

Baseline Assessment – Stream Attributes

Reach S-RR5 (Pipeline ROW)

Perennial

Spread G

Giles 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	N/A – Low flow
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 SE, AW



Photo Type: LB DS VIEW

Location, Orientation, Photographer Initials: Standing on LB looking downstream along the ROW looking S, AW



Photo Type: RB US VIEW

Location, Orientation, Photographer Initials: Standing on RB looking upstream along the ROW looking NW, AW



Photo Type: LB US VIEW

Location, Orientation, Photographer Initials: Standing on LB looking upstream along the ROW looking NW, AW



Photo Type: RB CL

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



Photo Type: LB CL

Location, Orientation, Photographer Initials: Standing on LB looking at RB along pipe centerline looking SW, AW



Photo Type: DS COND

Location, Orientation, Photographer Initials: Downstream conditions outside of ROW looking SE, AW

L:\22000s\22800\22865.06\Admin\05-ENVR\Field Data\Spread G\Field Forms\S-RR5\I_QAQC\Photo Doc_BKF10plus.docx

STREAM NAME S-RR5		LOCATION Giles County	
STATION # <u>11015+50</u> RIVERMILE _____		STREAM CLASS Perennial	
LAT <u>37.323702</u> LONG <u>-80.555627</u>		RIVER BASIN Middle New	
STORET # _____		AGENCY VADEQ	
INVESTIGATORS KD, AW			
FORM COMPLETED BY KD, AW		DATE <u>8/19/21</u> TIME <u>9:31 AM</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 type="checkbox"/> Herbaceous Dominant species present <i>Rosa multiflora, Rubus sp.</i>	
INSTREAM FEATURES	<div style="display: flex; justify-content: space-between;"> <div style="width: 45%;"> Estimated Reach Length <u>12</u> m Estimated Stream Width <u>0.8</u> m Sampling Reach Area <u>9.6</u> m² Area in km² (m²x1000) _____ km² Estimated Stream Depth <u>0.5</u> m Surface Velocity (at thalweg) <u>0.2</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>0.5</u> m Proportion of Reach Represented by Stream Morphology Types Riffle <u>75</u> % Run <u>10</u> % Pool <u>15</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>0</u> m ² Density of LWD <u>0</u> m ² /km ² (LWD/ reach area)	
AQUATIC VEGETATION	Indicate the dominant type and record the dominant species present <input checked="" 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 <i>Impatiens capensis</i> Portion of the reach with aquatic vegetation <u>40</u> %	
WATER QUALITY	<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 _____ WQ Instrument Used _____ </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 _____ 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 _____ 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 _____ </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 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)	5%
Boulder	> 256 mm (10")	5			
Cobble	64-256 mm (2.5"-10")	40	Muck-Mud	black, very fine organic (FPOM)	0
Gravel	2-64 mm (0.1"-2.5")	0			
Sand	0.06-2mm (gritty)	40	Marl	grey, shell fragments	0
Silt	0.004-0.06 mm	15			
Clay	< 0.004 mm (slick)	0			

Notes: Low flow. No water quality measurements were taken due to low flow.

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

STREAM NAME S-RR5		LOCATION Giles County	
STATION # 11015+50 RIVERMILE		STREAM CLASS Perennial	
LAT 37.323702 LONG -80.555627		RIVER BASIN Middle New	
STORET #		AGENCY VADEQ	
INVESTIGATORS KD, AW			
FORM COMPLETED BY KD, AW		DATE 8/19/21 TIME 9:31 AM 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 13	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 4	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 12	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 8	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0

Notes: Braided channel, assessed dominant channel. Low flow.

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

Habitat Parameter	Condition Category																				
	Optimal					Suboptimal					Marginal					Poor					
6. Channel Alteration SCORE 19	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 5	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 4 SCORE 9	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 4 SCORE 7	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 8 SCORE 8	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 **114** Notes: Braided channel, assessed dominant channel. Low flow.

BENTHIC MACROINVERTEBRATE FIELD DATA SHEET

STREAM NAME S-RR5		LOCATION Giles County	
STATION # 11015+50 RIVERMILE		STREAM CLASS Perennial	
LAT 37.323702 LONG -80.555627		RIVER BASIN Middle New	
STORET #		AGENCY VADEQ	
INVESTIGATORS KD, AW		LOT NUMBER	
FORM COMPLETED BY KD, AW		DATE 8/19/21 TIME 9:31 AM	REASON FOR SURVEY Baseline Assessment

HABITAT TYPES	Indicate the percentage of each habitat type present <input checked="" type="checkbox"/> Cobble 65 % <input type="checkbox"/> Snags % <input type="checkbox"/> Vegetated Banks 90 % <input checked="" type="checkbox"/> Sand 35 % <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 4 <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. 1 crayfish discarded.

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						

Sample ID Collection Date		S-RR5 08-19-2021
ORDER	GENUS/SPECIES	COUNT
	Ephemeroptera Baetis sp.	2
	Ephemeroptera Diphetor hageni	9
	Ephemeroptera Ephemerella sp.	5
	Ephemeroptera Eurylophella sp.	2
	Ephemeroptera Maccaffertium sp.	8
	Plecoptera Leuctra sp.	25
	Plecoptera Nemouridae	1
	Plecoptera Peltoperla sp.	2
	Plecoptera Perlodidae	3
	Plecoptera Sweltsa sp.	2
	Plecoptera Tallaperla sp.	2
	Trichoptera Diplectrona modesta	7
	Trichoptera Diplectrona sp.	40
	Odonata Cordulegaster sp.	1
	Odonata Gomphidae	1
	Odonata Lanthus sp.	1
	Coleoptera Ectopria sp.	19
	Coleoptera Hydrobius sp.	1
	Coleoptera Oulimnius sp.	3
	Diptera-Chironomidae Briliia sp.	1
	Diptera-Chironomidae Heleniella sp.	1
	Diptera-Chironomidae Larsia sp.	1
	Diptera-Chironomidae Metriocnemus sp.	1
	Diptera-Chironomidae Orthocladius sp.	1
	Diptera-Chironomidae Paracladopelma sp.	6
	Diptera-Chironomidae Parametriocnemus sp.	2
	Diptera-Chironomidae Paraphaenocladus sp.	1
	Diptera-Chironomidae Paratendipes sp.	1
	Diptera-Chironomidae Polypedilum sp.	1
	Diptera-Chironomidae Psilometriocnemus triannulatus	6
	Diptera-Chironomidae Stictochironomus sp.	1
	Diptera-Chironomidae Tvetenia sp.	4
	Diptera Caloparyphus/Euparyphus sp.	1
	Diptera Ceratopogoninae	10
	Diptera Chrysops sp.	2
	Diptera Clinocera sp.	1
	Diptera Dicranota sp.	2
	Diptera Diptera	4
	Diptera Dixia sp.	2
	Diptera Erioptera sp.	1
	Diptera Limnophila sp.	1
	Diptera Limonia sp.	2
	Diptera Molophilus sp.	1
	Diptera Neoplasia sp.	1
	Diptera Pseudolimnophila sp.	2
	Diptera Stratiomyidae	1
	Lepidoptera Lepidoptera	1
	Annelida Enchytraeidae	7
	Annelida tubificoid Naididae w/o cap setae	3
	Crustacea Cambaridae	1
	Crustacea Gammarus sp.	1
	Acari Oribatei	1
	Acari Sperchon sp.	1
	Acari Torrenticolidae	1
	Other Organisms Nematoda	6
	Other Organisms Turbellaria	1
TOTAL		215

