INDEX OF SHEETS SHEET NO: **DESCRIPTION**:

TITLE SHEET

1A(1)-1A(3)CONSTRUCTION ALIGNMENT DATA AND SURVEY CONTROL 1B(1)-1B(5) TRAFFIC MAINTENANCE PLAN AND SEQUENCE OF CONSTRUCTION

STORMWATER MANAGEMENT NARRATIVE

1C(1)-1C(2)EXISTING CONDITIONS GENERAL NOTES TYPICAL SECTIONS CURB RAMP DETAILS 2C(1)-2C(3)

DETAILS

SWPPP GENERAL INFORMATION SHEET 2E(1)-2E(4)PLAN (STA. 10+00 TO STA 17+50) PROFILE (STA. 10+00 TO STA 17+50) PLAN (STA. 17+50 TO STA 25+00) PROFILE (STA. 17+50 TO STA 25+00) ENTRANCE PROFILES

6(1)-6(6) EROSION & SEDIMENT CONTROL PLANS DRAINAGE DESCRIPTIONS STORM SEWER PROFILES STORM SEWER COMPUTATIONS EXISTING DRAINAGE AREA MAP PROPOSED DRAINAGE AREA MAP 12(1)-12(2) OUTFALL ANALYSES

AND COMPUTATIONS 13(2) WATER QUALITY MAPS 13(3) WATER QUANTITY MAP

14(1)-14(4) SIGNING AND PAVEMENT MARKING PLAN

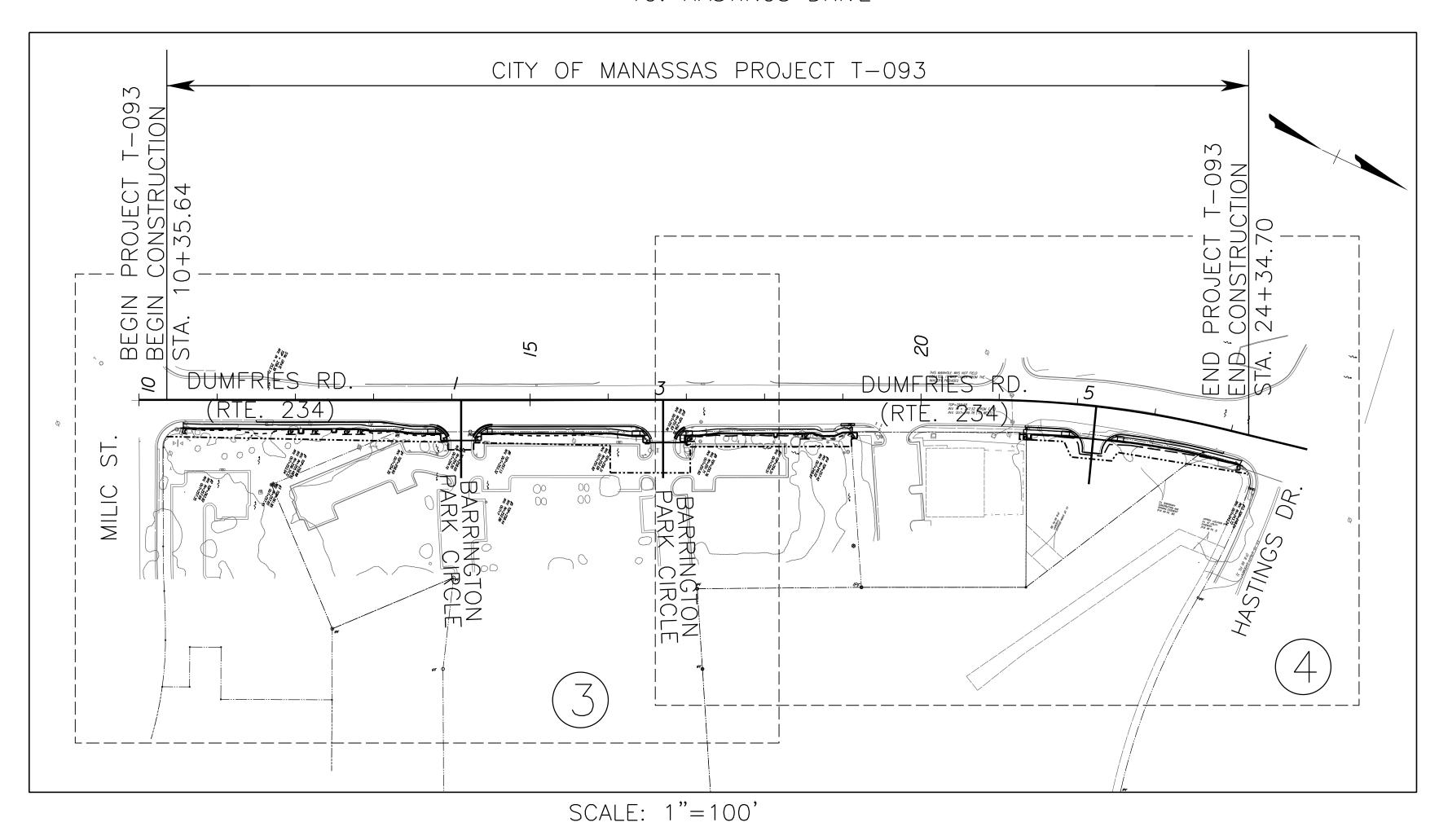
X1 - X14CROSS SECTIONS

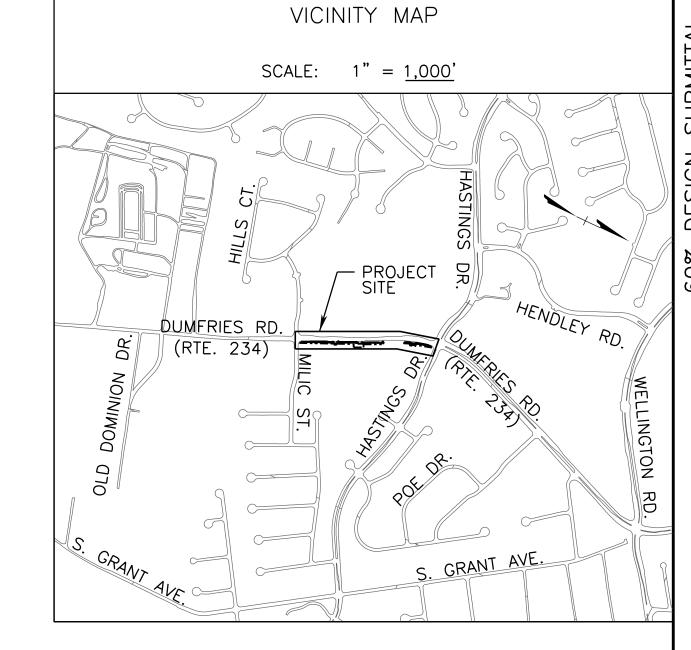
13(1)

CITY OF MANASSAS PUBLIC WORKS - ENGINEERING

DUMFRIES ROAD SIDEWALK

FROM: MILIC STREET TO: HASTINGS DRIVE





Responsible Land Disturber (RLD) means an individual holding a certificate of competence issued by DCR who will be in charge of and responsible for carrying out the land—disturbing activity in accordance with the approved plan. The RLD may be the owner, applicant, permittee, designer, superintendent, project manager, contractor, or any other project or development team member. The RLD must be designated as a prerequisite for obtaining City permit and prior to any land disturbing activities. Ref VESCH.

Official Approved Plan The City of Manassas

Development Services Manager

THESE PLANS ARE UNFINISHED AND UNAPPROVED AND ARE NOT TO BE USED FOR ANY TYPE

The following endorsement hereby represent that this plan has been reviewed by all of the appropriate departments and agencies, using the City of Manassas Code of Ordinances and the City DCSM, and based upon the affirmative recommendation of those departments and agencies has been found to be consistent with the regulations, ordinances, conditions and provisions related to the development and use of this parcel and may be Approved as the

> OF CONSTRUCTION OR THE ACQUISITION OF RIGHT OF WAY.

SHEET

SCALE: AS NOTED

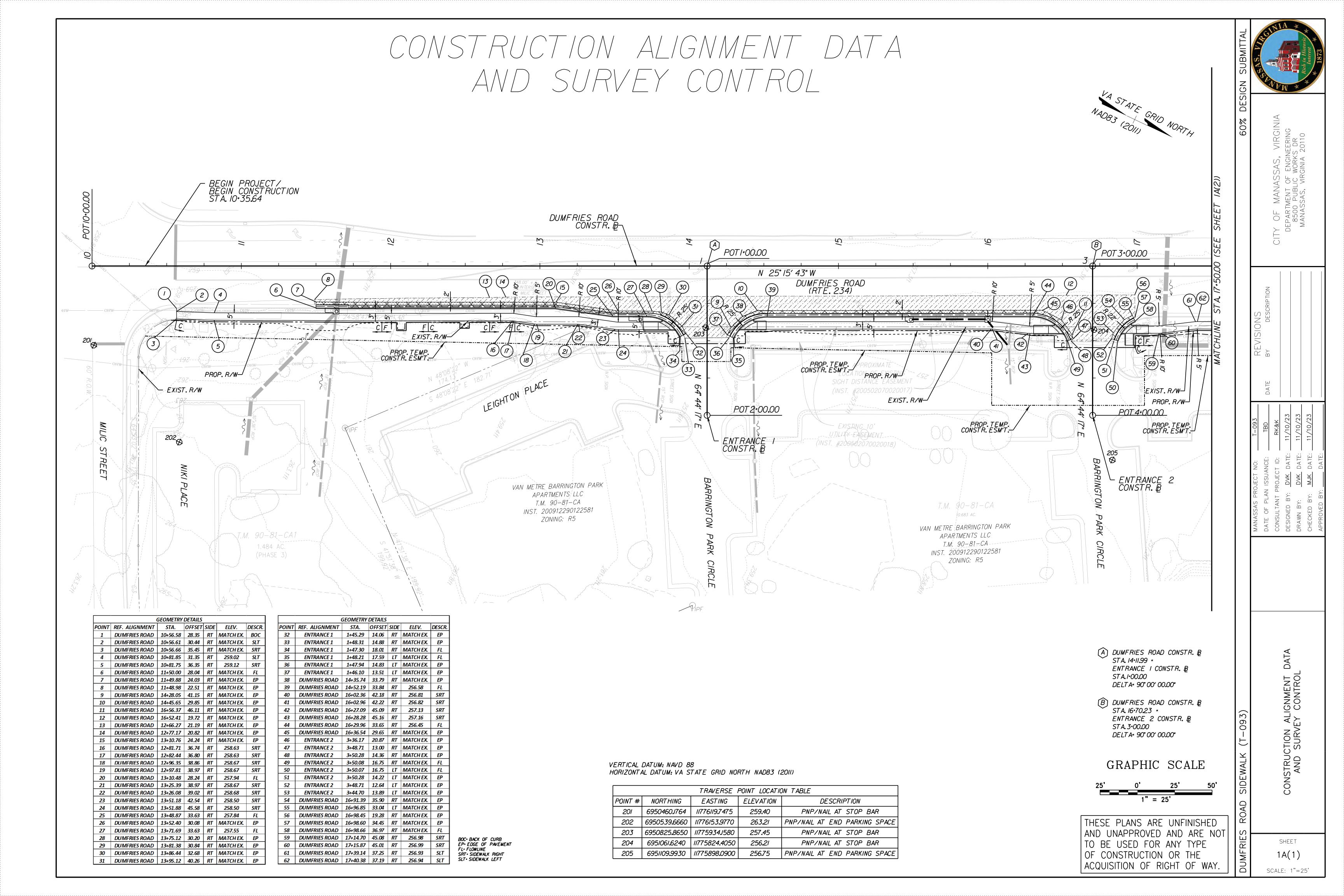
DUMF

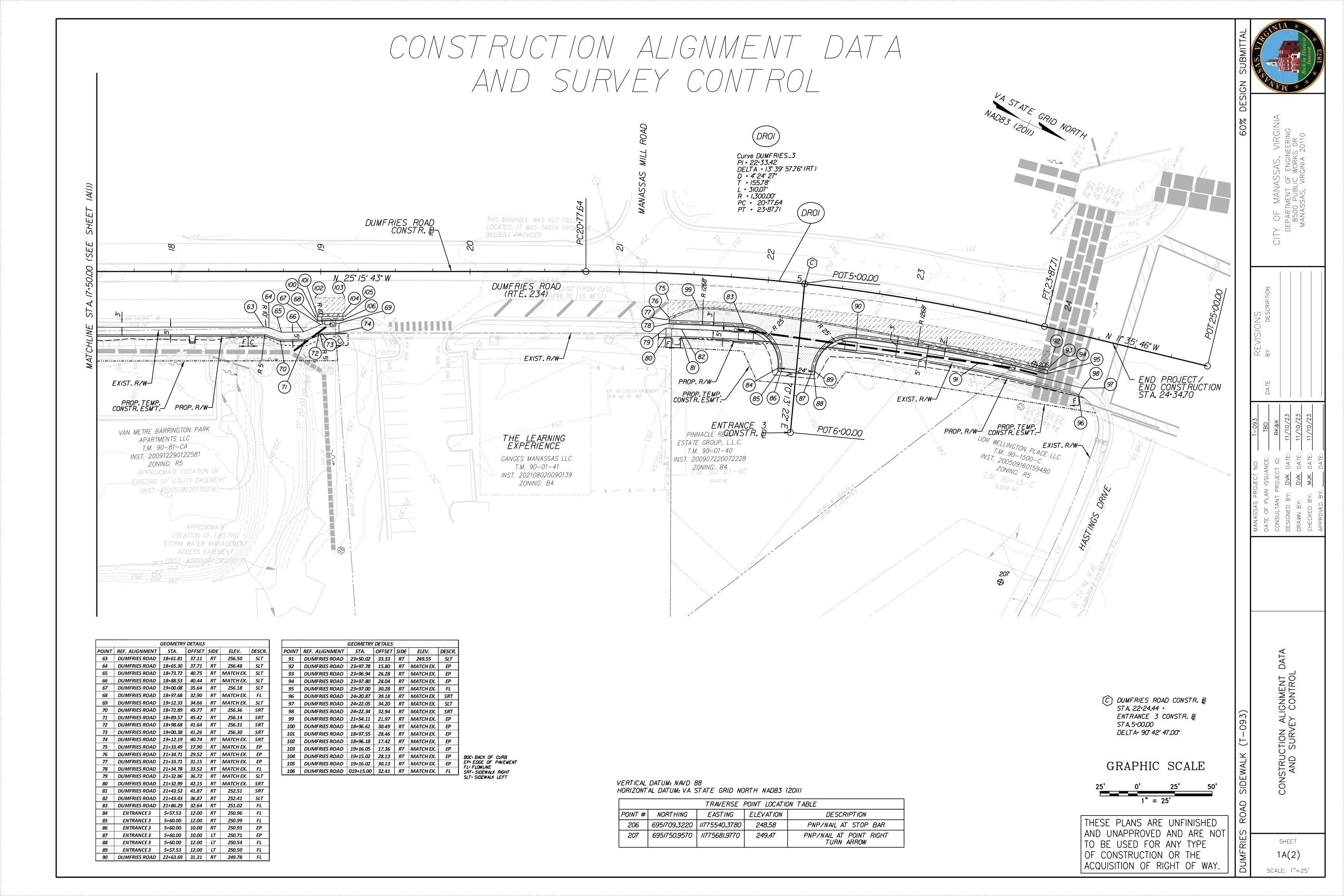
FUNCTIO	NAL CLASSIFICATION
ROAD NAME	DUMFRIES ROAD
	(ROUTE 234)
FROM:	MANASSAS SOUTH COUNTY LINE
TO:	HASTINGS DRIVE
VDOT STREET	URBAN MINOR
CLASSIFICATION	ARTERIAL (GS-6)
STREET	COLLECTOR/CONNECTOR
TYPOLOGY	
TERRAIN	ROLLING
AADT (2021)	9,000
AADT (2046)	11,500
DHV	765
D (%)	60.2%
T (%)	1%
DESIGN V (MPH)	35 MPH
POSTED V (MPH)	35 MPH

T (%)	1%
DESIGN V (MPH)	35 MPH
POSTED V (MPH)	35 MPH
ROAD NAME	HASTINGS DRIVE
FROM:	DUMFRIES ROAD (ROUTE 234)
TO:	LIBERIA AVENUE
VDOT STREET	URBAN MINOR
CLASSIFICATION	ARTERIAL (GS-6)
STREET TYPOLOGY	COLLECTOR/CONNECTOR
TERRAIN	ROLLING
AADT (2020)	5,000
AADT (2045)	6,400
DHV	435
D (%)	66.5%
T (%)	1%
DESIGN V (MPH)	25 MPH
POSTED V (MPH)	25 MPH

BENCHMARK STORM MANHOLE GROUND LIGHT TRAFFIC SIGNAL POLE LIGHT POLE FIRE HYDRANT WATER VALVE GUY WIRE POWER POLE SANITARY MANHOLE

SANITARY CLEANOUT





CONSTRUCTION ALIGNMENT DATA AND SURVEY CONTROL



Beginning chain DUMFRIES description Feature: - 25 Scale Baselines 6,950,436.50 Sta Course from DUMFRIESI to PC DUMFRIES_3 N 25° 15′ 43.45" W Dist 1,077.64 Curve Data Curve DUMFRIES_3 11,775,545,87 *6,951,551.9*6 PJ. Station 13° 39′ 57.76° (RT) 4° 24′ 26.52° 155.78 310.07 310.07 1,300.00 9.30 309.34 9.23 11,775,612.35 Y 11,776,788.03 Y F = N 25° 15′ 43.45° W = N 11° 35′ 45.69° W Long Chord • Mid.Ord. • P.C. Station P.T. Station 6,951,411,08 20.77.64 X Ahead • N II 35' 45.69" W Chord Bear • N I8 25' 44.57" W Course from PT DUMFRIES_3 to DUMFRIES5 N II 35' 45.69" W Dist II2.29 Point DUMFRIES5 25.00.00 11**,**775**,**491**,9**9 Y 6,951,814.55 Sta Ending chain DUMFRIES description

Beginning chain ENTRANCEI description Feature: - 25 Scale Baselines Point ENTRANCEII X II,775,896,42 Y 6,950,809.08 Sta I-00.00 Course from ENTRANCEII to ENTRANCEI2 N 64° 44′ 16.55° E Dist 100.00 Point ENTRANCEI2 X II,775,986.86 Y 6,950,851,76 Sta 2-00.00 Ending chain ENTRANCEI description

Beginning chain ENTRANCE2 description Feature: - 25 Scale Baselines Point ENTRANCE2I X II,775,786.22 Y 6,951,042.63 Sta 3.00.00 Course from ENTRANCE2I to ENTRANCE22 N 64°44′16.55° E Dist 100.00 Point ENTRANCE22 X II,775,876.66 Y 6,951,085.30 Sta 4.00.00 Ending chain ENTRANCE2 description

Beginning chain ENTRANCE3 description Feature: - 25 Scale Baselines Point ENTRANCE3I X II,775,557,33 Y 6,951,547,09 Sta 5.00,00 Course from ENTRANCE3I to ENTRANCE32 N 70°13' 21,71" E Dist 100,00 Point ENTRANCE32 X II,775,651,43 Y 6,951,580,92 Sta 6.00,00 Ending chain ENTRANCE3 description

THESE PLANS ARE UNFINISHED
AND UNAPPROVED AND ARE NOT
TO BE USED FOR ANY TYPE
OF CONSTRUCTION OR THE
ACQUISITION OF RIGHT OF WAY.

PATE BY DESCRIPTION

CITY OF MANASSAS, VIRGINIA

BD

CITY OF MANASSAS, VIRGINIA

BEATMENT OF ENGINEERING

8500 PUBLIC WORKS DR

MANASSAS, VIRGINIA 20110

MANASSAS PRUJECT NO: 1-093

DATE OF PLAN ISSUANCE: TBD DATE

CONSULTANT PROJECT ID: RK&K

DESIGNED BY: DVK DATE: 11/10/23

CHECKED BY: MJK DATE: 11/10/23

CONSTRUCTION ALIGNMENT [AND SURVEY CONTROL

SHEET

1A(3)

SCALE: N/A

TEMPORARY TRAFFIC CONTROL PLAN

GENERAL NOTES:

- 1. TMP/SOC TYPE A PROJECT INFORMATION:
 - A. IDENTIFY THE PROJECT'S TMP TYPE: THIS PROJECT'S TMP/SOC PLAN HAS BEEN DESIGNED IN CONFORMANCE WITH A TYPE A TMP/SOC
 - B. IDENTIFY THE WORK ZONE LOCATION, LENGTH, AND WIDTHS: THE PROJECT LOCATION IS AS SHOWN ON SHEET 1. THE WORK ZONE AREAS HAVE BEEN DELINEATED AS DETAILED ON THE TMP/SOC PLAN SHEET
 - C. NOTE THE HOURS THE CONSTRUCTION AREA WILL BE ACTIVE: THE CONSTRUCTION AREA SHALL BE CONSIDERED ACTIVE WHEN ANY IMPACT TO TRAFFIC OCCURS. (1ST CONE IN ROAD)

LANE CLOSURE HOURS HAVE THE FOLLOWING LIMITATIONS:

		SINGLE LANE CLOSUR	ES (URBAN MINOR ARTE	ERIAL)
	MONDAY TO THURSDAY	FRIDAY	SATURDAY TO SUNDAY	SUNDAY TO MONDAY
DAY	9:00 AM TO 3:30 PM	9:00 AM TO 2:00 PM	-	_
NIGHT	9:00 PM TO 5:00 AM	-	1	_

WEEKEND WORK SHALL NOT BE ALLOWED.

NO LANE CLOSURES WILL BE ALLOWED FROM NOON ON THE DAY BEFORE A HOLIDAY UNTIL NOON ON THE WORKDAY FOLLOWING THE HOLIDAY. HOLIDAYS INCLUDE ALL STATE AND FEDERAL HOLIDAYS.

NIGHT TIME WORK SHALL NOT BE PERMITTED UNLESS APPROVED BY THE CITY. NIGHT TIME CLOSURE HOURS ARE SHOWN IN THE LANE CLOSURE TABLES FOR INFORMATION ONLY IN THE EVENT THAT NIGHT TIME WORK IS PERMITTED BY THE CITY.

IF NIGHT TIME WORK IS REQUIRED, CONTRACTOR SHALL SUBMIT REQUIRED DOCUMENTATION AND OBTAIN PERMISSION FOR ANY NIGHT TIME WORK DUE TO NOISE ORDINANCE

- D. THE TMP/SOC PLAN, DURING CONSTRUCTION, SHALL BE IN ACCORDANCE WITH SECTIONS 512, 701, 703 & 704 OF THE VIRGINIA DEPARTMENT OF TRANSPORTATION ROAD AND BRIDGE SPECIFICATIONS, DATED 2020; THE 2011 VIRGINIA WORK AREA PROTECTION MANUAL (WAPM), REVISION 2.1, NOVEMBER 1, 2020; THE MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES (MUTCD), 2009 EDITION; AND THE VIRGINIA SUPPLEMENT TO THE 2009 MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES, 2011 EDITION, REVISION 1 - SEPTEMBER 30, 2013.
- THE CONTRACTOR SHALL: DESIGNATE A PERSON ASSIGNED TO THE PROJECT WHO WILL HAVE THE PRIMARY RESPONSIBILITY, WITH SUFFICIENT AUTHORITY, FOR IMPLEMENTING THE TMP/SOC AND OTHER SAFETY AND MOBILITY ASPECTS OF THE PERMIT WORK. THIS PERSON SHALL COORDINATE WITH THE CITY'S CONSTRUCTION INSPECTOR FOR THE DURATION OF CONSTRUCTION.

ENSURE THAT PERSONNEL ASSIGNED TO THE PROJECT ARE TRAINED IN TRAFFIC CONTROL TO A LEVEL COMMENSURATE WITH THEIR RESPONSIBILITIES IN ACCORDANCE WITH VDOT'S WORK ZONE TRAFFIC CONTROL TRAINING GUIDELINES.

INFORM THE ENGINEER OF ANY WORK REQUIRING LANE SHIFTS, LANE CLOSURES, AND/OR PHASE CHANGES; A MINIMUM OF ONE WEEK PRIOR TO IMPLEMENTING THIS ACTIVITY.

PERFORM REVIEWS OF THE CONSTRUCTION AREA, TO ENSURE COMPLIANCE WITH CONTRACT DOCUMENTS. AT REGULARLY SCHEDULED INTERVALS AT THE DIRECTION OF THE ENGINEER. CONTRACTOR SHALL MAINTAIN A COPY OF THE TEMPORARY TRAFFIC CONTROL PLAN AT THE WORK SITE AT ALL

COORDINATE WITH CITY OF MANASSAS POLICE DEPARTMENT AND FIRE/RESCUE DEPARTMENT FOR ANY LANE CLOSURES AND ANY DETOURS OF ANY NATURE.

SCHEDULE ALL PHASES OF CONSTRUCTION IN SUCH A MANNER THAT WATER, SANITARY SEWER, CABLE, FIBER CABLE/OPTIC CABLE, ANY OVERHANGING UTILITIES, AND ANY UNDERGROUND UTILITIES SERVICES WILL NOT BE INTERRUPTED.

- 2. THIS APPROVED TMP/SOC PLAN IS INTENDED AS A GUIDE. IT IS NOT TO ENUMERATE EVERY DETAIL WHICH MUST BE CONSIDERED IN THE CONSTRUCTION OF EACH PHASE, BUT ONLY TO SHOW THE GENERAL HANDLING OF EXISTING TRAFFIC. THE CONTRACTOR IS EXPECTED TO FOLLOW THE TMP/SOC PLAN AS PROPOSED. IF THE CONTRACTOR WISHES TO DEVIATE FROM THE APPROVED TMP/SOC PLAN, THE CONTRACTOR SHALL DEVELOP TMP/SOC PLANS, AT NO COST TO THE CITY, AND SUBMIT THE TMP/SOC PLAN FOR REVIEW AND APPROVAL BY THE CITY.
- 3. ALL AREAS EXCAVATED BELOW THE EXISTING PAVEMENT SURFACE AND WITHIN THE CLEAR ZONE AT THE CONCLUSION OF EACH WORKDAY, SHALL BE BACKFILLED TO FORM ON APPROXIMATE 6:1 WEDGE AGAINST THE EXISTING PAVEMENT OR NEWLY CONSTRUCTED PAVEMENT SURFACE FOR THE SAFETY AND PROTECTION OF VEHICULAR TRAFFIC.
- 4. TRAFFIC BARRIER SERVICE IS NOT PROPOSED FOR THE CONSTRUCTION OF THIS PROJECT.
- 5. IF A GEOTECHNICAL INVESTIGATION HAS BEEN PERFORMED FOR THE PROJECT, THE CONTRACTOR SHALL FOLLOW THE GEOTECHNICAL RECOMMENDATIONS PROVIDED BY THE CITY OF MANASSAS.
- CONTRACTOR SHALL ENSURE POSITIVE DRAINAGE FOR THE DURATION OF THE PROJECT. CONTRACTOR SHALL ADD ANY ADDITIONAL TEMPORARY MEASURES NECESSARY TO FACILITATE PROPER, POSITIVE DRAINAGE FOR THE DURATION OF CONSTRUCTION.
- WHERE GROUP 2 CHANNELIZING DEVICES ARE USED TO SEPARATE THE CONSTRUCTION AREA AND TRAFFIC, A MINIMUM CLEAR ZONE AREA AS DEFINED IN THE VA. WAPM. IS TO BE MAINTAINED.
- 8. THE CONTRACTOR SHALL COORDINATE WITH CITY OF MANASSAS FOR LOCATION(S) OF THE CONSTRUCTION STAGING AREA. THE CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING ALL PERMITS AND/OR EASEMENTS FOR THE STAGING AREA.
- 9. IMPLEMENTING THE TRANSPORTATION MANAGEMENT PLAN:

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

10. EVALUATION OF THE TRANSPORTATION MANAGEMENT PLAN:

A PERFORMANCE ASSESSMENT OF THE TMP INCLUDING AREA WIDE IMPACTS ON ADJACENT ROADWAYS SHALL BE PERFORMED BY THE CITY OF MANASSAS. IF REQUESTED BY VDOT.

- 11. PUBLIC COMMUNICATIONS PLAN:
 - THE CONTRACTOR SHALL BE RESPONSIBLE FOR:
 - A. NOTIFYING THE PROJECT MANAGER AND CONSTRUCTION INSPECTOR TWO WEEKS IN ADVANCE OF ANY SCHEDULED WORK PLANS AND TRAFFIC DELAYS.
 - B. NOTIFYING THE PROJECT MANAGER, CONSTRUCTION INSPECTOR, AND CORRESPONDING ENGINEER OF ANY UNSCHEDULED TRAFFIC DELAYS.
- 12. TRANSPORTATION OPERATIONS:

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

- A. NOTIFY THE VDOT NORTHERN VIRGINIA TRAFFIC OPERATION CENTER (TOC) ONE WEEK IN ADVANCE IN ORDER TO PLACE LANE CLOSURE INFORMATION ON THE 511 SYSTEM AND VA-TRAFFIC.
- B. POST A LIST OF LOCAL EMERGENCY RESPONSE AGENCIES INSIDE THE PROJECT'S CONSTRUCTION OFFICE /TRAILER.
- IMMEDIATELY REPORT ANY TRAFFIC INCIDENTS THAT MAY OCCUR IN THE WORK ZONE.
- D. NOTIFY THE PROJECT'S CONSTRUCTION INSPECTOR AND CORRESPONDING ENGINEER OF ANY INCIDENTS AND EXPECTED TRAFFIC DELAYS.
- WITHIN 24 HOURS OF ANY INCIDENTS WITHIN THE CONSTRUCTION WORK ZONE, A REVIEW OF THE TRAFFIC CONTROLS SHALL BE COMPLETED AND NECESSARY ADJUSTMENTS MADE TO REDUCE THE FREQUENCY AND SEVERITY OF ANY FUTURE INCIDENTS.

CONTACT NUMBERS:

CITY PROJECT MANAGER - SUNG JIN CHUNG, PE - (703) 257-8339 CITY CONSTRUCTION MANAGER - TBD CITY CONSTRUCTION INSPECTOR - TBD POLICE/AMBULANCE/FIRE SAFETY/HAZMAT SPILLS - 911 VDOT NORTHERN VIRGINIA TRAFFIC OPERATION CENTER - (800) 367-7623 VIRGINIA STATE POLICE - (703) 803-8660 VDOT NOVA DISTRICT OFFICE - (703) 877-3401 (8:15 AM - 4:00 PM) CITY OF MANASSAS DEPARTMENT OF PUBLIC WORKS - (703) 257-8429

NON-EMERGENCY NUMBERS:

CITY OF MANASSAS POLICE DEPARTMENT - (703) 257-8000 CITY OF MANASSAS FIRE AND RESCUE DEPARTMENT - (703) 257-8458

GENERAL CONSTRUCTION NOTES:

- PRIOR TO THE START OF CONSTRUCTION, THE CONTRACTOR SHALL INSTALL PROJECT LIMIT SIGNAGE IN ACCORDANCE WITH VA. WAPM. FIGURE TTC-53.0 (NOT GRAPHICALLY SHOWN ON THE PLANS). FOR THE DURATION OF CONSTRUCTION, THE CONTRACTOR SHALL ENSURE THIS SIGNAGE REMAINS IN COMPLIANCE IF THE PROJECT LIMITS CHANGE.
- 2. THE CONTRACTOR IS RESPONSIBLE FOR ENSURING PROPER DRAINAGE FOR THE DURATION OF ALL CONSTRUCTION PHASES AND INSTALLING ANY NECESSARY MEASURES TO FACILITATE PROPER DRAINAGE.
- THE CONTRACTOR SHALL MAKE ANY NECESSARY ADJUSTMENTS DURING BOTH WORK AND NON-WORK HOURS TO ENSURE THE PROTECTION AND SAFETY OF THE ADJACENT PROPERTY OWNERS, PEDESTRIANS, VEHICULAR TRAFFIC AND THE GENERAL PUBLIC FROM ANY CONSTRUCTION RELATED ACTIVITY, CONSTRUCTION EQUIPMENT AND THE CONSTRUCTION SITE ITSELF.
- 4. IT WILL BE THE RESPONSIBILITY OF THE CONTRACTOR TO PROVIDE SAFE TRAVEL ON THE ROADWAYS WITHIN THE WORK ZONE.
- THE PUBLIC SHALL BE NOTIFIED OF THE EXPECTED CONSTRUCTION SCHEDULE ON THE CITY'S WEB SITE FOR THIS PROJECT. INFORMATION OF THE POTENTIAL FOR BACK-UPS DURING THE PEAK HOURS OF OPERATION IS PROVIDED BY THE VDOT NORTHERN VIRGINIA TRAFFIC OPERATION CENTER (TOC). THE CITY PROJECT MANAGER NEEDS TO COORDINATE WITH VDOT.
- 6. THE VDOT NORTHERN VIRGINIA TRAFFIC OPERATION CENTER (TOC) SHALL BE NOTIFIED OF LANE AND ROADWAY CLOSURE INFORMATION FOR DISTRIBUTION ON THE 511 SYSTEM AND VIRGINIA OPERATIONS INFORMATION SYSTEM (VOIS). EMERGENCY RESPONSE PROFESSIONALS SHALL RESPOND TO TRAFFIC INCIDENTS IN THE WORK ZONE AS SOON AS POSSIBLE.
- 7. THE APPROPRIATE CLEAR ZONE SHALL BE MAINTAINED, FREE OF PARKED EQUIPMENT AND STORED MATERIAL, OR PROTECTED AT THE END OF EACH DAY IN ACCORDANCE WITH THE VIRGINIA WORK AREA PROTECTION MANUAL. EQUIPMENT AND MATERIAL SHALL NOT BE STORED WITHIN THE ESTABLISHED CLEAR ZONE AND/OR DEFLECTION ZONE OF PHYSICAL BARRIERS IN ACCORDANCE WITH THE WORK AREA PROTECTION MANUAL.
- CONTRACTOR SHALL REQUIRE THE APPROVAL OF THE ENGINEER FOR SELECTED LOCATIONS OF ANY STAGING AREA FOR STAGING AND FOR MATERIALS OR EQUIPMENT STORAGE.
- 9. ACCESS TO PRIVATE DRIVEWAYS WITHIN THE PROJECT LIMITS SHALL BE MAINTAINED AT ALL TIMES.

CONSTRUCTION NARRATIVE:

THE CONTRACTOR SHALL INSTALL PROJECT LIMIT SIGNAGE IN ACCORDANCE WITH WAPM FIGURE TTC-53.0.

CONTRACTOR SHALL INSTALL EROSION AND SEDIMENT CONTROLS AS APPROPRIATE PRIOR TO STARTING WORK ON EACH PHASE.

PRIOR TO OPENING CLOSED LANES TO DAILY PEAK HOUR TRAFFIC, COVER AND PROTECT UNFINISHED

EXCAVATED AREAS WITHIN THE CLEAR ZONE WITH TEMPORARY BACKFILL OR STEEL PLATES.

THE TRAFFIC PATTERN SHOULD REMAIN IN THE CURRENT CONFIGURATION UNTIL ALL LANE MARKINGS AND SIGNING ARE IN PLACE BEFORE SHIFTING TRAFFIC TO THE NEW PATTERN

CONSTRUCTION NARRATIVE (CONTINUED):

- 1. CONTRACTOR SHALL INSTALL EROSION AND SEDIMENT CONTROLS AS APPROPRIATE PRIOR TO STARTING WORK.
- 2. WHEN CONSTRUCTION OF A WORK ZONE IS COMPLETE, THE CONTRACTOR SHALL REMOVE TEMPORARY TRAFFIC CONTROL DEVICES AND CONSTRUCTION SIGNS AND RESTORE TRAFFIC TO NORMAL CONDITIONS.
- 3. PLACE TEMPORARY TRAFFIC CONTROL DEVICES AND SIGNS PER VA WAPM FIGURES TTC-1.1, TTC-5.2, TTC-16.2, TTC-22.2, TTC-27.2, TTC-28.2, TTC-35.1, TTC-53.0, AND TTC-57.2.
- 4. CONSTRUCT PROPOSED DRAINAGE, CURB AND GUTTER, CURB, CONCRETE SIDEWALKS, CURB RAMPS, PAVEMENT MILLING, PAVEMENT WIDENING, PAVEMENT RESURFACING, PAVEMENT MARKINGS, AND SIGN PLACEMENT.
- 5. PRIOR TO DAILY PEAK HOUR TRAFFIC, REMOVE LANE CLOSURE

CONSTRUCTION PAVEMENT MARKING GENERAL NOTES:

(DURING CONSTRUCTION ONLY)

- 1. ALL CONSTRUCTION PAVEMENT MARKINGS SHALL BE IN ACCORDANCE WITH THE MOST CURRENT EDITION OF EACH OF THE FOLLOWING AND ANY REVISION THEREOF:
- A. MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES (MUTCD), 2009, REVISED JULY 2022
- B. THE VIRGINIA SUPPLEMENT TO THE 2009 MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES, 2011, REVISION 1, SEPTEMBER 30, 2013
- C. THE VIRGINIA DEPARTMENT OF TRANSPORTATION ROAD AND BRIDGE SPECIFICATIONS. DATED DECEMBER, 2020
- D. THE VIRGINIA DEPARTMENT OF TRANSPORTATION ROAD AND BRIDGE STANDARDS, 2016, REVISED - SEPTEMBER 2022
- 2. ALL CONSTRUCTION PAVEMENT MARKINGS SHALL BE OF TYPE A OR TYPE D, CLASS II, UNLESS OTHERWISE DIRECTED BY THE ENGINEER. DURING CONSTRUCTION ANY PAVEMENT MARKINGS WHICH WILL CONFLICT WITH THOSE SHOWN ON THE TMP/SOC PLANS, OR AS DIRECTED BY THE ENGINEER, SHALL BE COVERED WITH TYPE E, NON REFLECTIVE BLACK TAPE (OR ERADICATED AT THE DIRECTION OF THE ENGINEER).
- 3. ELONGATED ARROWS SHALL BE IN ACCORDANCE WITH MUTCD AND VDOT ROAD AND BRIDGE STANDARD.

TRANSPORTATION OPERATION PLAN:

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

ADVANCED WORK

ZONE TRAFFIC

CONTROL TRAINING

DESIGNER

VERIFICATION NO.:

022422244

EXP.: 02/02/2026

THESE PLANS ARE UNFINISHED AND UNAPPROVED AND ARE NOT GLADSTON R. ROSE TO BE USED FOR ANY TYPE OF CONSTRUCTION OR THE ACQUISITION OF RIGHT OF WAY.

