COUNTY OF ROANOKE, VA

GENERAL NOTES

PRE-CONSTRUCTION MEETING AND CONSTRUCTION COMMENCEMENT:

1. All construction methods and materials shall conform to the Construction Standards and Specifications of Roanoke County, the Western Virginia Water Authority, and the Virginia Department of Transportation.
2. Stormwater Management Agreements with an attached 8 1/2" x 11" or 8 1/2" x 14" plat must be approved and recorded prior to the pre-construction meeting.
3. Once all required items are submitted to the County of Roanoke, the developer must contact the Development Review Coordinator to indicate that a pre-construction meeting needs to be scheduled. The pre-construction meeting will be scheduled with the owner/developer two (2) working days later.
4. All land disturbing projects that require approval of an erosion and sediment control plan, grading or clearing permit shall require that the applicant provide the name of an individual who will be responsible for land disturbing activities and that this individual hold a Responsible Land Disturber (RLD) Certificate from the Department of Environmental Quality. The Responsible Land Disturber can be anyone from the Project team that is certified by the Commonwealth of Virginia to be in charge of carrying out the land disturbing activity for the project.
5. It is the responsibility of the owner/developer to notify the certified Responsible Land Disturber and the Utility Contractor to attend the pre-construction meeting.
6. The Development Review Coordinator will schedule the pre-construction meeting with the County Review Engineer, the County Inspector, and the Western Virginia Water Authority and the Town of Vinton Public Works Department if applicable.
7. An approved set of plans, Storm Water Pollution Prevention Plan (SWPPP), VSMP coverage letter, and all permits must be available at the construction site at all times.
8. The developer and/or contractor shall supply all utility companies with copies of approved plans, advising them that all grading and installation shall conform to approved plans.
9. The project engineer will inform the owner/developer verbally and in writing of the County's obligation to perform inspections on site. Everyone in the meeting will be required to sign a pre-construction checklist indicating their knowledge of Roanoke County's obligation to perform inspections on site.
10. The Erosion Control Permit or Combined Erosion Control & VSMP Permit is given to the developer at this pre-construction meeting.
11. Notify the County of Roanoke prior to beginning installation of ESC measures. The County will inspect initial installations to ensure compliance with approved plan prior to start of grading. The developer SHALL contact the project inspector 24 hours before beginning any grading or construction on the property.
12. County inspectors must inspect storm drain / stormwater management / BMP installations during the process of installation. Please contact the site inspector 24 hours in advance.
13. All work shall be subject to inspection by Roanoke County, the Western Virginia Water Authority and the Virginia Department of Transportation Inspectors.
14. Contractors shall notify utilities of proposed construction at least two (2), but not more than ten (10) working days in advance. Area public utilities may be notified thru "Miss Utility": 1-800-552-7001 or VA 811.
15. The 100 year Floodway shall be staked prior to any construction.
16. Grade stakes shall be set for all curb and gutter, culvert, sanitary sewer and storm sewer at all times of construction.
17. The Department of Community Development shall be notified when a spring is encountered during construction.
18. Construction debris shall be containerized in accordance with the Virginia Litter Control Act. No less than one litter receptacle shall be provided on site.
19. The contractor shall provide adequate means of cleaning mud from trucks and/or other equipment prior to entering public streets or rights of ways. It is the contractors responsibility to insure that the streets are in a clean, mud and dust free condition at all times.
20. Plan approval in no way relieves the developer or contractors of the responsibilities contained within the erosion and sediment control or stormwater management policies.
21. Field construction shall honor proposed drainage divides as shown on plans.
22. Field corrections shall be approved by the Roanoke County Engineering Division and/or the Western Virginia Water Authority and the Professional of Record, prior to such construction.
23. The developer or contractor shall supply the County and the Western Virginia Water Authority with correct As-Built plans before final acceptance.

VIRGINIA DEPARTMENT OF TRANSPORTATION:

24. Plan approval by Roanoke County does not guarantee issuance of any permits by the Virginia Department of Transportation.
25. A permit must be obtained from the Virginia Department of Transportation, Salem Residency Office prior to construction in the highway right-of-way.
26. The preliminary pavement designs should be based on a predicted sub-grade CBR value of 7.0 and with a Resiliency Factor (RF) of 2.0 as shown in Appendix I of the 2018 Virginia Department of Transportation Pavement Design Guide for Subdivision and Secondary Roads. The sub-grade soil is to be tested by an independent laboratory and the results submitted to the Virginia Department of Transportation prior to base construction. Should the sub-grade CBR value and/or the RF value be less than the predicted values, additional base material will be required in accordance with Departmental specifications. Refer to the same manual as the number and locations of the required soil samples to be tested. All pavement designs shall be submitted to the Department for review and approval. The sub-grade shall be approved by the Virginia Department of Transportation prior to placement of the base. Base shall be approved by the Virginia Department of Transportation for depth, template, and compaction before the surface is applied.
27. Standard guardrail with safety end sections may be required on fills or in areas where hazards exist as deemed necessary. After completion of rough grading operations, the County Engineer and Virginia Department of Transportation shall be contacted to schedule a field review. Where guardrail is warranted, the standard shoulder width shall be provided and the guardrail shall be installed in accordance with the 2020 VDOT Road and Bridge Standards as part of this development.
28. Standard street and traffic control signs shall be erected at each intersection by the developer prior to final street acceptance.
29. All traffic devices shall be in accordance with current edition of the "Manual on Uniform Traffic Control Devices" (MUTCD) Virginia Supplement to the MUTCD, Revision 1, Virginia Work Area Protection Manual, Revision 2, and 2020 VDOT Road and Bridge Specifications and all revisions.
30. All unsuitable material shall be removed from the construction limits of the roadway before placing embankment.

See Sheet C2.1 for Stormwater Site Statistics Table.
See Sheet C2.1 for New BMP Information Table.

The Project Engineer shall provide electronic copies of the approved plans to the Development Review Coordinator within 5 working days of the pre-construction meeting.
The notes on this sheet shall not be modified.

NAME OF DEVELOPMENT	**EAST ROANOKE RIVER GREENWAY CONNECTOR**
MAGISTERIAL DISTRICT(S)	VINTON
OWNER (name, address, telephone)	VIRGINIA RECREATIONAL FACILITIES AUTHORITY P.O. BOX 29800 ROANOKE, VIRGINIA 24018
DEVELOPER (name, address, telephone)	COUNTY OF ROANOKE, ATTN: DAVID HENDERSON 5204 BERNARD DRIVE ROANOKE, VIRGINIA 24018
ENGINEER, ARCHITECT OR SURVEYOR (name, address, telephone)	BALZER AND ASSOCIATES, INC. ATTN: CHRIS BURNS, P.E. 1208 CORPORATE CIRCLE ROANOKE, VA 24018 540-772-9580 FAX 540-772-8050
TAX MAP NO(S)	080.00-05-02.01-0000, 080.00-01-34.03-0000, 080.00-01-35.00-0000, 061.02-02-16.00-0000

I, _____ **OWNER/DEVELOPER,** AM AWARE OF THE SITE DESIGN REQUIREMENTS IMPOSED BY THIS SITE DEVELOPMENT PLAN AND OTHER APPLICABLE ROANOKE COUNTY CODES. I HEREBY CERTIFY THAT I AGREE TO COMPLY WITH THESE REQUIREMENTS AND THE THIRTY (30) POINTS SHOWN ON THIS COVER SHEET UNLESS MODIFIED IN ACCORDANCE WITH LOCAL LAW.

WATER NOTES

All water facilities shall be constructed according to the Western Virginia Regional Design and Construction Standards (Latest Edition).

A minimum cover of three (3) feet is required over proposed lines.

Contractor shall be responsible for locating and uncovering valve vaults after paving and adjustment to final grade if necessary.

All existing utilities may not be shown in their exact location. The contractor shall comply with (State Water Works Regulations, Section 12VAC5-590-1150, where lines cross.

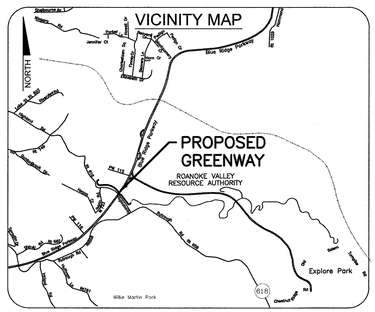
All trenches in existing or future highway right-of-ways shall be compacted according to Virginia Department of Transportation standards.

Lines shall be staked prior to construction.

Water mains shall be minimum Class 350 Ductile Iron in accordance to AWWA C151 or DR-14 PVC in accordance with AWWA C-900.

Ductile Iron Pipe in accordance with the Western Virginia Regional Design and Construction Standards shall be required for all pipe with a working pressure equal to or greater than 100 p.s.i.

Western Virginia Water Authority
Availability letter number: N/A



LEGEND

Property Line	
Right-of-way	
Prescriptive Right-of-way	
Centerline	
Existing Storm Sewer	24"CMP 24"CMP
Existing Sanitary Sewer	8" SAN
Existing Water Main	8" WL
Existing Contour	1155
Proposed Contour	1155
Proposed Limits of Clearing	
Proposed Storm Sewer	
To Be Removed	T.B.R.

SEWER NOTES

All sanitary sewer facilities shall be installed according to the Western Virginia Regional Design and Construction Standards. (Latest Edition).

A minimum cover of three (3) feet is required over proposed lines.

Contractor shall be responsible for locating and uncovering all manholes after paving. Manhole tops shall be adjusted to grade if necessary.

All existing utilities may not be shown in their exact location. The contractor shall comply with (State Water Works Regulations, Section 12VAC5-590-1150, where lines cross.)

All trenches in existing or future rights-of-way shall be compacted according to Virginia Department of Transportation standards.

Lines shall be staked prior to construction.

PRIVATE UTILITIES

Underground utilities installed on private property or in private utility easements and building related storm drains shall be designed and installed per the current edition of the Virginia Uniform Statewide Building Code. Design and installation requirements issued by the Western Virginia Water Authority that meet or exceed the USBC requirements are acceptable for private utilities. All private utilities are to be permitted through and inspected by the Roanoke County Inspections Office. Vaults, valves and other devices installed by or under the control of the Western Virginia Water Authority may not substituted for the code required devices.

Sheet Index

SURVEY INFORMATION

Horizontal and vertical control surveys were performed in year: 2018
By: BALZER AND ASSOCIATES, INC.

All vertical elevations must be referenced to the National Geodetic Vertical Datum of 1929 or 1988. All horizontal elevations must be referenced to the North American Datum of 1927 or 1983.

Horizontal Datum: NAD83 Vertical Datum: NGVD88

Source of topographic mapping is dated 2018

Boundary was performed by BALZER & ASSOCIATES, INC. dated: 2018

Benchmark Information: 2018

The professional seal and signature certifies the boundary survey and topographic mapping to be accurate and correct.

NOTE: THIS COST ESTIMATE TABLE IS PROVIDED FOR BONDING PURPOSES ONLY. VERIFICATION OF ALL QUANTITIES AND PRICES FOR BIDDING PURPOSES SHALL BE THE RESPONSIBILITY OF THE BIDDER.

QUANTITY & COST ESTIMATE

ITEM	QUANTITY	UNIT	UNIT PRICE	COST	BONDABLE
CLEARING AND GRUBBING		ACRES			
S.W.M. EXCAVATION		C.Y.			
S.W.M. EMBANKMENT		C.Y.			
VDOT STD MH-1		EACH			
15" TYPE S HDPE PIPE		LIN. FT.			
24" TYPE S HDPE PIPE		LIN. FT.			
36" TYPE S HDPE PIPE		LIN. FT.			
BOX CULVERT		LUMP SUM			
PAVED DITCH		LIN. FT.			
RIPRAP - CLASS		S.F.			
SODDED SWALE		S.Y.			
-IN. CONCRETE ENDWALL EW-		EACH			
PAVEMENT (INCLUDING SUB-BASE)					
CURB & GUTTER CG-6		LIN.			
GRAVEL SHOULDER		S.Y.			
SURFACE TREATMENT		S.Y.			
-IN. BIT. CONC.: TYPE B-		S.Y.			
-IN. BIT. CONC.: TYPE S-		S.Y.			
-IN. BASE MATERIAL		C.Y.			
-IN. SUBBASE MATERIAL		C.Y.			
COMMERCIAL WATER METER (1") & Lateral		EACH			
		EACH			
FIRE HYDRANT ASSEMBLIES		EACH			
BLOW OFFS W/VAULT, FRAME & COVER		EACH			
8 -IN. GATE VALVE, W/VAULT, FRAME & COVER		EACH			
-IN. GATE VALVE, W/VAULT, FRAME & COVER		EACH			
SANITARY SEWER MANHOLE		EACH			
8" PVC SANITARY SEWER MAIN		LIN. FT.			
6" SANITARY SEWER LATERAL & SAMPLING MANHOLE		EACH			
LANDSCAPING (SEE SHEET C-08)		LUMP SUM			
AS-BUILT PLANS - STORM SEWER		LUMP SUM			
SUB-TOTAL					
10% CONTINGENCY					
ESTIMATED TOTAL					

BY SEALING THE PLANS, THE DESIGN PROFESSIONAL HEREBY CERTIFIES THAT THE FOREGOING ESTIMATE REFLECTS THE CURRENT IMPROVEMENT COSTS OF THIS PROJECT.

NOT APPLICABLE

NOT APPLICABLE

NOT APPLICABLE

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ENGINEERS • SURVEYORS

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15871 City View Drive
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Phone: 804/794-0571
FAX: 804/794-2635

448 Peppers Ferry Road
Christiansburg, Virginia 24073
Phone: 540/381-4290
FAX: 540/381-4291

1561 Commerce Road
Suite 401
Verona, Virginia 24482
Phone: 540/248-3220
FAX: 540/248-3221

128 W. Market Street
Suite 301
Harrisonburg, Virginia 22801
Phone: 540/433-1908

COMMONWEALTH OF VIRGINIA
CHRISTOPHER P. BURNS
Lic. No. 47338
3/20/23
PROFESSIONAL ENGINEER

DRAWN BY: CPB
DESIGNED BY: CPB
CHECKED BY: BTC
DATE: 10/4/2019
REVISIONS:
3/19/2020
6/10/2020
7/27/2021
12/21/2022
3/20/2023

TIER 1 PROJECT

LOCALLY ADMINISTERED PROJECTS

COUNTY OF ROANOKE
NAME OF LOCALITY

(SIGNATURE)
NAME OF RESPONSIBLE LOCAL GOVERNMENT OFFICAL (TYPED)
RECOMMENDED FOR APPROVAL FOR RIGHT OF WAY ACQUISITION
3/13/23 DATE — COUNTY ENGINEER TITLE OF POSITION

(SIGNATURE)
NAME OF RESPONSIBLE LOCAL GOVERNMENT OFFICAL (TYPED)
RECOMMENDED FOR APPROVAL FOR CONSTRUCTION
3/13/23 DATE — County Engineer TITLE OF POSITION

RECOMMENDED FOR APPROVAL FOR RIGHT OF WAY ACQUISITION
DATE — DISTRICT PLANNING AND INVESTMENT MANAGER
DATE — DISTRICT PROJECT DEVELOPMENT ENGINEER

APPROVED FOR RIGHT OF WAY ACQUISITION
DATE — DISTRICT ADMINISTRATOR

RECOMMENDED FOR APPROVAL FOR CONSTRUCTION
DATE — DISTRICT PLANNING AND INVESTMENT MANAGER
DATE — DISTRICT PROJECT DEVELOPMENT ENGINEER

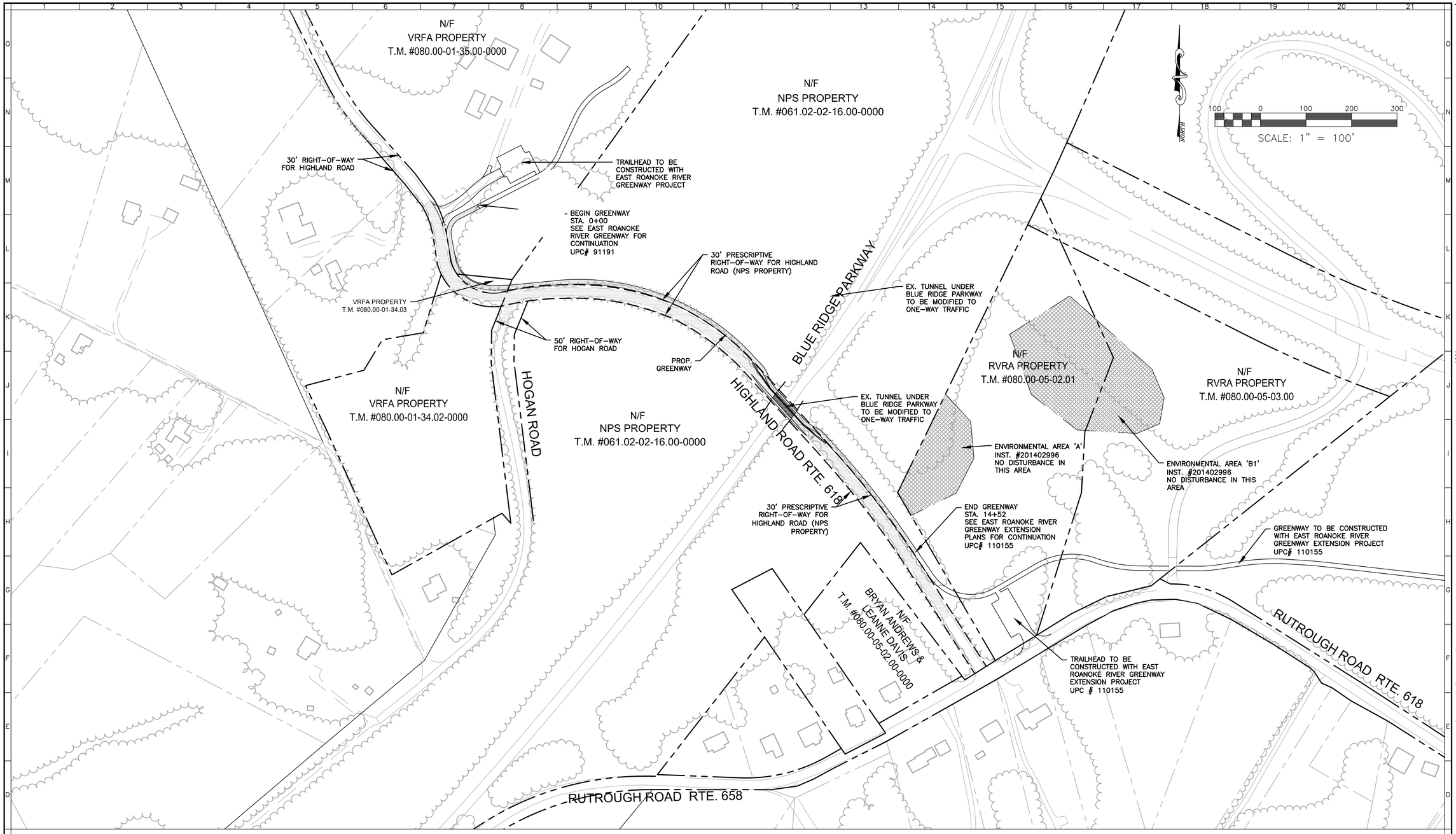
APPROVED FOR CONSTRUCTION
DATE — DISTRICT ADMINISTRATOR

EAST ROANOKE RIVER GREENWAY CONNECTOR

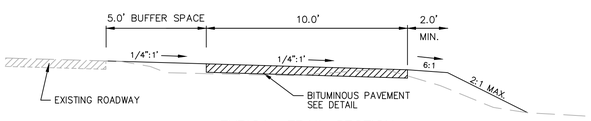
VDOT PROJECT #: EN18-080-932, P101, R201, C501
UPC #: 113356
FEDERAL #: TAP-5128(489)
County of Roanoke, Virginia

SHEET No.: C1

JOB No.: 04170071.00

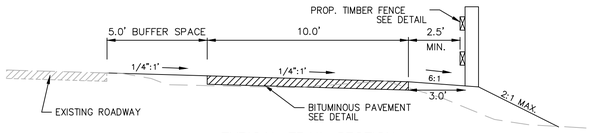


TYPICAL GREENWAY SECTION
(WITHOUT TIMBER FENCE)



TYPICAL TRAIL SECTION
DESIGN SPEED = 12 MPH

TYPICAL GREENWAY SECTION
(WITH TIMBER FENCE)



TYPICAL TRAIL SECTION
DESIGN SPEED = 12 MPH

STORMWATER SITE STATISTICS

	EXISTING	PROPOSED
TOTAL DISTURBED AREA (AC)	--	2.10
TOTAL SITE AREA (AC)	2.10	2.10
IMPERVIOUS AREA (AC)	0.04	0.35
MANAGED TURF AREA (AC)	0.84	1.75
OPEN SPACE/FOREST (AC)	1.22	0.00
RIGHT OF WAY DISTURBANCE (SF)	--	--
KARST PRESENT (Y/N)	UNDETERMINED	UNDETERMINED

*NOTE: STORMWATER QUALITY REQUIREMENTS ARE BEING MET THROUGH THE DEDICATION OF A FORESTED BMP EASEMENT AT HAPPY HOLLOWS PARK. 1.98 ACRES HAVE BEDICATED FOR THIS PROJECT TO OFFSET THE REMOVAL REQUIREMENT OF 0.70 LB/YR OF PHOSPHORUS.