Sample ID Collection Date		S-RR5 08-19-2021
WVSCI Metric Values		
Total taxa		32
EPT taxa		9
% EPT		50.2
% Chironomidae		12.6
% 2 Dominant		34.4
HBI		4.67
WVSCI Metric Scores		
Total taxa		152.4
EPT taxa		69.2
% EPT		54.7
% Chironomidae		88.3
% 2 Dominant		102.5
HBI		75.1
WVSCI Metric Scores		
Total taxa		100.0
EPT taxa		69.2
% EPT		54.7
% Chironomidae		88.3
% 2 Dominant		100.0
HBI		75.1
WVSCI Total Score		81.2

WVSCI Thresholds

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

WOLMAN PEBBLE COUNT FORM

County:	Giles County	Stream ID:	S-RR5
Stream Name:	UNT to Sinking Creek		
HUC Code:	05050002	Basin:	Middle New
Survey Date:	8/19/2021		
Surveyors:	KD AW		
Type:	Representative		

PEBBLE COUNT							
Inches	PARTICLE	Millimeters		Particle Count	Total #	Item %	% Cum
	Silt/Clay	< .062	S/C	<div><div></div><div></div><div></div></div>	4	4.00	4.00
	Very Fine	.062-.125	S A N D	<div><div></div><div></div><div></div></div>	1	1.00	5.00
	Fine	.125-.25		<div><div></div><div></div><div></div></div>	0	0.00	5.00
	Medium	.25-.5		<div><div></div><div></div><div></div></div>	0	0.00	5.00
	Coarse	.50-1.0		<div><div></div><div></div><div></div></div>	8	8.00	13.00
.04-.08	Very Coarse	1.0-2		<div><div></div><div></div><div></div></div>	4	4.00	17.00
.08 -.16	Very Fine	2 -4		G R A V E L	<div><div></div><div></div><div></div></div>	8	8.00
.16 - .22	Fine	4 -5.7	<div><div></div><div></div><div></div></div>		5	5.00	30.00
.22 - .31	Fine	5.7 - 8	<div><div></div><div></div><div></div></div>		8	8.00	38.00
.31 - .44	Medium	8 -11.3	<div><div></div><div></div><div></div></div>		9	9.00	47.00
.44 - .63	Medium	11.3 - 16	<div><div></div><div></div><div></div></div>		11	11.00	58.00
.63 - .89	Coarse	16 -22.6	<div><div></div><div></div><div></div></div>		5	5.00	63.00
.89 - 1.26	Coarse	22.6 - 32	<div><div></div><div></div><div></div></div>		3	3.00	66.00
1.26 - 1.77	Vry Coarse	32 - 45	<div><div></div><div></div><div></div></div>		8	8.00	74.00
1.77 -2.5	Vry Coarse	45 - 64	<div><div></div><div></div><div></div></div>		5	5.00	79.00
2.5 - 3.5	Small	64 - 90	C O B B L E		<div><div></div><div></div><div></div></div>	9	9.00
3.5 - 5.0	Small	90 - 128		<div><div></div><div></div><div></div></div>	6	6.00	94.00
5.0 - 7.1	Large	128 - 180		<div><div></div><div></div><div></div></div>	2	2.00	96.00
7.1 - 10.1	Large	180 - 256		<div><div></div><div></div><div></div></div>	3	3.00	99.00
10.1 - 14.3	Small	256 - 362	B O U L D E R	<div><div></div><div></div><div></div></div>	1	1.00	100.00
14.3 - 20	Small	362 - 512		<div><div></div><div></div><div></div></div>	0	0.00	100.00
20 - 40	Medium	512 - 1024		<div><div></div><div></div><div></div></div>	0	0.00	100.00
40 - 80	Large	1024 -2048		<div><div></div><div></div><div></div></div>	0	0.00	100.00
80 - 160	Vry Large	2048 -4096		<div><div></div><div></div><div></div></div>	0	0.00	100.00
	Bedrock		BDRK	<div><div></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-RR5
 Sample Name: Representative
 Survey Date: 08/19/2021

