

## Baseline Assessment – Stream Attributes

### Reach S-J20 (Timber Mat Crossing) Perennial Spread E Greenbrier County, West 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	✓ * Full pick <100
Wolman Pebble Count	✓
Reference Reach Software Pebble Count Data	✓
Longitudinal Profile and Cross Sections	✓

## Spread E Stream S-J20 (Timber Mat Crossing) Greenbrier County

38.023801° N, -80.747266° W



Photo Type: US Reach, US View

Location, Orientation, Photographer Initials: Upstream Reach, Upstream View, AAK/SM

38.023801° N, -80.747266° W



Photo Type: US Reach, DS View

Location, Orientation, Photographer Initials: Upstream Reach, Downstream View, AAK/SM



## Spread E Stream S-J20 (Timber Mat Crossing) Greenbrier County

38.023801° N, -80.747266° W



Photo Type: DS Reach, US View

Location, Orientation, Photographer Initials: Downstream Reach, Upstream View, AAK/SM

38.023801° N, -80.747266° W



Photo Type: DS Reach, DS View

Location, Orientation, Photographer Initials: Downstream Reach, Downstream View, AAK/SM

"Q:\Charleston\2021 Projects\21-0244- MVP- STREAM AND WETLAND CONDITIONS ASSESSMENT AND SURVEY PLAN\002 - Pre-Crossing Monitoring\Spread E\S-J20"

USCE FILE NO./ Project Name: (v2.1, Sept 2015)				Mountain Valley Pipeline				IMPACT COORDINATES: (in Decimal Degrees)				Lat.	38.023801				Lon.	-80.747266				WEATHER:				Clear/Sunny 70 °F				DATE:				9/7/2021																									
IMPACT STREAM/SITE ID AND SITE DESCRIPTION: (watershed size (acreage), unaltered or impairments)												S-J20 UNT to Meadow Creek												MITIGATION STREAM CLASS./SITE ID AND SITE DESCRIPTION: (watershed size (acreage), unaltered or impairments)																								Comments:											
STREAM IMPACT LENGTH:				22				FORM OF MITIGATION:				RESTORATION (Levels I-III)				MIT COORDINATES: (in Decimal Degrees)				Lat.					Lon.								PRECIPITATION PAST 48 HRS:								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:				Perennial								Stream Classification:												Stream Classification:				0								Stream Classification:				0								Stream Classification:				0							
Percent Stream Channel Slope				0.9								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												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 Scale				Range				Site Score								Points Scale				Range				Site Score								Points Scale				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				0-20				0-1				3				1. Epifaunal Substrate/Available Cover				0-20				0-1				0				1. Epifaunal Substrate/Available Cover				0-20				0-1				0															
2. Embeddedness				0-20								12				2. Embeddedness				0-20								0				2. Embeddedness				0-20								0															
3. Velocity/ Depth Regime				0-20								2				3. Velocity/ Depth Regime				0-20								0				3. Velocity/ Depth Regime				0-20								0															
4. Sediment Deposition				0-20								5				4. Sediment Deposition				0-20								0				4. Sediment Deposition				0-20								0															
5. Channel Flow Status				0-20								16				5. Channel Flow Status				0-20								0				5. Channel Flow Status				0-20								0															
6. Channel Alteration				0-20								14				6. Channel Alteration				0-20								0				6. Channel Alteration				0-20								0															
7. Frequency of Riffles (or bends)				0-20								2				7. Frequency of Riffles (or bends)				0-20								0				7. Frequency of Riffles (or bends)				0-20								0															
8. Bank Stability (LB & RB)				0-20								6				8. Bank Stability (LB & RB)				0-20								0				8. Bank Stability (LB & RB)				0-20								0															
9. Vegetative Protection (LB & RB)				0-20								4				9. Vegetative Protection (LB & RB)				0-20								0				9. Vegetative Protection (LB & RB)				0-20								0															
10. Riparian Vegetative Zone Width (LB & RB)				0-20								0				10. Riparian Vegetative Zone Width (LB & RB)				0-20								0				10. Riparian Vegetative Zone Width (LB & RB)				0-20								0															
Total RBP Score				Marginal				64				Total RBP Score				Poor				0				Total RBP Score				Poor				0				Total RBP Score				Poor				0															
Sub-Total								0.32				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								0-1				257				Specific Conductivity								0-1				257				Specific Conductivity								0-1				257															
pH				200-299 - 80 points								0-90				pH				200-299 - 80 points								0-90				pH				200-299 - 80 points								0-90															
6.0-8.0 = 80 points				0-80								7.16				6.0-8.0 = 80 points				0-80								7.16				6.0-8.0 = 80 points				0-80								7.16															
DO				>5.0 = 30 points								10-30				9.9				DO								>5.0 = 30 points				10-30				9.9								DO				>5.0 = 30 points				10-30				9.9			
Sub-Total												0.95				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																																			

