

Baseline Assessment - Stream Attributes

Reach S-IJ16-a (Permanent Access Road) Ephemeral Spread G Giles County, Virginia

Data	Included
Photos	✓
SWVM Form	✓
FCI Calculator and HGM Form	✓
RBP Physical Characteristics Form	✓
Water Quality Data	N/A – No water present
RBP Habitat Form	✓
RBP Benthic Form	✓
Benthic Identification Sheet	N/A – No water present
Wolman Pebble Count	✓
RiverMorph Data Sheet	✓
USM Form (Virginia Only)	✓
Longitudinal Profile and Cross Sections	✓



Photo Type: DS VIEW

Location, Orientation, Photographer Initials: Downstream view of LOC looking SE, ES

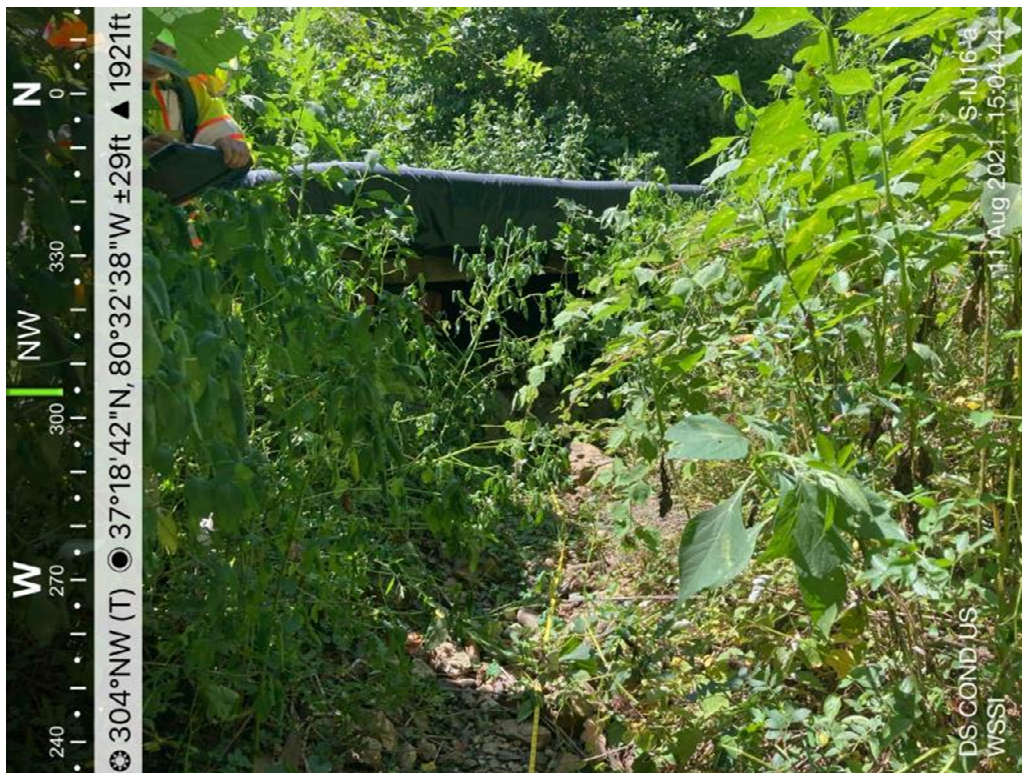


Photo Type: US VIEW

Location, Orientation, Photographer Initials: Upstream view of LOC looking NW, ES



Photo Type: CL ACCESS 1

Location, Orientation, Photographer Initials: Standing in Access Road looking NE, ES

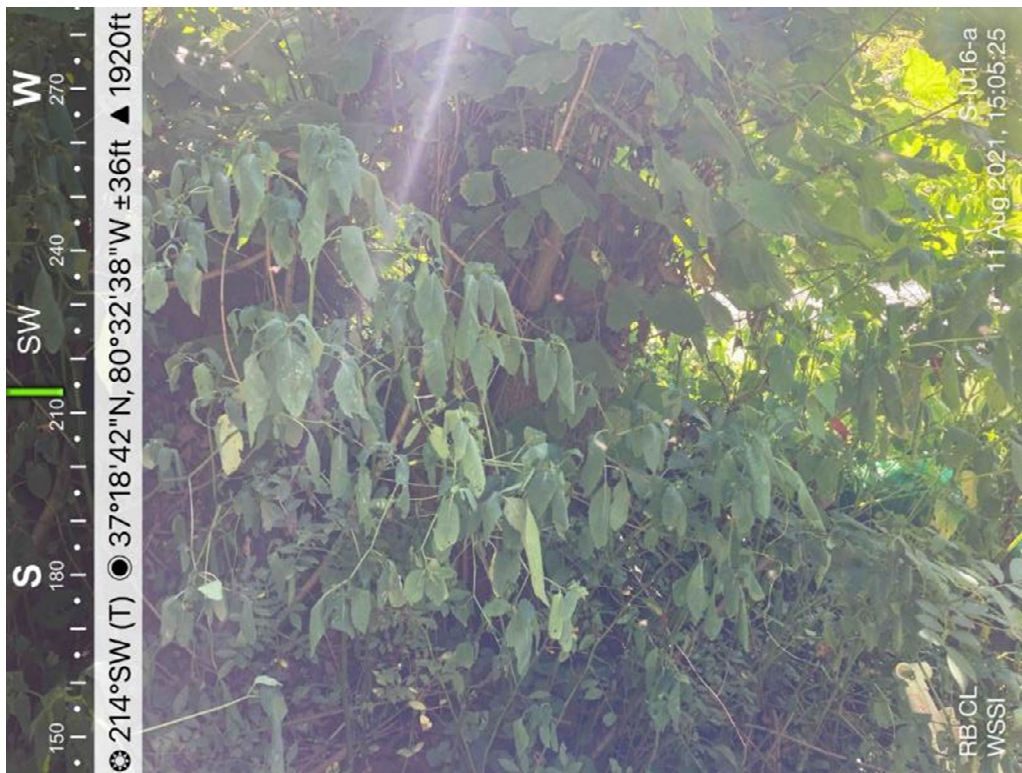


Photo Type: CL ACCESS

Location, Orientation, Photographer Initials: Sta Standing in Access Road looking SW, ES



Photo Type: DS COND

Location, Orientation, Photographer Initials: Downstream conditions outside of LOC looking SE, ES

L:\22000s\22800\22865.06\Admin\05-ENVR\Field Data\Spread G\Field Forms\S-IJ16-a\Photo Document_Access Road_S-IJ16a.docx

