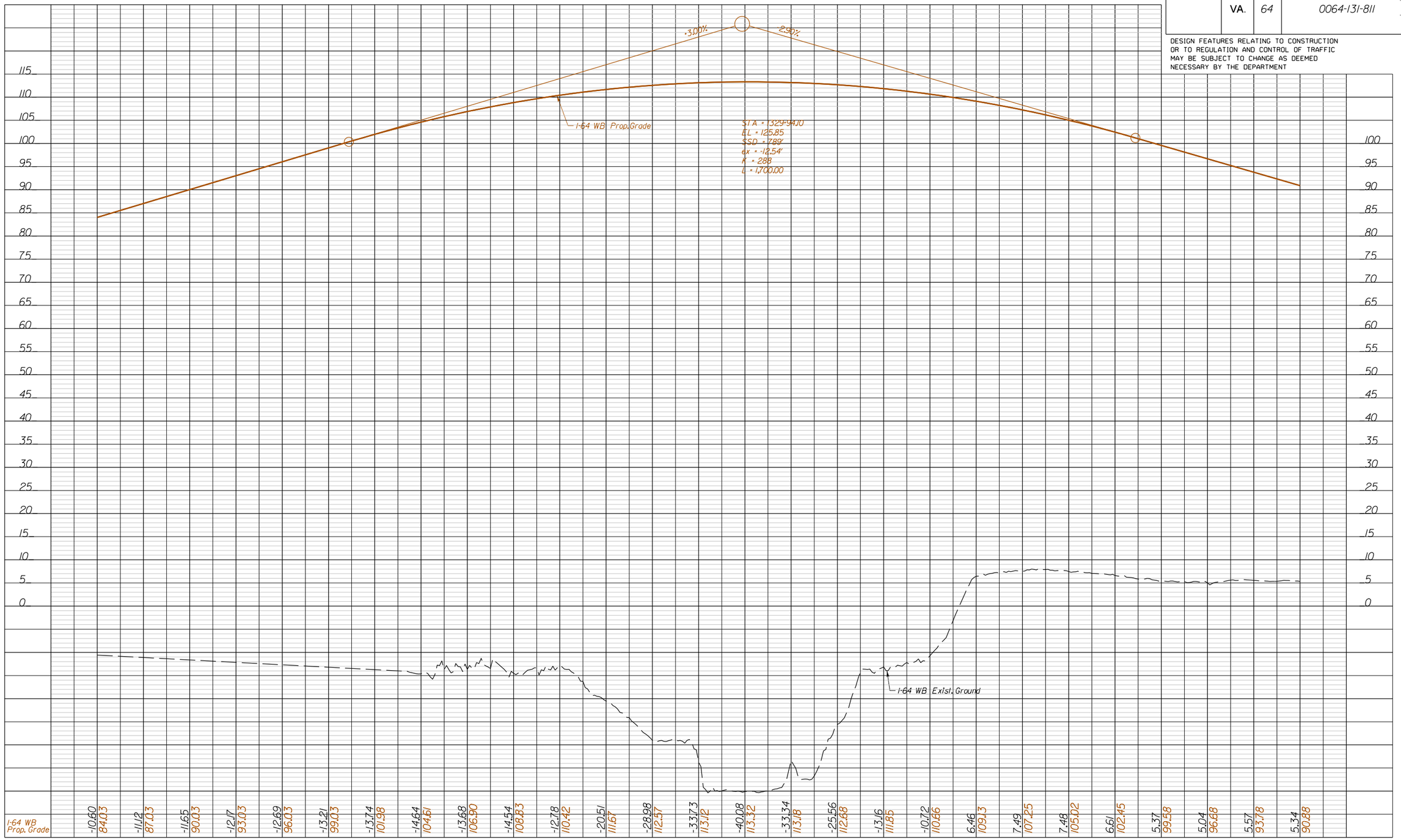
Solid Line	Type B, Class IV	White	6" Width	(A)
Solid Line	Type B, Class IV	Yellow	6" Width	(B)
Dashed Line	Type B, Class IV	White 10' Long, 30' Space	6" Width	(C)
Dashed Line	Type B, Class IV	White 3' Long, 9' Space	6" Width	(D)
Solid Line	Type B, Class IV	White Double White Line	2-6" Width	(E)
Solid Line	Type B, Class IV	White	8" Width	(F)
Solid Line	Type B, Class IV	Yellow	4" Width	(G)
Message	Type B, Class IV	Pvmt Msg Mrkg Text - "SHOULDER LANE"		(H)

19 15" Jacked CLASS 5 RCP

SCALE	PROJECT	SHEET NO.
0 200' 400'	0064-131-811	24

REVISED	STATE	STATE ROUTE	STATE PROJECT	SHEET NO.
	VA.	64	0064-131-811	25

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



SCALE	PROJECT	SHEET NO.
0 100' 200'	0064-131-811	25

REVISED	STATE	STATE ROUTE	STATE PROJECT	SHEET NO
	VA.	64	0064-131-811	26

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

3 15" RCP
4 18" RCP
6 30" RCP
10 15" Jacked RCP
12 24" Jacked RCP

LV-2
Curve LBVILLE2
PI = 109+35.09
DELTA = 1° 03' 32.95" (LT)
D = 11° 45' 54"
T = 30.04'
L = 60.00'
R = 487.00'
PC = 109+05.05
PRC = 109+65.06
e = NC
V = 30MPH

LV-3
Curve LBVILLE3
PI = 109+85.47
DELTA = 4° 33' 27.15" (RT)
D = 11° 10' 08"
T = 20.41'
L = 40.81'
R = 513.00'
PRC = 109+65.06
PT = 110+05.86
e = NC
V = 35MPH

DRAINAGE ENHANCEMENT
HRB Grass Channels to Provide Stormwater Treatment for Bridge Scupper Discharge

DRAINAGE ENHANCEMENT
Use Weir Walls as Stormwater Outlets

ROADWAY ENHANCEMENT
Reduced HRB length by 638 feet

ROADWAY ENHANCEMENT
Addition of an ADA accessible ramp on Libertyville Road.

ROADWAY ENHANCEMENT
Addition of an ADA accessible ramp and concrete bus pad on Libertyville Road.

UTILITY ENHANCEMENT
Realign Libertyville Road to avoid utility poles.

Match Line Station 1829+00 EBL - See Sheet 24
Match Line Station 1342+00 WBL - See Sheet 24
Match Line Station 1855+00 EBL See Sheet 28
Match Line Station 1368+00 WBL - See Sheet 28
BAINBRIDGE BLVD.
I-64 EB CONST. ℄
I-64 WB CONST. ℄
LIBERTYVILLE ROAD CONST. ℄
POT 50+00.00
POT 100+00.00
POT 57+00.00
POT 114+00.00
PT 1846+30.14
PT1363+15.20
PT1356+48.26
PC1360+92.72
PT1108+53.46
S 87° 08' 46" E
PC109+05.05
PRC109+65.06
PT110+05.86
End Project 0064-131-811, B-662
Sta 1364+51.34 WB I-64 Constr. ℄
N 83° 23' 13" E
N 85° 09' 09" E
N 85° 06' 53" E
N 84° 58' 33" E
S 8° 12' 53" E
S 89° 38' 52" E
Existing R/W & Limited Access Line
Prop. Perm. Access Easement
Prop. Perm. Drainage Easement
Prop. Temp. Drainage Easement
Std. FE-WI Req'd.
Prop. RW & Limited Access Line
Prop. at grade railroad crossing.
Prop. Limited Access Line
Tie to Exist. Barrier
Std. BPPS-1 Req'd.
BMP-29-W Grass Channel
BMP-1-E Constructed Wetland Level 2
Basin Access Road
28' Gate Req'd.
Existing Billboard
Noise Barrier *10
Noise Barrier *9
Std. MB-7F Req'd.
MSE Retaining Wall Req'd. (Sta. 1364+48.79 to Sta. 1368+30.43)
MSE Retaining Wall Req'd. (Sta. 1364+48.79 to Sta. 1368+50.00)
12' Shoulder Lane
14' Paved Shoulder
Prop. Perm. Easement for Bus Pad
Norfolk and Portsmouth Line Railroad

C-7
Curve I-64_OUT-7
PI = 1348+08.01
DELTA = 8° 25' 03.73" (LT)
D = 0° 30' 00"
T = 843.29'
L = 1,683.54'
R = 11,459.16'
PC = 1339+64.72
PT = 1356+48.26
Lr = 90°
e = 2.0%
V = 70MPH

C-21
Curve I-64_IN-12
PI = 1837+53.01
DELTA = 8° 47' 19.00" (LT)
D = 0° 30' 00"
T = 880.59'
L = 1,757.72'
R = 11,459.16'
PC = 1828+72.42
PT = 1846+30.14
Lr = 90°
e = 2.0%
V = 70MPH

C-7A
Curve I-64_OUT-8
PI = 1362+03.96
DELTA = 0° 30' 35.61" (LT)
D = 0° 13' 45"
T = 111.24'
L = 222.48'
R = 25,000.00'
PC = 1360+92.72
PT = 1363+15.20
e = NC
V = 70MPH

LV-1
Curve LBVILLE1
PI = 107+74.08
DELTA = 9° 28' 00.77" (RT)
D = 5° 56' 59"
T = 79.74'
L = 159.11'
R = 963.00'
PC = 106+94.34
PT = 108+53.46
e = NC
V = 40MPH

PAVEMENT MARKING LEGEND

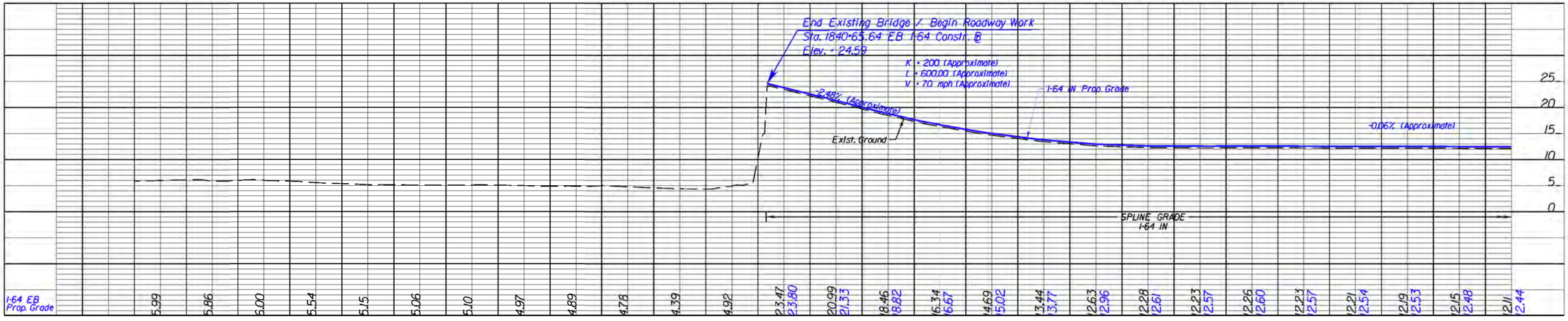
Solid Line	Type B, Class I	White	6" Width	Ⓐ
Solid Line	Type B, Class I	Yellow	6" Width	Ⓑ
Dashed Line	Type B, Class I	White 10' Long, 30' Space	6" Width	Ⓒ
Solid Line	Type B, Class I	White Double White Line	2-6" Width	Ⓔ
Message	Type B, Class I	Pvmt Msg Mrkg Text - "SHOULDER LANE"		Ⓗ

LEGEND

- Denotes Mill & Overlay
- Denotes New Pavement
- 10" 21A Gravel Base SWM Basin Access Road
- Noise Barrier
- Prop. Perm. Drainage Easement
- Prop. R/W & Limited Access Line
- Prop. Temp. Const. Easement
- Prop. Limited Access Line
- Prop. Wet Swale/Dry Swale/ Grass Channel
- Prop. Ditch (No Stormwater Treatment Credit)
- HOV/HOT Lanes
- Prop. Luminaire On Prop. Pole
- Prop. Twin Luminaire On Prop. Pole

Denotes Prop. Temp Constr. Easement
Denotes Prop. Perm. Drainage Easement

Note: See Typical Sections for Begin and End Stations of Libertyville Road, Ramps, CD Roads and Bulldog Drive/Private Entrance



SEE SHEET 27 FOR WB I-64 PROFILE

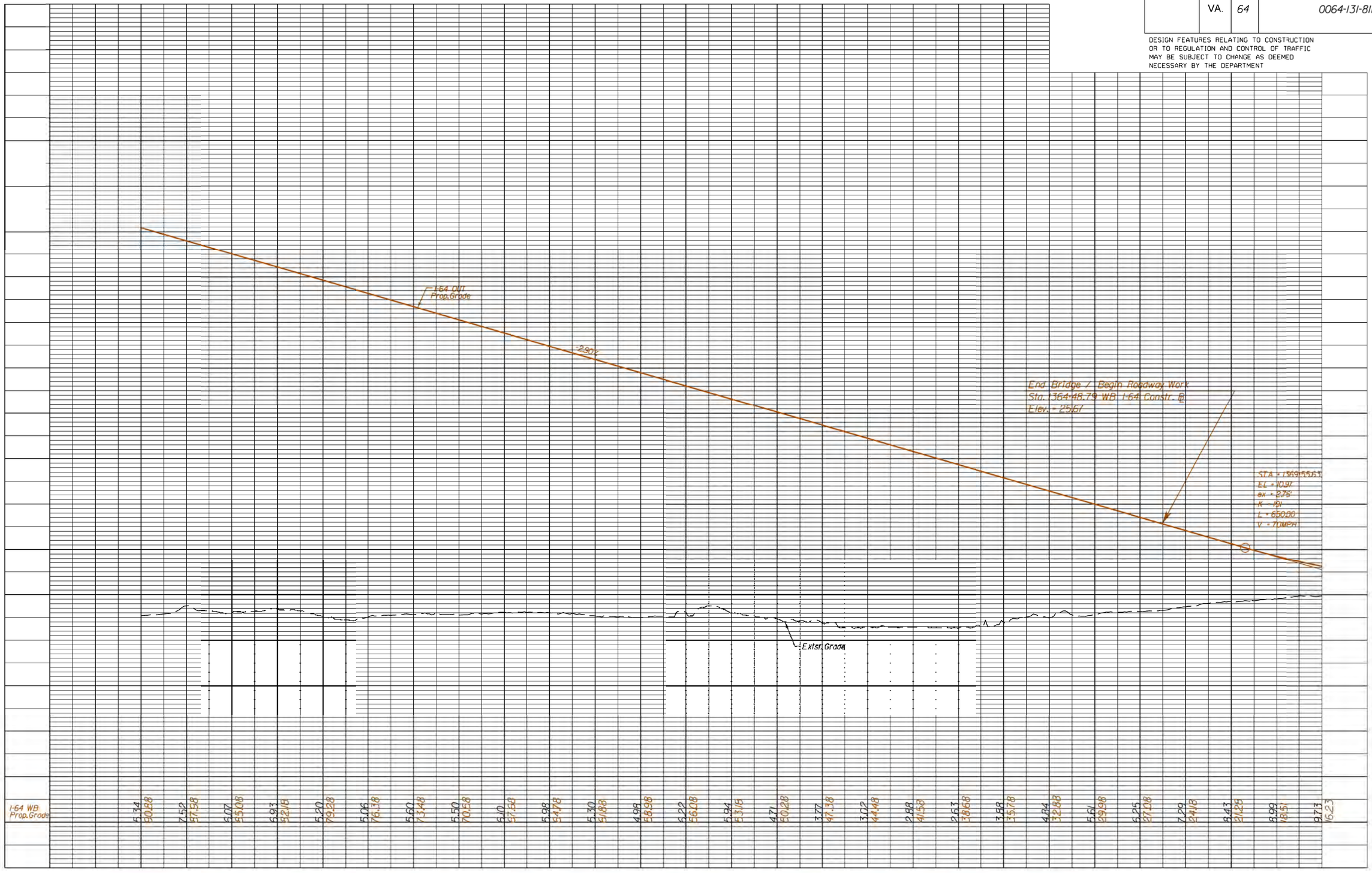
SCALE 0 200' 400'

PROJECT	SHEET NO
0064-131-811	26

8/3/2017

REVISED	STATE	STATE ROUTE	STATE PROJECT	SHEET NO
	VA.	64	0064-131-811	27

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



SCALE	PROJECT	SHEET NO.
0 200 400'	0064-131-811	27

REVISED	STATE	STATE ROUTE	STATE PROJECT	SHEET NO
	VA.	64	0064-131-811	28

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

- 3 15" RCP
- 4 18" RCP
- 5 24" RCP
- 6 30" RCP
- 7 36" RCP
- 8 42" RCP
- 9 48" RCP
- 12 24" Jacked RCP
- 16 48" Jacked RCP
- 17 60" x 38" Ellip.RCP

DRAINAGE ENHANCEMENT
Use Weir Walls as Stormwater Outlets

DRAINAGE ENHANCEMENT
Use Weir Walls as Stormwater Outlets

ROADWAY ENHANCEMENT
Improved Vertical Alignment of HRB and Approaches

ROADWAY ENHANCEMENT
Steepened side slopes at Ramp from I-64 WB to Great Bridge Boulevard to avoid archaeological area

Match Line Station 1855+00 EBL - See Sheet 26
Match Line Station 1368+00 WBL - See Sheet 26
Match Line Station 1878+00 EBL See Sheet 29
Match Line Station 1393+00 WBL - See Sheet 29
Std.FE-WI Req'd.
Prop.RW & Limited Access Line
Basin Access Road
BMP-2-E Wet Pond Level I
BMP-3-E Ext Detention Pond (Quantity Only)
Std.MB-7F Req'd.
Std.MB-8A Req'd.
Std.MB-7E Req'd.
Noise Barrier "10
I-64 EB CONST. ℄
12' Shoulder Lane
14' Paved Shoulder
Existing R/W & Limited Access Line
PCC 1389+25.52
PCC 1877+50.48
PC1861+44.17
Std.BPPS-1 Req'd.
End 12' Shoulder Lane
Std.GR-MGS2 Req'd.
12' Paved Shoulder
Std.GR-MGS1 Req'd.
4' Paved Shoulder
PC610+50.93
End MSE Retaining Wall Sta. 1368+50.00
Noise Barrier "9
Prop.RW
Tie to Exist. Barrier
PC1375+93.55
I-64 WB CONST. ℄
Std.GR-MGS1 Req'd.
N 78° 55' 19" E
PC603+32.29
PT605+86.13
S 75° 47' 05" E
8' Paved Shoulder
I-64 WB to GBB RAMP CONST. ℄
POT600+00.00

C-8 Curve I-64_OUT-9
PI = 1382+64.26
DELTA = 16° 38' 54.21" (LT)
D = 1° 15' 00"
T = 670.71'
L = 1,331.97'
R = 4,584.00'
PC = 1375+93.55
PCC = 1389+25.52
Lr = 198'
e = 4.4%
V = 70MPH

C-22 Curve I-64_IN-13
PI = 1869+55.65
DELTA = 20° 04' 44.14" (LT)
D = 1° 15' 00"
T = 811.48'
L = 1,606.31'
R = 4,583.66'
PC = 1861+44.17
PCC = 1877+50.48
Lr = 264'
e = 4.4%
V = 70MPH

R-1 Curve RPGBB_3
PI = 604+61.31
DELTA = 25° 17' 36.26" (RT)
D = 9° 57' 52"
T = 129.02'
L = 253.84'
R = 575.00'
PC = 603+32.29
PT = 605+86.13
Lr = 190'
e = 7.8%
V = 40MPH

R-2 Curve RPGBB_6
PI = 612+21.74
DELTA = 52° 01' 39.11" (LT)
D = 16° 22' 13"
T = 170.81'
L = 317.82'
R = 350.00'
PC = 610+50.93
PT = 613+68.75
Lr = 192'
e = 8.0%
V = 35MPH

C-9 Curve I-64_OUT-10
PI = 1401+75.78
DELTA = 24° 37' 18.45" (LT)
D = 1° 00' 00"
T = 1,250.27'
L = 2,461.93'
R = 5,729.00'
PCC = 1389+25.52
PT = 1413+87.45
Lr = 162'
e = 3.6%
V = 70MPH

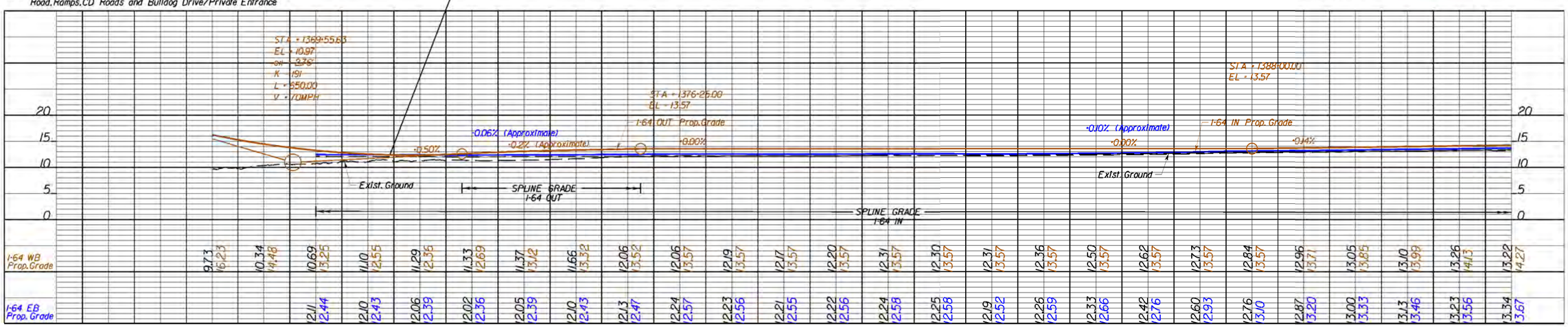
C-23 Curve I-64_IN-14
PI = 1888+21.72
DELTA = 21° 10' 48.86" (LT)
D = 1° 00' 00"
T = 1,071.24'
L = 2,118.02'
R = 5,729.58'
PCC = 1877+50.48
PT = 1898+68.51
Lr = 216'
e = 3.6%
V = 70MPH

PAVEMENT MARKING LEGEND

Solid Line	Type B, Class I	White	6" Width	Ⓐ
Solid Line	Type B, Class I	Yellow	6" Width	Ⓑ
Dashed Line	Type B, Class I	White	10' Long, 30' Space 6" Width	Ⓒ
Solid Line	Type B, Class I	White	Double White Line 2-6" Width	Ⓔ
Solid Line	Type B, Class I	White	8" Width	Ⓕ

Note: See Typical Sections for Begin and End Stations of Libertyville Road, Ramps, CD Roads and Bulldog Drive/Private Entrance

LEGEND
- Denotes Mill & Overlay
- Denotes New Pavement
- 10' 21A Gravel Base SWM Basin Access Road
- Noise Barrier
- Prop. Perm. Drainage Easement
- Prop. R/W & Limited Access Line
- Prop. Temp. Const. Easement
- Prop. Ditch (No Stormwater Treatment Credit)
- HOV/HOT Lanes
- Prop. Luminaire On Prop. Pole
- Prop. Twin Luminaire On Prop. Pole



6/4/2017

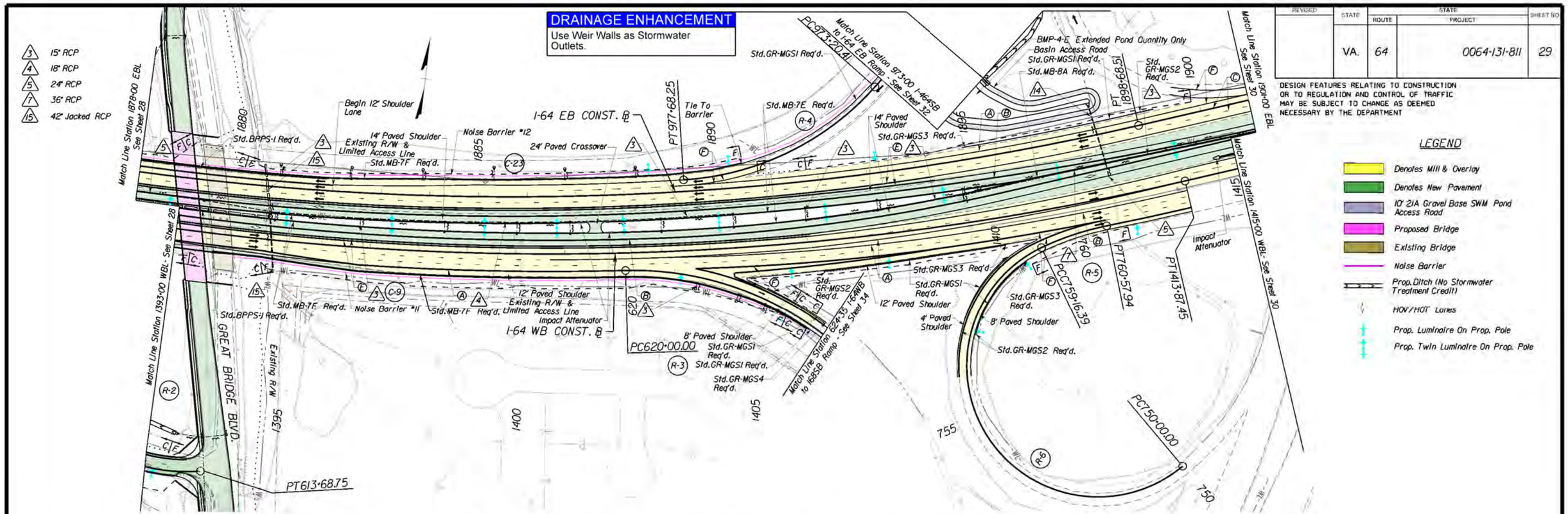
SCALE	PROJECT	SHEET NO.
0 200' 400'	0064-131-811	28

REVISED	STATE	STATE ROUTE	STATE PROJECT	SHEET NO
	VA.	64	0064-131-811	29

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

3 15" RCP
4 18" RCP
5 24" RCP
7 36" RCP
15 42" Jacked RCP

DRAINAGE ENHANCEMENT
Use Weir Walls as Stormwater Outlets.



LEGEND

- Denotes Mill & Overlay
- Denotes New Pavement
- 10' 21A Gravel Base SWM Pond Access Road
- Proposed Bridge
- Existing Bridge
- Noise Barrier
- Prop. Ditch (No Stormwater Treatment Credit)
- HOV/HOT Lanes
- Prop. Luminaire On Prop. Pole
- Prop. Twin Luminaire On Prop. Pole

PAVEMENT MARKING LEGEND

Solid Line	Type B, Class I	White	6" Width	Ⓐ
Solid Line	Type B, Class I	Yellow	6" Width	Ⓑ
Dashed Line	Type B, Class I	White (10' Long, 30' Space)	6" Width	Ⓒ
Solid Line	Type B, Class I	White (Double White Line)	2-6" Width	Ⓔ
Solid Line	Type B, Class I	White	8" Width	Ⓕ

Note: See Typical Sections for Begin and End Stations of Libertyville Road, Ramps, CD Roads and Bulldog Drive/Private Entrance

R-2
Curve RPGBB_6
PI = 612+21.74
DELTA = 52° 01' 39.11" (LT)
D = 16° 22' 13"
T = 170.81'
L = 317.82'
R = 350.00'
PC = 610+50.93
PT = 613+68.75
Lr = 192'
e = 8.0%
V = 35MPH

C-9
Curve I-64_OUT-10
PI = 1401+75.78
DELTA = 24° 37' 18.45" (LT)
D = 1° 00' 00"
T = 1,250.27'
L = 2,461.93'
R = 5,729.00'
PCC = 1389+25.52
PT = 1413+87.45
Lr = 162'
e = 3.6%
V = 70MPH

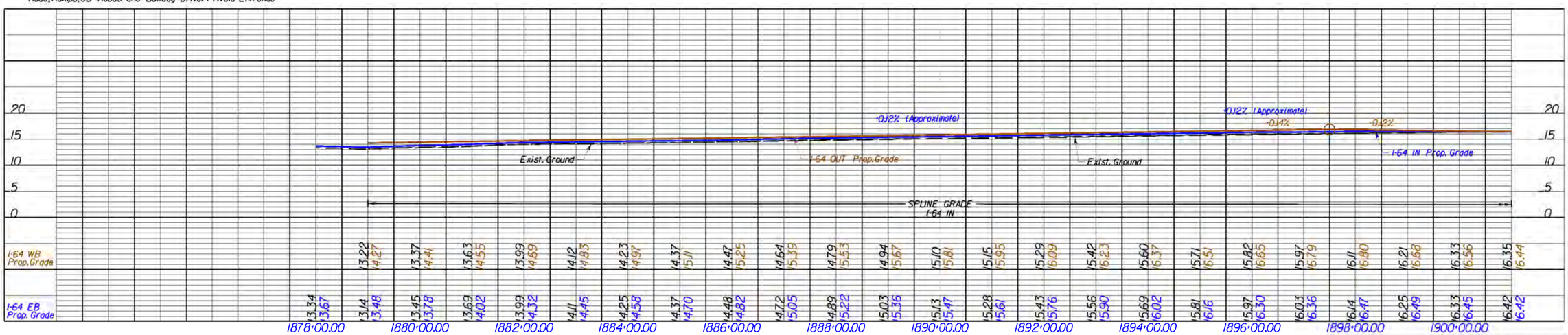
C-23
Curve I-64_IN-14
PI = 1888+21.72
DELTA = 2° 10' 48.86" (LT)
D = 1° 00' 00"
T = 1,071.24'
L = 2,118.02'
R = 5,729.58'
PCC = 1877+50.48
PT = 1898+68.51
Lr = 216'
e = 3.6%
V = 70MPH

R-3
Curve RPWBSBI68_1
PI = 622+63.70
DELTA = 45° 00' 10.60" (RT)
D = 9° 00' 02"
T = 263.70'
L = 500.00'
R = 636.57'
PC = 620+00.00
PT = 625+00.00
e = MATCH EXISTING
V = 40MPH

R-4
Curve RPEBSB464_3
PI = 975+56.47
DELTA = 44° 46' 52.73" (RT)
D = 9° 59' 58"
T = 236.06'
L = 447.84'
R = 572.99'
PC = 973+20.41
PT = 977+68.25
e = MATCH EXISTING
V = 40MPH

R-5
Curve RPWBSB464_1
PI = 771+27.71
DELTA = 194° 27' 50.39" (RT)
D = 21° 13' 14"
T = Inf.
L = 916.39'
R = 270.00'
PC = 750+00.00
PCC = 759+16.39
e = MATCH EXISTING
V = 30MPH

R-6
Curve RPWBSB464_2
PI = 759+87.53
DELTA = 14° 09' 18.39" (RT)
D = 10° 00' 00"
T = 71.14'
L = 141.55'
R = 572.96'
PCC = 759+16.39
PT = 760+57.94
e = MATCH EXISTING
V = 30MPH



SCALE	PROJECT	SHEET NO.
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8/4/2017

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REVISED	STATE	STATE ROUTE	STATE PROJECT	SHEET NO
	VA.	64	0064-131-811	30

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

3 15" RCP
4 18" RCP
5 24" RCP
9 48" RCP
15 42" Jacked RCP

DRAINAGE ENHANCEMENT
Use Weir Walls as Stormwater Outlets.

DRAINAGE ENHANCEMENT
Use Weir Walls as Stormwater Outlets.

POT 880+52.66
880
N 81° 22' 39" W
I-64EB to I-464NB Ramp Constr. ℄
PT 875+46.38
875
I-464 SBL
I-464 NBL
BMP-5-E Constructed Wetland Level 2
Basin Access Road
Std. CR
Impact Attenuator
Match Line Station 1901+00 EBL - See Sheet 29
Std. MB-8A Req'd.
Std. BBPS-1 Req'd.
4' Paved Shoulder
1905
Std. MB-8A Req'd.
Std. MB-7E Req'd.
Std. GR-MGS3 Req'd.
Std. GR-MGS2 Req'd.
Std. GR-MGS1 Req'd.
1910
R-7
1915
Existing R/W & Limited Access Line
I-64 EB CONST. ℄
PC 870+00.00
N 43° 51' 20" E
N 43° 42' 20" E
I-64 WB CONST. ℄
Match Line Station 1415+00 WBL See Sheet 29
Std. BBPS-1 Req'd.
1420
1425
14' Paved Shoulder
PC 1915+12.42
Existing R/W & Limited Access Line
1430
Std. MB-7E Req'd.
Std. GR-MGS4 Req'd.
Std. GR-MGS1 Req'd.
8' Paved Shoulder
PC 1434+59.79
1435
Noise Barrier #13B
Std. GR-MGS3 Req'd.
6' Paved Shoulder
Std. MB-7D Req'd.
C-10
C-11
End Managed Lane Sta. 1439+28.00
14' Paved Shoulder
1440
Prop. Perm. Drainage Easement
026 BISHOP WALTER F SULLIVAN
027 GERARD W MCGUIRE & CATHY L MCGUIRE
020 INTERSTATE CONDOS INC
Prop. Perm. Drainage Easement
14' Paved Shoulder
PT 1923+46.84
PRC 1438+12.57
Begin Extension of HOV Lane Sta. 1924+85.00
Std. GR-MGS3 Req'd.
Std. GR-MGS1
Std. GR-MGS2 Req'd.
BMP-5-E Ext Detention Pond Quality Only
C-24
1920
Basin Access Road
1925
Std. MB-7D Req'd.
N 44° 41' 24" E
PI 1927+60.27
End Roadway Work Sta. 1927+52.33 EB I-64 Constr. ℄
Match Line Station 1928+00 EBL - See Sheet 31
Match Line Station 1442+00 WBL See Sheet 31

LEGEND

- Denotes Mill & Overlay
- Denotes New Pavement
- 10' 21A Gravel Base SWM Basin Access Road
- Noise Barrier
- Prop. Perm. Drainage Easement
- Prop. Ditch (No Stormwater Treatment Credit)
- HOV/HOT Lanes
- Prop. Luminaire On Prop. Pole
- Prop. Twin Luminaire On Prop. Pole

PAVEMENT MARKING LEGEND

Solid Line	Type B, Class I	White		6" Width Ⓐ
Solid Line	Type B, Class I	Yellow		6" Width Ⓑ
Dashed Line	Type B, Class I	White	10' Long, 30' Space	6" Width Ⓒ
Dashed Line	Type B, Class I	White	3' Long, 9' Space	6" Width Ⓓ
Solid Line	Type B, Class I	White	Double White Line	2-6" Width Ⓔ
Solid Line	Type B, Class I	White		8" Width Ⓕ

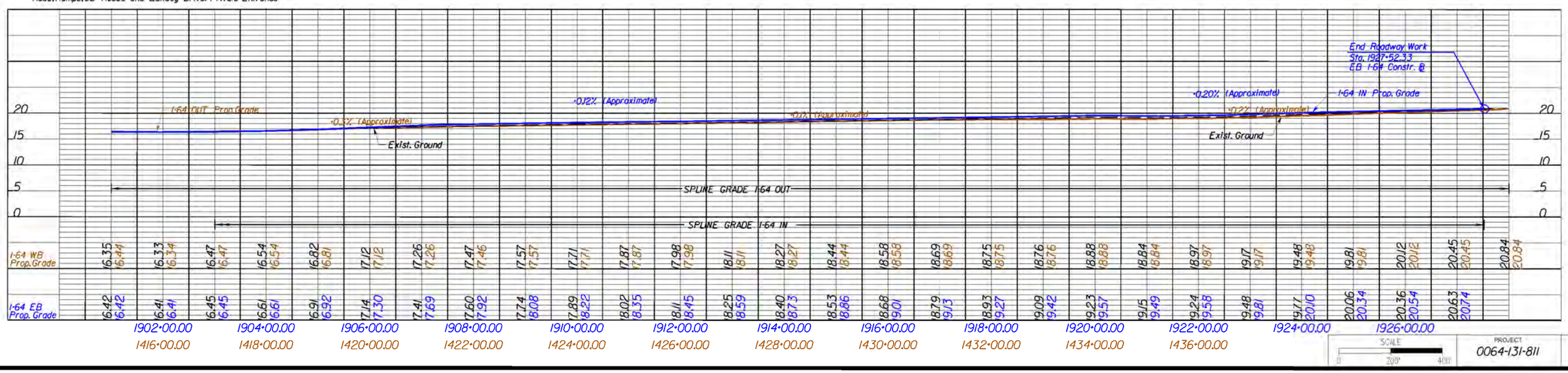
R-7
Curve 64EB_464NB-1
PI = 872+95.96
DELTA = 54° 38' 15.10" (RT)
D = 10° 00' 00"
T = 295.96'
L = 546.38'
R = 572.96'
PC = 870+00.00
PT = 875+46.38
NOT USED

C-24
Curve I-64_IN-I5
PI = 1919+29.64
DELTA = 0° 50' 03.93" (RT)
D = 0° 06' 00"
T = 417.22'
L = 834.42'
R = 57,295.78'
PC = 1915+12.42
PT = 1923+46.84
e = NC
V = 70MPH

C-10
Curve I-64_OUT-11
PI = 1436+36.19
DELTA = 1° 10' 32.94" (LT)
D = 0° 20' 00"
T = 176.39'
L = 352.77'
R = 17,190.00'
PC = 1434+59.79
PRC = 1438+12.57
e = NC
V = 70MPH

C-11
Curve I-64_OUT-12
PI = 1440+12.28
DELTA = 1° 19' 52.50" (RT)
D = 0° 20' 00"
T = 199.71'
L = 399.40'
R = 17,190.00'
PRC = 1438+12.57
PT = 1442+11.97
e = NC
V = 70MPH

Note: See Typical Sections for Begin and End Stations of Libertyville Road, Ramps, CD Roads and Bulldog Drive/Private Entrance



SCALE 0 200' 400'

PROJECT	SHEET NO.
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8/4/2017

REVISED	STATE	STATE ROUTE	STATE PROJECT	SHEET NO
	VA.	64	0064-131-811	31

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

PAVEMENT MARKING LEGEND

Solid Line	Type B, Class I	White		6" Width (A)
Solid Line	Type B, Class I	Yellow		6" Width (B)
Dashed Line	Type B, Class I	White	10' Long, 30' Space	6" Width (C)
Solid Line	Type B, Class I	White		8" Width (F)

UTILITY ENHANCEMENT
Avoid gas main near Battlefield Boulevard

DRAINAGE ENHANCEMENT
Use Weir Walls as Stormwater Outlets.

ROADWAY ENHANCEMENT
Shifted alignment of Bulldog Drive to avoid utility impacts

Match Line Station 1928+00 EBL - See Sheet 30

Match Line Station 1442+00 WBL-See Sheet 30

I-64 WB CONST. ℄

I-64 EB CONST. ℄

BULLDOG DR. & PRIVATE ENTR. CONST. ℄

CD Constr. ℄

CD TO BATTLEFIELD BLVD. RAMP CONST. ℄

End Roadway Work Sta. 1466+78.99 WB I-64 Constr. ℄

Existing R/W & Limited Access Line

Existing R/W & LA Line

Prop. Perm. Drainage Easement

Prop. Temp. Constr. Easement

Prop. R/W & Limited Access Line

Prop. RW

Remove Ex. Barrier

Remove Ex. Barrier Impact Attenuator Req'd.

Std. GR-MGS1 Req'd.

Std. GR-MGS2 Req'd.

Std. GR-MGS3 Req'd.

Std. GR-MGS4

Std. GR-FOA-2 Type I

Std. MB-13 Req'd.

Std. MB-7D Req'd.

Std. MB-8A Req'd.

Std. MB-12C

Std. FE-WI Req'd.

