



October 22, 2021

MS Kim Browning

US Army Corps of Engineers
Wilmington District
69 Darlington Avenue
Wilmington, NC 28403-1343

RE: IRT Review comments for Mitigation Plan
Liberty Rock Mitigation Site (USACE AID#: SAW-2020-00047)
Cape Fear 03030003, Randolph County, NC

Dear Ms. Browning

Thank you for compiling and providing comments on the Liberty Rock Mitigation Site Mitigation Plan. We have reviewed the comments dated September 24, 2021 and have revised the Mitigation Plan accordingly. This letter includes a response to each comment; comments have been reprinted with our response in *italics*. The revised Mitigation Plan is being submitted with this letter.

USFWS, Kathy Matthews:

1. The applicant's response to our concerns for stringent erosion and sedimentation controls is not sufficient. In response to our concerns, the applicant simply states "Wildlands will receive all necessary erosion and sediment control permits prior to constructing the project." That really is the minimum for any project, and we would like to have the opportunity to review the controls that they propose in future design phases. NCWRC should also be provided the opportunity to review and make recommendations on specific controls.

Per guidance from USACE, we are working closely with WRC to develop and implement protocols to use during mussel relocations and construction. Please see the answer to question 3 below for a description of the construction process as it pertains to mussels including erosion control items. Care is being taken to build primarily off-line and limit disruption to the old channel and Rocky River Reach 2, which will remain on-line.

2. The logistics of mussel relocation in the plans are confusing and do not provide enough details. The plans state that mussels will be salvaged and placed in a cooler with aeration, and then moved to the upstream relocation reach or to the newly restored reach of Rocky River. However, the last page of the 12/15/2020 Technical memorandum states that mussel relocation will take place during Pre-construction. There will be no new reach of Rocky River at that time.



Salvaged mussels should not be handled or held any longer than absolutely necessary, and should not be relocated to a new stream reach that has not equilibrated. At least two weeks prior to the proposed first salvage date, the applicant or contractor should provide a more specific mussel salvage and relocation plan for review and approval. Information to be provided includes all methods and information on timing, including the maximum length of time that individuals are proposed to be held, and lat/long, photos, and habitat descriptions of the proposed relocation area(s).

Per NCWRC request below, the mussels will only be moved to the upstream relocation reach agreed upon by SEPI and NCWRC. The proposed location is shown in the GIS figure and has been provided to NCDMS via geodatabase. The upstream location was selected by the certified mussel biologist at SEPI as an appropriate habitat. NCWRC will be involved in relocation efforts and verifying upstream conditions prior to placement should on-site conditions have changed. Wildlands and SEPI will work with NCWRC to ensure their preferred mussel handling guidelines are followed during relocation including the length of time mussels are handled and stored with aeration.

3. The logistics of mussel relocation is further complicated by the lack of information on the order of construction. We assume that the new channel will be constructed in the dry, and water will not be turned into it until after it is relatively stable. When will the mussels be relocated, just prior to the entire construction effort, or prior to dewatering of the old channel, or both? Some of this is usually general knowledge for the IRT, but it is important for us to get it all spelled out.

Mussels will be relocated prior to any construction work on the channel. As mentioned above, no mussels will be placed in the newly constructed channels. The majority of the project was designed off-line to limit impact to the old channel during construction. The new channel will be cut in the floodplain from approximately station 102+71 (first proposed riffle) to station 120+00 (tail of last riffle on Reach 1). That section will be strawed, seeded, and matted while water continues to flow through the old channel. When the end of Reach 1 is connected to the original stream channel along Reach 2, temporary check dams will be put in place to safeguard from sediment that could move into Reach 2 when water is turned into the newly constructed Reach 1. The connection from upstream to the newly constructed Reach 1 will be done after temporary check dams are in place.

Work done on Reach 2 will be done with water flowing in the reach to protect mussels located there. Work will only be done on streambanks. The off-line meander on Reach 3 will then be constructed, strawed, seeded and matted before tying it in to the old channel.

Schist Creek was designed off-line and will be constructed in the floodplain with water moving through the old channel while the new stream is constructed. Other tributaries will be constructed using a pump around system.

USACE, Kim Browning:



1. Appendix 1, Mussel Survey Report: In the Technical Memo Review that I sent January 5, 2021, USFWS, WRC, USACE and DWR all requested a copy of the Mussel Surveys as they become available. It would have been beneficial for the IRT to review the survey dated February 2021 and provide feedback on the proposed stream design prior to receiving the draft mitigation plan and 60% drawings.

Understood. Wildlands will be sure to promptly make available any mussel surveys as they become available in the future including pre-construction relocation data.

2. Section 3.5: The Atlantic pigtoe (*Fusconaia masoni*) was listed as being identified on the initial mussel survey conducted in February 2020; however, this species was not listed in the correspondence the IRT received from WEI April 29, 2020, which included correspondence from Brena Jones. Additionally, the Savannah Lilliput (*Toxolasma pullus*) was not listed as being identified, but it was stated that there was the potential for them to be present.
 - a. After discussion with Wildlands, this section contained incorrect aquatic species survey data. It was noted that no federally listed species were identified on project reaches. Attached are the survey results. Please update section 3.5 in the final mitigation plan.

Section 3.5 has been updated in the Final Mitigation Plan with a correction to mussel species found.

3. Section 3.4.3:
 - a. Pre-construction groundwater wells 1 and 7 currently have 100% hydroperiods. Do you anticipate that these areas will develop into more of an herbaceous wetland or open water? I'd like to see random veg plot data for these areas during monitoring.

Development of features that pond water deep enough to be classified as open water is not expected. It is possible that some small areas with concave relief will have a hydrology regime that favors the most flood tolerant woody species proposed in the planting plan and thus has a woody stem density lower than areas with shorter and intermediate hydroperiods. Wildlands will sample vegetation near these areas utilizing random veg plots during the monitoring period.

- b. During the site visit we discussed that the rehabilitation areas may be eligible for a 1:1 credit ratio; however, since the hydroperiods already exceed the proposed 12% performance standard, I agree with the proposed 1.5:1 ratio since livestock exclusion and vegetation establishment are the sources of functional uplift near gauges 1, 2 and 7.

Thank you for confirming.

- c. Additionally, the text reads that GW7 recorded hydroperiods of 100% and 44.7%. I believe it was meant to read that GW2 recorded a 44.7%

This error has been corrected in the mitigation plan text.



4. Section 6.7, page 20: “It is likely livestock removal will promote some level of functional uplift” is a rather vague statement. Are the wooded wetland areas highly degraded? To further enhance this area, please add a few shrub and/or herbaceous species to increase diversity.

Livestock concentrate in the wooded wetland areas to use for shade. We will add shrub and/or herbaceous species to our planting plan to increase diversity.

5. Section 6.7, page 21: Wehadkee and Roanoke soils are listed in this section, but Figure 5 doesn't list Roanoke. I trust that the soils descriptions listed in section 3.4.2 are accurate since historic soil surveys were not mapped on a small scale. Please ensure that well data captures both types of soils.

One of the proposed groundwater monitoring wells has been moved near the location where Roanoke soils were observed.

6. Section 6.8.2: Eradication of pasture grasses should be discussed in this section.

Section 8.8.2, paragraph 2, has been updated to discuss treatment of pasture grasses within the easement area.

7. Section 6.9: All mussel relocation should be done in coordination with WRC's Central Aquatic Wildlife Diversity Research Coordinator, Brena Jones.

A sentence has been added to reiterate this in the mitigation plan text.

8. Section 6.10: This section states that there are no internal or external easement breaks. Design Sheet 5.6 shows a detail of a ford crossing. Please confirm that a ford is not proposed.

There is a proposed ford crossing located upstream of the project and outside of the easement.

9. Section 8, page 24: If the documentation of soil temperature data and vegetative indicators suggest that a modified growing season is warranted, please notify the IRT in the annual monitoring report. Additionally, if the growing season is extended at the beginning of the monitoring period, it must also be extended at the end.

Noted. Growing season dates will be confirmed during the monitoring period using observations of bud burst, autumn leaf senescence, and soil temperature data.

10. Table 16, page 24: A performance standard should be added that specifies that mussel surveys will be conducted, and provided to the IRT, in monitoring years 1, 2, 3, 5, and 7. While project credits are not associated with the findings, the surveys and accompanying reports are required; therefore, the statement on page 25 in Section 9 and Table 17 should be modified to reflect this.

This requirement statement has been added to Table 16, Section 9, and Table 17.



11. Concur with DWR comment #13.

Noted. Thank you.

12. Figure 11: Please show the location of the rain gauge.

Please refer to the response to Erin Davis' 9th comment below.

13. Design Sheet 0.2: The Project overview sheet numbers don't match the stream plan and profile sheets. For example, Sheet 1.1 should be labeled sheet 1.01.

The overview plan sheet has been corrected to match plan and profile sheets.

14. Design Sheet 3.1: River Birch, Sycamore and Boxelder are larger system species and account for 40% of the proposed species for the buffer planting zone and 37% of the wetland planting zone. I understand they have a high survivability and high growth rates, and are more readily available; I'm curious if the increased use of Boxelder recently is due to Green Ash no longer being an option?

Boxelder is a typical alluvial tree species found in the piedmont and fits well into our target natural community types and the channel size of the Rocky River, which is on the larger side of our typical project. Green ash would have likely been included in this list if the emerald ash borer were not an issue. Its omission increases the planting rates of other early successional alluvial species such as sycamore, river birch, and boxelder.

DWR, Erin Davis:

1. Page 5, Section 3.4.1 – DWR appreciates the detail provided in this section, particularly the reasoning behind the assessment locations and subsequent scoring.

Thank you.

2. Page 8, Section 3.4.2 – Is there data available (e.g. boring map and logs) from the WEI supplemental/expanded soil investigation. Also, please confirm the LLS investigation date, the Appendix 1 LLS sealed report is dated August 2019.

Wildlands observed hydric soil indicator F3 (depleted matrix) within wetland credit areas not evaluated by the LSS, but did not document soil morphology thoroughly as though to serve as a stand-alone soils evaluation. These observations were intended to fill in gaps and confirm presence of hydric soils in wooded areas of the Rocky River floodplain. The LSS investigation concluded that all areas of the Rocky River floodplain within study limits contained hydric soils. Wooded areas were excluded from the LSS study area simply because it was based on an early



approximation of wetland credit areas which did not extend into the treeline. The mitigation plan text has been updated to indicate an LSS study date of August 7th 2019 instead of August 2020.

3. Page 19, Rocky River Reach – The narrative mentions approx. 70 feet of bank grading at the end of this restoration credit reach, but no callouts are shown for this section on Sheet 1.07. Please make sure to show all proposed work for the reach on the final design sheets.

Grading contours in the final plans show grading on the banks in this location. All of our preferred contractors use GPS controlled machines and grade based on the grading model which helps to ensure this type of bank grading is not missed during construction. A call out will be added to the plans here to clarify bank work at the tie-in to the downstream end of the project.

4. Page 20, Mica Creek – During both design and construction, please consider aquatic passage in the structure drops.

Aquatic organism passage has been considered in the design of drop structures. Final plans limited drops on Mica Creek to approximately 0.3ft and reduced the overall number of drops. Care will be taken during construction to ensure drop structures are properly installed within the construction tolerances of design.

5. Page 21, Section 6.7 –
 - a. Please call out on Figure 3 which existing wetlands are relic channel features.

Wetlands that appear to be relic channel features have been identified on Figure 2.

- b. The existing/proposed landscape variability described in the text is difficult to see in Sheet 2. Is it possible to add callouts or bold some contour lines on Sheet 2 to better show the habitat diversity?

Figures 12, 12a, and 12b have been added and include a digital elevation model to show the existing landscape variability.

- c. Please explain why the 12 percent hydroperiod performance standard is appropriate and will demonstrate functional uplift for the wetland rehabilitation credit areas given that the existing hydrology groundwater wells both recorded 100 percent hydroperiods.

In areas that already have lengthy wetland hydroperiods, cattle exclusion, vegetation establishment, and habitat improvement will be the primary sources of functional uplift. The vegetation, habitat, and water quality impairments to wetlands proposed for rehabilitation are severe. We believe these existing wetlands cover a wide range of hydroperiods; however, our chosen gauge locations only captured the extreme upper end of that range. Installing



groundwater wells is an early step in our existing conditions assessment and it is difficult to select locations that represent all combinations of wetland, non-wetland, relief, and hydroperiods. Wetlands adjacent to reaches of the Rocky River and Mica Creek that will be elevated and re-aligned with a meandering pattern will, presumably, experience improved hydrologic interaction with the stream which is often not detectable through observation of a hydroperiod percentage alone.

6. Page 21, Section 6.8.1 –
 - a. Please include at least one regional vegetative reference community or explain why a reference community is not available/applicable for this project site.

Wildlands does not currently have an inventory of relatively undisturbed reference quality vegetation community sites. The goal of our planting plans is to establish a mix of early and later successional species that grow across a variety of soil and moisture conditions. This approach provides short-term habitat, soil, and water quality improvements while also boosting long-term forest succession. Species selection is based on our best professional knowledge of silvics, scientific literature, and experience on prior ecological restoration sites. We believe incorporating early successional species is critical in creating favorable growing conditions for later successional species, particularly on the disturbed and degraded sites we typically deal with. We are hesitant to alter our planting approach based on species proportions that may be observed in later successional reference quality vegetation communities because of risk that it could slow vegetation establishment and forest development for the duration of our involvement with a site.

- b. A reminder that planting should be completed by March 15th and any extension request needs to be approved by the IRT and may involve a postponement of the MY1 monitoring period.

Noted.

7. Page 21, Section 6.8.2 – DWR appreciates the site specific discussion in this section. Past WEI mitigation plans have included a site specific invasive management plan appendix, which DWR considers a useful resource.

Thank you for the feedback.

8. Page 22, Section 6.10 –
 - a. Not sure if this is a question for Section 6.7, Section 11 or this section, but what if the wetland credit areas trend wetter than expected? Is there a risk that some of the wetland credit areas develop into open water, herbaceous or shrub wetland types rather than bottomland hardwood forest? Is so, please address.



Depressional areas may pond water seasonally but development of sizable areas that are limited to open water or herbaceous vegetation is not expected. We have observed development of varying hydroperiod areas on prior wetland mitigation sites, some of which were wet enough to limit survival and growth of less flood tolerant planted woody species. Such areas are typically small and interspersed with shorter or moderate hydroperiod areas that allow a wider variety of species to proliferate. We expect this type of interspersed occurrence of excessively wet areas at Liberty Rock and feel that the spatial scale and difficulty of predicting these locations would defeat the practicality of targeting such areas as independent planting units. Due to logistics of large scale tree planting, it is inevitable that some planted stems will be introduced to incompatible microsite growing conditions and be subject to mortality. However, the woody stem species mix and planting density is intended to provide high likelihood that enough trees will be planted in suitable microsites to attain survival and growth success criteria. If planted stem survival and growth fails to meet interim success criteria due to excess moisture on larger areas that comprise 20% or more of the site, then an adaptive management plan proposing supplemental planting of flood tolerant species will be submitted.

- b. There was no discussion in Section 3.1 of watershed land use/cover changes over time. Have county/local planning resources been consulted for potential future watershed changes? Are there any proposed DOT projects in the vicinity (e.g. road widening, culvert maintenance)?

Discussion of watershed scale land use has been added to Section 3.1.

- c. Please expand on your discussion of risks associated with presence of parrot feather for long-term site management and functional uplift.

Section 6.8.2 was expanded upon to discuss the source of parrot feather likely being from an aquarium deposited upstream, as evidenced by aquarium rocks found throughout upstream riffles, limiting the potential of a true continuous upstream source. Section 6.10 was updated to discuss how the majority of existing parrot feather will be buried during construction and it will be monitored and treated during monitoring years.

- d. The last sentence references Section 10. Please highlight where in Section 10 the maintenance activities associated with the identified risks and uncertainties are discussed.

The reference in this section has been corrected to "Appendix 9 – Maintenance Plan"

- 9. Page 24, Section 8 – Will an onsite rain gauge be installed? If not, please identify the proposed rainfall data source location and distance from the project site.



The proposed source of rainfall data is the Siler City 2N weather station (Station ID 317924) located 7 miles southeast of the project. This is the nearest weather station to the Site with a history of reliable records. Sourcing off-site rainfall data is preferred to supplying on-site instrumentation due to high probability of equipment malfunction with readily available instruments and challenges in securing a gauge location that will remain undisturbed and unobstructed by vegetation. Additionally, Wildlands believes that sourcing off-site data adequately supports general trends observed in stream and groundwater hydrology. Although there may be occasional discrepancy in off-site versus on-site rainfall quantities during isolated, scattered storms, these differences are likely insignificant for the scope of hydrology analysis required for mitigation projects.

10. Page 24, Table 16 – Please clarify that the wetland hydroperiod is an annual standard. And please confirm that “average precipitation” is equivalent to “normal rainfall”.

Clarification has been added to Table 16 to indicate that wetland hydroperiod is an annual standard and that hydrology will be evaluated in light of “normal” precipitation.

11. Page 24, Section 9 – Please remember to include soil profile data near all groundwater wells in the MY0 Report. DWR also requests the inclusion of red-line drawings in the as-built submittal, including the planting plan and any species/quantity changes. If species substitutions are necessary, DWR encourages the provider to consult with the IRT prior to planting. Also, please confirm with DMS on the Closeout Report references.

Noted.

12. Page 26, Table 18 – DWR would like to see two of the fixed plots changed to random. And please note that in addition to the reference photos, there will be photo points at each cross-section and veg plot.

Table 18 and Figure 11 have been adjusted to show 15 fixed and 4 random vegetation plots. A note has been added to Table 18 next to Reference Photos clarifying that additional photos will be taken at each cross-section and from the southwest corner of each vegetation plot.

13. Page 27, Section 11 – As discussed during the IRT site walk, DWR is concerned with the tributaries sustaining channel features long-term in the Rocky River floodplain. Please take into consideration that any channel maintenance or adaptive management activities should be limited to within the first three years of the monitoring period so the IRT can evaluate how these features are trending (stream/wetland) and the associated functional uplift.

Noted. Thank you. We will keep this in mind as we do our annual monitoring and plan any maintenance and adaptive management.

14. Figures – Inclusion of a LiDAR figure would be helpful for this project review.



Figures 12, 12a, and 12b have been added and include a digital elevation model to aid in project review.

15. Figure 11 – In this particular situation where concave relief areas are mentioned but are difficult to see on figures/sheets, DWR is ok with field shifts of groundwater well locations out of depression areas as long as it's noted in the MYO Report.

Thank you. We will place groundwater wells in locations that are representative of that area and mitigation approach.

16. Sheet 2 – If there is any wetland grading proposed beyond the installation of wetland plugs, existing channel backfill and surface roughening, please provide a wetland grading plan sheet/figure. It would also be helpful to see a cross-section across the wetland credit areas with the new Rocky River channel configuration (similar to cross-sections included in WEI's Banner Farm mitigation plan).

No additional wetland grading is proposed for this project beyond wetland plugs and channel backfill.

17. Sheets 5.3 – 5.6 – More of an educational inquiry than concern, but why do some structure details callout woven filter fabric and others callout non-woven filter fabric?

Wildlands typically uses the woven filter fabric on log structures because it helps seal the structure better with the rock and soil mixture just upstream of the sill. The non-woven fabric will often tear and rip when installed behind a log structure when backfilling with rock and allow for piping underneath the structure before it can naturally seal with fines in the interstitial spaces.

18. Sheet 5.5, Lunker Structure Detail – Is there a live stake or bank planting component with this structure? DWR requests a photo of an installed lunker structure in the MYO report.

We are happy to provide a lunker structure photograph taken during construction. The structure provides an undercut bank for fish habitat and is not visible once the pool fills with water. There will still be livestakes on top of the bank where a lunker structure is installed according to the streambank planting plan. If you are interested in seeing it installed, please let us know and we will coordinate with you when it is being constructed.

19. Sheet 5.6, Wetland Plug – Understanding that individual plug width will vary, what are the proposed minimum and average plug widths for this site?

The plug width will be dependent on the depth of the existing ditch. The detail has been updated to include a 4:1 slope from the crest of the plug to the ditch bottom. The ditches are generally below one foot indicating the length of plug would likely be eight feet or less.



20. DWR truly appreciates the efforts made to enhance the proposed project, including capturing the origins of two tributaries and the full floodplain of Rocky River with wider buffers, and creating a continuous site without easement break or stream crossing fragmentation.

Thank you.

WRC, Olivia Munzer:

1. Page 9, Section 3.5: Existing Mussels Survey, it is stated that during the preliminary mussel survey, we identified two state endangered species and one state threatened species. Please clarify that these species are known to occur in the watershed because it can be misinterpreted that we found them at the site.

This Section has been corrected in the Mitigation Plan. See response to USACE question 2.a.

2. In regards to the planting plan, I would like to see more flowering herbaceous species in the wetland seed mix to increase diversity. The species listed, bur marigold and/or swamp sunflower, are also in the riparian seed mix and plugs. If you are doing flowering herbaceous plugs, I would prefer a milkweed or other pollinator species typical of the vegetation community but not already in the planting plan. Also, redtop panicgrass is more of a southern Coastal Plain or Sandhills species. The preference would be a species that commonly occurs in Randolph County. Please do not use tall fescue or orchardgrass as they are invasive and/or non-native species.

The wetland and riparian areas have a permanent seed mix and bare root plantings, but are not using plugs. The plugs are only located on streambanks. The swamp sunflower plugs in the streambank plug mix adjacent to wetlands (Zone 1) have been changed to cardinal flower to increase diversity. We are expecting native flowering herbaceous pollinator communities to naturally increase through the life of the project based on existing populations of pollinator friendly forbs.

Redtop panicgrass, while often found in the sandhills and coastal plain, is found in wet disturbed areas in the central piedmont as far west as Lincoln County. Its inclusion is based on our ability to source seed from a local seed source. This more local provenance will help promote better establishment than its alternative (beaked panicgrass) which can only be sourced from Maryland. Tall fescue and orchard grass are not being planted within the easement, however they may be used to repair impacts from construction to agricultural fields outside of the conservation easement.



WRC, Brena Jones:

1. Section 6.9: The language about placing mussels in the newly constructed reach should be removed as that channel will take time to stabilize. I would recommend that it state that mussels will be relocated to either upstream habitats or to another appropriate habitat within the same basin. This would allow us the flexibility to place them somewhere else if we find a better option in the meantime. I don't think this would prevent later efforts to manually introduce animals to the new reach at a later time when it is deemed stable.

We will follow this directive and only place relocated mussels in the identified habitat areas upstream of the project, or any other habitats identified by WRC that they would like to see species relocated to. Wildlands will work with WRC on any future manual relocation efforts to restored streams when they have been deemed stable enough for relocation.

If you have any questions please contact me at aallen@wildlandseng.com, (919)851-9986 x 106.

Sincerely,

A handwritten signature in black ink that reads "Angela Allen".

Angela Allen, P.E., Project Manager



June 22, 2021

Mr. Jeremiah Dow

NC Department of Environmental Quality
Division of Mitigation Services
1652 Mail Service Center
Raleigh, NC 27699-1652

RE: DMS Review comments for Mitigation Plan
Liberty Rock Mitigation Site (DMS# 100135)
Cape Fear 03030003, Randolph County, NC
Contract No. 7877-01

Dear Mr. Dow,

Thank you for compiling and providing comments on the Liberty Rock Mitigation Site draft Mitigation Plan. We have reviewed the comments dated May 28, 2021 and have revised the Mitigation Plan accordingly. This letter includes a response to each comment; comments have been reprinted with our response in *italics*. The revised Mitigation Plan is being submitted with this letter.

1. Title Page – Please add DWR# 20200035.

Response: The DWR # has been added to the title page.

2. Section 1.0 – The first paragraph references DWR Subbasin 17-43-(1) which does not match Table 2, which lists 03-06-12. Please clarify.

Response: The first paragraph has been corrected to state 03-06-12

3. Section 3.4.3 – How was the growing season for the existing hydrology section determined, and will this be the same method used during monitoring?

Response: The method for determining growing season dates for existing groundwater hydrology observations has been added to section 3.4.3. Additional discussion regarding growing season dates and wetland performance standards has been added to section 8.0.

4. Section 3.5 -

- a. The December 2020 Technical Memorandum titled Mussel Surveys and Relocation Efforts states that as part of the pre-construction plan, “A maximum of three separate freshwater mussel surveys and relocations efforts will take place within the proposed 3,375 ft reach proposed for realignment, and within the downstream reach (600 ft section between the railroad and Old 421). If no mussels are found during the second survey effort, then a third survey will not be necessary.” To date, only 120 ft. of channel proposed for realignment has been surveyed. Please provide more detail for upcoming pre-construction survey and relocation efforts. Was the SEPI survey from February 2021 considered one of the three pre-construction surveys, or was it simply done to inform design?



Response: Section 3.5 was reworded to provide extra clarity on the different mussel surveys. The initial survey post IRT walk is the “preliminary survey”. The second, after IRT coordination, is the design survey. The design survey was done to inform design and led us to the conclusion that we would not put in any streambed structures along that reach and only address bank erosion. A section was added in the Design Approach and Mitigation Work Plan to describe the mussel collection and relocation prior to construction. This is referred to as the “mussel collection survey” and is independent of both the preliminary and design surveys.

5. Section 5.2 – Please include a wetland impact map in an Appendix of the final mitigation plan.

Response: Final wetland impacts will be determined while preparing the Pre-Construction Notification. A copy of impact figures submitted with the PCN will be appended to the Final Mitigation Plan.

6. Section 6.2 – Given that the drainage area of Gypsum Creek Reach 2 is much smaller than that of the reference reaches, please explain how the design parameters were derived from the reference reaches.

Response: The reference reaches are of similar channel type to the proposed channel and the dimensionless ratios from the reference reaches were used to inform the design, specifically, the belt width, linear wavelength ratio, pool to pool spacing ratio, and riffle slope ratios. These ratios are independent of drainage area.

7. Section 6.3

- a. Table 11 – Listed in the Proposed Parameters column are Rocky River R1 and Rocky River R2. Presumably, Rocky River R2 should be R3.

Response: The table has been corrected to show Rocky River R3.

- b. Table 12 – Please reorder the Proposed Parameters columns so they are in the same order as the Existing Parameters.

Response: The proposed parameters columns have been reordered to match the existing parameters columns.

- c. With Rocky River R1 morphological parameters largely only changing appreciably for sinuosity and W/D ratio, and maintaining essentially the same discharge and a similar bankfull area, will the channel be perched? Please clarify, and if so, is this to achieve the desired sinuosity?

Response: The proposed design utilizes opportunity to slightly elevate the Rocky River streambed between Gypsum Creek and Dolomite Creek to restore and improve wetland hydrology. Clarification has been added to specify that elevating the Rocky River is only feasible within this length. The improvement in stream pattern is most important to wetland hydrology on the right floodplain and the expected effects of stream re-alignment on wetland hydrology have been added. The perching of the channel is independent of the pattern and was not required in order to achieve the desired sinuosity.



8. Section 6.4

- a. Third paragraph states for Schist Creek and Mica Creek that “Design discharge for both streams was set slightly lower than the estimated 1.2-year discharge to account for peak discharge attenuation due to upstream impoundments.” Sometime after 1993 it appears that the upstream impoundment of Mica Creek was removed.

Response: That is correct. The reference to the impoundments has been removed.

9. Section 6.5

- a. Last paragraph states “Due to the proximity of the agricultural impoundments upstream of Schist Creek and Mica Creek, it is anticipated that these systems will be supply limited.” See comment above, Mica Creek appears to no longer be impounded. Would you consider Mica Creek supply limited in this scenario?

Response: Yes. You are correct that it is no longer impounded. While there is no impoundment, there is a culvert through a railway crossing. There is no evidence channel bedload is traveling through the culvert and supplying bed material to the system. There is also no evidence of active aggradation, indicating the channel has the capacity to pass any fines that is being supplied. This section has been edited in the report.

10. Section 6.6

- a. On page 21 the paragraph discussing Dolomite Creek Reach 2 suggests that Wildlands will be installing boulder steps. For EII, this seems like heavy treatment. Please clarify.

Response: Dolomite Creek Reach 2 is a short reach where we are re-building the channel that was trampled by livestock so heavily it did not have an existing channel cross-section connecting the upstream preservation reach to the Rocky River. The drop over this section to the bed of the Rocky River is over two feet. Rock steps were the most appropriate structure to stabilize this drop. A description of this has been added to the text. Enhancement II was agreed upon by the IRT for this short connection reach.

- b. Please provide a brief description on how sensitive mussel species will be (potentially) relocated to the restored Rocky River reach.

Response: The restored reaches will first be constructed off-line. The mussels will be collected, and mussels identified as “rare” will be tagged and stored in mesh bags in water coolers. When water has moved to the new channel the mussels will be brought to the new reach in the coolers and placed in the appropriate habitats on the restored reach. Section 6.9 has been added to the report to describe this. This is described as the “mussel collection survey”.

- c. For consistency, please add “Restoration” after Mica Creek paragraph heading.

Response: “Restoration” has been added.



11. Section 6.7

- a. Second paragraph states that “Rehabilitation and re-establishment of wetland hydrology will be accomplished by elevating the Rocky River and Mica Creek streambeds” and that “Elevating the streambeds will eliminate the drainage effect currently provided by the channels...” The Rocky River is not currently incised. Will the Rocky River streambed be raised a significant amount, or is it creating increased meander pattern that will drive re-establishment of wetland hydrology in these reaches? Please clarify.

Response: The proposed design utilizes opportunity to slightly elevate the Rocky River streambed between Gypsum Creek and Dolomite Creek to restore and improve wetland hydrology. Clarification has been added to specify that elevating the Rocky River is only feasible within this length. Improving stream pattern is most important to wetland hydrology on the right floodplain and the expected effects of stream re-alignment on wetland hydrology have been added.

- b. There are no wetland plugs proposed for the south side (right bank) of Rocky River (see Plan Sheet 2.0), the existing channel is not incised, and the proposed channel will be realigned to the north. What is the driver for re-establishment of wetland hydrology in this area in particular?

Response: Re-aligning the stream channel farther from the right valley wall is the primary driver for re-establishment of wetland hydrology south of the Rocky River. A description of this driver has been added to Section 6.7.

12. Appendix 1

- a. Please add a map identifying mussel relocation reaches proposed to be monitored upstream, downstream, and/or within the project. This is part of what will be the final approved monitoring plan.

Response: Mussel relocation areas have been marked on the monitoring figure. The symbol represents approximately 100-meter reach. Should these locations change per on site conditions during relocation, they will be included in the as-built baseline monitoring report.

- b. Please add a legend to Cross Sections 3, 8, and 10.

Response: A legend has been added to Cross Sections 3, 8, and 10.

- c. Figure 11 – There is no groundwater well proposed between Schist Creek and the western edge of the project. This is a large area of wetland re-establishment, and we think a GW well somewhere in the area is appropriate, and likely to be requested by the regulatory agencies.

Response: A groundwater well has been added between Schist Creek and the western edge of the project.

- d. Proposed Geomorphic Parameters do not include Rocky River reaches or Schist Creek.



Response: Rocky River R1, Rocky River R3, and Schist Creek have been added to the proposed geomorphic parameters table.

13. Appendix 7 – First paragraph states “All credit releases will be based on the total credit generated as reported by the as-built survey of the mitigation site.” Please change so that it reads that credit releases will be based on “the total credit generated as reported in the approved final mitigation plan.”

Response: The first paragraph has been updated.

14. Appendix 10

- a. Please include the DWR project ID on the title sheet. Also, change NCDENR to NCDEQ.

Response: The DWR project ID has been added to the title sheet and NCDENR has been updated to NCDEQ.

- b. Please make sure to label wetlands in the plan sheets according to the approved JD.

Response: Wetland labels have been added to the plan sheets.

- c. Creditable lengths for tributaries entering Rocky River appear to extend to the centerline of Rocky River (see Sheets 1.09, 1.10, 1.11, & 1.18). Recent guidance has been to stop crediting at top of bank of the receiving channel. However, it appears that an argument could be made for creditable stream beyond the receiving water’s top of bank to the bank toe of slope in situations like Schist Creek on Sheet 1.09. Regardless, the stationing for the end of the tributary reaches will probably need to be adjusted.

Response: The creditable lengths for the tributaries have been updated to extend to the bank toe of Rocky River, instead of the centerline. The mitigation plan and supporting documentation have been updated to reflect this change.

- d. Please show proposed limits of disturbance.

Response: The proposed limits of disturbance will be provided upon completion of the erosion and sediment control design at the 90% design phase.

Electronic Files

1. Proposed enhancement wetland EE overlaps with the wetland Re-Establishment polygon. Please review and address this overlap. Adjust asset table if necessary.

Response: The overlap between wetland EE and the wetland re-establishment polygon has been corrected.

2. Please provide the data used to create the cross section and pebble count figures, and include the existing conditions photos.

Response: The data used to create the cross sections and pebble count figures along with



the existing conditions photos have been provided.

If you have any questions please contact me at aallen@wildlandseng.com, (919)851-9986 x 106.

Sincerely,

A handwritten signature in black ink that reads "Angela Allen".

Angela Allen, P.E., Project Manager



FINAL MITIGATION PLAN

October 22, 2021

Liberty Rock Mitigation Site

Randolph County, NC
NCDEQ Contract No. 7877-01
DMS ID No. 100135

Cape Fear River Basin
HUC 03030003

USACE Action ID No. 2020-00047
DWR# 20200035
RFP #: 16-007877

PREPARED FOR:



NC Department of Environmental Quality Division of Mitigation Services

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PREPARED BY:



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FINAL MITIGATION PLAN

Liberty Rock Mitigation Site

Randolph County, NC
Cape Fear River Basin
HUC 03030003

USACE Action ID No. 2020-00047

DWR# 20200035

PREPARED BY:



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Appendix 1 Figures, Data, Analysis, Supplementary Information

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- Appendix 2** Site Protection Instrument
- Appendix 3** DWR Stream ID Forms, NCWAM, NCSAM
- Appendix 4** Preliminary JD and Supporting USACE Forms
- Appendix 5** Regulatory Correspondence
- Appendix 6** Categorical Exclusion
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- Appendix 8** Financial Assurance
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1.0 Introduction

The Liberty Rock Mitigation Site (Site) is located in Randolph County two miles south of Liberty and nine miles northwest of Siler City (Figure 1). The Site is located within the Rocky River Headwaters targeted local watershed (TLW) Hydrologic Unit Code 03030003070010 and the NC Division of Water Resources (DWR) Subbasin 03-06-12. The Site will provide stream and wetland credits to the Cape Fear River Basin Cataloguing Unit (CU) 03030003 through the restoration, enhancement, and preservation of the Rocky River and four unnamed tributaries to the Rocky River (referred to as Schist Creek, Gypsum Creek, Dolomite Creek, and Mica Creek for the project) and riparian wetland re-establishment, rehabilitation, and enhancement (Figure 2). This Site will provide 5,142.350 warm stream credits and 15.252 wetland credits and will be protected by a 41.12-acre conservation easement. All figures are in Appendix 1The Site Protection Instrument detailing the easement is included in Appendix 2.

Table 1: Project Attribute Table Part 1

Project Information	
Project Name	Liberty Rock Mitigation Site
County	Randolph
Project Area (acres)	41.12
Project Coordinates (latitude and longitude)	35°49'12.34"N 79°33'43.89"W
Planted Acreage (acres of woody stems planted)	23.70

2.0 Basin Characterization and Site Selection

The Rocky River at the Site is classified by DWR as Water Supply III. The River flows from the site to the Siler City Water Supply Lake approximately six miles downstream. The 2009 Cape Fear River Basin Restoration Priorities states improvement of water quality in streams draining to water supply reservoirs as a top priority along with the protection of fish and mussel species.

The Upper and Middle Rocky River Local Watershed Plan (LWP) Identified the following primary stressors as leading to poor water quality and aquatic biology ratings within the watershed:

- Stream and bank erosion;
- Lack of adequate forested buffer;
- Nutrients;
- Fecal coliform bacteria;
- Livestock access to streams;
- Overuse of herbicides and pesticides;
- Stormwater runoff; and
- Floodplain development.

Management strategies listed in the LWP to address these stressors include:

- Restoring streams, wetlands, and riparian buffers;
- Excluding livestock from streams;
- Implementing stormwater and agricultural BMPS, including the reduction of herbicide and pesticide usage; and
- Limiting development within floodplains.

The Cape Fear River Basin is also discussed in the 2015 North Carolina Wildlife Resource Commission's (NCWRC) Wildlife Action Plan (WAP). This report notes that urbanization, dams, and animal feeding operations are primary stressors within this watershed and that management activities such as riparian land conservation and stream restoration should be implemented.

Restoration of the Site streams and wetlands will directly and indirectly address stressors identified in the LWP and NCWRC WAP by removing livestock, creating stable stream banks, restoring forest in agriculturally maintained buffer areas, and restricting potential development by creating a conservation easement. These actions may reduce fecal, nutrient and sediment inputs into the Rocky River, and ultimately the Siler City water supply reservoir, as well as reconnect instream and terrestrial habitats on the Site. Restoration of the Site is directly in line with recommended management strategies in the LWP.

3.0 Baseline and Existing Conditions

3.1 Watershed Conditions

The headwaters of the Rocky River originate in the Town of Liberty and transition to a rural landscape outside of the town limits. The Rocky River Watershed has slowly increased in development from 1985 to present, with low-density residential construction increasing along Old NC-421 and within the town of Liberty. The rural areas currently outside of the town limits are zoned for low density residential development and could see potential development over time. There are currently no DOT projects planned within the watershed.

The headwaters are 24% developed and 6.7% impervious (Table 2, Figure 3). On site, the Rocky River flows through a broad (200 feet wide or greater) floodplain containing several wetland features. Schist Creek and Mica Creek both have rural watersheds as well, exhibiting 15% and 5% total developed area respectively. Both watersheds are comprised predominantly of cultivated cropland followed by forested area. Gypsum Creek and Dolomite Creek watersheds are nearly entirely on the project parcel and are 100% forested.

A review of historic aerials from 1943-2019 (Appendix 1) shows that on-site streams have existed in their same approximate location over 75 years, with some changes to the agricultural management of the land. Aerials show that the riparian buffers for Dolomite, Gypsum, and Schist Creeks have remained undisturbed since prior to 1943. The riparian buffer of Mica Creek was timbered and converted to agricultural use in the 1960's and the riparian buffer and floodplain of Rocky River was timbered and converted to agricultural use in the 1980's. The Rocky River was straightened and moved to the south valley edge during that time (see 1983 and 1993 aerial photos Appendix 1). Land use and buffer extents have remained consistent since then. A review of historic imagery for the greater Rocky River Watershed draining to the Site shows little land use change since 1993 as well. Nearly 4% of the watershed area is planted pine trees for future harvesting. According to aerial photography, the most recent logging event occurred between 2006 and 2008 when approximately 75 acres of pines in the upper watershed were timbered.

Two major watershed stressors, as noted in Section 2, are nutrient and bacteria loading, both of which can be attributed to unrestricted livestock access throughout the Site. Livestock have access to all riparian wetlands and directly contribute fecal coliform and nutrients to wetland and stream areas. Sediment input to streams is also a watershed stressor. Trampled stream banks and mass wasting are prevalent along the project streams. A lack of riparian vegetation, due to constant grazing, has created highly erodible streambanks. Mass wasting is often the result of lateral instability of the streams.



Table 2: Project Attribute Table Part 2

Project Watershed Summary Information	
Physiographic Province	Piedmont
Ecoregion	Carolina Slate Belt
River Basin	Cape Fear
USGS HUC (8-digit, 14 digit)	03030003; 03030003070010
NCDWR Sub-basin	03-06-12
Project Drainage Area (acres)	2,600
Project Drainage Area Percentage of Impervious Area	6.7%
CGIA Land Use Classification	42% Cultivated Crops, 24% Developed, 24% Forest, 5% Shrubland, 3% Grassland/Herbaceous, 1% Open Water, 1% Wetlands

3.2 Landscape Characteristics

The Site is located in the Piedmont Physiographic Province. The Piedmont Province is characterized by gently rolling, well rounded hills with long low ridges and elevations ranging from 300-1,500 feet above sea level (Figure 13, 13a, 13b). The surrounding fluvial landforms at the Site are typical of the Piedmont region. The valley topography is gentle to moderate slope (Figure 4). Rocky River has a flat, broad valley confined between steeper hillslopes and the other tributaries that drain to Rocky River are situated in steeper, moderately confined valleys.

This Site is located in a portion of the Piedmont physiographic province known as the Carolina Slate Belt (NCGS, 1985). The rocks in this region are primarily volcanic and sedimentary rocks that underwent low-grade metamorphism giving them a slaty cleavage. Coarse-grained intrusive granites comprise the rest of the Slate Belt rocks (Rogers, 2006). The Rocky River flows through an unconstrained alluvial valley that is controlled by shallow granite bedrock prevalent throughout the existing river and surrounding floodplain. This shallow bedrock creates a natural grade control and has prevented the river from incising, which allows flood flows to frequently access the floodplain.

NRCS soil maps for the site show that Chewacla and Wehadkee soils dominate the floodplain of Rocky River (Figure 5). These are somewhat poorly drained soils that are typical of the piedmont bottomland hardwood areas where the water table generally remains within 24 inches of the surface. Georgeville silt clay loam is mapped along Schist, Gypsum, and Dolomite Creeks. This soil is a moderately eroded silt clay loam that is deep and well drained. Vance sandy loam soils are shown along the steeper valley of Mica Creek. The well drained and deep soils along the tributaries paired with the slaty texture of the underlying geology indicate that streams may go dry during later summer months, as is typical for slate belt streams.

3.3 Existing Streams

There are five jurisdictional streams channels on site: Rocky River, Schist Creek, Gypsum Creek, Dolomite Creek, and Mica Creek (Figure 2). The streams are discussed in the sections below. Table 3 provides a detailed summary of each stream. Surveyed cross sections and geomorphic details are included in Appendix 1. NCSAM field assessment forms with the rating calculator outputs and NCDWR stream identification forms are included in Appendix 3.

Rocky River

Rocky River flows east onto the Site from an adjacent parcel and exits the site at a railroad easement. Within the Site limits, livestock have access to the entire stream and floodplain. The pasture is extensively grazed and vegetation on the banks is limited to a single line of trees sporadically spaced on each bank. These trees are used as shade for livestock, leading to in-stream wallow areas. Scour is present on the majority of stream banks (> 75%) and is more severe on the left bank. The majority of the stream is straightened and was likely moved to near the right valley wall upon clearing of the floodplain for agricultural use. There are a few isolated meanders with depositional point bars. The degree of lateral instability along this reach indicates the river is trying to increase sinuosity.

Bedrock grade control has prevented further incision of Rocky River in the project site. Several bedrock seams are exposed on the upper half of the River, west of the confluence with Mica Creek. The seams create areas of backwater behind them, which contributed to limited bedform variability and algae growth. The low slope within this area has also resulted in deposition and the creation of mid-channel bars. Riffle pool sequences are scattered throughout the length of Rocky River where it is not backwatered. The stream substrate is composed of cobble and gravel embedded with fines from the bank erosion. There is colluvium from the right valley wall actively providing bed material for the river.

Schist Creek

Schist Creek, the westernmost tributary, originates south of US-421 and enters the site through a culvert under the road. The upstream end of the channel is overwidened and the stream begins to narrow and incise as it approaches the floodplain of Rocky River. A bedrock outcrop at the confluence with Rocky River, slightly perched from the bed of the Rocky River, is preventing any further downcutting, however the stream is actively widening as evidenced by scour on the banks. There are riffle-pool sequences in a short section prior to backwater caused by the bedrock outcrop. The wooded riparian area is providing some woody debris and leaf packs to the channel; however, the bed is impacted by livestock trampling. The wooded riparian buffer along Schist Creek is dominated by canopy trees as described in Section 3.6. The stream substrate is mostly comprised of gravel material mixed with some silt and sands.



Gypsum Creek

Gypsum Creek starts at a spring head on the south side of Rocky River. It is an intermittent channel with well-formed banks and bed material consisting of gravel. The wooded buffer provides large woody debris and leaf packs for habitat. It is connected to its floodplain and not actively incising or scouring, however hoof shear imprints along the banks and bed show livestock actively cross the channel. As Gypsum Creek enters the floodplain of Rocky River it loses bank definition because of the large impact of livestock on the channel. Hoof imprints in this area are often 6-8" deep and have completely trampled the banks. Vegetation along this reach is described in Section 3.6.



Dolomite Creek

Dolomite Creek becomes jurisdictional just downstream of an existing perched culvert within the riparian area south of Rocky River. The wooded buffer provides large woody debris and leaf packs for habitat. The gravel bed consists of riffle-pool sequences. Dolomite Creek is connected to its floodplain within the wooded portion of the stream. As the channel enters the Rocky River floodplain it downcuts to tie into the Rocky River. Vegetation along this reach is described in Section 3.6.



Mica Creek

Mica creek enters the site through a perched culvert at the northeast corner of the site. The stream is straightened, and the banks and riparian area are dominated by pasture grasses and dogfennel (*Eupatorium capillifolium*). There is a short reach with riparian trees just upstream of the floodplain of Rocky River. The area is used by livestock for shade and grazing has limited understory growth. The stream is narrow, deep, and incised along its entire length. Scoured banks along the stream reveal a layer of gravel approximately one foot above the existing bed, indicating the elevation of the old channel bed. The channel becomes overwidened as it enters the floodplain of Rocky River. There is little bedform variability, however, some shallow pools are interspersed along the stream. The bed material is gravel embedded with fines from the mass wasting of bank material. Livestock frequently cross this channel creating trampled wallow areas. There are no woody debris, leaf packs, or root material limiting habitat diversity.



Table 3: Summary of Stream Resources

Reach Summary Information					
Parameter	Rocky River	Schist Creek	Gypsum Creek ²	Dolomite Creek ²	Mica Creek
Length of Reach (lf)	2,625	211	113	44	952
Valley Confinement (confined, moderately confined, unconfined)	U	U	U	U	M
Drainage Area (acres)	2600	219	2.3	7	92
Perennial, Intermittent, Ephemeral	P	P	I	I	P
NCDWR Water Quality Classification	Water Supply III				
Stream Classification ¹ (Existing and Proposed)	C4/C4	C4/C4	NA ² /C4	NA ² /NC	E4/C4
FEMA Classification	AE	-	-	-	-
NCSAM Overall Score ³	Reach 1 – Low Reach 2 – Low Reach 3 - Medium	Medium	High	Low	Low

1. Source: Rosgen, D. L. 1994. A classification of natural rivers. *Catena* 22:169-199. Reaches not slated for restoration or enhancement I were not classified (NC).
2. Gypsum Creek Reach 2 and Dolomite Creek Reach 2 were severely degraded and eroded due to cattle trampling. Cross section surveys could not be performed.
3. NCSAM worksheets and scores can be found in Appendix 3.

3.4 Existing Wetlands

3.4.1 Existing Jurisdictional Wetlands

Wildlands investigated the extent of Waters of the United States within the project area during July of 2020. All jurisdictional resources were located by sub-meter GPS or conventional survey and are shown on Figure 2. USACE staff provided confirmation of extent of jurisdictional resources on November 16, 2020 (Appendix 4). Existing wetland summary information is presented in Table 4.

Table 4: Summary of Wetland Resources

Parameter	Size of Wetland (acres)	Wetland Type	NCWAM Rating	Mapped Soil Series	Drainage Class	Soil Hydric Status	Source of Hydrology
Wetland A	0.174	Headwater Forest	Low	Vance	WD	No	Groundwater
Wetland B	0.002	Headwater Forest	Low	Vance	WD	No	Groundwater
Wetland C	0.017	Headwater Forest	Low	Vance	WD	No	Groundwater
Wetland D	0.019	Headwater Forest	Low	Vance	WD	No	Groundwater
Wetland E	0.006	Headwater Forest	Low	Vance	WD	No	Groundwater
Wetland F	0.017	Headwater Forest	Low	Chewacla/ Wehadkee	SPD/PD	No/Yes	Groundwater
Wetland G	0.017	Headwater Forest	Low	Chewacla/ Wehadkee	SPD/PD	No/Yes	Groundwater
Wetland H	0.011	Bottomland Hardwood Forest	Low	Chewacla/ Wehadkee	SPD/PD	No/Yes	Groundwater
Wetland I	0.545	Bottomland Hardwood Forest	Low	Chewacla/ Wehadkee	SPD/PD	No/Yes	Groundwater
Wetland J	0.114	Bottomland Hardwood Forest	Low	Chewacla/ Wehadkee	SPD/PD	No/Yes	Groundwater
Wetland K	0.028	Bottomland Hardwood Forest	Low	Chewacla/ Wehadkee	SPD/PD	No/Yes	Groundwater



Parameter	Size of Wetland (acres)	Wetland Type	NCWAM Rating	Mapped Soil Series	Drainage Class	Soil Hydric Status	Source of Hydrology
Wetland L	0.006	Bottomland Hardwood Forest	Low	Chewacla/Wehadkee	SPD/PD	No/Yes	Groundwater
Wetland M	0.005	Bottomland Hardwood Forest	Low	Chewacla/Wehadkee	SPD/PD	No/Yes	Groundwater
Wetland N	0.004	Bottomland Hardwood Forest	Low	Chewacla/Wehadkee	SPD/PD	No/Yes	Groundwater
Wetland O	0.006	Bottomland Hardwood Forest	Low	Chewacla/Wehadkee	SPD/PD	No/Yes	Groundwater
Wetland P	0.002	Bottomland Hardwood Forest	Low	Chewacla/Wehadkee	SPD/PD	No/Yes	Groundwater
Wetland Q	0.016	Bottomland Hardwood Forest	Low	Chewacla/Wehadkee	SPD/PD	No/Yes	Groundwater
Wetland R	0.007	Bottomland Hardwood Forest	Low	Chewacla/Wehadkee	SPD/PD	No/Yes	Groundwater
Wetland S	0.010	Bottomland Hardwood Forest	Low	Chewacla/Wehadkee	SPD/PD	No/Yes	Groundwater
Wetland T	0.010	Bottomland Hardwood Forest	Low	Chewacla/Wehadkee	SPD/PD	No/Yes	Groundwater
Wetland U	0.009	Bottomland Hardwood Forest	Low	Chewacla/Wehadkee	SPD/PD	No/Yes	Groundwater
Wetland V	0.014	Bottomland Hardwood Forest	Low	Chewacla/Wehadkee	SPD/PD	No/Yes	Groundwater
Wetland W	0.021	Bottomland Hardwood Forest	Low	Chewacla/Wehadkee	SPD/PD	No/Yes	Groundwater
Wetland X	0.005	Bottomland Hardwood Forest	Low	Chewacla/Wehadkee	SPD/PD	No/Yes	Groundwater
Wetland Y	0.005	Bottomland Hardwood Forest	Low	Chewacla/Wehadkee	SPD/PD	No/Yes	Groundwater
Wetland Z	0.030	Bottomland Hardwood Forest	Low	Chewacla/Wehadkee	SPD/PD	No/Yes	Groundwater
Wetland BB	0.047	Bottomland Hardwood Forest	Low	Chewacla/Wehadkee	SPD/PD	No/Yes	Groundwater
Wetland CC	0.088	Bottomland Hardwood Forest	Low	Chewacla/Wehadkee	SPD/PD	No/Yes	Groundwater
Wetland DD	0.067	Bottomland Hardwood Forest	Low	Chewacla/Wehadkee	SPD/PD	No/Yes	Groundwater
Wetland EE (Pasture)	0.254	Bottomland Hardwood Forest	Low	Chewacla/Wehadkee	SPD/PD	No/Yes	Groundwater
Wetland EE (Woods)	0.453	Bottomland Hardwood Forest	High	Chewacla/Wehadkee	SPD/PD	No/Yes	Groundwater
Wetland FF	0.147	Bottomland Hardwood Forest	Low	Chewacla/Wehadkee	SPD/PD	No/Yes	Groundwater
Wetland GG	0.021	Bottomland Hardwood Forest	Low	Chewacla/Wehadkee	SPD/PD	No/Yes	Groundwater
Wetland HH	0.004	Floodplain Pool	Low	Chewacla/Wehadkee	SPD/PD	No/Yes	Groundwater
Wetland II	0.013	Riverine Swamp Forest	Low	Chewacla/Wehadkee	SPD/PD	No/Yes	Groundwater

Parameter	Size of Wetland (acres)	Wetland Type	NCWAM Rating	Mapped Soil Series	Drainage Class	Soil Hydric Status	Source of Hydrology
Wetland JJ	0.047	Bottomland Hardwood Forest	Low	Chewacla/Wehadkee	SPD/PD	No/Yes	Groundwater
Wetland KK	0.047	Bottomland Hardwood Forest	Low	Chewacla/Wehadkee	SPD/PD	No/Yes	Groundwater
Wetland LL (Pasture)	2.130	Bottomland Hardwood Forest	Low	Chewacla/Wehadkee	SPD/PD	No/Yes	Groundwater
Wetland LL (Woods)	0.440	Bottomland Hardwood Forest	High	Chewacla/Wehadkee	SPD/PD	No/Yes	Groundwater
Wetland MM	0.023	Bottomland Hardwood Forest	Low	Chewacla/Wehadkee	SPD/PD	No/Yes	Groundwater
Wetland NN	0.004	Bottomland Hardwood Forest	Low	Chewacla/Wehadkee	SPD/PD	No/Yes	Groundwater
Wetland OO	0.010	Bottomland Hardwood Forest	Low	Chewacla/Wehadkee	SPD/PD	No/Yes	Groundwater
Wetland PP	0.004	Bottomland Hardwood Forest	Low	Chewacla/Wehadkee	SPD/PD	No/Yes	Groundwater

Forty-one of the delineated wetlands were located within the proposed conservation easement and classified and evaluated using the North Carolina Wetland Assessment Method (NCWAM). Wetlands located along Mica Creek (Wetlands A-D) were classified as the Headwater Forest Type since it is a first order stream based on USGS topographical maps. Within the Rocky River floodplain, there was one wetland classified as the floodplain pool type (Wetland HH) and one wetland classified as a Riverine Swamp Forest (Wetland II). Wetland II appears to have been excavated at some point in the past resulting in a longer hydroperiod and, thus, the classification as Riverine Swamp Forest. All remaining wetlands within the Rocky River floodplain and were classified as Bottomland Hardwood Forest.

Wetlands EE and LL both have portions in pasture and portions that are currently forested. Since vegetation composition and structure heavily influence function and quality, these wetlands were each separated into two assessment areas. The wooded portions of these Bottomland Hardwood Forest wetlands scored high for the hydrology, water quality, and habitat functions as well as the overall rating. Cattle were observed concentrating within these areas during the warm summer months.

All remaining existing wetlands scored low for the hydrology, water quality, and habitat function ratings as well as the overall wetland ratings. Wetland impairments are the direct result of land use as cattle pasture. Herbaceous vegetation within these wetlands is heavily grazed and very few woody stems are present. Livestock cause nutrient and bacteria inputs, creating a pollutant source and reducing water quality improvement mechanisms of riparian wetlands on adjacent streams. Wetlands are fragmented and disconnected from other wildlife habitat types. NCWAM field assessment forms and the rating calculator outputs are included in Appendix 3.

3.4.2 Relic Hydric Soils

A licensed soil scientist (LSS) evaluated the site on August 7, 2019 to assess the extent of hydric soils onsite. The results of this investigation were used to determine wetland re-establishment potential. Areas containing hydric soils but lacking a contemporary wetland hydrology regime were likely functional wetlands prior to manipulation of the site for agricultural purposes. The LSS report and hydric soil map are included in Appendix 1.



The investigation determined that soils in the Rocky River Floodplain are most like the Wehadkee series series (Fine-loamy, mixed, active, nonacid, thermic, Fluvaquentic Endoaquepts) with one area appearing more similar to the Roanoke series (Fine, mixed, semiactive, thermic Typic Endoaquilt).

The LSS investigation did not address the entire area proposed for wetland re-establishment. The larger excluded areas were forested portions of Wetlands EE and LL and the south floodplain of the Rocky River beginning near Dolomite Creek and moving downstream. These areas were evaluated by Wildlands staff and meet Hydric Soil Indicator F3 (Depleted Matrix).

3.4.3 Existing Hydrology

Groundwater gauges (GW) were installed on site in January 2020 at locations shown on Figure 2. Growing season dates for existing hydrology observations were determined using the WETS table for years 1990-2019 from the Asheboro 2 W, NC weather station (Coop ID 310286). Based on this period of record and the 28-degree Fahrenheit temperature threshold, there is a 50% probability that the growing season will occur from 3/18-11/16 (243 days). The longest hydroperiods observed on site occurred at GW 1, GW 2, and GW 7. GW 1 and GW7 recorded hydroperiods of 100% and GW 2 recorded a 44.7% hydroperiod. These locations are associated with existing wetlands driven by groundwater discharge and concave relief. Remaining groundwater gages are located in relic hydric soil areas and recorded hydroperiods ranging from 0.4% to 8.2% of the growing season. These areas appear to be drained by adjacent stream channels and relic channel features. Although the relic channel features may have formed due to natural stream migration, cattle trampling and lack of vegetation has caused them to function as clearly defined drainage conduits. These features provide a pathway for groundwater discharge near slopes to move directly to the stream and expedite drainage of surface water. A summary of groundwater gauge data is provided in Table 5 and plots for the entire observation period are in Appendix 1.

Table 5: Groundwater Gauge Summary

Gauge	Consecutive Days in Growing Season with Groundwater Table Above 12 in. Depth	Consecutive Percent of Growing Season with Groundwater Table Above 12 in. Depth	Proposed Wetland Approach
1	244	100	Rehabilitation
2	109	44.7	N/A ¹
3	20	8.2	Re-establishment
4	6	2.5	N/A ¹
5	1	0.4	Re-establishment
6	7	2.9	Re-establishment
7	244	100	Rehabilitation
8	1	0.4	Re-establishment
9	13	5.3	Re-establishment
10	3	1.2	N/A ¹

¹N/A indicates gauge is located within proposed stream channel footprint.

3.5 Existing Mussels Survey

During the North Carolina Interagency Review Team (NC IRT) post-contract site walk in February 2020, the NC Wildlife Resource Commission (WRC) raised a concern that there may be some rare mussel species in the Rocky River. They noted three crayfish species, three native snail species, and three native mussels including the Eastern Creekshell (*Villosa delumbis*) and potential habitat for Carolina Creekshell (*Villosa vaughaniana*) and Savannah Lilliput (*Toxolasma pullus*). In April 2020 WRC worked with Wildlands to develop an assessment and relocation plan for mussels. The plan included conducting a preliminary mussel survey to identify freshwater mussels in the Rocky River and choosing mussel relocation reaches up and downstream of the project. During the preliminary survey (described in detail

below), WRC and Wildlands subcontractor SEPI, Inc. (SEPI) identified five species on site: Eastern Creekshell, Notched rainbow (*Villosa constricta*), Eastern elliptio (*Elliptio complanata*), Florida pondhorn (*Unio merous carolinianus*), and Eastern floater (*Pyganodon cataracta*). The identification of these species on the Site led to the development of a new concept plan for the Rocky River, where restoration activities will remain on-line in areas where the species of concern were found. Further details of the communication with the IRT regarding the preliminary survey are located in Appendix 5.

A design survey was conducted by SEPI along 700 linear feet (LF) of the Rocky River, including the proposed enhancement I reach and an additional 120 LF upstream to obtain data on mussels that may move into the enhancement reach prior to construction. The design survey, conducted in February 2021, was divided into seven 100 LF reaches. Mussels were identified and placed back in the channel after each survey reach. A catch per unit effort (CPUE) per species was calculated for each reach, and an overall CPUE was calculated per species based on the entire survey. State species were measured and checked for gravidity. A total of 225 individuals were observed during the survey including the eastern elliptio, notched rainbow, eastern creekshell, Florida pondhorn, and eastern floater. The Eastern creekshell is a state endangered species and Notched rainbow is a species of concern. The eastern elliptio was the dominant species making up 81% of the species composition. The Carolina Creekshell and Savannah lilliput were not found during the design survey. The smallest population density is located between the existing and proposed confluences of Mica Creek and the Rocky River. The largest populations were noted up and downstream of these reaches. Most mussels were found within the river thalweg where the substrate consists of a heterogeneous mixture of sand, gravel, and cobble. No individuals were found within the stream banks, as few undercut banks were present in the survey reach to provide adequate habitat. A full report of the findings is located in Appendix 1. Discussions of further mussel surveys and mussel relocation plans are location in Section 6.9 and Section 9 of this report.

3.6 Existing Vegetation

Much of the site, including the riparian zones of Rocky River and Mica Creek, are dominated by pasture grasses such as fescue (*Festuca spp.*) and common bottlebrush grass (*Elymus hystrix*) with scattered trees along the top of bank and adjacent floodplain. In addition to pasture grasses, other herbaceous species include joe-pye (*Eutrochium spp.*), goldenrod (*Solidago spp.*), Virginia buttonwood (*Diodia virginiana*), leathery rush (*Juncus coriaceus*), path rush (*Juncus tenuis*), boneset (*Eupatorium spp.*), and dogfennel (*Eupatorium capilifolium*). Soft rush (*Juncus effuses*), shallow sedge (*Carex lurida*), Maryland meadowbeauty (*Rhexia mariana*), smartweed (*Persiaris spp.*), spotted jewelweed (*Impatiens capensis*), and blunt spikerush (*Eleocharis obtuse*) are present in the wetland features within the floodplain. Invasive species on site include marsh dewflower (*Murdannia keisak*), parrot feather (*Mirophyllum aquaticum*), multiflora rose (*Rosa multiflora*), and Chinese privet (*Ligustrum sinense*).

Dolomite Creek, Gypsum Creek and Schist Creek have buffers that are primarily wooded. Canopy species in these areas include American elm (*Ulmus americana*), sycamore (*Platanus occidentalis*), tulip poplar (*Liriodendron tulipifera*), ironwood (*Carpinus caroliniana*), mockernut hickory (*Carya glabra*), black walnut (*Juglans nigra*), winged elm (*Ulmus alata*), honey locust (*Gleditsia triacanthos*), and persimmon (*Diospyros virginiana*). The shrub layer is primarily comprised of blackberry (*Rubus spp.*), and elderberry (*Sambucus canadensis*).

3.7 Overall Functional Uplift Potential

The primary stressors to streams on Site are the lateral instability on the Rocky River, Schist Creek, and Mica Creek, the incision on Schist Creek and Mica Creek, livestock access on all reaches, and lack of riparian buffers on Mica Creek and the Rocky River. Without intervention, livestock will continue to trample banks and wallow in the stream channels, expediting the degradation and widening processes of the streams on Site and contributing to the sediment and pollutant loads downstream.



Wetland functionality within the Rocky River floodplain has been compromised by agricultural conversion. Wetland restoration practices will increase groundwater storage and residence time, improve hydrologic interaction of the stream and floodplain wetlands, provide opportunity for water quality treatment, and establish diverse wildlife habitat.

The primary functional uplift on site will be the reduction of sediment loads, stabilization of stream channels, establishment of riparian buffers, and improvements to wetland functions through the following activities:

- Addressing varying degrees of geomorphic instability through channel restoration and enhancement.
- Removal of livestock from the project parcel.
- Reconnecting stream channels to their floodplains and riparian wetlands.
- Establishing a riparian buffer for all restoration and enhancement reaches on site.
- Plugging drainage swales in the Rocky River floodplain.

Potential habitat and water quality benefits to the mussel population could occur from removing livestock, enhancing the riparian buffer, and protecting the Site in perpetuity.

4.0 Mitigation Site Goals and Objectives

The overall goal of the project is to reduce sediment, nutrients, and fecal coliform loading in the Rocky River, and greater Cape Fear watershed and improve stream and wetland function through the restoration and preservation of streams, the reestablishment and rehabilitation of riparian wetlands, and the establishment and protection of riparian buffers. Goals have been set to achieve the functional uplift outlined in Section 3 and alleviate the watershed stressors discussed in Section 2. The project goals and related objectives are described in Table 6.



Table 6: Mitigation Goals and Objectives

Goal	Objective	Expected Outcomes
Exclude livestock from streams.	Remove livestock from the site.	<ul style="list-style-type: none"> Support LWP/WAP objective of reduction in sediment, nutrient, fecal coliform, and bacteria inputs through removal of livestock.
Improve the stability of stream channels.	Construct stream channels that will maintain stable cross-sections, patterns, and profiles over time.	<ul style="list-style-type: none"> Reduce shear stress on channel boundary. Reduce sediment inputs from bank erosion. Support LWP/WAP objective of stabilizing streambanks
Improve instream habitat.	Install habitat features such as constructed riffles, lunger structures, and brush toes into restored/enhanced streams. Add woody materials to channel beds. Construct pools of varying depth.	<ul style="list-style-type: none"> Increase and diversify available habitats for macroinvertebrates, fish, mussels, and amphibians leading to colonization and increase in biodiversity over time. Add complexity including LWD to the streams.
Reconnect channels with floodplains.	Reconstruct stream channels with appropriate bankfull dimensions and depth relative to the existing floodplain.	<ul style="list-style-type: none"> Allow more frequent flood flows to disperse on the floodplain. Support geomorphology and higher-level functions. Improve wetland hydrology in the Rocky River floodplain.
Improve wetland hydrology.	Remove livestock to allow soil profiles to stabilize. Remove drain effect of channelized stream and floodplain swales.	<ul style="list-style-type: none"> Increased surface water residence time will provide contact treatment and groundwater recharge potential.
Restore and enhance native floodplain and streambank vegetation.	Plant native tree and understory species in riparian zones and plant native shrub and herbaceous species on streambanks. Treat invasive species within project area.	<ul style="list-style-type: none"> Reduce sediment inputs from bank erosion and runoff. Increase nutrient cycling and storage in floodplain. Provide riparian habitat. Add a source of LWD and organic material to stream. Support all stream functions. Support LWP/WAP objective of restoring riparian buffers
Permanently protect the project site from harmful uses.	Establish a conservation easement on the site. Preserve high quality stream reaches through the placement of a conservation easement on site.	<ul style="list-style-type: none"> Protect Site from encroachment on the riparian corridor and direct impact to streams and wetlands. Support all stream functions.

5.0 Regulatory Considerations

Table 7, below, is a summary of regulatory considerations for the Site. These considerations are expanded upon in Sections 5.1-5.4. Excerpts of the Categorical Exclusion are located in Appendix 6.



Table 7: Project Attribute Table Part 4

Regulatory Considerations			
Parameters	Applicable?	Resolved?	Supporting Docs?
Water of the United States - Section 404	Yes	No	PCN, 404 Permit
Water of the United States - Section 401	Yes	No	PCN, 401 Permit
Endangered Species Act	Yes	Yes	Categorical Exclusion Documents
Historic Preservation Act	Yes	Yes	Categorical Exclusion Documents
Coastal Zone Management Act	No	No	N/A
FEMA Floodplain Compliance	Yes	No	CLOMR
Essential Fisheries Habitat	No	N/A	N/A

5.1 FEMA Floodplain Compliance and Hydrologic Trespass

The site is located on the Randolph County Flood Map 3710872400K. Rocky River is mapped in a Zone AE Special Flood Hazard Area (SFHA) (Figure 6). No other tributaries are mapped, though confluences of each tributary enter into the Zone AE in the Rocky River floodplain. Wildlands will model the stream in HEC-RAS as a CLOMR, coordinating permitting through Randolph County and the State FEMA coordinator.

The conservation easement surrounding the Rocky River floodplain encompasses the entire floodplain and areas where the water table may raise due to the restoration of the Rocky River floodplain. The restoration of the Rocky River and adjacent wetlands is unlikely to affect hydrology outside of the easement.

5.2 401/404

Design of the Site prioritized avoidance and minimization of impacts to wetlands that currently provide appropriate function. Some small impacts were unavoidable and necessary to maximize ecological uplift potential of the stream design on the Rocky River and its tributaries. These impacts are due to conversion of wetland to stream resource, floodplain grading, and temporary haul roads. Several existing wetlands within the Rocky River floodplain are relic channel features. The value of maintaining these features is recognized but some small impacts will occur to plug these features and prevent them from functioning as a surface drainage swales. A net gain of wetland area and function is expected. Wetlands within the limits of disturbance will be shown on construction plans, erosion and sediment control plan and detail sheets, and avoidance procedures described in project specifications. Wetland impacts are provided in Table 8 to the project as a whole. The Pre-Construction Notification and Figures 13, 13a, and 13b provides itemized impacts in greater detail.



Table 8: Impacts to Project Wetlands

Jurisdictional Feature	Classification	Acreage	Permanent (P) Impact		Temporary (T) Impact	
			Type of Activity	Impact Area (acres)	Type of Activity	Impact Area (acres)
Wetlands A-PP	Bottomland Hardwood Forest, Headwater Forest, Floodplain Pool, and Riverine Swamp Forest	5.85	Conversion to Stream Resource, Plug Swales	0.42	Floodplain Grading and Haul Roads	0.25

6.0 Design Approach and Mitigation Work Plan

6.1 Design Approach Overview

The design approach for this site was developed to maximize functional uplift and meet the goals and objectives described in Section 4. The table below summarizes the primary impairments to each resource and the proposed restoration activity.

Table 9: Functional Impairments and Restoration Approach

Resource	Reach(es)	Primary Stressors/Impairments	Restoration Approach
Rocky River	1,3	Livestock access, bank erosion and mass wasting, invasive in-stream vegetation, lack of wooded buffer	Restoration
Rocky River	2	Livestock access, bank erosion and mass wasting, invasive in-stream vegetation, lack of wooded buffer	Enhancement I ¹
Schist Creek	-	Livestock access, incision and bank erosion, inadequate ability to dissipate energy from upstream culvert discharge, lack of wooded buffer in lower section	Restoration
Gypsum Creek	1	Livestock access	Preservation
Gypsum Creek	2	Livestock access, lack of channel definition, lack of wooded buffer	Restoration
Dolomite Creek	1	Livestock access	Preservation
Dolomite Creek	2	Livestock access, lack of wooded buffer	Enhancement II
Mica Creek	-	Livestock access, incision, bank erosion, lack of wooded buffer.	Restoration
Relic hydric soils in floodplain	Rocky River	Floodplain drainage, livestock access, lack of wooded buffer	Reestablishment
Existing floodplain wetlands	Rocky River, Mica Creek	Livestock access, lack of wooded buffer	Rehabilitation
Existing floodplain wetlands (wooded)	Rocky River	Livestock access	Enhancement

¹ Enhancement 1 on Rocky River Reach 2 will involve bank treatments along the majority of its length to reduce sediment input and channel instability, while maintaining the existing channel bottom where the sensitive mussel species were identified.



6.2 Reference Streams

Reference reaches were chosen to inform the design because of their similarities to the Site streams including drainage area, valley slope, morphology, and bed material. Proximity of the reference reaches to the project site and location within similar physiographic and geologic regions were also considered. In all, six reference reaches were used to develop and support the design of stream reaches on site (Figure 7). Geomorphic parameters for these reference reaches are summarized in Appendix 1. A brief description of each reference reach is included in Table 10.

Table 10: Stream Reference Data Used in Development of Design Parameters

Reference Reach	Stream Type	Landscape Position	Chosen For	Used For	Design Reaches
Long Branch	C4/E4	Central piedmont region of NC receiving runoff primarily from wooded and agricultural areas, and some low-density residential areas	Proximity to the project site and similar valley slope	Discharge, Dimension, Pattern, Profile	Rocky River
UT to Varnals Creek	C4/E4	Forested area in the central piedmont region of NC	Proximity to the project site and similar valley slope as the project reaches	Discharge, Dimension, Pattern, Profile	Schist Creek, Gypsum Creek, Dolomite Creek, Mica Creek
UT to Wells Creek	C4	Central piedmont region of NC with a nearly entirely forested watershed	Similar size drainage area and valley slope as project reaches. Within close proximity to the site	Discharge, Dimension, Pattern, Profile	Schist Creek, Gypsum Creek, Dolomite Creek, Mica Creek
UT to Polecat Creek	E4	Piedmont region of NC in a mature forested area receiving runoff from agricultural, wooded, and low-density residential areas	Similar valley slope to the project reach and entrenchment ratio near what is anticipated for final reach design	Dimension, Pattern, Profile	Schist Creek, Gypsum Creek, Dolomite Creek, Mica Creek
UT to Richland Creek Reach 2	E4/C4	Central Piedmont region of NC located in 10-year-old timber regrowth.	Similar size drainage area and valley slope as the project reaches. No pattern data available for this reference reach	Discharge	Schist Creek, Gypsum Creek, Dolomite Creek, Mica Creek



Reference Reach	Stream Type	Landscape Position	Chosen For	Used For	Design Reaches
UT to Rocky Creek	E4b	Central Piedmont Region of NC in a mature forested portion of the Uwharrie National Forest.	Similar size drainage area and valley slope as the project reaches	Discharge	Schist Creek, Gypsum Creek, Dolomite Creek, Mica Creek

6.3 Design Channel Morphological Parameters -

A combination of reference reach data and designer experience was used to develop design parameters for streams on site. Key morphological parameters are summarized in tables below and extended parameter tables can be found in Appendix 1. Gypsum Creek and Dolomite Creek do not list existing morphological parameters for their restoration reaches because the existing streams have lost channel definition in the floodplain of the Rocky River due to extensive livestock trampling.

Table 11: Summary of Morphological Parameters for Rocky River

Parameter	Existing Parameters	Reference Parameters	Proposed Parameters	
	Rocky River	Long Branch	Rocky River R1	Rocky River R3
Valley Width (ft)	200+	-	200+	200+
Contributing Drainage Area (acres)	2600	954	2600	2600
Channel/ Reach Classification	C4	C4/E4	C4	C4
Bankfull Width (ft)	18.1-22.8	14.8-18.6	28	26
Bankfull Depth (ft)	1.7-2.3	1.3-2.1	1.6	1.9
Bankfull Area (sq ft)	35.7-48.1	25.0-34.6	45.5	49
Bankfull Discharge Velocity (ft/s)	1.7-3.1	3.6-4.0	2.7	2.6
Bankfull Discharge (cfs)	110-121	101-124	110	128
Water Surface Slope (%)	0.1-0.9	0.6	0.1-0.5	0.2
Sinuosity	1.0-1.1	1.3	1.26	1.10
Width/ Depth Ratio	7.9-12.7	7.9-13.8	17.2	13.8
Bank Height Ratio	1.0	1.2-1.5	1.0	1.0
Entrenchment Ratio	>2.2	>3.4	>2.2	>2.2

Table 12: Summary of Morphological Parameters for Schist Creek, Gypsum Creek, and Mica Creek

Parameter	Existing Parameters			Reference Parameters			Proposed Parameters		
	Schist Creek	Gypsum Creek Reach 2	Mica Creek	UT to Varnals Creek	UT to Wells Creek	UT to Polecat	Schist Creek	Gypsum Creek Reach 2	Mica Creek
Valley Width (ft)	75+	100+	50+	-	-	-	75+	100+	50+
Contributing Drainage Area (acres)	219	2	92	262	83	262	219	2	92
Channel/ Reach Classification	C4/E4	-	C4/E4	C4/E4	C4	E4	C4	C4	C4
Bankfull Width (ft)	11.2	-	6.6	9.3-10.5	6.2-8.6	5.3-10.9	12.8	6	8.7
Bankfull Depth (ft)	0.9	-	0.7	1.1-1.2	0.6-1.0	1.0-1.1	1	0.5	0.7
Bankfull Area (sq ft)	10.4	-	4.9	10.3-12.3	3.9-6.3	5.4-12.4	12.5	2.9	5.7
Bankfull Discharge Velocity (ft/s)	2.0	-	4.1	4.4-5.2	3.8	2.2-3.5	2.5	1.4	2.8
Bankfull Discharge (cfs)	20.9	-	20.1	54	15	20.3	31	4	16
Water Surface Slope (%)	0.0-0.1	-	0.9-1.5	2	2	1.7	0.6-1.7	0.96	1.4

Parameter	Existing Parameters			Reference Parameters			Proposed Parameters		
	Schist Creek	Gypsum Creek Reach 2	Mica Creek	UT to Varnals Creek	UT to Wells Creek	UT to Polecat	Schist Creek	Gypsum Creek Reach 2	Mica Creek
Sinuosity	1	-	1	1.2	1.4	1.4	1.17	1.15	1.12
Width/ Depth Ratio	12.4	-	9.4	8.1-9.3	6.1-12.6	5.2-9.6	13	13	13
Bank Height Ratio	1.2	-	1.7	1	1-1.8	1-1.1	1	1	1
Entrenchment Ratio	>2.2	-	>2.2	5.7-10	1.9-4.0	3.2-8.3	>2.2	>2.2	>2.2

6.4 Design Bankfull Discharge Analysis

Stream restoration reaches on the Site will be hydraulically connected to their existing floodplains to allow for energy dissipation and prevent erosion. In order to achieve this, a design discharge must be selected that allows for frequent overbank events. Multiple methods were used to develop design discharges for restoration reaches, including published regional curve data (Harman et al., 1999, Harman et al., 2000), reference reach data, and existing bankfull indicators from surveyed cross sections. Additionally, Wildlands performed a regional flood frequency analysis using U.S. Geological Survey (USGS) gage sites. Results are shown in Table 13 and illustrated in Figures 8a and 8b.

Table 13: Summary of Design Discharge Analysis

		Rocky River	Schist Creek	Gypsum Creek Reach 2	Mica Creek
DA (acres)		2600	219	2	92
DA (sq. mi.)		4.06	0.34	0.004	0.14
NC Rural Piedmont Regional Curve (cfs)		219	41	2	22
NRCS Piedmont/Mountain Regional Curve (cfs)		148	24	0.7	12.1
Regional Flood Frequency Analysis (cfs)	1-year event	81.4	10.4	0.2	5.1
	1.2-year event	218.2	35.2	1.2	18.6
	1.5-year event	304	51	2	27
Manning's Equation at Surveyed Riffles	XS1	111	-	-	-
	XS3	-	21	-	-
	XS5	121	-	-	-
	XS7	111	-	-	-
	XS10	-	-	-	20
Site Specific Reference Reach Curve (cfs)		189	29	1	14
Design Q		122-128	31	4	16

For the Rocky River, Wildlands examined the aforementioned discharge analysis and looked at USGS gage data on the Rocky River downstream of the project (USGS gage 0210166029). Analysis showed that the existing cross-sections of the Rocky River supported a return interval storm between the 1- and 1.2-year based on the flood frequency analysis, which is significantly lower than bankfull estimates using published regional curve data or the Reference Reach Curve. Analysis of the watershed led to the conclusion that the Sizemore Lake reservoir, located at the head of the Rocky River, may be impacting bankfull flows at the site via storage and outflow regulation. To confirm the design flow rates were adequate at the lower level, Wildlands visited locations upstream of the project and took cross-sections on riffles. Those sections supported the discharge rates and bankfull area associated with existing cross-sectional data on-site. The Rocky River cross-section was then designed based on comparison with existing cross-sectional areas and flow rates with width to depth ratios appropriate for the channel type and to support a higher water table in riparian wetlands.

In determining the design discharge for Schist Creek and Mica Creek through the various estimation methods, greatest weight was given to the Regional Flood Frequency Analysis and the site-specific reference reach curve. This decision was driven by the lack of inclusion of small (less than 1 square mile) drainage area reference reaches in both the NC Rural Piedmont and NC Piedmont/Mountain regional curves and the presence of nearby gage data used in the Regional Flood Frequency Analysis.

Estimated discharges for the 1.2-year event produced from the various published curves and the regional flood frequency analysis were too low to design and construct a new channel for Gypsum and Dolomite Creeks and likely do not account for the spring fed nature of the channels. To allow for constructability, the design discharge for Gypsum Creek was set slightly higher than the 1.5-year storm from the Regional Flood Frequency Analysis and the design discharge for Dolomite Creek was set equal to both the estimated discharges from the 1.5-year storm from the Regional Flood Frequency Analysis and the NC Rural Piedmont Regional Curve.

6.5 Sediment Transport Analysis

The overall watershed was evaluated for potential off-site sources of sediment into the system that may affect existing conditions and design. Approximately half of the area draining to the site is wooded, with the remainder being split nearly evenly between agricultural land uses and residential/developed areas. The primary sources of fine sediment delivered to the site are unstable stream banks upstream of the Site, agricultural practices, and periodic logging episodes. As discussed in Section 3.1, the last logging event within the watershed occurred between 2006 and 2008. It is assumed small, infrequent logging events will continue, serving as short-term sources of sediment. Figure 3 shows the Site watershed.

The primary on-site source of sediment to the system is stream bank erosion along the Rocky River, Schist Creek, and Mica Creek caused by lateral instability, stream incision, and livestock access. Due to the proximity of an agricultural impoundment upstream of Schist Creek, it will likely be supply limited. The heterogeneous riffle material present along the Reaches 1 and 2 of the Rocky River, Schist Creek, and Mica Creek indicate the existing channels have adequate power to move the fine sediments delivered to the streams. The downstream extents of Reach 3 on the Rocky River are backwatered by an unverified downstream structure, believed to be a beaver dam, diminishing the competence of the reach. On-site sediment input will be mitigated through various design approaches.

Restoration reaches will be designed to appropriate geomorphic dimensions that will reduce shear stress within the channel and reconnect the stream to its floodplain. Reach 2 of the Rocky River (Enhancement 1) will have bank treatments along the majority of its length to reduce sediment input and channel instability, while maintaining the existing channel bottom where the sensitive mussel species were identified. Because sediment loads will be reduced and there are currently no capacity issues, the focus of this analysis is on competence. A competence analysis was performed using shear stress as calculated by the Shields (1936) curve and Andrews (1984) equation described by Rosgen (2001). The analysis was done to evaluate the current conditions of site streams and to aid in the design of threshold channels.



Table 14: Results of Competence Analysis

	Rocky River Reach 1	Rocky River Reach 3	Schist Creek	Gypsum Creek Reach 2	Mica Creek
Design Abkf (sq ft)	45.5	49.0	9.8	1.8	5.6
Design Wbkf (ft)	28.0	26.0	11.4	4.8	8.6
Design Dbkf (ft)	1.6	1.9	0.9	0.4	0.7
Design Schan (ft/ft)	0.003	0.002	0.010	0.014	0.011
Design Bankfull Velocity (fps)	2.7	2.6	3.2	2.2	2.9
Bankfull Shear Stress, t (lb/sq ft)	1.59	0.68	1.00	0.40	1.54
Movable particle size (mm) – Shields curve	21	18	22	8.2	31
Movable particle size (mm)-Rosgen curve	60	55	62	31	79
D ₅₀ particle from sediment sample (mm)	15	7	4	-	7
Largest particle from sediment sample (mm)	22	34	-	-	12

Streams on-site are a mix of alluvial and colluvial systems, where the bed material is supplied from off-site upstream reaches as well as the underlying geology of the site. Competence analysis of streams on-site shows that the design channels are capable of moving the maximum size particle collected in the bar or sub-pavement sample. Streams will be designed as threshold channels with heterogeneous riffle material. It is anticipated that the majority of riffle material can be harvested on-site for construction of riffles. The D₂₅ of the riffle material will be designed to remain in place in high flow events to provide grade control for the site and consistent areas for mussels and other aquatic life to seek hydraulic refuge during high-flow events while allowing a portion of the riffle material to be actively mobile bedload. Storm events will replenish point bars with fine sediments in between bankfull events. Grade control structures will be incorporated into many of the riffles along Mica Creek where bedrock seams and natural grade control were not noted in the field.

6.6 Stream Design Implementation

Restoration, enhancement I, and preservation approaches will be implemented throughout the Site. Further details on proposed design approaches are discussed below and illustrated in Figure 9. Draft construction plans are included in Appendix 10.

Rocky River Reach 1 - Restoration

Rocky River Reach 1 will be restored as a C4 stream. The reach will begin on-line at the western property line where a J-hook structure will be installed approximately 50 feet downstream from the property line. Downstream of the structure, the design channel will quickly abandon the existing channel and meander through relic hydric soils in the left floodplain at, or slightly above, existing bed grade. As Reach 1 flows towards its confluence with Gypsum Creek, the design channel will be elevated (≤ 6 inches) to improve riparian wetland hydrology in the floodplains. Reach 1 will end where the design channel converges with the existing channel, approximately 33 linear feet (LF) upstream of Rocky River’s confluence with Dolomite Creek. The entirety of Reach 1 will be built off-line to minimize impacts of sediment on sensitive mussel species.

Instream structures along the reach will consist of native material, jazz, and chunky riffles. Varying riffle types will add diversity and variation to the channel. Deep pools with brush toe and lunker structures will be constructed on every meander bend to provide habitat and prevent erosion. Pools will have no slope to maximize riffle slope and aid in sediment transport processes.

Rocky River Reach 2 – Enhancement I

Rocky River Reach 2 will begin approximately 33 LF upstream of Dolomite Creek. The entirety of the reach will remain on-line and no in-channel work is proposed in order to avoid impacts to the existing channel bottom and bed material to minimize risk to sensitive mussel species present. However, because the reach is over widened with several areas of bank scour and failure, banks will be stabilized through a combination of bank grading and installation of brush toe and vegetated soil lifts.

Rocky River Reach 3 – Restoration

Rock River Reach 3 will be restored as a C4 stream using a priority 1 restoration approach. The reach will begin approximately 114 LF downstream of Rocky River’s confluence with Mica Creek where it will immediately move off-line. The reach will gently meander for 447 LF in the left floodplain before it ties back into the existing channel approximately 70 LF upstream of the conservation easement boundary. Minor bank grading and stream bank planting will occur between the tie-in point and the boundary of the conservation easement. Native material and chunky riffles will be constructed to provide stability and enhance habitat and brush toe will all be installed to prevent erosion during high flows and provide additional aquatic habitat.

Schist Creek - Restoration

Schist Creek will be restored as a C4 stream using a priority 1 restoration approach. The reach will begin approximately 42 LF downstream of the box culvert under U.S. Highway 421 where a boulder sill will be installed. The sill will be placed at an elevation five inches above the culvert invert elevation to eliminate the perched conditions of the culvert and allow for aquatic organism passage upstream through the culvert during low flows. Downstream of the proposed sill, the stream will abandon the existing channel and meander off-line through the right floodplain until its confluence with Rocky River.

Instream structures along the reach will consist of native material and chunky riffles. Varying riffle types will add diversity and variation to the channel. Several meanders will be constructed with brush toe to provide habitat and prevent erosion. Pools will have no slope to maximize riffle slope and aid in sediment transport processes.

Gypsum Creek Reach 1 – Preservation

Gypsum Creek Reach 1 is proposed for preservation and no instream work is proposed. Preservation will begin at jurisdictional limit of the stream and end at the edge of the wood line. The proposed conservation easement will provide a 150-foot buffer around the headwaters of the stream.

Gypsum Creek Reach 2 – Restoration

Gypsum Creek Reach 2 will be restored as a C4 stream. The reach will begin where the stream channel exits the wood line and enters the Rocky River floodplain. The reach will meander through the floodplain before dropping down to its confluence with Rocky River.

This low sloped system will be constructed with native material and woody riffles that will help diversify habitat within the reach. Several meanders will have brush toe installed to prevent erosion during higher flows and provide additional habitat to aquatic species.

Dolomite Creek Reach 1 – Preservation

Dolomite Creek Reach 1 is proposed for preservation and no instream channel work is proposed. An existing in-line culvert located above the upper extent of the reach will be removed during construction. The proposed conservation easement provides a 150-foot buffer around the headwaters of the stream.

Dolomite Creek Reach 2 – Enhancement II

Dolomite Creek Reach 2 is proposed for enhancement II. This short reach will begin approximately 40 LF upstream from its confluence with the Rocky River. It is a transition reach from the floodplain elevation



of the Rocky River to the bed elevation of the Rocky River and has a two-foot drop in bed elevation. Rock steps will be used to stabilize this drop in elevation.

Mica Creek – Restoration

Mica Creek will be restored as a C4 stream. Restoration will begin at the existing railroad culvert where a plunge pool will be constructed to dissipate energy during higher flows and help prevent erosion. The boulder sill at the downstream riffle will be placed at the same elevation as the culvert invert to eliminate the perched culvert. The stream will then meander through a moderately confined valley for several hundred feet before entering the broad, flat floodplain of Rocky River. The reach will gently meander through the floodplain for approximately 700 LF before dropping down to its confluence with Rocky River.

Instream structures along the reach will consist of native material, angled log, and chunky riffles. Varying riffle types will add diversity and variation to the channel. Several meanders will be constructed with brush toe and lunker logs to provide habitat and prevent erosion. Log sills at the end of pools will provide grade control on steeper sections of the reach and two log step pools will be constructed downstream of the plunge pool at upstream extent to quickly drop grade in steeper sections. Impacts to existing trees and wetlands along the reach were minimized when determining the alignment and profile of the design channel.

6.7 Wetland Design Implementation

The proposed wetland restoration at the Site includes the re-establishment of previously manipulated riparian wetland areas and rehabilitation of existing jurisdictional wetland features. Wetland re-establishment is proposed on 12.870 acres that contain hydric soils that lack a contemporary wetland hydrology regime. Wetland rehabilitation is proposed on 3.306 acres of existing jurisdictional features that exhibit substantial impairments to hydrology, water quality, and habitat functions.

Rehabilitation and re-establishment of wetland hydrology will be accomplished by elevating the Rocky River and Mica Creek streambeds, installing plugs in relic channel features that provide surface drainage, and creating surface roughness. There is opportunity to raise the Mica Creek streambed as well as the Rocky River streambed between Gypsum Creek and Dolomite Creek. Elevating the streambeds relative to their current elevation will reduce groundwater drainage to existing stream channels and increase frequency of interaction of the stream with floodplain wetlands. Many existing wetlands are relic channel features proposed for rehabilitation. The value of maintaining the landscape variability and potential habitat diversity provided by these features is recognized; however, they dissect the Rocky River floodplain in such a way that promotes drainage and runoff of surface water. Plugs will be installed at appropriate locations to reduce surface drainage and increase infiltration to groundwater. Where feasible, surface roughness will be increased on existing, smooth land surfaces by tilling the soil. The close proximity of the current stream alignment to the right valley wall does not provide opportunity for discharge at the toe of slope to hydrate the soil profile throughout the right floodplain. Re-aligning the channel farther from the right valley wall will also allow groundwater discharging near the toe of slope to diffuse and hydrate more of the right floodplain area. Water quality treatment and potential and wildlife habitat will be addressed in rehabilitation and re-establishment areas through the removal of livestock and planting of a native, hydrophytic vegetation community.

Wetland enhancement is proposed in forested portions of Wetlands EE and LL, totally 0.893 acres. Enhancement will be achieved through the removal of livestock from the Site. It is likely livestock removal will promote some level of functional uplift, particularly related to lower strata vegetation and nutrient cycling.



Wetland credit areas will be restored to a bottomland hardwood forest. Wehadkee and Roanoke soils are capable of supporting this wetland type and a 12% hydroperiod is proposed. This duration hydroperiod is sufficient to drive redoximorphic reactions, support a hydrophytic plant community, and is within the range provided in the mitigation guidance.

6.8 Vegetation, Planting Plan, and Land Management

6.8.1 Vegetation and Planting Plan

Non-forested areas within the conservation easement will be planted and seeded with a combination of trees, shrubs, and herbs with the objective of establishing diverse and robust native plant communities in the project's wetlands and riparian buffers. This restored buffer will improve riparian habitat and provide a source for large woody debris (LWD) and organic material to the streams. In addition, restored vegetation will help shade the streams, stabilize banks, and reduce sediment inputs. The specific species composition is based on the selected target natural communities, species currently occurring on the Site, and professional judgement regarding species establishment in the anticipated Site conditions. Planting species and rates are listed on the plans located in Appendix 10. The species composition was based on the target natural communities of piedmont bottomland forest and piedmont alluvial forest (Schafale and Weakley, 1990). Some adaptations were made based on the need to include early successional tree species that will create more favorable conditions for climax species to grow and the omission of undesired tree species (i.e. *Acer rubrum* & *Liquidambar styraciflua*). The streambanks and the channel toe will be planted with regionally appropriate native live stakes and herbaceous plugs that will stabilize streambanks, provide habitat, and cool water temperatures via shading. Permanent native seed mixes were based on the proposed target communities, professional judgement regarding seed establishment, and commercial availability. Separate seed mixes were developed for riparian buffers and wetland areas and will be broadcast on all disturbed areas in the conservation easement.

To help ensure tree growth and survival, construction haul roads and areas of soil compaction will be ripped to a depth of 18 inches. Soil amendments may also be added to areas of the floodplain throughout the Site. Soil tests will be performed and appropriate amendments will be applied based on the results. Topsoil will be harvested during the grading process and reapplied where necessary before permanent seeding and planting activities take place.

Additional monitoring and maintenance issues regarding vegetation can be found in Sections 8 and 9.

6.8.2 Land Management/Stewardship

Land management activities at the Site will largely focus on controlling invasive plant populations. Existing instream invasive plant populations include parrotfeather (*Myriophyllum aquaticum*) and creeping water primrose (*Ludwigia peploides glabrescens*). The parrotfeather populations may be difficult to control. Although parrotfeather in the United States does not form seed, it spreads readily by fragmented stems and rhizomes making it difficult to manually remove. Chemical treatment is difficult due to the waxy cuticle on the plants leaves that repel herbicide (University of Georgia et al., 2018). Parrot feather on the site is mainly in the upper half of the Rocky River, which will be filled in during construction and no longer a conduit for spread. Blue aquarium rocks were found approximately 50 feet upstream of the easement on the Rocky River and have spread into downstream riffles. That leads us to believe the source of parrot feather was from an aquarium and that there is not a continuous source presence upstream. Control of parrotfeather will require intensive initial treatment and frequent monitoring of new populations. Creeping water primrose has similar propagative properties as parrotfeather, however populations at the Site are much smaller.

Limited populations of multiflora rose and Chinese privet also exist at the Site. All major invasive plant populations will be treated prior to construction. This includes the target treatment of parrotfeather and



creeping water primrose at least twice during the growing season of 2021. Initial treatment preconstruction and continued treatment throughout the monitoring period will be necessary. Undesirable pasture grasses in the easement area that are not being graded will be sprayed with herbicide and reseeded.

All invasive plant populations will continue to be monitored as necessary during the monitoring period and Wildlands will monitor for additional invasive species not currently found on site. Wildlands will also monitor the Site for future land management issues such as easement encroachment, beaver activity, floodplain erosion, bare areas, and damaged instream structures that may arise during the monitoring period.

6.9 Mussel Collection and Relocation

Prior to and/or during construction, up to three mussel collection survey efforts will be made on the reaches of the Rocky River to be restored. If by the end of the second collection it appears as though all mussels have been collected, a third will not be completed. This mussel collection survey is described in Appendix 1. Mussel will be collected and held in mesh bags and placed in a cooler with aeration. Rare mussel species will be tagged. Mussels will then be moved to the upstream relocation reach identified in the existing conditions survey. Per NCWRC request, not mussels will be moved into newly constructed channels. All mussel relocation will be done in coordination with NCWRC.

6.10 Project Risk and Uncertainties

There are no utility crossings on site, and no internal or external easement breaks on the project. However, the wide railroad easement on the project edge does mean that the start of Mica Creek is not protected at the culvert outlet. Structures placed at the outlet will help maintain grade as the stream flows into the easement. Livestock will be removed from the project parcel prior to construction.

The streams have been designed not to induce hydrologic trespass on neighboring properties. Raising of the water table along the Rocky River floodplain is intended to develop riparian wetlands. The easement extends across the entirety of the floodplain and areas potentially affected by the rising water table.

Potential risks to the project include beaver activity, encroachment on the easement, and the spreading of invasive species. Beaver were noted at the Site during the design phase of the project and the dams were removed. There has not been beaver activity since their removal (> 1 year). Streams will be monitored for future beaver activity according to the monitoring and maintenance plans. Invasive species management and encroachment are described above in Section 6.8.2. There will be continued treatment of parrot feather throughout the monitoring years. The majority of the existing population will be buried in the old stream channel during construction, and it will eventually be shaded out by mature vegetation. With the likely source being a discarded aquarium, there may not be a long-term source located upstream of the project, which would limit potential of repopulation in the new channel.

Encroachment on the easement is not expected since Wildlands purchased the parcels fee simple. Potential maintenance activities that address these risks and uncertainties are discussed in Appendix 9 – Maintenance Plan.

7.0 Determination of Credits

The final stream credits proposed for the Site are listed in Table 15. Stream Restoration is proposed at a ratio of 1:1. The ratio for the Enhancement I Reach of the Rocky River is proposed at a ratio of 1:1. This ratio was presented in the technical memorandum dated 12/15/2020 and approved by the IRT. This memorandum and additional communication with the IRT are in Appendix 5. The ratio of 1:1 is supported by the level of functional uplift that will be achieved for the existing mussel species of concern along the reach, and the degree of monitoring of the mussel population pre-and post-



construction of the project. All riparian buffers are the required minimum of 50 feet. Additional credit was calculated for the buffers extending past the required 50 feet using the most up to date Wilmington District Stream Buffer Calculator. A copy of the buffer calculator is included in Appendix 7. Wetland reestablishment is proposed at a ratio of 1:1, wetland rehabilitation is proposed at a ratio of 1.5:1, and wetland enhancement is proposed at a ratio of 5:1. The ratios for wetland rehabilitation and enhancement were chosen according to the level of impact to the wetlands from livestock and a lack of an appropriate vegetative community and the potential for ecological uplift.

Table 15: Project Stream Assets and Credits

Project Segment	Existing Footage or Acreage	Mitigation Plan Footage or Acreage	Mitigation Category	Restoration Level	Priority Level	Mitigation Ratio (X:1)
Rocky River Reach 1	1,625	1,989	Warm	R	1	1
Rocky River Reach 2	580	580	Warm	EI	1	1
Rocky River Reach 3	447	479	Warm	R	1	1
Schist Creek	211	420	Warm	R	1	1
Gypsum Creek Reach 1	152	152	Warm	P	--	10
Gypsum Creek Reach 2	113	208	Warm	R	1	1
Dolomite Creek Reach 1	188	188	Warm	P	--	10
Dolomite Creek Reach 2	44	36	Warm	EII	2	5
Mica Creek	952	1,151	Warm	R	1	1
Wetland Rehabilitation	3.306	3.308	Riverine	--	--	1.5
Wetland Reestablishment	N/A	12.868	Riverine	--	--	1
Wetland Enhancement	0.893	0.893	Riverine	--	--	5

Restoration Level	Stream			Riparian Wetland		Non-Riparian Wetland	Coastal Marsh
	Warm	Cool	Cold	Riverine	Non-Riverine		
Restoration	4,247.000						
Re-establishment				12.868			
Rehabilitation				2.205			
Enhancement				0.179			
Enhancement I	580.000						
Enhancement II	7.200						
Creation							
Preservation	34.000						
Additional Credit from Extended Buffers	274.150						
TOTAL	5,142.350			15.252			

8.0 Performance Standards

The stream and wetland performance standards for the project will follow approved standards presented in the Wilmington District Stream and Wetland Compensatory Mitigation Update issued October 2016 by the USACE and NCIRT. Annual monitoring and routine site visits will be conducted by a qualified scientist to assess the condition of the finished project. Specific performance standards that apply to this project are those described in the 2016 Compensatory Mitigation Update including

Vegetation (Section V, B, Items 1 through 3) and Stream Channel Stability and Stream Hydrology Performance Standards (Section VI, B, Items 1 through 7). Wetland performance criteria has been developed in accordance with Section IX Wetland Hydrology Monitoring. Table 16 summarizes performance standards.

The estimated growing season dates for the area are 3/1-11/20 (265 days). The wetland hydroperiod criterion proposed for the entire site is 12% which is within the hydroperiod ranges for both the Wehadkee and Roanoke soil series presented in Table 1 of the Wilmington District Stream and Wetland Compensatory Mitigation Update (2016). Twelve percent of the approximated growing season equates to 32 consecutive days during which the water table must remain within 12 inches of the soil surface. A growing season start date of no later than March 1st and end date of no earlier than November 20th will be confirmed during the monitoring period using observations of bud burst, autumn leaf senescence, and soil temperature data.

Table 16: Summary of Performance Standards

Parameter	Monitoring Feature	Performance Standard
Dimension	Cross-Section Survey	BHR <1.2; ER >2.2 for C/E channels.
Pattern and Profile	Visual Assessment	Should indicate stream stability.
Substrate	Pebble Counts	Coarser material in riffles; finer particles in pools.
Photo Documentation	<ul style="list-style-type: none"> • Cross-Section Photos • Photo Points 	No excessive erosion or degradation of banks. No mid-channel bars, Stable grade control.
Stream Hydrology	Crest Gauge (Pressure Transducer)	Four bankfull events during the 7-year period; in separate years.
	Flow Gauge (Pressure Transducer)	At least 30 consecutive days of surface water flow must be documented each monitoring year on intermittent streams during years of normal precipitation.
Wetland Hydrology	Groundwater Gauge (Pressure Transducer)	Free groundwater table within 12 inches of the soil surface for 12% of the annual growing season.
Vegetation	Vegetation Plots	MY3 success criteria: 320 planted stems per acre, MY5 success criteria: 260 planted stems per acre, average of 7 feet in height in each plot. MY7 success criteria: 210 planted stems per acre, average of 10 feet in height in each plot. Note: shrub and subcanopy species will be omitted from average height calculations
Invasive Species	Visual Assessment and GPS mapping	Riparian invasive coverage not to exceed 5% of the easement acreage.
Visual Assessment	CCPV	Signs of encroachment, stream instability, invasive species.
Mussels	Mussel survey	Conducted and provided to IRT in MY1, 2, 3, 5, and 7.

Changes in the channel that indicate a movement toward stability or enhanced habitat include a decrease in the width-to-depth ratio in meandering channels or an increase in pool depth.

Invasive vegetation will be mapped, photographed, and visually assessed annually. Invasive species will be treated by mechanical and/or chemical methods so that riparian invasive species do not exceed 5% of the easement acreage. All herbicide applications will be performed in accordance with the NC Department of Agriculture rules and regulations.

9.0 Monitoring Plan

The Site monitoring plan has been developed to ensure that the required performance standards are met, and project goals and objectives are achieved. Annual monitoring data will be reported using the

DMS Annual Monitoring Reporting Template (October 2020). The monitoring report shall provide project data chronology that will facilitate an understanding of project status and trends, ease population of DMS databases for analysis and research purposes and assist in close-out decision making.

Using the DMS Annual Monitoring Report Template (October 2020), a baseline monitoring document and as-built record drawings of the project will be developed upon completion of planting and monitoring installation on the restored Site. Monitoring reports will be prepared in the fall of each monitoring year and submitted to DMS by November 30. Full monitoring reports will be submitted to DMS in monitoring years 1, 2, 3, 5, and 7. Abbreviated reports will be submitted in monitoring years 4 and 6. Closeout monitoring period will be seven years beyond completion of construction or until performance standards have been met.

SEPI, Inc. and Wildlands will conduct monitoring mussel surveys, as described in the December 2020 Wildlands Technical Memorandum (Appendix 5), to assess the effects of stream and buffer restoration on mussel populations in monitoring years 1, 2, 3, 5, and 7. No performance standards or project credits are associated with the findings. However, survey data are required for informational purposes with the appropriate monitoring report.

Table 17, below, describes how the monitoring plan is set up in order to verify project goals and objectives have been achieved.

Table 17: Monitoring Plan

Goal	Objective	Performance Standards	Monitoring Metric
Exclude livestock from streams.	Exclude livestock through removal of livestock from the project parcel.	N/A	N/A
Improve the stability of stream channels.	Construct stream channels that will maintain stable cross-sections, patterns, and profiles over time.	Entrenchment ratio over 2.2 for C/E restoration reaches and bank height ratio below 1.2 with visual assessments showing progression towards stability.	Cross-section monitoring and visual inspections.
Improve instream habitat.	Reconstruct stream channels with appropriate bankfull dimensions and depth relative to the existing floodplain.	There is no required performance standard for this metric. However, reports are required deliverables to the IRT.	Mussel surveys will take place in restoration and relocation reaches. In MY1, 2, 3, 5, and 7.
Reconnect channels with floodplains.	Reconstruct stream channels with appropriate bankfull dimensions and depth relative to the existing floodplain.	Four bankfull events in separate years within monitoring period. Thirty days of continuous flow each year on intermittent streams.	Crest and flow gauges (pressure transducers) will record flow elevations.
Improve wetland hydrology.	Remove livestock to allow soil profiles to stabilize. Remove drain effect of channelized stream and floodplain swales.	Free groundwater table within 12 inches of the ground surface for 12% of the growing season.	Groundwater gauges will be placed in wetland areas and monitored annually.
Restore and enhance native floodplain and streambank vegetation.	Plant native tree and understory species in riparian zones and plant native shrub and herbaceous species on streambanks. Treat invasive species within project area.	210 planted stems per acre at MY7. Interim survival rate of 320 planted stems per acre at MY3 and 260 at MY5. Trees in each plot must average 7 ft at MY5 and 10 ft at MY7 (excluding shrub and subcanopy species).	Vegetation plots, each covering 100 square meters, will be placed on 2% of the planted area of the project and monitored annually.



Goal	Objective	Performance Standards	Monitoring Metric
Permanently protect the project site from harmful uses.	Establish a conservation easement on the site.	Prevent easement encroachment.	Visually inspect the perimeter of the Site to ensure no easement encroachment is occurring.

9.1 Monitoring Components

Project monitoring components are listed in more detail in Table 18. Approximate locations of the proposed monitoring components are illustrated in Figure 11.

Table 18: Monitoring Components

Parameter	Monitoring Feature	Quantity/ Length by Reach									Frequency	Notes
		Rocky River			Mica Creek	Schist Creek	Gypsum Creek		Dolomite Creek			
		R1	R2	R3			R1	R2	R1	R2		
Dimension	Riffle Cross-Sections	2	1	1	1	1	N/A	1	N/A		Year 0, 1, 2, 3, 5, and 7	1
	Pool Cross-Sections	2	0	0	1	0	N/A	0	N/A			
Pattern	Pattern	N/A									Year 0	2
Profile	Longitudinal Profile	N/A									Year 0	
Substrate	Reach wide (RW), Riffle (RF) 100 pebble count	RW	RW	RW	RW	RW	N/A	RW	N/A		Year 0, 1, 2, 3, 5, and 7	3
Stream Hydrology	Crest Gauge (CG), Flow Gauge (FG)	1 CG			1 CG	N/A	1 FG		N/A		Quarterly	4
Vegetation	Vegetation Plots	15 Fixed Plots, 4 Random Plots									Annual	5
Wetlands	Groundwater Wells	11									Quarterly	6
Visual Assessment	Photographs and Notes										Semi-Annual	
Exotic and nuisance vegetation	Photographs and Mapping										Semi-Annual	7
Project Boundary	Photographs and Mapping										Semi-Annual	8
Reference Photos	Photographs	5	2	1	4	2	1	1	1	0	Annual	9

-
1. Cross-sections will be permanently marked with rebar to establish location. Surveys will include points measured at all breaks in slope, including top of bank, bankfull, edge of water, and thalweg.
 2. Pattern and profile will be assessed visually during semi-annual site visits. Longitudinal profile will be collected during as-built baseline monitoring survey only unless observations indicate lack of stability and profile survey is warranted in additional years.
 3. Riffle 100 pebble counts at cross-sections will be conducted during as-built baseline monitoring only unless observations indicate a trend toward finer substrate and a comparison is needed.
 4. Crest gauges and flow gauges will be monitored using automated pressure transducers at 15-30 minutes intervals. Transducers will set to record bankfull events at least twice a day, stream flow at least every 3 hours, and will be inspected quarterly.
 5. Vegetation monitoring will follow CVS protocols. In years 4 and 6, vegetation will be only monitored visually.
 6. Groundwater well data will be collected using automated pressure transducers. Transducers will set to record at least twice a day and will be inspected quarterly.
 7. Locations of exotic and nuisance vegetation will be mapped.
 8. Locations of vegetation damage, boundary encroachments, etc. will be mapped.
 9. Additional photos will be taken at each cross-section and from the southwest corner of each vegetation plot.

10.0 Long-Term Management Plan

The site will be transferred to the North Carolina Department of Environmental Quality (NCDEQ) Stewardship Program. This party shall serve as conservation easement holder and long-term steward for the property and will conduct periodic inspection of the site to ensure that restrictions required in the conservation easement are upheld. The NCDEQ Stewardship Program is developing an endowment system within the non-reverting, interest-bearing Conservation Lands Conservation Fund Account. The use of funds from the Endowment Account will be governed by North Carolina General Statute GS 113A-232(d)(3). Interest gained by the endowment fund may be used for the purpose of stewardship, monitoring, stewardship administration, and land transaction costs, if applicable. The Site Protection Instrument can be found in Appendix 2 and financial assurances are in Appendix 8.

11.0 Adaptive Management Plan

Upon completion of site construction DMS will implement the post-construction monitoring protocols previously defined in this document. Project maintenance will be performed as described Appendix 9. If, during the course of annual monitoring, it is determined the site's ability to achieve site performance standards are jeopardized, DMS will notify the USACE and the NCIRT of the need to develop a Plan of Corrective Action. The Plan of Corrective Action may be prepared using in-house technical staff or may require engineering and consulting services. Once the Corrective Action Plan is prepared and finalized DMS will:

- Notify the USACE and NCIRT as required by the Nationwide 27 permit general conditions.
- Revise performance standards, maintenance requirements, and monitoring requirements as necessary and/or required by the USACE and NCIRT.
- Obtain other permits as necessary.
- Implement the Corrective Action Plan.
- Provide the USACE and NCIRT a Record Drawing of Corrective Actions. This document shall depict the extent and nature of the work performed.