USACE FILE NO./ Project Name: <small>(v2.1, Sept 2016)</small>		Mountain Valley Pipeline		IMPACT COORDINATES: <small>(in Decimal Degrees)</small>		Lat.		37.31173		Lon.		-80.544091		WEATHER:		Mostly Sunny		DATE:		August 11, 2021	
IMPACT STREAM/SITE ID AND SITE DESCRIPTION: <small>(watershed size (acres), unaltered or impairment)</small>				S-J16-a				MITIGATION STREAM CLASS./SITE ID AND SITE DESCRIPTION: <small>(watershed size (acres), unaltered or impairment)</small>								Comments:					
STREAM IMPACT LENGTH:		20		FORM OF MITIGATION:		RESTORATION (Levels I-III)		MIT COORDINATES: <small>(in Decimal Degrees)</small>		Lat.		Lon.		PRECIPITATION PAST 48 HRS:		None		Mitigation Length:			
Column No. 1- Impact Existing Condition (Debit)				Column No. 2- Mitigation Existing Condition - Baseline (Credit)				Column No. 3- Mitigation Projected at Five Years Post Completion (Credit)				Column No. 4- Mitigation Projected at Ten Years Post Completion (Credit)				Column No. 5- Mitigation Projected at Maturity (Credit)					
Stream Classification:		Ephemeral		Stream Classification:				Stream Classification:		0		Stream Classification:		0		Stream Classification:		0			
Percent Stream Channel Slope		4		Percent Stream Channel Slope				Percent Stream Channel Slope		0		Percent Stream Channel Slope		0		Percent Stream Channel Slope		0			
HGM Score (attach data forms):				HGM Score (attach data forms):				HGM Score (attach data forms):				HGM Score (attach data forms):				HGM Score (attach data forms):					
Average				Average				Average				Average				Average					
Hydrology		0.56		Hydrology				Hydrology				Hydrology				Hydrology					
Biogeochemical Cycling		0.42		Biogeochemical Cycling		0		Biogeochemical Cycling		0		Biogeochemical Cycling		0		Biogeochemical Cycling		0			
Habitat		0.31		Habitat				Habitat				Habitat				Habitat					
PART I - Physical, Chemical and Biological Indicators				PART I - Physical, Chemical and Biological Indicators				PART I - Physical, Chemical and Biological Indicators				PART I - Physical, Chemical and Biological Indicators				PART I - Physical, Chemical and Biological Indicators					
Points Score		Range		Points Score		Range		Points Score		Range		Points Score		Range		Points Score		Range			
Sub-Score				Sub-Score				Sub-Score				Sub-Score				Sub-Score					
PHYSICAL INDICATOR (Applies to all streams classifications)				PHYSICAL INDICATOR (Applies to all streams classifications)				PHYSICAL INDICATOR (Applies to all streams classifications)				PHYSICAL INDICATOR (Applies to all streams classifications)				PHYSICAL INDICATOR (Applies to all streams classifications)					
USEPA RBP (High Gradient Data Sheet)				USEPA RBP (Low Gradient Data Sheet)				USEPA RBP (High Gradient Data Sheet)				USEPA RBP (High Gradient Data Sheet)				USEPA RBP (High Gradient Data Sheet)					
1. Epifaunal Substrate/Avaliable Cover		0-20		1. Epifaunal Substrate/Avaliable Cover		0-20		1. Epifaunal Substrate/Avaliable Cover		0-20		1. Epifaunal Substrate/Avaliable Cover		0-20		1. Epifaunal Substrate/Avaliable Cover		0-20			
2. Embeddedness		0-20		2. Embeddedness		0-20		2. Embeddedness		0-20		2. Embeddedness		0-20		2. Embeddedness		0-20			
3. Velocity/ Depth Regime		0-20		3. Velocity/ Depth Regime		0-20		3. Velocity/ Depth Regime		0-20		3. Velocity/ Depth Regime		0-20		3. Velocity/ Depth Regime		0-20			
4. Sediment Deposition		0-20		4. Sediment Deposition		0-20		4. Sediment Deposition		0-20		4. Sediment Deposition		0-20		4. Sediment Deposition		0-20			
5. Channel Flow Status		0-20		5. Channel Flow Status		0-20		5. Channel Flow Status		0-20		5. Channel Flow Status		0-20		5. Channel Flow Status		0-20			
6. Channel Alteration		0-20		6. Channel Alteration		0-20		6. Channel Alteration		0-20		6. Channel Alteration		0-20		6. Channel Alteration		0-20			
7. Frequency of Riffles (or bends)		0-20		7. Frequency of Riffles (or bends)		0-20		7. Frequency of Riffles (or bends)		0-20		7. Frequency of Riffles (or bends)		0-20		7. Frequency of Riffles (or bends)		0-20			
8. Bank Stability (LB & RB)		0-20		8. Bank Stability (LB & RB)		0-20		8. Bank Stability (LB & RB)		0-20		8. Bank Stability (LB & RB)		0-20		8. Bank Stability (LB & RB)		0-20			
9. Vegetative Protection (LB & RB)		0-20		9. Vegetative Protection (LB & RB)		0-20		9. Vegetative Protection (LB & RB)		0-20		9. Vegetative Protection (LB & RB)		0-20		9. Vegetative Protection (LB & RB)		0-20			
10. Riparian Vegetative Zone Width (LB & RB)		0-20		10. Riparian Vegetative Zone Width (LB & RB)		0-20		10. Riparian Vegetative Zone Width (LB & RB)		0-20		10. Riparian Vegetative Zone Width (LB & RB)		0-20		10. Riparian Vegetative Zone Width (LB & RB)		0-20			
Total RBP Score		Suboptimal		Total RBP Score		Poor		Total RBP Score		Poor		Total RBP Score		Poor		Total RBP Score		Poor			
Sub-Total		0.75		Sub-Total		0		Sub-Total		0		Sub-Total		0		Sub-Total		0			
CHEMICAL INDICATOR (Applies to Intermittent and Perennial Streams)				CHEMICAL INDICATOR (Applies to Intermittent and Perennial Streams)				CHEMICAL INDICATOR (Applies to Intermittent and Perennial Streams)				CHEMICAL INDICATOR (Applies to Intermittent and Perennial Streams)				CHEMICAL INDICATOR (Applies to Intermittent and Perennial Streams)					
WVDEP Water Quality Indicators (General)				WVDEP Water Quality Indicators (General)				WVDEP Water Quality Indicators (General)				WVDEP Water Quality Indicators (General)				WVDEP Water Quality Indicators (General)					
Specific Conductivity		0-90		Specific Conductivity		0-90		Specific Conductivity		0-90		Specific Conductivity		0-90		Specific Conductivity		0-90			
pH		5.6-5.9 = 45 points		pH		5-90		pH		5-90		pH		5-90		pH		5-90			
DO		10-30		DO		10-30		DO		10-30		DO		10-30		DO		10-30			
Sub-Total				Sub-Total		0		Sub-Total		0		Sub-Total		0		Sub-Total		0			
BIOLOGICAL INDICATOR (Applies to Intermittent and Perennial Streams)				BIOLOGICAL INDICATOR (Applies to Intermittent and Perennial Streams)				BIOLOGICAL INDICATOR (Applies to Intermittent and Perennial Streams)				BIOLOGICAL INDICATOR (Applies to Intermittent and Perennial Streams)				BIOLOGICAL INDICATOR (Applies to Intermittent and Perennial Streams)					
WV Stream Condition Index (WVSCI)				WV Stream Condition Index (WVSCI)				WV Stream Condition Index (WVSCI)				WV Stream Condition Index (WVSCI)				WV Stream Condition Index (WVSCI)					
0		0-100		0		0-100		0		0-100		0		0-100		0		0-100			
Sub-Total		0		Sub-Total		0		Sub-Total		0		Sub-Total		0		Sub-Total		0			
PART II - Index and Unit Score				PART II - Index and Unit Score				PART II - Index and Unit Score				PART II - Index and Unit Score				PART II - Index and Unit Score					
Index		Linear Feet		Index		Linear Feet		Index		Linear Feet		Index		Linear Feet		Index		Linear Feet			
0.603		20		0		0		0		0		0		0		0		0			
Unit Score		12.05		Unit Score		0		Unit Score		0		Unit Score		0		Unit Score		0			

FCI Calculator for the High-Gradient Headwater Streams in Appalachia

To ensure accurate calculations, the UPPERMOST STRATUM of the plant community is determined based on the calculated value for $V_{CCANOPY}$ (≥20% cover is required for tree/sapling strata). Go to the SAR Data Entry tab and enter site characteristics and data in the yellow cells. For information on determining how to split a project into SARs, see Chapter 5 of the Operational Draft Regional Guidebook for the Functional Assessment of High-Gradient Headwater Streams and Low-Gradient Perennial Streams in Appalachia (Environmental Laboratory U.S. Army Corps of Engineers 2017).

Project Name: Mountain Valley Pipeline

Location: Giles County

Sampling Date: 8/11/21

Project Site Before Project

Subclass for this SAR:

Ephemeral Stream

Uppermost stratum present at this SAR:

Shrub/Herb Strata

SAR number: S-IJ16-a

Functional Results Summary:

Enter Results in Section A of the Mitigation Sufficiency Calculator

Function	Functional Capacity Index
Hydrology	0.56
Biogeochemical Cycling	0.42
Habitat	0.31

Variable Measure and Subindex Summary:

Variable	Name	Average Measure	Subindex
$V_{CCANOPY}$	Percent canopy over channel.	Not Used, <20%	Not Used
V_{EMBED}	Average embeddedness of channel.	2.13	0.51
$V_{SUBSTRATE}$	Median stream channel substrate particle size.	4.10	1.00
V_{BERO}	Total percent of eroded stream channel bank.	26.67	0.93
V_{LWD}	Number of down woody stems per 100 feet of stream.	0.00	0.00
V_{TDBH}	Average dbh of trees.	Not Used	Not Used
V_{SNAG}	Number of snags per 100 feet of stream.	0.00	0.10
V_{SSD}	Number of saplings and shrubs per 100 feet of stream.	66.67	1.00
V_{SRICH}	Riparian vegetation species richness.	0.00	0.00
$V_{DETRITUS}$	Average percent cover of leaves, sticks, etc.	15.00	0.18
V_{HERB}	Average percent cover of herbaceous vegetation.	62.50	0.83
V_{WLUSE}	Weighted Average of Runoff Score for Catchment.	0.83	0.87

High-Gradient Headwater Streams in Appalachia Field Data Sheet and Calculator

Team: AO, ES		Latitude/UTM Northing: 37.31173	
Project Name: Mount Valley Pipeline		Longitude/UTM Easting: -80.544091	
Location: Giles County		Sampling Date: 8/11/21	
SAR Number: S-IJ16-a	Reach Length (ft): 15	Stream Type: Ephemeral Stream	▼
Top Strata: Shrub/Herb Strata (determined from percent calculated in $V_{CCANOPY}$)			
Site and Timing: Project Site		Before Project ▼	