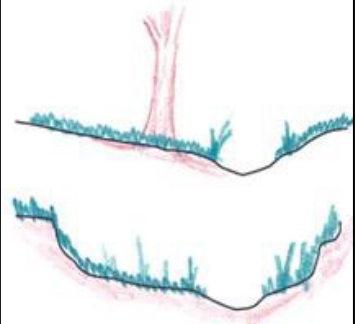
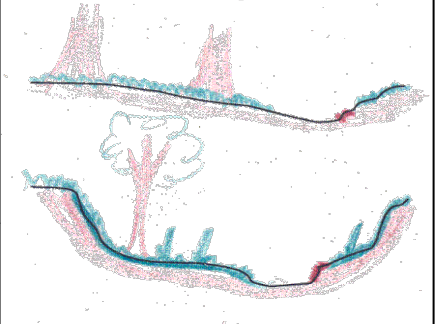
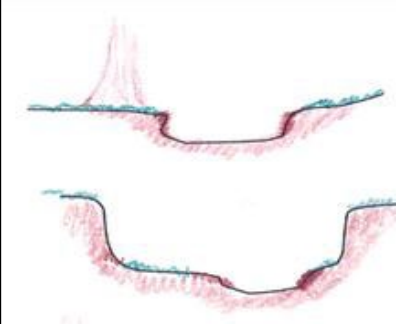
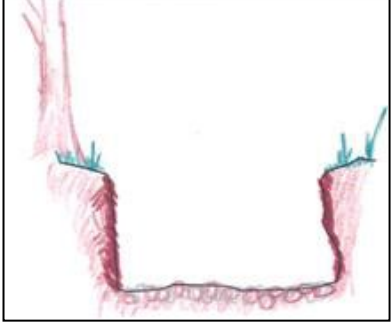
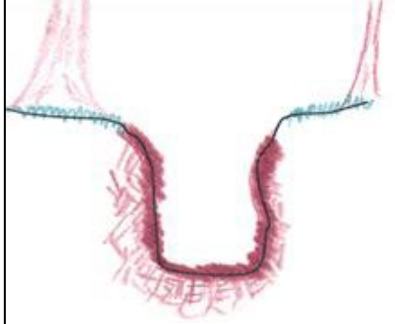
Size (mm)	TOT #	ITEM %	CUM %
0 - 0.062	4	4.00	4.00
0.062 - 0.125	1	1.00	5.00
0.125 - 0.25	0	0.00	5.00
0.25 - 0.50	0	0.00	5.00
0.50 - 1.0	8	8.00	13.00
1.0 - 2.0	4	4.00	17.00
2.0 - 4.0	8	8.00	25.00
4.0 - 5.7	5	5.00	30.00
5.7 - 8.0	8	8.00	38.00
8.0 - 11.3	9	9.00	47.00
11.3 - 16.0	11	11.00	58.00
16.0 - 22.6	5	5.00	63.00
22.6 - 32.0	3	3.00	66.00
32 - 45	8	8.00	74.00
45 - 64	5	5.00	79.00
64 - 90	9	9.00	88.00
90 - 128	6	6.00	94.00
128 - 180	2	2.00	96.00
180 - 256	3	3.00	99.00
256 - 362	1	1.00	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)	1.75		
D35 (mm)	7.14		
D50 (mm)	12.58		
D84 (mm)	78.44		
D95 (mm)	154		
D100 (mm)	361.99		
Silt/Clay (%)	4		
Sand (%)	13		
Gravel (%)	62		
Cobble (%)	20		
Boulder (%)	1		
Bedrock (%)	0		

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)	Giles County	R3	05050002	8/19/21	S-RR5	83	1			
Name(s) of Evaluator(s)		Stream Name and Information					SAR Length				
KD AW		UNT to Sinking Creek					42				
1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)											
Conditional Category											
Channel Condition	Optimal	Suboptimal		Marginal		Poor		Severe			
	 <p>Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable point bars / 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.</p>	 <p>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 floodplains along portions of the reach. Transient sediment covers 10-40% of the stream bottom.</p>	 <p>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.</p>	 <p>Overwidened/incised. Vertically / laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-80% of banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% of 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.</p>	 <p>Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average rooting depth, 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. Greater than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.</p>	CI					
Scores	3	2.4		2		1.6		1		2.40	
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								NOTES>>			
Riparian Buffers	Optimal	Suboptimal		Marginal		Poor					
	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	High	Low	High	Low	High	Low				
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>	80%	20%					100%			
	Score >	0.85	0.5								
								CI= (Sum % RA * Scores*0.01)/2			
Left Bank	% Riparian Area>	15%	65%	20%				100%	Rt Bank CI >	0.78	CI
	Score >	1.5	0.85	0.5					Lt Bank CI >	0.88	0.83
3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embededness; shade; undercut banks; root mats; SAV; riffle/pool complexes, stable features.											
Instream Habitat/ Available Cover	Conditional Category							NOTES>>			
	Optimal	Suboptimal		Marginal		Poor					
	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.		Stream Gradient			
Scores	1.5	1.2		0.9		0.5		High		1.20	

Stream Impact Assessment Form Page 2

Project #

22865.06

Project Name (Applicant)

Mountain Valley Pipeline (Mountain Valley Pipeline, LLC)

Locality

Giles County

Cowardin Class.

R3

HUC

05050002

Date

8/19/21

SAR #

S-RR5

Impact Length

83

Impact Factor

1

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

Channel Alteration

Negligible

Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.

Minor

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.

Moderate

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.

Severe

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.

NOTES>>

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) >>

1.19

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

COMPENSATION REQUIREMENT (CR) >>

99

CR = RCI X L_i X IF

INSERT PHOTOS:

(WSSI Photo Location L:\22000s\22800\22865.06\Admin\05-ENVR\Field Data\Spread G\Field Forms\S-RR5\Photos\2021-08-19_11-23-57.jpg)

NE

E

SE

S

SW

60

90

120

150


180

210

139°SE (T)

37°19'25"N, 80°33'20"W ±32ft

▲ 2415ft



RB DS VIEW

WSSI

S-RR5

19 Aug 2021, 11:22:37

Reach S-RR5 looking upstream within ROW. Assessment is limited to areas within the temporary ROW.