# PHYSICAL CHARACTERIZATION/WATER QUALITY FIELD DATA SHEET (FRONT)

STREAM NAMES-J20	LOCATION UNT to Meadow Creek	
STATION # _____ RIVERMILE _____	STREAM CLASS Perennial <input checked="" type="checkbox"/>	
LAT _____ LONG _____	COUNTY Greenbrier <input checked="" type="checkbox"/>	
STORET # _____	AGENCY Potesta/Edge	
INVESTIGATORS AK/SM		
FORM COMPLETED BY <b>AK</b>	DATE 9-7-2021 TIME 1200	REASON FOR SURVEY Preliminary Assessment

<b>WEATHER CONDITIONS</b>	<div style="display: flex; justify-content: space-between;"> <div> <p><b>Now</b></p> <div style="display: flex; align-items: center;"> <div style="margin-right: 5px;"> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input checked="" type="checkbox"/> </div> <div> <p>storm (heavy rain)</p> <p>rain (steady rain)</p> <p>showers (intermittent)</p> <p>%cloud cover</p> <p>clear/sunny</p> </div> </div> </div> <div> <p><b>Past 24 hours</b></p> <div style="display: flex; align-items: center;"> <div style="margin-right: 5px;"> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input checked="" type="checkbox"/> </div> <div> <p>storm (heavy rain)</p> <p>rain (steady rain)</p> <p>showers (intermittent)</p> <p>%cloud cover</p> <p>clear/sunny</p> </div> </div> </div> <div> <p><b>Has there been a heavy rain in the last 7 days?</b></p> <p><input checked="" type="checkbox"/> Yes <input type="checkbox"/> No</p> <p>Air Temperature 70 F ° C</p> <p>Other _____</p> </div> </div>	
<b>SITE LOCATION/MAP</b>	<p><b>Draw a map of the site and indicate the areas sampled (or attach a photograph)</b></p>	
<b>STREAM CHARACTERIZATION</b>	<div style="display: flex; justify-content: space-between;"> <div> <p><b>Stream Subsystem</b></p> <p><input checked="" type="checkbox"/> Perennial <input type="checkbox"/> Intermittent <input type="checkbox"/> Tidal</p> <p><b>Stream Origin</b></p> <p><input type="checkbox"/> Glacial <input type="checkbox"/> Spring-fed</p> <p><input type="checkbox"/> Non-glacial montane <input checked="" type="checkbox"/> Mixture of origins</p> <p><input type="checkbox"/> Swamp and bog <input type="checkbox"/> Other _____</p> </div> <div> <p><b>Stream Type</b></p> <p><input type="checkbox"/> Coldwater <input checked="" type="checkbox"/> Warmwater</p> <p><b>Catchment Area</b> _____ km<sup>2</sup></p> </div> </div>	

