# RELOCATION PLAN R2707D CLEVELAND COUNTY SEPTEMBER 20, 2022

The Shelby Bypass (R2707) individual 404/401 permit was issued in 2012. One of the project commitments is to use bioengineering techniques to relocate the tributary of Buffalo Creek between SR 2063 (Kemper Road) and the Light Oak community. The result would be meandering stream with riffles and pools and banks stabilized with native vegetation and root wads instead of rip-rap as appropriate.

The tributary to Buffalo Creek flows parallel to the proposed D section of the Bypass (R2707D) and construction will result in impacts to various sections of the tributary. Site visits were conducted with regulatory agencies in 2018 to determine if the identified tributary was suitable for relocation using bioengineering techniques. Areas were identified for relocation if they would be buried by the road fill. Adjacent areas were identified as well as connections to tributaries in order to create a more stable system. Relocating the tributaries in place of burying them or creating rip-rap lined channels minimizes the impacts from the proposed roadway. In addition, the relocation will result in functional uplift to a degraded system. The tributary is identified as stream 7-1 in the permit document and impact figures. The connecting tributaries are mapped as 7-3, 7-4, and 7-5. The below table summarizes the stream and connecting tributary impacts as presented in the permit application and impact drawings:

	Surface Water Impact Summary						
Impact Site No.	Station (From/To)	Structure Size/Type	Permanent SW Impacts (ac)	Temp. SW Impacts (ac)	Existing Channel Impacts Permanent (ft)	Existing Channel Impacts Temp. (ft)	Natural Stream Design(ft)
4A	720+05 TO 725+00-L-LT	CHANNEL	0.15	< 0.01	806	20	621
4B	720+52 TO 721+60-L-LT	CHANNEL	< 0.01	< 0.01	109	15	199
5A	727+99 TO 732+97-L-LT	CHANNEL	0.16	< 0.01	664	40	530
5B	730+88 TO 732+24-L-LT	CHANNEL	0.01	< 0.01	186	15	134
6A	734+37 TO 740+78-L-LT	CHANNEL	0.30	0.02	1,178	56	878
6B	739+73 TO 742+83-L-LT	CHANNEL	0.12		468		316

This mitigation plan includes information on the existing and proposed conditions as well as monitoring standards.

#### **1.0 BASELINE INFORMATION**

The R2707D Channel Relocation is located east of Shelby in Light Oak, Cleveland County. The channel relocation initiates north of Kemper Road and continues downstream past Kellom Dr.

	Watershed Designations							
River Basin	Broad River							
DWR Sub-basin 03-08-05								
Watershed	Beason Creek – Buffalo Creek							
Hydrologic Unit Code	030501050804							
NCDWR Classification	С							
EPA 303(d) List	Not Listed							
Physiographic Region	Piedmont							
EPA Level IV Ecoregion	Southern Outer Piedmont							

	Site Watershed Characteristics					
Site Watershed size	1.14 sq mi (730 acres)					
		An historic aerial from 1947 shows the watershed is mostly agricultural land with some wooded areas along streams and the county fairgrounds.				
	By 1993 the fairgrounds Kemper Road were buil	•		·		
Historic Land Use	Oak Grove neighborhoo	-	•			
Cita Matawahad Land	Forested	24.5%	Residential	23.1%		
Site Watershed Land Use	Open Space/Grass	22.1%	Impervious	15.2%		
U3E	Agriculture	15.2%				
Zoning/Future Land Use	Impervious surfaces will increase to 19% with construction of the bypass. In addition, 11% of undeveloped portions of the watershed are zoned for future commercial development. However, a quarter of this will be protected in NCDOT ROW purchased for the stream relocation and protection of the dwarf flowered heartleaf. The remainder of the undeveloped portions of the watershed are zoned for low density residential development.					

#### **Stream Existing Conditions**

Historically managed to support generations of silviculture and agriculture, the existing streams are now flanked on each side of the valley by residential/light industrial development. Throughout this land use

history, the streams themselves have experienced a range of human modifications including damming, ditching, channelizing, and/or armoring.

The following table provides a summary of existing conditions (length, characteristics and classification) for each reach: 7-1, 7-3, 7-4, 7-5.

	Reach Classification								
				Reach Properties (average)					
Surface Waters ID	Impact ID	Cross Reference: "Plan for Channel Relocation" Drawings	Length (ft)	Width To Depth Ratio	Entrenchment Ratio	Sinuosity	Slope (%)	Substrate	Rosgen Classification
	4A	Site 1 / Reach 1A	806	9.90	1.38	1.86	1.26	Gravel	B4c
7-1	5A	Site 2 / Reach 1B	664	11.08	1.47	1.26	1.10	Gravel	B4c
7-1	6A	Site 3 / Reach 2A Site 3 / Reach 2C	1178	32.34 37.56	2.66 3.06	1.18 1.49	3.30 0.53	Cobble/Bedrock Gravel	B3/1 C4
7-3	4B	Site 1 / Reach 1A	109	13.00	2.5	1.02	2.6	Cobble/Gravel	Bc3/4
7-4	5B	Site 2 / Reach 1B	186	15.04	2.27	1.02	1.69	Gravel	B4
7-5	6B	Site 3 / Reach 2B	468	32.34	2.66	1.66	0.65	Gravel	C4

NOTE: In general, the data presented above serves as "representative", meaning that some variations/departures within reaches may exist. Data were analyzed by reach and then adapted to impact sites

Beginning in the upper reaches of the project (upstream including stream 7-1, Impact 4A; reference Figure 1), the channel is steeper, interacting with bedrock to behave as a gravel/bedrock step-pool system (classification: Rosgen B). These upper reaches, though somewhat armored by bedrock, have still degraded as observed in the channel downcutting, lateral instability, fair bedform, and fair riparian zone (vegetative width and composition). Further downstream (middle portion of Reach 7-1, Impact 5A), the valley broadens and where there is potential to transition (through a bedrock armored section, Impact 5A) to a sinuous riffle-pool sand bed complex (Classification: Rosgen C), the disturbed existing channels become further incised and resemble confined F-channels, characterized by poor horizontal stability, disconnection with active floodplain, poor bedform (indistinguishable facets), and poor riparian zone. Approaching the downstream extents of the stream project (lower Reach 7-1, Impact 6A), further valley widening and sediment contribution from tributaries and surrounding land results in aggradation and sediment imbalance. Throughout Stream 7-1, the channel predominantly classes out as a Bc/C type channel attempting to establish a stable form (downstream of Reach 7-5).

Detailed field data was collected at seven locations along Reaches 7-1 and 7-5 (reference "Plan for Channel Relocation") within the project area and compiled/evaluated to develop this summary of existing stream conditions. At each location, the thalweg profile and multiple cross sections were surveyed by engineers with a total station. The reach locations were predominantly where the proposed relocated stream will tie-in to the existing channel. Profile and cross section data were used to classify the Rosgen stream type and for consideration of hydraulic geometry in support of overall functional assessment.

The geomorphic data, in addition to visual investigation (Pfankuch Stability, consistently "Fair"), was used to determine the Bank Erosion Hazard Index (BEHI, mostly "High" to "High-Moderate") and Near-Bank Stress (NBS, also mostly "High" to "High-Moderate") for both stream banks along the impact sites. A summary of BEHI/NBS approximation and weighted average is provided in the below table:

	BEHI/NBS Summary													
Impact Site	% Ver	y Low	% L	.ow	Mod	erate	Hi	gh	Very	High	Extr	eme	Weig Ave	
No.	BEHI	NBS	BEHI	NBS	BEHI	NBS	BEHI	NBS	BEHI	NBS	BEHI	NBS	BEHI	NBS
4A	5	10	20	30	40	35	15	10	15	10	5		M-H	M-H
4B	5	5	30	25	50	65	10	5	5				М	M-H
5A	10	40	40	50	45	10	5						M-L	L
5B	30	55	60	40	10	5							L	L
6A			5	15	15	15	60	40	15	25	5	5	H-VH	H-VH
6B			5	15	15	15	65	50	10	15	5	5	H-VH	H-VH

These metrics can be used to predict the magnitude of erosion from the banks at the current condition via the Bank Assessment for Non-point Source Consequences of Sediment (BANCS) method. In this case, the BEHI and NBS data collected were used to qualitatively assess the stability of the banks. Additionally, the North Carolina Stream Assessment Method (NC SAM) was used to determine the level of function of the streams at the impact sites. Cumulatively, this data was used to evaluate the function, form, and stability of the existing channel that will be relocated.

#### 2.0 MITIGATION WORK PLAN

The goal of the project is to minimize impacts to the Buffalo Creek tributary and provide functional uplift by relocating the channel using bioengineering techniques and natural channel design methods. The stream design allowed for lower gradient culverts located at the upstream and downstream ends of the relocation area.

The existing, manipulated stream struggles to convey the hydrologic and sediment loading regimes of a modified (developed) watershed, resulting in a dysfunctional, degraded stream. With or without the proposed roadway project, this existing stream will persist in disequilibrium util it receives active management imposing a balance between form and process.

The proposed improvements aim to pair proposed channel form and hydraulic geometry (reference "Plan for Channel Relocation" for geomorphic table) with the current/future hydrologic and sediment loading regimes resulting in an appropriate natural form that corresponds to modified watershed processes. A Proposed channel hydraulics build upon existing function, reducing or eliminating issues associated with lateral bank stability, bedform diversity, access to active floodplain and riparian zone functions. By crafting channels in select locations and leaving other portions undisturbed, this plan proposes to improve stream and floodplain functionality throughout the project length. In addition to detailed grading (channel-floodplain geometry), this plan proposes in-stream bedform treatments (Vanes, J-Hook, Riffles) and bank bioengineering treatments (wood toe, live staking) that both promote vertical/horizontal stability, while also contributing to bedform diversity and associated aquatic habitat.

Thirdly, this plan proposes a robust reforestation plan that provides for stable establishment of buffer/bank vegetation following construction. Reforestation plans are included in the "Plan for Channel Relocation" on sheets RF-1 to RF-4.

#### 4.0 SUCCESS CRITERIA

The stream relocation site shall be monitored for five years or until success criteria are satisfied. NCDOT will evaluate the success of the stream relocation project based on guidance provided by the April 2003 Stream Mitigation Guidelines, Monitoring Level I protocol disseminated by the United States Army Corps of Engineers-Wilmington District. The survey of channel dimension will consist of permanent cross sections placed at six (6) cross sections (three riffles and three pools). Annual photographs showing both banks and upstream and downstream views will be taken from permanent, mapped photo points. The survey of the longitudinal profile will cover a cumulative total of approximately 2,678 linear feet of channel (2,029' of 7-1, 199'et of 7-3, 134' of 7-4 and 316' of 7-5). The entire restored length of stream will be investigated for channel stability and in-stream structure functionality. Any evidence of channel instability will be identified, mapped and photographed. Pebble counts shall not be conducted. In the event that success criteria are not being met, remedial measures will be coordinated with resource agencies. The monitoring shall be conducted annually for a minimum of five (5) years after final planting. The monitoring results shall be submitted to resource agencies in a final report within sixty (60) days after completing monitoring. After 5 years, the NCDOT shall contact resource agencies to schedule a site visit to "close out" the mitigation site if the site has met success criteria. If success is not met, NCDOT will make necessary adjustments to the site or provide alternative mitigation credits to cover the impacts.

#### **Vegetation Success**

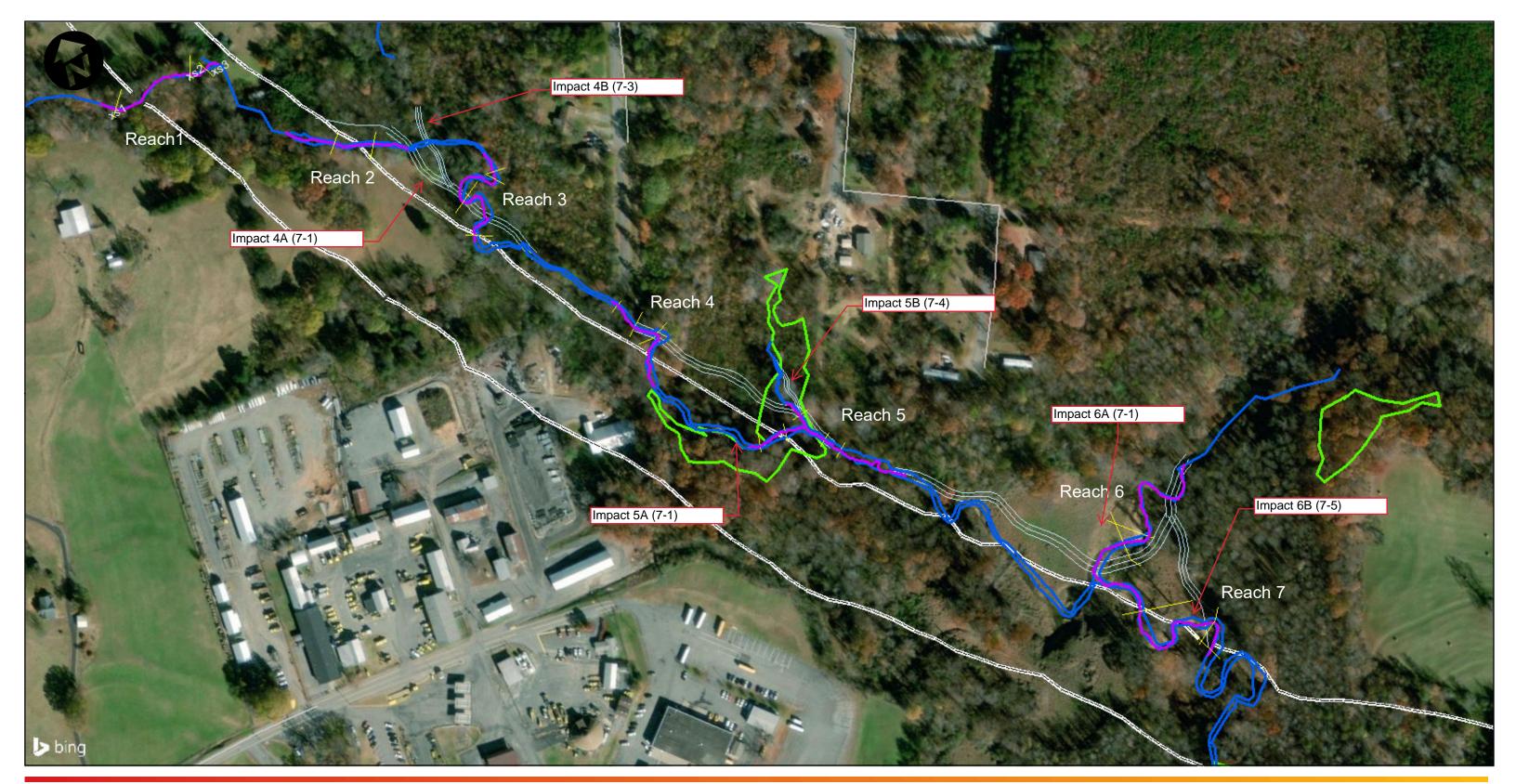
The success of vegetation and plantings will be measured through stem counts. Permanent quadrants will be used to sample the riparian buffer. Survival of the live stakes will be determined by visual observation throughout the five-year monitoring period. Bare root vegetation will be evaluated using three (3) staked survival plots. Plots will be 50ft. by 50ft. If site conditions prevent a 50ft. by 50ft. plot, then the plot will have varying dimensions to encompass an area of 2,500 ft2. All flagged stems will be counted in those plots. Success will be defined as 320 stems per acre after three years and 260 stems per acre after five years. All vegetation monitoring will be conducted during the growing season. Appropriate measures will be taken to control nuisance vegetation during the monitoring period if it affects the success of the planted vegetation.

#### **Functional Assessment: Pre and Post construction**

NCSAM forms were completed for seven locations along the proposed stream relocation. The main channel was split into 4 reaches. The forms have been attached to this Stream Relocation plan and are labeled Appendix 1. See table below for scores by relocation area. A NCSAM form will be completed after the monitoring period in order to compare the potential functional uplift to pre-project conditions.

SAN	SAM Scores					
Stream	Impact Site	SAM Score				
7-1 (upstream 1)	4A	Low				
7-1 (upstream 2)	4A	Medium				
7-3	4B	Medium				
7-1 (middle)	5A	High*				
7-4	5B	High*				
7-1 (lower above confluence with 7-5))	6A	Low				
7-1 (lower below confluence with 7-5)	6A	Low				
7-5	6B	Low				

<sup>\*</sup>These reaches scored high due to the wooded riparian buffers and streamside vegetation. Both reaches have considerable bank instability.











Project Location

Cleveland County

Client/Project NCDOT Division 12 STIP Project R-2707D/E 2017 Merger Team Update

Figure No.

Stream Relocation

	Accon	ipailles Osei Mailuai veis	1011 2.1					
USACE AID #:		NCD	WR #:					
INSTRUCTIONS: Attach a sk	<b>INSTRUCTIONS:</b> Attach a sketch of the assessment area and photographs. Attach a copy of the USGS 7.5-minute topographic quadrangle,							
and circle the location of the stream reach under evaluation. If multiple stream reaches will be evaluated on the same property, identify and								
number all reaches on the attached map, and include a separate form for each reach. See the NC SAM User Manual for detailed descriptions								
				urements were performed. See the				
NC SAM User Manual for exa								
NOTE EVIDENCE OF STRES		ASSESSMENT AREA (do	not need to be within	i the assessment area).				
PROJECT/SITE INFORMATI		0 <b>D</b> / /	1 1.1.10.10					
Project name (if any):	R2707D	2. Date of e	valuation: 11/10/2					
2 Applicant/owner name:	NCDOT	4	r nama/arganization:	Melissa Ruiz, Alex Baldwin,				
3. Applicant/owner name: 5. County:	Cleveland		name/organization: named water body	Stnatec				
7. River basin:	Broad		S 7.5-minute quad:	Buffalo Creek				
8. Site coordinates (decimal d			6554, -81.480992	Bullalo Cleek				
STREAM INFORMATION: (d	_		0004, -01.400992					
9. Site number (show on attack			sessment reach evalu	ated (feet): 100				
11. Channel depth from bed (				nable to assess channel depth.				
12. Channel width at top of ba			reach a swamp steam					
14. Feature type: ⊠Perennia			'					
STREAM CATEGORY INFO								
15. NC SAM Zone:	☐ Mountains (M)	☑ Piedmont (P) ☐ Inr	ner Coastal Plain (I)	Outer Coastal Plain (O)				
			1	,				
16. Estimated geomorphic								
valley shape (skip for	$\boxtimes$ A		□В					
Tidal Marsh Stream):	(more sinuous stream,	flatter valley slope)	(less sinuous str	ream, steeper valley slope)				
17. Watershed size: (skip	$\square$ Size 1 (< 0.1 mi <sup>2</sup> )	$\square$ Size 2 (0.1 to < 0.5 mi <sup>2</sup> )	☐Size 3 (0.5 to <	5 mi²)				
for Tidal Marsh Stream)								
ADDITIONAL INFORMATION		The RM of the land of						
18. Were regulatory considera  ☐Section 10 water	☐ Classified Trou	_		shed (   I   III   III   IV   IV)				
☐ Section 10 water ☐ Essential Fish Habitat	☐Primary Nurse	_		Siled (				
☐Publicly owned propert			Nutrient Sensitive W					
☐Anadromous fish	☐303(d) List			onmental Concern (AEC)				
Documented presence	of a federal and/or state list							
List species:								
☐Designated Critical Hat	· · · · · · · · · · · · · · · · · · ·							
19. Are additional stream info	rmation/supplementary mea	asurements included in "No	tes/Sketch" section or	attached?				
1 Channel Water - assess	ment reach metric (skip fo	or Size 1 streams and Tid	al March Stroame)					
_	it assessment reach.	on Size i streams and the	ai waisii Sticailis)					
☐B No flow, water in								
☐C No water in asset	ssment reach.							
2. Evidence of Flow Restric	ction – assessment reach	metric						
			ence is severely affect	cted by a flow restriction or fill to the				
point of obstruct	ing flow <u>or</u> a channel choke	ed with aquatic macrophyte	s or ponded water or	impoundment on flood or ebb within				
	reach (examples: undersize	ed or perched culverts, cau	seways that constrict	the channel, tidal gates, debris jams,				
beaver dams). ⊠B Not A								
3. Feature Pattern – assess								
	assessment reach has alte	red pattern (examples: stra	ightening, modification	n above or below culvert).				
⊠B Not A								
	ofile – assessment reach r							
				down-cutting, existing damming, over				
	aggradation, dredging, and	d excavation where approp	oriate channel profile	has not reformed from any of these				
disturbances). □B Not A								
	y – assessment reach me		haa armaaatha	and Evennels of Section 200 Co. Co.				
				<b>red.</b> Examples of instability include uch as concrete, gabion, rip-rap).				
□A < 10% of channe		i-outy, active widefillig, and	armiciai Haruetiitiy (St	aon as concrete, gabion, np-rapj.				
⊠B 10 to 25% of cha								

