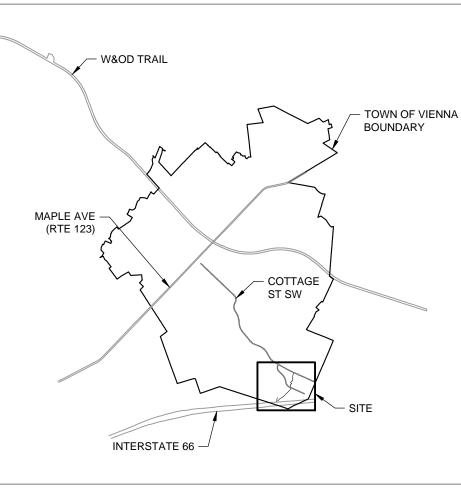
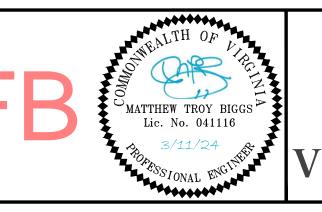
## VICINITY MAPS



FAIRFAX COUNTY, VIRGINIA 1" = 50,000ft



TOWN OF VIENNA, VIRGINIA 1" = 5,000ft



LOTTED BY:HUMPTON, JOHN SHEET SET:Bear Branch LAYOUT:01 COVER SHEET March 12, 2024 11:45:47am Q: \VIENNA\BEAR BRANCH\CIV\01 COVER

# TOWN OF VIENNNA

# BEAR BRANCH STREAM RESTORATION 100% IFB CONSTRUCTION DOCUMENT

SITE MAP

								CLIENT: TOWN OF VI 127 CENTER STRE VIENNA, VA 2	ET SOUTH
	1	11	MAR	2024	IFB SUBMISSION	JDH	МТВ	ENGINEER:	
IENNA	0	28	JUL	2023	IFB SUBMISSION	JDH	МТВ	WSP Environment & Infrastructure Solutions 4795 Meadow Wood Lane, Suite 310 East Chantilly, VA 20151-1678	<b>NSD</b>
since 1890	NO.	DD	MON		ISSUE / REVISION DESCRIPTION	ENG.	APPR.	Tel (703) 188-3700	

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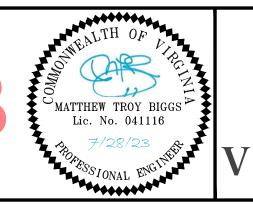
DRAWN BY: AEA / JH	PROJECT:	BEAR BRANCH STREAM RESTORATION 100% IFB CONSTRUCTION DOCUMENT	PROJECT NO.: 752620V001
CHECKED BY:		SOUTHSIDE PARK	DATE:
МТВ		1315 ROSS DR. SW, VIENNA, VA 22181	11 MARCH 2024
APPROVED BY:	SHEET TITLE:		DWG. SIZE
MTB			ARCH D
SCALE:		COVER SHEET	SHEET NUMBER:
AS NOTED			01 OF 41

STORM	SEWER	TABLE

STORM	SEWER TABLE	SANITA	RY SEWER TABLE
(EX) 1034)	RIM = 335.53 INV IN = 327.56 (15" PIPE FROM EX 1035) INV IN = 328.33 (15" PIPE FROM UNK) INV OUT = 327.28 (15" PIPE TO 66" RCP)	[ EX ] [ 066 ]	RIM = 314.56 INV IN = 299.56 (18" PI INV IN = 300.82 (15" PI INV OUT = 299.03 (18"
(EX) (1035)	RIM = 336.13 INV IN = 328.70 (15" PIPE FROM EX 1036) INV OUT = 328.70 (15" PIPE TO EX 1034)	[ EX ] [ 068 ]	RIM = 318.33 INV IN = 304.31 (18" PI INV OUT = 304.26 (18"
(EX) 1036)	RIM = 333.26 INV IN = 329.06 (15" PIPE FROM EX 1037) INV OUT = 328.87 (15" PIPE TO EX 1035)	EX 117	RIM = 315.14 CENTER INV = 305.27
(EX) 1037)	RIM = 333.38 INV OUT = 329.56 (15" PIPE TO EX 1036)	[ EX [ 284 ]	RIM = 340.20 INV IN = 327.85 (10" PI INV IN = 327.80 (10" PI INV OUT = 327.80 (10"
(EX 1038)	RIM = 337.40 INV IN = 331.88 (15" PIPE FROM EX 1039) INV OUT = 331.18 (15" PIPE TO OUTLET)	[ EX [ 286 ]	RIM = 325.99 INV IN = 316.59 (12" PI INV OUT = 316.59 (12"
(EX 1039)	RIM = 337.30 INV OUT = 332.28 (15" PIPE TO EX 1038)	[ EX ] [ 287 ]	RIM = 327.78 INV IN = 321.98 (8" PIP INV OUT = 321.93 (8" F
(EX) 1040	RIM = 328.13 INV IN = 323.54 (18" PIPE FROM EX 1041) INV IN = 322.24 (42" PIPE FROM UNK) INV OUT = 321.88 (42" PIPE TO OUTLET)	[ EX ] [ 297 ]	RIM = 328.30 INV IN = 319.70 (10" PI INV IN = 319.65 (10" PI INV OUT = 319.45 (10"
( EX 1041 )	RIM = 328.36 INV OUT = 324.33 (15" PIPE TO EX 1040)	[ EX ] [ <u>323</u> ]	RIM = 334.77 INV IN = 315.67 (12" PI INV OUT = 315.62 (12"
(EX (1248)	RIM = 326.02 INV IN = 318.56 (15" PIPE FROM EX 1351) INV OUT = 318.19 (15" PIPE TO 66" RCP)	[ EX ] [ 349 ]	RIM = 333.48 INV IN = 323.08 (10" PI INV IN = 322.88 (10" PI INV OUT = 322.81 (10"
(EX) (1351)	RIM = 325.76 INV OUT = 319.59 (15" PIPE TO EX 1248)	[ EX [ 405]	RIM = 324.70 INV IN = 318.70 (12" PI INV OUT = 318.65 (12"
(EX)	RIM = 315.58 NO ACCESS BOLTED CLOSED	[ EX [ 406 ]	RIM = 321.46 INV IN = 316.16 (12" PI INV OUT = 316.11 (12"
(EX) (10022)	RIM = 323.43 INV IN = 317.75 (30" PIPE FROM EX 10027) INV IN = 318.77 (30" PIPE FROM EX 10028) INV OUT = 313.92 (36" PIPE TO OUTLET)	[ EX [ 407]	RIM = 329.53 INV IN = 317.23 (8" PIP INV IN = 317.03 (12" PI INV IN = 317.38 (10" PI INV OUT = 316.82 (12"
(EX) 10027)	RIM = 327.66 INV IN = 321.21 (18" PIPE FROM UNK) INV OUT = 319.47 (30" PIPE TO EX 10022)	[_EX_] [_408_]	RIM = 336.33 INV IN = 314.88 (12" PI INV OUT = 314.81 (12"
(EX) 10028)	RIM = 325.59 INV IN = 321.54 (18" PIPE FROM UNK) INV OUT = 321.63 (30" PIPE TO EX 10022)	[EX 409]	RIM = 318.61 INV IN = 313.55 (12" PI INV IN = 308.41 (12" PI INV OUT = 308.19 (12" (HAS OUTSIDE DROP)
		EX 1055	RIM = 314.91 INV IN = 302.79 (15" PI INV OUT = 302.56 (15"
STORM	SEWER CULVERT TABLE		

STORM SEWER CULVERT TABLE

COTTAGE STREET	INV IN = 319.12 (66" DUAL RCP) INV OUT = 319.07 (66" DUAL RCP)
ROSS DRIVE	INV IN = 314.38 (66" DUAL RCP) INV OUT = 313.75 (66" DUAL RCP)
INTERSTATE 66	INV IN = 304.73 (10'x10' DUAL BOX CULVERT) INV OUT = 302.38 (10'x10' DUAL BOX CULVERT)



#### RIM = 314.56 INV IN = 299.56 (18" PIPE FROM EX 117) <u> 266</u> INV IN = 300.82 (15" PIPE FROM EX 1055) INV OUT = 299.03 (18" PIPE TO EX 065) RIM = 318.33 INV IN = 304.31 (18" PIPE FROM EX 069) J<u>68</u>7 INV OUT = 304.26 (18" PIPE TO EX 117) RIM = 315.14 CENTER INV = 305.27 RIM = 340.20 INV IN = 327.85 (10" PIPE FROM EX 285) INV IN = 327.80 (10" PIPE FROM EX 305) INV OUT = 327.80 (10" PIPE TO EX 297) RIM = 325.99 INV IN = 316.59 (12" PIPE FROM EX 407) <u>286</u> j INV OUT = 316.59 (12" PIPE TO EX 323) RIM = 327.78 <u>287</u>] INV IN = 321.98 (8" PIPE FROM EX 288) INV OUT = 321.93 (8" PIPE TO EX 407) RIM = 328.30 INV IN = 319.70 (10" PIPE FROM EX 284) 297 INV IN = 319.65 (10" PIPE FROM EX 296) INV OUT = 319.45 (10" PIPE TO EX 405) RIM = 334.77 INV IN = 315.67 (12" PIPE FROM EX 286) INV OUT = 315.62 (12" PIPE TO EX 408) RIM = 333.48 INV IN = 323.08 (10" PIPE FROM EX 350) <u>349</u> INV IN = 322.88 (10" PIPE FROM EX 353) INV OUT = 322.81 (10" PIPE TO EX 407) RIM = 324.70 INV IN = 318.70 (12" PIPE FROM EX 297) <u>105</u> INV OUT = 318.65 (12" PIPE TO EX 406) RIM = 321.46 INV IN = 316.16 (12" PIPE FROM EX 405) <u>106</u> INV OUT = 316.11 (12" PIPE TO EX 407) RIM = 329.53 INV IN = 317.23 (8" PIPE FROM EX 287) INV IN = 317.03 (12" PIPE FROM EX 406) INV IN = 317.38 (10" PIPE FROM EX 349) INV OUT = 316.82 (12" PIPE TO EX 286) RIM = 336.33 INV IN = 314.88 (12" PIPE FROM EX 323) 1<u>08</u> INV OUT = 314.81 (12" PIPE TO EX 409) RIM = 318.61

INV IN = 313.55 (12" PIPE FROM EX 408) UPPER 109\_ INV IN = 308.41 (12" PIPE FROM EX408) LOWER INV OUT = 308.19 (12" PIPE TO EX 070) (HAS OUTSIDE DROP)

INV IN = 302.79 (15" PIPE FROM UNK) 1000 INV OUT = 302.56 (15" PIPE TO EX 066)

$(\mathbb{H})$	UNKNOWN MANHOLE
S	SANITARY MANHOLE
$\square$	STORM MANHOLE
	SIGN
MW	MONITORING WELL
$\oplus$	WETLAND FLAG WITH NUMBER
Ø	UTILITY POLE
Y	GUY WIRE
¢	LIGHT POLE
•	WATER VALVE
EP	EDGE OF PAVEMENT
CLF	CHAIN LINK FENCE
	WETLAND DELINEATION
S	UNDERGROUND SANITARY
	STREAM THALWEG
OHU	OVERHEAD UTILITY
· ·	EXISTING FLOODPLAIN BOUNDARY
	PROPERTY BOUNDARY
<u> </u>	MAJOR CONTOUR
	MINOR CONTOUR
	TREE WITH CRITICAL ROOT ZONE
	BENCHMARK

## SURVEY NOTES (FROM BOWMAN)

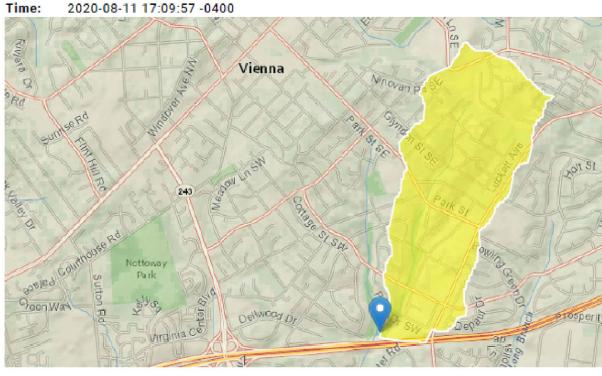
- THE PROPERTIES AFFECTED BY THIS STREAM SURVEY ARE CURRENTLY IN THE NAME OF THE TOWN OF VIENNA (0482-03-2360A, 0491-08-2380A, 0482-03-2350B AND 0482-02-0013B) AND VIENNA LIONS LITTLE LEAGUE (0491-02-0004).
- 2. NORTH MERIDIAN IS REFERENCED TO VIRGINIA STATE PLANE NAD83 DATUM.
- THE STREAM SURVEY SHOWN HEREON LIES IN ZONE A (SPECIAL FLOOD ZONE AREAS SUBJECT TO INUNDATION BY THE 1% ANNUAL CHANCE FLOOD EVENT) AS SHOWN ON FEMA FLOOD INSURANCE RATE MAP FOR FAIRFAX COUNTY, VIRGINIA, MAP NUMBER 51059C0145E AND 51059C0165E, EFFECTIVE DATE SEPTEMBER 17, 2010.
- 4. ELEVATIONS ARE BASED ON GPS OBSERVATIONS AND CONVERTED TO NGVD 88.
- MISS UTILITY WAS UTILIZED FOR THIS SURVEY AND LOCATION OF ALL UNDERGROUND UTILITIES ARE AN APPROXIMATE SOURCE OF INFORMATION. OTHER INFORMATION FROM PLANS AND MARKINGS COMBINED WITH OBSERVED EVIDENCE OF UTILITIES WAS ADDED TO THIS SURVEY. HOWEVER, LACKING EXCAVATION, THE EXACT LOCATION OF UNDERGROUND FEATURES CANNOT BE ACCURATELY, COMPLETELY AND RELIABLY DEPICTED. WHERE ADDITIONAL OR MORE DETAILED INFORMATION IS REQUIRED, THE CLIENT IS ADVISED THAT EXCAVATION MAY BE NECESSARY.

## StreamStats Report - Bear Brown Downstream (above

## confluence)

Region ID: VA

Workspace ID: VA20200811210939394000 Clicked Point (Latitude, Longitude): 38.88019, -77.25206



Basin Character	istics		
Parameter Code	Parameter Description	Value	Unit
DRNAREA	Area that drains to a point on a stream	0.79	square miles

#### SOURCE: STREAMSTATS.USGS.GOV

								CLIENT: TOWN OF VIENNA 127 CENTER STREET SOUTH VIENNA, VA 22180	
								ENGINEER: WSP Environment & Infrastructure Solutions	
IENNA	0	28	JUL	2023	IFB SUBMISSION	JDH	МТВ	4795 Meadow Wood Lane, Suite 310 East Chantilly, VA 20151-1678	
since 1890	NO.	DD	MON	YYYY	ISSUE / REVISION DESCRIPTION	ENG.	APPR.	Tel (703) 488 3700	

#### **TOWN OF VIENNA GENERAL NOTES**

- A PRE-CONSTRUCTION MEETING MUST BE HELD PRIOR TO THE START OF CONSTRUCTION. CALL 703-255-6384 TO SCHEDULE THE PRE-CONSTRUCTION MEETING.
- ALL CONSTRUCTION GENERATED DEBRIS MUST BE HAULED AWAY BY THE CONTRACTOR OR OWNER.
- PRIOR TO THE REMOVAL OF ANY TOWN TREES (TREES WITHIN THE RIGHT OF WAY), THE APPLICANT OR THEIR REPRESENTATIVE SHALL CONTACT THE TOWN OF VIENNA ARBORIST AT 703-255-6360 TO COORDINATE HAVING THE TOWN ARBORIST ONSITE DURING ALL TOWN TREE REMOVAL.
- 4. TREE PROTECTION FOR ANY TOWN TREE, AS SHOWN ON PLAN, MUST BE INSTALLED PRIOR TO ANY SITE WORK.
- 5. IT IS UNLAWFUL TO PERFORM ANY CONSTRUCTION ABOVE FOUNDATION CORNERS PRIOR TO APPROVAL OF SETBACKS. WORK COMPLETED IN VIOLATION OF THIS REQUIREMENT IS SUBJECT TO DEMOLITION.
- 6. ALL DUMPSTERS/PODS ARE TO BE PLACE ON PRIVATE PROPERTY.
- FRONT ELEVATION CHECKS ARE REQUIRED.
- WALL CHECK SURVEYS ARE REQUIRED AND MUST BE SUBMITTED PRIOR TO CONSTRUCTION ABOVE FOUNDATION CORNERS.
- A CERTIFICATE OF OCCUPANCY IS REQUIRED PRIOR TO OCCUPANCY. ALL REQUIRED DOCUMENTATION AND INSPECTIONS MUST BE SUBMITTED/COMPLETED BEFORE THE TOWN OF VIENNA WILL ISSUE A CERTIFICATE OF OCCUPANCY.
- 10. EXISTING SANITARY SEWER LATERALS ARE TYPICALLY CAPPED AT OR NEAR THE PROPERTY LINE. THE REUSE OF THE PORTION OF THE EXISTING SANITARY SEWER LATERAL BETWEEN THE TOWN OWNED SEWER MAIN AND THE CAPPED END MAY BE ALLOWED PROVIDING THAT A LICENSED PLUMBER CERTIFIES THAT THE EXISTING PIECE OF PIPE IS GRADED PROPERLY AND IN LIKE NEW CONDITION. THE REUSE OF A PORTION OF THE EXISTING LATERAL DOES NOT IMPLY THAT THE TOWN IN WARRANTING THE CONDITION IN ANY WAY.
- 11. VERTICAL TOLERANCES FOR ALL STRUCTURES (CROSS-VANES, OFFSET CROSS-VANES, LOGS, MINI CROSS-VANES, IMBRICATED ROCK WALLS, ECT.) SHALL BE +/- 0.1 MAXIMUM. FOR CROSS-VANES, OFFSET CROSS-VANES, MINI CROSS-VANES, AND LOGS, CONTRACTOR SHALL ENSURE THALWEG (PROFILE) ELEVATIONS DECREASE IN DOWNSTREAM DIRECTION SO BACKWATER DOESN'T INUNDATE AN UPSTREAM STRUCTURE.

#### TOWN OF VIENNA LAND DISTURBING GENERAL NOTES

- 1. THE LAND DISTURBING PERMIT MUST BE KEPT ON THE WORK SITE AND SHOWN WHEN REQUESTED.
- 2. A STORMWATER POLLUTION PREVENTION PLAN (SWPPP) IN CONFORMANCE WITH 9VAC25-870-54 AND TOWN CODE SECTION 23-13 MUST BE MAINTAINED AT A CENTRAL LOCATION ON THE SITE. IF AN ON-SITE LOCATION IS UNAVAILABLE, NOTICE OF THE SWPPP'S LOCATION MUST BE POSTED NEAR THE MAIN ENTRANCE OF THE CONSTRUCTION SITE. THE SWPPP SHALL BE MADE AVAILABLE FOR PUBLIC REVIEW IN ACCORDANCE WITH THE GENERAL PERMIT EITHER ELECTRONICALLY OR IN HARD COPY.
- THE TOWN OF VIENNA DEPARTMENT OF PUBLIC WORKS MUST BE NOTIFIED BY TELEPHONE (703-255-6380) WHEN WORK IS TO COMMENCE AND WHEN THE PROJECT IS COMPLETED. PRIOR TO COMMENCEMENT OF WORK, THE CONTRACTOR AGREES TO CONTACT AND MEET WITH THE DEPARTMENT TO IDENTIFY SIGNIFICANT STORMWATER CONTROL INSTALLATION POINTS WHERE THE CONTRACTOR MUST CONTACT THE TOWN FOR INSPECTION EITHER DURING OR IMMEDIATELY AFTER INSTALLATION. THE DEPARTMENT SHALL BE NOTIFIED AT LEAST 48 HOURS IN ADVANCE OF THESE INSTALLATION POINTS.
- NO LAND DISTURBING ACTIVITY SHALL COMMENCE UNTIL ALL EROSION AND SEDIMENT CONTROL ARE IN PLACE AS SPECIFIED IN THE EROSION AND SEDIMENT CONTROL PLAN AND A PRE-CONSTRUCTION MEETING WITH TOWN STAFF IS HELD.
- THE CONTRACTOR AGREES TO BE RESPONSIBLE FOR ANY AND ALL DAMAGES TO ANY OTHER INSTALLATION. ALREADY IN PLACE, AS A RESULT OF WORK COVERED BY THIS PERMIT.
- THE TOWN RESERVES THE RIGHT TO ORDER A DEVELOPER OR CONTRACTOR TO CEASE AND DESIST ALL WORK ACTIVITY IN THE EVENT THAT THE DEVELOPER OR CONTRACTOR IS UNABLE TO MEET THE REQUIREMENTS OF THE STORMWATER MANAGEMENT PLAN, EROSION AND SEDIMENT CONTROL PLAN, OR THE SWPPP. THIS INCLUDES KEEPING ALL STREETS AND RIGHTS-OF-WAY FREE OF MUD AND DIRT.
- 7. THE APPLICANT AGREES TO MAINTAIN THE WORK IN THE MANNER APPROVED UPON ITS COMPLETION.
- 8. A PERMIT MAY BE DENIED ANY APPLICANT, AND ALL PERMIT ISSUED BY THE TOWN MAY BE REVOKED, WHENEVER, IN THE OPINION OF THE DIRECTOR OF PUBLIC WORKS, THE SAFETY, USE OR MAINTENANCE OF THE PROPERTY SO REQUIRES. PERFORMANCE BONDS REQUIRED UNDER SECTION 23-7 AND SECTION 23-23 OF THE TOWN CODE WILL STAND FORFEITED AND WORK SHALL NOT BE RECOMMENCED UNTIL A REPLACEMENT BOND IS POSTED.
- PERFORMANCE BONDS SHALL BE CONDITIONED TO CONFORM ANY WORK TO APPROVED STANDARDS, SPECIFICATIONS, AND CRITERIA AS SET OUT IN THE APPROVED EROSION AND SEDIMENT CONTROL PLAN AND STORMWATER MANAGEMENT PLAN.
- 10. UPON COMPLETION OF ADEQUATE STABILIZATION OF AN APPROVED EROSION AND SEDIMENT CONTROL PLAN, THE CONTRACTOR SHALL NOTIFY THE DIRECTOR OF PUBLIC WORKS OF SUCH COMPLETION. FOLLOWING INSPECTION OF THE WORK AND PLANTING AND A DETERMINATION THAT THEY ARE IN COMPLIANCE WITH THE APPROVED PLAN, THE DIRECTOR OF PUBLIC WORKS SHALL ISSUE A LETTER OR PRELIMINARY ACCEPTANCE. THE CONTRACTOR SHALL GUARANTEE ALL EROSION AND SEDIMENT CONTROL WORK FOR A PERIOD OF ONE YEAR FROM THE DATE OF THE PRELIMINARY ACCEPTANCE, OR FOR A PERIOD OF ONE YEAR FROM ANY REPAIR OR REPLANTING ORDERED BY THE DIRECTOR OF PUBLIC WORKS, OR UNTIL SUCH TIME THAT ALL CONTROL STRUCTURES AND A MINIMUM OF 90% OF ALL PLANTINGS HAVE SURVIVED FOR A YEAR WITHOUT NEED FOR FURTHER REPLANTING AND REPAIR. FINAL ACCEPTANCE SHALL OCCUR WHEN PRELIMINARY ACCEPTANCE HAS REMAINED UNREVOKED FOR A PERIOD OF ONE YEAR, OR WHEN ALL CONTROL STRUCTURES AND A MINIMUM OF 90% OF ALL PLANTS HAVE SURVIVED FOR A PERIOD OF ONE YEAR WITHOUT NEED FOR FURTHER REPLANTING OR REPAIR.
- 11. THE STORMWATER MANAGEMENT PERFORMANCE BOND WILL BE RELEASED UPON ALL STORMWATER MANAGEMENT FACILITIES IN THE STORMWATER MANAGEMENT PLAN PASSING FINAL CONSTRUCTION INSPECTION BY THE DIRECTOR OF PUBLIC WORKS OR HIS DESIGNEE. A CONSTRUCTION RECORD DRAWING FOR PERMANENT STORMWATER MANAGEMENT FACILITIES MUST BE SUBMITTED TO THE DIRECTOR PRIOR TO BOND RELEASE IN ACCORDANCE WITH TOWN CODE SECTION 23-14D.
- 12. THE MAINTENANCE AGREEMENT REQUIRED IN TOWN CODE SECTION 23-18 MUST BE RECORDED IN THE FAIRFAX COUNTY LAND RECORDS PRIOR TO TERMINATION OF THE GENERAL PERMIT.

DRAWN BY: AEA / JH	PROJECT:	BEAR BRANCH STREAM RESTORATION 100% IFB CONSTRUCTION DOCUMENT	PROJECT NO.: 752620V001
CHECKED BY:		SOUTHSIDE PARK	DATE:
MTB		1315 ROSS DR. SW, VIENNA, VA 22181	28 JULY 2023
APPROVED BY:	SHEET TITLE:		DWG. SIZE
MTB			ARCH D
SCALE:		GENERAL NOTES	SHEET NUMBER:
NOT TO SCALE			02 OF 41

## **PROJECT NARRATIVE**

## I. BACKGROUND

THE ULTIMATE GOAL OF THE BEAR BRANCH PHASE I STREAM RESTORATION PROJECT IS TO DESIGN NATURAL CHANNEL DESIGN (NCD) TECHNIQUES WHICH WILL ADDRESS STREAMBANK EROSION ISSUES BY STABILIZING DEEP, ERODED BANKS ALONG APPROXIMATELY 1,315 LINEAR FEET OF EXISTING STREAM REACH. THE ORIGINAL PROJECT LOCATION EXTENDED FROM COTTAGE ST SW TO INTERSTATE 66. HOWEVER, DUE TO THE INABILITY TO OBTAIN EASEMENTS AND AGREEMENTS FROM VIENNA LIONS LITTLE LEAGUE, BEAR BRANCH IS NOT BEING RESTORED FROM ROSS DR. TO THE WOOD DECK FOOT BRIDGE. ADDITIONALLY, VDOT WIDENED ROUTE 66 AND EXTENDED THE 2- 10'X10' BOX CULVERTS. THEREFORE, THE NEW RESTORATION LIMITS DOWN OF ROSS DR NOW EXTEND FROM THE WOOD DECK FOOT BRIDGE FOR APPROXIMATELY 400 FT BEFORE PERFORMING BANK ARMORING (APPROXIMATELY 100 FT) TO THE VDOT RIGHT OF WAY.

## II. REGULATORY COMPLIANCE

NCD IS THE PREFERRED DESIGN METHODOLOGY FOR THE VIRGINIA DEPARTMENT OF ENVIRONMENTAL QUALITY (DEQ) AND THE U.S. ARMY CORPS OF ENGINEERS (USACE). THE 2005 STATE LEGISLATURE REVISED STATE LAW TO STIPULATE THAT ANY STREAM RESTORATION PROJECT THAT IS DESIGNED IN ACCORDANCE WITH NCD PRINCIPLES IS EXEMPT FROM THE REQUIREMENTS OF MS 19 (CODE OF VIRGINIA, 10.1-560 AND 10.1-561) AS WELL AS ANY OTHER RELATED LOCAL REQUIREMENTS, ADDITIONALLY, ON MARCH 16, 2007, DEQ PUBLISHED ITS PROPOSED SECTION 401 WATER QUALITY CERTIFICATION CONDITIONS FOR THE USACE'S NATIONWIDE PERMIT (NWP) #27 (STREAM AND WETLAND RESTORATION ACTIVITIES) REQUIRING THAT NATURAL STREAM DESIGN BE USED FOR STREAM RESTORATION.

#### **III. DESIGN CRITERIA**

THE DOWNSTREAM EXTENTS OF THE BEAR BRANCH PROJECT DRAIN APPROXIMATELY 0.79 SQUARE MILES WHEREAS THE UPSTREAM EXTENT OF THE PROJECT DRAINS APPROXIMATELY 0.73 SQUARE MILES. BASED ON THE NATIONAL LAND COVER DATABASE 2011 (NLCD 2011) DATA, THE WATERSHED IS APPROXIMATELY 67% DEVELOPED. USING JUST DOWNSTREAM OF THE ROSS DRIVE CULVERTS THERE IS A SHORT RIFFLE SECTION OF A HYDRAULICALLY STABLE, MULTI-STAGE CHANNEL WHICH PROVIDED AN INITIAL GUIDANCE FOR THE USGS STREAMSTATS (URBAN-PEALK FLOW STATISTICS FLOW REPORT, AUSTIN 2014), THESE DISCHARGES WERE COMPARED WITH URBAN REGRESSION EQUATIONS USING PROPOSED CHANNEL WIDTH AND DEPTH (SEE SHEET 20 FOR TYPICAL CHANNEL SECTIONS). THE GEOMETRIC CHARACTERISTICS OF THE STABLE SECTION HELPED PROVIDE INSIGHT INTO THE DESIGN USGS WATER SUPPLY PAPER 2207 AND WERE FOUND TO BE IN CLOSE AGREEMENT. THESE DISCHARGES WERE THEN COMPARED WITH THE REVISED PRELIMINARY FEMA SECTION (SEE BEAR BRANCH STREAM RESTORATION - ASSESSMENT OF STABLE REACH ALONG BEAR BRANCH, NOVEMBER 4, 2020). WHILE THE STABLE SECTION HELPED PROVIDE INFORMATION FOR DISCHARGES. THE 100-YR DISCHARGE COMPUTED FROM USING USGS WATER SUPPLY PAPER 2207 WAS 1,117 CFS (USING A BASIN DEVELOPMENT FACTOR OF 8). THIS VALUE THE DESIGN OF THE SECTION, RATIO DESIGN TARGETS DEVELOPED FROM PAST EXPERIENCE, BEST PROFESSIONAL JUDGEMENT, AND HYDRAULIC ANALYSIS WERE INTEGRAL INTO THE COMPARED FAVORABLY WITH THE REVISED PRELIMINARY FEMA DISCHARGE, Q100 = 1,199, AND Q100 = 1,200 (USGS STREAMSTATS). THE REGRESSION VALUES FOR VARIOUS "HYDRAULICS-BASED DESIGN" OF THE THRESHOLD SYSTEM. HYDRAULIC MODELLING WAS USED TO VALIDATE THE FINAL MORPHOLOGY AND DETERMINE SHEAR STRESS AND VELOCITY ACTING ON THE RECURRENCE INTERVALS FOR THE PROJECT AREA ARE LISTED BELOW. THE DISCHARGE USED FOR ANLAYSIS WAS Q100 = 1,199 CFS. SMALLER DISCHARGES (2- AND 5-YR) BED AND BANKS DURING THE 100-YR DESIGN EVENT. BEAR BRANCH ACTS AS MORE OF THRESHOLD SYSTEM AND IS NOT SIMPLY CONCERNED WITH THE BANKFULL EVENT. BUT THE LARGER STORM ARE BASED ON WATER SUPPLY PAPER 2207. LARGER DISCHARGES WHICH WERE ALSO MODELED ARE BASED ON THE REVISED PRELIMINARY DISCHARGES WHICH ALSO EVENTS WHICH THE BED MATERIAL NEEDS TO RESIST. SINCE THE AREA BETWEEN ROSS DRIVE AND THE WOOD DECK FOOT BRIDGE IS NO LONGER BEING RESTORED, FURTHER EROSION AND COMPARE FAVORABLY WITH USGS STREAMSTATS (AUSTIN, 2014) AND USGS WATER SUPPLY PAPER 2207 DEGRADATION IN THIS SECTION COULD POTENTIALLY PROVIDE BEDLOAD INTO THE RESTORED REACH. DURING THE GEOMORPHIC ASSESSMENT, A POINT BAR SAMPLE WAS TAKEN UPSTREAM OF THE WOOD DECK FOOT BRIDGE. THIS MATERIAL WHICH WAS WET SIEVED IN THE FIELD REPRESENTS THE SIZE OF BEDLOAD IN TRANSPORT AT THE BANKFULL STAGE. THE D50 OF THE MATERIAL IS 38 MM DESIGN DISCHARGES AND THE D84 IS 160 MM (SHEAR STRESS REQUIRED TO MOVE THESE PARTICLES IS 0.15 PSF AND 1.1 PSF, RESPECTIVELY). THE PROPOSED CHANNEL WITH A W/D RATIO OF 12 WILL BE COMPETENT TO Q100-YR = 1,199 CFS ((TOWN OF VIENNA, FEMA REVISED PRELIMINARY DISCHARGES). 2-, 5-, 10-, 25-, AND 50-YR; 248, 431, 532, 712, AND 918 CFS MOVE THESE PARTICLE CLASS SIZES (E.G. 100-YR STORM, SHEAR STRESS APPROXIMATELY 3.4 PSF).

HYDRAULICALLY STABLE SECTION MEASURED IN FIELD

WIDTH = 10 FT

MEAN DEPTH = 0.7 FT

AREA = 7.2 SF

D50; D84;D95 = 41, 100, AND 160 MM

BASED ON THESE MEASUREMENTS, AVAILABLE SPACE, AND HYDRAULIC RESISTANCE COMPUTATIONS, THE FOLLOWING RIFFLE
SECTION WAS DESIGNED
RIFFLE WIDTH = 12 FT
MEAN DEPTH = 1.0 FT
AREA = 11.6 SF

BEAR BRANCH GEOMORPHOLOGY DESIGN PARAMETERS (UPSTREAM SECTION FROM COTTAGE STREET TO ROSS DR.)	<u>BEA</u> (DOV
WIDTH OF RIFFLE (W) = 12'	WID
MEAN DEPTH OF RIFFLE (D) = 0.97' ~ 1.0'	MEA
W/D = 12.4	W/D
RIFFLE AREA = 11.6 SF	RIFF
MAX DEPTH OF RIFFLE (Dmr) = 1.4'	MAX
AVERAGE REACH SLOPE (Save) = 0.58%	AVE
AVERAGE RIFFLE SLOPE (Srif) = 1.18%	AVE
RADIUS OF CURVATURE TO WIDTH (Rc/W) = 3-4	RAD
WIDTH OF POOL IN A BEND (Wpb) = 15'	WID
WIDTH OF STRAIGHT POOL (Wp) = 13.2'	WID
Dmr/D = 1.4	Dmr/
Wp/W = 1.10 ; Wpb/W = 1.25	Wp/V
MAX POOL DEPTH IN BEND (Dmpb) = 2'	MAX
MAX STRAIGHT POOL DEPTH (Dmp) = 2'	MAX

#### Bear Branch Geomorphology Design Parameters Upstream Section

		0, 0									
From Sta	To Sta	Elev Fr	Elev To	Description	Length (ft)	Slope (%)	Pool-Pool Spacing	Riffle Length	Pool-Pool Spacing / Riffle Width	S <sub>riffle</sub> / S <sub>ave</sub>	R
10+00.00	10+27.50	319.07	318.97	Plunge Pool	28	0.36					
10+27.50	10+63.50	318.97	318.56	Riffle	36	1.14	69	36	5.8	1.9	
10+63.50	11+02.50	318.56	318.46	Pool	39	0.26					
11+02.50	11+37.50	318.46	318.06	Riffle	35	1.14	72	35	6.0	2.0	
11+37.50	11+72.02	318.06	317.96	Pool	35	0.29					
11+72.02	12+04.94	317.96	317.59	Riffle	33	1.12	74	33	6.2	1.9	
12+04.94	12+52.94	317.59	317.49	Pool	48	0.21					
12+52.94	12+70.94	317.49	317.28	Riffle	18	1.17	66	18	5.5	2.0	
12+70.94	13+18.94	317.28	317.18	Pool	48	0.21					
13+18.94	13+34.94	317.18	317.00	Riffle	16	1.13	58	16	4.8	1.9	
13+34.94	13+70.88	317	316.90	Pool	36	0.28					
13+70.88	13+88.88	316.9	316.69	Riffle	18	1.17	58	18	4.9	2.0	
13+88.88	14+33.62	316.69	316.59	Pool	45	0.22					
14+33.62	14+48.06	316.59	316.43	Riffle	14	1.11	52	14	4.3	1.9	
14+48.06	14+77.54	316.43	316.33	Pool	29	0.34					
14+77.54	15+00.93	316.33	316.06	Riffle	23	1.15	60	23	5.0	2.0	
15+00.93	15+45.37	316.06	315.96	Pool	44	0.23					
15+45.37	15+81.37	315.96	315.55	Riffle	36	1.14	82	36	6.9	1.9	
15+81.37	16+29.37	315.55	315.45	Pool	48	0.21					
16+29.37	16+65.37	315.45	315.04	Riffle	36	1.14	82	36	6.9	1.9	
16+65.37	17+09.89	315.04	314.94	Pool	45	0.22					
17+09.89	17+21.89	314.94	314.8	Riffle	12	1.17	55	12	4.6	2.0	
17+21.89	17+62.74	314.8	314.7	Pool	41	0.24					
17+62.74	17+76.97	314.7	314.48	Riffle/Glide	14	1.55	47	14	3.9	2.6	
17+76.97	18+01.74	314.48	314.38	Pool	25	0.40					

#### Bear Branch Geomorphology Design Parameters Downstream Section

Bear Branen			i arametere	Bomisticanio							
From Sta	To Sta	Elev Fr	Elev To	Description	Length (ft)	Slope (%)	Pool-Pool Spacing	Riffle Length	Pool-Pool Spacing / Riffle Width	S <sub>riffle</sub> / S <sub>ave</sub>	Rif Rif
23+53.92	23+89.92	308.23	307.7	Riffle	36	1.47					
23+89.92	24+37.92	307.7	307.6	Pool	48	0.21					
24+37.92	24+55.92	307.6	307.35	Riffle	18	1.39	66	18	5.5	2.7	
24+55.92	25+03.92	307.35	307.25	Pool	48	0.21					
25+03.92	25+39.00	307.25	306.77	Riffle	35	1.37	83	35	6.9	2.6	
25+39.00	25+87.00	306.77	306.67	Pool	48	0.21					
25+87.00	26+22.07	306.67	306.19	Riffle	35	1.37	83	35	6.9	2.6	
26+22.07	26+70.07	306.19	306.19	Pool	48	0.00					
26+70.07	27+08.36	306.19	306.13	Riffle	38	0.16	86	38	7.2	0.3	
27+08.36	27+56.36	306.13	306.13	Pool	48	0.00					



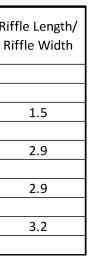


#### AR BRANCH GEOMORPHOLOGY DESIGN PARAMETERS WNSTREAM BETWEEN ROSS DR AND I-66)

DTH OF RIFFLE (W) = 12'

- AN DEPTH OF RIFFLE (D) = 0.97' ~ 1.0'
- ) = 12.4
- FLE AREA = 11.6 SF
- X DEPTH OF RIFFLE (Dmr) = 1.4'
- ERAGE REACH SLOPE (Save) = 0.52%
- ERAGE RIFFLE SLOPE (Srif) = 1.15%
- DIUS OF CURVATURE TO WIDTH (Rc/W) = n/a
- DTH OF POOL IN A BEND (Wpb) = 13.2'
- DTH OF STRAIGHT POOL (Wp) = 13.2'
- r/D = 1.94
- W = 1.10; Wpb/W = 1.10
- X POOL DEPTH IN BEND (Dmpb) = 2'
- X STRAIGHT POOL DEPTH (Dmp) = 2'

iffle Length/ Riffle Width
3.0
2.9
2.7
1 5
1.5
1.3
1.5
1.5
1.2
1.9
3.0
3.0
1.0
1.0
1.2
±:£



#### **IV. URBAN CHANNELS**

THE GOAL OF NATURAL CHANNEL DESIGN (NCD) IS TO RESTORE A DEGRADED SYSTEM BY MIMICKING, TO THE EXTENT PRACTICABLE, THE CHARACTERISTICS OF A STABLE, "NATURAL" SYSTEM. THROUGH THE USE OF GEOMORPHIC PRINCIPLES, NCD SEEKS TO ACHIEVE LONG-TERM STABILITY BY NEITHER AGGRADING nor DEGRADING. THE TERM "BANKFULL DISCHARGE" WHEN USED IN CONJUNCTION WITH NATURAL CHANNEL DESIGN IMPLIES STABILITY AND EQUILIBRIUM FOR ALLUVIAL SYSTEMS. FOR THE URBANIZED NATURE OF BEAR BRANCH, THE BANKFULL DISCHARGE NEEDS TO BE RELABELED AS THE "CHANNEL FILLING DISCHARGE" WHICH REPRESENTS THE FLOW WHICH FILLS THE ACTIVE CHANNEL TO A STAGE AT WHICH WATER SPREADS OUT ONTO A FLOODPLAIN. TYPICALLY, THE CHANNEL FILLING DISCHARGE IN AN URBAN ENVIRONMENT IS LESS THAN A 1-YR RECURRENCE INTERVAL, OCCURRING MULTIPLE TIMES PER YEAR. THE GOAL IS TO DESIGN CHANNEL WHICH CAN MAINTAIN SEDIMENT TRANSPORT IN THE THALWEG (TYPICALLY SMALLER PARTICLES IN THIS SETTING USUALLY RESULTING FROM LOCALIZED UPSTREAM BED AND BANK EROSION) WHILE REDUCING SHEAR STRESSES IN THE OVERBANKS BY PROVIDING A CONTROL VALVE OR ACCESS TO A FLOODPLAIN BENCH (PRIORITY III RESTORATION). THE SYSTEM IS ANALYZED AND DESIGNED SUCH THAT THE IN-STREAM STRUCTURES AND LARGEST MATERIAL IN THE RIFFLES WILL NOT MOVE (FUNCTION AS A THRESHOLD CHANNEL) UP TO THE 100-YR RECURRENCE INTERVAL

#### V. HYDROLOGY

#### **VI. HYDRAULICS**

DUE TO THE URBAN NATURE OF THE WATERSHED, THE SEDIMENT SUPPLY IS LIMITED TO GRAVEL AND FINES WITH THE LARGER MATERIAL COMING FROM BANK EROSION AND FINER MATERIAL RESULTING FROM UPLAND EROSION AND SANDS USED AS ROADWAY TREATMENT DURING THE WINTER MONTHS. DUE TO THE URBAN NATURE, ALTERED LANDSCAPE, AND FIELD INVESTIGATIONS OF THE BEAR BRANCH WATERSHED, IT IS PREDICTED THAT SUPPLY WILL NOT EXCEED TRANSPORT CAPACITY AFTER THE SEDIMENT SUPPLY COMING FROM BANK EROSION IS REDUCED. THE BED MATERIAL NEEDS TO BE ENGINEERED SO THAT THE MAJORITY OF THE LARGER PARTICLES IN THE RIFFLES DO NOT BECOMEMOBILIZED DURING LARGER STORM EVENTS, AND THIS IS DETERMINED THROUGH SEDIMENT COMPETENCE COMPUTATIONS INVOLVING SHEAR STRESS. A DETAILED HYDRAULIC ANALYSIS WAS BUILT IN HEC-RAS. THE DISCHARGE EVENT USED FOR THIS ANALYSIS WAS THE 100-YR Q (1,199CFS). THE CULVERT AT ROSS DRIVE CAUSES A BACKWATER EFFECT IN THE UPSTREAM REACH. THE 10-YR DISHARGE PRODUCES SLIGHTLY HIGHER VELOCITIES AND SHEAR STRESSES IN SOME CASES. ALONG THE STREAM CHANNEL BED, THE HIGHEST VELOCITIES EXPECTED FOR THE 100-YR EVENT IS APPROXIMATELY 12.5 FPS. THE HIGHER SHEAR STRESS AND VELOCITY OCCUR DOWNSTREAM OF ROSS DRIVE. ALTERNATIVELY, FOR THE 100-YR EVENT, THE HIGHEST SHEAR STRESS EXPERIENCED IN THE CHANNEL RANGE UP TO 4.1 PSF (20.0 KG/M2). USING THIS SHEAR STRESS WOULD RESULT IN A MINIMUM ROCK SIZE FOR STRUCTURES OF APPROXIMATELY 1.2 M (4.0) FT (SEE MINIMUM ROCK SIZE GRAPH THIS SHEET). IN STREAMS WITH SUBSTRATE OF GRAVEL AND LARGER ROCK, THE BOULDERS SHOULD GENERALLY BE ONE (1) TO TWO (2) TONS WITH FLAT RECTANGULAR ROCKS BEING THE PREFERENCE. THEREFORE, HEADER ROCKS FOR STRUCTURE AND VANES SHALL BE 4' x 3' x 2'. USING THE ROSGEN COLORADO DATA INCIPIENT MOTION COMPUTATIONS (SEE GRAPH THIS SHEET), A MAXIMUM SHEAR STRESS OF 4.1 PSF CORRESPONDS TO A PARTICLE SIZE OF APPROXIMATELY 400 MM (15.7 INCHES). THE LARGER PARTICLES USED IN THE CONSTRUCTED RIFFLES WILL SIT HIGHER IN THE FLOW FIELD WHERE TURBULENCE IS HIGHER. HOWEVER, THESE LARGER PARTICLES SHELTER THE SMALLER PARTICLES REQUIRING HIGHER SHEAR TO INITIATE MOVEMENT. IN HETEROGENEOUS MIXTURES THIS IS REFERRED TO AS "HIDING." THE LARGEST MATERIALS USED IN THE CONSTRUCTED RIFFLES WILL REMAIN PRACTICALLY IMMOBILE FOR EVENTS UP TO THE 100-YR DESIGN DISCHARGE; HOWEVER, SMALLER PARTICLES (SANDS, GRAVELS) ARE EXPECTED TO MOVE DURING HIGHER EVENTS AND BE REPLENISHED ON THE FALLING LIMB OF THE HYDROGRAPH. THE SIZE OF MATERIALS USED FOR CROSS VANES AND CONSTRUCTED RIFFLES IS PROVIDED ON THE DETAIL SHEETS. THE LARGER MATERIAL IS SIZED AS A THRESHOLD SYSTEM TO RESIST THE SHEAR AND VELOCITY RESULTING FROM THE 100-YR DESIGN EVENT. ALL AREAS ALONG THE CHANNEL BANKS AND DISTURBED FLOODPLAIN (GRADED AREAS) WILL BE COVERED WITH ROCK SUBSTRATE OR COIR MATTING AND PLANTED. FROM DATA COMPILED BY EARTHSAVER EROSION CONTROL PRODUCTS RELATING TO PERMISSIBLE SHEAR AND VELOCITY FOR SELECTED LINING MATERIALS, THE FOLLOWING INFORMATION IS PROVIDED:

BOUNDARY TYPE	PERMISSIBLE VELOCITY (FPS)	PERMISSIBLE SHEAR
1. COIR MATTING (700 g/m2)	12	4.46
2. 24" - D50 RipRap (Norman, 1975)	14-18	10.1
3. 18" - D50 RipRap (Norman, 1975)	12-16	7.6

3. 18" - D50 RipRap (Norman, 1975)	12-16	7.6
2. 24 - Dou Ripkap (Norman, 1975)	14-18	10.1

NOTE: CLASS I RIPRAP = 12-18"

CLASS II RIPRAP = 18-26 BEAR BRANCH PROPOSED VELOCITY

AND SHEAR STRESS BY STATION

Reach	<b>River Sta</b>	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl	Shear Chan
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)		(lb/sq ft)
1	1952	PK100	1199	318.86	327.31	324.09	327.39	0.00053	3.16	732.83	186.98	0.21	0.24
1	1742	PK100	1199	316.88	327.3		327.32	0.000114	1.64	1273.42	228.47	0.1	0.06
1	1514	PK100	1199	315.84	327.28		327.3	0.000116	1.87	1391.63	222.38	0.1	0.07
1	1165	PK100	1199	314.09	327.26	318.87	327.28	0.000046	1.17	1825.92	258.28	0.06	0.03
1	1078		Culvert										
1	977	PK100	1199	310.73	317.1	316.86	318.47	0.014413	9.37	128.14	39.04	0.9	2.74
1	655	PK100	1199	307.2	315.62		316.2	0.003139	6.11	207.2	44.99	0.45	0.99
1	439	PK100	1199	306.59	314.42		315.35	0.004625	8.92	222.13	53.07	0.6	1.92
1	267	PK100	1199	305.56	311.93	311.93	313.99	0.012612	12.51	135.85	38.14	0.94	4.09
1	48	PK100	1199	304.45	308.96	308.54	309.84	0.010988	7.37	163.7	72.35	0.67	2.13

THE EXISTING STREAM IS UNSTABLE DUE TO AN INABILITY TO RESIST THE APPLIED SHEAR FORCES. THE FLOW ENERGY CAN BE REDUCED BY INCORPORATING A "RELEASE VALVE" IN THE FORM OF A FLOODPLAIN BENCH AND USING A CHANNEL WITH A HIGHER WIDTH-TO-DEPTH RATIO. IN ADDITION, CROSS VANES KEEP SEDIMENT MOVING THROUGH A SYSTEM DUE TO THE CONTRACTION AT THE THROAT OF THE STRUCTURE.

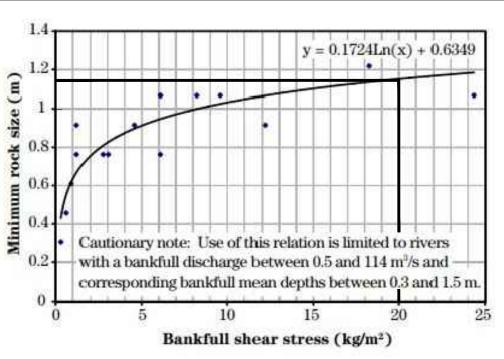
#### **VII. 100-YR FLOODPLAIN ANALYSIS**

TO ASSESS THE IMPACT OF THE CHANNEL RESTORATIONS ON THE EXTENT OF THE EXISTING 100-YR FLOODPLAIN, A HEC-RAS HYDRAULIC MODEL WAS DEVELOPED TO COMPARE EXISTING AND PROPOSED CONDITIONS. BASED ON CHANNEL AND OVERBANK SURVEY COMPLETED BY BOWMAN CONSULTING GROUP, LTD, BETWEEN MAY 5, 2021 AND FEBRUARY 10, 2023, SUPPLEMENTED WITH FAIRFAX COUNTY LIDAR DATA CAPTURED IN DECEMBER 2018 IN THE FURTHER OVERBANK EXTENTS, AN EXISTING CONDITIONS MODEL WAS DEVELOPED. THE CHANNEL IS CLASSIFIED AS PRIMARILY AN F AND G ROSGEN STREAM TYPES (AN EX. MANNINGS N CHANNEL VALUE OF 0.045, USDA 2007; OBSTRUCTIONS THROUGHOUT, IRREGULAR MEANDERING). EXISTING OVERBANK FLOODPLAIN AREAS WERE ASSIGNED WITH MANNINGS ROUGHNESS VALUES OF 0.1. REVISED GEOMETRY AND CROSS SECTIONS WERE DEVELOPED TO ACCOUNT FOR PROPOSED RESTORATION GRADING ALONG WITH UPDATED ROUGHNESS COEFFICIENTS FOR PROPOSED VEGETATION AND CHANNEL MORPHOLOGY. THE PROPOSED ALIGNMENT IMPROVES THE EFFICIENCY OF THE CHANNEL, PROVIDES FOR MORE REGULAR MEANDERS AND REMOVES THE IRREGULAR MEANDERING AND REDUCES THE DEGREE OF IRREGULARITY AND EFFECTS OF OBSTRUCTIONS. THE MANNINGS N VALUE FOR PROPOSED CONDITIONS IS A 0.040 FOR THE CHANNEL WITH AN OVERBANK MANNINGS N IN THE OVERBANK RIPARIAN AREAS OF 0.08. THE 1% ANNUAL CHANCE WSELS ASSOCIATED WITH THE PROPOSED CONDITIONS HEC-RAS MODEL WERE EVALUATED VERSUS THE UPDATED EXISTING CONDITIONS HYDRAULIC MODEL AND DETERMINED THE PROPOSED DESIGN RESULTS IN NO INCREASES IN WSEL (AS SHOWN IN THE TABLE TO THE RIGHT). THE DOWNSTREAM BOUNDARY CONDITION AT THE I-66 CULVERT USED FOR BOTH EXISTING AND PROPOSED CONDITONS WAS THE NORMAL DEPTH SINCE IT WOULD PROVIDE FOR MORE CONSERVATIVE VELOCITIES AND SHEAR STRESSES. STATIONING IS BASED ON THE FEMA PRELIMINARY MODEL. ADDITIONALLY, THE HYDRAULIC ANALYSIS FROM VDOT HAS THE HEADWATER DESIGN ELEVATION OF THE I-66 CULVERT AT 318.97'. THIS BOUNDARY CONDITION WAS ALSO USED FOR EX. AND PROPOSED AND STILL RESULTS IN NO INCREASE IN THE 100-YR WSE.