Sample Variables 1-4 in stream channel

1	$V_{CCANOPY}$	Average percent cover over channel by tree and sapling canopy. Measure at no fewer than 10 roughly equidistant points along the stream. Measure only if tree/sapling cover is at least 20%. (If less than 20%, enter at least one value between 0 and 19 to trigger Top Strata choice.)	Not Used, <20%																																																														
List the percent cover measurements at each point below:																																																																	
<table border="1" style="width: 100%; border-collapse: collapse;"> <tr><td>0</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr> <tr><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr> </table>				0																																																													
0																																																																	
2	V_{EMBED}	Average embeddedness of the stream channel. Measure at no fewer than 30 roughly equidistant points along the stream. Select a particle from the bed. Before moving it, determine the percentage of the surface and area surrounding the particle that is covered by fine sediment, and enter the rating according to the following table. If the bed is an artificial surface, or composed of fine sediments, use a rating score of 1. If the bed is composed of bedrock, use a rating score of 5. <div style="border: 1px solid black; padding: 5px; margin-top: 5px;"> Embeddedness rating for gravel, cobble and boulder particles (rescaled from Platts, Megahan, and Minshall 1983) <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th>Rating</th> <th>Rating Description</th> </tr> </thead> <tbody> <tr><td>5</td><td><5 percent of surface covered, surrounded, or buried by fine sediment (or bedrock)</td></tr> <tr><td>4</td><td>5 to 25 percent of surface covered, surrounded, or buried by fine sediment</td></tr> <tr><td>3</td><td>26 to 50 percent of surface covered, surrounded, or buried by fine sediment</td></tr> <tr><td>2</td><td>51 to 75 percent of surface covered, surrounded, or buried by fine sediment</td></tr> <tr><td>1</td><td>>75 percent of surface covered, surrounded, or buried by fine sediment (or artificial surface)</td></tr> </tbody> </table> </div> List the ratings at each point below: <table border="1" style="width: 100%; border-collapse: collapse;"> <tr><td>1</td><td>5</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr> <tr><td>3</td><td>1</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr> <tr><td>1</td><td>1</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr> <tr><td>1</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr> <tr><td>4</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr> </table>	Rating	Rating Description	5	<5 percent of surface covered, surrounded, or buried by fine sediment (or bedrock)	4	5 to 25 percent of surface covered, surrounded, or buried by fine sediment	3	26 to 50 percent of surface covered, surrounded, or buried by fine sediment	2	51 to 75 percent of surface covered, surrounded, or buried by fine sediment	1	>75 percent of surface covered, surrounded, or buried by fine sediment (or artificial surface)	1	5									3	1									1	1									1										4										2.1
Rating	Rating Description																																																																
5	<5 percent of surface covered, surrounded, or buried by fine sediment (or bedrock)																																																																
4	5 to 25 percent of surface covered, surrounded, or buried by fine sediment																																																																
3	26 to 50 percent of surface covered, surrounded, or buried by fine sediment																																																																
2	51 to 75 percent of surface covered, surrounded, or buried by fine sediment																																																																
1	>75 percent of surface covered, surrounded, or buried by fine sediment (or artificial surface)																																																																
1	5																																																																
3	1																																																																
1	1																																																																
1																																																																	
4																																																																	
3	$V_{SUBSTRATE}$	Median stream channel substrate particle size. Measure at no fewer than 30 roughly equidistant points along the stream; use the same points and particles as used in V_{EMBED} . <div style="margin-top: 5px;"> Enter particle size in inches to the nearest 0.1 inch at each point below (bedrock should be counted as 99 in, asphalt or concrete as 0.0 in, sand or finer particles as 0.08 in): <table border="1" style="width: 100%; border-collapse: collapse;"> <tr><td>12.90</td><td>0.60</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr> <tr><td>0.60</td><td>5.80</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr> <tr><td>4.60</td><td>0.20</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr> <tr><td>10.80</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr> <tr><td>3.60</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr> </table> </div>	12.90	0.60									0.60	5.80									4.60	0.20									10.80										3.60										4.10 in												
12.90	0.60																																																																
0.60	5.80																																																																
4.60	0.20																																																																
10.80																																																																	
3.60																																																																	
4	V_{BERO}	Total percent of eroded stream channel bank. Enter the total number of feet of eroded bank on each side and the total percentage will be calculated. If both banks are eroded, total erosion for the stream may be up to 200%. <div style="margin-top: 5px;"> Left Bank: 3 ft Right Bank: 1 ft </div>	27 %																																																														

Sample Variables 5-9 within the entire riparian/buffer zone adjacent to the stream channel (25 feet from each bank).

5	V_{LWD}	Number of down woody stems (at least 4 inches in diameter and 36 inches in length) per 100 feet of stream reach. Enter the number from the entire 50'-wide buffer and within the channel, and the amount per 100 feet of stream will be calculated. <div style="margin-top: 5px;"> Number of downed woody stems: 0 </div>	0.0																																																																																																				
6	V_{TDBH}	Average dbh of trees (measure only if $V_{CCANOPY}$ tree/sapling cover is at least 20%). Trees are at least 4 inches (10 cm) in diameter. Enter tree DBHs in inches. <div style="margin-top: 5px;"> List the dbh measurements of individual trees (at least 4 in) within the buffer on each side of the stream below: <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th colspan="5">Left Side</th> <th colspan="5">Right Side</th> </tr> </thead> <tbody> <tr><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr> <tr><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr> <tr><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr> <tr><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr> <tr><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr> <tr><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr> <tr><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr> <tr><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr> <tr><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr> </tbody> </table> </div>	Left Side					Right Side																																																																																															Not Used
Left Side					Right Side																																																																																																		
7	V_{SNAG}	Number of snags (at least 4" dbh and 36" tall) per 100 feet of stream. Enter number of snags on each side of the stream, and the amount per 100 feet will be calculated. <div style="margin-top: 5px;"> Left Side: 0 Right Side: 0 </div>	0.0																																																																																																				
8	V_{SSD}	Number of saplings and shrubs (woody stems up to 4 inches dbh) per 100 feet of stream (measure only if tree cover is <20%). Enter number of saplings and shrubs on each side of the stream, and the amount per 100 ft of stream will be calculated. <div style="margin-top: 5px;"> Left Side: 7 Right Side: 3 </div>	66.7																																																																																																				

9	V _{SRICH}	Riparian vegetation species richness per 100 feet of stream reach. Check all species present from Group 1 in the tallest stratum. Check all exotic and invasive species present in all strata. Species richness per 100 feet and the subindex will be calculated from these data.	0.00
Group 1 = 1.0		Group 2 (-1.0)	
<input type="checkbox"/> <i>Acer rubrum</i>	<input type="checkbox"/> <i>Magnolia tripetala</i>	<input type="checkbox"/> <i>Ailanthus altissima</i>	<input type="checkbox"/> <i>Lonicera japonica</i>
<input type="checkbox"/> <i>Acer saccharum</i>	<input type="checkbox"/> <i>Nyssa sylvatica</i>	<input type="checkbox"/> <i>Albizia julibrissin</i>	<input type="checkbox"/> <i>Lonicera tatarica</i>
<input type="checkbox"/> <i>Aesculus flava</i>	<input type="checkbox"/> <i>Oxydendrum arboreum</i>	<input type="checkbox"/> <i>Alliaria petiolata</i>	<input type="checkbox"/> <i>Lotus corniculatus</i>
<input type="checkbox"/> <i>Asimina triloba</i>	<input type="checkbox"/> <i>Prunus serotina</i>	<input type="checkbox"/> <i>Alternanthera philoxeroides</i>	<input type="checkbox"/> <i>Lythrum salicaria</i>
<input type="checkbox"/> <i>Betula alleghaniensis</i>	<input type="checkbox"/> <i>Quercus alba</i>	<input type="checkbox"/> <i>Aster tataricus</i>	<input type="checkbox"/> <i>Microstegium vimineum</i>
<input type="checkbox"/> <i>Betula lenta</i>	<input type="checkbox"/> <i>Quercus coccinea</i>	<input type="checkbox"/> <i>Cerastium fontanum</i>	<input type="checkbox"/> <i>Paulownia tomentosa</i>
<input type="checkbox"/> <i>Carya alba</i>	<input type="checkbox"/> <i>Quercus imbricaria</i>	<input type="checkbox"/> <i>Coronilla varia</i>	<input type="checkbox"/> <i>Polygonum cuspidatum</i>
<input type="checkbox"/> <i>Carya glabra</i>	<input type="checkbox"/> <i>Quercus prinus</i>	<input type="checkbox"/> <i>Elaeagnus umbellata</i>	<input checked="" type="checkbox"/> <i>Rosa multiflora</i>
<input type="checkbox"/> <i>Carya ovalis</i>	<input type="checkbox"/> <i>Quercus rubra</i>	<input type="checkbox"/> <i>Lespedeza bicolor</i>	<input type="checkbox"/> <i>Sorghum halepense</i>
<input type="checkbox"/> <i>Carya ovata</i>	<input type="checkbox"/> <i>Quercus velutina</i>	<input type="checkbox"/> <i>Lespedeza cuneata</i>	<input type="checkbox"/> <i>Verbena brasiliensis</i>
<input type="checkbox"/> <i>Cornus florida</i>	<input type="checkbox"/> <i>Sassafras albidum</i>	<input type="checkbox"/> <i>Ligustrum obtusifolium</i>	
<input type="checkbox"/> <i>Fagus grandifolia</i>	<input type="checkbox"/> <i>Tilia americana</i>	<input type="checkbox"/> <i>Ligustrum sinense</i>	
<input type="checkbox"/> <i>Fraxinus americana</i>	<input type="checkbox"/> <i>Tsuga canadensis</i>		
<input type="checkbox"/> <i>Liriodendron tulipifera</i>	<input type="checkbox"/> <i>Ulmus americana</i>		
<input type="checkbox"/> <i>Magnolia acuminata</i>			
0 Species in Group 1		1 Species in Group 2	

Sample Variables 10-11 within at least 8 subplots (40" x 40", or 1m x 1m) in the riparian/buffer zone within 25 feet from each bank. The four subplots should be placed roughly equidistantly along each side of the stream.

10	V _{DETritus}	Average percent cover of leaves, sticks, or other organic material. Woody debris <4" diameter and <36" long are include. Enter the percent cover of the detrital layer at each subplot.	15.00 %																								
<table border="1"> <thead> <tr> <th colspan="4">Left Side</th> <th colspan="4">Right Side</th> </tr> </thead> <tbody> <tr> <td>10</td> <td></td> <td></td> <td></td> <td>20</td> <td></td> <td></td> <td></td> </tr> <tr> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> </tbody> </table>				Left Side				Right Side				10				20											
Left Side				Right Side																							
10				20																							
11	V _{HERB}	Average percentage cover of herbaceous vegetation (measure only if tree cover is <20%). Do not include woody stems at least 4" dbh and 36" tall. Because there may be several layers of ground cover vegetation percentages up through 200% are accepted. Enter the percent cover of ground vegetation at each subplot.	63 %																								
<table border="1"> <thead> <tr> <th colspan="4">Left Side</th> <th colspan="4">Right Side</th> </tr> </thead> <tbody> <tr> <td>50</td> <td></td> <td></td> <td></td> <td>75</td> <td></td> <td></td> <td></td> </tr> <tr> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> </tbody> </table>				Left Side				Right Side				50				75											
Left Side				Right Side																							
50				75																							

Sample Variable 12 within the entire catchment of the stream.

