

Baseline Assessment – Stream Attributes

Reach S-IJ50 (Pipeline ROW)

Perennial

Spread H

Roanoke County, Virginia

Data	Included
Photos	✓
SWVM Form	✓
FCI Calculator and HGM Form	N/A – Perennial stream (not shadeable, slope >4%)
RBP Physical Characteristics Form	✓
Water Quality Data	✓
RBP Habitat Form	✓
RBP Benthic Form	✓
Benthic Identification Sheet	✓
Wolman Pebble Count	✓
RiverMorph Data Sheet	✓
USM Form (Virginia Only)	✓
Longitudinal Profile and Cross Sections	✓



Photo Type: RB DS VIEW

Location, Orientation, Photographer Initials: Standing on RB looking downstream along the ROW looking N, SB



Photo Type: LB DS VIEW

Location, Orientation, Photographer Initials: Standing on LB looking downstream along the ROW looking N, SB



Photo Type: RB US VIEW

Location, Orientation, Photographer Initials: Standing on RB looking upstream along the ROW looking S, SB

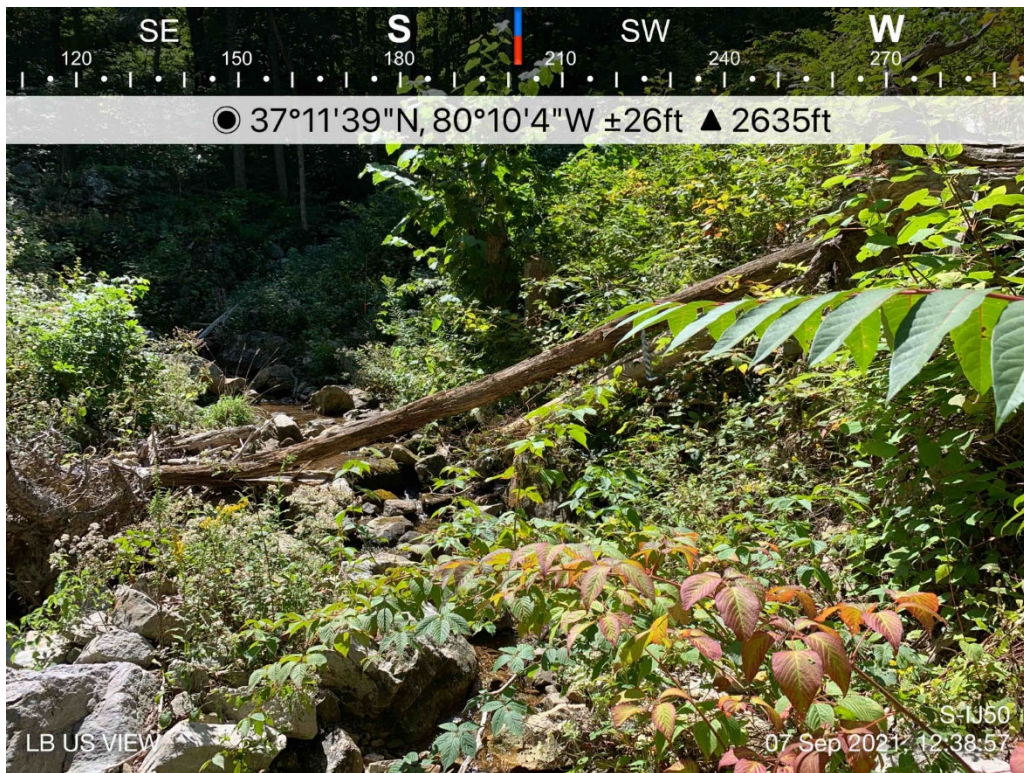


Photo Type: LB US VIEW

Location, Orientation, Photographer Initials: Standing on LB looking upstream along the ROW looking S, SB



Photo Type: RB CL

Location, Orientation, Photographer Initials: Standing on RB looking at LB along pipe centerline looking W, SB