0.				Bank (LE	3) and the								
	LB	RB		•	•	•	. ,						
	∏A ⊠B	∏A ⊠B	Mo refe	derate evi erence inte	idence of o eraction (e	conditions xamples:	limited strea	berms mside a	, levee area ad	es, down- ccess, dis	cutting, aggradation, di	redging) that adversely affect rough streamside area, leaky mosquito ditching])	
	С	□C	Ext [exa of fl mos	ensive ev amples: c lood flows	idence of causeways through stocking]) or the ching of th	conditions with flood treamside	s that adversed plain and char area] <u>or</u> too	ely affe annel co much flo	ct refe onstric oodpla	rence int ction, bulk ain/intertion	eraction (little to no floc theads, retaining walls, dal zone access [examp	odplain/intertidal zone access fill, stream incision, disruption des: impoundments, intensive s a man-made feature on an	n e
7.	Wate	r Quality	Stress	ors – ass	essment :	reach/inte	ertidal zone	metric					
		k all that					,						
	□A □B						ne (milky whi m features oi				er discoloration, oil she	en, stream foam)	
											nd causing a water qua	lity problem	
					tural sulfid		- - C 1 1	. 1		Pr. 1. 11.		N	,,
	□E	Section	-	ished or d	collected d	lata indica	ating degrade	ed wate	er qual	lity in the	assessment reach. C	Cite source in "Notes/Sketch	
	□F	Lives	stock wit		to stream								
	□G □H			0	eam or inte			wal hu	rnina	regular m	nowing, destruction, etc	1	
		Othe	r:				n in "Notes/SI				lowing, destruction, etc	7)	
	$\boxtimes$ J	Little	to no st	ressors									
8.					•	•	lal Marsh Str		r Cizo	2 or 4 ot	rooma D2 drought or hi	abor is considered a drought	
		Drou	ght cond	ditions <u>and</u>	<u>d</u> no rainfa	Ill or rainfa	all not exceed	ling 1 ir	nch wit	thin the la	eams, D2 drought of m	gher is considered a drought	
	В	Drou	ght cond	ditions <u>and</u>			1 inch within						
_	⊠c		_	onditions									
9.	□Ye		_		assessme oo large o			? If Ye	s, skip	to Metric	c 13 (Streamside Area 0	Ground Surface Condition).	
10.		r <b>al In-stre</b> □Yes	<b>eam Ha</b> l □No				each metric	rity of	tho a	ecocemo	at reach (examples of	stressors include excessive	^
	iva.	Птез		sedime	entation, m	nining, ex	cavation, in-	stream	harde	ning [for		ent dredging, and snagging	
	10b.										ize 4 Coastal Plain st		
		∐A			macropnyi ts, lichens		quatic mosse al mats)	is a	Marsh Streams Only	□F □G	5% oysters or other n Submerged aquatic v		
		⊠B	Multiple	e sticks a			d/or emerger	nt 💆	h Stree	□H	Low-tide refugia (poo		
		⊠c	vegeta		nd logs (in	cludina la	ap trees)	eck	arsh	□I □J	Sand bottom 5% vertical bank alor	ng the marsh	
		□D	5% un	dercut baı	nks and/or	r root mat	s and/or root	is Ö	Ž	□ĸ	Little or no habitat		
		□E		ks extend r no habita		mal wette	d perimeter						
		_											
****	*****	******	******	**REMAI	NING QUE	STIONS	ARE NOT A	PPLICA	BLE	FOR TID	AL MARSH STREAMS	*******	
11.	Bedfo	orm and	Substra	ite – asse	ssment r	each met	ric (skip for	Size 4	Coast	tal Plain	streams and Tidal Ma	rsh Streams)	
	11a.	□Yes	⊠No	Is asses	sment rea	ich in a na	atural sand-be	ed strea	am? <b>(s</b>	kip for C	Coastal Plain streams)		
	11b.	Bedform ⊠A			k the app		box(es).						
		⊠B			n <b>(evaluat</b> e n <b>(evalua</b> t								
		□с	Natura	l bedform	absent (sl	kip to Me	tric 12, Aqua	atic Life	e)				
	11c.	at least of	one box	in each	row (skip	for Size 4	4 Coastal Pla	ain stre	ams a	and Tidal	Marsh Streams). Not	ner or not submerged. <b>Checl</b> Present (NP) = absent, Rare 19%. Cumulative percentages	е
		should n	ot excee	ed 100% f	or each as				,		( )	, ,	_
		NP ⊠	R □	C	A	P □	Bedrock/sa	anrolite					
							Boulder (2		96 mr	n)			
			R				Cobble (64						
			H	$\square$		H	Gravel (2 - Sand (.062						
		$\boxtimes$					Silt/clay (<						
			$\square$		$\exists$		Detritus Artificial (ri	p-rap, c	oncre	te, etc.)			
	11d.	⊠Yes	□No	Are poo	ls filled wit	h sedime	`			,	streams and Tidal Ma	rsh Streams)	
			-				. •					,	

12.			sessment reach metric (skip for Tidal Marsh Streams)
	12a. ⊠ If N		No Was an in-stream aquatic life assessment performed as described in the User Manual? one of the following reasons and skip to Metric 13. ☐No Water ☑Other:
	12b. 🛚	Yes [	No Are aquatic organisms present in the assessment reach (look in riffles, pools, then snags)? If Yes, check all that apply. If No, skip to Metric 13.
	1		Numbers over columns refer to "individuals" for Size 1 and 2 streams and "taxa" for Size 3 and 4 streams.  Adult frogs  Aquatic reptiles
			Aquatic macrophytes and aquatic mosses (include liverworts, lichens, and algal mats) Beetles
			Caddisfly larvae (T) Asian clam ( <i>Corbicula</i> )
			Crustacean (isopod/amphipod/crayfish/shrimp)
			Damselfly and dragonfly larvae Dipterans
			Mayfly larvae (E) Megaloptera (alderfly, fishfly, dobsonfly larvae)
			Midges/mosquito larvae Mosquito fish ( <i>Gambusia</i> ) or mud minnows ( <i>Umbra pygmaea</i> )
			Mussels/Clams (not <i>Corbicula</i> ) Other fish
			Salamanders/tadpoles Snails
			Stonefly larvae (P) Tipulid larvae
40	_	_	Worms/leeches
13.	Conside	r for the	Ground Surface Condition – streamside area metric (skip for Tidal Marsh Streams and B valley types)  Left Bank (LB) and the Right Bank (RB). Consider storage capacity with regard to both overbank flow and upland runoff.
	LB □A	RB □A	Little or no alteration to water storage capacity over a majority of the streamside area
	⊠B □C	□в ⊠c	Moderate alteration to water storage capacity over a majority of the streamside area Severe alteration to water storage capacity over a majority of the streamside area (examples: ditches, fill, soil compaction, livestock disturbance, buildings, man-made levees, drainage pipes)
14.			Water Storage – streamside area metric (skip for Size 1 streams, Tidal Marsh Streams, and B valley types) Left Bank (LB) and the Right Bank (RB) of the streamside area.
	□A □B ⊠C	□A □B ⊠C	Majority of streamside area with depressions able to pond water ≥ 6 inches deep Majority of streamside area with depressions able to pond water 3 to 6 inches deep Majority of streamside area with depressions able to pond water < 3 inches deep
15.	Conside wetted p	er for the erimeter	te – streamside area metric (skip for Tidal Marsh Streams)  Left Bank (LB) and the Right Bank (RB). Do not consider wetlands outside of the streamside area or within the normal of assessment reach.
	LB □Y ⊠N	RB □Y ⊠N	Are wetlands present in the streamside area?
16.	<del>_</del>		outors – assessment reach metric (skip for Size 4 streams and Tidal Marsh Streams)
	Check a  ☐A	Streams	outors within the assessment reach or within view of <u>and</u> draining to the assessment reach.  and/or springs (jurisdictional discharges)
	□B □C □D ⊠E □F	Obstruc Evidence Stream	nclude wet detention basins; do not include sediment basins or dry detention basins) ion passing flow during low-flow periods within the assessment area (beaver dam, leaky dam, bottom-release dam, weir) e of bank seepage or sweating (iron in water indicates seepage) bed or bank soil reduced (dig through deposited sediment if present) the above
17.	Baseflov	w Detrac	tors – assessment area metric (skip for Tidal Marsh Streams)
	Check a  A B C C	Evidend Obstruc	ply. e of substantial water withdrawals from the assessment reach (includes areas excavated for pump installation) ion not passing flow during low-flow periods affecting the assessment reach (ex: watertight dam, sediment deposit) tream (≥ 24% impervious surface for watershed)
	□D □E ⊠F	Evidend Assessi	e that the streamside area has been modified resulting in accelerated drainage into the assessment reach nent reach relocated to valley edge the above
18.			sment reach metric (skip for Tidal Marsh Streams) Consider "leaf-on" condition.
	⊠A □B □C	Stream Degrade	shading is appropriate for stream category (may include gaps associated with natural processes)  d (example: scattered trees)  shading is gone or largely absent

19.	Buffer Width – streamside area metric (skip for Tidal Marsh Streams)  Consider "vegetated buffer" and "wooded buffer" separately for left bank (LB) and right bank (RB) starting at the top of bank out to the first break.  Vegetated Wooded  LB RB LB RB $\square$ A $\square$ A $\square$ A $\supseteq$ 100 feet wide or extends to the edge of the watershed $\square$ B $\square$ B $\square$ B $\square$ B From 50 to < 100 feet wide $\square$ C $\square$ C $\square$ C $\square$ C $\square$ C From 30 to < 50 feet wide
	□ □ □ □ □ □ □ □ □ □ □ □ □ □ □ □ □ □ □
20.	Buffer Structure – streamside area metric (skip for Tidal Marsh Streams)  Consider for left bank (LB) and right bank (RB) for Metric 19 ("Vegetated" Buffer Width).  LB RB  A A Mature forest  B B Non-mature woody vegetation or modified vegetation structure  C C Herbaceous vegetation with or without a strip of trees < 10 feet wide  D D Maintained shrubs  E E Little or no vegetation
	Buffer Stressors – streamside area metric (skip for Tidal Marsh Streams)  Check all appropriate boxes for left bank (LB) and right bank (RB). Indicate if listed stressor abuts stream (Abuts), does not abut but is within 30 feet of stream (< 30 feet), or is between 30 to 50 feet of stream (30-50 feet).  If none of the following stressors occurs on either bank, check here and skip to Metric 22:  Abuts < 30 feet 30-50 feet  LB RB LB RB  A A A A A A A A A A A A A A A A A A A
22.	Stem Density – streamside area metric (skip for Tidal Marsh Streams)  Consider for left bank (LB) and right bank (RB) for Metric 19 ("Wooded" Buffer Width).  LB RB  □ A □ A Medium to high stem density □ B □ B Low stem density □ C □ C No wooded riparian buffer or predominantly herbaceous species or bare ground
23.	Continuity of Vegetated Buffer – streamside area metric (skip for Tidal Marsh Streams)  Consider whether vegetated buffer is continuous along stream (parallel). Breaks are areas lacking vegetation > 10 feet wide.  LB RB  A The total length of buffer breaks is < 25 percent.  B B B The total length of buffer breaks is between 25 and 50 percent.  C C The total length of buffer breaks is > 50 percent.
24.	Vegetative Composition – streamside area metric (skip for Tidal Marsh Streams)         Evaluate the dominant vegetation within 100 feet of each bank or to the edge of the watershed (whichever comes first) as it contributes to assessment reach habitat.         LB       RB         □A       Vegetation is close to undisturbed in species present and their proportions. Lower strata composed of native species, with non-native invasive species absent or sparse.         □B       Usegtation indicates disturbance in terms of species diversity or proportions, but is still largely composed of native species. This may include communities of weedy native species that develop after clear-cutting or clearing or communities with non-native invasive species present, but not dominant, over a large portion of the expected strata or communities missing understory but retaining canopy trees.         □C       □C       □C       Vegetation is severely disturbed in terms of species diversity or proportions. Mature canopy is absent or communities with non-native invasive species dominant over a large portion of expected strata or communities composed of planted stands of non-characteristic species or communities inappropriately composed of a single species or no vegetation.
25.	Conductivity – assessment reach metric (skip for all Coastal Plain streams)  25a.  ☐ Yes ☐ No Was conductivity measurement recorded?  If No, select one of the following reasons. ☐ No Water ☐ Other:  25b. Check the box corresponding to the conductivity measurement (units of microsiemens per centimeter).  ☐ A < 46 ☐ B 46 to < 67 ☐ C 67 to < 79 ☐ D 79 to < 230 ☐ E ≥ 230
Note	es/Sketch:

Ctroom Cito Nome	D07007D 7 4 /lines and City 44 L	IC) Data of Assessment	44/40/0047	
Stream Site Mame	R27207D 7-1 (Impact Site 4A L	• '	Malissa Ri	ıiz, Alex Baldwin,
Stream Category	Pa2	Assessor Name/Organization	Stnatec	iiz, Alex Dalawiii,
		•		
Notes of Field Asses	ssment Form (Y/N)		NO	
	ory considerations (Y/N)		NO	_
Additional stream in	formation/supplementary measu	rements included (Y/N)	NO	
NC SAM feature typ	e (perennial, intermittent, Tidal I	Marsh Stream)	Intermittent	<u> </u>
	Formation Olara Batina Comm		USACE/	NCDWR
	Function Class Rating Sumr (1) Hydrology	nary F	All Streams LOW	Intermittent
	(2) Baseflow	<del></del>	HIGH	
	(2) Flood Flow	<del></del>	LOW	
	(3) Streamside Ar	— — — — — — — — — — — — — — — — — — —	MEDIUM	
	(4) Floodpla	<del></del>	MEDIUM	
		d Riparian Buffer	MEDIUM	
	(4) Microto		LOW	
	(3) Stream Stabili		LOW	
	(4) Channe	· —	MEDIUM	
		nt Transport	LOW	
		Geomorphology	MEDIUM	
	, ,	dal Zone Interaction	NA	
	(2) Longitudinal Tid		NA	
	(2) Tidal Marsh Str		NA	
		rsh Channel Stability	NA	
		rsh Stream Geomorphology	NA	
	(1) Water Quality	non-caream Coomorphicogy	HIGH	
	(2) Baseflow		HIGH	
	(2) Streamside Area Ve	 getation	MEDIUM	
	(3) Upland Polluta	<del></del>	LOW	
	(3) Thermoregula		HIGH	
	(2) Indicators of Stresso		NO	
	(2) Aquatic Life Tolerand		HIGH	
	(2) Intertidal Zone Filtration		NA	
	(1) Habitat		LOW	
	(2) In-stream Habitat		LOW	
	(3) Baseflow	_	HIGH	-
	(3) Substrate	_	LOW	-
	(3) Stream Stabili	ty	MEDIUM	-
	(3) In-stream Hab	· —	MEDIUM	
	(2) Stream-side Habitat	<del></del>	HIGH	
	(3) Stream-side H	labitat	MEDIUM	
	(3) Thermoregula	tion	HIGH	
	(2) Tidal Marsh In-stream		NA	
	(3) Flow Restriction	<u> </u>	NA	
	(3) Tidal Marsh Str	eam Stability	NA	
		rsh Channel Stability	NA	
	(4) Tidal Ma	rsh Stream Geomorphology	NA	
	(3) Tidal Marsh In-		NA	
	(2) Intertidal Zone		NA	
	Overall		LOW	

	Accompanies User	Manual Version 2.1				
USACE AID #:		NCDWR #:				
		raphs. Attach a copy of the USGS 7.5-minute topographic quadrangle,				
		e stream reaches will be evaluated on the same property, identify and				
number all reaches on the attached map, and include a separate form for each reach. See the NC SAM User Manual for detailed descriptions and explanations of requested information. Record in the "Notes/Sketch" section if supplementary measurements were performed. See the						
1						
	mples of additional measurements that n	T AREA (do not need to be within the assessment area).				
		TAKEA (do not need to be within the assessment area).				
PROJECT/SITE INFORMATION	<b>ON:</b> R2707D	2. Date of evaluation: 11/10/2017				
Project name (if any):	RZTOTD	Melissa Ruiz, Alex Baldwin,				
3. Applicant/owner name:	NCDOT	4. Assessor name/organization: Stnatec				
5. County:	Cleveland	6. Nearest named water body				
7. River basin:	Broad	on USGS 7.5-minute quad: Kings Mountain Reservoir				
	legrees, at lower end of assessment read	·				
-	epth and width can be approximations					
		Length of assessment reach evaluated (feet): 100				
T	in riffle, if present) to top of bank (feet):	4 Unable to assess channel depth.				
12. Channel width at top of ba	ank (feet): 8 13. Is	assessment reach a swamp steam? ☐Yes ☐No				
	al flow Intermittent flow ITidal Marsh					
STREAM CATEGORY INFOR						
15. NC SAM Zone:		P)				
		\ /				
16. Estimated geomorphic						
valley shape (skip for	⊠a <u> </u>					
Tidal Marsh Stream):	(more sinuous stream, flatter valley s	lope) (less sinuous stream, steeper valley slope)				
17. Watershed size: (skip	☐Size 1 (< 0.1 mi²) ☐Size 2 (0.1	to $< 0.5 \text{ mi}^2$ ) $\square$ Size 3 (0.5 to $< 5 \text{ mi}^2$ ) $\square$ Size 4 ( $\ge 5 \text{ mi}^2$ )				
for Tidal Marsh Stream)						
ADDITIONAL INFORMATION						
	_	check all that apply to the assessment area.				
Section 10 water	Classified Trout Waters	□Water Supply Watershed (□I □II □III □IV □V)				
☐Essential Fish Habitat	□Primary Nursery Area	☐ High Quality Waters/Outstanding Resource Waters				
☐Publicly owned property☐Anadromous fish						
l ——	☐303(d) List of a federal and/or state listed protected	CAMA Area of Environmental Concern (AEC)				
List species:	of a rederal and/or state listed protected	species within the assessment area.				
☐Designated Critical Hab	pitat (list species)					
		cluded in "Notes/Sketch" section or attached? ☐Yes ☒No				
1. Channel Water - assessi	ment reach metric (skip for Size 1 stre	ams and Tidal Marsh Streams)				
	t assessment reach.					
☐B No flow, water in	•					
☐C No water in asse	ssment reacn.					
2. Evidence of Flow Restric	ction - assessment reach metric					
		ffle-pool sequence is severely affected by a flow restriction or fill to the				
		c macrophytes <u>or</u> ponded water <u>or</u> impoundment on flood or ebb within				
the assessment i beaver dams).	reach (examples: undersized or perched	l culverts, causeways that constrict the channel, tidal gates, debris jams,				
⊠B Not A						
	mont road motific					
3. Feature Pattern – assess		vamples: etraightening, modification above or below authors.				
<ul><li>□A A majority of the</li><li>図B Not A</li></ul>	assessment reach has aftered pattern (e	xamples: straightening, modification above or below culvert).				
_	ofile - assessment reach metric					
Majority of assessment reach has a substantially altered stream profile (examples: channel down-cutting, existing damming, owidening, active aggradation, dredging, and excavation where appropriate channel profile has not reformed from any of the						
widening, active disturbances).	aggradation, dredging, and excavation	where appropriate channel profile has not reformed from any of these				
□B Not A						
	y – assessment reach metric	discount is a summer to the second se				
		the stream has currently recovered. Examples of instability include				
active bank failure, active of the company of the c	<u> </u>	videning, and artificial hardening (such as concrete, gabion, rip-rap).				
☐B 10 to 25% of cha						
<ul><li>□ C &gt; 25% of channe</li></ul>						

6.				raction – Bank (I B							
	LB	RB	ne Leit	Dalik (LE	B) and the	Kigiit Da	IIIK (KD).				
	□A ⊠B	□A ⊠B	Moo refe or ii	derate evi erence inte ntermitten	dence of or eraction (e. t bulkhead	conditions xamples: ls, cause	limited strean ways with floo	perms, levenside area a dplain cons	ees, down- access, dis striction, m	<ul> <li>cutting, aggradation, dredging) that adversely affest sruption of flood flows through streamside area, leating including mosquito ditching]</li> </ul>	ıky
	□с	□c	[exa of fl mos	amples: c ood flows	auseways through st ching]) <u>or</u> f	with flood reamside	dplain and cha area] <u>or</u> too m	nnel constr auch floodp	iction, bull lain/interti	eraction (little to no floodplain/intertidal zone acce kheads, retaining walls, fill, stream incision, disruptional dal zone access [examples: impoundments, intension or assessment reach is a man-made feature on a	on ve
7.	Wate	r Quality	Stresso	ors – asse	essment r	each/inte	ertidal zone n	netric			
	□A ⊠B □C	Exce	olored w ssive se	dimentation	on (buryin	g of strea	m features or	intertidal zo	one)	er discoloration, oil sheen, stream foam)  und causing a water quality problem	
	□D □E		ent publi		ural sulfide collected d		ating degrade	d water qu	ality in the	e assessment reach. Cite source in "Notes/Sketc	:h"
	□F □G □H	Lives Exce	tock with	gae in stre	to stream or inte tation in th	rtidal zon	ne	al, burning	ı, regular n	nowing, destruction, etc)	
	□J	Othe Little	r: to no st			_ (explair	n in "Notes/Sko	etch" section	on)		
8.		ize 1 or 2 Drou Drou	streams ght cond ght cond	s, D1 drou ditions <u>and</u>	ght or high <u>d</u> no rainfa	ner is cons Il or rainfa	al Marsh Stre sidered a drou all not exceedi 1 inch within t	ght; for Siz ng 1 inch w	ithin the la	reams, D2 drought or higher is considered a drougl ast 48 hours	ht.
9.	<b>Large</b> □Ye		•		assessme			If Yes, ski	p to Metric	c 13 (Streamside Area Ground Surface Condition).	
10.		r <b>al In-stre</b> ∐Yes	eam Hal ⊠No	Degrad sedime	led in-stre ntation, m	am habita nining, ex	cavation, in-st	ream hard	lening [for	nt reach (examples of stressors include excessi example, rip-rap], recent dredging, and snaggin	
	4.0 h	Oh a ala a	II 414 -	,			tal Plain stre	•	-	·	
	10b.	□A □B	Multiple (include	e aquatic i e liverwort	macrophyt ts, lichens,	es and ac and alga	quatic mosses	Tidal	□F □G	Size 4 Coastal Plain streams)  5% oysters or other natural hard bottoms Submerged aquatic vegetation Low-tide refugia (pools)	
		⊠c □D	5% und	e snags ar dercut bar		root mat	s and/or roots	Check for Marsh Stre	□I □J □K	Sand bottom 5% vertical bank along the marsh Little or no habitat	
		□E		s extend to no habita		nal wetted	d perimeter				
****	*****	******	******	**REMAIN	NING QUE	STIONS	ARE NOT AP	PLICABLE	FOR TID	AL MARSH STREAMS************************************	
11.	Bedf	orm and	Substra	ite – asse	ssment re	each met	ric (skip for S	Size 4 Coas	stal Plain	streams and Tidal Marsh Streams)	
		□Yes	⊠No					d stream?	(skip for C	Coastal Plain streams)	
	11b.	Bedform ⊠A ⊠B □C	Riffle-ru Pool-gl	un section ide sectio	k the app (evaluate n (evaluat absent (sl	e 11c) :e 11d)	box(es). tric 12, Aqua	tic Life)			
	11c.	at least (R) = pre	one box esent bu	t <b>in each</b> i t <u>&lt;</u> 10%, (	r <b>ow (skip</b> Common (	<b>for Size 4</b> (C) = > 10	<b>4 Coastal Plai</b> 0-40%, Abund	n streams	and Tida	sessment reach – whether or not submerged. Check Marsh Streams). Not Present (NP) = absent, Ra Predominant (P) = $> 70\%$ . Cumulative percentage	are
		NP	ot excee	C	or each as A	P	Bedrock/sap Boulder (25		ım)		
							Cobble (64 Gravel (2 –	– 256 mm)	,		
					$\square$		Sand (.062 Silt/clay (< 0				
		$\boxtimes$					Detritus Artificial (rip		ete, etc.)		
	11d.	□Yes	⊠No	Are pool	s filled wit	h sedimer	nt? (skip for S	ize 4 Coa	stal Plain	streams and Tidal Marsh Streams)	