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Appendix 1

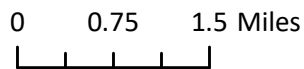
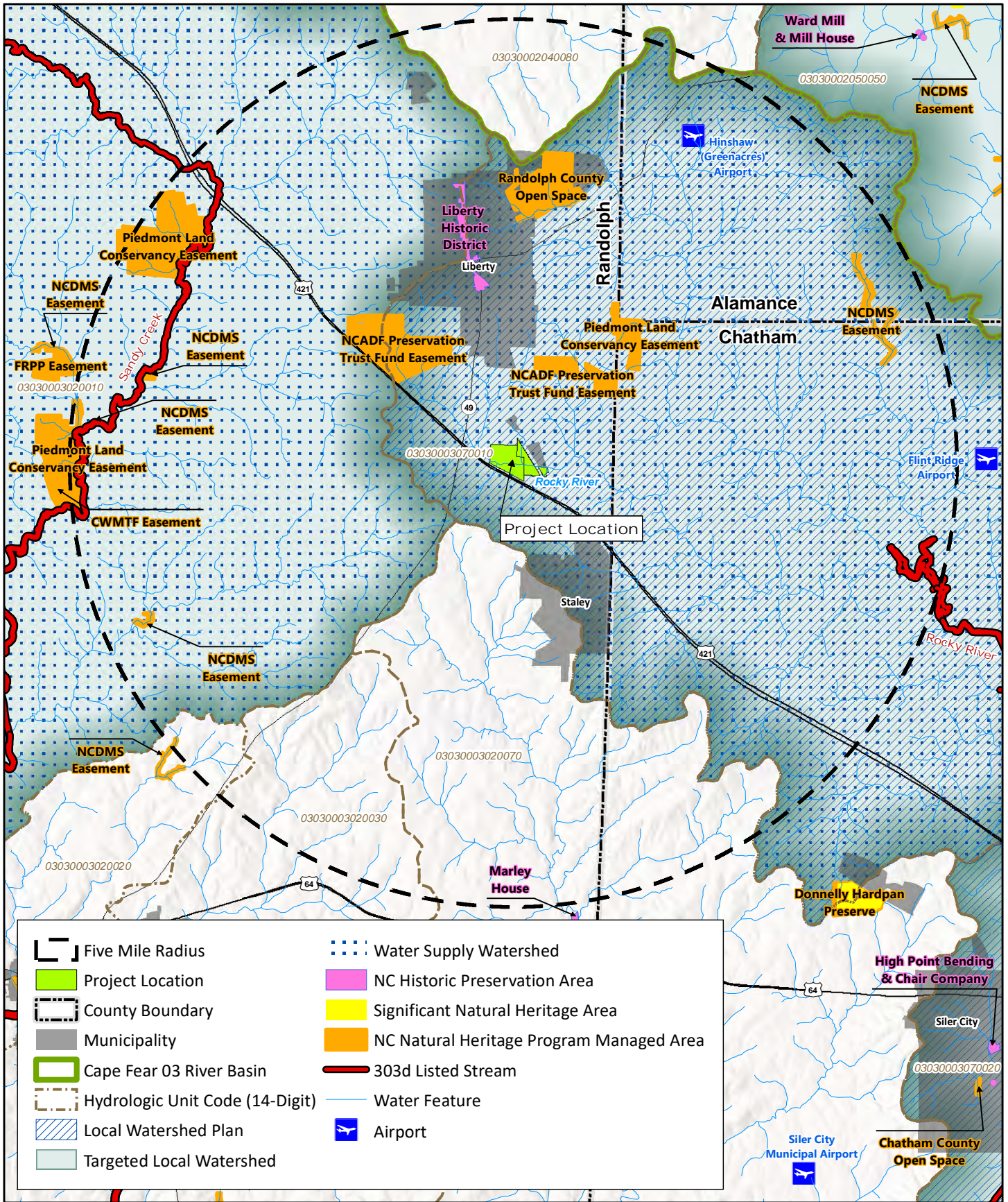


Figure 1. Vicinity Map
 Liberty Rock Mitigation Site
 Cape Fear River Basin 03030003

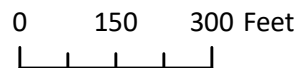
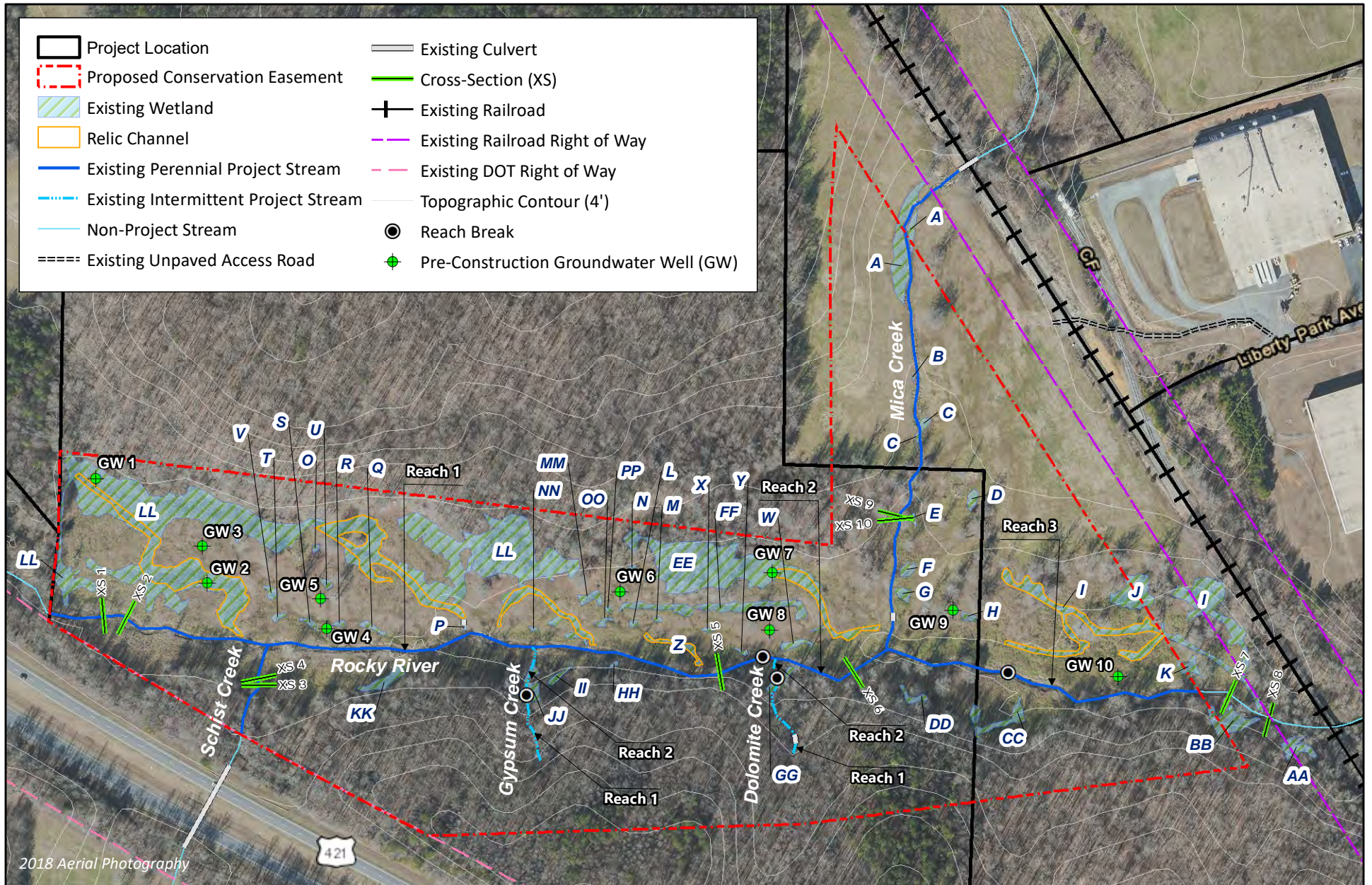
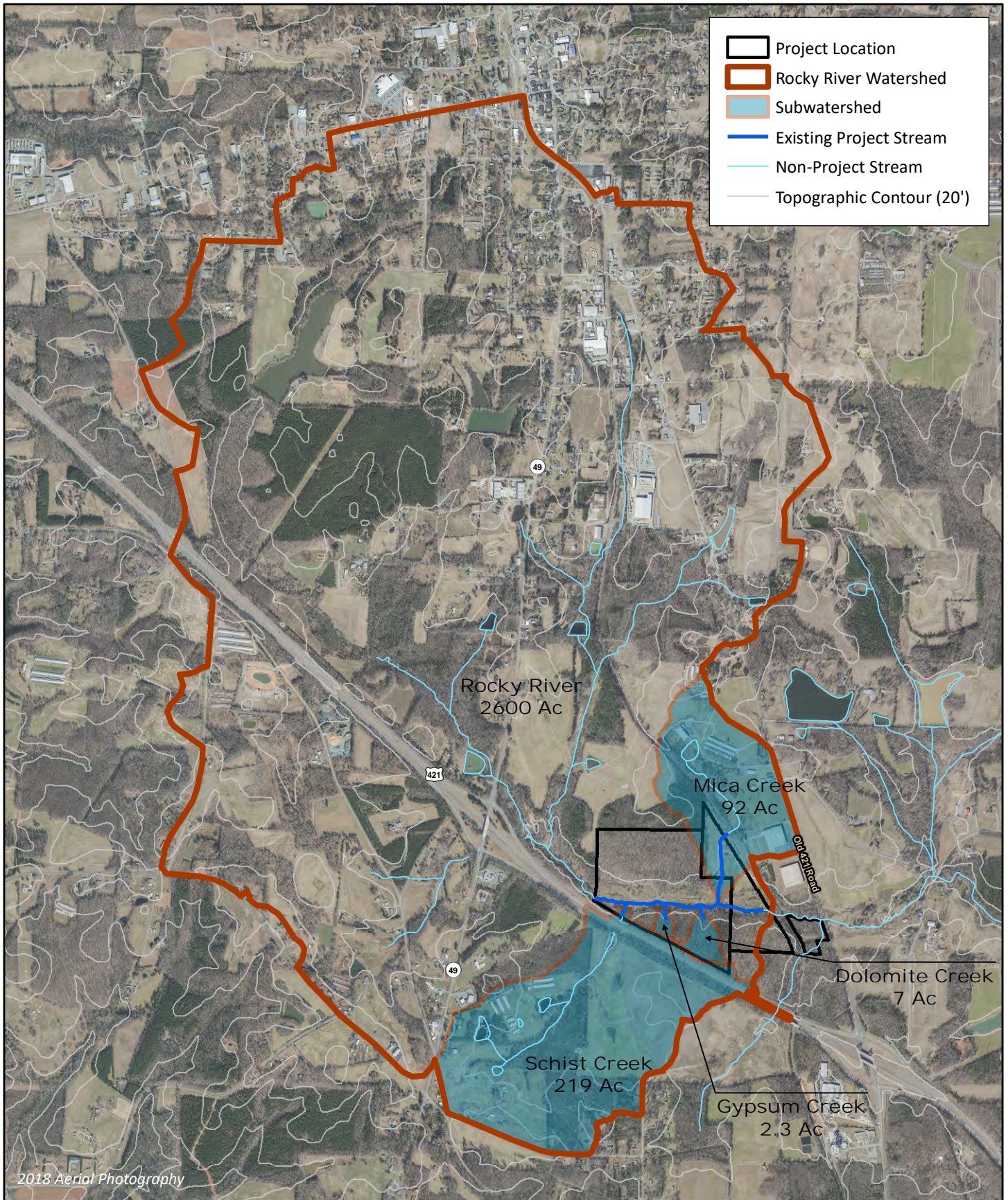


Figure 2. Existing Conditions Map
 Liberty Rock Mitigation Site
 Cape Fear River Basin 03030003

Randolph County, NC

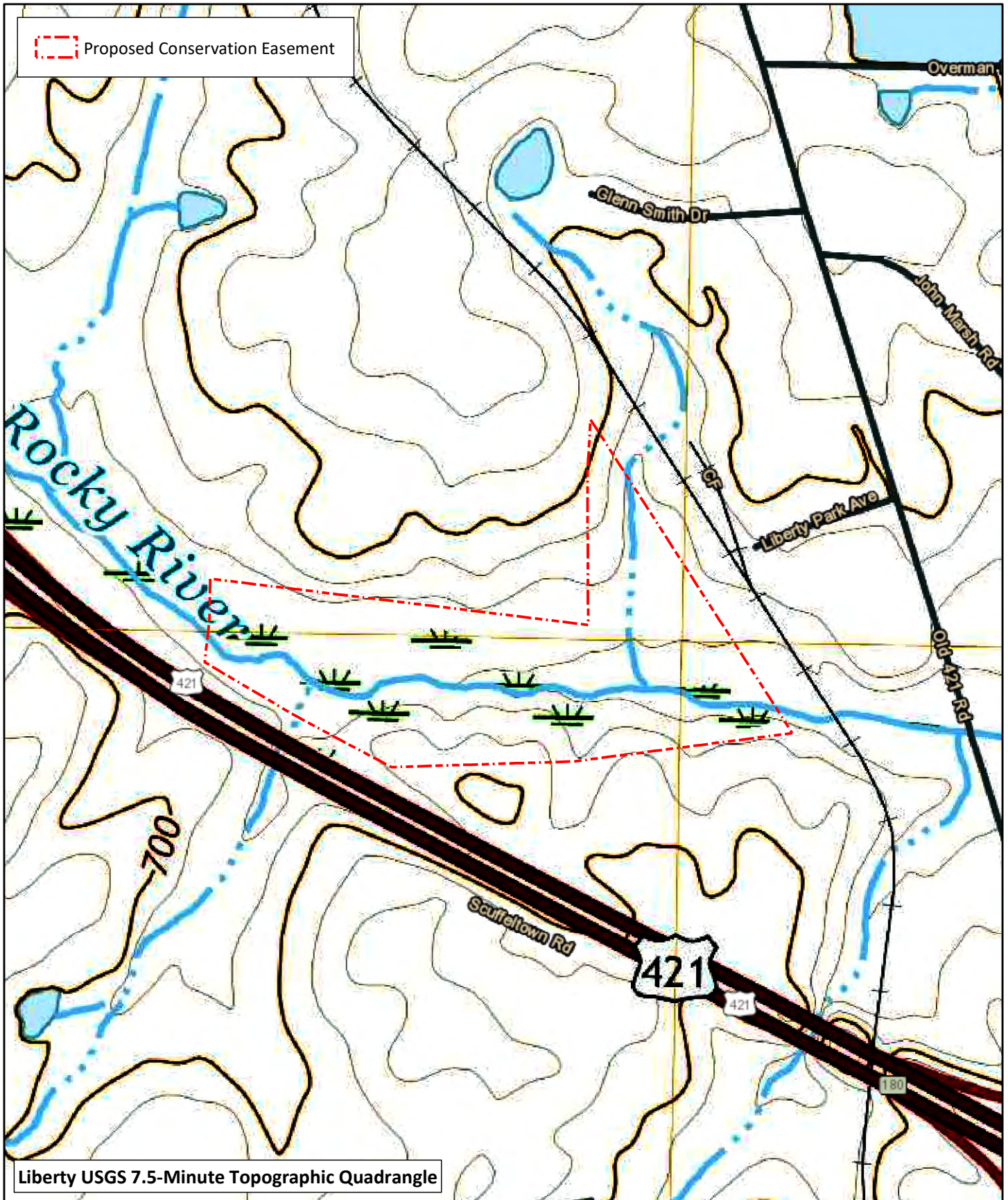


0 1,000 2,000 Feet



Figure 3. Watershed Map
 Liberty Rock Mitigation Site
 Cape Fear River Basin 03030003

Randolph County, NC



0 300 600 Feet



Figure 4. USGS Topographic Map
 Liberty Rock Mitigation Site
 Cape Fear River Basin 03030003

Randolph County, NC

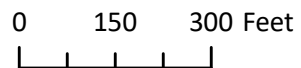
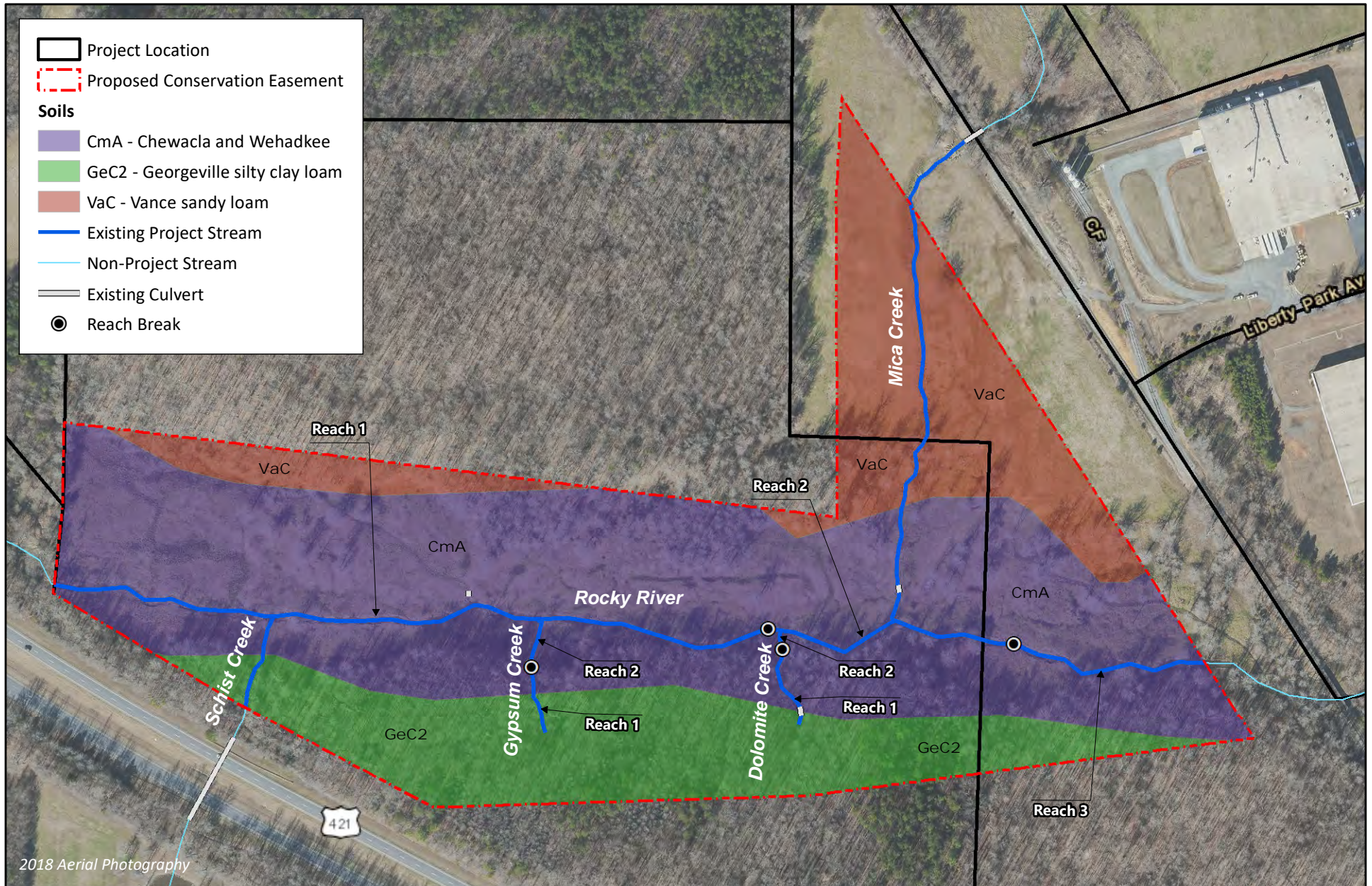


Figure 5. Soils Map
 Liberty Rock Mitigation Site
 Cape Fear River Basin 03030003

Randolph County, NC

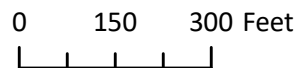
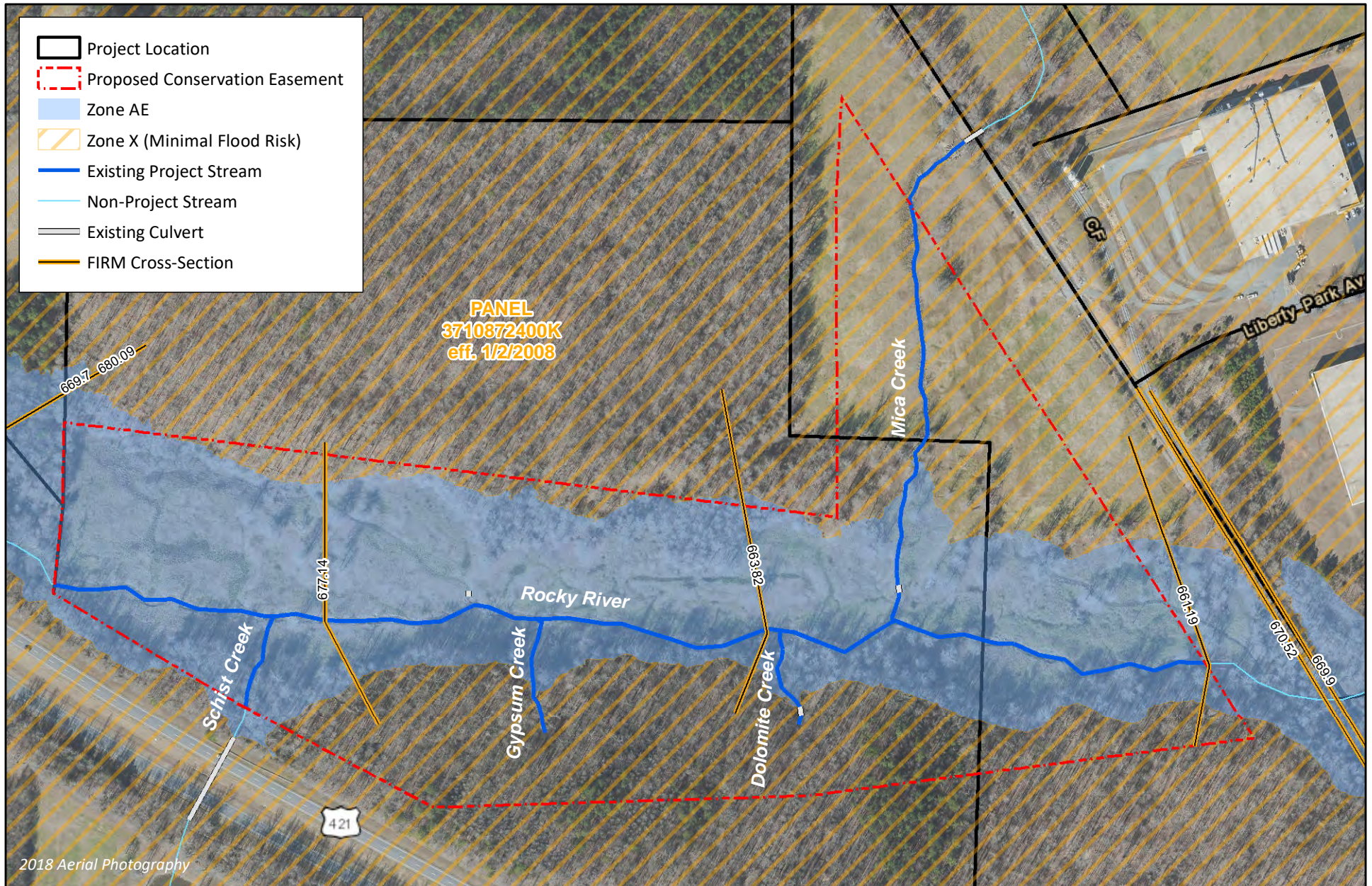


Figure 6. FEMA Flood Map
 Liberty Rock Mitigation Site
 Cape Fear River Basin 03030003

Randolph County, NC

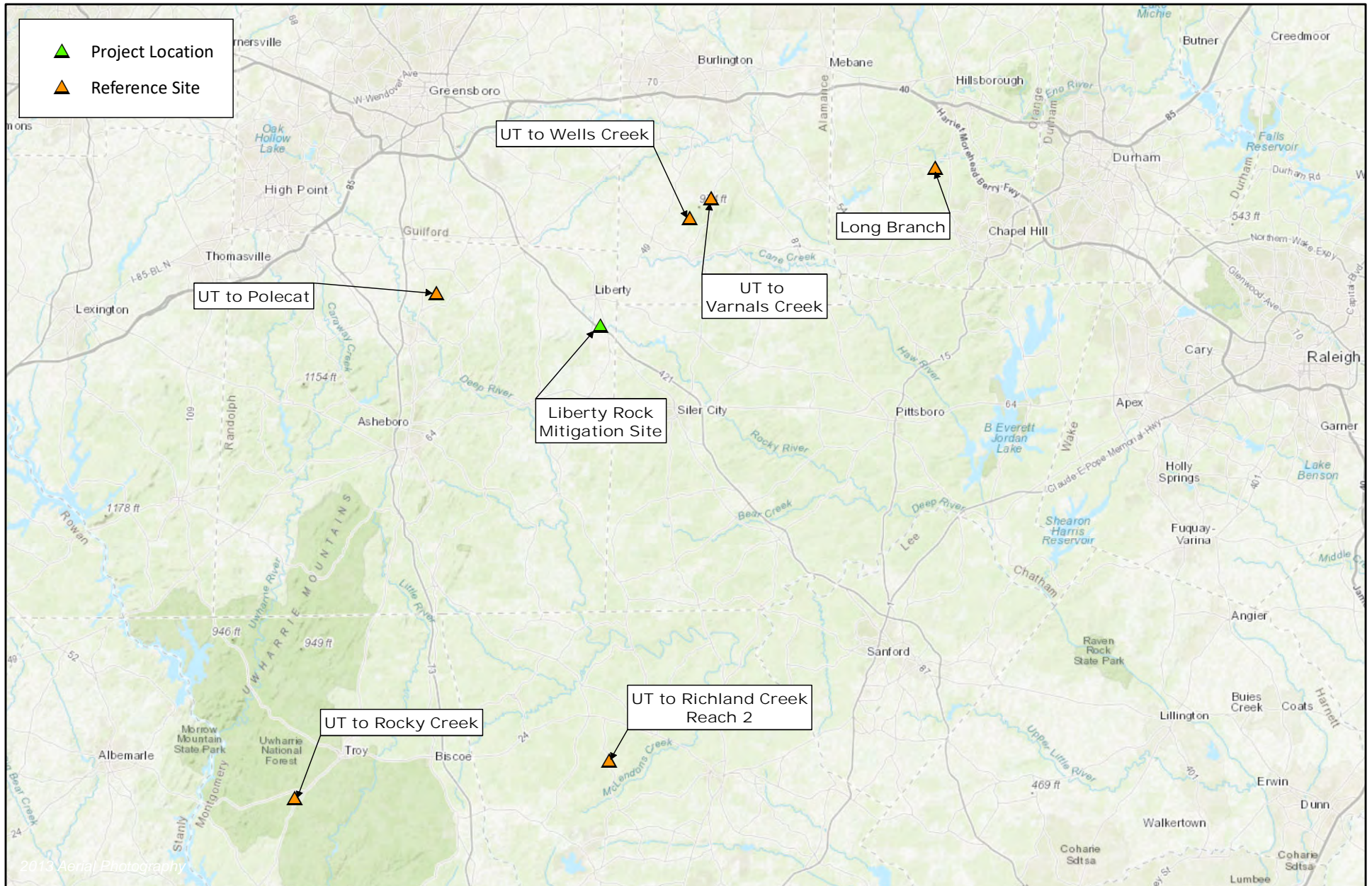


Figure 7. Reference Reach Vicinity Map
 Liberty Rock Mitigation Site
 Cape Fear River Basin 03030003
 Randolph County, NC

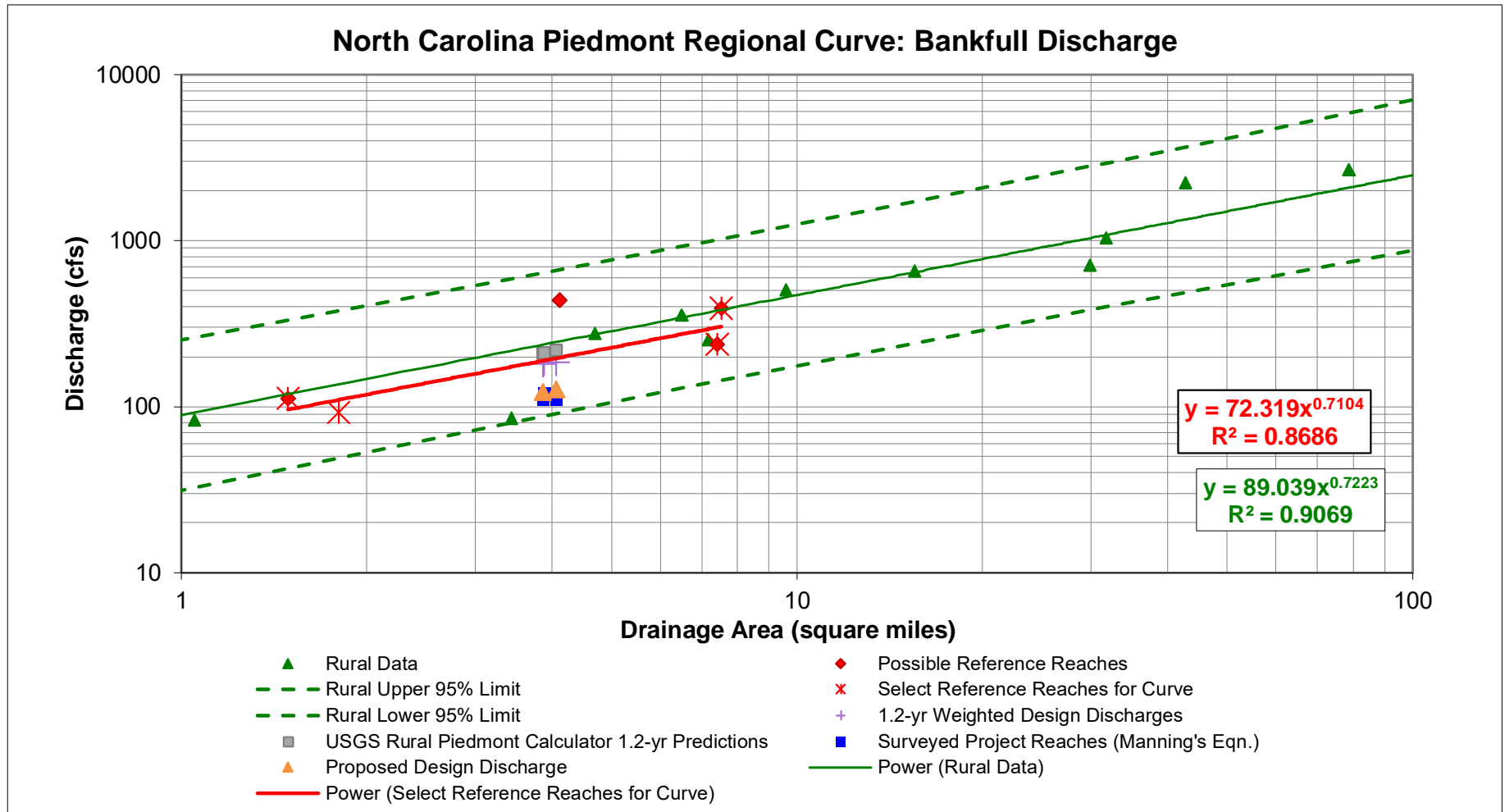


Figure 8a: Discharge Analysis Rocky River
 Liberty Rock Mitigation Site
 Cape Fear River Basin 03030003

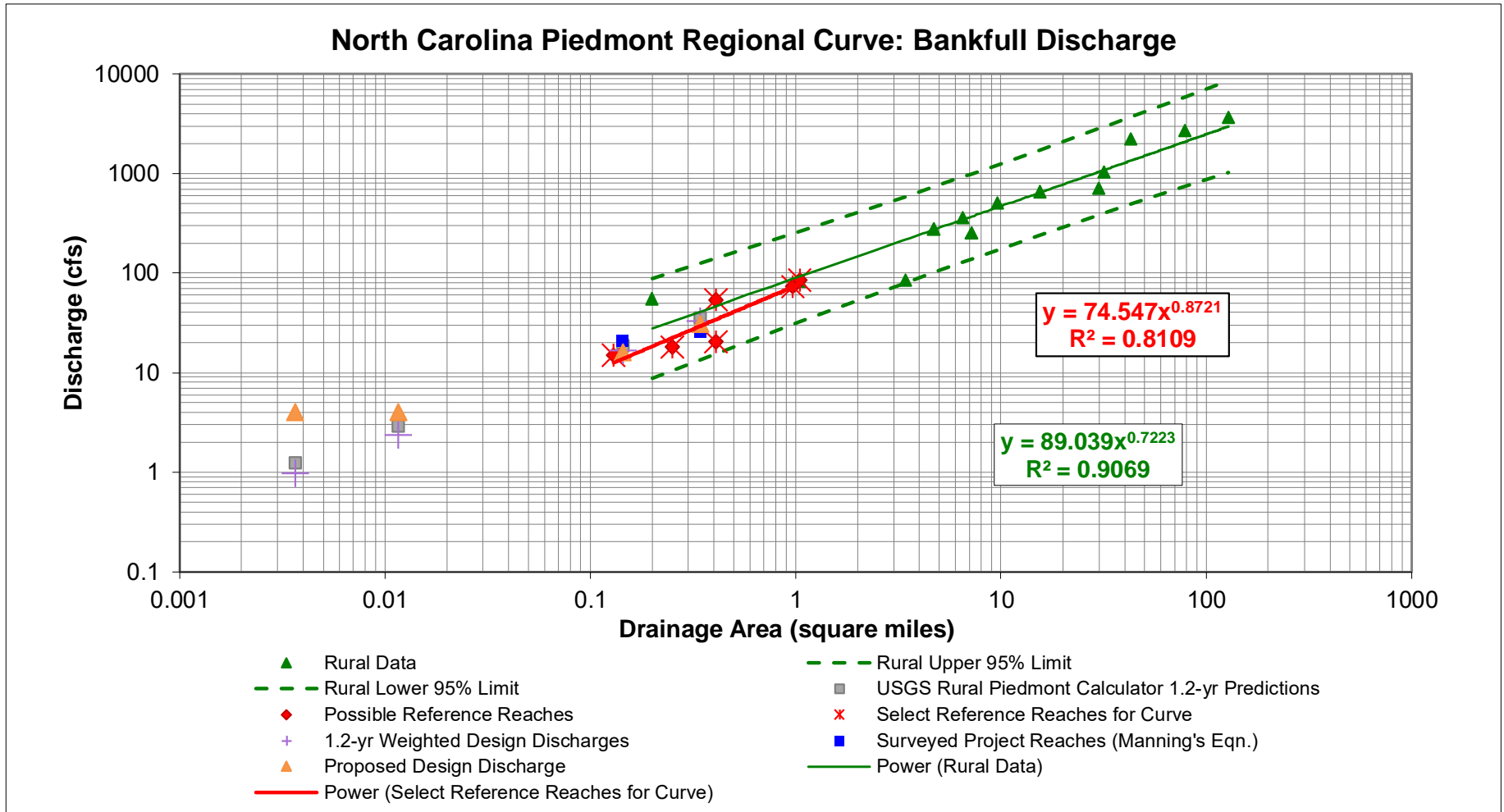


Figure 8b: Discharge Analysis Tributaries
 Liberty Rock Mitigation Site
 Cape Fear River Basin 03030003

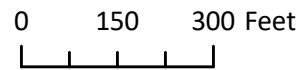
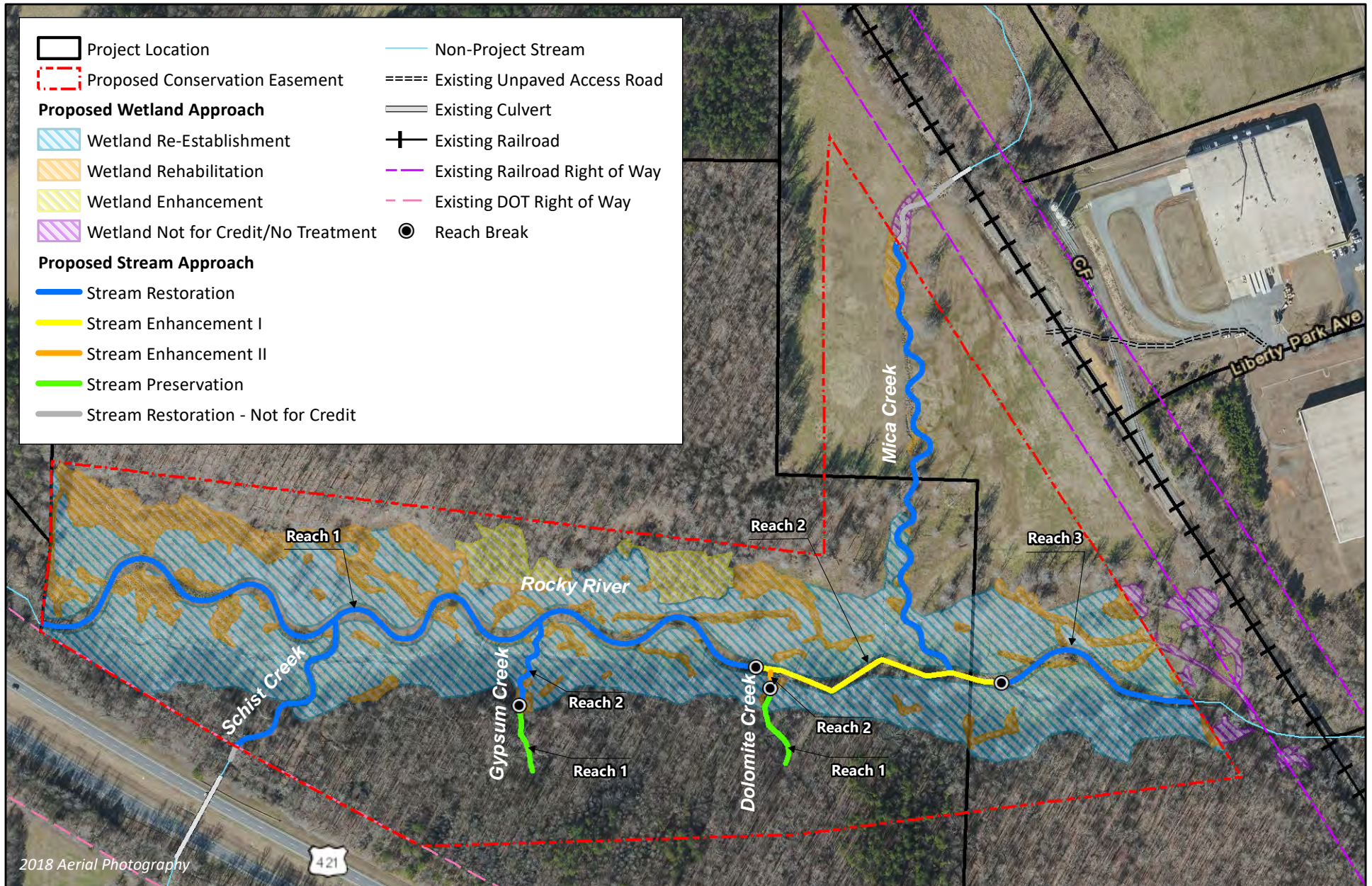


Figure 9. Concept Design Map
 Liberty Rock Mitigation Site
 Cape Fear River Basin 03030003

Randolph County, NC

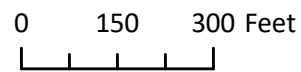
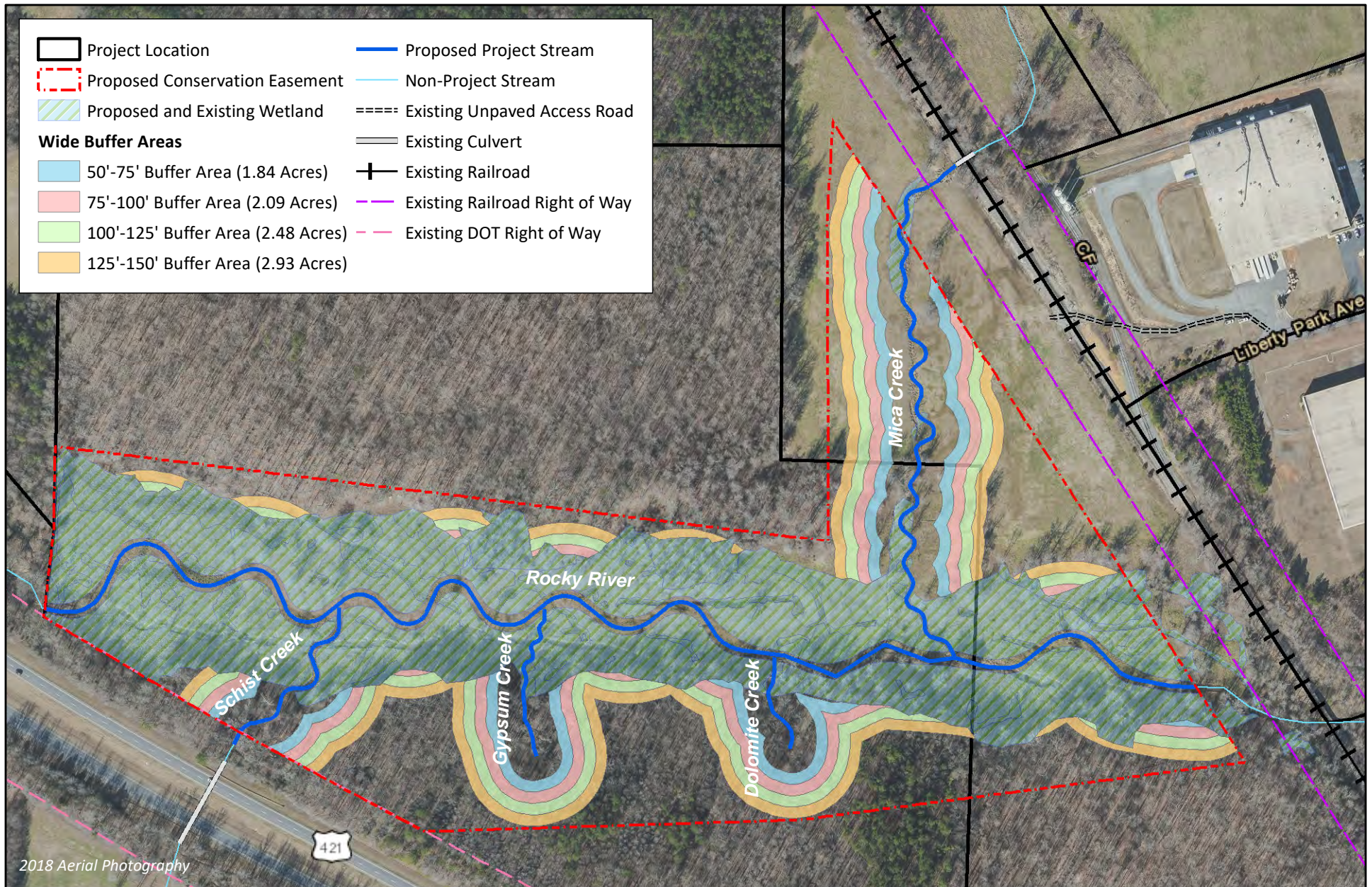


Figure 10. Wide Buffer Credit Areas Map
 Liberty Rock Mitigation Site
 Cape Fear River Basin 03030003

Randolph County, NC

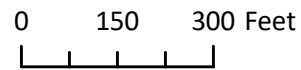
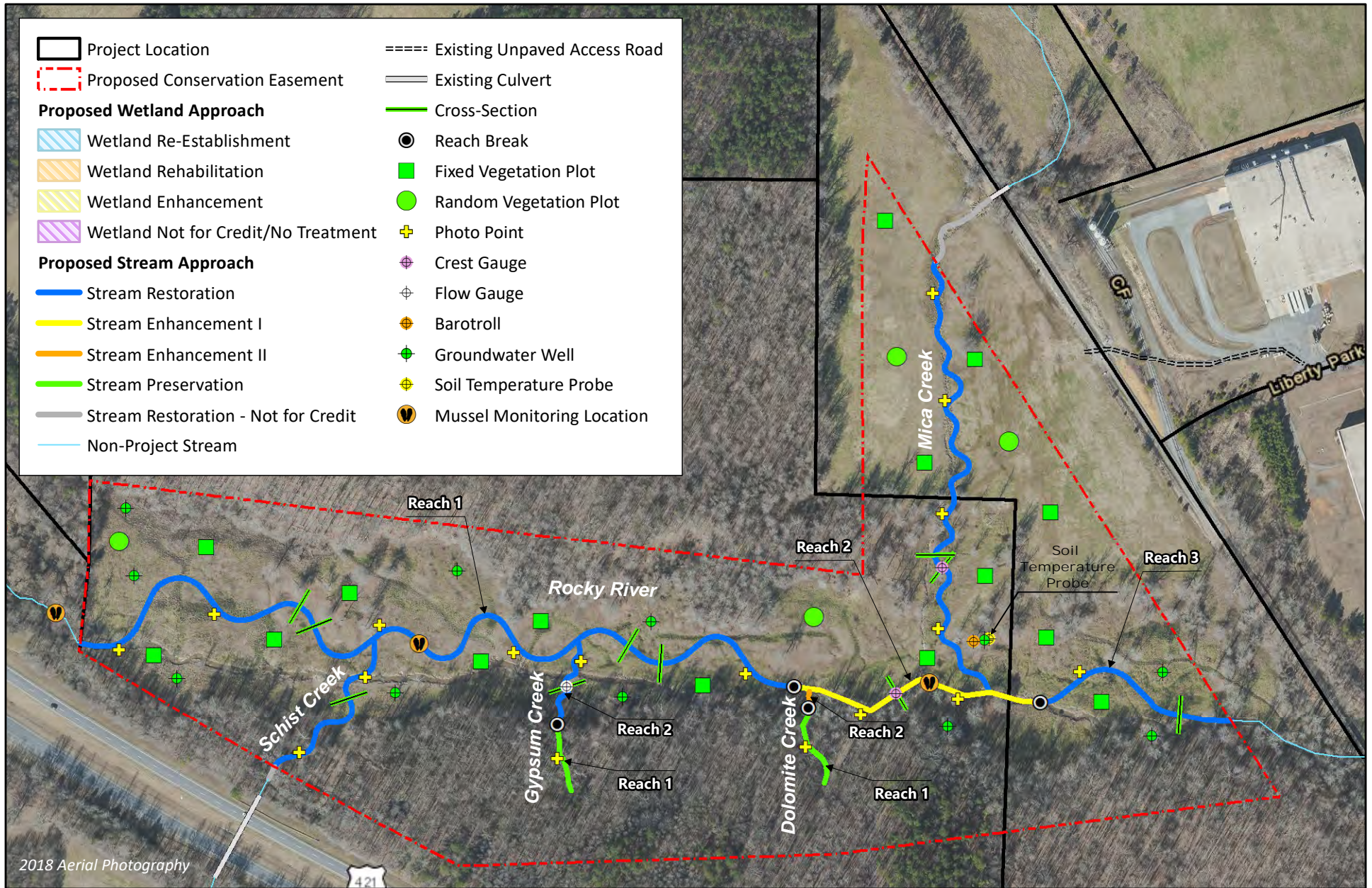
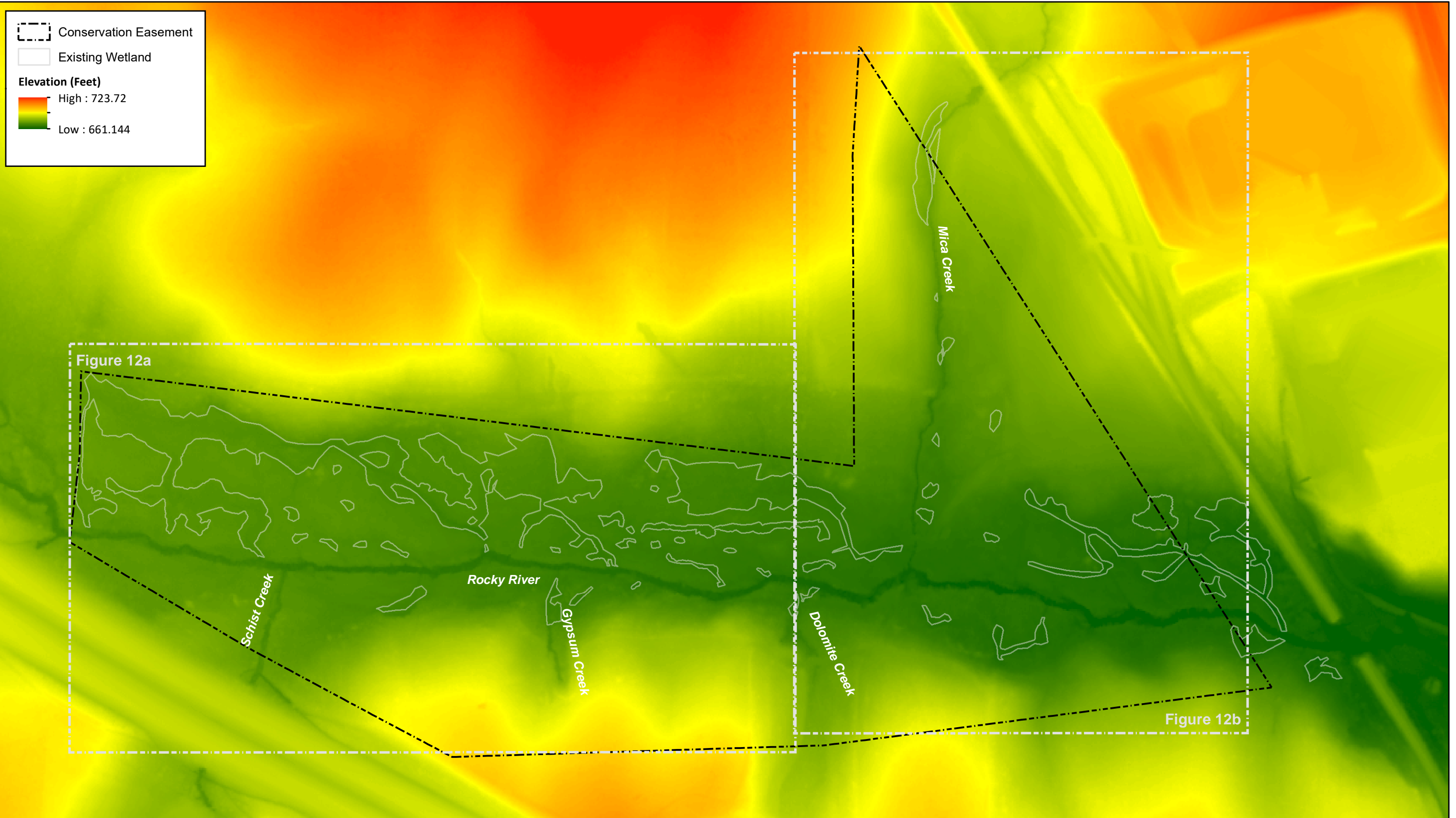
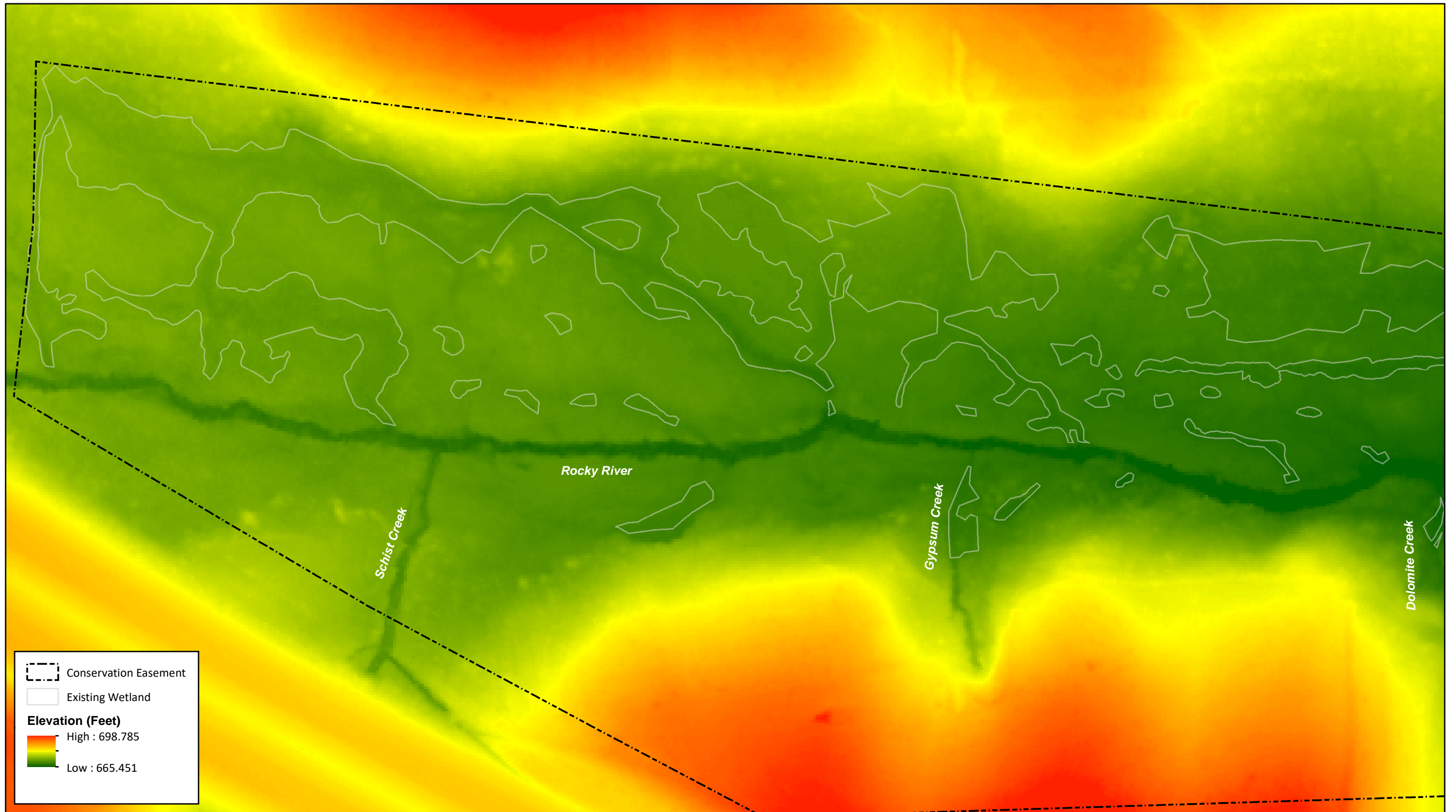
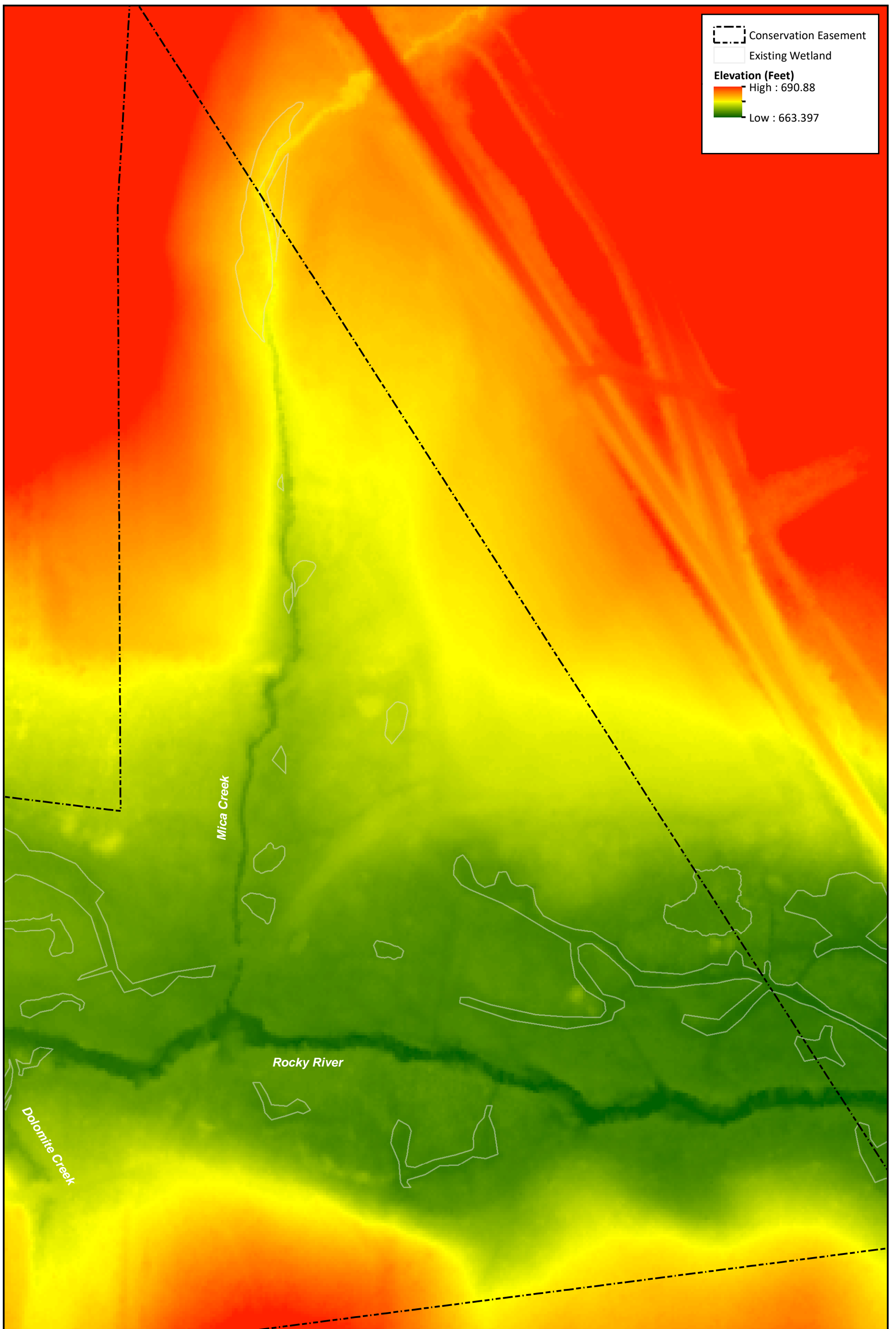
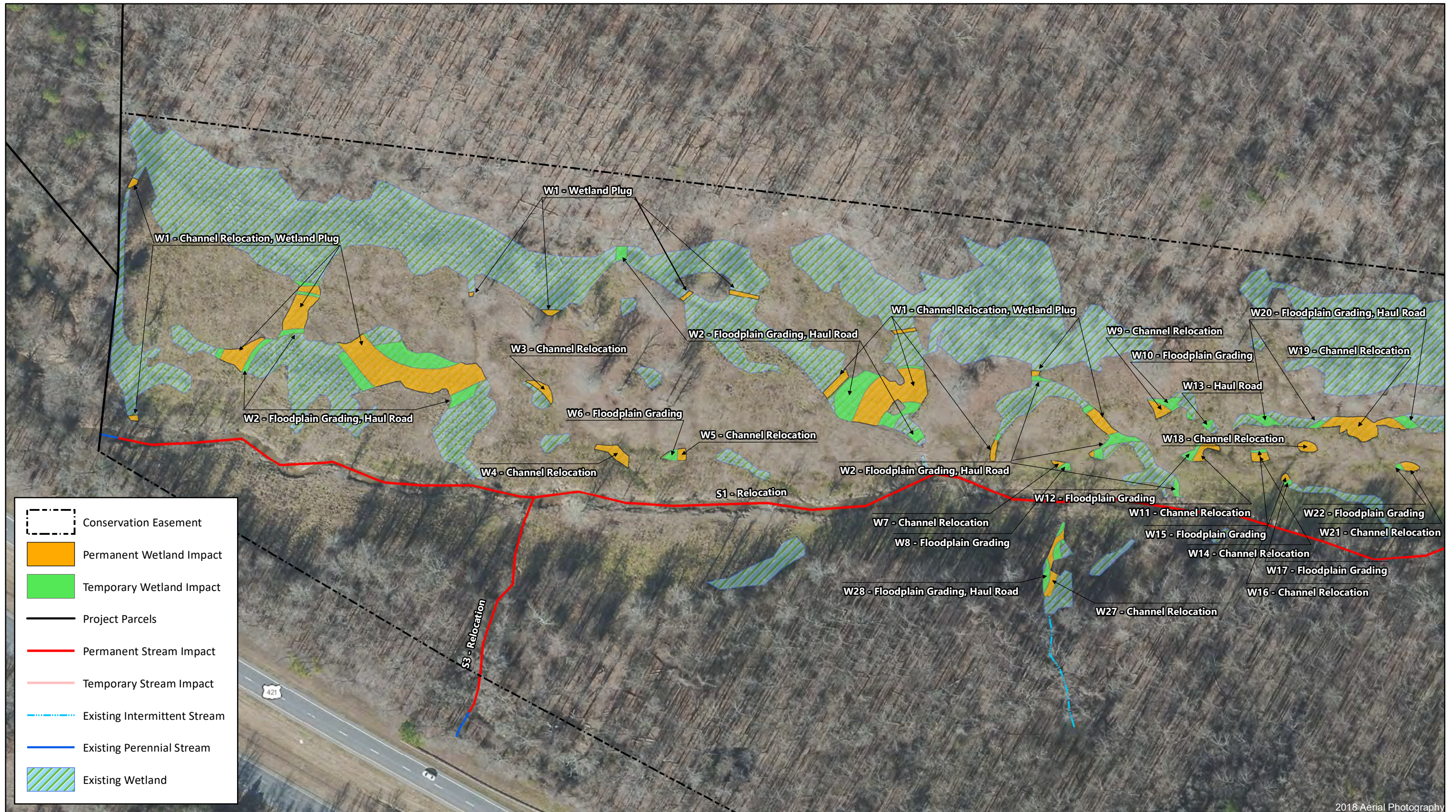


Figure 11. Proposed Monitoring Components Map
 Liberty Rock Mitigation Site
 Cape Fear River Basin 03030003



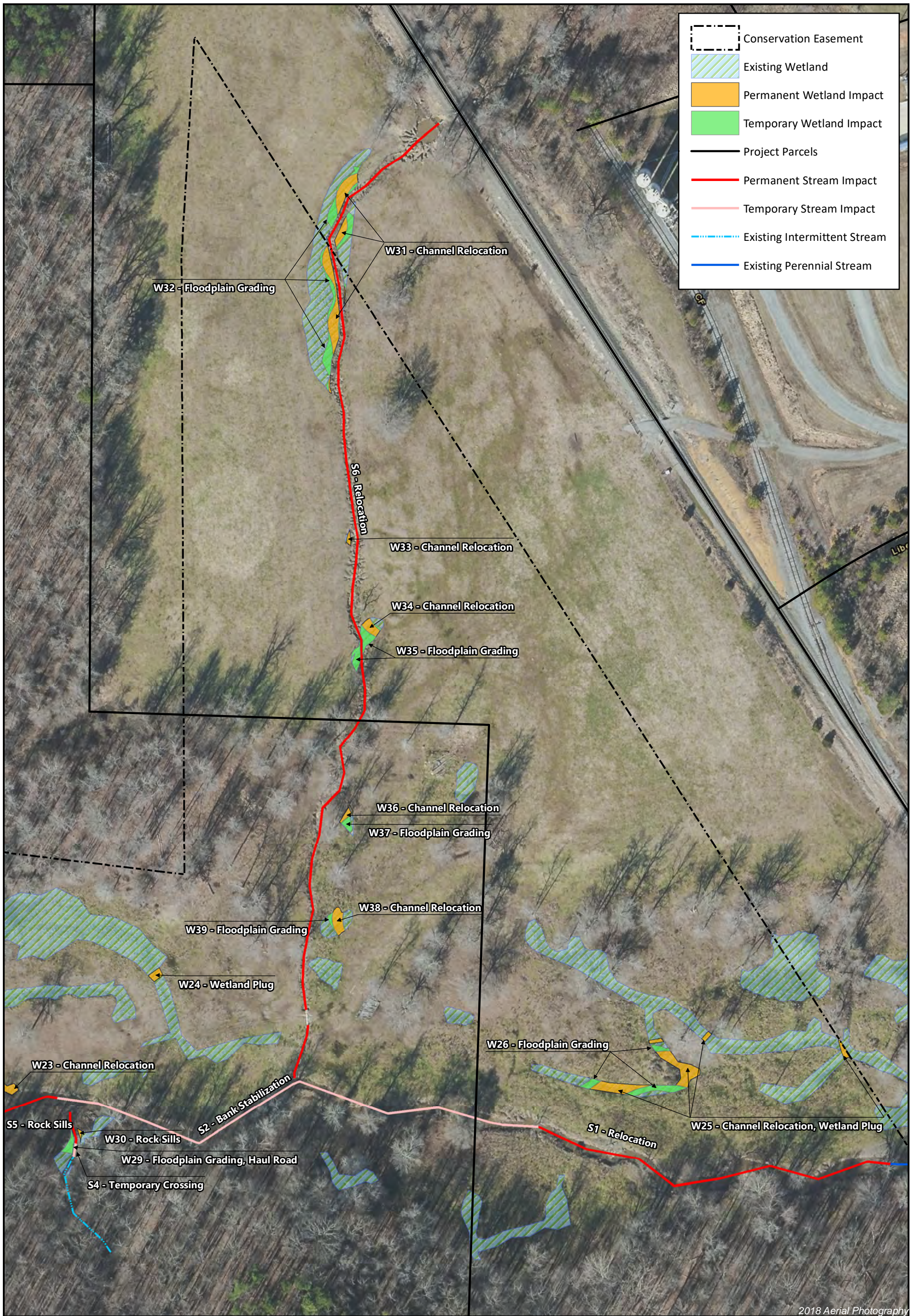






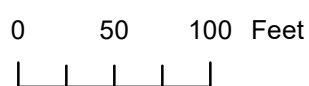
2018 Aerial Photography

Figure 13a Impact Map
 Liberty Rock Mitigation Site
 Cape Fear River Basin (03030003)

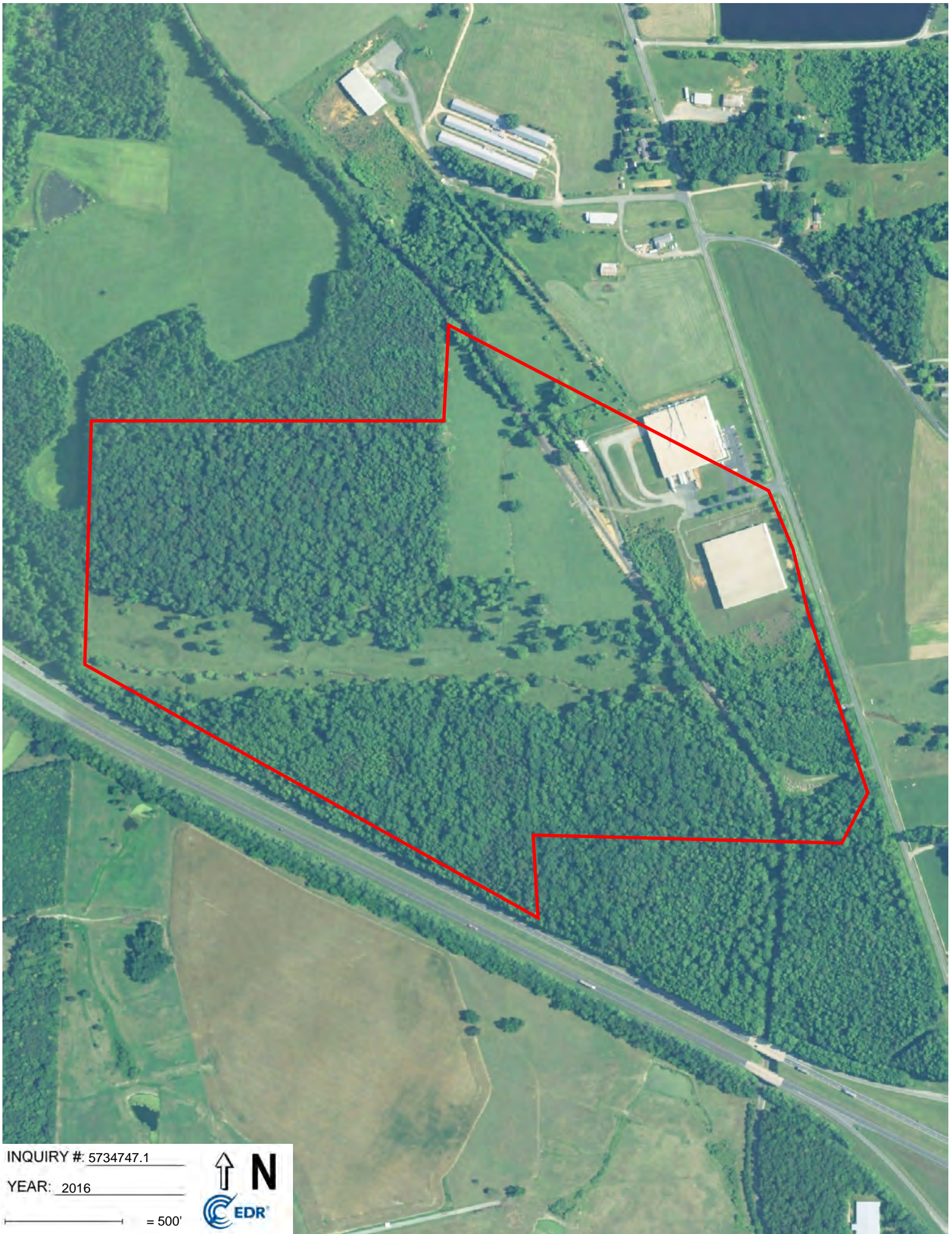


2018 Aerial Photography

Figure 13b Impact Map
 Liberty Rock Mitigation Site
 Cape Fear River Basin (03030003)



Randolph County, NC



INQUIRY #: 5734747.1

YEAR: 2016

— = 500'



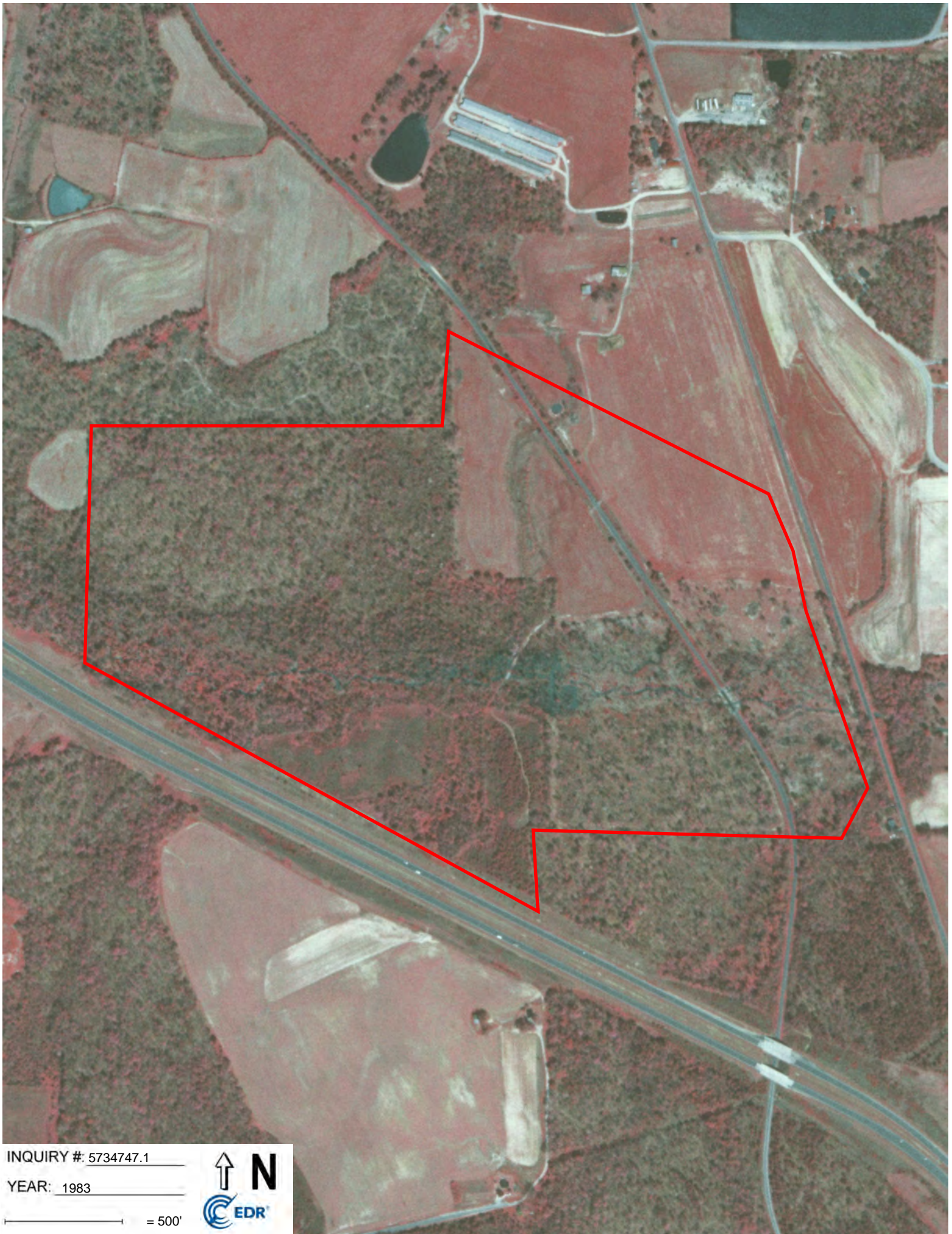


INQUIRY #: 5734747.1

YEAR: 1993

— = 500'





INQUIRY #: 5734747.1

YEAR: 1983

— = 500'





INQUIRY #: 5734747.1

YEAR: 1973

— = 500'





INQUIRY #: 5734747.1

YEAR: 1948

— = 500'





Rocky River Reach 1 – looking downstream



Rocky River Reach 2 – looking upstream



Rocky River Reach 2 – looking downstream



Rocky River Reach 3 – looking downstream



Mica Creek – looking downstream



Schist Creek - looking downstream



Wetland CC



Wetland EE – wooded section



Wetland LL



Wetland T



Gypsum Creek – looking downstream



Dolomite Creek – looking upstream



Micah Creek – existing culvert



Rocky River Reach 1 – looking downstream

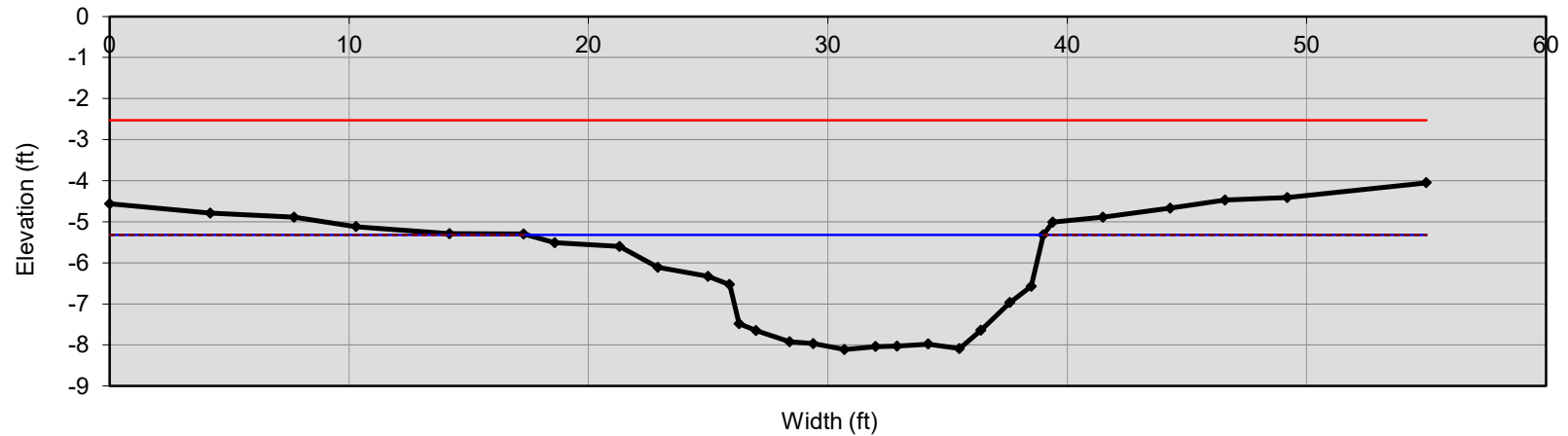
Existing Conditions Geomorphic Parameters

Parameter			Rocky River Reach 1		Rocky River Reach 2		Rocky River Reach 3	
			min	max	min	max	min	max
stream type			C4		C4		C4	
drainage area	DA	sq mi	3.47		3.88		4.06	
bankfull cross-sectional area	A_{bkf}	SF	35.7		48.1		41.4	
avg velocity during bankfull event	v_{bkf}	fps	3.1		2.5		1.7	
width at bankfull	w_{bkf}	feet	21.6		22.8		18.1	
maximum depth at bankfull	d_{max}	feet	2.8		3.0		2.9	
mean depth at bankfull	d_{bkf}	feet	1.7		2.1		2.3	
bankfull width to depth ratio	w_{bkf}/d_{bkf}		12.7		12.6		7.9	
low bank height		feet	2.8		3.0		2.9	
bank height ratio	BHR		1.0		1.0		1.0	
floodprone area width	w_{fpa}	feet	-		-		-	
entrenchment ratio	ER		> 2.2		> 2.2		> 2.2	
max pool depth at bankfull	d_{pool}	feet	3.6		2.8		4.2	
pool depth ratio	d_{pool}/d_{bkf}		2.1		1.3		1.8	
pool width at bankfull	w_{pool}	feet	20.9		17.5		39.7	
pool width ratio	w_{pool}/w_{bkf}		1.0		0.8		2.2	
Bkf pool cross-sectional area	A_{pool}	SF	33.8		36		68.9	
pool area ratio	A_{pool}/A_{bkf}		0.9		0.7		1.7	
pool-pool spacing	p-p	feet	86	132	137	314	150	202
pool-pool spacing ratio	$p-p/w_{bkf}$		4.0	6.1	6.0	14	8	11
valley slope	S_{valley}	feet/ foot	0.003		0.003		0.004	
channel slope	$S_{channel}$	feet/ foot	0.003	0.005	0.001	0.009	0.000	0.005
sinuosity	K		1.1		1.0		1.0	
belt width	w_{bit}	feet	36	66	50	72	36	50
meander width ratio	w_{bit}/w_{bkf}		1.7	3.1	2.2	3.2	2.0	2.8
meander length	L_m	feet	111	191	163	325	141	163
meander length ratio	L_m/w_{bkf}		5.1	8.8	7.1	14.3	7.8	9.0
Linear Wavelength	LW		122	223	176	342	158	164
Linear Wavelength Ratio	LW/w_{bkf}		5.6	10.3	7.7	15.0	8.7	9.1
radius of curvature	R_c	feet	40	81	38	169	472	110
radius of curvature ratio	R_c/w_{bkf}		1.9	3.8	1.7	7.4	26.1	6.1

Existing Conditions Geomorphic Parameters

Parameter			Schist Creek		Gypsum Creek Reach 2		Mica Creek	
			min	max	min	max	min	max
stream type			C4/E4				C4/E4	
drainage area	DA	sq mi	0.34		0.004		0.14	
bankfull cross-sectional area	A_{bkf}	SF	10.4				4.9	
avg velocity during bankfull event	v_{bkf}	fps	2.0				4.1	
width at bankfull	w_{bkf}	feet	11.2				6.6	
maximum depth at bankfull	d_{max}	feet	1.8				1.5	
mean depth at bankfull	d_{bkf}	feet	0.9				0.70	
bankfull width to depth ratio	w_{bkf}/d_{bkf}		12.4				9.4	
low bank height		feet	2.2				2.6	
bank height ratio	BHR		1.2				1.7	
floodprone area width	w_{fpa}	feet	-				-	
entrenchment ratio	ER		> 2.2				> 2.2	
max pool depth at bankfull	d_{pool}	feet	1.7				1.8	
pool depth ratio	d_{pool}/d_{bkf}		1.9				2.6	
pool width at bankfull	w_{pool}	feet	12.3				7.9	
pool width ratio	w_{pool}/w_{bkf}		1.1				1.2	
Bkf pool cross-sectional area	A_{pool}	SF	12				8.2	
pool area ratio	A_{pool}/A_{bkf}		1.2				1.7	
pool-pool spacing	p-p	feet	-	82	-	-	43	310
pool-pool spacing ratio	$p-p/w_{bkf}$		-	7	-	-	6.5	47.0
valley slope	S_{valley}	feet/ foot	0.010		0.013		0.013	
channel slope	$S_{channel}$	feet/ foot	0.000	0.010	0.010		0.009	0.015
sinuosity	K		1.0		1.0		1.0	
belt width	w_{bit}	feet	-	-	-	-	-	-
meander width ratio	w_{bit}/w_{bkf}		-	-	-	-	-	-
meander length	L_m	feet	-	-	-	-	-	-
meander length ratio	L_m/w_{bkf}		-	-	-	-	-	-
Linear Wavelength	LW		-	-	-	-	-	-
Linear Wavelength Ratio	LW/w_{bkf}		-	-	-	-	-	-
radius of curvature	R_c	feet	-	-	-	-	-	-
radius of curvature ratio	R_c/w_{bkf}		-	-	-	-	-	-

Riffle



cross section
 flood prone area
 bankfull
 low bank height

Bankfull Dimensions

35.7	x-section area (ft.sq.)
21.6	width (ft)
1.7	mean depth (ft)
2.8	max depth (ft)
23.6	wetted perimeter (ft)
1.5	hydraulic radius (ft)
12.7	width-depth ratio

Flood Dimensions

---	W flood prone area (ft)
---	entrenchment ratio
2.8	low bank height (ft)
1.0	low bank height ratio

Materials

17	D50 Riffle (mm)
31	D84 Riffle (mm)
19	threshold grain size (mm):

Rosgen Stream Type

--- Missing: , , Sinuosity, ,

Bankfull Flow

3.1	velocity (ft/s)
110.8	discharge rate (cfs)
0.44	Froude number

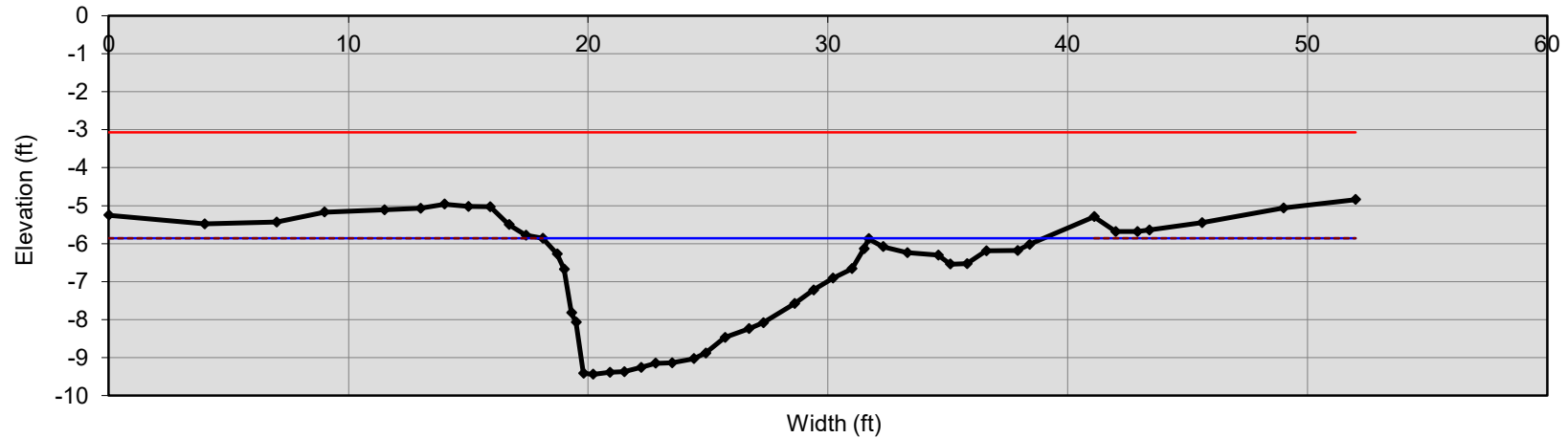
Flow Resistance

0.040	Manning's roughness
0.16	Darcy-Weisbach fric.
10.1	resistance factor u/u^*
16.2	relative roughness

Forces & Power

0.4	channel slope (%)
0.38	shear stress (lb/sq.ft.)
0.44	shear velocity (ft/s)
1.28	unit strm power (lb/ft/s)

Pool



—●— cross section — flood prone area — bankfull - - - low bank height

Bankfull Dimensions

33.8	x-section area (ft.sq.)
20.9	width (ft)
1.6	mean depth (ft)
3.6	max depth (ft)
24.3	wetted perimeter (ft)
1.4	hydraulic radius (ft)
13.1	width-depth ratio

Flood Dimensions

---	W flood prone area (ft)
---	entrenchment ratio
3.6	low bank height (ft)
1.0	low bank height ratio

Materials

17	D50 Riffle (mm)
31	D84 Riffle (mm)
17	threshold grain size (mm):

Rosgen Stream Type

Bankfull Flow

2.9	velocity (ft/s)
99.1	discharge rate (cfs)
0.44	Froude number

Flow Resistance

0.040	Manning's roughness
0.17	Darcy-Weisbach fric.
10.2	resistance factor u/u^*
15.9	relative roughness

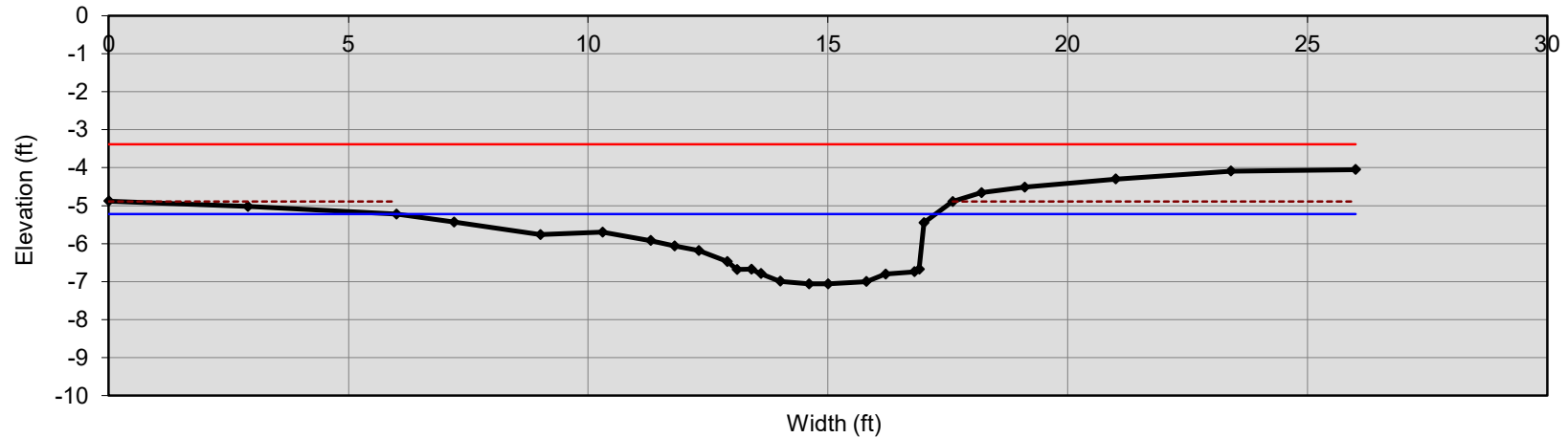
Forces & Power

0.4	channel slope (%)
0.35	shear stress (lb/sq.ft.)
0.42	shear velocity (ft/s)
1.18	unit strm power (lb/ft/s)

Cross Section 3

Schist Creek

Riffle



—◆— cross section — flood prone area — bankfull - - - low bank height

Bankfull Dimensions

10.4	x-section area (ft.sq.)
11.2	width (ft)
0.9	mean depth (ft)
1.8	max depth (ft)
12.9	wetted perimeter (ft)
0.8	hydraulic radius (ft)
12.4	width-depth ratio

Flood Dimensions

---	W flood prone area (ft)
---	entrenchment ratio
2.2	low bank height (ft)
1.2	low bank height ratio

Materials

2	D50 Riffle (mm)
9.8	D84 Riffle (mm)
7	threshold grain size (mm):

Rosgen Stream Type

--- Missing: , , Sinuosity, D50,

Bankfull Flow

2.0	velocity (ft/s)
20.9	discharge rate (cfs)
0.40	Froude number

Flow Resistance

0.035	Manning's roughness
0.15	Darcy-Weisbach fric.
11.6	resistance factor u/u^*
28.9	relative roughness

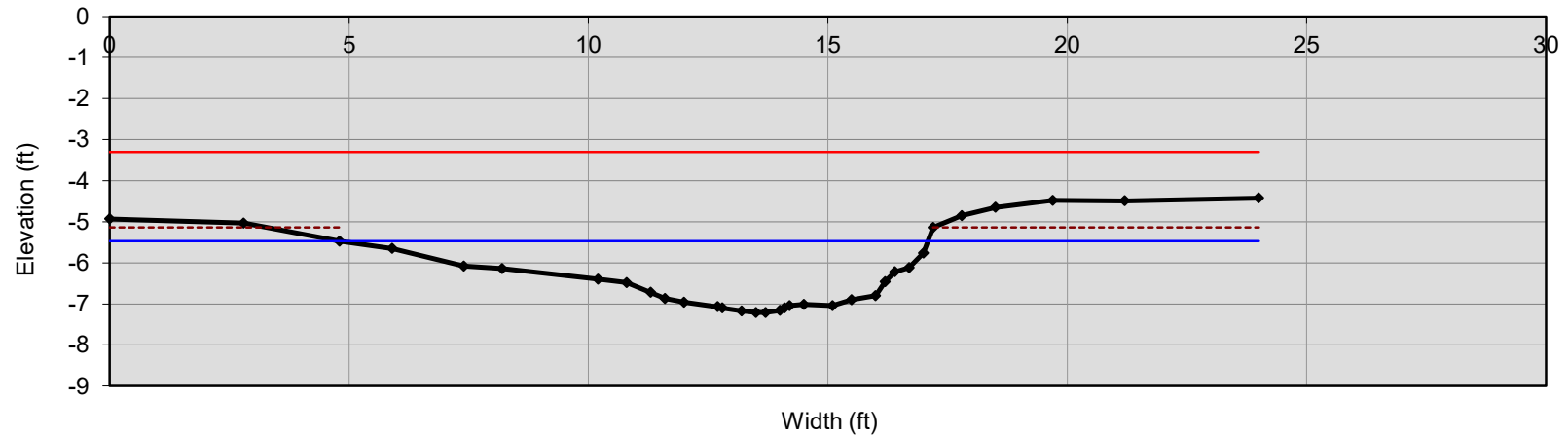
Forces & Power

0.3	channel slope (%)
0.15	shear stress (lb/sq.ft.)
0.28	shear velocity (ft/s)
0.35	unit strm power (lb/ft/s)

Cross Section 4

Schist Creek

Pool



Bankfull Dimensions

12.0	x-section area (ft.sq.)
12.3	width (ft)
1.0	mean depth (ft)
1.7	max depth (ft)
13.3	wetted perimeter (ft)
0.9	hydraulic radius (ft)
12.3	width-depth ratio

Flood Dimensions

---	W flood prone area (ft)
---	entrenchment ratio
2.1	low bank height (ft)
1.2	low bank height ratio

Materials

2	D50 Riffle (mm)
9.8	D84 Riffle (mm)
8	threshold grain size (mm):

Rosgen Stream Type

c

Bankfull Flow

1.9	velocity (ft/s)
22.9	discharge rate (cfs)
0.35	Froude number

Flow Resistance

0.040	Manning's roughness
0.19	Darcy-Weisbach fric.
11.7	resistance factor u/u^*
30.3	relative roughness

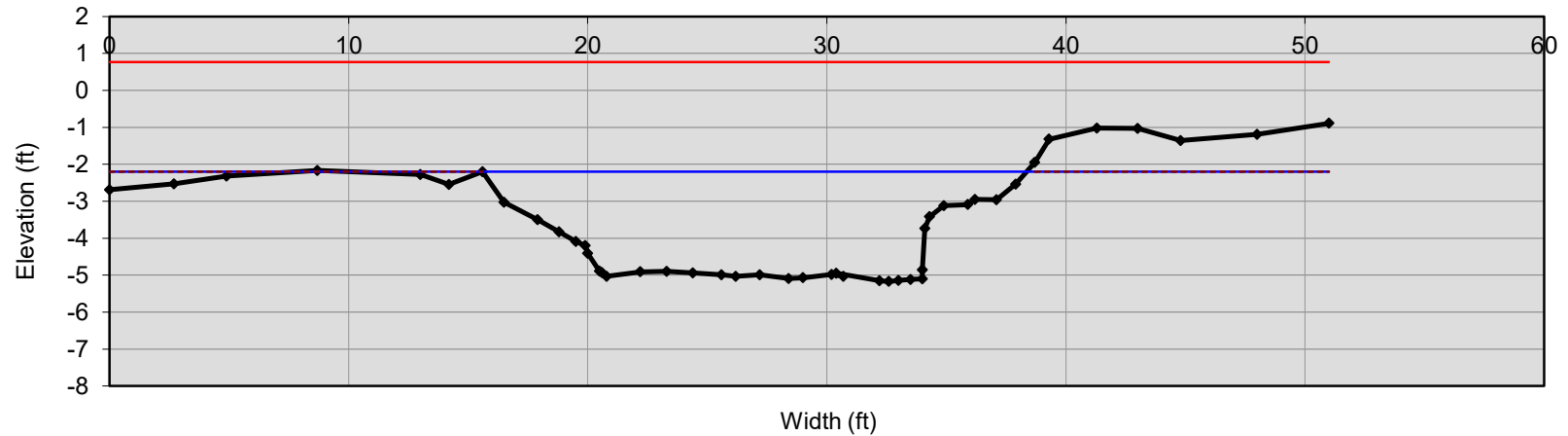
Forces & Power

0.3	channel slope (%)
0.17	shear stress (lb/sq.ft.)
0.30	shear velocity (ft/s)
0.35	unit strm power (lb/ft/s)

Cross Section 5

Rocky River - Reach 2

riffle



cross section
 flood prone area
 bankfull
 low bank height

Bankfull Dimensions

48.1	x-section area (ft.sq.)
22.8	width (ft)
2.1	mean depth (ft)
3.0	max depth (ft)
26.0	wetted perimeter (ft)
1.9	hydraulic radius (ft)
10.9	width-depth ratio

Flood Dimensions

---	W flood prone area (ft)
---	entrenchment ratio
3.0	low bank height (ft)
1.0	low bank height ratio

Materials

25	D50 Riffle (mm)
100	D84 Riffle (mm)
11	threshold grain size (mm):

Rosgen Stream Type

--- Missing: , , Sinuosity, ,

Bankfull Flow

2.5	velocity (ft/s)
120.7	discharge rate (cfs)
0.33	Froude number

Flow Resistance

0.040	Manning's roughness
0.15	Darcy-Weisbach fric.
7.6	resistance factor u/u^*
6.4	relative roughness

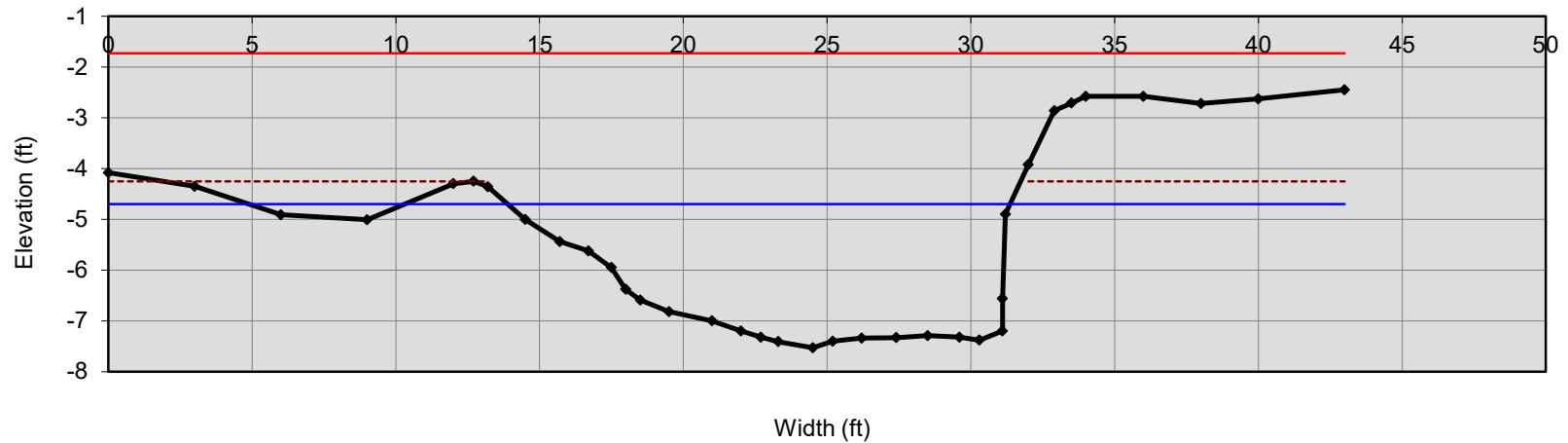
Forces & Power

0.2	channel slope (%)
0.23	shear stress (lb/sq.ft.)
0.34	shear velocity (ft/s)
0.66	unit strm power (lb/ft/s)

Cross Section 6

Rocky River - Reach 2

pool



cross section
 flood prone area
 bankfull
 low bank height

Bankfull Dimensions

36.0	x-section area (ft.sq.)
17.5	width (ft)
2.1	mean depth (ft)
2.8	max depth (ft)
20.3	wetted perimeter (ft)
1.8	hydraulic radius (ft)
8.3	width-depth ratio

Flood Dimensions

---	W flood prone area (ft)
---	entrenchment ratio
3.3	low bank height (ft)
1.2	low bank height ratio

Materials

25	D50 Riffle (mm)
100	D84 Riffle (mm)
11	threshold grain size (mm):

Rosgen Stream Type

Bankfull Flow

2.4	velocity (ft/s)
87.9	discharge rate (cfs)
0.32	Froude number

Flow Resistance

0.040	Manning's roughness
0.15	Darcy-Weisbach fric.
7.5	resistance factor u/u^*
6.3	relative roughness

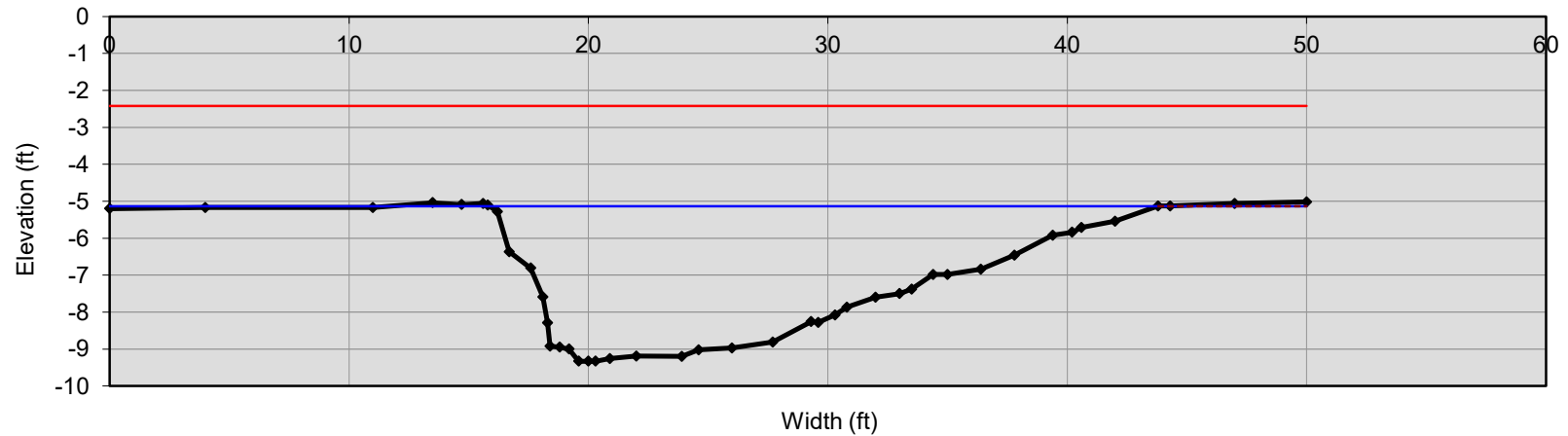
Forces & Power

0.2	channel slope (%)
0.22	shear stress (lb/sq.ft.)
0.34	shear velocity (ft/s)
0.63	unit strm power (lb/ft/s)

Cross Section 7

Rocky River - Reach 3

Pool



cross section
 flood prone area
 bankfull
 low bank height

Bankfull Dimensions

68.9	x-section area (ft.sq.)
39.7	width (ft)
1.7	mean depth (ft)
4.2	max depth (ft)
42.7	wetted perimeter (ft)
1.6	hydraulic radius (ft)
23.4	width-depth ratio

Flood Dimensions

---	W flood prone area (ft)
---	entrenchment ratio
4.2	low bank height (ft)
1.0	low bank height ratio

Materials

10	D50 Riffle (mm)
69	D84 Riffle (mm)
10	threshold grain size (mm):

Rosgen Stream Type

Bankfull Flow

2.3	velocity (ft/s)
157.9	discharge rate (cfs)
0.32	Froude number

Flow Resistance

0.040	Manning's roughness
0.16	Darcy-Weisbach fric.
8.5	resistance factor u/u^*
7.7	relative roughness

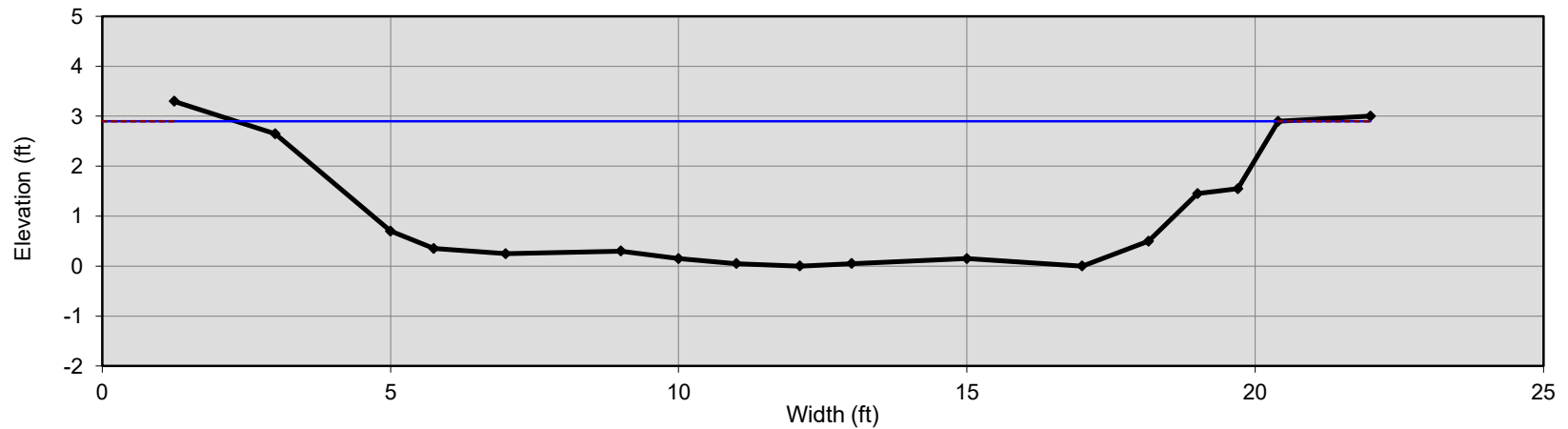
Forces & Power

0.2	channel slope (%)
0.20	shear stress (lb/sq.ft.)
0.32	shear velocity (ft/s)
0.5	unit strm power (lb/ft/s)

Cross Section 8

Rocky River Reach 3 (taken d/s of Mica confluence)

riffle



—◆— cross section — bankfull

Bankfull Dimensions

41.4	x-section area (ft.sq.)
18.1	width (ft)
2.3	mean depth (ft)
2.9	max depth (ft)
20.4	wetted perimeter (ft)
2.0	hydraulic radius (ft)
7.9	width-depth ratio

Flood Dimensions

---	W flood prone area (ft)
---	entrenchment ratio
2.9	low bank height (ft)
1.0	low bank height ratio

Materials

10	D50 Riffle (mm)
69	D84 Riffle (mm)
12	threshold grain size (mm):

Rosgen Stream Type

--- Missing: , , Sinuosity, D50,

Bankfull Flow

2.7	velocity (ft/s)
110.6	discharge rate (cfs)
0.33	Froude number

Flow Resistance

0.040	Manning's roughness
0.15	Darcy-Weisbach fric.
8.6	resistance factor u/u^*
10.1	relative roughness

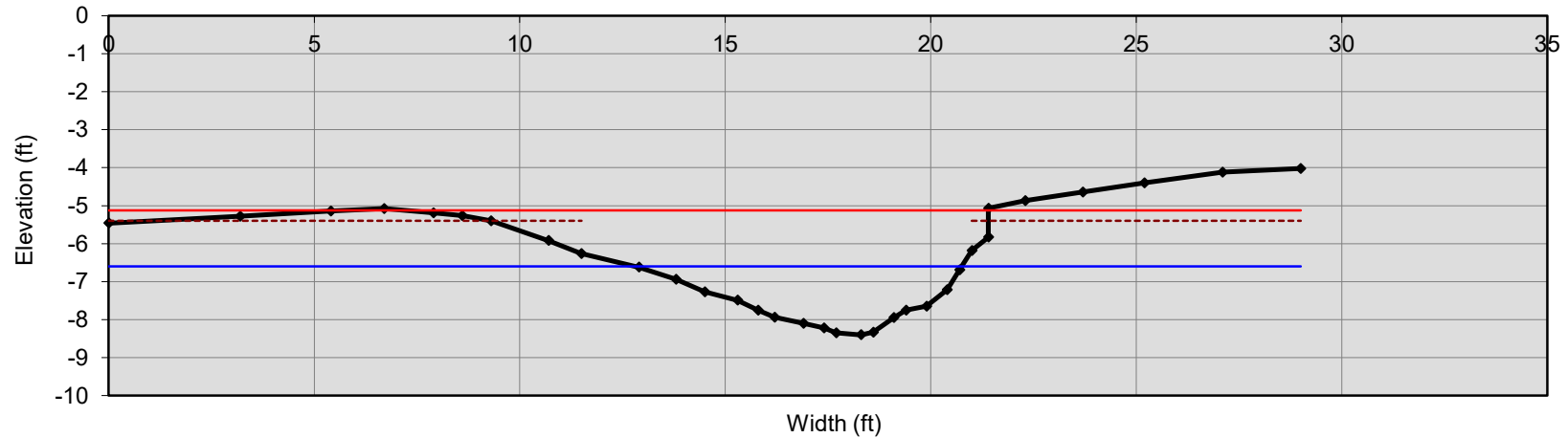
Forces & Power

0.2	channel slope (%)
0.25	shear stress (lb/sq.ft.)
0.36	shear velocity (ft/s)
0.76	unit strm power (lb/ft/s)

Cross Section 9

Mica Creek

Pool



cross section
 flood prone area
 bankfull
 low bank height

Bankfull Dimensions

8.2	x-section area (ft.sq.)
7.9	width (ft)
1.0	mean depth (ft)
1.8	max depth (ft)
9.0	wetted perimeter (ft)
0.9	hydraulic radius (ft)
7.9	width-depth ratio

Flood Dimensions

---	W flood prone area (ft)
---	entrenchment ratio
3.0	low bank height (ft)
1.7	low bank height ratio

Materials

12	D50 Riffle (mm)
30	D84 Riffle (mm)
37	threshold grain size (mm):

Rosgen Stream Type

Bankfull Flow

4.0	velocity (ft/s)
32.9	discharge rate (cfs)
0.74	Froude number

Flow Resistance

0.040	Manning's roughness
0.19	Darcy-Weisbach fric.
9.0	resistance factor u/u^*
10.5	relative roughness

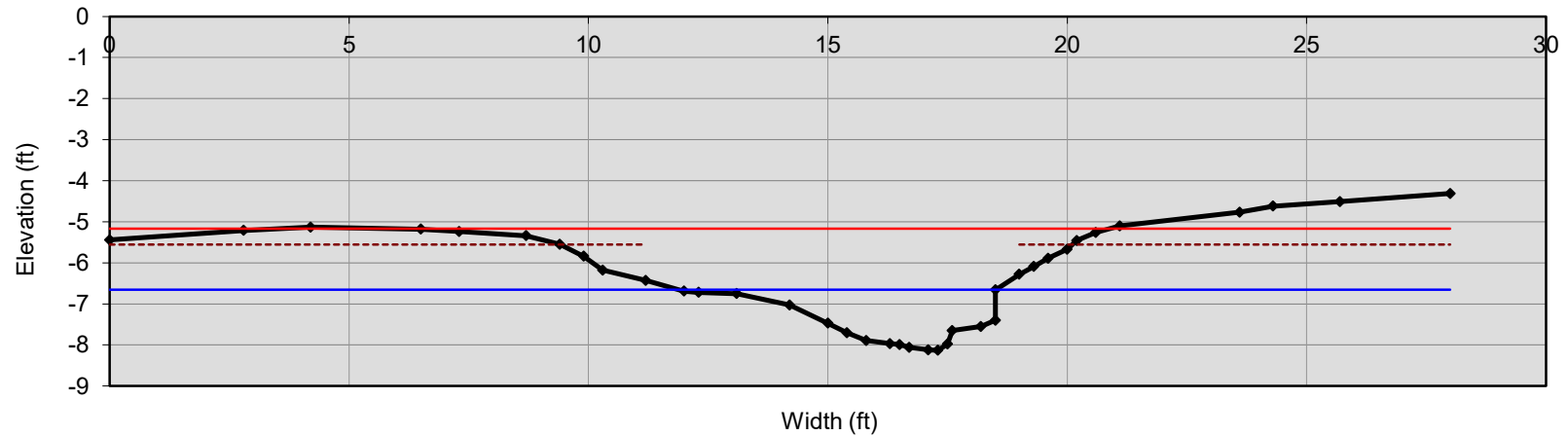
Forces & Power

1.3	channel slope (%)
0.74	shear stress (lb/sq.ft.)
0.62	shear velocity (ft/s)
3.4	unit strm power (lb/ft/s)

Cross Section 10

Mica Creek

Riffle



—◆— cross section — flood prone area — bankfull - - - low bank height

Bankfull Dimensions

4.9	x-section area (ft.sq.)
6.6	width (ft)
0.7	mean depth (ft)
1.5	max depth (ft)
8.0	wetted perimeter (ft)
0.6	hydraulic radius (ft)
9.4	width-depth ratio

Flood Dimensions

---	W flood prone area (ft)
---	entrenchment ratio
2.6	low bank height (ft)
1.7	low bank height ratio

Materials

12	D50 Riffle (mm)
30	D84 Riffle (mm)
25	threshold grain size (mm):

Rosgen Stream Type

--- Missing: , , Sinuosity, ,

Bankfull Flow

4.1	velocity (ft/s)
20.1	discharge rate (cfs)
0.92	Froude number

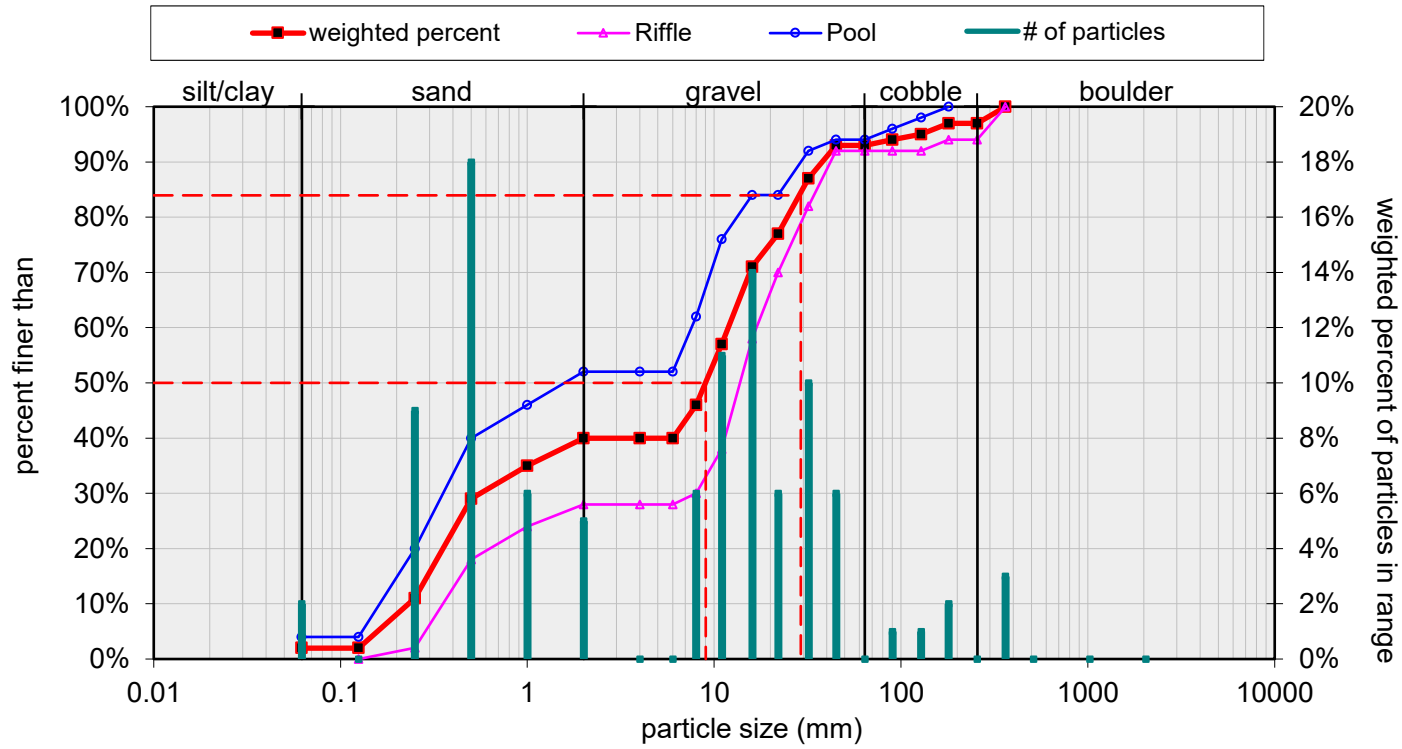
Flow Resistance

0.030	Manning's roughness
0.12	Darcy-Weisbach fric.
8.1	resistance factor u/u^*
7.5	relative roughness

Forces & Power

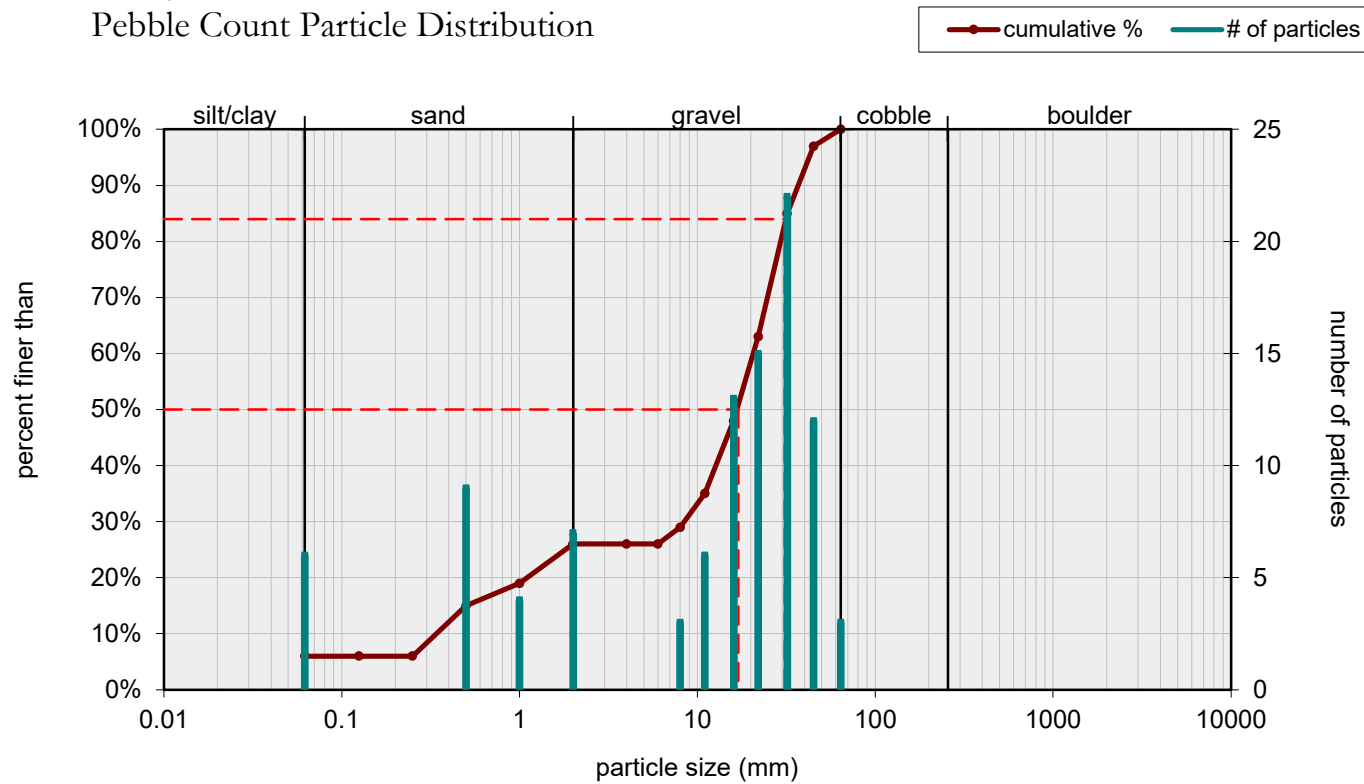
1.3	channel slope (%)
0.50	shear stress (lb/sq.ft.)
0.51	shear velocity (ft/s)
2.5	unit strm power (lb/ft/s)

Rocky River Reach 1 Reachwide Particle Distribution



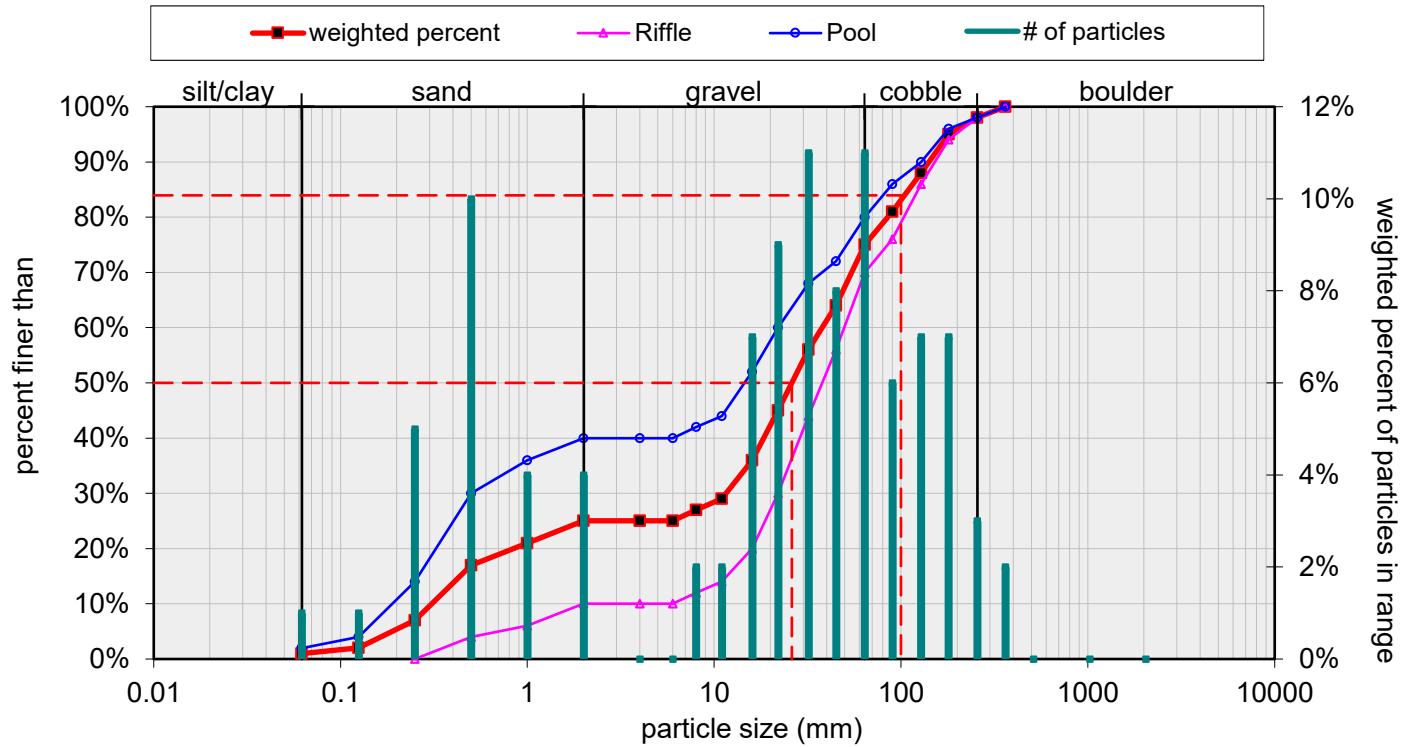
Size (mm)		Size Distribution		Type	
D16	0.3	mean	2.9	silt/clay	2%
D35	1	dispersion	16.6	sand	38%
D50	9	skewness	-0.34	gravel	53%
D65	14			cobble	4%
D84	29			boulder	3%
D95	130				

Rocky River Reach 1 XS1
Pebble Count Particle Distribution



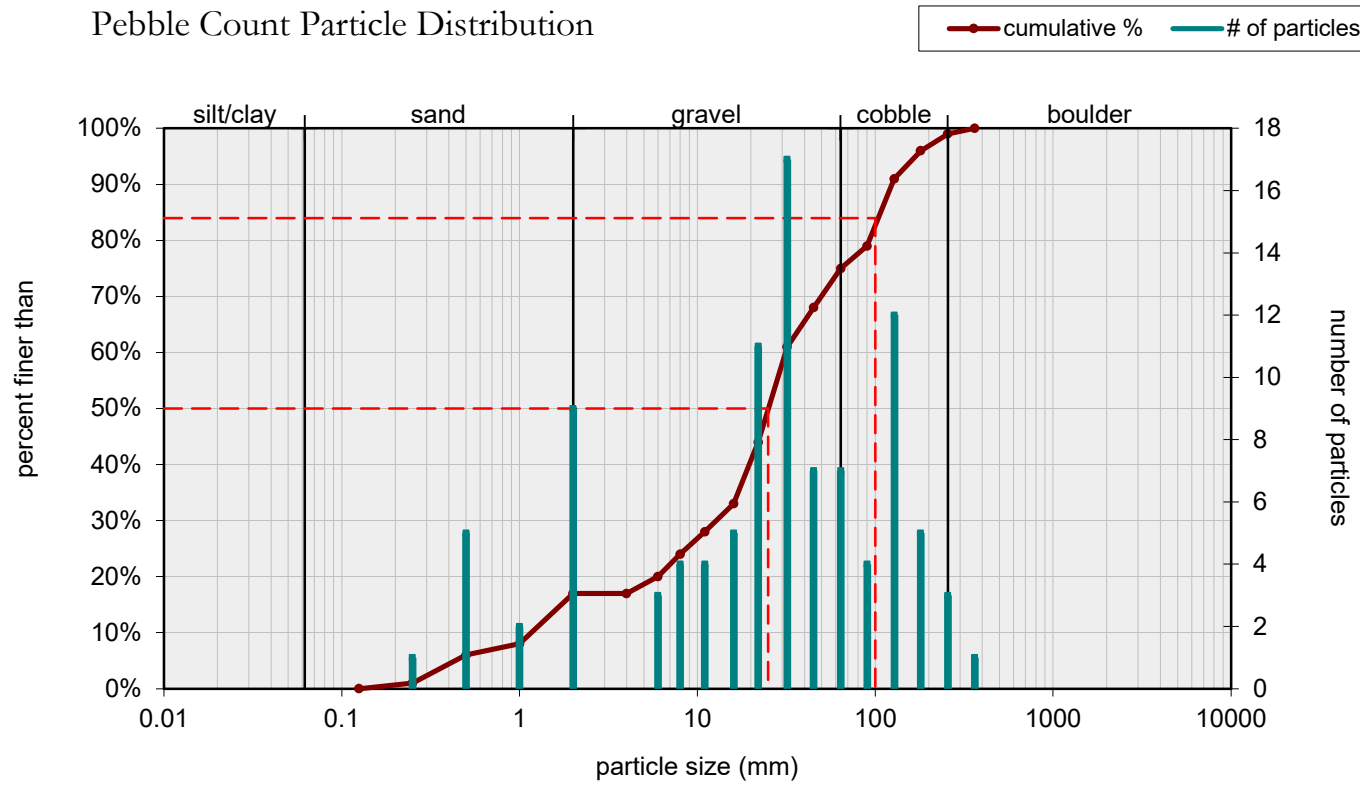
Size (mm)		Size Distribution		Type	
D16	0.59	mean	4.3	silt/clay	6%
D35	11	dispersion	15.3	sand	20%
D50	17	skewness	-0.46	gravel	74%
D65	23			cobble	0%
D84	31			boulder	0%
D95	43				

Rocky River Reach 2 Reachwide Particle Distribution



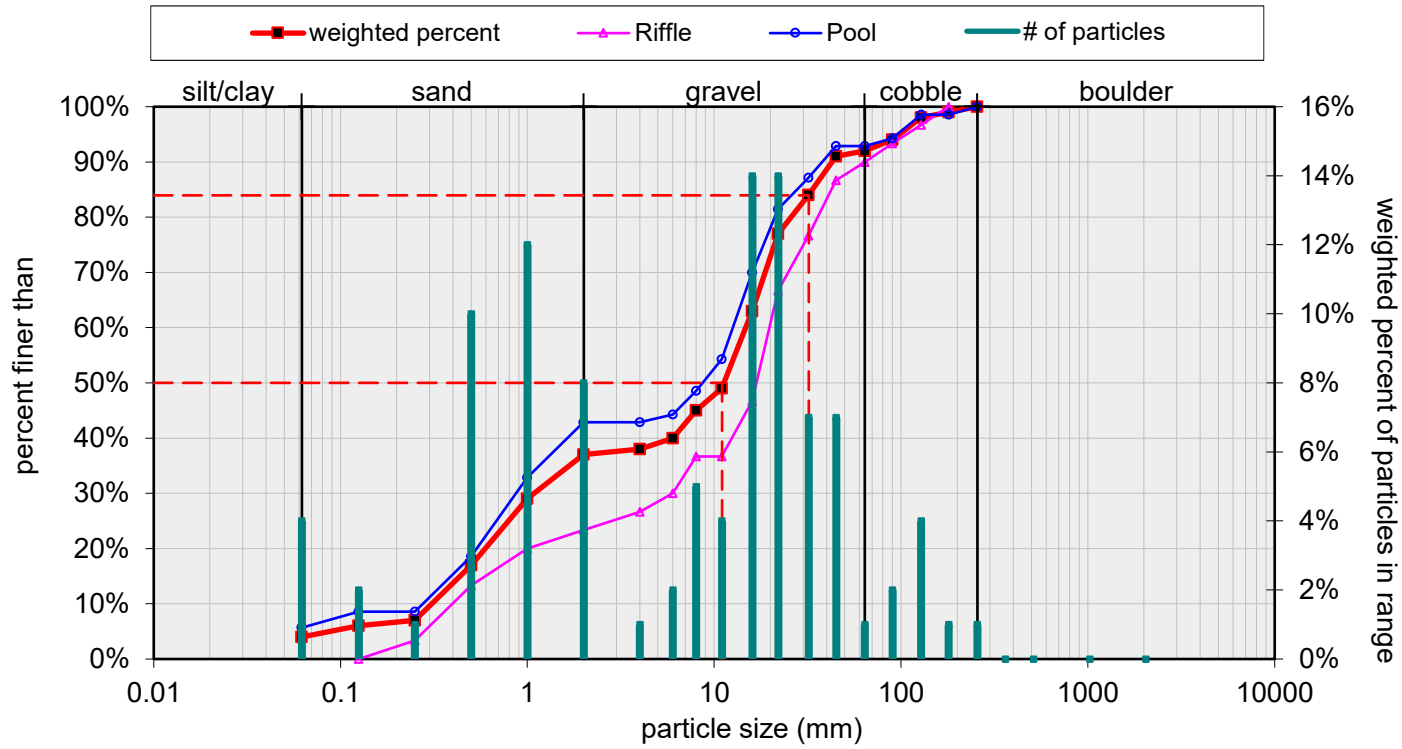
Size (mm)		Size Distribution		Type	
D16	0.47	mean	6.9	silt/clay	1%
D35	15	dispersion	29.6	sand	24%
D50	26	skewness	-0.38	gravel	50%
D65	46			cobble	23%
D84	100			boulder	2%
D95	180				

Rocky River Reach 2 XS5
Pebble Count Particle Distribution



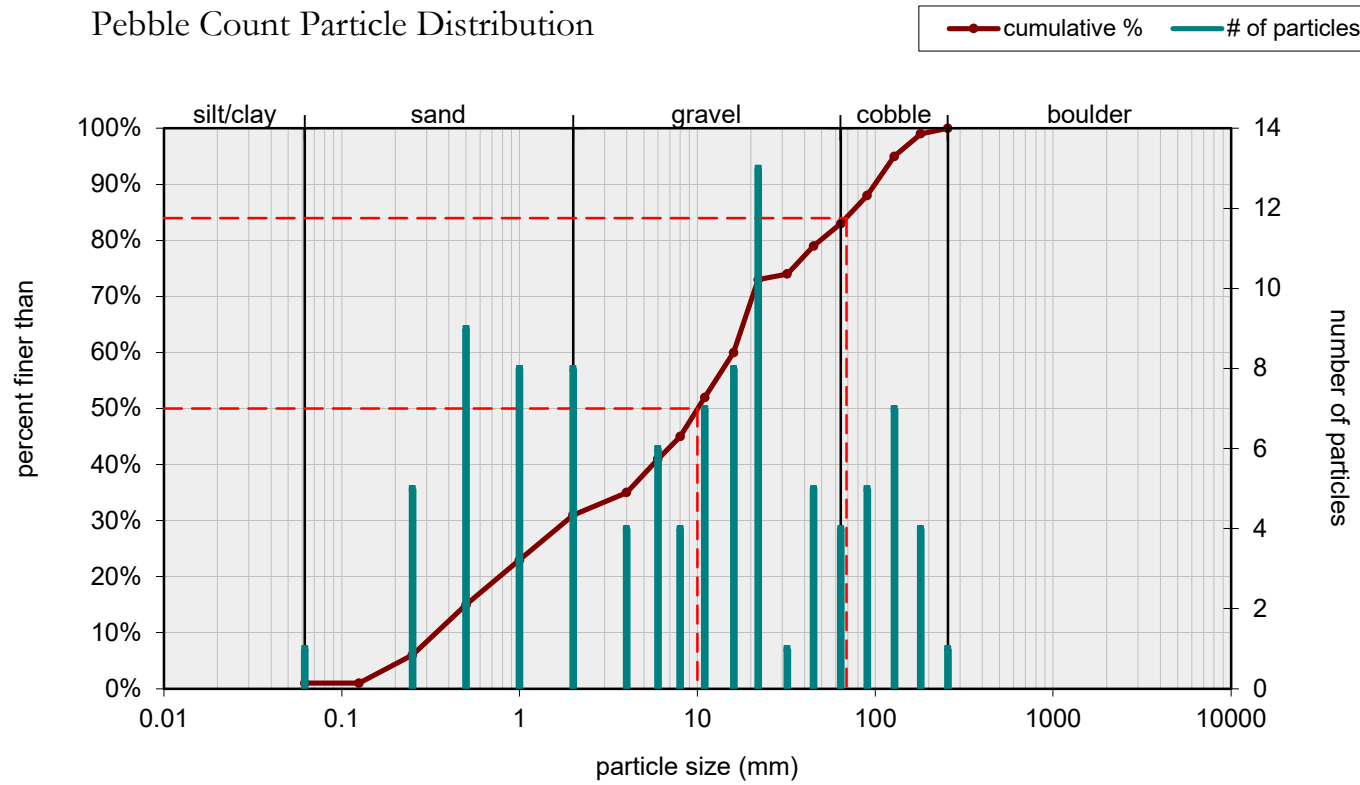
Size (mm)		Size Distribution		Type	
D16	1.9	mean	13.8	silt/clay	0%
D35	17	dispersion	8.6	sand	17%
D50	25	skewness	-0.20	gravel	58%
D65	39			cobble	24%
D84	100			boulder	1%
D95	170				

Rocky River Reach 3 Reachwide Particle Distribution



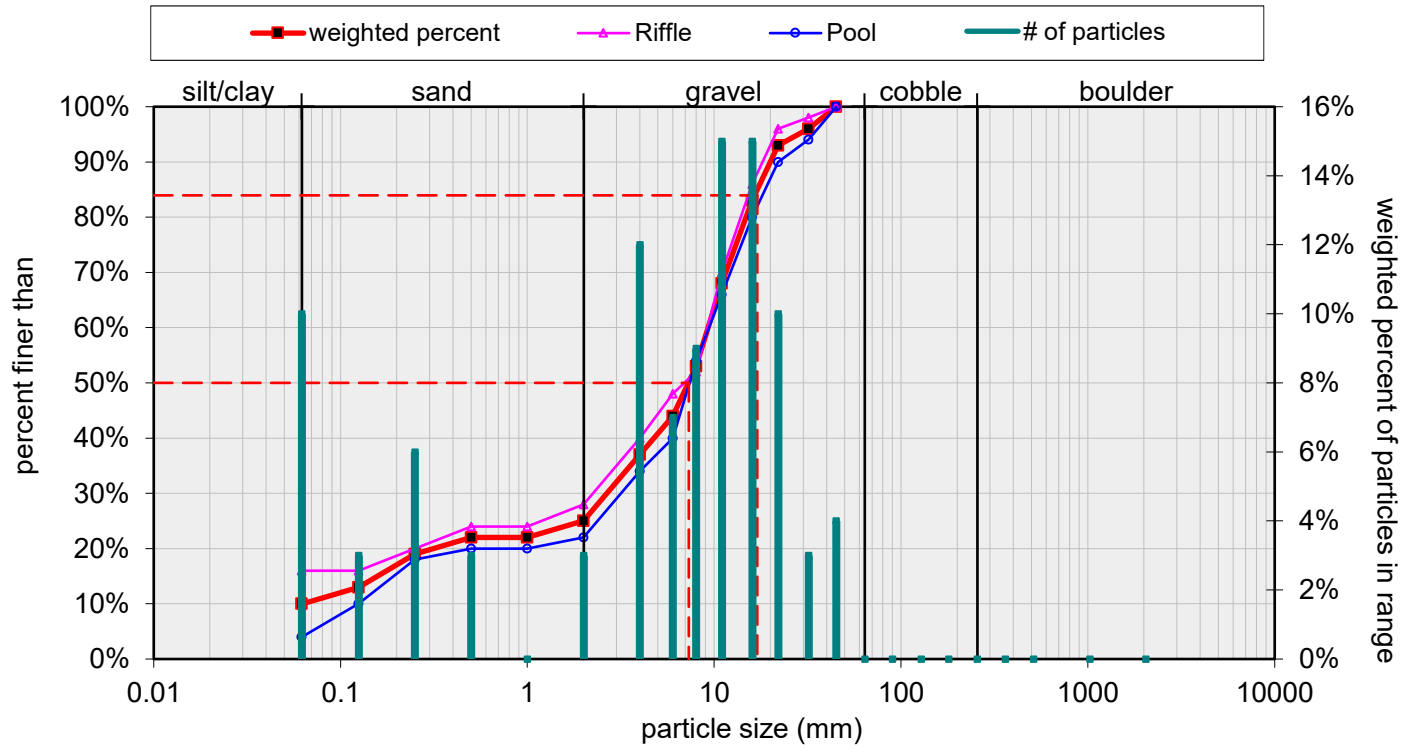
Size (mm)		Size Distribution		Type	
D16	0.47	mean	3.9	silt/clay	4%
D35	1.7	dispersion	13.2	sand	33%
D50	11	skewness	-0.33	gravel	55%
D65	17			cobble	8%
D84	32			boulder	0%
D95	98				

Rocky River Reach 3 XS8
Pebble Count Particle Distribution



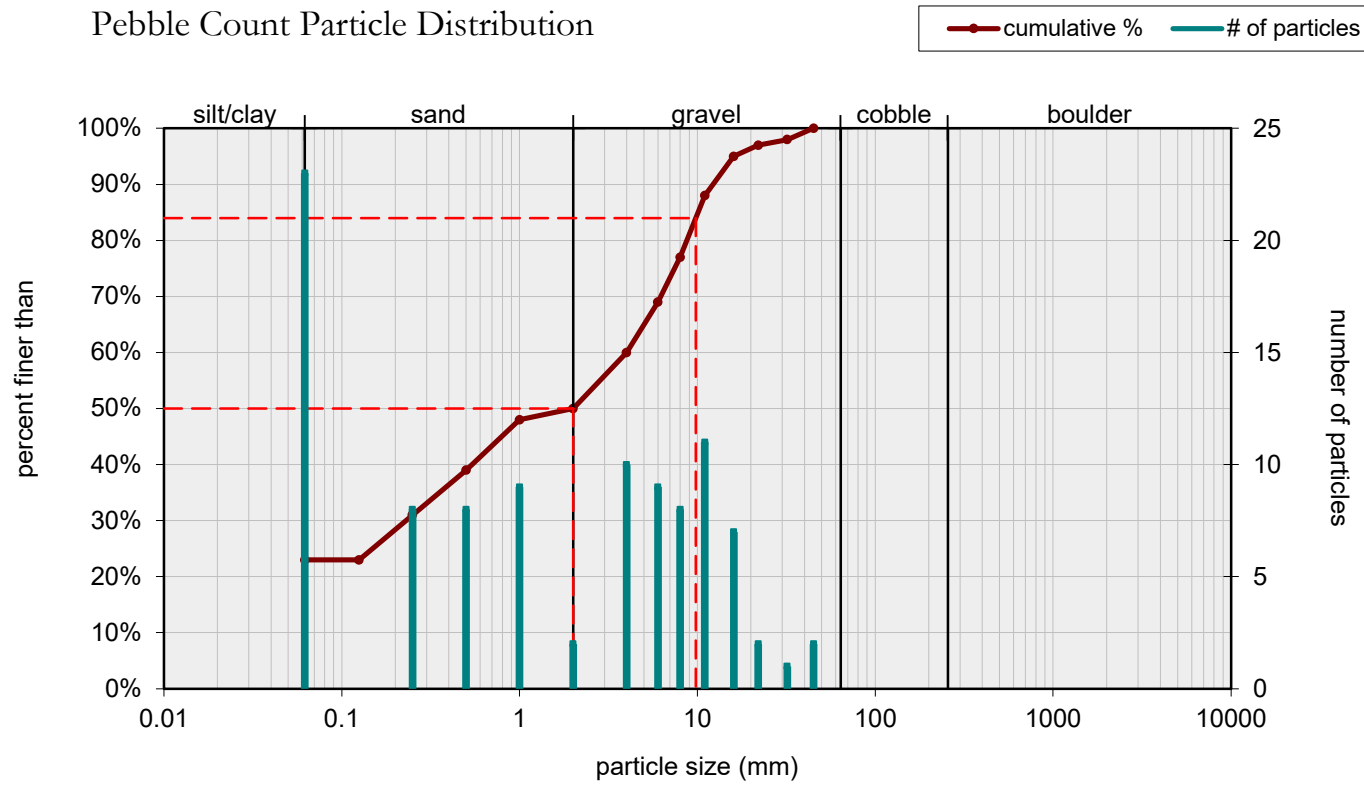
Size (mm)		Size Distribution		Type	
D16	0.55	mean	6.2	silt/clay	1%
D35	4	dispersion	12.5	sand	30%
D50	10	skewness	-0.15	gravel	52%
D65	18			cobble	17%
D84	69			boulder	0%
D95	130				

