

# MEMORANDUM

**Date:** May 23, 2016

**From:** Ted Boecher, RK&K  
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**To:** Dan Anderson, Anne Arundel County Department of Public Works

**Project:** **B&A Trail Connector Overpass Study**

**Subject:** **Schematic Design Report**

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## INTRODUCTION

RK&K has prepared a Schematic Design study with preliminary plans and cost estimate of four (4) alternative routes for a new 10-foot wide shared use asphalt trail connection linking the future Broadneck Peninsula (BN) Trail to the Baltimore & Annapolis (B&A) Trail. Along each alignment, the design includes a grade separated crossing of Maryland Route 2 (MD 2). The BN Trail is a planned trail facility that will provide east-west connectivity along College Parkway. The B&A trail is an existing rail-trail that provides north-south connectivity along the west side of MD 648, which generally parallels MD 2. The proposed bicycle improvements are designed to meet the latest ADA guidelines for pedestrian accessibility. This analysis and preliminary engineering are based on field observation and record data including existing utility records and GIS mapping.

## OBJECTIVES

This schematic design has been developed to review potential route alignments and grade separation locations across Ritchie Highway (MD 2) for a trail connection between the existing B&A Trail and future Broadneck Trail. The purpose of this report is to evaluate the feasibility of improving bicycle and pedestrian access, to identify any potential alternatives for the desired improvements and to evaluate impacts and costs.

## ALTERNATIVES

The 4 alternate grade separation locations and trail alignments for this study are depicted on Figure 1 and are summarized below.



### **Alternate 1: MD- 2 North of West Jones Station Road**

A grade separated trail crossing would be provided across the north leg of the MD 2 / Jones Station Road intersection. A new trail would be provided along the alignment of the previously studied “interim on-street connection” between the B&A Trail / Jones Station Road and College Parkway / Peninsula Farm Rd. / Anne Arundel Community College Rd. For the purpose of this study, the trail would be continued along College Parkway to the intersection with College Drive.

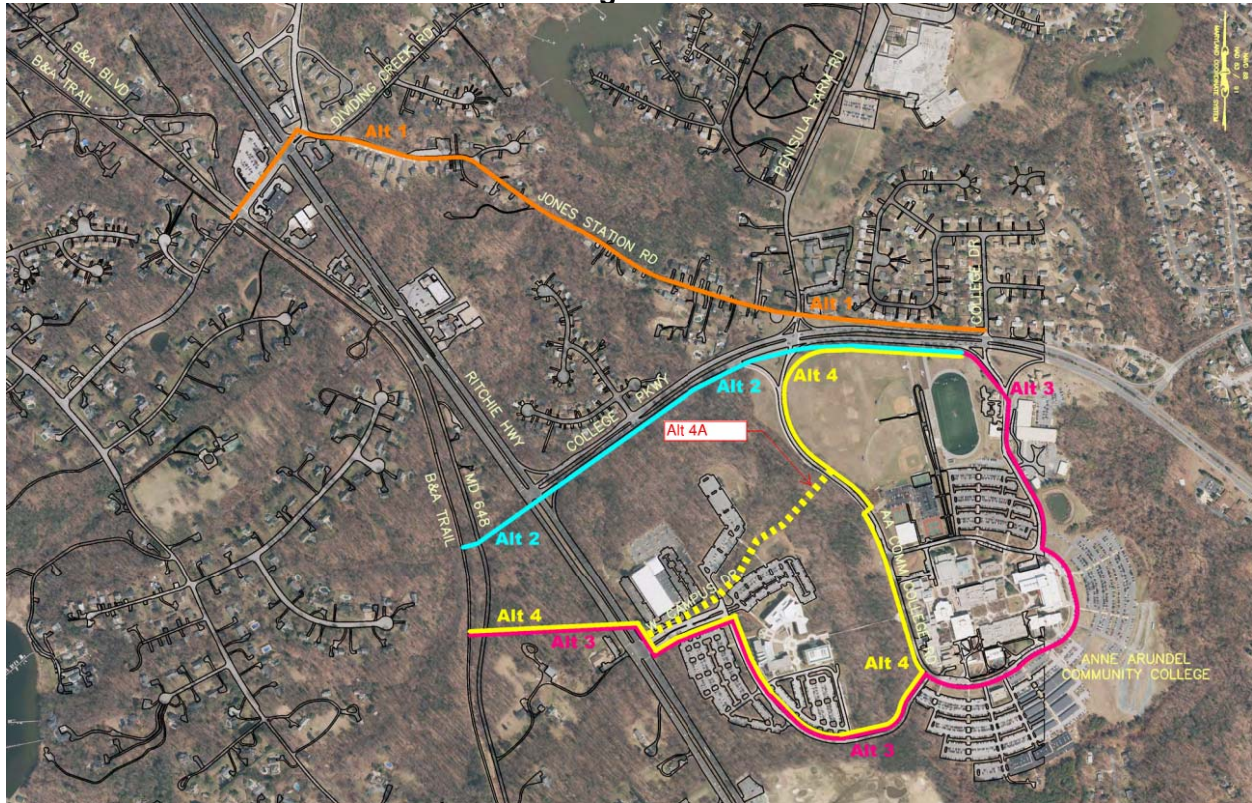
### **Alternate 2: MD-2 South of College Parkway**

A grade separated trail crossing would be provided across MD 2 approximately 330 feet south of the intersection with College Parkway. To the west of MD 2 a new trail would be provided from the B&A Trail across Baltimore Annapolis Blvd (MD 648) at a marked and signed crosswalk, and continue through the BG&E site north of the future BG&E sub-station. To the east of MD 2 a new trail would be provided along the east side of MD 2 and the south side of College Parkway to the intersection with College Drive.

### **Alternates 3 & 4: MD-2 North of West Campus Drive**

Alternates 3 and 4 consisted of a grade separated trail crossing across MD 2 north of the intersection with West Campus Drive. Each alternative consisted of a tunnel option under MD 2 located approximately 630 feet north of West Campus Drive or a bridge option over MD 2 located approximately 300 feet north of West Campus Drive. To the west of MD 2 a new trail would be provided from the B&A Trail across Baltimore Annapolis Boulevard (MD 648) at a marked and signed crosswalk. It would continue through the BG&E site south of the future BG&E sub-station. To the east of MD 2 a new trail would be provided along West Campus Drive to Anne Arundel Community College Road. Alternate 3 would extend along the south and east sides of the campus, terminating at the intersection with College Drive. Alternate 4 would extend north through the center of the campus to the intersection with College Parkway / Peninsula Farm Road, then along the south side of College Parkway to the intersection with College Drive.

Figure 1



## GRADE SEPARATION

There is one (1) proposed grade separation for each alternative as follows: an overpass crossing MD-2 approximately 100'-0" north of West Jones Station Road; an overpass crossing MD-2 approximately 330'-0" south of College Parkway; an overpass crossing MD-2 approximately 300'-0" north of West Campus Drive; and, a tunnel beneath MD-2 approximately 630'-0" north of West Campus Drive.

### Alternate 1: MD- 2 Overpass North of West Jones Station Road

The purpose of the overpass at this location is to provide a means of travel along the B&A Trail Connector across MD-2 other than the signal-controlled pedestrian crosswalk at the intersection of MD-2 and West Jones Station Road. RKK is proposing a 163'-6" two-span pre-engineered truss bridge with a concrete deck and spans of 82'-4" & 81'-2". There is no available space to construct approaches to the bridge and stairwells do not satisfy ADA requirements, therefore

elevators are proposed as the sole means of access from the trail to the structure. An 18'-0" minimum vertical clearance is provided over MD-2.

The clear width between the safety railings on the bridge is 14'-0" in order to accommodate the 10'-0" shared use path and an additional 2'-0" clear to the railings on either side of the pathway. As an alternative to drainage scuppers, RKK has proposed a minimal longitudinal slope on the bridge such that stormwater will be diverted away from the structure and roadway through a drainage trough and downspout located at one (1) of the abutments. The proposed substructure units will be comprised of full height concrete abutments supported on piles and a pile supported single-column pier with pier cap.

### **Alternate 2: MD-2 Overpass South of College Parkway**

The purpose of the overpass at this location is to provide a means of travel along the B&A Trail Connector across MD-2. RKK is proposing a 202'-1" two-span pre-engineered truss bridge with a concrete deck and spans of 101'-9 7/8" & 100'-2 5/8". A 18'-0" minimum vertical clearance is provided over MD-2.

The clear width between the safety railings on the bridge is 14'-0" in order to accommodate the 10'-0" shared use path and an additional 2'-0" clear to the railings on either side of the pathway. The proposed substructure units will be comprised of full height concrete abutments and wingwalls supported on piles and a pile supported single-column pier with pier cap. Wingwalls are only required at the East Abutment and are approximately 50'-0" long.

Retaining walls are required at the West Approach due to the existing grades. RKK is proposing 7'-0" tall retaining walls approximately 60'-0" long at this location. Additional 5'-0" tall retaining walls are proposed between STA 7+25 and STA 8+50.

### **Alternates 3 & 4: MD-2 Overpass North of West Campus Drive**

The purpose of the overpass at this location is to provide a means of travel along the B&A Trail Connector across MD-2. RKK is proposing a 542'-11" six-span pre-engineered truss bridge with a concrete deck and spans of 89'-7 1/4", 99'-4 1/2", 74'-5", 66'-0", 80'-4 5/8" & 133'-1 5/8". An 18'-0" minimum vertical clearance is provided over MD-2.

The clear width between the safety railings on the bridge is 14'-0" in order to accommodate the 10'-0" shared use path and an additional 2'-0" clear to the railings on either side of the pathway.

The proposed substructure units will be comprised of full height concrete abutments and wingwalls supported on piles and a pile supported single-column pier with pier cap. The wingwalls at the West Abutment are approximately 25'-0" long and the wingwalls at the East Abutment are approximately 100'-0" long.

Retaining walls are required at the West Approach due to the existing grades. RKK is proposing 6'-0" to 22'-0" tall walls for approximately 250'-0". Additional retaining walls may be considered between station 5+25 and 6+25 to reduce the quantity of excavation.

### **Alternates 3 & 4: Tunnel North of West Campus Drive**

The purpose of the tunnel at this location is to provide a means of travel along the B&A Trail Connector across MD-2 as an alternative to an overpass. RKK is proposing a 284'-0" long x 16'-6" wide cast-in-place concrete box culvert with concrete headwalls and wingwalls. The box culvert has a 10'-0" vertical and a 14'-0" horizontal clear distance and provides for a minimum of 3'-0" of fill below MD-2. The bottom slab is assumed to be will be supported on piles. The foundation type will be calculated during final design.

Due to the length of the culvert, lighting will be required.

Retaining walls are required at the West Approach due to the existing grades. Retaining walls approximately 3'-0" to 8'-0" high will be required for approximately 100'-0" at this location. The trail profile exceeds 5% on each end of the tunnel which would not meet ADA requirements. The 6.8% slopes shown could be reduced to 5%, but project costs would increase significantly.

## **OPERATIONAL & SAFETY**

### **Alternate 1: MD- 2 Overpass North of West Jones Station Road**

Due to constraints that include intersection geometry, roadside grade and available right of way, a grade separated structure with elevators was determined to be the most feasible facility along this alignment. The presence of intersecting roads and driveways essentially prevent installation of an on grade accessible route, which could only be provided by substantially increasing the size and cost of the structure.

The grade separated structure would essentially serve as a parallel facility to the existing signalized crosswalk at the MD 2 / Jones Station Road intersection. Despite offering the benefit of physical separation between users and traffic on MD 2, it could be reasonably assumed that

some bicyclists or pedestrians would continue to utilize the signalized crosswalk. Potential for delays required to access the 2 elevators may factor into their decision.

Higher operation and maintenance costs could be expected for Alternative 1 due to the added costs of elevator inspection, repairs and electricity.

### **Alternate 2: MD-2 Overpass South of College Parkway**

Improved visibility and accessibility of the trail that result from being generally located along existing right of way provide a benefit for this alternative. With exception of the portions of trail within the BG&E property and the switchback on the AACC property, the trail would primarily be located within right-of-way along MD 648, MD 2 and College Parkway.

### **Alternates 3 & 4: MD-2 North of West Campus Drive**

Improved visibility and accessibility of the trail that result from being generally located along existing right of way or AACC streets provide a benefit for this alternative. With exception of the portions of trail within the BG&E property, the trail would primarily be located within right-of-way along MD 648, MD 2, and College Parkway or along AACC campus streets.

The tunnel alternative presents a few disadvantages from an operational and safety perspective. The reduced visibility in tunnels may deter some users from utilizing the tunnel. The location identified for the tunnel based on terrain does not accommodate an ADA accessible route, so adjustment would be required to balance accessibility to the tunnel with other site constraints, including the downgrade along Route 2 and cut required due to the presence of side slopes on both sides of the roadway.

## **IMPACTS ASSESMENT**

### **Property Impacts**

#### **Alternate 1: MD- 2 Overpass North of West Jones Station Road**

Property acquisition or easements will be needed at the MTA park and ride lot located west of MD 2; the estimated easement area is 6,500 sf. Property acquisition or easements for approximately 500 sf of impacts may also be required at the Giant gas station located between MD 2 and Manhattan Beach Road. The majority of the bridge structure will be located within the

State owned right-of-way along MD 2. Property lines near MD 2 and College Parkway were determined from researching property records.

### **Alternate 2: MD-2 Overpass South of College Parkway**

Property acquisition will include approximately 21,400 sf of impacts to the BGE property and 75,000 sf of impacts to the Anne Arundel Community College. The remaining impacts are located within County or State owned roadway.

### **Alternate 3: MD-2 North of West Campus Drive**

Property acquisition for the alternate 3 overpass will include approximately 21,500 sf of impacts to the BGE property, 10,500 sf of impacts to the YMCA, and 88,000 sf of impacts to the Anne Arundel Community College. If the underpass option is selected then additional property acquisition will include 10,500 sf of impacts to the BGE property, 6,500 sf of impacts to the YMCA, and 6,400 sf of impacts to Anne Arundel Community College. The remaining impacts are located within County or State owned roadway.

### **Alternate 4: MD-2 North of West Campus Drive**

Property acquisition for the alternate 4 overpass will include approximately 21,500 sf of impacts to the BGE property, 10,500 sf of impacts to the YMCA, and 81,700 sf of impacts to the Anne Arundel Community College. If the underpass option is selected then additional property acquisition will include 10,500 sf of impacts to the BGE property, 6,500 sf of impacts to the YMCA, and 6,400 sf of impacts to Anne Arundel Community College. The remaining impacts are located within County or State owned roadway.

### **Utilities**

Utility Records were determined based on available record data provided by the utility companies. GIS Data was utilized for available data sets. Potential utility impacts could include relocation and/or adjustments to utility poles, fire hydrants, gas valves and water meters. There is an existing water main and gas main that run parallel to MD 2 which could require relocation. Existing pedestrian signal equipment may also require installation, modifications and/or upgrades at the following intersections: Jones Station Road @ MD 2 (Alt 1), College Parkway @ Peninsula Farm Road (Alts 1, 2 & 4), and College Parkway @ College Drive (Alts 1 - 4). Impacts to other utilities that records were not provided for, such as underground cable, fiber-optic or electric would be anticipated and would be explored further in later stages of design.

## **Environmental Resources**

The four proposed alignments may impact regulated resources and will require permits to authorize these impacts. The regulated resources that may be found along one or more of the alignments include forests, landscape and road-side trees, streams, wetlands, historic properties and cultural resources, and rare, threatened and endangered (RTE) species. The project was coordinated with the US Fish and Wildlife Service (USFWS) and the Maryland Department of Natural Resources, Wildlife and Heritage Service (DNR W&H) for the presence of rare, threatened or endangered species within the project area, and with the Maryland Historic Trust (MHT) for the presence of historic building and protected cultural resources. Natural resource scientists with RK&K walked the proposed alignments and identified the approximate location of regulated streams, wetlands, forests, and roadside and landscape trees; although these resources were not delineated in accordance with state and federal guidelines.

DNR W&H has no records of state-listed RTE species within or near the project area. A query of the USFWS Information for Planning and Conservation (IpaC) online system indicated that the Northern Long-eared Bat (*Myotis septentrionalis*) may occur or could be affected by the project. Additional coordination with USFWS will be required to determine if suitable habitat for the Northern Long-eared Bat is present along the preferred alternative, and if so, what steps the project must take to protect this species. MHT determined that no historic properties will be affected by the project.

The field review of the project area identified two potential wetlands, three streams, and numerous roadside and landscape trees within or along the proposed alignments and extensive forested areas along the western end of the alignments. The two wetlands are located in the forest south of College Parkway and between Anne Arundel Community College Road and Governor Ritchie Highway (MD 2), on plans PS-01 and PS-02. One perennial stream is located between MD 2 and MD 648 west of College Parkway (plan PS-01). The second stream is likely intermittent, and located east of MD 2, between the YMCA and College Parkway (Plan PS-04). The third stream is perennial and is located west of Anne Arundel Community College Road and flows under West Campus Drive on plan PS-06. Landscape trees are located along the alignments across the college campus on plans PS-03, PS-05 through PS-09. The forested



areas are located west of Anne Arundel Community College Road, south of College Parkway and also west of MD 2, on plan sheets PS-01, PS-02, PS-04, PS-06 and PS-07.

Wetlands and streams are unlikely to be directly impacted by any of the proposed alignments, but Alignment 2 will likely impact wetland buffers along College Parkway. Stream buffers may be impacted by Alignment 2 east of the proposed MD 2 overpass and by Alternates 3 and 4 along West Campus Drive. The impacts to wetland buffers will require the submission of a permit application and authorization from the Maryland Department of the Environment (MDE) and the U.S. Army Corps of Engineers (USACE). Impacts to stream buffers will require approval from the County Office of Planning and Zoning (OPZ).

Forests, roadside and landscape tree impacts are anticipated along all the alignments. The greatest impacts to forests will occur along alignments 2, 3 and 4, between MD 2 and MD 648, on the western end of the project (Plan PS-04). Forest impacts are also anticipated along most of the alignments where forested areas abut the roads and proposed bike paths, such as on plans PS-01, PS-02 and PS-06. The forest impacts located within the state-owned roadway right-of-way must be reviewed and authorized by the DNR Forest Service. Landscape trees are likely to be impacted along the alignments on plans PS-03, PS-05 through PS-10. Impacts to landscape trees on the Anne Arundel Community College campus are likely to require coordination with and authorization from the OPZ.

## **STORMWATER MANAGEMENT**

Stormwater management requirements for this project were estimated based off the MDE 2009 Stormwater Design Manual. The site was divided into 30 preliminary Points of Investigation (POI) based on the existing topography. For this level of analysis offsite drainage has not been considered. These 30 POI's contain all of the anticipated impervious area for each of the proposed alternatives.

As most of the proposed work occurs outside of the existing right of way, the LOD was used as the site area when determining the percentage of imperviousness for each alternative. Alternatives 2, 3, 4, and 4A have an existing impervious cover of <40%, and therefore new development criteria will be used. Under new development criteria, the total post-development impervious area needs to be treated at 100%. Alternative 1 has an existing impervious area of >40%, and therefore qualifies as redevelopment. Under redevelopment criteria, any new

impervious area needs to be treated at 100%, while existing impervious areas require 50% treatment. Additionally, pavement additions that are proposed over an existing pavement layer (ie, the proposed pedestrian bridges over Governor Ritchie Highway) need to be treated as new impervious area. Hydrologic soil groups in the area are a mixture of A, B, C and D. POI's 8-13, 16, 17, 23 and 30 are all located in poorly draining soils (type C or D) and POI's 1-7, 14, 15, 18-22, and 24-29 are located in well-draining soils (types A or B). All route alternatives are located within the Magothy River (02-13-10-01) watershed.

Based on this methodology, the total treatment requirements for alternatives 2, 3, 4, and 4A are shown below. Alternate 4A is the same as alternate 4 except the tunnel option is substituted for the bridge.

Alternative 2 =  $1.05 - 0 = 1.05$  acres

Alternative 3 =  $1.52 - 0.29 = 1.23$  acres

Alternative 4 =  $1.45 - 0.22 = 1.23$  acres

Alternative 4A w/ tunnel =  $1.61 - 0.22 = 1.39$  acres

As alternative 1 is classified as redevelopment, the treatment requirements can be found using the following equation:

**Equation 1:**

Treatment Requirement = NEW IA + (0.5)\*REDEV IA – IA REMOVED

Alternative 1 =  $0.17 + (0.5)*(0.1) - 0.04 = 0.18$  acres

ESDv required is calculated using equation 2. The ESDv required for each POI, shown in Table 1, were calculated using a PE of 2.6 and an Rv of 0.95.

**Equation 2:**

$ESDv = (PE * Rv * IART)/12$

Table 1

	<b>New Development</b>	<b>Re-Development</b>			
	Alt. 1	Alt. 2	Alt. 3	Alt. 4	Alt. 4A
IA increase (acres)	0.18	1.05	1.24	1.23	1.39
ESDv Required (CF)	1959.54	9448.88	11077.62	11015.75	12475.43

Due to the existing slopes and wooded conditions surrounding most of the proposed layout, as well as the narrow existing ROW, providing SWM facilities may not be feasible in many of the POI's. It is recommended that pervious pavement be used in all POI's where the soils are conducive for such a practice in order to provide the required ESDv treatment. In POI's with poorly draining soils, linear practices (such as swales/bio-swales) along the existing roadway or proposed pathway and/or tree box plantings are proposed in order to provide the necessary water quality treatment. Linear practices can also be added along the proposed pervious pavement in order to provide further treatment, if required. Recommended facilities are based on a desktop analysis of the area using GIS contours, existing aeriels, soils maps, and Google Street View. An effort was made to avoid existing trees/environmentally sensitive areas when selecting potential treatment sites. These prospective site locations, as well as any potential impacts to pre-existing treatment facilities, will need to be field verified. Additionally, in accordance with Section 7.2.2 of the Practices and Procedures Manual, stormwater quantity management of the Overbank Flood Protection Volume ( $Q_p$ ) shall be provided if historic downstream flooding exists, the site discharges to floodplain areas that are not contained within easements that preclude development, or the site discharges to a location that is deemed to have an inadequate outfall. Extreme Flood Volume ( $Q_f$ ) control is only required if there is evidence of flooding downstream of the development. The quantity management requirements for this project will need to be evaluated as the design progresses, and provided as necessary. For POI's where treatment cannot be provided, variances will be requested from Anne Arundel County.