12	V _{WLUSE}	Weighted Average of Runoff Score for watershed:	0.83																																
<table border="1"> <thead> <tr> <th>Land Use (Choose From Drop List)</th> <th>Runoff Score</th> <th>% in Catchment</th> <th>Running Percent (not >100)</th> </tr> </thead> <tbody> <tr> <td>Forest and native range (<50% ground cover)</td> <td>0.5</td> <td>6</td> <td>6</td> </tr> <tr> <td>Forest and native range (>75% ground cover)</td> <td>1</td> <td>77</td> <td>83</td> </tr> <tr> <td>Impervious areas (parking lots, roofs, driveways, etc)</td> <td>0</td> <td>8</td> <td>91</td> </tr> <tr> <td>Open space (pasture, lawns, parks, etc.), grass cover >75%</td> <td>0.3</td> <td>9</td> <td>100</td> </tr> <tr> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td></td> <td></td> <td></td> <td></td> </tr> </tbody> </table>				Land Use (Choose From Drop List)	Runoff Score	% in Catchment	Running Percent (not >100)	Forest and native range (<50% ground cover)	0.5	6	6	Forest and native range (>75% ground cover)	1	77	83	Impervious areas (parking lots, roofs, driveways, etc)	0	8	91	Open space (pasture, lawns, parks, etc.), grass cover >75%	0.3	9	100												
Land Use (Choose From Drop List)	Runoff Score	% in Catchment	Running Percent (not >100)																																
Forest and native range (<50% ground cover)	0.5	6	6																																
Forest and native range (>75% ground cover)	1	77	83																																
Impervious areas (parking lots, roofs, driveways, etc)	0	8	91																																
Open space (pasture, lawns, parks, etc.), grass cover >75%	0.3	9	100																																

S-IJ16-a			Notes:
Variable	Value	VSI	Land Cover Analysis was completed using the 2019 National Land Cover Database (NLCD), from Landsat satellite imagery and other supplementary datasets. Watershed boundaries are based off of field delineated stream impacts. *Percentages in catchment values have been rounded to the nearest full number.
V _{CCANOPY}	Not Used, <20%	Not Used	
V _{EMBED}	2.1	0.51	
V _{SUBSTRATE}	4.10 in	1.00	
V _{BERO}	27 %	0.93	
V _{LWD}	0.0	0.00	
V _{TDBH}	Not Used	Not Used	
V _{SNAG}	0.0	0.10	
V _{SSD}	66.7	1.00	
V _{SRICH}	0.00	0.00	
V _{DETritus}	15.0 %	0.18	
V _{HERB}	63 %	0.83	
V _{WLUSE}	0.83	0.87	

PHYSICAL CHARACTERIZATION/WATER QUALITY FIELD DATA SHEET (FRONT)

STREAM NAME S-IJ16-a		LOCATION Giles County	
STATION # _____ RIVERMILE _____		STREAM CLASS Ephemeral	
LAT 37.31173 LONG -80.544091		RIVER BASIN Middle New	
STORET # _____		AGENCY VADEQ	
INVESTIGATORS ES, AO			
FORM COMPLETED BY ES, AO		DATE 8/11/2021 TIME 3:00 PM	REASON FOR SURVEY Baseline Assessment

WEATHER CONDITIONS	<div style="display: flex; justify-content: space-between;"> <div> <p>Now</p> <div style="display: flex; align-items: center;"> <div style="margin-right: 5px;"> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> </div> <div> <p>storm (heavy rain) rain (steady rain) showers (intermittent) %cloud cover clear/sunny</p> </div> </div> <p>5 %</p> </div> <div> <p>Past 24 hours</p> <div style="display: flex; align-items: center;"> <div style="margin-right: 5px;"> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> </div> <div> <p>storm (heavy rain) rain (steady rain) showers (intermittent) %cloud cover clear/sunny</p> </div> </div> <p>20 %</p> </div> <div> <p>Has there been a heavy rain in the last 7 days?</p> <p><input type="checkbox"/> Yes <input checked="" type="checkbox"/> No</p> <p>Air Temperature 33 °C</p> <p>Other _____</p> </div> </div>
SITE LOCATION/MAP	<p>Draw a map of the site and indicate the areas sampled (or attach a photograph)</p> <p>The map shows a horizontal line representing a road or boundary, labeled 'Route 608' on the left and 'AR 245.01' in the center. Above this line, a diagonal line is labeled 'S-IJ16-a' and 'upstream'. Below the line, another diagonal line is labeled 'S-IJ16-a' and 'down stream'. To the right of the line, a vertical line is labeled 'ROW'. A bracket on the right side of the line indicates a '15 ft evaluated' section. An arrow points to a section of the line labeled 'not evaluated'.</p>
STREAM CHARACTERIZATION	<div style="display: flex; justify-content: space-between;"> <div> <p>Stream Subsystem</p> <p><input type="checkbox"/> Perennial <input type="checkbox"/> Intermittent <input type="checkbox"/> Tidal</p> <p>Stream Origin</p> <p><input type="checkbox"/> Glacial <input type="checkbox"/> Spring-fed <input type="checkbox"/> Non-glacial montane <input type="checkbox"/> Mixture of origins <input type="checkbox"/> Swamp and bog <input checked="" type="checkbox"/> Other* Precipitation</p> </div> <div> <p>Stream Type</p> <p><input type="checkbox"/> Coldwater <input checked="" type="checkbox"/> Warmwater</p> <p>Catchment Area 1.85 km²</p> </div> </div>

Notes: No water present

PHYSICAL CHARACTERIZATION/WATER QUALITY FIELD DATA SHEET (BACK)

WATERSHED FEATURES	Predominant Surrounding Landuse <input checked="" type="checkbox"/> Forest <input type="checkbox"/> Commercial <input type="checkbox"/> Field/Pasture <input type="checkbox"/> Industrial <input type="checkbox"/> Agricultural <input type="checkbox"/> Other _____ <input type="checkbox"/> Residential	Local Watershed NPS Pollution <input checked="" type="checkbox"/> No evidence <input type="checkbox"/> Some potential sources <input type="checkbox"/> Obvious sources Local Watershed Erosion <input checked="" type="checkbox"/> None <input type="checkbox"/> Moderate <input type="checkbox"/> Heavy
RIPARIAN VEGETATION (18 meter buffer)	Indicate the dominant type and record the dominant species present <input type="checkbox"/> Trees <input type="checkbox"/> Shrubs <input type="checkbox"/> Grasses <input checked="" type="checkbox"/> Herbaceous Dominant species present <u>Verbesina alternifolia</u>	
INSTREAM FEATURES	<div style="display: flex; justify-content: space-between;"> <div style="width: 45%;"> Estimated Reach Length <u>4.6</u> m Estimated Stream Width <u>1.2</u> m Sampling Reach Area <u>5.5</u> m² Area in km² (m²x1000) _____ km² Estimated Stream Depth <u>N/A</u> m Surface Velocity (at thalweg) <u>N/A</u> m/sec </div> <div style="width: 45%;"> Canopy Cover <input checked="" type="checkbox"/> Partly open <input type="checkbox"/> Partly shaded <input type="checkbox"/> Shaded High Water Mark <u>0.2</u> m Proportion of Reach Represented by Stream Morphology Types Riffle _____ % Run _____ % Pool _____ % Channelized <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No Dam Present <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No </div> </div>	
LARGE WOODY DEBRIS	LWD <u>0</u> m ² Density of LWD <u>N/A</u> m ² /km ² (LWD/ reach area)	
AQUATIC VEGETATION	Indicate the dominant type and record the dominant species present <input type="checkbox"/> Rooted emergent <input type="checkbox"/> Rooted submergent <input type="checkbox"/> Rooted floating <input type="checkbox"/> Free floating <input type="checkbox"/> Floating Algae <input type="checkbox"/> Attached Algae Dominant species present <u>None observed</u> Portion of the reach with aquatic vegetation <u>N/A</u> %	
WATER QUALITY (DS, US)	<div style="display: flex; justify-content: space-between;"> <div style="width: 45%;"> Temperature <u>N/A</u> °C Specific Conductance <u>N/A</u> Dissolved Oxygen <u>N/A</u> pH <u>N/A</u> Turbidity <u>N/A</u> WQ Instrument Used <u>N/A</u> </div> <div style="width: 45%;"> Water Odors <input type="checkbox"/> Normal/None <input type="checkbox"/> Sewage <input type="checkbox"/> Petroleum <input type="checkbox"/> Chemical <input type="checkbox"/> Fishy <input type="checkbox"/> Other _____ Water Surface Oils <input type="checkbox"/> Slick <input type="checkbox"/> Sheen <input type="checkbox"/> Globs <input type="checkbox"/> Flecks <input type="checkbox"/> None <input type="checkbox"/> Other _____ Turbidity (if not measured) <input type="checkbox"/> Clear <input type="checkbox"/> Slightly turbid <input type="checkbox"/> Turbid <input type="checkbox"/> Opaque <input type="checkbox"/> Stained <input type="checkbox"/> Other _____ </div> </div>	
SEDIMENT/SUBSTRATE	<div style="display: flex; justify-content: space-between;"> <div style="width: 45%;"> Odors <input checked="" type="checkbox"/> Normal <input type="checkbox"/> Sewage <input type="checkbox"/> Petroleum <input type="checkbox"/> Chemical <input type="checkbox"/> Anaerobic <input type="checkbox"/> None <input type="checkbox"/> Other _____ Oils <input checked="" type="checkbox"/> Absent <input type="checkbox"/> Slight <input type="checkbox"/> Moderate <input type="checkbox"/> Profuse </div> <div style="width: 45%;"> Deposits <input type="checkbox"/> Sludge <input type="checkbox"/> Sawdust <input type="checkbox"/> Paper fiber <input type="checkbox"/> Sand <input type="checkbox"/> Relict shells <input type="checkbox"/> Other _____ Looking at stones which are not deeply embedded, are the undersides black in color? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No </div> </div>	

