Baseline Assessment – Stream Attributes

Reach S-D1-EPH (Pipeline ROW) Ephemeral Spread I Pittsylvania County, Virginia

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

Spread I Stream S-D1-EPH (Pipeline ROW) Pittsylvania County



Location, Orientation, Photographer Initials: Downstream at ROW/LOD looking E upstream, RAH



Photo Type: DS COND

Location, Orientation, Photographer Initials: Downstream at ROW/LOD looking W downstream, RAH

Spread I Stream S-D1-EPH (Pipeline ROW) Pittsylvania County



Photo Type: LB CL

Location, Orientation, Photographer Initials: On thalweg at pipe centerline looking NE at right streambank, RAH



Photo Type: RB CL

Location, Orientation, Photographer Initials: On thalweg at pipe centerline looking S at left streambank, RAH

Spread I Stream S-D1-EPH (Pipeline ROW) Pittsylvania County



Location, Orientation, Photographer Initials: Upstream at ROW/LOD looking NE upstream, RAH



Location, Orientation, Photographer Initials: Upstream at ROW/LOD looking SW downstream, RAH

USACE FILE NO./ Project Name: (v2.1, Sept 2015)		N	Mountain Valle	y Pipeline		COORDINATES: imal Degrees)	Lat.	36.96443	Lon.	-79.595691	WEAT	HER:		Sunny	DATE:	9/2/:	2021
IMPACT STREAM/SITE ID (watershed size {acreage},				S-D1-EP	H/14.17 ac			MITIGATION STREAM CLASS. (watershed size {acreage			:				Comments:		
STREAM IMPACT LENGTH:	61	FORM MITIGAT		RESTORATION (Levels I-III)		ORDINATES: imal Degrees)	Lat.		Lon.		PRECIPITATION	I PAST 48 HRS:		NO	Mitigation Length:		
Column No. 1- Impact Existing	g Condition (Deb	bit)		Column No. 2- Mitigation Existing C	Condition - Basel	ine (Credit)		Column No. 3- Mitigation Pr Post Completion		ve Years	Column N	o. 4- Mitigation Proj Post Completion		ars	Column No. 5- Mitigation Project	ed at Maturity ((Credit)
Stream Classification:	Ephe	meral	Stre	eam Classification:				Stream Classification:		0	Stream Classification	:	0)	Stream Classification:		0
Percent Stream Channel SI	ope			Percent Stream Channel SI	ope			Percent Stream Channel S	lope	0	Percent	Stream Channel S	lope	0	Percent Stream Channel S	оре	0
HGM Score (attach d	ata forms):			HGM Score (attach	data forms):			HGM Score (attach	data forms)):	н	M Score (attach d	lata forms):		HGM Score (attach d	ata forms):	
		Average				Average				Average				Average			Average
Hydrology	0.17		Hyd	Irology				Hydrology			Hydrology				Hydrology	1	
Biogeochemical Cycling	0.28	0.18333333		geochemical Cycling		0		Biogeochemical Cycling		0	Biogeochemical Cycl	ing		0	Biogeochemical Cycling		0
Habitat PART I - Physical, Chemical and	0.1 Biological Indic	cators	Hab	PART I - Physical, Chemical an	d Biological Ind	icators		Habitat PART I - Physical, Chemical ar	nd Biological	Indicators	Habitat PART I - Phy	sical, Chemical and	d Biological Indic	cators	Habitat PART I - Physical, Chemical and	Biological India	cators
	Points Scale Range	Site Score			Dainta Casta Banga	Site Score			Points Scale Ra	ange Site Score			Points Scale Range	Site Score		Points Scale Range	e Site Score
	Folits Scale Range	Site Score	_		Points Scale Range	Site Score			Politis Scale Ra	singe Store			Points Scale Range	Site Score		ronts scale Range	Site Score
PHYSICAL INDICATOR (Applies to all streams	s classifications)		PH	SICAL INDICATOR (Applies to all streams	classifications)			PHYSICAL INDICATOR (Applies to all streams	s classifications)	PHYSICAL INDICATO	R (Applies to all stream	ns classifications)		PHYSICAL INDICATOR (Applies to all streams	classifications)	
USEPA RBP (High Gradient Data Sheet)				EPA RBP (Low Gradient Data Sheet)				USEPA RBP (High Gradient Data Sheet)			USEPA RBP (High Gr				USEPA RBP (High Gradient Data Sheet)		
Epifaunal Substrate/Available Cover	0-20	0		pifaunal Substrate/Available Cover	0-20			Epifaunal Substrate/Available Cover	0-20		Epifaunal Substrate/	Available Cover	0-20		Epifaunal Substrate/Available Cover	0-20	
Embeddedness Velocity/ Depth Regime	0-20 0-20	8		ool Substrate Characterization Ool Variability	0-20 0-20			2. Embeddedness	0-20 0-20		 Embeddedness Velocity/ Depth Regi 	mo	0-20 0-20		Embeddedness Velocity/ Depth Regime	0-20 0-20	
4. Sediment Deposition	0-20	19		ediment Deposition	0-20			Velocity/ Depth Regime Sediment Deposition	0-20		Velocity/ Deptil Regi Sediment Deposition		0-20		4. Sediment Deposition	0-20	
5. Channel Flow Status	0-20	0		Channel Flow Status	0-20			5. Channel Flow Status	0-20		5. Channel Flow Status		0-20		5. Channel Flow Status	0-20	
6. Channel Alteration	0-20	19	6. C	channel Alteration	0-20			6. Channel Alteration	0-20)-1	Channel Alteration		0-20		6. Channel Alteration	0-20	
7. Frequency of Riffles (or bends)	0-20	0		channel Sinuosity	0-20			7. Frequency of Riffles (or bends)	0-20		Frequency of Riffles		0-20		7. Frequency of Riffles (or bends)	0-20	
8. Bank Stability (LB & RB)	0-20	3		ank Stability (LB & RB)	0-20			8. Bank Stability (LB & RB)	0-20		8. Bank Stability (LB &	-	0-20		8. Bank Stability (LB & RB)	0-20	
9. Vegetative Protection (LB & RB)	0-20	10		/egetative Protection (LB & RB)	0-20			9. Vegetative Protection (LB & RB)	0-20		Vegetative Protectio		0-20		9. Vegetative Protection (LB & RB)	0-20	
10. Riparian Vegetative Zone Width (LB & RB) Total RBP Score	0-20 Suboptimal	11 70		Riparian Vegetative Zone Width (LB & RB) al RBP Score	0-20 Poor	0		10. Riparian Vegetative Zone Width (LB & RB) Total RBP Score	0-20 Poor	0	10. Riparian Vegetative 2 Total RBP Score	one Width (LB & RB)	0-20 Poor	0	10. Riparian Vegetative Zone Width (LB & RB) Total RBP Score	0-20 Poor	0
Sub-Total	Ouboptimal	0.58333333	· ·	-Total	1 001	0		Sub-Total	1 001	0	Sub-Total		1 001	0	Sub-Total	1 001	0
CHEMICAL INDICATOR (Applies to Intermitte	nt and Perennial St			EMICAL INDICATOR (Applies to Intermitter	nt and Perennial Str	eams)		CHEMICAL INDICATOR (Applies to Intermitte	nt and Perennia	al Streams)	CHEMICAL INDICATO	OR (Applies to Intermitte	ent and Perennial St		CHEMICAL INDICATOR (Applies to Intermitter	nt and Perennial S	treams)
WVDEP Water Quality Indicators (General	n.		ww	DEP Water Quality Indicators (General	١			WVDEP Water Quality Indicators (General	I)		WVDEP Water Quality	Indicators (Conors	al)		WVDEP Water Quality Indicators (General	1	
Specific Conductivity	<u>'</u>			ecific Conductivity	,			Specific Conductivity	',		Specific Conductivity		11/		Specific Conductivity		
	0-90	139.3		<u> </u>	0-90				0-90		<u> </u>		0-90		,	0-90	
100-199 - 85 points	0-90	139.3			0-90				0-90				0-90			0-90	
рН	0.1	(3)	рН		0.1	0		рН		1	рН		0.1		рН		
6.0-8.0 = 80 points	0-80	6.23			5-90				5-90) - 1			5-90			5-90	
DO		(3)	DO			0		DO			DO				DO		
	10-30	0.48			10-30				10-30				10-30			10-30	
<5.0 = 10 points	10 00		01	Takal	10 00	0		Out Tatal	.0 00	0	Out Tatal		10 00	0	Out Tatal		
Sub-Total BIOLOGICAL INDICATOR (Applies to Intermit	tent and Perennial	0.875		r-Total LOGICAL INDICATOR (Applies to Intermit	tent and Perennial S	Streams)		Sub-Total BIOLOGICAL INDICATOR (Applies to Intern	nittent and Per	ennial Streams)	Sub-Total BIOLOGICAL INDICA	TOR (Annlies to Inter	mittent and Perenr	nial Streams)	Sub-Total BIOLOGICAL INDICATOR (Applies to Interm	nittent and Perent	nial Streams)
WV Stream Condition Index (WVSCI)	acin und i cicinnai	Olicanis)		Stream Condition Index (WVSCI)	tont and i oronniai v	Succinis)		WV Stream Condition Index (WVSCI)	interit una i ci	ermai otreams)	WV Stream Condition		initioni unu i ciciii	nar Garcanis)	WV Stream Condition Index (WVSCI)	ittent und i ereini	mur otreums)
WV Stream Condition fidex (WVSCI)	0-100 0-1			Stream Condition index (WVSCI)	0-100 0-1			WV Stream Condition index (WVSCI)	0-100	0-1	VVV Stream Condition	IIIdex (WV3CI)	0-100 0-1		WV Stream Condition maex (WVSCI)	0-100 0-1	
0 Sub-Total		0	Sub	ı-Total		0		Sub-Total		0	Sub-Total		1 1	0	Sub-Total		0
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PART II - Index and U	Init Score]	PART II - Index and	Unit Score			PART II - Index and	Unit Score		P	ART II - Index and l	Unit Score		PART II - Index and U	nit Score	
Index	Linear Feet	Unit Score		Index	Linear Feet	Unit Score		Index	Linear Fe	et Unit Score	Ind	ex	Linear Feet	Unit Score	Index	Linear Feet	Unit Score
0.456	61	27.83125		0	0	0		0	0	0	0		0	0	0	0	0