					CLIENT: TOWN OF VIENNA 127 CENTER STREET SOUTH VIENNA, VA 22180	DRAWN BY: AEA / JH CHECKED BY: MTB	PROJECT: BEAR BRANCH STREAM RESTORATION 100% IFB CONSTRUCTION DOCUMENT SOUTHSIDE PARK 1315 ROSS DR. SW, VIENNA, VA 22181	PROJECT NO.: 752620V001 DATE: 28 JULY 2023
					ENGINEER:	APPROVED BY:	SHEET TITLE:	DWG. SIZE
	0 28 JUL 2023	IFB SUBMISSION		МТВ	WSP Environment & Infrastructure Solutions 4795 Meadow Wood Lane, Suite 310 East Chantilly, VA 20151-1678	МТВ		ARCH D
	0 20 30L 2023					SCALE:	PROJECT NARRATIVE	SHEET NUMBER:
since 1890	NO. DD MON YYYY	ISSUE / REVISION DESCRIPTION	ENG	. APPR.	Tel. (703) 488-3700 www.WSP.com	NOT TO SCALE		03 OF 41

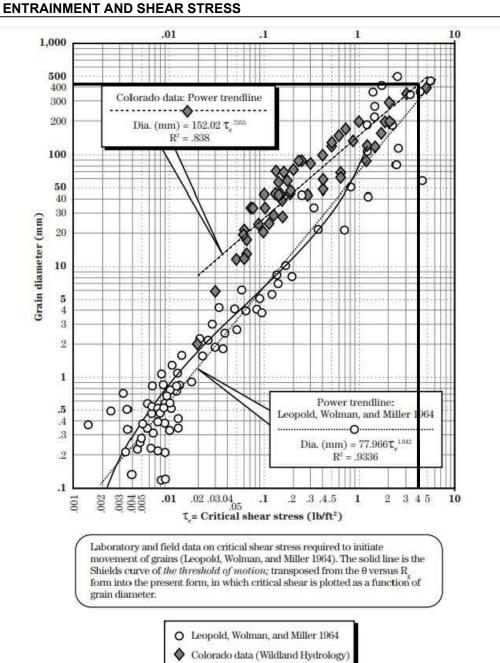
MINIMUM ROCK SIZE

#### R STRESS (PSF)



SOURCE: USDA, NRCS, NATIONAL ENGINEERING HANDBOOK - CHAPTER 11 ROSGEN **GEOMORPHIC CHANNEL DESIGN** 

#### SHIELDS/COLORADO RELATION BETWEEN GRAIN DIAMETER FOR



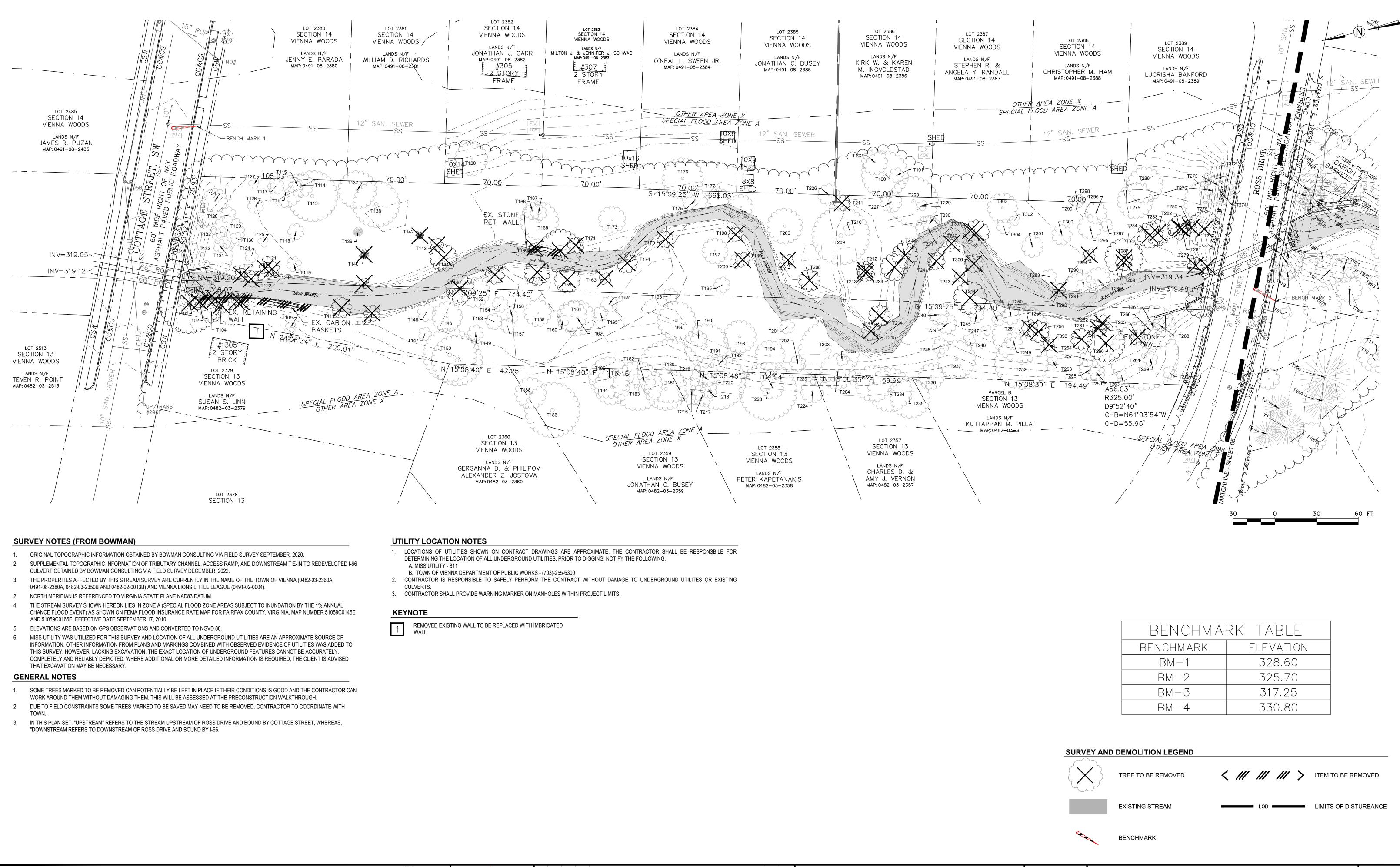
SOURCE RIVER STABILITY FIELD GUIDE, SECOND EDITION, DAVE ROSGEN, 2014

#### BEAR BRANCH EXISTING VS. PROPOSED WATER SURFACE ELEVATIONS

	EXISTING			PROPOSED					
RIVER STA.	Q 100	WSEL	RIVER STA.	Q 100 WSEL		DESIGN RIVER STA.	(PR - EX)		
RIVER STA.	(cfs)	(ft)	NIVEN SIA.	(cfs)	(ft)	DESIGN RIVER STA.	(ft)		
19+52.00	1199	327.35	19+52.00	1199	327.31	10+39.17	-0.04		
17+42.00	1199	327.33	17+42.00	1199	327.30	12+45.43	-0.03		
15+14.00	1199	327.29	15+14.00	1199	327.28	14+72.74	-0.01		
11+65.00	1199	327.26	11+65.00	1199	327.26	17+42.23	0.00		
10+78.00	CULVERT		10+78.00	1199		-	-		
9+77.00	1199	317.53	9+77.00	1199	317.10	-	-0.43		
6+55.00	1199	316.00	6+55.00	1199	315.62	-	-0.38		
4+39.00	1199	314.63	4+39.00	1199	314.42	24+69.25	-0.21		
2+67.00	1199	311.98	2+67.00	1199	311.93	26+42.70	-0.05		
0+48.00	1199	309.53	0+48.00	1199	308.96	28+61.56	-0.57		

#### **BEAR BRANCH EXISTING VS.** PROPOSED (I-66 DESIGN WSE)

	•						
	EXISTING			DELTA			
	Q 100	WSEL		Q 100	WSEL		(PR - EX)
RIVER STA.	(cfs)	(ft)	RIVER STA.	RIVER STA. (cfs)		DESIGN RIVER STA.	(ft)
19+52.00	1199	327.36	19+52.00	1199	327.30	10+39.17	-0.06
17+42.00	1199	327.33	17+42.00	1199	327.29	12+45.43	-0.04
15+14.00	1199	327.30	15+14.00	1199	327.26	14+72.74	-0.04
11+65.00	1199	327.27	11+65.00	1199	327.25	17+42.23	-0.02
10+78.00	CULVERT		10+78.00	1199		-	-
9+77.00	1199	319.34	9+77.00	1199	319.22	-	-0.12
6+55.00	1199	319.17	6+55.00	1199	319.11	-	-0.06
4+39.00	1199	319.01	4+39.00	1199	318.98	24+69.25	-0.03
2+67.00	1199	318.98	2+67.00	1199	318.93	26+42.70	-0.05
0+48.00	1199	318.97	0+48.00	1199	318.97	28+61.56	0.00

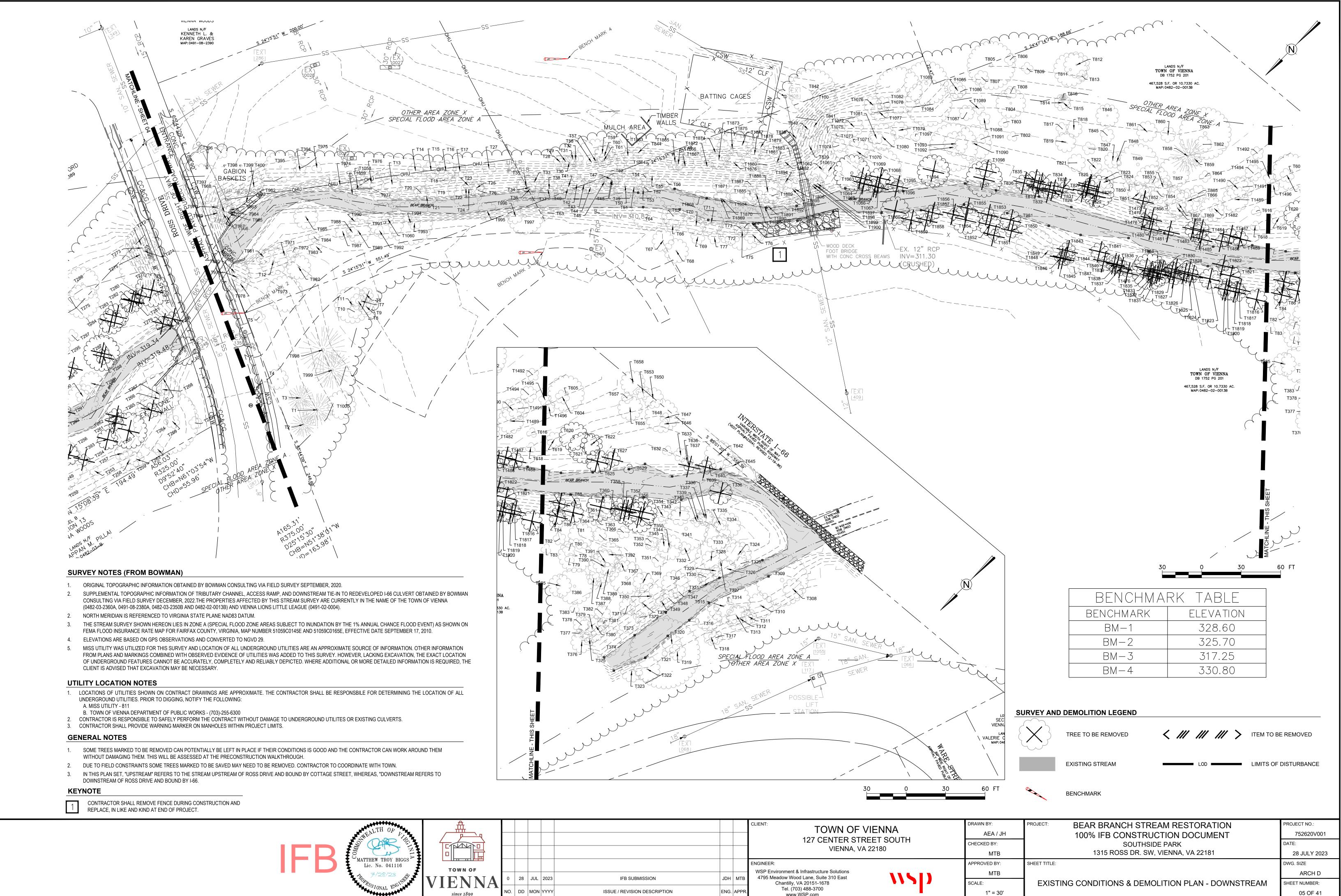


MATTHEW TROY BIGGS Lic. No. 041116

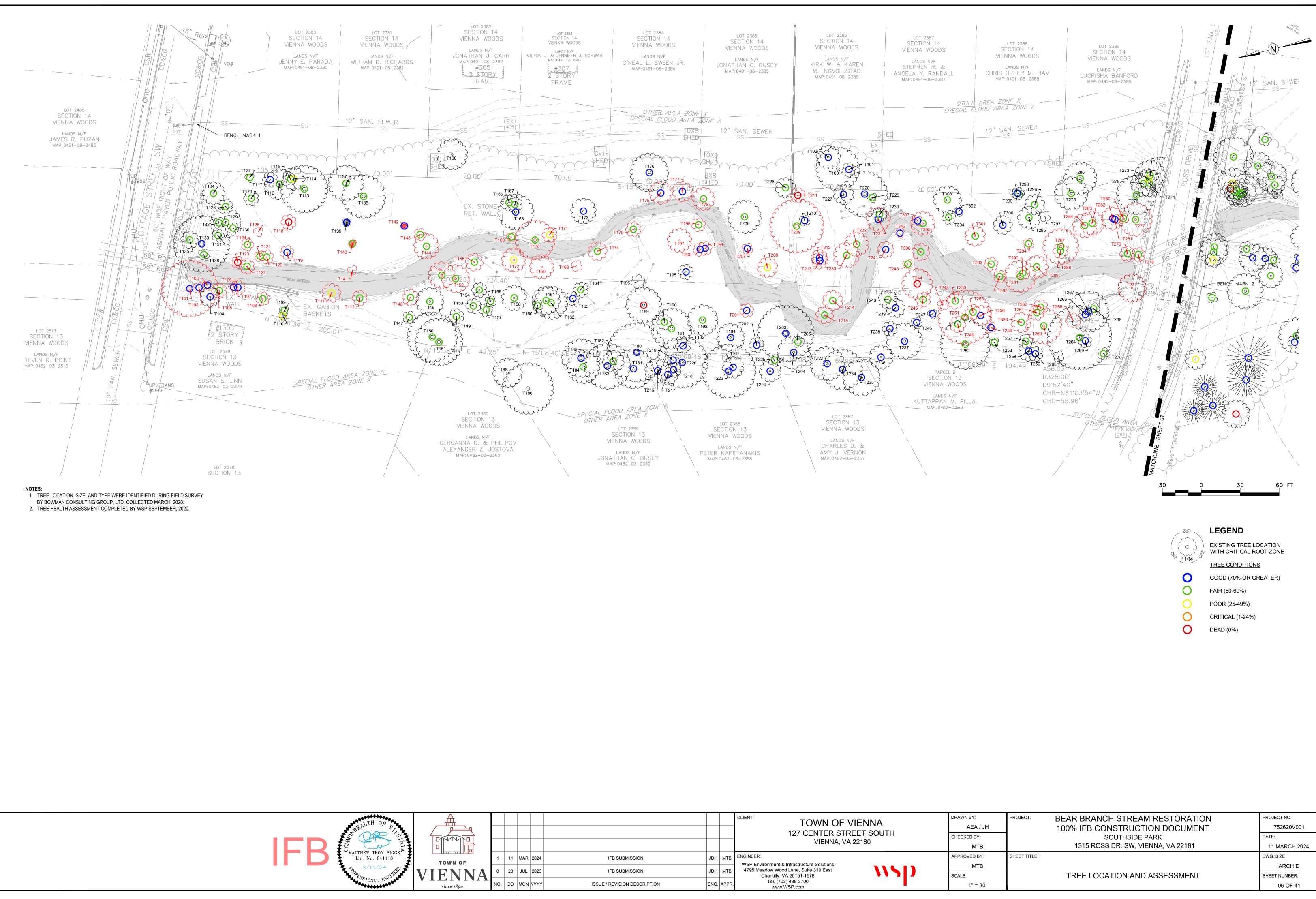
								CLIENT: TOWN OF VIENNA 127 CENTER STREET SOUTH VIENNA, VA 22180
								ENGINEER: WSP Environment & Infrastructure Solutions
IENNA	0	28	JUL	2023	IFB SUBMISSION	JDH	МТВ	4795 Meadow Wood Lane, Suite 310 East Chantilly, VA 20151-1678
since 1890	NO.	DD	MON	YYYY	ISSUE / REVISION DESCRIPTION	ENG.	APPR.	Tel. (703) 488-3700 www.WSP.com

BENCHMA	rk table
BENCHMARK	ELEVATION
BM-1	328.60
BM-2	325.70
BM-3	317.25
BM-4	330.80

DRAWN BY:	PROJECT: BEAR BRANCH STREAM RESTORATION	PROJECT NO .:
AEA / JH	100% IFB CONSTRUCTION DOCUMENT	752620V001
CHECKED BY:	SOUTHSIDE PARK	DATE:
МТВ	1315 ROSS DR. SW, VIENNA, VA 22181	28 JULY 2023
APPROVED BY:	SHEET TITLE:	DWG. SIZE
МТВ		ARCH D
SCALE:	EXISTING CONDITIONS & DEMOLITION PLAN - UPSTREAM	SHEET NUMBER:
1" = 30'		04 OF 41
	AEA / JH CHECKED BY: MTB APPROVED BY: MTB SCALE:	AEA / JH       100% IFB CONSTRUCTION DOCUMENT         CHECKED BY:       SOUTHSIDE PARK         MTB       1315 ROSS DR. SW, VIENNA, VA 22181         APPROVED BY:       SHEET TITLE:         MTB       EXISTING CONDITIONS & DEMOLITION PLAN - UPSTREAM

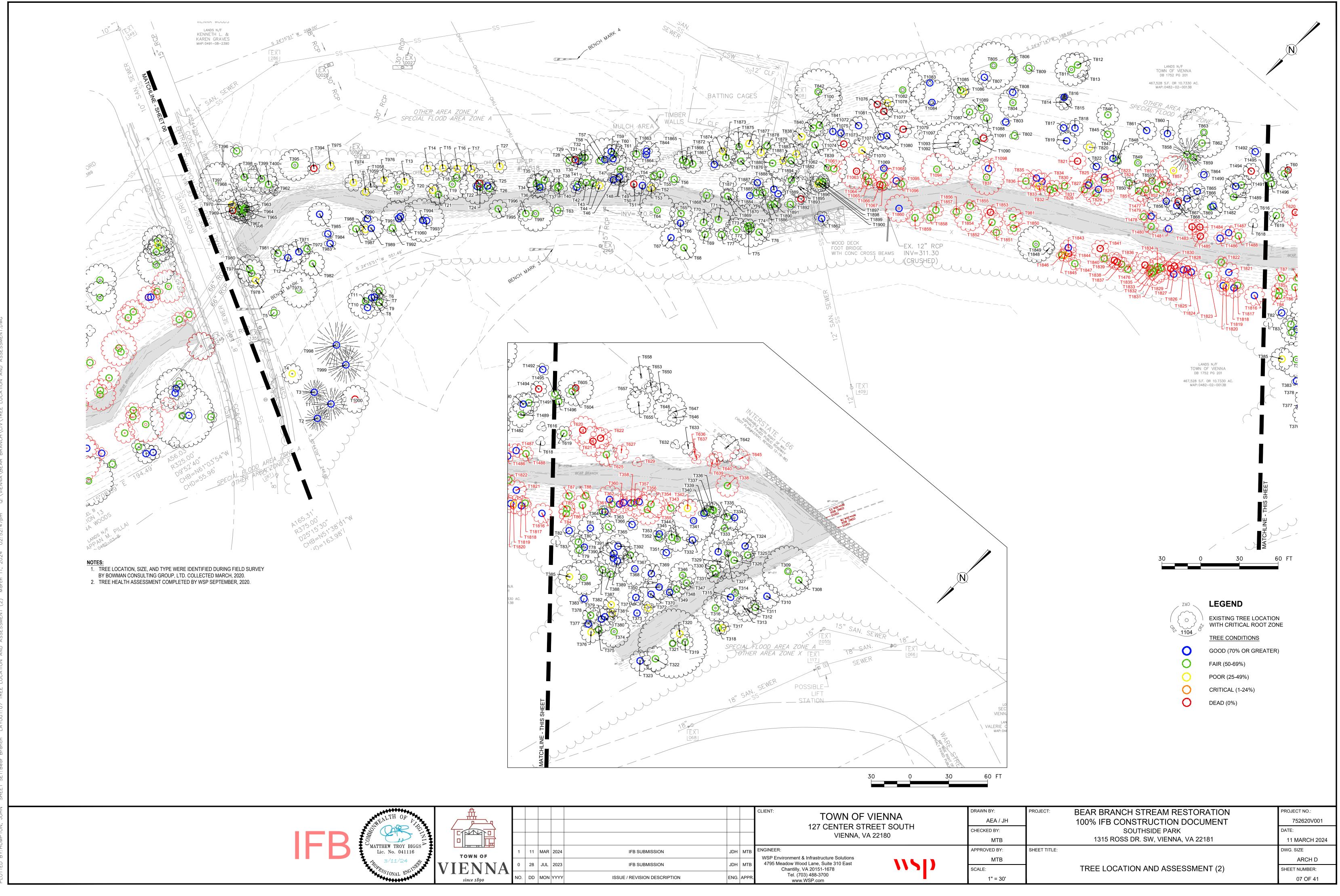


								TOWN OF VIE 127 CENTER STREE VIENNA, VA 22	T SOUTH
								ENGINEER: WSP Environment & Infrastructure Solutions	
IENNA	0	28	JUL	2023	IFB SUBMISSION	JDH	МТВ		- <b>\\</b> \\
since 1890	NO.	DD	MON	YYYY	ISSUE / REVISION DESCRIPTION	ENG.	APPR.	Tel (703) /88-3700	<b>I</b>



								CLIENT: TOWN OF VIENNA 127 CENTER STREET SOUTH VIENNA, VA 22180
	1	11	MAR	2024	IFB SUBMISSION	JDH	МТВ	ENGINEER: WSP Environment & Infrastructure Solutions
IENNA	0	28	JUL	2023	IFB SUBMISSION	JDH	МТВ	4795 Meadow Wood Lane, Suite 310 East Chantilly, VA 20151-1678
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CHECKED BY:	SOUTHSIDE PARK	DATE:
MTB	1315 ROSS DR. SW, VIENNA, VA 22181	11 MARCH 202
APPROVED BY:	SHEET TITLE:	DWG. SIZE
MTB		ARCH D
SCALE:	TREE LOCATION AND ASSESSMENT	SHEET NUMBER:
1" = 30'		06 OF 41



								TOWN OF VIENNA 127 CENTER STREET SOUTH VIENNA, VA 22180	
	1	11	MAR	2024	IFB SUBMISSION	JDH	MTB	ENGINEER: WSP Environment & Infrastructure Solutions	
IENNA	0	28	JUL	2023	IFB SUBMISSION	JDH	MTB	4795 Meadow Wood Lane, Suite 310 East Chantilly, VA 20151-1678	
since 1890	NO.	DD	MON	ΥΥΥΥ	ISSUE / REVISION DESCRIPTION	ENG.	APPR.	Tel (703) 488-3700	

Tag #	Common Name	Botanical Name	Breast Height (DBH)(inches)	Health	To Be Removed	Notes
1 2	White Pine Norway Spruce	Pinus strobus Picea abies	21 16	Good Good		Some dead limbs Some girdling roots
3	Norway Spruce Eastern Redbud	Picea abies Cercis canadensis	16 8	Good Poor		Small dead limbs mini-trunk cavities and dead limbs
5 6	Flowering Dogwood Black Gum	Cornus florida Nyssa sylvatica	5 7	Fair Fair		Small dead limbs One sided and girdling roots
7 8	Black Gum Black Gum	Nyssa sylvatica Nyssa sylvatica	5 9	Good Good		
9 10	Northern Red Oak Red Maple	Quercus rubra Acer rubrum	9 7	Fair Good		Sever lean and small dead limbs Growing over 11, girdling roots, and one sided
11 12	Tulip Poplar American Sycamore	Liriodendron tulipifera Platanus occidentalis	24 18	Fair Good		Leaning, girdling roots, and small dead limbs Banks and one sided
13 14	Black Walnut American Elm	Juglans nigra Ulmus americana	10 8	Poor Poor		Topped Topped
15 16	American Sycamore American Elm	Platanus occidentalis Ulmus americana	9 7	Poor Poor		Topped Topped
17 18	Black Walnut Dogwood	Juglans nigra Cercis canadensis	7 4	Poor Pfair		Topped Dead limbs
19 20	Tulip Poplar Red Maple	Liriodendron tulipifera Acer rubrum	21 7	Fair Poor		Dead limbs and bank Mostly dead
21 22	River Birch American Sycamore	Betula nigra Platanus occidentalis	12 24	Fair Good		Dead limbs and bank One sided and bank
23 24	Dead Red Maple	- Acer rubrum	4 8	Dead Fair		Vines, dead limbs, and bank
25 26	River Birch Red Maple	Betula nigra Acer rubrum	8 8	<u> </u>		Vines, one sided, and bank Vines, one sided, dead limbs, and bank
27 28	Black Walnut Sassafras	Juglans nigra Sassafras albidum	76	Poor Fair		Topped Dead limbs
29 30	Dead Silver Maple	- Acer saccharinum	6 7	Dead Good		
31 32	Silver Maple Silver Maple	Acer saccharinum Acer saccharinum	5 8	Good Fair		Silght lean and one sided
33 34	Red Maple River Birch	Acer rubrum Betula nigra	7 15	Fair Fair		Double trunk, one trunk dead, and vines Vines, leaning, and banks
35 36	American Elm Red Maple	Ulmus americana Acer rubrum	12 6	Fair Good		Vines, dead limbs, and bank One sided and bank
37 38	Red Maple Red Maple	Acer rubrum Acer rubrum	5 10	Fair Fair		Dead limbs, leaning, and bank Dead limbs and bank
39 40	American Elm River Birch	Ulmus americana Betula nigra	8	Fair Good		Double Trunk, vines, dead limbs, and banks Leaning and bank
41 42	Red Maple River Birch	Acer rubrum Betula nigra	7 8	Fair Fair		Vines, dead limbs, and bank Leaning and bank
43 44	American Elm Black Cherry	Ulmus americana Prunus serotina	5 6	Fair Poor		One sided, vines, and bank Mostly dead, crooked, and borken top
45 46	Red Maple Red Maple	Acer rubrum Acer rubrum	5	Fair Good		Leaning, dead limbs, and bank
47 50	River Birch Dead	Betula nigra	10 15	Good Dead		Vines and bank
51 52	Red Maple River Birch	Acer rubrum Betula nigra	12 4	Good Poor		One sided and bank Heavy leaning
54 55	Bradford Pear Black Cherry	Pyrus calleryana Prunus serotina	4 7	Fair Fair		Dead limbs and banks Trunk damage, dead limbs, and leaning
56 57	Black Cherry Silver Maple	Prunus serotina Acer saccharinum	5 10	Fair Good		Leaning, dead limbs, trunk cavity, and bank Multi-trunk
58 59	Silver Maple Silver Maple	Acer saccharinum Acer saccharinum Acer saccharinum	4	Fair Good		Trunk Damage Double trunk and vines
60 61	Silver Maple Silver Maple	Acer saccharinum Acer saccharinum	12 7	Fair Good		Trunk damage
62 63	Black Willow Black Walnut	Salix nigra Juglans nigra	18 6	Fair Fair		Vines and severe lean One sided, some dead limbs, and bank
64 65	Silver Maple Silver Maple	Acer saccharinum Acer saccharinum	24 8	Fair Fair		Vines, large dead limbs, and bank Double trunk, one trunk dead, and bank
66 67	Tulip Poplar Silver Maple	Liriodendron tulipifera Acer saccharinum	7 13	Good Good		Vines and double trunk Small vines and dead limbs
68 69	Black Cherry Black Cherry	Prunus serotina Prunus serotina	5	Fair Fair		Multi-trunk, cavity at base, and vines Dead limbs and one sided
70 71	River Birch Box Elder	Betula nigra Acer negundo	12 15	Fair Fair		Leaning, vines, and dead limbs Bank and dead limbs
72 73	Red Maple American Hornbeam	Acer rubrum	10 8	Fair Fair		Vines, double trunk, one sided, and bank Dead limbs, growing into 74 bank
74 75	American Sycamore American Elm	Platanus occidentalis Ulmus americana	30 5	Fair Fair		Vines and bank Vines, leaning, and banks
76 77	Red Maple Black Walnut	Acer rubrum Juglans nigra	10 6	Fair Fair		One sided, vines, and bank Vines and dead limbs
78 79	American Sycamore Red Maple	Platanus occidentalis Acer rubrum	22 4	Good Fair		Trunk and insect damage
80 81	Red Maple American Sycamore	Acer rubrum Acer rubrum Platanus occidentalis	6 16	Fair Good		
82 84	Red Maple Japanese Cherry	Acer rubrum Prunus serrulata	6 8	<u> </u>	X	Some dead limbs Some dead limbs
85	American Sycamore	Platanus occidentalis	9	Fair	X	Trunk damage and some dead limbs
86 87 88	Red Maple Red Maple American Elm	Acer rubrum Acer rubrum Ulmus americana	12 6 4	Fair Fair Fair	X X X	Trunk damage One sided and cavity near roots One sided and cavity near roots
88 101 102	American Elm American Sycamore Black Walnut	Ulmus americana Platanus occidentalis Juglans nigra	4 26 5	Good	X	One sided and cavity near roots Double trunk and bank One sided and bank
103	Black Walnut Black Walnut Japanese Cherry	Jugians nigra Jugians nigra Prunus serrulata	4	Good Good	X X	One sided and bank One sided, vines, and bank Doulbe trunk and small dead libms
104 105	Black Walnut	Juglans nigra	9	Good Fair	X	Fungus, dead limbs, one sided, and bank Small dead limbs and bank
106 107	American Elm Black Walnut	Ulmus americana Juglans nigra	4 8 7	Good Good	X X	Small dead limbs and bank Small dead limbs and bank Vine and dead limbs
108 109	Flowering Dogwood White Mulberry Flowering Dogwood	Cornus florida Morus alba Cornus florida	7	Fair Fair	X	Vine and small dead limbs
110 111 112	Box Elder Box Elder	Acer negundo	4 11 8	Poor Poor	X	Heavy vines, dead limbs, and leaning Trunk damage, leaning, and bank Trunk damage, leaning, and bank
112 113	Red Maple Northern Red Oak	Acer negundo Acer rubrum Quercus rubra	8 33	Fair Fair	X	Trunk damage, leaning, and bank Heavy vine and double trunk Hollow and dead limbs
114 115	American Elm	Quercus rubra Ulmus americana Rotula piara	14 5	Poor Fair		Doulbe trunk, one sided, and dead limbs
116 117	River Birch Persimmon	Betula nigra Diospyros virginiana	20 8	Fair Good		Vines, leaning, and trunk cavity Slight lean
118 119	Dead Black Walnut	- Juglans nigra	8 7 7	Dead Good	X X	Vine and bank
120 121	American Elm White Mulberry	Ulmus americana Morus alba	7 5	Fair Fair	X X	Heavy vines, bank, and double trunk(?) Dead limbs, vines, and bank
122 123	Box Elder Dead	Acer negundo	8	Fair Dead	X X	Leaning, vines, and bank
124 126	Black Cherry Black Locust	Prunus serotina Robinia pseduoacacia	6 8	Fair Fair	X	Vines, dead limbs, and lean Vine and dead limbs
127 128	Persimmon Persimmon	Diospyros virginiana Diospyros virginiana	4 8	Fair Fair		Heavy vine Heavy vines
129 130	Northern Red Oak American Elm	Quercus rubra Ulmus americana	20 5	Fair Fair		Vines and one sided Double trunk, leaning, and vines
131 132	American Elm Persimmon	Ulmus americana Diospyros virginiana	6 5	Fair Fair		Dead limbs and vines Vines and leaning
133 134	American Sycamore Black Walnut	Platanus occidentalis Juglans nigra	40 14	Good Fair		Double trunk, vines, and bank Leaning and vines
135 136	Japenese Cherry Red Maple	Prunus serrulata Acer rubrum	6 5	Fair Fair		Double trunk, leaning, and vines Triple trunk, leaning, vines, and bank
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						MATTHEW TROY BIG Lic. No. 041116

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Tag #	Common Name	Botanical Name	Diameter at Breast Height (DBH)(inches)	Health	To Be Removed	Notes	Tag #	Cor
137 138 139	Red Maple Red Maple Norway Spurce	Acer rubrum Acer rubrum Picea abies	24 26 4	Fair Fair Good		Double trunk, vines, and dead limbs Triple trunk and dead limbs Vines	266 267 268	F T
140 141	Leyland Cyprus Privet?		4 4	Fair	X	Vines	269 270	Nort
142 143	Norway Spurce Box Elder	Picea abies Acer negundo	4 6	Good Fair	X X	Leaning and dead limbs	272	F
144 145	Tulip Poplar River Birch	Liriodendron tulipifera Betula nigra	16 17	Fair Fair	X X X	Leaning, one sided, and bank Severe lean, vines, and bank	274	F
146 147	American Elm Dogwood	Ulmus americana Cornus florida	18 6	Fair Fair		Lenaing and heavy vines Double trunk, leaning, and dead limbs	276	T T
148 149	American Elm Box Elder	Ulmus americana Acer negundo	9 8	Fair	X	Leaning and vines Dead limbs	278 279	Re
150 151	White Oak White Oak	Quercus alba Quercus alba	35 33	Fair		One sided, vines, and dead limbs Vine and dead limbs	280 281	Ar
151 152 153	River Birch Black Cherry	Betula nigra Prunus serotina	12 8	Fair	X	Double trunk, vines, and leaning Dead limbs	282 283	F
154 155	Box Elder Box Elder	Acer negundo Acer negundo	8 10	Fair Fair	X	One sided, vines, and leaning One sided, leaning, and bank	284 285	F
155 156 157	Box Elder Box Elder Box Elder	Acer negundo Acer negundo Acer negundo	5	Fair		Leaning and dead limbs Heavy vines	285 286 287	Si
158	Silver Maple Box Elder	Acer negundo Acer saccharinum Acer negundo	16	Fair		Heavy vines Leaning and vines	288	F
160 161	River Birch	Betula nigra	5 18	Fair Fair		Leaning and vines	289 290	
162 164	River Birch Box Elder	Betula nigra Acer negundo	22 8	Fair Fair		Leaning and vines Leaning and dead limbs	291 292	B
165 166	Box Elder American Hornbeam	Acer negundo Carpinus caroliniana	7 9	Good Fair		Leaning Leaning, large dead limbs, and fungus	293 294	BI
167 168	American Hornbeam Red Maple	Carpinus caroliniana Acer rubrum	8 24	Fair Good		Leaning and large dead limbs Slight lean	295 296	Si
169 170	Bush Honey Suckle Slippery Elm	Lonicera maackii Ulmus rubra	7 27	Fair Fair	X X	Double trunk and bank Large dead limbs, leaning, and bank	298 299	F
171 172	Slippery Elm Box Elder	Ulmus rubra Acer negundo	8 15	Poor Poor	X X	Many dead limbs and bank Trunk damage, fungus, heavy vine, and bank	300 301	BI
173 174	Silver Maple Red Maple	Acer saccharinum Acer rubrum	16 11	Good Fair	X	Slight lean and bank Vines, dead limbs, and bank	302 303	S F
175 176	Silver Maple Slippery Elm	Acer saccharinum Ulmus rubra	14 26	Good Good	Х	Bank	304 305	Amer
177 178	Silver Maple Silver Maple	Acer saccharinum Acer saccharinum	12 14	Good Fair	X X	Bank Double trunk, leaning, trunk damage, and bank	306 307	F
179 180	American Elm Tulip Poplar	Ulmus americana Liriodendron tulipifera	8 42	Fair Good	X	Heavy vines, leaning, and bank Small trunk cavity	308 309	F
180 181 182	Tulip Poplar Tulip Poplar	Liriodendron tulipifera Liriodendron tulipifera	27	<u>Good</u> Fair		One sided, trunk cavity, and vines	310 311	F
182 183 184	Tulip Poplar Tulip Poplar	Liriodendron tulipifera Liriodendron tulipifera	32 22	Good Fair		One sided Vines and trunk cavity	<u> </u>	Si
184 185 189	Tulip Poplar Dead	Liriodendron tulipifera	26 24	Good		One sided	316 317	Si
190	Black Cherry Black Walnut	Prunus serotina Juglans nigra	8	Fair		Large dead limbs One sided and dead limbs	318	Re
191 192	Black Cherry American Elm	Prunus serotina	28 8	Fair Good			319 320	Bl Amer
193 194	River Birch	Ulmus americana Betula nigra	13 18	Fair Good		Double trunk, vines, and one sided Leaning	321 322	Amer Bl
195 198	Black Oak Box Elder	Quercus velutina Acer negundo	8 7	Good Fair	X	Small dead limbs Leaning, water sprouts, and bank	323 324	BI F
199 200	Box Elder Box Elder	Acer negundo Acer negundo	7 7	Good Good	X X	Leaning and bank Leaning and vines	325 326	F
201 202	Box Elder Black Oak	Acer negundo Quercus velutina	7 8	Good Good	X	Leaning and bank Vines	327 328	T T
203 204	Tulip Poplar Tulip Poplar	Liriodendron tulipifera Liriodendron tulipifera	40 22	Good Good		Vines and bank Vines	330 331	F
205 206	Tulip Poplar Red Maple	Liriodendron tulipifera Acer rubrum	5 22	Fair Fair		One sided, leaning, and bank Leaning and dead limbs	<u>332</u> 333	F Amer
207 208	Box Elder Black Cherry	Acer negundo Prunus serotina	5 7	Good Poor	X X	Mostly dead	334 335	Amer F
209 210	Silver Maple Black Walnut	Acer saccharinum Juglans nigra	38 5	Fair Good	Х	Vine and dead limbs One sided	336 337	F
211 212	Black Cherry Tulip Poplar	Prunus serotina Liriodendron tulipifera	8 9	Dead Good	X X		338 339	Ar
213 214	Tulip Poplar American Elm	Liriodendron tulipifera Ulmus americana	9 12	Good Fair	X X	Slight lean Leaning, one sided, vines, and bank	340 341	A F
215 216	Box Elder Tulip Poplar	Acer negundo Liriodendron tulipifera	10 16	Fair Good	Х	One sided, small dead limbs, and bank	342 343	F Ar
217 218	Tulip Poplar Tulip Poplar	Liriodendron tulipifera Liriodendron tulipifera	12 8	Good Good			344 345	Amer
219 220	Northern Catalpa Tulip Poplar	Catalpa speciosa Liriodendron tulipifera	6 36	Good Good		One sided	346 347	F
221 222	Tulip Poplar Tulip Poplar	Liriodendron tulipifera Liriodendron tulipifera	13 23	Good Good		Vines Vines	348 349	F
223	Tulip Poplar Tulip Poplar	Liriodendron tulipifera Liriodendron tulipifera	38 13	Good Good		Vines	350 351	F
225 226	Mockernut Hickory Red Maple	Carya tomentosa Acer rubrum	6 12	Fair Fair		Leaning and vines Crooked trunk and dead limbs	351 352 353	F
227	Northern Red Oak Silver Maple	Quercus rubra Acer saccharinum	12 12 32	Good		Growing over fence and some dead limbs	354 355	F
229 230	Red Maple Black Cherry	Acer rubrum Prunus serotina	4	Fair Fair		Crooked trunk and dead limbs Vines, leaning, and bank	355 356 357	F
231	River Birch Red Maple	Betula nigra Acer rubrum	8 15	Good	X	Leaning, vines, and bank One sided, dead limbs, and bank	358	Amer
232 233	American Elm	Ulmus americana	15 16	Fair Fair	X X	Leaning and bank	359 360	Amer
234 235	Tulip Poplar White Oak	Liriodendron tulipifera Quercus alba	28 25	Good Good		Vines Vines	361 362	Ar T
236 237	Mockernut HIckory Pignut Hickory	Carya tomentosa Carya glabra	15 24	Good Good		Vines Vines	363 364	F
238 239	Green Ash Red Maple	Fraxinus pennsylvanica Acer rubrum	8 11	Good Good		Vines and one sided	365 366	F
240 241	Black Cherry Black Walnut	Prunus serotina Juglans nigra	11 9	Fair Good	X	Leaning and dead limbs Bank	367 368	F Amer
242 243	Black Cherry Silver Maple	Prunus serotina Acer saccharinum	4 4	<u>Good</u> Fair	X X	Bank Dead limbs and bank	369 370	F F
244 245	Dead American Elm	- Ulmus americana	11 8	Dead Fair	X X	Heavy vines	<u>371</u> 372	F
246 247	American Elm Red Maple	Ulmus americana Acer rubrum	5 4	Good Good		One sided Slight lean	373 374	F
249 250	Red Maple Black Cherry	Acer rubrum Prunus serotina	9	Fair Fair	X X	Leaning and trunk damage One sided and dead limbs	375 376	- F
251 252	American Sycamore Tulip Poplar	Platanus occidentalis Liriodendron tulipifera	38 35	Fair	X	Extreme lean and dead limbs, remove with bucket truck Vines and dead limbs	377 378	- F
253 254	Red Maple Red Maple	Acer rubrum Acer rubrum	<u> </u>	Fair Good	X	Small dead limbs and insect damage Crooked trunk	378 379 380	F
254 255 256	Red Maple Red Maple River Birch	Acer rubrum Acer rubrum Betula nigra	8	Fair	X X X	Double trunk, one trunk broken, and dead limbs Slight lean	381	
256 257 258	River Birch Red Maple Red Maple	Acer rubrum Acer rubrum	12 7	Good Fair	A	Double trunk and one trunk fallen	381 382	
	Red Maple Red Maple	Acer rubrum	12 8	Good Good		Vines Vines	383 384	F
259		Ouer	· · ·		1			
	White Oak American Elm Black Cherry	Quercus alba Ulmus americana Prunus serotina	24 8 8	Fair Fair Fair	X X X	Vines and dead limbs Vines, one sided, and leaning Vines, dead limbs, and bank	385 386 387	Amer

								CLIENT: TOWN OF VIENNA 127 CENTER STREET SOUTH VIENNA, VA 22180	
	1	11	MAR	2024	IFB SUBMISSION	JDH	МТВ	ENGINEER: WSP Environment & Infrastructure Solutions	
IENNA	0	28	JUL	2023	IFB SUBMISSION	JDH	MTB		
since 1890	NO.	DD	MON	YYYY	ISSUE / REVISION DESCRIPTION	ENG.	APPR.	Tel (703) 488-3700	

		Diameter at				
Common Name	Botanical Name	Breast Height (DBH)(inches)	Health	To Be Removed	Notes	
Red Maple Tulip Poplar	Acer rubrum Liriodendron tulipifera	7 28	Good Good		One sided Vines	
Black Oak Northern Red Oak	Quercus velutina Quercus rubra	6 7	Fair Good		Vines and dead limbs One sided	
Black Cherry Red Maple	Prunus serotina Acer rubrum	6 20	Fair Fair		Triple trunk and cavity between trunks Dead limbs and slight lean Mostly dead	
Red Maple Red Maple Red Maple	Acer rubrum Acer rubrum Acer rubrum	12 17 16 or 22	Poor Fair Fair		Mostly dead One sided and leaning Dead limbs and slight lean	
Tulip Poplar Tulip Poplar	Liriodendron tulipifera	27 22	Fair Fair Fair	x	Dead limbs Dead limbs Some dead limbs	
Red Mulberry Black Walnut	Morus rubra Juglans nigra	7 8	Fair Fair Fair		Dead limbs and vines Vines and Dead limbs	
American Elm Red Maple	Ulmus americana Acer rubrum	5 5	Fair Good		Small dead limbs and slight lean One sided	
Red Maple Red Maple River Birch	Acer rubrum Betula nigra	14 15	<u> </u>		Double trunk and small dead limbs Leaning and small dead limbs	
River Birch Silver Maple	Betula nigra Acer saccharinum	15	Fair Fair	X	Leaning and vines Dead libms	
Silver Maple River Birch	Acer saccharinum Betula nigra	22 24	Fair Fair	x	Double trunk, leaning, and dead limbs Vines and dead limbs	
River Birch Silver Maple	Betula nigra Acer saccharinum	8 14	Fair Fair	X X X	Vines and dead limbs Vines, trunk damage, and bank	
Box Elder Box Elder	Acer negundo Acer negundo	7	Fair Fair	X X X	Leaning, dead limbs, and bank Trimple trunk, dead limbs, and bank	
Black Cherry Black Walnut	Prunus serotina Juglans nigra	6	Fair Fair	X X	Dead limbs and bank Leaning, small dead limbs, and bank	
Box Elder Silver Maple	Acer negundo Acer saccharinum	5 14	Fair Fair	Х	Dead limbs Crooked trunk and dead limbs	
Silver Maple River BIrch	Acer saccharinum Betula nigra	12 5	Fair Good		Dead limbs Fused with 299 at base	
Box Elder Box Elder	Acer negundo Acer negundo	6 11	Fair Good		One sided, small dead limbs, and fused with 298 at b Small dead limbs	base
Black Walnut Sweet Gum	Juglans nigra Liquidambar styraciflua	12 4	Fair Good	X	Dead limbs	
River BIrch Box Elder	Betula nigra Acer negundo	18 4	Fair Fair		Dead limbs and water sprouts Double trunk and dead limbs	
American Sycamore River BIrch	Platanus occidentalis Betula nigra	15 10	Fair Fair	X X	One sided, leaning, and bank Stream, branch pile, leaning, and bank	
River Birch Red Maple	Betula nigra Acer rubrum	4 12	Good Fair	X	Bank Leaning and some dead limbs	
Silver Maple Red Maple	Acer saccharinum Acer rubrum	20 16	Fair Good		Vines, double trunk, and area girdling roots Some vines	
Box Elder Silver Maple	Acer negundo Acer saccharinum	8 30	Fair Fair		Vines and leaning Trunk damage, dead limbs, and vines.	
Silver Maple Silver Maple	Acer saccharinum Acer saccharinum	8 17	Good Fair		Buble trunk and small dead limbs Vines and slight lean	
Red Mulberry Red Mulberry	Morus rubra Morus rubra	7 8	Poor Fair		Large trunk cavity and leaning Leaning	
Black Walnut American Sycamore	Juglans nigra Platanus occidentalis	9 11	Fair Poor		Vines and dead limbs Decaying roots, leaning, and growths.	
American Sycamore Black Walnut	Platanus occidentalis Juglans nigra	36 16	Fair Fair		Large cavity at base, double trunk, and dead limbs Vines and one sided	S
Black Walnut Red Maple	Juglans nigra Acer rubrum	13 16	Good Good		One sided Vine growth	
Red Maple Red Maple	Acer rubrum Acer rubrum	7 10	Fair Fair		Small vines and trunk damage Exposed roots, water sprouts, and banks	
Tulip Poplar Tulip Poplar	Liriodendron tulipifera Liriodendron tulipifera	36 11	Fair Good		Dead limbs and girdling roots Vines, small dead limbs, and bank	
Red Maple Red Maple	Acer rubrum Acer rubrum	9 11	Fair Fair		Small dead limbs One sided, small dead limbs, and bank	
Red Maple	Acer rubrum Platanus occidentalis	6 17	Good Fair		Small dead limbs and leaning	
Merican Sycamore Red Maple	Platanus occidentalis Acer rubrum	16 6	<u>Good</u> Fair Fair		Small vines Small vines, Small dead limbs, and one sided One sided and vines	
Red Maple Red Maple American Elm	Acer rubrum Acer rubrum Ulmus americana	8 9 14	Fair Fair Fair	x	One sided and vines One sided and vines Vines, small dead limbs, and bank	
Red Maple Red Maple	Acer rubrum Acer rubrum	4	Fair Good		Dead limbs	
Tulip Poplar Red Maple	Liriodendron tulipifera Acer rubrum	17 11	<u> </u>	x	Double trunk Leaning, one sided, and trunk disease	
American Elm	Ulmus americana Platanus occidentalis	6 16	Fair Fair	X	One sided and water sprouts Small hole a the base of trunk	
Red Maple Red Maple	Acer rubrum Acer rubrum	7 17	Fair Fair		Bent at top Dead limbs	
Red Maple Red Maple	Acer rubrum Acer rubrum	7 10	Fair Fair		One sided and small dead limbs Dead leader	
Red Maple Red Maple	Acer rubrum Acer rubrum	5	Good		Small dead limbs	
Red Maple Red Maple	Acer rubrum Acer rubrum	6 4	<u>Good</u> Fair		Hole in trunk and small dead limbs	
Black Cherry Red Maple	Prunus serotina Acer rubrum	6 18	Good Fair	X	One sided and small dead limbs	
Tulip Poplar Red Maple	Liriodendron tulipifera Acer rubrum	20 4	Fair Good	X X	Dead limbs and vines One sided	
merican Sycamore Red Maple	Platanus occidentalis Acer rubrum	18 8	Fair Good	X X	One sided and vines Small dead limbs	
Red Maple American Sycamore	Acer rubrum Platanus occidentalis	4 12	Good Good	X	Bent at top	
American Elm Tulip Poplar	Ulmus americana Liriodendron tulipifera	5 18	Fair Good	X X	Leaning and insect damage Little one sided	
Red Maple Red Maple	Acer rubrum Acer rubrum	6 5	Good Fair		Crooked trunk	
Red Maple Red Maple	Acer rubrum Acer rubrum	7 6	Fair Good		One side and hole at base Small dead limbs	
Red Maple	Acer rubrum Platanus occidentalis	8 22	Fair Good		Crooked trunk	
Red Maple Red Maple	Acer rubrum Acer rubrum	12 16	Good Good		Small dead limbs One sided	
Red Maple Red Maple	Acer rubrum Acer rubrum	9 6	Good Poor		Small dead limbs Trunk rot	
Red Maple Red Maple	Acer rubrum Acer rubrum	13 21	Good Fair		Leaning and vines	
Red Maple Red Maple	Acer rubrum Acer rubrum	4 13	Fair Poor		Insect damage and trunk damage Fungal trunk infection	
Red Maple Red Maple	Acer rubrum Acer rubrum	4 9	Good Fair		Dead limbs and trunk cavity	
Red Maple Red Maple Red Maple	Acer rubrum Acer rubrum	17 10	Good Good		Girdling roots	
Red Maple Tulip Poplar	Acer rubrum Liriodendron tulipifera	5	<u>Good</u> Fair		Small vines and dead limbs Vine and dead limbs	
Red Maple Red Maple Red Maple	Acer rubrum Acer rubrum	9 4	Fair Good		Girdling roots, water sprouts, and small dead limb	15
Red Maple Red Maple	Acer rubrum Acer rubrum Platanus occidentalis	14 24	Poor Poor Fair		Trunk rot Roten trunk, gungus, and one sided Dead limbs	
<u>merican Sycamore</u> Red Maple Red Maple	Platanus occidentalis Acer rubrum Acer rubrum	24 7 5	Fair Fair Fair		Dead limbs Trunk cavity Crooked trunk and water sprouts	
DRAV	/N BY: PROJEC				EAM RESTORATION	PROJECT NO.: 752620
CHEC	:KED BY:	100		SOUTHS	IDE PARK	DATE:
	MTB OVED BY: SHEET		V, VIENNA, VA 22181			
APPR	MTB					DWG. SIZE
SCAL		TF		ATION AN	ND ASSESSMENT (3)	SHEET NUMBE
N	DT TO SCALE					08 OF -

