



ENGINEER
DEPARTMENT OF ENVIRONMENTAL SERVICES
FACILITIES & ENGINEERING DIVISION
ENGINEERING BUREAU
2100 CLARENDON BOULEVARD, SUITE 813
ARLINGTON, VA 22201
PHONE: 703.228.3629 FAX: 703.228.3606
WWW.ARLINGTONVA.US

OWNER
DES/OSEM/WTRSHD
CONTRACTOR
TO BE DETERMINED

CONSTRUCTION DRAWINGS FOR:
N GLEBE ROAD CHANNEL REPAIR
FINAL DESIGN

ARLINGTON, VIRGINIA

PROJECT NUMBER: 28460.01

FINAL PLAN SIGNATURES

DATE: July 6, 2022
TO: Bi Wu, Design Engineer Team Supervisor
Carla Alayon Gonzalez, Construction Management Supervisor
Jon Lawler, WSS Bureau Chief
Dennis Leach, Deputy Director, DES
Seamus Pugh, Project Manager
FROM: Bi Wu, Design Engineer Team Supervisor
PROJECT: N Glebe Road Channel Repair
ATTACHMENT: FINAL DESIGN PLAN SET (24 SHEETS)
NOTE: The attached final design plan has been designed, reviewed and approved by VDOT Reviewing Staffs. Once your final review is complete, please sign your name in your designated space on the signature block below, ensuring both signature and date stay within the borders. Upon receiving all signatures, the signature block will be inserted into each sheet of the final design plan set to be included in the construction documents.

SEAL

Table with 2 columns: APPROVALS, DATE. Includes signatures and dates for Design Engineer Team Supervisor, Construction Management Supervisor, Water, Sewer, Streets Bureau Chief, Transportation Director, and Project Manager.

NOTE: PLEASE DO NOT FORWARD. EMAIL THE SIGNATURE SHEET TO ME.

LOCATION MAP



Source: World Street Map - ESRI
1" = 2,000'



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Table for APPROVALS and REVISIONS with columns for APPROVALS, DATE, DESIGN TEAM ENGINEER SUPERVISOR, CONSTRUCTION MANAGEMENT SUPERVISOR, WATER, SEWER, STREETS BUREAU CHIEF, TRANSPORTATION DIRECTOR, PROJECT MANAGER, REVISIONS, and DATE.

GENERAL NOTES:

GENERAL CONSTRUCTION NOTES

- 1. ALL CONSTRUCTION WORK FOR THIS PROJECT SHALL CONFORM TO THE ARLINGTON COUNTY DEPARTMENT OF ENVIRONMENTAL SERVICES, CONSTRUCTION STANDARDS AND SPECIFICATIONS, AND WHERE APPLICABLE THE VIRGINIA DEPARTMENT OF TRANSPORTATION (VDOT) ROAD AND BRIDGE SPECIFICATIONS, AND ROAD AND BRIDGE STANDARDS. THE LATEST EDITIONS OF EACH RELEVANT MANUAL SHALL BE USED.
2. ALL CONSTRUCTION AND WORK ACTIVITIES SHALL COMPLY WITH THE VIRGINIA WORK AREA PROTECTION MANUAL AND ALL OTHER RELEVANT WORK SAFETY REQUIREMENTS, LATEST EDITIONS.
3. THE CONTRACTOR SHALL IMMEDIATELY NOTIFY THE PROJECT OFFICER OF ANY DISCREPANCIES BETWEEN ACTUAL FIELD CONDITIONS AND THE APPROVED PLANS.
4. THE CONTRACTOR SHALL CONTACT "MISS UTILITY" AT 811 FOR MARKING THE LOCATIONS OF EXISTING UNDERGROUND UTILITIES (I.E. WATER, SEWER, GAS, TELEPHONE, ELECTRIC, AND CABLE TV) AT LEAST 72 HOURS PRIOR TO ANY EXCAVATION OR CONSTRUCTION. THE CONTRACTOR IS REQUIRED TO IDENTIFY AND PROTECT ALL OTHER UTILITY LINES FOUND IN THE WORK SITE AREA BELONGING TO OTHER OWNERS THAT ARE NOT MEMBERS OF "MISS UTILITY". PRIVATE WATER, SEWER AND GAS LATERALS WILL NOT BE MARKED BY MISS UTILITY OR THE COUNTY. THE CONTRACTOR SHALL LOCATE AND PROTECT THESE SERVICES DURING CONSTRUCTION.
5. THE CONTRACTOR SHALL BE RESPONSIBLE FOR LAYING OUT THE WORK AND SHALL RETAIN A PROFESSIONAL LAND SURVEYOR LICENSED IN THE COMMONWEALTH OF VIRGINIA TO PROVIDE ALL NECESSARY CONSTRUCTION LAYOUTS AND ESTABLISH ALL CONTROL LINES, GRADES, AND ELEVATION DURING CONSTRUCTION. THE CONTRACTOR SHALL SUBMIT A COPY OF ALL CUT SHEETS FOR REVIEW, PER THE SPECIFICATIONS. THE COST OF ALL NECESSARY SURVEYING SERVICES SHALL BE CONSIDERED INCIDENTAL TO THE WORK AND, UNLESS OTHERWISE SPECIFIED, THE COST SHALL BE INCORPORATED INTO THE COSTS FOR RELEVANT ITEMS.
6. THE LOCATION OF ALL EXISTING UTILITIES SHOWN ON THESE PLANS ARE FROM BEST AVAILABLE RECORDS AND SHALL BE CONSIDERED TO BE APPROXIMATE. WHEN CONSTRUCTION ACTIVITY REACHES IN PROXIMITY TO EXISTING UTILITIES, THE TRENCH(ES) SHALL BE OPENED A SUFFICIENT DISTANCE AHEAD OF THE WORK OR TEST PITS SHALL BE MADE TO VERIFY THE EXACT LOCATION AND INVERTS OF THE UTILITY TO ALLOW FOR POSSIBLE CHANGES IN THE LINE OR GRADE AS DIRECTED BY OFFICER. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ANY DAMAGE TO THE EXISTING UTILITIES AND THE RELATED STRUCTURES. ALL EXISTING UTILITY SYSTEMS SHALL BE PROTECTED TO PREVENT DAMAGE DURING THE CONTRACTOR'S OPERATIONS. ANY SYSTEM DAMAGED SHALL BE PROMPTLY REPAIRED AT NO COST TO THE OWNER.
7. EXISTING MANHOLE FRAMES, COVERS, VALVE BOXES, AND OTHER APPURTENANCES SHALL BE ADJUSTED TO THE FINAL GRADE OR REPLACED, AS NECESSARY. UNLESS OTHERWISE SPECIFIED, THE COST FOR THIS SHALL BE CONSIDERED INCIDENTAL TO THE WORK, AND SHALL BE INCORPORATED INTO THE COSTS FOR RELEVANT ITEMS.
8. THE CONTRACTOR SHALL PROVIDE ADA COMPLIANT ACCESS THROUGH OR AROUND THE SITE AT ALL TIMES AND SHALL ENSURE THE SAFETY OF ALL THOSE PASSING THROUGH OR ADJACENT TO THE SITE.
9. ALL SIDEWALK AND CURB AND GUTTER DEMOLITION SHALL BEGIN AND END AT THE CONSTRUCTION JOINT NEAREST TO THE DEPICTED DEMOLITION EXTENTS WITH A NEAT SAWCUT LINE TO FULL DEPTH OF PAVEMENT SECTION.

STORMWATER AND ENVIRONMENTAL PROTECTION

- 10. THE CONTRACTOR SHALL CONFINE ALL ACTIVITIES AT THE SITE ASSOCIATED WITH CONSTRUCTION ACTIVITIES, TO INCLUDE STORAGE OF EQUIPMENT AND OR MATERIALS, ACCESS TO THE WORK, FORMWORK, ETC. TO WITHIN THE DESIGNATED LIMITS OF DISTURBANCE (LOD).

TREE PROTECTION

- 11. TREES SHALL BE PROTECTED PER THE REQUIREMENTS OF ARLINGTON PARKS & RECREATION STANDARD.

TRAFFIC CONTROL

- 12. CONTRACTOR SHALL NOTIFY THE PROJECT OFFICER AT LEAST 3 WORKING DAYS PRIOR TO DISTURBING ANY EXISTING, OR INSTALLING ANY NEW, TRAFFIC SIGNS, SIGNALS, OR OTHER TRAFFIC CONTROL DEVICES.
13. THE CONTRACTOR SHALL PREMARK THE LAYOUT OF ANY PERMANENT TRAFFIC CONTROL STRIPING, INDICATING THE PROPOSED LOCATION AND TYPE OF MARKING TO BE INSTALLED. THE PREMARKING MAY CONSIST OF TYPE D TAPE, CHALK, OR LUMBER CRAYONS. THE CONTRACTOR SHALL ALLOW 3 WORKING DAYS FOR THE INSPECTION AND APPROVAL OF THE PREMARKINGS PRIOR TO PLACING THE PERMANENT MARKINGS.
14. THE CONTRACTOR SHALL SUBMIT ANY REQUESTS FOR TEMPORARY "NO PARKING" RESTRICTIONS TO THE PROJECT OFFICER AT LEAST 3 WORKING DAYS PRIOR TO THE DESIRED ONSET OF RESTRICTIONS. PRIOR TO A REQUEST FOR THE REMOVAL OF ACCESS TO ANY ADA PARKING SPACE THE CONTRACTOR MUST HAVE MADE PROVISION FOR ALTERNATIVE ADA PARKING AS INDICATED ON THE APPROVED PLAN OR AS DIRECTED BY THE PROJECT OFFICER.
15. WHEN THE APPROVED PLAN CALLS FOR THE REMOVAL OF ANY PARKING METER THE CONTRACTOR MUST MAKE A REQUEST TO THE PROJECT OFFICER AT LEAST ONE WEEK IN ADVANCE OF THE DESIRED REMOVAL. THE PROJECT OFFICER WILL THEN COORDINATE THE PARKING METER REMOVAL WITH TRAFFIC ENGINEERING AND OPERATIONS.
16. THE CONTRACTOR SHALL PRESERVE ALL BUS STOPS, INCLUDING MAINTAINING ADEQUATE ACCESSIBILITY THROUGH AND ADJACENT TO THE CONSTRUCTION FOR BUSES AND THEIR PASSENGERS. THE CONTRACTOR SHALL NOT CLOSE, RELOCATE, OR OTHERWISE MODIFY A BUS STOP WITHOUT PRIOR REQUEST OF THE PROJECT OFFICER. ANY RELOCATION OR CLOSURE OF A BUS STOP SHALL REQUIRE AT LEAST FOUR WEEKS ADVANCE NOTICE FOR COORDINATION WITH THE COUNTY'S BUS STOP COORDINATOR - 703-228-3049.
17. WHEN CONDITIONS WARRANT DUE TO TRAFFIC VOLUMES, PATTERNS, OR SPECIAL EVENTS, THE COUNTY MAY SUSPEND OR OTHERWISE DIRECT THE CONTRACTOR'S ACTIVITIES TO PROTECT THE PUBLIC AND OR THE COUNTY'S TRANSPORTATION NETWORK.

WATER DISTRIBUTION, STORM AND SANITARY SEWER SYSTEMS

- 18. UNLESS OTHERWISE DIRECTED, CONTRACTORS ARE EXPRESSLY PROHIBITED FROM OPERATING ANY WATER VALVES OR APPURTENANCES. CONTRACTORS SHALL SUBMIT ALL REQUESTS FOR VALVE OPERATIONS TO THE PROJECT OFFICER AT LEAST 1 WEEK IN ADVANCE OF THE REQUIRED OPERATION.
19. IN THE EVENT OF A WATER OR SEWER EMERGENCY, THE CONTRACTOR SHALL IMMEDIATELY NOTIFY THE COUNTY'S WATER CONTROL CENTER AT 703-228-6555 AND THE PROJECT OFFICER.
20. THE CONTRACTOR SHALL COORDINATE ALL UTILITY SHUTOFFS, DISCONNECTS, AND/OR ABANDONMENT WITH UTILITY OWNER AND PROJECT OFFICER AT LEAST 1 WEEK IN ADVANCE OF THE REQUIRED INTERRUPTION.

FIRE DEPARTMENT NOTES:

- 21. ALL EXISTING FIRE HYDRANTS AND FIRE DEPARTMENT CONNECTIONS SHALL BE MAINTAINED UNOBSTRUCTED AND ACCESSIBLE AT ALL TIMES IN ACCORDANCE WITH SECTIONS 508.5.4 AND 508.5.5 OF THE ARLINGTON COUNTY FIRE PREVENTION CODE.
22. ACCESS TO BUILDINGS FOR FIREFIGHTING SHALL BE MAINTAINED AT ALL TIMES. EXISTING FIRE APPARATUS ACCESS ROADS (FIRE LANES) SHALL BE KEPT CLEAR OF OBSTRUCTIONS IN ACCORDANCE WITH SECTION 503.4 OF THE ARLINGTON COUNTY FIRE PREVENTION CODE. ACCESS TO CONSTRUCTION SITES SHALL BE PROVIDED AND MAINTAINED IN ACCORDANCE WITH SECTION 1410 OF THE ARLINGTON COUNTY FIRE PREVENTION CODE.
23. IN THE EVENT THAT EXISTING FIRE DEPARTMENT CONNECTIONS OR FIRE APPARATUS ACCESS ROADS (FIRE LANES) MUST BE OBSTRUCTED TO FACILITATE CONSTRUCTION ACTIVITIES, CONTACT THE ARLINGTON COUNTY FIRE DEPARTMENT FIRE PREVENTION OFFICE AT 703-228-4644 TO COORDINATE REVIEW AND APPROVAL OF TEMPORARY FIRE DEPARTMENT CONNECTIONS AND/OR FIRE APPARATUS ACCESS ROADS PRIOR TO CREATING THE OBSTRUCTION.

SHEET INDEX

- 1 COVER SHEET
2 OVERALL SITE PLAN AND CROSS SECTIONS
2A SUPPLEMENTAL CROSS SECTIONS
3 EXISTING CONDITIONS PLAN
4-5 GRADING PLAN AND PROFILE
6 CONSTRUCTION DETAILS
7 EROSION & SEDIMENT CONTROL PLAN & PLANTING PLAN
8-9 EROSION AND SEDIMENT CONTROL NARRATIVE & DETAILS
10 SEEDING SCHEDULE AND NOTES
11 DESIGN NARRATIVE
12-17 MOT PLAN
18 GUARDRAIL SYSTEM DETAILS
19 TYPICAL SECTIONS (GUARDRAIL)
20 PROPOSED PLAN (GUARDRAIL)
21-23 CROSS SECTIONS (GUARDRAIL)

SWM#

SWM#

ADT

X,XXX - STREET NAME (FROM STREET NAME TO STREET NAME) - YEAR OF COUNT - SOURCE OF COUNT
X,XXX - STREET NAME (FROM STREET NAME TO STREET NAME) - YEAR OF COUNT - SOURCE OF COUNT

STREET CLASSIFICATION

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STREET NAME - MINOR ARTERIAL

POSTED SPEED

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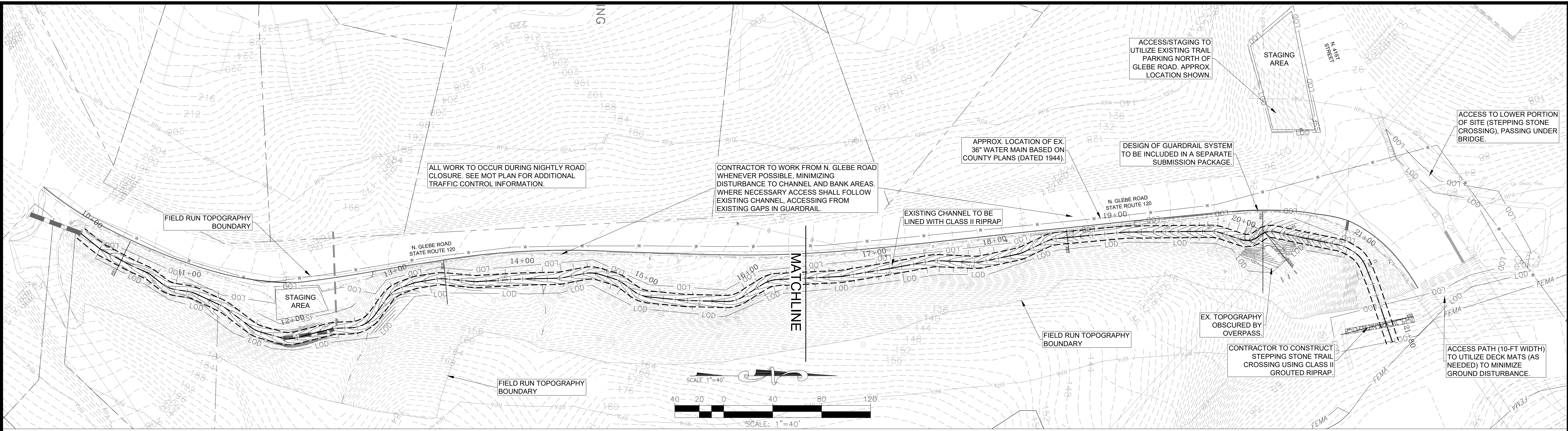
N GLEBE ROAD CHANNEL REPAIR FINAL

DESIGN (---)
28460.01
ARLINGTON, VIRGINIA

COVER SHEET

DESIGNED: NAS
DRAWN: NAS
CHECKED: FRG
PLOTTED: January 22, 2021

SCALE:



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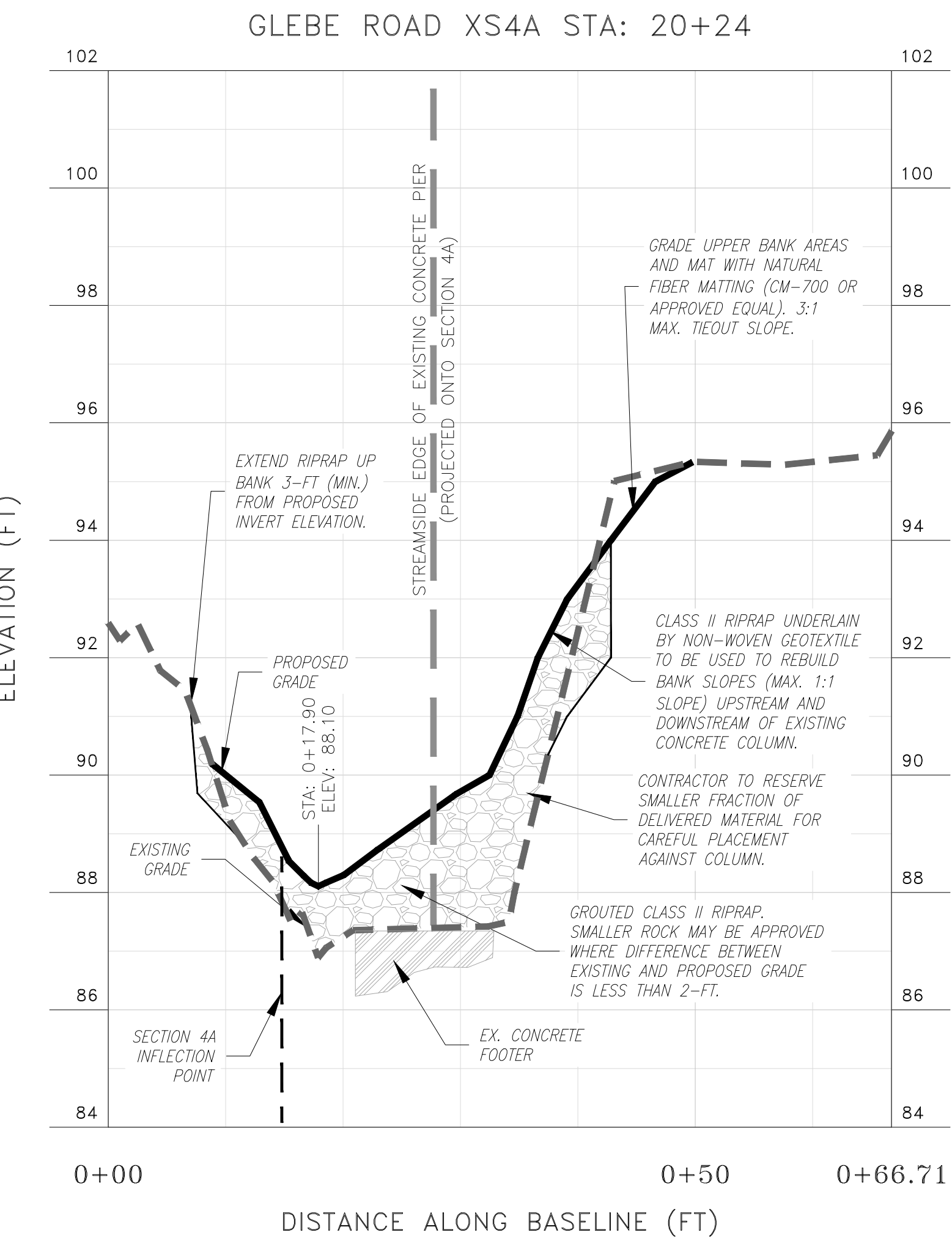
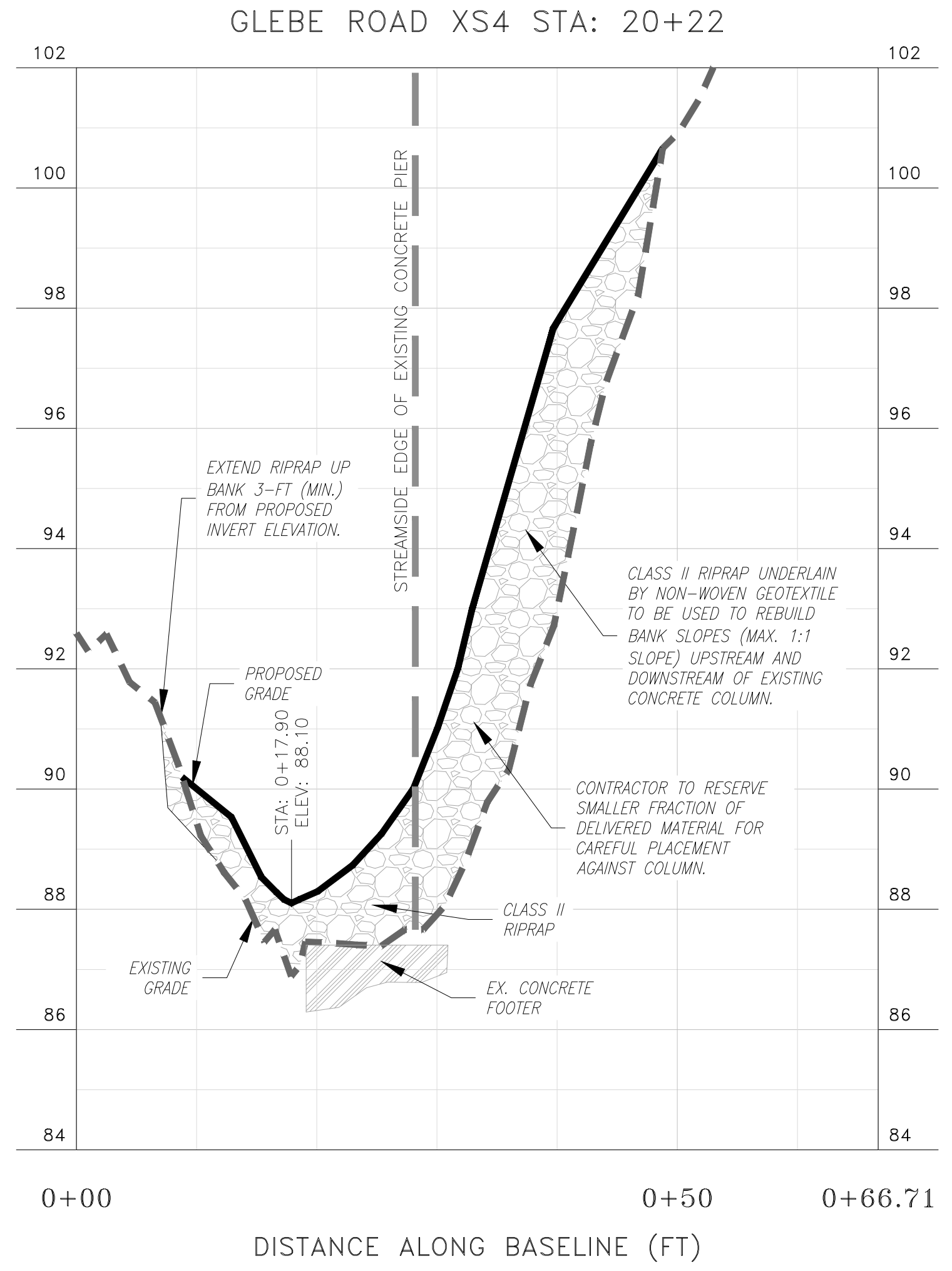
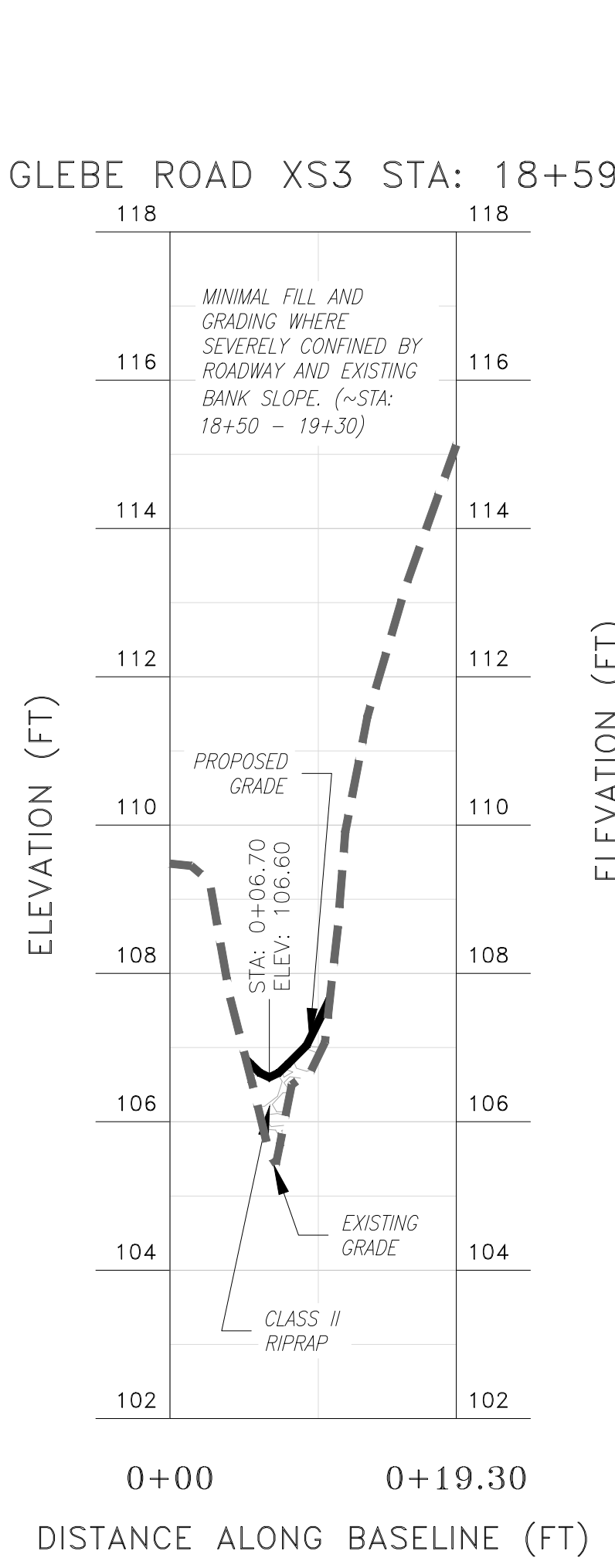
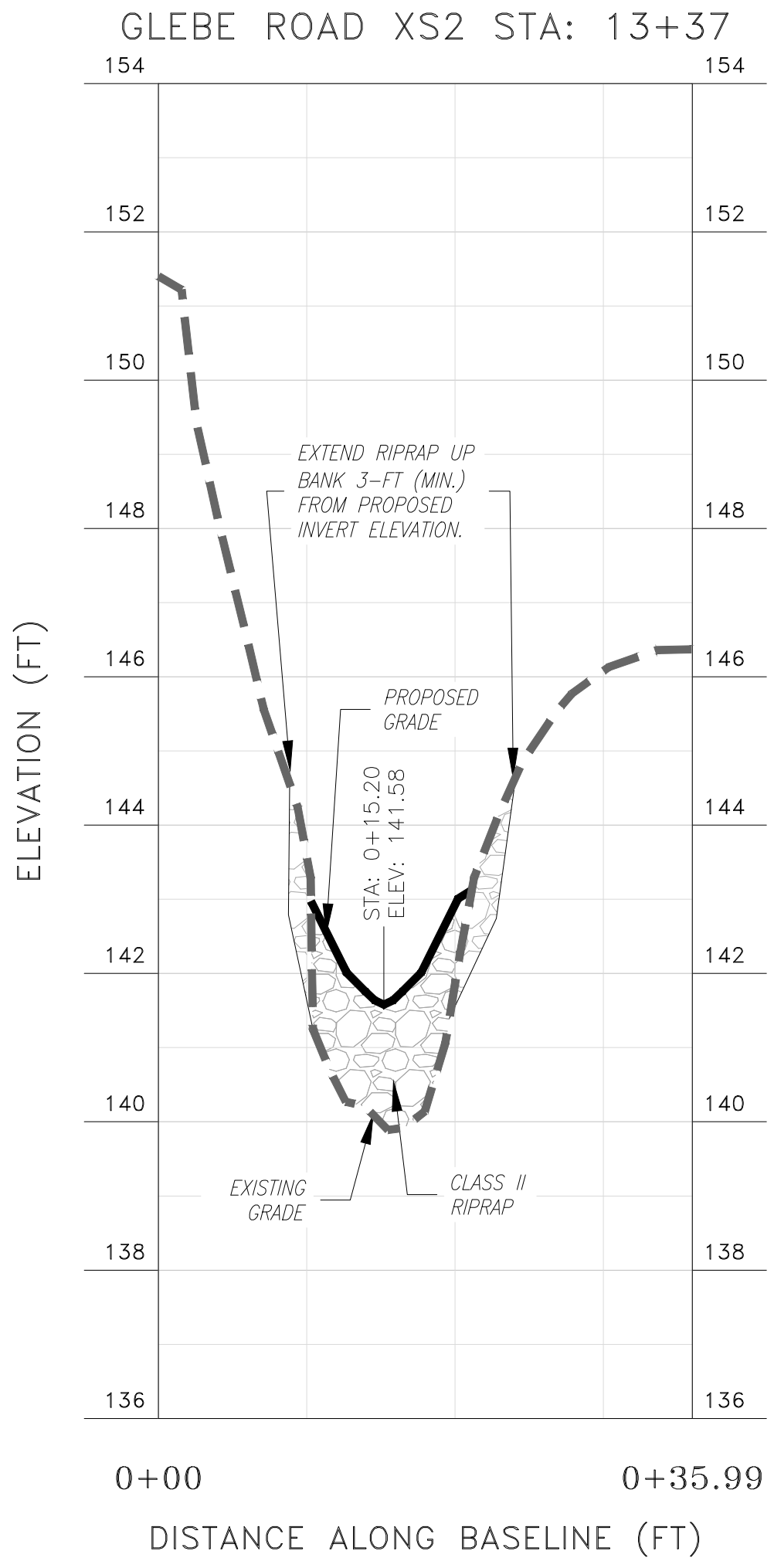
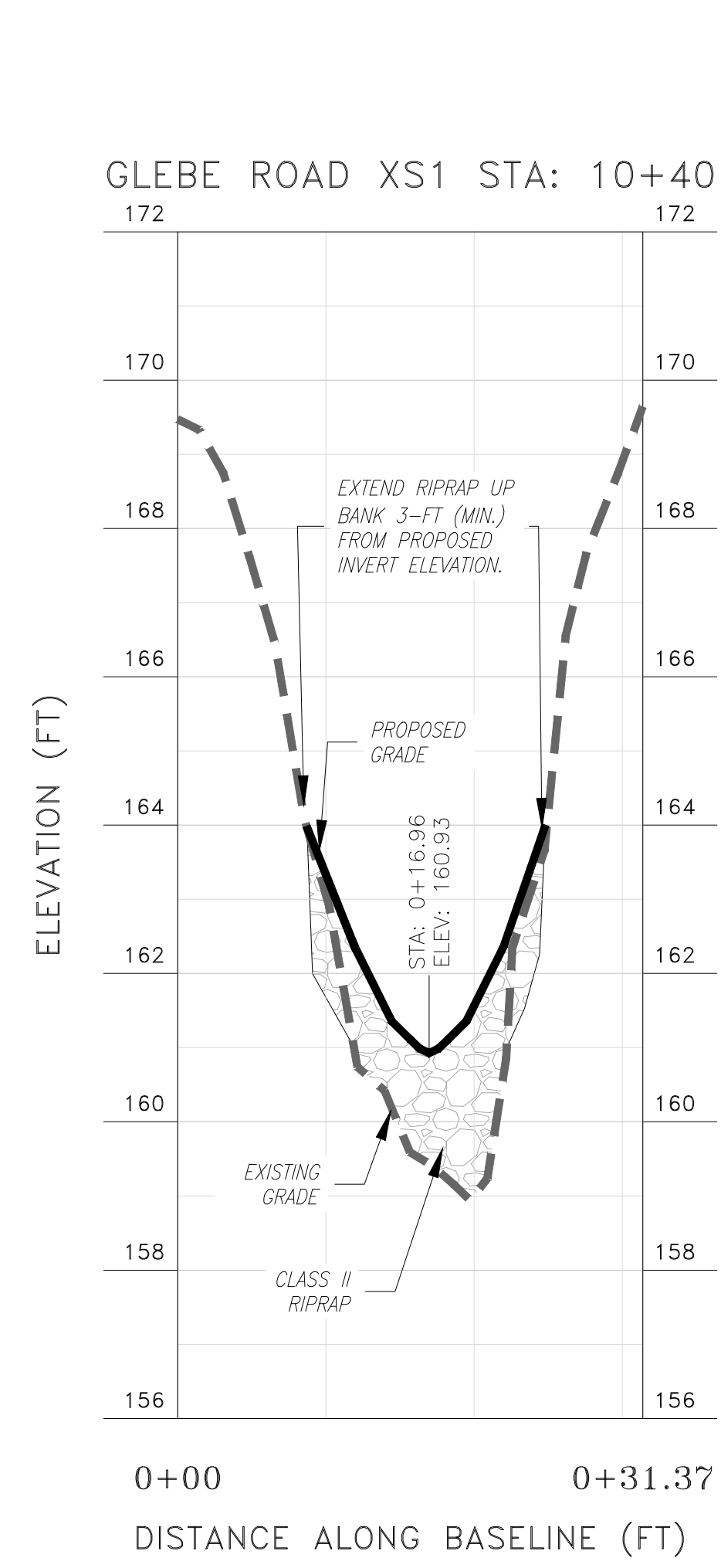
**N GLEBE ROAD CHANNEL REPAIR  
 FINAL DESIGN**  
 Arlington, Virginia

**Overall Site Plan and Cross Sections**

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**CROSS SECTION NOTES:**  
 1. ALL CROSS SECTION VIEWS SHOWN FACING DOWNSTREAM.  
 2. TYPICAL BANKFULL CHANNEL DIMENSIONS: WIDTH = 10 FT, DEPTH = 1.5 FT  
 4. TYPICAL SECTION - CONTRACTOR TO PLACE 2-FT (MIN.) THICKNESS OF CLASS II RIPRAP UNLESS PRECLUDED BY EX. BEDROCK. CLASS II SHALL BE TOP DRESSED WITH SALVAGED BED MATERIAL (OR IMPORTED REINFORCED BED MATERIAL).