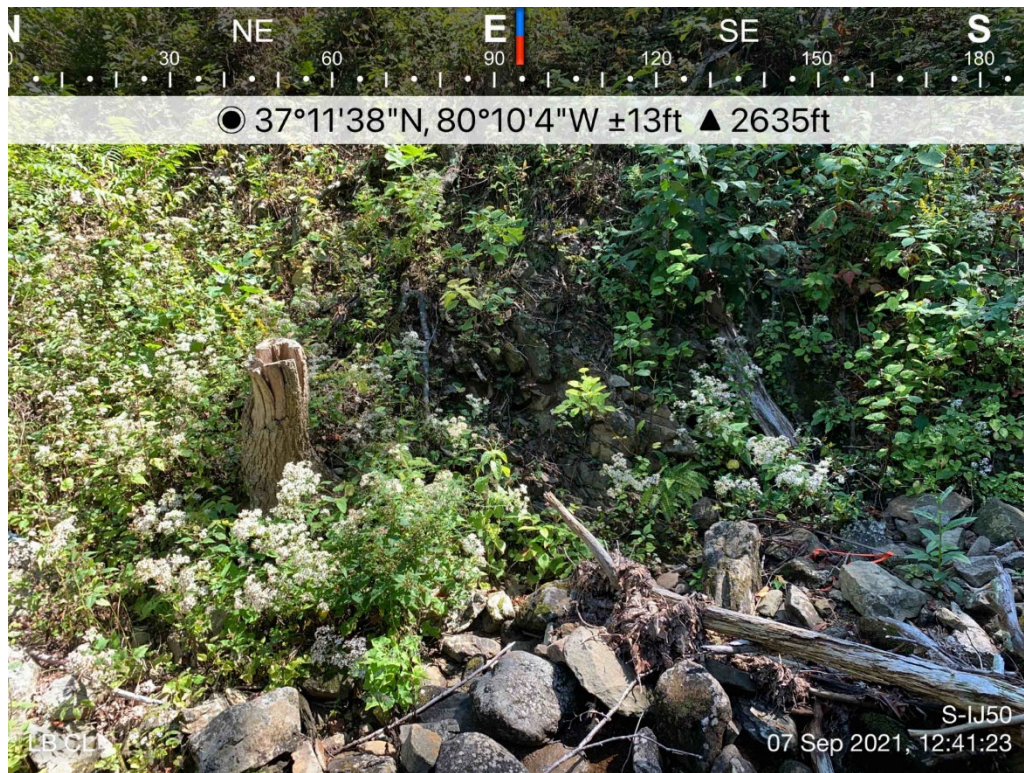


Photo Type: LB CL

Location, Orientation, Photographer Initials: Standing on LB looking at RB along pipe centerline looking E, SB

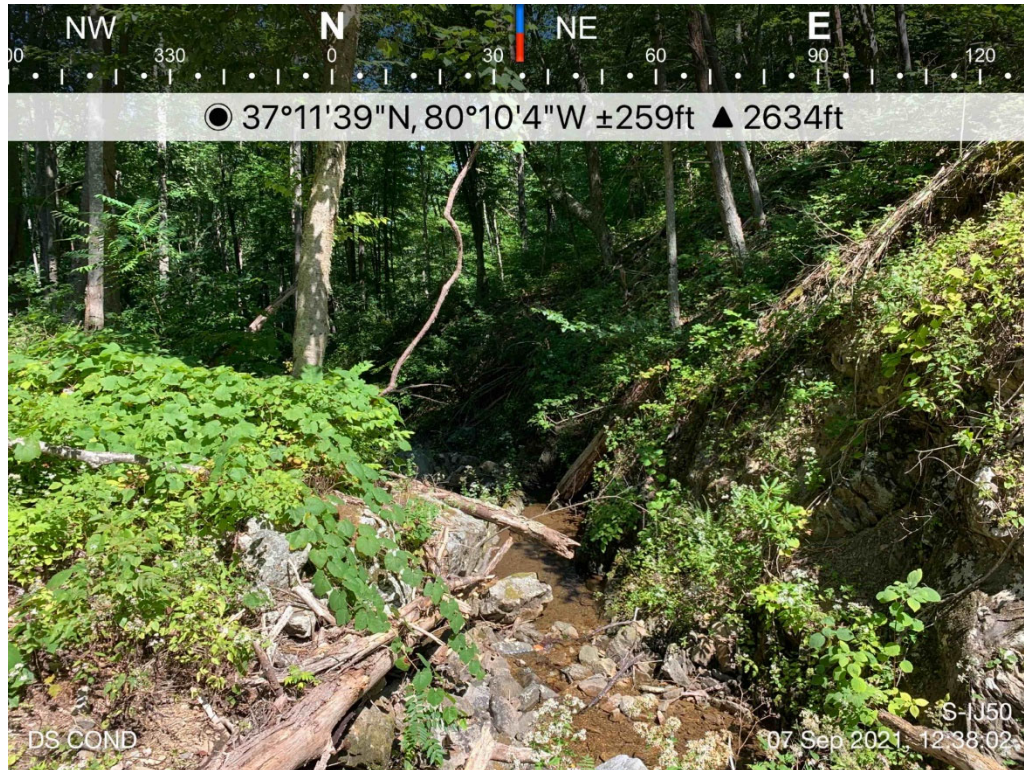


Photo Type: DS COND

Location, Orientation, Photographer Initials: Downstream conditions outside of ROW looking N, SB

L:\22000s\22800\22865.06\Admin\05-ENVR\Field Data\Spread H\Field Forms\S-IJ50\0_Potesta Submission\Docs\Photo Document_S-IJ50.docx