N 43° 51' 40" E

S 27° 09' 53" E

6' Paved Shoulder

14' Paved Shoulder

10' Paved Shoulder

8' Paved Shoulder

4' Paved Shoulder

Noise Barrier *15

Tie To Exist. Barrier

Existing R/W & Limited Access Line

Basin Access Road

BMP-7-E Ext Detention Pond Quality Only

Match Line Station 777+50 CD to Battlefield Blvd.Ramp - See Sheet 34

PC 1442+11.97

PC 5000+00.00

POT 190+00.00

PI 190+55.74

PT 192+02.27

PRC 5003+12.25

PC 192+89.01

PCC 195+28.63

PT 5006+24.50

PC 5006+74.50

PRC 199+59.14

PT 200+36.36

PC 5011+64.43

PC 770+00.00

PT 776+84.89

PT 5017+92.99

(3) 15" RCP
(4) 18" RCP
(5) 24" RCP
(8) 42" RCP

(B-1) Curve PEBD_3
PI = 191+29.04
DELTA = 4° 15' 58.19" (RT)
D = 2° 54' 41"
T = 73.30'
L = 146.53'
R = 1,967.99'
PC = 190+55.74
PT = 192+02.27
e = NC
V = 25MPH

(D-1) Curve CD_1
PI = 5001+56.28
DELTA = 6° 14' 41.91" (RT)
D = 2° 00' 00"
T = 156.28'
L = 312.25'
R = 2,864.79'
PC = 5000+00.00
PRC = 5003+12.25
Lr = 139'
e = 5.2%
V = 60MPH

(B-2) Curve PEBD_6
PI = 194+08.87
DELTA = 4° 07' 15.03" (LT)
D = 1° 43' 11"
T = 119.86'
L = 239.62'
R = 3,331.70'
PC = 192+89.01
PCC = 195+28.63
e = NC
V = 25MPH

(D-2) Curve CD_2
PI = 5004+68.53
DELTA = 6° 14' 41.91" (LT)
D = 2° 00' 00"
T = 156.28'
L = 312.25'
R = 2,864.79'
PRC = 5003+12.25
PT = 5006+24.50
Lr = 139'
e = 5.2%
V = 60MPH

(B-3) Curve PEBD_7
PI = 197+43.91
DELTA = 1° 58' 05.29" (LT)
D = 0° 27' 26"
T = 215.27'
L = 430.50'
R = 12,532.66'
PCC = 195+28.53
PRC = 199+59.14
e = NC
V = 25MPH

(D-3) Curve CD_5
PI = 5009+19.50
DELTA = 2° 25' 43.28" (LT)
D = 0° 29' 45"
T = 245.00'
L = 489.93'
R = 11,558.00'
PC = 5006+74.50
PRC = 5011+64.43
e = NC
V = 60MPH

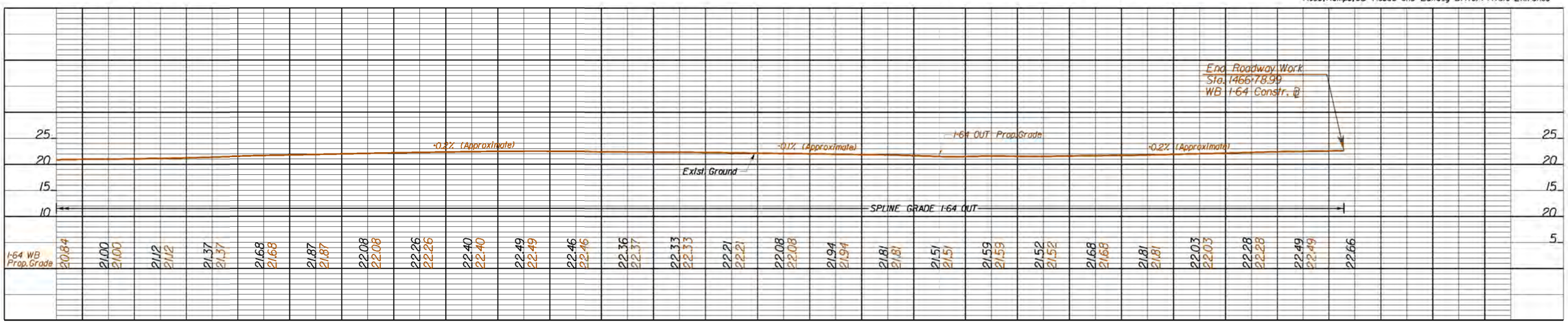
(B-4) Curve PEBD_8
PI = 200+16.92
DELTA = 110° 37' 04.60" (RT)
D = 143° 14' 22"
T = 57.79'
L = 77.23'
R = 40.00'
PRC = 199+59.14
PT = 200+36.36
e = NC
V = 15MPH

(R-8) Curve RPCDBFB_1
PI = 773+68.41
DELTA = 52° 19' 17.28" (RT)
D = 7° 38' 22"
T = 368.41'
L = 684.89'
R = 750.00'
PC = 770+00.00
PT = 776+84.89
Lr = 62'
e = 7.8%
V = 45MPH

(D-4) Curve CD_6
PI = 5014+78.88
DELTA = 4° 42' 51.16" (RT)
D = 0° 45' 00"
T = 314.46'
L = 628.56'
R = 7,639.44'
PRC = 5011+64.43
PT = 5017+92.99
Lr = 205'
e = 2.3%
V = 60MPH

LEGEND
- Denotes Mill & Overlay
- Denotes New Pavement
- 10' 21A Gravel Base SWM Basin Access Road
- Noise Barrier
- Prop. Perm. Drainage Easement
- Prop. R/W & Limited Access Line
- Prop. Temp. Const. Easement
- Prop. Ditch (No Stormwater Treatment Credit)
- Prop. Luminaire On Prop. Pole
- Prop. Twin Luminaire On Prop. Pole

Note: See Typical Sections for Begin and End Stations of Libertyville Road, Ramps, CD Roads and Bulldog Drive/Private Entrance



SCALE	PROJECT	SHEET NO.
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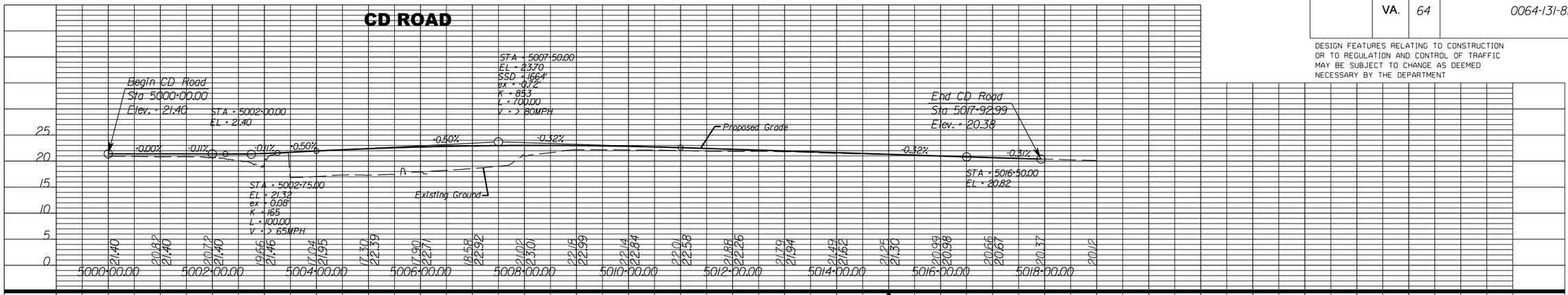
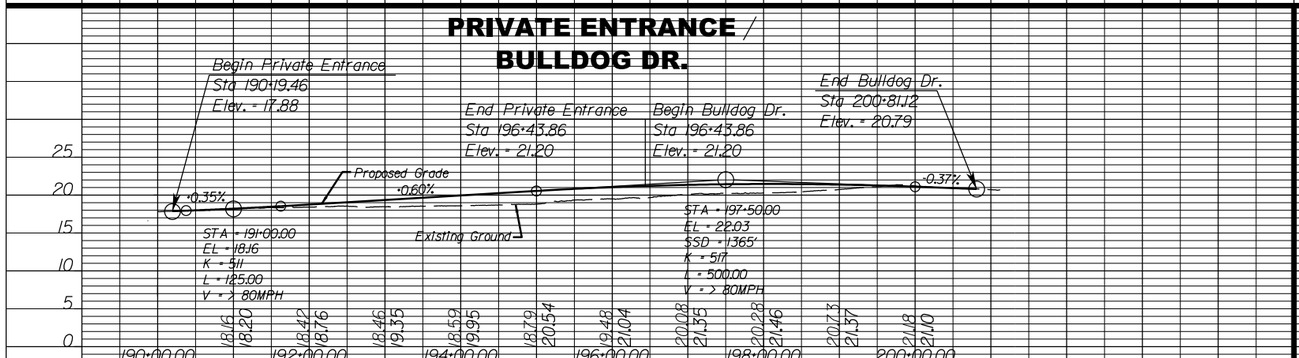
DESIGN FEATURES RELATING TO CONSTRUCTION OR TO REGULATION AND CONTROL OF TRAFFIC MAY BE SUBJECT TO CHANGE AS DEEMED NECESSARY BY THE DEPARTMENT

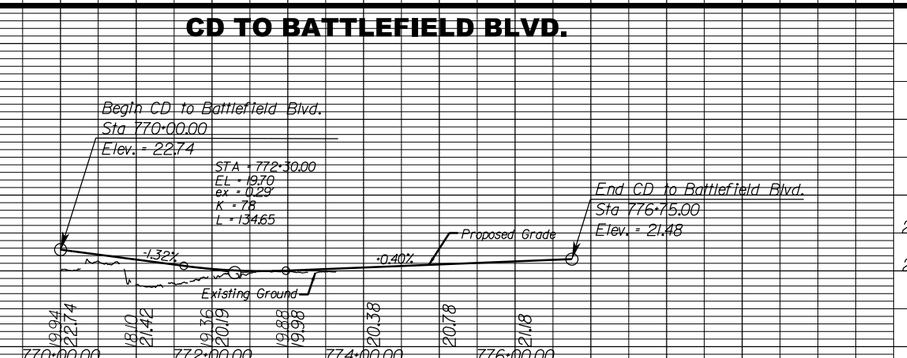
CD ROAD



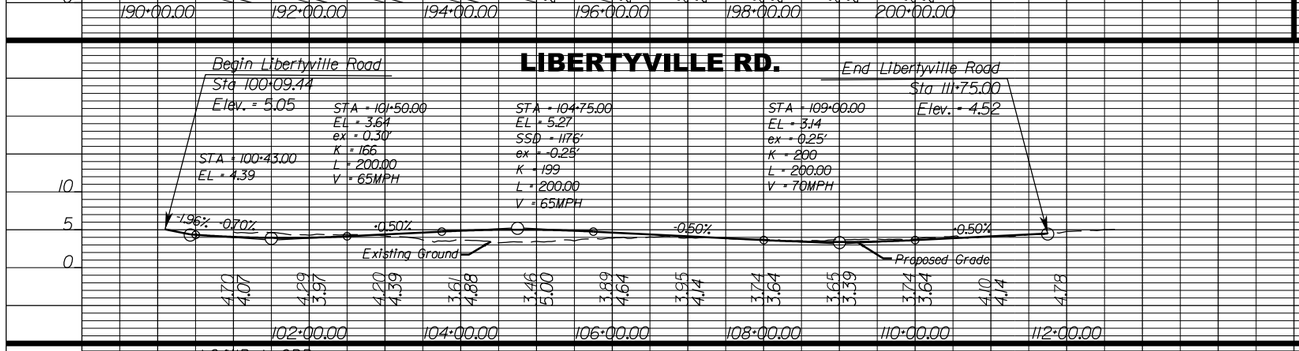
PRIVATE ENTRANCE / BULLDOG DR.



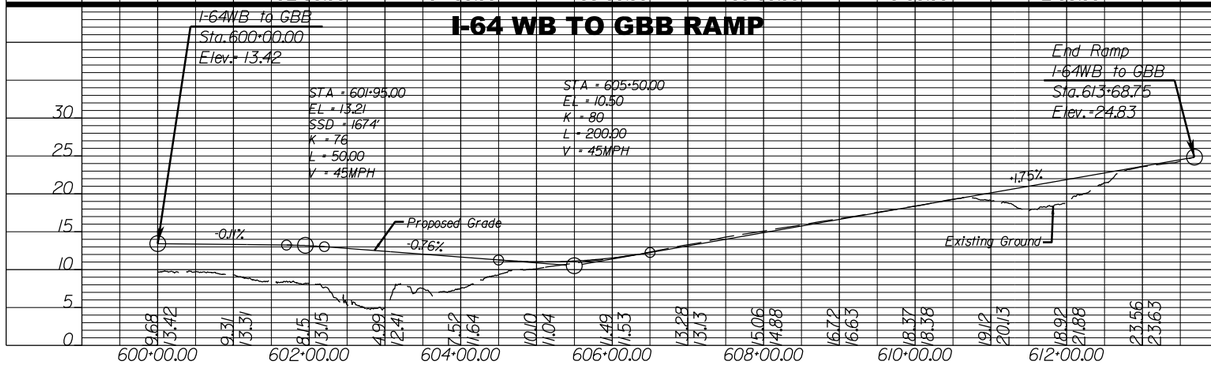
CD TO BATTLEFIELD BLVD.



LIBERTYVILLE RD.



I-64 WB TO GBB RAMP



SCALE	PROJECT	SHEET NO.
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8/3/2017

LEGEND

- Denotes New Pavement
- 10' 21A Gravel Base SWM Basin Access Road
- Proposed Bridge
- Existing Bridge
- Prop. Luminaire On Prop. Pole
- Prop. Pedestrian Signal and Audible Pushbotton
- Prop. Signal Mast Arm Pole, Signal Heads, Video Detection Camera, Pre-Emption Sensor and Street Name Sign
- (3) 15" RCP

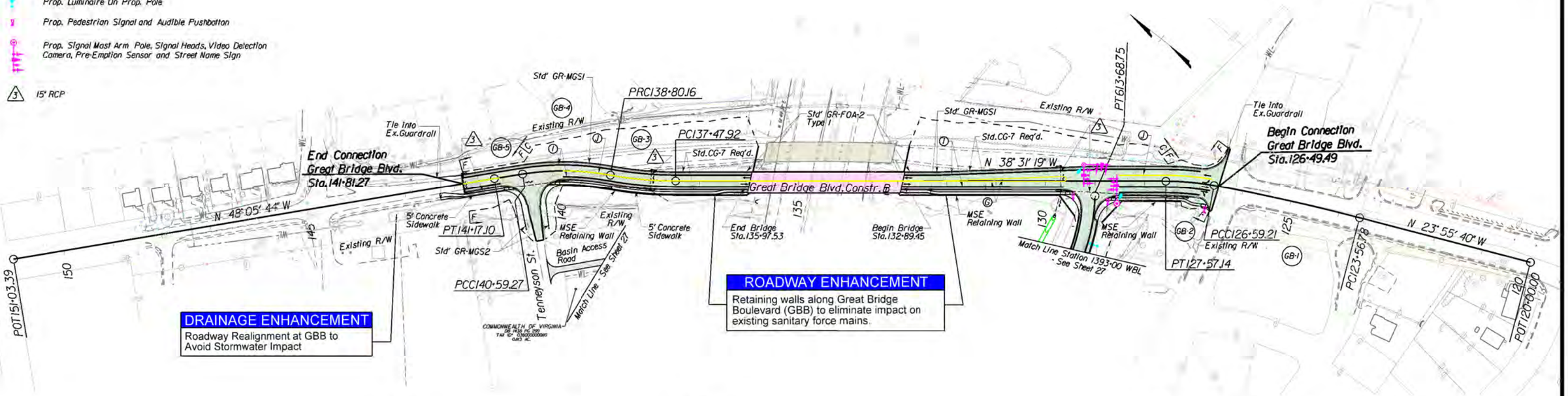
PAVEMENT MARKING LEGEND

Solid Line	Type B, Class I	Yellow	4" Width (G)
Solid Line	Type B, Class I	White	4" Width (I)
Solid Line	Type B, Class I	Yellow Double Yellow Line	2-4" Width (J)

Note: Bicycle lane symbol shown on Typical Section Sheet 9

REVISED	STATE	STATE ROUTE	STATE PROJECT	SHEET NO
	VA.	64	0064-131-811	33

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



DRAINAGE ENHANCEMENT
Roadway Realignment at GBB to Avoid Stormwater Impact

ROADWAY ENHANCEMENT
Retaining walls along Great Bridge Boulevard (GBB) to eliminate impact on existing sanitary force mains.

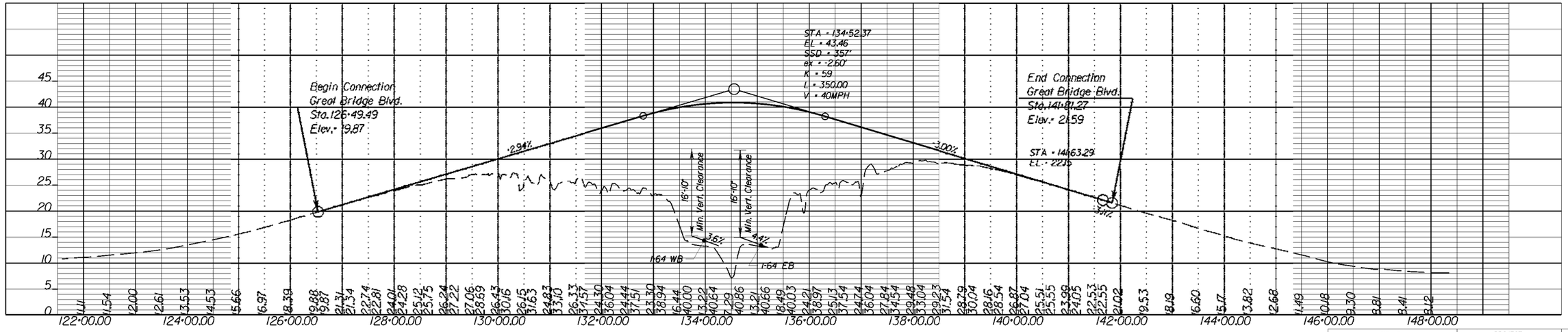
(GB-5)
Curve GBB_9
PI = 140+88.19
DELTA = 0° 41' 40.96" (LT)
D = 1° 12' 04"
T = 28.92'
L = 57.84'
R = 4,770.00'
PCC = 140+59.27
PT = 141+17.10
e = NC
V = 40MPH

(GB-4)
Curve GBB_8
PI = 139+70.56
DELTA = 19° 08' 43.93" (LT)
D = 10° 41' 22"
T = 90.40'
L = 179.11'
R = 536.00'
PRC = 138+80.16
PCC = 140+59.27
Lr = 104'
e = 4.0%
V = 40MPH

(GB-3)
Curve GBB_7
PI = 138+14.22
DELTA = 10° 16' 00.29" (RT)
D = 7° 45' 49"
T = 66.30'
L = 132.24'
R = 738.00'
PC = 137+47.92
PRC = 138+80.16
Lr = 99'
e = 3.8%
V = 40MPH

(GB-2)
Curve GBB_4
PI = 127+08.31
DELTA = 10° 28' 07.05" (LT)
D = 10° 41' 22"
T = 49.10'
L = 97.93'
R = 536.00'
PCC = 126+59.21
PT = 127+57.14
Lr = 104'
e = 4.0%
V = 40MPH

(GB-1)
Curve GBB_3
PI = 125+08.06
DELTA = 4° 07' 32.33" (LT)
D = 1° 21' 51"
T = 151.28'
L = 302.43'
R = 4,200.00'
PC = 123+56.78
PCC = 126+59.21
Lr = 69'
e = 2.0%
V = 40MPH



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SCALE	PROJECT	SHEET NO.
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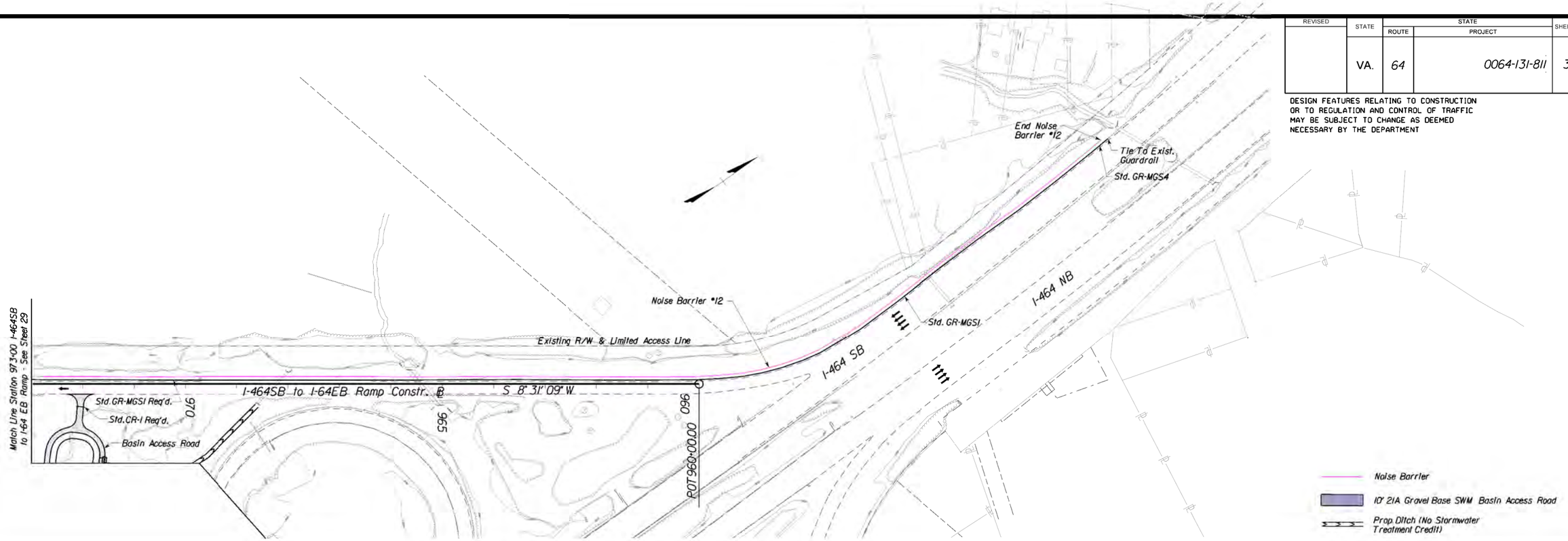
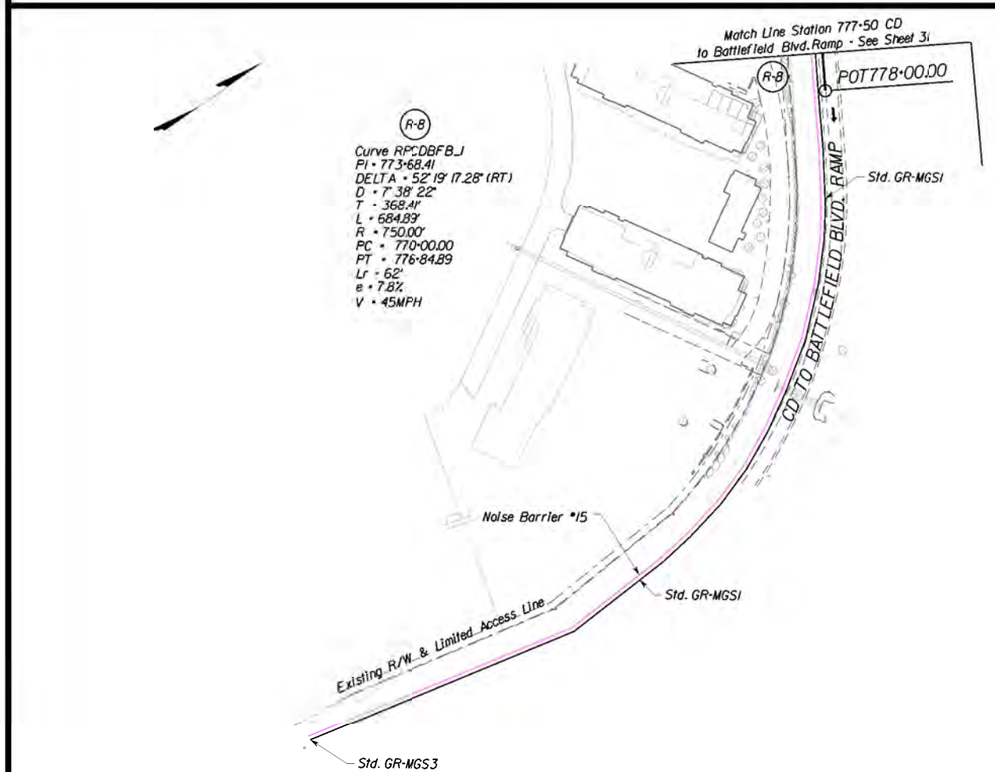
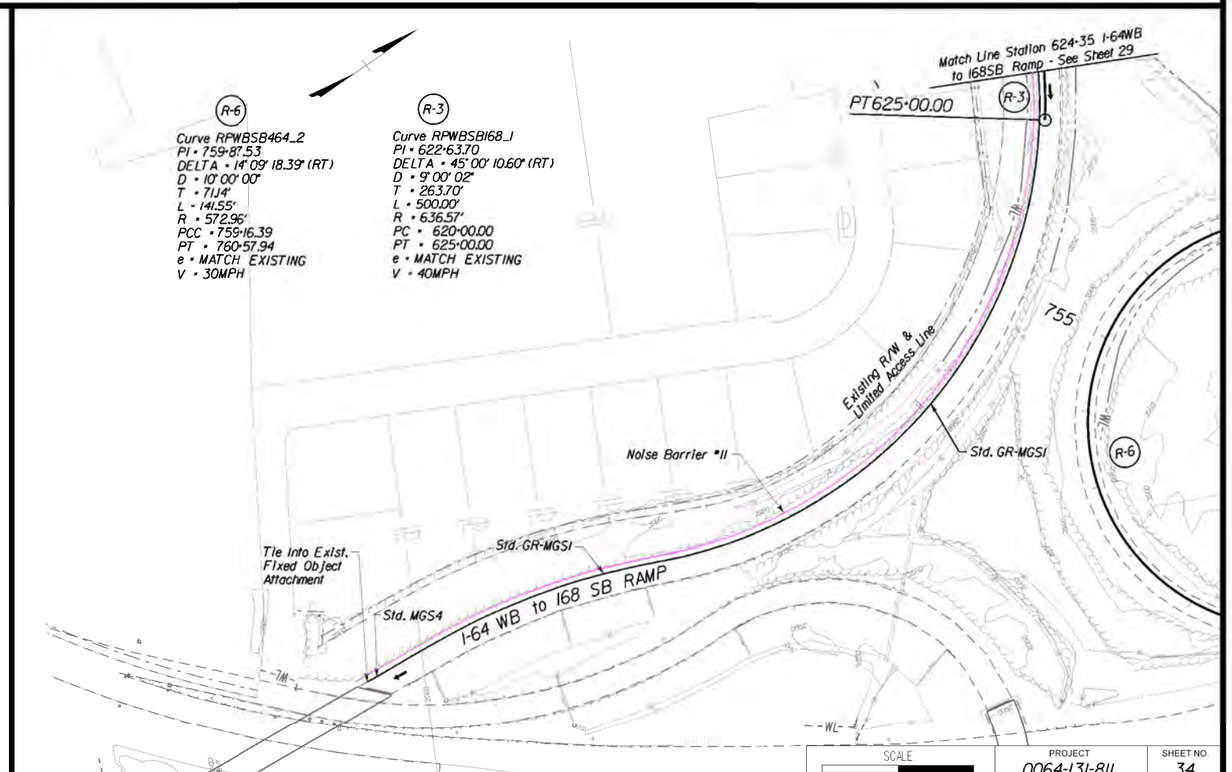
	VA.	64	0064-131-811	34

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







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Plotted By: 76773

REVISED	STATE	STATE ROUTE	STATE PROJECT	SHEET NO.
	VA.	64		35

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

LEGEND

- ITS POLE (60')
- ITS POLE (40')
- VEHICLE DETECTION SYSTEM (MICROWAVE RADAR)
- DYNAMIC MESSAGE SIGN (SPECIAL INSERT)
- DYNAMIC MESSAGE SIGN (TYPE 1 OR 2A)
- DYNAMIC MESSAGE SIGN (SPECIAL INSERT)
- CCTV CAMERA (DIGITAL)
- ITS CABINET
- OVERHEAD CANTILEVER SIGN
- OVERHEAD SPAN SIGN
- DOUBLE POST GROUND MOUNTED
- BUTTERFLY GROUND MOUNTED
- EXIST. LUMINAIRE ON EXIST. POLE
- PROP. LUMINAIRE ON EXIST. POLE
- PROP. LUMINAIRE ON PROP. POLE
- PROP. TWIN LUMINAIRE ON PROP. POLE
- EXIST. O/H STRUCTURE
- * OTHER EQUIPMENT AS LABELED

INTERSTATE 264

TO I-264

1 1/2 MILES AHEAD
EXPRESS LANES
REQUIRED
TOLL X AM - X AM, X PM - X PM MON - FRI
MON - FRI
LEFT

VDOT *640709
VDOT *640782
VDOT *640756
VDOT WITH *640755 DETECTOR
VDOT *640711
VDOT *640710
VDOT *640720
VDOT *640708
VDOT *640701

"DMS" TOLLS
EXPRESS LANES

TO I-664 EBL
TO I-664 WBL

Noise Barrier * 2
Sensor Pole DETECTOR
VDOT *640686 WITH DETECTOR

ROTUNDA AVE.
ROTUNDA AVENUE

Exit 299A
EAST
Portsmouth
Norfolk
**Existing Signs and Structure to Remain

Exit 299B
13 58 460
Bowers Hill
Suffolk
Newport News

Exit 299B
Petersburg
Via 460
**Existing Signs and Structure to Remain

VDOT *640754

990 995 1000 1005 1010 1015 1020
1485 1490 1495 1500 1505

1-64 EB CONST. ℄
1-64 EASTBOUND
1-64 WB CONST. ℄
1-64 WESTBOUND

Match Line Station 1509+00.00 EB - See Sheet 36
Match Line Station 1021+00.00 WB - See Sheet 36

INTERSTATE 664

Begin Construction
Begin Project 0064-131-118, PE-101
Sta. 1491+27.83 EB I-64 Const. ℄

1 MILE AHEAD
EXPRESS LANES
REQUIRED
TOLL X AM - X AM, X PM - X PM MON - FRI
MON - FRI
LEFT

NO EXIT TO 17 BUSINESS
EXPRESS LANES

Exit 15A
EAST
Portsmouth
Norfolk
**Existing Signs and Structure to Remain

Exit 15B
Chesapeake
Va Beach

Exit 14
NORTH EAST
460
Military Hwy

**Existing Signs and Structure to Remain

ROADWAY ENHANCEMENT
Expedited installation of ITS Cameras in permanent locations

SCALE	PROJECT	SHEET NO.
0 400' 800'	0064-131-811	35

1106692036.dgn
Plotted By: 76773

REVISED	STATE	STATE ROUTE	STATE PROJECT	SHEET NO.
	VA.	64		36

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

LEGEND

- ITS POLE (60')
- ITS POLE (40')
- VEHICLE DETECTION SYSTEM (MICROWAVE RADAR)
- DYNAMIC MESSAGE SIGN (SPECIAL INSERT)
- DYNAMIC MESSAGE SIGN (TYPE 1 OR 2A)
- DYNAMIC MESSAGE SIGN (SPECIAL INSERT)
- CCTV CAMERA (DIGITAL)
- ITS CABINET
- OVERHEAD CANTILEVER SIGN
- OVERHEAD SPAN SIGN
- DOUBLE POST GROUND MOUNTED
- BUTTERFLY GROUND MOUNTED
- EXIST. LUMINAIRE ON EXIST. POLE
- PROP. LUMINAIRE ON EXIST. POLE
- PROP. LUMINAIRE ON PROP. POLE
- PROP. TWIN LUMINAIRE ON PROP. POLE
- EXIST. O/H STRUCTURE
- * OTHER EQUIPMENT AS LABELED

Match Line Station 1509+00.00 EB - See Sheet 35

Match Line Station 1021+00.00 WB - See Sheet 35

Match Line Station 1563+00.00 EB - See Sheet 37

Match Line Station 1076+00.00 WB - See Sheet 37

Williamsburg USE NORTH 664

EXIT 299 A EAST 264 Portsmouth Norfolk 1/2 MILE

EXIT 299 A EAST 264 Portsmouth Norfolk 1 MILE

EXPRESS LANE ENDS

ROADWAY ENHANCEMENT
Expedited installation of ITS Cameras in permanent locations

INTERSTATE 64

1510 VDOT *640753

VDOT *640752 WITH DETECTOR

VDOT *640751

I-64 EASTBOUND

I-64 EB CONST. ℄

Toll Gantry

Technical Shelter

I-64 WESTBOUND

I-64 WB CONST. ℄

VDOT *640722 WITH DETECTOR

VDOT *640723

DMS-6401

Traf. Vault

VDOT *640724

LEFT ONLY — 64 EXPRESS LANES — TOLL: 2 AM - 2 AM MON - FRI — 3 OR MORE REQUIRED

OR HOV 2+ ONLY

"DMS"

"DMS" TOLLS

13 460 Military Hwy 1 MILE EXIT 297

13 460 Military Hwy 1/2 MILE EXIT 297

**Existing Sign and Structure to Remain

**Existing Sign and Structure to Remain

SCALE	PROJECT	SHEET NO.
0 400' 800'	0064-131-811	36

REVISED	STATE	STATE ROUTE	STATE PROJECT	SHEET NO.
	VA.	64		37

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

LEGEND

- ITS POLE (60')
- ITS POLE (40')
- VEHICLE DETECTION SYSTEM (MICROWAVE RADAR)
- DYNAMIC MESSAGE SIGN (SPECIAL INSERT)
- DYNAMIC MESSAGE SIGN (TYPE 1 OR 2A)
- DYNAMIC MESSAGE SIGN (SPECIAL INSERT)
- CCTV CAMERA (DIGITAL)
- ITS CABINET
- OVERHEAD CANTILEVER SIGN
- OVERHEAD SPAN SIGN
- DOUBLE POST GROUND MOUNTED
- BUTTERFLY GROUND MOUNTED
- EXIST. LUMINAIRE ON EXIST. POLE
- PROP. LUMINAIRE ON EXIST. POLE
- PROP. LUMINAIRE ON PROP. POLE
- PROP. TWIN LUMINAIRE ON PROP. POLE
- EXIST. O/H STRUCTURE
- * OTHER EQUIPMENT AS LABELED

ROADWAY ENHANCEMENT
Expedited installation of ITS Cameras in permanent locations

CAVALIER BLVD.
ROUTE 13 SOUTH MILITARY HWY.
INTERSTATE 64
I-64 EB CONST. ℄
I-64 WB CONST. ℄
I-64 EASTBOUND
I-64 WESTBOUND
GALBERRY RD.
BASS LN.
Noise Barrier #4-5
TCB w/ EMS
TSP No#
TSP #1A79
TSP #1A57
TSP No# w/ Meter & Traffic Cabinet
VDOT #640749 WITH DETECTOR
VDOT #640750
VDOT #640964
VDOT #640727
VDOT #640728
VDOT #640726
VDOT #640748
VDOT #640736 WITH DETECTOR
VDOT #640725
EXPRESS LANE ENDS ½ MILE
EXIT 297 460 13 Military Hwy
EXIT 299B Petersburg Via 460
EXIT 299A EAST 264 Portsmouth Norfolk 1/2 MILES
1565 1570 1575 1580 1585 1590 1595 1600 1605 1610 1615 1080 1085 1090 1095 1100 1105 1110 1115 1120 1125 1130
Match Line Station 1563+00.00 EB - See Sheet 36
Match Line Station 1076+00.00 WB - See Sheet 36
Match Line Station 1178+00.00 EB - See Sheet 38
Match Line Station 1130+00.00 WB - See Sheet 38

SCALE	PROJECT	SHEET NO.
0 400' 800'	0064-131-811	37

REVISED	STATE	STATE ROUTE	STATE PROJECT	SHEET NO.
	VA.	64		38

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

LEGEND

- ITS POLE (60')
- ITS POLE (40')
- VEHICLE DETECTION SYSTEM (MICROWAVE RADAR)
- DYNAMIC MESSAGE SIGN (SPECIAL INSERT)
- DYNAMIC MESSAGE SIGN (TYPE 1 OR 2A)
- DYNAMIC MESSAGE SIGN (SPECIAL INSERT)
- CCTV CAMERA (DIGITAL)
- ITS CABINET
- OVERHEAD CANTILEVER SIGN
- OVERHEAD SPAN SIGN
- DOUBLE POST GROUND MOUNTED
- BUTTERFLY GROUND MOUNTED
- EXIST. LUMINAIRE ON EXIST. POLE
- PROP. LUMINAIRE ON EXIST. POLE
- PROP. LUMINAIRE ON PROP. POLE
- PROP. TWIN LUMINAIRE ON PROP. POLE
- EXIST. O/H STRUCTURE
- * OTHER EQUIPMENT AS LABELED

Match Line Station 1618+00.00 EB - See Sheet 37

Match Line Station 1130+00.00 WB - See Sheet 37

Match Line Station 1660+00.00 EB - See Sheet 39

Match Line Station 1174+00.00 WB - See Sheet 39

YADKIN ROAD

ANNAKA LOOP

HONCOCK DR.

I-64 EB CONST. ℄

I-64 EASTBOUND

I-64 WESTBOUND

I-64 WB CONST. ℄

**Existing Sign and Structure to Remain

ROADWAY ENHANCEMENT
Expedited installation of ITS Cameras in permanent locations

"DMS" DMS-64-02 DMS-64-11 DMS is in a curve and needs to be placed in coordination with Signing

VDOT #640963 VDOT #640747 WITH DETECTOR VDOT #640746 VDOT #640745 VDOT #640733 VDOT #640730 VDOT #640731 VDOT #640732 VDOT #640734

Noise Barrier #6 Noise Barrier #4-5

Trdr. Box

EXIT 297 460 Military Hwy 1/2 MILE 13

EXIT 297 460 Military Hwy 1 MILE 13

SHOULDER LANE BEGINS 1/2 MILE

HARD SHOULDER RUNNING SIGNS ARE GROUND-MOUNTED

64 Va Beach Norfolk Hampton 17 SOUTH

North 17 Portsmouth Deep Creek South 17 BUSINESS EXIT 296

Portsmouth Deep Creek 17 EXIT 296 1/2 MILE

INTERSTATE 64

SCALE	PROJECT	SHEET NO.
0 400' 800'	0064-131-811	38

REVISED	STATE	STATE ROUTE	STATE PROJECT	SHEET NO.
	VA.	64		39

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

Match Line Station 1660+00.00 EB - See Sheet 38

Match Line Station 1174+00.00 WB - See Sheet 38

Match Line Station 1717+00.00 EB - See Sheet 40

Match Line Station 1230+00.00 WB - See Sheet 40

EXIT 296 B
17 SOUTH
Deep Creek
BUSINESS ROUTE

NORTH
To 664
Suffolk
64
Richmond

**Existing Bridge-Mounted Signs to Remain

FLAG RD.

GEORGE WASHINGTON HWY. N.

17

LAKE RIDGE CROSSING

FENWAY AVE.

ANNAKA LOOP

Noise Barrier #6

GAMES AVE.

**Existing Sign and Structure to Remain

EXIT 296 A
17 NORTH
Portsmouth

ROADWAY ENHANCEMENT
Expedited installation of ITS
Cameras in permanent locations

VDOT #640744 WITH DETECTOR

HARD SHOULDER RUNNING SIGNS ARE GROUND-MOUNTED

SHOULDER LANE ENDS 1/4 MILE

Noise Barrier #8

I-64 EASTBOUND

I-64 EB CONST. ⊄

SHELL RD.

TCB No*

EXIT 296 B
17 SOUTH
Deep Creek
BUSINESS ROUTE
1/2 MILE

HARD SHOULDER RUNNING SIGNS ARE GROUND-MOUNTED

SHOULDER LANE ENDS 1/2 MILE

EXIT 296 A
17 NORTH
Portsmouth
1/4 MILE

Noise Barrier #7

I-64 WESTBOUND

I-64 WB CONST. ⊄

FIRMAN ST.

DMS-64-03

VDOT #640956

"DMS"

HOYT DR.

PLANTATION DR.

WINWOOD DR.

TRENT AVE.

GERREY DR.

Noise Barrier #4-5

TSP No *

TSP #640166

(School "Speed Limit" Signal)

VDOT #640669

SHOULDER LANE BEGINS 1/4 MILE

HARD SHOULDER RUNNING SIGNS ARE GROUND-MOUNTED

GEORGE WASHINGTON HWY. N.

INTERSTATE 64

EMERGENCY STOPPING ONLY

OPEN TO TRAFFIC

SHOULDER LANE

LEGEND

- ITS POLE (60')
- ITS POLE (40')
- VEHICLE DETECTION SYSTEM (MICROWAVE RADAR)
- DYNAMIC MESSAGE SIGN (SPECIAL INSERT) — SPEED LIMIT XX
- DYNAMIC MESSAGE SIGN (TYPE 1 OR 2A) — "DMS" TOLLS
- DYNAMIC MESSAGE SIGN (SPECIAL INSERT) — 664 TO 64 XX MIN
- CCTV CAMERA (DIGITAL)
- ITS CABINET
- OVERHEAD CANTILEVER SIGN
- OVERHEAD SPAN SIGN
- DOUBLE POST GROUND MOUNTED
- BUTTERFLY GROUND MOUNTED
- EXIST. LUMINAIRE ON EXIST. POLE
- PROP. LUMINAIRE ON EXIST. POLE
- PROP. LUMINAIRE ON PROP. POLE
- PROP. TWIN LUMINAIRE ON PROP. POLE
- EXIST. O/H STRUCTURE
- * OTHER EQUIPMENT AS LABELED

SCALE	PROJECT	SHEET NO.
0 400' 800'	0064-131-811	39

REVISED	STATE	STATE ROUTE	STATE PROJECT	SHEET NO.
	VA.	64		40

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

Match Line Station 1717+00.00 EB - See Sheet 39

Match Line Station 1230+00.00 WB - See Sheet 39

Match Line Station 1773+00.00 EB - See Sheet 41

Match Line Station 1286+00.00 WB - See Sheet 41

ROADWAY ENHANCEMENT
Expedited installation of ITS Cameras in permanent locations

**Existing Sign and Structure to Remain

Richmond Via I-295 To I-64 460 MIN XX
To I-64 I-664 MIN XX

SHOULDER LANE OPEN TO TRAFFIC
EMERGENCY STOPPING ONLY X

"DMS"

EXITS 296 A-B
17 Portsmouth Deep Creek 1 MILE

INTERSTATE 64

I-64 WEST BOUND

I-64 EAST BOUND

I-64 EB CONST. B

I-64 WB CONST. B

Noise Barrier #8

Noise Barrier #7

GRUEN ST.

FIRMAN ST.