**CROSS SECTION SCALE**  
 H: 1" = 10'  
 V: 1" = 2'



REVISIONS		App. By	By
No.	Date	Description	

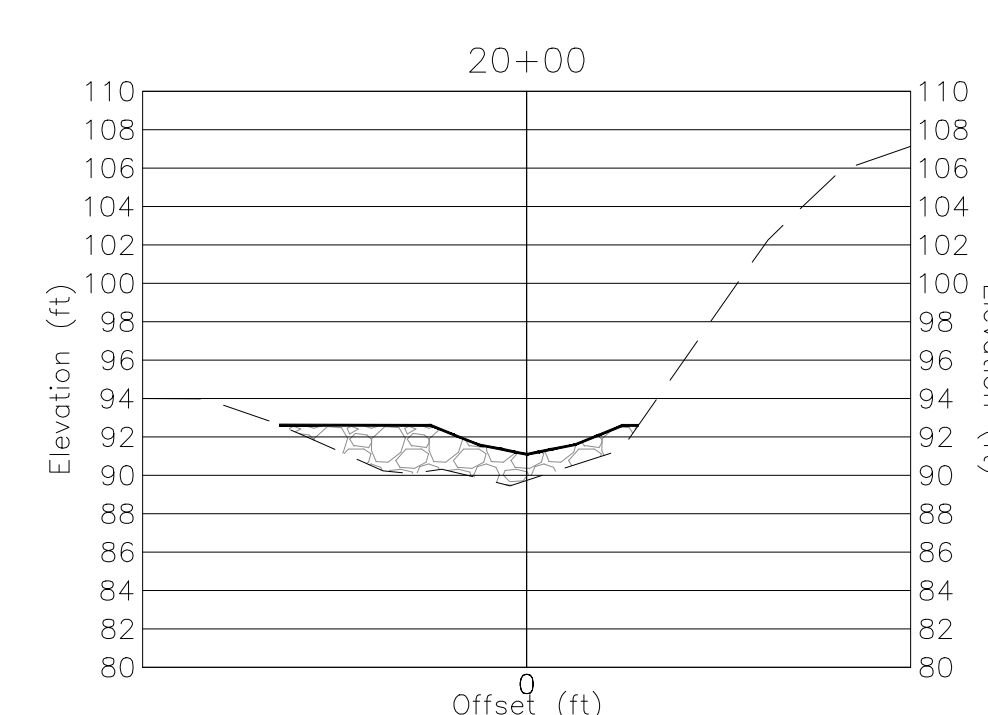
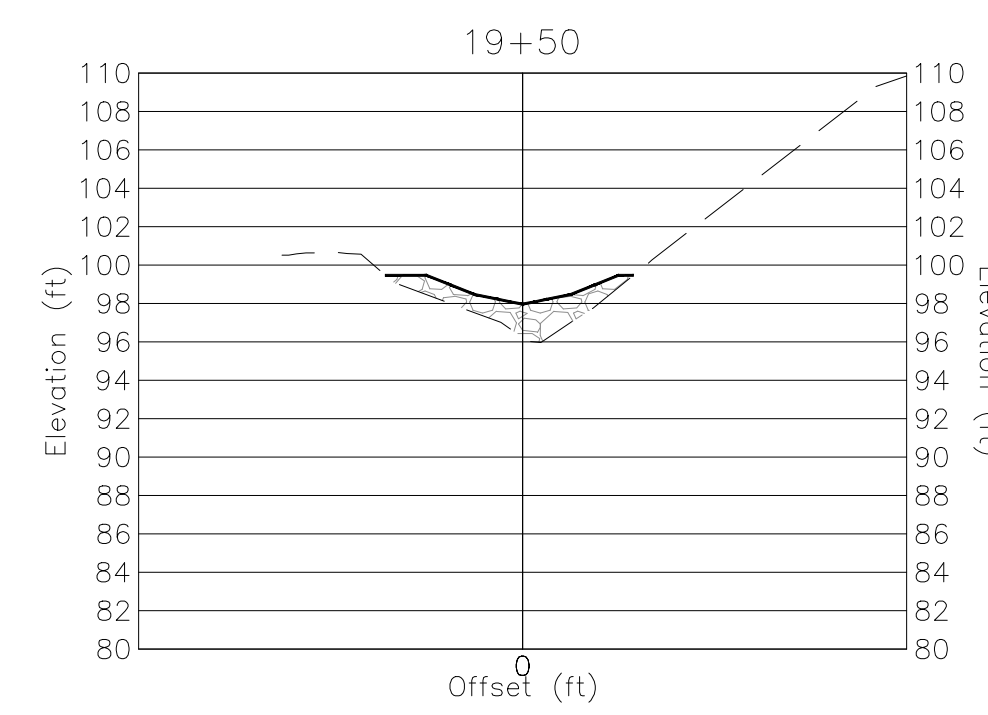
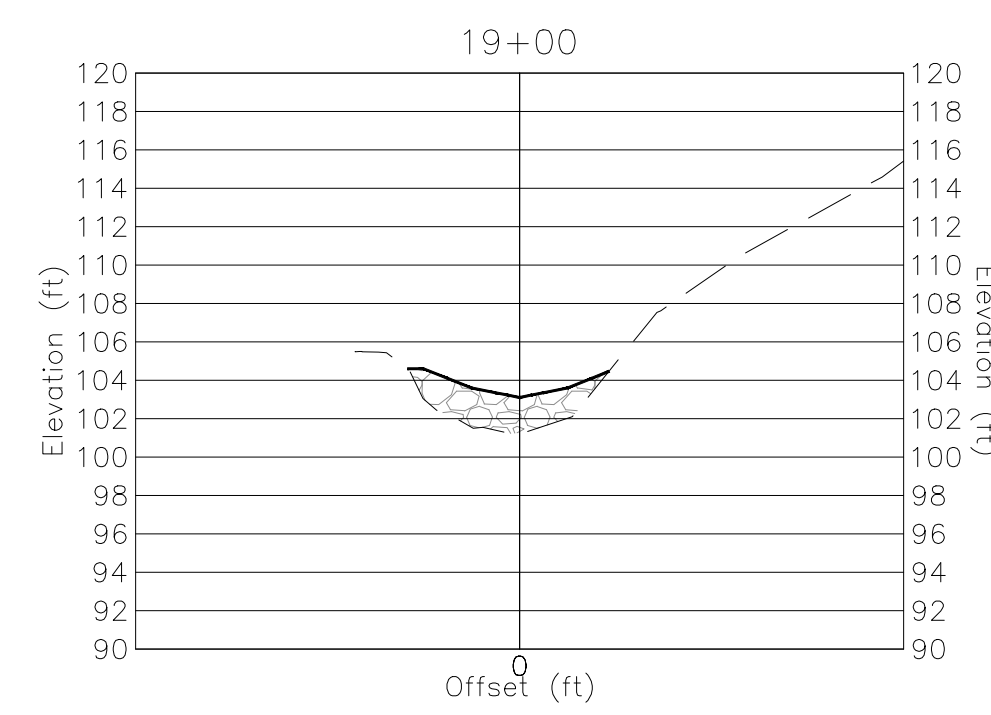
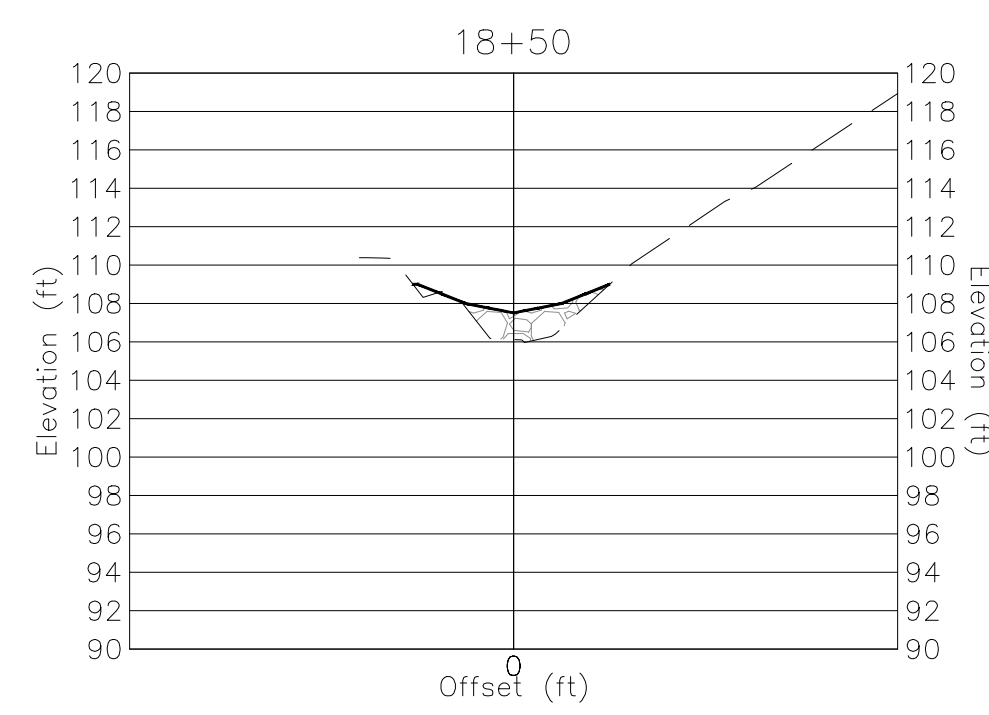
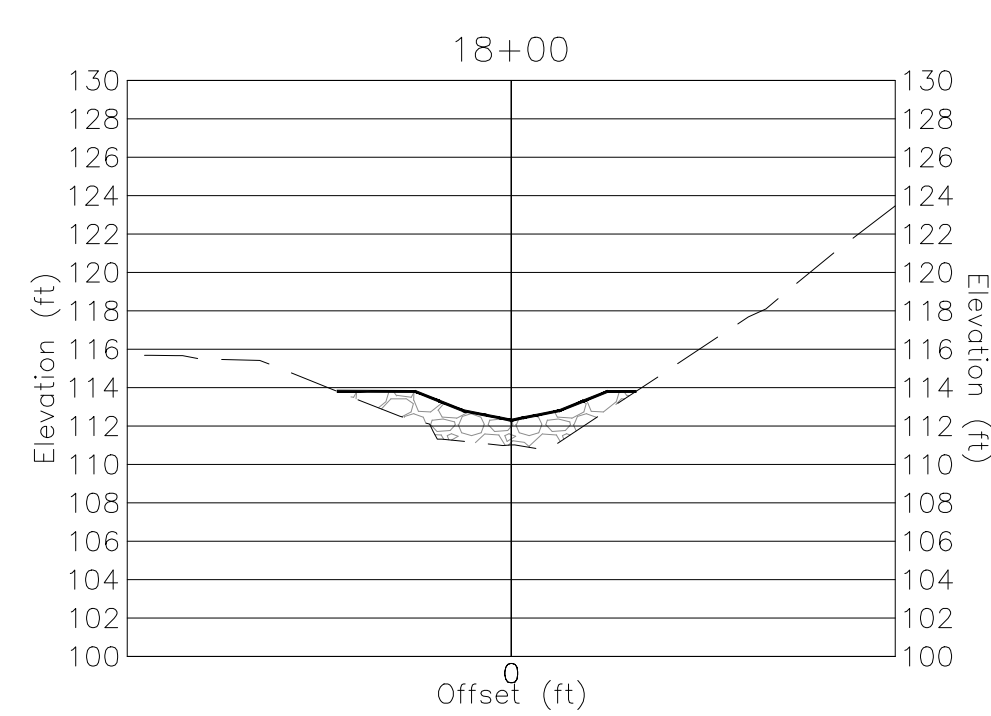
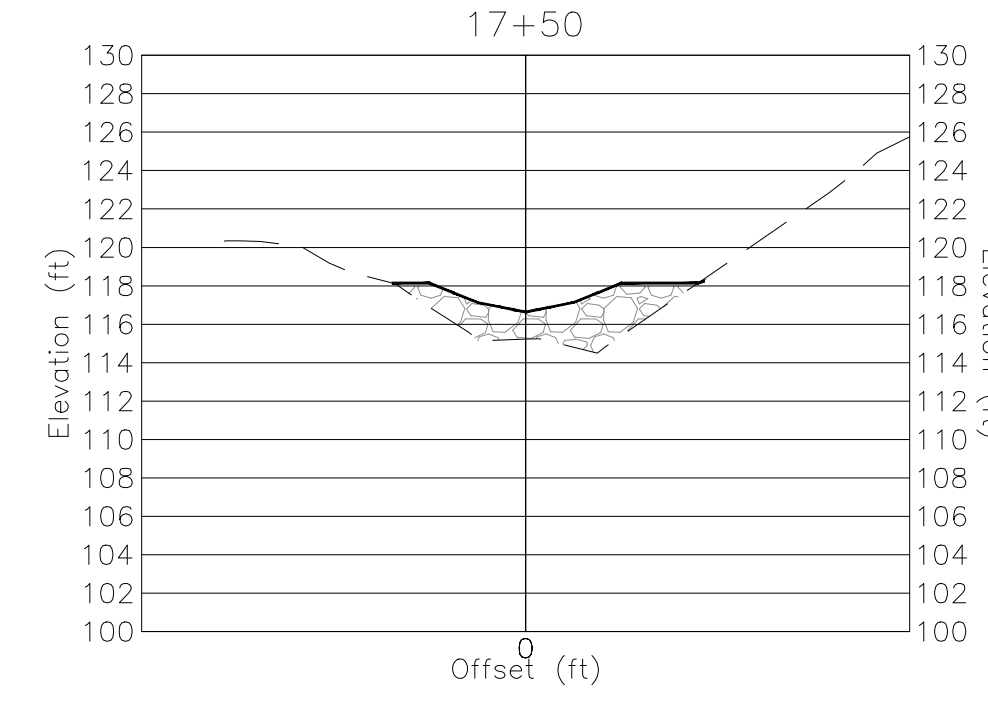
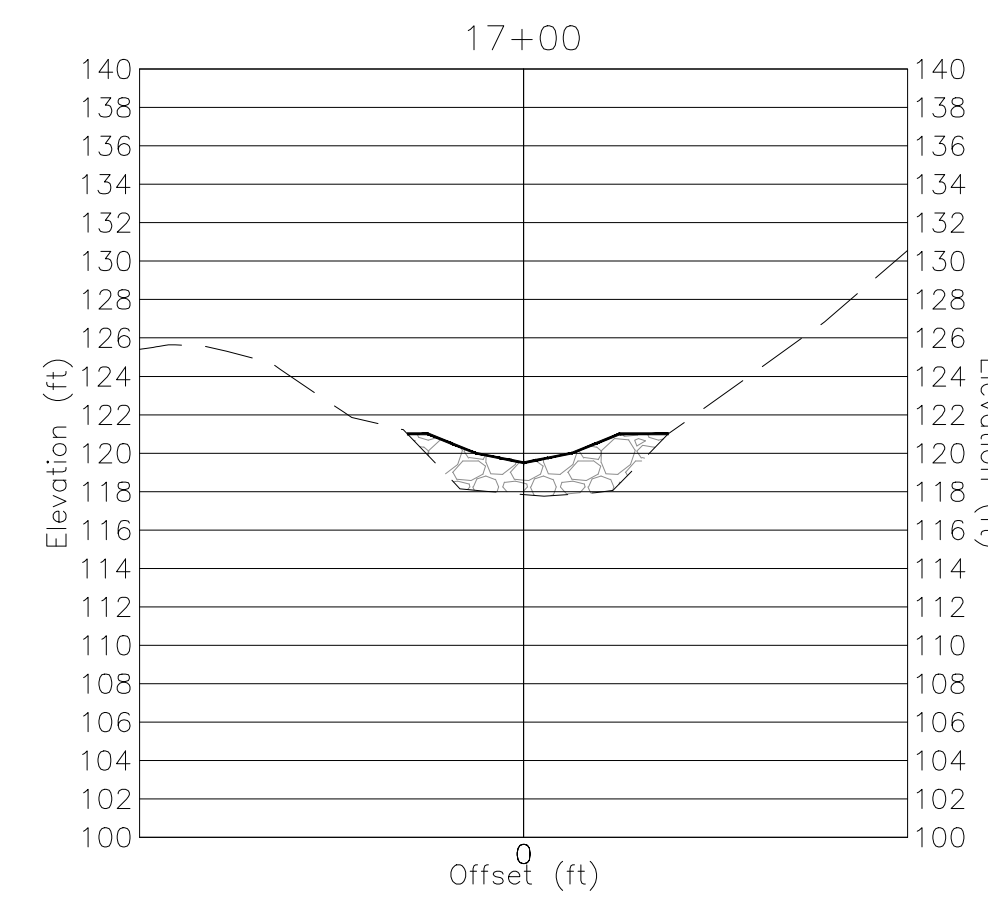
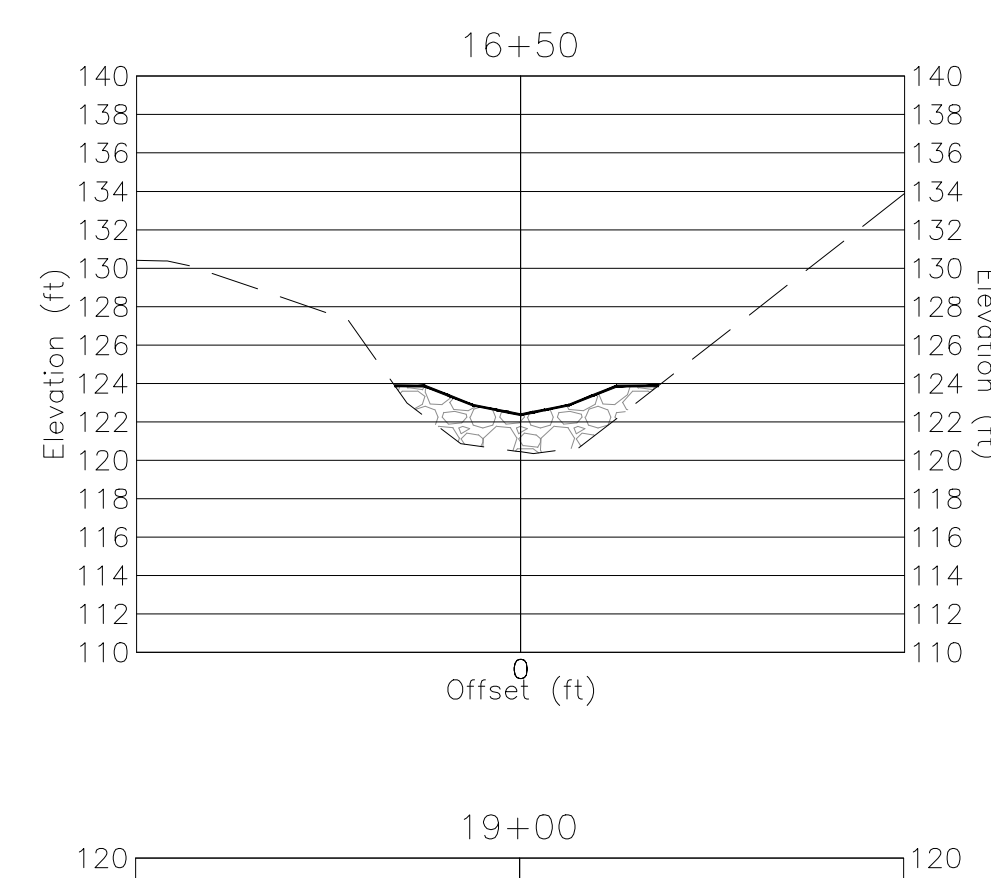
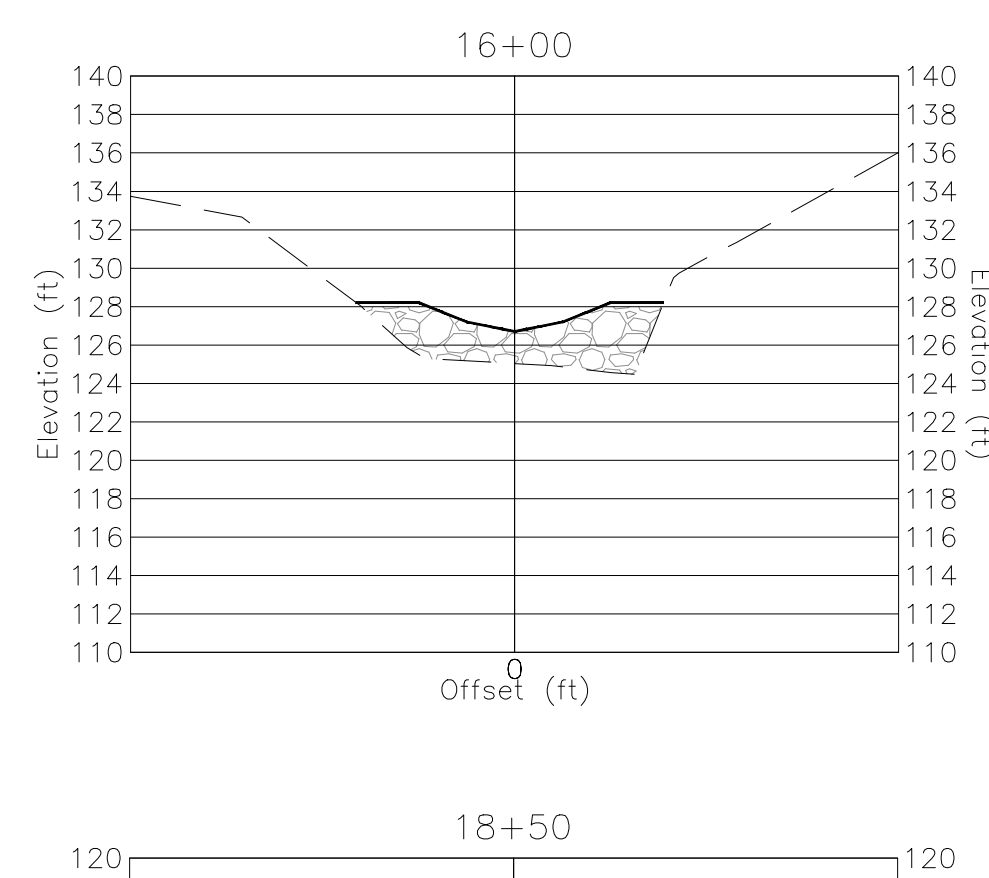
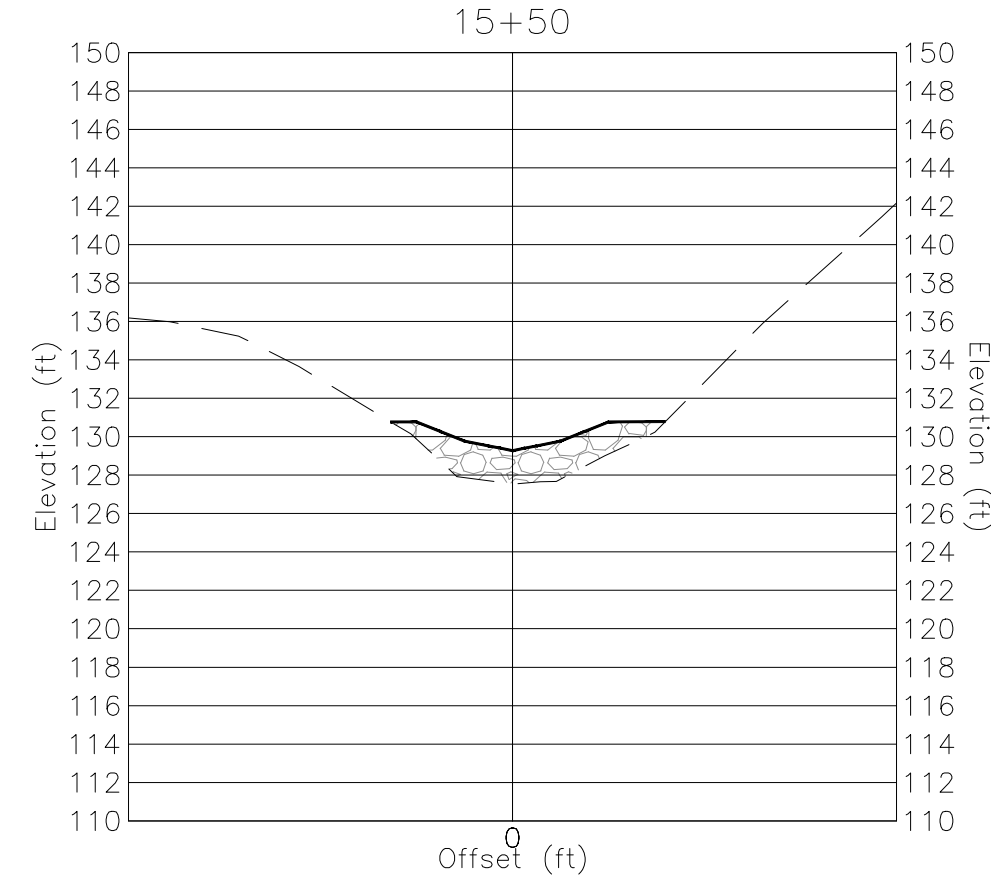
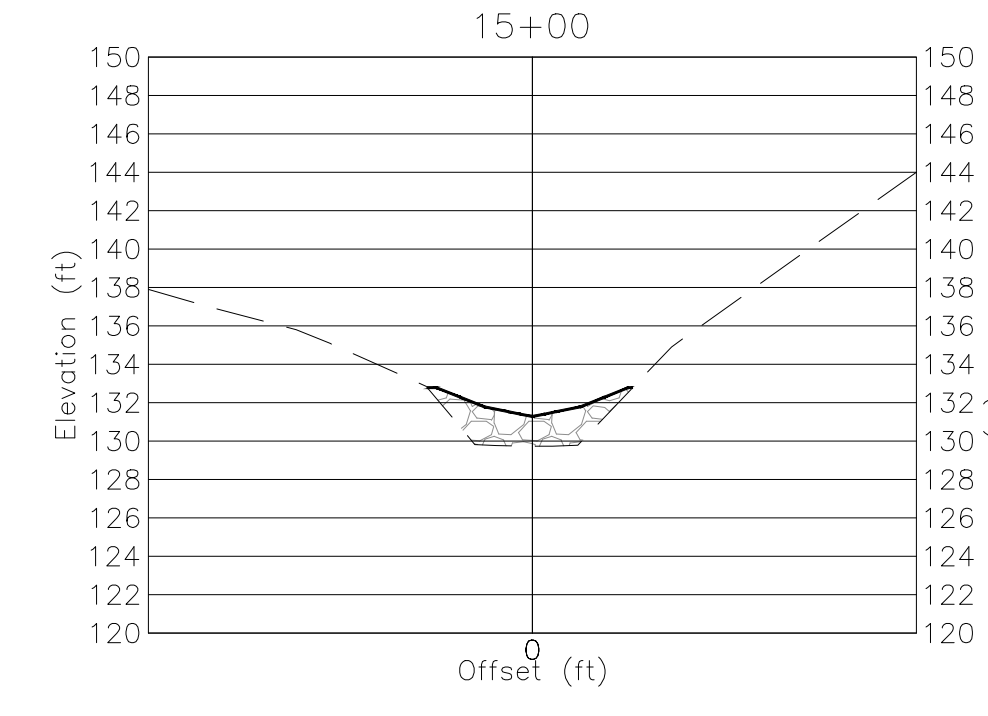
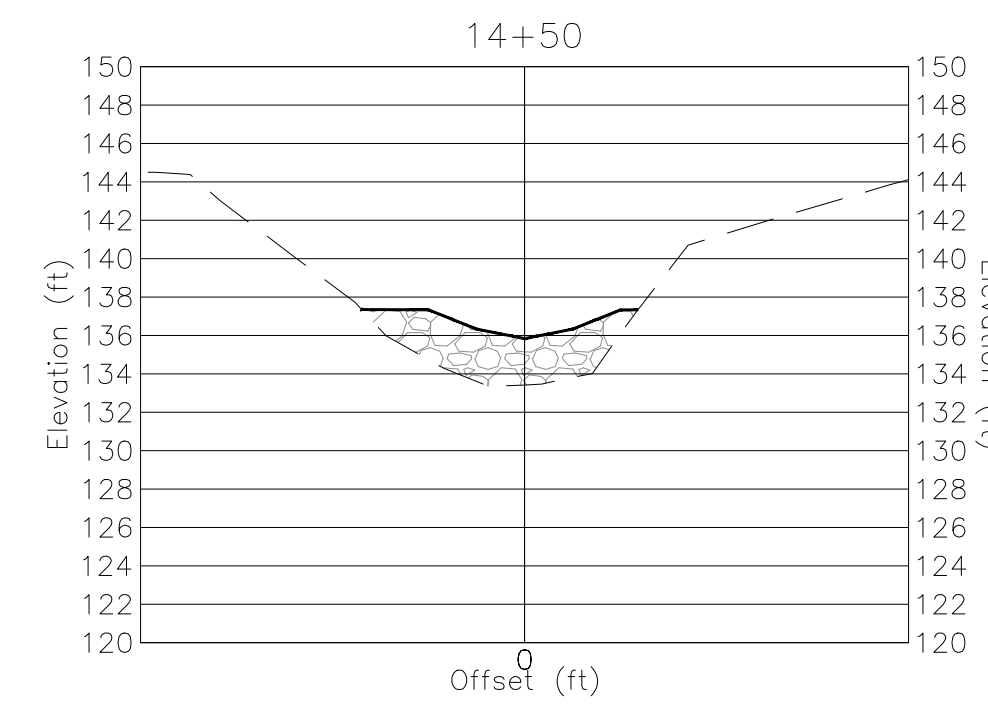
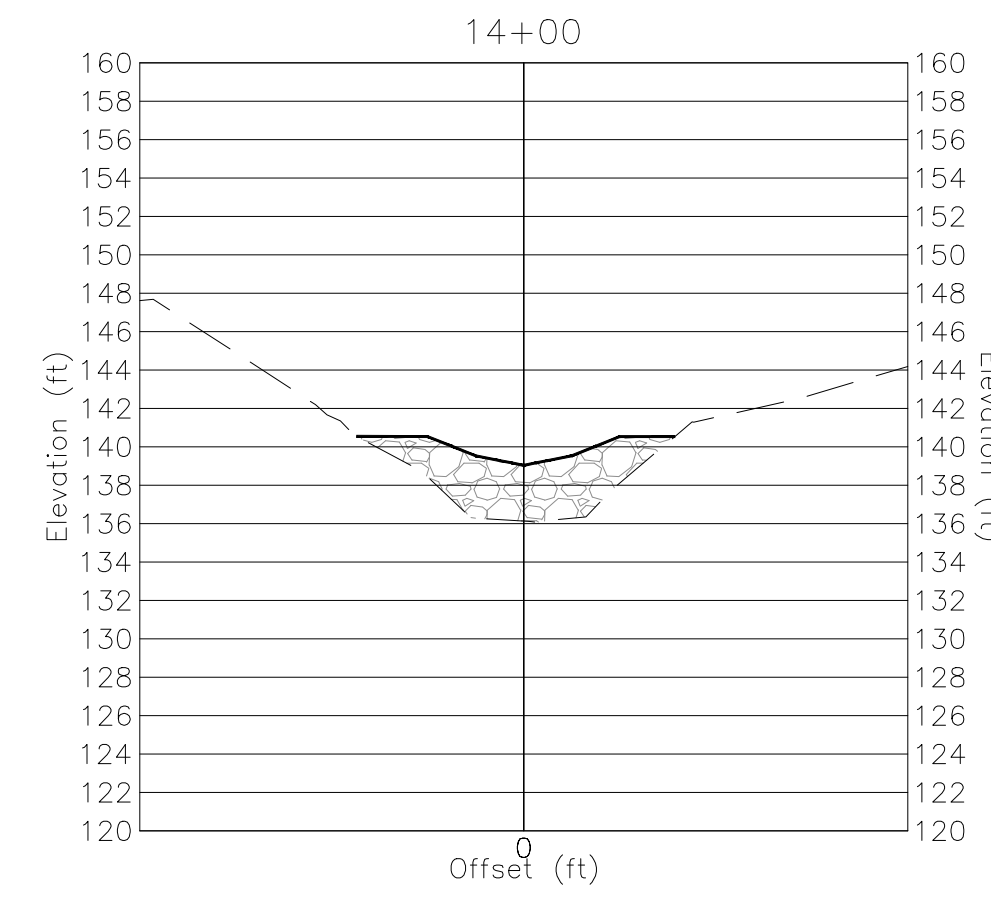
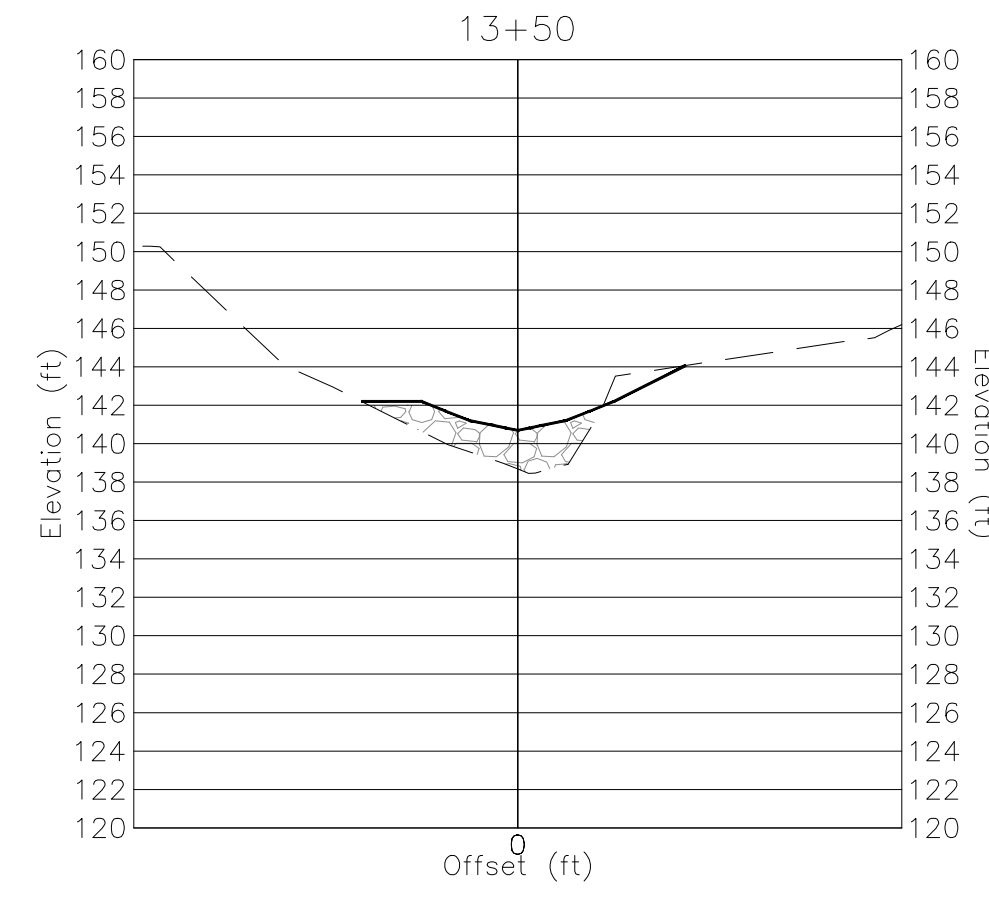
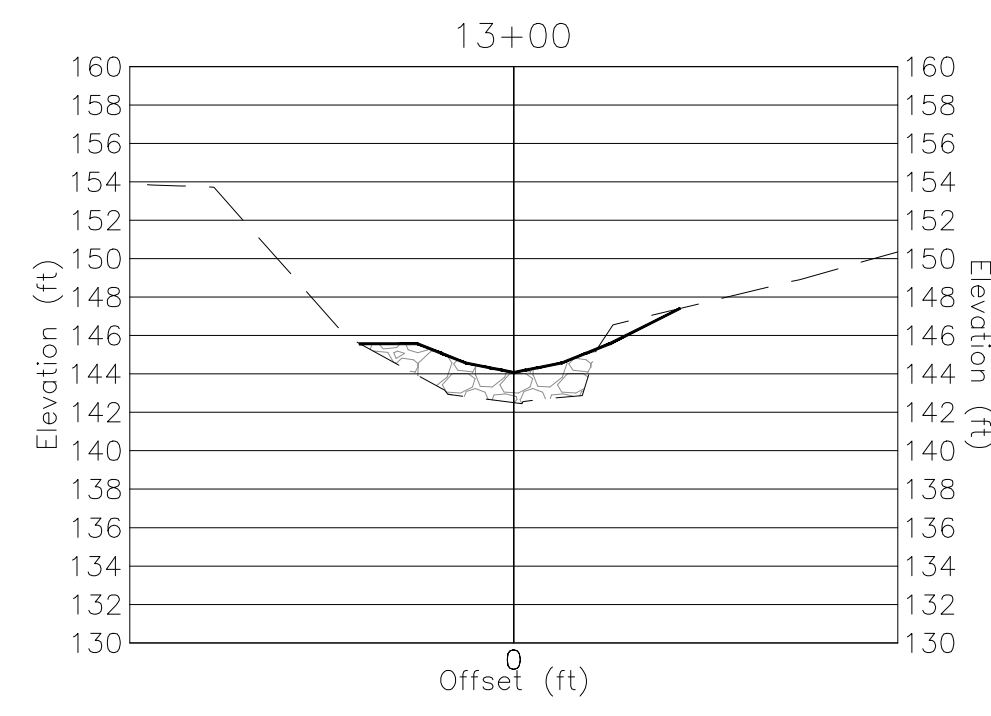
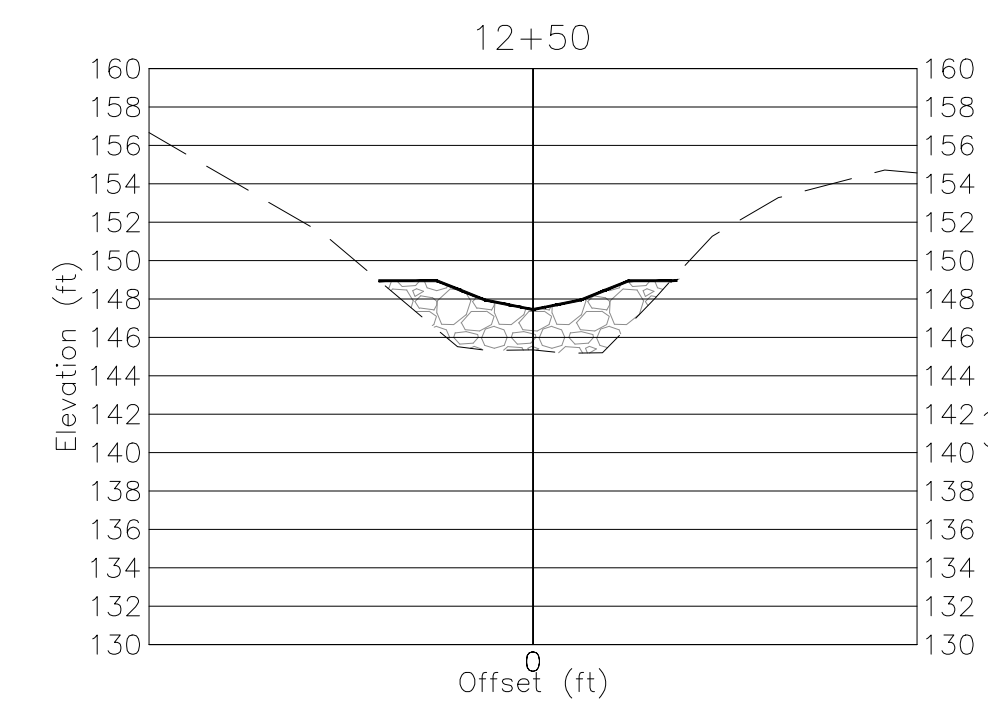
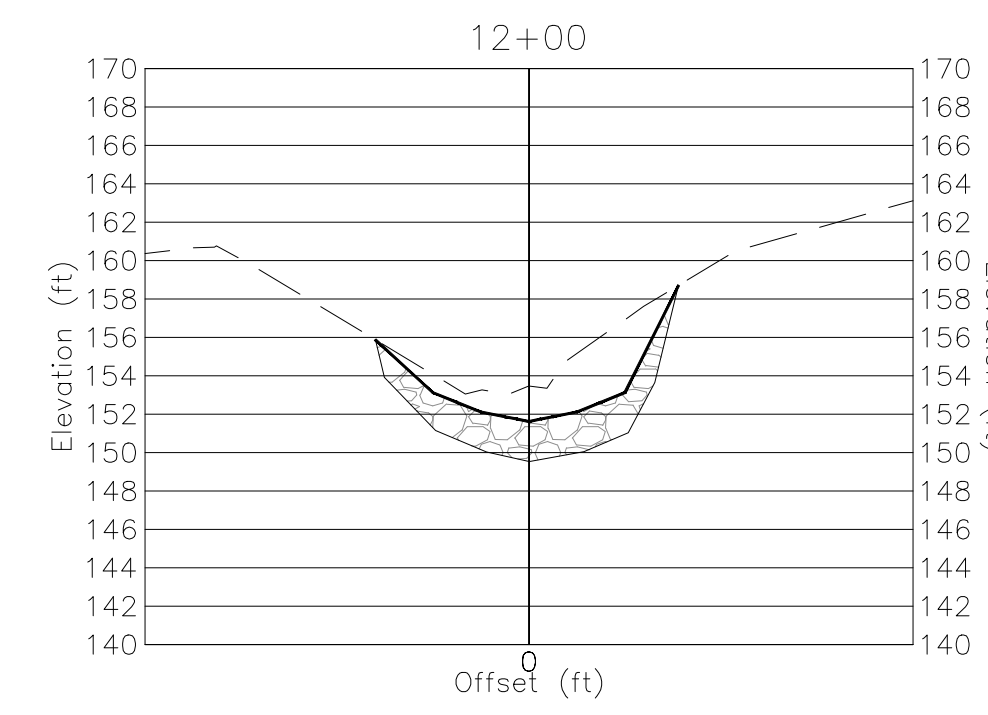
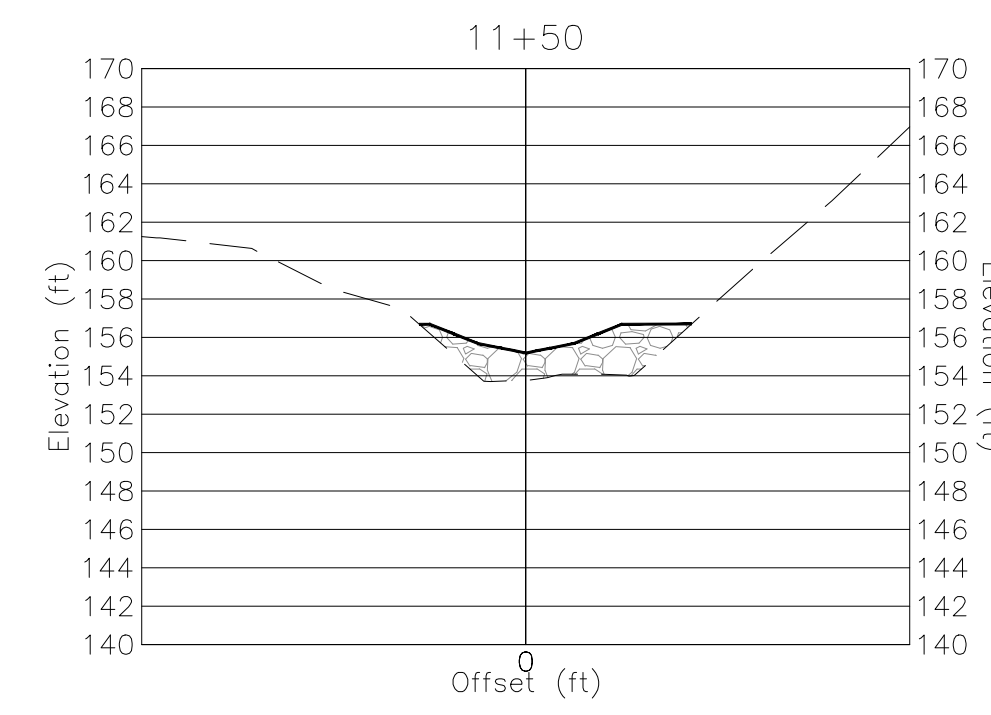
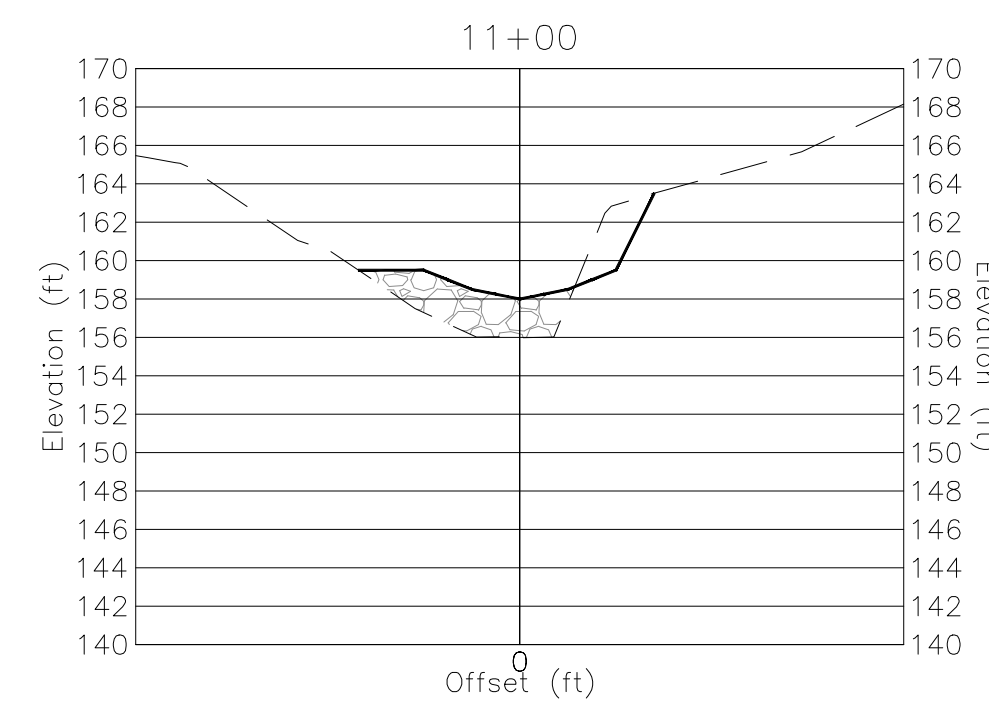
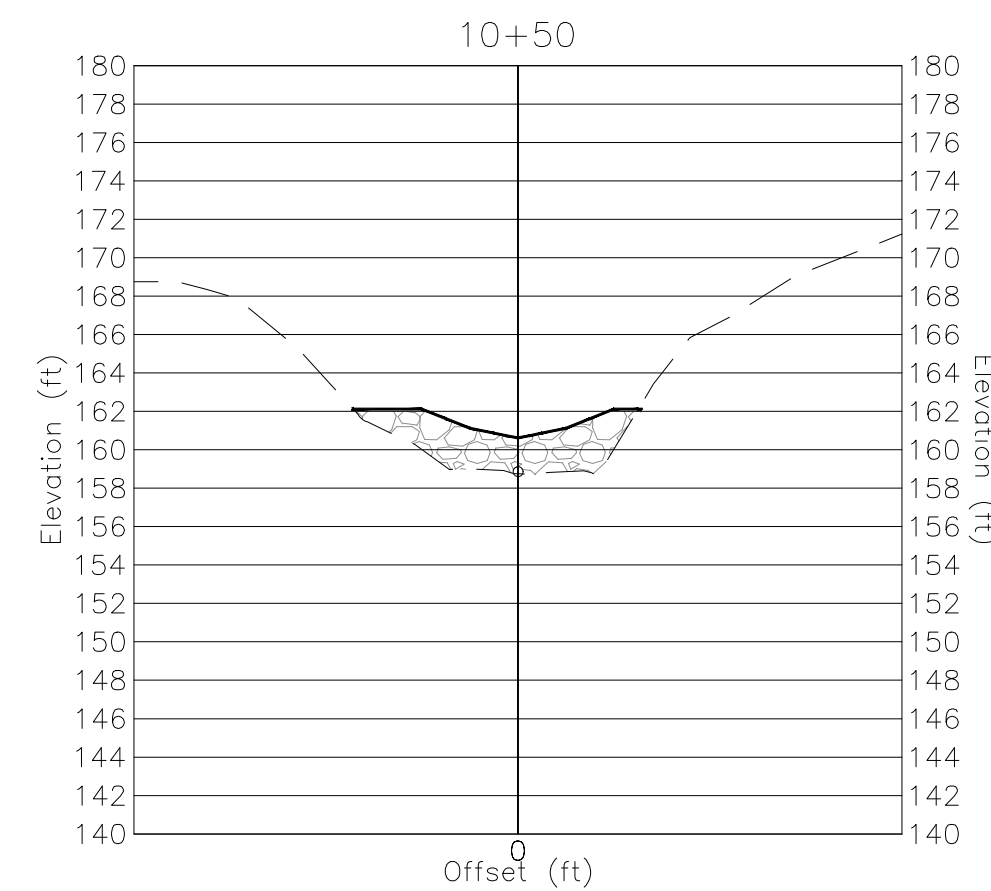
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 Vertical Datum: NAVD 88  
 Boundary and Topo Source: Arlington GIS Survey Data, WSSI Survey