# PHYSICAL CHARACTERIZATION/WATER QUALITY FIELD DATA SHEET (BACK)

<b>WATERSHED FEATURES</b>	<b>Predominant Surrounding Landuse</b> <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	<b>Local Watershed NPS Pollution</b> <input checked="" type="checkbox"/> No evidence <input type="checkbox"/> Some potential sources <input type="checkbox"/> Obvious sources <b>Local Watershed Erosion</b> <input checked="" type="checkbox"/> None <input type="checkbox"/> Moderate <input type="checkbox"/> Heavy
<b>RIPARIAN VEGETATION (18 meter buffer)</b>	<b>Indicate the dominant type and record the dominant species present</b> <input type="checkbox"/> Trees <input type="checkbox"/> Shrubs <input type="checkbox"/> Grasses <input type="checkbox"/> Herbaceous <b>Dominant species present</b> _____	
<b>INSTREAM FEATURES</b>	<div style="display: flex; justify-content: space-between;"> <div style="width: 45%;"> <b>Estimated Reach Length</b> 25 ft m  <b>Estimated Stream Width</b> 20 ft m  <b>Sampling Reach Area</b> 500 ft<sup>2</sup> m<sup>2</sup>  <b>Area in km<sup>2</sup> (m<sup>2</sup>x1000)</b> _____ km<sup>2</sup>  <b>Estimated Stream Depth</b> 0.7 ft m  <b>Surface Velocity (at thalweg)</b> 0.70 ft/s m/sec  <b>Stream Dry</b> <input type="checkbox"/> </div> <div style="width: 45%;"> <b>Canopy Cover</b>  <input checked="" type="checkbox"/> Partly open    <input type="checkbox"/> Partly shaded    <input type="checkbox"/> Shaded  <b>High Water Mark</b> 3.0 ft m  <b>Proportion of Reach Represented by Stream Morphology Types</b>            Riffle<sup>o</sup> _____ %    Run<sup>100</sup> _____ %            Pool<sup>o</sup> _____ %  <b>Channelized</b> <input type="checkbox"/> Yes    <input checked="" type="checkbox"/> No  <b>Dam Present</b> <input type="checkbox"/> Yes    <input checked="" type="checkbox"/> No         </div> </div>	
<b>LARGE WOODY DEBRIS</b>	<b>LWD</b> 2 m <sup>2</sup> <b>Density of LWD</b> _____ m <sup>2</sup> /km <sup>2</sup> (LWD/ reach area)	
<b>AQUATIC VEGETATION</b>	<b>Indicate the dominant type and record the dominant species present</b> <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 checked="" type="checkbox"/> Attached Algae <b>Dominant species present</b> _____ <b>Portion of the reach with aquatic vegetation</b> 20 %	
<b>WATER QUALITY</b>	<div style="display: flex; justify-content: space-between;"> <div style="width: 45%;"> <b>Temperature</b> 15.2 °C  <b>Specific Conductance</b> 0.257 us/cm  <b>Dissolved Oxygen</b> 9.90 mg/L  <b>pH</b> 7.16 su  <b>Turbidity</b> 5.10 ntu  <b>WQ Instrument Used</b> YSI         </div> <div style="width: 45%;"> <b>Water Odors</b>  <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 _____  <b>Water Surface Oils</b>  <input type="checkbox"/> Slick    <input type="checkbox"/> Sheen    <input type="checkbox"/> Globs    Flecks  <input checked="" type="checkbox"/> None    <input type="checkbox"/> Other _____  <b>Turbidity (if not measured)</b>  <input type="checkbox"/> Clear    <input checked="" type="checkbox"/> Slightly turbid    <input type="checkbox"/> Turbid  <input type="checkbox"/> Opaque    <input type="checkbox"/> Stained    <input type="checkbox"/> Other _____         </div> </div>	
<b>SEDIMENT/ SUBSTRATE</b>	<div style="display: flex; justify-content: space-between;"> <div style="width: 45%;"> <b>Odors</b>  <input type="checkbox"/> Normal    <input type="checkbox"/> Sewage    <input type="checkbox"/> Petroleum  <input type="checkbox"/> Chemical    <input type="checkbox"/> Anaerobic    <input checked="" type="checkbox"/> None  <input type="checkbox"/> Other _____  <b>Oils</b>  <input checked="" type="checkbox"/> Absent    <input type="checkbox"/> Slight    <input type="checkbox"/> Moderate    <input type="checkbox"/> Profuse         </div> <div style="width: 45%;"> <b>Deposits</b>  <input type="checkbox"/> Sludge    <input type="checkbox"/> Sawdust    <input type="checkbox"/> Paper fiber    <input checked="" type="checkbox"/> Sand  <input type="checkbox"/> Relict shells    <input type="checkbox"/> Other _____  <b>Looking at stones which are not deeply embedded, are the undersides black in color?</b>  <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)	10
Boulder	> 256 mm (10")	10			
Cobble	64-256 mm (2.5"-10")	10	Muck-Mud	black, very fine organic (FPOM)	0
Gravel	2-64 mm (0.1"-2.5")	5			
Sand	0.06-2mm (gritty)	75	Marl	grey, shell fragments	0
Silt	0.004-0.06 mm	5			
Clay	< 0.004 mm (slick)	0			



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

STREAM NAMES-J20		LOCATION	
STATION # _____ RIVERMILE _____		STREAM CLASS Perennial <input type="checkbox"/>	
LAT _____ LONG _____		COUNTY Greenbrier <input type="checkbox"/>	
STORET # _____		AGENCY Potesta/Edge	
INVESTIGATORS			
FORM COMPLETED BY AK		DATE 9-7-2021 TIME 1200 AM PM	REASON FOR SURVEY Preliminary Assessment