Version 10-20-17

Pr	Team:	RC/RH/DW	<u> </u>					Latitude/UT	M Northing:	36.96443	
	oject Name:						L	•	•	-79.595691	l
	Location:	UNT to Jon	nikin Creek					San	npling Date:	9/2/2021	
S	AR Number:	S-D1-EPH	Reach	Length (ft):	70	Stream Ty	rpe: Ephe	meral Stream	1		•
	Top Strata:	Shr	rub/Herb Str	ata	(determined	d from perce	nt calculate	d in V _{CCANO}	_{PY})		
Site	and Timing:	Project Site				•	Before Proje	ct			•
_	e Variables									0 11	
1	V _{CCANOPY}	equidistant	ercent cover points along at least one	g the stream	n. Measure	only if tree/s	apling cove	r is at least			Not Used, <20%
	List the per	cent cover r	measuremer	nts at each r	ooint below:						
	0	5	5	0	0	0	0	0	0	0	
2	V	Average or	nh a ddadnas	o of the otre	am abanna	Magazira	at no fourer	than 20 rau	able ognidia	tant nainta	
2	V_{EMBED}		nbeddednes tream. Sele								1.8
		surface and	d area surro	unding the p	particle that i	s covered b	y fine sedim	nent, and en	ter the ratin	g according	
			wing table. I					f fine sedim	ents, use a	rating score	
			bed is comp ness rating f					d from Plat	e Menahar	n and	Measure
		Minshall 19		or graver, or	obbic and b	bulder partie	ics (researe	a nomi iau	is, ivicgariai	i, and	at least
		Rating	Rating Des	•							30 points
		5			overed, sur					<)	4
		3			ce covered,		,	,			1
		2	51 to 75 pe	rcent of sur	face covered	d, surrounde	d, or buried	by fine sed	liment]
	Lint the"				covered, su	rrounded, o	r buried by f	ine sedime	nt (or artifici	al surface)	J
	List the rati	ngs at each	point below	1	3	1	2	1	1	1	1
	1	1	2	1	2	2	2	2	3	2	
	3	1	3	3							
			eam channe								
	0.08	0.10	0.08	0.08	0.25 1.00	0.08 1.80	0.60 2.00	0.08 2.10	0.08 2.80	0.08 2.75	
	3.00	0.08	3.10	3.30							
4	V_{BERO}		ent of eroded								
		side and the	e total perce	entage will b	e calculated	I If both bar	iks are eroo	ded, total er	osion for the	e stream	186 %
		,		65	5 ft		Right Bank	6	5 ft		
			Left Bank:	6	5 ft		Right Bank:	6	5 ft		
ample	e Variables		Left Bank:							nch bank).	
ample 5	e Variables	5-9 within the Number of 6	Left Bank:	parian/buffo	er zone adja	acent to the	stream ch	annel (25 f	eet from ea	feet of	0.0
		5-9 within to	Left Bank:	parian/buffe y stems (at l le number fr	er zone adja least 4 inche	acent to the	stream ch	annel (25 f	eet from ea	feet of	0.0
		5-9 within to	Left Bank: the entire rip down woody ch. Enter th	parian/buffe y stems (at l le number fr	er zone adja least 4 inche om the entir llated.	acent to the	e stream ch er and 36 in uffer and w	annel (25 f ches in leng ithin the cha	eet from ea	feet of	0.0
		5-9 within the Number of stream react per 100 fee	the entire rip down woody ch. Enter the et of stream v	parian/buffor y stems (at l e number fro will be calcumeasure onl	er zone adja least 4 inche om the entir llated. Number of ly if V _{CCANOP}	es in diamete e 50'-wide b downed wo	e stream cher and 36 in uffer and w	annel (25 f ches in leng ithin the cha	eet from ea gth) per 100 annel, and th	feet of ne amount	0.0
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5	V_{LWD}	5-9 within to Number of a stream read per 100 fee Average db inches (10 a List the dbh	Left Bank: the entire rip down woody ch. Enter the et of stream w oh of trees (r cm) in diame	parian/buffor y stems (at I e number frowill be calcumeasure onleter. Enter	er zone adja east 4 inche om the entir ilated. Number of ly if V _{CCANOP} tree DBHs in	es in diamete e 50'-wide b downed wo tree/saplin	e stream cher and 36 in uffer and woody stems: g cover is a	annel (25 f ches in leng ithin the cha	eet from ea ith) per 100 annel, and the 0	feet of ne amount	
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5	V _{LWD}	5-9 within the Number of stream read per 100 fee. Average db inches (10 of List the dbh the stream.	che entire rip down woody ch. Enter the et of stream w ch of trees (r cm) in diame measurem below: Left Side	parian/buffry stems (at I e number fr will be calcumeasure onleter. Enter ents of indiv	er zone adji least 4 inche om the entir llated. Number of ly if V _{CCANOP} , tree DBHs in vidual trees (acent to the es in diamete e 50'-wide b f downed wo y tree/saplin n inches. at least 4 in	e stream cher and 36 in uffer and woody stems: g cover is a	annel (25 f ches in leng ithin the cha t least 20%) buffer on ea Right Side	eet from ea yth) per 100 annel, and th 0 o. Trees are ach side of	feet of ne amount at least 4	
5	V_{LWD}	5-9 within ti Number of stream reac per 100 fee Average db inches (10 of List the dbh the stream	the entire rip down woody ch. Enter the et of stream wood of trees (r cm) in diame	parian/buffry stems (at I le number fr will be calcumeasure onleter. Enter lents of indiv	er zone adji least 4 inche om the entir lated. Number of ly if V _{CCANOP} tree DBHs in ridual trees (acent to the es in diamete e 50'-wide be fowned wo received the inches. (at least 4 in the control of the contr	e stream cher and 36 in uffer and woody stems: g cover is a) within the	annel (25 f ches in leng ithin the cha t least 20%) buffer on ea Right Side	eet from ea yth) per 100 annel, and th 0 o. Trees are ach side of	feet of ne amount at least 4	
5	V _{LWD}	5-9 within ti Number of stream reac per 100 fee Average db inches (10 of List the dbh the stream	che entire rig down woody ch. Enter the et of stream w ch of trees (r cm) in diame n measurem below: Left Side	parian/buffry stems (at I e number fr will be calcumeasure onleter. Enter sents of individuals ast 4" dbh a I the amount	er zone adji least 4 inche om the entir lated. Number of ly if V _{CCANOP} tree DBHs in ridual trees (acent to the es in diamete e 50'-wide b f downed wo y tree/saplin n inches. (at least 4 in per 100 feet et will be cal-	e stream cher and 36 in uffer and woody stems: g cover is a) within the of stream. culated.	annel (25 f ches in leng ithin the cha t least 20%) buffer on ea Right Side	eet from ea yth) per 100 annel, and th 0 o. Trees are ach side of	feet of ne amount at least 4	Not Used
5	V _{LWD}	5-9 within the Number of stream reacher 100 fee. Average db inches (10 of List the dbh the stream. Number of side of the stream.	the entire rip down woody ch. Enter the et of stream w ch of trees (r cm) in diame below: Left Side snags (at leastream, and	parian/buffry stems (at le number frwill be calcumeasure onleter. Enter lents of indiv	er zone adjueast 4 inche om the entirulated. Number of ly if V _{CCANOP} : virtee DBHs in vidual trees (es in diamete es in diamete e 50'-wide b f downed wo n inches. at least 4 in	e stream cher and 36 in uffer and woody stems: g cover is a) within the of stream. culated.	annel (25 f ches in leng ithin the cha t least 20%) buffer on ea Right Side	eet from ea 1th) per 100 1nnel, and th 0 1. Trees are 1. Trees are 1. Trees are	feet of ne amount at least 4 on each	Not Used
6	V _{LWD}	5-9 within ti Number of stream reac per 100 fee Average db inches (10 o List the dbh the stream Number of side of the s Number of if tree cover	che entire rip down woody ch. Enter the et of stream v ch of trees (r cm) in diame measurem below: Left Side snags (at lesstream, and Left Side:	parian/buffry stems (at I le number fr will be calcumeasure onleter. Enterments of individuals ast 4" dbh a I the amount d shrubs (we Enter numb	er zone adji least 4 inche om the entir lated. Number of ly if V _{CCANOP} tree DBHs in ridual trees (and 36" tall) in t per 100 fee	acent to the es in diamete e 50'-wide b f downed wo y tree/saplin n inches. (at least 4 in per 100 feet et will be calculup to 4 inch	e stream cher and 36 in uffer and woody stems: g cover is a) within the of stream. culated. Right Side: es dbh) per	annel (25 f ches in leng ithin the cha t least 20%) buffer on ea Right Side	eet from ea yth) per 100 annel, and the 0 or Trees are ach side of eer of snags	feet of ne amount at least 4 on each asure only	Not Used