12.			sessment reach metric (skip for Tidal Marsh Streams)
	12a. ⊠ If N		No Was an in-stream aquatic life assessment performed as described in the User Manual? one of the following reasons and skip to Metric 13. ☐No Water ☑Other:
	12b. 🛚	Yes [	No Are aquatic organisms present in the assessment reach (look in riffles, pools, then snags)? If Yes, check all that apply. If No, skip to Metric 13.
	1 		Numbers over columns refer to "individuals" for Size 1 and 2 streams and "taxa" for Size 3 and 4 streams.  Adult frogs  Aquatic reptiles
			Aquatic macrophytes and aquatic mosses (include liverworts, lichens, and algal mats) Beetles Caddisfly larvae (T)
			Asian clam ( <i>Corbicula</i> ) Crustacean (isopod/amphipod/crayfish/shrimp) Damselfly and dragonfly larvae
			Dipterans Mayfly larvae (E)
			Megaloptera (alderfly, fishfly, dobsonfly larvae) Midges/mosquito larvae Mosquito fish ( <i>Gambusia</i> ) or mud minnows ( <i>Umbra pygmaea)</i>
			Mussels/Clams (not <i>Corbicula</i> ) Other fish Salamanders/tadpoles
			Snails Stonefly larvae (P) Tipulid larvae
13.	Streams	ide Area	Worms/leeches  Ground Surface Condition – streamside area metric (skip for Tidal Marsh Streams and B valley types)
	Conside LB □A	er for the RB ⊠A	Left Bank (LB) and the Right Bank (RB). Consider storage capacity with regard to both overbank flow and upland runoff  Little or no alteration to water storage capacity over a majority of the streamside area
	⊠B □C	□B □C	Moderate alteration to water storage capacity over a majority of the streamside area Severe alteration to water storage capacity over a majority of the streamside area (examples: ditches, fill, soil compaction livestock disturbance, buildings, man-made levees, drainage pipes)
14.			Water Storage – streamside area metric (skip for Size 1 streams, Tidal Marsh Streams, and B valley types) Left Bank (LB) and the Right Bank (RB) of the streamside area.
	□A □B ⊠C	□A □B ⊠C	Majority of streamside area with depressions able to pond water ≥ 6 inches deep Majority of streamside area with depressions able to pond water 3 to 6 inches deep Majority of streamside area with depressions able to pond water < 3 inches deep
15.	Conside wetted p	er for the erimeter	ee – streamside area metric (skip for Tidal Marsh Streams)  Left Bank (LB) and the Right Bank (RB). Do not consider wetlands outside of the streamside area or within the norma of assessment reach.
	LB □Y ⊠N	RB □Y ⊠N	Are wetlands present in the streamside area?
16.	Check a ☐A	II contrib	outors – assessment reach metric (skip for Size 4 streams and Tidal Marsh Streams) outors within the assessment reach or within view of <u>and</u> draining to the assessment reach.  and/or springs (jurisdictional discharges)
	□B □C □D ⊠E □F	Obstruc Evidenc Stream	nclude wet detention basins; do not include sediment basins or dry detention basins) ion passing flow during low-flow periods within the assessment area (beaver dam, leaky dam, bottom-release dam, weir) e of bank seepage or sweating (iron in water indicates seepage) oed or bank soil reduced (dig through deposited sediment if present) the above
17.	Baseflov Check a	II that ap	
	□A □B □C □D	Obstruc Urban s	e of substantial water withdrawals from the assessment reach (includes areas excavated for pump installation) ition not passing flow during low-flow periods affecting the assessment reach (ex: watertight dam, sediment deposit) tream (≥ 24% impervious surface for watershed) that the streamside area has been modified resulting in accelerated drainage into the assessment reach
	□E ⊠F	Assessr	nent reach relocated to valley edge the above
18.			sment reach metric (skip for Tidal Marsh Streams) Consider "leaf-on" condition.
	□A ⊠B □C	Degrade	shading is appropriate for stream category (may include gaps associated with natural processes) ed (example: scattered trees) shading is gone or largely absent

19.	Buffer Width – streamside area metric (skip for Tidal Marsh Streams)  Consider "vegetated buffer" and "wooded buffer" separately for left bank (LB) and right bank (RB) starting at the top of bank out to the first break.  Vegetated Wooded  LB RB LB RB
	□ A       □ A       □ A       □ 100 feet wide or extends to the edge of the watershed         □ B       □ B       □ B       □ B       □ From 50 to < 100 feet wide         □ C       □ C       □ C       □ C       □ From 30 to < 50 feet wide         □ D       □ D       □ D       □ D       □ From 10 to < 30 feet wide         □ E       □ E       □ E       □ E       □ E       □ From 10 to < 30 feet wide
20.	Buffer Structure – streamside area metric (skip for Tidal Marsh Streams) Consider for left bank (LB) and right bank (RB) for Metric 19 ("Vegetated" Buffer Width).
	LB RB  □ A □ A Mature forest  □ B □ B Non-mature woody vegetation or modified vegetation structure  □ C □ C Herbaceous vegetation with or without a strip of trees < 10 feet wide  □ D □ D Maintained shrubs  □ E □ E Little or no vegetation
21.	Buffer Stressors – streamside area metric (skip for Tidal Marsh Streams)  Check all appropriate boxes for left bank (LB) and right bank (RB). Indicate if listed stressor abuts stream (Abuts), does not abut but is within 30 feet of stream (< 30 feet), or is between 30 to 50 feet of stream (30-50 feet).  If none of the following stressors occurs on either bank, check here and skip to Metric 22:  Abuts < 30 feet 30-50 feet
	LB RB LB RB LB RB  A A A A A A A A A A A A A A A A A A A
22.	Stem Density – streamside area metric (skip for Tidal Marsh Streams)  Consider for left bank (LB) and right bank (RB) for Metric 19 ("Wooded" Buffer Width).
	LB RB  ⊠A □A Medium to high stem density  □B □B Low stem density  □C □C No wooded riparian buffer or predominantly herbaceous species or bare ground
23.	Continuity of Vegetated Buffer – streamside area metric (skip for Tidal Marsh Streams)  Consider whether vegetated buffer is continuous along stream (parallel). Breaks are areas lacking vegetation > 10 feet wide.  LB RB
	<ul> <li>□ A</li> <li>□ B</li> <li>□ B</li> <li>□ C</li> <li>□ C</li> <li>□ C</li> <li>□ D</li> <li>□ D</li></ul>
24.	Vegetative Composition – streamside area metric (skip for Tidal Marsh Streams)  Evaluate the dominant vegetation within 100 feet of each bank or to the edge of the watershed (whichever comes first) as it contributes to assessment reach habitat.
	LB RB  A Vegetation is close to undisturbed in species present and their proportions. Lower strata composed of native species, with non-native invasive species absent or sparse.
	Vegetation indicates disturbance in terms of species diversity or proportions, but is still largely composed of native species. This may include communities of weedy native species that develop after clear-cutting or clearing or communities with non-native invasive species present, but not dominant, over a large portion of the expected strata or
	communities missing understory but retaining canopy trees.  Vegetation is severely disturbed in terms of species diversity or proportions. Mature canopy is absent <u>or</u> communities with non-native invasive species dominant over a large portion of expected strata <u>or</u> communities composed of planted stands of non-characteristic species <u>or</u> communities inappropriately composed of a single species <u>or</u> no vegetation.
25.	Conductivity – assessment reach metric (skip for all Coastal Plain streams)  25a.
	25b. Check the box corresponding to the conductivity measurement (units of microsiemens per centimeter). $\Box A < 46 \qquad \Box B  46 \text{ to} < 67 \qquad \Box C  67 \text{ to} < 79 \qquad \Box D  79 \text{ to} < 230 \qquad \Box E  ≥ 230$
Note	es/Sketch:

Stream Site Name	R2707D 7-1 (Impact Site4A DS)	Date of Assessment	11/10/2017	•
Stream Category	Pa2 Asses	ssor Name/Organization	Melissa Ru	
Circuit Catogory	7,000	oor Hamo, Organization	Baldwin, St	tantec
Notes of Field Asses	consort Forms (V/NI)		NO	
Notes of Field Asses	ory considerations (Y/N)		NO NO	<u> </u>
•	ormation/supplementary measurement	s included (Y/N)	NO	<u> </u>
	e (perennial, intermittent, Tidal Marsh S		Perennial	
	(F	,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,		
			USACE/	NCDWR
	Function Class Rating Summary	A	II Streams	Intermittent
	(1) Hydrology		LOW	
	(2) Baseflow		HIGH	
	(2) Flood Flow		LOW	
	(3) Streamside Area Atte	<del></del>	MEDIUM	
	(4) Floodplain Acce		MEDIUM	
	(4) Wooded Riparia		MEDIUM	
	(4) Microtopograph		LOW	
	(3) Stream Stability		LOW	
	(4) Channel Stabili		LOW	
	(4) Sediment Trans	· —	MEDIUM	
	(4) Stream Geomo	· • • • • • • • • • • • • • • • • • • •	MEDIUM	
	(2) Stream/Intertidal Zone		NA	
	(2) Longitudinal Tidal Flow		NA NA	
	(2) Tidal Marsh Stream Sta		NA NA	
	(3) Tidal Marsh Cha		NA NA	
	(1) Water Quality	am Geomorphology	MEDIUM	
	(2) Baseflow		HIGH	
	(2) Streamside Area Vegetation	· —	LOW	
	(3) Upland Pollutant Filtra		LOW	
	(3) Thermoregulation		MEDIUM	
	(2) Indicators of Stressors		YES	-
	(2) Aquatic Life Tolerance		HIGH	
	(2) Intertidal Zone Filtration		NA	-
	(1) Habitat		MEDIUM	
	(2) In-stream Habitat		MEDIUM	
	(3) Baseflow		HIGH	
	(3) Substrate		MEDIUM	
	(3) Stream Stability		LOW	
	(3) In-stream Habitat		MEDIUM	
	(2) Stream-side Habitat		MEDIUM	
	(3) Stream-side Habitat		MEDIUM	
	(3) Thermoregulation		MEDIUM	
	(2) Tidal Marsh In-stream Habitat		NA	
	(3) Flow Restriction		NA	
	(3) Tidal Marsh Stream Sta	ability	NA	
	(4) Tidal Marsh Cha	innel Stability	NA	
		am Geomorphology	NA	
	(3) Tidal Marsh In-stream I	Habitat	NA	
	(2) Intertidal Zone		NA	
	Overall		MEDIUM	

		ACC	ompanies Oser ivi	allual VelSion 2.1	
USACE AII	O #:			NCDWR #:	
INSTRUCT	IONS: Attach a s	ketch of the assessment a	area and photogra	phs. Attach a copy of the USGS	7.5-minute topographic quadrangle,
					d on the same property, identify and
					Iser Manual for detailed descriptions
					urements were performed. See the
		amples of additional meas			
NOTE EVID	ENCE OF STRE	SSORS AFFECTING TH	E ASSESSMENT	AREA (do not need to be withi	n the assessment area).
	SITE INFORMAT	ION:			
-	ame (if any):	R2707D		2. Date of evaluation: 3/4/201	
	d/owner name:	NCDOT		4. Assessor name/organization:	Melissa Ruiz/Stantec
5. County:		Cleveland		6. Nearest named water body	
7. River bas		Broad	<del></del>	on USGS 7.5-minute quad:	Buffalo Creek
	,	degrees, at lower end of a	•	: <u>35.286208, -81.480007</u>	
		depth and width can be			400
	ber (show on atta			ength of assessment reach evalu	
		(in riffle, if present) to top	_	-	Jnable to assess channel depth.
	I width at top of b	ank (feet): <u>8</u> al flow		ssessment reach a swamp stean	II LITES LINU
	type: Perenni		v 🗀 i idai iviaish S	ou calli	
15. NC SAN			Diadmant (D)	☐ Inner Coastal Plain (I)	Outer Coastal Plain (O)
ID. NO SAN	vi ∠UII€.	☐ Mountains (M)	□ Piedmont (P)	☐ IIIIlei Cuastai Plain (I)	
		,	,		
	ed geomorphic	$\bowtie_{A}$	$\sqrt{}$	□в	
,	hape ( <b>skip for</b> <b>arsh Stream</b> ):	(more sinuous strear	m flatter valley slo		ream, steeper valley slope)
	,	,	•	• •	
	ned size: (skip	Size 1 (< 0.1 mi²)	☐Size 2 (0.1 to	$0 < 0.5 \text{ mi}^2$ ) Size 3 (0.5 to <	: 5 mi²)
	al Marsh Stream) AL INFORMATIO				
			. □No If Ves che	eck all that apply to the assessme	ant area
	on 10 water	Classified T			rshed (   I   III   III   IV   IV)
_	ntial Fish Habitat	□Primary Nur			s/Outstanding Resource Waters
_	cly owned proper	-	parian buffer rule ir		_
	romous fish	☐303(d) List	oanan banon talo n		ronmental Concern (AEC)
			listed protected sp	ecies within the assessment are	
	species:				
□Desig	gnated Critical Ha	bitat (list species)			
19. Are add	itional stream info	ormation/supplementary m	neasurements inclu	uded in "Notes/Sketch" section o	rattached?  ☐Yes ⊠No
			o for Size 1 strean	ns and Tidal Marsh Streams)	
⊠A □B	No flow, water in	ut assessment reach.			
□C	No water in ass	. ,			
_					
		ction – assessment read			
□A					cted by a flow restriction or fill to the impoundment on flood or ebb within
					the channel, tidal gates, debris jams,
	beaver dams).	reach (examples: under	sized of percifica c	diverts, eadseways that constitut	the charmer, tradi gates, debris jams,
⊠B	Not A				
3. Feature	Pattorn - accos	sment reach metric			
			altered nattern (eva	amples: straightening, modificatio	n above or below culvert)
⊠R	Not A	assessment reach has a	increa patient (exe	imples. straighterning, mounicatio	it above of below ediverty.
		-#! ·	la manda! -		
	•	ofile – assessment reac			In the second se
⊠A			•		down-cutting, existing damming, over
	disturbances).	ayyıaualluri, üreüyiriğ, a	and excavation wi	iere appropriate channel profile	has not reformed from any of these
□в	Not A				
		ty – assessment reach r			and Francisco of Section 29 (Section 2)
					ered. Examples of instability include uch as concrete, gabion, rip-rap).
active ba	ank failure, active < 10% of chann		au-cui), active wic	uening, and armidal hardening (S	uch as concrete, gabion, rip-rap).
⊟B	10 to 25% of ch				
⊠c	> 25% of chann				

6.					streamsio					
	Cons LB	sider for t RB	he Left	Bank (LE	3) and the	Right Ba	nk (RB).			
	□A ⊠B	∏A ⊠B	Mo refe	derate evi erence inte	idence of o eraction (e	conditions xamples:	limited streamsi	rms, leve de area a	es, down- ccess, dis	cutting, aggradation, dredging) that adversely affect truption of flood flows through streamside area, leaky
	□C	□c	Ext [ex of f mo	ensive ev amples: o lood flows	ridence of c causeways sthrough st ching]) <u>or</u> f	conditions with flood reamside	s that adversely dplain and chann area] <u>or</u> too mud	affect refe el constri ch floodpla	erence inte ction, bulk ain/intertic	inor ditching [including mosquito ditching]) eraction (little to no floodplain/intertidal zone access heads, retaining walls, fill, stream incision, disruption dal zone access [examples: impoundments, intensive or assessment reach is a man-made feature on an
7.	Wate	r Quality	Stress	ors – ass	essment r	each/inte	ertidal zone me	tric		
		k all that	apply.							
	□A □B									er discoloration, oil sheen, stream foam)
							m features or intest or intest entering the as			nd causing a water quality problem
	$\Box$ D	Odor	(not inc	cluding na	tural sulfide	e odors)				
	□E	Curre		ished or o	collected d	ata indica	ating degraded v	water qua	lity in the	assessment reach. Cite source in "Notes/Sketch"
	□F	Lives	stock wit		to stream of					
	□G □H				eam or inte			hurning	regular m	nowing, destruction, etc)
	⊠ı						n in "Notes/Sketc			iowing, destruction, etc)
	□J	Little	to no st	ressors						
8.							al Marsh Strear		0 4	Do la alta dista in a si la da la da
	For S □A	Drou	stream	s, D1 arou ditions and	ignt or nigr d no rainfa	ner is cons Il or rainfa	sidered a drough all not exceeding	it; for Size	thin the la	eams, D2 drought or higher is considered a drought.
	□B	Drou	ght cond	ditions <u>and</u>			1 inch within the			
•	⊠c		-	conditions						
9.	∐Ye		-		assessme oo large o			Yes, skip	to Metric	: 13 (Streamside Area Ground Surface Condition).
10.							each metric	of the o	ccccmor	at reach (examples of stressors include examples
	iua.	∐Yes	∐No	sedime	entation, m	nining, exc		am harde	ening [for	nt reach (examples of stressors include excessive example, rip-rap], recent dredging, and snagging) to Metric 12)
	10b.									ize 4 Coastal Plain streams)
		□A			ts, lichens,		quatic mosses I mats)	Check for Tidal Marsh Streams Only	□F □G	5% oysters or other natural hard bottoms Submerged aquatic vegetation
		□в			nd/or leaf	packs and	d/or emergent	k for T h Stre Only	∏.H	Low-tide refugia (pools)
		□с	vegeta Multipl		nd logs (in	cluding la	p trees)	heck arsh	□J	Sand bottom 5% vertical bank along the marsh
		$\overline{\boxtimes}$ D	5% un	dercut bai	nks and/or	root mate	s and/or roots	ਹਂ≥	□ĸ	Little or no habitat
		□E		ks extend r no habita		nai wetted	d perimeter			
****	******	******	******	**REMAII	NING QUE	STIONS	ARE NOT APPL	LICABLE	FOR TID	AL MARSH STREAMS************************************
11.	Bedf	orm and	Substra	ate – asse	essment re	each met	ric (skip for Siz	e 4 Coas	tal Plain	streams and Tidal Marsh Streams)
	11a.	□Yes	□No	ls asses	sment rea	ch in a na	tural sand-bed s	stream? (s	skip for C	coastal Plain streams)
	11b.	_			k the app		oox(es).			
		⊠A ⊠B			n <b>(evaluat</b> e on <b>(evaluat</b>					
		□с	Natura	l bedform	absent (sl	kip to Met	tric 12, Aquatic	Life)		
	11c.	at least of	one box	in each	row (skip	for Size 4	Coastal Plain	streams	and Tidal	essment reach – whether or not submerged. <b>Check Marsh Streams)</b> . Not Present (NP) = absent, Rare
					Common ( or each as			it(A) = >	40-70%, I	Predominant (P) = > 70%. Cumulative percentages
		NP	R	<u>C</u>	A	Р				
			H	H	H		Bedrock/sapro Boulder (256 -		m)	
				$\boxtimes$			Cobble (64 – 2		11)	
							Gravel (2 – 64			
		$\exists$	$\boxtimes$	$\exists$		$\exists$	Sand (.062 – 2 Silt/clay (< 0.0			
						$\exists$	Detritus	•	oto oto \	
	112		⊔ ⊠N:-	<b>□</b> Λ <b>εο</b> := = : !	الله المحادثات	_	Artificial (rip-ra	-	•	otrooms and Tidal March Ctroops
	пa.	□Yes	$\boxtimes$ No	Are poo	is illied With	ıı seaimer	IL! (SKIP TOF SIZ	e 4 Coas	ıaı rıdın s	streams and Tidal Marsh Streams)