LONDON PLANE CREST

DMS 64-12

VDOT #640742

VDOT #640734

DETECTOR

1720 1725 1730 1735 1740 1745 1750 1755 1760 1765 1770 1240 1245 1250 1255 1260 1265 1270 1275 1280 1285 1230 1235

SOUTH TOLL 168 Outer Banks
NORTH I-464 BUSINESS 168 Norfolk Battlefield Blvd 3 MILES
EXITS 291-290

LEGEND

- ITS POLE (60')
- ITS POLE (40')
- VEHICLE DETECTION SYSTEM (MICROWAVE RADAR)
- DYNAMIC MESSAGE SIGN (SPECIAL INSERT) — SPEED LIMIT XX
- DYNAMIC MESSAGE SIGN (TYPE 1 OR 2A) — "DMS" TOLLS
- DYNAMIC MESSAGE SIGN (SPECIAL INSERT) — I-664 TO I-64 XX MIN
- CCTV CAMERA (DIGITAL)
- ITS CABINET
- OVERHEAD CANTILEVER SIGN
- OVERHEAD SPAN SIGN
- DOUBLE POST GROUND MOUNTED
- BUTTERFLY GROUND MOUNTED
- EXIST. LUMINAIRE ON EXIST. POLE
- PROP. LUMINAIRE ON EXIST. POLE
- PROP. LUMINAIRE ON PROP. POLE
- PROP. TWIN LUMINAIRE ON PROP. POLE
- EXIST. O/H STRUCTURE
- * OTHER EQUIPMENT AS LABELED

SCALE	PROJECT	SHEET NO.
0 200' 400'	0064-131-811	40

REVISED	STATE	STATE ROUTE	STATE PROJECT	SHEET NO.
	VA.	64		41

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

Match Line Station 1773+00.00 EB - See Sheet 40

Match Line Station 1286+00.00 WB - See Sheet 40

Match Line Station 1831+00.00 EB - See Sheet 42

Match Line Station 1345+00.00 WB - See Sheet 42

ROADWAY ENHANCEMENT
Expedited installation of ITS Cameras in permanent locations

INTERSTATE 64

EMERGENCY PULL OFF

VDOT #640957 WITH DETECTOR DMS-64-03A

1-64 EASTBOUND

1-64 WESTBOUND

1-64 EB CONST. ℄

1-64 WB CONST. ℄

ELIZABETH RIVER

ELIZABETH RIVER

NORFOLK AND PORTSMOUTH BELT LINE (NPBL) RAILROAD

PRIVATE RAILROAD

OH SIGNAL HEAD FOR EACH LANE

"DMS"

SHOULDER LANE
OPEN TO TRAFFIC
EMERGENCY STOPPING ONLY X

EXPRESS LANE ENDS ½ MILE

EXPRESS LANE ENDS

"DMS"

"DMS"

SHOULDER LANE
EMERGENCY STOPPING ONLY X
OPEN TO TRAFFIC

* TYPE 2 - HYDROPLANE MITIGATION SIGN

1775 1780 1785 1790 1795 1800 1805 1810 1815 1820 1825 1830

1290 1295 1300 1305 1310 1315 1320 1325 1330 1335 1340 1345

LEGEND

- ITS POLE (60')
- ITS POLE (40')
- VEHICLE DETECTION SYSTEM (MICROWAVE RADAR)
- DYNAMIC MESSAGE SIGN (SPECIAL INSERT) — SPEED LIMIT XX
- DYNAMIC MESSAGE SIGN (TYPE 1 OR 2A) — "DMS" TOLLS
- DYNAMIC MESSAGE SIGN (SPECIAL INSERT) — I64 TO I64 XX MIN
- CCTV CAMERA (DIGITAL)
- ITS CABINET
- OVERHEAD CANTILEVER SIGN
- OVERHEAD SPAN SIGN
- DOUBLE POST GROUND MOUNTED
- BUTTERFLY GROUND MOUNTED
- EXIST. LUMINAIRE ON EXIST. POLE
- PROP. LUMINAIRE ON EXIST. POLE
- PROP. LUMINAIRE ON PROP. POLE
- PROP. TWIN LUMINAIRE ON PROP. POLE
- EXIST. O/H STRUCTURE
- * OTHER EQUIPMENT AS LABELED

SCALE	PROJECT	SHEET NO.
0 400' 800'	0064-131-811	41

REVISED	STATE	STATE ROUTE	STATE PROJECT	SHEET NO.
	VA.	64		42

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

ROADWAY ENHANCEMENT
Expedited installation of ITS Cameras in permanent locations

Match Line Station 1831+00.00 EB - See Sheet 41
Match Line Station 1345+00.00 WB - See Sheet 41
Match Line Station 1885+00.00 EB - See Sheet 43
Match Line Station 1403+00.00 WB - See Sheet 43
I-64 EB CONST. ℄
I-64 WESTBOUND
I-64 EASTBOUND
BAINBRIDGE BLVD.
BAINBRIDGE BLVD. CONST. ℄
GREAT BRIDGE BLVD.
GREAT BRIDGE BLVD. CONST. ℄
BOOKER ST
CAMPOSTELLA RD.
SHELLEY ST
TENNYSON ST
LIBERTYVILLE RD.
FINCK LN.
NORFOLK AND PORTSMOUTH BELT LINE (NPBL) RAILROAD
Tower w/ Camera And Weather Station
VDOT #640741 WITH DETECTOR
DMS-6412AI
DMS-64-04
VDOT #640735 Sensor Pole (No Sensor)
Sensor Pole #6683-II DETECTOR
VDOT #640736
Ped. Crossing TC Box No #
TSP No #
TCB No #
Noise Barrier #10
Noise Barrier #11
Noise Barrier #12
Noise Barrier #9
HARD SHOULDER RUNNING SIGNS ARE GROUND-MOUNTED
SHOULDER LANE ENDS 1/2 MILE
SHOULDER LANE ENDS 1/4 MILE
SHOULDER LANE OPEN TO TRAFFIC / EMERGENCY STOPPING ONLY
EXPRESS LANES LEFT ONLY TOLL X AM - X PM MON - FRI HOV 3+ REQUIRED
HOV LANE ENDS
"DMS" TOLLS
OR HOV 2+ ONLY
SOUTH 168 TOLL Outer Banks NORTH 168 BUSINESS 464 Norfolk Battlefield Blvd 1 MILE EXITS 291-290
SOUTH 168 TOLL Ches Expwy Outer Banks ½ MILE EXIT 291B
190 To 17 Elizabeth City ½ MILE EXIT 292
WEST 64 Va Beach
SOUTH 168 TOLL Great Bridge Outer Banks EXIT 291B
**Existing Sign and Structure to Remain

LEGEND

- ITS POLE (60')
- ITS POLE (40')
- VEHICLE DETECTION SYSTEM (MICROWAVE RADAR)
- DYNAMIC MESSAGE SIGN (SPECIAL INSERT)
- "DMS" TOLLS — DYNAMIC MESSAGE SIGN (TYPE 1 OR 2A)
- DYNAMIC MESSAGE SIGN (SPECIAL INSERT)
- CCTV CAMERA (DIGITAL)

LEGEND

- ITS CABINET
- OVERHEAD CANTILEVER SIGN
- OVERHEAD SPAN SIGN
- DOUBLE POST GROUND MOUNTED
- BUTTERFLY GROUND MOUNTED
- EXIST. LUMINAIRE ON EXIST. POLE
- PROP. LUMINAIRE ON EXIST. POLE
- PROP. LUMINAIRE ON PROP. POLE
- PROP. TWIN LUMINAIRE ON PROP. POLE
- EXIST. O/H STRUCTURE
- * OTHER EQUIPMENT AS LABELED

SCALE	PROJECT	SHEET NO.
0 400' 800'	0064-131-811	42

REVISED	STATE	STATE ROUTE	STATE PROJECT	SHEET NO.
	VA.	64		43

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

March Line Station 1885+00.00 EB - See Sheet 42

Match Line Station 1403+00.00 WB - See Sheet 42

ROADWAY ENHANCEMENT
Expedited installation of ITS Cameras in permanent locations

**Existing Bridge-Mounted Signs to Remain

EXIT ONLY Battlefield Blvd NORTH 168 BUSINESS EXITS 291-290

EXIT 291B TOLL SOUTH 168 SOUTH 17 Elizabeth City Outer Banks

NORTH 17 64 Portsmouth Suffolk Richmond

SOUTH 168 TOLL Great Bridge Outer Banks EXIT 291B

SHOULDER LANE BEGINS 1/4 MILE

SHOULDER LANE BEGINS 1/2 MILE

HARD SHOULDER RUNNING SIGNS ARE GROUND-MOUNTED

HARD SHOULDER RUNNING SIGNS ARE GROUND-MOUNTED

INTERSTATE 464

HOV LANE ENDS ¼ MILE

LEFT EXPRESS LANES 64 TOLL X AM - X AM MON - FRI X PM - X PM MON - FRI REQUIRED 1 MILE AHEAD

I-64 WESTBOUND

I-64 EASTBOUND

I-64 EB CONST. ⊄

I-64 WB CONST. ⊄

OAK GROVE CONNECTOR

OAK GROVE CONNECTOR

ROBERT WELCH LN.

FINCK LN.

QUEENS GATE

BYRON

Noise Barrier #11

Noise Barrier #12

Sensor Pole

VDOT #640765

VDOT #640740

VDOT #640767

VDOT #640766

TC Box No#

TC Box No#

DMS-64-04A

**Existing Signs and Structure to Remain

EXIT 291A NORTH 64 Downtown Norfolk

EXIT 290BA BUSINESS 3/4 MILE Battlefield Blvd 168

EXIT ONLY Battlefield Blvd 168 EXITS 290BA

Match Line Station 1918+00.00 EB - See Sheet 44

Match Line Station 1432+00.00 WB See Sheet 44

1885 1890 1895 1900 1905 1910 1915 1420 1425 1430 1400 1405 1410 1415 970 965 960 880 875 870 620 760 755 750

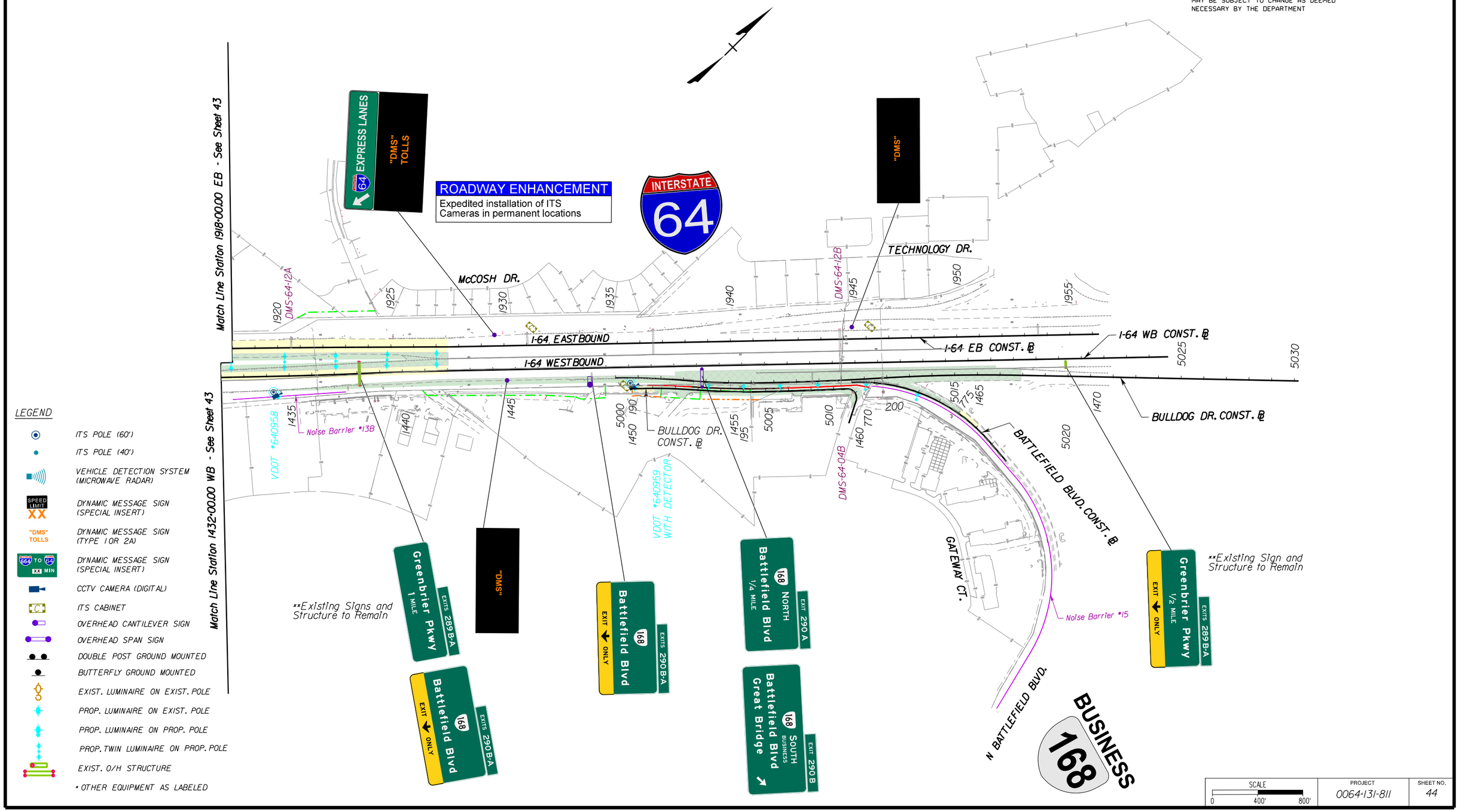
LEGEND

- ITS POLE (60')
- ITS POLE (40')
- VEHICLE DETECTION SYSTEM (MICROWAVE RADAR)
- SPEED LIMIT XX — DYNAMIC MESSAGE SIGN (SPECIAL INSERT)
- "DMS" TOLLS — DYNAMIC MESSAGE SIGN (TYPE 1 OR 2A)
- 664 TO 64 XX MIN — DYNAMIC MESSAGE SIGN (SPECIAL INSERT)
- CCTV CAMERA (DIGITAL)
- ITS CABINET
- OVERHEAD CANTILEVER SIGN
- OVERHEAD SPAN SIGN
- DOUBLE POST GROUND MOUNTED
- BUTTERFLY GROUND MOUNTED
- EXIST. LUMINAIRE ON EXIST. POLE
- PROP. LUMINAIRE ON EXIST. POLE
- PROP. LUMINAIRE ON PROP. POLE
- PROP. TWIN LUMINAIRE ON PROP. POLE
- EXIST. O/H STRUCTURE
- * OTHER EQUIPMENT AS LABELED

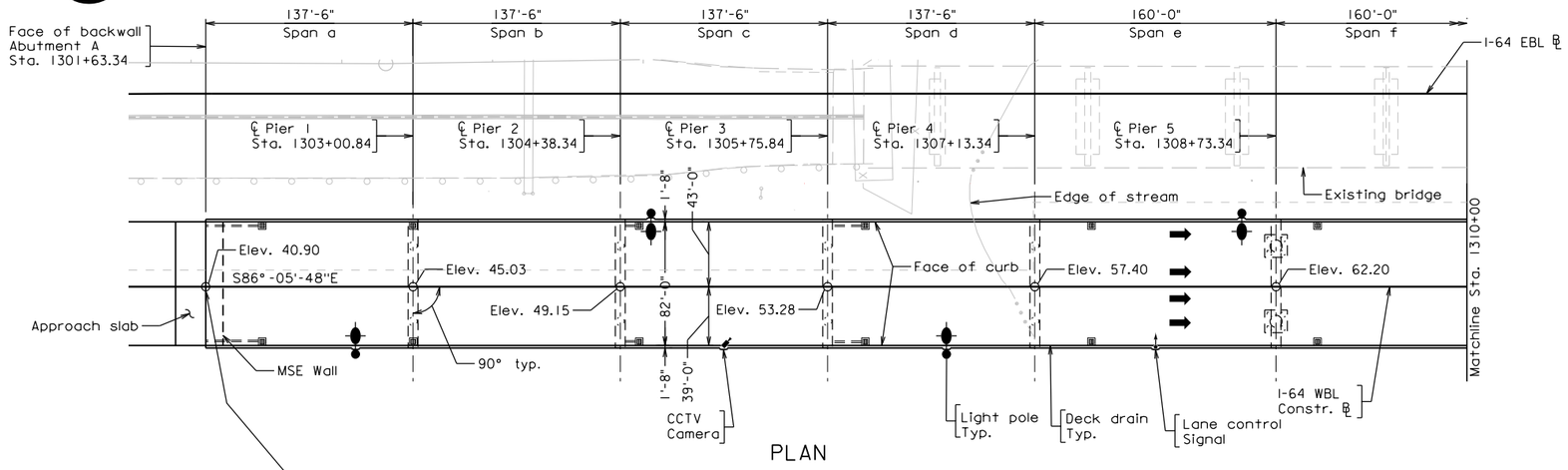
SCALE	PROJECT	SHEET NO.
0 400' 800'	0064-131-811	43

REVISED	STATE	STATE ROUTE	STATE PROJECT	SHEET NO.
	VA.	64		44

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

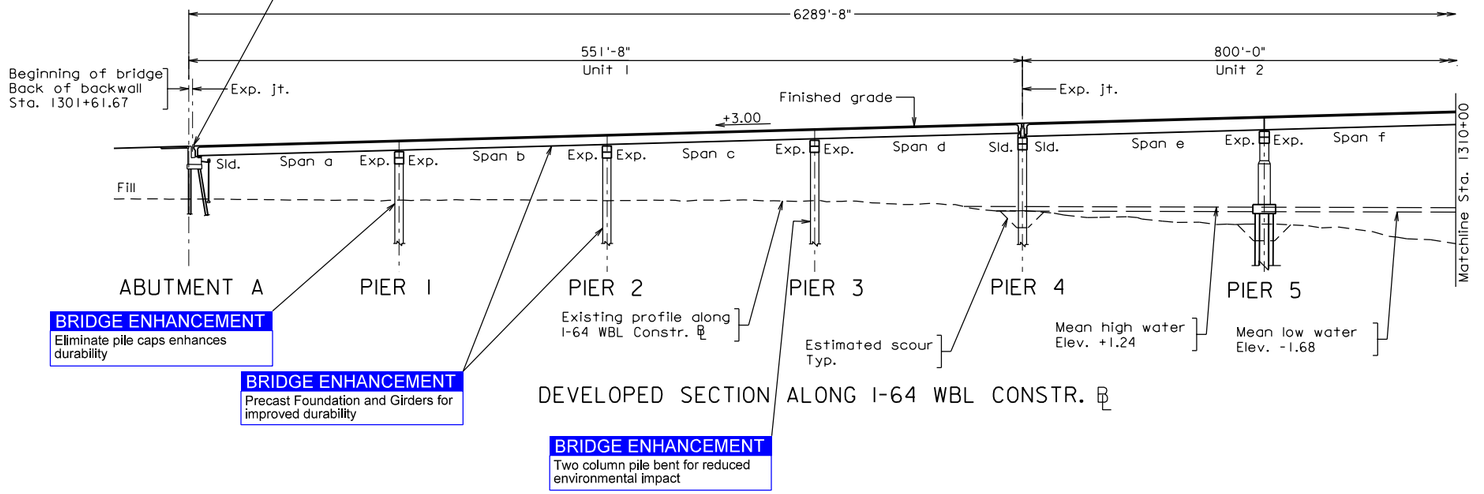


SCALE	PROJECT	SHEET NO.
0 400' 800'	0064-131-811	44



PLAN

BRIDGE ENHANCEMENT
Reduce bridge length and lower profile reduces maitenance and inspection costs



BRIDGE ENHANCEMENT
Eliminate pile caps enhances durability

BRIDGE ENHANCEMENT
Precast Foundation and Girders for improved durability

BRIDGE ENHANCEMENT
Two column pile bent for reduced environmental impact

DEVELOPED SECTION ALONG I-64 WBL CONSTR. ℄

NOTES:

1. For approach slab details, see VDOT Standard Plan No. BAS-11.
2. For light pole support details see VDOT Standard Plan No. BCS-28A.
3. For deck drain details, see VDOT Manual of the Structure and Bridge Division Part 2, file Nos. 22.03-14 and 22.03-27.

LEGEND:

Sld.	Sliding bearing
Fix.	Fixed bearing
Exp.	Expansion bearing

PRELIMINARY PLANS
THESE PLANS NOT TO BE USED FOR CONSTRUCTION OF BRIDGE

Scale: 1" = 50'

No.	Description	Date

REVISIONS

For Table of Revisions see sheet 2.

PARSONS TRANSPORTATION GROUP INC. OF VIRGINIA
FAIRFAX, VIRGINIA
BRIDGE ENGINEER

PLANS BY:	Consultant
COORDINATED:	
SUPERVISED:	
DESIGNED:	Ali M. Ghalib
DRAWN:	Michael T. Wieczorek
CHECKED:	Gregory H. Shafer

b106692_001-HR.dgn
12:35:38 PM
8/2/2017

STATE	FEDERAL AID		STATE		SHEET
	ROUTE	PROJECT	ROUTE	PROJECT	NO.
VA.	-	NHPP-064-3(488)	64	0064-131-811, B662	45
NBIS Number: -			UPC No. 106692		
Federal Oversight Code: NFO			FHWA Construction and Scour Code: X931-S5		

DESIGN EXCEPTION(S):

None

GENERAL NOTES:

Capacity: HL-93 loading.

Specifications:

Construction: Virginia Department of Transportation Road and Bridge Specifications, 2016.

Design: AASHTO LRFD Bridge Design Specifications, 7th Edition, 2014; and VDOT Modifications.

Guide Specifications and Commentary for Vessel Collision Design Highway Bridges, 2nd Edition, 2009; 2010 Interim Specifications.

Standards: Virginia Department of Transportation Road and Bridge Standards, 2008; including all current revisions.

This project is to be constructed in accordance with the Virginia Department of Transportation Work Area Protection Manual, June 2011 and latest revisions.

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

Design loading includes 15 psf allowance for future wearing surface.

All structural steel, except in bearings and sole plates, shall be ASTM A709 Grade 50W and shall be unpainted except as required by Section 407 of the Specifications. Structural steel in bearings and sole plates shall be ASTM A709 Grade 36 and shall be painted.

Concrete in prestressed piles shall be Class A5. Concrete in superstructure, parapets and terminal walls shall be Low Shrinkage Class A4 Modified; in substructure, Class A3; in bag riprap, Class A3.

Concrete in prestressed concrete girders shall be Class A5 having a minimum compressive cylinder strength at 28 days to be determined by design (10 ksi Max.).

All reinforcing steel shall be deformed and shall conform to ASTM A615 Grade 60 except for steels noted as Corrosion Resistant Reinforcing (CRR) which shall conform to Section 223 of the Specifications. All reinforcing bars in the deck slab and concrete diaphragms shall be CRR Class III. All reinforcing bars in precast concrete piling (both square and cylindrical) shall be ASTM A1022 Type 304 (UNS S30400), minimum Grade 60.

CRR steels shall conform to one or more of the three Classes listed in Section 223 of the Specifications. The Classes of CRR steel(s) required on this project is/are noted on plan sheets and in the reinforcing steel schedule. CRR Steel, Class II or Class III, may be substituted for Class I. CRR Steel, Class III, may be substituted for Class II.

Prestressing strands shall be uncoated, seven-wire, low-relaxation steel strands conforming to ASTM A416 Grade 270 except in the precast concrete piling.

Prestressing strands in precast concrete piling (both square and cylindrical) shall be 250 ksi low relaxation stainless steel, Grade 2205. The cylinder piles shall be manufactured and installed in accordance with the Special Provision for Concrete Cylinder Piles.

All piles shall be driven to the required nominal axial resistance. All piles shall be driven to or below the minimum tip elevation unless otherwise directed or authorized by the Engineer. Nominal axial resistance shall be determined by Dynamic Pile Testing.

VDOT

COMMONWEALTH OF VIRGINIA
DEPARTMENT OF TRANSPORTATION

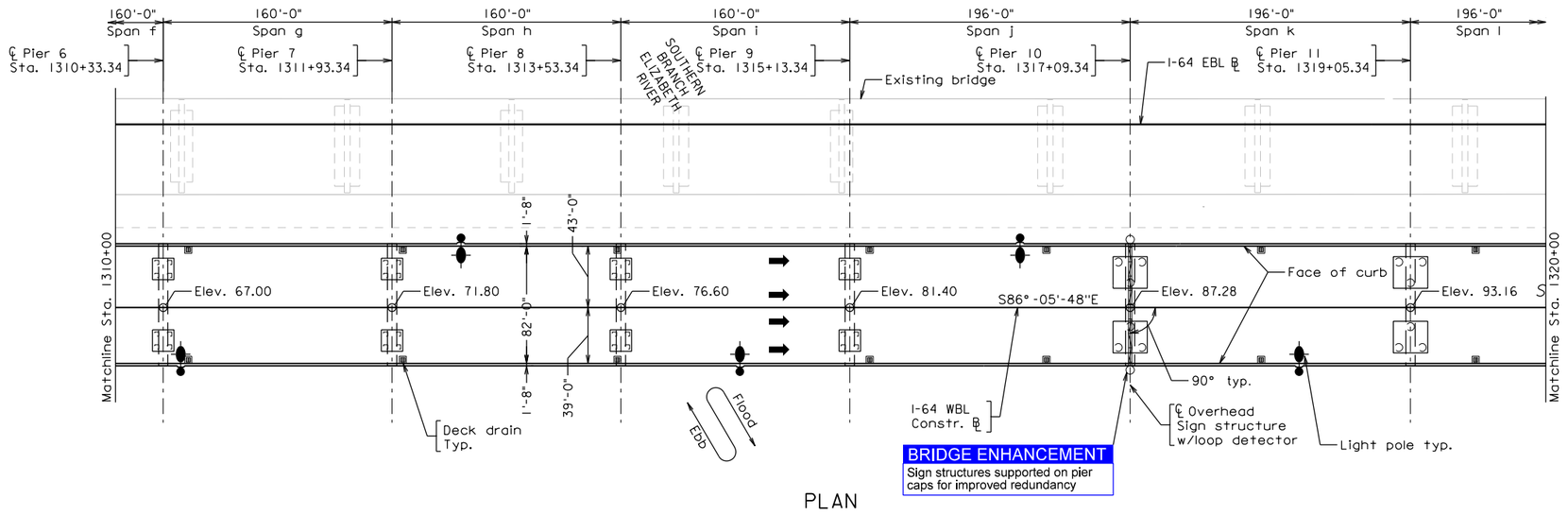
PROPOSED BRIDGE ON
I-64 (WB) OVER SOUTHERN BRANCH ELIZABETH RIVER, NPBL RR, AND RTE. 166 (BAINBRIDGE BLVD.)
CITY OF CHEASAPEAKE - 1.7 MI. W. OF ROUTE I-464
PROJ. 0064-131-811, B662

Recommended for Approval: _____ Date

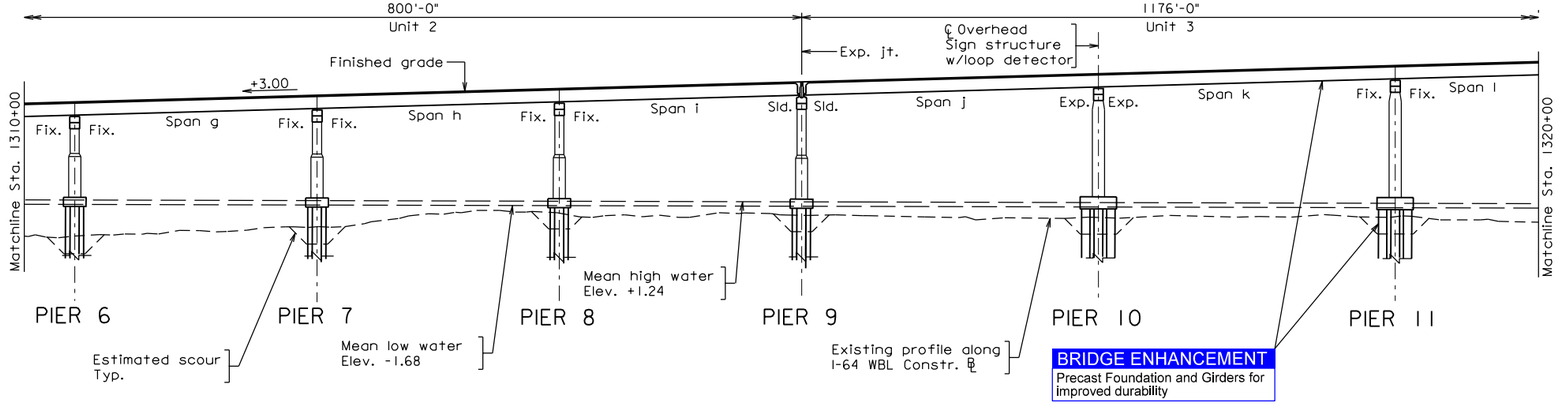
Approved: _____ Chief Engineer Date

Date: August 2017

FHWA REGION	FEDERAL AID		STATE		SHEET NO.
	STATE	PROJECT	ROUTE	PROJECT	
3	VA.	NHPP-064-3(488)	64	0064-131-811, B662	46



PLAN



DEVELOPED SECTION ALONG I-64 WBL CONSTR. ℄

PRELIMINARY PLANS
THESE PLANS NOT TO BE USED FOR CONSTRUCTION OF BRIDGE

PARSONS TRANSPORTATION GROUP INC. OF VIRGINIA
FAIRFAX, VIRGINIA
BRIDGE ENGINEER

Scale: 1" = 50'

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Revisions		

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DEPARTMENT OF TRANSPORTATION
STRUCTURE AND BRIDGE DIVISION

GENERAL PLAN & ELEVATION - 2

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8/2/2017

FHWA REGION	FEDERAL AID		STATE		SHEET
	STATE	PROJECT	ROUTE	PROJECT	NO.
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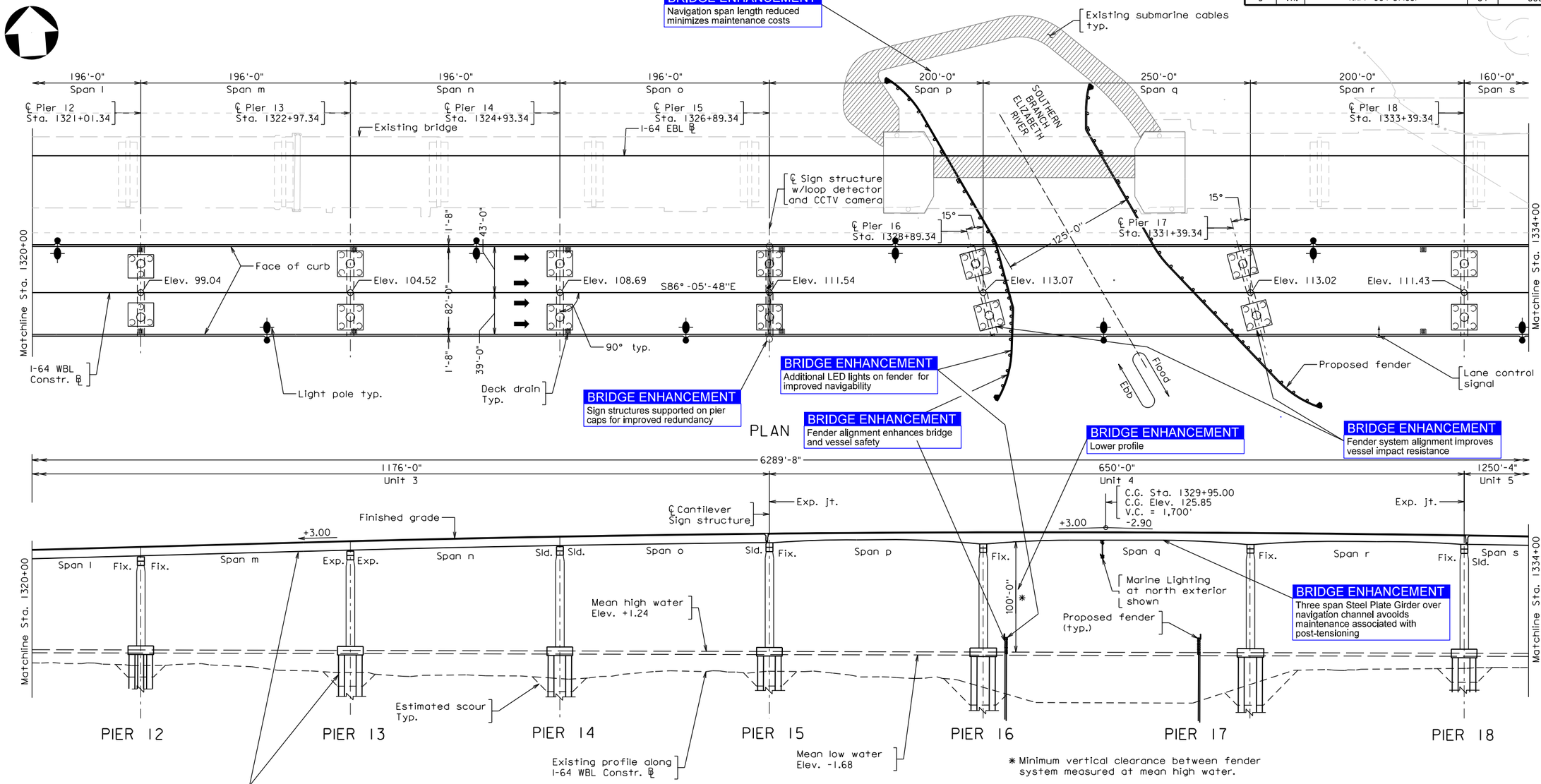

DEVELOPED SECTION ALONG I-64 WBL CONSTR. ℄

PRELIMINARY PLANS
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PARSONS TRANSPORTATION GROUP INC. OF VIRGINIA
FAIRFAX, VIRGINIA
BRIDGE ENGINEER

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COMMONWEALTH OF VIRGINIA
DEPARTMENT OF TRANSPORTATION
STRUCTURE AND BRIDGE DIVISION

GENERAL PLAN & ELEVATION - 3

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8/2/2017

FHWA REGION	FEDERAL AID		STATE		SHEET NO.
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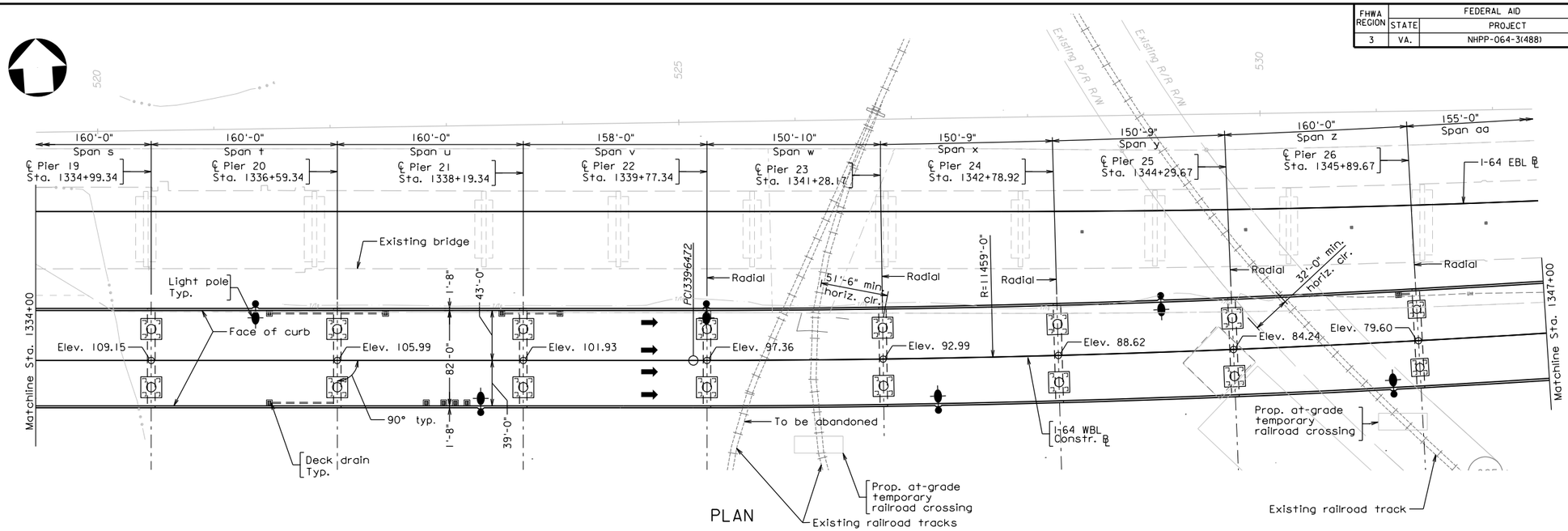
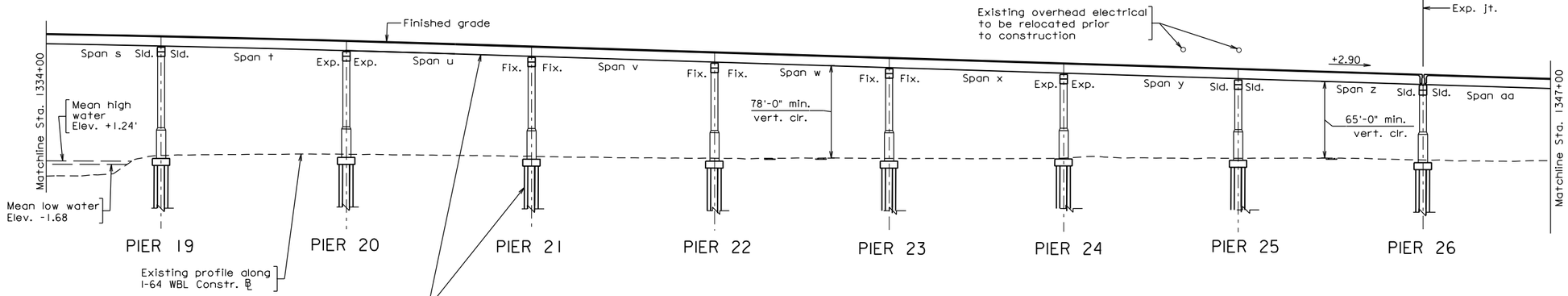


PLAN

6289'-8"

1250'-4" Unit 5

920'-0" Unit 6



DEVELOPED SECTION ALONG I-64 WBL CONSTR. ℄

BRIDGE ENHANCEMENT
Precast Foundation and Girders for improved durability

PRELIMINARY PLANS
THESE PLANS NOT TO BE USED FOR CONSTRUCTION OF BRIDGE

PARSONS TRANSPORTATION GROUP INC. OF VIRGINIA
FAIRFAX, VIRGINIA
BRIDGE ENGINEER

Scale: 1" = 50'

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COMMONWEALTH OF VIRGINIA
DEPARTMENT OF TRANSPORTATION
STRUCTURE AND BRIDGE DIVISION

GENERAL PLAN & ELEVATION - 4

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8/2/2017

FHWA REGION	FEDERAL AID		STATE		SHEET NO.
	STATE	PROJECT	ROUTE	PROJECT	
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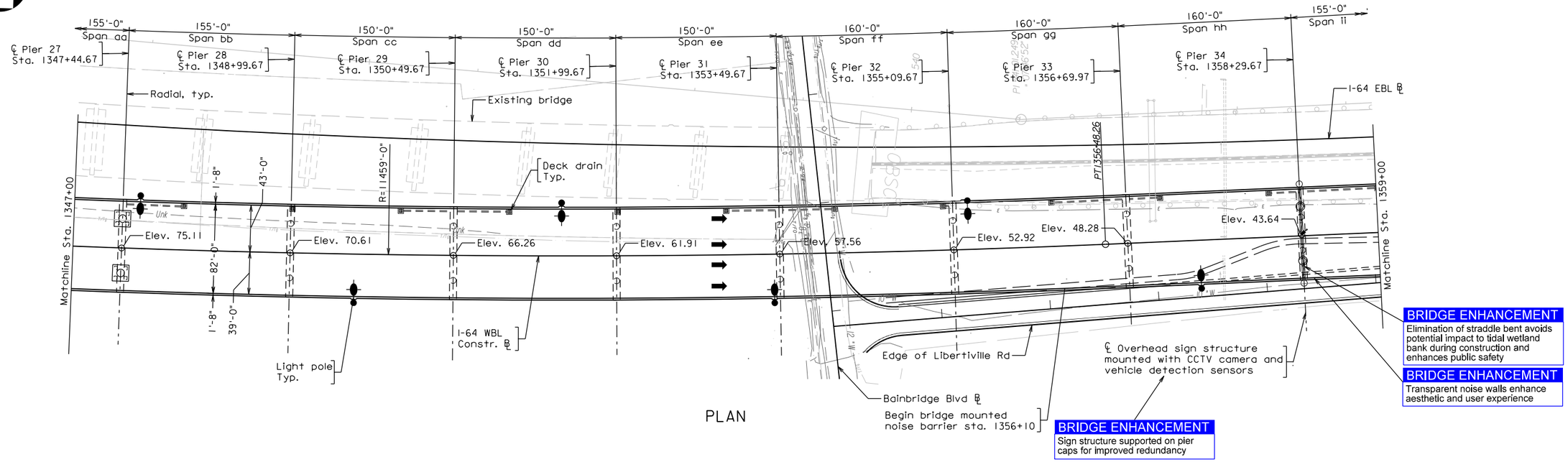
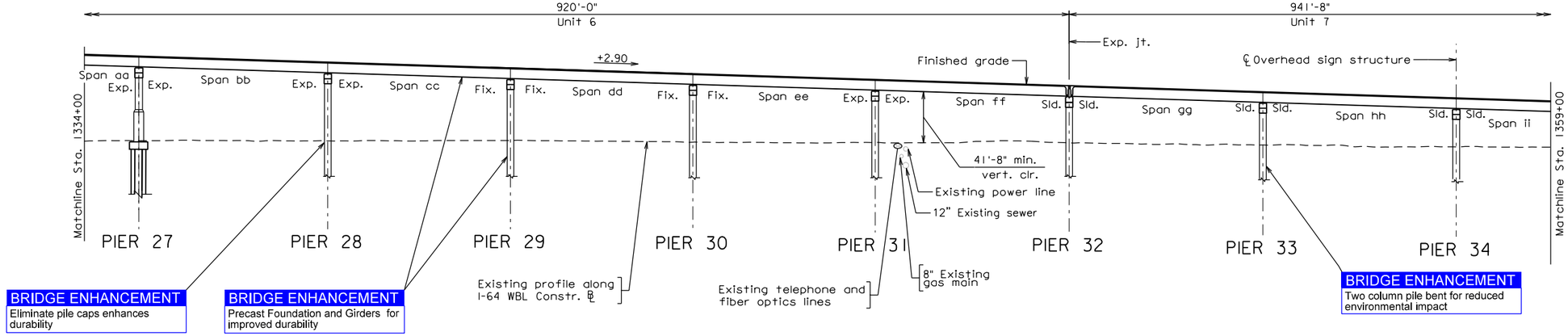


PLAN



DEVELOPED SECTION ALONG I-64 WBL CONSTR. ℄

PRELIMINARY PLANS
THESE PLANS NOT TO BE USED FOR CONSTRUCTION OF BRIDGE

PARSONS TRANSPORTATION GROUP INC. OF VIRGINIA
FAIRFAX, VIRGINIA
BRIDGE ENGINEER

Scale: 1" = 50'

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COMMONWEALTH OF VIRGINIA
DEPARTMENT OF TRANSPORTATION
STRUCTURE AND BRIDGE DIVISION

GENERAL PLAN & ELEVATION - 5

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FHWA REGION	FEDERAL AID		STATE		SHEET NO.
	STATE	PROJECT	ROUTE	PROJECT	
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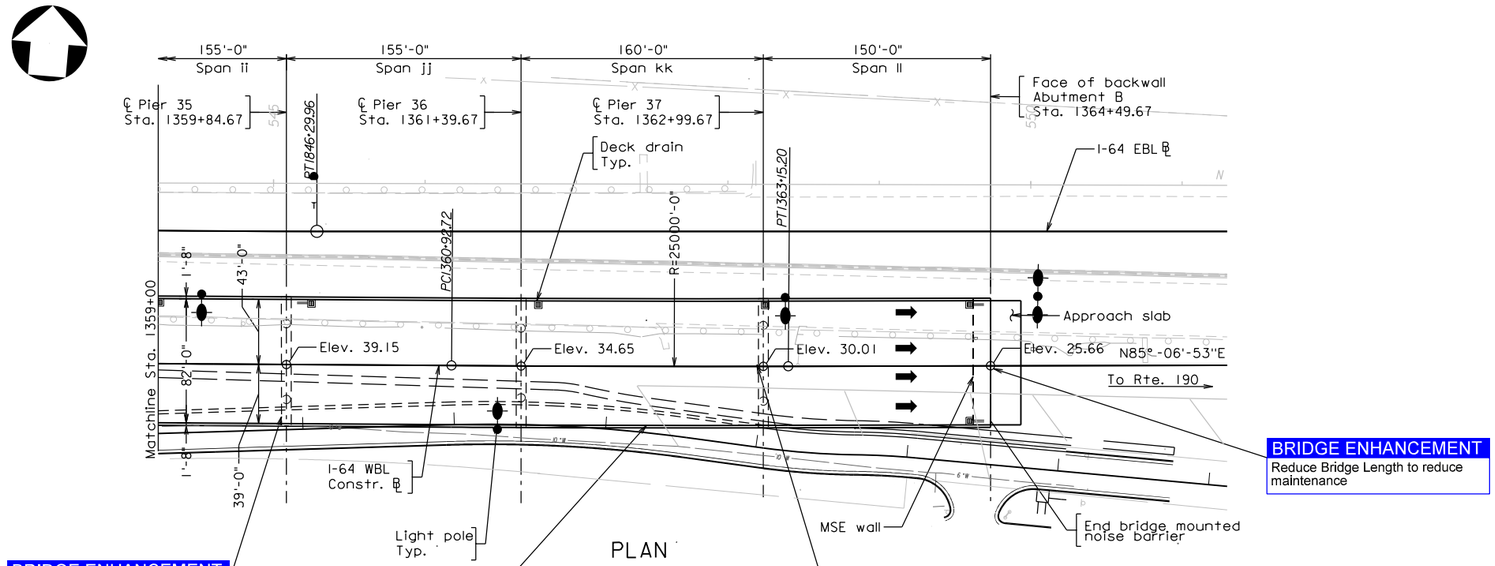