BMP INFORMATION TABLE

	BMP #1
BMP TYPE	FORESTED AREA
LEVEL OF TREATMENT (LEVEL 1 OR LEVEL 2)	N/A
TECHNICAL REQUIREMENTS MET (PART IIB OR IIC)	PART IIB
TOTAL AREA TREATED (AC)	1.98 AC.
IMPERVIOUS AREA TREATED BY BMP (AC)	0.00 AC.
MANAGED TURF AREA TREATED BY BMP (AC)	0.00 AC.
OPEN SPACE / FOREST AREA TREATED BY BMP (AC)	1.98 AC.
SURFACE AREA OF BMP (AC)	1.98 AC.
STORAGE VOLUME OF BMP (AC-FT)	N/A
MAXIMUM AVERAGE DEPTH (FT)	N/A
QUALITY, QUANTITY, OR BOTH?	QUALITY
TMDL ADDRESSED? (PHOSOPHORUS, BACTERIA, SEDIMENT, ETC)	PHOSPORUS
NAME OF RECEIVING WATER (PROJECT SITE)	ROANOKE RIVER - PETERS CREEK
HYDROLOGIC UNIT CODE FOR PROJECT SITE (ALPHANUMERIC CODE RU14, ETC)	RU14
LATITUDE (DECIMAL DEGREES XX.XXXX)	37.2475d N
LONGITUDE (DECIMAL DEGREES XX.XXXX)	79.8755d W

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LAND USE PLANNING & ZONING
LANDSCAPE ARCHITECTURE
LAND SURVEYING
ARCHITECTURE
STRUCTURAL ENGINEERING
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ENVIRONMENTAL & SOIL SCIENCE
WETLAND DELINEATIONS & STREAM EVALUATIONS
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COMMONWEALTH OF VIRGINIA
CHRISTOPHER P. BURNS
Lic. No. 47338
3/20/23
PROFESSIONAL ENGINEER

EAST ROANOKE RIVER GREENWAY CONNECTOR

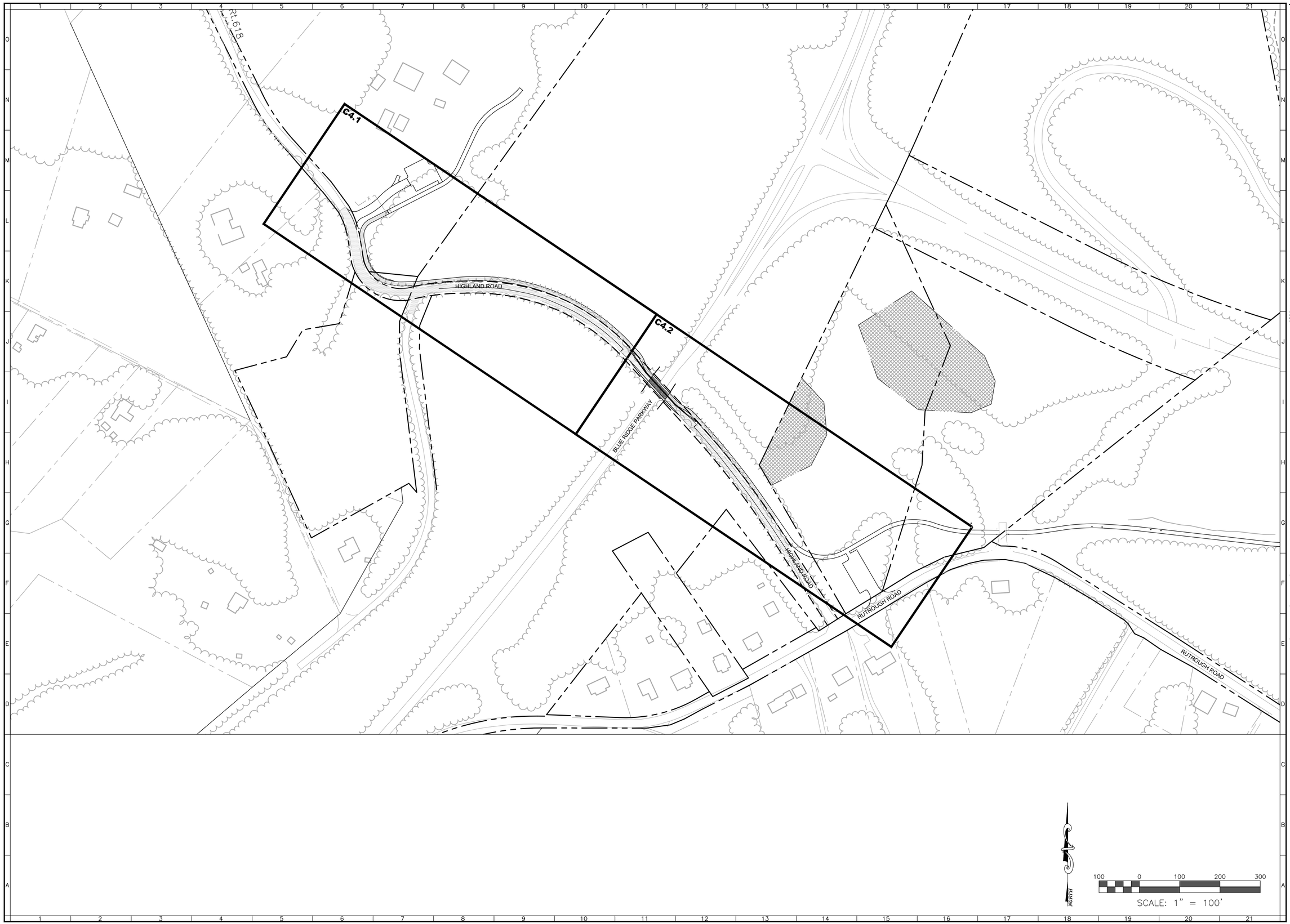
OVERALL MAP

VINTON DISTRICT
ROANOKE COUNTY, VIRGINIA

DRAWN BY CPB
DESIGNED BY CPB
CHECKED BY BTC
DATE 10/4/2019
SCALE 1"=100'

REVISIONS:
3/19/2020
6/10/2020
7/27/2021
12/21/2022
3/20/2023

SHEET NO.
C2.1
JOB NO. 04170071.00



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COMMONWEALTH OF VIRGINIA
CHRISTOPHER P. BURNS
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3/20/23
PROFESSIONAL ENGINEER

EAST ROANOKE RIVER GREENWAY CONNECTOR

KEY PLAN

VINTON DISTRICT
ROANOKE COUNTY, VIRGINIA

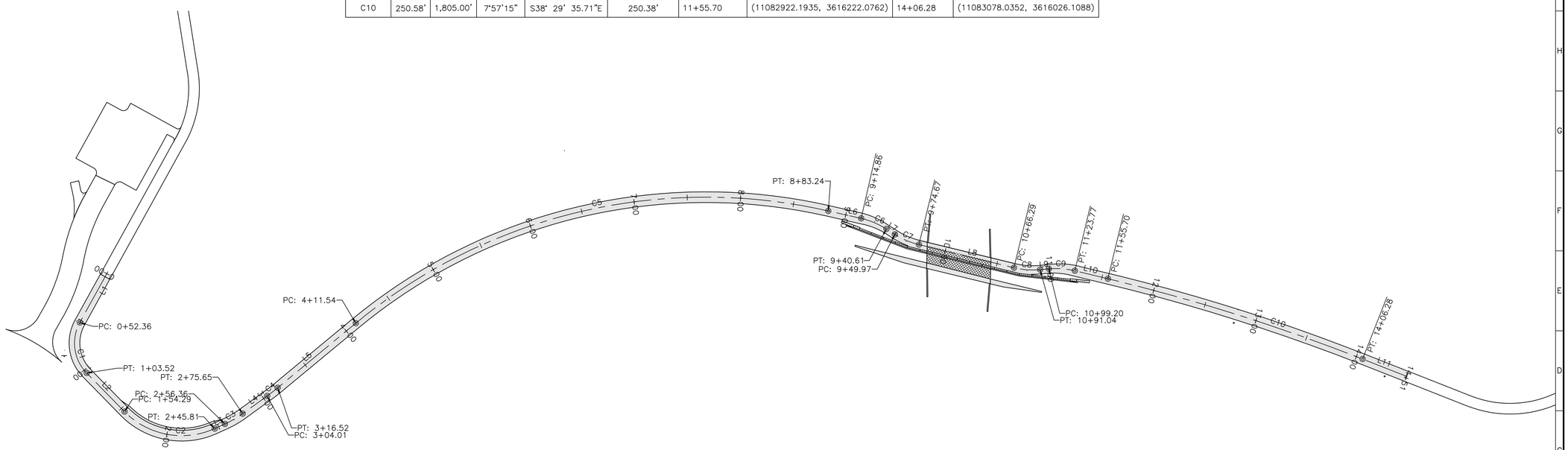
DRAWN BY CPB
DESIGNED BY CPB
CHECKED BY BTC
DATE 10/4/2019
SCALE 1"=100'

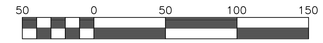
REVISIONS:
3/19/2020
6/10/2020
7/27/2021
12/21/2022
3/20/2023

SHEET NO.
C2.2
JOB NO. 04170071.00

LINE TABLE						
LINE #	LENGTH	BEARING	START STATION	START POINT	END STATION	END POINT
L1	52.36	S62°54'16"W	0+00.00	(11082146.6744, 3616750.7801)	0+52.36	(11082100.0601, 3616726.9311)
L2	50.76	S10°22'56"E	1+03.52	(11082078.9340, 3616684.1125)	1+54.29	(11082088.0823, 3616634.1800)
L3	10.55	S80°17'58"E	2+45.81	(11082149.2169, 3616573.7685)	2+56.36	(11082159.6126, 3616571.9914)
L4	28.36	N88°03'45"E	2+75.65	(11082178.8318, 3616570.6874)	3+04.01	(11082207.1715, 3616571.6460)
L5	95.01	N84°23'07"E	3+16.52	(11082219.6572, 3616572.4701)	4+11.54	(11082314.2141, 3616581.7659)
L6	31.62	S43°08'11"E	8+83.24	(11082740.4109, 3616421.3608)	9+14.86	(11082762.0320, 3616398.2852)
L7	9.37	S23°27'54"E	9+40.61	(11082776.0999, 3616376.8695)	9+49.97	(11082779.8292, 3616368.2783)
L8	91.62	S42°19'56"E	9+74.67	(11082793.1831, 3616347.6353)	10+66.29	(11082854.8840, 3616279.9038)
L9	8.16	S61°14'28"E	10+91.04	(11082874.2439, 3616264.6617)	10+99.20	(11082881.3976, 3616260.7356)
L10	31.93	S42°28'13"E	11+23.77	(11082900.6351, 3616245.6274)	11+55.70	(11082922.1935, 3616222.0762)
L11	44.58	S34°30'58"E	14+06.28	(11083078.0352, 3616026.1088)	14+50.87	(11083103.2980, 3615989.3735)

CURVE TABLE									
CURVE #	LENGTH	RADIUS	DELTA	CHORD BEARING	CHORD LENGTH	START STATION	START POINT	END STATION	END POINT
C1	51.16'	40.00'	73°17'13"	S26° 15' 40.13"W	47.75'	0+52.36	(11082100.0601, 3616726.9311)	1+03.52	(11082078.9340, 3616684.1125)
C2	91.52'	75.00'	69°55'02"	S45° 20' 27.01"E	85.95'	1+54.29	(11082088.0823, 3616634.1800)	2+45.81	(11082149.2169, 3616573.7685)
C3	19.30'	95.00'	11°38'17"	S86° 07' 06.32"E	19.26'	2+56.36	(11082159.6126, 3616571.9914)	2+75.65	(11082178.8318, 3616570.6874)
C4	12.51'	195.00'	3°40'38"	N86° 13' 26.27"E	12.51'	3+04.01	(11082207.1715, 3616571.6460)	3+16.52	(11082219.6572, 3616572.4701)
C5	471.70'	515.00'	52°28'42"	S69° 22' 31.68"E	455.38'	4+11.54	(11082314.2141, 3616581.7659)	8+83.24	(11082740.4109, 3616421.3608)
C6	25.75'	75.00'	19°40'16"	S33° 18' 02.53"E	25.62'	9+14.86	(11082762.0320, 3616398.2852)	9+40.61	(11082776.0999, 3616376.8695)
C7	24.70'	75.00'	18°52'02"	S32° 53' 55.42"E	24.59'	9+49.97	(11082779.8292, 3616368.2783)	9+74.67	(11082793.1831, 3616347.6353)
C8	24.75'	75.00'	18°54'31"	S51° 47' 12.04"E	24.64'	10+66.29	(11082854.8840, 3616279.9038)	10+91.04	(11082874.2439, 3616264.6617)
C9	24.57'	75.00'	18°46'14"	S51° 51' 20.39"E	24.46'	10+99.20	(11082881.3976, 3616260.7356)	11+23.77	(11082900.6351, 3616245.6274)
C10	250.58'	1,805.00'	7°57'15"	S38° 29' 35.71"E	250.38'	11+55.70	(11082922.1935, 3616222.0762)	14+06.28	(11083078.0352, 3616026.1088)





SCALE: 1" = 50'

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COMMONWEALTH OF VIRGINIA
CHRISTOPHER P. BURNS
Lic. No. 47338
3/20/23
PROFESSIONAL ENGINEER

EAST ROANOKE RIVER GREENWAY CONNECTOR

ALIGNMENT DATA SHEET

VINTON DISTRICT
ROANOKE COUNTY, VIRGINIA

DRAWN BY CPB
DESIGNED BY CPB
CHECKED BY BTC
DATE 10/4/2019
SCALE 1"=50'

REVISIONS:
3/19/2020
6/10/2020
7/27/2021
12/21/2022
3/20/2023

SHEET NO.
C3.1
JOB NO. 04170071.00

RIGHT-OF-WAY AND PROPERTY DATA

TRACT	TAX MAP NUMBER	RECORDING INFORMATION	ZONING	LANDOWNER	PERMANENT GREENWAY EASEMENT AREA (AC)	VDOT PERMANENT DRAINAGE EASEMENT AREA (AC)	ROANOKE COUNTY PERMANENT DRAINAGE EASEMENT AREA (AC)	PERMANENT SLOPE EASEMENT AREA (AC)	TEMPORARY CONSTRUCTION EASEMENT AREA (AC)
A	080.00-01-35.00-0000	D.B. 1472, PG. 314	EP	VIRGINIA RECREATIONAL FACILITIES AUTHORITY	0.12 AC.	0.01 AC.	0.04 AC.	N/A	0.14 AC.
B	080.00-01-34.03-0000	D.B. 1301, PG. 792	EP	VIRGINIA RECREATIONAL FACILITIES AUTHORITY	0.06 AC.	0.03 AC.	0.01 AC.	N/A	0.002 AC.
C	061.02-02-16.00-0000	--	EP	DEPARTMENT OF THE INTERIOR	*0.79 AC.	*0.08 AC.	*0.04 AC.	*0.44 AC.	*0.35 AC.
D	080.00-05-02.01-0000	INST. #201611794	AG1	ROANOKE VALLEY RESOURCE AUTHORITY	N/A	N/A	N/A	0.03 AC.	0.21 AC.

*NOTE: EASEMENTS WILL NOT BE OBTAINED ACROSS PROPERTY OWNED BY THE DEPARTMENT OF THE INTERIOR. CONSTRUCTION AND IMPROVEMENTS WILL BE ALLOWED BY "GENERAL AGREEMENT BETWEEN THE NATIONAL PARK SERVICE BLUE RIDGE PARKWAY AND COUNTY OF ROANOKE, VIRGINIA CONCERNING THE ROANOKE RIVER GREENWAY."

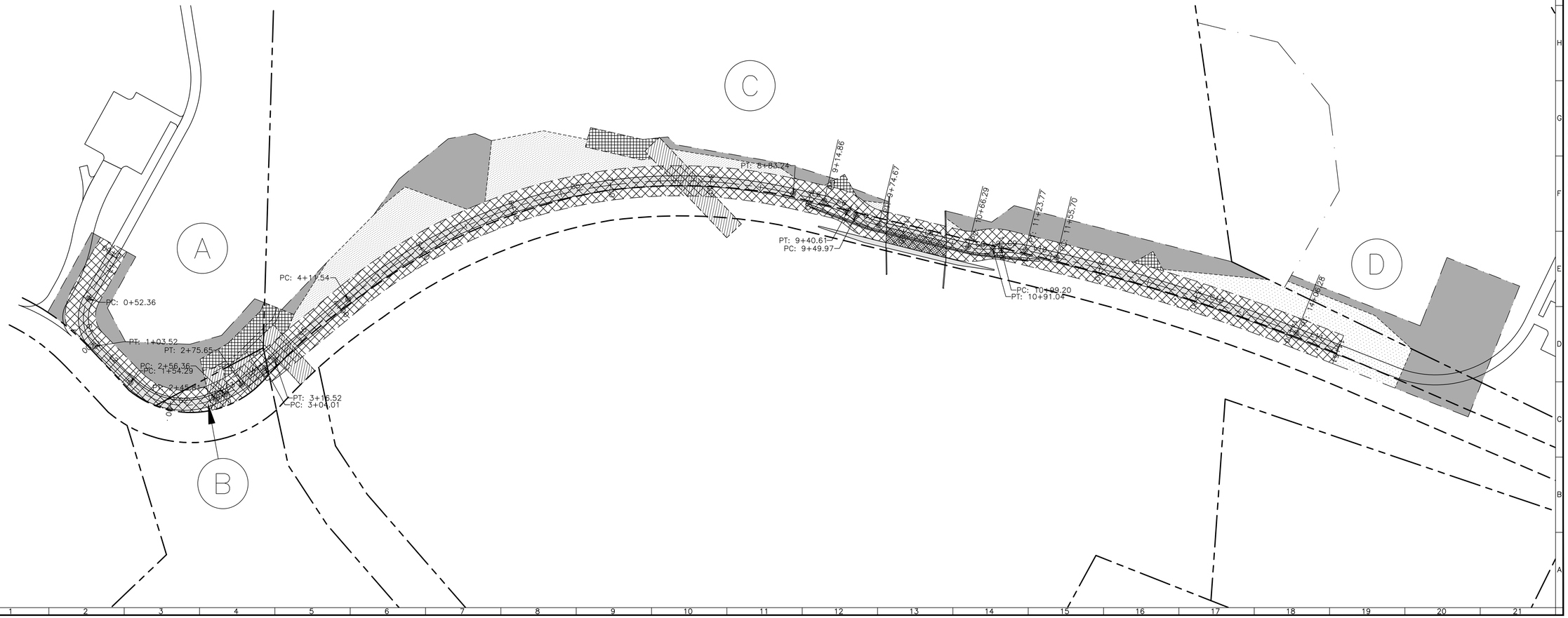
LEGEND

- PERMANENT GREENWAY EASEMENT
- ROANOKE COUNTY PERMANENT DRAINAGE EASEMENT
- VDOT PERMANENT DRAINAGE EASEMENT
- PERMANENT SLOPE EASEMENT
- TEMPORARY CONSTRUCTION EASEMENT

NORTH

50 0 50 100 150

SCALE: 1" = 50'



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R.O.W. DATA SHEET

VINTON DISTRICT
ROANOKE COUNTY, VIRGINIA

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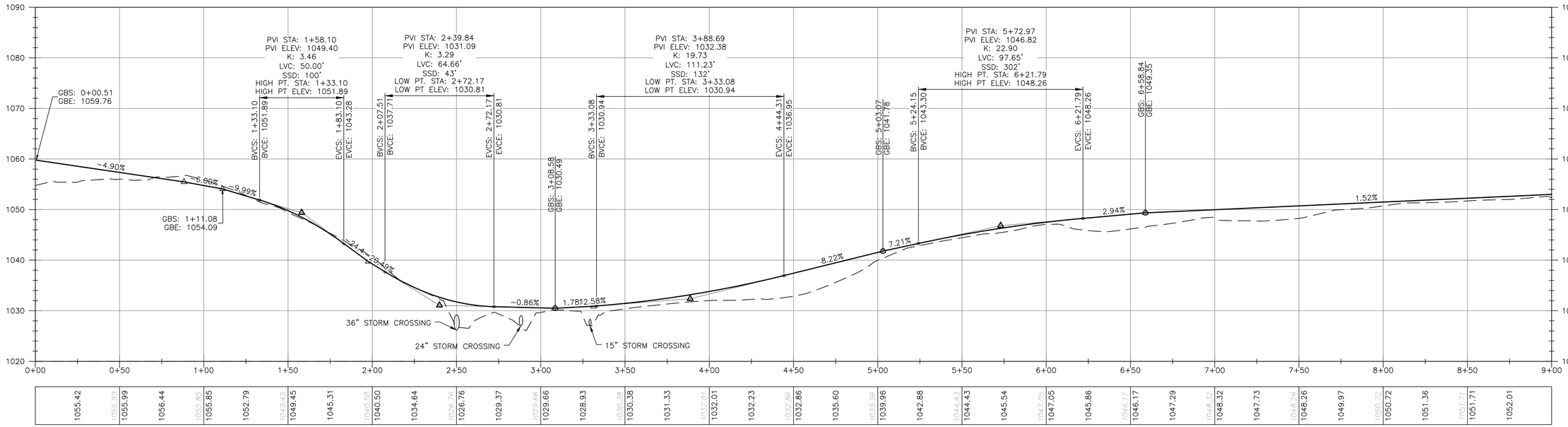
SHEET NO.
C3.2

JOB NO. 04170071.00

GREENWAY (STA: 0+00 TO 9+00) PROFILE

VERTICAL SCALE: 1" = 10'

HORIZONTAL SCALE: 1" = 30'



WETLAND TABLE		
Point #	Northing	Easting
w-1	3616724.67	11082547.08
w-2	3616716.46	11082544.26
w-3	3616664.85	11082547.73
w-4	3616627.38	11082545.13
w-5	3616598.24	11082564.77
w-6	3616578.06	11082568.23
w-7	3616608.75	11082534.45
w-8	3616631.25	11082530.66
w-9	3616654.62	11082515.91
w-10	3616696.36	11082503.24
w-11	3616699.46	11082515.88
w-12	3616715.80	11082540.49

LIMITS OF WETLANDS SHALL BE STAKED PRIOR TO CONSTRUCTION. WETLANDS TO REMAIN SHALL BE PROTECTED BY CONSTRUCTION FENCING

EX. WETLANDS AREA TO REMAIN UNDISTURBED.

APPROX. 750 S.F. OF WETLAND DISTURBANCE SEE PERMIT

APPROX. 93 L.F. OF STREAM DISTURBANCE SEE PERMIT

EX. CREEK TO REMAIN UNDISTURBED BELOW RIPRAP

NEW DITCH B SEE DETAIL ON SHEET 4.1

Ex. utility pole and guy wires TO REMAIN

Ex. 15" CMP culvert 'D' Inv. In: 1043.60 Inv. Out: 1040.20

PT: 8+83.24

MATCHLINE

PROP. PARKING AREA PERMITTED UNDER EAST ROANOKE RIVER GREENWAY PROJECT UPC# 91191

EX. CREEK BED AND BANKS TO REMAIN UNDISTURBED

END OF WALL STA. 4+72 42.1' OFFSET LT. TW1022 BW1021.5

EXIST. 18" & 20" TREE OF HEAVEN (G.C. TO ENSURE COMPLETE REMOVAL)

PROP. SEGMENTAL BLOCK RETAINING WALL DESIGN BY CONTRACTOR'S DESIGN PROFESSIONAL

TW1023 BW1020

END OF WALL STA. 4+10 29.4' OFFSET LT. TW1023.5 BW1023

PC: 4+11.54

TIE TO PROP. EAST ROANOKE RIVER GREENWAY PROJECT UPC# 91191 STA. 0+3.25

EX. FENCE T.B.R. AS NECESSARY

EX. CREEK TO REMAIN UNDISTURBED BELOW NEW RIPRAP DITCH

PC: 0+52.36

W7-5 SIGN SIZE 18"x18" (MIN. 2' LATERAL CLEARANCE BETWEEN PATH AND EDGE OF SIGN)

PT: 1+03.52

APPROX. 119 L.F. OF STREAM DISTURBANCE SEE PERMIT

NEW DITCH A SEE DETAIL ON SHEET 4.1

1022.55

PT: 2+75.65

1023.50

PC: 2+56.36

PC: 1+54.29

PT: 2+11.81

Ex. 36" cmp culvert 'A' Inv. In: 1032.04 Inv. Out: 1026.65

Ex. 24" cmp culvert 'B' Inv. In: 1029.38 Inv. Out: 1022.28

Ex. 15" cmp culvert 'C' Inv. In: 1029.19 Inv. Out: 1027.29

HIGHLAND ROAD

RTE. 618 25 MPH SPEED LIMIT

500' OF NEW DOUBLE YELLOW CENTERLINE STRIPING

EXIST. 16" TREE OF HEAVEN (G.C. TO ENSURE COMPLETE REMOVAL)

EXIST. 4" TREE OF HEAVEN (G.C. TO ENSURE COMPLETE REMOVAL)

PT: 3+16.52

PC: 3+04.01

PROP. TIMBER FENCE SEE DETAILS ON SHEET 9.1

PROP. W3-2 YIELD AHEAD SIGN (300 FT BEFORE YIELD BAR) SIGN SIZE 30"x30"

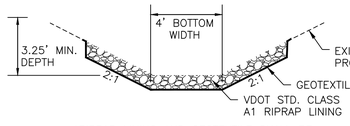
PROP. MODIFIED W5-3 "ONE LANE ROAD AHEAD" SIGN (150 FT BEFORE YIELD BAR) SIGN SIZE 30"x30"

500' OF NEW DOUBLE YELLOW CENTERLINE STRIPING. TYPE A PAVEMENT LINE MARKING 4" OR TYPE B CLASS 1 PAVEMENT LINE MARKING (4")

SIGHT DISTANCE NORTHBOUND=350' 155' STOPPING SIGHT DISTANCE REQUIRED

YIELD BAR SEE DETAIL ON SHEET 9.1. PVMT. SYMBOL MARKING YIELD TYPE B, CLASS II

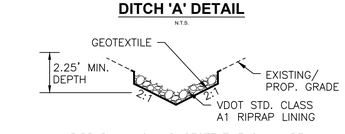
PROP. R1-2 "YIELD" SIGN (SIZE 30"x30") AND R1-2A "TO ONCOMING TRAFFIC" SIGN (SIZE 24"x18")



*RIPRAP LINING AND GEOTEXTILE SHALL BE INSTALLED PER VDOT STD. PG-3 DETAIL

DITCH 'A' DETAIL

N.T.S.



*RIPRAP LINING AND GEOTEXTILE SHALL BE INSTALLED PER VDOT STD. PG-3 DETAIL

DITCH 'B' DETAIL

N.T.S.