9	V _{SRICH}	Group 1 in		nd the cubi	ndex will he	calculated f	rom these d	ata			
		richness pe		illu tile subil	IIGOX WIII DO	I	ioni inese di		0 / 4 -:		
			p 1 = 1.0				• " "		2 (-1.0)		
_	Acer rubrui		Ш	Magnolia ti	-		Ailanthus a		Ш	Lonicera ja	
Ш	Acer sacch		Ш	Nyssa sylv			Albizia julib		Ш	Lonicera ta	
Ш	Aesculus fl	ava	Ш	Oxydendrun	n arboreum		Alliaria peti	olata	Ш	Lotus comi	culatus
Ш	Asimina tril	loba	Ш	Prunus ser	rotina	Ш	Alternanthe		Ш	Lythrum sa	licaria
Ш	Betula alleg	haniensis	Ш	Quercus al	lba		philoxeroide	es	<u> </u>	Microstegium	n vimineum
Ш	Betula lent	а	\Box	Quercus co	occinea	Ш	Aster tatari	cus	Ш	Paulownia	tomentosa
Ш	Carya alba		Ш	Quercus in	nbricaria	Ш	Cerastium i	fontanum	Ш	Polygonum d	uspidatum
	Carya glab	ra		Quercus pi	rinus		Coronilla va	aria		Pueraria m	ontana
Ш	Carya oval	is	Ш	Quercus ru	ıbra	ш	Elaeagnus u	mbellata	Ш	Rosa multif	lora
	Carya ovat			Quercus ve	elutina		Lespedeza	bicolor		Sorghum h	alepense
_	Cornus flor		_	Sassafras			Lespedeza		_	Verbena br	•
_	Fagus gran		_	Tilia americ			Ligustrum ob		_		
_	Fraxinus a			Tsuga can			Ligustrum s				
_			_	-		_	Ligustrum	Sirierise			
	Liriodendron	-		Ulmus ame	ericaria						
	Magnolia a	cuminata									
		0	Species in	Group 1				1	Species in	Group 2	
			· ·	•		<u> </u>			•		
										25 feet fron	n each
anк. і 10	V _{DETRITUS}	•			equidistant sticks, or oth					er and <36"	
10	DETRITUS				t cover of th				44 diamica	or and 400	4.17 %
			Left	Side		<u> </u>	Right	Side		1 '	
		0	10	5		0	5	5			
11	V_{HERB}				aceous vege						
					oh and 36" ta n 200% are a					und cover egetation at	93 %
				o ap illioagi			intor the per	00111 00 101	or ground v	ogotation at	
		each subpl	ot.								
		each subpl		Side			Right	Side]	
		100		Side 95		100	Right	Side 90]	
Sample 12	e Variable 1	100 2 within the	Left 80 e entire cate	95 chment of t	the stream.	100					0.00
		100 2 within the	Left 80 e entire cate experies a series of F	95 chment of t	e for watersh	100			Runoff	% in Catch	0.29 Running
		100 2 within the	Left 80 e entire cate experies a series of F	95 chment of t		100			Runoff Score	% in Catch- ment	
	V _{WLUSE}	100 2 within the	Left 80 e entire cate everage of F	95 chment of t Runoff Score Use (Choose	e for watersh	100					Running Percent
	V _{WLUSE} Forest and n	2 within the Weighted A	Left 80 e entire cate werage of F Land	95 chment of t Runoff Score Use (Choose	e for watersh	100			Score 0.5	ment 10	Running Percent (not >100)
	VwLuse Forest and n Open space	2 within the Weighted A	Left 80 e entire cate everage of F Land 50% ground s, parks, etc.)	95 Chment of t Runoff Score Use (Choos cover)	e for watersh	100			0.5 0.3	10 13	Running Percent (not >100) 10
	VwLuse Forest and n Open space	2 within the Weighted A	Left 80 e entire cate everage of F Land 50% ground s, parks, etc.)	95 Chment of t Runoff Score Use (Choos cover)	e for watersh	100			Score 0.5	ment 10	Running Percent (not >100)
	VwLuse Forest and n Open space Impervious a	2 within the Weighted A	Left 80 e entire cate werage of F Land :50% ground is, parks, etc.)	95 Chment of t Runoff Score Use (Choos cover) , grass cover riveways, etc)	se From Dro	100			0.5 0.3	10 13	Running Percent (not >100) 10
	VwLuse Forest and n Open space Impervious a	2 within the Weighted A ative range (< (pasture, lawr areas (parking	Left 80 e entire cate werage of F Land :50% ground is, parks, etc.)	95 Chment of t Runoff Score Use (Choos cover) , grass cover riveways, etc)	se From Dro	100		90	0.5 0.3	ment 10 13 10	Running Percent (not >100) 10 23 33
	VwLuse Forest and n Open space Impervious a	2 within the Weighted A ative range ((pasture, lawr areas (parking)	Left 80 e entire cate werage of F Land :50% ground is, parks, etc.)	95 Chment of t Runoff Score Use (Choos cover) , grass cover riveways, etc)	se From Dro	100		90	0.5 0.3	ment 10 13 10	Running Percent (not >100) 10 23 33
	VwLuse Forest and n Open space Impervious a	2 within the Weighted A ative range ((pasture, lawr areas (parking)	Left 80 e entire cate werage of F Land :50% ground is, parks, etc.)	95 Chment of t Runoff Score Use (Choos cover) , grass cover riveways, etc)	se From Dro	100		90	0.5 0.3	ment 10 13 10	Running Percent (not >100) 10 23 33
	Forest and n Open space	2 within the Weighted A ative range ((pasture, lawr areas (parking)	Left 80 e entire cate werage of F Land :50% ground is, parks, etc.)	95 Chment of t Runoff Score Use (Choos cover) , grass cover riveways, etc)	se From Dro	100		90	0.5 0.3	ment 10 13 10	Running Percent (not >100) 10 23 33
	Forest and n Open space	2 within the Weighted A ative range ((pasture, lawr areas (parking)	Left 80 e entire cate werage of F Land :50% ground is, parks, etc.)	95 Chment of t Runoff Score Use (Choos cover) , grass cover riveways, etc)	se From Dro	100		90	0.5 0.3	ment 10 13 10	Running Percent (not >100) 10 23 33
	Forest and n Open space Impervious a Open space	2 within the Weighted A ative range ((pasture, lawr areas (parking)	Left 80 e entire cate werage of F Land :50% ground is, parks, etc.)	95 Chment of t Runoff Score Use (Choos cover) , grass cover riveways, etc)	se From Dro	100	90	90	0.5 0.3	ment 10 13 10	Running Percent (not >100) 10 23 33
12	Forest and n Open space Impervious a Open space	2 within the Weighted A ative range (< (pasture, lawr areas (parking (pasture, lawr	Left 80 e entire cate werage of F Land :50% ground is, parks, etc.) lots, roofs, di	Use (Choose Cover) , grass cover riveways, etc) , grass cover	e for watersh se From Dro >75% >75%	100 ned: p List)	90 Not	90 V	0.5 0.3 0 0.3	ment 10 13 10 67	Running Percent (not >100) 10 23 33 100
12 Va	Forest and n Open space Impervious a Open space	2 within the Weighted A ative range ((pasture, lawr areas (parking (pasture, lawr D1-EPH Value	Left 80 e entire cate werage of F Land :50% ground is, parks, etc.) lots, roofs, di is, parks, etc.)	Use (Choose Cover) , grass cover riveways, etc) , grass cover	e for watersh se From Dro >75% >75% er Analysis	100 ned: p List)	90 Not bletted using	90 V V V V V V V V V V V V V V V V V V	0.5 0.3 0 0.3	ment 10 13 10	Running Percent (not >100) 23 33 100
12 Va	Forest and n Open space Impervious a Open space	2 within the Weighted A ative range (< (pasture, lawr areas (parking (pasture, lawr	Left 80 e entire cate werage of F Land :50% ground is, parks, etc.) lots, roofs, di	Use (Choose Cover) , grass cover riveways, etc) , grass cover	e for watersh se From Dro >75% >75% er Analysis	ned: p List)	90 Not pleted using imagery an	90 V V V V V V V V V V V V V V V V V V	Score 0.5 0.3 0 0.3	ment 10 13 10 67 and Cover	Running Percent (not >100) 23 33 100
Va Voc	Forest and n Open space Impervious a Open space	2 within the Weighted A ative range (< (pasture, lawr areas (parking (pasture, lawr Value Not Used,	Left 80 e entire cate werage of F Land :50% ground is, parks, etc.) lots, roofs, di is, parks, etc.)	Use (Choose Cover) , grass cover riveways, etc) , grass cover	e for watersh se From Dro >75% >75% >rom Lands; d boundari	ned: p List) s was compat satellite es are base	Not bleted using imagery an ed off of fie	90 V V V V V V V V V V V V V V V V V V	Score 0.5 0.3 0 0.3 National Lupplementated stream	ment 10 13 10 67 and Cover	Running Percent (not >100) 10 23 33 100 Database
Va V _{CC} V _E	Forest and n Open space Impervious a Open space S-E ariable CANOPY	ative range (< (pasture, lawr areas (parking (pasture, lawr b) D1-EPH Value Not Used, <20% 1.8	Left 80 e entire cate werage of F Land 150% ground as, parks, etc.) lots, roofs, di as, parks, etc.) VSI Not Used 0.39	Use (Choose Cover) , grass cover riveways, etc) , grass cover	e for watersh se From Dro >75% >75% >rom Lands; d boundari	ned: p List) s was compat satellite es are base	Not bleted using imagery an ed off of fie	90 V V V V V V V V V V V V V V V V V V	Score 0.5 0.3 0 0.3 National Lupplementated stream	ment 10 13 10 67 and Cover ary datasets impacts.	Running Percent (not >100) 10 23 33 100 Database
Va V _{Ct} V _{Et} V _{St}	Forest and n Open space Impervious a Open space S-E ariable CANOPY MBED UBSTRATE	ative range (ative range ((pasture, lawrareas (parking) (pasture, lawr Value Not Used, <20%	Left 80 e entire cate verage of F Land 50% ground is, parks, etc.) lots, roofs, di is, parks, etc.) VSI Not Used 0.39 0.09	Use (Choose Cover) , grass cover riveways, etc) , grass cover	e for watersh se From Dro >75% >75% >rom Lands; d boundari	ned: p List) s was compat satellite es are base	Not bleted using imagery an ed off of fie	90 V V V V V V V V V V V V V V V V V V	Score 0.5 0.3 0 0.3 National Lupplementated stream	ment 10 13 10 67 and Cover ary datasets impacts.	Running Percent (not >100) 10 23 33 100 Database