SHEET 1B(1) SCALE: N/A

PLAN RUCTI

IANCE F

RAFFIC MAINTEN SEQUENCE OF

TRAFFIC MAINTENANCE PLAN AND SEQUENCE OF CONSTRUCTION Curve DUMFRIES_3 PI = 22+33.42 DELTA = 13* 39' 57.76" (RT) D = 4* 24' 27" T = 155.78' L = 310.07' R = 1,300.00' PC = 20+77.64 PT = 23+87.71 MAINTAIN ACCESS AT ALL TIMES DURING DUMFRIES RD. CONSTR. B CONSTRUCTION DUMFRIES ROAD (RTE. 234) (POSTED SPEED 35 MPH) POT 1+00.00 POT 3+00.00 POT5+00.00 N 25° 15′ 43" W (POSTED SPEED 25 END PROJECT/ END CONSTRUCTION STA. 24+34.70 POT 2+00.00 POT 4.00.00 PROP. RXW POT6+00.00 VAN METRE BARRINGTON PARK APARTMENTS LLC T.M. 90-81-CA INST: 200912290122581 ZONING: R5 PINNACLÉ REAL EX. R/W ESTATE GROUP, L.L.C. T.M. 90-01-40 INST. 200907220072228 ZONING: B4 I.M. 90-01-40 PROP. R/W PROP. TEMP. CONSTR. ESM'T. T.M. 90-01-41 INST. 202108020090139 ZONING: B4 EX. R/W-П VAN METRE BARRINGTON PARK APARTMENTS LLC T.M. 90-81-CA PROPITEMP./ CONSTR.ESMT. MAINTAIN ACCESS AT ALL TIMES DURING VAN METRE BARRINGTON PARK APARTMENTS LLC T.M. 90-81-CA INST. 200912290122581 ZONING: R5 STORM WATER MANAGEMENT ACCESS EASEMENT CONSTRUCTION 1.484 AC. (PHASE 3) (A) DUMFRIES ROAD CONSTR. & STA. 14+11.99 = ENTRANCE / CONSTR. @ ST A. 1+00.00 RAFFIC MAINTENANCE PLAN AND SEQUENCE OF CONSTRUCTION DELTA= 90° 00′ 00.00" (B) DUMFRIES ROAD CONSTR. & STA. 16+70.23 = SECTION A-A' ENTRANCE 2 CONSTR. & N.T.S STA.3+00.00 DUMFRIES ROAD DELTA= 90° 00′ 00.00" (C) DUMFRIES ROAD CONSTR. & STA. 22+24.44 = ENTRANCE CONSTR. & - GROUP 2 CHANNELIZING DEVICE (DRUM). STA.5+00.00 DELTA= 90° 42′ 47.00" GRAPHIC SCALE WORK AREA USE TTC-1J, TTC-5.2, TTC-16.2, TTC-22.2, TTC-27.2, TTC-28.2, TTC-35.1, TTC-53.0, TTC-57.2 SB ROADWAY NB ROADWAY THESE PLANS ARE UNFINISHED <u>LEGEND</u> MOT TYPICAL SECTION AND UNAPPROVED AND ARE NOT WORK AREA DUMFRIES ROAD TO BE USED FOR ANY TYPE SHEET OF CONSTRUCTION OR THE DUMF 1B(2) OPEN TRAFFIC LANE ACQUISITION OF RIGHT OF WAY. SCALE 1"=50'

Page 6H-40

September 2019 Page 6H-8 **Typical Traffic Control** Work Beyond the Shoulder Operation (Figure TTC-1.1) **NOTES** Guidance:

1. The minimum distance between the sign and work vehicle should be 1300'-1500' on Limited Access highways. and on all other roadways 500'-800' where the posted speed limit is greater than 45 mph, and 350'-500' where the posted speed limited is 45 mph or less.

- 2. The ROAD WORK AHEAD (W20-1) sign may be replaced with other appropriate signs such as the SHOULDER WORK (W21-5) sign. The SHOULDER WORK sign may be used for work adjacent to
- 3. The ROAD WORK AHEAD sign may be omitted where the work space is behind a barrier, more than 4 feet behind vertical curb (Standard CG-2 and CG-6) on urban roadways, or outside of the clear zone for all other roadways. For clear zone values see Page A-4 of Appendix A.
- 4. For short-term, short duration or mobile operations¹, all signs and channelizing devices may be eliminated if a vehicle with activated high-intensity amber rotating, flashing, or oscillating lights is used.
- 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 oscillating lights.
- 6. If the work space is in the median of a divided highway, an advance warning sign shall also be placed on the left side of the directional roadway.

September 2019 **Typical Traffic Control**

Shoulder Operation with Minor Encroachment (Figure TTC-5.2) **NOTES**

1. For required sign assemblies for multi-lane roadways see Note 1, TTC-4.1

- 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.
- 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.
- 5. A shadow vehicle with either an arrow board operating in the caution mode, or at least one highintensity amber rotating, flashing, or oscillating light shall be parked 80' - 120' in advance of the
- 6. Vehicle hazard warning signals shall not be used instead of the vehicle's high-intensity amber rotating, flashing, or oscillating lights. Vehicle hazard warning signals can be used to supplement high-intensity amber rotating, flashing, or oscillating lights.

Speed	L	ane Wid	ith (Fee	t)	Taper Length	Speed	Lane Width (Feet)					
Limit (mph)	9	10	11	12	Remarks		Limit (mph)	9	10	11	12	Remarks
25	95	105	115	125	L=S ² W/60		50	450	500	550	600	L=SW
30	135	150	165	180	L=S2W/60		55	495	550	605	660	L= SW
35	185	205	225	245	L=S2W/60		60	540	600	660	720	L=SW
40	240	270	295	320	L=S2W/60		65	585	650	715	780	L=SW
45	405	450	495	540	L=SW		70	630	700	770	840	L=SW

8. Channelizing device spacing shall be at the following:

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

1: Revision 1 – 4/1/2015

2: Revision 2 - 9/1/2019

September 2019

Typical Traffic Control Outside Lane Closure Operation on a Four-Lane Roadway (Figure TTC-16.2) **NOTES**

1. On divided highways having a median wider than 8', right and left sign assemblies shall be

- required. 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. When closing a lane, a PCMS should be used in advance of the first warning sign if all of the left side signs cannot be installed.2
- 4. Care should be exercised when establishing the limits of the work zone to insure maximum possible sight distance in advance of the transition, based on the posted speed limit and at least equal to or greater than the values in Table 6H-3. For Limited Access highways a minimum of 1000' is desired.

. All vehicles, equipment, workers, and their activities should be restricted to one side of the pavement.

6. Taper length (L) and channelizing device spacing shall be at the following:

	Taper Length L											
Speed	L	ane Wid	th (Fee	t)			Speed	La	ane Wid	th (Feet	t)	
Limit (mph)	9	10	11	12	Remarks		Limit (mph)	9	10	11	12	Remarks
25	95	105	115	125	L=S ² W/60		50	450	500	550	600	L=SW
30	135	150	165	180	L=S ² W/60		55	495	550	605	660	L= SW
35	185	205	225	245	L=S ² W/60		60	540	600	660	720	L=SW
40	240	270	295	320	L=S ² 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	highwa	ys shall	use a 1000' r	ner	ging tape	r regard	less of t	the post	ted spe	ed.
	Shiftin	g Taper	s see Ta	able 6H-	·2. ²			Shoulde	r Taper	= 1/3 L N	1inimun	n

7. Channelizing device spacing shall be at the following:

				Chainlenzing D	evice Spa	icing						
	Location Spacing	Speed Limit (mph)		Location Spacing	Speed L (mph)	imit	Location Spacing	Speed Limit (mph)				
	Spacing	0 -35	36 +	Spacing	0 -35	36 +		0 -35	36 +			
	Transition	20'	40'	Travelway	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.	An arrow board s	hall be	used v	vhen a lane is close	d. When	n more	than one lane is clo	sed, a				

- separate arrow board shall be used for each closed lane (see Figure TTC-18). 9. The buffer space length shall be shown in Table 6H-3 on Page 6H-5 for the posted speed limit. 10. A shadow vehicle with either a Type B or C arrow board operating in the caution mode, or at
- least one high intensity amber rotating, flashing, or oscillating light shall be parked 80'-120' in advance of the first work crew. When the posted speed limit is 45 mph or greater, a truck-11. Vehicle hazard warning signals shall not be used instead of the vehicle's high-intensity amber
- rotating, flashing, or oscillating lights but can be used to supplement the amber rotating, flashing, 12. When a side road intersects the highway within the TTC zone, additional TTC devices shall be
- placed as needed.

13. PTRS and their supporting signs may be used, see Sections 6F.99 and 6G.25. Long-term transverse rumble strips may be used in long-term situations, see Section 6F.99 and TTC-20.2 14. The supplemental PTRS may be eliminated.²

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

Page 6H-52

Typical Traffic Control Right Lane Closure Operation on a Three-Lane Roadway (Figure TTC-22.2) **NOTES**

September 2019

- 1. The distance between signs 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.² The distance of the beginning of channelizing device transition should be a minimum of 500' and a maximum of 800'.
- 2. The buffer space length should be as shown in Table 6H-3 on Page 6H-5 for the posted speed limit. 3. For locations with a high volume of left turning movements, the graphic NO LEFT TURN (R3-2) signs should be used within the closed lane.

4. Where Right-of-Way or geometric conditions prevent use of 48" x 48" signs, 36" x 36" signs may be used.

5. Taper length (L) shall be at the following:

					Taper	Len	gth L					
Speed	L	ane Wi	dth (Fee	t)			Speed	L	ane Wid	lth (Fee	t)	
Limit (mph)	9	10	11	12	Remarks		Limit (mph)	9	10	11	12	Remar
25	95	105	115	125	L=S2W/60	1	50	450	500	550	600	L=SV
30	135	150	165	180	L=S2W/60	1	55	495	550	605	660	L= SV
35	185	205	225	245	L=S ² W/60	1	60	540	600	660	720	L=SV
40	240	270	295	320	L=S ² W/60		65	585	650	715	780	L=SV
45	405	450	495	540	L=SW		70	630	700	770	840	L=SV
posted s	shifting Tapers - full lane width shifts on Limited Access Highways shall use a 750' shifting taper for costed speeds less than 65 mph and a 1000' shifting taper for posted speeds equal to or greater than 65 mph. For all other readways 3/L should be used 2											

6. Channelizing device spacing shall be at the following:

	Channelizing Device Spacing													
Location	Speed Limit (mph)		Location	Speed L (mph)	imit	Location Spacing	Speed Limit (mph)							
Spacing	0 -35	36 +	Spacing	0 -35	36 +		0 -35	36 +						
Transition	20'	40'	Travelway	40'	80'	*Construction Access	80'	120'						
*Construction access spacing may be increased to this distance, but shall not exceed one access per ¼ mile.														

- 7. To prevent vehicles from entering into the buffer and activity areas¹, channelizing device spacing shall be a maximum of 20' on center. 8. A shadow vehicle with either a Type B or C arrow board operating in the caution mode, or at least
- one rotating amber light or high intensity amber flashing or oscillating light shall be parked 80'-120' in advance of the work crew in both directions of travel. When the posted speed limit is 45 mph or greater, the shadow vehicle shall be equipped with a truck-mounted attenuator (TMA).² 9. When a side road intersects the highway within the temporary traffic control zone, additional traffic
- control devices shall be placed as needed. 10. For long-term work zones existing conflicting pavement markings and markers shall be removed and temporary pavement markings and markers shall be installed per Figure TTC-60.
- 11. When channelizing devices have the potential of leading vehicular traffic out of the intended traffic space,

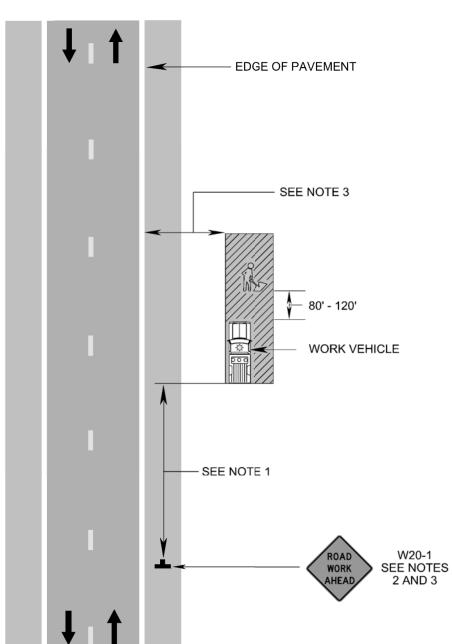
the channelizing devices should be extended a distance with 4 additional channelizing devices beyond the downstream end of the transition area as depicted.¹

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

September 2019

1: Revision 1 - 4/1/2015

Work Beyond the Shoulder Operation (Figure TTC-1.1)

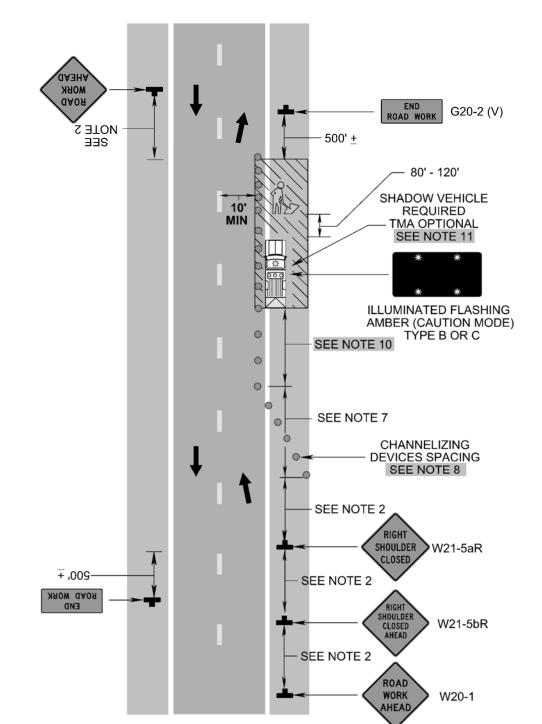


1: Revision 1 – 4/1/2015

September 2019

Page 6H-16

Shoulder Operation with Minor Encroachment (Figure TTC-5.2)



September 2019 **Outside Lane Closure Operation on a Four-Lane Roadway**

SHADOW VEHICLE REQUIRED (TMA REQUIREMENT SEE NOTE 10) PTRS OPTIONAL SEE NOTE 14 SEE NOTE 6 SHOULDER TAPER SEE NOTE 6 ARROW BOARD TYPE C SEE NOTES 4 & 8 SEE NOTE 2 & 4 -W20-V28L REQUIRED WITH PTRS

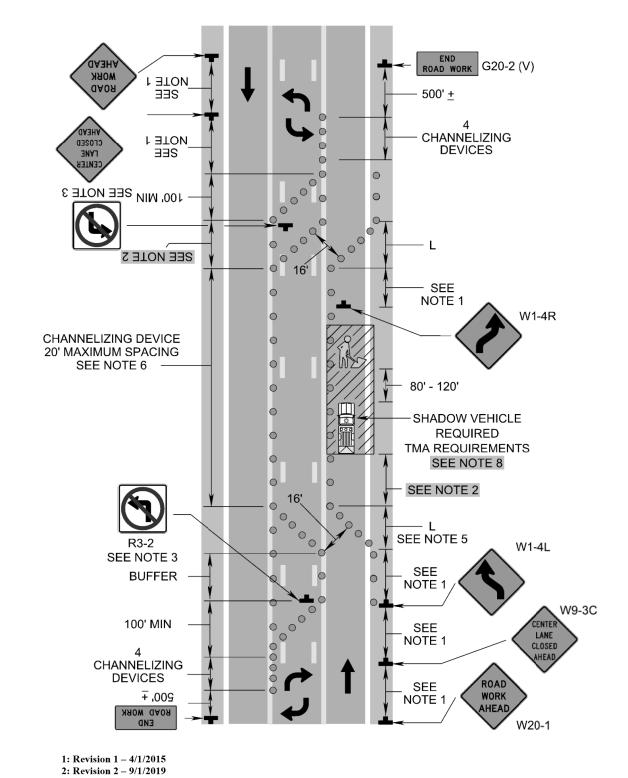
PCMS - SEE NOTE 3 →

2: Revision 2 – 9/1/2019

3: Revision 2.1 -11/1/2020

September 2019

Right Lane Closure Operation on a Three-Lane Roadway (Figure TTC-22.2)



THESE PLANS ARE UNFINISHED AND UNAPPROVED AND ARE NO TO BE USED FOR ANY TYPE OF CONSTRUCTION OR THE ACQUISITION OF RIGHT OF WAY

SHEET 1B(3)

SCALE: N/A

DUMF

September 2019

Page 6H-62 September 2019 **Typical Traffic Control** Lane Closure Operation – Far Side of an Intersection (Figure TTC-27.2) **NOTES** 1. Sign spacing distance should be 350'-500' where the posted speed limit is 45 mph or less, 500'-800' where the posted speed limit is greater than 45 mph.

2. On divided highways having a median wider than 8', right and left sign assemblies shall be required. 3. Taper length (L) shall be at the following:

					Taper	Len	gth L					
Speed	L	ane Wic	th (Fee	t)			Speed	L	ane Wid	th (Fee	t)	
Limit (mph)	9	10	11	12	Remarks	Remarks		9	10	11	12	Remarks
25	95	105	115	125	L=S ² W/60	1	50	450	500	550	600	L=SW
30	135	150	165	180	L=S2W/60	1	55	495	550	605	660	L= SW
35	185	205	225	245	L=S ² W/60		60	540	600	660	720	L=SW
40	240	270	295	320	L=S ² W/60		65	585	650	715	780	L=SW
45	405	450	495	540	L=SW		70	630	700	770	840	L=SW
posted s	peeds l	ess than	65 mpl	n and a	n Limited Ac 1000' shifting d be used.²							
					haulder Ten	3r = 1	/ I Minin					

4. Channelizing device spacing shall be at the following:

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

5. If room permits, a shadow vehicle with at least one amber rotating, oscillating, or high intensity flashing 1 light should be parked 80'-120' in advance of the first work crew.

Standard: 6. If the posted speed limit is 45 mph or greater, the shadow vehicle shall have a truck-mounted

7. For emergency situations (any non-planned operation) of 30 minutes or less duration, two rotating amber lights or high intensity amber flashing or oscillating1 lights mounted on the vehicle and visible for 360° shall be required in addition to the channelizing devices shown around the vehicle. Also, vehicle hazard warning signals shall be used.

8. If the work space extends across a crosswalk, the crosswalk should be closed using the information and

9. If the left turn lane is closed a NO LEFT TURN (Symbol) (R3-2) shall be used.¹

10. PTRS may be used as shown in Figure TTC-17 and in accordances with Section 6F-99.2 11. The supplemental PTRS may be eliminated.²

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

Typical Traffic Control Lane Closure Operation in an Intersection (Figure TTC-28.2) **NOTES**

Guidance:

Page 6H-64

1. The control of traffic through the intersection in order of preference should be:

a. Obtain the services of law enforcement personnel. b. Detour the effective routes to other roads and streets as approved and directed by the District² Traffic

c. Place a state certified flagger on each leg of the intersection controlling a single lane of traffic. Appropriate signing as shown should be used for law enforcement and flagging operations. For detour

2. Sign spacing distance should be 350'-500' where the posted speed limit is 45 mph or less, 500'-800' where the posted speed limit is greater than 45 mph.

3. To maintain efficient traffic flow in a flagging operation on a two-lane roadway the maximum time motorist 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

Standard:

4. Channelizing device spacing shall be on 20' centers or less.

500 vehicles per day). For additional information see Section 6E.07.²

5. PTRS shall be used as noted in Section 6F.99.2

6. If room permits, a shadow vehicle with at least one rotating amber light or high intensity amber flashing or oscilllating¹ light should be parked 80'-120' in advance of the first work crew.

7. For emergency situations (any non-planned operation) of 30 minutes or less duration, two rotating amber lights or high intensity amber flashing or oscillating lights mounted on the vehicle and visible for 360° shall be required in addition to the channelizing devices shown around the vehicle. Also, vehicle hazard warning signals shall be used.

8. If the work space extends across a crosswalk, the crosswalk should be closed using the information and devices shown in Figure TTC-36.

9. Turns can be prohibited as required by vehicular traffic conditions. Unless the streets are wide, it might be physically impossible to make certain turns, especially for large vehicles.

Page 6H-78

Typical Traffic Control Sidewalk Closure and Bypass Sidewalk Operation (Figure TTC-35.1)

1. When crosswalks or other pedestrian facilities are closed or relocated, temporary facilities shall be detectable and shall include accessibility features consistent with the features present in the existing pedestrian facility.

NOTES

2. Where high speeds are anticipated, a temporary traffic barrier and, if necessary, a crash cushion should be used to separate the temporary sidewalks from vehicular traffic.

3. Audible information devices should be considered where midblock closings and changed crosswalk areas

cause inadequate communication to be provided to pedestrians who have visual disabilities. 4. Temporary markings should be considered for operations exceeding three days in duration.

5. Only the TTC devices related to pedestrians are shown. Other devices, such as lane closure signing or ROAD NARROWS (W5-1) signs, may be used to control vehicular traffic.

6. For nighttime closures, Type A Flashing warning lights may be used on barricades that support signs and close sidewalks.

7. Signs, such as KEEP RIGHT (R4-V7R) and KEEP LEFT (R4-V7L), may be placed along a temporary sidewalk to guide or direct pedestrians.

8. All sidewalk closures shall be closed with Type 3 Barricades. The SIDEWALK CLOSED (R9-9) sign and the SIDEWALK CROSS HERE (R9-11) sign shall be installed above the Type 3 barricade. The KEEP RIGHT sign can cover the top rail of the Type 3 Barricade.²

Page 6H-114

September 2019

Typical Traffic Control Signing for Project Limits (Figure TTC-53.0) **NOTES**

September 2019

1. This layout depicts signing requirements for notifying motorist when they are entering and exiting a potential construction/maintenance area with a duration equal to or greater than 60 days.

2. The ROAD WORK AHEAD (W20-1) sign or the ROAD WORK NEXT XX MILES (G20-1 (V)) sign shall be placed far enough in advance of the project limits so that other warning signs in a

series may be adequately placed prior to the condition they are warning about. 3. The ROAD WORK NEXT XX MILES sign shall be used for projects with activity areas greater than 2 miles in length, or when multiple work activities (such as pavement patching, guardrail

installations, shoulder restoration, etc.) occur along a highway.

4. The distance displayed on the ROAD WORK NEXT XX MILES sign shall be stated to the nearest whole mile from the point of installation to the END ROAD WORK (G20-2 (V)) sign.

5. On divided highways having a median wider than 8', right and left sign assemblies shall be required.

6. For projects with activity areas 2 miles or less in length, the ROAD WORK AHEAD sign should be the

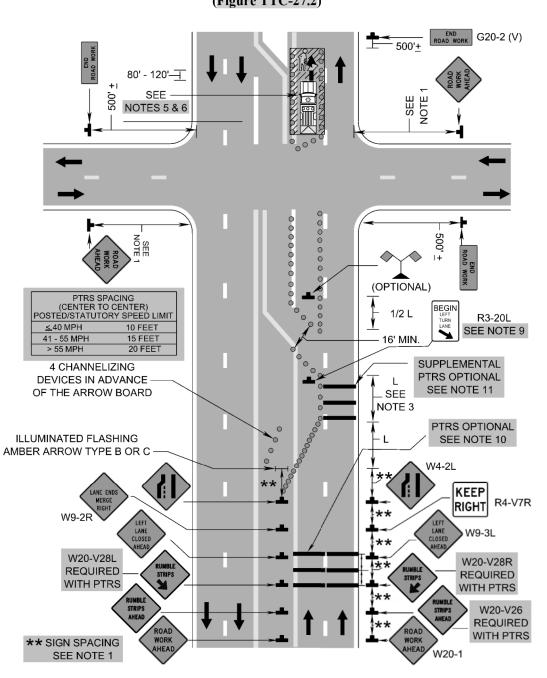
7. Sign spacing should be 1300'-1500' for Limited Access highways. For all other roadways, the sign spacing should be 500'-800' where the posted speed limit is greater than 45 mph, and 350'-500' where the posted speed limit is 45 mph or less.

8. All connections within the project limits should be identified with signs indicating to motorist they are entering or exiting a potential construction/maintenance area.

2: Revision 2 - 9/1/2019

September 2019

Lane Closure Operation - Far Side of an Intersection (Figure TTC-27.2)



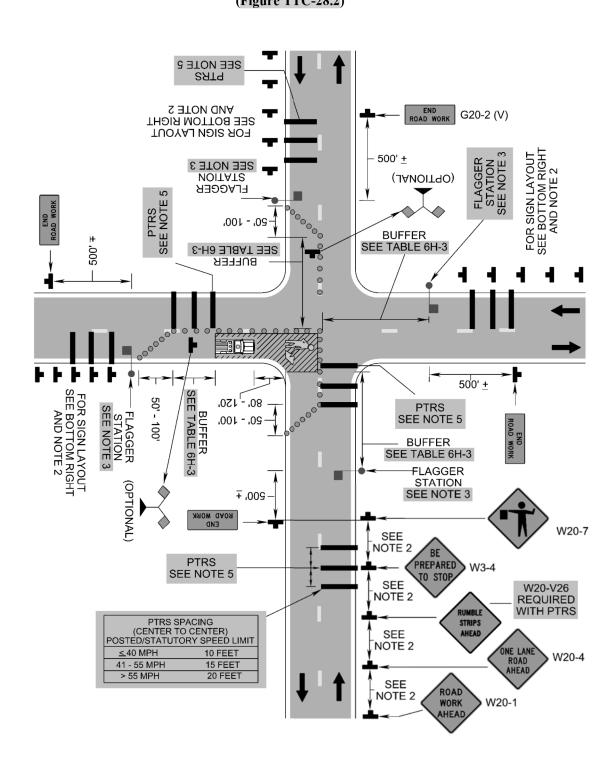
1: Revision 1 - 4/1/2015 2: Revision 2 - 9/1/2019 September 2019

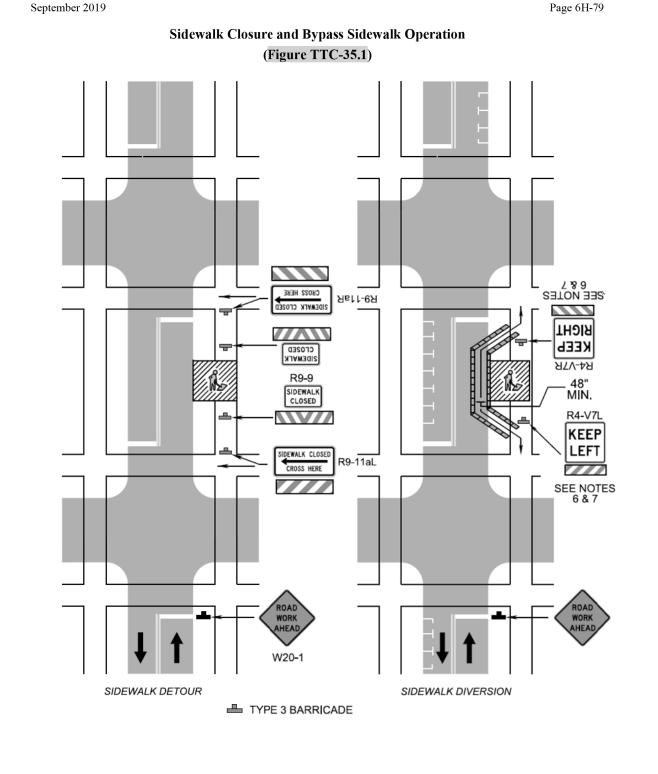
2: Revision 2 – 9/1/2019

Page 6H-63

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

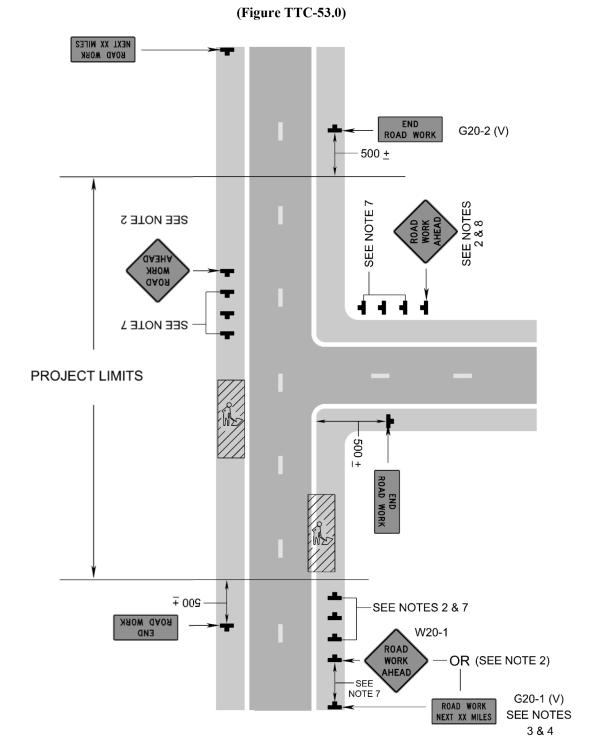
> **Lane Closure Operation in an Intersection** (Figure TTC-28.2)





2: Revision 2 – 9/1/2019

September 2019 Page 6H-115 **Signing for Project Limits** (Figure TTC-53.0)



THESE PLANS ARE UNFINISHED AND UNAPPROVED AND ARE NO TO BE USED FOR ANY TYPE OF CONSTRUCTION OR THE

ACQUISITION OF RIGHT OF WAY.

SHEET 1B(4)

SCALE: N/A

DUMF

Page 6H-122

July 2019

Typical Traffic Control

End of Day Signing for Partial Paving Operations on a Multi-Lane Roadway (Figure TTC-57.2)

<u>NOTES</u>

Standard:

- 1. On divided highways having a median wider than 8', right and left sign assemblies shall be used. Median barrier is considered to be part of the shoulder and its measurement shall be used to determined the total width of the shoulder.
- 2. The maximum pavement edge drop-off between traffic lanes shall be 2 inches or less.
- 3. Open travel lane(s) shall not be exposed to more than 2 to 3 mile sections of milled or uneven surface.
 4. A portable changeable message sign with "ROUGH ROAD AHEAD" and other appropriate
- messages shall be used.

 5. A BUMP (W8-1) sign shall be placed in advance of the end of the pavement drop-off.¹
- 6. The District² Traffic Engineer shall determine speed reductions.
- 7. The UNEVEN LANES (W8-11), STAY IN LANE (R4-9), and BUMP signs shall be adjusted daily with the work operation and their sign stand shall be supported with a sand bag weighing approximately 25-pounds on each leg or two (2) drum collar weights positioned on the center of the sign stand¹. Additional UNEVEN LANES signs shall be installed every 2 miles and on entrance ramps
- 8. Where conditions warrant, ROUGH ROAD (W8-8) and BUMP signs shall be installed 500' ± in advance of the affected roadway surface on entrance ramps, and BUMP signs shall be installed 500' ± in advance of unaffected roadway surface on exit ramps.

9. All signs shall be post-mounted at locations after 72 consecutive hours of non-work activities.

Guidance:

10. Sign spacing distance should be 1300'-1500' for Limited Access highways, and on all other roadways 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.

11. Only traffic control signing for partial pavement resurfacing is shown. Other devices may be used for the

- control of traffic through the work area.
 Temporary pavement markers spaced at 10 foot centers for two-way traffic centerlines or three per skip
- line for lane division lines may be added as directed by the engineer.

 13. The LOW SHOULDER (W8-9) sign may be used to warn of a shoulder condition where there is an

elevation difference of less than 2 inches between the shoulder and the travel lane.

14. If used, the LOW SHOULDER sign shall be repeated at 1 mile intervals if the condition extends over a distance in excess of 1 mile.

- 15. The SHOULDER DROP OFF (W8-V5) sign shall be used when an unprotected shoulder drop-off, adjacent to the travel lane, exceeds 2 inches depth between the shoulder and the travel lane. Where the condition extends over a distance in excess of 1 mile, the sign shall be repeated at 1 mile intervals.
- Option:

 16. The SHOULDER DROP OFF sign may be eliminated if a 6:1 (desirable) to 4:1 (minimum) wedge is used

16. The SHOULDER DROP OFF sign may be eliminated if a 6:1 (desirable) to 4:1 (minimum) wedge is used between the travel lane and the shoulder.Standard:

- 17. A temporary pavement wedge shall be constructed of surface mix asphalt a minimum of three (3) feet in length for every inch of depth of pavement milling on the approach and departure end of the
- milled travel lane(s). Refer to Standard ACOT-1 of the Road and Bridge Standards for details.

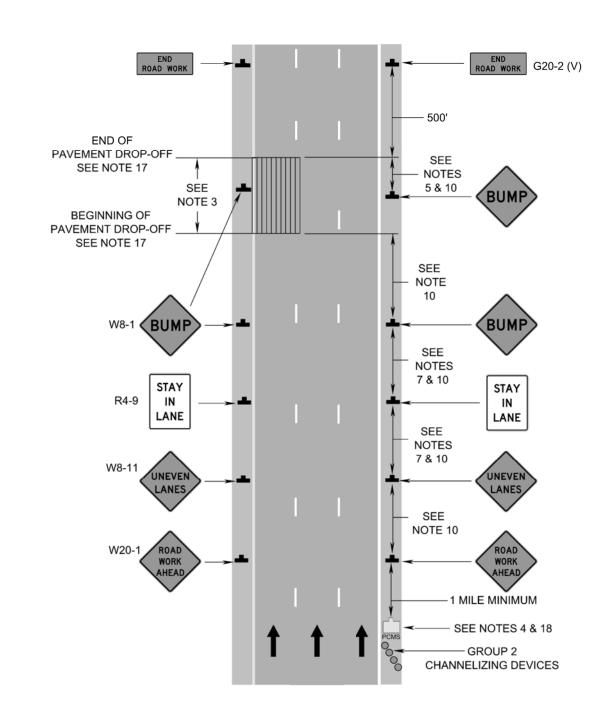
 18. A minimum of four (4) drum channelizing devices shall be placed on the shoulder in advance of the PCMS in a taper for delineation (see Figure 6F-6).

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

July 2019

Page 6H-1

End of Day Signing for Partial Paving Operations on a Multi-Lane Roadway (Figure TTC-57.2)



* Rich in Historic

POF MANASSAS, VIRGIN DEPARTMENT OF ENGINEERING 8500 PUBLIC WORKS DR MANASSAS, VIRGINIA 20110

MANASSAS PROJECT NO: 1-033 REVISION
DATE OF PLAN ISSUANCE: TBD DATE BY DI
CONSULTANT PROJECT ID: RK&K
DESIGNED BY: DVK DATE: 11/10/23
CHECKED BY: MJK DATE: 11/10/23

RAFFIC MAINTENANCE PLAN AI SEQUENCE OF CONSTRUCTION

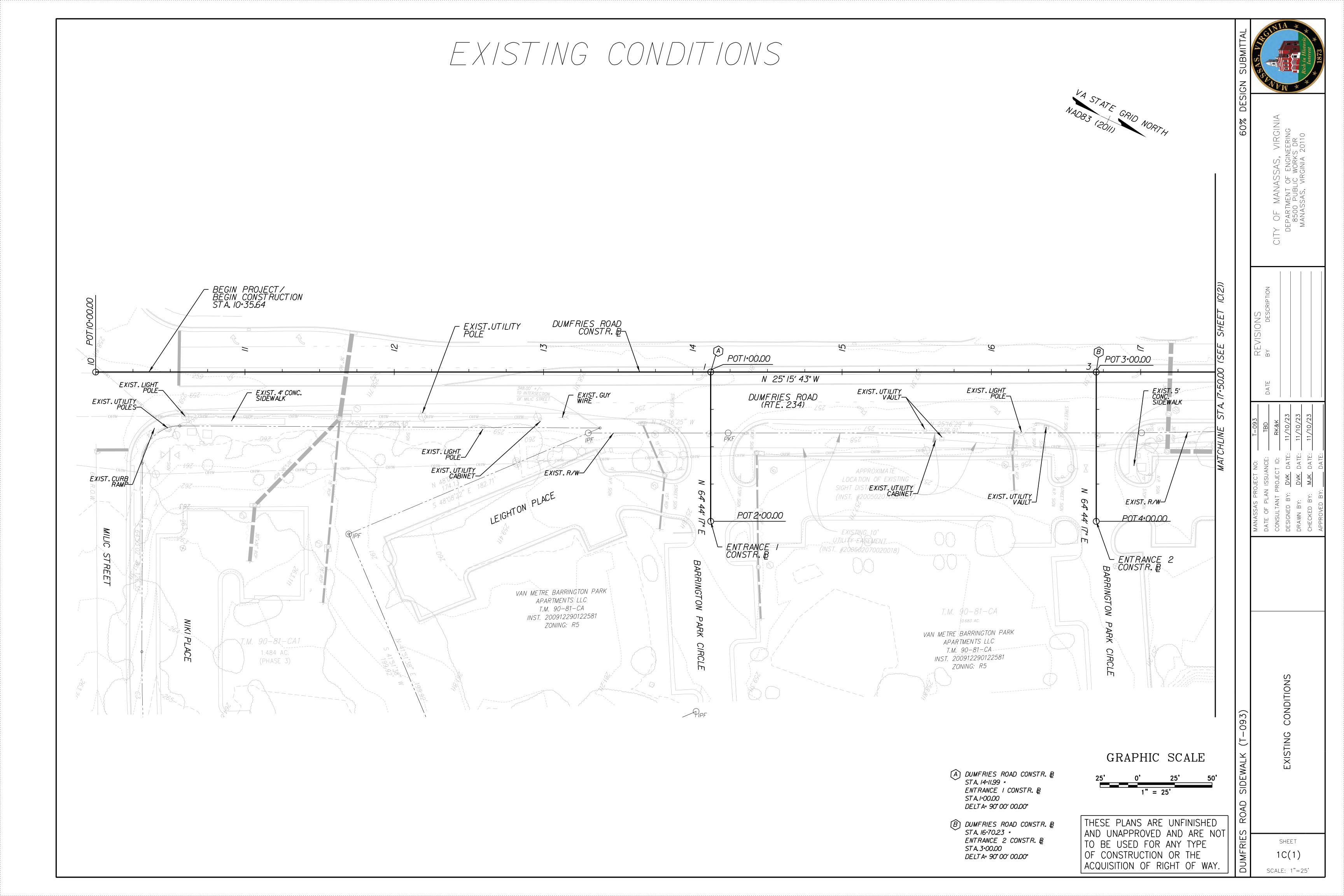
DUMFRIES ROAD SIDEWALK (

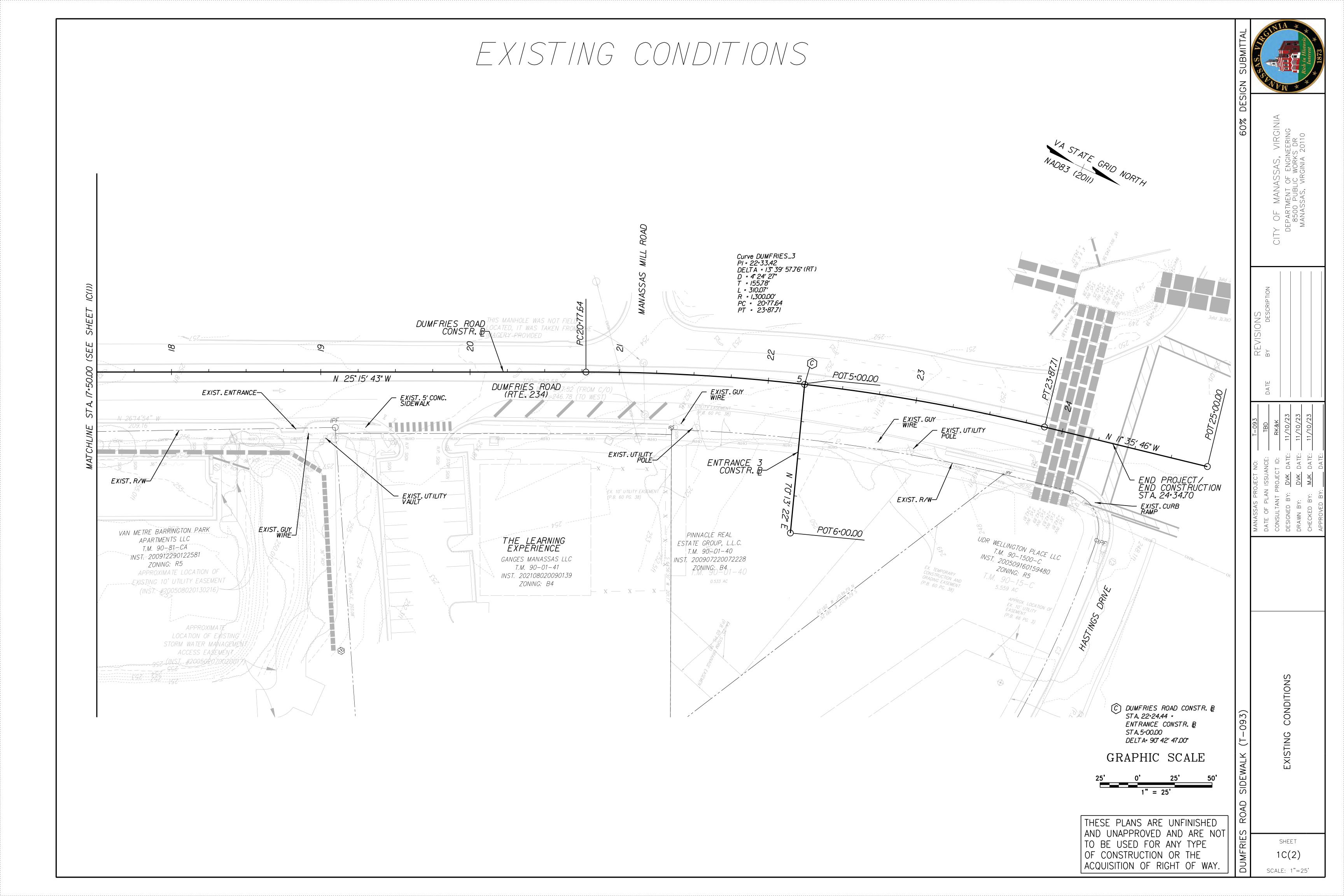
SHEET

1B(5)

SCALE: N/A

THESE PLANS ARE UNFINISHED AND UNAPPROVED AND ARE NOT TO BE USED FOR ANY TYPE OF CONSTRUCTION OR THE ACQUISITION OF RIGHT OF WAY.