NORTH

30 0 30 60 90

SCALE: 1" = 30'

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PLAN & PROFILE (STA: 0+00 TO 9+00)

VINTON DISTRICT
ROANOKE COUNTY, VIRGINIA

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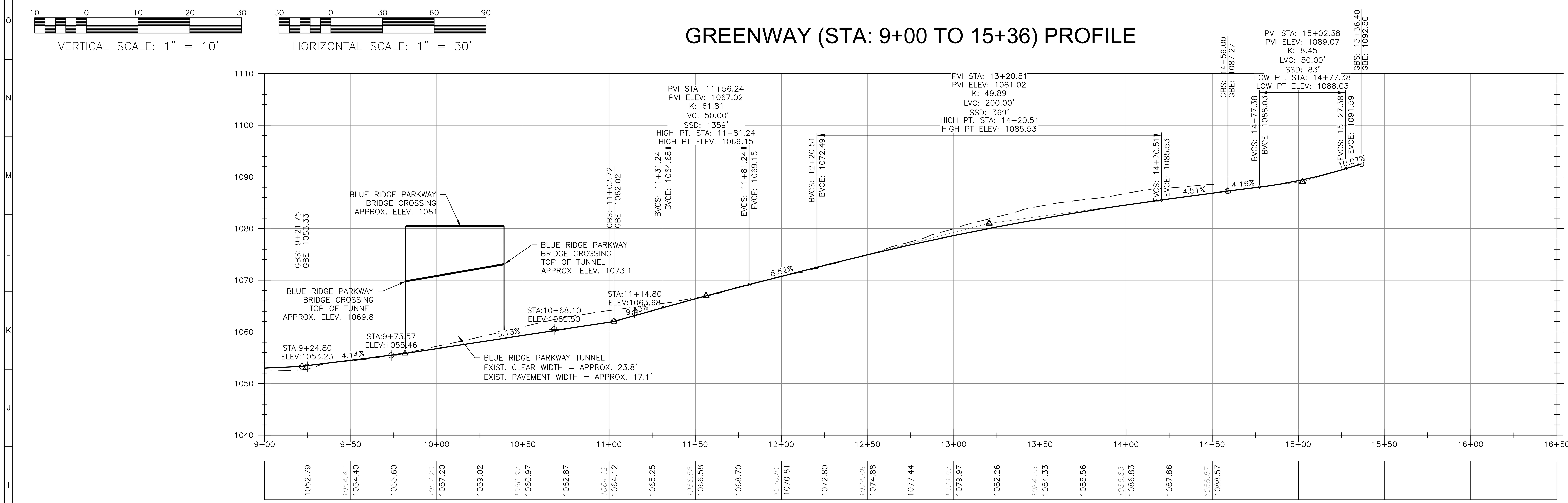
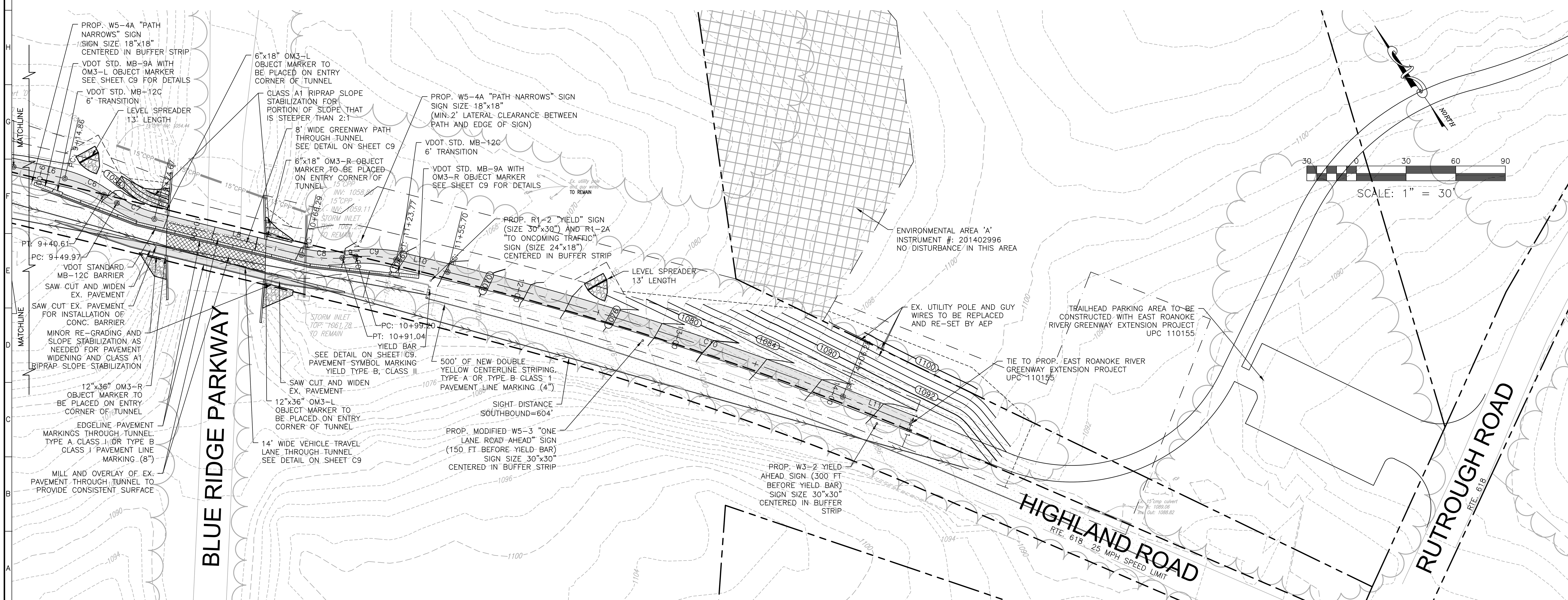
3/20/2023

SHEET NO.
C4.1
JOB NO. 04170071.00

GREENWAY (STA: 9+00 TO 15+36) PROFILE





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PLAN & PROFILE (STA: 9+00 TO 16+17)

VINTON DISTRICT
ROANOKE COUNTY, VIRGINIA

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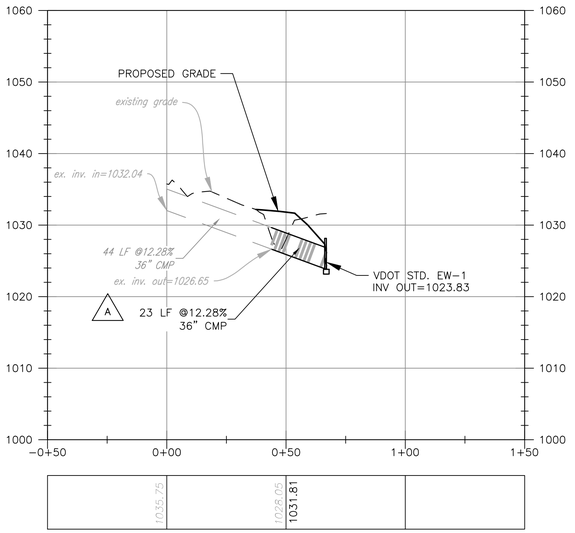
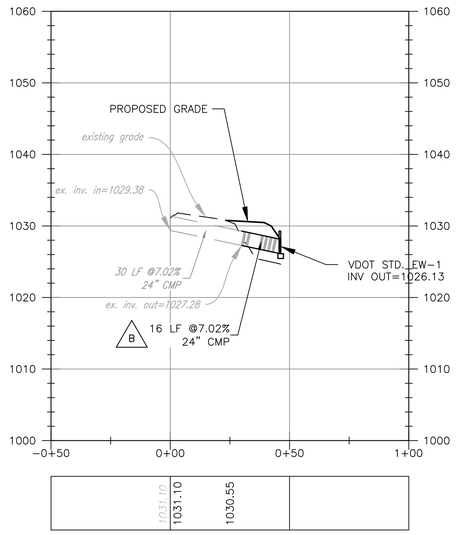
SHEET NO. C4.2

JOB NO. 04170071.00

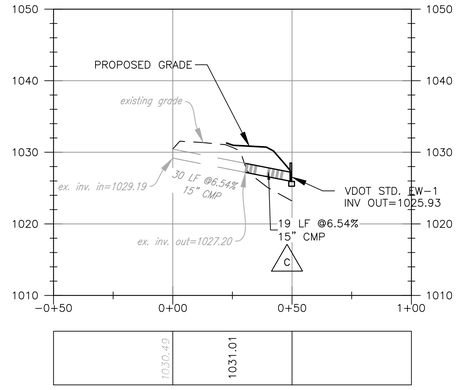
STORM SEWER 'A' PROFILE



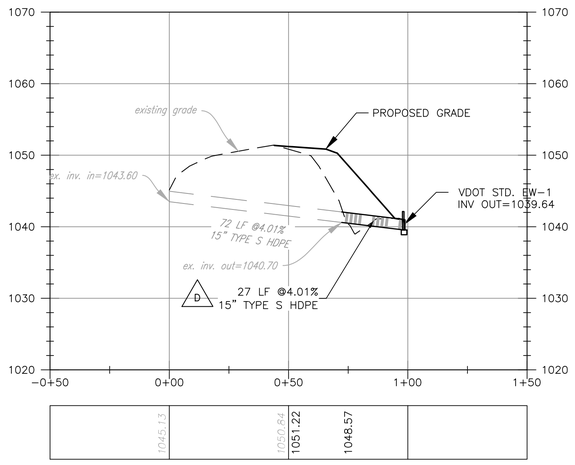
STORM SEWER 'B' PROFILE



STORM SEWER 'C' PROFILE



STORM SEWER 'D' PROFILE



STORM STRUCTURE SCHEDULE

A — 23 LF OF 36" CMP PIPE EXTENSION @ 12.28%
W/ VDOT STD. EW-1
INV. OUT=1023.83

B — 16 LF OF 24" CMP PIPE EXTENSION @ 7.02%
W/ VDOT STD. EW-1
INV. OUT=1026.13

C — 19 LF OF 15" CMP PIPE EXTENSION @ 6.54%
W/ VDOT STD. EW-1
INV. OUT=1025.93

D — 27 LF OF 15" TYPE S HDPE PIPE EXTENSION
@ 4.01% W/ VDOT STD. EW-1
INV. OUT=1039.64

10 0 10 20 30
VERTICAL SCALE: 1" = 10'

30 0 30 60 90
HORIZONTAL SCALE: 1" = 30'

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EAST ROANOKE RIVER GREENWAY CONNECTOR

STORM PROFILES

VINTON DISTRICT
ROANOKE COUNTY, VIRGINIA

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CONSTRUCTION SEQUENCING NOTES:

1. G.C. SHALL BE RESPONSIBLE FOR MAINTAINING THE SWPPP AT ALL TIMES DURING CONSTRUCTION AND ENSURING THAT ALL SITE INSPECTIONS ARE PERFORMED AND DOCUMENTED.
2. CONSTRUCTION ENTRANCE SHALL BE INSTALLED AS THE FIRST STEP IN CONSTRUCTION. EACH CONSTRUCTION ENTRANCE SHALL BE INSTALLED AT THE APPROPRIATE TIME AS CONSTRUCTION PROGRESSES INTO EACH AREA. G.C. SHALL PAY SPECIAL ATTENTION TO ENSURE THERE IS NO MUD 'TRACKING' FROM THE CONSTRUCTION AREA ONTO THE ROADWAY.
3. PERIMETER SILT FENCE, INLET PROTECTION, CULVERT INLET PROTECTION, AND CHECK DAM SHALL BE INSTALLED AT THIS TIME AND MAINTAINED THROUGHOUT THE PROJECT.
4. CLEARING OPERATIONS SHALL TAKE PLACE AT THIS TIME AND TOPSOIL STOCKPILED ON-SITE.
5. MAJOR GRADING OPERATIONS, STORM SEWER IMPROVEMENTS, AND SITE CONSTRUCTION SHALL TAKE PLACE AT THIS TIME. VDOT EC-15 SEDIMENT RETENTION ROLLS TO BE UTILIZED ON THE STEEP FILL SLOPE AS NECESSARY TO PROTECT THE SILT FENCE AT THE BOTTOM OF THE SLOPE AND PROTECT THE CREEK FROM SEDIMENT.
6. SLOPES SHALL BE SEEDED AND STABILIZED AS SOON AS POSSIBLE AFTER REACHING FINAL GRADE. ALL SLOPES THAT ARE 3:1 OR GREATER SHALL RECEIVE BLANKET MATTING.
7. AS NEW STORM SEWER IMPROVEMENTS ARE CONSTRUCTED, DITCHES WITH RIPRAP LINING SHALL BE INSTALLED AS REQUIRED.
8. AFTER MAJOR GRADING OPERATIONS ARE COMPLETE, PAVEMENT SHALL BE INSTALLED AND THE CONSTRUCTION ENTRANCES REMOVED AT THE APPROPRIATE TIMES. NO CONSTRUCTION TRAFFIC SHALL BE ALLOWED ON THE NEW PAVEMENT.
9. ALL AREAS OF THE SITE NOT RECEIVING PAVEMENT OR OTHER IMPROVEMENTS SHALL BE SEEDED AND PERMANENTLY STABILIZED.

* NOTE: G.C. SHALL UTILIZE A SHADE TOLERANT SEED MIX AS APPROPRIATE WHEN PROVIDING PERMANENT STABILIZATION FOR DISTURBED AREAS.

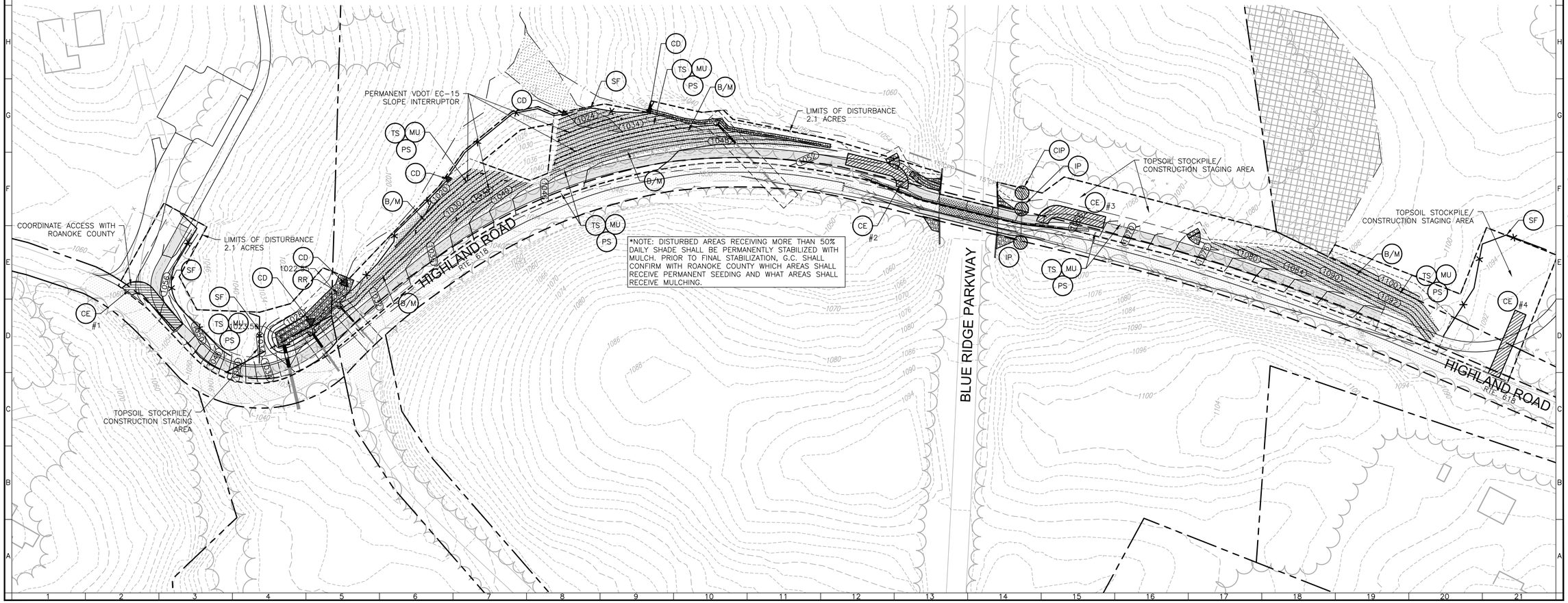
10. AS EACH CONSTRUCTION ENTRANCE IS REMOVED, THESE AREAS SHALL RECEIVE PAVEMENT OR BE SEEDED AND STABILIZED AS SHOWN ON THE PLANS.
11. AFTER PERMANENT STABILIZATION OF THE SITE, THE DIVERSION DIKES, CHECK DAM, AND SILT FENCE MAY BE REMOVED.

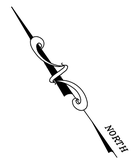
*NOTE: ROANOKE COUNTY INSPECTION AND APPROVAL IS REQUIRED PRIOR TO THE REMOVAL OF EROSION AND SEDIMENT CONTROL MEASURES.

12. G.C. SHALL ENSURE THAT THE LIMITS OF DISTURBANCE ARE STRICTLY ADHERED TO DURING THE PROJECT.
13. NO DEVIATIONS TO THE PLANS SHALL TAKE PLACE UNLESS PRIOR APPROVAL FROM THE OWNER, PROJECT ENGINEER, AND THE APPROPRIATE REVIEW AGENCIES.

ESC KEY

3.02	TEMPORARY STONE CONSTRUCTION ENTRANCE	CE
3.05	SILT FENCE	SF
3.07	STORM DRAIN INLET PROTECTION	IP
3.08	CULVERT INLET PROTECTION	CIP
3.20	ROCK CHECK DAM	CD
3.31	TEMPORARY SEEDING	TS
3.32	PERMANENT SEEDING	PS
3.35	MULCHING	MU
3.36	SOIL STABILIZATION BLANKETS & MATTING	B/M





50 0 50 100 150

SCALE: 1" = 50'

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EROSION & SEDIMENT CONTROL PLAN

VINTON DISTRICT
ROANOKE COUNTY, VIRGINIA

DRAWN BY CPB
DESIGNED BY CPB
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JOB NO. 04170071.00

GRADING NOTES

G.C. SHALL REFER TO "SUBSURFACE EXPLORATION AND GEOTECHNICAL ENGINEERING REPORT ROANOKE COUNTY GREENWAY EAST ROANOKE RIVER GREENWAY CONNECTOR," PREPARED BY FROEHLING & ROBERTSON, INC. DATED NOVEMBER 2018 FOR SPECIFIC GEOTECHNICAL REQUIREMENTS. ALL RECOMMENDATIONS IN THE REPORT SHALL BE FOLLOWED. IF DISCREPANCIES ARE FOUND BETWEEN THESE NOTES AND THE REPORT, THE REPORT SHALL GOVERN.

REFER TO BUILDING PLANS FOR SUBGRADE AND UTILITY TRENCHES WITHIN 5' OF THE BUILDING ENVELOPE.

REMOVE TREES, SHRUBS, GRASS, AND OTHER VEGETATION, IMPROVEMENTS OR OBSTRUCTIONS AS REQUIRED TO PERMIT INSTALLATION OF NEW CONSTRUCTION. REMOVE TREES AND OTHER VEGETATION, INCLUDING STUMPS AND ROOTS, COMPLETELY IN AREAS REQUIRED FOR SUBSEQUENT SEEDING. CUT OFF TREES AND STUMPS IN AREAS TO RECEIVE FILL MORE THAN THREE FEET IN DEPTH TO WITHIN EIGHT INCHES OF THE ORIGINAL GROUND SURFACE.

BARRICADE OPEN EXCAVATIONS OCCURRING AS PART OF THIS WORK AND OPERATE WARNING LIGHTS AS RECOMMENDED BY AUTHORITIES HAVING JURISDICTION.

EXCAVATION FOR STRUCTURES:

a. CONFORM TO ELEVATIONS AND DIMENSIONS SHOWN WITHIN A TOLERANCE OF 0.1'
b. PROVIDE TRUE AND STRAIGHT FOOTING EXCAVATIONS WITH UNIFORM AND LEVEL BOTTOMS OF THE WIDTH INDICATED TO ENSURE PROPER PLACEMENT AND COVER OF ALL REINFORCEMENT.
c. REMOVE ALL LOOSE MATERIALS FROM THE EXCAVATION PRIOR TO PLACEMENT OF CONCRETE.
d. FOOTINGS WHICH SUPPORT CONCRETE MASONRY UNITS MAY BE STEPPED PROVIDED THE VERTICAL STEP DOES NOT EXCEED ONE HALF OF THE HORIZONTAL DISTANCE BETWEEN STEPS AND HORIZONTAL DISTANCE BETWEEN STEPS IS NOT LESS THAN TWO FEET.
e. IF ROCK IS ENCOUNTERED IN A FOOTING EXCAVATION, UNDERCUT IT A MINIMUM EXCAVATION WITH CONTROLLED FILL.

CUT SURFACE UNDER PAVEMENTS TO COMPLY WITH CROSS SECTIONS, ELEVATIONS, AND GRADES AS INDICATED.

EXCAVATE TRENCHES TO UNIFORM WIDTH CONFORMING TO VDOT STANDARD PB-1 FOR STORM DRAINAGE PIPING.

PREVENT SURFACE WATER AND SUBSURFACE OR GROUND WATER FROM FLOWING INTO EXCAVATIONS AND FROM FLOODING PROJECT SITE AND SURROUNDING AREA. DO NOT ALLOW WATER TO ACCUMULATE IN EXCAVATIONS. REMOVE WATER TO PREVENT SOFTENING OF FOUNDATION BOTTOMS, UNDERCUTTING FOOTINGS, AND SOIL CHANGES DETRIMENTAL TO STABILITY OF SUBGRADES AND FOUNDATIONS. CONVEY WATER WHEN ATMOSPHERIC TEMPERATURE IS LESS THEN 35°F (1°C).

PROTECT EXCAVATED BOTTOMS OF ALL FOOTINGS AND TRENCHES AGAINST FREEZING WHEN ATMOSPHERIC TEMPERATURE IS LESS THEN 35°F (1°).

BACKFILLING:

a. COMPACT THE BACKFILL AROUND THE OUTSIDE OF EACH BUILDING TO A MINIMUM OF 85% OF MAXIMUM DRY DENSITY IN ACCORDANCE WITH ASTM D 698 STANDARD PROCTOR. DO NOT ALLOW HEAVY COMPACTION EQUIPMENT SUCH AS ROLLERS, ETC., CLOSER TO ANY FOOTING THAN THE HORIZONTAL DISTANCE SUBTENDED BY A 45° ANGLE WITH THE TOP EDGE OF THE FOOTINGS AND THE SURFACE OF THE GROUND.
b. BACKFILL BEHIND WALLS AFTER PERMANENT CONSTRUCTION WHICH BRACES THE WALL IS IN PLACE OR TEMPORARY BRACING OF THE WALL IS PROPERLY INSTALLED, AND AFTER ACCEPTANCE OF CONSTRUCTION BELOW FINISH GRADE INCLUDING DAMP-PROOFING, REMOVAL OF CONCRETE FORMWORK, AND REMOVAL OF TRASH AND DEBRIS.

FINISH LAWN AREAS TO WITHIN ONE INCH ABOVE OR BELOW REQUIRED SUBGRADE ELEVATIONS. SHAPE SURFACE UNDER WALKS AND PAVEMENTS TO LINE, GRADE, AND CROSS SECTION, WITH NOT MORE THAN 1/2" ABOVE OR BELOW REQUIRED SUBGRADE ELEVATION.

GRADE SURFACE UNDER BUILDING SLABS SMOOTH AND EVEN, FREE OF VOIDS. PROVIDE FINAL GRADES WITHIN 1/2" OF THOSE INDICATED WHEN TESTED WITH A 10' STRAIGHT EDGE.

PROTECT GRADED AREAS FROM TRAFFIC AND EROSION. REPAIR AREAS WHICH HAVE SETTLED, ERODED, OR BECOME DAMAGED DUE TO CONSTRUCTION ACTIVITIES AT NO ADDITIONAL COST TO OWNER.

PLACE ALL FILL AND BACKFILL AS CONTROLLED FILL AS FOLLOWS:

a. ESTABLISH SUITABLE SUBGRADE CONDITIONS PRIOR TO PLACING FILL BY PROOFROLLING, UNDERCUTTING AND COMPACTING AS NECESSARY.
b. PLACE FILL MATERIALS IN LAYERS NOT MORE THAN 8" IN LOOSE DEPTH FOR HEAVY COMPACTION EQUIPMENT, AND NOT MORE THAN 4" FOR HAND TAMPERS.
c. PRIOR TO COMPACTION, PROVIDE MOISTURE CONTENT TO WITHIN 3% OF OPTIMUM BY MOISTENING OR AERATING EACH LAYER. DO NOT PLACE FILL MATERIAL ON SURFACES WHICH ARE MUDDY, FROZEN OR CONTAIN FROST OR ICE.
d. COMPACT SOIL TO NOT LESS THAN 95% OF MAXIMUM DRY DENSITY IN ACCORDANCE WITH ASTM D 698 (STANDARD PROCTOR).

SPREAD TOPSOIL TO A DEPTH OF 4" OVER ALL DISTURBED AREAS NOT RECEIVING WALKS, PAVEMENT, WALLS OR BUILDING, INCLUDING TRENCHES. IMMEDIATELY FOLLOWING PLACEMENT OF TOPSOIL, DISK THE ENTIRE TOPSOILED AREA AND RAKE FREE OF STONES AND DEBRIS OVER 1/2" IN ANY DIMENSION. PROVIDE A FINISHED SURFACE FREE OF DEPRESSIONS OR HIGH SPOTS. SEED IMMEDIATELY.

CONTRACTOR IS RESPONSIBLE FOR ALL QUALITY CONTROL TESTING AND SHALL RETAIN A LICENSED INDEPENDENT GEOTECHNICAL ENGINEER AND SOILS TESTING LABORATORY AND SHALL PROVIDE PERIODIC REPORTS TO THE OWNER IN ACCORDANCE WITH VDOT REQUIREMENTS. OWNER IS RESPONSIBLE FOR ALL QUALITY ASSURANCE TESTING IN ACCORDANCE WITH VDOT REQUIREMENTS.