## **ESTIMATED COST**

The estimated construction costs are approximately \$2,100,000 for alternate 1, \$6,000,000 for alternate 2, \$12,000,000 for alternate 3 overpass, and \$11,800,000 for alternate 4 overpass. Alternate 3 underpass option is approximately \$8,400,000 and alternate 4 underpass is \$8,200,000. Itemized cost estimates for each alternative are enclosed. It should be noted that although alternate 1 may have the lowest cost it may not be the most cost effective considering trail users may not utilize the pedestrian bridge as frequently due to the nearby parallel signalized crosswalk at the intersection of MD 2 and Jones Station Road. Property acquisition and utility relocation costs are not included. Utility relocations will be further evaluated during next phase of design once detailed utility records and surveys are provided.

## SUMMARY

Four Alternatives have been evaluated that will enhance bicycle and pedestrian travel between the existing B&A Trail and future Broadneck Trail. These Options are summarized in the table below.

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<b>COMPARISON OF ALTERNATIVES</b>				
<b>Item</b>	<b>Alt 1</b>	<b>Alt 2</b>	<b>Alt 3</b>	<b>Alt 4</b>
Length of Trail	5500 ft	4700 ft	6500 ft (7200 ft)	6800 ft (7500 ft)
Length of Retaining Wall	150 ft	200 ft	700 ft (450 ft)	700 ft (450 ft)
Number of Signalized Intersections Requiring Upgrades	3	3	2	1
Property Impacts	7000 sf	96,400 sf	120,000 sf (143,400 sf)	113,700 sf (137,100 sf)
Total Project Cost	\$2,100,000	\$6,000,000	\$12,000,000 (\$8,400,000)	\$11,800,000 (\$8,200,000)

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(Note: Tunnel Option for Alternates 3 & 4 noted in parenthesis)

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**B&A Trail Connector - Schematic Design (Alt 1)**

	Quantity	Unit	Unit Price	Cost
<b>CATEGORY 1</b>				
25% of Category 2, 4, 5 & 6				<b>\$297,573</b>
<b>CATEGORY 2</b>				
Removal of Existing Pavement	80	CY	\$35	\$2,800
Removal of Existing Sidewalk	70	CY	\$70	\$4,900
Removal of Existing Combination Curb & Gutter	800	LF	\$12	\$9,600
Saw Cuts	850	LF	\$3	\$2,550
Removal of Existing Pavement Line Markings, Any Width	510	LF	\$2	\$1,020
Common Borrow	50	CY	\$80	\$4,000
Class 2 Excavation	110	CY	\$60	\$6,600
<b>Sub-total</b>				<b>\$31,470</b>
<b>CATEGORY 3</b>				
Standard Yard Inlet	1	EA	\$2,600	\$2,600
Bioretention Soil Mixture	57	CY	\$90	\$5,130
15 Inch Reinforced Concrete Pipe	90	LF	\$77	\$6,930
6 Inch Perforated PPWP	40	LF	\$20	\$800
No. 57 Stone for Sediment Control	57	CY	\$84	\$4,788
Class I Riprap for Slope and Channel Protection	33	SY	\$75	\$2,475
<b>Sub-total</b>				<b>\$22,723</b>
<b>CATEGORY 4</b>				
Segmental Block Retaining Wall	LS	LS	\$25,000	\$25,000
Furnish and Install Bus Shelter (Contingent)	1	EA	\$10,000	\$10,000
Structural Excavation	305	CY	\$30	\$9,150
Piling	900	LF	\$75	\$67,500
Aggregate Base and Subbase Courses	125	SY	\$10	\$1,250
Cast-in-Place Concrete Structures	250	CY	\$1,125	\$281,250
Pre-Engineered Truss Bridge	LS	LS	\$177,000	\$177,000
Elevators	LS	LS	\$450,000	\$450,000
<b>Sub-total</b>				<b>\$1,021,150</b>
<b>CATEGORY 5</b>				
3 Inch HMA 12.5mm for Surface	15	Tons	\$150	\$2,250
4 Inch HMA 12.5mm for Surface	250	Tons	\$150	\$37,500
3 Inch HMA 19.0mm for Base	15	Tons	\$140	\$2,100
6 Inch Graded Aggregate Base Course	1,100	SY	\$20	\$22,000
9 Inch Portland Cement Concrete Pavement for Driveway Mix 7	30	SY	\$150	\$4,500
5 Inch White Thermoplastic Pavement Markings	1,000	LF	\$2	\$2,000
5 Inch Yellow Thermoplastic Pavement Markings	500	LF	\$2	\$1,000
12 Inch White Thermoplastic Pavement Markings	620	LF	\$16	\$9,920
White Thermoplastic Pavement Marking Symbols	520	SF	\$20	\$10,400
<b>Sub-total</b>				<b>\$91,670</b>
<b>CATEGORY 6</b>				
Concrete Curb and Gutter	800	LF	\$30	\$24,000
Concrete Sidewalk - 5 Inch Thickness	1,000	SF	\$8	\$8,000
Detectable Warning Surface for Ramps	350	SF	\$40	\$14,000
<b>Sub-total</b>				<b>\$46,000</b>
<b>CATEGORY 7</b>				
2% of Category 2, 4, 5 & 6				<b>\$23,806</b>
<b>CATEGORY 8</b>				
Sheet Aluminum Signs	55	SF	\$30	\$1,650
Wood Sign Supports 4 Inch x 4 Inch	80	LF	\$11	\$880
Update Existing Ped Equipment and Provide New	LS	LS	\$30,000	\$30,000
Relocate Ex. Fire Hydrant & Service Lead and Valve	1	EA	\$1,500	\$1,500
Additional Utility Relocations for Truss Bridge (TBD)				
<b>Sub-total</b>				<b>\$34,030</b>
<b>NEAT SUB-TOTAL</b>				<b>\$1,568,421</b>
30% Contingency				\$470,526
<b>TOTAL</b>				<b>\$2,038,948</b>

<b>B&amp;A Trail Connector - Schematic Design (Alt 2)</b>				
	<b>Quantity</b>	<b>Unit</b>	<b>Unit Price</b>	<b>Cost</b>
<b>CATEGORY 1</b>				
25% of Category 2, 4, 5 & 6				<b>\$718,134</b>
<b>Sub-total</b>				<b>\$718,134</b>

<b>CATEGORY 2</b>				
Removal of Existing Sidewalk	120	CY	\$70	\$8,400
Removal of Existing Combination Curb & Gutter	105	LF	\$12	\$1,260
Common Borrow	4,000	CY	\$80	\$320,000
Class 2 Excavation	7,500	CY	\$60	\$450,000
<b>Sub-total</b>				<b>\$779,660</b>

<b>CATEGORY 3</b>				
30% of Category 2, 4, 5, & 6				\$861,761
<b>Sub-total</b>				<b>\$861,761</b>

<b>CATEGORY 4</b>				
Structural Excavation	1,815	CY	\$30	\$54,450
Piling	8,700	LF	\$75	\$652,500
Aggregate Base and Subbase Courses	685	SY	\$10	\$6,850
Cast-in-Place Concrete Structures	735	CY	\$1,125	\$826,875
Pre-Engineered Truss Bridge	1	LS	\$239,000	\$239,000
<b>Sub-total</b>				<b>\$1,779,675</b>

<b>CATEGORY 5</b>				
4 Inch HMA 12.5mm for Surface	1,250	Tons	\$150	\$187,500
6 Inch Graded Aggregate Base Course	5,500	SY	\$20	\$110,000
<b>Sub-total</b>				<b>\$297,500</b>

<b>CATEGORY 6</b>				
Concrete Curb and Gutter	150	LF	\$30	\$4,500
Concrete Sidewalk - 5 Inch Thickness	700	SF	\$8	\$5,600
Detectable Warning Surface for Ramps	140	SF	\$40	\$5,600
<b>Sub-total</b>				<b>\$15,700</b>

<b>CATEGORY 7</b>				
2% of Category 2, 4, 5 & 6				<b>\$57,451</b>

<b>CATEGORY 8</b>				
Update Existing Ped Equipment and Provide New	LS	LS	\$30,000	\$30,000
Additional Utility Relocations for Truss Bridge (TBD)				
<b>Sub-total</b>				<b>\$30,000</b>

<b>NEAT SUB-TOTAL</b>	<b>\$4,539,880</b>
30% Contingency	\$1,361,964
<b>TOTAL</b>	<b>\$5,901,844</b>

<b>B&amp;A Trail Connector - Schematic Design (Alt 3 - Overpass)</b>				
	<b>Quantity</b>	<b>Unit</b>	<b>Unit Price</b>	<b>Cost</b>
<b>CATEGORY 1</b>				
25% of Category 2, 4, 5 & 6				<b>\$1,464,828</b>
<b>Sub-total</b>				<b>\$1,464,828</b>

<b>CATEGORY 2</b>				
Removal of Existing Sidewalk	210	CY	\$70	\$14,700
Removal of Existing Combination Curb & Gutter	750	LF	\$12	\$9,000
Common Borrow	4,000	CY	\$80	\$320,000
Class 2 Excavation	2,500	CY	\$60	\$150,000
<b>Sub-total</b>				<b>\$493,700</b>

<b>CATEGORY 3</b>				
30% of Category 2, 4, 5, & 6				\$1,757,793
<b>Sub-total</b>				<b>\$1,757,793</b>

<b>CATEGORY 4</b>				
Structural Excavation	3,430	CY	\$47	\$161,210
Piling	19,800	LF	\$75	\$1,485,000
Aggregate Base and Subbase Courses	1,765	SY	\$10	\$17,650
Cast-in-Place Concrete Structures	2,270	CY	\$1,125	\$2,553,750
Pre-Engineered Truss Bridge	1	LS	\$615,000	\$615,000
<b>Sub-total</b>				<b>\$4,832,610</b>

<b>CATEGORY 5</b>				
4 Inch HMA 12.5mm for Surface	1,900	Tons	\$150	\$285,000
6 Inch Graded Aggregate Base Course	8,500	SY	\$20	\$170,000
<b>Sub-total</b>				<b>\$455,000</b>

<b>CATEGORY 6</b>				
Concrete Curb and Gutter	1,000	LF	\$30	\$30,000
Concrete Sidewalk - 5 Inch Thickness	3,000	SF	\$8	\$24,000
Detectable Warning Surface for Ramps	600	SF	\$40	\$24,000
<b>Sub-total</b>				<b>\$78,000</b>

<b>CATEGORY 7</b>				
2% of Category 2, 4, 5 & 6				<b>\$117,186</b>

<b>CATEGORY 8</b>				
Utility Relocations (TBD)				
<b>Sub-total</b>				<b>\$0</b>

<b>NEAT SUB-TOTAL</b>	<b>\$9,199,117</b>
30% Contingency	\$2,759,735
<b>TOTAL</b>	<b>\$11,958,852</b>

<b>B&amp;A Trail Connector - Schematic Design (Alt 4 - Overpass)</b>				
	<b>Quantity</b>	<b>Unit</b>	<b>Unit Price</b>	<b>Cost</b>
<b>CATEGORY 1</b>				
25% of Category 2, 4, 5 & 6				<b>\$1,434,990</b>
<b>Sub-total</b>				<b>\$1,434,990</b>

<b>CATEGORY 2</b>				
Removal of Existing Sidewalk	155	CY	\$70	\$10,850
Removal of Existing Combination Curb & Gutter	375	LF	\$12	\$4,500
Common Borrow	4,000	CY	\$80	\$320,000
Class 2 Excavation	1,800	CY	\$60	\$108,000
<b>Sub-total</b>				<b>\$443,350</b>

<b>CATEGORY 3</b>				
30% of Category 2, 4, 5, & 6				\$1,721,988
<b>Sub-total</b>				<b>\$1,721,988</b>

<b>CATEGORY 4</b>				
Structural Excavation	3,430	CY	\$47	\$161,210
Piling	19,800	LF	\$75	\$1,485,000
Aggregate Base and Subbase Courses	1,765	SY	\$10	\$17,650
Cast-in-Place Concrete Structures	2,270	CY	\$1,125	\$2,553,750
Pre-Engineered Truss Bridge	1	LS	\$615,000	\$615,000
<b>Sub-total</b>				<b>\$4,832,610</b>

<b>CATEGORY 5</b>				
4 Inch HMA 12.5mm for Surface	1,800	Tons	\$150	\$270,000
6 Inch Graded Aggregate Base Course	7,900	SY	\$20	\$158,000
<b>Sub-total</b>				<b>\$428,000</b>

<b>CATEGORY 6</b>				
Concrete Curb and Gutter	400	LF	\$30	\$12,000
Concrete Sidewalk - 5 Inch Thickness	1,500	SF	\$8	\$12,000
Detectable Warning Surface for Ramps	300	SF	\$40	\$12,000
<b>Sub-total</b>				<b>\$36,000</b>

<b>CATEGORY 7</b>				
2% of Category 2, 4, 5 & 6				<b>\$114,799</b>

<b>CATEGORY 8</b>				
Utility Relocations (TBD)				
<b>Sub-total</b>				<b>\$0</b>

<b>NEAT SUB-TOTAL</b>	<b>\$9,011,737</b>
30% Contingency	\$2,703,521
<b>TOTAL</b>	<b>\$11,715,258</b>



<b>B&amp;A Trail Connector - Schematic Design (Alt 3 - Underpass)</b>				
	<b>Quantity</b>	<b>Unit</b>	<b>Unit Price</b>	<b>Cost</b>
<b>CATEGORY 1</b>				
40% of Category 2, 4, 5 & 6				<b>\$1,502,034</b>
<b>Sub-total</b>				<b>\$1,502,034</b>
<b>CATEGORY 2</b>				
Removal of Existing Sidewalk	210	CY	\$70	\$14,700
Removal of Existing Combination Curb & Gutter	750	LF	\$12	\$9,000
Common Borrow	4,000	CY	\$80	\$320,000
Class 2 Excavation	2,500	CY	\$60	\$150,000
<b>Sub-total</b>				<b>\$493,700</b>
<b>CATEGORY 3</b>				
30% of Category 2, 4, 5, & 6				\$1,126,526
<b>Sub-total</b>				<b>\$1,126,526</b>
<b>CATEGORY 4</b>				
Structure Excavation	565	CY	\$30	\$16,950
Piling	4,000	LF	\$75	\$300,000
Concrete Box Culvert	285	LF	\$6,630	\$1,889,598
Aggregate Base and Subbase Courses	245	SY	\$8	\$1,838
Cast-in-Place Concrete Structures	240	CY	\$1,125	\$270,000
Pedestrian Tunnel Lighting	1	LS	\$25,000	\$25,000
<b>Sub-total</b>				<b>\$2,503,386</b>
<b>CATEGORY 5</b>				
4 Inch HMA 12.5mm for Surface	2,000	Tons	\$150	\$300,000
6 Inch Graded Aggregate Base Course	9,000	SY	\$20	\$180,000
Roadway Restoration at Tunnel	2,000	SF	\$100	\$200,000
<b>Sub-total</b>				<b>\$680,000</b>
<b>CATEGORY 6</b>				
Concrete Curb and Gutter	1,000	LF	\$30	\$30,000
Concrete Sidewalk - 5 Inch Thickness	3,000	SF	\$8	\$24,000
Detectable Warning Surface for Ramps	600	SF	\$40	\$24,000
<b>Sub-total</b>				<b>\$78,000</b>
<b>CATEGORY 7</b>				
2% of Category 2, 4, 5 & 6				<b>\$75,102</b>
<b>CATEGORY 8</b>				
Utility Relocations (TBD)				
<b>Sub-total</b>				<b>\$0</b>

<b>NEAT SUB-TOTAL</b>	<b>\$6,458,748</b>
30% Contingency	\$1,937,624
<b>TOTAL</b>	<b>\$8,396,372</b>

<b>B&amp;A Trail Connector - Schematic Design (Alt 4 - Underpass)</b>				
	<b>Quantity</b>	<b>Unit</b>	<b>Unit Price</b>	<b>Cost</b>
<b>CATEGORY 1</b>				
40% of Category 2, 4, 5 & 6				<b>\$1,454,294</b>
<b>Sub-total</b>				<b>\$1,454,294</b>

<b>CATEGORY 2</b>				
Removal of Existing Sidewalk	155	CY	\$70	\$10,850
Removal of Existing Combination Curb & Gutter	375	LF	\$12	\$4,500
Common Borrow	4,000	CY	\$80	\$320,000
Class 2 Excavation	1,800	CY	\$60	\$108,000
<b>Sub-total</b>				<b>\$443,350</b>

<b>CATEGORY 3</b>				
30% of Category 2, 4, 5, & 6				\$1,090,721
<b>Sub-total</b>				<b>\$1,090,721</b>

<b>CATEGORY 4</b>				
Structure Excavation	565	CY	\$30	\$16,950
Piling	4,000	LF	\$75	\$300,000
Concrete Box Culvert	285	LF	\$6,630	\$1,889,598
Aggregate Base and Subbase Courses	245	SY	\$8	\$1,838
Cast-in-Place Concrete Structures	240	CY	\$1,125	\$270,000
Pedestrian Tunnel Lighting	1	LS	\$25,000	\$25,000
<b>Sub-total</b>				<b>\$2,503,386</b>

<b>CATEGORY 5</b>				
4 Inch HMA 12.5mm for Surface	1,900	Tons	\$150	\$285,000
6 Inch Graded Aggregate Base Course	8,400	SY	\$20	\$168,000
Roadway Restoration at Tunnel	2,000	SF	\$100	\$200,000
<b>Sub-total</b>				<b>\$653,000</b>

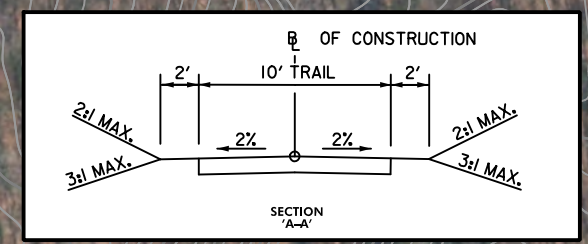
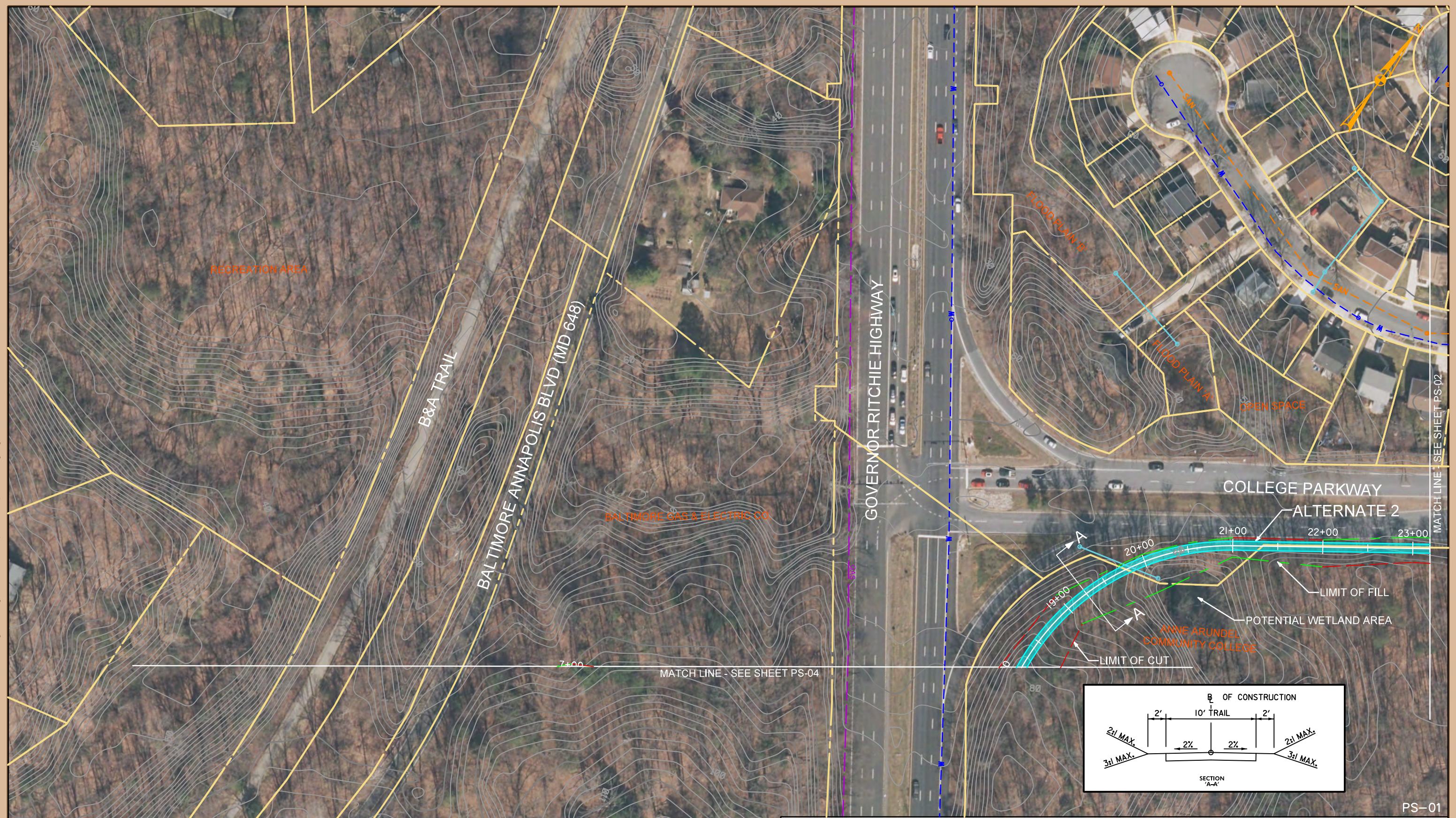
<b>CATEGORY 6</b>				
Concrete Curb and Gutter	400	LF	\$30	\$12,000
Concrete Sidewalk - 5 Inch Thickness	1,500	SF	\$8	\$12,000
Detectable Warning Surface for Ramps	300	SF	\$40	\$12,000
<b>Sub-total</b>				<b>\$36,000</b>