Design	Draft	Approved
NAS	NAS	FRG

Sheet #  
 2 of 23

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CROSS SECTION GRADE INFORMATION SHOWN ON THIS SHEET DEPICTS GENERAL CONDITIONS AT REGULAR INTERVALS. ACTUAL GRADING AND CLASS II PLACEMENT TO BE BASED ON FIELD CONDITIONS, GRADING PLAN AND PROFILE GRADES/NOTES TAKE PRECEDENT OVER TYPICAL SECTION INFORMATION.

**N GLEBE ROAD CHANNEL REPAIR**  
**FINAL DESIGN**  
 Arlington, Virginia  
**Typical Cross Sections**

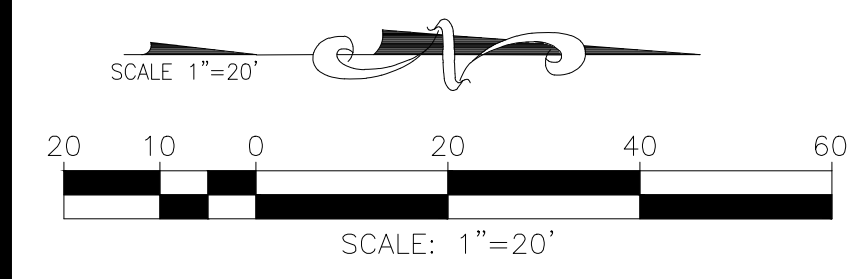
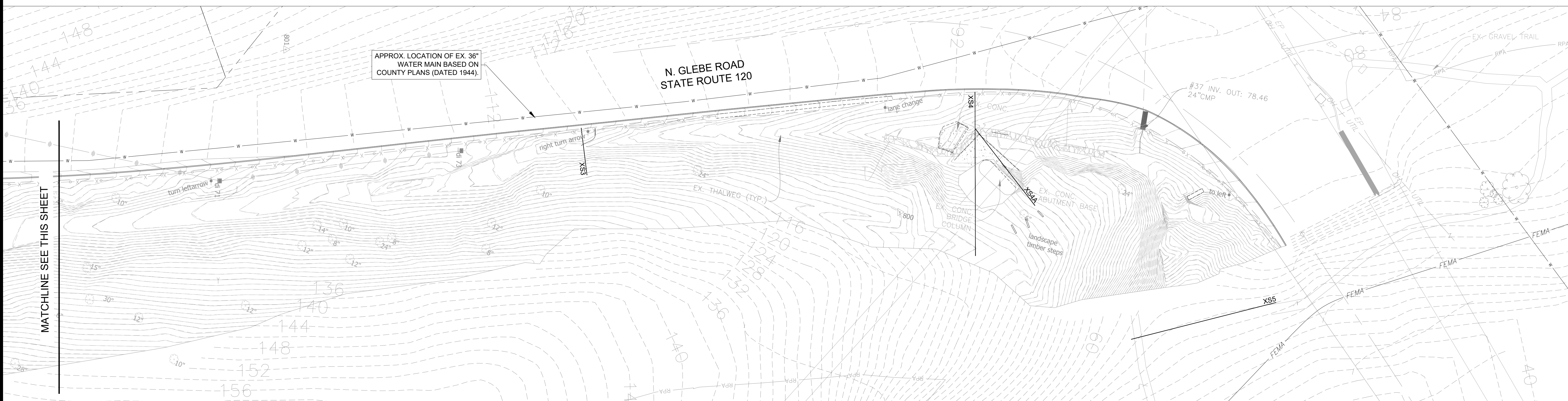
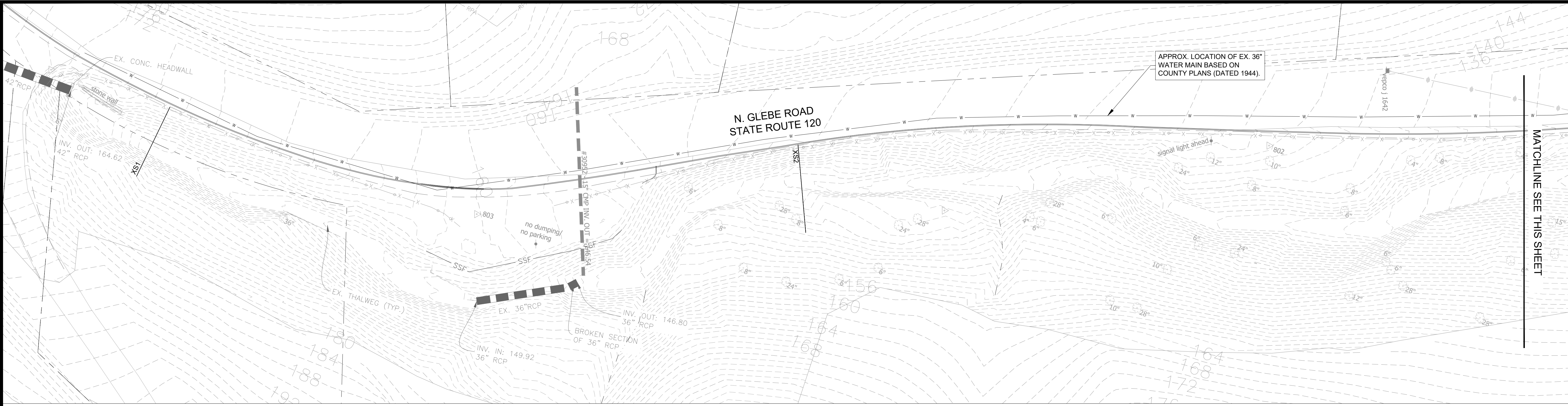


REVISIONS		App. By	By
No.	Date	Description	

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 Vertical Datum: NAVD 88  
 Boundary and Topo Source:  
 Arlington GIS Survey Data, WSSI Survey  

Design	Draft	Approved
NAS	NAS	FRG

 Sheet #  
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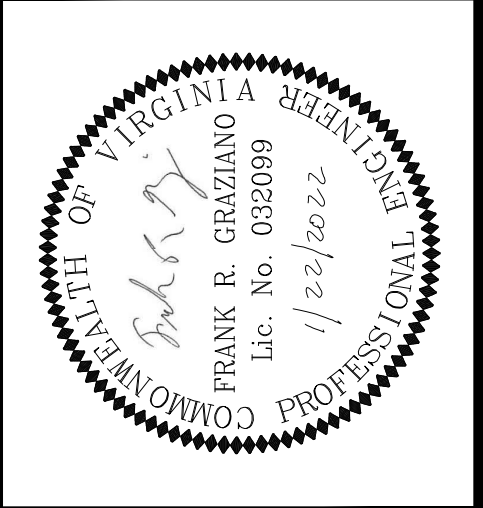
EXISTING CONDITIONS LEGEND	
	GUARDRAIL
	OVERHEAD UTILITY
	EXISTING EASEMENT
	EXISTING INFRASTRUCTURE
	EXISTING CONTOURS
	INTERMITTENT STREAM
	SURVEYED TREE

**SURVEY NOTES:**

- This map has been horizontally oriented to The Virginia Coordinate System of 1983, North Zone, and Vertically to North American Vertical Datum of 1988 (NAVD88) by field location of monumentation shown on drawings provided by Arlington County on March 12, 2020. All horizontal and vertical information is expressed in U.S. Survey Feet. Field locations shown hereon were completed on April 13-14, 2020.
- Additional survey information was collected by Wetland Studies and Solutions, Inc. and data incorporated with County-supplied information.
- One foot contour interval topography provided by County staff is provided for the project area. Additional topography in surrounding areas is based on readily available GIS data. A boundary is shown to depict the interface of the two data sources.

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 Gainesville, Virginia 20155  
 Phone: 703-679-5600 • Fax: 703-679-5601  
 www.wetlands.com

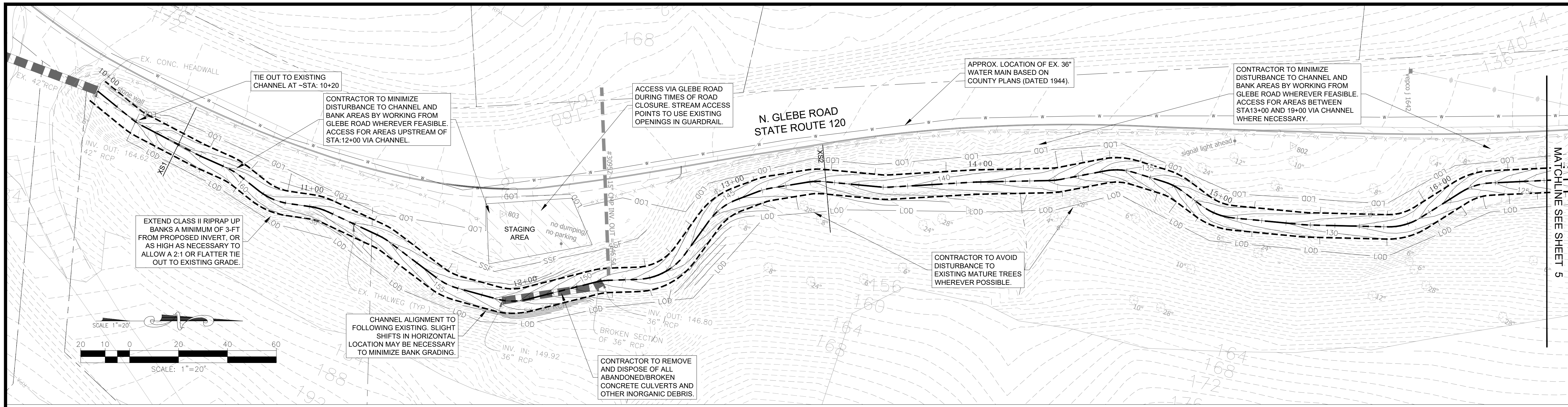
**N GLEBE ROAD CHANNEL REPAIR  
 FINAL DESIGN**  
 Arlington, Virginia  
 Grading Plan and Longitudinal Profile



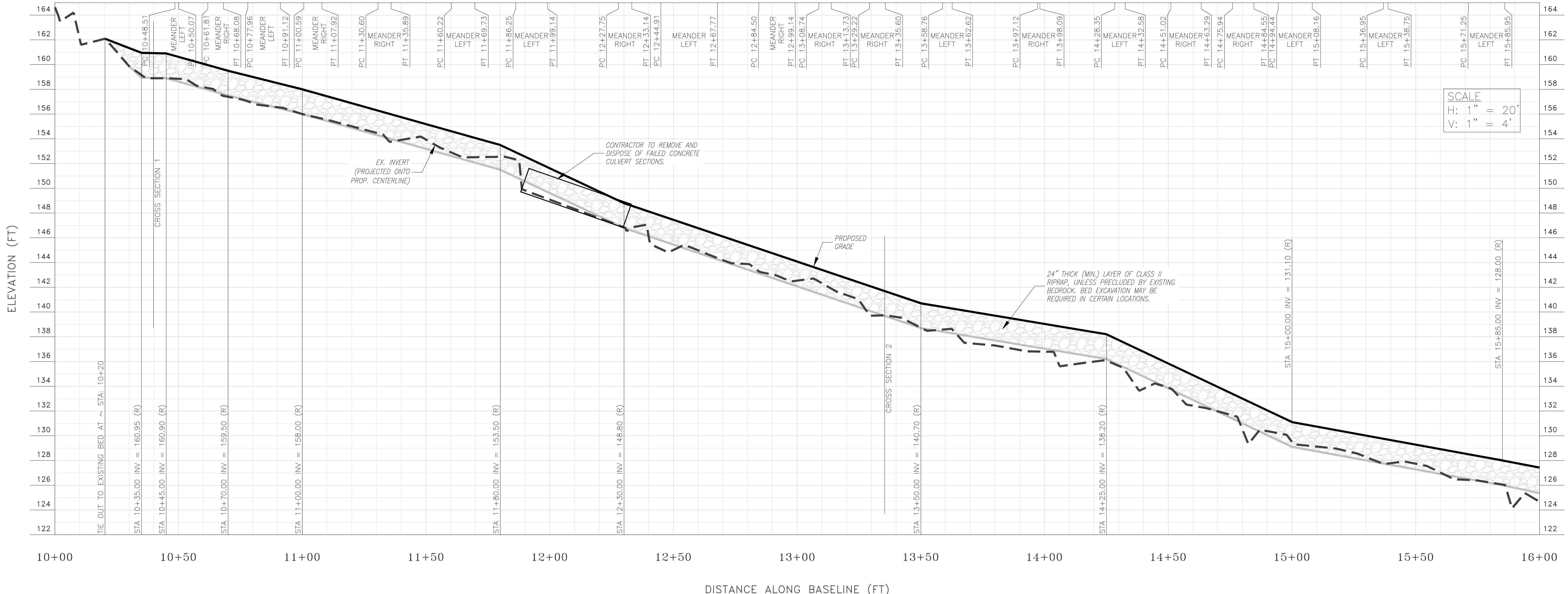
REVISIONS	
No.	Description

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Design	Draft	Approved
NAS	NAS	FRG
Sheet #		
3 of 23		
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LONGITUDINAL PROFILE GLEBE ROAD



SEE CONSTRUCTION DETAIL SHEET FOR GRADING AND AND PROFILE LEGEND INFORMATION

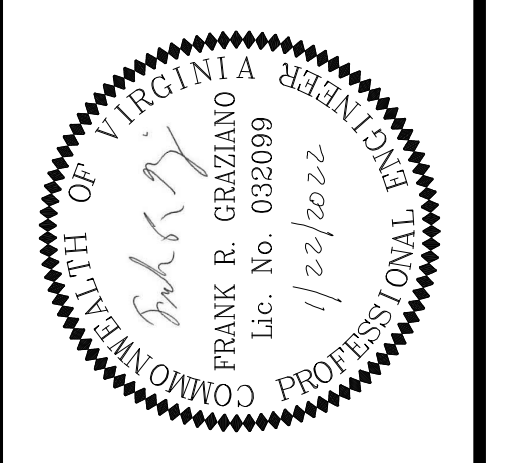
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Gainesville, Virginia 20155  
Phone: 703-679-5600 • Fax: 703-679-5601  
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**N GLEBE ROAD CHANNEL REPAIR**  
**FINAL DESIGN**  
Arlington, Virginia

**Grading Plan and Longitudinal Profile**

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REVISIONS	
No.	Description

App. By: \_\_\_\_\_  
Rev. By: \_\_\_\_\_

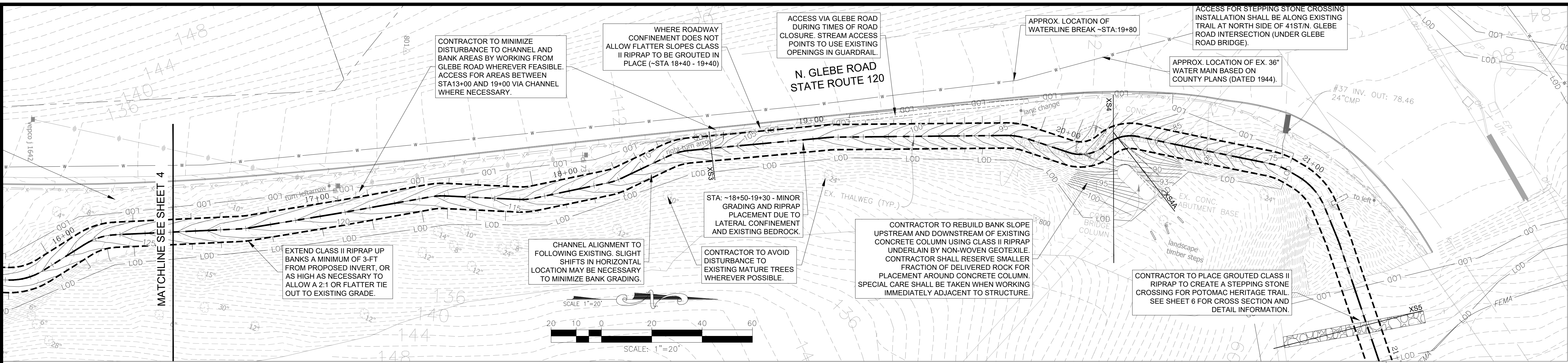
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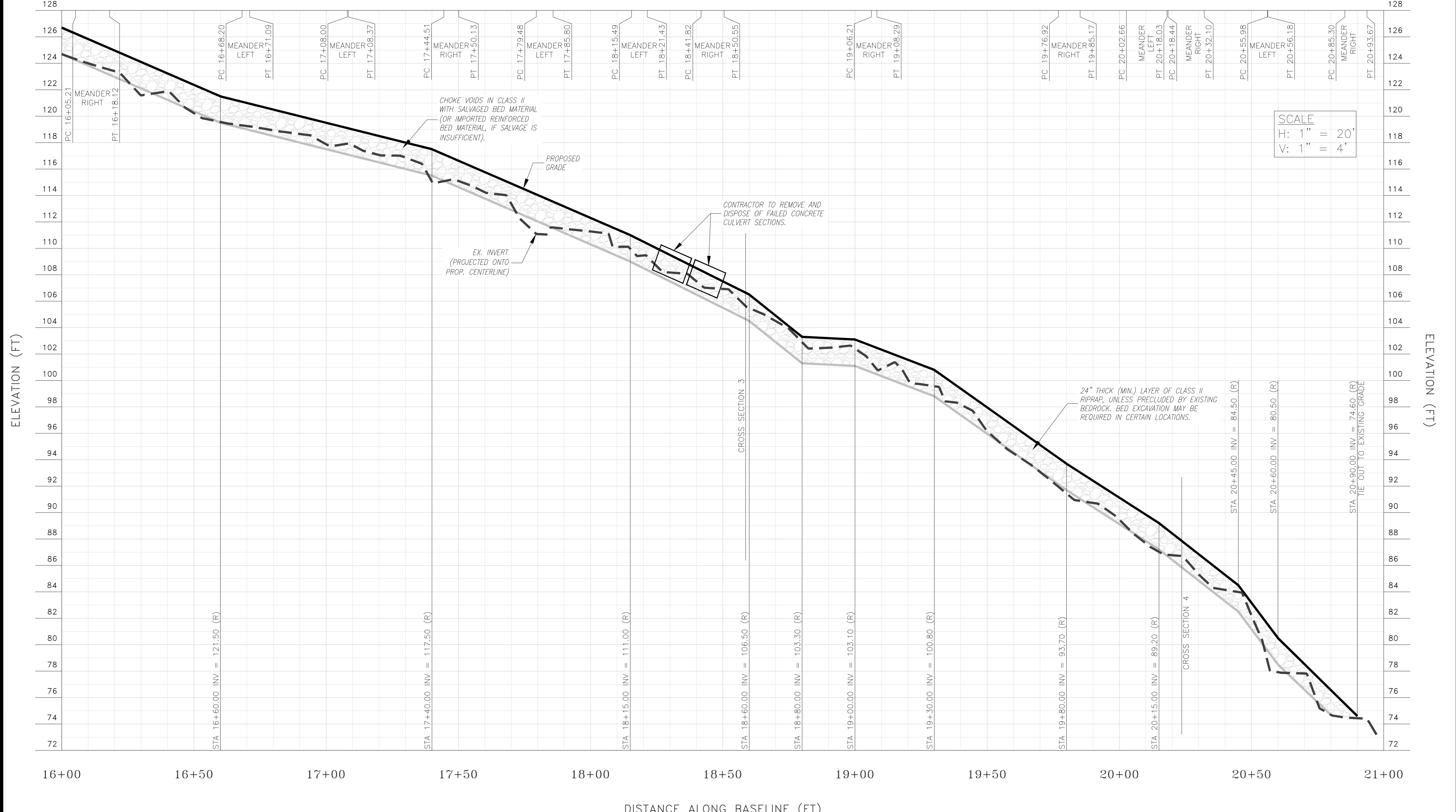
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NAS	NAS	FRG

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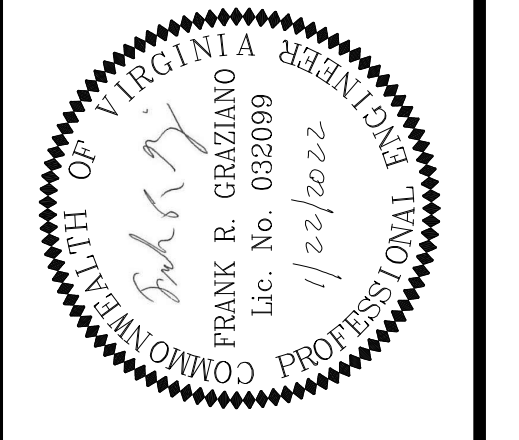
LONGITUDINAL PROFILE GLEBE ROAD (CONT'D)



SEE CONSTRUCTION DETAIL SHEET FOR GRADING AND AND PROFILE LEGEND INFORMATION

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*Studies and Solutions, Inc.*  
 a **DAVEY** company  
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 Gainesville, Virginia 20155  
 Phone: 703-679-5600 • Fax: 703-679-5601  
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**N GLEBE ROAD CHANNEL REPAIR**  
**FINAL DESIGN**  
 Arlington, Virginia  
**Grading Plan and Longitudinal Profile**  
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REVISIONS		App. By	By
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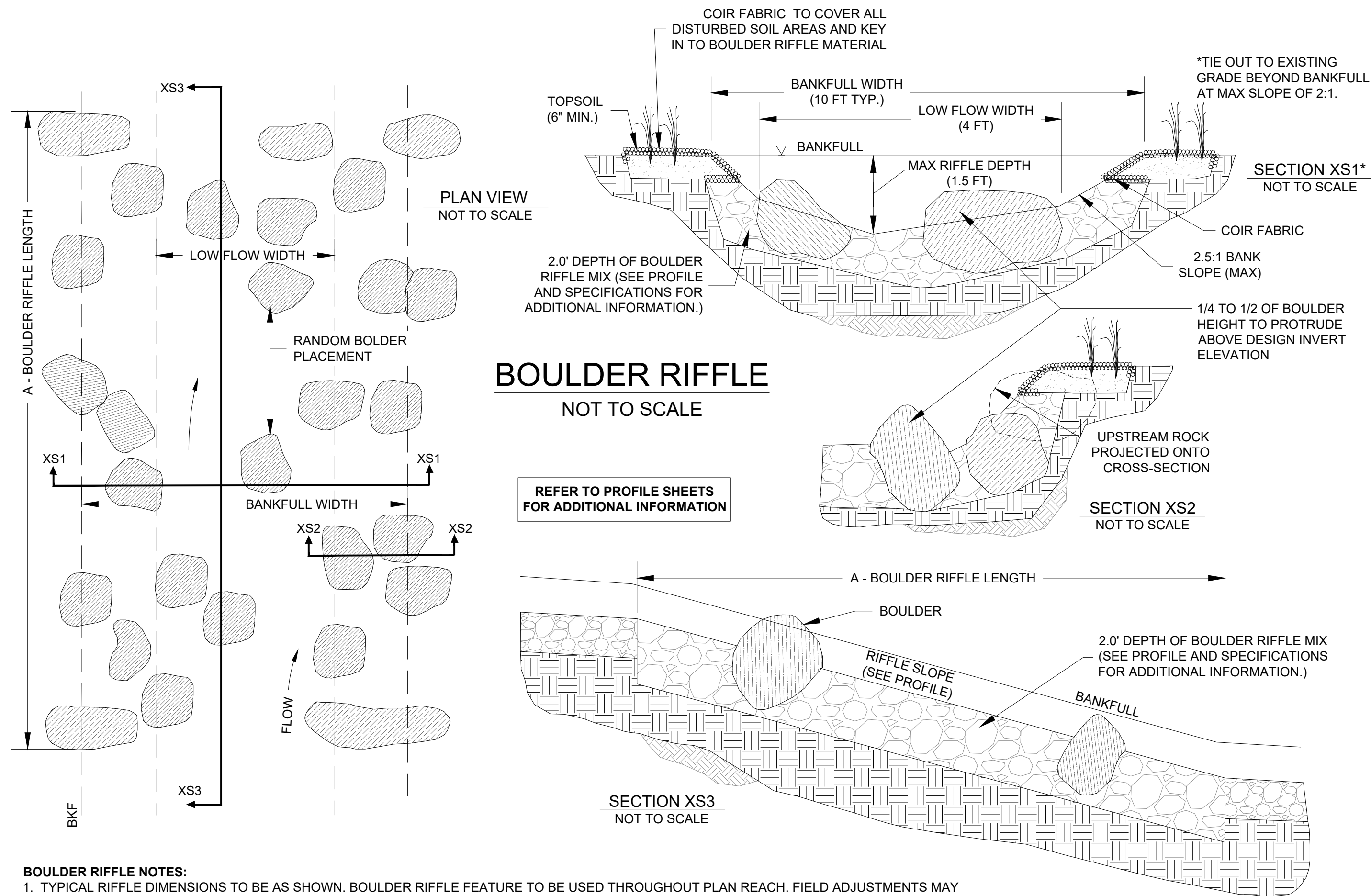
DATE: JAN 22, 2022      SCALE: 1" = 20'

Horizontal Datum: VCS NAD 83  
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 Boundary and Topo Source: Arlington GIS Survey Data, WSSI Survey

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**5 of 23**

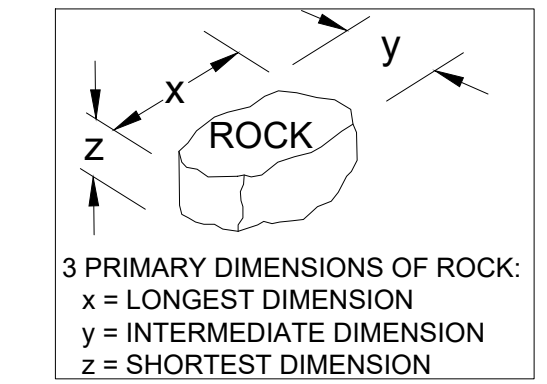
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- BOULDER RIFFLE NOTES:**
1. TYPICAL RIFFLE DIMENSIONS TO BE AS SHOWN. BOULDER RIFFLE FEATURE TO BE USED THROUGHOUT PLAN REACH. FIELD ADJUSTMENTS MAY BE NECESSARY WHERE ROAD AND EXISTING STEEP SLOPE SEVERELY CONFINE CHANNEL.
  2. WEIR ELEVATIONS AND LOCATIONS SHALL ADHERE TO PLAN SPECIFICATIONS. BETWEEN THESE POINTS INVERT LOCATION IS EXPECTED TO VARY WIDELY THROUGH THE FULL WIDTH OF THE LOW FLOW CHANNEL. SEE TYPICAL RIFFLE DETAIL FOR ADDITIONAL INFORMATION.
  3. 40% OF RIFFLE AREA SHALL CONSIST OF PROTRUDING RANDOM BOULDERS (STRUCTURE ROCK). BOULDERS SHALL BE PLACED SO AS TO MAXIMIZE CHANNEL ROUGHNESS (NOT FLAT), LEAVING LOCALIZED SCOUR HOLES BETWEEN PROTRUDING BOULDERS. BOULDERS SHALL BE PLACED WITH 1/4 TO 1/2 OF THE ROCK HEIGHT BURIED BELOW THE INVERT AND THE REMAINDER PROTRUDING FROM THE SURROUNDING BED. PROTRUSION HEIGHTS SHALL VARY.
  4. SPECIFIC LOCATIONS FOR RANDOM BOULDER PLACEMENT SHALL BE MARKED AND REVIEWED BY DESIGN ENGINEER OR ENGINEER'S REPRESENTATIVE PRIOR TO PLACEMENT.
  5. RANDOM BOULDERS SHOULD BE PLACED AT THE DESIGNATED LOCATIONS AND THE FEATURE BACKFILLED WITH MATERIAL AS SPECIFIED IN THE PROFILE AND BOULDER RIFFLE MIXTURE SPECIFICATIONS.