GENERAL EROSION AND SEDIMENT CONTROL NOTES

1. ALL SOIL EROSION & SEDIMENT CONTROL MEASURES SHALL BE ACCOMPLISHED IN STRICT ACCORDANCE WITH THE STANDARDS AND SPECIFICATIONS CONTAINED IN THE VIRGINIA EROSION AND SEDIMENT CONTROL HANDBOOK, LATEST EDITION.
2. THE APPROVING AUTHORITY MAY ADD TO, DELETE, RELOCATE, CHANGE, OR OTHERWISE MODIFY CERTAIN EROSION AND SEDIMENT CONTROL MEASURES WHERE FIELD CONDITIONS ARE ENCOUNTERED THAT WARRANT SUCH MODIFICATIONS.
3. ALL SOIL EROSION AND SEDIMENT CONTROL MEASURES AS SHOWN ON THE PLAN SHALL BE PLACED IN ADVANCE OF THE WORK BEING PERFORMED, AS FAR AS PRACTICAL.
4. IN NO CASE DURING CONSTRUCTION SHALL WATER RUNOFF BE DIVERTED OR ALLOWED TO FLOW TO LOCATIONS WHERE ADEQUATE PROTECTION HAS NOT BEEN PROVIDED.
5. IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO LEAVE THE SITE ADEQUATELY PROTECTED AGAINST EROSION, SEDIMENTATION, OR ANY DAMAGE TO ANY ADJACENT PROPERTY AT THE END OF EACH DAY'S WORK.
6. FOR THE EROSION CONTROL KEY SYMBOLS SHOWN ON THE PLANS, REFER TO THE VIRGINIA UNIFORM CODING SYSTEM FOR EROSION AND SEDIMENT CONTROL PRACTICES CONTAINED IN THE VIRGINIA EROSION AND SEDIMENT CONTROL HANDBOOK, LATEST EDITION. THESE SYMBOLS AND KEYS ARE TO BE UTILIZED ON ALL EROSION CONTROL PLANS SUBMITTED TO ROANOKE COUNTY.
7. THE LOCATION OF ALL OFF-SITE FILL OR BORROW AREAS ASSOCIATED WITH THE CONSTRUCTION PROJECT WILL BE PROVIDED TO ROANOKE COUNTY DEPARTMENT OF COMMUNITY DEVELOPMENT. AN EROSION CONTROL PLAN OR MEASURES MAY BE REQUIRED FOR THIS AREA.
8. THIS SHEET MAY NOT BE MODIFIED EXCEPT FOR TABLES

TOTAL DISTURBED AREA = 2.1 AC.= 90,000 SQ. FT.

EROSION AND SEDIMENT CONTROL NARRATIVE

PROJECT DESCRIPTION: THE PURPOSE OF THIS PROJECT IS FOR THE CONSTRUCTION OF THE EAST ROANOKE RIVER GREENWAY CONNECTOR TRAIL. THE PROJECT WILL CONNECT TO TWO EXISTING TRAILHEAD LOCATIONS, UPC# 91191 AND 110155. THE LIMITS OF DISTURBANCE FOR THE PROJECT IS APPROXIMATELY 2.1 ACRES.

EXISTING SITE CONDITIONS: THE PROJECT AREA CURRENTLY CONSISTS OF A MIX OF WOODS AND MANAGED TURF WITH IMPERVIOUS AREA WHERE THE PROJECT INTERSECTS THE EXISTING ROADWAY, THE DISTURBED AREA IS LARGELY PARALLEL WITH HIGHLAND ROAD. STORMWATER GENERALLY SHEET FLOWS OFF OF THE EXISTING ROAD TO THE NORTH AND EAST TO THE EXISTING DRAINAGE SYSTEM. POST-DEVELOPMENT DRAINAGE PATTERNS WILL BE VERY SIMILAR TO PRE-DEVELOPMENT DRAINAGE PATTERNS.

ADJACENT PROPERTY: THE DEVELOPMENT AREA IS BOUNDED BY HIGHLAND ROAD TO THE SOUTH AND WEST AND BY PROPERTY OWNED BY VIRGINIA RECREATIONAL FACILITIES AUTHORITY, NATIONAL PARK SERVICE, AND ROANOKE VALLEY RESOURCE AUTHORITY ON THE NORTH AND EAST.

OFF-SITE AREAS: THE PROPOSED DEVELOPMENT WILL REQUIRE MATERIAL TO BE TRANSPORTED TO THE SITE FROM A PERMITTED LOCATION. G.C. SHALL NOTIFY ROANOKE COUNTY OF THE LOCATION PRIOR TO TRANSPORTING ANY MATERIAL.

SOILS: THE "WEB SOIL SURVEY" AS PREPARED BY THE UNITED STATES DEPARTMENT OF AGRICULTURE IDENTIFIES THE SOILS ON-SITE AS 26C-HAYESVILLE FINE SANDY LOAM, 7 TO 15 PERCENT SLOPES, 26D-HAYESVILLE FINE SANDY LOAM, 15 TO 25 PERCENT SLOPES, 27D-HAYESVILLE GRAVELLY FINE SANDY LOAM, AND 28E-HAYESVILLE CHANNERY FINE SANDY LOAM, 25-50 PERCENT SLOPES. ALL OF THESE SOILS ARE HYDROLOGIC SOIL GROUP B.

CRITICAL EROSION AREAS: CRITICAL AREAS FOR THIS PROJECT INCLUDE THE EXISTING AND PROPOSED STEEP SLOPES AND ALL AREA NEAR EXISTING DRAINAGE COURSES. THE SLOPES SHALL RECEIVE BLANKET MATTING AS NECESSARY AND SHALL BE SEEDED AND STABILIZED AS SOON AS POSSIBLE AFTER REACHING FINAL GRADE.

EROSION AND SEDIMENT CONTROL MEASURES:
UNLESS OTHERWISE INDICATED, ALL VEGETATIVE AND STRUCTURAL EROSION AND SEDIMENT CONTROL PRACTICES SHALL BE CONSTRUCTED AND MAINTAINED ACCORDING TO MINIMUM STANDARDS AND SPECIFICATIONS OF THE "VIRGINIA EROSION AND SEDIMENT CONTROL HANDBOOK, THIRD EDITION" (VESCH). THE MINIMUM STANDARDS OF THE VESCH SHALL BE ADHERED TO UNLESS OTHERWISE DIRECTED BY THE LOCAL PROGRAM ADMINISTRATOR.

STRUCTURAL –

CONSTRUCTION ENTRANCE-STD. 3.02.....A STONE PAD, LOCATED AT POINTS OF VEHICULAR INGRESS AND EGRESS TO THE CONSTRUCTION SITE, TO REDUCE THE SOIL TRANSPORTED ONTO PUBLIC ROADS AND OTHER PAVED AREAS.

SILT FENCE-STD. 3.05.....A TEMPORARY SEDIMENT BARRIER CONSISTING OF A SYNTHETIC FILTER FABRIC STRETCHED ACROSS AND ATTACHED TO SUPPORTING POSTS AND ENTRENCHED TO INTERCEPT AND DETAIN SMALL AMOUNTS OF SEDIMENT FROM DISTURBED AREAS.

STORM DRAIN INLET PROTECTION-STD. 3.07.....A SEDIMENT FILTER OR EXCAVATED IMPOUNDING AREA AROUND A STORM DRAIN INLET TO PREVENT SEDIMENT FROM ENTERING STORM DRAINAGE SYSTEMS PRIIOR TO PERMANENT STABILIZATION OF THE DISTURBED AREA.

CULVERT INLET PROTECTION-STD. 3.08.....A SEDIMENT FILTER LOCATED AT THE INLET TO STORM SEWER CULVERTS TO PREVENT SEDIMENT FROM ENTERING, ACCUMULATING IN AND BEING TRANSFERRED BY A CULVERT PRIIOR TO PERMANENT STABILIZATION OF THE DISTURBED AREA.

OUTLET PROTECTION-STD. 3.18.....STRUCTURALLY LINED APRONS OR OTHER ACCEPTABLE ENERGY DISSIPATING DEVICES PLACED AT THE OUTLETS OF PIPES OR PAVED CHANNEL SECTIONS TO PREVENT SCOUR AT STORMWATER OUTLETS.

ROCK CHECK DAMS-STD. 3.20.....SMALL TEMPORARY STONE DAMS CONSTRUCTED ACROSS A SWALE OR DRAINAGE DITCH TO REDUCE THE VELOCITY OF CONCENTRATED STORMWATER FLOWS, THEREBY REDUCING EROSION OF THE SWALE OR DITCH.

VEGETATIVE –

TEMPORARY SEEDING-STD. 3.31.....ESTABLISHMENT OF A TEMPORARY VEGETATIVE COVER ON DISTURBED AREAS BY SEEDING WITH APPROPRIATE RAPIDLY GROWING ANNUAL PLANTS TO REDUCE EROSION BY STABILIZING DISTURBED AREAS THAT WILL NOT BE BROUGHT TO FINAL GRADE FOR A PERIOD OF MORE THAN 14 DAYS.

PERMANENT SEEDING-STD. 3.32.....ESTABLISHMENT OF PERENNIAL VEGETATIVE COVER ON DISTURBED AREAS BY PLANTING SEED TO REDUCE EROSION AND DECREASE SEDIMENT YIELD FROM DISTURBED AREAS.

MULCHING-STD. 3.35.....APPLICATION OF PLANT RESIDUES OR OTHER SUITABLE MATERIALS TO THE SOIL SURFACE TO PREVENT EROSION BY PROTECTING THE SOIL SURFACE FROM RAINDROP IMPACT AND REDUCING THE VELOCITY OF OVERLAND FLOW.

SOIL STABILIZATION BLANKETS & MATTING-STD. 3.36.....INSTALLATION OF A PROTECTIVE COVERING (BLANKET) OR A SOIL STABILIZATION MAT ON A PREPARED AREA OF A STEEP SLOPE TO AID IN CONTROLLING EROSION BY PROVIDING A MICROCLIMATE WHICH PROTECTS YOUNG VEGETATION AND PROMOTES ITS ESTABLISHMENT.

SLOPE INTERRUPTER.....INSTALLATION OF A TUBULAR RUNOFF AND EROSION CONTROL DEVICE USED TO CONTROL RUNOFF VELOCITY AND EROSION CONTROL ON STEEP SLOPES AFTER CONSTRUCTION ACTIVITIES. THESE SHALL REMAIN IN PLACE PERMANENTLY ON THE FILL SLOPE.

MANAGEMENT STRATEGIES:
A) CONSTRUCTION WILL BE SEQUENCED SO THAT GRADING OPERATIONS CAN BEGIN AND END AS QUICKLY AS POSSIBLE.
B) SEDIMENT TRAPPING MEASURES WILL BE INSTALLED AS A FIRST STEP IN GRADING.
C) THE LOCAL PROGRAM ADMINISTRATOR RESERVES THE RIGHT TO ADD TO, DELETE OR OTHERWISE CHANGE THE EROSION CONTROL MEASURES AS DEEMED NECESSARY DUE TO ACTUAL FIELD CONDITIONS BY WRITTEN NOTIFICATION TO THE CONTRACTOR.
D) ALL FILL AND CUT SLOPES SHALL BE SEEDED WITHIN SEVEN (7) DAYS OF ACHIEVING FINAL GRADE.
E) ONLY AFTER INSPECTION AND APPROVAL FROM THE LOCAL PROGRAM ADMINISTRATOR MAY ITEMS BE REMOVED FOLLOWING THE STABILIZATION OF THE CONTRIBUTING AREAS.

INSPECTIONS:
THE GENERAL CONTRACTOR SHALL INSPECT DISTURBED AREAS OF THE SITE THAT HAVE NOT BEEN FINALLY STABILIZED, AND AREAS USED FOR STORAGE OF MATERIALS THAT ARE EXPOSED TO PRECIPITATION, STRUCTURAL CONTROL MEASURES, AND THE AREA OF CONSTRUCTION VEHICLE ACCESS AT LEAST EVERY FOURTEEN (14) CALENDAR DAYS, AND WITHIN 48 HOURS OF THE END OF A STORM EVENT PRODUCING 1/2" OR GREATER OF PRECIPITATION. WHERE AREAS HAVE BEEN FINALLY OR TEMPORARILY STABILIZED OR RUNOFF IS UNLIKELY DUE TO WINTER CONDITIONS (SITE IS COVERED WITH SNOW, ICE, OR FROZEN GROUND EXISTS) SUCH INSPECTIONS SHALL BE CONDUCTED AT LEAST ONCE EVERY MONTH.
A) INSPECT DISTURBED AREAS AND AREAS OF MATERIALS STORAGE THAT ARE EXPOSED TO PRECIPITATION FOR EVIDENCE OF, OR THE POTENTIAL FOR SEDIMENT ENTERING THE STORM DRAIN SYSTEM. INSPECT E&S CONTROLS IN ACCORDANCE WITH REQUIREMENTS STATED HEREIN, AND INSPECT POINTS OF STORM DRAIN DISCHARGE FOR EXCESSIVE SEDIMENTATION. CORRECT SITE CONTROLS AS REQUIRED TO REDUCE SEDIMENTATION OF STORM DRAINS, CULVERTS, AND RECEIVING CHANNELS.
B) IF CONTROLS OR SEDIMENT PREVENTION AREAS ARE FOUND TO BE IN NEED OF REPAIR OR MODIFICATION, THE GENERAL CONTRACTOR SHALL PROVIDE ADDITIONAL MEASURES OR MODIFICATIONS TO EXISTING MEASURES AS REQUIRED. ANY ADDITIONAL MEASURES OR MODIFICATIONS TO EXISTING MEASURES SHALL BE RECORDED AS FIELD REVISIONS TO THESE PLANS. IN THE EVENT THAT ADDITIONAL CONTROLS ARE FOUND TO BE REQUIRED, THE GENERAL CONTRACTOR SHALL BE RESPONSIBLE FOR IMPLEMENTING THESE CONTROLS BEFORE THE NEXT ANTICIPATED STORM EVENT. IF IMPLEMENTATION BEFORE THE NEXT STORM EVENT IS IMPRACTICAL, THEY SHALL BE IMPLEMENTED AS SOON AS PRACTICAL.
C) A REPORT SUMMARIZING THE SCOPE OF INSPECTIONS, NAME OF INSPECTOR, INSPECTOR'S QUALIFICATIONS, DATES OF INSPECTIONS, MAJOR OBSERVATIONS PERTAINING TO THE IMPLEMENTATION OF THESE EROSION CONTROL PLANS, AND ACTIONS TAKEN SHALL BE MADE AND RETAINED AS A PART OF THESE PLANS. MAJOR OBSERVATIONS OF THESE REPORTS SHALL INCLUDE: THE LOCATIONS OF EXCESSIVE SEDIMENTATION FROM THE SITE; LOCATIONS OF CONTROLS IN NEED OF REPAIR; LOCATIONS OF FAILED OR INADEQUATE CONTROLS; AND LOCATIONS WHERE ADDITIONAL CONTROLS ARE NEEDED.

STORMWATER MANAGEMENT:

POST-DEVELOPMENT DRAINAGE CONDITIONS ARE VERY SIMILAR TO PRE-DEVELOPMENT DRAINAGE CONDITIONS WITH MUCH OF THE DRAINAGE LEAVING THE DISTURBED AREA AS SHEET FLOW. IN ADDITION, TWO LEVEL SPREADERS ARE BEING PROVIDED AT CRITICAL LOCATIONS. PLEASE REFER TO THE STORMWATER NARRATIVE IN THE CALCULATIONS PACKAGE FOR ADDITIONAL DETAILS. THIS DEVELOPMENT IS NOT ANTICIPATED TO HAVE NOTICEABLE IMPACTS ON DOWNSTREAM EROSION, SEDIMENTATION, OR FLOODING.

STORMWATER QUALITY REQUIREMENTS WILL BE MET THROUGH THE DEDICATION OF A FORESTED BMP EASEMENT.

EROSION & SEDIMENT CONTROL COST ESTIMATE

NOTE: ALL COSTS GIVEN ARE COMPLETE IN PLACE.
NOTE: THIS COST ESTIMATE TABLE IS PROVIDED FOR BONDING PURPOSES ONLY. VERIFICATION OF ALL QUANTITIES AND PRICES FOR BIDDING PURPOSES SHALL BE THE RESPONSIBILITY OF THE BIDDER.

NOT APPLICABLE

DESCRIPTION	UNIT	QUANTITY	UNIT COST	TOTAL COST
SUB-TOTAL				$
10% CONTINGENCY				$
TOTAL PROJECT COST				$

MINIMUM STANDARDS

THE FOLLOWING STANDARDS ARE TO BE PROVIDED OR ADDRESSED ON EVERY DEVELOPMENT PROJECT EXCEEDING 10,000 S.F. IN AREA OF DISTURBANCE THESE STANDARDS ARE CONSIDERED A MINIMUM AND MAY REQUIRE ADDITIONAL MEASURES AS DEEMED NECESSARY BY THE LOCAL APPROVING AUTHORITY OR THE CONSULTING ENGINEER.