<b>CATEGORY 7</b>				
2% of Category 2, 4, 5 & 6				<b>\$72,715</b>

<b>CATEGORY 8</b>				
Utility Relocations (TBD)				
<b>Sub-total</b>				<b>\$0</b>

<b>NEAT SUB-TOTAL</b>	<b>\$6,253,466</b>
30% Contingency	\$1,876,040
<b>TOTAL</b>	<b>\$8,129,506</b>

Wednesday, May 11, 2016 AT 02:06 PM  
 \\balisr-v02\2011\11036-AAC00E\Task 57 - Ped Bridge Study\Cadd\Plans\pPS02-A-ped-study.dgn



PS-01

**RK&K**  
 Engineers | Construction Managers | Planners | Scientists  
 81 MOSHER STREET | BALTIMORE, MD 21217  
 PH: (410) 728-2900 FAX: (410) 728-3160

REVISED			
NO.	DESCRIPTION	DATE	BY

APPROVED	DATE	APPROVED	DATE
CHIEF ENGINEER		PROJECT MANAGER	
APPROVED	DATE	APPROVED	DATE
ASSISTANT CHIEF ENGINEER		CHIEF RIGHT-OF-WAY	

SCALE: 1" = 100'
DRAWN BY: TMB
CHECKED BY: TMB
SHEET NO. 1 OF 19
PROJECT NO: H563900
PROPOSAL NO: H563902

**SITE PLAN**  
**B&A TRAIL CONNECTOR STUDY**  
 PREPARED MAY 2016

MATCH LINE - SEE SHEET PS-02

MATCH LINE - SEE SHEET PS-04

Thursday, May 05, 2016 AT 03:04 PM  
 \\balisrv02\sv201\2011\11036\_AA000E\Task 57 - Ped Bridge Study\Cadd\Plans\pPS02\_B\_ped-study.dgn



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REVISED				APPROVED	DATE	APPROVED	DATE	SCALE: 1" = 100'
NO.	DESCRIPTION	DATE	BY					DRAWN BY: TMB
				CHIEF ENGINEER		PROJECT MANAGER		CHECKED BY: TMB
				APPROVED	DATE	APPROVED	DATE	SHEET NO. 2 OF 19
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								PROPOSAL NO: H563902

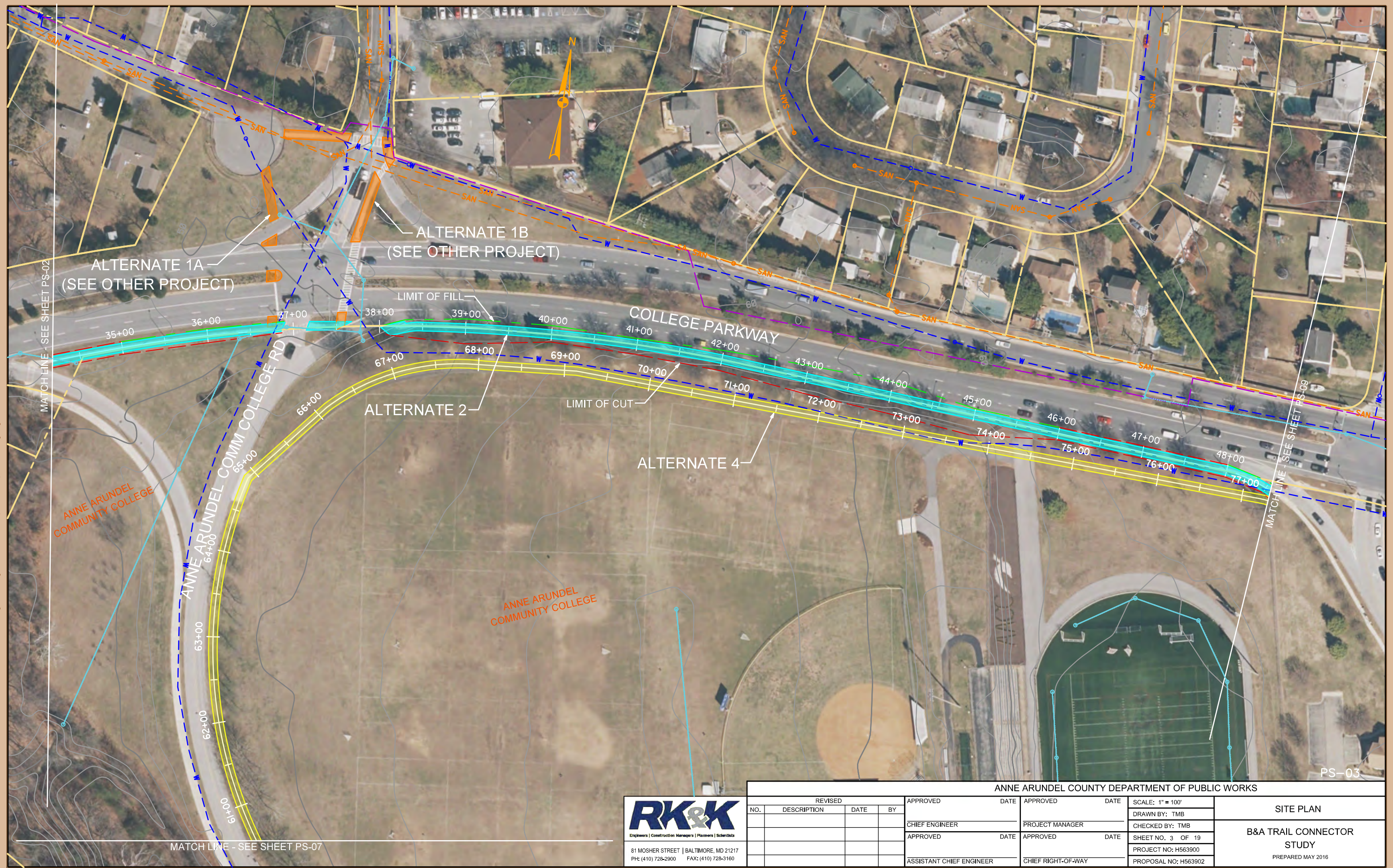
ANNE ARUNDEL COUNTY DEPARTMENT OF PUBLIC WORKS

**SITE PLAN**

**B&A TRAIL CONNECTOR STUDY**

PREPARED MAY 2016

Thursday, May 05, 2016 AT 03:18 PM  
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MATCH LINE - SEE SHEET PS-07

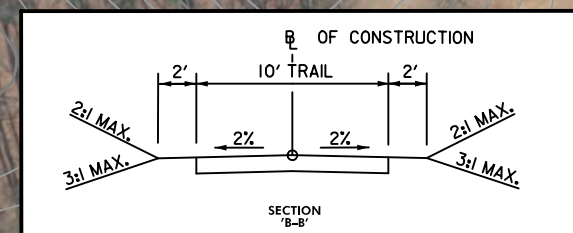
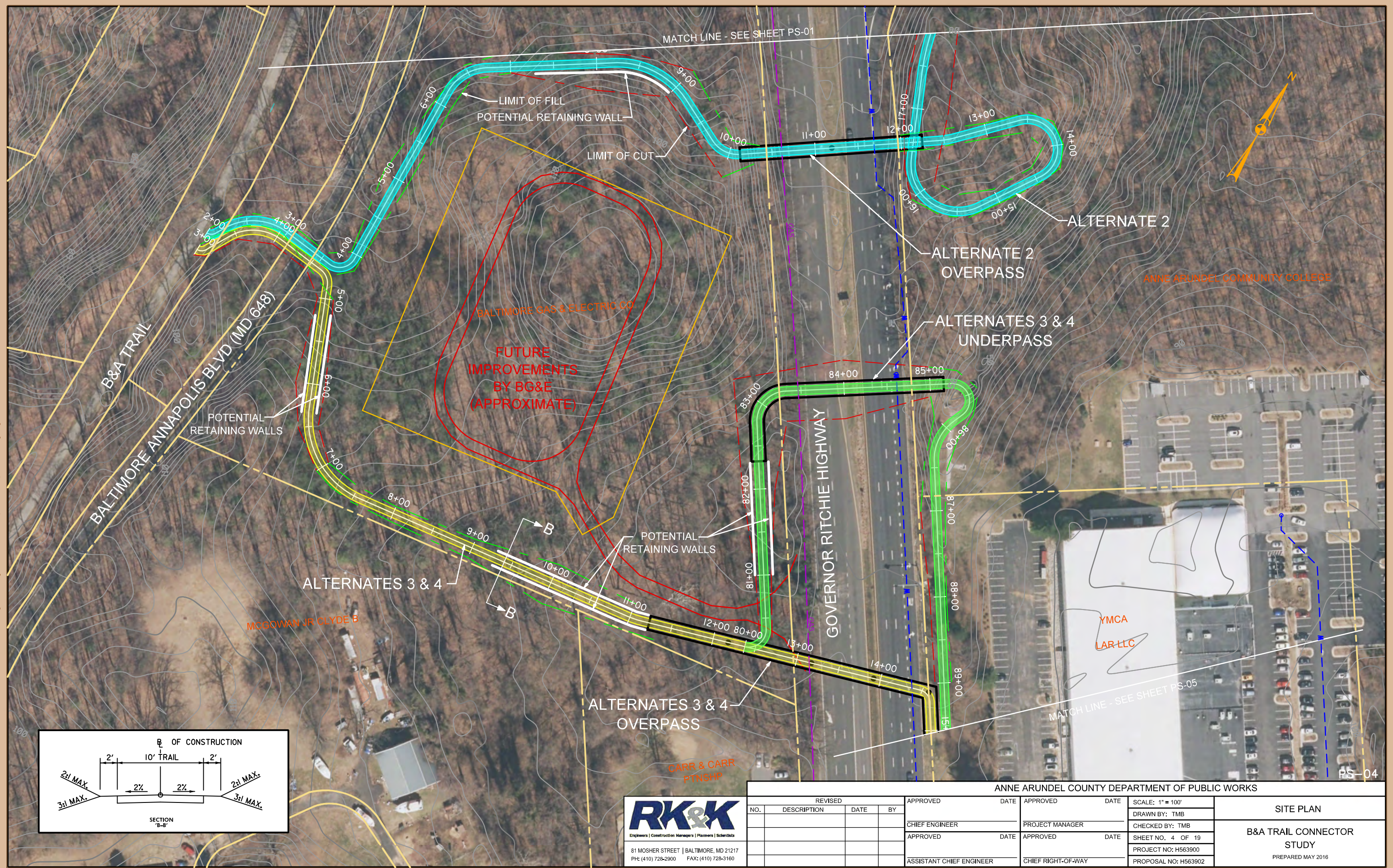
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REVISED				APPROVED		APPROVED		SCALE: 1" = 100'		SITE PLAN
NO.	DESCRIPTION	DATE	BY	DATE	DATE	DATE	DATE	DRAWN BY: TMB		
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				APPROVED	DATE	APPROVED	DATE	SHEET NO. 3 OF 19		
				ASSISTANT CHIEF ENGINEER		CHIEF RIGHT-OF-WAY		PROJECT NO: H563900		
								PROPOSAL NO: H563902		

B&A TRAIL CONNECTOR STUDY  
 PREPARED MAY 2016

Thursday, May 05, 2016 AT 04:33 PM  
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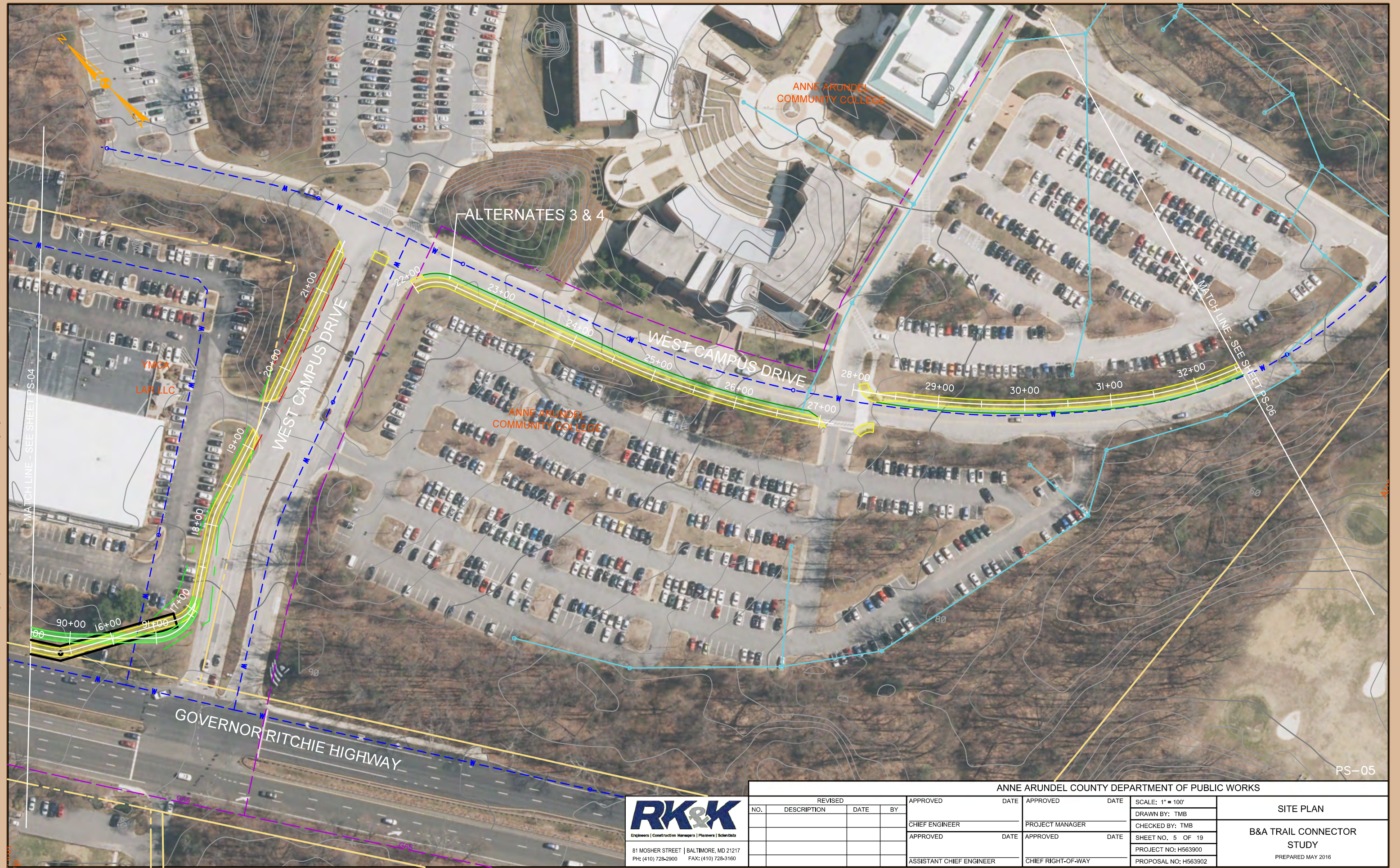


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REVISED				APPROVED		APPROVED		SCALE: 1" = 100'	
NO.	DESCRIPTION	DATE	BY	DATE	DATE	DATE	DATE	DRAWN BY: TMB	SITE PLAN  B&A TRAIL CONNECTOR STUDY PREPARED MAY 2016
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				APPROVED	DATE	APPROVED	DATE	SHEET NO. 4 OF 19	
				ASSISTANT CHIEF ENGINEER		CHIEF RIGHT-OF-WAY		PROJECT NO: H563900 PROPOSAL NO: H563902	

PS-04

Monday, May 09, 2016 AT 01:21 PM  
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PS-05

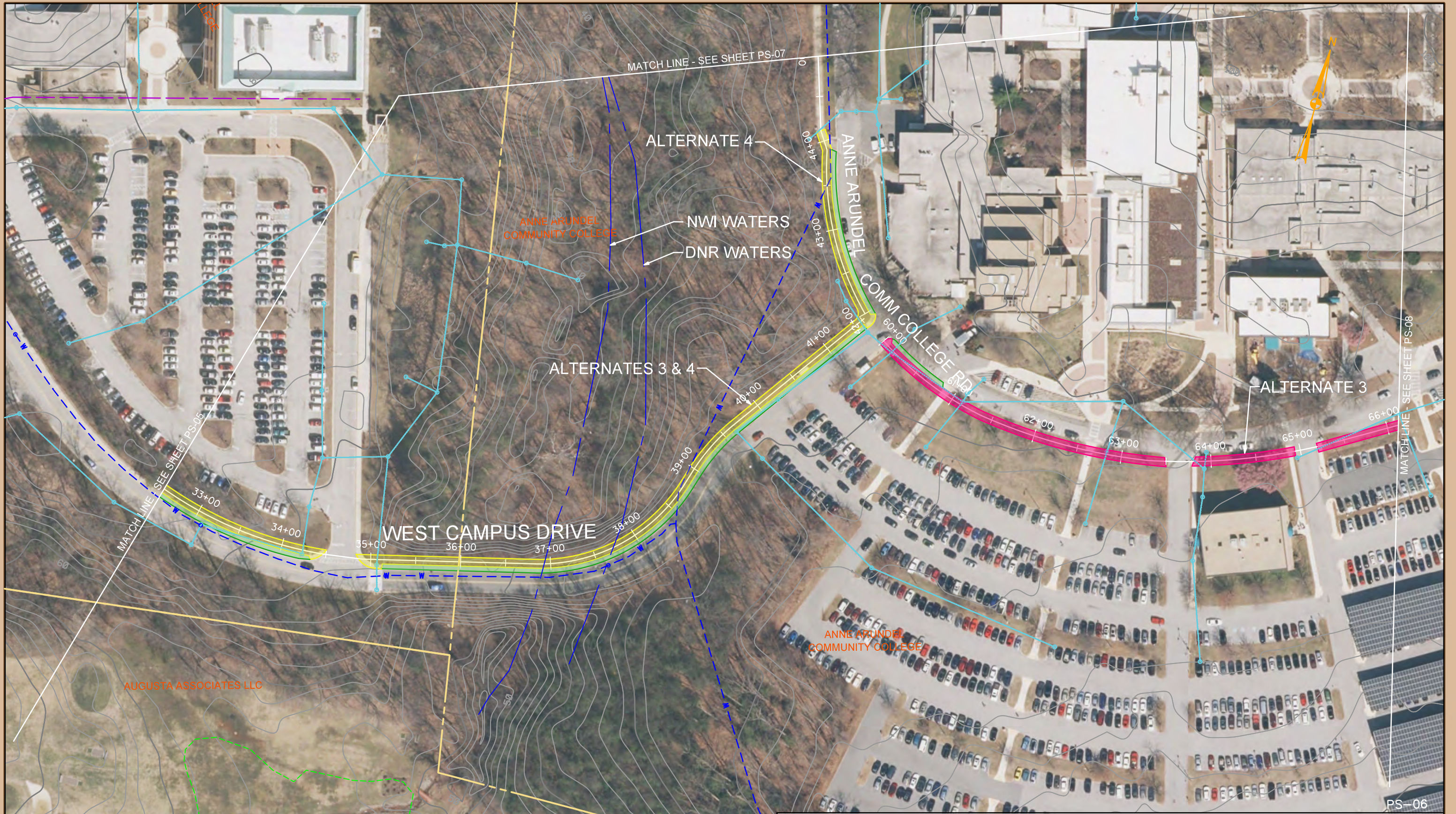
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 81 MOSHER STREET | BALTIMORE, MD 21217  
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REVISED			APPROVED	DATE	APPROVED	DATE	SCALE: 1" = 100'
NO.	DESCRIPTION	DATE	BY				
				CHIEF ENGINEER		PROJECT MANAGER	DRAWN BY: TMB
				APPROVED	DATE	APPROVED	CHECKED BY: TMB
				ASSISTANT CHIEF ENGINEER		CHIEF RIGHT-OF-WAY	SHEET NO. 5 OF 19
							PROJECT NO: H563900
							PROPOSAL NO: H563902

**SITE PLAN**  
**B&A TRAIL CONNECTOR STUDY**  
 PREPARED MAY 2016

Thursday, May 05, 2016 AT 05:10 PM  
 \\balisrv02\sv2011\2011\11036\_AACoOE\Task 57 - Ped Bridge Study\Cadd\Plans\pPS02\_F\_ped-study.dgn