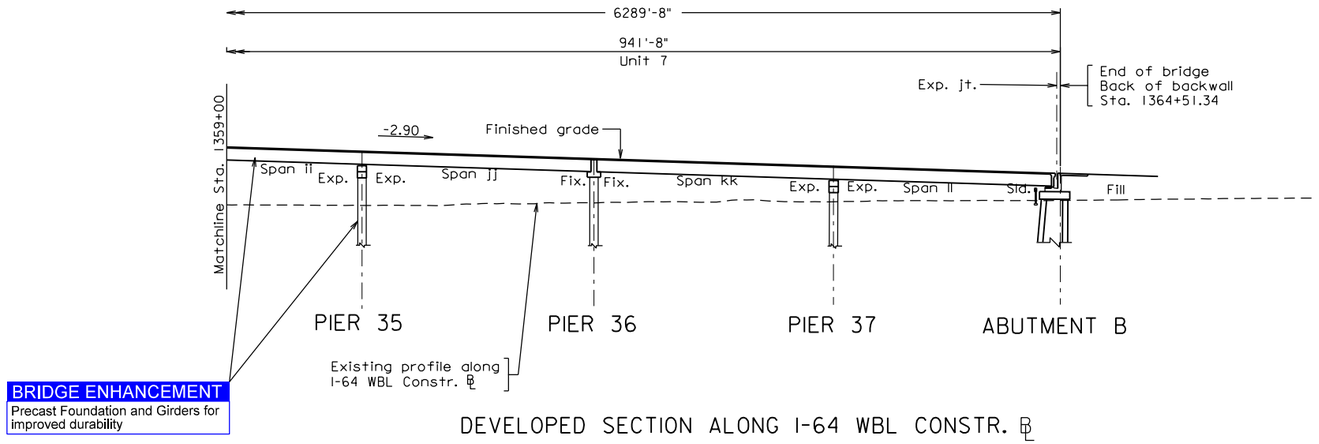

DEVELOPED SECTION ALONG I-64 WBL CONSTR. ℄

PRELIMINARY PLANS
THESE PLANS NOT TO BE USED FOR CONSTRUCTION OF BRIDGE

PARSONS TRANSPORTATION GROUP INC. OF VIRGINIA
FAIRFAX, VIRGINIA
BRIDGE ENGINEER

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COMMONWEALTH OF VIRGINIA
DEPARTMENT OF TRANSPORTATION
STRUCTURE AND BRIDGE DIVISION

GENERAL PLAN & ELEVATION - 6

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FHWA REGION	FEDERAL AID		STATE		SHEET NO.
	STATE	PROJECT	ROUTE	PROJECT	
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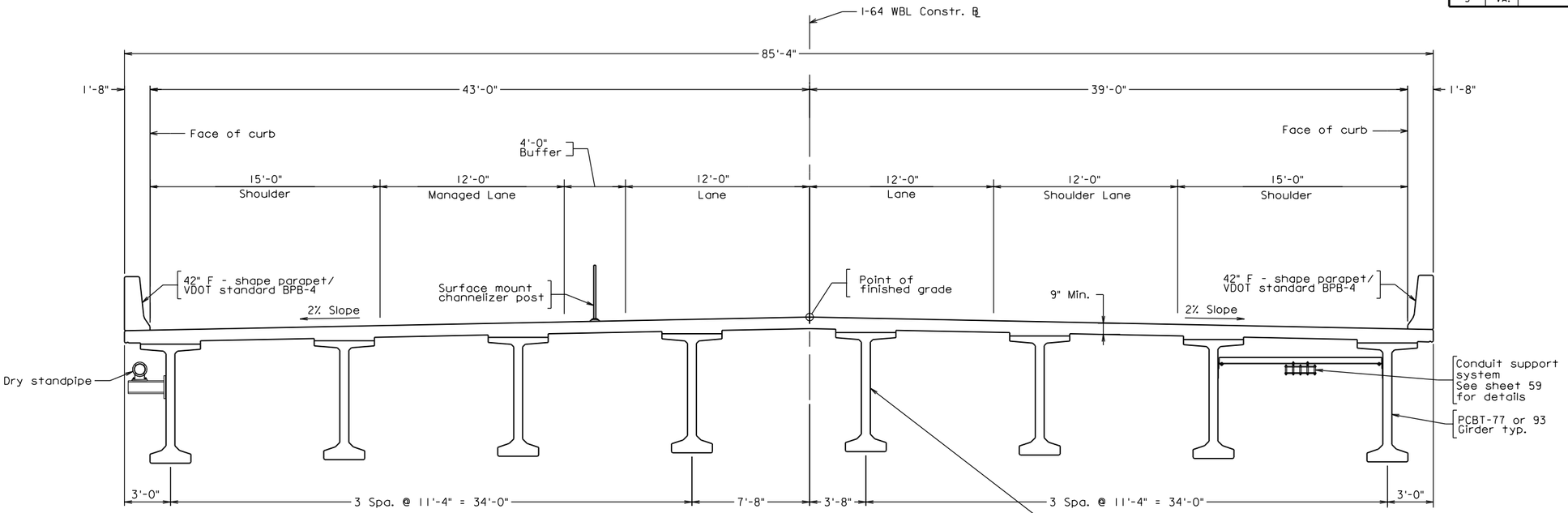
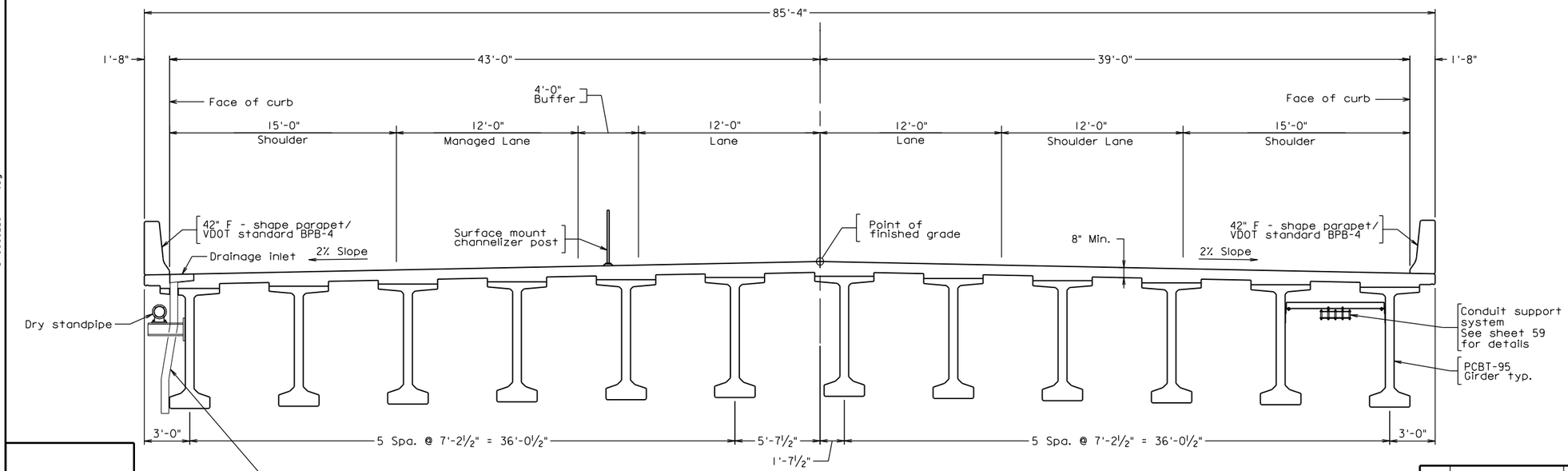


TRANSVERSE SECTION
(For Units 1, 2, 5 & 7 Tangent)

BRIDGE ENHANCEMENT
Precast Foundation and Girders for improved durability



TRANSVERSE SECTION
(For Unit 3 only)

BRIDGE ENHANCEMENT
Drop inlets over river to reduce maintenance

Notes:

1. For location of deck drains, sign structures and lights on bridge, see General Plan and Elevation drawings.
2. For limits of sound barrier on bridge, see General Plan and Elevation drawings.
3. Dry standpipe hose valves located along outside of north traffic barrier at approximately 200 ft. along bridge length.
4. Concrete deck slab shall be low shrinkage with a 28-day compressive strength of 4,000 psi.
5. Deck reinforcement shall be class III CRR steel as defined by VDOT II M-S&B-81.

PRELIMINARY PLANS
THESE PLANS NOT TO BE USED FOR CONSTRUCTION OF BRIDGE

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PARSONS TRANSPORTATION GROUP INC. OF VIRGINIA
FAIRFAX, VIRGINIA
BRIDGE ENGINEER

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Scale: ¼" = 1'-0"

COMMONWEALTH OF VIRGINIA
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STRUCTURE AND BRIDGE DIVISION

TRANSVERSE SECTION - 1

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FHWA REGION	FEDERAL AID		STATE		SHEET NO.
	STATE	PROJECT	ROUTE	PROJECT	
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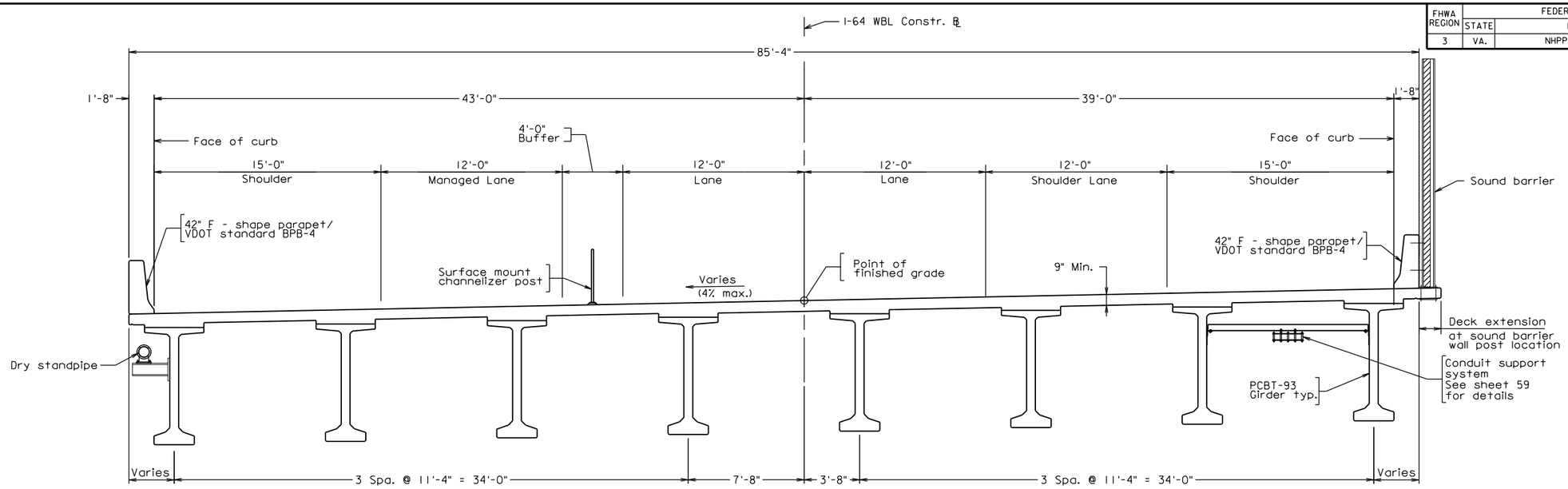
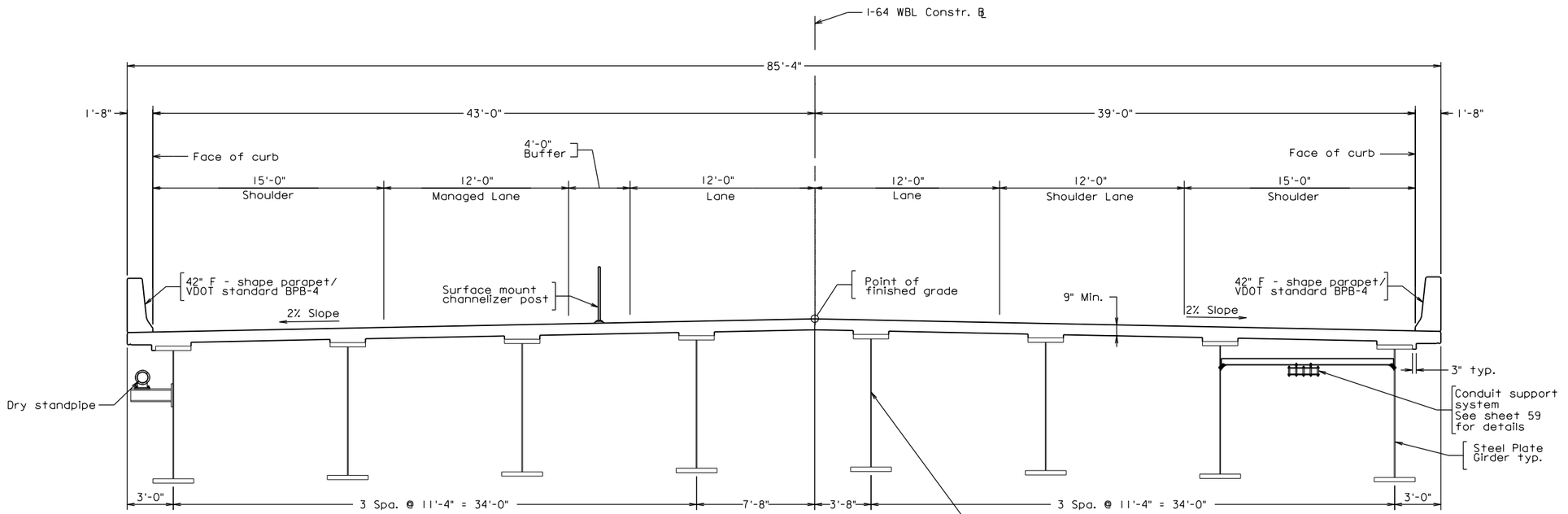


TRANSVERSE SECTION
(For Units 6 and 7, Curved)



TRANSVERSE SECTION
(For Unit 4 only)

BRIDGE ENHANCEMENT
Three span Steel Plate Girder over navigation channel avoids maintenance associated with post-tensioning

Notes:
1. For notes see, Tansverse Section - 1 drawing.
2. Deck extension at sound barrier wall post location shall be 1'-3" wide and 1'-10" long.

PRELIMINARY PLANS
THESE PLANS NOT TO BE USED FOR CONSTRUCTION OF BRIDGE

PARSONS TRANSPORTATION GROUP INC. OF VIRGINIA
FAIRFAX, VIRGINIA
BRIDGE ENGINEER

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TRANSVERSE SECTION - 2

Designed: AMG	Date	Plan No.	Sheet No.
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Scale: 1/4" = 1'-0"

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FHWA REGION	FEDERAL AID		STATE		SHEET NO.
	STATE	PROJECT	ROUTE	PROJECT	
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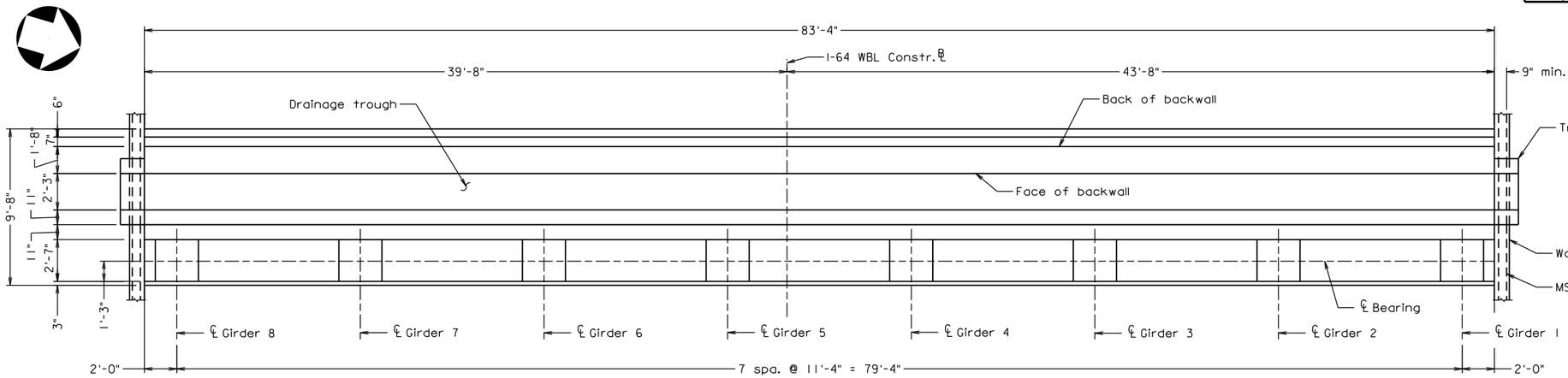
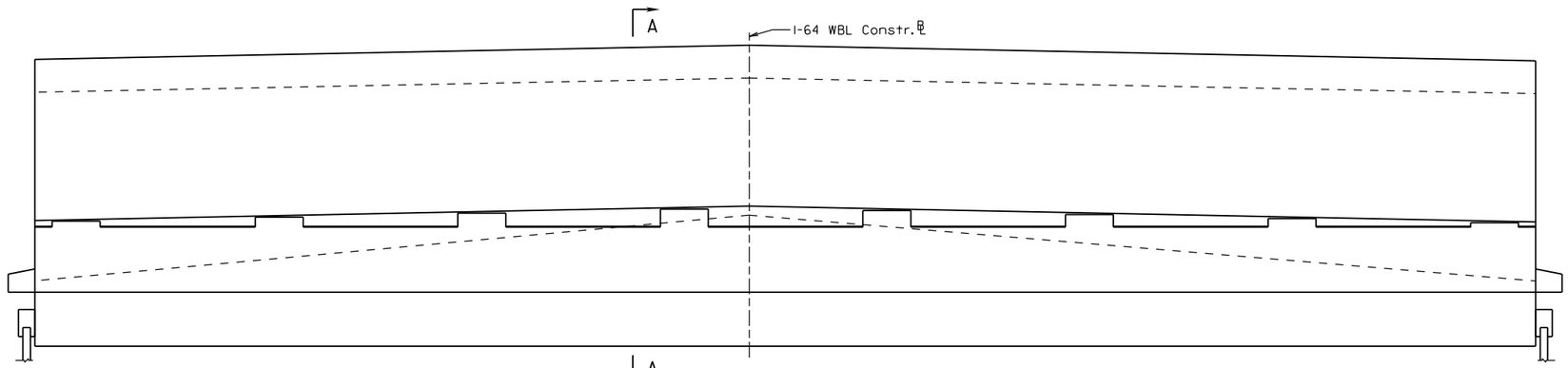
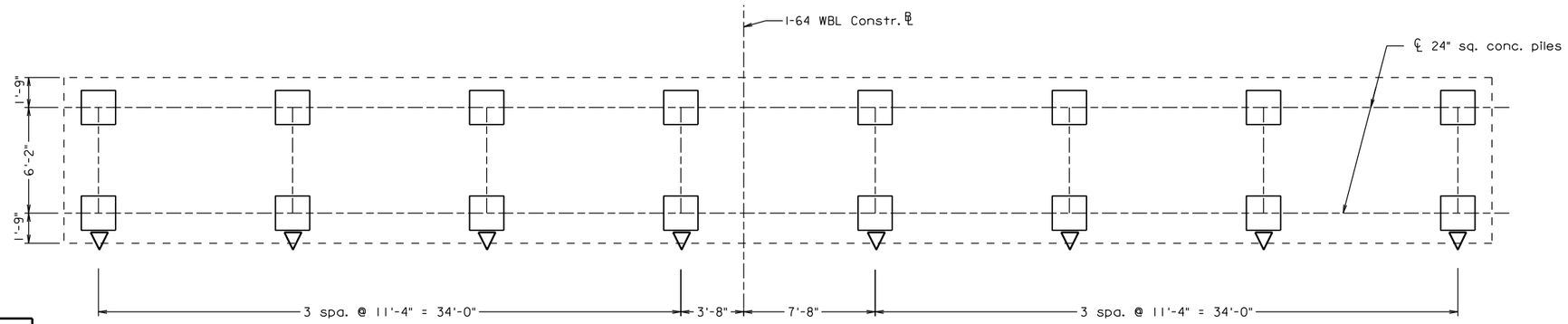


PLAN

Abutment A shown looking downstation
Abutment B similar and opposite



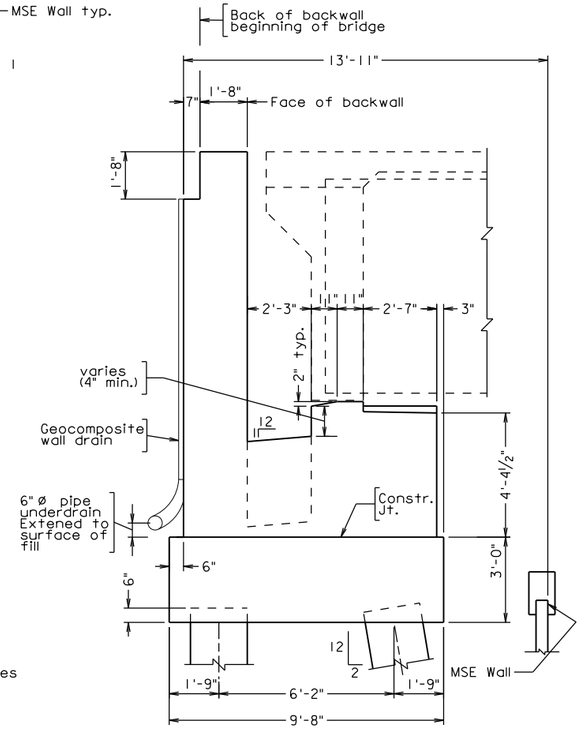
ELEVATION



PILE LAYOUT

Abutment A shown looking downstation
Abutment B similar and opposite

▽ Denotes direction of 2:12 pile batter



SECTION A-A

Scale: ⅜" = 1'-0"

PRELIMINARY PLANS

THESE PLANS NOT TO BE USED FOR CONSTRUCTION OF BRIDGE

PARSONS TRANSPORTATION GROUP INC. OF VIRGINIA
FAIRFAX, VIRGINIA
BRIDGE ENGINEER

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COMMONWEALTH OF VIRGINIA
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STRUCTURE AND BRIDGE DIVISION

ABUTMENT A AND B

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Scale 1/4" = 1'-0" unless otherwise noted

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FHWA REGION	FEDERAL AID STATE	FEDERAL AID PROJECT	STATE ROUTE	STATE PROJECT	SHEET NO.
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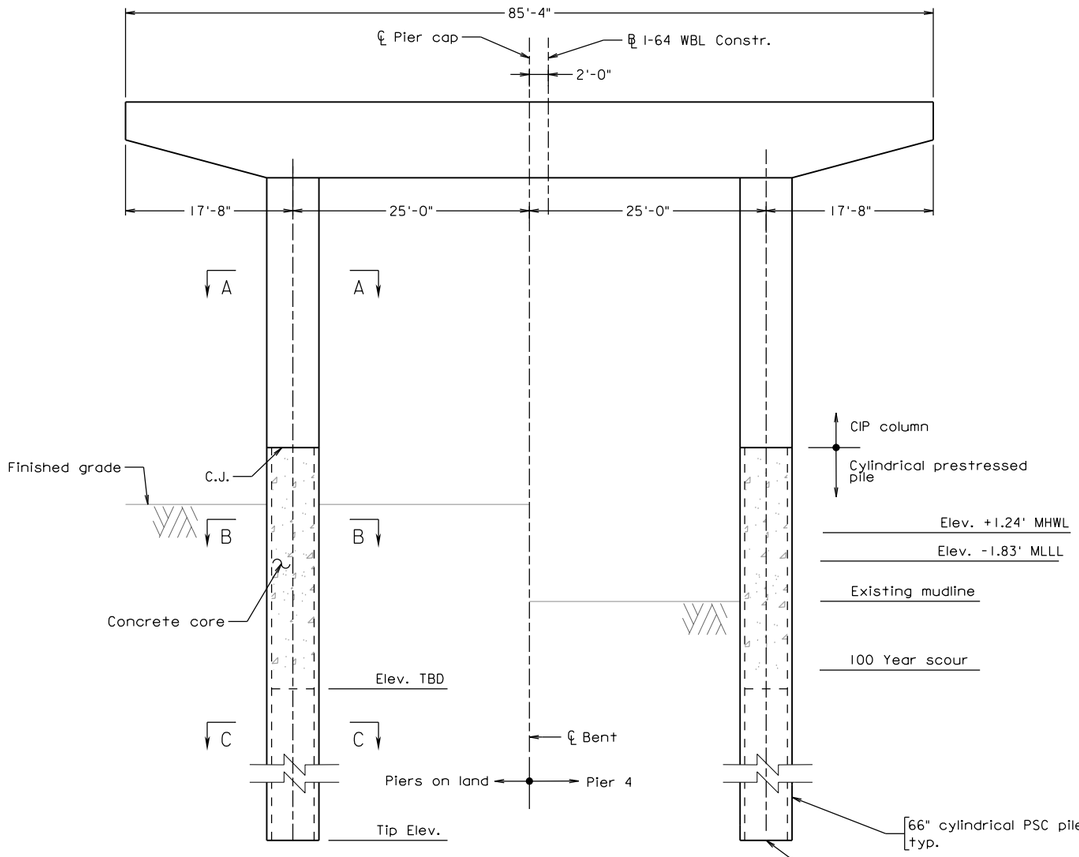
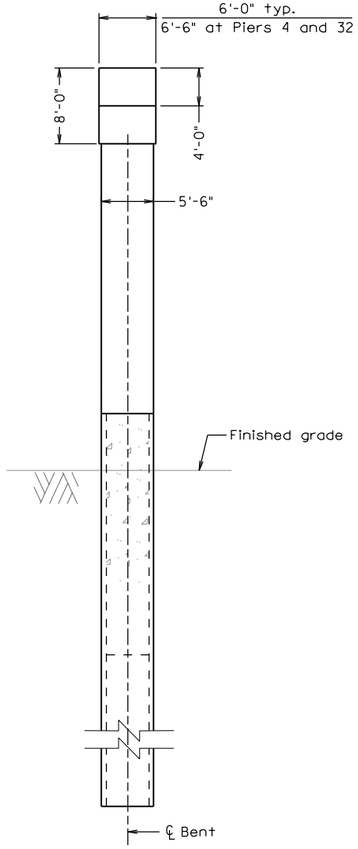
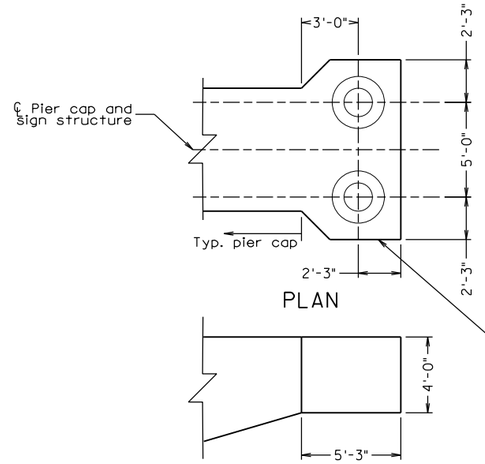


ELEVATION

BRIDGE ENHANCEMENT
Two - Column Pile Bents for reduced environmental impact



END VIEW



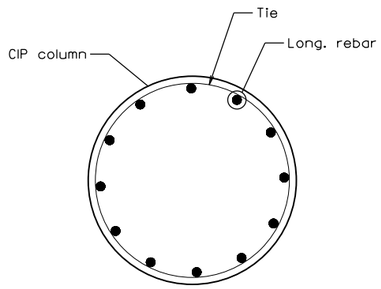
PLAN

ELEVATION

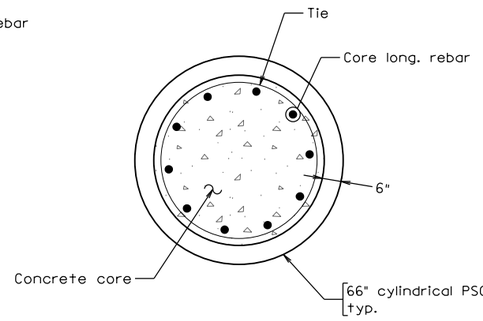
CAP DETAIL AT PIER 34

BRIDGE ENHANCEMENT
Sign structure supported on pier caps for improved redundancy

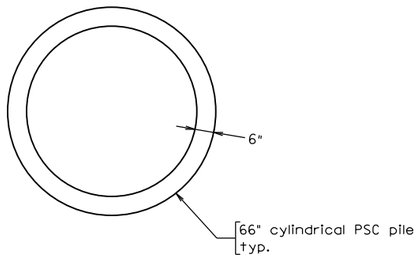
CAP STEP DETAIL AT PIER 4



SECTION A



SECTION B
Prestressing strands not shown



SECTION C
Prestressing strands not shown

Note:

This sheet applies to piers 1 to 4, piers 28 to 35 and 37.

PRELIMINARY PLANS
THESE PLANS NOT TO BE USED FOR CONSTRUCTION OF BRIDGE

PARSONS TRANSPORTATION GROUP INC. OF VIRGINIA
FAIRFAX, VIRGINIA
BRIDGE ENGINEER

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PIER DETAILS - TYPE PILE BENT

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Scale: 1/8" = 1'-0" unless otherwise noted

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	STATE	PROJECT	ROUTE	PROJECT	
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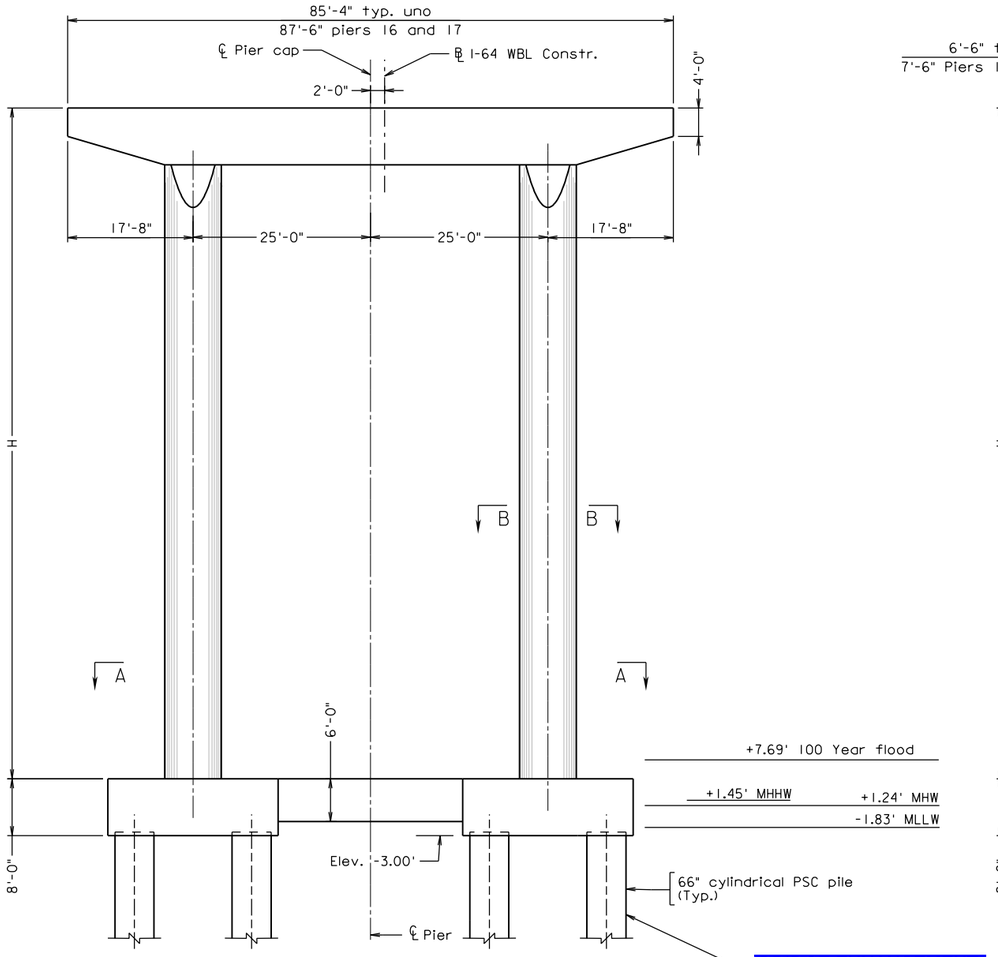
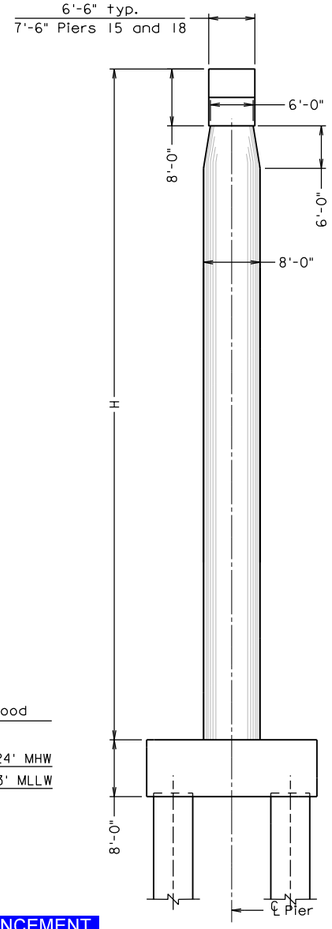
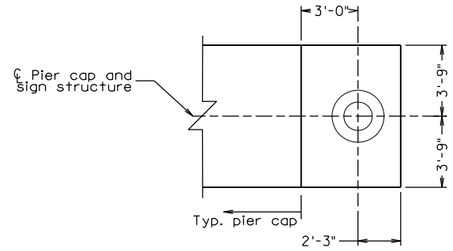


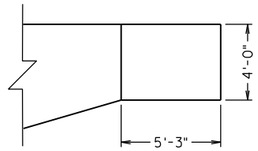
ELEVATION



END VIEW



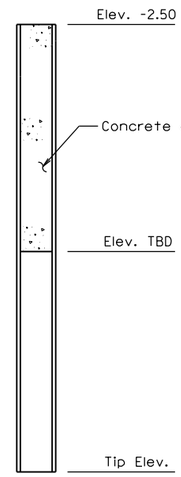
PLAN



ELEVATION

CAP DETAIL AT PIER 15

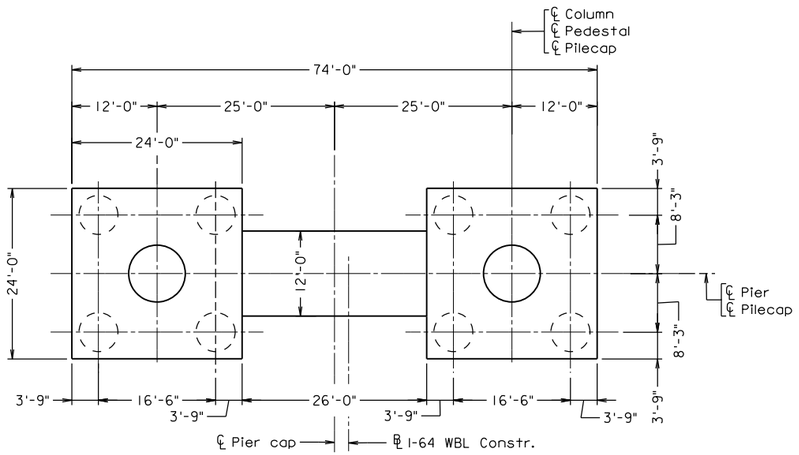
BRIDGE ENHANCEMENT
Support of sign structures on pier caps for improved redundancy



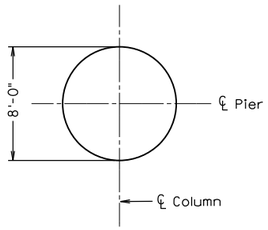
66" CYLINDRICAL PSC PILE DETAIL

Note: concrete core rebar not shown

BRIDGE ENHANCEMENT
Spun-cast cylinder piles for improved durability



SECTION A-A



SECTION B-B
Scale: 3/16" = 1'-0"

Note:

This sheet applies to CV1 Piers 16 and 17 and CV2 Piers 13, 14, 15 and 18.

PRELIMINARY PLANS
THESE PLANS NOT TO BE USED FOR CONSTRUCTION OF BRIDGE

PARSONS TRANSPORTATION GROUP INC. OF VIRGINIA
FAIRFAX, VIRGINIA
BRIDGE ENGINEER

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PIER DETAILS - TYPES CV1 & CV2

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Scale: 3/32" = 1'-0" unless otherwise noted

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FHWA REGION	FEDERAL AID		STATE		SHEET NO.
	STATE	PROJECT	ROUTE	PROJECT	
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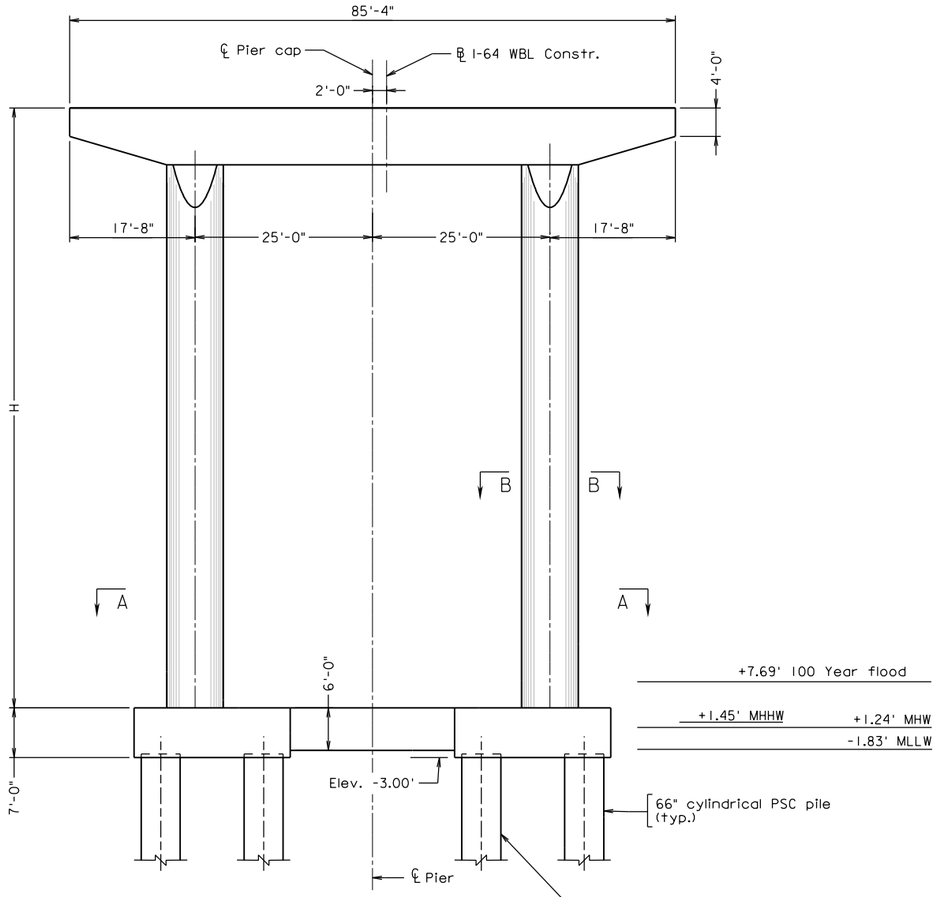
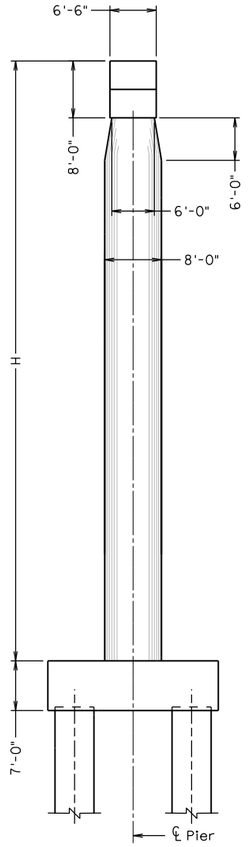
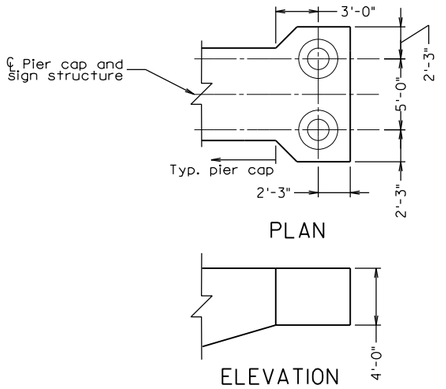


ELEVATION

BRIDGE ENHANCEMENT
Spun-cast cylinder piles improve durability



END VIEW

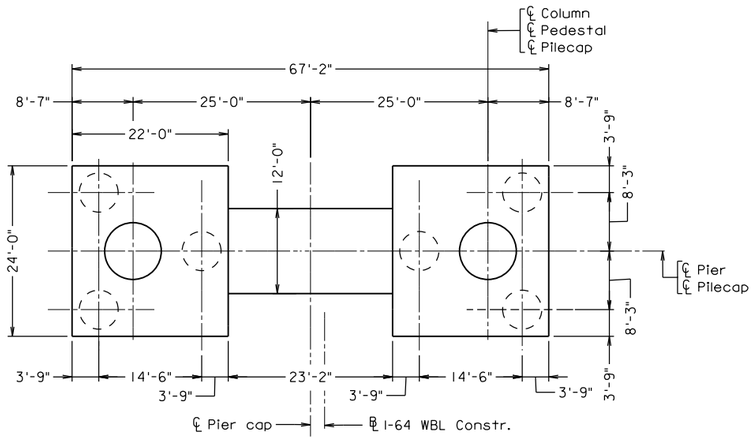


PLAN

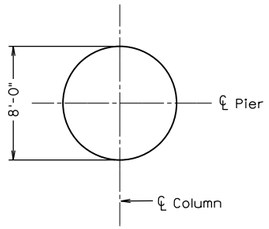
ELEVATION

CAP DETAIL AT PIER 10

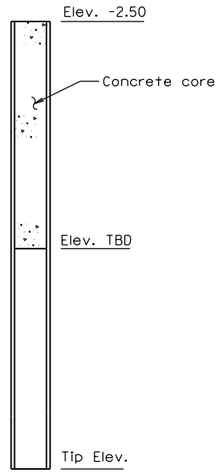
BRIDGE ENHANCEMENT
Support of sign structures on pier caps for improved redundancy



SECTION A-A



SECTION B-B
Scale: 3/16" = 1'-0"



66" CYLINDRICAL PSC PILE DETAIL

Note: concrete core rebar not shown

Note:

This sheet applies to Piers 10 to 12.