INORGANIC SUBSTRATE COMPONENTS (should add up to 100%)			ORGANIC SUBSTRATE COMPONENTS (does not necessarily add up to 100%)		
Substrate Type	Diameter	% Composition in Sampling Reach	Substrate Type	Characteristic	% Composition in Sampling Area
Bedrock		0	Detritus	sticks, wood, coarse plant materials (CPOM)	25
Boulder	> 256 mm (10")	5			
Cobble	64-256 mm (2.5"-10")	30	Muck-Mud	black, very fine organic (FPOM)	0
Gravel	2-64 mm (0.1"-2.5")	40			
Sand	0.06-2mm (gritty)	10	Marl	grey, shell fragments	0
Silt	0.004-0.06 mm	5			
Clay	< 0.004 mm (slick)	10			

Notes: No water present, thus no water quality measurements were taken.

HABITAT ASSESSMENT FIELD DATA SHEET - HG - USE ON ALL STREAMS (FRONT)

STREAM NAME S-IJ16-a		LOCATION Giles County	
STATION # _____ RIVERMILE _____		STREAM CLASS Ephemeral	
LAT 37.31173 LONG -80.544091		RIVER BASIN Middle New	
STORET # _____		AGENCY VADEQ	
INVESTIGATORS ES, AO			
FORM COMPLETED BY ES, AO		DATE 8/11/2021 TIME 3:00 PM AM PM	REASON FOR SURVEY Baseline Assessment

	Habitat Parameter	Condition Category			
		Optimal	Suboptimal	Marginal	Poor
Parameters to be evaluated in sampling reach	1. Epifaunal Substrate/ Available Cover	Greater than 70% of substrate favorable for epifaunal colonization and fish cover; mix of snags, submerged logs, undercut banks, cobble or other stable habitat and at stage to allow full colonization potential (i.e., logs/snags that are <u>not</u> new fall and <u>not</u> transient).	40-70% mix of stable habitat; well-suited for full colonization potential; adequate habitat for maintenance of populations; presence of additional substrate in the form of newfall, but not yet prepared for colonization (may rate at high end of scale).	20-40% mix of stable habitat; habitat availability less than desirable; substrate frequently disturbed or removed.	Less than 20% stable habitat; lack of habitat is obvious; substrate unstable or lacking.
	SCORE 0	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
	2. Embeddedness	Gravel, cobble, and boulder particles are 0-25% surrounded by fine sediment. Layering of cobble provides diversity of niche space.	Gravel, cobble, and boulder particles are 25-50% surrounded by fine sediment.	Gravel, cobble, and boulder particles are 50-75% surrounded by fine sediment.	Gravel, cobble, and boulder particles are more than 75% surrounded by fine sediment.
	SCORE 13	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
	3. Velocity/Depth Regime	All four velocity/depth regimes present (slow-deep, slow-shallow, fast-deep, fast-shallow). (Slow is < 0.3 m/s, deep is > 0.5 m.)	Only 3 of the 4 regimes present (if fast-shallow is missing, score lower than if missing other regimes).	Only 2 of the 4 habitat regimes present (if fast-shallow or slow-shallow are missing, score low).	Dominated by 1 velocity/depth regime (usually slow-deep).
	SCORE 0	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
	4. Sediment Deposition	Little or no enlargement of islands or point bars and less than 5% of the bottom affected by sediment deposition.	Some new increase in bar formation, mostly from gravel, sand or fine sediment; 5-30% of the bottom affected; slight deposition in pools.	Moderate deposition of new gravel, sand or fine sediment on old and new bars; 30-50% of the bottom affected; sediment deposits at obstructions, constrictions, and bends; moderate deposition of pools prevalent.	Heavy deposits of fine material, increased bar development; more than 50% of the bottom changing frequently; pools almost absent due to substantial sediment deposition.
	SCORE 15	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
	5. Channel Flow Status	Water reaches base of both lower banks, and minimal amount of channel substrate is exposed.	Water fills >75% of the available channel; or <25% of channel substrate is exposed.	Water fills 25-75% of the available channel, and/or riffle substrates are mostly exposed.	Very little water in channel and mostly present as standing pools.
	SCORE 0	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0

Notes: No water present.

HABITAT ASSESSMENT FIELD DATA SHEET—HIGH GRADIENT STREAMS (BACK)

Habitat Parameter	Condition Category																				
	Optimal					Suboptimal					Marginal					Poor					
6. Channel Alteration SCORE <u>18</u>	Channelization or dredging absent or minimal; stream with normal pattern.					Some channelization present, usually in areas of bridge abutments; evidence of past channelization, i.e., dredging, (greater than past 20 yr) may be present, but recent channelization is not present.					Channelization may be extensive; embankments or shoring structures present on both banks; and 40 to 80% of stream reach channelized and disrupted.					Banks shored with gabion or cement; over 80% of the stream reach channelized and disrupted. Instream habitat greatly altered or removed entirely.					
	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
7. Frequency of Riffles (or bends) SCORE <u>0</u>	Occurrence of riffles relatively frequent; ratio of distance between riffles divided by width of the stream <7:1 (generally 5 to 7); variety of habitat is key. In streams where riffles are continuous, placement of boulders or other large, natural obstruction is important.					Occurrence of riffles infrequent; distance between riffles divided by the width of the stream is between 7 to 15.					Occasional riffle or bend; bottom contours provide some habitat; distance between riffles divided by the width of the stream is between 15 to 25.					Generally all flat water or shallow riffles; poor habitat; distance between riffles divided by the width of the stream is a ratio of >25.					
	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
8. Bank Stability (score each bank) Note: determine left or right side by facing downstream. SCORE <u>7</u> SCORE <u>8</u>	Banks stable; evidence of erosion or bank failure absent or minimal; little potential for future problems. <5% of bank affected.					Moderately stable; infrequent, small areas of erosion mostly healed over. 5-30% of bank in reach has areas of erosion.					Moderately unstable; 30-60% of bank in reach has areas of erosion; high erosion potential during floods.					Unstable; many eroded areas; "raw" areas frequent along straight sections and bends; obvious bank sloughing; 60-100% of bank has erosional scars.					
	Left Bank	10	9			8	7	6			5	4	3			2	1	0			
	Right Bank	10	9			8	7	6			5	4	3			2	1	0			
9. Vegetative Protection (score each bank) SCORE <u>8</u> SCORE <u>8</u>	More than 90% of the streambank surfaces and immediate riparian zone covered by native vegetation, including trees, understory shrubs, or nonwoody macrophytes; vegetative disruption through grazing or mowing minimal or not evident; almost all plants allowed to grow naturally.					70-90% of the streambank surfaces covered by native vegetation, but one class of plants is not well-represented; disruption evident but not affecting full plant growth potential to any great extent; more than one-half of the potential plant stubble height remaining.					50-70% of the streambank surfaces covered by vegetation; disruption obvious; patches of bare soil or closely cropped vegetation common; less than one-half of the potential plant stubble height remaining.					Less than 50% of the streambank surfaces covered by vegetation; disruption of streambank vegetation is very high; vegetation has been removed to 5 centimeters or less in average stubble height.					
	Left Bank	10	9			8	7	6			5	4	3			2	1	0			
	Right Bank	10	9			8	7	6			5	4	3			2	1	0			
10. Riparian Vegetative Zone Width (score each bank riparian zone) SCORE <u>10</u> SCORE <u>3</u>	Width of riparian zone >18 meters; human activities (i.e., parking lots, roadbeds, clear-cuts, lawns, or crops) have not impacted zone.					Width of riparian zone 12-18 meters; human activities have impacted zone only minimally.					Width of riparian zone 6-12 meters; human activities have impacted zone a great deal.					Width of riparian zone <6 meters; little or no riparian vegetation due to human activities.					
	Left Bank	10	9			8	7	6			5	4	3			2	1	0			
	Right Bank	10	9			8	7	6			5	4	3			2	1	0			

Total Score 90

Notes: No water present

BENTHIC MACROINVERTEBRATE FIELD DATA SHEET

STREAM NAME S-IJ16-a		LOCATION Giles County	
STATION # _____ RIVERMILE _____		STREAM CLASS Ephemeral	
LAT <u>37.31173</u> LONG <u>-80.544091</u>		RIVER BASIN Middle New	
STORET # _____		AGENCY VADEQ	
INVESTIGATORS ES, AO		LOT NUMBER _____	
FORM COMPLETED BY ES, AO		DATE <u>8/11/2021</u> TIME <u>3:00 PM</u>	REASON FOR SURVEY Baseline Assessment

HABITAT TYPES	Indicate the percentage of each habitat type present <input type="checkbox"/> Cobble _____% <input type="checkbox"/> Snags _____% <input type="checkbox"/> Vegetated Banks _____% <input type="checkbox"/> Sand _____% <input type="checkbox"/> Submerged Macrophytes _____% <input type="checkbox"/> Other (_____) _____%
SAMPLE COLLECTION	Gear used <input type="checkbox"/> D-frame <input type="checkbox"/> kick-net <input type="checkbox"/> Other _____ How were the samples collected? <input type="checkbox"/> wading <input type="checkbox"/> from bank <input type="checkbox"/> from boat Indicate the number of jabs/kicks taken in each habitat type. <input type="checkbox"/> Cobble _____ <input type="checkbox"/> Snags _____ <input type="checkbox"/> Vegetated Banks _____ <input type="checkbox"/> Sand _____ <input type="checkbox"/> Submerged Macrophytes _____ <input type="checkbox"/> Other (_____) _____
GENERAL COMMENTS	No water present.