USACE FILE NO./ Project Name: <small>(V2.1, Sept 2015)</small>		Mountain Valley Pipeline		IMPACT COORDINATES: (in Decimal Degrees)		Lat.	37.194064	Lon.	-80.167933	WEATHER:		Sunny	DATE:		September 7, 2021		
IMPACT STREAM/SITE ID AND SITE DESCRIPTION: <small>(watershed size (acresage), unaltered or impairments)</small>				S-J50				MITIGATION STREAM CLASS/SITE ID AND SITE DESCRIPTION: <small>(watershed size (acresage), unaltered or impairments)</small>				Comments:					
STREAM IMPACT LENGTH:		77	FORM OF MITIGATION:		RESTORATION (Levels I-III)		MIT COORDINATES: (in Decimal Degrees)		Lat.		Lon.		PRECIPITATION PAST 48 HRS:		0.05"	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:			Stream Classification:			Stream Classification:			Stream Classification:			Stream Classification:					
Percent Stream Channel Slope			Percent Stream Channel Slope			Percent Stream Channel Slope			Percent Stream Channel Slope			Percent Stream Channel Slope					
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			Hydrology			Hydrology			Hydrology			Hydrology					
Biogeochemical Cycling			Biogeochemical Cycling			Biogeochemical Cycling			Biogeochemical Cycling			Biogeochemical Cycling					
Habitat			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 Site Score			Points Score Range Site Score			Points Score Range Site Score			Points Score Range Site Score			Points Score Range Site 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/Available Cover			1. Epifaunal Substrate/Available Cover			1. Epifaunal Substrate/Available Cover			1. Epifaunal Substrate/Available Cover			1. Epifaunal Substrate/Available Cover					
2. Embeddedness			2. Embeddedness			2. Embeddedness			2. Embeddedness			2. Embeddedness					
3. Velocity/ Depth Regime			3. Velocity/ Depth Regime			3. Velocity/ Depth Regime			3. Velocity/ Depth Regime			3. Velocity/ Depth Regime					
4. Sediment Deposition			4. Sediment Deposition			4. Sediment Deposition			4. Sediment Deposition			4. Sediment Deposition					
5. Channel Flow Status			5. Channel Flow Status			5. Channel Flow Status			5. Channel Flow Status			5. Channel Flow Status					
6. Channel Alteration			6. Channel Alteration			6. Channel Alteration			6. Channel Alteration			6. Channel Alteration					
7. Frequency of Riffles (or bends)			7. Frequency of Riffles (or bends)			7. Frequency of Riffles (or bends)			7. Frequency of Riffles (or bends)			7. Frequency of Riffles (or bends)					
8. Bank Stability (LB & RB)			8. Bank Stability (LB & RB)			8. Bank Stability (LB & RB)			8. Bank Stability (LB & RB)			8. Bank Stability (LB & RB)					
9. Vegetative Protection (LB & RB)			9. Vegetative Protection (LB & RB)			9. Vegetative Protection (LB & RB)			9. Vegetative Protection (LB & RB)			9. Vegetative Protection (LB & RB)					
10. Riparian Vegetative Zone Width (LB & RB)			10. Riparian Vegetative Zone Width (LB & RB)			10. Riparian Vegetative Zone Width (LB & RB)			10. Riparian Vegetative Zone Width (LB & RB)			10. Riparian Vegetative Zone Width (LB & RB)					
Total RBP Score			Total RBP Score			Total RBP Score			Total RBP Score			Total RBP Score					
Sub-Total			Sub-Total			Sub-Total			Sub-Total			Sub-Total					
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			Specific Conductivity			Specific Conductivity			Specific Conductivity			Specific Conductivity					
<=99 - 90 points			<=99 - 90 points			<=99 - 90 points			<=99 - 90 points			<=99 - 90 points					
pH			pH			pH			pH			pH					
4.6-5.5 = 10 points			4.6-5.5 = 10 points			4.6-5.5 = 10 points			4.6-5.5 = 10 points			4.6-5.5 = 10 points					
DO			DO			DO			DO			DO					
>5.0 = 30 points			>5.0 = 30 points			>5.0 = 30 points			>5.0 = 30 points			>5.0 = 30 points					
Sub-Total			Sub-Total			Sub-Total			Sub-Total			Sub-Total					
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)					
Good			Good			Good			Good			Good					
Sub-Total			Sub-Total			Sub-Total			Sub-Total			Sub-Total					
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 Unit Score			Index Linear Feet Unit Score			Index Linear Feet Unit Score			Index Linear Feet Unit Score			Index Linear Feet Unit Score					
0.734 77 56.5436667			0 0 0			0 0 0			0 0 0			0 0 0					

STREAM NAME S-IJ50		LOCATION Roanoke County	
STATION # <u>12650+70</u> RIVERMILE _____		STREAM CLASS Perennial	
LAT <u>37.194064</u> LONG <u>-80.167933</u>		RIVER BASIN Upper Roanoke	
STORET # _____		AGENCY VADEQ	
INVESTIGATORS ES SB			
FORM COMPLETED BY ES, SB		DATE <u>9/7/2021</u> TIME <u>12:45 PM</u>	REASON FOR SURVEY Baseline Assessment