CITY OF MANASSAS GENERAL NOTES

ALL CONSTRUCTION WITHIN EXISTING AND/ OR PROPOSED R/W IS TO CONFORM TO THE VDOT STANDARDS AND SPECIFICATIONS, THE CURRENT EDITION OF THE CITY OF MANASSAS DESIGN AND CONSTRUCTION STANDARDS MANUAL (DSCM), LATEST EDITION MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES (MUTCD) AND THE VIRGINIA WORK AREA PROTECTION MANUAL (VWAPM), UNLESS OTHERWISE NOTED.

METHODS AND MATERIALS USED IN THE CONSTRUCTION OF THE IMPROVEMENTS HEREIN SHALL CONFORM TO THE CURRENT EDITION OF THE CITY OF MANASSAS DESIGN AND CONSTRUCTION STANDARDS MANUAL (DCSM) AND VIRGINIA DEPARTMENT OF TRANSPORTATION STANDARDS AND SPECIFICATIONS.

THE CONTRACTOR SHALL BE RESPONSIBLE FOR COSTS INCURRED FOR THE RELOCATION OF OR DAMAGE TO ANY PUBLIC UTILITIES DUE TO CONSTRUCTION.

MEASURES TO CONTROL EROSION AND SILTATION MUST BE PROVIDED AND INSTALLED ACCORDING TO ARTICLE 4 OF THE CITY OF MANASSAS DCSM AND/OR THE CURRENT EDITION OF THE VIRGINIA EROSION AND SEDIMENT CONTROL HANDBOOK. THE APPROVAL OF THESE PLANS IN NO WAY RELIEVES THE CONTRACTOR OR AGENT OF THE RESPONSIBILITIES CONTAINED IN THE SILTATION AND EROSION CONTROL POLICY.

THE CONTRACTOR IS REQUIRED TO SCHEDULE A PRECONSTRUCTION MEETING WITH THE DEVELOPMENT SERVICES SITE INSPECTION DIVISION PRIOR TO ANY LAND DISTURBING ACTIVITIES (703-257-8278).

BEFORE BURNING, BLASTING, TRANSPORTATION OR STORAGE OF EXPLOSIVES IN THE CITY OF MANASSAS A PERMIT SHALL BE OBTAINED FROM THE FIRE MARSHAL'S OFFICE.

PRIOR TO ANY LAND DISTURBING ACTIVITIES, ALL NECESSARY PERMITS SHALL BE OBTAINED (703-257-8278).

A PERMIT WILL BE REQUIRED FOR ALL ADVERTISING SIGNS. THIS PERMIT CAN BE SECURED FROM THE CITY OF MANASSAS DEVELOPMENT SERVICES.

ALL UNSTABLE MATERIAL SHALL BE REMOVED FROM THE CONSTRUCTION LIMITS OF THE ROADWAY BEFORE PLACING EMBANKMENT.

ALL STREETS SHALL BE COMPACTED TO A DENSITY OF NOT LESS THAN 95% OF MAXIMUM DENSITY DETERMINED IN CONFORMITY WITH VTM-1 METHOD. THE SUBDIVIDER SHALL USE MECHANICAL MEANS TO ACHIEVE THE REQUIRED COMPACTION.

THE CONTRACTOR SHALL PROVIDE TO THE CITY OF MANASSAS, THIRD PARTY GEOTECHNICAL TESTING RESULTS.

ALL STORM SEWER SYSTEMS SHALL BE REINFORCED CONCRETE PIPE. ALL CONCRETE PIPE TO BE PLACED WITHIN THE DEDICATED RIGHT-OF-WAY- SHALL CONFORM TO ASTM SPECIFICATION C76-65T CLASS IV.

ALL CITY OF MANASSAS STANDARD PAVEMENT DESIGNS ARE BASED ON A MINIMUM CBR VALUE OF 10.

A SMOOTH GRADE SHALL BE MAINTAINED FROM CENTERLINE OF EXISTING ROAD TO PROPOSED CURB AND GUTTER TO PRECLUDE THE FORMING OF FALSE GUTTERS AND/ OR THE PONDING OF ANY WATER ON THE ROADWAY.

THE CONTRACTOR SHALL GRADE SLOPES NO STEEPER THAN 3:1 ON RETURNS AT INTERSECTIONS TO PROVIDE ADEQUATE SIGHT DISTANCE.

ALL UNDERGROUND UTILITIES MUST BE PLACED FROM THE UTILITY MAIN TO THE RIGHT-OF-WAY LINE FOR EACH LOT AND ALL UNDERGROUND UTILITY MAINS AND CONNECTIONS MUST BE INSTALLED AND TESTED IN-PLACE PRIOR TO THE APPLICATION OF ANY BITUMINOUS MATERIALS OR BASE STONE.

THE CONTRACTOR SHALL BE RESPONSIBLE FOR DETERMINING THE LOCATION OF ALL EXISTING UNDERGROUND UTILITIES PRIOR TO BEGINNING ANY CONSTRUCTION. CALL BEFORE YOU DIG 1-800-552-7001.

IT IS THE INTENTION OF THESE PLANS THAT ALL AREAS SHALL BE GRADED IN DETAIL SO AS TO PROVIDE POSITIVE SURFACE DRAINAGE AND TO PREVENT THE PONDING OF WATER.

THE CONTRACTOR SHALL PROVIDE ADEQUATE MEANS OF CLEANING TRUCKS AND/ OR OTHER EQUIPMENT OF MUD PRIOR TO ENTERING PUBLIC STREETS, AND IT IS THE CONTRACTOR'S RESPONSIBILITY TO CLEAN STREETS, ALLAY DUST, AND TO TAKE WHATEVER MEASURES ARE NECESSARY TO INSURE THAT THE ROAD IS MAINTAINED IN A CLEAN, MUD AND DUST FREE CONDITIONS AT ALL TIMES. NO SEPARATE PAY ITEM WILL BE PROVIDED FOR THIS WORK.

THE CONTRACTOR SHALL BE RESPONSIBLE FOR SUPPLYING ALL UTILITY COMPANIES (GAS, ELECTRIC, TELEPHONE, ETC.) WITH COPIES OF PLANS THAT HAVE BEEN APPROVED BY THE CITY OF MANASSAS AND ADVISING THEM THAT ALL GRADING SHALL CONFORM TO THE APPROVED PLANS AND FURTHER THAT THE UTILITY COMPANIES SHALL BE RESPONSIBLE FOR HONORING THESE PLANS AND THE FINISH GRADES IN THE INSTALLATION OF THEIR UTILITY LINES.

ALL UTILITY TIE IN WORK SHALL BE COORDINATED WITH THE CITY INSPECTOR.

GENERAL NOTES

DRAINAGE

- D-1 The horizontal location of all drainage structures shown on these plans is approximate only, with the exception of structures showing specific stations, special design bridges and storm sewer systems.
- D-2 The horizontal location and invert elevations shown for proposed culverts and storm sewer outfall pipes are based on existing survey data and required design criteria. If during construction, it is found that the horizontal location or invert elevations shown on the plans differ significantly from the horizontal location or elevations of the stream or swale in which the culvert or storm sewer outfall pipe is to be placed, the Engineer shall confer with, and get approval from, the applicable District Drainage Engineer before installing the culvert or storm sewer outfall pipe.
- D-3 The "H" dimensions shown on plans for drop inlets and junction boxes and the "L.F." dimensions shown for manholes are for estimating purposes and are based on the proposed invert elevations shown for the structure and the anticipated top (rim) elevation based on existing or proposed finished grade. The actual "H" or "L.F." dimensions are to be determined by the contractor from field conditions.
- D-7 All pipe on this project shall be <u>class IV reinforced</u> concrete. For strength, sheet thickness, or class designation; available sizes; height of cover limitations; and other restrictions for a particular pipe type or height cover, see the applicable sections of the VDOT Road and Bridge Standards PC-1.
- D-12 All existing drainage facilities labeled "To Be Abandoned" shall be left in place, backfilled and plugged in accordance with the VDOT Road and Bridge Standard PP-1. Basis of Payment will be C.Y. of Flowable Backfill.
- D-13 Existing drainage facilities being utilized as a part of the drainage system, and designated on the plans "To Be Cleaned Out" shall be cleaned as directed by the Engineer. The cost incidental to this shall be included in the contract price for other items.
- D-14 Proposed drop inlets with a height (H) less than the standard minimum shown in the VDOT Road and Bridge Standards shall be considered and paid for as Standard Drop Inlets for the type specified. Pipes with less than standard minimum finished height of cover shall be noted as such in the drainage description for the pipe. Specific pipe bedding and cover requirements are provided in the applicable PB-1 and PC-1 standard drawings of the VDOT Road and Bridge Standards.

GRADING

- G-1 The grade line denotes top of finished pavement unless shown otherwise on typical sections or plans.
- G-2 Earthwork quantities on this project are based on anticipated settlement and may require adjusting during construction.
- G-4 The cost of removal of all existing concrete items located in the area to be graded, including, but not limited to the following, shall be included in the price bid for regular excavation: Concrete Pipe
- G-6 The borrow material for this project shall be a minimum CBR 10 or as approved by the Materials Engineer.

INCIDENTALS

- I-6 Certain trees shall be preserved as noted on plans or as directed by the Engineer.
- I-16 The "underground utilities" survey data on this project has been provided by consultant and copies are available from the Department.
- I-18 All pavement markings and traffic flow arrows shown on the roadway construction plans are schematic only. The actual location and application of pavement markings shall be in accordance with Section 704 of the applicable VDOT Road and Bridge Specifications and MUTCD.

PAVEMENT

P-2 The pavement materials on this project will be paid for on a tonnage basis. The weight will vary in accordance with the specific gravity of the aggregates and the asphaltic content of the mix actually used to secure the design depth. The weight of the asphalt concrete is based on 95% of the theoretical maximum density.

GN SUBMILIAL

Rich in Historic

Rich in Historic

% DESIGN

CITY OF MANASSAS, VIRGINIA
DEPARTMENT OF ENGINEERING
8500 PUBLIC WORKS DR
MANASSAS, VIRGINIA 20110

TBD DATE BY DESCRIPTION

10/23

10/23

10/23

MANASSAS PRUJECT NO: 1-093

DATE OF PLAN ISSUANCE: TBD

CONSULTANT PROJECT ID: RK&K

DESIGNED BY: DVK DATE: 11/10/23

CHECKED BY: MJK DATE: 11/10/23

RAL NOTES

DUMFRIES ROAD SIDE

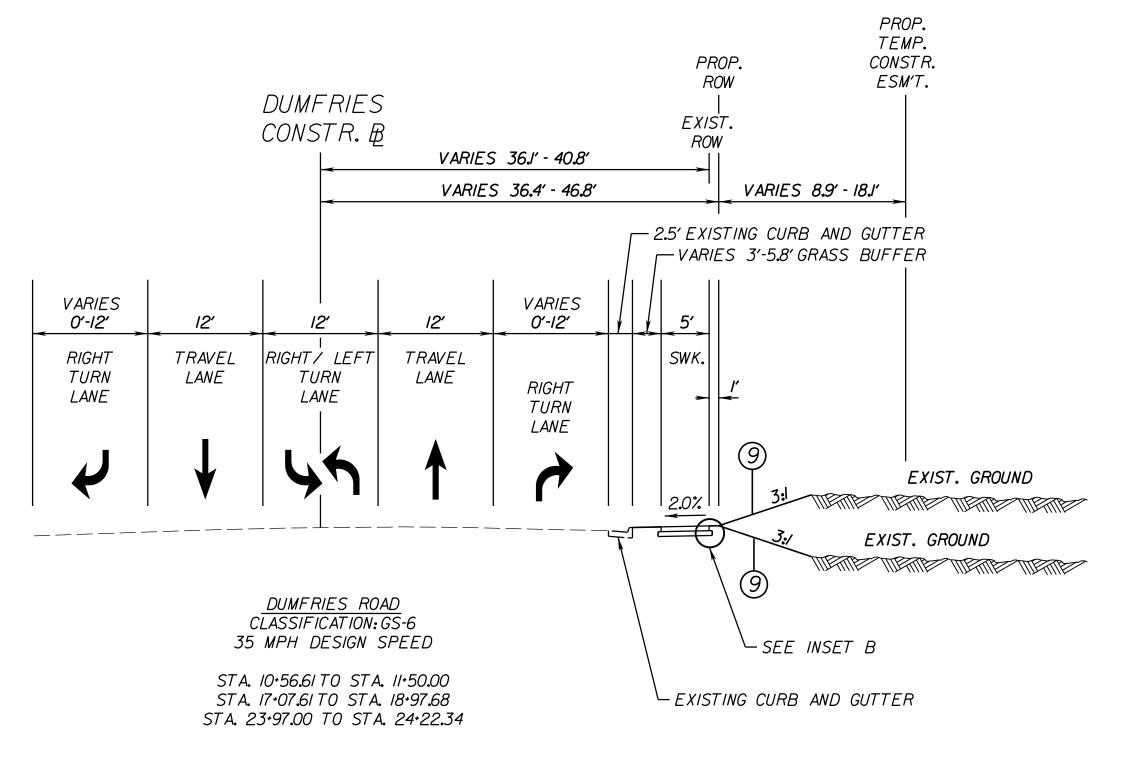
SHEET

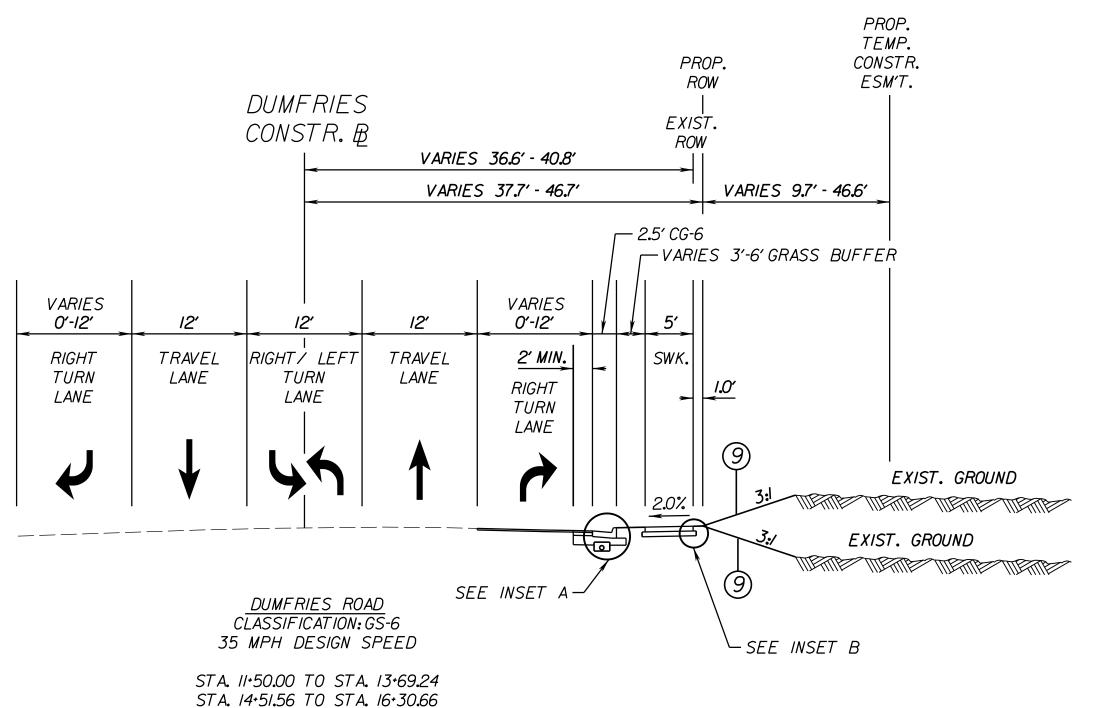
2A

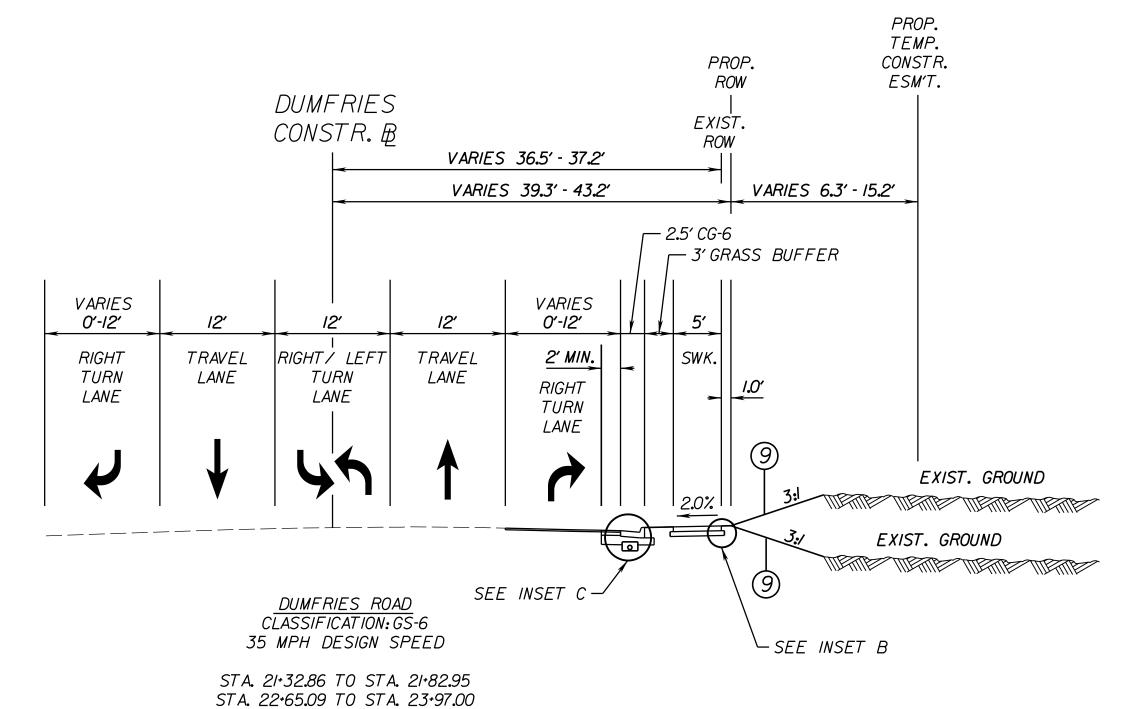
SCALE: N/A

THESE PLANS ARE UNFINISHED AND UNAPPROVED AND ARE NOT TO BE USED FOR ANY TYPE OF CONSTRUCTION OR THE ACQUISITION OF RIGHT OF WAY.

TYP/CAL SECT/ONS







CURB RAMP LIMITS

STA. 13+69.24 TO STA. 13+93.98

STA. 14+29.58 TO STA. 14+51.56

STA. 16+30.66 TO STA. 16+53.47

STA. 16+88.75 TO STA. 17+07.61

STA. 21+82.95 TO STA. 22+06.63

STA. 22+43.71TO STA. 22+65.09

ENTRANCE LIMITS

STA. 13+93.98 TO STA. 14+29.58

STA. 16+53.47 TO STA. 16+88.75

STA. 22+06.63 TO STA. 22+43.71

LEGEND

EXISTING PAVEMENT (TO REMAIN)

2" ASPHALT CONCRETE TYPE SM-9.5D

2) VARIABLE DEPTH ASPHALT CONCRETE TYPE SM-9.5D (WEDGE AND LEVEL) 2" MIN. DEPTH

NOTE: ALL PAVEMENT WIDENING SHALL BE DONE IN ACCORDANCE WITH VDOT ST'D. WP-2.

STA. 18+97.68 TO STA. 19+15.00

8" ASPHALT CONCRETE BASE COURSE TYPE BM-25.0A

4" AGGREGATE BASE MATERIAL, TYPE I, SIZE NO.2IA OR 2IB

12" AGGREGATE BASE MATERIAL, TYPE 1, SIZE NO. 21A OR 21B

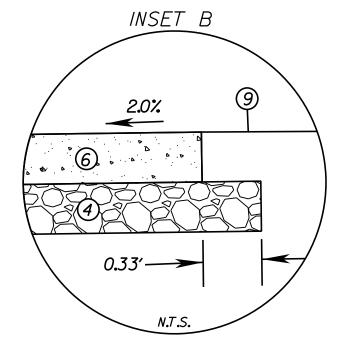
4" HYDRAULIC CONCRETE SIDEWALK

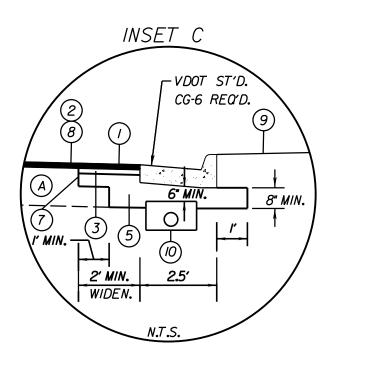
7) SAWCUT ASPHALT CONCRETE PAVEMENT (FULL DEPTH)

B) 2" MILL & OVERLAY

(9) 2" TOPSOIL CLASS A AND SEEDING REQ'D.

) VDOT ST'D. UNDERDRAIN UD-4





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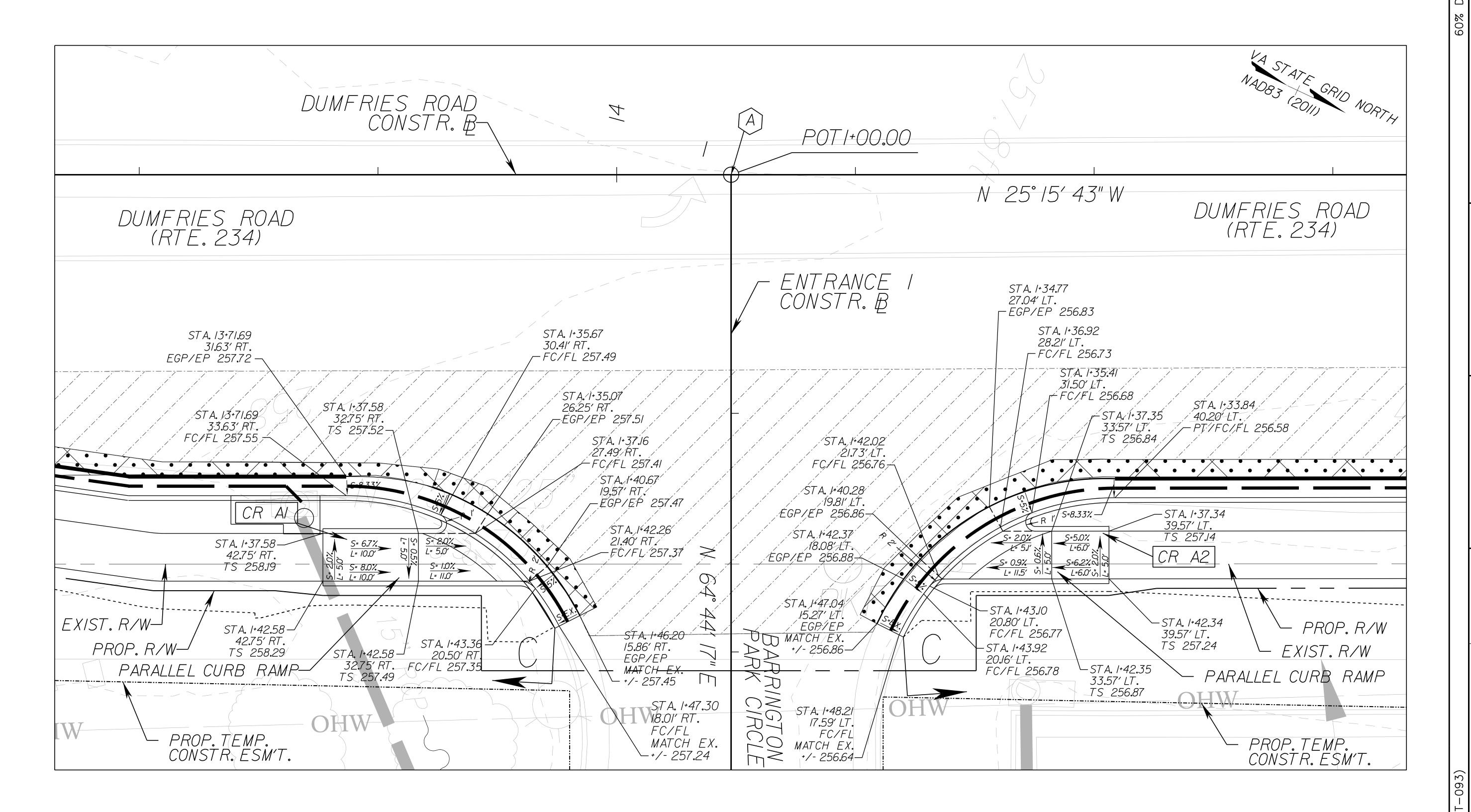
FINISHED ARE NOT TYPE THE OF WAY.

SHEET

2B

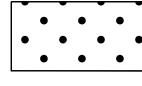
SCALE: NTS

TC - TOP OF CURB TS - TOP OF SIDEWALK (SURFACE)

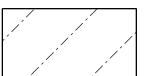


LEGEND

DENOTES DEMOLITION OF PAVEMENT



DENOTES FULL DEPTH PAVEMENT



DENOTES MILL AND OVERLAY

DUMFRIES ROAD CONSTR. B STA. 14+11.99 = ENTRANCE / CONSTR. B ST A. 1+00.00 DELTA= 90° 00′ 00.00"

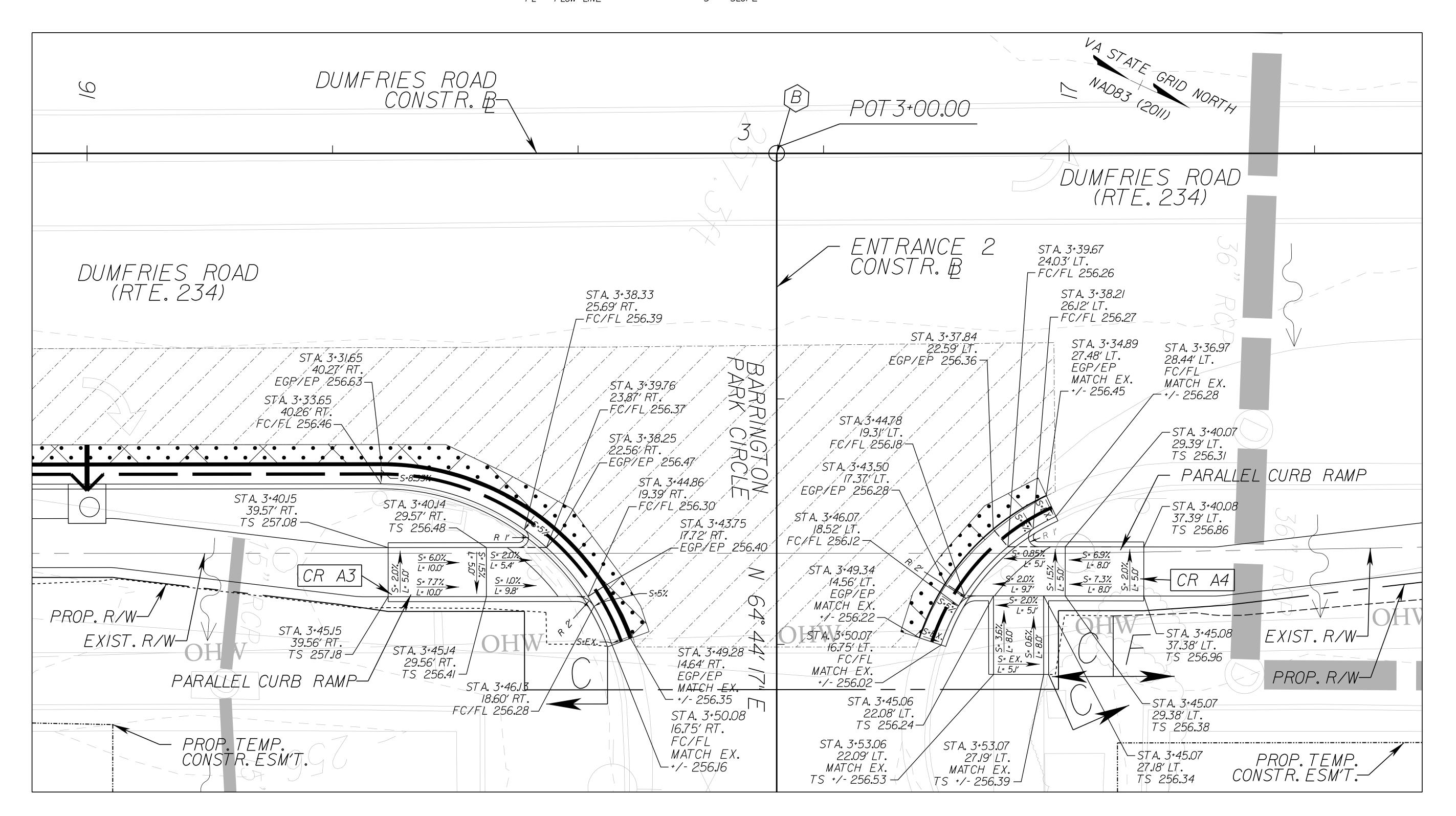


THESE PLANS ARE UNFINISHED AND UNAPPROVED AND ARE NOT TO BE USED FOR ANY TYPE OF CONSTRUCTION OR THE ACQUISITION OF RIGHT OF WAY.

2C(1) SCALE: 1"=5' EGP - EDGE OF GUTTER PAN EP - EDGE OF PAVEMENT FC - FACE OF CURB FL - FLOW LINE

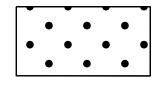
L - LENGTH PC - POINT OF CURVATURE PT - POINT OF TANGENCY S - SLOPE

TC - TOP OF CURB TS - TOP OF SIDEWALK (SURFACE)



LEGEND

DENOTES DEMOLITION OF PAVEMENT

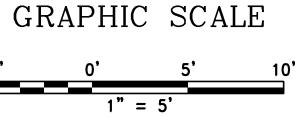


DENOTES FULL DEPTH PAVEMENT



DENOTES MILL AND OVERLAY

DUMFRIES ROAD CONSTR. B STA. 16+70.23 = ENTRANCE 2 CONSTR. B STA. 3+00.00 DELTA= 90° 00′ 00.00"



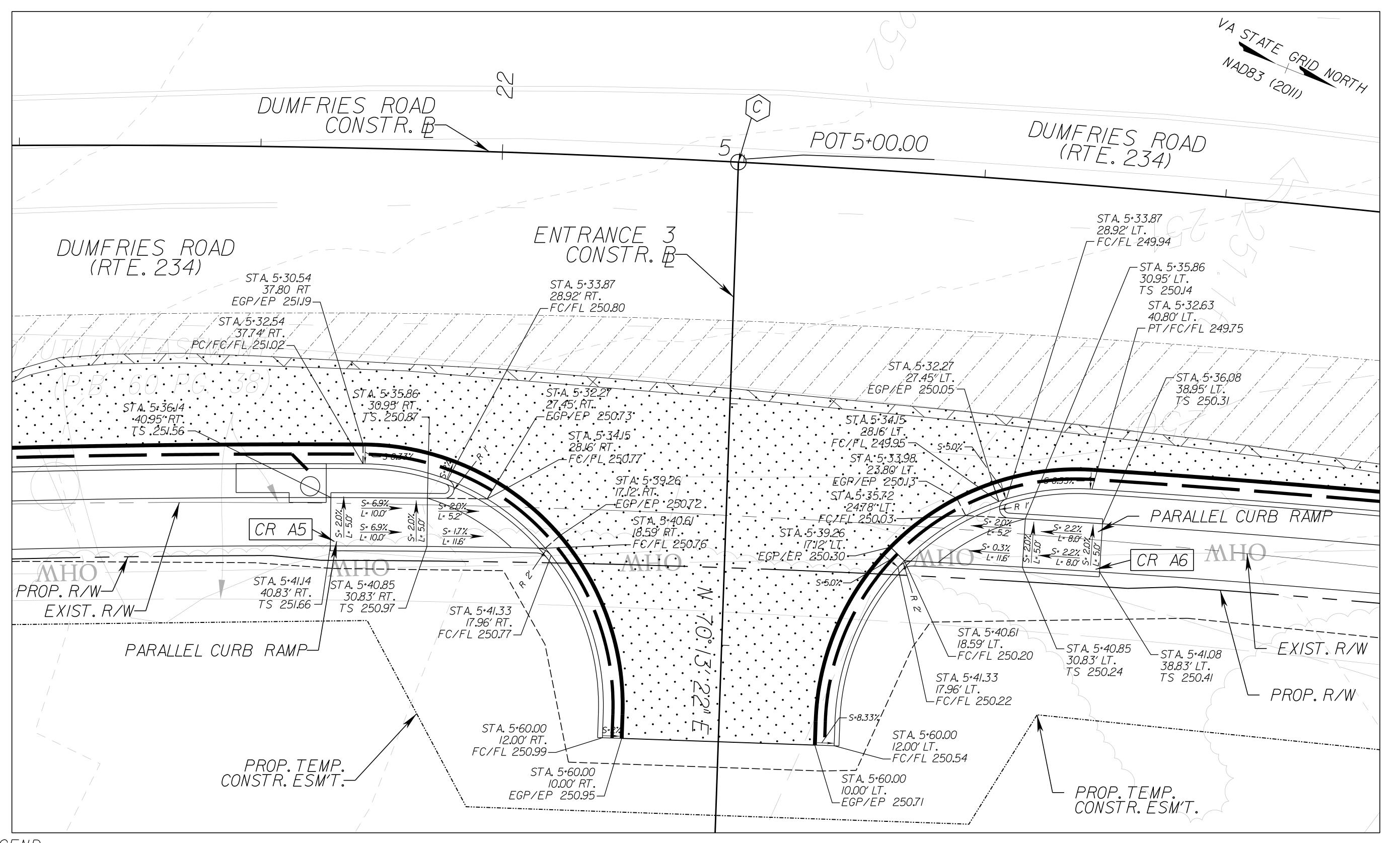
THESE PLANS ARE UNFINISHED AND UNAPPROVED AND ARE NOT TO BE USED FOR ANY TYPE OF CONSTRUCTION OR THE ACQUISITION OF RIGHT OF WAY.