Habitat Parameter	Condition Category			
	Optimal	Suboptimal	Marginal	Poor
<b>1. Epifaunal Substrate/ Available Cover</b>  <input type="checkbox"/> N/A  <b>SCORE 3</b> <input type="checkbox"/>	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).  20 19 18 17 16	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).  15 14 13 12 11	20-40% mix of stable habitat; habitat availability less than desirable; substrate frequently disturbed or removed.  10 9 8 7 6	Less than 20% stable habitat; lack of habitat is obvious; substrate unstable or lacking.  5 4 3 2 1 0
<b>2. Embeddedness</b>  <b>SCORE 12</b> <input type="checkbox"/>	Gravel, cobble, and boulder particles are 0-25% surrounded by fine sediment. Layering of cobble provides diversity of niche space.  20 19 18 17 16	Gravel, cobble, and boulder particles are 25-50% surrounded by fine sediment.  15 14 13 12 11	Gravel, cobble, and boulder particles are 50-75% surrounded by fine sediment.  10 9 8 7 6	Gravel, cobble, and boulder particles are more than 75% surrounded by fine sediment.  5 4 3 2 1 0
<b>3. Velocity/Depth Regime</b>  <input type="checkbox"/> N/A  <b>SCORE 2</b> <input type="checkbox"/>	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.)  20 19 18 17 16	Only 3 of the 4 regimes present (if fast-shallow is missing, score lower than if missing other regimes).  15 14 13 12 11	Only 2 of the 4 habitat regimes present (if fast-shallow or slow-shallow are missing, score low).  10 9 8 7 6	Dominated by 1 velocity/depth regime (usually slow-deep).  5 4 3 2 1 0
<b>4. Sediment Deposition</b>  <b>SCORE 5</b> <input type="checkbox"/>	Little or no enlargement of islands or point bars and less than 5% of the bottom affected by sediment deposition.  20 19 18 17 16	Some new increase in bar formation, mostly from gravel, sand or fine sediment; 5-30% of the bottom affected; slight deposition in pools.  15 14 13 12 11	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.  10 9 8 7 6	Heavy deposits of fine material, increased bar development; more than 50% of the bottom changing frequently; pools almost absent due to substantial sediment deposition.  5 4 3 2 1 0
<b>5. Channel Flow Status</b> <input type="checkbox"/> N/A  <b>SCORE 16</b> <input type="checkbox"/>	Water reaches base of both lower banks, and minimal amount of channel substrate is exposed.  20 19 18 17 16	Water fills >75% of the available channel; or <25% of channel substrate is exposed.  15 14 13 12 11	Water fills 25-75% of the available channel, and/or riffle substrates are mostly exposed.  10 9 8 7 6	Very little water in channel and mostly present as standing pools.  5 4 3 2 1 0

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

Habitat Parameter	Condition Category			
	Optimal	Suboptimal	Marginal	Poor
<b>6. Channel Alteration</b>  SCORE <u>14</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
<b>7. Frequency of Riffles (or bends)</b>  <input type="checkbox"/> N/A  SCORE <u>2</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
<b>8. Bank Stability (score each bank)</b>  Note: determine left or right side by facing downstream. SCORE <u>3</u> SCORE <u>3</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
<b>9. Vegetative Protection (score each bank)</b>  SCORE <u>2</u> SCORE <u>2</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
<b>10. Riparian Vegetative Zone Width (score each bank riparian zone)</b>  SCORE <u>0</u> SCORE <u>0</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 64



## BENTHIC MACROINVERTEBRATE FIELD DATA SHEET

STREAM NAMES-J20		LOCATION	
STATION # _____ RIVERMILE _____		STREAM CLASS Perennial <span style="float: right;">▼</span>	
LAT _____ LONG _____		COUNTY Greenbrier <span style="float: right;">▼</span>	
STORET # _____		AGENCY Potesta/Edge	
INVESTIGATORS		LOT NUMBER	
FORM COMPLETED BY <b>AK</b>		DATE <u>9-7-2021</u> TIME <u>1200</u>	REASON FOR SURVEY Preliminary Assessment