Rapid Bioassessment Protocols For Use in Streams and Wadeable Rivers: Periphyton, Benthic Macroinvertebrates, and Fish, Second Edition - Form 1

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 checked="" type="checkbox"/> Shrubs <input type="checkbox"/> Grasses <input checked="" type="checkbox"/> Herbaceous Dominant species present <u>Rubus sp., Liriodendron tulipifera</u>	
INSTREAM FEATURES	<div style="display: flex; justify-content: space-between;"> <div style="width: 45%;"> Estimated Reach Length <u>24.4</u> m Estimated Stream Width <u>1.2</u> m Sampling Reach Area <u>29.3</u> m² Area in km² (m²x1000) _____ km² Estimated Stream Depth <u>0.10</u> m Surface Velocity (at thalweg) _____ 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>0.20</u> m Proportion of Reach Represented by Stream Morphology Types Riffle <u>40</u> % Run <u>30</u> % Pool <u>30</u> % </div> </div> <div style="display: flex; justify-content: space-between; margin-top: 10px;"> <div> 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>5</u> m ² Density of LWD _____ 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>N/A</u> Portion of the reach with aquatic vegetation <u>0</u> %	
WATER QUALITY (DS, US)	<div style="display: flex; justify-content: space-between;"> <div style="width: 45%;"> Temperature <u>15.2, 14.7</u> °C Specific Conductance <u>14.4, 14.6</u> us/cm Dissolved Oxygen <u>9.18, 9.37</u> mg/L pH <u>5.19, 5.65</u> Turbidity <u>N/A</u> WQ Instrument Used <u>VA1</u> </div> <div style="width: 45%;"> Water Odors <input checked="" type="checkbox"/> Normal/None <input type="checkbox"/> Sewage <input type="checkbox"/> Petroleum <input type="checkbox"/> Chemical <input type="checkbox"/> Fishy <input type="checkbox"/> Other <u>N/A</u> Water Surface Oils <input type="checkbox"/> Slick <input type="checkbox"/> Sheen <input type="checkbox"/> Globs <input type="checkbox"/> Flecks <input checked="" type="checkbox"/> None <input type="checkbox"/> Other <u>N/A</u> Turbidity (if not measured) <input checked="" type="checkbox"/> Clear <input type="checkbox"/> Slightly turbid <input type="checkbox"/> Turbid <input type="checkbox"/> Opaque <input type="checkbox"/> Stained <input type="checkbox"/> Other <u>N/A</u> </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 <u>N/A</u> </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 <u>N/A</u> </div> </div> <div style="margin-top: 10px;"> Oils <input checked="" type="checkbox"/> Absent <input type="checkbox"/> Slight <input type="checkbox"/> Moderate <input type="checkbox"/> Profuse </div> <div style="margin-top: 10px;"> Looking at stones which are not deeply embedded, are the undersides black in color? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No </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)	15
Boulder	> 256 mm (10")	20			
Cobble	64-256 mm (2.5"-10")	30	Muck-Mud	black, very fine organic (FPOM)	0
Gravel	2-64 mm (0.1"-2.5")	50			
Sand	0.06-2mm (gritty)	0	Marl	grey, shell fragments	0
Silt	0.004-0.06 mm	0			
Clay	< 0.004 mm (slick)	0			

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

STREAM NAME S-IJ50		LOCATION Roanoke County	
STATION # 12650+70 RIVERMILE		STREAM CLASS Perennial	
LAT 37.194064 LONG -80.167933		RIVER BASIN Upper Roanoke	
STORET #		AGENCY VADEQ	
INVESTIGATORS ES SB			
FORM COMPLETED BY ES, SB		DATE 9/7/2021 TIME 12:45 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 17	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 18	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 18	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 19	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 15	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0

Notes:

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

Habitat Parameter	Condition Category																				
	Optimal					Suboptimal					Marginal					Poor					
6. Channel Alteration SCORE <u>19</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>18</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>9</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>8</u> SCORE <u>8</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			

Parameters to be evaluated broader than sampling reach

Total Score 173 Notes:

BENTHIC MACROINVERTEBRATE FIELD DATA SHEET

STREAM NAME S-IJ50		LOCATION Roanoke County	
STATION # <u>12650+70</u> RIVERMILE _____		STREAM CLASS Perennial	
LAT <u>37.194064</u> LONG <u>-80.167933</u>		RIVER BASIN Upper Roanoke	
STORET # _____		AGENCY VADEQ	
INVESTIGATORS ES SB		LOT NUMBER _____	
FORM COMPLETED BY ES, SB		DATE <u>9/7/2021</u> TIME <u>12:45 PM</u>	REASON FOR SURVEY Baseline Assessment

HABITAT TYPES	Indicate the percentage of each habitat type present <input checked="" type="checkbox"/> Cobble <u>90</u> % <input checked="" type="checkbox"/> Snags <u>5</u> % <input checked="" type="checkbox"/> Vegetated Banks <u>5</u> % <input type="checkbox"/> Sand _____ % <input type="checkbox"/> Submerged Macrophytes _____ % <input type="checkbox"/> Other (_____) _____ %
SAMPLE COLLECTION	Gear used <input type="checkbox"/> D-frame <input checked="" type="checkbox"/> kick-net <input type="checkbox"/> Other _____ How were the samples collected? <input checked="" 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 checked="" type="checkbox"/> Cobble <u>4</u> <input type="checkbox"/> Snags _____ <input type="checkbox"/> Vegetated Banks _____ <input type="checkbox"/> Sand _____ <input type="checkbox"/> Submerged Macrophytes _____ <input type="checkbox"/> Other (_____) _____
GENERAL COMMENTS	4 kicks in riffle habitat.