Schist Creek Reachwide Particle Distribution



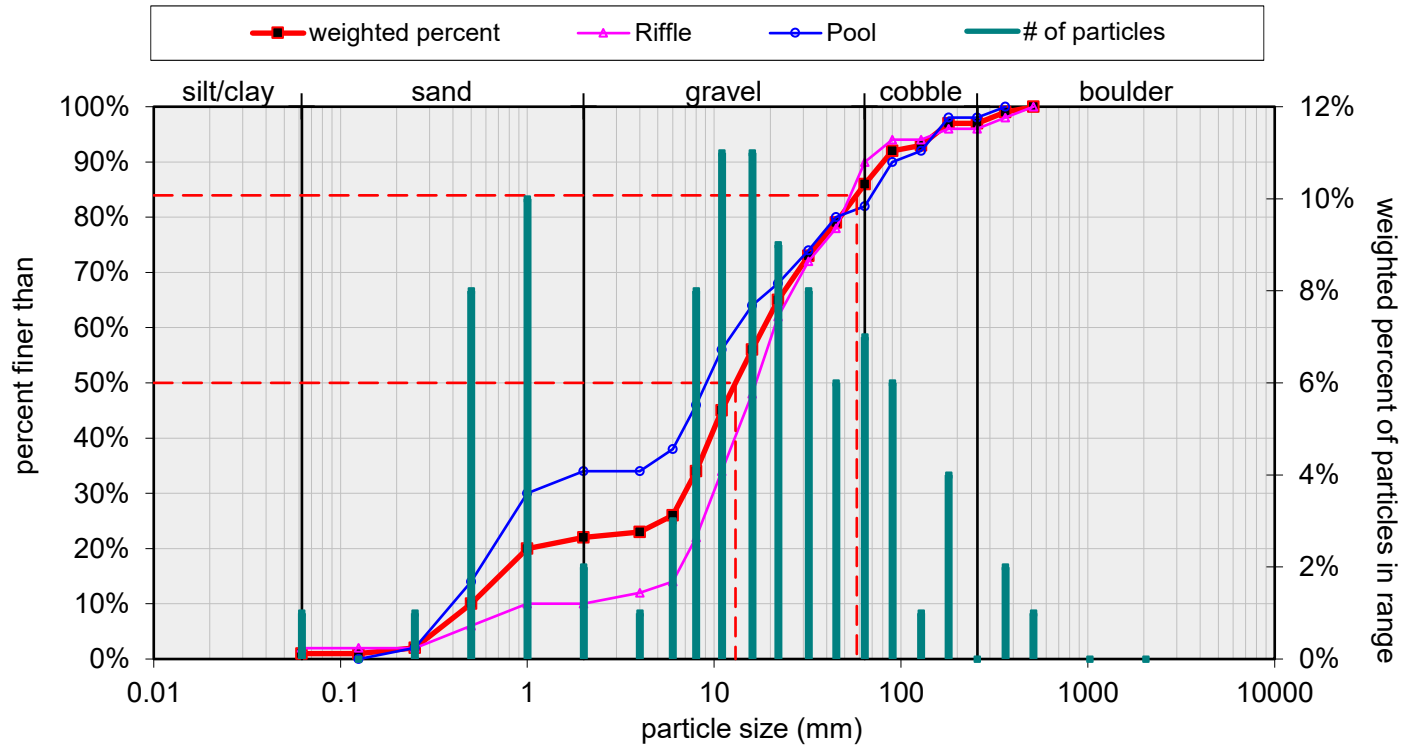
Size (mm)		Size Distribution		Type	
D16	0.18	mean	1.7	silt/clay	10%
D35	3.6	dispersion	21.4	sand	15%
D50	7.3	skewness	-0.44	gravel	75%
D65	10			cobble	0%
D84	17			boulder	0%
D95	28				

Schist Creek XS3
Pebble Count Particle Distribution



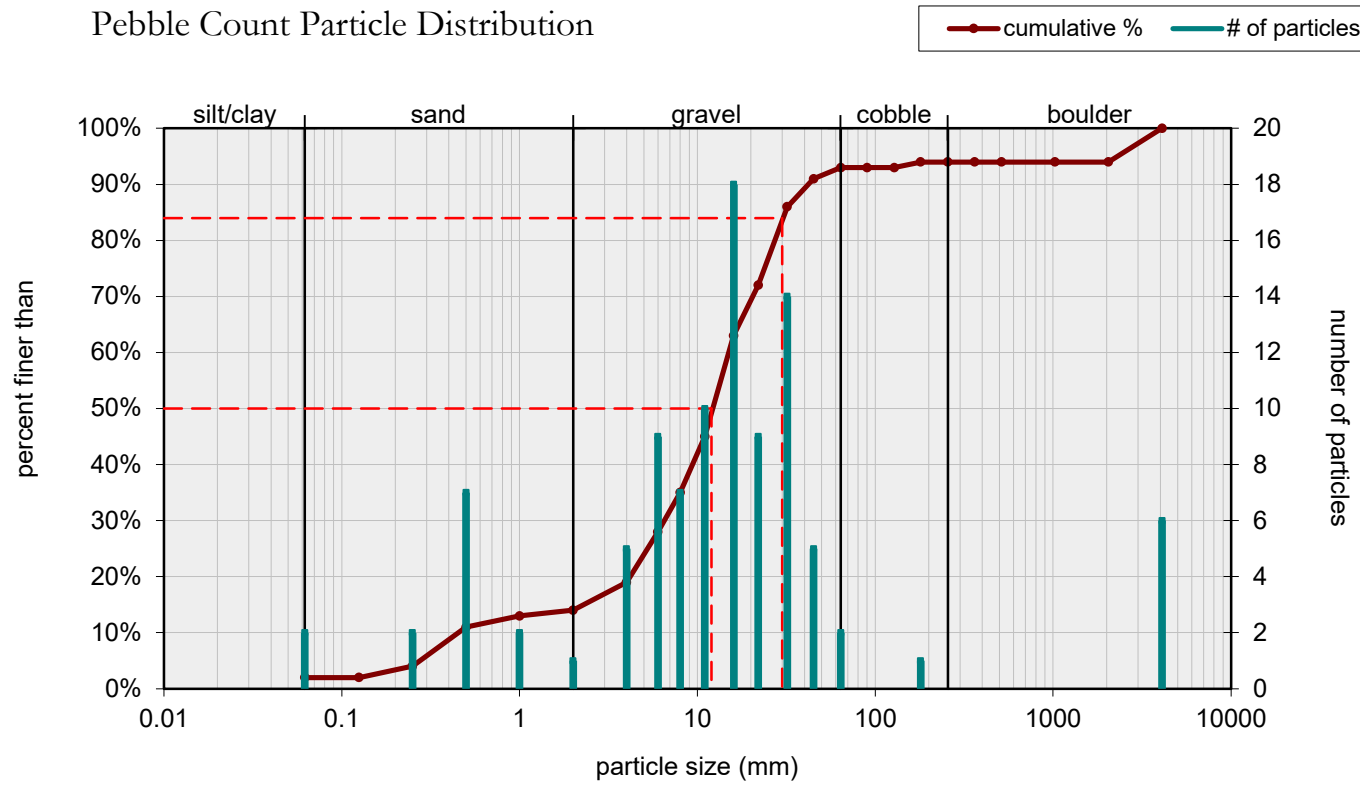
Size (mm)		Size Distribution		Type	
D16	0.062	mean	0.8	silt/clay	23%
D35	0.35	dispersion	18.6	sand	27%
D50	2	skewness	-0.28	gravel	50%
D65	5			cobble	0%
D84	9.8			boulder	0%
D95	16				

Mica Creek Reachwide Particle Distribution



Size (mm)		Size Distribution		Type	
D16	0.76	mean	6.6	silt/clay	1%
D35	8.2	dispersion	10.8	sand	21%
D50	13	skewness	-0.21	gravel	64%
D65	22			cobble	11%
D84	58			boulder	3%
D95	150				

Mica Creek XS10
Pebble Count Particle Distribution



Size (mm)		Size Distribution		Type	
D16	2.6	mean	8.8	silt/clay	2%
D35	8	dispersion	3.6	sand	12%
D50	12	skewness	-0.13	gravel	79%
D65	17			cobble	1%
D84	30			boulder	6%
D95	2300				

Reference Reach Geomorphic Parameters														
	Notation	Units	Long Branch		UT to Varnals Creek		UT Polecat		UT to Wells Creek		UT to Richland Creek Reach 2		UT to Rocky Creek	
			min	max	min	max	min	max	min	max	min	max	min	max
stream type			C4/E4		C4/E4		E4		C4		C4/E4		E4b	
drainage area	DA	sq mi	1.49		0.41		0.41		0.13		0.97		1.05	
design discharge	Q	cfs	101	124	54		20.3		15		68.9	78.6	85	
bankfull cross-sectional area	A _{bkf}	SF	25.0	34.6	10.3	12.3	5.4	12.4	3.9	6.3	16.5	17.5	16.3	
average velocity during bankfull event	V _{bkf}	fps	3.6	4.0	4.4	5.2	2.2	3.5	3.8		4.2	4.5	5.5	
Cross-Section														
width at bankfull	W _{bkf}	feet	14.8	18.6	9.3	10.5	5.3	10.9	6.18	8.63	13.3	15.2	12.2	
maximum depth at bankfull	d _{max}	feet	1.9	2.9	1.5	1.7	1.4	1.7	0.64	1.38	1.8	2.1	1.8	
mean depth at bankfull	d _{bkf}	feet	1.3	2.1	1.1	1.2	1.0	1.1	0.6	1.0	1.1	1.3	1.30	
bankfull width to depth ratio	W _{bkf} /d _{bkf}		7.9	13.8	8.1	9.3	5.2	9.6	6.1	12.6	10.1	13.9	9.1	
max depth ratio	d _{max} /d _{bkf}	feet	1.4	1.5	1.4	1.4	1.4	1.7	1.0	1.8	1.6	1.7	1.3	
bank height ratio	BHR		1.2	1.5	1	1	1	1.1	1	1.83	1.0		1	
floodprone area width	W _{fpa}	feet	>50		60	100	25	65	15.31	25	>50		72	
entrenchment ratio	ER		>3.4		5.7	10	3.2	8.3	1.93	4.05	>2.5		6	
Slope														
valley slope	S _{valley}	feet/foot	0.006		0.020		0.017		0.028		0.016		0.03	
channel slope	S _{chnl}	feet/foot	0.004		0.017		0.012		0.020		0.014		0.02	
Profile														
riffle slope	S _{rifle}	feet/foot	0.013	0.012	0.024	0.057	0.004	0.047	0.016	0.085	0.018	0.036	0.1	0.1
riffle slope ratio	S _{rifle} /S _{chnl}		3.0	3.3	1.4	3.4	0.3	4	0.8	4.3	1.3	2.5	2.6	3.8
pool slope	S _p	feet/foot	0.0003	0.003	0	0.015	0.017		0.00	0.01	0.0003	0.004	0.000	0.004
pool slope ratio	S _p /S _{chnl}		0.1	0.8	0.0	0.9	1.4		0.00	0.43	0.0	0.0	0.0	0.2
pool-to-pool spacing	L _{p-p}	feet	50	105	7.8	82.2	34	52	16.5	62.8	33	93	26.3	81.3
pool spacing ratio	L _{p-p} /W _{bkf}		3.4	7.1	0.5	5.6	0.3	3.2	2.3	8.8	2.5	6.1	2.2	6.7
pool cross-sectional area	A _{pool}	SF	25.5	33.4	22	22.7	9.3		6.2	9.0	14.7	15.8	19.3	
pool area ratio	A _{pool} /A _{bkf}		1.0	1.3	1.8	1.9	0.8	1.7	1.2	1.7	0.09		1.2	
maximum pool depth	d _{pool}	feet	2.2		2.5	2.6	1.8		--	--	1.8		2.2	
pool depth ratio	d _{pool} /d _{bkf}		0.8	1.2	3	3.1	1.6	1.8	--	--	1.4	1.6	1.6	
pool width at bankfull	W _{pool}	feet	16.2	18.8	15.1	18.6	8.0		7.1	10.5	14.7	16	10.9	
pool width ratio	W _{pool} /W _{bkf}		0.9	1.3	1.0	1.3	0.7	1.5	1.0	1.5	1.0	1.2	0.9	
Pattern														
sinuosity	K		1.3		1.2		1.4		1.4		1.1		1.1	
belt width	W _{belt}	feet	60		14.6	44.5	28	50	10.0	35.0	--	--	N/A	
meander width ratio	W _{belt} /W _{bkf}		3.2	4.1	1	3	3	5	1.4	4.9	--	--	N/A	
linear wavelength (formerly meander length)	L _m	feet	66	191	16.4	46.6	56	85	35.0	70.0	--	--	N/A	
linear wavelength ratio (formerly meander length ratio)	L _m /W _{bkf}		4.5	10.3	1.1	3.2	6	9	4.9	9.8	--	--	N/A	
meander length		feet	--	--	--	--	--	--	--	--	--	--	--	--
meander length ratio			--	--	--	--	--	--	--	--	--	--	--	--
radius of curvature	R _c	feet	16	87	8.3	47.3	19	50	2.3	31.8	--	--	N/A	
radius of curvature ratio	R _c /W _{bkf}		1.1	4.7	0.6	3.2	2.0	5.3	0.3	4.5	--	--	N/A	
Particle Size Distribution from Reach-wide Pebble Count														
d50 Description							Fine Gravel				Coarse Gravel			
	d ₁₆	mm	8.1		2.9		0.1				<0.063			
	d ₃₅	mm	26.6		9.2		0.6				2.4			
	d ₅₀	mm	41.6		15.0		4.5				22.6			
	d ₈₄	mm	124.8		56.0		53				120			
	d ₉₅	mm	225.5		88.0		96				256			
	d ₁₀₀	mm			256.0									

Proposed Geomorphic Parameters											
	Notation	Units	Rocky River Reach 1			Rocky River Reach 3			Schist Creek		
			Typical Section Values	Min	Max	Typical Section Values	Min	Max	Typical Section Values	Min	Max
stream type			C4			C4			C4		
drainage area	DA	sq mi	4.060			4.060			0.34		
design discharge	Q	cfs	110.0	-		128.0	-		31.0	-	
bankfull cross-sectional area	A _{bkf}	SF	45.5	-		49.0	-		12.5	-	
average velocity during bankfull event	V _{bkf}	fps	2.7	-		2.6	-		2.5	-	
Cross Section											
width at bankfull	w _{bkf}	feet	28	-		26	-		12.8	-	
maximum depth at bankfull	d _{max}	feet	2.5	-		3.0	-		1.5	-	
mean depth at bankfull	d _{bkf}	feet	1.6	-		1.9	-		1.0	-	
bankfull width to depth ratio	w _{bkf} /d _{bkf}		18	-		14	-		13	-	
max depth ratio	d _{max} /d _{bkf}	feet	1.6	-		1.6	-		1.5	-	
bank height ratio	BHR	-	-	1.0		-	1.0		-	1.0	
floodprone area width	w _{fp}	feet	-	>100		-	>100		-	>75	
entrenchment ratio	ER	-	-	>2.2		-	>2.2		-	>2.2	
Slope											
valley slope	S _{valley}	feet/foot	0.003			0.001			0.011		
channel slope	S _{chnl}	feet/foot	-	0.0010	0.0060	-	0.0020		-	0.0080	0.0030
Profile											
riffle slope	S _{riffle}	feet/foot	-	0.005	0.031	-	0.004	0.010	-	0.017	0.006
riffle slope ratio	S _{riffle} /S _{chnl}	-	-	5.4	5.1	-	2.0	5.0	-	1.5	3.3
pool slope	S _p	feet/foot	-	0.000		-	0.000		-	0.000	
pool slope ratio	S _p /S _{chnl}	-	-	0.0		-	0.0		-	0.0	
pool-to-pool spacing	L _{p-p}	feet	-	84	199	-	78	185	-	38	102
pool spacing ratio	L _{p-p} /w _{bkf}	-	-	3.0	7.1	-	3.0	7.1	-	3.0	8.0
pool cross-sectional area	A _{pool}	SF	-	97.9		-	100.7		-	24.9	37.4
pool area ratio	A _{pool} /A _{bkf}	-	-	2.2		-	3.9		-	2.0	3.0
maximum pool depth	d _{pool}	feet	-	4.2		-	4.5		-	2.4	3.9
pool depth ratio	d _{pool} /d _{bkf}	-	-	2.6		-	2.4		-	2.4	3.9
pool width at bankfull	w _{pool}	feet	-	38.0		-	37.0		-	17.5	
pool width ratio	w _{pool} /w _{bkf}	-	-	1.4		-	1.4		-	1.4	
Pattern											
sinuosity	K	-	-	1.26		-	1.1		-	1.15	
belt width	w _{bit}	feet	-	90.0	224	-	83.0	208	-	32	102
meander width ratio	w _{bit} /w _{bkf}	-	-	3.2	8.0	-	3.2	8.0	-	2.5	8.0
linear wavelength (formerly meander length)	LW	feet	-	126	308	-	117	286	-	64	128
linear wavelength ratio (formerly meander length ratio)	LW/w _{bkf}	-	-	4.5	11.0	-	4.5	11.0	-	5.0	10.0
meander length	L _m	feet	-	159	388	-	148	361	-	72	145
meander length ratio	L _m /w _{bkf}	-	-	5.7	13.9	-	5.7	13.9	-	5.6	11.3
radius of curvature	R _c	feet	-	56	132	-	52	122	-	26	47
radius of curvature ratio	R _c /w _{bkf}	-	-	2.0	4.7	-	2.0	4.7	-	2.0	3.7

Proposed Geomorphology

Proposed Geomorphic Parameters											
	Notation	Units	Gypsum Creek - Reach 2			Mica Creek			Dolomite		
			Typical Section Values	Min	Max	Typical Section Values	Min	Max	Typical Section Values	Min	Max
stream type			C4			C4			C4		
drainage area	DA	sq mi	0.004			0.14			0.011		
design discharge	Q	cfs	4.0	-		16.0	-		4.0	-	
bankfull cross-sectional area	A _{bkf}	SF	2.9	-		5.7	-		1.6	-	
average velocity during bankfull event	V _{bkf}	fps	1.4	-		2.8	-		2.8	-	
Cross Section											
width at bankfull	w _{bkf}	feet	6.0	-		8.7	-		4.5	-	
maximum depth at bankfull	d _{max}	feet	0.8	-		1.0	-		0.6	-	
mean depth at bankfull	d _{bkf}	feet	0.5	-		0.7	-		0.4	-	
bankfull width to depth ratio	w _{bkf} /d _{bkf}		13	-		13	-		11	-	
max depth ratio	d _{max} /d _{bkf}	feet	1.6	-		1.4	-		1.5	-	
bank height ratio	BHR	-	-	1.0		-	1.0		-	1.0	
floodprone area width	w _{fpa}	feet	-	>20		-	>50		-	>50	
entrenchment ratio	ER	-	-	>2.2		-	>2.2		-	>2.2	
Slope											
valley slope	S _{valley}	feet/foot	0.016			0.010			0.012		
channel slope	S _{chnl}	feet/foot	-	0.004	0.018	-	0.006	0.027	-	0.023	
Profile											
riffle slope	S _{riffle}	feet/foot	-	0.032	0.007	-	0.017	0.040	-	0.019	0.003
riffle slope ratio	S _{riffle} /S _{chnl}	-	-	1.7	3.5	-	1.5	2.6	-	0.817	0.117
pool slope	S _p	feet/foot	-	0.000		-	0.000		-	0.0	
pool slope ratio	S _p /S _{chnl}	-	-	0.0		-	0.0		-	0.000	
pool-to-pool spacing	L _{p-p}	feet	-	22	32	-	26	70	-	9	23
pool spacing ratio	L _{p-p} /w _{bkf}	-	-	3.7	5.3	-	3.0	8.0	-	2.0	5.1
pool cross-sectional area	A _{pool}	SF	-	6.7	7.4	-	12.3	15.4	-	3.5	
pool area ratio	A _{pool} /A _{bkf}	-	-	2.3	2.6	-	1.4	1.8	-	2.2	
maximum pool depth	d _{pool}	feet	-	1.5	1.7	-	1.8	2.4	-	1.0	
pool depth ratio	d _{pool} /d _{bkf}	-	-	3.0	3.4	-	2.6	3.4	-	2.5	
pool width at bankfull	w _{pool}	feet	-	8.2		-	11.8		-	6.0	
pool width ratio	w _{pool} /w _{bkf}	-	-	1.4		-	1.4		-	1.3	
Pattern											
sinuosity	K	-	-	1.12		-	1.17		-	1.0	
belt width	w _{blt}	feet	-	15	30	-	26	70	-	11	27
meander width ratio	w _{blt} /w _{bkf}	-	-	2.5	5.0	-	3.0	8.0	-	2.5	6.0
linear wavelength (formerly meander length)	LW	feet	-	30	60	-	44	96	-	23	45
linear wavelength ratio (formerly meander length ratio)	LW/w _{bkf}	-	-	5.0	10.0	-	5.1	11.0	-	5.0	10.0
meander length	L _m	feet	-	34	67	-	51	112	-	23	45
meander length ratio	L _m /w _{bkf}	-	-	5.7	11.2	-	5.9	12.9	-	5.0	10.0
radius of curvature	R _c	feet	-	12	24	-	17	39	-	9	18
radius of curvature ratio	R _c /w _{bkf}	-	-	2.0	4.0	-	2.0	4.5	-	2.0	4.0

Proposed Geomorphology



Soil & Environmental Consultants, PA

11010 Raven Ridge Road • Raleigh, North Carolina 27614 • Phone: (919) 846-5900 • Fax: (919) 846-9467
www.SandEC.com

HYDRIC SOIL INVESTIGATION

Liberty Rock Project Site
7279 Liberty Park Ave., Liberty, NC
PIEDMONT
Cape Fear River Basin
Randolph County, North Carolina

Prepared for:
Mr. John Hutton
Wildlands
312 West Millbrook Road, Suite 225
Raleigh, NC 27609



Kevin C. Martin



August 7th, 2019

INTRODUCTION

Soil & Environmental Consultants, PA (S&EC, PA) was retained to perform a preliminary evaluation to assess the presence and extent of hydric soils onsite. The project area is currently planted in herbaceous grass, with some mixed hardwoods along the perimeter. The project area contained hydric soil indicator F3 throughout its extent. (see attached Figure A - Preliminary Soils Investigation Map)

METHODOLOGY

On August 1st, 2019 S&EC, PA staff performed a hydric soil evaluation at the site. Hand auger borings were advanced on the property at locations as appropriate to approximately estimate the location and extent of hydric soils within the project area (see attached Figure A - Preliminary Soils Investigation Map). Each soil boring was evaluated to assess the presence or absence of hydric soil indicators. Hydric soil indicators were identified utilizing the NRCS Field Indicators of Hydric Soils in the United States - A Guide for Identifying and Delineating Hydric Soils (Version 8.2, 2018).

All areas evaluated are mapped as the poorly drained to very poorly drained Wehadkee soil series (Fine-loamy, mixed, active, nonacid, thermic Fluvaquentic Endoaquepts) and the somewhat poorly drained Chewacla series (Fine-loamy, mixed, active, thermic Fluvaquentic Dystrudepts). Most hydric soils observed onsite within the project area were most like Wehadkee soil series (Fine-loamy, mixed, active, nonacid, thermic Fluvaquentic Endoaquepts), except for a few small areas along the northwestern perimeter of the project area that were similar to the poorly drained Roanoke soil series (Fine, mixed, semiactive, thermic Typic Endoaquult). The Roanoke soils are a bit more clayey than the Wehadkee soils. There were no non-hydric soils observed within the project area.

RESULTS

Approximately 12 soil borings were performed within the study area. Soil characteristics were evaluated and all areas identified as containing hydric soils met the hydric soil criteria described below.

Soil boring locations are indicated on the attached Preliminary Soils Investigation Map. The depth to and type of hydric soil indicator at each boring is shown in the table on the Preliminary Soils Investigation Map.

Plus Signs - - are hydric soils areas containing a depleted matrix ((F3) indicator) within 10" of current land surface

Indicator F3: Depleted Matrix

Technical Description: A layer that has a depleted matrix with 60 percent or more chroma of 2 or less and that has a minimum thickness of either:

- (a) 2 in. (5 cm) if the 2 in. (5 cm) is entirely within the upper 6 in. (15 cm) of the soil, or
- (b) 6 in. (15 cm) starting within 10 in. (25 cm) of the soil surface.

Soil Profile #1 / Boring Location 1
 Hydric Soil Indicator F3
 Series and Taxonomic Class: Wehadkee - Fine-loamy, mixed, active, nonacid, thermic Fluvaquentic Endoaquepts

Horizon Depth (inches)	Horizon	Matrix Color (moist)	%	Redox Features			Texture	Notes	
				Color (moist)	%	Type			Location
0-10	A	10YR 6/6	90	5YR 5/8	10	C	M	Silt Loam	
10-18	Bg1	10YR 6/1	70	5YR 5/8 10YR 6/6	15 15	C C	M, PL M, PL	Silt Loam	
18-31	Bg2	10YR 6/1	90	5YR 5/8	10	C	PL	Silt Loam	
31-33	Bt	10YR 6/1 5YR 4/6	50 50					Silty Clay Loam	
33-41	Cg	10YR 5/1	100					Sandy Clay Loam	



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Soil Profile #2 / Boring Location 3

Hydric Soil Indicator F3

Series and Taxonomic Class: Wehadkee - Fine-loamy, mixed, active, nonacid, thermic Fluvaquentic Endoaquepts

Horizon Depth (inches)	Horizon	Matrix Color (moist)	%	Redox Features				Texture	Notes
				Color (moist)	%	Type	Location		
0-3	A	10YR 7/1	100					Silt Loam	
3-20	Bg	10YR 7/1	60	5YR 5/8 10YR 6/6	20 15	C C	M M	Silt Loam	
20-24	CB	10YR 7/1	100					Gravelly Sandy Loam	



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Soil Profile #3 / Boring Location 5
 Hydric Soil Indicator F3
 Series and Taxonomic Class: Roanoke - Fine, mixed, semiactive, thermic Typic Endoaquult

Horizon Depth (inches)	Horizon	Matrix Color (moist)	%	Redox Features			Texture	Notes	
				Color (moist)	%	Type			Location
0-6	A	10YR 7/1	100				Silt Loam		
6-24	Btg1	10YR 5/1	80	10YR 6/6	20	C	M	Clay	Expansive Clay Mineralogy
24-36+	Btg2	10YR 5/1 10YR 6/6	50 50					Clay	Expansive Clay Mineralogy



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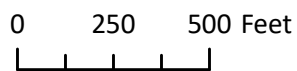
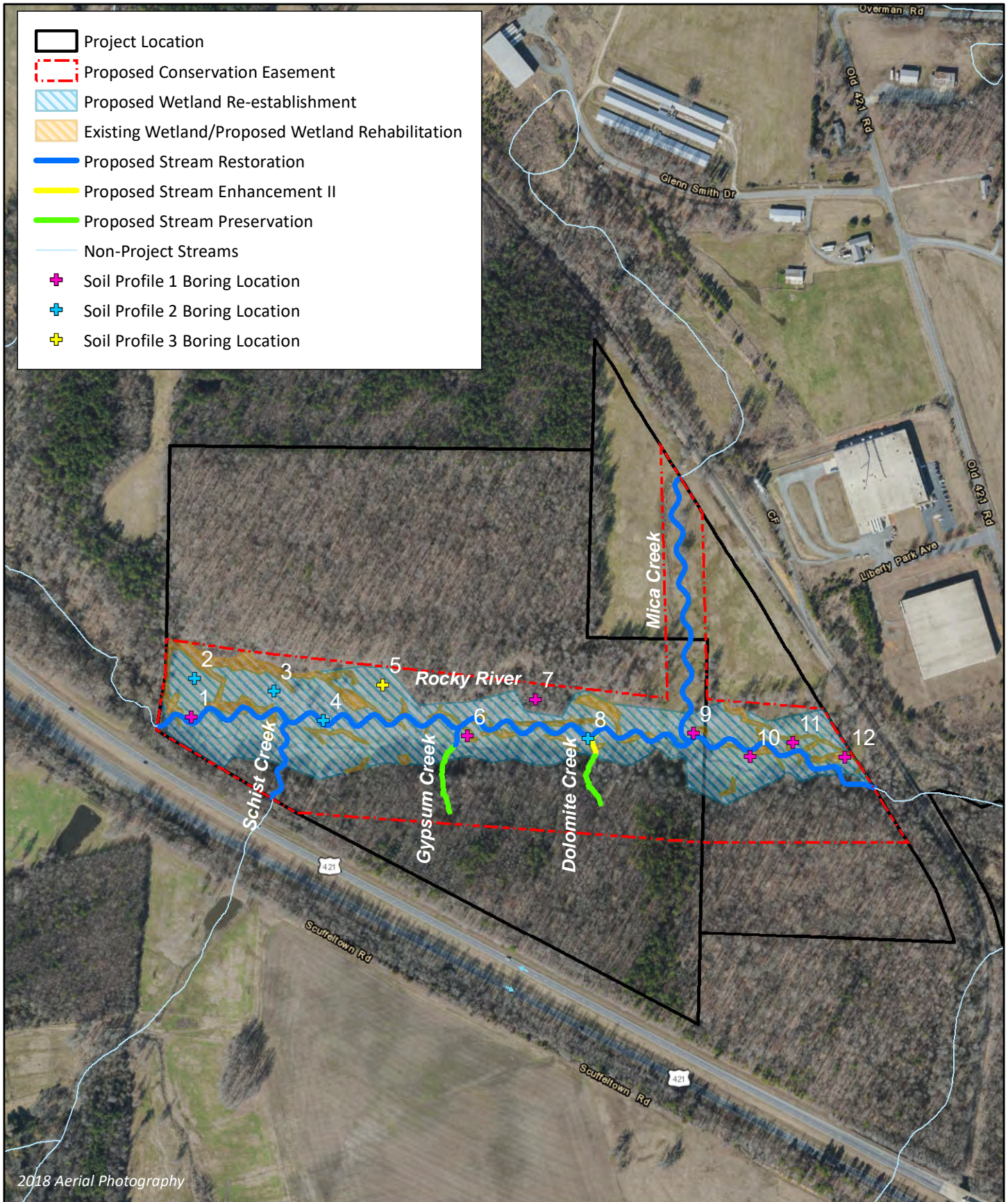


Figure A - Preliminary Soils Investigation Map
 Liberty Rock Mitigation Site - Option 2
 Cape Fear River Basin (03030003)

Randolph County, NC

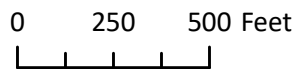
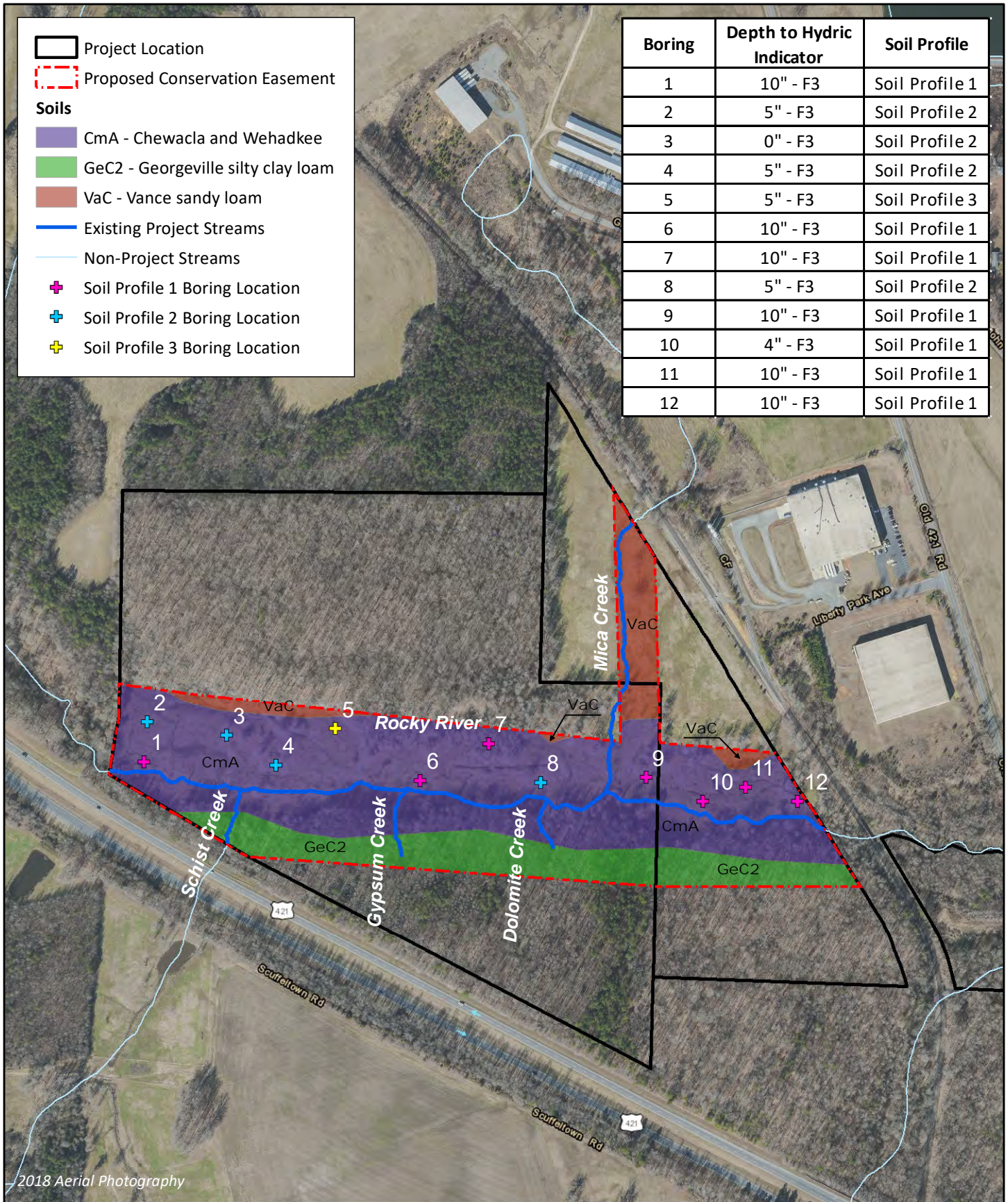


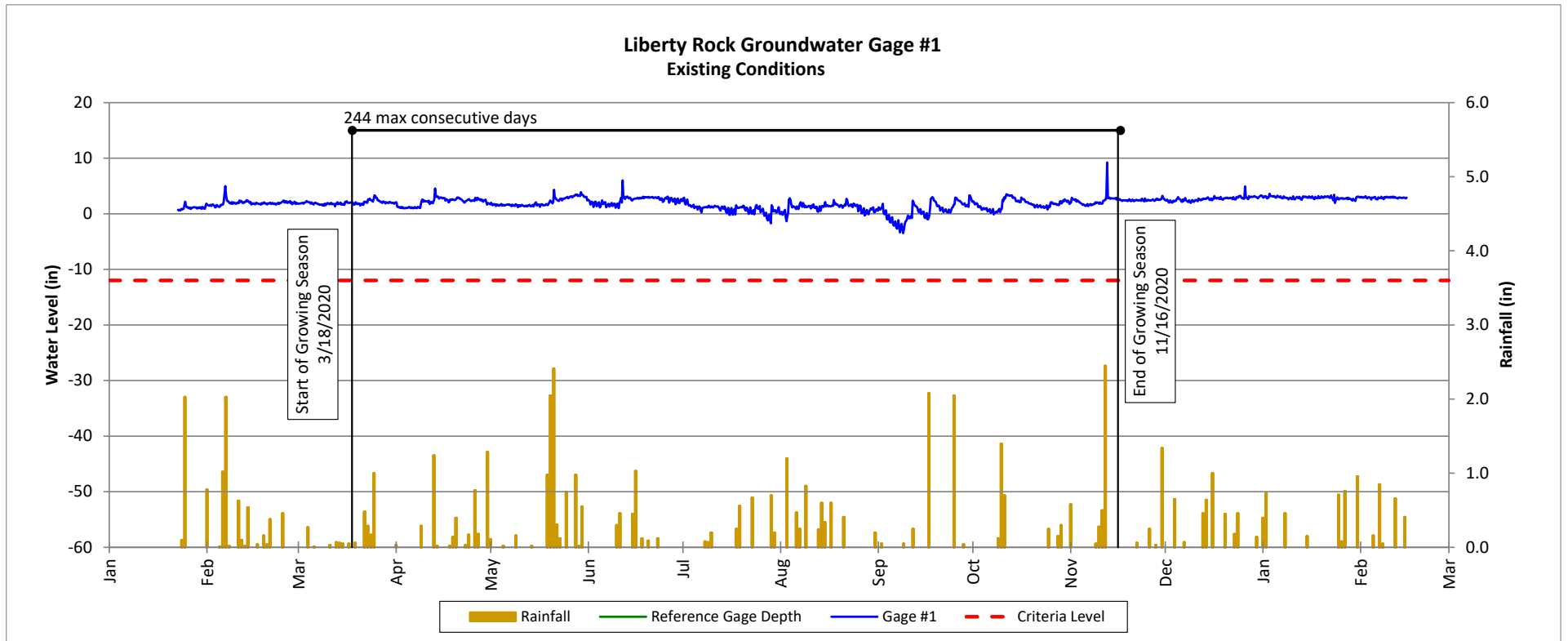
Figure B - Preliminary Soils Investigation Map
 Liberty Rock Mitigation Site - Option 2
 Cape Fear River Basin (03030003)

Groundwater Gage Plots

Liberty Rock Mitigation Site

DMS Project No. 100135

Existing Conditions

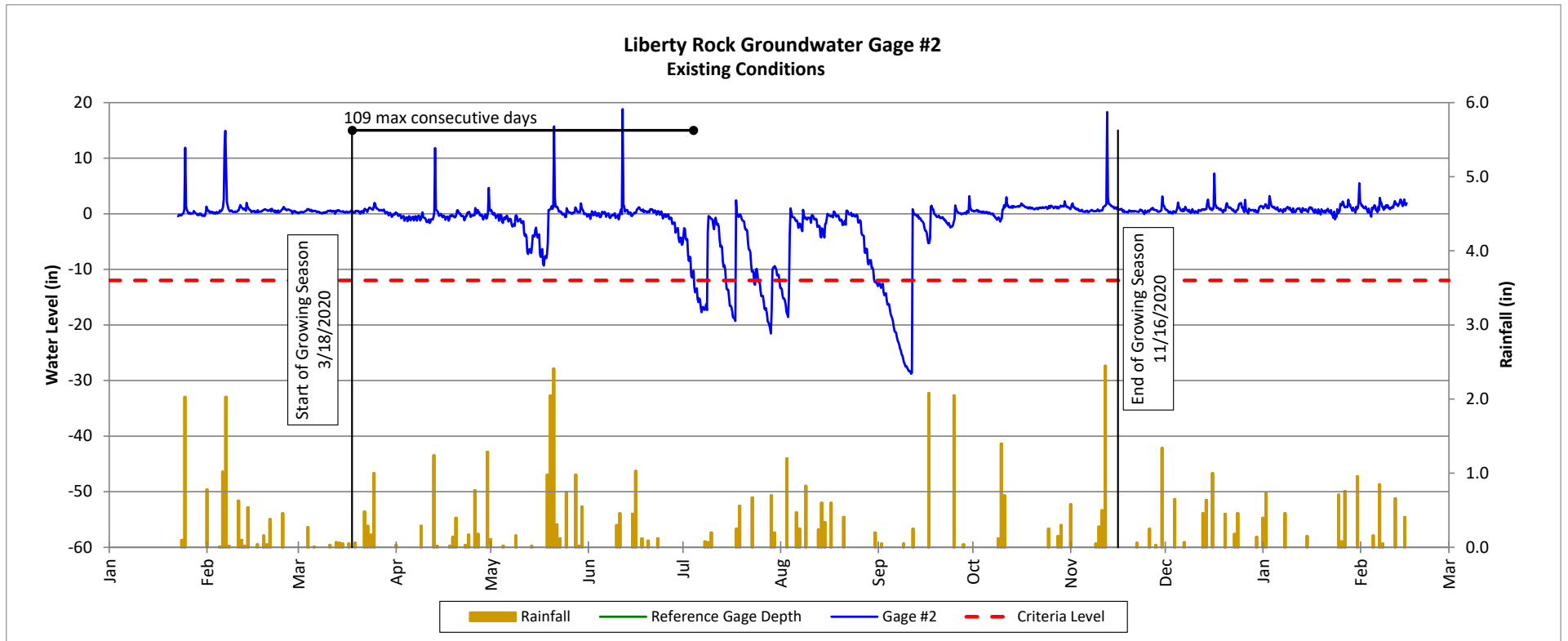


Groundwater Gage Plots

Liberty Rock Mitigation Site

DMS Project No. 100135

Existing Conditions

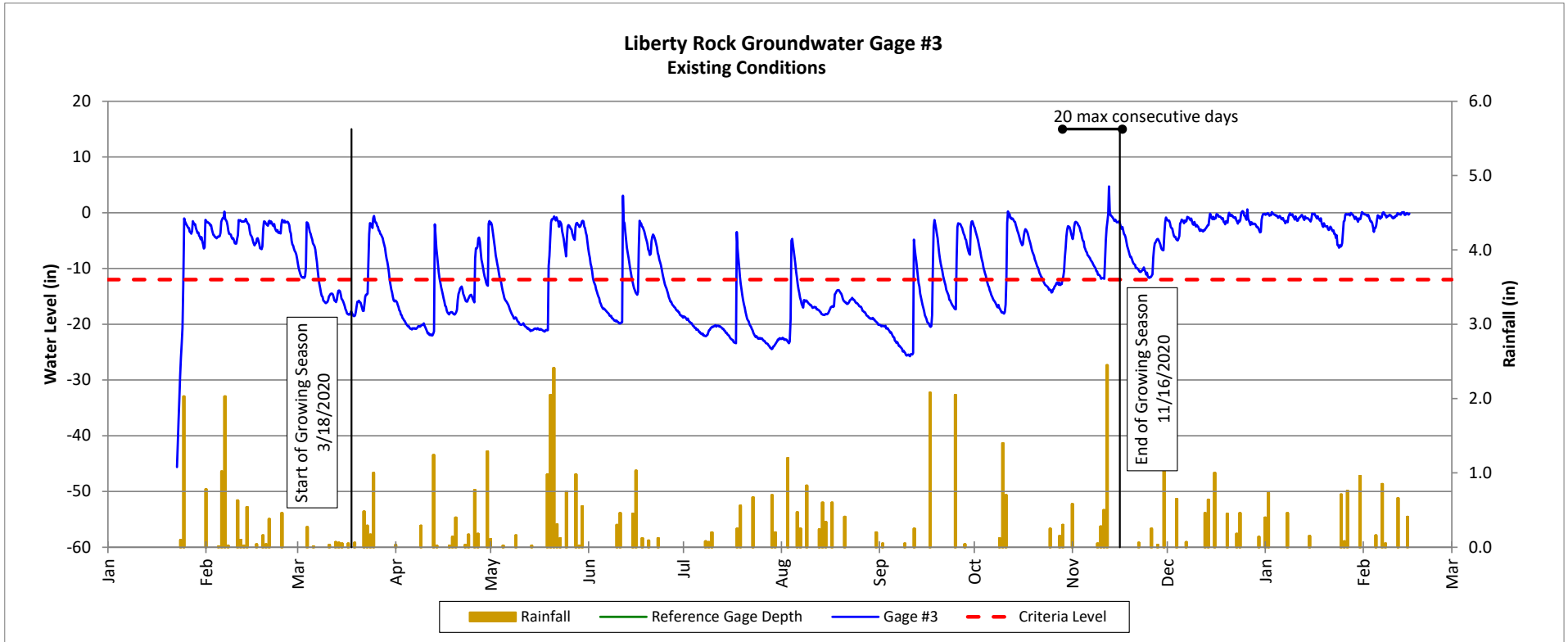


Groundwater Gage Plots

Liberty Rock Mitigation Site

DMS Project No. 100135

Existing Conditions

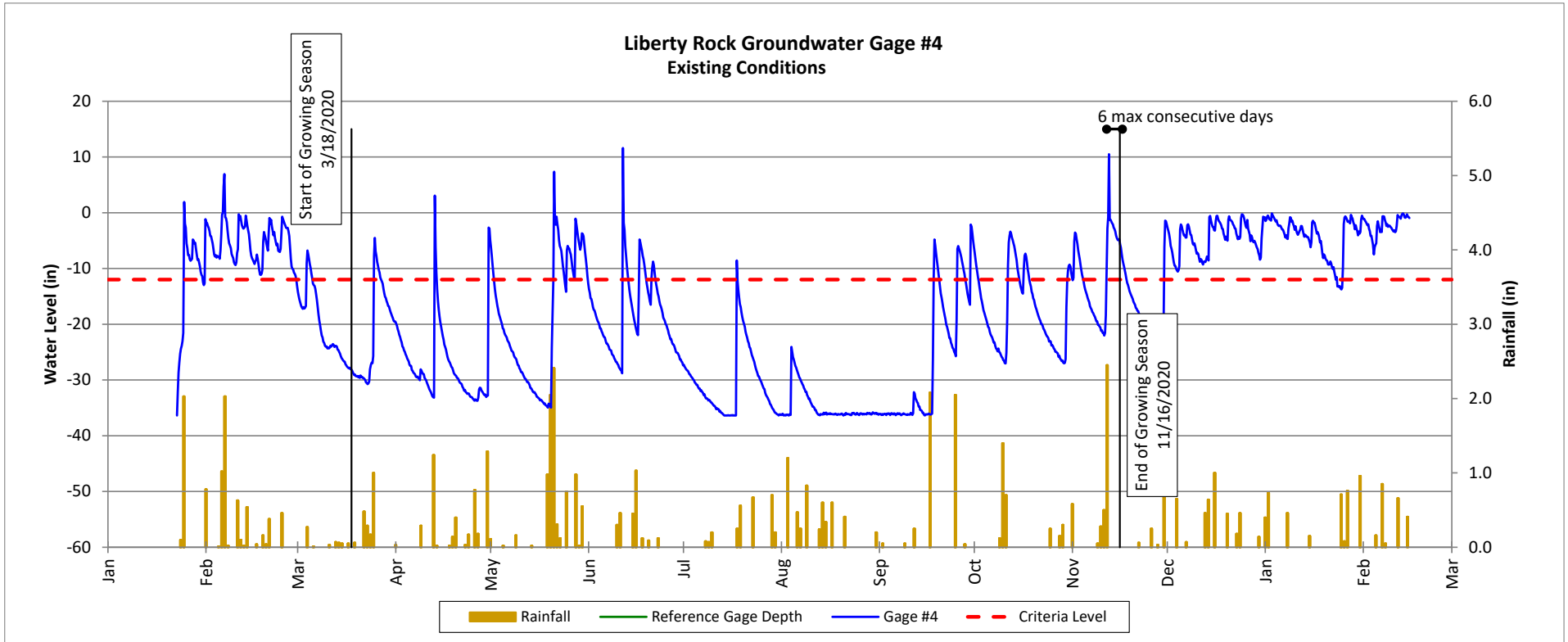


Groundwater Gage Plots

Liberty Rock Mitigation Site

DMS Project No. 100135

Existing Conditions

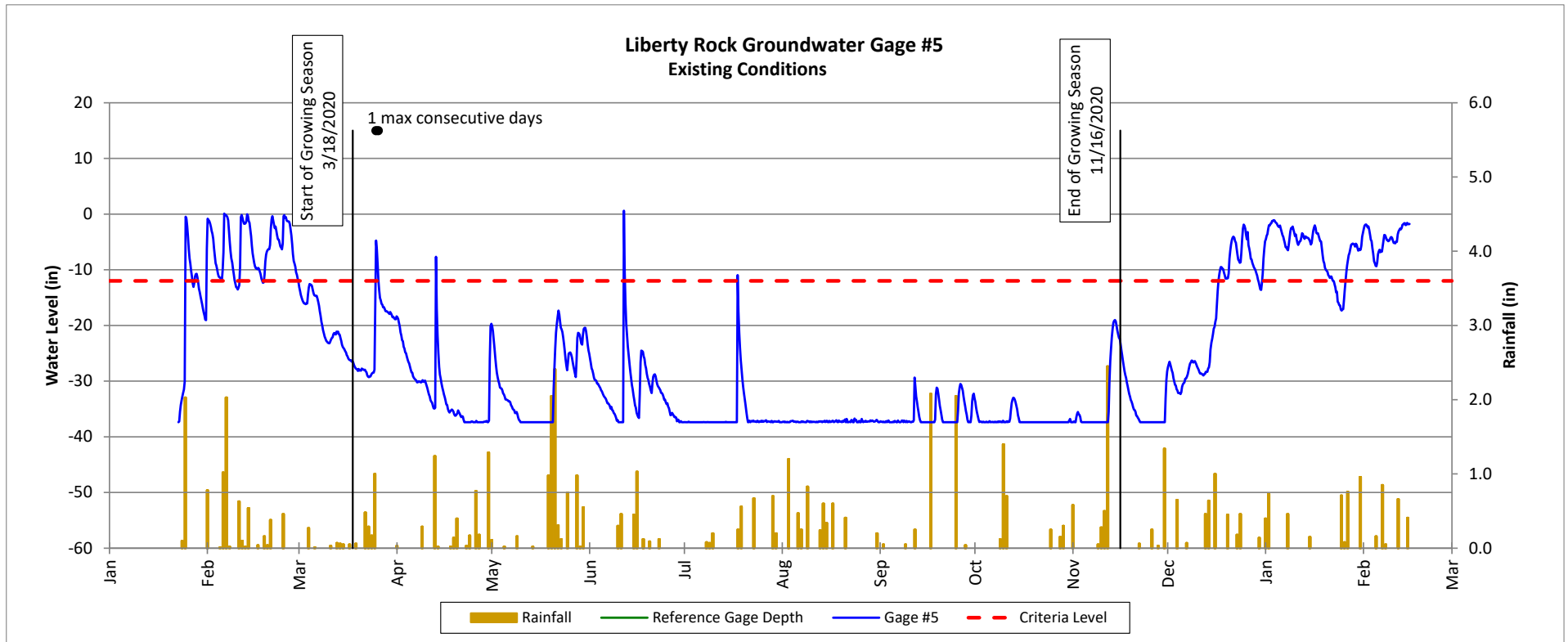


Groundwater Gage Plots

Liberty Rock Mitigation Site

DMS Project No. 100135

Existing Conditions

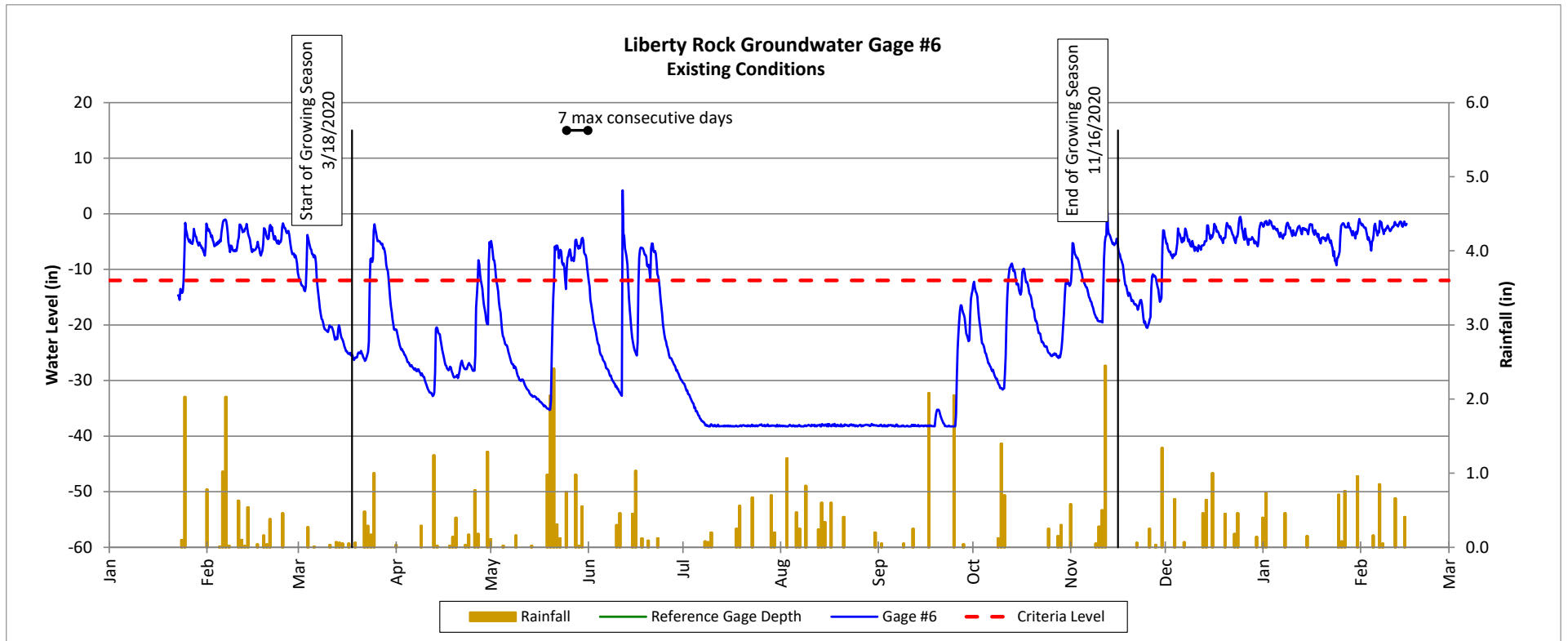


Groundwater Gage Plots

Liberty Rock Mitigation Site

DMS Project No. 100135

Existing Conditions

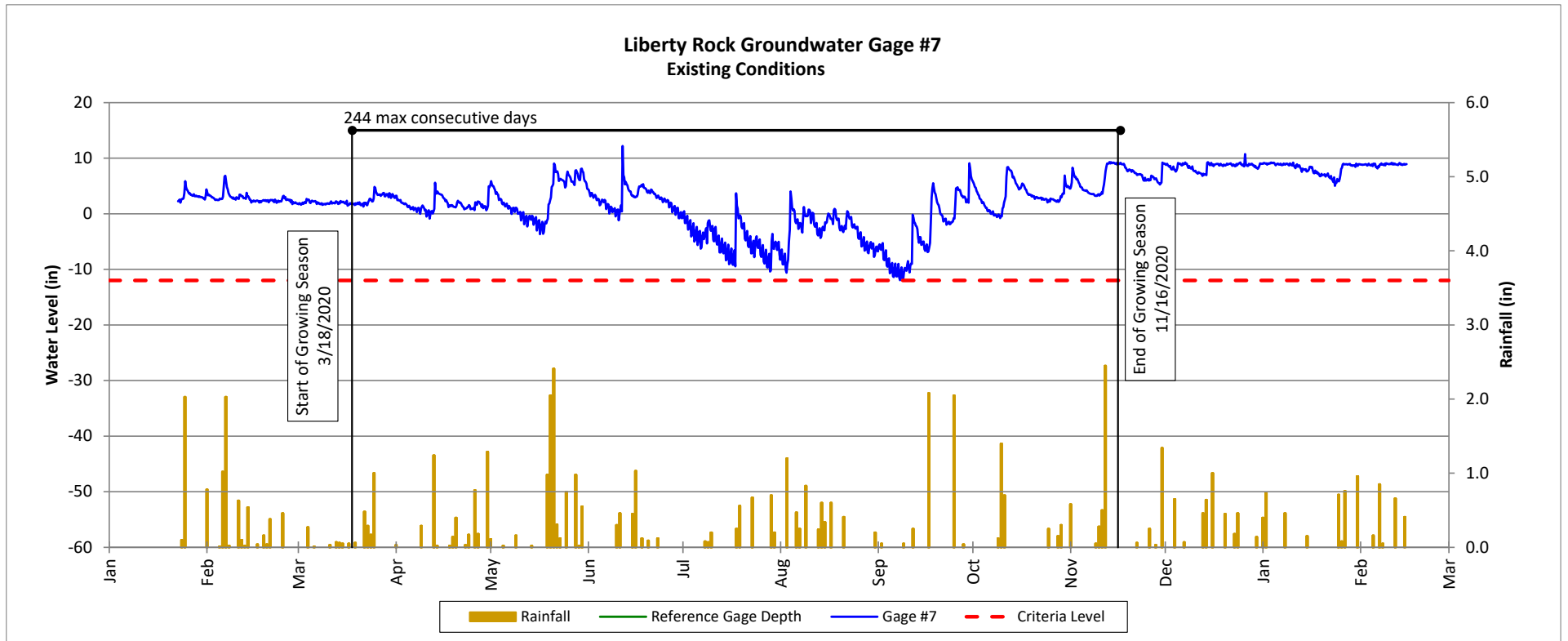


Groundwater Gage Plots

Liberty Rock Mitigation Site

DMS Project No. 100135

Existing Conditions

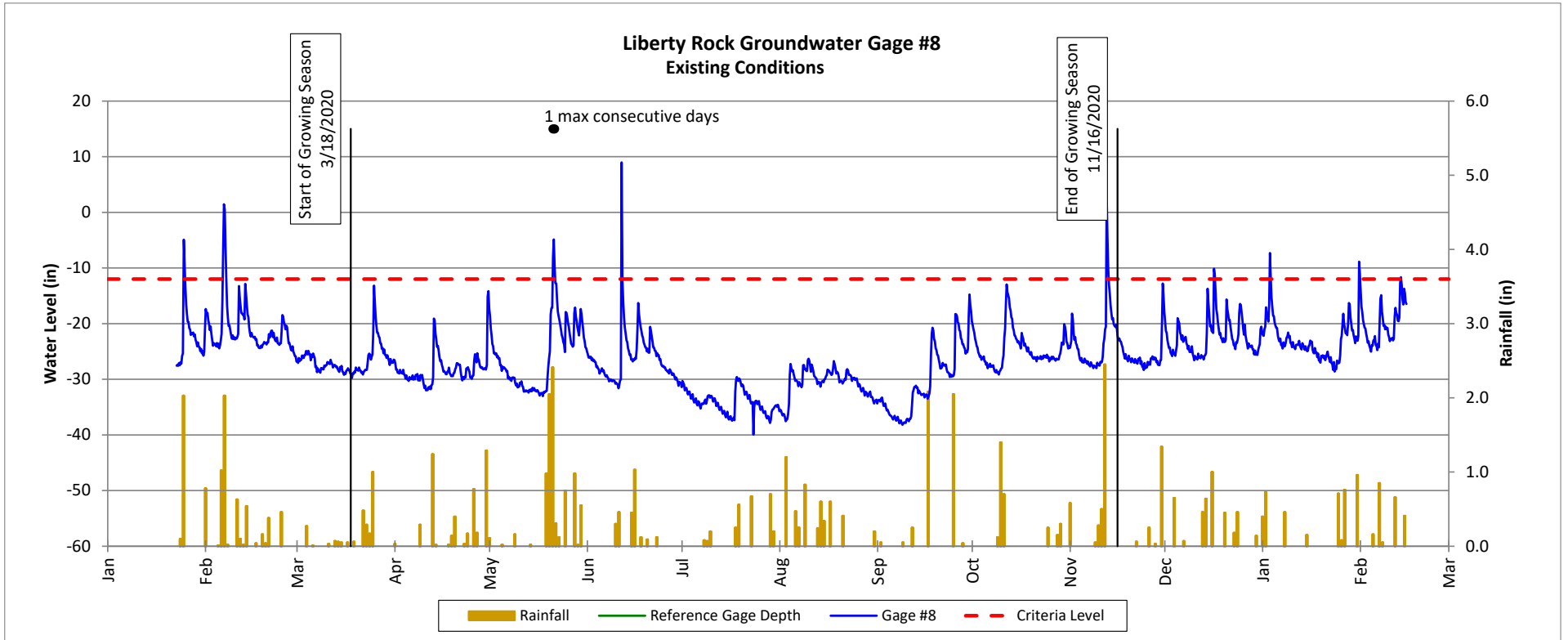


Groundwater Gage Plots

Liberty Rock Mitigation Site

DMS Project No. 100135

Existing Conditions

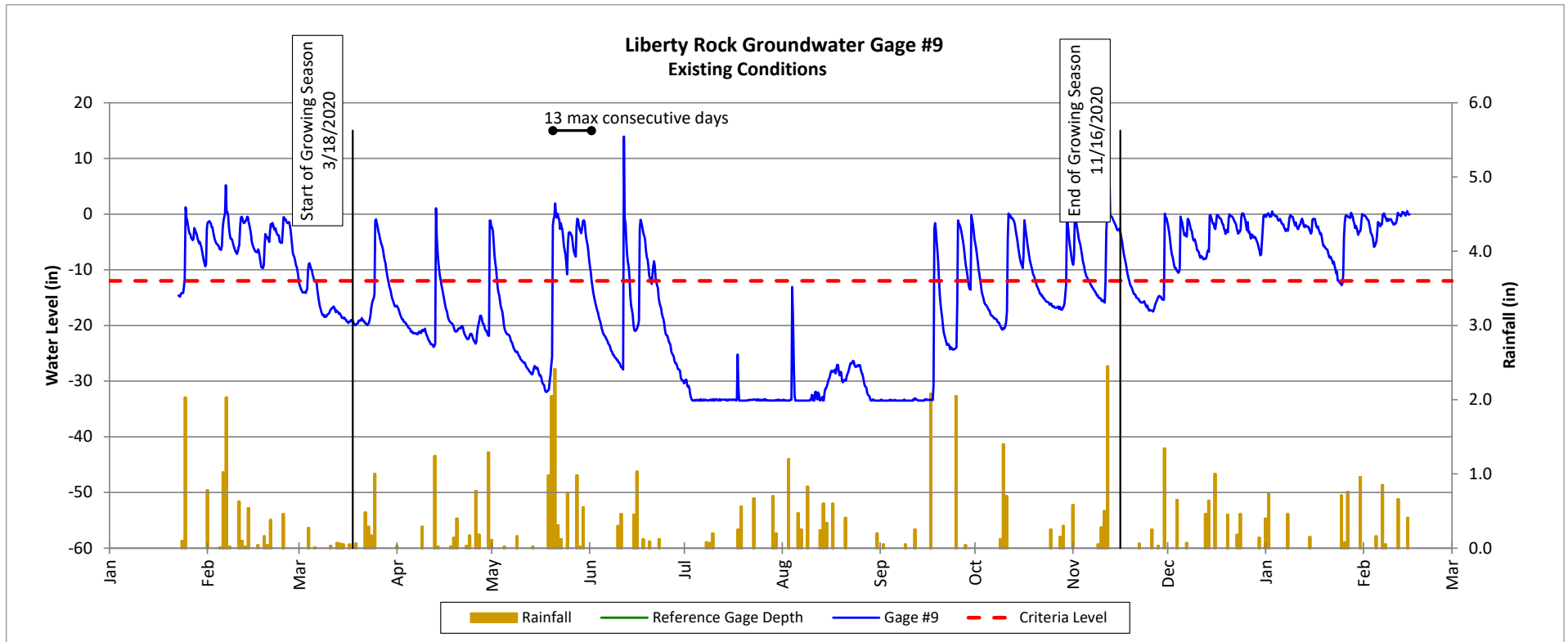


Groundwater Gage Plots

Liberty Rock Mitigation Site

DMS Project No. 100135

Existing Conditions

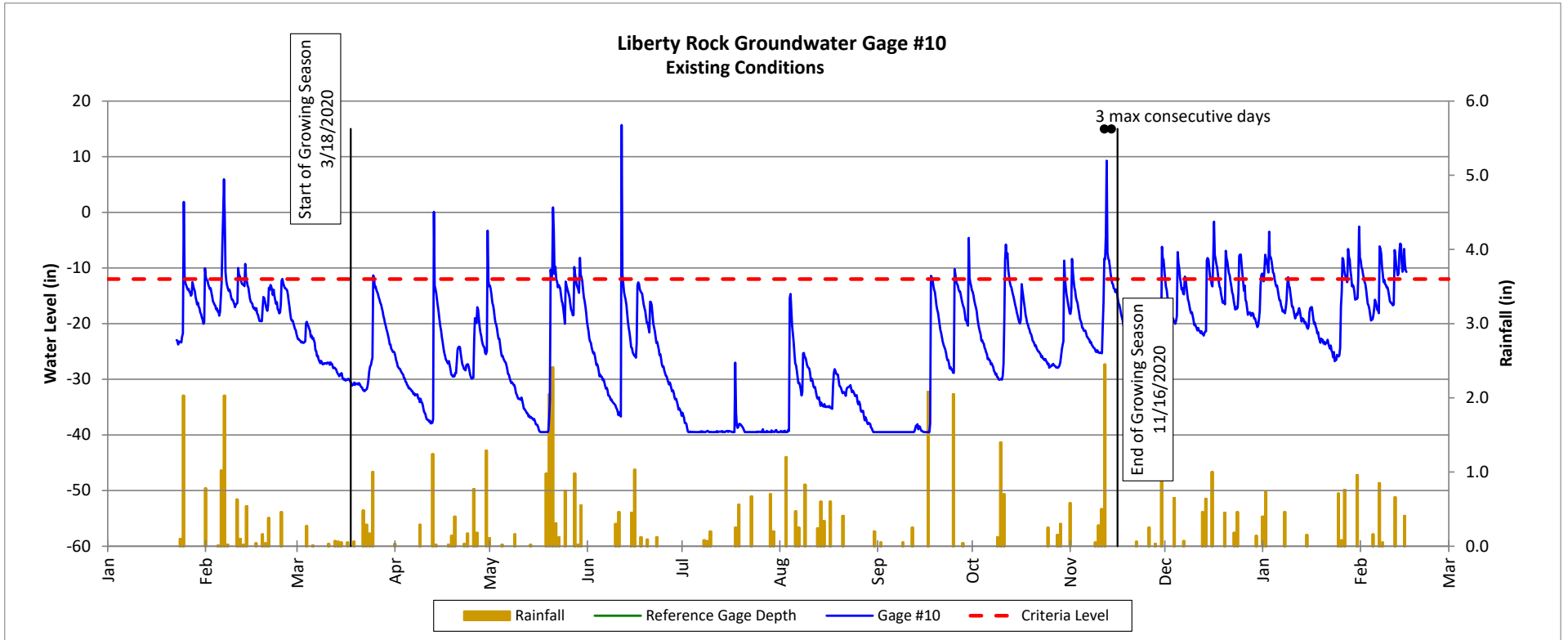


Groundwater Gage Plots

Liberty Rock Mitigation Site

DMS Project No. 100135

Existing Conditions



Mussel Survey Report

Liberty Rock Stream Mitigation Enhancement Reach

Upper Rocky River

Randolph County, North Carolina



Prepared For:



Wildlands Engineering, Inc.
Raleigh, North Carolina

Contact Person:

Angela Allen
312 West Millbrook Road, Suite 325
Raleigh, NC 27609

February 2021

Prepared by:



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Raleigh, NC 27603

Contact Person:

Chris Sheats

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919-417-2732

Table of Contents

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4.0 Discussion/Conclusions..... 2

Appendix I.

Figure 1

Appendix II.

Survey Reach Photos

1.0 INTRODUCTION

The Liberty Rock Stream Mitigation project design has been revised and will consist of realigning 1990 linear feet (lf) of stream channel upstream, and 420 lf downstream. A 580 lf reach in between is proposed for enhancement. Based on North Carolina Wildlife Resources Commission (NCWRC) recommendations, SEPI conducted a freshwater mussel survey within 700 lf of stream (580 lf of enhancement reach, plus an additional 120 lf upstream) to detail the distribution and densities of freshwater mussels. This report details the findings to assist in the stream restoration design.

2.0 SURVEY EFFORTS

The survey was divided into seven-100 lf reaches, which were subdivided into three sections (e.g. Station 0-100 lf; Section 1 (0-33 lf), Section 2 (33-66 lf), and Section 3 (66-100 lf)). Freshwater mussels were surveyed using visual (bathyscopes) and tactile methods. A pin flag was placed at each freshwater mussel observed. Individuals were identified and placed back in the stream after each survey reach. A catch per unit effort (CPUE) for each species was estimated for each reach, as well as an overall CPUE for each species was estimated for the entire survey. State status species were measured and checked for gravidity. The survey began at the downstream extent of the proposed enhancement reach (Station 0) and terminated 700 lf upstream (Station 700). Surveys (Station 0-600) were conducted on February 11, 2021 by SEPI personnel Chris Sheats, Tori Fowler, Anna Reusche, and Wildlands Engineering personnel Tasha King. Surveys for the remaining reach (Station 600-700) was completed on February 12, 2021 by Chris Sheats and Tori Fowler.

3.0 RESULTS

A total of 225 freshwater mussels were observed in the proposed enhancement reach of the Liberty Rock Stream Mitigation Project. Five species were observed including eastern elliptio (*Elliptio complanata*), eastern floater (*Pyganodon cataracta*), Florida pondhorn (*Unio merus carolinianus*), notched rainbow (*Villosa constricta*), and the eastern creekshell (*Villosa delumbis*) (Table 1-2).

Table 1. Freshwater mussels observed in the Upper Rocky River (27 hrs total survey time).

Common Name	Scientific Name	NC Status*	# Live	% of Total	CPUE*
Eastern elliptio	<i>Elliptio complanata</i>	-	183	81%	6.78
Notched rainbow	<i>Villosa constricta</i>	SC	19	8.4%	0.70
Eastern creekshell	<i>Villosa delumbis</i>	E	18	8%	0.67
Florida pondhorn	<i>Unio merus carolinianus</i>	-	4	1.8%	0.15
Eastern floater	<i>Pyganodon cataracta</i>	-	1	0.4%	0.04
Total			225	100	8.34

* NC Status (SC-Special Concern; E-Endangered); CPUE-Catch per Unit Effort

Upper Rocky River (210210.1cms, 210211.1cms)

The stream was 3-4 meters wide with majority of the reach having depths less than 0.5 meter. Riffle, run and pool habitats were present throughout the reaches. Substrate was dominated by sand, cobble and gravel particles with bedrock present in some sections.

Table 2. Species observed within the proposed enhancement reach.

Common Name	Scientific Name	Reach 1			Reach 2			Reach 3			Reach 4			Reach 5			Reach 6			Reach 7		
		(0-100ft)			(100-200ft)			(200-300ft)			(300-400ft)			(400-500ft)			(500-600ft)			(600-700ft)		
		Section			Section			Section			Section			Section			Section			Section		
		1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3
<i>Eastern elliptio</i>	<i>E. complanata</i>	14	2	14	2	4	7	10	-	-	1	3	29	5	22	12	12	7	5	15	11	8
<i>Eastern floater</i>	<i>P. cataracta</i>	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1
<i>Florida pondhorn</i>	<i>U. carolinianus</i>	1	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	1	-	1
<i>Notched rainbow</i>	<i>V. constricta</i>	-	-	1	-	1	1	-	-	1	-	-	5	1	5	1	-	-	1	1	-	1
<i>Eastern creekshell</i>	<i>V. delumbis</i>	1	-	1	-	2	1	-	-	-	-	2	4	1	-	-	1	-	-	1	1	3
Total per reach		34			18			11			45			47			26			44		
CPUE per reach		8.5			4.23			2.59			10.59			11.06			6.12			25.12		

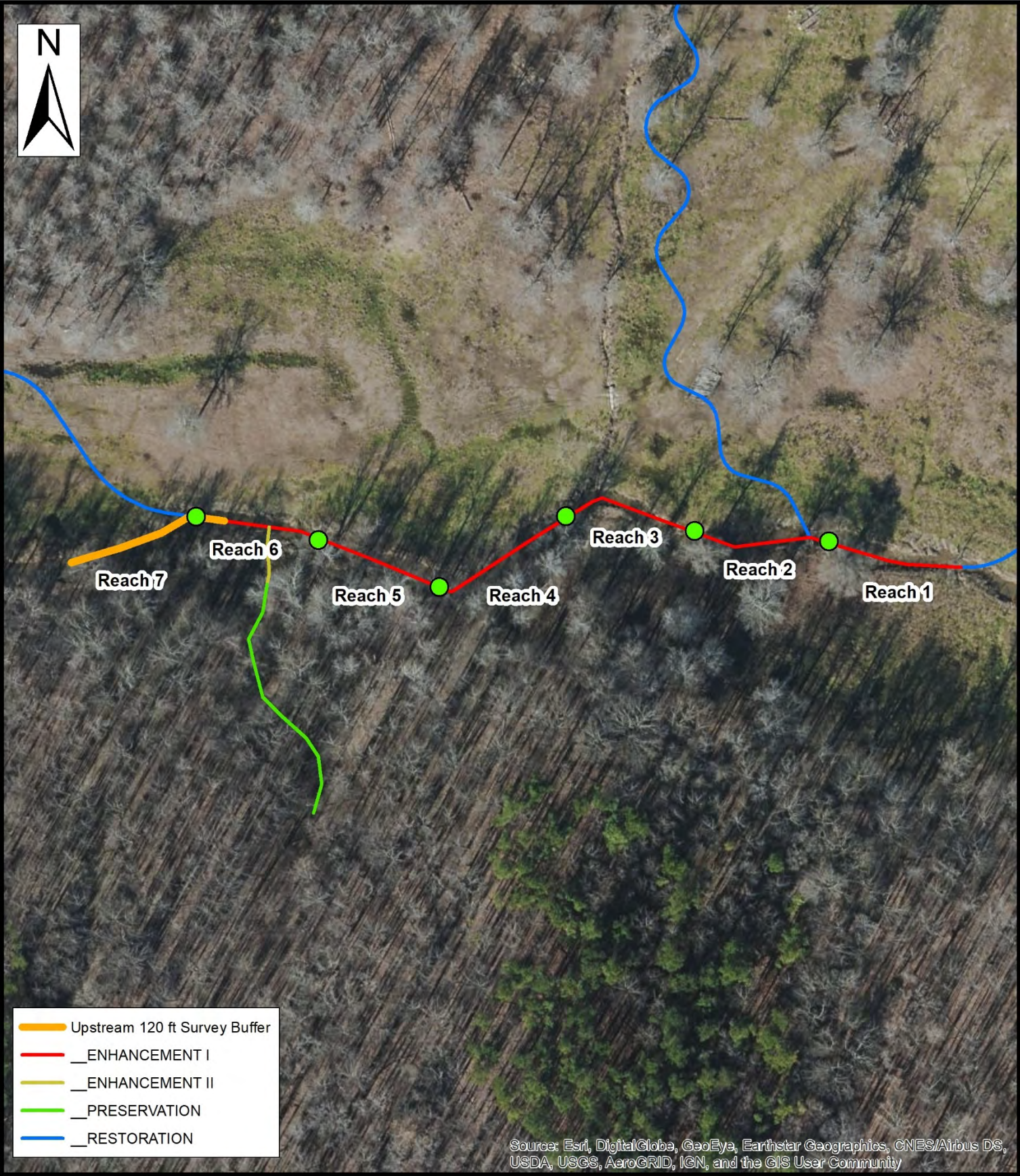
Subsections 1-3 are divided into lengths of approximately 33 feet

4.0 DISCUSSION/CONCLUSIONS

Five freshwater mussel species were observed including eastern elliptio, notched rainbow, eastern creekshell, Florida pondhorn, and eastern floater. Eastern elliptio was the dominant species observed and a wide range of size class observed (30-80mm) indicating species recruitment. The abundance of the notched rainbow, a species of special concern, and the state endangered eastern creekshell, several of both species gravid with glochidia, indicates a relatively healthy and stable reach of stream. Reach 2 and 3 had the least observed mussels, while Reaches 4, 5, and 7 had most observations and greatest species diversity (Table 2). Most mussel observations were where stable substrates consisting of a cobble/gravel/sand mix. Undercut bank habitats were very uncommon, and mussels were rarely observed in those habitats. Most individuals were observed in the vicinity of the channel thalweg. Should streambank activities take place within this reach of the Upper Rocky River, extreme caution is highly recommended to avoid impacts to these mussels. This survey memorandum serves to update species information within this segment of the Upper Rocky River.

APPENDIX I

Figure 1



- Upstream 120 ft Survey Buffer
- _ENHANCEMENT I
- _ENHANCEMENT II
- _PRESERVATION
- _RESTORATION

Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

Prepared By:



Prepared For:



Liberty Rock Stream Mitigation Project Enhancement Reach Freshwater Mussel Survey

Upper Rocky River
of the Cape Fear River Basin

Randolph County, North Carolina

Created By:

CMS

Checked By:

VCF

Scale:

0 20 40
Feet

Date:

February 2021

Figure

1

APPENDIX II

Photos



Reach 1 (@ Station 0), facing upstream.



Reach 2 (@ Station 100), facing upstream.



Reach 3 (@ Station 200), facing upstream.



Reach 4 (@ Station 300), facing upstream.



Reach 4 (@ ~Station 330), facing upstream at Section 2 and 3.



Reach 4 (@ Station 400) facing downstream at Sections 2 and 3.



Reach 5 (@ Station 500) facing downstream.



Reach 6 (@ Station 500) facing upstream.



Reach 7 (@ Station 600) facing upstream.



Species diversity observed in Reach 7.

Appendix 2

Site Protection Instrument

The land required for construction, management, and stewardship of this mitigation project includes portions of the parcels listed in Table 1. A conservation easement was recorded on the parcels and includes streams being restored along with their corresponding riparian buffers.

Table 1: Site Protection Instrument

Landowner	PIN	County	Under Option to Purchase by Wildlands?	Memorandum of Option Conservation Easement Deed Book (DB) and Page Number (PG)	Acreage to be Protected
Lyn Villa Smith Richardson	8735-23-4859	Randolph	Yes	DB: 2629, PG: 714	10.73
Lyn Villa Smith Richardson	8735-33-8516	Randolph	Yes	DB:2629, PG: 726	30.38

All site protection instruments require 60-day advance notification to the USACE and or DMS prior to any action to void, amend, or modify the document. No such action shall take place unless approved by the State.

Appendix 3

1.0 DWR Stream Classification

The results of the DWR Stream Classification Forms are listed in the table below. DWR forms can be found in this appendix and in the digital submission to DMS. DWR forms were completed by Wildlands for all on-site streams.

Table 1: DWR Form Summary

Stream	Geomorphology Score	Hydrology Score	Biology Score	Total Score
Rocky River	24.5	6.5	13	44
Shist Creek	25.5	5	9.5	40
Gypsum Creek	15	6	6	27
Dolomite Creek	13	3.5	8.5	25
Mica Creek	15	6	10	31

NC DWQ Stream Identification Form Version 4.11

Date: 8/1/2019	Project/Site: Liberty Rock	Latitude: 35.820276
Evaluator: GT	County: Randolph	Longitude: -79.568019
Total Points: Stream is at least intermittent if ≥ 19 or perennial if $\geq 30^*$ 44	Stream Determination (circle one) Ephemeral Intermittent <u>Perennial</u>	Other Rocky River e.g. Quad Name:

A. Geomorphology (Subtotal = 24.5)

	Absent	Weak	Moderate	Strong
1 ^a Continuity of channel bed and bank	0	1	2	3
2. Sinuosity of channel along thalweg	0	1	2	3
3. In-channel structure: ex. riffle-pool, step-pool, ripple-pool sequence	0	1	2	3
4. Particle size of stream substrate	0	1	2	3
5. Active/relict floodplain	0	1	2	3
6. Depositional bars or benches	0	1	2	3
7. Recent alluvial deposits	0	1	2	3
8. Headcuts	0	1	2	3
9. Grade control	0	0.5	1	1.5
10. Natural valley	0	0.5	1	1.5
11. Second or greater order channel	No = 0		Yes = 3	

^a artificial ditches are not rated; see discussions in manual

B. Hydrology (Subtotal = 6.5)

12. Presence of Baseflow	0	1	2	3
13. Iron oxidizing bacteria	0	1	2	3
14. Leaf litter	1.5	1	0.5	0
15. Sediment on plants or debris	0	0.5	1	1.5
16. Organic debris lines or piles	0	0.5	1	1.5
17. Soil-based evidence of high water table?	No = 0		Yes = 3	

C. Biology (Subtotal = 13)

18. Fibrous roots in streambed	3	2	1	0
19. Rooted upland plants in streambed	3	2	1	0
20. Macroinvertebrates (note diversity and abundance)	0	1	2	3
21. Aquatic Mollusks	0	1	2	3
22. Fish	0	0.5	1	1.5
23. Crayfish	0	0.5	1	1.5
24. Amphibians	0	0.5	1	1.5
25. Algae	0	0.5	1	1.5
26. Wetland plants in streambed	FACW = 0.75; OBL = 1.5 Other = 0			

*perennial streams may also be identified using other methods. See p. 35 of manual.

Notes:

Sketch:

NC DWQ Stream Identification Form Version 4.11

Date: <u>8/1/2019</u>	Project/Site: <u>Liberty Rock</u>	Latitude: <u>35.819483</u>
Evaluator: <u>GT</u>	County: <u>Randolph</u>	Longitude: <u>-79.566739</u>
Total Points: <u>40</u> <i>Stream is at least intermittent if ≥ 19 or perennial if ≥ 30*</i>	Stream Determination (circle one) Ephemeral Intermittent Perennial	Other <u>Schist Creek</u> e.g. Quad Name:

A. Geomorphology (Subtotal = 25.5)

	Absent	Weak	Moderate	Strong
1 ^a Continuity of channel bed and bank	0	1	2	<u>3</u>
2. Sinuosity of channel along thalweg	0	1	2	<u>3</u>
3. In-channel structure: ex. riffle-pool, step-pool, ripple-pool sequence	0	1	2	<u>3</u>
4. Particle size of stream substrate	0	1	2	<u>3</u>
5. Active/relict floodplain	0	1	2	<u>3</u>
6. Depositional bars or benches	0	1	2	<u>3</u>
7. Recent alluvial deposits	0	1	2	<u>3</u>
8. Headcuts	<u>0</u>	1	2	3
9. Grade control	0	<u>0.5</u>	1	1.5
10. Natural valley	0	0.5	<u>1</u>	1.5
11. Second or greater order channel	No = 0		Yes = <u>3</u>	

^a artificial ditches are not rated; see discussions in manual

B. Hydrology (Subtotal = 5)

12. Presence of Baseflow	0	1	2	<u>3</u>
13. Iron oxidizing bacteria	<u>0</u>	1	2	3
14. Leaf litter	1.5	<u>1</u>	0.5	0
15. Sediment on plants or debris	0	<u>0.5</u>	1	1.5
16. Organic debris lines or piles	0	<u>0.5</u>	1	1.5
17. Soil-based evidence of high water table?	No = <u>0</u>		Yes = 3	

C. Biology (Subtotal = 9.5)

18. Fibrous roots in streambed	3	<u>2</u>	1	0
19. Rooted upland plants in streambed	3	<u>2</u>	1	0
20. Macrobenthos (note diversity and abundance)	0	<u>1</u>	2	3
21. Aquatic Mollusks	0	1	<u>2</u>	3
22. Fish	0	0.5	1	<u>1.5</u>
23. Crayfish	<u>0</u>	0.5	1	1.5
24. Amphibians	0	0.5	<u>1</u>	1.5
25. Algae	<u>0</u>	0.5	1	1.5
26. Wetland plants in streambed	FACW = 0.75; OBL = 1.5 Other = <u>0</u>			

*perennial streams may also be identified using other methods. See p. 35 of manual.

Notes:

Sketch:

NC DWQ Stream Identification Form Version 4.11

Date: 8/1/2019	Project/Site: Liberty Rock	Latitude: 35.819423
Evaluator: AA	County: Randolph	Longitude: -79.564523
Total Points: Stream is at least intermittent if ≥ 19 or perennial if ≥ 30* 27	Stream Determination (circle one) Ephemeral (Intermittent) Perennial	Other Gypsum Creek e.g. Quad Name:

A. Geomorphology (Subtotal = 15)

	Absent	Weak	Moderate	Strong
1 ^a Continuity of channel bed and bank	0	1	2	3
2. Sinuosity of channel along thalweg	0	1	2	3
3. In-channel structure: ex. riffle-pool, step-pool, ripple-pool sequence	0	1	2	3
4. Particle size of stream substrate	0	1	2	3
5. Active/relict floodplain	0	1	2	3
6. Depositional bars or benches	0	1	2	3
7. Recent alluvial deposits	0	1	2	3
8. Headcuts	0	1	2	3
9. Grade control	0	0.5	1	1.5
10. Natural valley	0	0.5	1	1.5
11. Second or greater order channel	No = 0		Yes = 3	

^a artificial ditches are not rated; see discussions in manual

B. Hydrology (Subtotal = 6)

12. Presence of Baseflow	0	1	2	3
13. Iron oxidizing bacteria	0	1	2	3
14. Leaf litter	1.5	1	0.5	0
15. Sediment on plants or debris	0	0.5	1	1.5
16. Organic debris lines or piles	0	0.5	1	1.5
17. Soil-based evidence of high water table?	No = 0		Yes = 3	

C. Biology (Subtotal = 6)

18. Fibrous roots in streambed	3	2	1	0
19. Rooted upland plants in streambed	3	2	1	0
20. Macrobenthos (note diversity and abundance)	0	1	2	3
21. Aquatic Mollusks	0	1	2	3
22. Fish	0	0.5	1	1.5
23. Crayfish	0	0.5	1	1.5
24. Amphibians	0	0.5	1	1.5
25. Algae	0	0.5	1	1.5
26. Wetland plants in streambed	FACW = 0.75; OBL = 1.5 Other = 0			

*perennial streams may also be identified using other methods. See p. 35 of manual.

Notes:

Sketch:

NC DWQ Stream Identification Form Version 4.11

Date: 8/1/2019	Project/Site: Liberty Rock	Latitude: 35.819614
Evaluator: GT	County: Randolph	Longitude: -79.562617
Total Points: Stream is at least intermittent if ≥ 19 or perennial if $\geq 30^*$ 25	Stream Determination (circle one) Ephemeral <u>Intermittent</u> Perennial	Other Dolomite Creek e.g. Quad Name: D.S. of Culvert

A. Geomorphology (Subtotal = 13)

	Absent	Weak	Moderate	Strong
1 ^a Continuity of channel bed and bank	0	1	2	3
2. Sinuosity of channel along thalweg	0	1	2	3
3. In-channel structure: ex. riffle-pool, step-pool, ripple-pool sequence	0	1	2	3
4. Particle size of stream substrate	0	1	2	3
5. Active/relict floodplain	0	1	2	3
6. Depositional bars or benches	0	1	2	3
7. Recent alluvial deposits	0	1	2	3
8. Headcuts	0	1	2	3
9. Grade control	0	0.5	1	1.5
10. Natural valley	0	0.5	1	1.5
11. Second or greater order channel	No = 0		Yes = 3	

^a artificial ditches are not rated; see discussions in manual

B. Hydrology (Subtotal = 3.5)

12. Presence of Baseflow	0	1	2	3
13. Iron oxidizing bacteria	0	1	2	3
14. Leaf litter	1.5	1	0.5	0
15. Sediment on plants or debris	0	0.5	1	1.5
16. Organic debris lines or piles	0	0.5	1	1.5
17. Soil-based evidence of high water table?	No = 0		Yes = 3	

C. Biology (Subtotal = 8.5)

18. Fibrous roots in streambed	3	2	1	0
19. Rooted upland plants in streambed	3	2	1	0
20. Macroinvertebrates (note diversity and abundance)	0	1	2	3
21. Aquatic Mollusks	0	1	2	3
22. Fish	0	0.5	1	1.5
23. Crayfish	0	0.5	1	1.5
24. Amphibians	0	0.5	1	1.5
25. Algae	0	0.5	1	1.5
26. Wetland plants in streambed	FACW = 0.75; OBL = 1.5 Other = 0			

*perennial streams may also be identified using other methods. See p. 35 of manual.

Notes:

Sketch:

NC DWQ Stream Identification Form Version 4.11

Date: <u>8/1/2019</u>	Project/Site: <u>Liberty Rock</u>	Latitude: <u>35.822895</u>
Evaluator: <u>GT</u>	County: <u>Randolph</u>	Longitude: <u>-79.561562</u>
Total Points: <i>Stream is at least intermittent if ≥ 19 or perennial if ≥ 30*</i>	Stream Determination (circle one) Ephemeral Intermittent <u>Perennial</u>	Other <u>Mica Creek</u> <i>e.g. Quad Name:</i>

A. Geomorphology (Subtotal = <u>15</u>)	Absent	Weak	Moderate	Strong
1 ^a Continuity of channel bed and bank	0	1	2	(3)
2. Sinuosity of channel along thalweg	0	1	(2)	3
3. In-channel structure: ex. riffle-pool, step-pool, ripple-pool sequence	0	1	(2)	3
4. Particle size of stream substrate	0	(1)	2	3
5. Active/relict floodplain	0	1	2	(3)
6. Depositional bars or benches	0	(1)	2	3
7. Recent alluvial deposits	0	(1)	2	3
8. Headcuts	(0)	1	2	3
9. Grade control	0	(0.5)	1	1.5
10. Natural valley	0	0.5	1	(1.5)
11. Second or greater order channel	No = (0)		Yes = 3	

^a artificial ditches are not rated; see discussions in manual

B. Hydrology (Subtotal = <u>6</u>)	Absent	Weak	Moderate	Strong
12. Presence of Baseflow	0	1	2	(3)
13. Iron oxidizing bacteria	(0)	1	2	3
14. Leaf litter	(1.5)	1	0.5	0
15. Sediment on plants or debris	0	0.5	(1)	1.5
16. Organic debris lines or piles	0	(0.5)	1	1.5
17. Soil-based evidence of high water table?	No = (0)		Yes = 3	

C. Biology (Subtotal = <u>10</u>)	Absent	Weak	Moderate	Strong
18. Fibrous roots in streambed	(3)	2	1	0
19. Rooted upland plants in streambed	(3)	2	1	0
20. Macrobenthos (note diversity and abundance)	(0)	1	2	3
21. Aquatic Mollusks	(0)	1	2	3
22. Fish	0	0.5	1	(1.5)
23. Crayfish	(0)	0.5	1	1.5
24. Amphibians	0	0.5	(1)	1.5
25. Algae	(0)	0.5	1	1.5
26. Wetland plants in streambed	FACW = 0.75; OBL = (1.5) Other = 0			

*perennial streams may also be identified using other methods. See p. 35 of manual.

Notes:

Sketch:

NC SAM FIELD ASSESSMENT FORM
Accompanies User Manual Version 2.1

USACE AID #:	2020-00047	NCDWR #:
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INSTRUCTIONS: 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 and explanations of requested information. Record in the "Notes/Sketch" section if any supplementary measurements were performed. See the 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).

PROJECT / SITE INFORMATION:



1. Project name (if any): Liberty Rock - Rocky River Reach 1 2. Date of evaluation: 10/08/2020
 3. Applicant/owner name: _____ 4. Assessor name/organization: Wildlands Engineering
 5. County: Randolph 6. Nearest named water body _____
 7. River Basin: Cape Fear on USGS 7.5-minute quad: Rocky River
 8. Site coordinates (decimal degrees, at lower end of assessment reach): Lat 35.8200518 Long -79.562831

STREAM INFORMATION: (depth and width can be approximations)

9. Site number (show on attached map): Rocky River Reach 1 10. Length of assessment reach evaluated (feet): Approx 1600 ft
 11. Channel depth from bed (in riffle, if present) to top of bank (feet): 2.5-3.5 ft Unable to assess channel depth.
 12. Channel width at top of bank (feet): 15-18 ft 13. Is assessment reach a swamp stream? Yes No
 14. Feature type: Perennial flow Intermittent flow Tidal Marsh Stream

STREAM RATING 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):
 a  (more sinuous stream, flatter valley slope) b  (less sinuous stream, steeper valley slope)

17. Watershed size: (skip for Tidal Marsh Stream) Size 1 (< 0.1 mi²) Size 2 (0.1 to < 0.5 mi²) Size 3 (0.5 to < 5 mi²) Size 4 (> 5 mi²)

ADDITIONAL INFORMATION:

18. Were regulatory considerations evaluated? Yes No If Yes, check all that apply to the assessment area.

<input type="checkbox"/> Section 10 water	<input type="checkbox"/> Classified Trout Waters	<input checked="" type="checkbox"/> Water Supply Watershed (<input type="radio"/> I <input type="radio"/> II <input checked="" type="radio"/> III <input type="radio"/> IV <input type="radio"/> V)
<input type="checkbox"/> Essential Fish Habitat	<input type="checkbox"/> Primary Nursery Area	<input type="checkbox"/> High Quality Waters/Outstanding Resource Waters
<input type="checkbox"/> Publicly owned property	<input type="checkbox"/> NCDWR riparian buffer rule in effect	<input type="checkbox"/> Nutrient Sensitive Waters
<input type="checkbox"/> Anadromous fish	<input type="checkbox"/> 303(d) List	<input type="checkbox"/> CAMA Area of Environmental Concern (AEC)
<input type="checkbox"/> 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 adversely affected by a flow restriction or fill to the point of obstructing flow or a channel choked with aquatic macrophytes or ponded water or impounded on flood or ebb within the assessment reach (examples: undersized or perched culverts, causeways that constrict the channel, tidal gates).
 - B Not A

3. **Feature Pattern – assessment reach metric**
 - A A majority of the assessment reach has altered pattern (examples: straightening, modification above or below culvert).
 - B Not A.

4. **Feature Longitudinal Profile – assessment reach metric**
 - 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

5. **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% of channel unstable
 - B 10 to 25% of channel unstable
 - C > 25% of channel unstable

6. **Streamside Area Interaction – streamside area metric**
Consider for the Left Bank (LB) and the Right Bank (RB).

	LB	RB	
<input type="radio"/> A	<input type="radio"/> A		Little or no evidence of conditions that adversely affect reference interaction
<input checked="" type="radio"/> B	<input checked="" type="radio"/> B		Moderate evidence of conditions (examples: berms, levees, down-cutting, aggradation, dredging) that adversely affect reference interaction (examples: limited streamside area access, disruption of flood flows through streamside area, leaky or intermittent bulkheads, causeways with floodplain constriction, minor ditching [including mosquito ditching])
<input type="radio"/> C	<input type="radio"/> C		Extensive evidence of conditions that adversely affect reference interaction (little to no floodplain/intertidal zone access [examples: causeways with floodplain and channel constriction, bulkheads, retaining walls, fill, stream incision, disruption of flood flows through streamside area] <u>or</u> too much floodplain/intertidal zone access [examples: impoundments, intensive mosquito ditching]) <u>or</u> floodplain/intertidal zone unnaturally absent <u>or</u> assessment reach is a man-made feature on an interstream divide

7. Water Quality Stressors – assessment reach/intertidal zone metric

Check all that apply.

- A Discolored water in stream or intertidal zone (milky white, blue, unnatural water discoloration, oil sheen, stream foam)
- B Excessive sedimentation (burying of stream features or intertidal zone)
- C Noticeable evidence of pollutant discharges entering the assessment reach and causing a water quality problem
- D Odor (not including natural sulfide odors)
- E Current published or collected data indicating degraded water quality in the assessment reach. Cite source in the "Notes/Sketch" section.
- F Livestock with access to stream or intertidal zone
- G Excessive algae in stream or intertidal zone
- H Degraded marsh vegetation in the intertidal zone (removal, burning, regular mowing, destruction, etc.)
- I Other: _____ (explain in "Notes/Sketch" section)
- J Little to no stressors

8. Recent Weather – watershed metric

For Size 1 or 2 streams, D1 drought or higher is considered a drought; for Size 3 or 4 streams, D2 drought or higher is considered a drought.

- A Drought conditions and no rainfall or rainfall not exceeding 1 inch within the last 48 hours
- B Drought conditions and rainfall exceeding 1 inch within the last 48 hours
- C No drought conditions

9. Large or Dangerous Stream – assessment reach metric

Yes No Is stream is too large or dangerous to assess? If Yes, skip to Metric 13 (Streamside Area Ground Surface Condition).

10. Natural In-stream Habitat Types – assessment reach metric

10a. Yes No Degraded in-stream habitat over majority of the assessment reach (examples of stressors include excessive sedimentation, mining, excavation, in-stream hardening [for example, rip-rap], recent dredging, and snagging) (evaluate for size 4 Coastal Plain streams only, then skip to Metric 12)

10b. Check all that occur (occurs if > 5% coverage of assessment reach) (skip for Size 4 Coastal Plain streams)

- | | | |
|--|------------------------------------|---|
| <ul style="list-style-type: none"> <input type="checkbox"/> A Multiple aquatic macrophytes and aquatic mosses (include liverworts, lichens, and algal mats) <input checked="" type="checkbox"/> B Multiple sticks and/or leaf packs and/or emergent vegetation <input checked="" type="checkbox"/> C Multiple snags and logs (including lap trees) <input checked="" type="checkbox"/> D 5% undercut banks and/or root mats and/or roots in banks extend to the normal wetted perimeter <input type="checkbox"/> E Little or no habitat | Check for Tidal Marsh Streams only | <ul style="list-style-type: none"> <input type="checkbox"/> F 5% oysters or other natural hard bottoms <input type="checkbox"/> G Submerged aquatic vegetation <input type="checkbox"/> H Low-tide refugia (pools) <input type="checkbox"/> I Sand bottom <input type="checkbox"/> J 5% vertical bank along the marsh <input type="checkbox"/> K Little or no habitat |
|--|------------------------------------|---|

*****REMAINING QUESTIONS ARE NOT APPLICABLE FOR TIDAL MARSH STREAMS*****

11. Bedform and Substrate – assessment reach metric (skip for Size 4 Coastal Plain streams and Tidal Marsh Streams)

11a. Yes No Is assessment reach in a natural sand-bed stream? (skip for Coastal Plain streams)

11b. Bedform evaluated. Check the appropriate box(es).

- A Riffle-run section (evaluate 11c)
- B Pool-glide section (evaluate 11d)
- C Natural bedform absent (skip to Metric 12, Aquatic Life)

11c. In riffles sections, check all that occur below the normal wetted perimeter of the assessment reach – whether or not submerged.

Check at least one box in each row (skip for Size 4 Coastal Plain Streams and Tidal Marsh Streams). Not Present (NP) = absent, Rare (R) = present but ≤ 10%, Common (C) = > 10-40%, Abundant (A) = > 40-70%, Predominant (P) = > 70%. Cumulative percentages should not exceed 100% for each assessment reach.

NP	R	C	A	P	
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Bedrock/saprolite
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Boulder (256 – 4096 mm)
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Cobble (64 – 256 mm)
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Gravel (2 – 64 mm)
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Sand (.062 – 2 mm)
<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Silt/clay (< 0.062 mm)
<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Detritus
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Artificial (rip-rap, concrete, etc.)

11d. Yes No Are pools filled with sediment? (skip for Size 4 Coastal Plain streams and Tidal Marsh Streams)

12. Aquatic Life – assessment reach metric (skip for Size 4 Coastal Plain streams and Tidal Marsh Streams)

12a. Yes No Was an in-stream aquatic life assessment performed as described in the User Manual?

If No, select 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 >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 (including water pennies)
 - Caddisfly larvae (Trichoptera [T])
 - Asian clam (*Corbicula*)
 - Crustacean (isopod/amphipod/crayfish/shrimp)
 - Damselfly and dragonfly larvae
 - Dipterans (true flies)
 - Mayfly larvae (Ephemeroptera [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 (Plecoptera [P])
- Tipulid larvae
- Worms/leeches

13. **Streamside Area Ground Surface Condition – streamside area metric (skip for Tidal Marsh Streams and B valley types)**
 Consider for the Left Bank (LB) and the Right Bank (RB). Consider storage capacity with regard to both overbank flow and upland runoff.

- | | | |
|------------------------------------|------------------------------------|---|
| LB | RB | |
| <input type="radio"/> A | <input type="radio"/> A | Little or no alteration to water storage capacity over a majority of the streamside area |
| <input checked="" type="radio"/> B | <input checked="" type="radio"/> B | Moderate alteration to water storage capacity over a majority of the streamside area |
| <input type="radio"/> C | <input type="radio"/> C | Severe alteration to water storage capacity over a majority of the streamside area (examples include: ditches, fill, soil, compaction, livestock disturbance, buildings, man-made levees, drainage pipes) |

14. **Streamside Area Water Storage – streamside area metric (skip for Size 1 streams, Tidal Marsh Streams, and B valley types)**
 Consider for the Left Bank (LB) and the Right Bank (RB) of the streamside area.

- | | | |
|------------------------------------|------------------------------------|--|
| LB | RB | |
| <input type="radio"/> A | <input type="radio"/> A | Majority of streamside area with depressions able to pond water \geq 6 inches deep |
| <input checked="" type="radio"/> B | <input checked="" type="radio"/> B | Majority of streamside area with depressions able to pond water 3 to 6 inches deep |
| <input type="radio"/> C | <input type="radio"/> C | Majority of streamside area with depressions able to pond water < 3 inches deep |

15. **Wetland Presence – streamside area metric (skip for Tidal Marsh Streams)**

Consider for the Left Bank (LB) and the Right Bank (RB). Do not consider wetlands outside of the streamside area or within the normal wetted perimeter of assessment reach.

- | | | |
|------------------------------------|------------------------------------|--|
| LB | RB | |
| <input checked="" type="radio"/> Y | <input type="radio"/> Y | Are wetlands present in the streamside area? |
| <input type="radio"/> N | <input checked="" type="radio"/> N | |

16. **Baseflow Contributors – assessment reach metric (skip for size 4 streams and Tidal Marsh Streams)**

Check all contributors within the assessment reach or within view of and draining to the assessment reach.

- A Streams and/or springs (jurisdictional discharges)
- B Ponds (include wet detention basins; do not include sediment basins or dry detention basins)
- C Obstruction that passes some flow during low-flow periods within assessment area (beaver dam, bottom-release dam)
- D Evidence of bank seepage or sweating (iron oxidizing bacteria in water indicates seepage)
- E Stream bed or bank soil reduced (dig through deposited sediment if present)
- F None of the above

17. **Baseflow Detractors – assessment area metric (skip for Tidal Marsh Streams)**

Check all that apply.

- A Evidence of substantial water withdrawals from the assessment reach (includes areas excavated for pump installation)
- B Obstruction not passing flow during low flow periods affecting the assessment reach (ex: watertight dam, sediment deposit)
- C Urban stream (\geq 24% impervious surface for watershed)
- D Evidence that the stream-side area has been modified resulting in accelerated drainage into the assessment reach
- E Assessment reach relocated to valley edge
- F None of the above

18. **Shading – assessment reach metric (skip for Tidal Marsh Streams)**

Consider aspect. Consider "leaf-on" condition.

- A Stream shading is appropriate for stream category (may include gaps associated with natural processes)
- B Degraded (example: scattered trees)
- C Stream 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 | |
| <input checked="" type="radio"/> A | <input checked="" type="radio"/> A | <input type="radio"/> A | <input type="radio"/> A | \geq 100-feet wide <u>or</u> extends to the edge of the watershed |
| <input type="radio"/> B | <input type="radio"/> B | <input type="radio"/> B | <input type="radio"/> B | From 50 to < 100-feet wide |
| <input type="radio"/> C | <input type="radio"/> C | <input type="radio"/> C | <input type="radio"/> C | From 30 to < 50-feet wide |
| <input type="radio"/> D | <input type="radio"/> D | <input type="radio"/> D | <input checked="" type="radio"/> D | From 10 to < 30-feet wide |
| <input type="radio"/> E | <input type="radio"/> E | <input checked="" type="radio"/> E | <input type="radio"/> E | < 10-feet wide <u>or</u> no trees |

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 | |
| <input type="radio"/> A | <input type="radio"/> A | Mature forest |
| <input type="radio"/> B | <input checked="" type="radio"/> B | Non-mature woody vegetation <u>or</u> modified vegetation structure |
| <input checked="" type="radio"/> C | <input type="radio"/> C | Herbaceous vegetation with or without a strip of trees < 10 feet wide |
| <input type="radio"/> D | <input type="radio"/> D | Maintained shrubs |
| <input type="radio"/> E | <input type="radio"/> 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 |
| <input type="radio"/> A | <input type="radio"/> A | <input type="radio"/> A | <input type="radio"/> A |
| <input type="radio"/> A | <input type="radio"/> A | <input type="radio"/> A | <input type="radio"/> A |
- Row crops

- B B B B B B Maintained turf
 C C C C C C Pasture (no livestock)/commercial horticulture
 D D D D D D Pasture (active livestock use)

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 A The total length of buffer breaks is < 25 percent.
 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 – First 100 feet of 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 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 a 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

Notes/Sketch:

Refer to cross-sections 1,2, 5, 11, 12, 13 and 14

NC SAM Stream Rating Sheet
Accompanies User Manual Version 2.1

Stream Site Name Liberty Rock - Rocky River Reach 1
 Stream Category Pa3

Date of Evaluation 10/08/2020
 Assessor Name/Organization Wildlands Engineering

Notes of Field Assessment Form (Y/N)	YES
Presence of regulatory considerations (Y/N)	NO
Additional stream information/supplementary measurements included (Y/N)	YES
NC SAM feature type (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	MEDIUM	
(4) Wooded Riparian Buffer	LOW	
(4) Microtopography	LOW	
(3) Stream Stability	MEDIUM	
(4) Channel Stability	MEDIUM	
(4) Sediment Transport	MEDIUM	
(4) Stream Geomorphology	MEDIUM	
(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	MEDIUM	
(2) Intertidal Zone Filtration	NA	
(1) Habitat	MEDIUM	
(2) In-stream Habitat	HIGH	
(3) Baseflow	HIGH	
(3) Substrate	MEDIUM	
(3) Stream Stability	MEDIUM	
(3) In-stream Habitat	HIGH	
(2) Stream-side Habitat	LOW	
(3) Stream-side Habitat	LOW	
(3) Thermoregulation	LOW	
(2) Tidal Marsh In-stream Habitat	NA	
(3) Flow Restriction	NA	
(3) Tidal Marsh Stream Stability	NA	
(4) Tidal Marsh Channel Stability	NA	
(4) Tidal Marsh Stream Geomorphology	NA	
(3) Tidal Marsh In-stream Habitat	NA	
(2) Intertidal Zone Habitat	NA	
Overall	LOW	

NC SAM FIELD ASSESSMENT FORM
Accompanies User Manual Version 2.1

USACE AID #:	2020-00047	NCDWR #:	
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INSTRUCTIONS: 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 and explanations of requested information. Record in the "Notes/Sketch" section if any supplementary measurements were performed. See the 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).

PROJECT / SITE INFORMATION:

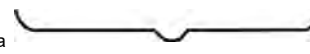

1. Project name (if any): Liberty Rock - Rocky River Reach 2 2. Date of evaluation: 10/08/2020
 3. Applicant/owner name: _____ 4. Assessor name/organization: Wildlands Engineering
 5. County: Randolph 6. Nearest named water body _____
 7. River Basin: Cape Fear on USGS 7.5-minute quad: Rocky River
 8. Site coordinates (decimal degrees, at lower end of assessment reach): Lat 35.8199636 Long -79.5609996

STREAM INFORMATION: (depth and width can be approximations)

9. Site number (show on attached map): Rocky River Reach 2 10. Length of assessment reach evaluated (feet): Approx 580 ft
 11. Channel depth from bed (in riffle, if present) to top of bank (feet): 2.5-4 ft Unable to assess channel depth.
 12. Channel width at top of bank (feet): 18-25 ft 13. Is assessment reach a swamp stream? Yes No
 14. Feature type: Perennial flow Intermittent flow Tidal Marsh Stream

STREAM RATING 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):
 a  (more sinuous stream, flatter valley slope)
 b  (less sinuous stream, steeper valley slope)

17. Watershed size: (skip for Tidal Marsh Stream)
 Size 1 (< 0.1 mi²) Size 2 (0.1 to < 0.5 mi²) Size 3 (0.5 to < 5 mi²) Size 4 (> 5 mi²)

ADDITIONAL INFORMATION:

18. Were regulatory considerations evaluated? Yes No If Yes, check all that apply to the assessment area.

<input type="checkbox"/> Section 10 water	<input type="checkbox"/> Classified Trout Waters	<input checked="" type="checkbox"/> Water Supply Watershed (<input type="radio"/> I <input type="radio"/> II <input checked="" type="radio"/> III <input type="radio"/> IV <input type="radio"/> V)
<input type="checkbox"/> Essential Fish Habitat	<input type="checkbox"/> Primary Nursery Area	<input type="checkbox"/> High Quality Waters/Outstanding Resource Waters
<input type="checkbox"/> Publicly owned property	<input type="checkbox"/> NCDWR riparian buffer rule in effect	<input type="checkbox"/> Nutrient Sensitive Waters
<input type="checkbox"/> Anadromous fish	<input type="checkbox"/> 303(d) List	<input type="checkbox"/> CAMA Area of Environmental Concern (AEC)

Documented presence of a federal and/or state listed protected species within the assessment area.
 List species: Notched rainbow (Villosa constricta) - State Threatened. Eastern creekshell (Villosa delumbis) - State Significantly Rare.
 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 adversely affected by a flow restriction or fill to the point of obstructing flow or a channel choked with aquatic macrophytes or ponded water or impounded on flood or ebb within the assessment reach (examples: undersized or perched culverts, causeways that constrict the channel, tidal gates).
 - B Not A

3. **Feature Pattern – assessment reach metric**
 - A A majority of the assessment reach has altered pattern (examples: straightening, modification above or below culvert).
 - B Not A.

4. **Feature Longitudinal Profile – assessment reach metric**
 - 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

5. **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% of channel unstable
 - B 10 to 25% of channel unstable
 - C > 25% of channel unstable

6. **Streamside Area Interaction – streamside area metric**
Consider for the Left Bank (LB) and the Right Bank (RB).

	LB	RB	
<input type="radio"/> A	<input type="radio"/> A		Little or no evidence of conditions that adversely affect reference interaction
<input checked="" type="radio"/> B	<input checked="" type="radio"/> B		Moderate evidence of conditions (examples: berms, levees, down-cutting, aggradation, dredging) that adversely affect reference interaction (examples: limited streamside area access, disruption of flood flows through streamside area, leaky or intermittent bulkheads, causeways with floodplain constriction, minor ditching [including mosquito ditching])
<input type="radio"/> C	<input type="radio"/> C		Extensive evidence of conditions that adversely affect reference interaction (little to no floodplain/intertidal zone access [examples: causeways with floodplain and channel constriction, bulkheads, retaining walls, fill, stream incision, disruption of flood flows through streamside area] <u>or</u> too much floodplain/intertidal zone access [examples: impoundments, intensive mosquito ditching]) <u>or</u> floodplain/intertidal zone unnaturally absent <u>or</u> assessment reach is a man-made feature on an interstream divide

7. Water Quality Stressors – assessment reach/intertidal zone metric

Check all that apply.

- A Discolored water in stream or intertidal zone (milky white, blue, unnatural water discoloration, oil sheen, stream foam)
- B Excessive sedimentation (burying of stream features or intertidal zone)
- C Noticeable evidence of pollutant discharges entering the assessment reach and causing a water quality problem
- D Odor (not including natural sulfide odors)
- E Current published or collected data indicating degraded water quality in the assessment reach. Cite source in the "Notes/Sketch" section.
- F Livestock with access to stream or intertidal zone
- G Excessive algae in stream or intertidal zone
- H Degraded marsh vegetation in the intertidal zone (removal, burning, regular mowing, destruction, etc.)
- I Other: _____ (explain in "Notes/Sketch" section)
- J Little to no stressors

8. Recent Weather – watershed metric

For Size 1 or 2 streams, D1 drought or higher is considered a drought; for Size 3 or 4 streams, D2 drought or higher is considered a drought.

- A Drought conditions and no rainfall or rainfall not exceeding 1 inch within the last 48 hours
- B Drought conditions and rainfall exceeding 1 inch within the last 48 hours
- C No drought conditions

9. Large or Dangerous Stream – assessment reach metric

Yes No Is stream is too large or dangerous to assess? If Yes, skip to Metric 13 (Streamside Area Ground Surface Condition).

10. Natural In-stream Habitat Types – assessment reach metric

10a. Yes No Degraded in-stream habitat over majority of the assessment reach (examples of stressors include excessive sedimentation, mining, excavation, in-stream hardening [for example, rip-rap], recent dredging, and snagging) (evaluate for size 4 Coastal Plain streams only, then skip to Metric 12)

10b. Check all that occur (occurs if > 5% coverage of assessment reach) (skip for Size 4 Coastal Plain streams)

- | | | |
|--|------------------------------------|---|
| <ul style="list-style-type: none"> <input type="checkbox"/> A Multiple aquatic macrophytes and aquatic mosses (include liverworts, lichens, and algal mats) <input checked="" type="checkbox"/> B Multiple sticks and/or leaf packs and/or emergent vegetation <input checked="" type="checkbox"/> C Multiple snags and logs (including lap trees) <input checked="" type="checkbox"/> D 5% undercut banks and/or root mats and/or roots in banks extend to the normal wetted perimeter <input type="checkbox"/> E Little or no habitat | Check for Tidal Marsh Streams only | <ul style="list-style-type: none"> <input type="checkbox"/> F 5% oysters or other natural hard bottoms <input type="checkbox"/> G Submerged aquatic vegetation <input type="checkbox"/> H Low-tide refugia (pools) <input type="checkbox"/> I Sand bottom <input type="checkbox"/> J 5% vertical bank along the marsh <input type="checkbox"/> K Little or no habitat |
|--|------------------------------------|---|

*****REMAINING QUESTIONS ARE NOT APPLICABLE FOR TIDAL MARSH STREAMS*****

11. Bedform and Substrate – assessment reach metric (skip for Size 4 Coastal Plain streams and Tidal Marsh Streams)

11a. Yes No Is assessment reach in a natural sand-bed stream? (skip for Coastal Plain streams)

11b. Bedform evaluated. Check the appropriate box(es).

- A Riffle-run section (evaluate 11c)
- B Pool-glide section (evaluate 11d)
- C Natural bedform absent (skip to Metric 12, Aquatic Life)

11c. In riffles sections, check all that occur below the normal wetted perimeter of the assessment reach – whether or not submerged.

Check at least one box in each row (skip for Size 4 Coastal Plain Streams and Tidal Marsh Streams). Not Present (NP) = absent, Rare (R) = present but ≤ 10%, Common (C) = > 10-40%, Abundant (A) = > 40-70%, Predominant (P) = > 70%. Cumulative percentages should not exceed 100% for each assessment reach.

NP	R	C	A	P	
<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Bedrock/saprolite
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Boulder (256 – 4096 mm)
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Cobble (64 – 256 mm)
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Gravel (2 – 64 mm)
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Sand (.062 – 2 mm)
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Silt/clay (< 0.062 mm)
<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Detritus
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Artificial (rip-rap, concrete, etc.)

11d. Yes No Are pools filled with sediment? (skip for Size 4 Coastal Plain streams and Tidal Marsh Streams)

12. Aquatic Life – assessment reach metric (skip for Size 4 Coastal Plain streams and Tidal Marsh Streams)

12a. Yes No Was an in-stream aquatic life assessment performed as described in the User Manual?

If No, select 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 >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 (including water pennies)
 - Caddisfly larvae (Trichoptera [T])
 - Asian clam (*Corbicula*)
 - Crustacean (isopod/amphipod/crayfish/shrimp)
 - Damselfly and dragonfly larvae
 - Dipterans (true flies)
 - Mayfly larvae (Ephemeroptera [E])
 - Megaloptera (alderfly, fishfly, dobsonfly larvae)
 - Midge/mosquito larvae

- B B B B B B Maintained turf
 C C C C C C Pasture (no livestock)/commercial horticulture
 D D D D D D Pasture (active livestock use)

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 A The total length of buffer breaks is < 25 percent.
 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 – First 100 feet of 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 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 a 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

Notes/Sketch:

Refer to cross-sections 1,2, 5, 11, 12, 13 and 14

NC SAM Stream Rating Sheet
Accompanies User Manual Version 2.1

Stream Site Name Liberty Rock - Rocky River Reach 2
 Stream Category Pa3

Date of Evaluation 10/08/2020
 Assessor Name/Organization Wildlands Engineering

Notes of Field Assessment Form (Y/N)	YES
Presence of regulatory considerations (Y/N)	YES
Additional stream information/supplementary measurements included (Y/N)	YES
NC SAM feature type (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	MEDIUM	
(4) Wooded Riparian Buffer	LOW	
(4) Microtopography	LOW	
(3) Stream Stability	MEDIUM	
(4) Channel Stability	MEDIUM	
(4) Sediment Transport	MEDIUM	
(4) Stream Geomorphology	MEDIUM	
(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	MEDIUM	
(2) Indicators of Stressors	YES	
(2) Aquatic Life Tolerance	HIGH	
(2) Intertidal Zone Filtration	NA	
(1) Habitat	MEDIUM	
(2) In-stream Habitat	HIGH	
(3) Baseflow	HIGH	
(3) Substrate	MEDIUM	
(3) Stream Stability	MEDIUM	
(3) In-stream Habitat	HIGH	
(2) Stream-side Habitat	LOW	
(3) Stream-side Habitat	LOW	
(3) Thermoregulation	MEDIUM	
(2) Tidal Marsh In-stream Habitat	NA	
(3) Flow Restriction	NA	
(3) Tidal Marsh Stream Stability	NA	
(4) Tidal Marsh Channel Stability	NA	
(4) Tidal Marsh Stream Geomorphology	NA	
(3) Tidal Marsh In-stream Habitat	NA	
(2) Intertidal Zone Habitat	NA	
Overall	LOW	

NC SAM FIELD ASSESSMENT FORM
Accompanies User Manual Version 2.1

USACE AID #:	2020-00047	NCDWR #:
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INSTRUCTIONS: 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 and explanations of requested information. Record in the "Notes/Sketch" section if any supplementary measurements were performed. See the 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).

PROJECT / SITE INFORMATION:



1. Project name (if any): Liberty Rock - Rocky River Reach 3 2. Date of evaluation: 10/08/2020
 3. Applicant/owner name: _____ 4. Assessor name/organization: Wildlands Engineering
 5. County: Randolph 6. Nearest named water body _____
 7. River Basin: Cape Fear on USGS 7.5-minute quad: Rocky River
 8. Site coordinates (decimal degrees, at lower end of assessment reach): Lat 35.8198574 Long -79.5595774

STREAM INFORMATION: (depth and width can be approximations)

9. Site number (show on attached map): Rocky River Reach 3 10. Length of assessment reach evaluated (feet): Approx 450
 11. Channel depth from bed (in riffle, if present) to top of bank (feet): 2-3 ft Unable to assess channel depth.
 12. Channel width at top of bank (feet): 20-30 ft 13. Is assessment reach a swamp stream? Yes No
 14. Feature type: Perennial flow Intermittent flow Tidal Marsh Stream

STREAM RATING 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):
 a  (more sinuous stream, flatter valley slope) b  (less sinuous stream, steeper valley slope)

17. Watershed size: (skip for Tidal Marsh Stream) Size 1 (< 0.1 mi²) Size 2 (0.1 to < 0.5 mi²) Size 3 (0.5 to < 5 mi²) Size 4 (> 5 mi²)

ADDITIONAL INFORMATION:

18. Were regulatory considerations evaluated? Yes No If Yes, check all that apply to the assessment area.

<input type="checkbox"/> Section 10 water	<input type="checkbox"/> Classified Trout Waters	<input checked="" type="checkbox"/> Water Supply Watershed (<input type="radio"/> I <input type="radio"/> II <input checked="" type="radio"/> III <input type="radio"/> IV <input type="radio"/> V)
<input type="checkbox"/> Essential Fish Habitat	<input type="checkbox"/> Primary Nursery Area	<input type="checkbox"/> High Quality Waters/Outstanding Resource Waters
<input type="checkbox"/> Publicly owned property	<input type="checkbox"/> NCDWR riparian buffer rule in effect	<input type="checkbox"/> Nutrient Sensitive Waters
<input type="checkbox"/> Anadromous fish	<input type="checkbox"/> 303(d) List	<input type="checkbox"/> 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 adversely affected by a flow restriction or fill to the point of obstructing flow or a channel choked with aquatic macrophytes or ponded water or impounded on flood or ebb within the assessment reach (examples: undersized or perched culverts, causeways that constrict the channel, tidal gates).
 - B Not A

3. **Feature Pattern – assessment reach metric**
 - A A majority of the assessment reach has altered pattern (examples: straightening, modification above or below culvert).
 - B Not A.

4. **Feature Longitudinal Profile – assessment reach metric**
 - 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

5. **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% of channel unstable
 - B 10 to 25% of channel unstable
 - C > 25% of channel unstable

6. **Streamside Area Interaction – streamside area metric**
Consider for the Left Bank (LB) and the Right Bank (RB).

	LB	RB	
<input checked="" type="radio"/> A	<input checked="" type="radio"/> A		Little or no evidence of conditions that adversely affect reference interaction
<input type="radio"/> B	<input type="radio"/> B		Moderate evidence of conditions (examples: berms, levees, down-cutting, aggradation, dredging) that adversely affect reference interaction (examples: limited streamside area access, disruption of flood flows through streamside area, leaky or intermittent bulkheads, causeways with floodplain constriction, minor ditching [including mosquito ditching])
<input type="radio"/> C	<input type="radio"/> C		Extensive evidence of conditions that adversely affect reference interaction (little to no floodplain/intertidal zone access [examples: causeways with floodplain and channel constriction, bulkheads, retaining walls, fill, stream incision, disruption of flood flows through streamside area] <u>or</u> too much floodplain/intertidal zone access [examples: impoundments, intensive mosquito ditching]) <u>or</u> floodplain/intertidal zone unnaturally absent <u>or</u> assessment reach is a man-made feature on an interstream divide

7. Water Quality Stressors – assessment reach/intertidal zone metric

Check all that apply.

- A Discolored water in stream or intertidal zone (milky white, blue, unnatural water discoloration, oil sheen, stream foam)
B Excessive sedimentation (burying of stream features or intertidal zone)
C Noticeable evidence of pollutant discharges entering the assessment reach and causing a water quality problem
D Odor (not including natural sulfide odors)
E Current published or collected data indicating degraded water quality in the assessment reach. Cite source in the "Notes/Sketch" section.
F Livestock with access to stream or intertidal zone
G Excessive algae in stream or intertidal zone
H Degraded marsh vegetation in the intertidal zone (removal, burning, regular mowing, destruction, etc.)
I Other: (explain in "Notes/Sketch" section)
J Little to no stressors

8. Recent Weather – watershed metric

For Size 1 or 2 streams, D1 drought or higher is considered a drought; for Size 3 or 4 streams, D2 drought or higher is considered a drought.

- A Drought conditions and no rainfall or rainfall not exceeding 1 inch within the last 48 hours
B Drought conditions and rainfall exceeding 1 inch within the last 48 hours
C No drought conditions

9. Large or Dangerous Stream – assessment reach metric

Yes No Is stream is too large or dangerous to assess? If Yes, skip to Metric 13 (Streamside Area Ground Surface Condition).

10. Natural In-stream Habitat Types – assessment reach metric

10a. Yes No Degraded in-stream habitat over majority of the assessment reach (examples of stressors include excessive sedimentation, mining, excavation, in-stream hardening [for example, rip-rap], recent dredging, and snagging) (evaluate for size 4 Coastal Plain streams only, then skip to Metric 12)

10b. Check all that occur (occurs if > 5% coverage of assessment reach) (skip for Size 4 Coastal Plain streams)

- A Multiple aquatic macrophytes and aquatic mosses (include liverworts, lichens, and algal mats)
B Multiple sticks and/or leaf packs and/or emergent vegetation
C Multiple snags and logs (including lap trees)
D 5% undercut banks and/or root mats and/or roots in banks extend to the normal wetted perimeter
E Little or no habitat
F 5% oysters or other natural hard bottoms
G Submerged aquatic vegetation
H Low-tide refugia (pools)
I Sand bottom
J 5% vertical bank along the marsh
K Little or no habitat

*****REMAINING QUESTIONS ARE NOT APPLICABLE FOR TIDAL MARSH STREAMS*****

11. Bedform and Substrate – assessment reach metric (skip for Size 4 Coastal Plain streams and Tidal Marsh Streams)

11a. Yes No Is assessment reach in a natural sand-bed stream? (skip for Coastal Plain streams)

11b. Bedform evaluated. Check the appropriate box(es).