<b>HABITAT TYPES</b>	<b>Indicate the percentage of each habitat type present</b> <input checked="" type="checkbox"/> Cobble <u>10</u> % <input type="checkbox"/> Snags _____ % <input type="checkbox"/> Vegetated Banks _____ % <input checked="" type="checkbox"/> Sand <u>75</u> % <input type="checkbox"/> Submerged Macrophytes _____ % <input type="checkbox"/> Other ( <u>boulder</u> ) <u>10</u> %
<b>SAMPLE COLLECTION</b>	<b>Gear used</b> <input type="checkbox"/> D-frame <input checked="" type="checkbox"/> kick-net <input type="checkbox"/> Other _____  <b>How were the samples collected?</b> <input checked="" type="checkbox"/> wading <input type="checkbox"/> from bank <input type="checkbox"/> from boat  <b>Indicate the number of jabs/kicks taken in each habitat type.</b> <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 ( _____ ) _____
<b>GENERAL COMMENTS</b>	Benthic collected

### 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						

SITE ID:	S-J20
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9/7/2021

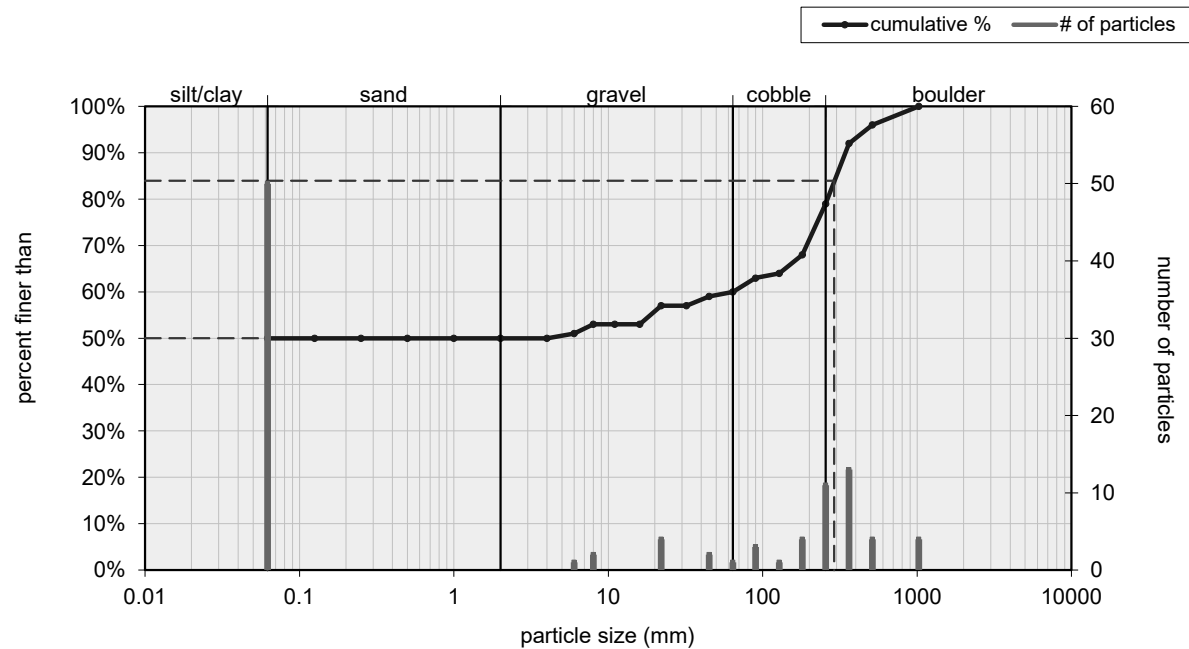
Insects	Count	Tolerance	TV	Insects	Count	Tolerance	TV	Non-Insects	Count	Tolerance	TV			
Ephemeroptera				51	Odonata			2	Crustacea			0		
Ameletidae		2	0	Aeshnidae		3	0	Asellidae		7	0			
Baetidae		4	0	Calopterygidae		6	0	Cambaridae		5	0			
Beatiscidae	10	4	40	Coenagrionidae		7	0	Gammaridae		5	0			
Caenidae	10	5	50	Cordulegastridae		3	0	Palaemonidae		5	0			
Ephemerellidae		3	0	Gomphidae	2	5	10	Annelida			0			
Ephemeridae		5	0	Lestidae		7	0	Hirudinea		10	0			
Heptageniidae	30	3	90	Libellulidae		7	0	Nematoda		10	0			
Isonychiidae	1	3	3	Coleoptera			29	Nematomorpha		10	0			
Leptophlebiidae		4	0	Chrysomelidae		7	0	Oligochaeta		10	0			
Potamanthidae		5	0	Dryopidae		5	0	Turbellaria			0			
Siphonuridae		3	0	Dytiscidae		6	0	Turbellaria		7	0			
Tricorythidae		5	0	Elmidae	29	4	116	Bivalvia			0			
Plecoptera			0	Gyrinidae		5	0	Corbiculidae		6	0			
Capniidae		2	0	Haliplidae		7	0	Sphaeriidae		5	0			
Chloroperlidae		2	0	Hydrophilidae		7	0	Unionidae		4	0			
Leuctridae		2	0	Psephenidae		3	0	Gastropoda			0			
Nemouridae		2	0	Ptilodactylidae		5	0	Ancylidae		7	0			
Peltoperlidae		1	0	Hemiptera			0	Hydrobiidae		4	0			
Perlidae		1	0	Belostomatidae		8	0	Physidae		7	0			
Perlodidae		1	0	Corixidae		8	0	Planorbidae		5	0			
Pteronarcyidae		1	0	Gerridae		10	0	Pleuroceridae		5	0			
Taeniopterygidae		2	0	Hydrometridae		8	0	Viviparidae		5	0			
Trichoptera			30	Nepidae		8	0	Miscellaneous			0			
Brachycentridae		2	0	Notonectidae		8	0	Collembola		6	0			
Glossosomatidae		2	0	Megaloptera			5	Lepidoptera		5	0			
Helicopsychidae		3	0	Corydalidae	5	3	15	Neuroptera		5	0			
Hydropsychidae	25	5	125	Sialidae		6	0	Hydrachnidae		6	0			
Hydroptilidae		3	0	Diptera			92	Totals	Total number		209			
Lepidostomatidae		3	0	Athericidae		3	0		Total families		12			
Leptoceridae		3	0	Blephariceridae		2	0	Metric calculations						
Limnephilidae		4	0	Ceratopogonidae		8	0	WVSCI Metric Scores			Additional metrics			
Molannidae		3	0	Chironomidae	79	9	711				Ephemeroptera Taxa	4		
Philopotamidae	5	4	20	Culicidae		10	0	Total Taxa		12	54.5	Plecoptera Taxa	0	
Phryganeidae		4	0	Dixidae		6	0	EPT Taxa		6	46.2	Trichoptera Taxa	2	
Polycentropodidae		5	0	Empididae	4	7	28	% EPT Abundance		38.8	43.4	Long-lived Taxa	6	
Psychomiidae		4	0	Psychodidae		8	0	% Chironomidae		37.8	63.3	Odonata Taxa	1	
Rhyacophilidae		3	0	Ptychopteridae		8	0	Hilsenhoff Biotic Index (HBI)		6.00	54.2	Diptera Taxa	3	
Uenoidae		2	0	Simuliidae		7	0	% 2 Dominant Taxa		52.2	76.3	COET Taxa	8	
Total Tolerance Value			1253	Stratiomyidae		10	0	WV Stream Condition Index			% Sensitive		19.6	
West Virginia Stream Condition Index (WVSCI)				Syrphidae		10	0				% Tolerant		39.7	
Gerritson, J., J. Burton, and M.T. Barbour. 2000. A stream condition index for West Virginia wadeable streams. Tetra Tech, Inc. Owning Mills, MD.				Tabanidae		7	0				56.3		% Clingers	28.2
				Tipulidae	9	5	45						% Net-spinners	14.4