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						

Mountain Valley Pipeline
Data are not adjusted for subsampling



Sample ID Collection Date		S-IJ50 09-07-2021
ORDER	GENUS/SPECIES	COUNT
Ephemeroptera	Baetis sp.	7
Ephemeroptera	Habrophlebiodes sp.	3
Ephemeroptera	Heptageniidae	12
Ephemeroptera	Maccaffertium sp.	8
Plecoptera	Acronuria sp.	10
Plecoptera	Capniidae	1
Plecoptera	Eccoptura xanthenes	1
Plecoptera	Leuctra sp.	9
Plecoptera	Nemouridae	1
Plecoptera	Sweltsa sp.	3
Plecoptera	Tallaperla sp.	2
Trichoptera	Diplectrona sp.	23
Trichoptera	Dolophilodes sp.	8
Trichoptera	Hydropsyche sp.	4
Trichoptera	Rhyacophila sp.	2
Coleoptera	Ectopria sp.	2
Coleoptera	Psephenus sp.	2
Diptera-Chironomidae	Corynoneura sp.	1
Diptera-Chironomidae	Eukiefferiella sp.	6
Diptera-Chironomidae	Micropsectra sp.	79
Diptera-Chironomidae	Microtendipes sp.	1
Diptera-Chironomidae	Parametrioctonus sp.	4
Diptera-Chironomidae	Rheocricotopus sp.	3
Diptera-Chironomidae	Rheotanytarsus sp.	1
Diptera-Chironomidae	Tanytarsus sp.	8
Diptera-Chironomidae	Thienemannimyia gr. sp.	2
Diptera-Chironomidae	Tvetenia sp.	6
Diptera	Hemerodromia sp.	1
Diptera	Hexatoma sp.	1
Annelida	Enchytraeidae	1
Acari	Sperchonopsis sp.	2
Other Organisms	Nematoda	1
Other Organisms	Turbellaria	1
TOTAL		216

Mountain Valley Pipeline
WV SCI Metrics



Sample ID Collection Date		S-IJ50 09-07-2021
WVSCI Metric Values		
Total taxa		20
EPT taxa		12
% EPT		43.5
% Chironomidae		51.4
% 2 Dominant		63.9
HBI		4.88
WVSCI Metric Scores		
Total taxa		95.2
EPT taxa		92.3
% EPT		47.4
% Chironomidae		49.1
% 2 Dominant		56.4
HBI		72.2
WVSCI Metric Scores		
Total taxa		95.2
EPT taxa		92.3
% EPT		47.4
% Chironomidae		49.1
% 2 Dominant		56.4
HBI		72.2
WVSCI Total Score		68.8

WVSCI Thresholds
Unimpaired = > 68.00
Gray Zone = 60.61 to 68.00
Impaired = <60.61

WOLMAN PEBBLE COUNT FORM

County: Roanoke County
Stream Name: UNT to Roanoke River
HUC Code: 03010101
Survey Date: 9/7/2021
Surveyors: ES, SB
Type: Representative