NWI WETLANDS

AUGUSTA ASSOCIATES LLC

WEST CAMPUS DRIVE

ANNE ARUNDEL  
COMMUNITY COLLEGE

ANNE ARUNDEL  
COMM COLLEGE RD

MATCH LINE - SEE SHEET PS-07

PS-06

ALTERNATE 4

NWI WATERS

DNR WATERS

ALTERNATES 3 & 4

ALTERNATE 3

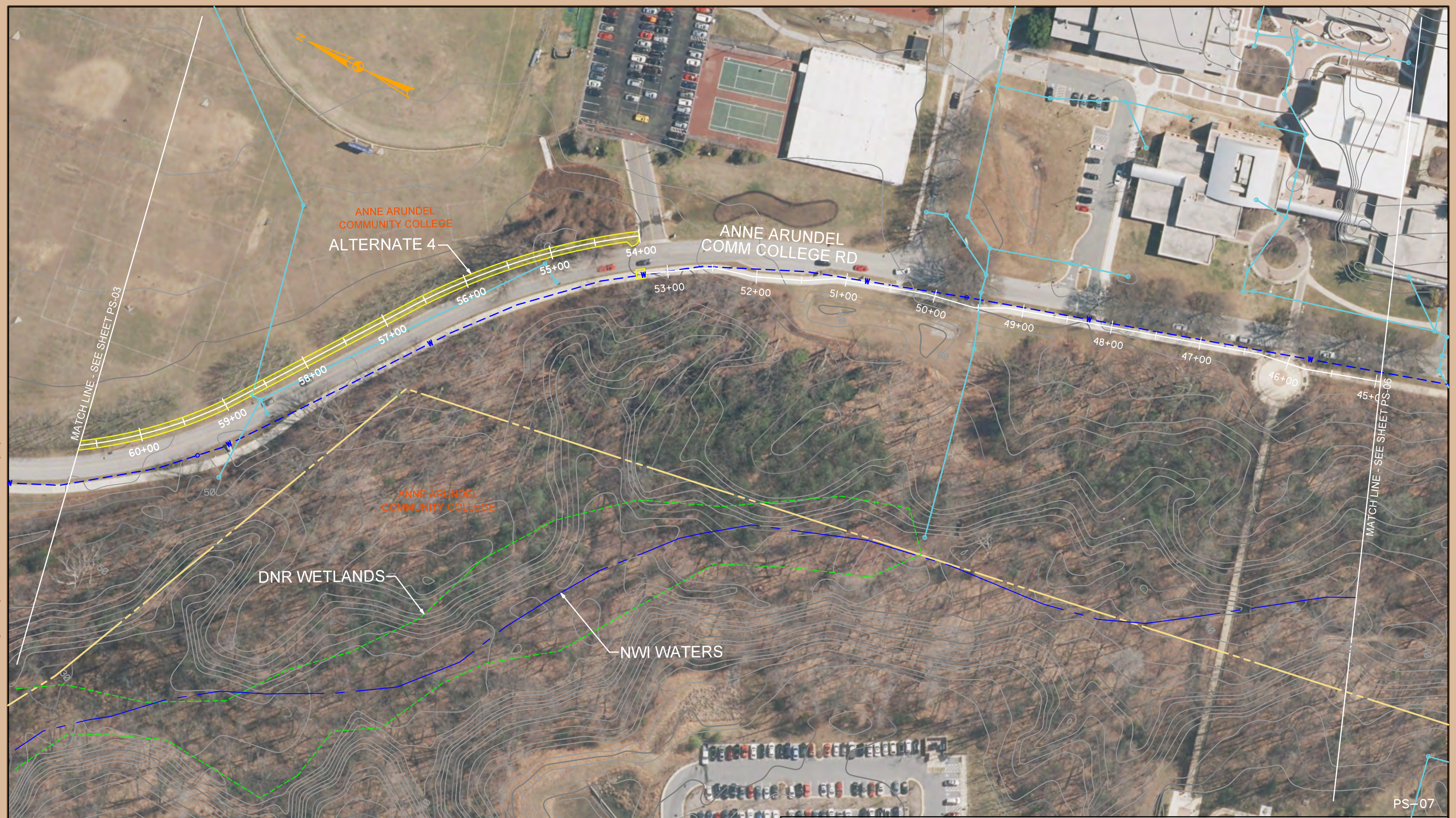



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REVISED				APPROVED		APPROVED		SCALE: 1" = 100'		SITE PLAN  B&A TRAIL CONNECTOR STUDY PREPARED MAY 2016
NO.	DESCRIPTION	DATE	BY	DATE	DATE	DATE	DATE	DRAWN BY: TMB		
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				APPROVED	DATE	APPROVED	DATE	SHEET NO. 6 OF 19		
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								PROPOSAL NO: H563902		

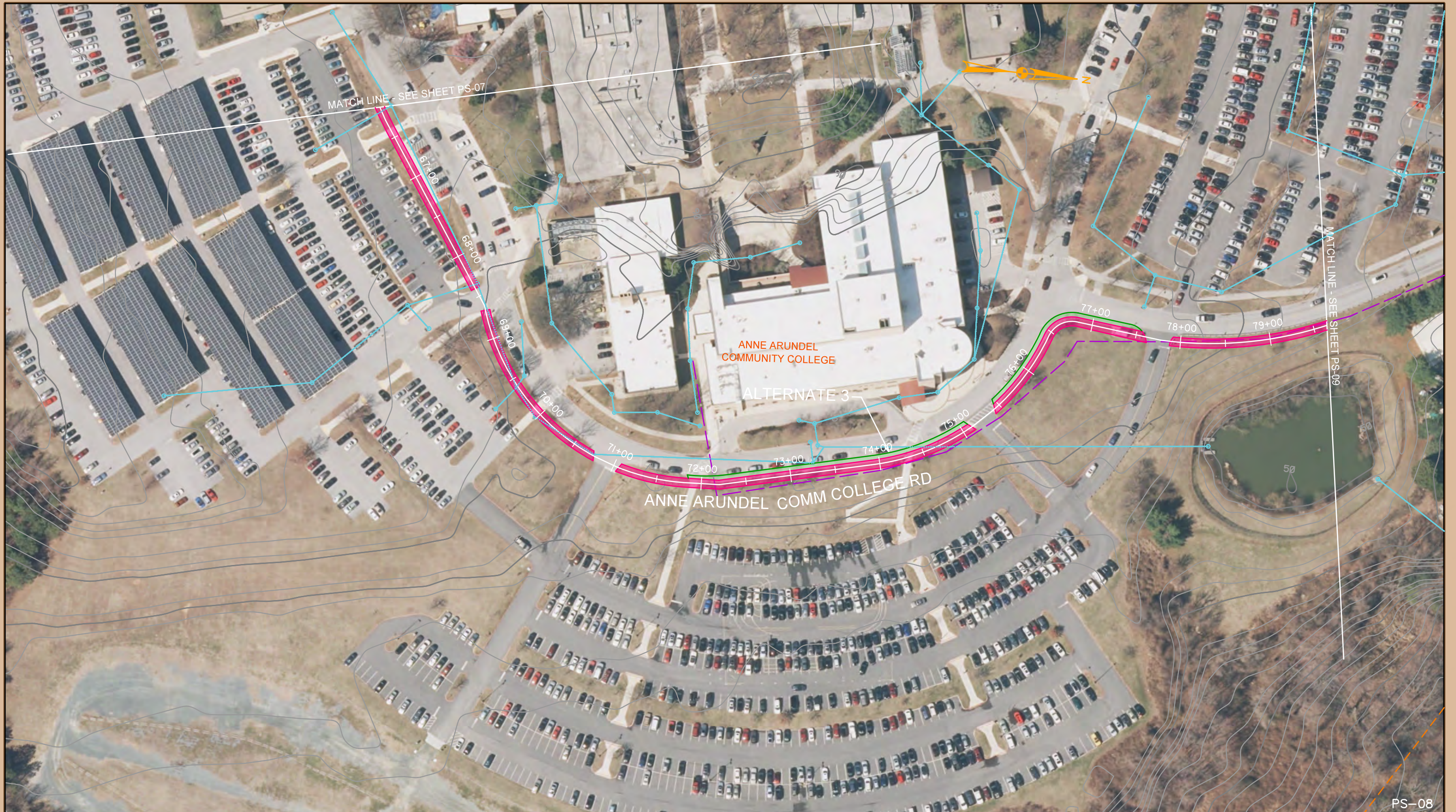


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<b>ANNE ARUNDEL COUNTY DEPARTMENT OF PUBLIC WORKS</b>													
REVISED				APPROVED		DATE		APPROVED		DATE			
NO.	DESCRIPTION	DATE	BY	CHIEF ENGINEER		PROJECT MANAGER		SCALE: 1" = 100'		<b>SITE PLAN</b>  <b>B&amp;A TRAIL CONNECTOR STUDY</b> PREPARED MAY 2016			
				APPROVED		DATE		APPROVED				DATE	
				ASSISTANT CHIEF ENGINEER		CHIEF RIGHT-OF-WAY		SHEET NO. 7 OF 19				PROJECT NO: H563900	
 Engineers   Construction Managers   Planners   Scientists 81 MOSHER STREET   BALTIMORE, MD 21217 PH: (410) 728-2900 FAX: (410) 728-3160				APPROVED		DATE		APPROVED		DATE			
				ASSISTANT CHIEF ENGINEER		CHIEF RIGHT-OF-WAY		PROPOSAL NO: H563902					

Thursday, May 05, 2016 AT 05:23 PM  
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PS-08

ANNE ARUNDEL COUNTY DEPARTMENT OF PUBLIC WORKS



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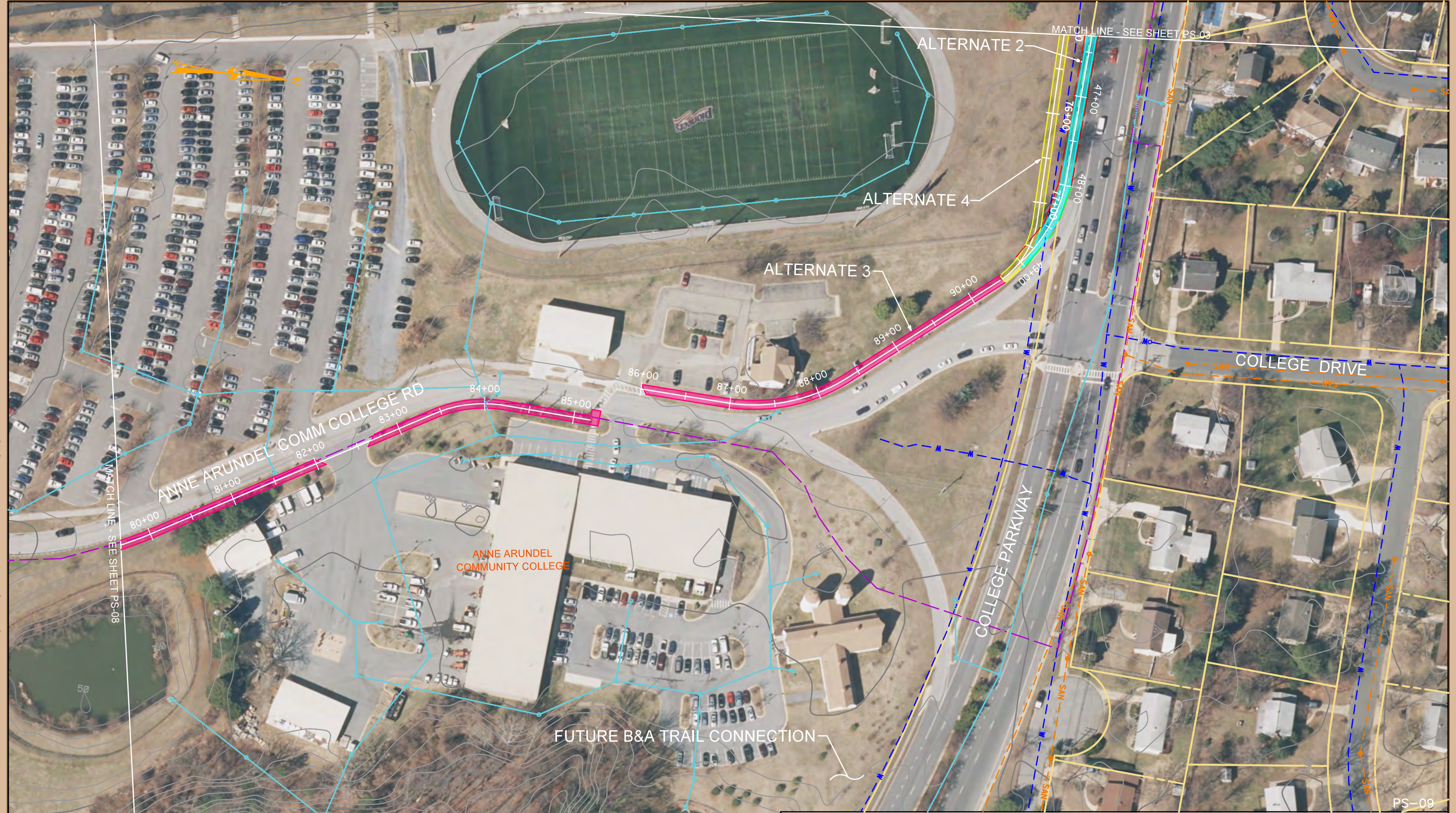
REVISED			
NO.	DESCRIPTION	DATE	BY

APPROVED	DATE	APPROVED	DATE
CHIEF ENGINEER		PROJECT MANAGER	
APPROVED	DATE	APPROVED	DATE
ASSISTANT CHIEF ENGINEER		CHIEF RIGHT-OF-WAY	

SCALE: 1" = 100'
DRAWN BY: TMB
CHECKED BY: TMB
SHEET NO. 8 OF 19
PROJECT NO: H563900
PROPOSAL NO: H563902

SITE PLAN
B&A TRAIL CONNECTOR STUDY
PREPARED MAY 2016

Monday, May 09, 2016 AT 02:11 PM  
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REVISED			
NO.	DESCRIPTION	DATE	BY

APPROVED	DATE
CHIEF ENGINEER	
APPROVED	DATE
ASSISTANT CHIEF ENGINEER	

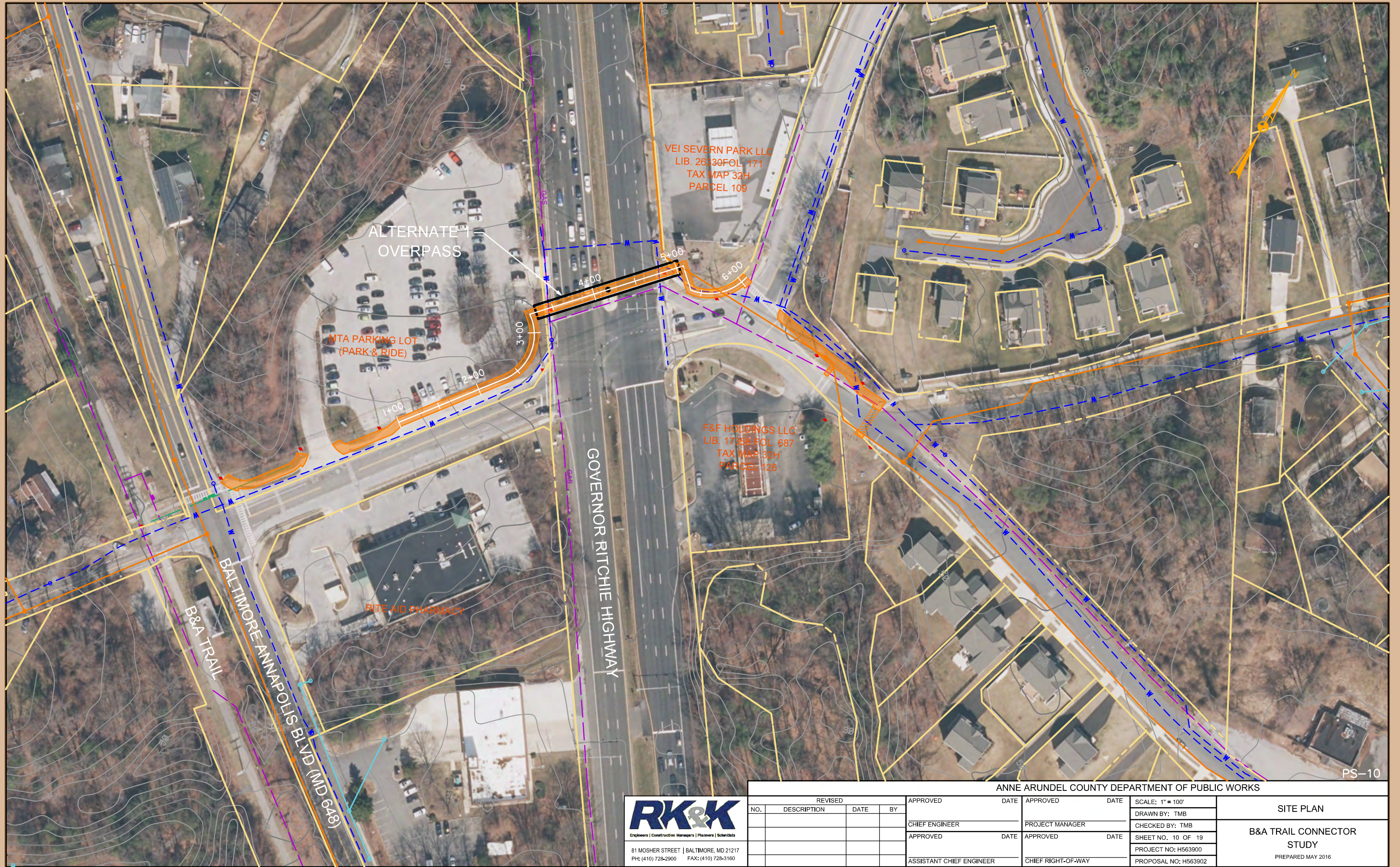
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PROJECT MANAGER	
APPROVED	DATE
CHIEF RIGHT-OF-WAY	

SCALE: 1" = 100'
DRAWN BY: TMB
CHECKED BY: TMB
SHEET NO. 9 OF 19
PROJECT NO: H563900
PROPOSAL NO: H563902

**SITE PLAN**  
**B&A TRAIL CONNECTOR STUDY**  
 PREPARED MAY 2016

PS-09

Thursday, May 05, 2016 AT 05:40 PM  
 \\bdlisrv02\sv2011\2011\11036\_AA00E\Task 57 - Ped Bridge Study\Cadd\Plans\pPS02\_J.ped-study.dgn



PS-10

ANNE ARUNDEL COUNTY DEPARTMENT OF PUBLIC WORKS

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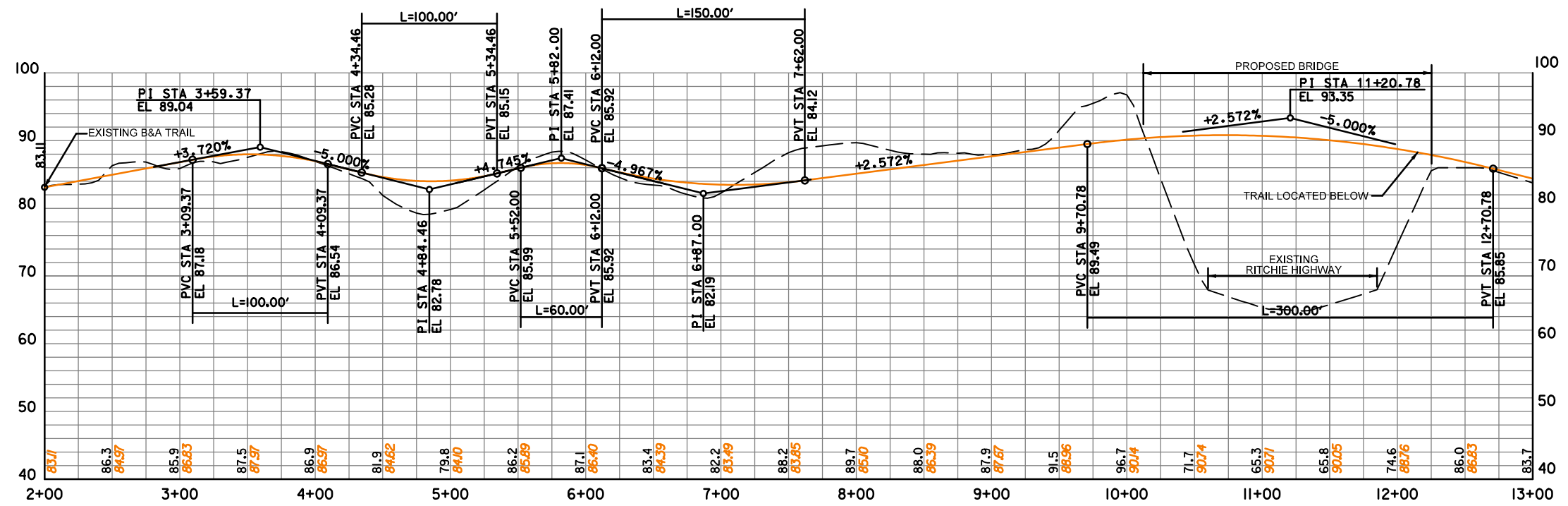
REVISED			
NO.	DESCRIPTION	DATE	BY

APPROVED	DATE	APPROVED	DATE
CHIEF ENGINEER		PROJECT MANAGER	
APPROVED	DATE	APPROVED	DATE
ASSISTANT CHIEF ENGINEER		CHIEF RIGHT-OF-WAY	

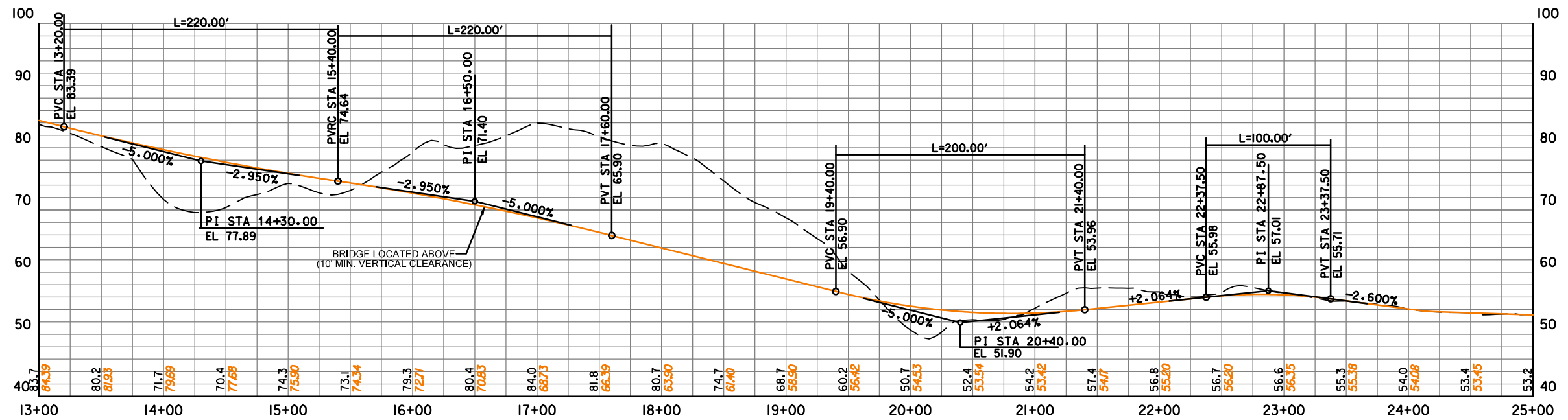
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SHEET NO. 10 OF 19
PROJECT NO: H563900
PROPOSAL NO: H563902

**SITE PLAN**  
**B&A TRAIL CONNECTOR STUDY**  
 PREPARED MAY 2016

Monday, May 09, 2016 AT 10:08 AM  
 \\Balisrv02\2016\2016\11036\_AA000E\Task 57 - Ped Bridge Study\Cadd\Plans\PR02\_A\_ped-study.dgn