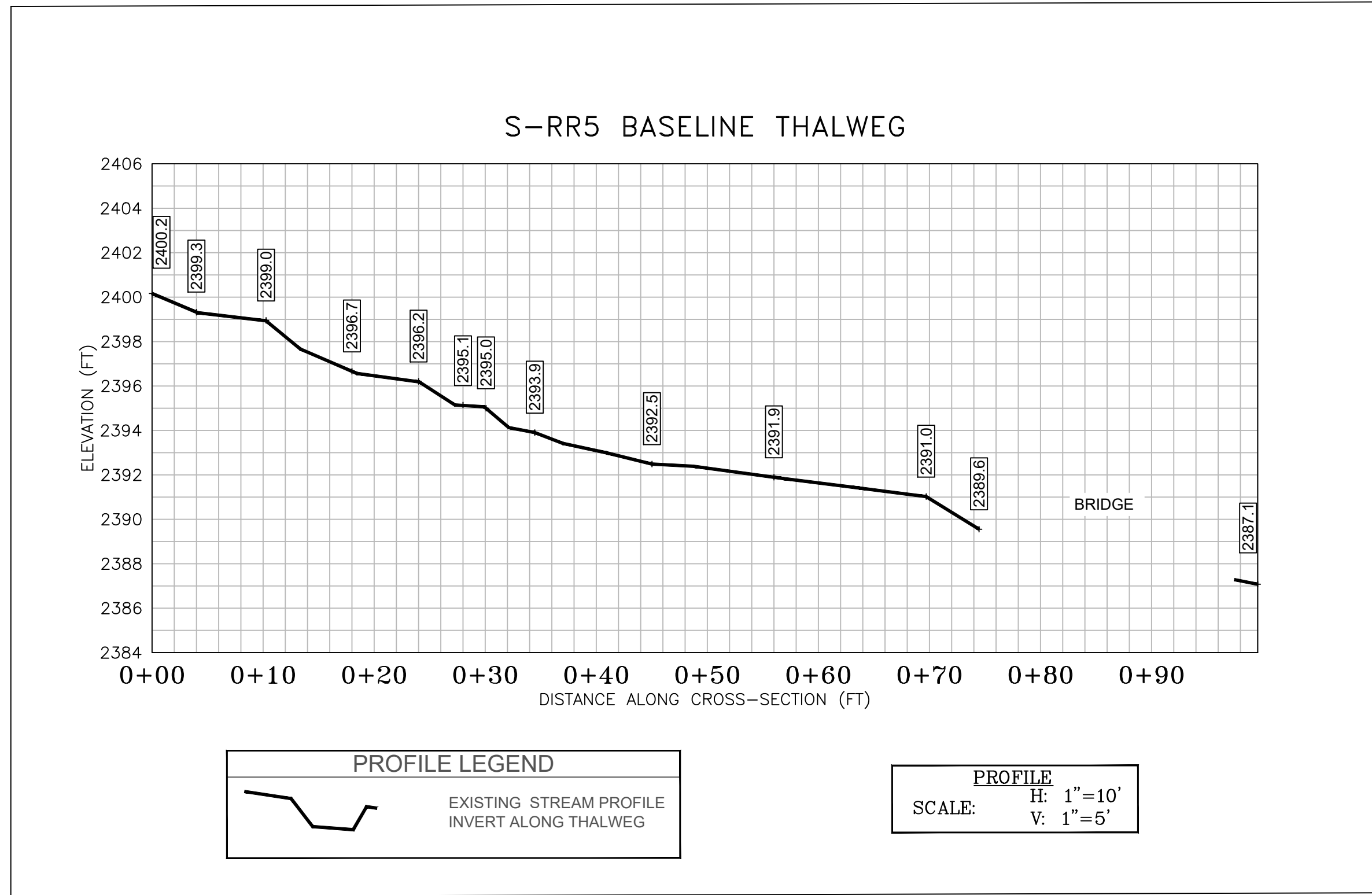
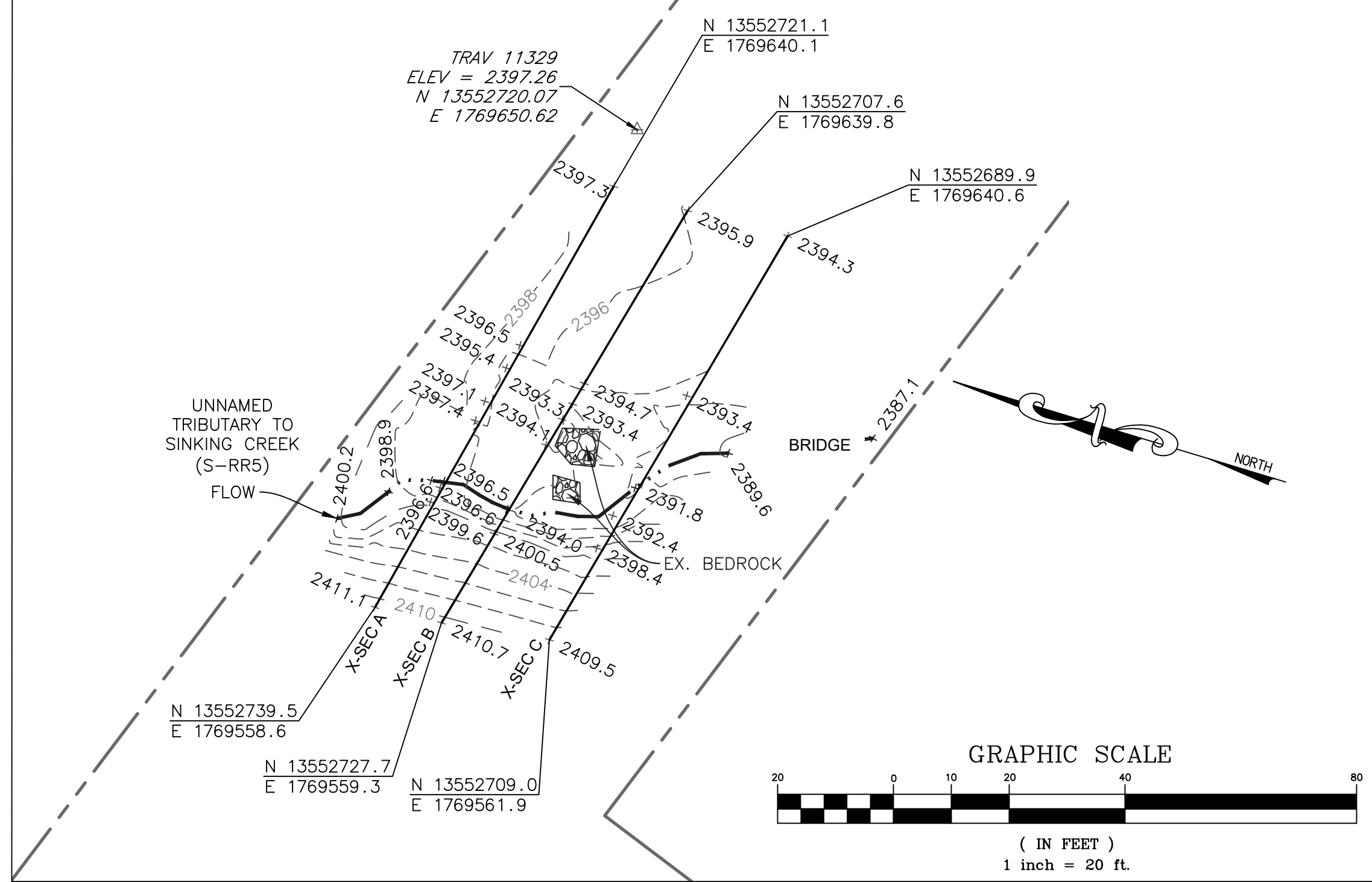
DESCRIBE PROPOSED IMPACT:

PROVIDED UNDER SEPARATE COVER

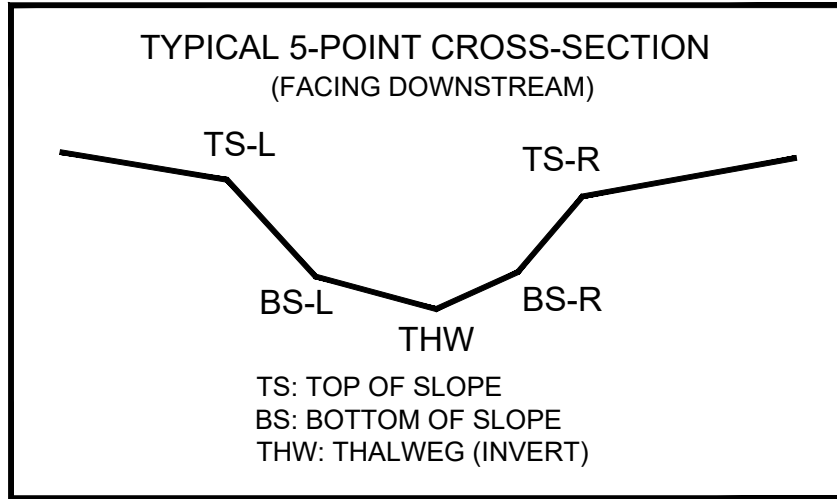
Reach R3

File: L:\22000s\22800\22865.06\Admin\05-ENVR\Field Data\Spread G\Field Forms\S-RR5\0_Potesta Submission\Files\S-RR5_HGM_HG_R4R6_USM_Wolman.xlsx

CROSSING S-RR5 CONTROL (OUTSIDE OF VIEW)				
POINT #	NORTHING	EASTING	ELEVATION	DESCRIPTION
11328	13552599.52	1769844.109	2400.78	NAIL