Tag #	Common Name	Botanical Name	Diameter at Breast Height (DBH)(inches)	Health	To Be Removed	Notes
389 390	Red Maple American Sycamore	Acer rubrum Platanus occidentalis	7 21	Good Good		Vines
391	Red Maple	Acer rubrum	10	Good		Double trunk and yellow jacket nest nearby
392 393	American Sycamore River Birch	Platanus occidentalis Betula nigra	15 12	<u> </u>		Vines and leaning
394	Dead	-	6	Dead		
395 396	Red Maple Flowering Dogwood	Acer rubrum Cornus florida	21 6	Fair Fair		Vines and one sided Dead limbs and leaf dieback
397	Red Maple	Acer rubrum	27	Fair		Girdling roots, trunk knots, and dead limbs
398	Red Maple	Acer rubrum	18	Fair		One sided and trunk knots
399 400	American Elm American Elm	Ulmus americana Ulmus americana	20 12	Fair Fair		Vines, leaning, and one sided Heavy vines and bank
604	Red Maple	Acer rubrum	7	Fair		Vine and dead limbs
605	Dead American Holly	- Ilex opaca	24	Dead		Double trunk and dead limbs
619 620	Dead	-	5 18	Fair Dead	x	
621	Dead	-	20	Dead	X	
622 625	Dead American Elm	- Ulmus americana	13 15	Dead Fair	X X	One sided and dead limbs
802	Bradford Pear	Pyrus calleryana	4	Fair		Dead leader and vines
803	American Hornbeam	Carpinus caroliniana	4	Good		Vines Trunk damage and vines
804 805	Black Gum Red Maple	Nyssa sylvatica Acer rubrum	19 33	Fair Fair		Heavy vines and dead limbs
806	American Elm	Ulmus americana	5	Fair		Slight lean and one sided
807 808	Northern Red Oak American Hornbeam	Quercus rubra Carpinus caroliniana	7 6	<u> </u>		One sided Double trunk
809	American Elm	Ulmus americana	5	Fair		Crooked trunk and vines
810	Loblolly pine	Pinus taeda	22	Good		Slight lean
811 812	Tulip Poplar Tulip Poplar	Liriodendron tulipifera Liriodendron tulipifera	22 16	Fair Fair		Crooked trunk and vines One sided and dead limbs
816	American Holly	Ilex opaca	5	Good		Vines
817 818	Black Cherry Red Maple	Prunus serotina Acer rubrum	6 9	Good Good		Small dead limbs
818 819	Tulip Poplar	Acer rubrum Liriodendron tulipifera	<u> </u>	Good Good		
820	Black Cherry	Prunus serotina	6	Fair		Crooked trunk and dead limbs
821 822	Dead Red Maple	- Acer rubrum	10 6	Dead Good	X	
823	American Sycamore	Platanus occidentalis	12	Good	X	
824	American Hornbeam	Carpinus caroliniana	5	Fair	X	Leaning and dead limbs Dead limbs
825 826	American Hornbeam Pignut Hickory	Carpinus caroliniana Carya glabra	6 21	Fair Good	X	
827	American Hornbeam	Carpinus caroliniana	4	Good	Х	
828 829	American Hornbeam American Hornbeam	Carpinus caroliniana Carpinus caroliniana	5 4	Fair Fair	X X	Leaning and dead limbs Leaning and one sided
830	American Hornbeam	Carpinus caroliniana	5	Fair	Х	Dead limbs
831	Red Maple	Acer rubrum	9	Fair	X	Dead limbs and undercut bank
832 833	Red Maple Red Maple	Acer rubrum Acer rubrum	7 6	Fair Poor	X X	Dead limbs and undercut bank Falling in stream
834	River Birch	Betula nigra	10	Good	Х	Some dead limbs and bank
835 836	Red Maple American Hornbeam	Acer rubrum Carpinus caroliniana	10 9	<u>Good</u> Fair	X X	Bank Triple trunk, dead limbs, and bank
837	Northern Red Oak	Quercus rubra	24	Fair	X	Leaning, dead limbs, and bank
838	Black Locust	Robinia pseduoacacia	11	Poor		Top broken
839 840	Black Locust Red Maple	Robinia pseduoacacia Acer rubrum	10 11	<u>Fair</u> Fair		Leaning and fungus Dead limbs and one sided
841	Red Maple	Acer rubrum	13	Fair		Dead limbs and one sided
842 844	Black Cherry Black Locust	Prunus serotina Robinia pseduoacacia	<u>32</u> 5	Fair Good		Dead limbs and trunk damage Leaning and one sided
845	Black Oak	Quercus rubra	7	Fair		Vine and some dead limbs
846	River Birch	Betula nigra	14	Fair		Slight lean and some dead limbs
847 848	Northern Red Oak Red Maple	Quercus rubra Acer rubrum	9 4	<u> </u>		Some dead limbs
849	Tulip Poplar	Liriodendron tulipifera	28	Fair		Large dead limbs
850	American Hornbeam	Carpinus caroliniana Liriodendron tulipifera	5	Fair		Trunk cavity Leaning
851 852	Tulip Poplar American Elm	Ulmus americana	13 6	<u>Fair</u> Fair	X	Leaning and dead limbs
853	Tulip Poplar	Liriodendron tulipifera	24	Fair		Dead limbs
854 855	Tulip Poplar Tulip Poplar	Liriodendron tulipifera Liriodendron tulipifera	16 10	<u>Fair</u> Fair	X	Vine and dead limbs Trunk damage
856	Northern Red Oak	Quercus rubra	26	Good		Some dead limbs
857	Tulip Poplar	Liriodendron tulipifera	20	Poor	X	Mostly dead
858 859	Virginia Pine American Elm	Pinus virginiana Ulmus americana	22 7	<u>Fair</u> Fair		Fungal growth Dead limbs
860	American Hornbeam	Carpinus caroliniana	8	Good		Slight lean
861	Red Maple	Acer rubrum	12 9	Good		Leaning and dead limbs
862 863	American Elm White Oak	Ulmus americana Quercus alba	36	Fair Fair		Dead limbs
864	American Hornbeam	Carpinus caroliniana	5	Good		
865 866	Persimmon Red Maple	Diospyros virginiana Acer rubrum	9 15	<u> </u>		Supporting dead tree
867	Dead	-	18	Dead		
868	Northern Red Oak	Quercus rubra	10	Good		Come dead lineba
869 962	American Elm Black Cherry	Ulmus americana Prunus serotina	15 5	Fair Poor		Some dead limbs Many dead limbs, vines, and bank
963	Silver Maple	Acer saccharinum		Fair		Vines and bank
964 965	Red Maple Red Maple	Acer rubrum Acer rubrum	8 12	Fair Fair		Vines and bank Vines and bank
965	Red Maple Red Maple	Acer rubrum Acer rubrum	12	Fair Fair		Banks, heavy vine, and leaning
967	Red Maple	Acer rubrum	12	Fair		Banks, heavy vines, and leaning
968 969	Red Maple Dead	Acer rubrum -	12 8	Fair Dead		Heavy vines
970	Red Maple	- Acer rubrum	20	Poor		Mostly dead
971	Black Oak	Quercus velutina	14	Good		Vines
972 973	Black Walnut Red Maple	Juglans nigra Acer rubrum	6 24	<u>Fair</u> Fair		Vines and slight lean Dead limbs
974	Black Walnut	Juglans nigra	10	Poor		Mostly dead and topped
975	Red Mulberry Black Willow	Morus rubra	4	Poor	<u> </u>	Heavy vines and dead limbs
976 977	Black Willow Box Elder	Salix nigra Acer negundo	14 21	Poor Fair		Topped Severe lean and bank
978	American Elm	Ulmus americana	4	Poor		Trunk damage, many dead limbs, and senescence
979 980	Black Walnut Black Cherry	Juglans nigra Prunus serotina	18 18	Fair Fair		Vine and dead limbs Vines, top die back, and banks
980 981	Dead	-	18	Dead	X	
981	Black Walnut	Juglans nigra	8	Fair		Trunk damage and bank
982 983	Red Maple Mimosa	Acer rubrum Albizia julibrissin	15 5	Fair Good		Dead limbs Invasive
983 984	American Sycamore	Platanus occidentalis	5	Good		
985	Black Walnut	Juglans nigra	15	Good		Slight lean and bank
986 987	Mimosa American Elm	Albizia julibrissin Ulmus americana	8	<u>Poor</u> Fair	+	Mostly dead and invasive Dead limbs
988	American Elm	Ulmus americana	5	Poor		Top broken and leaning
989	Red Maple	Acer rubrum	15	Good		Vine and bank
990 991	Black Oak American Sycamore	Quercus velutina Platanus occidentalis	4 24	<u> </u>		Leaning and bank Bank
992	American Elm	Ulmus americana	4	Fair		Small dead limbs and one sided
993 994	American Elm	Ulmus americana	6 12	Good Good		Double trunk and one sided Triple trunk and bank
<u>994</u> 995	Red Maple American Elm	Acer rubrum Ulmus americana	12	<u> </u>		Dead limbs and bank
	Black Oak	Quercus velutina	8	Fair		Dead limbs and bank

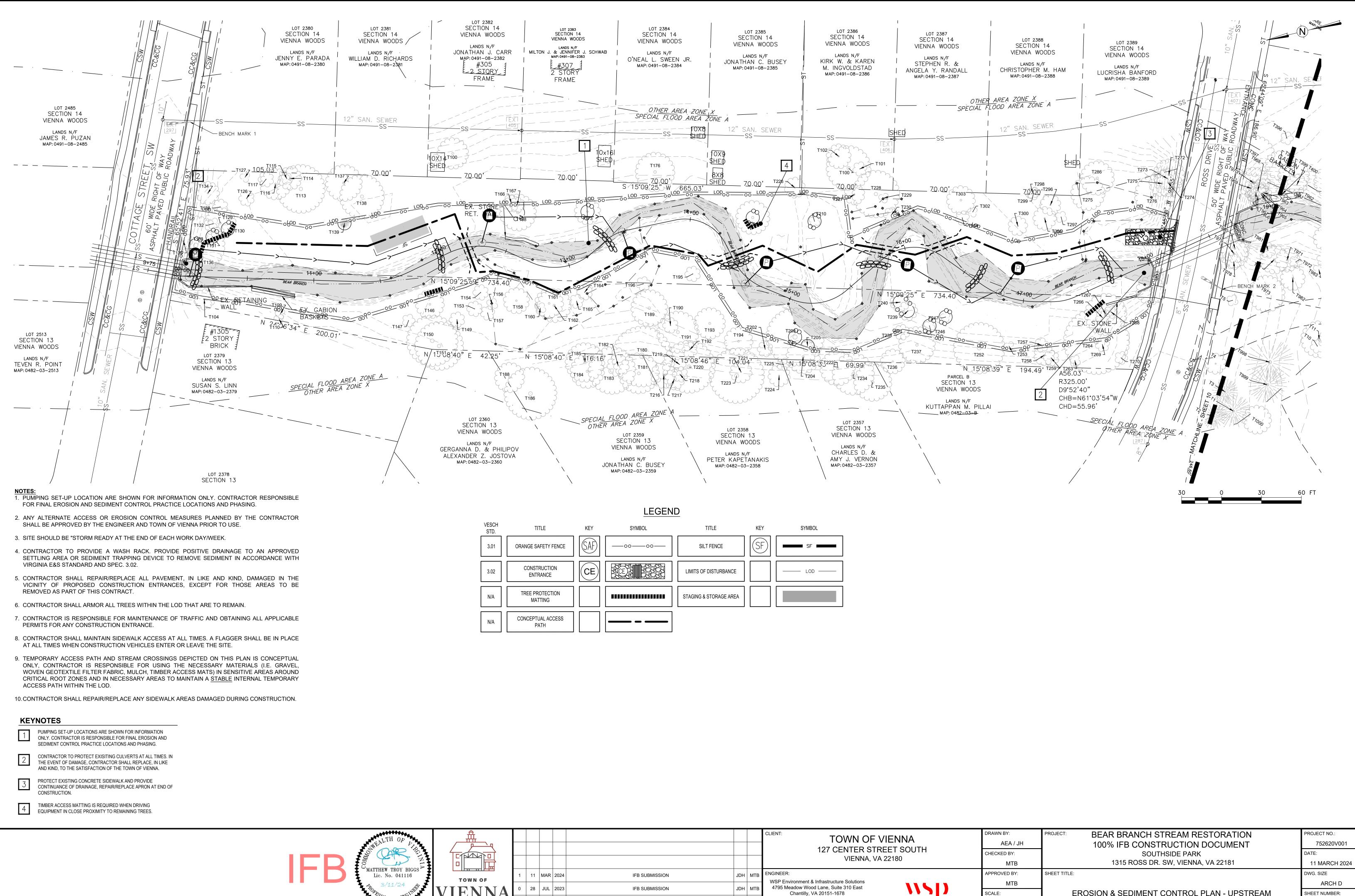
MATTHEW TROY BIGGS A Lic. No. 041116

Tag #	Common Name	Botanical Name	Diameter at Breast Height (DBH)(inches)	Health	To Be Removed	Notes
997 998 999	American Sycamore Tulip Poplar Red Maple	Platanus occidentalis Liriodendron tulipifera Acer rubrum	18 30 24	Fair Good Good		Double trunk, vines, cavity between trunks, and bank Some dead limbs Some dead limbs
1000	Dead	-	18	Dead		
1059 1060	American Elm Black Oak	Ulmus americana Quercus velutina	4 6	Poor Good		Vines and topped Vines and bank
1061 1062	American Hornbeam Red Maple	Carpinus caroliniana Acer rubrum	5 27	Fair Fair	X	Dead limbs and double trunk Vines and large dead limbs
1063 1064	Dead American Hornbeam	- Carpinus caroliniana	24 5	Dead Fair	X X	Small dead limbs and leaning
1065 1066	River Birch Dead	Betula nigra -	8 8	Fair Dead	X X	Severe lean
1067 1068	River Birch Black Gum	Betula nigra Nyssa sylvatica	5 12	Fair	X X	Severe lean Vines and small dead limbs
1069	Pignut Hickory	Carya glabra	30	Good		Small dead limbs
1070 1072	Loblolly pine Black Cherry	Pinus taeda Prunus serotina	14 11	Poor Good		Leaning and dead limbs
1073 1074	Dead Dead	-	4 7	<u> </u>		
1075 1076	Black Gum Dead	Nyssa sylvatica	12 10	Good Dead		Small vines
1077	Black Cherry	Prunus serotina	10	Dead		Nachly doed
1078 1079	Black Cherry Dead	Prunus serotina -	7 10	Poor Dead		Mostly dead
1080 1081	Tulip Poplar American Holly	Liriodendron tulipifera Ilex opaca	17 6	<u> </u>		
1082 1083	White Oak Red Maple	Quercus alba Acer rubrum	32 30	Fair Good		Vines and some dead limbs Double trunk and some dead limbs
1084	Tulip Poplar	Liriodendron tulipifera	32	Good		Trunk damage and dead limbs
1085 1086	Red Maple Red Maple	Acer rubrum Acer rubrum	9 5	Fair Poor		Some broken limbs Top broken
1087 1088	Red Maple Black Gum	Acer rubrum Nyssa sylvatica	8 6	Fair Fair		Double trunk, girdling roots, and some dead limbs Leaning and dead limbs
1089 1090	Red Maple Black Gum	Acer rubrum Nyssa sylvatica	5 24	Fair Fair		Leaning and water sprouts Trunk damage and some dead limbs
1091	Dead	-	4	Dead		
1094 1095	White Oak American Hornbeam	Quercus alba Carpinus caroliniana	21 6	Fair Good	X X	Triple trunk, one trunk dead, trunk damage, and dead limbs
1096 1098	American Hornbeam Red Maple	Carpinus caroliniana Acer rubrum	6 4	Fair Good	X X	Severe lean and bank
1476 1477	Dead Northern Red Oak	-	7 5	Dead Fair	X X X	Some dead limbs
1478	Black Cherry	Quercus rubra Prunus serotina	5	Fair	Х	Leaning and bank
1479 1480	Red Maple River Birch	Acer rubrum Betula nigra	6 8	<u>Good</u> Fair	X X	Vines, leaning, and one sided
1481 1482	American Elm American Hornbeam	Ulmus americana Carpinus caroliniana	4 4	<u>Good</u> Good	Х	Vines and bank Double trunk
1483 1484	Dead	-	9	Dead Dead	X X	
1485	Dead	-	8	Dead	Х	<u> </u>
1486 1487	Red Maple Red Maple	Acer rubrum Acer rubrum	6 7	<u> </u>	X X	Bank
1488 1489	Red Maple Red Maple	Acer rubrum Acer rubrum	8 16	Fair Fair	Х	Dead limbs and bank Double trunk and some dead limbs
1490	Northern Red Oak	Quercus rubra	14	Good		Girdling root
1491 1492	Red Maple American Holly	Acer rubrum Ilex opaca	13 6	Fair Good		One sided and vines Vines
1493 1494	Northern Red Oak Dead	Quercus rubra -	9	Fair Dead		Dead limbs
1495	Red Maple American Elm	Acer rubrum Ulmus americana	6	Fair		Dead limbs and one sided Dead limbs
1496 1816	Red Maple	Acer rubrum	6 12	Fair Good	x	Small dead limbs
1817 1818	Red Maple Red Maple	Acer rubrum Acer rubrum	5 12	Fair Good	X X	Vines and trunk damage Small dead limbs
1819 1820	Red Maple Red Maple	Acer rubrum Acer rubrum	11 6	Poor Good	X X	Leaning and vines
1821	American Elm	Ulmus americana	12	Good	Х	
1822 1823	Black Cherry American Sycamore	Prunus serotina Platanus occidentalis	6 12	<u>Fair</u> Fair	X X	Leaning over stream Vines and dead limbs
1824 1825	Northern Red Oak Dead	Quercus rubra	7 11	Good Dead	X X	Vines N/a
1826	Black Gum	Nyssa sylvatica	6	Good	Х	Small dead limbs
1827 1828	Red Maple Dead	Acer rubrum -	7 8	<u> </u>	X X	Small dead limbs
1829 1830	Dead Red Maple	- Acer rubrum	8 4	Dead Fair	X X	Dead limbs and one sided
1830 1831 1832	American Sycamore Black Cherry	Platanus occidentalis	16 7	Fair Fair	X X X	Vines and small dead limbs Crooked trunk
1833	Red Maple	Prunus serotina Acer rubrum	7	Fair	Х	One sided and leaning
1834 1835	Red Maple Tulip Poplar	Acer rubrum Liriodendron tulipifera	9 24	Fair Fair	X X	Vines and dead limbs Vines and canopy die back
1836 1837	Mockernut Hickory Red Maple	Carya tomentosa Acer rubrum	4	Fair Fair	X X	Heavy vines Onesided and insect damage
1838	Dead	-	9	Dead	Х	שאנשיאל איז
1839 1840	Dead American Elm	- Ulmus americana	9 4	Dead Fair	X X	One sided and dead limbs
1841 1842	Dead Dead	-	10 9	Dead Dead	Х	
1843 1844	American Elm Dead	Ulmus americana -	8	Good Dead	X X	Vines
1845	Black Oak	Quercus velutina	7	Poor	Х	Top bent/broken
1846 1847	Black Cherry Northern Red oak	Prunus serotina Quercus rubra	5 6	Fair Fair	X X	Heavy vines Heavy vines
1849 1850	American Sycamore Red Maple	Platanus occidentalis Acer rubrum	25 7	Fair Fair	X	Vines and dead limbs one sided and dead limbs
1851	Tulip Poplar	Liriodendron tulipifera	5	Fair	Х	Dead limbs
1852 1853	Red Maple Dead	Acer rubrum	13 7	Fair Dead	X X	Double trunk, one sided, and dead limbs
1854 1855	Tulip Poplar Red Maple	Liriodendron tulipifera Acer rubrum	18 6	Fair Fair	X X	Vines and one sided Trunk damage, dead limbs, and bank
1856 1857	Red Maple Red Maple	Acer rubrum Acer rubrum Acer rubrum	5	Fair Fair	X X X	Banks and one sided Banks and one sided
1858	Black Cherry	Prunus serotina	6	Fair	Х	Vines and dead leader
1859 1860	Black Cherry American Sycamore	Prunus serotina Platanus occidentalis	10 18	Fair Good	X X	Vine and one sided Exposed roots and bank
1861 1862	Black Walnut Norway Maple	Juglans nigra Acer platanoides	8	Fair Good		Vine and bank Next to bridge and bank
1863	Black Locust	Robinia pseduoacacia	6	Fair		Vines and small dead limbs
1864 1865	Silver Maple Black Locust	Acer saccharinum Robinia pseduoacacia	7 11	<u>Good</u> Fair		Doulbe trunk Vines and leaning
	Black Locust Black Walnut	Robinia pseduoacacia Juglans nigra	7 7	Fair Fair		Vines and dead limbs Dead limbs
1865		Robinia pseduoacacia	11	Fair		Double trunk and dead limbs
1865 1866 1867	Black Locust		7	Eair	1	Leaning vines and bank
1865 1866 1867 1868 1869	American Elm Box Elder	Ulmus americana Acer negundo	7 7	Fair Fair		Leaning, vines, and bank Trunk damage, almost fused with dead tree, leaning, and bank
1865 1866 1867 1868	American Elm	Ulmus americana				

 Image: Since 1890
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Common Name	Botanical Name	Diameter at Breast Height	Health	To Be Removed	Notes
		(DBH)(inches)			
Red Maple	Acer rubrum	12	Fair		Vines and dead limbs
Black Locust	Robinia pseduoacacia	13	Poor		Heavy vines and large broken limbs
Black Locust	Robinia pseduoacacia	6	Poor		Mostly dead
Black Locust	Robinia pseduoacacia	4	Fair		leaning and vines
Red Maple	Acer rubrum	12	Fair		Dead limbs and vines
Black Locust	Robinia pseduoacacia	26	Poor		Fungus, large dead limbs, and vines
Sassafras	Sassafras albidum	7	Fair		Vines and dead limbs
Black Locust	Robinia pseduoacacia	14	Poor		Heavy vines, broken limbs, and leaning
American Sycamore	Platanus occidentalis	18	Good		Small vines and bank
Red Maple	Acer rubrum	5	Fair		Dead limbs
Red Maple	Acer rubrum	6	Fair		Vines and one sided
Morckernut Hickory	Carya tomentosa	6	Good		Slight lean and bank
American Sycamore	Platanus occidentalis	15	Good		Small vines
Red Maple	Acer rubrum	8	Good		Vines
River Birch	Betula nigra	11	Fair		Severe lean and bank
Box Elder	Acer negundo	7	Fair		Severe lean and bank
American Elm	Ulmus americana	5	Fair		Severe lean and bank
Dead	-	5	Dead		
Black Cherry	Prunus serotina	8	Fair		Vines and trunk damage
River Birch	Betula nigra	7	Fair		Severe lean
American Elm	Ulmus americana	7	Fair		Vines and one sided
American Elm	Ulmus americana	12	Fair		Vines, leaning, and one sided
River Birch	Betula nigra	9	Poor		Mostly dead
White Oak	Quercus alba	33/15	Fair		Trunk damage and dead limb
Red Maple	Acer rubrum	5	Fair		Some dead limbs
River Birch	Betula nigra	12/14	Fair		Vines, leaning, and dead limbs
American Sycamore	Platanus occidentalis	16/12	Fair		Severe lean and vines
Red Maple	Acer rubrum	4/8	Fair		Double trunk, dead limbs, and bank
Red Maple	Acer rubrum	9/5	Good		Vines and double trunk
Black Walnut	Juglans nigra		Fair		Behind 28
American Hornbeam	Carpinus caroliniana		Good		8 in diameter next to 846
Black Cherry	Prunus serotina		Fair		10 in diameter between 816 and 846

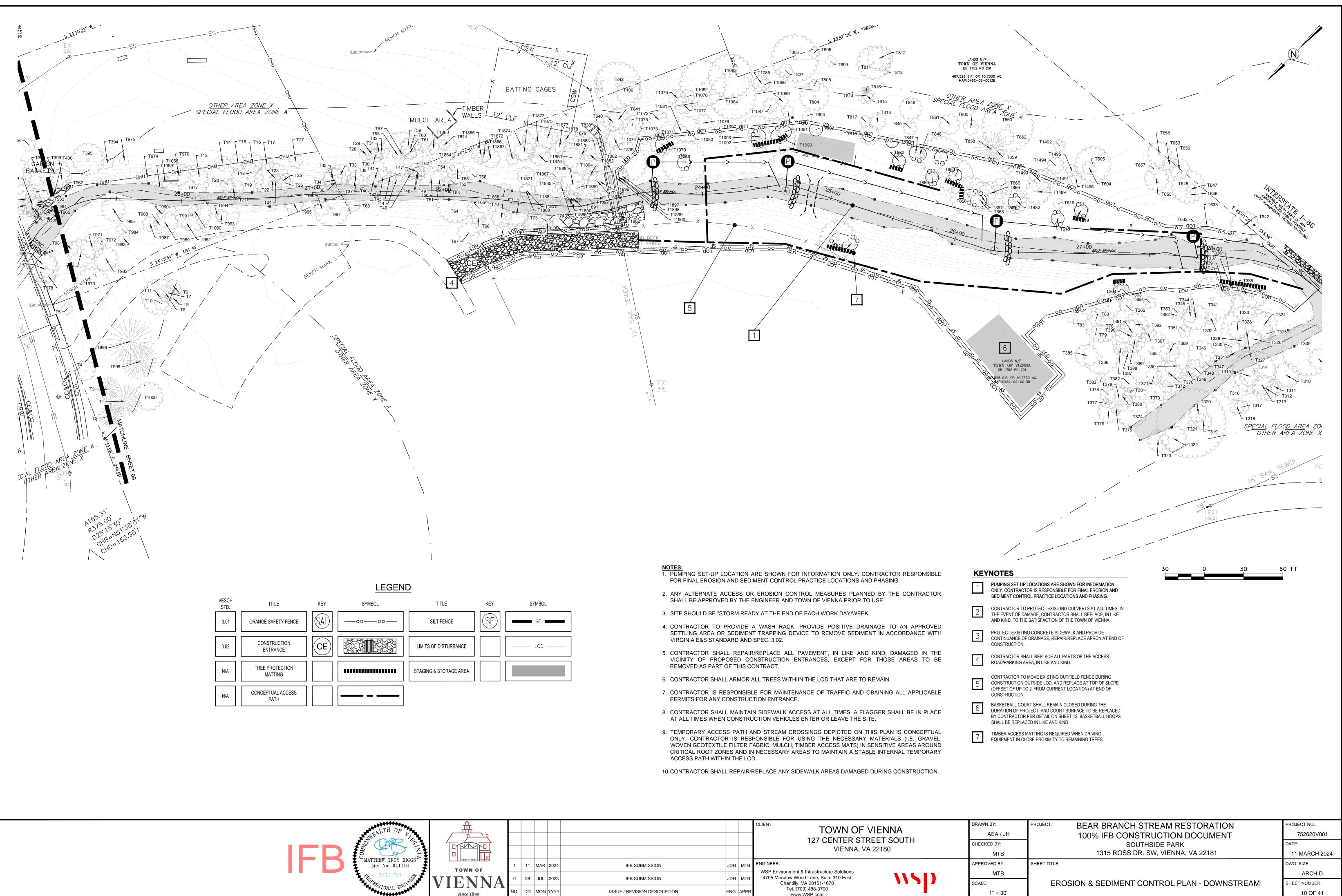
DRAWN BY:	PROJECT: BEAR BRANCH STREAM RESTORATION	PROJECT NO .:
AEA / JH	100% IFB CONSTRUCTION DOCUMENT	752620V001
CHECKED BY:	SOUTHSIDE PARK	DATE:
МТВ	1315 ROSS DR. SW, VIENNA, VA 22181	11 MARCH 2024
APPROVED BY:	SHEET TITLE:	DWG. SIZE
МТВ		ARCH D
SCALE:	TREE LOCATION AND ASSESSMENT (4)	SHEET NUMBER:
NOT TO SCALE		08A OF 41



								CLIENT: TOWN OF VIENNA 127 CENTER STREET SOUTH VIENNA, VA 22180
	1	11	MAR	2024	IFB SUBMISSION	JDH	МТВ	ENGINEER: WSP Environment & Infrastructure Solutions
IENNA	0	28	JUL	2023	IFB SUBMISSION	JDH	МТВ	4795 Meadow Wood Lane, Suite 310 East Chantilly, VA 20151-1678
since 1890	NO.	DD	MON	YYYY	ISSUE / REVISION DESCRIPTION	ENG.	APPR.	Tel (703) 488 3700

MTB		L
E:	EROSION & SEDIMENT CONTROL PLAN - UPSTREAM	5
1" = 30'		

09 OF 41



								CLIENT: TOWN OF VIENN 127 CENTER STREET SO VIENNA, VA 22180	
	1	11	MAR	2024	IFB SUBMISSION	JDH	МТВ		
IENNA	0	28	JUL	2023	IFB SUBMISSION	JDH	МТВ	WSP Environment & Infrastructure Solutions 4795 Meadow Wood Lane, Suite 310 East Chantilly, VA 20151-1678	<b>NSD</b>
since 1890	NO.	DD	MON	YYYY	ISSUE / REVISION DESCRIPTION	ENG.	APPR	Tel (703) 488-3700	

EDOSION	
MS-1	I AND SEDIMENT CONTROL MINIMUM STANDARDS PERMANENT OR TEMPORARY SOIL STABILIZATION SHALL BE APPLIED TO DENUDED AREAS WITHIN SEVEN DAYS AFTER FINAL GRADE IS REACHE
	SHALL BE APPLIED WITHIN SEVEN DAYS TO DENUDED AREAS THAT MAY NOT BE AT FINAL GRADE BUT WILL REMAIN DORMANT FOR LONGER AREAS THAT ARE TO BE LEFT DORMANT FOR MORE THAN ONE YEAR.
✓ MS-2	DURING CONSTRUCTION OF THE PROJECT, SOIL STOCKPILES AND BORROW AREAS SHALL BE STABILIZED OR PROTECTED WITH SEDIMENT TRAP TEMPORARY PROTECTION AND PERMANENT STABILIZATION OF ALL SOIL STOCKPILES ON SITE AS WELL AS BORROW AREAS AND SOIL INTENTION
✓ MS-3	A PERMANENT VEGETATIVE COVER SHALL BE ESTABLISHED ON DENUDED AREAS NOT OTHERWISE PERMANENTLY STABILIZED. PERMANENT GROUND COVER IS ACHIEVED THAT IS UNIFORM, MATURE ENOUGH TO SURVIVE AND WILL INHIBIT EROSION
N/A MS-4	SEDIMENT BASINS AND TRAPS, PERIMETER DIKES, SEDIMENT BARRIERS AND OTHER MEASURES INTENDED TO TRAP SEDIMENT SHALL BE CONS SHALL BE MADE FUNCTIONAL BEFORE UPSLOPE LAND DISTURBANCE TAKES PLACE.
✓ MS-5	STABILIZATION MEASURES SHALL BE APPLIED TO EARTHEN STRUCTURES SUCH AS DAMS, DIKES, AND DIVERSION IMMEDIATELY AFTER INSTALLA
N/A MS-6	<ul> <li>SEDIMENT TRAPS AND SEDIMENT BASINS SHALL BE DESIGNED AND CONSTRUCTED BASED UPON THE TOTAL DRAINAGE AREA TO BE SERVED BY</li> <li>a. THE MINIMUM STORAGE CAPACITY OF A SEDIMENT TRAP SHALL BE 134 CUBIC YARDS PER ACRE OF DRAINAGE AREA AND THE TRAP SHALL O</li> <li>b. SURFACE RUNOFF FROM DISTURBED AREAS THAT IS COMPRISED OF FLOW FROM DRAINAGE AREAS GREATER THAN OR EQUAL TO THREE A STORAGE CAPACITY OF A SEDIMENT BASIN SHALL BE 134 CUBIC YARDS PER ACRE OF DRAINAGE AREA. THE OUTFALL SYSTEM SHALL, AT DURING A 25-YEAR STORM OF 24-HOUR DURATION. RUNOFF COEFFICIENTS USED IN RUNOFF CALCULATIONS SHALL CORRESPOND TO A BAI WHILE THE SEDIMENT BASIN IS UTILIZED.</li> </ul>
🗸 MS-7	CUT AND FILL SLOPES SHALL BE DESIGNED AND CONSTRUCTED IN A MANNER THAT WILL MINIMIZE EROSION. SLOPES THAT ARE FOUND T STABILIZATION SHALL BE PROVIDED WITH ADDITIONAL SLOPE STABILIZING MEASURES UNTIL THE PROBLEM IS CORRECTED.
🗸 MS-8	CONCENTRATED RUNOFF SHALL NOT FLOW DOWN CUT OR FILL SLOPES UNLESS CONTAINED WITHIN AN ADEQUATE TEMPORARY OR PERMANENT
<ul> <li>✓ MS-9</li> <li>✓ MS-10</li> </ul>	WHENEVER WATER SEEPS FROM A SLOPE FACE, ADEQUATE DRAINAGE OR OTHER PROECTION SHALL BE PROVIDED. ALL STORM SEWER INLETS THAT ARE MADE OPERABLE DURING CONSTRUCTION SHALL BE PROTECTED SO THAT SEDIMENT-LADEN WATER C
✓ MS-11	FILTERED OR OTHERWISE TREATED TO REMOVE SEDIMENT. BEFORE NEWLY CONSTRUCTED STORMWATER CONVEYANCE CHANNELS OR PIPES ARE MADE OPERATIONAL, ADEQUATE OUTLET PROTECTION /
	SHALL BE INSTALLED IN BOTH THE CONVEYANCE CHANNEL AND RECEIVING CHANNEL.
✓ MS-12	WHEN WORK IN A LIVE WATERCOURSE IS PERFORMED, PRECAUTIONS SHALL BE TAKEN TO MINIMIZE ENCROACHMENT, CONTROL SEDIMENT EXTENT POSSIBLE DURING CONSTRUCTION NONERODIBLE MATERIAL SHALL BE USED FOR THE CONSTRUCTION OF CAUSEWAYS AND COFFE ARMORED BY NONERODIBLE COVER MATERIALS.
🗸 MS-13	WHEN A LIVE WATERCOURSE MUST BE CROSSED BY CONSTRUCTION VEHICLE MORE THAN TWICE IN ANY SIX-MONTH PERIOD, A TEMPORARY
🗸 MS-14	MATERIAL SHALL BE PROVIDED. ALL APPLICABLE FEDERAL, STATE AND LOCAL CHAPTERS PERTAINING TO WORKING IN OR CROSSING LIVE WATERCOURSES SHALL BE MET.
✓ MS-15	THE BED AND BANKS OF A WATERCOURSE SHALL BE STABILIZED IMMEDIATELY AFTER WORK IN THE WATERCOURSE IS COMPLETED.
✓ MS-16	<ul> <li>UNDERGROUND UTILITY LINES SHALL BE INSTALLED IN ACCORDANCE WITH THE FOLLOWING STANDARDS IN ADDITION TO OTHER APPLICABLE CF</li> <li>a. NO MORE THAN 500 LINEAR FEET OF TRENCH MAY BE OPENED AT ONE TIME</li> <li>b. EXCAVATED MATERIAL SHALL BE PLACED ON THE UPHILL SIDE OF TRENCHES.</li> <li>c. EFFLUENT FROM DEWATERING OPERATIONS SHALL BE FILTERED OR PASSED THROUGH AN APPROVED SEDIMENT TRAPPING DEVICE, OR B AFFECT FLOWING STREAMS OR OFF-SITE PROPERTY.</li> <li>d. MATERIAL USED FOR BACKFILLING TRENCHES SHALL BE PROPERLY COMPACTED IN ORDER TO MINIMIZE EROSION AND PROMOTE STABILIZA</li> </ul>
	<ul> <li>e. RESTABILIZATION SHALL BE ACCOMPLISHED IN ACCORDANCE WITH THIS CHAPTER.</li> <li>f. APPLICABLE SAFETY CHAPTERS SHALL BE COMPLIED WITH.</li> </ul>
✓ MS-17	WHERE CONSTRUCTION VEHICLE ACCESS ROUTES INTERSECT PAVED OR PUBLIC ROADS, PROVISIONS SHALL BE MADE TO MINIMIZE THE TRAN SURFACE. WHERE SEDIMENT IS TRANSPORTED ONTO A PAVED OR PUBLIC ROAD SURFACE, THE ROAD SURFACE SHALL BE CLEANED THOROUGH THE ROADS BY SHOVELING OR SWEEPING AND TRANSPORTED TO A SEDIMENT CONTROL DISPOSAL AREA. STREET WASHING SHALL BE ALLC PROVISION SHALL APPLY TO INDIVIDUAL DEVELOPMENT LOTS AS WELL AS TO LARGER LAND-DISTURBING ACTIVITIES.
✓ MS-18	ALL TEMPORARY EROSION SEDIMENT CONTROL MEASURES SHALL BE REMOVED WITHIN 30 DAYS AFTER FINAL SITE STABILIZATION OR AFTER OTHERWISE AUTHORIZED BY THE VESCP AUTHORITY. TRAPPED SEDIMENT AND THE DISTURBED SOIL AREAS RESULTING FROM THE DISPOSITION TO PREVENT FURTHER EROSION AND SEDIMENTATION.
N/A MS-19	PROPERTIES AND WATERWAYS DOWNSTREAM FROM DEVELOPMENT SITES SHALL BE PROTECTED FROM SEDIMENT DEPOSITION, EROSION AI FLOW RATE OF STORMWATER RUNOFF FOR THE STATED FREQUENCY STORM OF 24-HOUR DURATION. STREAM RESTORATION AND RELOCA
Soils containing other lead to foundation dis during design and con FEATU	URES & SYMBOLS
	FB THE TROY BIGGS Lic. No. 041116

#### HED ON ANY PORTION OF THE SITE. TEMPORARY SOIL STABILIZATION THAN 14 DAYS. PERMANENT STABILIZATION SHALL BE APPLIED TO

- PPING MEASURES. THE APPLICANT IS RESPONSIBLE FOR THE ONALLY TRANSPORTED FROM THE PROJECT SITE. IT VEGETATION SHALL NOT BE CONSIDERED ESTABLISHED UNTIL A
- ISTRUCTED AS A FIRST STEP IN ANY LAND-DISTURBING ACTIVITY AND
- LATION.
- Y THE TRAP OR BASIN. ONLY CONTROL DRAINAGE AREAS LESS THAN THREE ACRES. ACRES SHALL BE CONTROLLED BY A SEDIMENT BASIN. THE MINIMUM T A MINIMUM, MAINTAIN THE STRUCTURAL INTEGRITY OF THE BASIN ARE EARTH CONDITION OR THOSE CONDITIONS EXPECTED TO EXIST
- ) TO BE ERODING EXCESSIVELY WITHIN ONE YEAR OF PERMANENT
- NT CHANNEL, FLUME OR SLOPE DRAIN STRUCTURE.
- CANNOT ENTER THE CONVEYANCE SYSTEM WITHOUT FIRST BEING
- AND ANY REQUIRED TEMPORARY OR PERMANENT CHANNEL LINING
- NT TRANSPORT AND STABILIZE THE WORK AREA TO THE GREATEST ERDAMS. EARTHEN FILL MAY BE USED FOR THESE STRUCTURES IF
- Y VEHICULAR STREAM CROSSING CONSTRUCTED OF NONERODIBLE

#### CRITERIA:

- BOTH, AND DISCHARGED IN A MANNER THAT DOES NOT ADVERSELY ATION.
- ANSPORT OF SEDIMENT BY VEHICULAR TRACKING ONTO THE PAVED GHLY AT THE END OF THE DAY. SEDIMENT SHALL BE REMOVED FROM LOWED ONLY AFTER SEDIMENT IS REMOVED IN THIS MANNER. THIS
- ER THE TEMPORARY MEASURES ARE NO LONGER NEEDED, UNLESS ION OF TEMPORARY MEASURES SHALL BE PERMANENTLY STABILIZED
- AND DAMAGE DUE TO INCREASES IN VOLUME, VELOCITY AND PEAK CATION PROJECTS THAT INCORPORATE NATURAL CHANNEL DESIGN URAL AND MAN-MADE CHANNELS.

- 1. NO DISTURBED AREA WHICH IS NOT ACTIVELY BEING WORKED SHALL REMAIN DENUDED FOR MORE THAN 7 CALENDAR DAYS UNLESS OTHERWISE AUTHORIZED BY THE DIRECTOR.
- 2. ALL EROSION AND SEDIMENT (E&S) CONTROL MEASURES APPROVED WITH THE PHASE ONE E&S CONTROL PLAN MUST BE PLACED AS THE FIRST STEP IN GRADING.
- 3. ALL STORM AND SANITARY SEWER LINES NOT IN STREETS MUST BE SEEDED AND MULCHED WITHIN 14 DAYS AFTER BACKFILL. NO MORE THAN 500 LINEAR FEET OF TRENCH MAY BE OPEN AT ANY ONE TIME.
- 4. ELECTRIC POWER, TELEPHONE, AND GAS SUPPLY TRENCHES SHALL BE COMPACTED, SEEDED AND MULCHED WITHIN 14 DAYS AFTER BACKFILL.
- ALL TEMPORARY EARTH BERMS, DIVERSIONS AND SEDIMENT CONTROL DAMS MUST BE SEEDED AND MULCHED FOR TEMPORARY VEGETATIVE COVER IMMEDIATELY (AS SOON AS POSSIBLE BUT NO LATER THAN 48 HOURS) AFTER COMPLETION OF GRADING. STRAW OR HAY MULCH IS REQUIRED. ALL SOIL STOCKPILES MUST BE SEEDED AND MULCHED WITHIN 14 DAYS AFTER GRADING.
- 6. DURING CONSTRUCTION, ALL STORM SEWER INLETS MUST BE PROTECTED BY SEDIMENT TRAPS, MAINTAINED AND MODIFIED DURING CONSTRUCTION PROGRESS AS REQUIRED.
- ANY DISTURBED AREA NOT COVER BY § 11-0304.1 AND NOT PAVED, SODDED OR BUILT UPON BY NOVEMBER 1, OR DISTURBED AFTER THAT DATE. MUST BE MULCHED IMMEDIATELY WITH HAY OR STRAW MULCH AT THE RATE OF 2 TONS/ACRE AND OVER-SEEDED BY APRIL
- 8. AT THE COMPLETION OF ANY PROJECT CONSTRUCTION AND BEFORE BOND RELEASE, ALL TEMPORARY SEDIMENT CONTROL MEASURES MUST BE REMOVED AND ALL DENUDED AREAS MUST BE STABILIZED.
- 9. PROVISION FOR DUST CONTROL SHALL BE MADE IN ACCORDANCE WITH STD. AND SPEC. 3.39 OF VESCH.

## **EROSION AND SEDIMENT CONTROL NARRATIVE**

PROJECT DESCRIPTION: THIS PROJECT CONSISTS OF RESTORING A PORTION OF THE SUGARLAND RUN STREAM CORRIDOR BEGINNING AT THE WASHINGTON & OLD DOMINION BRIDLE TRAIL PEDESTRIAN BRIDGE AND ENDING AT THE SUGARLAND RUN TRAIL BRIDGE. THE PROPOSED STREAM LENGTH IS 1354 LINEAR FEET. RESTORATION ACTIVITIES SHALL INCLUDE: RECONFIGURING THE STREAM CHANNEL THROUGH A CUT AND FILL OPERATION TO ACHIEVE SELF-MAINTAINING FORM; INCORPORATING LOG AND NATURAL ROCK BOULDER STRUCTURES TO PROMOTE STABILITY AND ENHANCE AQUATIC HABITAT; PLANTING DISTURBED AREAS WITH A VARIETY OF NATIVE TREES, SHRUBS, AND HERBACEOUS MATERIALS TO PROMOTE LONG-TERM STABILITY, INCREASE HABITAT AND DIVERSITY, AND ENHANCE VISUAL VALUE THROUGHOUT THE STREAM CORRIDOR. PROPOSED LIMITS OF DISTURBANCE ARE 2.63 ACRES.

EXISTING SITE CONDITION: AT THE DOWNSTREAM PROJECT EXTENTS, BEAR BRANCH DRAINS APPROXIMATELY 0.79 SQUARE MILES. THE WATERSHED IS HIGHLY URBANIZED, APPROXIMATELY 67% DEVELOPED. THE MAJORITY OF THE STREAM CORRIDOR IS UNSTABLE AND ERODING DUE TO DEVELOPMENT OF THE WATERSHED.

ADJACENT AREAS: THIS PROJECT SITE IS LOCATED WITHIN THE WOODED AREA IN THE UPSTREAM PORTION BETWEEN THE PATRICK ST SW AND HOUSES ALONG COTTAGE ST SW AND ROSS DR SW. THE ADJACENT PROPERTIES ARE COMPRISED OF RESIDENTIAL SINGLE FAMILY HOMES. THE CONTRACTOR SHALL ENSURE THAT CONSTRUCTION ACTIVITIES DO NOT ADVERSELY IMPACT AREAS OUTSIDE OF THE PROPOSED LIMITS OF DISTURBANCE.

OFF-SITE AREAS:

OFF SITE DISPOSAL OF SURPLUS OR UNSUITABLE EXCAVATION, STREAM CROSSINGS, CONCRETE, FALLEN TREES AND OTHER DEBRIS SHALL BE CONDUCTED IN ACCORDANCE WITH ALL APPLICABLE FEDERAL, STATE, AND LOCAL ORDINANCES.

CRITICAL AREAS: PROPOSED SLOPES STEEPER THAN 3:1 SHALL BE PROTECTED WITH COIR MATTING AND PLANTINGS AS SPECIFIED IN THE CONSTRUCTION DOCUMENTS AND SPECIFICATIONS. THE CONTRACTOR SHALL BE RESPONSIBLE FOR MINIMIZING EROSION AND SEDIMENTATION WITHIN THE LIMITS OF DISTURBANCE THROUGHOUT THE DURATION OF THE CONSTRUCTION PERIOD IN ACCORDANCE WITH ALL APPLICABLE, LOCAL, STATE, AND FEDERAL REGULATIONS.

SOILS:

SOILS INFORMATION WAS OBTAINED FROM THE FAIRFAX COUNTY SOIL SURVEY AND THE UNITED STATES DEPARTMENT OF AGRICULTURE (USDA) NATURAL RESOURCES CONSERVATION SERVICE (NRCS) WEB SOIL SURVEY (WSS). SOILS BOUNDARIES ARE SHOWN ON THE SOILS MAP ON SHEET 10; EACH SOIL TYPE IS IDENTIFIED BY ALPHA-NUMERIC SYMBOLS. DESCRIPTIONS AND RATINGS OF EACH SOIL TYPE MAY FOUND FOUND IN THE TABLE ON SHEET 10.

EROSION AND SEDIMENT CONTROL MEASURES: EROSION AND SEDIMENT CONTROL MEASURES ARE PROVIDED ON THE CONSTRUCTION DOCUMENTS AND CONSIST OF BUT NOT LIMITED TOO CONSTRUCTION ENTRANCES. STRUCTURAL STREAMBANK STABILIZATION, DEWATERING, TREE PRESERVATION AND PROTECTION, TEMPORARY SEEDING, AND PERMANENT SEEDING.

PERMANENT STABILIZATION: AND SPECIFICATIONS.

				SELECTED	PROPERTIES A	ND SOIL PROPER	TIES	-			-
SOIL NUMBER	SOIL NAME <sup>1</sup>	SOIL PROBLEM CLASS <sup>2</sup>	HYDROLOGIC SOIL GROUP <sup>3</sup>	SOIL EROSION FACTOR <sup>4</sup> SURFACE K	SOIL EROSION FACTOR <sup>4</sup> CRITICAL K	SOIL EROSION FACTOR <sup>4</sup> T (tons/acre-year)	SUBSOIL PERMEABILITY RATE <sup>5</sup> (in/hr)	DEPTH TO WATER TABLE <sup>6</sup> (ft)	DEPTH TO HARD BEDROCK <sup>7</sup> (ft)	SOIL DRAINAGE <sup>8</sup>	EROSION POTENTIAL <sup>9</sup>
30A	CODORUS AND HATBORO SOILS*	111	D	0.3700	0.3700	4	0.6 TO 2.0	0.0 TO 2.0	8 TO 20	POOR - W,F	LOW
39C & 39D	GLENELG SILT LOAM	I	В	0.3700	0.3700	5	0.6 TO 2.0	>6	5 TO 100	GOOD	HIGH
102	WHEATON LOAM	IVB	D	0.3200	0.3200	5	0.06 TO 0.2	>6	>5	FAIR - S	HIGH
105C	WHEATON - GLENELG COMPLEX*	IVB	D	0.3700	0.3700	5	0.06 TO 2.0	>6	>5	GOOD	HIGH

<sup>1</sup>SOIL NAMES SOIL NAMES ARE TAKEN FROM THE NRCS SOIL SURVEY OF FAIRFAX COUNTY, VIRGINIA. ISSUED JANUARY 2008. SOIL NAMES WERE FORMULATED USING THE USDA NATURAL RESOURCES CONSERVATION SERVICE'S SOIL TAXONOMY: 2ND ED.

#### \* COMPLEXES AND ASSOCIATIONS

COMPLEXES AND ASSOCIATIONS HAVE TWO OR MORE SOILS INCLUDED IN THE SAME MAP UNIT. COMPLEXES CONSIST OF SOILS THAT ARE INTERTWINED IN THE NATURAL LANDSCAPE AND COULD NOT BE MAPPED SEPARATELY AT THE SCALE OF THE CURRENT SOIL SURVEY.

#### <sup>2</sup> SOIL PROBLEM CLASS

BASED ON THE SEVERITY OF PROBLEMS ASSOCIATED WITH THESE SOILS AND THE POTENTIAL DIFFICULTY OF ANALYZING AND CORRECTING THOSE PROBLEMS, SOILS ARE GROUPED INTO 4 CLASSES: I, II, III AND IV: CLASS I SOILS - ARE UNDISTURBED NATURAL SOILS THAT TYPICALLY HAVE FEW

CHARACTERISTICS THAT WOULD ADVERSELY AFFECT BUILDING FOUNDATIONS OR SURROUNDING LAND.

CLASS II SOILS - ARE UNDISTURBED NATURAL SOILS THAT TYPICALLY HAVE SHALLOW WATER TABLES OR RESTRICTIVE SOIL LAYERS.

CLASS III SOILS - ARE UNDISTURBED NATURAL SOILS THAT HAVE CHARACTERISTICS

SUCH AS HIGH SHRINK/SWELL POTENTIAL, LANDSLIDE SUSCEPTIBILITY, HIGH COMPRESSIBILITY, LOW BEARING STRENGTH, AND SHALLOW WATER TABLES, WHICH MAY RESULT IN POOR DRAINAGE, BUILDING SETTLEMENT, UNSTABLE SLOPES, ETC.