- A Riffle-run section (evaluate 11c)
B Pool-glide section (evaluate 11d)
C Natural bedform absent (skip to Metric 12, Aquatic Life)

11c. In riffles sections, check all that occur below the normal wetted perimeter of the assessment reach – whether or not submerged. Check at least one box in each row (skip for Size 4 Coastal Plain Streams and Tidal Marsh Streams). Not Present (NP) = absent, Rare (R) = present but ≤ 10%, Common (C) = > 10-40%, Abundant (A) = > 40-70%, Predominant (P) = > 70%. Cumulative percentages should not exceed 100% for each assessment reach.

Table with 5 columns (NP, R, C, A, P) and 7 rows of habitat types: Bedrock/saprolite, Boulder (256 – 4096 mm), Cobble (64 – 256 mm), Gravel (2 – 64 mm), Sand (.062 – 2 mm), Silt/clay (< 0.062 mm), Detritus, Artificial (rip-rap, concrete, etc.)

11d. Yes No Are pools filled with sediment? (skip for Size 4 Coastal Plain streams and Tidal Marsh Streams)

12. Aquatic Life – assessment reach metric (skip for Size 4 Coastal Plain streams and Tidal Marsh Streams)

12a. Yes No Was an in-stream aquatic life assessment performed as described in the User Manual?

If No, select 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 >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 (including water pennies)
Caddisfly larvae (Trichoptera [T])
Asian clam (Corbicula)
Crustacean (isopod/amphipod/crayfish/shrimp)
Damselfly and dragonfly larvae
Dipterans (true flies)
Mayfly larvae (Ephemeroptera [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 (Plecoptera [P])
- Tipulid larvae
- Worms/leeches

13. **Streamside Area Ground Surface Condition – streamside area metric (skip for Tidal Marsh Streams and B valley types)**
Consider for the Left Bank (LB) and the Right Bank (RB). Consider storage capacity with regard to both overbank flow and upland runoff.

- | | | |
|------------------------------------|------------------------------------|---|
| LB | RB | |
| <input type="radio"/> A | <input checked="" type="radio"/> A | Little or no alteration to water storage capacity over a majority of the streamside area |
| <input checked="" type="radio"/> B | <input type="radio"/> B | Moderate alteration to water storage capacity over a majority of the streamside area |
| <input type="radio"/> C | <input type="radio"/> C | Severe alteration to water storage capacity over a majority of the streamside area (examples include: ditches, fill, soil, compaction, livestock disturbance, buildings, man-made levees, drainage pipes) |

14. **Streamside Area Water Storage – streamside area metric (skip for Size 1 streams, Tidal Marsh Streams, and B valley types)**
Consider for the Left Bank (LB) and the Right Bank (RB) of the streamside area.

- | | | |
|-------------------------|------------------------------------|--|
| LB | RB | |
| <input type="radio"/> A | <input type="radio"/> A | Majority of streamside area with depressions able to pond water \geq 6 inches deep |
| <input type="radio"/> B | <input type="radio"/> B | Majority of streamside area with depressions able to pond water 3 to 6 inches deep |
| <input type="radio"/> C | <input checked="" type="radio"/> C | Majority of streamside area with depressions able to pond water < 3 inches deep |

15. **Wetland Presence – streamside area metric (skip for Tidal Marsh Streams)**

Consider for the Left Bank (LB) and the Right Bank (RB). Do not consider wetlands outside of the streamside area or within the normal wetted perimeter of assessment reach.

- | | | |
|------------------------------------|------------------------------------|--|
| LB | RB | |
| <input checked="" type="radio"/> Y | <input type="radio"/> Y | Are wetlands present in the streamside area? |
| <input type="radio"/> N | <input checked="" type="radio"/> N | |

16. **Baseflow Contributors – assessment reach metric (skip for size 4 streams and Tidal Marsh Streams)**

Check all contributors within the assessment reach or within view of and draining to the assessment reach.

- A Streams and/or springs (jurisdictional discharges)
- B Ponds (include wet detention basins; do not include sediment basins or dry detention basins)
- C Obstruction that passes some flow during low-flow periods within assessment area (beaver dam, bottom-release dam)
- D Evidence of bank seepage or sweating (iron oxidizing bacteria in water indicates seepage)
- E Stream bed or bank soil reduced (dig through deposited sediment if present)
- F None of the above

17. **Baseflow Detractors – assessment area metric (skip for Tidal Marsh Streams)**

Check all that apply.

- A Evidence of substantial water withdrawals from the assessment reach (includes areas excavated for pump installation)
- B Obstruction not passing flow during low flow periods affecting the assessment reach (ex: watertight dam, sediment deposit)
- C Urban stream (\geq 24% impervious surface for watershed)
- D Evidence that the stream-side area has been modified resulting in accelerated drainage into the assessment reach
- E Assessment reach relocated to valley edge
- F None of the above

18. **Shading – assessment reach metric (skip for Tidal Marsh Streams)**

Consider aspect. Consider "leaf-on" condition.

- A Stream shading is appropriate for stream category (may include gaps associated with natural processes)
- B Degraded (example: scattered trees)
- C Stream 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 | |
| <input checked="" type="radio"/> A | <input checked="" type="radio"/> A | <input type="radio"/> A | <input checked="" type="radio"/> A | \geq 100-feet wide <u>or</u> extends to the edge of the watershed |
| <input type="radio"/> B | <input type="radio"/> B | <input type="radio"/> B | <input type="radio"/> B | From 50 to < 100-feet wide |
| <input type="radio"/> C | <input type="radio"/> C | <input type="radio"/> C | <input type="radio"/> C | From 30 to < 50-feet wide |
| <input type="radio"/> D | <input type="radio"/> D | <input type="radio"/> D | <input type="radio"/> D | From 10 to < 30-feet wide |
| <input type="radio"/> E | <input type="radio"/> E | <input checked="" type="radio"/> E | <input type="radio"/> E | < 10-feet wide <u>or</u> no trees |

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 | |
| <input type="radio"/> A | <input checked="" type="radio"/> A | Mature forest |
| <input type="radio"/> B | <input type="radio"/> B | Non-mature woody vegetation <u>or</u> modified vegetation structure |
| <input checked="" type="radio"/> C | <input type="radio"/> C | Herbaceous vegetation with or without a strip of trees < 10 feet wide |
| <input type="radio"/> D | <input type="radio"/> D | Maintained shrubs |
| <input type="radio"/> E | <input type="radio"/> 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 |
| <input type="radio"/> A | <input type="radio"/> A | <input type="radio"/> A | <input type="radio"/> A |
| <input type="radio"/> A | <input type="radio"/> A | <input type="radio"/> A | <input type="radio"/> A |
- Row crops

- B B B B B B Maintained turf
 C C C C C C Pasture (no livestock)/commercial horticulture
 D D D D D D Pasture (active livestock use)

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 A The total length of buffer breaks is < 25 percent.
 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 – First 100 feet of 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 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 a 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

Notes/Sketch:

Refer to cross-sections 7 and 8

NC SAM Stream Rating Sheet
Accompanies User Manual Version 2.1

Stream Site Name Liberty Rock - Rocky River Reach 3
 Stream Category Pa3

Date of Evaluation 10/08/2020
 Assessor Name/Organization Wildlands Engineering

Notes of Field Assessment Form (Y/N)	YES
Presence of regulatory considerations (Y/N)	YES
Additional stream information/supplementary measurements included (Y/N)	YES
NC SAM feature type (perennial, intermittent, Tidal Marsh Stream)	Perennial

Function Class Rating Summary	USACE/ All Streams	NCDWR Intermittent
(1) Hydrology	MEDIUM	
(2) Baseflow	HIGH	
(2) Flood Flow	MEDIUM	
(3) Streamside Area Attenuation	HIGH	
(4) Floodplain Access	HIGH	
(4) Wooded Riparian Buffer	MEDIUM	
(4) Microtopography	LOW	
(3) Stream Stability	LOW	
(4) Channel Stability	MEDIUM	
(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	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	LOW	
(3) Stream Stability	MEDIUM	
(3) In-stream Habitat	HIGH	
(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 Stability	NA	
(4) Tidal Marsh Channel Stability	NA	
(4) Tidal Marsh Stream Geomorphology	NA	
(3) Tidal Marsh In-stream Habitat	NA	
(2) Intertidal Zone Habitat	NA	
Overall	MEDIUM	

NC SAM FIELD ASSESSMENT FORM
Accompanies User Manual Version 2.1

USACE AID #:	2020-00047	NCDWR #:	
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INSTRUCTIONS: 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 and explanations of requested information. Record in the "Notes/Sketch" section if any supplementary measurements were performed. See the 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).

PROJECT / SITE INFORMATION:



1. Project name (if any): Liberty Rock - Mica Creek 2. Date of evaluation: 10/08/2020
 3. Applicant/owner name: _____ 4. Assessor name/organization: Wildlands Engineering
 5. County: Randolph 6. Nearest named water body: _____
 7. River Basin: Cape Fear on USGS 7.5-minute quad: Rocky River
 8. Site coordinates (decimal degrees, at lower end of assessment reach): Lat 35.8200891 Long -79.5619198

STREAM INFORMATION: (depth and width can be approximations)

9. Site number (show on attached map): Mica Creek 10. Length of assessment reach evaluated (feet): Approx 1095 ft
 11. Channel depth from bed (in riffle, if present) to top of bank (feet): 2-3 ft Unable to assess channel depth.
 12. Channel width at top of bank (feet): 5-6 ft 13. Is assessment reach a swamp stream? Yes No
 14. Feature type: Perennial flow Intermittent flow Tidal Marsh Stream

STREAM RATING 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):
 a  (more sinuous stream, flatter valley slope) b  (less sinuous stream, steeper valley slope)

17. Watershed size: (skip for Tidal Marsh Stream) Size 1 (< 0.1 mi²) Size 2 (0.1 to < 0.5 mi²) Size 3 (0.5 to < 5 mi²) Size 4 (> 5 mi²)

ADDITIONAL INFORMATION:

18. Were regulatory considerations evaluated? Yes No If Yes, check all that apply to the assessment area.

<input type="checkbox"/> Section 10 water	<input type="checkbox"/> Classified Trout Waters	<input checked="" type="checkbox"/> Water Supply Watershed (<input type="radio"/> I <input type="radio"/> II <input checked="" type="radio"/> III <input type="radio"/> IV <input type="radio"/> V)
<input type="checkbox"/> Essential Fish Habitat	<input type="checkbox"/> Primary Nursery Area	<input type="checkbox"/> High Quality Waters/Outstanding Resource Waters
<input type="checkbox"/> Publicly owned property	<input type="checkbox"/> NCDWR riparian buffer rule in effect	<input type="checkbox"/> Nutrient Sensitive Waters
<input type="checkbox"/> Anadromous fish	<input type="checkbox"/> 303(d) List	<input type="checkbox"/> CAMA Area of Environmental Concern (AEC)
<input type="checkbox"/> 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 adversely affected by a flow restriction or fill to the point of obstructing flow or a channel choked with aquatic macrophytes or ponded water or impounded on flood or ebb within the assessment reach (examples: undersized or perched culverts, causeways that constrict the channel, tidal gates).
 - B Not A

3. **Feature Pattern – assessment reach metric**
 - A A majority of the assessment reach has altered pattern (examples: straightening, modification above or below culvert).
 - B Not A.

4. **Feature Longitudinal Profile – assessment reach metric**
 - 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

5. **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% of channel unstable
 - B 10 to 25% of channel unstable
 - C > 25% of channel unstable

6. **Streamside Area Interaction – streamside area metric**
Consider for the Left Bank (LB) and the Right Bank (RB).

	LB	RB	
<input type="radio"/> A	<input type="radio"/> A		Little or no evidence of conditions that adversely affect reference interaction
<input checked="" type="radio"/> B	<input checked="" type="radio"/> B		Moderate evidence of conditions (examples: berms, levees, down-cutting, aggradation, dredging) that adversely affect reference interaction (examples: limited streamside area access, disruption of flood flows through streamside area, leaky or intermittent bulkheads, causeways with floodplain constriction, minor ditching [including mosquito ditching])
<input type="radio"/> C	<input type="radio"/> C		Extensive evidence of conditions that adversely affect reference interaction (little to no floodplain/intertidal zone access [examples: causeways with floodplain and channel constriction, bulkheads, retaining walls, fill, stream incision, disruption of flood flows through streamside area] <u>or</u> too much floodplain/intertidal zone access [examples: impoundments, intensive mosquito ditching]) <u>or</u> floodplain/intertidal zone unnaturally absent <u>or</u> assessment reach is a man-made feature on an interstream divide

7. **Water Quality Stressors – assessment reach/intertidal zone metric**

Check all that apply.

- A Discolored water in stream or intertidal zone (milky white, blue, unnatural water discoloration, oil sheen, stream foam)
- B Excessive sedimentation (burying of stream features or intertidal zone)
- C Noticeable evidence of pollutant discharges entering the assessment reach and causing a water quality problem
- D Odor (not including natural sulfide odors)
- E Current published or collected data indicating degraded water quality in the assessment reach. Cite source in the "Notes/Sketch" section.
- F Livestock with access to stream or intertidal zone
- G Excessive algae in stream or intertidal zone
- H Degraded marsh vegetation in the intertidal zone (removal, burning, regular mowing, destruction, etc.)
- I Other: _____ (explain in "Notes/Sketch" section)
- J Little to no stressors

8. **Recent Weather – watershed metric**

For Size 1 or 2 streams, D1 drought or higher is considered a drought; for Size 3 or 4 streams, D2 drought or higher is considered a drought.

- A Drought conditions and no rainfall or rainfall not exceeding 1 inch within the last 48 hours
- B Drought conditions and rainfall exceeding 1 inch within the last 48 hours
- C No drought conditions

9. **Large or Dangerous Stream – assessment reach metric**

Yes No Is stream is too large or dangerous to assess? If Yes, skip to Metric 13 (Streamside Area Ground Surface Condition).

10. **Natural In-stream Habitat Types – assessment reach metric**

10a. Yes No Degraded in-stream habitat over majority of the assessment reach (examples of stressors include excessive sedimentation, mining, excavation, in-stream hardening [for example, rip-rap], recent dredging, and snagging) (evaluate for size 4 Coastal Plain streams only, then skip to Metric 12)

10b. Check all that occur (occurs if > 5% coverage of assessment reach) (skip for Size 4 Coastal Plain streams)

- | | | |
|---|------------------------------------|---|
| <ul style="list-style-type: none"> <input type="checkbox"/> A Multiple aquatic macrophytes and aquatic mosses (include liverworts, lichens, and algal mats) <input checked="" type="checkbox"/> B Multiple sticks and/or leaf packs and/or emergent vegetation <input type="checkbox"/> C Multiple snags and logs (including lap trees) <input checked="" type="checkbox"/> D 5% undercut banks and/or root mats and/or roots in banks extend to the normal wetted perimeter <input type="checkbox"/> E Little or no habitat | Check for Tidal Marsh Streams only | <ul style="list-style-type: none"> <input type="checkbox"/> F 5% oysters or other natural hard bottoms <input type="checkbox"/> G Submerged aquatic vegetation <input type="checkbox"/> H Low-tide refugia (pools) <input type="checkbox"/> I Sand bottom <input type="checkbox"/> J 5% vertical bank along the marsh <input type="checkbox"/> K Little or no habitat |
|---|------------------------------------|---|

*****REMAINING QUESTIONS ARE NOT APPLICABLE FOR TIDAL MARSH STREAMS*****

11. **Bedform and Substrate – assessment reach metric (skip for Size 4 Coastal Plain streams and Tidal Marsh Streams)**

11a. Yes No Is assessment reach in a natural sand-bed stream? (skip for Coastal Plain streams)

11b. Bedform evaluated. Check the appropriate box(es).

- A Riffle-run section (evaluate 11c)
- B Pool-glide section (evaluate 11d)
- C Natural bedform absent (skip to Metric 12, Aquatic Life)

11c. In riffles sections, check all that occur below the normal wetted perimeter of the assessment reach – whether or not submerged.

Check at least one box in each row (skip for Size 4 Coastal Plain Streams and Tidal Marsh Streams). Not Present (NP) = absent, Rare (R) = present but ≤ 10%, Common (C) = > 10-40%, Abundant (A) = > 40-70%, Predominant (P) = > 70%. Cumulative percentages should not exceed 100% for each assessment reach.

NP	R	C	A	P	
<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Bedrock/saprolite
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Boulder (256 – 4096 mm)
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Cobble (64 – 256 mm)
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Gravel (2 – 64 mm)
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Sand (.062 – 2 mm)
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Silt/clay (< 0.062 mm)
<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Detritus
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Artificial (rip-rap, concrete, etc.)

11d. Yes No Are pools filled with sediment? (skip for Size 4 Coastal Plain streams and Tidal Marsh Streams)

12. **Aquatic Life – assessment reach metric (skip for Size 4 Coastal Plain streams and Tidal Marsh Streams)**

12a. Yes No Was an in-stream aquatic life assessment performed as described in the User Manual?

If No, select 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 >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 (including water pennies)
 - Caddisfly larvae (Trichoptera [T])
 - Asian clam (*Corbicula*)
 - Crustacean (isopod/amphipod/crayfish/shrimp)
 - Damselfly and dragonfly larvae
 - Dipterans (true flies)
 - Mayfly larvae (Ephemeroptera [E])
 - Megaloptera (alderfly, fishfly, dobsonfly larvae)
 - Midge/mosquito larvae

- Mosquito fish (*Gambusia*) or mud minnows (*Umbra pygmaea*)
- Mussels/Clams (not *Corbicula*)
- Other fish
- Salamanders/tadpoles
- Snails
- Stonefly larvae (Plecoptera [P])
- Tipulid larvae
- Worms/leeches

13. Streamside Area Ground Surface Condition – streamside area metric (skip for Tidal Marsh Streams and B valley types)
Consider for the Left Bank (LB) and the Right Bank (RB). Consider storage capacity with regard to both overbank flow and upland runoff.

- | | | |
|------------------------------------|------------------------------------|---|
| LB | RB | |
| <input type="radio"/> A | <input type="radio"/> A | Little or no alteration to water storage capacity over a majority of the streamside area |
| <input checked="" type="radio"/> B | <input checked="" type="radio"/> B | Moderate alteration to water storage capacity over a majority of the streamside area |
| <input type="radio"/> C | <input type="radio"/> C | Severe alteration to water storage capacity over a majority of the streamside area (examples include: ditches, fill, soil, compaction, livestock disturbance, buildings, man-made levees, drainage pipes) |

14. Streamside Area Water Storage – streamside area metric (skip for Size 1 streams, Tidal Marsh Streams, and B valley types)
Consider for the Left Bank (LB) and the Right Bank (RB) of the streamside area.

- | | | |
|------------------------------------|------------------------------------|--|
| LB | RB | |
| <input type="radio"/> A | <input type="radio"/> A | Majority of streamside area with depressions able to pond water \geq 6 inches deep |
| <input type="radio"/> B | <input type="radio"/> B | Majority of streamside area with depressions able to pond water 3 to 6 inches deep |
| <input checked="" type="radio"/> C | <input checked="" type="radio"/> C | Majority of streamside area with depressions able to pond water < 3 inches deep |

15. Wetland Presence – streamside area metric (skip for Tidal Marsh Streams)

Consider for the Left Bank (LB) and the Right Bank (RB). Do not consider wetlands outside of the streamside area or within the normal wetted perimeter of assessment reach.

- | | | |
|------------------------------------|------------------------------------|--|
| LB | RB | |
| <input type="radio"/> Y | <input type="radio"/> Y | Are wetlands present in the streamside area? |
| <input checked="" type="radio"/> N | <input checked="" type="radio"/> N | |

16. Baseflow Contributors – assessment reach metric (skip for size 4 streams and Tidal Marsh Streams)

Check all contributors within the assessment reach or within view of and draining to the assessment reach.

- A Streams and/or springs (jurisdictional discharges)
- B Ponds (include wet detention basins; do not include sediment basins or dry detention basins)
- C Obstruction that passes some flow during low-flow periods within assessment area (beaver dam, bottom-release dam)
- D Evidence of bank seepage or sweating (iron oxidizing bacteria in water indicates seepage)
- E Stream bed or bank soil reduced (dig through deposited sediment if present)
- F None of the above

17. Baseflow Detractors – assessment area metric (skip for Tidal Marsh Streams)

Check all that apply.

- A Evidence of substantial water withdrawals from the assessment reach (includes areas excavated for pump installation)
- B Obstruction not passing flow during low flow periods affecting the assessment reach (ex: watertight dam, sediment deposit)
- C Urban stream (\geq 24% impervious surface for watershed)
- D Evidence that the stream-side area has been modified resulting in accelerated drainage into the assessment reach
- E Assessment reach relocated to valley edge
- F None of the above

18. Shading – assessment reach metric (skip for Tidal Marsh Streams)

Consider aspect. Consider "leaf-on" condition.

- A Stream shading is appropriate for stream category (may include gaps associated with natural processes)
- B Degraded (example: scattered trees)
- C Stream 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 | |
| <input checked="" type="radio"/> A | <input checked="" type="radio"/> A | <input type="radio"/> A | <input type="radio"/> A | \geq 100-feet wide <u>or</u> extends to the edge of the watershed |
| <input type="radio"/> B | <input type="radio"/> B | <input type="radio"/> B | <input type="radio"/> B | From 50 to < 100-feet wide |
| <input type="radio"/> C | <input type="radio"/> C | <input type="radio"/> C | <input type="radio"/> C | From 30 to < 50-feet wide |
| <input type="radio"/> D | <input type="radio"/> D | <input type="radio"/> D | <input type="radio"/> D | From 10 to < 30-feet wide |
| <input type="radio"/> E | <input type="radio"/> E | <input checked="" type="radio"/> E | <input checked="" type="radio"/> E | < 10-feet wide <u>or</u> no trees |

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 | |
| <input type="radio"/> A | <input type="radio"/> A | Mature forest |
| <input type="radio"/> B | <input type="radio"/> B | Non-mature woody vegetation <u>or</u> modified vegetation structure |
| <input checked="" type="radio"/> C | <input checked="" type="radio"/> C | Herbaceous vegetation with or without a strip of trees < 10 feet wide |
| <input type="radio"/> D | <input type="radio"/> D | Maintained shrubs |
| <input type="radio"/> E | <input type="radio"/> 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 |
| <input type="radio"/> A | <input type="radio"/> A | <input type="radio"/> A | <input type="radio"/> A |
| <input type="radio"/> A | <input type="radio"/> A | <input type="radio"/> A | <input type="radio"/> A |
- Row crops

- B B B B B B Maintained turf
 C C C C C C Pasture (no livestock)/commercial horticulture
 D D D D D D Pasture (active livestock use)

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 A The total length of buffer breaks is < 25 percent.
 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 – First 100 feet of 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 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 a 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

Notes/Sketch:

Refer to Existing Conditions cross-sections 9 and 10.

NC SAM Stream Rating Sheet
Accompanies User Manual Version 2.1

Stream Site Name Liberty Rock - Mica Creek
 Stream Category Pa2

Date of Evaluation 10/08/2020
 Assessor Name/Organization Wildlands Engineering

Notes of Field Assessment Form (Y/N)	YES
Presence of regulatory considerations (Y/N)	YES
Additional stream information/supplementary measurements included (Y/N)	YES
NC SAM feature type (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	MEDIUM	
(4) Wooded Riparian Buffer	LOW	
(4) Microtopography	LOW	
(3) Stream Stability	LOW	
(4) Channel Stability	LOW	
(4) Sediment Transport	MEDIUM	
(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	MEDIUM	
(2) Intertidal Zone Filtration	NA	
(1) Habitat	LOW	
(2) In-stream Habitat	MEDIUM	
(3) Baseflow	HIGH	
(3) Substrate	MEDIUM	
(3) Stream Stability	LOW	
(3) In-stream Habitat	MEDIUM	
(2) Stream-side Habitat	LOW	
(3) Stream-side Habitat	LOW	
(3) Thermoregulation	LOW	
(2) Tidal Marsh In-stream Habitat	NA	
(3) Flow Restriction	NA	
(3) Tidal Marsh Stream Stability	NA	
(4) Tidal Marsh Channel Stability	NA	
(4) Tidal Marsh Stream Geomorphology	NA	
(3) Tidal Marsh In-stream Habitat	NA	
(2) Intertidal Zone Habitat	NA	
Overall	LOW	

NC SAM FIELD ASSESSMENT FORM
Accompanies User Manual Version 2.1

USACE AID #:	2020-00047	NCDWR #:	
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INSTRUCTIONS: 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 and explanations of requested information. Record in the "Notes/Sketch" section if any supplementary measurements were performed. See the 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).

PROJECT / SITE INFORMATION:

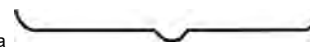

1. Project name (if any): Liberty Rock - Schist Creek 2. Date of evaluation: 10/08/2020
 3. Applicant/owner name: _____ 4. Assessor name/organization: Wildlands Engineering
 5. County: Randolph 6. Nearest named water body _____
 7. River Basin: Cape Fear on USGS 7.5-minute quad: Rocky River
 8. Site coordinates (decimal degrees, at lower end of assessment reach): Lat 35.8200956 Long -79.56655348

STREAM INFORMATION: (depth and width can be approximations)

9. Site number (show on attached map): Schist Creek 10. Length of assessment reach evaluated (feet): Approx 220 ft
 11. Channel depth from bed (in riffle, if present) to top of bank (feet): 1-2.5 ft Unable to assess channel depth.
 12. Channel width at top of bank (feet): 10-17 ft 13. Is assessment reach a swamp stream? Yes No
 14. Feature type: Perennial flow Intermittent flow Tidal Marsh Stream

STREAM RATING 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):
 a  (more sinuous stream, flatter valley slope) b  (less sinuous stream, steeper valley slope)

17. Watershed size: (skip for Tidal Marsh Stream) Size 1 (< 0.1 mi²) Size 2 (0.1 to < 0.5 mi²) Size 3 (0.5 to < 5 mi²) Size 4 (> 5 mi²)

ADDITIONAL INFORMATION:

18. Were regulatory considerations evaluated? Yes No If Yes, check all that apply to the assessment area.

<input type="checkbox"/> Section 10 water	<input type="checkbox"/> Classified Trout Waters	<input checked="" type="checkbox"/> Water Supply Watershed (<input type="radio"/> I <input type="radio"/> II <input checked="" type="radio"/> III <input type="radio"/> IV <input type="radio"/> V)
<input type="checkbox"/> Essential Fish Habitat	<input type="checkbox"/> Primary Nursery Area	<input type="checkbox"/> High Quality Waters/Outstanding Resource Waters
<input type="checkbox"/> Publicly owned property	<input type="checkbox"/> NCDWR riparian buffer rule in effect	<input type="checkbox"/> Nutrient Sensitive Waters
<input type="checkbox"/> Anadromous fish	<input type="checkbox"/> 303(d) List	<input type="checkbox"/> 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 adversely affected by a flow restriction or fill to the point of obstructing flow or a channel choked with aquatic macrophytes or ponded water or impounded on flood or ebb within the assessment reach (examples: undersized or perched culverts, causeways that constrict the channel, tidal gates).
 - B Not A

3. **Feature Pattern – assessment reach metric**
 - A A majority of the assessment reach has altered pattern (examples: straightening, modification above or below culvert).
 - B Not A.

4. **Feature Longitudinal Profile – assessment reach metric**
 - 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

5. **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% of channel unstable
 - B 10 to 25% of channel unstable
 - C > 25% of channel unstable

6. **Streamside Area Interaction – streamside area metric**
Consider for the Left Bank (LB) and the Right Bank (RB).

	LB	RB	
<input type="radio"/> A	<input type="radio"/> A	<input type="radio"/> A	Little or no evidence of conditions that adversely affect reference interaction
<input checked="" type="radio"/> B	<input checked="" type="radio"/> B	<input type="radio"/> B	Moderate evidence of conditions (examples: berms, levees, down-cutting, aggradation, dredging) that adversely affect reference interaction (examples: limited streamside area access, disruption of flood flows through streamside area, leaky or intermittent bulkheads, causeways with floodplain constriction, minor ditching [including mosquito ditching])
<input type="radio"/> C	<input type="radio"/> C	<input type="radio"/> C	Extensive evidence of conditions that adversely affect reference interaction (little to no floodplain/intertidal zone access [examples: causeways with floodplain and channel constriction, bulkheads, retaining walls, fill, stream incision, disruption of flood flows through streamside area] <u>or</u> too much floodplain/intertidal zone access [examples: impoundments, intensive mosquito ditching]) <u>or</u> floodplain/intertidal zone unnaturally absent <u>or</u> assessment reach is a man-made feature on an interstream divide

7. **Water Quality Stressors – assessment reach/intertidal zone metric**

Check all that apply.

- A Discolored water in stream or intertidal zone (milky white, blue, unnatural water discoloration, oil sheen, stream foam)
- B Excessive sedimentation (burying of stream features or intertidal zone)
- C Noticeable evidence of pollutant discharges entering the assessment reach and causing a water quality problem
- D Odor (not including natural sulfide odors)
- E Current published or collected data indicating degraded water quality in the assessment reach. Cite source in the "Notes/Sketch" section.
- F Livestock with access to stream or intertidal zone
- G Excessive algae in stream or intertidal zone
- H Degraded marsh vegetation in the intertidal zone (removal, burning, regular mowing, destruction, etc.)
- I Other: _____ (explain in "Notes/Sketch" section)
- J Little to no stressors

8. **Recent Weather – watershed metric**

For Size 1 or 2 streams, D1 drought or higher is considered a drought; for Size 3 or 4 streams, D2 drought or higher is considered a drought.

- A Drought conditions and no rainfall or rainfall not exceeding 1 inch within the last 48 hours
- B Drought conditions and rainfall exceeding 1 inch within the last 48 hours
- C No drought conditions

9. **Large or Dangerous Stream – assessment reach metric**

Yes No Is stream is too large or dangerous to assess? If Yes, skip to Metric 13 (Streamside Area Ground Surface Condition).

10. **Natural In-stream Habitat Types – assessment reach metric**

10a. Yes No Degraded in-stream habitat over majority of the assessment reach (examples of stressors include excessive sedimentation, mining, excavation, in-stream hardening [for example, rip-rap], recent dredging, and snagging) (evaluate for size 4 Coastal Plain streams only, then skip to Metric 12)

10b. Check all that occur (occurs if > 5% coverage of assessment reach) (skip for Size 4 Coastal Plain streams)

- | | | |
|---|------------------------------------|---|
| <input type="checkbox"/> A Multiple aquatic macrophytes and aquatic mosses (include liverworts, lichens, and algal mats) | Check for Tidal Marsh Streams only | <input type="checkbox"/> F 5% oysters or other natural hard bottoms |
| <input checked="" type="checkbox"/> B Multiple sticks and/or leaf packs and/or emergent vegetation | | <input type="checkbox"/> G Submerged aquatic vegetation |
| <input checked="" type="checkbox"/> C Multiple snags and logs (including lap trees) | | <input type="checkbox"/> H Low-tide refugia (pools) |
| <input type="checkbox"/> D 5% undercut banks and/or root mats and/or roots in banks extend to the normal wetted perimeter | | <input type="checkbox"/> I Sand bottom |
| <input type="checkbox"/> E Little or no habitat | | <input type="checkbox"/> J 5% vertical bank along the marsh |
| | | <input type="checkbox"/> K Little or no habitat |

*****REMAINING QUESTIONS ARE NOT APPLICABLE FOR TIDAL MARSH STREAMS*****

11. **Bedform and Substrate – assessment reach metric (skip for Size 4 Coastal Plain streams and Tidal Marsh Streams)**

11a. Yes No Is assessment reach in a natural sand-bed stream? (skip for Coastal Plain streams)

11b. Bedform evaluated. Check the appropriate box(es).

- A Riffle-run section (evaluate 11c)
- B Pool-glide section (evaluate 11d)
- C Natural bedform absent (skip to Metric 12, Aquatic Life)

11c. In riffles sections, check all that occur below the normal wetted perimeter of the assessment reach – whether or not submerged. Check at least one box in each row (skip for Size 4 Coastal Plain Streams and Tidal Marsh Streams). Not Present (NP) = absent, Rare (R) = present but ≤ 10%, Common (C) = > 10-40%, Abundant (A) = > 40-70%, Predominant (P) = > 70%. Cumulative percentages should not exceed 100% for each assessment reach.

NP	R	C	A	P	
<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Bedrock/saprolite
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Boulder (256 – 4096 mm)
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Cobble (64 – 256 mm)
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Gravel (2 – 64 mm)
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Sand (.062 – 2 mm)
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Silt/clay (< 0.062 mm)
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Detritus
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Artificial (rip-rap, concrete, etc.)

11d. Yes No Are pools filled with sediment? (skip for Size 4 Coastal Plain streams and Tidal Marsh Streams)

12. **Aquatic Life – assessment reach metric (skip for Size 4 Coastal Plain streams and Tidal Marsh Streams)**

12a. Yes No Was an in-stream aquatic life assessment performed as described in the User Manual?

If No, select 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 >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 (including water pennies)
 - Caddisfly larvae (Trichoptera [T])
 - Asian clam (*Corbicula*)
 - Crustacean (isopod/amphipod/crayfish/shrimp)
 - Damselfly and dragonfly larvae
 - Dipterans (true flies)
 - Mayfly larvae (Ephemeroptera [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 (Plecoptera [P])
- Tipulid larvae
- Worms/leeches

13. **Streamside Area Ground Surface Condition – streamside area metric (skip for Tidal Marsh Streams and B valley types)**
 Consider for the Left Bank (LB) and the Right Bank (RB). Consider storage capacity with regard to both overbank flow and upland runoff.

- | | | |
|------------------------------------|------------------------------------|---|
| LB | RB | |
| <input type="radio"/> A | <input type="radio"/> A | Little or no alteration to water storage capacity over a majority of the streamside area |
| <input checked="" type="radio"/> B | <input checked="" type="radio"/> B | Moderate alteration to water storage capacity over a majority of the streamside area |
| <input type="radio"/> C | <input type="radio"/> C | Severe alteration to water storage capacity over a majority of the streamside area (examples include: ditches, fill, soil, compaction, livestock disturbance, buildings, man-made levees, drainage pipes) |

14. **Streamside Area Water Storage – streamside area metric (skip for Size 1 streams, Tidal Marsh Streams, and B valley types)**
 Consider for the Left Bank (LB) and the Right Bank (RB) of the streamside area.

- | | | |
|------------------------------------|------------------------------------|--|
| LB | RB | |
| <input type="radio"/> A | <input type="radio"/> A | Majority of streamside area with depressions able to pond water \geq 6 inches deep |
| <input type="radio"/> B | <input type="radio"/> B | Majority of streamside area with depressions able to pond water 3 to 6 inches deep |
| <input checked="" type="radio"/> C | <input checked="" type="radio"/> C | Majority of streamside area with depressions able to pond water < 3 inches deep |

15. **Wetland Presence – streamside area metric (skip for Tidal Marsh Streams)**

Consider for the Left Bank (LB) and the Right Bank (RB). Do not consider wetlands outside of the streamside area or within the normal wetted perimeter of assessment reach.

- | | | |
|------------------------------------|------------------------------------|--|
| LB | RB | |
| <input type="radio"/> Y | <input type="radio"/> Y | Are wetlands present in the streamside area? |
| <input checked="" type="radio"/> N | <input checked="" type="radio"/> N | |

16. **Baseflow Contributors – assessment reach metric (skip for size 4 streams and Tidal Marsh Streams)**

Check all contributors within the assessment reach or within view of and draining to the assessment reach.

- A Streams and/or springs (jurisdictional discharges)
- B Ponds (include wet detention basins; do not include sediment basins or dry detention basins)
- C Obstruction that passes some flow during low-flow periods within assessment area (beaver dam, bottom-release dam)
- D Evidence of bank seepage or sweating (iron oxidizing bacteria in water indicates seepage)
- E Stream bed or bank soil reduced (dig through deposited sediment if present)
- F None of the above

17. **Baseflow Detractors – assessment area metric (skip for Tidal Marsh Streams)**

Check all that apply.

- A Evidence of substantial water withdrawals from the assessment reach (includes areas excavated for pump installation)
- B Obstruction not passing flow during low flow periods affecting the assessment reach (ex: watertight dam, sediment deposit)
- C Urban stream (\geq 24% impervious surface for watershed)
- D Evidence that the stream-side area has been modified resulting in accelerated drainage into the assessment reach
- E Assessment reach relocated to valley edge
- F None of the above

18. **Shading – assessment reach metric (skip for Tidal Marsh Streams)**

Consider aspect. Consider "leaf-on" condition.

- A Stream shading is appropriate for stream category (may include gaps associated with natural processes)
- B Degraded (example: scattered trees)
- C Stream 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 | |
| <input checked="" type="radio"/> A | <input checked="" type="radio"/> A | <input type="radio"/> A | <input type="radio"/> A | \geq 100-feet wide <u>or</u> extends to the edge of the watershed |
| <input type="radio"/> B | <input type="radio"/> B | <input type="radio"/> B | <input type="radio"/> B | From 50 to < 100-feet wide |
| <input type="radio"/> C | <input type="radio"/> C | <input checked="" type="radio"/> C | <input checked="" type="radio"/> C | From 30 to < 50-feet wide |
| <input type="radio"/> D | <input type="radio"/> D | <input type="radio"/> D | <input type="radio"/> D | From 10 to < 30-feet wide |
| <input type="radio"/> E | <input type="radio"/> E | <input type="radio"/> E | <input type="radio"/> E | < 10-feet wide <u>or</u> no trees |

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 | |
| <input type="radio"/> A | <input type="radio"/> A | Mature forest |
| <input checked="" type="radio"/> B | <input checked="" type="radio"/> B | Non-mature woody vegetation <u>or</u> modified vegetation structure |
| <input type="radio"/> C | <input type="radio"/> C | Herbaceous vegetation with or without a strip of trees < 10 feet wide |
| <input type="radio"/> D | <input type="radio"/> D | Maintained shrubs |
| <input type="radio"/> E | <input type="radio"/> 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 |
| <input type="radio"/> A | <input type="radio"/> A | <input type="radio"/> A | <input type="radio"/> A |
| <input type="radio"/> A | <input type="radio"/> A | <input type="radio"/> A | <input type="radio"/> A |
- Row crops

- B B B B B B Maintained turf
 C C C C C C Pasture (no livestock)/commercial horticulture
 D D D D D D Pasture (active livestock use)

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 A The total length of buffer breaks is < 25 percent.
 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 – First 100 feet of 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 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 a 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

Notes/Sketch:

Refer to cross-sections 3 and 4. Wooded buffer on the upstream end of the stream, herbaceous vegetation buffer on downstream end with few trees.

NC SAM Stream Rating Sheet
Accompanies User Manual Version 2.1

Stream Site Name Liberty Rock - Schist Creek
 Stream Category Pa2

Date of Evaluation 10/08/2020
 Assessor Name/Organization Wildlands Engineering

Notes of Field Assessment Form (Y/N)	YES
Presence of regulatory considerations (Y/N)	YES
Additional stream information/supplementary measurements included (Y/N)	YES
NC SAM feature type (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	MEDIUM	
(4) Floodplain Access	MEDIUM	
(4) Wooded Riparian Buffer	MEDIUM	
(4) Microtopography	LOW	
(3) Stream Stability	LOW	
(4) Channel Stability	LOW	
(4) Sediment Transport	HIGH	
(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	MEDIUM	
(2) Baseflow	HIGH	
(2) Streamside Area Vegetation	LOW	
(3) Upland Pollutant Filtration	LOW	
(3) Thermoregulation	MEDIUM	
(2) Indicators of Stressors	YES	
(2) Aquatic Life Tolerance	HIGH	
(2) Intertidal Zone Filtration	NA	
(1) Habitat	HIGH	
(2) In-stream Habitat	HIGH	
(3) Baseflow	HIGH	
(3) Substrate	HIGH	
(3) Stream Stability	LOW	
(3) In-stream Habitat	HIGH	
(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 Stability	NA	
(4) Tidal Marsh Channel Stability	NA	
(4) Tidal Marsh Stream Geomorphology	NA	
(3) Tidal Marsh In-stream Habitat	NA	
(2) Intertidal Zone Habitat	NA	
Overall	MEDIUM	

NC SAM FIELD ASSESSMENT FORM
Accompanies User Manual Version 2.1

USACE AID #:	2020-00047	NCDWR #:
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INSTRUCTIONS: 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 and explanations of requested information. Record in the "Notes/Sketch" section if any supplementary measurements were performed. See the 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).

PROJECT / SITE INFORMATION:



1. Project name (if any): Liberty Rock - Gypsum Creek 2. Date of evaluation: 10/08/2020
 3. Applicant/owner name: _____ 4. Assessor name/organization: Wildlands Engineering
 5. County: Randolph 6. Nearest named water body _____
 7. River Basin: Cape Fear on USGS 7.5-minute quad: Rocky River
 8. Site coordinates (decimal degrees, at lower end of assessment reach): Lat 35.8201154 Long -79.564431

STREAM INFORMATION: (depth and width can be approximations)

9. Site number (show on attached map): Gypsum Creek 10. Length of assessment reach evaluated (feet): Approx 280 ft
 11. Channel depth from bed (in riffle, if present) to top of bank (feet): _____ Unable to assess channel depth.
 12. Channel width at top of bank (feet): _____ 13. Is assessment reach a swamp stream? Yes No
 14. Feature type: Perennial flow Intermittent flow Tidal Marsh Stream

STREAM RATING 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):
 a  (more sinuous stream, flatter valley slope)
 b  (less sinuous stream, steeper valley slope)

17. Watershed size: (skip for Tidal Marsh Stream)
 Size 1 (< 0.1 mi²) Size 2 (0.1 to < 0.5 mi²) Size 3 (0.5 to < 5 mi²) Size 4 (> 5 mi²)

ADDITIONAL INFORMATION:

18. Were regulatory considerations evaluated? Yes No If Yes, check all that apply to the assessment area.

<input type="checkbox"/> Section 10 water	<input type="checkbox"/> Classified Trout Waters	<input checked="" type="checkbox"/> Water Supply Watershed (<input type="radio"/> I <input type="radio"/> II <input checked="" type="radio"/> III <input type="radio"/> IV <input type="radio"/> V)
<input type="checkbox"/> Essential Fish Habitat	<input type="checkbox"/> Primary Nursery Area	<input type="checkbox"/> High Quality Waters/Outstanding Resource Waters
<input type="checkbox"/> Publicly owned property	<input type="checkbox"/> NCDWR riparian buffer rule in effect	<input type="checkbox"/> Nutrient Sensitive Waters
<input type="checkbox"/> Anadromous fish	<input type="checkbox"/> 303(d) List	<input type="checkbox"/> 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 adversely affected by a flow restriction or fill to the point of obstructing flow or a channel choked with aquatic macrophytes or ponded water or impounded on flood or ebb within the assessment reach (examples: undersized or perched culverts, causeways that constrict the channel, tidal gates).
 - B Not A

3. **Feature Pattern – assessment reach metric**
 - A A majority of the assessment reach has altered pattern (examples: straightening, modification above or below culvert).
 - B Not A.

4. **Feature Longitudinal Profile – assessment reach metric**
 - 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

5. **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% of channel unstable
 - B 10 to 25% of channel unstable
 - C > 25% of channel unstable

6. **Streamside Area Interaction – streamside area metric**
Consider for the Left Bank (LB) and the Right Bank (RB).

	LB	RB	
<input checked="" type="radio"/> A	<input checked="" type="radio"/> A		Little or no evidence of conditions that adversely affect reference interaction
<input type="radio"/> B	<input type="radio"/> B		Moderate evidence of conditions (examples: berms, levees, down-cutting, aggradation, dredging) that adversely affect reference interaction (examples: limited streamside area access, disruption of flood flows through streamside area, leaky or intermittent bulkheads, causeways with floodplain constriction, minor ditching [including mosquito ditching])
<input type="radio"/> C	<input type="radio"/> C		Extensive evidence of conditions that adversely affect reference interaction (little to no floodplain/intertidal zone access [examples: causeways with floodplain and channel constriction, bulkheads, retaining walls, fill, stream incision, disruption of flood flows through streamside area] <u>or</u> too much floodplain/intertidal zone access [examples: impoundments, intensive mosquito ditching]) <u>or</u> floodplain/intertidal zone unnaturally absent <u>or</u> assessment reach is a man-made feature on an interstream divide

7. Water Quality Stressors – assessment reach/intertidal zone metric

Check all that apply.

- A Discolored water in stream or intertidal zone (milky white, blue, unnatural water discoloration, oil sheen, stream foam)
B Excessive sedimentation (burying of stream features or intertidal zone)
C Noticeable evidence of pollutant discharges entering the assessment reach and causing a water quality problem
D Odor (not including natural sulfide odors)
E Current published or collected data indicating degraded water quality in the assessment reach. Cite source in the "Notes/Sketch" section.
F Livestock with access to stream or intertidal zone
G Excessive algae in stream or intertidal zone
H Degraded marsh vegetation in the intertidal zone (removal, burning, regular mowing, destruction, etc.)
I Other: (explain in "Notes/Sketch" section)
J Little to no stressors

8. Recent Weather – watershed metric

For Size 1 or 2 streams, D1 drought or higher is considered a drought; for Size 3 or 4 streams, D2 drought or higher is considered a drought.

- A Drought conditions and no rainfall or rainfall not exceeding 1 inch within the last 48 hours
B Drought conditions and rainfall exceeding 1 inch within the last 48 hours
C No drought conditions

9. Large or Dangerous Stream – assessment reach metric

Yes No Is stream is too large or dangerous to assess? If Yes, skip to Metric 13 (Streamside Area Ground Surface Condition).

10. Natural In-stream Habitat Types – assessment reach metric

10a. Yes No Degraded in-stream habitat over majority of the assessment reach (examples of stressors include excessive sedimentation, mining, excavation, in-stream hardening [for example, rip-rap], recent dredging, and snagging) (evaluate for size 4 Coastal Plain streams only, then skip to Metric 12)

10b. Check all that occur (occurs if > 5% coverage of assessment reach) (skip for Size 4 Coastal Plain streams)

- A Multiple aquatic macrophytes and aquatic mosses (include liverworts, lichens, and algal mats)
B Multiple sticks and/or leaf packs and/or emergent vegetation
C Multiple snags and logs (including lap trees)
D 5% undercut banks and/or root mats and/or roots in banks extend to the normal wetted perimeter
E Little or no habitat
F 5% oysters or other natural hard bottoms
G Submerged aquatic vegetation
H Low-tide refugia (pools)
I Sand bottom
J 5% vertical bank along the marsh
K Little or no habitat

*****REMAINING QUESTIONS ARE NOT APPLICABLE FOR TIDAL MARSH STREAMS*****

11. Bedform and Substrate – assessment reach metric (skip for Size 4 Coastal Plain streams and Tidal Marsh Streams)

11a. Yes No Is assessment reach in a natural sand-bed stream? (skip for Coastal Plain streams)

11b. Bedform evaluated. Check the appropriate box(es).

- A Riffle-run section (evaluate 11c)
B Pool-glide section (evaluate 11d)
C Natural bedform absent (skip to Metric 12, Aquatic Life)

11c. In riffles sections, check all that occur below the normal wetted perimeter of the assessment reach – whether or not submerged. Check at least one box in each row (skip for Size 4 Coastal Plain Streams and Tidal Marsh Streams). Not Present (NP) = absent, Rare (R) = present but <= 10%, Common (C) = > 10-40%, Abundant (A) = > 40-70%, Predominant (P) = > 70%. Cumulative percentages should not exceed 100% for each assessment reach.

Table with 5 columns (NP, R, C, A, P) and 7 rows of habitat types: Bedrock/saprolite, Boulder (256 – 4096 mm), Cobble (64 – 256 mm), Gravel (2 – 64 mm), Sand (.062 – 2 mm), Silt/clay (< 0.062 mm), Detritus, Artificial (rip-rap, concrete, etc.)

11d. Yes No Are pools filled with sediment? (skip for Size 4 Coastal Plain streams and Tidal Marsh Streams)

12. Aquatic Life – assessment reach metric (skip for Size 4 Coastal Plain streams and Tidal Marsh Streams)

12a. Yes No Was an in-stream aquatic life assessment performed as described in the User Manual?

If No, select 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 >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 (including water pennies)
Caddisfly larvae (Trichoptera [T])
Asian clam (Corbicula)
Crustacean (isopod/amphipod/crayfish/shrimp)
Damselfly and dragonfly larvae
Dipterans (true flies)
Mayfly larvae (Ephemeroptera [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 (Plecoptera [P])
- Tipulid larvae
- Worms/leeches

13. Streamside Area Ground Surface Condition – streamside area metric (skip for Tidal Marsh Streams and B valley types)
Consider for the Left Bank (LB) and the Right Bank (RB). Consider storage capacity with regard to both overbank flow and upland runoff.

- | | | |
|------------------------------------|------------------------------------|---|
| LB | RB | |
| <input type="radio"/> A | <input type="radio"/> A | Little or no alteration to water storage capacity over a majority of the streamside area |
| <input checked="" type="radio"/> B | <input checked="" type="radio"/> B | Moderate alteration to water storage capacity over a majority of the streamside area |
| <input type="radio"/> C | <input type="radio"/> C | Severe alteration to water storage capacity over a majority of the streamside area (examples include: ditches, fill, soil, compaction, livestock disturbance, buildings, man-made levees, drainage pipes) |

14. Streamside Area Water Storage – streamside area metric (skip for Size 1 streams, Tidal Marsh Streams, and B valley types)
Consider for the Left Bank (LB) and the Right Bank (RB) of the streamside area.

- | | | |
|------------------------------------|------------------------------------|--|
| LB | RB | |
| <input type="radio"/> A | <input type="radio"/> A | Majority of streamside area with depressions able to pond water \geq 6 inches deep |
| <input type="radio"/> B | <input type="radio"/> B | Majority of streamside area with depressions able to pond water 3 to 6 inches deep |
| <input checked="" type="radio"/> C | <input checked="" type="radio"/> C | Majority of streamside area with depressions able to pond water < 3 inches deep |

15. Wetland Presence – streamside area metric (skip for Tidal Marsh Streams)

Consider for the Left Bank (LB) and the Right Bank (RB). Do not consider wetlands outside of the streamside area or within the normal wetted perimeter of assessment reach.

- | | | |
|------------------------------------|------------------------------------|--|
| LB | RB | |
| <input checked="" type="radio"/> Y | <input checked="" type="radio"/> Y | Are wetlands present in the streamside area? |
| <input type="radio"/> N | <input type="radio"/> N | |

16. Baseflow Contributors – assessment reach metric (skip for size 4 streams and Tidal Marsh Streams)

Check all contributors within the assessment reach or within view of and draining to the assessment reach.

- A Streams and/or springs (jurisdictional discharges)
- B Ponds (include wet detention basins; do not include sediment basins or dry detention basins)
- C Obstruction that passes some flow during low-flow periods within assessment area (beaver dam, bottom-release dam)
- D Evidence of bank seepage or sweating (iron oxidizing bacteria in water indicates seepage)
- E Stream bed or bank soil reduced (dig through deposited sediment if present)
- F None of the above

17. Baseflow Detractors – assessment area metric (skip for Tidal Marsh Streams)

Check all that apply.

- A Evidence of substantial water withdrawals from the assessment reach (includes areas excavated for pump installation)
- B Obstruction not passing flow during low flow periods affecting the assessment reach (ex: watertight dam, sediment deposit)
- C Urban stream (\geq 24% impervious surface for watershed)
- D Evidence that the stream-side area has been modified resulting in accelerated drainage into the assessment reach
- E Assessment reach relocated to valley edge
- F None of the above

18. Shading – assessment reach metric (skip for Tidal Marsh Streams)

Consider aspect. Consider "leaf-on" condition.

- A Stream shading is appropriate for stream category (may include gaps associated with natural processes)
- B Degraded (example: scattered trees)
- C Stream 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 | |
| <input checked="" type="radio"/> A | <input checked="" type="radio"/> A | <input checked="" type="radio"/> A | <input checked="" type="radio"/> A | \geq 100-feet wide <u>or</u> extends to the edge of the watershed |
| <input type="radio"/> B | <input type="radio"/> B | <input type="radio"/> B | <input type="radio"/> B | From 50 to < 100-feet wide |
| <input type="radio"/> C | <input type="radio"/> C | <input type="radio"/> C | <input type="radio"/> C | From 30 to < 50-feet wide |
| <input type="radio"/> D | <input type="radio"/> D | <input type="radio"/> D | <input type="radio"/> D | From 10 to < 30-feet wide |
| <input type="radio"/> E | <input type="radio"/> E | <input type="radio"/> E | <input type="radio"/> E | < 10-feet wide <u>or</u> no trees |

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 | |
| <input checked="" type="radio"/> A | <input checked="" type="radio"/> A | Mature forest |
| <input type="radio"/> B | <input type="radio"/> B | Non-mature woody vegetation <u>or</u> modified vegetation structure |
| <input type="radio"/> C | <input type="radio"/> C | Herbaceous vegetation with or without a strip of trees < 10 feet wide |
| <input type="radio"/> D | <input type="radio"/> D | Maintained shrubs |
| <input type="radio"/> E | <input type="radio"/> 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 |
| <input type="radio"/> A | <input type="radio"/> A | <input type="radio"/> A | <input type="radio"/> A |
| <input type="radio"/> A | <input type="radio"/> A | <input type="radio"/> A | <input type="radio"/> A |
- Row crops

- B B B B B B Maintained turf
- C C C C C C Pasture (no livestock)/commercial horticulture
- D D D D D D Pasture (active livestock use)

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 A The total length of buffer breaks is < 25 percent.
- 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 – First 100 feet of 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 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 a 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

Notes/Sketch:

NC SAM Stream Rating Sheet
Accompanies User Manual Version 2.1

Stream Site Name Liberty Rock - Gypsum Creek
 Stream Category Pa1

Date of Evaluation 10/08/2020
 Assessor Name/Organization Wildlands Engineering

Notes of Field Assessment Form (Y/N)	NO
Presence of regulatory considerations (Y/N)	YES
Additional stream information/supplementary measurements included (Y/N)	YES
NC SAM feature type (perennial, intermittent, Tidal Marsh Stream)	Intermittent

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	HIGH	HIGH
(4) Wooded Riparian Buffer	HIGH	HIGH
(4) Microtopography	MEDIUM	MEDIUM
(3) Stream Stability	HIGH	HIGH
(4) Channel Stability	HIGH	HIGH
(4) Sediment Transport	LOW	LOW
(4) Stream Geomorphology	HIGH	HIGH
(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	MEDIUM	MEDIUM
(3) Upland Pollutant Filtration	LOW	LOW
(3) Thermoregulation	HIGH	HIGH
(2) Indicators of Stressors	YES	YES
(2) Aquatic Life Tolerance	HIGH	NA
(2) Intertidal Zone Filtration	NA	NA
(1) Habitat	HIGH	HIGH
(2) In-stream Habitat	MEDIUM	MEDIUM
(3) Baseflow	HIGH	HIGH
(3) Substrate	LOW	LOW
(3) Stream Stability	HIGH	HIGH
(3) In-stream Habitat	HIGH	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
(2) Intertidal Zone Habitat	NA	NA
Overall	HIGH	HIGH

NC SAM FIELD ASSESSMENT FORM
Accompanies User Manual Version 2.1

USACE AID #:	2020-00047	NCDWR #:	
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INSTRUCTIONS: 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 and explanations of requested information. Record in the "Notes/Sketch" section if any supplementary measurements were performed. See the 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).

PROJECT / SITE INFORMATION:



1. Project name (if any): Liberty Rock - Dolomite Creek 2. Date of evaluation: 10/08/2020
 3. Applicant/owner name: _____ 4. Assessor name/organization: Wildlands Engineering
 5. County: Randolph 6. Nearest named water body: _____
 7. River Basin: Cape Fear on USGS 7.5-minute quad: Rocky River
 8. Site coordinates (decimal degrees, at lower end of assessment reach): Lat 35.8200148 Long -79.5626558

STREAM INFORMATION: (depth and width can be approximations)

9. Site number (show on attached map): Dolomite Creek 10. Length of assessment reach evaluated (feet): Approx 210 ft
 11. Channel depth from bed (in riffle, if present) to top of bank (feet): 0.5-1 ft Unable to assess channel depth.
 12. Channel width at top of bank (feet): 2-3 ft 13. Is assessment reach a swamp stream? Yes No
 14. Feature type: Perennial flow Intermittent flow Tidal Marsh Stream

STREAM RATING 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):
 a  (more sinuous stream, flatter valley slope)
 b  (less sinuous stream, steeper valley slope)

17. Watershed size: (skip for Tidal Marsh Stream)
 Size 1 (< 0.1 mi²) Size 2 (0.1 to < 0.5 mi²) Size 3 (0.5 to < 5 mi²) Size 4 (> 5 mi²)

ADDITIONAL INFORMATION:

18. Were regulatory considerations evaluated? Yes No If Yes, check all that apply to the assessment area.

<input type="checkbox"/> Section 10 water	<input type="checkbox"/> Classified Trout Waters	<input checked="" type="checkbox"/> Water Supply Watershed (<input type="radio"/> I <input type="radio"/> II <input checked="" type="radio"/> III <input type="radio"/> IV <input type="radio"/> V)
<input type="checkbox"/> Essential Fish Habitat	<input type="checkbox"/> Primary Nursery Area	<input type="checkbox"/> High Quality Waters/Outstanding Resource Waters
<input type="checkbox"/> Publicly owned property	<input type="checkbox"/> NCDWR riparian buffer rule in effect	<input type="checkbox"/> Nutrient Sensitive Waters
<input type="checkbox"/> Anadromous fish	<input type="checkbox"/> 303(d) List	<input type="checkbox"/> CAMA Area of Environmental Concern (AEC)
<input type="checkbox"/> 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 adversely affected by a flow restriction or fill to the point of obstructing flow or a channel choked with aquatic macrophytes or ponded water or impounded on flood or ebb within the assessment reach (examples: undersized or perched culverts, causeways that constrict the channel, tidal gates).
 - B Not A

3. **Feature Pattern – assessment reach metric**
 - A A majority of the assessment reach has altered pattern (examples: straightening, modification above or below culvert).
 - B Not A.

4. **Feature Longitudinal Profile – assessment reach metric**
 - 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

5. **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% of channel unstable
 - B 10 to 25% of channel unstable
 - C > 25% of channel unstable

6. **Streamside Area Interaction – streamside area metric**
Consider for the Left Bank (LB) and the Right Bank (RB).

	LB	RB	
<input checked="" type="radio"/> A	<input checked="" type="radio"/> A		Little or no evidence of conditions that adversely affect reference interaction
<input type="radio"/> B	<input type="radio"/> B		Moderate evidence of conditions (examples: berms, levees, down-cutting, aggradation, dredging) that adversely affect reference interaction (examples: limited streamside area access, disruption of flood flows through streamside area, leaky or intermittent bulkheads, causeways with floodplain constriction, minor ditching [including mosquito ditching])
<input type="radio"/> C	<input type="radio"/> C		Extensive evidence of conditions that adversely affect reference interaction (little to no floodplain/intertidal zone access [examples: causeways with floodplain and channel constriction, bulkheads, retaining walls, fill, stream incision, disruption of flood flows through streamside area] <u>or</u> too much floodplain/intertidal zone access [examples: impoundments, intensive mosquito ditching]) <u>or</u> floodplain/intertidal zone unnaturally absent <u>or</u> assessment reach is a man-made feature on an interstream divide

7. **Water Quality Stressors – assessment reach/intertidal zone metric**

Check all that apply.

- A Discolored water in stream or intertidal zone (milky white, blue, unnatural water discoloration, oil sheen, stream foam)
- B Excessive sedimentation (burying of stream features or intertidal zone)
- C Noticeable evidence of pollutant discharges entering the assessment reach and causing a water quality problem
- D Odor (not including natural sulfide odors)
- E Current published or collected data indicating degraded water quality in the assessment reach. Cite source in the "Notes/Sketch" section.
- F Livestock with access to stream or intertidal zone
- G Excessive algae in stream or intertidal zone
- H Degraded marsh vegetation in the intertidal zone (removal, burning, regular mowing, destruction, etc.)
- I Other: _____ (explain in "Notes/Sketch" section)
- J Little to no stressors

8. **Recent Weather – watershed metric**

For Size 1 or 2 streams, D1 drought or higher is considered a drought; for Size 3 or 4 streams, D2 drought or higher is considered a drought.

- A Drought conditions and no rainfall or rainfall not exceeding 1 inch within the last 48 hours
- B Drought conditions and rainfall exceeding 1 inch within the last 48 hours
- C No drought conditions

9. **Large or Dangerous Stream – assessment reach metric**

Yes No Is stream is too large or dangerous to assess? If Yes, skip to Metric 13 (Streamside Area Ground Surface Condition).

10. **Natural In-stream Habitat Types – assessment reach metric**

10a. Yes No Degraded in-stream habitat over majority of the assessment reach (examples of stressors include excessive sedimentation, mining, excavation, in-stream hardening [for example, rip-rap], recent dredging, and snagging) (evaluate for size 4 Coastal Plain streams only, then skip to Metric 12)

10b. Check all that occur (occurs if > 5% coverage of assessment reach) (skip for Size 4 Coastal Plain streams)

- | | | |
|---|------------------------------------|---|
| <ul style="list-style-type: none"> <input type="checkbox"/> A Multiple aquatic macrophytes and aquatic mosses (include liverworts, lichens, and algal mats) <input checked="" type="checkbox"/> B Multiple sticks and/or leaf packs and/or emergent vegetation <input checked="" type="checkbox"/> C Multiple snags and logs (including lap trees) <input type="checkbox"/> D 5% undercut banks and/or root mats and/or roots in banks extend to the normal wetted perimeter <input type="checkbox"/> E Little or no habitat | Check for Tidal Marsh Streams only | <ul style="list-style-type: none"> <input type="checkbox"/> F 5% oysters or other natural hard bottoms <input type="checkbox"/> G Submerged aquatic vegetation <input type="checkbox"/> H Low-tide refugia (pools) <input type="checkbox"/> I Sand bottom <input type="checkbox"/> J 5% vertical bank along the marsh <input type="checkbox"/> K Little or no habitat |
|---|------------------------------------|---|

*****REMAINING QUESTIONS ARE NOT APPLICABLE FOR TIDAL MARSH STREAMS*****

11. **Bedform and Substrate – assessment reach metric (skip for Size 4 Coastal Plain streams and Tidal Marsh Streams)**

11a. Yes No Is assessment reach in a natural sand-bed stream? (skip for Coastal Plain streams)

11b. Bedform evaluated. Check the appropriate box(es).

- A Riffle-run section (evaluate 11c)
- B Pool-glide section (evaluate 11d)
- C Natural bedform absent (skip to Metric 12, Aquatic Life)

11c. In riffles sections, check all that occur below the normal wetted perimeter of the assessment reach – whether or not submerged.

Check at least one box in each row (skip for Size 4 Coastal Plain Streams and Tidal Marsh Streams). Not Present (NP) = absent, Rare (R) = present but ≤ 10%, Common (C) = > 10-40%, Abundant (A) = > 40-70%, Predominant (P) = > 70%. Cumulative percentages should not exceed 100% for each assessment reach.

NP	R	C	A	P	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Bedrock/saprolite
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Boulder (256 – 4096 mm)
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Cobble (64 – 256 mm)
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Gravel (2 – 64 mm)
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Sand (.062 – 2 mm)
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Silt/clay (< 0.062 mm)
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Detritus
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Artificial (rip-rap, concrete, etc.)

11d. Yes No Are pools filled with sediment? (skip for Size 4 Coastal Plain streams and Tidal Marsh Streams)

12. **Aquatic Life – assessment reach metric (skip for Size 4 Coastal Plain streams and Tidal Marsh Streams)**

12a. Yes No Was an in-stream aquatic life assessment performed as described in the User Manual?

If No, select 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 >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 (including water pennies)
 - Caddisfly larvae (Trichoptera [T])
 - Asian clam (*Corbicula*)
 - Crustacean (isopod/amphipod/crayfish/shrimp)
 - Damselfly and dragonfly larvae
 - Dipterans (true flies)
 - Mayfly larvae (Ephemeroptera [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 (Plecoptera [P])
- Tipulid larvae
- Worms/leeches

13. **Streamside Area Ground Surface Condition – streamside area metric (skip for Tidal Marsh Streams and B valley types)**
 Consider for the Left Bank (LB) and the Right Bank (RB). Consider storage capacity with regard to both overbank flow and upland runoff.

- | | | |
|------------------------------------|------------------------------------|---|
| LB | RB | |
| <input type="radio"/> A | <input type="radio"/> A | Little or no alteration to water storage capacity over a majority of the streamside area |
| <input checked="" type="radio"/> B | <input checked="" type="radio"/> B | Moderate alteration to water storage capacity over a majority of the streamside area |
| <input type="radio"/> C | <input type="radio"/> C | Severe alteration to water storage capacity over a majority of the streamside area (examples include: ditches, fill, soil, compaction, livestock disturbance, buildings, man-made levees, drainage pipes) |

14. **Streamside Area Water Storage – streamside area metric (skip for Size 1 streams, Tidal Marsh Streams, and B valley types)**
 Consider for the Left Bank (LB) and the Right Bank (RB) of the streamside area.

- | | | |
|------------------------------------|------------------------------------|--|
| LB | RB | |
| <input type="radio"/> A | <input type="radio"/> A | Majority of streamside area with depressions able to pond water \geq 6 inches deep |
| <input type="radio"/> B | <input type="radio"/> B | Majority of streamside area with depressions able to pond water 3 to 6 inches deep |
| <input checked="" type="radio"/> C | <input checked="" type="radio"/> C | Majority of streamside area with depressions able to pond water < 3 inches deep |

15. **Wetland Presence – streamside area metric (skip for Tidal Marsh Streams)**

Consider for the Left Bank (LB) and the Right Bank (RB). Do not consider wetlands outside of the streamside area or within the normal wetted perimeter of assessment reach.

- | | | |
|------------------------------------|------------------------------------|--|
| LB | RB | |
| <input type="radio"/> Y | <input type="radio"/> Y | Are wetlands present in the streamside area? |
| <input checked="" type="radio"/> N | <input checked="" type="radio"/> N | |

16. **Baseflow Contributors – assessment reach metric (skip for size 4 streams and Tidal Marsh Streams)**

Check all contributors within the assessment reach or within view of and draining to the assessment reach.

- A Streams and/or springs (jurisdictional discharges)
- B Ponds (include wet detention basins; do not include sediment basins or dry detention basins)
- C Obstruction that passes some flow during low-flow periods within assessment area (beaver dam, bottom-release dam)
- D Evidence of bank seepage or sweating (iron oxidizing bacteria in water indicates seepage)
- E Stream bed or bank soil reduced (dig through deposited sediment if present)
- F None of the above

17. **Baseflow Detractors – assessment area metric (skip for Tidal Marsh Streams)**

Check all that apply.

- A Evidence of substantial water withdrawals from the assessment reach (includes areas excavated for pump installation)
- B Obstruction not passing flow during low flow periods affecting the assessment reach (ex: watertight dam, sediment deposit)
- C Urban stream (\geq 24% impervious surface for watershed)
- D Evidence that the stream-side area has been modified resulting in accelerated drainage into the assessment reach
- E Assessment reach relocated to valley edge
- F None of the above

18. **Shading – assessment reach metric (skip for Tidal Marsh Streams)**

Consider aspect. Consider "leaf-on" condition.

- A Stream shading is appropriate for stream category (may include gaps associated with natural processes)
- B Degraded (example: scattered trees)
- C Stream 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 | |
| <input checked="" type="radio"/> A | <input checked="" type="radio"/> A | <input checked="" type="radio"/> A | <input checked="" type="radio"/> A | \geq 100-feet wide <u>or</u> extends to the edge of the watershed |
| <input type="radio"/> B | <input type="radio"/> B | <input type="radio"/> B | <input type="radio"/> B | From 50 to < 100-feet wide |
| <input type="radio"/> C | <input type="radio"/> C | <input type="radio"/> C | <input type="radio"/> C | From 30 to < 50-feet wide |
| <input type="radio"/> D | <input type="radio"/> D | <input type="radio"/> D | <input type="radio"/> D | From 10 to < 30-feet wide |
| <input type="radio"/> E | <input type="radio"/> E | <input type="radio"/> E | <input type="radio"/> E | < 10-feet wide <u>or</u> no trees |

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 | |
| <input checked="" type="radio"/> A | <input checked="" type="radio"/> A | Mature forest |
| <input type="radio"/> B | <input type="radio"/> B | Non-mature woody vegetation <u>or</u> modified vegetation structure |
| <input type="radio"/> C | <input type="radio"/> C | Herbaceous vegetation with or without a strip of trees < 10 feet wide |
| <input type="radio"/> D | <input type="radio"/> D | Maintained shrubs |
| <input type="radio"/> E | <input type="radio"/> 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 |
| <input type="radio"/> A | <input type="radio"/> A | <input type="radio"/> A | <input type="radio"/> A |
| <input type="radio"/> A | <input type="radio"/> A | <input type="radio"/> A | <input type="radio"/> A |
- Row crops

- B B B B B B Maintained turf
 C C C C C C Pasture (no livestock)/commercial horticulture
 D D D D D D Pasture (active livestock use)

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 A The total length of buffer breaks is < 25 percent.
 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 – First 100 feet of 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 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 a 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

Notes/Sketch:

NC SAM Stream Rating Sheet
Accompanies User Manual Version 2.1

Stream Site Name Liberty Rock - Dolomite Creek
 Stream Category Pa2

Date of Evaluation 10/08/2020
 Assessor Name/Organization Wildlands Engineering

Notes of Field Assessment Form (Y/N)	NO
Presence of regulatory considerations (Y/N)	YES
Additional stream information/supplementary measurements included (Y/N)	YES
NC SAM feature type (perennial, intermittent, Tidal Marsh Stream)	Intermittent

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	HIGH	HIGH
(4) Wooded Riparian Buffer	HIGH	HIGH
(4) Microtopography	LOW	LOW
(3) Stream Stability	HIGH	HIGH
(4) Channel Stability	HIGH	HIGH
(4) Sediment Transport	LOW	LOW
(4) Stream Geomorphology	HIGH	HIGH
(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	LOW	LOW
(2) Baseflow	HIGH	HIGH
(2) Streamside Area Vegetation	MEDIUM	MEDIUM
(3) Upland Pollutant Filtration	LOW	LOW
(3) Thermoregulation	HIGH	HIGH
(2) Indicators of Stressors	YES	YES
(2) Aquatic Life Tolerance	MEDIUM	NA
(2) Intertidal Zone Filtration	NA	NA
(1) Habitat	LOW	HIGH
(2) In-stream Habitat	LOW	MEDIUM
(3) Baseflow	HIGH	HIGH
(3) Substrate	LOW	LOW
(3) Stream Stability	HIGH	HIGH
(3) In-stream Habitat	MEDIUM	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
(2) Intertidal Zone Habitat	NA	NA
Overall	LOW	HIGH

NC WAM FIELD ASSESSMENT FORM
Accompanies User Manual Version 5.0

USACE AID #	SAW-2020-00047	NCDWR#	20200035
Project Name	Liberty Rock Mitigation Site	Date of Evaluation	7/30/2020
Applicant/Owner Name	Widlands Engineering	Wetland Site Name	Wetland A
Wetland Type	Headwater Forest	Assessor Name/Organization	C. Neaves
Level III Ecoregion	Piedmont	Nearest Named Water Body	Rocky River
River Basin	Cape Fear	USGS 8-Digit Catalogue Unit	03030003
County	Randolph	NCDWR Region	Winston-Salem
<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	Precipitation within 48 hrs?	Latitude/Longitude (deci-degrees)	35.8224455, -79.561830

Evidence of stressors affecting the assessment area (may not be within the assessment area)

Please circle and/or make note on the last page if evidence of stressors is apparent. Consider departure from reference, if appropriate, in recent past (for instance, within 10 years). Noteworthy stressors include, but are not limited to the following.

- Hydrological modifications (examples: ditches, dams, beaver dams, dikes, berms, ponds, etc.)
- Surface and sub-surface discharges into the wetland (examples: discharges containing obvious pollutants, presence of nearby septic tanks, underground storage tanks (USTs), hog lagoons, etc.)
- Signs of vegetation stress (examples: vegetation mortality, insect damage, disease, storm damage, salt intrusion, etc.)
- Habitat/plant community alteration (examples: mowing, clear-cutting, exotics, etc.)

Is the assessment area intensively managed? Yes No

Regulatory Considerations - Were regulatory considerations evaluated? Yes No If Yes, check all that apply to the assessment area.

- Anadromous fish
- Federally protected species or State endangered or threatened species
- NCDWR riparian buffer rule in effect
- Abuts a Primary Nursery Area (PNA)
- Publicly owned property
- N.C. Division of Coastal Management Area of Environmental Concern (AEC) (including buffer)
- Abuts a stream with a NCDWQ classification of SA or supplemental classifications of HQW, ORW, or Trout
- Designated NCNHP reference community
- Abuts a 303(d)-listed stream or a tributary to a 303(d)-listed stream

What type of natural stream is associated with the wetland, if any? (check all that apply)

- Blackwater
- Brownwater
- Tidal (if tidal, check one of the following boxes) Lunar Wind Both

Is the assessment area on a coastal island? Yes No

Is the assessment area's surface water storage capacity or duration substantially altered by beaver? Yes No

Does the assessment area experience overbank flooding during normal rainfall conditions? Yes No

1. Ground Surface Condition/Vegetation Condition – assessment area condition metric

Check a box in each column. Consider alteration to the ground surface (GS) in the assessment area and vegetation structure (VS) in the assessment area. Compare to reference wetland if applicable (see User Manual). If a reference is not applicable, then rate the assessment area based on evidence an effect.

- | | | |
|---------------------------------------|---------------------------------------|--|
| GS | VS | |
| <input checked="" type="checkbox"/> A | <input type="checkbox"/> A | Not severely altered |
| <input type="checkbox"/> B | <input checked="" type="checkbox"/> B | Severely altered over a majority of the assessment area (ground surface alteration examples: vehicle tracks, excessive sedimentation, fire-plow lanes, skidder tracks, bedding, fill, soil compaction, obvious pollutants) (vegetation structure alteration examples: mechanical disturbance, herbicides, salt intrusion [where appropriate], exotic species, grazing, less diversity [if appropriate], hydrologic alteration) |

2. Surface and Sub-Surface Storage Capacity and Duration – assessment area condition metric

Check a box in each column. Consider surface storage capacity and duration (Surf) and sub-surface storage capacity and duration (Sub). Consider both increase and decrease in hydrology. A ditch ≤ 1 foot deep is considered to affect surface water only, while a ditch > 1 foot deep is expected to affect both surface and sub-surface water. Consider tidal flooding regime, if applicable.

- | | | |
|---------------------------------------|---------------------------------------|--|
| Surf | Sub | |
| <input type="checkbox"/> A | <input type="checkbox"/> A | Water storage capacity and duration are not altered. |
| <input type="checkbox"/> B | <input type="checkbox"/> B | Water storage capacity or duration are altered, but not substantially (typically, not sufficient to change vegetation). |
| <input checked="" type="checkbox"/> C | <input checked="" type="checkbox"/> C | Water storage capacity or duration are substantially altered (typically, alteration sufficient to result in vegetation change) (examples: draining, flooding, soil compaction, filling, excessive sedimentation, underground utility lines). |

3. Water Storage/Surface Relief – assessment area/wetland type condition metric (skip for all marshes)

Check a box in each column. Select the appropriate storage for the assessment area (AA) and the wetland type (WT).

- | | | |
|---------------------------------------|---------------------------------------|---|
| AA | WT | |
| 3a. <input type="checkbox"/> A | <input type="checkbox"/> A | Majority of wetland with depressions able to pond water > 1 deep |
| <input type="checkbox"/> B | <input type="checkbox"/> B | Majority of wetland with depressions able to pond water 6 inches to 1 foot deep |
| <input type="checkbox"/> C | <input type="checkbox"/> C | Majority of wetland with depressions able to pond water 3 to 6 inches deep |
| <input checked="" type="checkbox"/> D | <input checked="" type="checkbox"/> D | Depressions able to pond water < 3 inches deep |
| 3b. <input type="checkbox"/> A | | Evidence that maximum depth of inundation is greater than 2 feet |
| <input type="checkbox"/> B | | Evidence that maximum depth of inundation is between 1 and 2 feet |
| <input checked="" type="checkbox"/> C | | Evidence that maximum depth of inundation is less than 1 foot |

4. Soil Texture/Structure – assessment area condition metric (skip for all marshes)

Check a box from each of the three soil property groups below. Dig soil profile in the dominant assessment area landscape feature. Make soil observations within the top 12 inches. Use most recent National Technical Committee for Hydric Soils guidance for regional indicators.

- 4a. A Sandy soil
- B Loamy or clayey soils exhibiting redoximorphic features (concentrations, depletions, or rhizospheres)
- C Loamy or clayey soils not exhibiting redoximorphic features
- D Loamy or clayey gleyed soil
- E Histosol or histlic epipedon
- 4b. A Soil ribbon < 1 inch
- B Soil ribbon ≥ 1 inch
- 4c. A No peat or muck presence
- B A peat or muck presence

5. Discharge into Wetland – opportunity metric

Check a box in each column. Consider surface pollutants or discharges (Surf) and sub-surface pollutants or discharges (Sub). Examples of sub-surface discharges include presence of nearby septic tank, underground storage tank (UST), etc.

- | | | |
|---------------------------------------|---------------------------------------|---|
| Surf | Sub | |
| <input type="checkbox"/> A | <input type="checkbox"/> A | Little or no evidence of pollutants or discharges entering the assessment area |
| <input checked="" type="checkbox"/> B | <input checked="" type="checkbox"/> B | Noticeable evidence of pollutants or discharges entering the wetland and stressing, but not overwhelming the treatment capacity of the assessment area |
| <input type="checkbox"/> C | <input type="checkbox"/> C | Noticeable evidence of pollutants or discharges (pathogen, particulate, or soluble) entering the assessment area and potentially overwhelming the treatment capacity of the wetland (water discoloration, dead vegetation, excessive sedimentation, odor) |

6. Land Use – opportunity metric (skip for non-riparian wetlands)

Check all that apply (at least one box in each column). Evaluation involves a GIS effort with field adjustment. Consider sources draining to assessment area within entire upstream watershed (WS), within 5 miles and within the watershed draining to the assessment area (5M), and within 2 miles and within the watershed draining to the assessment area (2M).

- | | | | |
|---------------------------------------|---------------------------------------|---------------------------------------|---|
| WS | 5M | 2M | |
| <input type="checkbox"/> A | <input type="checkbox"/> A | <input type="checkbox"/> A | ≥ 10% impervious surfaces |
| <input type="checkbox"/> B | <input type="checkbox"/> B | <input type="checkbox"/> B | Confined animal operations (or other local, concentrated source of pollutants) |
| <input checked="" type="checkbox"/> C | <input checked="" type="checkbox"/> C | <input checked="" type="checkbox"/> C | ≥ 20% coverage of pasture |
| <input type="checkbox"/> D | <input type="checkbox"/> D | <input type="checkbox"/> D | ≥ 20% coverage of agricultural land (regularly plowed land) |
| <input checked="" type="checkbox"/> E | <input checked="" type="checkbox"/> E | <input checked="" type="checkbox"/> E | ≥ 20% coverage of maintained grass/herb |
| <input type="checkbox"/> F | <input type="checkbox"/> F | <input type="checkbox"/> F | ≥ 20% coverage of clear-cut land |
| <input type="checkbox"/> G | <input type="checkbox"/> G | <input type="checkbox"/> G | Little or no opportunity to improve water quality. Lack of opportunity may result from little or no disturbance in the watershed or hydrologic alterations that prevent drainage and/or overbank flow from affecting the assessment area. |

7. Wetland Acting as Vegetated Buffer – assessment area/wetland complex condition metric (skip for non-riparian wetlands)

- 7a. Is assessment area within 50 feet of a tributary or other open water?
- Yes No If Yes, continue to 7b. If No, skip to Metric 8.
- Wetland buffer need only be present on one side of the water body. Make buffer judgment based on the average width of wetland. Record a note if a portion of the buffer has been removed or disturbed.
- 7b. How much of the first 50 feet from the bank is wetland? (Wetland buffer need only be present on one side of the water body. Make buffer judgment based on the average width of wetland. Record a note if a portion of the buffer has been removed or disturbed.)
- A ≥ 50 feet
- B From 30 to < 50 feet
- C From 15 to < 30 feet
- D From 5 to < 15 feet
- E < 5 feet or buffer bypassed by ditches
- 7c. Tributary width. If the tributary is anastomosed, combine widths of channels/braids for a total width.
- ≤ 15-foot wide > 15-foot wide Other open water (no tributary present)
- 7d. Do roots of assessment area vegetation extend into the bank of the tributary/open water?
- Yes No
- 7e. Is stream or other open water sheltered or exposed?
- Sheltered – adjacent open water with width < 2500 feet and no regular boat traffic.
- Exposed – adjacent open water with width ≥ 2500 feet or regular boat traffic.

8. Wetland Width at the Assessment Area – wetland type/wetland complex condition metric (evaluate WT for all marshes and Estuarine Woody Wetland only; evaluate WC for Bottomland Hardwood Forest, Headwater Forest, and Riverine Swamp Forest only)

Check a box in each column for riverine wetlands only. Select the average width for the wetland type at the assessment area (WT) and the wetland complex at the assessment area (WC). See User Manual for WT and WC boundaries.

- | | | |
|---------------------------------------|---------------------------------------|-----------------------|
| WT | WC | |
| <input type="checkbox"/> A | <input type="checkbox"/> A | ≥ 100 feet |
| <input type="checkbox"/> B | <input type="checkbox"/> B | From 80 to < 100 feet |
| <input type="checkbox"/> C | <input type="checkbox"/> C | From 50 to < 80 feet |
| <input type="checkbox"/> D | <input type="checkbox"/> D | From 40 to < 50 feet |
| <input checked="" type="checkbox"/> E | <input checked="" type="checkbox"/> E | From 30 to < 40 feet |
| <input type="checkbox"/> F | <input type="checkbox"/> F | From 15 to < 30 feet |
| <input type="checkbox"/> G | <input type="checkbox"/> G | From 5 to < 15 feet |
| <input type="checkbox"/> H | <input type="checkbox"/> H | < 5 feet |

9. **Inundation Duration – assessment area condition metric (skip for non-riparian wetlands)**

Answer for assessment area dominant landform.

- A Evidence of short-duration inundation (< 7 consecutive days)
B Evidence of saturation, without evidence of inundation
C Evidence of long-duration inundation or very long-duration inundation (7 to 30 consecutive days or more)

10. **Indicators of Deposition – assessment area condition metric (skip for non-riparian wetlands and all marshes)**

Consider recent deposition only (no plant growth since deposition).

- A Sediment deposition is not excessive, but at approximately natural levels.
B Sediment deposition is excessive, but not overwhelming the wetland.
C Sediment deposition is excessive and is overwhelming the wetland.

11. **Wetland Size – wetland type/wetland complex condition metric**

Check a box in each column. Involves a GIS effort with field adjustment. This metric evaluates three aspects of the wetland area: the size of the wetland type (WT), the size of the wetland complex (WC), and the size of the forested wetland (FW) (if applicable, see User Manual). See the User Manual for boundaries of these evaluation areas. If assessment area is clear-cut, select "K" for the FW column.

- | | | |
|---------------------------------------|---------------------------------------|--|
| WT | WC | FW (if applicable) |
| <input type="checkbox"/> A | <input type="checkbox"/> A | <input type="checkbox"/> A ≥ 500 acres |
| <input type="checkbox"/> B | <input type="checkbox"/> B | <input type="checkbox"/> B From 100 to < 500 acres |
| <input type="checkbox"/> C | <input type="checkbox"/> C | <input type="checkbox"/> C From 50 to < 100 acres |
| <input type="checkbox"/> D | <input type="checkbox"/> D | <input type="checkbox"/> D From 25 to < 50 acres |
| <input type="checkbox"/> E | <input type="checkbox"/> E | <input type="checkbox"/> E From 10 to < 25 acres |
| <input type="checkbox"/> F | <input type="checkbox"/> F | <input type="checkbox"/> F From 5 to < 10 acres |
| <input type="checkbox"/> G | <input type="checkbox"/> G | <input type="checkbox"/> G From 1 to < 5 acres |
| <input type="checkbox"/> H | <input type="checkbox"/> H | <input type="checkbox"/> H From 0.5 to < 1 acre |
| <input checked="" type="checkbox"/> I | <input checked="" type="checkbox"/> I | <input type="checkbox"/> I From 0.1 to < 0.5 acre |
| <input type="checkbox"/> J | <input type="checkbox"/> J | <input type="checkbox"/> J From 0.01 to < 0.1 acre |
| <input type="checkbox"/> K | <input type="checkbox"/> K | <input checked="" type="checkbox"/> K < 0.01 acre <u>or</u> assessment area is clear-cut |

12. **Wetland Intactness – wetland type condition metric (evaluate for Pocosins only)**

- A Pocosin is the full extent (≥ 90%) of its natural landscape size.
B Pocosin type is < 90% of the full extent of its natural landscape size.

13. **Connectivity to Other Natural Areas – landscape condition metric**

13a. **Check appropriate box(es) (a box may be checked in each column).** Involves a GIS effort with field adjustment. This metric evaluates whether the wetland is well connected (Well) and/or loosely connected (Loosely) to the landscape patch, the contiguous naturally vegetated area and open water (if appropriate). Boundaries are formed by four-lane roads, regularly maintained utility line corridors the width of a four-lane road or wider, urban landscapes, maintained fields (pasture and agriculture), or open water > 300 feet wide.

- | | |
|---------------------------------------|---|
| Well | Loosely |
| <input type="checkbox"/> A | <input type="checkbox"/> A ≥ 500 acres |
| <input type="checkbox"/> B | <input type="checkbox"/> B From 100 to < 500 acres |
| <input type="checkbox"/> C | <input type="checkbox"/> C From 50 to < 100 acres |
| <input type="checkbox"/> D | <input type="checkbox"/> D From 10 to < 50 acres |
| <input type="checkbox"/> E | <input type="checkbox"/> E < 10 acres |
| <input checked="" type="checkbox"/> F | <input type="checkbox"/> F Wetland type has a poor or no connection to other natural habitats |

13b. **Evaluate for marshes only.**

- Yes No Wetland type has a surface hydrology connection to open waters/stream or tidal wetlands.

14. **Edge Effect – wetland type condition metric (skip for all marshes and Estuarine Woody Wetland)**

May involve a GIS effort with field adjustment. Estimate distance from wetland type boundary to artificial edges. Artificial edges include non-forested areas ≥ 40 feet wide such as fields, development, roads, regularly maintained utility line corridors, and clear-cuts. Consider the eight main points of the compass. Artificial edge occurs within 150 feet in how many directions? If the assessment area is clear cut, select option "C."

- A 0
B 1 to 4
C 5 to 8

15. **Vegetative Composition – assessment area condition metric (skip for all marshes and Pine Flat)**

- A Vegetation is close to reference condition in species present and their proportions. Lower strata composed of appropriate species, with exotic plants absent or sparse within the assessment area.
B Vegetation is different from reference condition in species diversity or proportions, but still largely composed of native species characteristic of the wetland type. This may include communities of weedy native species that develop after clearcutting or clearing. It also includes communities with exotics present, but not dominant, over a large portion of the expected strata.
C Vegetation severely altered from reference in composition, or expected species are unnaturally absent (planted stands of non-characteristic species or at least one stratum inappropriately composed of a single species), or exotic species are dominant in at least one stratum.

16. **Vegetative Diversity – assessment area condition metric (evaluate for Non-tidal Freshwater Marsh only)**

- A Vegetation diversity is high and is composed primarily of native species (< 10% cover of exotics).
B Vegetation diversity is low or has > 10% to 50% cover of exotics.
C Vegetation is dominated by exotic species (> 50 % cover of exotics).

17. **Vegetative Structure – assessment area/wetland type condition metric**

17a. Is vegetation present?

- Yes No If Yes, continue to 17b. If No, skip to Metric 18.

17b. Evaluate percent coverage of assessment area vegetation for all marshes only. Skip to 17c for non-marsh wetlands.

- A ≥ 25% coverage of vegetation
B < 25% coverage of vegetation

17c. **Check a box in each column for each stratum.** Evaluate this portion of the metric for non-marsh wetlands. Consider structure in airspace above the assessment area (AA) and the wetland type (WT) separately.

- | | | |
|-----------|---------------------------------------|---|
| AA | WT | |
| Canopy | <input type="checkbox"/> A | <input type="checkbox"/> A Canopy closed, or nearly closed, with natural gaps associated with natural processes |
| | <input type="checkbox"/> B | <input type="checkbox"/> B Canopy present, but opened more than natural gaps |
| | <input checked="" type="checkbox"/> C | <input checked="" type="checkbox"/> C Canopy sparse or absent |
| Mid-Story | <input type="checkbox"/> A | <input type="checkbox"/> A Dense mid-story/sapling layer |
| | <input type="checkbox"/> B | <input type="checkbox"/> B Moderate density mid-story/sapling layer |
| | <input checked="" type="checkbox"/> C | <input checked="" type="checkbox"/> C Mid-story/sapling layer sparse or absent |
| Shrub | <input type="checkbox"/> A | <input type="checkbox"/> A Dense shrub layer |
| | <input type="checkbox"/> B | <input type="checkbox"/> B Moderate density shrub layer |
| | <input checked="" type="checkbox"/> C | <input checked="" type="checkbox"/> C Shrub layer sparse or absent |
| Herb | <input checked="" type="checkbox"/> A | <input checked="" type="checkbox"/> A Dense herb layer |
| | <input type="checkbox"/> B | <input type="checkbox"/> B Moderate density herb layer |
| | <input type="checkbox"/> C | <input type="checkbox"/> C Herb layer sparse or absent |

18. **Snags – wetland type condition metric (skip for all marshes)**

- A Large snags (more than one) are visible (> 12 inches DBH, or large relative to species present and landscape stability).
B Not A

19. **Diameter Class Distribution – wetland type condition metric (skip for all marshes)**

- A Majority of canopy trees have stems > 6 inches in diameter at breast height (DBH); many large trees (> 12 inches DBH) are present.
B Majority of canopy trees have stems between 6 and 12 inches DBH, few are > 12 inch DBH.
C Majority of canopy trees are < 6 inches DBH or no trees.

20. **Large Woody Debris – wetland type condition metric (skip for all marshes)**

Include both natural debris and man-placed natural debris.

- A Large logs (more than one) are visible (> 12 inches in diameter, or large relative to species present and landscape stability).
B Not A

21. **Vegetation/Open Water Dispersion – wetland type/open water condition metric (evaluate for Non-Tidal Freshwater Marsh only)**

Select the figure that best describes the amount of interspersed between vegetation and open water in the growing season. Patterned areas indicate vegetated areas, while solid white areas indicate open water.



22. **Hydrologic Connectivity – assessment area condition metric (evaluate for riparian wetlands and Salt/Brackish Marsh only)**

Examples of activities that may severely alter hydrologic connectivity include intensive ditching, fill, sedimentation, channelization, diversion, man-made berms, beaver dams, and stream incision. Documentation required if evaluated as B, C, or D.

- A Overbank and overland flow are not severely altered in the assessment area.
B Overbank flow is severely altered in the assessment area.
C Overland flow is severely altered in the assessment area.
D Both overbank and overland flow are severely altered in the assessment area.

Notes

NC WAM Wetland Rating Sheet
Accompanies User Manual Version 5.0

Wetland Site Name Wetland A Date of Assessment 7/30/2020
 Wetland Type Headwater Forest Assessor Name/Organization C. Neaves
 Notes on Field Assessment Form (Y/N) NO
 Presence of regulatory considerations (Y/N) NO
 Wetland is intensively managed (Y/N) _____
 Assessment area is located within 50 feet of a natural tributary or other open water (Y/N) YES
 Assessment area is substantially altered by beaver (Y/N) _____
 Assessment area experiences overbank flooding during normal rainfall conditions (Y/N) _____
 Assessment area is on a coastal island (Y/N) _____

Sub-function Rating Summary

Function	Sub-function	Metrics	Rating
Hydrology	Surface Storage and Retention	Condition	LOW
	Sub-surface Storage and Retention	Condition	LOW
Water Quality	Pathogen Change	Condition	MEDIUM
		Condition/Opportunity	MEDIUM
	Particulate Change	Opportunity Presence (Y/N)	NO
		Condition	LOW
Soluble Change	Particulate Change	Condition/Opportunity	NA
		Opportunity Presence (Y/N)	NA
	Soluble Change	Condition	MEDIUM
		Condition/Opportunity	MEDIUM
Physical Change	Physical Change	Opportunity Presence (Y/N)	NO
		Condition	LOW
	Physical Change	Condition/Opportunity	LOW
		Opportunity Presence (Y/N)	NO
Pollution Change	Pollution Change	Condition	NA
		Condition/Opportunity	NA
	Pollution Change	Opportunity Presence (Y/N)	NA
		Condition	NA
Habitat	Physical Structure	Condition	LOW
	Landscape Patch Structure	Condition	LOW
	Vegetation Composition	Condition	LOW

Function Rating Summary

Function	Metrics	Rating
Hydrology	Condition	LOW
Water Quality	Condition	LOW
	Condition/Opportunity	LOW
	Opportunity Presence (Y/N)	NO
Habitat	Condition	LOW

Overall Wetland Rating LOW

NC WAM FIELD ASSESSMENT FORM
Accompanies User Manual Version 5.0

USACE AID #	SAW-2020-00047	NCDWR#	20200035
Project Name	Liberty Rock Mitigation Site	Date of Evaluation	7/30/2020
Applicant/Owner Name	Wildlands Engineering	Wetland Site Name	Wetland B
Wetland Type	Headwater Forest	Assessor Name/Organization	C. Neaves
Level III Ecoregion	Piedmont	Nearest Named Water Body	Rocky River
River Basin	Cape Fear	USGS 8-Digit Catalogue Unit	03030003
County	Randolph	NCDWR Region	Winston-Salem
<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	Precipitation within 48 hrs?	Latitude/Longitude (deci-degrees)	35.821753, -79.561723

Evidence of stressors affecting the assessment area (may not be within the assessment area)
 Please circle and/or make note on the last page if evidence of stressors is apparent. Consider departure from reference, if appropriate, in recent past (for instance, within 10 years). Noteworthy stressors include, but are not limited to the following.

- Hydrological modifications (examples: ditches, dams, beaver dams, dikes, berms, ponds, etc.)
- Surface and sub-surface discharges into the wetland (examples: discharges containing obvious pollutants, presence of nearby septic tanks, underground storage tanks (USTs), hog lagoons, etc.)
- Signs of vegetation stress (examples: vegetation mortality, insect damage, storm damage, salt intrusion, etc.)
- Habitat/plant community alteration (examples: mowing, clear-cutting, exotics, etc.)

Is the assessment area intensively managed? Yes No

Regulatory Considerations - Were regulatory considerations evaluated? Yes No If Yes, check all that apply to the assessment area.

- Anadromous fish
- Federally protected species or State endangered or threatened species
- NCDWR riparian buffer rule in effect
- Abuts a Primary Nursery Area (PNA)
- Publicly owned property
- N.C. Division of Coastal Management Area of Environmental Concern (AEC) (including buffer)
- Abuts a stream with a NCDWQ classification of SA or supplemental classifications of HQW, ORW, or Trout
- Designated NCNHP reference community
- Abuts a 303(d)-listed stream or a tributary to a 303(d)-listed stream

What type of natural stream is associated with the wetland, if any? (check all that apply)

- Blackwater
- Brownwater
- Tidal (if tidal, check one of the following boxes) Lunar Wind Both

Is the assessment area on a coastal island? Yes No

Is the assessment area's surface water storage capacity or duration substantially altered by beaver? Yes No

Does the assessment area experience overbank flooding during normal rainfall conditions? Yes No

- Ground Surface Condition/Vegetation Condition – assessment area condition metric**
Check a box in each column. Consider alteration to the ground surface (GS) in the assessment area and vegetation structure (VS) in the assessment area. Compare to reference wetland if applicable (see User Manual). If a reference is not applicable, then rate the assessment area based on evidence an effect.

GS	VS	
<input checked="" type="checkbox"/> A	<input type="checkbox"/> A	Not severely altered
<input type="checkbox"/> B	<input checked="" type="checkbox"/> B	Severely altered over a majority of the assessment area (ground surface alteration examples: vehicle tracks, excessive sedimentation, fire-plow lanes, skidder tracks, bedding, fill, soil compaction, obvious pollutants) (vegetation structure alteration examples: mechanical disturbance, herbicides, salt intrusion [where appropriate], exotic species, grazing, less diversity [if appropriate], hydrologic alteration)
- Surface and Sub-Surface Storage Capacity and Duration – assessment area condition metric**
Check a box in each column. Consider surface storage capacity and duration (Surf) and sub-surface storage capacity and duration (Sub). Consider both increase and decrease in hydrology. A ditch ≤ 1 foot deep is considered to affect surface water only, while a ditch > 1 foot deep is expected to affect both surface and sub-surface water. Consider tidal flooding regime, if applicable.

Surf	Sub	
<input type="checkbox"/> A	<input type="checkbox"/> A	Water storage capacity and duration are not altered.
<input type="checkbox"/> B	<input type="checkbox"/> B	Water storage capacity or duration are altered, but not substantially (typically, not sufficient to change vegetation).
<input checked="" type="checkbox"/> C	<input checked="" type="checkbox"/> C	Water storage capacity or duration are substantially altered (typically, alteration sufficient to result in vegetation change) (examples: draining, flooding, soil compaction, filling, excessive sedimentation, underground utility lines).
- Water Storage/Surface Relief – assessment area/wetland type condition metric (skip for all marshes)**
Check a box in each column. Select the appropriate storage for the assessment area (AA) and the wetland type (WT).

AA	WT	
3a. <input type="checkbox"/> A <input type="checkbox"/> A		Majority of wetland with depressions able to pond water > 1 foot deep
<input type="checkbox"/> B <input type="checkbox"/> B		Majority of wetland with depressions able to pond water 6 inches to 1 foot deep
<input type="checkbox"/> C <input type="checkbox"/> C		Majority of wetland with depressions able to pond water 3 to 6 inches deep
<input checked="" type="checkbox"/> D <input checked="" type="checkbox"/> D		Depressions able to pond water < 3 inches deep
3b. <input type="checkbox"/> A	<input type="checkbox"/> A	Evidence that maximum depth of inundation is greater than 2 feet
<input type="checkbox"/> B	<input type="checkbox"/> B	Evidence that maximum depth of inundation is between 1 and 2 feet
<input checked="" type="checkbox"/> C	<input checked="" type="checkbox"/> C	Evidence that maximum depth of inundation is less than 1 foot

4. Soil Texture/Structure – assessment area condition metric (skip for all marshes)

Check a box from each of the three soil property groups below. Dig soil profile in the dominant assessment area landscape feature. Make soil observations within the top 12 inches. Use most recent National Technical Committee for Hydric Soils guidance for regional indicators.

- 4a. A Sandy soil
B Loamy or clayey soils exhibiting redoximorphic features (concentrations, depletions, or rhizospheres)
C Loamy or clayey soils not exhibiting redoximorphic features
D Loamy or clayey gleyed soil
E Histosol or histc epipedon
- 4b. A Soil ribbon < 1 inch
B Soil ribbon ≥ 1 inch
- 4c. A No peat or muck presence
B A peat or muck presence

5. Discharge into Wetland – opportunity metric

Check a box in each column. Consider surface pollutants or discharges (Surf) and sub-surface pollutants or discharges (Sub). Examples of sub-surface discharges include presence of nearby septic tank, underground storage tank (UST), etc.

- | | | |
|---------------------------------------|---------------------------------------|---|
| Surf | Sub | |
| <input type="checkbox"/> A | <input checked="" type="checkbox"/> A | Little or no evidence of pollutants or discharges entering the assessment area |
| <input checked="" type="checkbox"/> B | <input type="checkbox"/> B | Noticeable evidence of pollutants or discharges entering the wetland and stressing, but not overwhelming the treatment capacity of the assessment area |
| <input type="checkbox"/> C | <input type="checkbox"/> C | Noticeable evidence of pollutants or discharges (pathogen, particulate, or soluble) entering the assessment area and potentially overwhelming the treatment capacity of the wetland (water discoloration, dead vegetation, excessive sedimentation, odor) |

6. Land Use – opportunity metric (skip for non-riparian wetlands)

Check all that apply (at least one box in each column). Evaluation involves a GIS effort with field adjustment. Consider sources draining to assessment area within entire upstream watershed (WS), within 5 miles and within the watershed draining to the assessment area (5M), and within 2 miles and within the watershed draining to the assessment area (2M).

- | | | | |
|---------------------------------------|---------------------------------------|---------------------------------------|---|
| WS | 5M | 2M | |
| <input type="checkbox"/> A | <input type="checkbox"/> A | <input type="checkbox"/> A | ≥ 10% impervious surfaces |
| <input type="checkbox"/> B | <input type="checkbox"/> B | <input type="checkbox"/> B | Confined animal operations (or other local, concentrated source of pollutants) |
| <input checked="" type="checkbox"/> C | <input checked="" type="checkbox"/> C | <input checked="" type="checkbox"/> C | ≥ 20% coverage of pasture |
| <input type="checkbox"/> D | <input type="checkbox"/> D | <input type="checkbox"/> D | ≥ 20% coverage of agricultural land (regularly plowed land) |
| <input checked="" type="checkbox"/> E | <input checked="" type="checkbox"/> E | <input checked="" type="checkbox"/> E | ≥ 20% coverage of maintained grass/herb |
| <input type="checkbox"/> F | <input type="checkbox"/> F | <input type="checkbox"/> F | ≥ 20% coverage of clear-cut land |
| <input type="checkbox"/> G | <input type="checkbox"/> G | <input type="checkbox"/> G | Little or no opportunity to improve water quality. Lack of opportunity may result from little or no disturbance in the watershed or hydrologic alterations that prevent drainage and/or overbank flow from affecting the assessment area. |

7. Wetland Acting as Vegetated Buffer – assessment area/wetland complex condition metric (skip for non-riparian wetlands)

- 7a. Is assessment area within 50 feet of a tributary or other open water?
Yes No If Yes, continue to 7b. If No, skip to Metric 8.
 Wetland buffer need only be present on one side of the water body. Make buffer judgment based on the average width of wetland. Record a note if a portion of the buffer has been removed or disturbed.
- 7b. How much of the first 50 feet from the bank is wetland? (Wetland buffer need only be present on one side of the water body. Make buffer judgment based on the average width of wetland. Record a note if a portion of the buffer has been removed or disturbed.)
A ≥ 50 feet
B From 30 to < 50 feet
C From 15 to < 30 feet
D From 5 to < 15 feet
E < 5 feet or buffer bypassed by ditches
- 7c. Tributary width. If the tributary is anastomosed, combine widths of channels/braids for a total width.
 ≤ 15-foot wide > 15-foot wide Other open water (no tributary present)
- 7d. Do roots of assessment area vegetation extend into the bank of the tributary/open water?
Yes No
- 7e. Is stream or other open water sheltered or exposed?
 Sheltered – adjacent open water with width < 2500 feet and no regular boat traffic.
 Exposed – adjacent open water with width ≥ 2500 feet or regular boat traffic.

8. Wetland Width at the Assessment Area – wetland type/wetland complex condition metric (evaluate WT for all marshes and Estuarine Woody Wetland only; evaluate WC for Bottomland Hardwood Forest, Headwater Forest, and Riverine Swamp Forest only)

Check a box in each column for riverine wetlands only. Select the average width for the wetland type at the assessment area (WT) and the wetland complex at the assessment area (WC). See User Manual for WT and WC boundaries.

- | | | |
|---------------------------------------|---------------------------------------|-----------------------|
| WT | WC | |
| <input type="checkbox"/> A | <input type="checkbox"/> A | ≥ 100 feet |
| <input type="checkbox"/> B | <input type="checkbox"/> B | From 80 to < 100 feet |
| <input type="checkbox"/> C | <input type="checkbox"/> C | From 50 to < 80 feet |
| <input type="checkbox"/> D | <input type="checkbox"/> D | From 40 to < 50 feet |
| <input type="checkbox"/> E | <input type="checkbox"/> E | From 30 to < 40 feet |
| <input type="checkbox"/> F | <input type="checkbox"/> F | From 15 to < 30 feet |
| <input checked="" type="checkbox"/> G | <input checked="" type="checkbox"/> G | From 5 to < 15 feet |
| <input type="checkbox"/> H | <input type="checkbox"/> H | < 5 feet |

9. Inundation Duration – assessment area condition metric (skip for non-riparian wetlands)

Answer for assessment area dominant landform.

- A Evidence of short-duration inundation (< 7 consecutive days)
B Evidence of saturation, without evidence of inundation
C Evidence of long-duration inundation or very long-duration inundation (7 to 30 consecutive days or more)

10. Indicators of Deposition – assessment area condition metric (skip for non-riparian wetlands and all marshes)

Consider recent deposition only (no plant growth since deposition).

- A Sediment deposition is not excessive, but at approximately natural levels.
B Sediment deposition is excessive, but not overwhelming the wetland.
C Sediment deposition is excessive and is overwhelming the wetland.

11. Wetland Size – wetland type/wetland complex condition metric

Check a box in each column. Involves a GIS effort with field adjustment. This metric evaluates three aspects of the wetland area: the size of the wetland type (WT), the size of the wetland complex (WC), and the size of the forested wetland (FW) (if applicable, see User Manual). See the User Manual for boundaries of these evaluation areas. If assessment area is clear-cut, select "K" for the FW column.

- | | | |
|---------------------------------------|---------------------------------------|---|
| WT | WC | FW (if applicable) |
| <input type="checkbox"/> A | <input type="checkbox"/> A | <input type="checkbox"/> A ≥ 500 acres |
| <input type="checkbox"/> B | <input type="checkbox"/> B | <input type="checkbox"/> B From 100 to < 500 acres |
| <input type="checkbox"/> C | <input type="checkbox"/> C | <input type="checkbox"/> C From 50 to < 100 acres |
| <input type="checkbox"/> D | <input type="checkbox"/> D | <input type="checkbox"/> D From 25 to < 50 acres |
| <input type="checkbox"/> E | <input type="checkbox"/> E | <input type="checkbox"/> E From 10 to < 25 acres |
| <input type="checkbox"/> F | <input type="checkbox"/> F | <input type="checkbox"/> F From 5 to < 10 acres |
| <input type="checkbox"/> G | <input type="checkbox"/> G | <input type="checkbox"/> G From 1 to < 5 acres |
| <input type="checkbox"/> H | <input type="checkbox"/> H | <input type="checkbox"/> H From 0.5 to < 1 acre |
| <input type="checkbox"/> I | <input type="checkbox"/> I | <input type="checkbox"/> I From 0.1 to < 0.5 acre |
| <input type="checkbox"/> J | <input type="checkbox"/> J | <input type="checkbox"/> J From 0.01 to < 0.1 acre |
| <input checked="" type="checkbox"/> K | <input checked="" type="checkbox"/> K | <input checked="" type="checkbox"/> K < 0.01 acre or assessment area is clear-cut |

12. Wetland Intactness – wetland type condition metric (evaluate for Pocosins only)

- A Pocosin is the full extent (≥ 90%) of its natural landscape size.
B Pocosin type is < 90% of the full extent of its natural landscape size.

13. Connectivity to Other Natural Areas – landscape condition metric

13a. **Check appropriate box(es) (a box may be checked in each column).** Involves a GIS effort with field adjustment. This metric evaluates whether the wetland is well connected (Well) and/or loosely connected (Loosely) to the landscape patch, the contiguous naturally vegetated area and open water (if appropriate). Boundaries are formed by four-lane roads, regularly maintained utility line corridors the width of a four-lane road or wider, urban landscapes, maintained fields (pasture and agriculture), or open water > 300 feet wide.

- | | | |
|---------------------------------------|----------------------------|--|
| Well | Loosely | |
| <input type="checkbox"/> A | <input type="checkbox"/> A | ≥ 500 acres |
| <input type="checkbox"/> B | <input type="checkbox"/> B | From 100 to < 500 acres |
| <input type="checkbox"/> C | <input type="checkbox"/> C | From 50 to < 100 acres |
| <input type="checkbox"/> D | <input type="checkbox"/> D | From 10 to < 50 acres |
| <input type="checkbox"/> E | <input type="checkbox"/> E | < 10 acres |
| <input checked="" type="checkbox"/> F | <input type="checkbox"/> F | Wetland type has a poor or no connection to other natural habitats |

13b. **Evaluate for marshes only.**

- Yes No Wetland type has a surface hydrology connection to open waters/stream or tidal wetlands.

14. Edge Effect – wetland type condition metric (skip for all marshes and Estuarine Woody Wetland)

May involve a GIS effort with field adjustment. Estimate distance from wetland type boundary to artificial edges. Artificial edges include non-forested areas ≥ 40 feet wide such as fields, development, roads, regularly maintained utility line corridors, and clear-cuts. Consider the eight main points of the compass. Artificial edge occurs within 150 feet in how many directions? If the assessment area is clear cut, select option "C."

- A 0
B 1 to 4
C 5 to 8

15. Vegetative Composition – assessment area condition metric (skip for all marshes and Pine Flat)

- A Vegetation is close to reference condition in species present and their proportions. Lower strata composed of appropriate species, with exotic plants absent or sparse within the assessment area.
B Vegetation is different from reference condition in species diversity or proportions, but still largely composed of native species characteristic of the wetland type. This may include communities of weedy native species that develop after clearcutting or clearing. It also includes communities with exotics present, but not dominant, over a large portion of the expected strata.
C Vegetation severely altered from reference in composition, or expected species are unnaturally absent (planted stands of non-characteristic species or at least one stratum inappropriately composed of a single species), or exotic species are dominant in at least one stratum.

16. Vegetative Diversity – assessment area condition metric (evaluate for Non-tidal Freshwater Marsh only)

- A Vegetation diversity is high and is composed primarily of native species (< 10% cover of exotics).
B Vegetation diversity is low or has > 10% to 50% cover of exotics.
C Vegetation is dominated by exotic species (> 50 % cover of exotics).

17. **Vegetative Structure – assessment area/wetland type condition metric**

17a. Is vegetation present?

Yes No If Yes, continue to 17b. If No, skip to Metric 18.

17b. Evaluate percent coverage of assessment area vegetation for all marshes only. Skip to 17c for non-marsh wetlands.

A ≥ 25% coverage of vegetation
 B < 25% coverage of vegetation

17c. **Check a box in each column for each stratum.** Evaluate this portion of the metric for non-marsh wetlands. Consider structure in airspace above the assessment area (AA) and the wetland type (WT) separately.

	AA	WT	
Canopy	<input type="checkbox"/> A	<input type="checkbox"/> A	Canopy closed, or nearly closed, with natural gaps associated with natural processes
	<input type="checkbox"/> B	<input type="checkbox"/> B	Canopy present, but opened more than natural gaps
	<input checked="" type="checkbox"/> C	<input checked="" type="checkbox"/> C	Canopy sparse or absent
Mid-Story	<input type="checkbox"/> A	<input type="checkbox"/> A	Dense mid-story/sapling layer
	<input type="checkbox"/> B	<input type="checkbox"/> B	Moderate density mid-story/sapling layer
	<input checked="" type="checkbox"/> C	<input checked="" type="checkbox"/> C	Mid-story/sapling layer sparse or absent
Shrub	<input type="checkbox"/> A	<input type="checkbox"/> A	Dense shrub layer
	<input type="checkbox"/> B	<input type="checkbox"/> B	Moderate density shrub layer
	<input checked="" type="checkbox"/> C	<input checked="" type="checkbox"/> C	Shrub layer sparse or absent
Herb	<input checked="" type="checkbox"/> A	<input checked="" type="checkbox"/> A	Dense herb layer
	<input type="checkbox"/> B	<input type="checkbox"/> B	Moderate density herb layer
	<input type="checkbox"/> C	<input type="checkbox"/> C	Herb layer sparse or absent

18. **Snags – wetland type condition metric (skip for all marshes)**

A Large snags (more than one) are visible (> 12 inches DBH, or large relative to species present and landscape stability).
 B Not A

19. **Diameter Class Distribution – wetland type condition metric (skip for all marshes)**

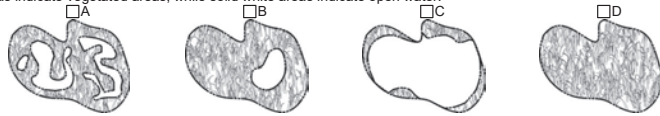
A Majority of canopy trees have stems > 6 inches in diameter at breast height (DBH); many large trees (> 12 inches DBH) are present.
 B Majority of canopy trees have stems between 6 and 12 inches DBH, few are > 12 inch DBH.
 C Majority of canopy trees are < 6 inches DBH or no trees.

20. **Large Woody Debris – wetland type condition metric (skip for all marshes)**

Include both natural debris and man-placed natural debris.
 A Large logs (more than one) are visible (> 12 inches in diameter, or large relative to species present and landscape stability).
 B Not A

21. **Vegetation/Open Water Dispersion – wetland type/open water condition metric (evaluate for Non-Tidal Freshwater Marsh only)**

Select the figure that best describes the amount of interspersed vegetation and open water in the growing season. Patterned areas indicate vegetated areas, while solid white areas indicate open water.



22. **Hydrologic Connectivity – assessment area condition metric (evaluate for riparian wetlands and Salt/Brackish Marsh only)**

Examples of activities that may severely alter hydrologic connectivity include intensive ditching, fill, sedimentation, channelization, diversion, man-made berms, beaver dams, and stream incision. Documentation required if evaluated as B, C, or D.

A Overbank and overland flow are not severely altered in the assessment area.
 B Overbank flow is severely altered in the assessment area.
 C Overland flow is severely altered in the assessment area.
 D Both overbank and overland flow are severely altered in the assessment area.

Notes

**NC WAM Wetland Rating Sheet
 Accompanies User Manual Version 5.0**

Wetland Site Name Wetland B Date of Assessment 7/30/2020
 Wetland Type Headwater Forest Assessor Name/Organization C. Neaves

Notes on Field Assessment Form (Y/N) NO
 Presence of regulatory considerations (Y/N) NO
 Wetland is intensively managed (Y/N) _____
 Assessment area is located within 50 feet of a natural tributary or other open water (Y/N) YES
 Assessment area is substantially altered by beaver (Y/N) _____
 Assessment area experiences overbank flooding during normal rainfall conditions (Y/N) _____
 Assessment area is on a coastal island (Y/N) _____

Sub-function Rating Summary

Function	Sub-function	Metrics	Rating
Hydrology	Surface Storage and Retention	Condition	LOW
		Sub-surface Storage and Retention	LOW
Water Quality	Pathogen Change	Condition	MEDIUM
		Condition/Opportunity	MEDIUM
		Opportunity Presence (Y/N)	NO
	Particulate Change	Condition	LOW
		Condition/Opportunity	NA
		Opportunity Presence (Y/N)	NA
	Soluble Change	Condition	MEDIUM
		Condition/Opportunity	MEDIUM
		Opportunity Presence (Y/N)	NO
	Physical Change	Condition	LOW
		Condition/Opportunity	LOW
		Opportunity Presence (Y/N)	NO
	Pollution Change	Condition	NA
		Condition/Opportunity	NA
		Opportunity Presence (Y/N)	NA
Habitat	Physical Structure	Condition	LOW
	Landscape Patch Structure	Condition	LOW
	Vegetation Composition	Condition	LOW

Function Rating Summary

Function	Metrics	Rating
Hydrology	Condition	LOW
Water Quality	Condition	LOW
	Condition/Opportunity	LOW
	Opportunity Presence (Y/N)	NO
Habitat	Condition	LOW

Overall Wetland Rating LOW

NC WAM FIELD ASSESSMENT FORM
Accompanies User Manual Version 5.0

USACE AID #	SAW-2020-00047	NCDWR#	20200035
Project Name	Liberty Rock Mitigation Site	Date of Evaluation	7/30/2020
Applicant/Owner Name	Widlands Engineering	Wetland Site Name	Wetland C
Wetland Type	Headwater Forest	Assessor Name/Organization	C. Neaves
Level III Ecoregion	Piedmont	Nearest Named Water Body	Rocky River
River Basin	Cape Fear	USGS 8-Digit Catalogue Unit	03030003
County	Randolph	NCDWR Region	Winston-Salem
<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	Precipitation within 48 hrs?	Latitude/Longitude (deci-degrees)	35.821473, -79.561633

Evidence of stressors affecting the assessment area (may not be within the assessment area)

Please circle and/or make note on the last page if evidence of stressors is apparent. Consider departure from reference, if appropriate, in recent past (for instance, within 10 years). Noteworthy stressors include, but are not limited to the following.

- Hydrological modifications (examples: ditches, dams, beaver dams, dikes, berms, ponds, etc.)
- Surface and sub-surface discharges into the wetland (examples: discharges containing obvious pollutants, presence of nearby septic tanks, underground storage tanks (USTs), hog lagoons, etc.)
- Signs of vegetation stress (examples: vegetation mortality, insect damage, disease, storm damage, salt intrusion, etc.)
- Habitat/plant community alteration (examples: mowing, clear-cutting, exotics, etc.)

Is the assessment area intensively managed? Yes No

Regulatory Considerations - Were regulatory considerations evaluated? Yes No If Yes, check all that apply to the assessment area.

- Anadromous fish
- Federally protected species or State endangered or threatened species
- NCDWR riparian buffer rule in effect
- Abuts a Primary Nursery Area (PNA)
- Publicly owned property
- N.C. Division of Coastal Management Area of Environmental Concern (AEC) (including buffer)
- Abuts a stream with a NCDWQ classification of SA or supplemental classifications of HQW, ORW, or Trout
- Designated NCNHP reference community
- Abuts a 303(d)-listed stream or a tributary to a 303(d)-listed stream

What type of natural stream is associated with the wetland, if any? (check all that apply)

- Blackwater
- Brownwater
- Tidal (if tidal, check one of the following boxes) Lunar Wind Both

Is the assessment area on a coastal island? Yes No

Is the assessment area's surface water storage capacity or duration substantially altered by beaver? Yes No

Does the assessment area experience overbank flooding during normal rainfall conditions? Yes No

1. Ground Surface Condition/Vegetation Condition – assessment area condition metric

Check a box in each column. Consider alteration to the ground surface (GS) in the assessment area and vegetation structure (VS) in the assessment area. Compare to reference wetland if applicable (see User Manual). If a reference is not applicable, then rate the assessment area based on evidence an effect.

- | | | |
|---------------------------------------|---------------------------------------|--|
| GS | VS | |
| <input checked="" type="checkbox"/> A | <input type="checkbox"/> A | Not severely altered |
| <input type="checkbox"/> B | <input checked="" type="checkbox"/> B | Severely altered over a majority of the assessment area (ground surface alteration examples: vehicle tracks, excessive sedimentation, fire-plow lanes, skidder tracks, bedding, fill, soil compaction, obvious pollutants) (vegetation structure alteration examples: mechanical disturbance, herbicides, salt intrusion [where appropriate], exotic species, grazing, less diversity [if appropriate], hydrologic alteration) |

2. Surface and Sub-Surface Storage Capacity and Duration – assessment area condition metric

Check a box in each column. Consider surface storage capacity and duration (Surf) and sub-surface storage capacity and duration (Sub). Consider both increase and decrease in hydrology. A ditch ≤ 1 foot deep is considered to affect surface water only, while a ditch > 1 foot deep is expected to affect both surface and sub-surface water. Consider tidal flooding regime, if applicable.

- | | | |
|---------------------------------------|---------------------------------------|--|
| Surf | Sub | |
| <input type="checkbox"/> A | <input type="checkbox"/> A | Water storage capacity and duration are not altered. |
| <input type="checkbox"/> B | <input type="checkbox"/> B | Water storage capacity or duration are altered, but not substantially (typically, not sufficient to change vegetation). |
| <input checked="" type="checkbox"/> C | <input checked="" type="checkbox"/> C | Water storage capacity or duration are substantially altered (typically, alteration sufficient to result in vegetation change) (examples: draining, flooding, soil compaction, filling, excessive sedimentation, underground utility lines). |

3. Water Storage/Surface Relief – assessment area/wetland type condition metric (skip for all marshes)

Check a box in each column. Select the appropriate storage for the assessment area (AA) and the wetland type (WT).

- | | | |
|---------------------------------------|---------------------------------------|---|
| AA | WT | |
| 3a. <input type="checkbox"/> A | <input type="checkbox"/> A | Majority of wetland with depressions able to pond water > 1 deep |
| <input type="checkbox"/> B | <input type="checkbox"/> B | Majority of wetland with depressions able to pond water 6 inches to 1 foot deep |
| <input type="checkbox"/> C | <input type="checkbox"/> C | Majority of wetland with depressions able to pond water 3 to 6 inches deep |
| <input checked="" type="checkbox"/> D | <input checked="" type="checkbox"/> D | Depressions able to pond water < 3 inches deep |
| 3b. <input type="checkbox"/> A | | Evidence that maximum depth of inundation is greater than 2 feet |
| <input type="checkbox"/> B | | Evidence that maximum depth of inundation is between 1 and 2 feet |
| <input checked="" type="checkbox"/> C | | Evidence that maximum depth of inundation is less than 1 foot |

4. Soil Texture/Structure – assessment area condition metric (skip for all marshes)

Check a box from each of the three soil property groups below. Dig soil profile in the dominant assessment area landscape feature. Make soil observations within the top 12 inches. Use most recent National Technical Committee for Hydric Soils guidance for regional indicators.

- 4a. A Sandy soil
- B Loamy or clayey soils exhibiting redoximorphic features (concentrations, depletions, or rhizospheres)
- C Loamy or clayey soils not exhibiting redoximorphic features
- D Loamy or clayey gleyed soil
- E Histosol or histlic epipedon
- 4b. A Soil ribbon < 1 inch
- B Soil ribbon ≥ 1 inch
- 4c. A No peat or muck presence
- B A peat or muck presence

5. Discharge into Wetland – opportunity metric

Check a box in each column. Consider surface pollutants or discharges (Surf) and sub-surface pollutants or discharges (Sub). Examples of sub-surface discharges include presence of nearby septic tank, underground storage tank (UST), etc.

- | | | |
|---------------------------------------|---------------------------------------|---|
| Surf | Sub | |
| <input type="checkbox"/> A | <input checked="" type="checkbox"/> A | Little or no evidence of pollutants or discharges entering the assessment area |
| <input checked="" type="checkbox"/> B | <input type="checkbox"/> B | Noticeable evidence of pollutants or discharges entering the wetland and stressing, but not overwhelming the treatment capacity of the assessment area |
| <input type="checkbox"/> C | <input type="checkbox"/> C | Noticeable evidence of pollutants or discharges (pathogen, particulate, or soluble) entering the assessment area and potentially overwhelming the treatment capacity of the wetland (water discoloration, dead vegetation, excessive sedimentation, odor) |

6. Land Use – opportunity metric (skip for non-riparian wetlands)

Check all that apply (at least one box in each column). Evaluation involves a GIS effort with field adjustment. Consider sources draining to assessment area within entire upstream watershed (WS), within 5 miles and within the watershed draining to the assessment area (5M), and within 2 miles and within the watershed draining to the assessment area (2M).