12.	-		sessment reach metric (skip for Tidal Marsh Streams)
	12a. ⊠ If N		No Was an in-stream aquatic life assessment performed as described in the User Manual? one of the following reasons and skip to Metric 13.   No Water Other:
	12b. 🛚	Yes	No Are aquatic organisms present in the assessment reach (look in riffles, pools, then snags)? If Yes, check all that apply. If No, skip to Metric 13.
	1		Numbers over columns refer to "individuals" for Size 1 and 2 streams and "taxa" for Size 3 and 4 streams. Adult frogs Aquatic reptiles
			Aquatic neptiles Aquatic macrophytes and aquatic mosses (include liverworts, lichens, and algal mats) Beetles
		$\boxtimes$	Caddisfly larvae (T) Asian clam ( <i>Corbicula</i> )
			Crustacean (isopod/amphipod/crayfish/shrimp)
			Damselfly and dragonfly larvae Dipterans
			Mayfly larvae (E) Megaloptera (alderfly, fishfly, dobsonfly larvae)
			Midges/mosquito larvae Mosquito fish ( <i>Gambusia</i> ) or mud minnows ( <i>Umbra pygmaea)</i>
			Mussels/Clams (not <i>Corbicula</i> ) Other fish
			Salamanders/tadpoles Snails
	Ä		Stonefly larvae (P) Tipulid larvae
			Worms/leeches
13.			Ground Surface Condition – streamside area metric (skip for Tidal Marsh Streams and B valley types)  Left Bank (LB) and the Right Bank (RB). Consider storage capacity with regard to both overbank flow and upland runoff.
	⊠a □B	⊠a □B	Little or no alteration to water storage capacity over a majority of the streamside area Moderate alteration to water storage capacity over a majority of the streamside area
	□C	□C	Severe alteration to water storage capacity over a majority of the streamside area (examples: ditches, fill, soil compaction, livestock disturbance, buildings, man-made levees, drainage pipes)
14.			Water Storage – streamside area metric (skip for Size 1 streams, Tidal Marsh Streams, and B valley types) Left Bank (LB) and the Right Bank (RB) of the streamside area.
	□A □B ⊠C	□A □B ⊠C	Majority of streamside area with depressions able to pond water ≥ 6 inches deep Majority of streamside area with depressions able to pond water 3 to 6 inches deep Majority of streamside area with depressions able to pond water < 3 inches deep
15.	Conside wetted p	er for the erimeter o	<ul> <li>e – streamside area metric (skip for Tidal Marsh Streams)</li> <li>Left Bank (LB) and the Right Bank (RB). Do not consider wetlands outside of the streamside area or within the normal of assessment reach.</li> </ul>
	LB □Y ⊠N	RB □Y ⊠N	Are wetlands present in the streamside area?
16.	<del>_</del>		outors – assessment reach metric (skip for Size 4 streams and Tidal Marsh Streams)
	Check a □A		utors within the assessment reach or within view of <u>and</u> draining to the assessment reach. and/or springs (jurisdictional discharges)
	□B □C □D ⊠E	Ponds (i Obstruct Evidence	include wet detention basins; do not include sediment basins or dry detention basins) ion passing flow during low-flow periods within the assessment area (beaver dam, leaky dam, bottom-release dam, weir) of bank seepage or sweating (iron in water indicates seepage) oed or bank soil reduced (dig through deposited sediment if present)
17	□F Baseflo		the above ors – assessment area metric (skip for Tidal Marsh Streams)
	Check a  □A	ll that ap	
	□B □C	Obstruct	ion not passing flow during low-flow periods affecting the assessment reach (ex: watertight dam, sediment deposit) ream (≥ 24% impervious surface for watershed)
	$\Box$ D	Evidence	e that the streamside area has been modified resulting in accelerated drainage into the assessment reach
	□E ⊠F		nent reach relocated to valley edge the above
18.			sment reach metric (skip for Tidal Marsh Streams) Consider "leaf-on" condition.
	⊠A □B	Stream	shading is appropriate for stream category (may include gaps associated with natural processes) d (example: scattered trees)
	□c		shading is gone or largely absent

19.	Buffer Width – streamside area metric (skip for Tidal Marsh Streams)  Consider "vegetated buffer" and "wooded buffer" separately for left bank (LB) and right bank (RB) starting at the top of bank out to the first break.  Vegetated Wooded  LB RB LB RB  △A △A △A △A △A △A △A △A ○ feet wide or extends to the edge of the watershed  □B □B □B □B □B From 50 to < 100 feet wide
	□ C       □ C       From 30 to < 50 feet wide         □ D       □ D       □ D       From 10 to < 30 feet wide         □ E
20.	Buffer Structure – streamside area metric (skip for Tidal Marsh Streams)  Consider for left bank (LB) and right bank (RB) for Metric 19 ("Vegetated" Buffer Width).  LB RB  A Mature forest  B Non-mature woody vegetation or modified vegetation structure  C C C Herbaceous vegetation with or without a strip of trees < 10 feet wide  D D Maintained shrubs
21.	Buffer Stressors – streamside area metric (skip for Tidal Marsh Streams)  Check all appropriate boxes for left bank (LB) and right bank (RB). Indicate if listed stressor abuts stream (Abuts), does not abut but is within 30 feet of stream (< 30 feet), or is between 30 to 50 feet of stream (30-50 feet).  If none of the following stressors occurs on either bank, check here and skip to Metric 22:  Abuts < 30 feet 30-50 feet  LB RB LB RB  A A A A A A A A A A A A A A A A A A A
22.	Stem Density – streamside area metric (skip for Tidal Marsh Streams)  Consider for left bank (LB) and right bank (RB) for Metric 19 ("Wooded" Buffer Width).  LB RB  A Medium to high stem density  B B Low stem density  C C No wooded riparian buffer or predominantly herbaceous species or bare ground
23.	Continuity of Vegetated Buffer – streamside area metric (skip for Tidal Marsh Streams)  Consider whether vegetated buffer is continuous along stream (parallel). Breaks are areas lacking vegetation > 10 feet wide.  LB RB  A The total length of buffer breaks is < 25 percent.  B B B The total length of buffer breaks is between 25 and 50 percent.  C C The total length of buffer breaks is > 50 percent.
24.	Vegetative Composition – streamside area metric (skip for Tidal Marsh Streams)         Evaluate the dominant vegetation within 100 feet of each bank or to the edge of the watershed (whichever comes first) as it contributes to assessment reach habitat.         LB       RB         □A       Vegetation is close to undisturbed in species present and their proportions. Lower strata composed of native species, with non-native invasive species absent or sparse.         □B       B       Vegetation indicates disturbance in terms of species diversity or proportions, but is still largely composed of native species. This may include communities of weedy native species that develop after clear-cutting or clearing or communities with non-native invasive species present, but not dominant, over a large portion of the expected strata or communities missing understory but retaining canopy trees.         □C       □C       Vegetation is severely disturbed in terms of species diversity or proportions. Mature canopy is absent or communities with non-native invasive species dominant over a large portion of expected strata or communities composed of planted stands of non-characteristic species or communities inappropriately composed of a single species or no vegetation.
25.	Conductivity – assessment reach metric (skip for all Coastal Plain streams)  25a.  ☐Yes ☐No Was conductivity measurement recorded?  If No, select one of the following reasons. ☐No Water ☐Other:  25b. Check the box corresponding to the conductivity measurement (units of microsiemens per centimeter).  ☐A < 46 ☐B 46 to < 67 ☐C 67 to < 79 ☐D 79 to < 230 ☐E ≥ 230
Note	es/Sketch:

Stream Site Name	R2707D 7-3 (Impact Site 4B) Date of Assessme	ent 3/4/2019	
Stream Category	Pa1 Assessor Name/Organizati		uiz/Stantec
Notes of Field Asses	ssment Form (Y/N)	NO	
	ory considerations (Y/N)	NO	
•	formation/supplementary measurements included (Y/N)	NO	
	e (perennial, intermittent, Tidal Marsh Stream)	Intermitte	nt
		USACE/	NCDWR
	Function Class Rating Summary	All Streams	Intermittent
	(1) Hydrology	MEDIUM	MEDIUM
	(2) Baseflow	HIGH	HIGH
	(2) Flood Flow	MEDIUM	MEDIUM
	(3) Streamside Area Attenuation	HIGH	HIGH
	(4) Floodplain Access	MEDIUM	MEDIUM
	(4) Wooded Riparian Buffer	HIGH	HIGH
	(4) Microtopography	HIGH	HIGH
	(3) Stream Stability	LOW	LOW
	(4) Channel Stability	LOW	LOW
	(4) Sediment Transport	MEDIUM	MEDIUM
	(4) Stream Geomorphology	MEDIUM	MEDIUM
	(2) Stream/Intertidal Zone Interaction	NA	NA
	(2) Longitudinal Tidal Flow	NA	NA
	(2) Tidal Marsh Stream Stability	NA	NA
	(3) Tidal Marsh Channel Stability	NA	NA
	(3) Tidal Marsh Stream Geomorphology	NA	NA
	(1) Water Quality	MEDIUM	MEDIUM
	(2) Baseflow	HIGH	HIGH
	(2) Streamside Area Vegetation	HIGH	HIGH
	(3) Upland Pollutant Filtration	HIGH	HIGH
	(3) Thermoregulation	HIGH	HIGH
	(2) Indicators of Stressors	YES	YES
	(2) Aquatic Life Tolerance	HIGH	NA NA
	(2) Intertidal Zone Filtration	NA	NA
	(1) Habitat	LOW	HIGH
	(2) In-stream Habitat	LOW	MEDIUM
	(3) Baseflow	HIGH	HIGH
	(3) Substrate	MEDIUM	MEDIUM
	(3) Stream Stability	LOW	LOW
	(3) In-stream Habitat	LOW	HIGH
	(2) Stream-side Habitat	HIGH	HIGH
	(2) Stream-side Habitat	HIGH	HIGH
	(3) Thermoregulation	HIGH	HIGH
	(2) Tidal Marsh In-stream Habitat		
		NA NA	NA NA
	(3) Flow Restriction		
	(3) Tidal Marsh Stream Stability	NA NA	NA NA
	(4) Tidal Marsh Channel Stability	NA NA	NA NA
	(4) Tidal Marsh Stream Geomorphology	NA NA	NA NA
	(3) Tidal Marsh In-stream Habitat	NA	NA NA
	(2) Intertidal Zone	NA	NA

MEDIUM

MEDIUM

Overall

	Accompanies	S User Manual Version 2.1
USACE AID #:		NCDWR #:
		photographs. Attach a copy of the USGS 7.5-minute topographic quadrangle,
		multiple stream reaches will be evaluated on the same property, identify and
		e form for each reach. See the NC SAM User Manual for detailed descriptions
	d information. Record in the "Note amples of additional measurements	es/Sketch" section if supplementary measurements were performed. See the
	•	SMENT AREA (do not need to be within the assessment area).
		טוויבורו אוזבא נעט ווטנ ווטטע נט שב שונווווו נווב מססכססוווכווג מוכמן.
PROJECT/SITE INFORMAT  1. Project name (if any):	ION: R2707D	2. Date of evaluation: 11/10/2017
rojoot namo (ii any).		Melissa Ruiz, Alex
3. Applicant/owner name:	NCDOT	4. Assessor name/organization: Baldwin, Stantec
5. County:	Cleveland	6. Nearest named water body
7. River basin:	Broad	on USGS 7.5-minute quad: Kings Mountain Reservoir
8. Site coordinates (decimal	degrees, at lower end of assessmen	
STREAM INFORMATION: (	lepth and width can be approxim	nations)
9. Site number (show on atta	ched map): 7-1 (Impact Site 5	A) 10. Length of assessment reach evaluated (feet): 100
	(in riffle, if present) to top of bank (f	
12. Channel width at top of b		13. Is assessment reach a swamp steam? ☐Yes ☐No
	al flow ☐Intermittent flow ☐Tidal	Marsh Stream
STREAM CATEGORY INFO		
15. NC SAM Zone:	☐ Mountains (M)         Pied	mont (P)
		\ /
16. Estimated geomorphic	MA	
valley shape (skip for	_	_
Tidal Marsh Stream):	(more sinuous stream, flatter v	
17. Watershed size: (skip	· · ·	2 (0.1 to < 0.5 mi²) ☐Size 3 (0.5 to < 5 mi²) ☐Size 4 (≥ 5 mi²)
for Tidal Marsh Stream)		
ADDITIONAL INFORMATIO		Voc. chack all that apply to the acceptment area
Section 10 water	ations evaluated?   Yes   No if   Classified Trout Wate	Yes, check all that apply to the assessment area.  rs
☐Essential Fish Habitat	☐ Primary Nursery Area	
Publicly owned proper		=
☐Anadromous fish	□303(d) List	CAMA Area of Environmental Concern (AEC)
		tected species within the assessment area.
List species:		
Designated Critical Ha	·	
19. Are additional stream info	ormation/supplementary measurem	ents included in "Notes/Sketch" section or attached?  Yes No
1 Channel Water access	ment reach metric (chin for fire	1 streams and Tidal Marsh Streams)
	ut assessment reach.	i su cams and tidal maish sucams
B No flow, water in		
☐C No water in ass		
2. Evidence of Flow Restri	ction – assessment reach metric	
		at or riffle-pool sequence is severely affected by a flow restriction or fill to the
		aquatic macrophytes <u>or</u> ponded water <u>or</u> impoundment on flood or ebb within
	reach (examples: undersized or p	erched culverts, causeways that constrict the channel, tidal gates, debris jams,
beaver dams).		
⊠B Not A		
3. Feature Pattern – asses		
	assessment reach has altered pat	tern (examples: straightening, modification above or below culvert).
⊠B Not A		
_	ofile – assessment reach metric	
		tered stream profile (examples: channel down-cutting, existing damming, over
•	e aggradation, dredging, and excav	vation where appropriate channel profile has not reformed from any of these
disturbances). ☐B Not A		
_	ty – assessment reach metric	
		which the stream has currently recovered. Examples of instability include
	= :	active widening, and artificial hardening (such as concrete, gabion, rip-rap).
☐A < 10% of chann	ol unetable	
□B 10 to 25% of ch		

0.					3) and the							
	LB	RB		•	•	_			_			
	□A ⊠B	∏A ⊠B	Mod refe	derate ev erence int	idence of e eraction (e	conditions xamples:	limited streams	erms, levee side area a	es, down- ccess, dis	-cutting, aggradation sruption of flood flows	, dredging) that adversely a sthrough streamside area, ke	
	□c	□c	Extended Ext	ensive ev amples: o ood flows	vidence of causeways s through s ching]) <u>or</u>	conditions with floot treamside	s that adversely dplain and chan e area] <u>or</u> too mu	affect refe nel constric och floodpla	erence int ction, bulk ain/intertion	eraction (little to no f kheads, retaining wal dal zone access [exa	ng mosquito ditching])  floodplain/intertidal zone acc ls, fill, stream incision, disrup mples: impoundments, inten h is a man-made feature of	otior sive
7.	Wate	r Quality	Stresso	ors – ass	essment	reach/int	ertidal zone me	etric				
	Chec A B C D D E	Exce Notic Odor	olored was sive se	dimentat /idence o luding na	ion (buryin f pollutant tural sulfid	g of strea discharge e odors)	am features or in es entering the a	tertidal zor assessmer	ne) it reach <u>a</u>	er discoloration, oil s  nd causing a water of assessment reach.		etch
	_   G   H   D   J	secti Lives Exce Degr Othe	on. stock with ssive alo aded ma	h access gae in str arsh vege	to stream eam or inte	or intertid ertidal zor ie intertida	dal zone ne	l, burning,	regular n	nowing, destruction,		
8.	Rece	ent Weath Size 1 or 2 Drou Drou	ner – wa streams ght cond ght cond	tershed s, D1 drou ditions <u>an</u>	ught or higl <u>d</u> no rainfa <u>d</u> rainfall e	her is con Ill or rainfa	dal Marsh Strea nsidered a droug all not exceeding 1 inch within the	ht; for Size g 1 inch wi	thin the la		r higher is considered a drou	ıght
9.		e or Dan	gerous \$	Stream –	assessm			lf Yes, skip	to Metri	c 13 (Streamside Are	a Ground Surface Condition	า).
10.							each metric					
	10a.	∐Yes	⊠No	sedime	entation, n	nining, ex		eam harde	ening [for	example, rip-rap], r	of stressors include exces recent dredging, and snagg	
	10b.	Check a  □A  □B	Multiple (include	e aquatic e liverwor	macrophy ts, lichens	tes and a , and alga	quatic mosses		skip for S F G H	Size 4 Coastal Plain 5% oysters or othe Submerged aquati Low-tide refugia (p	er natural hard bottoms c vegetation	
		⊠C □D	5% und in bank	e snags a dercut ba s extend	to the nor	r root mat	ap trees) ts and/or roots ed perimeter	Check for Tidal Marsh Streams Only	□k □l	Sand bottom 5% vertical bank a Little or no habitat	•	
		□E	Little or	no habit	at							
****	*****	******	*****	**REMAI	NING QUE	STIONS	ARE NOT APP	LICABLE	FOR TID	AL MARSH STREA	MS********	t
11.	Bedf	orm and	Substra	ite – ass	essment r	each me	tric (skip for Si	ze 4 Coas	tal Plain	streams and Tidal I	Marsh Streams)	
	11a.	□Yes	⊠No	Is asses	ssment rea	ich in a na	atural sand-bed	stream? (s	skip for C	Coastal Plain strean	ns)	
	11b.	Bedform ⊠A ⊠B □C	Riffle-ru Pool-gl	un sectioi ide sectio	ck the app n (evaluate on (evalua absent (s	e 11c) te 11d)	box(es). etric 12, Aquatio	c Life)				
	11c.	at least (R) = pre	<b>one box</b> esent bu	t in each t <u>&lt;</u> 10%,	row (skip	<b>for Size</b> (C) = > 1	4 Coastal Plain 0-40%, Abunda	streams	and Tida	l Marsh Streams). 1	ether or not submerged. <b>CF</b> Not Present (NP) = absent, F 70%. Cumulative percenta	Rare
		NP	R ⊠	c □	A	P	Bedrock/sapr	olite				
				$\boxtimes$		$\overline{\mathbb{R}}$	Boulder (256 Cobble (64 –	– 4096 mı	m)			
		Ħ	Ä			Ä	Gravel (2 – 6	4 mm) ´				
						Ä	Sand (.062 – Silt/clay (< 0.					
		$\boxtimes$					Detritus Artificial (rip-r	ap, concre	ete, etc.)			
	11d.	□Yes	⊠No	Are poo	ls filled wit	h sedime	ent? (skip for Si	ze 4 Coas	tal Plain	streams and Tidal I	Marsh Streams)	

12.	Aquatic Life	- assessment reach metric (skip for Tidal Marsh Streams)
	12a. ⊠Yes If No, se	□No Was an in-stream aquatic life assessment performed as described in the User Manual? elect one of the following reasons and skip to Metric 13. □No Water ☑Other:
	12b. ⊠Yes	No Are aquatic organisms present in the assessment reach (look in riffles, pools, then snags)? If Yes, check all that apply. If No, skip to Metric 13.
		>1 Numbers over columns refer to "individuals" for Size 1 and 2 streams and "taxa" for Size 3 and 4 streams.  Adult frogs  Aquatic reptiles  Aquatic macrophytes and aquatic mosses (include liverworts, lichens, and algal mats)  Beetles  Caddisfly larvae (T)  Asian clam (Corbicula)  Crustacean (isopod/amphipod/crayfish/shrimp)  Damselfly and dragonfly larvae  Dipterans  Mayfly larvae (E)  Megaloptera (alderfly, fishfly, dobsonfly larvae)  Midges/mosquito larvae
		Mosquito fish (Gambusia) or mud minnows (Umbra pygmaea)   Mussels/Clams (not Corbicula)   Other fish   Salamanders/tadpoles   Snails   Stonefly larvae (P)   Tipulid larvae   Worms/leeches
13.		Moderate alteration to water storage capacity over a majority of the streamside area
14.		Area Water Storage – streamside area metric (skip for Size 1 streams, Tidal Marsh Streams, and B valley types) the Left Bank (LB) and the Right Bank (RB) of the streamside area.
	□A □A □B □B □C □C	Majority of streamside area with depressions able to pond water 3 to 6 inches deep
15.	Consider for	
16.	Check all cor  A Stre  B Pond C Obs D Evid  E Stre	ntributors – assessment reach metric (skip for Size 4 streams and Tidal Marsh Streams) ntributors within the assessment reach or within view of and draining to the assessment reach. ams and/or springs (jurisdictional discharges) ds (include wet detention basins; do not include sediment basins or dry detention basins) truction passing flow during low-flow periods within the assessment area (beaver dam, leaky dam, bottom-release dam, weir) lence of bank seepage or sweating (iron in water indicates seepage) am bed or bank soil reduced (dig through deposited sediment if present) e of the above
17.	Check all that  A Evid  B Obs  C Urba  D Evid  E Asse	tractors – assessment area metric (skip for Tidal Marsh Streams) t apply. lence of substantial water withdrawals from the assessment reach (includes areas excavated for pump installation) truction not passing flow during low-flow periods affecting the assessment reach (ex: watertight dam, sediment deposit) an stream (≥ 24% impervious surface for watershed) lence that the streamside area has been modified resulting in accelerated drainage into the assessment reach essment reach relocated to valley edge e of the above
18.	Consider aspe ⊠A Stre □B Deg	sessment reach metric (skip for Tidal Marsh Streams) ect. Consider "leaf-on" condition. am shading is appropriate for stream category (may include gaps associated with natural processes) raded (example: scattered trees) am shading is gone or largely absent