ALTERNATE 2 - PROPOSED TRAIL PROFILE



ALTERNATE 2 - PROPOSED TRAIL PROFILE

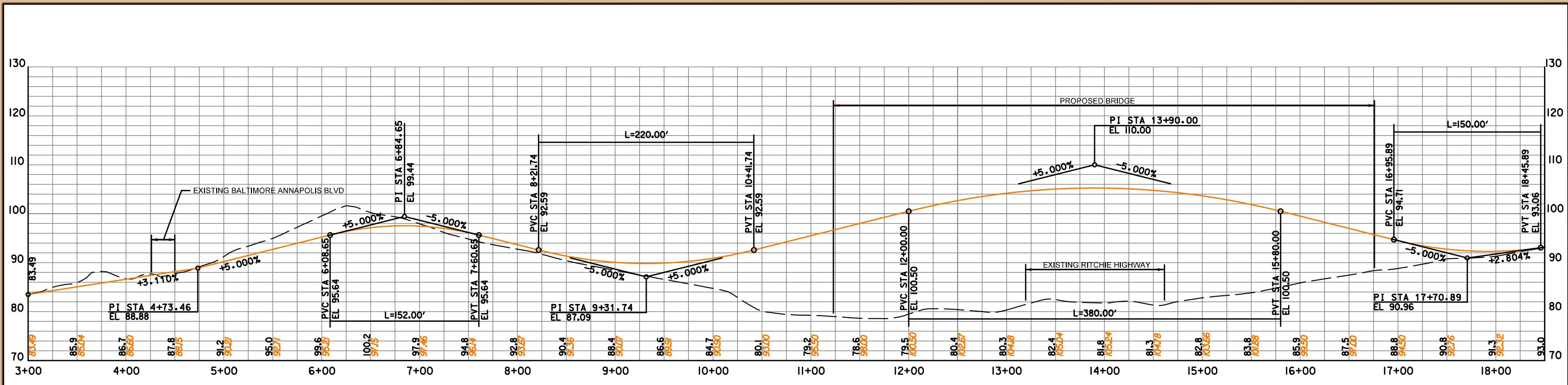
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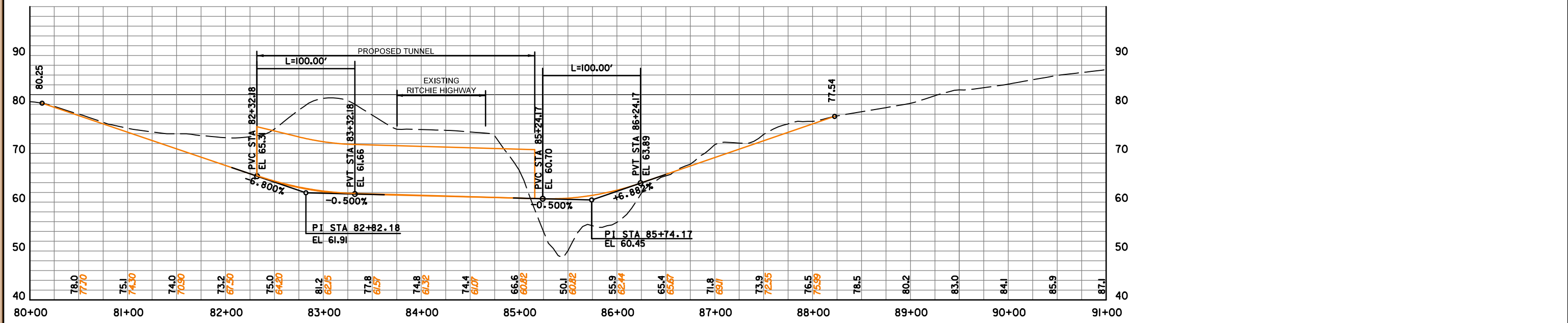
REVISED				APPROVED		APPROVED		APPROVED		APPROVED		APPROVED	
NO.	DESCRIPTION	DATE	BY	DATE	DATE	DATE	DATE	DATE	DATE	DATE	DATE	DATE	DATE

SCALE: 1" = 100'	PROPOSED TRAIL PROFILE
DRAWN BY: TMB	
CHECKED BY: TMB	
SHEET NO. 11 OF 19	
PROJECT NO: H563900	B&A TRAIL CONNECTOR STUDY
PROPOSAL NO: H563902	
	PREPARED MAY 2016


Thursday, May 05, 2016 AT 05:53 PM  
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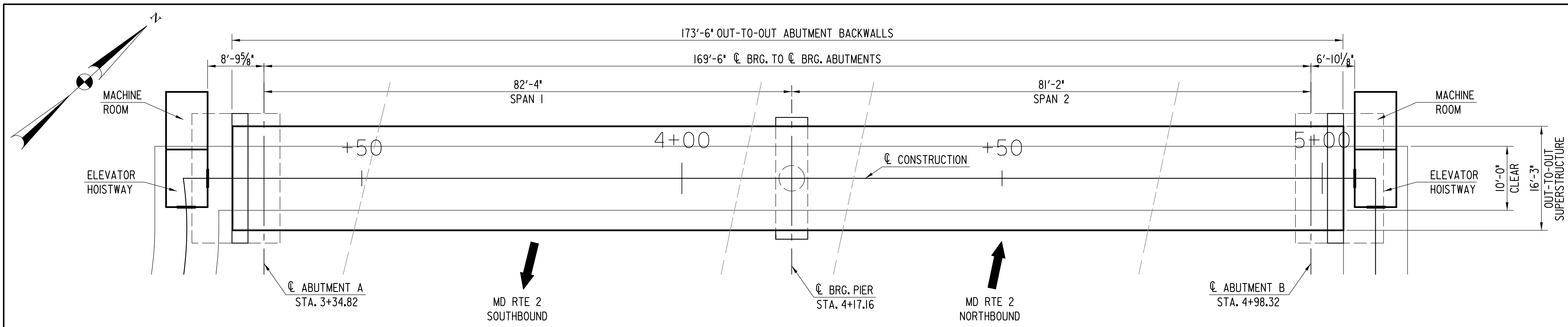


**ALTERNATE 3 & 4 - PROPOSED TRAIL PROFILE (OVERPASS OPTION)**

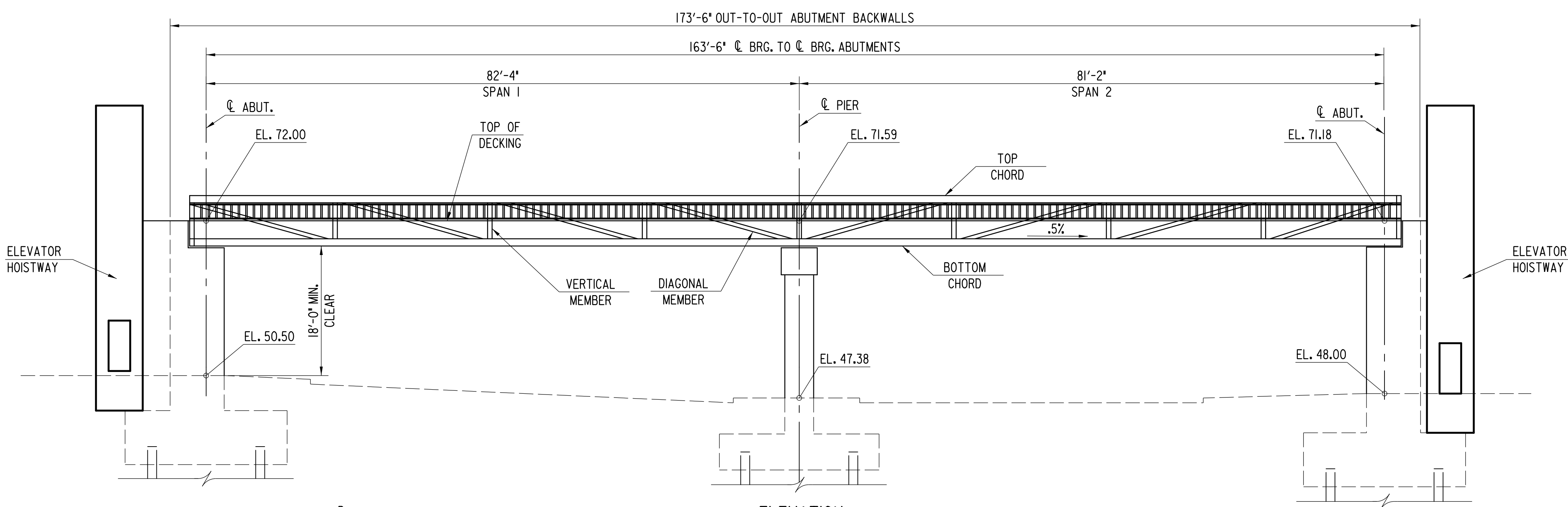


**ALTERNATE 3 & 4 - PROPOSED TRAIL PROFILE (UNDERPASS OPTION)**

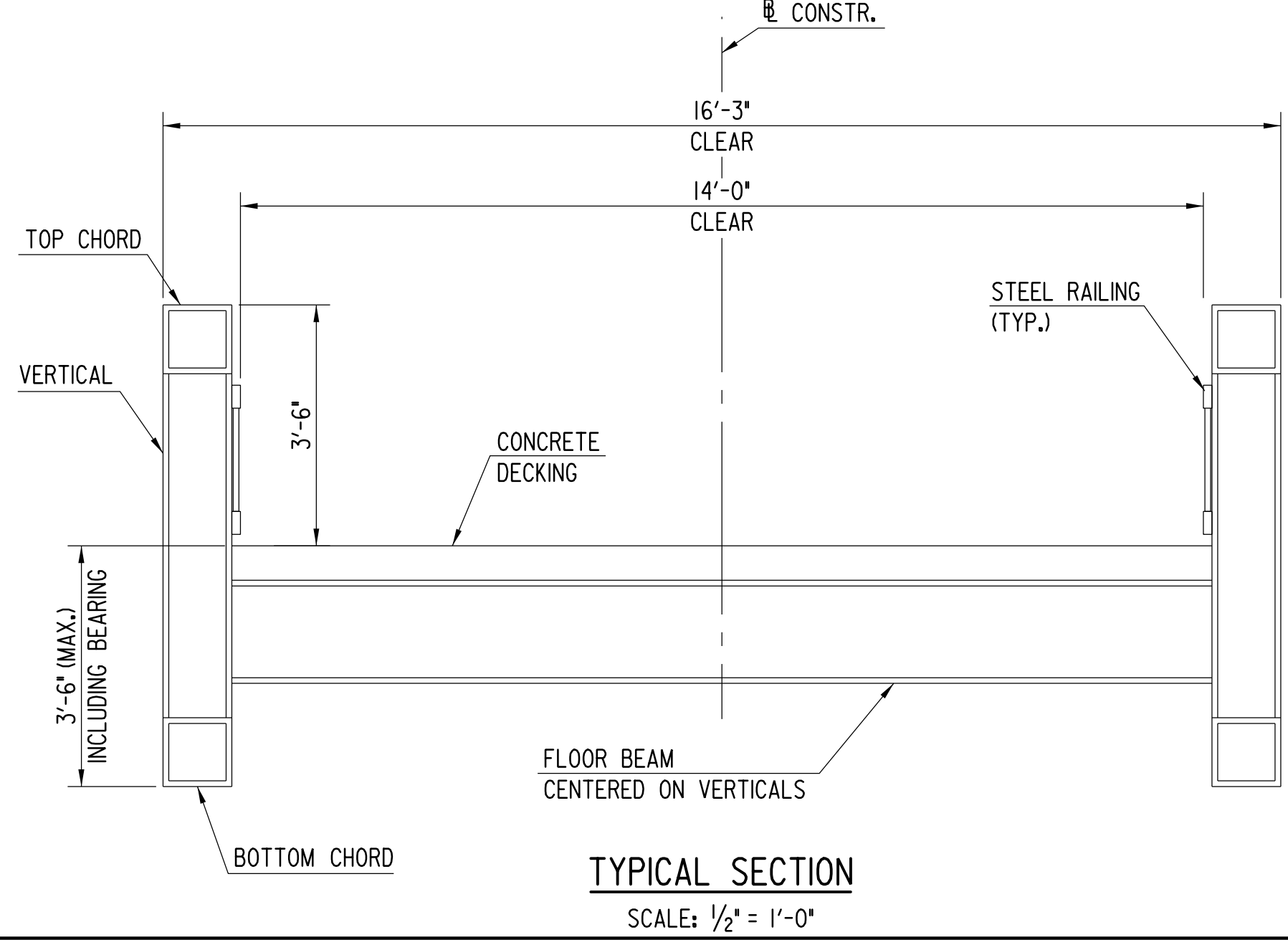
 Engineers   Construction Managers   Planners   Scientists 81 MOSHER STREET   BALTIMORE, MD 21217 PH: (410) 728-2900 FAX: (410) 728-3100		ANNE ARUNDEL COUNTY DEPARTMENT OF PUBLIC WORKS																													
		<table border="1"> <thead> <tr> <th colspan="2">REVISED</th> <th>APPROVED</th> <th>DATE</th> <th>APPROVED</th> <th>DATE</th> </tr> </thead> <tbody> <tr> <td>NO.</td> <td>DESCRIPTION</td> <td>DATE</td> <td>BY</td> <td></td> <td></td> </tr> <tr> <td> </td> <td> </td> <td> </td> <td> </td> <td> </td> <td> </td> </tr> </tbody> </table>		REVISED		APPROVED	DATE	APPROVED	DATE	NO.	DESCRIPTION	DATE	BY									<table border="1"> <tbody> <tr> <td>CHIEF ENGINEER</td> <td>PROJECT MANAGER</td> </tr> <tr> <td>APPROVED</td> <td>APPROVED</td> </tr> <tr> <td>ASSISTANT CHIEF ENGINEER</td> <td>CHIEF RIGHT-OF-WAY</td> </tr> </tbody> </table>		CHIEF ENGINEER	PROJECT MANAGER	APPROVED	APPROVED	ASSISTANT CHIEF ENGINEER	CHIEF RIGHT-OF-WAY	SCALE: 1" = 100' DRAWN BY: TMB CHECKED BY: TMB SHEET NO. 12 OF 19 PROJECT NO: H563900 PROPOSAL NO: H563902	
REVISED		APPROVED	DATE	APPROVED	DATE																										
NO.	DESCRIPTION	DATE	BY																												
CHIEF ENGINEER	PROJECT MANAGER																														
APPROVED	APPROVED																														
ASSISTANT CHIEF ENGINEER	CHIEF RIGHT-OF-WAY																														



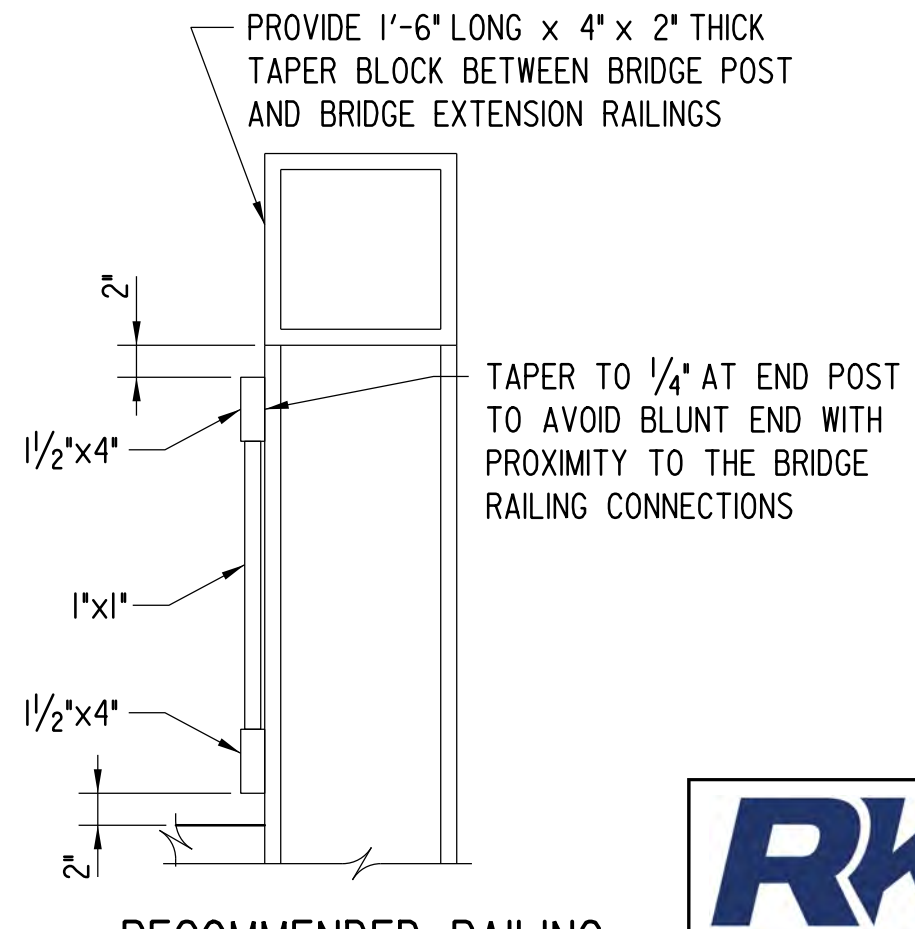
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**ELEVATION**  
SCALE: 1"=20'-0"



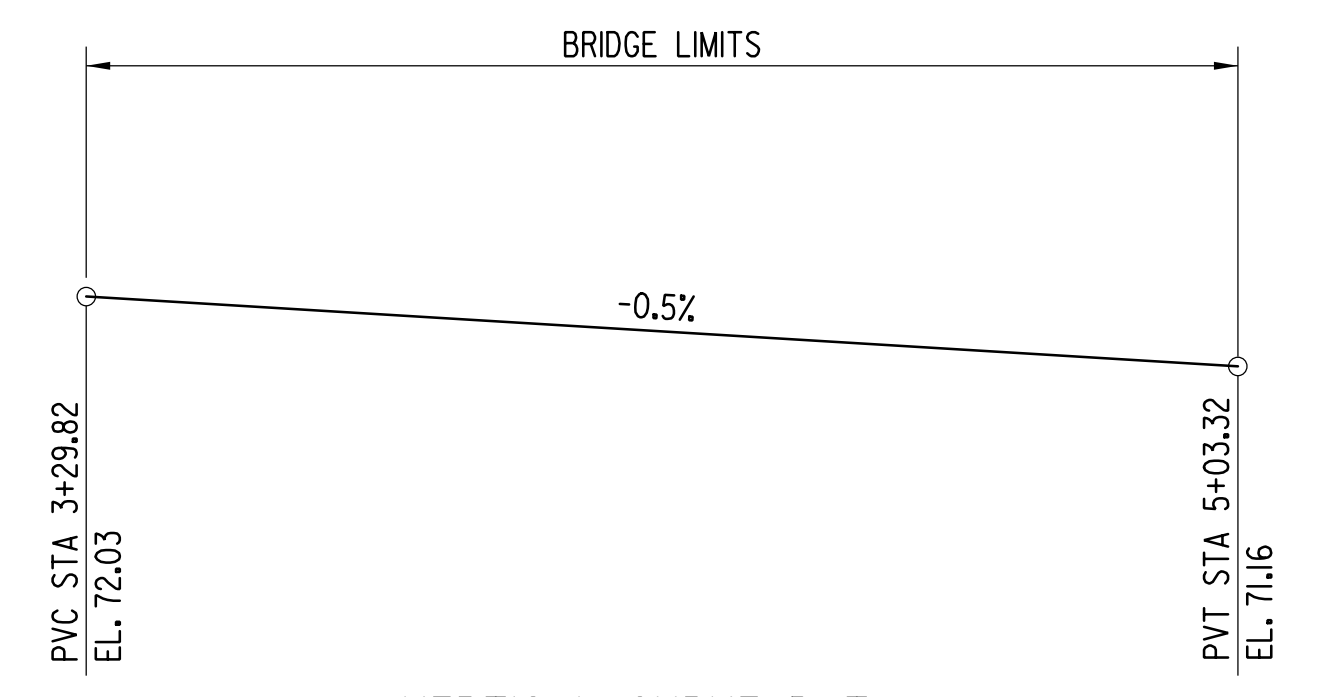
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**RECOMMENDED RAILING**  
SCALE: 1"=1'-0"