- | | | | |
|---------------------------------------|---------------------------------------|---------------------------------------|---|
| WS | 5M | 2M | |
| <input type="checkbox"/> A | <input type="checkbox"/> A | <input type="checkbox"/> A | ≥ 10% impervious surfaces |
| <input type="checkbox"/> B | <input type="checkbox"/> B | <input type="checkbox"/> B | Confined animal operations (or other local, concentrated source of pollutants) |
| <input checked="" type="checkbox"/> C | <input checked="" type="checkbox"/> C | <input checked="" type="checkbox"/> C | ≥ 20% coverage of pasture |
| <input type="checkbox"/> D | <input type="checkbox"/> D | <input type="checkbox"/> D | ≥ 20% coverage of agricultural land (regularly plowed land) |
| <input checked="" type="checkbox"/> E | <input checked="" type="checkbox"/> E | <input checked="" type="checkbox"/> E | ≥ 20% coverage of maintained grass/herb |
| <input type="checkbox"/> F | <input type="checkbox"/> F | <input type="checkbox"/> F | ≥ 20% coverage of clear-cut land |
| <input type="checkbox"/> G | <input type="checkbox"/> G | <input type="checkbox"/> G | Little or no opportunity to improve water quality. Lack of opportunity may result from little or no disturbance in the watershed or hydrologic alterations that prevent drainage and/or overbank flow from affecting the assessment area. |

7. Wetland Acting as Vegetated Buffer – assessment area/wetland complex condition metric (skip for non-riparian wetlands)

- 7a. Is assessment area within 50 feet of a tributary or other open water?
 Yes No If Yes, continue to 7b. If No, skip to Metric 8.
 Wetland buffer need only be present on one side of the water body. Make buffer judgment based on the average width of wetland. Record a note if a portion of the buffer has been removed or disturbed.
- 7b. How much of the first 50 feet from the bank is wetland? (Wetland buffer need only be present on one side of the water body. Make buffer judgment based on the average width of wetland. Record a note if a portion of the buffer has been removed or disturbed.)
- A ≥ 50 feet
- B From 30 to < 50 feet
- C From 15 to < 30 feet
- D From 5 to < 15 feet
- E < 5 feet or buffer bypassed by ditches
- 7c. Tributary width. If the tributary is anastomosed, combine widths of channels/braids for a total width.
 ≤ 15-foot wide > 15-foot wide Other open water (no tributary present)
- 7d. Do roots of assessment area vegetation extend into the bank of the tributary/open water?
 Yes No
- 7e. Is stream or other open water sheltered or exposed?
 Sheltered – adjacent open water with width < 2500 feet and no regular boat traffic.
 Exposed – adjacent open water with width ≥ 2500 feet or regular boat traffic.

8. Wetland Width at the Assessment Area – wetland type/wetland complex condition metric (evaluate WT for all marshes and Estuarine Woody Wetland only; evaluate WC for Bottomland Hardwood Forest, Headwater Forest, and Riverine Swamp Forest only)

Check a box in each column for riverine wetlands only. Select the average width for the wetland type at the assessment area (WT) and the wetland complex at the assessment area (WC). See User Manual for WT and WC boundaries.

- | | | |
|---------------------------------------|---------------------------------------|-----------------------|
| WT | WC | |
| <input type="checkbox"/> A | <input type="checkbox"/> A | ≥ 100 feet |
| <input type="checkbox"/> B | <input type="checkbox"/> B | From 80 to < 100 feet |
| <input type="checkbox"/> C | <input type="checkbox"/> C | From 50 to < 80 feet |
| <input type="checkbox"/> D | <input type="checkbox"/> D | From 40 to < 50 feet |
| <input type="checkbox"/> E | <input type="checkbox"/> E | From 30 to < 40 feet |
| <input type="checkbox"/> F | <input type="checkbox"/> F | From 15 to < 30 feet |
| <input checked="" type="checkbox"/> G | <input checked="" type="checkbox"/> G | From 5 to < 15 feet |
| <input type="checkbox"/> H | <input type="checkbox"/> H | < 5 feet |

9. Inundation Duration – assessment area condition metric (skip for non-riparian wetlands)

Answer for assessment area dominant landform.

- A Evidence of short-duration inundation (< 7 consecutive days)
B Evidence of saturation, without evidence of inundation
C Evidence of long-duration inundation or very long-duration inundation (7 to 30 consecutive days or more)

10. Indicators of Deposition – assessment area condition metric (skip for non-riparian wetlands and all marshes)

Consider recent deposition only (no plant growth since deposition).

- A Sediment deposition is not excessive, but at approximately natural levels.
B Sediment deposition is excessive, but not overwhelming the wetland.
C Sediment deposition is excessive and is overwhelming the wetland.

11. Wetland Size – wetland type/wetland complex condition metric

Check a box in each column. Involves a GIS effort with field adjustment. This metric evaluates three aspects of the wetland area: the size of the wetland type (WT), the size of the wetland complex (WC), and the size of the forested wetland (FW) (if applicable, see User Manual). See the User Manual for boundaries of these evaluation areas. If assessment area is clear-cut, select "K" for the FW column.

- | | | |
|---------------------------------------|---------------------------------------|--|
| WT | WC | FW (if applicable) |
| <input type="checkbox"/> A | <input type="checkbox"/> A | <input type="checkbox"/> A ≥ 500 acres |
| <input type="checkbox"/> B | <input type="checkbox"/> B | <input type="checkbox"/> B From 100 to < 500 acres |
| <input type="checkbox"/> C | <input type="checkbox"/> C | <input type="checkbox"/> C From 50 to < 100 acres |
| <input type="checkbox"/> D | <input type="checkbox"/> D | <input type="checkbox"/> D From 25 to < 50 acres |
| <input type="checkbox"/> E | <input type="checkbox"/> E | <input type="checkbox"/> E From 10 to < 25 acres |
| <input type="checkbox"/> F | <input type="checkbox"/> F | <input type="checkbox"/> F From 5 to < 10 acres |
| <input type="checkbox"/> G | <input type="checkbox"/> G | <input type="checkbox"/> G From 1 to < 5 acres |
| <input type="checkbox"/> H | <input type="checkbox"/> H | <input type="checkbox"/> H From 0.5 to < 1 acre |
| <input type="checkbox"/> I | <input type="checkbox"/> I | <input type="checkbox"/> I From 0.1 to < 0.5 acre |
| <input checked="" type="checkbox"/> J | <input checked="" type="checkbox"/> J | <input type="checkbox"/> J From 0.01 to < 0.1 acre |
| <input type="checkbox"/> K | <input type="checkbox"/> K | <input checked="" type="checkbox"/> K < 0.01 acre <u>or</u> assessment area is clear-cut |

12. Wetland Intactness – wetland type condition metric (evaluate for Pocosins only)

- A Pocosin is the full extent (≥ 90%) of its natural landscape size.
B Pocosin type is < 90% of the full extent of its natural landscape size.

13. Connectivity to Other Natural Areas – landscape condition metric

13a. Check appropriate box(es) (a box may be checked in each column). Involves a GIS effort with field adjustment. This metric evaluates whether the wetland is well connected (Well) and/or loosely connected (Loosely) to the landscape patch, the contiguous naturally vegetated area and open water (if appropriate). Boundaries are formed by four-lane roads, regularly maintained utility line corridors the width of a four-lane road or wider, urban landscapes, maintained fields (pasture and agriculture), or open water > 300 feet wide.

- | | |
|---------------------------------------|---|
| Well | Loosely |
| <input type="checkbox"/> A | <input type="checkbox"/> A ≥ 500 acres |
| <input type="checkbox"/> B | <input type="checkbox"/> B From 100 to < 500 acres |
| <input type="checkbox"/> C | <input type="checkbox"/> C From 50 to < 100 acres |
| <input type="checkbox"/> D | <input type="checkbox"/> D From 10 to < 50 acres |
| <input type="checkbox"/> E | <input type="checkbox"/> E < 10 acres |
| <input checked="" type="checkbox"/> F | <input type="checkbox"/> F Wetland type has a poor or no connection to other natural habitats |

13b. Evaluate for marshes only.

- Yes No Wetland type has a surface hydrology connection to open waters/stream or tidal wetlands.

14. Edge Effect – wetland type condition metric (skip for all marshes and Estuarine Woody Wetland)

May involve a GIS effort with field adjustment. Estimate distance from wetland type boundary to artificial edges. Artificial edges include non-forested areas ≥ 40 feet wide such as fields, development, roads, regularly maintained utility line corridors, and clear-cuts. Consider the eight main points of the compass. Artificial edge occurs within 150 feet in how many directions? If the assessment area is clear cut, select option "C."

- A 0
B 1 to 4
C 5 to 8

15. Vegetative Composition – assessment area condition metric (skip for all marshes and Pine Flat)

- A Vegetation is close to reference condition in species present and their proportions. Lower strata composed of appropriate species, with exotic plants absent or sparse within the assessment area.
B Vegetation is different from reference condition in species diversity or proportions, but still largely composed of native species characteristic of the wetland type. This may include communities of weedy native species that develop after clearcutting or clearing. It also includes communities with exotics present, but not dominant, over a large portion of the expected strata.
C Vegetation severely altered from reference in composition, or expected species are unnaturally absent (planted stands of non-characteristic species or at least one stratum inappropriately composed of a single species), or exotic species are dominant in at least one stratum.

16. Vegetative Diversity – assessment area condition metric (evaluate for Non-tidal Freshwater Marsh only)

- A Vegetation diversity is high and is composed primarily of native species (< 10% cover of exotics).
B Vegetation diversity is low or has > 10% to 50% cover of exotics.
C Vegetation is dominated by exotic species (> 50 % cover of exotics).

17. Vegetative Structure – assessment area/wetland type condition metric

17a. Is vegetation present?

- Yes No If Yes, continue to 17b. If No, skip to Metric 18.

17b. Evaluate percent coverage of assessment area vegetation for all marshes only. Skip to 17c for non-marsh wetlands.

- A ≥ 25% coverage of vegetation
B < 25% coverage of vegetation

17c. Check a box in each column for each stratum. Evaluate this portion of the metric for non-marsh wetlands. Consider structure in airspace above the assessment area (AA) and the wetland type (WT) separately.

- | | | | |
|-----------|---------------------------------------|---------------------------------------|--|
| | AA | WT | |
| Canopy | <input type="checkbox"/> A | <input type="checkbox"/> A | Canopy closed, or nearly closed, with natural gaps associated with natural processes |
| | <input type="checkbox"/> B | <input type="checkbox"/> B | Canopy present, but opened more than natural gaps |
| | <input checked="" type="checkbox"/> C | <input checked="" type="checkbox"/> C | Canopy sparse or absent |
| Mid-Story | <input type="checkbox"/> A | <input type="checkbox"/> A | Dense mid-story/sapling layer |
| | <input type="checkbox"/> B | <input type="checkbox"/> B | Moderate density mid-story/sapling layer |
| | <input checked="" type="checkbox"/> C | <input checked="" type="checkbox"/> C | Mid-story/sapling layer sparse or absent |
| Shrub | <input type="checkbox"/> A | <input type="checkbox"/> A | Dense shrub layer |
| | <input type="checkbox"/> B | <input type="checkbox"/> B | Moderate density shrub layer |
| | <input checked="" type="checkbox"/> C | <input checked="" type="checkbox"/> C | Shrub layer sparse or absent |
| Herb | <input checked="" type="checkbox"/> A | <input checked="" type="checkbox"/> A | Dense herb layer |
| | <input type="checkbox"/> B | <input type="checkbox"/> B | Moderate density herb layer |
| | <input type="checkbox"/> C | <input type="checkbox"/> C | Herb layer sparse or absent |

18. Snags – wetland type condition metric (skip for all marshes)

- A Large snags (more than one) are visible (> 12 inches DBH, or large relative to species present and landscape stability).
B Not A

19. Diameter Class Distribution – wetland type condition metric (skip for all marshes)

- A Majority of canopy trees have stems > 6 inches in diameter at breast height (DBH); many large trees (> 12 inches DBH) are present.
B Majority of canopy trees have stems between 6 and 12 inches DBH, few are > 12 inch DBH.
C Majority of canopy trees are < 6 inches DBH or no trees.

20. Large Woody Debris – wetland type condition metric (skip for all marshes)

Include both natural debris and man-placed natural debris.

- A Large logs (more than one) are visible (> 12 inches in diameter, or large relative to species present and landscape stability).
B Not A

21. Vegetation/Open Water Dispersion – wetland type/open water condition metric (evaluate for Non-Tidal Freshwater Marsh only)

Select the figure that best describes the amount of interspersed between vegetation and open water in the growing season. Patterned areas indicate vegetated areas, while solid white areas indicate open water.



22. Hydrologic Connectivity – assessment area condition metric (evaluate for riparian wetlands and Salt/Brackish Marsh only)

Examples of activities that may severely alter hydrologic connectivity include intensive ditching, fill, sedimentation, channelization, diversion, man-made berms, beaver dams, and stream incision. Documentation required if evaluated as B, C, or D.

- A Overbank and overland flow are not severely altered in the assessment area.
B Overbank flow is severely altered in the assessment area.
C Overland flow is severely altered in the assessment area.
D Both overbank and overland flow are severely altered in the assessment area.

Notes

NC WAM Wetland Rating Sheet
Accompanies User Manual Version 5.0

Wetland Site Name Wetland C Date of Assessment 7/30/2020
 Wetland Type Headwater Forest Assessor Name/Organization C. Neaves
 Notes on Field Assessment Form (Y/N) NO
 Presence of regulatory considerations (Y/N) NO
 Wetland is intensively managed (Y/N) _____
 Assessment area is located within 50 feet of a natural tributary or other open water (Y/N) YES
 Assessment area is substantially altered by beaver (Y/N) _____
 Assessment area experiences overbank flooding during normal rainfall conditions (Y/N) _____
 Assessment area is on a coastal island (Y/N) _____

Sub-function Rating Summary

Function	Sub-function	Metrics	Rating
Hydrology	Surface Storage and Retention	Condition	LOW
	Sub-surface Storage and Retention	Condition	LOW
Water Quality	Pathogen Change	Condition	MEDIUM
		Condition/Opportunity	MEDIUM
	Particulate Change	Opportunity Presence (Y/N)	NO
		Condition	LOW
Soluble Change	Condition/Opportunity	Condition/Opportunity	NA
		Opportunity Presence (Y/N)	NA
	Physical Change	Condition	MEDIUM
		Condition/Opportunity	MEDIUM
Pollution Change	Opportunity Presence (Y/N)	Opportunity Presence (Y/N)	NO
		Condition	LOW
	Condition/Opportunity	Condition/Opportunity	LOW
		Opportunity Presence (Y/N)	NO
Habitat	Physical Structure	Condition	LOW
	Landscape Patch Structure	Condition	LOW
	Vegetation Composition	Condition	LOW

Function Rating Summary

Function	Metrics	Rating
Hydrology	Condition	LOW
Water Quality	Condition	LOW
	Condition/Opportunity	LOW
	Opportunity Presence (Y/N)	NO
Habitat	Condition	LOW

Overall Wetland Rating LOW

NC WAM FIELD ASSESSMENT FORM
Accompanies User Manual Version 5.0

USACE AID #	SAW-2020-00047	NCDWR#	20200035
Project Name	Liberty Rock Mitigation Site	Date of Evaluation	7/30/2020
Applicant/Owner Name	Wildlands Engineering	Wetland Site Name	Wetland D
Wetland Type	Headwater Forest	Assessor Name/Organization	C. Neaves
Level III Ecoregion	Piedmont	Nearest Named Water Body	Rocky River
River Basin	Cape Fear	USGS 8-Digit Catalogue Unit	03030003
County	Randolph	NCDWR Region	Winston-Salem
<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	Precipitation within 48 hrs?	Latitude/Longitude (deci-degrees)	35.820998, -79.561274

Evidence of stressors affecting the assessment area (may not be within the assessment area)
 Please circle and/or make note on the last page if evidence of stressors is apparent. Consider departure from reference, if appropriate, in recent past (for instance, within 10 years). Noteworthy stressors include, but are not limited to the following.

- Hydrological modifications (examples: ditches, dams, beaver dams, dikes, berms, ponds, etc.)
- Surface and sub-surface discharges into the wetland (examples: discharges containing obvious pollutants, presence of nearby septic tanks, underground storage tanks (USTs), hog lagoons, etc.)
- Signs of vegetation stress (examples: vegetation mortality, insect damage, storm damage, salt intrusion, etc.)
- Habitat/plant community alteration (examples: mowing, clear-cutting, exotics, etc.)

Is the assessment area intensively managed? Yes No

Regulatory Considerations - Were regulatory considerations evaluated? Yes No If Yes, check all that apply to the assessment area.

- Anadromous fish
- Federally protected species or State endangered or threatened species
- NCDWR riparian buffer rule in effect
- Abuts a Primary Nursery Area (PNA)
- Publicly owned property
- N.C. Division of Coastal Management Area of Environmental Concern (AEC) (including buffer)
- Abuts a stream with a NCDWQ classification of SA or supplemental classifications of HQW, ORW, or Trout
- Designated NCNHP reference community
- Abuts a 303(d)-listed stream or a tributary to a 303(d)-listed stream

What type of natural stream is associated with the wetland, if any? (check all that apply)

- Blackwater
- Brownwater
- Tidal (if tidal, check one of the following boxes) Lunar Wind Both

Is the assessment area on a coastal island? Yes No

Is the assessment area's surface water storage capacity or duration substantially altered by beaver? Yes No

Does the assessment area experience overbank flooding during normal rainfall conditions? Yes No

- Ground Surface Condition/Vegetation Condition – assessment area condition metric**
Check a box in each column. Consider alteration to the ground surface (GS) in the assessment area and vegetation structure (VS) in the assessment area. Compare to reference wetland if applicable (see User Manual). If a reference is not applicable, then rate the assessment area based on evidence an effect.

GS	VS	
<input checked="" type="checkbox"/> A	<input type="checkbox"/> A	Not severely altered
<input type="checkbox"/> B	<input checked="" type="checkbox"/> B	Severely altered over a majority of the assessment area (ground surface alteration examples: vehicle tracks, excessive sedimentation, fire-plow lanes, skidder tracks, bedding, fill, soil compaction, obvious pollutants) (vegetation structure alteration examples: mechanical disturbance, herbicides, salt intrusion [where appropriate], exotic species, grazing, less diversity [if appropriate], hydrologic alteration)
- Surface and Sub-Surface Storage Capacity and Duration – assessment area condition metric**
Check a box in each column. Consider surface storage capacity and duration (Surf) and sub-surface storage capacity and duration (Sub). Consider both increase and decrease in hydrology. A ditch ≤ 1 foot deep is considered to affect surface water only, while a ditch > 1 foot deep is expected to affect both surface and sub-surface water. Consider tidal flooding regime, if applicable.

Surf	Sub	
<input type="checkbox"/> A	<input type="checkbox"/> A	Water storage capacity and duration are not altered.
<input checked="" type="checkbox"/> B	<input checked="" type="checkbox"/> B	Water storage capacity or duration are altered, but not substantially (typically, not sufficient to change vegetation).
<input type="checkbox"/> C	<input type="checkbox"/> C	Water storage capacity or duration are substantially altered (typically, alteration sufficient to result in vegetation change) (examples: draining, flooding, soil compaction, filling, excessive sedimentation, underground utility lines).
- Water Storage/Surface Relief – assessment area/wetland type condition metric (skip for all marshes)**
Check a box in each column. Select the appropriate storage for the assessment area (AA) and the wetland type (WT).

AA	WT	
3a. <input type="checkbox"/> A <input type="checkbox"/> A		Majority of wetland with depressions able to pond water > 1 foot deep
<input type="checkbox"/> B <input type="checkbox"/> B		Majority of wetland with depressions able to pond water 6 inches to 1 foot deep
<input type="checkbox"/> C <input type="checkbox"/> C		Majority of wetland with depressions able to pond water 3 to 6 inches deep
<input checked="" type="checkbox"/> D <input checked="" type="checkbox"/> D		Depressions able to pond water < 3 inches deep
3b. <input type="checkbox"/> A	<input type="checkbox"/> A	Evidence that maximum depth of inundation is greater than 2 feet
<input type="checkbox"/> B	<input type="checkbox"/> B	Evidence that maximum depth of inundation is between 1 and 2 feet
<input checked="" type="checkbox"/> C	<input checked="" type="checkbox"/> C	Evidence that maximum depth of inundation is less than 1 foot

4. Soil Texture/Structure – assessment area condition metric (skip for all marshes)

Check a box from each of the three soil property groups below. Dig soil profile in the dominant assessment area landscape feature. Make soil observations within the top 12 inches. Use most recent National Technical Committee for Hydric Soils guidance for regional indicators.

- 4a. A Sandy soil
 B Loamy or clayey soils exhibiting redoximorphic features (concentrations, depletions, or rhizospheres)
 C Loamy or clayey soils not exhibiting redoximorphic features
 D Loamy or clayey gleyed soil
 E Histosol or histc epipedon
- 4b. A Soil ribbon < 1 inch
 B Soil ribbon ≥ 1 inch
- 4c. A No peat or muck presence
 B A peat or muck presence

5. Discharge into Wetland – opportunity metric

Check a box in each column. Consider surface pollutants or discharges (Surf) and sub-surface pollutants or discharges (Sub). Examples of sub-surface discharges include presence of nearby septic tank, underground storage tank (UST), etc.

- | | | |
|---------------------------------------|---------------------------------------|---|
| Surf | Sub | |
| <input type="checkbox"/> A | <input checked="" type="checkbox"/> A | Little or no evidence of pollutants or discharges entering the assessment area |
| <input checked="" type="checkbox"/> B | <input type="checkbox"/> B | Noticeable evidence of pollutants or discharges entering the wetland and stressing, but not overwhelming the treatment capacity of the assessment area |
| <input type="checkbox"/> C | <input type="checkbox"/> C | Noticeable evidence of pollutants or discharges (pathogen, particulate, or soluble) entering the assessment area and potentially overwhelming the treatment capacity of the wetland (water discoloration, dead vegetation, excessive sedimentation, odor) |

6. Land Use – opportunity metric (skip for non-riparian wetlands)

Check all that apply (at least one box in each column). Evaluation involves a GIS effort with field adjustment. Consider sources draining to assessment area within entire upstream watershed (WS), within 5 miles and within the watershed draining to the assessment area (5M), and within 2 miles and within the watershed draining to the assessment area (2M).

- | | | | |
|---------------------------------------|---------------------------------------|---------------------------------------|---|
| WS | 5M | 2M | |
| <input type="checkbox"/> A | <input type="checkbox"/> A | <input type="checkbox"/> A | ≥ 10% impervious surfaces |
| <input type="checkbox"/> B | <input type="checkbox"/> B | <input type="checkbox"/> B | Confined animal operations (or other local, concentrated source of pollutants) |
| <input checked="" type="checkbox"/> C | <input checked="" type="checkbox"/> C | <input checked="" type="checkbox"/> C | ≥ 20% coverage of pasture |
| <input type="checkbox"/> D | <input type="checkbox"/> D | <input type="checkbox"/> D | ≥ 20% coverage of agricultural land (regularly plowed land) |
| <input checked="" type="checkbox"/> E | <input checked="" type="checkbox"/> E | <input checked="" type="checkbox"/> E | ≥ 20% coverage of maintained grass/herb |
| <input type="checkbox"/> F | <input type="checkbox"/> F | <input type="checkbox"/> F | ≥ 20% coverage of clear-cut land |
| <input type="checkbox"/> G | <input type="checkbox"/> G | <input type="checkbox"/> G | Little or no opportunity to improve water quality. Lack of opportunity may result from little or no disturbance in the watershed or hydrologic alterations that prevent drainage and/or overbank flow from affecting the assessment area. |

7. Wetland Acting as Vegetated Buffer – assessment area/wetland complex condition metric (skip for non-riparian wetlands)

- 7a. Is assessment area within 50 feet of a tributary or other open water?
 Yes No If Yes, continue to 7b. If No, skip to Metric 8.
 Wetland buffer need only be present on one side of the water body. Make buffer judgment based on the average width of wetland. Record a note if a portion of the buffer has been removed or disturbed.
- 7b. How much of the first 50 feet from the bank is wetland? (Wetland buffer need only be present on one side of the water body. Make buffer judgment based on the average width of wetland. Record a note if a portion of the buffer has been removed or disturbed.)
 A ≥ 50 feet
 B From 30 to < 50 feet
 C From 15 to < 30 feet
 D From 5 to < 15 feet
 E < 5 feet or buffer bypassed by ditches
- 7c. Tributary width. If the tributary is anastomosed, combine widths of channels/braids for a total width.
 ≤ 15-foot wide > 15-foot wide Other open water (no tributary present)
- 7d. Do roots of assessment area vegetation extend into the bank of the tributary/open water?
 Yes No
- 7e. Is stream or other open water sheltered or exposed?
 Sheltered – adjacent open water with width < 2500 feet and no regular boat traffic.
 Exposed – adjacent open water with width ≥ 2500 feet or regular boat traffic.

8. Wetland Width at the Assessment Area – wetland type/wetland complex condition metric (evaluate WT for all marshes and Estuarine Woody Wetland only; evaluate WC for Bottomland Hardwood Forest, Headwater Forest, and Riverine Swamp Forest only)

Check a box in each column for riverine wetlands only. Select the average width for the wetland type at the assessment area (WT) and the wetland complex at the assessment area (WC). See User Manual for WT and WC boundaries.

- | | | |
|---------------------------------------|---------------------------------------|-----------------------|
| WT | WC | |
| <input type="checkbox"/> A | <input type="checkbox"/> A | ≥ 100 feet |
| <input type="checkbox"/> B | <input type="checkbox"/> B | From 80 to < 100 feet |
| <input type="checkbox"/> C | <input type="checkbox"/> C | From 50 to < 80 feet |
| <input type="checkbox"/> D | <input type="checkbox"/> D | From 40 to < 50 feet |
| <input type="checkbox"/> E | <input type="checkbox"/> E | From 30 to < 40 feet |
| <input checked="" type="checkbox"/> F | <input checked="" type="checkbox"/> F | From 15 to < 30 feet |
| <input type="checkbox"/> G | <input type="checkbox"/> G | From 5 to < 15 feet |
| <input type="checkbox"/> H | <input type="checkbox"/> H | < 5 feet |

9. Inundation Duration – assessment area condition metric (skip for non-riparian wetlands)

Answer for assessment area dominant landform.

- A Evidence of short-duration inundation (< 7 consecutive days)
 B Evidence of saturation, without evidence of inundation
 C Evidence of long-duration inundation or very long-duration inundation (7 to 30 consecutive days or more)

10. Indicators of Deposition – assessment area condition metric (skip for non-riparian wetlands and all marshes)

Consider recent deposition only (no plant growth since deposition).

- A Sediment deposition is not excessive, but at approximately natural levels.
 B Sediment deposition is excessive, but not overwhelming the wetland.
 C Sediment deposition is excessive and is overwhelming the wetland.

11. Wetland Size – wetland type/wetland complex condition metric

Check a box in each column. Involves a GIS effort with field adjustment. This metric evaluates three aspects of the wetland area: the size of the wetland type (WT), the size of the wetland complex (WC), and the size of the forested wetland (FW) (if applicable, see User Manual). See the User Manual for boundaries of these evaluation areas. If assessment area is clear-cut, select "K" for the FW column.

- | | | |
|---------------------------------------|---------------------------------------|---|
| WT | WC | FW (if applicable) |
| <input type="checkbox"/> A | <input type="checkbox"/> A | <input type="checkbox"/> A ≥ 500 acres |
| <input type="checkbox"/> B | <input type="checkbox"/> B | <input type="checkbox"/> B From 100 to < 500 acres |
| <input type="checkbox"/> C | <input type="checkbox"/> C | <input type="checkbox"/> C From 50 to < 100 acres |
| <input type="checkbox"/> D | <input type="checkbox"/> D | <input type="checkbox"/> D From 25 to < 50 acres |
| <input type="checkbox"/> E | <input type="checkbox"/> E | <input type="checkbox"/> E From 10 to < 25 acres |
| <input type="checkbox"/> F | <input type="checkbox"/> F | <input type="checkbox"/> F From 5 to < 10 acres |
| <input type="checkbox"/> G | <input type="checkbox"/> G | <input type="checkbox"/> G From 1 to < 5 acres |
| <input type="checkbox"/> H | <input type="checkbox"/> H | <input type="checkbox"/> H From 0.5 to < 1 acre |
| <input type="checkbox"/> I | <input type="checkbox"/> I | <input type="checkbox"/> I From 0.1 to < 0.5 acre |
| <input checked="" type="checkbox"/> J | <input checked="" type="checkbox"/> J | <input type="checkbox"/> J From 0.01 to < 0.1 acre |
| <input type="checkbox"/> K | <input type="checkbox"/> K | <input checked="" type="checkbox"/> K < 0.01 acre or assessment area is clear-cut |

12. Wetland Intactness – wetland type condition metric (evaluate for Pocosins only)

- A Pocosin is the full extent (≥ 90%) of its natural landscape size.
 B Pocosin type is < 90% of the full extent of its natural landscape size.

13. Connectivity to Other Natural Areas – landscape condition metric

13a. Check appropriate box(es) (a box may be checked in each column). Involves a GIS effort with field adjustment. This metric evaluates whether the wetland is well connected (Well) and/or loosely connected (Loosely) to the landscape patch, the contiguous naturally vegetated area and open water (if appropriate). Boundaries are formed by four-lane roads, regularly maintained utility line corridors the width of a four-lane road or wider, urban landscapes, maintained fields (pasture and agriculture), or open water > 300 feet wide.

- | | | |
|---------------------------------------|----------------------------|--|
| Well | Loosely | |
| <input type="checkbox"/> A | <input type="checkbox"/> A | ≥ 500 acres |
| <input type="checkbox"/> B | <input type="checkbox"/> B | From 100 to < 500 acres |
| <input type="checkbox"/> C | <input type="checkbox"/> C | From 50 to < 100 acres |
| <input type="checkbox"/> D | <input type="checkbox"/> D | From 10 to < 50 acres |
| <input type="checkbox"/> E | <input type="checkbox"/> E | < 10 acres |
| <input checked="" type="checkbox"/> F | <input type="checkbox"/> F | Wetland type has a poor or no connection to other natural habitats |

13b. Evaluate for marshes only.

- Yes No Wetland type has a surface hydrology connection to open waters/stream or tidal wetlands.

14. Edge Effect – wetland type condition metric (skip for all marshes and Estuarine Woody Wetland)

May involve a GIS effort with field adjustment. Estimate distance from wetland type boundary to artificial edges. Artificial edges include non-forested areas ≥ 40 feet wide such as fields, development, roads, regularly maintained utility line corridors, and clear-cuts. Consider the eight main points of the compass. Artificial edge occurs within 150 feet in how many directions? If the assessment area is clear cut, select option "C."

- A 0
 B 1 to 4
 C 5 to 8

15. Vegetative Composition – assessment area condition metric (skip for all marshes and Pine Flat)

- A Vegetation is close to reference condition in species present and their proportions. Lower strata composed of appropriate species, with exotic plants absent or sparse within the assessment area.
 B Vegetation is different from reference condition in species diversity or proportions, but still largely composed of native species characteristic of the wetland type. This may include communities of weedy native species that develop after clearcutting or clearing. It also includes communities with exotics present, but not dominant, over a large portion of the expected strata.
 C Vegetation severely altered from reference in composition, or expected species are unnaturally absent (planted stands of non-characteristic species or at least one stratum inappropriately composed of a single species), or exotic species are dominant in at least one stratum.

16. Vegetative Diversity – assessment area condition metric (evaluate for Non-tidal Freshwater Marsh only)

- A Vegetation diversity is high and is composed primarily of native species (< 10% cover of exotics).
 B Vegetation diversity is low or has > 10% to 50% cover of exotics.
 C Vegetation is dominated by exotic species (> 50 % cover of exotics).

17. **Vegetative Structure – assessment area/wetland type condition metric**

17a. Is vegetation present?

Yes No If Yes, continue to 17b. If No, skip to Metric 18.

17b. Evaluate percent coverage of assessment area vegetation for all marshes only. Skip to 17c for non-marsh wetlands.

A ≥ 25% coverage of vegetation
 B < 25% coverage of vegetation

17c. **Check a box in each column for each stratum.** Evaluate this portion of the metric for non-marsh wetlands. Consider structure in airspace above the assessment area (AA) and the wetland type (WT) separately.

	AA	WT	
Canopy	<input type="checkbox"/> A	<input type="checkbox"/> A	Canopy closed, or nearly closed, with natural gaps associated with natural processes
	<input type="checkbox"/> B	<input type="checkbox"/> B	Canopy present, but opened more than natural gaps
	<input checked="" type="checkbox"/> C	<input checked="" type="checkbox"/> C	Canopy sparse or absent
Mid-Story	<input type="checkbox"/> A	<input type="checkbox"/> A	Dense mid-story/sapling layer
	<input type="checkbox"/> B	<input type="checkbox"/> B	Moderate density mid-story/sapling layer
	<input checked="" type="checkbox"/> C	<input checked="" type="checkbox"/> C	Mid-story/sapling layer sparse or absent
Shrub	<input type="checkbox"/> A	<input type="checkbox"/> A	Dense shrub layer
	<input type="checkbox"/> B	<input type="checkbox"/> B	Moderate density shrub layer
	<input checked="" type="checkbox"/> C	<input checked="" type="checkbox"/> C	Shrub layer sparse or absent
Herb	<input checked="" type="checkbox"/> A	<input checked="" type="checkbox"/> A	Dense herb layer
	<input type="checkbox"/> B	<input type="checkbox"/> B	Moderate density herb layer
	<input type="checkbox"/> C	<input type="checkbox"/> C	Herb layer sparse or absent

18. **Snags – wetland type condition metric (skip for all marshes)**

A Large snags (more than one) are visible (> 12 inches DBH, or large relative to species present and landscape stability).
 B Not A

19. **Diameter Class Distribution – wetland type condition metric (skip for all marshes)**

A Majority of canopy trees have stems > 6 inches in diameter at breast height (DBH); many large trees (> 12 inches DBH) are present.
 B Majority of canopy trees have stems between 6 and 12 inches DBH, few are > 12 inch DBH.
 C Majority of canopy trees are < 6 inches DBH or no trees.

20. **Large Woody Debris – wetland type condition metric (skip for all marshes)**

Include both natural debris and man-placed natural debris.
 A Large logs (more than one) are visible (> 12 inches in diameter, or large relative to species present and landscape stability).
 B Not A

21. **Vegetation/Open Water Dispersion – wetland type/open water condition metric (evaluate for Non-Tidal Freshwater Marsh only)**

Select the figure that best describes the amount of interspersed vegetation and open water in the growing season. Patterned areas indicate vegetated areas, while solid white areas indicate open water.



22. **Hydrologic Connectivity – assessment area condition metric (evaluate for riparian wetlands and Salt/Brackish Marsh only)**

Examples of activities that may severely alter hydrologic connectivity include intensive ditching, fill, sedimentation, channelization, diversion, man-made berms, beaver dams, and stream incision. Documentation required if evaluated as B, C, or D.

A Overbank and overland flow are not severely altered in the assessment area.
 B Overbank flow is severely altered in the assessment area.
 C Overland flow is severely altered in the assessment area.
 D Both overbank and overland flow are severely altered in the assessment area.

Notes

**NC WAM Wetland Rating Sheet
 Accompanies User Manual Version 5.0**

Wetland Site Name Wetland D Date of Assessment 7/30/2020
 Wetland Type Headwater Forest Assessor Name/Organization C. Neaves

Notes on Field Assessment Form (Y/N) NO
 Presence of regulatory considerations (Y/N) NO
 Wetland is intensively managed (Y/N) _____
 Assessment area is located within 50 feet of a natural tributary or other open water (Y/N) NO
 Assessment area is substantially altered by beaver (Y/N) _____
 Assessment area experiences overbank flooding during normal rainfall conditions (Y/N) _____
 Assessment area is on a coastal island (Y/N) _____

Sub-function Rating Summary

Function	Sub-function	Metrics	Rating
Hydrology	Surface Storage and Retention	Condition	LOW
		Sub-surface Storage and Retention	MEDIUM
Water Quality	Pathogen Change	Condition	MEDIUM
		Condition/Opportunity	MEDIUM
		Opportunity Presence (Y/N)	NO
	Particulate Change	Condition	LOW
		Condition/Opportunity	NA
		Opportunity Presence (Y/N)	NA
	Soluble Change	Condition	MEDIUM
		Condition/Opportunity	MEDIUM
		Opportunity Presence (Y/N)	NO
	Physical Change	Condition	LOW
		Condition/Opportunity	LOW
		Opportunity Presence (Y/N)	NO
	Pollution Change	Condition	NA
		Condition/Opportunity	NA
		Opportunity Presence (Y/N)	NA
Habitat	Physical Structure	Condition	LOW
	Landscape Patch Structure	Condition	LOW
	Vegetation Composition	Condition	LOW

Function Rating Summary

Function	Metrics	Rating
Hydrology	Condition	LOW
Water Quality	Condition	LOW
	Condition/Opportunity	LOW
	Opportunity Presence (Y/N)	NO
Habitat	Condition	LOW

Overall Wetland Rating LOW

NC WAM FIELD ASSESSMENT FORM
Accompanies User Manual Version 5.0

USACE AID #	SAW-2020-00047	NCDWR#	20200035
Project Name	Liberty Rock Mitigation Site	Date of Evaluation	7/30/2020
Applicant/Owner Name	Wildlands Engineering	Wetland Site Name	Wetland E
Wetland Type	Headwater Forest	Assessor Name/Organization	C. Neaves
Level III Ecoregion	Piedmont	Nearest Named Water Body	Rocky River
River Basin	Cape Fear	USGS 8-Digit Catalogue Unit	03030003
County	Randolph	NCDWR Region	Winston-Salem
<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	Precipitation within 48 hrs?	Latitude/Longitude (deci-degrees)	35.820884, -79.561718

Evidence of stressors affecting the assessment area (may not be within the assessment area)

Please circle and/or make note on the last page if evidence of stressors is apparent. Consider departure from reference, if appropriate, in recent past (for instance, within 10 years). Noteworthy stressors include, but are not limited to the following.

- Hydrological modifications (examples: ditches, dams, beaver dams, dikes, berms, ponds, etc.)
- Surface and sub-surface discharges into the wetland (examples: discharges containing obvious pollutants, presence of nearby septic tanks, underground storage tanks (USTs), hog lagoons, etc.)
- Signs of vegetation stress (examples: vegetation mortality, insect damage, disease, storm damage, salt intrusion, etc.)
- Habitat/plant community alteration (examples: mowing, clear-cutting, exotics, etc.)

Is the assessment area intensively managed? Yes No

Regulatory Considerations - Were regulatory considerations evaluated? Yes No If Yes, check all that apply to the assessment area.

- Anadromous fish
- Federally protected species or State endangered or threatened species
- NCDWR riparian buffer rule in effect
- Abuts a Primary Nursery Area (PNA)
- Publicly owned property
- N.C. Division of Coastal Management Area of Environmental Concern (AEC) (including buffer)
- Abuts a stream with a NCDWQ classification of SA or supplemental classifications of HQW, ORW, or Trout
- Designated NCNHP reference community
- Abuts a 303(d)-listed stream or a tributary to a 303(d)-listed stream

What type of natural stream is associated with the wetland, if any? (check all that apply)

- Blackwater
- Brownwater
- Tidal (if tidal, check one of the following boxes) Lunar Wind Both

Is the assessment area on a coastal island? Yes No

Is the assessment area's surface water storage capacity or duration substantially altered by beaver? Yes No

Does the assessment area experience overbank flooding during normal rainfall conditions? Yes No

1. Ground Surface Condition/Vegetation Condition – assessment area condition metric

Check a box in each column. Consider alteration to the ground surface (GS) in the assessment area and vegetation structure (VS) in the assessment area. Compare to reference wetland if applicable (see User Manual). If a reference is not applicable, then rate the assessment area based on evidence an effect.

- | | | |
|---------------------------------------|---------------------------------------|--|
| GS | VS | |
| <input checked="" type="checkbox"/> A | <input type="checkbox"/> A | Not severely altered |
| <input type="checkbox"/> B | <input checked="" type="checkbox"/> B | Severely altered over a majority of the assessment area (ground surface alteration examples: vehicle tracks, excessive sedimentation, fire-plow lanes, skidder tracks, bedding, fill, soil compaction, obvious pollutants) (vegetation structure alteration examples: mechanical disturbance, herbicides, salt intrusion [where appropriate], exotic species, grazing, less diversity [if appropriate], hydrologic alteration) |

2. Surface and Sub-Surface Storage Capacity and Duration – assessment area condition metric

Check a box in each column. Consider surface storage capacity and duration (Surf) and sub-surface storage capacity and duration (Sub). Consider both increase and decrease in hydrology. A ditch ≤ 1 foot deep is considered to affect surface water only, while a ditch > 1 foot deep is expected to affect both surface and sub-surface water. Consider tidal flooding regime, if applicable.

- | | | |
|---------------------------------------|---------------------------------------|--|
| Surf | Sub | |
| <input type="checkbox"/> A | <input type="checkbox"/> A | Water storage capacity and duration are not altered. |
| <input checked="" type="checkbox"/> B | <input checked="" type="checkbox"/> B | Water storage capacity or duration are altered, but not substantially (typically, not sufficient to change vegetation). |
| <input type="checkbox"/> C | <input type="checkbox"/> C | Water storage capacity or duration are substantially altered (typically, alteration sufficient to result in vegetation change) (examples: draining, flooding, soil compaction, filling, excessive sedimentation, underground utility lines). |

3. Water Storage/Surface Relief – assessment area/wetland type condition metric (skip for all marshes)

Check a box in each column. Select the appropriate storage for the assessment area (AA) and the wetland type (WT).

- | | | |
|---------------------------------------|---------------------------------------|---|
| AA | WT | |
| 3a. <input type="checkbox"/> A | <input type="checkbox"/> A | Majority of wetland with depressions able to pond water > 1 deep |
| <input type="checkbox"/> B | <input type="checkbox"/> B | Majority of wetland with depressions able to pond water 6 inches to 1 foot deep |
| <input type="checkbox"/> C | <input type="checkbox"/> C | Majority of wetland with depressions able to pond water 3 to 6 inches deep |
| <input checked="" type="checkbox"/> D | <input checked="" type="checkbox"/> D | Depressions able to pond water < 3 inches deep |
| 3b. <input type="checkbox"/> A | | Evidence that maximum depth of inundation is greater than 2 feet |
| <input type="checkbox"/> B | | Evidence that maximum depth of inundation is between 1 and 2 feet |
| <input checked="" type="checkbox"/> C | | Evidence that maximum depth of inundation is less than 1 foot |

4. Soil Texture/Structure – assessment area condition metric (skip for all marshes)

Check a box from each of the three soil property groups below. Dig soil profile in the dominant assessment area landscape feature. Make soil observations within the top 12 inches. Use most recent National Technical Committee for Hydric Soils guidance for regional indicators.

- 4a. A Sandy soil
- B Loamy or clayey soils exhibiting redoximorphic features (concentrations, depletions, or rhizospheres)
- C Loamy or clayey soils not exhibiting redoximorphic features
- D Loamy or clayey gleyed soil
- E Histosol or histic epipedon
- 4b. A Soil ribbon < 1 inch
- B Soil ribbon ≥ 1 inch
- 4c. A No peat or muck presence
- B A peat or muck presence

5. Discharge into Wetland – opportunity metric

Check a box in each column. Consider surface pollutants or discharges (Surf) and sub-surface pollutants or discharges (Sub). Examples of sub-surface discharges include presence of nearby septic tank, underground storage tank (UST), etc.

- | | | |
|---------------------------------------|---------------------------------------|---|
| Surf | Sub | |
| <input type="checkbox"/> A | <input checked="" type="checkbox"/> A | Little or no evidence of pollutants or discharges entering the assessment area |
| <input checked="" type="checkbox"/> B | <input type="checkbox"/> B | Noticeable evidence of pollutants or discharges entering the wetland and stressing, but not overwhelming the treatment capacity of the assessment area |
| <input type="checkbox"/> C | <input type="checkbox"/> C | Noticeable evidence of pollutants or discharges (pathogen, particulate, or soluble) entering the assessment area and potentially overwhelming the treatment capacity of the wetland (water discoloration, dead vegetation, excessive sedimentation, odor) |

6. Land Use – opportunity metric (skip for non-riparian wetlands)

Check all that apply (at least one box in each column). Evaluation involves a GIS effort with field adjustment. Consider sources draining to assessment area within entire upstream watershed (WS), within 5 miles and within the watershed draining to the assessment area (5M), and within 2 miles and within the watershed draining to the assessment area (2M).

- | | | | |
|---------------------------------------|---------------------------------------|---------------------------------------|---|
| WS | 5M | 2M | |
| <input type="checkbox"/> A | <input type="checkbox"/> A | <input type="checkbox"/> A | ≥ 10% impervious surfaces |
| <input type="checkbox"/> B | <input type="checkbox"/> B | <input type="checkbox"/> B | Confined animal operations (or other local, concentrated source of pollutants) |
| <input checked="" type="checkbox"/> C | <input checked="" type="checkbox"/> C | <input checked="" type="checkbox"/> C | ≥ 20% coverage of pasture |
| <input type="checkbox"/> D | <input type="checkbox"/> D | <input type="checkbox"/> D | ≥ 20% coverage of agricultural land (regularly plowed land) |
| <input checked="" type="checkbox"/> E | <input checked="" type="checkbox"/> E | <input checked="" type="checkbox"/> E | ≥ 20% coverage of maintained grass/herb |
| <input type="checkbox"/> F | <input type="checkbox"/> F | <input type="checkbox"/> F | ≥ 20% coverage of clear-cut land |
| <input type="checkbox"/> G | <input type="checkbox"/> G | <input type="checkbox"/> G | Little or no opportunity to improve water quality. Lack of opportunity may result from little or no disturbance in the watershed or hydrologic alterations that prevent drainage and/or overbank flow from affecting the assessment area. |

7. Wetland Acting as Vegetated Buffer – assessment area/wetland complex condition metric (skip for non-riparian wetlands)

- 7a. Is assessment area within 50 feet of a tributary or other open water?
 Yes No If Yes, continue to 7b. If No, skip to Metric 8.
 Wetland buffer need only be present on one side of the water body. Make buffer judgment based on the average width of wetland. Record a note if a portion of the buffer has been removed or disturbed.
- 7b. How much of the first 50 feet from the bank is wetland? (Wetland buffer need only be present on one side of the water body. Make buffer judgment based on the average width of wetland. Record a note if a portion of the buffer has been removed or disturbed.)
- | | |
|---------------------------------------|--|
| <input type="checkbox"/> A | ≥ 50 feet |
| <input type="checkbox"/> B | From 30 to < 50 feet |
| <input type="checkbox"/> C | From 15 to < 30 feet |
| <input checked="" type="checkbox"/> D | From 5 to < 15 feet |
| <input type="checkbox"/> E | < 5 feet or buffer bypassed by ditches |
- 7c. Tributary width. If the tributary is anastomosed, combine widths of channels/braids for a total width.
 ≤ 15-foot wide > 15-foot wide Other open water (no tributary present)
- 7d. Do roots of assessment area vegetation extend into the bank of the tributary/open water?
 Yes No
- 7e. Is stream or other open water sheltered or exposed?
 Sheltered – adjacent open water with width < 2500 feet and no regular boat traffic.
 Exposed – adjacent open water with width ≥ 2500 feet or regular boat traffic.

8. Wetland Width at the Assessment Area – wetland type/wetland complex condition metric (evaluate WT for all marshes and Estuarine Woody Wetland only; evaluate WC for Bottomland Hardwood Forest, Headwater Forest, and Riverine Swamp Forest only)

Check a box in each column for riverine wetlands only. Select the average width for the wetland type at the assessment area (WT) and the wetland complex at the assessment area (WC). See User Manual for WT and WC boundaries.

- | | | |
|---------------------------------------|---------------------------------------|-----------------------|
| WT | WC | |
| <input type="checkbox"/> A | <input type="checkbox"/> A | ≥ 100 feet |
| <input type="checkbox"/> B | <input type="checkbox"/> B | From 80 to < 100 feet |
| <input type="checkbox"/> C | <input type="checkbox"/> C | From 50 to < 80 feet |
| <input type="checkbox"/> D | <input type="checkbox"/> D | From 40 to < 50 feet |
| <input type="checkbox"/> E | <input type="checkbox"/> E | From 30 to < 40 feet |
| <input type="checkbox"/> F | <input type="checkbox"/> F | From 15 to < 30 feet |
| <input checked="" type="checkbox"/> G | <input checked="" type="checkbox"/> G | From 5 to < 15 feet |
| <input type="checkbox"/> H | <input type="checkbox"/> H | < 5 feet |

9. **Inundation Duration – assessment area condition metric (skip for non-riparian wetlands)**

Answer for assessment area dominant landform.

- A Evidence of short-duration inundation (< 7 consecutive days)
B Evidence of saturation, without evidence of inundation
C Evidence of long-duration inundation or very long-duration inundation (7 to 30 consecutive days or more)

10. **Indicators of Deposition – assessment area condition metric (skip for non-riparian wetlands and all marshes)**

Consider recent deposition only (no plant growth since deposition).

- A Sediment deposition is not excessive, but at approximately natural levels.
B Sediment deposition is excessive, but not overwhelming the wetland.
C Sediment deposition is excessive and is overwhelming the wetland.

11. **Wetland Size – wetland type/wetland complex condition metric**

Check a box in each column. Involves a GIS effort with field adjustment. This metric evaluates three aspects of the wetland area: the size of the wetland type (WT), the size of the wetland complex (WC), and the size of the forested wetland (FW) (if applicable, see User Manual). See the User Manual for boundaries of these evaluation areas. If assessment area is clear-cut, select "K" for the FW column.

- | | | |
|---------------------------------------|---------------------------------------|--|
| WT | WC | FW (if applicable) |
| <input type="checkbox"/> A | <input type="checkbox"/> A | <input type="checkbox"/> A ≥ 500 acres |
| <input type="checkbox"/> B | <input type="checkbox"/> B | <input type="checkbox"/> B From 100 to < 500 acres |
| <input type="checkbox"/> C | <input type="checkbox"/> C | <input type="checkbox"/> C From 50 to < 100 acres |
| <input type="checkbox"/> D | <input type="checkbox"/> D | <input type="checkbox"/> D From 25 to < 50 acres |
| <input type="checkbox"/> E | <input type="checkbox"/> E | <input type="checkbox"/> E From 10 to < 25 acres |
| <input type="checkbox"/> F | <input type="checkbox"/> F | <input type="checkbox"/> F From 5 to < 10 acres |
| <input type="checkbox"/> G | <input type="checkbox"/> G | <input type="checkbox"/> G From 1 to < 5 acres |
| <input type="checkbox"/> H | <input type="checkbox"/> H | <input type="checkbox"/> H From 0.5 to < 1 acre |
| <input type="checkbox"/> I | <input type="checkbox"/> I | <input type="checkbox"/> I From 0.1 to < 0.5 acre |
| <input type="checkbox"/> J | <input type="checkbox"/> J | <input type="checkbox"/> J From 0.01 to < 0.1 acre |
| <input checked="" type="checkbox"/> K | <input checked="" type="checkbox"/> K | <input checked="" type="checkbox"/> K < 0.01 acre <u>or</u> assessment area is clear-cut |

12. **Wetland Intactness – wetland type condition metric (evaluate for Pocosins only)**

- A Pocosin is the full extent (≥ 90%) of its natural landscape size.
B Pocosin type is < 90% of the full extent of its natural landscape size.

13. **Connectivity to Other Natural Areas – landscape condition metric**

13a. **Check appropriate box(es) (a box may be checked in each column).** Involves a GIS effort with field adjustment. This metric evaluates whether the wetland is well connected (Well) and/or loosely connected (Loosely) to the landscape patch, the contiguous naturally vegetated area and open water (if appropriate). Boundaries are formed by four-lane roads, regularly maintained utility line corridors the width of a four-lane road or wider, urban landscapes, maintained fields (pasture and agriculture), or open water > 300 feet wide.

- | | |
|---------------------------------------|---|
| Well | Loosely |
| <input type="checkbox"/> A | <input type="checkbox"/> A ≥ 500 acres |
| <input type="checkbox"/> B | <input type="checkbox"/> B From 100 to < 500 acres |
| <input type="checkbox"/> C | <input checked="" type="checkbox"/> C From 50 to < 100 acres |
| <input type="checkbox"/> D | <input type="checkbox"/> D From 10 to < 50 acres |
| <input checked="" type="checkbox"/> E | <input type="checkbox"/> E < 10 acres |
| <input type="checkbox"/> F | <input type="checkbox"/> F Wetland type has a poor or no connection to other natural habitats |

13b. **Evaluate for marshes only.**

- Yes No Wetland type has a surface hydrology connection to open waters/stream or tidal wetlands.

14. **Edge Effect – wetland type condition metric (skip for all marshes and Estuarine Woody Wetland)**

May involve a GIS effort with field adjustment. Estimate distance from wetland type boundary to artificial edges. Artificial edges include non-forested areas ≥ 40 feet wide such as fields, development, roads, regularly maintained utility line corridors, and clear-cuts. Consider the eight main points of the compass. Artificial edge occurs within 150 feet in how many directions? If the assessment area is clear cut, select option "C."

- A 0
B 1 to 4
C 5 to 8

15. **Vegetative Composition – assessment area condition metric (skip for all marshes and Pine Flat)**

- A Vegetation is close to reference condition in species present and their proportions. Lower strata composed of appropriate species, with exotic plants absent or sparse within the assessment area.
B Vegetation is different from reference condition in species diversity or proportions, but still largely composed of native species characteristic of the wetland type. This may include communities of weedy native species that develop after clearcutting or clearing. It also includes communities with exotics present, but not dominant, over a large portion of the expected strata.
C Vegetation severely altered from reference in composition, or expected species are unnaturally absent (planted stands of non-characteristic species or at least one stratum inappropriately composed of a single species), or exotic species are dominant in at least one stratum.

16. **Vegetative Diversity – assessment area condition metric (evaluate for Non-tidal Freshwater Marsh only)**

- A Vegetation diversity is high and is composed primarily of native species (< 10% cover of exotics).
B Vegetation diversity is low or has > 10% to 50% cover of exotics.
C Vegetation is dominated by exotic species (> 50 % cover of exotics).

17. **Vegetative Structure – assessment area/wetland type condition metric**

17a. Is vegetation present?

- Yes No If Yes, continue to 17b. If No, skip to Metric 18.

17b. Evaluate percent coverage of assessment area vegetation for all marshes only. Skip to 17c for non-marsh wetlands.

- A ≥ 25% coverage of vegetation
B < 25% coverage of vegetation

17c. **Check a box in each column for each stratum.** Evaluate this portion of the metric for non-marsh wetlands. Consider structure in airspace above the assessment area (AA) and the wetland type (WT) separately.

- | | | |
|-----------|---------------------------------------|---|
| AA | WT | |
| Canopy | <input type="checkbox"/> A | <input type="checkbox"/> A Canopy closed, or nearly closed, with natural gaps associated with natural processes |
| | <input type="checkbox"/> B | <input type="checkbox"/> B Canopy present, but opened more than natural gaps |
| | <input checked="" type="checkbox"/> C | <input checked="" type="checkbox"/> C Canopy sparse or absent |
| Mid-Story | <input type="checkbox"/> A | <input type="checkbox"/> A Dense mid-story/sapling layer |
| | <input type="checkbox"/> B | <input type="checkbox"/> B Moderate density mid-story/sapling layer |
| | <input checked="" type="checkbox"/> C | <input checked="" type="checkbox"/> C Mid-story/sapling layer sparse or absent |
| Shrub | <input type="checkbox"/> A | <input type="checkbox"/> A Dense shrub layer |
| | <input type="checkbox"/> B | <input type="checkbox"/> B Moderate density shrub layer |
| | <input checked="" type="checkbox"/> C | <input checked="" type="checkbox"/> C Shrub layer sparse or absent |
| Herb | <input checked="" type="checkbox"/> A | <input checked="" type="checkbox"/> A Dense herb layer |
| | <input type="checkbox"/> B | <input type="checkbox"/> B Moderate density herb layer |
| | <input type="checkbox"/> C | <input type="checkbox"/> C Herb layer sparse or absent |

18. **Snags – wetland type condition metric (skip for all marshes)**

- A Large snags (more than one) are visible (> 12 inches DBH, or large relative to species present and landscape stability).
B Not A

19. **Diameter Class Distribution – wetland type condition metric (skip for all marshes)**

- A Majority of canopy trees have stems > 6 inches in diameter at breast height (DBH); many large trees (> 12 inches DBH) are present.
B Majority of canopy trees have stems between 6 and 12 inches DBH, few are > 12 inch DBH.
C Majority of canopy trees are < 6 inches DBH or no trees.

20. **Large Woody Debris – wetland type condition metric (skip for all marshes)**

Include both natural debris and man-placed natural debris.

- A Large logs (more than one) are visible (> 12 inches in diameter, or large relative to species present and landscape stability).
B Not A

21. **Vegetation/Open Water Dispersion – wetland type/open water condition metric (evaluate for Non-Tidal Freshwater Marsh only)**

Select the figure that best describes the amount of interspersed between vegetation and open water in the growing season. Patterned areas indicate vegetated areas, while solid white areas indicate open water.



22. **Hydrologic Connectivity – assessment area condition metric (evaluate for riparian wetlands and Salt/Brackish Marsh only)**

Examples of activities that may severely alter hydrologic connectivity include intensive ditching, fill, sedimentation, channelization, diversion, man-made berms, beaver dams, and stream incision. Documentation required if evaluated as B, C, or D.

- A Overbank and overland flow are not severely altered in the assessment area.
B Overbank flow is severely altered in the assessment area.
C Overland flow is severely altered in the assessment area.
D Both overbank and overland flow are severely altered in the assessment area.

Notes

NC WAM Wetland Rating Sheet
Accompanies User Manual Version 5.0

Wetland Site Name Wetland E Date of Assessment 7/30/2020
 Wetland Type Headwater Forest Assessor Name/Organization C. Neaves
 Notes on Field Assessment Form (Y/N) NO
 Presence of regulatory considerations (Y/N) NO
 Wetland is intensively managed (Y/N) _____
 Assessment area is located within 50 feet of a natural tributary or other open water (Y/N) YES
 Assessment area is substantially altered by beaver (Y/N) _____
 Assessment area experiences overbank flooding during normal rainfall conditions (Y/N) _____
 Assessment area is on a coastal island (Y/N) _____

Sub-function Rating Summary

Function	Sub-function	Metrics	Rating
Hydrology	Surface Storage and Retention	Condition	LOW
	Sub-surface Storage and Retention	Condition	MEDIUM
Water Quality	Pathogen Change	Condition	MEDIUM
		Condition/Opportunity	MEDIUM
	Particulate Change	Opportunity Presence (Y/N)	NO
		Condition	LOW
	Soluble Change	Condition/Opportunity	NA
		Opportunity Presence (Y/N)	NA
	Physical Change	Condition	MEDIUM
		Condition/Opportunity	MEDIUM
	Pollution Change	Opportunity Presence (Y/N)	NO
		Condition	LOW
	Habitat	Condition/Opportunity	LOW
		Opportunity Presence (Y/N)	NO
	Physical Structure	Condition	LOW
	Landscape Patch Structure	Condition	LOW
	Vegetation Composition	Condition	LOW

Function Rating Summary

Function	Metrics	Rating
Hydrology	Condition	LOW
Water Quality	Condition	LOW
	Condition/Opportunity	LOW
	Opportunity Presence (Y/N)	NO
Habitat	Condition	LOW

Overall Wetland Rating LOW

NC WAM FIELD ASSESSMENT FORM
Accompanies User Manual Version 5.0

USACE AID #	SAW-2020-00047	NCDWR#	20200035
Project Name	Liberty Rock Mitigation Site	Date of Evaluation	7/30/2020
Applicant/Owner Name	Wildlands Engineering	Wetland Site Name	Wetland F
Wetland Type	Headwater Forest	Assessor Name/Organization	C. Neaves
Level III Ecoregion	Piedmont	Nearest Named Water Body	Rocky River
River Basin	Cape Fear	USGS 8-Digit Catalogue Unit	03030003
County	Randolph	NCDWR Region	Winston-Salem
<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	Precipitation within 48 hrs?	Latitude/Longitude (deci-degrees)	35.820567, -79.561757

Evidence of stressors affecting the assessment area (may not be within the assessment area)
 Please circle and/or make note on the last page if evidence of stressors is apparent. Consider departure from reference, if appropriate, in recent past (for instance, within 10 years). Noteworthy stressors include, but are not limited to the following.

- Hydrological modifications (examples: ditches, dams, beaver dams, dikes, berms, ponds, etc.)
- Surface and sub-surface discharges into the wetland (examples: discharges containing obvious pollutants, presence of nearby septic tanks, underground storage tanks (USTs), hog lagoons, etc.)
- Signs of vegetation stress (examples: vegetation mortality, insect damage, storm damage, disease, salt intrusion, etc.)
- Habitat/plant community alteration (examples: mowing, clear-cutting, exotics, etc.)

Is the assessment area intensively managed? Yes No

Regulatory Considerations - Were regulatory considerations evaluated? Yes No If Yes, check all that apply to the assessment area.

- Anadromous fish
- Federally protected species or State endangered or threatened species
- NCDWR riparian buffer rule in effect
- Abuts a Primary Nursery Area (PNA)
- Publicly owned property
- N.C. Division of Coastal Management Area of Environmental Concern (AEC) (including buffer)
- Abuts a stream with a NCDWQ classification of SA or supplemental classifications of HQW, ORW, or Trout
- Designated NCNHP reference community
- Abuts a 303(d)-listed stream or a tributary to a 303(d)-listed stream

What type of natural stream is associated with the wetland, if any? (check all that apply)

- Blackwater
- Brownwater
- Tidal (if tidal, check one of the following boxes) Lunar Wind Both

Is the assessment area on a coastal island? Yes No

Is the assessment area's surface water storage capacity or duration substantially altered by beaver? Yes No

Does the assessment area experience overbank flooding during normal rainfall conditions? Yes No

- Ground Surface Condition/Vegetation Condition – assessment area condition metric**
Check a box in each column. Consider alteration to the ground surface (GS) in the assessment area and vegetation structure (VS) in the assessment area. Compare to reference wetland if applicable (see User Manual). If a reference is not applicable, then rate the assessment area based on evidence an effect.

GS	VS	
<input checked="" type="checkbox"/> A	<input type="checkbox"/> A	Not severely altered
<input type="checkbox"/> B	<input checked="" type="checkbox"/> B	Severely altered over a majority of the assessment area (ground surface alteration examples: vehicle tracks, excessive sedimentation, fire-plow lanes, skidder tracks, bedding, fill, soil compaction, obvious pollutants) (vegetation structure alteration examples: mechanical disturbance, herbicides, salt intrusion [where appropriate], exotic species, grazing, less diversity [if appropriate], hydrologic alteration)
- Surface and Sub-Surface Storage Capacity and Duration – assessment area condition metric**
Check a box in each column. Consider surface storage capacity and duration (Surf) and sub-surface storage capacity and duration (Sub). Consider both increase and decrease in hydrology. A ditch ≤ 1 foot deep is considered to affect surface water only, while a ditch > 1 foot deep is expected to affect both surface and sub-surface water. Consider tidal flooding regime, if applicable.

Surf	Sub	
<input type="checkbox"/> A	<input type="checkbox"/> A	Water storage capacity and duration are not altered.
<input checked="" type="checkbox"/> B	<input checked="" type="checkbox"/> B	Water storage capacity or duration are altered, but not substantially (typically, not sufficient to change vegetation).
<input type="checkbox"/> C	<input type="checkbox"/> C	Water storage capacity or duration are substantially altered (typically, alteration sufficient to result in vegetation change) (examples: draining, flooding, soil compaction, filling, excessive sedimentation, underground utility lines).
- Water Storage/Surface Relief – assessment area/wetland type condition metric (skip for all marshes)**
Check a box in each column. Select the appropriate storage for the assessment area (AA) and the wetland type (WT).

AA	WT	
3a. <input type="checkbox"/> A	<input type="checkbox"/> A	Majority of wetland with depressions able to pond water > 1 foot deep
<input type="checkbox"/> B	<input type="checkbox"/> B	Majority of wetland with depressions able to pond water 6 inches to 1 foot deep
<input type="checkbox"/> C	<input type="checkbox"/> C	Majority of wetland with depressions able to pond water 3 to 6 inches deep
<input checked="" type="checkbox"/> D	<input checked="" type="checkbox"/> D	Depressions able to pond water < 3 inches deep
3b. <input type="checkbox"/> A	<input type="checkbox"/> A	Evidence that maximum depth of inundation is greater than 2 feet
<input type="checkbox"/> B	<input type="checkbox"/> B	Evidence that maximum depth of inundation is between 1 and 2 feet
<input checked="" type="checkbox"/> C	<input checked="" type="checkbox"/> C	Evidence that maximum depth of inundation is less than 1 foot

4. Soil Texture/Structure – assessment area condition metric (skip for all marshes)

Check a box from each of the three soil property groups below. Dig soil profile in the dominant assessment area landscape feature. Make soil observations within the top 12 inches. Use most recent National Technical Committee for Hydric Soils guidance for regional indicators.

- 4a. A Sandy soil
 B Loamy or clayey soils exhibiting redoximorphic features (concentrations, depletions, or rhizospheres)
 C Loamy or clayey soils not exhibiting redoximorphic features
 D Loamy or clayey gleyed soil
 E Histosol or histc epipedon
- 4b. A Soil ribbon < 1 inch
 B Soil ribbon ≥ 1 inch
- 4c. A No peat or muck presence
 B A peat or muck presence

5. Discharge into Wetland – opportunity metric

Check a box in each column. Consider surface pollutants or discharges (Surf) and sub-surface pollutants or discharges (Sub). Examples of sub-surface discharges include presence of nearby septic tank, underground storage tank (UST), etc.

- | | | |
|---------------------------------------|---------------------------------------|---|
| Surf | Sub | |
| <input type="checkbox"/> A | <input checked="" type="checkbox"/> A | Little or no evidence of pollutants or discharges entering the assessment area |
| <input checked="" type="checkbox"/> B | <input type="checkbox"/> B | Noticeable evidence of pollutants or discharges entering the wetland and stressing, but not overwhelming the treatment capacity of the assessment area |
| <input type="checkbox"/> C | <input type="checkbox"/> C | Noticeable evidence of pollutants or discharges (pathogen, particulate, or soluble) entering the assessment area and potentially overwhelming the treatment capacity of the wetland (water discoloration, dead vegetation, excessive sedimentation, odor) |

6. Land Use – opportunity metric (skip for non-riparian wetlands)

Check all that apply (at least one box in each column). Evaluation involves a GIS effort with field adjustment. Consider sources draining to assessment area within entire upstream watershed (WS), within 5 miles and within the watershed draining to the assessment area (5M), and within 2 miles and within the watershed draining to the assessment area (2M).

- | | | | |
|---------------------------------------|---------------------------------------|---------------------------------------|---|
| WS | 5M | 2M | |
| <input type="checkbox"/> A | <input type="checkbox"/> A | <input type="checkbox"/> A | ≥ 10% impervious surfaces |
| <input type="checkbox"/> B | <input type="checkbox"/> B | <input type="checkbox"/> B | Confined animal operations (or other local, concentrated source of pollutants) |
| <input checked="" type="checkbox"/> C | <input checked="" type="checkbox"/> C | <input checked="" type="checkbox"/> C | ≥ 20% coverage of pasture |
| <input type="checkbox"/> D | <input type="checkbox"/> D | <input type="checkbox"/> D | ≥ 20% coverage of agricultural land (regularly plowed land) |
| <input checked="" type="checkbox"/> E | <input checked="" type="checkbox"/> E | <input checked="" type="checkbox"/> E | ≥ 20% coverage of maintained grass/herb |
| <input type="checkbox"/> F | <input type="checkbox"/> F | <input type="checkbox"/> F | ≥ 20% coverage of clear-cut land |
| <input type="checkbox"/> G | <input type="checkbox"/> G | <input type="checkbox"/> G | Little or no opportunity to improve water quality. Lack of opportunity may result from little or no disturbance in the watershed or hydrologic alterations that prevent drainage and/or overbank flow from affecting the assessment area. |

7. Wetland Acting as Vegetated Buffer – assessment area/wetland complex condition metric (skip for non-riparian wetlands)

- 7a. Is assessment area within 50 feet of a tributary or other open water?
 Yes No If Yes, continue to 7b. If No, skip to Metric 8.
 Wetland buffer need only be present on one side of the water body. Make buffer judgment based on the average width of wetland. Record a note if a portion of the buffer has been removed or disturbed.
- 7b. How much of the first 50 feet from the bank is wetland? (Wetland buffer need only be present on one side of the water body. Make buffer judgment based on the average width of wetland. Record a note if a portion of the buffer has been removed or disturbed.)
 A ≥ 50 feet
 B From 30 to < 50 feet
 C From 15 to < 30 feet
 D From 5 to < 15 feet
 E < 5 feet or buffer bypassed by ditches
- 7c. Tributary width. If the tributary is anastomosed, combine widths of channels/braids for a total width.
 ≤ 15-foot wide > 15-foot wide Other open water (no tributary present)
- 7d. Do roots of assessment area vegetation extend into the bank of the tributary/open water?
 Yes No
- 7e. Is stream or other open water sheltered or exposed?
 Sheltered – adjacent open water with width < 2500 feet and no regular boat traffic.
 Exposed – adjacent open water with width ≥ 2500 feet or regular boat traffic.

8. Wetland Width at the Assessment Area – wetland type/wetland complex condition metric (evaluate WT for all marshes and Estuarine Woody Wetland only; evaluate WC for Bottomland Hardwood Forest, Headwater Forest, and Riverine Swamp Forest only)

Check a box in each column for riverine wetlands only. Select the average width for the wetland type at the assessment area (WT) and the wetland complex at the assessment area (WC). See User Manual for WT and WC boundaries.

- | | | |
|---------------------------------------|---------------------------------------|-----------------------|
| WT | WC | |
| <input type="checkbox"/> A | <input type="checkbox"/> A | ≥ 100 feet |
| <input type="checkbox"/> B | <input type="checkbox"/> B | From 80 to < 100 feet |
| <input type="checkbox"/> C | <input type="checkbox"/> C | From 50 to < 80 feet |
| <input type="checkbox"/> D | <input type="checkbox"/> D | From 40 to < 50 feet |
| <input type="checkbox"/> E | <input type="checkbox"/> E | From 30 to < 40 feet |
| <input checked="" type="checkbox"/> F | <input checked="" type="checkbox"/> F | From 15 to < 30 feet |
| <input type="checkbox"/> G | <input type="checkbox"/> G | From 5 to < 15 feet |
| <input type="checkbox"/> H | <input type="checkbox"/> H | < 5 feet |

9. Inundation Duration – assessment area condition metric (skip for non-riparian wetlands)

Answer for assessment area dominant landform.

- A Evidence of short-duration inundation (< 7 consecutive days)
 B Evidence of saturation, without evidence of inundation
 C Evidence of long-duration inundation or very long-duration inundation (7 to 30 consecutive days or more)

10. Indicators of Deposition – assessment area condition metric (skip for non-riparian wetlands and all marshes)

Consider recent deposition only (no plant growth since deposition).

- A Sediment deposition is not excessive, but at approximately natural levels.
 B Sediment deposition is excessive, but not overwhelming the wetland.
 C Sediment deposition is excessive and is overwhelming the wetland.

11. Wetland Size – wetland type/wetland complex condition metric

Check a box in each column. Involves a GIS effort with field adjustment. This metric evaluates three aspects of the wetland area: the size of the wetland type (WT), the size of the wetland complex (WC), and the size of the forested wetland (FW) (if applicable, see User Manual). See the User Manual for boundaries of these evaluation areas. If assessment area is clear-cut, select "K" for the FW column.

- | | | |
|---------------------------------------|---------------------------------------|---|
| WT | WC | FW (if applicable) |
| <input type="checkbox"/> A | <input type="checkbox"/> A | <input type="checkbox"/> A ≥ 500 acres |
| <input type="checkbox"/> B | <input type="checkbox"/> B | <input type="checkbox"/> B From 100 to < 500 acres |
| <input type="checkbox"/> C | <input type="checkbox"/> C | <input type="checkbox"/> C From 50 to < 100 acres |
| <input type="checkbox"/> D | <input type="checkbox"/> D | <input type="checkbox"/> D From 25 to < 50 acres |
| <input type="checkbox"/> E | <input type="checkbox"/> E | <input type="checkbox"/> E From 10 to < 25 acres |
| <input type="checkbox"/> F | <input type="checkbox"/> F | <input type="checkbox"/> F From 5 to < 10 acres |
| <input type="checkbox"/> G | <input type="checkbox"/> G | <input type="checkbox"/> G From 1 to < 5 acres |
| <input type="checkbox"/> H | <input type="checkbox"/> H | <input type="checkbox"/> H From 0.5 to < 1 acre |
| <input type="checkbox"/> I | <input type="checkbox"/> I | <input type="checkbox"/> I From 0.1 to < 0.5 acre |
| <input checked="" type="checkbox"/> J | <input checked="" type="checkbox"/> J | <input type="checkbox"/> J From 0.01 to < 0.1 acre |
| <input type="checkbox"/> K | <input type="checkbox"/> K | <input checked="" type="checkbox"/> K < 0.01 acre or assessment area is clear-cut |

12. Wetland Intactness – wetland type condition metric (evaluate for Pocosins only)

- A Pocosin is the full extent (≥ 90%) of its natural landscape size.
 B Pocosin type is < 90% of the full extent of its natural landscape size.

13. Connectivity to Other Natural Areas – landscape condition metric

13a. Check appropriate box(es) (a box may be checked in each column). Involves a GIS effort with field adjustment. This metric evaluates whether the wetland is well connected (Well) and/or loosely connected (Loosely) to the landscape patch, the contiguous naturally vegetated area and open water (if appropriate). Boundaries are formed by four-lane roads, regularly maintained utility line corridors the width of a four-lane road or wider, urban landscapes, maintained fields (pasture and agriculture), or open water > 300 feet wide.

- | | | |
|---------------------------------------|---------------------------------------|--|
| Well | Loosely | |
| <input type="checkbox"/> A | <input type="checkbox"/> A | ≥ 500 acres |
| <input type="checkbox"/> B | <input type="checkbox"/> B | From 100 to < 500 acres |
| <input type="checkbox"/> C | <input checked="" type="checkbox"/> C | From 50 to < 100 acres |
| <input type="checkbox"/> D | <input type="checkbox"/> D | From 10 to < 50 acres |
| <input checked="" type="checkbox"/> E | <input type="checkbox"/> E | < 10 acres |
| <input type="checkbox"/> F | <input type="checkbox"/> F | Wetland type has a poor or no connection to other natural habitats |

13b. Evaluate for marshes only.

- Yes No Wetland type has a surface hydrology connection to open waters/stream or tidal wetlands.

14. Edge Effect – wetland type condition metric (skip for all marshes and Estuarine Woody Wetland)

May involve a GIS effort with field adjustment. Estimate distance from wetland type boundary to artificial edges. Artificial edges include non-forested areas ≥ 40 feet wide such as fields, development, roads, regularly maintained utility line corridors, and clear-cuts. Consider the eight main points of the compass. Artificial edge occurs within 150 feet in how many directions? If the assessment area is clear cut, select option "C."

- A 0
 B 1 to 4
 C 5 to 8

15. Vegetative Composition – assessment area condition metric (skip for all marshes and Pine Flat)

- A Vegetation is close to reference condition in species present and their proportions. Lower strata composed of appropriate species, with exotic plants absent or sparse within the assessment area.
 B Vegetation is different from reference condition in species diversity or proportions, but still largely composed of native species characteristic of the wetland type. This may include communities of weedy native species that develop after clearcutting or clearing. It also includes communities with exotics present, but not dominant, over a large portion of the expected strata.
 C Vegetation severely altered from reference in composition, or expected species are unnaturally absent (planted stands of non-characteristic species or at least one stratum inappropriately composed of a single species), or exotic species are dominant in at least one stratum.

16. Vegetative Diversity – assessment area condition metric (evaluate for Non-tidal Freshwater Marsh only)

- A Vegetation diversity is high and is composed primarily of native species (< 10% cover of exotics).
 B Vegetation diversity is low or has > 10% to 50% cover of exotics.
 C Vegetation is dominated by exotic species (> 50 % cover of exotics).

17. **Vegetative Structure – assessment area/wetland type condition metric**

17a. Is vegetation present?

Yes No If Yes, continue to 17b. If No, skip to Metric 18.

17b. Evaluate percent coverage of assessment area vegetation for all marshes only. Skip to 17c for non-marsh wetlands.

A ≥ 25% coverage of vegetation
 B < 25% coverage of vegetation

17c. **Check a box in each column for each stratum.** Evaluate this portion of the metric for non-marsh wetlands. Consider structure in airspace above the assessment area (AA) and the wetland type (WT) separately.

	AA	WT	
Canopy	<input type="checkbox"/> A	<input type="checkbox"/> A	Canopy closed, or nearly closed, with natural gaps associated with natural processes
	<input type="checkbox"/> B	<input type="checkbox"/> B	Canopy present, but opened more than natural gaps
	<input checked="" type="checkbox"/> C	<input checked="" type="checkbox"/> C	Canopy sparse or absent
Mid-Story	<input type="checkbox"/> A	<input type="checkbox"/> A	Dense mid-story/sapling layer
	<input type="checkbox"/> B	<input type="checkbox"/> B	Moderate density mid-story/sapling layer
	<input checked="" type="checkbox"/> C	<input checked="" type="checkbox"/> C	Mid-story/sapling layer sparse or absent
Shrub	<input type="checkbox"/> A	<input type="checkbox"/> A	Dense shrub layer
	<input type="checkbox"/> B	<input type="checkbox"/> B	Moderate density shrub layer
	<input checked="" type="checkbox"/> C	<input checked="" type="checkbox"/> C	Shrub layer sparse or absent
Herb	<input checked="" type="checkbox"/> A	<input checked="" type="checkbox"/> A	Dense herb layer
	<input type="checkbox"/> B	<input type="checkbox"/> B	Moderate density herb layer
	<input type="checkbox"/> C	<input type="checkbox"/> C	Herb layer sparse or absent

18. **Snags – wetland type condition metric (skip for all marshes)**

A Large snags (more than one) are visible (> 12 inches DBH, or large relative to species present and landscape stability).
 B Not A

19. **Diameter Class Distribution – wetland type condition metric (skip for all marshes)**

A Majority of canopy trees have stems > 6 inches in diameter at breast height (DBH); many large trees (> 12 inches DBH) are present.
 B Majority of canopy trees have stems between 6 and 12 inches DBH, few are > 12 inch DBH.
 C Majority of canopy trees are < 6 inches DBH or no trees.

20. **Large Woody Debris – wetland type condition metric (skip for all marshes)**

Include both natural debris and man-placed natural debris.
 A Large logs (more than one) are visible (> 12 inches in diameter, or large relative to species present and landscape stability).
 B Not A

21. **Vegetation/Open Water Dispersion – wetland type/open water condition metric (evaluate for Non-Tidal Freshwater Marsh only)**

Select the figure that best describes the amount of interspersed vegetation and open water in the growing season. Patterned areas indicate vegetated areas, while solid white areas indicate open water.



22. **Hydrologic Connectivity – assessment area condition metric (evaluate for riparian wetlands and Salt/Brackish Marsh only)**

Examples of activities that may severely alter hydrologic connectivity include intensive ditching, fill, sedimentation, channelization, diversion, man-made berms, beaver dams, and stream incision. Documentation required if evaluated as B, C, or D.

A Overbank and overland flow are not severely altered in the assessment area.
 B Overbank flow is severely altered in the assessment area.
 C Overland flow is severely altered in the assessment area.
 D Both overbank and overland flow are severely altered in the assessment area.

Notes

**NC WAM Wetland Rating Sheet
 Accompanies User Manual Version 5.0**

Wetland Site Name Wetland F Date of Assessment 7/30/2020
 Wetland Type Headwater Forest Assessor Name/Organization C. Neaves

Notes on Field Assessment Form (Y/N) NO
 Presence of regulatory considerations (Y/N) NO
 Wetland is intensively managed (Y/N) _____
 Assessment area is located within 50 feet of a natural tributary or other open water (Y/N) YES
 Assessment area is substantially altered by beaver (Y/N) _____
 Assessment area experiences overbank flooding during normal rainfall conditions (Y/N) _____
 Assessment area is on a coastal island (Y/N) _____

Sub-function Rating Summary

Function	Sub-function	Metrics	Rating
Hydrology	Surface Storage and Retention	Condition	LOW
		Sub-surface Storage and Retention	MEDIUM
Water Quality	Pathogen Change	Condition	MEDIUM
		Condition/Opportunity	MEDIUM
		Opportunity Presence (Y/N)	NO
	Particulate Change	Condition	LOW
		Condition/Opportunity	NA
		Opportunity Presence (Y/N)	NA
	Soluble Change	Condition	MEDIUM
		Condition/Opportunity	MEDIUM
		Opportunity Presence (Y/N)	NO
	Physical Change	Condition	LOW
		Condition/Opportunity	LOW
		Opportunity Presence (Y/N)	NO
	Pollution Change	Condition	NA
		Condition/Opportunity	NA
		Opportunity Presence (Y/N)	NA
Habitat	Physical Structure	Condition	LOW
	Landscape Patch Structure	Condition	LOW
	Vegetation Composition	Condition	LOW

Function Rating Summary

Function	Metrics	Rating
Hydrology	Condition	LOW
	Condition/Opportunity	LOW
Water Quality	Condition	LOW
	Condition/Opportunity	LOW
Habitat	Opportunity Presence (Y/N)	NO
	Condition	LOW

Overall Wetland Rating LOW

NC WAM FIELD ASSESSMENT FORM
Accompanies User Manual Version 5.0

USACE AID #	SAW-2020-00047	NCDWR#	20200035
Project Name	Liberty Rock Mitigation Site	Date of Evaluation	7/30/2020
Applicant/Owner Name	Widlands Engineering	Wetland Site Name	Wetland G
Wetland Type	Headwater Forest	Assessor Name/Organization	C. Neaves
Level III Ecoregion	Piedmont	Nearest Named Water Body	Rocky River
River Basin	Cape Fear	USGS 8-Digit Catalogue Unit	03030003
County	Randolph	NCDWR Region	Winston-Salem
<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	Precipitation within 48 hrs?	Latitude/Longitude (deci-degrees)	38.820442, -79.561788

Evidence of stressors affecting the assessment area (may not be within the assessment area)

Please circle and/or make note on the last page if evidence of stressors is apparent. Consider departure from reference, if appropriate, in recent past (for instance, within 10 years). Noteworthy stressors include, but are not limited to the following.

- Hydrological modifications (examples: ditches, dams, beaver dams, dikes, berms, ponds, etc.)
- Surface and sub-surface discharges into the wetland (examples: discharges containing obvious pollutants, presence of nearby septic tanks, underground storage tanks (USTs), hog lagoons, etc.)
- Signs of vegetation stress (examples: vegetation mortality, insect damage, disease, storm damage, salt intrusion, etc.)
- Habitat/plant community alteration (examples: mowing, clear-cutting, exotics, etc.)

Is the assessment area intensively managed? Yes No

Regulatory Considerations - Were regulatory considerations evaluated? Yes No If Yes, check all that apply to the assessment area.

- Anadromous fish
- Federally protected species or State endangered or threatened species
- NCDWR riparian buffer rule in effect
- Abuts a Primary Nursery Area (PNA)
- Publicly owned property
- N.C. Division of Coastal Management Area of Environmental Concern (AEC) (including buffer)
- Abuts a stream with a NCDWQ classification of SA or supplemental classifications of HQW, ORW, or Trout
- Designated NCNHP reference community
- Abuts a 303(d)-listed stream or a tributary to a 303(d)-listed stream

What type of natural stream is associated with the wetland, if any? (check all that apply)

- Blackwater
- Brownwater
- Tidal (if tidal, check one of the following boxes) Lunar Wind Both

Is the assessment area on a coastal island? Yes No

Is the assessment area's surface water storage capacity or duration substantially altered by beaver? Yes No

Does the assessment area experience overbank flooding during normal rainfall conditions? Yes No

1. Ground Surface Condition/Vegetation Condition – assessment area condition metric

Check a box in each column. Consider alteration to the ground surface (GS) in the assessment area and vegetation structure (VS) in the assessment area. Compare to reference wetland if applicable (see User Manual). If a reference is not applicable, then rate the assessment area based on evidence an effect.

- | | | |
|---------------------------------------|---------------------------------------|--|
| GS | VS | |
| <input checked="" type="checkbox"/> A | <input type="checkbox"/> A | Not severely altered |
| <input type="checkbox"/> B | <input checked="" type="checkbox"/> B | Severely altered over a majority of the assessment area (ground surface alteration examples: vehicle tracks, excessive sedimentation, fire-plow lanes, skidder tracks, bedding, fill, soil compaction, obvious pollutants) (vegetation structure alteration examples: mechanical disturbance, herbicides, salt intrusion [where appropriate], exotic species, grazing, less diversity [if appropriate], hydrologic alteration) |

2. Surface and Sub-Surface Storage Capacity and Duration – assessment area condition metric

Check a box in each column. Consider surface storage capacity and duration (Surf) and sub-surface storage capacity and duration (Sub). Consider both increase and decrease in hydrology. A ditch ≤ 1 foot deep is considered to affect surface water only, while a ditch > 1 foot deep is expected to affect both surface and sub-surface water. Consider tidal flooding regime, if applicable.

- | | | |
|---------------------------------------|---------------------------------------|--|
| Surf | Sub | |
| <input type="checkbox"/> A | <input type="checkbox"/> A | Water storage capacity and duration are not altered. |
| <input checked="" type="checkbox"/> B | <input checked="" type="checkbox"/> B | Water storage capacity or duration are altered, but not substantially (typically, not sufficient to change vegetation). |
| <input type="checkbox"/> C | <input type="checkbox"/> C | Water storage capacity or duration are substantially altered (typically, alteration sufficient to result in vegetation change) (examples: draining, flooding, soil compaction, filling, excessive sedimentation, underground utility lines). |

3. Water Storage/Surface Relief – assessment area/wetland type condition metric (skip for all marshes)

Check a box in each column. Select the appropriate storage for the assessment area (AA) and the wetland type (WT).

- | | | |
|---|----|---|
| AA | WT | |
| 3a. <input type="checkbox"/> A <input type="checkbox"/> A | | Majority of wetland with depressions able to pond water > 1 deep |
| <input type="checkbox"/> B <input type="checkbox"/> B | | Majority of wetland with depressions able to pond water 6 inches to 1 foot deep |
| <input type="checkbox"/> C <input type="checkbox"/> C | | Majority of wetland with depressions able to pond water 3 to 6 inches deep |
| <input checked="" type="checkbox"/> D <input checked="" type="checkbox"/> D | | Depressions able to pond water < 3 inches deep |
| 3b. <input type="checkbox"/> A | | Evidence that maximum depth of inundation is greater than 2 feet |
| <input type="checkbox"/> B | | Evidence that maximum depth of inundation is between 1 and 2 feet |
| <input checked="" type="checkbox"/> C | | Evidence that maximum depth of inundation is less than 1 foot |

4. Soil Texture/Structure – assessment area condition metric (skip for all marshes)

Check a box from each of the three soil property groups below. Dig soil profile in the dominant assessment area landscape feature. Make soil observations within the top 12 inches. Use most recent National Technical Committee for Hydric Soils guidance for regional indicators.

- 4a. A Sandy soil
- B Loamy or clayey soils exhibiting redoximorphic features (concentrations, depletions, or rhizospheres)
- C Loamy or clayey soils not exhibiting redoximorphic features
- D Loamy or clayey gleyed soil
- E Histosol or histc epipedon
- 4b. A Soil ribbon < 1 inch
- B Soil ribbon ≥ 1 inch
- 4c. A No peat or muck presence
- B A peat or muck presence

5. Discharge into Wetland – opportunity metric

Check a box in each column. Consider surface pollutants or discharges (Surf) and sub-surface pollutants or discharges (Sub). Examples of sub-surface discharges include presence of nearby septic tank, underground storage tank (UST), etc.

- | | | |
|---------------------------------------|---------------------------------------|---|
| Surf | Sub | |
| <input type="checkbox"/> A | <input checked="" type="checkbox"/> A | Little or no evidence of pollutants or discharges entering the assessment area |
| <input checked="" type="checkbox"/> B | <input type="checkbox"/> B | Noticeable evidence of pollutants or discharges entering the wetland and stressing, but not overwhelming the treatment capacity of the assessment area |
| <input type="checkbox"/> C | <input type="checkbox"/> C | Noticeable evidence of pollutants or discharges (pathogen, particulate, or soluble) entering the assessment area and potentially overwhelming the treatment capacity of the wetland (water discoloration, dead vegetation, excessive sedimentation, odor) |

6. Land Use – opportunity metric (skip for non-riparian wetlands)

Check all that apply (at least one box in each column). Evaluation involves a GIS effort with field adjustment. Consider sources draining to assessment area within entire upstream watershed (WS), within 5 miles and within the watershed draining to the assessment area (5M), and within 2 miles and within the watershed draining to the assessment area (2M).

- | | | | |
|---------------------------------------|---------------------------------------|---------------------------------------|---|
| WS | 5M | 2M | |
| <input type="checkbox"/> A | <input type="checkbox"/> A | <input type="checkbox"/> A | ≥ 10% impervious surfaces |
| <input type="checkbox"/> B | <input type="checkbox"/> B | <input type="checkbox"/> B | Confined animal operations (or other local, concentrated source of pollutants) |
| <input checked="" type="checkbox"/> C | <input checked="" type="checkbox"/> C | <input checked="" type="checkbox"/> C | ≥ 20% coverage of pasture |
| <input type="checkbox"/> D | <input type="checkbox"/> D | <input type="checkbox"/> D | ≥ 20% coverage of agricultural land (regularly plowed land) |
| <input checked="" type="checkbox"/> E | <input checked="" type="checkbox"/> E | <input checked="" type="checkbox"/> E | ≥ 20% coverage of maintained grass/herb |
| <input type="checkbox"/> F | <input type="checkbox"/> F | <input type="checkbox"/> F | ≥ 20% coverage of clear-cut land |
| <input type="checkbox"/> G | <input type="checkbox"/> G | <input type="checkbox"/> G | Little or no opportunity to improve water quality. Lack of opportunity may result from little or no disturbance in the watershed or hydrologic alterations that prevent drainage and/or overbank flow from affecting the assessment area. |

7. Wetland Acting as Vegetated Buffer – assessment area/wetland complex condition metric (skip for non-riparian wetlands)

- 7a. Is assessment area within 50 feet of a tributary or other open water?
- Yes No If Yes, continue to 7b. If No, skip to Metric 8.
- Wetland buffer need only be present on one side of the water body. Make buffer judgment based on the average width of wetland. Record a note if a portion of the buffer has been removed or disturbed.
- 7b. How much of the first 50 feet from the bank is wetland? (Wetland buffer need only be present on one side of the water body. Make buffer judgment based on the average width of wetland. Record a note if a portion of the buffer has been removed or disturbed.)
- A ≥ 50 feet
- B From 30 to < 50 feet
- C From 15 to < 30 feet
- D From 5 to < 15 feet
- E < 5 feet or buffer bypassed by ditches
- 7c. Tributary width. If the tributary is anastomosed, combine widths of channels/braids for a total width.
- ≤ 15-foot wide > 15-foot wide Other open water (no tributary present)
- 7d. Do roots of assessment area vegetation extend into the bank of the tributary/open water?
- Yes No
- 7e. Is stream or other open water sheltered or exposed?
- Sheltered – adjacent open water with width < 2500 feet and no regular boat traffic.
- Exposed – adjacent open water with width ≥ 2500 feet or regular boat traffic.

8. Wetland Width at the Assessment Area – wetland type/wetland complex condition metric (evaluate WT for all marshes and Estuarine Woody Wetland only; evaluate WC for Bottomland Hardwood Forest, Headwater Forest, and Riverine Swamp Forest only)

Check a box in each column for riverine wetlands only. Select the average width for the wetland type at the assessment area (WT) and the wetland complex at the assessment area (WC). See User Manual for WT and WC boundaries.

- | | | |
|---------------------------------------|---------------------------------------|-----------------------|
| WT | WC | |
| <input type="checkbox"/> A | <input type="checkbox"/> A | ≥ 100 feet |
| <input type="checkbox"/> B | <input type="checkbox"/> B | From 80 to < 100 feet |
| <input type="checkbox"/> C | <input type="checkbox"/> C | From 50 to < 80 feet |
| <input type="checkbox"/> D | <input type="checkbox"/> D | From 40 to < 50 feet |
| <input checked="" type="checkbox"/> E | <input checked="" type="checkbox"/> E | From 30 to < 40 feet |
| <input type="checkbox"/> F | <input type="checkbox"/> F | From 15 to < 30 feet |
| <input type="checkbox"/> G | <input type="checkbox"/> G | From 5 to < 15 feet |
| <input type="checkbox"/> H | <input type="checkbox"/> H | < 5 feet |

9. Inundation Duration – assessment area condition metric (skip for non-riparian wetlands)

Answer for assessment area dominant landform.

- A Evidence of short-duration inundation (< 7 consecutive days)
B Evidence of saturation, without evidence of inundation
C Evidence of long-duration inundation or very long-duration inundation (7 to 30 consecutive days or more)

10. Indicators of Deposition – assessment area condition metric (skip for non-riparian wetlands and all marshes)

Consider recent deposition only (no plant growth since deposition).

- A Sediment deposition is not excessive, but at approximately natural levels.
B Sediment deposition is excessive, but not overwhelming the wetland.
C Sediment deposition is excessive and is overwhelming the wetland.

11. Wetland Size – wetland type/wetland complex condition metric

Check a box in each column. Involves a GIS effort with field adjustment. This metric evaluates three aspects of the wetland area: the size of the wetland type (WT), the size of the wetland complex (WC), and the size of the forested wetland (FW) (if applicable, see User Manual). See the User Manual for boundaries of these evaluation areas. If assessment area is clear-cut, select "K" for the FW column.

- | | | |
|---------------------------------------|---------------------------------------|--|
| WT | WC | FW (if applicable) |
| <input type="checkbox"/> A | <input type="checkbox"/> A | <input type="checkbox"/> A ≥ 500 acres |
| <input type="checkbox"/> B | <input type="checkbox"/> B | <input type="checkbox"/> B From 100 to < 500 acres |
| <input type="checkbox"/> C | <input type="checkbox"/> C | <input type="checkbox"/> C From 50 to < 100 acres |
| <input type="checkbox"/> D | <input type="checkbox"/> D | <input type="checkbox"/> D From 25 to < 50 acres |
| <input type="checkbox"/> E | <input type="checkbox"/> E | <input type="checkbox"/> E From 10 to < 25 acres |
| <input type="checkbox"/> F | <input type="checkbox"/> F | <input type="checkbox"/> F From 5 to < 10 acres |
| <input type="checkbox"/> G | <input type="checkbox"/> G | <input type="checkbox"/> G From 1 to < 5 acres |
| <input type="checkbox"/> H | <input type="checkbox"/> H | <input type="checkbox"/> H From 0.5 to < 1 acre |
| <input type="checkbox"/> I | <input type="checkbox"/> I | <input type="checkbox"/> I From 0.1 to < 0.5 acre |
| <input checked="" type="checkbox"/> J | <input checked="" type="checkbox"/> J | <input type="checkbox"/> J From 0.01 to < 0.1 acre |
| <input type="checkbox"/> K | <input type="checkbox"/> K | <input checked="" type="checkbox"/> K < 0.01 acre <u>or</u> assessment area is clear-cut |

12. Wetland Intactness – wetland type condition metric (evaluate for Pocosins only)

- A Pocosin is the full extent (≥ 90%) of its natural landscape size.
B Pocosin type is < 90% of the full extent of its natural landscape size.

13. Connectivity to Other Natural Areas – landscape condition metric

13a. Check appropriate box(es) (a box may be checked in each column). Involves a GIS effort with field adjustment. This metric evaluates whether the wetland is well connected (Well) and/or loosely connected (Loosely) to the landscape patch, the contiguous naturally vegetated area and open water (if appropriate). Boundaries are formed by four-lane roads, regularly maintained utility line corridors the width of a four-lane road or wider, urban landscapes, maintained fields (pasture and agriculture), or open water > 300 feet wide.

- | | |
|---------------------------------------|--|
| Well | Loosely |
| <input type="checkbox"/> A | <input type="checkbox"/> A ≥ 500 acres |
| <input type="checkbox"/> B | <input type="checkbox"/> B From 100 to < 500 acres |
| <input type="checkbox"/> C | <input type="checkbox"/> C From 50 to < 100 acres |
| <input type="checkbox"/> D | <input type="checkbox"/> D From 10 to < 50 acres |
| <input type="checkbox"/> E | <input type="checkbox"/> E < 10 acres |
| <input checked="" type="checkbox"/> F | <input checked="" type="checkbox"/> F Wetland type has a poor or no connection to other natural habitats |

13b. Evaluate for marshes only.

- Yes No Wetland type has a surface hydrology connection to open waters/stream or tidal wetlands.

14. Edge Effect – wetland type condition metric (skip for all marshes and Estuarine Woody Wetland)

May involve a GIS effort with field adjustment. Estimate distance from wetland type boundary to artificial edges. Artificial edges include non-forested areas ≥ 40 feet wide such as fields, development, roads, regularly maintained utility line corridors, and clear-cuts. Consider the eight main points of the compass. Artificial edge occurs within 150 feet in how many directions? If the assessment area is clear cut, select option "C."

- A 0
B 1 to 4
C 5 to 8

15. Vegetative Composition – assessment area condition metric (skip for all marshes and Pine Flat)

- A Vegetation is close to reference condition in species present and their proportions. Lower strata composed of appropriate species, with exotic plants absent or sparse within the assessment area.
B Vegetation is different from reference condition in species diversity or proportions, but still largely composed of native species characteristic of the wetland type. This may include communities of weedy native species that develop after clearcutting or clearing. It also includes communities with exotics present, but not dominant, over a large portion of the expected strata.
C Vegetation severely altered from reference in composition, or expected species are unnaturally absent (planted stands of non-characteristic species or at least one stratum inappropriately composed of a single species), or exotic species are dominant in at least one stratum.

16. Vegetative Diversity – assessment area condition metric (evaluate for Non-tidal Freshwater Marsh only)

- A Vegetation diversity is high and is composed primarily of native species (< 10% cover of exotics).
B Vegetation diversity is low or has > 10% to 50% cover of exotics.
C Vegetation is dominated by exotic species (> 50 % cover of exotics).

17. Vegetative Structure – assessment area/wetland type condition metric

17a. Is vegetation present?

- Yes No If Yes, continue to 17b. If No, skip to Metric 18.

17b. Evaluate percent coverage of assessment area vegetation for all marshes only. Skip to 17c for non-marsh wetlands.

- A ≥ 25% coverage of vegetation
B < 25% coverage of vegetation

17c. Check a box in each column for each stratum. Evaluate this portion of the metric for non-marsh wetlands. Consider structure in airspace above the assessment area (AA) and the wetland type (WT) separately.

- | | | | |
|-----------|---------------------------------------|---------------------------------------|--|
| | AA | WT | |
| Canopy | <input type="checkbox"/> A | <input type="checkbox"/> A | Canopy closed, or nearly closed, with natural gaps associated with natural processes |
| | <input type="checkbox"/> B | <input type="checkbox"/> B | Canopy present, but opened more than natural gaps |
| | <input checked="" type="checkbox"/> C | <input checked="" type="checkbox"/> C | Canopy sparse or absent |
| Mid-Story | <input type="checkbox"/> A | <input type="checkbox"/> A | Dense mid-story/sapling layer |
| | <input type="checkbox"/> B | <input type="checkbox"/> B | Moderate density mid-story/sapling layer |
| | <input checked="" type="checkbox"/> C | <input checked="" type="checkbox"/> C | Mid-story/sapling layer sparse or absent |
| Shrub | <input type="checkbox"/> A | <input type="checkbox"/> A | Dense shrub layer |
| | <input type="checkbox"/> B | <input type="checkbox"/> B | Moderate density shrub layer |
| | <input checked="" type="checkbox"/> C | <input checked="" type="checkbox"/> C | Shrub layer sparse or absent |
| Herb | <input checked="" type="checkbox"/> A | <input checked="" type="checkbox"/> A | Dense herb layer |
| | <input type="checkbox"/> B | <input type="checkbox"/> B | Moderate density herb layer |
| | <input type="checkbox"/> C | <input type="checkbox"/> C | Herb layer sparse or absent |

18. Snags – wetland type condition metric (skip for all marshes)

- A Large snags (more than one) are visible (> 12 inches DBH, or large relative to species present and landscape stability).
B Not A

19. Diameter Class Distribution – wetland type condition metric (skip for all marshes)

- A Majority of canopy trees have stems > 6 inches in diameter at breast height (DBH); many large trees (> 12 inches DBH) are present.
B Majority of canopy trees have stems between 6 and 12 inches DBH, few are > 12 inch DBH.
C Majority of canopy trees are < 6 inches DBH or no trees.

20. Large Woody Debris – wetland type condition metric (skip for all marshes)

Include both natural debris and man-placed natural debris.

- A Large logs (more than one) are visible (> 12 inches in diameter, or large relative to species present and landscape stability).
B Not A

21. Vegetation/Open Water Dispersion – wetland type/open water condition metric (evaluate for Non-Tidal Freshwater Marsh only)

Select the figure that best describes the amount of interspersed between vegetation and open water in the growing season. Patterned areas indicate vegetated areas, while solid white areas indicate open water.



22. Hydrologic Connectivity – assessment area condition metric (evaluate for riparian wetlands and Salt/Brackish Marsh only)

Examples of activities that may severely alter hydrologic connectivity include intensive ditching, fill, sedimentation, channelization, diversion, man-made berms, beaver dams, and stream incision. Documentation required if evaluated as B, C, or D.

- A Overbank and overland flow are not severely altered in the assessment area.
B Overbank flow is severely altered in the assessment area.
C Overland flow is severely altered in the assessment area.
D Both overbank and overland flow are severely altered in the assessment area.

Notes

NC WAM Wetland Rating Sheet
Accompanies User Manual Version 5.0

Wetland Site Name Wetland G Date of Assessment 7/30/2020
 Wetland Type Headwater Forest Assessor Name/Organization C. Neaves
 Notes on Field Assessment Form (Y/N) NO
 Presence of regulatory considerations (Y/N) NO
 Wetland is intensively managed (Y/N) _____
 Assessment area is located within 50 feet of a natural tributary or other open water (Y/N) YES
 Assessment area is substantially altered by beaver (Y/N) _____
 Assessment area experiences overbank flooding during normal rainfall conditions (Y/N) _____
 Assessment area is on a coastal island (Y/N) _____

Sub-function Rating Summary

Function	Sub-function	Metrics	Rating
Hydrology	Surface Storage and Retention	Condition	LOW
	Sub-surface Storage and Retention	Condition	MEDIUM
Water Quality	Pathogen Change	Condition	MEDIUM
		Condition/Opportunity	MEDIUM
	Particulate Change	Opportunity Presence (Y/N)	NO
		Condition	LOW
Soluble Change	Particulate Change	Condition/Opportunity	NA
		Opportunity Presence (Y/N)	NA
	Soluble Change	Condition	MEDIUM
		Condition/Opportunity	MEDIUM
Physical Change	Physical Change	Opportunity Presence (Y/N)	NO
		Condition	LOW
	Physical Change	Condition/Opportunity	LOW
		Opportunity Presence (Y/N)	NO
Pollution Change	Pollution Change	Condition	NA
		Condition/Opportunity	NA
	Pollution Change	Opportunity Presence (Y/N)	NA
		Condition	LOW
Habitat	Physical Structure	Condition	LOW
	Landscape Patch Structure	Condition	LOW
	Vegetation Composition	Condition	LOW

Function Rating Summary

Function	Metrics	Rating
Hydrology	Condition	LOW
Water Quality	Condition	LOW
	Condition/Opportunity	LOW
	Opportunity Presence (Y/N)	NO
Habitat	Condition	LOW

Overall Wetland Rating LOW

NC WAM FIELD ASSESSMENT FORM
Accompanies User Manual Version 5.0

USACE AID #	SAW-2020-00047	NCDWR#	20200035
Project Name	Liberty Rock Mitigation Site	Date of Evaluation	7/30/2020
Applicant/Owner Name	Wildlands Engineering	Wetland Site Name	Wetland H
Wetland Type	Headwater Forest	Assessor Name/Organization	C. Neaves
Level III Ecoregion	Piedmont	Nearest Named Water Body	Rocky River
River Basin	Cape Fear	USGS 8-Digit Catalogue Unit	03030003
County	Randolph	NCDWR Region	Winston-Salem
<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	Precipitation within 48 hrs?	Latitude/Longitude (deci-degrees)	35.820287, -79.561288

Evidence of stressors affecting the assessment area (may not be within the assessment area)
 Please circle and/or make note on the last page if evidence of stressors is apparent. Consider departure from reference, if appropriate, in recent past (for instance, within 10 years). Noteworthy stressors include, but are not limited to the following.

- Hydrological modifications (examples: ditches, dams, beaver dams, dikes, berms, ponds, etc.)
- Surface and sub-surface discharges into the wetland (examples: discharges containing obvious pollutants, presence of nearby septic tanks, underground storage tanks (USTs), hog lagoons, etc.)
- Signs of vegetation stress (examples: vegetation mortality, insect damage, storm damage, salt intrusion, etc.)
- Habitat/plant community alteration (examples: mowing, clear-cutting, exotics, etc.)

Is the assessment area intensively managed? Yes No

Regulatory Considerations - Were regulatory considerations evaluated? Yes No If Yes, check all that apply to the assessment area.

- Anadromous fish
- Federally protected species or State endangered or threatened species
- NCDWR riparian buffer rule in effect
- Abuts a Primary Nursery Area (PNA)
- Publicly owned property
- N.C. Division of Coastal Management Area of Environmental Concern (AEC) (including buffer)
- Abuts a stream with a NCDWQ classification of SA or supplemental classifications of HQW, ORW, or Trout
- Designated NCNHP reference community
- Abuts a 303(d)-listed stream or a tributary to a 303(d)-listed stream

What type of natural stream is associated with the wetland, if any? (check all that apply)

- Blackwater
- Brownwater
- Tidal (if tidal, check one of the following boxes) Lunar Wind Both

Is the assessment area on a coastal island? Yes No

Is the assessment area's surface water storage capacity or duration substantially altered by beaver? Yes No

Does the assessment area experience overbank flooding during normal rainfall conditions? Yes No

- Ground Surface Condition/Vegetation Condition – assessment area condition metric**
Check a box in each column. Consider alteration to the ground surface (GS) in the assessment area and vegetation structure (VS) in the assessment area. Compare to reference wetland if applicable (see User Manual). If a reference is not applicable, then rate the assessment area based on evidence an effect.

GS	VS	
<input checked="" type="checkbox"/> A	<input type="checkbox"/> A	Not severely altered
<input type="checkbox"/> B	<input checked="" type="checkbox"/> B	Severely altered over a majority of the assessment area (ground surface alteration examples: vehicle tracks, excessive sedimentation, fire-plow lanes, skidder tracks, bedding, fill, soil compaction, obvious pollutants) (vegetation structure alteration examples: mechanical disturbance, herbicides, salt intrusion [where appropriate], exotic species, grazing, less diversity [if appropriate], hydrologic alteration)
- Surface and Sub-Surface Storage Capacity and Duration – assessment area condition metric**
Check a box in each column. Consider surface storage capacity and duration (Surf) and sub-surface storage capacity and duration (Sub). Consider both increase and decrease in hydrology. A ditch ≤ 1 foot deep is considered to affect surface water only, while a ditch > 1 foot deep is expected to affect both surface and sub-surface water. Consider tidal flooding regime, if applicable.

Surf	Sub	
<input type="checkbox"/> A	<input type="checkbox"/> A	Water storage capacity and duration are not altered.
<input checked="" type="checkbox"/> B	<input checked="" type="checkbox"/> B	Water storage capacity or duration are altered, but not substantially (typically, not sufficient to change vegetation).
<input type="checkbox"/> C	<input type="checkbox"/> C	Water storage capacity or duration are substantially altered (typically, alteration sufficient to result in vegetation change) (examples: draining, flooding, soil compaction, filling, excessive sedimentation, underground utility lines).
- Water Storage/Surface Relief – assessment area/wetland type condition metric (skip for all marshes)**
Check a box in each column. Select the appropriate storage for the assessment area (AA) and the wetland type (WT).

AA	WT	
3a. <input type="checkbox"/> A <input type="checkbox"/> A		Majority of wetland with depressions able to pond water > 1 foot deep
<input type="checkbox"/> B <input type="checkbox"/> B		Majority of wetland with depressions able to pond water 6 inches to 1 foot deep
<input type="checkbox"/> C <input type="checkbox"/> C		Majority of wetland with depressions able to pond water 3 to 6 inches deep
<input checked="" type="checkbox"/> D <input checked="" type="checkbox"/> D		Depressions able to pond water < 3 inches deep
3b. <input type="checkbox"/> A	<input type="checkbox"/> A	Evidence that maximum depth of inundation is greater than 2 feet
<input type="checkbox"/> B	<input type="checkbox"/> B	Evidence that maximum depth of inundation is between 1 and 2 feet
<input checked="" type="checkbox"/> C	<input checked="" type="checkbox"/> C	Evidence that maximum depth of inundation is less than 1 foot

4. Soil Texture/Structure – assessment area condition metric (skip for all marshes)

Check a box from each of the three soil property groups below. Dig soil profile in the dominant assessment area landscape feature. Make soil observations within the top 12 inches. Use most recent National Technical Committee for Hydric Soils guidance for regional indicators.

- 4a. A Sandy soil
 B Loamy or clayey soils exhibiting redoximorphic features (concentrations, depletions, or rhizospheres)
 C Loamy or clayey soils not exhibiting redoximorphic features
 D Loamy or clayey gleyed soil
 E Histosol or histc epipedon
- 4b. A Soil ribbon < 1 inch
 B Soil ribbon ≥ 1 inch
- 4c. A No peat or muck presence
 B A peat or muck presence

5. Discharge into Wetland – opportunity metric

Check a box in each column. Consider surface pollutants or discharges (Surf) and sub-surface pollutants or discharges (Sub). Examples of sub-surface discharges include presence of nearby septic tank, underground storage tank (UST), etc.

- | | | |
|---------------------------------------|---------------------------------------|---|
| Surf | Sub | |
| <input type="checkbox"/> A | <input checked="" type="checkbox"/> A | Little or no evidence of pollutants or discharges entering the assessment area |
| <input checked="" type="checkbox"/> B | <input type="checkbox"/> B | Noticeable evidence of pollutants or discharges entering the wetland and stressing, but not overwhelming the treatment capacity of the assessment area |
| <input type="checkbox"/> C | <input type="checkbox"/> C | Noticeable evidence of pollutants or discharges (pathogen, particulate, or soluble) entering the assessment area and potentially overwhelming the treatment capacity of the wetland (water discoloration, dead vegetation, excessive sedimentation, odor) |

6. Land Use – opportunity metric (skip for non-riparian wetlands)

Check all that apply (at least one box in each column). Evaluation involves a GIS effort with field adjustment. Consider sources draining to assessment area within entire upstream watershed (WS), within 5 miles and within the watershed draining to the assessment area (5M), and within 2 miles and within the watershed draining to the assessment area (2M).

- | | | | |
|---------------------------------------|---------------------------------------|---------------------------------------|---|
| WS | 5M | 2M | |
| <input type="checkbox"/> A | <input type="checkbox"/> A | <input type="checkbox"/> A | ≥ 10% impervious surfaces |
| <input type="checkbox"/> B | <input type="checkbox"/> B | <input type="checkbox"/> B | Confined animal operations (or other local, concentrated source of pollutants) |
| <input checked="" type="checkbox"/> C | <input checked="" type="checkbox"/> C | <input checked="" type="checkbox"/> C | ≥ 20% coverage of pasture |
| <input type="checkbox"/> D | <input type="checkbox"/> D | <input type="checkbox"/> D | ≥ 20% coverage of agricultural land (regularly plowed land) |
| <input checked="" type="checkbox"/> E | <input checked="" type="checkbox"/> E | <input checked="" type="checkbox"/> E | ≥ 20% coverage of maintained grass/herb |
| <input type="checkbox"/> F | <input type="checkbox"/> F | <input type="checkbox"/> F | ≥ 20% coverage of clear-cut land |
| <input type="checkbox"/> G | <input type="checkbox"/> G | <input type="checkbox"/> G | Little or no opportunity to improve water quality. Lack of opportunity may result from little or no disturbance in the watershed or hydrologic alterations that prevent drainage and/or overbank flow from affecting the assessment area. |

7. Wetland Acting as Vegetated Buffer – assessment area/wetland complex condition metric (skip for non-riparian wetlands)

- 7a. Is assessment area within 50 feet of a tributary or other open water?
 Yes No If Yes, continue to 7b. If No, skip to Metric 8.
 Wetland buffer need only be present on one side of the water body. Make buffer judgment based on the average width of wetland. Record a note if a portion of the buffer has been removed or disturbed.
- 7b. How much of the first 50 feet from the bank is wetland? (Wetland buffer need only be present on one side of the water body. Make buffer judgment based on the average width of wetland. Record a note if a portion of the buffer has been removed or disturbed.)
 A ≥ 50 feet
 B From 30 to < 50 feet
 C From 15 to < 30 feet
 D From 5 to < 15 feet
 E < 5 feet or buffer bypassed by ditches
- 7c. Tributary width. If the tributary is anastomosed, combine widths of channels/braids for a total width.
 ≤ 15-foot wide > 15-foot wide Other open water (no tributary present)
- 7d. Do roots of assessment area vegetation extend into the bank of the tributary/open water?
 Yes No
- 7e. Is stream or other open water sheltered or exposed?
 Sheltered – adjacent open water with width < 2500 feet and no regular boat traffic.
 Exposed – adjacent open water with width ≥ 2500 feet or regular boat traffic.

8. Wetland Width at the Assessment Area – wetland type/wetland complex condition metric (evaluate WT for all marshes and Estuarine Woody Wetland only; evaluate WC for Bottomland Hardwood Forest, Headwater Forest, and Riverine Swamp Forest only)

Check a box in each column for riverine wetlands only. Select the average width for the wetland type at the assessment area (WT) and the wetland complex at the assessment area (WC). See User Manual for WT and WC boundaries.

- | | | |
|---------------------------------------|---------------------------------------|-----------------------|
| WT | WC | |
| <input type="checkbox"/> A | <input type="checkbox"/> A | ≥ 100 feet |
| <input type="checkbox"/> B | <input type="checkbox"/> B | From 80 to < 100 feet |
| <input type="checkbox"/> C | <input type="checkbox"/> C | From 50 to < 80 feet |
| <input type="checkbox"/> D | <input type="checkbox"/> D | From 40 to < 50 feet |
| <input type="checkbox"/> E | <input type="checkbox"/> E | From 30 to < 40 feet |
| <input checked="" type="checkbox"/> F | <input checked="" type="checkbox"/> F | From 15 to < 30 feet |
| <input type="checkbox"/> G | <input type="checkbox"/> G | From 5 to < 15 feet |
| <input type="checkbox"/> H | <input type="checkbox"/> H | < 5 feet |

9. Inundation Duration – assessment area condition metric (skip for non-riparian wetlands)

Answer for assessment area dominant landform.

- A Evidence of short-duration inundation (< 7 consecutive days)
 B Evidence of saturation, without evidence of inundation
 C Evidence of long-duration inundation or very long-duration inundation (7 to 30 consecutive days or more)

10. Indicators of Deposition – assessment area condition metric (skip for non-riparian wetlands and all marshes)

Consider recent deposition only (no plant growth since deposition).

- A Sediment deposition is not excessive, but at approximately natural levels.
 B Sediment deposition is excessive, but not overwhelming the wetland.
 C Sediment deposition is excessive and is overwhelming the wetland.

11. Wetland Size – wetland type/wetland complex condition metric

Check a box in each column. Involves a GIS effort with field adjustment. This metric evaluates three aspects of the wetland area: the size of the wetland type (WT), the size of the wetland complex (WC), and the size of the forested wetland (FW) (if applicable, see User Manual). See the User Manual for boundaries of these evaluation areas. If assessment area is clear-cut, select "K" for the FW column.

- | | | |
|---------------------------------------|---------------------------------------|---|
| WT | WC | FW (if applicable) |
| <input type="checkbox"/> A | <input type="checkbox"/> A | <input type="checkbox"/> A ≥ 500 acres |
| <input type="checkbox"/> B | <input type="checkbox"/> B | <input type="checkbox"/> B From 100 to < 500 acres |
| <input type="checkbox"/> C | <input type="checkbox"/> C | <input type="checkbox"/> C From 50 to < 100 acres |
| <input type="checkbox"/> D | <input type="checkbox"/> D | <input type="checkbox"/> D From 25 to < 50 acres |
| <input type="checkbox"/> E | <input type="checkbox"/> E | <input type="checkbox"/> E From 10 to < 25 acres |
| <input type="checkbox"/> F | <input type="checkbox"/> F | <input type="checkbox"/> F From 5 to < 10 acres |
| <input type="checkbox"/> G | <input type="checkbox"/> G | <input type="checkbox"/> G From 1 to < 5 acres |
| <input type="checkbox"/> H | <input type="checkbox"/> H | <input type="checkbox"/> H From 0.5 to < 1 acre |
| <input type="checkbox"/> I | <input type="checkbox"/> I | <input type="checkbox"/> I From 0.1 to < 0.5 acre |
| <input checked="" type="checkbox"/> J | <input checked="" type="checkbox"/> J | <input type="checkbox"/> J From 0.01 to < 0.1 acre |
| <input type="checkbox"/> K | <input type="checkbox"/> K | <input checked="" type="checkbox"/> K < 0.01 acre or assessment area is clear-cut |

12. Wetland Intactness – wetland type condition metric (evaluate for Pocosins only)

- A Pocosin is the full extent (≥ 90%) of its natural landscape size.
 B Pocosin type is < 90% of the full extent of its natural landscape size.

13. Connectivity to Other Natural Areas – landscape condition metric

13a. Check appropriate box(es) (a box may be checked in each column). Involves a GIS effort with field adjustment. This metric evaluates whether the wetland is well connected (Well) and/or loosely connected (Loosely) to the landscape patch, the contiguous naturally vegetated area and open water (if appropriate). Boundaries are formed by four-lane roads, regularly maintained utility line corridors the width of a four-lane road or wider, urban landscapes, maintained fields (pasture and agriculture), or open water > 300 feet wide.

- | | | |
|---------------------------------------|---------------------------------------|--|
| Well | Loosely | |
| <input type="checkbox"/> A | <input type="checkbox"/> A | ≥ 500 acres |
| <input type="checkbox"/> B | <input type="checkbox"/> B | From 100 to < 500 acres |
| <input type="checkbox"/> C | <input type="checkbox"/> C | From 50 to < 100 acres |
| <input type="checkbox"/> D | <input type="checkbox"/> D | From 10 to < 50 acres |
| <input type="checkbox"/> E | <input type="checkbox"/> E | < 10 acres |
| <input checked="" type="checkbox"/> F | <input checked="" type="checkbox"/> F | Wetland type has a poor or no connection to other natural habitats |

13b. Evaluate for marshes only.

- Yes No Wetland type has a surface hydrology connection to open waters/stream or tidal wetlands.

14. Edge Effect – wetland type condition metric (skip for all marshes and Estuarine Woody Wetland)

May involve a GIS effort with field adjustment. Estimate distance from wetland type boundary to artificial edges. Artificial edges include non-forested areas ≥ 40 feet wide such as fields, development, roads, regularly maintained utility line corridors, and clear-cuts. Consider the eight main points of the compass. Artificial edge occurs within 150 feet in how many directions? If the assessment area is clear cut, select option "C."

- A 0
 B 1 to 4
 C 5 to 8

15. Vegetative Composition – assessment area condition metric (skip for all marshes and Pine Flat)

- A Vegetation is close to reference condition in species present and their proportions. Lower strata composed of appropriate species, with exotic plants absent or sparse within the assessment area.
 B Vegetation is different from reference condition in species diversity or proportions, but still largely composed of native species characteristic of the wetland type. This may include communities of weedy native species that develop after clearcutting or clearing. It also includes communities with exotics present, but not dominant, over a large portion of the expected strata.
 C Vegetation severely altered from reference in composition, or expected species are unnaturally absent (planted stands of non-characteristic species or at least one stratum inappropriately composed of a single species), or exotic species are dominant in at least one stratum.

16. Vegetative Diversity – assessment area condition metric (evaluate for Non-tidal Freshwater Marsh only)

- A Vegetation diversity is high and is composed primarily of native species (< 10% cover of exotics).
 B Vegetation diversity is low or has > 10% to 50% cover of exotics.
 C Vegetation is dominated by exotic species (> 50 % cover of exotics).

17. **Vegetative Structure – assessment area/wetland type condition metric**

17a. Is vegetation present?

Yes No If Yes, continue to 17b. If No, skip to Metric 18.

17b. Evaluate percent coverage of assessment area vegetation for all marshes only. Skip to 17c for non-marsh wetlands.

A ≥ 25% coverage of vegetation
 B < 25% coverage of vegetation

17c. **Check a box in each column for each stratum.** Evaluate this portion of the metric for non-marsh wetlands. Consider structure in airspace above the assessment area (AA) and the wetland type (WT) separately.

	AA	WT	
Canopy	<input type="checkbox"/> A	<input type="checkbox"/> A	Canopy closed, or nearly closed, with natural gaps associated with natural processes
	<input type="checkbox"/> B	<input type="checkbox"/> B	Canopy present, but opened more than natural gaps
	<input checked="" type="checkbox"/> C	<input checked="" type="checkbox"/> C	Canopy sparse or absent
Mid-Story	<input type="checkbox"/> A	<input type="checkbox"/> A	Dense mid-story/sapling layer
	<input type="checkbox"/> B	<input type="checkbox"/> B	Moderate density mid-story/sapling layer
	<input checked="" type="checkbox"/> C	<input checked="" type="checkbox"/> C	Mid-story/sapling layer sparse or absent
Shrub	<input type="checkbox"/> A	<input type="checkbox"/> A	Dense shrub layer
	<input type="checkbox"/> B	<input type="checkbox"/> B	Moderate density shrub layer
	<input checked="" type="checkbox"/> C	<input checked="" type="checkbox"/> C	Shrub layer sparse or absent
Herb	<input checked="" type="checkbox"/> A	<input checked="" type="checkbox"/> A	Dense herb layer
	<input type="checkbox"/> B	<input type="checkbox"/> B	Moderate density herb layer
	<input type="checkbox"/> C	<input type="checkbox"/> C	Herb layer sparse or absent

18. **Snags – wetland type condition metric (skip for all marshes)**

A Large snags (more than one) are visible (> 12 inches DBH, or large relative to species present and landscape stability).
 B Not A

19. **Diameter Class Distribution – wetland type condition metric (skip for all marshes)**

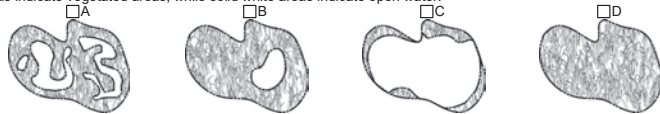
A Majority of canopy trees have stems > 6 inches in diameter at breast height (DBH); many large trees (> 12 inches DBH) are present.
 B Majority of canopy trees have stems between 6 and 12 inches DBH, few are > 12 inch DBH.
 C Majority of canopy trees are < 6 inches DBH or no trees.

20. **Large Woody Debris – wetland type condition metric (skip for all marshes)**

Include both natural debris and man-placed natural debris.
 A Large logs (more than one) are visible (> 12 inches in diameter, or large relative to species present and landscape stability).
 B Not A

21. **Vegetation/Open Water Dispersion – wetland type/open water condition metric (evaluate for Non-Tidal Freshwater Marsh only)**

Select the figure that best describes the amount of interspersed vegetation and open water in the growing season. Patterned areas indicate vegetated areas, while solid white areas indicate open water.



22. **Hydrologic Connectivity – assessment area condition metric (evaluate for riparian wetlands and Salt/Brackish Marsh only)**

Examples of activities that may severely alter hydrologic connectivity include intensive ditching, fill, sedimentation, channelization, diversion, man-made berms, beaver dams, and stream incision. Documentation required if evaluated as B, C, or D.

A Overbank and overland flow are not severely altered in the assessment area.
 B Overbank flow is severely altered in the assessment area.
 C Overland flow is severely altered in the assessment area.
 D Both overbank and overland flow are severely altered in the assessment area.