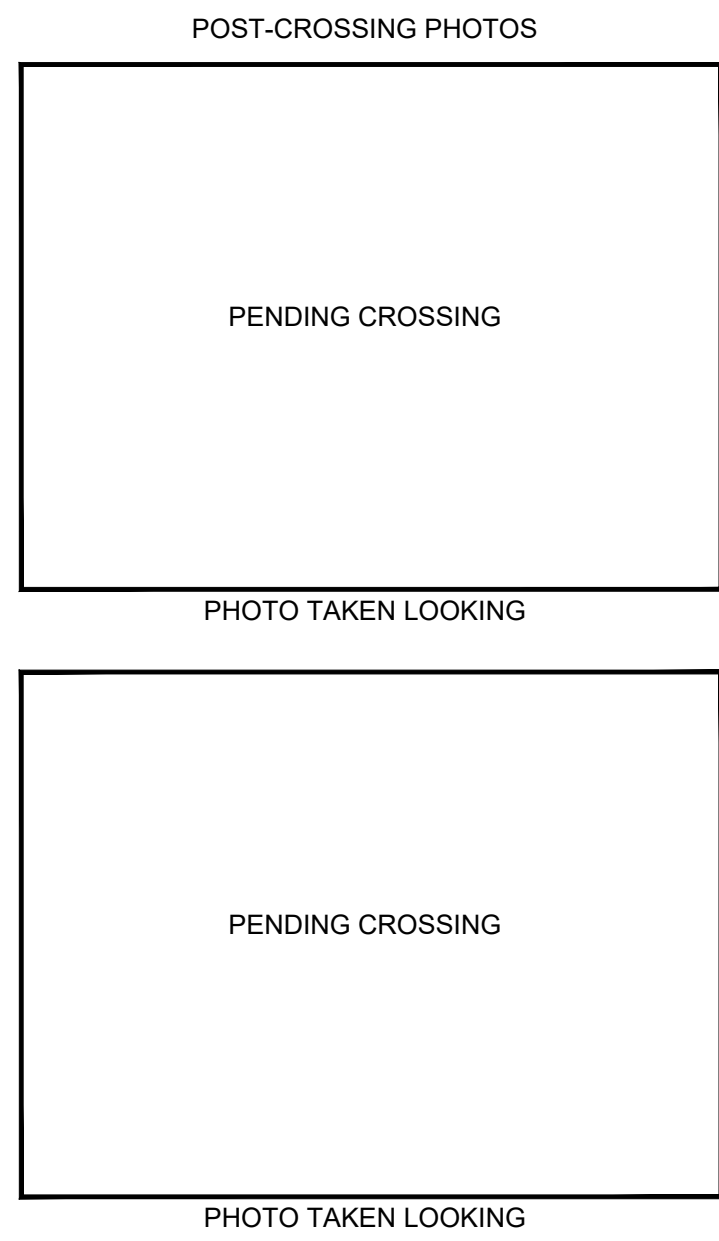
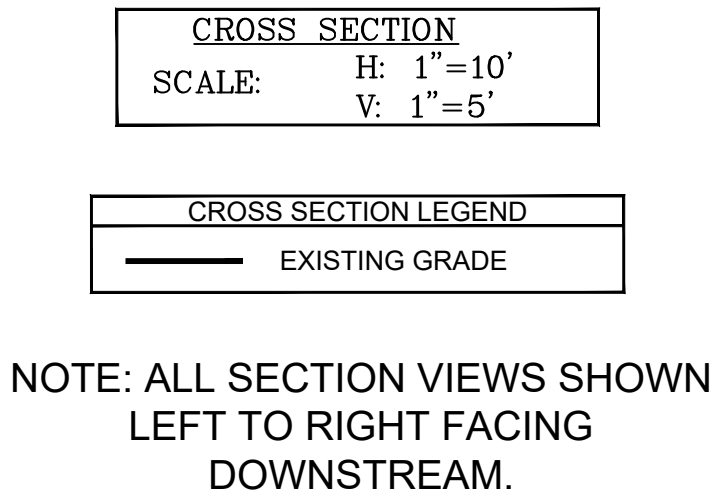
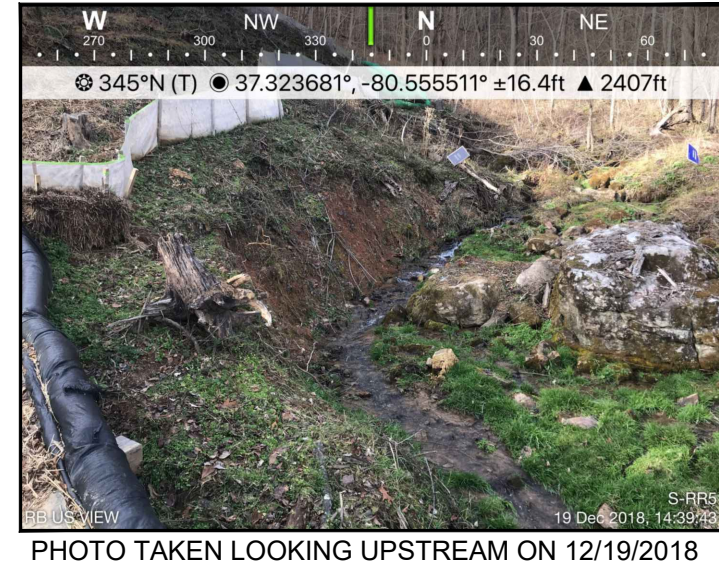
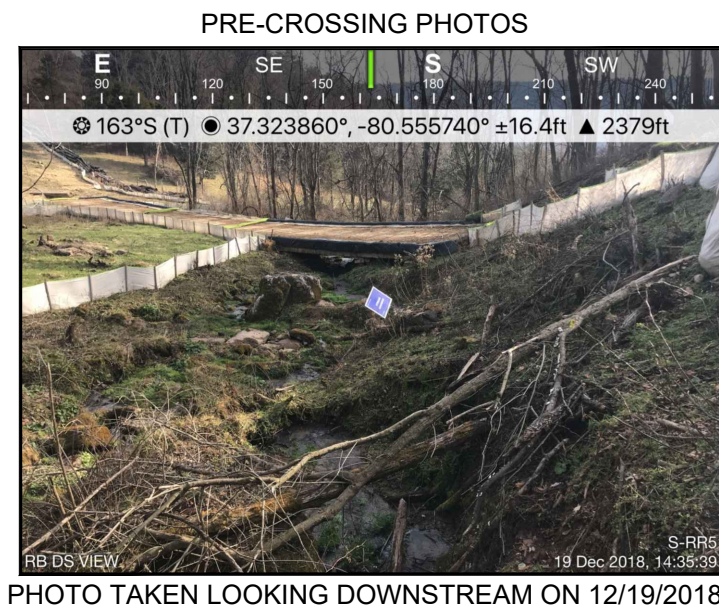