**STRUCTURE DETAIL LEGEND**

- CLASS II REINFORCED BED
- IN-SITU MATERIAL
- FILL MATERIAL
- TOPSOIL
- FILTER FABRIC
- COIR MATTING



- STEPPING STONE NOTES:**
1. LOCATION OF STEPPING STONE CROSSING TO BE FIELD ADJUSTED TO CONNECT EXISTING PORTIONS OF HERITAGE TRAIL AT ADJACENT TOP OF BANKS.
  2. HEADER AND FOOTER ROCKS TO HAVE AN INTERMEDIATE DIMENSION OF 30-IN (MIN.), AND DENSITY OF 175 PCF OR GREATER.
  3. FILL UPSTREAM AND DOWNSTREAM AREAS AROUND STEPPING STONE STRUCTURE WITH CLASS II RIPRAP TO PROVIDE GRADUAL (5:1 SLOPE OR FLATTER) TRANSITION TO SURROUNDING GRADE.
  4. CONTRACTOR TO GROUT ROCKS OF STEPPING STONE CROSSING (INCLUDING MIN. OF 5-FT UPSTREAM AND DOWNSTREAM OF CROSSING) IN PLACE. GROUT MIXING, HANDLING, AND PLACEMENT SHALL CONFORM TO CURRENT VDOT ROAD AND BRIDGE SPECIFICATION STANDARDS.

**"REINFORCED BED" MIXTURE SPECIFICATIONS**

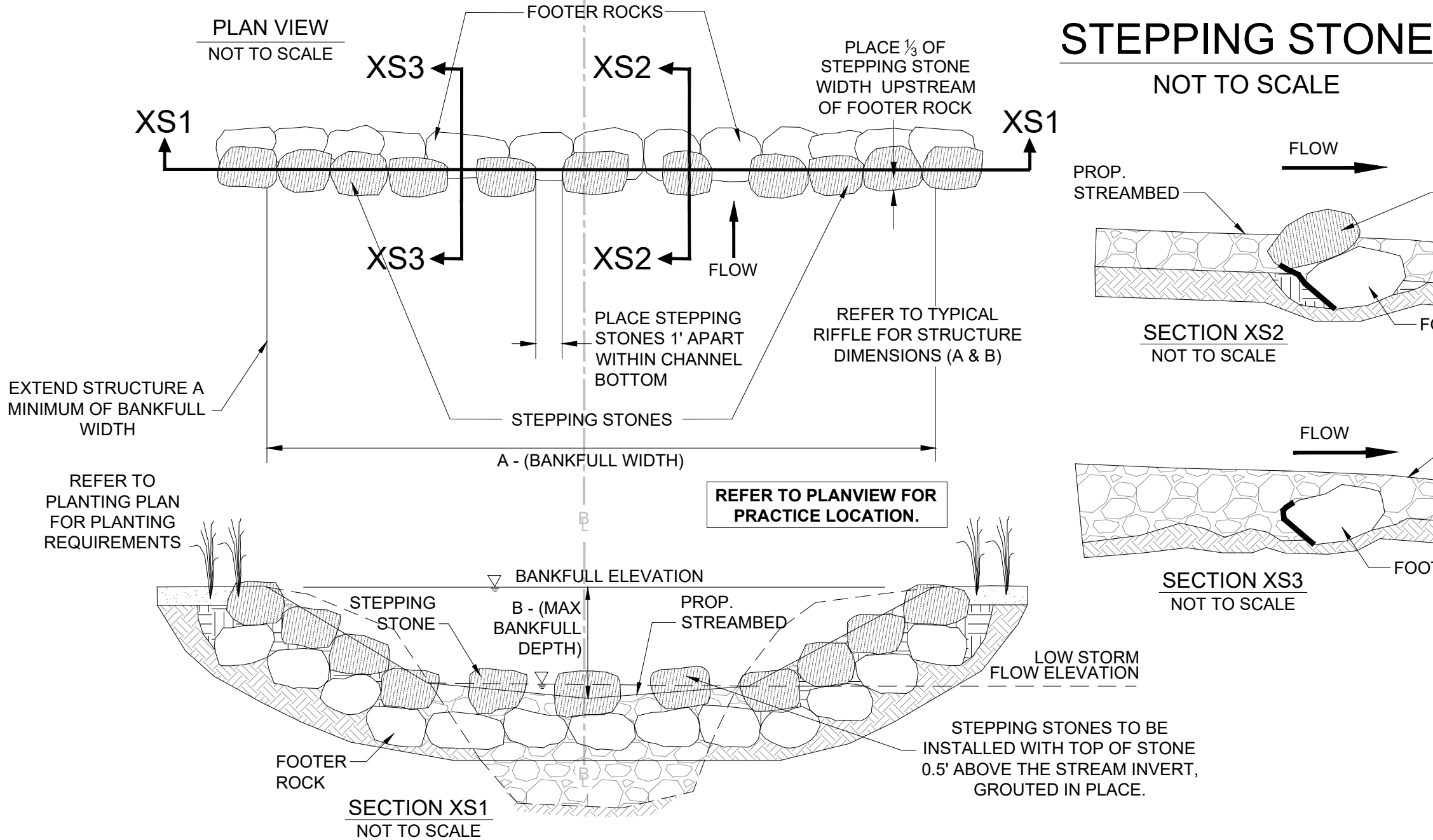
THE REINFORCED BED MIXTURE SPECIFIED BELOW MUST BE APPROVED BY THE PROJECT ENGINEER PRIOR TO BEING PLACED IN THE STREAM CHANNEL. SHOULD EXCAVATION TO SUBGRADE GENERATE SUITABLE MATERIALS/QUANTITIES FOR CHOKING CLASS II RIPRAP. SMALLER FRACTIONS OF THE BELOW SPECIFIED MIX MAY NOT BE NECESSARY.

MATERIAL	SIZE (D <sub>50</sub> )	PORTION	PERCENT (%)
ROCK	VDOT CLASS II (1.6 FT)	2 BUCKETS	50 - 55%
A1 ROCK <sup>2</sup>	6.7 in (277 mm)	2 BUCKETS	20 - 25%
BANK RUN <sup>3</sup> GRAVEL	0.08 - 2.5 in (2 - 64 mm)	2 BUCKETS	10 - 15%
COARSE SAND <sup>4</sup>	0.04 - 0.08 in (1 - 2 mm)	0.75 BUCKET	10 - 15%

1. THE REINFORCED BED SHALL BE A MINIMUM OF 2.0' IN DEPTH. PORTIONS OF THE STREAM WITH SLOPES GREATER THAN 2.0% SHALL HAVE A MINIMUM REINFORCED BED MATERIAL THICKNESS OF 1.5X THE ROCK FRACTION D<sub>50</sub>. SEE LONGITUDINAL PROFILE FOR LOCATIONS AND THICKNESS.
2. THE A1 ROCK PORTION OF THE MIXTURE SHALL CONSIST OF RIVER COBBLE (MIN. ALLOWABLE D<sub>50</sub> FOR COBBLE MATERIAL = 8 INCHES) OF COLOR WHITE, TAN, YELLOW, OR BROWN. THE VOIDS WILL BE FILLED WITH A MIXTURE OF SAND, GRAVEL, AND TOPSOIL. THIS COMPOSITION WILL RESULT IN A VERY RESISTANT, ARMORED SUBSTRATE THAT WILL BE CAPABLE OF WITHSTANDING MUCH GREATER SHEAR STRESS THAN THE COMPUTATION OF THE REQUIRED D<sub>50</sub> WOULD SUGGEST. CLASS A1 RIPRAP SHALL BE AN ACCEPTABLE ALTERNATE, SUBJECT TO COUNTY APPROVAL, AS LONG AS IT MEETS THE SPECIFIED SIZE REQUIREMENTS. **NOTE** - CLASS A1 IS SPECIFIED BY VDOT TO HAVE A D<sub>50</sub> OF APPROXIMATELY 10 INCHES. WSSI INVESTIGATION OF MATERIAL FROM MULTIPLE QUARRIES HAS FOUND ACTUAL D<sub>50</sub> TO BE APPROXIMATELY 6.7 INCHES (THE LARGEST SIZE TYPICALLY PRODUCED AS ROCK CRUSHER OUTPUT). SPECIFICATIONS IN THIS PLAN ARE DESIGNED TO ACKNOWLEDGE AND ACCOUNT FOR THIS DISCREPANCY.
3. BANK RUN GRAVEL MAY INCLUDE UP TO 5% CLAY, SILT, AND/OR SAND, AND UP TO 25% COBBLE (D<sub>50</sub> = 3" TO 8"). GRAVEL MUST HAVE NATURAL COLOR (WHITE, TAN, YELLOW, OR BROWN).
4. THE SAND PORTION OF THE MIXTURE SHALL CONSIST OF A WELL MIXED SAND PREDOMINANTLY 1.0 MILLIMETERS TO 2.0 MILLIMETERS IN SIZE, SUBJECT TO ENGINEER APPROVAL (I.E. WASHED CONCRETE SAND IS NOT REQUIRED). SAND MUST BE WHITE, TAN, YELLOW, OR BROWN IN COLOR.

**LEGEND**

- GUARDRAIL
- OVERHEAD UTILITY
- EXISTING EASEMENT
- EXISTING INFRASTRUCTURE
- EXISTING CONTOURS
- INTERMITTENT STREAM
- SURVEYED TREE
- LIMITS OF DISTURBANCE
- PROPOSED GRADING (1-FT C.I.)
- PROPOSED STREAM CENTERLINE
- PROPOSED BANKFULL WIDTH



EXTEND STRUCTURE A MINIMUM OF BANKFULL WIDTH

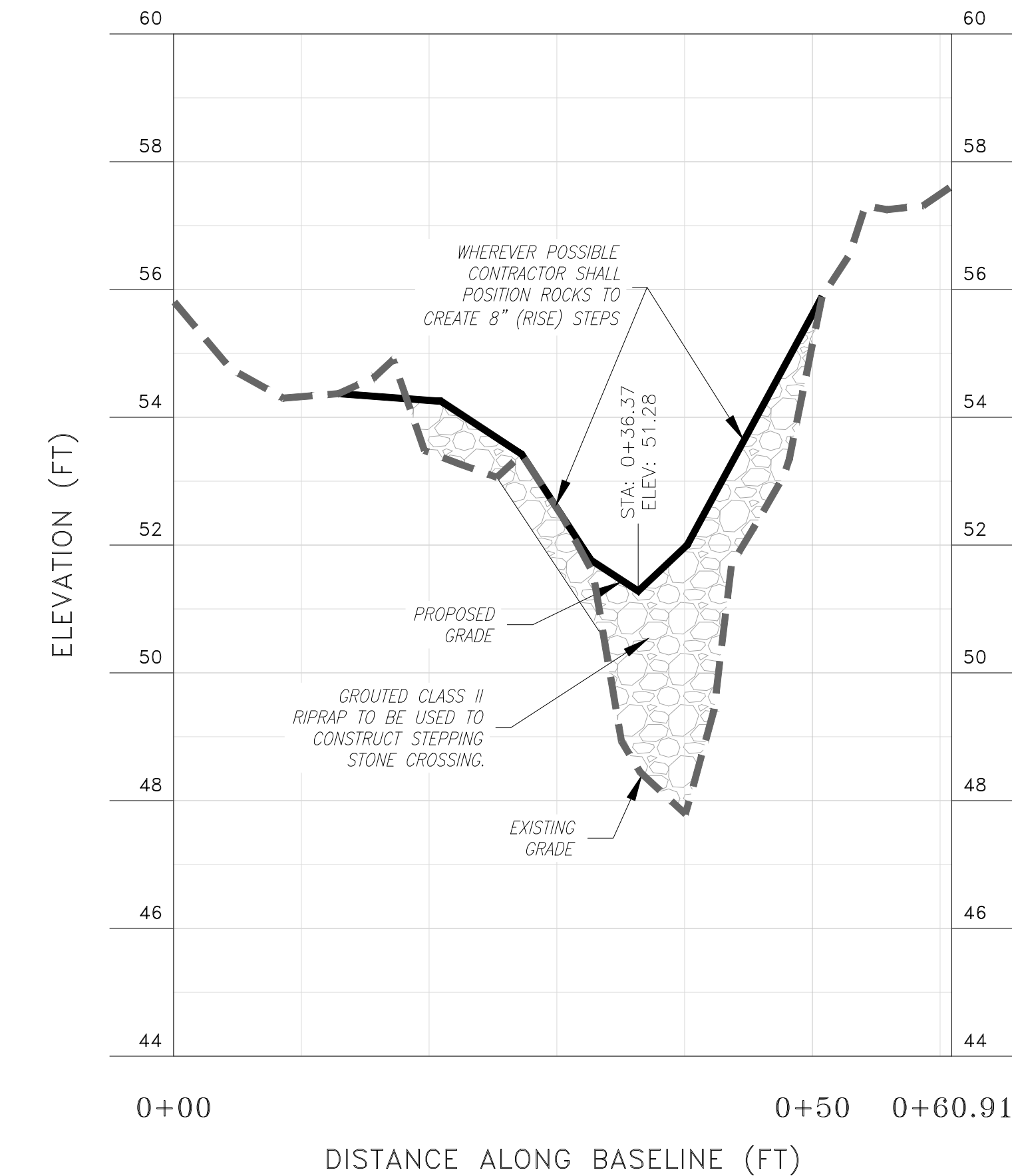
REFER TO PLANVIEW FOR PRACTICE LOCATION.

REFER TO TYPICAL RIFFLE FOR STRUCTURE DIMENSIONS (A & B)

REFER TO PLANTING PLAN FOR PLANTING REQUIREMENTS

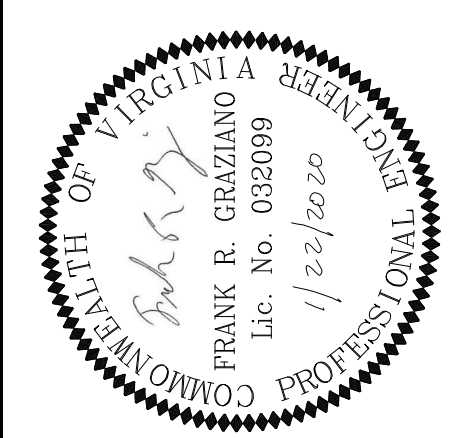
STEPPING STONES TO BE INSTALLED WITH TOP OF STONE 0.5' ABOVE THE STREAM INVERT, GROUTED IN PLACE.

**GLEBE ROAD XS5 STA: 21+64 - STEPPING STONE CROSSING**



N GLEBE ROAD CHANNEL REPAIR  
FINAL DESIGN

Arlington, Virginia  
Construction Details & Bed Material Sizing



**REVISIONS**

No.	Date	Description	App. By	By

DATE: JAN 22, 2021 SCALE: As Noted

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Vertical Datum: N/A  
Boundary and Topo Source: N/A

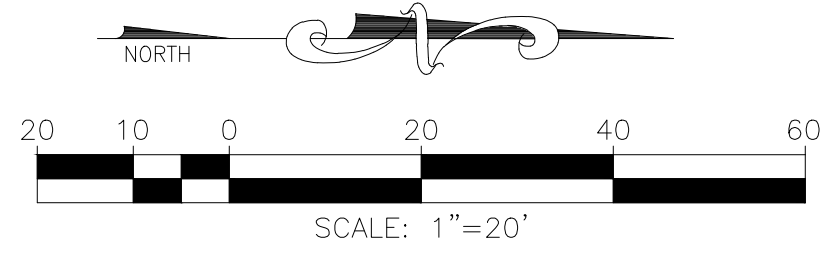
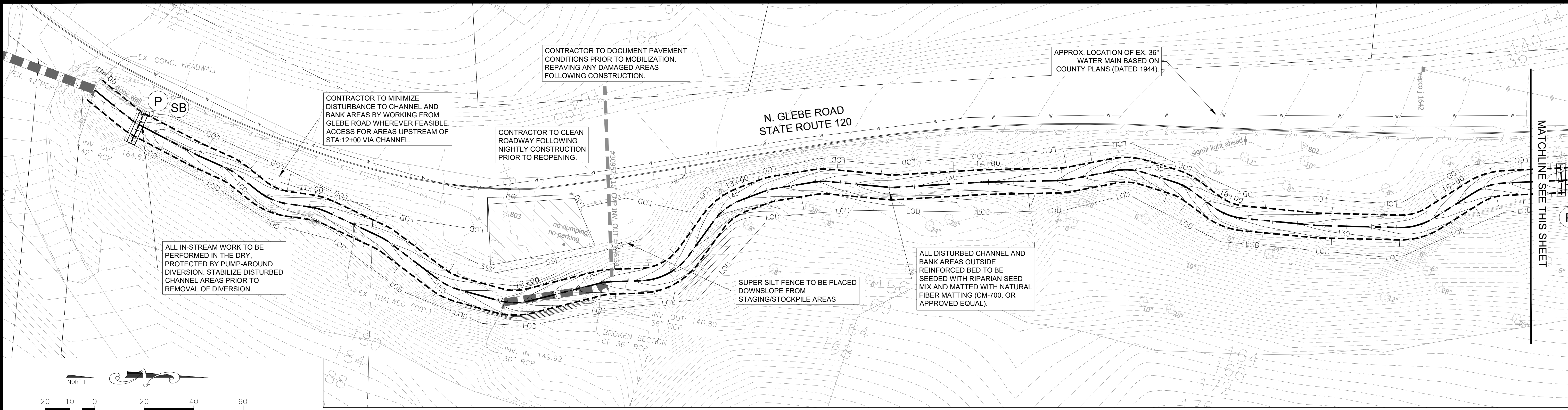
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**6 of 23**

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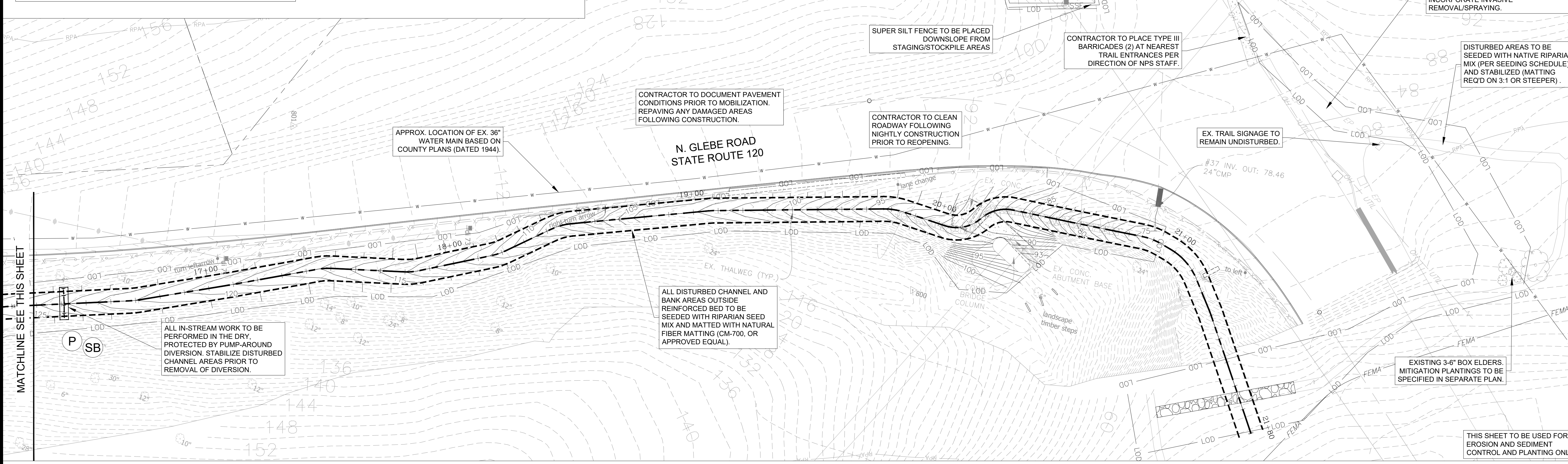


**LEGEND**

- GUARDRAIL
- OVERHEAD UTILITY
- EXISTING EASEMENT
- EXISTING INFRASTRUCTURE
- EXISTING CONTOURS
- INTERMITTENT STREAM
- SURVEYED TREE
- LIMITS OF DISTURBANCE
- PROPOSED GRADING (1-FT C.I.)
- PROPOSED STREAM CENTERLINE
- PROPOSED BANKFULL WIDTH

**EROSION/SEDIMENT CONTROL LEGEND**

NO.	TITLE	KEY	SYMBOL	UNITS	QUANTITY
MGWC 1.2	PUMP AROUND DIVERSION	P		EA	AS NEEDED
MGWC 1.2	SANDBAG DIKE	SB		EA	AS NEEDED
3.05	SILT FENCE WITH WIRE SUPPORT (SUPER SILT FENCE)	SSF		LF	170
N/A	FILTER BAG	FB		EA	AS NEEDED
3.05	SILT FENCE	SF		LF	AS NEEDED
3.32	PERMANENT SEEDING	PS		EA	AS NEEDED



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**N GLEBE ROAD CHANNEL REPAIR  
 FINAL DESIGN**  
 Arlington, Virginia  
**Erosion & Sediment Control Plan and Planting Plan**  
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**REVISIONS**

No.	Date	Description	App. By	Rev. By

Horizontal Datum: VCS NAD 83  
 Vertical Datum: NAVD 88  
 Boundary and Topo Source: Arlington GIS Survey Data, WSSI Survey

Design	Draft	Approved
NAS	NAS	FRG

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**7 of 23**

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**EROSION AND SEDIMENT CONTROL NARRATIVE**

**A. PROJECT DESCRIPTION**

THIS CHANNEL REPAIR PROJECT INCLUDES THE STABILIZATION OF A TRIBUTARY TO THE POTOMAC RIVER, REFERRED TO AS THE NORTH GLEBE ROAD CHANNEL. THE CHANNEL FLOWS ALONG THE SOUTH SIDE OF THE ROADWAY FOR APPROXIMATELY 1,000 FEET BEFORE PASSING UNDER GEORGE WASHINGTON MEMORIAL PARKWAY AND DROPPING SHARPLY TO THE CONFLUENCE WITH THE POTOMAC RIVER. SEVERE CHANNEL EROSION WAS EXPERIENCED AFTER FAILURE OF AN ADJACENT WATER MAIN. THE PROPOSED WORK SEEKS TO STABILIZE THE EXISTING CHANNEL TO PREVENT FUTURE DAMAGE TO THE ROADWAY AND OTHER ADJACENT INFRASTRUCTURE.

DURING A SITE VISIT ON APRIL 13, 2020 ENGINEERING AND ECOSYSTEM SERVICES STAFF FROM WETLAND STUDIES AND SOLUTIONS, INC. EVALUATED EXISTING CHANNEL CONDITIONS FOR THE 1,000+ LINEAR FOOT NORTH GLEBE ROAD DESIGN REACH. THE PROJECT AREA BEGINS AT AN EXISTING DRIVEWAY ENTRANCE AND FLOWS NORTH ALONG THE EAST SIDE OF N. GLEBE ROAD TOWARD THE POTOMAC RIVER, ENDING AT THE CROSSING OF THE POTOMAC HERITAGE TRAIL JUST AFTER CROSSING UNDER GEORGE WASHINGTON MEMORIAL PARKWAY. THE REPAIR WORK IS NECESSARY TO STABILIZE CHANNEL AND ROAD SHOULDER AREAS WHICH WERE BADLY ERODED FOLLOWING A HIGH FLOW EVENT ASSOCIATED WITH A MAJOR WATER LINE RUPTURE. PROPOSED MEASURES INVOLVE DISTURBANCE OF 0.71 AC (~30,733 SF), PLUS ADDITIONAL STAGING AREAS WITHIN EXISTING PAVED ROADWAYS AND PARKING AREAS.

**B. EXISTING SITE CONDITIONS**

THE 35-ACRE CONTRIBUTING DRAINAGE AREA FOR THE WATERSHED (FIGURE 1) IS CHARACTERIZED BY A MIX OF MAINLY FORESTED AND RESIDENTIAL LANDUSE. THE IMPERVIOUS COVER WAS ESTIMATED AT APPROXIMATELY 20%. RUNOFF FROM UPLAND AREAS OF THE WATERSHED IS CONVEYED MAINLY THROUGH A NETWORK OF STORM DRAINS AND OPEN CHANNELS PRIOR TO ENTERING THE ROADSIDE SWALE WITHIN THE PROJECT AREA. THE STREAM VALLEY IS STEEP (APPROX. 8% AVG.) AND HIGHLY CONFINED AS IT DROPS DOWN THE ESCARPMENT TO THE CONFLUENCE WITH THE POTOMAC RIVER.

THE EXISTING STREAM CHANNEL IS BOUNDED AT THE UPSTREAM END BY AND EXISTING DRIVEWAY ENTRANCE OFF OF N. GLEBE ROAD AND ENDS JUST UPSTREAM OF THE CONFLUENCE WITH THE POTOMAC RIVER, WHERE THE POTOMAC HERITAGE TRAIL CROSSSES THE LOWER PORTION OF THE REACH. THE DRAINAGE AREA IS 35 ACRES WITH APPROXIMATELY 20% IMPERVIOUSNESS. THE AREA AROUND THE CHANNEL IS MODERATELY TO STEEPLY SLOPING. THE CHANNEL IS GENERALLY 8 TO 20 FEET WIDE, WITH DEPTH VARYING FROM APPROXIMATELY 4 FT TO DEEPLY INCISED AREAS MORE THAN 8 FEET DEEP. BANK INSTABILITY IS SEEN THROUGHOUT, WITH SOME AREAS THREATENING TO DESTABILIZE THE EXISTING ROADWAY AND GUARDRAIL. PORTIONS OF THE CHANNEL LIE ON BEDROCK.

**C. ADJACENT AREAS**

THE SUBJECT SITE IS BOUNDED BY THE ROAD AND LARGE LOT RESIDENTIAL AREAS. NONE OF THE ADJACENT PROPERTIES WILL BE AFFECTED BY THE PROPOSED STABILIZATION EFFORTS.

**D. OFF-SITE AREAS**

NO OFF-SITE LAND DISTURBING ACTIVITIES ARE PROPOSED.

**E. CRITICAL AREAS**

THIS PROJECT IS LOCATED ENTIRELY WITHIN A STREAM CHANNEL; HOWEVER, THE DESIGN PRESENTED HEREIN PROPOSES TO STABILIZE THIS DEGRADED STREAM CHANNEL THUS PROTECTING EXISTING INFRASTRUCTURE AND REDUCING EROSION AND SEDIMENT TRANSPORT INTO THE POTOMAC RIVER, IMPROVING THE WATER QUALITY OF THE DOWNSTREAM RECEIVING WATERS.

**F. SOILS**

THE PROPOSED WORK INVOLVES LITTLE EXCAVATION OR SOIL DISTURBANCE. LIMITED BED EXCAVATION WILL OCCUR TO ALLOW PLACEMENT OF CLASS II RIPRAP, UNLESS PRECLUDED BY BEDROCK. BED MATERIALS SEEN DURING SITE INVESTIGATION WERE GENERALLY NON-COHESIVE SAND GRAVEL AND LARGER COBBLE MATERIAL.

**G. EROSION AND SEDIMENT CONTROL MEASURES**

- BEFORE ANY WORK IN THE STREAM AREA COMMENCES, AN ON-SITE PRE-CONSTRUCTION MEETING SHALL BE HELD TO ENSURE THAT ALL AFFECTED PARTIES (DESIGN ENGINEER, CONTRACTOR, STATE OFFICIALS, OWNER, AND PROJECT MANAGER) FULLY UNDERSTAND THE CONSTRUCTION SEQUENCING.
- MATERIALS AND METHODS USED IN CONSTRUCTION AND MAINTENANCE OF THE EROSION AND SEDIMENT CONTROL MEASURES REQUIRED SHALL CONFORM TO THE CONSTRUCTION STANDARDS AND SPECIFICATIONS IN CHAPTER 3 OF THE VIRGINIA EROSION AND SEDIMENT CONTROL HANDBOOK (VESCH), THIRD EDITION, 1992, AS WELL AS ANY OTHER APPLICABLE LOCAL, STATE, AND FEDERAL REGULATIONS.
- THE CONTRACTOR SHALL BE RESPONSIBLE FOR PROVIDING ANY ADDITIONAL TEMPORARY EROSION AND SEDIMENT CONTROL MEASURES THAT MAY BE REQUIRED BY THE COUNTY INSPECTOR, OR COMMENSURATE WITH THEIR SEQUENCE OF CONSTRUCTION, TO PREVENT EROSION AND SEDIMENT CONTROL RELATED DAMAGE TO PROPERTY OF OTHERS, ADJACENT AND/OR DOWNSTREAM WATERWAYS, OR TO THE PROJECT, DURING CONSTRUCTION AND PRIOR TO PERMANENT STABILIZATION OF ALL DISTURBED AREAS.
- PRIOR TO ANY OTHER CONSTRUCTION ACTIVITIES, PERIMETER EROSION CONTROL MEASURES ARE TO BE INSTALLED (E.G. TREE PROTECTION FENCE, STONE CONSTRUCTION ENTRANCE AND THE ASSOCIATED WASH RACK AN TEMPORARY SEDIMENT TRAP, AND DIVERSION DIKE WITH ROCK OUTLET AS APPLICABLE) AROUND THE LIMITS OF DISTURBANCE.
- WORK WITHIN THE STREAM AREA SHALL NOT COMMENCE UNTIL AFTER PERIMETER EROSION CONTROL MEASURES ARE APPROVED BY THE COUNTY INSPECTOR.
- FOR ANY CLEARING OR GRADING ON THE SITE, THE LIMITS OF CLEARING AND GRADING (LOC) SHALL BE MARKED WITH FLAGGING.
- THE LOD SHALL BE REVIEWED ON-SITE WITH THE CONTRACTOR, THE OWNER OR OWNER'S REPRESENTATIVE(S), AND A COUNTY URBAN FORESTER, AND A DETERMINATION MADE AT THAT TIME REGARDING WHICH TREES WILL BE REMOVED BASED ON THE APPROVED STABILIZATION ACTIVITIES.
- ADJUSTMENTS WILL BE MADE TO FLAGGING MARKING THE LOD TO ADEQUATELY PROTECT TREES TO BE PRESERVED AND ALLOW REMOVAL OF TREES TO BE REMOVED.
- TREES TO BE REMOVED THAT ARE LOCATED ON THE LOD OR IMMEDIATELY ADJACENT TO THE LOD WITHIN THE PROTECTED AREA SHALL BE REMOVED USING CHAIN SAWS TO MINIMIZE ROOT ZONE DISTURBANCE OR TREES TO BE PRESERVED.
- THE CONTRACTOR SHALL AVOID WETLAND AREAS WHEN POSSIBLE DURING CONSTRUCTION. ALL ACCESS AND STOCKPILE AREAS TO BE RETURNED TO PRE-CONSTRUCTION CONDITIONS AT THE COMPLETION OF CONSTRUCTION.
- STOCKPILE AREAS HAVE BEEN DESIGNATED PRIMARILY FOR STOCKPILING SOIL AND ROCK. SILT FENCE SHALL BE PLACED ALONG THE DOWNSTREAM SIDE OF ANY STOCKPILE OF SOIL THAT WILL REMAIN STOCKPILED AT THE END OF ANY WORK DAY. ADDITIONAL AREAS MAY BE UTILIZED AS STOCKPILE AREAS IF APPROVED BY ENGINEER AND THE COUNTY SITE INSPECTOR.
- STABILIZATION MEASURES SHALL BE APPLIED TO EARTHEN STRUCTURES SUCH AS DAMS, DIKES, AND DIVERSIONS IMMEDIATELY AFTER INSTALLATION.
- ONLY DISTURB AS MUCH AREA AS CAN BE STABILIZED IN ONE DAY.
- STABILIZE ALL DISTURBED AREAS, INCLUDING ACCESS AREAS AT THE END OF EACH DAY.
- ALL STREAM WORK SHALL BE CONDUCTED IN THE DRY, AND NO WORK SHALL BE PERFORMED IN THE RAIN. IF THERE IS A THREAT OF RAIN, WORK IS TO STOP AND WORK AREA SHALL BE STABILIZED.
- A "PUMP AROUND" SYSTEM SHALL BE USED TO DIVERT THE STREAM DURING CONSTRUCTION. SANDBAG DIKES SHALL BE INSTALLED WITHIN THE STREAM AROUND THE AREA TO BE DISTURBED THAT DAY (LARGER REACHES ARE ALLOWED IF APPROVED BY THE SITE ENGINEER); ONE AT THE UPSTREAM LIMIT OF DISTURBANCE AND ONE AT THE DOWNSTREAM LIMIT OF DISTURBANCE. IF BASEFLOW IS PRESENT, AN ADEQUATELY SIZED PUMP SYSTEM SHALL BE USED TO PUMP BASEFLOW AROUND THE AREA OF CONSTRUCTION AND BACK INTO THE STREAM AT A POINT DOWNSTREAM OF THE SECOND SANDBAG DIKE. WORK SHALL NOT PROCEED DURING RAIN EVENTS. IF SEDIMENT LAIDEN WATER ACCUMULATES AT THE DOWNSTREAM SANDBAG DIKE, SUCH WATER SHALL BE PUMPED INTO A FILTER BAG PRIOR TO BEING RELEASED BACK INTO THE STREAM.
- ACCESS ACROSS AND IN THE STREAM SHALL BE ALLOWED WITHIN THE STREAM REACH PROTECTED BY THE "PUMP AROUND" SYSTEM AS DESCRIBED ABOVE.
- ALL TEMPORARY EROSION AND SEDIMENT CONTROL MEASURES SHALL BE REMOVED WITHIN 30 DAYS AFTER FINAL SITE STABILIZATION OR AFTER THE TEMPORARY MEASURES ARE NO LONGER NEEDED, UNLESS OTHERWISE AUTHORIZED BY THE COUNTY INSPECTOR. TRAPPED SEDIMENT AND THE DISTURBED SOIL AREA RESULTING FROM THE DEPOSITION OF TEMPORARY MEASURES SHALL BE PERMANENTLY STABILIZED TO PREVENT FURTHER EROSION AND SEDIMENTATION.

**H. PERMANENT STABILIZATION**

- PLANTING OF ALL SPECIFIED CONTAINERIZED STREAMSIDE AND RIPARIAN VEGETATION SHALL BE LIMITED TO THE PERIOD BETWEEN NOVEMBER 30 AND MARCH 30, UNLESS APPROVED BY THE COUNTY OR COUNTY WITH SPECIAL WARRANTY CONDITIONS. NO PLANTING SHALL OCCUR WHEN THE SOIL IS FROZEN.
- PLANT ALL SPECIFIED PLANT MATERIAL ON THE NEW STREAM BANKS AND RIPARIAN AREAS - SUBJECT TO TIME OF YEAR RESTRICTIONS IN PLANTING SPECIFICATIONS, CUTTING HOLES AS REQUIRED IN THE EROSION CONTROL FABRIC. SEE VEGETATION NOTES AND THE SCHEDULE FOR SPECIFICATIONS REGARDING PLANTS AND PLANTING MATERIAL. PLANTING CONTRACTOR SHALL USE SAME ACCESS POINTS TO MINIMIZE DISTURBANCE.
- FOR ALL PLANTING TYPES, QUANTITIES, SPECIFICATIONS AND DETAILS PLEASE REFER TO THE PLANTING PLAN.

**I. GENERAL LAND CONSERVATION NOTES**

- PERMANENT OR TEMPORARY STABILIZATION MUST BE APPLIED TO DENUDED AREAS WITHIN 7 DAYS AFTER FINAL GRADE IS REACHED OR WITHIN 7 DAYS TO DENUDED AREAS TO REMAIN DORMANT FOR LONGER THAN 14 DAYS.
- ANY DISTURBED AREA NOT COVERED BY GENERAL CONSERVATION NOTE 1 AND NOT PAVED, SODDED OR BUILT UPON BY NOVEMBER 1, OR DISTURBED AFTER THAT DATE, SHALL BE MULCHED IMMEDIATELY WITH HAY OR STRAW MULCH AT THE RATE OF 2 TONS/ACRE (4483 KG/HA) AND OVERSEEDED BY APRIL 15.
- AT THE COMPLETION OF THE PROJECT CONSTRUCTION AND PRIOR TO BOND RELEASE ALL TEMPORARY SEDIMENT CONTROLS SHALL BE REMOVED AND ALL DENUDED AREAS SHALL BE STABILIZED.