Notes

**NC WAM Wetland Rating Sheet
 Accompanies User Manual Version 5.0**

Wetland Site Name Wetland H Date of Assessment 7/30/2020
 Wetland Type Headwater Forest Assessor Name/Organization C. Neaves

Notes on Field Assessment Form (Y/N) NO
 Presence of regulatory considerations (Y/N) NO
 Wetland is intensively managed (Y/N) _____
 Assessment area is located within 50 feet of a natural tributary or other open water (Y/N) NO
 Assessment area is substantially altered by beaver (Y/N) _____
 Assessment area experiences overbank flooding during normal rainfall conditions (Y/N) _____
 Assessment area is on a coastal island (Y/N) _____

Sub-function Rating Summary

Function	Sub-function	Metrics	Rating
Hydrology	Surface Storage and Retention	Condition	LOW
		Sub-surface Storage and Retention	MEDIUM
Water Quality	Pathogen Change	Condition	MEDIUM
		Condition/Opportunity	MEDIUM
		Opportunity Presence (Y/N)	NO
	Particulate Change	Condition	LOW
		Condition/Opportunity	NA
		Opportunity Presence (Y/N)	NA
	Soluble Change	Condition	MEDIUM
		Condition/Opportunity	MEDIUM
		Opportunity Presence (Y/N)	NO
	Physical Change	Condition	LOW
		Condition/Opportunity	LOW
		Opportunity Presence (Y/N)	NO
	Pollution Change	Condition	NA
		Condition/Opportunity	NA
		Opportunity Presence (Y/N)	NA
Habitat	Physical Structure	Condition	LOW
	Landscape Patch Structure	Condition	LOW
	Vegetation Composition	Condition	LOW

Function Rating Summary

Function	Metrics	Rating
Hydrology	Condition	LOW
	Water Quality	LOW
	Condition/Opportunity	LOW
	Opportunity Presence (Y/N)	NO
Habitat	Condition	LOW

Overall Wetland Rating LOW

NC WAM FIELD ASSESSMENT FORM
Accompanies User Manual Version 5.0

USACE AID #	SAW-2020-00047	NCDWR#	20200035
Project Name	Liberty Rock Mitigation Site	Date of Evaluation	7/30/2020
Applicant/Owner Name	Widlands Engineering	Wetland Site Name	Wetland I
Wetland Type	Bottomland Hardwood Forest	Assessor Name/Organization	C. Neaves
Level III Ecoregion	Piedmont	Nearest Named Water Body	Rocky River
River Basin	Cape Fear	USGS 8-Digit Catalogue Unit	03030003
County	Randolph	NCDWR Region	Winston-Salem
<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	Precipitation within 48 hrs?	Latitude/Longitude (deci-degrees)	35.820467, -79.560841

Evidence of stressors affecting the assessment area (may not be within the assessment area)

Please circle and/or make note on the last page if evidence of stressors is apparent. Consider departure from reference, if appropriate, in recent past (for instance, within 10 years). Noteworthy stressors include, but are not limited to the following.

- Hydrological modifications (examples: ditches, dams, beaver dams, dikes, berms, ponds, etc.)
- Surface and sub-surface discharges into the wetland (examples: discharges containing obvious pollutants, presence of nearby septic tanks, underground storage tanks (USTs), hog lagoons, etc.)
- Signs of vegetation stress (examples: vegetation mortality, insect damage, disease, storm damage, salt intrusion, etc.)
- Habitat/plant community alteration (examples: mowing, clear-cutting, exotics, etc.)

Is the assessment area intensively managed? Yes No

Regulatory Considerations - Were regulatory considerations evaluated? Yes No If Yes, check all that apply to the assessment area.

- Anadromous fish
- Federally protected species or State endangered or threatened species
- NCDWR riparian buffer rule in effect
- Abuts a Primary Nursery Area (PNA)
- Publicly owned property
- N.C. Division of Coastal Management Area of Environmental Concern (AEC) (including buffer)
- Abuts a stream with a NCDWQ classification of SA or supplemental classifications of HQW, ORW, or Trout
- Designated NCNHP reference community
- Abuts a 303(d)-listed stream or a tributary to a 303(d)-listed stream

What type of natural stream is associated with the wetland, if any? (check all that apply)

- Blackwater
- Brownwater
- Tidal (if tidal, check one of the following boxes) Lunar Wind Both

Is the assessment area on a coastal island? Yes No

Is the assessment area's surface water storage capacity or duration substantially altered by beaver? Yes No

Does the assessment area experience overbank flooding during normal rainfall conditions? Yes No

1. Ground Surface Condition/Vegetation Condition – assessment area condition metric

Check a box in each column. Consider alteration to the ground surface (GS) in the assessment area and vegetation structure (VS) in the assessment area. Compare to reference wetland if applicable (see User Manual). If a reference is not applicable, then rate the assessment area based on evidence an effect.

- | | | |
|---------------------------------------|---------------------------------------|--|
| GS | VS | |
| <input checked="" type="checkbox"/> A | <input type="checkbox"/> A | Not severely altered |
| <input type="checkbox"/> B | <input checked="" type="checkbox"/> B | Severely altered over a majority of the assessment area (ground surface alteration examples: vehicle tracks, excessive sedimentation, fire-plow lanes, skidder tracks, bedding, fill, soil compaction, obvious pollutants) (vegetation structure alteration examples: mechanical disturbance, herbicides, salt intrusion [where appropriate], exotic species, grazing, less diversity [if appropriate], hydrologic alteration) |

2. Surface and Sub-Surface Storage Capacity and Duration – assessment area condition metric

Check a box in each column. Consider surface storage capacity and duration (Surf) and sub-surface storage capacity and duration (Sub). Consider both increase and decrease in hydrology. A ditch ≤ 1 foot deep is considered to affect surface water only, while a ditch > 1 foot deep is expected to affect both surface and sub-surface water. Consider tidal flooding regime, if applicable.

- | | | |
|---------------------------------------|---------------------------------------|--|
| Surf | Sub | |
| <input type="checkbox"/> A | <input type="checkbox"/> A | Water storage capacity and duration are not altered. |
| <input checked="" type="checkbox"/> B | <input checked="" type="checkbox"/> B | Water storage capacity or duration are altered, but not substantially (typically, not sufficient to change vegetation). |
| <input type="checkbox"/> C | <input type="checkbox"/> C | Water storage capacity or duration are substantially altered (typically, alteration sufficient to result in vegetation change) (examples: draining, flooding, soil compaction, filling, excessive sedimentation, underground utility lines). |

3. Water Storage/Surface Relief – assessment area/wetland type condition metric (skip for all marshes)

Check a box in each column. Select the appropriate storage for the assessment area (AA) and the wetland type (WT).

- | | | |
|---------------------------------------|---------------------------------------|---|
| AA | WT | |
| 3a. <input type="checkbox"/> A | <input type="checkbox"/> A | Majority of wetland with depressions able to pond water > 1 deep |
| <input type="checkbox"/> B | <input type="checkbox"/> B | Majority of wetland with depressions able to pond water 6 inches to 1 foot deep |
| <input type="checkbox"/> C | <input type="checkbox"/> C | Majority of wetland with depressions able to pond water 3 to 6 inches deep |
| <input checked="" type="checkbox"/> D | <input checked="" type="checkbox"/> D | Depressions able to pond water < 3 inches deep |
| 3b. <input type="checkbox"/> A | | Evidence that maximum depth of inundation is greater than 2 feet |
| <input type="checkbox"/> B | | Evidence that maximum depth of inundation is between 1 and 2 feet |
| <input checked="" type="checkbox"/> C | | Evidence that maximum depth of inundation is less than 1 foot |

4. Soil Texture/Structure – assessment area condition metric (skip for all marshes)

Check a box from each of the three soil property groups below. Dig soil profile in the dominant assessment area landscape feature. Make soil observations within the top 12 inches. Use most recent National Technical Committee for Hydric Soils guidance for regional indicators.

- 4a. A Sandy soil
- B Loamy or clayey soils exhibiting redoximorphic features (concentrations, depletions, or rhizospheres)
- C Loamy or clayey soils not exhibiting redoximorphic features
- D Loamy or clayey gleyed soil
- E Histosol or histc epipedon
- 4b. A Soil ribbon < 1 inch
- B Soil ribbon ≥ 1 inch
- 4c. A No peat or muck presence
- B A peat or muck presence

5. Discharge into Wetland – opportunity metric

Check a box in each column. Consider surface pollutants or discharges (Surf) and sub-surface pollutants or discharges (Sub). Examples of sub-surface discharges include presence of nearby septic tank, underground storage tank (UST), etc.

- | | | |
|---------------------------------------|---------------------------------------|---|
| Surf | Sub | |
| <input type="checkbox"/> A | <input checked="" type="checkbox"/> A | Little or no evidence of pollutants or discharges entering the assessment area |
| <input checked="" type="checkbox"/> B | <input type="checkbox"/> B | Noticeable evidence of pollutants or discharges entering the wetland and stressing, but not overwhelming the treatment capacity of the assessment area |
| <input type="checkbox"/> C | <input type="checkbox"/> C | Noticeable evidence of pollutants or discharges (pathogen, particulate, or soluble) entering the assessment area and potentially overwhelming the treatment capacity of the wetland (water discoloration, dead vegetation, excessive sedimentation, odor) |

6. Land Use – opportunity metric (skip for non-riparian wetlands)

Check all that apply (at least one box in each column). Evaluation involves a GIS effort with field adjustment. Consider sources draining to assessment area within entire upstream watershed (WS), within 5 miles and within the watershed draining to the assessment area (5M), and within 2 miles and within the watershed draining to the assessment area (2M).

- | | | | |
|---------------------------------------|---------------------------------------|---------------------------------------|---|
| WS | 5M | 2M | |
| <input type="checkbox"/> A | <input type="checkbox"/> A | <input type="checkbox"/> A | ≥ 10% impervious surfaces |
| <input type="checkbox"/> B | <input type="checkbox"/> B | <input type="checkbox"/> B | Confined animal operations (or other local, concentrated source of pollutants) |
| <input checked="" type="checkbox"/> C | <input checked="" type="checkbox"/> C | <input checked="" type="checkbox"/> C | ≥ 20% coverage of pasture |
| <input type="checkbox"/> D | <input type="checkbox"/> D | <input type="checkbox"/> D | ≥ 20% coverage of agricultural land (regularly plowed land) |
| <input checked="" type="checkbox"/> E | <input checked="" type="checkbox"/> E | <input checked="" type="checkbox"/> E | ≥ 20% coverage of maintained grass/herb |
| <input type="checkbox"/> F | <input type="checkbox"/> F | <input type="checkbox"/> F | ≥ 20% coverage of clear-cut land |
| <input type="checkbox"/> G | <input type="checkbox"/> G | <input type="checkbox"/> G | Little or no opportunity to improve water quality. Lack of opportunity may result from little or no disturbance in the watershed or hydrologic alterations that prevent drainage and/or overbank flow from affecting the assessment area. |

7. Wetland Acting as Vegetated Buffer – assessment area/wetland complex condition metric (skip for non-riparian wetlands)

- 7a. Is assessment area within 50 feet of a tributary or other open water?
 Yes No If Yes, continue to 7b. If No, skip to Metric 8.
Wetland buffer need only be present on one side of the water body. Make buffer judgment based on the average width of wetland. Record a note if a portion of the buffer has been removed or disturbed.
- 7b. How much of the first 50 feet from the bank is wetland? (Wetland buffer need only be present on one side of the water body. Make buffer judgment based on the average width of wetland. Record a note if a portion of the buffer has been removed or disturbed.)
- A ≥ 50 feet
- B From 30 to < 50 feet
- C From 15 to < 30 feet
- D From 5 to < 15 feet
- E < 5 feet or buffer bypassed by ditches
- 7c. Tributary width. If the tributary is anastomosed, combine widths of channels/braids for a total width.
 ≤ 15-foot wide > 15-foot wide Other open water (no tributary present)
- 7d. Do roots of assessment area vegetation extend into the bank of the tributary/open water?
 Yes No
- 7e. Is stream or other open water sheltered or exposed?
 Sheltered – adjacent open water with width < 2500 feet and no regular boat traffic.
 Exposed – adjacent open water with width ≥ 2500 feet or regular boat traffic.

8. Wetland Width at the Assessment Area – wetland type/wetland complex condition metric (evaluate WT for all marshes and Estuarine Woody Wetland only; evaluate WC for Bottomland Hardwood Forest, Headwater Forest, and Riverine Swamp Forest only)

Check a box in each column for riverine wetlands only. Select the average width for the wetland type at the assessment area (WT) and the wetland complex at the assessment area (WC). See User Manual for WT and WC boundaries.

- | | | |
|---------------------------------------|---------------------------------------|-----------------------|
| WT | WC | |
| <input type="checkbox"/> A | <input type="checkbox"/> A | ≥ 100 feet |
| <input type="checkbox"/> B | <input type="checkbox"/> B | From 80 to < 100 feet |
| <input type="checkbox"/> C | <input type="checkbox"/> C | From 50 to < 80 feet |
| <input type="checkbox"/> D | <input type="checkbox"/> D | From 40 to < 50 feet |
| <input type="checkbox"/> E | <input type="checkbox"/> E | From 30 to < 40 feet |
| <input type="checkbox"/> F | <input type="checkbox"/> F | From 15 to < 30 feet |
| <input checked="" type="checkbox"/> G | <input checked="" type="checkbox"/> G | From 5 to < 15 feet |
| <input type="checkbox"/> H | <input type="checkbox"/> H | < 5 feet |

9. Inundation Duration – assessment area condition metric (skip for non-riparian wetlands)

Answer for assessment area dominant landform.

- A Evidence of short-duration inundation (< 7 consecutive days)
B Evidence of saturation, without evidence of inundation
C Evidence of long-duration inundation or very long-duration inundation (7 to 30 consecutive days or more)

10. Indicators of Deposition – assessment area condition metric (skip for non-riparian wetlands and all marshes)

Consider recent deposition only (no plant growth since deposition).

- A Sediment deposition is not excessive, but at approximately natural levels.
B Sediment deposition is excessive, but not overwhelming the wetland.
C Sediment deposition is excessive and is overwhelming the wetland.

11. Wetland Size – wetland type/wetland complex condition metric

Check a box in each column. Involves a GIS effort with field adjustment. This metric evaluates three aspects of the wetland area: the size of the wetland type (WT), the size of the wetland complex (WC), and the size of the forested wetland (FW) (if applicable, see User Manual). See the User Manual for boundaries of these evaluation areas. If assessment area is clear-cut, select "K" for the FW column.

- | | | |
|---------------------------------------|---------------------------------------|--|
| WT | WC | FW (if applicable) |
| <input type="checkbox"/> A | <input type="checkbox"/> A | <input type="checkbox"/> A ≥ 500 acres |
| <input type="checkbox"/> B | <input type="checkbox"/> B | <input type="checkbox"/> B From 100 to < 500 acres |
| <input type="checkbox"/> C | <input type="checkbox"/> C | <input type="checkbox"/> C From 50 to < 100 acres |
| <input type="checkbox"/> D | <input type="checkbox"/> D | <input type="checkbox"/> D From 25 to < 50 acres |
| <input type="checkbox"/> E | <input type="checkbox"/> E | <input type="checkbox"/> E From 10 to < 25 acres |
| <input type="checkbox"/> F | <input type="checkbox"/> F | <input type="checkbox"/> F From 5 to < 10 acres |
| <input type="checkbox"/> G | <input type="checkbox"/> G | <input type="checkbox"/> G From 1 to < 5 acres |
| <input type="checkbox"/> H | <input type="checkbox"/> H | <input type="checkbox"/> H From 0.5 to < 1 acre |
| <input type="checkbox"/> I | <input type="checkbox"/> I | <input type="checkbox"/> I From 0.1 to < 0.5 acre |
| <input checked="" type="checkbox"/> J | <input checked="" type="checkbox"/> J | <input type="checkbox"/> J From 0.01 to < 0.1 acre |
| <input type="checkbox"/> K | <input type="checkbox"/> K | <input checked="" type="checkbox"/> K < 0.01 acre <u>or</u> assessment area is clear-cut |

12. Wetland Intactness – wetland type condition metric (evaluate for Pocosins only)

- A Pocosin is the full extent (≥ 90%) of its natural landscape size.
B Pocosin type is < 90% of the full extent of its natural landscape size.

13. Connectivity to Other Natural Areas – landscape condition metric

13a. Check appropriate box(es) (a box may be checked in each column). Involves a GIS effort with field adjustment. This metric evaluates whether the wetland is well connected (Well) and/or loosely connected (Loosely) to the landscape patch, the contiguous naturally vegetated area and open water (if appropriate). Boundaries are formed by four-lane roads, regularly maintained utility line corridors the width of a four-lane road or wider, urban landscapes, maintained fields (pasture and agriculture), or open water > 300 feet wide.

- | | |
|----------------------------|---|
| Well | Loosely |
| <input type="checkbox"/> A | <input type="checkbox"/> A ≥ 500 acres |
| <input type="checkbox"/> B | <input type="checkbox"/> B From 100 to < 500 acres |
| <input type="checkbox"/> C | <input checked="" type="checkbox"/> C From 50 to < 100 acres |
| <input type="checkbox"/> D | <input type="checkbox"/> D From 10 to < 50 acres |
| <input type="checkbox"/> E | <input type="checkbox"/> E < 10 acres |
| <input type="checkbox"/> F | <input type="checkbox"/> F Wetland type has a poor or no connection to other natural habitats |

13b. Evaluate for marshes only.

- Yes No Wetland type has a surface hydrology connection to open waters/stream or tidal wetlands.

14. Edge Effect – wetland type condition metric (skip for all marshes and Estuarine Woody Wetland)

May involve a GIS effort with field adjustment. Estimate distance from wetland type boundary to artificial edges. Artificial edges include non-forested areas ≥ 40 feet wide such as fields, development, roads, regularly maintained utility line corridors, and clear-cuts. Consider the eight main points of the compass. Artificial edge occurs within 150 feet in how many directions? If the assessment area is clear cut, select option "C."

- A 0
B 1 to 4
C 5 to 8

15. Vegetative Composition – assessment area condition metric (skip for all marshes and Pine Flat)

- A Vegetation is close to reference condition in species present and their proportions. Lower strata composed of appropriate species, with exotic plants absent or sparse within the assessment area.
B Vegetation is different from reference condition in species diversity or proportions, but still largely composed of native species characteristic of the wetland type. This may include communities of weedy native species that develop after clearcutting or clearing. It also includes communities with exotics present, but not dominant, over a large portion of the expected strata.
C Vegetation severely altered from reference in composition, or expected species are unnaturally absent (planted stands of non-characteristic species or at least one stratum inappropriately composed of a single species), or exotic species are dominant in at least one stratum.

16. Vegetative Diversity – assessment area condition metric (evaluate for Non-tidal Freshwater Marsh only)

- A Vegetation diversity is high and is composed primarily of native species (< 10% cover of exotics).
B Vegetation diversity is low or has > 10% to 50% cover of exotics.
C Vegetation is dominated by exotic species (> 50 % cover of exotics).

17. Vegetative Structure – assessment area/wetland type condition metric

17a. Is vegetation present?

- Yes No If Yes, continue to 17b. If No, skip to Metric 18.

17b. Evaluate percent coverage of assessment area vegetation for all marshes only. Skip to 17c for non-marsh wetlands.

- A ≥ 25% coverage of vegetation
B < 25% coverage of vegetation

17c. Check a box in each column for each stratum. Evaluate this portion of the metric for non-marsh wetlands. Consider structure in airspace above the assessment area (AA) and the wetland type (WT) separately.

- | | | | |
|-----------|---------------------------------------|---------------------------------------|--|
| | AA | WT | |
| Canopy | <input type="checkbox"/> A | <input type="checkbox"/> A | Canopy closed, or nearly closed, with natural gaps associated with natural processes |
| | <input type="checkbox"/> B | <input type="checkbox"/> B | Canopy present, but opened more than natural gaps |
| | <input checked="" type="checkbox"/> C | <input checked="" type="checkbox"/> C | Canopy sparse or absent |
| Mid-Story | <input type="checkbox"/> A | <input type="checkbox"/> A | Dense mid-story/sapling layer |
| | <input type="checkbox"/> B | <input type="checkbox"/> B | Moderate density mid-story/sapling layer |
| | <input checked="" type="checkbox"/> C | <input checked="" type="checkbox"/> C | Mid-story/sapling layer sparse or absent |
| Shrub | <input type="checkbox"/> A | <input type="checkbox"/> A | Dense shrub layer |
| | <input type="checkbox"/> B | <input type="checkbox"/> B | Moderate density shrub layer |
| | <input checked="" type="checkbox"/> C | <input checked="" type="checkbox"/> C | Shrub layer sparse or absent |
| Herb | <input checked="" type="checkbox"/> A | <input checked="" type="checkbox"/> A | Dense herb layer |
| | <input type="checkbox"/> B | <input type="checkbox"/> B | Moderate density herb layer |
| | <input type="checkbox"/> C | <input type="checkbox"/> C | Herb layer sparse or absent |

18. Snags – wetland type condition metric (skip for all marshes)

- A Large snags (more than one) are visible (> 12 inches DBH, or large relative to species present and landscape stability).
B Not A

19. Diameter Class Distribution – wetland type condition metric (skip for all marshes)

- A Majority of canopy trees have stems > 6 inches in diameter at breast height (DBH); many large trees (> 12 inches DBH) are present.
B Majority of canopy trees have stems between 6 and 12 inches DBH, few are > 12 inch DBH.
C Majority of canopy trees are < 6 inches DBH or no trees.

20. Large Woody Debris – wetland type condition metric (skip for all marshes)

- Include both natural debris and man-placed natural debris.
A Large logs (more than one) are visible (> 12 inches in diameter, or large relative to species present and landscape stability).
B Not A

21. Vegetation/Open Water Dispersion – wetland type/open water condition metric (evaluate for Non-Tidal Freshwater Marsh only)

Select the figure that best describes the amount of interspersed between vegetation and open water in the growing season. Patterned areas indicate vegetated areas, while solid white areas indicate open water.



22. Hydrologic Connectivity – assessment area condition metric (evaluate for riparian wetlands and Salt/Brackish Marsh only)

Examples of activities that may severely alter hydrologic connectivity include intensive ditching, fill, sedimentation, channelization, diversion, man-made berms, beaver dams, and stream incision. Documentation required if evaluated as B, C, or D.

- A Overbank and overland flow are not severely altered in the assessment area.
B Overbank flow is severely altered in the assessment area.
C Overland flow is severely altered in the assessment area.
D Both overbank and overland flow are severely altered in the assessment area.

Notes

NC WAM Wetland Rating Sheet
Accompanies User Manual Version 5.0

Wetland Site Name Wetland I Date of Assessment 7/30/2020
 Wetland Type Bottomland Hardwood Forest Assessor Name/Organization C. Neaves
 Notes on Field Assessment Form (Y/N) NO
 Presence of regulatory considerations (Y/N) NO
 Wetland is intensively managed (Y/N) _____
 Assessment area is located within 50 feet of a natural tributary or other open water (Y/N) YES
 Assessment area is substantially altered by beaver (Y/N) _____
 Assessment area experiences overbank flooding during normal rainfall conditions (Y/N) _____
 Assessment area is on a coastal island (Y/N) _____

Sub-function Rating Summary

Function	Sub-function	Metrics	Rating
Hydrology	Surface Storage and Retention	Condition	LOW
	Sub-surface Storage and Retention	Condition	LOW
Water Quality	Pathogen Change	Condition	LOW
		Condition/Opportunity	MEDIUM
	Opportunity Presence (Y/N)	YES	
	Particulate Change	Condition	MEDIUM
Condition/Opportunity		MEDIUM	
Soluble Change	Opportunity Presence (Y/N)	YES	
		Condition	HIGH
	Condition/Opportunity	HIGH	
	Opportunity Presence (Y/N)	YES	
Physical Change	Condition	LOW	
		Condition/Opportunity	LOW
	Opportunity Presence (Y/N)	YES	
	Pollution Change	Condition	NA
Condition/Opportunity		NA	
Habitat	Physical Structure	Condition	LOW
	Landscape Patch Structure	Condition	LOW
	Vegetation Composition	Condition	LOW

Function Rating Summary

Function	Metrics	Rating
Hydrology	Condition	LOW
Water Quality	Condition	LOW
	Condition/Opportunity	MEDIUM
	Opportunity Presence (Y/N)	YES
Habitat	Condition	LOW

Overall Wetland Rating LOW

NC WAM FIELD ASSESSMENT FORM
Accompanies User Manual Version 5.0

USACE AID #	SAW-2020-00047	NCDWR#	20200035
Project Name	Liberty Rock Mitigation Site	Date of Evaluation	7/30/2020
Applicant/Owner Name	Wildlands Engineering	Wetland Site Name	Wetland J
Wetland Type	Bottomland Hardwood Forest	Assessor Name/Organization	C. Neaves
Level III Ecoregion	Piedmont	Nearest Named Water Body	Rocky River
River Basin	Cape Fear	USGS 8-Digit Catalogue Unit	03030003
County	Randolph	NCDWR Region	Winston-Salem
<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	Precipitation within 48 hrs?	Latitude/Longitude (deci-degrees)	35.820430, -79.530053

Evidence of stressors affecting the assessment area (may not be within the assessment area)
 Please circle and/or make note on the last page if evidence of stressors is apparent. Consider departure from reference, if appropriate, in recent past (for instance, within 10 years). Noteworthy stressors include, but are not limited to the following.

- Hydrological modifications (examples: ditches, dams, beaver dams, dikes, berms, ponds, etc.)
- Surface and sub-surface discharges into the wetland (examples: discharges containing obvious pollutants, presence of nearby septic tanks, underground storage tanks (USTs), hog lagoons, etc.)
- Signs of vegetation stress (examples: vegetation mortality, insect damage, storm damage, disease, salt intrusion, etc.)
- Habitat/plant community alteration (examples: mowing, clear-cutting, exotics, etc.)

Is the assessment area intensively managed? Yes No

Regulatory Considerations - Were regulatory considerations evaluated? Yes No If Yes, check all that apply to the assessment area.

- Anadromous fish
- Federally protected species or State endangered or threatened species
- NCDWR riparian buffer rule in effect
- Abuts a Primary Nursery Area (PNA)
- Publicly owned property
- N.C. Division of Coastal Management Area of Environmental Concern (AEC) (including buffer)
- Abuts a stream with a NCDWQ classification of SA or supplemental classifications of HQW, ORW, or Trout
- Designated NCNHP reference community
- Abuts a 303(d)-listed stream or a tributary to a 303(d)-listed stream

What type of natural stream is associated with the wetland, if any? (check all that apply)

- Blackwater
- Brownwater
- Tidal (if tidal, check one of the following boxes) Lunar Wind Both

Is the assessment area on a coastal island? Yes No

Is the assessment area's surface water storage capacity or duration substantially altered by beaver? Yes No

Does the assessment area experience overbank flooding during normal rainfall conditions? Yes No

- Ground Surface Condition/Vegetation Condition – assessment area condition metric**
Check a box in each column. Consider alteration to the ground surface (GS) in the assessment area and vegetation structure (VS) in the assessment area. Compare to reference wetland if applicable (see User Manual). If a reference is not applicable, then rate the assessment area based on evidence an effect.

GS	VS	
<input checked="" type="checkbox"/> A	<input type="checkbox"/> A	Not severely altered
<input type="checkbox"/> B	<input checked="" type="checkbox"/> B	Severely altered over a majority of the assessment area (ground surface alteration examples: vehicle tracks, excessive sedimentation, fire-plow lanes, skidder tracks, bedding, fill, soil compaction, obvious pollutants) (vegetation structure alteration examples: mechanical disturbance, herbicides, salt intrusion [where appropriate], exotic species, grazing, less diversity [if appropriate], hydrologic alteration)
- Surface and Sub-Surface Storage Capacity and Duration – assessment area condition metric**
Check a box in each column. Consider surface storage capacity and duration (Surf) and sub-surface storage capacity and duration (Sub). Consider both increase and decrease in hydrology. A ditch ≤ 1 foot deep is considered to affect surface water only, while a ditch > 1 foot deep is expected to affect both surface and sub-surface water. Consider tidal flooding regime, if applicable.

Surf	Sub	
<input type="checkbox"/> A	<input type="checkbox"/> A	Water storage capacity and duration are not altered.
<input checked="" type="checkbox"/> B	<input checked="" type="checkbox"/> B	Water storage capacity or duration are altered, but not substantially (typically, not sufficient to change vegetation).
<input type="checkbox"/> C	<input type="checkbox"/> C	Water storage capacity or duration are substantially altered (typically, alteration sufficient to result in vegetation change) (examples: draining, flooding, soil compaction, filling, excessive sedimentation, underground utility lines).
- Water Storage/Surface Relief – assessment area/wetland type condition metric (skip for all marshes)**
Check a box in each column. Select the appropriate storage for the assessment area (AA) and the wetland type (WT).

AA	WT	
3a. <input type="checkbox"/> A <input type="checkbox"/> A		Majority of wetland with depressions able to pond water > 1 foot deep
<input type="checkbox"/> B <input type="checkbox"/> B		Majority of wetland with depressions able to pond water 6 inches to 1 foot deep
<input type="checkbox"/> C <input type="checkbox"/> C		Majority of wetland with depressions able to pond water 3 to 6 inches deep
<input checked="" type="checkbox"/> D <input checked="" type="checkbox"/> D		Depressions able to pond water < 3 inches deep
3b. <input type="checkbox"/> A	<input type="checkbox"/> A	Evidence that maximum depth of inundation is greater than 2 feet
<input type="checkbox"/> B	<input type="checkbox"/> B	Evidence that maximum depth of inundation is between 1 and 2 feet
<input checked="" type="checkbox"/> C	<input checked="" type="checkbox"/> C	Evidence that maximum depth of inundation is less than 1 foot

4. Soil Texture/Structure – assessment area condition metric (skip for all marshes)

Check a box from each of the three soil property groups below. Dig soil profile in the dominant assessment area landscape feature. Make soil observations within the top 12 inches. Use most recent National Technical Committee for Hydric Soils guidance for regional indicators.

- 4a. A Sandy soil
 B Loamy or clayey soils exhibiting redoximorphic features (concentrations, depletions, or rhizospheres)
 C Loamy or clayey soils not exhibiting redoximorphic features
 D Loamy or clayey gleyed soil
 E Histosol or histc epipedon
- 4b. A Soil ribbon < 1 inch
 B Soil ribbon ≥ 1 inch
- 4c. A No peat or muck presence
 B A peat or muck presence

5. Discharge into Wetland – opportunity metric

Check a box in each column. Consider surface pollutants or discharges (Surf) and sub-surface pollutants or discharges (Sub). Examples of sub-surface discharges include presence of nearby septic tank, underground storage tank (UST), etc.

- | | | |
|---------------------------------------|---------------------------------------|---|
| Surf | Sub | |
| <input type="checkbox"/> A | <input checked="" type="checkbox"/> A | Little or no evidence of pollutants or discharges entering the assessment area |
| <input checked="" type="checkbox"/> B | <input type="checkbox"/> B | Noticeable evidence of pollutants or discharges entering the wetland and stressing, but not overwhelming the treatment capacity of the assessment area |
| <input type="checkbox"/> C | <input type="checkbox"/> C | Noticeable evidence of pollutants or discharges (pathogen, particulate, or soluble) entering the assessment area and potentially overwhelming the treatment capacity of the wetland (water discoloration, dead vegetation, excessive sedimentation, odor) |

6. Land Use – opportunity metric (skip for non-riparian wetlands)

Check all that apply (at least one box in each column). Evaluation involves a GIS effort with field adjustment. Consider sources draining to assessment area within entire upstream watershed (WS), within 5 miles and within the watershed draining to the assessment area (5M), and within 2 miles and within the watershed draining to the assessment area (2M).

- | | | | |
|---------------------------------------|---------------------------------------|---------------------------------------|---|
| WS | 5M | 2M | |
| <input type="checkbox"/> A | <input type="checkbox"/> A | <input type="checkbox"/> A | ≥ 10% impervious surfaces |
| <input type="checkbox"/> B | <input type="checkbox"/> B | <input type="checkbox"/> B | Confined animal operations (or other local, concentrated source of pollutants) |
| <input checked="" type="checkbox"/> C | <input checked="" type="checkbox"/> C | <input checked="" type="checkbox"/> C | ≥ 20% coverage of pasture |
| <input type="checkbox"/> D | <input type="checkbox"/> D | <input type="checkbox"/> D | ≥ 20% coverage of agricultural land (regularly plowed land) |
| <input checked="" type="checkbox"/> E | <input checked="" type="checkbox"/> E | <input checked="" type="checkbox"/> E | ≥ 20% coverage of maintained grass/herb |
| <input type="checkbox"/> F | <input type="checkbox"/> F | <input type="checkbox"/> F | ≥ 20% coverage of clear-cut land |
| <input type="checkbox"/> G | <input type="checkbox"/> G | <input type="checkbox"/> G | Little or no opportunity to improve water quality. Lack of opportunity may result from little or no disturbance in the watershed or hydrologic alterations that prevent drainage and/or overbank flow from affecting the assessment area. |

7. Wetland Acting as Vegetated Buffer – assessment area/wetland complex condition metric (skip for non-riparian wetlands)

- 7a. Is assessment area within 50 feet of a tributary or other open water?
 Yes No If Yes, continue to 7b. If No, skip to Metric 8.
 Wetland buffer need only be present on one side of the water body. Make buffer judgment based on the average width of wetland. Record a note if a portion of the buffer has been removed or disturbed.
- 7b. How much of the first 50 feet from the bank is wetland? (Wetland buffer need only be present on one side of the water body. Make buffer judgment based on the average width of wetland. Record a note if a portion of the buffer has been removed or disturbed.)
 A ≥ 50 feet
 B From 30 to < 50 feet
 C From 15 to < 30 feet
 D From 5 to < 15 feet
 E < 5 feet or buffer bypassed by ditches
- 7c. Tributary width. If the tributary is anastomosed, combine widths of channels/braids for a total width.
 ≤ 15-foot wide > 15-foot wide Other open water (no tributary present)
- 7d. Do roots of assessment area vegetation extend into the bank of the tributary/open water?
 Yes No
- 7e. Is stream or other open water sheltered or exposed?
 Sheltered – adjacent open water with width < 2500 feet and no regular boat traffic.
 Exposed – adjacent open water with width ≥ 2500 feet or regular boat traffic.

8. Wetland Width at the Assessment Area – wetland type/wetland complex condition metric (evaluate WT for all marshes and Estuarine Woody Wetland only; evaluate WC for Bottomland Hardwood Forest, Headwater Forest, and Riverine Swamp Forest only)

Check a box in each column for riverine wetlands only. Select the average width for the wetland type at the assessment area (WT) and the wetland complex at the assessment area (WC). See User Manual for WT and WC boundaries.

- | | | |
|---------------------------------------|---------------------------------------|-----------------------|
| WT | WC | |
| <input type="checkbox"/> A | <input type="checkbox"/> A | ≥ 100 feet |
| <input type="checkbox"/> B | <input type="checkbox"/> B | From 80 to < 100 feet |
| <input checked="" type="checkbox"/> C | <input checked="" type="checkbox"/> C | From 50 to < 80 feet |
| <input type="checkbox"/> D | <input type="checkbox"/> D | From 40 to < 50 feet |
| <input type="checkbox"/> E | <input type="checkbox"/> E | From 30 to < 40 feet |
| <input type="checkbox"/> F | <input type="checkbox"/> F | From 15 to < 30 feet |
| <input type="checkbox"/> G | <input type="checkbox"/> G | From 5 to < 15 feet |
| <input type="checkbox"/> H | <input type="checkbox"/> H | < 5 feet |

9. Inundation Duration – assessment area condition metric (skip for non-riparian wetlands)

Answer for assessment area dominant landform.

- A Evidence of short-duration inundation (< 7 consecutive days)
 B Evidence of saturation, without evidence of inundation
 C Evidence of long-duration inundation or very long-duration inundation (7 to 30 consecutive days or more)

10. Indicators of Deposition – assessment area condition metric (skip for non-riparian wetlands and all marshes)

Consider recent deposition only (no plant growth since deposition).

- A Sediment deposition is not excessive, but at approximately natural levels.
 B Sediment deposition is excessive, but not overwhelming the wetland.
 C Sediment deposition is excessive and is overwhelming the wetland.

11. Wetland Size – wetland type/wetland complex condition metric

Check a box in each column. Involves a GIS effort with field adjustment. This metric evaluates three aspects of the wetland area: the size of the wetland type (WT), the size of the wetland complex (WC), and the size of the forested wetland (FW) (if applicable, see User Manual). See the User Manual for boundaries of these evaluation areas. If assessment area is clear-cut, select "K" for the FW column.

- | | | |
|---------------------------------------|---------------------------------------|---|
| WT | WC | FW (if applicable) |
| <input type="checkbox"/> A | <input type="checkbox"/> A | <input type="checkbox"/> A ≥ 500 acres |
| <input type="checkbox"/> B | <input type="checkbox"/> B | <input type="checkbox"/> B From 100 to < 500 acres |
| <input type="checkbox"/> C | <input type="checkbox"/> C | <input type="checkbox"/> C From 50 to < 100 acres |
| <input type="checkbox"/> D | <input type="checkbox"/> D | <input type="checkbox"/> D From 25 to < 50 acres |
| <input type="checkbox"/> E | <input type="checkbox"/> E | <input type="checkbox"/> E From 10 to < 25 acres |
| <input type="checkbox"/> F | <input type="checkbox"/> F | <input type="checkbox"/> F From 5 to < 10 acres |
| <input type="checkbox"/> G | <input type="checkbox"/> G | <input type="checkbox"/> G From 1 to < 5 acres |
| <input type="checkbox"/> H | <input type="checkbox"/> H | <input type="checkbox"/> H From 0.5 to < 1 acre |
| <input checked="" type="checkbox"/> I | <input checked="" type="checkbox"/> I | <input type="checkbox"/> I From 0.1 to < 0.5 acre |
| <input type="checkbox"/> J | <input type="checkbox"/> J | <input type="checkbox"/> J From 0.01 to < 0.1 acre |
| <input type="checkbox"/> K | <input type="checkbox"/> K | <input checked="" type="checkbox"/> K < 0.01 acre or assessment area is clear-cut |

12. Wetland Intactness – wetland type condition metric (evaluate for Pocosins only)

- A Pocosin is the full extent (≥ 90%) of its natural landscape size.
 B Pocosin type is < 90% of the full extent of its natural landscape size.

13. Connectivity to Other Natural Areas – landscape condition metric

13a. Check appropriate box(es) (a box may be checked in each column). Involves a GIS effort with field adjustment. This metric evaluates whether the wetland is well connected (Well) and/or loosely connected (Loosely) to the landscape patch, the contiguous naturally vegetated area and open water (if appropriate). Boundaries are formed by four-lane roads, regularly maintained utility line corridors the width of a four-lane road or wider, urban landscapes, maintained fields (pasture and agriculture), or open water > 300 feet wide.

- | | | |
|---------------------------------------|---------------------------------------|--|
| Well | Loosely | |
| <input type="checkbox"/> A | <input type="checkbox"/> A | ≥ 500 acres |
| <input type="checkbox"/> B | <input type="checkbox"/> B | From 100 to < 500 acres |
| <input type="checkbox"/> C | <input type="checkbox"/> C | From 50 to < 100 acres |
| <input type="checkbox"/> D | <input type="checkbox"/> D | From 10 to < 50 acres |
| <input type="checkbox"/> E | <input type="checkbox"/> E | < 10 acres |
| <input checked="" type="checkbox"/> F | <input checked="" type="checkbox"/> F | Wetland type has a poor or no connection to other natural habitats |

13b. Evaluate for marshes only.

- Yes No Wetland type has a surface hydrology connection to open waters/stream or tidal wetlands.

14. Edge Effect – wetland type condition metric (skip for all marshes and Estuarine Woody Wetland)

May involve a GIS effort with field adjustment. Estimate distance from wetland type boundary to artificial edges. Artificial edges include non-forested areas ≥ 40 feet wide such as fields, development, roads, regularly maintained utility line corridors, and clear-cuts. Consider the eight main points of the compass. Artificial edge occurs within 150 feet in how many directions? If the assessment area is clear cut, select option "C."

- A 0
 B 1 to 4
 C 5 to 8

15. Vegetative Composition – assessment area condition metric (skip for all marshes and Pine Flat)

- A Vegetation is close to reference condition in species present and their proportions. Lower strata composed of appropriate species, with exotic plants absent or sparse within the assessment area.
 B Vegetation is different from reference condition in species diversity or proportions, but still largely composed of native species characteristic of the wetland type. This may include communities of weedy native species that develop after clearcutting or clearing. It also includes communities with exotics present, but not dominant, over a large portion of the expected strata.
 C Vegetation severely altered from reference in composition, or expected species are unnaturally absent (planted stands of non-characteristic species or at least one stratum inappropriately composed of a single species), or exotic species are dominant in at least one stratum.

16. Vegetative Diversity – assessment area condition metric (evaluate for Non-tidal Freshwater Marsh only)

- A Vegetation diversity is high and is composed primarily of native species (< 10% cover of exotics).
 B Vegetation diversity is low or has > 10% to 50% cover of exotics.
 C Vegetation is dominated by exotic species (> 50 % cover of exotics).

17. **Vegetative Structure – assessment area/wetland type condition metric**

17a. Is vegetation present?

Yes No If Yes, continue to 17b. If No, skip to Metric 18.

17b. Evaluate percent coverage of assessment area vegetation for all marshes only. Skip to 17c for non-marsh wetlands.

A ≥ 25% coverage of vegetation
 B < 25% coverage of vegetation

17c. **Check a box in each column for each stratum.** Evaluate this portion of the metric for non-marsh wetlands. Consider structure in airspace above the assessment area (AA) and the wetland type (WT) separately.

	AA	WT	
Canopy	<input type="checkbox"/> A	<input type="checkbox"/> A	Canopy closed, or nearly closed, with natural gaps associated with natural processes
	<input type="checkbox"/> B	<input type="checkbox"/> B	Canopy present, but opened more than natural gaps
	<input checked="" type="checkbox"/> C	<input checked="" type="checkbox"/> C	Canopy sparse or absent
Mid-Story	<input type="checkbox"/> A	<input type="checkbox"/> A	Dense mid-story/sapling layer
	<input type="checkbox"/> B	<input type="checkbox"/> B	Moderate density mid-story/sapling layer
	<input checked="" type="checkbox"/> C	<input checked="" type="checkbox"/> C	Mid-story/sapling layer sparse or absent
Shrub	<input type="checkbox"/> A	<input type="checkbox"/> A	Dense shrub layer
	<input type="checkbox"/> B	<input type="checkbox"/> B	Moderate density shrub layer
	<input checked="" type="checkbox"/> C	<input checked="" type="checkbox"/> C	Shrub layer sparse or absent
Herb	<input checked="" type="checkbox"/> A	<input checked="" type="checkbox"/> A	Dense herb layer
	<input type="checkbox"/> B	<input type="checkbox"/> B	Moderate density herb layer
	<input type="checkbox"/> C	<input type="checkbox"/> C	Herb layer sparse or absent

18. **Snags – wetland type condition metric (skip for all marshes)**

A Large snags (more than one) are visible (> 12 inches DBH, or large relative to species present and landscape stability).
 B Not A

19. **Diameter Class Distribution – wetland type condition metric (skip for all marshes)**

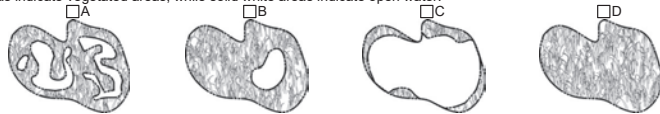
A Majority of canopy trees have stems > 6 inches in diameter at breast height (DBH); many large trees (> 12 inches DBH) are present.
 B Majority of canopy trees have stems between 6 and 12 inches DBH, few are > 12 inch DBH.
 C Majority of canopy trees are < 6 inches DBH or no trees.

20. **Large Woody Debris – wetland type condition metric (skip for all marshes)**

Include both natural debris and man-placed natural debris.
 A Large logs (more than one) are visible (> 12 inches in diameter, or large relative to species present and landscape stability).
 B Not A

21. **Vegetation/Open Water Dispersion – wetland type/open water condition metric (evaluate for Non-Tidal Freshwater Marsh only)**

Select the figure that best describes the amount of interspersed vegetation and open water in the growing season. Patterned areas indicate vegetated areas, while solid white areas indicate open water.



22. **Hydrologic Connectivity – assessment area condition metric (evaluate for riparian wetlands and Salt/Brackish Marsh only)**

Examples of activities that may severely alter hydrologic connectivity include intensive ditching, fill, sedimentation, channelization, diversion, man-made berms, beaver dams, and stream incision. Documentation required if evaluated as B, C, or D.

A Overbank and overland flow are not severely altered in the assessment area.
 B Overbank flow is severely altered in the assessment area.
 C Overland flow is severely altered in the assessment area.
 D Both overbank and overland flow are severely altered in the assessment area.

Notes

**NC WAM Wetland Rating Sheet
 Accompanies User Manual Version 5.0**

Wetland Site Name Wetland J Date of Assessment 7/30/2020
 Wetland Type Bottomland Hardwood Forest Assessor Name/Organization C. Neaves

Notes on Field Assessment Form (Y/N) NO
 Presence of regulatory considerations (Y/N) NO
 Wetland is intensively managed (Y/N) _____
 Assessment area is located within 50 feet of a natural tributary or other open water (Y/N) NO
 Assessment area is substantially altered by beaver (Y/N) _____
 Assessment area experiences overbank flooding during normal rainfall conditions (Y/N) _____
 Assessment area is on a coastal island (Y/N) _____

Sub-function Rating Summary

Function	Sub-function	Metrics	Rating
Hydrology	Surface Storage and Retention	Condition	LOW
		Sub-surface Storage and Retention	Condition LOW
Water Quality	Pathogen Change	Condition	LOW
		Condition/Opportunity	LOW
		Opportunity Presence (Y/N)	NO
	Particulate Change	Condition	LOW
		Condition/Opportunity	LOW
		Opportunity Presence (Y/N)	NO
	Soluble Change	Condition	MEDIUM
		Condition/Opportunity	MEDIUM
		Opportunity Presence (Y/N)	NO
	Physical Change	Condition	LOW
		Condition/Opportunity	LOW
		Opportunity Presence (Y/N)	NO
	Pollution Change	Condition	NA
		Condition/Opportunity	NA
		Opportunity Presence (Y/N)	NA
Habitat	Physical Structure	Condition	LOW
	Landscape Patch Structure	Condition	LOW
	Vegetation Composition	Condition	LOW

Function Rating Summary

Function	Metrics	Rating
Hydrology	Condition	LOW
	Water Quality	Condition LOW
	Condition/Opportunity	LOW
	Opportunity Presence (Y/N)	NO
Habitat	Condition	LOW

Overall Wetland Rating LOW

NC WAM FIELD ASSESSMENT FORM
Accompanies User Manual Version 5.0

USACE AID #	SAW-2020-00047	NCDWR#	20200035
Project Name	Liberty Rock Mitigation Site	Date of Evaluation	7/30/2020
Applicant/Owner Name	Widlands Engineering	Wetland Site Name	Wetland K
Wetland Type	Bottomland Hardwood Forest	Assessor Name/Organization	C. Neaves
Level III Ecoregion	Piedmont	Nearest Named Water Body	Rocky River
River Basin	Cape Fear	USGS 8-Digit Catalogue Unit	03030003
County	Randolph	NCDWR Region	Winston-Salem
<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	Precipitation within 48 hrs?	Latitude/Longitude (deci-degrees)	35.819988, -79.559667

Evidence of stressors affecting the assessment area (may not be within the assessment area)

Please circle and/or make note on the last page if evidence of stressors is apparent. Consider departure from reference, if appropriate, in recent past (for instance, within 10 years). Noteworthy stressors include, but are not limited to the following.

- Hydrological modifications (examples: ditches, dams, beaver dams, dikes, berms, ponds, etc.)
- Surface and sub-surface discharges into the wetland (examples: discharges containing obvious pollutants, presence of nearby septic tanks, underground storage tanks (USTs), hog lagoons, etc.)
- Signs of vegetation stress (examples: vegetation mortality, insect damage, disease, storm damage, salt intrusion, etc.)
- Habitat/plant community alteration (examples: mowing, clear-cutting, exotics, etc.)

Is the assessment area intensively managed? Yes No

Regulatory Considerations - Were regulatory considerations evaluated? Yes No If Yes, check all that apply to the assessment area.

- Anadromous fish
- Federally protected species or State endangered or threatened species
- NCDWR riparian buffer rule in effect
- Abuts a Primary Nursery Area (PNA)
- Publicly owned property
- N.C. Division of Coastal Management Area of Environmental Concern (AEC) (including buffer)
- Abuts a stream with a NCDWQ classification of SA or supplemental classifications of HQW, ORW, or Trout
- Designated NCNHP reference community
- Abuts a 303(d)-listed stream or a tributary to a 303(d)-listed stream

What type of natural stream is associated with the wetland, if any? (check all that apply)

- Blackwater
- Brownwater
- Tidal (if tidal, check one of the following boxes) Lunar Wind Both

Is the assessment area on a coastal island? Yes No

Is the assessment area's surface water storage capacity or duration substantially altered by beaver? Yes No

Does the assessment area experience overbank flooding during normal rainfall conditions? Yes No

1. Ground Surface Condition/Vegetation Condition – assessment area condition metric

Check a box in each column. Consider alteration to the ground surface (GS) in the assessment area and vegetation structure (VS) in the assessment area. Compare to reference wetland if applicable (see User Manual). If a reference is not applicable, then rate the assessment area based on evidence an effect.

- | | | |
|---------------------------------------|---------------------------------------|--|
| GS | VS | |
| <input checked="" type="checkbox"/> A | <input type="checkbox"/> A | Not severely altered |
| <input type="checkbox"/> B | <input checked="" type="checkbox"/> B | Severely altered over a majority of the assessment area (ground surface alteration examples: vehicle tracks, excessive sedimentation, fire-plow lanes, skidder tracks, bedding, fill, soil compaction, obvious pollutants) (vegetation structure alteration examples: mechanical disturbance, herbicides, salt intrusion [where appropriate], exotic species, grazing, less diversity [if appropriate], hydrologic alteration) |

2. Surface and Sub-Surface Storage Capacity and Duration – assessment area condition metric

Check a box in each column. Consider surface storage capacity and duration (Surf) and sub-surface storage capacity and duration (Sub). Consider both increase and decrease in hydrology. A ditch ≤ 1 foot deep is considered to affect surface water only, while a ditch > 1 foot deep is expected to affect both surface and sub-surface water. Consider tidal flooding regime, if applicable.

- | | | |
|---------------------------------------|---------------------------------------|--|
| Surf | Sub | |
| <input type="checkbox"/> A | <input type="checkbox"/> A | Water storage capacity and duration are not altered. |
| <input checked="" type="checkbox"/> B | <input checked="" type="checkbox"/> B | Water storage capacity or duration are altered, but not substantially (typically, not sufficient to change vegetation). |
| <input type="checkbox"/> C | <input type="checkbox"/> C | Water storage capacity or duration are substantially altered (typically, alteration sufficient to result in vegetation change) (examples: draining, flooding, soil compaction, filling, excessive sedimentation, underground utility lines). |

3. Water Storage/Surface Relief – assessment area/wetland type condition metric (skip for all marshes)

Check a box in each column. Select the appropriate storage for the assessment area (AA) and the wetland type (WT).

- | | | |
|---------------------------------------|---------------------------------------|---|
| AA | WT | |
| 3a. <input type="checkbox"/> A | <input type="checkbox"/> A | Majority of wetland with depressions able to pond water > 1 deep |
| <input type="checkbox"/> B | <input type="checkbox"/> B | Majority of wetland with depressions able to pond water 6 inches to 1 foot deep |
| <input type="checkbox"/> C | <input type="checkbox"/> C | Majority of wetland with depressions able to pond water 3 to 6 inches deep |
| <input checked="" type="checkbox"/> D | <input checked="" type="checkbox"/> D | Depressions able to pond water < 3 inches deep |
| 3b. <input type="checkbox"/> A | | Evidence that maximum depth of inundation is greater than 2 feet |
| <input type="checkbox"/> B | | Evidence that maximum depth of inundation is between 1 and 2 feet |
| <input checked="" type="checkbox"/> C | | Evidence that maximum depth of inundation is less than 1 foot |

4. Soil Texture/Structure – assessment area condition metric (skip for all marshes)

Check a box from each of the three soil property groups below. Dig soil profile in the dominant assessment area landscape feature. Make soil observations within the top 12 inches. Use most recent National Technical Committee for Hydric Soils guidance for regional indicators.

- 4a. A Sandy soil
- B Loamy or clayey soils exhibiting redoximorphic features (concentrations, depletions, or rhizospheres)
- C Loamy or clayey soils not exhibiting redoximorphic features
- D Loamy or clayey gleyed soil
- E Histosol or histc epipedon
- 4b. A Soil ribbon < 1 inch
- B Soil ribbon ≥ 1 inch
- 4c. A No peat or muck presence
- B A peat or muck presence

5. Discharge into Wetland – opportunity metric

Check a box in each column. Consider surface pollutants or discharges (Surf) and sub-surface pollutants or discharges (Sub). Examples of sub-surface discharges include presence of nearby septic tank, underground storage tank (UST), etc.

- | | | |
|---------------------------------------|---------------------------------------|---|
| Surf | Sub | |
| <input type="checkbox"/> A | <input checked="" type="checkbox"/> A | Little or no evidence of pollutants or discharges entering the assessment area |
| <input checked="" type="checkbox"/> B | <input type="checkbox"/> B | Noticeable evidence of pollutants or discharges entering the wetland and stressing, but not overwhelming the treatment capacity of the assessment area |
| <input type="checkbox"/> C | <input type="checkbox"/> C | Noticeable evidence of pollutants or discharges (pathogen, particulate, or soluble) entering the assessment area and potentially overwhelming the treatment capacity of the wetland (water discoloration, dead vegetation, excessive sedimentation, odor) |

6. Land Use – opportunity metric (skip for non-riparian wetlands)

Check all that apply (at least one box in each column). Evaluation involves a GIS effort with field adjustment. Consider sources draining to assessment area within entire upstream watershed (WS), within 5 miles and within the watershed draining to the assessment area (5M), and within 2 miles and within the watershed draining to the assessment area (2M).

- | | | | |
|---------------------------------------|---------------------------------------|---------------------------------------|---|
| WS | 5M | 2M | |
| <input type="checkbox"/> A | <input type="checkbox"/> A | <input type="checkbox"/> A | ≥ 10% impervious surfaces |
| <input type="checkbox"/> B | <input type="checkbox"/> B | <input type="checkbox"/> B | Confined animal operations (or other local, concentrated source of pollutants) |
| <input checked="" type="checkbox"/> C | <input checked="" type="checkbox"/> C | <input checked="" type="checkbox"/> C | ≥ 20% coverage of pasture |
| <input type="checkbox"/> D | <input type="checkbox"/> D | <input type="checkbox"/> D | ≥ 20% coverage of agricultural land (regularly plowed land) |
| <input type="checkbox"/> E | <input checked="" type="checkbox"/> E | <input checked="" type="checkbox"/> E | ≥ 20% coverage of maintained grass/herb |
| <input type="checkbox"/> F | <input checked="" type="checkbox"/> F | <input type="checkbox"/> F | ≥ 20% coverage of clear-cut land |
| <input type="checkbox"/> G | <input type="checkbox"/> G | <input type="checkbox"/> G | Little or no opportunity to improve water quality. Lack of opportunity may result from little or no disturbance in the watershed or hydrologic alterations that prevent drainage and/or overbank flow from affecting the assessment area. |

7. Wetland Acting as Vegetated Buffer – assessment area/wetland complex condition metric (skip for non-riparian wetlands)

- 7a. Is assessment area within 50 feet of a tributary or other open water?
 Yes No If Yes, continue to 7b. If No, skip to Metric 8.
 Wetland buffer need only be present on one side of the water body. Make buffer judgment based on the average width of wetland. Record a note if a portion of the buffer has been removed or disturbed.
- 7b. How much of the first 50 feet from the bank is wetland? (Wetland buffer need only be present on one side of the water body. Make buffer judgment based on the average width of wetland. Record a note if a portion of the buffer has been removed or disturbed.)
- | | |
|---------------------------------------|--|
| <input type="checkbox"/> A | ≥ 50 feet |
| <input type="checkbox"/> B | From 30 to < 50 feet |
| <input type="checkbox"/> C | From 15 to < 30 feet |
| <input checked="" type="checkbox"/> D | From 5 to < 15 feet |
| <input type="checkbox"/> E | < 5 feet or buffer bypassed by ditches |
- 7c. Tributary width. If the tributary is anastomosed, combine widths of channels/braids for a total width.
 ≤ 15-foot wide > 15-foot wide Other open water (no tributary present)
- 7d. Do roots of assessment area vegetation extend into the bank of the tributary/open water?
 Yes No
- 7e. Is stream or other open water sheltered or exposed?
 Sheltered – adjacent open water with width < 2500 feet and no regular boat traffic.
 Exposed – adjacent open water with width ≥ 2500 feet or regular boat traffic.

8. Wetland Width at the Assessment Area – wetland type/wetland complex condition metric (evaluate WT for all marshes and Estuarine Woody Wetland only; evaluate WC for Bottomland Hardwood Forest, Headwater Forest, and Riverine Swamp Forest only)

Check a box in each column for riverine wetlands only. Select the average width for the wetland type at the assessment area (WT) and the wetland complex at the assessment area (WC). See User Manual for WT and WC boundaries.

- | | | |
|---------------------------------------|---------------------------------------|-----------------------|
| WT | WC | |
| <input type="checkbox"/> A | <input type="checkbox"/> A | ≥ 100 feet |
| <input type="checkbox"/> B | <input type="checkbox"/> B | From 80 to < 100 feet |
| <input type="checkbox"/> C | <input type="checkbox"/> C | From 50 to < 80 feet |
| <input type="checkbox"/> D | <input type="checkbox"/> D | From 40 to < 50 feet |
| <input type="checkbox"/> E | <input type="checkbox"/> E | From 30 to < 40 feet |
| <input checked="" type="checkbox"/> F | <input checked="" type="checkbox"/> F | From 15 to < 30 feet |
| <input type="checkbox"/> G | <input type="checkbox"/> G | From 5 to < 15 feet |
| <input type="checkbox"/> H | <input type="checkbox"/> H | < 5 feet |

9. Inundation Duration – assessment area condition metric (skip for non-riparian wetlands)

Answer for assessment area dominant landform.

- A Evidence of short-duration inundation (< 7 consecutive days)
B Evidence of saturation, without evidence of inundation
C Evidence of long-duration inundation or very long-duration inundation (7 to 30 consecutive days or more)

10. Indicators of Deposition – assessment area condition metric (skip for non-riparian wetlands and all marshes)

Consider recent deposition only (no plant growth since deposition).

- A Sediment deposition is not excessive, but at approximately natural levels.
B Sediment deposition is excessive, but not overwhelming the wetland.
C Sediment deposition is excessive and is overwhelming the wetland.

11. Wetland Size – wetland type/wetland complex condition metric

Check a box in each column. Involves a GIS effort with field adjustment. This metric evaluates three aspects of the wetland area: the size of the wetland type (WT), the size of the wetland complex (WC), and the size of the forested wetland (FW) (if applicable, see User Manual). See the User Manual for boundaries of these evaluation areas. If assessment area is clear-cut, select "K" for the FW column.

- | | | |
|---------------------------------------|---------------------------------------|--|
| WT | WC | FW (if applicable) |
| <input type="checkbox"/> A | <input type="checkbox"/> A | <input type="checkbox"/> A ≥ 500 acres |
| <input type="checkbox"/> B | <input type="checkbox"/> B | <input type="checkbox"/> B From 100 to < 500 acres |
| <input type="checkbox"/> C | <input type="checkbox"/> C | <input type="checkbox"/> C From 50 to < 100 acres |
| <input type="checkbox"/> D | <input type="checkbox"/> D | <input type="checkbox"/> D From 25 to < 50 acres |
| <input type="checkbox"/> E | <input type="checkbox"/> E | <input type="checkbox"/> E From 10 to < 25 acres |
| <input type="checkbox"/> F | <input type="checkbox"/> F | <input type="checkbox"/> F From 5 to < 10 acres |
| <input type="checkbox"/> G | <input type="checkbox"/> G | <input type="checkbox"/> G From 1 to < 5 acres |
| <input type="checkbox"/> H | <input type="checkbox"/> H | <input type="checkbox"/> H From 0.5 to < 1 acre |
| <input type="checkbox"/> I | <input type="checkbox"/> I | <input type="checkbox"/> I From 0.1 to < 0.5 acre |
| <input checked="" type="checkbox"/> J | <input checked="" type="checkbox"/> J | <input type="checkbox"/> J From 0.01 to < 0.1 acre |
| <input type="checkbox"/> K | <input type="checkbox"/> K | <input checked="" type="checkbox"/> K < 0.01 acre <u>or</u> assessment area is clear-cut |

12. Wetland Intactness – wetland type condition metric (evaluate for Pocosins only)

- A Pocosin is the full extent (≥ 90%) of its natural landscape size.
B Pocosin type is < 90% of the full extent of its natural landscape size.

13. Connectivity to Other Natural Areas – landscape condition metric

13a. Check appropriate box(es) (a box may be checked in each column). Involves a GIS effort with field adjustment. This metric evaluates whether the wetland is well connected (Well) and/or loosely connected (Loosely) to the landscape patch, the contiguous naturally vegetated area and open water (if appropriate). Boundaries are formed by four-lane roads, regularly maintained utility line corridors the width of a four-lane road or wider, urban landscapes, maintained fields (pasture and agriculture), or open water > 300 feet wide.

- | | |
|----------------------------|--|
| Well | Loosely |
| <input type="checkbox"/> A | <input type="checkbox"/> A ≥ 500 acres |
| <input type="checkbox"/> B | <input type="checkbox"/> B From 100 to < 500 acres |
| <input type="checkbox"/> C | <input type="checkbox"/> C From 50 to < 100 acres |
| <input type="checkbox"/> D | <input type="checkbox"/> D From 10 to < 50 acres |
| <input type="checkbox"/> E | <input type="checkbox"/> E < 10 acres |
| <input type="checkbox"/> F | <input checked="" type="checkbox"/> F Wetland type has a poor or no connection to other natural habitats |

13b. Evaluate for marshes only.

- Yes No Wetland type has a surface hydrology connection to open waters/stream or tidal wetlands.

14. Edge Effect – wetland type condition metric (skip for all marshes and Estuarine Woody Wetland)

May involve a GIS effort with field adjustment. Estimate distance from wetland type boundary to artificial edges. Artificial edges include non-forested areas ≥ 40 feet wide such as fields, development, roads, regularly maintained utility line corridors, and clear-cuts. Consider the eight main points of the compass. Artificial edge occurs within 150 feet in how many directions? If the assessment area is clear cut, select option "C."

- A 0
B 1 to 4
C 5 to 8

15. Vegetative Composition – assessment area condition metric (skip for all marshes and Pine Flat)

- A Vegetation is close to reference condition in species present and their proportions. Lower strata composed of appropriate species, with exotic plants absent or sparse within the assessment area.
B Vegetation is different from reference condition in species diversity or proportions, but still largely composed of native species characteristic of the wetland type. This may include communities of weedy native species that develop after clearcutting or clearing. It also includes communities with exotics present, but not dominant, over a large portion of the expected strata.
C Vegetation severely altered from reference in composition, or expected species are unnaturally absent (planted stands of non-characteristic species or at least one stratum inappropriately composed of a single species), or exotic species are dominant in at least one stratum.

16. Vegetative Diversity – assessment area condition metric (evaluate for Non-tidal Freshwater Marsh only)

- A Vegetation diversity is high and is composed primarily of native species (< 10% cover of exotics).
B Vegetation diversity is low or has > 10% to 50% cover of exotics.
C Vegetation is dominated by exotic species (> 50 % cover of exotics).

17. Vegetative Structure – assessment area/wetland type condition metric

17a. Is vegetation present?

- Yes No If Yes, continue to 17b. If No, skip to Metric 18.

17b. Evaluate percent coverage of assessment area vegetation for all marshes only. Skip to 17c for non-marsh wetlands.

- A ≥ 25% coverage of vegetation
B < 25% coverage of vegetation

17c. Check a box in each column for each stratum. Evaluate this portion of the metric for non-marsh wetlands. Consider structure in airspace above the assessment area (AA) and the wetland type (WT) separately.

- | | | | |
|-----------|---------------------------------------|---------------------------------------|--|
| | AA | WT | |
| Canopy | <input type="checkbox"/> A | <input type="checkbox"/> A | Canopy closed, or nearly closed, with natural gaps associated with natural processes |
| | <input type="checkbox"/> B | <input type="checkbox"/> B | Canopy present, but opened more than natural gaps |
| | <input checked="" type="checkbox"/> C | <input checked="" type="checkbox"/> C | Canopy sparse or absent |
| Mid-Story | <input type="checkbox"/> A | <input type="checkbox"/> A | Dense mid-story/sapling layer |
| | <input type="checkbox"/> B | <input type="checkbox"/> B | Moderate density mid-story/sapling layer |
| | <input checked="" type="checkbox"/> C | <input checked="" type="checkbox"/> C | Mid-story/sapling layer sparse or absent |
| Shrub | <input type="checkbox"/> A | <input type="checkbox"/> A | Dense shrub layer |
| | <input type="checkbox"/> B | <input type="checkbox"/> B | Moderate density shrub layer |
| | <input checked="" type="checkbox"/> C | <input checked="" type="checkbox"/> C | Shrub layer sparse or absent |
| Herb | <input checked="" type="checkbox"/> A | <input checked="" type="checkbox"/> A | Dense herb layer |
| | <input type="checkbox"/> B | <input type="checkbox"/> B | Moderate density herb layer |
| | <input type="checkbox"/> C | <input type="checkbox"/> C | Herb layer sparse or absent |

18. Snags – wetland type condition metric (skip for all marshes)

- A Large snags (more than one) are visible (> 12 inches DBH, or large relative to species present and landscape stability).
B Not A

19. Diameter Class Distribution – wetland type condition metric (skip for all marshes)

- A Majority of canopy trees have stems > 6 inches in diameter at breast height (DBH); many large trees (> 12 inches DBH) are present.
B Majority of canopy trees have stems between 6 and 12 inches DBH, few are > 12 inch DBH.
C Majority of canopy trees are < 6 inches DBH or no trees.

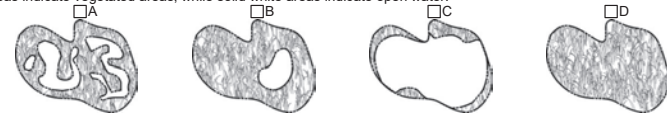
20. Large Woody Debris – wetland type condition metric (skip for all marshes)

Include both natural debris and man-placed natural debris.

- A Large logs (more than one) are visible (> 12 inches in diameter, or large relative to species present and landscape stability).
B Not A

21. Vegetation/Open Water Dispersion – wetland type/open water condition metric (evaluate for Non-Tidal Freshwater Marsh only)

Select the figure that best describes the amount of interspersed between vegetation and open water in the growing season. Patterned areas indicate vegetated areas, while solid white areas indicate open water.



22. Hydrologic Connectivity – assessment area condition metric (evaluate for riparian wetlands and Salt/Brackish Marsh only)

Examples of activities that may severely alter hydrologic connectivity include intensive ditching, fill, sedimentation, channelization, diversion, man-made berms, beaver dams, and stream incision. Documentation required if evaluated as B, C, or D.

- A Overbank and overland flow are not severely altered in the assessment area.
B Overbank flow is severely altered in the assessment area.
C Overland flow is severely altered in the assessment area.
D Both overbank and overland flow are severely altered in the assessment area.

Notes

NC WAM Wetland Rating Sheet
Accompanies User Manual Version 5.0

Wetland Site Name Wetland K Date of Assessment 7/30/2020
 Wetland Type Bottomland Hardwood Forest Assessor Name/Organization C. Neaves
 Notes on Field Assessment Form (Y/N) NO
 Presence of regulatory considerations (Y/N) NO
 Wetland is intensively managed (Y/N) _____
 Assessment area is located within 50 feet of a natural tributary or other open water (Y/N) YES
 Assessment area is substantially altered by beaver (Y/N) _____
 Assessment area experiences overbank flooding during normal rainfall conditions (Y/N) _____
 Assessment area is on a coastal island (Y/N) _____

Sub-function Rating Summary

Function	Sub-function	Metrics	Rating
Hydrology	Surface Storage and Retention	Condition	LOW
	Sub-surface Storage and Retention	Condition	LOW
Water Quality	Pathogen Change	Condition	LOW
		Condition/Opportunity	LOW
	Particulate Change	Opportunity Presence (Y/N)	NO
		Condition	LOW
	Soluble Change	Condition/Opportunity	LOW
		Opportunity Presence (Y/N)	NO
	Physical Change	Condition	MEDIUM
		Condition/Opportunity	MEDIUM
	Pollution Change	Opportunity Presence (Y/N)	NO
		Condition	LOW
Habitat	Physical Structure	Condition/Opportunity	LOW
	Landscape Patch Structure	Condition	LOW
	Vegetation Composition	Opportunity Presence (Y/N)	NO
		Condition	LOW

Function Rating Summary

Function	Metrics	Rating
Hydrology	Condition	LOW
Water Quality	Condition	LOW
	Condition/Opportunity	LOW
	Opportunity Presence (Y/N)	NO
Habitat	Condition	LOW

Overall Wetland Rating LOW

NC WAM FIELD ASSESSMENT FORM
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USACE AID #	SAW-2020-00047	NCDWR#	20200035
Project Name	Liberty Rock Mitigation Site	Date of Evaluation	7/30/2020
Applicant/Owner Name	Wildlands Engineering	Wetland Site Name	Wetland L
Wetland Type	Bottomland Hardwood Forest	Assessor Name/Organization	C. Neaves
Level III Ecoregion	Piedmont	Nearest Named Water Body	Rocky River
River Basin	Cape Fear	USGS 8-Digit Catalogue Unit	03030003
County	Randolph	NCDWR Region	Winston-Salem
<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	Precipitation within 48 hrs?	Latitude/Longitude (deci-degrees)	35.820242, -79.563800

Evidence of stressors affecting the assessment area (may not be within the assessment area)
 Please circle and/or make note on the last page if evidence of stressors is apparent. Consider departure from reference, if appropriate, in recent past (for instance, within 10 years). Noteworthy stressors include, but are not limited to the following.

- Hydrological modifications (examples: ditches, dams, beaver dams, dikes, berms, ponds, etc.)
- Surface and sub-surface discharges into the wetland (examples: discharges containing obvious pollutants, presence of nearby septic tanks, underground storage tanks (USTs), hog lagoons, etc.)
- Signs of vegetation stress (examples: vegetation mortality, insect damage, storm damage, salt intrusion, etc.)
- Habitat/plant community alteration (examples: mowing, clear-cutting, exotics, etc.)

Is the assessment area intensively managed? Yes No

Regulatory Considerations - Were regulatory considerations evaluated? Yes No If Yes, check all that apply to the assessment area.

- Anadromous fish
- Federally protected species or State endangered or threatened species
- NCDWR riparian buffer rule in effect
- Abuts a Primary Nursery Area (PNA)
- Publicly owned property
- N.C. Division of Coastal Management Area of Environmental Concern (AEC) (including buffer)
- Abuts a stream with a NCDWQ classification of SA or supplemental classifications of HQW, ORW, or Trout
- Designated NCNHP reference community
- Abuts a 303(d)-listed stream or a tributary to a 303(d)-listed stream

What type of natural stream is associated with the wetland, if any? (check all that apply)

- Blackwater
- Brownwater
- Tidal (if tidal, check one of the following boxes) Lunar Wind Both

Is the assessment area on a coastal island? Yes No

Is the assessment area's surface water storage capacity or duration substantially altered by beaver? Yes No

Does the assessment area experience overbank flooding during normal rainfall conditions? Yes No

- Ground Surface Condition/Vegetation Condition – assessment area condition metric**
Check a box in each column. Consider alteration to the ground surface (GS) in the assessment area and vegetation structure (VS) in the assessment area. Compare to reference wetland if applicable (see User Manual). If a reference is not applicable, then rate the assessment area based on evidence an effect.

GS	VS	
<input checked="" type="checkbox"/> A	<input type="checkbox"/> A	Not severely altered
<input type="checkbox"/> B	<input checked="" type="checkbox"/> B	Severely altered over a majority of the assessment area (ground surface alteration examples: vehicle tracks, excessive sedimentation, fire-plow lanes, skidder tracks, bedding, fill, soil compaction, obvious pollutants) (vegetation structure alteration examples: mechanical disturbance, herbicides, salt intrusion [where appropriate], exotic species, grazing, less diversity [if appropriate], hydrologic alteration)
- Surface and Sub-Surface Storage Capacity and Duration – assessment area condition metric**
Check a box in each column. Consider surface storage capacity and duration (Surf) and sub-surface storage capacity and duration (Sub). Consider both increase and decrease in hydrology. A ditch ≤ 1 foot deep is considered to affect surface water only, while a ditch > 1 foot deep is expected to affect both surface and sub-surface water. Consider tidal flooding regime, if applicable.

Surf	Sub	
<input type="checkbox"/> A	<input type="checkbox"/> A	Water storage capacity and duration are not altered.
<input checked="" type="checkbox"/> B	<input checked="" type="checkbox"/> B	Water storage capacity or duration are altered, but not substantially (typically, not sufficient to change vegetation).
<input type="checkbox"/> C	<input type="checkbox"/> C	Water storage capacity or duration are substantially altered (typically, alteration sufficient to result in vegetation change) (examples: draining, flooding, soil compaction, filling, excessive sedimentation, underground utility lines).
- Water Storage/Surface Relief – assessment area/wetland type condition metric (skip for all marshes)**
Check a box in each column. Select the appropriate storage for the assessment area (AA) and the wetland type (WT).

AA	WT	
3a. <input type="checkbox"/> A	<input type="checkbox"/> A	Majority of wetland with depressions able to pond water > 1 foot deep
<input type="checkbox"/> B	<input type="checkbox"/> B	Majority of wetland with depressions able to pond water 6 inches to 1 foot deep
<input type="checkbox"/> C	<input type="checkbox"/> C	Majority of wetland with depressions able to pond water 3 to 6 inches deep
<input checked="" type="checkbox"/> D	<input checked="" type="checkbox"/> D	Depressions able to pond water < 3 inches deep
3b. <input type="checkbox"/> A	<input type="checkbox"/> A	Evidence that maximum depth of inundation is greater than 2 feet
<input type="checkbox"/> B	<input type="checkbox"/> B	Evidence that maximum depth of inundation is between 1 and 2 feet
<input checked="" type="checkbox"/> C	<input checked="" type="checkbox"/> C	Evidence that maximum depth of inundation is less than 1 foot

4. Soil Texture/Structure – assessment area condition metric (skip for all marshes)

Check a box from each of the three soil property groups below. Dig soil profile in the dominant assessment area landscape feature. Make soil observations within the top 12 inches. Use most recent National Technical Committee for Hydric Soils guidance for regional indicators.

- 4a. A Sandy soil
 B Loamy or clayey soils exhibiting redoximorphic features (concentrations, depletions, or rhizospheres)
 C Loamy or clayey soils not exhibiting redoximorphic features
 D Loamy or clayey gleyed soil
 E Histosol or histc epipedon
- 4b. A Soil ribbon < 1 inch
 B Soil ribbon ≥ 1 inch
- 4c. A No peat or muck presence
 B A peat or muck presence

5. Discharge into Wetland – opportunity metric

Check a box in each column. Consider surface pollutants or discharges (Surf) and sub-surface pollutants or discharges (Sub). Examples of sub-surface discharges include presence of nearby septic tank, underground storage tank (UST), etc.

- | | | |
|----------------------------|----------------------------|---|
| Surf | Sub | |
| <input type="checkbox"/> A | <input type="checkbox"/> A | Little or no evidence of pollutants or discharges entering the assessment area |
| <input type="checkbox"/> B | <input type="checkbox"/> B | Noticeable evidence of pollutants or discharges entering the wetland and stressing, but not overwhelming the treatment capacity of the assessment area |
| <input type="checkbox"/> C | <input type="checkbox"/> C | Noticeable evidence of pollutants or discharges (pathogen, particulate, or soluble) entering the assessment area and potentially overwhelming the treatment capacity of the wetland (water discoloration, dead vegetation, excessive sedimentation, odor) |

6. Land Use – opportunity metric (skip for non-riparian wetlands)

Check all that apply (at least one box in each column). Evaluation involves a GIS effort with field adjustment. Consider sources draining to assessment area within entire upstream watershed (WS), within 5 miles and within the watershed draining to the assessment area (5M), and within 2 miles and within the watershed draining to the assessment area (2M).

- | | | | |
|---------------------------------------|---------------------------------------|---------------------------------------|---|
| WS | 5M | 2M | |
| <input type="checkbox"/> A | <input type="checkbox"/> A | <input type="checkbox"/> A | ≥ 10% impervious surfaces |
| <input type="checkbox"/> B | <input type="checkbox"/> B | <input type="checkbox"/> B | Confined animal operations (or other local, concentrated source of pollutants) |
| <input checked="" type="checkbox"/> C | <input checked="" type="checkbox"/> C | <input checked="" type="checkbox"/> C | ≥ 20% coverage of pasture |
| <input type="checkbox"/> D | <input type="checkbox"/> D | <input type="checkbox"/> D | ≥ 20% coverage of agricultural land (regularly plowed land) |
| <input checked="" type="checkbox"/> E | <input checked="" type="checkbox"/> E | <input checked="" type="checkbox"/> E | ≥ 20% coverage of maintained grass/herb |
| <input type="checkbox"/> F | <input type="checkbox"/> F | <input type="checkbox"/> F | ≥ 20% coverage of clear-cut land |
| <input type="checkbox"/> G | <input type="checkbox"/> G | <input type="checkbox"/> G | Little or no opportunity to improve water quality. Lack of opportunity may result from little or no disturbance in the watershed or hydrologic alterations that prevent drainage and/or overbank flow from affecting the assessment area. |

7. Wetland Acting as Vegetated Buffer – assessment area/wetland complex condition metric (skip for non-riparian wetlands)

- 7a. Is assessment area within 50 feet of a tributary or other open water?
 Yes No If Yes, continue to 7b. If No, skip to Metric 8.
 Wetland buffer need only be present on one side of the water body. Make buffer judgment based on the average width of wetland. Record a note if a portion of the buffer has been removed or disturbed.
- 7b. How much of the first 50 feet from the bank is wetland? (Wetland buffer need only be present on one side of the water body. Make buffer judgment based on the average width of wetland. Record a note if a portion of the buffer has been removed or disturbed.)
 A ≥ 50 feet
 B From 30 to < 50 feet
 C From 15 to < 30 feet
 D From 5 to < 15 feet
 E < 5 feet or buffer bypassed by ditches
- 7c. Tributary width. If the tributary is anastomosed, combine widths of channels/braids for a total width.
 ≤ 15-foot wide > 15-foot wide Other open water (no tributary present)
- 7d. Do roots of assessment area vegetation extend into the bank of the tributary/open water?
 Yes No
- 7e. Is stream or other open water sheltered or exposed?
 Sheltered – adjacent open water with width < 2500 feet and no regular boat traffic.
 Exposed – adjacent open water with width ≥ 2500 feet or regular boat traffic.

8. Wetland Width at the Assessment Area – wetland type/wetland complex condition metric (evaluate WT for all marshes and Estuarine Woody Wetland only; evaluate WC for Bottomland Hardwood Forest, Headwater Forest, and Riverine Swamp Forest only)

Check a box in each column for riverine wetlands only. Select the average width for the wetland type at the assessment area (WT) and the wetland complex at the assessment area (WC). See User Manual for WT and WC boundaries.

- | | | |
|---------------------------------------|---------------------------------------|-----------------------|
| WT | WC | |
| <input type="checkbox"/> A | <input type="checkbox"/> A | ≥ 100 feet |
| <input type="checkbox"/> B | <input type="checkbox"/> B | From 80 to < 100 feet |
| <input type="checkbox"/> C | <input type="checkbox"/> C | From 50 to < 80 feet |
| <input type="checkbox"/> D | <input type="checkbox"/> D | From 40 to < 50 feet |
| <input type="checkbox"/> E | <input type="checkbox"/> E | From 30 to < 40 feet |
| <input type="checkbox"/> F | <input type="checkbox"/> F | From 15 to < 30 feet |
| <input checked="" type="checkbox"/> G | <input checked="" type="checkbox"/> G | From 5 to < 15 feet |
| <input type="checkbox"/> H | <input type="checkbox"/> H | < 5 feet |

9. Inundation Duration – assessment area condition metric (skip for non-riparian wetlands)

Answer for assessment area dominant landform.

- A Evidence of short-duration inundation (< 7 consecutive days)
 B Evidence of saturation, without evidence of inundation
 C Evidence of long-duration inundation or very long-duration inundation (7 to 30 consecutive days or more)

10. Indicators of Deposition – assessment area condition metric (skip for non-riparian wetlands and all marshes)

Consider recent deposition only (no plant growth since deposition).

- A Sediment deposition is not excessive, but at approximately natural levels.
 B Sediment deposition is excessive, but not overwhelming the wetland.
 C Sediment deposition is excessive and is overwhelming the wetland.

11. Wetland Size – wetland type/wetland complex condition metric

Check a box in each column. Involves a GIS effort with field adjustment. This metric evaluates three aspects of the wetland area: the size of the wetland type (WT), the size of the wetland complex (WC), and the size of the forested wetland (FW) (if applicable, see User Manual). See the User Manual for boundaries of these evaluation areas. If assessment area is clear-cut, select "K" for the FW column.

- | | | |
|---------------------------------------|---------------------------------------|---|
| WT | WC | FW (if applicable) |
| <input type="checkbox"/> A | <input type="checkbox"/> A | <input type="checkbox"/> A ≥ 500 acres |
| <input type="checkbox"/> B | <input type="checkbox"/> B | <input type="checkbox"/> B From 100 to < 500 acres |
| <input type="checkbox"/> C | <input type="checkbox"/> C | <input type="checkbox"/> C From 50 to < 100 acres |
| <input type="checkbox"/> D | <input type="checkbox"/> D | <input type="checkbox"/> D From 25 to < 50 acres |
| <input type="checkbox"/> E | <input type="checkbox"/> E | <input type="checkbox"/> E From 10 to < 25 acres |
| <input type="checkbox"/> F | <input type="checkbox"/> F | <input type="checkbox"/> F From 5 to < 10 acres |
| <input type="checkbox"/> G | <input type="checkbox"/> G | <input type="checkbox"/> G From 1 to < 5 acres |
| <input type="checkbox"/> H | <input type="checkbox"/> H | <input type="checkbox"/> H From 0.5 to < 1 acre |
| <input type="checkbox"/> I | <input type="checkbox"/> I | <input type="checkbox"/> I From 0.1 to < 0.5 acre |
| <input type="checkbox"/> J | <input type="checkbox"/> J | <input type="checkbox"/> J From 0.01 to < 0.1 acre |
| <input checked="" type="checkbox"/> K | <input checked="" type="checkbox"/> K | <input checked="" type="checkbox"/> K < 0.01 acre or assessment area is clear-cut |

12. Wetland Intactness – wetland type condition metric (evaluate for Pocosins only)

- A Pocosin is the full extent (≥ 90%) of its natural landscape size.
 B Pocosin type is < 90% of the full extent of its natural landscape size.

13. Connectivity to Other Natural Areas – landscape condition metric

13a. Check appropriate box(es) (a box may be checked in each column). Involves a GIS effort with field adjustment. This metric evaluates whether the wetland is well connected (Well) and/or loosely connected (Loosely) to the landscape patch, the contiguous naturally vegetated area and open water (if appropriate). Boundaries are formed by four-lane roads, regularly maintained utility line corridors the width of a four-lane road or wider, urban landscapes, maintained fields (pasture and agriculture), or open water > 300 feet wide.

- | | | |
|---------------------------------------|----------------------------|--|
| Well | Loosely | |
| <input type="checkbox"/> A | <input type="checkbox"/> A | ≥ 500 acres |
| <input type="checkbox"/> B | <input type="checkbox"/> B | From 100 to < 500 acres |
| <input type="checkbox"/> C | <input type="checkbox"/> C | From 50 to < 100 acres |
| <input type="checkbox"/> D | <input type="checkbox"/> D | From 10 to < 50 acres |
| <input type="checkbox"/> E | <input type="checkbox"/> E | < 10 acres |
| <input checked="" type="checkbox"/> F | <input type="checkbox"/> F | Wetland type has a poor or no connection to other natural habitats |

13b. Evaluate for marshes only.

- Yes No Wetland type has a surface hydrology connection to open waters/stream or tidal wetlands.

14. Edge Effect – wetland type condition metric (skip for all marshes and Estuarine Woody Wetland)

May involve a GIS effort with field adjustment. Estimate distance from wetland type boundary to artificial edges. Artificial edges include non-forested areas ≥ 40 feet wide such as fields, development, roads, regularly maintained utility line corridors, and clear-cuts. Consider the eight main points of the compass. Artificial edge occurs within 150 feet in how many directions? If the assessment area is clear cut, select option "C."

- A 0
 B 1 to 4
 C 5 to 8

15. Vegetative Composition – assessment area condition metric (skip for all marshes and Pine Flat)

- A Vegetation is close to reference condition in species present and their proportions. Lower strata composed of appropriate species, with exotic plants absent or sparse within the assessment area.
 B Vegetation is different from reference condition in species diversity or proportions, but still largely composed of native species characteristic of the wetland type. This may include communities of weedy native species that develop after clearcutting or clearing. It also includes communities with exotics present, but not dominant, over a large portion of the expected strata.
 C Vegetation severely altered from reference in composition, or expected species are unnaturally absent (planted stands of non-characteristic species or at least one stratum inappropriately composed of a single species), or exotic species are dominant in at least one stratum.

16. Vegetative Diversity – assessment area condition metric (evaluate for Non-tidal Freshwater Marsh only)

- A Vegetation diversity is high and is composed primarily of native species (< 10% cover of exotics).
 B Vegetation diversity is low or has > 10% to 50% cover of exotics.
 C Vegetation is dominated by exotic species (> 50 % cover of exotics).

17. **Vegetative Structure – assessment area/wetland type condition metric**

17a. Is vegetation present?

Yes No If Yes, continue to 17b. If No, skip to Metric 18.

17b. Evaluate percent coverage of assessment area vegetation for all marshes only. Skip to 17c for non-marsh wetlands.

A ≥ 25% coverage of vegetation
 B < 25% coverage of vegetation

17c. **Check a box in each column for each stratum.** Evaluate this portion of the metric for non-marsh wetlands. Consider structure in airspace above the assessment area (AA) and the wetland type (WT) separately.

	AA	WT	
Canopy	<input type="checkbox"/> A	<input type="checkbox"/> A	Canopy closed, or nearly closed, with natural gaps associated with natural processes
	<input type="checkbox"/> B	<input type="checkbox"/> B	Canopy present, but opened more than natural gaps
	<input checked="" type="checkbox"/> C	<input checked="" type="checkbox"/> C	Canopy sparse or absent
Mid-Story	<input type="checkbox"/> A	<input type="checkbox"/> A	Dense mid-story/sapling layer
	<input type="checkbox"/> B	<input type="checkbox"/> B	Moderate density mid-story/sapling layer
	<input checked="" type="checkbox"/> C	<input checked="" type="checkbox"/> C	Mid-story/sapling layer sparse or absent
Shrub	<input type="checkbox"/> A	<input type="checkbox"/> A	Dense shrub layer
	<input type="checkbox"/> B	<input type="checkbox"/> B	Moderate density shrub layer
	<input checked="" type="checkbox"/> C	<input checked="" type="checkbox"/> C	Shrub layer sparse or absent
Herb	<input checked="" type="checkbox"/> A	<input checked="" type="checkbox"/> A	Dense herb layer
	<input type="checkbox"/> B	<input type="checkbox"/> B	Moderate density herb layer
	<input type="checkbox"/> C	<input type="checkbox"/> C	Herb layer sparse or absent

18. **Snags – wetland type condition metric (skip for all marshes)**

A Large snags (more than one) are visible (> 12 inches DBH, or large relative to species present and landscape stability).
 B Not A

19. **Diameter Class Distribution – wetland type condition metric (skip for all marshes)**

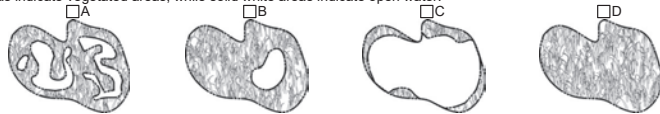
A Majority of canopy trees have stems > 6 inches in diameter at breast height (DBH); many large trees (> 12 inches DBH) are present.
 B Majority of canopy trees have stems between 6 and 12 inches DBH, few are > 12 inch DBH.
 C Majority of canopy trees are < 6 inches DBH or no trees.

20. **Large Woody Debris – wetland type condition metric (skip for all marshes)**

Include both natural debris and man-placed natural debris.
 A Large logs (more than one) are visible (> 12 inches in diameter, or large relative to species present and landscape stability).
 B Not A

21. **Vegetation/Open Water Dispersion – wetland type/open water condition metric (evaluate for Non-Tidal Freshwater Marsh only)**

Select the figure that best describes the amount of interspersed vegetation and open water in the growing season. Patterned areas indicate vegetated areas, while solid white areas indicate open water.



22. **Hydrologic Connectivity – assessment area condition metric (evaluate for riparian wetlands and Salt/Brackish Marsh only)**

Examples of activities that may severely alter hydrologic connectivity include intensive ditching, fill, sedimentation, channelization, diversion, man-made berms, beaver dams, and stream incision. Documentation required if evaluated as B, C, or D.

A Overbank and overland flow are not severely altered in the assessment area.
 B Overbank flow is severely altered in the assessment area.
 C Overland flow is severely altered in the assessment area.
 D Both overbank and overland flow are severely altered in the assessment area.

Notes

**NC WAM Wetland Rating Sheet
 Accompanies User Manual Version 5.0**

Wetland Site Name Wetland L Date of Assessment 7/30/2020
 Wetland Type Bottomland Hardwood Forest Assessor Name/Organization C. Neaves

Notes on Field Assessment Form (Y/N) NO
 Presence of regulatory considerations (Y/N) NO
 Wetland is intensively managed (Y/N) _____
 Assessment area is located within 50 feet of a natural tributary or other open water (Y/N) NO
 Assessment area is substantially altered by beaver (Y/N) _____
 Assessment area experiences overbank flooding during normal rainfall conditions (Y/N) _____
 Assessment area is on a coastal island (Y/N) _____

Sub-function Rating Summary

Function	Sub-function	Metrics	Rating
Hydrology	Surface Storage and Retention	Condition	LOW
		Sub-surface Storage and Retention	LOW
Water Quality	Pathogen Change	Condition	MEDIUM
		Condition/Opportunity	MEDIUM
	Particulate Change	Opportunity Presence (Y/N)	NO
		Condition	LOW
Soluble Change	Condition	Condition/Opportunity	LOW
		Opportunity Presence (Y/N)	NO
	Physical Change	Condition	MEDIUM
		Condition/Opportunity	MEDIUM
Pollution Change	Condition	Opportunity Presence (Y/N)	NO
		Condition/Opportunity	LOW
	Opportunity Presence (Y/N)	Condition	NA
		Condition/Opportunity	NA
Habitat	Physical Structure	Opportunity Presence (Y/N)	NA
		Condition	LOW
	Landscape Patch Structure	Condition	LOW
	Vegetation Composition	Condition	LOW

Function Rating Summary

Function	Metrics	Rating
Hydrology	Condition	LOW
	Condition/Opportunity	LOW
Water Quality	Condition	LOW
	Condition/Opportunity	LOW
Habitat	Opportunity Presence (Y/N)	NO
	Condition	LOW

Overall Wetland Rating LOW

NC WAM FIELD ASSESSMENT FORM
Accompanies User Manual Version 5.0

USACE AID #	SAW-2020-00047	NCDWR#	20200035
Project Name	Liberty Rock Mitigation Site	Date of Evaluation	7/30/2020
Applicant/Owner Name	Widlands Engineering	Wetland Site Name	Wetland M
Wetland Type	Bottomland Hardwood Forest	Assessor Name/Organization	C. Neaves
Level III Ecoregion	Piedmont	Nearest Named Water Body	Rocky River
River Basin	Cape Fear	USGS 8-Digit Catalogue Unit	03030003
County	Randolph	NCDWR Region	Winston-Salem
<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	Precipitation within 48 hrs?	Latitude/Longitude (deci-degrees)	35.820270, -79.563613

Evidence of stressors affecting the assessment area (may not be within the assessment area)

Please circle and/or make note on the last page if evidence of stressors is apparent. Consider departure from reference, if appropriate, in recent past (for instance, within 10 years). Noteworthy stressors include, but are not limited to the following.

- Hydrological modifications (examples: ditches, dams, beaver dams, dikes, berms, ponds, etc.)
- Surface and sub-surface discharges into the wetland (examples: discharges containing obvious pollutants, presence of nearby septic tanks, underground storage tanks (USTs), hog lagoons, etc.)
- Signs of vegetation stress (examples: vegetation mortality, insect damage, disease, storm damage, salt intrusion, etc.)
- Habitat/plant community alteration (examples: mowing, clear-cutting, exotics, etc.)

Is the assessment area intensively managed? Yes No

Regulatory Considerations - Were regulatory considerations evaluated? Yes No If Yes, check all that apply to the assessment area.

- Anadromous fish
- Federally protected species or State endangered or threatened species
- NCDWR riparian buffer rule in effect
- Abuts a Primary Nursery Area (PNA)
- Publicly owned property
- N.C. Division of Coastal Management Area of Environmental Concern (AEC) (including buffer)
- Abuts a stream with a NCDWQ classification of SA or supplemental classifications of HQW, ORW, or Trout
- Designated NCNHP reference community
- Abuts a 303(d)-listed stream or a tributary to a 303(d)-listed stream

What type of natural stream is associated with the wetland, if any? (check all that apply)

- Blackwater
- Brownwater
- Tidal (if tidal, check one of the following boxes) Lunar Wind Both

Is the assessment area on a coastal island? Yes No

Is the assessment area's surface water storage capacity or duration substantially altered by beaver? Yes No

Does the assessment area experience overbank flooding during normal rainfall conditions? Yes No

1. Ground Surface Condition/Vegetation Condition – assessment area condition metric

Check a box in each column. Consider alteration to the ground surface (GS) in the assessment area and vegetation structure (VS) in the assessment area. Compare to reference wetland if applicable (see User Manual). If a reference is not applicable, then rate the assessment area based on evidence an effect.

- | | | |
|---------------------------------------|---------------------------------------|--|
| GS | VS | |
| <input checked="" type="checkbox"/> A | <input type="checkbox"/> A | Not severely altered |
| <input type="checkbox"/> B | <input checked="" type="checkbox"/> B | Severely altered over a majority of the assessment area (ground surface alteration examples: vehicle tracks, excessive sedimentation, fire-plow lanes, skidder tracks, bedding, fill, soil compaction, obvious pollutants) (vegetation structure alteration examples: mechanical disturbance, herbicides, salt intrusion [where appropriate], exotic species, grazing, less diversity [if appropriate], hydrologic alteration) |

2. Surface and Sub-Surface Storage Capacity and Duration – assessment area condition metric

Check a box in each column. Consider surface storage capacity and duration (Surf) and sub-surface storage capacity and duration (Sub). Consider both increase and decrease in hydrology. A ditch ≤ 1 foot deep is considered to affect surface water only, while a ditch > 1 foot deep is expected to affect both surface and sub-surface water. Consider tidal flooding regime, if applicable.

- | | | |
|---------------------------------------|---------------------------------------|--|
| Surf | Sub | |
| <input type="checkbox"/> A | <input type="checkbox"/> A | Water storage capacity and duration are not altered. |
| <input checked="" type="checkbox"/> B | <input checked="" type="checkbox"/> B | Water storage capacity or duration are altered, but not substantially (typically, not sufficient to change vegetation). |
| <input type="checkbox"/> C | <input type="checkbox"/> C | Water storage capacity or duration are substantially altered (typically, alteration sufficient to result in vegetation change) (examples: draining, flooding, soil compaction, filling, excessive sedimentation, underground utility lines). |

3. Water Storage/Surface Relief – assessment area/wetland type condition metric (skip for all marshes)

Check a box in each column. Select the appropriate storage for the assessment area (AA) and the wetland type (WT).

- | | | |
|---|----|---|
| AA | WT | |
| 3a. <input type="checkbox"/> A <input type="checkbox"/> A | | Majority of wetland with depressions able to pond water > 1 deep |
| <input type="checkbox"/> B <input type="checkbox"/> B | | Majority of wetland with depressions able to pond water 6 inches to 1 foot deep |
| <input type="checkbox"/> C <input type="checkbox"/> C | | Majority of wetland with depressions able to pond water 3 to 6 inches deep |
| <input checked="" type="checkbox"/> D <input checked="" type="checkbox"/> D | | Depressions able to pond water < 3 inches deep |
| 3b. <input type="checkbox"/> A | | Evidence that maximum depth of inundation is greater than 2 feet |
| <input type="checkbox"/> B | | Evidence that maximum depth of inundation is between 1 and 2 feet |
| <input checked="" type="checkbox"/> C | | Evidence that maximum depth of inundation is less than 1 foot |

4. Soil Texture/Structure – assessment area condition metric (skip for all marshes)

Check a box from each of the three soil property groups below. Dig soil profile in the dominant assessment area landscape feature. Make soil observations within the top 12 inches. Use most recent National Technical Committee for Hydric Soils guidance for regional indicators.

- 4a. A Sandy soil
- B Loamy or clayey soils exhibiting redoximorphic features (concentrations, depletions, or rhizospheres)
- C Loamy or clayey soils not exhibiting redoximorphic features
- D Loamy or clayey gleyed soil
- E Histosol or histc epipedon
- 4b. A Soil ribbon < 1 inch
- B Soil ribbon ≥ 1 inch
- 4c. A No peat or muck presence
- B A peat or muck presence

5. Discharge into Wetland – opportunity metric

Check a box in each column. Consider surface pollutants or discharges (Surf) and sub-surface pollutants or discharges (Sub). Examples of sub-surface discharges include presence of nearby septic tank, underground storage tank (UST), etc.

- | | | |
|---------------------------------------|---------------------------------------|---|
| Surf | Sub | |
| <input type="checkbox"/> A | <input checked="" type="checkbox"/> A | Little or no evidence of pollutants or discharges entering the assessment area |
| <input checked="" type="checkbox"/> B | <input type="checkbox"/> B | Noticeable evidence of pollutants or discharges entering the wetland and stressing, but not overwhelming the treatment capacity of the assessment area |
| <input type="checkbox"/> C | <input type="checkbox"/> C | Noticeable evidence of pollutants or discharges (pathogen, particulate, or soluble) entering the assessment area and potentially overwhelming the treatment capacity of the wetland (water discoloration, dead vegetation, excessive sedimentation, odor) |

6. Land Use – opportunity metric (skip for non-riparian wetlands)

Check all that apply (at least one box in each column). Evaluation involves a GIS effort with field adjustment. Consider sources draining to assessment area within entire upstream watershed (WS), within 5 miles and within the watershed draining to the assessment area (5M), and within 2 miles and within the watershed draining to the assessment area (2M).

- | | | | |
|---------------------------------------|---------------------------------------|---------------------------------------|---|
| WS | 5M | 2M | |
| <input type="checkbox"/> A | <input type="checkbox"/> A | <input type="checkbox"/> A | ≥ 10% impervious surfaces |
| <input type="checkbox"/> B | <input type="checkbox"/> B | <input type="checkbox"/> B | Confined animal operations (or other local, concentrated source of pollutants) |
| <input checked="" type="checkbox"/> C | <input checked="" type="checkbox"/> C | <input checked="" type="checkbox"/> C | ≥ 20% coverage of pasture |
| <input type="checkbox"/> D | <input type="checkbox"/> D | <input type="checkbox"/> D | ≥ 20% coverage of agricultural land (regularly plowed land) |
| <input checked="" type="checkbox"/> E | <input checked="" type="checkbox"/> E | <input checked="" type="checkbox"/> E | ≥ 20% coverage of maintained grass/herb |
| <input type="checkbox"/> F | <input type="checkbox"/> F | <input type="checkbox"/> F | ≥ 20% coverage of clear-cut land |
| <input type="checkbox"/> G | <input type="checkbox"/> G | <input type="checkbox"/> G | Little or no opportunity to improve water quality. Lack of opportunity may result from little or no disturbance in the watershed or hydrologic alterations that prevent drainage and/or overbank flow from affecting the assessment area. |

7. Wetland Acting as Vegetated Buffer – assessment area/wetland complex condition metric (skip for non-riparian wetlands)

- 7a. Is assessment area within 50 feet of a tributary or other open water?
- Yes No If Yes, continue to 7b. If No, skip to Metric 8.
- Wetland buffer need only be present on one side of the water body. Make buffer judgment based on the average width of wetland. Record a note if a portion of the buffer has been removed or disturbed.
- 7b. How much of the first 50 feet from the bank is wetland? (Wetland buffer need only be present on one side of the water body. Make buffer judgment based on the average width of wetland. Record a note if a portion of the buffer has been removed or disturbed.)
- A ≥ 50 feet
- B From 30 to < 50 feet
- C From 15 to < 30 feet
- D From 5 to < 15 feet
- E < 5 feet or buffer bypassed by ditches
- 7c. Tributary width. If the tributary is anastomosed, combine widths of channels/braids for a total width.
- ≤ 15-foot wide > 15-foot wide Other open water (no tributary present)
- 7d. Do roots of assessment area vegetation extend into the bank of the tributary/open water?
- Yes No
- 7e. Is stream or other open water sheltered or exposed?
- Sheltered – adjacent open water with width < 2500 feet and no regular boat traffic.
- Exposed – adjacent open water with width ≥ 2500 feet or regular boat traffic.

8. Wetland Width at the Assessment Area – wetland type/wetland complex condition metric (evaluate WT for all marshes and Estuarine Woody Wetland only; evaluate WC for Bottomland Hardwood Forest, Headwater Forest, and Riverine Swamp Forest only)

Check a box in each column for riverine wetlands only. Select the average width for the wetland type at the assessment area (WT) and the wetland complex at the assessment area (WC). See User Manual for WT and WC boundaries.

- | | | |
|---------------------------------------|---------------------------------------|-----------------------|
| WT | WC | |
| <input type="checkbox"/> A | <input type="checkbox"/> A | ≥ 100 feet |
| <input type="checkbox"/> B | <input type="checkbox"/> B | From 80 to < 100 feet |
| <input type="checkbox"/> C | <input type="checkbox"/> C | From 50 to < 80 feet |
| <input type="checkbox"/> D | <input type="checkbox"/> D | From 40 to < 50 feet |
| <input type="checkbox"/> E | <input type="checkbox"/> E | From 30 to < 40 feet |
| <input type="checkbox"/> F | <input type="checkbox"/> F | From 15 to < 30 feet |
| <input checked="" type="checkbox"/> G | <input checked="" type="checkbox"/> G | From 5 to < 15 feet |
| <input type="checkbox"/> H | <input type="checkbox"/> H | < 5 feet |

9. Inundation Duration – assessment area condition metric (skip for non-riparian wetlands)

Answer for assessment area dominant landform.

- XA Evidence of short-duration inundation (< 7 consecutive days)
XB Evidence of saturation, without evidence of inundation
XC Evidence of long-duration inundation or very long-duration inundation (7 to 30 consecutive days or more)

10. Indicators of Deposition – assessment area condition metric (skip for non-riparian wetlands and all marshes)

Consider recent deposition only (no plant growth since deposition).

- XA Sediment deposition is not excessive, but at approximately natural levels.
XB Sediment deposition is excessive, but not overwhelming the wetland.
XC Sediment deposition is excessive and is overwhelming the wetland.

11. Wetland Size – wetland type/wetland complex condition metric

Check a box in each column. Involves a GIS effort with field adjustment. This metric evaluates three aspects of the wetland area: the size of the wetland type (WT), the size of the wetland complex (WC), and the size of the forested wetland (FW) (if applicable, see User Manual). See the User Manual for boundaries of these evaluation areas. If assessment area is clear-cut, select "K" for the FW column.

- WT WC FW (if applicable)
XA A A ≥ 500 acres
XB B B From 100 to < 500 acres
XC C C From 50 to < 100 acres
XD D D From 25 to < 50 acres
XE E E From 10 to < 25 acres
XF F F From 5 to < 10 acres
XG G G From 1 to < 5 acres
XH H H From 0.5 to < 1 acre
XI I I From 0.1 to < 0.5 acre
XJ J J From 0.01 to < 0.1 acre
XK K K < 0.01 acre or assessment area is clear-cut

12. Wetland Intactness – wetland type condition metric (evaluate for Pocosins only)

- XA Pocosin is the full extent (≥ 90%) of its natural landscape size.
XB Pocosin type is < 90% of the full extent of its natural landscape size.

13. Connectivity to Other Natural Areas – landscape condition metric

13a. Check appropriate box(es) (a box may be checked in each column). Involves a GIS effort with field adjustment. This metric evaluates whether the wetland is well connected (Well) and/or loosely connected (Loosely) to the landscape patch, the contiguous naturally vegetated area and open water (if appropriate). Boundaries are formed by four-lane roads, regularly maintained utility line corridors the width of a four-lane road or wider, urban landscapes, maintained fields (pasture and agriculture), or open water > 300 feet wide.

- Well Loosely
XA A A ≥ 500 acres
XB B B From 100 to < 500 acres
XC C C From 50 to < 100 acres
XD D D From 10 to < 50 acres
XE E E < 10 acres
XF F F Wetland type has a poor or no connection to other natural habitats

13b. Evaluate for marshes only.

- Yes No Wetland type has a surface hydrology connection to open waters/stream or tidal wetlands.

14. Edge Effect – wetland type condition metric (skip for all marshes and Estuarine Woody Wetland)

May involve a GIS effort with field adjustment. Estimate distance from wetland type boundary to artificial edges. Artificial edges include non-forested areas ≥ 40 feet wide such as fields, development, roads, regularly maintained utility line corridors, and clear-cuts. Consider the eight main points of the compass. Artificial edge occurs within 150 feet in how many directions? If the assessment area is clear cut, select option "C."

- XA 0
XB 1 to 4
XC 5 to 8

15. Vegetative Composition – assessment area condition metric (skip for all marshes and Pine Flat)

- XA Vegetation is close to reference condition in species present and their proportions. Lower strata composed of appropriate species, with exotic plants absent or sparse within the assessment area.
XB Vegetation is different from reference condition in species diversity or proportions, but still largely composed of native species characteristic of the wetland type. This may include communities of weedy native species that develop after clearcutting or clearing. It also includes communities with exotics present, but not dominant, over a large portion of the expected strata.
XC Vegetation severely altered from reference in composition, or expected species are unnaturally absent (planted stands of non-characteristic species or at least one stratum inappropriately composed of a single species), or exotic species are dominant in at least one stratum.

16. Vegetative Diversity – assessment area condition metric (evaluate for Non-tidal Freshwater Marsh only)

- XA Vegetation diversity is high and is composed primarily of native species (< 10% cover of exotics).
XB Vegetation diversity is low or has > 10% to 50% cover of exotics.
XC Vegetation is dominated by exotic species (> 50 % cover of exotics).

17. Vegetative Structure – assessment area/wetland type condition metric

17a. Is vegetation present?

- Yes No If Yes, continue to 17b. If No, skip to Metric 18.

17b. Evaluate percent coverage of assessment area vegetation for all marshes only. Skip to 17c for non-marsh wetlands.

- XA ≥ 25% coverage of vegetation
XB < 25% coverage of vegetation

17c. Check a box in each column for each stratum. Evaluate this portion of the metric for non-marsh wetlands. Consider structure in airspace above the assessment area (AA) and the wetland type (WT) separately.

- AA WT
Canopy XA A Canopy closed, or nearly closed, with natural gaps associated with natural processes
XB B Canopy present, but opened more than natural gaps
XC C Canopy sparse or absent
Mid-Story XA A Dense mid-story/sapling layer
XB B Moderate density mid-story/sapling layer
XC C Mid-story/sapling layer sparse or absent
Shrub XA A Dense shrub layer
XB B Moderate density shrub layer
XC C Shrub layer sparse or absent
Herb XA A Dense herb layer
XB B Moderate density herb layer
XC C Herb layer sparse or absent

18. Snags – wetland type condition metric (skip for all marshes)

- XA Large snags (more than one) are visible (> 12 inches DBH, or large relative to species present and landscape stability).
XB Not A

19. Diameter Class Distribution – wetland type condition metric (skip for all marshes)

- XA Majority of canopy trees have stems > 6 inches in diameter at breast height (DBH); many large trees (> 12 inches DBH) are present.
XB Majority of canopy trees have stems between 6 and 12 inches DBH, few are > 12 inch DBH.
XC Majority of canopy trees are < 6 inches DBH or no trees.

20. Large Woody Debris – wetland type condition metric (skip for all marshes)

- Include both natural debris and man-placed natural debris.
XA Large logs (more than one) are visible (> 12 inches in diameter, or large relative to species present and landscape stability).
XB Not A

21. Vegetation/Open Water Dispersion – wetland type/open water condition metric (evaluate for Non-Tidal Freshwater Marsh only)

Select the figure that best describes the amount of interspersed between vegetation and open water in the growing season. Patterned areas indicate vegetated areas, while solid white areas indicate open water.



22. Hydrologic Connectivity – assessment area condition metric (evaluate for riparian wetlands and Salt/Brackish Marsh only)

Examples of activities that may severely alter hydrologic connectivity include intensive ditching, fill, sedimentation, channelization, diversion, man-made berms, beaver dams, and stream incision. Documentation required if evaluated as B, C, or D.

- XA Overbank and overland flow are not severely altered in the assessment area.
XB Overbank flow is severely altered in the assessment area.
XC Overland flow is severely altered in the assessment area.
XD Both overbank and overland flow are severely altered in the assessment area.

Notes

NC WAM Wetland Rating Sheet
Accompanies User Manual Version 5.0

Wetland Site Name Wetland M Date of Assessment 7/30/2020
 Wetland Type Bottomland Hardwood Forest Assessor Name/Organization C. Neaves
 Notes on Field Assessment Form (Y/N) NO
 Presence of regulatory considerations (Y/N) NO
 Wetland is intensively managed (Y/N) _____
 Assessment area is located within 50 feet of a natural tributary or other open water (Y/N) NO
 Assessment area is substantially altered by beaver (Y/N) _____
 Assessment area experiences overbank flooding during normal rainfall conditions (Y/N) _____
 Assessment area is on a coastal island (Y/N) _____

Sub-function Rating Summary

Function	Sub-function	Metrics	Rating
Hydrology	Surface Storage and Retention	Condition	LOW
	Sub-surface Storage and Retention	Condition	LOW
Water Quality	Pathogen Change	Condition	MEDIUM
		Condition/Opportunity	MEDIUM
	Particulate Change	Opportunity Presence (Y/N)	NO
		Condition	LOW
	Soluble Change	Condition/Opportunity	LOW
		Opportunity Presence (Y/N)	NO
	Physical Change	Condition	MEDIUM
		Condition/Opportunity	MEDIUM
	Pollution Change	Opportunity Presence (Y/N)	NO
		Condition	LOW
	Habitat	Condition/Opportunity	LOW
		Opportunity Presence (Y/N)	NO
	Physical Structure	Condition	LOW
	Landscape Patch Structure	Condition	LOW
	Vegetation Composition	Condition	LOW

Function Rating Summary

Function	Metrics	Rating
Hydrology	Condition	LOW
Water Quality	Condition	LOW
	Condition/Opportunity	LOW
	Opportunity Presence (Y/N)	NO
Habitat	Condition	LOW

Overall Wetland Rating LOW

NC WAM FIELD ASSESSMENT FORM
Accompanies User Manual Version 5.0

USACE AID #	SAW-2020-00047	NCDWR#	20200035
Project Name	Liberty Rock Mitigation Site	Date of Evaluation	7/30/2020
Applicant/Owner Name	Wildlands Engineering	Wetland Site Name	Wetland N
Wetland Type	Bottomland Hardwood Forest	Assessor Name/Organization	C. Neaves
Level III Ecoregion	Piedmont	Nearest Named Water Body	Rocky River
River Basin	Cape Fear	USGS 8-Digit Catalogue Unit	03030003
County	Randolph	NCDWR Region	Winston-Salem
<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	Precipitation within 48 hrs?	Latitude/Longitude (deci-degrees)	35.820583, -79.563803

Evidence of stressors affecting the assessment area (may not be within the assessment area)
 Please circle and/or make note on the last page if evidence of stressors is apparent. Consider departure from reference, if appropriate, in recent past (for instance, within 10 years). Noteworthy stressors include, but are not limited to the following.

- Hydrological modifications (examples: ditches, dams, beaver dams, dikes, berms, ponds, etc.)
- Surface and sub-surface discharges into the wetland (examples: discharges containing obvious pollutants, presence of nearby septic tanks, underground storage tanks (USTs), hog lagoons, etc.)
- Signs of vegetation stress (examples: vegetation mortality, insect damage, storm damage, disease, salt intrusion, etc.)
- Habitat/plant community alteration (examples: mowing, clear-cutting, exotics, etc.)

Is the assessment area intensively managed? Yes No

Regulatory Considerations - Were regulatory considerations evaluated? Yes No If Yes, check all that apply to the assessment area.

- Anadromous fish
- Federally protected species or State endangered or threatened species
- NCDWR riparian buffer rule in effect
- Abuts a Primary Nursery Area (PNA)
- Publicly owned property
- N.C. Division of Coastal Management Area of Environmental Concern (AEC) (including buffer)
- Abuts a stream with a NCDWQ classification of SA or supplemental classifications of HQW, ORW, or Trout
- Designated NCNHP reference community
- Abuts a 303(d)-listed stream or a tributary to a 303(d)-listed stream

What type of natural stream is associated with the wetland, if any? (check all that apply)

- Blackwater
- Brownwater
- Tidal (if tidal, check one of the following boxes) Lunar Wind Both

Is the assessment area on a coastal island? Yes No

Is the assessment area's surface water storage capacity or duration substantially altered by beaver? Yes No

Does the assessment area experience overbank flooding during normal rainfall conditions? Yes No

- Ground Surface Condition/Vegetation Condition – assessment area condition metric**
Check a box in each column. Consider alteration to the ground surface (GS) in the assessment area and vegetation structure (VS) in the assessment area. Compare to reference wetland if applicable (see User Manual). If a reference is not applicable, then rate the assessment area based on evidence an effect.

GS	VS	
<input checked="" type="checkbox"/> A	<input type="checkbox"/> A	Not severely altered
<input type="checkbox"/> B	<input checked="" type="checkbox"/> B	Severely altered over a majority of the assessment area (ground surface alteration examples: vehicle tracks, excessive sedimentation, fire-plow lanes, skidder tracks, bedding, fill, soil compaction, obvious pollutants) (vegetation structure alteration examples: mechanical disturbance, herbicides, salt intrusion [where appropriate], exotic species, grazing, less diversity [if appropriate], hydrologic alteration)
- Surface and Sub-Surface Storage Capacity and Duration – assessment area condition metric**
Check a box in each column. Consider surface storage capacity and duration (Surf) and sub-surface storage capacity and duration (Sub). Consider both increase and decrease in hydrology. A ditch ≤ 1 foot deep is considered to affect surface water only, while a ditch > 1 foot deep is expected to affect both surface and sub-surface water. Consider tidal flooding regime, if applicable.

Surf	Sub	
<input type="checkbox"/> A	<input type="checkbox"/> A	Water storage capacity and duration are not altered.
<input checked="" type="checkbox"/> B	<input checked="" type="checkbox"/> B	Water storage capacity or duration are altered, but not substantially (typically, not sufficient to change vegetation).
<input type="checkbox"/> C	<input type="checkbox"/> C	Water storage capacity or duration are substantially altered (typically, alteration sufficient to result in vegetation change) (examples: draining, flooding, soil compaction, filling, excessive sedimentation, underground utility lines).
- Water Storage/Surface Relief – assessment area/wetland type condition metric (skip for all marshes)**
Check a box in each column. Select the appropriate storage for the assessment area (AA) and the wetland type (WT).

AA	WT	
3a. <input type="checkbox"/> A <input type="checkbox"/> A		Majority of wetland with depressions able to pond water > 1 foot deep
<input type="checkbox"/> B <input type="checkbox"/> B		Majority of wetland with depressions able to pond water 6 inches to 1 foot deep
<input type="checkbox"/> C <input type="checkbox"/> C		Majority of wetland with depressions able to pond water 3 to 6 inches deep
<input checked="" type="checkbox"/> D <input checked="" type="checkbox"/> D		Depressions able to pond water < 3 inches deep
3b. <input type="checkbox"/> A	<input type="checkbox"/> A	Evidence that maximum depth of inundation is greater than 2 feet
<input type="checkbox"/> B	<input type="checkbox"/> B	Evidence that maximum depth of inundation is between 1 and 2 feet
<input checked="" type="checkbox"/> C	<input checked="" type="checkbox"/> C	Evidence that maximum depth of inundation is less than 1 foot

4. Soil Texture/Structure – assessment area condition metric (skip for all marshes)

Check a box from each of the three soil property groups below. Dig soil profile in the dominant assessment area landscape feature. Make soil observations within the top 12 inches. Use most recent National Technical Committee for Hydric Soils guidance for regional indicators.

- 4a. A Sandy soil
 B Loamy or clayey soils exhibiting redoximorphic features (concentrations, depletions, or rhizospheres)
 C Loamy or clayey soils not exhibiting redoximorphic features
 D Loamy or clayey gleyed soil
 E Histosol or histc epipedon
- 4b. A Soil ribbon < 1 inch
 B Soil ribbon ≥ 1 inch
- 4c. A No peat or muck presence
 B A peat or muck presence

5. Discharge into Wetland – opportunity metric

Check a box in each column. Consider surface pollutants or discharges (Surf) and sub-surface pollutants or discharges (Sub). Examples of sub-surface discharges include presence of nearby septic tank, underground storage tank (UST), etc.

- | | | |
|---------------------------------------|---------------------------------------|---|
| Surf | Sub | |
| <input type="checkbox"/> A | <input checked="" type="checkbox"/> A | Little or no evidence of pollutants or discharges entering the assessment area |
| <input checked="" type="checkbox"/> B | <input type="checkbox"/> B | Noticeable evidence of pollutants or discharges entering the wetland and stressing, but not overwhelming the treatment capacity of the assessment area |
| <input type="checkbox"/> C | <input type="checkbox"/> C | Noticeable evidence of pollutants or discharges (pathogen, particulate, or soluble) entering the assessment area and potentially overwhelming the treatment capacity of the wetland (water discoloration, dead vegetation, excessive sedimentation, odor) |

6. Land Use – opportunity metric (skip for non-riparian wetlands)

Check all that apply (at least one box in each column). Evaluation involves a GIS effort with field adjustment. Consider sources draining to assessment area within entire upstream watershed (WS), within 5 miles and within the watershed draining to the assessment area (5M), and within 2 miles and within the watershed draining to the assessment area (2M).

- | | | | |
|---------------------------------------|---------------------------------------|---------------------------------------|---|
| WS | 5M | 2M | |
| <input type="checkbox"/> A | <input type="checkbox"/> A | <input type="checkbox"/> A | ≥ 10% impervious surfaces |
| <input type="checkbox"/> B | <input type="checkbox"/> B | <input type="checkbox"/> B | Confined animal operations (or other local, concentrated source of pollutants) |
| <input checked="" type="checkbox"/> C | <input checked="" type="checkbox"/> C | <input checked="" type="checkbox"/> C | ≥ 20% coverage of pasture |
| <input type="checkbox"/> D | <input type="checkbox"/> D | <input type="checkbox"/> D | ≥ 20% coverage of agricultural land (regularly plowed land) |
| <input checked="" type="checkbox"/> E | <input checked="" type="checkbox"/> E | <input checked="" type="checkbox"/> E | ≥ 20% coverage of maintained grass/herb |
| <input type="checkbox"/> F | <input type="checkbox"/> F | <input type="checkbox"/> F | ≥ 20% coverage of clear-cut land |
| <input type="checkbox"/> G | <input type="checkbox"/> G | <input type="checkbox"/> G | Little or no opportunity to improve water quality. Lack of opportunity may result from little or no disturbance in the watershed or hydrologic alterations that prevent drainage and/or overbank flow from affecting the assessment area. |

7. Wetland Acting as Vegetated Buffer – assessment area/wetland complex condition metric (skip for non-riparian wetlands)

- 7a. Is assessment area within 50 feet of a tributary or other open water?
 Yes No If Yes, continue to 7b. If No, skip to Metric 8.
 Wetland buffer need only be present on one side of the water body. Make buffer judgment based on the average width of wetland. Record a note if a portion of the buffer has been removed or disturbed.
- 7b. How much of the first 50 feet from the bank is wetland? (Wetland buffer need only be present on one side of the water body. Make buffer judgment based on the average width of wetland. Record a note if a portion of the buffer has been removed or disturbed.)
 A ≥ 50 feet
 B From 30 to < 50 feet
 C From 15 to < 30 feet
 D From 5 to < 15 feet
 E < 5 feet or buffer bypassed by ditches
- 7c. Tributary width. If the tributary is anastomosed, combine widths of channels/braids for a total width.
 ≤ 15-foot wide > 15-foot wide Other open water (no tributary present)
- 7d. Do roots of assessment area vegetation extend into the bank of the tributary/open water?
 Yes No
- 7e. Is stream or other open water sheltered or exposed?
 Sheltered – adjacent open water with width < 2500 feet and no regular boat traffic.
 Exposed – adjacent open water with width ≥ 2500 feet or regular boat traffic.

8. Wetland Width at the Assessment Area – wetland type/wetland complex condition metric (evaluate WT for all marshes and Estuarine Woody Wetland only; evaluate WC for Bottomland Hardwood Forest, Headwater Forest, and Riverine Swamp Forest only)

Check a box in each column for riverine wetlands only. Select the average width for the wetland type at the assessment area (WT) and the wetland complex at the assessment area (WC). See User Manual for WT and WC boundaries.

- | | | |
|---------------------------------------|---------------------------------------|-----------------------|
| WT | WC | |
| <input type="checkbox"/> A | <input type="checkbox"/> A | ≥ 100 feet |
| <input type="checkbox"/> B | <input type="checkbox"/> B | From 80 to < 100 feet |
| <input type="checkbox"/> C | <input type="checkbox"/> C | From 50 to < 80 feet |
| <input type="checkbox"/> D | <input type="checkbox"/> D | From 40 to < 50 feet |
| <input type="checkbox"/> E | <input type="checkbox"/> E | From 30 to < 40 feet |
| <input type="checkbox"/> F | <input type="checkbox"/> F | From 15 to < 30 feet |
| <input checked="" type="checkbox"/> G | <input checked="" type="checkbox"/> G | From 5 to < 15 feet |
| <input type="checkbox"/> H | <input type="checkbox"/> H | < 5 feet |

9. Inundation Duration – assessment area condition metric (skip for non-riparian wetlands)

Answer for assessment area dominant landform.

- A Evidence of short-duration inundation (< 7 consecutive days)
 B Evidence of saturation, without evidence of inundation
 C Evidence of long-duration inundation or very long-duration inundation (7 to 30 consecutive days or more)

10. Indicators of Deposition – assessment area condition metric (skip for non-riparian wetlands and all marshes)

Consider recent deposition only (no plant growth since deposition).

- A Sediment deposition is not excessive, but at approximately natural levels.
 B Sediment deposition is excessive, but not overwhelming the wetland.
 C Sediment deposition is excessive and is overwhelming the wetland.

11. Wetland Size – wetland type/wetland complex condition metric

Check a box in each column. Involves a GIS effort with field adjustment. This metric evaluates three aspects of the wetland area: the size of the wetland type (WT), the size of the wetland complex (WC), and the size of the forested wetland (FW) (if applicable, see User Manual). See the User Manual for boundaries of these evaluation areas. If assessment area is clear-cut, select "K" for the FW column.

- | | | |
|---------------------------------------|---------------------------------------|---|
| WT | WC | FW (if applicable) |
| <input type="checkbox"/> A | <input type="checkbox"/> A | <input type="checkbox"/> A ≥ 500 acres |
| <input type="checkbox"/> B | <input type="checkbox"/> B | <input type="checkbox"/> B From 100 to < 500 acres |
| <input type="checkbox"/> C | <input type="checkbox"/> C | <input type="checkbox"/> C From 50 to < 100 acres |
| <input type="checkbox"/> D | <input type="checkbox"/> D | <input type="checkbox"/> D From 25 to < 50 acres |
| <input type="checkbox"/> E | <input type="checkbox"/> E | <input type="checkbox"/> E From 10 to < 25 acres |
| <input type="checkbox"/> F | <input type="checkbox"/> F | <input type="checkbox"/> F From 5 to < 10 acres |
| <input type="checkbox"/> G | <input type="checkbox"/> G | <input type="checkbox"/> G From 1 to < 5 acres |
| <input type="checkbox"/> H | <input type="checkbox"/> H | <input type="checkbox"/> H From 0.5 to < 1 acre |
| <input type="checkbox"/> I | <input type="checkbox"/> I | <input type="checkbox"/> I From 0.1 to < 0.5 acre |
| <input type="checkbox"/> J | <input type="checkbox"/> J | <input type="checkbox"/> J From 0.01 to < 0.1 acre |
| <input checked="" type="checkbox"/> K | <input checked="" type="checkbox"/> K | <input checked="" type="checkbox"/> K < 0.01 acre or assessment area is clear-cut |

12. Wetland Intactness – wetland type condition metric (evaluate for Pocosins only)

- A Pocosin is the full extent (≥ 90%) of its natural landscape size.
 B Pocosin type is < 90% of the full extent of its natural landscape size.