**GENERAL NOTES:**

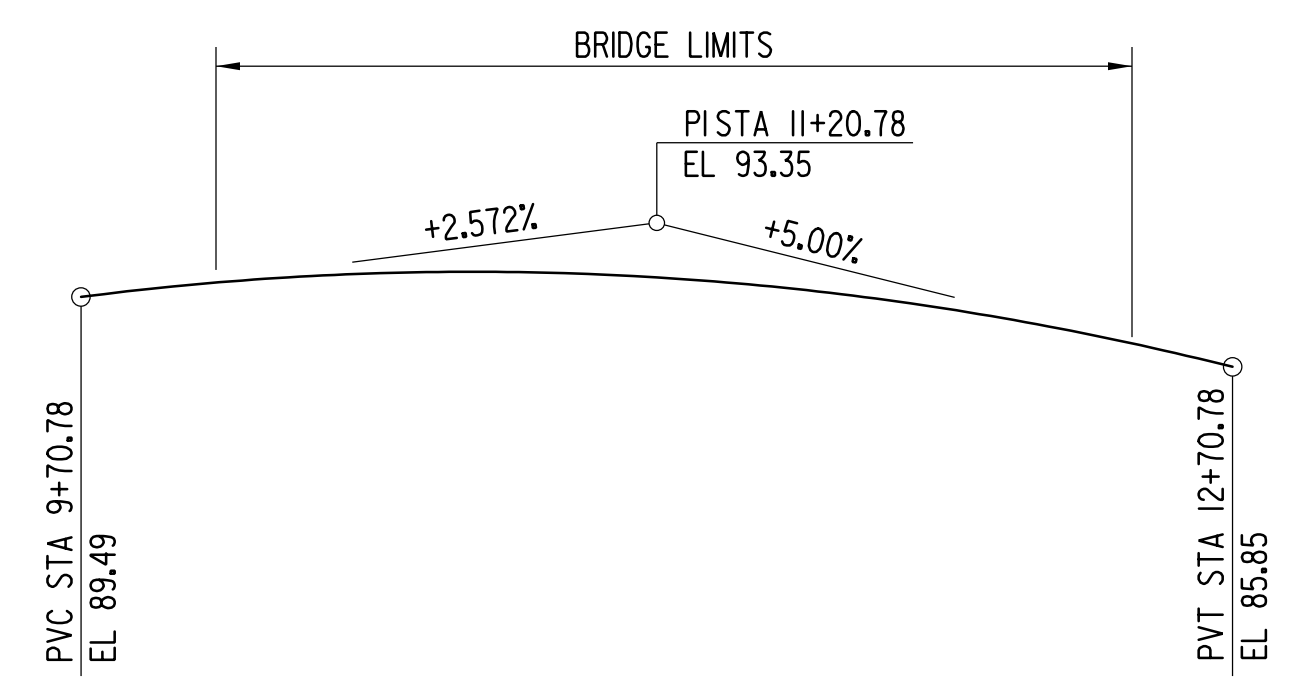
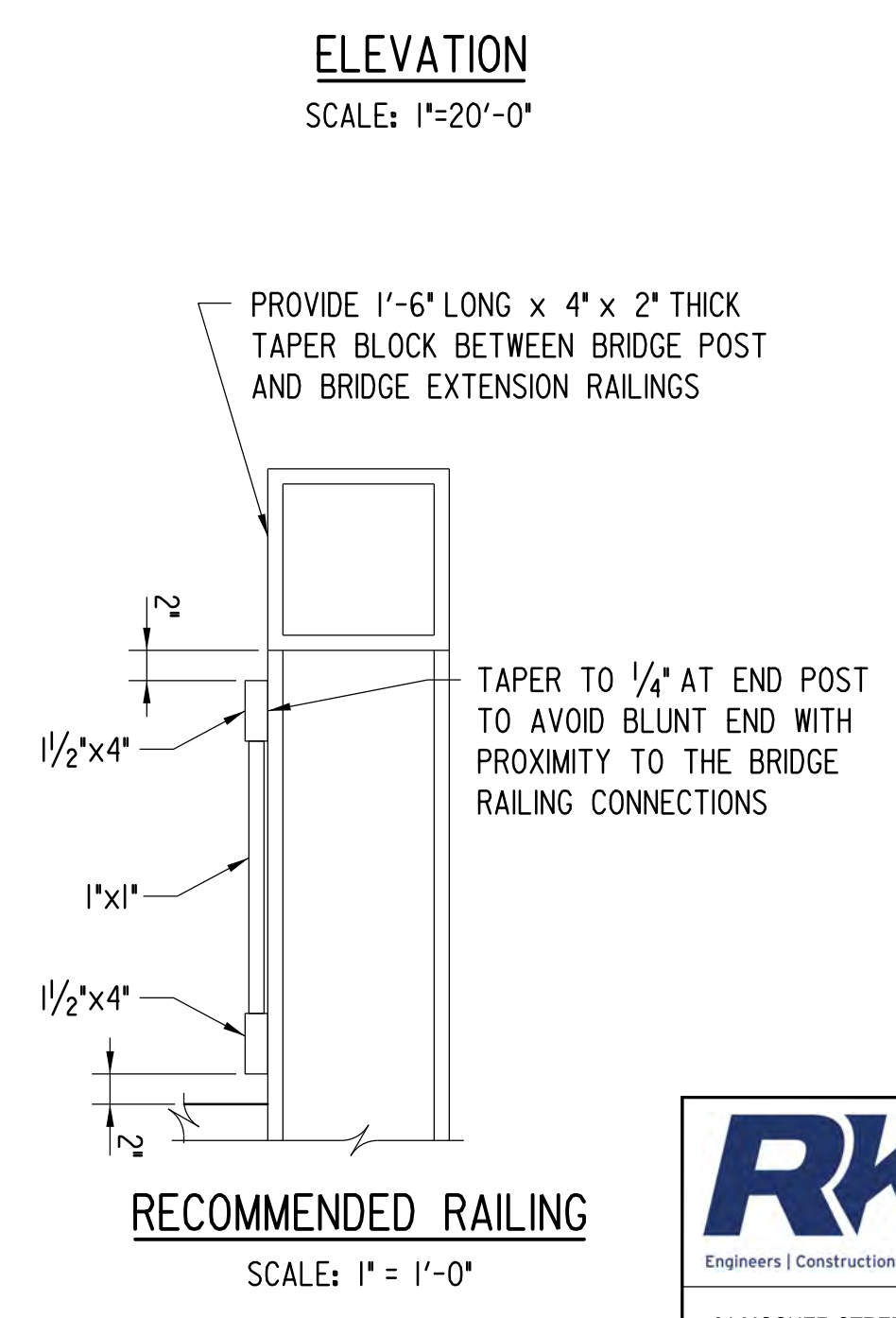
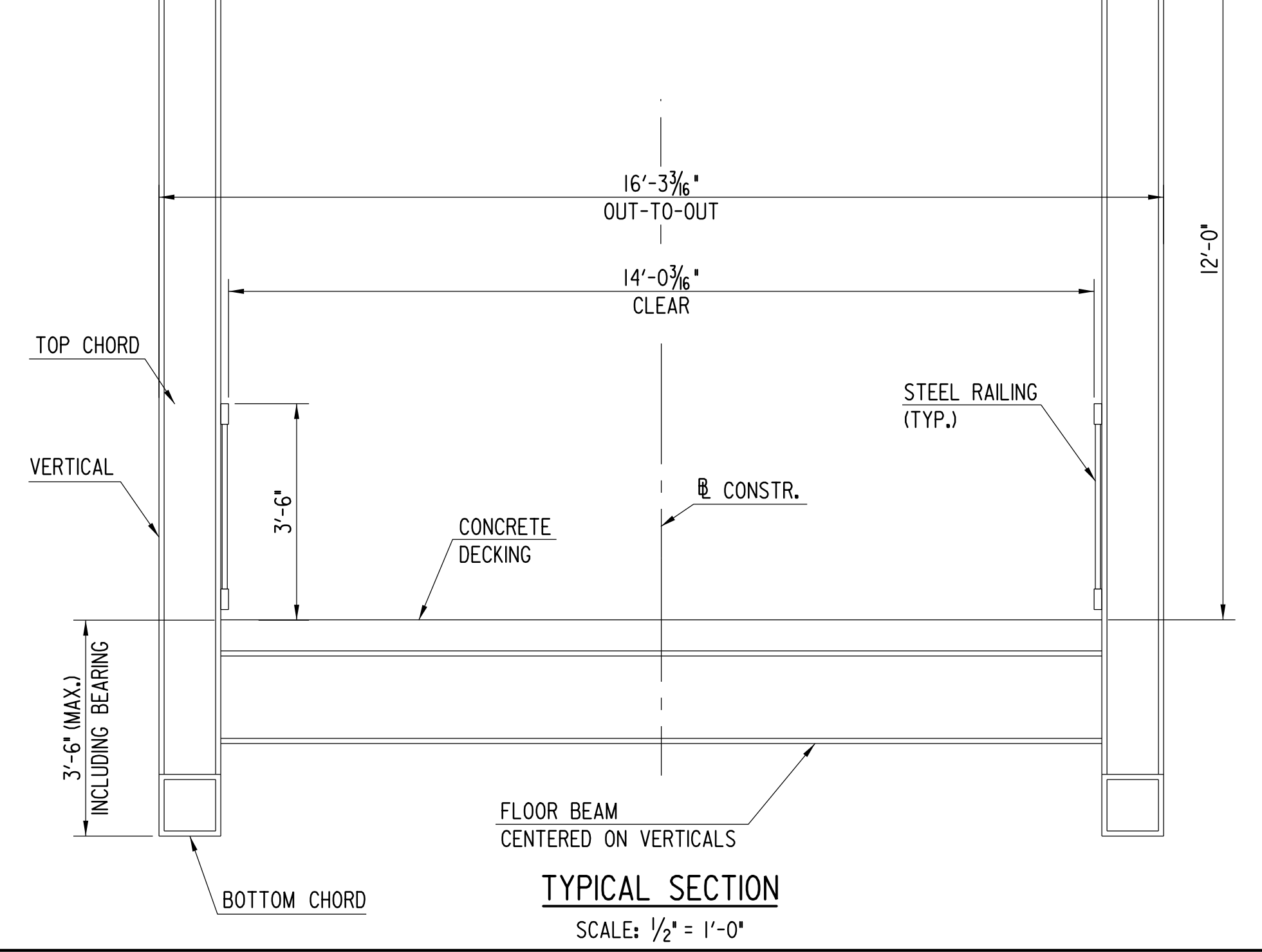
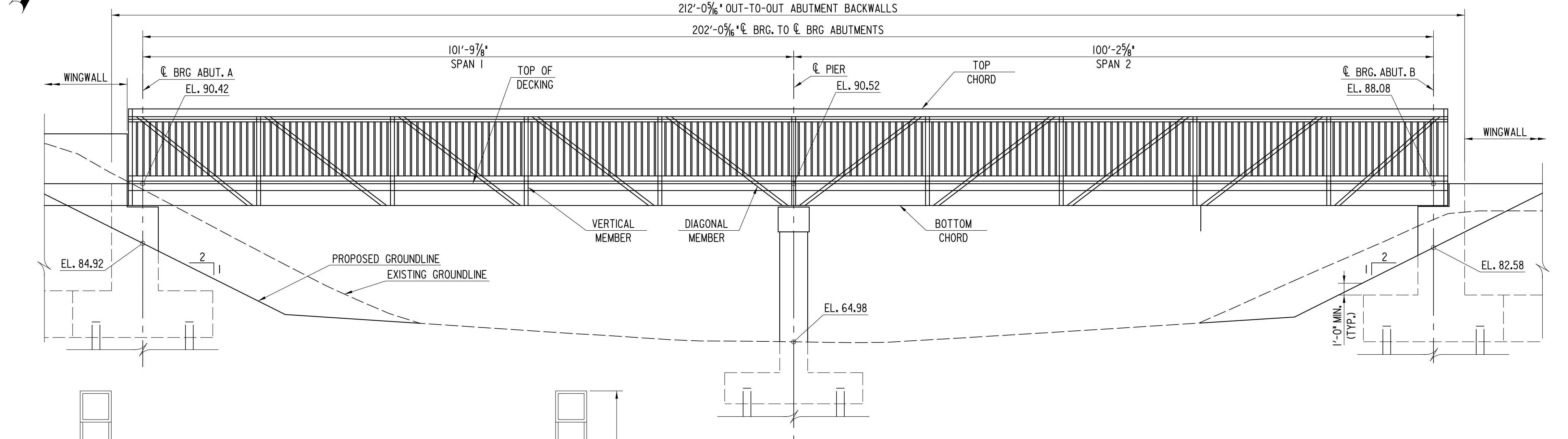
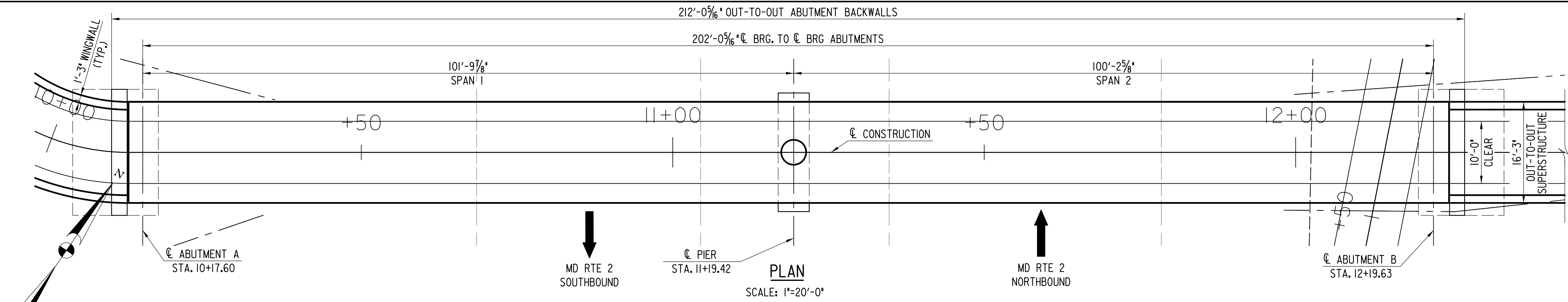
- SPECIFICATIONS:** ANNE ARUNDEL COUNTY, DEPARTMENT OF PUBLIC WORKS STANDARD SPECIFICATIONS FOR CONSTRUCTION DATED JANUARY 2001, INCLUDING REVISIONS THEREOF AND ADDITIONS THERETO AND SPECIAL PROVISIONS FOR MATERIAL AND CONSTRUCTION. ANSI/AASHTO/AWS 1.5 BRIDGE WELDING CODE
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- PAY ITEMS:** STRUCTURE EXCAVATION  
PILING  
AGGREGATE BASE  
SPECIAL ITEM - PREFABRICATED PEDESTRIAN BRIDGE  
CAST-IN-PLACE CONCRETE  
SPECIAL ITEM - ELEVATORS



**VERTICAL CURVE DATA**

\$\$\$DATE\$\$\$  
\$\$\$FILE\$\$\$

<b>ANNE ARUNDEL COUNTY DEPARTMENT OF PUBLIC WORKS</b>										
<b>REVIS</b>			<b>APPROVED</b>		<b>DATE</b>		<b>APPROVED</b>		<b>DATE</b>	
NO.	DESCRIPTION	DATE	BY	CHIEF ENGINEER	PROJECT MANAGER					
				APPROVED	DATE	APPROVED	DATE			
				ASSISTANT CHIEF ENGINEER	CHIEF RIGHT-OF-WAY					
				SCALE: 1" = 100' DRAWN BY: TMB CHECKED BY: TMB SHEET NO. 13 OF 19 PROJECT NO: H563900 PROPOSAL NO: H563902		<b>ALTERNATE 1</b> <b>PEDESTRIAN BRIDGE - GP&amp;E</b> <b>B&amp;A TRAIL CONNECTOR</b> <b>STUDY</b> PREPARED MAY 2016				
81 MOSHER STREET   BALTIMORE, MD 21217 PH: (410) 728-2900 FAX: (410) 728-3100										



- GENERAL NOTES:**
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PILING  
AGGREGATE BASE  
SPECIAL ITEM - PREFABRICATED PEDESTRIAN BRIDGE  
CAST-IN-PLACE CONCRETE

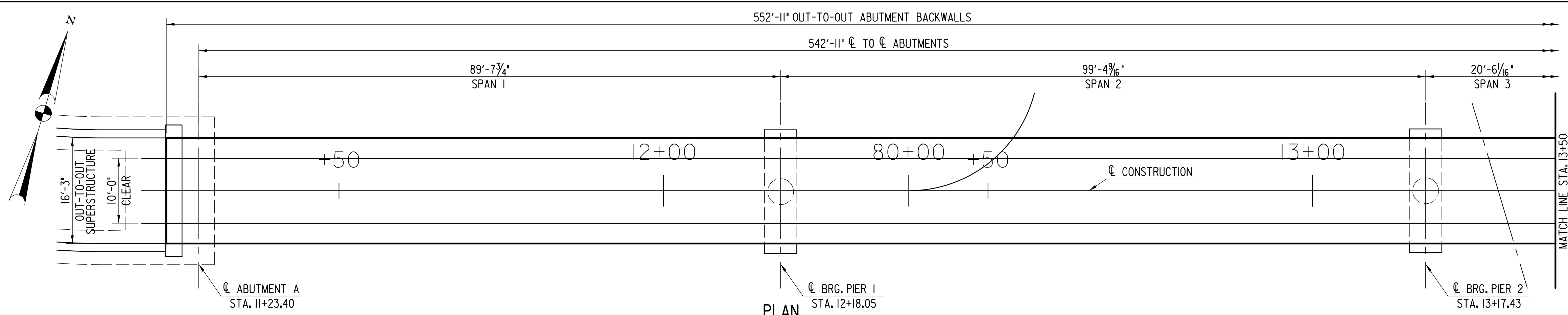
<b>ANNE ARUNDEL COUNTY DEPARTMENT OF PUBLIC WORKS</b>											
<b>REVISI</b>				<b>APPROVED</b>		<b>APPROVED</b>		<b>SCALE: 1" = 100'</b>		<b>ALTERNATE 2</b>	
NO.	DESCRIPTION	DATE	BY	DATE	DATE	DATE	DATE	DRAWN BY: TMB	<b>PEDESTRIAN BRIDGE - GP&amp;E</b>		
				CHIEF ENGINEER				PROJECT MANAGER	<b>B&amp;A TRAIL CONNECTOR</b>		
				APPROVED	DATE	APPROVED	DATE	CHECKED BY: TMB	<b>STUDY</b>		
				ASSISTANT CHIEF ENGINEER		CHIEF RIGHT-OF-WAY		SHEET NO. 14 OF 19	<b>PREPARED MAY 2016</b>		
								PROJECT NO: H563900			
								PROPOSAL NO: H563902			

**RK&K**  
Engineers | Construction Managers | Planners | Scientists

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PH: (410) 728-2900 FAX: (410) 728-3100

\$\$\$DATE\$\$\$  
\$\$\$FILE\$\$\$

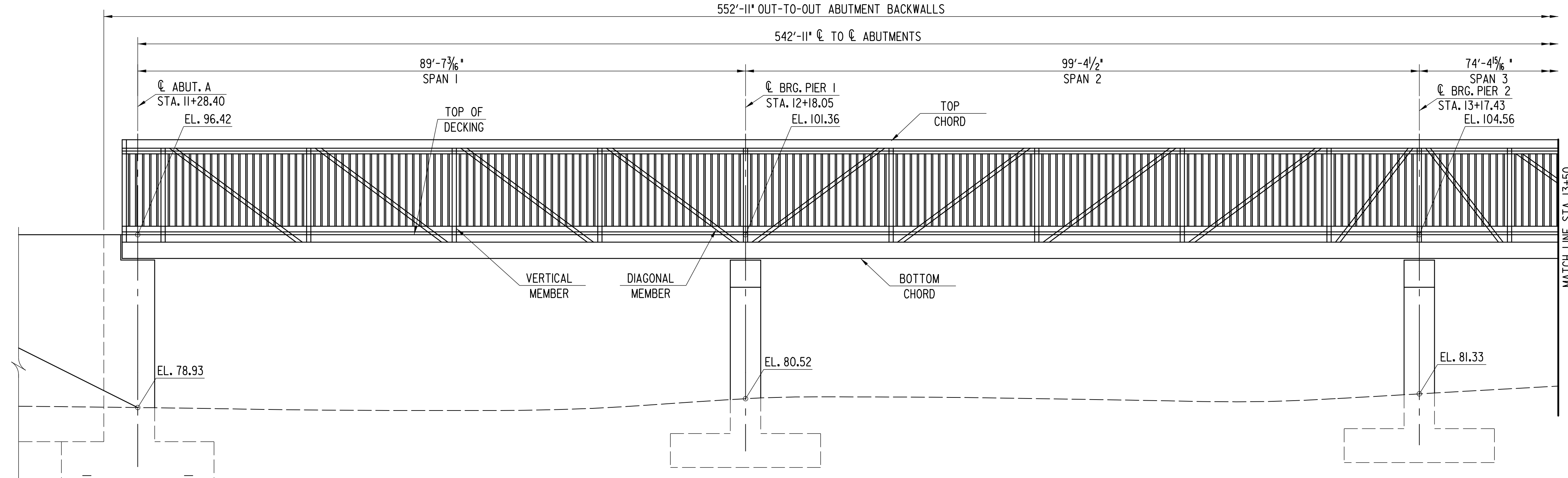




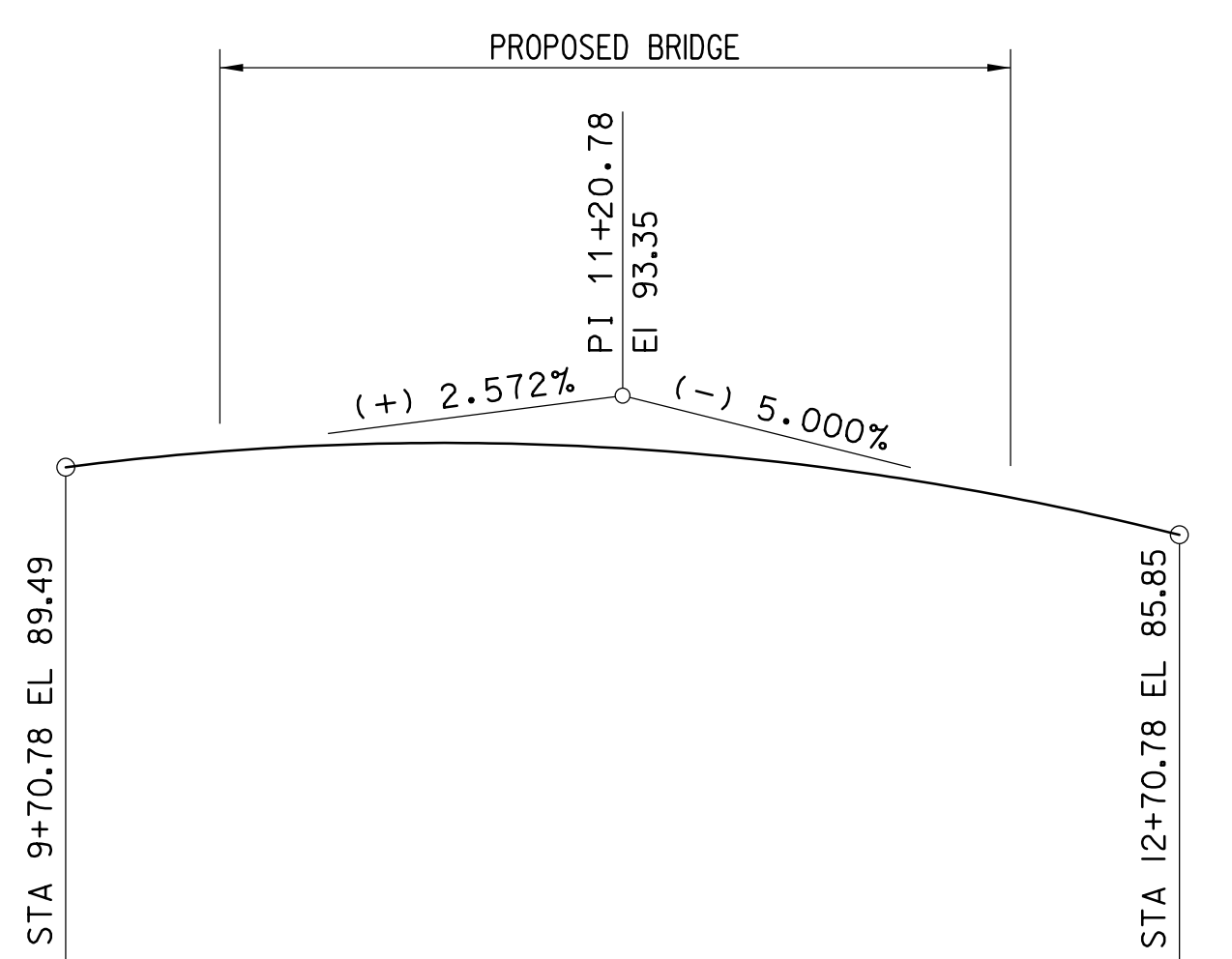
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**GENERAL NOTES:**