CLASS IVB SOILS - ARE SOILS THAT HAVE BEEN DISTURBED OR ALTERED AS A RESULT OF GRADING OR CONSTRUCTION RESULTING IN SOILS WITH VARIABLE CHARACTERISTICS. CLASS IVB

SOILS ARE DISTURBED SOILS THAT WERE ORIGINALLY CLASS I OR II SOILS.

MOVES PERMEABILITY OF THE LEAST PERMEABLE SUBSURFACE LAYER. <sup>6</sup> WATER TABLE

<sup>3</sup> HYDROLOGIC SOIL GROUP

FOR PRODUCING RUNOFF.

<sup>4</sup> SOIL EROSION FACTORS

UNIVERSAL SOIL LOSS EQUATION.

IN FEET, FOR EACH SOIL LAYER.

<sup>5</sup> SUBSOIL PERMEABILITY

500 FT

						CLIENT: TOWN OF VIENNA	DRAWN BY: AEA / JH	PROJECT: BEAR BRANCH STREAM RESTORATION 100% IFB CONSTRUCTION DOCUMENT	PROJECT NO.: 752620V001
						127 CENTER STREET SOUTH VIENNA, VA 22180	CHECKED BY:	SOUTHSIDE PARK	DATE:
						,	МТВ	1315 ROSS DR. SW, VIENNA, VA 22181	28 JULY 2023
						ENGINEER:	APPROVED BY:	SHEET TITLE:	DWG. SIZE
	0 28	JUL 2023	IFB SUBMISSION		МТВ	WSP Environment & Infrastructure Solutions 4795 Meadow Wood Lane, Suite 310 East Chantilly, VA 20151-1678	МТВ	EROSION & SEDIMENT CONTROL	ARCH D
ENNA	0 20	JUL 2023		JDH	IVIID		SCALE:		SHEET NUMBER:
	NO. DD	MON YYYY	ISSUE / REVISION DESCRIPTION	ENG.	APPR.	Tel. (703) 488-3700 www.WSP.com	NOT TO SCALE	NOTES	11 OF 41



ALL AREAS DISTURBED BY CONSTRUCTION SHALL BE STABILIZED PER THE DETAILS

#### GENERAL EROSION AND SEDIMENT CONTROL NOTES

- UNLESS OTHERWISE INDICATED. ALL VEGETATIVE AND STRUCTURAL EROSION AND SEDIMENT CONTROL PRACTICES WILL BE CONSTRUCTED AND MAINTAINED ACCORDING TO MIMIMUM STANDARDS AND SPECIFICATIONS OF THE VIRGINIA EROSION AND SEDIMENT CONTROL HANDBOOK AND VIRGINIA REGULATIONS 4VAC50-30 EROSION AND SEDIMENT CONTROL REGULATIONS.
- 2. THE PLAN APPROVING AUTHORITY MUST BE NOTIFIED ONE WEEK PRIOR TO THE PRECONSTRUCTION CONFERENCE, ONE WEEK PRIOR TO THE COMMENCEMENT OF LAND DISTURBING ACTIVITY, AND ONE WEEK PRIOR TO THE FINAL INSPECTION.
- 3. ALL EROSION AND SEDIMENT CONTROL MEASURES ARE TO BE PLACED PRIOR TO OR AS THE FIRST STEP IN CLEARING.
- A COPY OF THE APPROVED EROSION AND SEDIMENT CONTROL PLAN SHALL BE MAINTAINED ON THE SITE AT ALL TIMES.
- PRIOR TO COMMENCING LAND DISTURBING ACTIVITIES IN AREAS OTHER THAN INDICATED ON THESE PLANS (INCLUDING BUT NOT LIMITED TO, OFF-SITE BORROW OR WASTE AREAS), THE CONTRACTOR SHALL SUBMIT A SUPPLEMENTARY EROSION CONTROL PLAN TO THE OWNER FOR REVIEW AND APPROVAL BY THE PLAN APPROVING AUTHORITY.
- THE CONTRACTOR IS RESPONSIBLE FOR INSTALLATION OF ANY ADDITIONAL EROSION CONTROL MEASURES NECESSARY TO PREVENT EROSION AND SEDIMENTATION AS DETERMINED BY THE PLAN APPROVING AUTHORITY.
- ALL DISTURBED AREAS ARE TO DRAIN TO APPROVED SEDIMENT CONTROL MEASURES AT ALL TIMES DURING LAND DISTURBING ACTIVITIES AND DURING SITE DEVELOPMENT UNTIL FINAL STABILIZATION IS ACHIEVED.
- DURING DEWATERING OPERATIONS. WATER WILL BE PUMPED INTO AN APPROVED FILTERING DEVICE.
- 9. THE CONTRACTOR SHALL INSPECT ALL EROSION CONTROL MEASURES PERIODICALLY AND AFTER EACH RUNOFF-PRODUCING RAINFALL EVENT. ANY NECESSARY REPAIRS OR CLEANUP TO MAINTAIN THE EFFECTIVENESS OF THE EROSION CONTROL DEVICES SHALL BE MADE IMMEDIATELY.
- 10. CONTRACTOR SHALL USE NECESSARY MATERIALS (I.E. GRAVEL, WOVEN GEOTEXTILE FILTER FABRIC, MULCH) IN SENSITIVE AREAS AROUND CRITICAL ROOT ZONES AND TO MAINTAIN STABLE, INTERNAL TEMPRORAY ACCESS PATHS. WHERE COMPACTION MIGHT OCCUR DUE TO TRAFFIC OR MATERIALS THROUGH THE TREE PROTECTION ZONE, THE AREA MUST FIRST BE MULCHED WITH A MINIMUM FOUR-INCH LAYER OF PROCESSED PINE BARK OR WOOD CHIPS, A SIX INCH LAYER OF PINE STRAW, OR AN APPROVED SPECIALIZED MAT. EQUIPMENT OR MATERIALS STORAGE SHALL NOT BE ALLOWED WITHIN TREE PROTECTION ZONE AREAS.
- 11. CONSTRUCTION EQUIPMENT TRACKS AND ACCESS PATHS SHALL BE GRADED AND RE-CONTOURED AFTER CONSTRUCTION TO PREVENT RILL EROSION.

SOILS HYDROLOGIC GROUPS HAVE BEEN DEFINED BY THE USDA SOIL CONSERVATION SERVICE. SOILS ARE ASSIGNED TO ONE OF FOUR GROUPS BASED ON THE POTENTIAL

#### THE K FACTOR IS AN INDICATOR OF THE SUSCEPTIBILITY OF THE SOIL TO SHEET AND RILL EROSION. K FACTORS WERE DETERMINED USING THE SOIL ERODIBILITY NOMOGRAPH IN THE NATIONAL SOILS HANDBOOK (USDA SOILS CONSERVATION SERVICE 1983) AND ARE SPECIFIC TO THE SOILS OF FAIRFAX COUNTY. THE K FACTOR MAY VARY FOR EACH LAYER WITHIN THE SOIL. THE SURFACE K FACTOR REFERS TO ERODIBILITY OF THE UNDISTURBED SOIL SURFACE. THE CRITICAL K FACTOR IS THE MAXIMUM SOIL ERODIBILITY THAT CAN BE EXPECTED DURING CONSTRUCTION ACTIVITIES. THE T FACTOR REPRESENTS THE MAXIMUM TOLERABLE RATE OF ANNUAL SOIL EROSION, IN TONS PER ACRE, THAT WILL PERMIT SUSTAINABLE VEGETATIVE GROWTH. THE T FACTOR IS THE SOIL LOSS TOLERANCE VARIABLE USED IN THE

PERMEABILITY IS EXPRESSED AS A RATE, IN INCHES PER HOUR, IN WHICH WATER DOWNWARD THROUGH THE SOIL. SUBSURFACE PERMEABILITY REFERS TO THE

THE SEASONAL HIGH WATER TABLE IS DEFINED AS THE HIGHEST LEVEL OF A SATURATED ZONE OF A SOIL DURING MOST YEARS. THIS DEPTH IS GIVEN AS AVERAGE,

#### <sup>7</sup> DEPTH TO BEDROCK

THE DEPTH TO HARD BEDROCK IS DEFINED AS THE DEPTH AT WHICH ROCK CAN NO LONGER BE EXCAVATED WITH A BACKHOE, SMALL RIPPER OR A GRADER. BLASTING OR SPECIAL EQUIPMENT IS TYPICALLY NECESSARY FOR EXCAVATION BELOW THIS DEPTH. THE RANGE GIVEN FOR EACH SOIL IS TYPICAL FOR THAT SOIL TYPE, HOWEVER, SOME EXCEPTIONS MAY BE ENCOUNTERED IN EACH TYPE.

#### <sup>8</sup> SOIL DRAINAGE

SOIL CONDITIONS THAT AFFECT DRAINAGE INCLUDE DEPTH TO SEASONAL HIGH WATER TABLE, PERMEABILITY, LANDSCAPE POSITION AND POTENTIAL FOR FLOODING. SOILS WITH A "POOR" RATING HAVE A SEASONAL HIGH WATER TABLE AT OR NEAR THE SURFACE, PERMEABLE LAYERS WITH SLOW INFILTRATION RATES OR ARE SUBJECT TO FREQUENT FLOODING. A "GOOD" RATING REFERS TO PERMEABLE SOILS WITH A SEASONAL WATER TABLE WELL BELOW THE GROUND SURFACE.

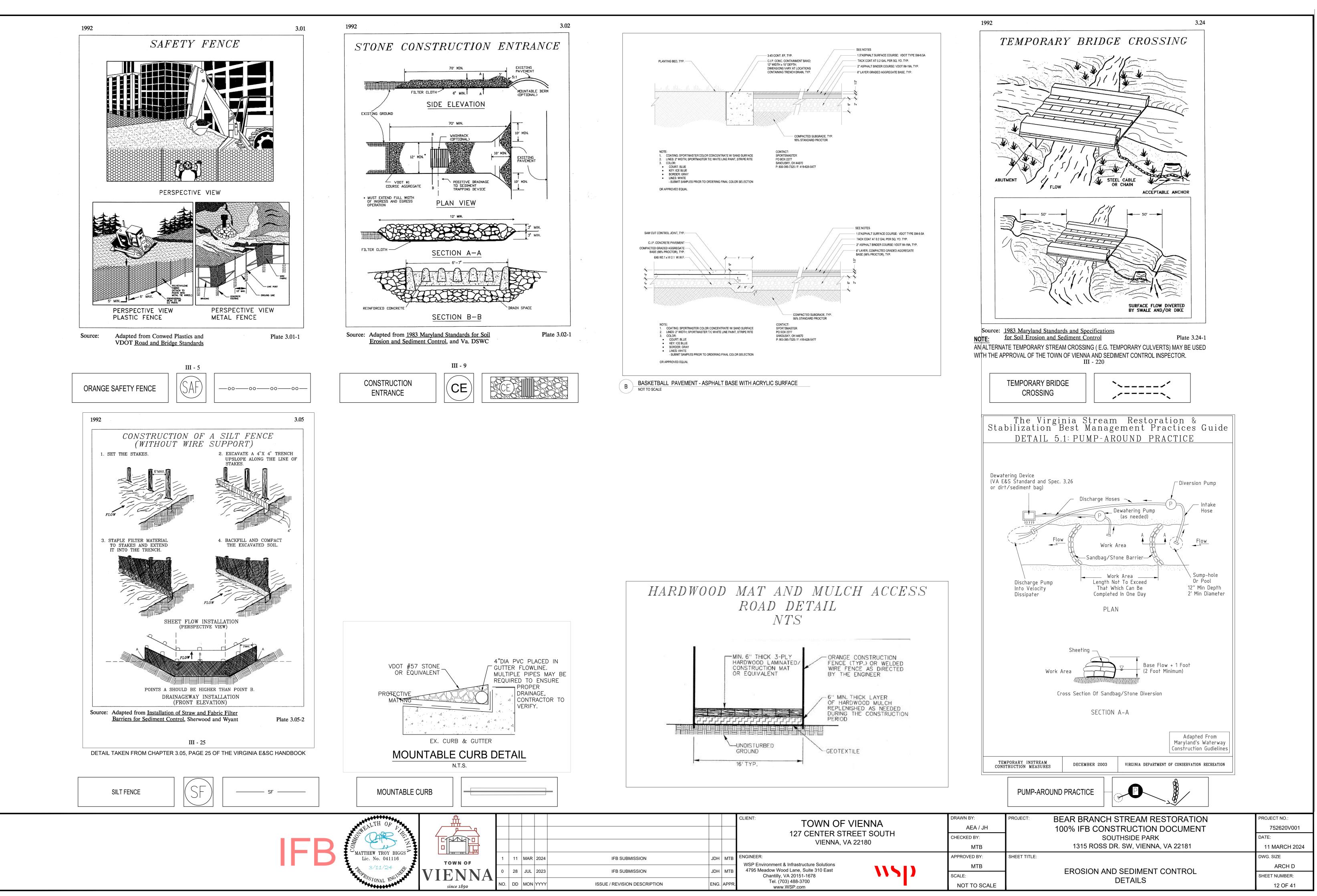
#### <sup>9</sup> EROSION POTENTIAL

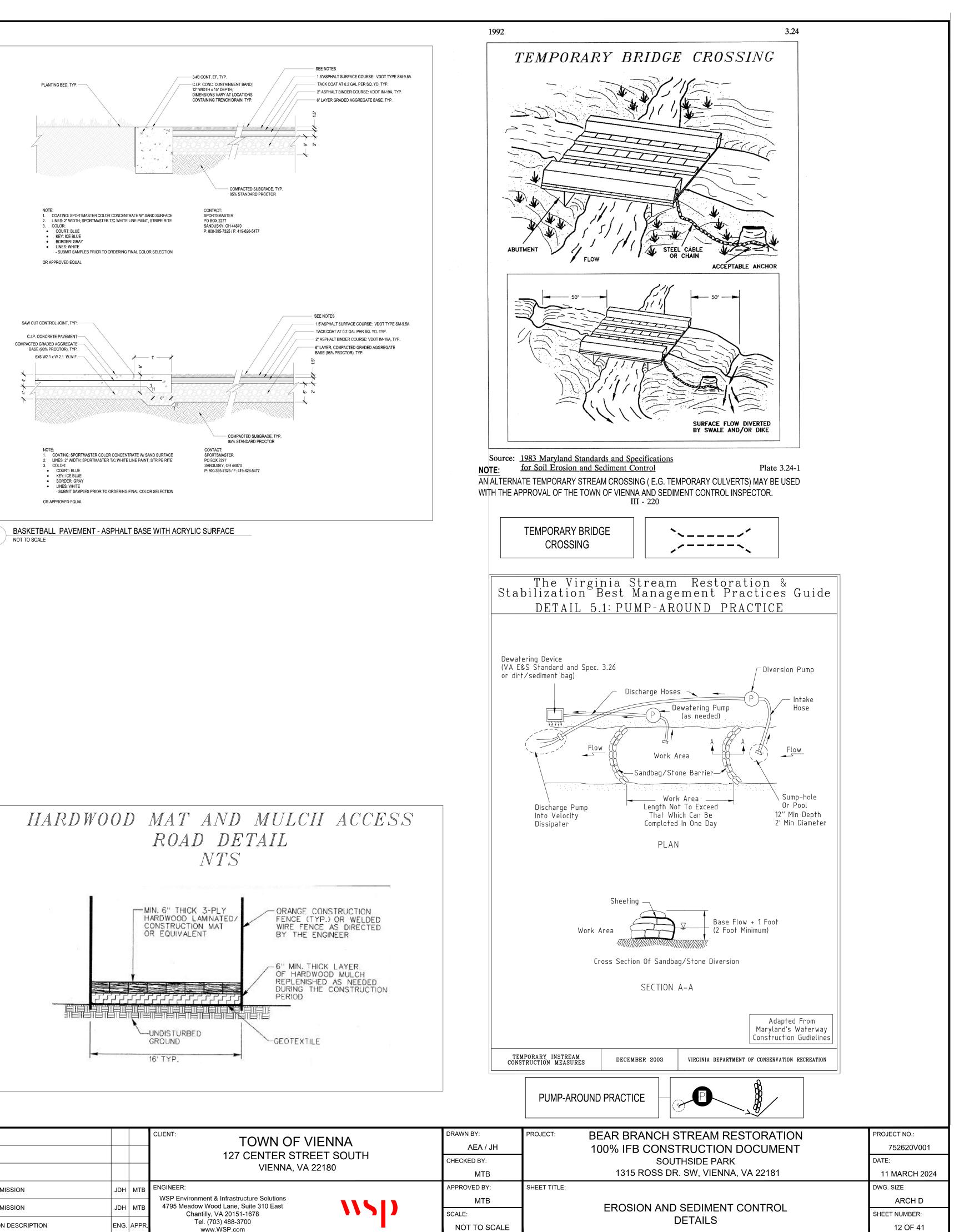
EROSION POTENTIAL APPLIES TO SOILS UNDER CONSTRUCTION SITE CONDITIONS. ERODIBILITY IS AFFECTED BY TEXTURE (RELATIVE PROPORTION OF SAND, SILT AND CLAY), ROCK CONTENT, PERMEABILITY, STRUCTURE AND SLOPE (EITHER NATURAL OR MAN-MADE).

#### LOW - SOILS ARE NOT HIGHLY ERODIBLE EXCEPT ON STEEP UNPROTECTED CUTS. EROSION OF LESS THAN 0.05 INCHES FROM SHEET-FLOW RUNOFF CAN BE EXPECTED ON UNPROTECTED SOILS DURING A SEVERE STORM.

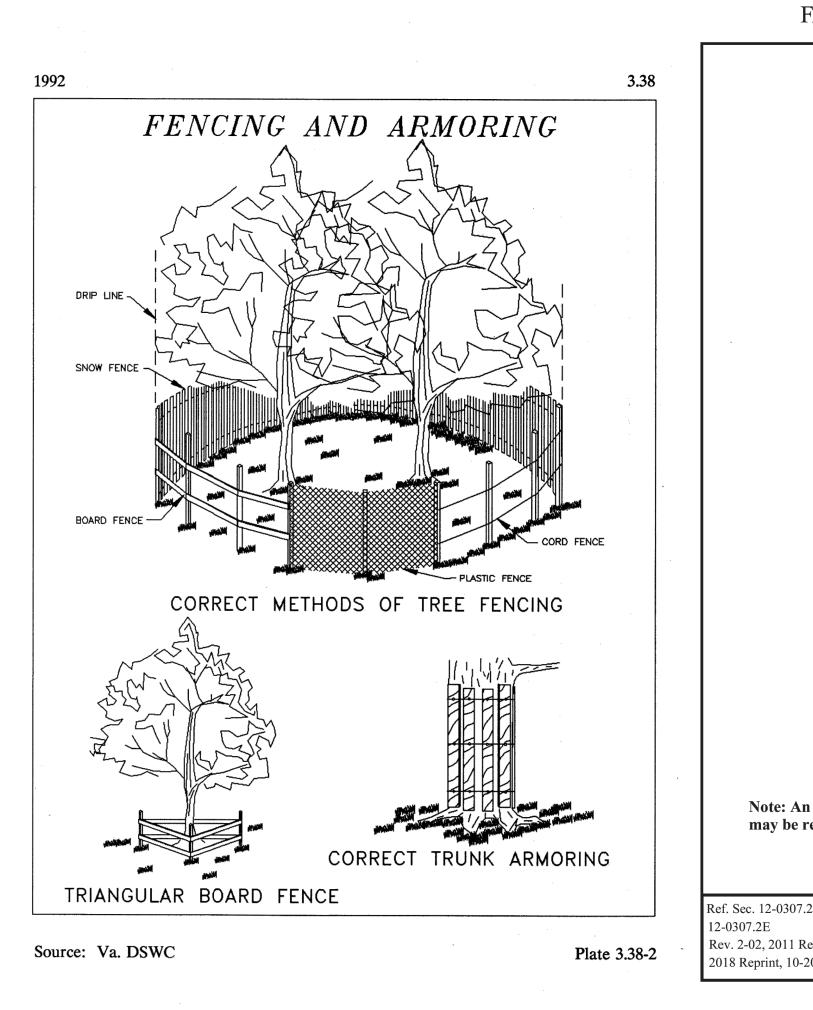
MODERATE - SOILS ARE MODERATELY ERODIBLE ON B SLOPES AND HIGHLY ERODIBLE ON C SLOPES OR GREATER. EROSION OF 0.05 TO 0.25 INCHES FROM SHEET-FLOW RUNOFF PLUS RILL AND SHALLOW GULLY EROSION CAN BE EXPECTED ON UNPROTECTED SOILS DURING A SEVERE STORM.

HIGH - SOILS WHICH ARE HIGHLY ERODIBLE EVEN ON B SLOPES. SOIL LOSS IN EXCESS OF 0.25 INCHES FROM SHEET-FLOW RUNOFF EROSION AND THE FORMATION OF NUMEROUS GULLIES CAN BE EXPECTED ON UNPROTECTED SOILS IN A SEVERE STORM.

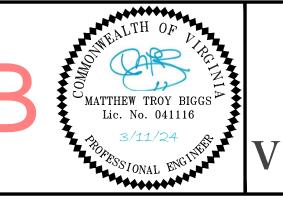




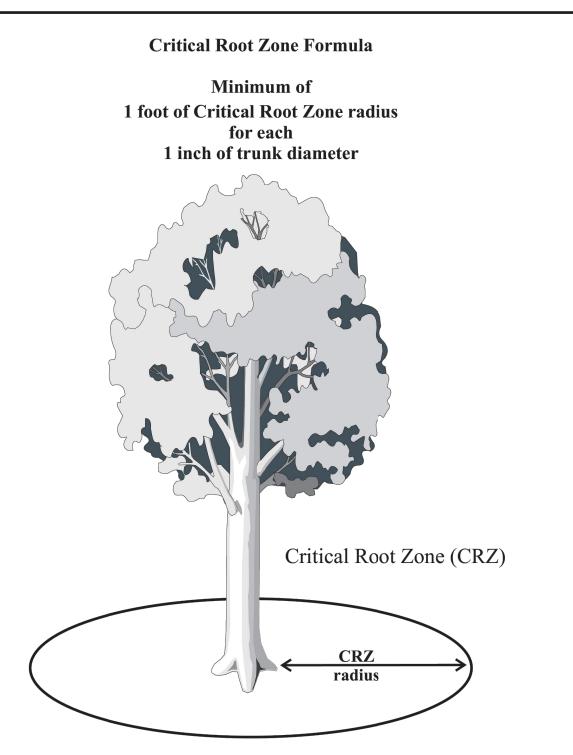
## TREE PRESERVATION DETAILS



III - 401

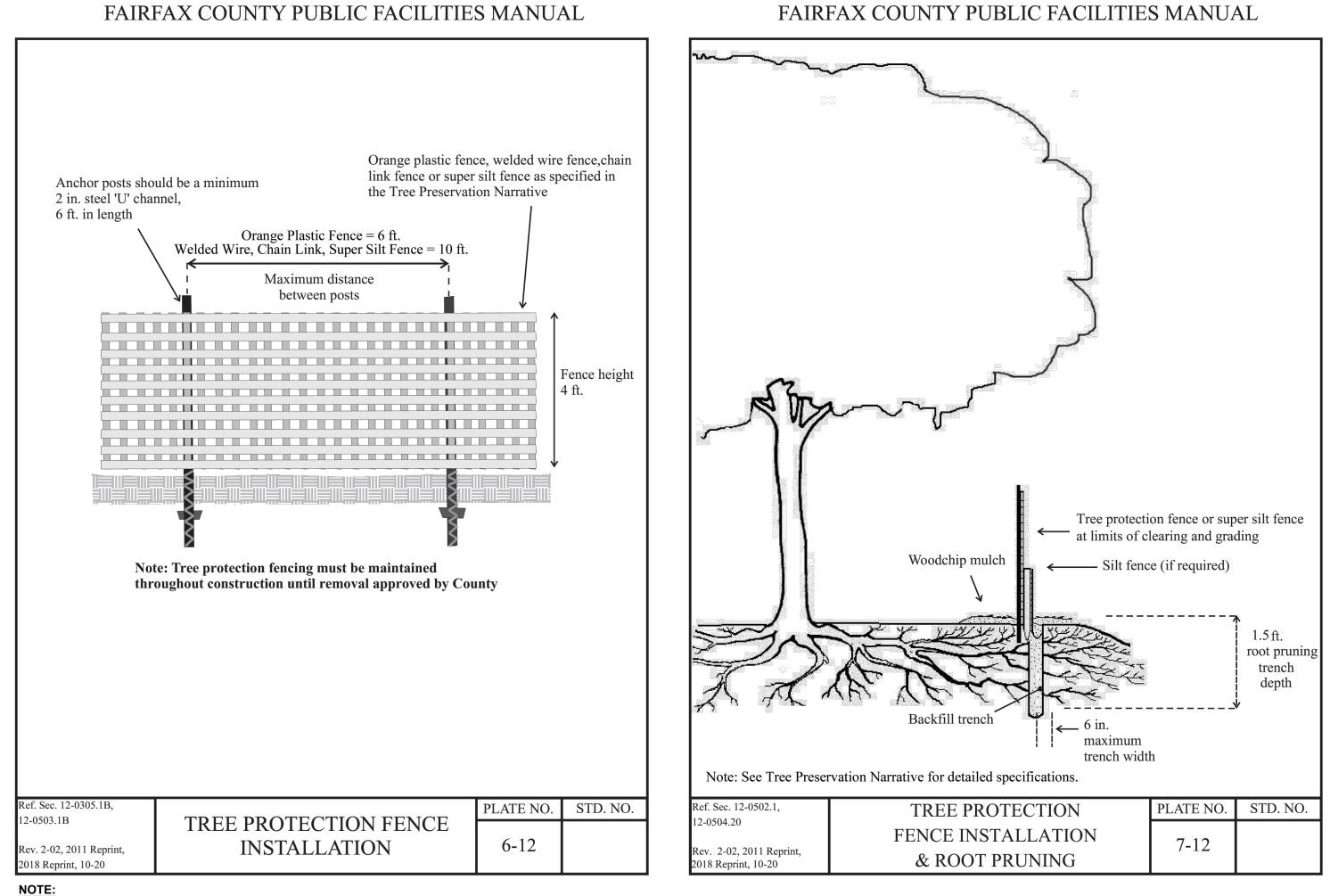


## FAIRFAX COUNTY PUBLIC FACILITIES MANUAL



Note: An increase in critical root zone radius to a total of 1.5 feet/inch of trunk diameter may be required in some instances based on site specific conditions (see 12-0307.2D(2)).

.2D,		PLATE NO	STD NO
Reprint, 20	CRITICAL ROOT ZONES OF TREES	2-12	



NOTE:

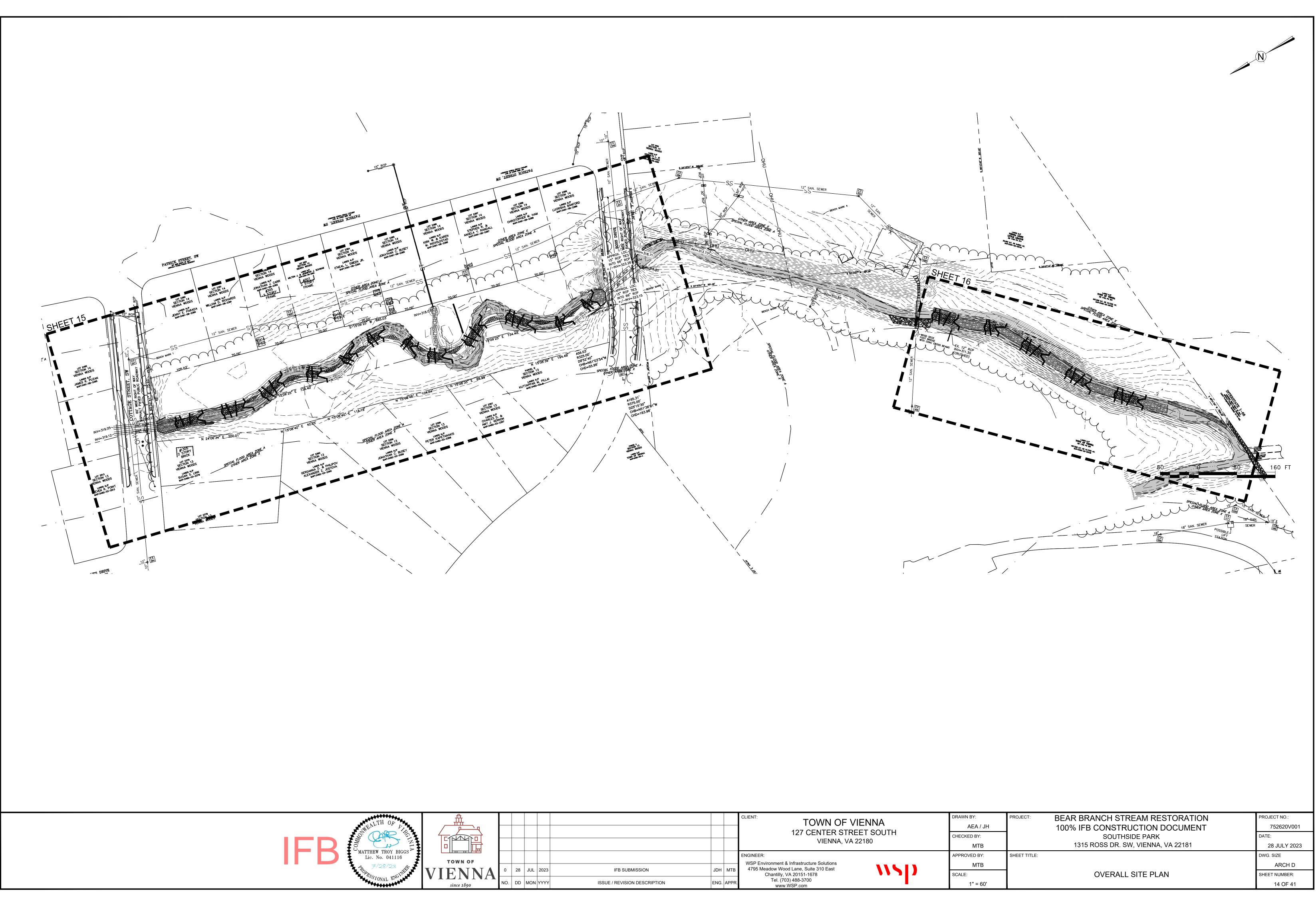
1. SIGNS SHALL BE INSTALLED ON TREE PROTECTION FENCE VISIBLE ON ALL SIDE OF THE FENCED-IN AREA (AT LEAST ONE EVERY 150 LINEAR FEET). THE SIZE OF EACH SIGN MUST BE A MINIMUM OF TWO (2) FEET BY TWO (2) FEET AND SHALL

CONTAIN THE FOLLOWING LANGUAGE: "TREE PROTECTION ZONE: KEEP OUT." 2. WELDED WIRE FENCE SHALL BE USED FOR TREE PROTECTION FENCING WITHIN THE LOD.

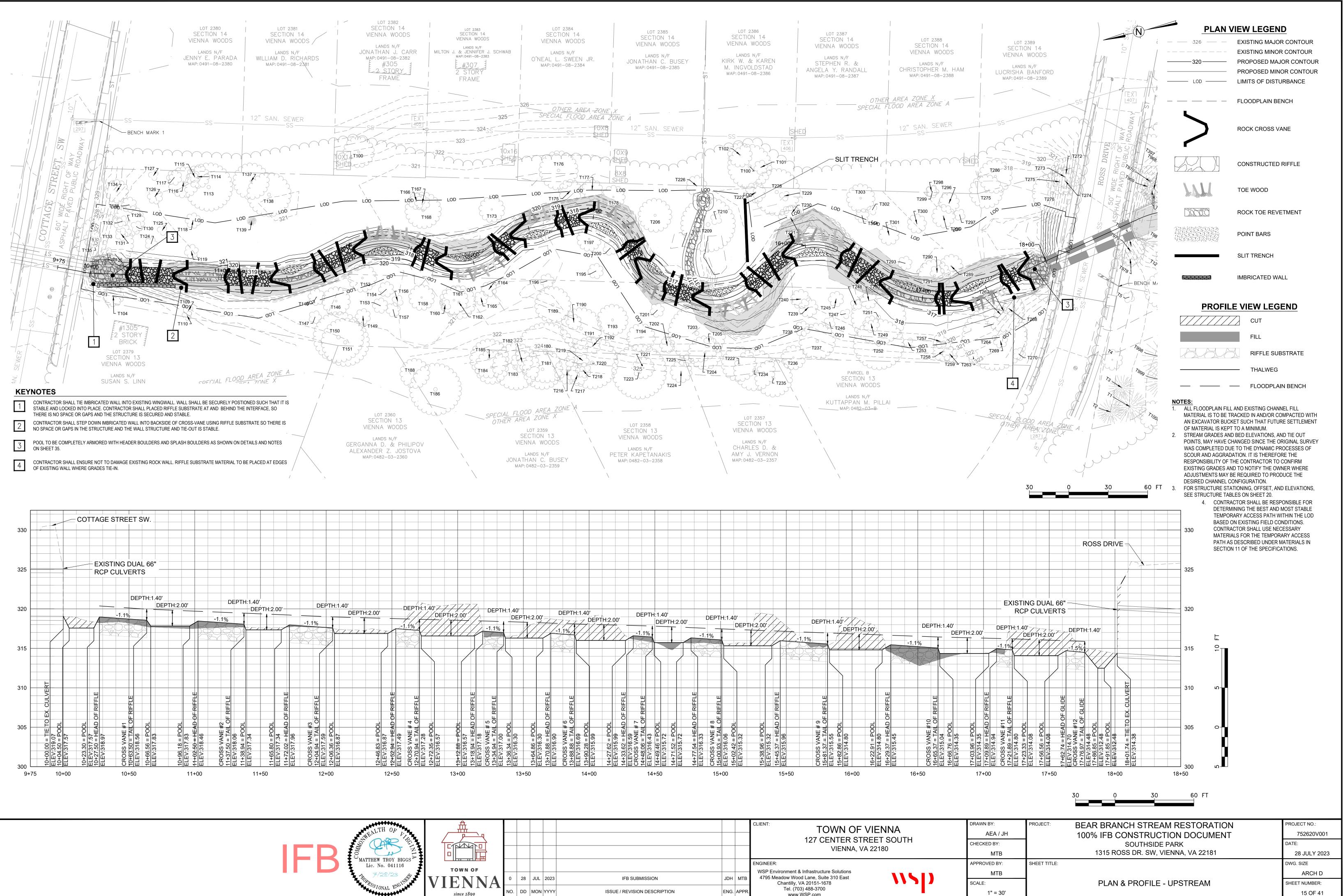
							CLIENT: TOWN OF VIENNA 127 CENTER STREET SOUTH VIENNA, VA 22180	DRAWN BY: AEA / JH CHECKED BY: MTB	PROJECT:	BEAR BRANCH STREAM RESTORATION 100% IFB CONSTRUCTION DOCUMENT SOUTHSIDE PARK 1315 ROSS DR. SW, VIENNA, VA 22181	PROJECT NO.: 752620V001 DATE: 11 MARCH 2024
	1 .	1 MAF	2024	IFB SUBMISSION	JDH	МТВ	ENGINEER:	APPROVED BY:	SHEET TITLE:		DWG. SIZE
	0 /	28 JUL	2022	IFB SUBMISSION		МТВ	WSP Environment & Infrastructure Solutions 4795 Meadow Wood Lane, Suite 310 East Chaptilly, VA 20151-1678	МТВ			ARCH D
IENNA			2023		JDH			SCALE:		TREE PRESERVATION DETAILS	SHEET NUMBER:
	NO. E	IOM D	IYYYY	ISSUE / REVISION DESCRIPTION	ENG.	APPR.	Tel. (703) 488-3700 www.WSP.com	NOT TO SCALE			13 OF 41



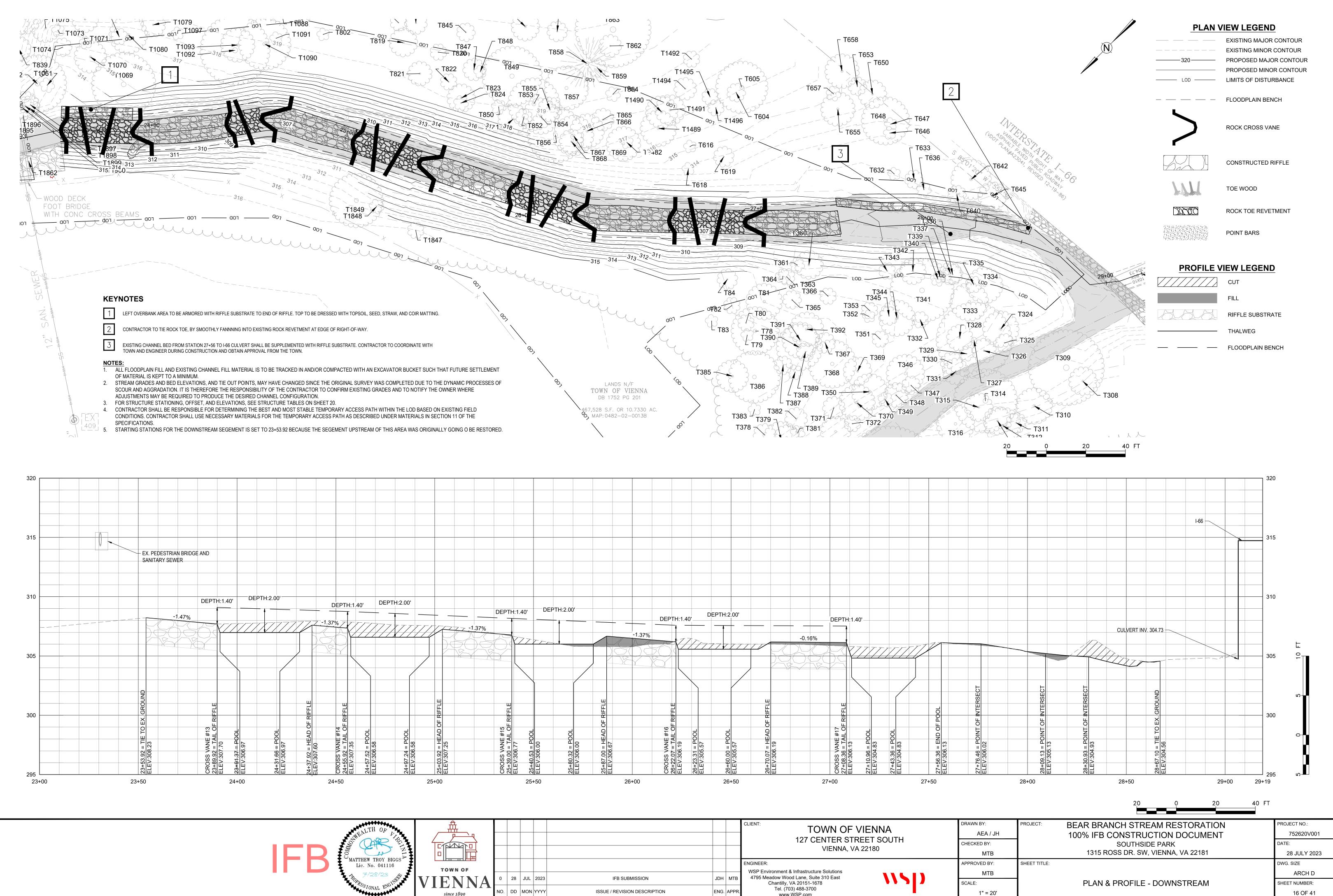
## FAIRFAX COUNTY PUBLIC FACILITIES MANUAL



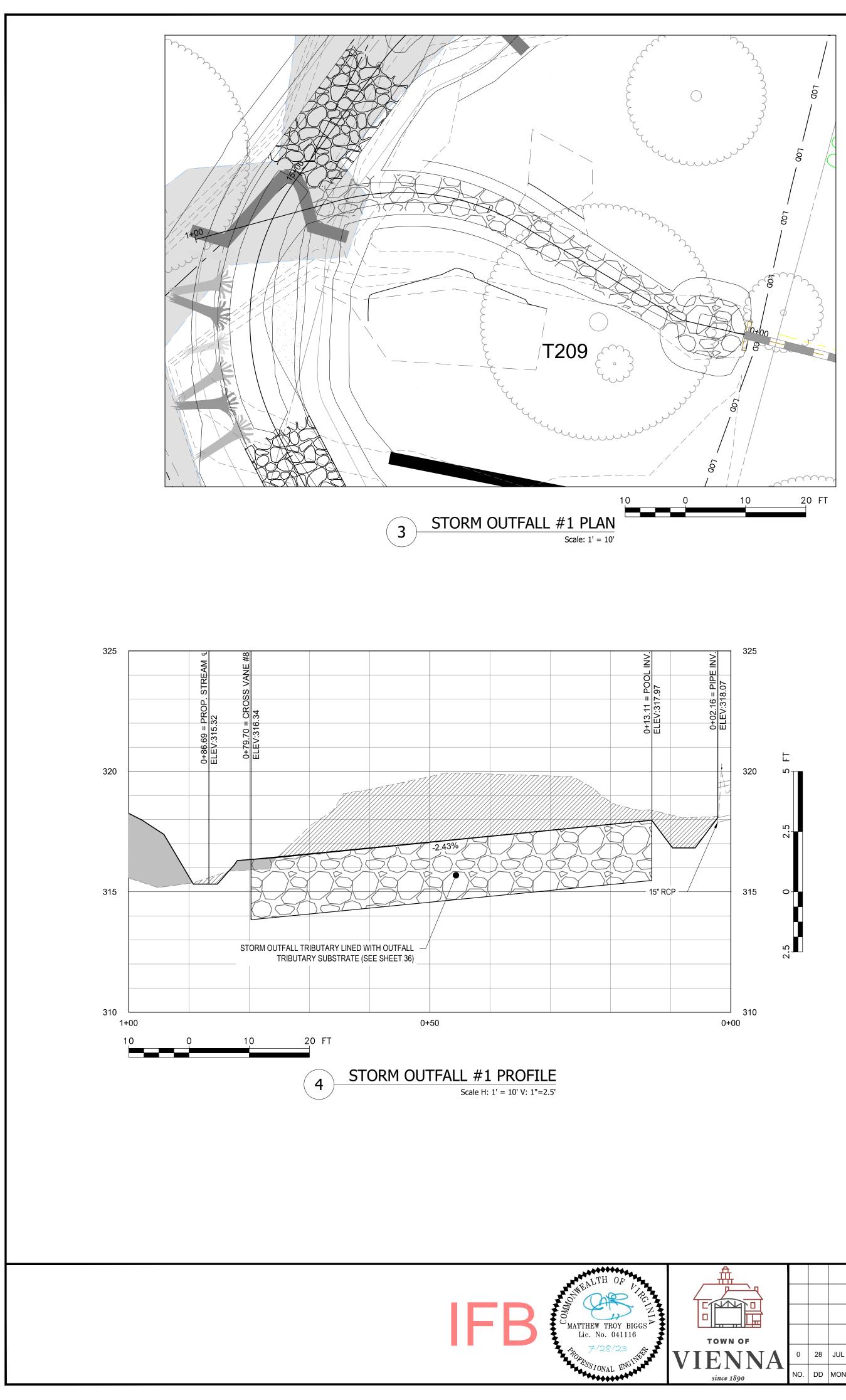
								CLIENT: TOWN OF VIENNA 127 CENTER STREET SOUTH
								VIENNA, VA 22180
TOWN OF								WSP Environment & Infrastructure Solutions
IENNA	0	28	JUL	2023	IFB SUBMISSION	JDH	МТВ	
since 1890	NO.	DD	MON	YYYY	ISSUE / REVISION DESCRIPTION	ENG.	APPR.	Tel (703) 488 3700

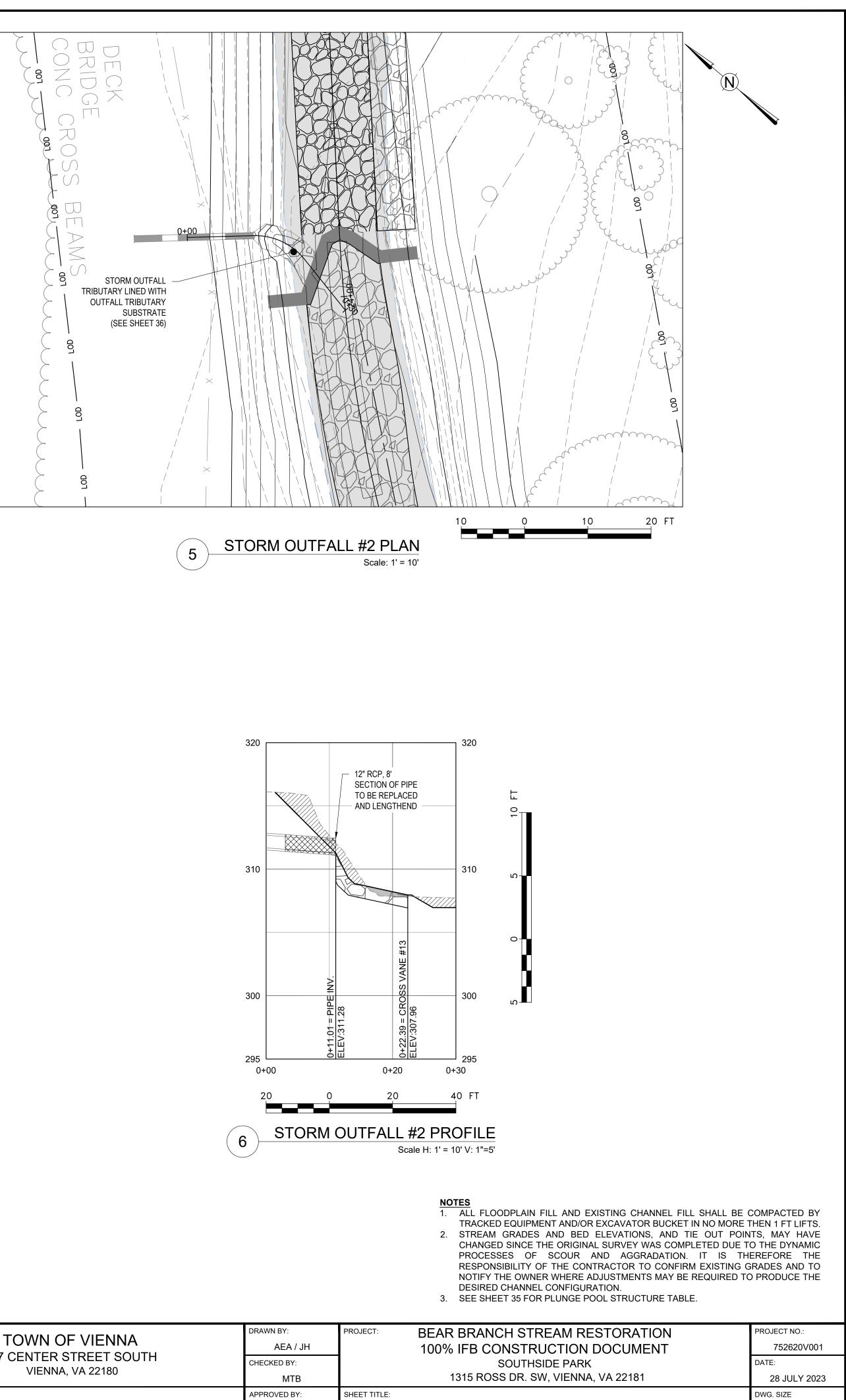


								127 CENTER STREET SOUTH VIENNA, VA 22180	
TOWN OF								ENGINEER: WSP Environment & Infrastructure Solutions	
IENNA	0	28	JUL	2023	IFB SUBMISSION	JDH	MTB	4795 Meadow Wood Lane, Suite 310 East Chantilly, VA 20151-1678	
since 1890	NO.	DD	MON	YYYY	ISSUE / REVISION DESCRIPTION	ENG.	APPR.	Tel. (703) 488-3700 www.WSP.com	



								CLIENT: TOWN OF VIENN 127 CENTER STREET SO VIENNA, VA 22180	
								ENGINEER: WSP Environment & Infrastructure Solutions	
IENNA	0	28	JUL	2023	IFB SUBMISSION	JDH	МТВ	4795 Meadow Wood Lane, Suite 310 East Chantilly, VA 20151-1678	<b>\\</b> \  ]
since 1890	NO.	DD	MON	YYYY	ISSUE / REVISION DESCRIPTION	ENG.	APPR.	Tel. (703) 488-3700 www.WSP.com	





LEGE	ND
	CUT
	FILL
	EXISTIING
	PROPOSED

							CLIENT: TOWN OF VIEN 127 CENTER STREET S VIENNA, VA 22180	SOUTH
							ENGINEER: WSP Environment & Infrastructure Solutions	
IENNA	0	28	JUL 2023	IFB SUBMISSION	JDH	MTB	4795 Meadow Wood Lane, Suite 310 East Chantilly, VA 20151-1678	<b>NSD</b>
since 1890	NO.	DD	MON YYYY	ISSUE / REVISION DESCRIPTION	ENG.	APPR.	Tol (703) 499 3700	<b>I</b>

STORM SEWER OUTFALLS PLAN & PROFILES

AS NOTED

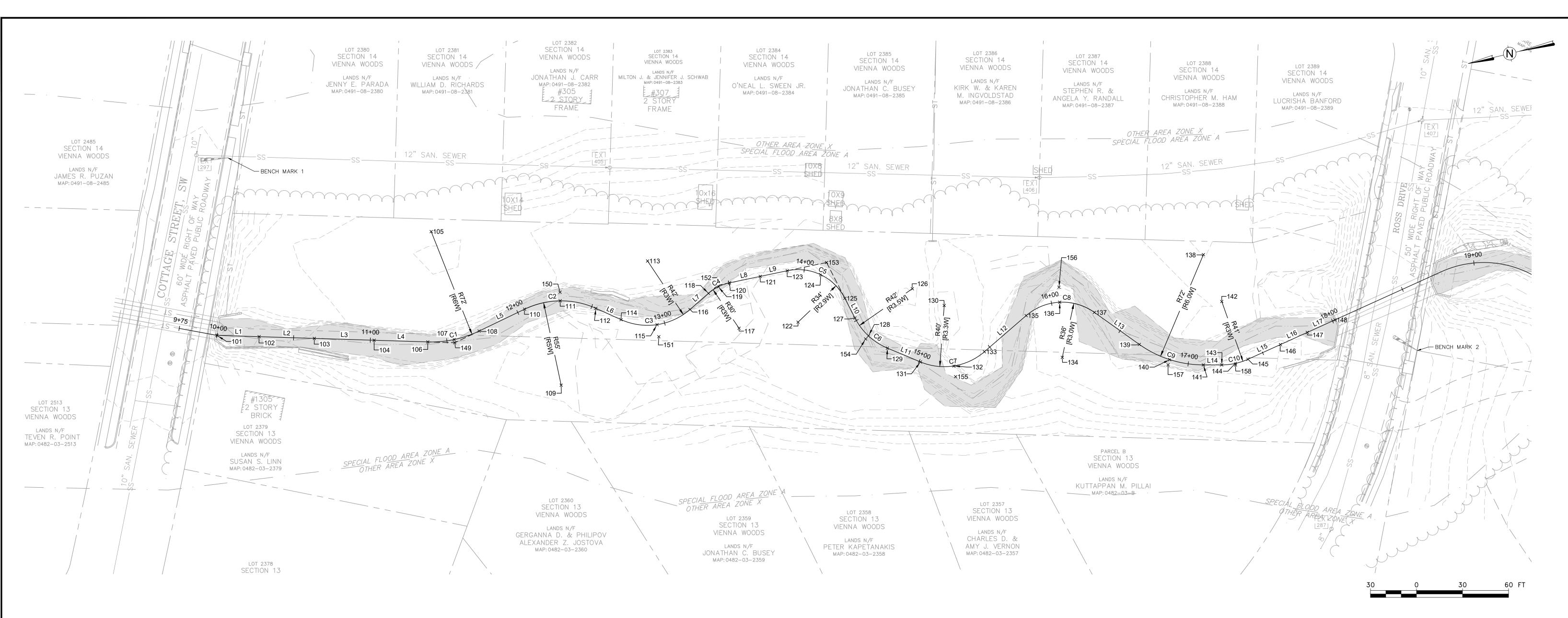
MTB

SCALE:

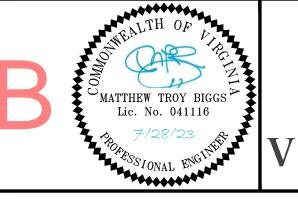
ARCH D

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SHEET NUMBER:



	CONTR	ROL POIN	Γ TABLE
Point #	Northing	Easting	Description
101	7007269.24	11838831.72	POINT OF BEGINNING
102	7007242.71	11838824.47	
103	7007207.99	11838814.98	
104	7007170.36	11838804.71	
105	7007117.63	11838864.94	CURVE 1 CENTER
106	7007136.61	11838795.48	PC
107	7007119.57	11838792.97	CURVE 1 MIDPOINT
108	7007102.42	11838794.56	PT
109	7007058.63	11838747.76	CURVE 2 CENTER
110	7007070.25	11838801.52	PC
111	7007046.44	11838801.39	CURVE 2 MIDPOINT
112	7007024.92	11838791.21	PT
113	7006984.95	11838813.36	CURVE 3 CENTER
114	7007010.70	11838780.18	PC
115	7006988.66	11838771.52	CURVE 3 MIDPOINT
116	7006965.44	11838776.16	PT
117	7006937.23	11838756.81	CURVE 4 CENTER
118	7006951.27	11838783.59	PC
119	7006944.04	11838786.27	CENTER 4 MIDPOINT
120	7006936.36	11838787.04	PT



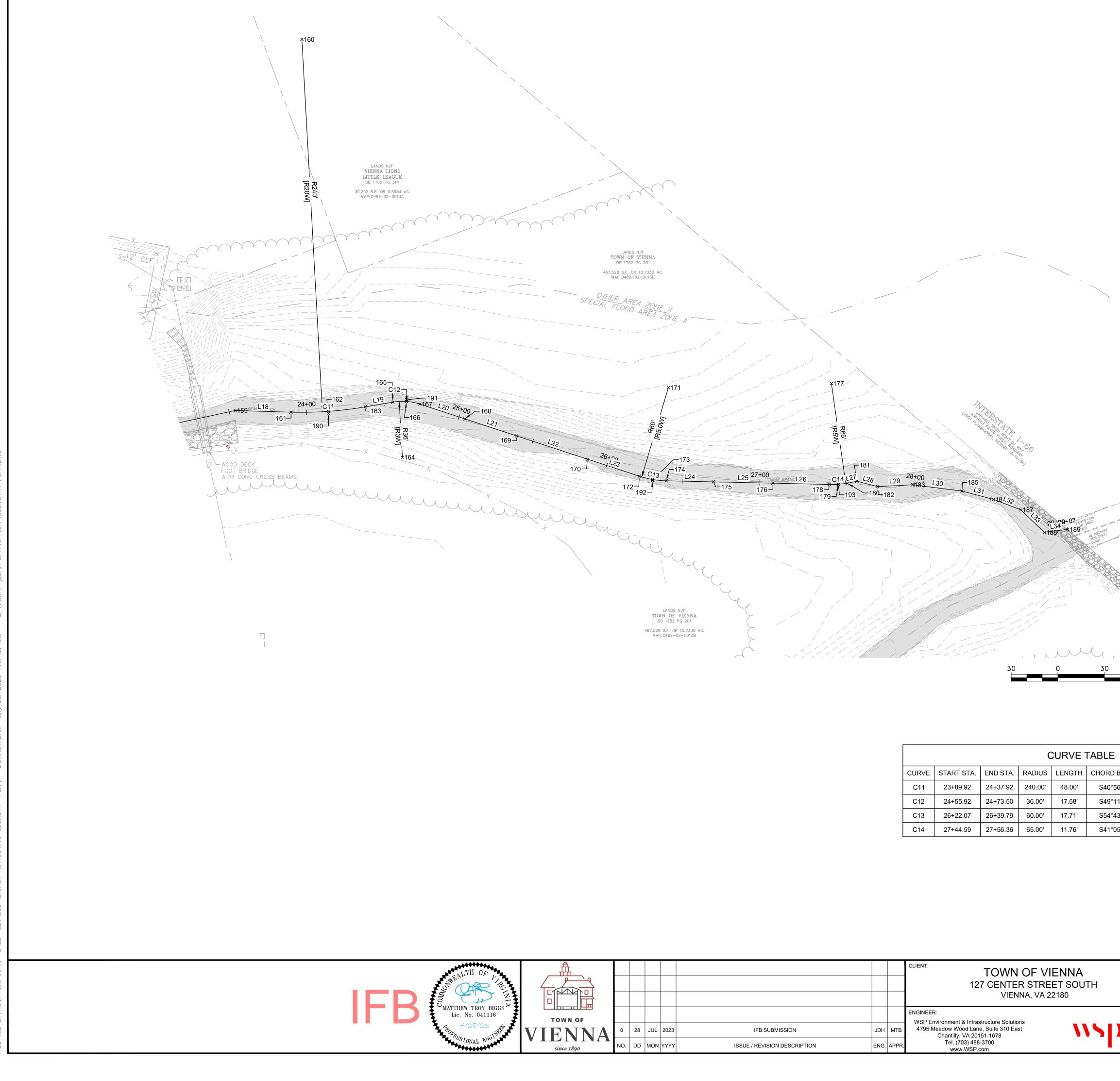
	CONTR	OL POINT	TABLE
Point #	Northing	Easting	Description
121	7006915.90	11838786.45	
122	7006898.89	11838751.68	CURVE 5 CENTER
123	7006897.91	11838785.93	PC
124	7006877.31	11838778.29	CURVE 5 MIDPOINT
125	7006865.58	11838759.70	PT
126	7006821.37	11838755.49	CURVE 6 CENTER
127	7006862.21	11838745.66	PC
128	7006856.34	11838732.22	CURVE 6 MIDPOINT
129	7006846.20	11838721.61	PT
130	7006803.69	11838740.05	CURVE 7 CENTER
131	7006827.34	11838707.78	PC
132	7006806.77	11838700.16	CURVE 7 MIDPOINT
133	7006785.28	11838704.54	PT
134	7006736.75	11838689.15	CURVE 8 CENTER
135	7006753.32	11838721.11	PC
136	7006730.01	11838724.51	CURVE 8 MIDPOINT
137	7006709.58	11838712.77	PT
138	7006631.68	11838732.81	CURVE 9 CENTER
139	7006685.96	11838685.61	PC
140	7006669.00	11838671.32	CURVE 9 MIDPOINT

	CONTF	ROL POINT	TABLE
Point #	Northing	Easting	Description
141	7006648.50	11838662.87	PT
142	7006627.16	11838700.31	CURVE 10 CENTER
143	7006636.83	11838660.07	PC
144	7006628.11	11838658.93	CURVE 10 MIDPOINT
145	7006619.35	11838659.66	PT
146	7006596.54	11838664.05	
147	7006577.66	11838667.67	
148	7006558.24	11838671.40	EX. PIPE INVERT
149	7007119.63	11838790.85	CURVE 1 PI
150	7007045.18	11838806.93	CURVE 2 PI
151	7006989.36	11838763.62	CURVE 3 PI
152	7006944.27	11838787.26	CURVE 4 PI
153	7006871.71	11838785.18	CURVE 5 PI
154	7006858.61	11838730.71	CURVE 6 PI
155	7006807.32	11838693.11	CURVE 7 PI
156	7006728.17	11838734.15	CURVE 8 PI
157	7006670.86	11838668.25	CURVE 9 PI
158	7006628.13	11838657.98	CURVE 10 PI

		LINE TA	BLE	
LINE	START STA.	END STA.	LENGTH	BEARING
L1	10+00.00	10+27.50	27.50	S15°16'43.26"W
L2	10+27.50	10+63.50	36.00	S15°16'43.26"W
L3	10+63.50	11+02.50	39.00	S15°16'43.26"W
L4	11+02.50	11+37.50	35.00	S15°16'43.26"W
L5	11+72.02	12+04.94	32.92	S12°11'36.71"E
L6	12+52.94	12+70.94	18.00	S37°48'36.22"W
L7	13+18.94	13+34.94	16.00	S27°40'14.99"E
L8	13+50.41	13+70.88	20.47	S1°38'55.34"W
L9	13+70.88	13+88.88	18.00	S1°38'55.34"W
L11	14+77.54	15+00.93	23.39	S36°14'30.87"W
L12	15+45.37	15+81.37	36.00	S27°24'25.73"E
L13	16+29.37	16+65.37	36.00	S48°59'14.01"W
L14	17+09.89	17+21.89	12.00	S13°31'14.41"W
L15	17+39.52	17+62.74	23.23	S10°52'28.96"E
L16	17+62.74	17+81.97	19.22	S10°52'28.96"E
L17	17+81.97	18+01.74	19.78	S10°52'28.96"E

				CLIENT: TOWN OF VIENNA 127 CENTER STREET SOUTH VIENNA, VA 22180	DRAWN BY: AEA / JH CHECKED BY: MTB	PROJECT: BEAR BRANCH STREAM RESTORATION 100% IFB CONSTRUCTION DOCUMENT SOUTHSIDE PARK 1315 ROSS DR. SW, VIENNA, VA 22181	PROJECT NO.: 752620V001 DATE: 28 JULY 2023
				ENGINEER:	APPROVED BY:	SHEET TITLE:	DWG. SIZE
				WSP Environment & Infrastructure Solutions 4795 Meadow Wood Lane, Suite 310 East	МТВ		ARCH D
<b>JIENNA</b>	0 28 JUL 2023	IFB SUBMISSION	JDH MTB	Chantilly, VA 20151-1678	SCALE:	GEOMETRY PLAN - UPSTREAM	SHEET NUMBER:
	NO. DD MON YYYY	ISSUE / REVISION DESCRIPTION	ENG. APPR.	Tel. (703) 488-3700 www.WSP.com	1" = 30'		18 OF 41

	CURVE TABLE								
CURVE	START STA.	END STA.	RADIUS	LENGTH	CHORD BEARING	CHORD	DELTA	TANGENT	
C1	11+37.50	11+72.02	72.00'	34.52'	S1°32'33"W	34.19'	27°28'20"	17.60'	
C2	12+04.94	12+52.94	55.00'	48.00'	S12°48'30"W	46.49'	50°00'13"	25.65'	
C3	12+70.94	13+18.94	42.00'	48.00'	S5°04'11"W	45.43'	65°28'51"	27.01'	
C4	13+34.94	13+50.41	30.24'	15.47'	S13°00'40"E	15.30'	29°19'10"	7.91'	
C5	13+88.88	14+33.62	34.26'	44.74'	S39°03'34"W	41.63'	74°49'17"	26.20'	
C6	14+48.06	14+77.54	42.00'	29.49'	S56°21'22"W	28.89'	40°13'42"	15.38'	
C7	15+00.93	15+45.37	40.00'	44.44'	S4°25'03"W	42.19'	63°38'57"	24.82'	
C8	15+81.37	16+29.37	36.00'	48.00'	S10°47'24"W	44.52'	76°23'40"	28.33'	
C9	16+65.37	17+09.89	71.93'	44.52'	S31°15'14"W	43.82'	35°28'00"	23.00'	
C10	17+21.89	17+39.52	41.39'	17.62'	S1°19'23"W	17.49'	24°23'43"	8.95'	



	CURVE TABLE							
CURVE	START STA.	END STA.	RADIUS	LENGTH	CHORD BEARING	CHORD	DELTA	TANGENT
C11	23+89.92	24+37.92	240.00'	48.00'	S40°56'21"W	47.92'	11°27'33"	24.08'
C12	24+55.92	24+73.50	36.00'	17.58'	S49°11'59"W	17.41'	27°58'48"	8.97'
C13	26+22.07	26+39.79	60.00'	17.71'	S54°43'54"W	17.65'	16°54'56"	8.92'
C14	27+44.59	27+56.36	65.00'	11.76'	S41°05'21"W	11.75'	10°22'11"	5.90'

60 FT

						CLIENT: TOWN OF VIENNA 127 CENTER STREET SOUTH VIENNA, VA 22180	DRAWN BY: AEA / JH CHECKED BY: MTB	PROJECT:	BEAR BRANCH STREAM RESTORATION 100% IFB CONSTRUCTION DOCUMENT SOUTHSIDE PARK 1315 ROSS DR. SW, VIENNA, VA 22181	PROJECT NO.: 752620V001 DATE: 28 JULY 2023
						ENGINEER:	APPROVED BY:	SHEET TITLE:		DWG. SIZE
						WSP Environment & Infrastructure Solutions 4795 Meadow Wood Lane, Suite 310 East	МТВ			ARCH D
ENNA	0 2	8 JUL 2023	IFB SUBMISSION	JDH	MIR	Chantilly, VA 20151-1678	SCALE:		GEOMETRY PLAN - DOWNSTREAM	SHEET NUMBER:
			ISSUE / REVISION DESCRIPTION	ENG.	APPR.	Tel. (703) 488-3700 www.WSP.com	1" = 30'			19 OF 41

		LINE TA	BLE	
LINE	START STA.	END STA.	LENGTH	BEARING
L18	23+53.92	23+89.92	36.00	S46°40'07.94"W
L19	24+37.92	24+55.92	18.00	S35°12'34.98"W
L20	24+73.50	25+03.92	30.42	S63°11'22.06"W
L21	25+03.92	25+39.00	35.08	S63°11'22.06"W
L22	25+39.00	25+87.00	48.00	S63°11'22.06"W
L23	25+87.00	26+22.07	35.08	S63°11'22.06"W
L25	26+70.07	27+08.36	38.28	S46°16'25.94"W
L26	27+08.36	27+44.59	36.24	S46°16'25.94"W
L27	27+56.36	27+62.64	6.28	S33°23'35.37"W
L28	27+62.64	27+76.46	13.82	S59°19'02.28"W
L29	27+76.46	27+98.89	22.43	S42°05'14.26"W
L30	27+98.89	28+30.93	32.04	S52°15'55.90"V
L31	28+30.93	28+51.91	20.98	S59°44'42.86"W
L32	28+51.91	28+70.76	18.85	S66°02'53.60"W
L33	28+70.76	28+91.71	20.95	S88°28'15.79"W
L34	28+91.71	29+06.88	15.17	S38°03'35.32"W

	CONTF	ROL POINT	TABLE
Point #	Northing	Easting	Description
159	7006131.24	11838381.23	
160	7005931.96	11838519.74	CURVE 15 CENTER
161	7006106.54	11838355.05	DEPART EX
162	7006089.22	11838338.44	CURVE 15 MIDPOIN
163	7006070.34	11838323.65	PT
164	7006076.39	11838283.86	CURVE 16 CENTER
165	7006055.63	11838313.27	PC
166	7006049.14	11838307.38	CURVE 16 MIDPOIN
167	7006044.26	11838300.09	PT
168	7006030.54	11838272.94	
169	7006014.72	11838241.64	
170	7005993.07	11838198.80	
171	7005923.69	11838194.55	CURVE 17 CENTER
172	7005977.24	11838167.49	PC
173	7005972.68	11838159.91	CURVE 17 MIDPOIN
174	7005967.05	11838153.08	PT
175	7005946.12	11838131.19	
176	7005919.66	11838103.53	
177	7005847.64	11838122.27	CURVE 18 CENTER
178	7005894.61	11838077.34	PC
179	7005890.36	11838073.28	CURVE 18 MIDPOIN
180	7005885.76	11838069.62	PT
181	7005880.51	11838066.16	
182	7005873.46	11838054.28	
183	7005856.81	11838039.25	
185	7005837.20	11838013.90	
186	7005826.63	11837995.78	
187	7005818.98	11837978.56	
188	7005818.42	11837957.61	
189	7005806.48	11837948.26	I-66 CULVERT INV
190	7006090.01	11838337.53	CURVE 11 PI
191	7006048.30	11838308.10	CURVE 12 PI
192	7005973.22	11838159.53	CURVE 13 PI
193	7005890.53	11838073.08	CURVE 14 PI

#### CONSTRUCTED RIFFLE STRUCTURE TABLES

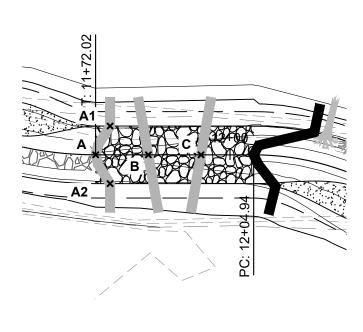
Riffle 1		Description	Invert El	Drop (ft)	Length (ft)	Slope
Station	10+27.50	US	318.97			
Station	10+63.50	DS	318.56			
				0.41	36.00	1.14%
			Length between			
Station	Elevation	Description	structures (ft)			
		Pt. A - Head of				
		rock mini-vane				
		#1 (head of				
10+27.50	318.97	riffle)	12.0			
		Micropool				
10+33.50	318.33	Bottom	-			
		Pt. A1 -				
		Minivane tie-				
10+30.50	319.32	into slope	-			
		Pt. A2 -				
		Minivane tie-				
10+30.50	319.32	into slope	-			
		Pt. B - Head of				
10+39.50	318.83	Log Roller #1	12.0			
		Micropool				
10+45.50	318.20	Bottom	-			
		Pt. C - Head of				
10+51.50	318.70	log roller #2	12.0			
		Micropool				
10+57.50	318.06	Bottom	-			
		Head of cross				
		vane #2 (tail of				
10+63.50	318.56	riffle)	-			

, 	
9+27.50	0+63.50
	на 1-1-0-1-1-0-1-1-0-1-1-0-1-1-0-1-1-0-1-1-0-1-1-0-1-1-0-1-1-0-1-1-0-1-1-0-1-1-0-1-1-0-1-0-1-0-1-0-1-0-1-0-1-0-1-0 1-1-1-1-

Riffle 2		Description	Invert El	Drop (ft)	Length (ft)	Slope
Station	11+02.50	US	318.46			
Station	11+37.50	DS	318.06			
				0.4	35	1.14%
			Length between			
Station	Elevation	Description	structures (ft)			
		Pt. A - Head of				
		rock mini-vane				
		#1 (head of				
11+02.50	318.46	riffle)	11.7			
		Micropool				
11+08.33	317.83	Bottom	-			
		Pt. A1 -				
		Minivane tie-				
11+05.50	318.81	into slope	-			
		Pt. A2 -				
		Minivane tie-				
11+05.50	318.81	into slope	-			
		Pt. B - Head of				
11+14.17	318.33	Log Roller #1	11.7			
		Micropool				
11+20.00	317.69	Bottom	-			
		Pt. C - Head of				
11+25.83	318.19	log roller #2	11.7			
		Micropool				
11+31.67	317.56	Bottom	-			
		Head of cross				
		vane #2 (tail of				
11+37.50	318.06	riffle)	-			

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Riffle 3		Description	Invert El	Drop (ft)	Length (ft)	Slope
Station	11+72.02	US	317.96			
Station	12+04.94	DS	317.59			
				0.37	32.92	1.12%
			Length between			
Station	Elevation	Description	structures (ft)			
		Pt. A - Head of				
		rock mini-vane				
		#1 (head of				
11+72.02	317.96	riffle)	11.0			
		Micropool				
11+77.51	317.34	Bottom	-			
		Pt. A1 -				
		Minivane tie-				
11+75.02	318.31	into slope	-			
		Pt. A2 -				
		Minivane tie-				
11+75.02	318.31	into slope	-			
		Pt. B - Head of				
11+82.99	317.84	Log Roller #1	11.0			
		Micropool				
11+88.48	317.21	Bottom	-			
		Pt. C - Head of				
11+93.97	317.71	log roller #2	11.0			
		Micropool				
11+99.45	317.09	Bottom	-			
		Head of cross				
		vane #3 (tail of				
12+04.94	317.59	riffle)	-			

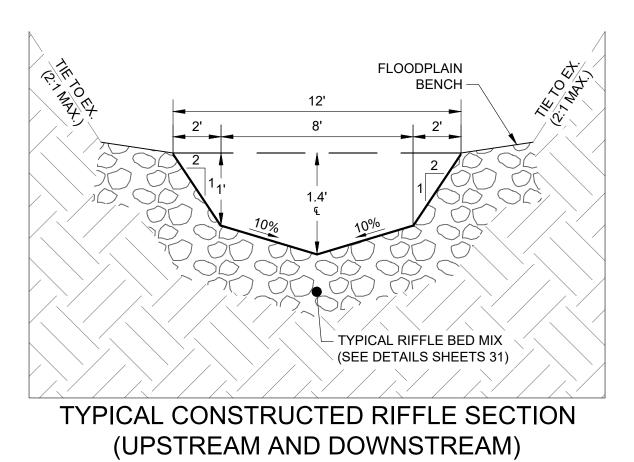




Lic. No. 041116



Structure	VaneType	1	1	Offset	Elevation	Description	Slop
CV1	Straight	A	10+63.50	0.00	318.56	Center of Throat	-
CV1		B	10+64.50	2.00' R	318.71	Right Edge of Throat	-
CV1 CV1		C D	10+64.50 10+73.77	2.00' L 6.32' R	318.71 318.91	Left Edge of Throat Right Vane	- 2%
CV1 CV1		E	10+73.77	6.32 K	318.91 318.91	Left Vane	2%
CV1 CV2	Offset	A	11+37.50	0.00	318.06	Center of Throat	-
CV2	Oliset	B	11+37.50	2.00' R	318.00	Right Edge of Throat	
CV2		C	11+38.50	2.00' L	318.21	Left Edge of Throat	-
CV2		D	11+50.76	6.00' R	318.48	Right Vane	2%
CV2		E	11+42.87	6.72' L	318.34	Left Vane	2%
CV3	Offset	A	12+04.94	0.00	317.59	Center of Throat	-
CV3		В	12+05.94	2.00' R	317.74	Right Edge of Throat	-
CV3		С	12+05.94	2.00' L	317.74	Left Edge of Throat	
CV3		D	12+10.08	6.37' R	317.86	Right Vane	2%
CV3		E	12+16.39	6.00' L	317.98	Left Vane	2%
CV4	Offset	A	12+70.94	0.00	317.28	Center of Throat	-
CV4		В	12+71.94	2.00' R	317.43	Right Edge of Throat	-
CV4		С	12+71.94	2.00' L	317.43	Left Edge of Throat	-
CV4		D	12+83.91	6.00' R	317.70	Right Vane	2%
CV4		E	12+76.50	6.44' L	317.55	Left Vane	2%
CV5	Offset	A	13+34.94	0.00	317.00	Center of Throat	
CV5		B	13+35.94	2.00' R	317.15	Right Edge of Throat	-
CV5		C	13+35.94	2.00' L	317.15	Left Edge of Throat	-
CV5		D	13+43.63	7.56' R	317.32	Right Vane	2%
CV5	044	E	13+48.81	6.00' L	317.45	Left Vane	2%
CV6	Offset	A	13+88.88	0.00	316.69	Center of Throat	-
CV6 CV6		B C	13+89.88 13+89.88	2.00' R 2.00' L	316.84 316.84	Right Edge of Throat Left Edge of Throat	-
CV6		D	13+95.15	6.63' R	316.84	Right Vane	- 2%
CV6		E	13+99.73	6.00' L	317.07	Left Vane	2%
CV7	Offset	A	14+48.06	0.00	316.43	Center of Throat	-
CV7	onset	B	14+49.06	2.00' R	316.58	Right Edge of Throat	_
CV7		C	14+49.06	2.00' L	316.58	Left Edge of Throat	-
CV7		D	14+61.10	6.00' R	316.85	Right Vane	2%
CV7		E	14+55.66	7.67' L	316.74	Left Vane	2%
CV8	Offset	A	15+00.93	0.00	316.06	Center of Throat	-
CV8		В	15+01.93	2.00' R	316.21	Right Edge of Throat	-
CV8		C	15+01.93	2.00' L	316.21	Left Edge of Throat	-
CV8		D	15+14.49	6.00' R	316.50	Right Vane	2%
CV8		E	15+06.75	6.55' L	316.34	Left Vane	2%
CV9	Offset	A	15+81.37	0.00	315.55	Center of Throat	-
CV9		В	15+82.37	2.00' R	315.70	Right Edge of Throat	
CV9		C	15+82.37	2.00' L	315.70	Left Edge of Throat	-
CV9		D	15+87.30	6.50' R	315.82	Right Vane	2%
CV9		E	15+93.02	6.00' L	315.95	Left Vane	2%
CV10	Offset	A	16+65.37	0.00	315.04	Center of Throat	
CV10		B	16+66.37	2.00' R	315.19	Right Edge of Throat	-
CV10 CV10		C D	16+66.37 16+78.63	2.00' L 6.00' R	315.19 315.46	Left Edge of Throat Right Vane	- 2%
CV10 CV10		E	16+70.33	6.39' L	315.31	Left Vane	27
CV10	Offset	A	17+21.89	0.00	314.80	Center of Throat	-
CV11 CV11	Uliset	B	17+21.89	2.00' R	314.80	Right Edge of Throat	
CV11		C	17+22.89	2.00 K	314.95	Left Edge of Throat	
CV11		D	17+35.18	6.00' R	315.23	Right Vane	29
CV11		E	17+28.20	6.89' L	315.09	Left Vane	29
CV12	Offset	A	17+76.97	0.00	314.48	Center of Throat	_
CV12		В	17+77.97	2.00' R	314.63	Right Edge of Throat	-
CV12		С	17+77.97	2.00' L	314.63	Left Edge of Throat	-
CV12		D	17+83.06	7.71' R	314.78	Right Vane	29
CV12		E	17+88.62	7.57' L	314.87	Left Vane	2%
CV13	Offset	A	23+89.92	0.00	307.70	Center of Throat	-
CV13		В	23+90.92	2.00' R	307.85	Right Edge of Throat	-
CV13		С	23+90.92	2.00' L	307.85	Left Edge of Throat	_
CV13		D	23+99.78	6.00' R	308.05	Right Vane	29
CV13		E	23+94.15	6.10' L	307.95	Left Vane	29
CV14	Offset	A	24+55.92	0.00	307.35	Center of Throat	-
CV14		В	24+56.92	2.00' R	307.50	Right Edge of Throat	-
CV14		C	24+56.92	2.00' L	307.50	Left Edge of Throat	-
CV14		D	24+63.09	6.35' R	307.64	Right Vane	29
CV14	C+	E	24+69.08	6.00' L	307.78	Left Vane	2%
CV15	Straight	A	25+39.00	0.00	306.77	Center of Throat	-
CV15 CV15		B C	25+40.00 25+40.00	2.00' R 2.00' L	306.92 306.92	Right Edge of Throat Left Edge of Throat	-
CV15 CV15		D	25+40.00	6.23' R	306.92	Right Vane	- 29
CV15 CV15		E	25+49.06	6.23' R 6.23' L	307.06	Left Vane	29
CV15 CV16	Offcot			0.00	307.06	Center of Throat	29
CV16 CV16	Offset	A	26+22.07	2.00' R	306.19		-
CV16 CV16		B C	26+23.07 26+23.07	2.00' R 2.00' L	306.34	Right Edge of Throat Left Edge of Throat	-
CV16 CV16		D	26+23.07	6.00' L	306.34	Right Vane	- 29
CV16		E	26+33.27	6.16' L	306.57	Left Vane	29
CV18 CV17	Straight	A	20+20.86	0.00	306.13	Center of Throat	21
CV17 CV17	Juaight	B	27+08.36	3.33' R	306.13	Right Edge of Throat	-
CV17 CV17		C B	27+09.36	3.33' L	306.28	Left Edge of Throat	-
V V I I		L	21 103.30	J.JJ L	500.20	Left Luge Of Hilloat	-
CV17		D	27+18.36	6.20' R	306.48	Right Vane	2%



FLOODPLAIN BENCH -13.2' 5.2' 4.0' 4.0'

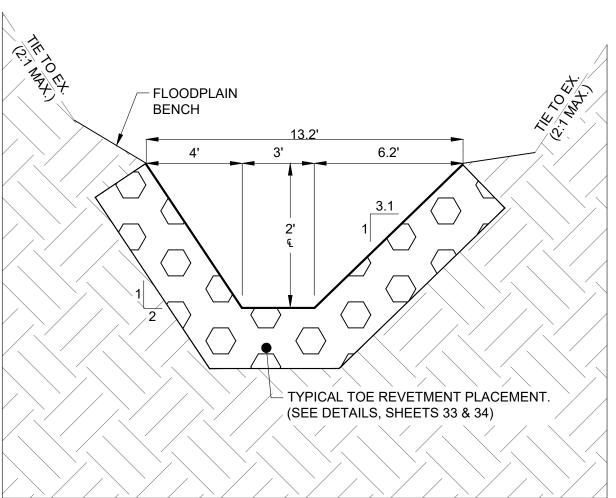
TYPICAL STRAIGHT POOL SECTION (UPSTREAM)

#### NOTE:

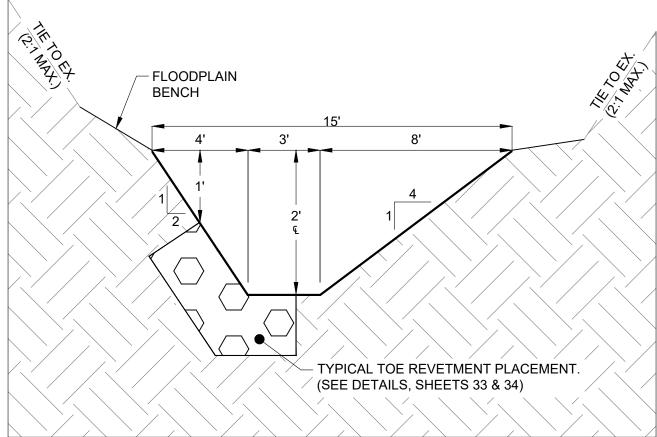
1. SLOPES SHOWN IN THE TABLE ARE DESIGN SLOPES. HOWEVER, VALUES MAY VARY DUE TO VARIABILITY IN THE CONSTRUCTED STRUCTURES. VANE ARM SLOPES MAY VARY BETWEEN 2-5% VERTICALLY AND THE ANGLE OF THE VANE ARM MAY VARY BETWEEN 20-30° HORIZONTALLY WITH THE BANK. THIS TABLE IS BASED ON A VANE ARM ANGLES OF 25° (OUTSIDE) AND 45° (INSIDE) AND AN ARM SLOPE AS SPECIFIED IN THE TABLE.

2. SEE SHEET 32 FOR LOCATIONS OF A, B, C, D, AND E ELEVATIONS.

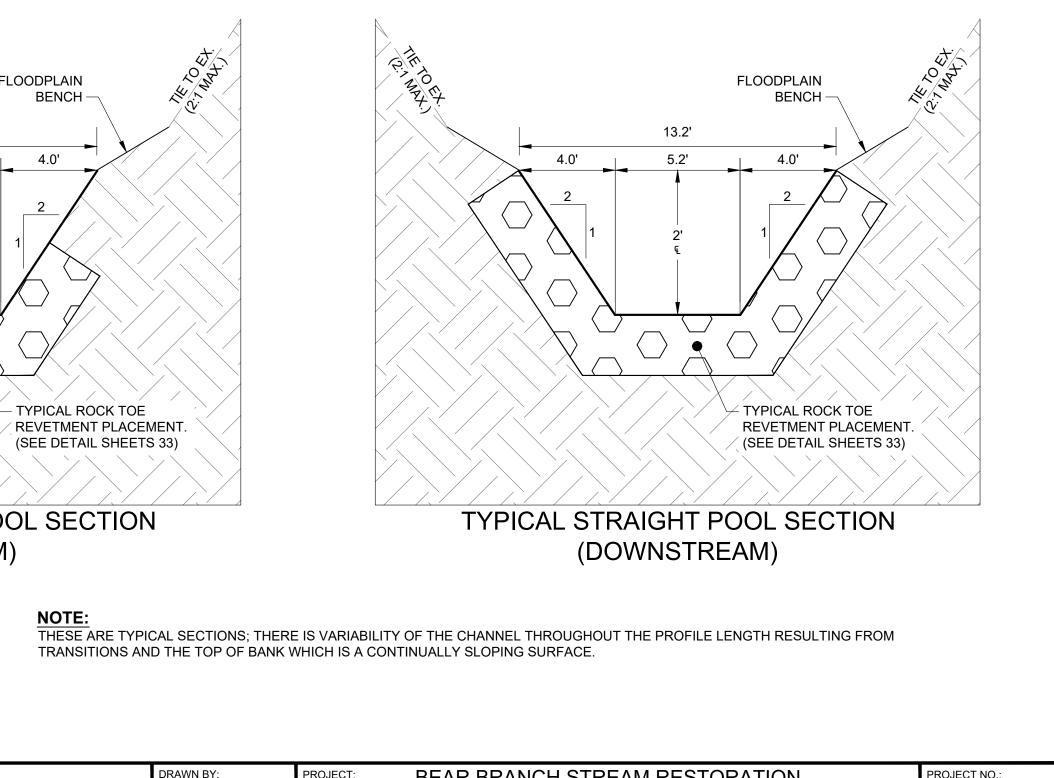
								CLIENT: TOWN OF VII 127 CENTER STREE VIENNA, VA 22	ET SOUTH
								ENGINEER: WSP Environment & Infrastructure Solutions	
IENNA	0	28	JUL	2023	IFB SUBMISSION	JDH	МТВ		- <b>NSD</b>
since 1890	NO.	DD	MON	YYYY	ISSUE / REVISION DESCRIPTION	ENG.	APPR.	Tel (703) 488-3700	







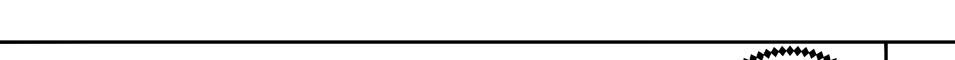
TYPICAL POOL IN BEND SECTION (UPSTREAM)

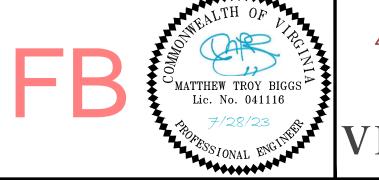


DRAWN BY:	PROJECT: BEAR BRANCH STREAM RESTORATION	PROJECT NO.:
AEA / JH	100% IFB CONSTRUCTION DOCUMENT	752620V001
CHECKED BY:	SOUTHSIDE PARK	DATE:
МТВ	1315 ROSS DR. SW, VIENNA, VA 22181	28 JULY 2023
APPROVED BY:	SHEET TITLE:	DWG. SIZE
МТВ	STREAM RESTORATION STRUCTURE DETAILS	ARCH D
SCALE:	TYPICAL SECTIONS & RIFFLE STRUCTURE TABLES	SHEET NUMBER:
NOT TO SCALE	TIPICAL SECTIONS & RIFFLE STRUCTURE TABLES	20 OF 41

fle 4		Description	Invert El	Drop (ft)	Length (ft)	Slope	Riff	ffle 7		Description	Invert El	Drop (ft)	Length (ft)	Slo
ion	12+52.94	US	317.49						14+33.62	US	316.59			
on	12+70.94	DS	317.28	0.01	10.00	1.170/	Stat	ation	14+48.06	DS	316.43	0.10		
			Length between	0.21	18.00	1.17%					Length between	0.16	14.44	1.1
on	Elevation	Description	structures (ft)				Stat	ation	Elevation	Description	structures (ft)			
		Pt. A - Head of		1			0			Pt. A - Head of				
		rock mini-vane					12			rock mini-vane				
~ 4	247.40	#1 (head of							046 50	#1 (head of				
.94	317.49	riffle) Micropool	9.0					+33.62	316.59	riffle) Micropool	7.2			
.44	316.89	Bottom	-				14+3	+37.23	316.26	Bottom	-			
		Pt. A1 -								Pt. A1 -				
		Minivane tie-								Minivane tie-				
.94	317.84	into slope Pt. A2 -	-				14+3	+36.62	316.94	into slope Pt. A2 -	-			
		Minivane tie-								Minivane tie-				
94	317.84	into slope	-				14+3	+36.62	316.94	into slope	-			
		Pt. B - Head of								Pt. B - Head of				
.94	317.39	Log Roller #1 Micropool	9.0	-			14+4	+40.84	316.51	Log Roller #1	7.2			
44	316.78	Bottom	-				14+4	+44.45	316.18	Micropool Bottom	-			
		Head of cross								Head of cross				
_		vane #4 (tail of		1						vane #7 (tail of				
.94	317.28	riffle)	-	j			14+4	+48.06	316.43	riffle)	-	J		
_			• —•					<u>(()</u> –	<del></del>	<b></b>		<b>D</b> (1)		
<b>e 5</b> on	13+18.94	Description US	Invert El 317.18	Drop (ft)	Length (ft)	Slope		ffle 8 ation	14+77.54	Description US	Invert El 316.33	orop (ft) Urop	Length (ft)	SI
	13+34.94	DS	317.00						15+00.93	DS	316.06			
				0.18	16.00	1.13%						0.27	23.39	1.
			Length between				~				Length between			
n	Elevation	-	structures (ft)	-			Stat	ation	Elevation		structures (ft)			
		Pt. A - Head of rock mini-vane					, , , , , , , , , , , , , , , , , , ,			Pt. A - Head of rock mini-vane				
		#1 (head of								#1 (head of				
94	317.18	riffle)	8.0				14+7	+77.54	316.33	riffle)	11.7			
		Micropool								Micropool				
94	316.84	Bottom	-	-				+83.39	315.70	Bottom Pt. A1 -	-			
		Pt. A1 - Minivane tie-								Minivane tie-				
94	317.53	into slope	-				14+8	+80.54	316.68	into slope	-			
		Pt. A2 -		-			13+34			Pt. A2 -				
04	217 52	Minivane tie-						. 90 F 4	210.09	Minivane tie-				
.94	317.53	into slope Pt. B - Head of	-					+80.54	316.68	into slope Pt. B - Head of	-			
.94	317.09	Log Roller #1	8.0				• •	+89.24	316.20	Log Roller #1	11.7			
		Micropool								Micropool				
.94	316.75	Bottom	-	_			14+9	+95.08	315.56	Bottom	-			
		Head of cross vane #5 (tail of								Head of cross vane #8 (tail of				
1.94	317.00	riffle)	-				15+0	+00.93	316.06	riffle)	-			
	1			•				•	··			•		
e 6		Description	Invert El	Drop (ft)	Length (ft)	Slope		ffle 9		Description	Invert El	Drop (ft)	Length (ft)	S
	13+70.88	US DS	316.90 316.69						15+45.37 15+81.37	US DS	315.96 315.55			
on	13+88.88	03	510.09	0.21	18.00	1.17%			13+61.57	03	515.55	0.41	36.00	1
			Length between	<u>.</u>	1	4					Length between			
on	Elevation		structures (ft)				Stat	ation	Elevation	-	structures (ft)			
		Pt. A - Head of								Pt. A - Head of				
		rock mini-vane #1 (head of								rock mini-vane #1 (head of				
.88	316.90	riffle)	9.0				15+4	+45.37	315.96	riffle)	12.0			
		Micropool								Micropool				
.38	316.30	Bottom	-	1			15+5	+51.37	315.32	Bottom	-			
		Pt. A1 - Minivane tie-								Pt. A1 - Minivane tie-				
.88	317.25	into slope	-				15+4	+48.37	316.31	into slope	-			
		Pt. A2 -		1						Pt. A2 -		1		
		Minivane tie-								Minivane tie-				
	317.25	into slope	-	-				+48.37	316.31	into slope Pt. B - Head of	-			
.88	316.80	Pt. B - Head of Log Roller #1	9.0					+57.37	315.82	Pt. B - Head of Log Roller #1	12.0			
	510.00	Micropool	5.0	1				2,.37		Micropool	12.0			
8.88 9.88	I	-	-				15+6	+63.37	315.19	Bottom	-			
	316.19	Bottom		-						Pt. C - Head of				
.88	316.19	Head of cross							·	1. 11 1.4				
88 38		Head of cross vane #6 (tail of					15+6	+69.37	315.69	log roller #2 Micropool	12.0			
88	316.19 316.69	Head of cross	-							log roller #2 Micropool Bottom	-			
8		Head of cross vane #6 (tail of	-						315.69 315.05	Micropool				

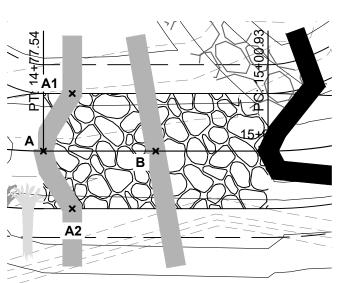
NOTE: FOR CONSTRUCTED RIFFLES, LOGS MAYBE ELIMINATED FROM RIFFLE MATRIX IF THERE IS NOT ENOUGH SPACING FOR CONSTRUCTION. FIELD ENGIENEER AND TOWN OF VIENNA WILL MAKE DETERMINATION IF LOGS ARE ELIMINATED.





				CLIENT: TOWN OF VIENNA 127 CENTER STREET SOUTH VIENNA, VA 22180	DRAWN BY: AEA / JH CHECKED BY: MTB	PROJECT: BEAR BRANCH STREAM RESTORATION 100% IFB CONSTRUCTION DOCUMENT SOUTHSIDE PARK 1315 ROSS DR. SW, VIENNA, VA 22181	PROJECT NO.: 752620V001 DATE: 28 JULY 2023
TOWN OF	0         28         JUL         2023           NO.         DD         MON         YYYY	IFB SUBMISSION ISSUE / REVISION DESCRIPTION	JDH MTB ENG. APPR.	ENGINEER: WSP Environment & Infrastructure Solutions 4795 Meadow Wood Lane, Suite 310 East Chantilly, VA 20151-1678 Tel. (703) 488-3700 www.WSP.com	APPROVED BY: MTB SCALE: NOT TO SCALE	SHEET TITLE: STREAM RESTORATION STRUCTURE DETAILS RIFFLE STRUCTURE TABLES (2)	DWG. SIZE ARCH D SHEET NUMBER: 20A OF 41

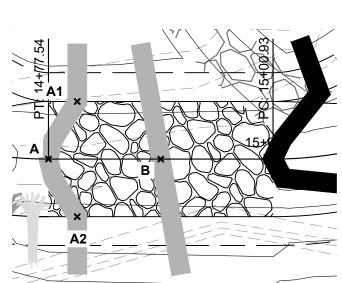
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A1 5

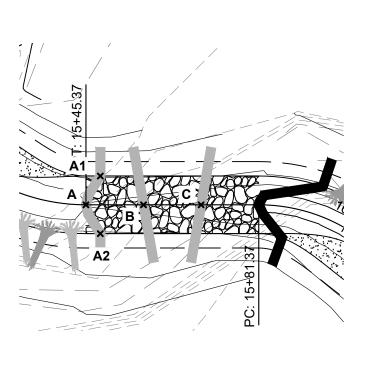


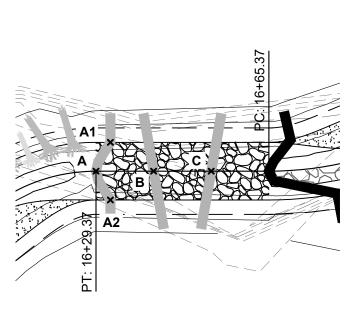
-				1	
Riffle 10		Description	Invert El	Drop (ft)	Length (ft)
Station	16+29.37	US	315.45		
Station	16+65.37	DS	315.04		
				0.41	36.00
			Length between		
Station	Elevation	Description	structures (ft)		
		Pt. A - Head of			
		rock mini-vane			
		#1 (head of			
16+29.37	315.45	riffle)	12.0		
		Micropool			
16+35.37	314.81	Bottom	-		
		Pt. A1 -			
		Minivane tie-			
16+32.37	315.80	into slope	-		
		Pt. A2 -			
		Minivane tie-			
16+32.37	315.80	into slope	-		
		Pt. B - Head of			
16+41.37	315.31	Log Roller #1	12.0		
		Micropool			
16+47.37	314.68	Bottom	-		
		Pt. C - Head of			
16+53.37	315.18	log roller #2	12.0		
		Micropool			
16+59.37	314.54	Bottom	-		
		Head of cross			
		vane #10 (tail of			
16+65.37	315.04	riffle)	-		

Riffle 11		Description	Invert El	Drop (ft)	Length (ft)	Slope
Station	17+09.89	US	314.94			
Station	17+21.89	DS	314.80			
				0.14	12.00	1.17%
			Length between			
Station	Elevation	Description	structures (ft)			
		Pt. A - Head of				
		rock mini-vane				
		#1 (head of				
17+09.89	314.94	riffle)	6.0			
		No Micropool				
17+12.89		Bottom	-			
		Pt. A1 -				
		Minivane tie-				
17+12.89	315.29	into slope	-			
		Pt. A2 -				
		Minivane tie-				
17+12.89	315.29	into slope	-			
		Pt. B - Head of				
17+15.89	314.87	Log Roller #1	6.0			
		No Micropool				
		Bottom	-			
		Head of cross				
		vane #11 (tail of				
17+21.89	314.80	riffle)	-			

Riffle 12		Description	Invert El	Drop (ft)	Length (ft)	Slope
Station	17+62.74	US	314.70			
Station	17+76.97	DS	314.48			
				0.22	14.23	1.55%
			Length between			
Station	Elevation	Description	structures (ft)			
		Pt. A - Head of				
		rock mini-vane				
		#1 (head of				
17+62.74	314.70	riffle)	7.1			
		Micropool				
17+66.30	314.34	Bottom	-			
		Pt. A1 -				
		Minivane tie-				
17+65.74	315.05	into slope	-			
		Pt. A2 -				
		Minivane tie-				
17+65.74	315.05	into slope	-			
		Pt. B - Head of				
17+69.86	314.59	Log Roller #1	7.1			
		Micropool				
17+73.41	314.23	Bottom	-			
		Head of cross				
		vane #12 (tail of				
17+76.97	314.48	riffle)	-			

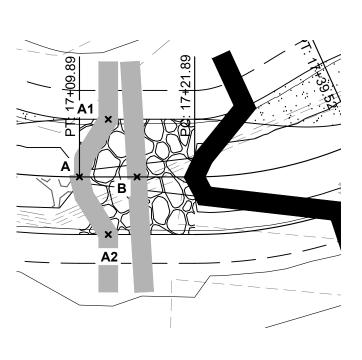


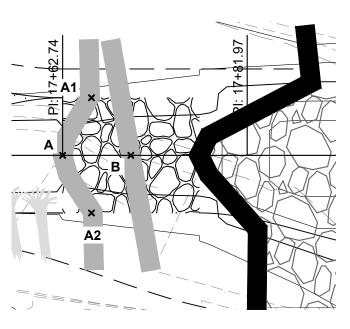




Slope

1.14%





|--|

Riffle 13		Description	Invert El	Drop (ft)	Length (ft)	Slope
Station	23+53.92	US	308.23			
Station	23+89.92	DS	307.70			
				0.53	36.00	1.47%
			Length between			
Station	Elevation	Description	structures (ft)			
		Pt. A - Head of				
		rock mini-vane				
		#1 (head of				
23+53.92	308.23	riffle)	12.0			
		Micropool				
23+59.92	307.55	Bottom	-			
		Pt. A1 -				
		Minivane tie-				
23+56.92	308.58	into slope	-			
		Pt. A2 -				
		Minivane tie-				
23+56.92	308.58	into slope	-			
		Pt. B - Head of				
23+65.92	308.05	Log Roller #1	12.0			
		Micropool				
23+71.92	307.38	Bottom	-			
		Pt. C - Head of				
23+77.92	307.88	log roller #2	12.0			
		Micropool				
23+83.92	307.20	Bottom	-			
		Head of cross				
		vane #13 (tail of				
23+89.92	307.70	riffle)	-			

Invert El Drop (ft) Length (ft) Slope

0.25 18.00 1.39%

307.60

307.35

Length between structures (ft)

9.0

9.0

-

 Riffle 14

 Station
 24+37.92

 Station
 24+55.92

Station Elevation Description

24+37.92 307.60 riffle)

24+40.92 307.95 into slope

24+40.92 307.95 into slope

24+46.92 307.48 Log Roller #1

24+51.42 306.85 Bottom

24+55.92 307.35 riffle)

24+42.42 306.98

Description

US

DS

Pt. A - Head of rock mini-vane #1 (head of

Micropool

Bottom

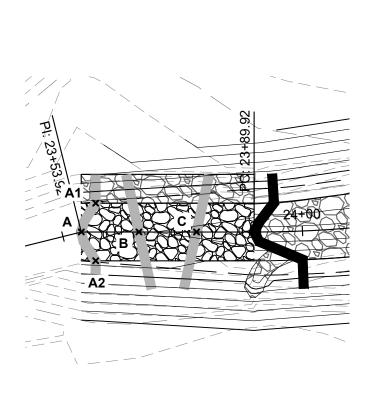
Pt. A1 -Minivane tie-

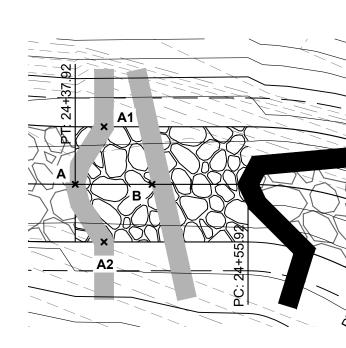
Pt. A2 -Minivane tie-

Pt. B - Head of

Micropool

Head of cross vane #14 (tail of

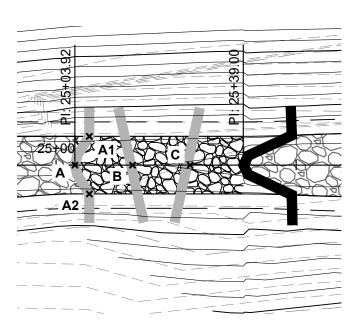




~	26+
ζ	
	26+
κ 2	26+8

26+89.2
26+95.6
27+01.9

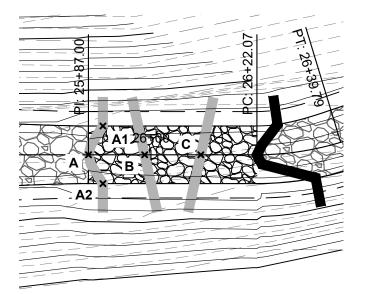
Riffle 15		Description	Invert El	Drop (ft)	Length (ft)	Slope
Station	25+03.92	US	307.25			
Station	25+39.00	DS	306.77			
				0.48	35.08	1.37%
			Length between			
Station	Elevation	Description	structures (ft)			
		Pt. A - Head of				
		rock mini-vane				
		#1 (head of				
25+03.92	307.25	riffle)	11.7			
		Micropool				
25+09.77	306.59	Bottom	-			
		Pt. A1 -				
		Minivane tie-				
25+06.92	307.60	into slope	-			
		Pt. A2 -				
		Minivane tie-				
25+06.92	307.60	into slope	-			
		Pt. B - Head of				
25+15.61	307.09	Log Roller #1	11.7			
		Micropool				
25+21.46	306.43	Bottom	-			
		Pt. C - Head of				
25+27.31	306.93	log roller #2	11.7			
		Micropool				
25+33.15	306.27	Bottom	-			
		Head of cross				
		vane #15 (tail of				
25+39.00	306.77	riffle)	-			



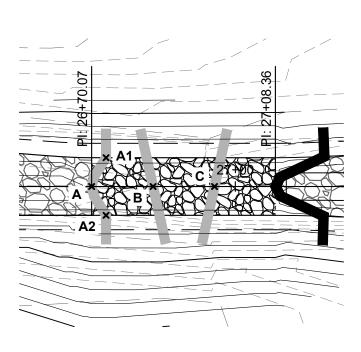
NOTE: FOR CONSTRUCTED RIFFLES, LOGS MAYBE ELIMINATED FROM RIFFLE MATRIX IF THERE IS NOT ENOUGH SPACING FOR CONSTRUCTION. FIELD ENGIENEER AND TOWN OF VIENNA WILL MAKE DETERMINATION IF LOGS ARE ELIMINATED.