13. Connectivity to Other Natural Areas – landscape condition metric

13a. Check appropriate box(es) (a box may be checked in each column). Involves a GIS effort with field adjustment. This metric evaluates whether the wetland is well connected (Well) and/or loosely connected (Loosely) to the landscape patch, the contiguous naturally vegetated area and open water (if appropriate). Boundaries are formed by four-lane roads, regularly maintained utility line corridors the width of a four-lane road or wider, urban landscapes, maintained fields (pasture and agriculture), or open water > 300 feet wide.

- | | | |
|---------------------------------------|----------------------------|--|
| Well | Loosely | |
| <input type="checkbox"/> A | <input type="checkbox"/> A | ≥ 500 acres |
| <input type="checkbox"/> B | <input type="checkbox"/> B | From 100 to < 500 acres |
| <input type="checkbox"/> C | <input type="checkbox"/> C | From 50 to < 100 acres |
| <input type="checkbox"/> D | <input type="checkbox"/> D | From 10 to < 50 acres |
| <input type="checkbox"/> E | <input type="checkbox"/> E | < 10 acres |
| <input checked="" type="checkbox"/> F | <input type="checkbox"/> F | Wetland type has a poor or no connection to other natural habitats |

13b. Evaluate for marshes only.

- Yes No Wetland type has a surface hydrology connection to open waters/stream or tidal wetlands.

14. Edge Effect – wetland type condition metric (skip for all marshes and Estuarine Woody Wetland)

May involve a GIS effort with field adjustment. Estimate distance from wetland type boundary to artificial edges. Artificial edges include non-forested areas ≥ 40 feet wide such as fields, development, roads, regularly maintained utility line corridors, and clear-cuts. Consider the eight main points of the compass. Artificial edge occurs within 150 feet in how many directions? If the assessment area is clear cut, select option "C."

- A 0
 B 1 to 4
 C 5 to 8

15. Vegetative Composition – assessment area condition metric (skip for all marshes and Pine Flat)

- A Vegetation is close to reference condition in species present and their proportions. Lower strata composed of appropriate species, with exotic plants absent or sparse within the assessment area.
 B Vegetation is different from reference condition in species diversity or proportions, but still largely composed of native species characteristic of the wetland type. This may include communities of weedy native species that develop after clearcutting or clearing. It also includes communities with exotics present, but not dominant, over a large portion of the expected strata.
 C Vegetation severely altered from reference in composition, or expected species are unnaturally absent (planted stands of non-characteristic species or at least one stratum inappropriately composed of a single species), or exotic species are dominant in at least one stratum.

16. Vegetative Diversity – assessment area condition metric (evaluate for Non-tidal Freshwater Marsh only)

- A Vegetation diversity is high and is composed primarily of native species (< 10% cover of exotics).
 B Vegetation diversity is low or has > 10% to 50% cover of exotics.
 C Vegetation is dominated by exotic species (> 50 % cover of exotics).

17. **Vegetative Structure – assessment area/wetland type condition metric**

17a. Is vegetation present?

Yes No If Yes, continue to 17b. If No, skip to Metric 18.

17b. Evaluate percent coverage of assessment area vegetation for all marshes only. Skip to 17c for non-marsh wetlands.

A ≥ 25% coverage of vegetation
 B < 25% coverage of vegetation

17c. **Check a box in each column for each stratum.** Evaluate this portion of the metric for non-marsh wetlands. Consider structure in airspace above the assessment area (AA) and the wetland type (WT) separately.

	AA	WT	
Canopy	<input type="checkbox"/> A	<input type="checkbox"/> A	Canopy closed, or nearly closed, with natural gaps associated with natural processes
	<input type="checkbox"/> B	<input type="checkbox"/> B	Canopy present, but opened more than natural gaps
	<input checked="" type="checkbox"/> C	<input checked="" type="checkbox"/> C	Canopy sparse or absent
Mid-Story	<input type="checkbox"/> A	<input type="checkbox"/> A	Dense mid-story/sapling layer
	<input type="checkbox"/> B	<input type="checkbox"/> B	Moderate density mid-story/sapling layer
	<input checked="" type="checkbox"/> C	<input checked="" type="checkbox"/> C	Mid-story/sapling layer sparse or absent
Shrub	<input type="checkbox"/> A	<input type="checkbox"/> A	Dense shrub layer
	<input type="checkbox"/> B	<input type="checkbox"/> B	Moderate density shrub layer
	<input checked="" type="checkbox"/> C	<input checked="" type="checkbox"/> C	Shrub layer sparse or absent
Herb	<input checked="" type="checkbox"/> A	<input checked="" type="checkbox"/> A	Dense herb layer
	<input type="checkbox"/> B	<input type="checkbox"/> B	Moderate density herb layer
	<input type="checkbox"/> C	<input type="checkbox"/> C	Herb layer sparse or absent

18. **Snags – wetland type condition metric (skip for all marshes)**

A Large snags (more than one) are visible (> 12 inches DBH, or large relative to species present and landscape stability).
 B Not A

19. **Diameter Class Distribution – wetland type condition metric (skip for all marshes)**

A Majority of canopy trees have stems > 6 inches in diameter at breast height (DBH); many large trees (> 12 inches DBH) are present.
 B Majority of canopy trees have stems between 6 and 12 inches DBH, few are > 12 inch DBH.
 C Majority of canopy trees are < 6 inches DBH or no trees.

20. **Large Woody Debris – wetland type condition metric (skip for all marshes)**

Include both natural debris and man-placed natural debris.
 A Large logs (more than one) are visible (> 12 inches in diameter, or large relative to species present and landscape stability).
 B Not A

21. **Vegetation/Open Water Dispersion – wetland type/open water condition metric (evaluate for Non-Tidal Freshwater Marsh only)**

Select the figure that best describes the amount of interspersed vegetation and open water in the growing season. Patterned areas indicate vegetated areas, while solid white areas indicate open water.



22. **Hydrologic Connectivity – assessment area condition metric (evaluate for riparian wetlands and Salt/Brackish Marsh only)**

Examples of activities that may severely alter hydrologic connectivity include intensive ditching, fill, sedimentation, channelization, diversion, man-made berms, beaver dams, and stream incision. Documentation required if evaluated as B, C, or D.

A Overbank and overland flow are not severely altered in the assessment area.
 B Overbank flow is severely altered in the assessment area.
 C Overland flow is severely altered in the assessment area.
 D Both overbank and overland flow are severely altered in the assessment area.

Notes

**NC WAM Wetland Rating Sheet
 Accompanies User Manual Version 5.0**

Wetland Site Name Wetland N Date of Assessment 7/30/2020
 Wetland Type Bottomland Hardwood Forest Assessor Name/Organization C. Neaves

Notes on Field Assessment Form (Y/N) NO
 Presence of regulatory considerations (Y/N) NO
 Wetland is intensively managed (Y/N) _____
 Assessment area is located within 50 feet of a natural tributary or other open water (Y/N) NO
 Assessment area is substantially altered by beaver (Y/N) _____
 Assessment area experiences overbank flooding during normal rainfall conditions (Y/N) _____
 Assessment area is on a coastal island (Y/N) _____

Sub-function Rating Summary

Function	Sub-function	Metrics	Rating
Hydrology	Surface Storage and Retention	Condition	LOW
		Sub-surface Storage and Retention	LOW
Water Quality	Pathogen Change	Condition	MEDIUM
		Condition/Opportunity	MEDIUM
		Opportunity Presence (Y/N)	NO
	Particulate Change	Condition	LOW
		Condition/Opportunity	LOW
		Opportunity Presence (Y/N)	NO
	Soluble Change	Condition	MEDIUM
		Condition/Opportunity	MEDIUM
		Opportunity Presence (Y/N)	NO
	Physical Change	Condition	LOW
		Condition/Opportunity	LOW
		Opportunity Presence (Y/N)	NO
	Pollution Change	Condition	NA
		Condition/Opportunity	NA
		Opportunity Presence (Y/N)	NA
Habitat	Physical Structure	Condition	LOW
	Landscape Patch Structure	Condition	LOW
	Vegetation Composition	Condition	LOW

Function Rating Summary

Function	Metrics	Rating
Hydrology	Condition	LOW
	Water Quality	LOW
	Condition/Opportunity	LOW
	Opportunity Presence (Y/N)	NO
Habitat	Condition	LOW

Overall Wetland Rating LOW

NC WAM FIELD ASSESSMENT FORM
Accompanies User Manual Version 5.0

USACE AID #	SAW-2020-00047	NCDWR#	20200035
Project Name	Liberty Rock Mitigation Site	Date of Evaluation	7/30/2020
Applicant/Owner Name	Widlands Engineering	Wetland Site Name	Wetland O
Wetland Type	Bottomland Hardwood Forest	Assessor Name/Organization	C. Neaves
Level III Ecoregion	Piedmont	Nearest Named Water Body	Rocky River
River Basin	Cape Fear	USGS 8-Digit Catalogue Unit	03030003
County	Randolph	NCDWR Region	Winston-Salem
<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	Precipitation within 48 hrs?	Latitude/Longitude (deci-degrees)	35.820686, -79.566166

Evidence of stressors affecting the assessment area (may not be within the assessment area)

Please circle and/or make note on the last page if evidence of stressors is apparent. Consider departure from reference, if appropriate, in recent past (for instance, within 10 years). Noteworthy stressors include, but are not limited to the following.

- Hydrological modifications (examples: ditches, dams, beaver dams, dikes, berms, ponds, etc.)
- Surface and sub-surface discharges into the wetland (examples: discharges containing obvious pollutants, presence of nearby septic tanks, underground storage tanks (USTs), hog lagoons, etc.)
- Signs of vegetation stress (examples: vegetation mortality, insect damage, disease, storm damage, salt intrusion, etc.)
- Habitat/plant community alteration (examples: mowing, clear-cutting, exotics, etc.)

Is the assessment area intensively managed? Yes No

Regulatory Considerations - Were regulatory considerations evaluated? Yes No If Yes, check all that apply to the assessment area.

- Anadromous fish
- Federally protected species or State endangered or threatened species
- NCDWR riparian buffer rule in effect
- Abuts a Primary Nursery Area (PNA)
- Publicly owned property
- N.C. Division of Coastal Management Area of Environmental Concern (AEC) (including buffer)
- Abuts a stream with a NCDWQ classification of SA or supplemental classifications of HQW, ORW, or Trout
- Designated NCNHP reference community
- Abuts a 303(d)-listed stream or a tributary to a 303(d)-listed stream

What type of natural stream is associated with the wetland, if any? (check all that apply)

- Blackwater
- Brownwater
- Tidal (if tidal, check one of the following boxes) Lunar Wind Both

Is the assessment area on a coastal island? Yes No

Is the assessment area's surface water storage capacity or duration substantially altered by beaver? Yes No

Does the assessment area experience overbank flooding during normal rainfall conditions? Yes No

1. Ground Surface Condition/Vegetation Condition – assessment area condition metric

Check a box in each column. Consider alteration to the ground surface (GS) in the assessment area and vegetation structure (VS) in the assessment area. Compare to reference wetland if applicable (see User Manual). If a reference is not applicable, then rate the assessment area based on evidence an effect.

- | | | |
|---------------------------------------|---------------------------------------|--|
| GS | VS | |
| <input checked="" type="checkbox"/> A | <input type="checkbox"/> A | Not severely altered |
| <input type="checkbox"/> B | <input checked="" type="checkbox"/> B | Severely altered over a majority of the assessment area (ground surface alteration examples: vehicle tracks, excessive sedimentation, fire-plow lanes, skidder tracks, bedding, fill, soil compaction, obvious pollutants) (vegetation structure alteration examples: mechanical disturbance, herbicides, salt intrusion [where appropriate], exotic species, grazing, less diversity [if appropriate], hydrologic alteration) |

2. Surface and Sub-Surface Storage Capacity and Duration – assessment area condition metric

Check a box in each column. Consider surface storage capacity and duration (Surf) and sub-surface storage capacity and duration (Sub). Consider both increase and decrease in hydrology. A ditch ≤ 1 foot deep is considered to affect surface water only, while a ditch > 1 foot deep is expected to affect both surface and sub-surface water. Consider tidal flooding regime, if applicable.

- | | | |
|---------------------------------------|---------------------------------------|--|
| Surf | Sub | |
| <input type="checkbox"/> A | <input type="checkbox"/> A | Water storage capacity and duration are not altered. |
| <input checked="" type="checkbox"/> B | <input checked="" type="checkbox"/> B | Water storage capacity or duration are altered, but not substantially (typically, not sufficient to change vegetation). |
| <input type="checkbox"/> C | <input type="checkbox"/> C | Water storage capacity or duration are substantially altered (typically, alteration sufficient to result in vegetation change) (examples: draining, flooding, soil compaction, filling, excessive sedimentation, underground utility lines). |

3. Water Storage/Surface Relief – assessment area/wetland type condition metric (skip for all marshes)

Check a box in each column. Select the appropriate storage for the assessment area (AA) and the wetland type (WT).

- | | | |
|---|----|---|
| AA | WT | |
| 3a. <input type="checkbox"/> A <input type="checkbox"/> A | | Majority of wetland with depressions able to pond water > 1 deep |
| <input type="checkbox"/> B <input type="checkbox"/> B | | Majority of wetland with depressions able to pond water 6 inches to 1 foot deep |
| <input type="checkbox"/> C <input type="checkbox"/> C | | Majority of wetland with depressions able to pond water 3 to 6 inches deep |
| <input checked="" type="checkbox"/> D <input checked="" type="checkbox"/> D | | Depressions able to pond water < 3 inches deep |
| 3b. <input type="checkbox"/> A | | Evidence that maximum depth of inundation is greater than 2 feet |
| <input type="checkbox"/> B | | Evidence that maximum depth of inundation is between 1 and 2 feet |
| <input checked="" type="checkbox"/> C | | Evidence that maximum depth of inundation is less than 1 foot |

4. Soil Texture/Structure – assessment area condition metric (skip for all marshes)

Check a box from each of the three soil property groups below. Dig soil profile in the dominant assessment area landscape feature. Make soil observations within the top 12 inches. Use most recent National Technical Committee for Hydric Soils guidance for regional indicators.

- 4a. A Sandy soil
- B Loamy or clayey soils exhibiting redoximorphic features (concentrations, depletions, or rhizospheres)
- C Loamy or clayey soils not exhibiting redoximorphic features
- D Loamy or clayey gleyed soil
- E Histosol or histc epipedon
- 4b. A Soil ribbon < 1 inch
- B Soil ribbon ≥ 1 inch
- 4c. A No peat or muck presence
- B A peat or muck presence

5. Discharge into Wetland – opportunity metric

Check a box in each column. Consider surface pollutants or discharges (Surf) and sub-surface pollutants or discharges (Sub). Examples of sub-surface discharges include presence of nearby septic tank, underground storage tank (UST), etc.

- | | | |
|---------------------------------------|---------------------------------------|---|
| Surf | Sub | |
| <input type="checkbox"/> A | <input checked="" type="checkbox"/> A | Little or no evidence of pollutants or discharges entering the assessment area |
| <input checked="" type="checkbox"/> B | <input type="checkbox"/> B | Noticeable evidence of pollutants or discharges entering the wetland and stressing, but not overwhelming the treatment capacity of the assessment area |
| <input type="checkbox"/> C | <input type="checkbox"/> C | Noticeable evidence of pollutants or discharges (pathogen, particulate, or soluble) entering the assessment area and potentially overwhelming the treatment capacity of the wetland (water discoloration, dead vegetation, excessive sedimentation, odor) |

6. Land Use – opportunity metric (skip for non-riparian wetlands)

Check all that apply (at least one box in each column). Evaluation involves a GIS effort with field adjustment. Consider sources draining to assessment area within entire upstream watershed (WS), within 5 miles and within the watershed draining to the assessment area (5M), and within 2 miles and within the watershed draining to the assessment area (2M).

- | | | | |
|---------------------------------------|---------------------------------------|---------------------------------------|---|
| WS | 5M | 2M | |
| <input type="checkbox"/> A | <input type="checkbox"/> A | <input type="checkbox"/> A | ≥ 10% impervious surfaces |
| <input type="checkbox"/> B | <input type="checkbox"/> B | <input type="checkbox"/> B | Confined animal operations (or other local, concentrated source of pollutants) |
| <input checked="" type="checkbox"/> C | <input checked="" type="checkbox"/> C | <input checked="" type="checkbox"/> C | ≥ 20% coverage of pasture |
| <input type="checkbox"/> D | <input type="checkbox"/> D | <input type="checkbox"/> D | ≥ 20% coverage of agricultural land (regularly plowed land) |
| <input checked="" type="checkbox"/> E | <input checked="" type="checkbox"/> E | <input checked="" type="checkbox"/> E | ≥ 20% coverage of maintained grass/herb |
| <input type="checkbox"/> F | <input type="checkbox"/> F | <input type="checkbox"/> F | ≥ 20% coverage of clear-cut land |
| <input type="checkbox"/> G | <input type="checkbox"/> G | <input type="checkbox"/> G | Little or no opportunity to improve water quality. Lack of opportunity may result from little or no disturbance in the watershed or hydrologic alterations that prevent drainage and/or overbank flow from affecting the assessment area. |

7. Wetland Acting as Vegetated Buffer – assessment area/wetland complex condition metric (skip for non-riparian wetlands)

- 7a. Is assessment area within 50 feet of a tributary or other open water?
- Yes No If Yes, continue to 7b. If No, skip to Metric 8.
- Wetland buffer need only be present on one side of the water body. Make buffer judgment based on the average width of wetland. Record a note if a portion of the buffer has been removed or disturbed.
- 7b. How much of the first 50 feet from the bank is wetland? (Wetland buffer need only be present on one side of the water body. Make buffer judgment based on the average width of wetland. Record a note if a portion of the buffer has been removed or disturbed.)
- A ≥ 50 feet
- B From 30 to < 50 feet
- C From 15 to < 30 feet
- D From 5 to < 15 feet
- E < 5 feet or buffer bypassed by ditches
- 7c. Tributary width. If the tributary is anastomosed, combine widths of channels/braids for a total width.
- ≤ 15-foot wide > 15-foot wide Other open water (no tributary present)
- 7d. Do roots of assessment area vegetation extend into the bank of the tributary/open water?
- Yes No
- 7e. Is stream or other open water sheltered or exposed?
- Sheltered – adjacent open water with width < 2500 feet and no regular boat traffic.
- Exposed – adjacent open water with width ≥ 2500 feet or regular boat traffic.

8. Wetland Width at the Assessment Area – wetland type/wetland complex condition metric (evaluate WT for all marshes and Estuarine Woody Wetland only; evaluate WC for Bottomland Hardwood Forest, Headwater Forest, and Riverine Swamp Forest only)

Check a box in each column for riverine wetlands only. Select the average width for the wetland type at the assessment area (WT) and the wetland complex at the assessment area (WC). See User Manual for WT and WC boundaries.

- | | | |
|---------------------------------------|---------------------------------------|-----------------------|
| WT | WC | |
| <input type="checkbox"/> A | <input type="checkbox"/> A | ≥ 100 feet |
| <input type="checkbox"/> B | <input type="checkbox"/> B | From 80 to < 100 feet |
| <input type="checkbox"/> C | <input type="checkbox"/> C | From 50 to < 80 feet |
| <input type="checkbox"/> D | <input type="checkbox"/> D | From 40 to < 50 feet |
| <input type="checkbox"/> E | <input type="checkbox"/> E | From 30 to < 40 feet |
| <input type="checkbox"/> F | <input type="checkbox"/> F | From 15 to < 30 feet |
| <input checked="" type="checkbox"/> G | <input checked="" type="checkbox"/> G | From 5 to < 15 feet |
| <input type="checkbox"/> H | <input type="checkbox"/> H | < 5 feet |

9. Inundation Duration – assessment area condition metric (skip for non-riparian wetlands)

Answer for assessment area dominant landform.

- A Evidence of short-duration inundation (< 7 consecutive days)
B Evidence of saturation, without evidence of inundation
C Evidence of long-duration inundation or very long-duration inundation (7 to 30 consecutive days or more)

10. Indicators of Deposition – assessment area condition metric (skip for non-riparian wetlands and all marshes)

Consider recent deposition only (no plant growth since deposition).

- A Sediment deposition is not excessive, but at approximately natural levels.
B Sediment deposition is excessive, but not overwhelming the wetland.
C Sediment deposition is excessive and is overwhelming the wetland.

11. Wetland Size – wetland type/wetland complex condition metric

Check a box in each column. Involves a GIS effort with field adjustment. This metric evaluates three aspects of the wetland area: the size of the wetland type (WT), the size of the wetland complex (WC), and the size of the forested wetland (FW) (if applicable, see User Manual). See the User Manual for boundaries of these evaluation areas. If assessment area is clear-cut, select "K" for the FW column.

- | | | |
|---------------------------------------|---------------------------------------|--|
| WT | WC | FW (if applicable) |
| <input type="checkbox"/> A | <input type="checkbox"/> A | <input type="checkbox"/> A ≥ 500 acres |
| <input type="checkbox"/> B | <input type="checkbox"/> B | <input type="checkbox"/> B From 100 to < 500 acres |
| <input type="checkbox"/> C | <input type="checkbox"/> C | <input type="checkbox"/> C From 50 to < 100 acres |
| <input type="checkbox"/> D | <input type="checkbox"/> D | <input type="checkbox"/> D From 25 to < 50 acres |
| <input type="checkbox"/> E | <input type="checkbox"/> E | <input type="checkbox"/> E From 10 to < 25 acres |
| <input type="checkbox"/> F | <input type="checkbox"/> F | <input type="checkbox"/> F From 5 to < 10 acres |
| <input type="checkbox"/> G | <input type="checkbox"/> G | <input type="checkbox"/> G From 1 to < 5 acres |
| <input type="checkbox"/> H | <input type="checkbox"/> H | <input type="checkbox"/> H From 0.5 to < 1 acre |
| <input type="checkbox"/> I | <input type="checkbox"/> I | <input type="checkbox"/> I From 0.1 to < 0.5 acre |
| <input type="checkbox"/> J | <input type="checkbox"/> J | <input type="checkbox"/> J From 0.01 to < 0.1 acre |
| <input checked="" type="checkbox"/> K | <input checked="" type="checkbox"/> K | <input checked="" type="checkbox"/> K < 0.01 acre <u>or</u> assessment area is clear-cut |

12. Wetland Intactness – wetland type condition metric (evaluate for Pocosins only)

- A Pocosin is the full extent (≥ 90%) of its natural landscape size.
B Pocosin type is < 90% of the full extent of its natural landscape size.

13. Connectivity to Other Natural Areas – landscape condition metric

13a. Check appropriate box(es) (a box may be checked in each column). Involves a GIS effort with field adjustment. This metric evaluates whether the wetland is well connected (Well) and/or loosely connected (Loosely) to the landscape patch, the contiguous naturally vegetated area and open water (if appropriate). Boundaries are formed by four-lane roads, regularly maintained utility line corridors the width of a four-lane road or wider, urban landscapes, maintained fields (pasture and agriculture), or open water > 300 feet wide.

- | | |
|---------------------------------------|--|
| Well | Loosely |
| <input type="checkbox"/> A | <input type="checkbox"/> A ≥ 500 acres |
| <input type="checkbox"/> B | <input type="checkbox"/> B From 100 to < 500 acres |
| <input type="checkbox"/> C | <input type="checkbox"/> C From 50 to < 100 acres |
| <input type="checkbox"/> D | <input type="checkbox"/> D From 10 to < 50 acres |
| <input type="checkbox"/> E | <input type="checkbox"/> E < 10 acres |
| <input checked="" type="checkbox"/> F | <input checked="" type="checkbox"/> F Wetland type has a poor or no connection to other natural habitats |

13b. Evaluate for marshes only.

- Yes No Wetland type has a surface hydrology connection to open waters/stream or tidal wetlands.

14. Edge Effect – wetland type condition metric (skip for all marshes and Estuarine Woody Wetland)

May involve a GIS effort with field adjustment. Estimate distance from wetland type boundary to artificial edges. Artificial edges include non-forested areas ≥ 40 feet wide such as fields, development, roads, regularly maintained utility line corridors, and clear-cuts. Consider the eight main points of the compass. Artificial edge occurs within 150 feet in how many directions? If the assessment area is clear cut, select option "C."

- A 0
B 1 to 4
C 5 to 8

15. Vegetative Composition – assessment area condition metric (skip for all marshes and Pine Flat)

- A Vegetation is close to reference condition in species present and their proportions. Lower strata composed of appropriate species, with exotic plants absent or sparse within the assessment area.
B Vegetation is different from reference condition in species diversity or proportions, but still largely composed of native species characteristic of the wetland type. This may include communities of weedy native species that develop after clearcutting or clearing. It also includes communities with exotics present, but not dominant, over a large portion of the expected strata.
C Vegetation severely altered from reference in composition, or expected species are unnaturally absent (planted stands of non-characteristic species or at least one stratum inappropriately composed of a single species), or exotic species are dominant in at least one stratum.

16. Vegetative Diversity – assessment area condition metric (evaluate for Non-tidal Freshwater Marsh only)

- A Vegetation diversity is high and is composed primarily of native species (< 10% cover of exotics).
B Vegetation diversity is low or has > 10% to 50% cover of exotics.
C Vegetation is dominated by exotic species (> 50 % cover of exotics).

17. Vegetative Structure – assessment area/wetland type condition metric

17a. Is vegetation present?

- Yes No If Yes, continue to 17b. If No, skip to Metric 18.

17b. Evaluate percent coverage of assessment area vegetation for all marshes only. Skip to 17c for non-marsh wetlands.

- A ≥ 25% coverage of vegetation
B < 25% coverage of vegetation

17c. Check a box in each column for each stratum. Evaluate this portion of the metric for non-marsh wetlands. Consider structure in airspace above the assessment area (AA) and the wetland type (WT) separately.

- | | | | |
|-----------|---------------------------------------|---------------------------------------|--|
| | AA | WT | |
| Canopy | <input type="checkbox"/> A | <input type="checkbox"/> A | Canopy closed, or nearly closed, with natural gaps associated with natural processes |
| | <input type="checkbox"/> B | <input type="checkbox"/> B | Canopy present, but opened more than natural gaps |
| | <input checked="" type="checkbox"/> C | <input checked="" type="checkbox"/> C | Canopy sparse or absent |
| Mid-Story | <input type="checkbox"/> A | <input type="checkbox"/> A | Dense mid-story/sapling layer |
| | <input type="checkbox"/> B | <input type="checkbox"/> B | Moderate density mid-story/sapling layer |
| | <input checked="" type="checkbox"/> C | <input checked="" type="checkbox"/> C | Mid-story/sapling layer sparse or absent |
| Shrub | <input type="checkbox"/> A | <input type="checkbox"/> A | Dense shrub layer |
| | <input type="checkbox"/> B | <input type="checkbox"/> B | Moderate density shrub layer |
| | <input checked="" type="checkbox"/> C | <input checked="" type="checkbox"/> C | Shrub layer sparse or absent |
| Herb | <input checked="" type="checkbox"/> A | <input checked="" type="checkbox"/> A | Dense herb layer |
| | <input type="checkbox"/> B | <input type="checkbox"/> B | Moderate density herb layer |
| | <input type="checkbox"/> C | <input type="checkbox"/> C | Herb layer sparse or absent |

18. Snags – wetland type condition metric (skip for all marshes)

- A Large snags (more than one) are visible (> 12 inches DBH, or large relative to species present and landscape stability).
B Not A

19. Diameter Class Distribution – wetland type condition metric (skip for all marshes)

- A Majority of canopy trees have stems > 6 inches in diameter at breast height (DBH); many large trees (> 12 inches DBH) are present.
B Majority of canopy trees have stems between 6 and 12 inches DBH, few are > 12 inch DBH.
C Majority of canopy trees are < 6 inches DBH or no trees.

20. Large Woody Debris – wetland type condition metric (skip for all marshes)

Include both natural debris and man-placed natural debris.

- A Large logs (more than one) are visible (> 12 inches in diameter, or large relative to species present and landscape stability).
B Not A

21. Vegetation/Open Water Dispersion – wetland type/open water condition metric (evaluate for Non-Tidal Freshwater Marsh only)

Select the figure that best describes the amount of interspersed between vegetation and open water in the growing season. Patterned areas indicate vegetated areas, while solid white areas indicate open water.



22. Hydrologic Connectivity – assessment area condition metric (evaluate for riparian wetlands and Salt/Brackish Marsh only)

Examples of activities that may severely alter hydrologic connectivity include intensive ditching, fill, sedimentation, channelization, diversion, man-made berms, beaver dams, and stream incision. Documentation required if evaluated as B, C, or D.

- A Overbank and overland flow are not severely altered in the assessment area.
B Overbank flow is severely altered in the assessment area.
C Overland flow is severely altered in the assessment area.
D Both overbank and overland flow are severely altered in the assessment area.

Notes

NC WAM Wetland Rating Sheet
Accompanies User Manual Version 5.0

Wetland Site Name Wetland O Date of Assessment 7/30/2020
 Wetland Type Bottomland Hardwood Forest Assessor Name/Organization C. Neaves
 Notes on Field Assessment Form (Y/N) NO
 Presence of regulatory considerations (Y/N) NO
 Wetland is intensively managed (Y/N) NO
 Assessment area is located within 50 feet of a natural tributary or other open water (Y/N) NO
 Assessment area is substantially altered by beaver (Y/N) NO
 Assessment area experiences overbank flooding during normal rainfall conditions (Y/N) NO
 Assessment area is on a coastal island (Y/N) NO

Sub-function Rating Summary

Function	Sub-function	Metrics	Rating
Hydrology	Surface Storage and Retention	Condition	LOW
		Sub-surface Storage and Retention	LOW
		Condition	LOW
Water Quality	Pathogen Change	Condition	MEDIUM
		Condition/Opportunity	MEDIUM
		Opportunity Presence (Y/N)	NO
	Particulate Change	Condition	LOW
		Condition/Opportunity	LOW
		Opportunity Presence (Y/N)	NO
	Soluble Change	Condition	MEDIUM
		Condition/Opportunity	MEDIUM
		Opportunity Presence (Y/N)	NO
	Physical Change	Condition	LOW
		Condition/Opportunity	LOW
		Opportunity Presence (Y/N)	NO
	Pollution Change	Condition	NA
		Condition/Opportunity	NA
		Opportunity Presence (Y/N)	NA
Habitat	Physical Structure	Condition	LOW
	Landscape Patch Structure	Condition	LOW
	Vegetation Composition	Condition	LOW

Function Rating Summary

Function	Metrics	Rating
Hydrology	Condition	LOW
Water Quality	Condition	LOW
	Condition/Opportunity	LOW
	Opportunity Presence (Y/N)	NO
Habitat	Condition	LOW

Overall Wetland Rating LOW

NC WAM FIELD ASSESSMENT FORM
Accompanies User Manual Version 5.0

USACE AID #	SAW-2020-00047	NCDWR#	20200035
Project Name	Liberty Rock Mitigation Site	Date of Evaluation	7/30/2020
Applicant/Owner Name	Wildlands Engineering	Wetland Site Name	Wetland P
Wetland Type	Bottomland Hardwood Forest	Assessor Name/Organization	C. Neaves
Level III Ecoregion	Piedmont	Nearest Named Water Body	Rocky River
River Basin	Cape Fear	USGS 8-Digit Catalogue Unit	03030003
County	Randolph	NCDWR Region	Winston-Salem
<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	Precipitation within 48 hrs?	Latitude/Longitude (deci-degrees)	35.820215, -79.565051

Evidence of stressors affecting the assessment area (may not be within the assessment area)
 Please circle and/or make note on the last page if evidence of stressors is apparent. Consider departure from reference, if appropriate, in recent past (for instance, within 10 years). Noteworthy stressors include, but are not limited to the following.

- Hydrological modifications (examples: ditches, dams, beaver dams, dikes, berms, ponds, etc.)
- Surface and sub-surface discharges into the wetland (examples: discharges containing obvious pollutants, presence of nearby septic tanks, underground storage tanks (USTs), hog lagoons, etc.)
- Signs of vegetation stress (examples: vegetation mortality, insect damage, storm damage, salt intrusion, etc.)
- Habitat/plant community alteration (examples: mowing, clear-cutting, exotics, etc.)

Is the assessment area intensively managed? Yes No

Regulatory Considerations - Were regulatory considerations evaluated? Yes No If Yes, check all that apply to the assessment area.

- Anadromous fish
- Federally protected species or State endangered or threatened species
- NCDWR riparian buffer rule in effect
- Abuts a Primary Nursery Area (PNA)
- Publicly owned property
- N.C. Division of Coastal Management Area of Environmental Concern (AEC) (including buffer)
- Abuts a stream with a NCDWQ classification of SA or supplemental classifications of HQW, ORW, or Trout
- Designated NCNHP reference community
- Abuts a 303(d)-listed stream or a tributary to a 303(d)-listed stream

What type of natural stream is associated with the wetland, if any? (check all that apply)

- Blackwater
- Brownwater
- Tidal (if tidal, check one of the following boxes) Lunar Wind Both

Is the assessment area on a coastal island? Yes No

Is the assessment area's surface water storage capacity or duration substantially altered by beaver? Yes No

Does the assessment area experience overbank flooding during normal rainfall conditions? Yes No

- Ground Surface Condition/Vegetation Condition – assessment area condition metric**
Check a box in each column. Consider alteration to the ground surface (GS) in the assessment area and vegetation structure (VS) in the assessment area. Compare to reference wetland if applicable (see User Manual). If a reference is not applicable, then rate the assessment area based on evidence an effect.

GS	VS	
<input checked="" type="checkbox"/> A	<input type="checkbox"/> A	Not severely altered
<input type="checkbox"/> B	<input checked="" type="checkbox"/> B	Severely altered over a majority of the assessment area (ground surface alteration examples: vehicle tracks, excessive sedimentation, fire-plow lanes, skidder tracks, bedding, fill, soil compaction, obvious pollutants) (vegetation structure alteration examples: mechanical disturbance, herbicides, salt intrusion [where appropriate], exotic species, grazing, less diversity [if appropriate], hydrologic alteration)
- Surface and Sub-Surface Storage Capacity and Duration – assessment area condition metric**
Check a box in each column. Consider surface storage capacity and duration (Surf) and sub-surface storage capacity and duration (Sub). Consider both increase and decrease in hydrology. A ditch ≤ 1 foot deep is considered to affect surface water only, while a ditch > 1 foot deep is expected to affect both surface and sub-surface water. Consider tidal flooding regime, if applicable.

Surf	Sub	
<input type="checkbox"/> A	<input type="checkbox"/> A	Water storage capacity and duration are not altered.
<input checked="" type="checkbox"/> B	<input checked="" type="checkbox"/> B	Water storage capacity or duration are altered, but not substantially (typically, not sufficient to change vegetation).
<input type="checkbox"/> C	<input type="checkbox"/> C	Water storage capacity or duration are substantially altered (typically, alteration sufficient to result in vegetation change) (examples: draining, flooding, soil compaction, filling, excessive sedimentation, underground utility lines).
- Water Storage/Surface Relief – assessment area/wetland type condition metric (skip for all marshes)**
Check a box in each column. Select the appropriate storage for the assessment area (AA) and the wetland type (WT).

AA	WT	
3a. <input type="checkbox"/> A <input type="checkbox"/> A		Majority of wetland with depressions able to pond water > 1 foot deep
<input type="checkbox"/> B <input type="checkbox"/> B		Majority of wetland with depressions able to pond water 6 inches to 1 foot deep
<input type="checkbox"/> C <input type="checkbox"/> C		Majority of wetland with depressions able to pond water 3 to 6 inches deep
<input checked="" type="checkbox"/> D <input checked="" type="checkbox"/> D		Depressions able to pond water < 3 inches deep
3b. <input type="checkbox"/> A	<input type="checkbox"/> A	Evidence that maximum depth of inundation is greater than 2 feet
<input type="checkbox"/> B	<input type="checkbox"/> B	Evidence that maximum depth of inundation is between 1 and 2 feet
<input checked="" type="checkbox"/> C	<input checked="" type="checkbox"/> C	Evidence that maximum depth of inundation is less than 1 foot

4. Soil Texture/Structure – assessment area condition metric (skip for all marshes)

Check a box from each of the three soil property groups below. Dig soil profile in the dominant assessment area landscape feature. Make soil observations within the top 12 inches. Use most recent National Technical Committee for Hydric Soils guidance for regional indicators.

- 4a. A Sandy soil
 B Loamy or clayey soils exhibiting redoximorphic features (concentrations, depletions, or rhizospheres)
 C Loamy or clayey soils not exhibiting redoximorphic features
 D Loamy or clayey gleyed soil
 E Histosol or histc epipedon
- 4b. A Soil ribbon < 1 inch
 B Soil ribbon ≥ 1 inch
- 4c. A No peat or muck presence
 B A peat or muck presence

5. Discharge into Wetland – opportunity metric

Check a box in each column. Consider surface pollutants or discharges (Surf) and sub-surface pollutants or discharges (Sub). Examples of sub-surface discharges include presence of nearby septic tank, underground storage tank (UST), etc.

- | | | |
|---------------------------------------|---------------------------------------|---|
| Surf | Sub | |
| <input type="checkbox"/> A | <input checked="" type="checkbox"/> A | Little or no evidence of pollutants or discharges entering the assessment area |
| <input checked="" type="checkbox"/> B | <input type="checkbox"/> B | Noticeable evidence of pollutants or discharges entering the wetland and stressing, but not overwhelming the treatment capacity of the assessment area |
| <input type="checkbox"/> C | <input type="checkbox"/> C | Noticeable evidence of pollutants or discharges (pathogen, particulate, or soluble) entering the assessment area and potentially overwhelming the treatment capacity of the wetland (water discoloration, dead vegetation, excessive sedimentation, odor) |

6. Land Use – opportunity metric (skip for non-riparian wetlands)

Check all that apply (at least one box in each column). Evaluation involves a GIS effort with field adjustment. Consider sources draining to assessment area within entire upstream watershed (WS), within 5 miles and within the watershed draining to the assessment area (5M), and within 2 miles and within the watershed draining to the assessment area (2M).

- | | | | |
|---------------------------------------|---------------------------------------|---------------------------------------|---|
| WS | 5M | 2M | |
| <input type="checkbox"/> A | <input type="checkbox"/> A | <input type="checkbox"/> A | ≥ 10% impervious surfaces |
| <input type="checkbox"/> B | <input type="checkbox"/> B | <input type="checkbox"/> B | Confined animal operations (or other local, concentrated source of pollutants) |
| <input checked="" type="checkbox"/> C | <input checked="" type="checkbox"/> C | <input checked="" type="checkbox"/> C | ≥ 20% coverage of pasture |
| <input type="checkbox"/> D | <input type="checkbox"/> D | <input type="checkbox"/> D | ≥ 20% coverage of agricultural land (regularly plowed land) |
| <input checked="" type="checkbox"/> E | <input checked="" type="checkbox"/> E | <input checked="" type="checkbox"/> E | ≥ 20% coverage of maintained grass/herb |
| <input type="checkbox"/> F | <input type="checkbox"/> F | <input type="checkbox"/> F | ≥ 20% coverage of clear-cut land |
| <input type="checkbox"/> G | <input type="checkbox"/> G | <input type="checkbox"/> G | Little or no opportunity to improve water quality. Lack of opportunity may result from little or no disturbance in the watershed or hydrologic alterations that prevent drainage and/or overbank flow from affecting the assessment area. |

7. Wetland Acting as Vegetated Buffer – assessment area/wetland complex condition metric (skip for non-riparian wetlands)

- 7a. Is assessment area within 50 feet of a tributary or other open water?
 Yes No If Yes, continue to 7b. If No, skip to Metric 8.
 Wetland buffer need only be present on one side of the water body. Make buffer judgment based on the average width of wetland. Record a note if a portion of the buffer has been removed or disturbed.
- 7b. How much of the first 50 feet from the bank is wetland? (Wetland buffer need only be present on one side of the water body. Make buffer judgment based on the average width of wetland. Record a note if a portion of the buffer has been removed or disturbed.)
 A ≥ 50 feet
 B From 30 to < 50 feet
 C From 15 to < 30 feet
 D From 5 to < 15 feet
 E < 5 feet or buffer bypassed by ditches
- 7c. Tributary width. If the tributary is anastomosed, combine widths of channels/braids for a total width.
 ≤ 15-foot wide > 15-foot wide Other open water (no tributary present)
- 7d. Do roots of assessment area vegetation extend into the bank of the tributary/open water?
 Yes No
- 7e. Is stream or other open water sheltered or exposed?
 Sheltered – adjacent open water with width < 2500 feet and no regular boat traffic.
 Exposed – adjacent open water with width ≥ 2500 feet or regular boat traffic.

8. Wetland Width at the Assessment Area – wetland type/wetland complex condition metric (evaluate WT for all marshes and Estuarine Woody Wetland only; evaluate WC for Bottomland Hardwood Forest, Headwater Forest, and Riverine Swamp Forest only)

Check a box in each column for riverine wetlands only. Select the average width for the wetland type at the assessment area (WT) and the wetland complex at the assessment area (WC). See User Manual for WT and WC boundaries.

- | | | |
|---------------------------------------|---------------------------------------|-----------------------|
| WT | WC | |
| <input type="checkbox"/> A | <input type="checkbox"/> A | ≥ 100 feet |
| <input type="checkbox"/> B | <input type="checkbox"/> B | From 80 to < 100 feet |
| <input type="checkbox"/> C | <input type="checkbox"/> C | From 50 to < 80 feet |
| <input type="checkbox"/> D | <input type="checkbox"/> D | From 40 to < 50 feet |
| <input type="checkbox"/> E | <input type="checkbox"/> E | From 30 to < 40 feet |
| <input type="checkbox"/> F | <input type="checkbox"/> F | From 15 to < 30 feet |
| <input checked="" type="checkbox"/> G | <input checked="" type="checkbox"/> G | From 5 to < 15 feet |
| <input type="checkbox"/> H | <input type="checkbox"/> H | < 5 feet |

9. Inundation Duration – assessment area condition metric (skip for non-riparian wetlands)

Answer for assessment area dominant landform.

- A Evidence of short-duration inundation (< 7 consecutive days)
 B Evidence of saturation, without evidence of inundation
 C Evidence of long-duration inundation or very long-duration inundation (7 to 30 consecutive days or more)

10. Indicators of Deposition – assessment area condition metric (skip for non-riparian wetlands and all marshes)

Consider recent deposition only (no plant growth since deposition).

- A Sediment deposition is not excessive, but at approximately natural levels.
 B Sediment deposition is excessive, but not overwhelming the wetland.
 C Sediment deposition is excessive and is overwhelming the wetland.

11. Wetland Size – wetland type/wetland complex condition metric

Check a box in each column. Involves a GIS effort with field adjustment. This metric evaluates three aspects of the wetland area: the size of the wetland type (WT), the size of the wetland complex (WC), and the size of the forested wetland (FW) (if applicable, see User Manual). See the User Manual for boundaries of these evaluation areas. If assessment area is clear-cut, select "K" for the FW column.

- | | | |
|---------------------------------------|---------------------------------------|---|
| WT | WC | FW (if applicable) |
| <input type="checkbox"/> A | <input type="checkbox"/> A | <input type="checkbox"/> A ≥ 500 acres |
| <input type="checkbox"/> B | <input type="checkbox"/> B | <input type="checkbox"/> B From 100 to < 500 acres |
| <input type="checkbox"/> C | <input type="checkbox"/> C | <input type="checkbox"/> C From 50 to < 100 acres |
| <input type="checkbox"/> D | <input type="checkbox"/> D | <input type="checkbox"/> D From 25 to < 50 acres |
| <input type="checkbox"/> E | <input type="checkbox"/> E | <input type="checkbox"/> E From 10 to < 25 acres |
| <input type="checkbox"/> F | <input type="checkbox"/> F | <input type="checkbox"/> F From 5 to < 10 acres |
| <input type="checkbox"/> G | <input type="checkbox"/> G | <input type="checkbox"/> G From 1 to < 5 acres |
| <input type="checkbox"/> H | <input type="checkbox"/> H | <input type="checkbox"/> H From 0.5 to < 1 acre |
| <input type="checkbox"/> I | <input type="checkbox"/> I | <input type="checkbox"/> I From 0.1 to < 0.5 acre |
| <input type="checkbox"/> J | <input type="checkbox"/> J | <input type="checkbox"/> J From 0.01 to < 0.1 acre |
| <input checked="" type="checkbox"/> K | <input checked="" type="checkbox"/> K | <input checked="" type="checkbox"/> K < 0.01 acre or assessment area is clear-cut |

12. Wetland Intactness – wetland type condition metric (evaluate for Pocosins only)

- A Pocosin is the full extent (≥ 90%) of its natural landscape size.
 B Pocosin type is < 90% of the full extent of its natural landscape size.

13. Connectivity to Other Natural Areas – landscape condition metric

13a. **Check appropriate box(es) (a box may be checked in each column).** Involves a GIS effort with field adjustment. This metric evaluates whether the wetland is well connected (Well) and/or loosely connected (Loosely) to the landscape patch, the contiguous naturally vegetated area and open water (if appropriate). Boundaries are formed by four-lane roads, regularly maintained utility line corridors the width of a four-lane road or wider, urban landscapes, maintained fields (pasture and agriculture), or open water > 300 feet wide.

- | | | |
|---------------------------------------|---------------------------------------|--|
| Well | Loosely | |
| <input type="checkbox"/> A | <input type="checkbox"/> A | ≥ 500 acres |
| <input type="checkbox"/> B | <input type="checkbox"/> B | From 100 to < 500 acres |
| <input type="checkbox"/> C | <input type="checkbox"/> C | From 50 to < 100 acres |
| <input type="checkbox"/> D | <input type="checkbox"/> D | From 10 to < 50 acres |
| <input type="checkbox"/> E | <input type="checkbox"/> E | < 10 acres |
| <input checked="" type="checkbox"/> F | <input checked="" type="checkbox"/> F | Wetland type has a poor or no connection to other natural habitats |

13b. **Evaluate for marshes only.**

- Yes No Wetland type has a surface hydrology connection to open waters/stream or tidal wetlands.

14. Edge Effect – wetland type condition metric (skip for all marshes and Estuarine Woody Wetland)

May involve a GIS effort with field adjustment. Estimate distance from wetland type boundary to artificial edges. Artificial edges include non-forested areas ≥ 40 feet wide such as fields, development, roads, regularly maintained utility line corridors, and clear-cuts. Consider the eight main points of the compass. Artificial edge occurs within 150 feet in how many directions? If the assessment area is clear cut, select option "C."

- A 0
 B 1 to 4
 C 5 to 8

15. Vegetative Composition – assessment area condition metric (skip for all marshes and Pine Flat)

- A Vegetation is close to reference condition in species present and their proportions. Lower strata composed of appropriate species, with exotic plants absent or sparse within the assessment area.
 B Vegetation is different from reference condition in species diversity or proportions, but still largely composed of native species characteristic of the wetland type. This may include communities of weedy native species that develop after clearcutting or clearing. It also includes communities with exotics present, but not dominant, over a large portion of the expected strata.
 C Vegetation severely altered from reference in composition, or expected species are unnaturally absent (planted stands of non-characteristic species or at least one stratum inappropriately composed of a single species), or exotic species are dominant in at least one stratum.

16. Vegetative Diversity – assessment area condition metric (evaluate for Non-tidal Freshwater Marsh only)

- A Vegetation diversity is high and is composed primarily of native species (< 10% cover of exotics).
 B Vegetation diversity is low or has > 10% to 50% cover of exotics.
 C Vegetation is dominated by exotic species (> 50 % cover of exotics).

17. Vegetative Structure – assessment area/wetland type condition metric

17a. Is vegetation present?

Yes No If Yes, continue to 17b. If No, skip to Metric 18.

17b. Evaluate percent coverage of assessment area vegetation for all marshes only. Skip to 17c for non-marsh wetlands.

A ≥ 25% coverage of vegetation
 B < 25% coverage of vegetation

17c. Check a box in each column for each stratum. Evaluate this portion of the metric for non-marsh wetlands. Consider structure in airspace above the assessment area (AA) and the wetland type (WT) separately.

	AA	WT	
Canopy	<input type="checkbox"/> A	<input type="checkbox"/> A	Canopy closed, or nearly closed, with natural gaps associated with natural processes
	<input type="checkbox"/> B	<input type="checkbox"/> B	Canopy present, but opened more than natural gaps
	<input checked="" type="checkbox"/> C	<input checked="" type="checkbox"/> C	Canopy sparse or absent
Mid-Story	<input type="checkbox"/> A	<input type="checkbox"/> A	Dense mid-story/sapling layer
	<input type="checkbox"/> B	<input type="checkbox"/> B	Moderate density mid-story/sapling layer
	<input checked="" type="checkbox"/> C	<input checked="" type="checkbox"/> C	Mid-story/sapling layer sparse or absent
Shrub	<input type="checkbox"/> A	<input type="checkbox"/> A	Dense shrub layer
	<input type="checkbox"/> B	<input type="checkbox"/> B	Moderate density shrub layer
	<input checked="" type="checkbox"/> C	<input checked="" type="checkbox"/> C	Shrub layer sparse or absent
Herb	<input checked="" type="checkbox"/> A	<input checked="" type="checkbox"/> A	Dense herb layer
	<input type="checkbox"/> B	<input type="checkbox"/> B	Moderate density herb layer
	<input type="checkbox"/> C	<input type="checkbox"/> C	Herb layer sparse or absent

18. Snags – wetland type condition metric (skip for all marshes)

A Large snags (more than one) are visible (> 12 inches DBH, or large relative to species present and landscape stability).
 B Not A

19. Diameter Class Distribution – wetland type condition metric (skip for all marshes)

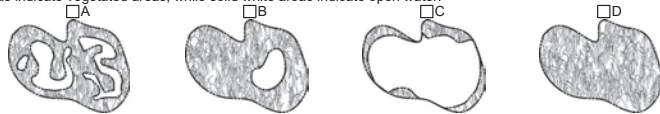
A Majority of canopy trees have stems > 6 inches in diameter at breast height (DBH); many large trees (> 12 inches DBH) are present.
 B Majority of canopy trees have stems between 6 and 12 inches DBH, few are > 12 inch DBH.
 C Majority of canopy trees are < 6 inches DBH or no trees.

20. Large Woody Debris – wetland type condition metric (skip for all marshes)

Include both natural debris and man-placed natural debris.
 A Large logs (more than one) are visible (> 12 inches in diameter, or large relative to species present and landscape stability).
 B Not A

21. Vegetation/Open Water Dispersion – wetland type/open water condition metric (evaluate for Non-Tidal Freshwater Marsh only)

Select the figure that best describes the amount of interspersed vegetation and open water in the growing season. Patterned areas indicate vegetated areas, while solid white areas indicate open water.



22. Hydrologic Connectivity – assessment area condition metric (evaluate for riparian wetlands and Salt/Brackish Marsh only)

Examples of activities that may severely alter hydrologic connectivity include intensive ditching, fill, sedimentation, channelization, diversion, man-made berms, beaver dams, and stream incision. Documentation required if evaluated as B, C, or D.

A Overbank and overland flow are not severely altered in the assessment area.
 B Overbank flow is severely altered in the assessment area.
 C Overland flow is severely altered in the assessment area.
 D Both overbank and overland flow are severely altered in the assessment area.

Notes

NC WAM Wetland Rating Sheet
 Accompanies User Manual Version 5.0

Wetland Site Name Wetland P Date of Assessment 7/30/2020
 Wetland Type Bottomland Hardwood Forest Assessor Name/Organization C. Neaves

Notes on Field Assessment Form (Y/N) NO
 Presence of regulatory considerations (Y/N) NO
 Wetland is intensively managed (Y/N) _____
 Assessment area is located within 50 feet of a natural tributary or other open water (Y/N) YES
 Assessment area is substantially altered by beaver (Y/N) _____
 Assessment area experiences overbank flooding during normal rainfall conditions (Y/N) _____
 Assessment area is on a coastal island (Y/N) _____

Sub-function Rating Summary

Function	Sub-function	Metrics	Rating
Hydrology	Surface Storage and Retention	Condition	LOW
		Sub-surface Storage and Retention	Condition LOW
Water Quality	Pathogen Change	Condition	LOW
		Condition/Opportunity	LOW
		Opportunity Presence (Y/N)	NO
	Particulate Change	Condition	LOW
		Condition/Opportunity	LOW
		Opportunity Presence (Y/N)	NO
	Soluble Change	Condition	LOW
		Condition/Opportunity	LOW
		Opportunity Presence (Y/N)	NO
	Physical Change	Condition	LOW
		Condition/Opportunity	LOW
		Opportunity Presence (Y/N)	NO
	Pollution Change	Condition	NA
		Condition/Opportunity	NA
		Opportunity Presence (Y/N)	NA
Habitat	Physical Structure	Condition	LOW
		Condition/Opportunity	LOW
		Opportunity Presence (Y/N)	LOW
	Landscape Patch Structure	Condition	LOW
		Condition/Opportunity	LOW
	Vegetation Composition	Condition	LOW
		Condition/Opportunity	LOW

Function Rating Summary

Function	Metrics	Rating
Hydrology	Condition	LOW
	Condition/Opportunity	LOW
	Opportunity Presence (Y/N)	NO
Water Quality	Condition	LOW
	Condition/Opportunity	LOW
	Opportunity Presence (Y/N)	NO
Habitat	Condition	LOW
	Condition/Opportunity	LOW

Overall Wetland Rating LOW

NC WAM FIELD ASSESSMENT FORM
Accompanies User Manual Version 5.0

USACE AID #	SAW-2020-00047	NCDWR#	20200035
Project Name	Liberty Rock Mitigation Site	Date of Evaluation	7/30/2020
Applicant/Owner Name	Widlands Engineering	Wetland Site Name	Wetland Q
Wetland Type	Bottomland Hardwood Forest	Assessor Name/Organization	C. Neaves
Level III Ecoregion	Piedmont	Nearest Named Water Body	Rocky River
River Basin	Cape Fear	USGS 8-Digit Catalogue Unit	03030003
County	Randolph	NCDWR Region	Winston-Salem
<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	Precipitation within 48 hrs?	Latitude/Longitude (deci-degrees)	35.820229, -79.565778

Evidence of stressors affecting the assessment area (may not be within the assessment area)

Please circle and/or make note on the last page if evidence of stressors is apparent. Consider departure from reference, if appropriate, in recent past (for instance, within 10 years). Noteworthy stressors include, but are not limited to the following.

- Hydrological modifications (examples: ditches, dams, beaver dams, dikes, berms, ponds, etc.)
- Surface and sub-surface discharges into the wetland (examples: discharges containing obvious pollutants, presence of nearby septic tanks, underground storage tanks (USTs), hog lagoons, etc.)
- Signs of vegetation stress (examples: vegetation mortality, insect damage, disease, storm damage, salt intrusion, etc.)
- Habitat/plant community alteration (examples: mowing, clear-cutting, exotics, etc.)

Is the assessment area intensively managed? Yes No

Regulatory Considerations - Were regulatory considerations evaluated? Yes No If Yes, check all that apply to the assessment area.

- Anadromous fish
- Federally protected species or State endangered or threatened species
- NCDWR riparian buffer rule in effect
- Abuts a Primary Nursery Area (PNA)
- Publicly owned property
- N.C. Division of Coastal Management Area of Environmental Concern (AEC) (including buffer)
- Abuts a stream with a NCDWQ classification of SA or supplemental classifications of HQW, ORW, or Trout
- Designated NCNHP reference community
- Abuts a 303(d)-listed stream or a tributary to a 303(d)-listed stream

What type of natural stream is associated with the wetland, if any? (check all that apply)

- Blackwater
- Brownwater
- Tidal (if tidal, check one of the following boxes) Lunar Wind Both

Is the assessment area on a coastal island? Yes No

Is the assessment area's surface water storage capacity or duration substantially altered by beaver? Yes No

Does the assessment area experience overbank flooding during normal rainfall conditions? Yes No

1. Ground Surface Condition/Vegetation Condition – assessment area condition metric

Check a box in each column. Consider alteration to the ground surface (GS) in the assessment area and vegetation structure (VS) in the assessment area. Compare to reference wetland if applicable (see User Manual). If a reference is not applicable, then rate the assessment area based on evidence an effect.

- | | | |
|---------------------------------------|---------------------------------------|--|
| GS | VS | |
| <input checked="" type="checkbox"/> A | <input type="checkbox"/> A | Not severely altered |
| <input type="checkbox"/> B | <input checked="" type="checkbox"/> B | Severely altered over a majority of the assessment area (ground surface alteration examples: vehicle tracks, excessive sedimentation, fire-plow lanes, skidder tracks, bedding, fill, soil compaction, obvious pollutants) (vegetation structure alteration examples: mechanical disturbance, herbicides, salt intrusion [where appropriate], exotic species, grazing, less diversity [if appropriate], hydrologic alteration) |

2. Surface and Sub-Surface Storage Capacity and Duration – assessment area condition metric

Check a box in each column. Consider surface storage capacity and duration (Surf) and sub-surface storage capacity and duration (Sub). Consider both increase and decrease in hydrology. A ditch ≤ 1 foot deep is considered to affect surface water only, while a ditch > 1 foot deep is expected to affect both surface and sub-surface water. Consider tidal flooding regime, if applicable.

- | | | |
|---------------------------------------|---------------------------------------|--|
| Surf | Sub | |
| <input type="checkbox"/> A | <input type="checkbox"/> A | Water storage capacity and duration are not altered. |
| <input checked="" type="checkbox"/> B | <input checked="" type="checkbox"/> B | Water storage capacity or duration are altered, but not substantially (typically, not sufficient to change vegetation). |
| <input type="checkbox"/> C | <input type="checkbox"/> C | Water storage capacity or duration are substantially altered (typically, alteration sufficient to result in vegetation change) (examples: draining, flooding, soil compaction, filling, excessive sedimentation, underground utility lines). |

3. Water Storage/Surface Relief – assessment area/wetland type condition metric (skip for all marshes)

Check a box in each column. Select the appropriate storage for the assessment area (AA) and the wetland type (WT).

- | | | |
|---|----|---|
| AA | WT | |
| 3a. <input type="checkbox"/> A <input type="checkbox"/> A | | Majority of wetland with depressions able to pond water > 1 deep |
| <input type="checkbox"/> B <input type="checkbox"/> B | | Majority of wetland with depressions able to pond water 6 inches to 1 foot deep |
| <input type="checkbox"/> C <input type="checkbox"/> C | | Majority of wetland with depressions able to pond water 3 to 6 inches deep |
| <input checked="" type="checkbox"/> D <input checked="" type="checkbox"/> D | | Depressions able to pond water < 3 inches deep |
| 3b. <input type="checkbox"/> A | | Evidence that maximum depth of inundation is greater than 2 feet |
| <input type="checkbox"/> B | | Evidence that maximum depth of inundation is between 1 and 2 feet |
| <input checked="" type="checkbox"/> C | | Evidence that maximum depth of inundation is less than 1 foot |

4. Soil Texture/Structure – assessment area condition metric (skip for all marshes)

Check a box from each of the three soil property groups below. Dig soil profile in the dominant assessment area landscape feature. Make soil observations within the top 12 inches. Use most recent National Technical Committee for Hydric Soils guidance for regional indicators.

- 4a. A Sandy soil
- B Loamy or clayey soils exhibiting redoximorphic features (concentrations, depletions, or rhizospheres)
- C Loamy or clayey soils not exhibiting redoximorphic features
- D Loamy or clayey gleyed soil
- E Histosol or histc epipedon
- 4b. A Soil ribbon < 1 inch
- B Soil ribbon ≥ 1 inch
- 4c. A No peat or muck presence
- B A peat or muck presence

5. Discharge into Wetland – opportunity metric

Check a box in each column. Consider surface pollutants or discharges (Surf) and sub-surface pollutants or discharges (Sub). Examples of sub-surface discharges include presence of nearby septic tank, underground storage tank (UST), etc.

- | | | |
|---------------------------------------|---------------------------------------|---|
| Surf | Sub | |
| <input type="checkbox"/> A | <input checked="" type="checkbox"/> A | Little or no evidence of pollutants or discharges entering the assessment area |
| <input checked="" type="checkbox"/> B | <input type="checkbox"/> B | Noticeable evidence of pollutants or discharges entering the wetland and stressing, but not overwhelming the treatment capacity of the assessment area |
| <input type="checkbox"/> C | <input type="checkbox"/> C | Noticeable evidence of pollutants or discharges (pathogen, particulate, or soluble) entering the assessment area and potentially overwhelming the treatment capacity of the wetland (water discoloration, dead vegetation, excessive sedimentation, odor) |

6. Land Use – opportunity metric (skip for non-riparian wetlands)

Check all that apply (at least one box in each column). Evaluation involves a GIS effort with field adjustment. Consider sources draining to assessment area within entire upstream watershed (WS), within 5 miles and within the watershed draining to the assessment area (5M), and within 2 miles and within the watershed draining to the assessment area (2M).

- | | | | |
|---------------------------------------|---------------------------------------|---------------------------------------|---|
| WS | 5M | 2M | |
| <input type="checkbox"/> A | <input type="checkbox"/> A | <input type="checkbox"/> A | ≥ 10% impervious surfaces |
| <input type="checkbox"/> B | <input type="checkbox"/> B | <input type="checkbox"/> B | Confined animal operations (or other local, concentrated source of pollutants) |
| <input checked="" type="checkbox"/> C | <input checked="" type="checkbox"/> C | <input checked="" type="checkbox"/> C | ≥ 20% coverage of pasture |
| <input type="checkbox"/> D | <input type="checkbox"/> D | <input type="checkbox"/> D | ≥ 20% coverage of agricultural land (regularly plowed land) |
| <input checked="" type="checkbox"/> E | <input checked="" type="checkbox"/> E | <input checked="" type="checkbox"/> E | ≥ 20% coverage of maintained grass/herb |
| <input type="checkbox"/> F | <input type="checkbox"/> F | <input type="checkbox"/> F | ≥ 20% coverage of clear-cut land |
| <input type="checkbox"/> G | <input type="checkbox"/> G | <input type="checkbox"/> G | Little or no opportunity to improve water quality. Lack of opportunity may result from little or no disturbance in the watershed or hydrologic alterations that prevent drainage and/or overbank flow from affecting the assessment area. |

7. Wetland Acting as Vegetated Buffer – assessment area/wetland complex condition metric (skip for non-riparian wetlands)

- 7a. Is assessment area within 50 feet of a tributary or other open water?
- Yes No If Yes, continue to 7b. If No, skip to Metric 8.
- Wetland buffer need only be present on one side of the water body. Make buffer judgment based on the average width of wetland. Record a note if a portion of the buffer has been removed or disturbed.
- 7b. How much of the first 50 feet from the bank is wetland? (Wetland buffer need only be present on one side of the water body. Make buffer judgment based on the average width of wetland. Record a note if a portion of the buffer has been removed or disturbed.)
- A ≥ 50 feet
- B From 30 to < 50 feet
- C From 15 to < 30 feet
- D From 5 to < 15 feet
- E < 5 feet or buffer bypassed by ditches
- 7c. Tributary width. If the tributary is anastomosed, combine widths of channels/braids for a total width.
- ≤ 15-foot wide > 15-foot wide Other open water (no tributary present)
- 7d. Do roots of assessment area vegetation extend into the bank of the tributary/open water?
- Yes No
- 7e. Is stream or other open water sheltered or exposed?
- Sheltered – adjacent open water with width < 2500 feet and no regular boat traffic.
- Exposed – adjacent open water with width ≥ 2500 feet or regular boat traffic.

8. Wetland Width at the Assessment Area – wetland type/wetland complex condition metric (evaluate WT for all marshes and Estuarine Woody Wetland only; evaluate WC for Bottomland Hardwood Forest, Headwater Forest, and Riverine Swamp Forest only)

Check a box in each column for riverine wetlands only. Select the average width for the wetland type at the assessment area (WT) and the wetland complex at the assessment area (WC). See User Manual for WT and WC boundaries.

- | | | |
|---------------------------------------|---------------------------------------|-----------------------|
| WT | WC | |
| <input type="checkbox"/> A | <input type="checkbox"/> A | ≥ 100 feet |
| <input type="checkbox"/> B | <input type="checkbox"/> B | From 80 to < 100 feet |
| <input type="checkbox"/> C | <input type="checkbox"/> C | From 50 to < 80 feet |
| <input type="checkbox"/> D | <input type="checkbox"/> D | From 40 to < 50 feet |
| <input type="checkbox"/> E | <input type="checkbox"/> E | From 30 to < 40 feet |
| <input checked="" type="checkbox"/> F | <input checked="" type="checkbox"/> F | From 15 to < 30 feet |
| <input type="checkbox"/> G | <input type="checkbox"/> G | From 5 to < 15 feet |
| <input type="checkbox"/> H | <input type="checkbox"/> H | < 5 feet |

9. Inundation Duration – assessment area condition metric (skip for non-riparian wetlands)

Answer for assessment area dominant landform.

- A Evidence of short-duration inundation (< 7 consecutive days)
B Evidence of saturation, without evidence of inundation
C Evidence of long-duration inundation or very long-duration inundation (7 to 30 consecutive days or more)

10. Indicators of Deposition – assessment area condition metric (skip for non-riparian wetlands and all marshes)

Consider recent deposition only (no plant growth since deposition).

- A Sediment deposition is not excessive, but at approximately natural levels.
B Sediment deposition is excessive, but not overwhelming the wetland.
C Sediment deposition is excessive and is overwhelming the wetland.

11. Wetland Size – wetland type/wetland complex condition metric

Check a box in each column. Involves a GIS effort with field adjustment. This metric evaluates three aspects of the wetland area: the size of the wetland type (WT), the size of the wetland complex (WC), and the size of the forested wetland (FW) (if applicable, see User Manual). See the User Manual for boundaries of these evaluation areas. If assessment area is clear-cut, select "K" for the FW column.

- | | | |
|---------------------------------------|---------------------------------------|--|
| WT | WC | FW (if applicable) |
| <input type="checkbox"/> A | <input type="checkbox"/> A | <input type="checkbox"/> A ≥ 500 acres |
| <input type="checkbox"/> B | <input type="checkbox"/> B | <input type="checkbox"/> B From 100 to < 500 acres |
| <input type="checkbox"/> C | <input type="checkbox"/> C | <input type="checkbox"/> C From 50 to < 100 acres |
| <input type="checkbox"/> D | <input type="checkbox"/> D | <input type="checkbox"/> D From 25 to < 50 acres |
| <input type="checkbox"/> E | <input type="checkbox"/> E | <input type="checkbox"/> E From 10 to < 25 acres |
| <input type="checkbox"/> F | <input type="checkbox"/> F | <input type="checkbox"/> F From 5 to < 10 acres |
| <input type="checkbox"/> G | <input type="checkbox"/> G | <input type="checkbox"/> G From 1 to < 5 acres |
| <input type="checkbox"/> H | <input type="checkbox"/> H | <input type="checkbox"/> H From 0.5 to < 1 acre |
| <input type="checkbox"/> I | <input type="checkbox"/> I | <input type="checkbox"/> I From 0.1 to < 0.5 acre |
| <input checked="" type="checkbox"/> J | <input checked="" type="checkbox"/> J | <input type="checkbox"/> J From 0.01 to < 0.1 acre |
| <input type="checkbox"/> K | <input type="checkbox"/> K | <input checked="" type="checkbox"/> K < 0.01 acre <u>or</u> assessment area is clear-cut |

12. Wetland Intactness – wetland type condition metric (evaluate for Pocosins only)

- A Pocosin is the full extent (≥ 90%) of its natural landscape size.
B Pocosin type is < 90% of the full extent of its natural landscape size.

13. Connectivity to Other Natural Areas – landscape condition metric

13a. Check appropriate box(es) (a box may be checked in each column). Involves a GIS effort with field adjustment. This metric evaluates whether the wetland is well connected (Well) and/or loosely connected (Loosely) to the landscape patch, the contiguous naturally vegetated area and open water (if appropriate). Boundaries are formed by four-lane roads, regularly maintained utility line corridors the width of a four-lane road or wider, urban landscapes, maintained fields (pasture and agriculture), or open water > 300 feet wide.

- | | |
|---------------------------------------|---|
| Well | Loosely |
| <input type="checkbox"/> A | <input type="checkbox"/> A ≥ 500 acres |
| <input type="checkbox"/> B | <input type="checkbox"/> B From 100 to < 500 acres |
| <input type="checkbox"/> C | <input type="checkbox"/> C From 50 to < 100 acres |
| <input type="checkbox"/> D | <input type="checkbox"/> D From 10 to < 50 acres |
| <input type="checkbox"/> E | <input type="checkbox"/> E < 10 acres |
| <input checked="" type="checkbox"/> F | <input type="checkbox"/> F Wetland type has a poor or no connection to other natural habitats |

13b. Evaluate for marshes only.

- Yes No Wetland type has a surface hydrology connection to open waters/stream or tidal wetlands.

14. Edge Effect – wetland type condition metric (skip for all marshes and Estuarine Woody Wetland)

May involve a GIS effort with field adjustment. Estimate distance from wetland type boundary to artificial edges. Artificial edges include non-forested areas ≥ 40 feet wide such as fields, development, roads, regularly maintained utility line corridors, and clear-cuts. Consider the eight main points of the compass. Artificial edge occurs within 150 feet in how many directions? If the assessment area is clear cut, select option "C."

- A 0
B 1 to 4
C 5 to 8

15. Vegetative Composition – assessment area condition metric (skip for all marshes and Pine Flat)

- A Vegetation is close to reference condition in species present and their proportions. Lower strata composed of appropriate species, with exotic plants absent or sparse within the assessment area.
B Vegetation is different from reference condition in species diversity or proportions, but still largely composed of native species characteristic of the wetland type. This may include communities of weedy native species that develop after clearcutting or clearing. It also includes communities with exotics present, but not dominant, over a large portion of the expected strata.
C Vegetation severely altered from reference in composition, or expected species are unnaturally absent (planted stands of non-characteristic species or at least one stratum inappropriately composed of a single species), or exotic species are dominant in at least one stratum.

16. Vegetative Diversity – assessment area condition metric (evaluate for Non-tidal Freshwater Marsh only)

- A Vegetation diversity is high and is composed primarily of native species (< 10% cover of exotics).
B Vegetation diversity is low or has > 10% to 50% cover of exotics.
C Vegetation is dominated by exotic species (> 50 % cover of exotics).

17. Vegetative Structure – assessment area/wetland type condition metric

17a. Is vegetation present?

- Yes No If Yes, continue to 17b. If No, skip to Metric 18.

17b. Evaluate percent coverage of assessment area vegetation for all marshes only. Skip to 17c for non-marsh wetlands.

- A ≥ 25% coverage of vegetation
B < 25% coverage of vegetation

17c. Check a box in each column for each stratum. Evaluate this portion of the metric for non-marsh wetlands. Consider structure in airspace above the assessment area (AA) and the wetland type (WT) separately.

- | | | | |
|-----------|---------------------------------------|---------------------------------------|--|
| | AA | WT | |
| Canopy | <input type="checkbox"/> A | <input type="checkbox"/> A | Canopy closed, or nearly closed, with natural gaps associated with natural processes |
| | <input type="checkbox"/> B | <input type="checkbox"/> B | Canopy present, but opened more than natural gaps |
| | <input checked="" type="checkbox"/> C | <input checked="" type="checkbox"/> C | Canopy sparse or absent |
| Mid-Story | <input type="checkbox"/> A | <input type="checkbox"/> A | Dense mid-story/sapling layer |
| | <input type="checkbox"/> B | <input type="checkbox"/> B | Moderate density mid-story/sapling layer |
| | <input checked="" type="checkbox"/> C | <input checked="" type="checkbox"/> C | Mid-story/sapling layer sparse or absent |
| Shrub | <input type="checkbox"/> A | <input type="checkbox"/> A | Dense shrub layer |
| | <input type="checkbox"/> B | <input type="checkbox"/> B | Moderate density shrub layer |
| | <input checked="" type="checkbox"/> C | <input checked="" type="checkbox"/> C | Shrub layer sparse or absent |
| Herb | <input checked="" type="checkbox"/> A | <input checked="" type="checkbox"/> A | Dense herb layer |
| | <input type="checkbox"/> B | <input type="checkbox"/> B | Moderate density herb layer |
| | <input type="checkbox"/> C | <input type="checkbox"/> C | Herb layer sparse or absent |

18. Snags – wetland type condition metric (skip for all marshes)

- A Large snags (more than one) are visible (> 12 inches DBH, or large relative to species present and landscape stability).
B Not A

19. Diameter Class Distribution – wetland type condition metric (skip for all marshes)

- A Majority of canopy trees have stems > 6 inches in diameter at breast height (DBH); many large trees (> 12 inches DBH) are present.
B Majority of canopy trees have stems between 6 and 12 inches DBH, few are > 12 inch DBH.
C Majority of canopy trees are < 6 inches DBH or no trees.

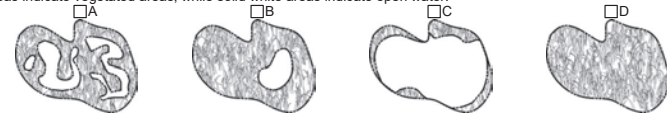
20. Large Woody Debris – wetland type condition metric (skip for all marshes)

Include both natural debris and man-placed natural debris.

- A Large logs (more than one) are visible (> 12 inches in diameter, or large relative to species present and landscape stability).
B Not A

21. Vegetation/Open Water Dispersion – wetland type/open water condition metric (evaluate for Non-Tidal Freshwater Marsh only)

Select the figure that best describes the amount of interspersed vegetation and open water in the growing season. Patterned areas indicate vegetated areas, while solid white areas indicate open water.



22. Hydrologic Connectivity – assessment area condition metric (evaluate for riparian wetlands and Salt/Brackish Marsh only)

Examples of activities that may severely alter hydrologic connectivity include intensive ditching, fill, sedimentation, channelization, diversion, man-made berms, beaver dams, and stream incision. Documentation required if evaluated as B, C, or D.

- A Overbank and overland flow are not severely altered in the assessment area.
B Overbank flow is severely altered in the assessment area.
C Overland flow is severely altered in the assessment area.
D Both overbank and overland flow are severely altered in the assessment area.

Notes

NC WAM Wetland Rating Sheet
Accompanies User Manual Version 5.0

Wetland Site Name Wetland Q Date of Assessment 7/30/2020
 Wetland Type Bottomland Hardwood Forest Assessor Name/Organization C. Neaves
 Notes on Field Assessment Form (Y/N) NO
 Presence of regulatory considerations (Y/N) NO
 Wetland is intensively managed (Y/N) _____
 Assessment area is located within 50 feet of a natural tributary or other open water (Y/N) YES
 Assessment area is substantially altered by beaver (Y/N) _____
 Assessment area experiences overbank flooding during normal rainfall conditions (Y/N) _____
 Assessment area is on a coastal island (Y/N) _____

Sub-function Rating Summary

Function	Sub-function	Metrics	Rating
Hydrology	Surface Storage and Retention	Condition	LOW
	Sub-surface Storage and Retention	Condition	LOW
Water Quality	Pathogen Change	Condition	MEDIUM
		Condition/Opportunity	MEDIUM
	Particulate Change	Opportunity Presence (Y/N)	NO
		Condition	LOW
	Soluble Change	Condition/Opportunity	LOW
		Opportunity Presence (Y/N)	NO
	Physical Change	Condition	MEDIUM
		Condition/Opportunity	MEDIUM
	Pollution Change	Opportunity Presence (Y/N)	NO
		Condition	LOW
	Habitat	Condition/Opportunity	LOW
		Opportunity Presence (Y/N)	NO
	Physical Structure	Condition	LOW
	Landscape Patch Structure	Condition	LOW
	Vegetation Composition	Condition	LOW

Function Rating Summary

Function	Metrics	Rating
Hydrology	Condition	LOW
Water Quality	Condition	LOW
	Condition/Opportunity	LOW
	Opportunity Presence (Y/N)	NO
Habitat	Condition	LOW

Overall Wetland Rating LOW

NC WAM FIELD ASSESSMENT FORM
Accompanies User Manual Version 5.0

USACE AID #	SAW-2020-00047	NCDWR#	20200035
Project Name	Liberty Rock Mitigation Site	Date of Evaluation	7/30/2020
Applicant/Owner Name	Wildlands Engineering	Wetland Site Name	Wetland R
Wetland Type	Bottomland Hardwood Forest	Assessor Name/Organization	C. Neaves
Level III Ecoregion	Piedmont	Nearest Named Water Body	Rocky River
River Basin	Cape Fear	USGS 8-Digit Catalogue Unit	03030003
County	Randolph	NCDWR Region	Winston-Salem
<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	Precipitation within 48 hrs?	Latitude/Longitude (deci-degrees)	35.820235, -79.565986

Evidence of stressors affecting the assessment area (may not be within the assessment area)
 Please circle and/or make note on the last page if evidence of stressors is apparent. Consider departure from reference, if appropriate, in recent past (for instance, within 10 years). Noteworthy stressors include, but are not limited to the following.

- Hydrological modifications (examples: ditches, dams, beaver dams, dikes, berms, ponds, etc.)
- Surface and sub-surface discharges into the wetland (examples: discharges containing obvious pollutants, presence of nearby septic tanks, underground storage tanks (USTs), hog lagoons, etc.)
- Signs of vegetation stress (examples: vegetation mortality, insect damage, storm damage, disease, salt intrusion, etc.)
- Habitat/plant community alteration (examples: mowing, clear-cutting, exotics, etc.)

Is the assessment area intensively managed? Yes No

Regulatory Considerations - Were regulatory considerations evaluated? Yes No If Yes, check all that apply to the assessment area.

- Anadromous fish
- Federally protected species or State endangered or threatened species
- NCDWR riparian buffer rule in effect
- Abuts a Primary Nursery Area (PNA)
- Publicly owned property
- N.C. Division of Coastal Management Area of Environmental Concern (AEC) (including buffer)
- Abuts a stream with a NCDWQ classification of SA or supplemental classifications of HQW, ORW, or Trout
- Designated NCNHP reference community
- Abuts a 303(d)-listed stream or a tributary to a 303(d)-listed stream

What type of natural stream is associated with the wetland, if any? (check all that apply)

- Blackwater
- Brownwater
- Tidal (if tidal, check one of the following boxes) Lunar Wind Both

Is the assessment area on a coastal island? Yes No

Is the assessment area's surface water storage capacity or duration substantially altered by beaver? Yes No

Does the assessment area experience overbank flooding during normal rainfall conditions? Yes No

- Ground Surface Condition/Vegetation Condition – assessment area condition metric**
Check a box in each column. Consider alteration to the ground surface (GS) in the assessment area and vegetation structure (VS) in the assessment area. Compare to reference wetland if applicable (see User Manual). If a reference is not applicable, then rate the assessment area based on evidence an effect.

GS	VS	
<input checked="" type="checkbox"/> A	<input type="checkbox"/> A	Not severely altered
<input type="checkbox"/> B	<input checked="" type="checkbox"/> B	Severely altered over a majority of the assessment area (ground surface alteration examples: vehicle tracks, excessive sedimentation, fire-plow lanes, skidder tracks, bedding, fill, soil compaction, obvious pollutants) (vegetation structure alteration examples: mechanical disturbance, herbicides, salt intrusion [where appropriate], exotic species, grazing, less diversity [if appropriate], hydrologic alteration)
- Surface and Sub-Surface Storage Capacity and Duration – assessment area condition metric**
Check a box in each column. Consider surface storage capacity and duration (Surf) and sub-surface storage capacity and duration (Sub). Consider both increase and decrease in hydrology. A ditch ≤ 1 foot deep is considered to affect surface water only, while a ditch > 1 foot deep is expected to affect both surface and sub-surface water. Consider tidal flooding regime, if applicable.

Surf	Sub	
<input type="checkbox"/> A	<input type="checkbox"/> A	Water storage capacity and duration are not altered.
<input checked="" type="checkbox"/> B	<input checked="" type="checkbox"/> B	Water storage capacity or duration are altered, but not substantially (typically, not sufficient to change vegetation).
<input type="checkbox"/> C	<input type="checkbox"/> C	Water storage capacity or duration are substantially altered (typically, alteration sufficient to result in vegetation change) (examples: draining, flooding, soil compaction, filling, excessive sedimentation, underground utility lines).
- Water Storage/Surface Relief – assessment area/wetland type condition metric (skip for all marshes)**
Check a box in each column. Select the appropriate storage for the assessment area (AA) and the wetland type (WT).

AA	WT	
3a. <input type="checkbox"/> A <input type="checkbox"/> A		Majority of wetland with depressions able to pond water > 1 foot deep
<input type="checkbox"/> B <input type="checkbox"/> B		Majority of wetland with depressions able to pond water 6 inches to 1 foot deep
<input type="checkbox"/> C <input type="checkbox"/> C		Majority of wetland with depressions able to pond water 3 to 6 inches deep
<input checked="" type="checkbox"/> D <input checked="" type="checkbox"/> D		Depressions able to pond water < 3 inches deep
3b. <input type="checkbox"/> A		Evidence that maximum depth of inundation is greater than 2 feet
<input type="checkbox"/> B		Evidence that maximum depth of inundation is between 1 and 2 feet
<input checked="" type="checkbox"/> C		Evidence that maximum depth of inundation is less than 1 foot

4. Soil Texture/Structure – assessment area condition metric (skip for all marshes)

Check a box from each of the three soil property groups below. Dig soil profile in the dominant assessment area landscape feature. Make soil observations within the top 12 inches. Use most recent National Technical Committee for Hydric Soils guidance for regional indicators.

- 4a. A Sandy soil
 B Loamy or clayey soils exhibiting redoximorphic features (concentrations, depletions, or rhizospheres)
 C Loamy or clayey soils not exhibiting redoximorphic features
 D Loamy or clayey gleyed soil
 E Histosol or histc epipedon
- 4b. A Soil ribbon < 1 inch
 B Soil ribbon ≥ 1 inch
- 4c. A No peat or muck presence
 B A peat or muck presence

5. Discharge into Wetland – opportunity metric

Check a box in each column. Consider surface pollutants or discharges (Surf) and sub-surface pollutants or discharges (Sub). Examples of sub-surface discharges include presence of nearby septic tank, underground storage tank (UST), etc.

- | | | |
|---------------------------------------|---------------------------------------|---|
| Surf | Sub | |
| <input type="checkbox"/> A | <input checked="" type="checkbox"/> A | Little or no evidence of pollutants or discharges entering the assessment area |
| <input checked="" type="checkbox"/> B | <input type="checkbox"/> B | Noticeable evidence of pollutants or discharges entering the wetland and stressing, but not overwhelming the treatment capacity of the assessment area |
| <input type="checkbox"/> C | <input type="checkbox"/> C | Noticeable evidence of pollutants or discharges (pathogen, particulate, or soluble) entering the assessment area and potentially overwhelming the treatment capacity of the wetland (water discoloration, dead vegetation, excessive sedimentation, odor) |

6. Land Use – opportunity metric (skip for non-riparian wetlands)

Check all that apply (at least one box in each column). Evaluation involves a GIS effort with field adjustment. Consider sources draining to assessment area within entire upstream watershed (WS), within 5 miles and within the watershed draining to the assessment area (5M), and within 2 miles and within the watershed draining to the assessment area (2M).

- | | | | |
|---------------------------------------|---------------------------------------|---------------------------------------|---|
| WS | 5M | 2M | |
| <input type="checkbox"/> A | <input type="checkbox"/> A | <input type="checkbox"/> A | ≥ 10% impervious surfaces |
| <input type="checkbox"/> B | <input type="checkbox"/> B | <input type="checkbox"/> B | Confined animal operations (or other local, concentrated source of pollutants) |
| <input checked="" type="checkbox"/> C | <input checked="" type="checkbox"/> C | <input checked="" type="checkbox"/> C | ≥ 20% coverage of pasture |
| <input type="checkbox"/> D | <input type="checkbox"/> D | <input type="checkbox"/> D | ≥ 20% coverage of agricultural land (regularly plowed land) |
| <input checked="" type="checkbox"/> E | <input checked="" type="checkbox"/> E | <input checked="" type="checkbox"/> E | ≥ 20% coverage of maintained grass/herb |
| <input type="checkbox"/> F | <input type="checkbox"/> F | <input type="checkbox"/> F | ≥ 20% coverage of clear-cut land |
| <input type="checkbox"/> G | <input type="checkbox"/> G | <input type="checkbox"/> G | Little or no opportunity to improve water quality. Lack of opportunity may result from little or no disturbance in the watershed or hydrologic alterations that prevent drainage and/or overbank flow from affecting the assessment area. |

7. Wetland Acting as Vegetated Buffer – assessment area/wetland complex condition metric (skip for non-riparian wetlands)

- 7a. Is assessment area within 50 feet of a tributary or other open water?
 Yes No If Yes, continue to 7b. If No, skip to Metric 8.
 Wetland buffer need only be present on one side of the water body. Make buffer judgment based on the average width of wetland. Record a note if a portion of the buffer has been removed or disturbed.
- 7b. How much of the first 50 feet from the bank is wetland? (Wetland buffer need only be present on one side of the water body. Make buffer judgment based on the average width of wetland. Record a note if a portion of the buffer has been removed or disturbed.)
 A ≥ 50 feet
 B From 30 to < 50 feet
 C From 15 to < 30 feet
 D From 5 to < 15 feet
 E < 5 feet or buffer bypassed by ditches
- 7c. Tributary width. If the tributary is anastomosed, combine widths of channels/braids for a total width.
 ≤ 15-foot wide > 15-foot wide Other open water (no tributary present)
- 7d. Do roots of assessment area vegetation extend into the bank of the tributary/open water?
 Yes No
- 7e. Is stream or other open water sheltered or exposed?
 Sheltered – adjacent open water with width < 2500 feet and no regular boat traffic.
 Exposed – adjacent open water with width ≥ 2500 feet or regular boat traffic.

8. Wetland Width at the Assessment Area – wetland type/wetland complex condition metric (evaluate WT for all marshes and Estuarine Woody Wetland only; evaluate WC for Bottomland Hardwood Forest, Headwater Forest, and Riverine Swamp Forest only)

Check a box in each column for riverine wetlands only. Select the average width for the wetland type at the assessment area (WT) and the wetland complex at the assessment area (WC). See User Manual for WT and WC boundaries.

- | | | |
|---------------------------------------|---------------------------------------|-----------------------|
| WT | WC | |
| <input type="checkbox"/> A | <input type="checkbox"/> A | ≥ 100 feet |
| <input type="checkbox"/> B | <input type="checkbox"/> B | From 80 to < 100 feet |
| <input type="checkbox"/> C | <input type="checkbox"/> C | From 50 to < 80 feet |
| <input type="checkbox"/> D | <input type="checkbox"/> D | From 40 to < 50 feet |
| <input type="checkbox"/> E | <input type="checkbox"/> E | From 30 to < 40 feet |
| <input type="checkbox"/> F | <input type="checkbox"/> F | From 15 to < 30 feet |
| <input checked="" type="checkbox"/> G | <input checked="" type="checkbox"/> G | From 5 to < 15 feet |
| <input type="checkbox"/> H | <input type="checkbox"/> H | < 5 feet |

9. Inundation Duration – assessment area condition metric (skip for non-riparian wetlands)

Answer for assessment area dominant landform.

- A Evidence of short-duration inundation (< 7 consecutive days)
 B Evidence of saturation, without evidence of inundation
 C Evidence of long-duration inundation or very long-duration inundation (7 to 30 consecutive days or more)

10. Indicators of Deposition – assessment area condition metric (skip for non-riparian wetlands and all marshes)

Consider recent deposition only (no plant growth since deposition).

- A Sediment deposition is not excessive, but at approximately natural levels.
 B Sediment deposition is excessive, but not overwhelming the wetland.
 C Sediment deposition is excessive and is overwhelming the wetland.

11. Wetland Size – wetland type/wetland complex condition metric

Check a box in each column. Involves a GIS effort with field adjustment. This metric evaluates three aspects of the wetland area: the size of the wetland type (WT), the size of the wetland complex (WC), and the size of the forested wetland (FW) (if applicable, see User Manual). See the User Manual for boundaries of these evaluation areas. If assessment area is clear-cut, select "K" for the FW column.

- | | | |
|---------------------------------------|---------------------------------------|---|
| WT | WC | FW (if applicable) |
| <input type="checkbox"/> A | <input type="checkbox"/> A | <input type="checkbox"/> A ≥ 500 acres |
| <input type="checkbox"/> B | <input type="checkbox"/> B | <input type="checkbox"/> B From 100 to < 500 acres |
| <input type="checkbox"/> C | <input type="checkbox"/> C | <input type="checkbox"/> C From 50 to < 100 acres |
| <input type="checkbox"/> D | <input type="checkbox"/> D | <input type="checkbox"/> D From 25 to < 50 acres |
| <input type="checkbox"/> E | <input type="checkbox"/> E | <input type="checkbox"/> E From 10 to < 25 acres |
| <input type="checkbox"/> F | <input type="checkbox"/> F | <input type="checkbox"/> F From 5 to < 10 acres |
| <input type="checkbox"/> G | <input type="checkbox"/> G | <input type="checkbox"/> G From 1 to < 5 acres |
| <input type="checkbox"/> H | <input type="checkbox"/> H | <input type="checkbox"/> H From 0.5 to < 1 acre |
| <input type="checkbox"/> I | <input type="checkbox"/> I | <input type="checkbox"/> I From 0.1 to < 0.5 acre |
| <input type="checkbox"/> J | <input type="checkbox"/> J | <input type="checkbox"/> J From 0.01 to < 0.1 acre |
| <input checked="" type="checkbox"/> K | <input checked="" type="checkbox"/> K | <input checked="" type="checkbox"/> K < 0.01 acre or assessment area is clear-cut |

12. Wetland Intactness – wetland type condition metric (evaluate for Pocosins only)

- A Pocosin is the full extent (≥ 90%) of its natural landscape size.
 B Pocosin type is < 90% of the full extent of its natural landscape size.

13. Connectivity to Other Natural Areas – landscape condition metric

13a. **Check appropriate box(es) (a box may be checked in each column).** Involves a GIS effort with field adjustment. This metric evaluates whether the wetland is well connected (Well) and/or loosely connected (Loosely) to the landscape patch, the contiguous naturally vegetated area and open water (if appropriate). Boundaries are formed by four-lane roads, regularly maintained utility line corridors the width of a four-lane road or wider, urban landscapes, maintained fields (pasture and agriculture), or open water > 300 feet wide.

- | | | |
|---------------------------------------|----------------------------|--|
| Well | Loosely | |
| <input type="checkbox"/> A | <input type="checkbox"/> A | ≥ 500 acres |
| <input type="checkbox"/> B | <input type="checkbox"/> B | From 100 to < 500 acres |
| <input type="checkbox"/> C | <input type="checkbox"/> C | From 50 to < 100 acres |
| <input type="checkbox"/> D | <input type="checkbox"/> D | From 10 to < 50 acres |
| <input type="checkbox"/> E | <input type="checkbox"/> E | < 10 acres |
| <input checked="" type="checkbox"/> F | <input type="checkbox"/> F | Wetland type has a poor or no connection to other natural habitats |

13b. **Evaluate for marshes only.**

- Yes No Wetland type has a surface hydrology connection to open waters/stream or tidal wetlands.

14. Edge Effect – wetland type condition metric (skip for all marshes and Estuarine Woody Wetland)

May involve a GIS effort with field adjustment. Estimate distance from wetland type boundary to artificial edges. Artificial edges include non-forested areas ≥ 40 feet wide such as fields, development, roads, regularly maintained utility line corridors, and clear-cuts. Consider the eight main points of the compass. Artificial edge occurs within 150 feet in how many directions? If the assessment area is clear cut, select option "C."

- A 0
 B 1 to 4
 C 5 to 8

15. Vegetative Composition – assessment area condition metric (skip for all marshes and Pine Flat)

- A Vegetation is close to reference condition in species present and their proportions. Lower strata composed of appropriate species, with exotic plants absent or sparse within the assessment area.
 B Vegetation is different from reference condition in species diversity or proportions, but still largely composed of native species characteristic of the wetland type. This may include communities of weedy native species that develop after clearcutting or clearing. It also includes communities with exotics present, but not dominant, over a large portion of the expected strata.
 C Vegetation severely altered from reference in composition, or expected species are unnaturally absent (planted stands of non-characteristic species or at least one stratum inappropriately composed of a single species), or exotic species are dominant in at least one stratum.

16. Vegetative Diversity – assessment area condition metric (evaluate for Non-tidal Freshwater Marsh only)

- A Vegetation diversity is high and is composed primarily of native species (< 10% cover of exotics).
 B Vegetation diversity is low or has > 10% to 50% cover of exotics.
 C Vegetation is dominated by exotic species (> 50 % cover of exotics).

17. Vegetative Structure – assessment area/wetland type condition metric

17a. Is vegetation present?
 Yes No If Yes, continue to 17b. If No, skip to Metric 18.

17b. Evaluate percent coverage of assessment area vegetation for all marshes only. Skip to 17c for non-marsh wetlands.
 A ≥ 25% coverage of vegetation
 B < 25% coverage of vegetation

17c. Check a box in each column for each stratum. Evaluate this portion of the metric for non-marsh wetlands. Consider structure in airspace above the assessment area (AA) and the wetland type (WT) separately.

	AA	WT	
Canopy	<input type="checkbox"/> A	<input type="checkbox"/> A	Canopy closed, or nearly closed, with natural gaps associated with natural processes
	<input type="checkbox"/> B	<input type="checkbox"/> B	Canopy present, but opened more than natural gaps
	<input checked="" type="checkbox"/> C	<input checked="" type="checkbox"/> C	Canopy sparse or absent
Mid-Story	<input type="checkbox"/> A	<input type="checkbox"/> A	Dense mid-story/sapling layer
	<input type="checkbox"/> B	<input type="checkbox"/> B	Moderate density mid-story/sapling layer
	<input checked="" type="checkbox"/> C	<input checked="" type="checkbox"/> C	Mid-story/sapling layer sparse or absent
Shrub	<input type="checkbox"/> A	<input type="checkbox"/> A	Dense shrub layer
	<input type="checkbox"/> B	<input type="checkbox"/> B	Moderate density shrub layer
	<input checked="" type="checkbox"/> C	<input checked="" type="checkbox"/> C	Shrub layer sparse or absent
Herb	<input checked="" type="checkbox"/> A	<input checked="" type="checkbox"/> A	Dense herb layer
	<input type="checkbox"/> B	<input type="checkbox"/> B	Moderate density herb layer
	<input type="checkbox"/> C	<input type="checkbox"/> C	Herb layer sparse or absent

18. Snags – wetland type condition metric (skip for all marshes)

A Large snags (more than one) are visible (> 12 inches DBH, or large relative to species present and landscape stability).
 B Not A

19. Diameter Class Distribution – wetland type condition metric (skip for all marshes)

A Majority of canopy trees have stems > 6 inches in diameter at breast height (DBH); many large trees (> 12 inches DBH) are present.
 B Majority of canopy trees have stems between 6 and 12 inches DBH, few are > 12 inch DBH.
 C Majority of canopy trees are < 6 inches DBH or no trees.

20. Large Woody Debris – wetland type condition metric (skip for all marshes)

Include both natural debris and man-placed natural debris.
 A Large logs (more than one) are visible (> 12 inches in diameter, or large relative to species present and landscape stability).
 B Not A

21. Vegetation/Open Water Dispersion – wetland type/open water condition metric (evaluate for Non-Tidal Freshwater Marsh only)

Select the figure that best describes the amount of interspersed vegetation and open water in the growing season. Patterned areas indicate vegetated areas, while solid white areas indicate open water.



22. Hydrologic Connectivity – assessment area condition metric (evaluate for riparian wetlands and Salt/Brackish Marsh only)

Examples of activities that may severely alter hydrologic connectivity include intensive ditching, fill, sedimentation, channelization, diversion, man-made berms, beaver dams, and stream incision. Documentation required if evaluated as B, C, or D.

A Overbank and overland flow are not severely altered in the assessment area.
 B Overbank flow is severely altered in the assessment area.
 C Overland flow is severely altered in the assessment area.
 D Both overbank and overland flow are severely altered in the assessment area.

Notes

NC WAM Wetland Rating Sheet
 Accompanies User Manual Version 5.0

Wetland Site Name Wetland R Date of Assessment 7/30/2020
 Wetland Type Bottomland Hardwood Forest Assessor Name/Organization C. Neaves

Notes on Field Assessment Form (Y/N)	NO
Presence of regulatory considerations (Y/N)	NO
Wetland is intensively managed (Y/N)	
Assessment area is located within 50 feet of a natural tributary or other open water (Y/N)	YES
Assessment area is substantially altered by beaver (Y/N)	
Assessment area experiences overbank flooding during normal rainfall conditions (Y/N)	
Assessment area is on a coastal island (Y/N)	

Sub-function Rating Summary

Function	Sub-function	Metrics	Rating
Hydrology	Surface Storage and Retention	Condition	LOW
		Sub-surface Storage and Retention	Condition
Water Quality	Pathogen Change	Condition	MEDIUM
		Condition/Opportunity	MEDIUM
	Particulate Change	Opportunity Presence (Y/N)	NO
		Condition	LOW
Soluble Change	Condition	Condition/Opportunity	LOW
		Opportunity Presence (Y/N)	NO
	Physical Change	Condition	MEDIUM
		Condition/Opportunity	MEDIUM
Pollution Change	Condition	Opportunity Presence (Y/N)	NO
		Condition/Opportunity	LOW
	Condition	Opportunity Presence (Y/N)	NO
		Condition/Opportunity	NA
Habitat	Physical Structure	Condition	LOW
		Condition/Opportunity	LOW
	Landscape Patch Structure	Condition	LOW
Vegetation Composition	Condition	Condition	LOW
		Condition/Opportunity	LOW

Function Rating Summary

Function	Metrics	Rating
Hydrology	Condition	LOW
	Condition/Opportunity	LOW
Water Quality	Condition	LOW
	Condition/Opportunity	LOW
Habitat	Opportunity Presence (Y/N)	NO
	Condition	LOW

Overall Wetland Rating LOW

NC WAM FIELD ASSESSMENT FORM
Accompanies User Manual Version 5.0

USACE AID #	SAW-2020-00047	NCDWR#	20200035
Project Name	Liberty Rock Mitigation Site	Date of Evaluation	7/30/2020
Applicant/Owner Name	Wildlands Engineering	Wetland Site Name	Wetland S
Wetland Type	Bottomland Hardwood Forest	Assessor Name/Organization	C. Neaves
Level III Ecoregion	Piedmont	Nearest Named Water Body	Rocky River
River Basin	Cape Fear	USGS 8-Digit Catalogue Unit	03030003
County	Randolph	NCDWR Region	Winston-Salem
<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	Precipitation within 48 hrs?	Latitude/Longitude (deci-degrees)	35.820237, -79.566207

Evidence of stressors affecting the assessment area (may not be within the assessment area)

Please circle and/or make note on the last page if evidence of stressors is apparent. Consider departure from reference, if appropriate, in recent past (for instance, within 10 years). Noteworthy stressors include, but are not limited to the following.

- Hydrological modifications (examples: ditches, dams, beaver dams, dikes, berms, ponds, etc.)
- Surface and sub-surface discharges into the wetland (examples: discharges containing obvious pollutants, presence of nearby septic tanks, underground storage tanks (USTs), hog lagoons, etc.)
- Signs of vegetation stress (examples: vegetation mortality, insect damage, disease, storm damage, salt intrusion, etc.)
- Habitat/plant community alteration (examples: mowing, clear-cutting, exotics, etc.)

Is the assessment area intensively managed? Yes No

Regulatory Considerations - Were regulatory considerations evaluated? Yes No If Yes, check all that apply to the assessment area.

- Anadromous fish
- Federally protected species or State endangered or threatened species
- NCDWR riparian buffer rule in effect
- Abuts a Primary Nursery Area (PNA)
- Publicly owned property
- N.C. Division of Coastal Management Area of Environmental Concern (AEC) (including buffer)
- Abuts a stream with a NCDWQ classification of SA or supplemental classifications of HQW, ORW, or Trout
- Designated NCNHP reference community
- Abuts a 303(d)-listed stream or a tributary to a 303(d)-listed stream

What type of natural stream is associated with the wetland, if any? (check all that apply)

- Blackwater
- Brownwater
- Tidal (if tidal, check one of the following boxes) Lunar Wind Both

Is the assessment area on a coastal island? Yes No

Is the assessment area's surface water storage capacity or duration substantially altered by beaver? Yes No

Does the assessment area experience overbank flooding during normal rainfall conditions? Yes No

1. Ground Surface Condition/Vegetation Condition – assessment area condition metric

Check a box in each column. Consider alteration to the ground surface (GS) in the assessment area and vegetation structure (VS) in the assessment area. Compare to reference wetland if applicable (see User Manual). If a reference is not applicable, then rate the assessment area based on evidence an effect.

- | | | |
|---------------------------------------|---------------------------------------|--|
| GS | VS | |
| <input checked="" type="checkbox"/> A | <input type="checkbox"/> A | Not severely altered |
| <input type="checkbox"/> B | <input checked="" type="checkbox"/> B | Severely altered over a majority of the assessment area (ground surface alteration examples: vehicle tracks, excessive sedimentation, fire-plow lanes, skidder tracks, bedding, fill, soil compaction, obvious pollutants) (vegetation structure alteration examples: mechanical disturbance, herbicides, salt intrusion [where appropriate], exotic species, grazing, less diversity [if appropriate], hydrologic alteration) |

2. Surface and Sub-Surface Storage Capacity and Duration – assessment area condition metric

Check a box in each column. Consider surface storage capacity and duration (Surf) and sub-surface storage capacity and duration (Sub). Consider both increase and decrease in hydrology. A ditch ≤ 1 foot deep is considered to affect surface water only, while a ditch > 1 foot deep is expected to affect both surface and sub-surface water. Consider tidal flooding regime, if applicable.

- | | | |
|---------------------------------------|---------------------------------------|--|
| Surf | Sub | |
| <input type="checkbox"/> A | <input type="checkbox"/> A | Water storage capacity and duration are not altered. |
| <input checked="" type="checkbox"/> B | <input checked="" type="checkbox"/> B | Water storage capacity or duration are altered, but not substantially (typically, not sufficient to change vegetation). |
| <input type="checkbox"/> C | <input type="checkbox"/> C | Water storage capacity or duration are substantially altered (typically, alteration sufficient to result in vegetation change) (examples: draining, flooding, soil compaction, filling, excessive sedimentation, underground utility lines). |

3. Water Storage/Surface Relief – assessment area/wetland type condition metric (skip for all marshes)

Check a box in each column. Select the appropriate storage for the assessment area (AA) and the wetland type (WT).

- | | | |
|---------------------------------------|---------------------------------------|---|
| AA | WT | |
| 3a. <input type="checkbox"/> A | <input type="checkbox"/> A | Majority of wetland with depressions able to pond water > 1 deep |
| <input type="checkbox"/> B | <input type="checkbox"/> B | Majority of wetland with depressions able to pond water 6 inches to 1 foot deep |
| <input type="checkbox"/> C | <input type="checkbox"/> C | Majority of wetland with depressions able to pond water 3 to 6 inches deep |
| <input checked="" type="checkbox"/> D | <input checked="" type="checkbox"/> D | Depressions able to pond water < 3 inches deep |
| 3b. <input type="checkbox"/> A | | Evidence that maximum depth of inundation is greater than 2 feet |
| <input type="checkbox"/> B | | Evidence that maximum depth of inundation is between 1 and 2 feet |
| <input checked="" type="checkbox"/> C | | Evidence that maximum depth of inundation is less than 1 foot |

4. Soil Texture/Structure – assessment area condition metric (skip for all marshes)

Check a box from each of the three soil property groups below. Dig soil profile in the dominant assessment area landscape feature. Make soil observations within the top 12 inches. Use most recent National Technical Committee for Hydric Soils guidance for regional indicators.

- 4a. A Sandy soil
- B Loamy or clayey soils exhibiting redoximorphic features (concentrations, depletions, or rhizospheres)
- C Loamy or clayey soils not exhibiting redoximorphic features
- D Loamy or clayey gleyed soil
- E Histosol or histc epipedon
- 4b. A Soil ribbon < 1 inch
- B Soil ribbon ≥ 1 inch
- 4c. A No peat or muck presence
- B A peat or muck presence

5. Discharge into Wetland – opportunity metric

Check a box in each column. Consider surface pollutants or discharges (Surf) and sub-surface pollutants or discharges (Sub). Examples of sub-surface discharges include presence of nearby septic tank, underground storage tank (UST), etc.

- | | | |
|---------------------------------------|---------------------------------------|---|
| Surf | Sub | |
| <input type="checkbox"/> A | <input checked="" type="checkbox"/> A | Little or no evidence of pollutants or discharges entering the assessment area |
| <input checked="" type="checkbox"/> B | <input type="checkbox"/> B | Noticeable evidence of pollutants or discharges entering the wetland and stressing, but not overwhelming the treatment capacity of the assessment area |
| <input type="checkbox"/> C | <input type="checkbox"/> C | Noticeable evidence of pollutants or discharges (pathogen, particulate, or soluble) entering the assessment area and potentially overwhelming the treatment capacity of the wetland (water discoloration, dead vegetation, excessive sedimentation, odor) |

6. Land Use – opportunity metric (skip for non-riparian wetlands)

Check all that apply (at least one box in each column). Evaluation involves a GIS effort with field adjustment. Consider sources draining to assessment area within entire upstream watershed (WS), within 5 miles and within the watershed draining to the assessment area (5M), and within 2 miles and within the watershed draining to the assessment area (2M).

- | | | | |
|---------------------------------------|---------------------------------------|---------------------------------------|---|
| WS | 5M | 2M | |
| <input type="checkbox"/> A | <input type="checkbox"/> A | <input type="checkbox"/> A | ≥ 10% impervious surfaces |
| <input type="checkbox"/> B | <input type="checkbox"/> B | <input type="checkbox"/> B | Confined animal operations (or other local, concentrated source of pollutants) |
| <input checked="" type="checkbox"/> C | <input checked="" type="checkbox"/> C | <input checked="" type="checkbox"/> C | ≥ 20% coverage of pasture |
| <input type="checkbox"/> D | <input type="checkbox"/> D | <input type="checkbox"/> D | ≥ 20% coverage of agricultural land (regularly plowed land) |
| <input checked="" type="checkbox"/> E | <input checked="" type="checkbox"/> E | <input checked="" type="checkbox"/> E | ≥ 20% coverage of maintained grass/herb |
| <input type="checkbox"/> F | <input type="checkbox"/> F | <input type="checkbox"/> F | ≥ 20% coverage of clear-cut land |
| <input type="checkbox"/> G | <input type="checkbox"/> G | <input type="checkbox"/> G | Little or no opportunity to improve water quality. Lack of opportunity may result from little or no disturbance in the watershed or hydrologic alterations that prevent drainage and/or overbank flow from affecting the assessment area. |

7. Wetland Acting as Vegetated Buffer – assessment area/wetland complex condition metric (skip for non-riparian wetlands)

- 7a. Is assessment area within 50 feet of a tributary or other open water?
 Yes No If Yes, continue to 7b. If No, skip to Metric 8.
 Wetland buffer need only be present on one side of the water body. Make buffer judgment based on the average width of wetland. Record a note if a portion of the buffer has been removed or disturbed.
- 7b. How much of the first 50 feet from the bank is wetland? (Wetland buffer need only be present on one side of the water body. Make buffer judgment based on the average width of wetland. Record a note if a portion of the buffer has been removed or disturbed.)
- A ≥ 50 feet
- B From 30 to < 50 feet
- C From 15 to < 30 feet
- D From 5 to < 15 feet
- E < 5 feet or buffer bypassed by ditches
- 7c. Tributary width. If the tributary is anastomosed, combine widths of channels/braids for a total width.
 ≤ 15-foot wide > 15-foot wide Other open water (no tributary present)
- 7d. Do roots of assessment area vegetation extend into the bank of the tributary/open water?
 Yes No
- 7e. Is stream or other open water sheltered or exposed?
 Sheltered – adjacent open water with width < 2500 feet and no regular boat traffic.
 Exposed – adjacent open water with width ≥ 2500 feet or regular boat traffic.

8. Wetland Width at the Assessment Area – wetland type/wetland complex condition metric (evaluate WT for all marshes and Estuarine Woody Wetland only; evaluate WC for Bottomland Hardwood Forest, Headwater Forest, and Riverine Swamp Forest only)

Check a box in each column for riverine wetlands only. Select the average width for the wetland type at the assessment area (WT) and the wetland complex at the assessment area (WC). See User Manual for WT and WC boundaries.

- | | | |
|---------------------------------------|---------------------------------------|-----------------------|
| WT | WC | |
| <input type="checkbox"/> A | <input type="checkbox"/> A | ≥ 100 feet |
| <input type="checkbox"/> B | <input type="checkbox"/> B | From 80 to < 100 feet |
| <input type="checkbox"/> C | <input type="checkbox"/> C | From 50 to < 80 feet |
| <input type="checkbox"/> D | <input type="checkbox"/> D | From 40 to < 50 feet |
| <input type="checkbox"/> E | <input type="checkbox"/> E | From 30 to < 40 feet |
| <input type="checkbox"/> F | <input type="checkbox"/> F | From 15 to < 30 feet |
| <input checked="" type="checkbox"/> G | <input checked="" type="checkbox"/> G | From 5 to < 15 feet |
| <input type="checkbox"/> H | <input type="checkbox"/> H | < 5 feet |

9. **Inundation Duration – assessment area condition metric (skip for non-riparian wetlands)**

Answer for assessment area dominant landform.

- A Evidence of short-duration inundation (< 7 consecutive days)
B Evidence of saturation, without evidence of inundation
C Evidence of long-duration inundation or very long-duration inundation (7 to 30 consecutive days or more)

10. **Indicators of Deposition – assessment area condition metric (skip for non-riparian wetlands and all marshes)**

Consider recent deposition only (no plant growth since deposition).

- A Sediment deposition is not excessive, but at approximately natural levels.
B Sediment deposition is excessive, but not overwhelming the wetland.
C Sediment deposition is excessive and is overwhelming the wetland.

11. **Wetland Size – wetland type/wetland complex condition metric**

Check a box in each column. Involves a GIS effort with field adjustment. This metric evaluates three aspects of the wetland area: the size of the wetland type (WT), the size of the wetland complex (WC), and the size of the forested wetland (FW) (if applicable, see User Manual). See the User Manual for boundaries of these evaluation areas. If assessment area is clear-cut, select "K" for the FW column.

- | | | |
|---------------------------------------|---------------------------------------|--|
| WT | WC | FW (if applicable) |
| <input type="checkbox"/> A | <input type="checkbox"/> A | <input type="checkbox"/> A ≥ 500 acres |
| <input type="checkbox"/> B | <input type="checkbox"/> B | <input type="checkbox"/> B From 100 to < 500 acres |
| <input type="checkbox"/> C | <input type="checkbox"/> C | <input type="checkbox"/> C From 50 to < 100 acres |
| <input type="checkbox"/> D | <input type="checkbox"/> D | <input type="checkbox"/> D From 25 to < 50 acres |
| <input type="checkbox"/> E | <input type="checkbox"/> E | <input type="checkbox"/> E From 10 to < 25 acres |
| <input type="checkbox"/> F | <input type="checkbox"/> F | <input type="checkbox"/> F From 5 to < 10 acres |
| <input type="checkbox"/> G | <input type="checkbox"/> G | <input type="checkbox"/> G From 1 to < 5 acres |
| <input type="checkbox"/> H | <input type="checkbox"/> H | <input type="checkbox"/> H From 0.5 to < 1 acre |
| <input type="checkbox"/> I | <input type="checkbox"/> I | <input type="checkbox"/> I From 0.1 to < 0.5 acre |
| <input type="checkbox"/> J | <input type="checkbox"/> J | <input type="checkbox"/> J From 0.01 to < 0.1 acre |
| <input checked="" type="checkbox"/> K | <input checked="" type="checkbox"/> K | <input checked="" type="checkbox"/> K < 0.01 acre <u>or</u> assessment area is clear-cut |

12. **Wetland Intactness – wetland type condition metric (evaluate for Pocosins only)**

- A Pocosin is the full extent (≥ 90%) of its natural landscape size.
B Pocosin type is < 90% of the full extent of its natural landscape size.

13. **Connectivity to Other Natural Areas – landscape condition metric**

13a. **Check appropriate box(es) (a box may be checked in each column).** Involves a GIS effort with field adjustment. This metric evaluates whether the wetland is well connected (Well) and/or loosely connected (Loosely) to the landscape patch, the contiguous naturally vegetated area and open water (if appropriate). Boundaries are formed by four-lane roads, regularly maintained utility line corridors the width of a four-lane road or wider, urban landscapes, maintained fields (pasture and agriculture), or open water > 300 feet wide.

- | | |
|---------------------------------------|---|
| Well | Loosely |
| <input type="checkbox"/> A | <input type="checkbox"/> A ≥ 500 acres |
| <input type="checkbox"/> B | <input type="checkbox"/> B From 100 to < 500 acres |
| <input type="checkbox"/> C | <input type="checkbox"/> C From 50 to < 100 acres |
| <input type="checkbox"/> D | <input type="checkbox"/> D From 10 to < 50 acres |
| <input type="checkbox"/> E | <input type="checkbox"/> E < 10 acres |
| <input checked="" type="checkbox"/> F | <input type="checkbox"/> F Wetland type has a poor or no connection to other natural habitats |

13b. **Evaluate for marshes only.**

- Yes No Wetland type has a surface hydrology connection to open waters/stream or tidal wetlands.

14. **Edge Effect – wetland type condition metric (skip for all marshes and Estuarine Woody Wetland)**

May involve a GIS effort with field adjustment. Estimate distance from wetland type boundary to artificial edges. Artificial edges include non-forested areas ≥ 40 feet wide such as fields, development, roads, regularly maintained utility line corridors, and clear-cuts. Consider the eight main points of the compass. Artificial edge occurs within 150 feet in how many directions? If the assessment area is clear cut, select option "C."

- A 0
B 1 to 4
C 5 to 8

15. **Vegetative Composition – assessment area condition metric (skip for all marshes and Pine Flat)**

- A Vegetation is close to reference condition in species present and their proportions. Lower strata composed of appropriate species, with exotic plants absent or sparse within the assessment area.
B Vegetation is different from reference condition in species diversity or proportions, but still largely composed of native species characteristic of the wetland type. This may include communities of weedy native species that develop after clearcutting or clearing. It also includes communities with exotics present, but not dominant, over a large portion of the expected strata.
C Vegetation severely altered from reference in composition, or expected species are unnaturally absent (planted stands of non-characteristic species or at least one stratum inappropriately composed of a single species), or exotic species are dominant in at least one stratum.

16. **Vegetative Diversity – assessment area condition metric (evaluate for Non-tidal Freshwater Marsh only)**

- A Vegetation diversity is high and is composed primarily of native species (< 10% cover of exotics).
B Vegetation diversity is low or has > 10% to 50% cover of exotics.
C Vegetation is dominated by exotic species (> 50 % cover of exotics).

17. **Vegetative Structure – assessment area/wetland type condition metric**

17a. Is vegetation present?

- Yes No If Yes, continue to 17b. If No, skip to Metric 18.

17b. Evaluate percent coverage of assessment area vegetation for all marshes only. Skip to 17c for non-marsh wetlands.

- A ≥ 25% coverage of vegetation
B < 25% coverage of vegetation

17c. **Check a box in each column for each stratum.** Evaluate this portion of the metric for non-marsh wetlands. Consider structure in airspace above the assessment area (AA) and the wetland type (WT) separately.

- | | | | |
|-----------|---------------------------------------|---------------------------------------|--|
| | AA | WT | |
| Canopy | <input type="checkbox"/> A | <input type="checkbox"/> A | Canopy closed, or nearly closed, with natural gaps associated with natural processes |
| | <input type="checkbox"/> B | <input type="checkbox"/> B | Canopy present, but opened more than natural gaps |
| | <input checked="" type="checkbox"/> C | <input checked="" type="checkbox"/> C | Canopy sparse or absent |
| Mid-Story | <input type="checkbox"/> A | <input type="checkbox"/> A | Dense mid-story/sapling layer |
| | <input type="checkbox"/> B | <input type="checkbox"/> B | Moderate density mid-story/sapling layer |
| | <input checked="" type="checkbox"/> C | <input checked="" type="checkbox"/> C | Mid-story/sapling layer sparse or absent |
| Shrub | <input type="checkbox"/> A | <input type="checkbox"/> A | Dense shrub layer |
| | <input type="checkbox"/> B | <input type="checkbox"/> B | Moderate density shrub layer |
| | <input checked="" type="checkbox"/> C | <input checked="" type="checkbox"/> C | Shrub layer sparse or absent |
| Herb | <input checked="" type="checkbox"/> A | <input checked="" type="checkbox"/> A | Dense herb layer |
| | <input type="checkbox"/> B | <input type="checkbox"/> B | Moderate density herb layer |
| | <input type="checkbox"/> C | <input type="checkbox"/> C | Herb layer sparse or absent |

18. **Snags – wetland type condition metric (skip for all marshes)**

- A Large snags (more than one) are visible (> 12 inches DBH, or large relative to species present and landscape stability).
B Not A

19. **Diameter Class Distribution – wetland type condition metric (skip for all marshes)**

- A Majority of canopy trees have stems > 6 inches in diameter at breast height (DBH); many large trees (> 12 inches DBH) are present.
B Majority of canopy trees have stems between 6 and 12 inches DBH, few are > 12 inch DBH.
C Majority of canopy trees are < 6 inches DBH or no trees.

20. **Large Woody Debris – wetland type condition metric (skip for all marshes)**

Include both natural debris and man-placed natural debris.

- A Large logs (more than one) are visible (> 12 inches in diameter, or large relative to species present and landscape stability).
B Not A

21. **Vegetation/Open Water Dispersion – wetland type/open water condition metric (evaluate for Non-Tidal Freshwater Marsh only)**

Select the figure that best describes the amount of interspersed between vegetation and open water in the growing season. Patterned areas indicate vegetated areas, while solid white areas indicate open water.



22. **Hydrologic Connectivity – assessment area condition metric (evaluate for riparian wetlands and Salt/Brackish Marsh only)**

Examples of activities that may severely alter hydrologic connectivity include intensive ditching, fill, sedimentation, channelization, diversion, man-made berms, beaver dams, and stream incision. Documentation required if evaluated as B, C, or D.

- A Overbank and overland flow are not severely altered in the assessment area.
B Overbank flow is severely altered in the assessment area.
C Overland flow is severely altered in the assessment area.
D Both overbank and overland flow are severely altered in the assessment area.

Notes

NC WAM Wetland Rating Sheet
Accompanies User Manual Version 5.0

Wetland Site Name Wetland S Date of Assessment 7/30/2020
 Wetland Type Bottomland Hardwood Forest Assessor Name/Organization C. Neaves
 Notes on Field Assessment Form (Y/N) NO
 Presence of regulatory considerations (Y/N) NO
 Wetland is intensively managed (Y/N) _____
 Assessment area is located within 50 feet of a natural tributary or other open water (Y/N) YES
 Assessment area is substantially altered by beaver (Y/N) _____
 Assessment area experiences overbank flooding during normal rainfall conditions (Y/N) _____
 Assessment area is on a coastal island (Y/N) _____

Sub-function Rating Summary

Function	Sub-function	Metrics	Rating
Hydrology	Surface Storage and Retention	Condition	LOW
	Sub-surface Storage and Retention	Condition	LOW
Water Quality	Pathogen Change	Condition	MEDIUM
		Condition/Opportunity	MEDIUM
	Particulate Change	Opportunity Presence (Y/N)	NO
		Condition	LOW
	Soluble Change	Condition/Opportunity	LOW
		Opportunity Presence (Y/N)	NO
	Physical Change	Condition	MEDIUM
		Condition/Opportunity	MEDIUM
	Pollution Change	Opportunity Presence (Y/N)	NO
		Condition	LOW
	Habitat	Condition/Opportunity	LOW
		Opportunity Presence (Y/N)	NO
	Physical Structure	Condition	LOW
	Landscape Patch Structure	Condition	LOW
	Vegetation Composition	Condition	LOW

Function Rating Summary

Function	Metrics	Rating
Hydrology	Condition	LOW
Water Quality	Condition	LOW
	Condition/Opportunity	LOW
	Opportunity Presence (Y/N)	NO
Habitat	Condition	LOW

Overall Wetland Rating LOW

NC WAM FIELD ASSESSMENT FORM
Accompanies User Manual Version 5.0

USACE AID #	SAW-2020-00047	NCDWR#	20200035
Project Name	Liberty Rock Mitigation Site	Date of Evaluation	7/30/2020
Applicant/Owner Name	Wildlands Engineering	Wetland Site Name	Wetland T
Wetland Type	Bottomland Hardwood Forest	Assessor Name/Organization	C. Neaves
Level III Ecoregion	Piedmont	Nearest Named Water Body	Rocky River
River Basin	Cape Fear	USGS 8-Digit Catalogue Unit	03030003
County	Randolph	NCDWR Region	Winston-Salem
<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	Precipitation within 48 hrs?	Latitude/Longitude (deci-degrees)	35.820272, -79.566460

Evidence of stressors affecting the assessment area (may not be within the assessment area)

Please circle and/or make note on the last page if evidence of stressors is apparent. Consider departure from reference, if appropriate, in recent past (for instance, within 10 years). Noteworthy stressors include, but are not limited to the following.

- Hydrological modifications (examples: ditches, dams, beaver dams, dikes, berms, ponds, etc.)
- Surface and sub-surface discharges into the wetland (examples: discharges containing obvious pollutants, presence of nearby septic tanks, underground storage tanks (USTs), hog lagoons, etc.)
- Signs of vegetation stress (examples: vegetation mortality, insect damage, disease, storm damage, salt intrusion, etc.)
- Habitat/plant community alteration (examples: mowing, clear-cutting, exotics, etc.)

Is the assessment area intensively managed? Yes No

Regulatory Considerations - Were regulatory considerations evaluated? Yes No If Yes, check all that apply to the assessment area.

- Anadromous fish
- Federally protected species or State endangered or threatened species
- NCDWR riparian buffer rule in effect
- Abuts a Primary Nursery Area (PNA)
- Publicly owned property
- N.C. Division of Coastal Management Area of Environmental Concern (AEC) (including buffer)
- Abuts a stream with a NCDWQ classification of SA or supplemental classifications of HQW, ORW, or Trout
- Designated NCNHP reference community
- Abuts a 303(d)-listed stream or a tributary to a 303(d)-listed stream

What type of natural stream is associated with the wetland, if any? (check all that apply)

- Blackwater
- Brownwater
- Tidal (if tidal, check one of the following boxes) Lunar Wind Both

Is the assessment area on a coastal island? Yes No

Is the assessment area's surface water storage capacity or duration substantially altered by beaver? Yes No

Does the assessment area experience overbank flooding during normal rainfall conditions? Yes No

1. Ground Surface Condition/Vegetation Condition – assessment area condition metric

Check a box in each column. Consider alteration to the ground surface (GS) in the assessment area and vegetation structure (VS) in the assessment area. Compare to reference wetland if applicable (see User Manual). If a reference is not applicable, then rate the assessment area based on evidence an effect.

- | | | |
|---------------------------------------|---------------------------------------|--|
| GS | VS | |
| <input checked="" type="checkbox"/> A | <input type="checkbox"/> A | Not severely altered |
| <input type="checkbox"/> B | <input checked="" type="checkbox"/> B | Severely altered over a majority of the assessment area (ground surface alteration examples: vehicle tracks, excessive sedimentation, fire-plow lanes, skidder tracks, bedding, fill, soil compaction, obvious pollutants) (vegetation structure alteration examples: mechanical disturbance, herbicides, salt intrusion [where appropriate], exotic species, grazing, less diversity [if appropriate], hydrologic alteration) |

2. Surface and Sub-Surface Storage Capacity and Duration – assessment area condition metric

Check a box in each column. Consider surface storage capacity and duration (Surf) and sub-surface storage capacity and duration (Sub). Consider both increase and decrease in hydrology. A ditch ≤ 1 foot deep is considered to affect surface water only, while a ditch > 1 foot deep is expected to affect both surface and sub-surface water. Consider tidal flooding regime, if applicable.