No.	CRITERIA, TECHNIQUE OR METHOD	PRACTICES PROVIDED
1	PERMANENT OR TEMPORARY SOIL STABILIZATION SHALL BE APPLIED TO DENUDED AREAS WITHIN SEVEN (7) DAYS AFTER FINAL GRADE HAS BEEN REACHED ON ANY PORTION OF THE SITE. TEMPORARY SOIL STABILIZATION SHALL BE APPLIED WITHIN SEVEN (7) DAYS TO DENUDED AREAS THAT MAY BE AT FINAL GRADE BUT WILL REMAIN DORMANT (UNDISTURBED) FOR LONGER THAN FOURTEEN (14) DAYS. PERMANENT STABILIZATION SHALL BE APPLIED TO AREAS THAT ARE TO BE LEFT DORMANT FOR MORE THAN ONE (1) YEAR.	TS PS MU B/M
2	DURING CONSTRUCTION OF THE PROJECT, SOIL STOCKPILES SHALL BE STABILIZED OR PROTECTED WITH SEDIMENT TRAPPING MEASURES. THE CONTRACTOR IS RESPONSIBLE FOR THE TEMPORARY PROTECTION AND PERMANENT STABILIZATION OF ALL SOIL STOCKPILES ON SITE AS WELL AS SOIL INTENTIONALLY TRANSPORTED FROM THE PROJECT SITE.	TS PS MU SF
3	A PERMANENT VEGETATIVE COVER SHALL BE ESTABLISHED ON DENUDED AREAS NOT OTHERWISE PERMANENTLY STABILIZED. PERMANENT VEGETATION SHALL NOT BE CONSIDERED ESTABLISHED UNTIL A GROUND COVER IS ACHIEVED THAT, IN THE OPINION OF THE LOCAL PROGRAM ADMINISTRATOR OR DESIGNATED AGENT, IS UNIFORM, MATURE ENOUGH TO SURVIVE AND WILL INHIBIT EROSION.	TS PS MU B/M
4	SEDIMENT BASINS AND TRAPS, PERIMETER DIKES, SEDIMENT BARRIERS AND OTHER MEASURES INTENDED TO TRAP SEDIMENT SHALL BE CONSTRUCTED AS A FIRST STEP IN ANY LAND-DISTURBING ACTIVITY AND SHALL BE MADE FUNCTIONAL BEFORE UPSLOPE LAND DISTURBANCE TAKES PLACE.	CE SF IP CIP CD
5	STABILIZATION METHODS SHALL BE APPLIED TO EARTHEN STRUCTURES SUCH AS DAMS, DIKES AND DIVERSIONS IMMEDIATELY AFTER INSTALLATION.	NOT APPLICABLE
6	SEDIMENT TRAPS AND BASINS SHALL BE DESIGNED AND CONSTRUCTED BASED UPON THE TOTAL DRAINAGE AREA TO BE SERVED BY THE TRAP OR BASIN.	NOT APPLICABLE
7	CUT AND FILL SLOPES SHALL BE CONSTRUCTED IN A MANNER THAT WILL MINIMIZE EROSION. SLOPES THAT ARE FOUND TO BE ERODING EXCESSIVELY WITHIN ONE (1) YEAR OF PERMANENT STABILIZATION SHALL BE PROVIDED WITH ADDITIONAL SLOPE STABILIZATION MEASURES UNTIL THE PROBLEM IS CORRECTED.	TS PS MU B/M
8	CONCENTRATED RUNOFF SHALL NOT FLOW DOWN CUT OR FILL SLOPES UNLESS CONTAINED WITHIN AN ADEQUATE TEMPORARY OR PERMANENT CHANNEL, FLUME OR SLOPE DRAIN STRUCTURE.	NOT APPLICABLE
9	WHENEVER WATER SEEPS FROM A SLOPE FACE, ADEQUATE DRAINAGE OR OTHER PROTECTION SHALL BE PROVIDED.	SHOULD SEEPS OCCUR IN ANY EXISTING OR NEW CUT OR FILL SLOPE, THE CONTRACTOR SHALL FIRST ENSURE THAT THERE ARE NOT AREAS OF PONDED WATER AT THE TOPS OF THE SLOPES, AND THEN SHALL CONTACT BOTH THE DESIGN ENGINEER AND THE PROJECT GEOTECHNICAL ENGINEER FOR ON-SITE EVALUATION OF THE AREAS OF SEEPAGE.
10	ALL STORM SEWER INLETS THAT ARE MADE OPERABLE DURING CONSTRUCTION SHALL BE PROTECTED SO THAT SEDIMENT-LADEN WATER CANNOT ENTER THE CONVEYANCE SYSTEM WITHOUT FIRST BEING FILTERED OR OTHERWISE TREATED TO REMOVE SEDIMENT.	IP
11	BEFORE NEWLY CONSTRUCTED STORMWATER CONVEYANCE CHANNELS ARE MADE OPERATIONAL, ADEQUATE OUTLET PROTECTION AND ANY REQUIRED TEMPORARY OR PERMANENT CHANNEL LINING SHALL BE INSTALLED IN BOTH THE CONVEYANCE CHANNEL AND RECEIVING CHANNEL.	OP
12	WHEN WORK IN A LIVE WATERCOURSE IS PERFORMED, PRECAUTIONS SHALL BE TAKEN TO MINIMIZE ENCROACHMENT, CONTROL SEDIMENT TRANSPORT AND STABILIZE THE WORK AREA TO THE GREATEST EXTENT POSSIBLE DURING CONSTRUCTION. NONERODIBLE MATERIAL SHALL BE USED FOR THE CONSTRUCTION OF CAUSEWAYS AND COFFERDAMS. EARTHEN FILL MAY BE USED FOR THESE STRUCTURES IF ARMORED BY NONERODIBLE COVER MATERIALS.	NOT APPLICABLE
13	WHEN A LIVE WATERCOURSE MUST BE CROSSED BY CONSTRUCTION VEHICLES MORE THAN TWICE IN ANY SIX (6) MONTH PERIOD, A TEMPORARY STREAM CROSSING CONSTRUCTED OF NONERODIBLE MATERIAL.	
14	ALL APPLICABLE FEDERAL, STATE AND LOCAL CHAPTERS PERTAINING TO WORKING IN OR CROSSING LIVE WATERCOURSES SHALL BE MET. THE BEDS AND BANKS OF ANY WATERCOURSE SHALL BE STABILIZED IMMEDIATELY AFTER WORK IN THE WATERCOURSE IS COMPLETED.	
15	THE BEDS AND BANKS OF A WATERCOURSE SHALL BE STABILIZED IMMEDIATELY AFTER WORK IN THE WATERCOURSE IS COMPLETED.	
16	UNDERGROUND UTILITY LINES SHALL BE INSTALLED IN ACCORDANCE WITH THE FOLLOWING STANDARDS IN ADDITION TO OTHER APPLICABLE CRITERIA: 1)NO MORE THAN 500 LINEAR FEET OF ANY TRENCH MAY BE OPENED AT ONE TIME. 2)EXCAVATED MATERIAL SHALL BE PLACED ON THE UPHILL SIDE OF TRENCHES. 3)EFFLUENT FROM DEWATERING OPERATIONS SHALL BE FILTERED OR PASSED THROUGH AN APPROVED SEDIMENT TRAPPING DEVICE, OR BOTH, AND DISCHARGED IN A MANNER THAT DOES NOT ADVERSELY AFFECT FLOWING STREAMS OR OFF-SITE PROPERTY. 4)MATERIAL USED FOR BACKFILLING TRENCHES SHALL BE PROPERLY COMPACTED IN ORDER TO MINIMIZE EROSION AND PROMOTE STABILIZATION. 5)RESTABILIZATION SHALL BE ACCOMPLISHED IN ACCORDANCE WITH THESE CHAPTERS. 6)APPLICABLE SAFETY REGULATIONS SHALL BE COMPLIED WITH.	TS PS MU
17	WHERE CONSTRUCTION VEHICLE ACCESS ROUTES INTERSECT PAVED OR PUBLIC ROADS, PROVISIONS SHALL BE MADE TO MINIMIZE THE TRANSPORT OF SEDIMENT BY VEHICULAR TRACKING ONTO THE PAVED SURFACE. WHERE SEDIMENT IS TRANSPORTED ONTO A PAVED OR PUBLIC ROAD SURFACE, THE ROAD SURFACE SHALL BE CLEANED THOROUGHLY AT THE END OF EACH DAY. SEDIMENT SHALL BE REMOVED FROM THE ROADS BY SHOVELING OR SWEEPING AND TRANSPORTED TO A SEDIMENT CONTROL DISPOSAL AREA. STREET WASHING SHALL BE ALLOWED ONLY AFTER SEDIMENT IS REMOVED IN THIS MANNER.	CE
18	ALL TEMPORARY EROSION AND SEDIMENT CONTROL MEASURES SHALL BE REMOVED WITHIN THIRTY (30) DAYS AFTER FINAL SITE STABILIZATION OR AFTER THE TEMPORARY MEASURES ARE NO LONGER NEEDED, UNLESS OTHERWISE AUTHORIZED BY THE VESCP AUTHORITY. TRAPPED SEDIMENT AND THE DISTURBED SOIL AREAS RESULTING FROM THE DISPOSITION OF TEMPORARY MEASURES SHALL BE PERMANENTLY STABILIZED TO PREVENT FURTHER EROSION AND SEDIMENTATION.	TS PS MU B/M
19	PROPERTIES AND WATERWAYS DOWNSTREAM FROM DEVELOPMENT SITES SHALL BE PROTECTED FROM SEDIMENT DEPOSITION, EROSION AND DAMAGE DUE TO INCREASES IN VOLUME, VELOCITY AND PEAK FLOW RATE OF STORMWATER RUNOFF FOR THE STATED FREQUENCY STORM OF 24-HOUR DURATION IN ACCORDANCE WITH THE FOLLOWING STANDARDS AND CRITERIA. STREAM RESTORATION AND RELOCATION PROJECTS THAT INCORPORATE NATURAL CHANNEL DESIGN CONCEPTS ARE NOT MAN-MADE CHANNELS AND SHALL BE EXEMPT FROM ANY FLOW RATE CAPACITY AND VELOCITY REQUIREMENTS FOR NATURAL OR MAN-MADE CHANNELS. a. CONCENTRATED STORMWATER RUNOFF LEAVING A DEVELOPMENT SITE SHALL BE DISCHARGED DIRECTLY INTO AN ADEQUATE OR MAN-MADE RECEIVING CHANNEL, PIPE OR STORM SEWER SYSTEM. FOR THOSE SITES WHERE RUNOFF IS DISCHARGED INTO A PIPE OR PIPE SYSTEM, DOWNSTREAM STABILITY ANALYSES AT THE OUTFALL OF THE PIPE OR PIPE SYSTEM SHALL BE PERFORMED. b. ADEQUACY OF ALL CHANNELS AND PIPES SHALL BE VERIFIED IN THE FOLLOWING MANNER: (1) THE APPLICANT SHALL DEMONSTRATE THAT THE TOTAL DRAINAGE AREA TO THE POINT OF ANALYSIS WITHIN THE CHANNEL IS ONE HUNDRED TIMES GREATER THAN THE CONTRIBUTING DRAINAGE AREA OF THE PROJECT IN QUESTION OR (2) (a) NATURAL CHANNELS SHALL BE ANALYZED BY THE USE OF THE TWO-YEAR STORM TO VERIFY THAT STORMWATER WILL NOT OVERTOP CHANNEL BANKS NOR CAUSE EROSION OF CHANNEL BED OR BANKS; AND (b) ALL PREVIOUSLY CONSTRUCTED MAN-MADE CHANNELS SHALL BE ANALYZED BY THE USE OF THE 10-YEAR STORM TO VERIFY THAT STORMWATER WILL NOT OVERTOP ITS BANKS AND BY THE USE OF A 2-YEAR STORM TO DEMONSTRATE THAT STORWMATER WILL NOT CAUSE EROSION OF CHANNEL BED OR BANKS; AND (c) PIPES AND STORM SEWER SYSTEMS SHALL BE ANALYZED BY THE USE OF A TEN-YEAR STORM TO VERIFY THAT STORMWATER WILL BE CONTAINED WITHIN THE PIPE SYSTEM c. IF EXISTING NATURAL RECEIVING CHANNELS OR PREVIOUSLY CONSTRUCTED MAN-MADE CHANNELS OR PIPES ARE NOT ADEQUATE, THE APPLICANT SHALL: (1) IMPROVE THE CHANNEL TO A CONDITION WHERE A 10-YEAR STORM WILL NOT OVERTOP THE BANKS AND A 2-YEAR STORM WILL NOT CAUSE EROSION TO THE CHANNEL BED OR BANKS; OR (2) IMPROVE THE PIPE OR PIPE SYSTEM TO A CONDITION WHERE THE 10-YEAR STORM IS CONTAINED WITHIN THE APPURTANCES; OR (3) DEVELOP A SITE DESIGN THAT WILL NOT CAUSE THE PRE-DEVELOPMENT PEAK RUNOFF RATE FROM A TWO-YEAR STORM TO INCREASE WHEN RUNOFF OUTFALLS INTO A NATURAL CHANNEL OR WILL NOT CAUSE THE PRE-DEVELOPMENT PEAK RUNOFF RATE FROM A 10-YEAR STORM TO INCREASE WHEN RUNOFF OUTFALLS INTO A MAN-MADE CHANNEL; OR (4) PROVIDE A COMBINATION OF CHANNEL IMPROVEMENT, STORMATER DETENTION OR OTHER MEASURES WHICH IS SATISFACTORY TO THE VESCP AUTHORITY TO PREVENT DOWNSTREAM EROSION. d. THE APPLICANT SHALL PROVIDE EVIDENCE OF PERMISSION TO MAKE THE IMPROVEMENTS e. ALL HYDROLOGIC ANALYSES SHALL BE BASED ON THE EXISTING WATERSHED CHARACTERISTICS AND THE ULTIMATE DEVELOPMENT CONDTION OF THE SUBJECT PROJECT. f. IF THE APPLICANT CHOOSES AN OPTION THAT INCLUDES STORMWATER DETENTION, HE SHALL OBTAIN APPROVAL FROM THE VESCP OF A PLAN FOR MAINTENANCE OF THE DETENTION FACILITIES. THE PLAN SHALL SET FORTH THE MAINTENANCE REQUIREMENTS OF THE FACILITY AND THE PERSON RESPONSIBLE FOR PERFORMING THE MAINTENANCE. g. OUTFALL FROM A DETENTION FACILITY SHALL BE DISCHARGED TO A RECEIVING CHANNEL, AND ENERGY DISSIPATORS SHALL BE PLACED AT THE OUTFALL OF ALL DETENTION FACILITIES AS NECESSARY TO PROVIDE A STABILIZED TRANSITION FROM THE FACILITY TO THE RECEIVING CHANNEL. h. ALL ON-SITE CHANNELS MUST BE VERIFIED TO BE ADEQUATE. i. INCREASED VOLUMES OF SHEET FLOWS THAT MAY CAUSE EROSION OR SEDIMENTATION ON ADJACENT PROPERTY SHALL BE DIVERTED TO A STABLE OUTLET, ADEQUATE CHANNEL, PIPE OR PIPE SYSTEM, OR TO A DETENTION FACILITY. j. IN APPLYING THESE STORMWATER MANAGEMENT CRITERIA, INDIVIDUAL LOTS OR PARCELS IN A RESIDENTIAL, COMMERCIAL OR INDUSTRIAL DEVELOPMENT SHALL NOT BE CONSIDERED TO BE SEPARATE DEVELOPMENT PROJECTS. INSTEAD, THE DEVELOPMENT, AS A WHOLE, SHALL BE CONSIDERED TO BE A SINGLE DEVELOPMENT PROJECT. HYDROLOGIC PARAMETERS THAT REFLECT THE ULTIMATE DEVELOPMENT CONDITION SHALL BE USED IN ALL ENGINEERING CALCULATIONS. k. ALL MEASURES USED TO PROTECT PROPERTIES AND WATERWAYS SHALL BE EMPLOYED IN A MANNER WHICH MINIMIZES IMPACTS ON THE PHYSICAL, CHEMICAL AND BIOLOGICAL INTEGRITY OF RIVERS, STREAMS AND OTHER WATERS OF THE STATE. l. ANY PLAN APPROVED PRIOR TO JULY 1, 2014, THAT PROVIDES FOR STORMWATER MANAGEMENT THAT ADDRESSES ANY FLOW RATE CAPACITY AND VELOCITY REQUIREMENTS FOR NATURAL OR MAN-MADE CHANNELS SHALL SATISFY THE FLOW RATE CAPACITY AND VELOCITY REQUIREMENTS FOR NATURAL OR MAN-MADE CHANNELS IF THE PRACTICES ARE DESIGNED TO (i) DETAIN THE WATER QUALITY VOLUME AND TO RELEASE IT OVER 48 HOURS; (ii) DETAIN AND RELEASE OVER A 24-HOUR PERIOD THE EXPECTED RAINFALL RESULTING FROM THE ONE YEAR, 24-HOUR STORM; AND (iii) REDUCE THE ALLOWABLE PEAK FLOW RATE RESULTING FROM THE 1.5, 2, AND 10-YEAR, 24-HOUR STORMS TO A LEVEL THAT IS LESS THAN OR EQUAL TO THE PEAK FLOW RATE FROM SITE ASSUMING IT WAS IN A GOOD FORESTED CONDITION, ACHIEVED THROUGH MULTIPLICATION OF THE FORESTED PEAK RATE BY A REDUCTION FACTOR THAT IS EQUAL TO THE RUNOFF VOLUME FROM THE SITE WHEN IT WAS IN A GOOD FORESTED CONDITION DIVIDED BY THE RUNOFF VOLUME FROM THE SITE IN ITS PROPOSED CONDITION, AND SHALL BE EXEMPT FROM ANY FLOW RATE CAPACITY AND VELOCITY REQUIREMENTS FOR NATURAL OR MAN-MADE CHANNELS AS DEFINED IN ANY REGULATIONS PROMULGATED PURSUANT TO 10.1-562 OR 10.1-570 OF THE ACT. m. FOR PLANS APPROVED ON AND AFTER JULY 1, 2014, THE FLOW RATE CAPACITY AND VELOCITY REQUIREMENTS OF 10.1-561 A OF THE ACT AND THIS SUBSECTION SHALL BE SATISFIED BY COMPLIANCE WITH WATER QUANTITY REQUIREMENTS IN THE STORMWATER MANAGEMENT ACT (10.1-603.2 ET SEQ. OF THE CODE OF VIRGINIA) AND ATTENDANT REGULATIONS, UNLESS SUCH LAND-DISTURBING ACTIVITIES ARE IN ACCORDANCE WITH 4VAC50-60-48 OF THE VIRGINIA STORMWATER MANAGEMENT PROGRAM (VSMP) PERMIT REGULATIONS. n. COMPLIANCE WITH THE WATER QUANTITY MINIMUM STANDARDS SET OUT IN 4VAC50-60-66 OF THE VIRGINIA STORMWATER MANAGEMENT PROGRAM (VSMP) PERMIT REGULATIONS SHALL BE DEEMED TO SATISFY THE REQUIREMENTS OF MINIMUM STANDARD 19.	POST-DEVELOPMENT RUNOFF WILL MAINTAIN A SHEET FLOW CONDITION AND THE SITE IS NOT ANTICIPATED TO CAUSE ANY MEASURABLE DOWNSTREAM EROSION, SEDIMENTATION, OR FLOODING

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COMMONWEALTH OF VIRGINIA
CHRISTOPHER P. BURNS
Lic. No. 47338
3/20/23
PROFESSIONAL ENGINEER

EAST ROANOKE RIVER GREENWAY CONNECTOR

ESC NOTES

VINTON DISTRICT
ROANOKE COUNTY, VIRGINIA

DRAWN BY CPB
DESIGNED BY CPB
CHECKED BY BTC
DATE 10/4/2019
SCALE AS NOTED

REVISIONS:
3/19/2020
6/10/2020
7/27/2021
12/21/2022
3/20/2023

SHEET NO.
C7

JOB NO. 04170071.00

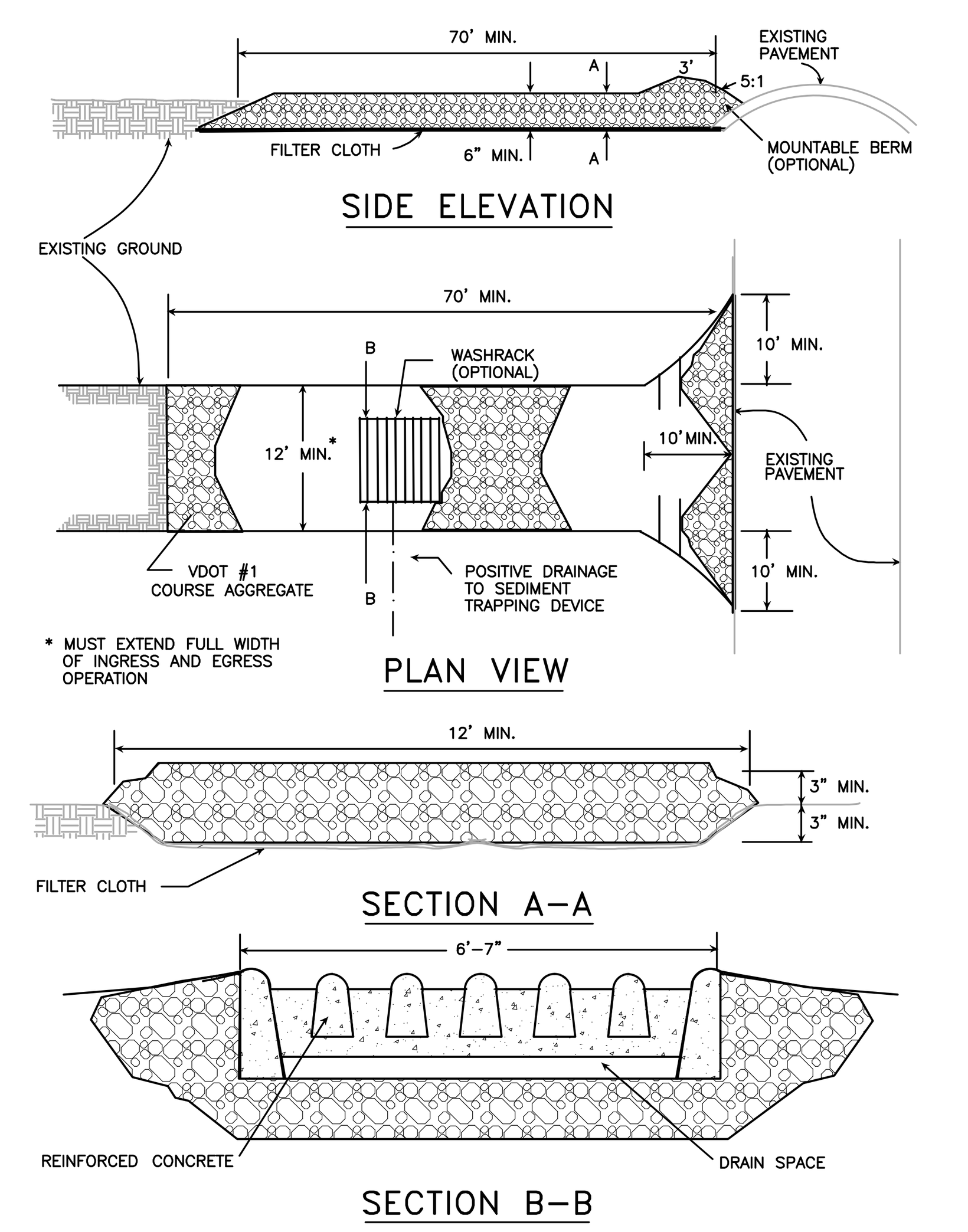
TABLE 3.35-A **ORGANIC MULCH MATERIALS AND APPLICATION RATES**			
MULCHES:	RATES:		NOTES:
	Per Acre	Per 1000 sq. ft.	
Straw or Hay	- 2 tons (Minimum 2 tons for winter cover)	70 - 90 lbs.	Free from weeds and coarse matter. Must be anchored. Spread with mulch blower or by hand.
Fiber Mulch	Minimum 1500 lbs.	35 lbs.	Do not use as mulch for winter cover or during hot, dry periods. * Apply as slurry.
Corn Stalks	4 - 6 tons	185 - 275 lbs.	Cut or shredded in 4-6" lengths. Air-dried. Do not use in fine turf areas. Apply with mulch blower or by hand.
Wood Chips	4 - 6 tons	185 - 275 lbs.	Free of coarse matter. Airdried. Treat with 12 lbs nitrogen per ton. Do not use in fine turf areas. Apply with mulch blower, chip handler, or by hand.
Bark Chips or Shredded Bark	50 - 70 cu. yds.	1-2 cu. Yds.	Free of coarse matter. Airdried. Do not use in fine turf areas. Apply with mulch blower, chip handler, or by hand.
* When fiber mulch is the only available mulch during periods when straw should be used, apply at a minimum rate of 2000 lbs./ac. or 45 lbs./ 1000 sq. ft.			

MU

*NOTE: MULCHING SHALL BE APPLIED IN ACCORDANCE WITH THE REQUIREMENTS IN TABLE 3.35–A. MULCH SHALL BE APPLIED IN 2"–3" THICK LAYER. IF POSSIBLE, THE G.C. SHALL CHIP AND UTILIZE EXISTING TREES THAT ARE BEING CLEARED FOR THE PROJECT.

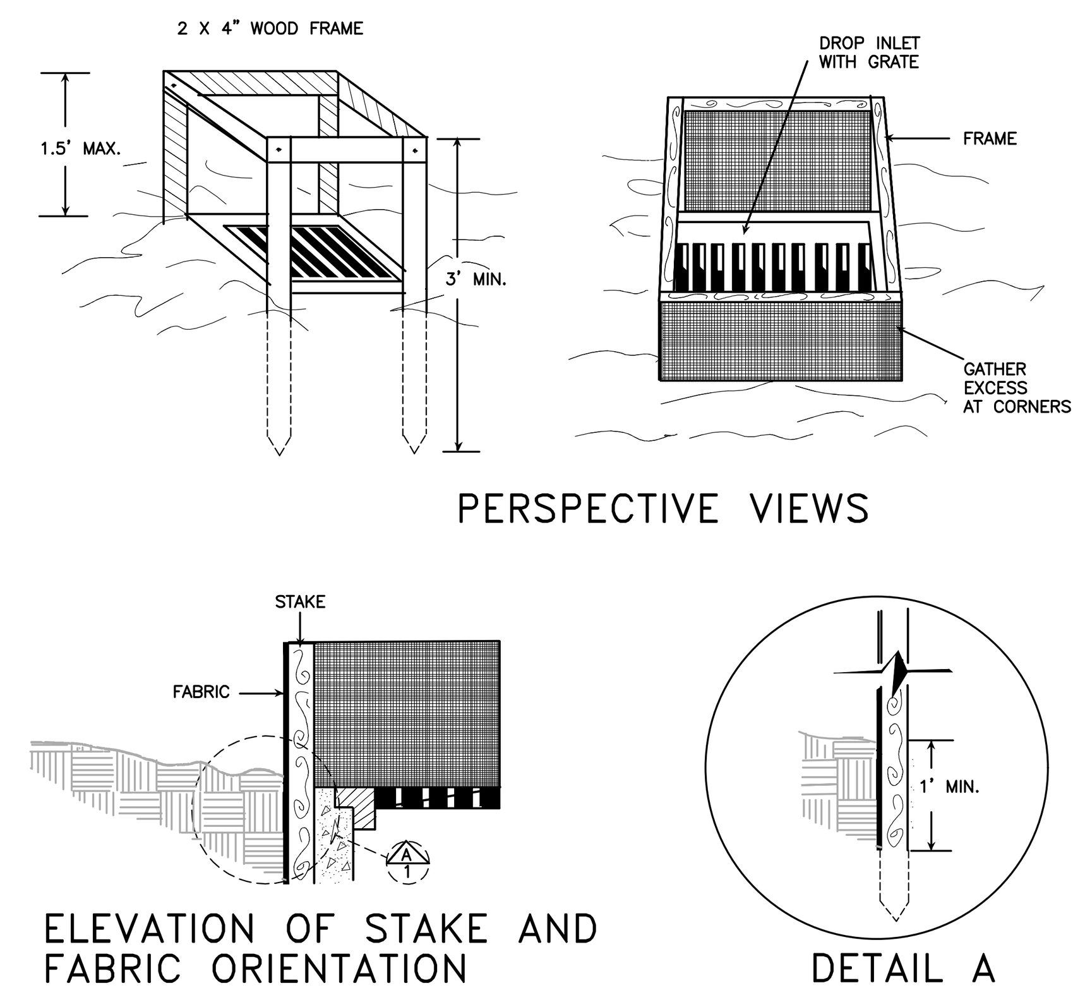
Source: Va. DSCW — Table 3.35–A

STONE CONSTRUCTION ENTRANCE



SOURCE: ADAPTED from 1983 Maryland Standards for Soil erosion and Sediment Control, and Va. DSWC — Plate 3.02-1

SILT FENCE DROP INLET PROTECTION

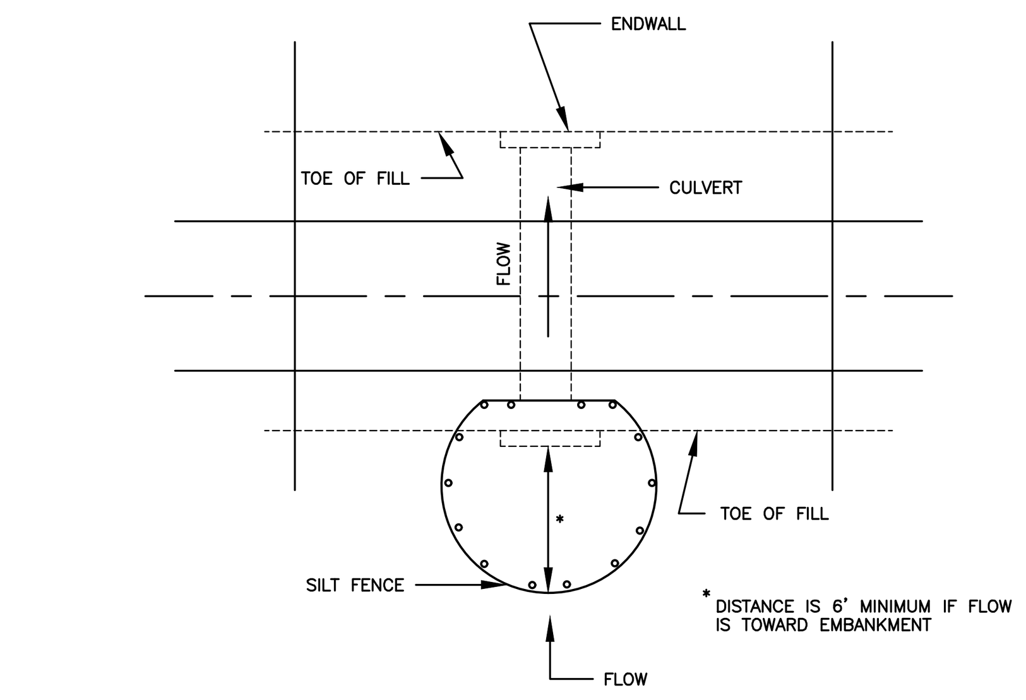


SPECIFIC APPLICATION

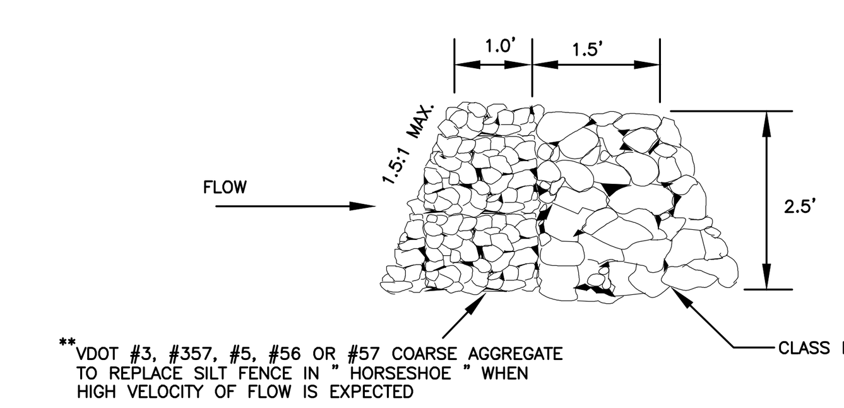
THIS METHOD OF INLET PROTECTION IS APPLICABLE WHERE THE INLET DRAINS A RELATIVELY FLAT AREA (SLOPE NO GREATER THAN 5%) WHERE THE INLET SHEET OR OVERLAND FLOWS (NOT EXCEEDING 1 C.F.S.) ARE TYPICAL. THE METHOD SHALL NOT APPLY TO INLETS RECEIVING CONCENTRATED FLOWS, SUCH AS IN STREET OR HIGHWAY MEDIANS.