Va V _{Ct} V _{Et} V _{St}	Forest and n Open space Impervious a Open space S-E ariable CANOPY	ative range (< (pasture, lawr areas (parking (pasture, lawr b) D1-EPH Value Not Used, <20% 1.8	Left 80 e entire cate werage of F Land 150% ground as, parks, etc.) lots, roofs, di as, parks, etc.) VSI Not Used 0.39	Use (Choose Cover) , grass cover riveways, etc) , grass cover	e for watersh se From Dro >75% >75% >rom Lands; d boundari	ned: p List) s was compat satellite es are base	Not bleted using imagery an ed off of fie	90 V V V V V V V V V V V V V V V V V V	Score 0.5 0.3 0 0.3 National Lupplementated stream	ment 10 13 10 67 and Cover ary datasets impacts.	Running Percent (not >100) 10 23 33 100 Database
Va V _{Ct} V _{Et} V _{St}	Forest and n Open space Impervious a Open space S-E ariable CANOPY MBED UBSTRATE	ative range (ative range ((pasture, lawrareas (parking) (pasture, lawr Value Not Used, <20%	Left 80 e entire cate verage of F Land 50% ground is, parks, etc.) lots, roofs, di is, parks, etc.) VSI Not Used 0.39 0.09	Use (Choose Cover) , grass cover riveways, etc) , grass cover	e for watersh se From Dro >75% >75% >rom Lands; d boundari	ned: p List) s was compat satellite es are base	Not bleted using imagery an ed off of fie	90 V V V V V V V V V V V V V V V V V V	Score 0.5 0.3 0 0.3 National Lupplementated stream	ment 10 13 10 67 and Cover ary datasets impacts.	Running Percent (not >100) 10 23 33 100 Database
Value	Forest and n Open space Impervious a Open space S-E ariable CANOPY MBED UBSTRATE ERO	ative range ((pasture, lawr areas (parking (pasture, lawr areas (parking (pasture, lawr 1.8 0.18 in 186 % 0.0	Left 80 e entire cate werage of F Land 550% ground as, parks, etc.) lots, roofs, di as, parks, etc.) VSI Not Used 0.39 0.09 0.08 0.00	Use (Choose Cover) , grass cover riveways, etc) , grass cover	e for watersh se From Dro >75% >75% >rom Lands; d boundari	ned: p List) s was compat satellite es are base	Not bleted using imagery an ed off of fie	90 V V V V V V V V V V V V V V V V V V	Score 0.5 0.3 0 0.3 National Lupplementated stream	ment 10 13 10 67 and Cover ary datasets impacts.	Running Percent (not >100) 10 23 33 100
Va Vcc Vst Vst VLV VTT	Forest and n Open space Impervious a Open space S-E ariable CANOPY MBED UBSTRATE ERO WD	ative range (ative range ((pasture, lawrareas (parking) 0.1-EPH Value Not Used, 0.0 Not Used 0.0 Not Used	Left 80 e entire cate verage of F Land 50% ground is, parks, etc.) lots, roofs, di is, parks, etc.) VSI Not Used 0.39 0.09 0.08 0.00 Not Used	Use (Choose Cover) , grass cover riveways, etc) , grass cover	e for watersh se From Dro >75% >75% >rom Lands; d boundari	ned: p List) s was compat satellite es are base	Not bleted using imagery an ed off of fie	90 V V V V V V V V V V V V V V V V V V	Score 0.5 0.3 0 0.3 National Lupplementated stream	ment 10 13 10 67 and Cover ary datasets impacts.	Running Percent (not >100) 10 23 33 100 Database
Value	Forest and n Open space Impervious a Open space S-E ariable CANOPY MBED UBSTRATE ERO WD	ative range ((pasture, lawr areas (parking (pasture, lawr areas (parking (pasture, lawr 1.8 0.18 in 186 % 0.0	Left 80 e entire cate werage of F Land 550% ground as, parks, etc.) lots, roofs, di as, parks, etc.) VSI Not Used 0.39 0.09 0.08 0.00	Use (Choose Cover) , grass cover riveways, etc) , grass cover	e for watersh se From Dro >75% >75% >rom Lands; d boundari	ned: p List) s was compat satellite es are base	Not bleted using imagery an ed off of fie	90 V V V V V V V V V V V V V V V V V V	Score 0.5 0.3 0 0.3 National Lupplementated stream	ment 10 13 10 67 and Cover ary datasets impacts.	Running Percent (not >100) 10 23 33 100 Database
Va Vcc Vst Vst VLV VTT	Forest and n Open space Impervious a Open space S-E ariable CANOPY MBED UBSTRATE ERO WD DBH	ative range (ative range ((pasture, lawrareas (parking) 0.1-EPH Value Not Used, 0.0 Not Used 0.0 Not Used	Left 80 e entire cate verage of F Land 50% ground is, parks, etc.) lots, roofs, di is, parks, etc.) VSI Not Used 0.39 0.09 0.08 0.00 Not Used	Use (Choose Cover) , grass cover riveways, etc) , grass cover	e for watersh se From Dro >75% >75% >rom Lands; d boundari	ned: p List) s was compat satellite es are base	Not bleted using imagery an ed off of fie	90 V V V V V V V V V V V V V V V V V V	Score 0.5 0.3 0 0.3 National Lupplementated stream	ment 10 13 10 67 and Cover ary datasets impacts.	Running Percent (not >100) 10 23 33 100
Value	Forest and n Open space Impervious a Open space S-E ariable CANOPY MBED UBSTRATE ERO WD DBH NAG SD	ative range ((pasture, lawr areas (parking (pasture, lawr branch areas (parking (pasture, lawr 1.8 0.18 in 186 % 0.0 Not Used 4.3 107.1	Left 80 e entire cate werage of F Land 550% ground as, parks, etc.) Iots, roofs, di as, parks, etc.) VSI Not Used 0.39 0.09 0.08 0.00 Not Used 0.87 1.00	Use (Choose Cover) , grass cover riveways, etc) , grass cover	e for watersh se From Dro >75% >75% >rom Lands; d boundari	ned: p List) s was compat satellite es are base	Not bleted using imagery an ed off of fie	90 V V V V V V V V V V V V V V V V V V	Score 0.5 0.3 0 0.3 National Lupplementated stream	ment 10 13 10 67 and Cover ary datasets impacts.	Running Percent (not >100) 10 23 33 100 Database
Value Volument Value Volument Value	Forest and n Open space Impervious a Open space Impervious a Open space S-E ariable CANOPY MBED UBSTRATE ERO WD DBH NAG SD RICH	2 within the Weighted A ative range (< (pasture, lawr areas (parking (pasture, lawr bridge () 1.8 0.18 in 186 % 0.0 Not Used 4.3 107.1 0.00	VSI Not Used 0.09 0.00 Not Used 0.00 0.00	Use (Choose Cover) , grass cover riveways, etc) , grass cover	e for watersh se From Dro >75% >75% >rom Lands; d boundari	ned: p List) s was compat satellite es are base	Not bleted using imagery an ed off of fie	90 V V V V V V V V V V V V V V V V V V	Score 0.5 0.3 0 0.3 National Lupplementated stream	ment 10 13 10 67 and Cover ary datasets impacts.	Running Percent (not >100) 10 23 33 100
Value Volument Value Volument Value	Forest and n Open space Impervious a Impervi	ative range (ative range ((pasture, lawr areas (parking (pasture, lawr branch areas (parking (pasture, lawr branch 186 0.0 Not Used 4.3 107.1 0.00 4.2 %	Left 80 e entire cate werage of F Land 550% ground as, parks, etc.) Iots, roofs, di as, parks, etc.) VSI Not Used 0.39 0.09 0.08 0.00 Not Used 0.87 1.00	Use (Choose Cover) , grass cover riveways, etc) , grass cover	e for watersh se From Dro >75% >75% >rom Lands; d boundari	ned: p List) s was compat satellite es are base	Not bleted using imagery an ed off of fie	90 V V V V V V V V V V V V V V V V V V	Score 0.5 0.3 0 0.3 National Lupplementated stream	ment 10 13 10 67 and Cover ary datasets impacts.	Running Percent (not >100) 10 23 33 100 Database
Value Volument Value Volument Value	Forest and n Open space Impervious a Open space Impervious a Open space S-E ariable CANOPY MBED UBSTRATE ERO WD DBH NAG SD RICH	2 within the Weighted A ative range (< (pasture, lawr areas (parking (pasture, lawr bridge () 1.8 0.18 in 186 % 0.0 Not Used 4.3 107.1 0.00	VSI Not Used 0.09 0.00 Not Used 0.00 0.00	Use (Choose Cover) , grass cover riveways, etc) , grass cover	e for watersh se From Dro >75% >75% >rom Lands; d boundari	ned: p List) s was compat satellite es are base	Not bleted using imagery an ed off of fie	90 V V V V V V V V V V V V V V V V V V	Score 0.5 0.3 0 0.3 National Lupplementated stream	ment 10 13 10 67 and Cover ary datasets impacts.	Running Percent (not >100) 10 23 33 100
Value V V V V V V V V V V V V V V V V V V V	Forest and n Open space Impervious a Impervi	ative range (ative range ((pasture, lawr areas (parking (pasture, lawr branch areas (parking (pasture, lawr branch 186 0.0 Not Used 4.3 107.1 0.00 4.2 %	Left 80 e entire cate verage of F Land 50% ground is, parks, etc.) lots, roofs, di is, parks, etc.) VSI Not Used 0.39 0.09 0.08 0.00 Not Used 0.87 1.00 0.005	Use (Choose Cover) , grass cover riveways, etc) , grass cover	e for watersh se From Dro >75% >75% >rom Lands; d boundari	ned: p List) s was compat satellite es are base	Not bleted using imagery an ed off of fie	90 V V V V V V V V V V V V V V V V V V	Score 0.5 0.3 0 0.3 National Lupplementated stream	ment 10 13 10 67 and Cover ary datasets impacts.	Running Percent (not >100 10 23 33 100