2C(2) SCALE: 1"=5'

EGP - EDGE OF GUTTER PAN EP - EDGE OF PAVEMENT FC - FACE OF CURB FL - FLOW LINE

L - LENGTH PC - POINT OF CURVATURE PT - POINT OF TANGENCY S - SLOPE

TC - TOP OF CURB TS - TOP OF SIDEWALK (SURFACE)



LEGEND

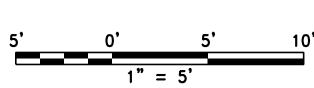
DENOTES DEMOLITION OF PAVEMENT

DENOTES FULL DEPTH PAVEMENT

DENOTES MILL AND OVERLAY

DUMFRIES ROAD CONSTR. B STA. 22+24.44 =

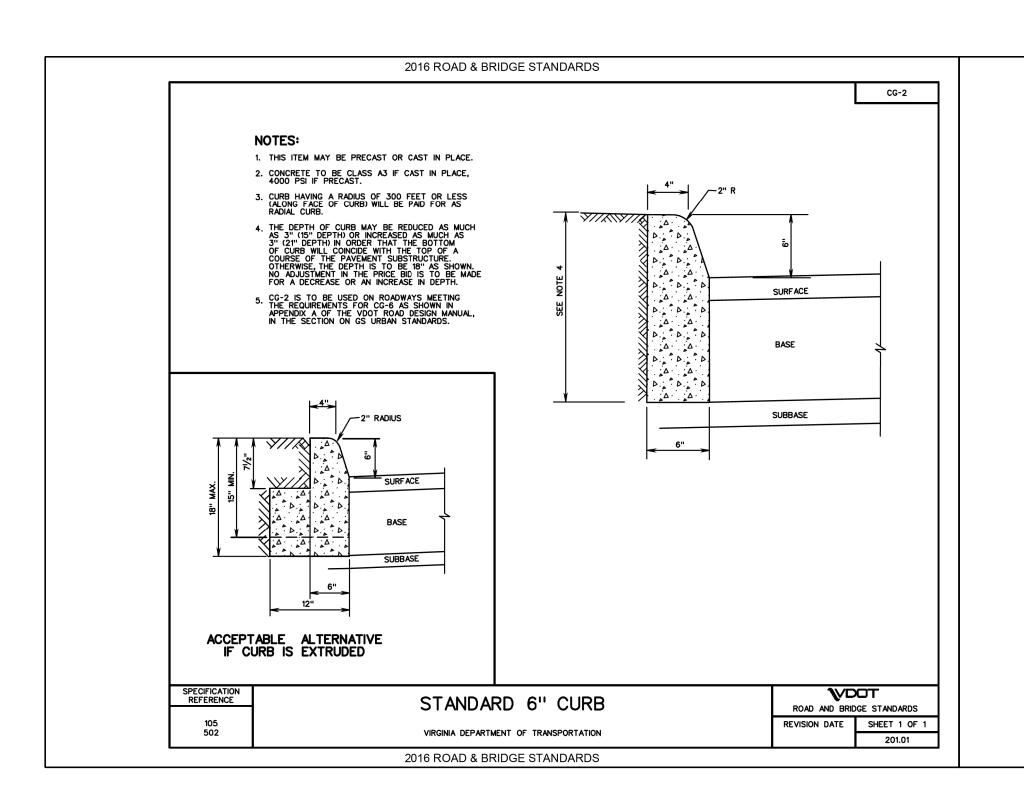
ENTRANCE CONSTR. B STA.5+00.00 DELTA= 90° 42′ 47.00"

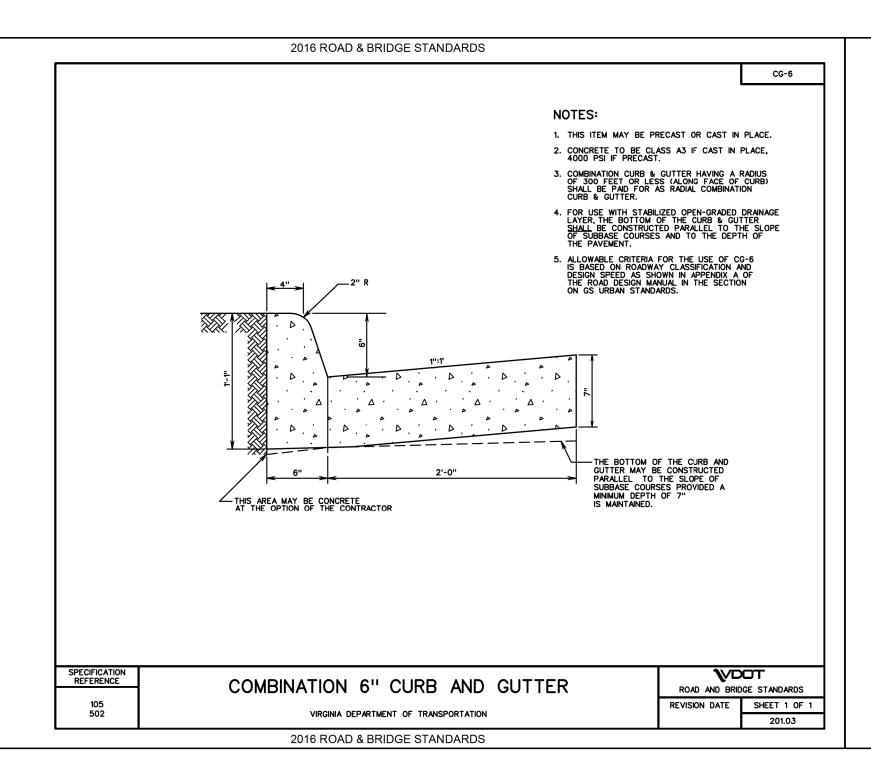


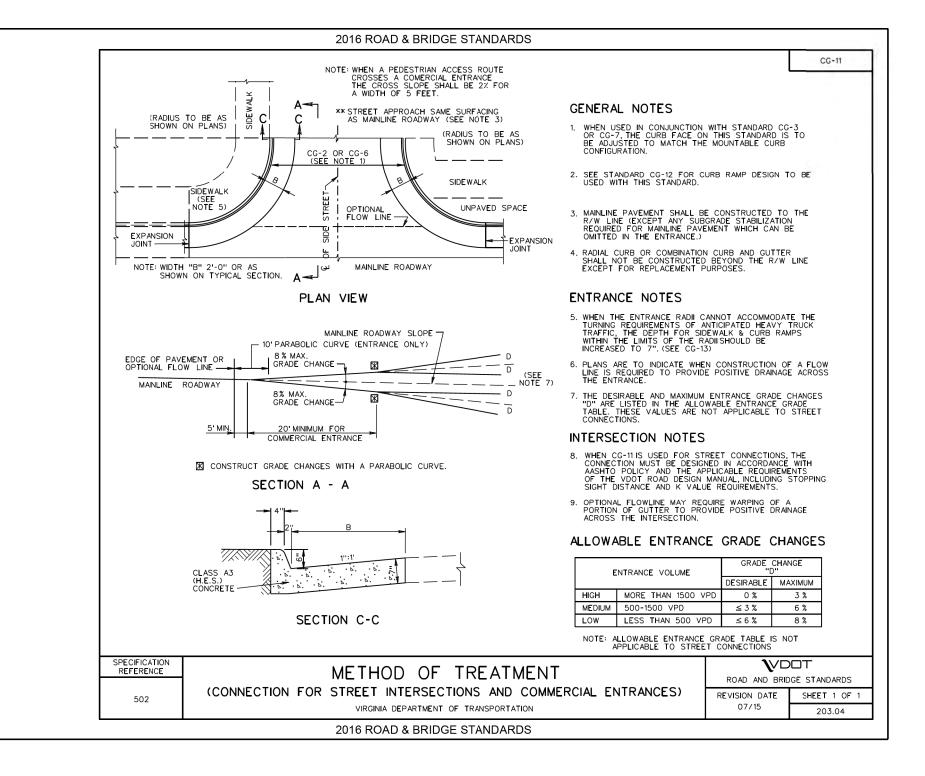
THESE PLANS ARE UNFINISHED AND UNAPPROVED AND ARE NOT TO BE USED FOR ANY TYPE OF CONSTRUCTION OR THE ACQUISITION OF RIGHT OF WAY.

GRAPHIC SCALE

2C(3)SCALE: 1"=5"







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DUMFRIES SHEET 2D

The information contained in the SWPPP General Information sheets is intended to comply with the requirements of the VPDES General Permit For Discharges Of Stormwater From Construction Activities (the VPDES Construction Permit) issued July 1, 2019 and VDOT's approved Annual ESC and SWM Standards and Specifications.

The SWPPP General Information sheets are to be completed and included in the construction plan set (or other such documents) for land disturbance activities that disturb an area equal to or greater than 10,000 square feet outside the Chesapeake Bay Preservation Area, or equal to or greater than 2,500 square feet in the area defined as Tidewater, Virginia in the Virginia Chesapeake Bay Preservation Act.

The VDOT RLD (as defined in the latest IIM 242) will ensure that the information shown on the SWPPP General Information sheets is updated/revised as necessary in order to reflect changes that may occur during the construction phase of the land disturbing (construction) activity. The updated/revised sheets shall be maintained with the designated record set of plans (or other such documents) for the land disturbance (construction) activity.

Icertify under penalty of law that I have read and understand this document and that this document and all attachments were prepared in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

I further certify that this document and all other documents related to the SWPPP, as identified on the SWPPP General Information Sheets, are maintained at the activity site, or at a location convenient to the activity site where no on-site facilities are available, and such documents will be made available for review upon request in accordance with the provisions of the General VPDES Permit for Discharges of Stormwater from Construction Activities (VAR10) when applicable. Where the SWPPP documents are not stored on-site, a copy of such documents shall be in the possession of those with day to day operational control over the implementation of the SWPPP whenever they are on site.

* or ** Delegated Authority Signature"

Signature:
Printed Name:
Date:

(1) See Section 1, Item 11 relating to delegation of authority, and form LD-445H (Delegation of Authority).

ACRONYMS

CBPA - Chesapeake Bay Preservation Act BMP - Best Management Practice

DEQ - Department of Environmental Quality EPA - U.S. Environmental Protection Agency

ESC - Erosion and Sediment Control IIM - Instructional and Informational Memorandum

R&B - Road and Bridge

RLD - Responsible Land Disturber

SWPPP - Stormwater Pollution Prevention Plan

TMDL - Total Maximum Daily Load VDOT - Virginia Department of Transportation

VPDES - Virginia Pollutant Discharge Elimination System VSMP - Virginia Stormwater Management Program

VESCP - Virginia Erosion and Sediment Control Program

WLA - Waste Load Allocation

SWM - Stormwater Management

SECTION I GENERAL INFORMATION

- 1. This project consists of sidewalk improvements along the east side of Dumfries Road from Milic Street to Hastings Drive.
- 2. This land disturbance (construction) activity site is located in City of Manassas and approximately 1.19 acres will be disturbed by excavation, grading or other construction activities.
- 3. This proposed activity disturbs one acre or greater and requires coverage under the VPDES General Permit for Discharges Of Stormwater from Construction Activities (the VPDES Construction Permit) as issued by the DEQ. A copy of the VPDES Construction Permit (VAR10), the registration information (LD-445 & LD-445C forms) and the permit coverage letter received from DEQ shall be maintained with other SWPPP documents for this land disturbing activity.

- XX 4. The location of on-site support facilities that will be covered under the VPDES Construction Permit coverage for this land disturbance (construction) activity shall be provided by the contractor and identified on the record set of plans or in other appropriate contract documents. Support facilities shall include, but not be limited to. borrow and disposal areas, construction and waste material storage areas, equipment and vehicle washing, maintenance, storage and fueling areas, storage areas for fertilizers, fuels or chemicals, concrete wash out areas, sanitary waste facilities and any other areas that may generate a stormwater or non-stormwater discharge directly related to the construction site.
- XX 5. Written Evidence of permit coverage shall be provided by the contractor for all support activities located outside of VDOT right of way or easement in the form of the Construction General Permit coverage letter: (List VPDES Permit * or Letter from VSMP Authority stating coverage not needed)
 - 6. List the surface waters that have been identified as impaired in the DEQ 2012 305(b)/303(d) Water Quality Assessment Integrated Report for sediment, total suspended solids, turbidity, Nitrogen or Phosphorus. These pollutants are considered benthic impairments: (List the impaired surface waters, when applicable)
 - 7. Identify the TMDL's where stormwater from construction activities discharges into a watershed with a TMDL waste load allocation established and approved by the State Water Control Board prior to July 1, 2016 for sediment, total suspended solids, turbidity, nitrogen or phosphorus: (List the TMDL and pollutant(s) of concern, when applicable)
 - 8. This land disturbance activity discharges stormwater to the following surface waters that have been identified as exceptional in Section 9VAC25-260-30 A 3 c of the Virginia Administrative Code: (List name of surface waters) or not applicable (N/A).
 - 9. Locations of surface waters and locations where concentrated stormwater is discharged from this land disturbance (construction) activity are identified in the construction plan set (or other such documents) for this land disturbance (construction) activity. (List name of surface waters and locations here if not shown in construction plan or other such documents).
 - 10. The ESC and SWM plans (where applicable) for this land disturbance (construction) activity have been developed in accordance with VDOT's Approved Annual Erosion and Sediment Control and Stormwater Management Standards and Specifications as approved by the DEQ.
 - 11. List the RLD and other responsible parties for the land disturbance activity: (required for erosion and sediment control). The following individual(s) have "delegated authority" to sign all reports required by the construction permit including the SWPPP General Information Sheets and Inspection Reports (C-107). Reference form LD-445H for delegation of authority (form 445H for the project is hereby incorporated by reference into this SWPPP). These individual(s) has/have overall responsibility or the environmental matters for the project: (required only for permitted projects):

Name	Position	Responsibility
	RLD	Certify the SWPPP (with date & sig.)
	Certified Inspector	Sign (C-107) Inspection Form Part 1
	Certified Inspector	Sign (C-107) Inspection Form Part 2
_		

X 12. The name of the VDOT individual(s) responsible for the oversight inspection in accordance with IIM-LD-256 on these land disturbance construction activities as identified on these SWPPP General Information Sheets. The names will be updated and maintained with the other SWPPP documents for this land disturbance activity.

VDOT Individuals	Position	Responsibility
	NPDES	NPDES coordinator responsible for the oversight inspection in accordance with IIM-LD-256
	Dist. Hyd. Engineer	District Hydraulic Engineer or designee(s) responsible for the review & the coordination approval of ESC SWM plan modification(s).

- X 13. The ESC and P2 inspections for this land disturbing (construction) activity shall follow (Select Schedule 1 or 2, if schedule #2 is used, void note #14) as defined in 2016 R&B Specifications except for Section 107.16(e) 4.an Inspection Requirements Rain gauge notes apply only to Inspection Schedule 1.
- ★米 14. The location of the on-site rain gage that will be used to determine the occurrence of a measurable storm event for the purposes of ESC and Pollution Prevention inspections will be provided by the contractor and identified on the record set of plans or in other appropriate SWPPP documents for this land disturbance activity: (List location of rain gage).

The rain gage shall be observed daily at "_____" to determine the occurrence of a measurable storm event (i.e., 0.25 inches of rainfall or greater in a 24 hour period). A log book shall be maintained to record observation information which shall include (1) the date, (2) the time, (3) whether or not rainfall is occurring at the time of the observation, (4) the amount of accumulated rainfall in the gage, if any, and (5) whether or not an inspection is required based on the amount of accumulated rainfall in the gage. If there is no rainfall occurring at the time of the observation, the observation information shall be noted in the log book and the rain gage emptied and replaced. An inspection is required if there is 0.25 inches or more accumulation noted in the rain gage. If there is rainfall occurring at the time of the observation, the observation information is to be noted in the log book. The rain gage is not to be emptied but left to accumulate additional rainfall until the conclusion of the rainfall event. At the conclusion of the rainfall event, an observation of the rain gage shall be made and the observation information shall be noted in the log book and the rain gage emptied and replaced. An inspection is required if there is 0.25 inches or more accumulation noted in the rain gage.

15. The following VDOT documents are applicable to a) permitted projects b) non-permitted projects in Chesapeake Bay Preservation Areas (CBPA) with 2,500 S.F. to 1.0 acre of land disturbance c) non-permitted projects requiring a SWPPP and d) Non-permitted, Non-CBPA with BMP projects that have a water quantity BMP:

> VDOT LD-445: Permitted projects, CBPA projects and Non-permitted. Non-CBPA with BMP projects that have a water quantity BMP and ESC projects > 10,000 s.f. but <1 acre.

VDOT LD-445A: Permitted projects only. VDOT LD-445C: Projects that require a permit, ESC Plan, or SWPPP.

VDOT LD-445D: Permitted projects, CBPA projects and Non-permitted,

Non-CBPA with BMP projects that have a water quantity BMP.

VDOT LD-445F: Emergency work projects (when applicable). Water Quality Requirement (when applicable)

VDOT LD-445H: Permitted projects only. VDOT C-107 Part Land Part II. All projects that require a permit or SWPPP. VDOT LD-445I: AS&S Approval Form (when applicable)

16. If there is an excessive loading of sediment from the project (i.e. more than to be expected from the project with an implemented ESC plan) that is discovered within a local watershed with a sediment TMDL that allocates a WLA to VDOT's MS4, (see note #7) the contractor shall investigate the area of concern at the site within 24 hours of discovery and ensure all erosion and sediment control best management practices are being implemented in accordance with the permits approved standards and specifications required by Part I.B. of the current Construction General Permit. If corrective action is necessary, the contractor shall initiate corrective actions no later than 5 business days after the initial investigation.

17. If excessive loading of sediment from a land disturbing activity that is not the responsibility of the contractor is discovered discharging into a MS-4, the contractor shall notify the municipality with jurisdiction over erosion and sediment control activities.

> X Denotes information that is to be provided/completed by the RLD.

** Denotes information that is to be provided/completed by the contractor.

Revised 5/1/19

THESE PLANS ARE UNFINISHED AND UNAPPROVED AND ARE NOT TO BE USED FOR ANY TYPE OF CONSTRUCTION OR THE ACQUISITION OF RIGHT OF WAY.

OF MANASS
EPARTMENT OF
8500 PUBLIC V
MANASSAS, VIRC

MAI DA CON DES

SHEET 2E(1)

SECTION II EROSION AND SEDIMENT CONTROL

- XX 1. The intended sequence and timing of activities that disturb soils at the site (e.g., grubbing, excavation, grading, utilities and infrastructure installation, etc.) shall be provided by the contractor in accordance with the current edition of Section 108.03 of the VDOT R&B Specifications and shall be included with the other SWPPP documents for this land disturbance (construction) activity.
 - 2. Directions of stormwater flow and approximate slopes anticipated after major grading activities are identified in the construction plan set (or other such documents) for this land disturbance (construction) activity.
 - 3. Areas of soil disturbance and areas of the site which will not be disturbed are identified in the construction plan set (or other such documents) for this land disturbance (construction) activity.
 - 4. Locations of major structural and nonstructural ESC measures intended to filter, settle or similarly remove sediment are identified in the construction plan set (or other such documents) for this land disturbance (construction) activity.
 - 5. Locations where stabilization practices are expected to occur are identified in the construction plan set (or other such documents) for this land disturbance (construction) activity.
 - 6. A description of interim and permanent stabilization practices for the site are identified in the applicable sections of the documents identified in the Note 1 of Section IV.
- 米米 7. A record of the dates when major grading activities occur, when construction activities temporarily or permanently cease on a portion of the site, and when stabilization measures are initiated will be provided by the contractor and maintained with the record set of plans or other SWPPP documents for this land disturbance (construction) activity: (List how this will be tracked and the location)
 - 8. A description and schedule of procedures to maintain vegetation, erosion and sediment control measures and other protective measures in good and effective operating conditions are identified in the current edition of Sections 107.16 and 303.03 of the VDOT R&B Specifications.
 - 9. Nutrients shall be applied in accordance with the current edition of Sections 603 and 604 of the VDOT Road and Bridge Specifications. Nutrients shall not be applied during rainfall events. Top soil shall be applied in accordance with the current edition of section 602 of the latest Road and Bridge Specifications.
 - 10. All engineering calculations supporting the design of erosion and sediment control measures proposed for this land disturbance (construction) activity are contained in the project drainage file located in the (insert appropriate location, i.e., VDOT Central Office Hydraulics Section or the VDOT (specify) District Hydraulics Section or the VDOT (specify) Residency Office) and will be made available for review upon request during normal business hours.
 - 11. The temporary erosion and siltation controlitems shown on the ESC Plan for this land disturbing (construction) activity are intended to provide a general plan for controlling erosion and sediment within the project limits. The ESC Plan is based on field conditions at the time of plan development and an assumed sequence of construction for the project. The contractor, in conjunction with the VDOT Project Engineer and/or ESC Inspector, shall adjust the location, quantity and type of erosion and sediment controlitems required based on the actual field conditions encountered at the time of construction and the actual scheduling and sequencing of the construction activities. Significant changes to the proposed ESC Plan (e.g., those that require an engineering analysis, elimination of a perimeter control, change to ESC concept that would affect the quantity or direction of flow of water) shall be submitted to the applicable District Hydraulics Engineer for review and approval. Any changes to the proposed ESC Plan must be noted on the designated record set of plans which shall be retained on the project site and made available upon request during normal business hours.
 - 12. The areas beyond the project's construction limits are to be protected from siltation. Perimeter controls such as silt fence, diversion dikes, turbidity curtains, etc. shall be installed prior to any grubbing operations or other earth moving activities.
 - 13. Temporary earthen structures such as dikes and berms are to be stabilized immediately upon installation. Stabilization may include temporary or permanent seeding, riprap, aggregate, sod, mulching, and/or soil stabilization blankets and matting in conjunction with seeding.
 - 14. All channel relocations are to be constructed during the earliest stage of construction and shall be constructed in accordance with all applicable permit requirements and shall be constructed in the dry wherever possible. Stabilization or vegetation shall be established before flow is redirected through the constructed area as directed by the Engineer.
 - 15. The contractor shall plan and implement his land disturbance operations in order to:
 - a. Control the volume and velocity of stormwater runoff within the site to minimize erosion.
 - b. Control the peak flow rates, volume and velocity of stormwater discharges to minimize erosion at outlets and in downstream channels.
 - c. Minimize the amount of soil exposed.
 - d. Minimize the disturbance of steep slopes.
 - e. Minimize sediment discharge from the site.
 - f. Provide and maintain natural buffers around surface waters, direct stormwater runoff to vegetated areas and maximize stormwater infiltration, unless infeasible.
 - g. Minimize soil compaction (except in those areas where compaction is required by the contract documents) and preserve topsoil where feasible.

- XX 16. The name of the individual(s) or contractor(s) responsible for the installation and maintenance of the erosion and sediment control measures shall be supplied by the contractor and maintained with the other SWPPP documents for this land disturbance (construction) activity.
 - 17. Soil stockpiles temporarily placed within the project area or on VDOT right of way or easement shall be identified, stabilized, and protected with sediment trapping measures.
 - 18. A construction entrance or other approved measure shall be installed at all locations where construction vehicular traffic access routes intersect a paved or a public road in order to minimize the transport of sediment by vehicular tracking onto the paved surface. Where sediment is transported onto a paved or a public road surface, the road shall be cleaned thoroughly at the end of each work day by shoveling or sweeping. Removed sediment shall be disposed of in accordance with Section 106.04 of the R&B Specifications.
 - 19. Any variance, exception or deviation approved by DEQ must be listed below and supporting documentation (exception/variance/deviation request and DEQ approval) must be maintained with the SWPPP.
 - The following exceptions to the Water Quantity criteria of the VSMP Regulation have been approved by the DEQ for this land disturbance (construction) activity: (list all approved exceptions and include a brief description of the exception, the date approved and the approving DEQ Office)

Type(1)	Regulation Modified(2)	Approval Date(3)	Description of Variance

- (1) Type of modification (Variance from ESC regulations, or Deviation from published guidance)
- (2) Section of Regulation or Guidance Document Modified (e.g. ESC Min. Std. 15)
- (3) Date that variance/exception/deviation was approved by DEQ.

SECTION III POST CONSTRUCTION STORMWATER MANAGEMENT

Choose the appropriate note 1A or 1B that is applicable to the proposed post construction SWM Plan for this land disturbance (construction) activity. (Delete, strikethrough or mark as NA those notes not applicable.)

- 1. This land disturbance activity utilizes the Part IIB technical criteria (i.e., Runoff Reduction Method, Energy Balance Equation, etc.) in Section 9VAC25-870-62 et seg. of the VSMP Regulations.
- 2. Any variance, exception or deviation approved by DEQ must be listed below and supporting documentation (exception/variance/deviation request and DEQ approval) must be maintained with the SWPPP.

The following exceptions to the Water Quantity criteria of the VSMP Regulation have been approved by the DEQ for this land disturbance activity: (list all approved exceptions and include a brief description of the exception, the date approved and the approving DEQ

Type(1)	Regulation Modified(2)	Approval Date(3)	Description of Waiver
		,	

- (1) Type of modification (Variance, or Exception from SWM Regulations
- or Deviation from published guidance)
- (2) Section of Regulation or Guidance Document Modified (e.g. ESC Min. Std. 15)
- (3) Date that variance/exception/deviation was approved by DEQ.

- 3. A description of all post-construction stormwater management measures that will be installed during the construction process to control pollutants in stormwater discharges after construction operations have been completed is included in the construction plan set (or other such documents) for this land disturbance (construction) activity.
- 4. All engineering calculations supporting the design of the post-construction stormwater management measures for this land disturbance (construction) activity, including an explanation of the technical basis used to select the practices, are contained in the project drainage file located in the (insert appropriate location, i.e., VDOT Central Office Hydraulics Section or the VDOT (specify) District Hydraulics Section or the VDOT (specify) Residency Office) and will be made

ACRONYMS

- CBPA Chesapeake Bay Preservation Act BMP - Best Management Practice
- DEQ Department of Environmental Quality
- EPA U.S. Environmental Protection Agency
- ESC Erosion and Sediment Control IIM - Instructional and Informational Memorandum
- R&B Road and Bridge
- RLD Responsible Land Disturber
- X Denotes information that is to be
- provided/ completed by the RLD.
- ** Denotes information that is to be provided/completed by the contractor.

SWPPP - Stormwater Pollution Prevention Plan

VDOT - Virginia Department of Transportation

VSMP - Virginia Stormwater Management Program

VPDES - Virginia Pollutant Discharge Elimination System

VESCP - Virginia Erosion and Sediment Control Program

TMDL - Total Maximum Daily Load

WLA - Waste Load Allocation

SWM - Stormwater Management

available for review upon request during normal working business hours.

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The information contained in the SWPPP GeneralInformation sheets is intended to comply with the requirements of the VPDES GeneralPermit For Discharges Of Stormwater From Construction Activities (the VPDES Construction Permit) issued July 1, 2019 and VDOT's approved AnnualESC and SWM Standards and Specifications.

The SWPPP General Information sheets are to be completed and included in the construction plan set (or other such documents) for land disturbance (construction) activities that disturb an area equal to or greater than 10,000 square feet outside the Chesapeake Bay Preservation Area, or equal to or greater than 2,500 square feet in the area defined as Tidewater, Virginia in the Virginia Chesapeake Bay Preservation Act.

The VDOT RLD will ensure that the information shown on the SWPPP General Information sheets is updated/revised as necessary in order to reflect changes that may occur during the construction phase of the land disturbing (construction) activity. The updated/revised sheets shall be maintained with the designated record set of plans (or other such documents) for the land disturbance (construction) activity.

SECTION IV SWPPP

1. All documents related to the SWPPP for this land disturbance (construction) activity shall be maintained at the activity site and shall be readily available for review upon request during normal business hours. Such documents include, but are not limited to, the construction plans (or other such documents), the ESC Plan, the Pollution Prevention Plan, the post construction SWM Plan (if applicable), the VDOT R&B Standards and Specifications, Supplemental Specifications, Special Provisions and Special Provision Copied Notes. Documents related to stormwater pollution prevention which are not a part of those documents referenced above, such as copies of the VPDES Construction Permit coverage letter (when applicable) and the VPDES General Permit For Discharges Of Stormwater From Construction Activities (when applicable) and those required to be developed by the contractor for pollution prevention associated with any on-site support facilities being included in the VPDES Construction Permit coverage for this land disturbance (construction) activity are to be maintained at the activity site with the other SWPPP documents for this land disturbance (construction) activity. Where no facilities are available at the activity site to maintain the SWPPP documents, they are to be kept by or with the designated RLD at a location convenient to the activity site where they would be made available for review upon request during normal business hours.

- 2. The SWPPP and any subsequent amendments, modifications and updates shall be implemented from commencement of land disturbance until termination of VPDES Construction Permit coverage or completion of land disturbance (construction) activities where no VPDES Construction Permit coverage is required.
- XX 3. For all on-site support facilities that will be included in the VPDES Construction Permit coverage for this land disturbance (construction) activity, the contractor shall develop a SWPPP in accordance with, but not limited to, Section 106.08, 107.02 and 107.16 of the VDOT Road and Bridge Specifications. The SWPPP for the on-site support facilities shall be maintained with and become a component of the SWPPP for this land disturbance (construction) activity. Support facilities shall include, but not be limited to, borrow and disposal areas, construction and waste material storage areas, equipment and vehicle washing, maintenance, storage and fueling areas, storage areas for fertilizers, fuels or chemicals, concrete wash out areas, sanitary waste facilities and any other areas that may generate a stormwater or non-stormwater discharge directly related to the construction site.
 - 4. For those land disturbing (construction) activities requiring coverage under the VPDES Construction Permit, the SWPPP shall be made available for review upon the request of the DEQ, the EPA, the VSMP Authority, the VESCP Authority, local government officials or the operator of a municipal separate storm sewer system (MS4) receiving discharge from the construction site.
- X 5. For those land disturbing (construction) activities requiring coverage under the VPDES Construction Permit, the VDOT RLD shall post, or have posted, a copy of the General Permit coverage letter and a copy of a completed LD-445A form, noting the name and contact information for the VDOT person responsible for the land disturbing (construction) activity and its SWPPP, outside the project's construction office along with other Federal and State mandated information. Where there is no construction office (e.g., a maintenance activity), the permit coverage letter and the LD-445A form are to be maintained with the other SWPPP documents for the land disturbing (construction) activity.
- 6. The SWPPP shall be made available for review by the public upon request. Such reviews shall be at a time and publicly accessible location convenient to the VDOT and shall be scheduled during normal business hours and no less than once per month.

SECTION V - POLLUTION PREVENTION PLAN

- 1. The following non-stormwater discharges from this land disturbing (construction) activity and any on-site support facilities are prohibited:
 - a. Wastewater from concrete washouts.
 - b. Wastewater from the washout and cleanout of stucco, paint, from release oils, curing compounds and other construction materials.
 - c. Fuels, oils or other pollutants used in vehicle and equipment operation and maintenance.
 - d. Oils, toxic substances or hazardous substances from spills or other releases.
 - e. Soaps, solvents or detergents used in equipment and vehicle washing.
 - f. There shall be no discharge of floating solids or visible foam in other than trace amounts
- 2. The following non-stormwater discharges from this land disturbing (construction) activity and any on-site support facilities are allowed when discharged in compliance with the VPDES Construction Permit:
 - a. Discharges from firefighting activities.
 - b. Fire hydrant flushings.
 - c. Waters used to wash vehicles or equipment where soaps, solvents or detergents have not been used and the wash water has been filtered, settled or similarly treated prior to discharge.
 - d. Water used to control dust that has been filtered, settled or similarly treated prior to discharge.
 - e. Potable water sources including uncontaminated waterline flushings managed in a manner to avoid stream impacts.
 - f. Routine external building wash down where soaps, solvents or detergents have not been used and the wash water has been filtered, settled or similarly treated prior to discharge.
 - g. Pavement wash waters where spills or leaks of toxic or hazardous materials have not occurred (or where all spilled or leaked material has been removed prior to washing), where soaps, solvents or detergents have not been used and where the wash water has been filtered, settled or similarly treated prior to discharge.
 - h. Uncontaminated air conditioning or compressor condensate.
 - . Uncontaminated ground water or spring water.
 - j. Foundation or footing drains where flows are not contaminated with process materials such as solvents.
 - k. Uncontaminated excavation dewatering, including dewatering trenches and
 - excavations that have been filtered, settled or similarly treated prior to discharge.
- I. Landscape irrigation.✗✗

3. The contractor shall develop a Pollution Prevention Plan to address any of his onsite operations that have a potential to generate a pollutant that may reasonably be expected to affect the quality of stormwater discharges from this land disturbance (construction) activity. The Pollution Prevention Plan shall be developed in accordance with, but not limited to, Sections 106.08, 107.02 and 107.16 of the VDOT Road and Bridge Specifications and shall include a narrative with appropriate plan detail and shall be provided on standard 8.5 x 11 inch paper or larger and shall:

- a. Identify the potential pollutant-generating activities and the pollutant that is expected to be exposed to stormwater.
- b. Describe the location where the potential pollutant-generating activities will occur, or if identified on the record set of plans, reference the record set of plans.
- c. Identify all non-stormwater discharges, as described in note two of this section, that are or will be commingled with stormwater discharges from the construction activity, including any on-site support activities.
- d. Identify the person(s) or contractor(s) responsible for implementing and maintaining the pollution prevention practice or practices for each pollutant-generating activity.
- e. Describe the pollution prevention practices and procedures that will be implemented to:
 - 1) Prevent and respond to leaks, spills, and other releases, including procedures for expeditiously stopping, containing, and cleaning up spills, leaks, and other releases, and procedures for reporting leaks, spills, and other releases in accordance with Section 107.16 of the VDOT Road and Bridge Specifications and the requirements within the VPDES Construction Permit.

- 2) Prevent the discharge of spilled and leaked fuels and chemicals from vehicle fueling and maintenance activities.
- 3) Prevent the discharge of soaps, solvents, detergents, and wash water from construction materials, including procedures for the clean-up of stucco, paint, form release oils, and curing compounds.
- 4) Minimize the discharge of pollutants from vehicle and equipment washing, wheel wash water, and other types of washing.
- 5) Direct concrete wash water into a leak-proof container or leak-proof settling basin. The container or basin shall be designed so that no overflows can occur due to inadequate sizing or precipitation. Hardened concrete wastes shall be removed and disposed of in a manner consistent with the handling of other construction wastes. Liquid concrete wastes shall be removed and disposed of in a manner consistent with the handling of other construction wash waters and shall not be discharged to surface waters.
- 6) Minimize the discharge of pollutants from storage, handling, and disposal of construction products, materials, and wastes including building products (such as asphalt sealants, copper flashing, roofing materials, adhesives, and concrete admixtures), pesticides, herbicides, insecticides, fertilizers, landscape materials, construction and domestic wastes (such as packaging materials), scrap construction materials, masonry products, timber, pipe and electrical cuttings, plastics, styrofoam, concrete, and other trash or building materials.
- 7) Prevent the discharge of fuels, oils, and other petroleum products, hazardous or toxic wastes, waste concrete and sanitary wastes.
- 8) Address any other discharge from any potential pollutant-generating activity not listed herein.
- 9) Minimize the exposure of waste materials to precipitation by closing or covering waste containers during precipitation events and at the end of the business day, or implementing other similarly effective practices. Minimization of exposure is not required in case where the exposure to precipitation will not result in a discharge of pollutants.
- 10) Describe and implement procedures for providing pollution prevention awareness (including but not limited to prevention practices, disposal practices and appropriate disposal locations) for all applicable wastes (including any wash water), to appropriate personnel.
- X Denotes information that is to be provided/completed by the RLD.
- XX Denotes information that is to be provided/completed by the contractor.

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ASSAS FRUJECT INC: TBD DATE BY DESCRIPTION

SULTANT PROJECT ID: RK&K

GNED BY: DVK DATE: 11/10/23

WN BY: MJK DATE: 11/10/23

CKED BY: MJK DATE: 11/10/23

RAL INFORMATION SHEET

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The SWPPP General Information sheets are to be completed and included in the construction plan set (or other such documents) for land disturbance (construction) activities that disturb an area equal to or greater than 10,000 square feet, or equal to or greater than 2,500 square feet in the area defined as Tidewater, Virginia in the Virginia Chesapeake Bay Preservation Act.

The VDOT RLD will ensure that the information shown on the SWPPP General Information sheets is updated/revised as necessary in order to reflect changes that may occur during the construction phase of the land disturbing (construction) activity. The updated/revised sheets shall be maintained with the designated record set of plans (or other such documents) for the land disturbance (construction) activity.

SECTION VI - PERMANENT BMP INFORMATION \triangle

X Denotes information that is to be completed by the RLD. () See note referenced by number in parentheses.

INSTALLED BMP INFORMATION (VDOT Owned/Operated)

Plan Sheet(s) Date BMP Made Functional	Type of BMP Installed (See Table A and C)	Geographic Location (County or City)	Latitude	e/Longitude (1)	VA 6th Order HUC	Receiving Water (2)	Name of Impaired Water (9)	Acre	s Treated Per I	BMP (3)	Ж ВМР Maintenance ID Number (10)	BMP Maintenance Manual (11)	BMP Inspection Manual (11)
			LAT	LONG	(7)			Impervious	Pervious	TOTAL		SECTION	SECTION
									1				

ALTERNATIVE BMP INFORMATION Geographic Location VA 6th (County or City) Order Plan Sheet(s) Latitude/Longitude Receiving Water Name of Impaired (See Table B) HUC (1) (5) (2) Water (9) LAT LONG

Table A: Permanent BMP Types (1999 Va. SWM Handbook)

Bio-retention Basin Bio-retention Filter Constructed Stormwater Wetlands Extended Detention Basin Extended Detention Basin Enhanced Grassed Swale Infiltration Basin Infiltration Trench Manufactured Treatment Device (MTD) (8) Retention Basin I Retention Basin II Retention Basin III Sand Filter

Detention Basin Table B: Alternative BMP Types Comprehensive SWM Plan (Regional) Facility

Pollutant Loading Pro Rata Share Program

Other Approved Options (List Type) (4)

Other Approved Types (List Type)

Vegetated Filter Strip

Table C: Permanent BMP Types (BMP Clearing House)

Sheet Flow to Vegetated Filter Strip Grass Channel Soil Compost Amendment Permeable Pavement (Level 1) Permeable Pavement (Level 2)

Infiltration Practice (Level 1) Infiltration Practice (Level 2)

Bioretention (Level 1) Bioretention (Level 2)

Dry Swale (Level 1) Dry Swale (Level 2) Wet Swale (Level 1)

Wet Swale (Level 2) Filtering Practice (Level 1) Filtering Practice (Level 2)

Constructed Wetlands (Level 2) Extended Detention Pond (Level 1) Extended Detention Pond (Level 2)

Constructed Wetlands (Level 1)

Wet Pond (Level 1) Wet Pond (Level 2)

Manufactured Treatment Device (MTD)(8) Other Approved Types (List Type)

(1) In decimal degrees to the nearest one ten-thousandth of a degree.

- (2) For streams with no names, list "(Unnamed Tributary to downstream name)".
- (3) Show acres treated to the nearest one hundreths acre.
- (4) Include agreements with off-site BMP owners.
- (5) Information pertains to the alternative BMP option location, where applicable. Exception - Not required for nutrient credit purchase option.
- (6) Applies to the purchase of nutrient credits only.
- (7) Virginia 6th Order HUC (VAHU6) Example YO30.
- (8) Final approved shop drawings of Manufactured Treatment Devices (MTDs) are to be included with the BMP information submitted with the LD-445D form.
- (9) List the name of any impaired water to which the BMP discharges. The determination of impaired water shall be based on those streams listed as impaired in the DEQ 2012 305(b)/303(d) Water Quality Assessment Integrated Report and shall be the first named waterbody to which the BMP discharges. The impaired waters are those impaired by sediment, total suspended solids, turbidity, nitrogen or phosphorus.
- (10) BMP Maintenance ID Number is to be assigned by the District Maintenance Division at permit termination or project completion. This ID number shall be assigned prior to the permit close out process and entered by the area construction engineer under this column, per IIM-LD-95

necessitated during the construction phase of the project that affects the proposed construction details or potentially affects the informationshown in the BMP Tables A and/or B shall be coordinated by the VDOT RLD with the appropriate VDOT District Hydraulics Engineer. The construction plans and the BMP Tables A and/or B are to be formally revised to reflect any authorized/ approved changes to the proposed SWM Plan and/or the proposed BMP construction details. All plan revisions shall be completed in accordance with the Road Design Manual and the Construction Division IIM-CD-2013-12.01, signed and sealed in accordance with Department's sealing and signing policy IIM-LD-243 and filed with the construction record drawings maintained in the VDOT Central Office Plan File Room (ProjectWise). Prior to submitting for termination of coverage under the VPDES General Permit For The Discharge Of Stormwater From Construction Activities, the RLD shall have the District Maintenance Division review the BMPs installed with the project (BMP Table A) for acceptance of maintenance responsibility and to obtain a Maintenance ID number for each BMP listed in BMP Table A. The RLD shall use the information in BMP Tables A and B along with the assigned Maintenance ID number and the date that the BMP became functional as a permanent control measure

(for BMPs in Table A only) to complete the LD-445D form

termination of coverage under the VPDES General Permit For

The Discharge Of Stormwater From Construction Activities.

when certifying the construction of the BMPs and submitting for

Any changes to the proposed SWM Plan or BMPs

(11) Provide the section of each Maintenance manual that pertains to the type of BMP. Both manuals can be found at www.vdot.virginia.gov/ business/manuals in the Maintenance selections. Example: Section 4 would be noted for both the maintenance and inspection manuals for a Bioretention Linfiltration BMP.

(12) Nutrient credits purchased to the nearest one hundredth pound.