SOURCE: N.C. Erosion and Sediment Control Planning and Design Manual, 1988 — PLATE 3.07–1

SILT FENCE CULVERT INLET PROTECTION

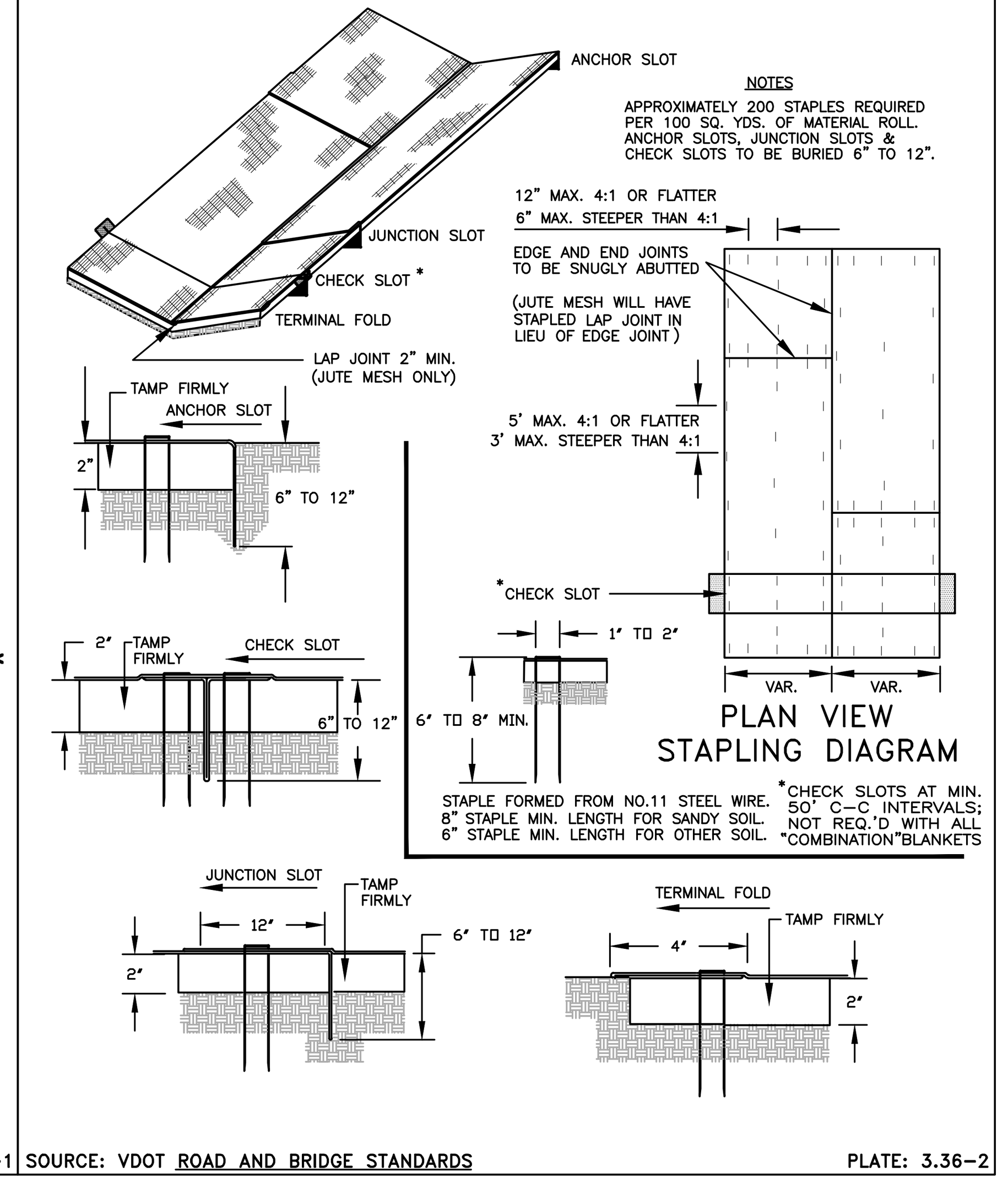


OPTIONAL STONE COMBINATION **



SOURCE: ADAPTED from VDOT Standard Sheets and Va. DSWC — PLATE. 3.08–1

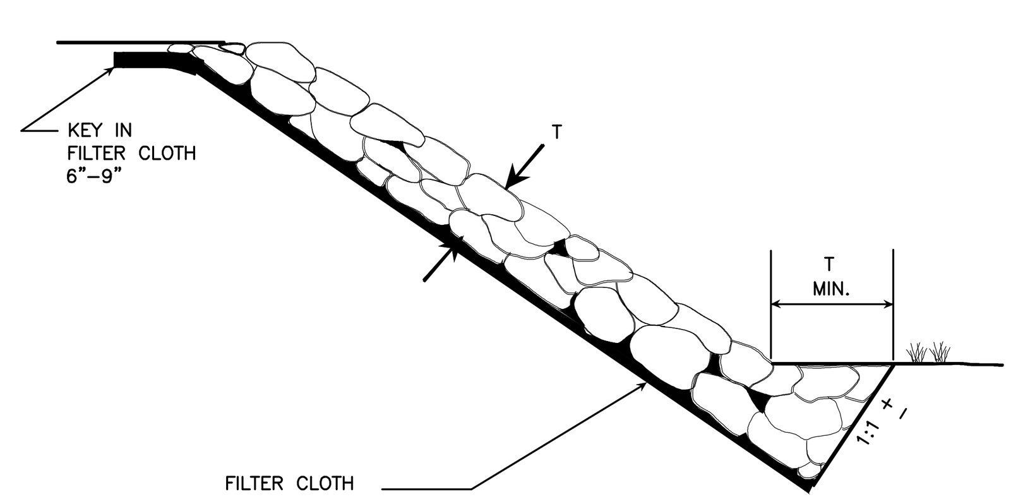
TYPICAL TREATMENT – 1 (SOIL STABILIZATION BLANKET) INSTALLATION CRITERIA



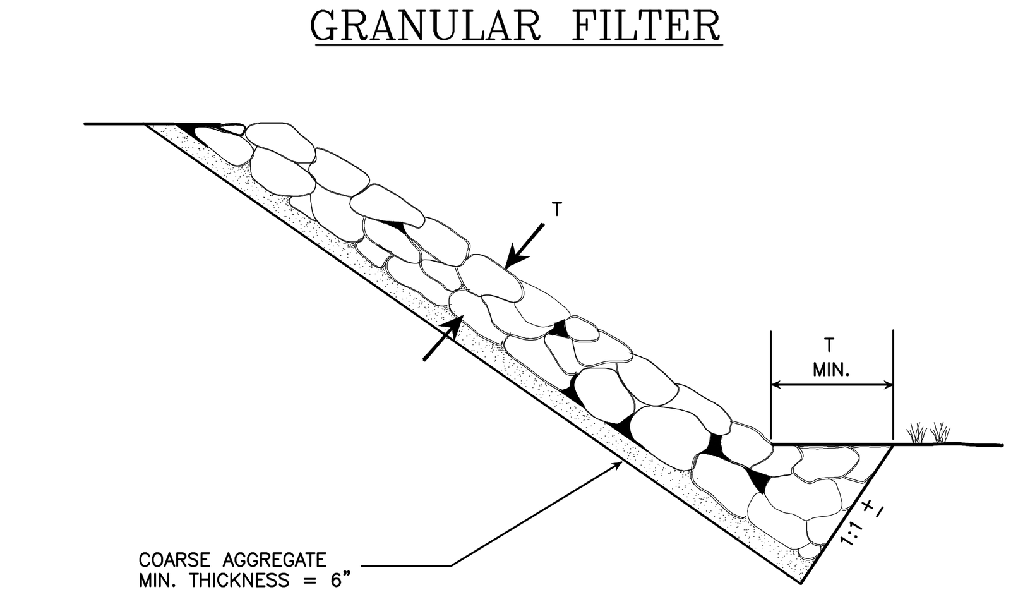
SOURCE: VDOT ROAD AND BRIDGE STANDARDS — PLATE: 3.36–2

TOE REQUIREMENTS FOR BANK STABILIZATION

FILTER CLOTH UNDERLINER (PREFERRED)

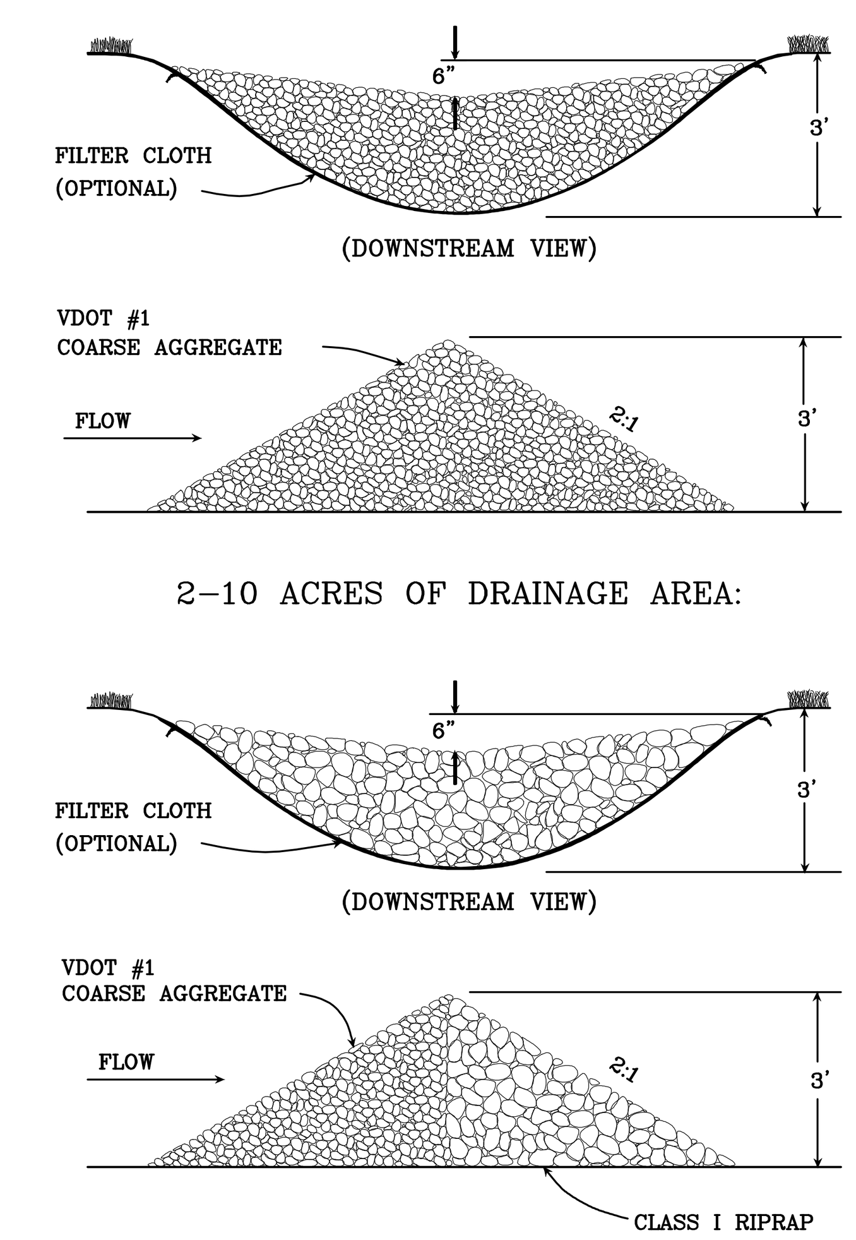


GRANULAR FILTER



SOURCE: Adapted from VDOT Drainage Manual — PLATE. 3.19–1

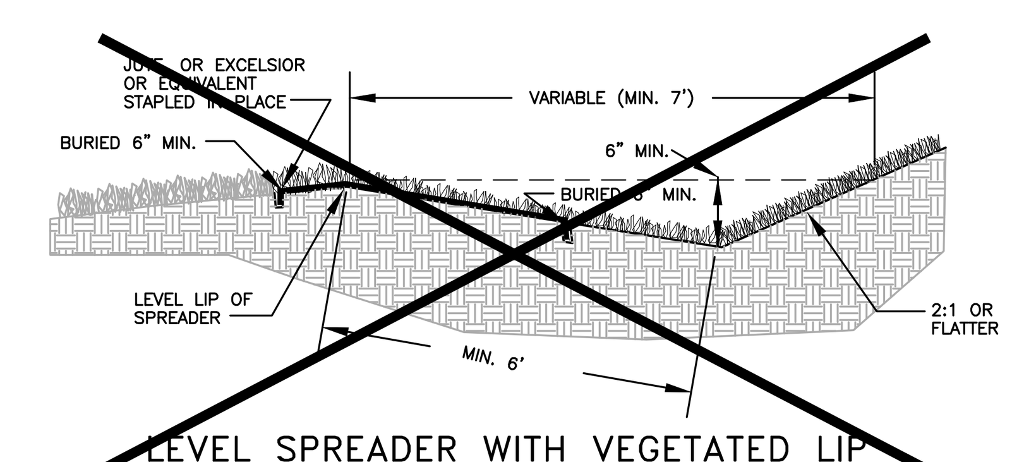
ROCK CHECK DAM



SOURCE: VA. DSWC — PLATE. 3.20–1

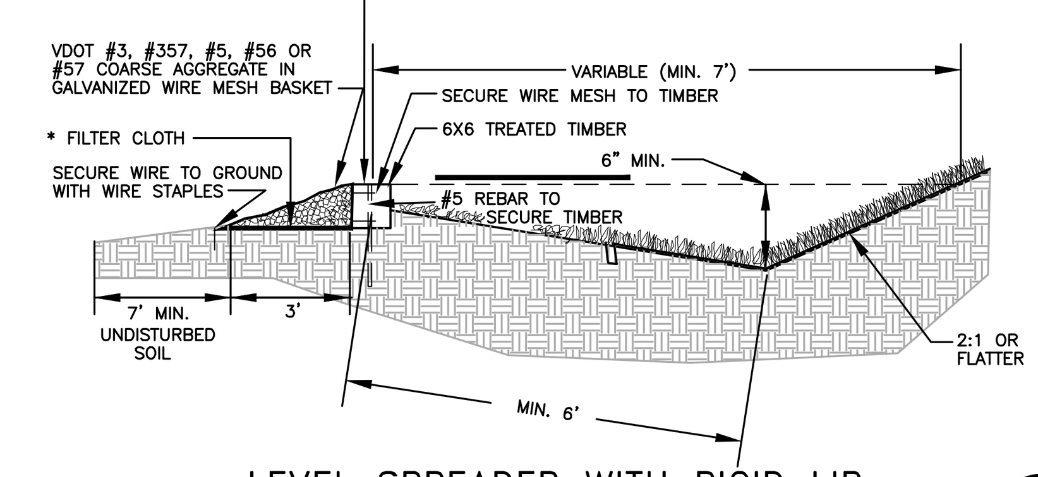
LEVEL SPREADER

CROSS SECTION



LEVEL SPREADER SHALL HAVE A RIGID, CONCRETE LIP IN ACCORDANCE WITH ROANOKE COUNTY REQUIREMENTS SEE ADDITIONAL DETAILS THIS SHEET

CROSS SECTION



LEVEL SPREADER WITH RIGID LIP

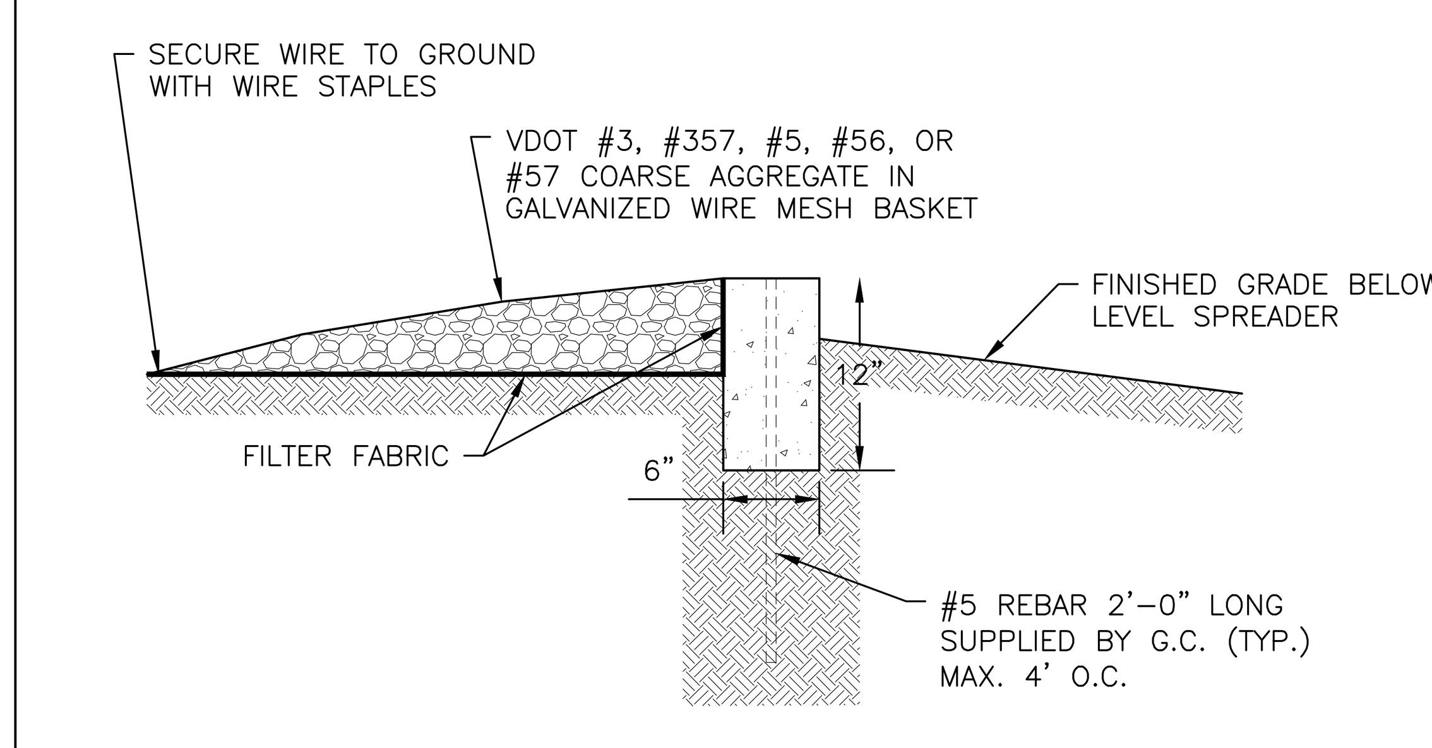
* MIN. PHYSICAL REQUIREMENTS OF FILTER CLOTH NOTED IN STD. & SPEC. 3.19, RIPRAP

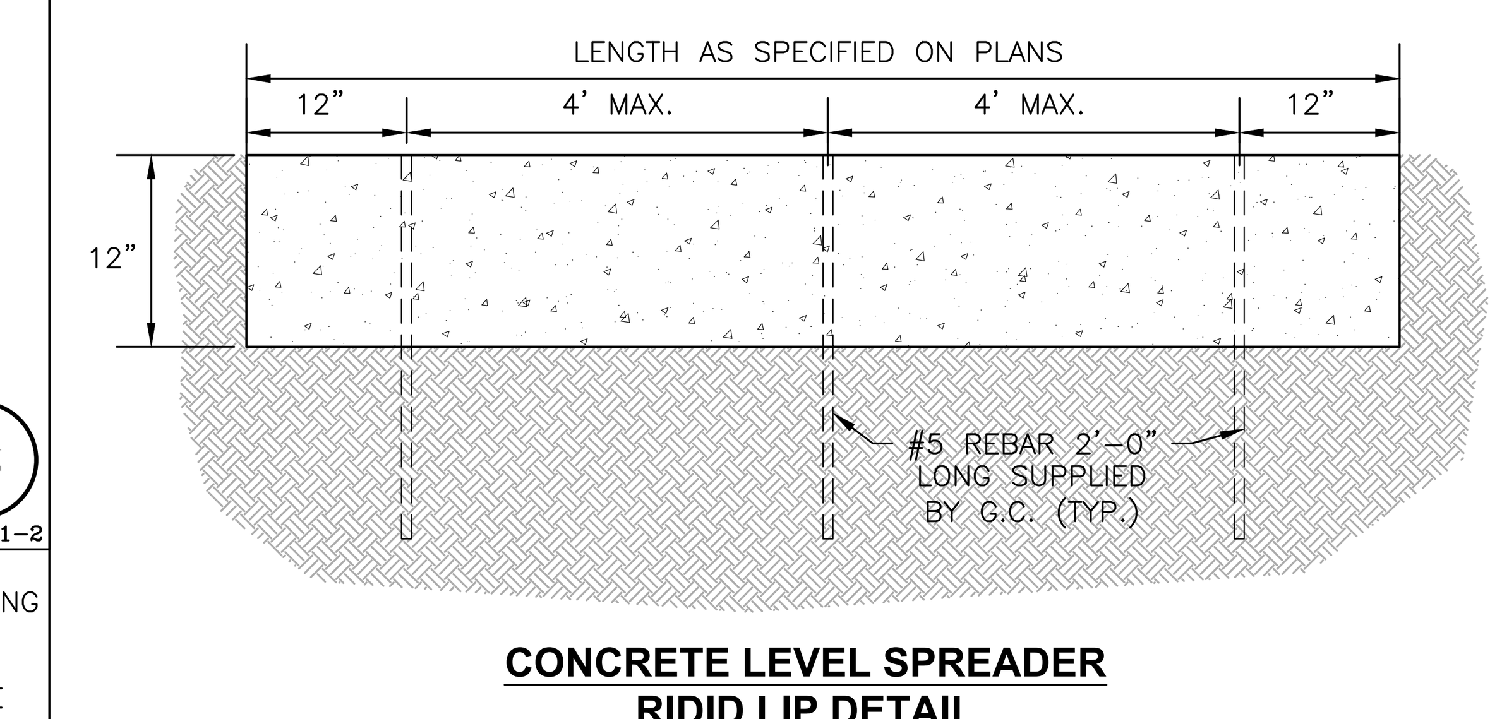
LS

SOURCE: VA. DSWC AND N.C. Erosion and Sediment Control Planning and Design Manual — PLATE: 3.21–2

*NOTE: G.C. SHALL ENSURE THAT CONCRETE LIP IS SET FLAT UTILIZING A LASER. AS–BUILT ELEVATIONS TO BE PROVIDED IN RECORD DRAWINGS WITH ELEVATIONS PROVIDED TO THE NEAREST 0.01 FOOT AND AT MAXIMUM 10 FOOT INCREMENTS ALONG THE LENGTH OF THE LEVEL SPREADER (MINIMUM THREE SPOT ELEVATIONS TO BE PROVIDED).

NOTES:
1. CONCRETE IS TO BE CLASS A3 CAST IN PLACE.





CONCRETE LEVEL SPREADER
RIDID LIP DETAIL
N.T.S.

TABLE 3.32-C
(Revised June 2003)
PERMANENT SEEDING SPECIFICATIONS FOR APPALACHIAN/MOUNTAIN AREA

SEED[1]		
LAND USE	SPECIES	APPLICATION RATES
Minimum Care Lawn (Commercial or Residential)	Tall Fescue[1] Perennial Ryegrass[2] Kentucky Bluegrass[1]	90-100% 0-10% 0-10% TOTAL: 200-250 lbs.
High-Maintenance Lawn	Minimum of three (3) up to five (5) varieties of Kentucky Bluegrass from approved list for use in Virginia[1]	TOTAL: 125 lbs.
ALL AREAS WITH SLOPES LESS THAN 3:1 ~~General Slope (3:1 or less)~~	Tall Fescue[1] Red Top Grass or Creeping Red Fescue Seasonal Nurse Crop[3]	128 lbs. 2 lbs. 20 lbs. TOTAL: 150 lbs.
Low-Maintenance Slope (Steeper than 3:1)	~~Tall Fescue[1]~~ HARD FESCUE Red Top Grass or Creeping Red Fescue Seasonal Nurse Crop[3] ~~Crownvetch[4]~~	108 lbs. 2 lbs. 20 lbs. ~~20 lbs.~~ TOTAL: 130 LBS. ~~TOTAL: 150 lbs.~~

1 - When selecting varieties of turfgrass, use the Virginia Crop Improvement Association (VCIA) recommended turfgrass variety list. Quality seed will bear a label indicating that they are approved by VCIA. A current turfgrass variety list is available at the local County Extension office or through VCIA at 804-746-4884 or at http://sudan.cses.vt.edu/html/Turf/turf/publications/publications2.html
2 - Perennial Ryegrass will germinate faster and at lower soil temperatures than Tall Fescues, thereby providing cover and erosion resistance for seedbed.
3 - Use seasonal nurse crop in accordance with seeding dates as stated below:
March, April - May 15th ……………………. Annual Rye
May 16th - August 15th ……………………. Foxtail Millet
August 16th - September, October ………. Annual Rye
November - February ……………………… Winter Rye
4 - All legume seed must be properly inoculated. If Flatpea is used, increase to 30 lbs/acre. If Weeping Lovegrass is used, include in any slope or low maintenance mixture during warmer seeding periods, increase to 30 -40 lbs/acre.

FERTILIZER & LIME

- Apply 10-20-10 **fertilizer** at a rate of **500** lbs. / acre (or 12 lbs. / 1,000 sq. ft.)
- Apply **Pulverized Agricultural Limestone** at a rate of 2 tons/acre (or 90 lbs. / 1,000 sq. ft.)