**J. MAINTENANCE PROGRAM.**

THE CONTRACTOR SHALL INSPECT ALL EROSION AND SEDIMENT CONTROL MEASURES IMMEDIATELY (WITHIN 24 HOURS) AFTER EACH RUNOFF PRODUCING RAINFALL EVENT, AT LEAST DAILY DURING PROLONGED RAINFALL, AND AT LEAST ONCE EVERY FOURTEEN DAYS. DAMAGED OR DEFICIENT MEASURES SHALL BE REPAIRED BY THE CLOSE OF EACH DAY AND ANY ADDITIONAL MEASURES REQUIRED SHALL BE IMMEDIATELY INSTALLED. FURTHER, THE CONTRACTOR SHALL MAKE A DAILY REVIEW OF AREAS OF CONSTRUCTION ACTIVITY TO INSURE THAT EROSION AND SEDIMENT CONTROL DEVICES ARE PROPERLY LOCATED FOR EFFECTIVENESS. WHERE DEFICIENCIES EXIST, ADDITIONAL MEASURES SHALL BE PROMPTLY INSTALLED. THE CONTRACTOR SHALL ALSO BE RESPONSIBLE FOR PROVIDING ANY ADDITIONAL TEMPORARY EROSION AND SEDIMENT CONTROL MEASURES THAT MAY BE REQUIRED, COMMENSURATE WITH HIS SCHEDULING SEQUENCE OF CONSTRUCTION, TO PREVENT EROSION AND SEDIMENT RELATED DAMAGE TO THE PROPERTY OF OTHERS, TO ADJACENT AND/OR DOWNSTREAM WATERWAYS, OR TO THE PROJECT, DURING CONSTRUCTION AND PRIOR TO PERMANENT STABILIZATION OF ALL DISTURBED AREAS.

THE CONTRACTOR SHALL INSTALL ANY AND ALL EROSION AND SEDIMENT CONTROLS DEEMED NECESSARY TO ACCOUNT FOR SITE AND ACTIVITY SPECIFIC ISSUES DETERMINED BY EITHER THE COUNTY INSPECTOR OR THE ENGINEER'S REPRESENTATIVE.

**MINIMUM STANDARDS NARRATIVE**

MS-1 (SOIL STABILIZATION): SOIL SHALL BE STABILIZED PURSUANT TO THE EROSION AND SEDIMENT CONTROL NARRATIVE, SECTIONS H AND I.

MS-2 (SOIL STOCKPILE STABILIZATION): PURSUANT TO THE EROSION AND SEDIMENT CONTROL NARRATIVE, SECTION G, NOTE 11 (THIS SHEET); SILT FENCE WILL BE PLACED AROUND ANY SOIL THAT WILL BE STOCKPILED FOR LONGER THAN ONE DAY.

MS-3 (PERMANENT STABILIZATION): PERMANENT STABILIZATION SHALL BE APPLIED PURSUANT TO THE EROSION AND SEDIMENT CONTROL NARRATIVE, SECTION G, NOTE 11 (THIS SHEET). SPECIFICS REGARDING THE PLANTINGS ARE PROVIDED ON THE PLANTING PLAN, VEGETATION SCHEDULE, AND PLANTING NOTES & DETAILS SHEETS.

MS-4 (SEDIMENT BASINS & TRAPS): NOT APPLICABLE. NO SEDIMENT BASINS OR TRAPS ARE PROPOSED TO BE CONSTRUCTED AS PART OF THIS PROJECT.

MS-5 (STABILIZATION OF EARTHEN STRUCTURES): PURSUANT TO THE EROSION AND SEDIMENT CONTROL NARRATIVE, SECTION G, NOTE 12 (THIS SHEET); ALL EARTHEN STRUCTURES SHALL BE STABILIZED IMMEDIATELY AFTER INSTALLATION.

MS-6 (SEDIMENT TRAPS & SEDIMENT BASINS): NOT APPLICABLE. NO SEDIMENT BASINS OR TRAPS ARE PROPOSED TO BE CONSTRUCTED AS PART OF THIS PROJECT.

MS-7 (CUT/FILL SLOPES DESIGN & CONSTRUCTION): NOT APPLICABLE. NO CUT OR FILL SLOPES ARE ASSOCIATED WITH THIS PROJECT.

MS-8 (CONCENTRATED RUNOFF DOWN SLOPES): NOT APPLICABLE. NO CUT OR FILL SLOPES ARE ASSOCIATED WITH THIS PROJECT.

MS-9 (SLOPE MAINTENANCE): NOT APPLICABLE. NO SLOPES ARE PROPOSED TO BE DISTURBED AS PART OF THIS PROJECT.

MS-10 (STORM SEWER INLET PROTECTION): NOT APPLICABLE. NO STORMWATER INLETS ARE PROPOSED TO BE CONSTRUCTED AS PART OF THIS PROJECT.

MS-11 (STORMWATER CONVEYANCE PROTECTION): NOT APPLICABLE. NO STORMWATER CONVEYANCES ARE PROPOSED TO BE CONSTRUCTED AS PART OF THIS PROJECT.

MS-12 (WORK IN LIVE WATERCOURSE): PURSUANT TO THE EROSION AND SEDIMENT CONTROL NARRATIVE, SECTION G, NOTE 17 (THIS SHEET); A "PUMP AROUND" SYSTEM WILL BE USED TO ISOLATE THE WORK AREA AND PROTECT DOWNSTREAM RECEIVING WATERS.

MS-13 (CROSSING LIVE WATERCOURSE): PURSUANT TO THE EROSION AND SEDIMENT CONTROL NARRATIVE, SECTION G, NOTE 17 (THIS SHEET); "ACCESS ACROSS AND IN THE STREAM SHALL BE ALLOWED WITHIN THE STREAM REACH PROTECTED BY THE "PUMP AROUND" SYSTEM DESCRIBED ABOVE"

MS-14 (REGULATION OF WATERCOURSE CROSSING): THE PROPOSED PROJECT IS BEING REGULATED BY NATIONWIDE PERMIT 3.

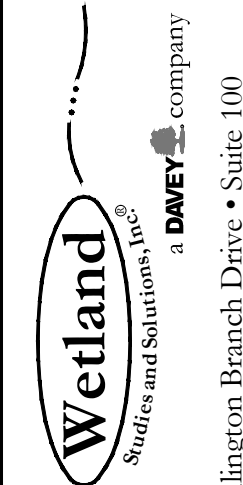
MS-15 (STABILIZATION OF WATERCOURSE): THIS MINIMUM STANDARD IS ADDRESSED IN THE EROSION AND SEDIMENT CONTROL NARRATIVE, SECTION G, NOTES 13, 14, & 15 (THIS SHEET).

MS-16 (UNDERGROUND UTILITY LINE CONSTRUCTION): NOT APPLICABLE. NO UNDERGROUND UTILITIES ARE PROPOSED TO BE CONSTRUCTED AS PART OF THIS PROJECT.

MS-17 (VEHICULAR SEDIMENT TRAPPING): DUE TO THE LOCATION AND NATURE OF THE PROPOSED WORK A CONSTRUCTION ENTRANCE IS NOT PROPOSED. ACCESS WILL BE ALONG AN EXISTING ROAD AND MACHINERY TRAVEL BETWEEN ROAD SURFACES LIMITED TO INITIAL ACCESS AND DEMOBILIZATION. WORK WILL BE DONE DURING A NIGHTLY ROAD CLOSURE AND THE ROADWAY CLEANED PRIOR TO REOPENING EACH MORNING.

MS-18 (REMOVAL OF TEMPORARY MEASURES): THIS MINIMUM STANDARD IS ADDRESSED IN THE EROSION AND SEDIMENT CONTROL NARRATIVE, SECTION G, NOTE 19 (THIS SHEET).

MS-19 (STORMWATER MANAGEMENT): THE PROPOSED MAINTENANCE/STABILIZATION ACTIVITIES ARE BEING UNDERTAKEN TO ALLOW CREATION OF A STABLE CHANNEL CAPABLE OF CONVEYING STORM FLOWS IN A NON-EROSIVE MANNER.



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**N GLEBE ROAD CHANNEL REPAIR  
 FINAL DESIGN**

Arlington, Virginia

**Erosion and Sediment Control Narrative  
 and Minimum Standards Narrative**

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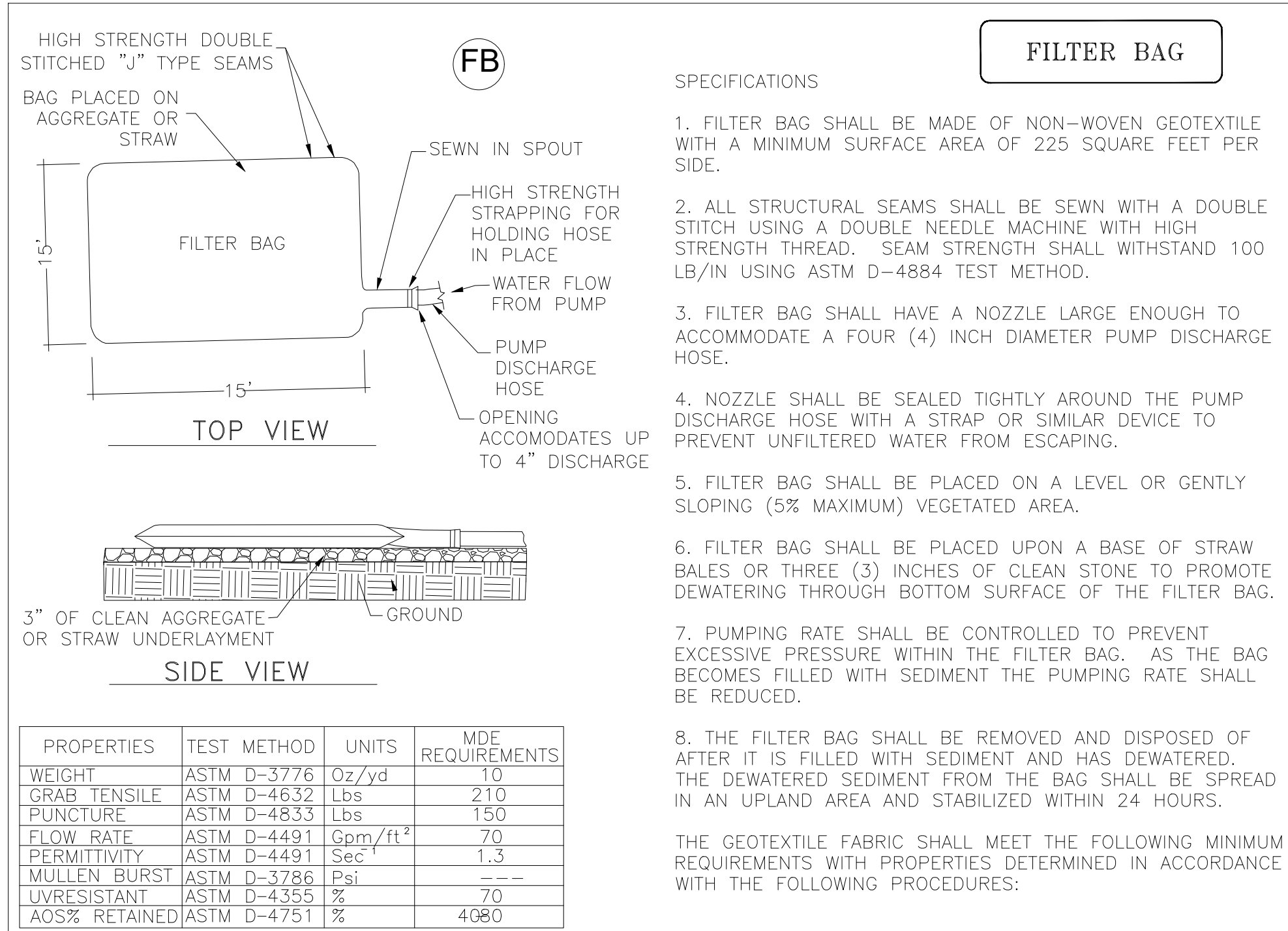
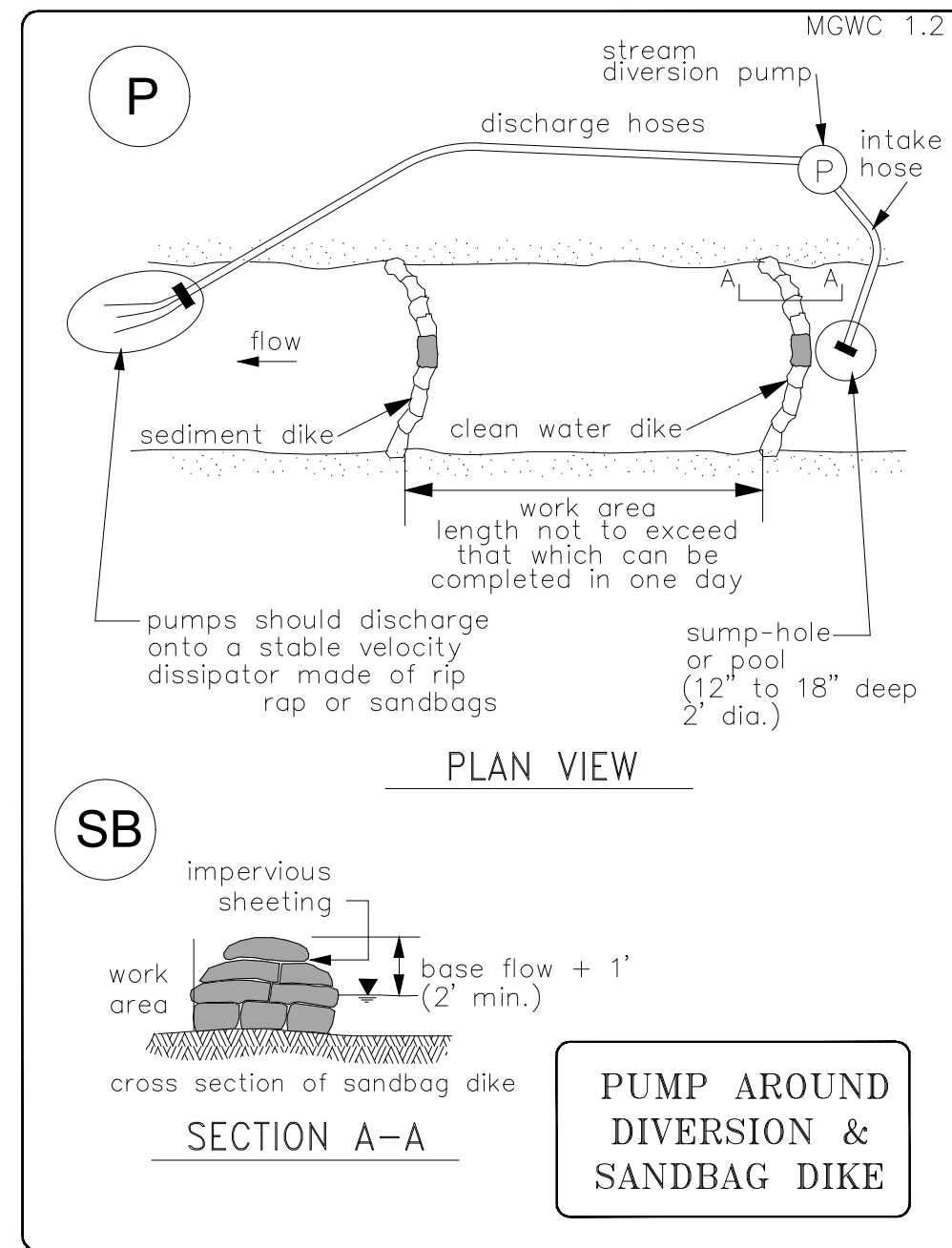
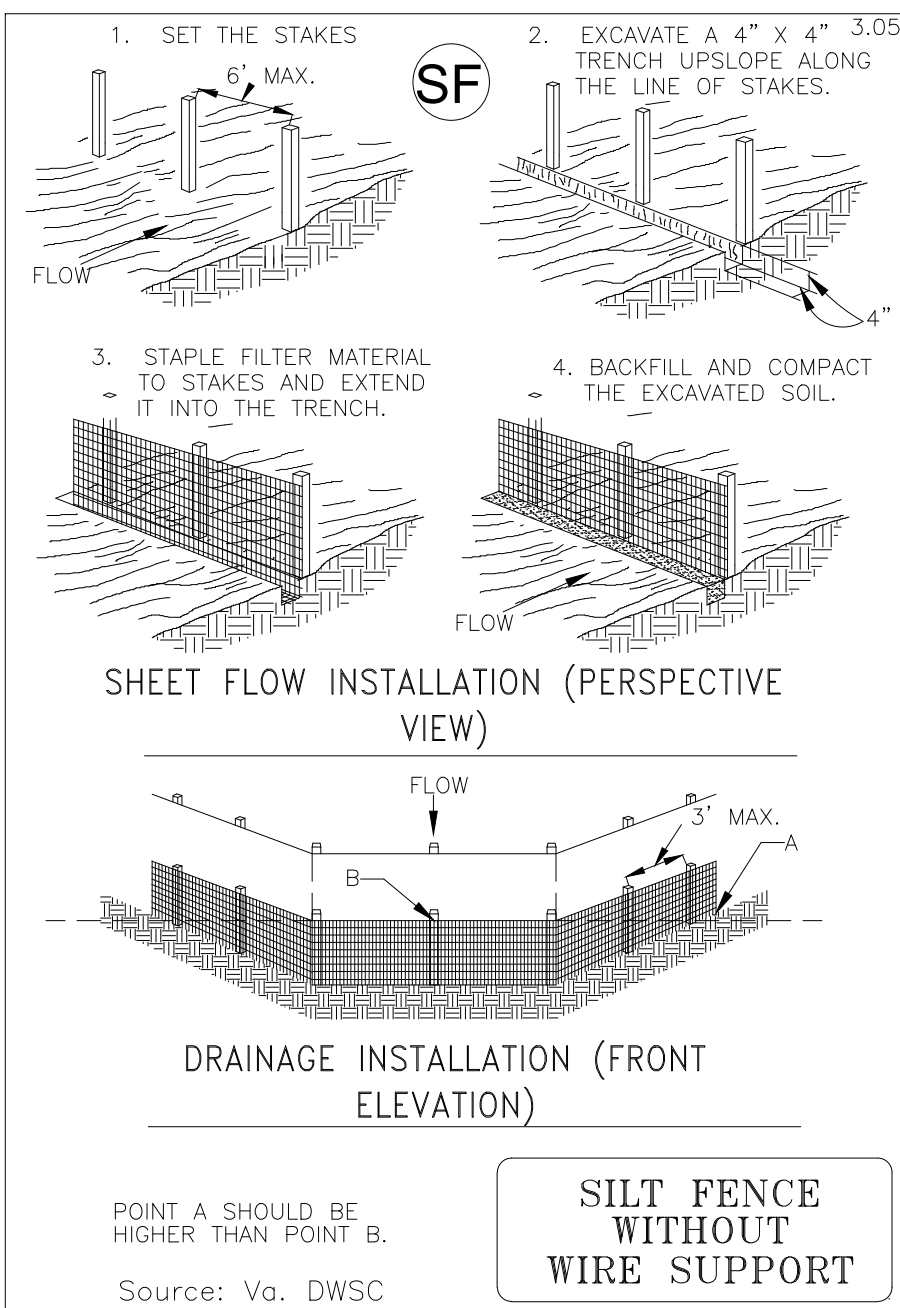
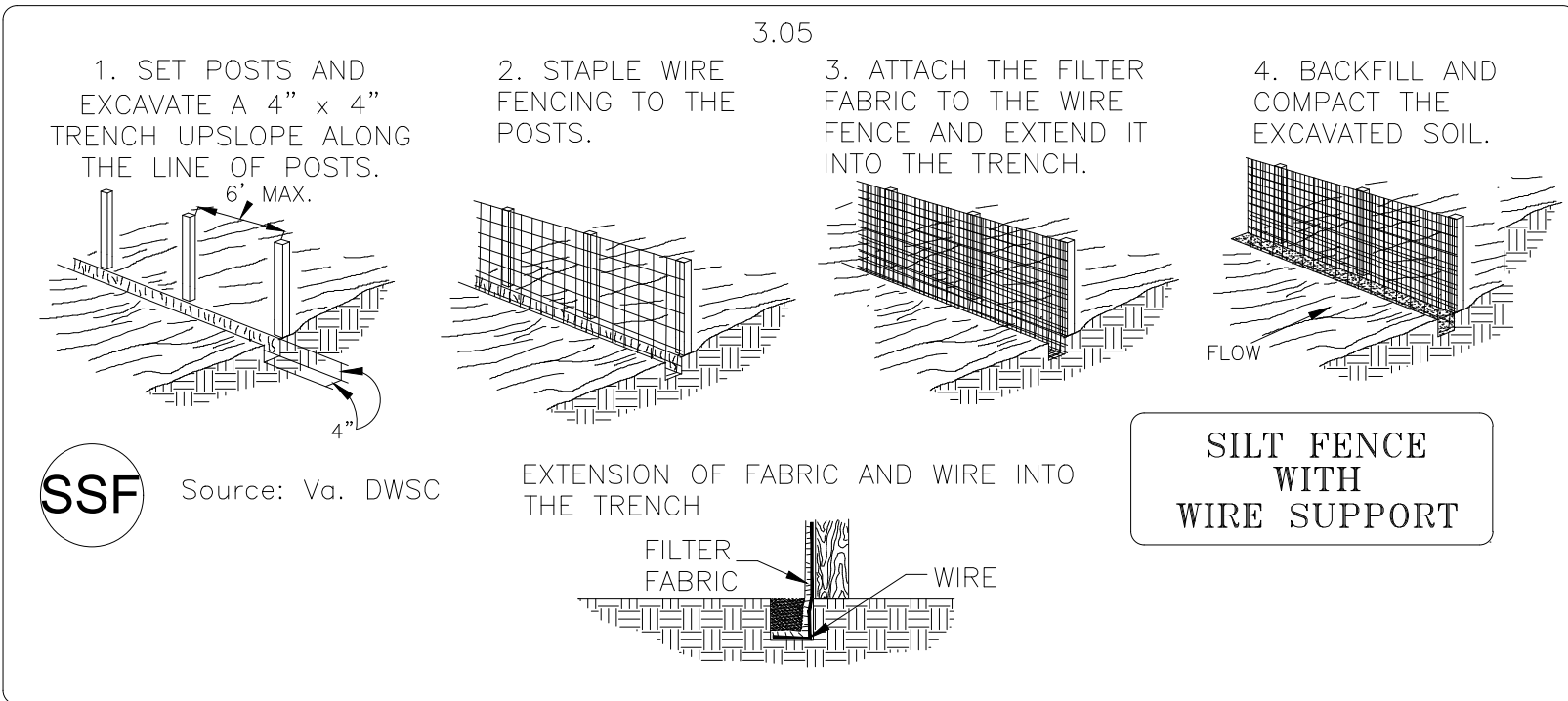
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**8 of 23**

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Area & Volume Control Number: 20-Planec



PROPERTIES	TEST METHOD	UNITS	MDE REQUIREMENTS
WEIGHT	ASTM D-3776	Oz/yd	10
GRAB TENSILE	ASTM D-4632	Lbs	210
PUNCTURE	ASTM D-4833	Lbs	150
FLOW RATE	ASTM D-4491	Gpm/ft <sup>2</sup>	70
PERMITTIVITY	ASTM D-4491	Sec	1.3
MULLEN BURST	ASTM D-3786	Psi	--
UVRESISTANT	ASTM D-4355	%	70
AOS% RETAINED	ASTM D-4751	%	4080

- SPECIFICATIONS**
1. FILTER BAG SHALL BE MADE OF NON-WOVEN GEOTEXTILE WITH A MINIMUM SURFACE AREA OF 225 SQUARE FEET PER SIDE.
  2. ALL STRUCTURAL SEAMS SHALL BE SEWN WITH A DOUBLE STITCH USING A DOUBLE NEEDLE MACHINE WITH HIGH STRENGTH THREAD. SEAM STRENGTH SHALL WITHSTAND 100 LB/IN USING ASTM D-4884 TEST METHOD.
  3. FILTER BAG SHALL HAVE A NOZZLE LARGE ENOUGH TO ACCOMMODATE A FOUR (4) INCH DIAMETER PUMP DISCHARGE HOSE.
  4. NOZZLE SHALL BE SEALED TIGHTLY AROUND THE PUMP DISCHARGE HOSE WITH A STRAP OR SIMILAR DEVICE TO PREVENT UNFILTERED WATER FROM ESCAPING.
  5. FILTER BAG SHALL BE PLACED ON A LEVEL OR GENTLY SLOPING (5% MAXIMUM) VEGETATED AREA.
  6. FILTER BAG SHALL BE PLACED UPON A BASE OF STRAW BALES OR THREE (3) INCHES OF CLEAN STONE TO PROMOTE DEWATERING THROUGH BOTTOM SURFACE OF THE FILTER BAG.
  7. PUMPING RATE SHALL BE CONTROLLED TO PREVENT EXCESSIVE PRESSURE WITHIN THE FILTER BAG. AS THE BAG BECOMES FILLED WITH SEDIMENT THE PUMPING RATE SHALL BE REDUCED.
  8. THE FILTER BAG SHALL BE REMOVED AND DISPOSED OF AFTER IT IS FILLED WITH SEDIMENT AND HAS DEWATERED. THE DEWATERED SEDIMENT FROM THE BAG SHALL BE SPREAD IN AN UPLAND AREA AND STABILIZED WITHIN 24 HOURS.
- THE GEOTEXTILE FABRIC SHALL MEET THE FOLLOWING MINIMUM REQUIREMENTS WITH PROPERTIES DETERMINED IN ACCORDANCE WITH THE FOLLOWING PROCEDURES:

**N GLEBE ROAD CHANNEL REPAIR  
FINAL DESIGN**

Arlington, Virginia

**Erosion and Sediment Control Plan Details**



REVISIONS		App. By	By
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**9 of 23**

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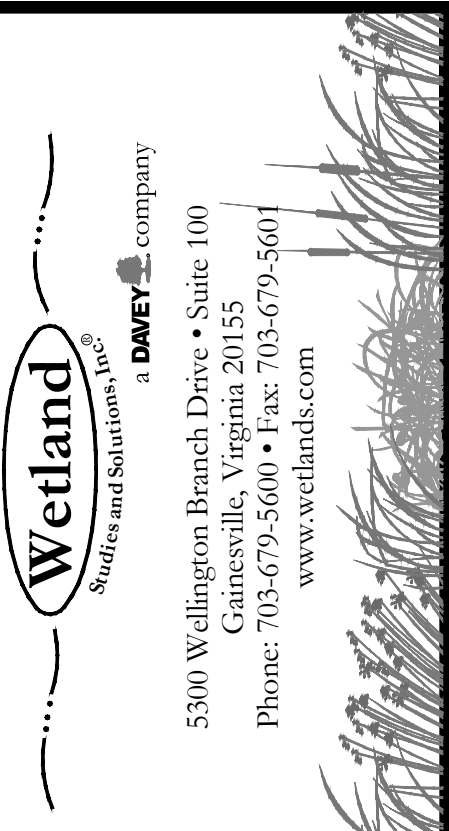
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**SEEDING SCHEDULE**

SPECIES GROUP <sup>1,2</sup>	SPECIES <sup>2</sup>	INDICATOR STATUS (AGCP)	INDICATOR STATUS (EMP)	WILDLIFE VALUE				SEEDING RATE <sup>7</sup> (LBS/AC)	AREA PER PLANT (AC)	QUANTITY (LBS)	
				FUNCTIONS	PRIMARY SPECIES	PLANT PART	SEASON				
RIPARIAN FOREST SEED MIX	7	LOLIUM MULTIFLORUM (ANNUAL RYEGRASS)	FACU	FACU	Erosion control, food	Sparrows, finches, small mammals.	Seeds	Summer, fall	45.00	1.37	62.10
		SETARIA ITALICA (FOXTAIL MILLET/ITALIAN BRISTLE GRASS)	FACU	UPL	Erosion control, food	Sparrows, finches, small mammals.	Seeds	Fall, winter	45.00	1.37	62.10
	8	ELYMUS RIPARIUS (RIVERBANK WILD RYE)	FACW	FACW	Food	Song birds, small mammals	Seeds, leaves	All	10.00	1.37	13.80
		ELYMUS VIRGINICUS (VIRGINIA WILD RYE)	FAC	FACW	Food	Deer, sparrows, small mammals	Seeds, leaves	All	10.00	1.37	13.80
		DICHANTHELIUM CLANDESTINUM (DEER TONGUE GRASS)	FACW	FAC	Food	Song birds, waterfowl, small mammals	Seeds	Summer, fall	10.00	1.37	13.80
		SENNA HEBECARPA (WILD SENNA)	FAC	FAC	Food	Pollinators, birds	Flower, seeds	Summer, Fall	10.00	1.37	13.80
	9	AGRIMONIA PUBESCENS (DOWNY AGRIMONY)	NI	NI	Food	Pollinators, butterflies, beneficial insects	Flowers	Summer, Fall	0.20	1.37	0.28
		CAREX SQUARROSA (SQUARROSE SEDGE)	FACW	FACW	Food	Song birds, waterfowl	Seeds	Summer, fall	0.20	1.37	0.28
		PARTHENOCISSUS QUINQUEFOLIA (VIRGINIA CREEPER)	FACU	FACU	Food	Song birds	Fruit	Summer	0.20	1.37	0.28
		JUNCUS TENUIS (PATH RUSH)	FAC	FAC	Food	Songbirds, small mammals	Seeds	Summer, fall	0.20	1.37	0.28
	10	ANEMONE VIRGINIANA (THIMBLEWEED)	FACU	FACU	Food	Pollinators, butterflies, beneficial insects	Flowers	Spring, summer	0.10	1.37	0.13
		EUPATORIUM PERFOOLIATUM (COMMON BONESET)	FACW	FACW	Food	Caterpillars, pollinators	Flowers, leaves	Spring, summer	0.10	1.37	0.13
		SYMPHYOTRICHUM PLOSUM (WHITE OLDFIELD AMERICAN-ASTER)	FACW	FAC	Food	Butterflies	Flowers	Summer, fall	0.10	1.37	0.13
		RHUS GLABRA (SMOOTH SUMAC)	UPL	UPL	Food	Beneficial insects, song birds, game birds, mammals	Flowers, fruit, leaves	Spring, summer, fall	0.10	1.37	0.13
		SOLIDAGO CAESIA (BLUE-STEMMED GOLDENROD)	FACU	FACU	Food	Butterflies, song birds, small mammals	Flowers	Summer, fall	0.10	1.37	0.13
		VERNONIA NOVEBORACENSIS (NEW YORK IRONWEED)	FACW	FACW	Food	Butterflies	Flowers	Fall	0.10	1.37	0.13
	11	BIDENS FRONDOSA (BEGGAR TICKS)	FACW	FACW	Food	Pollinators, butterflies, beneficial insects	Seeds	Summer, fall, winter	0.20	1.37	0.28
		GEUM CANADENSE (WHITE AVENS)	FAC	FACU	Food	Pollinators, butterflies, beneficial insects	Flowers	Summer	0.20	1.37	0.28
		CHAMAECRISTA NITANS (SENSITIVE PARTRIDGE PEA)	FACU	FACU	Food	Pollinators, caterpillars, mammals	Flowers, seeds, leaves	Spring, summer, fall	0.20	1.37	0.28
		DESMODIUM GLABELLUM (DILLENIUS' TICK-TREFOIL)	UPL	UPL	Food	Pollinators, small mammals	Seeds, plant	Summer, fall	0.20	1.37	0.28
		PENSTEMON DIGITALIS (PENSTEMON)	FAC	FAC	Food	Pollinators, butterflies, beneficial insects	Leaves, seeds	All	0.20	1.37	0.28
		CLEMATIS VIRGINIANA (VIRGIN'S BOWER)	FAC	FAC	Food, cover	Pollinators, birds	Flowers, plant	Spring, summer, fall	0.20	1.37	0.28
		VERBESINA ALTERNIFOLIA (WINGSTEM)	FAC	FAC	Food	Butterflies, other insects	Flowers	Summer, fall	0.20	1.37	0.28
	12	HAMAMELIS VIRGINIANA (WITCH HAZEL)	FACU	FACU	Food, cover, reproductive areas	Ruffed grouse, wild turkey, rabbit, deer, beaver	Flowers, fruit	Spring, fall, winter	0.20	1.37	0.28
		ILEX VERTICILLATA (WINTERBERRY)	FACW	FACW	Food, cover, reproductive areas	Song birds, upland game birds	Flower, seed, leaves	All	0.20	1.37	0.28
		LINDERA BENZOIN (NORTHERN SPICEBUSH)	FACW	FAC	Food	Thrushes vireos, catbird, bluebird, butterfly caterpillars	Fruit, leaves	Spring, summer, fall	0.20	1.37	0.28
		VIBURNUM DENTATUM (SOUTHERN ARROW WOOD)	FAC	FAC	Food	Robins, bluebirds, other thrushes, thrashers, catbirds, vireos	Fruit	Fall	0.20	1.37	0.28
	13	VIBURNUM PRUNIFOLIUM (BLACK-HAW)	FACU	FACU	Food, cover	Catbirds, thrashers, thrushes, cover and nest sites for songbirds	Fruit, plant	Spring, fall	0.20	1.37	0.28
		ACER RUBRUM (RED MAPLE)	FAC	FAC	Food	Finches, chickadees, squirrels, robins, goldfinches, other birds	Seeds, buds, flowers, plant	Spring, summer	0.50	1.37	0.71
		CARPINUS CAROLINIANA (AMERICAN HORNBEAM)	FAC	FAC	Food	Ruffed grouse, bobwhite, pheasant, wild turkey, squirrel, rabbit, deer	Fruit	Summer, fall	0.50	1.37	0.71
		CERCIS CANADENSIS (EASTERN REDBUD)	UPL	FACU	Food	Honeybees, butterfly caterpillars	Flowers, leaves	Spring, summer	0.50	1.37	0.71
		CORNUS FLORIDA (FLOWERING DOGWOOD)	FACU	FACU	Food	Wild turkey, cardinal, cedar waxwing, robin, brown thrasher, wood thrush, rabbits	Flower, fruit	Spring, fall	0.50	1.37	0.71
		NYSSA SYLVATICA (BLACK GUM)	FAC	FAC	Food, cover	Song birds, waterfowl, small mammals	Fruit, plant	All	0.50	1.37	0.71
		PLATANUS OCCIDENTALIS (AMERICAN SYCAMORE)	FACW	FACW	Food, cover	Raccoons, opossum, wood duck, pileated and other woodpeckers	Fruit, hollow trunks	All	0.50	1.37	0.71
	<b>RIPARIAN SEEDING TOTALS</b>								<b>136.80</b>		<b>188.92</b>

**SEEDING AND PLANTING NOTES**

- SCHEDULES PROVIDED GIVE GENERAL SPECIES AND PLANTING/SEEDING RATE INFORMATION. EXACT SEEDING AREAS TO BE DETERMINED DURING CONSTRUCTION BY COUNTY STAFF OR COUNTY'S REPRESENTATIVE. CONTRACTOR SHALL PROVIDE 10 LBS OF NATIVE RIPARIAN SEED MIX (EXCLUDING COVER CROP SPECIES) FOR USE ON BANK AREAS. ADDITIONAL SEED MAY BE REQUIRED BASED ON ACTUAL DISTURBANCE.
- REMOVAL OF THREE (3) 4" DBH BOX ELDER (ACER NEGUNDO) TREES WILL BE MITIGATED FOLLOWING THIS WORK AND UNDER A SEPARATE PERMIT. THIS PLAN INCLUDES NATIVE RIPARIAN SEEDING ONLY.



**N GLEBE ROAD CHANNEL REPAIR  
 FINAL DESIGN**  
 Arlington, Virginia

**Seeding Schedule and Notes**

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**SEEDING SPECIFICATIONS**

- SEED SHALL HAVE BEEN COLLECTED THE SAME YEAR OF SEEDING. SEED RATES ARE SPECIFIED AS PURE LIVE SEED (PLS). EVIDENCE OF SUCH SHALL BE PROVIDED TO OWNER PRIOR TO PLANTING.
- THE LANDSCAPE CONTRACTOR SHALL INSPECT THE AREAS AND CONDITIONS UNDER WHICH THE SEEDING WORK IS TO BE PERFORMED PRIOR TO COMMENCING WORK. IF CONDITIONS ARE DETRIMENTAL TO THE PROPER AND TIMELY COMPLETION OF THE WORK, HE/SHE SHALL NOTIFY THE OWNER VERBALLY AND IN WRITING AND POSTPONE COMMENCING WORK UNTIL THE UNSATISFACTORY CONDITIONS HAVE BEEN CORRECTED.
- PRIOR TO SEEDING, THE TOP SOIL SHALL BE RAKED SMOOTH AND CLEARED OF ALL STONES LARGER THAN 6" AND TRASH, DEBRIS, BRANCHES AND OTHER MATTER DETRIMENTAL TO THE SUCCESS OF SEEDING. SEEDING ALONG THE CHANNEL SHALL OCCUR AS CONSTRUCTION PROGRESSES DOWNSTREAM (I.E. DAILY), WITH ALL SEED PLACED IMMEDIATELY UPON REACHING FINAL GRADE AND PRIOR TO MATTING.
- CONTRACTOR TO PROVIDE SOIL TESTING OF IN-SITU AND ANY IMPORTED TOPSOIL. FERTILIZER APPLICATION WILL BE NECESSARY ONLY IF WARRANTED BASED ON ENGINEER REVIEW OF SOIL TESTING RESULTS.
- MULCH FOR ALL AREAS NOT COVERED BY NATURAL FIBER MATTING SHALL BE STRAW APPLIED AT A RATE SPECIFIED BY THE VIRGINIA EROSION AND SEDIMENT CONTROL HANDBOOK, 3RD EDITION, 1992.
- CARE SHOULD BE EXERCISED TO INSURE UNIFORM SEED COVERAGE IS OBTAINED. SEED SHALL BE APPLIED AT THE RATE SPECIFIED ON THE PLANTING SCHEDULE.
- THE SPECIFIED SEED SHALL BE BROADCAST IN AREAS SPECIFIED ON THE PLANTING PLAN.FOLLOWING SEEDING, MECHANICALLY SOW SEED TO A DEPTH OF 1/8 OF AN INCH BY THE USE OF A CULTIPACTOR, YORK RAKE, OR HAND RAKE.