Spreadsheet uses updated Best Standard Values [BSV] for each metric per WVSCI Addenda dated March 23, 2010

Inches	MILLIMETERS	
	Sticky	1-20
	Very Fine	30-125
	Fine	125-250
	Medium	250-500
	Coarse	500-1000
1/4-1/2	Very Coarse	1000-2000
3/8-1/2	Very Fine	2-4
1/2-22"	Fine	4-5.7
22-24	Fine	5.7-9
31-44	Medium	8-11.2
44-57	Medium	11.3-16
62-89	Coarse	16-22.6
89-12	Coarse	22.6-32
12-18	Very Coarse	32-45
18-25	Very Coarse	45-62
25-35	Small	62-90
35-50	Small	90-125
50-71	Large	125-180
71-100	Large	180-250
100-140	Small	250-360
140-200	Small	360-512
20-40	Medium	512-1024
40-80	Large-Very Large	1024-2048
	Bedrock	

Bankfull Channel		
Material	Size Range (mm)	Count
silt/clay	0 - 0.062	50
very fine sand	0.062 - 0.125	
fine sand	0.125 - 0.25	
medium sand	0.25 - 0.5	
coarse sand	0.5 - 1	
very coarse sand	1 - 2	
very fine gravel	2 - 4	
fine gravel	4 - 6	1
fine gravel	6 - 8	2