Ver. 10-20-17

FCI Calculator for the High-Gradient Headwater Streams in Appalachia

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

Project Name: Mountain Valley Pipeline

Location: UNT to Jonnikin Creek Spread I

Sampling Date: 9/2/2021 Project Site Before Project

Subclass for this SAR:

Ephemeral Stream

Uppermost stratum present at this SAR: SAR number: S-D1-EPH

Shrub/Herb Strata

Functional Results Summary:

Enter Results in Section A of the Mitigation Sufficiency Calculator

Function	Functional Capacity Index
Hydrology	0.17
Biogeochemical Cycling	0.28
Habitat	0.10

Variable Measure and Subindex Summary:

Variable	Name	Average Measure	Subindex
V _{CCANOPY}	Percent canpoy over channel.	Not Used, <20%	Not Used
V _{EMBED}	Average embeddedness of channel.	1.79	0.39
V _{SUBSTRATE}	Median stream channel substrate particle size.	0.18	0.09
V _{BERO}	Total percent of eroded stream channel bank.	185.71	0.08
V_{LWD}	Number of down woody stems per 100 feet of stream.	0.00	0.00
V _{TDBH}	Average dbh of trees.	Not Used	Not Used
$V_{\sf SNAG}$	Number of snags per 100 feet of stream.	4.29	0.87
V _{SSD}	Number of saplings and shrubs per 100 feet of stream.	107.14	1.00
V _{SRICH}	Riparian vegetation species richness.	0.00	0.00
V _{DETRITUS}	Average percent cover of leaves, sticks, etc.	4.17	0.05
V _{HERB}	Average percent cover of herbaceous vegetation.	92.50	1.00
V _{WLUSE}	Weighted Average of Runoff Score for Catchment.	0.29	0.31

PHYSICAL CHARACTERIZATION/WATER QUALITY FIELD DATA SHEET (FRONT)

STREAM NAME	LOCATION			
STATION # RIVERMILE	STREAM CLASS			
LAT LONG	RIVER BASIN			
STORET#	AGENCY			
INVESTIGATORS				
FORM COMPLETED BY	DATE	REASON FOR SURVEY		

WEATHER CONDITIONS	Now Past 24 hours Yes No storm (heavy rain) rain (steady rain) showers (intermittent) % cloud cover clear/sunny Has there been a heavy rain in the last 7 days? Yes No Air Temperature Other
SITE LOCATION/MAP	Draw a map of the site and indicate the areas sampled (or attach a photograph) Consing In Schl-Int Starts here TIMBER MAT BRIDGE
STREAM CHARACTERIZATION	Stream Subsystem Perennial Intermittent Tidal Stream Type Coldwater Warmwater Stream Origin Glacial Spring-fed Non-glacial montane Mixture of origins Swamp and bog Other

PHYSICAL CHARACTERIZATION/WATER QUALITY FIELD DATA SHEET (BACK)