Stream ID: S-IJ50

Basin: Upper Roanoke

PEBBLE COUNT							
Inches	PARTICLE	Millimeters		Particle Count	Total #	Item %	% Cum
	Silt/Clay	< .062	S/C	<div><div></div><div></div></div>	0	0.00	0.00
	Very Fine	.062-.125	S A N D	<div><div></div><div></div></div>	0	0.00	0.00
	Fine	.125-.25		<div><div></div><div></div></div>	0	0.00	0.00
	Medium	.25-.5		<div><div></div><div></div></div>	0	0.00	0.00
	Coarse	.50-1.0		<div><div></div><div></div></div>	0	0.00	0.00
.04-.08	Very Coarse	1.0-2		<div><div></div><div></div></div>	1	1.00	1.00
.08 -.16	Very Fine	2 -4		G R A V E L	<div><div></div><div></div></div>	5	5.00
.16 - .22	Fine	4 -5.7	<div><div></div><div></div></div>		4	4.00	10.00
.22 - .31	Fine	5.7 - 8	<div><div></div><div></div></div>		2	2.00	12.00
.31 - .44	Medium	8 -11.3	<div><div></div><div></div></div>		9	9.00	21.00
.44 - .63	Medium	11.3 - 16	<div><div></div><div></div></div>		13	13.00	34.00
.63 - .89	Coarse	16 -22.6	<div><div></div><div></div></div>		5	5.00	39.00
.89 - 1.26	Coarse	22.6 - 32	<div><div></div><div></div></div>		2	2.00	41.00
1.26 - 1.77	Vry Coarse	32 - 45	<div><div></div><div></div></div>		5	5.00	46.00
1.77 -2.5	Vry Coarse	45 - 64	<div><div></div><div></div></div>		6	6.00	52.00
2.5 - 3.5	Small	64 - 90	C O B B L E	<div><div></div><div></div></div>	8	8.00	60.00
3.5 - 5.0	Small	90 - 128		<div><div></div><div></div></div>	12	12.00	72.00
5.0 - 7.1	Large	128 - 180		<div><div></div><div></div></div>	2	2.00	74.00
7.1 - 10.1	Large	180 - 256		<div><div></div><div></div></div>	5	5.00	79.00
10.1 - 14.3	Small	256 - 362	B O U L D E R	<div><div></div><div></div></div>	7	7.00	86.00
14.3 - 20	Small	362 - 512		<div><div></div><div></div></div>	8	8.00	94.00
20 - 40	Medium	512 - 1024		<div><div></div><div></div></div>	3	3.00	97.00
40 - 80	Large	1024 -2048		<div><div></div><div></div></div>	1	1.00	98.00
80 - 160	Vry Large	2048 -4096		<div><div></div><div></div></div>	2	2.00	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 Roanoke River
 Reach Name: S-IJ50
 Sample Name: Representative
 Survey Date: 09/07/2021

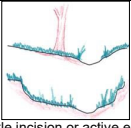
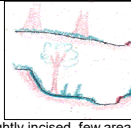
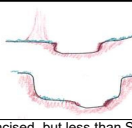
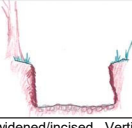
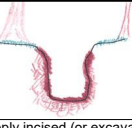
Size (mm)	TOT #	ITEM %	CUM %
0 - 0.062	0	0.00	0.00
0.062 - 0.125	0	0.00	0.00
0.125 - 0.25	0	0.00	0.00
0.25 - 0.50	0	0.00	0.00
0.50 - 1.0	0	0.00	0.00
1.0 - 2.0	1	1.00	1.00
2.0 - 4.0	5	5.00	6.00
4.0 - 5.7	4	4.00	10.00
5.7 - 8.0	2	2.00	12.00
8.0 - 11.3	9	9.00	21.00
11.3 - 16.0	13	13.00	34.00
16.0 - 22.6	5	5.00	39.00
22.6 - 32.0	2	2.00	41.00
32 - 45	5	5.00	46.00
45 - 64	6	6.00	52.00
64 - 90	8	8.00	60.00
90 - 128	12	12.00	72.00
128 - 180	2	2.00	74.00
180 - 256	5	5.00	79.00
256 - 362	7	7.00	86.00
362 - 512	8	8.00	94.00
512 - 1024	3	3.00	97.00
1024 - 2048	1	1.00	98.00
Bedrock	2	2.00	100.00
D16 (mm)	9.47		
D35 (mm)	17.32		
D50 (mm)	57.67		
D84 (mm)	331.71		
D95 (mm)	682.67		
D100 (mm)	Bedrock		
Silt/Clay (%)	0		
Sand (%)	1		
Gravel (%)	51		
Cobble (%)	27		
Boulder (%)	19		
Bedrock (%)	2		

Total Particles = 100.

Stream Assessment Form (Form 1)

Unified Stream Methodology for use in Virginia

For use in wadeable channels classified as intermittent or perennial

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR #	Impact Length	Impact Factor		
22865.06	Mountain Valley Pipeline (Mountain Valley Pipeline, LLC)	Roanoke County	R3	03010101	9/7/21	S-IJ50	77	1		
Name(s) of Evaluator(s)		Stream Name and Information					SAR Length			
ES, SB		Unnamed Tributary to Roanoke River					80			
1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)										
Conditional Category										
Channel Condition	Optimal	Suboptimal	Marginal	Poor	Severe					
	 Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. Mid channel bars and transverse bars few. Transient sediment deposition covers less than 10% of bottom.	 Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull benches, or newly developed portions of the reach. Transient sediment covers 10-40% of the stream bottom.	 Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may be vertical or undercut. AND/OR 40-60% Sediment may be temporary / transient, contribute instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which contribute to stability.	 Overwidened/incised. Vertically / laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. the stream is covered by sediment. Sediment is temporary / transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.	 Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. More than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.					
Scores	3	2.4	2	1.6	1	CI				
NOTES>>										
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										
Riparian Buffers	Optimal	Suboptimal	Marginal	Poor	NOTES>>					
	Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover. Wetlands located within the riparian 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% to 60% 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.			
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.					Ensure the sums					
2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below.					of % Riparian					
3. Enter the % Riparian Area and Score for each riparian category in the blocks below.					Blocks equal 100					
Right Bank	% Riparian Area>	100%					100%			
	Score >	0.85								
								CI= (Sum % RA * Scores*0.01)/2		
Left Bank	% Riparian Area>	100%					100%			
	Score >	0.85								
								Rt Bank CI >	0.85	CI
								Lt Bank CI >	0.85	0.85
3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embeddedness; shade; undercut banks; root mats; SAV; riffle/pool complexes, stable features.										
Conditional Category										
Instream Habitat/ Available Cover	Optimal	Suboptimal	Marginal	Poor	NOTES>>					
	Habitat elements are typically present in greater than 50% of the reach.	Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.	Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.	Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.						
Scores	1.5	1.2	0.9	0.5	Stream Gradient					
					High				CI	1.50