NOTE:
- A soil test is necessary to determine the actual amount of lime required to adjust the soil pH of site.
- Incorporate the lime and fertilizer into the top 4 – 6 inches of the soil by disking or by other means.
- When applying Slowly Available Nitrogen, use rates available in Erosion & Sediment Control Technical Bulletin # 4, 2003 Nutrient Management for Development Sites at http://www.dcr.state.va.us/sw/e&s.htm#pubs

PS

*NOTE: G.C. SHALL UTILIZE A SHADE MIX FOR PERMANENT SEEDING BLEND UTILIZED ON ALL NORTH–FACING SLOPES AND ANY OTHER APPLICABLE AREAS AS NECESSARY TO ACHIEVE PERMANENT STABILIZATION OF THESE AREAS. G.C. SHALL BE RESPONSIBLE FOR ENSURING PERMANENT STABILIZATION IS ACHIEVED FOR ALL DISTURBED AREAS.

Erosion & Sediment Control Technical Bulletin No. 4
Nutrient Management for Development Sites

C. When applying maintenance fertilizer on established sod,

Pounds of nitrogen per 1,000 sq. ft. if the fertilizer is less than 50 percent WIN				
Month	Type of Grass			
	Tall Fescue Perennial Rye	Kentucky Bluegrass	Bermudagrass	Zoysiagrass
September	1	1	0	0
October	1	1	0	0
Early November	0	0	0	0
April	0	0	0	0
May	0-0.5	0-0.05	1	1
June	0	0	1	0
July/August	0	0	0	1
Yearly Lbs. N/1000 sf	2.5	2.5	2	2

Pounds of nitrogen per 1,000 sq. ft. if the fertilizer is more than 50 percent WIN				
Month	Type of Grass			
	Tall Fescue Perennial Rye	Kentucky Bluegrass	Bermudagrass	Zoysiagrass
August 15	1.5	1.5	0	0
October 1	1.5	1.5	0	0
April	0	0	1.5	1.5
May 15	0	0	0	0
June	0	0	1.5	1.5
Yearly Lbs. N/1000 sf	3	3	3	3

TABLE 3.31-B
(Revised June 2003)
TEMPORARY SEEDING SPECIFICATIONS
QUICK REFERENCE FOR ALL REGIONS

SEED		
APPLICATION DATES	SPECIES	APPLICATION RATES
Sept. 1 - Feb. 15	50/50 Mix of Annual Ryegrass (lolium multi-florum) & Cereal (Winter) Rye (Secale cereale)	50 -100 (lbs/acre)
Feb. 16 - Apr. 30	Annual Ryegrass (lolium multi-florum)	60 - 100 (lbs/acre)
May 1 - Aug. 31	German Millet	50 (lbs/acre)

FERTILIZER & LIME

- Apply 10-10-10 **fertilizer** at a rate of 450 lbs. / acre (or 10 lbs. / 1,000 sq. ft.)
- Apply **Pulverized Agricultural Limestone** at a rate of 2 tons/acre (or 90 lbs. / 1,000 sq. ft.)

NOTE:
1 - A soil test is necessary to determine the actual amount of lime required to adjust the soil pH of site.
2 - Incorporate the lime and fertilizer into the top 4 – 6 inches of the soil by disking or by other means.
3 - When applying Slowly Available Nitrogen, use rates available in Erosion & Sediment Control Technical Bulletin # 4, 2003 Nutrient Management for Development Sites at http://www.dcr.state.va.us/sw/e&s.htm#pubs

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EAST ROANOKE RIVER GREENWAY CONNECTOR

ESC DETAILS

VINTON DISTRICT
ROANOKE COUNTY, VIRGINIA

DRAWN BY CPB
DESIGNED BY CPB
CHECKED BY BTC
DATE 10/4/2019
SCALE AS NOTED

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3/19/2020
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SHEET NO.
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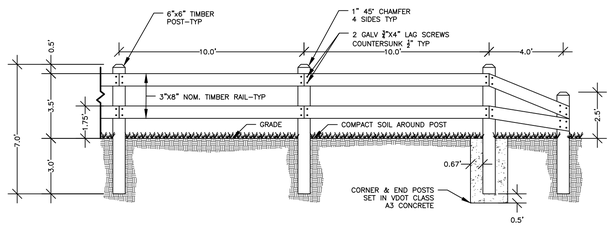
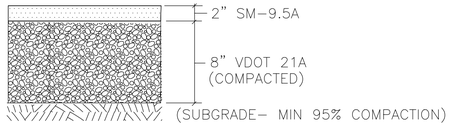


NOTES:
1. TIMBER POSTS SHALL BE 6"X6"X7' #1 SYP (SOUTHERN YELLOW PINE), S4S (SURFACE FOUR SIDES), GM (GRADE MARKED), CCA PRESERVATIVE TO 0.40LB./CU. FT., PET (PRECISION END TRIM), 2" CH4TE (2" CHAMFER AROUND TOP FOUR EDGES, LEAVING APPROX. 4" SQUARE ON POST)
2. TIMBER RAILS SHALL BE #1 SYP (SOUTHERN YELLOW PINE) S4S (SURFACE FOUR SIDES), GM (GRADE MARKED), CCA PRESERVATIVE TO 0.40LB./CU. FT., DET (DOUBLE END TRIM), DOH (DEPARTMENT OF HIGHWAYS). RAILS SHALL BE ATTACHED TO POST WITH TYPE 316 STAINLESS STEEL (18 GAUGE) CONCEALED FLANGE JOIST HANGERS WITH STAINLESS STEEL SCREWS.
3. ALL CUT ENDS SHALL BE FIELD TREATED IN ACCORDANCE WITH AWPA STANDARDS.

TIMBER FENCING SPECS:
1. TIMBER FENCING SHALL BE AS SHOWN ON DRAWINGS
2. POSTS SHALL BE NO MORE THAN 10 FEET APART. POSTS SHALL BE EQUALLY SPACED THROUGHOUT A RUN OF FENCING EXCEPT THAT FOR POSTS INSTALLED AT ALL TRANSITIONS AND TERMINATIONS.
3. POSTS AND RAILS SHALL BE SOUTHERN YELLOW PINE, NO. 1, AND SHALL BE PRESSURE TREATED IN ACCORDANCE WITH AWPA U1 AND AWPA T1 AS APPROPRIATE TO RETAIN AT LEAST 0.4 POUND PER FT^3 PENETRATION. ALL CUT OR EXPOSED ENDS (NOT IN CONCRETE) SHALL BE FIELD TREATED IN ACCORDANCE WITH AWPA GUIDELINES AND THEN SEALED WITH A NON–STAINING WOOD SEALER.
4. BOLTS SHALL BE THE TYPE AND SIZE AS SHOWN ON THE PLANS AND SHALL BE GALVANIZED IN ACCORDANCE WITH ASTM A153 UNLESS NOTED OTHERWISE.
5. CONCRETE USED TO ANCHOR FENCE POSTS SHALL MEET THE REQUIREMENTS OF VDOT TYPE A3.

TYPICAL TIMBER FENCE
N.T.S.



STANDARD ASPHALT PAVEMENT SECTION
NO SCALE

1. STONE BASE MUST BE PLACED IN LIFTS OF NO MORE THAN 4" EACH.
2. G.C. TO ENSURE A MINIMUM OF 95% COMPACTION OF THE SUBGRADE PRIOR TO STONE/ASPHALT PLACEMENT.

SIGN DETAILS

18"X18"

30"X30"

24"X18"

Type 3 Object Markers
(obstructions adjacent to or within the roadway)

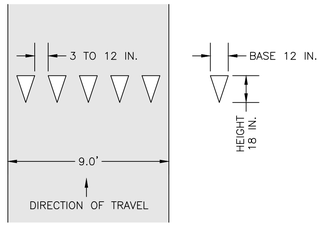
30"X30"

*NOTE: LANGUAGE FOR SIGN W5–3 SHALL BE MODIFIED TO READ "ONE LANE ROAD AHEAD."

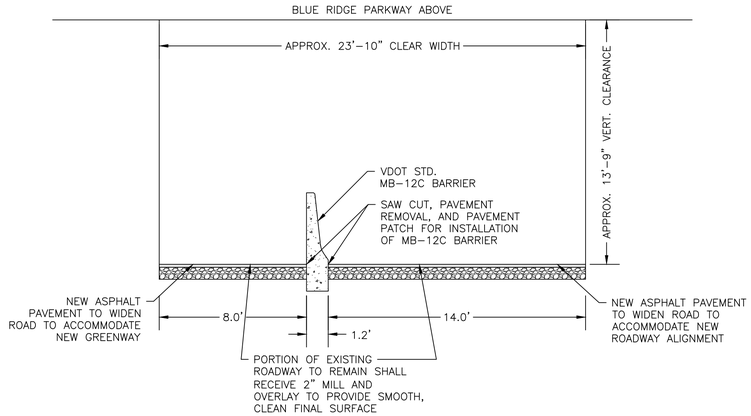
30"X30"

18"X18"

SIGN NOTES
1. ALL SIGNS TO BE INSTALLED IN ACCORDANCE WITH VDOT AND MUTCD STANDARDS.
2. SIGNS LOCATED ON OUTSIDE OF SHARED USE PATH SHALL ENSURE MINIMUM 2' LATERAL CLEARANCE TO EDGE OF SIGN. MOUNTING HEIGHT SHALL BE 5' TO BOTTOM EDGE OF SIGN.
3. SIGNS LOCATED BETWEEN ROADWAY AND SHARED USE PATH SHALL BE CENTERED IN THE BUFFER STRIP. MOUNTING HEIGHT SHALL BE 7' TO BOTTOM EDGE OF SIGN.



YIELD BAR DETAIL
N.T.S.



PROPOSED TUNNEL SECTION
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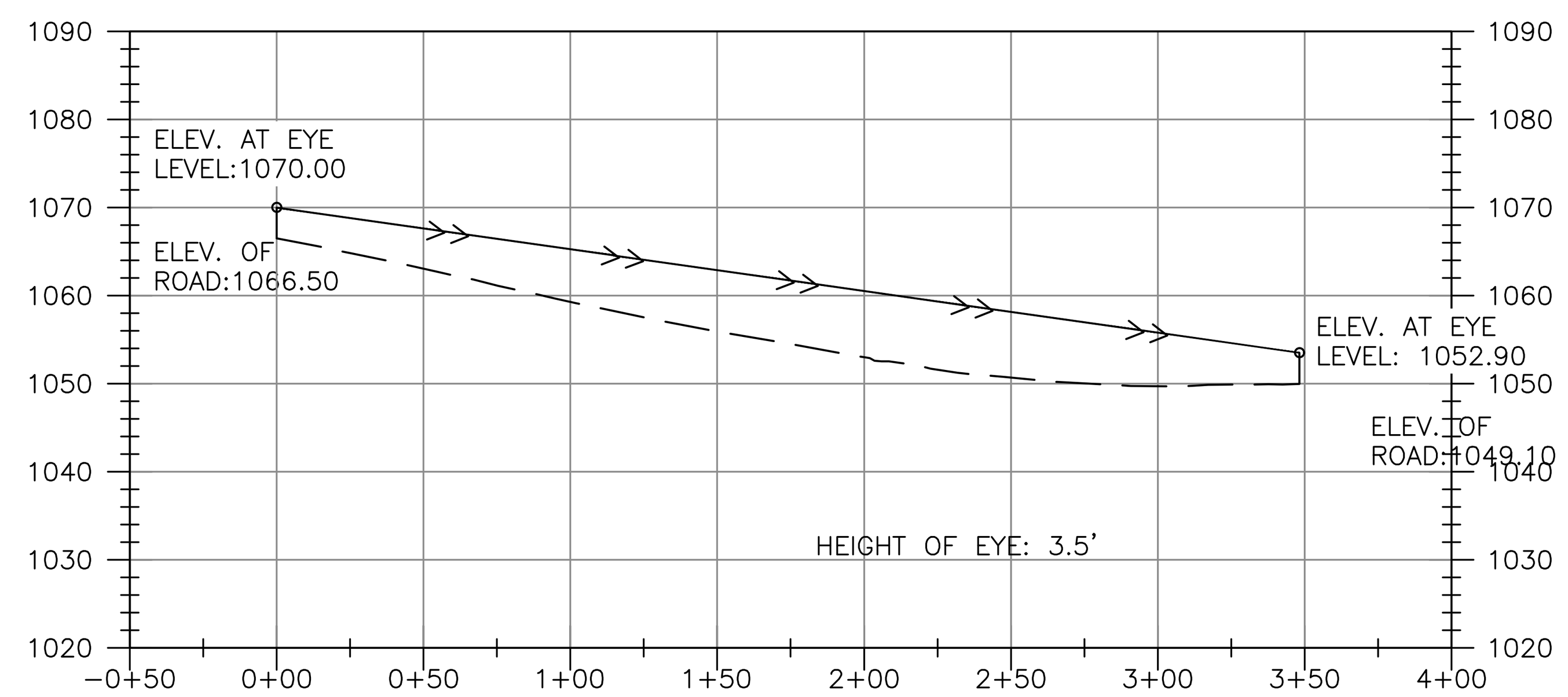
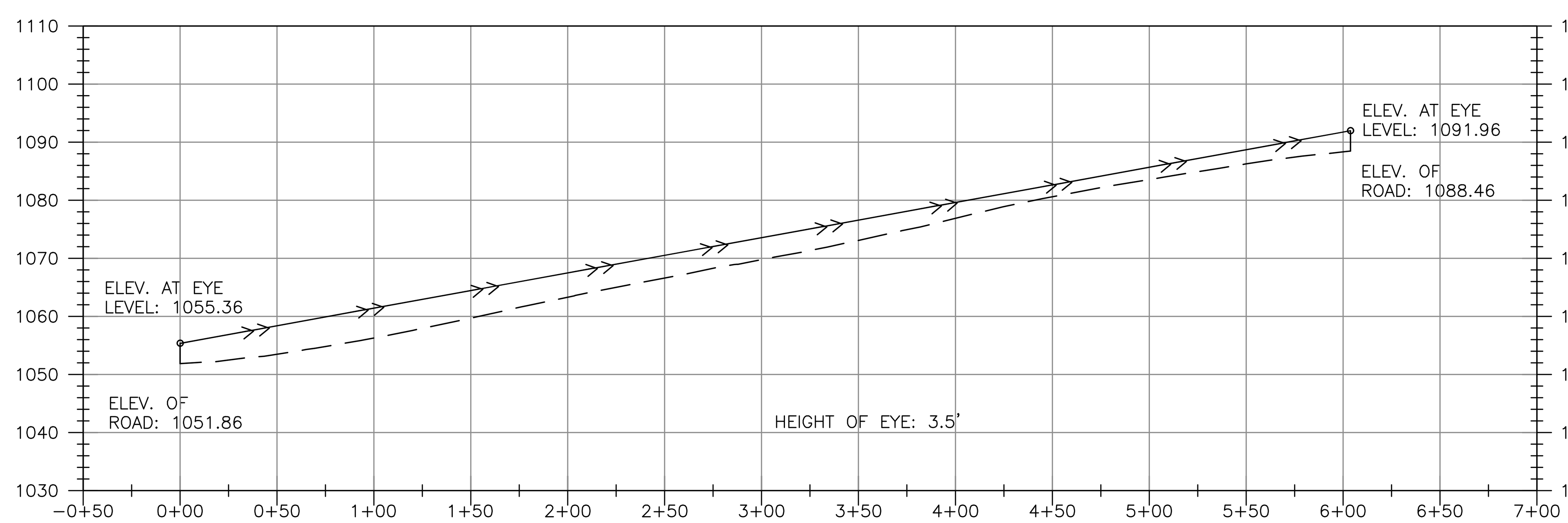
SHEET NO.
C9
JOB NO. 04170071.00

SIGHT DISTANCE NORTHBOUND PROFILE

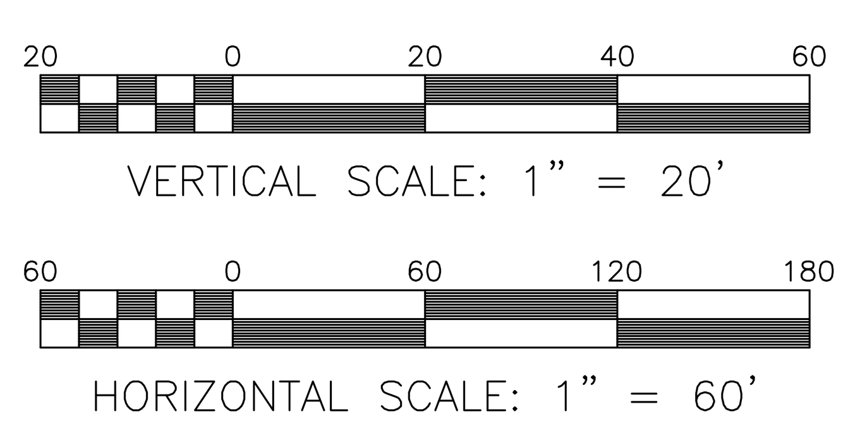


1066.50	1066.50	1064.84	1063.05	1063.05	1061.16	1059.28	1059.28	1057.53	1055.92	1055.92	1054.51	1053.00	1053.00	1051.58	1050.68	1050.68	1050.04	1049.71	1049.71	1049.89

SIGHT DISTANCE SOUTHBOUND PROFILE



1051.86	1051.86	1052.48	1053.48	1053.48	1054.80	1056.27	1056.27	1057.93	1059.69	1059.69	1061.55	1063.30	1063.30	1065.01	1066.60	1066.60	1068.28	1069.77	1069.77	1071.35	1073.09	1073.09	1074.93	1076.87	1076.87	1078.89	1080.59	1080.59	1082.16	1083.55	1083.55	1084.92	1086.26	1086.26	1087.43	1088.32	1088.32



CONSTRUCTION SITE PLAN GENERAL NOTES
CONSTRUCTION METHODS

1. ALL CONSTRUCTION AND MATERIALS SHALL BE IN ACCORDANCE WITH THE CURRENT VIRGINIA DEPARTMENT OF TRANSPORTATION ROAD AND BRIDGE SPECIFICATIONS, VIRGINIA DEPARTMENT OF TRANSPORTATION ROAD AND BRIDGE STANDARDS, AND LOCAL JURISDICTIONAL STANDARDS AND SPECIFICATIONS, WHERE APPLICABLE.
2. THE LOCATION OF EXISTING UTILITIES AS SHOWN IS APPROXIMATE. THE CONTRACTOR SHALL VERIFY THE LOCATION OF EXISTING UTILITIES PRIOR TO ANY CONSTRUCTION WORK AND NOTIFY ENGINEER IMMEDIATELY IF LOCATIONS DIFFER FROM PLANS.
3. THE CONTRACTOR SHALL NOTIFY 'MISS UTILITY' AT 1-800-552-7001 OR 811 PRIOR TO ANY CONSTRUCTION WORK IN THIS AREA.

HANDICAPPED ACCESSIBILITY / ADA COMPLIANCE

1. MAX CROSS SLOPE SHALL NOT EXCEED 2%.
2. LONGITUDINAL SLOPE SHALL MATCH THE EXISTING ROADWAY AS SHOWN.
3. ANY SLOPE DISCREPANCIES DETECTED BY THE SURVEYOR AND/OR CONTRACTOR SHALL BE REPORTED TO THE ENGINEER PRIOR TO INSTALLATION.
4. NO VERTICAL TRANSITIONS IN ADA ACCESSIBLE ROUTES SHALL EXCEED 1/4".

UNDERGROUND UTILITIES

1. THE CONTRACTOR IS RESPONSIBLE FOR VERIFYING LINE AND GRADE FOR ALL DRY UTILITIES PRIOR TO THE START OF CONSTRUCTION.
2. THE CONTRACTOR IS RESPONSIBLE FOR REVIEWING DRY UTILITY LINES AND GRADES AGAINST ALL PROPOSED UTILITIES SHOWN ON THE PLANS. POTENTIAL CONFLICTS SHALL BE REPORTED TO THE ENGINEER AS SOON AS POSSIBLE.
3. THE CONTRACTOR SHALL REVIEW SITE DRAWINGS TO VERIFY COORDINATION OF UTILITY INVERTS WITH SITE CONDITIONS. ANY DISCREPANCIES SHALL BE REPORTED TO THE ENGINEER PRIOR TO INSTALLATION.

ENGINEERS NOTES

BALZER AND ASSOCIATES, INC. ASSUMES NO RESPONSIBILITY FOR ADEQUACY OF PLANS OR FOR INFORMATION ON PLANS UNTIL SUCH PLANS HAVE BEEN APPROVED BY THE REQUIRED PUBLIC AGENCIES.

ANY WORK COMMENCED ON A PROJECT PRIOR TO PLAN APPROVAL IS AT SOLE RISK OF THE DEVELOPER.

BALZER AND ASSOCIATES, INC. WILL NOT BE RESPONSIBLE FOR THE CONTRACTOR'S FAILURE TO CARRY OUT THE WORK IN ACCORDANCE WITH THE PLANS AND WILL NOT BE RESPONSIBLE FOR ACTS OR OMISSIONS OF THE CONTRACTOR, SUBCONTRACTORS, OR THEIR AGENTS OR EMPLOYEES, OR OF ANY OTHER PERSONS PERFORMING PORTIONS OF THE WORK.

SUBDIVISION & SITE CONSTRUCTION PLAN GENERAL NOTES

ALL MATERIALS AND CONSTRUCTION WITHIN THE PUBLIC RIGHT–OF–WAY SHALL BE IN ACCORDANCE WITH CURRENT VIRGINIA DEPARTMENT OF TRANSPORTATION'S STANDARDS AND SPECIFICATIONS.

LAND USE PERMITS (CE–7P) MUST BE OBTAINED FROM THE VIRGINIA DEPARTMENT OF TRANSPORTATION PRIOR TO BEGINNING ANY CONSTRUCTION WITHIN THE EXISTING STATE MAINTAINED RIGHT–OF–WAY (INCLUDING ACCESS).
VDOT IS TO RECEIVE WRITTEN NOTIFICATION 48 HOURS PRIOR TO COMMENCING WITH INITIAL CONSTRUCTION ACTIVITIES WITHIN SAID RIGHT–OF–WAYS.

THE CONTRACTOR SHALL VERIFY THE ELEVATIONS OF ALL POINTS OF CONNECTION OR PROPOSED WORK TO EXISTING CURBS, SANITARY LINES, WATER LINES, ETC., PRIOR TO CONSTRUCTION.

UPON THE DISCOVERY OF SOILS THAT ARE UNSUITABLE FOR FOUNDATIONS, SUBGRADES, OR OTHER ROADWAY CONSTRUCTION PURPOSES, THE CONTRACTOR SHALL IMMEDIATELY CONTACT A GEOTECHNICAL ENGINEER AND VDOT. THESE AREAS SHALL BE EXCAVATED BELOW PLAN GRADE AS DIRECTED BY THE GEOTECHNICAL ENGINEER, BACKFILLED WITH SUITABLE MATERIAL AND COMPACTED IN ACCORDANCE WITH CURRENT VDOT SPECIFICATIONS.

ALL STORM SEWER DESIGN AND CONSTRUCTION TO BE IN ACCORDANCE WITH VDOT STANDARDS AND SPECIFICATIONS.

IF PRE–CAST DRAINAGE UNITS ARE TO BE USED, VDOT SHALL BE NOTIFIED AND THE MANUFACTURER SHALL SUBMIT DRAWING DETAILS FOR REVIEW. CERTIFICATION AND VDOT STAMP WILL BE REQUIRED ON ALL UNITS.

ALL CONCRETE SHALL BE CLASS A3–AE (AIR ENTRAINED 3,000 PSI).

CONTRACTOR SHALL VERIFY LOCATION AND ELEVATION OF ALL UNDERGROUND UTILITIES SHOWN ON PLANS IN AREAS OF CONSTRUCTION PRIOR TO STARTING WORK. CONTACT ENGINEER IMMEDIATELY IF LOCATION OR ELEVATION IS DIFFERENT FROM THAT SHOWN ON PLAN. IF THERE APPEARS TO BE A CONFLICT, AND/OR UPON DISCOVERY OF ANY UTILITY SHOWN ON THIS PLAN, CALL MISS UTILITY OF CENTRAL VIRGINIA AT 1–800–552–7001. THE DEVELOPER SHALL BE RESPONSIBLE FOR THE RELOCATION OF ANY UTILITY WITHIN EXISTING AND/OR PROPOSED RIGHT–OF–WAY REQUIRED BY THE DEVELOPMENT.

A PRIME COAT SEAL BETWEEN THE AGGREGATE BASE AND BITUMINOUS CONCRETE WILL BE REQUIRED AT A RATE OF 0.30 GALLONS PER SQUARE YARD (REC–250 PRIME COAT) PER VDOT STANDARDS AND SPECIFICATIONS.

THE SCHEDULING OF AGGREGATE BASE INSTALLATION AND SUBSEQUENT PAVING ACTIVITIES SHALL ACCOMMODATE FORECAST WEATHER CONDITIONS PER SECTION 315 OF THE ROAD AND BRIDGE SPECIFICATIONS.

ALL VEGETATION AND ORGANIC MATERIAL IS TO BE REMOVED FROM THE RIGHT–OF–WAY LIMITS PRIOR TO CONDITIONING OF THE SUBGRADE.

CERTIFICATION AND SOURCE OF MATERIALS ARE TO BE SUBMITTED TO VDOT FOR ALL MATERIALS AND BE IN ACCORDANCE WITH THE ROAD AND BRIDGE SPECIFICATIONS AND ROAD AND BRIDGE STANDARDS.