PRELIMINARY PLANS
THESE PLANS NOT TO BE USED FOR CONSTRUCTION OF BRIDGE

PARSONS TRANSPORTATION GROUP INC. OF VIRGINIA
FAIRFAX, VIRGINIA
BRIDGE ENGINEER

No.	Description	Date
	Revisions	

COMMONWEALTH OF VIRGINIA
DEPARTMENT OF TRANSPORTATION
STRUCTURE AND BRIDGE DIVISION

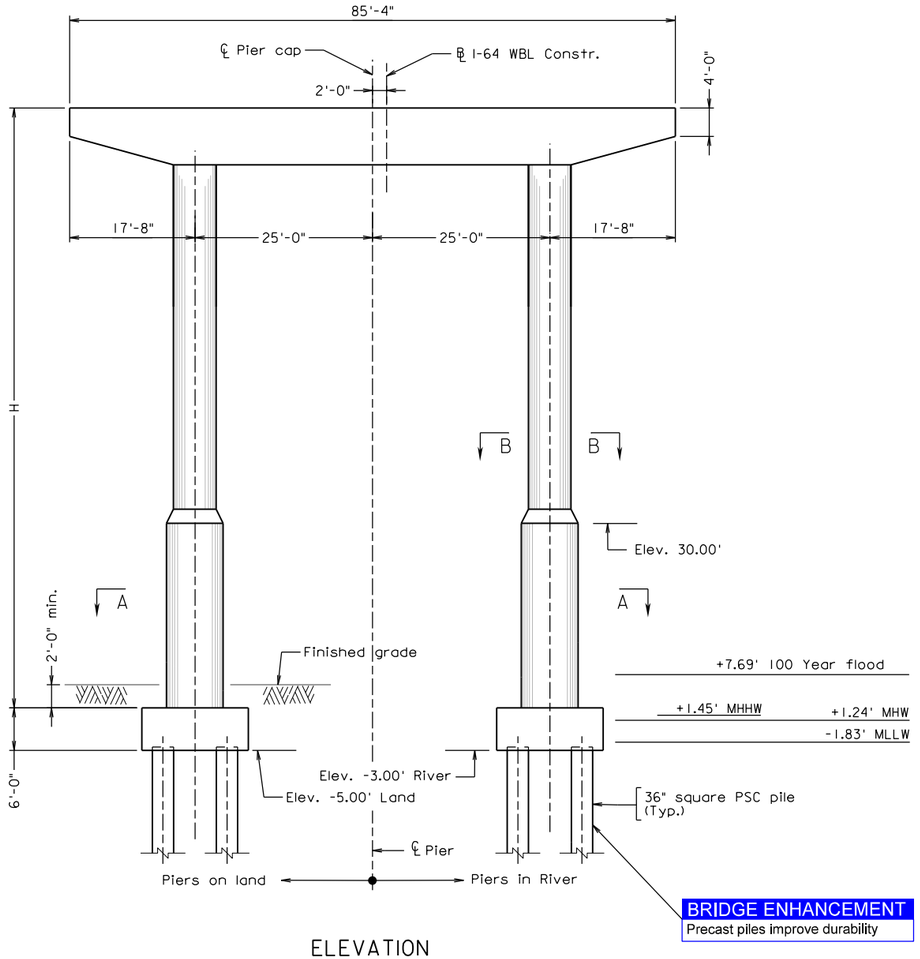
PIER DETAILS - TYPE CV3

Designed: AMC	Date	Plan No.	Sheet No.
Drawn: MTW	Aug 2017	XXX-XX	56 of 84
Checked: CHS			

Scale: 3/32" = 1'-0" unless otherwise noted

8/2/2017 12:20:51 PM b106692_011-HR.dgn

FHWA REGION	FEDERAL AID		STATE		SHEET NO.
	STATE	PROJECT	ROUTE	PROJECT	
3	VA.	NHPP-064-3(488)	64	0064-131-811, B662	57



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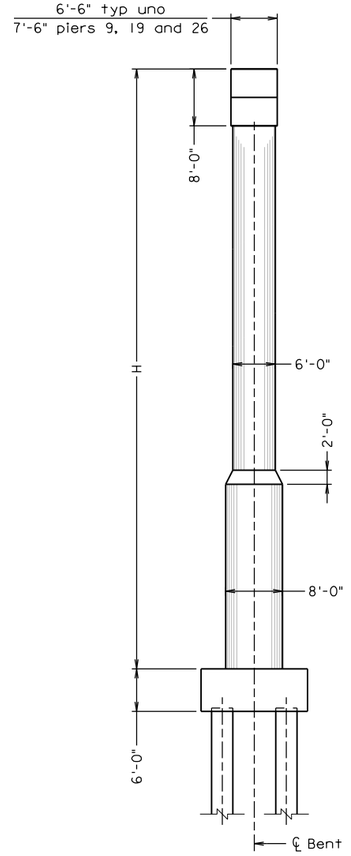

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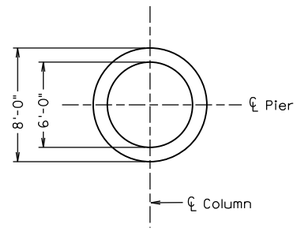
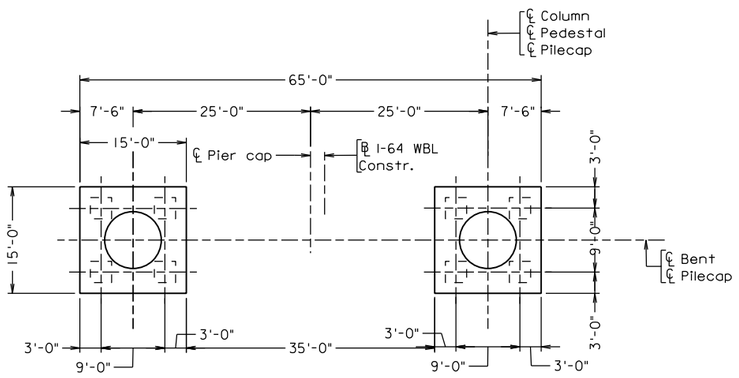
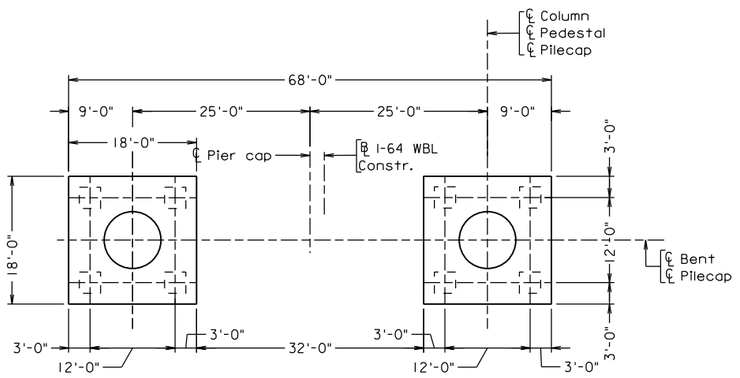


SECTION B-B
Scale: 3/16" = 1'-0"



SECTION A-A
For piers 5 thru 9 and piers 26 and 27



SECTION A-A
For piers 19 thru 25

Note:

This sheet applies to Piers 5 to 9 and Piers 19 to 27.

PRELIMINARY PLANS
THESE PLANS NOT TO BE USED FOR CONSTRUCTION OF BRIDGE

No.	Description	Date
	Revisions	

COMMONWEALTH OF VIRGINIA
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STRUCTURE AND BRIDGE DIVISION

PIER DETAILS - TYPE CV4

Designed: AMC	Date	Plan No.	Sheet No.
Drawn: MTW	Aug 2017	XXX-XX	57 of 84
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PARSONS TRANSPORTATION GROUP INC. OF VIRGINIA
FAIRFAX, VIRGINIA
BRIDGE ENGINEER

Scale: 3/32" = 1'-0" unless otherwise noted

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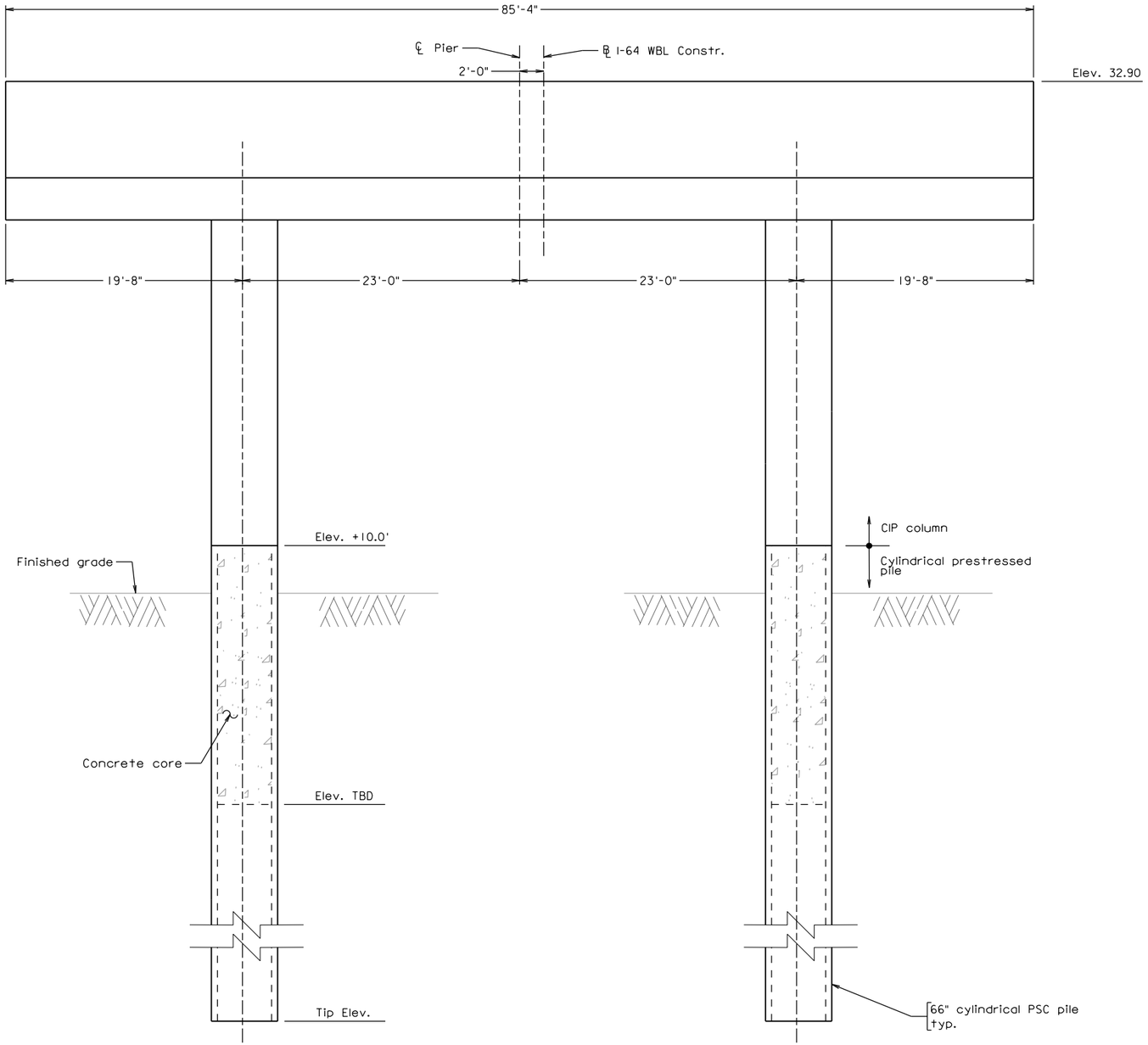
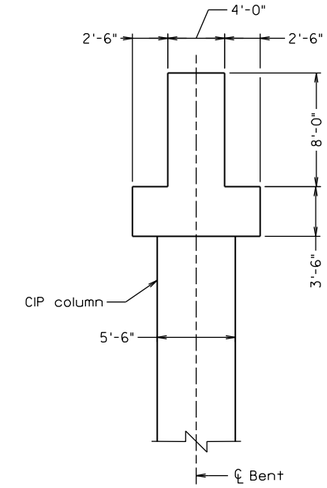
FHWA REGION	FEDERAL AID STATE	FEDERAL AID PROJECT	STATE ROUTE	STATE PROJECT	SHEET NO.
3	VA.	NHPP-064-3(488)	64	0064-131-811, B662	58



ELEVATION



END VIEW

Note:

This sheet applies to Pier 36.

PRELIMINARY PLANS
THESE PLANS NOT TO BE USED FOR CONSTRUCTION OF BRIDGE

PARSONS TRANSPORTATION GROUP INC. OF VIRGINIA
FAIRFAX, VIRGINIA
BRIDGE ENGINEER

No.	Description	Date
	Revisions	

COMMONWEALTH OF VIRGINIA
DEPARTMENT OF TRANSPORTATION
STRUCTURE AND BRIDGE DIVISION

PIER DETAILS - INVERTED T PIER

Designed: AMG	Date	Plan No.	Sheet No.
Drawn: MTW	Aug 2017	XXX-XX	58 of 84
Checked: CHS			

Scale: 3/16" = 1'-0" unless otherwise noted

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FHWA REGION	FEDERAL AID		STATE		SHEET NO.
	STATE	PROJECT	ROUTE	PROJECT	
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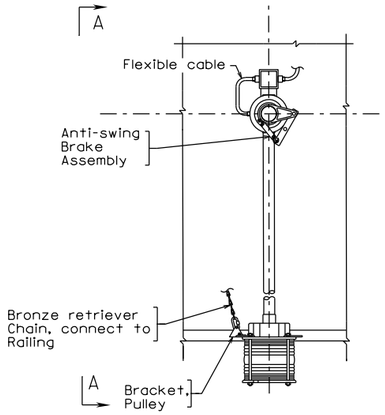
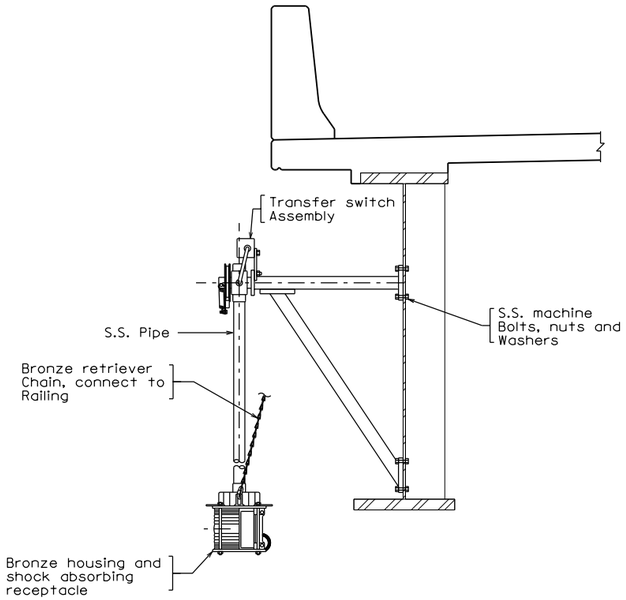
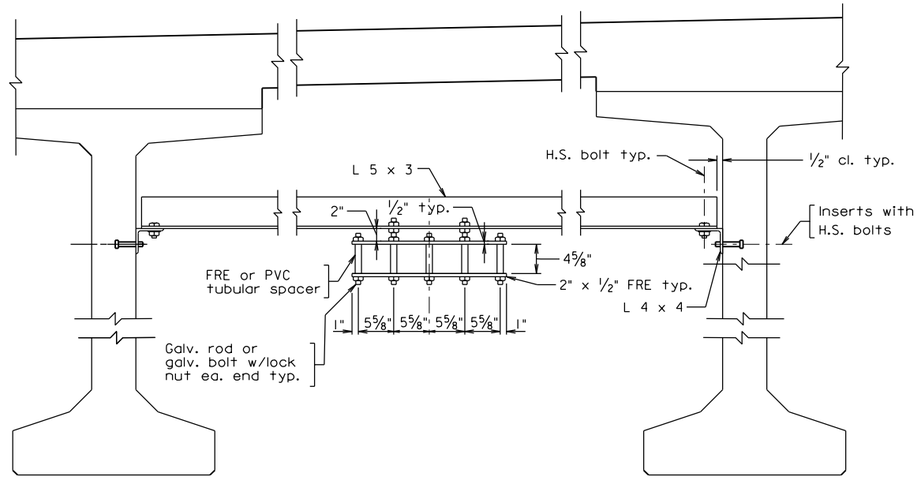


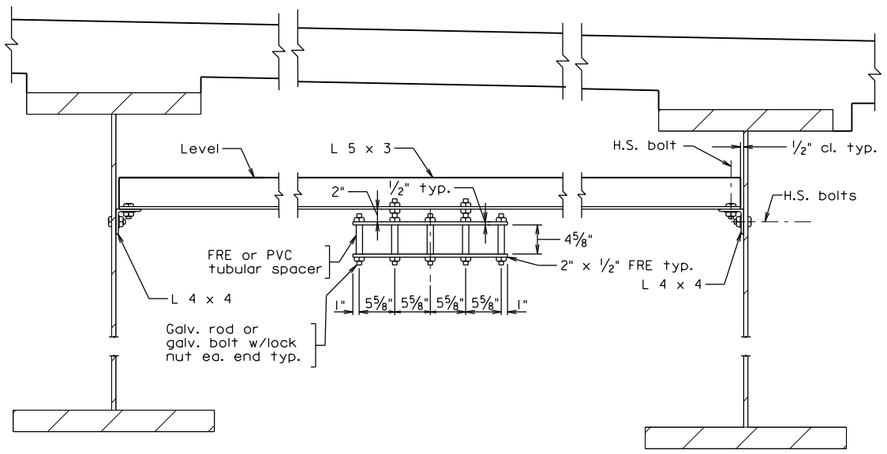
NAVIGATIONAL LIGHT



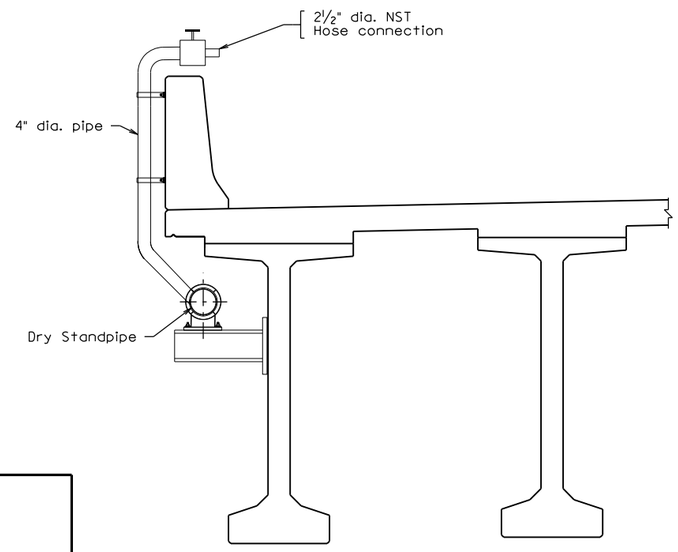
SECTION A-A



CONDUIT SUPPORT SYSTEM - CONCRETE GIRDERS



CONDUIT SUPPORT SYSTEM - STEEL GIRDERS



PARTIAL SECTION AT
DRY STANDPIPE FIRE NOZZLE

Note:
1. For notes, see sheet 51.

PRELIMINARY PLANS
THESE PLANS NOT TO BE USED FOR CONSTRUCTION OF BRIDGE

PARSONS TRANSPORTATION GROUP INC. OF VIRGINIA
FAIRFAX, VIRGINIA
BRIDGE ENGINEER

No.	Description	Date
	Revisions	

COMMONWEALTH OF VIRGINIA
DEPARTMENT OF TRANSPORTATION
STRUCTURE AND BRIDGE DIVISION

MISCELLANEOUS DETAILS

Designed: AMC	Date	Plan No.	Sheet No.
Drawn: MTW	Aug 2017	XXX-XX	59 of 84
Checked: GHS			

Scale: ¼" = 1'-0"

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FHWA REGION	FEDERAL AID		STATE		SHEET NO.
	STATE	PROJECT	ROUTE	PROJECT	
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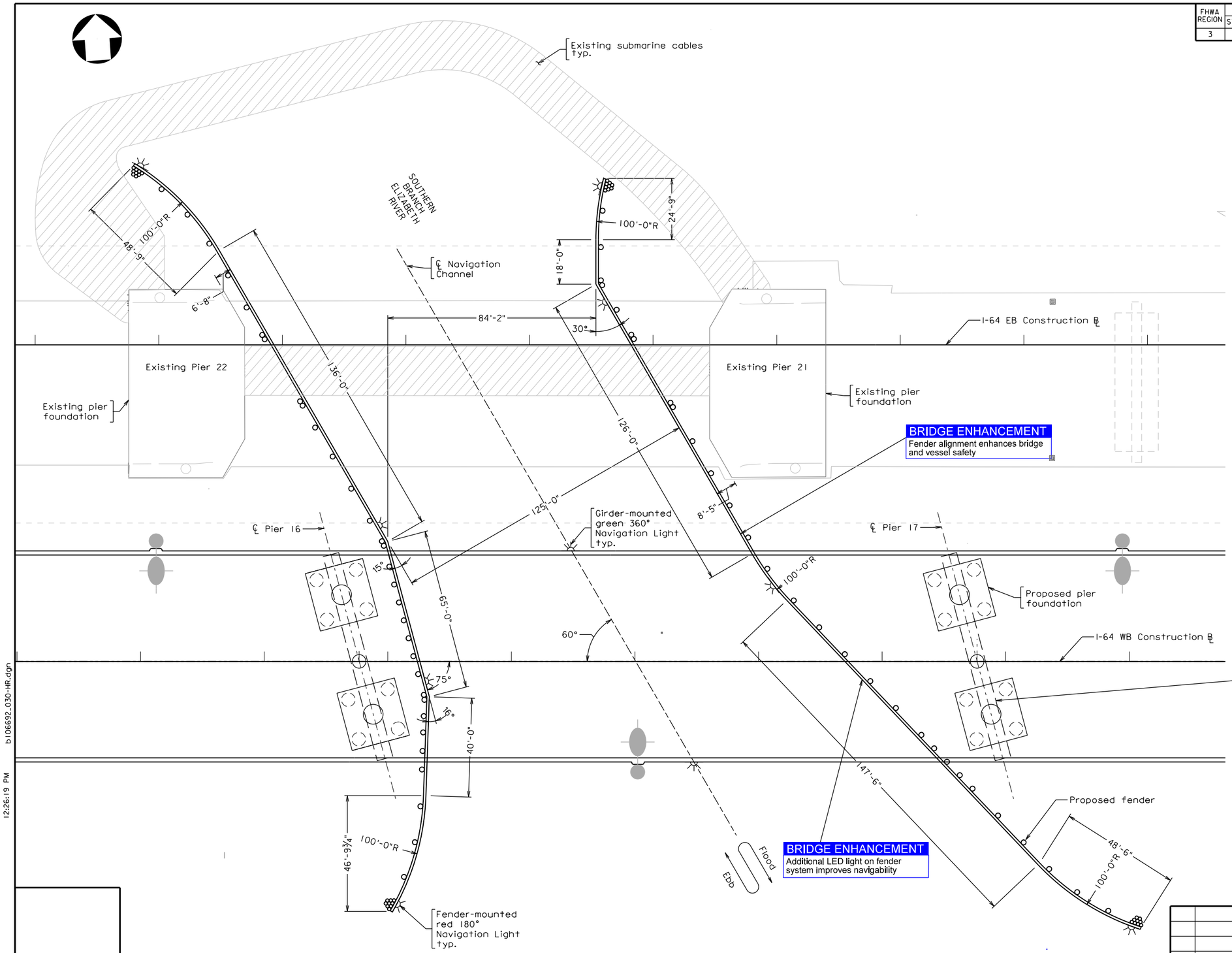

PRELIMINARY PLANS

THESE PLANS NOT TO BE USED FOR CONSTRUCTION OF BRIDGE

PARSONS TRANSPORTATION GROUP INC. OF VIRGINIA
FAIRFAX, VIRGINIA
BRIDGE ENGINEER

Scale: 1" = 20'

No.	Description	Date
Revisions		

COMMONWEALTH OF VIRGINIA
DEPARTMENT OF TRANSPORTATION

STRUCTURE AND BRIDGE DIVISION

FENDER LAYOUT

Designed: AMC	Date	Plan No.	Sheet No.
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Checked: GHS			

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8/2/2017

FHWA REGION	FEDERAL AID		STATE		SHEET NO.
	STATE	PROJECT	ROUTE	PROJECT	
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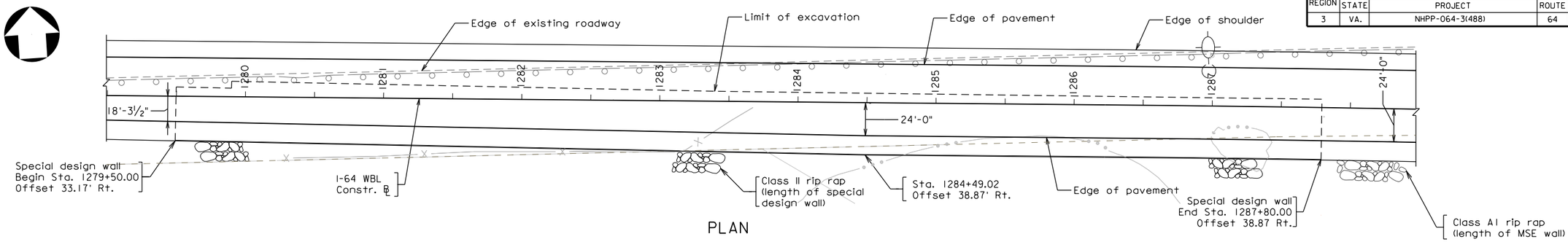
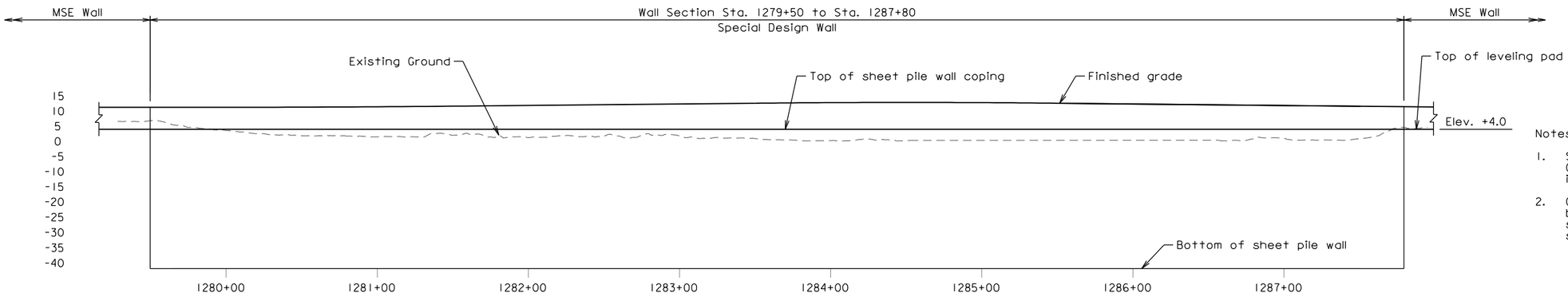


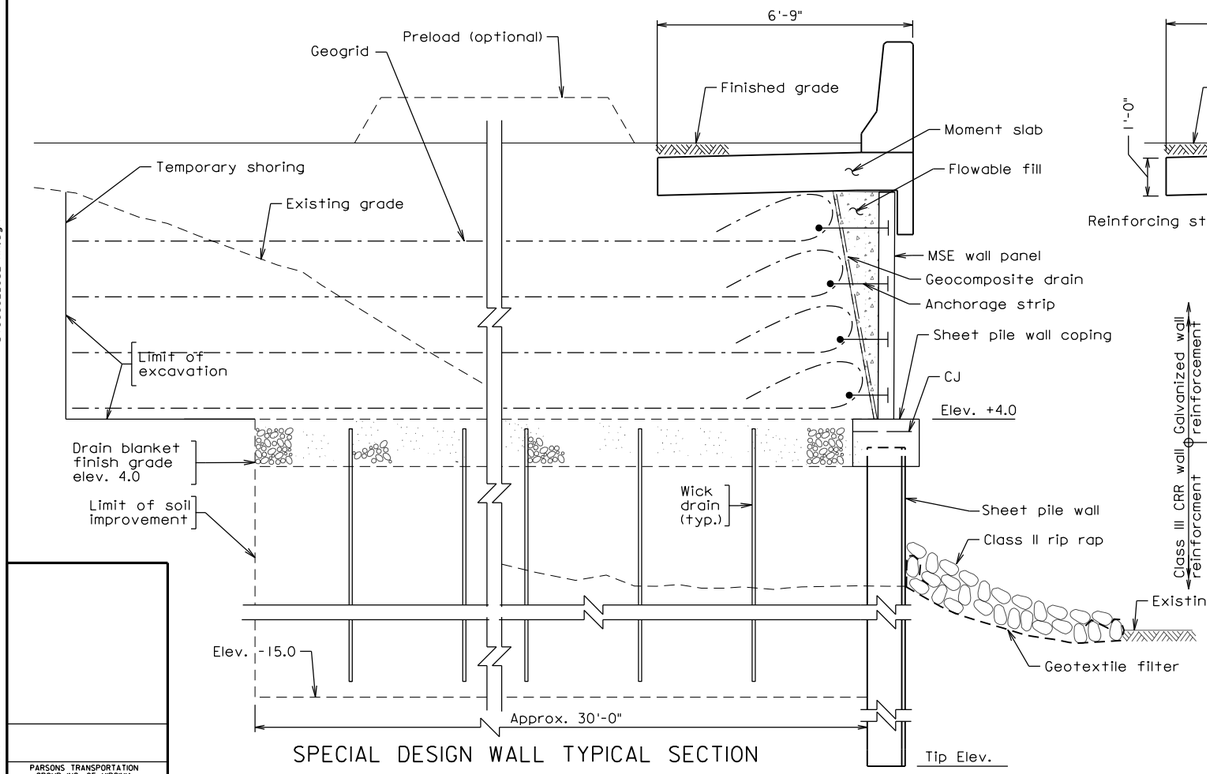
PLAN



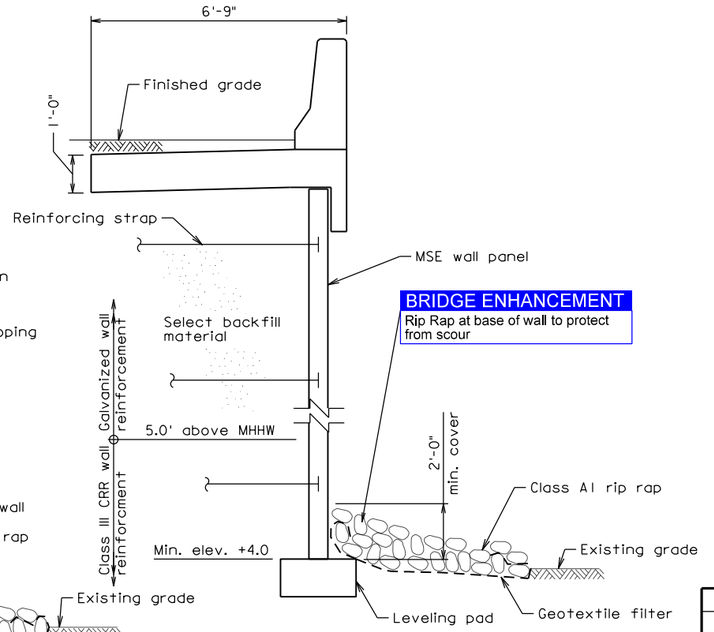
ELEVATION

Notes:

1. Sheet piles shall conform to ASTM A572 Grade 50 and shall be hot dip galvanized in accordance with ASTM A123.
2. Corrosion Resistant Reinforcing steel shall be used in moment slab and shall be the same type of corrosion resistant reinforcing steel specified for the roadway parapet.



SPECIAL DESIGN WALL TYPICAL SECTION



MSE WALL
TYPICAL SECTION

Sequence of Construction

1. Install sheet pile wall.
2. Install sheet pile wall coping
3. Place compacted fill to base of drainage blanket.
4. Install drainage blanket layer comprised of crushed gravel or open graded coarse sand.
5. Install wick drain soil improvement system.
6. Install embankment settlement monitoring instrumentation system. Execute embankment settlement monitoring program as directed by the geotechnical engineer.
7. Install temporary shoring as necessary. Construct reinforced earth embankment fill to base of roadway section in compacted lifts.
8. Preload embankment, as needed.
9. Install leveling section of sheet wall coping. Install MSE wall facing.
10. Install moment slab section above MSE wall and complete construction of roadway pavement section.

PRELIMINARY PLANS
THESE PLANS NOT TO BE USED FOR CONSTRUCTION OF BRIDGE

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PARSONS TRANSPORTATION GROUP INC. OF VIRGINIA
FAIRFAX, VIRGINIA
BRIDGE ENGINEER

not to scale

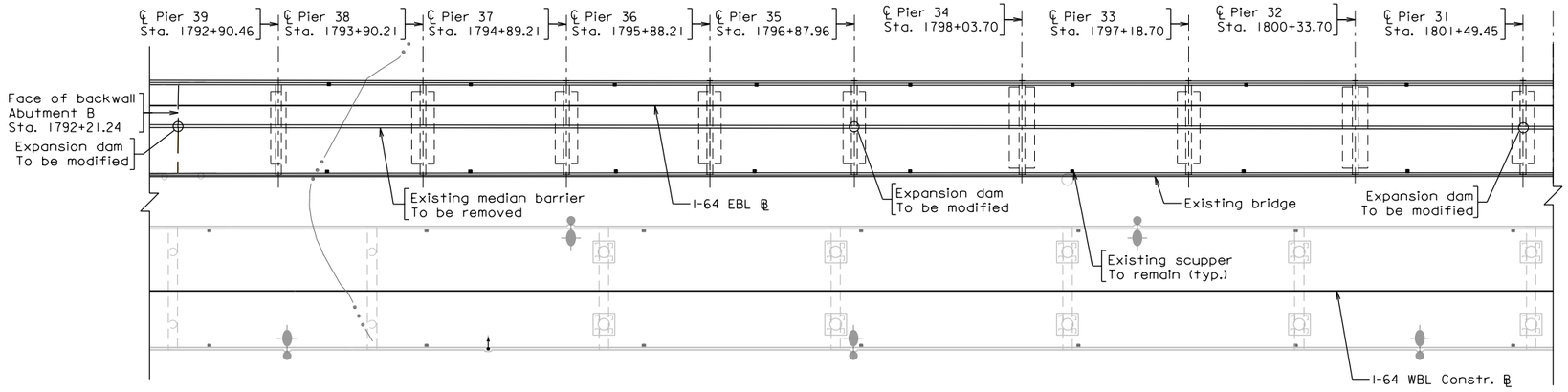
No.	Description	Date
	Revisions	

COMMONWEALTH OF VIRGINIA
DEPARTMENT OF TRANSPORTATION
STRUCTURE AND BRIDGE DIVISION

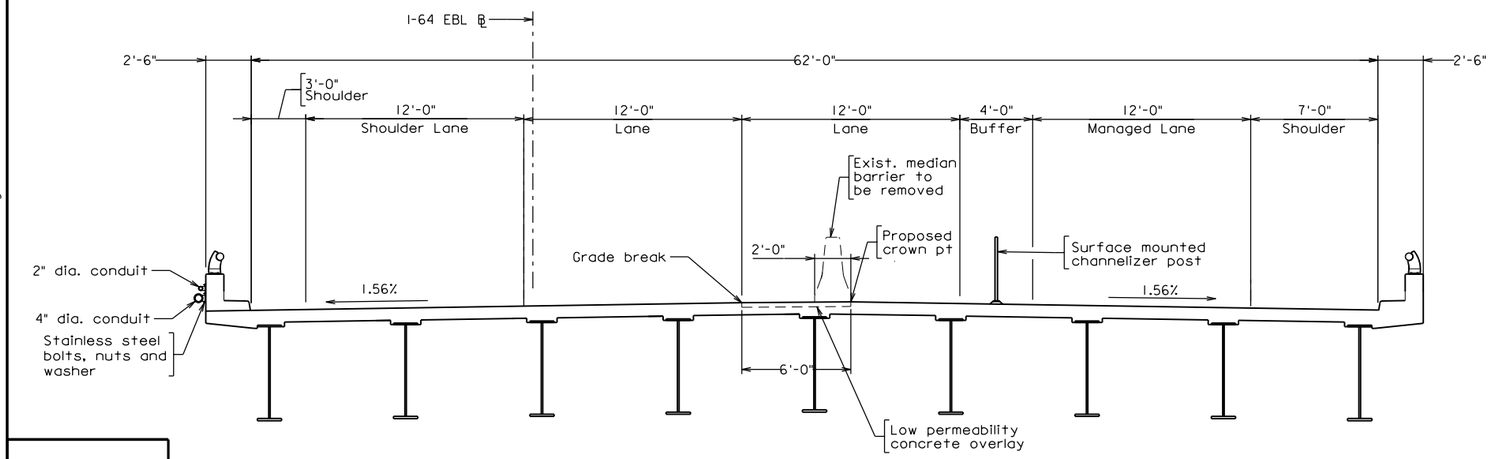
SPECIAL DESIGN WALL

Designed: AMC	Date	Plan No.	Sheet No.
Drawn: MTW	Aug 2017	XXX-XX	61 of 84
Checked: GHS			

STATE	FEDERAL AID		STATE		SHEET NO.
	ROUTE	PROJECT	ROUTE	PROJECT	
VA.	-	NHPP-064-3(488)	64	0064-131-811, B670	62
NBIS Number:			UPC No. 106692		
Federal Oversight Code: NFO			FHWA Construction and Scour Code: X936-S5		



PLAN



TRANSVERSE SECTION
Scale: 1/4" = 1'-0"

DESIGN EXCEPTION(S):

None

GENERAL NOTES:

Specifications:

Construction: Virginia Department of Transportation Road and Bridge Specifications, 2016.

Design: AASHTO LRFD Bridge Design Specifications, 7th Edition, 2014; and VDOT Modifications.

Guide Specifications and Commentary for Vessel Collision Design Highway Bridges, 2nd Edition, 2009; 2010 Interim Specifications.

Standards: Virginia Department of Transportation Road and Bridge Standards, 2008; including all current revisions.

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

This project is to be constructed in accordance with the Virginia Department of Transportation Work Area Protection Manual, June 2011 and latest revisions.

Bridge No. of existing bridge is 2527. Plan No. is 174-09

The existing structure is designated a Type B structure in accordance with Sec. 411.

VDOT

COMMONWEALTH OF VIRGINIA
DEPARTMENT OF TRANSPORTATION

PROPOSED EXISTING BRIDGE MODIFICATIONS
I-64 (EB) OVER SOUTHERN BRANCH ELIZABETH RIVER, NPBL RR, AND RTE. 166 (BAINBRIDGE BLVD.)
CITY OF CHEASAPEAKE - 1.7 MI. W. OF ROUTE I-464
PROJ. 0064-131-811, B670

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PARSONS TRANSPORTATION GROUP INC. OF VIRGINIA
FAIRFAX, VIRGINIA
BRIDGE ENGINEER

PLANS BY:	Consultant
COORDINATED:	
SUPERVISED:	
DESIGNED:	Ali M. Ghalib
DRAWN:	Michael T. Wieczorek
CHECKED:	Gregory H. Shafer

PRELIMINARY PLANS
THESE PLANS NOT TO BE USED FOR CONSTRUCTION OF BRIDGE

Scale: 1" = 50' unless noted otherwise

No.	Description	Date
	REVISIONS	
	For Table of Revisions see sheet 2.	