Stream Impact Assessment Form Page 2

Project #	Project Name (Applicant)	Locality	Cowardin Class.	HUC	Date	SAR #	Impact Length	Impact Factor
22865.06	Mountain Valley Pipeline (Mountain Valley Pipeline, LLC)	Roanoke County	R3	03010101	9/7/21	S-IJ50	77	1

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

Channel Alteration	Conditional Category						NOTES>>
	Negligible	Minor		Moderate		Severe	
	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	Greater than 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines AND/OR 80% of banks shored with gabion, riprap, or cement.	
Scores	1.5	1.3	1.1	0.9	0.7	0.5	CI
							1.50

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) >>

1.37

RCI= (Sum of all CI's)/5, except if stream is ephemeral RCI = (Riparian CI/2)

COMPENSATION REQUIREMENT (CR) >>

105

CR = RCI X L_r X IF

INSERT PHOTOS:

(WSSI Photo Location L:\22000s\22800\22865.06\Admin\05-ENVR\Field Data\Spread H\Field Forms\S-IJ50\Photos\LB DS VIEW.jpg)



Downstream view facing N within the ROW. Assessment is limited to areas within the temporary ROW.

DESCRIBE PROPOSED IMPACT:

PROVIDED UNDER SEPARATE COVER



— — — — — STUDY AREA (EASEMENT)

— . — . — EXISTING SURVEY—LOCATED THALWEG

— —1900— — EXISTING MAJOR CONTOUR

— —1904— — 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 SEPTEMBER 7, 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 (PIPE CL) WAS GENERATED FROM A SURFACE (NOT SURVEYED). ALL OTHER CROSS SECTIONS WERE SURVEYED.

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 Address: WWW.TETRA-TECH.COM



NTAIN VALLEY PIPELINE, LLC
O ENERGY DRIVE, 2ND FLOOR
CANONSBURG, PA 15317

Client

PROFILE AND CROSS-SECTIONS
BASELINE SURVEY
SSING S-IJ50 - UNNAMED TRIBUTARY
TO ROANOKE RIVER (MP 239.53)
ROANOKE COUNTY, VA

Drawing No.