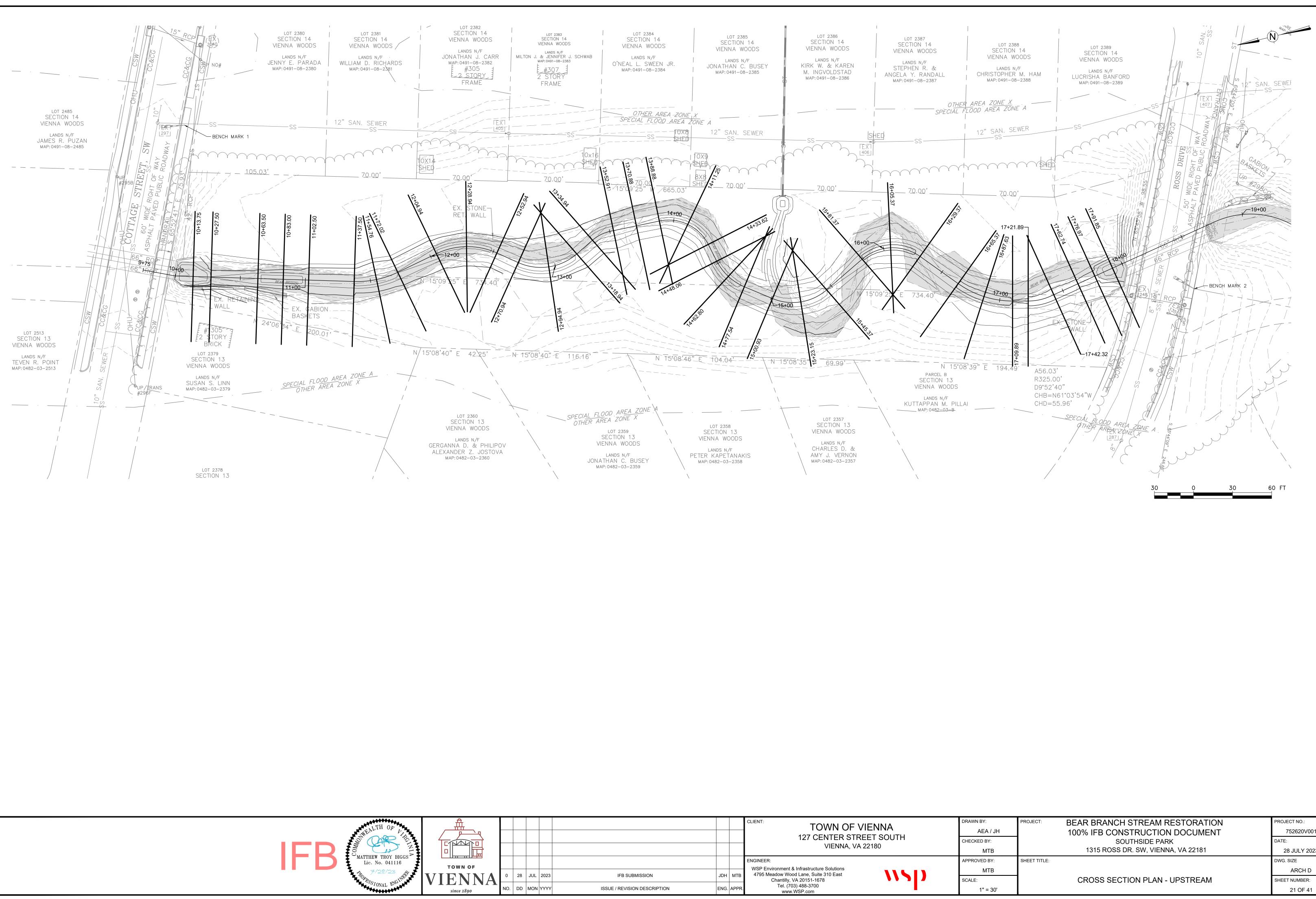
Riffle 16		Description	Invert El	Drop (ft)	Length (ft)	Slope
Station	25+87.00	US	306.67			
Station	26+22.07	DS	306.19			
				0.48	35.07	1.37%
			Length between			
Station	Elevation	Description	structures (ft)			
		Pt. A - Head of				
		rock mini-vane				
		#1 (head of				
25+87.00	306.67	riffle)	11.7			
		Micropool				
25+92.85	306.01	Bottom	-			
		Pt. A1 -				
		Minivane tie-				
25+90.00	307.02	into slope	-			
		Pt. A2 -				
		Minivane tie-				
25+90.00	307.02	into slope	-			
		Pt. B - Head of				
25+98.69	306.51	Log Roller #1	11.7			
		Micropool				
26+04.54	305.85	Bottom	-			
		Pt. C - Head of				
26+10.38	306.35	log roller #2	11.7			
		Micropool				
26+16.23	305.69	Bottom	-			
		Head of cross				
		vane #16 (tail of				
26+22.07	306.19	riffle)	-			



Riffle 17		Description	Invert El	Drop (ft)	Length (ft)	Slope
Station	26+70.07	US	306.19			
Station	27+08.36	DS	306.13			
				0.06	38.29	0.16%
			Length between			
Station	Elevation	Description	structures (ft)			
		Pt. A - Head of				
		rock mini-vane				
		#1 (head of				
26+70.07	306.19	riffle)	12.8			
		Micropool				
26+76.45	305.67	Bottom	-			
		Pt. A1 -				
		Minivane tie-				
26+73.07	306.54	into slope	-			
		Pt. A2 -				
		Minivane tie-				
26+73.07	306.54	into slope	-			
		Pt. B - Head of				
26+82.83	306.17	Log Roller #1	12.8			
		Micropool				
26+89.22	305.65	Bottom	-			
		Pt. C - Head of				
26+95.60	306.15	log roller #2	12.8			
		Micropool				
27+01.98	305.63	Bottom	-			
		Head of cross				
		vane #17 (tail of				
27+08.36	306.13	riffle)	-			

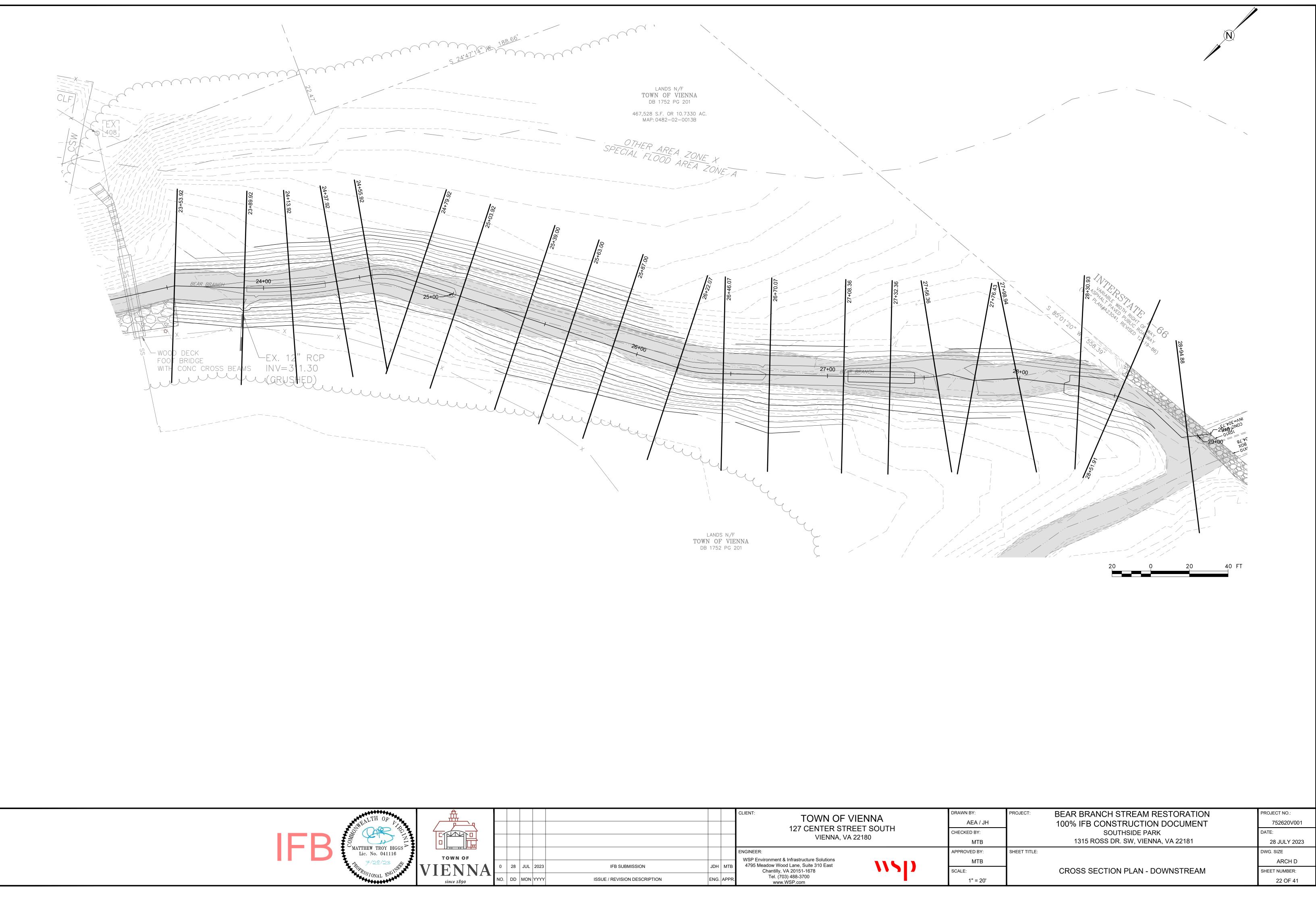


						CLIENT: TOWN OF VIENNA 127 CENTER STREET SOUTH VIENNA, VA 22180	DRAWN BY: AEA / JH CHECKED BY: MTB	PROJECT:       BEAR BRANCH STREAM RESTORATION       PROJECT NO.         100% IFB CONSTRUCTION DOCUMENT       752620         SOUTHSIDE PARK       DATE:         1315 ROSS DR. SW, VIENNA, VA 22181       28 JULY	20V001
						ENGINEER:	APPROVED BY:	SHEET TITLE: DWG. SIZE	
	0 29	3 JUL	2023	IFB SUBMISSION JDI	н мтв	WSP Environment & Infrastructure Solutions 4795 Meadow Wood Lane, Suite 310 East	MTB	STREAM RESTORATION STRUCTURE DETAILS	CH D
IENNA	0 20	, JOL	2023			Chantilly, VA 20151-1678	SCALE:	RIFFLE STRUCTURE TABLES (3)	BER:
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								CLIENT: TOWN OF VIENNA 127 CENTER STREET SOUTH VIENNA, VA 22180
								ENGINEER: WSP Environment & Infrastructure Solutions
IENNA	0	28	JUL	2023	IFB SUBMISSION	JDH	МТВ	4795 Meadow Wood Lane, Suite 310 East Chantilly, VA 20151-1678
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AEA / JH	100% IFB CONSTRUCTION DOCUMENT	752620V001
CHECKED BY:	SOUTHSIDE PARK	DATE:
MTB	1315 ROSS DR. SW, VIENNA, VA 22181	28 JULY 2023
APPROVED BY:	SHEET TITLE:	DWG. SIZE
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SCALE:	CROSS SECTION PLAN - UPSTREAM	SHEET NUMBER:
1" = 30'		21 OF 41



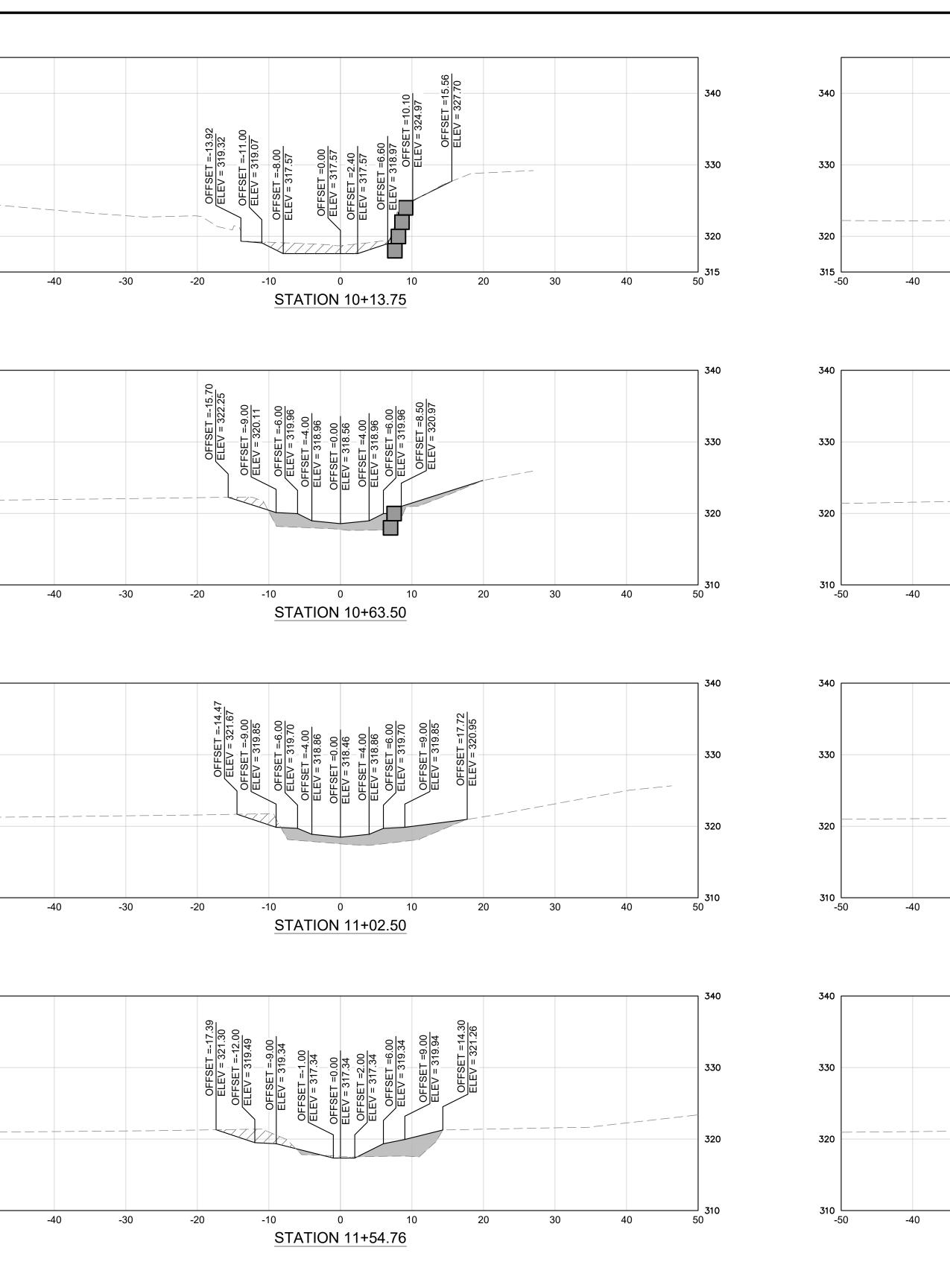
							TOWN OF VIENNA	DRAWN BY: AEA / JH	PROJECT:	BEAR BRANCH STREAM RESTORATION 100% IFB CONSTRUCTION DOCUMENT	PROJECT NO.: 752620V001
							127 CENTER STREET SOUTH VIENNA, VA 22180	CHECKED BY: MTB		SOUTHSIDE PARK 1315 ROSS DR. SW, VIENNA, VA 22181	DATE: 28 JULY 2023
							ENGINEER:	APPROVED BY:	SHEET TITLE:		DWG. SIZE
	0 00		2000	IFB SUBMISSION			WSP Environment & Infrastructure Solutions 4795 Meadow Wood Lane, Suite 310 East	MTB			ARCH D
IENNA	0 28	JUL	2023	ILR 20BINI2210N	JDH	IVITB	Chantilly, VA 20151-1678	SCALE:		CROSS SECTION PLAN - DOWNSTREAM	SHEET NUMBER:
	NO. DD	MON	YYYY	ISSUE / REVISION DESCRIPTION	ENG.	APPR.	Tel. (703) 488-3700 www.WSP.com	1" = 20'			22 OF 41

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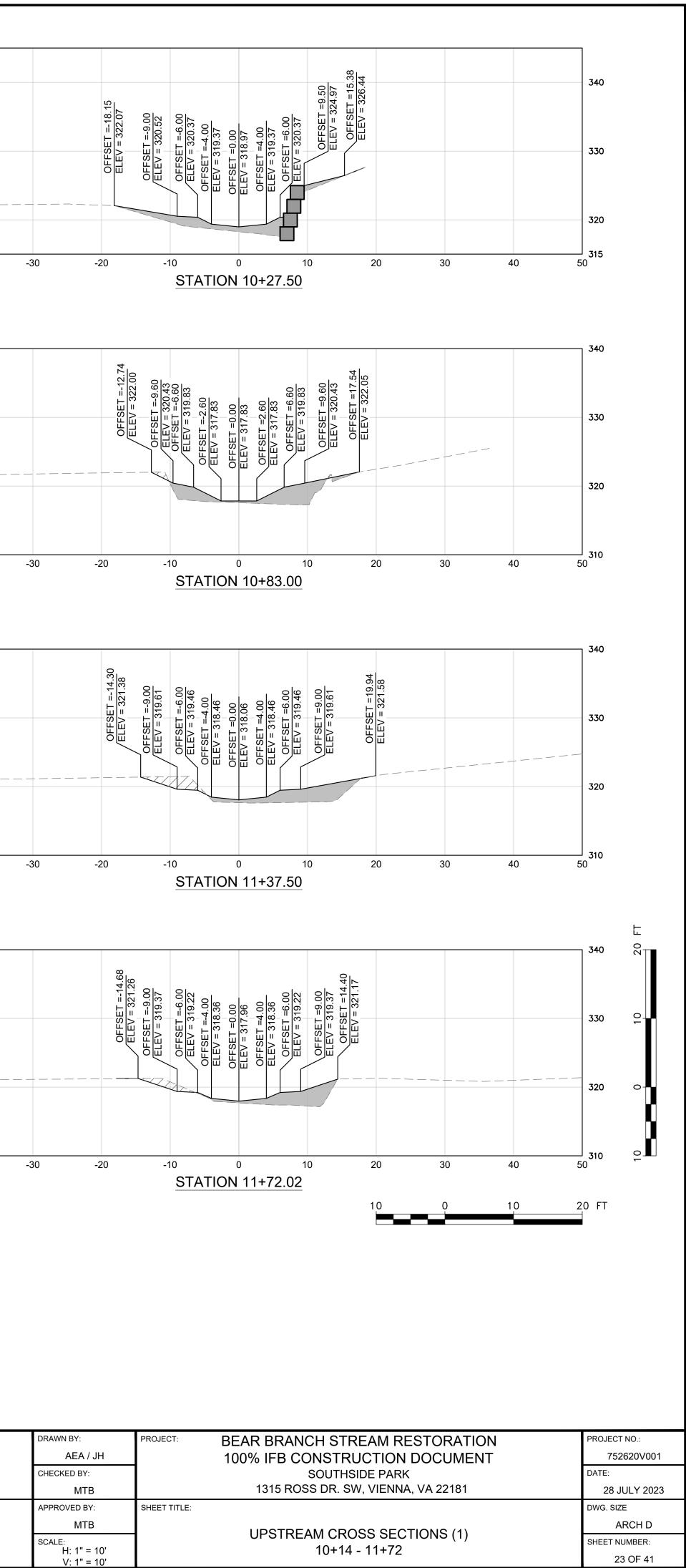
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MATTHEW TROY BIGGS Lic. No. 041116



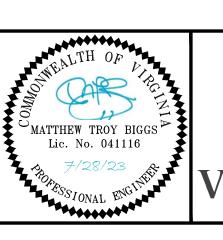
								CLIENT: TOWN OF VIENNA 127 CENTER STREET SOUTH
								VIENNA, VA 22180
TOWN OF								ENGINEER: WSP Environment & Infrastructure Solutions
IENNA	0	28	JUL	2023	IFB SUBMISSION	JDH	МТВ	
since 1890	NO.	DD	MON	YYYY	ISSUE / REVISION DESCRIPTION	ENG.	APPR.	Tol (703) 488 3700



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3. F 4. AS THE TAIL OF RIFFLE (SECTIONS TAKEN AT TAIL OF RIFFLE INTERFACE WITH CROSS VANES) APPROACHES THE PROPOSED CROSS VANE, CONTRACTOR SHALL CONSTRUCT THE INNER BERM FEATURE SUCH THAT IT GRADUALLY REDUCES AND FANS OUT / TAPERS INTO THE BACKSIDE OF THE VANE ARM AND DOES NOT IMPEDE OR BLOCK THE FLOW OF WATER THROUGH THE THROAT OF THE CROSS VANE.





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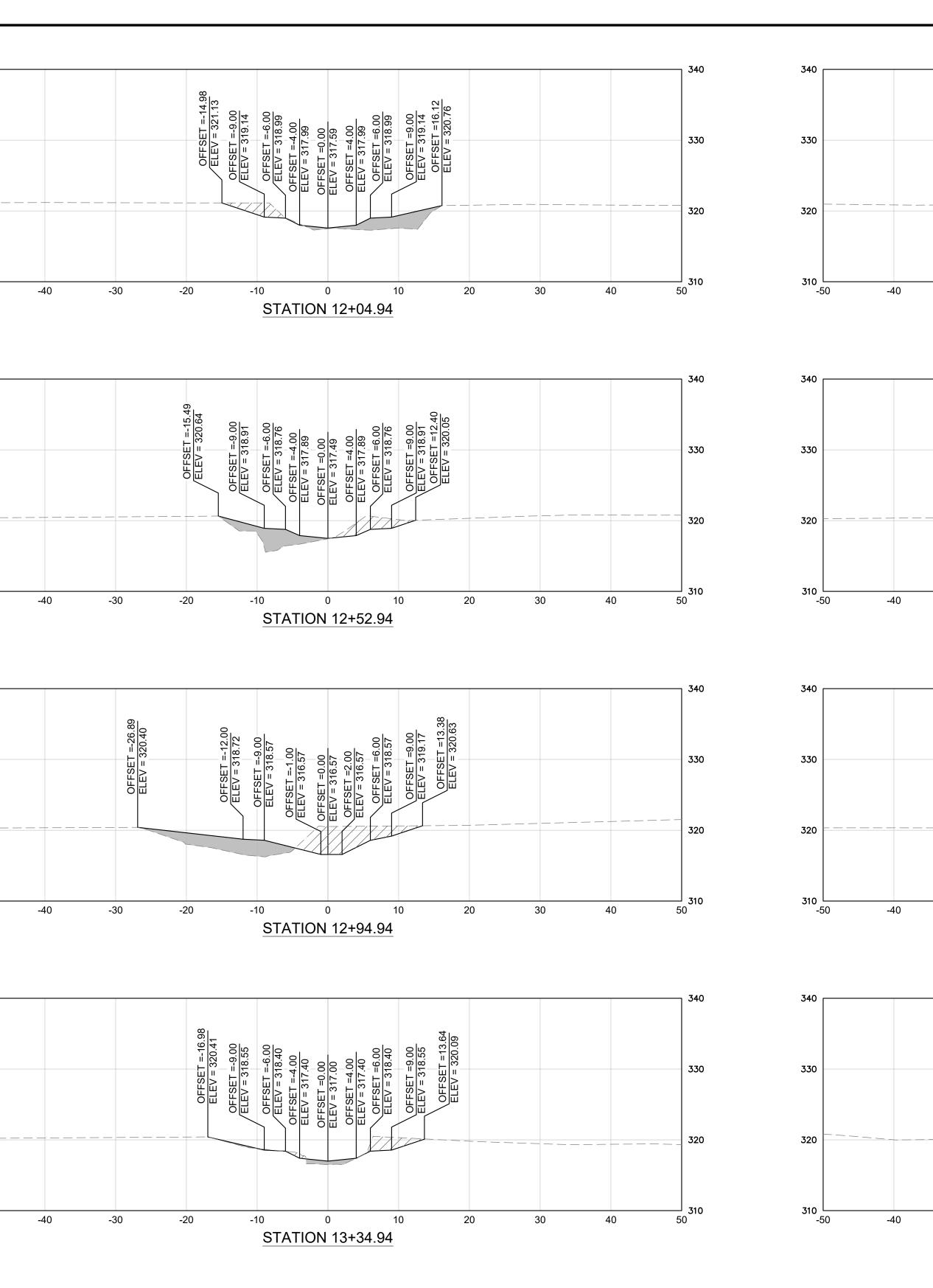
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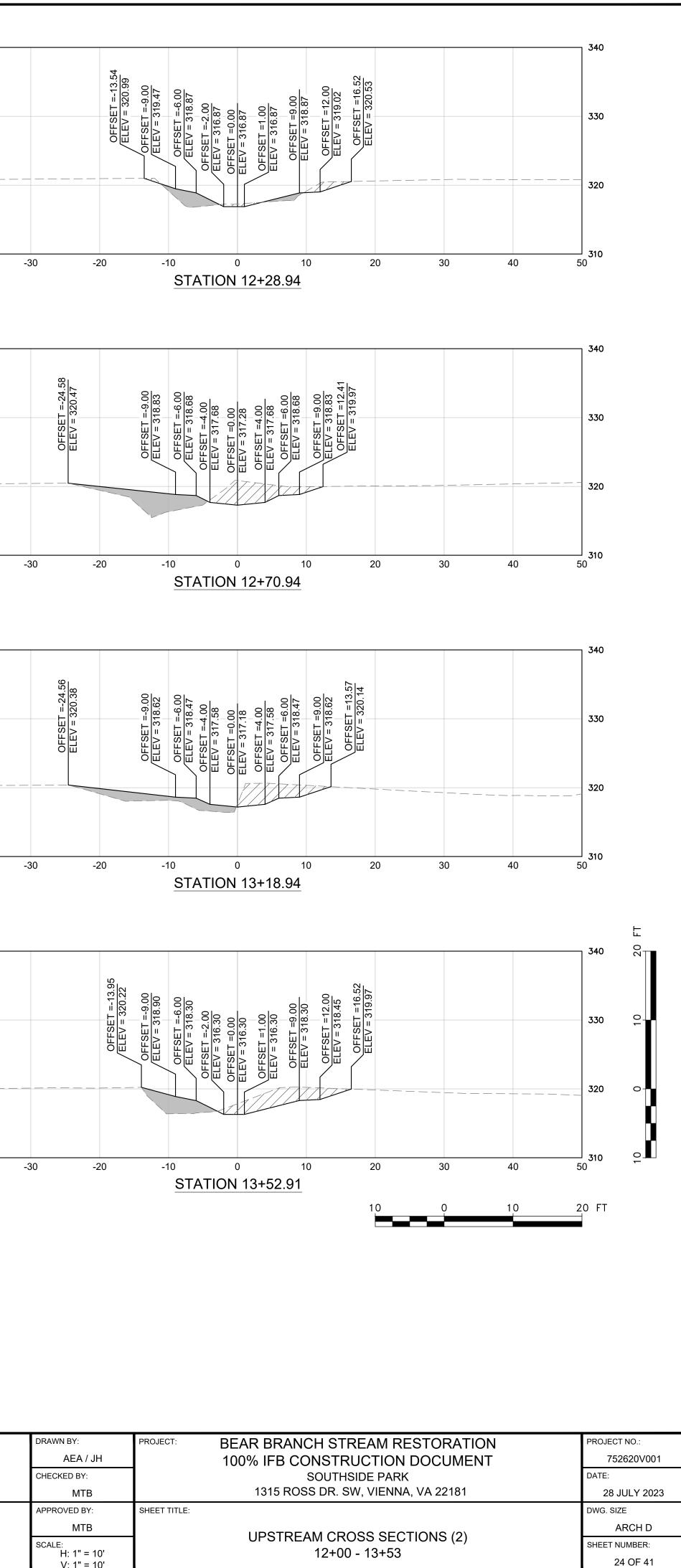
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								CLIENT: TOWN OF VIENNA 127 CENTER STREET SOUTH VIENNA, VA 22180
								ENGINEER: WSP Environment & Infrastructure Solutions
IENNA	0	28	JUL	2023	IFB SUBMISSION	JDH	МТВ	4795 Meadow Wood Lane, Suite 310 East Chantilly, VA 20151-1678
since 1890	NO.	DD	MON	YYYY	ISSUE / REVISION DESCRIPTION	ENG.	APPR.	Tel (703) 488 3700

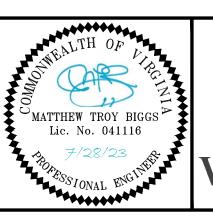


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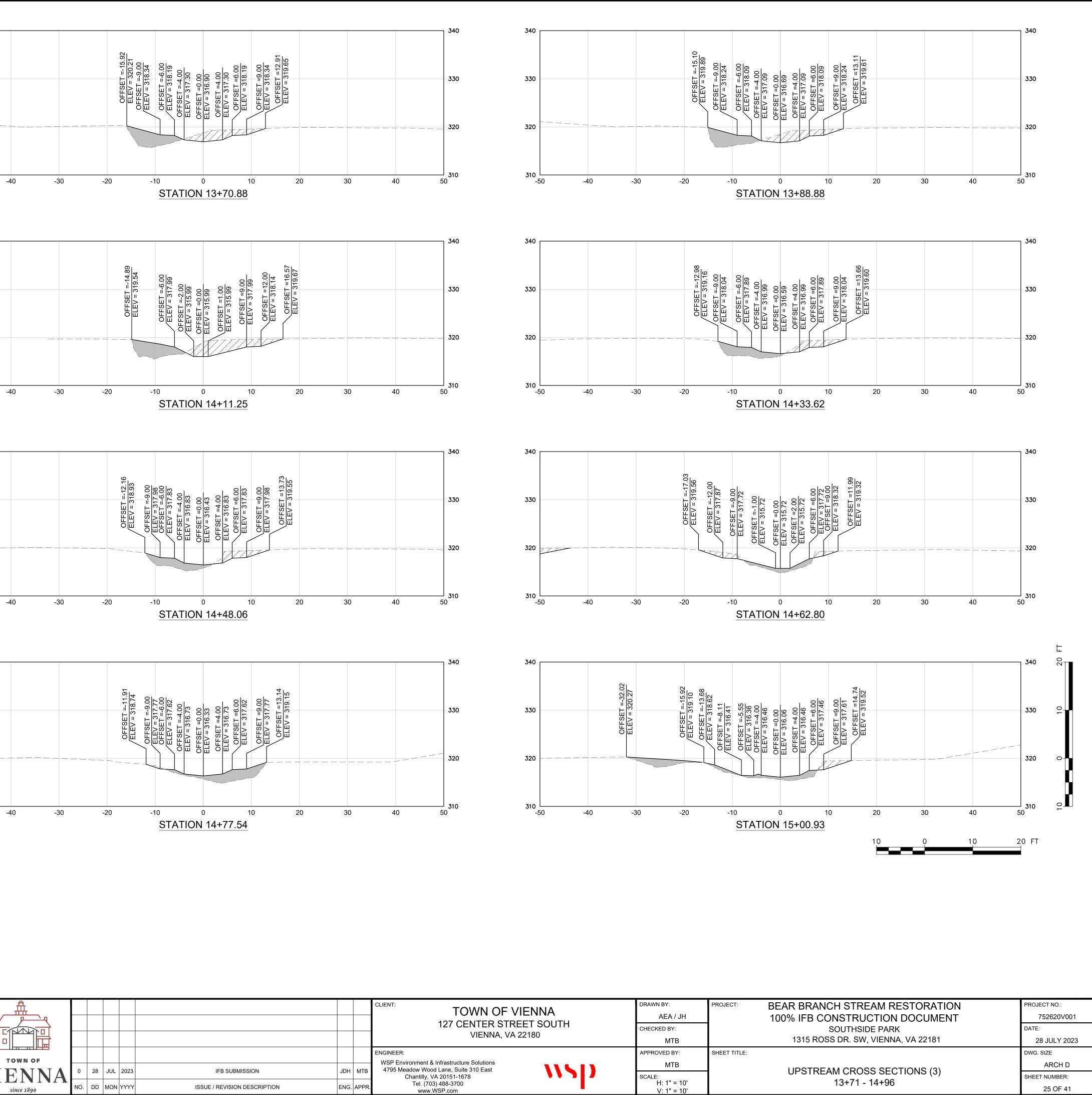


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								CLIENT: TOWN OF VIENNA 127 CENTER STREET SOUTH VIENNA, VA 22180
IENNA	0	28	JUL	2023	IFB SUBMISSION	JDH	МТВ	WSP Environment & Infrastructure Solutions 4795 Meadow Wood Lane, Suite 310 East Chantilly, VA 20151-1678
<b>since 1890</b>	NO.	DD	MON	YYYY	ISSUE / REVISION DESCRIPTION	ENG.	APPR	Tel (703) 488-3700

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PROFILE SHEETS.	G IN THE DOWNSTREAM DIRECTION. THE BASELINE AS SHOWN ON THE PLAN AND /OR COMPACTED WITH AN EXCAVATOR BUCKET

## NOTE

- SUCH THAT FUTURE SETTLEMENT OF MATERIAL IS KEPT TO A MINIMUM. 4. AS THE TAIL OF RIFFLE (SECTIONS TAKEN AT TAIL OF RIFFLE INTERFACE WITH CROSS VANES) APPROACHES THE PROPOSED CROSS VANE, CONTRACTOR SHALL CONSTRUCT THE INNER BERM FEATURE SUCH THAT IT GRADUALLY REDUCES AND FANS OUT / TAPERS INTO THE BACKSIDE OF THE VANE ARM AND DOES NOT IMPEDE OR BLOCK THE FLOW OF WATER THROUGH THE THROAT OF THE CROSS VANE.





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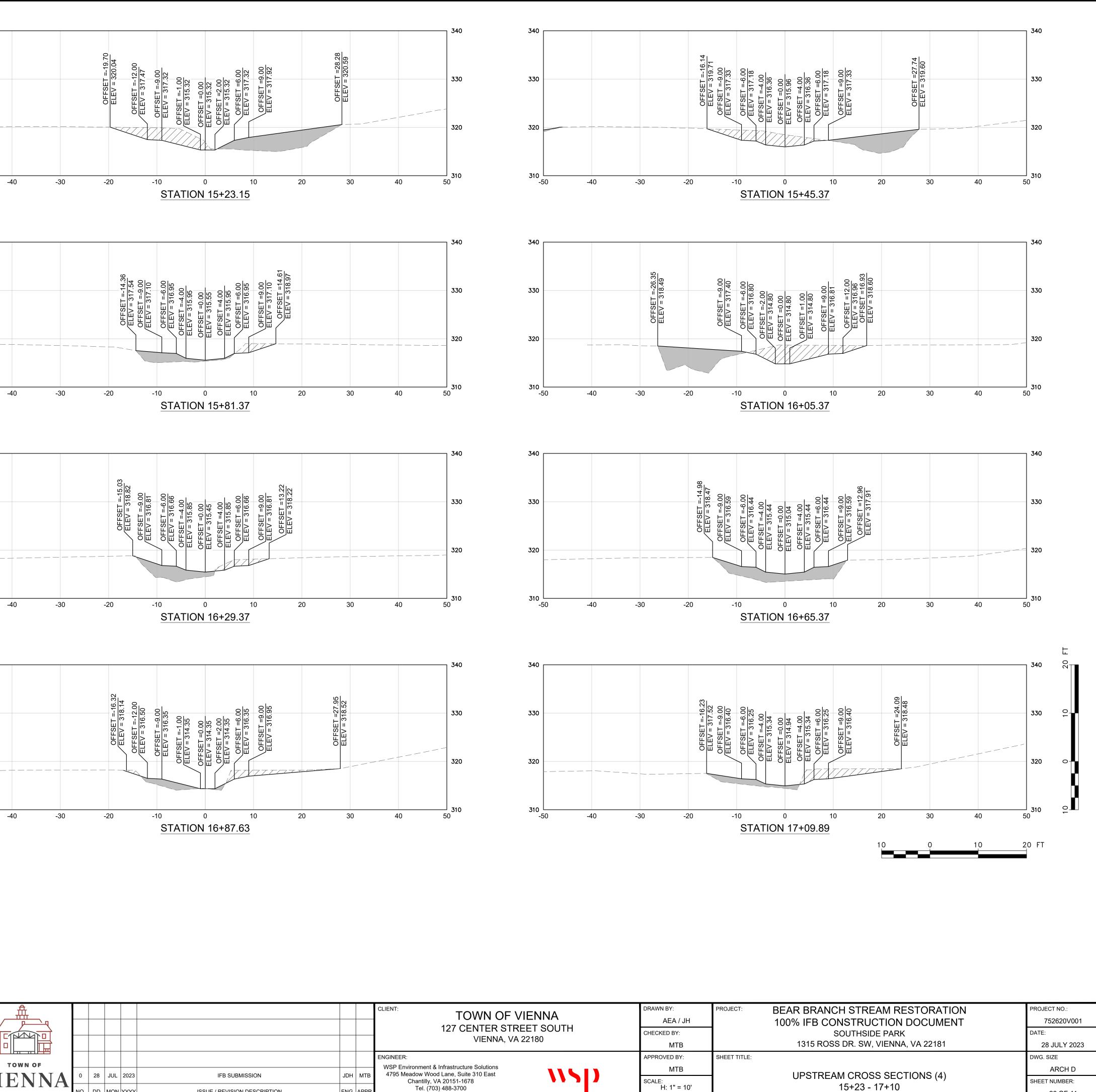
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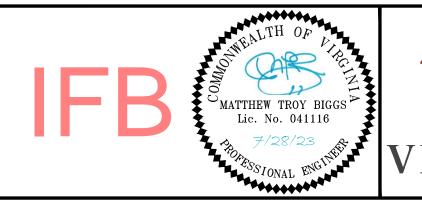
V: 1" = 10'

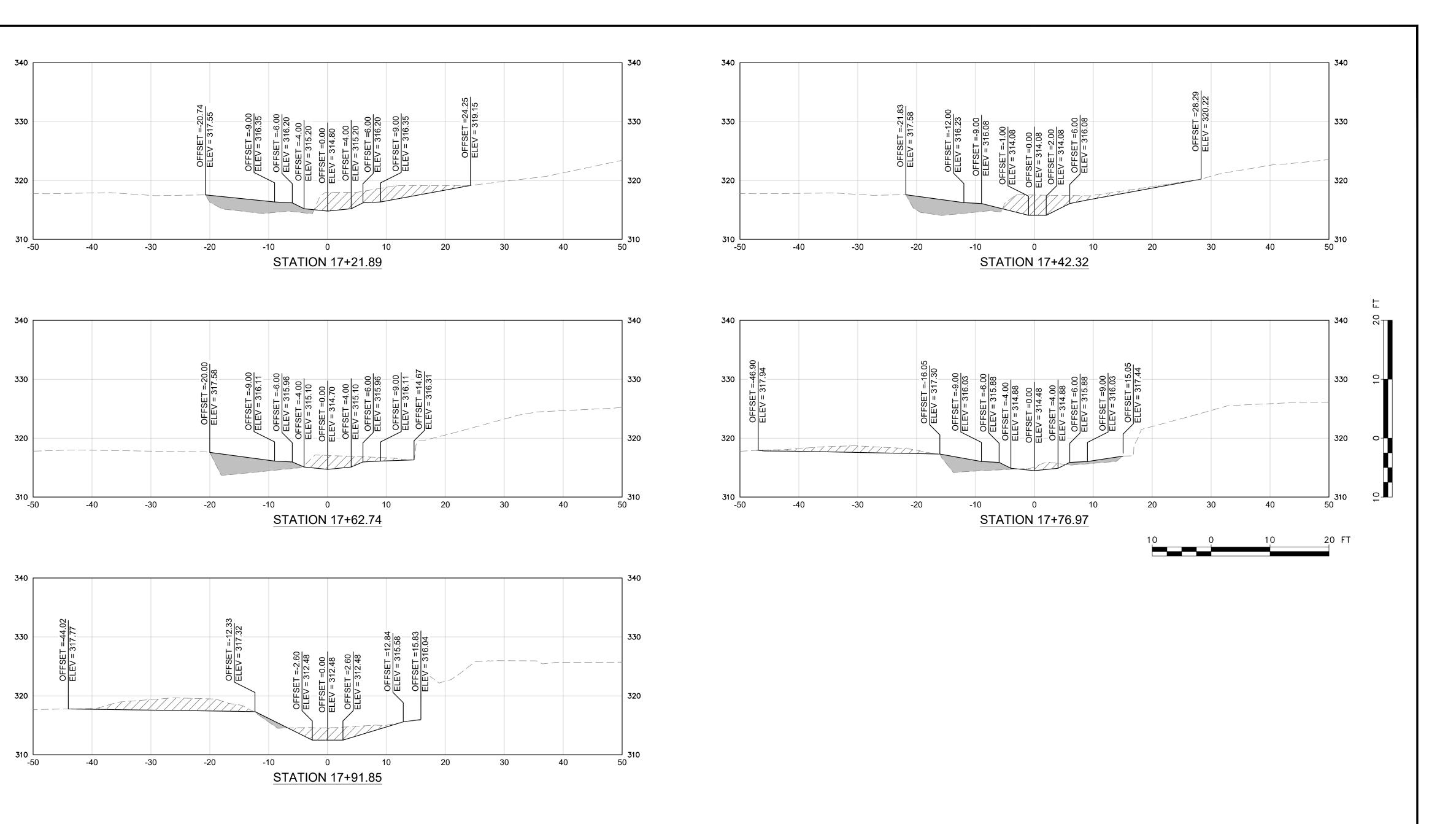
26 OF 41

<b>A</b>								CLIENT:	
								TOWN OF VIENNA 127 CENTER STREET SOL VIENNA, VA 22180	
								ENGINEER:	
IENNA	0	28	JUL	2023	IFB SUBMISSION	JDH	МТВ	WSP Environment & Infrastructure Solutions 4795 Meadow Wood Lane, Suite 310 East Chantilly, VA 20151-1678	<b>VSD</b>
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LEGE	ND
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	PROPOSED IMBRICATED WALL

- 1. CROSS SECTIONS ARE DEPICTED LOOKING IN THE DOWNSTREAM DIRECTION.
- 2. STATION NUMBERS ARE SHOWN ALONG THE BASELINE AS SHOWN ON THE PLAN AND PROFILE SHEETS.
- FILL MATERIAL IS TO BE TRACKED IN AND/OR COMPACTED WITH AN EXCAVATOR BUCKET SUCH THAT FUTURE SETTLEMENT OF MATERIAL IS KEPT TO A MINIMUM.
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								CLIENT: TOWN OF VIENNA 127 CENTER STREET SOUTH VIENNA, VA 22180
								ENGINEER: WSP Environment & Infrastructure Solutions
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since 1890	NO.	DD	MON	YYYY	ISSUE / REVISION DESCRIPTION	ENG.	APPR.	$T_{el}$ (703) 488-3700

DRAWN BY: AEA / JH	PROJECT: BEAR BRANCH STREAM RESTORATION 100% IFB CONSTRUCTION DOCUMENT	PROJECT NO.: 752620V001
CHECKED BY:	SOUTHSIDE PARK	DATE:
MTB	1315 ROSS DR. SW, VIENNA, VA 22181	28 JULY 2023
APPROVED BY:	SHEET TITLE:	DWG. SIZE
МТВ	LIDSTREAM CROSS SECTIONS (5)	ARCH D
SCALE: H: 1" = 10'	UPSTREAM CROSS SECTIONS (5) 17+17 - 17+92	SHEET NUMBER:
V: 1" = 10'	17 - 17 - 17 - 92	27 OF 41

LEGE	ND
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- CROSS SECTIONS ARE DEPICTED LOOKING IN THE DOWNSTREAM DIRECTION.
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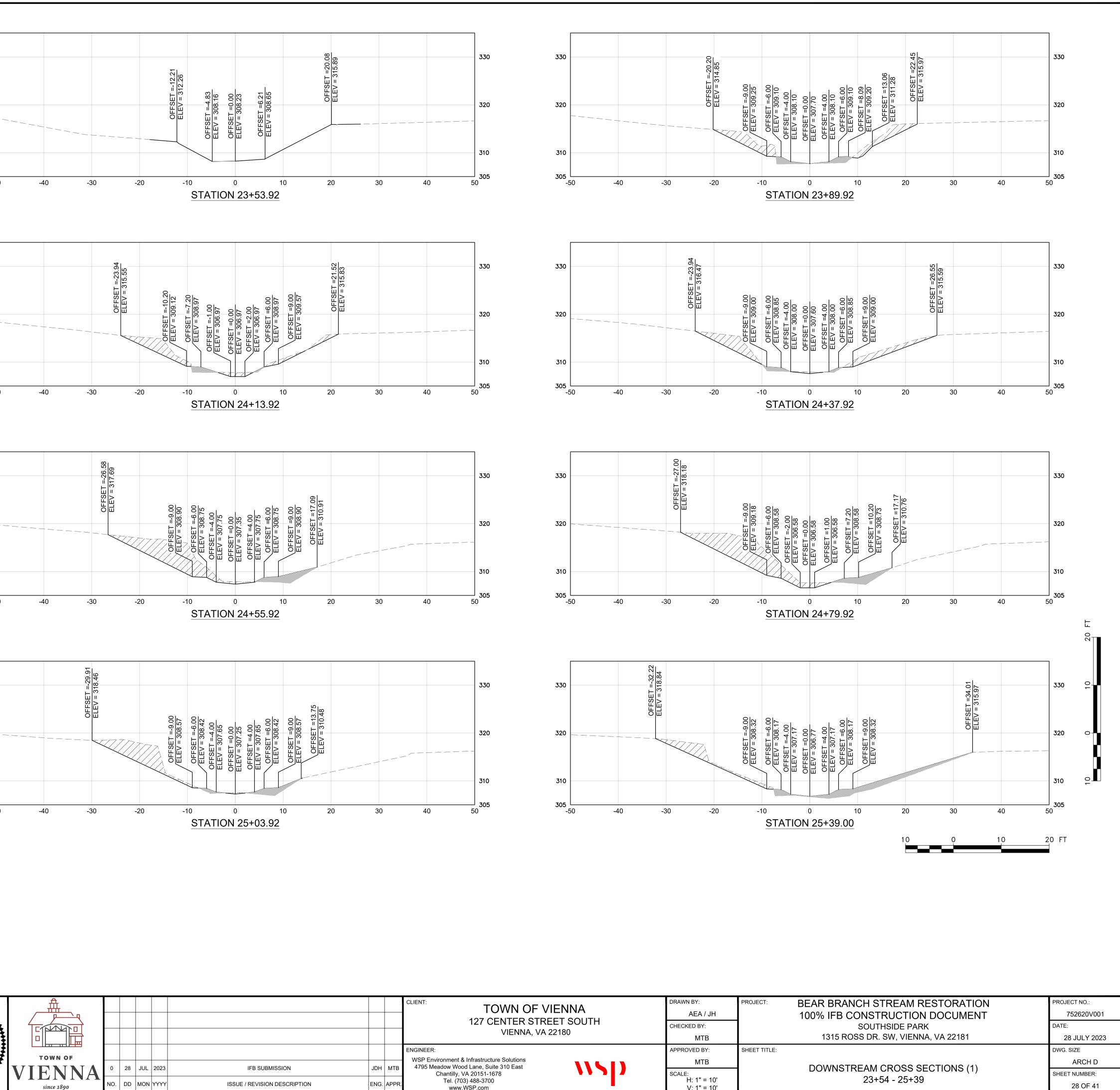
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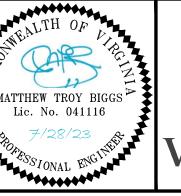


								CLIENT: TOWN OF VIENNA 127 CENTER STREET SOUTH VIENNA, VA 22180	
								ENGINEER: WSP Environment & Infrastructure Solutions	
TENNA	0	28	JUL	2023	IFB SUBMISSION	JDH	МТВ	4795 Meadow Wood Lane, Suite 310 East Chantilly, VA 20151-1678	
since 1890	NO.	DD	MON	YYYY	ISSUE / REVISION DESCRIPTION	ENG.	APPR.	Tel (703) 488-3700	