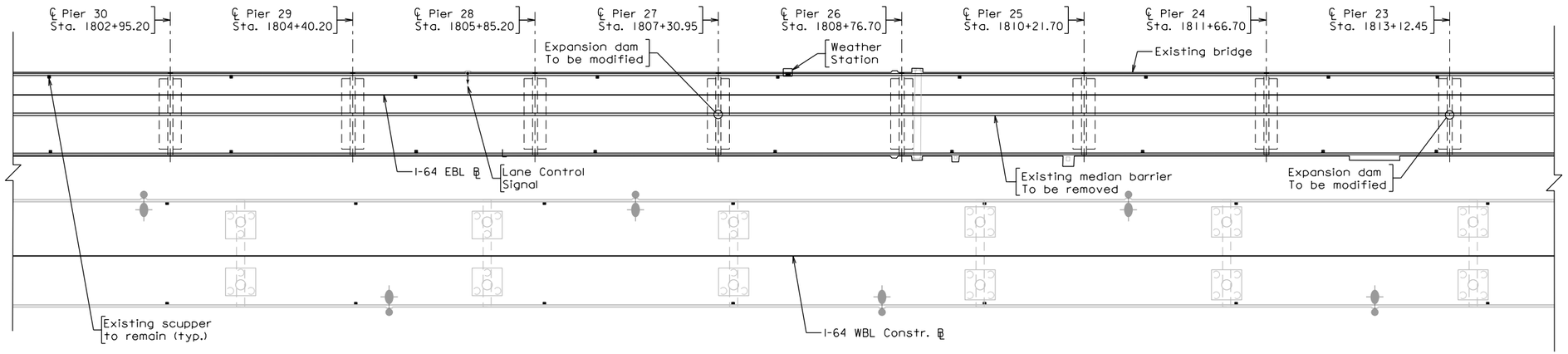
Recommended for Approval: _____ Date

Approved: _____ Chief Engineer Date

Date: August 2017

174-09
Sheet 62 of 84

FHWA REGION	FEDERAL AID		STATE		SHEET NO.
	STATE	PROJECT	ROUTE	PROJECT	
3	VA.	NHPP-064-3(488)	64	0064-131-811, B670	63



PLAN

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PARSONS TRANSPORTATION GROUP INC. OF VIRGINIA
FAIRFAX, VIRGINIA
BRIDGE ENGINEER

Scale: 1" = 50'

PRELIMINARY PLANS
THESE PLANS NOT TO BE USED FOR CONSTRUCTION OF BRIDGE

No.	Description	Date
	Revisions	

COMMONWEALTH OF VIRGINIA
DEPARTMENT OF TRANSPORTATION
STRUCTURE AND BRIDGE DIVISION

PLAN - 2

Designed: AMG	Date	Plan No.	Sheet No.
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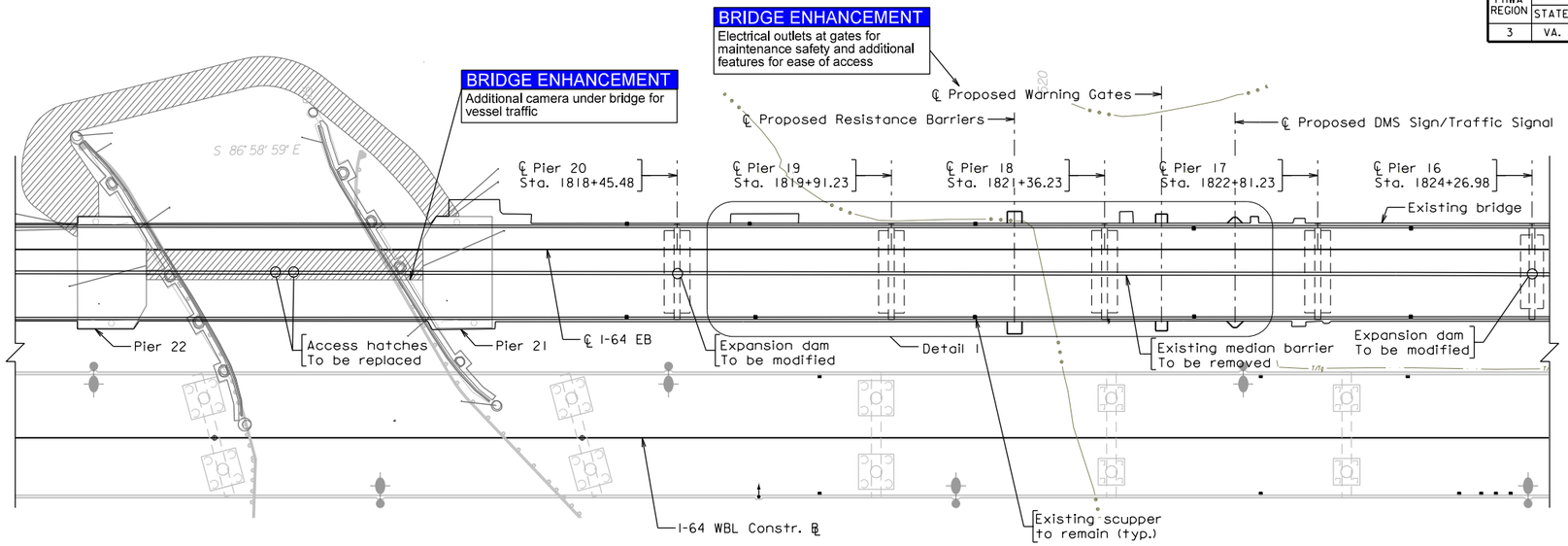
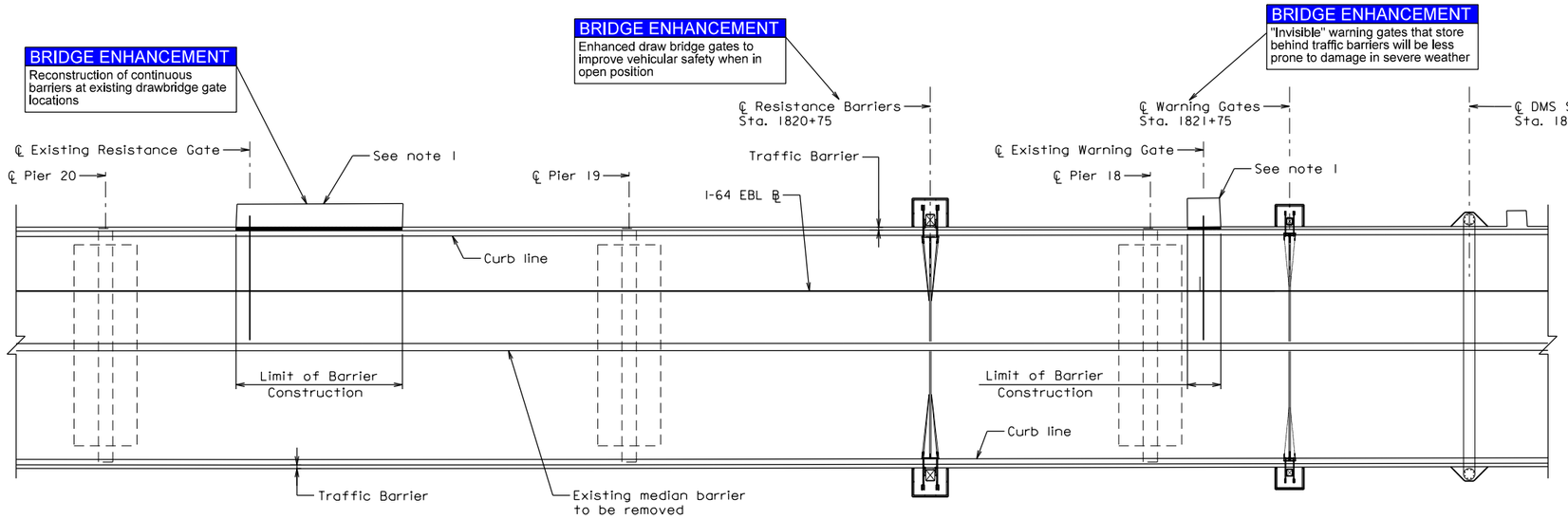
FHWA REGION	FEDERAL AID		STATE		SHEET NO.
	STATE	PROJECT	ROUTE	PROJECT	
3	VA.	NHPP-064-3(488)	64	0064-131-811, B670	64



PLAN



DETAIL I

Scale: 1" = 20'

Notes:

1. Remove existing gates and construct traffic barrier (and curb where required) within limits shown. Typical at east and west side of bascule span.
2. For proposed structural modification detail, see sheet 67.
3. For location of CCTV cameras, traffic signals and signs, see Roadway and Electrical drawings

PRELIMINARY PLANS

THESE PLANS NOT TO BE USED FOR CONSTRUCTION OF BRIDGE

PARSONS TRANSPORTATION GROUP INC. OF VIRGINIA
FAIRFAX, VIRGINIA
BRIDGE ENGINEER

Scale: 1" = 50' unless noted otherwise

No.	Description	Date
Revisions		

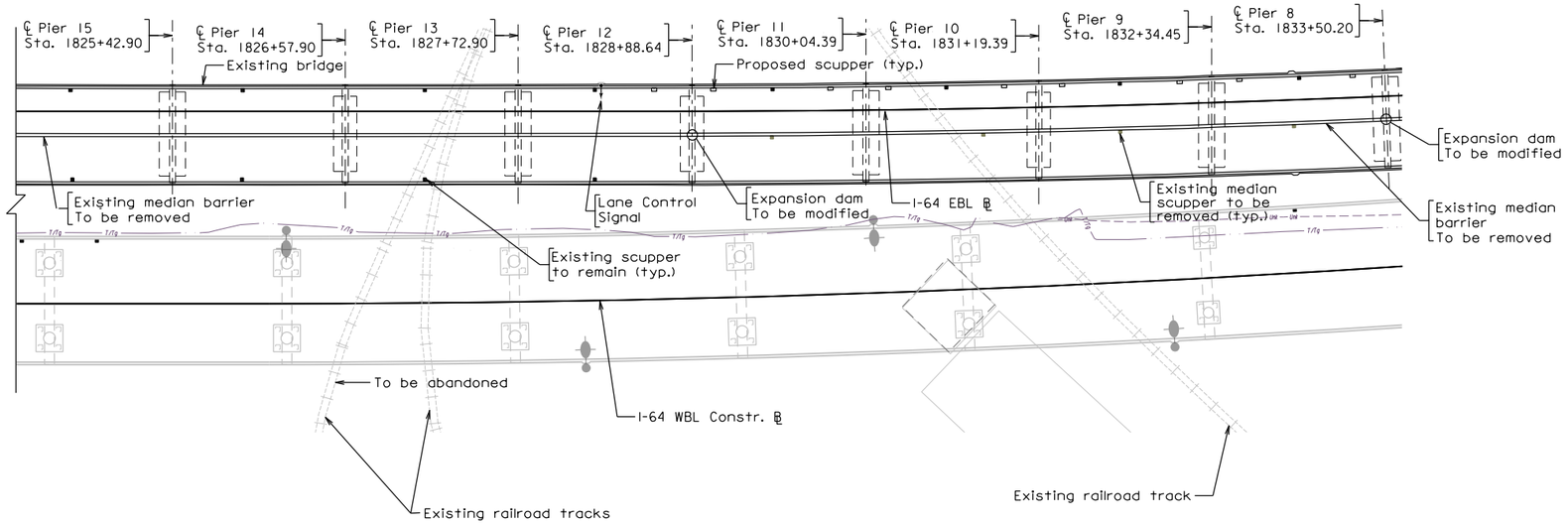
COMMONWEALTH OF VIRGINIA
DEPARTMENT OF TRANSPORTATION

STRUCTURE AND BRIDGE DIVISION

PLAN - 3

Designed: AMG	Date	Plan No.	Sheet No.
Drawn: MTW	Aug 2017	174-09	64 of 84
Checked: CHS			

FHWA REGION	FEDERAL AID		STATE		SHEET NO.
	STATE	PROJECT	ROUTE	PROJECT	
3	VA.	NHPP-064-3(488)	64	0064-131-811, B670	65



PLAN

Scale: 1" = 50'

PRELIMINARY PLANS
THESE PLANS NOT TO BE USED FOR CONSTRUCTION OF BRIDGE

PARSONS TRANSPORTATION GROUP INC. OF VIRGINIA
FAIRFAX, VIRGINIA
BRIDGE ENGINEER

No.	Description	Date
	Revisions	

COMMONWEALTH OF VIRGINIA
DEPARTMENT OF TRANSPORTATION
STRUCTURE AND BRIDGE DIVISION

PLAN - 4

Designed: AMG	Date	Plan No.	Sheet No.
Drawn: MTW	Aug 2017	174-09	65 of 84
Checked: GHS			

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FHWA REGION	FEDERAL AID		STATE		SHEET NO.
	STATE	PROJECT	ROUTE	PROJECT	
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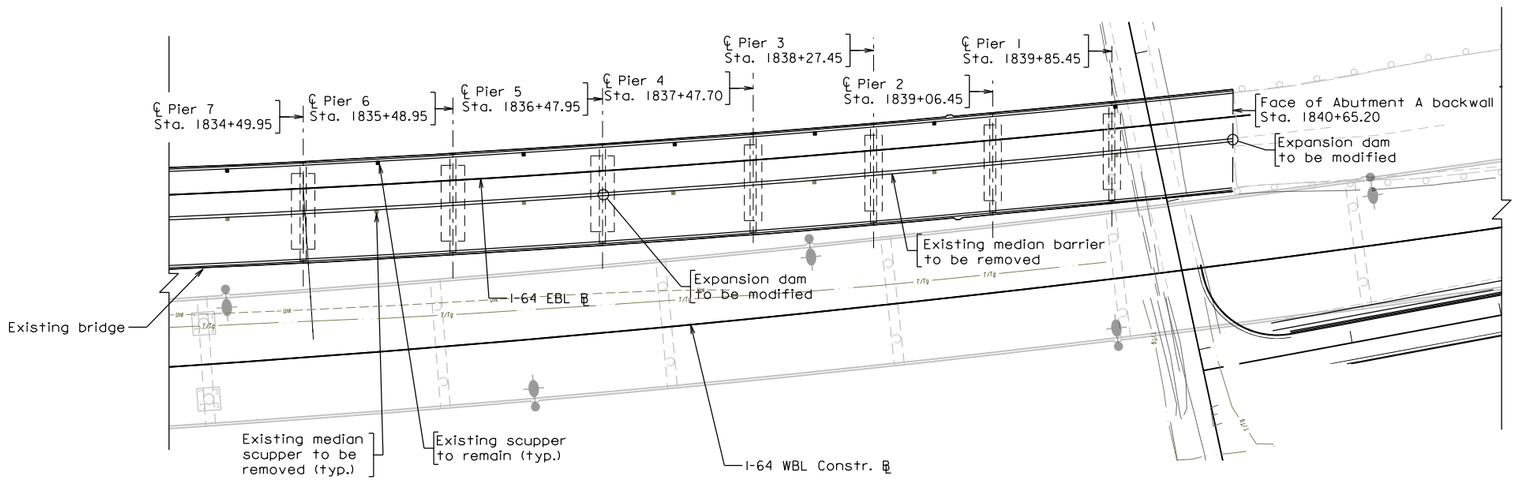

PLAN

Scale: 1" = 50'

PRELIMINARY PLANS
THESE PLANS NOT TO BE USED FOR CONSTRUCTION OF BRIDGE

PARSONS TRANSPORTATION GROUP INC. OF VIRGINIA
FAIRFAX, VIRGINIA
BRIDGE ENGINEER

No.	Description	Date
	Revisions	

COMMONWEALTH OF VIRGINIA
DEPARTMENT OF TRANSPORTATION
STRUCTURE AND BRIDGE DIVISION

PLAN - 5

Designed: AMG	Date	Plan No.	Sheet No.
Drawn: MTW	Aug 2017	174-09	66 of 84
Checked: GHS			

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7/31/2017

FHWA REGION	FEDERAL AID STATE	FEDERAL AID PROJECT	STATE ROUTE	STATE PROJECT	SHEET NO.
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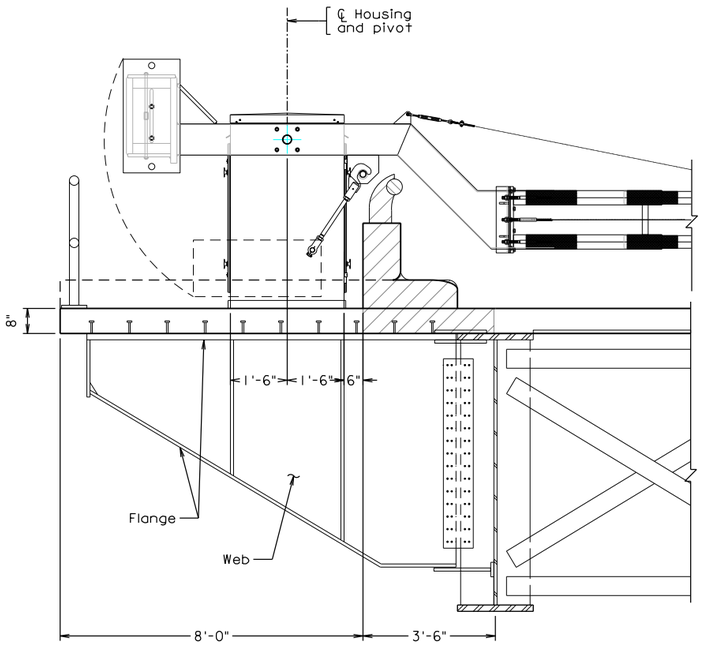
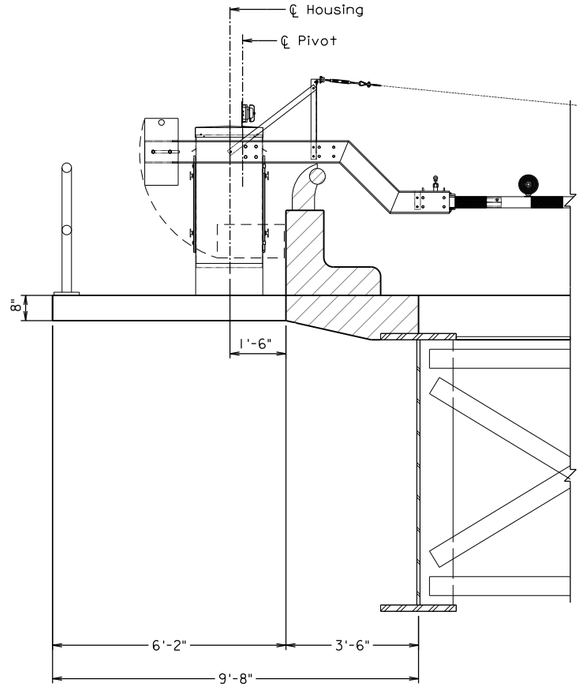
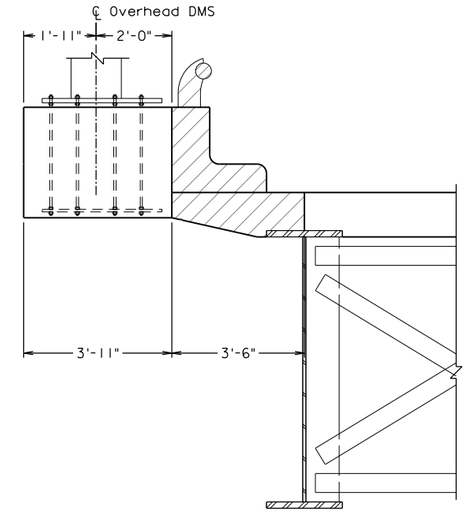


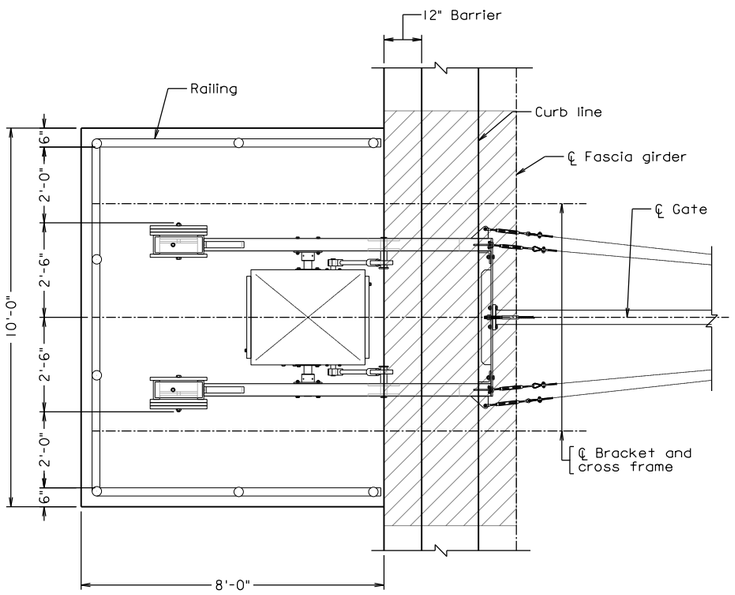
BARRIER GATE ELEVATION



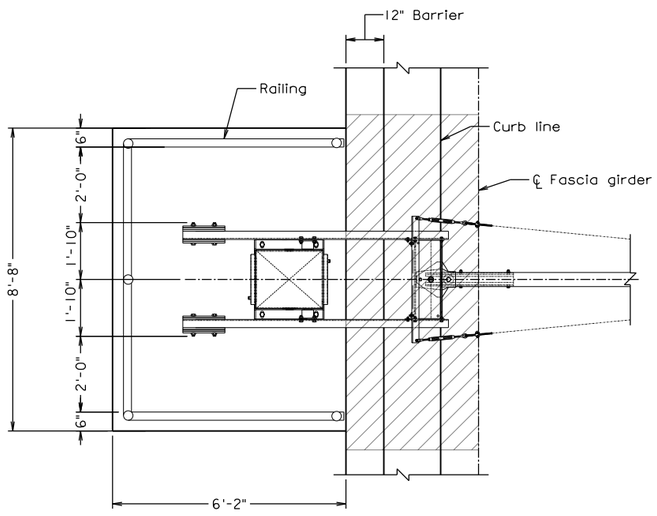
WARNING GATE - ELEVATION



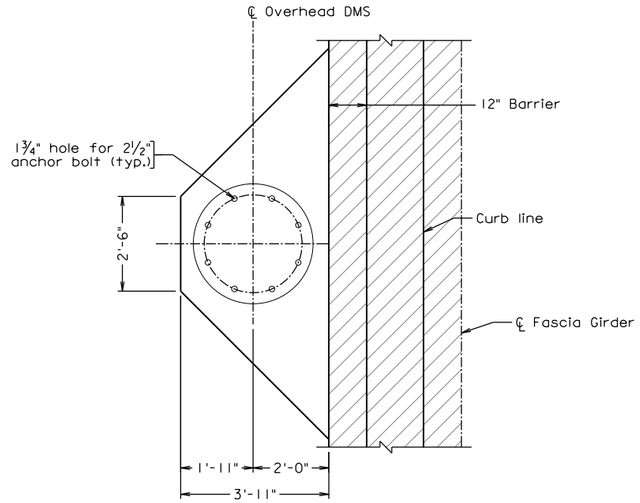
SECTION THRU OVERHEAD DMS



BARRIER GATE PLAN



WARNING GATE PLAN



PLAN AT OVERHEAD DMS

Notes: 1. For location of barrier gates and sign structure, see "Proposed DBTMS" drawing.

Limits of deck, curb and barrier removal and reconstruction.

PRELIMINARY PLANS
THESE PLANS NOT TO BE USED FOR CONSTRUCTION OF BRIDGE

PARSONS TRANSPORTATION GROUP INC. OF VIRGINIA
FAIRFAX, VIRGINIA
BRIDGE ENGINEER

No.	Description	Date
Revisions		

COMMONWEALTH OF VIRGINIA
DEPARTMENT OF TRANSPORTATION
STRUCTURE AND BRIDGE DIVISION

GATE DETAILS

Designed: AMC	Date	Plan No.	Sheet No.
Drawn: MTW	Aug 2017	174-09	67 of 84
Checked: CHS			

Scale: ½" = 1'-0"

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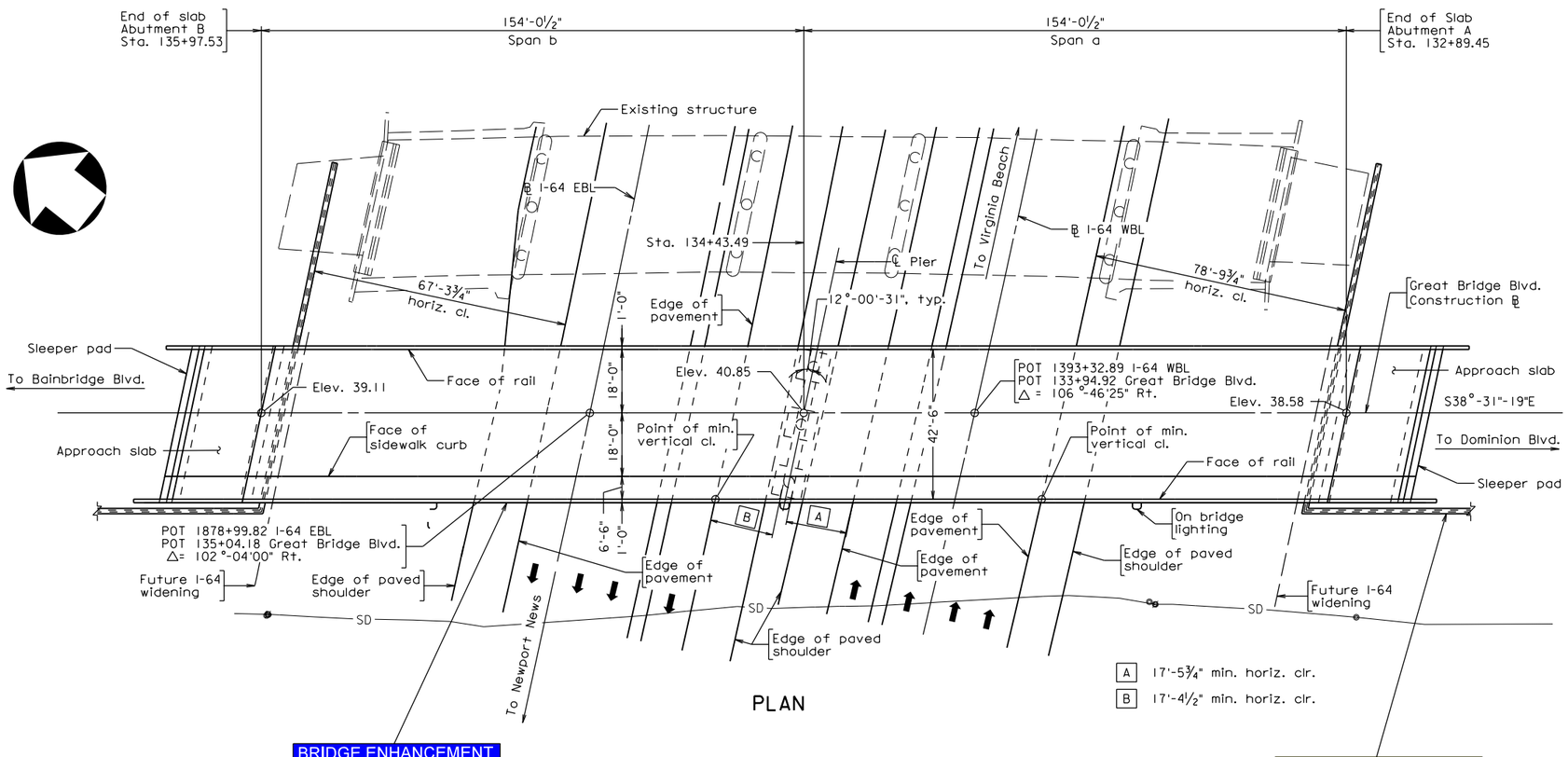
8/1/2017



DEVELOPED SECTION ALONG
GREAT BRIDGE BLVD. CONSTR. ℄

Scale: 1" = 20'

STATE	FEDERAL AID		STATE		SHEET NO.
	ROUTE	PROJECT	ROUTE	PROJECT	
VA.	—	NHPP-064-3(488)	64	0064-131-811, B663	68
NBIS Number:			UPC No. 106692		
Federal Oversight Code:			FHWA Construction and Scour Code: X281-SN		

DESIGN EXCEPTION(S):

None

GENERAL NOTES:

Width: 6'-6" sidewalk, 36'-0" roadway.
Overall width 42'-6" face-to-face of rails.

Span layout: 154'-0½" - 154'-0½" prestressed concrete girder span continuous for live load.

Capacity: HL-93 loading.

Specifications:

Construction: Virginia Department of Transportation Road and Bridge Specifications, 2016.

Design: AASHTO LRFD Bridge Design Specifications, 7th Edition, 2014; and VDOT Modifications.

Standards: Virginia Department of Transportation Road and Bridge Standards, 2016.

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

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

Design loading includes 15 psf allowance for future wearing surface.

Concrete in deck shall be low shrinkage Class A4 Modified; Concrete in superstructure including parapets shall be Class A4; in substructure, Class A3. All concrete shall be low permeability.

Concrete in prestressed beams shall be Class A5 having a minimum compressive cylinder strength at 28 days equal to 8,000 psi and a minimum compressive cylinder strength at time of release of strands equal to 6,000 psi.

All reinforcing steel shall be deformed and shall conform to ASTM A615, Grade 60 except for reinforcing steels noted as CRR (corrosion resistant reinforcement) which shall conform to the applicable specifications noted in the special provisions. All reinforcing bar dimensions on the detailed drawings are to centers of bars except where otherwise noted and are subject to fabrication and construction tolerances.

Corrosion resistant reinforcing (CRR) steels shall conform to one or more of the three Classes listed in the special provision. The minimum yield strength shall be: 100 ksi for low carbon/chromium steel and 60 ksi for stainless clad steel or solid stainless steel. Corrosion Resistant Reinforcing Steel, Class II or Class III, may be substituted for Class I. Corrosion Resistant Reinforcing Steel, Class III, may be substituted for Class II.

Prestressing strands shall be uncoated, seven-wire, low-relaxation steel strands conforming to ASTM A416 Grade 270.

Concrete piles have a design capacity of 245 kips per pile and shall be drilled to the elevation listed on plan sheet.

Bridge No. of existing bridge is 2544. Plan No. is 174-08.

VDOT

COMMONWEALTH OF VIRGINIA

DEPARTMENT OF TRANSPORTATION

PROPOSED BRIDGE ON
RTE. 190 (GREAT BRIDGE BLVD.) OVER I-64
CITY OF CHESAPEAKE - 0.5 MI. E. OF I-464
PROJ. 0064-131-811, B663

Recommended for Approval: _____ _____
State Structure and Bridge Engineer — Date

Approved: _____ _____
Chief Engineer — Date

Date: August 2017

Sheet 68 of 84

RK&K
RICHMOND, VA
STRUCTURAL ENGINEER

PLANS BY:	Consultant
COORDINATED:	
SUPERVISED:	John J. Farley
DESIGNED:	Nathan B. Harsh
DRAWN:	Jill R. Boxley
CHECKED:	M. Chris Vaught

PRELIMINARY PLANS

THESE PLANS NOT TO BE USED FOR CONSTRUCTION

No.	Description	Date
	REVISIONS	

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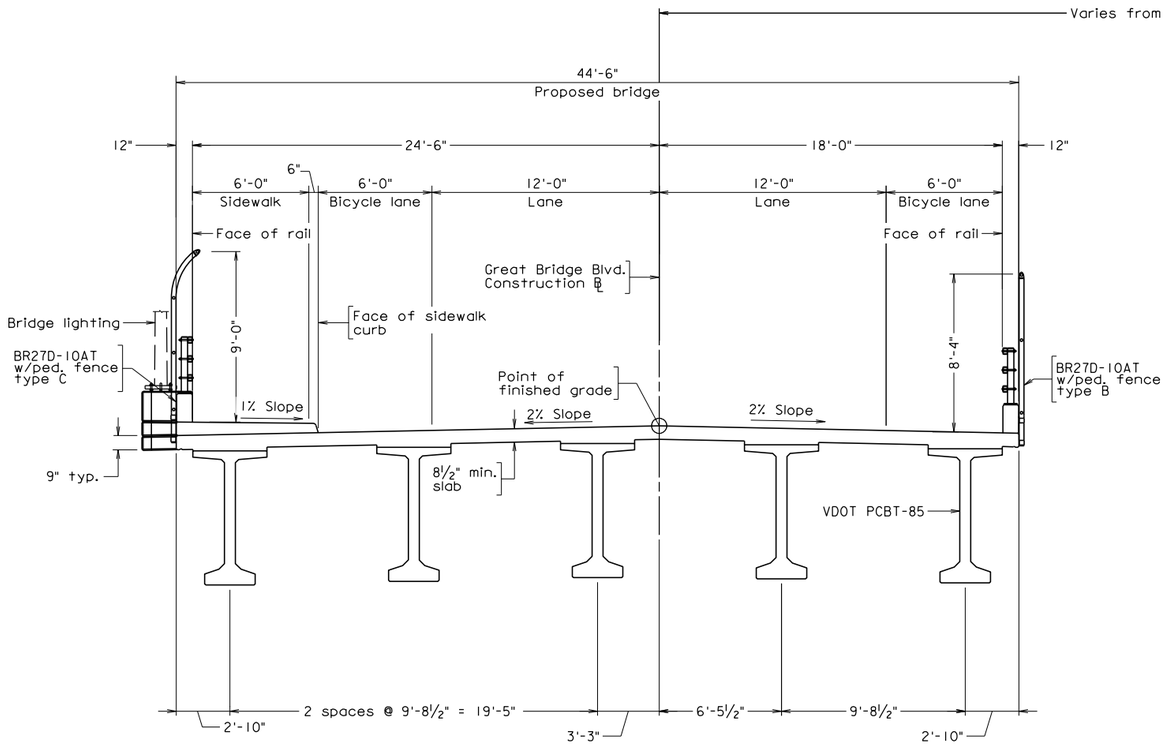
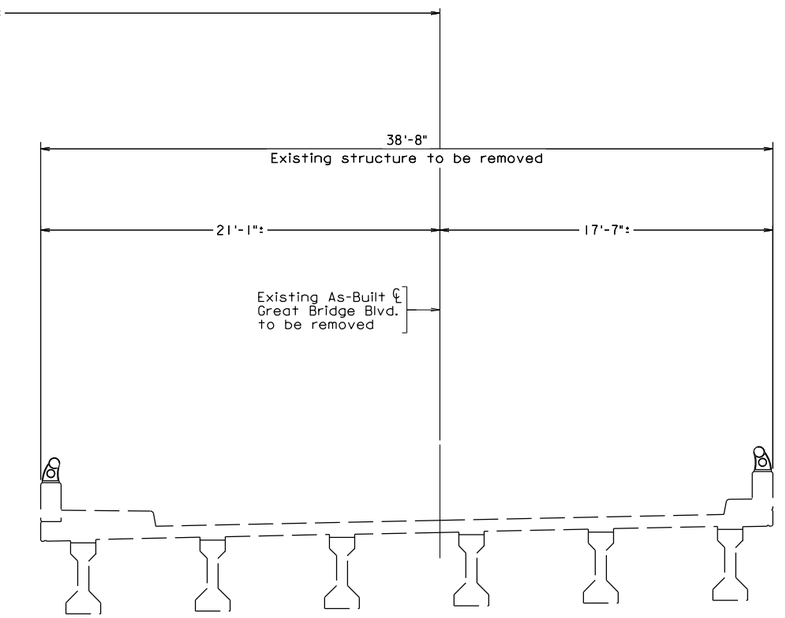
STATE	FEDERAL AID		STATE		SHEET NO.
	ROUTE	PROJECT	ROUTE	PROJECT	
VA.	—	NHPP-064-3(488)	64	0064-131-811, B663	69

Note:
Steel railing shall be galvanized and powder coated (Black, Federal color: 37033).

Pedestrian fence shall be black vinyl coated.





TRANSVERSE SECTION

PRELIMINARY PLANS

THESE PLANS NOT TO BE USED FOR CONSTRUCTION

b106692_069.dgn

RK&K
RICHMOND, VA
STRUCTURAL ENGINEER

Scale: ¼" = 1'-0"

No.	Description	Date
	Revisions	

COMMONWEALTH OF VIRGINIA
DEPARTMENT OF TRANSPORTATION

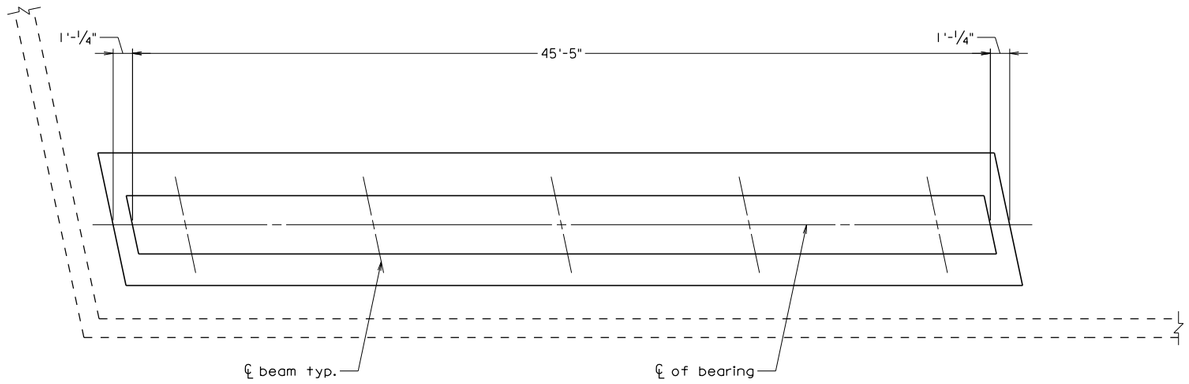
STRUCTURE AND BRIDGE DIVISION

TRANSVERSE SECTION

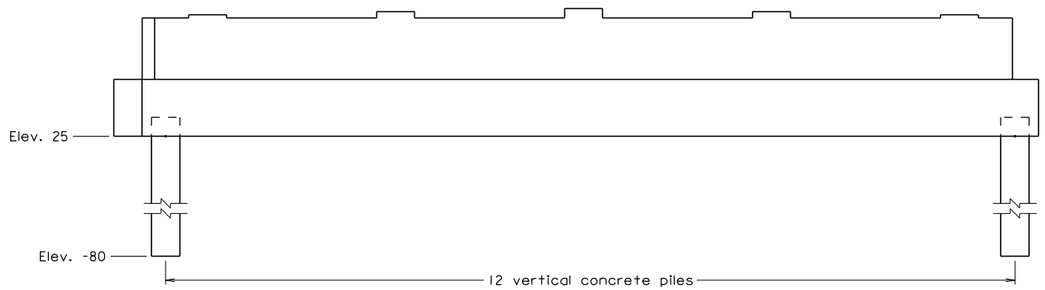
Designed: NBH	Date	Plan No.	Sheet No.
Drawn: JRB	Aug. 2017	XXX-XX	69 of 84
Checked: MCV			

STATE	FEDERAL AID		STATE		SHEET NO.
	ROUTE	PROJECT	ROUTE	PROJECT	
VA.	—	NHPP-064-3(488)	64	0064-131-811, B663	70

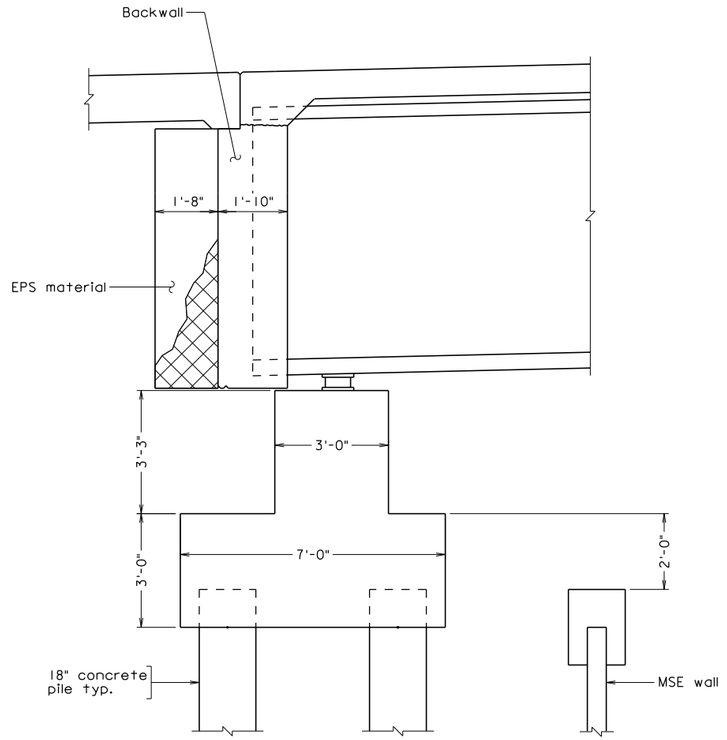
Note:
Refer to BBD-8 for bearing details.



PLAN
Scale: 1/4" = 1'-0"



ELEVATION
Scale: 1/4" = 1'-0"



SECTION
Scale: 1/2" = 1'-0"

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RK&K
RICHMOND, VA
STRUCTURAL ENGINEER

Scale as noted

PRELIMINARY PLANS
THESE PLANS NOT TO BE USED FOR CONSTRUCTION

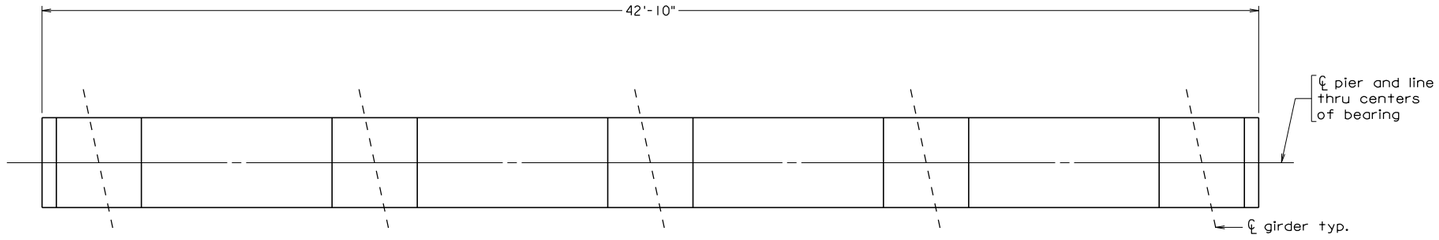
No.	Description	Date
	Revisions	

COMMONWEALTH OF VIRGINIA
DEPARTMENT OF TRANSPORTATION
STRUCTURE AND BRIDGE DIVISION

ABUTMENT

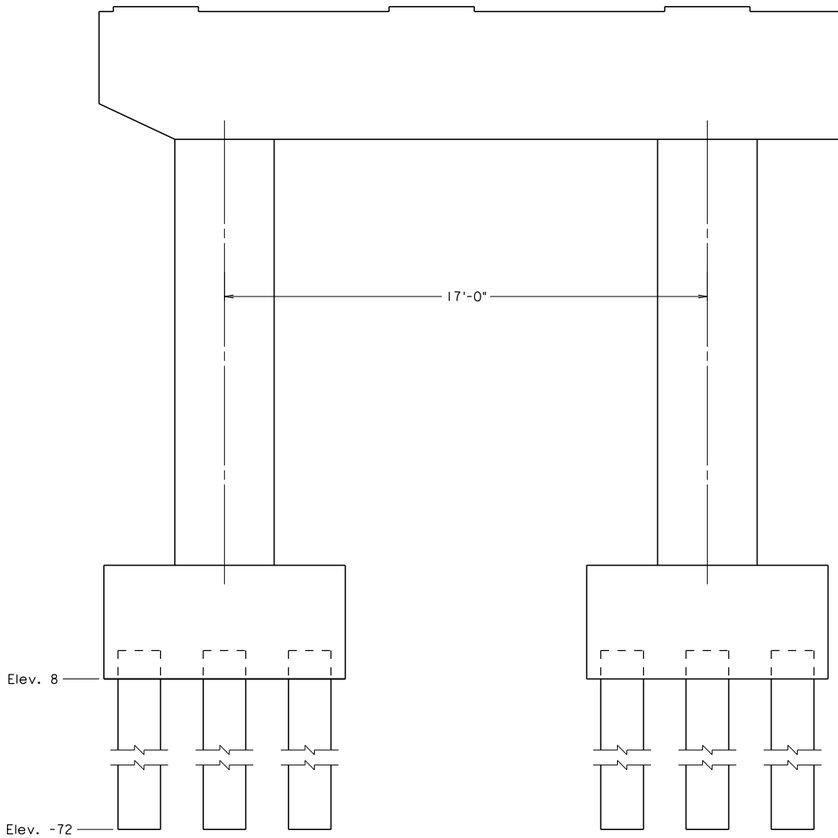
Designed: NRH	Date	Plan No.	Sheet No.
Drawn: JRB	Aug. 2017	XXX-XX	70 of 84
Checked: SSJ			

STATE	FEDERAL AID		STATE		SHEET NO.
	ROUTE	PROJECT	ROUTE	PROJECT	
VA.	—	NHPP-064-3(488)	64	0064-131-811, B663	71

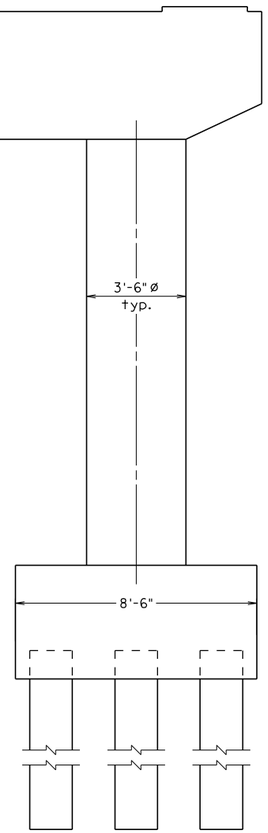


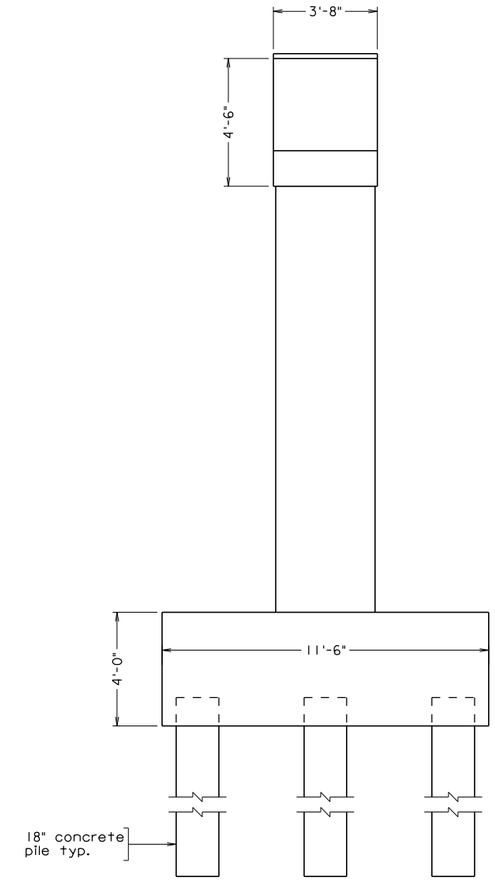
PLAN

Note:
Assume 24 total vertical concrete piles for pier.