WATERS FEATURI		Fores Field Agric	Pasture Industri	ercial	No evidence Son Obvious sources Local Watershed Erosi None Moderate	ne potential sources
RIPARIA VEGETA (18 meter	ΓΙΟΝ	Trees	e the dominant type and S ant species present	hrubs		rbaceous
INSTREA FEATURI			ted Reach Length		Canopy Cover Partly open Part	ly shaded Shaded
				m	High Water Mark	m
					Proportion of Reach Re	epresented by Stream
			km² (m²x1000) ted Stream Depth	km²	Morphology Types Riffle Pool %	Run%
			Velocity		Channelized Yes	No
		(111 11111			Dam Present Yes	No
LARGE V DEBRIS	VOODY		m² of LWDn	n ² /km ² (LWD /	reach area)	
AQUATIO VEGETA		Indicate Roote Floati Domina	e the dominant type and demergent R ng Algae A	l record the do ooted submerge ttached Algae	minant species present nt Rooted floating	C
		Portion	of the reach with aqua	tic vegetation _	%	
WATER (QUALITY	Specific	rature0 C Conductance	-	Water Odors Normal/None Sewage Petroleum Fishy	Chemical Other
		рН	ed Oxygen		Water Surface Oils Slick Sheen None Other	Globs Flecks
			strument Used		Turbidity (if not measu Clear ☐ Slightly tur Opaque Stained	r ed) rbid Turbid Other
SEDIMEN SUBSTRA		Odors Norm Chem		Petroleum None	Deposits Sludge Sawdust Relict shells	Paper fiber Sand Other
		Oils Abser		te Profu	are the undersides blac	h are not deeply embedded, k in color?
INC	ORGANIC SUBS		COMPONENTS (00%)		ORGANIC SUBSTRATE C (does not necessarily add	
Substrate Type	Diamete	er	% Composition in Sampling Reach	Substrate Type	Characteristic	% Composition in Sampling Area
Bedrock				Detritus	sticks, wood, coarse plant	
Boulder	> 256 mm (10")				materials (CPOM)	
Cobble	64-256 mm (2.5	"-10")		Muck-Mud	black, very fine organic	

Gravel

Sand

Silt

Clay

2-64 mm (0.1"-2.5")

0.06-2mm (gritty)

< 0.004 mm (slick)

0.004-0.06 mm

grey, shell fragments

Marl

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

STREAM NAME	LOCATION	
STATION # RIVERMILE	STREAM CLASS	
LAT LONG	RIVER BASIN	
STORET#	AGENCY	
INVESTIGATORS		
FORM COMPLETED BY	DATE AM PM	REASON FOR SURVEY

	Habitat		Condition	ı Category	
	Parameter Parameter	Optimal	Suboptimal	Marginal	Poor
	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 not new fall and not 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	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
n sampling reach	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.
ted in	SCORE	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
Parameters to be evaluated in sampling reach	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).
ıram	SCORE	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
P _s	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	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	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0

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

	Habitat		Condition	n Category	
	Parameter	Optimal	Suboptimal	Marginal	Poor
	6. Channel Alteration	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.
	SCORE	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
oling reach	7. Frequency of Riffles (or bends)	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.
samp	SCORE	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
Parameters to be evaluated broader than sampling reach	8. Bank Stability (score each bank) Note: determine left or right side by facing downstream.	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.
e eva	SCORE (LB)	Left Bank 10 9	8 7 6	5 4 3	2 1 0
to be	SCORE (RB)	Right Bank 10 9	8 7 6	5 4 3	2 1 0
Parameters	9. Vegetative Protection (score each bank)	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.
	SCORE (LB)	Left Bank 10 9	8 7 6	5 4 3	2 1 0
	SCORE (RB)	Right Bank 10 9	8 7 6	5 4 3	2 1 0
	10. Riparian Vegetative Zone Width (score each bank riparian zone)	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.
	SCORE (LB)	Left Bank 10 9	8 7 6	5 4 3	2 1 0
ĺ	SCORE (RB)	Right Bank 10 9	8 7 6	5 4 3	2 1 0

Total	Caare	
i otai	Score	

BENTHIC MACROINVERTEBRATE FIELD DATA SHEET

STREAM NAME		LOCATION	
STATION #	RIVERMILE	STREAM CLASS	
LAT	LONG	RIVER BASIN	
STORET#		AGENCY	
INVESTIGATORS			LOT NUMBER
FORM COMPLETED	ВҮ	DATE TIME	REASON FOR SURVEY
HABITAT TYPES	Indicate the percentage of	each habitat type present	

HABITAT TYPES	Indicate the percentage of each habitat type present Cobble% Snags% Vegetated Banks% Sand% Submerged Macrophytes% Other ()%
SAMPLE COLLECTION	Gear used D-frame kick-net Other
	How were the samples collected? wading from bank from boat
	Indicate the number of jabs/kicks taken in each habitat type. Cobble Snags Vegetated Banks Sand
	Cobble Snags Vegetated Banks Sand Submerged Macrophytes Other ()
GENERAL COMMENTS	

QUALITATIVE LISTING OF AQUATIC BIOTA

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

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

FIELD OBSERVATIONS OF MACROBENTHOS

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

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

WOLMAN PEBBLE COUNT FORM

County: Pittsylvania Stream ID: S-D1-EPH

Stream Name: UNT to Jonnikin Creek

HUC Code: 03010101 Basin: Upper Roanoke

Survey Date: 9/2/2020 Surveyors: RC/RH/DW Type: Representative

T 1	DADTICI E		LE COUNT	D (1)	7F 4 1 //	T. 0/	0/ C
Inches	PARTICLE	Millimeters		Particle Count	Total #	Item %	% Cur
	Silt/Clay	< .062	S/C	‡	39	39.00	39.00
	Very Fine	.062125		+	4	4.00	43.00
	Fine	.12525	1	‡	3	3.00	46.00
	Medium	.255	SAND	.	1	1.00	47.00
	Coarse	.50-1.0	1	+	3	3.00	50.00
.0408	Very Coarse	1.0-2	1	•	1	1.00	51.00
.0816	Very Fine	2 -4		‡		0.00	51.00
.1622	Fine	4 -5.7	1	.		0.00	51.00
.2231	Fine	5.7 - 8	1	+		0.00	51.00
.3144	Medium	8 -11.3	1	‡	2	2.00	53.00
.4463	Medium	11.3 - 16	GRAVEL	.	1	1.00	54.00
.6389	Coarse	16 -22.6	1	•	2	2.00	56.00
.89 - 1.26	Coarse	22.6 - 32	1	.	3	3.00	59.00
1.26 - 1.77	Vry Coarse	32 - 45	1	‡		0.00	59.00
1.77 -2.5	Vry Coarse	45 - 64	1	.	12	12.00	71.00
2.5 - 3.5	Small	64 - 90		‡	10	10.00	81.00
3.5 - 5.0	Small	90 - 128		‡	4	4.00	85.00
5.0 - 7.1	Large	128 - 180	COBBLE	.	5	5.00	90.00
7.1 - 10.1	Large	180 - 256	1	‡		0.00	90.00
10.1 - 14.3	Small	256 - 362		^		0.00	90.00
14.3 - 20	Small	362 - 512	1	‡		0.00	90.00
20 - 40	Medium	512 - 1024	BOULDER	^		0.00	90.00
40 - 80	Large	1024 -2048	1	^		0.00	90.00
80 - 160	Vry Large	2048 -4096	1	^		0.00	90.00
	Bedrock		BDRK	‡	10	10.00	100.0
				Totals:	100		

RIVERMORPH PARTICLE SUMMARY

River Name: UNT to Jonnikin Creek Reach Name: S-D1-EPH Representative Survey Date: 09/02/2021

Size (mm)	тот #	ITEM %	CUM %
0 - 0.062 0.062 - 0.125 0.125 - 0.25 0.25 - 0.50 0.50 - 1.0 1.0 - 2.0 2.0 - 4.0 4.0 - 5.7 5.7 - 8.0 8.0 - 11.3 11.3 - 16.0 16.0 - 22.6 22.6 - 32.0 32 - 45 45 - 64 64 - 90 90 - 128 128 - 180 180 - 256 256 - 362 362 - 512 512 - 1024 1024 - 2048 Bedrock	39 4 3 1 3 1 0 0 0 2 1 2 3 0 12 10 4 5 0 0 0 0 10	39.00 4.00 3.00 1.00 3.00 1.00 0.00 0.00 0.00 2.00 1.00 2.00 3.00 0.00 12.00 10.00 4.00 5.00 0.00 0.00 0.00 0.00 0.00	39.00 43.00 46.00 47.00 50.00 51.00 51.00 51.00 53.00 54.00 56.00 59.00 71.00 81.00 85.00 90.00 90.00 90.00 90.00 90.00 90.00
D16 (mm) D35 (mm) D50 (mm) D84 (mm) D95 (mm) D100 (mm) Silt/Clay (%) Sand (%) Gravel (%) Cobble (%) Boulder (%) Bedrock (%)	0.03 0.06 1 118.5 Bedrock Bedrock 39 12 20 19 0		

Total Particles = 100.