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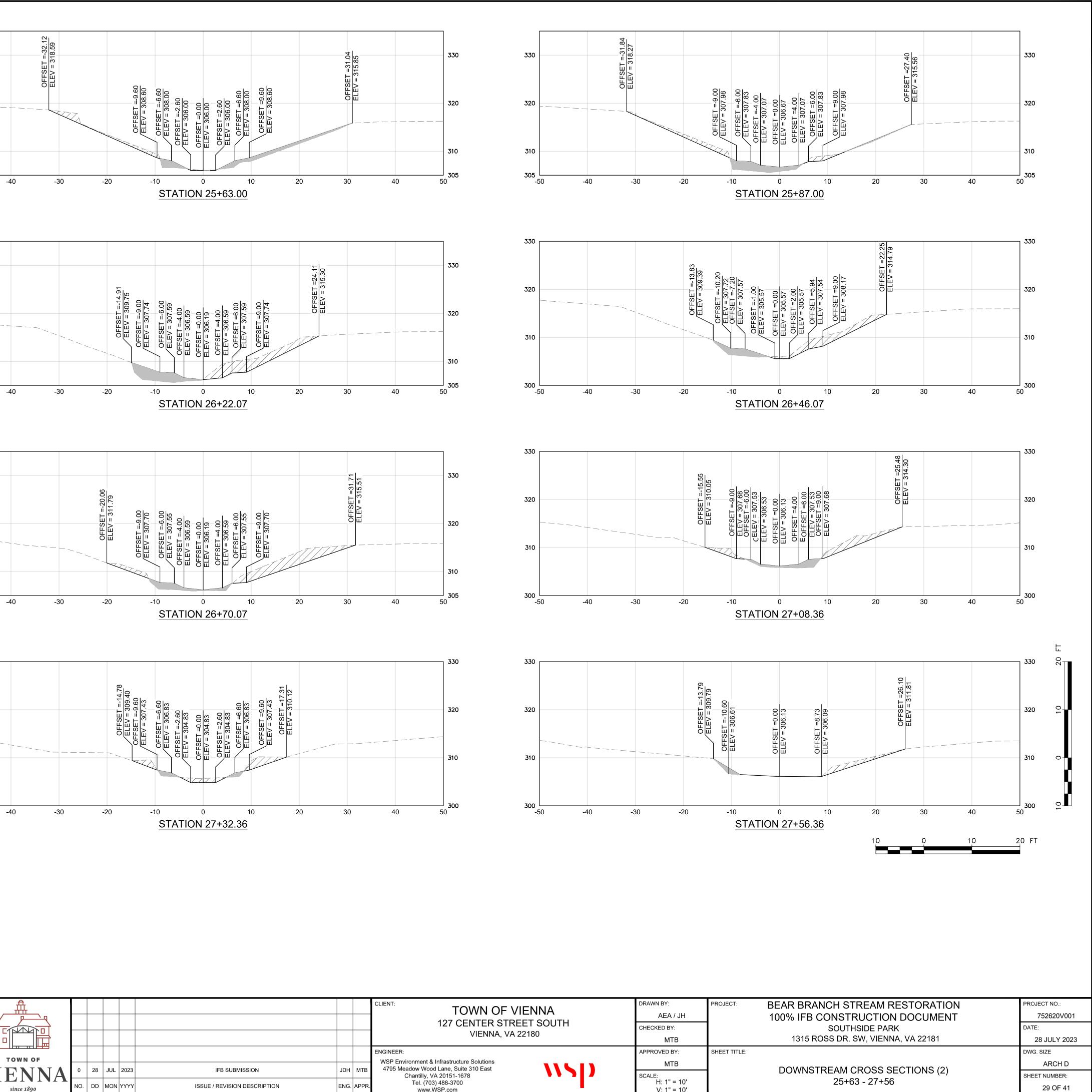
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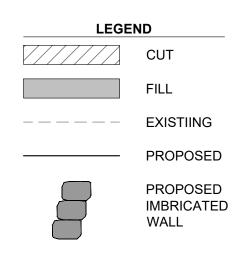
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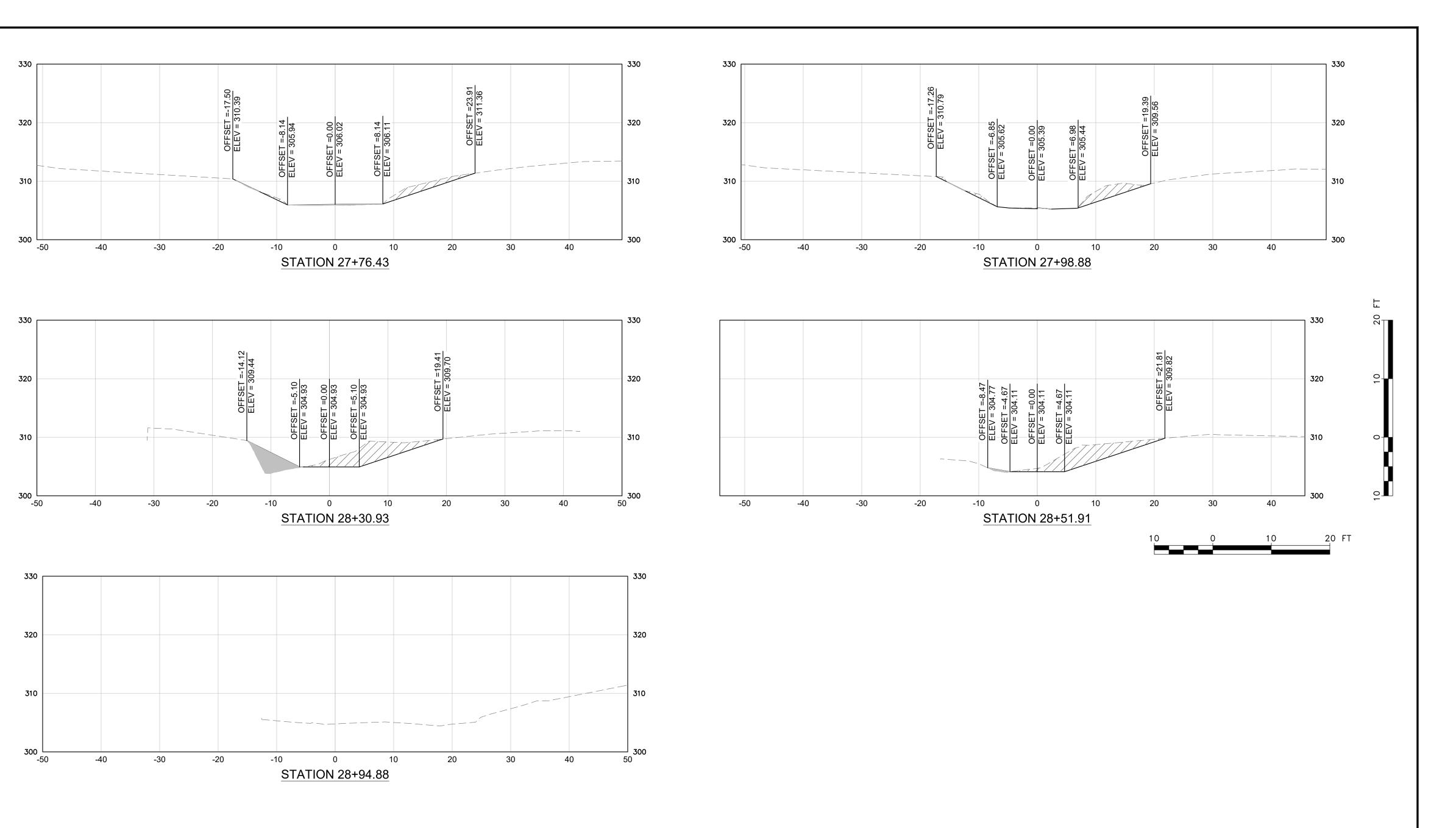
<b>A</b>								CLIENT:	
								TOWN OF VIENNA 127 CENTER STREET SOL VIENNA, VA 22180	
								ENGINEER:	
IENNA	0	28	JUL	2023	IFB SUBMISSION	JDH	МТВ	WSP Environment & Infrastructure Solutions 4795 Meadow Wood Lane, Suite 310 East Chantilly, VA 20151-1678	<b>VSD</b>
since 1890	NO.	DD	MON	YYYY	ISSUE / REVISION DESCRIPTION	ENG.	APPR.	Tel. (703) 488-3700 www.WSP.com	





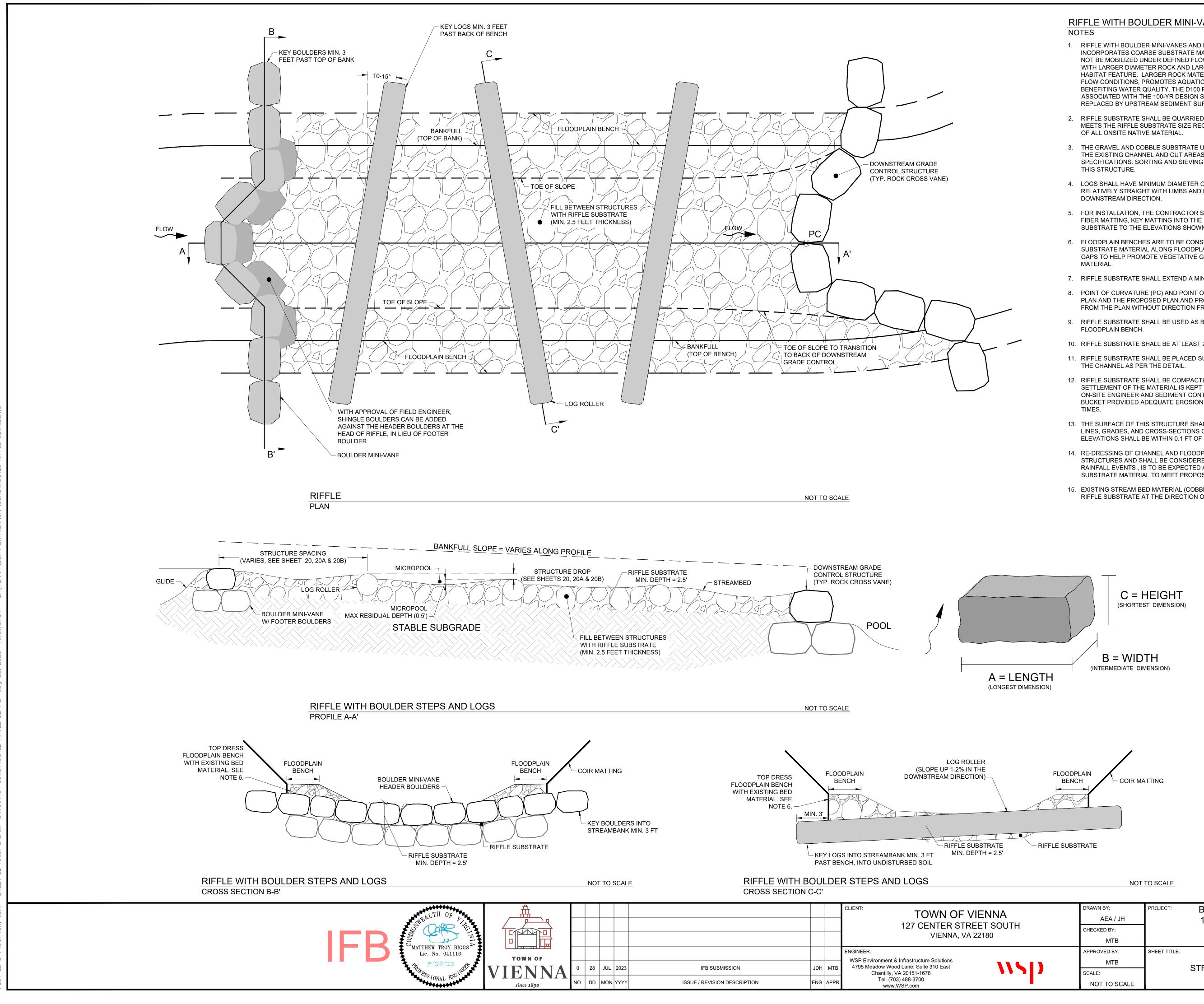
- 1. CROSS SECTIONS ARE DEPICTED LOOKING IN THE DOWNSTREAM DIRECTION.
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								CLIENT: TOWN OF VIENNA 127 CENTER STREET SOUTH VIENNA, VA 22180
								ENGINEER: WSP Environment & Infrastructure Solutions
ENNA	0	28	JUL	2023	IFB SUBMISSION JDH	н	МТВ	4795 Meadow Wood Lane, Suite 310 East Chantilly, VA 20151-1678
since 1890	NO.	DD	MON	YYYY	ISSUE / REVISION DESCRIPTION ENG	G. /	APPR.	Tel. (703) 488-3700 www.WSP.com

DRAWN BY:	PROJECT: BEAR BRANCH STREAM RESTORATION	PROJECT NO.:
AEA / JH	100% IFB CONSTRUCTION DOCUMENT	752620V001
CHECKED BY:	SOUTHSIDE PARK	DATE:
МТВ	1315 ROSS DR. SW, VIENNA, VA 22181	28 JULY 2023
APPROVED BY:	SHEET TITLE:	DWG. SIZE
МТВ	DOWNSTREAM CROSS SECTIONS (2)	ARCH D
SCALE: H: 1" = 10'	DOWNSTREAM CROSS SECTIONS (3) 27+90 - 29+19	SHEET NUMBER:
V: 1" = 10'	21-30-23-13	30 OF 41



## **RIFFLE WITH BOULDER MINI-VANES AND LOG ROLLERS**

- 1. RIFFLE WITH BOULDER MINI-VANES AND LOG ROLLERS IS A STREAM AND RIVER RESTORATION DESIGN FEATURE THAT INCORPORATES COARSE SUBSTRATE MATERIAL, BOULDERS AND LARGE WOOD (LOGS) IN THE CHANNEL BOTTOM THAT WILL NOT BE MOBILIZED UNDER DEFINED FLOW CONDITIONS. REPLACING (OR ADDING TO) THE NATIVE CHANNEL BED MATERIAL WITH LARGER DIAMETER ROCK AND LARGE WOOD CREATES A RIFFLE THAT FUNCTIONS AS RIGID GRADE CONTROL AND A HABITAT FEATURE. LARGER ROCK MATERIAL AND WOOD ENHANCES FLOW DIVERSITY AND TURBULENCE UNDER BASE FLOW CONDITIONS, PROMOTES AQUATIC HABITAT, NUTRIENT PROCESSING, AND RE-AERATION OF STREAM FLOW BENEFITING WATER QUALITY. THE D100 PARTICLES OF THE RIFFLE ARE DESIGNED TO RESIST THE SHEAR STRESS ASSOCIATED WITH THE 100-YR DESIGN STORM WHILE ALLOWING SMALLER SUBSTRATE PARTICLES TO BE MOBILIZED AND REPLACED BY UPSTREAM SEDIMENT SUPPLY.
- 2. RIFFLE SUBSTRATE SHALL BE QUARRIED STONE UNLESS NATIVE MATERIAL OF SIMILAR SIZE IS AVAILABLE ONSITE AND MEETS THE RIFFLE SUBSTRATE SIZE REQUIREMENTS. THE TOWN'S ON-SITE ENGINEER/INSPECTOR MUST APPROVE THE USE
- 3. THE GRAVEL AND COBBLE SUBSTRATE USED FOR THIS DESIGN FEATURE SHALL BE PREFERENTIALLY HARVESTED FROM THE EXISTING CHANNEL AND CUT AREAS ONSITE. ALL HARVESTED GRAVEL AND COBBLE SHALL MEET DESIGN SPECIFICATIONS. SORTING AND SIEVING OF THE HARVESTED RIFFLE SUBSTRATE IS INCIDENTAL TO THE CONSTRUCTION OF
- 4. LOGS SHALL HAVE MINIMUM DIAMETER OF 2'. LOGS SHALL HAVE A MINIMUM LENGTH OF 24 FEET. ALL LOGS SHALL BE RELATIVELY STRAIGHT WITH LIMBS AND BRANCHES TRIMMED FLUSH. ALL LOGS SHALL SLOPE UPSTREAM IN THE
- 5. FOR INSTALLATION, THE CONTRACTOR SHALL EXCAVATE THE LENGTH OF THE RIFFLE, INSTALL STRUCTURES, INSTALL COIR FIBER MATTING, KEY MATTING INTO THE RIFFLE TRENCH AND ALONG STRUCTURES, AND BACKFILL WITH THE RIFFLE SUBSTRATE TO THE ELEVATIONS SHOWN ON THE PROPOSED PROFILE.
- 6. FLOODPLAIN BENCHES ARE TO BE CONSTRUCTED FROM RIFFLE SUBSTRATE. INTERSTITIAL SPACES BETWEEN RIFFLE SUBSTRATE MATERIAL ALONG FLOODPLAIN BENCH SHALL BE FILLED. TOPSOIL SHALL BE INTERMITTENLY MIXED INTO TO GAPS TO HELP PROMOTE VEGETATIVE GROWTH. FLOODPLAIN BENCH IS TO BE TOP DRESSED WITH EXISTING BED
- 7. RIFFLE SUBSTRATE SHALL EXTEND A MINIMUM OF 3 FEET UPSTREAM OF THE POINT OF TANGENCY (PT) INTO THE GLIDE.
- 8. POINT OF CURVATURE (PC) AND POINT OF TANGENCY (PT) STATIONS AND ELEVATIONS ARE INCLUDED ON THE GEOMETRY PLAN AND THE PROPOSED PLAN AND PROFILE SHEETS. ELEVATIONS OF BOULDER MINI-VANES AND LOGS SHALL NOT VARY FROM THE PLAN WITHOUT DIRECTION FROM THE TOWN'S ON-SITE ENGINEER/INSPECTOR.
- 9. RIFFLE SUBSTRATE SHALL BE USED AS BACKFILL AROUND/BETWEEN ALL STRUCTURES AND BE USED TO CONSTRUCT THE
- 10. RIFFLE SUBSTRATE SHALL BE AT LEAST 2.5 FEET DEEP. RIFFLE SUBSTRATE SHALL BE PLACED AT A UNIFORM THICKNESS.
- 11. RIFFLE SUBSTRATE SHALL BE PLACED SUCH THAT, IN CROSS-SECTION, ITS LOWEST ELEVATION OCCURS IN THE CENTER OF
- 12. RIFFLE SUBSTRATE SHALL BE COMPACTED USING TRACKED EQUIPMENT OR AN EXCAVATOR BUCKET SUCH THAT FUTURE SETTLEMENT OF THE MATERIAL IS KEPT TO A MINIMUM. WITH APPROVAL FROM AND AT THE DIRCTION OF THE TOWN'S ON-SITE ENGINEER AND SEDIMENT CONTROL INSPECTOR, RIFFLE MATERIAL MAY BE WASHED IN USING AN EXCAVATOR BUCKET PROVIDED ADEQUATE EROSION AND SEDIMENT CONTROLS ARE IN PLACE AND FUNCTIONING PROPERLY AT ALL
- 13. THE SURFACE OF THIS STRUCTURE SHALL BE FINISHED TO A SMOOTH AND COMPACT SURFACE IN ACCORDANCE WITH THE LINES, GRADES, AND CROSS-SECTIONS OR ELEVATIONS SHOWN ON THE DRAWINGS. THE DEGREE OF FINISH FOR INVERT ELEVATIONS SHALL BE WITHIN 0.1 FT OF THE GRADES AND ELEVATIONS INDICATED.
- 14. RE-DRESSING OF CHANNEL AND FLOODPLAIN BENCH WILL LIKELY BE REQUIRED FOLLOWING INSTALLATION OF IN-STREAM STRUCTURES AND SHALL BE CONSIDERED INCIDENTAL TO CONSTRUCTION. MIGRATION OF FINES, ESPECIALLY AFTER RAINFALL EVENTS, IS TO BE EXPECTED AND MAY REQUIRE RE-SHAPING OF THE CHANNEL AND RE-DISTRIBUTION OF RIFFLE SUBSTRATE MATERIAL TO MEET PROPOSED GRADES.
- 15. EXISTING STREAM BED MATERIAL (COBBLE-GRAVEL-SAND) MAY BE USED TO TOP DRESS AND FILL THE MATRIX OF THE RIFFLE SUBSTRATE AT THE DIRECTION OF THE TOWN'S ON-SITE ENGINEER/INSPECTOR.

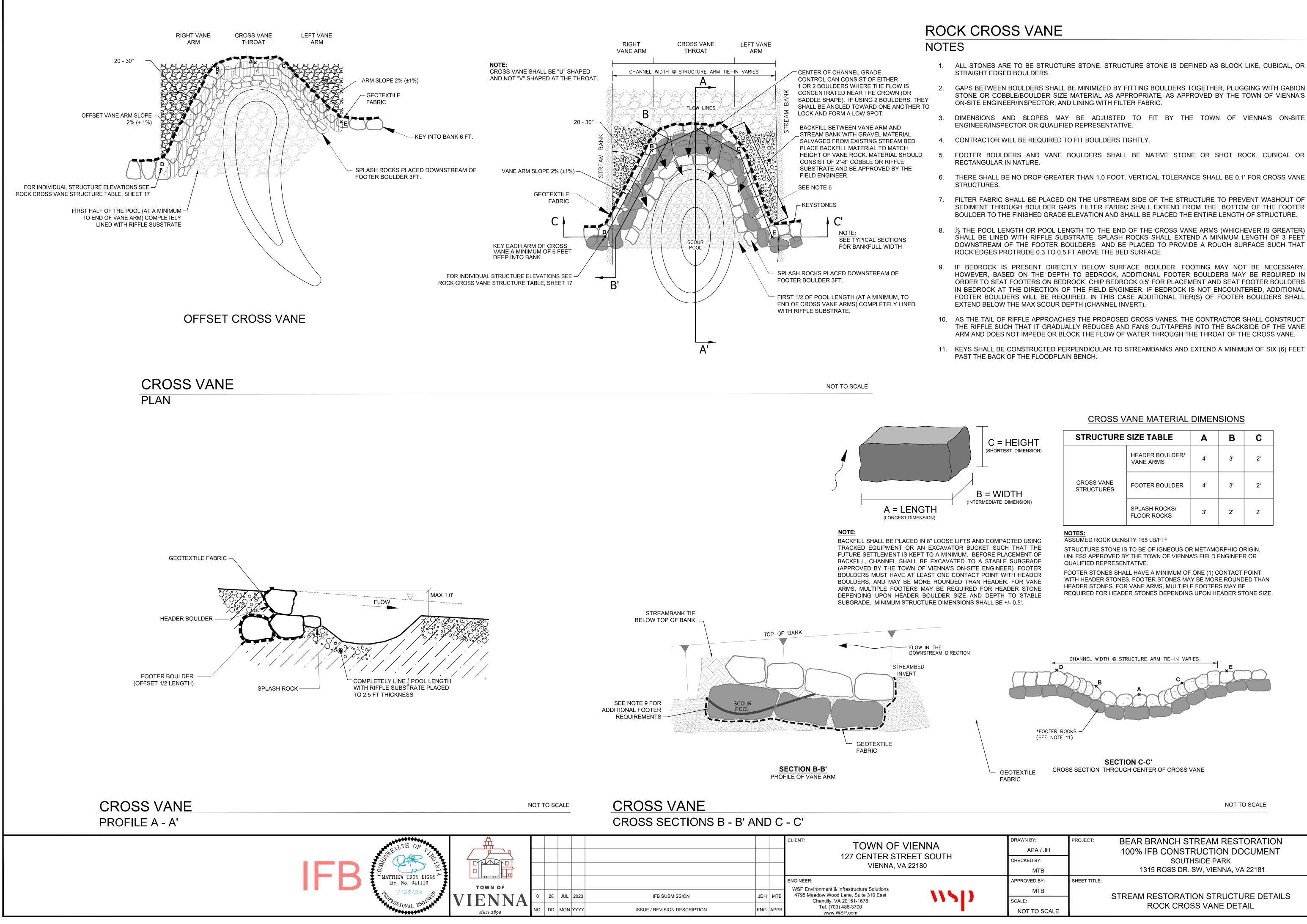
#### NOTE

BACKFILL SHALL BE PLACED IN 8" LOOSE LIFTS AND COMPACTED USING TRACKED EQUIPMENT OR AN EXCAVATOR BUCKET SUCH THAT FUTURE SETTLEMENT IS KEPT TO A MINIMUM. MINIMUM STRUCTURE DIMENSIONS SHALL BE +/- 0.5'. BEFORE PLACEMENT OF BACKFILL, CHANNEL SHALL BE EXCAVATED TO A STABLE SUBGRADE (APPROVED BY THE TOWN'S ON-SITE ENGINEER/INSPECTOR). FOOTER BOULDERS MUST HAVE ATLEAST ONE CONTACT POINT WITH HEADER BOULDERS, AND MAY BE MORE ROUNDED THAN HEADER.

#### RIFFLE MATERIAL DIMENSIONS

STRUCTURE	SIZE TABLE	Α	В	С
DOOK	OFFSET BOULDER STEP	4'	3'	2'
ROCK	FOOTER BOULDER	4'	3'	2'
LOGS	MIN DIAMETER = 2' MIN LENGTH = 24'			
CHANNEL BE	D MATERIAL SP	ECS		
RIFFLE SUBSTRATE	VDOT CLASS II RIPRA SELECT BOULDERS <sup>1</sup> VDOT CLASS I RIPRA GABION STONE SUPPLEMENTAL EXIS <sup>1</sup> ROUNDED RIVER C <sup>2</sup> EXISTING STREAM I (COBBLE-GRAVEL-S TOP DRESS THE RII VOIDS.	P STING BED OBBLE LIK BED MATE SAND) SHA	E STONE RIAL LL BE USI	14-20". ED TO
				PROJEC
-	AM RESTORATI	-		75

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CHECKED BY:	SOUTH	ISIDE PARK	DATE:
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APPROVED BY:	SHEET TITLE:		DWG. SIZE
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SCALE:		ED RIFFLE DETAIL	SHEET NUMBER:
NOT TO SCALE	CONSTRUCT		31 OF 41



								CLIENT: TOWN OF VIENN 127 CENTER STREET S VIENNA, VA 22180	
								ENGINEER: WSP Environment & Infrastructure Solutions	
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GAPS BETWEEN BOULDERS SHALL BE MINIMIZED BY FITTING BOULDERS TOGETHER, PLUGGING WITH GABION STONE OR COBBLE/BOULDER SIZE MATERIAL AS APPROPRIATE, AS APPROVED BY THE TOWN OF VIENNA'S

DIMENSIONS AND SLOPES MAY BE ADJUSTED TO FIT BY THE TOWN OF VIENNA'S ON-SITE

FOOTER BOULDERS AND VANE BOULDERS SHALL BE NATIVE STONE OR SHOT ROCK, CUBICAL OR

SEDIMENT THROUGH BOULDER GAPS. FILTER FABRIC SHALL EXTEND FROM THE BOTTOM OF THE FOOTER BOULDER TO THE FINISHED GRADE ELEVATION AND SHALL BE PLACED THE ENTIRE LENGTH OF STRUCTURE.

SHALL BE LINED WITH RIFFLE SUBSTRATE. SPLASH ROCKS SHALL EXTEND A MINIMUM LENGTH OF 3 FEET DOWNSTREAM OF THE FOOTER BOULDERS AND BE PLACED TO PROVIDE A ROUGH SURFACE SUCH THAT

IF BEDROCK IS PRESENT DIRECTLY BELOW SURFACE BOULDER, FOOTING MAY NOT BE NECESSARY. HOWEVER, BASED ON THE DEPTH TO BEDROCK, ADDITIONAL FOOTER BOULDERS MAY BE REQUIRED IN ORDER TO SEAT FOOTERS ON BEDROCK. CHIP BEDROCK 0.5' FOR PLACEMENT AND SEAT FOOTER BOULDERS IN BEDROCK AT THE DIRECTION OF THE FIELD ENGINEER. IF BEDROCK IS NOT ENCOUNTERED, ADDITIONAL FOOTER BOULDERS WILL BE REQUIRED. IN THIS CASE ADDITIONAL TIER(S) OF FOOTER BOULDERS SHALL

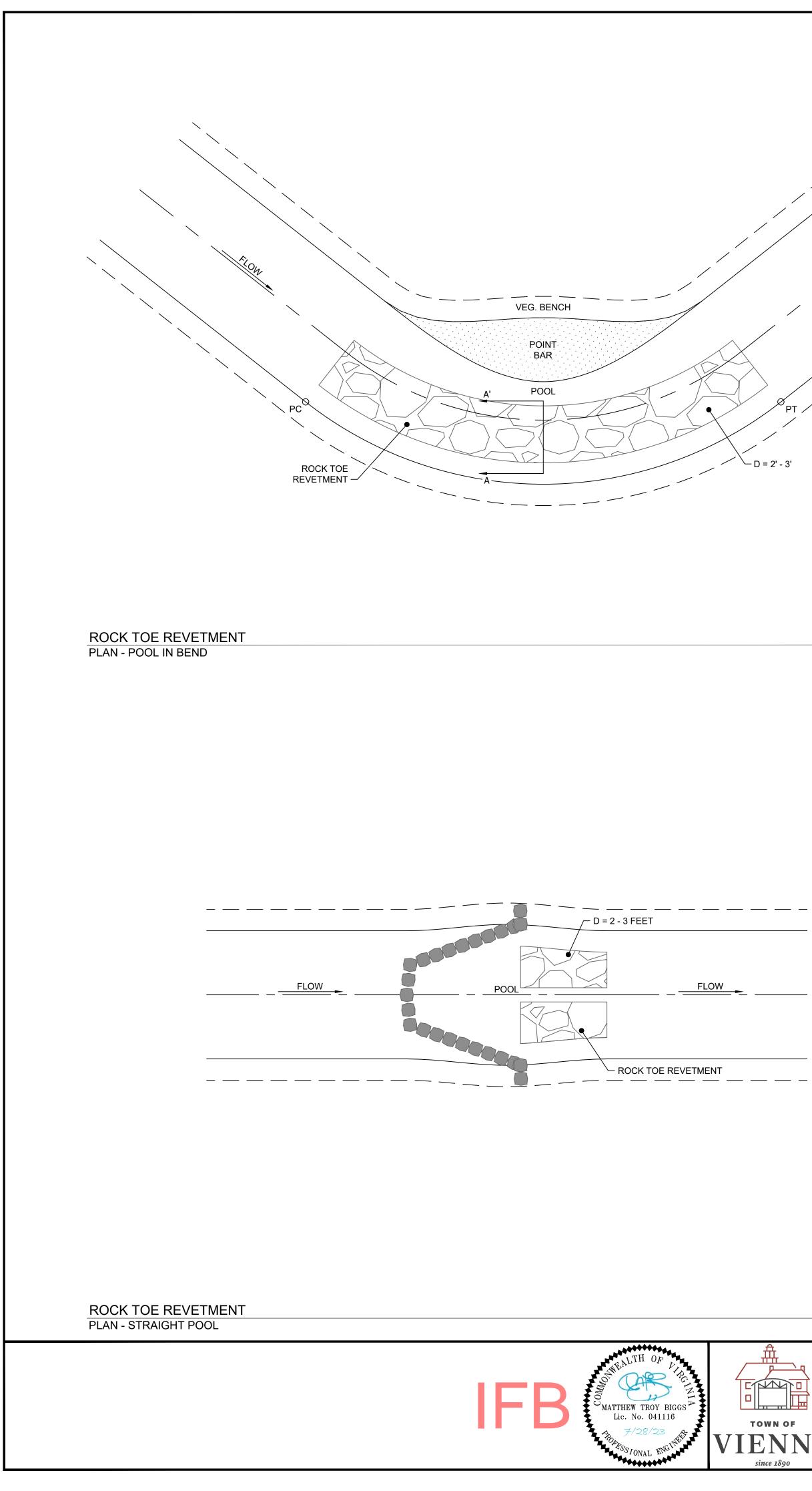
THE RIFFLE SUCH THAT IT GRADUALLY REDUCES AND FANS OUT/TAPERS INTO THE BACKSIDE OF THE VANE ARM AND DOES NOT IMPEDE OR BLOCK THE FLOW OF WATER THROUGH THE THROAT OF THE CROSS VANE.

C = HEIGHT (SHORTEST DIMENSION)

	HEADER BOULDER/ VANE ARMS	4'	3'	2'
ROSS VANE IRUCTURES	FOOTER BOULDER	4'	3'	2'
	SPLASH ROCKS/ FLOOR ROCKS	3'	2'	2'

WITH HEADER STONES. FOOTER STONES MAY BE MORE ROUNDED THAN REQUIRED FOR HEADER STONES DEPENDING UPON HEADER STONE SIZE.

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APPROVED BY:	SHEET TITLE:	DWG. SIZE
МТВ	STREAM RESTORATION STRUCTURE DETAILS	ARCH D
SCALE:	STREAM RESTORATION STRUCTURE DETAILS ROCK CROSS VANE DETAIL	SHEET NUMBER:
NOT TO SCALE	NOCK CROSS VANE DETAIL	32 OF 41



# ELON ELON D = 2' - 3'

## ROCK TOE REVETMENT

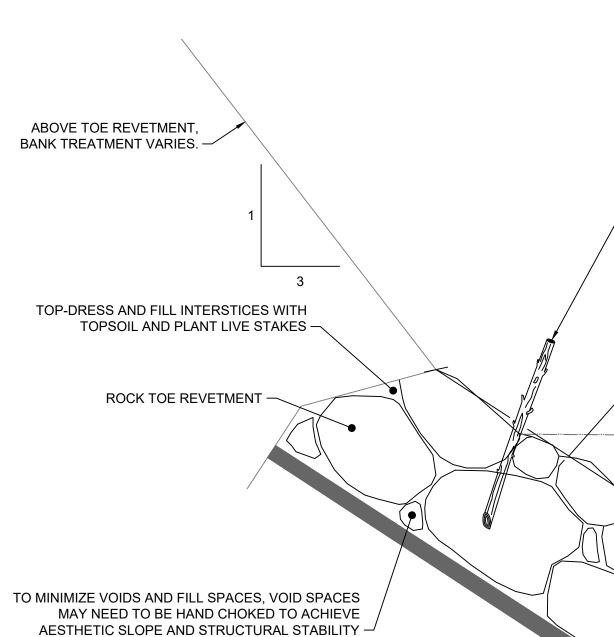
- NOTES
- 1. ALL STRUCTURE ROCK TOE SHALL BE VDOT CLASS III RIPRAP (LARGE ANGULAR ODD SHAPED) ( CITY ON-SITE ENGINEER/INSPECTOR BEFORE INSTALLATION.
- 2. ROCK TOE REVETMENT SHALL BE PLACED SUCH THAT MATERIALS LOCK TOGETHER.
- 3. SELECT BACKFILL AND SOIL BACKFILL MATERIAL SHALL BE COMPACTED SUCH THAT FUTURE MATERIAL IS KEPT TO A MINIMUM.
- 4. ASSUMED ROCK DENSITY = 165 LB/FT3.
- 5. IF BEDROCK IS ENCOUNTERED, SEAT REVETMENT IN BEDROCK AT DIRECTION OF ENGINEER/INSPECTOR.
- 6. ROCK TOE REVETMENT TO BEGIN AT CROSS VANE ARM AND END AT POINT OF TANGENCY (PT) BACK OF VANE ARM, IF PRESENT.
- 7. CONTRACTOR TO DIG 1" PILOT HOLES FOR PLACEMENT OF LIVE STAKES IN ROCK TOE REVETMENT.
- CONTRACTOR TO INSTALL ROCK TOE REVETMENT TO A DEPTH 2-3' BELOW MAXIMUM POOL DEPT LENGTH OF THE ROCK TOE REVETMENT.
- 9. IN STRAIGHT POOLS, ROCK TOE REVETMENT IS TO BE INSTALLED ALONG BOTH THE RIGHT AND LI INSTALLATION ALONG THE RIGHT BANK IS TO BE MIRROR IMAGE OF THE CROSS SECTION DETAIL SH

#### INSTALLATION GUIDELINES

- 1. EXCAVATE A TRENCH ALONG THE TOE OF THE STREAMBANK TO 2-3 FT BELOW THE STREAMBED INV
- 2. PLACE FILTER CLOTH ALONG THE BACKSIDE OF THE TRENCH. PLACE FILTER FABRIC LOOSELY PREPARED SLOPE AND SECURED WITH STAKES ON 2 FOOT CENTERS. ADJACENT STRIPS SHOUL AND BE STAPLED ON 12 INCH CENTERS. THE UPSTREAM OR UPSLOPE FILTER FABRIC SHOULD ALV THE DOWNSTREAM OR DOWNSLOPE FILTER FABRIC. IF THE FILTER FABRIC IS TORN OR DAM REPAIRED OR REPLACED.
- 3. PLACE STRUCTURE ROCK STARTING IN THE BOTTOM OF THE TRENCH WORKING UP THE BANK TRENCH TO BE FILLED WITH ROCK REVETMENT MATERIAL. ROCK MAY HAVE TO BE HAND PLACED THE DESIRED RESULTS OF LOCKING THE REVETMENT.

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NONWOVEN GEOTEXTILE FILTER FABRIC --

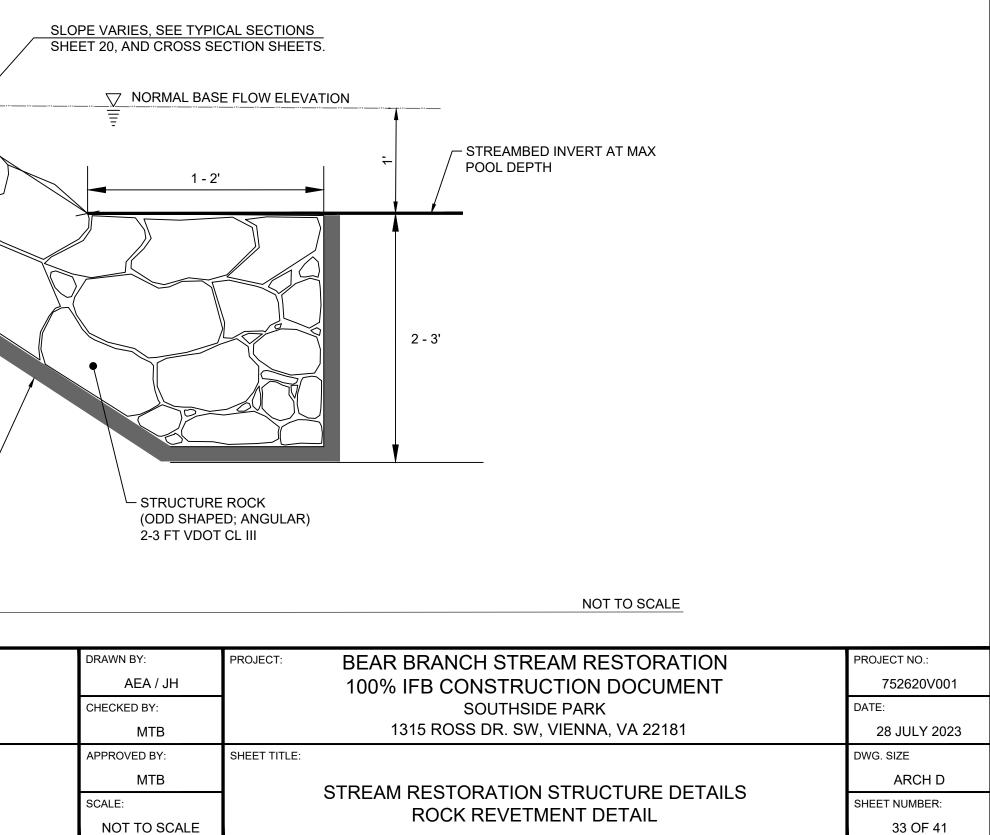
#### ROCK TOE REVETMENT CROSS SECTION A - A'

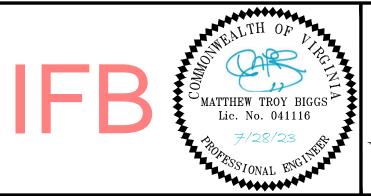
								CLIENT: TOWN OF VIENNA 127 CENTER STREET SOUTH VIENNA, VA 22180
								ENGINEER: WSP Environment & Infrastructure Solutions
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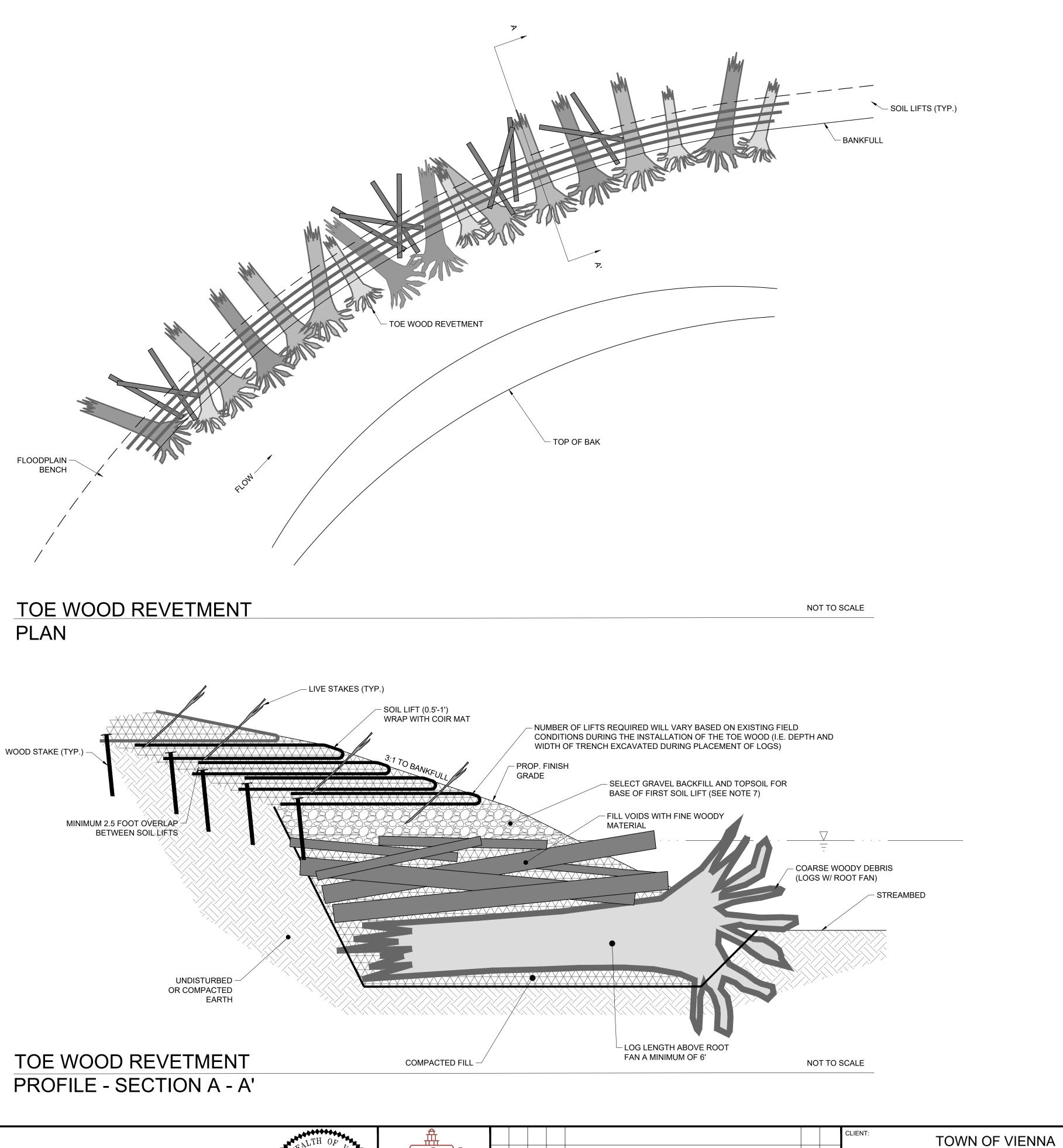
OR APPROVED BY THE	ROCK TOE REVE	TMENT MATERIAL DIMENSIONS				
		STRUCTURE SIZE TABLE				
E SETTLEMENT OF THE	ROCK STRUCTURES	VDOT CLASS III RIPRAP				
	ROC	K TOE REVETMENT MATERIAL SPECS				
THE CITY ON-SITE	ROCK TOE REVETMENT	VDOT CLASS II RIPRAP VDOT CLASS I RIPRAP GABION STONE				
) / HEAD OF RIFFLE OR	NOTES:	1				
T. PTH INVERT THE ENTIRE	ASSUMED ROCK DENSITY 165 LB/FT <sup>3</sup> BACKFILL SHALL BE PLACED IN 8" LOOSE LIFTS AND COMPACTED USING TRACKED EQUIPMENT OR AN EXCAVATOR BUCKET SUCH THAT THE FUTURE SETTLEMENT OF THE MATERIAL IS KEPT TO A MINIMUM. STRUCTURE DIMENSIONS SHALL BE +/- 0.5'.					
LEFT BANKS. ROCK TOE SHOWN BELOW.						
IVERT.						
Y AND EVENLY ON THE LD OVERLAP 12 INCHES WAYS BE PLACED OVER MAGED, IT SHOULD BE						
NK. REMAINDER OF THE D IN VOIDS TO ACHIEVE						

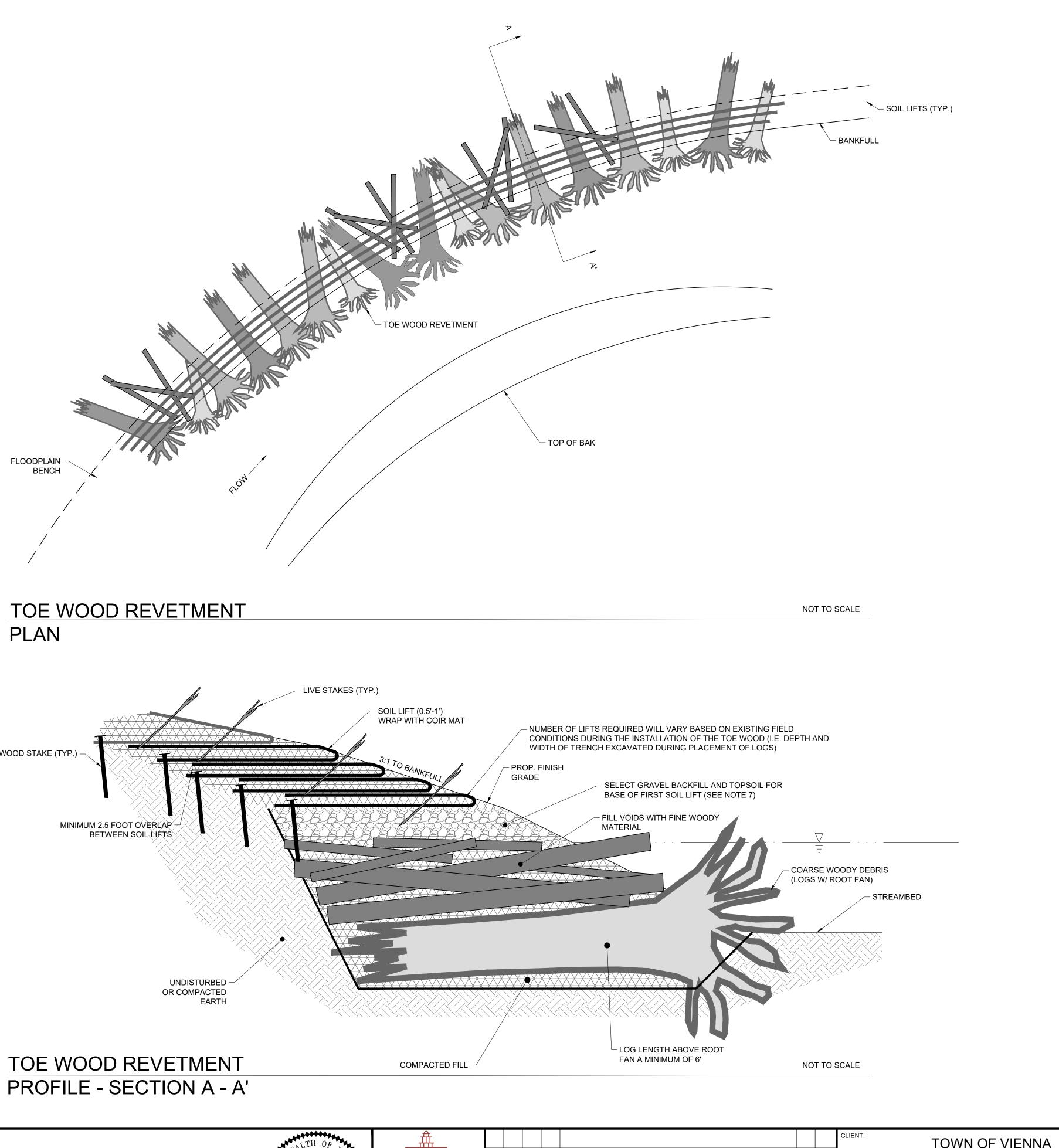
– LIVE STAKE (TYP.)

LIVE STAKES CAN BE DRIVEN THROUGH INTERSTICES OR OPENINGS IN THE ROCK TOE REVETMENT. LIVE STAKES TO BE INSTALLED TO BACK OF FLOODPLAIN BENCH.









							127 CENTER STREET SOUTH VIENNA, VA 22180	
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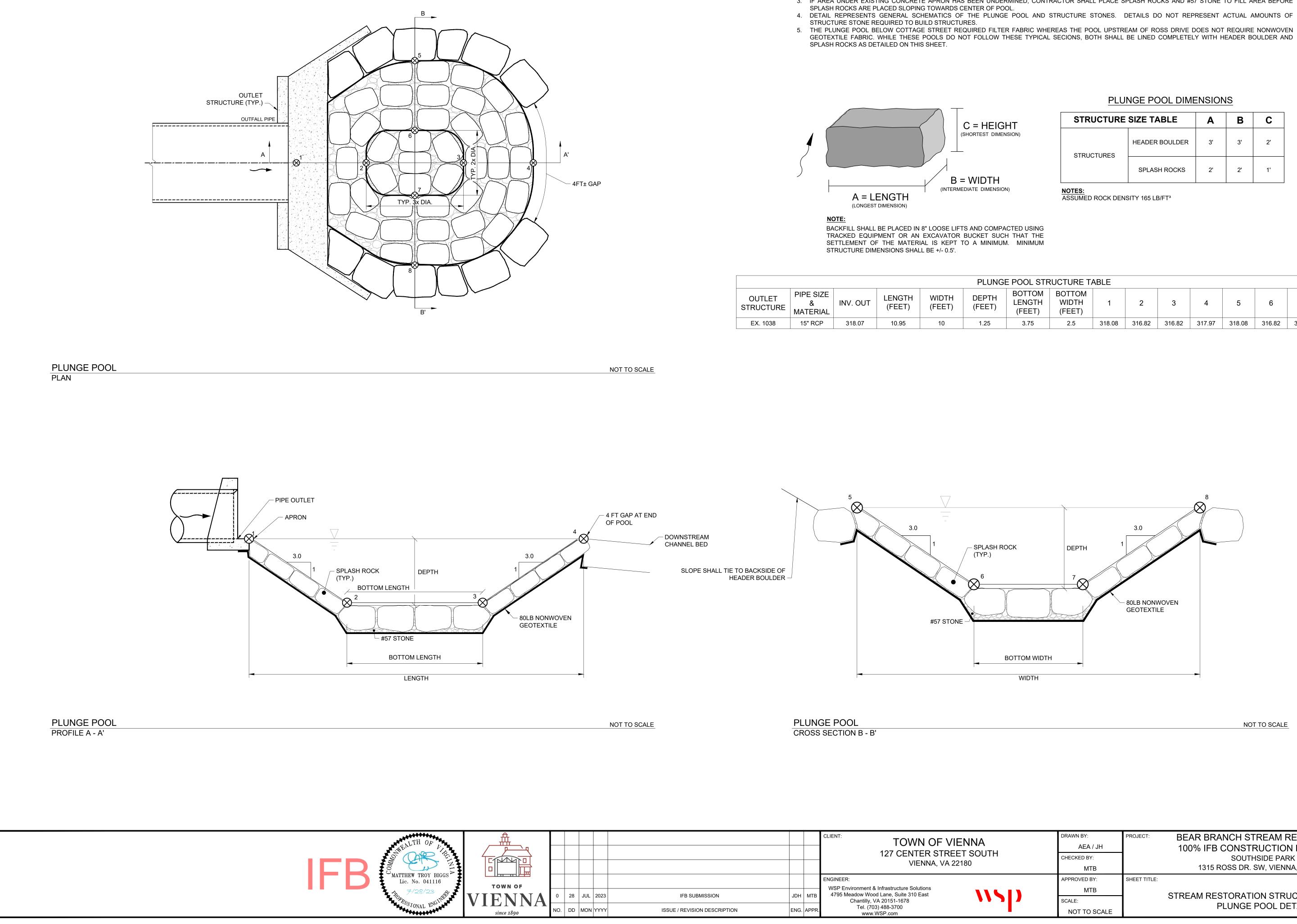
## TOE WOOD REVETMENT NOTES

- 1. COARSE, WOODY DEBRIS SHALL CONSIST OF LOGS, ROOTWADS, AND LARGE BRANCHES NOT SUITABLE FOR CONSTRUCTION OF LOG STRUCTURES. ALL MATERIALS ARE TO BE APPROVED BY THE TOWN OF VIENNA'S ON-SITE ENGINEER/INSPECTOR. COARSE WOODY DEBRIS SHALL BE CONSTRUCTED WITH THE LARGEST MATERIAL PLACED FIRST. NO LOGS SHALL BE PLACED PARALLEL TO THE FLOW OF WATER, UNLESS DIRECTED BY THE ENGINEER.
- 2. SMALL/FINE WOODY DEBRIS SHALL CONSIST OF MEDIUM TO SMALL LIMBS, BRANCHES, BUSHES, AND/OR LOGS. INVASIVE SPECIES SHALL NOT BE USED. SMALL/FINE WOODY DEBRIS SHALL BE PLACED ABOVE THE COARSE WOODY DEBRIS WITH THE LARGEST MATERIAL BEING PLACED FIRST AND THE SMALLEST MATERIAL PLACED LAST.
- 3. ALL WOODY DEBRIS SHALL BE COMPACTED WITH THE EXCAVATOR BUCKET TO REDUCE THE PRESENCE OF VOIDS IN THE SMALL/FINE WOODY DEBRIS LAYER.
- 4. TOE WOOD REVETMENT SHALL EXTEND TO AN ELEVATION 0.5 FEET ABOVE THE DOWNSTREAM HEAD OF RIFFLE ELEVATION.
- 5. GRAVEL/SOIL LEVELING BASE (APPROXIMATELY 0.5 FOOT THICKNESS) SHALL BE INSTALLED ABOVE THE HIGHEST ELEVATION OF THE WOODY DEBRIS BEFORE THE SOIL LIFTS ARE STARTED.
- 6. THE SOIL BACKFILL USED FOR LIFTS SHALL BE FREE OF ANY LARGE ROOTS OR WOODY DEBRIS AND SHALL GENERALLY BE FREE FROM ANY GRAVEL OR COBBLE MATERIAL.
- 7. SOIL BACKFILL SHALL BE COMPACTED SUCH THAT FUTURE SETTLING WILL BE KEPT TO A MINIMUM; YET, NOT SUCH THAT THE UNDERLYING BRUSH IS DISPLACED OR DAMAGED.
- 8. PLACE SOIL BACKFILL IN NO GREATER THAN ONE (1) FOOT LIFTS BEING CAREFUL NOT TO PUSH/PULL OR TEAR THE FABRIC PREVIOUSLY PLACED. COIR MATTING SHALL BE SECURED AT EACH LIFT WITH WOODEN STAKES.
- 9. COIR MAT SHALL BE PULLED AS TIGHT AS POSSIBLE WITHOUT TEARING OR EXCESSIVELY DISTORTING THE FABRIC. SECURE COIR MAT IN PLACE BY STAKING ON 2-FOOT CENTERS. SEE EROSION CONTROL FABRIC DETAIL, SHEET 16.
- 10. THE SURFACE OF THIS STRUCTURE SHALL BE FINISHED TO A SMOOTH AND COMPACT SURFACE IN ACCORDANCE WITH THE LINES, GRADES, AND CROSS-SECTIONS OR ELEVATIONS SHOWN ON THE DRAWINGS. THE DEGREE OF FINISH FOR ELEVATIONS SHALL BE WITHIN 0.1-FT OF THE GRADES AND ELEVATIONS INDICATED OR APPROVED BY THE TOWN OF VIENNA'S ON-SITE ENGINEER/INSPECTOR.
- 11. RE-DRESSING OF CHANNEL AND FLOODPLAIN WILL LIKELY BE REQUIRED FOLLOWING INSTALLATION OF IN-STREAM STRUCTURES AND SHALL BE CONSIDERED INCIDENTAL TO CONSTRUCTION.