THE NECESSITY AND LOCATIONS FOR ADDITIONAL VDOT STANDARD UNDERDRAINS TO BE DETERMINED AT TIME OF SUBGRADE INSPECTION.

VDOT SHALL BE PROVIDED DOCUMENTATION THAT ALL IN–PLACE PAVEMENTS MEET OR EXCEED THE APPROVED PAVEMENT DESIGN THICKNESS PRIOR TO STATE ACCEPTANCE.

GENERAL NOTES

PROVIDE NEW MATERIALS AND WORKMANSHIP IN CONFORMANCE WITH ALL APPLICABLE CODES, STATE AND FEDERAL LAWS, LOCAL ORDINANCES, INDUSTRY STANDARDS, AND OTHER CRITERIA WHICH WOULD NORMALLY APPLY TO WORK OF THIS NATURE. NOTIFY THE ENGINEER IMMEDIATELY UPON DISCOVERING A CONFLICT IN CODES, ORDINANCES, STANDARDS, OR OTHER CRITERIA. APPLICABLE CODES AND STANDARDS INCLUDE, BUT ARE NOT NECESSARILY LIMITED TO, THE FOLLOWING:

a. BOCA – BASIC CODES
b. ROANOKE COUNTY
c. VDOT – VIRGINIA DEPARTMENT OF TRANSPORTATION, ROAD AND BRIDGE STANDARDS AND SPECIFICATIONS
d. VIRGINIA EROSION AND SEDIMENT CONTROL REGULATIONS AND HANDBOOK
e. OSHA – OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION
f. ASTM – AMERICAN SOCIETY FOR TESTING AND MATERIALS

MAINTAIN A SET OF APPROVED PLANS ON SITE AT ALL TIMES DURING CONSTRUCTION.

OBTAIN EACH REQUIRED PERMIT PRIOR TO COMMENCING THAT PART OF THE WORK. PAY REQUIRED FEES.

NOTIFY THE ENGINEER IMMEDIATELY UPON DISCOVERY OF CONDITIONS WHICH DIFFER FROM THOSE SHOWN ON THE PLANS.

COMPLY WITH LOCAL ORDINANCES FOR BURNING OF WASTE. TRANSPORT WASTE MATERIALS AND UNSUITABLE MATERIALS FROM OWNER'S PROPERTY.

A PRECONSTRUCTION MEETING MUST TAKE PLACE PRIOR TO COMMENCING WORK. AS A MINIMUM, THE CONTRACTOR, OWNER'S AGENT AND COUNTY'S AGENT MUST ATTEND.

VERIFY THE LOCATION AND ELEVATION OF EACH EXISTING UNDERGROUND UTILITY IN AREAS OF CONSTRUCTION PRIOR TO COMMENCEMENT OF WORK. CONTACT ENGINEER IMMEDIATELY IF THERE APPEARS TO BE A CONFLICT, UPON DISCOVERY OF A UTILITY WHICH IS NOT SHOWN, AND UPON DISCOVERY OF A LOCATION OR ELEVATION WHICH DIFFERS FROM THAT SHOWN. TO LOCATE UTILITIES, CALL "MISS UTILITY", 1–800–552–7001. UTILITY LOCATIONS SHOWN ARE THE RESULT OF A COMBINATION OF FIELD LOCATION AND EXISTING INFORMATION. LOCATIONS ARE APPROXIMATE.

REPAIR ALL DAMAGE TO ANY UTILITY, PUBLIC OR PRIVATE, CAUSED AS A RESULT OF CONSTRUCTION ACTIVITIES AT NO ADDITIONAL COST TO OWNER.

NOTIFY OWNERS OF UTILITIES IN AREAS OF CONSTRUCTION PRIOR TO COMMENCEMENT OF EXCAVATION.

ANY SITE DEVELOPMENT OUTSIDE OF THE SCOPE OF THIS PLAN WILL REQUIRE SITE PLAN REVIEW AND APPROVAL.

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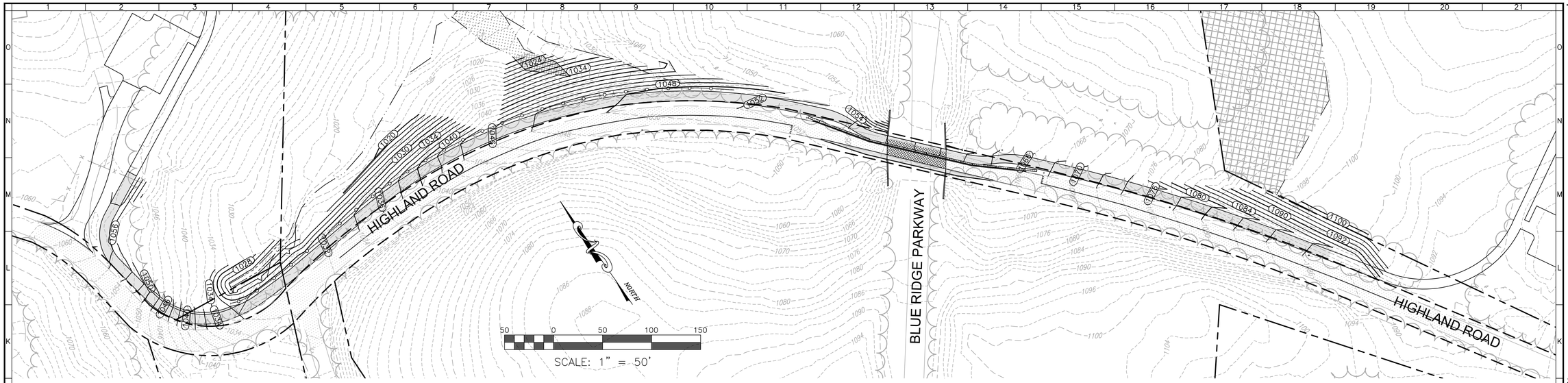
COMMONWEALTH OF VIRGINIA
[illegible]
CHRISTOPHER P. BURNS
Lic. No. 47338
3/20/23
PROFESSIONAL ENGINEER

EAST ROANOKE RIVER GREENWAY CONNECTOR
GENERAL NOTES
VINTON DISTRICT
ROANOKE COUNTY, VIRGINIA

DRAWN BY CPB
DESIGNED BY CPB
CHECKED BY BTC
DATE 10/4/2019
SCALE AS SHOWN

REVISIONS:
3/19/2020
6/10/2020
7/27/2021
12/21/2022
3/20/2023

SHEET NO.
C10
JOB NO. 04170071.00



TRAFFIC CONTROL NOTES:

1: ONE WORK ZONES IS SHOWN ON THIS PLAN AND CONSIST OF LANE/SHOULDER CLOSURES ON HIGHLAND ROAD TO BE PERFORMED IN ACCORDANCE WITH THE MOST CURRENT EDITION OF THE VIRGINIA WORK AREA PROTECTION MANUAL.

2: G.C. SHALL CONTACT THE VDOT REPRESENTATIVE IN WRITING WITH A WORK SCHEDULE 2 WEEKS BEFORE STARTING WORK. THE VDOT REPRESENTATIVE WILL DETERMINE IF POLICE PATROL IS NECESSARY FOR TRAFFIC CONTROL.

3: THE CONTRACTOR SHALL COORDINATE THE SEQUENCE OF CONSTRUCTION WITH VDOT.

4: SIGN SPACING MAY BE ADJUSTED TO FIT FIELD CONDITIONS WITH VDOT APPROVAL.

5: ALL PAVEMENT MARKINGS CONFLICTING WITH TRAFFIC PATTERNS SHALL BE ERADICATED AND RE-STRIPED AS NECESSARY.

6: WHEN WORK IS NOT BEING PERFORMED, THE CLEAR ZONE OF THE ROADWAY SHALL BE FREE OF STORED MATERIALS AND PARKED EQUIPMENT.

7: ALL WORK IS TO BE PERFORMED IN ACCORDANCE WITH THE MUTCD (LATEST EDITION), THE VIRGINIA WORK AREA PROTECTION MANUAL (LATEST EDITION), AND AS DIRECTED BY VDOT AND SHALL COMPLY WITH ALL REGULATIONS PROVIDED IN THE ENTRANCE PERMIT.

8: THE POSTED SPEED LIMIT ON THIS SECTION OF HIGHLAND ROAD IS 25 MPH. ALL TAPER LENGTHS, BUFFER LENGTHS, AND CHANNELIZING SHALL BE BASED ON THIESE SPEEDS.

9: NO WORK SHALL BE DONE ON-SITE UNTIL AN ENTRANCE PERMIT HAS BEEN ISSUED FOR THE SUBJECT PROPERTY.

10: SAFE ACCESS TO ALL EXISTING PUBLIC ROADWAYS SHALL BE MAINTAINED AT ALL TIMES.

11: CONSTRUCTION WORK AFTER DARK SHALL OCCUR WITH FLOODLIGHTS BEING UTILIZED WHERE EXISTING LIGHT IS NOT ADEQUATE. THE FLOODLIGHTS SHALL NOT CREATE A DISTRACTING GLARE TO ADJACENT DRIVERS.

12: CHANNELIZING DEVICES SUCH AS CONES OR BARRELS SHALL BE UTILIZED WHERE REQUIRED AND FOLLOW THE WORK AREA PROTECTION MANUAL.

13: G.C. SHALL MAINTAIN ALL EXISTING ROADWAY SIGNAGE DURING ALL PHASES OF THIS PROJECT.

14: WORK WITHIN THE EXISTING TUNNEL SHALL BE SEQUENCED TO MINIMIZE ANY POTENTIAL LANE CLOSURES AND TO ENSURE THAT AT LEAST ONE LANE REMAINS OPEN TO THE EXTENT PRACTICAL. IF A TEMPORARY CLOSURE OF THE TUNNEL IS NEEDED AT ANY TIME TO ALLOW FOR CONSTRUCTION OPERATIONS TO OCCUR WITHIN THE TUNNEL, THE G.C. SHALL COORDINATE SUCH CLOSURE WITH VDOT AND PROVIDE ALL NECESSARY TRAFFIC CONTROL MEASURES REQUIRED.

GENERAL NOTES:

1: PROJECT CATEGORY (MINIMUM TMP REQUIREMENTS):
- A: THIS WILL BE A CATEGORY 1 PROJECT (MINIMAL LEVEL OF CONSTRUCTION)
  - I. THIS WILL BE PERMITTED WORK.
  - II. THIS PROJECT WILL INVOLVE TRAFFIC CONTROL DEVICES AND A LANE/SHOULDER CLOSURE TO ENSURE SAFE TRAVEL AROUND THE WORK ZONES.

2: SIGNS AND OTHER TRAFFIC CONTROL MEASURES ARE SHOWN GRAPHICALLY FOR INFORMATIONAL PURPOSES ONLY AND ARE NOT SHOWN IN ACTUAL LOCATIONS. G.C. SHALL BE RESPONSIBLE FOR ENSURING THAT ALL SIGNAGE IS PLACED THE CORRECT DISTANCE BEFORE OR AFTER THE WORK ZONE AS SHOWN IN THE WORK AREA PROTECTION MANUAL (LATEST ADDITION) AND AS DICTATED BY THE SPECIFIC SITE. ALL SIGN LOCATIONS SHALL BE COORDINATED WITH VDOT.

3: THIS MAINTENANCE OF TRAFFIC PLAN IS INTENDED TO PROVIDE A BASIC OVERVIEW OF THE TYPES OF TRAFFIC CONTROL MEASURES NECESSARY FOR THE WORK ZONES ON THIS PROJECT. THIS PLAN IS NOT INTENDED TO SHOW EVERY FEATURE OF THE TRAFFIC CONTROL PLAN. THE G.C. SHALL PROVIDE VDOT WITH A COMPLETE MAINTENANCE OF TRAFFIC PLAN PRIOR TO COMMENCEMENT OF WORK WITHIN THE EXISTING RIGHT-OF-WAY AND THE G.C. SHALL ULTIMATELY BE RESPONSIBLE FOR ENSURING SAFE TRAVEL AROUND ALL WORK AREAS.

4: PUBLIC COMMUNICATION PLAN
- A. ROANOKE COUNTY
  1. SALEM TRAFFIC OPERATIONS CENTER (540) 375-0170*
     *THE TOC SHALL BE NOTIFIED OF PROPOSED LANE CLOSURES AT THE BEGINNING AND END OF EACH WORK DAY.
  2. ROANOKE COUNTY SHERIFF'S OFFICE (540) 777-8601
  3. ROANOKE COUNTY FIRE & RESCUE (540) 777-8701
  4. ROANOKE COUNTY COMMUNICATIONS CENTER (540) 562-3265
  5. ROANOKE COUNTY BOARD OF SUPERVISORS ADMINISTRATION OFFICE (540) 772-2003
  6. VA STATE POLICE (540) 375-9500

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COMMONWEALTH OF VIRGINIA
CHRISTOPHER P. BURNS
Lic. No. 47338
3/20/23
PROFESSIONAL ENGINEER

EAST ROANOKE RIVER GREENWAY CONNECTOR
MAINTENANCE OF TRAFFIC PLAN
VINTON DISTRICT
ROANOKE COUNTY, VIRGINIA

DRAWN BY CPB
DESIGNED BY CPB
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DATE 10/4/2019
SCALE AS SHOWN

REVISIONS:
3/19/2020
6/10/2020
7/27/2021
12/21/2022
3/20/2023

SHEET NO.
C11
JOB NO. 04170071.00

Typical Traffic Control
Stationary Operation on a Shoulder
(Figure TTC-4.2)
NOTES

Standard

1. **For long-term stationary work (more than 3 days) on divided highways having a median wider than 8', sign assemblies on both sides of the roadway shall be required as shown (ROAD WORK AHEAD (W20-1), RIGHT SHOULDER CLOSED AHEAD (W21-5bR), RIGHT SHOULDER CLOSED (W21-5aR)[1]), even though only one shoulder is being closed. For operations less than 3 days in duration, sign assemblies will only be required on the side where the shoulder is being closed.**

Guidance

2. *Sign spacing should be 1300'-1500' for Limited Access highways. For all other roadways, the sign spacing should be 500'-800' where the posted speed limit is greater than 45 mph, and 350'-500' where the posted speed limit is 45 mph or less.*

Option:

3. The SHOULDER WORK (W21-5) sign on an intersecting roadway may be omitted where drivers emerging from that roadway will encounter another advance warning sign prior to this activity area.
4. For short duration operations of 60 minutes or less, all signs and channelizing devices may be eliminated if a vehicle with activated high-intensity amber rotating, flashing, or[1] oscillating lights is used.

Standard:

5. **Vehicle hazard warning signals shall not be used instead of the vehicle's high-intensity amber rotating, flashing, or[1] oscillating lights. Vehicle hazard warning signals can be used to supplement high-intensity amber rotating, flashing, or[1] oscillating, lights.**
6. **Taper length (L) shall be at the following:**

Taper Length L

Speed Limit (mph)	Lane Width (Feet) 9	10	11	12	Remarks	Speed Limit (mph)	Lane Width (Feet) 9	10	11	12	Remarks
25	95	105	115	125	L=S*W/60	50	450	500	550	600	L=SW
30	135	150	165	180	L=S*W/60	55	495	550	605	660	L= SW
35	185	205	225	245	L=S*W/60	60	540	600	660	720	L=SW
40	240	270	295	320	L=S*W/60	65	585	650	715	780	L=SW
45	405	450	495	540	L=SW	70	630	700	770	840	L=SW

Limited Access highways shall use a 1000' merging taper regardless of the posted speed, for shifting taper see Table 6H.2[1]

Shoulder Taper = ½ L Minimum

7. **Channelizing device spacing shall be at the following:**

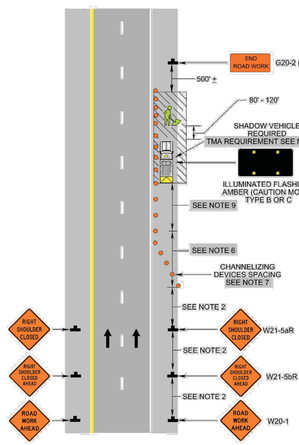
Channelizing Device Spacing					
Location Spacing	Speed Limit (mph) 0 -35	36 +	Location Spacing	Speed Limit (mph) 0 -35	36 +	Location Spacing	Speed Limit (mph) 0 -35	36 +
Transition	20'	40'	Traveway	40'	80'	*Construction Access	80'	120'

*Construction access spacing may be increased to this distance, but shall not exceed one access per ¼ mile.

8. **On roadways with paved shoulders having a width of 8 feet or more, channelizing devices shall be used to close the shoulder in advance of the merging taper to direct vehicular traffic to remain within the traveled way.**
9. **The buffer space length shall be as shown in Table 6H-3 on Page 6H-5 for the posted speed limit.**
10. **A truck-mounted attenuator (TMA) shall be used on the shadow vehicle on Limited Access highways and multi-lane roadways with posted speed limit equal to or greater than 45 mph for operations with a duration greater than 60 minutes.**
11. **When a side road intersects the highway within the temporary traffic control zone, additional traffic control devices shall be placed as needed.**

1: Revision 1 – 4/1/2015
2: Revision 2 – 9/1/2019

Stationary Operation on a Shoulder
(Figure TTC-4.2)



1: Revision 1 – 4/1/2015
2: Revision 2 – 9/1/2019

Typical Traffic Control
Shoulder Operation with Minor Encroachment
(Figure TTC-5.2)
NOTES

Standard

1. **For required sign assemblies for multi-lane roadways see Note 1, TTC-4.[1]**

Guidance

2. *Sign spacing should be 1300'-1500' for Limited Access highways. For all other roadways, the sign spacing should be 500'-800' where the posted speed limit is greater than 45 mph, and 350'-500' where the posted speed limit is 45 mph or less.*
3. *When work takes up part of a lane on a high volume roadway; vehicular traffic volumes, vehicle mix, speed and capacity should be analyzed to determine whether the affected lane should be closed. Unless the lane encroachment analysis permits a remaining lane width of 10 feet, the lane should be closed. If the closure operation is on a Limited Access highway, the minimum lane width is 11 feet.*

Option:

4. The ROAD WORK AHEAD (W20-1) sign on an intersecting roadway may be omitted where drivers emerging from that roadway will encounter another advance warning sign prior to this activity area.

Standard:

5. **A shadow vehicle with either an arrow board operating in the caution mode, or at least one high-intensity amber rotating, flashing, or[1] oscillating light shall be parked 80' - 120' in advance of the first work crew.**
6. **Vehicle hazard warning signals shall not be used instead of the vehicle's high-intensity amber rotating, flashing, or[1] oscillating lights. Vehicle hazard warning signals can be used to supplement high-intensity amber rotating, flashing, or[1] oscillating lights.**
7. **Taper length (L) and channelizing device spacing shall be at the following:**

Taper Length L

Speed Limit (mph)	Lane Width (Feet) 9	10	11	12	Remarks	Speed Limit (mph)	Lane Width (Feet) 9	10	11	12	Remarks
25	95	105	115	125	L=S*W/60	50	450	500	550	600	L=SW
30	135	150	165	180	L=S*W/60	55	495	550	605	660	L= SW
35	185	205	225	245	L=S*W/60	60	540	600	660	720	L=SW
40	240	270	295	320	L=S*W/60	65	585	650	715	780	L=SW
45	405	450	495	540	L=SW	70	630	700	770	840	L=SW

Limited Access highways shall use a 1000' merging taper regardless of the posted speed, a 750' shifting taper for posted speeds < 65 mph and a 1500' shifting taper for posted speeds ≥ 65 mph.[2]

Shoulder Taper = ½ L Minimum

8. **Channelizing device spacing shall be at the following:**

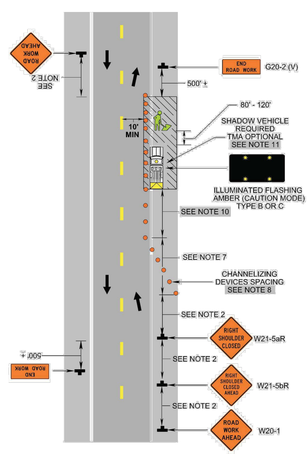
Channelizing Device Spacing					
Location Spacing	Speed Limit (mph) 0 -35	36 +	Location Spacing	Speed Limit (mph) 0 -35	36 +	Location Spacing	Speed Limit (mph) 0 -35	36 +
Transition	20'	40'	Traveway	40'	80'	*Construction Access	80'	120'

*Construction access spacing may be increased to this distance, but shall not exceed one access per ¼ mile.

9. **On roadways with paved shoulders having a width of 8 feet or more, channelizing devices shall be used to close the shoulder in advance of the merging taper to direct vehicular traffic to remain within the traveled way.[2]**
10. **The buffer space length The buffer space length shall be as shown in Table 6H-3 on Page 6H-5 for the posted speed limit.**
11. **A truck-mounted attenuator (TMA) shall be used on Limited Access highways and multi-lane roadways with posted speed limit equal to or greater than 45 mph.**
12. **When a side road intersects the highway within the temporary traffic control zone, additional traffic control devices shall be placed as needed.**

1: Revision 1 – 4/1/2015
2: Revision 2 – 9/1/2019

Shoulder Operation with Minor Encroachment
(Figure TTC-5.2)



1: Revision 1 – 4/1/2015
2: Revision 2 – 9/1/2019

Typical Traffic Control
Lane Closure on a Two-Lane Roadway Using Flaggers
(Figure TTC-23.2)
NOTES

Guidance:

1. *Sign spacing distance should be 350'-500' where the posted speed limit is 45 mph or less, and 500'-800' where the posted speed limit is greater than 45 mph.*
2. *Care should be exercised when establishing the limits of the work zone to insure maximum possible sight distance in advance of the flagger station and transition, based on the posted speed limit and at least equal to or greater than the values in Table 6H-3. Generally speaking, motorists should have a clear line of sight from the graphic flagger symbol sign to the flagger.*
3. *To maintain efficient traffic flow in a flagging operation on a two-lane roadway, the maximum time motorists should be stopped at a flagger station is 8 minutes for high volume roadways (average daily traffic of 500 or more vehicles per day) to a maximum of 12 minutes for low volume roadways (less than 500 vehicles per day). For additional information see Section 6E.07.*

Standard:

4. **Portable Temporary Rumble Strips (PTRS) shall be used as noted in Section 6F.99.**
5. **Flagging stations shall be located far enough in advance of the work space to permit approaching traffic to reduce speed and/or stop before passing the work space and allow sufficient distance for departing traffic in the left lane to return to the right lane before reaching opposing traffic (see Table 6H-3 on Page 6H-5).**
6. **All flaggers shall be state certified and have their certification card in their possession when performing flagging duties (see Section 6E.01, Qualifications for Flaggers).**
7. **Cone spacing shall be based on the posted speed and the values in Table 6H-4 on Page 6H-6.[1]**
8. **A shadow vehicle with at least one high intensity amber rotating, flashing, or[1] oscillating light shall be parked 80'-120' in advance of the first work crew.**

Option:

8. A SLOW (W21-V10) sign[1] may be required in this area to give advance warning of the operation ahead by slowing approaching traffic prior to reaching the flagger station or queued traffic.

Guidance:

9. *If the queue of traffic reaches the BE PREPARED TO STOP (W3-4) sign then the signs, and if used the PTRS[1] should be readjusted at greater distances.*
10. *When a highway-rail crossing exists within or upstream of the transition area and it is anticipated that queues resulting from the lane closure might extend through the highway-rail grade crossing, the temporary traffic control zone should be extended so that the transition area precedes the highway-rail crossing (see Figure TTC-56 for additional information on highway-rail crossings).*

Standard:

11. **At night, flagger stations shall be illuminated, except in emergencies (see Section 6E.08).**

Option:

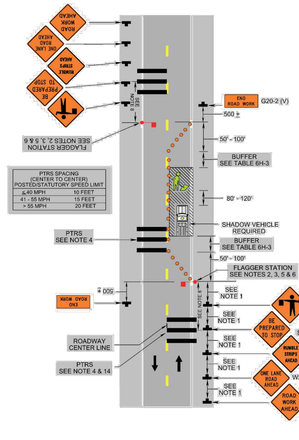
12. Cones may be eliminated when using a pilot vehicle operation or when the total roadway width is 20 feet or less.
13. For low-volume situations with short work zones on straight roadways where the flagger is visible to road users approaching from both directions, a single flagger, positioned to be visible to road users approaching from both directions, may be used (see Chapter 6E).

Standard:[1]

14. **When used[2], three portable temporary rumble (PTRS) strips shall be installed across the entire travel lane adjacent to the BE PREPARED TO STOP (W3-4) sign. The portable temporary rumble strips shall be monitored and adjusted as necessary during the work shift to ensure proper placement on the roadway. When the PTRS are installed, the RUMBLE STRIPS AHEAD (W20-V26) sign shall also be utilized.**

1: Revision 1 – 4/1/2015
2: Revision 2 – 9/1/2019

Lane Closure on a Two-Lane Roadway Using Flaggers
(Figure TTC-23.2)



1: Revision 1 – 4/1/2015
2: Revision 2 – 9/1/2019