Perpetual Nutrient Credits Acquired for Project

Nutrient Credit

Generating Entity

Nutrient Credits

(lbs./TP./year)

Acquired

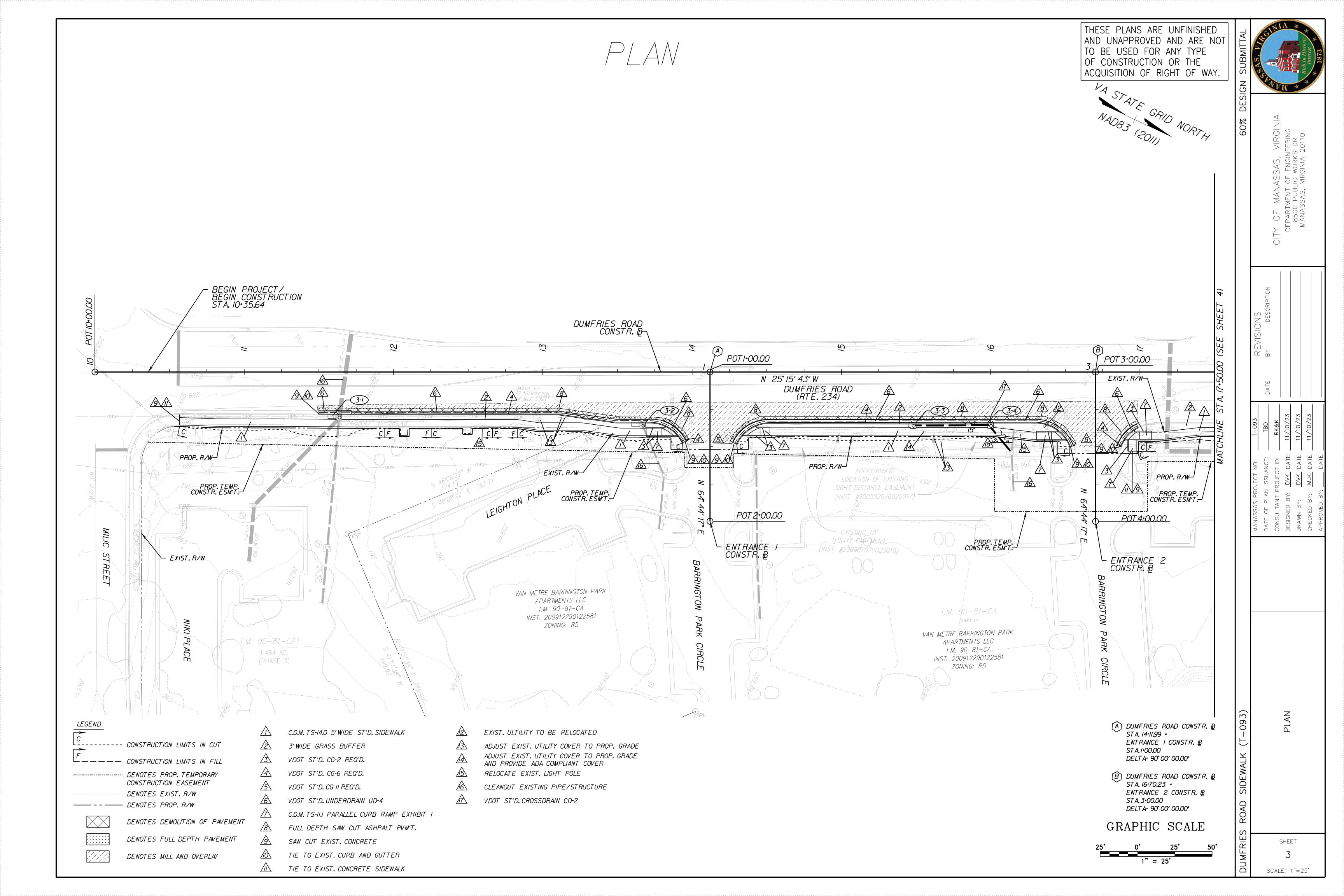
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Revised 5/1/19

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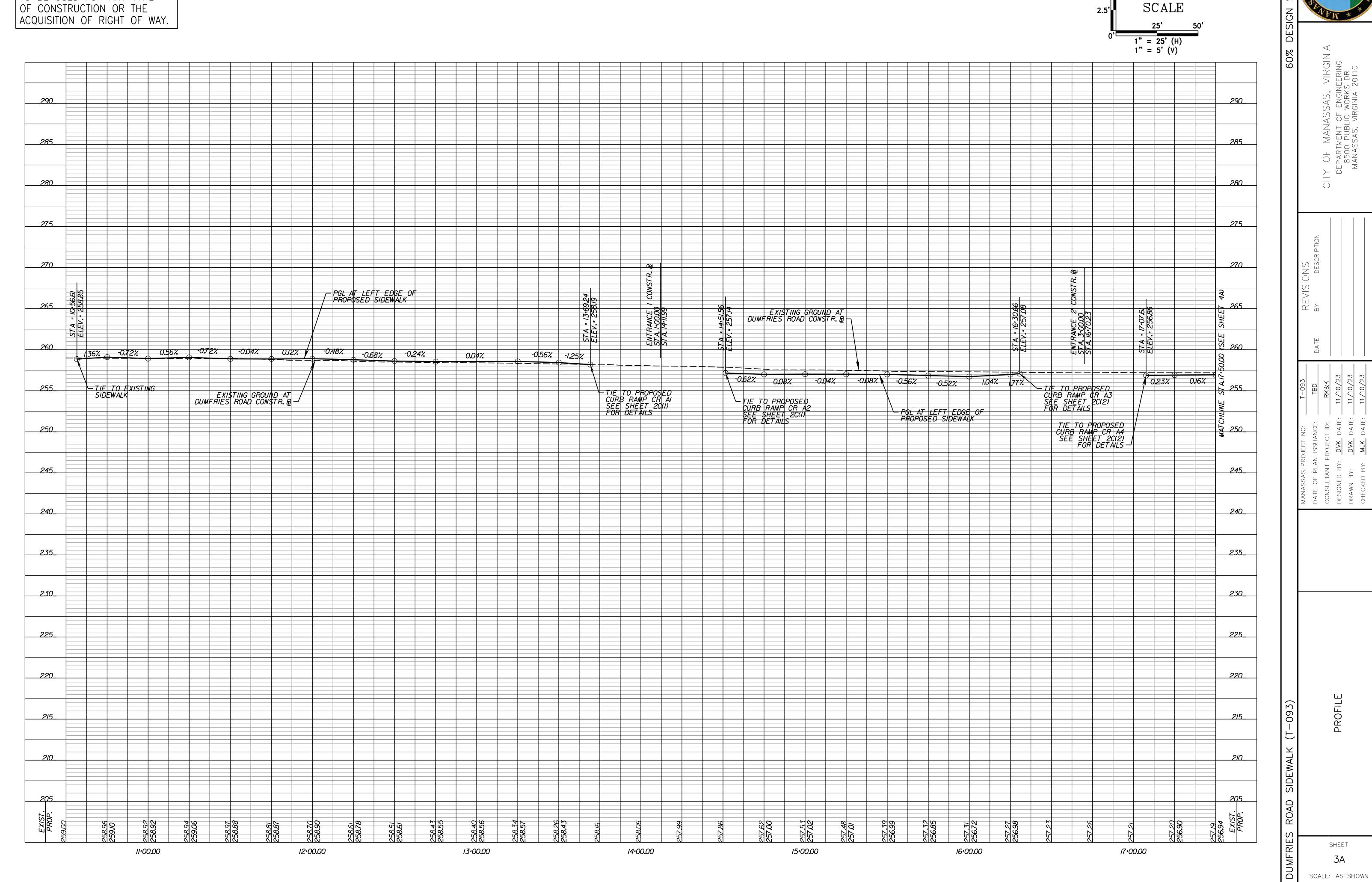
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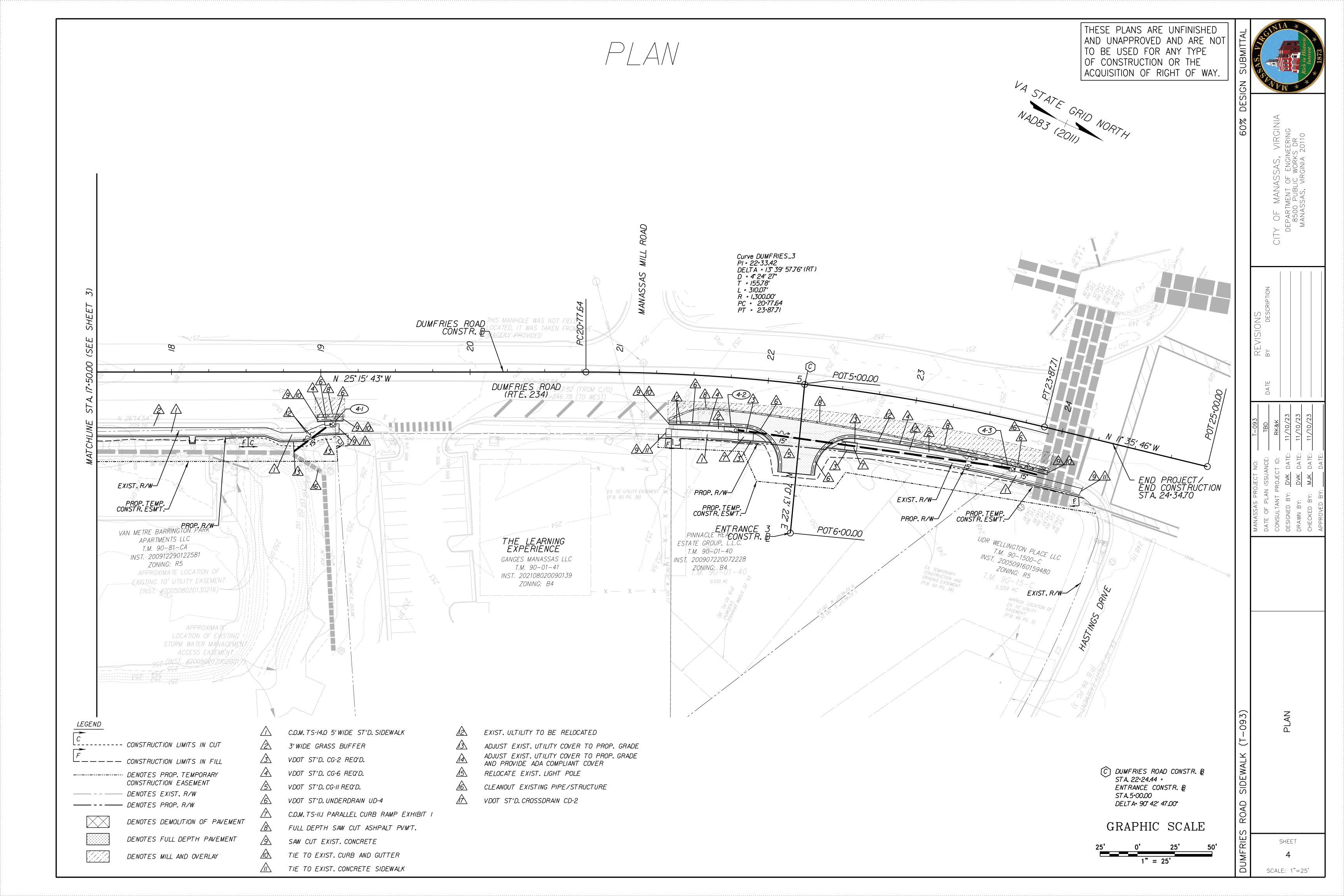


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0.00% -0.40% 0.16%

PGL AT LEFT EDGE OF PROPOSED SIDEWALK

-1.32% -0.81%

19•00.00

20•00.00

TIE TO EXISTING SIDEWALK

-0.36%

18•00.00

PROF/LE

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TIE TO EXISTING SIDEWALK

21.00.00

EXISTING GROUND AT DUNFRIES ROAD CONSTR. B

-3.04% -038

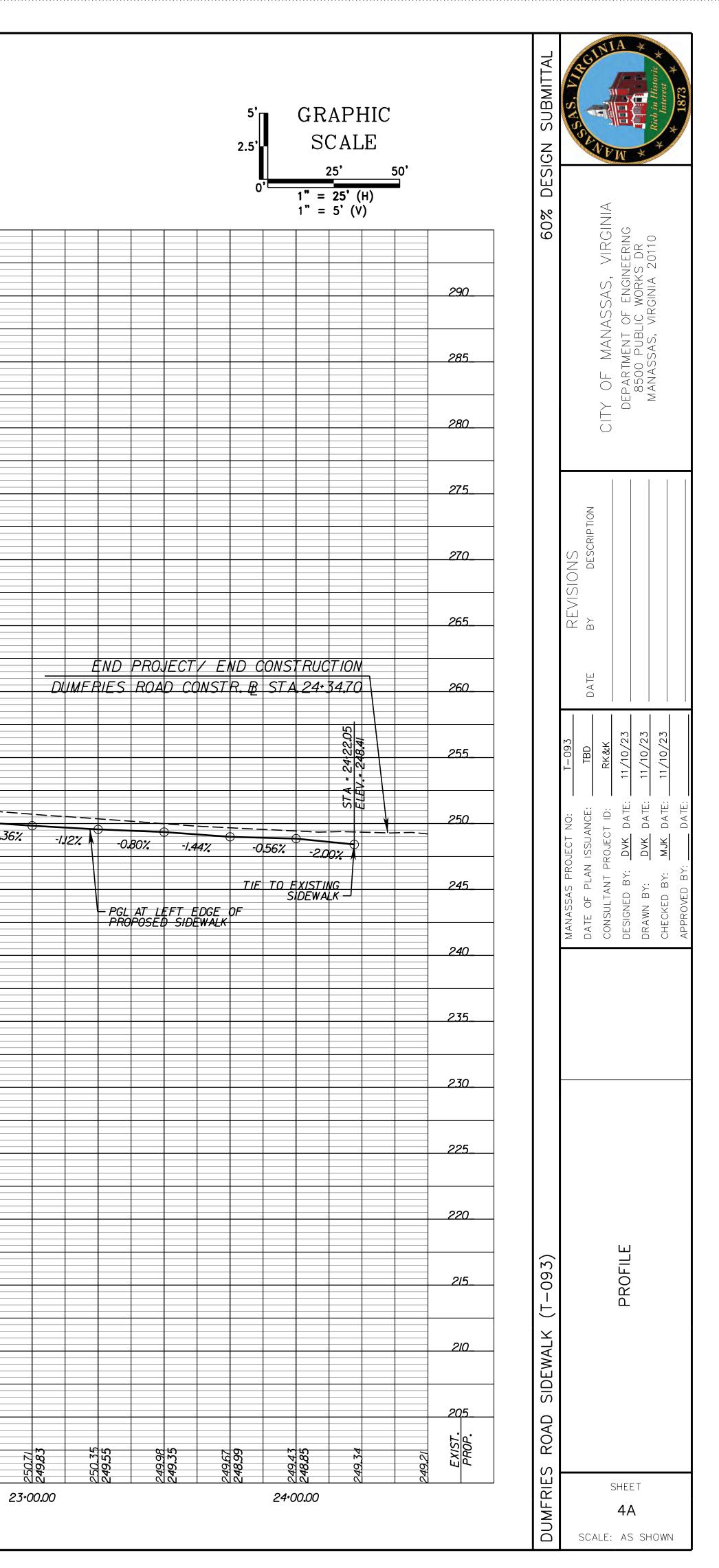
TIE TO PROPOSED
CURB RAMP CR A5
SEE SHEET 20(3)
FOR DETAILS

PGL AT LEFT EDGE OF CURB RAMP CR A6
PROPOSED SIDEWALK SEE SHEET 2C(3)
FOR DETAILS

22.00.00

1.41%

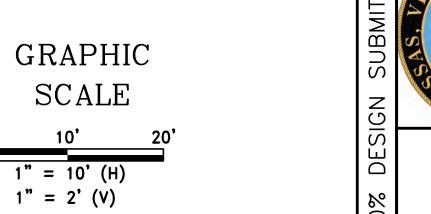
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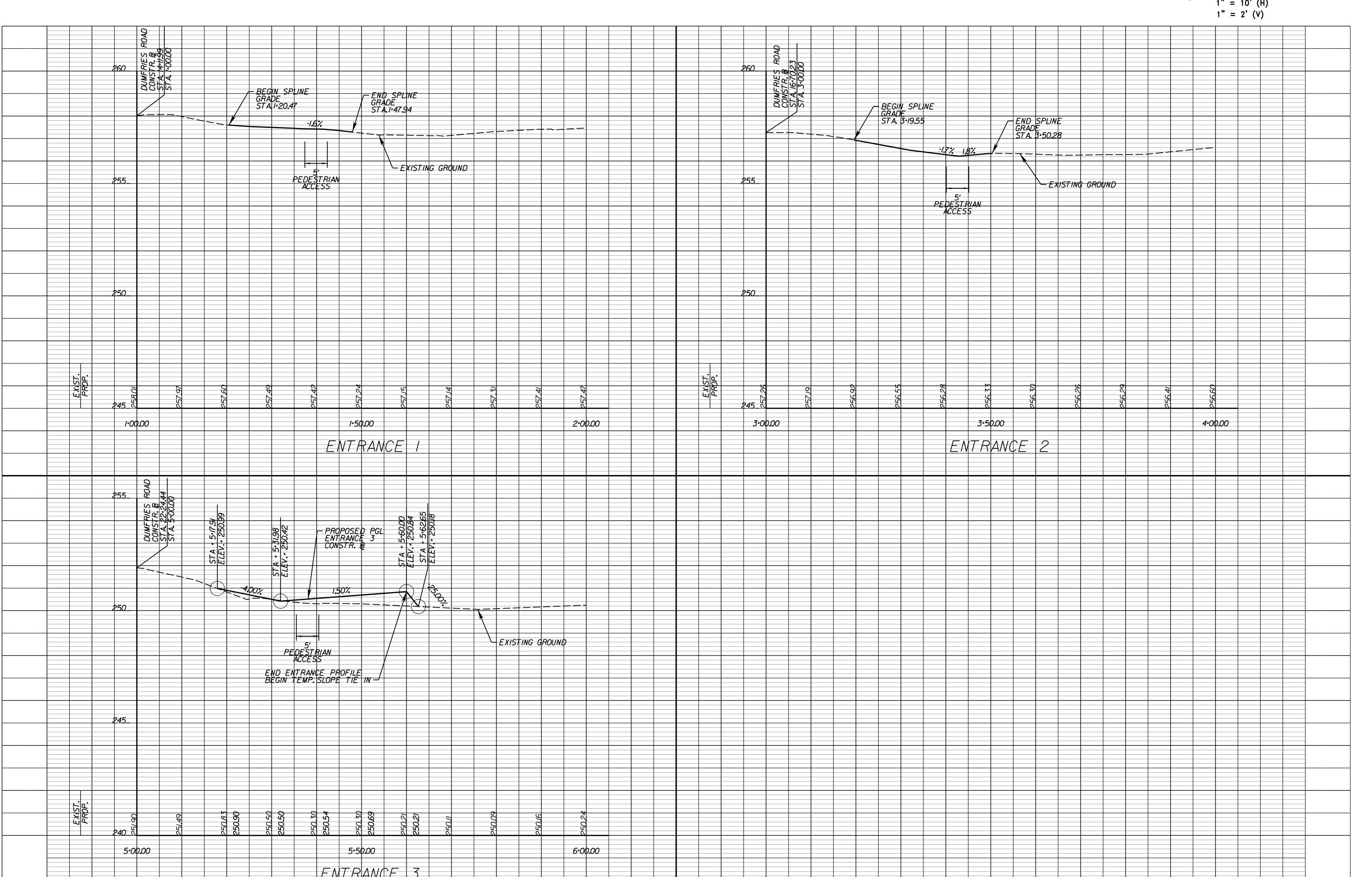


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ENTRANCE PROFILES

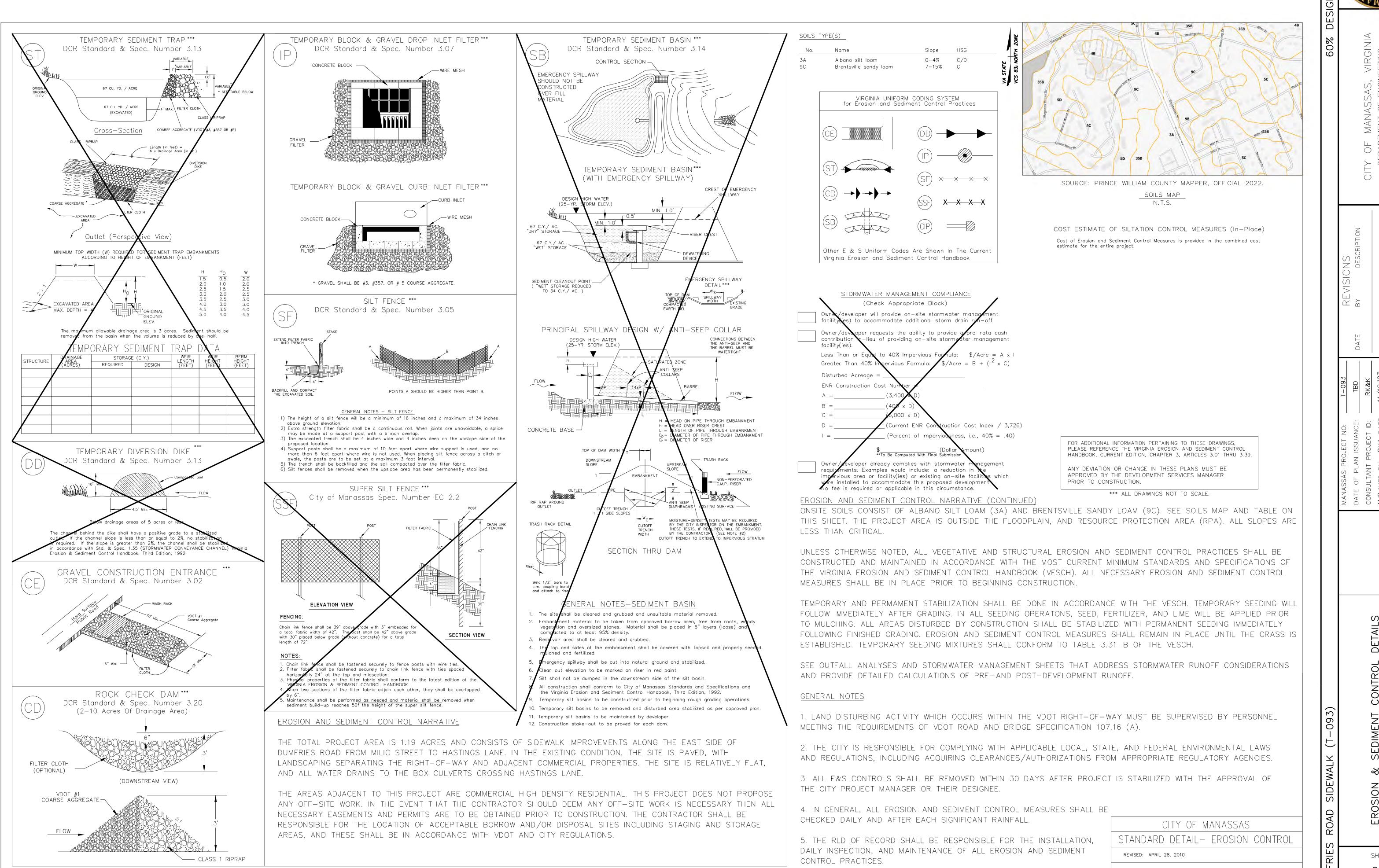






SHEET SCALE: AS SHOWN

EROSION & SEDIMENT CONTROL DETAILS AND NARRATIVE



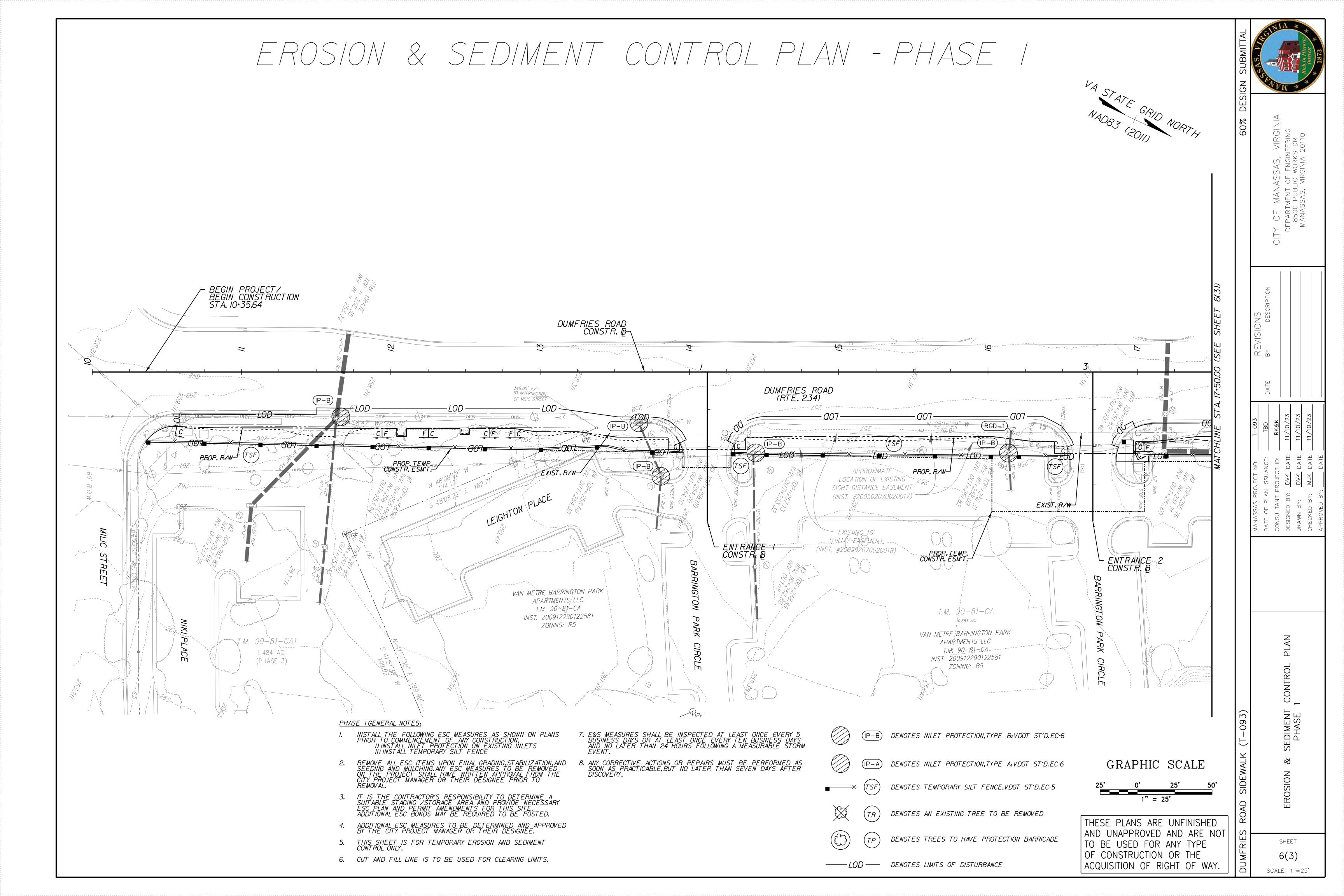
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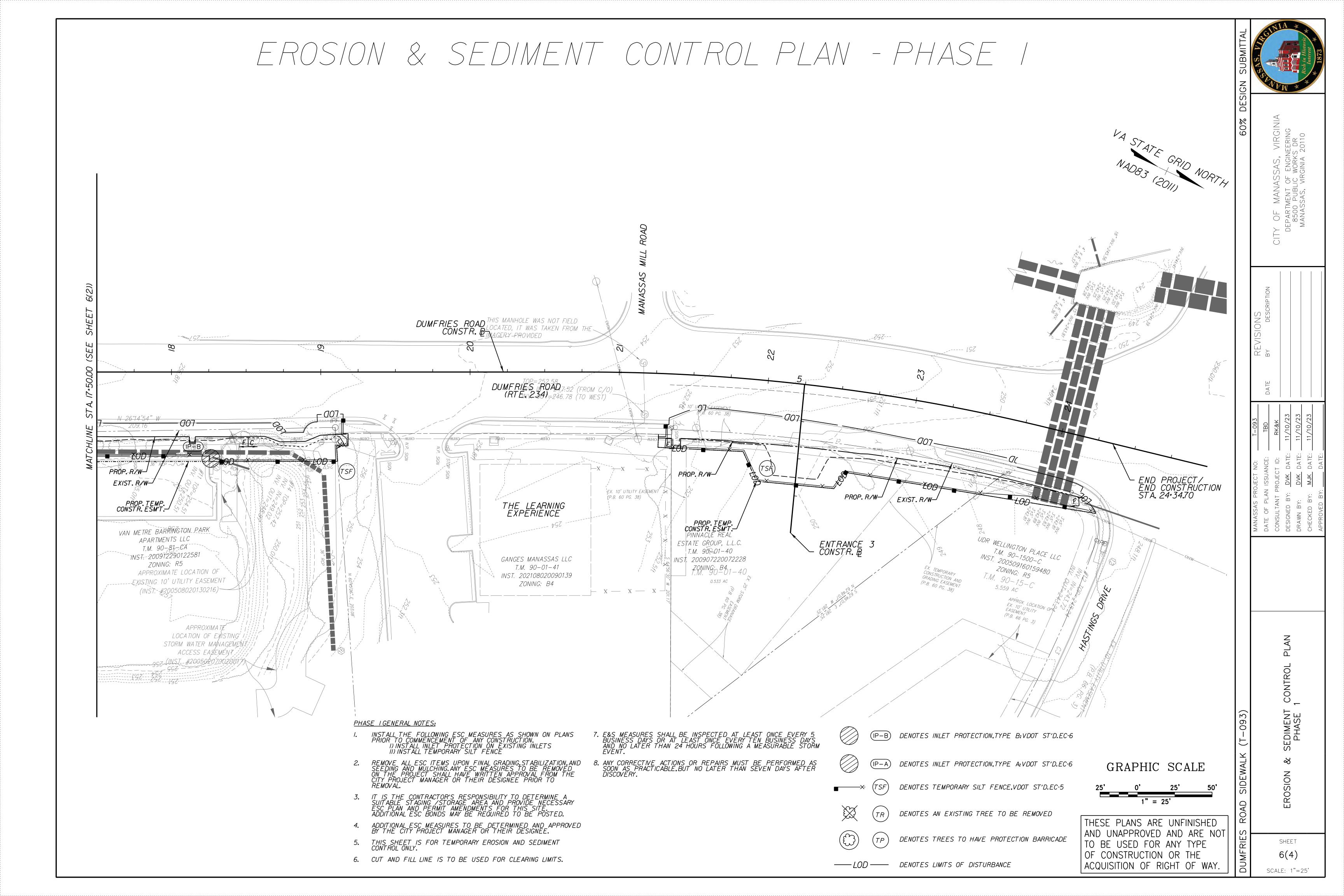
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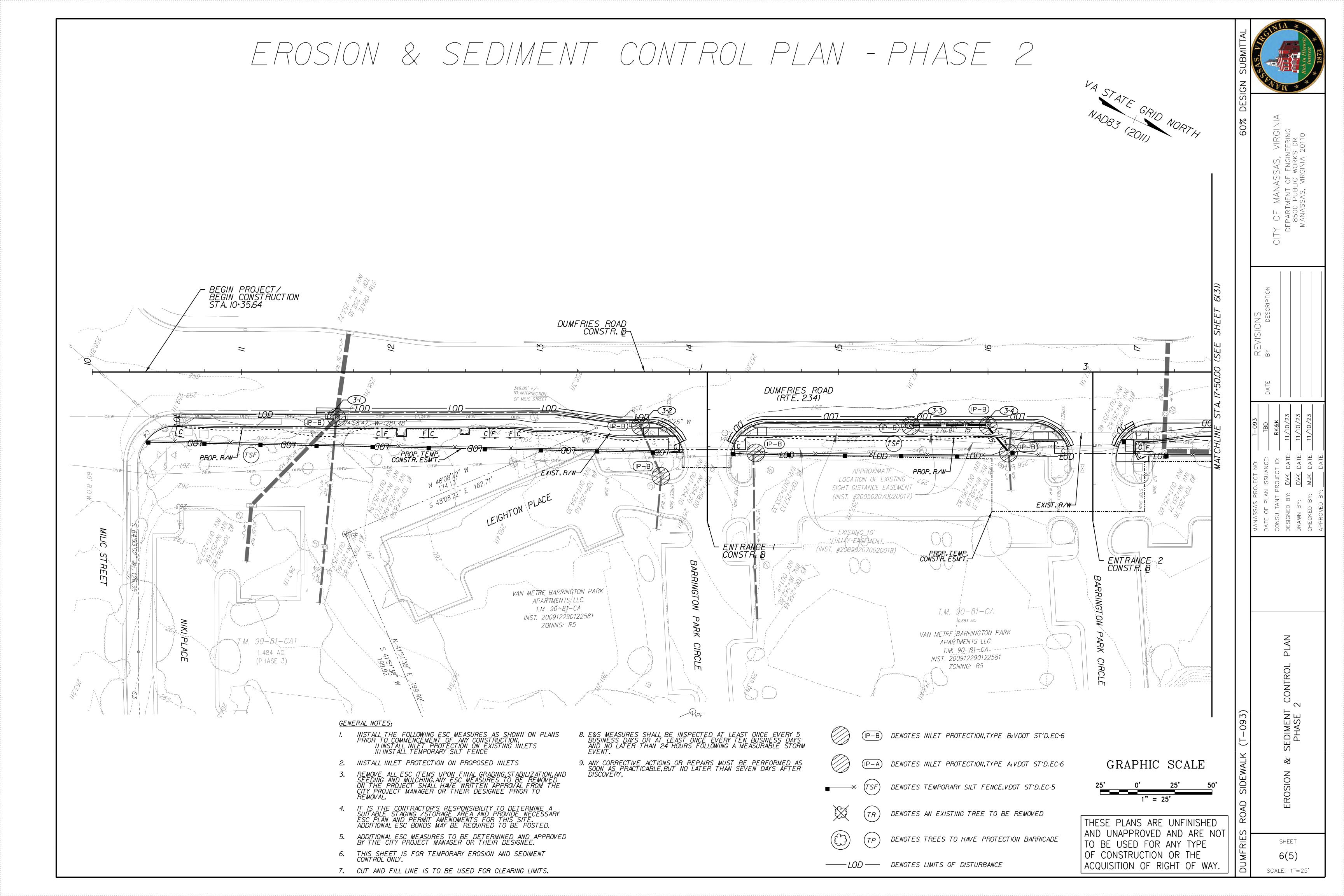
EROSION & SEDIMENT CONTROL CHECKLIST