ELEVATION





SECTION

PRELIMINARY PLANS

THESE PLANS NOT TO BE USED FOR CONSTRUCTION

No.	Description	Date
	Revisions	

COMMONWEALTH OF VIRGINIA
DEPARTMENT OF TRANSPORTATION

STRUCTURE AND BRIDGE DIVISION

PIER

Designed: NBH	Date	Plan No.	Sheet No.
Drawn: JRB	Aug. 2017	XXX-XX	71 of 84
Checked: MCV			

RK&K
RICHMOND, VA
STRUCTURAL ENGINEER

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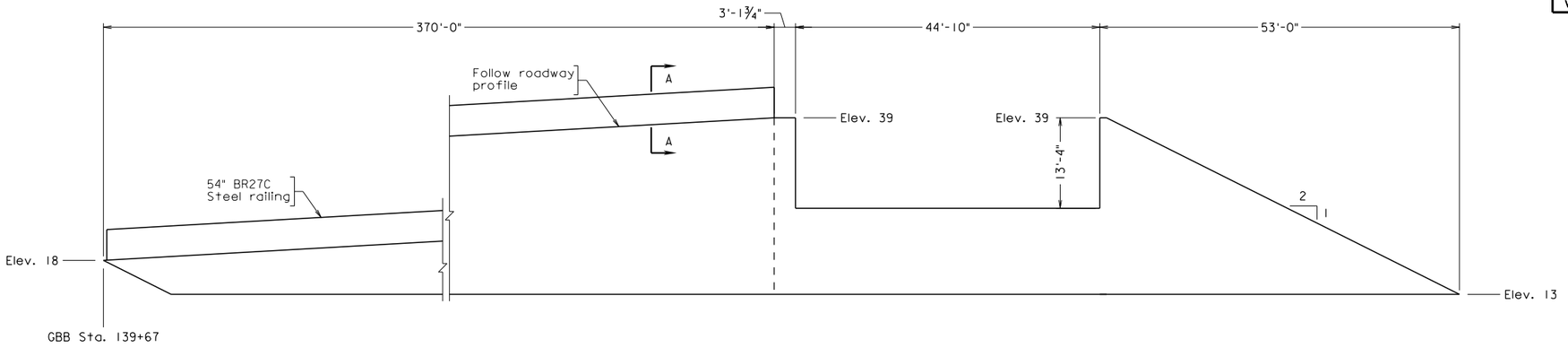
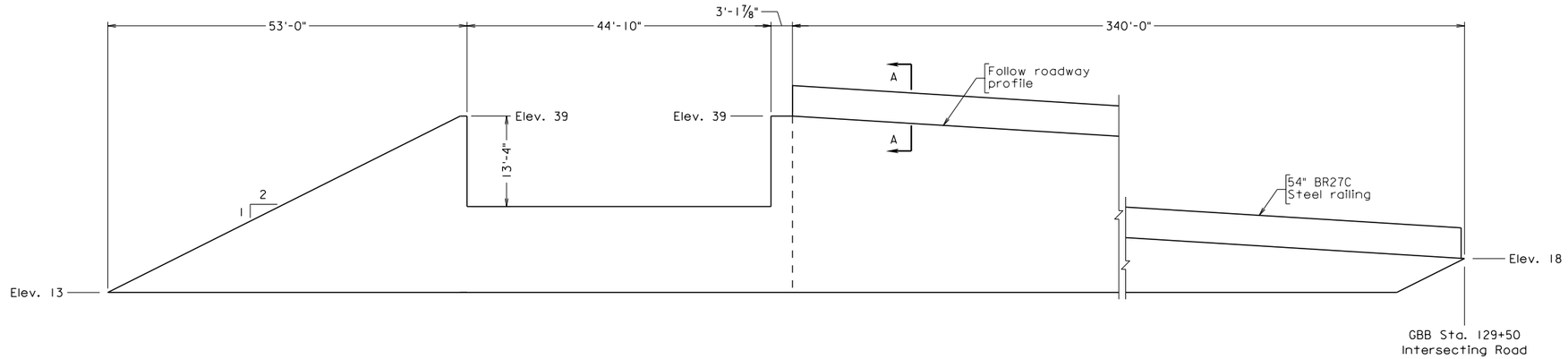
Scale: 3/8" = 1'-0"

STATE	FEDERAL AID		STATE		SHEET NO.
	ROUTE	PROJECT	ROUTE	PROJECT	
VA.	—	NHPP-064-3(488)	64	0064-131-811, B663	72



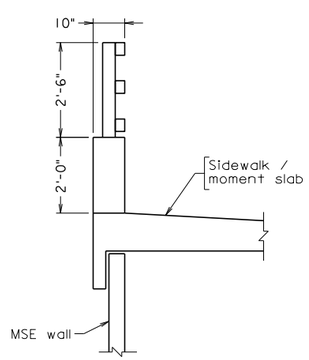
ABUTMENT B

North Elevation Envelope View



ABUTMENT A

South Elevation Envelope View



SECTION A-A

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RK&K
RICHMOND, VA
STRUCTURAL ENGINEER

PRELIMINARY PLANS

THESE PLANS NOT TO BE USED FOR CONSTRUCTION

Scale: 1" = 10'

No.	Description	Date
	Revisions	

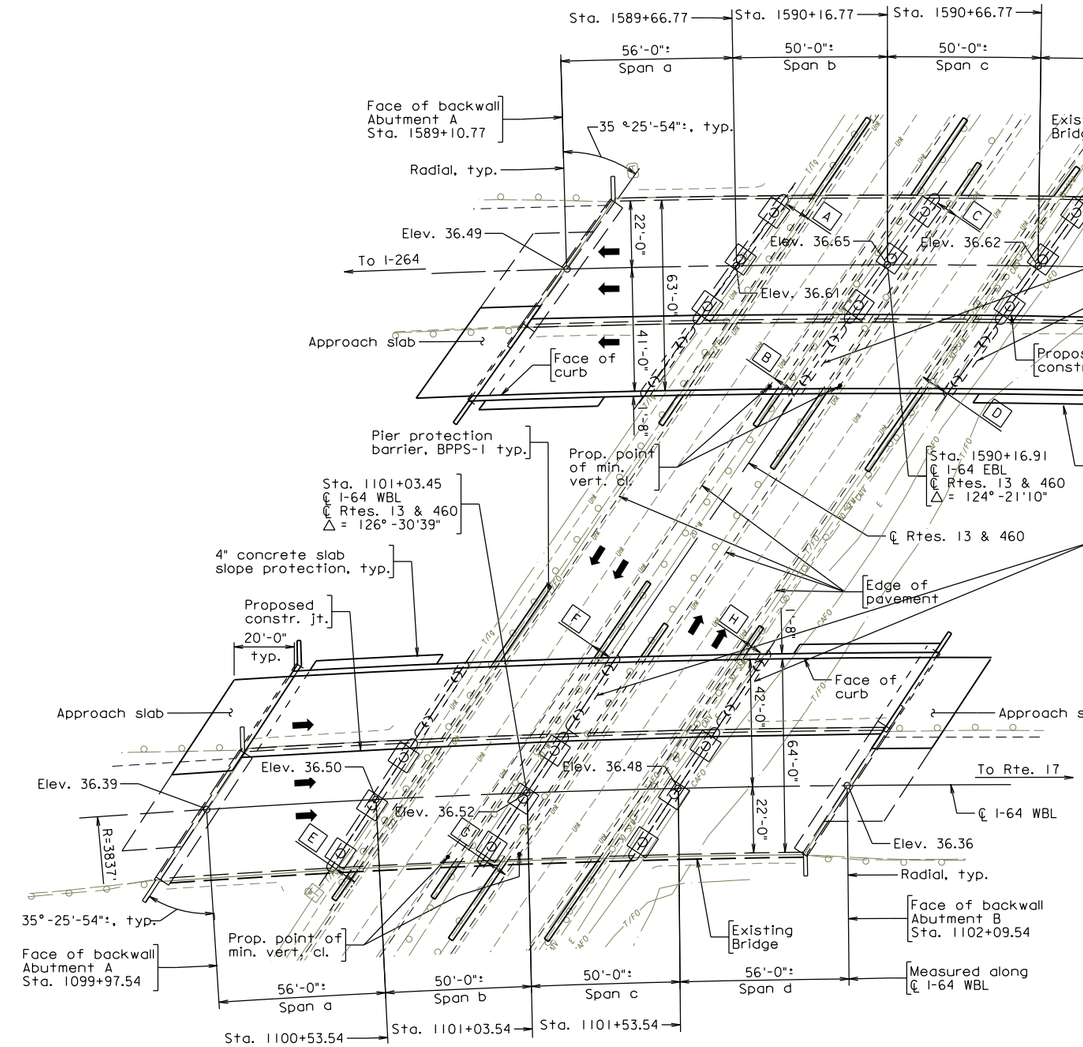
COMMONWEALTH OF VIRGINIA
DEPARTMENT OF TRANSPORTATION

STRUCTURE AND BRIDGE DIVISION

MSE ELEVATION

Designed: NBH	Date	Plan No.	Sheet No.
Drawn: JRR	Aug. 2017	XXX-XX	72 of 84
Checked: MCV			

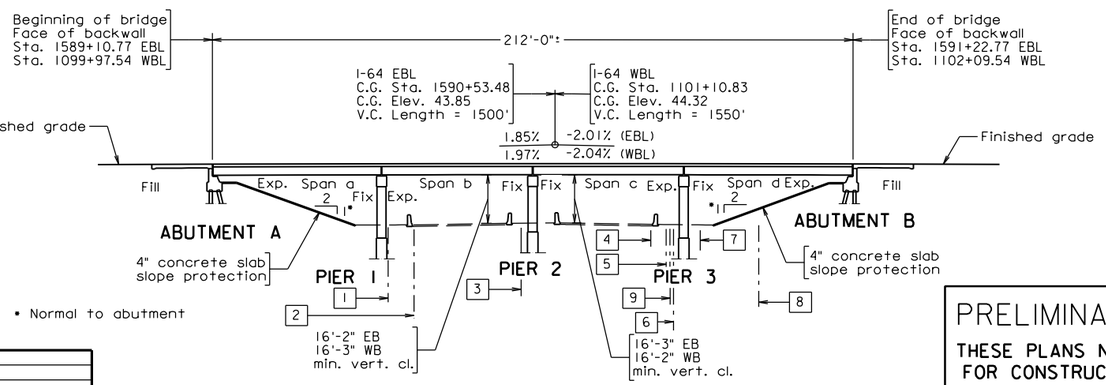
STATE	FEDERAL AID		STATE		SHEET
	ROUTE	PROJECT	ROUTE	PROJECT	NO.
VA.	-	NHPP-064-3(488)	64	0064-131-811, B664, B665	73
NBIS Number: 21862 21864			UPC No. 106692		
Federal Oversight Code: NFO			FHWA Construction and Scour Code: X271-SN		



BRIDGE ENHANCEMENT
Drilled Shaft Foundations avoid utility relocations thereby eliminating service disruptions and reducing disruptions to Military Highway

BRIDGE ENHANCEMENT
Drilled Shaft Foundations avoid utility relocations thereby eliminating service disruptions and reducing disruptions to Military Highway

PLAN



DEVELOPED SECTION ALONG WIDENING

Scale: 1" = 25'

DESIGN EXCEPTION(S):

16'-2" vertical clearance over Routes 13 & 460.
Design Exception approved by State Structure and Bridge Engineer xxxx xx, 2016.

GENERAL NOTES:

Width: EBL - 63'-0" face-to-face rails.
WBL - 64'-0" face-to-face of rails.

Span layout: 56'-0" - 50'-0" - 50'-0" - 56'-0"

Capacity: HL-93 loading.

Specifications:

Construction: Virginia Department of Transportation Road and Bridge Specifications, 2016.

Design: AASHTO LRFD Bridge Design Specifications, 7th Edition, 2014; and VDOT Modifications.

Standards: Virginia Department of Transportation Road and Bridge Standards, 2008; including all current revisions.

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

Bridge Nos. of existing bridges are 2517 (EBL) and 2518 (WBL). Plan No. is 174-13. The span, substructure and directional labels for each bridge shown herein differ from those shown in Plan No. 174-13.

The existing structure is designated a Type B structure in accordance with Sec. 411.

- A 8'-6" min. horiz. cl.
- B 6'-11⅞" min. horiz. cl.
- C 7'-1½" min. horiz. cl.
- D 8'-4⅛" min. horiz. cl.
- E 7'-6½" min. horiz. cl.
- F 6'-9½" min. horiz. cl.
- G 7'-4¼" min. horiz. cl.
- H 7'-4⅞" min. horiz. cl.

- 1 ℄ exist. telephone
- 2 ℄ exist. telephone
- 3 ℄ exist. 20" water
- 4 ℄ exist. fiber optic
- 5 ℄ exist. cable tv
- 6 ℄ exist. power line
- 7 ℄ exist. cable tv
- 8 ℄ exist. fiber optic
- 9 ℄ exist. 30" storm water

VDOT

COMMONWEALTH OF VIRGINIA
DEPARTMENT OF TRANSPORTATION

PROPOSED BRIDGE WIDENING ON I-64 OVER RTES. 13 & 460
CITY OF CHESAPEAKE - 1.6 MI. W. OF RTE. 17
PROJ. 0064-131-811, B664, B665

PARSONS TRANSPORTATION GROUP INC. OF VIRGINIA
FAIRFAX, VIRGINIA
BRIDGE ENGINEER

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

PRELIMINARY PLANS
THESE PLANS NOT TO BE USED FOR CONSTRUCTION OF BRIDGE

No.	Description	Date
REVISIONS		

For Table of Revisions see sheet 2.

Recommended for Approval: _____ Date

Approved: _____ Chief Engineer Date

Date: August 2017

174-13A
Sheet 73 of 84

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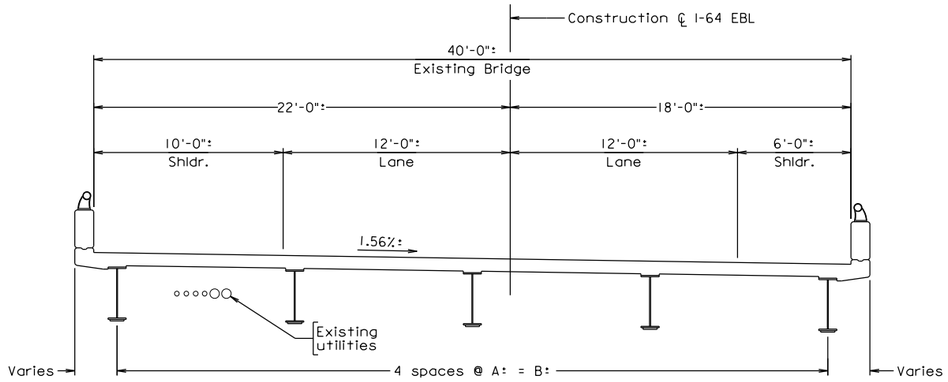
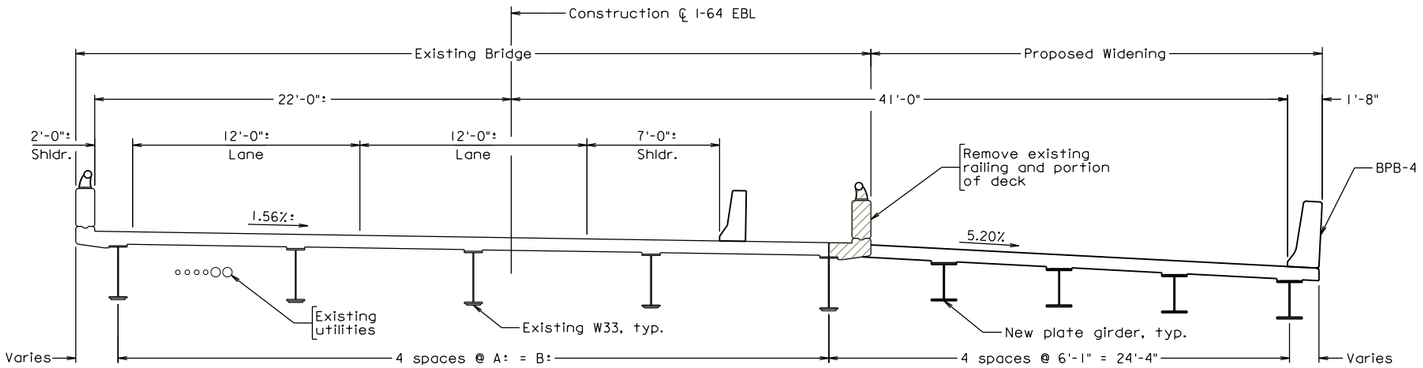
8/2/2017

FHWA REGION	FEDERAL AID		STATE		SHEET NO.
	STATE	PROJECT	ROUTE	PROJECT	
3	VA.	NHPP-064-3(488)	64	0064-131-811, B664	74

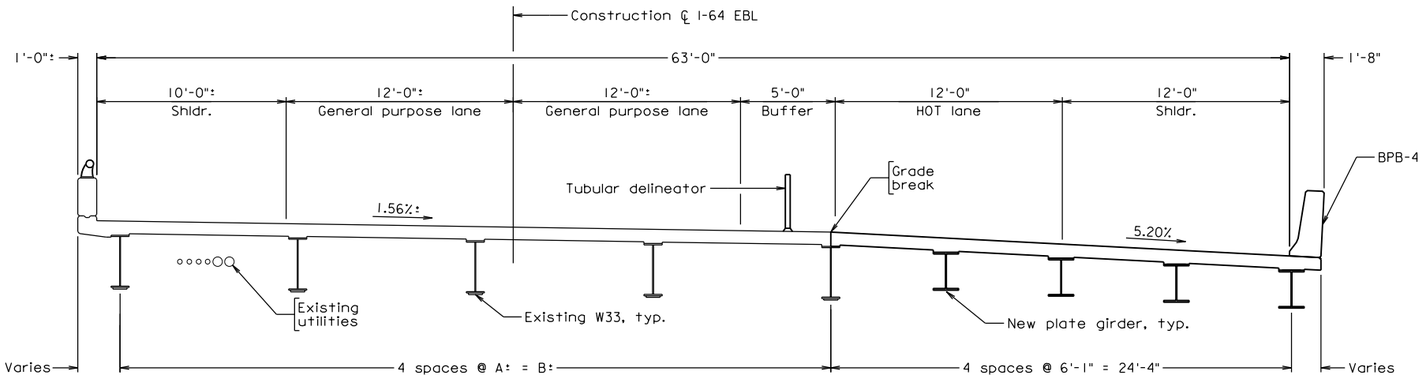


EXISTING BRIDGE - TRANSVERSE SECTION

Span	A	B
1	9'-1⅜"	36'-5½"
2	9'-2½"	36'-10"
3	9'-3⅜16"	37'-2¼"
4	9'-4⅝"	37'-6½"



DEMOLITION AND CONSTRUCTION - TRANSVERSE SECTION



FINAL - TRANSVERSE SECTION

Notes:

All sections shown looking station-ahead (to the east).

Dimensions shown in Transverse Section are measured radially.

A suggested Sequence of Construction for each bridge is provided below. Actual sequence of construction and maintenance of traffic is to be developed by the Offeror.

Stage 1: Install temporary traffic controls and shift traffic towards the outside of the existing bridge, maintaining two 12'-0" lanes. Remove railing and portion of deck from median side of existing bridge.

Stage 2: Construct proposed bridge widening. Longitudinal deck joint shall be located over an existing beam line.

Stage 3: Remove temporary traffic controls and shift traffic to final alignment.

Legend:

Portion of existing structure to be removed

PRELIMINARY PLANS

THESE PLANS NOT TO BE USED FOR CONSTRUCTION OF BRIDGE

PARSONS TRANSPORTATION GROUP INC. OF VIRGINIA
FAIRFAX, VIRGINIA
BRIDGE ENGINEER

No.	Description	Date
	Revisions	

Scale: 1/4" = 1'-0"

COMMONWEALTH OF VIRGINIA
DEPARTMENT OF TRANSPORTATION

STRUCTURE AND BRIDGE DIVISION

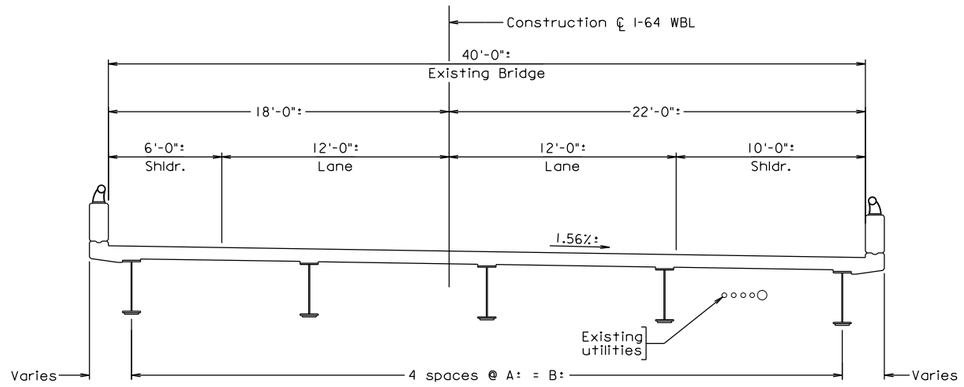
TRANSVERSE SECTION

Designed: B.P.	Date	Plan No.	Sheet No.
Drawn: G.H.R.	Aug 2017	174-13A	74 of 84
Checked: D.D.J.			

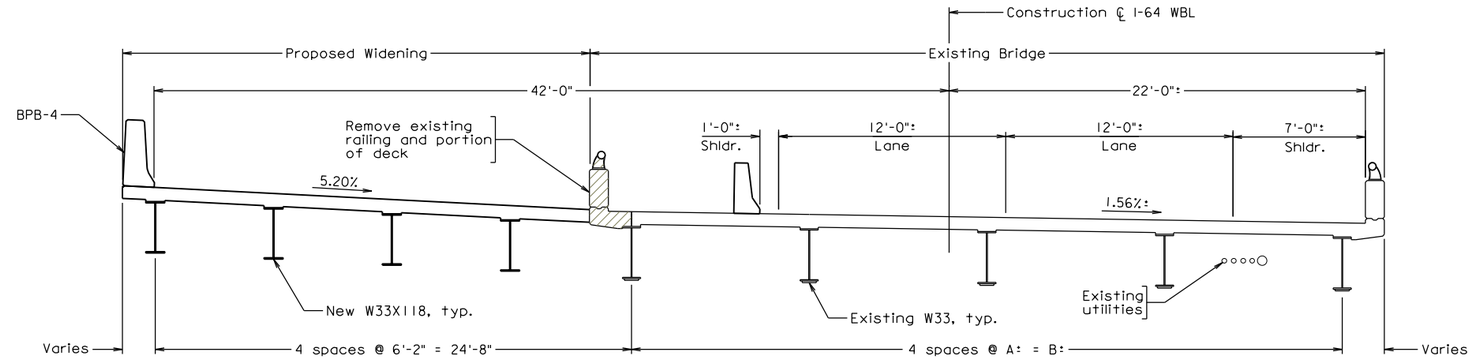
8/4/2017 12:24:57 PM b106692_074.dgn

FHWA REGION	FEDERAL AID		STATE		SHEET NO.
	STATE	PROJECT	ROUTE	PROJECT	
3	VA.	NHPP-064-3(488)	64	0064-131-811, B665	75

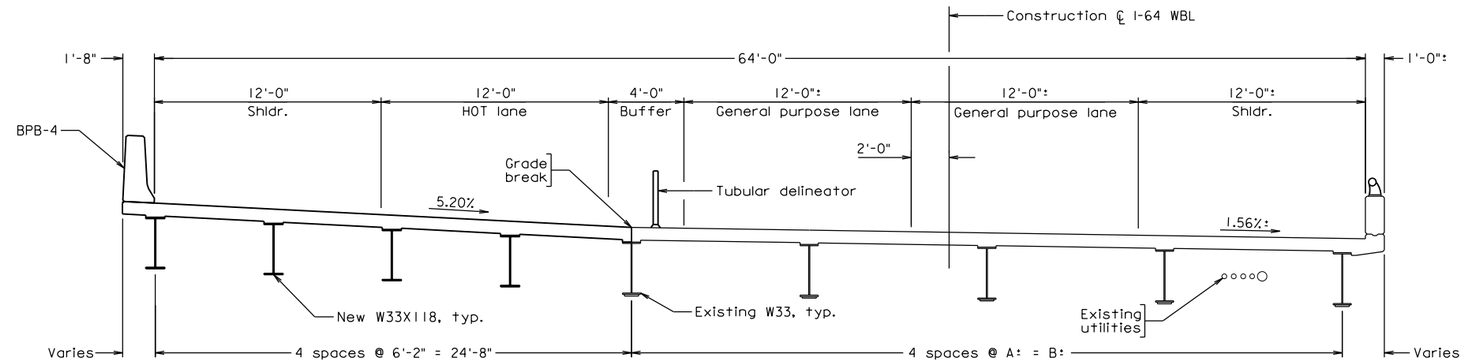
Span	A	B
1	9'-1⅜"	36'-5½"
2	9'-2½"	36'-10"
3	9'-3⅜"	37'-2¼"
4	9'-4⅝"	37'-6½"



EXISTING BRIDGE - TRANSVERSE SECTION



DEMOLITION AND CONSTRUCTION - TRANSVERSE SECTION



FINAL - TRANSVERSE SECTION

Notes:

All sections shown looking station-ahead (to the east).

Dimensions shown in Transverse Section are measured radially.

A suggested Sequence of Construction for each bridge is provided below. Actual sequence of construction and maintenance of traffic is to be developed by the Offeror.

Stage 1: Install temporary traffic controls and shift traffic towards the outside of the existing bridge, maintaining two 12'-0" lanes. Remove railing and portion of deck from median side of existing bridge.

Stage 2: Construct proposed bridge widening. Longitudinal deck joint shall be located over an existing beam line.

Stage 3: Remove temporary traffic controls and shift traffic to final alignment.

Legend:

Portion of existing structure to be removed

PRELIMINARY PLANS
THESE PLANS NOT TO BE USED FOR CONSTRUCTION OF BRIDGE

PARSONS TRANSPORTATION GROUP INC. OF VIRGINIA
FAIRFAX, VIRGINIA
BRIDGE ENGINEER

Scale: 1/4" = 1'-0"

No.	Description	Date
	Revisions	

COMMONWEALTH OF VIRGINIA
DEPARTMENT OF TRANSPORTATION
STRUCTURE AND BRIDGE DIVISION

TRANSVERSE SECTION

Designed: B.A.P.	Date	Plan No.	Sheet No.
Drawn: C.J.R.	Aug 2017	174-13A	75 of 84
Checked: A.A.T.			

8/4/2017 12:23:07 PM b106692_075.dgn

STATE	FEDERAL AID		STATE		SHEET NO.
	ROUTE	PROJECT	ROUTE	PROJECT	
VA.	-	NHPP-064-3(488)	64	0064-131-811, B666, B667	76
NBIS Number:		21858 28160	UPC No.	106692	
Federal Oversight Code:		NFO	FHWA Construction and Scour Code:		X581-SN

DESIGN EXCEPTION(S):

3'-0" wide outside (right) shoulder for bridge no. 2516. Design Exception approved by State Structure and Bridge Engineer on xxxx xx, 2016.

GENERAL NOTES:

Width: EBL - 62'-6" face-to-face of rails.
WBL - 55'-0" face-to-face of rails.

Span layout: 62'-1" - 62'-0" - 70'-0" - 70'-1"

Capacity: HL-93 loading.

Specifications:

Construction: Virginia Department of Transportation Road and Bridge Specifications, 2016.

Design: AASHTO LRFD Bridge Design Specifications, 7th Edition, 2014; and VDOT Modifications.

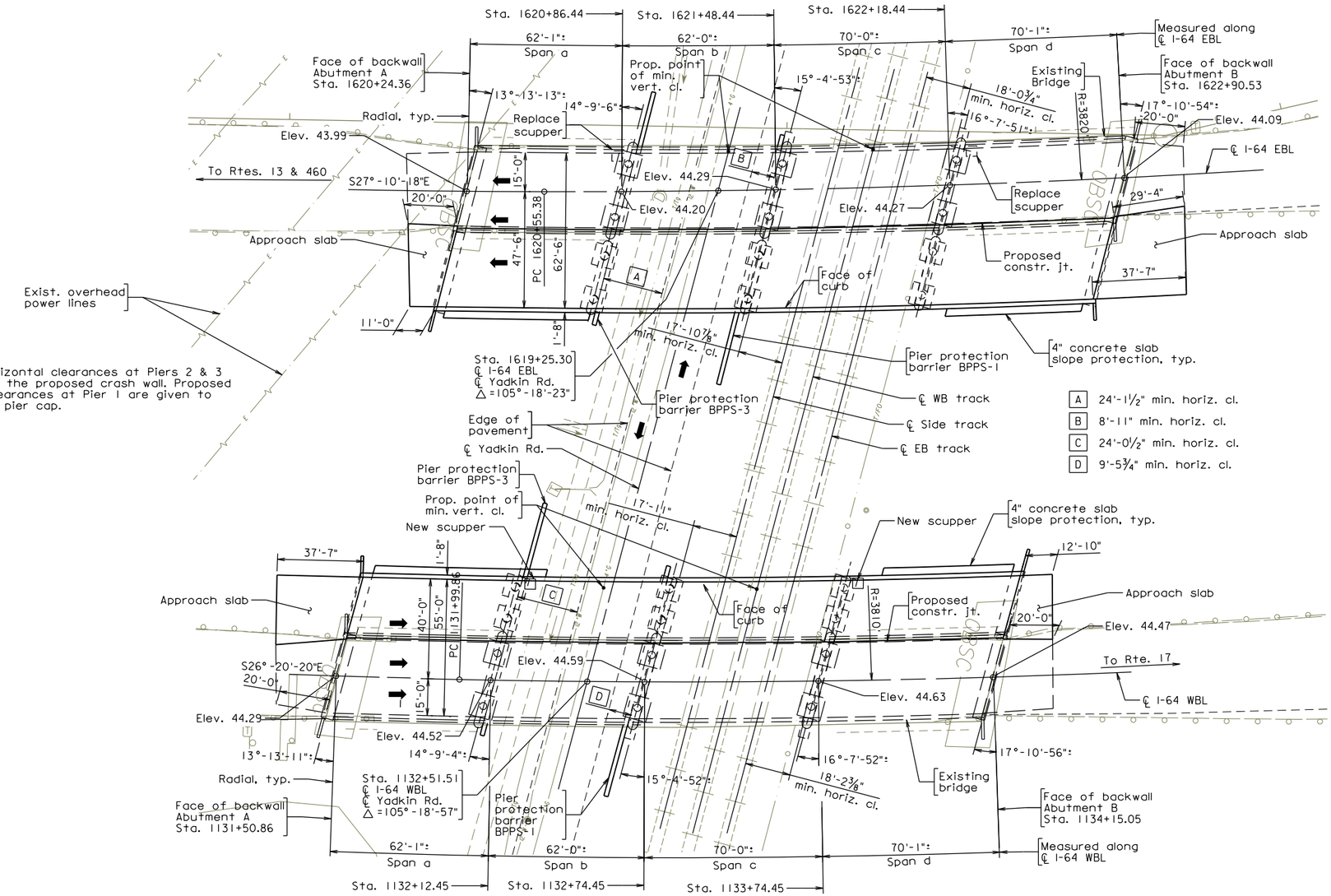
Standards: Virginia Department of Transportation Road and Bridge Standards, 2016; including all current revisions.

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

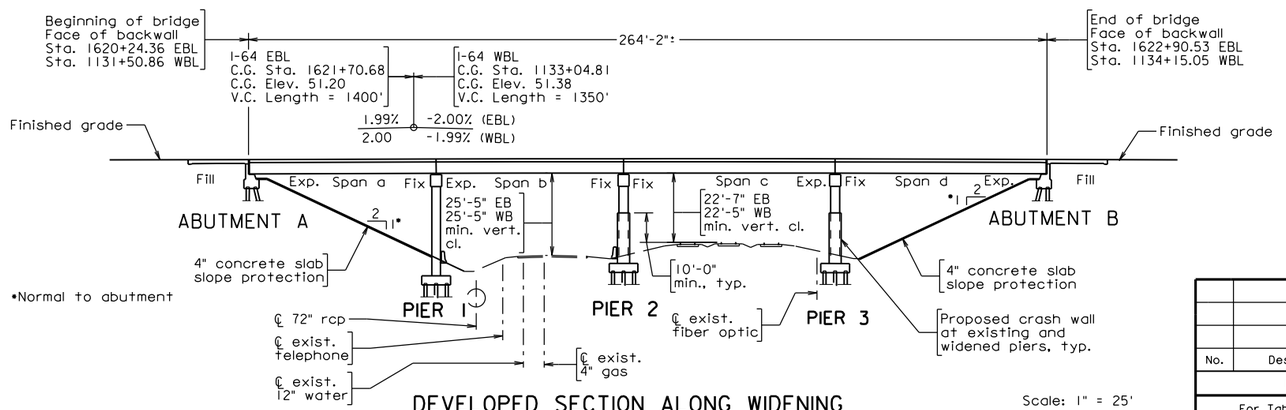
Bridge Nos of existing bridges are 2515 (EBL) and 2516 (WBL). Plan No. is 174-12. The span, substructure and directional labels for each bridge shown herein differ from those shown in Plan No. 174-12.

Note:

Proposed horizontal clearances at Piers 2 & 3 are given to the proposed crash wall. Proposed horizontal clearances at Pier 1 are given to the face of pier cap.



PLAN



DEVELOPED SECTION ALONG WIDENING

Scale: 1" = 25'

PRELIMINARY PLANS
THESE PLANS NOT TO BE USED FOR CONSTRUCTION OF BRIDGE

VDOT

COMMONWEALTH OF VIRGINIA
DEPARTMENT OF TRANSPORTATION

PROPSED BRIDGE WIDENING ON
I-64 OVER YADKIN ROAD & NORFOLK SOUTHERN RAILROAD
CITY OF CHESAPEAKE - 1.0 MI. W. OF RTE. 17
PROJ. 0064-131-811, B666, B667

No.	Description	Date

REVISIONS

For Table of Revisions see sheet 2.

Recommended for Approval: _____ Date

Approved: _____ Chief Engineer Date

174-12A

Date: August 2017

Sheet 76 of 84

PARSONS TRANSPORTATION GROUP INC. OF VIRGINIA
FAIRFAX, VIRGINIA
BRIDGE ENGINEER

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

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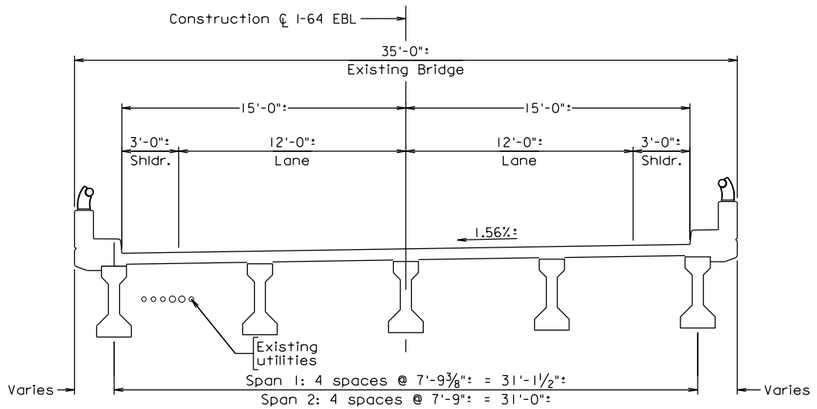
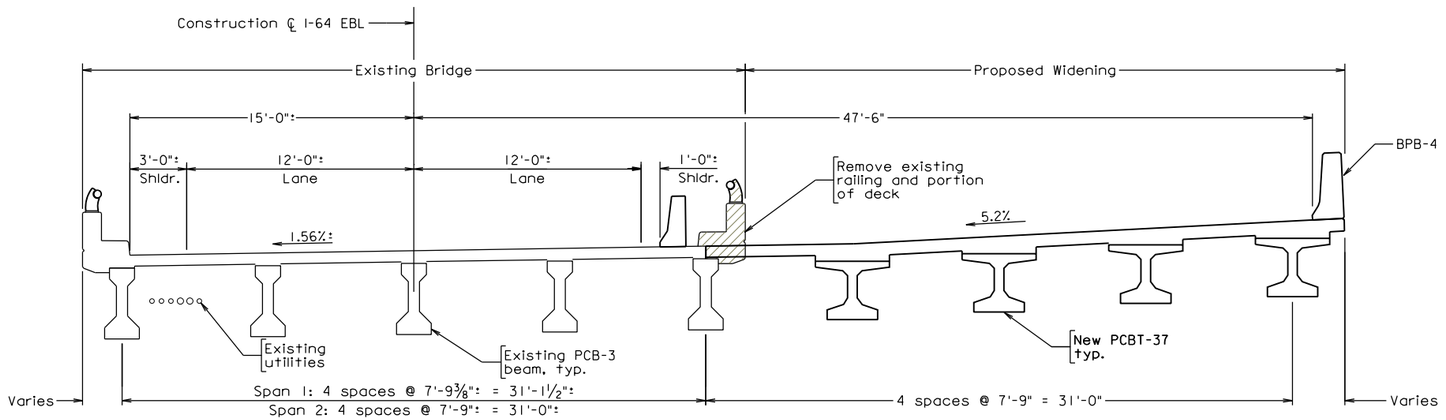
7/28/2017

FHWA REGION	FEDERAL AID		STATE		SHEET NO.
	STATE	PROJECT	ROUTE	PROJECT	
3	VA.	NHPP-064-3(488)	64	0064-131-811, B666	77



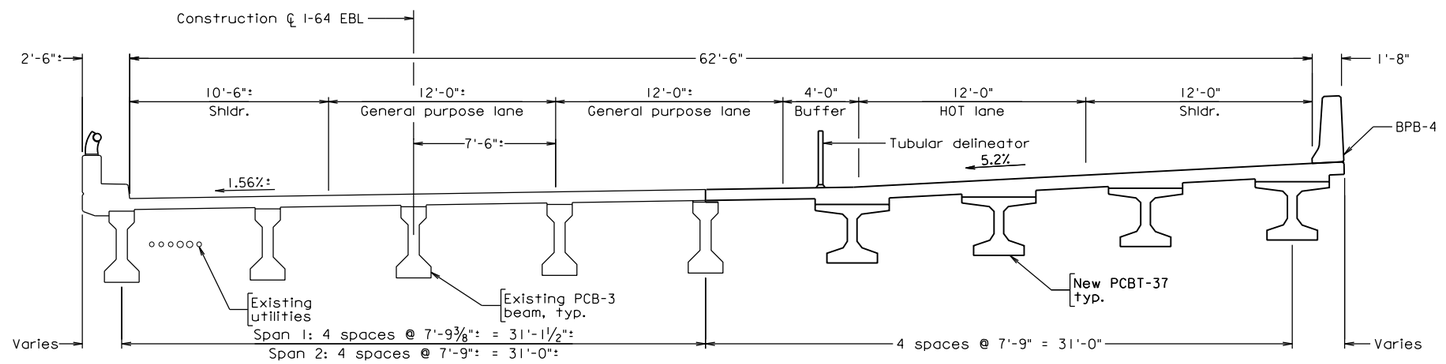
EXISTING BRIDGE - TRANSVERSE SECTION

(Spans 1 & 2 shown)



DEMOLITION AND CONSTRUCTION - TRANSVERSE SECTION

(Spans 1 & 2 shown)



FINAL - TRANSVERSE SECTION

(Spans 1 & 2 shown)

Notes:

All sections shown looking station-ahead (to the east).

A suggested Sequence of Construction for each bridge is provided below. Actual sequence of construction and maintenance of traffic is to be developed by the Offeror.

Stage 1: Install temporary traffic controls, maintaining two 12'-0" lanes. Remove railing and portion of deck from median side of existing bridge.

Stage 2: Construct proposed bridge widening. Longitudinal deck joint shall be located over an existing beam line.

Stage 3: Remove temporary traffic controls and shift traffic to final alignment.

An epoxy system for epoxy concrete overlay shall be placed on the deck surface of the widened structure to match the existing overlay on the existing structure as per VDOT Specifications 431.02.

Legend:

Portion of existing structure to be removed

PRELIMINARY PLANS

THESE PLANS NOT TO BE USED FOR CONSTRUCTION OF BRIDGE

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8/4/2017

PARSONS TRANSPORTATION GROUP INC. OF VIRGINIA
FAIRFAX, VIRGINIA
BRIDGE ENGINEER

No.	Description	Date
	Revisions	

Scale: 1/4" = 1'-0"

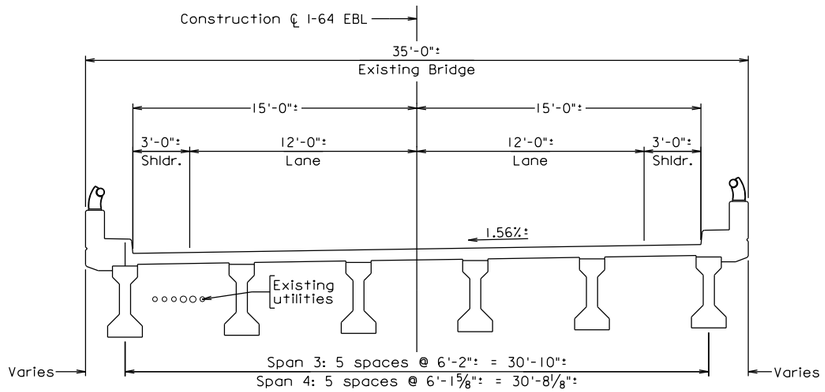
COMMONWEALTH OF VIRGINIA
DEPARTMENT OF TRANSPORTATION

STRUCTURE AND BRIDGE DIVISION

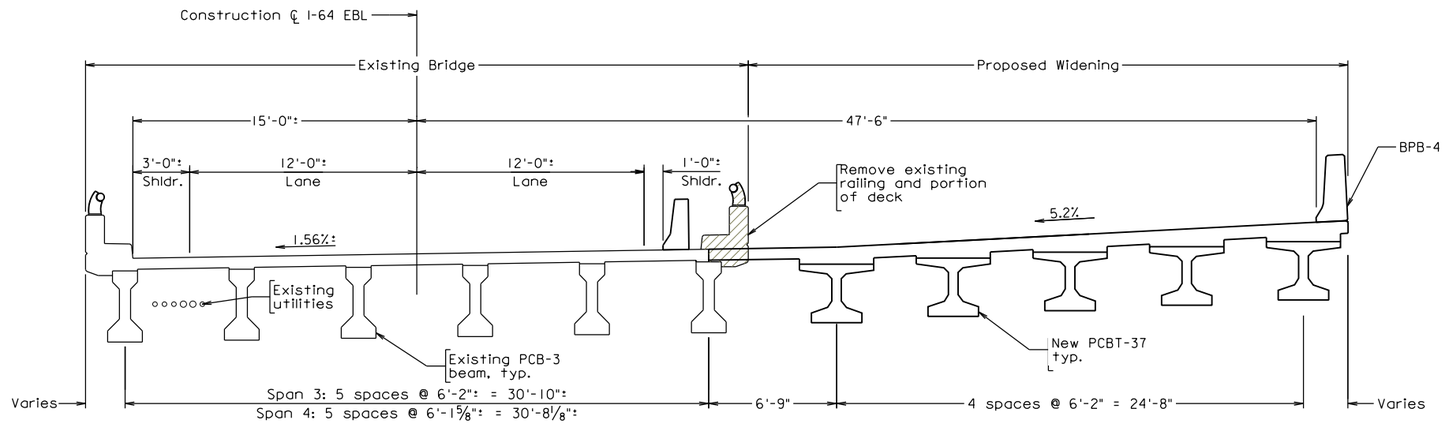
TRANSVERSE SECTION - 1

Designed: B.A.P.	Date	Plan No.	Sheet No.
Drawn: G.J.B.	Aug 2017	174-12A	77 of 84
Checked: A.A.H.			