QUALITATIVE LISTING OF AQUATIC BIOTA

Indicate estimated abundance: 0 = Absent/Not Observed, 1 = Rare, 2 = Common, 3= Abundant, 4 = Dominant

Periphyton	0	1	2	3	4	Slimes	0	1	2	3	4
Filamentous Algae	0	1	2	3	4	Macroinvertebrates	0	1	2	3	4
Macrophytes	0	1	2	3	4	Fish	0	1	2	3	4

FIELD OBSERVATIONS OF MACROBENTHOS

Indicate estimated abundance: 0 = Absent/Not Observed, 1 = Rare (1-3 organisms), 2 = Common (3-9 organisms), 3= Abundant (>10 organisms), 4 = Dominant (>50 organisms)

Porifera	0	1	2	3	4	Anisoptera	0	1	2	3	4	Chironomidae	0	1	2	3	4
Hydrozoa	0	1	2	3	4	Zygoptera	0	1	2	3	4	Ephemeroptera	0	1	2	3	4
Platyhelminthes	0	1	2	3	4	Hemiptera	0	1	2	3	4	Trichoptera	0	1	2	3	4
Turbellaria	0	1	2	3	4	Coleoptera	0	1	2	3	4	Other	0	1	2	3	4
Hirudinea	0	1	2	3	4	Lepidoptera	0	1	2	3	4						
Oligochaeta	0	1	2	3	4	Sialidae	0	1	2	3	4						
Isopoda	0	1	2	3	4	Corydalidae	0	1	2	3	4						
Amphipoda	0	1	2	3	4	Tipulidae	0	1	2	3	4						
Decapoda	0	1	2	3	4	Empididae	0	1	2	3	4						
Gastropoda	0	1	2	3	4	Simuliidae	0	1	2	3	4						
Bivalvia	0	1	2	3	4	Tabinidae	0	1	2	3	4						
						Culcidae	0	1	2	3	4						

WOLMAN PEBBLE COUNT FORM

County: Giles County
Stream Name: UNT to Sinking Creek
HUC Code: 05050002
Survey Date: 8/11/2021
Surveyors: AO, ES
Type: Representative

Stream ID: S-IJ16-a

Basin: Middle New

PEBBLE COUNT							
Inches	PARTICLE	Millimeters		Particle Count	Total #	Item %	% Cum
	Silt/Clay	< .062	S/C	<div><div></div><div></div></div>	13	13.00	13.00
	Very Fine	.062-.125	S A N D	<div><div></div><div></div></div>	0	0.00	13.00
	Fine	.125-.25		<div><div></div><div></div></div>	1	1.00	14.00
	Medium	.25-.5		<div><div></div><div></div></div>	0	0.00	14.00
	Coarse	.50-1.0		<div><div></div><div></div></div>	1	1.00	15.00
.04-.08	Very Coarse	1.0-2		<div><div></div><div></div></div>	1	1.00	16.00
.08 -.16	Very Fine	2 -4		G R A V E L	<div><div></div><div></div></div>	3	3.00
.16 - .22	Fine	4 -5.7	<div><div></div><div></div></div>		2	2.00	21.00
.22 - .31	Fine	5.7 - 8	<div><div></div><div></div></div>		6	6.00	27.00
.31 - .44	Medium	8 -11.3	<div><div></div><div></div></div>		7	7.00	34.00
.44 - .63	Medium	11.3 - 16	<div><div></div><div></div></div>		12	12.00	46.00
.63 - .89	Coarse	16 -22.6	<div><div></div><div></div></div>		6	6.00	52.00
.89 - 1.26	Coarse	22.6 - 32	<div><div></div><div></div></div>		3	3.00	55.00
1.26 - 1.77	Vry Coarse	32 - 45	<div><div></div><div></div></div>		9	9.00	64.00
1.77 -2.5	Vry Coarse	45 - 64	<div><div></div><div></div></div>		11	11.00	75.00
2.5 - 3.5	Small	64 - 90	C O B B L E	<div><div></div><div></div></div>	12	12.00	87.00
3.5 - 5.0	Small	90 - 128		<div><div></div><div></div></div>	7	7.00	94.00
5.0 - 7.1	Large	128 - 180		<div><div></div><div></div></div>	2	2.00	96.00
7.1 - 10.1	Large	180 - 256		<div><div></div><div></div></div>	2	2.00	98.00
10.1 - 14.3	Small	256 - 362	B O U L D E R	<div><div></div><div></div></div>	2	2.00	100.00
14.3 - 20	Small	362 - 512		<div><div></div><div></div></div>	0	0.00	100.00
20 - 40	Medium	512 - 1024		<div><div></div><div></div></div>	0	0.00	100.00
40 - 80	Large	1024 -2048		<div><div></div><div></div></div>	0	0.00	100.00
80 - 160	Vry Large	2048 -4096		<div><div></div><div></div></div>	0	0.00	100.00
	Bedrock		BDRK	<div><div></div><div></div></div>	0	0.00	100.00
				Totals:	100		
	Total Tally:						

RIVERMORPH PARTICLE SUMMARY

River Name: UNT to Sinking Creek
 Reach Name: S-IJ16-A
 Sample Name: Representative
 Survey Date: 08/11/2021

Size (mm)	TOT #	ITEM %	CUM %
0 - 0.062	13	13.00	13.00
0.062 - 0.125	0	0.00	13.00
0.125 - 0.25	1	1.00	14.00
0.25 - 0.50	0	0.00	14.00
0.50 - 1.0	1	1.00	15.00
1.0 - 2.0	1	1.00	16.00
2.0 - 4.0	3	3.00	19.00
4.0 - 5.7	2	2.00	21.00
5.7 - 8.0	6	6.00	27.00
8.0 - 11.3	7	7.00	34.00
11.3 - 16.0	12	12.00	46.00
16.0 - 22.6	6	6.00	52.00
22.6 - 32.0	3	3.00	55.00
32 - 45	9	9.00	64.00
45 - 64	11	11.00	75.00
64 - 90	12	12.00	87.00
90 - 128	7	7.00	94.00
128 - 180	2	2.00	96.00
180 - 256	2	2.00	98.00
256 - 362	2	2.00	100.00
362 - 512	0	0.00	100.00
512 - 1024	0	0.00	100.00
1024 - 2048	0	0.00	100.00
Bedrock	0	0.00	100.00
D16 (mm)	2		
D35 (mm)	11.69		
D50 (mm)	20.4		
D84 (mm)	83.5		
D95 (mm)	154		
D100 (mm)	361.99		
Silt/Clay (%)	13		
Sand (%)	3		
Gravel (%)	59		
Cobble (%)	23		
Boulder (%)	2		
Bedrock (%)	0		

Total Particles = 100.

Ephemeral Stream Assessment Form (Form 1a)

Unified Stream Methodology for use in Virginia

For use in ephemeral streams

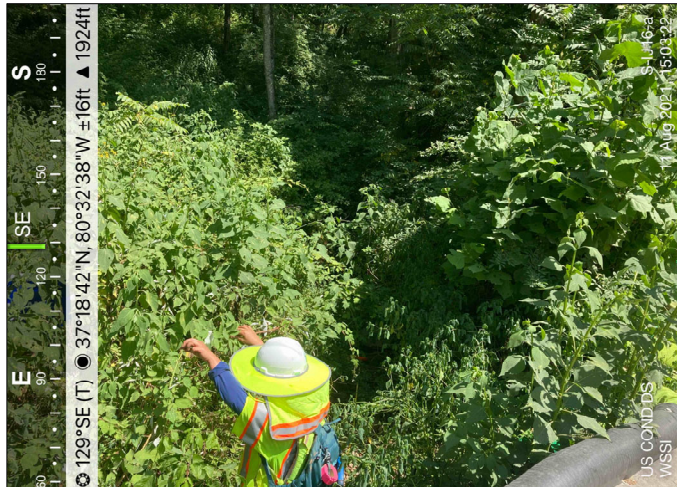
Project #	Project Name	Locality	Cowardin Class.	HUC	Date	SAR #	Impact Length	Impact Factor
22865.06	Mountain Valley Pipeline (Mountain Valley Pipeline, LLC)	Giles County	R6	05050002	8/11/2021	S-IJ16-a	20	1
Name(s) of Evaluator(s)		Stream Name and Information					SAR Length	
ES, AO		UNT to Sinking Creek					51	

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

Conditional Category								NOTES>>			
	Optimal	Suboptimal		Marginal		Poor					
Riparian Buffers	Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover and an non-maintained understory. Wetlands areas.	High Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.	Low Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with >30% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).	High Marginal: Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.	Low Marginal: Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh > 3 inches) present, with <30% tree canopy cover with maintained understory.	High Poor: Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.	Low Poor: Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.				
		High	Low	High	Low	High	Low				
Condition Scores	1.5	1.2	1.1	0.85	0.75	0.6	0.5				
1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors. 2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below. 3. Enter the % Riparian Area and Score for each riparian category in the blocks below.								Ensure the sums of % Riparian Blocks equal 100			
Right Bank	% Riparian Area >	45%	30%	25%				100%			
	Score >	0.5	0.75	0.85							
Left Bank	% Riparian Area >	35%	20%	15%	15%	15%		100%	Rt Bank CI >	0.66	
	Score >	1.5	0.75	0.85	0.5	0.6			Lt Bank CI >	0.97	
REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH											
NOTE: The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.								THE REACH CONDITION INDEX (RCI) >>			0.41
								RCI= (Riparian CI)/2			
								COMPENSATION REQUIREMENT (CR) >>			8
								CR = RCI X LF X IF			