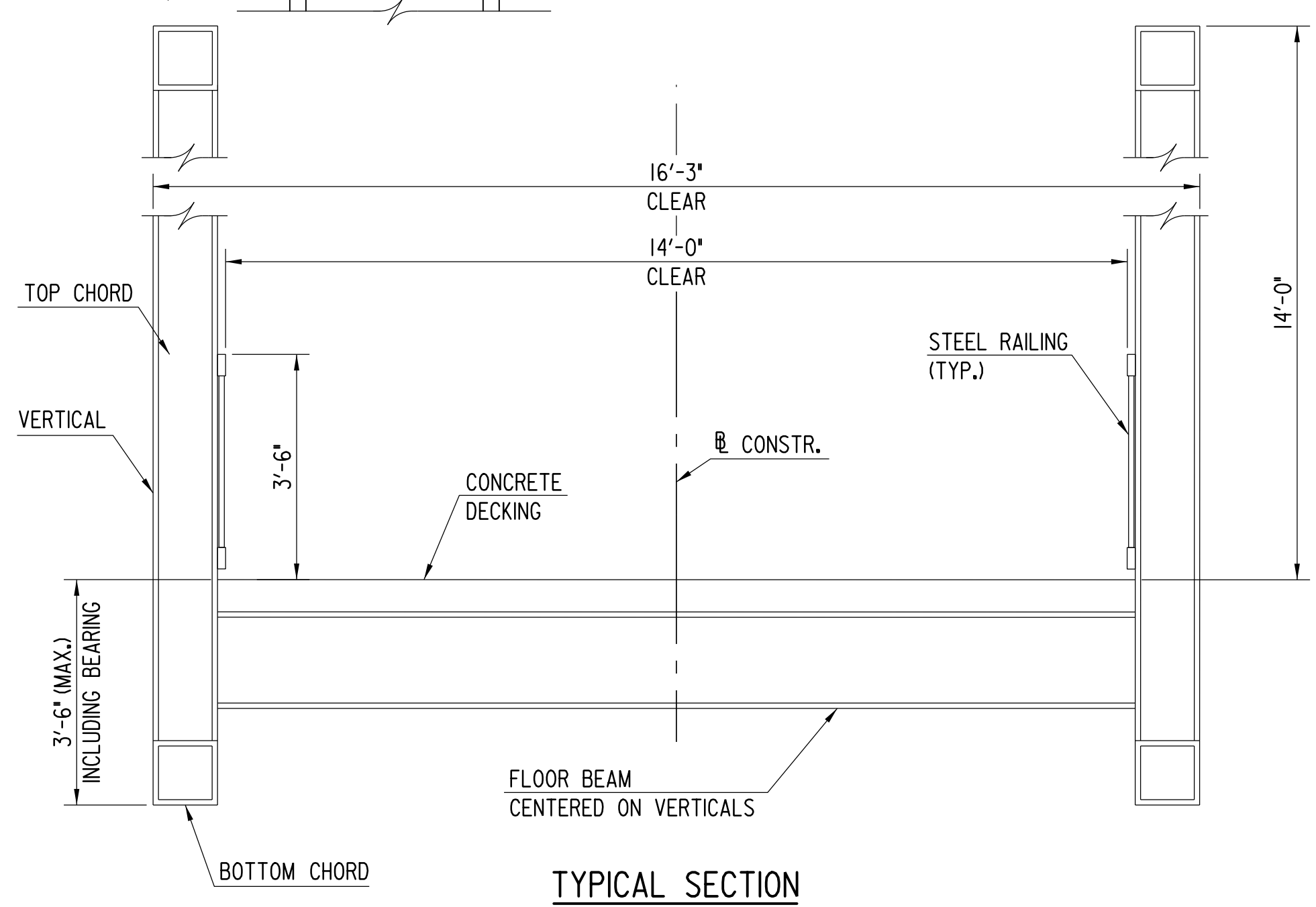
- SPECIFICATIONS:** ANNE ARUNDEL COUNTY, DEPARTMENT OF PUBLIC WORKS STANDARD SPECIFICATIONS FOR CONSTRUCTION DATED JANUARY 2001, INCLUDING REVISIONS THEREOF AND ADDITIONS THERETO AND SPECIAL PROVISIONS FOR MATERIAL AND CONSTRUCTION. ANSI/AASHTO/AWS 1.5 BRIDGE WELDING CODE
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PILING  
AGGREGATE BASE  
SPECIAL ITEM - PREFABRICATED PEDESTRIAN BRIDGE  
CAST-IN-PLACE CONCRETE



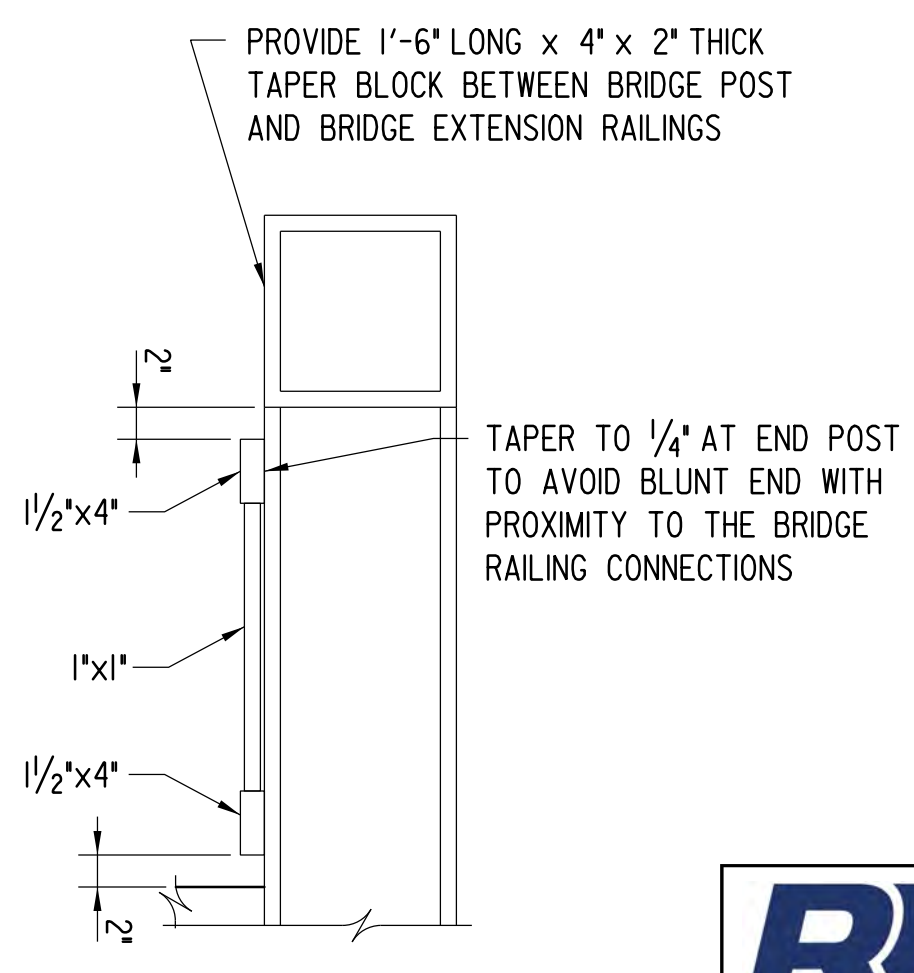
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**VERTICAL CURVE DATA**



**TYPICAL SECTION**  
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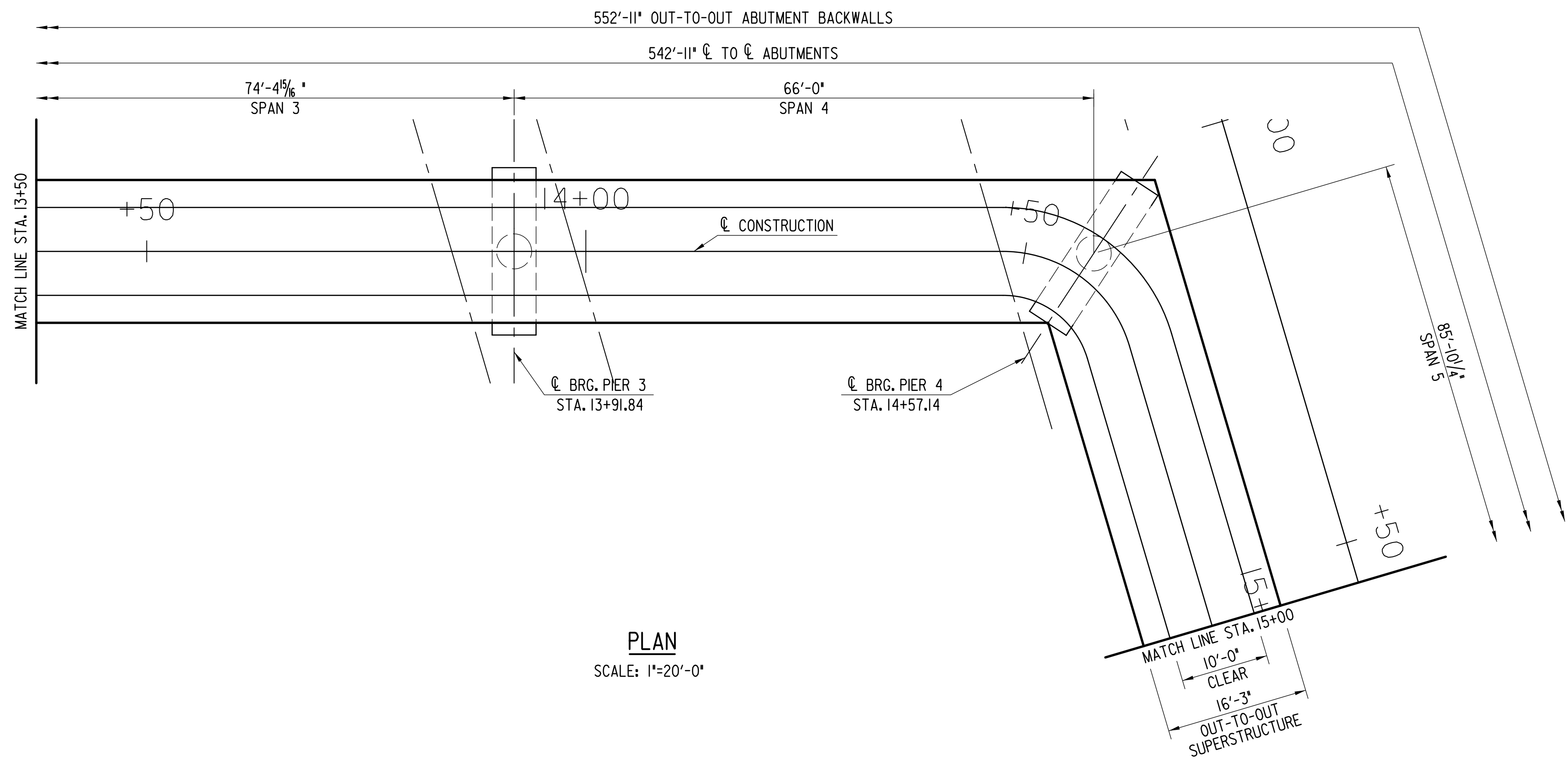
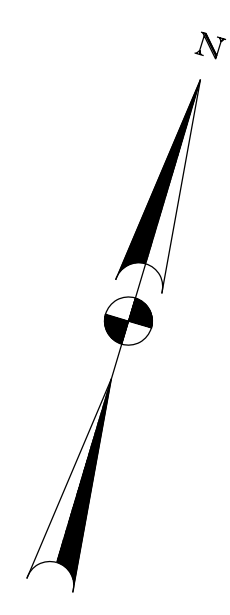
**RECOMMENDED RAILING**  
SCALE: 1" = 1'-0"

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Engineers | Construction Managers | Planners | Scientists  
81 MOSHER STREET | BALTIMORE, MD 21217  
PH: (410) 728-2900 FAX: (410) 728-3100

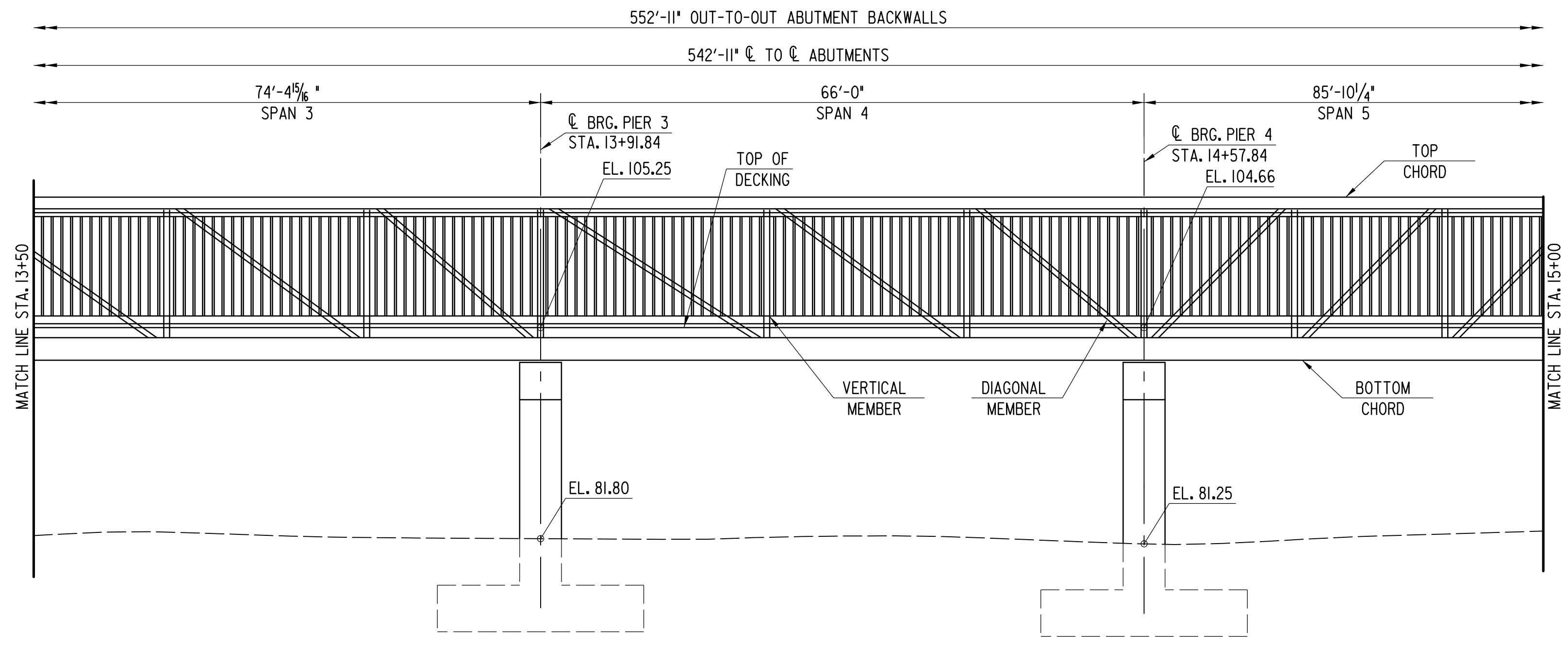
ANNE ARUNDEL COUNTY DEPARTMENT OF PUBLIC WORKS										
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NO.	DESCRIPTION	DATE	BY	DATE	DATE	DATE	DATE	SCALE: 1" = 100'	DRAWN BY: TMB	
				CHIEF ENGINEER					CHECKED BY: TMB	
				APPROVED	DATE	APPROVED	DATE		SHEET NO. 15 OF 19	
				ASSISTANT CHIEF ENGINEER		CHIEF RIGHT-OF-WAY			PROJECT NO: H563900	
									PROPOSAL NO: H563902	

**B&A TRAIL CONNECTOR STUDY**  
PREPARED MAY 2016

\$\$\$DATE\$\$\$  
\$\$\$FILE\$\$\$



**PLAN**  
SCALE: 1"=20'-0"



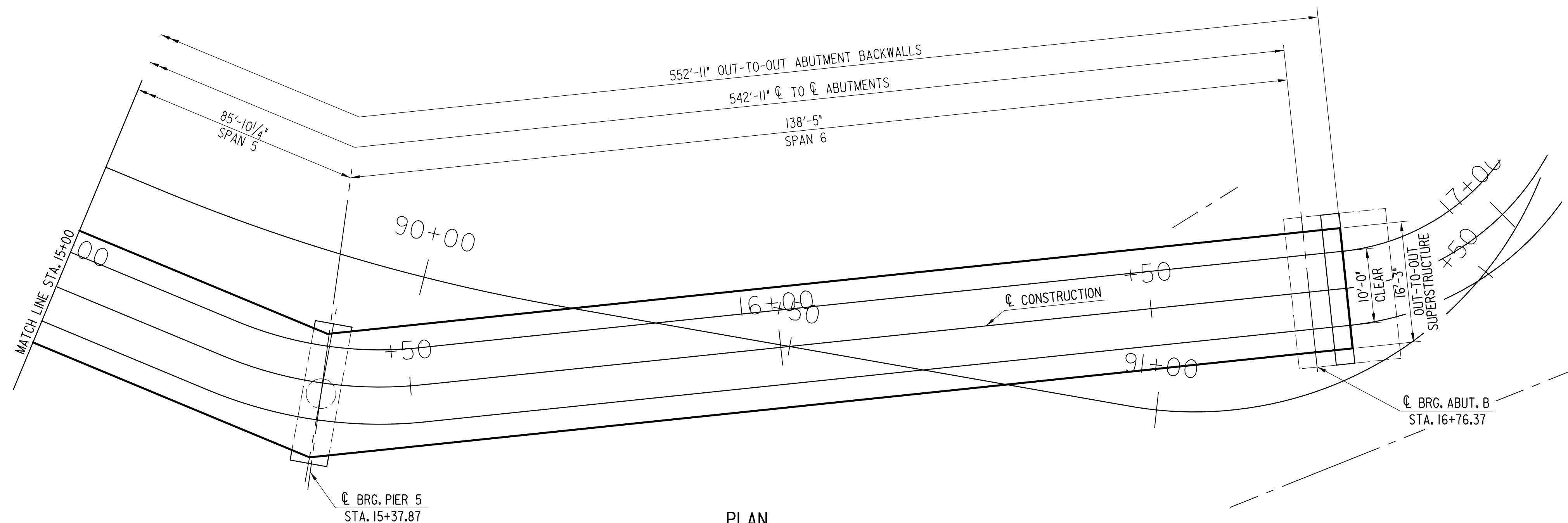
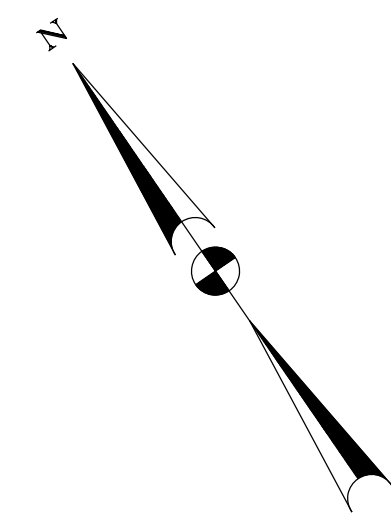
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SCALE: 1"=20'-0"

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\$\$\$FILES\$\$\$

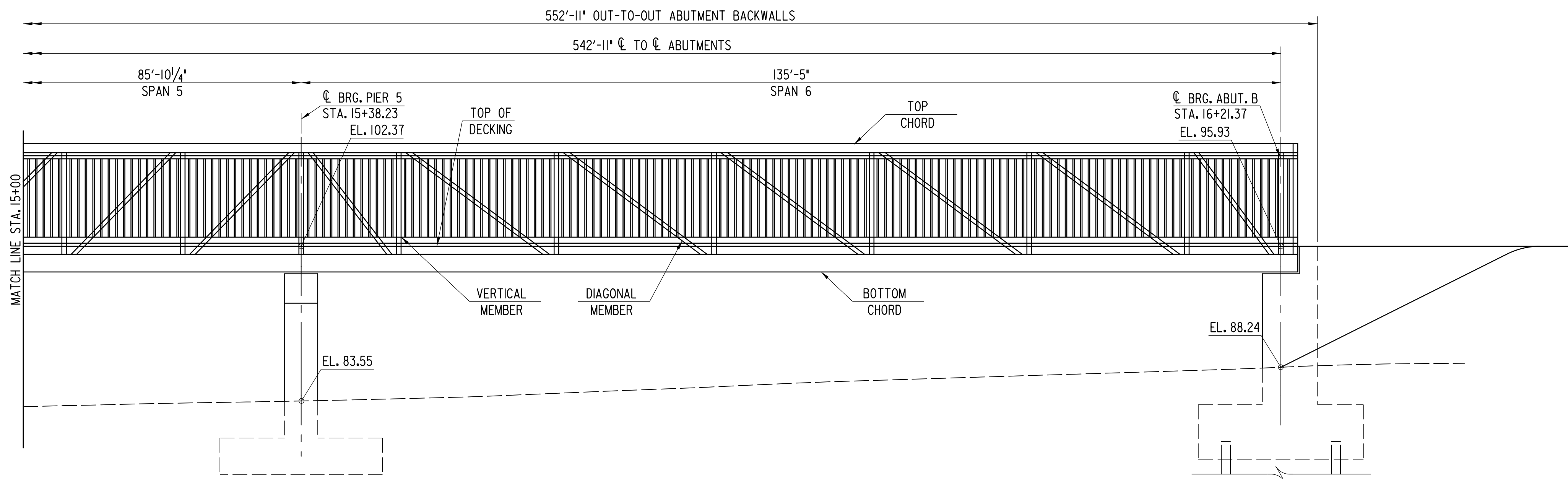
**RK&K**  
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ANNE ARUNDEL COUNTY DEPARTMENT OF PUBLIC WORKS									
REVISED			APPROVED		APPROVED		SCALE: 1" = 100'		ALTERNATE 3/4
NO.	DESCRIPTION	DATE	BY	DATE	DATE	DATE	DATE	SCALE: 1" = 100'	PEDESTRIAN BRIDGE - GP&E (2)
				CHIEF ENGINEER		PROJECT MANAGER		DRAWN BY: TMB	<b>B&amp;A TRAIL CONNECTOR STUDY</b> PREPARED MAY 2016
				APPROVED	DATE	APPROVED	DATE	CHECKED BY: TMB	
				ASSISTANT CHIEF ENGINEER		CHIEF RIGHT-OF-WAY		SHEET NO. 16 OF 19	
								PROJECT NO: H563900	
								PROPOSAL NO: H563902	