medium gravel	8 - 11	
medium gravel	11 - 16	
coarse gravel	16 - 22	4
coarse gravel	22 - 32	
very coarse gravel	32 - 45	2
very coarse gravel	45 - 64	1
small cobble	64 - 90	3
medium cobble	90 - 128	1
large cobble	128 - 180	4
very large cobble	180 - 256	11
small boulder	256 - 362	13
small boulder	362 - 512	4
medium boulder	512 - 1024	4
large boulder	1024 - 2048	
very large boulder	2048 - 4096	
total particle count:		100
bedrock -----		
clay hardpan -----		
detritus/wood -----		
artificial -----		
total count:		100
Note:		

Bankfull Channel Pebble Count, S-J20



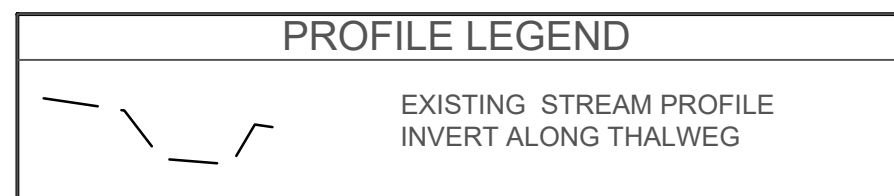
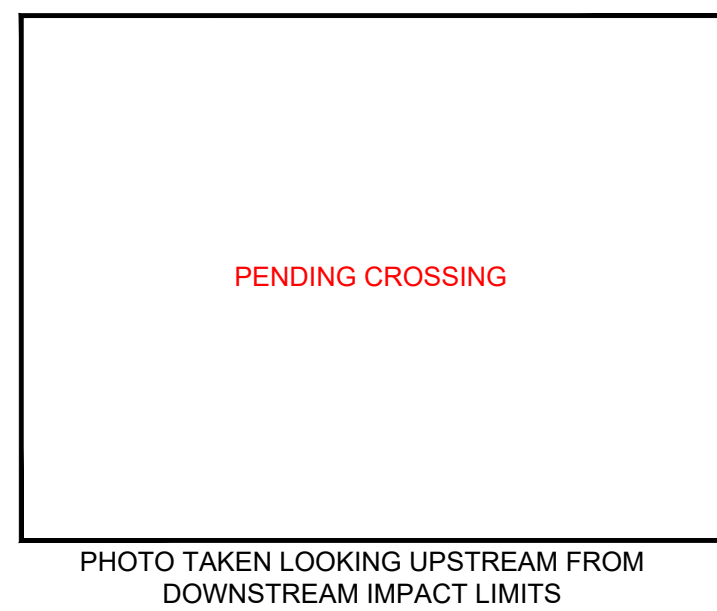
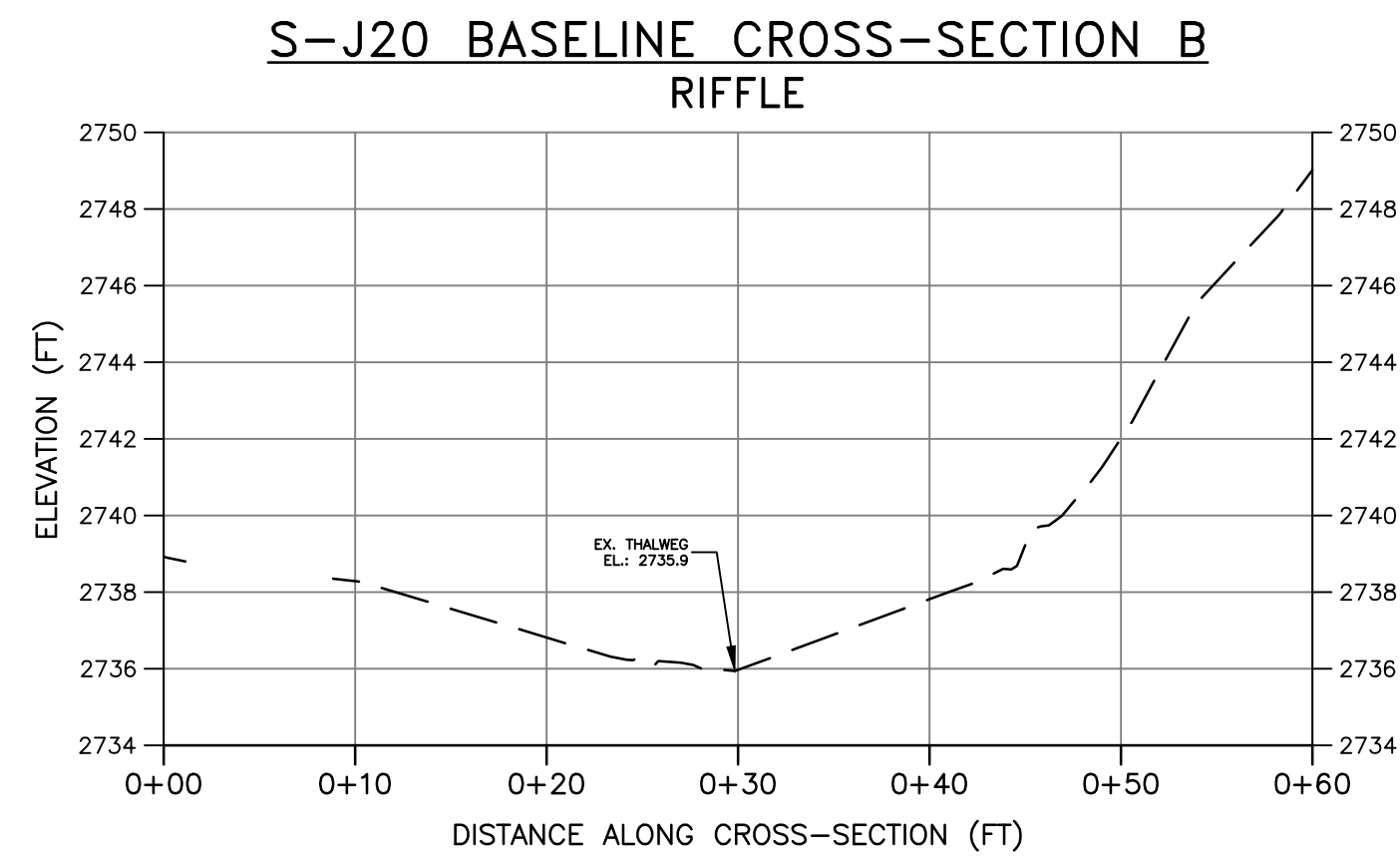
Size (mm)		Size Distribution		Type	
D16	0.062	mean	4.2	silt/clay	50%
D35	0.062	dispersion	2339.2	sand	0%
D50	0.062	skewness	0.96	gravel	10%
D65	140			cobble	19%
D84	290			boulder	21%
D95	470				