19.	19. Buffer Width – streamside area metric (skip for Tidal Marsh Streams Consider "vegetated buffer" and "wooded buffer" separately for left to the first break.  Vegetated Wooded  LB RB LB RB  △A □A △A □A ≥ 100 feet wide or extends to the edge of th □B △B □B △B From 50 to < 100 feet wide □C □C □C □C From 30 to < 50 feet wide □D □D □D □D From 10 to < 30 feet wide □E □E □E □E < 10 feet wide or no trees	bank (LB) and right bank (RB) starting at the top of bank out
	20. Buffer Structure – streamside area metric (skip for Tidal Marsh Streamside for left bank (LB) and right bank (RB) for Metric 19 ("Vegetal LB RB A A A Mature forest  B B B Non-mature woody vegetation or modified vegetation or	ated" Buffer Width).  structure < 10 feet wide
21.	21. Buffer Stressors – streamside area metric (skip for Tidal Marsh Streacheck all appropriate boxes for left bank (LB) and right bank (RB). It within 30 feet of stream (< 30 feet), or is between 30 to 50 feet of stream If none of the following stressors occurs on either bank, check here Abuts < 30 feet 30-50 feet  LB RB LB RB LB RB  A A A A A A A A A A A A A A A A A A A	ndicate if listed stressor abuts stream (Abuts), does not abut but is (30-50 feet).  and skip to Metric 22:
22.	22. Stem Density – streamside area metric (skip for Tidal Marsh Streams Consider for left bank (LB) and right bank (RB) for Metric 19 ("Wood LB RB  □ A □ A Medium to high stem density □ B □ B Low stem density □ C □ C No wooded riparian buffer or predominantly herbaceon	ed" Buffer Width).
23.	23. Continuity of Vegetated Buffer – streamside area metric (skip for Tide Consider whether vegetated buffer is continuous along stream (parallel).  LB RB  □ A □ A The total length of buffer breaks is < 25 percent.  □ B □ B The total length of buffer breaks is between 25 and 50 □ C □ C The total length of buffer breaks is > 50 percent.	Breaks are areas lacking vegetation > 10 feet wide.
24.	with non-native invasive species absent or sparse.  Vegetation indicates disturbance in terms of species species. This may include communities of weedy communities with non-native invasive species present communities missing understory but retaining canopy Vegetation is severely disturbed in terms of species with non-native invasive species dominant over a large	and their proportions. Lower strata composed of native species, diversity or proportions, but is still largely composed of native native species that develop after clear-cutting or clearing or, but not dominant, over a large portion of the expected strata or
25.	25. Conductivity – assessment reach metric (skip for all Coastal Plain states 25a.   Yes  No Was conductivity measurement recorded?  If No, select one of the following reasons.  No Water  Other:	reams)
	25b. Check the box corresponding to the conductivity measurement (uni  ☐A < 46 ☐B 46 to < 67 ☐C 67 to < 79 ☐E	s of microsiemens per centimeter).  79 to < 230 ☐E ≥ 230

Notes/Sketch:

Stream Site Name	R2707D 7-1 (Impact Site 5A)	Date of Assessment		
Stream Category	Pa2	Assessor Name/Organization	Melissa R	
on our outogory			Baldwin, S	tantec
Notes of Field Asses	consort Forms (V/NI)		NO	
Notes of Field Asses	• •		NO NO	
-	ory considerations (Y/N) formation/supplementary measu	uroments included (V/N)	NO	
	e (perennial, intermittent, Tidal I		Perennial	
NC SAM leature typ	e (perennai, intermittent, Tidai i	viaisii Stieaiii)	- r eremman	<u> </u>
			USACE/	NCDWR
	Function Class Rating Sumr	nary A	II Streams	Intermittent
	(1) Hydrology		MEDIUM	
	(2) Baseflow		HIGH	
	(2) Flood Flow		MEDIUM	
	(3) Streamside Ar	ea Attenuation	MEDIUM	
	(4) Floodpla		MEDIUM	
		d Riparian Buffer	HIGH	
	(4) Microto	· ·	LOW	
	(3) Stream Stabili	- · · · ·	MEDIUM	
	(4) Channe	· —	LOW	
		nt Transport	HIGH	
	` '	Geomorphology	MEDIUM	
		dal Zone Interaction	NA	
	(2) Longitudinal Tid		NA	
	(2) Tidal Marsh Str		NA	
		rsh Channel Stability	NA	
		rsh Stream Geomorphology	NA	
	(1) Water Quality	irsir stream secmorphology	HIGH	
	(2) Baseflow		HIGH	
	(2) Streamside Area Ve		HIGH	
	(3) Upland Polluta	· —	HIGH	
	(3) Thermoregula		HIGH	
	(2) Indicators of Stresso		NO	
	(2) Aquatic Life Tolerand	<del></del>	HIGH	
	(2) Intertidal Zone Filtration		NA	
		111		
	(1) Habitat		HIGH	
	(2) In-stream Habitat (3) Baseflow		HIGH	
	• •			
	(3) Substrate	<del></del>	HIGH	
	(3) Stream Stabili	· —	LOW	
	(3) In-stream Hab	<u> </u>	HIGH	
	(2) Stream-side Habitat		HIGH	
	(3) Stream-side H		HIGH	
	(3) Thermoregula		HIGH	
	(2) Tidal Marsh In-stream		NA NA	
	(3) Flow Restriction		NA	
	(3) Tidal Marsh Str		NA	
		rsh Channel Stability	NA	
		rsh Stream Geomorphology	NA	
	(3) Tidal Marsh In-	stream Habitat	NA	
	(2) Intertidal Zone		NA	
	Overall		HIGH	

	Accompanies user wa	iluai veisioii 2.1	
USACE AID #:		NCDWR #:	
	Attach a sketch of the assessment area and photograpl		
	on of the stream reach under evaluation. If multiple st		
	on the attached map, and include a separate form for e		
	requested information. Record in the "Notes/Sketch"		rements were performed. See the
	ual for examples of additional measurements that may		
NOTE EVIDENCE	OF STRESSORS AFFECTING THE ASSESSMENT A	REA (do not need to be within	the assessment area).
PROJECT/SITE INI			
Project name (if a	· · · · · · · · · · · · · · · · · · ·	Date of evaluation: 3/4/201	
3. Applicant/owner r		Assessor name/organization:	Melissa Ruiz/Stantec
5. County:		Nearest named water body	
7. River basin:	Broad	on USGS 7.5-minute quad:	Buffalo Creek
	(decimal degrees, at lower end of assessment reach):	35.28539, -81.478568	
	ATION: (depth and width can be approximations)	and of accompant reach avalua	atad (fact). 400
		ngth of assessment reach evaluation	
-	from bed (in riffle, if present) to top of bank (feet):		nable to assess channel depth.
12. Channel width a		sessment reach a swamp steam	! ☐ res ☐ No
	□Perennial flow □Intermittent flow □Tidal Marsh Str	caiii	
15. NC SAM Zone:		☐ Inner Coastal Plain (I)	Outer Coastal Plain (O)
13. NO SAIVI ZONE:	☐ Mountains (M) ☐ Piedmont (P)	☐ IIIIlei C∪asiai Piaili (I)	U Outer Coastal Plaiff (O)
		\	
16. Estimated geom		□в	
valley shape ( <b>sk</b> <b>Tidal Marsh St</b> ı	rip for —		eam, steeper valley slope)
		,	
17. Watershed size:		$< 0.5 \text{ mi}^2$ ) Size 3 (0.5 to <	5 mi²)
for Tidal Marsh ADDITIONAL INFO	,		
	oconsiderations evaluated? ⊠Yes □No If Yes, chec	ek all that apply to the assessme	nt area
Section 10 wa			shed (
☐Essential Fish	<u>=</u>		/Outstanding Resource Waters
Publicly owner	_ , ,		•
☐ Anadromous			onmental Concern (AEC)
	presence of a federal and/or state listed protected spe		
List species:	,		
	Critical Habitat (list species)		
19. Are additional st	tream information/supplementary measurements includ	ded in "Notes/Sketch" section or	attached?  ☐Yes ⊠No
	- assessment reach metric (skip for Size 1 streams	s and Tidal Marsh Streams)	
	throughout assessment reach.		
	v, water in pools only. ter in assessment reach.		
_			
	ow Restriction – assessment reach metric		
	st 10% of assessment reach in-stream habitat or riffle-		
	of obstructing flow <u>or</u> a channel choked with aquatic m sessment reach (examples: undersized or perched cul		
	sessment reach (examples: undersized or perched cui r dams).	veris, causeways that constrict	uie Giailiei, ildai gales, debiis jällis,
⊠B Not A			
	acceptament reach matrix		
	n – assessment reach metric prity of the assessment reach has altered pattern (exan	polos: etrajahtanina madifisation	a above or holow culvert)
∐A A majo ⊠B Not A	only or the assessment reach has altered pattern (exam	ipies. straightening, modification	i above of below curvert).
_	udinal Profile – assessment reach metric		
	ty of assessment reach has a substantially altered stream		0. 0.
	ng, active aggradation, dredging, and excavation whe	ere appropriate channel profile	nas not reformed from any of these
☐B Not A	ances).		
	Instability – assessment reach metric		
	current instability, not past events from which the		
	re, active channel down-cutting (head-cut), active wide	ning, and artificial hardening (su	uch as concrete, gabion, rip-rap).
=	of channel unstable 25% of channel unstable		
	of channel unstable		

6.					streamsic					
	LB	sider for t RB	ne Left	Bank (LE	3) and the	Right Ba	nk (RB).			
	□A ⊠B	∏A ⊠B	Mo refe	derate evi erence inte	idence of o eraction (ex	conditions xamples:	limited streamsi	rms, leve de area a	es, down- ccess, dis	cutting, aggradation, dredging) that adversely affect ruption of flood flows through streamside area, leaky
	□c	□c	Ext [ex: of f mo	ensive evi amples: c lood flows	ridence of c causeways through st ching]) <u>or</u> f	conditions with flood reamside	s that adversely dplain and chann area] <u>or</u> too mud	affect refe el constric ch floodpla	erence inte ction, bulk ain/intertid	nor ditching [including mosquito ditching]) eraction (little to no floodplain/intertidal zone access heads, retaining walls, fill, stream incision, disruption lal zone access [examples: impoundments, intensive or assessment reach is a man-made feature on an
7.	Wate	r Quality	Stress	ors <b>–</b> ass	essment r	each/inte	ertidal zone met	tric		
••		k all that		010 400	Cooment	cuon, in ite	nadi zone me			
	ΠA									er discoloration, oil sheen, stream foam)
	⊠B □C						m features or inter-			nd causing a water quality problem
	$\Box$ D	Odor	(not inc	cluding nat	tural sulfide	e odors)				
	□E			ished or c	collected d	ata indica	ating degraded v	water qua	lity in the	assessment reach. Cite source in "Notes/Sketch"
	□F	section Lives		h access	to stream o	or intertida	al zone			
	□G	Exce	ssive al	gae in stre	eam or inte	rtidal zon	e			
	□H						al zone (removal n in "Notes/Sketc			nowing, destruction, etc)
	∐j			ressors		_ (explail)	III Notes/Sketc	n section	')	
8.	Rece	nt Weath	er – wa	itershed r	netric (ski	ip for Tida	al Marsh Strear	ns)		
	For S	ize 1 or 2	streams	s, D1 drou	ight or high	ner is cons	sidered a drough	t; for Size	3 or 4 str	eams, D2 drought or higher is considered a drought.
	□A □B						all not exceeding 1 inch within the			st 48 hours
	⊠c			conditions	<u>1</u> Tall II all 67	ceeding	i inchi witiini the	1031 40 11	Juis	
9.	Large	e or Dang	gerous	Stream -	assessme	ent reach	metric			
	□Ye	s 🖾 No	ls s	tream is t	oo large or	dangero	us to assess? If	Yes, skip	to Metric	13 (Streamside Area Ground Surface Condition).
10.							each metric			
	10a.	∐Yes	∐No	sedime	entation, m	ining, exc		am harde	ening [for	nt reach (examples of stressors include excessive example, rip-rap], recent dredging, and snagging) to Metric 12)
	10b.									ize 4 Coastal Plain streams)
		□A			macropnyt ts, lichens,		quatic mosses I mats)	Check for Tidal Marsh Streams Only	□F □G	5% oysters or other natural hard bottoms Submerged aquatic vegetation
		⊠B	Multiple	e sticks a			d/or emergent	k for T h Stree	⊟н	Low-tide refugia (pools)
		□с	vegeta Multiple		nd logs (in	cluding la	n trees)	eck arsh O	□J	Sand bottom 5% vertical bank along the marsh
		□Ď	5% un	dercut bar	nks and/or	root mats	s and/or roots	ပ် 🖁	□ĸ	Little or no habitat
		□E		ks extend t r no habita		nal wetted	d perimeter			
		ш-	Little	THO HADIL	<b></b>					
****	*****	*****	******	**REMAIN	NING QUE	STIONS	ARE NOT APPL	ICABLE	FOR TID	AL MARSH STREAMS************************************
11.	Bedf	orm and	Substra	ate – asse	ssment re	each met	ric (skip for Siz	e 4 Coas	tal Plain s	streams and Tidal Marsh Streams)
	11a.	□Yes	⊠No	Is asses	sment rea	ch in a na	tural sand-bed s	stream? (s	skip for C	oastal Plain streams)
	11b.	_			k the app		oox(es).			
		⊠A ⊠B			n <b>(evaluate</b> en <b>(evaluat</b>					
		□с	Natura	I bedform	absent (sk	kip to Met	tric 12, Aquatic	Life)		
	11c.	In riffle se	ections,	check all t	that occur	below the	normal wetted p	oerimeter streams	of the ass and Tidal	essment reach – whether or not submerged. <b>Check Marsh Streams)</b> . Not Present (NP) = absent, Rare
		(R) = pre	esent bu	ıt <u>&lt;</u> 10%, (	Common (	(C) = > 10	0-40%, Abundan			Predominant (P) = $> 70\%$ . Cumulative percentages
		should no	ot excee	ed 100% fo C	or each as A	sessment P	reach.			
		$\boxtimes$		Ď			Bedrock/sapro			
							Boulder (256 -		m)	
		H	H	H		H	Cobble (64 – 2 Gravel (2 – 64			
					$\boxtimes$		Sand (.062 – 2	2 mm)		
			H	H	H	H	Silt/clay (< 0.0 Detritus	162 mm)		
		$\boxtimes$					Artificial (rip-ra	ap, concre	ete, etc.)	
	11d.	□Yes	⊠No	Are pool	ls filled with	h sedimer	nt? (skip for Siz	e 4 Coas	tal Plain s	streams and Tidal Marsh Streams)

12.	-		sessment reach metric (skip for Tidal Marsh Streams)
	12a. ⊠ If N		No Was an in-stream aquatic life assessment performed as described in the User Manual? one of the following reasons and skip to Metric 13. ☐No Water ☐Other:
	12b. 🛚	Yes	No Are aquatic organisms present in the assessment reach (look in riffles, pools, then snags)? If Yes, check all that apply. If No, skip to Metric 13.
	1		Numbers over columns refer to "individuals" for Size 1 and 2 streams and "taxa" for Size 3 and 4 streams. Adult frogs Aquatic reptiles
			Aquatic macrophytes and aquatic mosses (include liverworts, lichens, and algal mats) Beetles Caddisfly larvae (T)
			Asian clam ( <i>Corbicula</i> ) Crustacean (isopod/amphipod/crayfish/shrimp) Damselfly and dragonfly larvae
			Dipterans Mayfly larvae (E) Megaloptera (alderfly, fishfly, dobsonfly larvae) Midgae/magguita larvae
			Midges/mosquito larvae Mosquito fish ( <i>Gambusia</i> ) or mud minnows ( <i>Umbra pygmaea</i> ) Mussels/Clams (not <i>Corbicula</i> )
			Other fish Salamanders/tadpoles Snails
			Stonefly larvae (P) Tipulid larvae Worms/leeches
13.			Ground Surface Condition – streamside area metric (skip for Tidal Marsh Streams and B valley types)  Left Bank (LB) and the Right Bank (RB). Consider storage capacity with regard to both overbank flow and upland runoff.
	□A ⊠B □C	□A ⊠B □C	Little or no alteration to water storage capacity over a majority of the streamside area Moderate alteration to water storage capacity over a majority of the streamside area Severe alteration to water storage capacity over a majority of the streamside area (examples: ditches, fill, soil compaction, livestock disturbance, buildings, man-made levees, drainage pipes)
14.			Water Storage – streamside area metric (skip for Size 1 streams, Tidal Marsh Streams, and B valley types) Left Bank (LB) and the Right Bank (RB) of the streamside area.
	□A □B ⊠C	□A □B ⊠C	Majority of streamside area with depressions able to pond water ≥ 6 inches deep Majority of streamside area with depressions able to pond water 3 to 6 inches deep Majority of streamside area with depressions able to pond water < 3 inches deep
15.	Conside wetted p	r for the	e – streamside area metric (skip for Tidal Marsh Streams) Left Bank (LB) and the Right Bank (RB). Do not consider wetlands outside of the streamside area or within the normal of assessment reach.
	□Y ⊠N	□Y ⊠N	Are wetlands present in the streamside area?
16.		II contrib Streams Ponds (i	outors – assessment reach metric (skip for Size 4 streams and Tidal Marsh Streams) utors within the assessment reach or within view of and draining to the assessment reach. and/or springs (jurisdictional discharges) nclude wet detention basins; do not include sediment basins or dry detention basins) ion passing flow during low-flow periods within the assessment area (beaver dam, leaky dam, bottom-release dam, weir)
	□D ⊠E □F	Evidence Stream I	e of bank seepage or sweating (iron in water indicates seepage) bed or bank soil reduced (dig through deposited sediment if present) the above
17.		ll that ap	ors – assessment area metric (skip for Tidal Marsh Streams) oly. e of substantial water withdrawals from the assessment reach (includes areas excavated for pump installation)
	□B □C □D □E	Obstruct Urban st Evidence Assessn	ion not passing flow during low-flow periods affecting the assessment reach (ex: watertight dam, sediment deposit) ream (≥ 24% impervious surface for watershed) at the streamside area has been modified resulting in accelerated drainage into the assessment reach nent reach relocated to valley edge
18.		– asses	the above sment reach metric (skip for Tidal Marsh Streams)
	⊠A □B □C	Stream s Degrade	Consider "leaf-on" condition. hading is appropriate for stream category (may include gaps associated with natural processes) d (example: scattered trees) hading is gone or largely absent

19.	Buffer Width – streamside area metric (skip for Tidal Marsh Streams)  Consider "vegetated buffer" and "wooded buffer" separately for left bank (LB) and right bank (RB) starting at the top of bank out to the first break.  Vegetated Wooded  LB RB LB RB  △A △A △A △A △A △A △A △A ○ feet wide or extends to the edge of the watershed  □B □B □B □B □B From 50 to < 100 feet wide
	□ C       □ C       From 30 to < 50 feet wide         □ D       □ D       □ D       From 10 to < 30 feet wide         □ E
20.	Buffer Structure – streamside area metric (skip for Tidal Marsh Streams)  Consider for left bank (LB) and right bank (RB) for Metric 19 ("Vegetated" Buffer Width).  LB RB  A Mature forest  B Non-mature woody vegetation or modified vegetation structure  C C C Herbaceous vegetation with or without a strip of trees < 10 feet wide  D D Maintained shrubs
21.	Buffer Stressors – streamside area metric (skip for Tidal Marsh Streams)  Check all appropriate boxes for left bank (LB) and right bank (RB). Indicate if listed stressor abuts stream (Abuts), does not abut but is within 30 feet of stream (< 30 feet), or is between 30 to 50 feet of stream (30-50 feet).  If none of the following stressors occurs on either bank, check here and skip to Metric 22:  Abuts < 30 feet 30-50 feet  LB RB LB RB  A A A A A A A A A A A A A A A A A A A
22.	Stem Density – streamside area metric (skip for Tidal Marsh Streams)  Consider for left bank (LB) and right bank (RB) for Metric 19 ("Wooded" Buffer Width).  LB RB  A Medium to high stem density  B B Low stem density  C C No wooded riparian buffer or predominantly herbaceous species or bare ground
23.	Continuity of Vegetated Buffer – streamside area metric (skip for Tidal Marsh Streams)  Consider whether vegetated buffer is continuous along stream (parallel). Breaks are areas lacking vegetation > 10 feet wide.  LB RB  A The total length of buffer breaks is < 25 percent.  B B B The total length of buffer breaks is between 25 and 50 percent.  C C The total length of buffer breaks is > 50 percent.
24.	Vegetative Composition – streamside area metric (skip for Tidal Marsh Streams)         Evaluate the dominant vegetation within 100 feet of each bank or to the edge of the watershed (whichever comes first) as it contributes to assessment reach habitat.         LB       RB         □A       Vegetation is close to undisturbed in species present and their proportions. Lower strata composed of native species, with non-native invasive species absent or sparse.         □B       B       Vegetation indicates disturbance in terms of species diversity or proportions, but is still largely composed of native species. This may include communities of weedy native species that develop after clear-cutting or clearing or communities with non-native invasive species present, but not dominant, over a large portion of the expected strata or communities missing understory but retaining canopy trees.         □C       □C       Vegetation is severely disturbed in terms of species diversity or proportions. Mature canopy is absent or communities with non-native invasive species dominant over a large portion of expected strata or communities composed of planted stands of non-characteristic species or communities inappropriately composed of a single species or no vegetation.
25.	Conductivity – assessment reach metric (skip for all Coastal Plain streams)  25a.  ☐Yes ☐No Was conductivity measurement recorded?  If No, select one of the following reasons. ☐No Water ☐Other:  25b. Check the box corresponding to the conductivity measurement (units of microsiemens per centimeter).  ☐A < 46 ☐B 46 to < 67 ☐C 67 to < 79 ☐D 79 to < 230 ☐E ≥ 230
Note	es/Sketch:

Stream Site Name Stream Category	R2707D 7-4 (Impact Site 5B) Pa1	Date of Assessment Assessor Name/Organization	3/4/2019 Melissa Ruiz/Stantec	
Notes of Field Asses Presence of regulator	NO NO			
Additional stream inf	ormation/supplementary measu	rements included (Y/N)	NO	
NC SAM feature type	Intermittent			

(perennial, intermittent, Tidal Marsh Stream)	Intermitter	<u>nt</u>
Function Class Rating Summary	USACE/ All Streams	NCDWR Intermittent
(1) Hydrology	HIGH	HIGH
(2) Baseflow	HIGH	HIGH
(2) Flood Flow	HIGH	HIGH
(3) Streamside Area Attenuation	HIGH	HIGH
(4) Floodplain Access	MEDIUM	MEDIUM
(4) Wooded Riparian Buffer	HIGH	HIGH
(4) Microtopography	MEDIUM	MEDIUM
(3) Stream Stability	MEDIUM	MEDIUM
(4) Channel Stability	MEDIUM	MEDIUM
(4) Sediment Transport	MEDIUM	MEDIUM
(4) Stream Geomorphology	MEDIUM	MEDIUM
(2) Stream/Intertidal Zone Interaction	NA	NA
(2) Longitudinal Tidal Flow	NA	NA
(2) Tidal Marsh Stream Stability	NA	NA
(3) Tidal Marsh Channel Stability	NA	NA
(3) Tidal Marsh Stream Geomorphology	NA	NA
(1) Water Quality	HIGH	HIGH
(2) Baseflow	HIGH	HIGH
(2) Streamside Area Vegetation	HIGH	HIGH
(3) Upland Pollutant Filtration	HIGH	HIGH
(3) Thermoregulation	HIGH	HIGH
(2) Indicators of Stressors	NO	NO
(2) Aquatic Life Tolerance	MEDIUM	NA
(2) Intertidal Zone Filtration	NA	NA
(1) Habitat	LOW	HIGH
(2) In-stream Habitat	LOW	HIGH
(3) Baseflow	HIGH	HIGH
(3) Substrate	MEDIUM	MEDIUM
(3) Stream Stability	MEDIUM	MEDIUM
(3) In-stream Habitat	LOW	HIGH
(2) Stream-side Habitat	HIGH	HIGH
(3) Stream-side Habitat	HIGH	HIGH
(3) Thermoregulation	HIGH	HIGH
(2) Tidal Marsh In-stream Habitat	NA	NA
(3) Flow Restriction	NA	NA
(3) Tidal Marsh Stream Stability	NA	NA
(4) Tidal Marsh Channel Stability	NA	NA
(4) Tidal Marsh Stream Geomorphology	NA	NA
(3) Tidal Marsh In-stream Habitat	NA NA	NA
	NA NA	NA
(2) Intertidal Zone	IVA	IVA

		ACCO	inpanies User Wi	allual Version 2.1		
USACE AID	#:			NCDWR #:		
INSTRUCTION	ONS: Attach a ske	etch of the assessment a	rea and photograp	ohs. Attach a copy of the	e USGS 7.	5-minute topographic quadrangle,
and circle th	e location of the st	tream reach under evalua	ation. If multiple s	stream reaches will be e	evaluated o	n the same property, identify and
						r Manual for detailed descriptions
					ary measure	ements were performed. See the
		nples of additional measu SORS AFFECTING THE			he within t	ha assassment areal
			AJJEJJIVIENI	ANLA (uo noi need to	PC MINIIII I	nie assessinent alea).
1. Project na	SITE INFORMATION  The control of the	<b>)N:</b> R2707D	,	2. Date of evaluation:	11/10/20	17
i. i iojeti ila	(II ally).	1121010		Date of Evaluation.	11/10/20	Melissa Ruiz, Alex Baldwin,
3. Applicant/	owner name:	NCDOT	2	1. Assessor name/organ	ization:	Stantec
5. County:	<del>-</del>	Cleveland		6. Nearest named water		
7. River basi	n:	Broad		on USGS 7.5-minute		Kings Mountain Reservoir
	•	egrees, at lower end of as		35.281757, -81.47	7606	
STREAM IN	FORMATION: (de	pth and width can be a	pproximations)			
a Sita numb	or (show on attack	ned map): 7-1 (Impact S	Site 64 US) 10 La	angth of accomment rea	ach evaluet	ed (feet): 100
		ned map):		engtn of assessment rea 4		ed (feet): 100 able to assess channel depth.
	width at top of bar		` '	<u>4</u> ssessment reach a swan		•
		flow Intermittent flow			ייף טובמוווי	_ 103 _ 140
	ATEGORY INFOR			acam		
15. NC SAM		☐ Mountains (M)	□ Piedmont (P)	☐ Inner Coastal P	lain (I)	Outer Coastal Plain (O)
		_	_	_	( )	
				\		
16. Estimate	d geomorphic	MA				
valley sh	ape (skip for	_	ر ان ان ان	B		
	rsh Stream):	(more sinuous stream				am, steeper valley slope)
	ed size: (skip	$\square$ Size 1 (< 0.1 mi <sup>2</sup> )	☐Size 2 (0.1 to	$< 0.5 \text{ mi}^2$ ) $\square$ Size 3	(0.5  to < 5)	$mi^2$ ) $\square$ Size 4 ( $\ge 5 mi^2$ )
	Marsh Stream)	_				
	L INFORMATION		□No If Voc obo	ack all that apply to the o	ecocomon	area
	gulatory considerat on 10 water	tions evaluated? ⊠Yes □Classified Tro				rarea. ned (□I □II □III □IV □V)
· <u> </u>	itial Fish Habitat	☐Primary Nurs				Dutstanding Resource Waters
	ly owned property		arian buffer rule in		-	=
□Anadr	omous fish	☐303(d) List		☐CAMA Area		nmental Concern (AEC)
	•	of a federal and/or state li	sted protected sp	ecies within the assessn	ment area.	
	pecies:	tat (l'at an exter)				
	nated Critical Habi	· · · · —	aggiroments in the	idad in "Nataa/Cliatata" -	ootion == =	ttached2 TVcc TNc
19. Are addi	uonai stream intori	mation/supplementary me	zasurements incil	iueu III INOIES/SKEICN" S	ection or a	uacheu? [] feS [] NO
1. Channel	Water - assessn	nent reach metric (skip	for Size 1 stream	ns and Tidal Marsh Str	eams)	
$\boxtimes$ A	Water throughout	assessment reach.			,	
В	No flow, water in	•				
□с	No water in asses	ssment reach.				
_		tion - assessment reac				
□A						ed by a flow restriction or fill to the
						npoundment on flood or ebb within e channel, tidal gates, debris jams,
	beaver dams).	casti (champios, unuciói	_34 5. poronou 00	Sito, Sadoowayo iilat		o onamio, taai gatoo, aobiio jamo,
⊠B	Not A					
3. Feature	Pattern – assessi	ment reach metric				
⊠A		assessment reach has alt	ered pattern (exa	mples: straightening, mo	odification a	above or below culvert).
□в	Not A		. ,	. 3 3,		,
4. Feature	Longitudinal Prof	ile – assessment reach	metric			
⊠A	_			eam profile (examples:	channel do	wn-cutting, existing damming, over
	widening, active a					as not reformed from any of these
Пв	disturbances).					
□В	Not A					
_	_	- assessment reach m				
						ed. Examples of instability include
active ba ☐A	nk failure, active c		au-cut), active wid	ening, and artificial hard	aening (suc	h as concrete, gabion, rip-rap).
□B	10 to 25% of char					
⊠c	> 25% of channel					

0.					- streamsi B) and the							
	LB	RB		•	•	•	. ,					
	□A □B	□A □B	Mo refe or i	derate everence in derence in ntermitte	vidence of o teraction (e nt bulkhead	conditions xamples: ds, cause	: limited streams ways with flood	erms, leve side area plain cons	ees, down access, dis striction, m	-cutting, aggradation, sruption of flood flows inor ditching [includin		ı, leaky
	⊠c	⊠C	[ex of f mo	amples: lood flow	causeways s through st tching]) <u>or</u> t	with floo	dplain and chan e area] <u>or</u> too mu	nel consti uch floodp	riction, bull plain/interti	kheads, retaining wall dal zone access [exar	oodplain/intertidal zone as, fill, stream incision, disinples: impoundments, into a man-made feature	ruptior tensive
7.	Wate	r Quality	Stress	ors – ass	sessment ı	reach/int	tertidal zone me	etric				
	Chec □A	k all that		ater in st	ream or into	ertidal zo	ne (milky white	hlue uni	natural wat	er discoloration, oil sh	neen stream foam)	
	$\boxtimes$ B	Exce	ssive se	edimentat	tion (buryin	g of strea	am features or in	itertidal zo	one)			
					of pollutant atural sulfid		es entering the a	assessme	ent reach <u>a</u>	<u>ınd</u> causing a water q	uality problem	
	ΠE	Curre	ent publ				ating degraded	water qu	ality in the	assessment reach.	Cite source in "Notes/S	Sketch
	□F		stock wit		to stream							
	□G □H			0	eam or inte			al hurning	n regular n	nowing, destruction, e	etc)	
		Othe	r:				in in "Notes/Sket			nowing, deciración, c		
	□J			ressors	matria (ak	in for Tic	dal Marah Strac	.ma\				
8.	For S	Size 1 or 2	streams	s, D1 dro	ught or high	ner is con		ht; for Siz			higher is considered a dr	rought
	□A □B						all not exceeding 1 inch within the			ast 48 hours		
	⊠c			conditions								
9.	<b>Larg</b> e		_		- assessme too large o			If Yes, sk	ip to Metri	c 13 (Streamside Area	a Ground Surface Condit	ion).
10.		ral In-stre ⊠Yes	eam Hal □No				each metric	v of the	accacema	nt roach (overnoon	of stressors include exc	oooi.
	TUa.	⊠Tes		sedim	entation, m	nining, ex		eam hard	dening [for	example, rip-rap], re	ecent dredging, and sna	
	10b.	Check a  □A					ge of assessmer aquatic mosses		· —	Size 4 Coastal Plain	streams) r natural hard bottoms	
		_	(includ	e liverwo	rts, lichens	, and alga	al mats)	Check for Tidal Marsh Streams Only	⊟Ġ	Submerged aquation	vegetation	
		□В	vegeta	tion			nd/or emergent	ck for sh Str		Low-tide refugia (po Sand bottom		
		□c □D			and logs (in anks and/or		ap trees) its and/or roots	Chec	□J □K	5% vertical bank al Little or no habitat	ong the marsh	
		_	in bank	ks extend	I to the norr		ed perimeter	'				
		⊠E	Little 0	r no habi	ıaı							
****	*****	******	*****	**REMAI	INING QUE	STIONS	ARE NOT APP	LICABLI	E FOR TID	AL MARSH STREAM	ЛS********	***
11.	Bedf	orm and	Substra	ate – ass	essment r	each me	tric (skip for Si	ze 4 Coa	stal Plain	streams and Tidal N	larsh Streams)	
	11a.	□Yes	⊠No	Is asse	ssment rea	ch in a na	atural sand-bed	stream?	(skip for (	Coastal Plain stream	s)	
	11b.	Bedform ⊠A			ck the app		box(es).					
		$\boxtimes$ B	Pool-gl	lide section	on <b>(evalua</b> t	te 11d)						
		□с					etric 12, Aquati					
	11c.	at least (R) = pre	<b>one box</b> esent bu	<b>k in each</b> It <u>&lt;</u> 10%,	row (skip Common	<b>for Size</b> (C) = > 1	4 Coastal Plain 0-40%, Abunda	streams	and Tida	l Marsh Streams). N	ether or not submerged. ot Present (NP) = absen 70%. Cumulative perce	t, Rare
		should n NP	ot excee	ed 100% C	for each as A	sessmen P	ıt reach.					
							Bedrock/sapi		mm)			
							Boulder (256 Cobble (64 –	256 mm)	,			
				$\boxtimes$			Gravel (2 – 6 Sand (.062 –					
		$\overline{\boxtimes}$	Ä		Ë		Silt/clay (< 0.					
		$\boxtimes$			$\sqcup$		Detritus Artificial (rip-ı	rap, conc	rete, etc.)			
	11d.	_ □Yes	⊠No	Are poo	ols filled wit	<del></del>	` '	• •	,	streams and Tidal N	larsh Streams)	

12.	Aquatic		sessment reach metric (skip for Tidal Marsh Streams)	
	12a. ⊠ If N		No Was an in-stream aquatic life assessment performed as described in the User Manual? one of the following reasons and skip to Metric 13. ☐No Water ☐Other:	
	12b. 🖾	Yes □l	No Are aquatic organisms present in the assessment reach (look in riffles, pools, then snags)? If Yes, che apply. If No, skip to Metric 13.	ck all that
	1		Numbers over columns refer to "individuals" for Size 1 and 2 streams and "taxa" for Size 3 and 4 streams Adult frogs Aquatic reptiles Aquatic macrophytes and aquatic mosses (include liverworts, lichens, and algal mats)	
			Beetles Caddisfly larvae (T) Asian clam ( <i>Corbicula</i> )	
			Crustacean (isopod/amphipod/crayfish/shrimp)  Damselfly and dragonfly larvae  Dipterans	
		  -  -	Mayfly larvae (E) Megaloptera (alderfly, fishfly, dobsonfly larvae) Midges/mosquito larvae Mosquito fish ( <i>Gambusia</i> ) or mud minnows ( <i>Umbra pygmaea)</i>	
			Mussels/Clams (not <i>Corbicula</i> ) Other fish Salamanders/tadpoles	
			Snails Stonefly Iarvae (P) Tipulid Iarvae Worms/leeches	
13.	Streams	ide Area	Ground Surface Condition – streamside area metric (skip for Tidal Marsh Streams and B valley types)  Left Bank (LB) and the Right Bank (RB). Consider storage capacity with regard to both overbank flow and upla	and runoff.
	□A □B ⊠C	□A □B ⊠C	Little or no alteration to water storage capacity over a majority of the streamside area Moderate alteration to water storage capacity over a majority of the streamside area Severe alteration to water storage capacity over a majority of the streamside area (examples: ditches, fill, soil co livestock disturbance, buildings, man-made levees, drainage pipes)	mpaction,
14.			Water Storage – streamside area metric (skip for Size 1 streams, Tidal Marsh Streams, and B valley typ Left Bank (LB) and the Right Bank (RB) of the streamside area.	es)
	□A □B ⊠C	□A □B	Majority of streamside area with depressions able to pond water ≥ 6 inches deep Majority of streamside area with depressions able to pond water 3 to 6 inches deep Majority of streamside area with depressions able to pond water < 3 inches deep	
15.	Conside wetted pe	r for the L	e – streamside area metric (skip for Tidal Marsh Streams) Left Bank (LB) and the Right Bank (RB). Do not consider wetlands outside of the streamside area or within t f assessment reach.	he normal
	□Y ⊠N		Are wetlands present in the streamside area?	
16.	Check a	Il contribu Streams Ponds (in	utors – assessment reach metric (skip for Size 4 streams and Tidal Marsh Streams) utors within the assessment reach or within view of <u>and</u> draining to the assessment reach. and/or springs (jurisdictional discharges) nclude wet detention basins; do not include sediment basins or dry detention basins)	
	□C □D ⊠E □F	Evidence Stream b	on passing flow during low-flow periods within the assessment area (beaver dam, leaky dam, bottom-release defined bank seepage or sweating (iron in water indicates seepage)  ed or bank soil reduced (dig through deposited sediment if present)  the above	lam, weir)
17.	Check a	II that app		
	□A □B □C ⊠D	Obstructi Urban str	of substantial water withdrawals from the assessment reach (includes areas excavated for pump installation) on not passing flow during low-flow periods affecting the assessment reach (ex: watertight dam, sediment deported (≥ 24% impervious surface for watershed) that the streamside area has been modified resulting in accelerated drainage into the assessment reach	osit)
	□E □F	Assessm	ent reach relocated to valley edge the above	
18.	Consider	r aspect. (	sment reach metric (skip for Tidal Marsh Streams) Consider "leaf-on" condition.	
	□A □B ⊠C	Degraded	hading is appropriate for stream category (may include gaps associated with natural processes) d (example: scattered trees) hading is gone or largely absent	

19.	Consider "veget to the first break	
	LB RB LB  ⊠A ⊠A □/ □B □B □I  □C □C □C □D □D □I	rooded  RB  A □ A ≥ 100 feet wide or extends to the edge of the watershed  B □ B From 50 to < 100 feet wide  C □ C From 30 to < 50 feet wide  D □ D From 10 to < 30 feet wide  E □ E < 10 feet wide or no trees
20.		<ul> <li>streamside area metric (skip for Tidal Marsh Streams)</li> <li>bank (LB) and right bank (RB) for Metric 19 ("Vegetated" Buffer Width).</li> </ul>
	LB RB  □A □A  □B □B  □C □C  □D □D  □E □E	Mature forest Non-mature woody vegetation or modified vegetation structure Herbaceous vegetation with or without a strip of trees < 10 feet wide Maintained shrubs Little or no vegetation
21.	Check all appropriate within 30 feet of sold from the following sold from the	s – streamside area metric (skip for Tidal Marsh Streams)  priate boxes for left bank (LB) and right bank (RB). Indicate if listed stressor abuts stream (Abuts), does not abut but is stream (< 30 feet), or is between 30 to 50 feet of stream (30-50 feet).  Ilowing stressors occurs on either bank, check here and skip to Metric 22:
	LB RB LB  □ A □ A □ A  □ B □ B □ B  □ C □ C □ C	0 feet
22.	Consider for left LB RB □A □A	streamside area metric (skip for Tidal Marsh Streams) bank (LB) and right bank (RB) for Metric 19 ("Wooded" Buffer Width).  Medium to high stem density
	□B □B ⊠C ⊠C	Low stem density No wooded riparian buffer <u>or</u> predominantly herbaceous species <u>or</u> bare ground
23.		getated Buffer – streamside area metric (skip for Tidal Marsh Streams)  r vegetated buffer is continuous along stream (parallel). Breaks are areas lacking vegetation > 10 feet wide.  The total length of buffer breaks is < 25 percent.
	□в □в □С	The total length of buffer breaks is between 25 and 50 percent.  The total length of buffer breaks is > 50 percent.
24.	_	position – streamside area metric (skip for Tidal Marsh Streams) inant vegetation within 100 feet of each bank or to the edge of the watershed (whichever comes first) as it contributes to habitat.
	□A □A	Vegetation is close to undisturbed in species present and their proportions. Lower strata composed of native species, with non-native invasive species absent or sparse.
	□В □В	Vegetation indicates disturbance in terms of species diversity or proportions, but is still largely composed of native species. This may include communities of weedy native species that develop after clear-cutting or clearing or communities with non-native invasive species present, but not dominant, over a large portion of the expected strata or communities missing understory but retaining canopy trees.
	⊠c ⊠c	Vegetation is severely disturbed in terms of species diversity or proportions. Mature canopy is absent <u>or</u> communities with non-native invasive species dominant over a large portion of expected strata <u>or</u> communities composed of planted stands of non-characteristic species <u>or</u> communities inappropriately composed of a single species <u>or</u> no vegetation.
25.	25a. □Yes 🗵	ssessment reach metric (skip for all Coastal Plain streams)  No Was conductivity measurement recorded? t one of the following reasons. ⊠No Water □Other:
	25b. Check the b ☐A < 46	pox corresponding to the conductivity measurement (units of microsiemens per centimeter).  □ □ B 46 to < 67 □ □ C 67 to < 79 □ □ D 79 to < 230 □ E ≥ 230

Notes/Sketch:

Trash in stream

Stream Site Name	R2707D 7-1 (Impact Site 6A U	S) Date of Assessment	11/10/2017			
Stream Category	Pa3	Assessor Name/Organization	Melissa Ruiz, Alex Baldwin	,		
Sileani Calegory	1 83	Assessor Name/Organization	Stantec			
Notes of Field Asses	YES					
Presence of regulator	ory considerations (Y/N)		NO			
Additional stream information/supplementary measurements included (Y/N)						
NC SAM feature type (perennial, intermittent, Tidal Marsh Stream)  Perennial						
		•				
Presence of regulate Additional stream inf	ory considerations (Y/N) formation/supplementary measu	• •	NO			

e (perenniai, intermittent, ridai warsh Stream)	Perennia	<u> </u>
Function Class Rating Summary	USACE/ All Streams	NCDWR Intermittent
(1) Hydrology	LOW	
(2) Baseflow	HIGH	
(2) Flood Flow	LOW	
(3) Streamside Area Attenuation	LOW	
(4) Floodplain Access	LOW	
(4) Wooded Riparian Buffer	LOW	
(4) Microtopography	LOW	
(3) Stream Stability	LOW	
(4) Channel Stability	LOW	
(4) Sediment Transport	LOW	
(4) Stream Geomorphology	LOW	
(2) Stream/Intertidal Zone Interaction	NA	
(2) Longitudinal Tidal Flow	NA	
(2) Tidal Marsh Stream Stability	NA	
(3) Tidal Marsh Channel Stability	NA	
(3) Tidal Marsh Stream Geomorphology	NA	
(1) Water Quality	LOW	
(2) Baseflow	HIGH	
(2) Streamside Area Vegetation	LOW	
(3) Upland Pollutant Filtration	LOW	
(3) Thermoregulation	LOW	
(2) Indicators of Stressors	YES	
(2) Aquatic Life Tolerance	HIGH	
(2) Intertidal Zone Filtration	NA NA	
(1) Habitat	LOW	
(2) In-stream Habitat	LOW	
(3) Baseflow	HIGH	
(3) Substrate	LOW	
(3) Stream Stability	LOW	
(3) In-stream Habitat	LOW	
(2) Stream-side Habitat	LOW	
(3) Stream-side Habitat	LOW	
(3) Thermoregulation	LOW	
(2) Tidal Marsh In-stream Habitat	NA NA	
• •	NA NA	
(3) Flow Restriction		
(3) Tidal Marsh Stream Stability	NA NA	
(4) Tidal Marsh Channel Stability	NA NA	
(4) Tidal Marsh Stream Geomorphology	NA NA	
(3) Tidal Marsh In-stream Habitat	NA NA	
(2) Intertidal Zone	NA	
Overall	LOW	