No.	Date	Description	App. By		Rev. By
			By	By	

DATE: JAN 22, 2021      SCALE: N/A

Horizontal Datum: N/A  
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**Design Narrative**

**I. Background**

On November 8, 2019 a water main under Glebe Road broke which caused increased flow and subsequent damage to the roadside ditch and washing out the downstream crossing for the Potomac Heritage Trail. Arlington County's consultant, Wetland Studies and Solutions, Inc. has developed the attached plan to repair the damaged road side ditch, protect the existing Parkway bridge column, and reestablish the crossing for the Potomac Heritage Trail. This plan has been developed through several meetings and collaboration with Arlington County, The National Park Service and Virginia Department of Transportation.

During a site visit on April 13, 2020 engineering and ecosystem services staff from Wetland Studies and Solutions, Inc. evaluated existing channel conditions for the 1,000+ linear foot North Glebe Road design reach. The project area begins at an existing driveway entrance and flows north along the east side of N. Glebe Road toward the Potomac River, ending at the crossing of the Potomac Heritage Trail just after crossing under George Washington Memorial Parkway. The repair work is necessary to stabilize channel and road shoulder areas which were badly eroded following a high flow event associated with the water line rupture.

The 35-acre contributing drainage area for the watershed (Figure 1) is characterized by a mix of mainly forested area and residential landuse. The impervious cover was estimated at approximately 20%. Runoff from upland areas of the watershed is conveyed mainly through a network of storm drains and open channels prior to entering the roadside swale within the project area. The stream valley is steep (approx. 8% avg.) and highly confined as it drops down the escarpment to the confluence with the Potomac River.

The proposed design seeks to reestablish channel dimensions as seen prior to recent erosion, maintaining channel capacity while stabilizing channel areas to prevent future destabilization of adjacent infrastructure. Areas of particular concern include portions of the channel between ~Sta: 18+40 - 19+40 (where the existing channel has undermined the existing guardrail), and at Sta: 20+20 (the existing concrete pillars for the George Washington Memorial Parkway).

**II. Hydrologic Analysis**

Though the proposed measures are considered a maintenance activity, a cursory hydrologic analysis was performed using the published USGS Non-Urban Regional Curves for the Coastal Plain Province of Virginia and Maryland (Figure 2). These curves were developed to predict ideal bankfull characteristics for streams with low watershed imperviousness (typically less than 5%) and must be adjusted to account for development in the Glebe Road watershed. Adjustment may be achieved through application of an urban channel enlargement factor. The Center for Watershed Protection published a report on the impact of watershed development on channel enlargement. From this study, it is estimated that ultimate channel enlargement can take 50-75 yrs or longer from the time the watershed is fully developed. A plot depicting the ultimate channel size vs. watershed impervious area is presented in the article and given as Figure 3. Based on watershed imperviousness in the Glebe Road watershed (approximately 20%) the resulting enlargement factor would be approximately 2.0. Note - The contributing drainage area is well below the lower limit of available curve data. The scope of planned repairs/maintenance does not warrant a more detailed analysis of design flows, especially given that channel size is largely dictated by the severe site constraints associated with Glebe Road and adjacent steep slopes.

*Bankfull Channel Geometry as Predicted by the Non-Urban Regional Curves:*  
Cross-sectional Area = 2.2 sf.

**III. Restored Cross Section Sizing**

Using the adjusted cross-sectional area (2.2 sf x 2.0 = 4.4 sf) as predicted by the regional curves with enlargement factor adjustment, channel size for an ideal bankfull channel was determined to be approximately 8-ft wide and 1-ft deep (assuming a 3:1 design bank slope). These dimensions were determined by iteratively solving Manning's open channel flow equation using the channel slope and various geometry configurations. Due to the proximity to Glebe Road and the highly confined nature of the channel flow path a slightly larger typical design cross section was used (10-ft bankfull width, 1.5-ft maximum depth) as the basis for maintenance repairs to best protect the road shoulder where space allows. In most areas of the reach this section largely fits within the existing footprint of the channel and is consistent with size and conveyance prior to the water main break and associated channel erosion. Severe confinement in some portions of the design reach will necessitate tying out to the existing (smaller) channel cross section (~Sta: 18+50-19+40).

**IV. Discussion of Design Parameters**

The proposed maintenance measures are designed to reduce channel incision and limit further erosion and instability through the placement of a properly sized armor layer. Channel size and dimensions are dictated by existing site constraints rather than by a detailed hydrologic and hydraulic analysis. Regional curve information was used to inform channel cross section dimensions where allowed by site conditions. Grading in highly confined areas is limited, with activities doing only that necessary to improve bed stability without reducing the already limited channel cross sectional area.

An analysis of channel shear stresses/tractive force was performed per VDOT Drainage Manual Chapter 7, Section 7.4.6.2. Calculations were performed a various cross sections throughout the design reach, with channel slopes ranging from ~3% to more than 10%. Table 1 summarizes tractive force calculations and required channel linings per Section 7.4.6.3.1. The results of this analysis indicate that EC-3 Type II lining would meet required permissible velocities requirements. However, due to the confined nature of the channel and close proximity to the existing roadway, Class II riprap material (D50 = 1.6') is specified to promote long-term channel stability. The FHWA HEC-23 3rd Edition publication was used to assess riprap sizing. Sample riprap sizing calculations given below are for the location of highest tractive force (Sta: 20+22). These calculations indicate Class A1 riprap is sufficient to resist anticipated shear forces. The use of Class II provides the greatest factor of safety while working within the confines of the small constricted channel. The goal of this project is to select the optimal design solution which achieves long-term stability, minimizes impacts to the existing stream valley, maintains channel capacity in order to adequately protect existing infrastructure, and works within the limits of available funding.

Table 1. Tractive Force Calculations and Channel Lining

Channel Station	Hydraulic Radius, R (ft)	Channel Slope, S	Tractive Force, T	Required Lining (Min)
10+40	1.78	0.005	0.55536	EC-2 Type 1
13+37	1.24	0.033	2.553408	EC-3 Type 1
18+59	1.12	0.1	6.9888	EC-3 Type 2
20+22	0.76	0.157	7.445568	EC-3 Type 2

Figure 1. Sample Riprap Sizing Calculations

Design Storm Event=	Q=95.81cfs	XS=	20+22
Depth of flow=	1.29 FT		
Velocity	9.80 FPS		
Type of Abutment (Vertical=1, Spill=2)	1		
Fr=	1.52		
If Fr < 0.8	D(50)= 1.84	If Fr > 0.8	D(50)= 0.61

**V. Preliminary Floodplain Analysis**

Due to the limited contributing drainage area no floodplain modeling was performed as part of this design.

**VI. Special Concerns**

Significant erosion has occurred around the concrete column associated with George Washington Memorial Parkway on the right bank (facing downstream) at station 20+20 of the design alignment. The plan calls for reconstruction of eroded stream banks upstream and downstream of the column using Class II riprap. VDOT specifications allow approximately 10% of supplied Class II rock to be of a size 150 lbs or less. Plan notes require the contractor to set aside/reserve a portion of these smaller rocks for placement around the concrete column to avoid damage to the structure. Proposed plan measures will establish a more stable grade around the existing column, better protecting the column and concrete footer from instability associated with ongoing erosion.

**VII. Special Conditions for National Park Service Property**

1. Upon approval of LOD minimum hand clearing of vegetation within area.
2. No grubbing of vegetation and all material to be left on site.
3. Removal of three, 4" dbh Box Elder (Acer negundo) trees will be mitigated following this work and under a separate permit.
4. Placement of 3/4" plywood or equivalent matting throughout access area on top of herbaceous vegetation.
5. Equipment shall be limited to a mini excavator and rubber tracked skid steer to minimize impact.
6. Once the mats are removed the area shall be seeded with a native seed mix per the enclosed seed schedule.
7. Trail shall be restored to pre-construction conditions or better.
8. While working in the area the crew shall remain aware of any hikers that may have entered the closed area.
9. Upon completion site will be inspected by NPS staff for final approval and acceptance.

Figure 1. Drainage Area and Impervious Cover Analysis

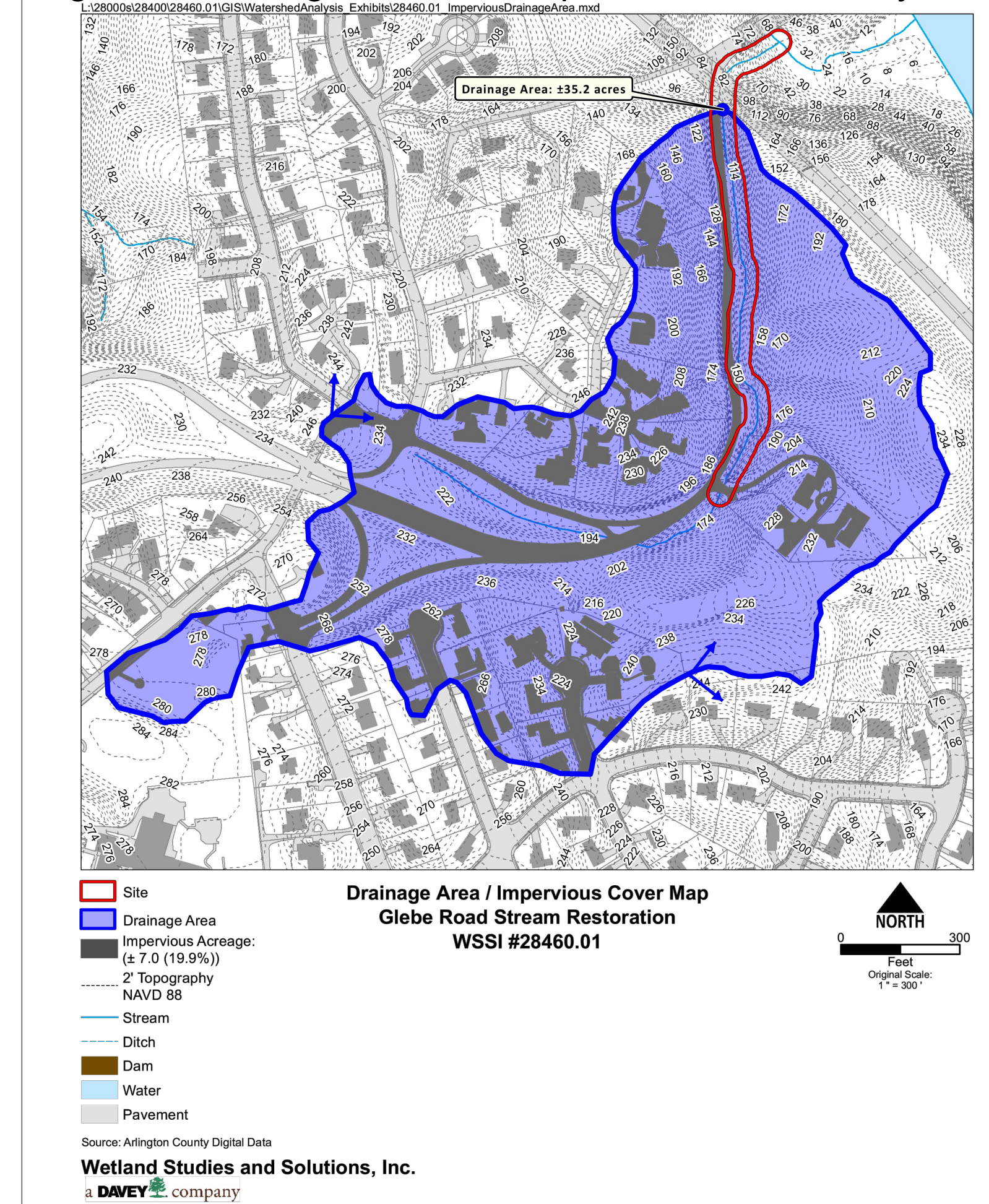
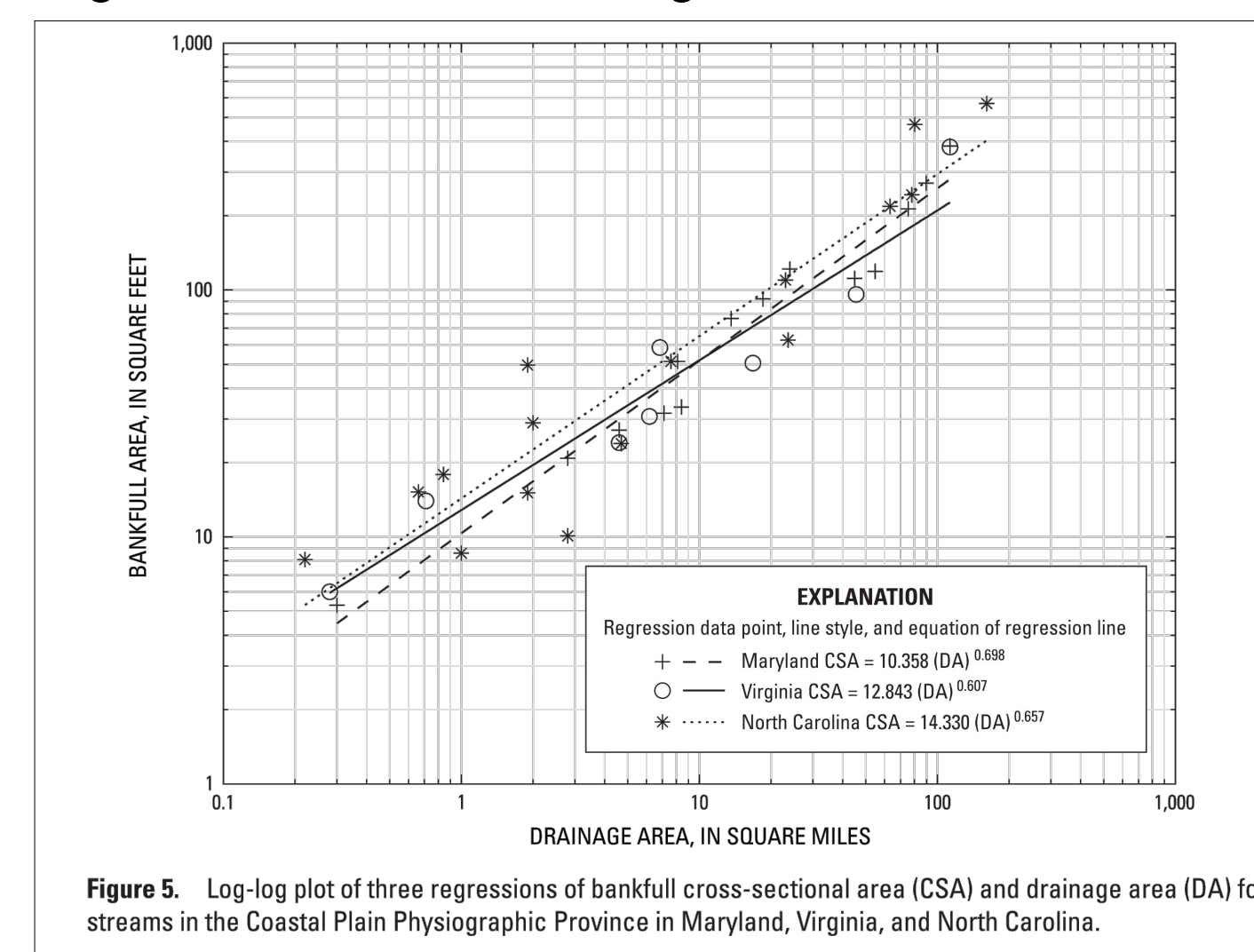
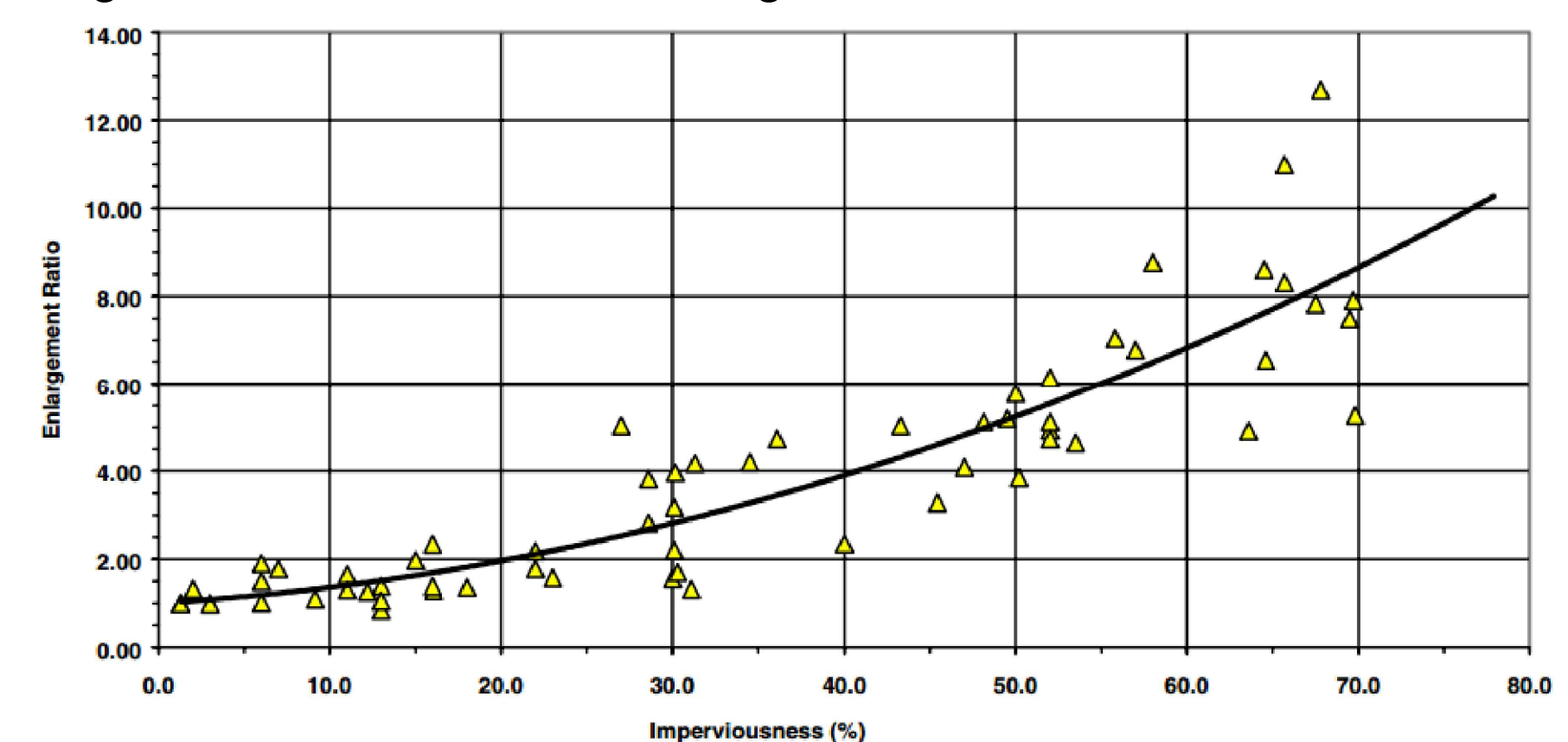


Figure 2. Coastal Plain Regional Curve



Krstolic, Jennifer L. and Chaplin, Jeffrey J., 2007, Regional Curves for Streams in the Non-Urban, Non-Tidal Coastal Plain Physiographic Province, Virginia and Maryland. U.S. Geological Survey Scientific Investigations Report 2007-5162, p. 12.

Figure 3. Urban Channel Enlargement Factor



"Ultimate" Channel Enlargement as a Function of Impervious Cover in Alluvial Streams in Maryland, Vermont and Texas (MacRae and DeAndrea, 1999; Brown and Claytor, 2000)

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**N GLEBE ROAD CHANNEL REPAIR**  
**FINAL DESIGN**  
 Arlington, Virginia  
**Design Narrative**

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DATE: JAN 22, 2021  
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**TEMPORARY TRAFFIC CONTROL PLAN**

**GENERAL NOTES:**

1. TMP/SOC TYPE A PROJECT INFORMATION:
    - A. THIS PROJECTS TMP/SOC PLAN HAS BEEN DESIGNED IN CONFORMANCE WITH A TYPE A TMP/SOC PLAN.
    - B. THE PROJECT LOCATION IS AS SHOWN ON SHEET 1.
    - C. CONSTRUCTION AREA SHALL BE CONSIDERED ACTIVE WHEN ANY IMPACT TO TRAFFIC OCCURS. (1ST CONE IN ROAD).
    - D. ALL WORK IS TO BE PERFORMED UTILIZING AN OVERNIGHT CLOSURE OF N GLEBE ROAD. OVERNIGHT HOURS ARE 9PM-5AM ON WEEKDAYS AND 10PM-7AM ON WEEKENDS (FRIDAY AND SATURDAY NIGHTS). THESE HOURS ARE PRELIMINARILY APPROVED AND THE HOURS MAY BE MODIFIED AT THE TIME OF CONSTRUCTION PENDING REVIEW OF CURRENT TRAFFIC CONDITIONS AT THE TIME OF WORK. NO LANE CLOSURES WILL BE ALLOWED FROM NOON ON THE DAY BEFORE A HOLIDAY UNTIL NOON ON THE WORKDAY FOLLOWING THE HOLIDAY. HOLIDAYS INCLUDE ALL STATE AND FEDERAL HOLIDAYS.
    - E. THE TMP/SOC PLAN, DURING CONSTRUCTION, SHALL BE IN ACCORDANCE WITH THE MOST CURRENT EDITION OF EACH OF THE FOLLOWING AND ANY REVISION THEREOF: SECTIONS 512, 701, 703 & 704 OF THE VIRGINIA DEPARTMENT OF TRANSPORTATION ROAD AND BRIDGE SPECIFICATIONS, DATED 2020, THE 2011 VIRGINIA WORK AREA PROTECTION MANUAL (WAPM), REVISION 2.1, NOVEMBER 1, 2020, THE MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES (MUTCD), 2009 EDITION, AND THE VIRGINIA SUPPLEMENT TO THE MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES, 2011 EDITION.
    - F. THE CONTRACTOR SHALL: DESIGNATE A PERSON ASSIGNED TO THE PROJECT WHO WILL HAVE THE PRIMARY RESPONSIBILITY, WITH SUFFICIENT AUTHORITY, FOR IMPLEMENTING THE TMP/SOC AND OTHER SAFETY AND MOBILITY ASPECTS OF THE PERMIT WORK. THIS PERSON SHALL COORDINATE WITH THE ARLINGTON COUNTY CONSTRUCTION INSPECTOR FOR THE DURATION OF CONSTRUCTION.
- ENSURE THAT PERSONNEL ASSIGNED TO THE PROJECT ARE TRAINED IN TRAFFIC CONTROL TO A LEVEL COMMENSURATE WITH THEIR RESPONSIBILITIES IN ACCORDANCE WITH VDOT'S WORK ZONE TRAFFIC CONTROL TRAINING GUIDELINES.
- INFORM THE ENGINEER OF ANY WORK REQUIRING LANE SHIFTS, LANE CLOSURES, AND/OR PHASE CHANGES A MINIMUM OF ONE WEEK PRIOR TO IMPLEMENTING THIS ACTIVITY. ANY REQUEST FOR DEVIATION FROM THE ALLOWABLE LANE CLOSURE HOURS MUST BE SUBMITTED TO VDOT NRO FOR REVIEW A MINIMUM OF FOURTEEN (14) DAYS IN ADVANCE OF WORK.
- PERFORM REVIEWS OF THE CONSTRUCTION AREA TO ENSURE COMPLIANCE WITH CONTRACT DOCUMENTS AT REGULARLY SCHEDULED INTERVALS AT THE DIRECTION OF THE ENGINEER. CONTRACTOR SHALL MAINTAIN A COPY OF THE TEMPORARY TRAFFIC CONTROL PLAN AT THE WORK SITE AT ALL TIMES.
- COORDINATE WITH ARLINGTON COUNTY POLICE DEPARTMENT AND ARLINGTON COUNTY FIRE/RESCUE DEPARTMENT FOR ANY LANE CLOSURES AND ANY DETOURS OF ANY NATURE.
- SCHEDULE ALL PHASES OF CONSTRUCTION IN SUCH A MANNER THAT WATER, SANITARY SEWER, CABLE, FIBER CABLE/OPTIC CABLE, ANY OVERHANGING UTILITIES, AND ANY UNDERGROUND UTILITIES SERVICES WILL NOT BE INTERRUPTED.
2. CONTRACTOR SHALL MAINTAIN ACCESS (INCLUDING EMERGENCY VEHICLES) TO ALL ROADWAYS, DRIVEWAYS, AND PROPERTIES WITHIN AND ADJACENT TO THE WORK ZONE AT ALL TIMES THROUGHOUT THE DURATION OF THE WORK. ACCESS SHALL BE COORDINATED WITH PROPERTY OWNERS THROUGHOUT CONSTRUCTION. POTENTIALLY IMPACTED PROPERTIES INCLUDE, BUT IS NOT LIMITED TO:
    - SHARED DRIVEWAYS FOR 4525, 4535, AND 4545 N GLEBE RD (AT THE SOUTH END OF THE PROJECT LIMITS)
  3. CONTRACTOR SHALL COORDINATE WITH IMPACTED TRAIL OWNERS AND OPERATORS TO ENSURE THEIR CLOSURE WHEN REQUIRED BY THE WORK.
  4. IF ANY DEVIATIONS FROM THIS TMP/SOC ARE MADE THE CONTRACTOR SHALL SUBMIT A REVISED PLAN FOR REVIEW AND APPROVAL.
  5. ALL AREAS EXCAVATED BELOW THE EXISTING PAVEMENT SURFACE AND WITHIN THE CLEAR ZONE AT THE CONCLUSION OF EACH WORKDAY, SHALL BE BACKFILLED TO FORM ON APPROXIMATE 6:1 WEDGE AGAINST THE EXISTING PAVEMENT OR NEWLY CONSTRUCTED PAVEMENT SURFACE FOR THE SAFETY AND PROTECTION OF VEHICULAR TRAFFIC.
  6. TRAFFIC BARRIER SERVICE IS NOT PROPOSED FOR THE CONSTRUCTION OF THIS PROJECT.
  7. IF A GEOTECHNICAL INVESTIGATION HAS BEEN PERFORMED FOR THE PROJECT, THE CONTRACTOR SHALL FOLLOW THE GEOTECHNICAL RECOMMENDATIONS PROVIDED BY THE COUNTY.
  8. CONTRACTOR SHALL ENSURE POSITIVE DRAINAGE FOR THE DURATION OF THE PROJECT. CONTRACTOR SHALL ADD ANY ADDITIONAL TEMPORARY MEASURES NECESSARY TO FACILITATE PROPER, POSITIVE DRAINAGE FOR THE DURATION OF CONSTRUCTION.
  9. WHERE GROUP 2 CHANNELIZING DEVICES ARE USED TO SEPARATE THE CONSTRUCTION AREA AND TRAFFIC, A MINIMUM CLEAR ZONE AREA AS DEFINED IN THE WAPM IS TO BE MAINTAINED.
  10. THE CONTRACTOR IS TO COORDINATE WITH ARLINGTON COUNTY FOR LOCATION(S) OF THE CONSTRUCTION STAGING AREA(S). THE CONTRACTOR IS RESPONSIBLE FOR OBTAINING ALL PERMITS AND/OR EASEMENTS FOR THE STAGING AREA(S).
  11. LANE AND/OR SHOULDER CLOSURES SHALL NOT BEGIN IF HEAVY TRAFFIC OR SIGNIFICANT QUEUING AND BACKUPS ARE ALREADY PRESENT ALONG THE ROADWAY(S).
  12. THE CONTRACTOR SHALL CONTINUOUSLY MONITOR ALL LANE CLOSURE(S) AND DETOUR ROUTE(S) AND MAKE SPOT ADJUSTMENTS AS NEEDED/AVAILABLE TO EASE UNDUE BACKUPS, DELAYS, OR QUEUING AND REOPEN AVAILABLE LANES IMMEDIATELY, IF NECESSARY.
  13. LANE AND SHOULDER CLOSURE HOURS OF OPERATION MAY BE ADJUSTED BY VDOT NRO AT ANY TIME, AS NECESSARY, IF SIGNIFICANT TRAFFIC IMPACTS ROUTINELY DEVELOP AS A RESULT OF THE PROJECT OR CITIZEN COMPLAINTS ARE RECEIVED.
  14. THE CONTRACTOR SHALL NOTIFY THE VIRGINIA STATE POLICE (VSP) AND THE VARIOUS LOCAL AREA LAW ENFORCEMENT AND EMERGENCY SERVICES OF ALL CLOSURES AND TIMES FOR SITUATIONAL AWARENESS.
  15. DEPENDING ON THE TIME OF YEAR, THE CONTRACTOR MUST NOTIFY AND/OR COORDINATE WITH THE LOCAL SCHOOLS OF ALL CLOSURES AND TIMES TO AVOID IMPACT TO BUS SCHEDULES/ROUTES AND/OR SCHOOL BUILDING ACCESS.
  16. ALL LANE CLOSURES SHALL BE IN ACCORDANCE WITH THE APPLICABLE ALLOWABLE HOURS AS LISTED IN THE LANE CLOSURE IN NOVA DISTRICT MEMORANDUM, DATED SEPTEMBER 29TH, 2016 AND ALL LANE AND/OR SHOULDER CLOSURES SHALL BE COMPLETELY REMOVED ON A DAILY/NIGHTLY BASIS WITH LANES BEING FULLY OPEN TO TRAFFIC AT ALL TIMES BEYOND THE ALLOWABLE AND/OR APPROVED LANE CLOSURE HOURS.

17. IMPLEMENTING THE TRANSPORTATION MANAGEMENT PLAN:
 

DURING THE FIRST DAY OF THE NEW WORK ZONE TRAFFIC PATTERN, THE PROJECT'S MANAGER AND PROJECT'S CONSTRUCTION INSPECTOR SHALL INSPECT THE WORK ZONE TO ENSURE COMPLIANCE WITH THE TMP. ON THE THIRD TO FOURTH DAY OF THE IMPLEMENTATION OF THE TMP'S NEW WORK ZONE TRAFFIC PATTERN, THE CONSTRUCTION INSPECTOR SHALL CONDUCT AN ON-SITE REVIEW OF THE WORK ZONE'S PERFORMANCE IN COORDINATION WITH THE ENGINEER AND RECOMMEND TO THE CONTRACTOR ANY REQUIRED CHANGES TO THE TMP TO ENHANCE THE WORK ZONE'S SAFETY AND MOBILITY. ALL SUCH CHANGES SHALL BE DOCUMENTED. AN ON-SITE REVIEW OF THE PROJECT'S WORK ZONE TRAFFIC CONTROL BY THE COUNTY'S CONSTRUCTION INSPECTOR AND THE CONTRACTOR SHALL BE CONDUCTED WITHIN 48 HOURS OF ANY FATAL INCIDENT/CRASH WITHIN THE WORK ZONE.
  18. EVALUATION OF THE TRANSPORTATION MANAGEMENT PLAN:
 

A PERFORMANCE ASSESSMENT OF THE TMP INCLUDING AREA WIDE IMPACTS ON ADJACENT ROADWAYS SHALL BE PERFORMED BY ARLINGTON COUNTY, IF REQUESTED BY VDOT.
  19. PUBLIC COMMUNICATIONS PLAN:
 

THE CONTRACTOR SHALL BE RESPONSIBLE FOR:

    - A. NOTIFYING THE PROJECT MANAGER AND CONSTRUCTION INSPECTOR TWO WEEKS IN ADVANCE OF ANY SCHEDULED WORK PLANS AND TRAFFIC DELAYS.
    - B. NOTIFYING THE PROJECT MANAGER, CONSTRUCTION INSPECTOR, AND CORRESPONDING ENGINEER OF ANY UNSCHEDULED TRAFFIC DELAYS.
  20. TRANSPORTATION OPERATIONS:
 

THE CONTRACTOR SHALL BE RESPONSIBLE FOR IMPLEMENTING AND PROVIDING THE FOLLOWING:

    - A. THE CONTRACTOR SHALL BE RESPONSIBLE FOR MAINTAINING PROJECT LANE CLOSURE INFORMATION OR ANY WORK WITHIN VDOT RIGHT-OF-WAY ON LCAMS AND VTRAFFIC THROUGHOUT THE DURATION OF THE PROJECT IN ACCORDANCE WITH IIM-OD-16-03, DATED DECEMBER 16, 2016.
    - B. POST A LIST OF LOCAL EMERGENCY RESPONSE AGENCIES INSIDE THE PROJECT'S CONSTRUCTION OFFICE/TRAILER.
    - C. IMMEDIATELY REPORT ANY TRAFFIC INCIDENTS THAT MAY OCCUR IN THE WORK ZONE.
    - D. NOTIFY THE PROJECT'S CONSTRUCTION INSPECTOR AND CORRESPONDING ENGINEER OF ANY INCIDENTS AND EXPECTED TRAFFIC DELAYS.
    - E. WITHIN 24 HOURS OF ANY INCIDENTS WITHIN THE CONSTRUCTION WORK ZONE, A REVIEW OF THE TRAFFIC CONTROLS SHALL BE COMPLETED AND NECESSARY ADJUSTMENTS MADE TO REDUCE THE FREQUENCY AND SEVERITY OF ANY FUTURE INCIDENTS.
- CONTACT NUMBERS
- COUNTY PROJECT MANAGER - TBD  
 COUNTY CONSTRUCTION MANAGER - TBD  
 COUNTY CONSTRUCTION INSPECTOR - TBD  
 POLICE/AMBULANCE/FIRE SAFETY/HAZMAT SPILLS - 911  
 VDOT NORTHERN VIRGINIA TRAFFIC OPERATION CENTER - (800) 367-7623  
 VIRGINIA STATE POLICE - (703) 803-8660  
 VDOT NOVA DISTRICT OFFICE - (703) 877-3401 (8:15 AM - 04:00 PM)  
 ARLINGTON COUNTY DEPT. OF ENV. SERVICES - (703) 228-3681  
 NON-EMERGENCY NUMBERS:  
 ARLINGTON COUNTY POLICE - (703) 558-2222  
 ARLINGTON COUNTY FIRE - (703) 228-3362

**GENERAL CONSTRUCTION NOTES:**

- NOTE: WAPM - VIRGINIA WORK AREA PROTECTION MANUAL (2011), REVISION 2.1, NOVEMBER 1, 2020, OR MOST CURRENT EDITION
1. PRIOR TO THE START OF CONSTRUCTION, THE CONTRACTOR SHALL INSTALL PROJECT LIMIT SIGNAGE IN ACCORDANCE WITH VA WAPM TTC-53.0 (NOT GRAPHICALLY SHOWN ON THE PLANS). FOR THE DURATION OF CONSTRUCTION, THE CONTRACTOR SHALL ENSURE THIS SIGNAGE REMAINS IN COMPLIANCE IF THE PROJECT LIMITS CHANGE.
  2. THE CONTRACTOR IS RESPONSIBLE FOR ENSURING PROPER DRAINAGE FOR THE DURATION OF ALL PHASES AND INSTALLING ANY NECESSARY MEASURES TO FACILITATE PROPER DRAINAGE.
  3. THE CONTRACTOR SHALL MAKE ANY NECESSARY ADJUSTMENTS DURING BOTH WORK AND NON-WORK HOURS TO ENSURE THE PROTECTION AND SAFETY OF THE ADJACENT PROPERTY OWNERS, PEDESTRIANS, VEHICULAR TRAFFIC AND THE GENERAL PUBLIC FROM ANY CONSTRUCTION RELATED ACTIVITY, CONSTRUCTION EQUIPMENT AND THE CONSTRUCTION SITE ITSELF.
  4. THE CONTRACTOR WILL DEVELOP TRAFFIC CONTROL PLANS AT NO COST TO THE COUNTY. IT WILL BE THE RESPONSIBILITY OF THE CONTRACTOR TO PROVIDE SAFE TRAVEL ON THE ROADWAYS WITHIN THE WORK ZONE.