— — — — —	STUDY AREA (EASEMENT)
— . — . —	EXISTING SURVEY—LOCATED THALWEG
<b>1176.87 +</b>	EXISTING SURVEYED GROUND SHOT ELEVATION

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 20, 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. POST-CROSSING SURVEY INFORMATION SHOWN IN RED. DATA PENDING.
6. POST-CROSSING SURVEY POINTS FOR CROSS SECTIONS AND THALWEG ARE PROJECTED ONTO PRE-CROSSING SECTION AND PROFILE VIEWS FOR COMPARISON.



**TYPICAL 5-POINT CROSS-SECTION**  
(FACING DOWNSTREAM)

TS-L TS-R

BS-L BS-R

THW

TS: TOP OF SLOPE  
BS: BOTTOM OF SLOPE  
THW: THALWEG (INVERT)

AS-BUILT TABLE: S-I20 CROSS SECTION A					
PRE-CROSSING				AS-BUILT	
PT. LOC.	NORTHING	EASTING	ELEV	VERT. DIFF.	HORZ. DIFF.
TS-L	13807367.4770	1713190.6570	2740.783'		
BS-L	13807355.1690	1713195.2300	2737.600'		
THW	13807346.1510	1713200.5770	2735.403'		
BS-R	13807334.2100	1713205.5950	2738.206'		
TS-R	13807317.4480	1713211.5460	2746.358'		

**CROSS SECTION LEGEND**

— — — EXISTING GRADE

**CROSS SECTION**

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

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

1  
Drawing No.

PRELIMINARY

## PRE-CROSSING

File X:\CADD\_PROJECTS\B07\157 - MAP\Crossing Permits\West Virginia WSSB Crossings\Crossings\04 - Completed\Completed\2021-09-16 - 9-120 STREAM TOPO MP 140.44\9-120 - MP 140.44 - 22x34.dwg  
Plot Date/Time Oct 04, 2021 - 1:46pm