INSERT PHOTOS:

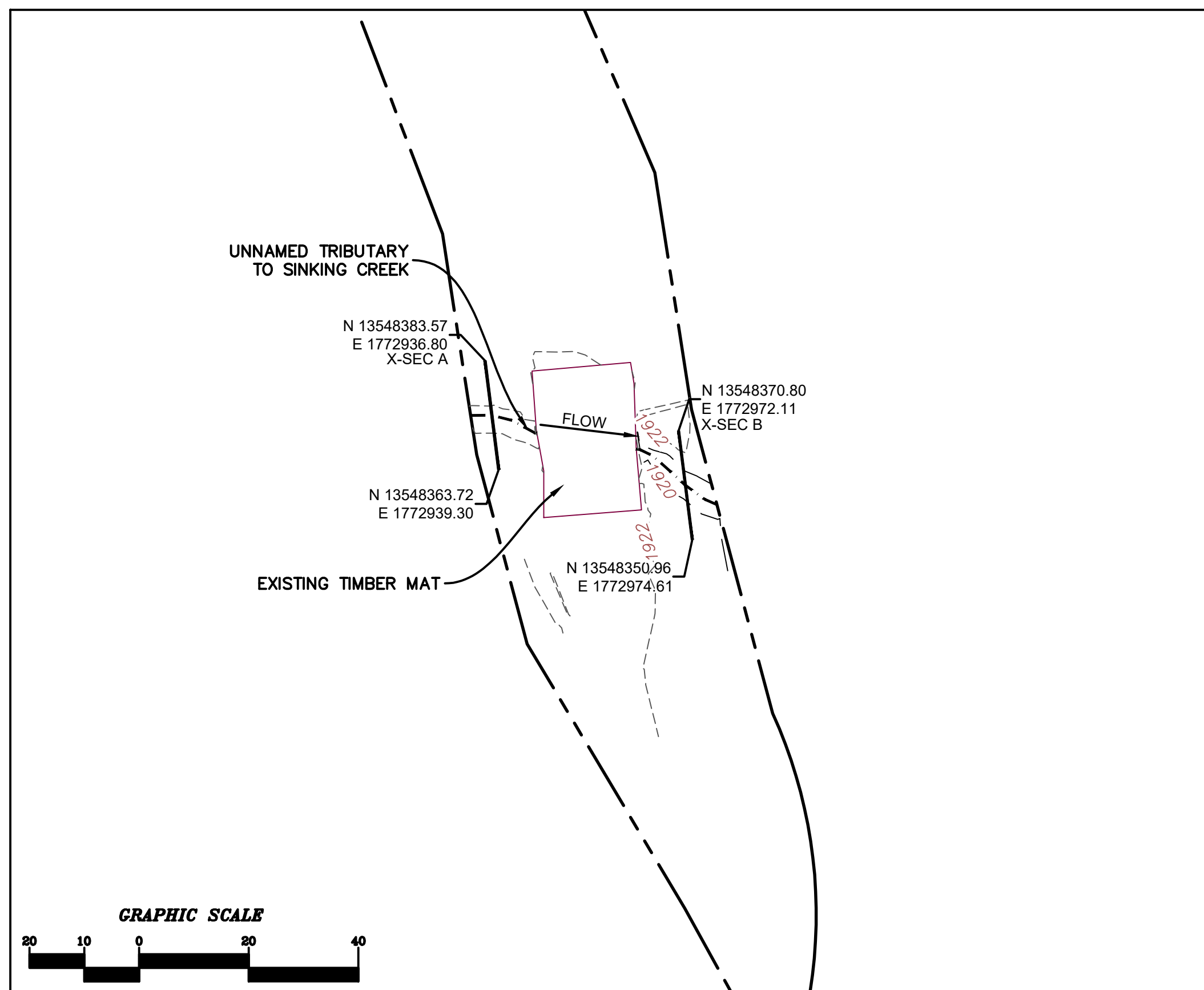
(WSSI Photo Location "L:\22000s\22800\22865.06\Admin\05-ENVR\Field Data\Spread G\Field Forms\S-IJ16-a\Photos\US COND DS.jpeg")



Reach S-IJ16-a looking downstream within the Access Road. Assessment is limited to areas within the temporary ROW.

DESCRIBE PROPOSED IMPACT:

PROVIDED UNDER SEPARATE COVER



LEGEND

- STUDY AREA (EASEMENT)
- EXISTING SURVEY—LOCATED THALWEG
- EXISTING MAJOR CONTOUR
- EXISTING MINOR CONTOUR

SURVEY NOTES:

1. THIS MAP HAS BEEN ORIENTED TO NAD 1983 UTM ZONE 17N, AND VERTICALLY TO THE NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD 88), USING REAL TIME DGPS. FIELD LOCATIONS WERE COMPLETED ON MARCH 23, 2021.
2. EASEMENT LINES SHOWN ON PLAN VIEW WERE PROVIDED BY MOUNTAIN VALLEY PIPELINE.
3. SURVEY POINTS FOR CROSS SECTIONS AND THALWEG PROFILES COLLECTED IN 2021 HAVE BEEN USED IN COMBINATION WITH SURVEY POINTS COLLECTED PREVIOUSLY IN 2020 IN ORDER TO GENERATE THE PRE-CROSSING SURFACE SHOWN IN PLAN. DUE TO NATURAL EROSIONAL STREAM PROCESSES THAT CAN OCCUR OVER TIME, MINOR ADJUSTMENTS TO THE PROFILE ALIGNMENTS MAY HAVE BEEN REQUIRED IN ORDER TO GENERATE A CLEAN PRE-CROSSING SURFACE.
4. ALL SECTION VIEWS SHOWN LEFT TO RIGHT FACING DOWNSTREAM.
5. CROSS SECTION A & B GENERATED USING SURFACE (NOT SURVEYED).

No.	Date	Eng.	Revision

CAD File No.
JZ
Drawn
GH
Checked
DW
Approved
NOTED
Scale:
SEPT. 2021
Date:
112IC07157
Project No.

TETRA TECH, INC.
661 ANDERSEN DRIVE FOSTER PLAZA 7
PITTSBURGH, PA 15220
TEL: (412) 921-7090 FAX: (412) 921-4040
E-Mail: info@tetra.com

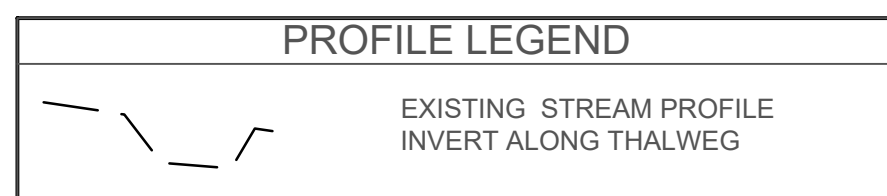
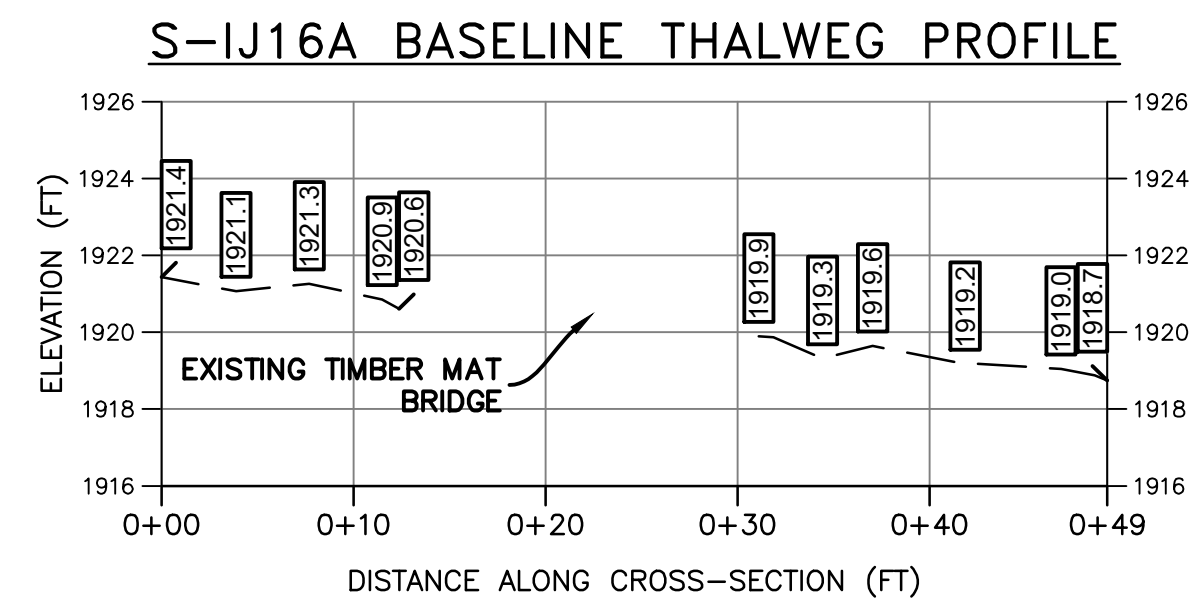