TOE WOOD RE	TOE WOOD REVETMENT STRUCTURE TABLE												
TOE WOOD REVETMENT LOCATION	START STA.	END STA.	TOP OF WOOD ELEV.										
POOL 4	12+17.29	12+52.94	317.99										
POOL 5	12+84.79	13+18.94	317.68										
POOL 6	13+49.64	13+70.88	317.40										
POOL 7	14+00.59	14+33.62	317.09										
POOL 8	14+61.97	14+77.54	316.83										
POOL 9	15+15.36	15+45.37	316.46										
POOL 10	15+93.87	16+29.37	315.95										
POOL 12	17+36.05	17+62.74	315.20										

TOE WOOD BEGINS AT THE END OF THE CROSS VANE ARM AND EXTENDS TO THE HEAD OF RIFFLE

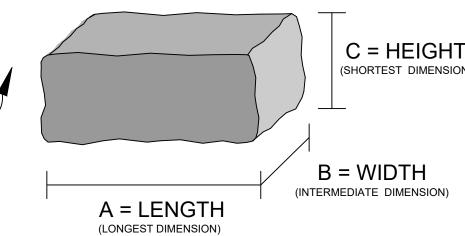
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## PLUNGE POOL

## NOTES

- BE FILLED WITH VDOT #57 STONE.
- 2. CONSTRUCT A 3 FOOT WIDE BENCH AROUND THE PERIMETER OF THE PLUNGE POOL WITH HEADER BOULDERS. 3. IF AREA UNDER EXISTING CONCRETE APRON HAS BEEN UNDERMINED, CONTRACTOR SHALL PLACE SPLASH ROCKS AND #57 STONE TO FILL AREA BEFORE



	PLUNGE POOL STRUCTURE TABLE														
OUTLET STRUCTURE	PIPE SIZE & MATERIAL	INV. OUT	LENGTH (FEET)	WIDTH (FEET)	DEPTH (FEET)	BOTTOM LENGTH (FEET)	BOTTOM WIDTH (FEET)	1	2	3	4	5	6	7	8
EX. 1038	15" RCP	318.07	10.95	10	1.25	3.75	2.5	318.08	316.82	316.82	317.97	318.08	316.82	316.82	318.08

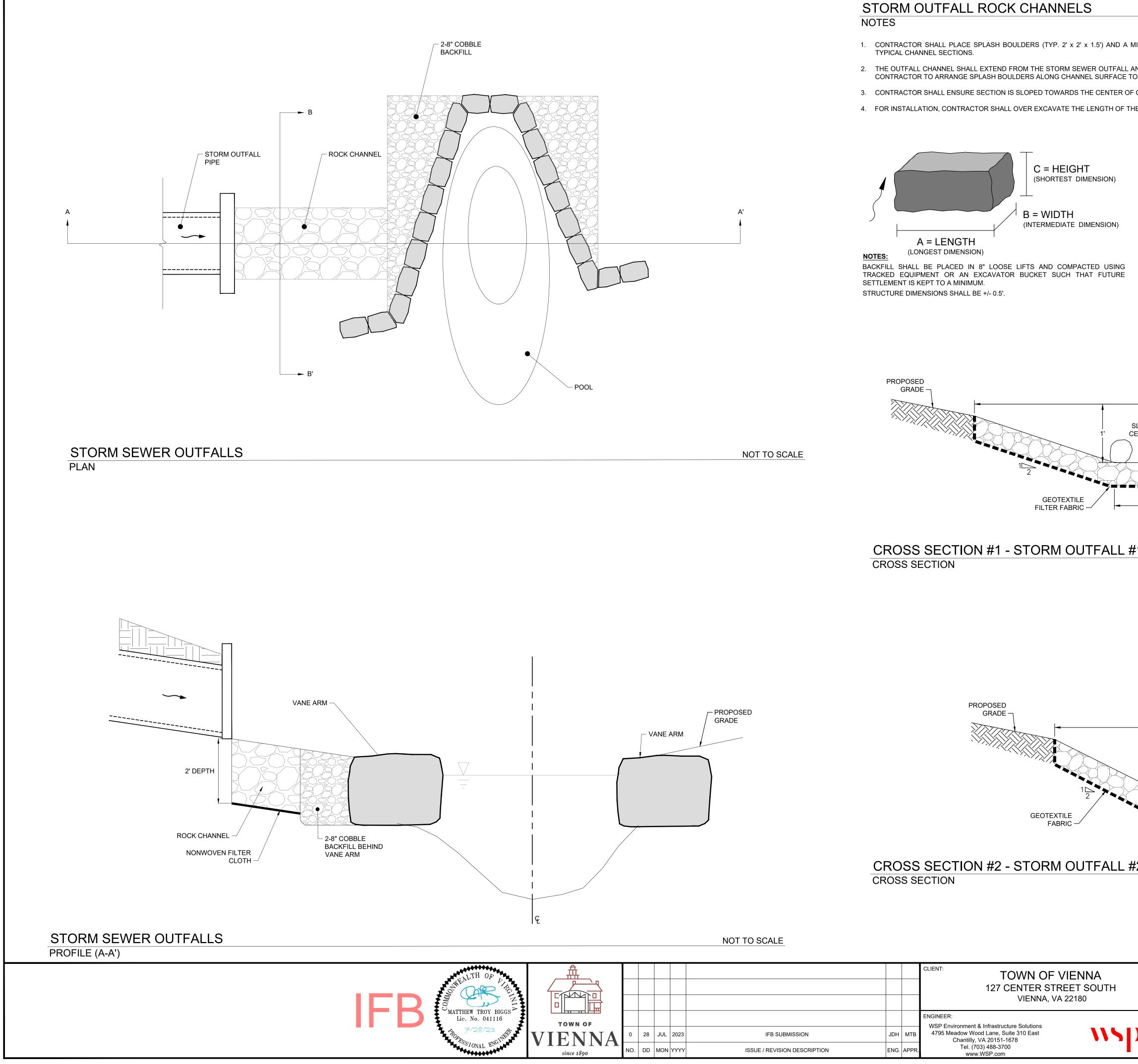


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						ENGINEER:		APPROVED BY:	SHEET TITLE:	DWG. SIZE
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<b>IENNA</b>		20 30	5023		3011 1110	Chantilly, VA 20151-1678		SCALE:	PLUNGE POOL DETAIL	SHEET NUMBER:
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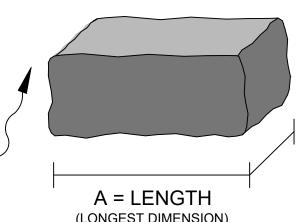
1. FOR PLUNGE POOL BELOW CULVERT, THERE ARE TO BE NO MAJOR GAPS AND SPLASH ROCKS SHALL TOUCH. INTERSTITIAL SPACE OR SMALLER GAPS SHALL

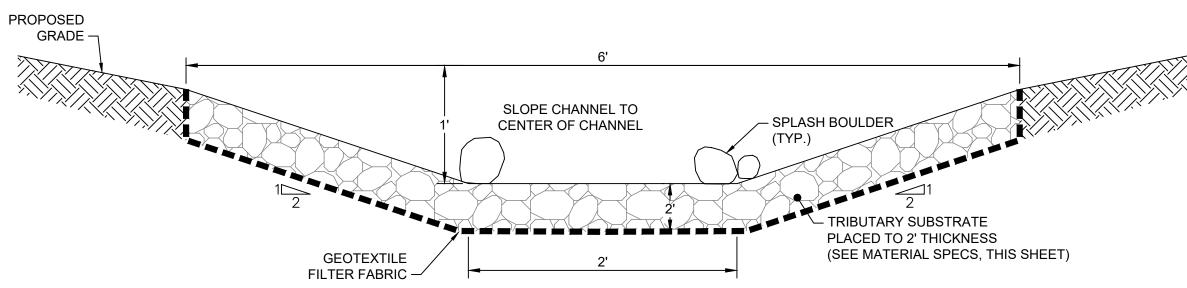
STRUCTURE	STRUCTURE SIZE TABLE						
STRUCTURES	HEADER BOULDER	3'	3'	2'			
SINGEFORES	SPLASH ROCKS	2'	2'	1'			

NOT TO SCALE

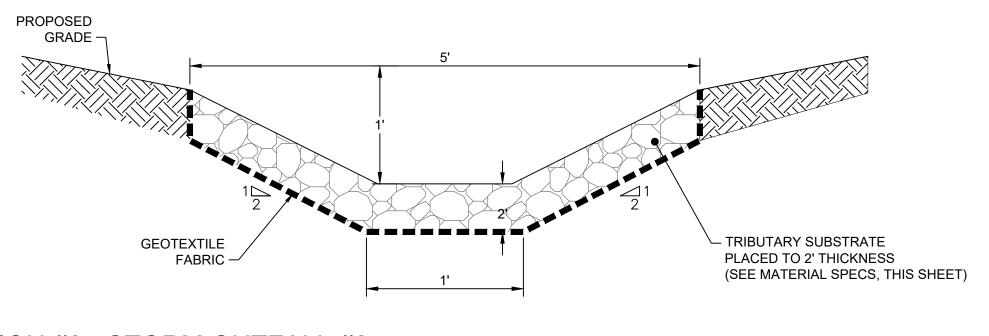


- CONTRACTOR TO ARRANGE SPLASH BOULDERS ALONG CHANNEL SURFACE TO CREATE UNDULATING AND TURBULENT EFFECTS.
- 3. CONTRACTOR SHALL ENSURE SECTION IS SLOPED TOWARDS THE CENTER OF CHANNEL.
- 4. FOR INSTALLATION, CONTRACTOR SHALL OVER EXCAVATE THE LENGTH OF THE TRIBUTARY CHANNELS AND INSTALL 80LB NON WOVEN GEOTEXTILE FILTER FABRIC.





## CROSS SECTION #1 - STORM OUTFALL #1



# CROSS SECTION #2 - STORM OUTFALL #2

1. CONTRACTOR SHALL PLACE SPLASH BOULDERS (TYP. 2' x 2' x 1.5') AND A MIXTURE OF SELECT BOULDERS, RIVER COBBLES, AND EXISTING BED MATERIAL TO FORM THE

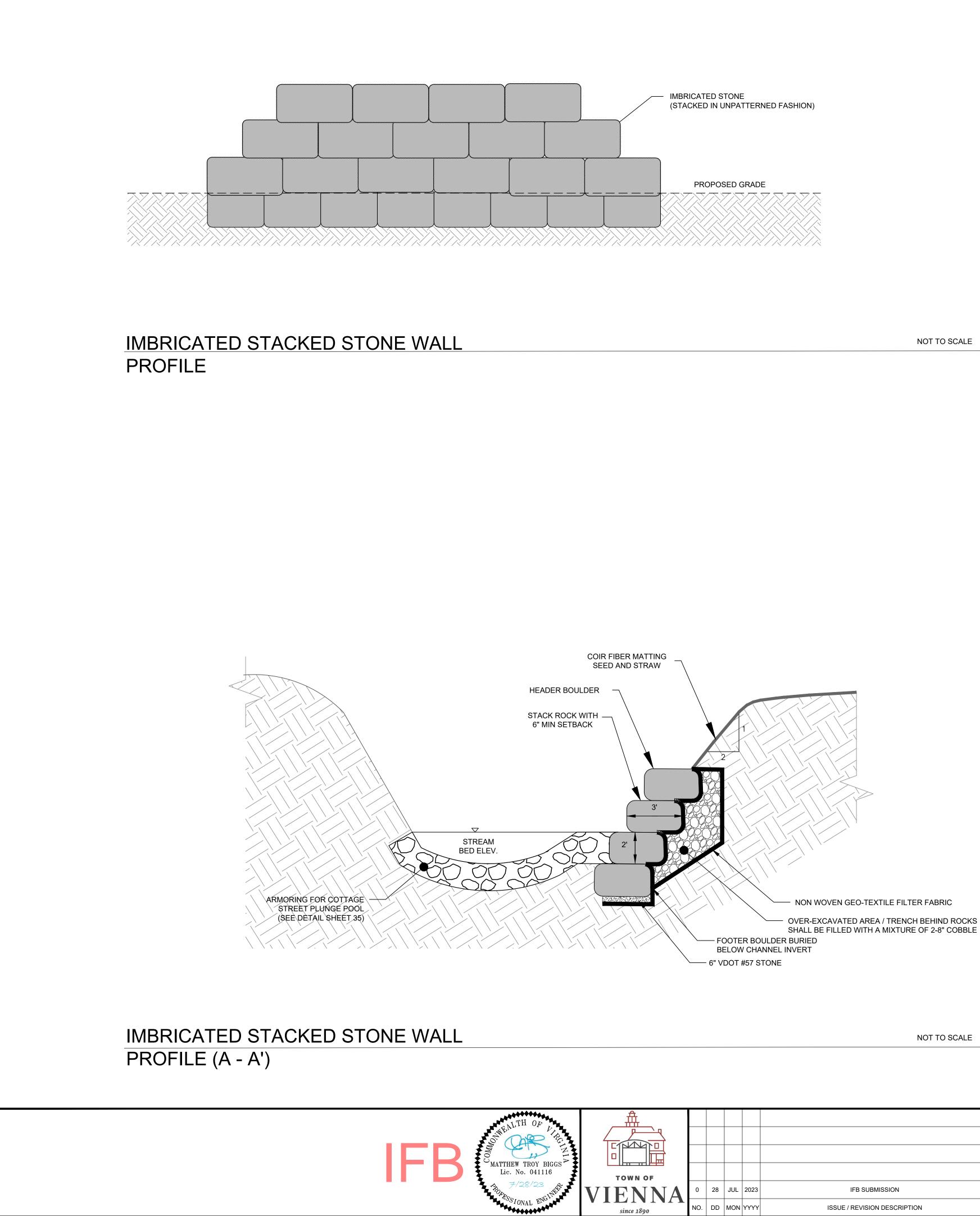
2. THE OUTFALL CHANNEL SHALL EXTEND FROM THE STORM SEWER OUTFALL AND BE CARRIED AND BLENDED INTO THE BACKFILL MATERIAL BEHIND THE TERMINAL VANE ARM.

STRUCTURE	SIZE TABLE	Α	В	С						
ROCK CHANNEL TRIBUTARY MATERIALS	SPLASH BOULDERS	2'	2'	1.5'						
CHANNEL BED MATERIAL SPECS										
TRIBUTARY SUBSTRATE	VDOT CLASS I RIPRA GABION STONE #57 STONE	Ρ								

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SCALE:	STREAM RESTORATION STRUCTURE DETAILS STORM SEWER OUTFALL DETAIL	SHEET NUMBER:
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- STRUCTURE ROCKS.

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						ENGINEER:		APPROVED BY:	SHEET TITLE:		DWG. SIZE
			0000			WSP Environment & Infrastructure Solutions 4795 Meadow Wood Lane, Suite 310 East	МТВ			ARCH D	
IENNA	0 28	JUL	2023	IFB SUBMISSION	JDH MTB	Chantilly, VA 20151-1678	<b>\\\\</b>	SCALE:	1	STREAM RESTORATION STRUCTURE DETAILS	SHEET NUMBER:
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## **IMBRICATED STACKED STONE WALL**

1. ALL BOULDERS ARE TO BE STRUCTURE STONE. STRUCTURE STONE IS BLOCK LIKE, CUBICAL, OR STRAIGHT EDGED BOULDERS. STRUCTURE STONE SHALL CONSIST OF ANGULAR ROCK, FLAT ON TWO SIDES, CAPABLE OF BEING LAIN IN AN IMBRICATED MANNER. STRUCTURE STONE SIZE SHALL BE AS SPECIFIED IN THE STRUCTURE STONE SIZE TABLE.

2. GAPS BETWEEN STRUCTURE STONE SHALL BE MINIMIZED BY FITTING STRUCTURE STONE TOGETHER AND PLUGGING WITH CHINKING STONE 2-8" COBBLE APPROVED BY THE TOWN OF VIENNA PROJECT MANAGER AND LINKING WITH FILTER FABRIC. GAPS BETWEEN STRUCTURE STONE SHALL BE ELIMINATED BY PLACING THE STONES SO THAT EACH STRUCTURE STONE ABUTS ANOTHER STRUCTURE STONE. ANY VOIDS BETWEEN STRUCTURE STONES SHALL BE FILLED WITH 2-8" COBBLE APPROVED BY THE FIELD ENGINEER.

3. THE CONTRACTOR WILL BE REQUIRED TO FIT STRUCTURE ROCKS TIGHTLY TOGETHER IN ORDER TO MINIMIZE VOID SPACES BETWEEN THE

4. FILTER FABRIC SHALL BE PLACED ON THE BACKSIDE SIDE OF THE STRUCTURE TO PREVENT WASHOUT OF SEDIMENT THROUGH VOIDS. FILTER FABRIC SHALL BE INSTALLED A MINIMUM OF ONE FOOT UNDERNEATH THE FOOTER STONE AND EXTEND FROM THE BOTTOM OF THE HEADER STONE TO THE FINISHED GRADE ELEVATION AND SHALL BE PLACED ALONG THE ENTIRE LENGTH OF THE STRUCTURE.

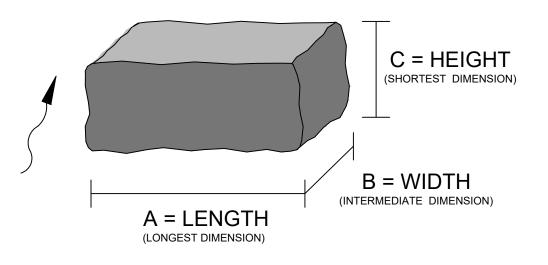
5. THE TRENCH BEHIND THE TOP OF ROCKS SHALL BE BACKFILLED WITH 2-8" COBBLE.

6. THE IMBRICATED STONE SHALL BE STACKED IN A WALL LIKE FASHION IN UNPATTERNED FASHION, STAGGERING THE JOINTS.

7. THE TOWN OF VIENNA PROJECT MANAGER SHALL INSPECT AND APPROVE BOULDER, COBBLE, AND GRAVEL MATERIAL BEFORE IT IS PLACED.

8. MINI-VANE ARMS CONSTRUCTED IN CASCADE RIFFLES SHALL TIE INTO THE IMBRICATED STACKED STONE WALL.

9. CONTRACTOR SHALL CREATE STABLE CUT FACE BEHIND THE WALL.



#### IMBRICATED STACKED STONE WALL MATERIAL

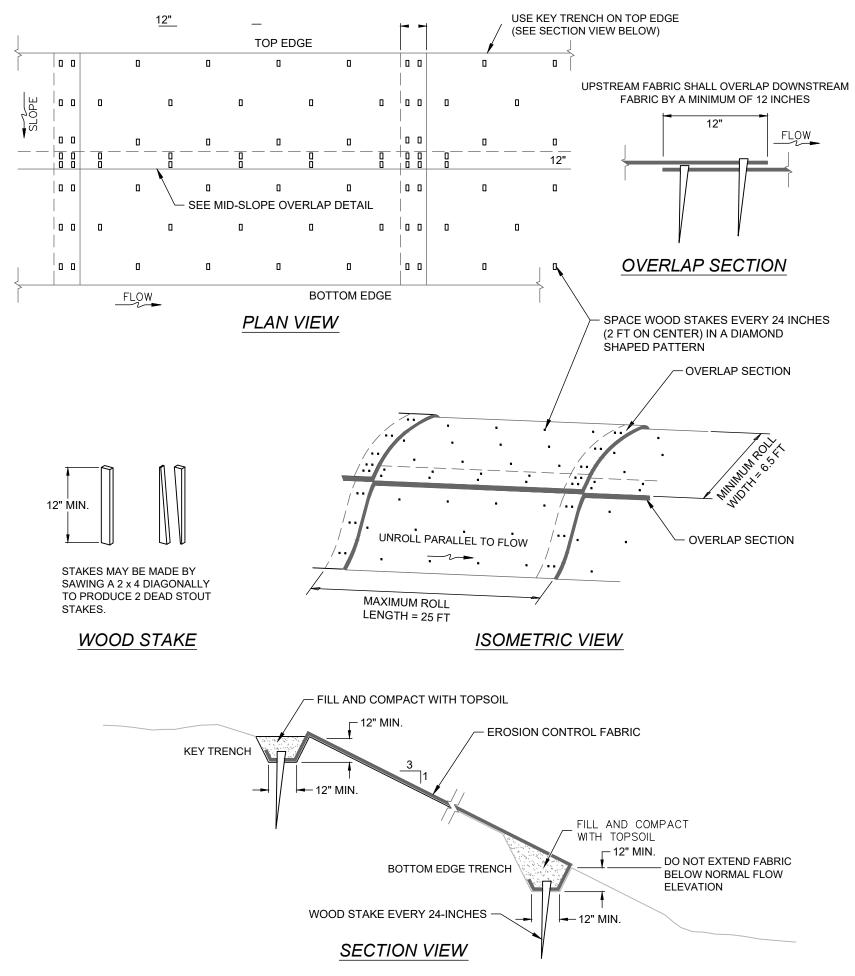
STRUCTURE	Α	В	С	
STRUCTURES	HEADER BOULDER	4'	3'	2'
STRUCTURES	FOOTER BOULDER	4'	3'	2'

NOTES:

ASSUMED ROCK DENSITY 165 LB/FT<sup>3</sup>

FOOTER STONES SHALL HAVE A MINIMUM OF ONE (1) CONTACT POINT WITH HEADER STONES. FOOTER STONES MAY BE MORE ROUNDED THAN HEADER STONES. FOR VANE ARMS, MULTIPLE FOOTERS MAY BE REQUIRED FOR HEADER STONES DEPENDING UPON HEADER STONE SIZE.

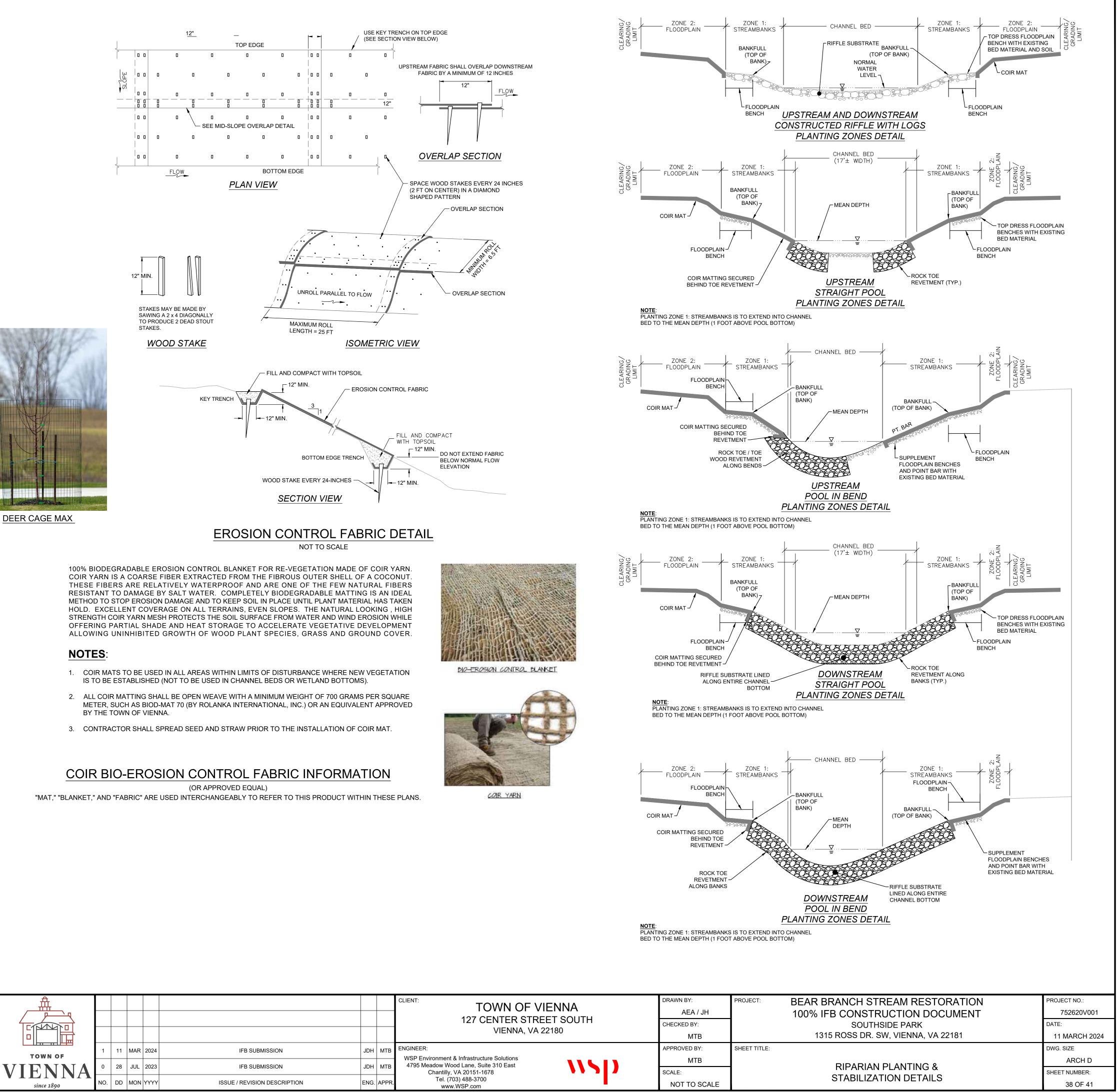


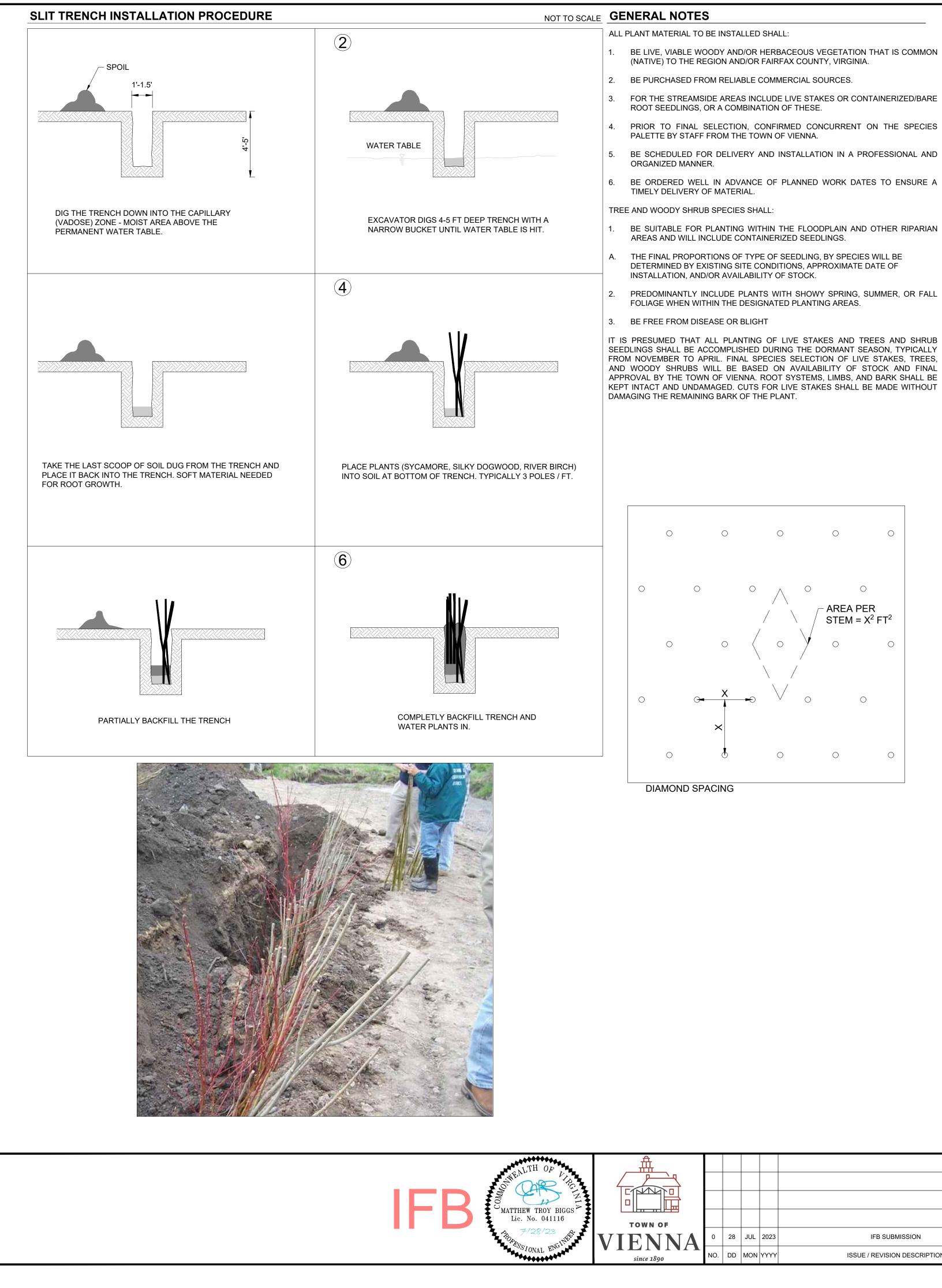


- IS TO BE ESTABLISHED (NOT TO BE USED IN CHANNEL BEDS OR WETLAND BOTTOMS).
- BY THE TOWN OF VIENNA.









- BE LIVE, VIABLE WOODY AND/OR HERBACEOUS VEGETATION THAT IS COMMON

FOR THE STREAMSIDE AREAS INCLUDE LIVE STAKES OR CONTAINERIZED/BARE

- BE SCHEDULED FOR DELIVERY AND INSTALLATION IN A PROFESSIONAL AND
- BE ORDERED WELL IN ADVANCE OF PLANNED WORK DATES TO ENSURE A
- BE SUITABLE FOR PLANTING WITHIN THE FLOODPLAIN AND OTHER RIPARIAN
- PREDOMINANTLY INCLUDE PLANTS WITH SHOWY SPRING, SUMMER, OR FALL

IT IS PRESUMED THAT ALL PLANTING OF LIVE STAKES AND TREES AND SHRUB SEEDLINGS SHALL BE ACCOMPLISHED DURING THE DORMANT SEASON, TYPICALLY FROM NOVEMBER TO APRIL. FINAL SPECIES SELECTION OF LIVE STAKES, TREES, AND WOODY SHRUBS WILL BE BASED ON AVAILABILITY OF STOCK AND FINAL APPROVAL BY THE TOWN OF VIENNA. ROOT SYSTEMS, LIMBS, AND BARK SHALL BE KEPT INTACT AND UNDAMAGED. CUTS FOR LIVE STAKES SHALL BE MADE WITHOUT

## PLANTING SCHEDULE

Zone 1A - Inner Berm				0.07 Acres
2" Plugs				
				Number of Plugs
Juncus effusus	Soft Rush	2" plugs	2' on center*	93
Carex lupulina	Hop Sedge	2" plugs	2' on center*	93
Justicia americana	Water Willow	2" plugs	2' on center*	93
Saururus cernuus	Lizard's Tail	2" plugs	2' on center*	93
Iris virginica	Virginia Blue Flag	2" plugs	2' on center*	93
Acornus americanus	Sweetflag	2" plugs	2' on center*	93
Peltandra virginica	Arrow Arum	2" plugs	2' on center*	93
Pontederia cordata	Pickerelweed	2" plugs	2' on center*	93
Sagittaria latifolia	Arrowhead	2" plugs	2' on center*	93
Total	•	·	•	837
Total			1	he waters edge) shall be planted wi

\*Density: Plugs are to be planted 2 feet on center in triangle spacing. First row of plugs (at the waters edge) shall be planted with Arrowhead and/or Pickerelweed

#### Zone 1 - Streambanks

Live Stakes				
				Number of Ste
Cornus amomum	Silky Dogwood	LS	2' on center*	
Cornus sericea	Red Osier Dogwood	LS	2' on center*	
Acer negundo	Box Elder	LS	2' on center*	
Betula nigra	River Birch	LS	2' on center*	
Physocarpus opulifolius	Ninebark	LS	2' on center*	
Salix nigra	Black Willow	LS	2' on center*	
Alnus serrulata	Smooth Alder	LS	2' on center*	
Total		ł	к. К.	

\*Density: Live stakes are to be planted 2 feet on center in triangle spacing Zone 1 includes a combination of the species listed (but minimum of four species)

\* Ernst Seeds - Item Number: ERNMX-852 - VA Northern Piedmont Riparian Mix

#### Zone 2 - Floodplain

Zone 2 - Floodplain				0.69 Acres
Seed Mix*	Planting Density = 20 lbs/acre			
		% Seed Mix	LBS/Acre	Total LBS
Panicum anceps	Beaked Panicgrass	21.0	4.2	2.89
Panicum clandestinum	Deertongue	18.0	3.6	2.48
Elymus virginicus	Virginia Wildrye	15.0	3.0	2.06
Sorghastrum nutans	Indiangrass	15.0	3.0	2.06
Andropogon gerardii	Big Bluestem	7.5	1.5	1.03
Panicum virgatum	Switchgrass	5.0	1.0	0.69
Carex vulpinoidea	Fox Sedge	4.0	0.8	0.55
Panicum rigidulum	Redtop Panicgrass	4.0	0.8	0.55
Agrostis perennans	Autumn Bentgrass	2.0	0.4	0.28
Helenium flexuosum	Purplehead Sneezeweed	2.0	0.4	0.28
Senna hebecarpa	Wild Senna	2.0	0.4	0.28
Asclepias incarnata	Swamp Milkweed	1.0	0.2	0.14
Eupatorium perfoliatum	Boneset	1.0	0.2	0.14
Hibiscus moscheutos	Crimsoneyed Rosemallow	1.0	0.2	0.14
Vernonia noveboracensis	New York Ironweed	1.0	0.2	0.14
Eupatorium fistulosum	Joe Pye Weed	0.5	0.1	0.07

Floodplain Shrubs

				Number of Stems
Sambucus canadensis	American Elderberry	2-Gallon	8' on center*	12
Salix nigra	Black Willow	2-Gallon	8' on center*	12
Cephalanthus occidentalis	Buttonbush	2-Gallon	8' on center*	12
Viburnum lentago	Nannyberry	2-Gallon	8' on center*	12
Cornus amomum	Silky Dogwood	2-Gallon	8' on center*	12
Alnus serrulata	Smooth Alder	2-Gallon	8' on center*	12
Virburnum recognitum	Smooth Viburnum	2-Gallon	8' on center*	12
Lindera benzoin	Spicebush	2-Gallon	8' on center*	12
ltea virginica	Virginia Sweetspire	2-Gallon	8' on center*	12
Morella pennsylvanica	Northern Bayberry	2-Gallon	8' on center*	12
Viburnum nudum	Possumhaw	2-Gallon	8' on center*	12
llex verticillata	Winterberry	2-Gallon	8' on center*	12
			Total	144
Floodplain Trees				0.69 Acres (75%)
				Number of Stoms

				Number of Stems
Platanus occidentalis	American Sycamore	Ball & Brlp	8' on center*	34
Nyssa sylvatica	Black Gum	Ball & Brlp	8' on center*	34
Juglans nigra	Black Walnut	Ball & Brlp	8' on center*	34
Populus deltoides	Cottonwood	Ball & Brlp	8' on center*	34
Quercus palustris	Pin Oak	Ball & Brlp	8' on center*	34
Acer rubrum	Red Maple	Ball & Brlp	8' on center*	34
Betula nigra	River Birch	Ball & Brlp	8' on center*	34
Acer saccharinum	Silver Maple	Ball & Brlp	8' on center*	34
Quercus michauxii	Swamp Chestnut Oak	Ball & Brlp	8' on center*	34
Quercus bicolor	Swamp White Oak	Ball & Brlp	8' on center*	34
Liquidambar styraciflua	Sweetgum	Ball & Brlp	8' on center*	34
Quercus phellos	Willow Oak	Ball & Brlp	8' on center*	34
			Total	408

\*Density: Trees and shrubs are to be planted 8 feet on center in triangle spacing

								CLIENT: TOWN OF VIENNA 127 CENTER STREET SOU VIENNA, VA 22180	ТН
								ENGINEER: WSP Environment & Infrastructure Solutions	
IENNA	0	28	JUL	2023	IFB SUBMISSION	JDH	МТВ		<b>S</b> ]]
since 1890	NO.	DD	MON	ΥΥΥΥ	ISSUE / REVISION DESCRIPTION	ENG		Tel. (703) 488-3700 www.WSP.com	

	0.46 Acres
ms	
	834
	834
	834
	834
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	834
	834
	5,838

ms			
	834		
	834		
	834		
	834		
	834		
	834		
	834		
	5,838		

0.69 Acres (25%)

Zone 2A - Floodplain, S	eeamix Uniy			0.68 Acres
Seed Mix*			Planting De	ensity = 20 lbs/acre
		% Seed Mix	LBS/Acre	Total LBS
Panicum anceps	Beaked Panicgrass	21.0	4.2	2.84
Panicum clandestinum	Deertongue	18.0	3.6	2.43
Elymus virginicus	Virginia Wildrye	15.0	3.0	2.03
Sorghastrum nutans	Indiangrass	15.0	3.0	2.03
Andropogon gerardii	Big Bluestem	7.5	1.5	1.01
Panicum virgatum	Switchgrass	5.0	1.0	0.68
Carex vulpinoidea	Fox Sedge	4.0	0.8	0.54
Panicum rigidulum	Redtop Panicgrass	4.0	0.8	0.54
Agrostis perennans	Autumn Bentgrass	2.0	0.4	0.27
Helenium flexuosum	Purplehead Sneezeweed	2.0	0.4	0.27
Senna hebecarpa	Wild Senna	2.0	0.4	0.27
Asclepias incarnata	Swamp Milkweed	1.0	0.2	0.14
Eupatorium perfoliatum	Boneset	1.0	0.2	0.14
Hibiscus moscheutos	Crimsoneyed Rosemallow	1.0	0.2	0.14

Zone 3 - Right-of-Way S Seed Mix**	eeu		Planting Dansity	0.20 Acres
Seed Mix			Planting Density	
		% Seed Mix	LBS/Acre	Total LBS
Panicum clandestinum	Deertongue	29.0	8.7	1.76
Elymus riparius	Riverbank Wildrye	21.0	6.3	1.28
Lolium multiflorum	Annual Ryegrass	20.0	6.0	1.22
Panicum virgatum	Switchgrass	14.0	4.2	0.85
Festuca rubra	Creeping Red Fescue	10.0	3.0	0.61
Carex vulpinoidea	Fox Sedge	3.0	0.9	0.18
Chamaecrista fasciculata	Partridge Pea	3.0	0.9	0.18

1.0

0.5

0.2

0.1

0.14

0.07

Chamaecrista fasciculata Partridge Pea 0.9 \*\* Ernst Seeds - Item Number: ERNMX-132-1 - Right-of-Way Native Woods Mix w/Annual Ryegrass

New York Ironweed

\* Ernst Seeds - Item Number: ERNMX-852 - VA Northern Piedmont Riparian Mix

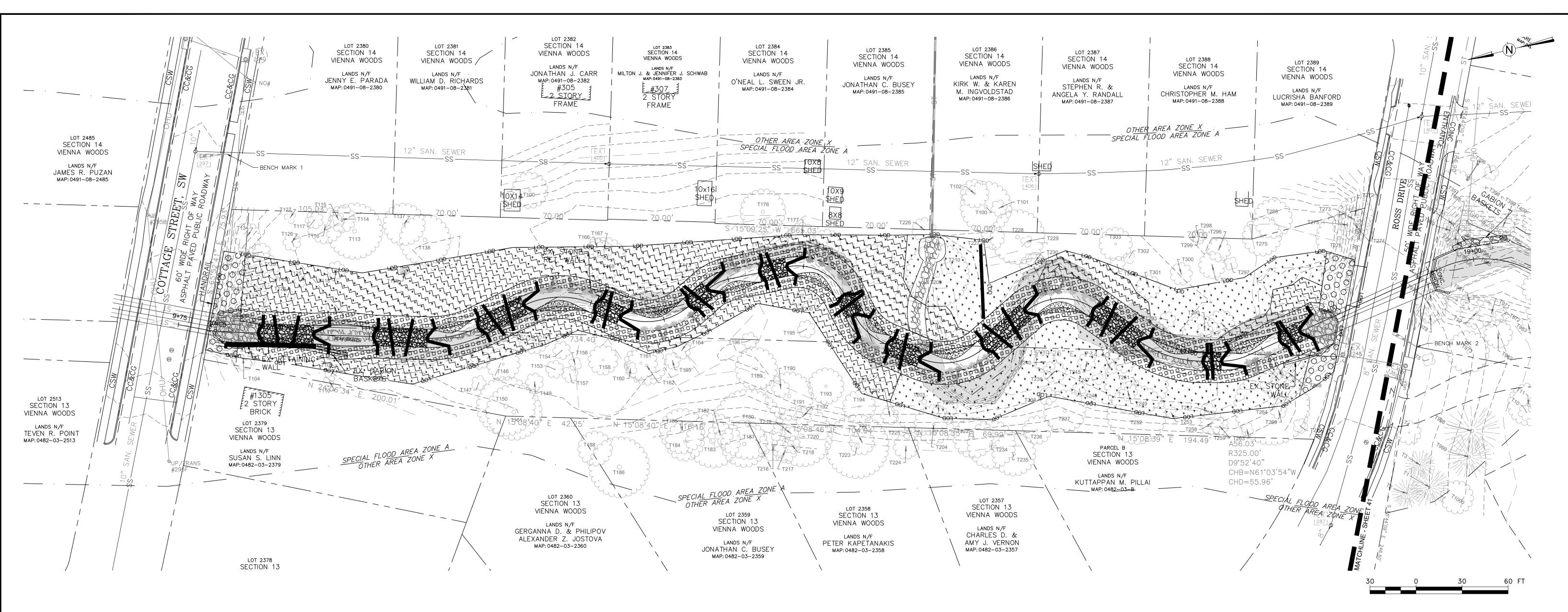
Joe Pye Weed

Vernonia noveboracensis

Eupatorium fistulosum

SLIT TRENCH			L = 50'
Poles	Planting density = Poles/ft		
		Poles/ft	Total poles
Platanus occidentalis	American Sycamore	3	50
Cornus amomum	Silky Dogwood	3	50
Betula nigra	River Birch	3	50

DRAWN BY:	PROJECT: BEAR BRANCH STREAM RESTORATION	PROJECT NO.:
AEA / JH	100% IFB CONSTRUCTION DOCUMENT	752620V001
CHECKED BY:	SOUTHSIDE PARK	DATE:
МТВ	1315 ROSS DR. SW, VIENNA, VA 22181	28 JULY 2023
APPROVED BY:	SHEET TITLE:	DWG. SIZE
МТВ		ARCH D
SCALE:	RIPARIAN PLANTING SCHEDULE	SHEET NUMBER:
NOT TO SCALE		39 OF 41



- COIR MATTING SHALL BE INSTALLED IN ALL AREAS WITHIN THE LIMITS OF DISTURBANCE WHERE NEW VEGETATION IS TO BE ESTABLISHED BUT NOT WITHIN CHANNEL BED. SEE SHEET 38 FOR INSTALLATION DETAILS.
- 2. PLANTING AREAS SHALL BE FIELD MARKED PRIOR TO PLANING TO ENSURE CORRECT ZONE PLACEMENT
- 3. A NOW MOW ZONE SHALL BE ENFORCED FROM THE WATER'S EDGE OF THE STREAM TOT HE LIMITS OF RIPARIAN PLANTING TO ALLOW THESE DESIGNATED AREA TO RETURN TO A NATURAL STATE THROUGH SUCCESSION. THE EXCEPTION IS THAT ALL PUBLIC EASEMENTS SHALL BE MOWED. SEE SHEET 38 FOR PLANTING ZONE SCHEMATICS
- 4. CONTRACTOR SHALL SCARIFY SUBGRADE AND APPLY TOPSOIL, SONTRACTOR SHALL SCARIFY SUBGRADE AND APPLY TOPSOIL, SO THAT AFTER TRACKING WITH EXCAVATOR TO 80-85% COMPACTION THERE WILL BE A MINIMUM OF 6" OF TOPSOIL TO THE INDICATED FINISHED GRADE OF TOPSOIL. TOPSOIL SHALL NOT BE ADDED ABOVE THE FINISHED GRADE.
- IN ALL PUBLIC EASEMENTS, CONTRACTOR TO ENSURE THAT THE TOP OF WOODEN STAKES EXTEND NO MORE THAN 1" ABOVE THE FINISHED GRADE.
- 6. CONTRACTOR SHALL ARMOR ALL TREES WITHIN THE LOD THAT ARE TO REMAIN.

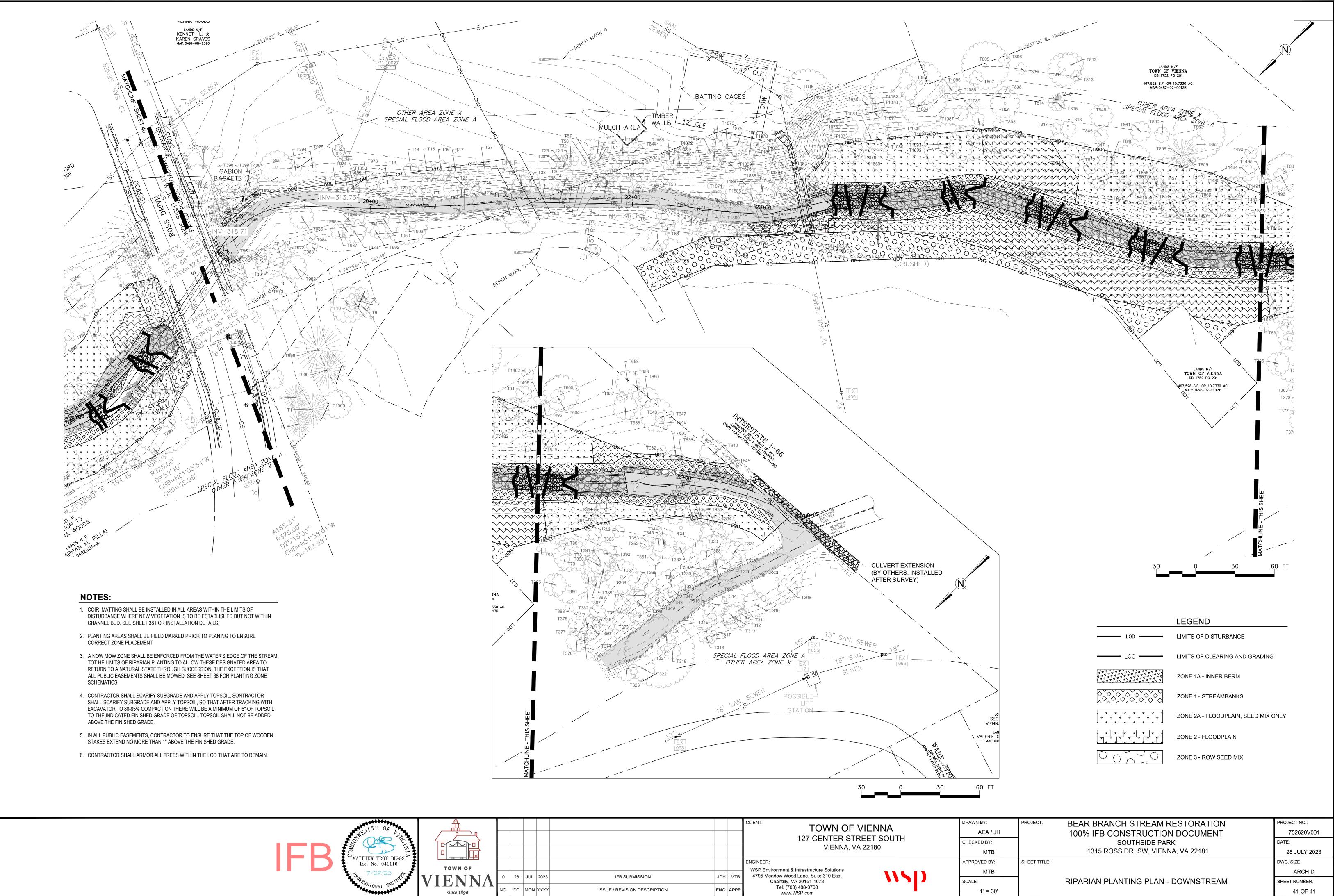




								CLIENT: TOWN OF VIENNA 127 CENTER STREET SOUTH VIENNA, VA 22180	
								ENGINEER: WSP Environment & Infrastructure Solutions	
IENNA	0	28	JUL	2023	IFB SUBMISSION	JDH	МТВ		
since 1890	NO.	DD	MON	YYYY	ISSUE / REVISION DESCRIPTION	ENG.	APPR.	$T_{el}$ (703) 488-3700	

	LEGEND
LOD	LIMITS OF DISTURBANCE
LCG	LIMITS OF CLEARING AND GRADING
444444 4444444444444444444444444444444	ZONE 1A - INNER BERM
$\left(\begin{array}{c} 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 $	ZONE 1 - STREAMBANKS
· + + + + + + + + + + + + + + + + + + +	ZONE 2A - FLOODPLAIN, SEED MIX ONLY
	ZONE 2 - FLOODPLAIN
00000	ZONE 3 - ROW SEED MIX

DRAWN BY:	PROJECT:	BEAR BRANCH STREAM RESTORATION	PROJECT NO.:
AEA / JH		100% IFB CONSTRUCTION DOCUMENT	752620V001
CHECKED BY:		SOUTHSIDE PARK	DATE:
МТВ		1315 ROSS DR. SW, VIENNA, VA 22181	28 JULY 2023
APPROVED BY:	SHEET TITLE:		DWG. SIZE
МТВ			ARCH D
SCALE:		RIPARIAN PLANTING PLAN - UPSTREAM	SHEET NUMBER:
1" = 30'			40 OF 41



								127 CENTER STREET SOU VIENNA, VA 22180
								ENGINEER: WSP Environment & Infrastructure Solutions
<b>TENNA</b>	0	28	JUL	2023	IFB SUBMISSION	JDH	MTB	4795 Meadow Wood Lane, Suite 310 East Chantilly, VA 20151-1678
$\mathbf{I} \mathbf{I} \mathbf{I} \mathbf{I} \mathbf{I} \mathbf{I} \mathbf{I} \mathbf{I} $	NO.	DD	MON	YYYY	ISSUE / REVISION DESCRIPTION	ENG.	APPR.	Tol (702) 488 2700