PHOTO TAKEN SEPTEMBER 7, 2021 LOOKING
DOWNSTREAM FROM UPSTREAM IMPACT LIMITS

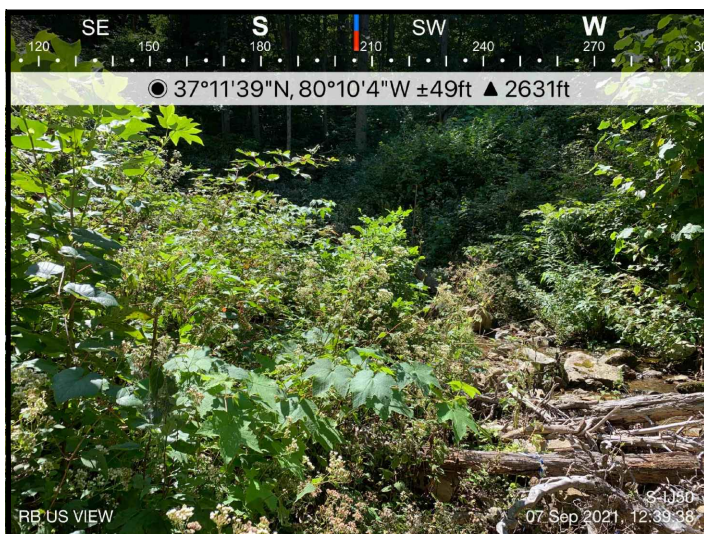


PHOTO TAKEN SEPTEMBER 7, 2021 LOOKING
UPSTREAM FROM DOWNSTREAM IMPACT LIMITS

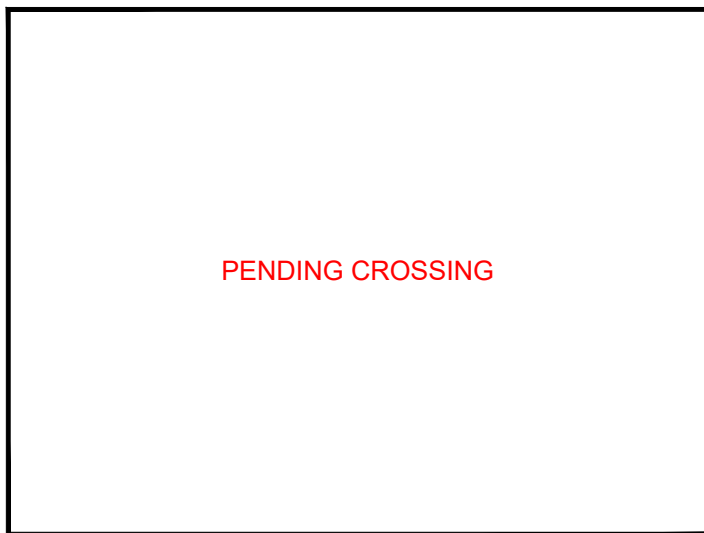


PHOTO TAKEN LOOKING DOWNSTREAM
FROM UPSTREAM IMPACT LIMITS

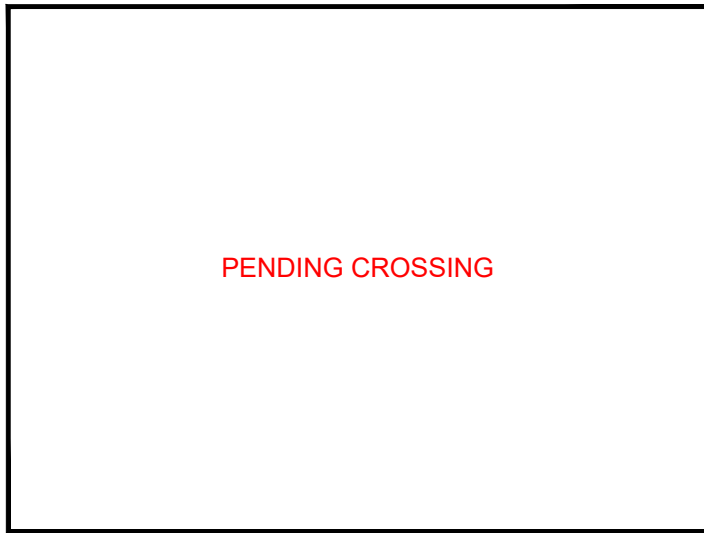


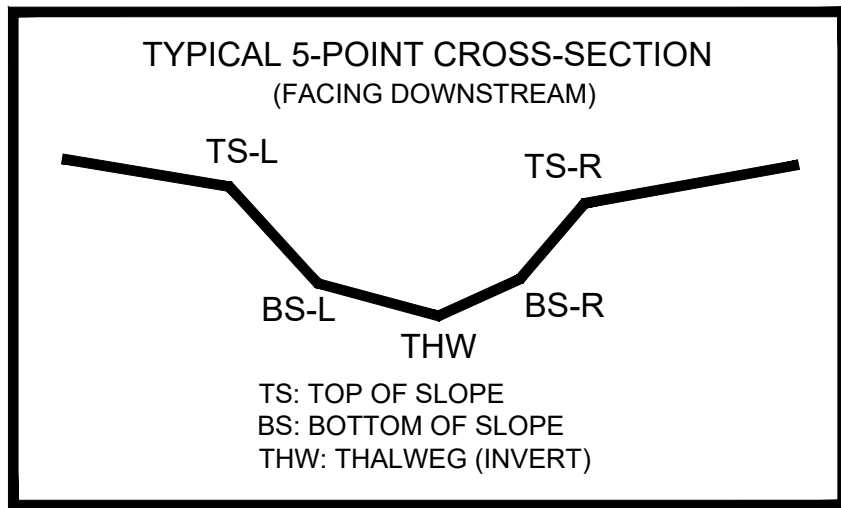
PHOTO TAKEN LOOKING UPSTREAM FROM
DOWNSTREAM IMPACT LIMITS



EXISTING STREAM PROFILE
INVERT ALONG THALWEG

PROFILE

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



CL STAKEOUT POINTS: S-1150 CROSS SECTION A (PIPE CL)					
PRE-CROSSING				POST-CROSSING	
PT. LOC.	NORTHING	EASTING	ELEV	VERT. DIFF.	HORZ. DIFF.
TS-L	13506294.57'	1882645.51'	2642.695'		
BS-L	13506291.82'	1882671.66'	2626.438'		
THW	13506291.12'	1882679.68'	2625.255'		
BS-R	13506290.45'	1882685.99'	2626.495'		
TS-R	13506288.92'	1882701.43'	2641.552'		

File X:\G000\Wildburg\EGT\7157 - MP\Breeding Permits\West Virginia WSSR Greenhops\Greenhops\Virginia Sires\Completed\2021-08-19 - 9-180 STREAM TOPO MP 239.53\9-180 - MP 239.53 - 22x34.4mg
 Pairs/Season 2021 1:15mm
 Pairs/Season 2021 1:15mm