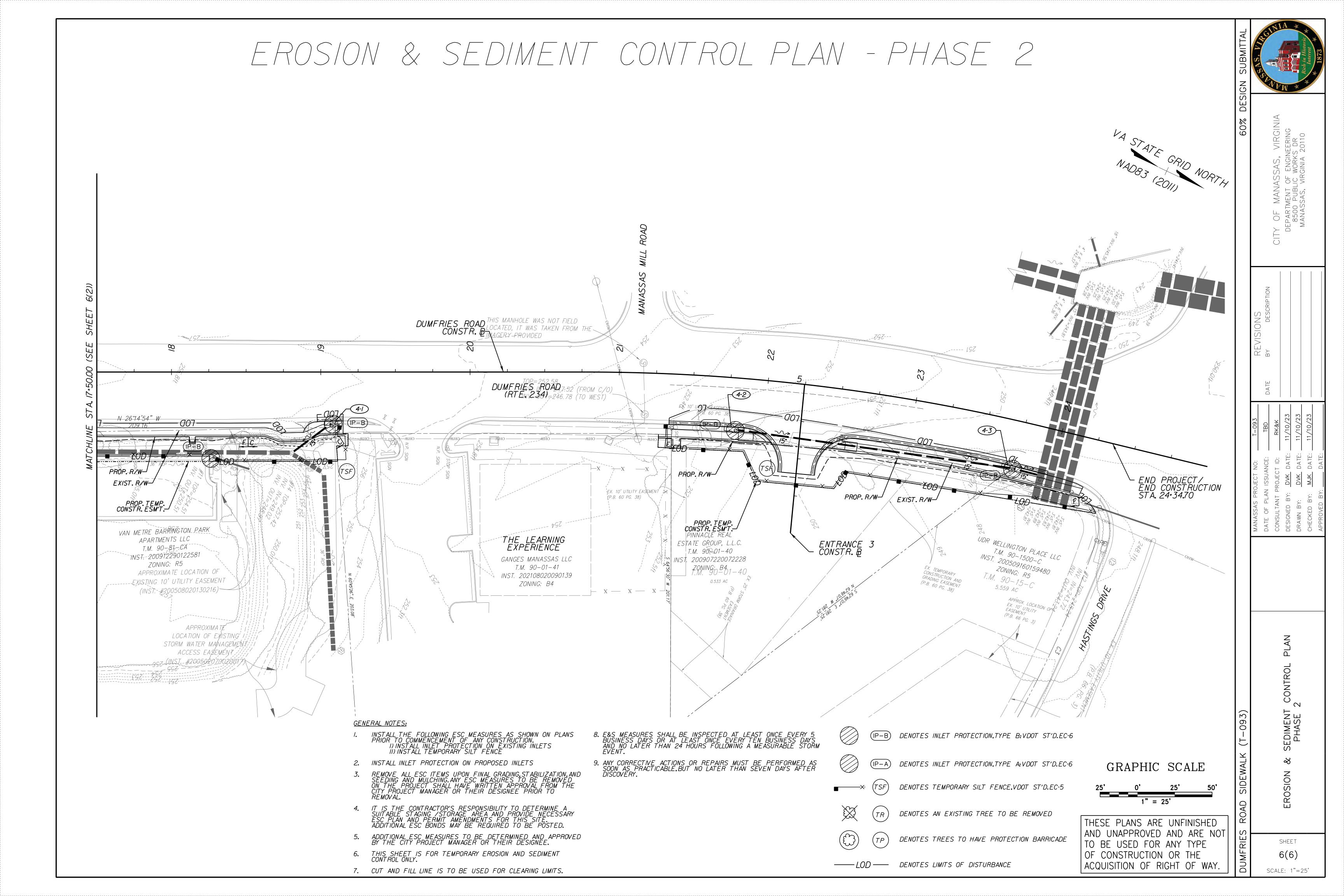
ENGINEER TO ADDRESS AND VERIFY ALL REQUIREMENTS INDICATED IN THE CHECKLISTS WATERSHED: g. Outfall from a detention facility shall be discharged to a receiving channel, and energy ARE MET PRIOR TO THE INITIAL SUBMISSION OF THE DEVELOPMENT PLANS. MS-16 Has stabilization of utility trenches been addressed? dissipators shall be placed at the outfall of all detention facilities as necessary to provide a (Underground utility lines shall be installed in accordance with the following standards in addition stabilized transistion from the facility to the receiving channel. PLAN REVIEW MINIMUM STANDARD CHECKLIST to other applicable criteria: OUTFALL #1: (Description of bed and banks or on-site SWM.) YES NO NA a. No more than 500 linear feet of trench may be opened at one time. h. All on-site channels must be verified to be adequate. b. Excavated material shall be placed on the uphill side of trenches. MS-1 Have temporary and permanent stabilization been addressed in narrative? c. Effluent from dewatering operations shall be filtered or passed through an approved sediment i. Increased volumes of sheet flows that may cause erosion or sedimentation on adjacent property Are practices shown on the plan? trapping device, or both, and discharged in a manner that does not adversely affect flowing shall be diverted to a stable outlet, adequate channel, pipe or pipe system, or to a detention Seed specifications? streams or off-site property facility. d. Material used for backfilling trenches shall be properly compacted in order to minimize erosion PRE-DEVELOPMENT (D.A. = and promote stabilization. j. In applying these stormwater management criteria, individual lots or parcels in a residential, D.A.(ac.) Sub-area Storm Event 1c min. I in./hr. Q cfs. e. Restabilization shall be accomplished in accordance with this chapter. commercial or industrial development shall not be considered to be separate development projects. (Permanent or temporary soil stabilization shall be applied to denuded areas within seven days Instead, the development, as a whole, shall be considered to be a single development project. after final grade is reached on any portion of the site. Temporary soil stabilization shall be f. Applicable safety chapters shall be complied with. Pre Dev. 2 YR. =Pre Q2 Hydrologic parameters that reflect the ultimate development condition shall be used in all applied within seven days to denuded areas that may not be at final grade but will remain dormant 10 YR. =Pre Q10 engineering calculations. for longer than 30 days. Permanent stabilization shall be applied to areas that are to be left [] [] MS-17 Has the prevention of transporting of soil and mud onto public roadways been adequately dormant for more than one year.) 100 YR. =Pre Q100 addressed? (i.e. Construction Entrances, Wash Racks, daily cleaning of roadways, transport k. All measures used to protect properties and waterways shall be employed in a manner which POST-DEVELOPMENT of sediment to a trapping facility) minimizes impacts on the physical, chemical and biological integrity of rivers, streams and other MS-2 Has stabilization of soil stockpiles been addressed in narrative? Sub-area Storm Event D.A.(ac.) C Tc min. | I in./hr. Are sediment trapping measures provided? waters of the state. (Where construction vehicle access routes intersect paved or public roads, provisions shall be made =Pre Q2 to minimize the transport of sediment by vehicular tracking onto the paved surface. Where sediment (During construction of the project, soil stock piles and borrow areas shall be stabilized or protected 10 YR. ≂Pre Q10 CHECKLIST is transported onto a paved or public road surface, the road surface shall be cleaned thoroughly at with sediment trapping measures. The applicant is responsible for the temporary protection and =Pre Q100 100 YR. the end of each day. Sediment shall be removed from the roads by shoveling or sweeping and permanent stabilization of all soil stockpiles on site as well as borrow areas and soil intentionally NARRATIVE transported to a sediment control disposal area. Street washing shall be allowed only after sediment controlled transported from the project site.) is removed in this manner. This provision shall apply to individual development lots as well as to Project description – Briefly describes the nature and purpose of the land-disturbing OUTFALL #2: (Description of bed and banks or on—site SWM.) larger land-disturbing activities.) activity, and the area (acres) to be disturbed. MS-3 Has maintenance of permanent stabilization been addressed? MS-18 Has the removal of temporary practices been addressed? (A permanent vegetative cover shall be established on denuded areas not otherwise permanently \times Existing site conditions – A description of the existing topography, vegetation and stabilized. Permanent vegetation shall not be considered established until a ground cover is (All temporary erosion and sediment control measures shall be removed within 30 days after final achieved that is uniform, mature enough to survive and will inhibit erosion.) site stabilization or after the temporary measures are no longer needed, unless otherwise authorized Adjacent areas – A description of neighboring areas such as streams, lakes, residential by the local program authority. Trapped sediment and the disturbed soil areas resulting from the PRE-DEVELOPMENT (D.A. = [] MS-4 Are sediment trapping facilities to be constructed as a first step in LDA? areas, roads, etc., which might be affected by the land disturbance. disposition of temporary measures shall be permanently stabilized to prevent further erosion and Has maintenance of practices been addressed? (i.e. repair of structures and removal l in./hr. Q cfs. Storm Event D.A.(ac.)C Tc min accumulated sediment) Off-site-areas - Describe any off-site land-disturbing activities that will occur (including (Sediment basins and traps, perimeter dikes, sediment barriers and other measures intended to trap Pre Dev. 2 YR. =Pre Q2 borrow sites, waste or surplus areas, etc.). Will any other areas be disturbed? erosion and sediment deposition due to increases in peak stormwater runoff? 10 YR. =Pre Q10 sediment shall be constructed as a first step in any land-disturbing activity and shall be made (Properties and waterways downstream from development sites shall be protected from sediment functional before upslope land disturbance takes place.) Soils – A brief description of the soils on the site giving such information as soil name, 100 YR. =Pre Q100 deposition, erosion and damage due to increases in volume, velocity and peak flow rate of mapping unit, erodibility, permeability, depth, texture and soil structure. POST-DEVELOPMENT (D.A. AC.) stormwater runoff for the stated frequency storm of 24-hour duration in accordance with the [] MS-5 Has stabilization of earthen structures been addressed? D.A.(ac.) | C | Tc min. Storm Eyent l in./hr. Q cfs. Sub-area following standards and criteria: _ Critical areas – A description of areas on the site which have potentially serious erosion a. Concentrated stormwater runoff leaving a development site shall be discharged directly into an 2/YR (Stabilization measures shall be applied to earthen structures such as dams, dikes and diversions problems (e.g. steep slopes, channels, wet weather/underground springs, etc.). adequate natural or man-made receiving channel, pipe or storm sewer system. For those sites where =Pre Q10 *immediately after installation.*) 10 YR. runoff is discharged into a pipe or pipe system, downstream stability analyses at the outfall of the 100 YR. =Pre_Q100 Erosion and sediment control measures – A description of the methods which will be used pipe or pipe system shall be performed. [] MS-6 Are sediment basins required where needed? to control erosion and sedimentation on the site. (Controls should meet the specifications ncontrolled b. Adequacy of all channels and pipes shall be verified in the following manner: in Chapter 3.) (Sediment traps and sediment basins shall be designed and constructed based upon the total OUTFALL #3: (Description of bed and banks or on—site SWM.) drainage area to be served by the trap or basin.) Permanent stabilization – A brief description, including specifications, of how the site will a. The minimum storage capacity of a sediment trap shall be 134 cubic yards per acre of drainage be stabilized after construction is completed. area and the trap shall only control drainage areas less than three acres. (1) The applicant shall demonstrate that the total drainage area to the point of b. Surface runoff from disturbed areas that is comprised of flow from drainage areas greater than analysis within the channel is one hundred times greater than the contributing Stormwater runnoff considerations – Will the development site cause an increase in peak or equal to three acres shall be controlled by a sediment basin. The minimum storage capacity drainage area of the project in question; or runoff rates? Will the increase in runoff cause flooding or channel degradation of a sediment basin shall be 134 cubic yards per acre of drainage area. The outfall system shall, downstream? Describe the strategy to control stormwater runoff. PRE-DEVELOPMENT (D.A. = at a minimum, maintain the structural integrity of the basin during a 25-year storm of 24-hour (2) (a) Natural channels shall be analyzed by the use of a two-year storm to verify I in./hr. Q cfs. ر Tc min duration. Runoff coefficients used in runoff calculations shall correspond to a bare earth Storm Event D.A.(ac.) Calculations – Detailed calculations for the design of temporary sediment basins, that stormwater will not overtop channel banks nor cause erosion of channel permanent stormwater detention basins, diversions, channels, etc. Include calculations for condition or those conditions expected to exist while the sediment basin is utilized.) pre- and post-development runoff. bed or banks. Pre Dev. 2 YR. =Pre Q2 [] MS-7 Has stabilization of cut and fill slopes been adequately addressed? 10 YR. =Pre Q10 SITE PLAN (b) All previously constructed man-made channels shall be analyzed by the use =Pre Q100 100 YR. (Cut and fill slopes shall be designed and constructed in a manner that will minimize erosion. Slopes of a ten-year storm to verify that stormwater will not overtop its banks and by Vicinity map – A small map locating the site in relation to the surrounding area. Include that are found to be eroding excessively within one year of permanent stabilization shall be POST-DEVELOPMENT (D.A. AC.) the use of a two-year storm to demonstrate that stormwater will not cause any landmarks which might assist in locating the site. provided with additional slope stabilizing measures until the problem is corrected.) Sub-area D.A.(ac.) Tc min. ∣ in./hr. Q cfs. erosion of channel bed or banks; and Storm Ex X Indicate north – The direction of north in relation to the site. =Pre Q2 [] [] MS-8 Are paved flumes, channels, or slope drains required where necessary? X Limits of clearing and grading – Areas which are to be cleared and graded. (c) Pipes and storm sewer systems shall be analyzed by the use of a ten-year storm to =Pre Q10 10 YR. verify that stormwater will be contained within the pipe or system. =Pre Q100 (Concentrated runoff shall not flow down cut or fill slopes unless contained within an adequate 100 YR. \times Existing contours – The existing contours of the site. c. If existing natural receiving channels or previously constructed man-made channels or pipes are temporary or permanent channel, flume or slope drain structure.) controlled not adequate, the applicant shall: X Final contours – Changes to the existing contours, including final drainage patterns. (1) Improve the channels to a condition where a ten-year storm will not overtop the [] MS-9 Have water seeps from slope face, adequate drainage or other protection addressed? Designer: √Project: \times Existing vegetation – The existing tree lines, grassed areas, or unique vegetation. banks and a two-year storm will not cause erosion to channel the bed or banks; or Date: (2) Improve the pipe or pipe system to a condition where the ten-year storm is contained (Whenever water seeps from a slope face, adequate drainage or other protection shall be provided.) X Soils – The boundaries of different soil types. within the appurtenances; (3) Develop a site design that will not cause the pre-development peak runoff rate from a Existing drainage patterns – The dividing lines and the direction of flow for the different MS-10 Is adequate inlet protection required on all operational storm sewer inlets? Hydrologic and Channel Information 085) drainage areas. Include the size (acreage) of each drainage area. two-year storm to increase when runoff outfalls into a natural channel or will not cause the pre-development peak runoff rate from a ten-year storm to increase when runoff (All storm sewer inlets that are made operable during construction shall be protected so that Critical erosion areas - Areas with potentially serious erosion problems. (See Chapter 6 outfalls into a man-made channel; or sediment-laden water cannot enter the conveyance system without first being filtered or otherwise (1) Improve the channels to a condition where a ten-year storm will not overtop treated to remove sediment.) Site Development - Show all improvements such as buildings, parking lots, access roads, the banks and a two-year storm will not cause erosion to channel the bed or utility construction, etc. banks; or [] MS-11 Are channel lining and/or outlet protection required on stormwater conveyance channels? Location of practices – The locations of erosion and sediment controls and stormwater \circ AHW =management practices used on the site. Use the standard symbols and abbreviations in $Q_1 =$ (Before newly constructed stormwater conveyance channels or pipes are made operational, (2) Improve the pipe or pipe system to a condition where the ten-year storm is Chapter 3 of the Virginia Erosion and Sediment Control Handbook. ROL Q₂ = adequate outlet protection and any required temporary or permanent channel lining shall be contained within the appurtenances; installed in both the conveyance channel and receiving channel.) A Off-site areas – Identify any off-site land-disturbing activities (e.g., borrow sites, waste TW 1 = areas, etc.). Show location of erosion controls. (Is there sufficient information to assure TW 2 = (3) Develop a site design that will not cause the pre-development peak runoff adequate protection and stabilization?) [] MS-12 Are in-stream construction measures required so that channel damage is minimized? rate from a two-year storm to increase when runoff outfalls into a natural A Detail drawings – Any structural practices used that are not referenced to the E&S channel or will not cause the pre-development peak runoff rate from a ten-vear Allowable Outlet Velocity= (When work in a live watercourse is performed, precautions shall be taken to minimize handbook or local handbooks should be explained and illustrated with detail drawings. storm to increase when runoff outfalls into a man-made channel; or encroachment, control sediment transport and stabilize the work area to the greatest extent Maintenance – A schedule of regular inspections and repair of erosion and sediment Headwater Computation possible during construction. Nonerodible material shall be used for the construction of causeways control structures should be set forth. and cofferdams. Earthen fill may be used for these structures if armored by nonerodible cover (4) Provide a combination of channel improvement, stormwater detention or Inlet Cont. Outlet Control other measures which is satisfactory to the plan approving authority to prevent ANY DEVIATION OR CHANGE IN THESE PLANS MUST BE APPROVED downstream erosion. [] MS-13 Are temporary stream crossings of non-erodible material required where necessary? BY THE DEVELOPMENT SERVICES MANAGER PRIOR TO CONSTRUCTION. Velocity Cost Size LSo Culvert Type ho Comments d. The applicant shall provide evidence of permission to make the improvements. (When a live watercourse must be crossed by construction vehicles more than twice in any six-month period, a temporary vehicular stream crossing constructed of nonerodible material shall be provided.) e. All hydrologic analyses shall be based on the existing watershed characteristics and the ultimate development condition of the subject project. [] MS-14 Are all applicable federal, state and local regulations pertaining to working in or crossing live watercourses being met? f. If the applicant chooses an option that includes stormwater detention, he shall obtain approval from the locality of a plan for maintenance of the detention facilities. The plan (All applicable federal, state and local chapters pertaining to working in or crossing live shall set forth the maintenance requirements of the facility and the person responsible for watercourses shall be met.) performing the maintenance. CITY OF MANASSAS [] MS-15 Has re-stabilization of areas subject to in-stream construction been adequately addressed? Summary & Recommendations: SEDIMENT CONTROL CHECKLIST & SWM (The bed and banks of a watercourse shall be stabilized immediately after work in the watercourse is completed.) SHEET REVISED: APRIL 28, 2010

6(2)









DRA/NAGE DESCRIPTIONS

EXISTING

$\langle 1 \rangle$	TOP=258.99
	INV. IN=255.49(2)
	INV. IN = 256.31(3)
	INV. OUT=253.94

- TOP=262.82 INV. IN=257.69INV. OUT=257.35
- TOP=261.85 /NV. /N=257.60INV. OUT=257.45
- TOP=258.60 INV. OUT=254.30
- TOP=258.00 /NV. /N = 254.20INV. OUT=254.10
- $\langle 6 \rangle$ TOP=257.13 INV. OUT=253.32
- TOP=258.44 INV. IN=252.86/NV. OUT=?
- TOP = 256.31INV. IN=252.09INV. OUT=251.82

TOP=255.76 /NV. /N=251.71INV. OUT=251.60

- TOP=256.70 INV. IN=251.62INV. OUT=251.46
- TOP=254.51 INV. OUT=250.51
- TOP=248.24 $1000 \cdot 1000 \cdot$ INV. OUT=243.24
- TOP = 258.38INV. IN = 253.72
- TOP=257.42 INV. IN=249.02 INV. OUT=248.97
- TOP=256.81 INV. IN=248.51INV. OUT=248.31
- INV. OUT=247.17

/NV. /N = 242.89INV. IN=242.83INV. IN=242.81INV. OUT=242.28 INV. OUT=242.25 INV. OUT=242.25 INV. OUT=242.20

INV. IN=242.81

PROPOSED

- Modify Existing Drop Inlet Adjust to Grade, Lower 0.18' Add DI-3B Top, L=8' Proposed Top Elev = 258.81' Connect UD-4 to Structure
- Modify Existing Drop Inlet Adjust to Grade, Lower 0.63' Add DI-3B Top, L=8' Proposed Top Elev = 257.97' Connect UD-4 to Structure
- I Std.DI-3B Req. L = 4', H = 4.1', Inv = 252.80' Std.IS-I Reg. Connect UD-4 to Structure
- 49' 15" Conc. Pipe Class IV Req. (2' Cover) Silt Tight Joint Type Inv(In) = 252.80', Inv(Out) = 252.50'
- I Std. DI-3A Req. H = 4.4', Inv = 252.30' Std.IS-I Req. Connect (2) UD-4 to Structure Connect CD-2 to Structure
- 20' 15" Conc. Pipe Class IV Req. (2' Cover) Silt Tight Joint Type Inv(In) = 252.30', Inv(Out) = 252.09'

- I Std.DI-3B Req. L = 6',H = 4.2', Inv = 251.90' Std.IS-I Req. Connect UD-4 to Structure
- (4-1) $\langle 14 \rangle$ 31' - 15" Conc. Pipe Class IV Req. (2' Cover) Silt Tight Joint Type Inv(In) = 251.90',Inv(Out) = 251.70'
 - I Std.DI-3B Req. L = 8', H = 4.1', Inv = 247.40' Std.IS-I Req. Connect UD-4 to Structure
- 184' 15" Conc. Pipe Class IV Req. (2' Cover) Silt Tight Joint Type Inv(In) = 247.40',Inv(Out) = 244.80'
 - I Std.DI-3B Req. L = 8',H = 4.3', Inv = 244.60' Std.IS-I Req. Connect UD-4 to Structure
- 4-3)-(17) 16' - 15" Conc. Pipe Class IV Reg. (2' Cover) Silt Tight Joint Type Inv(In) = 244.60',Inv(Out) = 244.50' Connect to Ex. Box Culvert

UNDERDRAIN OUTLET SUMMARY

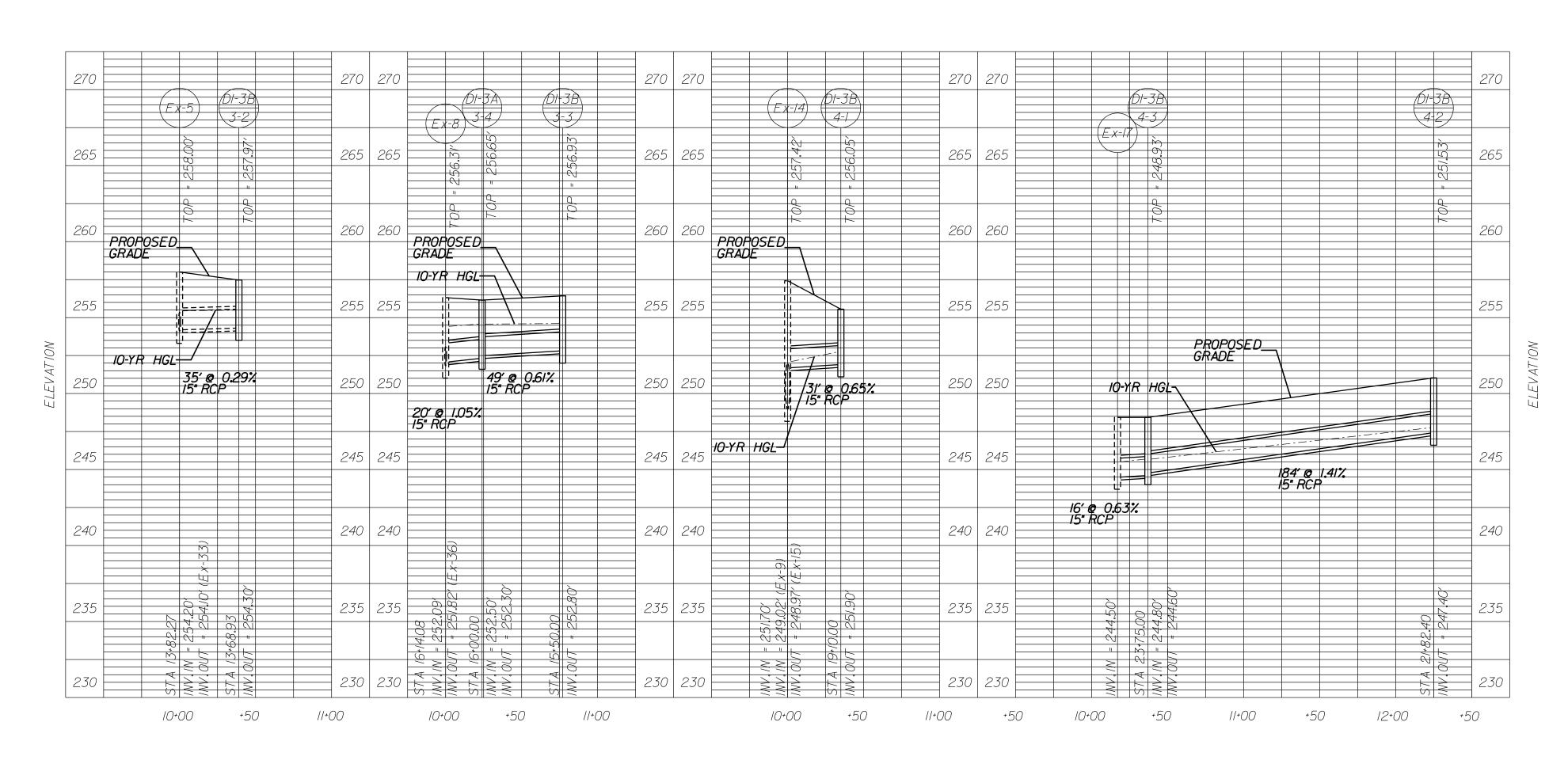
Station	Side	Remarks
11+63.53	RT	Connect UD-4 to Str. 3-1
13+67.02	RT	Connect UD-4 to Str. 3-2
15+48.08	RT	Connect UD-4 to Str. 3-3
16+00.00	RT	Connect (2) UD-4 to Str. 3-4
16+00.00	RT	Connect CD-2 to Str. 3-4
19+08.10	RT	Connect UD-4 to Str. 4-1
21+80.45	RT	Connect UD-4 to Str. 4-2
23+73.04	RT	Connect UD-4 to Str. 4-3

NOTES:

- A POST INSTALLATION INSPECTION SHALL BE CONDUCTED BY THE CONTRACTOR ON ALL STORM SEWER PIPES IN ACCORDANCE WITH SECTION 302.03(D) OF THE VDOT 2020 ROAD AND BRIDGE SPECIFICATIONS AND VTM 123.
- FOR EXISTING PIPES WITHIN THE PROJECT TO REMAIN, THE CONTRACTOR WILL NEED TO VERIFY IF THE CONDITION OF THE PIPE IS ACCEPTABLE, IF REPAIRS ARE NEEDED, OR IF THE PIPE NEEDS TO BE REPLACED.

THESE PLANS ARE UNFINISHED AND UNAPPROVED AND ARE NOT TO BE USED FOR ANY TYPE OF CONSTRUCTION OR THE ACQUISITION OF RIGHT OF WAY.

STORM SEWER PROFILES



SHEET

SCALE: N/A

THESE PLANS ARE UNFINISHED AND UNAPPROVED AND ARE NOT TO BE USED FOR ANY TYPE OF CONSTRUCTION OR THE ACQUISITION OF RIGHT OF WAY.

DUMFRIES

STORM SEWER COMPUTATIONS

	FORM LI	D 204													ST	ORMWA	ATER IN	LET COI	MPUTA	rions													SHE
ROUTE	INLET	Dumfrie	s	T	Ι	1	ı		PROJE	СТ	Dumfrie	es Road	Sidewall	ς Ι	I	Ι	I	Ι		Ι	Т	Т	Т		DESIGN CHECK		MJD	Γ	T	Sag Ini	DATE UNITS lets Only		1/21/2023 ENGLISH
NUMBER	TYPE	LENGTH (FT; M)	STATION	DRAINAGE AREA (AC; HA)	O	CA	ΣCA	I (IN/HR; mm/HR)	Q INCR. (CFS; CMS)	Qe CARRYOVER (CFS; CMS)	QT GUTTER FLOW (CFS; CMS)	S GUTTER SLOPE (FT/FT; M/M)	Sx CROSS SLOPE (FT/FT; M/M)	T (SPREAD) (FT; M)	W (GUTTER WIDTH) (FT; M)	W/T	Sw (GUTTER SLOPE) (FT/FT; M/M)	Sw/Sx	Eo (App. 9C-8)	ಪ	M/S	Se	COMPUTED LENGTH L _T (FT; M)	INLET / GRATE LENGTH (FT; M)	LLT	E (App. 9C-18)	Q INTERCEPTED (CFS; CMS) or d/h	Qb CARRYOVER (CFS; CMS)	d (FT; M)	h (FT; M)	d/h	T SPREAD @ SAG (FT; M)	REMARKS
3-1	DI-3B	8.000	11+65.45	0.260	0.90	0.234																											
			28.140'RIGI	0.180	0.35	0.063																											
							0.297	4	1.188	0	1.188	0.0150	0.0215	4.958	2.000	0.403	0.0833	3.8744	0.886	3.48	0.1451	0.1500	7.096	8.000	1.127	1.000	1.188	0.000					
3-2	DI-3B	8.000	13+68.93	0.160	0.90	0.144																											
			33.630'RIGI	0.180	0.35	0.063																											
							0.207	4	0.828	0	0.828	0.0200	0.0346	2.858	2.000	0.700	0.0833	2.4075	0.985	3.17	0.1320	0.1646	6.288	8.000	1.272	1.000	0.828	0.000					
3-3	DI-3B	4.000	15+50.00	0.170	0.90	0.153																											
			33.740'RIGI	<u> </u>	0.35	0.0105																											
							0.164	4	0.656	0	0.656	0.0008	0.0455	5.302	2.000	0.377	0.0833	1.8308	0.776	2.91	0.1211	0.1395	2.398	4.000	1.668	1.000	0.656	0.000					
3-4	DI-3A		16+00.00	0.040	0.90	0.036																											Back/Lt.
			33.690'RIGI	0.010	0.35	0.0035	_																										Back/Lt.
							0.04	4	0.16	0		0.001	0.0540	2.366	2.000	0.845	0.0833	1.5426		2.70													Back/Lt.
				0.030	0.90	0.027		_																									Ahead/Rt.
							0.027	4	0.108	0	0.268	0.001												1.25			0.268		0.0832	0.4583	0.18122	1.540	Ahead/Rt. Weir Flow
4-1	DI-3B	6.000	19+10.00	0.190	0.90	0.171																											
			30.400'RIGI	0.020	0.35	0.007																											
							0.178	4	0.712	0	0.712	0.0080	0.0282	3.812	2.000	0.525	0.0833	2.9539	0.941	3.32	0.1384	0.1584	4.587	6.000	1.308	1.000	0.712	0.000					
4-2	DI-3B	8.000	21+82.40	0.220	0.90	0.198																											
			32.710'RIGI	0.030	0.35	0.0105																											
							0.209	4	0.836	0	0.836	0.0304	0.0594	2.272	2.000	0.880	0.0833	1.4024	0.998	2.57	0.1072	0.1664	7.112	8.000	1.125	1.000	0.836	0.000					
4.2	DLab	0.000	23+75.00	0.260	0.00	0.224																											
4-3	DI-3B		23+75.00 29.990'RIGI	0.260	0.90	0.234																											
			29.990'KIGI	0.020	0.33	0.007	0.241	4	0.964	0	0.964	0.0144	0.0419	3.272	2.000	0.611	0.0833	1.9881	0.956	2.99	0.1247	0.1611	6.152	8.000	1.300	1.000	0.964	0.000					
							 		 				<u> </u>	-	<u> </u>	 		<u> </u>		 	 	 	 				 						

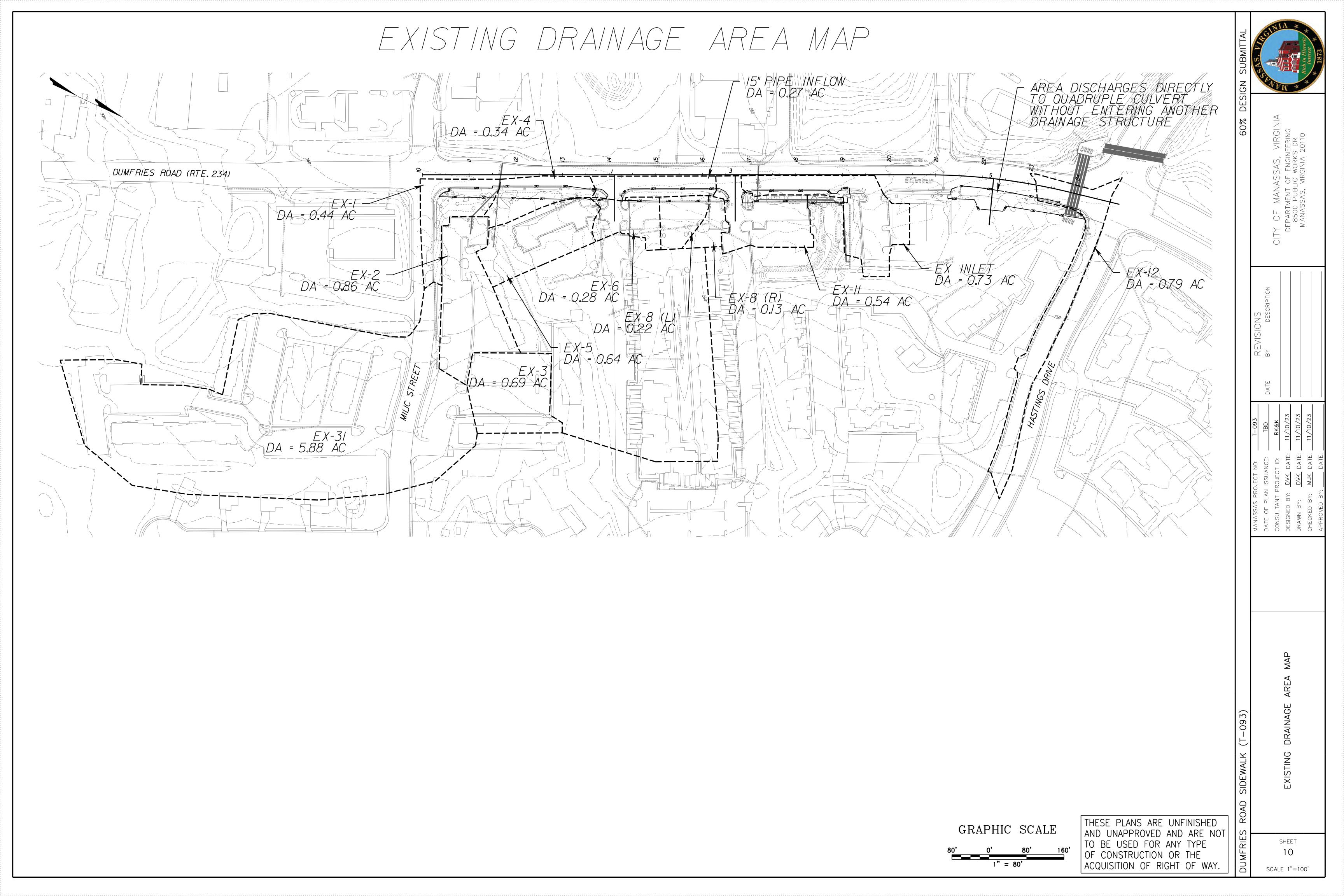
	FORM L	D 204													ST	ORMWA	ATER IN	LET COI	MPUTAT	TIONS													SHEE
ROUTE	=	Dumfri	es						PROJE	СТ	Dumfrie	s Road	Sidewall	k											DESIGN CHECK		MJD				DATE UNITS		1/21/2023 NGLISH
	INLET																													Sag Inl	ets Only		
NUMBER	TYPE	LENGTH (FT; M)	STATION	DRAINAGE AREA (AC; HA)	O	CA	ΣCA	I (IN/HR; mm/HR)	Q INCR. (CFS; CMS)	Qc CARRYOVER (CFS; CMS)	QT GUTTER FLOW (CFS; CMS)	S GUTTER SLOPE (FT/FT; M/M)	Sx CROSS SLOPE (FT/FT; M/M)	T (SPREAD) (FT; M)	W (GUTTER WIDTH) (FT; M)	W/T	Sw (GUTTER SLOPE) (FT/FT; M/M)	xS/wS	Eo (App. 9C-8)	ri .	S'w	Se	COMPUTED LENGTH L _T (FT; M)	INLET / GRATE LENGTH (FT; M)	L/LT	E (App. 9C-18)	Q INTERCEPTED (CFS; CMS) or d/h	Qb CARRYOVER (CFS; CMS)	d (FT; M)	h (FT; M)	d/h	T SPREAD @ SAG (FT; M)	REMARKS
Ex-11	DI-3B	12.000	18+25.00	0.470	0.90	0.423																											
			55.480'RIGI	0.070	0.35	0.0245																											
							0.448	4	1.792	0	1.792	0.0100	0.0207	7.248	2.000	0.276	0.0833	4.0242	0.732	3.50	0.1459	0.1275	8.235	12.000	1.457	1.000	1.792	0.000					
Ex-12	DI-3C	6.000	24+47.88	0.640	0.90	0.576																											Back/Lt.
			65.230'RIGI	0.100	0.35	0.035																											Back/Lt.
							0.611	4	2.444	0		0.0010	0.0290	11.484	2.000	0.174	0.0833	2.8724		3.30													Back/Lt.
							0	4	0	0																					ĺ		Ahead/Rt.
											2.444	0.0010												6			2.444		0.2303	0.4167	0.55156	7.944	Weir Flow
Ex-5	DI-3B	10.000	13+82.27	0.390	0.90	0.351																											
			71.110'RIGI	0.250	0.35	0.0875																											
							0.439	4	1.756	0	1.756	0.0151	0.0362	4.747	2.000	0.421	0.0833	2.3011	0.848	3.13	0.1304	0.1468	8.489	10.000	1.178	1.000	1.756	0.000					
Ex-6	DI-3B	6.000	14+41.03	0.230	0.90	0.207																											
			55.660'RIGI	0.050	0.35	0.0175																											
							0.225	4	0.9	0	0.900	0.0010	0.0287	7.512	2.000	0.266	0.0833	2.9024	0.667	3.31	0.1379	0.1208	3.192	6.000	1.880	1.000	0.900	0.000					
Ex-8	DI-3C	6.000	16+14.08	0.190	0.90	0.171																											Back/Lt.
			55.550'RIGI	1	0.35																												Back/Lt.
							0.182	4	0.728	0		0.001	0.0377	5.843	2.000	0.342	0.0833	2.2095		3.09													Back/Lt.
				0.120	0.90	0.108																											Ahead/Rt.
				0.010	0.35	0.0035																											Ahead/Rt.
							0.112	4	0.448	0																							Ahead/Rt.
											1.176	0.001												6			1.176		0.1414	0.4583	0.30786	3.751	Weir Flow

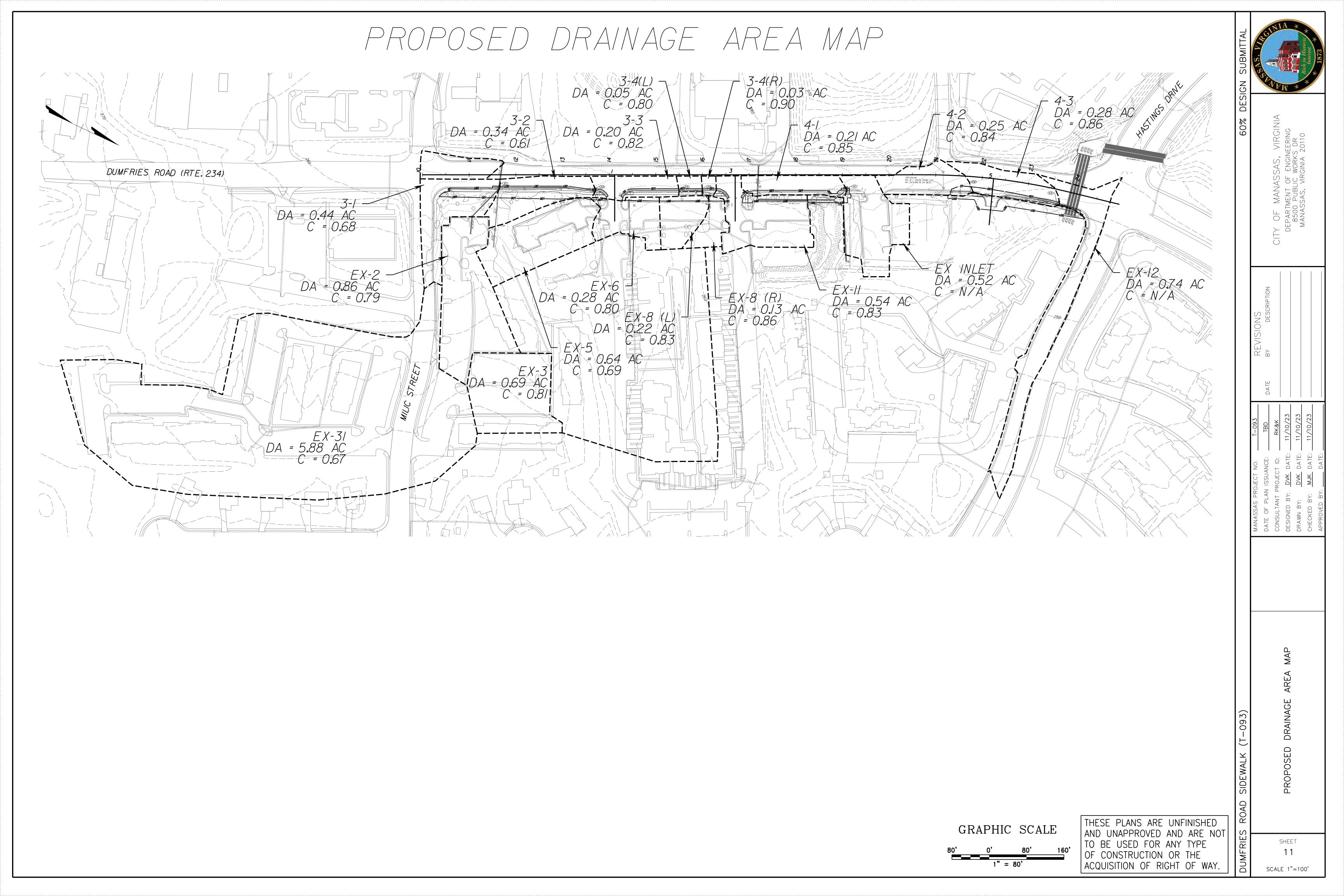
			OMPUTAT	TIONS						PRO. LOCA	TION:	Dumfries City of M Manassa		ewalk								Designe Checked	,	MJD SY					
STORM F	REQUENCY	10	_																				UNITS	ENG	LISH	1			
					DRAIN.	RUNOFF	7	CA		RAIN	RUI	NOFF	INVERT E	LEVATIONS	LENGTH	SLOPE	SIZE	SHAPE	Number	Capacity	Friction		NORM	IAL FLO)W		FLOW	V TIME	
PIPE	FROM I		TO PO		AREA	COEFF.	1	ACCUM-	INLET	FALL	Lateral	Total Q	UPPER	LOWER	of Pipe		(Dia. Or		of Pipes		Slope	Depth of	Area of	Hrn	Vn	En	INCRE-		1
NO.	REFERENCE	STA.	REFERENCE	STA.	"A"	"C"	MENT	ULATED	TIME Minutes	In/Hr	CFS	CFS	END	END	Ft.	Ft./Ft.	Span/Rise)			CFS	Ft./Ft.	Flow, dn Ft.	Flow, An	Ft.	Et/Caa	Ft.	MENT Minutes	-LATED Minutes	1
	(1)		(2)		Acre (3)	(4)	(5)	(6)	(7)	(8)	Crs	(9)	(10)	(11)	(12)	(13)	In. (14)			(15)	Ft./Ft.	Ft.	SqFt	Ft.	Ft/Sec (16)	Γι.	(17)	(17)	(18)
3(1)-Ex32	` '	11+65.45			0.44	0.68	0.30	5.45	5.39	6.31	0.00	34.86	253.94	253.72	56.00	0.00393	36	Circular	1	41.81	0.00280	2.09	5.27	0.89	6.62	2.77	0.14	5.53	(10)
Ex2-3(1)	Ex2		3-1	11+65.45	0.86	0.79	0.68	4.59	5.28	6.34	0.00	29.45	257.35	255.49	78.00	0.02385	36 X 30	Elliptical	1	80.55	0.00320	1.06	2.37	0.61	12.64	3.54	0.10	5.39	
Ex31-Ex2	Ex31		Ex2		0.00		0.00	3.91	5.00	6.43	0.00	25.14	259.85	257.69	165.00	0.01309	36 X 30	Elliptical	1	59.68	0.00230	1.14	2.61	0.64	9.69	2.60	0.28	5.28	
Ex3-3(1)	Ex3		3-1	11+65.45	0.69	0.81	0.56	0.56	5.00	6.43	0.00	3.60	257.45	256.31	83.00	0.01373	18	Circular	1	12.31	0.00120	0.56	0.60	0.30	6.05	1.12	0.23	5.23	
<u> </u>																													
3(2)-Ex5	3-2	13+68.93	Ex-5	13+82.27	0.34	0.61	0.21	0.21	5.00	6.43	0.00	1.33	254.30	254.20	35.00	0.00286	15	Circular	1	3.46	0.00040	0.54	0.51	0.28	2.63	0.65	0.22	5.22	Existing Pipe
3(3)-3(4)	3-3	15+50.00	3-4	16+00.00	0.20	0.82	0.16	0.16	5.00	6.43	0.00	1.05	252.80	252.50	49.00	0.00612	15	Circular	1	5.05	0.00030	0.39	0.32	0.22	3.26	0.55	0.25	5.25	
3(4)-Ex8	3-4	16+00.00	Ex-8	16+14.08	0.08	0.84	0.07	0.23	5.25	6.35	0.00	1.48	252.30	252.09	20.00	0.01050	15	Circular	1	6.62	0.00050	0.40	0.34	0.23	4.35	0.70	0.08	5.33	
Ex33-Ex34	Ex33		Ex34		0.00		0.00	0.65	5.44	6.29	0.00	4.12	253.70	253.40	53.00	0.00566	15	Circular	1	4.86	0.00430	0.88	0.93	0.37	4.44	1.19	0.20	5.64	
Ex34-Ex36	Ex34		Ex36		0.00		0.00	3.22	21.78	3.68	0.00	11.94	252.60	251.70	173.00	0.00520	27	Circular	1	22.33	0.00150	1.17	2.09	0.58	5.71	1.68	0.51	22.28	
Ex35-Ex34	Ex35		Ex34		3.87	0.61	2.35	2.35	21.29	3.72	0.00	8.74	253.40	252.70	150.00	0.00467	24	Circular	1	15.46	0.00160	1.08	1.72	0.52	5.07	1.48	0.49	21.78	
Ex36-Ex37	Ex36		Ex37		0.00		0.00	3.75	22.28	3.63	0.00	13.85	251.60	251.00	102.00	0.00588	30	Circular	1	31.45	0.00120	1.16	2.23	0.60	6.20	1.76	0.27	22.56	
Ex37-Ex38	Ex37		Ex38		0.00		0.00	3.75	22.56	3.61	0.00	13.85	251.00	250.70	60.00	0.00500	30	Circular	1	29.00	0.00120	1.22	2.37	0.61	5.84	1.75	0.17	22.73	
Ex38-Ex40	Ex38		Ex40		0.00		0.00	7.37	22.73	3.59	0.00	26.87	250.20	250.00	14.00	0.01429	36	Circular	1	79.73	0.00170	1.20	2.64	0.64	10.18	2.81	0.02	22.75	
Ex39-Ex38	Ex39		Ex38		6.53	0.56	3.62	3.62	5.00	6.43	0.00	23.28	253.00	251.20	130.00	0.01385	24	Circular	1	26.62	0.01100	1.45	2.44	0.60	9.55	2.87	0.23	5.23	
Ex5-Ex33	Ex-5	13+82.27	Ex33		0.64	0.69	0.44	0.65	5.22	6.36	0.00	4.12	254.10	253.70	61.00	0.00656	15	Circular	1	5.23	0.00430	0.84	0.87	0.36	4.72	1.18	0.22	5.44	
Ex6-Ex34	Ex-6	14+41.03	Ex34		0.28	0.80	0.23	0.23	5.00	6.43	0.00	1.45	253.32	252.86	73.00	0.00630	18	Circular	1	8.34	0.00020	0.42	0.41	0.24	3.54	0.62	0.34	5.34	
Ex8-Ex36	Ex-8	16+14.08	Ex36		0.35	0.84	0.29	0.53	5.33	6.33	0.00	3.34	251.82	251.60	49.00	0.00449	15	Circular	1	4.33	0.00280	0.82	0.86	0.36	3.89	1.06	0.21	5.54	
41-Ex14	4-1	19+10.00	Ex14		0.21	0.85	0.18	0.18	5.00	6.43	0.00	1.14	251.90	251.70	31.00	0.00645	15	Circular	1	5.19	0.00030	0.40	0.34	0.23	3.39	0.58	0.15	5.15	
Ex14-Ex15	Ex14		Ex15		0.00		0.00	0.18	5.15	6.38	0.00	1.14	248.97	248.51	22.00	0.02091	36	Circular	1	96.45	0.00000	0.23	0.25	0.15	4.62	0.56	0.08	5.23	
Ex15-Ex16	Ex15		Ex16		0.00		0.00	0.18	5.23	6.36	0.00	1.14	248.31	247.17	118.00	0.00966	36	Circular	1	65.56	0.00000	0.28	0.32	0.18	3.53	0.47	0.56	5.79	
1(2)-4(3)	4-2	21+82.40	4-3	23+75.00	0.25	0.84	0.21	0.21	5.00	6.43	0.00	1.34	247.40	244.80	184.00	0.01413	15	Circular	1	7.68	0.00050	0.35	0.29	0.20	4.71	0.70	0.65	5.65	
4(3)-Ex17	4-3	23+75.00	Ex-17		0.28	0.86	0.24	0.45	5.65	6.23	0.00	2.85	244.60	244.50	16.00	0.00625	15	Circular	1	5.11	0.00200	0.67	0.67	0.33	4.28	0.95	0.06	5.71	