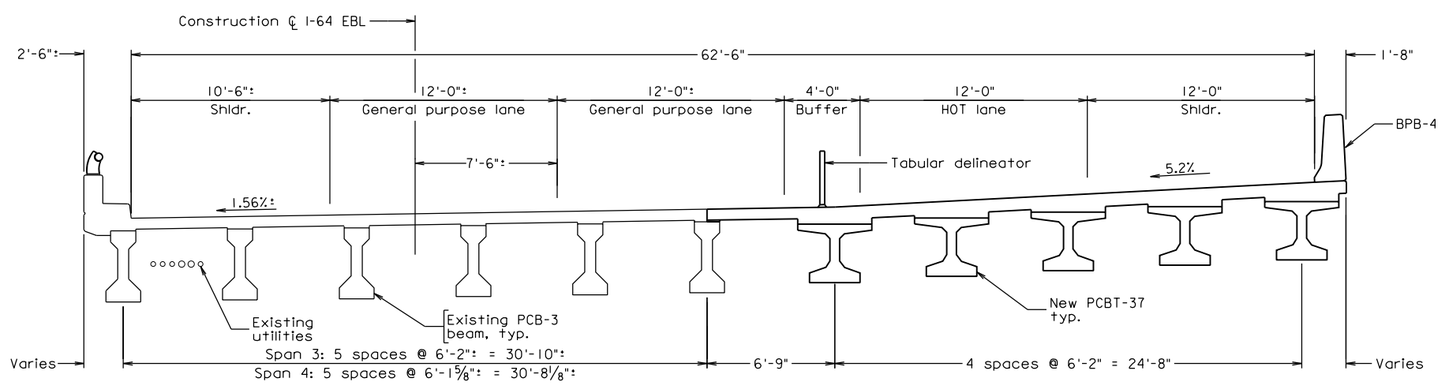
FHWA REGION	FEDERAL AID		STATE		SHEET NO.
	STATE	PROJECT	ROUTE	PROJECT	
3	VA.	NHPP-064-3(488)	64	0064-131-811, B666	78



EXISTING BRIDGE - TRANSVERSE SECTION
(Spans 3 & 4 shown)



DEMOLITION AND CONSTRUCTION - TRANSVERSE SECTION
(Spans 3 & 4 shown)



FINAL - TRANSVERSE SECTION
(Spans 3 & 4 shown)

Legend:

Portion of existing structure to be removed

PRELIMINARY PLANS
THESE PLANS NOT TO BE USED FOR CONSTRUCTION OF BRIDGE

PARSONS TRANSPORTATION GROUP INC. OF VIRGINIA
FAIRFAX, VIRGINIA
BRIDGE ENGINEER

No.	Description	Date
	Revisions	

COMMONWEALTH OF VIRGINIA
DEPARTMENT OF TRANSPORTATION
STRUCTURE AND BRIDGE DIVISION

TRANSVERSE SECTION - II

Designed: B.A.P.	Date	Plan No.	Sheet No.
Drawn: G.J.R.	Aug 2017	174-12A	78 of 84
Checked: A.A.H.			

Scale: 1/4" = 1'-0"

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FHWA REGION	FEDERAL AID		STATE		SHEET NO.
	STATE	PROJECT	ROUTE	PROJECT	
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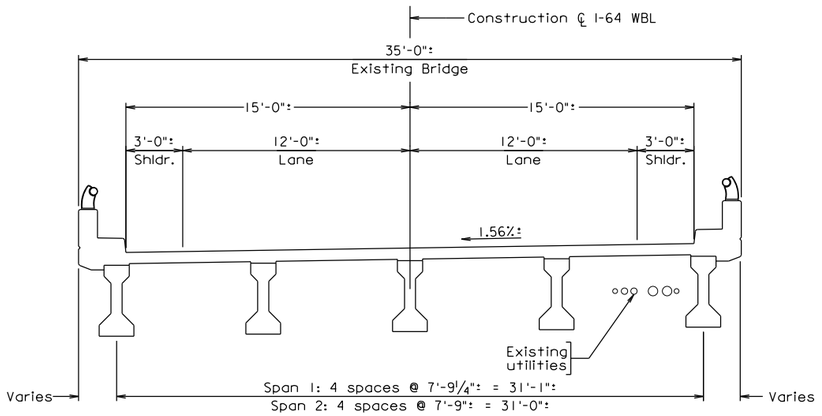
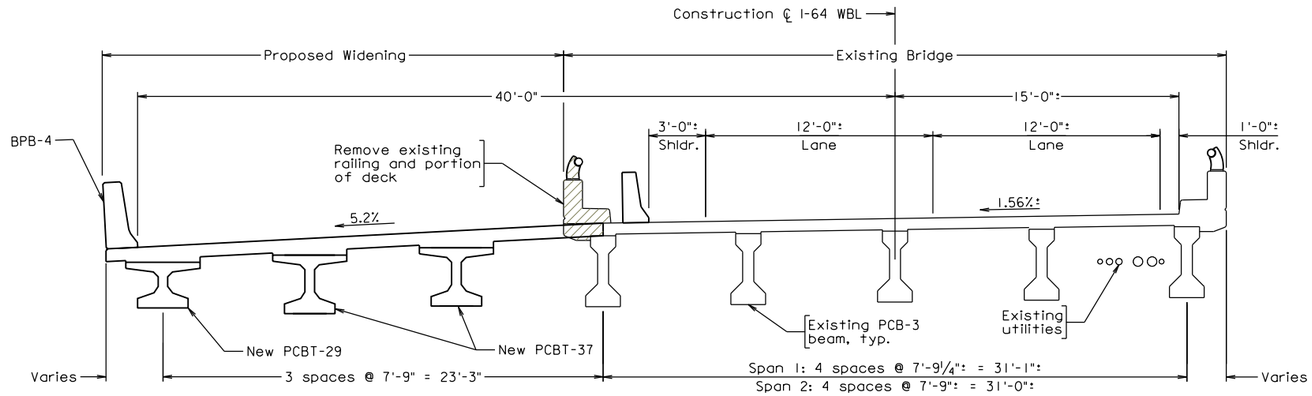


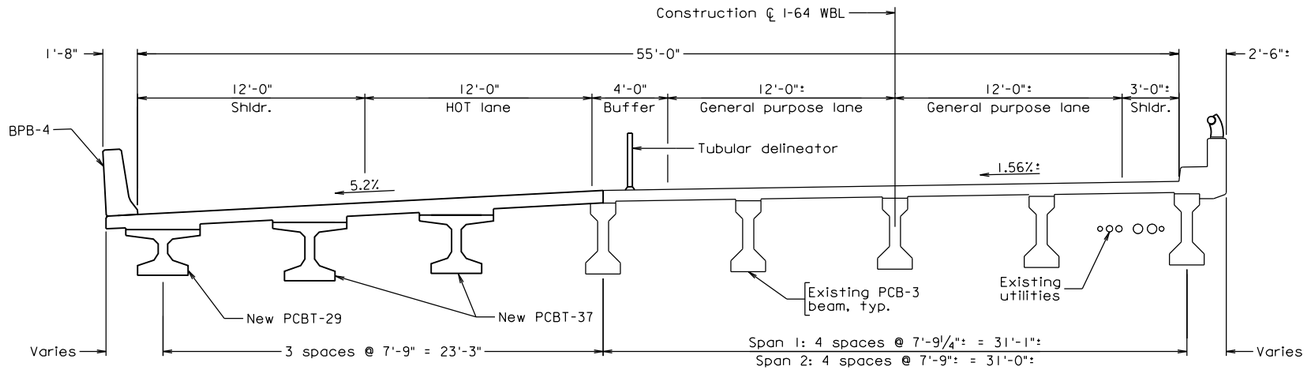
EXISTING BRIDGE - TRANSVERSE SECTION

(Spans 1 & 2 shown)



DEMOLITION AND CONSTRUCTION - TRANSVERSE SECTION

(Spans 1 & 2 shown)



FINAL - TRANSVERSE SECTION

(Spans 1 & 2 shown)

Notes:

All sections shown looking station-ahead (to the east).

A suggested Sequence of Construction for each bridge is provided below. Actual sequence of construction and maintenance of traffic is to be developed by the Offeror.

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Legend:

Portion of existing structure to be removed

PRELIMINARY PLANS

THESE PLANS NOT TO BE USED FOR CONSTRUCTION OF BRIDGE

Scale: 1/4" = 1'-0"

No.	Description	Date
	Revisions	

COMMONWEALTH OF VIRGINIA
DEPARTMENT OF TRANSPORTATION

STRUCTURE AND BRIDGE DIVISION

TRANSVERSE SECTION - 1

Designed: B.A.P.	Date	Plan No.	Sheet No.
Drawn: C.J.R.	Aug 2017	174-12A	79 of 84
Checked: A.A.H.			

PARSONS TRANSPORTATION GROUP INC. OF VIRGINIA
FAIRFAX, VIRGINIA
BRIDGE ENGINEER

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FHWA REGION	FEDERAL AID		STATE		SHEET NO.
	STATE	PROJECT	ROUTE	PROJECT	
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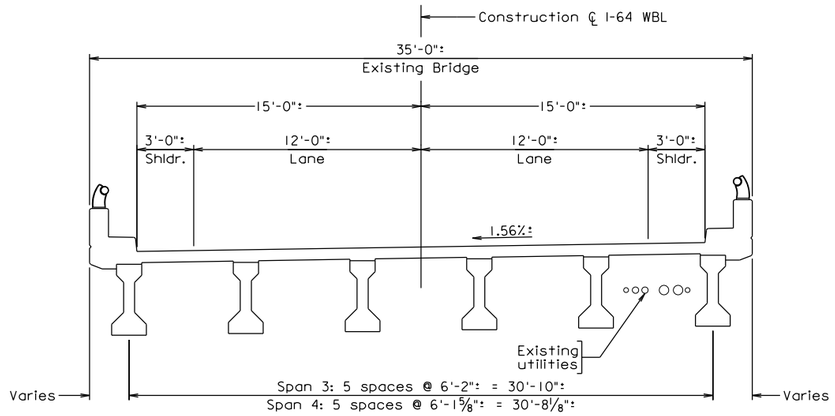
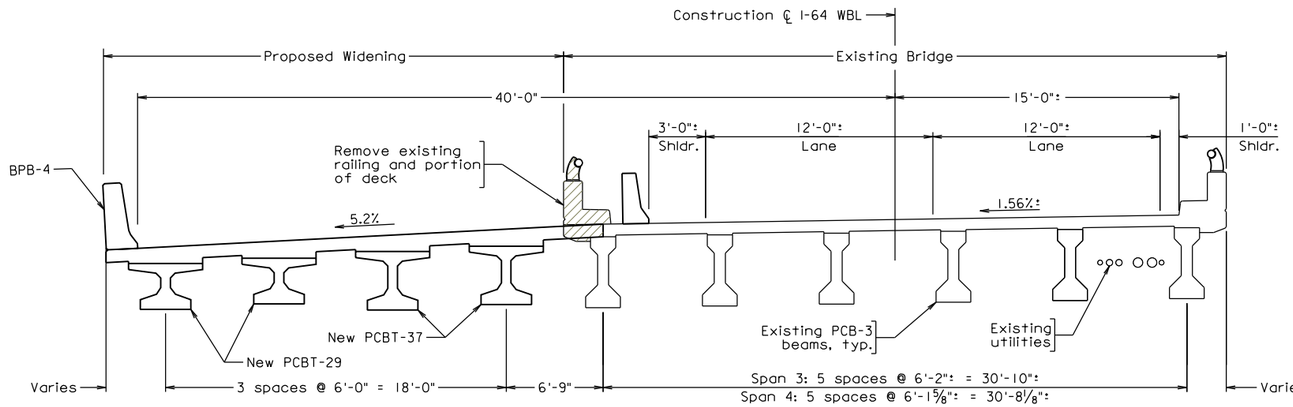
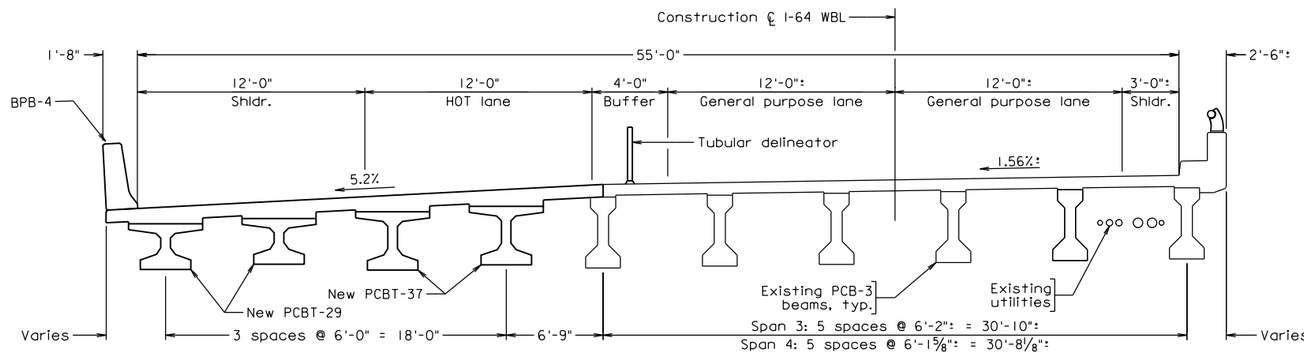


EXISTING BRIDGE - TRANSVERSE SECTION
(Spans 3 & 4 shown)



DEMOLITION AND CONSTRUCTION - TRANSVERSE SECTION
(Spans 3 & 4 shown)



FINAL - TRANSVERSE SECTION
(Spans 3 & 4 shown)

Legend:

Portion of existing structure to be removed

PRELIMINARY PLANS
THESE PLANS NOT TO BE USED FOR CONSTRUCTION OF BRIDGE

PARSONS TRANSPORTATION GROUP INC. OF VIRGINIA
FAIRFAX, VIRGINIA
BRIDGE ENGINEER

Scale: 1/4" = 1'-0"

No.	Description	Date
	Revisions	

COMMONWEALTH OF VIRGINIA
DEPARTMENT OF TRANSPORTATION
STRUCTURE AND BRIDGE DIVISION

TRANSVERSE SECTION - II

Designed: B.A.P.	Date	Plan No.	Sheet No.
Drawn: C.J.R.	Aug 2017	174-12A	80 of 84
Checked: K.A.W.			

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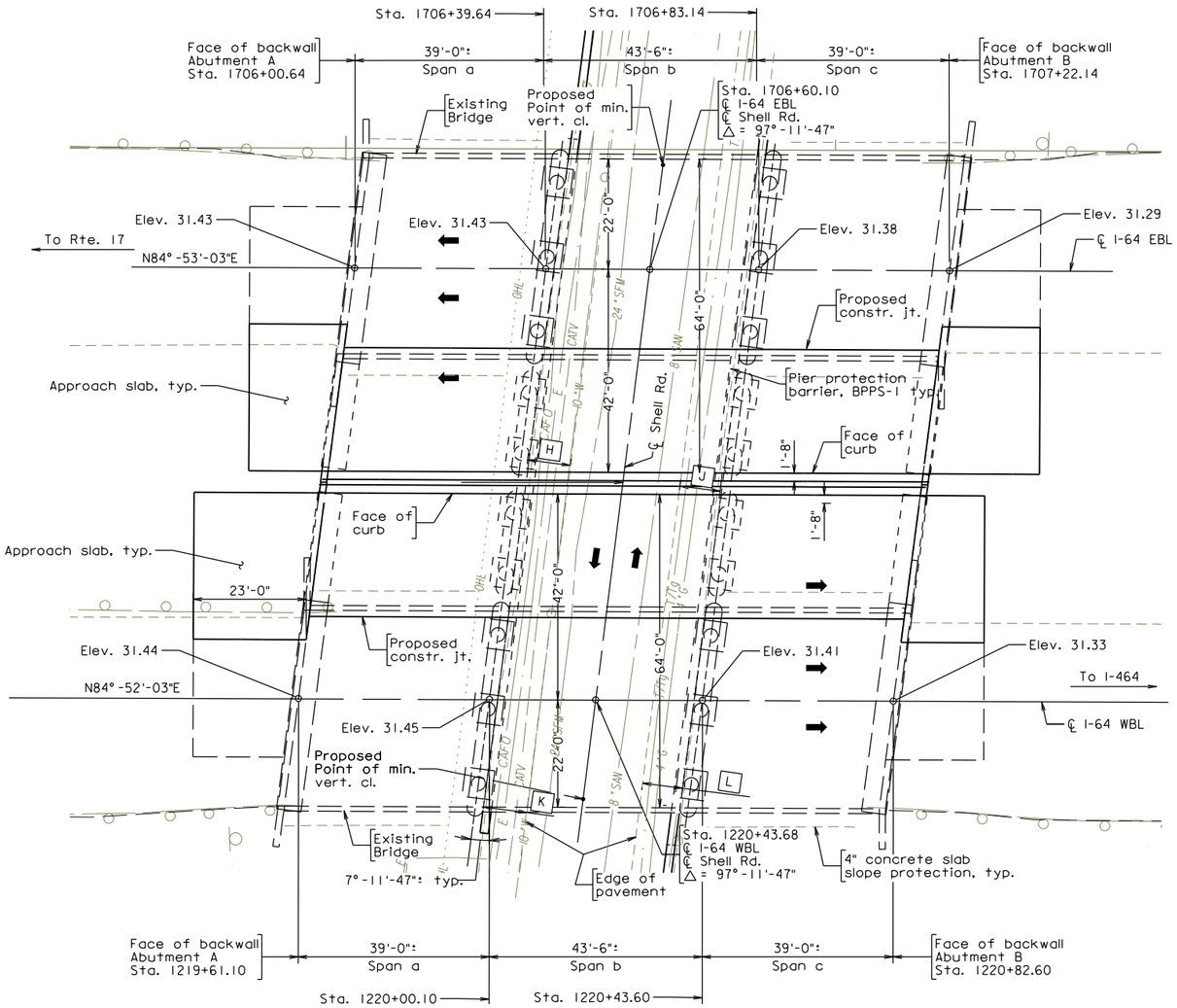
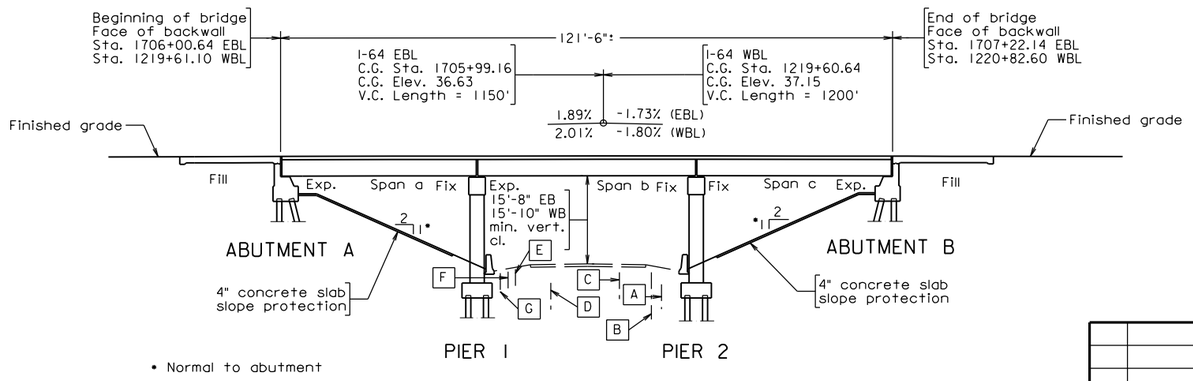
8/4/2017

STATE	FEDERAL AID		STATE		SHEET NO.
	ROUTE	PROJECT	ROUTE	PROJECT	
VA.	-	NHPP-064-3(488)	64	0064-131-811, B668, B669	81
NBIS Number: 21854 21856			UPC No. 106692		
Federal Oversight Code: NFO			FHWA Construction and Scour Code: X281-SN		



PLAN



• Normal to abutment

DEVELOPED SECTION ALONG WIDENING

Scale: 1" = 15'

A ℄ exist. 4" gas
B ℄ exist. telephone
C ℄ exist. 8" sanitary
D ℄ exist. 24" sanitary force main
E ℄ exist. cable tv
F ℄ exist. power line
G ℄ exist. fiber optic
H 8'-9⅞" min. horiz. cl.
J 8'-3¼" min. horiz. cl.
K 8'-9¾" min. horiz. cl.
L 8'-2⅜" min. horiz. cl.

DESIGN EXCEPTION(S):

None

GENERAL NOTES:

Width: 64'-0" face-to-face of rails.

Span layout: 39'-0" - 43'-6" - 39'-0"

Capacity: HL-93 loading.

Specifications:

Construction: Virginia Department of Transportation Road and Bridge Specifications, 2016.

Design: AASHTO LRFD Bridge Design Specifications, 7th Edition, 2014: and VDOT Modifications.

Standards: Virginia Department of Transportation Road and Bridge Standards, 2016; including all current revisions.

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

Bridge Nos. of existing bridges are 2514 (EBL) and 2513 (WBL). Plan No. is 174-10. The span, substructure and directional labels for each bridge shown herein differ from those shown in Plan No. 174-10.

PRELIMINARY PLANS
THESE PLANS NOT TO BE USED FOR CONSTRUCTION OF BRIDGE

VDOT

COMMONWEALTH OF VIRGINIA DEPARTMENT OF TRANSPORTATION

PROPOSED BRIDGE WIDENING ON I-64 OVER RTE. 648 (SHELL ROAD) CITY OF CHESAPEAKE - 0.6 MI. E. OF RTE. 17 PROJ. 0064-131-811, B668, B669

PARSONS TRANSPORTATION GROUP INC. OF VIRGINIA FAIRFAX, VIRGINIA BRIDGE ENGINEER

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

No.	Description	Date
	REVISIONS	
	For Table of Revisions see sheet 2.	

Recommended for Approval: _____ Date

Approved: _____ Chief Engineer Date

Date: August 2017

174-10A
Sheet 81 of 84

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7/28/2017

FHWA REGION	FEDERAL AID		STATE		SHEET NO.
	STATE	PROJECT	ROUTE	PROJECT	
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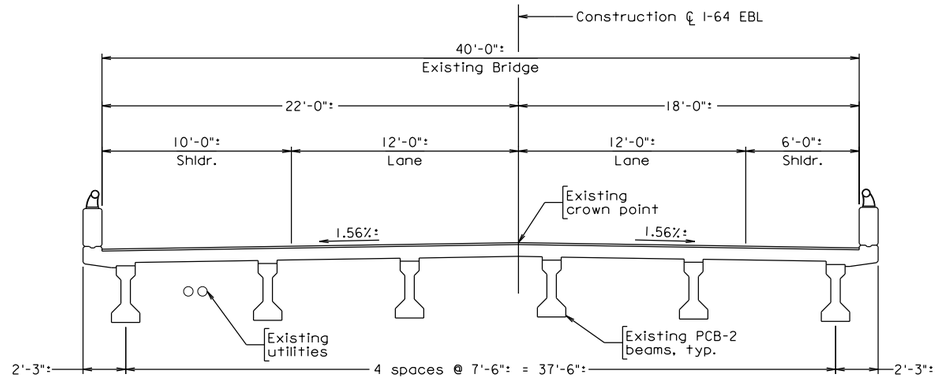
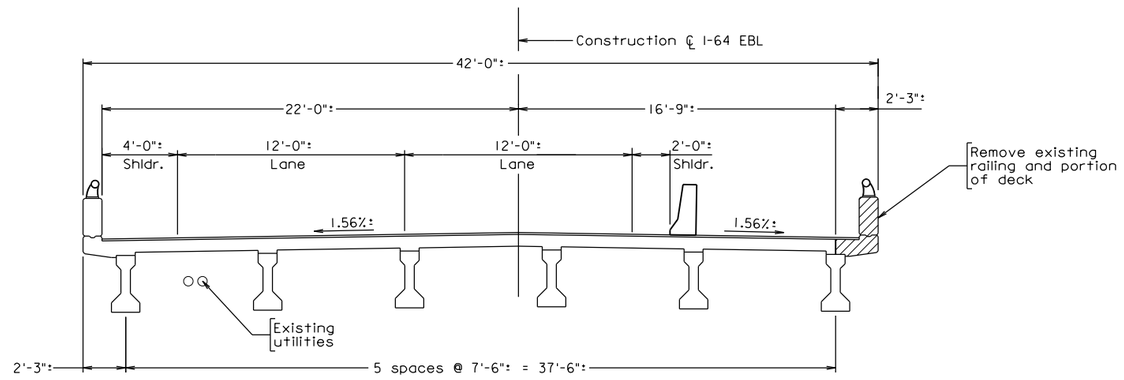


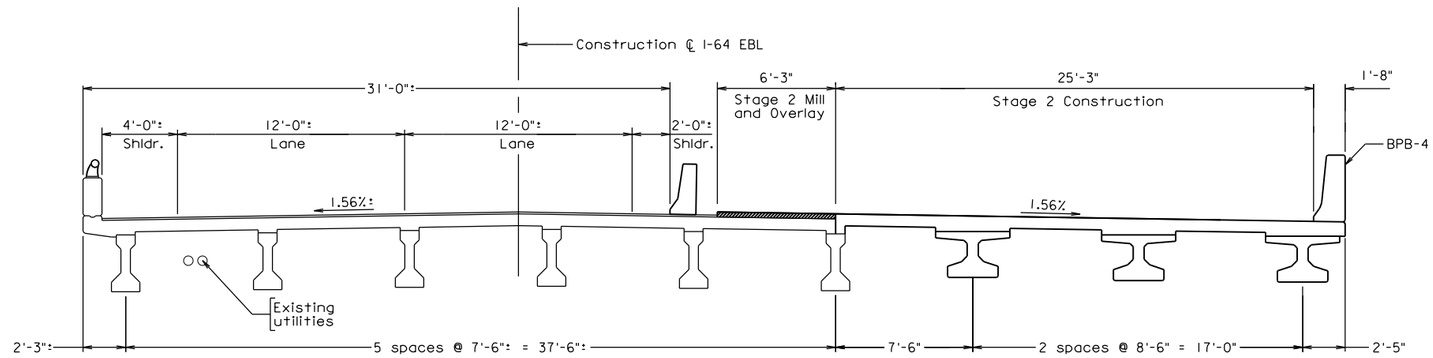
EXISTING BRIDGE - TRANSVERSE SECTION

(Eastbound shown, Westbound similar opposite hand)



STAGE 1: DEMOLITION - TRANSVERSE SECTION

(Eastbound shown, Westbound similar opposite hand)



STAGE 2: CONSTRUCTION - TRANSVERSE SECTION

(Eastbound shown, Westbound similar opposite hand)

Notes:

All sections shown looking station-ahead (to the east).

A suggested Sequence of Construction for each bridge is provided below. Actual sequence of construction and maintenance of traffic will be developed by the Offeror.

Stage 1: Install temporary traffic controls and shift traffic towards the outside of the existing bridge, maintaining two 11'-0" lanes. Remove railing and portion of deck from median side of existing bridge.

Stage 2: Construct proposed bridge widening. Longitudinal deck joint shall be located over an existing beam line. Mill and overlay existing deck to adjust deck crown point location.

Stage 3: Shift traffic onto proposed bridge widening and new overlay. Mill and overlay existing deck to adjust deck crown point location.

Stage 4: Remove temporary traffic controls and shift traffic to final alignment.

Legend:

Portion of existing structure to be removed

PRELIMINARY PLANS

THESE PLANS NOT TO BE USED FOR CONSTRUCTION OF BRIDGE

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PARSONS TRANSPORTATION GROUP INC. OF VIRGINIA
FAIRFAX, VIRGINIA
BRIDGE ENGINEER

Scale: 1/4" = 1'-0"

No.	Description	Date
	Revisions	

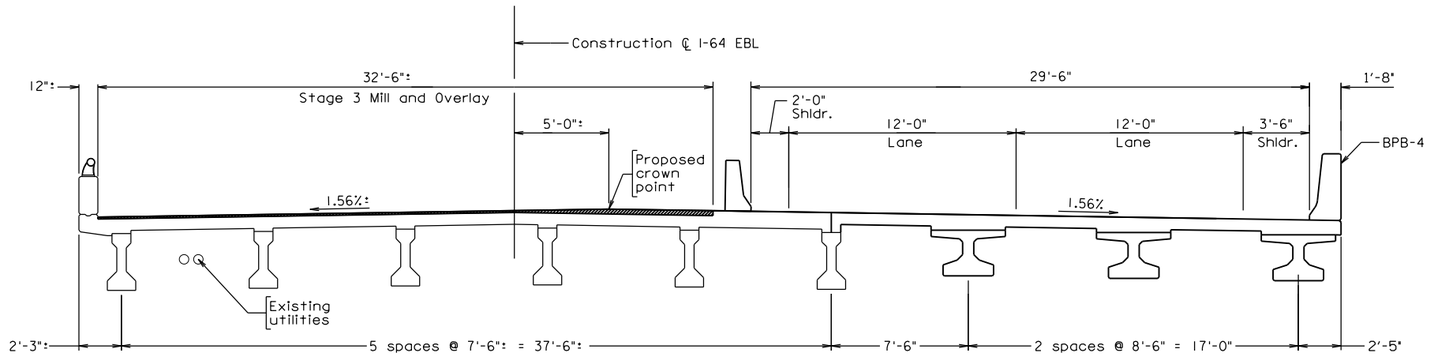
COMMONWEALTH OF VIRGINIA
DEPARTMENT OF TRANSPORTATION

STRUCTURE AND BRIDGE DIVISION

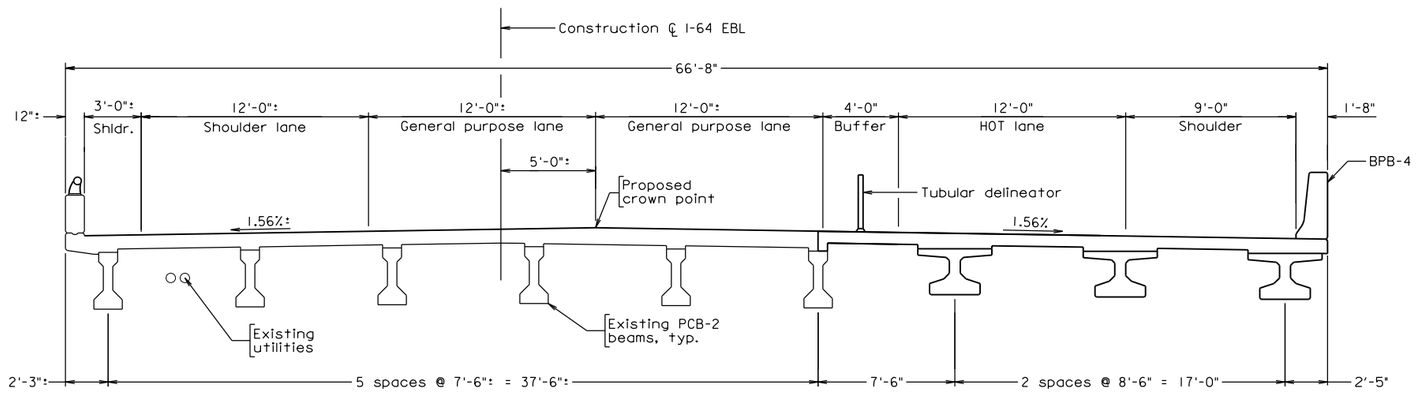
TRANSVERSE SECTION

Designed: B.A.P.	Date	Plan No.	Sheet No.
Drawn: G.J.S.			
Checked: A.A.H.	Aug 2017	174-10A	82 of 84

FHWA REGION	FEDERAL AID		STATE		SHEET
	STATE	PROJECT	ROUTE	PROJECT	NO.
3	VA.	NHPP-064-3(488)	64	0064-131-811, B668, B669	83



STAGE 3 OVERLAY: TRANSVERSE SECTION
(Eastbound shown, Westbound similar opposite hand)



FINAL - TRANSVERSE SECTION
(Eastbound shown, Westbound similar opposite hand)

Notes:

All sections shown looking station-ahead (to the east).

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Stage 3: Shift traffic onto proposed bridge widening and new overlay. Mill and overlay existing deck to adjust deck crown point location.

Stage 4: Remove temporary traffic controls and shift traffic to final alignment.

Legend:

Portion of existing structure to be removed

PRELIMINARY PLANS
THESE PLANS NOT TO BE USED FOR CONSTRUCTION OF BRIDGE

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8/4/2017

PARSONS TRANSPORTATION GROUP INC. OF VIRGINIA
FAIRFAX, VIRGINIA
BRIDGE ENGINEER

Scale: 1/4" = 1'-0"

No.	Description	Date
	Revisions	

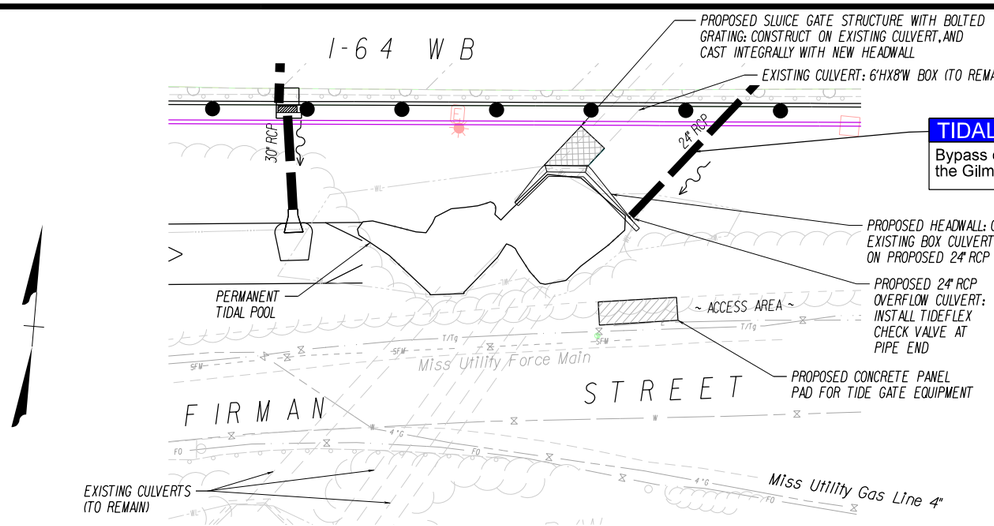
COMMONWEALTH OF VIRGINIA
DEPARTMENT OF TRANSPORTATION
STRUCTURE AND BRIDGE DIVISION

TRANSVERSE SECTION

Designed: B.A.P.	Date	Plan No.	Sheet No.
Drawn: G.J.R.	Aug 2017	174-10A	83 of 84
Checked: A.A.H.			

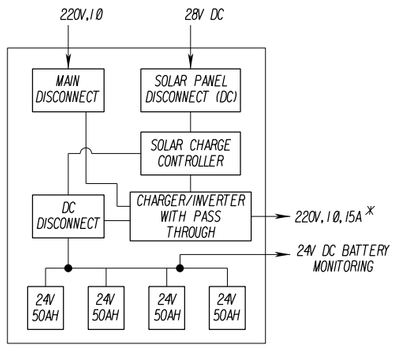
REVISED	STATE	STATE ROUTE	STATE PROJECT	SHEET NO.
	VA.	64	0064-131-811	84

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

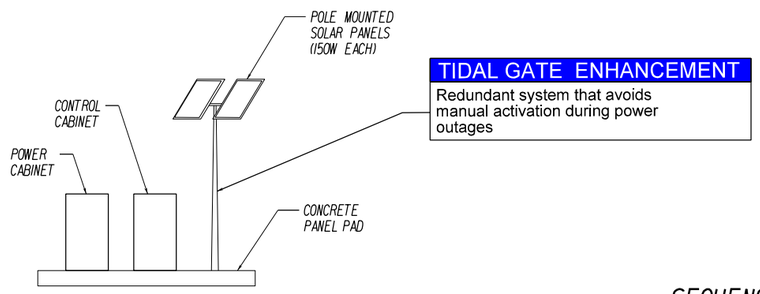


TIDE GATE PLAN

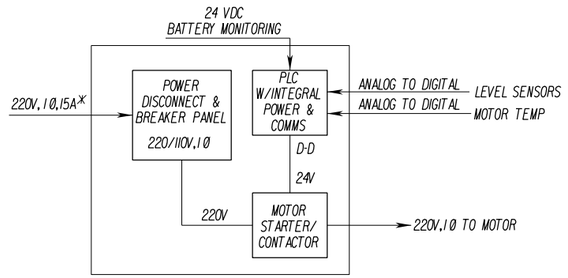
SCALE: 1" = 20'



POWER PANEL LAYOUT

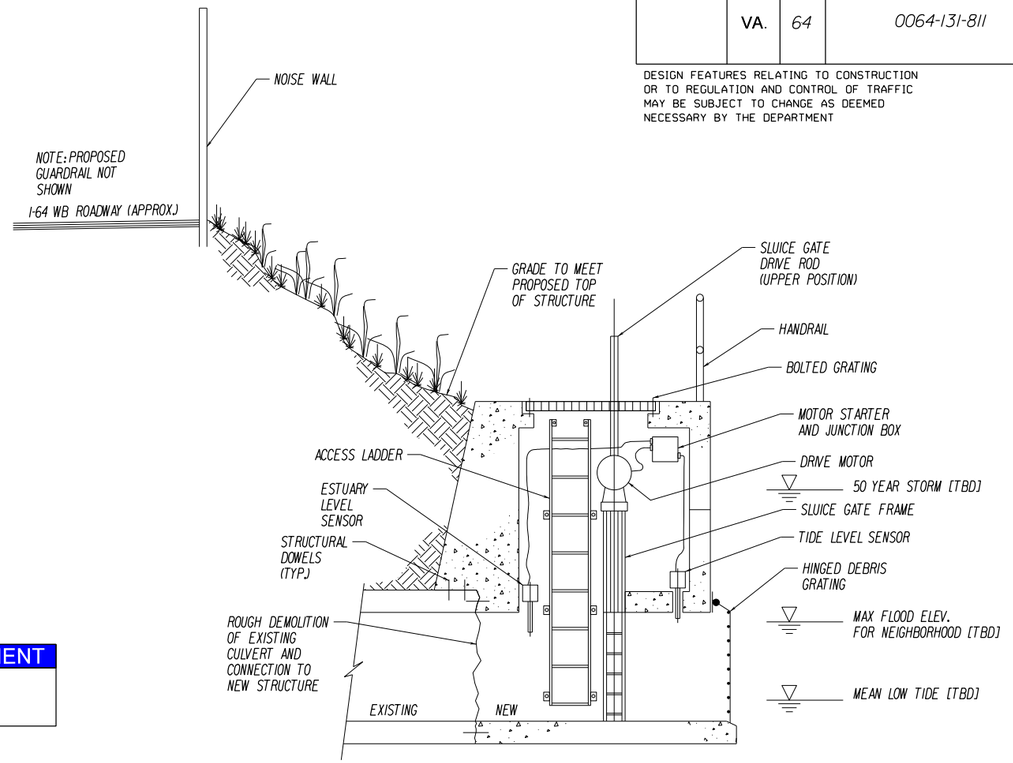


PANEL PAD ELEVATION



CONTROL PANEL LAYOUT

*ACTUAL CURRENT DRAW ~ 3 TO 6 AMP



TIDE GATE SECTION

NOT TO SCALE

SEQUENCE OF OPERATION

NORMAL OPERATIONS:
UNDER NORMAL CONDITIONS, THE SLUICE GATE REMAINS IN THE OPEN POSITION ALLOWING THE NATURAL TIDAL FLOW INTO AND OUT OF THE UPSTREAM ESTUARY. AS THE INVERT OF THE EXISTING CULVERT IS BELOW THE MEAN LOW-TIDE ELEVATION. NO PHYSICAL SEDIMENT TRAPS OR RIP-RAP SHALL BE INSTALLED THEREBY ALLOWING FREE AND NATURAL MIGRATION OF AQUATIC LIFE.

HIGH TIDE EVENT
AS THE WATER LEVELS IN THE TIDAL BASIN RISE, WATER LEVEL SENSORS SHALL DETECT THE MEAN-HIGH TIDE AND THE APPROACH OF MAXIMUM HIGH TIDE AND LOWER THE TIDE GATE WITH 10% OPENING. AT THIS CONFIGURATION, TIDAL WATERS CONTINUE TO FLOW UPSTREAM AND AT A GREATER VELOCITY THROUGH THE SLUICE GATE TO SELF-SCOUR THE GATE AND FRAME. WHEN THE MAXIMUM HIGH TIDE ELEVATION IS REACHED, THE SLUICE GATE SHALL FULLY CLOSE.
ONCE TIDAL LEVELS ARE BELOW FLOOD LEVEL, THEN THE SLUICE GATE SHALL OPEN 10% TO SELF-SCOUR THE SLUICE GATE FRAME AND BOX OF SEDIMENT. ONCE TIDE ELEVATIONS ARE BELOW MEAN HIGH-TIDE, THEN THE SLUICE GATE SHALL COMPLETELY OPEN FOR NORMAL TIDAL FLOWS.

STORM EVENT
THE WATER LEVEL SENSORS SHALL CONTINUOUSLY COMPARE THE UPSTREAM (ESTUARY) AND DOWNSTREAM (TIDAL) ELEVATIONS. PRIOR TO A KNOWN STORM EVENT, THE CONTROL SYSTEM SHALL BE REMOTELY PLACED INTO STORM EVENT MODE. WHERE THE TIDE GATE REMAINS OPEN UNTIL LOW TIDE IS REACHED. ONCE TIDES BEGIN TO RISE FROM LOW TIDE, THE SLUICE GATE SHALL COMPLETELY CLOSE. THE ESTUARY WILL BE AT ITS LOWEST LEVEL TO MAXIMIZE ITS STORAGE VOLUME FOR A PENDING STORM EVENT. AT ANY TIME DURING THE STORM EVENT, SHOULD THE ESTUARY LEVELS BE ABOVE THE TIDE LEVELS, THEN THE SLUICE GATE SHALL OPEN 25% TO ALLOW THE ESTUARY AND TIDE LEVELS TO EQUALIZE. ONCE EQUALIZED, THE SLUICE GATE SHALL CLOSE TO RETAIN STORAGE VOLUME WITHIN THE ESTUARY. ONCE THE STORM EVENT MODE IS SET BACK TO NORMAL AND THE ESTUARY LEVEL IS ABOVE TIDAL LEVEL, THEN THEN THE SLUICE GATE SHALL OPEN 10% TO SELF-SCOUR THE SLUICE GATE FRAME AND BOX OF SEDIMENT. ONCE TIDE ELEVATIONS AND ESTUARY ELEVATIONS HAVE EQUALIZED, THEN THE SLUICE GATE SHALL COMPLETELY OPEN FOR NORMAL TIDAL FLOWS.

PROPOSED TIDE GATE AT GILMERTON CANAL

	PROJECT	SHEET NO.
	0064-131-811	84