**PLAN**  
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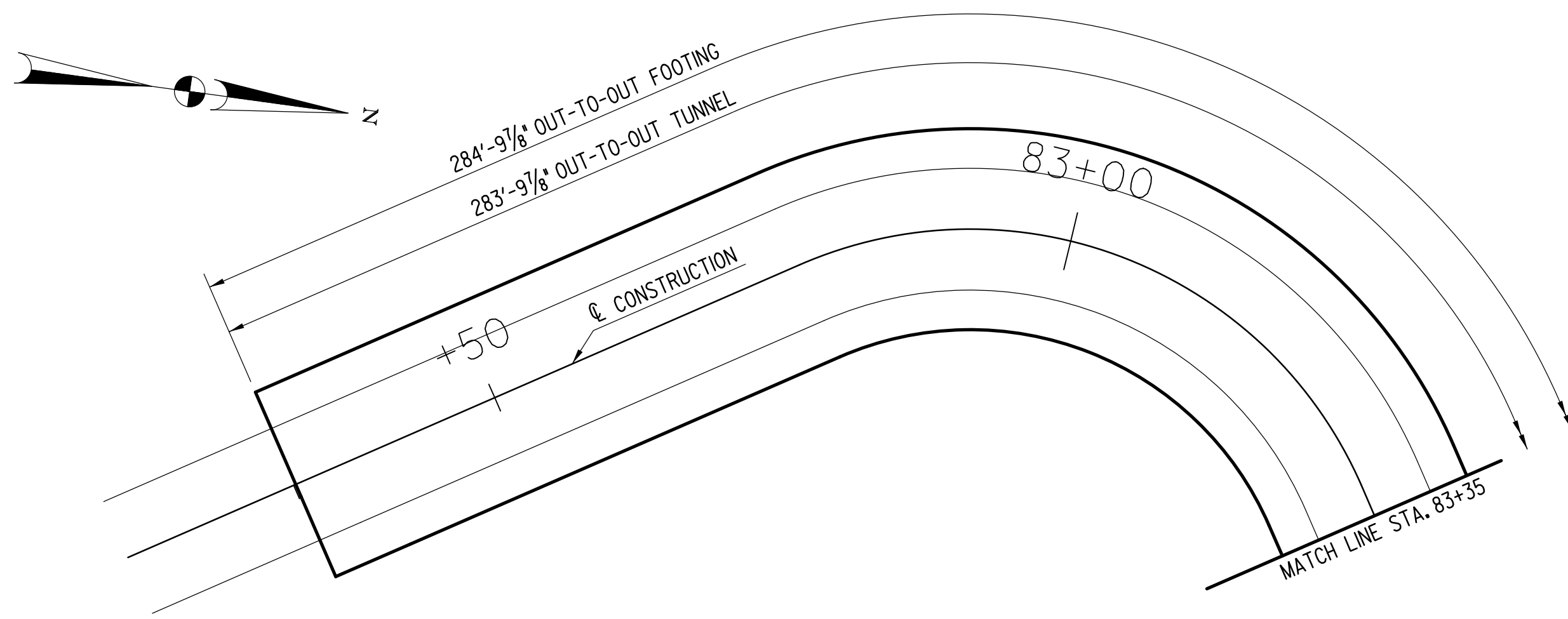
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\$\$\$DATE\$\$\$  
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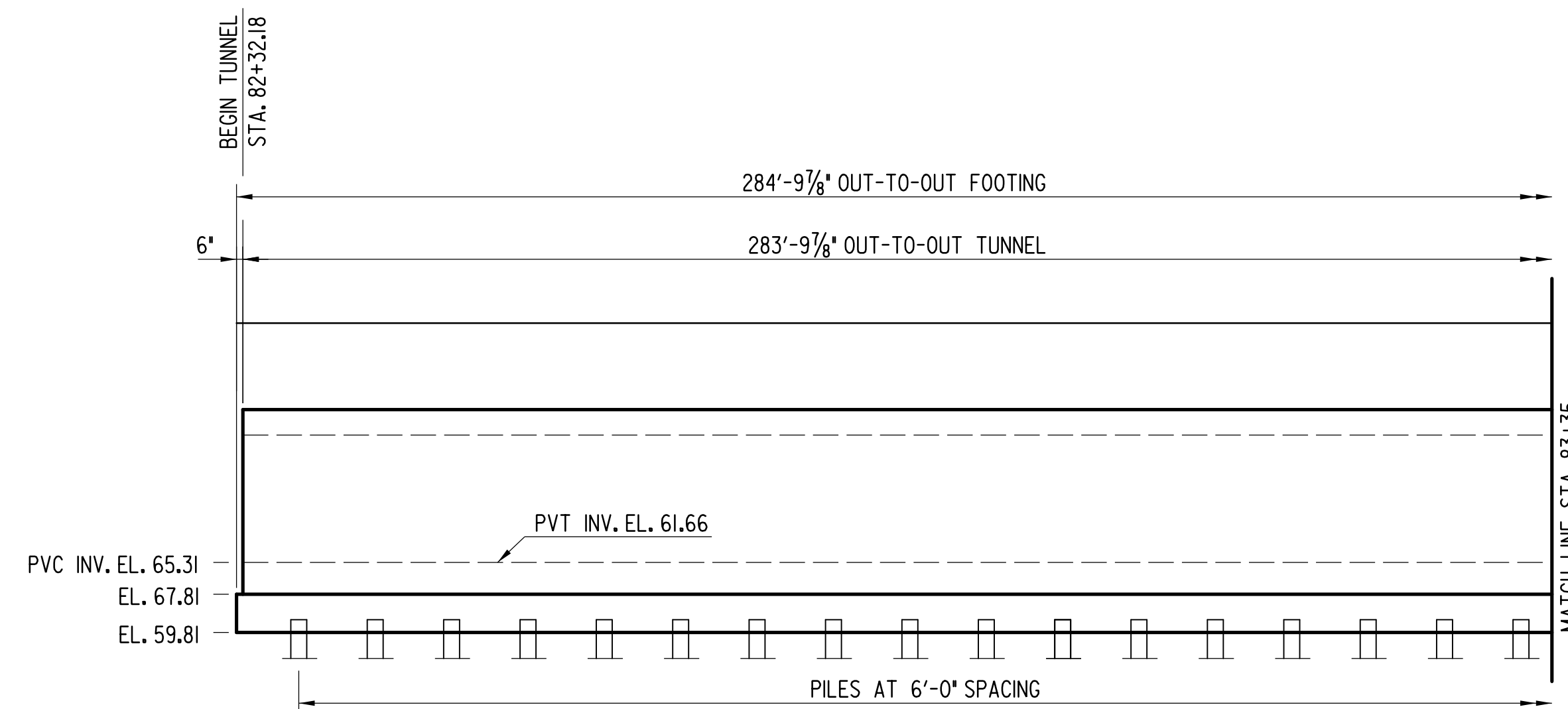


81 MOSHER STREET | BALTIMORE, MD 21217  
PH: (410) 728-2900 FAX: (410) 728-3160

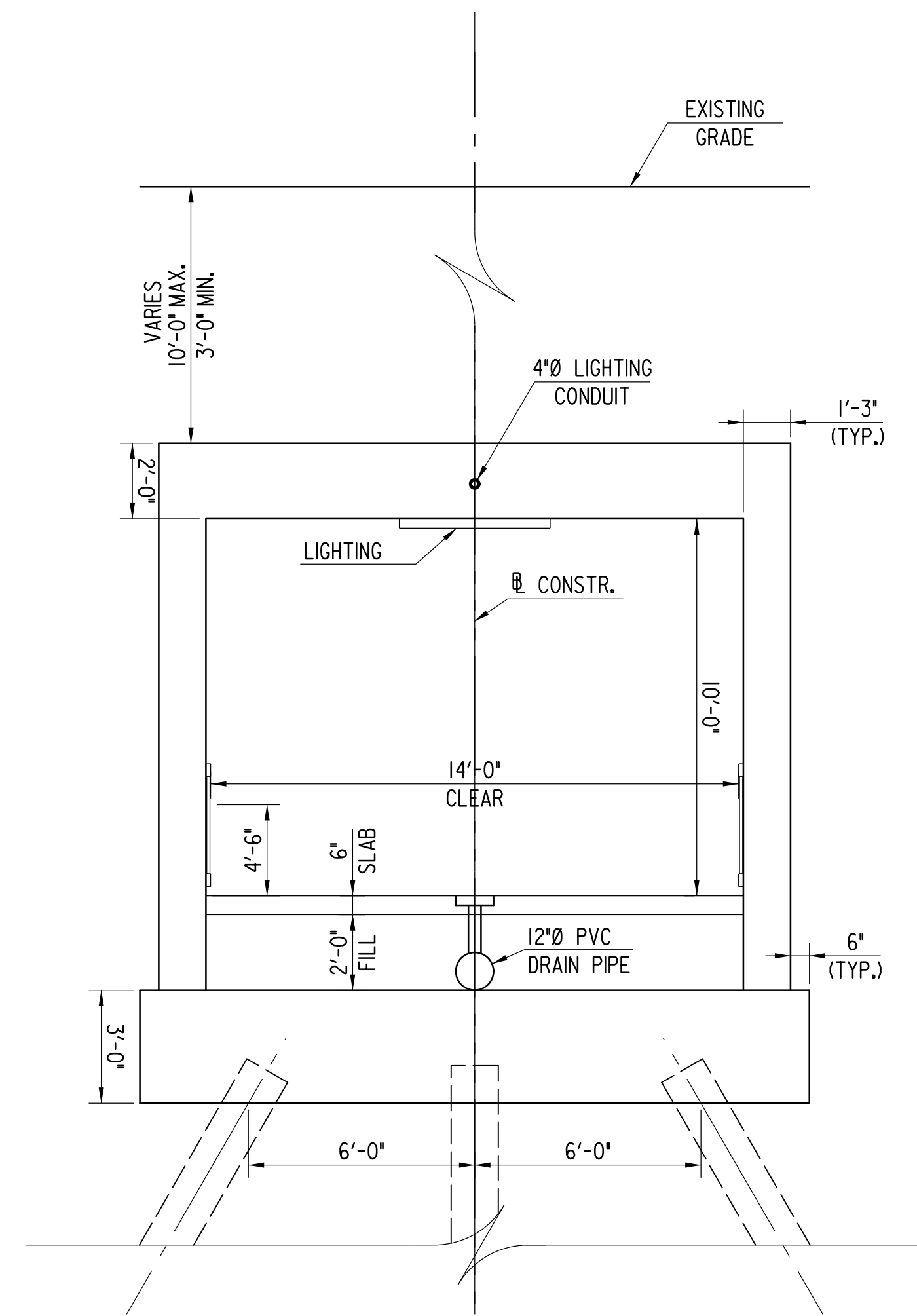
ANNE ARUNDEL COUNTY DEPARTMENT OF PUBLIC WORKS									
REVISED			APPROVED		APPROVED		SCALE: 1" = 100'		ALTERNATE 3/4
NO.	DESCRIPTION	DATE	BY	DATE	DATE	DATE	DATE	DRAWN BY: TMB	PEDESTRIAN BRIDGE - GP&E (3)
				CHIEF ENGINEER				CHECKED BY: TMB	B&A TRAIL CONNECTOR STUDY PREPARED MAY 2016
				APPROVED	DATE	APPROVED	DATE	SHEET NO. 17 OF 19	
				ASSISTANT CHIEF ENGINEER		CHIEF RIGHT-OF-WAY		PROJECT NO: H563900 PROPOSAL NO: H563902	



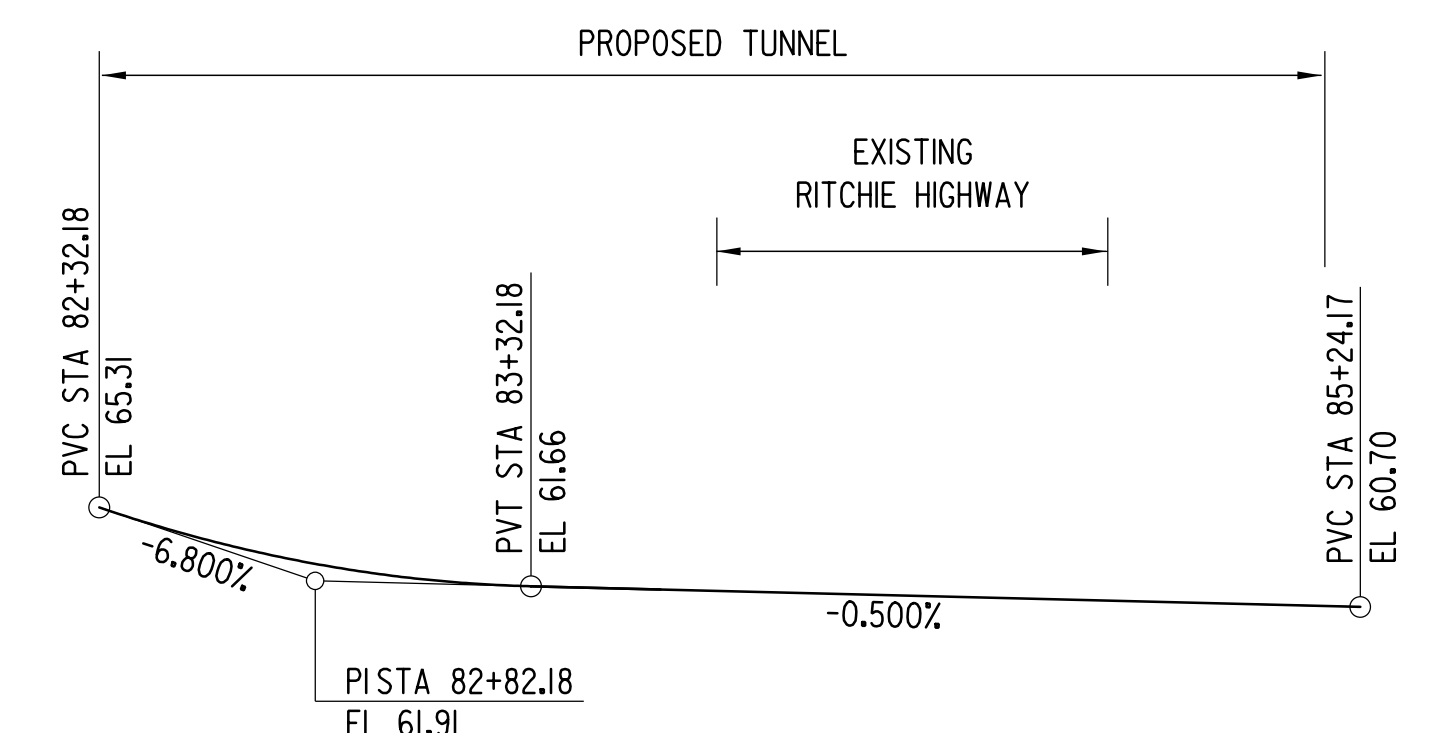
**PLAN**  
SCALE: 1"=20'-0"



**ELEVATION**  
SCALE: 1"=20'-0"



**TYPICAL SECTION**  
SCALE: 1/2" = 1'-0"



**VERTICAL CURVE DATA**

**GENERAL NOTES:**

- SPECIFICATIONS:** ANNE ARUNDEL COUNTY, DEPARTMENT OF PUBLIC WORKS STANDARD SPECIFICATIONS FOR CONSTRUCTION DATED JANUARY 2001, INCLUDING REVISIONS THEREOF AND ADDITIONS THERETO AND SPECIAL PROVISIONS FOR MATERIAL AND CONSTRUCTION. ANSI/AASHTO/AWS I.5 BRIDGE WELDING CODE
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AGGREGATE BASE  
CAST-IN-PLACE CONCRETE  
CONCRETE BOX CULVERT  
PEDESTRIAN TUNNEL LIGHTING

**ANNE ARUNDEL COUNTY DEPARTMENT OF PUBLIC WORKS**



REVISED				APPROVED	DATE	APPROVED	DATE
NO.	DESCRIPTION	DATE	BY				

CHIEF ENGINEER	PROJECT MANAGER
APPROVED	APPROVED
DATE	DATE
ASSISTANT CHIEF ENGINEER	CHIEF RIGHT-OF-WAY

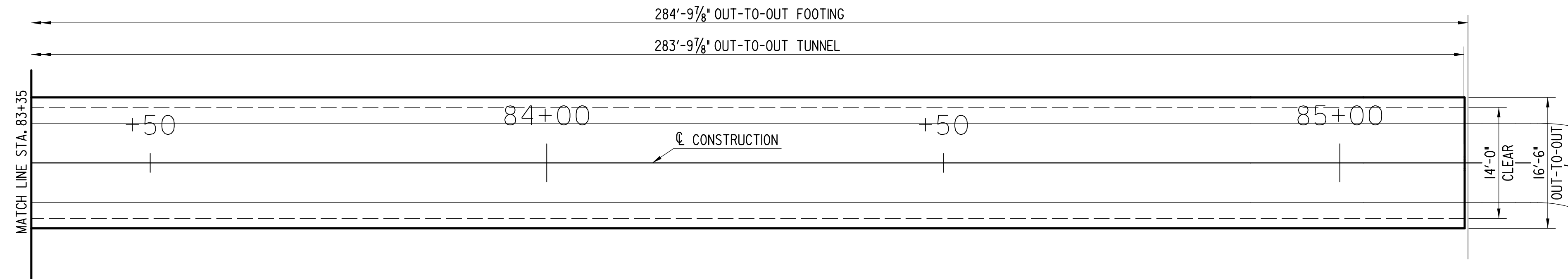
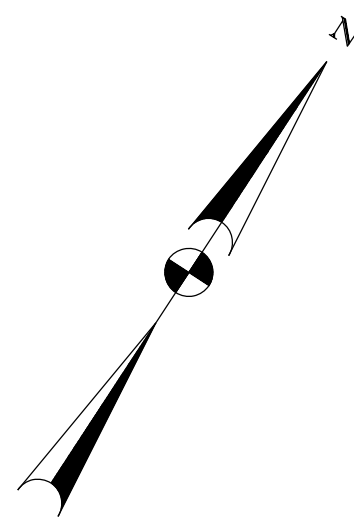
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DRAWN BY: TMB
CHECKED BY: TMB
SHEET NO. 18 OF 19
PROJECT NO: H563900
PROPOSAL NO: H563902

**ALTERNATE 3/4  
PEDESTRIAN TUNNEL - GP&E (1)**

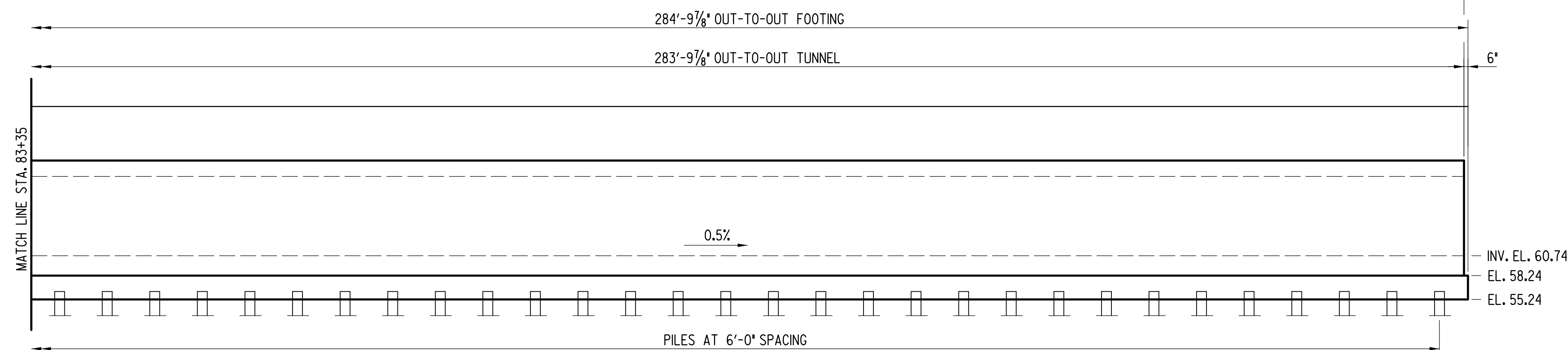
**B&A TRAIL CONNECTOR  
STUDY**

PREPARED MAY 2016

\$\$\$DATE\$\$\$  
\$\$\$FILES\$\$\$



**ELEVATION**  
SCALE: 1"=20'-0"



**PLAN**  
SCALE: 1"=20'-0"

\$\$\$DATE\$\$\$  
\$\$\$FILES\$\$\$



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ANNE ARUNDEL COUNTY DEPARTMENT OF PUBLIC WORKS									
REVISED				APPROVED	DATE	APPROVED	DATE	SCALE: 1" = 100'	
NO.	DESCRIPTION	DATE	BY					DRAWN BY: TMB	ALTERNATE 3/4 PEDESTRIAN TUNNEL - GP&E (2)  B&A TRAIL CONNECTOR STUDY PREPARED MAY 2016
				CHIEF ENGINEER		PROJECT MANAGER		CHECKED BY: TMB	
				APPROVED	DATE	APPROVED	DATE	SHEET NO. 19 OF 19	
				ASSISTANT CHIEF ENGINEER		CHIEF RIGHT-OF-WAY		PROJECT NO: H563900 PROPOSAL NO: H563902	