.D-347 IYDRAULI	C GRADE LINE	ANALYSIS	;			PROJECT	1:	Dumfries F	Road Side	waik													DESIGNI	ED BY:	MJD	
ICIDENCE	PROBABILITY	,	10	Year																			Checked	:	SY	
		INVERT	DEPTH	OUTLET	DIA.	DESIGN	LENGTH	FRICTION	FRICTION			11.1	NCTION LC	188						Adj. Ht	Inlet			Inlet	Top of MH	
INLET	STA.	EL.	OF FLOW	WATER	PIPE	DISCH.	PIPE	SLOPE, Sfo			Contr.		NOTION EC	Hi (Expn)	SKEW		Bend	Sum	SURFACE	1.3	Shaping?	0.5	FINAL	Water		Adjustme
OR	0171.		OUTFLOW	SURFACE	Do	Qo	Lo	(FT/FT)	Hf	Vo	Но	Vi	Vi*2/2g	0.35*MAX.	Angle	K	Н	HL	FLOW	Ht	S.i.ap.i.ig	Ht	Н	Surface	Elev.	, tajaoti ii
JUNCTION		PIPE	PIPE	ELEV.	(In/mm)	(CFS/CMS)	(Ft/M)	(M/M)	(Ft/M)		(Ft/M)			(Vi2/2g)	g		(Ft/M)	(Ft/M)		(Ft/M)	Y/N	(Ft/M)	(Ft/M)	Elevation	APPROX.	
(1)	(2)			(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)		(12)	(13)		(14)	(15)		(16)		(16)	(17)	(18)	(19)	
Ex32	` ,			` ´	ì	, ,			, ,		Ì			Ì	, ,					, ,			Ì	256.120	` '	
3-1	11+65.45	253.720	3.00	256.120	36	34.863	56.00	0.00286	0.160	6.619	0.170	12.636	2.479	0.868	36.0	0.39	0.960	1.998	1.874	1.998	YES	0.999	1.159	257.279	258.310	O.K
Ex2		255.490	2.50	257.490	36 X 30	29.454	78.00	0.00319	0.249	12.636	0.620	9.691	1.458	0.510	0.0	0.00	0.000	1.130	4.314	1.130	YES	0.565	0.814	258.410	262.820	O.K
Ex31		257.690	2.50	259.690	36 X 30	25.139	165.00	0.00232	0.383	9.691	0.365	0.000	0.000	0.000	0.0	0.00	0.000	0.365	0.000	0.365	YES	0.182	0.566	260.990	265.000	O.K.
Ex3		256.310	1.50	257.510	18	3.602	83.00	0.00123	0.102	6.048	0.142	0.000	0.000	0.000	0.0	0.00	0.000	0.142	3.602	0.185	YES	0.092	0.194	258.006	261.850	O.K.
Ex40																								252.400		
Ex38		250.000	3.00	252.400	36	26.865	14.00	0.00170	0.024	10.176	0.402	9.553	1.417	0.496	73.0	0.62	0.872	1.770	0.000	1.770	YES	0.885	0.909	253.309	258.200	О.К
Ex37		250.700	2.50	253.309	30	13.848	60.00	0.00119	0.071	5.840	0.132	6.203	0.597	0.209	59.0	0.55	0.328	0.669	0.000	0.669	YES	0.335	0.406	253.715	257.550	О.К
Ex36		251.000	2.50	253.715	30	13.848	102.00	0.00119	0.122	6.203	0.149	5.711	0.506	0.177	36.0	0.39	0.196	0.523	0.000	0.523	YES	0.261	0.383	254.098	258.300	О.К
Ex34		251.700	2.25	254.098	27	11.941	173.00	0.00155	0.269	5.711	0.127	5.072	0.399	0.140	90.0	0.70	0.280	0.546	0.000	0.546	YES	0.273	0.542	254.639	258.440	О.К
Ex33		253.400	1.25	254.639	15	4.122	53.00	0.00426	0.226	4.444	0.077	4.724	0.347	0.121	90.0	0.70	0.243	0.441	0.000	0.441	YES	0.220	0.446	255.085	259.500	O.K
Ex5	13+82.27	253.700	1.25	255.085	15	4.122	61.00	0.00426	0.260	4.724	0.087	2.633	0.108	0.038	28.0	0.32	0.034	0.158	2.791	0.206	YES	0.103	0.363	255.448	258.000	O.K
3-2	13+68.93	254.200	1.25	255.448	15	1.330	35.00	0.00044	0.016	2.633	0.027	0.000	0.000	0.000	0.0	0.00	0.000	0.027	1.330	0.035	YES	0.017	0.033	255.481	257.470	O.K.
																	1									
Ex39		251.200	2.00	253.309	24	23.279	130.00	0.01107	1.439	9.553	0.354	0.000	0.000	0.000	0.0	0.00	0.000	0.354	23.279	0.461	YES	0.230	1.669	254.978	260.500	O.K
	10:11.00	054.000	4.05	254 222	45		40.00	0.00070	0.407		0.050	4.040		0.400				2 222	4 000	0.007	\/=0	0.400		254 442	050.040	
Ex8	16+14.08	251.600	1.25	254.098	15	3.339	49.00	0.00279	0.137	3.893	0.059	4.346	0.293	0.103	39.0	0.41	0.121	0.282	1.860	0.367	YES	0.183	0.320	254.418	256.310	O.K.
3-4	16+00.00	252.090	1.25	254.418	15	1.479	20.00	0.00055	0.011	4.346	0.073	3.255	0.165	0.058	49.0	0.49	0.080	0.211	0.425	0.274	YES	0.137	0.148	254.566	256.150	O.K.
3-3	15+50.00	252.500	1.25	254.566	15	1.054	49.00	0.00028	0.014	3.255	0.041	0.000	0.000	0.000	0.0	0.00	0.000	0.041	1.054	0.053	YES	0.027	0.040	254.606	256.430	O.K
Ex6	14+41.03	252.860	1.50	254.639	18	1.446	73.00	0.00020	0.014	3.538	0.049	0.000	0.000	0.000	0.0	0.00	0.000	0.049	1.446	0.063	YES	0.032	0.046	254.685	257.130	0.К
LXU	14+41.03	232.800	1.50	254.059	10	1.440	73.00	0.00020	0.014	3.336	0.049	0.000	0.000	0.000	0.0	0.00	0.000	0.049	1.440	0.003	ILS	0.032	0.040	254.005	237.130	O.K
Ex35		252.700	2.00	254.639	24	8.740	150.00	0.00156	0.234	5.072	0.100	0.000	0.000	0.000	0.0	0.00	0.000	0.100	0.000	0.100	YES	0.050	0.284	254.923	261.400	О.К.
LXCC		202.700	2.00	204.000	2-4	0.740	100.00	0.00100	0.204	0.012	0.100	0.000	0.000	0.000	0.0	0.00	0.000	0.100	0.000	0.100	120	0.000	0.204	204.020	201.400	- O.IX.
Ex16																								249.570		
Ex15		247.170	3.00	249.570	36	1.144	118.00	0.00000	0.000	3.526	0.048	4.616	0.331	0.116	56.0	0.53	0.176	0.340	0.000	0.340	YES	0.170	0.170	249.740	256.810	O.K
Ex14		248.510	3.00	250.910	36	1.144	22.00	0.00000	0.000	4.616	0.083	3.394	0.179	0.063	90.0	0.70	0.125	0.271	0.000	0.271	YES	0.135	0.135	251.045	257.420	O.K
4-1	19+10.00	251.700	1.25	252.700	15	1.144	31.00	0.00033	0.010		0.045	0.000	0.000	0.000	0.0	0.00	0.000	0.045	1.144	0.058	YES	0.029	0.039	252.739	255.550	О.К
Ex17																								245.500		
4-3	23+75.00	244.500	1.25	245.500	15	2.845	16.00	0.00203	0.032	4.275	0.071	4.705	0.344	0.120	6.0	0.08	0.028	0.219	1.502	0.285	YES	0.143	0.175	245.675	248.430	O.K
4-2	21+82.40	244.800	1.25	245.800	15	1.343	184.00	0.00045	0.083	4.705	0.086	0.000	0.000	0.000	0.0	0.00	0.000	0.086	1.343	0.112	YES	0.056	0.139	247.754	251.030	О.К

DUMFRIES ROAD THESE PLANS ARE UNFINISHED AND UNAPPROVED AND ARE NOT TO BE USED FOR ANY TYPE OF CONSTRUCTION OR THE ACQUISITION OF RIGHT OF WAY.

SHEET





OUTFALL ANALYSES

NARRATIVE:

PER DCSM 8-530.4.A OUTFALL ANALYSES ARE REQUIRED A MINIMUM OF 300' DOWNSTREAM FOR A CAPACITY CHECK FOR CLOSED DRAINAGE SYSTEMS, OPEN CHANNEL DRAINAGE SYSTEMS MUST BE CHECKED FOR CAPACITY AND EROSION EVERY 100' DOWNSTREAM UP TO THE 300' LIMIT. ADDITIONALLY EXISTING DOWNSTREAM CULVERTS MUST BE ANALYZED FOR THE 25-YR STORM.

DOWNSTREAM OF OUTFALL 1 IS A CONCRETE LINED CHANNEL AND DOUBLE BARREL PIPE. THE CHANGE IN LAND USE IN THE DRAINAGE AREA OF OUTFALL 1 IS TOO SMALL (LESS THAN 0.01 AC) TO CREATE A MEASURABLE CHANGE IN LAND USE. EROSION AND CAPACITY ANALYSES ARE NOT NEEDED AS THE LAND USE CHANGES GENERATED BY THE PROJECT WILL NOT MEASURABLY CHANGE THE EXISTING FLOWS IN THE DOWNSTREAM CHANNEL AND CULVERT.

OUTFALL 3 IS LOCATED DOWNSTREAM OF OUTFALL 2. AS SUCH THE DOWNSTREAM ANALYSES ARE COMBINED. DOWNSTREAM OF OUTFALL 3 IS A QUADRUPLE BOX CULVERT THAT DISCHARGES INTO A SMALL DEPRESSION, WHERE OTHER OUTFALLS ARE LOCATED. THESE FLOWS COMBINE AND DISCHARGE INTO A DOUBLE BOX CULVERT. THE DOWNSTREAM END OF THE DOUBLE BOX CULVERT IS APPROX. 300' DOWNSTREAM FROM OUTFALL 3. ANALYSES HAVE BEEN PERFORMED IN THE DEPRESSION BETWEEN THE CULVERTS AND AT THE DOWNSTREAM ENDS OF BOTH BOX CULVERTS.

FLOWS WERE GENERATED USING THE RATIONAL METHOD. LAND USE WAS DETERMINED USING AERIAL PHOTOGRAPHY AND GIS DATA. CROSS SECTIONS AND CULVERT INFORMATION WAS OBTAINED FROM SURVEY DATA. THE CHANNEL WAS EVALUATED USING FLOWMASTER. THE BOX CULVERTS WERE ANALYZED USING HY-8. ANALYSES WERE PERFORMED FOR EROSION (2-YR STORM) AND CAPACITY (10-YR STORM). IT WAS FOUND THAT THERE IS ADEQUATE CAPACITY IN THE CHANNEL AND THE BOX CULVERTS AND THAT THE FLOW IN THE CHANNEL IS NONEROSIVE.

		Ratio	nal Me	thod Ca	alculations					
Cross Section		A-A			В-В		C-C			
Surface Cover	Land Use	Area		С	Area		С	Area		С
	Impervious	7.58	ac	0.9	11.95	ac	0.9	12.19	ac	0.9
	Commericial	1.09	ac	0.85	21.46	ac	0.85	22.64	ac	0.85
	Res - Townhomes	21.63	ac	0.7	32.72	ac	0.7	32.72	ac	0.7
	Res - House	32.3	ac	0.4	41.91	ac	0.4	41.91	ac	0.4
	Park	0.00	ac	0.35	11.40	ac	0.35	11.40	ac	0.35
	Woods	3.36	ac	0.25	17.13	ac	0.25	17.13	ac	0.25
	Total	65.96	ac	0.66	136.57	ac	0.64	137.99	ac	0.64
								1		
Intensities	Tc	18.04	min		27.73	min		28.99	min	
	15 min 2-yr	3.25	in/hr		3.25	in/hr		3.25	in/hr	
	30 min 2-yr	2.25	in/hr		2.25	in/hr		2.25	in/hr	
	15 min 10-yr	4.36	in/hr		4.36	in/hr		4.36	in/hr	
	30 min 10-yr	3.16	in/hr		3.16	in/hr		3.16	in/hr	
	15 min 25-yr	4.95	in/hr		4.95	in/hr		4.95	in/hr	
	30 min 25-yr	3.66	in/hr		3.66	in/hr		3.66	in/hr	
	12	3.05	in/hr		2.40	in/hr		2.32	in/hr	
	110	4.12	in/hr		3.34	in/hr		3.24	in/hr	
	125	4.69	in/hr		4.40	in/hr		3.75	in/hr	
Flows	Q2	134	cfs		210	cfs		206	cfs	
	Q10	180	cfs		292	cfs		287	cfs	
	Q25	206	cfs		385	cfs	Fail	332	cfs	

DESCRIPTION: To to A-A	4		DESCRIPTION: To to B-	В		DESCRIPTION: To to C	·c	
Overland Flow Tim	à (Sàah	m) AP	Overland Flow Tin	na (Saah	m\ AB	Time of Concent	ration to	0.0
Length:	90	(ft)	Length:	100	(ft)		27.73	
Slope:		and the second s		0.0375			21.15	Linny
Ground Cover: F		0.014	Ground Cover:		The state of the s	Channel Flow Tim	e (Kirpic	h) - II
C:	0.25	unitless	C:	0.36	unitless	ΔΗ:	1	(ft)
Tc:	9.04	(min)	Tc:	8.07	(min)	Length:	45	(ft)
						Type of Flow:	Channel	Flow-Grass Ch
Channel Flow Time	e (Kirpic	h) - BC	Channel Flow Tim	e (Kirpic	h) - BC	Tc Multiplier:	1	
ΔH:	22	(ft)	ΔH:	30	(ft)	Tc:	0.70	(min)
Length:	430	(ft)	Length:	950	(ft)			
Type of Flow: 0	Channel	Flow-Grass Channel	Type of Flow:	Channel	Flow-Grass Channel	Channel Flow Tim	e (Kirpicl	h) - JK
Tc Multiplier:	1		Tc Multiplier:	1		ΔH:	0.63	(ft)
Tc:	2.77	(min)	Tc:	5.03	(min)	Length:	130	(ft)
								Flow-Concrete
Channel Flow Time			Channel Flow Tim	7		Tc Multiplier:		
ΔΗ:	8	(ft)	ΔΗ:	4	(ft)	Tc:	0.55	(min)
Length:	800	(ft)	Length:	320	(ft)			650
		Flow-Concrete Channel			Flow-Grass Channel	TOTAL TC;		
Tc Multiplier:	0.2		Tc Multiplier:	1		Lag Time:	17.4	(min)
Tc:	1.64	(min)	Tc:	3.79	(min)			
200	0.0		el contrato		LL DE			
BMP -		Jan.	Channel Flow Tim					
Tc:	0.00	(min)	ΔΗ:	2	(ft)			
Ct	not at	L) FF	Length:	380	(ft)			
Channel Flow Tim		2.5	and the second s		Flow-Concrete Channel			
ΔH:	2	(ft)	Tc Multiplier:	0.2	Instal			
Length:	70	(ft)	Tc:	1.20	(min)			
Tc Multiplier:	0.2	Flow-Concrete Channel	Channel Flow Tim	o (Vienic	61 - EF			
Tc:	0.18	(min)	ΔH:	Z Kirpic	(ft)			
14.	0.10	(mm)	Length:	250	(ft)			
BMP -	rc.				Flow-Grass Channel			
	0.00	(min)	Tc Multiplier:	1	TOW GLADS CHARITICS			
16.	0.00	tunny	Tc:		(min)			
Channel Flow Time	(Kirnic	6) - GH		2.72	(min)			
ΔH:	4	(ft)	Channel Flow Tim	e (Kirnic	h) - EG			
Length:	320	(ft)	ΔН:	2	(ft)			
		Flow-Grass Channel	Length:	60	(ft)			
Tc Multiplier:	1		1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1		Flow-Concrete Channel			
Tc:		(min)	Tc Multiplier:	0.2				
		7		0.15	(min)			
Channel Flow Tim	e (Kirpic	h) - HI						
ΔΗ:	0.53	(ft)	Channel Flow Tim	e (Kirpic	h) - GH			
Length:	135	(ft)	ΔHt	1	(ft)			
Type of Flow: 0	Channel	Flow-Concrete Channel	Length:	125	(ft)			
Tc Multiplier:	0.2		Type of Flow:	Channel	Flow-Grass Channel			
Tc:	0.61	(min)	Tc Multiplier:	1				
			Tc:	2.22	(min)			
TOTAL Tc:	18.0	(min)						
Lag Time:	10.8	(min)	Channel Flow Tim	et Manager				
			ΔH:	10	(ft)			
			Length:	1270	(ft)			
					Flow-Concrete Channel			
			Tc Multiplier:	0.2	J. Prop. of			
			Tc:	2.54	(min)			

SECTION A-A CULVERT ANALYSIS:

Culvert Barrel Data

Culvert Barrel Type Straight Culvert

Inlet Elevation (invert): 242.83 ft,

Outlet Elevation (invert): 242.25 ft

Culvert Length: 134.50 ft,

Culvert Slope: 0.0043

Site Data - Dumfries Culvert Site Data Option: Culvert Invert Data

Inlet Station: 0.00 ft

Inlet Elevation: 242.83 ft Outlet Station: 134.50 ft

Outlet Elevation: 242.25 ft

Number of Barrels: 4

Culvert Data Summary - Dumfries Culvert

Barrel Shape: Concrete Box

Barrel Span: 5.00 ft Barrel Rise: 3.00 ft

Barrel Material: Concrete

Embedment: 0.00 in

Barrel Manning's n: 0.0120

Culvert Type: Straight

Inlet Configuration: Square Edge (90º) Headwall

Inlet Depression: None

Tailwater Channel Data - Dumfries - 10yr

Tailwater Channel Option: Irregular Channel

User Defined Channel Cross-Section

Channel	Slope:	Irregular	Chanr

Coord No.	Station (ft)	Elevation (ft)	Manning's n
1	0.00	250.00	0.0300
2	13.50	246.00	0.0130
3	14.00	243.00	0.0300
4	23.80	243.25	0.0300
5	35.00	243.00	0.0300
6	40.50	242.25	0.0300
7	46.70	243.00	0.0300
O	62.00	250.00	0.0000

Roadway Data for Crossing: Dumfries - 10yr

Roadway Profile Shape: Constant Roadway Elevation

Crest Length: 13.00 ft

Crest Elevation: 249.30 ft

Roadway Surface: Paved

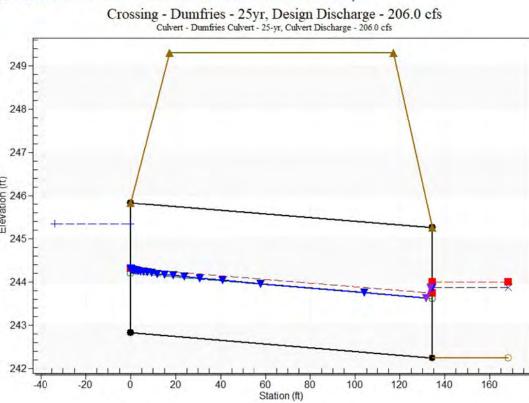
Roadway Top Width: 100.00 ft

Water Surface Profile Plot for Culvert: Dumfries Culvert - 10-yr

Crossing - Dumfries - 10yr, Design Discharge - 180.0 cfs
Culvert - Dumfries Culvert - 10-yr, Culvert Discharge - 180.0 cfs

-40 -20 0 20 40 60 80 100 120 140 160 Station (ft)

Water Surface Profile Plot for Culvert: Dumfries Culvert - 25-yr



B-B CHANNEL ANALYSIS:

Normal Depth

Critical Depth Critical Slope

Discharge

Worksheet for 2-yr Storm				
Project Description				
Friction Method	Manning Formula			
Solve For	Normal Depth			
Input Data				
Channel Slope	0.020 ft/ft			
Discharge	210.00 cfs			

Section De	inicions
Station (ft)	Elevation (ft)
0+00	250.00
0+14	246.00
0+14	243.00
0+24	243.25
0+35	243.00
0+41	242.25
0+47	243.00
0+64	250.00

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00, 250.00)	(0+14, 246.00)	0.050
(0+14, 246.00)	(0+14, 243.00)	0.013
(0+14, 243.00)	(0+47, 243.00)	0.035
(0+47, 243.00)	(0+64, 250.00)	0.050

Current Roughness Weighted Method	Pavlovskii's Method	
Open Channel Weighting Method	Pavlovskii's Method	
Closed Channel Weighting Method	Pavlovskii's Method	
Results		
Normal Depth	21.1 in	
Elevation Range	242.3 to 250.0 ft	
Flow Area	36.1 ft ²	
Wetted Perimeter	36.5 ft	
Hydraulic Radius	11.9 in	

21.1 in

21.2 in

0.019 ft/ft

292.00 cfs

Velocity	5.81 ft/s	
	Bentley Systems, Inc. Haestad Methods Solution	FlowMas
B-B.fm8	Center	[10.02.00.0
11/21/2023	27 Siemon Company Drive Suite 200 W	Page 1 o
	Watertown CT 06795 USA +1-203-755-1666	· ·

Worksheet for 10-yr Storm

Project Description			
Friction Method	Manning Formula		
Solve For	Normal Depth		
Input Data			
Channel Slope	0.020 ft/ft		

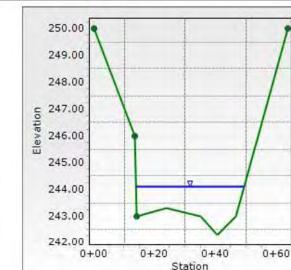
Section	Definitions

Station		Elevation	
(ft)		(ft)	
	0+00		250.00
	0+14		246.00
	0+14		243.00
	0+24		243.25
	0+35		243.00
	0+41		242.25
	0+47		243.00
	0+64		250.00

Roughness Segment Definitions

Start Station		Ending Station	Roughness Coefficient	
(0+00, 250.00)		(0+14, 246.00)		0.030
(0+14, 246.00)		(0+14, 243.00)		0.013
(0+14, 243.00)		(0+64, 250.00)		0.030
Options				
Current Roughness Weighted	Pavlovskii's			_
Method	Method			
Open Channel Weighting Method	Pavlovskii's Method			
Closed Channel Weighting	Pavlovskii's			
Method	Method			_
Results				-
Normal Depth	22.2 in			-
Elevation Range	242.3 to 250.0 ft			
Flow Area	39.4 ft ²			
Wetted Perimeter	36.8 ft			
Hydraulic Radius	12.8 in			
Top Width	35.58 ft			
Normal Depth	22.2 in			
Critical Depth	24.3 in			
Critical Slope	0.012 ft/ft			
Velocity	7.42 ft/s			
Velocity Head	0.85 ft			
DD(0	Bentley Syste	ems, Inc. Haestad Methods Solution		FlowMast
B-B.fm8 11/21/2023		Center on Company Drive Suite 200 W , CT 06795 USA +1-203-755-1666	ľ	10.02.00.0 Page 1 o

	Cross Section for 10-yr Storn	1
Project Description		
Friction Method	Manning Formula	
Solve For	Normal Depth	
Input Data		
Channel Slope	0.020 ft/ft	
Normal Depth	22.2 in	
Discharge	292.00 cfs	



THESE PLANS ARE UNFINISHED AND UNAPPROVED AND ARE NOT TO BE USED FOR ANY TYPE OF CONSTRUCTION OR THE ACQUISITION OF RIGHT OF WAY.

YSES

SHEET 12(1)

DUMFRIES

OUTFALL ANALYSES

<u>SECTION C-C CULVERT ANALYSIS:</u>

Culvert Barrel Data

Culvert Barrel Type Straight Culvert

Inlet Elevation (invert): 241.41 ft,

Outlet Elevation (invert): 240.69 ft

Culvert Length: 131.20 ft,

Culvert Slope: 0.0055

Site Data - Hastings Culvert - 10-yr

Site Data Option: Culvert Invert Data
Inlet Station: 0.00 ft

Inlet Elevation: 241.41 ft

Outlet Station: 131.20 ft

Outlet Elevation: 240.69 ft

Number of Barrels: 2

Culvert Data Summary - Hastings Culvert - 10-yr

Barrel Shape: Concrete Box

Barrel Span: 10.00 ft

Barrel Rise: 4.00 ft

Barrel Material: Concrete

Barrel Manning's n: 0.0120

Embedment: 0.00 in

Culvert Type: Straight

Inlet Configuration: Square Edge (90º) Headwall

Inlet Depression: None

Tailwater Channel Data - Hastings - 10yr
Tailwater Channel Option: Irregular Channel

Channel Slope: Irregular Channel

Coord No.	Station (ft)	Elevation (ft)	Manning's n
1	0.00	248.00	0.0300
2	10.60	242.00	0.0300
3	19.00	240.69	0.0300
4	35.40	244.00	0.0300
5	47.30	248.00	0.0300

Roadway Data for Crossing: Hastings - 10yr

Roadway Profile Shape: Constant Roadway Elevat

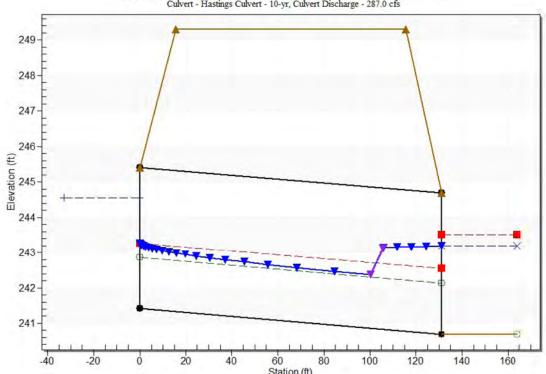
Crest Length: 10.40 ft

Crest Elevation: 249.30 ft Roadway Surface: Paved

Roadway Top Width: 100.00 ft

Water Surface Profile Plot for Culvert: Hastings Culvert - 10-yr

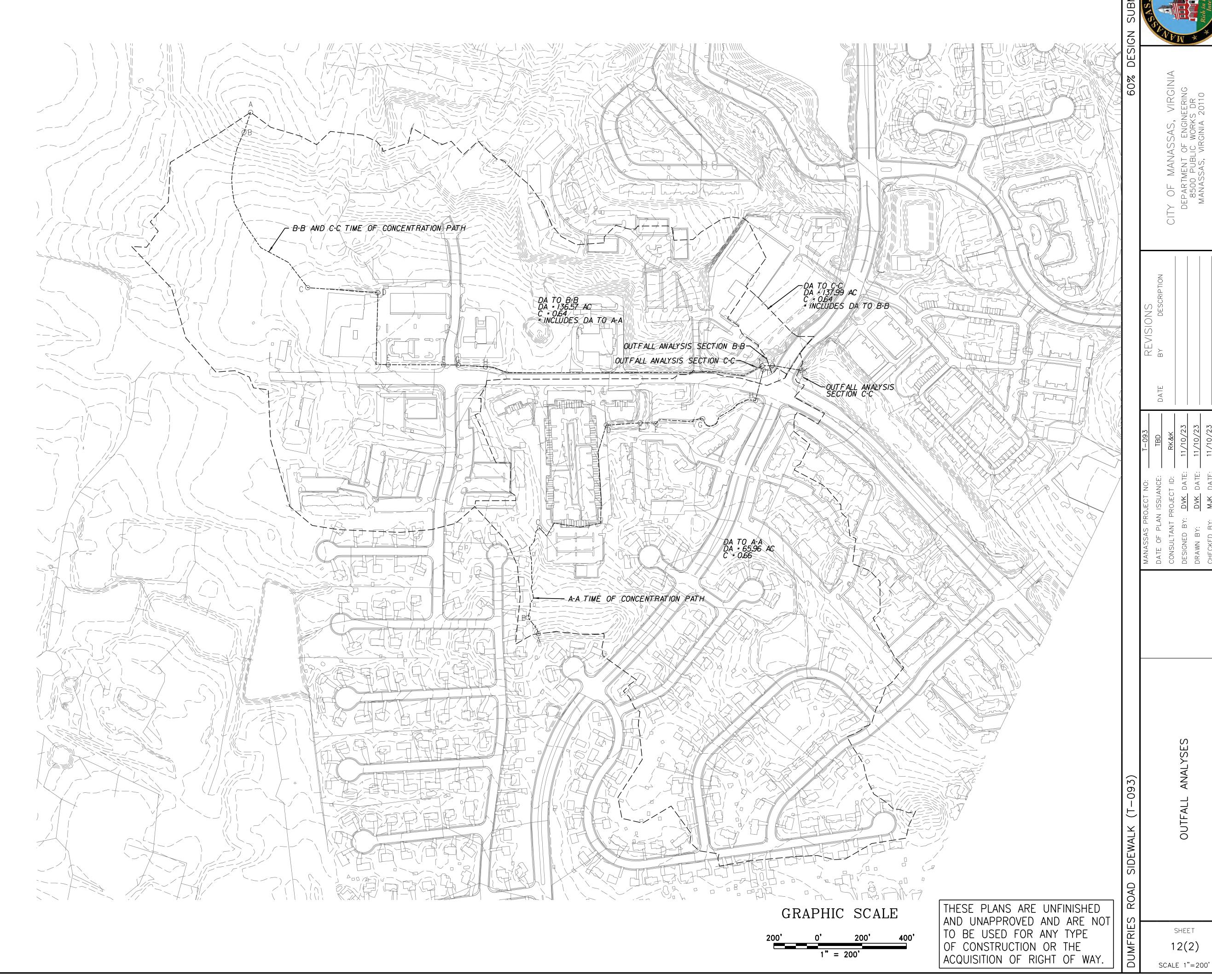
Crossing - Hastings - 10yr, Design Discharge - 287.0 cfs
Culvert - Hastings Culvert - 10-yr, Culvert Discharge - 287.0 cfs



Water Surface Profile Plot for Culvert: Hastings Culvert - 25-yr Crossing - Hastings - 25yr, Design Discharge - 332.0 cfs Culvert - Hastings Culvert - 25-yr, Culvert Discharge - 332.0 cfs

248-247-(£) Copped 245-244-243-

> 60 80 100 120 140 160 Station (ft)



THESE PLANS ARE UNFINISHED AND UNAPPROVED AND ARE NOT TO BE USED FOR ANY TYPE OF CONSTRUCTION OR THE ACQUISITION OF RIGHT OF WAY.

STORMWATER MANAGEMENT NARRATIVE AND COMPUTATIONS

STORMWATER MANAGEMENT:

SINCE THE FUNDING FOR THE PROJECT WAS ESTABLISHED AFTER JULY 1, 2012, THE PROJECT WILL CONFORM TO TECHNICAL CRITERIA FOR BOTH WATER QUALITY AND WATER QUANTITY LISTED IN DCSM ARTICLE 8.

WATER QUALITY:

THE VIRGINIA RUNOFF REDUCTION METHOD (VRRM) SPREADSHEET HAS BEEN USED TO CALCULATE THE WATER QUALITY REQUIREMENTS FOR THIS PROJECT, PER DCSM 8-510.2. THE PROJECT IS A LINEAR DEVELOPMENT THAT IS REQUIRED TO PROVIDE A PHOSPHORUS REDUCTION TO A LEVEL THAT IS 20% BELOW THE EXISTING PHOSPHORUS LOAD, PER DCSM 8-530.2.A.1.IV.

OUTFALLS FLOW TO BROAD RUN-ROCKY BRANCH (PL34). THE PROJECT HAS A TOTAL DISTURBED SITE AREA OF 0.64 ACRES, WITH 0.03 AC EXEMPT (FULL DEPTH PAVEMENT RECONSTRUCTION). THE PRE-REDEVELOPMENT LAND COVER IS 0.08 AC OF FOREST, 0.46 AC OF MANAGED TURE, AND 0.07 AC OF IMPERVIOUS COVER. THE POST-REDEVELOPMENT LAND COVER IS 0.40 AC OF MANAGED TURF AND 0.21 AC OF IMPERVIOUS COVER. SEE SHEET 12(2) FOR WATER QUALITY MAPS.

THE PHOSPHORUS LOAD REDUCTION REQUIRED IS 0.34 LB/YR. AS ALLOWED UNDER DCSM 8-530.5.A.3, NUTRIENT CREDITS WILL BE PURCHASED TO SATISFY PHOSPHORUS REMOVAL REQUIREMENTS.

Virginia Runoff Reduction Method Worksheet

DEQ Virginia Runoff Reduction Method Re-Development Compliance Spreadsheet - Version 3.0 BMP Design Specifications List: 2013 Draft Stds & Specs

Site Summary - Linear Development Project** Project Title: Dumfries Road Sidewalk

Site Land Cover Summary

	A soils	B Soils	C Soils	D Soils	Totals	% of Total
Forest/Open (acres)	0.00	0.00	0.08	0.00	0.08	13
Managed Turf (acres)	0.00	0.00	0.46	0.00	0.46	75
Impervious Cover (acres)	0.00	0.00	0.07	0.00	0.07	11
impervious cover (acres)	0.00	0.00	0.07	0.00	0.61	10

Forest/Open (acres) Managed Turf (acres)

Site Ty and Land Cover Nutrient Loads

Impervious Cover (acres)

	Final Post-Development (Post-ReDevelopment & New Impervious)	Post- ReDevelopment	Post- Development (New Impervious)	Adjusted Pre- ReDevelopment	Pre- ReDevelopment TP Load per acre (lb/acre/vr)	Final Pr TP (
Site Rv	0.47	0.33	0.95	0.33	0.75	
Treatment Volume (ft ⁵)	1,044	561	483	561		
TP Load (lb/yr)	0,66	0.35	0.30	0.35		

Site Compliance Summary - ***Linear Development Project

Total Runoff Volume Reduction (ft ³)	0
Total TP Load Reduction Achieved (lb/yr)	0,00
Total TN Load Reduction Achieved (lb/yr)	0.00
Remaining Post Development TP Load (lb/yr)	0,66
Remaining TP Load Reduction (lb/yr) Required	0.34

WATER QUANTITY:

تشارها والمساولة والسابات والسابات والشرب فالمسابات والا

FOR WATER QUANTITY ANALYSES, SEVEN OUTFALLS HAVE BEEN IDENTIFIED WHERE FLOWS DISCHARGE FROM THE PROJECT AREA.

AT OUTFALL 1, THE SITE CONTRIBUTING DRAINAGE AREA (CDA) IS LESS THAN 1% OF THE WATERSHED CDA. AS SUCH THE LIMIT OF ANALYSIS (LOA) FOR OUTFALL 1, LOA 1, IS LOCATED CONCURRENTLY WITH THE OUTFALL.

FLOW FROM OUTFALLS 2A, 2B, 2C, 2D, AND 2E MERGE DOWNSTREAM BEFORE THEIR SITE CDA'S ARE LESS THAN 1% OF THE WATERSHED CDA, AS SUCH THEY ARE ANALYZED AT A SINGLE LOA, LOA 2. LOA 2 IS LOCATED WHERE ENERGY BALANCE FOR 1-YR AND FLOOD PROTECTION FOR 10-YR STORM REQUIREMENTS ARE MET.

OUTFALL 3 DISCHARGES INTO A SINGLE BARREL OF A QUADRUPLE BOX CULVERT. THE LOA, LOA 3, IS LOCATED SLIGHTLY DOWNSTREAM, WHERE THE FLOW OF ALL FOUR CULVERT BARRELS MERGE.

LOA'S ARE THE SAME FOR CHANNEL PROTECTION AND FLOOD PROTECTION ANALYSES.