TETRA TECH
www.tetrattech.com

Client
MOUNTAIN VALLEY PIPELINE, LLC
2200 ENERGY DRIVE, 2ND FLOOR
CANONSBURG, PA 15317

Title PROFILE AND CROSS-SECTIONS
BASELINE SURVEY
CROSSING S-IJ16A - UNNAMED TRIBUTARY
TO SINKING CREEK (MP 209.40)
GILES COUNTY, VA

1
Drawing No.



PROFILE
SCALE: H: 1"=10'
V: 1"=5'

CL STEAKOUT POINTS: S-IJ16A CROSS SECTION B (DOWNSTREAM)					
PT. LOC.	PRE-CROSSING			POST-CROSSING	
	NORTHING	EASTING	ELEV	VERT. DIFF.	HORZ. DIFF.
TS-L	13548368.0190	1772791.8480'	1922.343'		
BS-L	13548361.7880	1772793.7280'	1919.120'		
THW	13548360.8770	1772793.3610'	1919.180'		
BS-R	13548360.7330	1772972.0140'	1920.226'		
TS-R	13548355.5740	1772974.2620'	1929.960'		

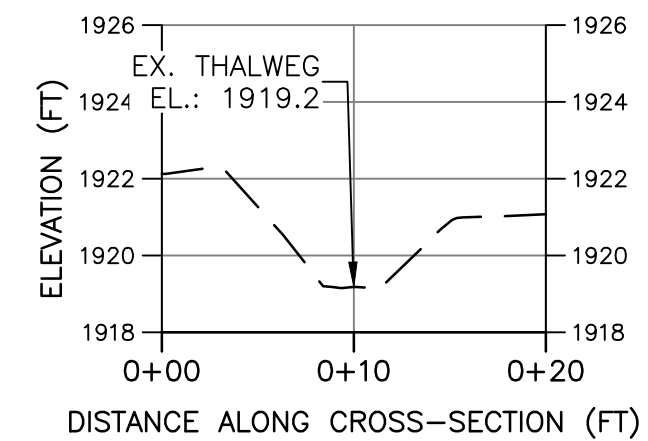
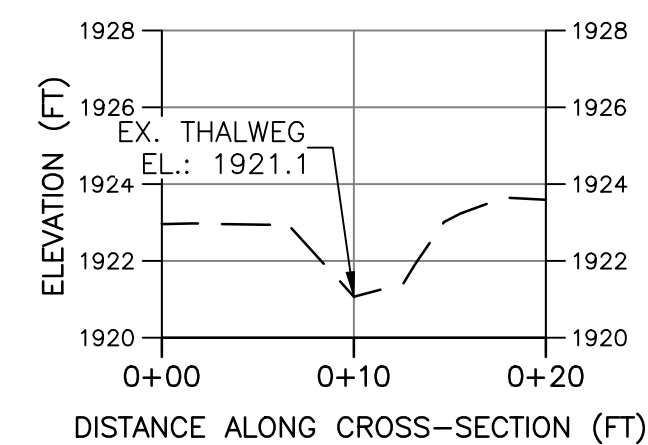
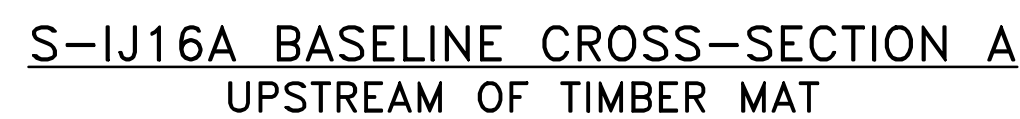
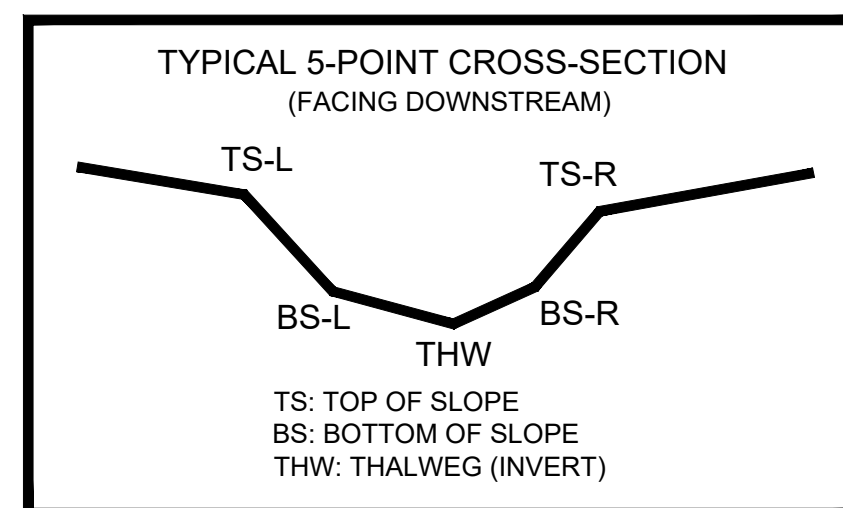


PHOTO TAKEN MARCH 23, 2021 LOOKING
DOWNSTREAM FROM UPSTREAM IMPACT LIMITS



PHOTO TAKEN MARCH 23, 2021 LOOKING
UPSTREAM FROM DOWNSTREAM IMPACT LIMITS

POST-CROSSING PHOTOS

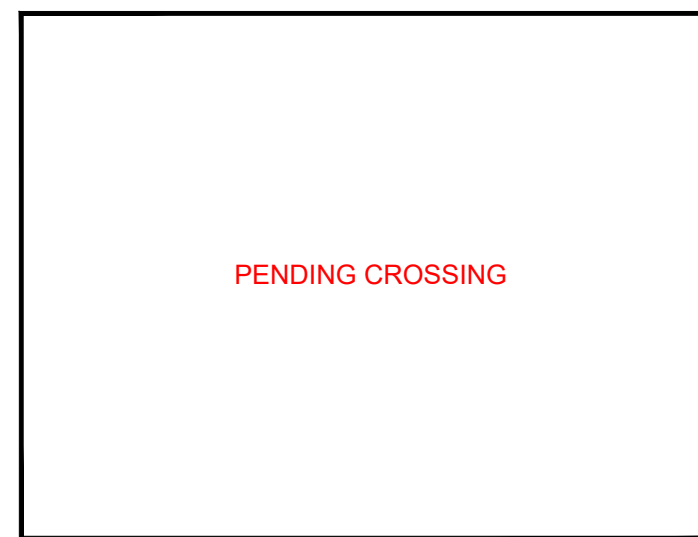


PHOTO TAKEN LOOKING DOWNSTREAM
FROM UPSTREAM IMPACT LIMITS

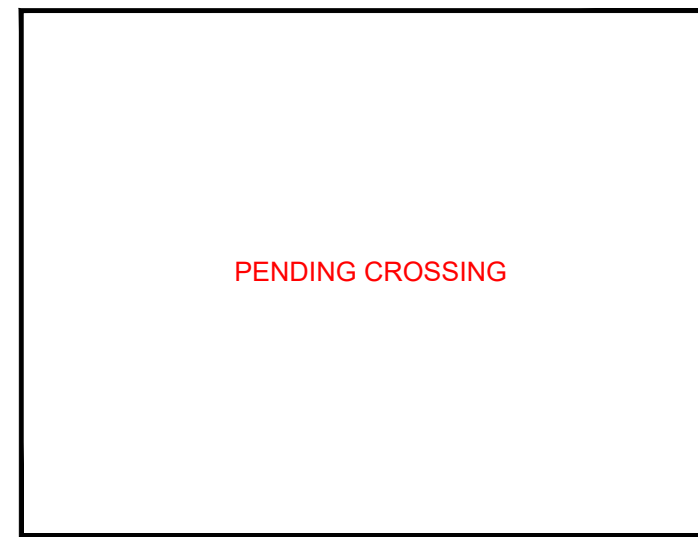
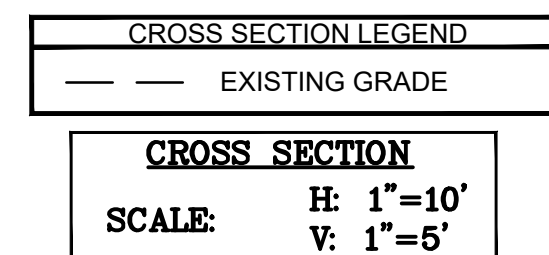


PHOTO TAKEN LOOKING UPSTREAM FROM
DOWNSTREAM IMPACT LIMITS

NOTE: ALL SECTIONS VIEWS SHOWN LEFT TO RIGHT
FACING DOWNSTREAM.



X:\CSD - Mustang\LS7\7187 - WP\Crossing Permits\North Virginia W88 Crossing\Crossing\Virginia W88\Completed\2021-10-12 - 9-116a STEPM TPO_LP 20A\9-116a - WP 20A - 226A.dwg
 Job Date: Oct 22, 2021 - 9:46am
 Job Name: 7187 - WP
 Job Number: 20A
 Job Description: Mustang
 Job Location: North Virginia W88 Crossing
 Job Status: Completed
 Job Owner: Mustang
 Job Manager: Mustang
 Job Designer: Mustang
 Job Checker: Mustang
 Job Approver: Mustang
 Job Date: Oct 22, 2021 - 9:46am
 Job Name: 7187 - WP
 Job Number: 20A
 Job Description: Mustang
 Job Location: North Virginia W88 Crossing
 Job Status: Completed
 Job Owner: Mustang
 Job Manager: Mustang
 Job Designer: Mustang
 Job Checker: Mustang
 Job Approver: Mustang