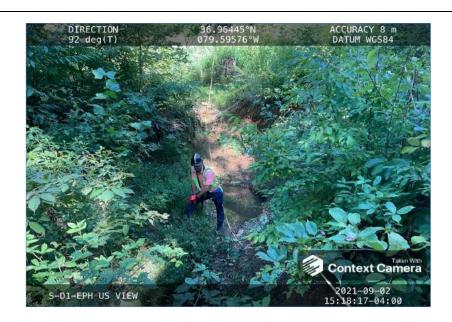
Ephemeral Stream Assessment Form (Form 1a) Unified Stream Methodology for use in Virginia For use in ephemeral streams Cowardin Impact HUC Project # **Project Name** Locality Date SAR# Class length Factor Mountain Valley Pipeline (Mountain 22865.06 Pittslyvania R6 03010101 9/2/21 S-D1-EPH 61 1 Valley Pipeline, LLC) Name(s) of Evaluator(s) Stream Name and Information SAR Length RC/RH/DW UNT to Jonnikin Creek 61 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>> Assessment Optimal Suboptimal Marginal Poor is limited to areas within Low Marginal: ligh Poor: Lawr the temporary ROW. Non-maintained High Suboptima ow Suboptimal mowed, and High Marginal: ense herbaceou Riparian areas Riparian areas naintained area Low Poor: Non-maintained vegetation, with tree stratum with tree stratum nurseries: no-till Impervious ense herbaceou riparian areas (dbh > 3 inches) (dbh > 3 inches) cropland: actively surfaces mine lacking shrub and tree stratum, hay vegetation with present, with 30% to 60% tree Tree stratum (dbh > 3 inches) present resent, with >30° grazed pasture spoil lands, Riparian either a shrub with > 60% tree canopy cover and an non-maintained understory. Wetlands tree canopy cover and a maintained parsely vegetate enuded surfaces layer or a tree layer (dbh > 3 oroduction, ponds open water. If **Buffers** nopy cover and row crops, active feed lots, trails, or containing both understory. area, recently inches) present present, tree herbaceous and shrub layers or a Recent cutover (dense seeded and other comparable conditions. with <30% tree stratum (dbh >3 abilized, or oth canopy cover inches) present, non-maintained vegetation). comparable with <30% tree understory condition. canopy cover wit maintained Low Low High High Low High Condition 1.5 1.2 1.1 0.85 0.75 0.6 0.5 Scores 1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors Ensure the sums Determine square footage for each by measuring or estimating length and width. Calculators are provided for you of % Riparian 3. Enter the % Riparian Area and Score for each riparian category in the blocks below Blocks equal 100 10% 20% 30% 100% % Riparian Area> 40% Right Bank Score > 0.5 0.85 0.6 0.75 CI= (Sum % RA * Scores*0.01)/2 20% 30% 40% 10% 100% CI Rt Bank CI > 0.63 % Riparian Area> Left Bank 0.85 0.6 0.75 Lt Bank CI > 0.67 0.65 REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH NOTE: The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number THE REACH CONDITION INDEX (RCI) >> 0.33

RCI= (Riparian CI)/2 COMPENSATION REQUIREMENT (CR) >>

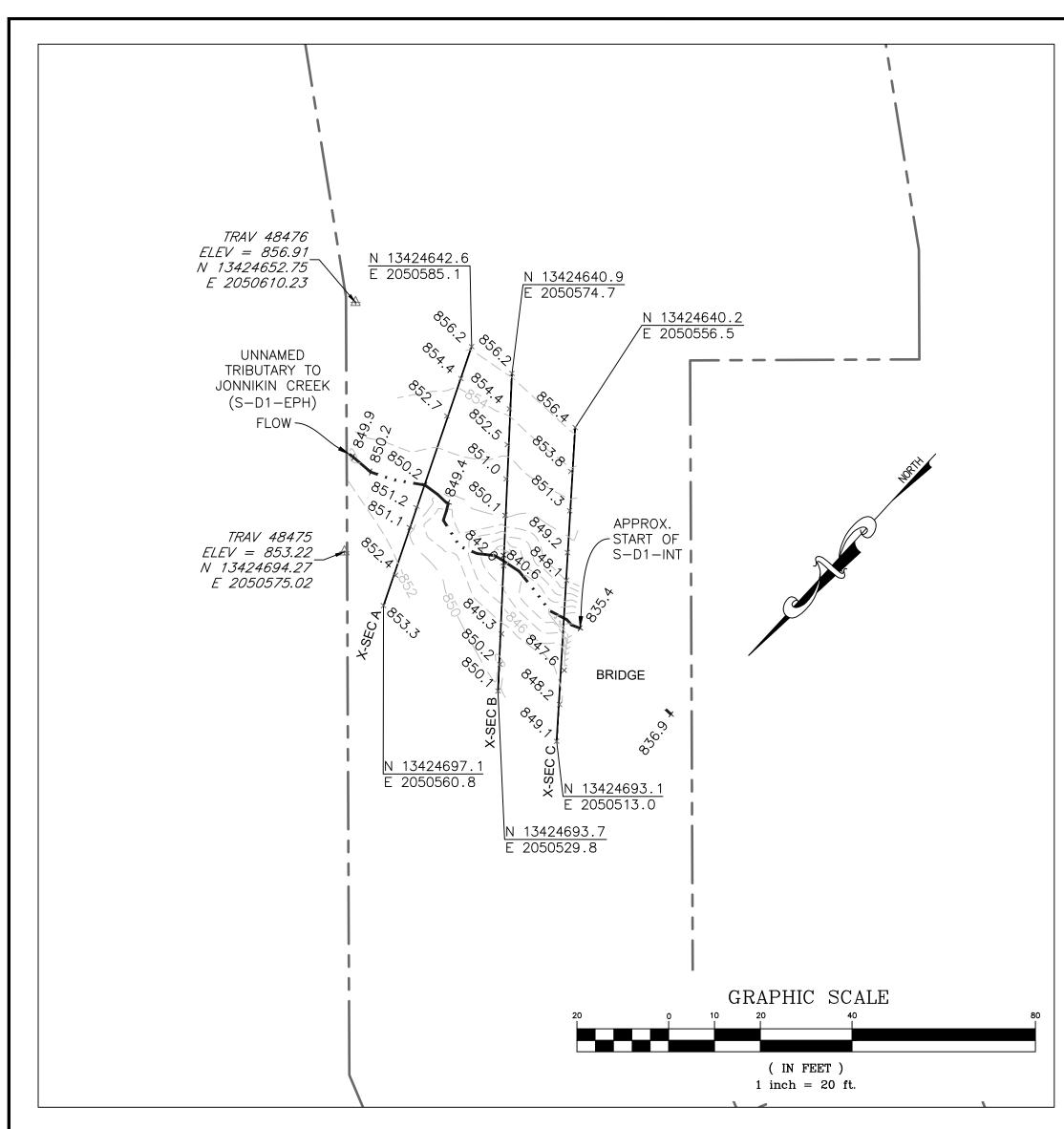
20

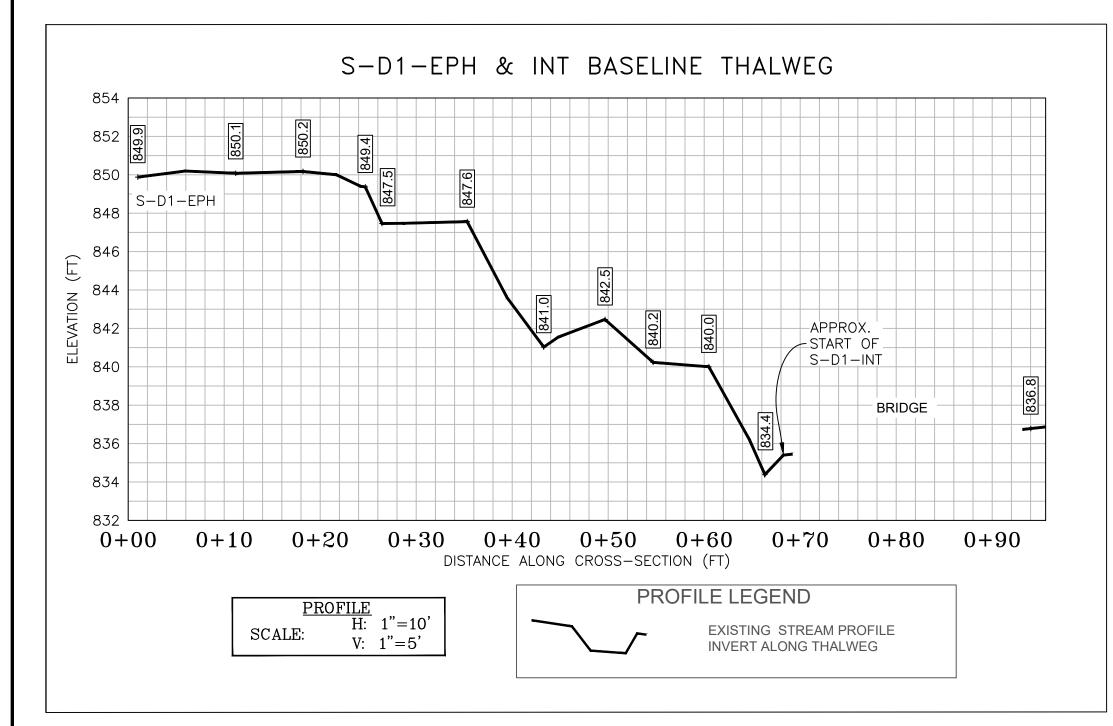
CR = RCI X LF X IF

INSERT PHOTOS:



DESCRIBE PROPOSED IMPACT:
PROVIDED UNDER SEPARATE COVER





LEGEND STUDY AREA (EASEMENT) EXISTING SURVEY-LOCATED THALWEG EXISTING SURVEY-LOCATED EDGE OF WATER (AS NECESSARY) EXISTING CONTOUR LINE (MAJOR) EXISTING CONTOUR LINE (MINOR) EXISTING SURVEYED GROUND SHOT ELEVATION 849.2 +BENCHMARK POINT (WSSI)

	858						H NO	WATER	SURFA	CE SHO	тс Т			
(FI	856						AT T		F SURV					
	854													
ELEVATION	852													
Ш	850				THALWE									
	848				.: 850.2									
	0+	00	0+				0+30 NG CROS				0+50	1		
			S-	D1-	EPH	ВА	SELIN	VE POO	CROS	S-2	SECT	TION	В	
	860													
	858										SURFA SURFA F SUR		ОТ	
	856								(DE	C 2018	B) 			
	854													
(FT)	852													
ION	850													
ELEV	848 846													
	844													
	842							$+$ \						
	840				EX	THAL	_WEG		\mathcal{L}					
						EL.: 84	40.6' —							
	₈₃₈	10	0 + 1	0		EL.: 84			2 40		150	0	160	
		00			0+20 DIS	O TANCE	0+30 ALONG	CROS	S-SECTI	ION (F	Τ)			
	₈₃₈	00			0+20 DIS	O TANCE	0+30	CROS	s-secti CROS	ION (F	Τ)			
	838 0+0	00			0+20 DIS	O TANCE	0+30 ALONG	CROS:	CROS	SS-: ATER S	T) SECT	ΓΙΟΝ E SHOT	С	
	838 0+ 0	00			0+20 DIS	O TANCE	0+30 ALONG	CROS:	CROS	SS-: ATER S ME OF	SEC	ΓΙΟΝ E SHOT	С	
	838 0+0 860 858	00			0+20 DIS	O TANCE	0+30 ALONG	CROS:	CROS L NO WA	SS-: ATER S ME OF	T) SECT	ΓΙΟΝ E SHOT	С	
	838 0+0 860 858 856	00			0+20 DIS	O TANCE	0+30 ALONG	CROS:	CROS L NO WA	SS-: ATER S ME OF	T) SECT	ΓΙΟΝ E SHOT	С	
	838 0+0 860 858 856 854	00			0+20 DIS	O TANCE	0+30 ALONG	CROS:	CROS L NO WA	SS-: ATER S ME OF	T) SECT	ΓΙΟΝ E SHOT	С	
(FT)	838 0+0 860 858 856 854 852	00			0+20 DIS	O TANCE	0+30 ALONG	CROS:	CROS L NO WA	SS-: ATER S ME OF	T) SECT	ΓΙΟΝ E SHOT	С	
(FT)	838 0+0 860 858 856 854 852 850	00			0+20 DIS	O TANCE	0+30 ALONG	CROS:	CROS L NO WA	SS-: ATER S ME OF	T) SECT	ΓΙΟΝ E SHOT	С	
	838 0+0 860 858 856 854 852 850 848	00			0+20 DIS	O TANCE	0+30 ALONG	CROS:	CROS L NO WA	SS-: ATER S ME OF	T) SECT	ΓΙΟΝ E SHOT	С	
(FT)	838 0+0 860 858 856 854 852 850 848 846	00			0+20 DIS	O TANCE	0+30 ALONG	CROS:	CROS L NO WA	SS-: ATER S ME OF	T) SECT	ΓΙΟΝ E SHOT	С	
(FT)	838 0+0 860 858 856 854 852 850 848 846 844				0+20 DIS	O TANCE	0+30 ALONG	CROS:	CROS L NO WA	SS-: ATER S ME OF	T) SECT	ΓΙΟΝ E SHOT	С	
(FT)	838 0+0 860 858 856 854 852 850 848 846 844 842	00			0+20 DIS	O TANCE	0+30 ALONG	CROS:	CROS L NO WA	SS-: ATER S ME OF	T) SECT	ΓΙΟΝ E SHOT	С	
(FT)	838 0+0 860 858 856 854 852 850 848 846 844 842 840	00			0+20 DIS	D TANCE BA	0+30 ALONG ASELIN	VE POO	CROS L NO WA	SS-: ATER S ME OF	T) SECT	ΓΙΟΝ E SHOT	С	
(FT)	838 0+0 860 858 856 854 852 850 848 846 844 842 840 838				0+20 DIS	D TANCE BA	0+30 ALONG SELIN	VE POO	CROS L NO WA	SS-: ATER S ME OF	T) SECT	ΓΙΟΝ E SHOT	С	
(FT)	838 0+0 860 858 856 854 852 850 848 846 844 842 840 838 836 834 834		S-	D1-	0+20 DIS EPH	D TANCE BA	0+30 ALONG ASELIN THALWEG: 834.2'	NE POO	CROSL NO WAT TIME (DEC	ATER SME OF 2018)	SECT SURFACE SURVE 0+50	FION E SHOTY	C	
(FT)	838 0+0 860 858 856 854 852 850 848 846 844 842 840 838 836 834 834	000	S-	D1-	0+20 DIS -EPH	D TANCE BA	0+30 ALONG ASELIN	NE POO	CROSL NO WAT TIME (DEC	ATER SME OF 2018)	SECT SURFACE SURVE 0+50	FION E SHOTY	+60	

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 December 26, 2018.
- 2. Monumentation, including traverse stations and fly points, shown on this drawing should be used to orient any future boundary, topographic, or location
- 3. Easement lines shown on plan view were provided by Mountain Valley Pipeline (MVP).
- 4. WSSI Contour Interval = 2.0'. Interpolated from cross-section and thalweg points without additional breakline shots.
- 5. All section views shown left to right facing downstream.
- 6. Cross section B shot at location of pipe centerline (based on field stakes).

CL STA	AKEOUT POINTS	S: S-D1-INT CR	OSS SECTIO	ON B (PIPE	CL)
	PR	E-CROSSING		POST-C	ROSSING
DT LOS	NORTHING	FACTING	FLEV	VERT.	HORZ.
PT. LOC.	NORTHING	EASTING	ELEV	DIFF.	DIFF.
TŞ-L	13424664.60	2050554.74	850.05		
BS-L	13424670.26	2050549.56	840.78		
THW	13424671.20	2050549.07	840.60		
BS-R	13424672.88	2050547.50	842.02		
TS-R	13424684.11	2050537.72	849.32		

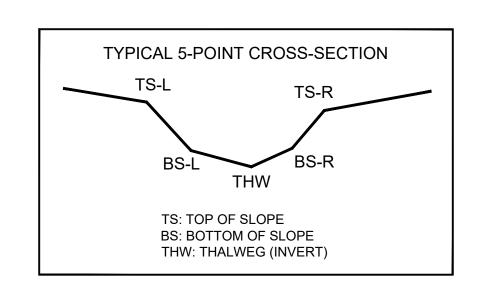




PHOTO TAKEN LOOKING UPSTREAM FROM BRIDGE ON 12/26/2018

Wetland

Profile

284.



PHOTO TAKEN LOOKING DOWNSTREAM FROM LEFT BANK ON 12/26/2018

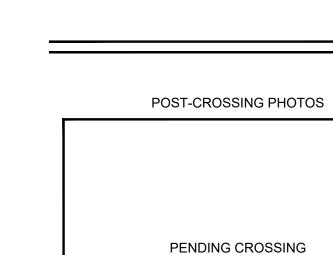


PHOTO TAKEN LOOKING

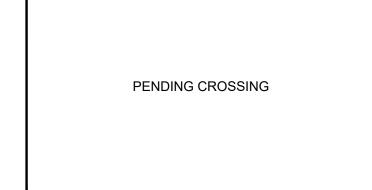


PHOTO TAKEN LOOKING

	Rev. App. By By			
	Rev. By			
REVISIONS				SCALE: AS NOTED
REV	Description			DATE: October 2021
	No. Date			FE: Octo
	No.			DA]

Vertical Datum: NAVD 88

Boundary and Topo Source: WSSI 2' C.I. Topo EJC NAS PFS

1 of 1

Sheet #

Computer File Name: L:\Survey\22000s\22800\22865.03\Spread I Work Dwgs 22865_03 S-I MP 279-291 Sheets.dwg