CHANNEL PROTECTION:

ALL OUTFALLS DISCHARGE INTO MAN-MADE CONVEYANCE SYSTEMS. THESE SYSTEMS HAVE BEEN ANALYZED AND FOUND TO CONVEY THE 2-YR 24 HOUR STORM EVENT WITHOUT CAUSING EROSION TO THE SYSTEM. SHEET STORM DRAINAGE COMPUTATION.

AT LOA 1 AND LOA 3, THE SITE CDA IS LESS THAN 1% OF THE WATERSHED CDA AND NO NATURAL CHANNELS ARE WITHIN THE SITE CDA OR BETWEEN THE OUTFALL AND LOA. AS SUCH, CHANNEL PROTECTION REQUIREMENTS ARE MET.

AT LOA 2, THE SITE CDA IS GREATER THAN 1% OF THE WATERSHED CDA. RELOCATING THE LOA FURTHER DOWNSTREAM WOULD ADD A NATURAL CHANNEL WITHIN THE CDA. AS SUCH, ENERGY BALANCE REQUIREMENTS MUST BE MET IN ORDER TO MEET CHANNEL PROTECTION REQUIREMENTS.

WITHIN THE CDA OF LOA 2, THERE IS AN DETENTION FACILITY LOCATED UNDERNEATH A PARKING LOT ON PRIVATE PROPERTY. THIS FACILITY WAS OVERSIZED IN ORDER TO MEET THE PLANNED ROADWAY IMPROVEMENTS INCLUDED IN THIS PROJECT. THE ATTENUATION PROVIDED AT THIS UNDERGROUND FACILITY IS ENOUGH TO MEET ENERGY BALANCE REQUIREMENTS. AS SUCH, CHANNEL PROTECTION REQUIREMENTS ARE MET AT LOA 2. SEE COMPUTATIONS ON THIS SHEET.

SCS Curve Numbers for Energy Balance

Project Name: Dumfries Road Sidewalk

Date: 11/13/2023

	data input cells calculation cells constant values			The second					
	Target Rainfall E	vent (in)		1-year storm		0-year storm 4.60			
Pre-Development									
		soils		Soils	C So	-1.7		oils	Totals
Cover Descriptions	Acres	CN	Acres	CN	Acres	CN	Acres	CN	
Woods Good	0.00	30	0.00	55	0.00	70	0.00	77	0.00
Open Space (Lawns, parks, etc.) Good Conditions; grass cover > 75%	0.00	39	0.00	61	0.36	74	0.00	80	0.36
Streets and roads: Paved; curbs and storm sewers	0.00	98	0.00	98	0.03	98	0.00	98	0.03
BVDeveloped (in) with	RVDeveloped (in) with no Runoff Reduction		1-year storm	2-year storm	10-year storm		7	Total	0.39
Kypevelopeu (iii) with i	io Runon Reduct	UII	0.6	58 1.0	2.20		Weighted Cu	rve Number (CN)	76
Cover Descriptions	Acres	cN	Acres	Soils	Acres	ils CN	Acres	CN	Totals
Woods Good	0.00	30	0.00	55	0.00	70	0.00	77	0.00
Open Space (Lawns, parks, etc.) Good Conditions: grass cover >75%	46.50	39	0.00	61	0.27	74	0.00	80	0.27
Streets and roads: Paved; ourbs and storm sewers	0.00	98	0,00	98	0.12	98	0.00	98	0.12
DVDl. n. d. c. to al.			1-year storm	2-year storm	10-year storm			Total	0.39
RVDeveloped (in) with i	no Runoff Reduct	on	0.9	1.3	2.67		Weighted Cu	rve Number (CN)	81
Post-Development, Forested							7.7		
	A:	soils	В	Soils	C So	ils	DS	Soils	Totals
Cover Descriptions	Acres	CN	Acres	CN	Acres	CN	Acres	CN	
Woods Good	0.00	30	0.00	55	0.39	70	0.00	77	0.39
Open Space (Lawns, parks, etc.) Good Conditions; grass cover >75%	0.00	39	0.00	61	0.00	74	0.00	80	0.00
Paved: curbs and storm sewers	0.00	98	0.00	98	0.00	98	0.00	98	0.00
			0,00		0,00		0,00	00	0.00

Load per acre

(lb/acre/yr)

RVDeveloped (in) with no Runoff Reduction

- (2) Lawns, parks, golf courses, and cemeteries, with a CN equivalent to pasture/grassland in good hydrologic condition. This is generally represents lawn areas that have been cleared and/or graded to accommodate development
- (3) The VRRM considers Opens Space to be equivalent to TR-55 Woods

-year storm 2-year storm 10-year storm

(4) Protected undisturbed (or restored) land, be it forested or undisturbed meadow, with a CN equivalent to woods in good hydrologic condition. This generally represents wooded areas as well as protected undisturbed or restored areas of the site with

Energy Balance for Channel Protection

Project Name: Dumfries Road Sidewalk LOA: 2

Date: 11/13/2023

data input cells
calculation cells
constant values

	Channel Protection (1-year)			
	Pre-Development	Post-Development	Forested	- 10
P (in) 24-hr Rainfall Depth	2.48	2.48	2.48	
CN Weighted Curve Number	76	81	70	From RV tab
S= 1000/CN -10	3.18	2.29	4.29	- 1
I _a = 0.2S Initial Abstraction	0.64	0,46	0.86	
RV (in) Runoff Depth	0.68	0.95	0.45	
RV (in-acres) Runoff Valume	0.26	0.37	0.17	47

Energy Balance Method:

q_{p Developed} must be ≤ I.F. * (q_{P Pre-Developed} * RV _{Pre-Developed})/RV _{Developed} Under no condition shall: qp Developed < (qp Forested * RV Forested)/RV Developed

	4P Develo	ped > QP Pre-Developed	
	I.F. Improvement Factor	0.9 For sites	> 1 acre, I.F.=0.8/ for sites <=1 acre, I.F.=0.9
	Channel Protection (1-year		
	QP Pre-Developed (Cfs)	0.23 From TR-	-55
	QP Developed (cfs) Actual	0.33 From TR	
	qp Developed (cfs) Forested	0.13 From TR-	-55
	Energy Balance Method		
I.F. * (q _{P l}	Pre-Developed * RV Pre-Developed)/RV Developed (cfs)	0.15	
	(q _{P Forested} * RV _{Forested})/RV _{Developed} (cfs)	0.06	
	qp Pre-Developed (Cfs)	0.23	
	q _{P Allowable} (cfs)	0.15	
	qp Developed (cfs) Actual - qp Developed (cfs	s) Allowable	
	Reduction Required (cfs)	0.18	
	Credit from Site Development	0.22	Per SP-2021-0010, plan sheet 20
	Remaining Reduction Required (cfs)	-0.04	
	Estimated Storage Volume Req	uired	
	Ge Developed (Cfs) Allowable	0.45	
	QP Developed (cfs) Actual	37.11	
	V _s Storage Volume V _r Runoff Volume	0.30	
	V _s (in) w/ out Runoff Reduction	0.28	
	V _s (cf) w/ out Runoff Reduction	397	

Notes: $V_3/V_i = C_0 + C_1(q_0/q_i) + C_2(q_0/q_i)^2 + C_3(q_0/q_i)^3$ where $C_0 = 0.680$, $C_1 = -1.76$, $C_2 = 1.96$, $C_3 = -0.730$ for Types I and IA rainfall distributions and $C_0 = 0.682$, $C_1 = -0.730$ for Types I and IA rainfall distributions and $C_0 = 0.682$, $C_1 = -0.730$ for Types I and IA rainfall distributions and $C_0 = 0.682$, $C_1 = -0.730$ for Types I and IA rainfall distributions and $C_0 = 0.682$, $C_1 = -0.730$ for Types I and IA rainfall distributions and $C_0 = 0.682$, $C_1 = -0.730$ for Types I and IA rainfall distributions and $C_0 = 0.682$, $C_1 = -0.730$ for Types I and IA rainfall distributions and $C_0 = 0.682$, $C_1 = -0.730$ for Types I and IA rainfall distributions and $C_0 = 0.682$, $C_1 = -0.730$ for Types I and IA rainfall distributions and $C_0 = 0.682$, $C_1 = -0.730$ for Types I and IA rainfall distributions and $C_0 = 0.682$, $C_1 = -0.730$ for Types I and IA rainfall distributions and $C_0 = 0.682$, $C_1 = -0.730$ for Types I and IA rainfall distributions and $C_0 = 0.682$, $C_1 = -0.730$ for Types I and IA rainfall distributions and $C_0 = 0.682$, $C_1 = -0.730$ for Types I and IA rainfall distributions and $C_0 = 0.682$, $C_1 = -0.730$ for Types I and IA rainfall distributions and $C_0 = 0.682$, $C_1 = -0.730$ for Types I and IA rainfall distributions and $C_0 = 0.682$, $C_1 = -0.730$ for Types I and IA rainfall distributions and $C_0 = 0.682$. 1.43, C z=1.64, C 3=-0.804 for Types II and III rainfall distributions.

FLOOD PROTECTION:

ALL OUTFALLS DISCHARGE INTO MANMADE CONVEYANCE SYSTEMS. THESE SYSTEMS DO NOT CURRENTLY EXPERIENCE FLOODING DURING THE 10-YR STORM. THE SYSTEMS HAVE BEEN ANALYZED AND FOUND TO CONTAIN THE 10-YR 24 HOUR STORM PER DCSM 8-530.4.C.1. SEE SHEET 9 FOR STORM DRAINAGE COMPUTATIONS.

AT LOA 1 AND LOA 3, THE SITE CDA IS LESS THAN 1% OF THE WATERSHED CDA. AS SUCH, FLOOD PROTECTION REQUIREMENTS ARE MET, PER DCSM 8-530.4.C.3.i.

AT LOA 2. THE SITE CDA IS GREATER THAN 1% OF THE WATERSHED CDA. INSTEAD THE LOA IS ESTABLISHED WHERE THE POST-DEVELOPMENT PEAK FLOW RATE TOR THE 10-YR 24 HR STORM IS LESS THAN THE PRE-DEVELOPMENT FLOW RATE FOR THE SAME STORM, PER DCSM 5-530.4.C.3.ii.

WITHIN THE CDA OF LOA 2, THERE IS A DETENTION FACILITY LOCATED UNDERNEATH A PARKING LOT ON PRIVATE PROPERTY. THIS FACILITY WAS OVERSIZED IN ORDER TO MEET THE PLANNED ROADWAY IMPROVEMENTS INCLUDED IN THIS PROJECT. THE ATTENUATION PROVIDED AT THIS UNDERGROUND FACILITY IS ENOUGH TO MEET FLOOD PROTECTION REQUIREMENTS. SEE COMPUTATIONS ON THIS SHEET.

Flood Protection

Project Name: Dumfries Road Sidewalk LOA: 2

calculation cells

Date: 11/13/2023

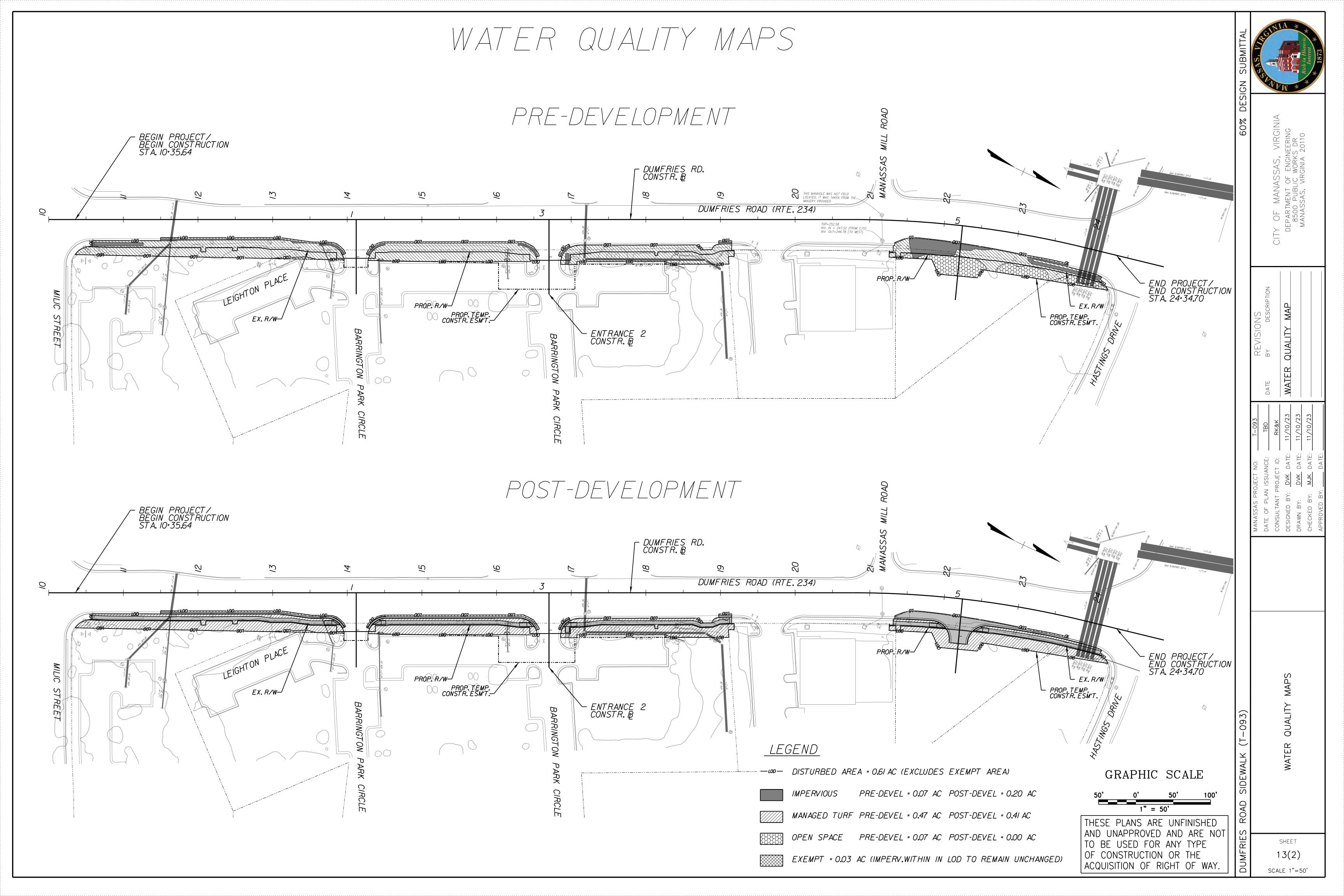
le .	constant values		
	Flood Protection (10-year)		
	Pre-Development	Post-Development	
P (in) 24-hr Rainfall Depth	4.60	4.6	
CN Weighted Curve Number	.76	81	
S= 1000/CN -10	3.18	2.29	
Ia= 0.25 Initial Abstraction	0.64	0.46	
RV (in) Runoff Depth	2.20	2.67	
RV (in-acres) Runoff Volume	0.86	1.04	

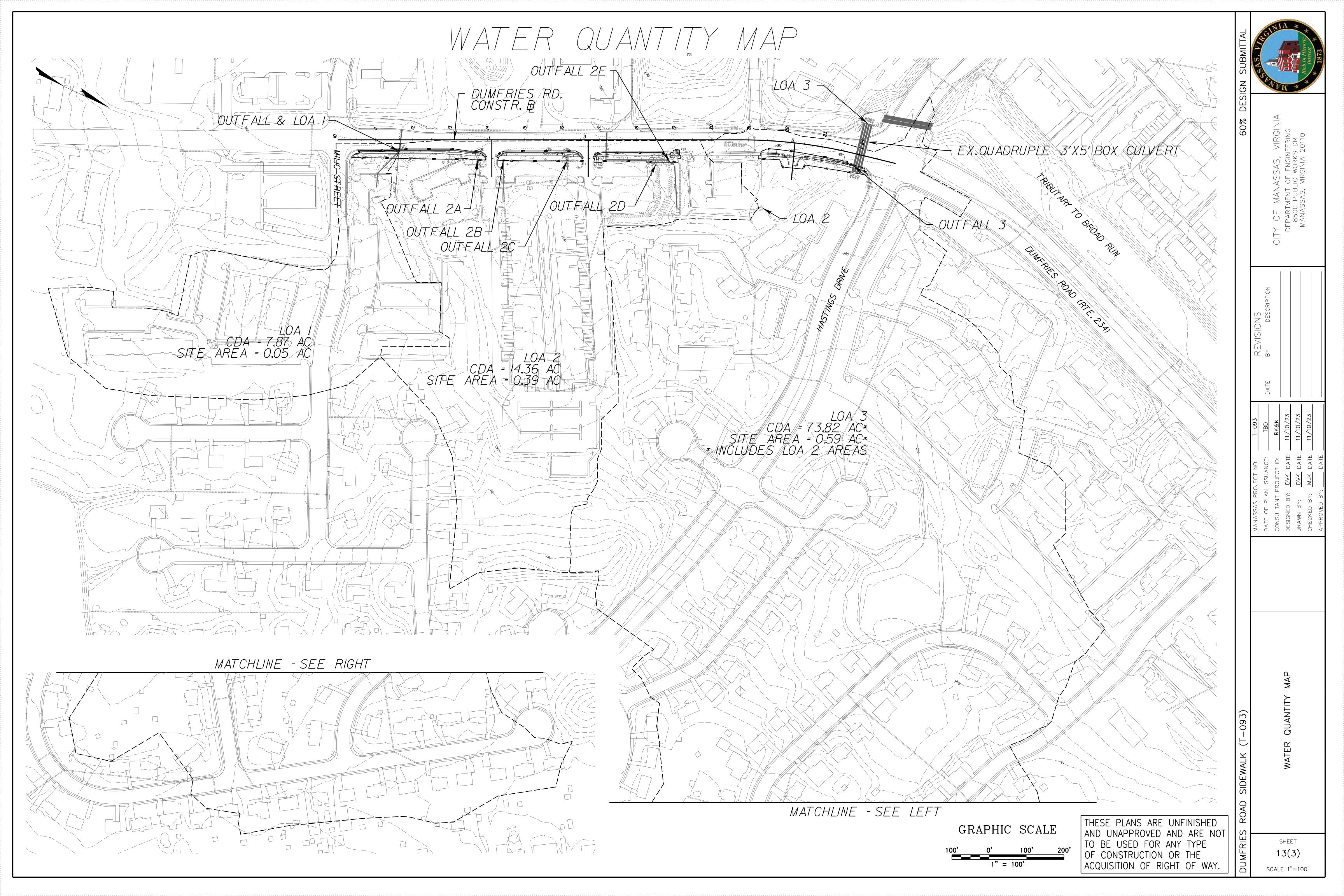
Flood Protection (10-year	r)
QP Pre-Developed (Cfs)	0.80
q _{P Developed} (cfs)	0.95
Is q _{P Developed} < q _{P Pre-Developed} ?	NO
QP Developed (cfs) - QP Pre-Develope	(cfs)
Required Reduction (cfs)	0.15
a mid and a desired	

2.83 Per SP-2021-0010, plan sheet 20

MANAGEMENT COMPUTATIONS STORMWATER NARRATIVES AND

13(1) SCALE 1"=50'





SIGNING AND PAVEMENT MARKING PLAN

GENERAL NOTES

- I. ALL PROPOSED SIGNING AND MARKING SHALL BE IN ACCORDANCE WITH:
 - * VDOT ROAD AND BRIDGE SPECIFICATIONS, DATED 2020
 - * VDOT ROAD AND BRIDGE STANDARDS, DATED 2016, REVISED SEPTEMBER 2022
 - * WORK AREA PROTECTION MANUAL, DATED 2011, REVISION 2.1, NOVEMBER 1,2020
 * MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES (MUTCD), DATED 2009, REVISION 3,

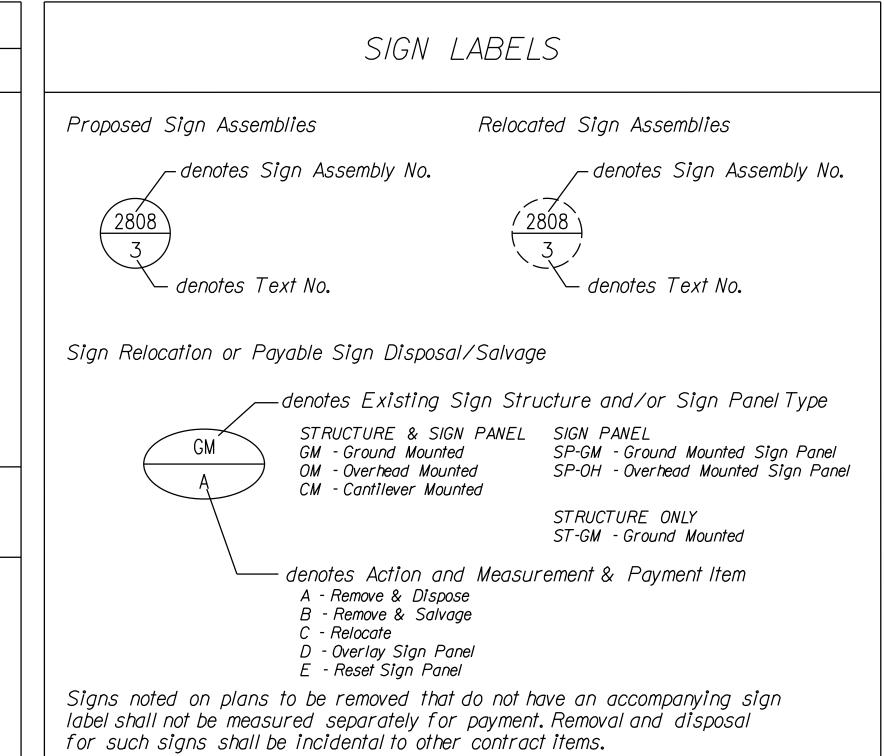
* VIRGINIA SUPPLEMENT TO THE 2009 MUTCD, DATED 2011, REVISION 1, SEPTEMBER 30, 2013

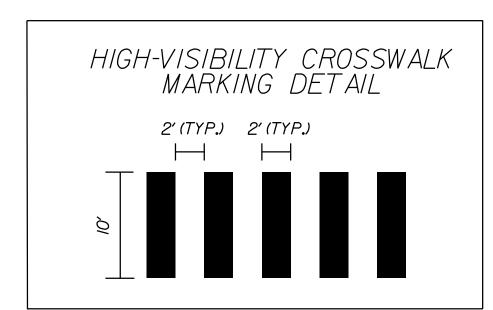
- DATED JULY 2022
- 2. PRIOR TO BEGINNING WORK, THE CONTRACTOR SHALL CONTACT "MISS UTILITY OF VIRGINIA" (1-800-522-7001) IN ORDER TO DETERMINE THE EXTENT AND LOCATION OF ALL UNDERGROUND UTILITIES WITHIN THE PROJECT LIMITS. UTILITY COMPANIES SHALL BE NOTIFIED THROUGH "MISS UTILITY OF VIRGINIA" 48 HOURS IN ADVANCE OF ANY EXCAVATION WITHIN THE PROXIMITY OF THEIR UTILITIES. THE CONTRACTOR SHALL BE RESPONSIBLE FOR REPAIRING OR REPLACING, AT THEIR OWN EXPENSE, ANY EXISTING UTILITIES, PAVEMENT, CONCRETE ITEMS, PIPES, ETC. THAT ARE DAMAGED DURING CONSTRUCTION.
- 3. UNLESS OTHERWISE APPROVED BY THE ENGINEER OR INDICATED IN THE MAINTENANCE OF TRAFFIC AND SEQUENCE OF CONSTRUCTION PLANS, EXISTING TRAFFIC SIGNS WHICH ARE TO BE RELOCATED SHALL REMAIN IN PLACE UNTIL THE NEW SIGN STRUCTURE IS IN PLACE.
- 4. THE REMOVAL OR MODIFICATION OF EXISTING SIGN PANELS, STRUCTURES, OR FOUNDATIONS SHALL CONFORM TO SECTION 510 OF THE SPECIFICATIONS.
- 5. NEW MATERIALS AND ITEMS REQUIRED TO COMPLETE THE REMOVAL OR MODIFICATION OF EXISTING ITEMS SHALL BE SUBMITTED TO THE ENGINEER FOR REVIEW AND APPROVAL IN ACCORDANCE WITH SECTION 105 OF THE SPECIFICATIONS.
- 6. ALL EXISTING AND PROPOSED SIGN LOCATIONS ARE APPROXIMATE AND SHALL BE FIELD VERIFIED BY THE CONTRACTOR. ALL PROPOSED SIGN LOCATIONS SHALL BE STAKED BY THE CONTRACTOR FOR REVIEW AND APPROVAL BY THE TRAFFIC ENGINEER PRIOR TO ANY INSTALLATION OR RELOCATION.
- 7. ALL SIGN PANELS, FRAMING MEMBERS, AND MISCELLANEOUS HARDWARE SHALL BE SALVAGED OR DISPOSED OF AT THE DIRECTION OF THE ENGINEER.
- 8. ALL STRIPING, WHERE MATCHING TO EXISTING, SHALL BE DONE IN A MANNER APPROVED BY THE ENGINEER.
- 9. EXISTING PAVEMENT MARKINGS THAT CONFLICT WITH THE PROPOSED MARKINGS SHOWN HEREIN SHALL BE ERADICATED.
- IO. LIMITS SHOWN OF PROPOSED PAVEMENT MARKINGS ARE APPROXIMATE AND SHALL BE MODIFIED IN THE FIELD TO ENSURE THAT PROPOSED PAVEMENT MARKINGS CONTINUE UNTIL EXISTING PAVEMENT MARKINGS CAN BE MATCHED.
- II. PAVEMENT MARKING ARROWS, WORDS, AND SYMBOLS SHALL BE IN ACCORDANCE WITH STANDARD PM-IO.
- 12. MEASUREMENT AND PAYMENT FOR SIGNS AND PAVEMENT MARKINGS SHALL BE IN ACCORDANCE WITH STANDARD VDOT BID ITEMS.

STANDARD SIGN LEGEND

PLAN ITEM	PLAN SYMBOL					
TLAN II EW	PROPOSED	EXISTING				
Single Post Sign Support	•	0				
Double Post Sign Support	• •	0 0				
Triple Post Sign Support	• • •	000				
SIGN CALL-OUTS						
Existing sign and structure to be replaced in current location	(INTER	şi <u>ate</u> 5				

Existing Sign to be Removed





THESE PLANS ARE UNFINISHED
AND UNAPPROVED AND ARE NOT
TO BE USED FOR ANY TYPE
OF CONSTRUCTION OR THE
ACQUISITION OF RIGHT OF WAY.

A SAS, VIDA

60% UE ASSAS, VIRGINIA OF FNGINFFRING

CITY OF MANASSAS, VIR DEPARTMENT OF ENGINEERIN 8500 PUBLIC WORKS DR MANASSAS, VIRGINIA 2011

SULTANT PROJECT ID: TBD DATE BY

SULTANT PROJECT ID: RK&K

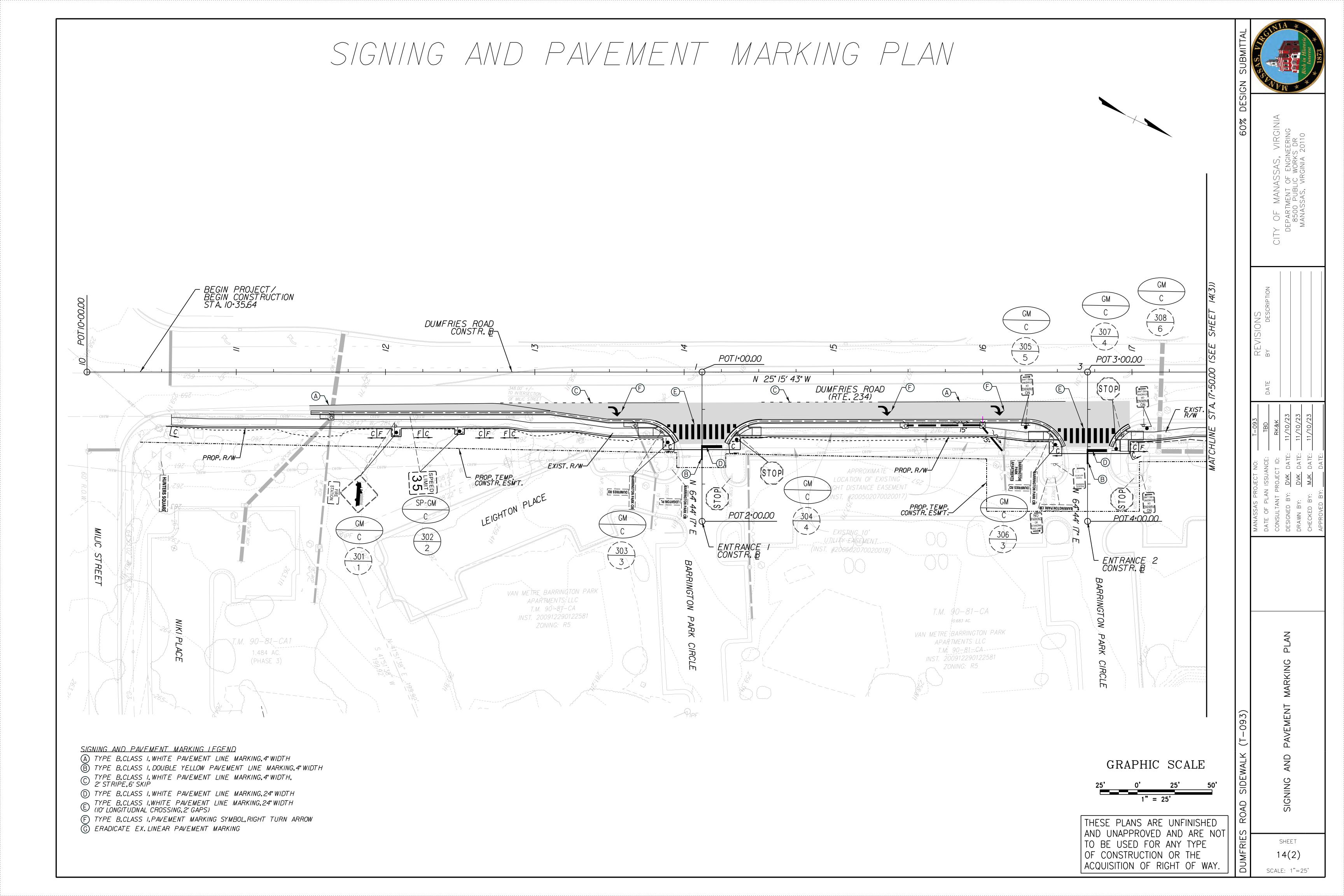
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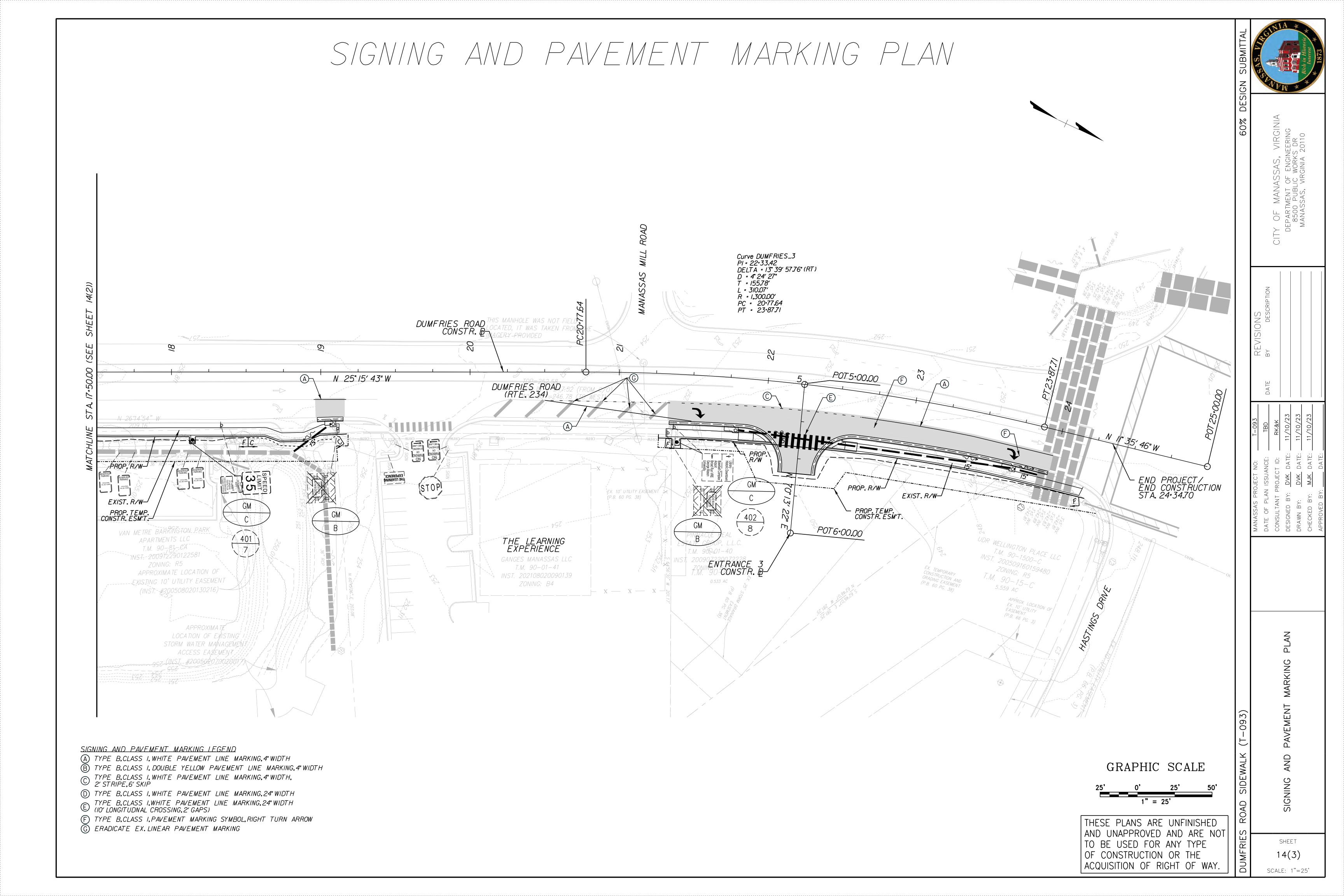
SKED BY: MJK DATE: 11/10/23

PAVEMENT MARKING PLA

ROAD SIDEWALK (1-095)

SHEET 14(1)





Rich in Historic

SAS, VIRGINIA

DEPARTMENT OF ENGINEERING
8500 PUBLIC WORKS DR

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SNOISIA	DESCRIPTION		

CHECKED BY: MJK DATE: 11/10/23	DVK DATE: Y: MJK DATE:	DRAWN BY: DVK DATE: 11/10/23	CONSULTANT PROJECT ID: RK&K	MANAUVAN TROJECT NO:	>	DATE		ISSUANCE: ROJECT ID: DVK DATE: MJK DATE:	MANASSAS PRO DATE OF PLAN CONSULTANT P DESIGNED BY: DRAWN BY: CHECKED BY:
		MJK DATE:	3Y: DVK DATE:	TBD DATE RK&K 11/10/23 11/10/23				DATE:	APPROVED BY:
DVK DATE:				TBD DATE			11/10/23	DVK DATE:	DESIGNED BY:
					ш	DATE	TBD	ISSUANCE:	DATE OF PLAN

AND PAVEMENT MARKING PLA

DUMFRIES RO 14(4)

THESE PLANS ARE UNFINISHED AND UNAPPROVED AND ARE NOT

TO BE USED FOR ANY TYPE

ACQUISITION OF RIGHT OF WAY.

OF CONSTRUCTION OR THE

			S	IGN ASS COMPON	SEMBLY ENTS		SIGN AREA	PANEL (s.f.)			
TEXT NO.	SIGN ASSEMBLY NO(s).	TEXT	MUTCD ST'D.	PANEL W	SIZE H	QTY.	per ASSEMBLY	ALL ASSEM- BLIES	PROP. SIGN STRUCTURE ST'D.	PROP. FOUNDATION ST'D.	REMARKS
/	301		EXIST.	-	-	/	-	-	STP-1 2.5" 12 GA.	TYPE A	
		FIRE STATION	EXIST.	-	-	/	-				
2	302	SPEEDI LIMIT 35	EXIST.	-	-	/	-	-	STP-1 2" 14 GA.	TYPE A	
3	303,306	BARRINGTON PARK CIR	EXIST.	-	-	2	-	_	STP-I 2.5"	TYPE A	
O		DUMFRIES RD	EXIST.	-	-	2	-		12 GA.		
4	304, 307	STOP	EXIST.	-	-	2	-	-	STP-1 2" 14 GA.	TYPE A	
5	305	PARKING OR STANDING FIRE LANE	EXIST.	-	-	/	-	-	STP-I 2" I4 GA.	TYPE A	
6	308	NO PARKING OR STANDING FIRE LANE	EXIST.	-	-	/	-	-	STP-1 2" 14 GA.	TYPE A	
7	401	SPEEDI LIMIT I 35	EXIST.	-	-	/	-	-	STP-I 2.5"	TYPE A	
		SNOW EMERGENCY ROUTE NO PARKING OR IMPEDING TRAFFICE FLOW DURING EMERGENCY TOWING ENFORCED	EXIST.	-	ı	/	-		12 GA.		
8	402	Library Historic Downtown Baseball Complex Airport → Broad Run VRE George Mason University	EXIST.	-	-	/	-	-	NON-STANDARD	NON-STANDARD	CUSTOMIZED SIGN BY THE CITY OF MANASSAS

<u>NOTES:</u>

- I) ALL SIGNS SHALL BE ORIENTATED AS SHOWN ON THE PLANS.
- 2) SIGN COLOR COMBINATIONS SHALL BE IN ACCORDANCE WITH THE FHWA SHS BOOK AND THE 2011 VIRGINIA SHS BOOK OR AS NOTED IN THE PLANS.
- 3) ALL POSITIVE CONTRAST GUIDE AND SPECIFIC SERVICE SIGNS
 SHALL UTILIZE FABRICATION LETTER TYPE L-3 OR L-4 UNLESS
 OTHERWISE NOTED IN THE REMARKS. ALL OTHER SIGNS SHALL
 UTILIZE FABRICATION LETTER TYPE L-1 OR L-2 UNLESS
 OTHERWISE NOTED IN THE REMARKS.
- 4) ALL BLACK SHEETING SHALL BE NON-REFLECTIVE.
- 5) SIGN STRUCTURES SHALL BE INSTALLED PER THE NOTED SIGN ST'D.
- 6) ALL ST'D.STP-I STRUCTURES TO BE SINGLE POST UNLESS OTHERWISE NOTED.

	CROSS SECTIONS scale 1 in. = 5 ft	ITTAL
		% DESIGN SUBMI
270	PROP.	ANASSAS, VIRGIN INT OF ENGINEERING UBLIC WORKS DR AS, VIRGINIA 20110
	DUMFRIES ROAD 70 89 82 85 7 7 7 7 7 7 7 7 7	CITY OF M. DEPARTME 8500 P
		VISIONS
265	DUMFRIES ROAD	DATE BY 3 3
255	20% MM	AN ISSUANCE: TBD PROJECT ID: RK&K TOVK DATE: 11/10/2 DVK DATE: 11/10/2 MJK DATE: 11/10/2
265	DUMFRIES ROAD TEMP. CONSTR. B EX. ESMT. R/W 265 260	MANASSAS F DATE OF PL, CONSULTANT DESIGNED BY CHECKED BY
255	/O+50.00 255	
265		ECTIONS
		IDEWALK (T-093
	ITILISE I LANS AND CIVITINISTIED I	DUMFRIES ROAD SI SHEET XI SCALE 1"=5'