INSTRUCTIONS: Attach a sketch of the assessment area and photographs. Attach a copy of the USSS 7.5-minute topographic quadrangle and cricle the location of the steam reach under volusion. If multiple steam reaches will be ovaluated on the same property, identify and number all reaches on the attached map, and include a separate form for each reach. See the NC SAM User Manual for detailed descriptions and suplanations of requested information. Record in the "NebuSVBuch" section if supplementary measurements were performed. See the NC SAM User Manual for examples of additional measurements that may be relevant.  NOTE EVIDENCE OF STRESSORS AFFECTION THE ASSESSMENT AREA (do not need to be within the assessment area).  PROJECTISTIE INFORMATION:  1. Project name (if any): R. 27070	USACE AID #:		NCDWR #:					
and circle the location of the stream reach under evaluation. If multiple stream reaches will be evaluated on the same property, identify and number all reaches on the state-form app, and include a separate form for each reach. See the NC SAM User Manual for exhalled descriptions and explanations of requested information. Record in the "Notes/Sketch" section if supplementary measurements were performed. See the NC SAM User Manual for exhalled sections of the NC SAM User Manual for exhalled sections of the NC SAM User Manual for exhalled sections. A section of the NC SAM User Manual for exhalled descriptions and explanations of the NC SAM User Manual for exhalled sections. A section of the NC SAM User Manual for exhalled sections of the NC SAM User Manual for exhalled sections. A section of the NC SAM User Manual for the								
and explanations of requested information. Record in the "Notes/Sketch' section if supplementary measurements that may be relevant.  NOTE EVIDENCE OF STRESSORS AFFECTING THE ASSESSMENT AREA (do not need to be within the assessment area).  PROJECT/STRE INFORMATION:  1. Project name (if any):  RE207D  2. Date of evaluation:  1/1/0/2017  1. Assessor name (a any):  Realissa Ruiz, Alex Baldwin, Stantec  County:  Realissa Ruiz, Alex Baldwin, Stantec  Rings Mountain Reservoir  S. Ste coordinates (decimal degrees, at lower end of assessment reach):  S. Ste coordinates (decimal degrees, at lower end of assessment reach):  S. Ste condinates (decimal degrees, at lower end of assessment reach):  S. Ste condinates (decimal degrees, at lower end of assessment reach):  S. Ste number (show on attached map):  9. Ste number (show on attached map):  10. Channel width at top of bank (feet):  8. 13. Is assessment reach a swamp steam?   yes   No    11. Reature bye;   Perennial flow   Intermittent flow   Indal Marsh Stream  STREAM CATEGORY INFORMATION:  15. NC SAM Zone:    Mountains (M)   Piedmont (P)   Inner Coastal Plain (I)   Outer Coastal Plain (O)  16. Estimated geomorphic valley shape (skip for Tidal Marsh Stream)  ADDITIONAL PROFRMATION:  18. Were regulatory considerations evaluated?   2yes   No   1 Yes, check all that apply to the assessment area.    Section 10 water   Classified Trout Waters   Section 10 water   Classified Trout Waters   Supply Watershed (I)   Ill   Ill   Ill   Ill   V  V								
NC SAM User Manual for examples of additional measurements that may be relevant.  NOTE EVIDENCE OF STRESSORS AFFECTING THE ASSESSMENT AREA (do not need to be within the assessment area).  PROLECTISTE INFORMATION:  1. Project name (if any):  8. PROYD  2. Date of evaluation:  1. 1/10/2017  Melissa Ruiz, Alex Balthwin,  Startec  Startec  1. Noarrast named vaster body  on USSG 7. Smillute quad:  8. Site coordinates (decimal degrees, at lower end of assessment reach):  9. Site number (show on attached map):  7. 1. (Impact Site Os D. 1). On USSG 7. Smillute quad:  8. Site coordinates (decimal degrees, at lower end of assessment reach):  9. Site number (show on attached map):  7. 1. (Impact Site Os D. 1). On the origination of the origination originat								
NOTE EVIDENCE OF STRESSORS AFFECTING THE ASSESSMENT AREA (do not need to be within the assessment area).  PROJECTISTE INFORMATION:  1. Project name (if any): R2707D	and explanations of requested	information. Record in	the "Notes/Sketch" section if supplementary measurements were performed. See the					
PROJECT(SITE INFORMATION:   R2707D								
1. Project name (if any): R2707D 2. Date of evaluation: 11/10/2017 Melissas Ruiz, Alex Baldwin, 3. Applican/lowner name: NCDOT 4. Assessor name/organization: Stantec Colorables (feel): Gloveland 6. Nearest named water body or USGS 7.5-minute quad: Control (feel): 100 muscle (feel): 100 muscle (feel): 3. Sz. 281812, -81.477274  STREAM INFORMATION: (depth and width can be approximations)  9. Site number (show on attached map): 7-1 (Impact Site 6A DS) 10. Length of assessment reach evaluated (feel): 100 muscle for sessor feel): 4 muscle feel feel feel feel feel feel feel f	NOTE EVIDENCE OF STRES	SORS AFFECTING THE	E ASSESSMENT AREA (do not need to be within the assessment area).					
3. Applicant/owner name: NCDOT	PROJECT/SITE INFORMATION	ON:						
3. Applicant/owner name:   NCDOT	Project name (if any):	R2707D						
S. County:								
7. River basin: State condinates (decimal degrees, at lower end of assessment reach): 35.281812, -81.477274  STREAM INFORMATION: (depth and width can be approximations)  9. Site number (show on attached map): 7-1 (Impact Site 6A DS) 10. Length of assessment reach evaluated (feet): 100  11. Channel depth from bed (in riffle, if present) to top of bank (feet): 4  12. Channel width at top of bank (feet): 8  13. Is assessment reach a swamp steam?   Yes   No  14. Faculto type:   Periodic North March   Per	_ · · ·							
B. Site coordinates (decimal degrees, at lower end of assessment reach):  STREAM INFORMATION: (depth and width can be approximations)  9. Site number (show on attached map): 7-1 (Impact Site BA DS) 10. Length of assessment reach evaluated (feet): 100  11. Channel depth from bed (in riffle, if present) to top of bank (feet): 4			•					
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9. Site number (show on attached map): 7-1 (Impact Site 6A DS) 10. Length of assessment reach evaluated (feet): 100 11. Channel depth from bed (in riffle, if present) to top of bank (feet): 4	·	=						
11. Channel depth from bed (in riffle, if present) to top of bank (feet): 2. Channel width at top of bank (feet): 3. Is assessment reach a swamp steam?   Yes   No 14. Feature type:   Perennial flow   Intermittent flow   Tidal Marsh Stream STREAM CATEGORY INFORMATION: 15. NC SAM Zone:   Mountains (M)   Piedmont (P)   Inner Coastal Plain (I)   Outer Coastal Plain (O)  16. Estimated geomorphic valley shape (skip for Tidal Marsh Stream)   (more sinuous stream, flatter valley slope)   (less sinuous stream, steeper valley slope)   17. Watershed size: (skip   Size 1 (< 0.1 mi²)   Size 2 (0.1 to < 0.5 mi²)   Size 3 (0.5 to < 5 mi²)   Size 4 (≥ 5 mi²)   18. Were regulatory considerations evaluated?   Size   No If Yes, check all that apply to the assessment area.   Section 10 water   Classified Trout Waters   Water Supply Watershed (  Int   Int	STREAM INFORMATION: (de	pth and width can be a	pproximations)					
11. Channel depth from bed (in riffle, if present) to top of bank (feet): 2. Channel width at top of bank (feet): 3. Is assessment reach a swamp steam?   Yes   No 14. Feature type:   Perennial flow   Intermittent flow   Tidal Marsh Stream STREAM CATEGORY INFORMATION: 15. NC SAM Zone:   Mountains (M)   Piedmont (P)   Inner Coastal Plain (I)   Outer Coastal Plain (O)  16. Estimated geomorphic valley shape (skip for Tidal Marsh Stream)   (more sinuous stream, flatter valley slope)   (less sinuous stream, steeper valley slope)   17. Watershed size: (skip   Size 1 (< 0.1 mi²)   Size 2 (0.1 to < 0.5 mi²)   Size 3 (0.5 to < 5 mi²)   Size 4 (≥ 5 mi²)   18. Were regulatory considerations evaluated?   Size   No If Yes, check all that apply to the assessment area.   Section 10 water   Classified Trout Waters   Water Supply Watershed (  Int   Int	0.000	7.4 (1mmont)	Cito CA DC) 40 Level of consequent and a level (feet)					
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14. Feature type: ⊠ Perennial flow intermittent	•		, ,					
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16. Estimated geomorphic valley shape (skip for Tidal Marsh Stream): (more sinuous stream, flatter valley slope) (less sinuous stream, steeper valley slope)  17. Watershed size: (skip			M Diadment (D)					
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valley shape (skip for Tidal Marsh Stream)								
valley shape (skip for Tidal Marsh Stream)		•						
Valers has Stream; (more sinuous stream, flatter valley slope) (less sinuous stream, steeper valley slope)  17. Watershed size: (skip		$\bowtie$						
17. Watershed size: (skip		_						
Title   Marsh Stream    ADDITIONAL INFORMATION:	•							
ADDITIONAL INFORMATION:	` •	☐Size 1 (< 0.1 mi $^2$ )	$\square$ Size 2 (0.1 to < 0.5 mi <sup>2</sup> ) $\square$ Size 3 (0.5 to < 5 mi <sup>2</sup> ) $\square$ Size 4 (≥ 5 mi <sup>2</sup> )					
18. Were regulatory considerations evaluated?	,							
Section 10 water   Classified Trout Waters   High Quality Watershed (    □   □   □   □   □   □   □   □   □								
Essential Fish Habitat								
Publicly owned property   NCDWR Riparian buffer rule in effect   Nutrient Sensitive Waters   Anadromous fish   303(d) List   CAMA Area of Environmental Concern (AEC)   Documented presence of a federal and/or state listed protected species within the assessment area. List species:   Designated Critical Habitat (list species)   19. Are additional stream information/supplementary measurements included in "Notes/Sketch" section or attached?   Yes   No    1. Channel Water – assessment reach metric (skip for Size 1 streams and Tidal Marsh Streams)   A Water throughout assessment reach.   B No flow, water in pools only.   C No water in assessment reach.    2. Evidence of Flow Restriction – assessment reach metric   A At least 10% of assessment reach in-stream habitat or riffle-pool sequence is severely affected by a flow restriction or fill to the point of obstructing flow or a channel choked with aquatic macrophytes or ponded water or impoundment on flood or ebb within the assessment reach (examples: undersized or perched culverts, causeways that constrict the channel, tidal gates, debris jams, beaver dams).   B Not A   A majority of the assessment reach metric   A majority of the assessment reach has altered pattern (examples: straightening, modification above or below culvert).   B Not A   A majority of assessment reach has a substantially altered stream profile (examples: channel down-cutting, existing damming, over widening, active aggradation, dredging, and excavation where appropriate channel profile has not reformed from any of these disturbances).   B Not A   Signs of Active Instability – assessment reach metric   Consider only current instability, not past events from which the stream has currently recovered. Examples of instability include active bank failure, active channel down-cutting (head-cut), active widening, and artificial hardening (such as concrete, gabion, rip-rap).   A   10 to 25% of channel unstable   B   10 to 25% of channel unstable   B   10 to 25% of channel unstable   B   10 to 25% of ch		_						
	_							
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□A < 10% of channel unstable □B 10 to 25% of channel unstable								
B 10 to 25% of channel unstable			ad-cut), active widening, and artificial hardening (such as concrete, gabion, rip-rap).					

6.					streamsid ) and the					
	□A □B	□A □B	Mod refe	derate evi erence inte	dence of ceraction (ex	conditions camples:	limited streamsi	rms, levee de area ac	es, down- ccess, dis	eraction cutting, aggradation, dredging) that adversely affect sruption of flood flows through streamside area, leaky inor ditching [including mosquito ditching])
	⊠C	⊠c	Exte [exa of fl mos	ensive evi amples: c ood flows	dence of causeways through streaming]) or fl	conditions with flood reamside	that adversely plain and chann area] or too mud	affect refe el constric ch floodpla	rence inte ction, bulk ain/intertic	eraction (little to no floodplain/intertidal zone access heads, retaining walls, fill, stream incision, disruption dal zone access [examples: impoundments, intensive or assessment reach is a man-made feature on an
7.		-		ors – asse	essment r	each/inte	rtidal zone me	tric		
	$\square A$		olored wa							er discoloration, oil sheen, stream foam)
	⊠B □C						n features or int s entering the a			nd causing a water quality problem
	D DE	Odor	(not inc	luding nat	ural sulfide	e odors)	· ·			assessment reach. Cite source in "Notes/Sketch"
	□F	section	on.		o stream o			rator qua	,	
	□G	Exce	ssive alg	gae in stre	am or inte	rtidal zone	е	h		and a struction of a
		Othe					in "Notes/Sketo			nowing, destruction, etc)
8.					netric (ski	n for Tida	al Marsh Strear	ns)		
		ize 1 or 2	streams	s, D1 drou	ght or high	er is cons		t; for Size		eams, D2 drought or higher is considered a drought.
	□B □C	Drou	ght cond				1 inch within the			ist 40 flours
9.	Large	e or Dang	gerous S		assessme	ent reach	metric			
	□Ye				_	_		Yes, skip	to Metric	: 13 (Streamside Area Ground Surface Condition).
10.		ral In-stre ⊠Yes	eam Hab □No	Degrad sedime	led in-streantation, m	am habita ining, exc		am harde	ning [for	nt reach (examples of stressors include excessive example, rip-rap], recent dredging, and snagging) to Metric 12)
	10b.	Check a ☐A					e of assessment		kip for S □F	ize 4 Coastal Plain streams) 5% oysters or other natural hard bottoms
			(include	e liverwort	s, lichens,	and algal		Check for Tidal Marsh Streams Only	□' □G □H	Submerged aquatic vegetation
		□B	vegetat	tion				sck for shock on Stre		Low-tide refugia (pools) Sand bottom
		□C □D	5% und	dercut bar		root mats	s and/or roots	Che	□J □K	5% vertical bank along the marsh Little or no habitat
		⊠E		s extend to no habita		nal wetted	l perimeter			
****	*****	*****	*****	**REMAIN	IING QUE	STIONS A	ARE NOT APPL	ICABLE	FOR TID	AL MARSH STREAMS************************************
11.	Bedf	orm and	Substra	ite – asse	ssment re	each meti	ric (skip for Siz	e 4 Coast	tal Plain	streams and Tidal Marsh Streams)
	11a.	□Yes	⊠No	Is asses	sment read	ch in a na	tural sand-bed s	stream? (s	kip for C	Coastal Plain streams)
	11b.	Bedform ⊠A			k the appr		oox(es).			
		⊠B □C	Pool-gli	ide sectio	n <b>(evaluat</b> e	e 11d)	ric 12, Aquatic	Life)		
	11c.	In riffle se	ections,	check all t	hat occur b	below the	normal wetted p	erimeter o		essment reach – whether or not submerged. Check
										<b>Marsh Streams)</b> . Not Present (NP) = absent, Rare Predominant (P) = > 70%. Cumulative percentages
		should no	ot excee R	ed 100% fo C	or each ass A	sessment P	reach.			
							Bedrock/sapro Boulder (256 -		m)	
					Ä	Ä	Cobble (64 – 2	256 mm)	''')	
							Gravel (2 – 64 Sand (.062 – 2	2 mm)		
							Silt/clay (< 0.0 Detritus	62 mm)		
		_					Artificial (rip-ra	•	,	
	11d.	□Yes	$\boxtimes$ No	Are pool	s filled with	n sedimen	nt? (skip for Siz	e 4 Coast	ai Plain s	streams and Tidal Marsh Streams)

12.	Aquatic L	_ife – as	sessment reach metric (skip for Tidal Marsh Streams)
	12a. ⊠Y If No		No Was an in-stream aquatic life assessment performed as described in the User Manual? one of the following reasons and skip to Metric 13. ☐No Water ☑Other:
	12b. ⊠Y	′es 🗌	No Are aquatic organisms present in the assessment reach (look in riffles, pools, then snags)? If Yes, check all that apply. If No, skip to Metric 13.
	1 		Adult frogs Aquatic reptiles
	30000000000000000000000000000000000000		Aquatic macrophytes and aquatic mosses (include liverworts, lichens, and algal mats) Beetles Caddisfly larvae (T)
			Asian clam ( <i>Corbicula</i> ) Crustacean (isopod/amphipod/crayfish/shrimp) Damselfly and dragonfly larvae
			Dipterans Mayfly larvae (E) Megaloptera (alderfly, fishfly, dobsonfly larvae) Midges/mosquito larvae
			Mosquito fish ( <i>Gambusia</i> ) or mud minnows ( <i>Umbra pygmaea)</i> Mussels/Clams (not <i>Corbicula</i> )
			Other fish Salamanders/tadpoles Snails
			Stonefly Iarvae (P) Tipulid Iarvae Worms/leeches
13.	Consider		Ground Surface Condition – streamside area metric (skip for Tidal Marsh Streams and B valley types)  Left Bank (LB) and the Right Bank (RB). Consider storage capacity with regard to both overbank flow and upland runoff.
	⊟в i	□A □B ⊠C	Little or no alteration to water storage capacity over a majority of the streamside area Moderate alteration to water storage capacity over a majority of the streamside area Severe alteration to water storage capacity over a majority of the streamside area (examples: ditches, fill, soil compaction, livestock disturbance, buildings, man-made levees, drainage pipes)
14.	Consider		Water Storage – streamside area metric (skip for Size 1 streams, Tidal Marsh Streams, and B valley types) Left Bank (LB) and the Right Bank (RB) of the streamside area.
	□в	□A □B ⊠C	Majority of streamside area with depressions able to pond water ≥ 6 inches deep Majority of streamside area with depressions able to pond water 3 to 6 inches deep Majority of streamside area with depressions able to pond water < 3 inches deep
15.	Consider wetted pe	for the	<ul> <li>e – streamside area metric (skip for Tidal Marsh Streams)</li> <li>Left Bank (LB) and the Right Bank (RB). Do not consider wetlands outside of the streamside area or within the normal of assessment reach.</li> </ul>
	□Y	□Y ⊠N	Are wetlands present in the streamside area?
16.	Check all  ☐A  ☐B	l <b>contrib</b> Streams Ponds (i	outors – assessment reach metric (skip for Size 4 streams and Tidal Marsh Streams) utors within the assessment reach or within view of and draining to the assessment reach. and/or springs (jurisdictional discharges) nclude wet detention basins; do not include sediment basins or dry detention basins)
	□D I	Evidence Stream b	ion passing flow during low-flow periods within the assessment area (beaver dam, leaky dam, bottom-release dam, weir) e of bank seepage or sweating (iron in water indicates seepage) bed or bank soil reduced (dig through deposited sediment if present) the above
17.	Check all	that ap	
	□B □C ☑D	Obstruct Urban st Evidence	e of substantial water withdrawals from the assessment reach (includes areas excavated for pump installation) ion not passing flow during low-flow periods affecting the assessment reach (ex: watertight dam, sediment deposit) ream (≥ 24% impervious surface for watershed) that the streamside area has been modified resulting in accelerated drainage into the assessment reach nent reach relocated to valley edge
19	□F I	None of	the above
10.	Consider : □A	aspect. Stream s	sment reach metric (skip for Tidal Marsh Streams) Consider "leaf-on" condition. shading is appropriate for stream category (may include gaps associated with natural processes)
			d (example: scattered trees) shading is gone or largely absent