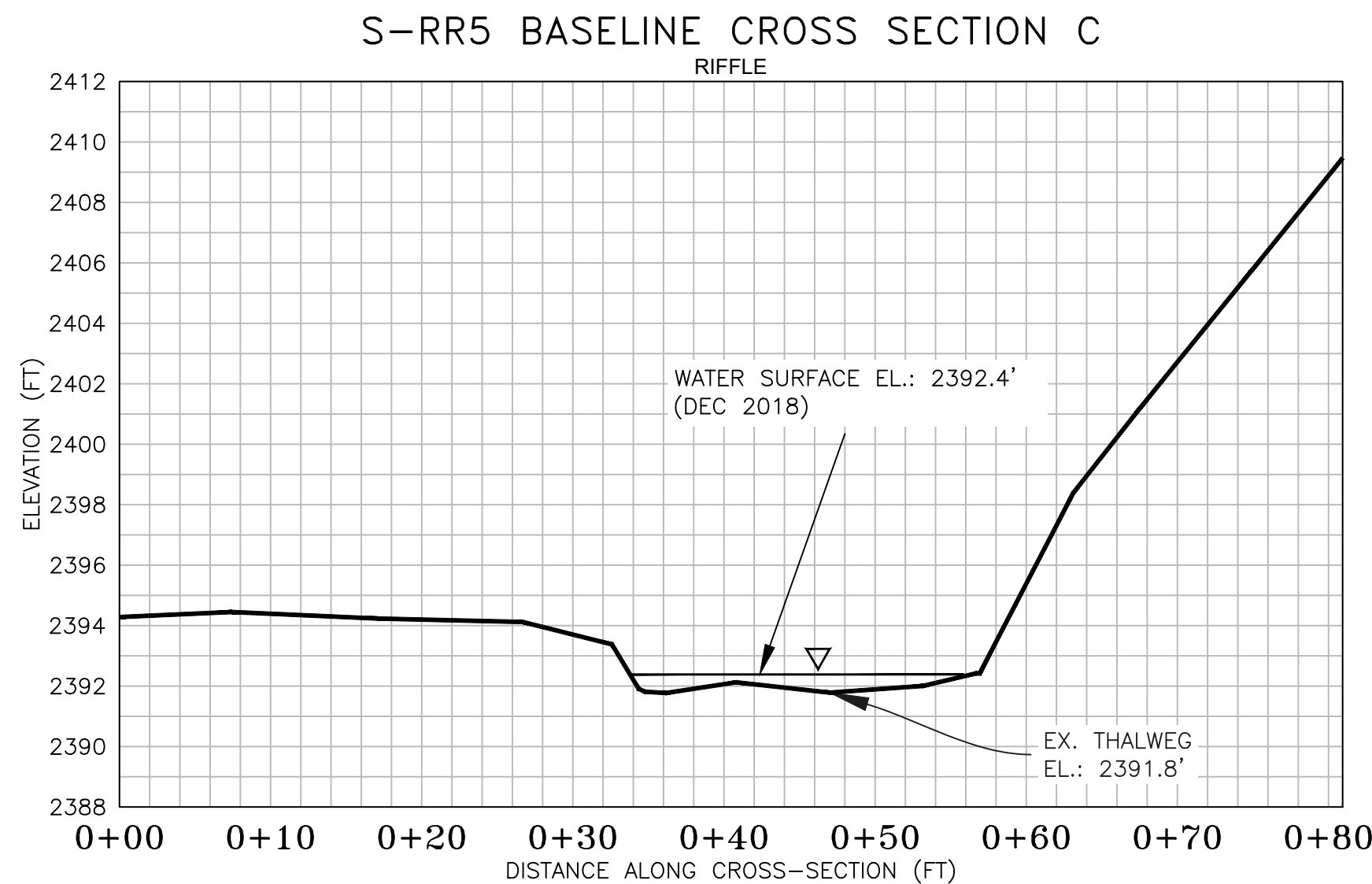
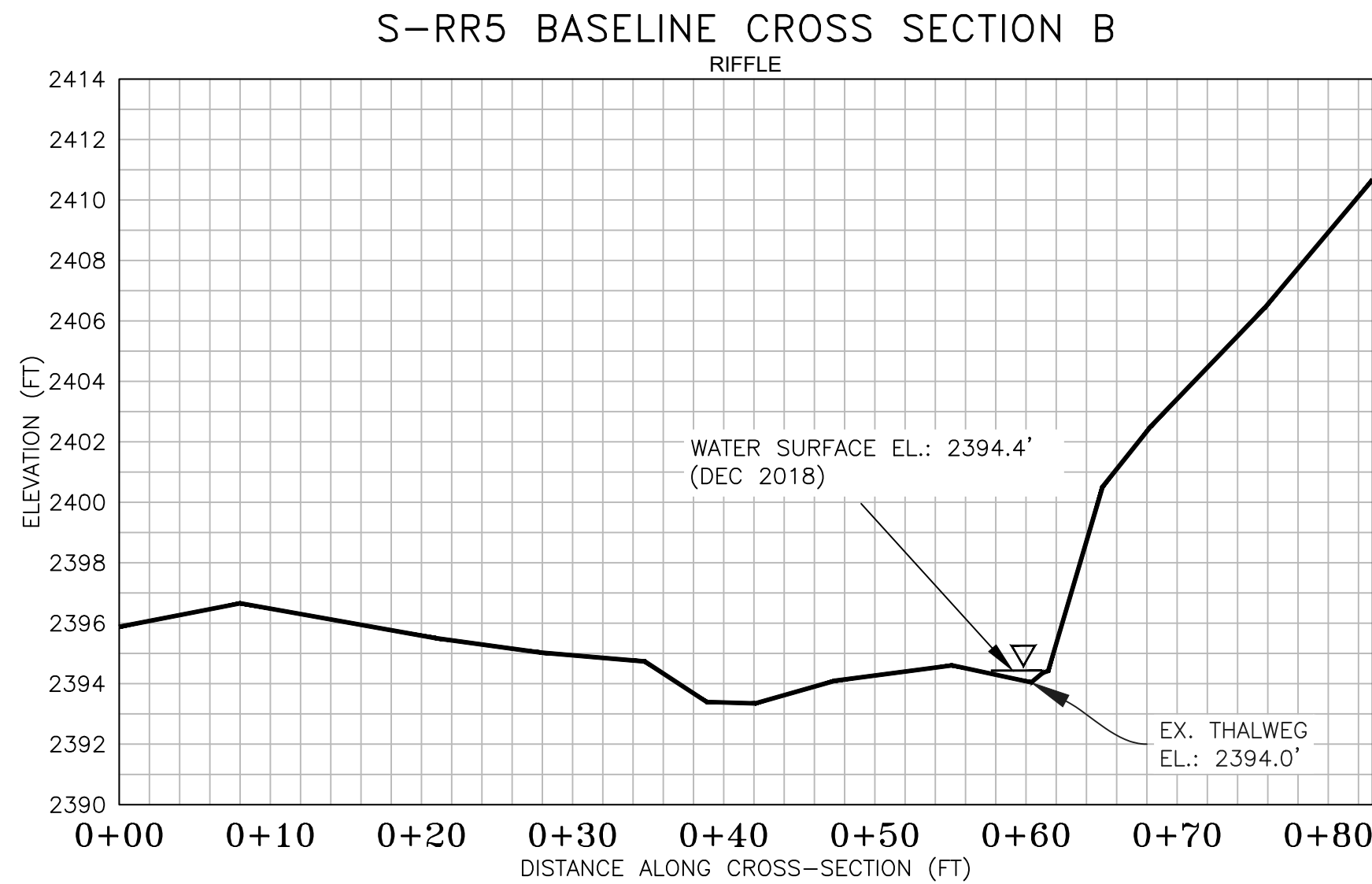
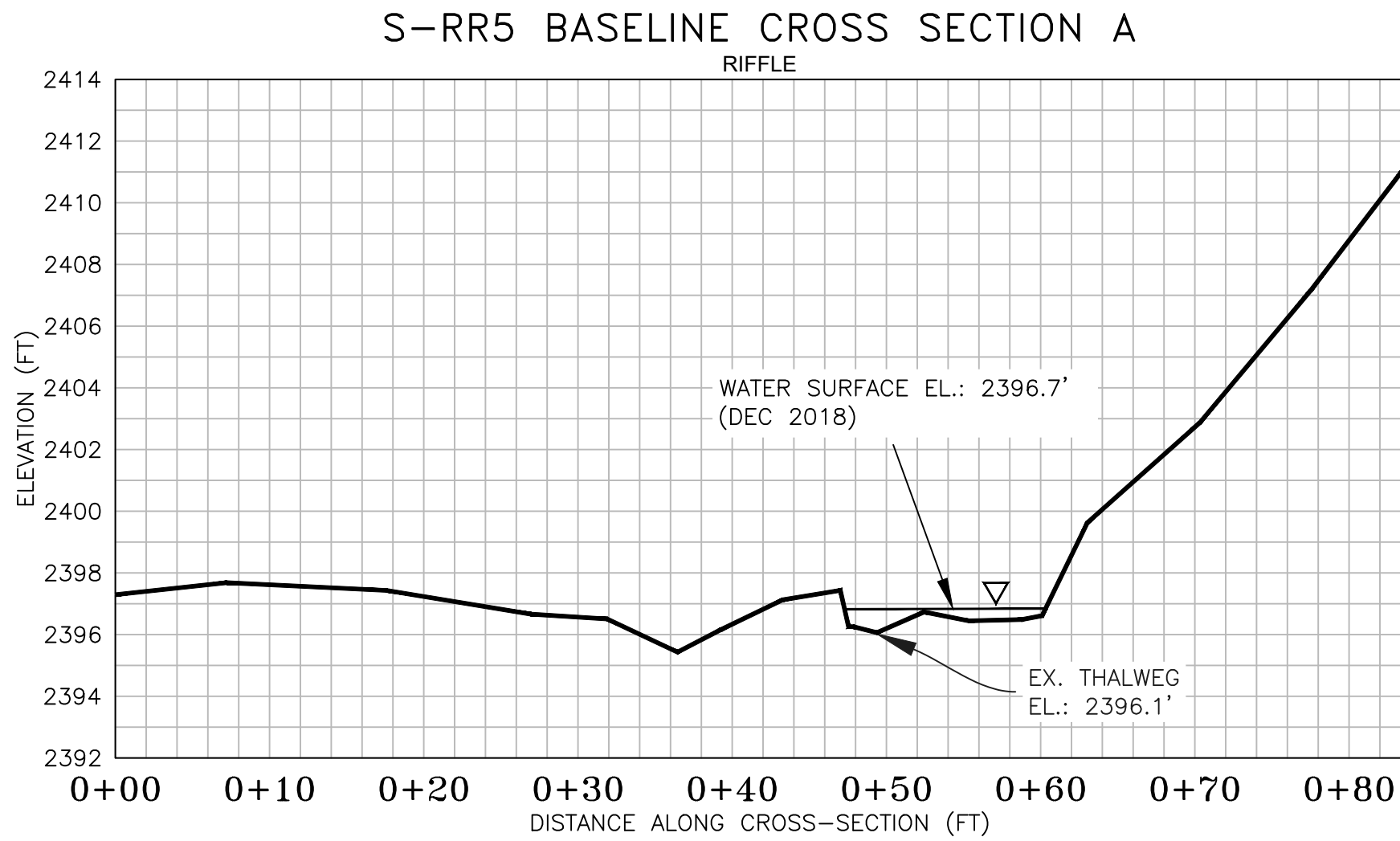
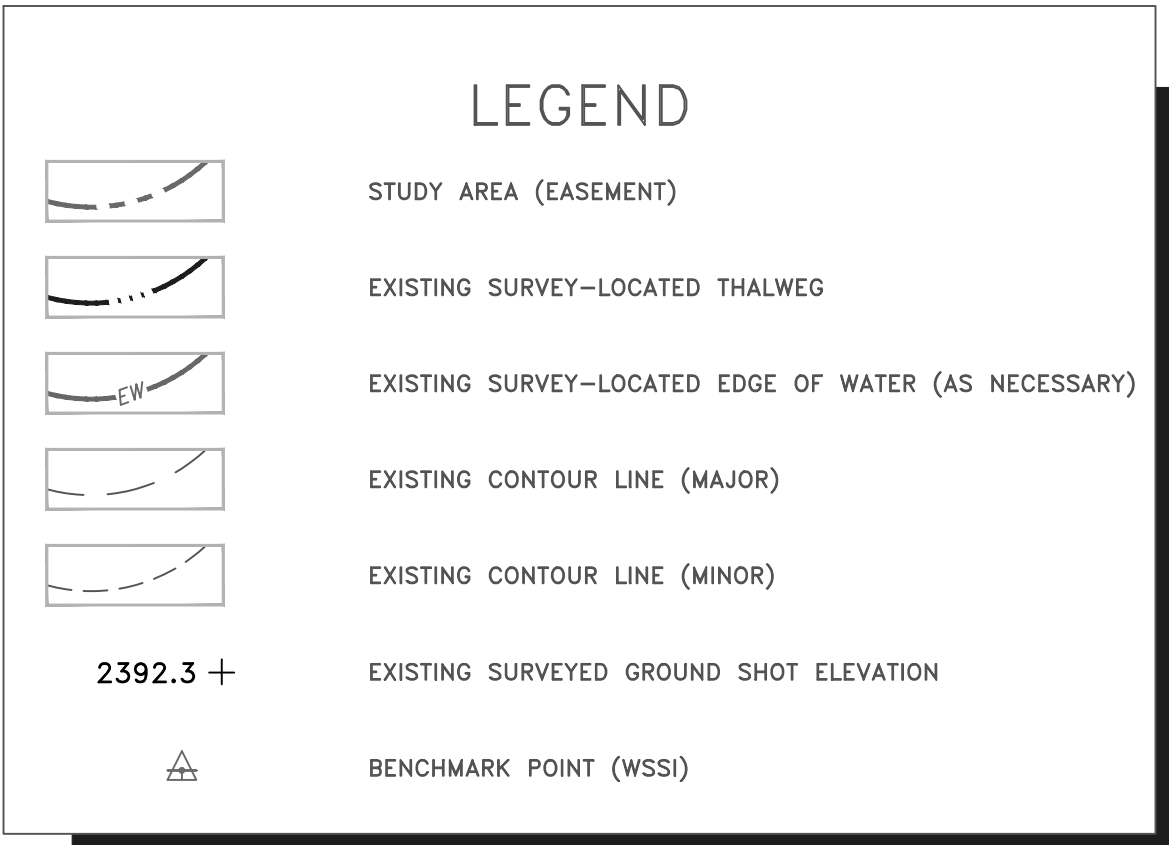