5. THE PUBLIC SHALL BE NOTIFIED OF THE EXPECTED CONSTRUCTION SCHEDULE ON THE COUNTY'S WEB SITE FOR THIS PROJECT. INFORMATION OF THE POTENTIAL FOR BACK-UPS DURING THE PEAK HOURS OF OPERATION IS PROVIDED BY THE VDOT NORTHERN VIRGINIA TRAFFIC OPERATION CENTER (TOC). THE ENGINEER NEEDS TO COORDINATE WITH VDOT.
6. THE VDOT NORTHERN VIRGINIA TRAFFIC OPERATION CENTER (TOC) SHALL BE NOTIFIED OF LANE AND ROADWAY CLOSURE INFORMATION FOR DISTRIBUTION ON THE 511 SYSTEM AND VIRGINIA OPERATIONS INFORMATION SYSTEM (VOIS). EMERGENCY RESPONSE PROFESSIONALS SHALL RESPOND TO TRAFFIC INCIDENTS IN THE WORK ZONE AS SOON AS POSSIBLE.
7. THE APPROPRIATE CLEAR ZONE SHALL BE MAINTAINED FREE OF PARKED EQUIPMENT AND STORED MATERIAL OR PROTECTED AT THE END OF EACH DAY IN ACCORDANCE WITH THE WORK AREA PROTECTION MANUAL. EQUIPMENT AND MATERIAL SHALL NOT BE STORED WITHIN THE ESTABLISHED. CLEAR ZONE AND/OR DEFLECTION ZONE OF PHYSICAL BARRIERS IN ACCORDANCE WITH THE WORK AREA PROTECTION MANUAL.
8. CONTRACTOR SHALL REQUIRE THE APPROVAL OF THE ENGINEER FOR SELECTED LOCATIONS OF ANY STAGING AREA FOR STAGING ARE FOR MATERIALS OR EQUIPMENT STORAGE.
9. ACCESS TO PRIVATE AND COMMERCIAL DRIVEWAYS WITHIN THE PROJECT LIMITS SHALL BE MAINTAINED AT ALL TIMES.
10. THE USE OF STEEL PLATES TO PROVIDE A TEMPORARY RIDING SURFACE WILL NOT BE ALLOWED BETWEEN NOVEMBER 1 AND APRIL 1. THE USE OF STEEL PLATES BETWEEN APRIL 2 AND OCTOBER 31 SHALL BE IN ACCORDANCE WITH VDOT STANDARDS AND SPECIFICATIONS.

**CONSTRUCTION NARRATIVE:**

1. CONTRACTOR SHALL INSTALL EROSION AND SEDIMENT CONTROLS AS APPROPRIATE PRIOR TO STARTING WORK.
2. WHEN CONSTRUCTION OF A WORK ZONE IS COMPLETE, THE CONTRACTOR SHALL REMOVE TEMPORARY CONTROL DEVICES AND CONSTRUCTION SIGNS AND RESTORE TRAFFIC TO NORMAL CONDITIONS.

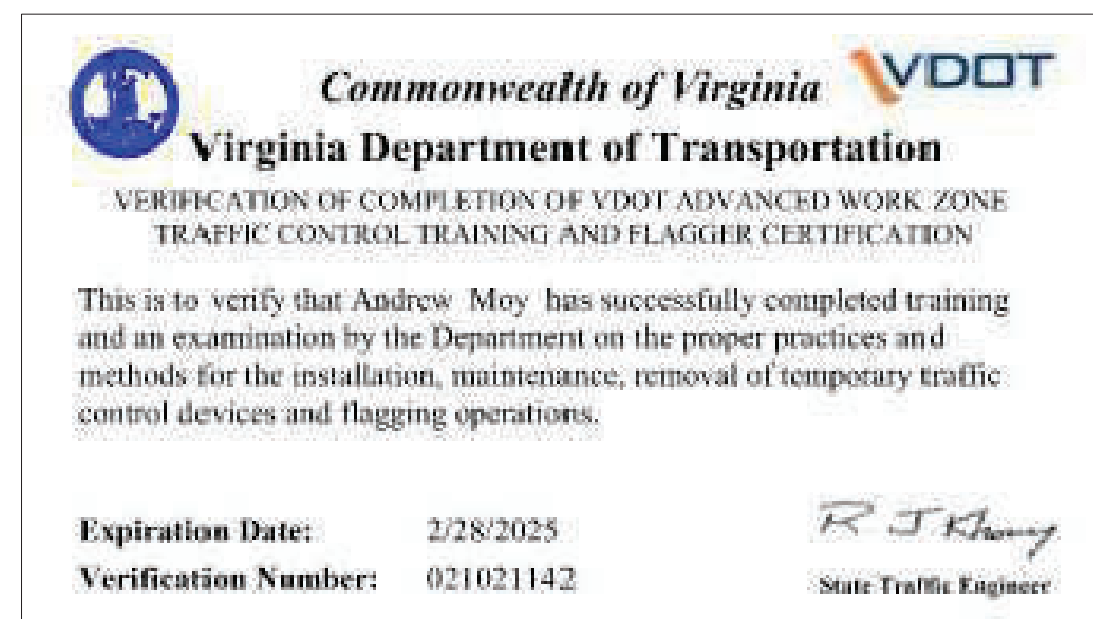
**CONSTRUCTION PAVEMENT MARKING GENERAL NOTES:**

**(DURING CONSTRUCTION ONLY)**

1. ALL CONSTRUCTION PAVEMENT MARKINGS SHALL BE IN ACCORDANCE WITH THE MOST CURRENT EDITION OF EACH OF THE FOLLOWING AND ANY REVISION THEREOF:
  - A. MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES (MUTCD), 2009
  - B. THE VIRGINIA SUPPLEMENT TO THE MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES, 2011
  - C. THE VIRGINIA DEPARTMENT OF TRANSPORTATION ROAD AND BRIDGE SPECIFICATIONS, 2020
  - D. THE VIRGINIA DEPARTMENT OF TRANSPORTATION ROAD AND BRIDGE STANDARDS, 2016
2. ALL CONSTRUCTION PAVEMENT MARKINGS SHALL BE TYPE A OR TYPE D, CLASS II, UNLESS OTHERWISE DIRECTED BY THE ENGINEER. DURING CONSTRUCTION ANY PAVEMENT MARKINGS WHICH WILL CONFLICT WITH THOSE SHOWN ON THE TMP/SOC PLANS, OR AS DIRECTED BY THE ENGINEER, SHALL BE COVERED WITH TYPE E, NON-REFLECTIVE BLACK TAPE (OR ERADICATED AT THE DIRECTION OF THE ENGINEER).
3. ELONGATED ARROWS SHALL BE IN ACCORDANCE WITH MUTCD AND VDOT ROAD AND BRIDGE STANDARD.

**TRANSPORTATION OPERATION PLAN:**

THE PUBLIC AFFAIRS SECTION AND THE TRANSPORTATION OPERATIONS CENTER SHALL BE NOTIFIED BY THE CONSTRUCTION PROJECT MANAGER OF LANE CLOSURE INFORMATION FOR DISTRIBUTION ON THE 511 SYSTEM AND VIRGINIA OPERATIONS INFORMATION SYSTEM (VOIS). THE CONTRACTOR SHALL GET APPROVAL FROM VDOT 4 WEEKS PRIOR TO CONSTRUCTION. FOLLOWING ANY TRAFFIC INCIDENTS, THE CONTRACTOR SHALL CLEAN AND RESTORE THE SITE FOR NORMAL OPERATIONS AS SOON AS POSSIBLE.



Virginia Department of Transportation  
**REVIEW OF WORKING DRAWINGS**  
 Working drawings have been reviewed in accordance with Section 105.10 2016 VDOT Road & Bridge Specifications

REVIEW COMPLETED CORRECT & RESUBMIT  
 REJECTED - SEE REMARKS

Reviewed by: \_\_\_\_\_ Date: \_\_\_\_\_

**REVIEWED**  
 By Brian E. Fry at 7:30 am, Jan 17, 2023

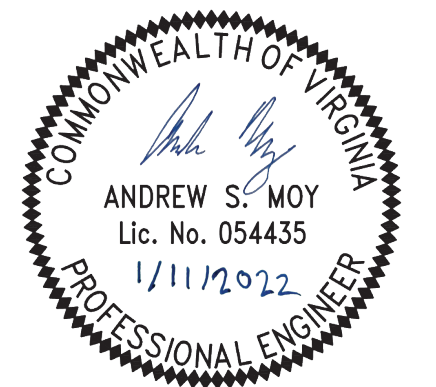
GLEBE ROAD CHANNEL REPAIR  
 FINAL DESIGN

Arlington, Virginia

MOT Notes

**RK&K**  
 Rummel, Klepper & Kahl, LLP  
 12600 Fair Lakes Circle, Suite 300  
 Fairfax, VA

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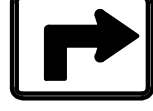
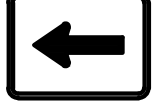


Boundary and Topo Source: WSS1 and Arlington Digital Data

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DETOUR SIGN LEGEND

		
M4-8 24" X 12"	M3-1 24" X 12"	M3-3 24" X 12"
		
M4-8a 24" X 12"	M1-V1c 30" X 24"	M5-1L 21" X 15"
		
M5-1R 21" X 15"	M6-1L 21" X 15"	M6-1R 21" X 15"
		
M6-3 21" X 15"		

PRE-CLOSURE MESSAGE

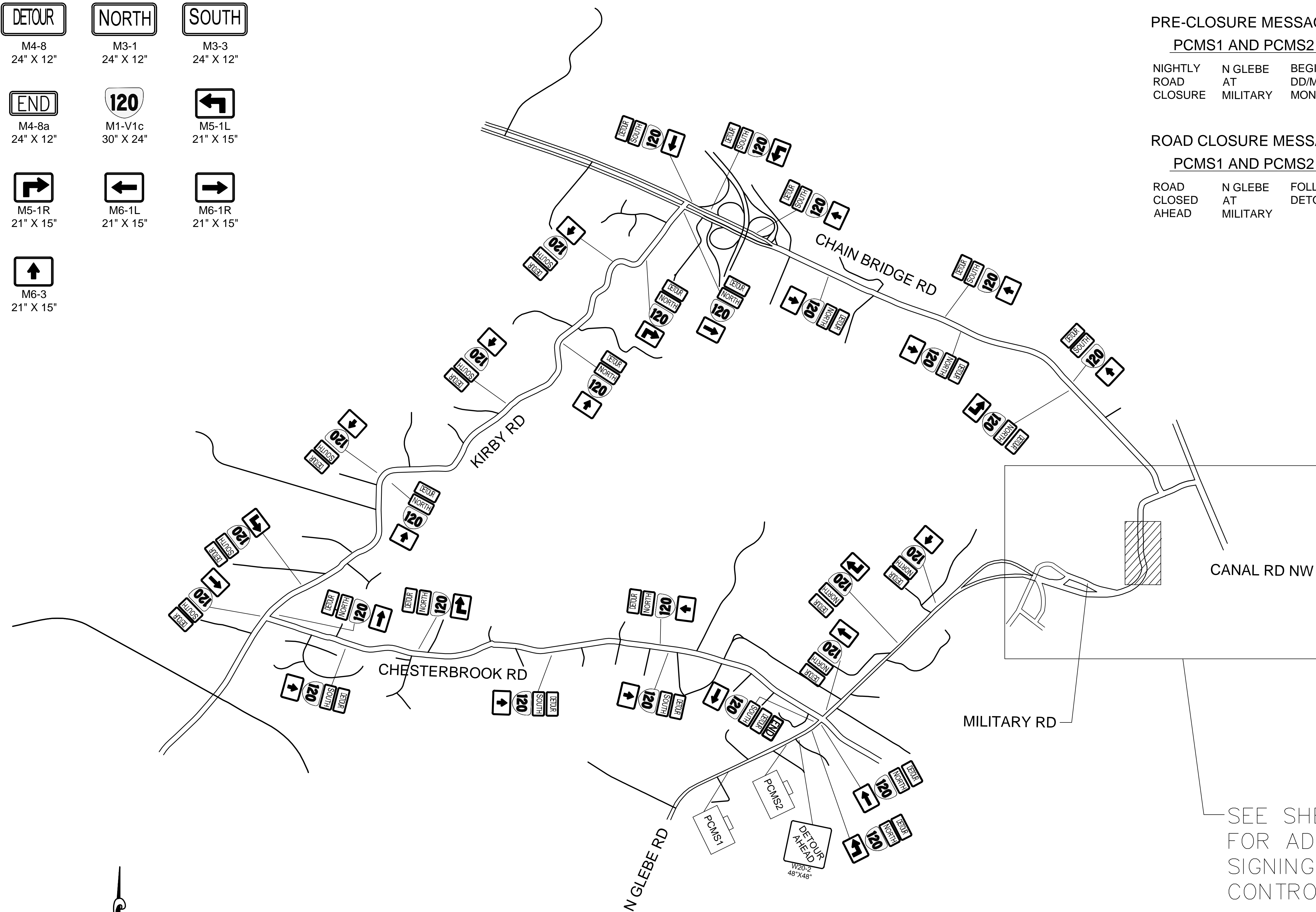
PCMS1 AND PCMS2

NIGHTLY ROAD CLOSURE	N GLEBE AT MILITARY	BEGINS DD/MM MON-FRI
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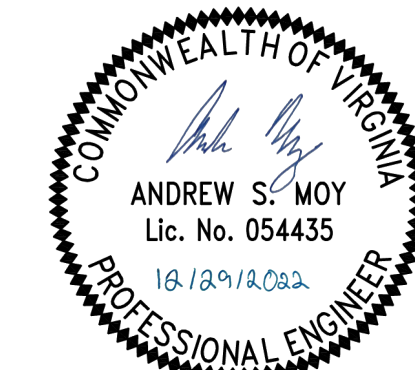
ROAD CLOSURE MESSAGE

PCMS1 AND PCMS2

ROAD CLOSED AHEAD	N GLEBE AT MILITARY	FOLLOW DETOUR
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SEE SHEETS 14 THRU 17 FOR ADDITIONAL DETOUR SIGNING AND TRAFFIC CONTROL DEVICES



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DATE: June 9, 2020 SCALE: NTS



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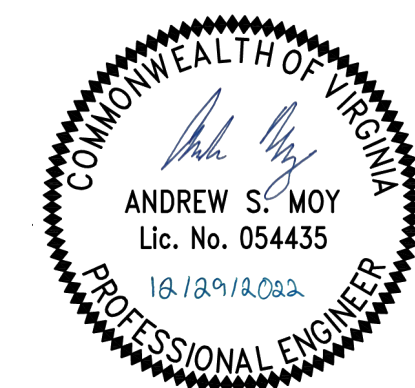
GLEBE ROAD CHANNEL REPAIR

FINAL DESIGN

Arlington, Virginia

MOT Detour Plan

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No.	Date	Description	Rev. By	App. By

SCALE: 1" = 50'

DATE: June 9, 2020

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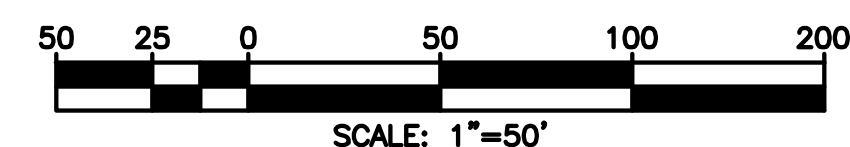
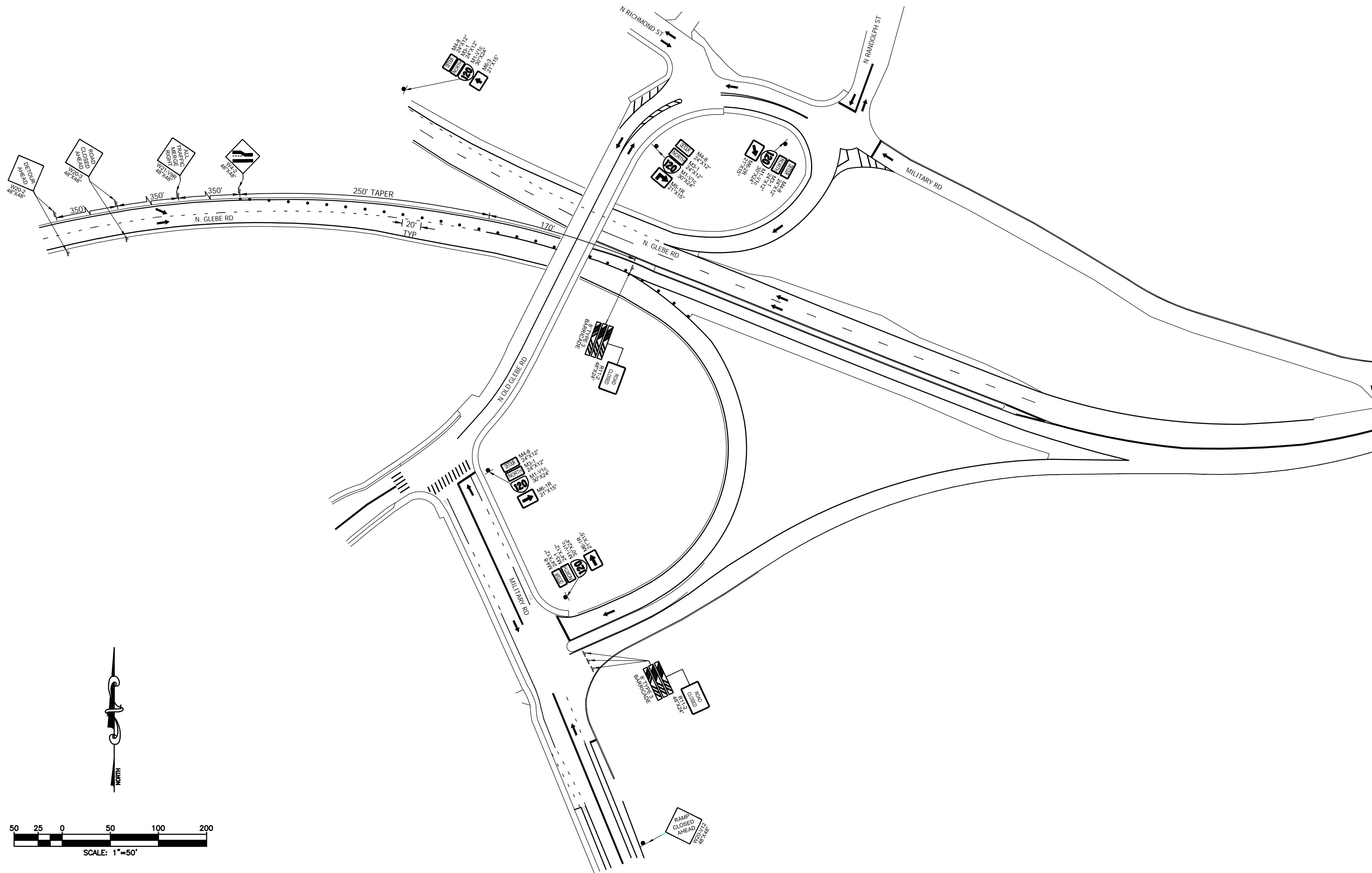
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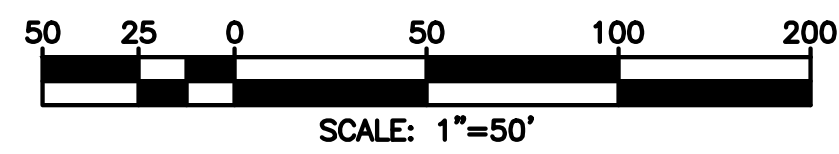
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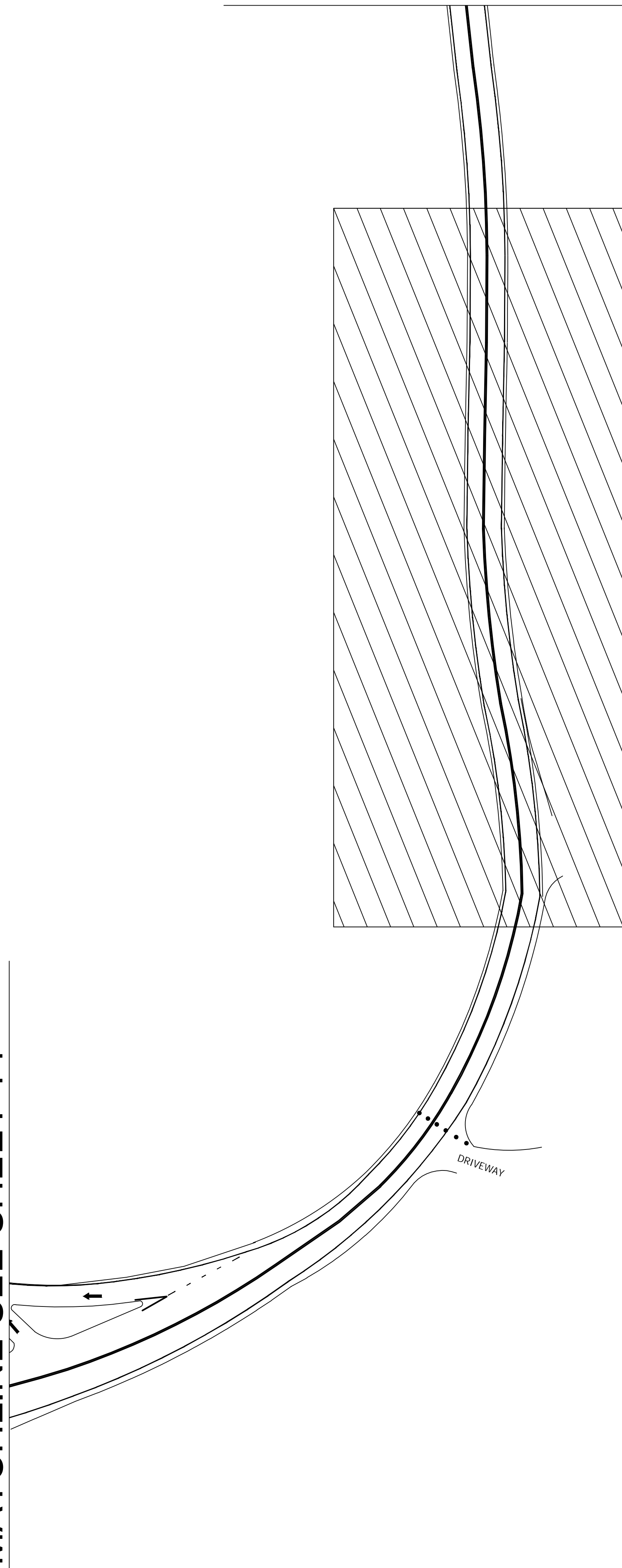
MATCHLINE SEE SHEET 15





MATCHLINE SEE SHEET 16

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GLEBE ROAD CHANNEL REPAIR

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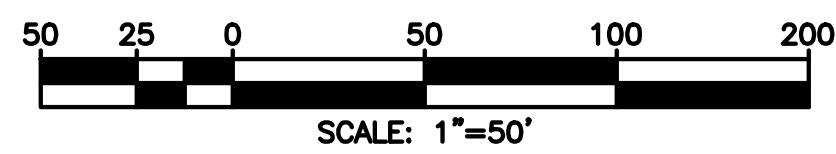
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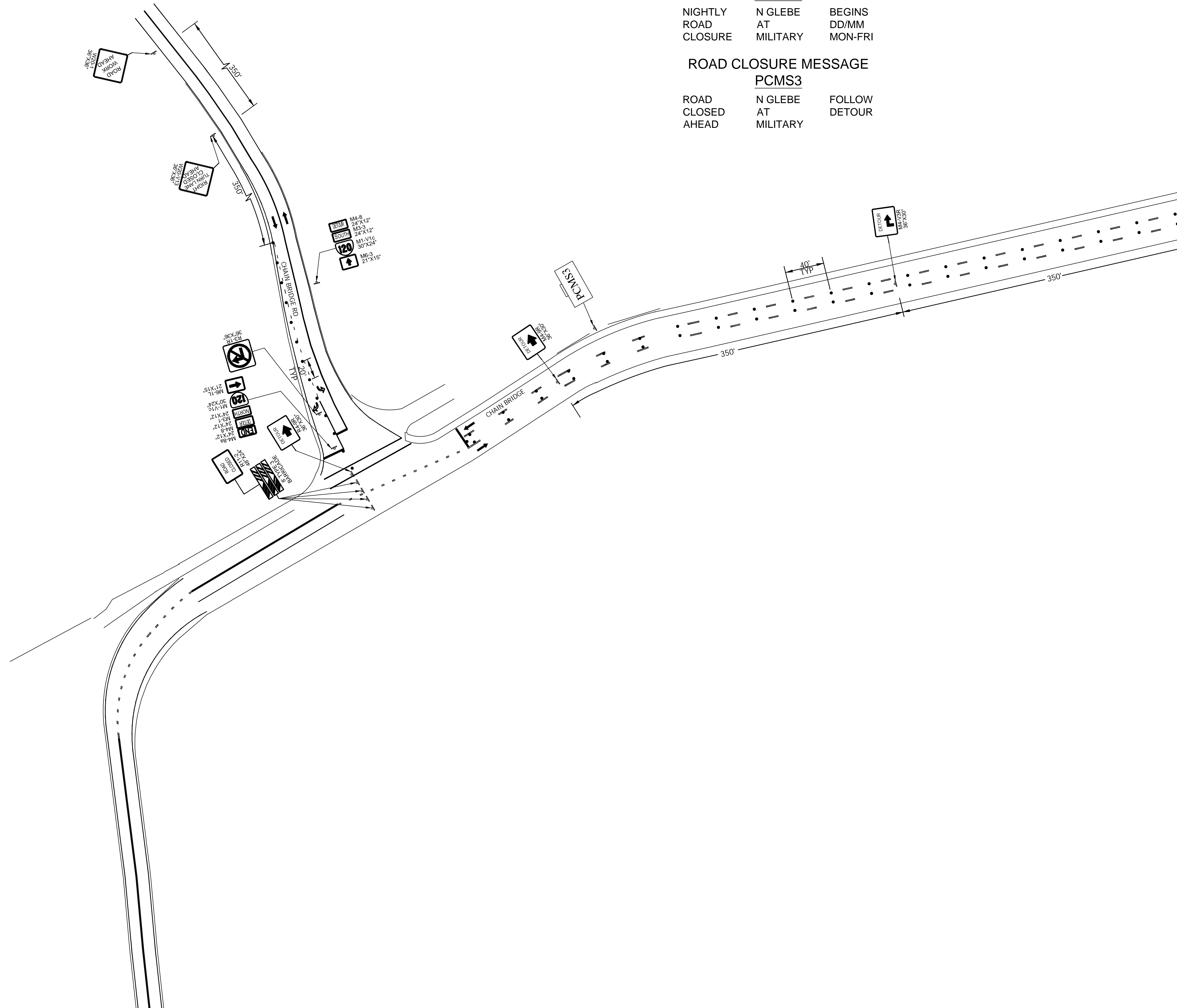
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DATE: June 9, 2020





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PRE-CLOSURE MESSAGE  
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 NIGHTLY N GLEBE BEGINS  
 ROAD AT DD/MM  
 CLOSURE MILITARY MON-FRI

ROAD CLOSURE MESSAGE  
**PCMS3**  
 ROAD N GLEBE FOLLOW  
 CLOSED AT DD/MM DETOUR  
 AHEAD MILITARY

MATCHLINE SEE SHEET 17

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 Fairfax, VA

GLEBE ROAD CHANNEL REPAIR  
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 Arlington, Virginia  
 MOT Detour Plan



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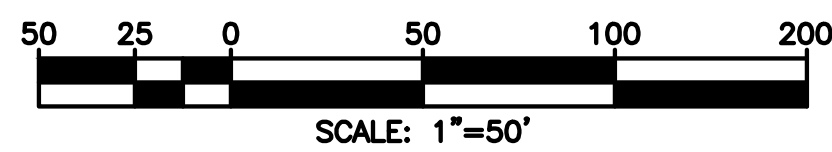
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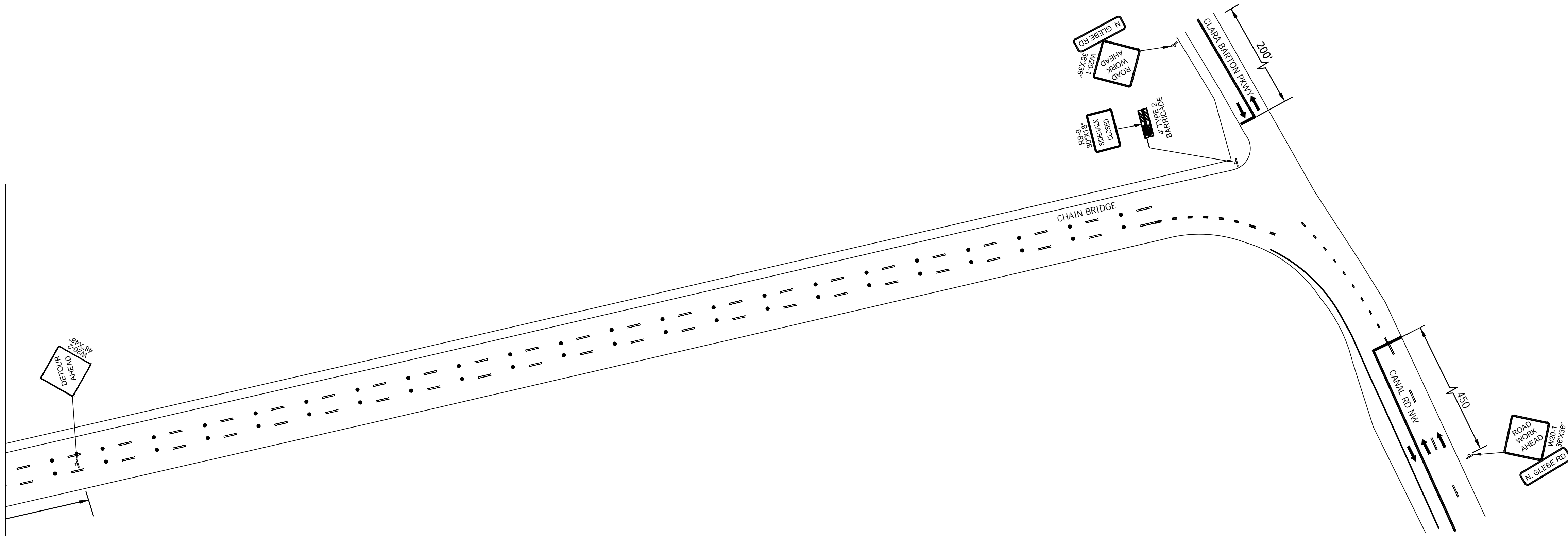
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MATCHLINE SEE SHEET 16



**NOTES:**

- CONTRACTOR SHALL COORDINATE AND GET APPROVAL FOR PLACEMENT OF TRAFFIC CONTROL DEVICES IN D.C. WITH DDOT AND/OR MPD.



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DATE: June 9, 2020      SCALE: 1" = 50'

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GLEBE ROAD CHANNEL REPAIR  
FINAL DESIGN

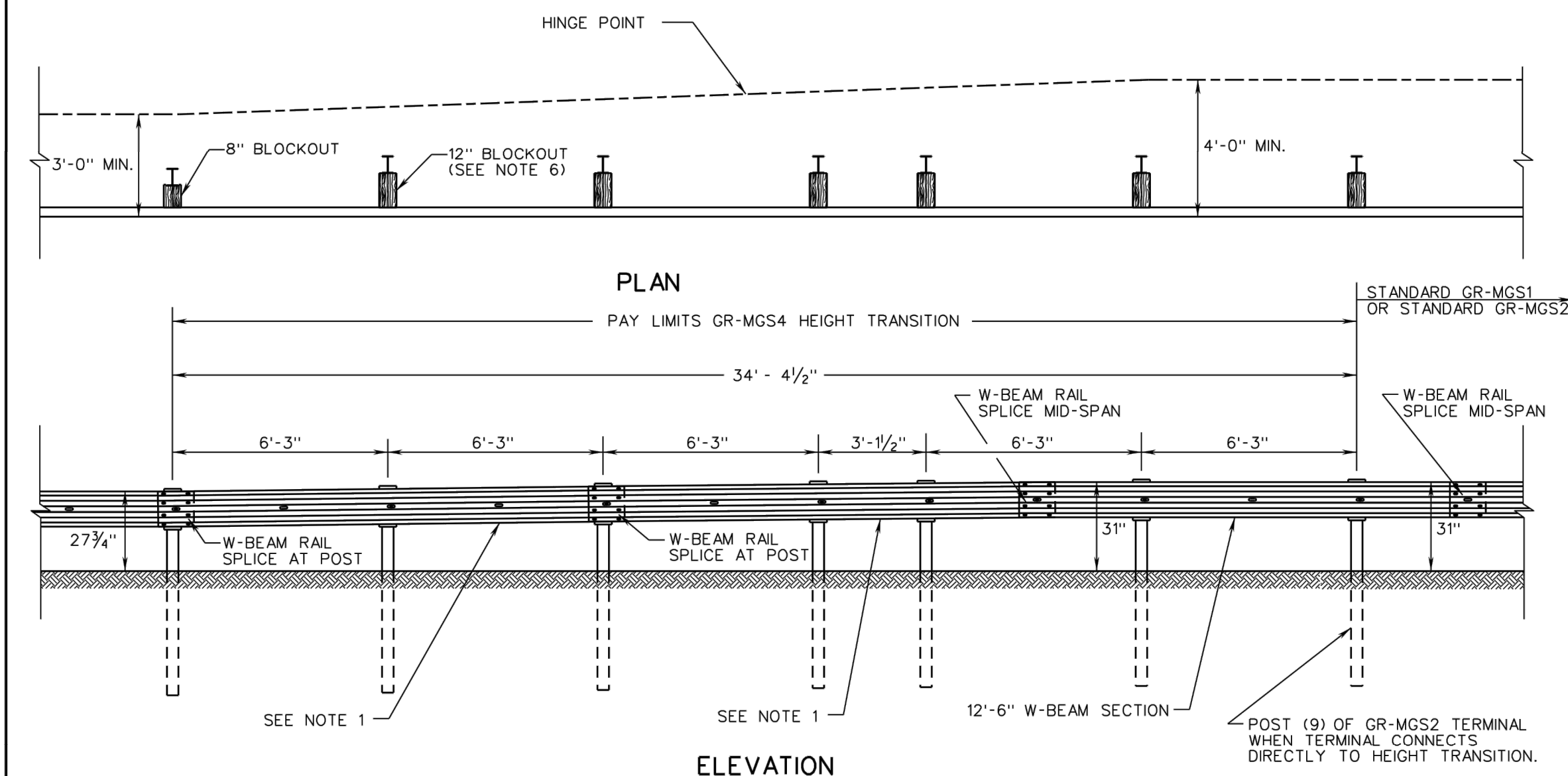
Arlington, Virginia

MOT Detour Plan

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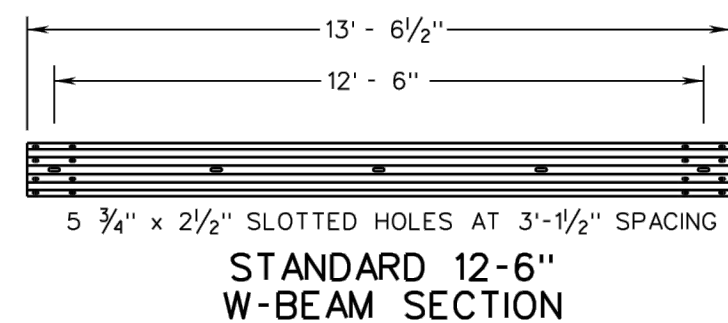


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NOTES:

- HEIGHT TRANSITION FROM 31" GR-MGS1 TO 27 3/4" GR-2 WILL REQUIRE 2 - STANDARD 12'-6" SECTIONS OF W-BEAM (SPLICES AS SHOWN) OR A SINGLE 25' W-BEAM WITH 1/4" x 2 1/2" SLOTTED HOLES AT 3'-1/2" SPACING.
- POSTS, BLOCKOUTS, AND SPLICES WILL BE IN ACCORDANCE WITH THE GR-MGS1 STANDARD AND LOCATED AS SHOWN IN THE DETAILS ABOVE.
- STANDARD 6 FOOT POSTS WILL BE USED UNLESS OTHERWISE NOTED ON PLANS.
- STANDARD GR-MGS4 TRANSITION WILL BE PAID FOR AS EACH COMPLETE IN PLACE.
- END TERMINAL WILL BE A VDOT APPROVED PRODUCT MEETING MASH TESTING CRITERIA.
- THE BLOCKOUT DEPTH OF THE GR-MGS4 TERMINAL WILL MATCH THE BLOCKOUT DEPTH OF THE GR-MGS2 TERMINAL WHEN THE TERMINAL TIES DIRECTLY TO THE GR-MGS4 HEIGHT TRANSITION.