19.	Consider "veget to the first break	
	LB RB LB  ⊠A ⊠A □/ □B □B □I  □C □C □C □D □D □I	rooded  RB  A □ A ≥ 100 feet wide or extends to the edge of the watershed  B □ B From 50 to < 100 feet wide  C □ C From 30 to < 50 feet wide  D □ D From 10 to < 30 feet wide  E □ E < 10 feet wide or no trees
20.		<ul> <li>streamside area metric (skip for Tidal Marsh Streams)</li> <li>bank (LB) and right bank (RB) for Metric 19 ("Vegetated" Buffer Width).</li> </ul>
	LB RB  □A □A  □B □B  □C □C  □D □D  □E □E	Mature forest Non-mature woody vegetation or modified vegetation structure Herbaceous vegetation with or without a strip of trees < 10 feet wide Maintained shrubs Little or no vegetation
21.	Check all appropriate within 30 feet of sold from the following sold from the	s – streamside area metric (skip for Tidal Marsh Streams)  priate boxes for left bank (LB) and right bank (RB). Indicate if listed stressor abuts stream (Abuts), does not abut but is stream (< 30 feet), or is between 30 to 50 feet of stream (30-50 feet).  Ilowing stressors occurs on either bank, check here and skip to Metric 22:
	LB RB LB  □ A □ A □ A  □ B □ B □ B  □ C □ C □ C	0 feet
22.	Consider for left LB RB □A □A	streamside area metric (skip for Tidal Marsh Streams) bank (LB) and right bank (RB) for Metric 19 ("Wooded" Buffer Width).  Medium to high stem density
	□B □B ⊠C ⊠C	Low stem density No wooded riparian buffer <u>or</u> predominantly herbaceous species <u>or</u> bare ground
23.		getated Buffer – streamside area metric (skip for Tidal Marsh Streams)  r vegetated buffer is continuous along stream (parallel). Breaks are areas lacking vegetation > 10 feet wide.  The total length of buffer breaks is < 25 percent.
	□в □в □С	The total length of buffer breaks is between 25 and 50 percent.  The total length of buffer breaks is > 50 percent.
24.	_	position – streamside area metric (skip for Tidal Marsh Streams) inant vegetation within 100 feet of each bank or to the edge of the watershed (whichever comes first) as it contributes to habitat.
	□A □A	Vegetation is close to undisturbed in species present and their proportions. Lower strata composed of native species, with non-native invasive species absent or sparse.
	□В □В	Vegetation indicates disturbance in terms of species diversity or proportions, but is still largely composed of native species. This may include communities of weedy native species that develop after clear-cutting or clearing or communities with non-native invasive species present, but not dominant, over a large portion of the expected strata or communities missing understory but retaining canopy trees.
	⊠c ⊠c	Vegetation is severely disturbed in terms of species diversity or proportions. Mature canopy is absent <u>or</u> communities with non-native invasive species dominant over a large portion of expected strata <u>or</u> communities composed of planted stands of non-characteristic species <u>or</u> communities inappropriately composed of a single species <u>or</u> no vegetation.
25.	25a. □Yes 🗵	ssessment reach metric (skip for all Coastal Plain streams)  No Was conductivity measurement recorded? t one of the following reasons. ⊠No Water □Other:
	25b. Check the b ☐A < 46	pox corresponding to the conductivity measurement (units of microsiemens per centimeter).  □ □ B 46 to < 67 □ □ C 67 to < 79 □ □ D 79 to < 230 □ E ≥ 230

Notes/Sketch:

Trash in stream

Stream Site Name	R2707D 7-1 (Impact Site 6A D	S) Date of Assessment	11/10/2017				
Stream Category	 Pa3	Assessor Name/Organization	Melissa Ruiz, Alex B	aldwin,			
Stream Category	ras	Assessor Name/Organization	Stantec				
Notes of Field Assessment Form (Y/N)  YES							
Presence of regulator	NO						
Additional stream information/supplementary measurements included (Y/N)							
NC SAM feature type (perennial, intermittent, Tidal Marsh Stream)  Perennial  Perennial							
		•					

(perennial, intermittent, Tidal Marsh Stream)	Perennia	<u> </u>
Function Class Rating Summary	USACE/ All Streams	NCDWR Intermittent
(1) Hydrology	LOW	
(2) Baseflow	HIGH	
(2) Flood Flow	LOW	
(3) Streamside Area Attenuation	LOW	
(4) Floodplain Access	LOW	
(4) Wooded Riparian Buffer	LOW	
(4) Microtopography	LOW	
(3) Stream Stability	LOW	
(4) Channel Stability	LOW	
(4) Sediment Transport	LOW	
(4) Stream Geomorphology	LOW	
(2) Stream/Intertidal Zone Interaction	NA	
(2) Longitudinal Tidal Flow	NA	
(2) Tidal Marsh Stream Stability	NA	
(3) Tidal Marsh Channel Stability	NA	
(3) Tidal Marsh Stream Geomorphology	NA	
(1) Water Quality	LOW	
(2) Baseflow	HIGH	
(2) Streamside Area Vegetation	LOW	
(3) Upland Pollutant Filtration	LOW	
(3) Thermoregulation	LOW	
(2) Indicators of Stressors	YES	
(2) Aquatic Life Tolerance	HIGH	
(2) Intertidal Zone Filtration	NA NA	
(1) Habitat	LOW	
(1) In-stream Habitat	LOW	
(3) Baseflow	HIGH	
	LOW	
(3) Substrate (3) Stream Stability	LOW	
(3) In-stream Habitat		
(2) Stream-side Habitat	LOW	
	1.014	
(3) Stream-side Habitat	LOW	
(3) Thermoregulation	LOW	
(2) Tidal Marsh In-stream Habitat	NA NA	
(3) Flow Restriction	NA NA	
(3) Tidal Marsh Stream Stability	NA NA	
(4) Tidal Marsh Channel Stability	NA NA	
(4) Tidal Marsh Stream Geomorphology	NA NA	
(3) Tidal Marsh In-stream Habitat	NA NA	
(2) Intertidal Zone	NA	
Overall	LOW	

	7100011110000011	Harraar Verbieri 2:1	
USACE AID #:		NCDWR #:	
INSTRUCTIONS: Attach a sketch of	the assessment area and photogra	aphs. Attach a copy of the	USGS 7.5-minute topographic quadrangle,
and circle the location of the stream r	each under evaluation. If multiple	stream reaches will be e	valuated on the same property, identify and
number all reaches on the attached m	ap, and include a separate form fo	or each reach. See the NC	SAM User Manual for detailed descriptions
and explanations of requested informa	ation. Record in the "Notes/Sketc	h" section if supplementa	ry measurements were performed. See the
NC SAM User Manual for examples o	of additional measurements that ma	ay be relevant.	
NOTE EVIDENCE OF STRESSORS	AFFECTING THE ASSESSMENT	AREA (do not need to I	oe within the assessment area).
PROJECT/SITE INFORMATION:	_		
1. Project name (if any):  R2707	<u>D</u>	2. Date of evaluation:	11/10/2017
			Melissa Ruiz, Alex Baldwin,
3. Applicant/owner name: NCDO		4. Assessor name/organi	
5. County: Clevel		6. Nearest named water	
7. River basin: Broad		on USGS 7.5-minute	·
8. Site coordinates (decimal degrees,			77095
STREAM INFORMATION: (depth an	d width can be approximations)		
0. Site number (show on attached ma	(n): 7.5 (Impact Site 6B) 10.1	angth of accessment rea	ch evaluated (feet): 100
9. Site number (show on attached ma			
11. Channel depth from bed (in riffle, i		4	Unable to assess channel depth.
12. Channel width at top of bank (feet		assessment reach a swan	ip steam? Lifes Lino
14. Feature type:   Perennial flow		Stream	
STREAM CATEGORY INFORMATIO		))	air (I) Douter Coastal Blair (O)
15. NC SAM Zone:	Mountains (M) 🔀 Piedmont (P	P)	ain (I) Uuter Coastal Plain (O)
		\	
16. Estimated geomorphic		/ □B	
valley snape ( <b>skip for</b>			
,	re sinuous stream, flatter valley slo	. ,	nuous stream, steeper valley slope)
` .	Size 1 (< $0.1 \text{ mi}^2$ ) $\square$ Size 2 (0.1 t	to $< 0.5 \text{ mi}^2$ ) $\square$ Size 3	$(0.5 \text{ to } < 5 \text{ mi}^2)$ Size 4 ( $\ge 5 \text{ mi}^2$ )
for Tidal Marsh Stream)			
ADDITIONAL INFORMATION:			
18. Were regulatory considerations ev			
Section 10 water	Classified Trout Waters		ly Watershed (☐I ☐II ☐III ☐IV ☐V)
☐Essential Fish Habitat	☐Primary Nursery Area		y Waters/Outstanding Resource Waters
☐Publicly owned property	□NCDWR Riparian buffer rule		
☐Anadromous fish	☐303(d) List		of Environmental Concern (AEC)
·	eral and/or state listed protected s	pecies within the assessm	nent area.
List species:  ☐Designated Critical Habitat (list	enocios)		
19. Are additional stream information/		luded in "Notes/Sketch" s	ection or attached? □Ves □No
19. Are additional stream information	supplementary measurements inc	idded iii Notes/Oketeii s	ection of attached: Tes Tivo
1. Channel Water - assessment re	ach metric (skip for Size 1 strea	ms and Tidal Marsh Stre	eams)
☑A Water throughout assess			•
□B No flow, water in pools o			
□C No water in assessment	reach.		
2. Evidence of Flow Restriction – a	assessment reach metric		
	nent reach in-stream habitat or riff	fle-pool sequence is seve	rely affected by a flow restriction or fill to the
			water or impoundment on flood or ebb within
the assessment reach (e	examples: undersized or perched	culverts, causeways that o	constrict the channel, tidal gates, debris jams,
beaver dams).			
⊠B Not A			
3. Feature Pattern – assessment re	each metric		
☑A A majority of the assessr	ment reach has altered pattern (ex	amples: straightening, mo	odification above or below culvert).
☐B Not A			,
4. Feature Longitudinal Profile – as	ssessment reach metric		
		ream profile (examples: o	channel down-cutting, existing damming, over
			I profile has not reformed from any of these
disturbances).	,	11 -1 -1	,
☐B Not A			
5. Signs of Active Instability – asse	essment reach metric		
		he stream has currently	recovered. Examples of instability include
			ening (such as concrete, gabion, rip-rap).
☐A < 10% of channel unstab	ole	<u> </u>	_ , , , , , , , , , , , , , , , , , , ,
B 10 to 25% of channel un			
	ole		

b.		amside Ar sider for t								
	LB	RB		` '	,	J	` ,			
	□A □B	□A □B	Mod refe or ir	lerate evic rence inte itermittent	dence of c raction (ex bulkhead	conditions xamples: ls, causev	limited stream ways with flood	erms, leve side area a Iplain const	es, down- ccess, dis riction, m	cutting, aggradation, dredging) that adversely affec sruption of flood flows through streamside area, leaky inor ditching [including mosquito ditching])
	⊠c	⊠c	[exa of flo mos	imples: ca	auseways hrough st ning]) <u>or</u> f	with flood reamside	dplain and char area] <u>or</u> too m	nel constri uch floodpl	ction, bulk ain/intertic	eraction (little to no floodplain/intertidal zone access theads, retaining walls, fill, stream incision, disruptior dal zone access [examples: impoundments, intensive or assessment reach is a man-made feature on ar
7.				rs – asse	ssment r	each/inte	ertidal zone m	etric		
	□A ⊠B	Exces	lored wa ssive se	dimentatio	ท (burying	g of strear	m features or i	ntertidal zo	ne)	er discoloration, oil sheen, stream foam)
	□C □D □E	Odor Curre	(not inclent public	uding natu	iral sulfide	e odors)				nd causing a water quality problem assessment reach. Cite source in "Notes/Sketch
	□F		tock with	access to						
	GH D	Degra Other	aded ma			e intertida				nowing, destruction, etc)
В.					atric (ski	n for Tid	al Marsh Stre	ame)		
<b>J.</b>		Size 1 or 2 Droug Droug	streams ght cond ght cond	, D1 drouເ itions <u>and</u>	ght or high no rainfal	er is cons Il or rainfa		ght; for Size	thin the la	reams, D2 drought or higher is considered a drought ast 48 hours
9.	<b>Larg</b> e	<b>e or Dang</b> s ⊠No	•					If Yes, skip	to Metric	: 13 (Streamside Area Ground Surface Condition).
10.							each metric			
	10a.	⊠Yes	□No	sedimer	ntation, m	ining, ex		ream harde	ening [for	nt reach (examples of stressors include excessive example, rip-rap], recent dredging, and snagging to Metric 12)
	10b.	Check al ☐A					e of assessme		skip for S □F	ize 4 Coastal Plain streams) 5% oysters or other natural hard bottoms
		□В	Multiple				ıl mats) d/or emergent	Check for Tidal Marsh Streams Only	□G □H	Submerged aquatic vegetation Low-tide refugia (pools)
		□с		snags an	• •	-	• '	Sheck Marsh B	□1 □1	Sand bottom 5% vertical bank along the marsh
		□D ⊠E	in bank		the norn		s and/or roots d perimeter	02	□K	Little or no habitat
****	*****	******	*****	*REMAIN	ING QUE	STIONS	ARE NOT AP	PLICABLE	FOR TID	AL MARSH STREAMS************************************
11.	Bedf	orm and	Substra	te – asses	ssment re	each met	ric (skip for S	ize 4 Coas	tal Plain	streams and Tidal Marsh Streams)
	11a.	□Yes	⊠No	Is assess	ment rea	ch in a na	itural sand-bed	l stream? (	skip for C	Coastal Plain streams)
	11b.	Bedform ⊠A ⊠B □C	Riffle-ru Pool-gli	ın section de sectior	(evaluate (evaluat	e 11c) e 11d)	box(es). tric 12, Aquat	ic Life)		
	11c.	In riffle se	ections, o	check all th	nat occur ow (skip	below the	normal wetted 4 Coastal Plai	l perimeter n streams	and Tidal	sessment reach – whether or not submerged. Check Marsh Streams). Not Present (NP) = absent, Rare
				: <u>&lt;</u> 10%, C d 100% fo C				uii (A) = >	4U-7U%, I	Predominant (P) = > 70%. Cumulative percentages
							Bedrock/sap Boulder (256		m)	
					Ħ	Ä	Cobble (64 -	- 256 mm)	111)	
							Gravel (2 – ) Sand (.062 -	- 2 mm)		
							Silt/clay (< 0			
	11d	⊠ □Yes	□ ⊠No	Are pools	☐ s filled with	∐ h sedimer	Artificial (ripont? (skip for S		,	streams and Tidal Marsh Streams)
							. ,p . • . •			

12.	Aquatic Life	fe – assessment reach metric (skip for Tidal Marsh Streams)	
	12a. ⊠Yes If No,	s ☐No Was an in-stream aquatic life assessment performed as described in the User Manual? select one of the following reasons and skip to Metric 13. ☐No Water ☐Other:	
	12b. ⊠Yes	Are aquatic organisms present in the assessment reach (look in riffles, pools, then snags)? If Yes, check all t apply. If No, skip to Metric 13.	hat
	1 000000000000000000000000000000000000	>1 Numbers over columns refer to "individuals" for Size 1 and 2 streams and "taxa" for Size 3 and 4 streams.    Adult frogs	
		☐ Snails  ☐ Stonefly larvae (P) ☐ Tipulid larvae ☐ Worms/leeches	
13.	Streamsider for LB RE	e Area Ground Surface Condition – streamside area metric (skip for Tidal Marsh Streams and B valley types) or the Left Bank (LB) and the Right Bank (RB). Consider storage capacity with regard to both overbank flow and upland rune	
		livestock disturbance, buildings, man-made levees, drainage pipes)	·
14.		e Area Water Storage – streamside area metric (skip for Size 1 streams, Tidal Marsh Streams, and B valley types) or the Left Bank (LB) and the Right Bank (RB) of the streamside area. B	
	□B □	A Majority of streamside area with depressions able to pond water ≥ 6 inches deep  Majority of streamside area with depressions able to pond water 3 to 6 inches deep  Majority of streamside area with depressions able to pond water < 3 inches deep	
15.	Consider for wetted perind LB RE	resence – streamside area metric (skip for Tidal Marsh Streams) or the Left Bank (LB) and the Right Bank (RB). Do not consider wetlands outside of the streamside area or within the norr meter of assessment reach. B  Y Are wetlands present in the streamside area?	nal
16.	Check all c  A St  B Pc  C Ot  D Ev  E St	Contributors – assessment reach metric (skip for Size 4 streams and Tidal Marsh Streams) contributors within the assessment reach or within view of and draining to the assessment reach. treams and/or springs (jurisdictional discharges) onds (include wet detention basins; do not include sediment basins or dry detention basins) bistruction passing flow during low-flow periods within the assessment area (beaver dam, leaky dam, bottom-release dam, we vidence of bank seepage or sweating (iron in water indicates seepage) tream bed or bank soil reduced (dig through deposited sediment if present) one of the above	eir)
17.	Check all the A Every B Observation C Ure D Every B Assert	Detractors – assessment area metric (skip for Tidal Marsh Streams) that apply. vidence of substantial water withdrawals from the assessment reach (includes areas excavated for pump installation) bistruction not passing flow during low-flow periods affecting the assessment reach (ex: watertight dam, sediment deposit) rban stream (≥ 24% impervious surface for watershed) vidence that the streamside area has been modified resulting in accelerated drainage into the assessment reach ssessment reach relocated to valley edge one of the above	
18.	Consider as	assessment reach metric (skip for Tidal Marsh Streams) spect. Consider "leaf-on" condition. tream shading is appropriate for stream category (may include gaps associated with natural processes) egraded (example: scattered trees) tream shading is gone or largely absent	

19.	Consider "veget to the first break Vegetated Wo LB RB LB A A A B B B B B B B B B B B B B B B	oded
20.	Buffer Structure	- streamside area metric (skip for Tidal Marsh Streams)
	Consider for left  LB RB  □ A □ A  □ B □ B  □ C □ C  □ D □ D  □ E □ E	bank (LB) and right bank (RB) for Metric 19 ("Vegetated" Buffer Width).  Mature forest Non-mature woody vegetation or modified vegetation structure Herbaceous vegetation with or without a strip of trees < 10 feet wide Maintained shrubs Little or no vegetation
21.	Check all approprime within 30 feet of solutions of the following solutions within 30 feet of solutions of the following solution	- streamside area metric (skip for Tidal Marsh Streams)  priate boxes for left bank (LB) and right bank (RB). Indicate if listed stressor abuts stream (Abuts), does not abut but is tream (< 30 feet), or is between 30 to 50 feet of stream (30-50 feet).    lowing stressors occurs on either bank, check here and skip to Metric 22: □  0 feet
22.		streamside area metric (skip for Tidal Marsh Streams) bank (LB) and right bank (RB) for Metric 19 ("Wooded" Buffer Width).  Medium to high stem density Low stem density No wooded riparian buffer or predominantly herbaceous species or bare ground
23.		getated Buffer – streamside area metric (skip for Tidal Marsh Streams) vegetated buffer is continuous along stream (parallel). Breaks are areas lacking vegetation > 10 feet wide.  The total length of buffer breaks is < 25 percent. The total length of buffer breaks is between 25 and 50 percent. The total length of buffer breaks is > 50 percent.
24.		Vegetation is close to undisturbed in species present and their proportions. Lower strata composed of native species, with non-native invasive species absent or sparse.  Vegetation indicates disturbance in terms of species diversity or proportions, but is still largely composed of native
	⊠c ⊠c	species. This may include communities of weedy native species that develop after clear-cutting or clearing of communities with non-native invasive species present, but not dominant, over a large portion of the expected strata of communities missing understory but retaining canopy trees.  Vegetation is severely disturbed in terms of species diversity or proportions. Mature canopy is absent or communities with non-native invasive species dominant over a large portion of expected strata or communities composed of planted stands of non-characteristic species or communities inappropriately composed of a single species or no vegetation.
25.	25a. □Yes 🗵	ssessment reach metric (skip for all Coastal Plain streams)  No Was conductivity measurement recorded? t one of the following reasons.   No Water  Other:
	25b. Check the b ☐A < 46	oox corresponding to the conductivity measurement (units of microsiemens per centimeter).  ☐B 46 to < 67 ☐C 67 to < 79 ☐D 79 to < 230 ☐E ≥ 230

Notes/Sketch:

Trash in stream

Ottoain Oite Haine	R2707D 7-5 (Impact Site 6B)	Date of Assessment	11/10/2017	
Stream Category	Pa3	Assessor Name/Organization	Melissa Ruiz, Stantec	Alex Baldwin,
Presence of regulator Additional stream info	Notes of Field Assessment Form (Y/N) Presence of regulatory considerations (Y/N) Additional stream information/supplementary measurements included (Y/N) IC SAM feature type (perennial, intermittent, Tidal Marsh Stream)		YES NO	

e (perennial, intermittent, Tidal Marsh Stream)	Perennial		
Function Class Rating Summary	USACE/ All Streams	NCDWR Intermittent	
(1) Hydrology	LOW		
(2) Baseflow	HIGH		
(2) Flood Flow	LOW		
(3) Streamside Area Attenuation	LOW		
(4) Floodplain Access	LOW		
(4) Wooded Riparian Buffer	LOW		
(4) Microtopography	LOW		
(3) Stream Stability	LOW		
(4) Channel Stability	LOW		
•	LOW		
(4) Stroom Coomers helegy			
(4) Stream Geomorphology	LOW		
(2) Stream/Intertidal Zone Interaction	NA NA		
(2) Longitudinal Tidal Flow	NA NA		
(2) Tidal Marsh Stream Stability	NA		
(3) Tidal Marsh Channel Stability	NA		
(3) Tidal Marsh Stream Geomorphology	NA		
(1) Water Quality	LOW		
(2) Baseflow	HIGH		
(2) Streamside Area Vegetation	LOW		
(3) Upland Pollutant Filtration	LOW		
(3) Thermoregulation	LOW		
(2) Indicators of Stressors	YES		
(2) Aquatic Life Tolerance	HIGH		
(2) Intertidal Zone Filtration	NA		
(1) Habitat	LOW		
(2) In-stream Habitat	LOW		
(3) Baseflow	HIGH		
(3) Substrate	LOW		
(3) Stream Stability	LOW		
(3) In-stream Habitat	LOW		
(2) Stream-side Habitat	LOW		
(3) Stream-side Habitat	LOW		
(3) Thermoregulation	LOW		
(2) Tidal Marsh In-stream Habitat	NA NA		
(3) Flow Restriction	NA NA		
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(3) Tidal Marsh Stream Stability	NA NA		
(4) Tidal Marsh Channel Stability	NA NA		
(4) Tidal Marsh Stream Geomorphology	NA NA		
(3) Tidal Marsh In-stream Habitat	NA NA		
(2) Intertidal Zone	NA		
Overall	LOW		