CL STAKEOUT POINTS: S-RRS CROSS SECTION B (PIPE CL)					
PRE-CROSSING				POST-CROSSING	
PT. LOC.	NORTHING	EASTING	ELEV	VERT. DIFF.	HORIZ. DIFF.
TS-L	13552716.10	17696006.06	2394.74	----	----
BS-L	13552716.98	17696002.06	2393.40	----	----
THW	13552722.59	1769581.34	2394.04	----	----
BS-R	13552722.72	1769580.22	2394.42	----	----
TS-R	13552723.48	1769576.69	2400.52	----	----



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 a Real Time Network (RTN) GPS. Field locations were completed on December 19, 2018.
2. Monumentation, including traverse stations and fly points, shown on this drawing should be used to orient any future boundary, topographic, or location survey.
3. Easement lines shown on plan view were provided by Mountain Valley Pipeline (MVP).
4. WSSI Contour Interval = 2.0'. Contours within the channel were interpolated using stream channel breaklines (i.e. top of slopes, toe of slopes, thalweg) and cross-sectional points. Contours outside the channel were interpolated using cross-sectional spot shots.
5. All section views shown are left to right facing downstream.
6. Cross-section B shot at location of pipe centerline (based on best professional judgement).



Wetland
Solutions and Services, Inc.[®]
a DMEET company

5300 Wellington Branch Drive • Suite 100
Gainesville, Virginia 20155
Phone: 703-679-5600 • Fax: 703-679-5601
www.wetlands.com

Profile and Cross-Sections Baseline Survey

Prepared For: MVP

Crossing S-RR5 - UNT to Sinking Creek (MP 208.4)

REVISIONS					SCALE: AS NOTED
No.	Date	Description	Rev. By	App. By	
Horizontal Datum: NAD 1983 UTM ZONE 17N					DATE: October 2021
Vertical Datum: NAVD 88					
Boundary and Topo Source: MVP WSS1 2' C.I. Topo					
Design		Draft		Approved	
PFS		TLK		PFS	
Sheet # <div>1 of 1</div>					
Computer File Name: L:\Survey\220000\220005\22005-07-Spread (1 Work Draw) 22005-10-04-MP-200-227 Sheet.dwg					