ITEM CODE 13288 GUARDRAIL HEIGHT TRANSITION GR-MGS4 EACH

SPECIFICATION REFERENCE	A COPY OF THE ORIGINAL SEALED AND SIGNED DRAWING IS ON FILE IN THE CENTRAL OFFICE.	VDOT ROAD AND BRIDGE STANDARDS
221 236 505	<b>MIDWEST GUARDRAIL SYSTEM</b> (TRANSITION FROM MGS 31" HEIGHT TO GR-2 27 3/4" HEIGHT) VIRGINIA DEPARTMENT OF TRANSPORTATION	REVISION DATE 09/17 SHEET 1 OF 1 506.11

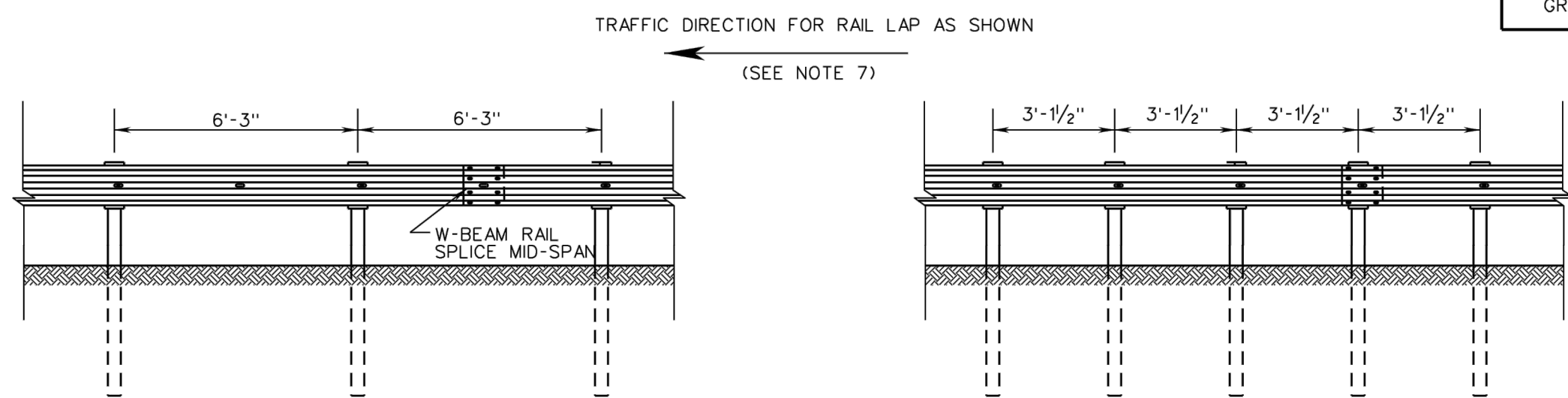
# DETAILS

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Fairfax, VA

FINAL DESIGN  
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Arlington, Virginia

Guardrail System Details

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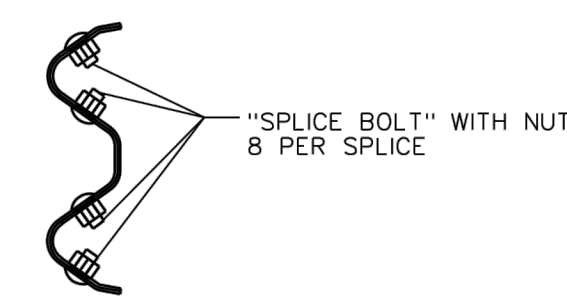


GR-MGS1

(6'-3" POST SPACING)  
MIN. DISTANCE FROM FACE OF RAIL TO FIXED OBJECT = 60'

GR-MGS1A

(3'-1/2" POST SPACING)  
MIN. DISTANCE FROM FACE OF RAIL TO FIXED OBJECT = 48'



SPlice DETAIL

RAIL SPlice SHALL BE PLACED MID-SPAN FOR STANDARD POST SPACING (6'-3")

DESIGN SPEED	FLARE RATES		
	INSIDE SHY LINE	FLARE RATE	BEYOND SHY LINE
70	9'	30:1	15:1 *
60	8'	26:1	14:1 *
50	6.5'	21:1	11:1 *
40	5'	16:1	8:1 *
30	4'	13:1	7:1 *

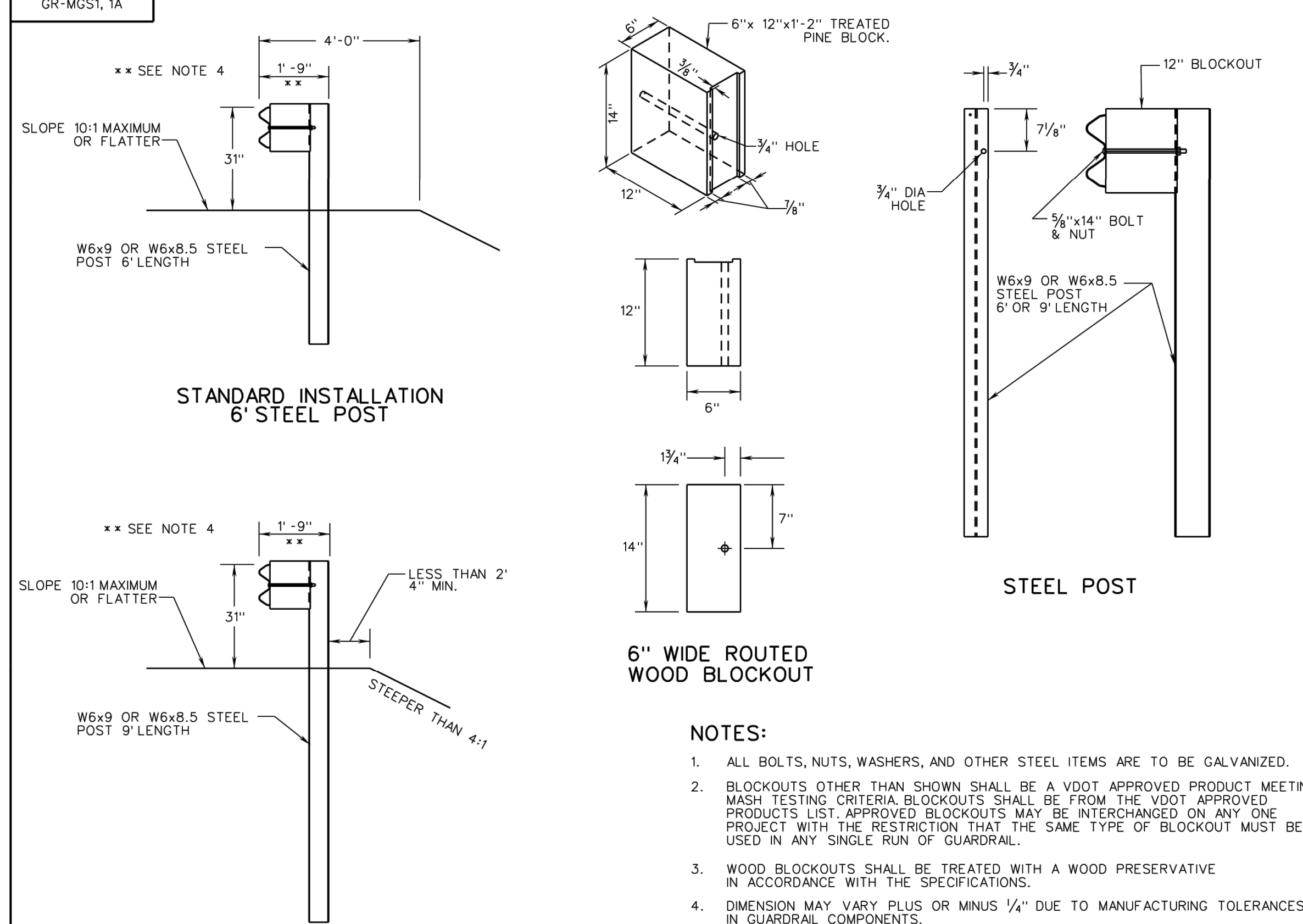
\* SUGGESTED MAXIMUM FLARE RATE FOR SEMI-RIGID BARRIER SYSTEMS.

NOTES:

- GUARDRAIL LOCATIONS SHOWN ON PLANS ARE APPROXIMATE ONLY AND CAN BE ADJUSTED DURING CONSTRUCTION IF AND AS DIRECTED BY THE ENGINEER.
- FOR DETAILS OF POST AND BLOCKOUTS SEE SHEET NO. 506.05.
- FOR DETAILS OF RAIL ELEMENT, AND ASSOCIATED HARDWARE SEE SHEETS 506.01 AND 506.02.
- RAIL ELEMENTS WITH RADIUS LESS THAN OR EQUAL TO 150 FEET SHALL BE SHOP CURVED AND PAID FOR AS RADIAL GR-MGS1, OR 1A.
- ALL GR-MGS1 AND GR-MGS1A RAIL SHALL BE MAINTAINED AT A HEIGHT OF 30" MIN - 32" MAX AS MEASURED PER STANDARD GR-INS.
- ALL GUARDRAIL POSTS SHALL BE SET PLUMB. POST SHALL NOT BE SET WITH A VARIATION OF MORE THAN 1/8" PER FOOT FROM VERTICAL. W-BEAM, BLOCKOUTS, AND POSTS SHALL BE SET AND ALIGNED WITHOUT ALTERATION OR FORCE, AS PER SECTION 505 OF THE SPECIFICATIONS.
- ALL W-BEAM RAILS SHALL BE LAPPED IN THE DIRECTION OF VEHICULAR TRAVEL FOR THE FINISHED ROADWAY.
- ADJUSTING EXISTING GUARDRAIL TO MEET THE MGS1 STANDARD IS NOT PERMITTED.

DESCRIPTION	ITEM CODE	LF
GUARDRAIL GR-MGS1	13280	LF
GUARDRAIL GR-MGS1A	13281	LF
GUARDRAIL GR-MGS1, 9' POST	13282	LF
GUARDRAIL RADIAL GR-MGS1	13283	LF
GUARDRAIL RADIAL GR-MGS1A	13284	LF
GUARDRAIL RADIAL GR-MGS1, 9' POST	13285	LF

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221 236 505	<b>MIDWEST GUARDRAIL SYSTEM</b> (STANDARD AND REDUCED POST SPACING) VIRGINIA DEPARTMENT OF TRANSPORTATION	REVISION DATE NEW 02/17 SHEET 1 OF 2 506.04



STANDARD INSTALLATION  
6" STEEL POST

GUARDRAIL INSTALLATION  
SITES REQUIRING 9"  
GUARDRAIL POSTS

6" WIDE ROUTED  
WOOD BLOCKOUT

NOTES:

- ALL BOLTS, NUTS, WASHERS, AND OTHER STEEL ITEMS ARE TO BE GALVANIZED.
- BLOCKOUTS OTHER THAN SHOWN SHALL BE A VDOT APPROVED PRODUCT MEETING MASH TESTING CRITERIA. BLOCKOUTS SHALL BE FROM THE VDOT APPROVED PRODUCTS LIST. APPROVED BLOCKOUTS MAY BE INTERCHANGED ON ANY ONE PROJECT WITH THE RESTRICTION THAT THE SAME TYPE OF BLOCKOUT MUST BE USED IN ANY SINGLE RUN OF GUARDRAIL.
- WOOD BLOCKOUTS SHALL BE TREATED WITH A WOOD PRESERVATIVE IN ACCORDANCE WITH THE SPECIFICATIONS.
- DIMENSION MAY VARY PLUS OR MINUS 1/4" DUE TO MANUFACTURING TOLERANCES IN GUARDRAIL COMPONENTS.

SPECIFICATION REFERENCE	A COPY OF THE ORIGINAL SEALED AND SIGNED DRAWING IS ON FILE IN THE CENTRAL OFFICE.	SPECIFICATION REFERENCE
221 236 505	<b>MIDWEST GUARDRAIL SYSTEM</b> (STANDARD AND REDUCED POST SPACING) VIRGINIA DEPARTMENT OF TRANSPORTATION	221 236 505

SEAL



REVISIONS			SCALE: NTS
No.	Date	Description	
			DATE: August 24, 2021

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Vertical Datum: NAVD 88

Boundary and Topo Source: WSSI and Arlington Digital Data

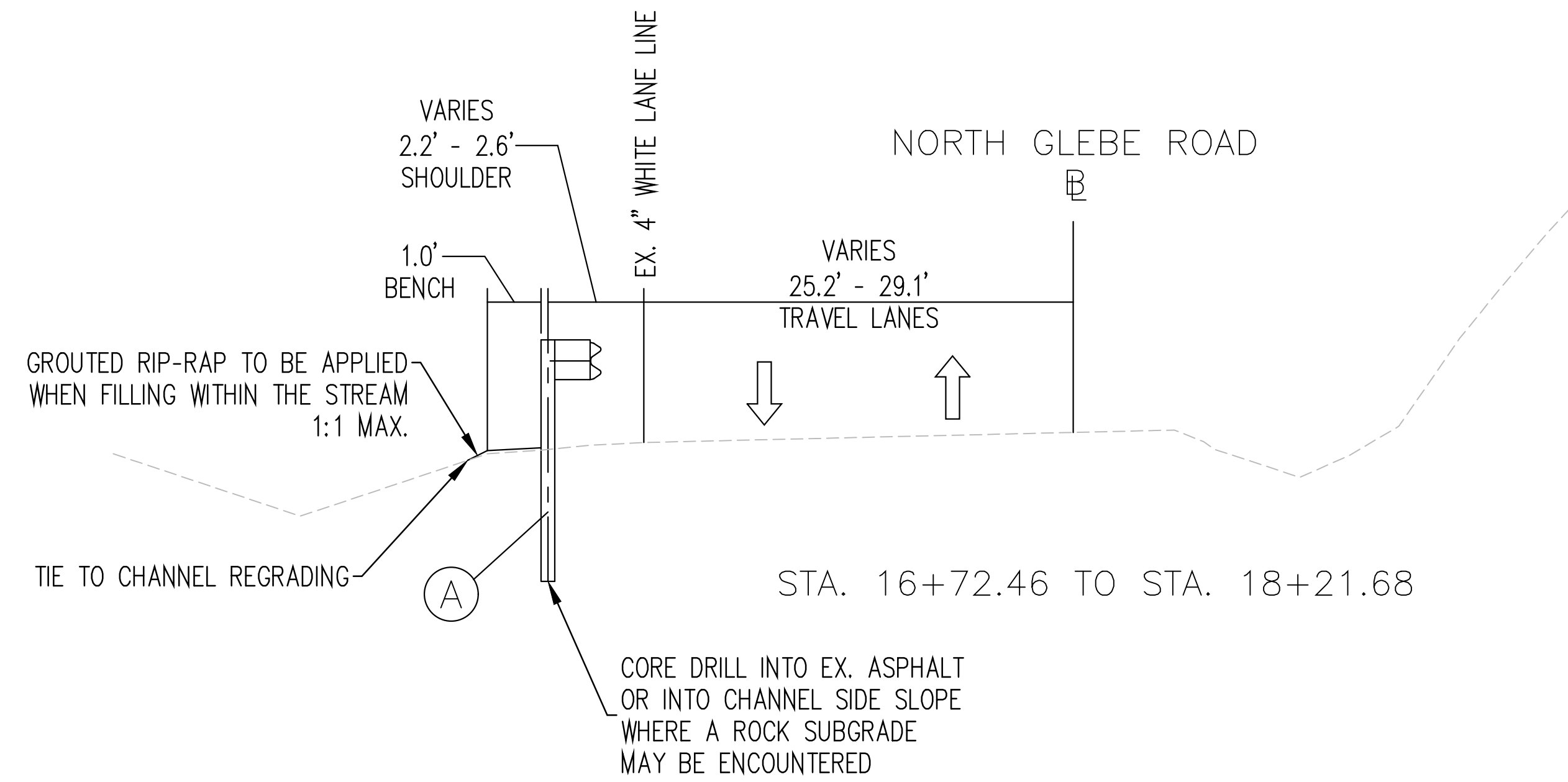
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KAV	KM	MJA

Sheet #  
18 of 23

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08-24-21

# TYPICAL SECTIONS



**LEGEND**

(A) VDOT ST'D GR-MGS1A OR ST'D GR-MGS4  
(SEE PROPOSED PLAN FOR GUARDRAIL LIMITS)

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Typical Sections

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No.	Date	Rev. By

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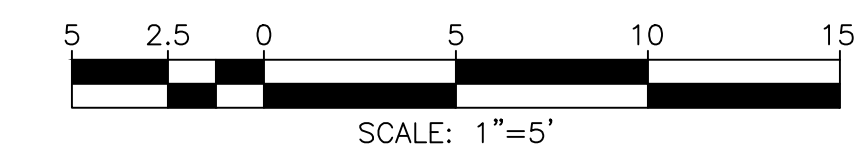
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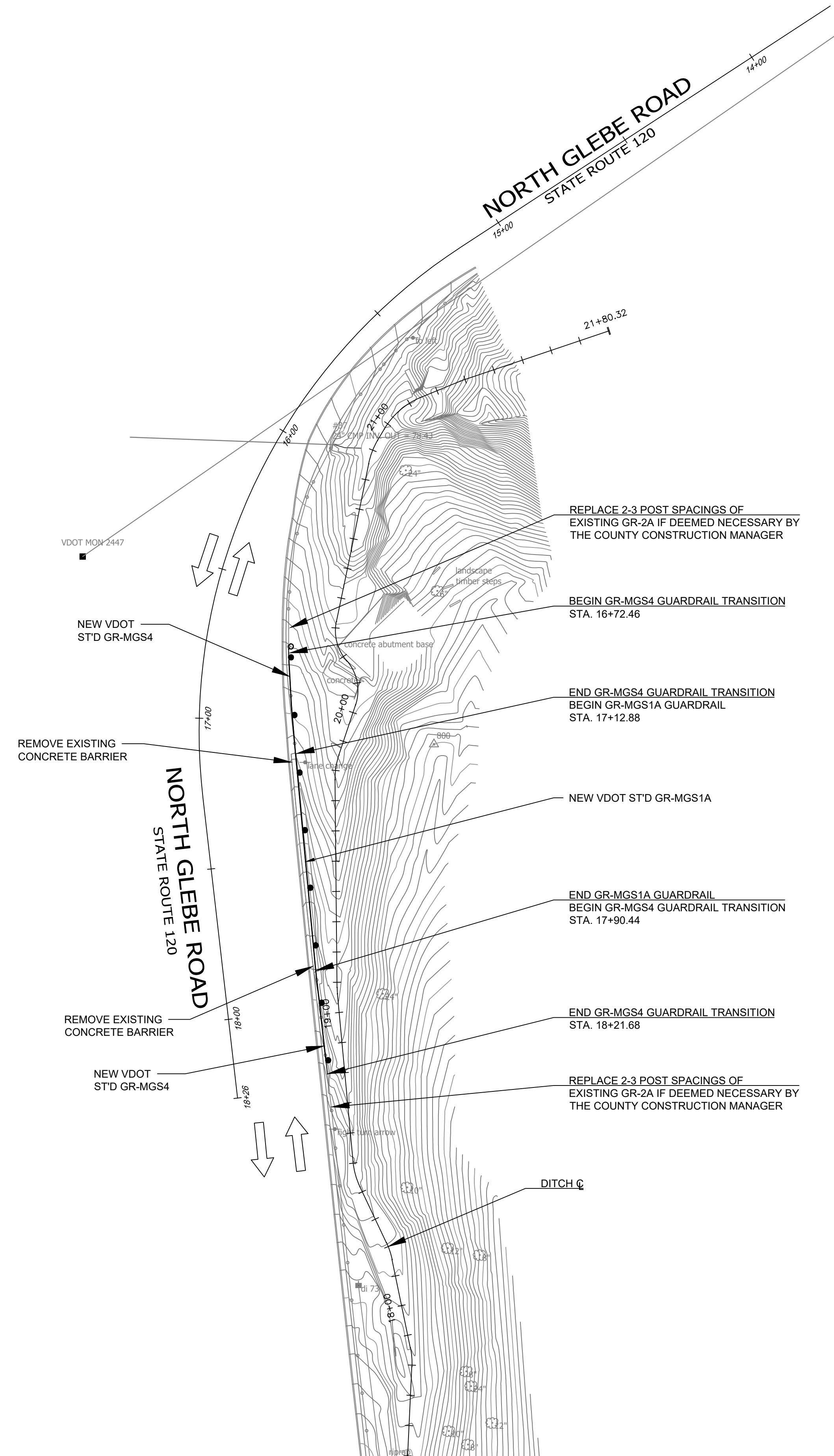
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19 of 23



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# PLAN



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**Proposed Plan**

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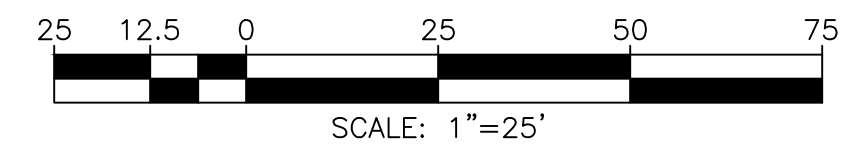
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# CROSS SECTIONS

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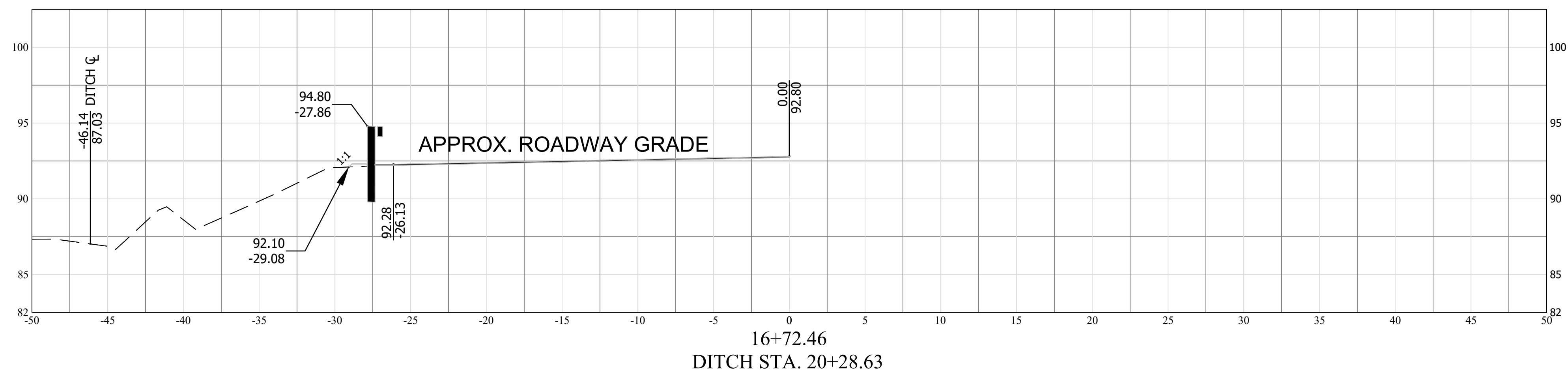
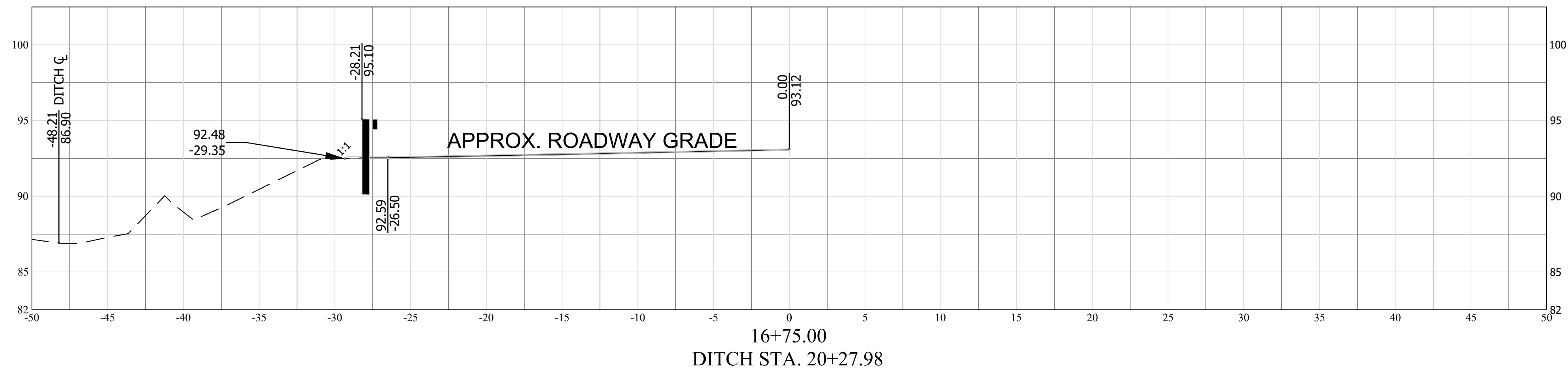
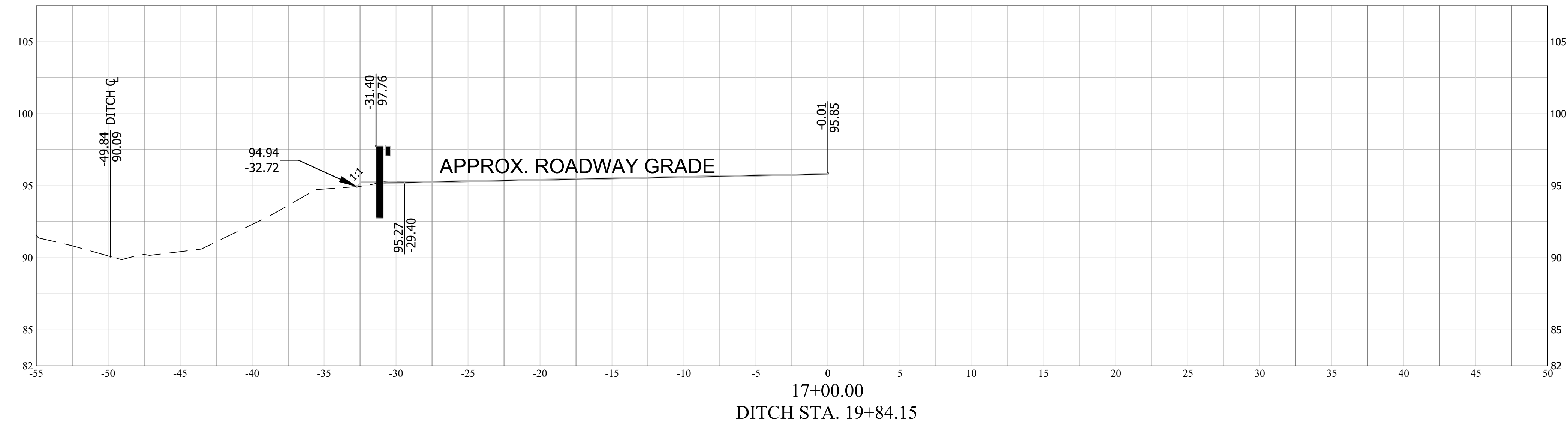
1. Grading within stream to be dictated by stream cross sections on Sheet 2
2. Fill grading within the stream to be grouted rip-rap material

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**Cross Sections**

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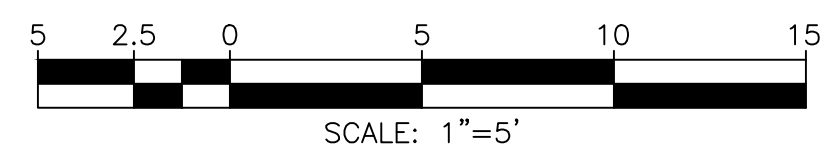
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**21 of 23**



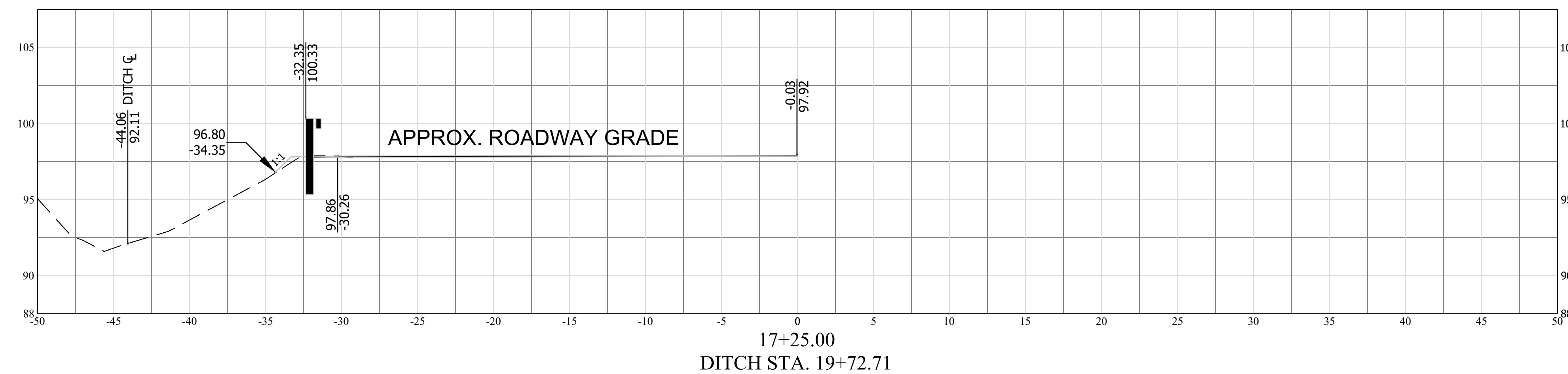
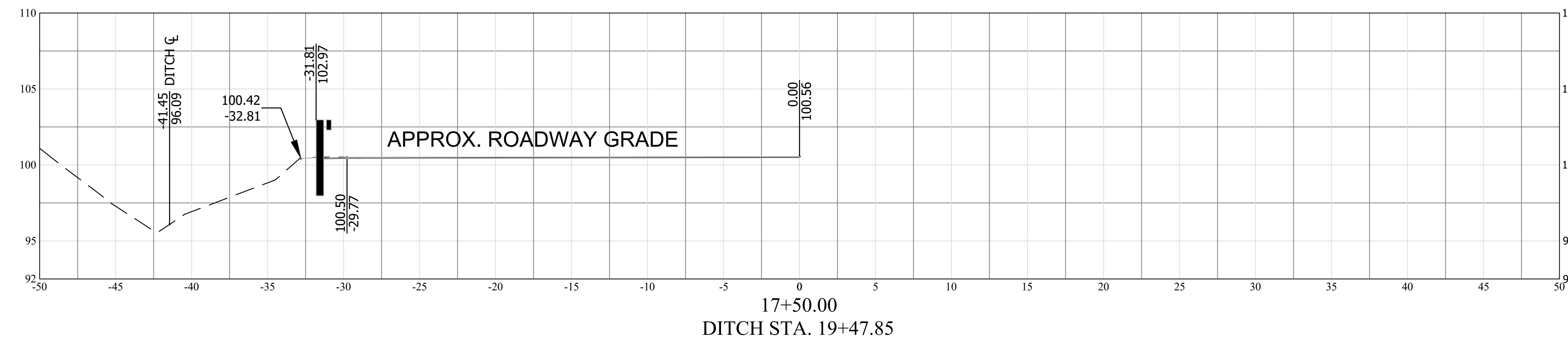
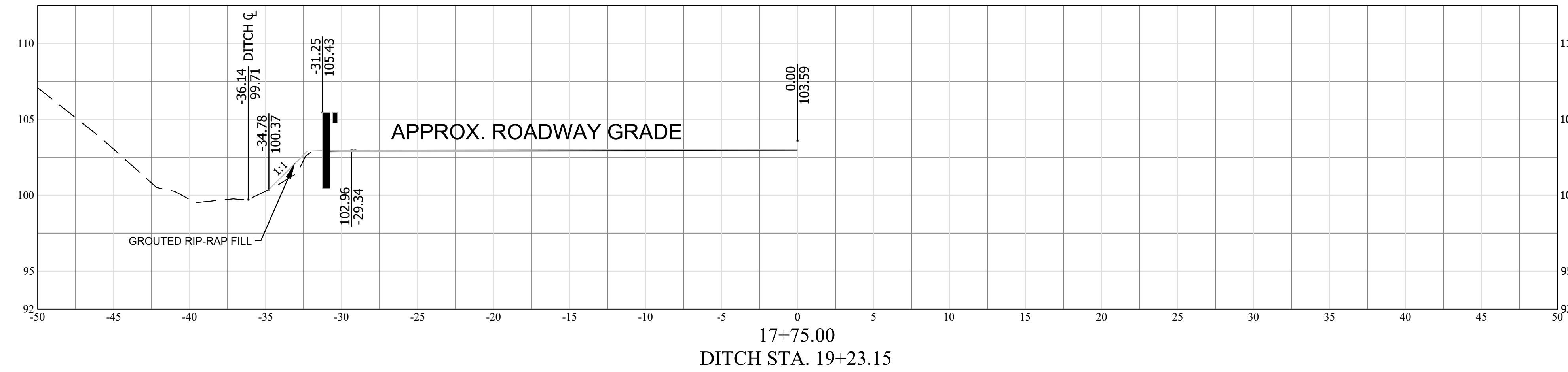
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# CROSS SECTIONS

## GENERAL NOTES:

- Grading within stream to be dictated by stream cross sections on Sheet 2
- Fill grading within the stream to be grouted rip-rap material

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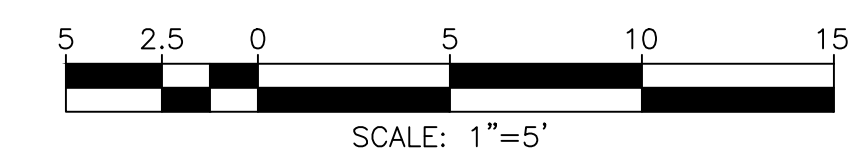
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# CROSS SECTIONS

## GENERAL NOTES:

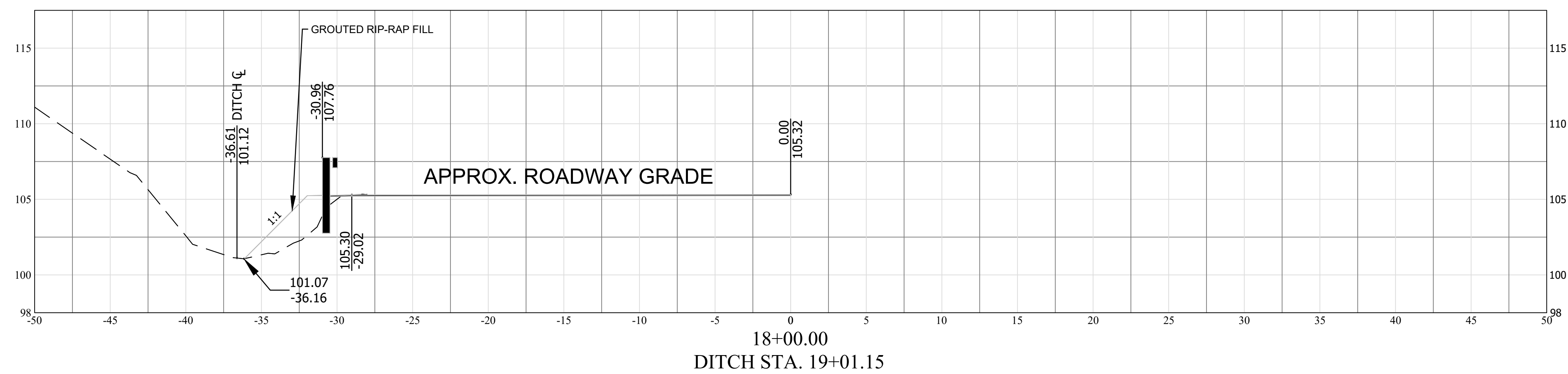
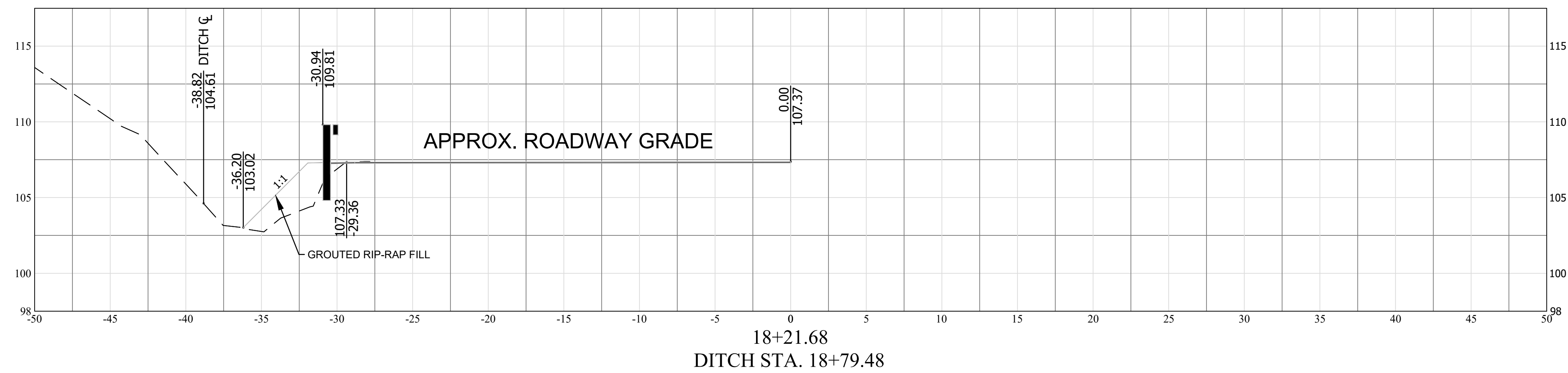
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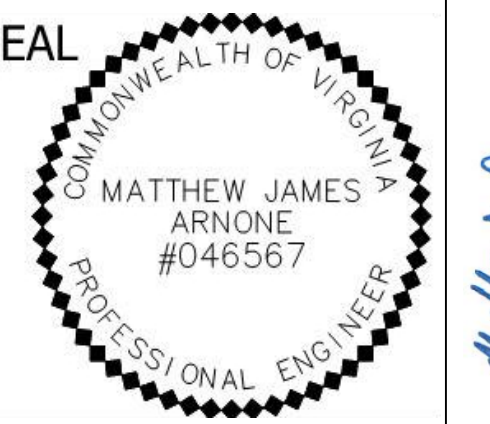
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