- | | | |
|---------------------------------------|---------------------------------------|--|
| Surf | Sub | |
| <input type="checkbox"/> A | <input type="checkbox"/> A | Water storage capacity and duration are not altered. |
| <input checked="" type="checkbox"/> B | <input checked="" type="checkbox"/> B | Water storage capacity or duration are altered, but not substantially (typically, not sufficient to change vegetation). |
| <input type="checkbox"/> C | <input type="checkbox"/> C | Water storage capacity or duration are substantially altered (typically, alteration sufficient to result in vegetation change) (examples: draining, flooding, soil compaction, filling, excessive sedimentation, underground utility lines). |

3. Water Storage/Surface Relief – assessment area/wetland type condition metric (skip for all marshes)

Check a box in each column. Select the appropriate storage for the assessment area (AA) and the wetland type (WT).

- | | | |
|---------------------------------------|---------------------------------------|---|
| AA | WT | |
| 3a. <input type="checkbox"/> A | <input type="checkbox"/> A | Majority of wetland with depressions able to pond water > 1 foot deep |
| <input type="checkbox"/> B | <input type="checkbox"/> B | Majority of wetland with depressions able to pond water 6 inches to 1 foot deep |
| <input type="checkbox"/> C | <input type="checkbox"/> C | Majority of wetland with depressions able to pond water 3 to 6 inches deep |
| <input checked="" type="checkbox"/> D | <input checked="" type="checkbox"/> D | Depressions able to pond water < 3 inches deep |
| 3b. <input type="checkbox"/> A | <input type="checkbox"/> A | Evidence that maximum depth of inundation is greater than 2 feet |
| <input type="checkbox"/> B | <input type="checkbox"/> B | Evidence that maximum depth of inundation is between 1 and 2 feet |
| <input checked="" type="checkbox"/> C | <input checked="" type="checkbox"/> C | Evidence that maximum depth of inundation is less than 1 foot |

4. Soil Texture/Structure – assessment area condition metric (skip for all marshes)

Check a box from each of the three soil property groups below. Dig soil profile in the dominant assessment area landscape feature. Make soil observations within the top 12 inches. Use most recent National Technical Committee for Hydric Soils guidance for regional indicators.

- 4a. A Sandy soil
 B Loamy or clayey soils exhibiting redoximorphic features (concentrations, depletions, or rhizospheres)
 C Loamy or clayey soils not exhibiting redoximorphic features
 D Loamy or clayey gleyed soil
 E Histosol or histc epipedon
- 4b. A Soil ribbon < 1 inch
 B Soil ribbon ≥ 1 inch
- 4c. A No peat or muck presence
 B A peat or muck presence

5. Discharge into Wetland – opportunity metric

Check a box in each column. Consider surface pollutants or discharges (Surf) and sub-surface pollutants or discharges (Sub). Examples of sub-surface discharges include presence of nearby septic tank, underground storage tank (UST), etc.

- | | | |
|---------------------------------------|----------------------------|---|
| Surf | Sub | |
| <input type="checkbox"/> A | <input type="checkbox"/> A | Little or no evidence of pollutants or discharges entering the assessment area |
| <input checked="" type="checkbox"/> B | <input type="checkbox"/> B | Noticeable evidence of pollutants or discharges entering the wetland and stressing, but not overwhelming the treatment capacity of the assessment area |
| <input type="checkbox"/> C | <input type="checkbox"/> C | Noticeable evidence of pollutants or discharges (pathogen, particulate, or soluble) entering the assessment area and potentially overwhelming the treatment capacity of the wetland (water discoloration, dead vegetation, excessive sedimentation, odor) |

6. Land Use – opportunity metric (skip for non-riparian wetlands)

Check all that apply (at least one box in each column). Evaluation involves a GIS effort with field adjustment. Consider sources draining to assessment area within entire upstream watershed (WS), within 5 miles and within the watershed draining to the assessment area (5M), and within 2 miles and within the watershed draining to the assessment area (2M).

- | | | | |
|---------------------------------------|---------------------------------------|---------------------------------------|---|
| WS | 5M | 2M | |
| <input type="checkbox"/> A | <input type="checkbox"/> A | <input type="checkbox"/> A | ≥ 10% impervious surfaces |
| <input type="checkbox"/> B | <input type="checkbox"/> B | <input type="checkbox"/> B | Confined animal operations (or other local, concentrated source of pollutants) |
| <input checked="" type="checkbox"/> C | <input checked="" type="checkbox"/> C | <input checked="" type="checkbox"/> C | ≥ 20% coverage of pasture |
| <input type="checkbox"/> D | <input type="checkbox"/> D | <input type="checkbox"/> D | ≥ 20% coverage of agricultural land (regularly plowed land) |
| <input checked="" type="checkbox"/> E | <input checked="" type="checkbox"/> E | <input checked="" type="checkbox"/> E | ≥ 20% coverage of maintained grass/herb |
| <input type="checkbox"/> F | <input type="checkbox"/> F | <input type="checkbox"/> F | ≥ 20% coverage of clear-cut land |
| <input type="checkbox"/> G | <input type="checkbox"/> G | <input type="checkbox"/> G | Little or no opportunity to improve water quality. Lack of opportunity may result from little or no disturbance in the watershed or hydrologic alterations that prevent drainage and/or overbank flow from affecting the assessment area. |

7. Wetland Acting as Vegetated Buffer – assessment area/wetland complex condition metric (skip for non-riparian wetlands)

- 7a. Is assessment area within 50 feet of a tributary or other open water?
 Yes No If Yes, continue to 7b. If No, skip to Metric 8.
 Wetland buffer need only be present on one side of the water body. Make buffer judgment based on the average width of wetland. Record a note if a portion of the buffer has been removed or disturbed.
- 7b. How much of the first 50 feet from the bank is wetland? (Wetland buffer need only be present on one side of the water body. Make buffer judgment based on the average width of wetland. Record a note if a portion of the buffer has been removed or disturbed.)
 A ≥ 50 feet
 B From 30 to < 50 feet
 C From 15 to < 30 feet
 D From 5 to < 15 feet
 E < 5 feet or buffer bypassed by ditches
- 7c. Tributary width. If the tributary is anastomosed, combine widths of channels/braids for a total width.
 ≤ 15-foot wide > 15-foot wide Other open water (no tributary present)
- 7d. Do roots of assessment area vegetation extend into the bank of the tributary/open water?
 Yes No
- 7e. Is stream or other open water sheltered or exposed?
 Sheltered – adjacent open water with width < 2500 feet and no regular boat traffic.
 Exposed – adjacent open water with width ≥ 2500 feet or regular boat traffic.

8. Wetland Width at the Assessment Area – wetland type/wetland complex condition metric (evaluate WT for all marshes and Estuarine Woody Wetland only; evaluate WC for Bottomland Hardwood Forest, Headwater Forest, and Riverine Swamp Forest only)

Check a box in each column for riverine wetlands only. Select the average width for the wetland type at the assessment area (WT) and the wetland complex at the assessment area (WC). See User Manual for WT and WC boundaries.

- | | | |
|---------------------------------------|---------------------------------------|-----------------------|
| WT | WC | |
| <input type="checkbox"/> A | <input type="checkbox"/> A | ≥ 100 feet |
| <input type="checkbox"/> B | <input type="checkbox"/> B | From 80 to < 100 feet |
| <input type="checkbox"/> C | <input type="checkbox"/> C | From 50 to < 80 feet |
| <input type="checkbox"/> D | <input type="checkbox"/> D | From 40 to < 50 feet |
| <input type="checkbox"/> E | <input type="checkbox"/> E | From 30 to < 40 feet |
| <input checked="" type="checkbox"/> F | <input checked="" type="checkbox"/> F | From 15 to < 30 feet |
| <input type="checkbox"/> G | <input type="checkbox"/> G | From 5 to < 15 feet |
| <input type="checkbox"/> H | <input type="checkbox"/> H | < 5 feet |

9. Inundation Duration – assessment area condition metric (skip for non-riparian wetlands)

Answer for assessment area dominant landform.

- A Evidence of short-duration inundation (< 7 consecutive days)
 B Evidence of saturation, without evidence of inundation
 C Evidence of long-duration inundation or very long-duration inundation (7 to 30 consecutive days or more)

10. Indicators of Deposition – assessment area condition metric (skip for non-riparian wetlands and all marshes)

- Consider recent deposition only (no plant growth since deposition).
 A Sediment deposition is not excessive, but at approximately natural levels.
 B Sediment deposition is excessive, but not overwhelming the wetland.
 C Sediment deposition is excessive and is overwhelming the wetland.

11. Wetland Size – wetland type/wetland complex condition metric

Check a box in each column. Involves a GIS effort with field adjustment. This metric evaluates three aspects of the wetland area: the size of the wetland type (WT), the size of the wetland complex (WC), and the size of the forested wetland (FW) (if applicable, see User Manual). See the User Manual for boundaries of these evaluation areas. If assessment area is clear-cut, select "K" for the FW column.

- | | | |
|---------------------------------------|---------------------------------------|---|
| WT | WC | FW (if applicable) |
| <input type="checkbox"/> A | <input type="checkbox"/> A | <input type="checkbox"/> A ≥ 500 acres |
| <input type="checkbox"/> B | <input type="checkbox"/> B | <input type="checkbox"/> B From 100 to < 500 acres |
| <input type="checkbox"/> C | <input type="checkbox"/> C | <input type="checkbox"/> C From 50 to < 100 acres |
| <input type="checkbox"/> D | <input type="checkbox"/> D | <input type="checkbox"/> D From 25 to < 50 acres |
| <input type="checkbox"/> E | <input type="checkbox"/> E | <input type="checkbox"/> E From 10 to < 25 acres |
| <input type="checkbox"/> F | <input type="checkbox"/> F | <input type="checkbox"/> F From 5 to < 10 acres |
| <input type="checkbox"/> G | <input type="checkbox"/> G | <input type="checkbox"/> G From 1 to < 5 acres |
| <input type="checkbox"/> H | <input type="checkbox"/> H | <input type="checkbox"/> H From 0.5 to < 1 acre |
| <input type="checkbox"/> I | <input type="checkbox"/> I | <input type="checkbox"/> I From 0.1 to < 0.5 acre |
| <input type="checkbox"/> J | <input type="checkbox"/> J | <input type="checkbox"/> J From 0.01 to < 0.1 acre |
| <input checked="" type="checkbox"/> K | <input checked="" type="checkbox"/> K | <input checked="" type="checkbox"/> K < 0.01 acre or assessment area is clear-cut |

12. Wetland Intactness – wetland type condition metric (evaluate for Pocosins only)

- A Pocosin is the full extent (≥ 90%) of its natural landscape size.
 B Pocosin type is < 90% of the full extent of its natural landscape size.

13. Connectivity to Other Natural Areas – landscape condition metric

13a. Check appropriate box(es) (a box may be checked in each column). Involves a GIS effort with field adjustment. This metric evaluates whether the wetland is well connected (Well) and/or loosely connected (Loosely) to the landscape patch, the contiguous naturally vegetated area and open water (if appropriate). Boundaries are formed by four-lane roads, regularly maintained utility line corridors the width of a four-lane road or wider, urban landscapes, maintained fields (pasture and agriculture), or open water > 300 feet wide.

- | | | |
|---------------------------------------|----------------------------|--|
| Well | Loosely | |
| <input type="checkbox"/> A | <input type="checkbox"/> A | ≥ 500 acres |
| <input type="checkbox"/> B | <input type="checkbox"/> B | From 100 to < 500 acres |
| <input type="checkbox"/> C | <input type="checkbox"/> C | From 50 to < 100 acres |
| <input type="checkbox"/> D | <input type="checkbox"/> D | From 10 to < 50 acres |
| <input type="checkbox"/> E | <input type="checkbox"/> E | < 10 acres |
| <input checked="" type="checkbox"/> F | <input type="checkbox"/> F | Wetland type has a poor or no connection to other natural habitats |

- 13b. Evaluate for marshes only.
 Yes No Wetland type has a surface hydrology connection to open waters/stream or tidal wetlands.

14. Edge Effect – wetland type condition metric (skip for all marshes and Estuarine Woody Wetland)

May involve a GIS effort with field adjustment. Estimate distance from wetland type boundary to artificial edges. Artificial edges include non-forested areas ≥ 40 feet wide such as fields, development, roads, regularly maintained utility line corridors, and clear-cuts. Consider the eight main points of the compass. Artificial edge occurs within 150 feet in how many directions? If the assessment area is clear cut, select option "C."

- A 0
 B 1 to 4
 C 5 to 8

15. Vegetative Composition – assessment area condition metric (skip for all marshes and Pine Flat)

- A Vegetation is close to reference condition in species present and their proportions. Lower strata composed of appropriate species, with exotic plants absent or sparse within the assessment area.
 B Vegetation is different from reference condition in species diversity or proportions, but still largely composed of native species characteristic of the wetland type. This may include communities of weedy native species that develop after clearcutting or clearing. It also includes communities with exotics present, but not dominant, over a large portion of the expected strata.
 C Vegetation severely altered from reference in composition, or expected species are unnaturally absent (planted stands of non-characteristic species or at least one stratum inappropriately composed of a single species), or exotic species are dominant in at least one stratum.

16. Vegetative Diversity – assessment area condition metric (evaluate for Non-tidal Freshwater Marsh only)

- A Vegetation diversity is high and is composed primarily of native species (< 10% cover of exotics).
 B Vegetation diversity is low or has > 10% to 50% cover of exotics.
 C Vegetation is dominated by exotic species (> 50 % cover of exotics).

17. **Vegetative Structure – assessment area/wetland type condition metric**

17a. Is vegetation present?

Yes No If Yes, continue to 17b. If No, skip to Metric 18.

17b. Evaluate percent coverage of assessment area vegetation for all marshes only. Skip to 17c for non-marsh wetlands.

A ≥ 25% coverage of vegetation
 B < 25% coverage of vegetation

17c. **Check a box in each column for each stratum.** Evaluate this portion of the metric for non-marsh wetlands. Consider structure in airspace above the assessment area (AA) and the wetland type (WT) separately.

	AA	WT	
Canopy	<input type="checkbox"/> A	<input type="checkbox"/> A	Canopy closed, or nearly closed, with natural gaps associated with natural processes
	<input type="checkbox"/> B	<input type="checkbox"/> B	Canopy present, but opened more than natural gaps
	<input checked="" type="checkbox"/> C	<input checked="" type="checkbox"/> C	Canopy sparse or absent
Mid-Story	<input type="checkbox"/> A	<input type="checkbox"/> A	Dense mid-story/sapling layer
	<input type="checkbox"/> B	<input type="checkbox"/> B	Moderate density mid-story/sapling layer
	<input checked="" type="checkbox"/> C	<input checked="" type="checkbox"/> C	Mid-story/sapling layer sparse or absent
Shrub	<input type="checkbox"/> A	<input type="checkbox"/> A	Dense shrub layer
	<input type="checkbox"/> B	<input type="checkbox"/> B	Moderate density shrub layer
	<input checked="" type="checkbox"/> C	<input checked="" type="checkbox"/> C	Shrub layer sparse or absent
Herb	<input checked="" type="checkbox"/> A	<input checked="" type="checkbox"/> A	Dense herb layer
	<input type="checkbox"/> B	<input type="checkbox"/> B	Moderate density herb layer
	<input type="checkbox"/> C	<input type="checkbox"/> C	Herb layer sparse or absent

18. **Snags – wetland type condition metric (skip for all marshes)**

A Large snags (more than one) are visible (> 12 inches DBH, or large relative to species present and landscape stability).
 B Not A

19. **Diameter Class Distribution – wetland type condition metric (skip for all marshes)**

A Majority of canopy trees have stems > 6 inches in diameter at breast height (DBH); many large trees (> 12 inches DBH) are present.
 B Majority of canopy trees have stems between 6 and 12 inches DBH, few are > 12 inch DBH.
 C Majority of canopy trees are < 6 inches DBH or no trees.

20. **Large Woody Debris – wetland type condition metric (skip for all marshes)**

Include both natural debris and man-placed natural debris.
 A Large logs (more than one) are visible (> 12 inches in diameter, or large relative to species present and landscape stability).
 B Not A

21. **Vegetation/Open Water Dispersion – wetland type/open water condition metric (evaluate for Non-Tidal Freshwater Marsh only)**

Select the figure that best describes the amount of interspersed vegetation and open water in the growing season. Patterned areas indicate vegetated areas, while solid white areas indicate open water.



22. **Hydrologic Connectivity – assessment area condition metric (evaluate for riparian wetlands and Salt/Brackish Marsh only)**

Examples of activities that may severely alter hydrologic connectivity include intensive ditching, fill, sedimentation, channelization, diversion, man-made berms, beaver dams, and stream incision. Documentation required if evaluated as B, C, or D.

A Overbank and overland flow are not severely altered in the assessment area.
 B Overbank flow is severely altered in the assessment area.
 C Overland flow is severely altered in the assessment area.
 D Both overbank and overland flow are severely altered in the assessment area.

Notes

**NC WAM Wetland Rating Sheet
 Accompanies User Manual Version 5.0**

Wetland Site Name Wetland T Date of Assessment 7/30/2020
 Wetland Type Bottomland Hardwood Forest Assessor Name/Organization C. Neaves

Notes on Field Assessment Form (Y/N) NO
 Presence of regulatory considerations (Y/N) NO
 Wetland is intensively managed (Y/N) _____
 Assessment area is located within 50 feet of a natural tributary or other open water (Y/N) YES
 Assessment area is substantially altered by beaver (Y/N) _____
 Assessment area experiences overbank flooding during normal rainfall conditions (Y/N) _____
 Assessment area is on a coastal island (Y/N) _____

Sub-function Rating Summary

Function	Sub-function	Metrics	Rating
Hydrology	Surface Storage and Retention	Condition	LOW
		Sub-surface Storage and Retention	Condition
Water Quality	Pathogen Change	Condition	MEDIUM
		Condition/Opportunity	MEDIUM
	Particulate Change	Opportunity Presence (Y/N)	NO
		Condition	LOW
Soluble Change	Condition/Opportunity	Condition/Opportunity	LOW
		Opportunity Presence (Y/N)	NO
	Physical Change	Condition	MEDIUM
		Condition/Opportunity	MEDIUM
Pollution Change	Opportunity Presence (Y/N)	Opportunity Presence (Y/N)	NO
		Condition	LOW
	Condition/Opportunity	Condition/Opportunity	LOW
		Opportunity Presence (Y/N)	NO
Habitat	Physical Structure	Condition	LOW
		Condition/Opportunity	LOW
		Opportunity Presence (Y/N)	NA
Landscape Patch Structure	Condition	Condition	NA
		Opportunity Presence (Y/N)	NA
Vegetation Composition	Condition	Condition	LOW
		Opportunity Presence (Y/N)	LOW

Function Rating Summary

Function	Metrics	Rating
Hydrology	Condition	LOW
	Condition/Opportunity	LOW
Water Quality	Condition	LOW
	Condition/Opportunity	LOW
Opportunity Presence (Y/N)	Opportunity Presence (Y/N)	NO
	Condition	LOW

Overall Wetland Rating LOW

NC WAM FIELD ASSESSMENT FORM
Accompanies User Manual Version 5.0

USACE AID #	SAW-2020-00047	NCDWR#	20200035
Project Name	Liberty Rock Mitigation Site	Date of Evaluation	7/30/2020
Applicant/Owner Name	Widlands Engineering	Wetland Site Name	Wetland U
Wetland Type	Bottomland Hardwood Forest	Assessor Name/Organization	C. Neaves
Level III Ecoregion	Piedmont	Nearest Named Water Body	Rocky River
River Basin	Cape Fear	USGS 8-Digit Catalogue Unit	03030003
County	Randolph	NCDWR Region	Winston-Salem
<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	Precipitation within 48 hrs?	Latitude/Longitude (deci-degrees)	35.820474, -79.566083

Evidence of stressors affecting the assessment area (may not be within the assessment area)

Please circle and/or make note on the last page if evidence of stressors is apparent. Consider departure from reference, if appropriate, in recent past (for instance, within 10 years). Noteworthy stressors include, but are not limited to the following.

- Hydrological modifications (examples: ditches, dams, beaver dams, dikes, berms, ponds, etc.)
- Surface and sub-surface discharges into the wetland (examples: discharges containing obvious pollutants, presence of nearby septic tanks, underground storage tanks (USTs), hog lagoons, etc.)
- Signs of vegetation stress (examples: vegetation mortality, insect damage, disease, storm damage, salt intrusion, etc.)
- Habitat/plant community alteration (examples: mowing, clear-cutting, exotics, etc.)

Is the assessment area intensively managed? Yes No

Regulatory Considerations - Were regulatory considerations evaluated? Yes No If Yes, check all that apply to the assessment area.

- Anadromous fish
- Federally protected species or State endangered or threatened species
- NCDWR riparian buffer rule in effect
- Abuts a Primary Nursery Area (PNA)
- Publicly owned property
- N.C. Division of Coastal Management Area of Environmental Concern (AEC) (including buffer)
- Abuts a stream with a NCDWQ classification of SA or supplemental classifications of HQW, ORW, or Trout
- Designated NCNHP reference community
- Abuts a 303(d)-listed stream or a tributary to a 303(d)-listed stream

What type of natural stream is associated with the wetland, if any? (check all that apply)

- Blackwater
- Brownwater
- Tidal (if tidal, check one of the following boxes) Lunar Wind Both

Is the assessment area on a coastal island? Yes No

Is the assessment area's surface water storage capacity or duration substantially altered by beaver? Yes No

Does the assessment area experience overbank flooding during normal rainfall conditions? Yes No

1. Ground Surface Condition/Vegetation Condition – assessment area condition metric

Check a box in each column. Consider alteration to the ground surface (GS) in the assessment area and vegetation structure (VS) in the assessment area. Compare to reference wetland if applicable (see User Manual). If a reference is not applicable, then rate the assessment area based on evidence an effect.

- | | | |
|---------------------------------------|---------------------------------------|--|
| GS | VS | |
| <input checked="" type="checkbox"/> A | <input type="checkbox"/> A | Not severely altered |
| <input type="checkbox"/> B | <input checked="" type="checkbox"/> B | Severely altered over a majority of the assessment area (ground surface alteration examples: vehicle tracks, excessive sedimentation, fire-plow lanes, skidder tracks, bedding, fill, soil compaction, obvious pollutants) (vegetation structure alteration examples: mechanical disturbance, herbicides, salt intrusion [where appropriate], exotic species, grazing, less diversity [if appropriate], hydrologic alteration) |

2. Surface and Sub-Surface Storage Capacity and Duration – assessment area condition metric

Check a box in each column. Consider surface storage capacity and duration (Surf) and sub-surface storage capacity and duration (Sub). Consider both increase and decrease in hydrology. A ditch ≤ 1 foot deep is considered to affect surface water only, while a ditch > 1 foot deep is expected to affect both surface and sub-surface water. Consider tidal flooding regime, if applicable.

- | | | |
|---------------------------------------|---------------------------------------|--|
| Surf | Sub | |
| <input type="checkbox"/> A | <input type="checkbox"/> A | Water storage capacity and duration are not altered. |
| <input checked="" type="checkbox"/> B | <input checked="" type="checkbox"/> B | Water storage capacity or duration are altered, but not substantially (typically, not sufficient to change vegetation). |
| <input type="checkbox"/> C | <input type="checkbox"/> C | Water storage capacity or duration are substantially altered (typically, alteration sufficient to result in vegetation change) (examples: draining, flooding, soil compaction, filling, excessive sedimentation, underground utility lines). |

3. Water Storage/Surface Relief – assessment area/wetland type condition metric (skip for all marshes)

Check a box in each column. Select the appropriate storage for the assessment area (AA) and the wetland type (WT).

- | | | |
|---|----|---|
| AA | WT | |
| 3a. <input type="checkbox"/> A <input type="checkbox"/> A | | Majority of wetland with depressions able to pond water > 1 deep |
| <input type="checkbox"/> B <input type="checkbox"/> B | | Majority of wetland with depressions able to pond water 6 inches to 1 foot deep |
| <input type="checkbox"/> C <input type="checkbox"/> C | | Majority of wetland with depressions able to pond water 3 to 6 inches deep |
| <input checked="" type="checkbox"/> D <input checked="" type="checkbox"/> D | | Depressions able to pond water < 3 inches deep |
| 3b. <input type="checkbox"/> A | | Evidence that maximum depth of inundation is greater than 2 feet |
| <input type="checkbox"/> B | | Evidence that maximum depth of inundation is between 1 and 2 feet |
| <input checked="" type="checkbox"/> C | | Evidence that maximum depth of inundation is less than 1 foot |

4. Soil Texture/Structure – assessment area condition metric (skip for all marshes)

Check a box from each of the three soil property groups below. Dig soil profile in the dominant assessment area landscape feature. Make soil observations within the top 12 inches. Use most recent National Technical Committee for Hydric Soils guidance for regional indicators.

- 4a. A Sandy soil
- B Loamy or clayey soils exhibiting redoximorphic features (concentrations, depletions, or rhizospheres)
- C Loamy or clayey soils not exhibiting redoximorphic features
- D Loamy or clayey gleyed soil
- E Histosol or histc epipedon
- 4b. A Soil ribbon < 1 inch
- B Soil ribbon ≥ 1 inch
- 4c. A No peat or muck presence
- B A peat or muck presence

5. Discharge into Wetland – opportunity metric

Check a box in each column. Consider surface pollutants or discharges (Surf) and sub-surface pollutants or discharges (Sub). Examples of sub-surface discharges include presence of nearby septic tank, underground storage tank (UST), etc.

- | | | |
|---------------------------------------|---------------------------------------|---|
| Surf | Sub | |
| <input type="checkbox"/> A | <input checked="" type="checkbox"/> A | Little or no evidence of pollutants or discharges entering the assessment area |
| <input checked="" type="checkbox"/> B | <input type="checkbox"/> B | Noticeable evidence of pollutants or discharges entering the wetland and stressing, but not overwhelming the treatment capacity of the assessment area |
| <input type="checkbox"/> C | <input type="checkbox"/> C | Noticeable evidence of pollutants or discharges (pathogen, particulate, or soluble) entering the assessment area and potentially overwhelming the treatment capacity of the wetland (water discoloration, dead vegetation, excessive sedimentation, odor) |

6. Land Use – opportunity metric (skip for non-riparian wetlands)

Check all that apply (at least one box in each column). Evaluation involves a GIS effort with field adjustment. Consider sources draining to assessment area within entire upstream watershed (WS), within 5 miles and within the watershed draining to the assessment area (5M), and within 2 miles and within the watershed draining to the assessment area (2M).

- | | | | |
|---------------------------------------|---------------------------------------|---------------------------------------|---|
| WS | 5M | 2M | |
| <input type="checkbox"/> A | <input type="checkbox"/> A | <input type="checkbox"/> A | ≥ 10% impervious surfaces |
| <input type="checkbox"/> B | <input type="checkbox"/> B | <input type="checkbox"/> B | Confined animal operations (or other local, concentrated source of pollutants) |
| <input checked="" type="checkbox"/> C | <input checked="" type="checkbox"/> C | <input checked="" type="checkbox"/> C | ≥ 20% coverage of pasture |
| <input type="checkbox"/> D | <input type="checkbox"/> D | <input type="checkbox"/> D | ≥ 20% coverage of agricultural land (regularly plowed land) |
| <input checked="" type="checkbox"/> E | <input checked="" type="checkbox"/> E | <input checked="" type="checkbox"/> E | ≥ 20% coverage of maintained grass/herb |
| <input type="checkbox"/> F | <input type="checkbox"/> F | <input type="checkbox"/> F | ≥ 20% coverage of clear-cut land |
| <input type="checkbox"/> G | <input type="checkbox"/> G | <input type="checkbox"/> G | Little or no opportunity to improve water quality. Lack of opportunity may result from little or no disturbance in the watershed or hydrologic alterations that prevent drainage and/or overbank flow from affecting the assessment area. |

7. Wetland Acting as Vegetated Buffer – assessment area/wetland complex condition metric (skip for non-riparian wetlands)

- 7a. Is assessment area within 50 feet of a tributary or other open water?
- Yes No If Yes, continue to 7b. If No, skip to Metric 8.
- Wetland buffer need only be present on one side of the water body. Make buffer judgment based on the average width of wetland. Record a note if a portion of the buffer has been removed or disturbed.
- 7b. How much of the first 50 feet from the bank is wetland? (Wetland buffer need only be present on one side of the water body. Make buffer judgment based on the average width of wetland. Record a note if a portion of the buffer has been removed or disturbed.)
- A ≥ 50 feet
- B From 30 to < 50 feet
- C From 15 to < 30 feet
- D From 5 to < 15 feet
- E < 5 feet or buffer bypassed by ditches
- 7c. Tributary width. If the tributary is anastomosed, combine widths of channels/braids for a total width.
- ≤ 15-foot wide > 15-foot wide Other open water (no tributary present)
- 7d. Do roots of assessment area vegetation extend into the bank of the tributary/open water?
- Yes No
- 7e. Is stream or other open water sheltered or exposed?
- Sheltered – adjacent open water with width < 2500 feet and no regular boat traffic.
- Exposed – adjacent open water with width ≥ 2500 feet or regular boat traffic.

8. Wetland Width at the Assessment Area – wetland type/wetland complex condition metric (evaluate WT for all marshes and Estuarine Woody Wetland only; evaluate WC for Bottomland Hardwood Forest, Headwater Forest, and Riverine Swamp Forest only)

Check a box in each column for riverine wetlands only. Select the average width for the wetland type at the assessment area (WT) and the wetland complex at the assessment area (WC). See User Manual for WT and WC boundaries.

- | | | |
|---------------------------------------|---------------------------------------|-----------------------|
| WT | WC | |
| <input type="checkbox"/> A | <input type="checkbox"/> A | ≥ 100 feet |
| <input type="checkbox"/> B | <input type="checkbox"/> B | From 80 to < 100 feet |
| <input type="checkbox"/> C | <input type="checkbox"/> C | From 50 to < 80 feet |
| <input type="checkbox"/> D | <input type="checkbox"/> D | From 40 to < 50 feet |
| <input type="checkbox"/> E | <input type="checkbox"/> E | From 30 to < 40 feet |
| <input checked="" type="checkbox"/> F | <input checked="" type="checkbox"/> F | From 15 to < 30 feet |
| <input type="checkbox"/> G | <input type="checkbox"/> G | From 5 to < 15 feet |
| <input type="checkbox"/> H | <input type="checkbox"/> H | < 5 feet |

9. **Inundation Duration – assessment area condition metric (skip for non-riparian wetlands)**

Answer for assessment area dominant landform.

- A Evidence of short-duration inundation (< 7 consecutive days)
B Evidence of saturation, without evidence of inundation
C Evidence of long-duration inundation or very long-duration inundation (7 to 30 consecutive days or more)

10. **Indicators of Deposition – assessment area condition metric (skip for non-riparian wetlands and all marshes)**

Consider recent deposition only (no plant growth since deposition).

- A Sediment deposition is not excessive, but at approximately natural levels.
B Sediment deposition is excessive, but not overwhelming the wetland.
C Sediment deposition is excessive and is overwhelming the wetland.

11. **Wetland Size – wetland type/wetland complex condition metric**

Check a box in each column. Involves a GIS effort with field adjustment. This metric evaluates three aspects of the wetland area: the size of the wetland type (WT), the size of the wetland complex (WC), and the size of the forested wetland (FW) (if applicable, see User Manual). See the User Manual for boundaries of these evaluation areas. If assessment area is clear-cut, select "K" for the FW column.

- | | | |
|---------------------------------------|---------------------------------------|--|
| WT | WC | FW (if applicable) |
| <input type="checkbox"/> A | <input type="checkbox"/> A | <input type="checkbox"/> A ≥ 500 acres |
| <input type="checkbox"/> B | <input type="checkbox"/> B | <input type="checkbox"/> B From 100 to < 500 acres |
| <input type="checkbox"/> C | <input type="checkbox"/> C | <input type="checkbox"/> C From 50 to < 100 acres |
| <input type="checkbox"/> D | <input type="checkbox"/> D | <input type="checkbox"/> D From 25 to < 50 acres |
| <input type="checkbox"/> E | <input type="checkbox"/> E | <input type="checkbox"/> E From 10 to < 25 acres |
| <input type="checkbox"/> F | <input type="checkbox"/> F | <input type="checkbox"/> F From 5 to < 10 acres |
| <input type="checkbox"/> G | <input type="checkbox"/> G | <input type="checkbox"/> G From 1 to < 5 acres |
| <input type="checkbox"/> H | <input type="checkbox"/> H | <input type="checkbox"/> H From 0.5 to < 1 acre |
| <input type="checkbox"/> I | <input type="checkbox"/> I | <input type="checkbox"/> I From 0.1 to < 0.5 acre |
| <input type="checkbox"/> J | <input type="checkbox"/> J | <input type="checkbox"/> J From 0.01 to < 0.1 acre |
| <input checked="" type="checkbox"/> K | <input checked="" type="checkbox"/> K | <input checked="" type="checkbox"/> K < 0.01 acre <u>or</u> assessment area is clear-cut |

12. **Wetland Intactness – wetland type condition metric (evaluate for Pocosins only)**

- A Pocosin is the full extent (≥ 90%) of its natural landscape size.
B Pocosin type is < 90% of the full extent of its natural landscape size.

13. **Connectivity to Other Natural Areas – landscape condition metric**

13a. **Check appropriate box(es) (a box may be checked in each column).** Involves a GIS effort with field adjustment. This metric evaluates whether the wetland is well connected (Well) and/or loosely connected (Loosely) to the landscape patch, the contiguous naturally vegetated area and open water (if appropriate). Boundaries are formed by four-lane roads, regularly maintained utility line corridors the width of a four-lane road or wider, urban landscapes, maintained fields (pasture and agriculture), or open water > 300 feet wide.

- | | |
|---------------------------------------|---|
| Well | Loosely |
| <input type="checkbox"/> A | <input type="checkbox"/> A ≥ 500 acres |
| <input type="checkbox"/> B | <input type="checkbox"/> B From 100 to < 500 acres |
| <input type="checkbox"/> C | <input type="checkbox"/> C From 50 to < 100 acres |
| <input type="checkbox"/> D | <input type="checkbox"/> D From 10 to < 50 acres |
| <input type="checkbox"/> E | <input type="checkbox"/> E < 10 acres |
| <input checked="" type="checkbox"/> F | <input type="checkbox"/> F Wetland type has a poor or no connection to other natural habitats |

13b. **Evaluate for marshes only.**

- Yes No Wetland type has a surface hydrology connection to open waters/stream or tidal wetlands.

14. **Edge Effect – wetland type condition metric (skip for all marshes and Estuarine Woody Wetland)**

May involve a GIS effort with field adjustment. Estimate distance from wetland type boundary to artificial edges. Artificial edges include non-forested areas ≥ 40 feet wide such as fields, development, roads, regularly maintained utility line corridors, and clear-cuts. Consider the eight main points of the compass. Artificial edge occurs within 150 feet in how many directions? If the assessment area is clear cut, select option "C."

- A 0
B 1 to 4
C 5 to 8

15. **Vegetative Composition – assessment area condition metric (skip for all marshes and Pine Flat)**

- A Vegetation is close to reference condition in species present and their proportions. Lower strata composed of appropriate species, with exotic plants absent or sparse within the assessment area.
B Vegetation is different from reference condition in species diversity or proportions, but still largely composed of native species characteristic of the wetland type. This may include communities of weedy native species that develop after clearcutting or clearing. It also includes communities with exotics present, but not dominant, over a large portion of the expected strata.
C Vegetation severely altered from reference in composition, or expected species are unnaturally absent (planted stands of non-characteristic species or at least one stratum inappropriately composed of a single species), or exotic species are dominant in at least one stratum.

16. **Vegetative Diversity – assessment area condition metric (evaluate for Non-tidal Freshwater Marsh only)**

- A Vegetation diversity is high and is composed primarily of native species (< 10% cover of exotics).
B Vegetation diversity is low or has > 10% to 50% cover of exotics.
C Vegetation is dominated by exotic species (> 50 % cover of exotics).

17. **Vegetative Structure – assessment area/wetland type condition metric**

17a. Is vegetation present?

- Yes No If Yes, continue to 17b. If No, skip to Metric 18.

17b. Evaluate percent coverage of assessment area vegetation for all marshes only. Skip to 17c for non-marsh wetlands.

- A ≥ 25% coverage of vegetation
B < 25% coverage of vegetation

17c. **Check a box in each column for each stratum.** Evaluate this portion of the metric for non-marsh wetlands. Consider structure in airspace above the assessment area (AA) and the wetland type (WT) separately.

- | | | | |
|-----------|---------------------------------------|---------------------------------------|--|
| | AA | WT | |
| Canopy | <input type="checkbox"/> A | <input type="checkbox"/> A | Canopy closed, or nearly closed, with natural gaps associated with natural processes |
| | <input type="checkbox"/> B | <input type="checkbox"/> B | Canopy present, but opened more than natural gaps |
| | <input checked="" type="checkbox"/> C | <input checked="" type="checkbox"/> C | Canopy sparse or absent |
| Mid-Story | <input type="checkbox"/> A | <input type="checkbox"/> A | Dense mid-story/sapling layer |
| | <input type="checkbox"/> B | <input type="checkbox"/> B | Moderate density mid-story/sapling layer |
| | <input checked="" type="checkbox"/> C | <input checked="" type="checkbox"/> C | Mid-story/sapling layer sparse or absent |
| Shrub | <input type="checkbox"/> A | <input type="checkbox"/> A | Dense shrub layer |
| | <input type="checkbox"/> B | <input type="checkbox"/> B | Moderate density shrub layer |
| | <input checked="" type="checkbox"/> C | <input checked="" type="checkbox"/> C | Shrub layer sparse or absent |
| Herb | <input checked="" type="checkbox"/> A | <input checked="" type="checkbox"/> A | Dense herb layer |
| | <input type="checkbox"/> B | <input type="checkbox"/> B | Moderate density herb layer |
| | <input type="checkbox"/> C | <input type="checkbox"/> C | Herb layer sparse or absent |

18. **Snags – wetland type condition metric (skip for all marshes)**

- A Large snags (more than one) are visible (> 12 inches DBH, or large relative to species present and landscape stability).
B Not A

19. **Diameter Class Distribution – wetland type condition metric (skip for all marshes)**

- A Majority of canopy trees have stems > 6 inches in diameter at breast height (DBH); many large trees (> 12 inches DBH) are present.
B Majority of canopy trees have stems between 6 and 12 inches DBH, few are > 12 inch DBH.
C Majority of canopy trees are < 6 inches DBH or no trees.

20. **Large Woody Debris – wetland type condition metric (skip for all marshes)**

Include both natural debris and man-placed natural debris.

- A Large logs (more than one) are visible (> 12 inches in diameter, or large relative to species present and landscape stability).
B Not A

21. **Vegetation/Open Water Dispersion – wetland type/open water condition metric (evaluate for Non-Tidal Freshwater Marsh only)**

Select the figure that best describes the amount of interspersed between vegetation and open water in the growing season. Patterned areas indicate vegetated areas, while solid white areas indicate open water.



22. **Hydrologic Connectivity – assessment area condition metric (evaluate for riparian wetlands and Salt/Brackish Marsh only)**

Examples of activities that may severely alter hydrologic connectivity include intensive ditching, fill, sedimentation, channelization, diversion, man-made berms, beaver dams, and stream incision. Documentation required if evaluated as B, C, or D.

- A Overbank and overland flow are not severely altered in the assessment area.
B Overbank flow is severely altered in the assessment area.
C Overland flow is severely altered in the assessment area.
D Both overbank and overland flow are severely altered in the assessment area.

Notes

NC WAM Wetland Rating Sheet
Accompanies User Manual Version 5.0

Wetland Site Name Wetland U Date of Assessment 7/30/2020
 Wetland Type Bottomland Hardwood Forest Assessor Name/Organization C. Neaves
 Notes on Field Assessment Form (Y/N) _____ NO
 Presence of regulatory considerations (Y/N) _____ NO
 Wetland is intensively managed (Y/N) _____
 Assessment area is located within 50 feet of a natural tributary or other open water (Y/N) _____ NO
 Assessment area is substantially altered by beaver (Y/N) _____
 Assessment area experiences overbank flooding during normal rainfall conditions (Y/N) _____
 Assessment area is on a coastal island (Y/N) _____

Sub-function Rating Summary

Function	Sub-function	Metrics	Rating
Hydrology	Surface Storage and Retention	Condition	<u>LOW</u>
	Sub-surface Storage and Retention	Condition	<u>LOW</u>
Water Quality	Pathogen Change	Condition	<u>MEDIUM</u>
		Condition/Opportunity	<u>MEDIUM</u>
	Opportunity Presence (Y/N)	<u>NO</u>	
	Particulate Change	Condition	<u>LOW</u>
		Condition/Opportunity	<u>LOW</u>
	Opportunity Presence (Y/N)	<u>NO</u>	
	Soluble Change	Condition	<u>MEDIUM</u>
		Condition/Opportunity	<u>MEDIUM</u>
	Opportunity Presence (Y/N)	<u>NO</u>	
	Physical Change	Condition	<u>LOW</u>
		Condition/Opportunity	<u>LOW</u>
	Opportunity Presence (Y/N)	<u>NO</u>	
	Pollution Change	Condition	<u>NA</u>
		Condition/Opportunity	<u>NA</u>
	Opportunity Presence (Y/N)	<u>NA</u>	
Habitat	Physical Structure	Condition	<u>LOW</u>
	Landscape Patch Structure	Condition	<u>LOW</u>
	Vegetation Composition	Condition	<u>LOW</u>

Function Rating Summary

Function	Metrics	Rating
Hydrology	Condition	<u>LOW</u>
Water Quality	Condition	<u>LOW</u>
	Condition/Opportunity	<u>LOW</u>
	Opportunity Presence (Y/N)	<u>NO</u>
Habitat	Condition	<u>LOW</u>

Overall Wetland Rating LOW

NC WAM FIELD ASSESSMENT FORM
Accompanies User Manual Version 5.0

USACE AID #	SAW-2020-00047	NCDWR#	20200035
Project Name	Liberty Rock Mitigation Site	Date of Evaluation	7/30/2020
Applicant/Owner Name	Wildlands Engineering	Wetland Site Name	Wetland V
Wetland Type	Bottomland Hardwood Forest	Assessor Name/Organization	C. Neaves
Level III Ecoregion	Piedmont	Nearest Named Water Body	Rocky River
River Basin	Cape Fear	USGS 8-Digit Catalogue Unit	03030003
County	Randolph	NCDWR Region	Winston-Salem
<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	Precipitation within 48 hrs?	Latitude/Longitude (deci-degrees)	35.820429, -79.566486

Evidence of stressors affecting the assessment area (may not be within the assessment area)
 Please circle and/or make note on the last page if evidence of stressors is apparent. Consider departure from reference, if appropriate, in recent past (for instance, within 10 years). Noteworthy stressors include, but are not limited to the following.

- Hydrological modifications (examples: ditches, dams, beaver dams, dikes, berms, ponds, etc.)
- Surface and sub-surface discharges into the wetland (examples: discharges containing obvious pollutants, presence of nearby septic tanks, underground storage tanks (USTs), hog lagoons, etc.)
- Signs of vegetation stress (examples: vegetation mortality, insect damage, storm damage, disease, salt intrusion, etc.)
- Habitat/plant community alteration (examples: mowing, clear-cutting, exotics, etc.)

Is the assessment area intensively managed? Yes No

Regulatory Considerations - Were regulatory considerations evaluated? Yes No If Yes, check all that apply to the assessment area.

- Anadromous fish
- Federally protected species or State endangered or threatened species
- NCDWR riparian buffer rule in effect
- Abuts a Primary Nursery Area (PNA)
- Publicly owned property
- N.C. Division of Coastal Management Area of Environmental Concern (AEC) (including buffer)
- Abuts a stream with a NCDWQ classification of SA or supplemental classifications of HQW, ORW, or Trout
- Designated NCNHP reference community
- Abuts a 303(d)-listed stream or a tributary to a 303(d)-listed stream

What type of natural stream is associated with the wetland, if any? (check all that apply)

- Blackwater
- Brownwater
- Tidal (if tidal, check one of the following boxes) Lunar Wind Both

Is the assessment area on a coastal island? Yes No

Is the assessment area's surface water storage capacity or duration substantially altered by beaver? Yes No

Does the assessment area experience overbank flooding during normal rainfall conditions? Yes No

- Ground Surface Condition/Vegetation Condition – assessment area condition metric**
Check a box in each column. Consider alteration to the ground surface (GS) in the assessment area and vegetation structure (VS) in the assessment area. Compare to reference wetland if applicable (see User Manual). If a reference is not applicable, then rate the assessment area based on evidence an effect.

GS	VS	
<input checked="" type="checkbox"/> A	<input type="checkbox"/> A	Not severely altered
<input type="checkbox"/> B	<input checked="" type="checkbox"/> B	Severely altered over a majority of the assessment area (ground surface alteration examples: vehicle tracks, excessive sedimentation, fire-plow lanes, skidder tracks, bedding, fill, soil compaction, obvious pollutants) (vegetation structure alteration examples: mechanical disturbance, herbicides, salt intrusion [where appropriate], exotic species, grazing, less diversity [if appropriate], hydrologic alteration)
- Surface and Sub-Surface Storage Capacity and Duration – assessment area condition metric**
Check a box in each column. Consider surface storage capacity and duration (Surf) and sub-surface storage capacity and duration (Sub). Consider both increase and decrease in hydrology. A ditch ≤ 1 foot deep is considered to affect surface water only, while a ditch > 1 foot deep is expected to affect both surface and sub-surface water. Consider tidal flooding regime, if applicable.

Surf	Sub	
<input type="checkbox"/> A	<input type="checkbox"/> A	Water storage capacity and duration are not altered.
<input checked="" type="checkbox"/> B	<input checked="" type="checkbox"/> B	Water storage capacity or duration are altered, but not substantially (typically, not sufficient to change vegetation).
<input type="checkbox"/> C	<input type="checkbox"/> C	Water storage capacity or duration are substantially altered (typically, alteration sufficient to result in vegetation change) (examples: draining, flooding, soil compaction, filling, excessive sedimentation, underground utility lines).
- Water Storage/Surface Relief – assessment area/wetland type condition metric (skip for all marshes)**
Check a box in each column. Select the appropriate storage for the assessment area (AA) and the wetland type (WT).

AA	WT	
3a. <input type="checkbox"/> A <input type="checkbox"/> A		Majority of wetland with depressions able to pond water > 1 foot deep
<input type="checkbox"/> B <input type="checkbox"/> B		Majority of wetland with depressions able to pond water 6 inches to 1 foot deep
<input type="checkbox"/> C <input type="checkbox"/> C		Majority of wetland with depressions able to pond water 3 to 6 inches deep
<input checked="" type="checkbox"/> D <input checked="" type="checkbox"/> D		Depressions able to pond water < 3 inches deep
3b. <input type="checkbox"/> A	<input type="checkbox"/> A	Evidence that maximum depth of inundation is greater than 2 feet
<input type="checkbox"/> B	<input type="checkbox"/> B	Evidence that maximum depth of inundation is between 1 and 2 feet
<input checked="" type="checkbox"/> C	<input checked="" type="checkbox"/> C	Evidence that maximum depth of inundation is less than 1 foot

4. Soil Texture/Structure – assessment area condition metric (skip for all marshes)

Check a box from each of the three soil property groups below. Dig soil profile in the dominant assessment area landscape feature. Make soil observations within the top 12 inches. Use most recent National Technical Committee for Hydric Soils guidance for regional indicators.

- 4a. A Sandy soil
 B Loamy or clayey soils exhibiting redoximorphic features (concentrations, depletions, or rhizospheres)
 C Loamy or clayey soils not exhibiting redoximorphic features
 D Loamy or clayey gleyed soil
 E Histosol or histc epipedon
- 4b. A Soil ribbon < 1 inch
 B Soil ribbon ≥ 1 inch
- 4c. A No peat or muck presence
 B A peat or muck presence

5. Discharge into Wetland – opportunity metric

Check a box in each column. Consider surface pollutants or discharges (Surf) and sub-surface pollutants or discharges (Sub). Examples of sub-surface discharges include presence of nearby septic tank, underground storage tank (UST), etc.

- | | | |
|---------------------------------------|---------------------------------------|---|
| Surf | Sub | |
| <input type="checkbox"/> A | <input checked="" type="checkbox"/> A | Little or no evidence of pollutants or discharges entering the assessment area |
| <input checked="" type="checkbox"/> B | <input type="checkbox"/> B | Noticeable evidence of pollutants or discharges entering the wetland and stressing, but not overwhelming the treatment capacity of the assessment area |
| <input type="checkbox"/> C | <input type="checkbox"/> C | Noticeable evidence of pollutants or discharges (pathogen, particulate, or soluble) entering the assessment area and potentially overwhelming the treatment capacity of the wetland (water discoloration, dead vegetation, excessive sedimentation, odor) |

6. Land Use – opportunity metric (skip for non-riparian wetlands)

Check all that apply (at least one box in each column). Evaluation involves a GIS effort with field adjustment. Consider sources draining to assessment area within entire upstream watershed (WS), within 5 miles and within the watershed draining to the assessment area (5M), and within 2 miles and within the watershed draining to the assessment area (2M).

- | | | | |
|---------------------------------------|---------------------------------------|---------------------------------------|---|
| WS | 5M | 2M | |
| <input type="checkbox"/> A | <input type="checkbox"/> A | <input type="checkbox"/> A | ≥ 10% impervious surfaces |
| <input type="checkbox"/> B | <input type="checkbox"/> B | <input type="checkbox"/> B | Confined animal operations (or other local, concentrated source of pollutants) |
| <input checked="" type="checkbox"/> C | <input checked="" type="checkbox"/> C | <input checked="" type="checkbox"/> C | ≥ 20% coverage of pasture |
| <input type="checkbox"/> D | <input type="checkbox"/> D | <input type="checkbox"/> D | ≥ 20% coverage of agricultural land (regularly plowed land) |
| <input checked="" type="checkbox"/> E | <input checked="" type="checkbox"/> E | <input checked="" type="checkbox"/> E | ≥ 20% coverage of maintained grass/herb |
| <input type="checkbox"/> F | <input type="checkbox"/> F | <input type="checkbox"/> F | ≥ 20% coverage of clear-cut land |
| <input type="checkbox"/> G | <input type="checkbox"/> G | <input type="checkbox"/> G | Little or no opportunity to improve water quality. Lack of opportunity may result from little or no disturbance in the watershed or hydrologic alterations that prevent drainage and/or overbank flow from affecting the assessment area. |

7. Wetland Acting as Vegetated Buffer – assessment area/wetland complex condition metric (skip for non-riparian wetlands)

- 7a. Is assessment area within 50 feet of a tributary or other open water?
 Yes No If Yes, continue to 7b. If No, skip to Metric 8.
 Wetland buffer need only be present on one side of the water body. Make buffer judgment based on the average width of wetland. Record a note if a portion of the buffer has been removed or disturbed.
- 7b. How much of the first 50 feet from the bank is wetland? (Wetland buffer need only be present on one side of the water body. Make buffer judgment based on the average width of wetland. Record a note if a portion of the buffer has been removed or disturbed.)
 A ≥ 50 feet
 B From 30 to < 50 feet
 C From 15 to < 30 feet
 D From 5 to < 15 feet
 E < 5 feet or buffer bypassed by ditches
- 7c. Tributary width. If the tributary is anastomosed, combine widths of channels/braids for a total width.
 ≤ 15-foot wide > 15-foot wide Other open water (no tributary present)
- 7d. Do roots of assessment area vegetation extend into the bank of the tributary/open water?
 Yes No
- 7e. Is stream or other open water sheltered or exposed?
 Sheltered – adjacent open water with width < 2500 feet and no regular boat traffic.
 Exposed – adjacent open water with width ≥ 2500 feet or regular boat traffic.

8. Wetland Width at the Assessment Area – wetland type/wetland complex condition metric (evaluate WT for all marshes and Estuarine Woody Wetland only; evaluate WC for Bottomland Hardwood Forest, Headwater Forest, and Riverine Swamp Forest only)

Check a box in each column for riverine wetlands only. Select the average width for the wetland type at the assessment area (WT) and the wetland complex at the assessment area (WC). See User Manual for WT and WC boundaries.

- | | | |
|---------------------------------------|---------------------------------------|-----------------------|
| WT | WC | |
| <input type="checkbox"/> A | <input type="checkbox"/> A | ≥ 100 feet |
| <input type="checkbox"/> B | <input type="checkbox"/> B | From 80 to < 100 feet |
| <input type="checkbox"/> C | <input type="checkbox"/> C | From 50 to < 80 feet |
| <input type="checkbox"/> D | <input type="checkbox"/> D | From 40 to < 50 feet |
| <input type="checkbox"/> E | <input type="checkbox"/> E | From 30 to < 40 feet |
| <input checked="" type="checkbox"/> F | <input checked="" type="checkbox"/> F | From 15 to < 30 feet |
| <input type="checkbox"/> G | <input type="checkbox"/> G | From 5 to < 15 feet |
| <input type="checkbox"/> H | <input type="checkbox"/> H | < 5 feet |

9. Inundation Duration – assessment area condition metric (skip for non-riparian wetlands)

Answer for assessment area dominant landform.

- A Evidence of short-duration inundation (< 7 consecutive days)
 B Evidence of saturation, without evidence of inundation
 C Evidence of long-duration inundation or very long-duration inundation (7 to 30 consecutive days or more)

10. Indicators of Deposition – assessment area condition metric (skip for non-riparian wetlands and all marshes)

- Consider recent deposition only (no plant growth since deposition).
 A Sediment deposition is not excessive, but at approximately natural levels.
 B Sediment deposition is excessive, but not overwhelming the wetland.
 C Sediment deposition is excessive and is overwhelming the wetland.

11. Wetland Size – wetland type/wetland complex condition metric

Check a box in each column. Involves a GIS effort with field adjustment. This metric evaluates three aspects of the wetland area: the size of the wetland type (WT), the size of the wetland complex (WC), and the size of the forested wetland (FW) (if applicable, see User Manual). See the User Manual for boundaries of these evaluation areas. If assessment area is clear-cut, select "K" for the FW column.

- | | | |
|---------------------------------------|---------------------------------------|---|
| WT | WC | FW (if applicable) |
| <input type="checkbox"/> A | <input type="checkbox"/> A | <input type="checkbox"/> A ≥ 500 acres |
| <input type="checkbox"/> B | <input type="checkbox"/> B | <input type="checkbox"/> B From 100 to < 500 acres |
| <input type="checkbox"/> C | <input type="checkbox"/> C | <input type="checkbox"/> C From 50 to < 100 acres |
| <input type="checkbox"/> D | <input type="checkbox"/> D | <input type="checkbox"/> D From 25 to < 50 acres |
| <input type="checkbox"/> E | <input type="checkbox"/> E | <input type="checkbox"/> E From 10 to < 25 acres |
| <input type="checkbox"/> F | <input type="checkbox"/> F | <input type="checkbox"/> F From 5 to < 10 acres |
| <input type="checkbox"/> G | <input type="checkbox"/> G | <input type="checkbox"/> G From 1 to < 5 acres |
| <input type="checkbox"/> H | <input type="checkbox"/> H | <input type="checkbox"/> H From 0.5 to < 1 acre |
| <input type="checkbox"/> I | <input type="checkbox"/> I | <input type="checkbox"/> I From 0.1 to < 0.5 acre |
| <input checked="" type="checkbox"/> J | <input checked="" type="checkbox"/> J | <input type="checkbox"/> J From 0.01 to < 0.1 acre |
| <input type="checkbox"/> K | <input type="checkbox"/> K | <input checked="" type="checkbox"/> K < 0.01 acre or assessment area is clear-cut |

12. Wetland Intactness – wetland type condition metric (evaluate for Pocosins only)

- A Pocosin is the full extent (≥ 90%) of its natural landscape size.
 B Pocosin type is < 90% of the full extent of its natural landscape size.

13. Connectivity to Other Natural Areas – landscape condition metric

13a. Check appropriate box(es) (a box may be checked in each column). Involves a GIS effort with field adjustment. This metric evaluates whether the wetland is well connected (Well) and/or loosely connected (Loosely) to the landscape patch, the contiguous naturally vegetated area and open water (if appropriate). Boundaries are formed by four-lane roads, regularly maintained utility line corridors the width of a four-lane road or wider, urban landscapes, maintained fields (pasture and agriculture), or open water > 300 feet wide.

- | | | |
|---------------------------------------|----------------------------|--|
| Well | Loosely | |
| <input type="checkbox"/> A | <input type="checkbox"/> A | ≥ 500 acres |
| <input type="checkbox"/> B | <input type="checkbox"/> B | From 100 to < 500 acres |
| <input type="checkbox"/> C | <input type="checkbox"/> C | From 50 to < 100 acres |
| <input type="checkbox"/> D | <input type="checkbox"/> D | From 10 to < 50 acres |
| <input type="checkbox"/> E | <input type="checkbox"/> E | < 10 acres |
| <input checked="" type="checkbox"/> F | <input type="checkbox"/> F | Wetland type has a poor or no connection to other natural habitats |

- 13b. Evaluate for marshes only.
 Yes No Wetland type has a surface hydrology connection to open waters/stream or tidal wetlands.

14. Edge Effect – wetland type condition metric (skip for all marshes and Estuarine Woody Wetland)

May involve a GIS effort with field adjustment. Estimate distance from wetland type boundary to artificial edges. Artificial edges include non-forested areas ≥ 40 feet wide such as fields, development, roads, regularly maintained utility line corridors, and clear-cuts. Consider the eight main points of the compass. Artificial edge occurs within 150 feet in how many directions? If the assessment area is clear cut, select option "C."

- A 0
 B 1 to 4
 C 5 to 8

15. Vegetative Composition – assessment area condition metric (skip for all marshes and Pine Flat)

- A Vegetation is close to reference condition in species present and their proportions. Lower strata composed of appropriate species, with exotic plants absent or sparse within the assessment area.
 B Vegetation is different from reference condition in species diversity or proportions, but still largely composed of native species characteristic of the wetland type. This may include communities of weedy native species that develop after clearcutting or clearing. It also includes communities with exotics present, but not dominant, over a large portion of the expected strata.
 C Vegetation severely altered from reference in composition, or expected species are unnaturally absent (planted stands of non-characteristic species or at least one stratum inappropriately composed of a single species), or exotic species are dominant in at least one stratum.

16. Vegetative Diversity – assessment area condition metric (evaluate for Non-tidal Freshwater Marsh only)

- A Vegetation diversity is high and is composed primarily of native species (< 10% cover of exotics).
 B Vegetation diversity is low or has > 10% to 50% cover of exotics.
 C Vegetation is dominated by exotic species (> 50 % cover of exotics).

17. **Vegetative Structure – assessment area/wetland type condition metric**

17a. Is vegetation present?

Yes No If Yes, continue to 17b. If No, skip to Metric 18.

17b. Evaluate percent coverage of assessment area vegetation for all marshes only. Skip to 17c for non-marsh wetlands.

A ≥ 25% coverage of vegetation
 B < 25% coverage of vegetation

17c. **Check a box in each column for each stratum.** Evaluate this portion of the metric for non-marsh wetlands. Consider structure in airspace above the assessment area (AA) and the wetland type (WT) separately.

	AA	WT	
Canopy	<input type="checkbox"/> A	<input type="checkbox"/> A	Canopy closed, or nearly closed, with natural gaps associated with natural processes
	<input type="checkbox"/> B	<input type="checkbox"/> B	Canopy present, but opened more than natural gaps
	<input checked="" type="checkbox"/> C	<input checked="" type="checkbox"/> C	Canopy sparse or absent
Mid-Story	<input type="checkbox"/> A	<input type="checkbox"/> A	Dense mid-story/sapling layer
	<input type="checkbox"/> B	<input type="checkbox"/> B	Moderate density mid-story/sapling layer
	<input checked="" type="checkbox"/> C	<input checked="" type="checkbox"/> C	Mid-story/sapling layer sparse or absent
Shrub	<input type="checkbox"/> A	<input type="checkbox"/> A	Dense shrub layer
	<input type="checkbox"/> B	<input type="checkbox"/> B	Moderate density shrub layer
	<input checked="" type="checkbox"/> C	<input checked="" type="checkbox"/> C	Shrub layer sparse or absent
Herb	<input checked="" type="checkbox"/> A	<input checked="" type="checkbox"/> A	Dense herb layer
	<input type="checkbox"/> B	<input type="checkbox"/> B	Moderate density herb layer
	<input type="checkbox"/> C	<input type="checkbox"/> C	Herb layer sparse or absent

18. **Snags – wetland type condition metric (skip for all marshes)**

A Large snags (more than one) are visible (> 12 inches DBH, or large relative to species present and landscape stability).
 B Not A

19. **Diameter Class Distribution – wetland type condition metric (skip for all marshes)**

A Majority of canopy trees have stems > 6 inches in diameter at breast height (DBH); many large trees (> 12 inches DBH) are present.
 B Majority of canopy trees have stems between 6 and 12 inches DBH, few are > 12 inch DBH.
 C Majority of canopy trees are < 6 inches DBH or no trees.

20. **Large Woody Debris – wetland type condition metric (skip for all marshes)**

Include both natural debris and man-placed natural debris.
 A Large logs (more than one) are visible (> 12 inches in diameter, or large relative to species present and landscape stability).
 B Not A

21. **Vegetation/Open Water Dispersion – wetland type/open water condition metric (evaluate for Non-Tidal Freshwater Marsh only)**

Select the figure that best describes the amount of interspersed vegetation and open water in the growing season. Patterned areas indicate vegetated areas, while solid white areas indicate open water.



22. **Hydrologic Connectivity – assessment area condition metric (evaluate for riparian wetlands and Salt/Brackish Marsh only)**

Examples of activities that may severely alter hydrologic connectivity include intensive ditching, fill, sedimentation, channelization, diversion, man-made berms, beaver dams, and stream incision. Documentation required if evaluated as B, C, or D.

A Overbank and overland flow are not severely altered in the assessment area.
 B Overbank flow is severely altered in the assessment area.
 C Overland flow is severely altered in the assessment area.
 D Both overbank and overland flow are severely altered in the assessment area.

Notes

**NC WAM Wetland Rating Sheet
 Accompanies User Manual Version 5.0**

Wetland Site Name Wetland V Date of Assessment 7/30/2020
 Wetland Type Bottomland Hardwood Forest Assessor Name/Organization C. Neaves

Notes on Field Assessment Form (Y/N) NO
 Presence of regulatory considerations (Y/N) NO
 Wetland is intensively managed (Y/N) _____
 Assessment area is located within 50 feet of a natural tributary or other open water (Y/N) NO
 Assessment area is substantially altered by beaver (Y/N) _____
 Assessment area experiences overbank flooding during normal rainfall conditions (Y/N) _____
 Assessment area is on a coastal island (Y/N) _____

Sub-function Rating Summary

Function	Sub-function	Metrics	Rating
Hydrology	Surface Storage and Retention	Condition	LOW
		Sub-surface Storage and Retention	LOW
Water Quality	Pathogen Change	Condition	MEDIUM
		Condition/Opportunity	MEDIUM
		Opportunity Presence (Y/N)	NO
	Particulate Change	Condition	LOW
		Condition/Opportunity	LOW
		Opportunity Presence (Y/N)	NO
	Soluble Change	Condition	MEDIUM
		Condition/Opportunity	MEDIUM
		Opportunity Presence (Y/N)	NO
	Physical Change	Condition	LOW
		Condition/Opportunity	LOW
		Opportunity Presence (Y/N)	NO
	Pollution Change	Condition	NA
		Condition/Opportunity	NA
		Opportunity Presence (Y/N)	NA
Habitat	Physical Structure	Condition	LOW
	Landscape Patch Structure	Condition	LOW
	Vegetation Composition	Condition	LOW

Function Rating Summary

Function	Metrics	Rating
Hydrology	Condition	LOW
	Condition/Opportunity	LOW
	Opportunity Presence (Y/N)	NO
Water Quality	Condition	LOW
	Condition/Opportunity	LOW
	Opportunity Presence (Y/N)	NO
Habitat	Condition	LOW

Overall Wetland Rating LOW

NC WAM FIELD ASSESSMENT FORM
Accompanies User Manual Version 5.0

USACE AID #	SAW-2020-00047	NCDWR#	20200035
Project Name	Liberty Rock Mitigation Site	Date of Evaluation	7/30/2020
Applicant/Owner Name	Widlands Engineering	Wetland Site Name	Wetland W
Wetland Type	Bottomland Hardwood Forest	Assessor Name/Organization	C. Neaves
Level III Ecoregion	Piedmont	Nearest Named Water Body	Rocky River
River Basin	Cape Fear	USGS 8-Digit Catalogue Unit	03030003
County	Randolph	NCDWR Region	Winston-Salem
<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	Precipitation within 48 hrs?	Latitude/Longitude (deci-degrees)	35.820122, -79.562637

Evidence of stressors affecting the assessment area (may not be within the assessment area)

Please circle and/or make note on the last page if evidence of stressors is apparent. Consider departure from reference, if appropriate, in recent past (for instance, within 10 years). Noteworthy stressors include, but are not limited to the following.

- Hydrological modifications (examples: ditches, dams, beaver dams, dikes, berms, ponds, etc.)
- Surface and sub-surface discharges into the wetland (examples: discharges containing obvious pollutants, presence of nearby septic tanks, underground storage tanks (USTs), hog lagoons, etc.)
- Signs of vegetation stress (examples: vegetation mortality, insect damage, disease, storm damage, salt intrusion, etc.)
- Habitat/plant community alteration (examples: mowing, clear-cutting, exotics, etc.)

Is the assessment area intensively managed? Yes No

Regulatory Considerations - Were regulatory considerations evaluated? Yes No If Yes, check all that apply to the assessment area.

- Anadromous fish
- Federally protected species or State endangered or threatened species
- NCDWR riparian buffer rule in effect
- Abuts a Primary Nursery Area (PNA)
- Publicly owned property
- N.C. Division of Coastal Management Area of Environmental Concern (AEC) (including buffer)
- Abuts a stream with a NCDWQ classification of SA or supplemental classifications of HQW, ORW, or Trout
- Designated NCNHP reference community
- Abuts a 303(d)-listed stream or a tributary to a 303(d)-listed stream

What type of natural stream is associated with the wetland, if any? (check all that apply)

- Blackwater
- Brownwater
- Tidal (if tidal, check one of the following boxes) Lunar Wind Both

Is the assessment area on a coastal island? Yes No

Is the assessment area's surface water storage capacity or duration substantially altered by beaver? Yes No

Does the assessment area experience overbank flooding during normal rainfall conditions? Yes No

1. Ground Surface Condition/Vegetation Condition – assessment area condition metric

Check a box in each column. Consider alteration to the ground surface (GS) in the assessment area and vegetation structure (VS) in the assessment area. Compare to reference wetland if applicable (see User Manual). If a reference is not applicable, then rate the assessment area based on evidence an effect.

- | | | |
|---------------------------------------|---------------------------------------|--|
| GS | VS | |
| <input checked="" type="checkbox"/> A | <input type="checkbox"/> A | Not severely altered |
| <input type="checkbox"/> B | <input checked="" type="checkbox"/> B | Severely altered over a majority of the assessment area (ground surface alteration examples: vehicle tracks, excessive sedimentation, fire-plow lanes, skidder tracks, bedding, fill, soil compaction, obvious pollutants) (vegetation structure alteration examples: mechanical disturbance, herbicides, salt intrusion [where appropriate], exotic species, grazing, less diversity [if appropriate], hydrologic alteration) |

2. Surface and Sub-Surface Storage Capacity and Duration – assessment area condition metric

Check a box in each column. Consider surface storage capacity and duration (Surf) and sub-surface storage capacity and duration (Sub). Consider both increase and decrease in hydrology. A ditch ≤ 1 foot deep is considered to affect surface water only, while a ditch > 1 foot deep is expected to affect both surface and sub-surface water. Consider tidal flooding regime, if applicable.

- | | | |
|---------------------------------------|---------------------------------------|--|
| Surf | Sub | |
| <input type="checkbox"/> A | <input type="checkbox"/> A | Water storage capacity and duration are not altered. |
| <input checked="" type="checkbox"/> B | <input checked="" type="checkbox"/> B | Water storage capacity or duration are altered, but not substantially (typically, not sufficient to change vegetation). |
| <input type="checkbox"/> C | <input type="checkbox"/> C | Water storage capacity or duration are substantially altered (typically, alteration sufficient to result in vegetation change) (examples: draining, flooding, soil compaction, filling, excessive sedimentation, underground utility lines). |

3. Water Storage/Surface Relief – assessment area/wetland type condition metric (skip for all marshes)

Check a box in each column. Select the appropriate storage for the assessment area (AA) and the wetland type (WT).

- | | | |
|---|----|---|
| AA | WT | |
| 3a. <input type="checkbox"/> A <input type="checkbox"/> A | | Majority of wetland with depressions able to pond water > 1 deep |
| <input type="checkbox"/> B <input type="checkbox"/> B | | Majority of wetland with depressions able to pond water 6 inches to 1 foot deep |
| <input type="checkbox"/> C <input type="checkbox"/> C | | Majority of wetland with depressions able to pond water 3 to 6 inches deep |
| <input checked="" type="checkbox"/> D <input checked="" type="checkbox"/> D | | Depressions able to pond water < 3 inches deep |
| 3b. <input type="checkbox"/> A | | Evidence that maximum depth of inundation is greater than 2 feet |
| <input type="checkbox"/> B | | Evidence that maximum depth of inundation is between 1 and 2 feet |
| <input checked="" type="checkbox"/> C | | Evidence that maximum depth of inundation is less than 1 foot |

4. Soil Texture/Structure – assessment area condition metric (skip for all marshes)

Check a box from each of the three soil property groups below. Dig soil profile in the dominant assessment area landscape feature. Make soil observations within the top 12 inches. Use most recent National Technical Committee for Hydric Soils guidance for regional indicators.

- 4a. A Sandy soil
- B Loamy or clayey soils exhibiting redoximorphic features (concentrations, depletions, or rhizospheres)
- C Loamy or clayey soils not exhibiting redoximorphic features
- D Loamy or clayey gleyed soil
- E Histosol or histc epipedon
- 4b. A Soil ribbon < 1 inch
- B Soil ribbon ≥ 1 inch
- 4c. A No peat or muck presence
- B A peat or muck presence

5. Discharge into Wetland – opportunity metric

Check a box in each column. Consider surface pollutants or discharges (Surf) and sub-surface pollutants or discharges (Sub). Examples of sub-surface discharges include presence of nearby septic tank, underground storage tank (UST), etc.

- | | | |
|---------------------------------------|---------------------------------------|---|
| Surf | Sub | |
| <input type="checkbox"/> A | <input checked="" type="checkbox"/> A | Little or no evidence of pollutants or discharges entering the assessment area |
| <input checked="" type="checkbox"/> B | <input type="checkbox"/> B | Noticeable evidence of pollutants or discharges entering the wetland and stressing, but not overwhelming the treatment capacity of the assessment area |
| <input type="checkbox"/> C | <input type="checkbox"/> C | Noticeable evidence of pollutants or discharges (pathogen, particulate, or soluble) entering the assessment area and potentially overwhelming the treatment capacity of the wetland (water discoloration, dead vegetation, excessive sedimentation, odor) |

6. Land Use – opportunity metric (skip for non-riparian wetlands)

Check all that apply (at least one box in each column). Evaluation involves a GIS effort with field adjustment. Consider sources draining to assessment area within entire upstream watershed (WS), within 5 miles and within the watershed draining to the assessment area (5M), and within 2 miles and within the watershed draining to the assessment area (2M).

- | | | | |
|---------------------------------------|---------------------------------------|---------------------------------------|---|
| WS | 5M | 2M | |
| <input type="checkbox"/> A | <input type="checkbox"/> A | <input type="checkbox"/> A | ≥ 10% impervious surfaces |
| <input type="checkbox"/> B | <input type="checkbox"/> B | <input type="checkbox"/> B | Confined animal operations (or other local, concentrated source of pollutants) |
| <input checked="" type="checkbox"/> C | <input checked="" type="checkbox"/> C | <input checked="" type="checkbox"/> C | ≥ 20% coverage of pasture |
| <input type="checkbox"/> D | <input type="checkbox"/> D | <input type="checkbox"/> D | ≥ 20% coverage of agricultural land (regularly plowed land) |
| <input checked="" type="checkbox"/> E | <input checked="" type="checkbox"/> E | <input checked="" type="checkbox"/> E | ≥ 20% coverage of maintained grass/herb |
| <input type="checkbox"/> F | <input type="checkbox"/> F | <input type="checkbox"/> F | ≥ 20% coverage of clear-cut land |
| <input type="checkbox"/> G | <input type="checkbox"/> G | <input type="checkbox"/> G | Little or no opportunity to improve water quality. Lack of opportunity may result from little or no disturbance in the watershed or hydrologic alterations that prevent drainage and/or overbank flow from affecting the assessment area. |

7. Wetland Acting as Vegetated Buffer – assessment area/wetland complex condition metric (skip for non-riparian wetlands)

- 7a. Is assessment area within 50 feet of a tributary or other open water?
- Yes No If Yes, continue to 7b. If No, skip to Metric 8.
- Wetland buffer need only be present on one side of the water body. Make buffer judgment based on the average width of wetland. Record a note if a portion of the buffer has been removed or disturbed.
- 7b. How much of the first 50 feet from the bank is wetland? (Wetland buffer need only be present on one side of the water body. Make buffer judgment based on the average width of wetland. Record a note if a portion of the buffer has been removed or disturbed.)
- A ≥ 50 feet
- B From 30 to < 50 feet
- C From 15 to < 30 feet
- D From 5 to < 15 feet
- E < 5 feet or buffer bypassed by ditches
- 7c. Tributary width. If the tributary is anastomosed, combine widths of channels/braids for a total width.
- ≤ 15-foot wide > 15-foot wide Other open water (no tributary present)
- 7d. Do roots of assessment area vegetation extend into the bank of the tributary/open water?
- Yes No
- 7e. Is stream or other open water sheltered or exposed?
- Sheltered – adjacent open water with width < 2500 feet and no regular boat traffic.
- Exposed – adjacent open water with width ≥ 2500 feet or regular boat traffic.

8. Wetland Width at the Assessment Area – wetland type/wetland complex condition metric (evaluate WT for all marshes and Estuarine Woody Wetland only; evaluate WC for Bottomland Hardwood Forest, Headwater Forest, and Riverine Swamp Forest only)

Check a box in each column for riverine wetlands only. Select the average width for the wetland type at the assessment area (WT) and the wetland complex at the assessment area (WC). See User Manual for WT and WC boundaries.

- | | | |
|---------------------------------------|---------------------------------------|-----------------------|
| WT | WC | |
| <input type="checkbox"/> A | <input type="checkbox"/> A | ≥ 100 feet |
| <input type="checkbox"/> B | <input type="checkbox"/> B | From 80 to < 100 feet |
| <input type="checkbox"/> C | <input type="checkbox"/> C | From 50 to < 80 feet |
| <input type="checkbox"/> D | <input type="checkbox"/> D | From 40 to < 50 feet |
| <input type="checkbox"/> E | <input type="checkbox"/> E | From 30 to < 40 feet |
| <input checked="" type="checkbox"/> F | <input checked="" type="checkbox"/> F | From 15 to < 30 feet |
| <input type="checkbox"/> G | <input type="checkbox"/> G | From 5 to < 15 feet |
| <input type="checkbox"/> H | <input type="checkbox"/> H | < 5 feet |

9. Inundation Duration – assessment area condition metric (skip for non-riparian wetlands)

Answer for assessment area dominant landform.

- XA Evidence of short-duration inundation (< 7 consecutive days)
XB Evidence of saturation, without evidence of inundation
XC Evidence of long-duration inundation or very long-duration inundation (7 to 30 consecutive days or more)

10. Indicators of Deposition – assessment area condition metric (skip for non-riparian wetlands and all marshes)

Consider recent deposition only (no plant growth since deposition).

- XA Sediment deposition is not excessive, but at approximately natural levels.
XB Sediment deposition is excessive, but not overwhelming the wetland.
XC Sediment deposition is excessive and is overwhelming the wetland.

11. Wetland Size – wetland type/wetland complex condition metric

Check a box in each column. Involves a GIS effort with field adjustment. This metric evaluates three aspects of the wetland area: the size of the wetland type (WT), the size of the wetland complex (WC), and the size of the forested wetland (FW) (if applicable, see User Manual). See the User Manual for boundaries of these evaluation areas. If assessment area is clear-cut, select "K" for the FW column.

- WT WC FW (if applicable)
XA A A ≥ 500 acres
XB B B From 100 to < 500 acres
XC C C From 50 to < 100 acres
XD D D From 25 to < 50 acres
XE E E From 10 to < 25 acres
XF F F From 5 to < 10 acres
XG G G From 1 to < 5 acres
XH H H From 0.5 to < 1 acre
XI I I From 0.1 to < 0.5 acre
XJ J J From 0.01 to < 0.1 acre
XK K K < 0.01 acre or assessment area is clear-cut

12. Wetland Intactness – wetland type condition metric (evaluate for Pocosins only)

- XA Pocosin is the full extent (≥ 90%) of its natural landscape size.
XB Pocosin type is < 90% of the full extent of its natural landscape size.

13. Connectivity to Other Natural Areas – landscape condition metric

13a. Check appropriate box(es) (a box may be checked in each column). Involves a GIS effort with field adjustment. This metric evaluates whether the wetland is well connected (Well) and/or loosely connected (Loosely) to the landscape patch, the contiguous naturally vegetated area and open water (if appropriate). Boundaries are formed by four-lane roads, regularly maintained utility line corridors the width of a four-lane road or wider, urban landscapes, maintained fields (pasture and agriculture), or open water > 300 feet wide.

- Well Loosely
XA A A ≥ 500 acres
XB B B From 100 to < 500 acres
XC C C From 50 to < 100 acres
XD D D From 10 to < 50 acres
XE E E < 10 acres
XF F F Wetland type has a poor or no connection to other natural habitats

13b. Evaluate for marshes only.

- Yes No Wetland type has a surface hydrology connection to open waters/stream or tidal wetlands.

14. Edge Effect – wetland type condition metric (skip for all marshes and Estuarine Woody Wetland)

May involve a GIS effort with field adjustment. Estimate distance from wetland type boundary to artificial edges. Artificial edges include non-forested areas ≥ 40 feet wide such as fields, development, roads, regularly maintained utility line corridors, and clear-cuts. Consider the eight main points of the compass. Artificial edge occurs within 150 feet in how many directions? If the assessment area is clear cut, select option "C."

- XA 0
XB 1 to 4
XC 5 to 8

15. Vegetative Composition – assessment area condition metric (skip for all marshes and Pine Flat)

- XA Vegetation is close to reference condition in species present and their proportions. Lower strata composed of appropriate species, with exotic plants absent or sparse within the assessment area.
XB Vegetation is different from reference condition in species diversity or proportions, but still largely composed of native species characteristic of the wetland type. This may include communities of weedy native species that develop after clearcutting or clearing. It also includes communities with exotics present, but not dominant, over a large portion of the expected strata.
XC Vegetation severely altered from reference in composition, or expected species are unnaturally absent (planted stands of non-characteristic species or at least one stratum inappropriately composed of a single species), or exotic species are dominant in at least one stratum.

16. Vegetative Diversity – assessment area condition metric (evaluate for Non-tidal Freshwater Marsh only)

- XA Vegetation diversity is high and is composed primarily of native species (< 10% cover of exotics).
XB Vegetation diversity is low or has > 10% to 50% cover of exotics.
XC Vegetation is dominated by exotic species (> 50 % cover of exotics).

17. Vegetative Structure – assessment area/wetland type condition metric

17a. Is vegetation present?

- Yes No If Yes, continue to 17b. If No, skip to Metric 18.

17b. Evaluate percent coverage of assessment area vegetation for all marshes only. Skip to 17c for non-marsh wetlands.

- XA ≥ 25% coverage of vegetation
XB < 25% coverage of vegetation

17c. Check a box in each column for each stratum. Evaluate this portion of the metric for non-marsh wetlands. Consider structure in airspace above the assessment area (AA) and the wetland type (WT) separately.

- AA WT
Canopy XA A Canopy closed, or nearly closed, with natural gaps associated with natural processes
XB B Canopy present, but opened more than natural gaps
XC C Canopy sparse or absent
Mid-Story XA A Dense mid-story/sapling layer
XB B Moderate density mid-story/sapling layer
XC C Mid-story/sapling layer sparse or absent
Shrub XA A Dense shrub layer
XB B Moderate density shrub layer
XC C Shrub layer sparse or absent
Herb XA A Dense herb layer
XB B Moderate density herb layer
XC C Herb layer sparse or absent

18. Snags – wetland type condition metric (skip for all marshes)

- XA Large snags (more than one) are visible (> 12 inches DBH, or large relative to species present and landscape stability).
XB Not A

19. Diameter Class Distribution – wetland type condition metric (skip for all marshes)

- XA Majority of canopy trees have stems > 6 inches in diameter at breast height (DBH); many large trees (> 12 inches DBH) are present.
XB Majority of canopy trees have stems between 6 and 12 inches DBH, few are > 12 inch DBH.
XC Majority of canopy trees are < 6 inches DBH or no trees.

20. Large Woody Debris – wetland type condition metric (skip for all marshes)

- XA Include both natural debris and man-placed natural debris.
XB Large logs (more than one) are visible (> 12 inches in diameter, or large relative to species present and landscape stability).
XC Not A

21. Vegetation/Open Water Dispersion – wetland type/open water condition metric (evaluate for Non-Tidal Freshwater Marsh only)

Select the figure that best describes the amount of interspersed vegetation and open water in the growing season. Patterned areas indicate vegetated areas, while solid white areas indicate open water.



22. Hydrologic Connectivity – assessment area condition metric (evaluate for riparian wetlands and Salt/Brackish Marsh only)

Examples of activities that may severely alter hydrologic connectivity include intensive ditching, fill, sedimentation, channelization, diversion, man-made berms, beaver dams, and stream incision. Documentation required if evaluated as B, C, or D.

- XA Overbank and overland flow are not severely altered in the assessment area.
XB Overbank flow is severely altered in the assessment area.
XC Overland flow is severely altered in the assessment area.
XD Both overbank and overland flow are severely altered in the assessment area.

Notes

NC WAM Wetland Rating Sheet
Accompanies User Manual Version 5.0

Wetland Site Name Wetland W Date of Assessment 7/30/2020
 Wetland Type Bottomland Hardwood Forest Assessor Name/Organization C. Neaves
 Notes on Field Assessment Form (Y/N) NO
 Presence of regulatory considerations (Y/N) NO
 Wetland is intensively managed (Y/N) _____
 Assessment area is located within 50 feet of a natural tributary or other open water (Y/N) YES
 Assessment area is substantially altered by beaver (Y/N) _____
 Assessment area experiences overbank flooding during normal rainfall conditions (Y/N) _____
 Assessment area is on a coastal island (Y/N) _____

Sub-function Rating Summary

Function	Sub-function	Metrics	Rating
Hydrology	Surface Storage and Retention	Condition	LOW
	Sub-surface Storage and Retention	Condition	LOW
Water Quality	Pathogen Change	Condition	MEDIUM
		Condition/Opportunity	MEDIUM
	Particulate Change	Opportunity Presence (Y/N)	NO
		Condition	LOW
	Soluble Change	Condition/Opportunity	LOW
		Opportunity Presence (Y/N)	NO
	Physical Change	Condition	MEDIUM
		Condition/Opportunity	MEDIUM
	Pollution Change	Opportunity Presence (Y/N)	NO
		Condition	LOW
	Habitat	Condition/Opportunity	LOW
		Opportunity Presence (Y/N)	NO
	Physical Structure	Condition	LOW
	Landscape Patch Structure	Condition	LOW
	Vegetation Composition	Condition	LOW

Function Rating Summary

Function	Metrics	Rating
Hydrology	Condition	LOW
Water Quality	Condition	LOW
	Condition/Opportunity	LOW
	Opportunity Presence (Y/N)	NO
Habitat	Condition	LOW

Overall Wetland Rating LOW

NC WAM FIELD ASSESSMENT FORM
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USACE AID #	SAW-2020-00047	NCDWR#	20200035
Project Name	Liberty Rock Mitigation Site	Date of Evaluation	7/30/2020
Applicant/Owner Name	Wildlands Engineering	Wetland Site Name	Wetland X
Wetland Type	Bottomland Hardwood Forest	Assessor Name/Organization	C. Neaves
Level III Ecoregion	Piedmont	Nearest Named Water Body	Rocky River
River Basin	Cape Fear	USGS 8-Digit Catalogue Unit	03030003
County	Randolph	NCDWR Region	Winston-Salem
<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	Precipitation within 48 hrs?	Latitude/Longitude (deci-degrees)	35.820211, -79.563238

Evidence of stressors affecting the assessment area (may not be within the assessment area)

Please circle and/or make note on the last page if evidence of stressors is apparent. Consider departure from reference, if appropriate, in recent past (for instance, within 10 years). Noteworthy stressors include, but are not limited to the following.

- Hydrological modifications (examples: ditches, dams, beaver dams, dikes, berms, ponds, etc.)
- Surface and sub-surface discharges into the wetland (examples: discharges containing obvious pollutants, presence of nearby septic tanks, underground storage tanks (USTs), hog lagoons, etc.)
- Signs of vegetation stress (examples: vegetation mortality, insect damage, storm damage, salt intrusion, etc.)
- Habitat/plant community alteration (examples: mowing, clear-cutting, exotics, etc.)

Is the assessment area intensively managed? Yes No

Regulatory Considerations - Were regulatory considerations evaluated? Yes No If Yes, check all that apply to the assessment area.

- Anadromous fish
- Federally protected species or State endangered or threatened species
- NCDWR riparian buffer rule in effect
- Abuts a Primary Nursery Area (PNA)
- Publicly owned property
- N.C. Division of Coastal Management Area of Environmental Concern (AEC) (including buffer)
- Abuts a stream with a NCDWQ classification of SA or supplemental classifications of HQW, ORW, or Trout
- Designated NCNHP reference community
- Abuts a 303(d)-listed stream or a tributary to a 303(d)-listed stream

What type of natural stream is associated with the wetland, if any? (check all that apply)

- Blackwater
- Brownwater
- Tidal (if tidal, check one of the following boxes) Lunar Wind Both

Is the assessment area on a coastal island? Yes No

Is the assessment area's surface water storage capacity or duration substantially altered by beaver? Yes No

Does the assessment area experience overbank flooding during normal rainfall conditions? Yes No

1. Ground Surface Condition/Vegetation Condition – assessment area condition metric

Check a box in each column. Consider alteration to the ground surface (GS) in the assessment area and vegetation structure (VS) in the assessment area. Compare to reference wetland if applicable (see User Manual). If a reference is not applicable, then rate the assessment area based on evidence an effect.

- | | | |
|---------------------------------------|---------------------------------------|--|
| GS | VS | |
| <input checked="" type="checkbox"/> A | <input type="checkbox"/> A | Not severely altered |
| <input type="checkbox"/> B | <input checked="" type="checkbox"/> B | Severely altered over a majority of the assessment area (ground surface alteration examples: vehicle tracks, excessive sedimentation, fire-plow lanes, skidder tracks, bedding, fill, soil compaction, obvious pollutants) (vegetation structure alteration examples: mechanical disturbance, herbicides, salt intrusion [where appropriate], exotic species, grazing, less diversity [if appropriate], hydrologic alteration) |

2. Surface and Sub-Surface Storage Capacity and Duration – assessment area condition metric

Check a box in each column. Consider surface storage capacity and duration (Surf) and sub-surface storage capacity and duration (Sub). Consider both increase and decrease in hydrology. A ditch ≤ 1 foot deep is considered to affect surface water only, while a ditch > 1 foot deep is expected to affect both surface and sub-surface water. Consider tidal flooding regime, if applicable.

- | | | |
|---------------------------------------|---------------------------------------|--|
| Surf | Sub | |
| <input type="checkbox"/> A | <input type="checkbox"/> A | Water storage capacity and duration are not altered. |
| <input checked="" type="checkbox"/> B | <input checked="" type="checkbox"/> B | Water storage capacity or duration are altered, but not substantially (typically, not sufficient to change vegetation). |
| <input type="checkbox"/> C | <input type="checkbox"/> C | Water storage capacity or duration are substantially altered (typically, alteration sufficient to result in vegetation change) (examples: draining, flooding, soil compaction, filling, excessive sedimentation, underground utility lines). |

3. Water Storage/Surface Relief – assessment area/wetland type condition metric (skip for all marshes)

Check a box in each column. Select the appropriate storage for the assessment area (AA) and the wetland type (WT).

- | | | |
|---------------------------------------|---------------------------------------|---|
| AA | WT | |
| 3a. <input type="checkbox"/> A | <input type="checkbox"/> A | Majority of wetland with depressions able to pond water > 1 foot deep |
| <input type="checkbox"/> B | <input type="checkbox"/> B | Majority of wetland with depressions able to pond water 6 inches to 1 foot deep |
| <input type="checkbox"/> C | <input type="checkbox"/> C | Majority of wetland with depressions able to pond water 3 to 6 inches deep |
| <input checked="" type="checkbox"/> D | <input checked="" type="checkbox"/> D | Depressions able to pond water < 3 inches deep |
| 3b. <input type="checkbox"/> A | <input type="checkbox"/> A | Evidence that maximum depth of inundation is greater than 2 feet |
| <input type="checkbox"/> B | <input type="checkbox"/> B | Evidence that maximum depth of inundation is between 1 and 2 feet |
| <input checked="" type="checkbox"/> C | <input checked="" type="checkbox"/> C | Evidence that maximum depth of inundation is less than 1 foot |

4. Soil Texture/Structure – assessment area condition metric (skip for all marshes)

Check a box from each of the three soil property groups below. Dig soil profile in the dominant assessment area landscape feature. Make soil observations within the top 12 inches. Use most recent National Technical Committee for Hydric Soils guidance for regional indicators.

- 4a. A Sandy soil
 B Loamy or clayey soils exhibiting redoximorphic features (concentrations, depletions, or rhizospheres)
 C Loamy or clayey soils not exhibiting redoximorphic features
 D Loamy or clayey gleyed soil
 E Histosol or histc epipedon
- 4b. A Soil ribbon < 1 inch
 B Soil ribbon ≥ 1 inch
- 4c. A No peat or muck presence
 B A peat or muck presence

5. Discharge into Wetland – opportunity metric

Check a box in each column. Consider surface pollutants or discharges (Surf) and sub-surface pollutants or discharges (Sub). Examples of sub-surface discharges include presence of nearby septic tank, underground storage tank (UST), etc.

- | | | |
|---------------------------------------|---------------------------------------|---|
| Surf | Sub | |
| <input type="checkbox"/> A | <input checked="" type="checkbox"/> A | Little or no evidence of pollutants or discharges entering the assessment area |
| <input checked="" type="checkbox"/> B | <input type="checkbox"/> B | Noticeable evidence of pollutants or discharges entering the wetland and stressing, but not overwhelming the treatment capacity of the assessment area |
| <input type="checkbox"/> C | <input type="checkbox"/> C | Noticeable evidence of pollutants or discharges (pathogen, particulate, or soluble) entering the assessment area and potentially overwhelming the treatment capacity of the wetland (water discoloration, dead vegetation, excessive sedimentation, odor) |

6. Land Use – opportunity metric (skip for non-riparian wetlands)

Check all that apply (at least one box in each column). Evaluation involves a GIS effort with field adjustment. Consider sources draining to assessment area within entire upstream watershed (WS), within 5 miles and within the watershed draining to the assessment area (5M), and within 2 miles and within the watershed draining to the assessment area (2M).

- | | | | |
|---------------------------------------|---------------------------------------|---------------------------------------|---|
| WS | 5M | 2M | |
| <input type="checkbox"/> A | <input type="checkbox"/> A | <input type="checkbox"/> A | ≥ 10% impervious surfaces |
| <input type="checkbox"/> B | <input type="checkbox"/> B | <input type="checkbox"/> B | Confined animal operations (or other local, concentrated source of pollutants) |
| <input checked="" type="checkbox"/> C | <input checked="" type="checkbox"/> C | <input checked="" type="checkbox"/> C | ≥ 20% coverage of pasture |
| <input type="checkbox"/> D | <input type="checkbox"/> D | <input type="checkbox"/> D | ≥ 20% coverage of agricultural land (regularly plowed land) |
| <input checked="" type="checkbox"/> E | <input checked="" type="checkbox"/> E | <input checked="" type="checkbox"/> E | ≥ 20% coverage of maintained grass/herb |
| <input type="checkbox"/> F | <input type="checkbox"/> F | <input type="checkbox"/> F | ≥ 20% coverage of clear-cut land |
| <input type="checkbox"/> G | <input type="checkbox"/> G | <input type="checkbox"/> G | Little or no opportunity to improve water quality. Lack of opportunity may result from little or no disturbance in the watershed or hydrologic alterations that prevent drainage and/or overbank flow from affecting the assessment area. |

7. Wetland Acting as Vegetated Buffer – assessment area/wetland complex condition metric (skip for non-riparian wetlands)

- 7a. Is assessment area within 50 feet of a tributary or other open water?
 Yes No If Yes, continue to 7b. If No, skip to Metric 8.
Wetland buffer need only be present on one side of the water body. Make buffer judgment based on the average width of wetland. Record a note if a portion of the buffer has been removed or disturbed.
- 7b. How much of the first 50 feet from the bank is wetland? (Wetland buffer need only be present on one side of the water body. Make buffer judgment based on the average width of wetland. Record a note if a portion of the buffer has been removed or disturbed.)
 A ≥ 50 feet
 B From 30 to < 50 feet
 C From 15 to < 30 feet
 D From 5 to < 15 feet
 E < 5 feet or buffer bypassed by ditches
- 7c. Tributary width. If the tributary is anastomosed, combine widths of channels/braids for a total width.
 ≤ 15-foot wide > 15-foot wide Other open water (no tributary present)
- 7d. Do roots of assessment area vegetation extend into the bank of the tributary/open water?
 Yes No
- 7e. Is stream or other open water sheltered or exposed?
 Sheltered – adjacent open water with width < 2500 feet and no regular boat traffic.
 Exposed – adjacent open water with width ≥ 2500 feet or regular boat traffic.

8. Wetland Width at the Assessment Area – wetland type/wetland complex condition metric (evaluate WT for all marshes and Estuarine Woody Wetland only; evaluate WC for Bottomland Hardwood Forest, Headwater Forest, and Riverine Swamp Forest only)

Check a box in each column for riverine wetlands only. Select the average width for the wetland type at the assessment area (WT) and the wetland complex at the assessment area (WC). See User Manual for WT and WC boundaries.

- | | | |
|---------------------------------------|---------------------------------------|-----------------------|
| WT | WC | |
| <input type="checkbox"/> A | <input type="checkbox"/> A | ≥ 100 feet |
| <input type="checkbox"/> B | <input type="checkbox"/> B | From 80 to < 100 feet |
| <input type="checkbox"/> C | <input type="checkbox"/> C | From 50 to < 80 feet |
| <input type="checkbox"/> D | <input type="checkbox"/> D | From 40 to < 50 feet |
| <input type="checkbox"/> E | <input type="checkbox"/> E | From 30 to < 40 feet |
| <input type="checkbox"/> F | <input type="checkbox"/> F | From 15 to < 30 feet |
| <input checked="" type="checkbox"/> G | <input checked="" type="checkbox"/> G | From 5 to < 15 feet |
| <input type="checkbox"/> H | <input type="checkbox"/> H | < 5 feet |

9. Inundation Duration – assessment area condition metric (skip for non-riparian wetlands)

Answer for assessment area dominant landform.

- A Evidence of short-duration inundation (< 7 consecutive days)
 B Evidence of saturation, without evidence of inundation
 C Evidence of long-duration inundation or very long-duration inundation (7 to 30 consecutive days or more)

10. Indicators of Deposition – assessment area condition metric (skip for non-riparian wetlands and all marshes)

Consider recent deposition only (no plant growth since deposition).

- A Sediment deposition is not excessive, but at approximately natural levels.
 B Sediment deposition is excessive, but not overwhelming the wetland.
 C Sediment deposition is excessive and is overwhelming the wetland.

11. Wetland Size – wetland type/wetland complex condition metric

Check a box in each column. Involves a GIS effort with field adjustment. This metric evaluates three aspects of the wetland area: the size of the wetland type (WT), the size of the wetland complex (WC), and the size of the forested wetland (FW) (if applicable, see User Manual). See the User Manual for boundaries of these evaluation areas. If assessment area is clear-cut, select "K" for the FW column.

- | | | |
|---------------------------------------|---------------------------------------|---|
| WT | WC | FW (if applicable) |
| <input type="checkbox"/> A | <input type="checkbox"/> A | <input type="checkbox"/> A ≥ 500 acres |
| <input type="checkbox"/> B | <input type="checkbox"/> B | <input type="checkbox"/> B From 100 to < 500 acres |
| <input type="checkbox"/> C | <input type="checkbox"/> C | <input type="checkbox"/> C From 50 to < 100 acres |
| <input type="checkbox"/> D | <input type="checkbox"/> D | <input type="checkbox"/> D From 25 to < 50 acres |
| <input type="checkbox"/> E | <input type="checkbox"/> E | <input type="checkbox"/> E From 10 to < 25 acres |
| <input type="checkbox"/> F | <input type="checkbox"/> F | <input type="checkbox"/> F From 5 to < 10 acres |
| <input type="checkbox"/> G | <input type="checkbox"/> G | <input type="checkbox"/> G From 1 to < 5 acres |
| <input type="checkbox"/> H | <input type="checkbox"/> H | <input type="checkbox"/> H From 0.5 to < 1 acre |
| <input type="checkbox"/> I | <input type="checkbox"/> I | <input type="checkbox"/> I From 0.1 to < 0.5 acre |
| <input type="checkbox"/> J | <input type="checkbox"/> J | <input type="checkbox"/> J From 0.01 to < 0.1 acre |
| <input checked="" type="checkbox"/> K | <input checked="" type="checkbox"/> K | <input checked="" type="checkbox"/> K < 0.01 acre or assessment area is clear-cut |

12. Wetland Intactness – wetland type condition metric (evaluate for Pocosins only)

- A Pocosin is the full extent (≥ 90%) of its natural landscape size.
 B Pocosin type is < 90% of the full extent of its natural landscape size.

13. Connectivity to Other Natural Areas – landscape condition metric

13a. Check appropriate box(es) (a box may be checked in each column). Involves a GIS effort with field adjustment. This metric evaluates whether the wetland is well connected (Well) and/or loosely connected (Loosely) to the landscape patch, the contiguous naturally vegetated area and open water (if appropriate). Boundaries are formed by four-lane roads, regularly maintained utility line corridors the width of a four-lane road or wider, urban landscapes, maintained fields (pasture and agriculture), or open water > 300 feet wide.

- | | | |
|---------------------------------------|----------------------------|--|
| Well | Loosely | |
| <input type="checkbox"/> A | <input type="checkbox"/> A | ≥ 500 acres |
| <input type="checkbox"/> B | <input type="checkbox"/> B | From 100 to < 500 acres |
| <input type="checkbox"/> C | <input type="checkbox"/> C | From 50 to < 100 acres |
| <input type="checkbox"/> D | <input type="checkbox"/> D | From 10 to < 50 acres |
| <input type="checkbox"/> E | <input type="checkbox"/> E | < 10 acres |
| <input checked="" type="checkbox"/> F | <input type="checkbox"/> F | Wetland type has a poor or no connection to other natural habitats |

13b. Evaluate for marshes only.

- Yes No Wetland type has a surface hydrology connection to open waters/stream or tidal wetlands.

14. Edge Effect – wetland type condition metric (skip for all marshes and Estuarine Woody Wetland)

May involve a GIS effort with field adjustment. Estimate distance from wetland type boundary to artificial edges. Artificial edges include non-forested areas ≥ 40 feet wide such as fields, development, roads, regularly maintained utility line corridors, and clear-cuts. Consider the eight main points of the compass. Artificial edge occurs within 150 feet in how many directions? If the assessment area is clear cut, select option "C."

- A 0
 B 1 to 4
 C 5 to 8

15. Vegetative Composition – assessment area condition metric (skip for all marshes and Pine Flat)

- A Vegetation is close to reference condition in species present and their proportions. Lower strata composed of appropriate species, with exotic plants absent or sparse within the assessment area.
 B Vegetation is different from reference condition in species diversity or proportions, but still largely composed of native species characteristic of the wetland type. This may include communities of weedy native species that develop after clearcutting or clearing. It also includes communities with exotics present, but not dominant, over a large portion of the expected strata.
 C Vegetation severely altered from reference in composition, or expected species are unnaturally absent (planted stands of non-characteristic species or at least one stratum inappropriately composed of a single species), or exotic species are dominant in at least one stratum.

16. Vegetative Diversity – assessment area condition metric (evaluate for Non-tidal Freshwater Marsh only)

- A Vegetation diversity is high and is composed primarily of native species (< 10% cover of exotics).
 B Vegetation diversity is low or has > 10% to 50% cover of exotics.
 C Vegetation is dominated by exotic species (> 50 % cover of exotics).

17. Vegetative Structure – assessment area/wetland type condition metric

17a. Is vegetation present?

Yes No If Yes, continue to 17b. If No, skip to Metric 18.

17b. Evaluate percent coverage of assessment area vegetation for all marshes only. Skip to 17c for non-marsh wetlands.

A ≥ 25% coverage of vegetation
 B < 25% coverage of vegetation

17c. Check a box in each column for each stratum. Evaluate this portion of the metric for non-marsh wetlands. Consider structure in airspace above the assessment area (AA) and the wetland type (WT) separately.

	AA	WT	
Canopy	<input type="checkbox"/> A	<input type="checkbox"/> A	Canopy closed, or nearly closed, with natural gaps associated with natural processes
	<input type="checkbox"/> B	<input type="checkbox"/> B	Canopy present, but opened more than natural gaps
	<input checked="" type="checkbox"/> C	<input checked="" type="checkbox"/> C	Canopy sparse or absent
Mid-Story	<input type="checkbox"/> A	<input type="checkbox"/> A	Dense mid-story/sapling layer
	<input type="checkbox"/> B	<input type="checkbox"/> B	Moderate density mid-story/sapling layer
	<input checked="" type="checkbox"/> C	<input checked="" type="checkbox"/> C	Mid-story/sapling layer sparse or absent
Shrub	<input type="checkbox"/> A	<input type="checkbox"/> A	Dense shrub layer
	<input type="checkbox"/> B	<input type="checkbox"/> B	Moderate density shrub layer
	<input checked="" type="checkbox"/> C	<input checked="" type="checkbox"/> C	Shrub layer sparse or absent
Herb	<input checked="" type="checkbox"/> A	<input checked="" type="checkbox"/> A	Dense herb layer
	<input type="checkbox"/> B	<input type="checkbox"/> B	Moderate density herb layer
	<input type="checkbox"/> C	<input type="checkbox"/> C	Herb layer sparse or absent

18. Snags – wetland type condition metric (skip for all marshes)

A Large snags (more than one) are visible (> 12 inches DBH, or large relative to species present and landscape stability).
 B Not A

19. Diameter Class Distribution – wetland type condition metric (skip for all marshes)

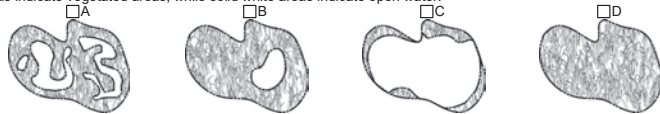
A Majority of canopy trees have stems > 6 inches in diameter at breast height (DBH); many large trees (> 12 inches DBH) are present.
 B Majority of canopy trees have stems between 6 and 12 inches DBH, few are > 12 inch DBH.
 C Majority of canopy trees are < 6 inches DBH or no trees.

20. Large Woody Debris – wetland type condition metric (skip for all marshes)

Include both natural debris and man-placed natural debris.
 A Large logs (more than one) are visible (> 12 inches in diameter, or large relative to species present and landscape stability).
 B Not A

21. Vegetation/Open Water Dispersion – wetland type/open water condition metric (evaluate for Non-Tidal Freshwater Marsh only)

Select the figure that best describes the amount of interspersed vegetation and open water in the growing season. Patterned areas indicate vegetated areas, while solid white areas indicate open water.



22. Hydrologic Connectivity – assessment area condition metric (evaluate for riparian wetlands and Salt/Brackish Marsh only)

Examples of activities that may severely alter hydrologic connectivity include intensive ditching, fill, sedimentation, channelization, diversion, man-made berms, beaver dams, and stream incision. Documentation required if evaluated as B, C, or D.

A Overbank and overland flow are not severely altered in the assessment area.
 B Overbank flow is severely altered in the assessment area.
 C Overland flow is severely altered in the assessment area.
 D Both overbank and overland flow are severely altered in the assessment area.

Notes

NC WAM Wetland Rating Sheet
 Accompanies User Manual Version 5.0

Wetland Site Name Wetland X Date of Assessment 7/30/2020
 Wetland Type Bottomland Hardwood Forest Assessor Name/Organization C. Neaves

Notes on Field Assessment Form (Y/N) NO
 Presence of regulatory considerations (Y/N) NO
 Wetland is intensively managed (Y/N) _____
 Assessment area is located within 50 feet of a natural tributary or other open water (Y/N) NO
 Assessment area is substantially altered by beaver (Y/N) _____
 Assessment area experiences overbank flooding during normal rainfall conditions (Y/N) _____
 Assessment area is on a coastal island (Y/N) _____

Sub-function Rating Summary

Function	Sub-function	Metrics	Rating
Hydrology	Surface Storage and Retention	Condition	LOW
		Sub-surface Storage and Retention	Condition
Water Quality	Pathogen Change	Condition	MEDIUM
		Condition/Opportunity	MEDIUM
	Particulate Change	Opportunity Presence (Y/N)	NO
		Condition	LOW
Soluble Change	Condition	Condition/Opportunity	LOW
		Opportunity Presence (Y/N)	NO
	Physical Change	Condition	MEDIUM
		Condition/Opportunity	MEDIUM
Pollution Change	Condition	Opportunity Presence (Y/N)	NO
		Condition	LOW
	Opportunity Presence (Y/N)	Condition	NA
		Condition/Opportunity	NA
Habitat	Physical Structure	Opportunity Presence (Y/N)	NA
		Condition	LOW
	Landscape Patch Structure	Condition	LOW
	Vegetation Composition	Condition	LOW

Function Rating Summary

Function	Metrics	Rating
Hydrology	Condition	LOW
	Water Quality	Condition
	Condition/Opportunity	LOW
	Opportunity Presence (Y/N)	NO
Habitat	Condition	LOW

Overall Wetland Rating LOW

NC WAM FIELD ASSESSMENT FORM
Accompanies User Manual Version 5.0

USACE AID #	SAW-2020-00047	NCDWR#	20200035
Project Name	Liberty Rock Mitigation Site	Date of Evaluation	7/30/2020
Applicant/Owner Name	Wildlands Engineering	Wetland Site Name	Wetland Y
Wetland Type	Bottomland Hardwood Forest	Assessor Name/Organization	C. Neaves
Level III Ecoregion	Piedmont	Nearest Named Water Body	Rocky River
River Basin	Cape Fear	USGS 8-Digit Catalogue Unit	03030003
County	Randolph	NCDWR Region	Winston-Salem
<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	Precipitation within 48 hrs?	Latitude/Longitude (deci-degrees)	35.820070, -79.562969

Evidence of stressors affecting the assessment area (may not be within the assessment area)

Please circle and/or make note on the last page if evidence of stressors is apparent. Consider departure from reference, if appropriate, in recent past (for instance, within 10 years). Noteworthy stressors include, but are not limited to the following.

- Hydrological modifications (examples: ditches, dams, beaver dams, dikes, berms, ponds, etc.)
- Surface and sub-surface discharges into the wetland (examples: discharges containing obvious pollutants, presence of nearby septic tanks, underground storage tanks (USTs), hog lagoons, etc.)
- Signs of vegetation stress (examples: vegetation mortality, insect damage, disease, storm damage, salt intrusion, etc.)
- Habitat/plant community alteration (examples: mowing, clear-cutting, exotics, etc.)

Is the assessment area intensively managed? Yes No

Regulatory Considerations - Were regulatory considerations evaluated? Yes No If Yes, check all that apply to the assessment area.

- Anadromous fish
- Federally protected species or State endangered or threatened species
- NCDWR riparian buffer rule in effect
- Abuts a Primary Nursery Area (PNA)
- Publicly owned property
- N.C. Division of Coastal Management Area of Environmental Concern (AEC) (including buffer)
- Abuts a stream with a NCDWQ classification of SA or supplemental classifications of HQW, ORW, or Trout
- Designated NCNHP reference community
- Abuts a 303(d)-listed stream or a tributary to a 303(d)-listed stream

What type of natural stream is associated with the wetland, if any? (check all that apply)

- Blackwater
- Brownwater
- Tidal (if tidal, check one of the following boxes) Lunar Wind Both

Is the assessment area on a coastal island? Yes No

Is the assessment area's surface water storage capacity or duration substantially altered by beaver? Yes No

Does the assessment area experience overbank flooding during normal rainfall conditions? Yes No

1. Ground Surface Condition/Vegetation Condition – assessment area condition metric

Check a box in each column. Consider alteration to the ground surface (GS) in the assessment area and vegetation structure (VS) in the assessment area. Compare to reference wetland if applicable (see User Manual). If a reference is not applicable, then rate the assessment area based on evidence an effect.

- | | | |
|---------------------------------------|---------------------------------------|--|
| GS | VS | |
| <input checked="" type="checkbox"/> A | <input type="checkbox"/> A | Not severely altered |
| <input type="checkbox"/> B | <input checked="" type="checkbox"/> B | Severely altered over a majority of the assessment area (ground surface alteration examples: vehicle tracks, excessive sedimentation, fire-plow lanes, skidder tracks, bedding, fill, soil compaction, obvious pollutants) (vegetation structure alteration examples: mechanical disturbance, herbicides, salt intrusion [where appropriate], exotic species, grazing, less diversity [if appropriate], hydrologic alteration) |

2. Surface and Sub-Surface Storage Capacity and Duration – assessment area condition metric

Check a box in each column. Consider surface storage capacity and duration (Surf) and sub-surface storage capacity and duration (Sub). Consider both increase and decrease in hydrology. A ditch ≤ 1 foot deep is considered to affect surface water only, while a ditch > 1 foot deep is expected to affect both surface and sub-surface water. Consider tidal flooding regime, if applicable.

- | | | |
|---------------------------------------|---------------------------------------|--|
| Surf | Sub | |
| <input type="checkbox"/> A | <input type="checkbox"/> A | Water storage capacity and duration are not altered. |
| <input checked="" type="checkbox"/> B | <input checked="" type="checkbox"/> B | Water storage capacity or duration are altered, but not substantially (typically, not sufficient to change vegetation). |
| <input type="checkbox"/> C | <input type="checkbox"/> C | Water storage capacity or duration are substantially altered (typically, alteration sufficient to result in vegetation change) (examples: draining, flooding, soil compaction, filling, excessive sedimentation, underground utility lines). |

3. Water Storage/Surface Relief – assessment area/wetland type condition metric (skip for all marshes)

Check a box in each column. Select the appropriate storage for the assessment area (AA) and the wetland type (WT).

- | | | |
|---------------------------------------|---------------------------------------|---|
| AA | WT | |
| 3a. <input type="checkbox"/> A | <input type="checkbox"/> A | Majority of wetland with depressions able to pond water > 1 deep |
| <input type="checkbox"/> B | <input type="checkbox"/> B | Majority of wetland with depressions able to pond water 6 inches to 1 foot deep |
| <input type="checkbox"/> C | <input type="checkbox"/> C | Majority of wetland with depressions able to pond water 3 to 6 inches deep |
| <input checked="" type="checkbox"/> D | <input checked="" type="checkbox"/> D | Depressions able to pond water < 3 inches deep |
| 3b. <input type="checkbox"/> A | | Evidence that maximum depth of inundation is greater than 2 feet |
| <input type="checkbox"/> B | | Evidence that maximum depth of inundation is between 1 and 2 feet |
| <input checked="" type="checkbox"/> C | | Evidence that maximum depth of inundation is less than 1 foot |

4. Soil Texture/Structure – assessment area condition metric (skip for all marshes)

Check a box from each of the three soil property groups below. Dig soil profile in the dominant assessment area landscape feature. Make soil observations within the top 12 inches. Use most recent National Technical Committee for Hydric Soils guidance for regional indicators.

- 4a. A Sandy soil
- B Loamy or clayey soils exhibiting redoximorphic features (concentrations, depletions, or rhizospheres)
- C Loamy or clayey soils not exhibiting redoximorphic features
- D Loamy or clayey gleyed soil
- E Histosol or histc epipedon
- 4b. A Soil ribbon < 1 inch
- B Soil ribbon ≥ 1 inch
- 4c. A No peat or muck presence
- B A peat or muck presence

5. Discharge into Wetland – opportunity metric

Check a box in each column. Consider surface pollutants or discharges (Surf) and sub-surface pollutants or discharges (Sub). Examples of sub-surface discharges include presence of nearby septic tank, underground storage tank (UST), etc.

- | | | |
|---------------------------------------|---------------------------------------|---|
| Surf | Sub | |
| <input type="checkbox"/> A | <input checked="" type="checkbox"/> A | Little or no evidence of pollutants or discharges entering the assessment area |
| <input checked="" type="checkbox"/> B | <input type="checkbox"/> B | Noticeable evidence of pollutants or discharges entering the wetland and stressing, but not overwhelming the treatment capacity of the assessment area |
| <input type="checkbox"/> C | <input type="checkbox"/> C | Noticeable evidence of pollutants or discharges (pathogen, particulate, or soluble) entering the assessment area and potentially overwhelming the treatment capacity of the wetland (water discoloration, dead vegetation, excessive sedimentation, odor) |

6. Land Use – opportunity metric (skip for non-riparian wetlands)

Check all that apply (at least one box in each column). Evaluation involves a GIS effort with field adjustment. Consider sources draining to assessment area within entire upstream watershed (WS), within 5 miles and within the watershed draining to the assessment area (5M), and within 2 miles and within the watershed draining to the assessment area (2M).

- | | | | |
|---------------------------------------|---------------------------------------|---------------------------------------|---|
| WS | 5M | 2M | |
| <input type="checkbox"/> A | <input type="checkbox"/> A | <input type="checkbox"/> A | ≥ 10% impervious surfaces |
| <input type="checkbox"/> B | <input type="checkbox"/> B | <input type="checkbox"/> B | Confined animal operations (or other local, concentrated source of pollutants) |
| <input checked="" type="checkbox"/> C | <input checked="" type="checkbox"/> C | <input checked="" type="checkbox"/> C | ≥ 20% coverage of pasture |
| <input type="checkbox"/> D | <input type="checkbox"/> D | <input type="checkbox"/> D | ≥ 20% coverage of agricultural land (regularly plowed land) |
| <input checked="" type="checkbox"/> E | <input checked="" type="checkbox"/> E | <input checked="" type="checkbox"/> E | ≥ 20% coverage of maintained grass/herb |
| <input type="checkbox"/> F | <input type="checkbox"/> F | <input type="checkbox"/> F | ≥ 20% coverage of clear-cut land |
| <input type="checkbox"/> G | <input type="checkbox"/> G | <input type="checkbox"/> G | Little or no opportunity to improve water quality. Lack of opportunity may result from little or no disturbance in the watershed or hydrologic alterations that prevent drainage and/or overbank flow from affecting the assessment area. |

7. Wetland Acting as Vegetated Buffer – assessment area/wetland complex condition metric (skip for non-riparian wetlands)

- 7a. Is assessment area within 50 feet of a tributary or other open water?
 Yes No If Yes, continue to 7b. If No, skip to Metric 8.
 Wetland buffer need only be present on one side of the water body. Make buffer judgment based on the average width of wetland. Record a note if a portion of the buffer has been removed or disturbed.
- 7b. How much of the first 50 feet from the bank is wetland? (Wetland buffer need only be present on one side of the water body. Make buffer judgment based on the average width of wetland. Record a note if a portion of the buffer has been removed or disturbed.)
- A ≥ 50 feet
- B From 30 to < 50 feet
- C From 15 to < 30 feet
- D From 5 to < 15 feet
- E < 5 feet or buffer bypassed by ditches
- 7c. Tributary width. If the tributary is anastomosed, combine widths of channels/braids for a total width.
 ≤ 15-foot wide > 15-foot wide Other open water (no tributary present)
- 7d. Do roots of assessment area vegetation extend into the bank of the tributary/open water?
 Yes No
- 7e. Is stream or other open water sheltered or exposed?
 Sheltered – adjacent open water with width < 2500 feet and no regular boat traffic.
 Exposed – adjacent open water with width ≥ 2500 feet or regular boat traffic.

8. Wetland Width at the Assessment Area – wetland type/wetland complex condition metric (evaluate WT for all marshes and Estuarine Woody Wetland only; evaluate WC for Bottomland Hardwood Forest, Headwater Forest, and Riverine Swamp Forest only)

Check a box in each column for riverine wetlands only. Select the average width for the wetland type at the assessment area (WT) and the wetland complex at the assessment area (WC). See User Manual for WT and WC boundaries.

- | | | |
|---------------------------------------|---------------------------------------|-----------------------|
| WT | WC | |
| <input type="checkbox"/> A | <input type="checkbox"/> A | ≥ 100 feet |
| <input type="checkbox"/> B | <input type="checkbox"/> B | From 80 to < 100 feet |
| <input type="checkbox"/> C | <input type="checkbox"/> C | From 50 to < 80 feet |
| <input type="checkbox"/> D | <input type="checkbox"/> D | From 40 to < 50 feet |
| <input type="checkbox"/> E | <input type="checkbox"/> E | From 30 to < 40 feet |
| <input type="checkbox"/> F | <input type="checkbox"/> F | From 15 to < 30 feet |
| <input checked="" type="checkbox"/> G | <input checked="" type="checkbox"/> G | From 5 to < 15 feet |
| <input type="checkbox"/> H | <input type="checkbox"/> H | < 5 feet |

9. **Inundation Duration – assessment area condition metric (skip for non-riparian wetlands)**

Answer for assessment area dominant landform.

- A Evidence of short-duration inundation (< 7 consecutive days)
B Evidence of saturation, without evidence of inundation
C Evidence of long-duration inundation or very long-duration inundation (7 to 30 consecutive days or more)

10. **Indicators of Deposition – assessment area condition metric (skip for non-riparian wetlands and all marshes)**

Consider recent deposition only (no plant growth since deposition).

- A Sediment deposition is not excessive, but at approximately natural levels.
B Sediment deposition is excessive, but not overwhelming the wetland.
C Sediment deposition is excessive and is overwhelming the wetland.

11. **Wetland Size – wetland type/wetland complex condition metric**

Check a box in each column. Involves a GIS effort with field adjustment. This metric evaluates three aspects of the wetland area: the size of the wetland type (WT), the size of the wetland complex (WC), and the size of the forested wetland (FW) (if applicable, see User Manual). See the User Manual for boundaries of these evaluation areas. If assessment area is clear-cut, select "K" for the FW column.

- | | | |
|---------------------------------------|---------------------------------------|--|
| WT | WC | FW (if applicable) |
| <input type="checkbox"/> A | <input type="checkbox"/> A | <input type="checkbox"/> A ≥ 500 acres |
| <input type="checkbox"/> B | <input type="checkbox"/> B | <input type="checkbox"/> B From 100 to < 500 acres |
| <input type="checkbox"/> C | <input type="checkbox"/> C | <input type="checkbox"/> C From 50 to < 100 acres |
| <input type="checkbox"/> D | <input type="checkbox"/> D | <input type="checkbox"/> D From 25 to < 50 acres |
| <input type="checkbox"/> E | <input type="checkbox"/> E | <input type="checkbox"/> E From 10 to < 25 acres |
| <input type="checkbox"/> F | <input type="checkbox"/> F | <input type="checkbox"/> F From 5 to < 10 acres |
| <input type="checkbox"/> G | <input type="checkbox"/> G | <input type="checkbox"/> G From 1 to < 5 acres |
| <input type="checkbox"/> H | <input type="checkbox"/> H | <input type="checkbox"/> H From 0.5 to < 1 acre |
| <input type="checkbox"/> I | <input type="checkbox"/> I | <input type="checkbox"/> I From 0.1 to < 0.5 acre |
| <input type="checkbox"/> J | <input type="checkbox"/> J | <input type="checkbox"/> J From 0.01 to < 0.1 acre |
| <input checked="" type="checkbox"/> K | <input checked="" type="checkbox"/> K | <input checked="" type="checkbox"/> K < 0.01 acre <u>or</u> assessment area is clear-cut |

12. **Wetland Intactness – wetland type condition metric (evaluate for Pocosins only)**

- A Pocosin is the full extent (≥ 90%) of its natural landscape size.
B Pocosin type is < 90% of the full extent of its natural landscape size.

13. **Connectivity to Other Natural Areas – landscape condition metric**

13a. **Check appropriate box(es) (a box may be checked in each column).** Involves a GIS effort with field adjustment. This metric evaluates whether the wetland is well connected (Well) and/or loosely connected (Loosely) to the landscape patch, the contiguous naturally vegetated area and open water (if appropriate). Boundaries are formed by four-lane roads, regularly maintained utility line corridors the width of a four-lane road or wider, urban landscapes, maintained fields (pasture and agriculture), or open water > 300 feet wide.

- | | |
|---------------------------------------|---|
| Well | Loosely |
| <input type="checkbox"/> A | <input type="checkbox"/> A ≥ 500 acres |
| <input type="checkbox"/> B | <input type="checkbox"/> B From 100 to < 500 acres |
| <input type="checkbox"/> C | <input type="checkbox"/> C From 50 to < 100 acres |
| <input type="checkbox"/> D | <input type="checkbox"/> D From 10 to < 50 acres |
| <input type="checkbox"/> E | <input type="checkbox"/> E < 10 acres |
| <input checked="" type="checkbox"/> F | <input type="checkbox"/> F Wetland type has a poor or no connection to other natural habitats |

13b. **Evaluate for marshes only.**

- Yes No Wetland type has a surface hydrology connection to open waters/stream or tidal wetlands.

14. **Edge Effect – wetland type condition metric (skip for all marshes and Estuarine Woody Wetland)**

May involve a GIS effort with field adjustment. Estimate distance from wetland type boundary to artificial edges. Artificial edges include non-forested areas ≥ 40 feet wide such as fields, development, roads, regularly maintained utility line corridors, and clear-cuts. Consider the eight main points of the compass. Artificial edge occurs within 150 feet in how many directions? If the assessment area is clear cut, select option "C."

- A 0
B 1 to 4
C 5 to 8

15. **Vegetative Composition – assessment area condition metric (skip for all marshes and Pine Flat)**

- A Vegetation is close to reference condition in species present and their proportions. Lower strata composed of appropriate species, with exotic plants absent or sparse within the assessment area.
B Vegetation is different from reference condition in species diversity or proportions, but still largely composed of native species characteristic of the wetland type. This may include communities of weedy native species that develop after clearcutting or clearing. It also includes communities with exotics present, but not dominant, over a large portion of the expected strata.
C Vegetation severely altered from reference in composition, or expected species are unnaturally absent (planted stands of non-characteristic species or at least one stratum inappropriately composed of a single species), or exotic species are dominant in at least one stratum.

16. **Vegetative Diversity – assessment area condition metric (evaluate for Non-tidal Freshwater Marsh only)**

- A Vegetation diversity is high and is composed primarily of native species (< 10% cover of exotics).
B Vegetation diversity is low or has > 10% to 50% cover of exotics.
C Vegetation is dominated by exotic species (> 50 % cover of exotics).

17. **Vegetative Structure – assessment area/wetland type condition metric**

17a. Is vegetation present?

- Yes No If Yes, continue to 17b. If No, skip to Metric 18.

17b. Evaluate percent coverage of assessment area vegetation for all marshes only. Skip to 17c for non-marsh wetlands.

- A ≥ 25% coverage of vegetation
B < 25% coverage of vegetation

17c. **Check a box in each column for each stratum.** Evaluate this portion of the metric for non-marsh wetlands. Consider structure in airspace above the assessment area (AA) and the wetland type (WT) separately.

- | | | | |
|-----------|---------------------------------------|---------------------------------------|--|
| | AA | WT | |
| Canopy | <input type="checkbox"/> A | <input type="checkbox"/> A | Canopy closed, or nearly closed, with natural gaps associated with natural processes |
| | <input type="checkbox"/> B | <input type="checkbox"/> B | Canopy present, but opened more than natural gaps |
| | <input checked="" type="checkbox"/> C | <input checked="" type="checkbox"/> C | Canopy sparse or absent |
| Mid-Story | <input type="checkbox"/> A | <input type="checkbox"/> A | Dense mid-story/sapling layer |
| | <input type="checkbox"/> B | <input type="checkbox"/> B | Moderate density mid-story/sapling layer |
| | <input checked="" type="checkbox"/> C | <input checked="" type="checkbox"/> C | Mid-story/sapling layer sparse or absent |
| Shrub | <input type="checkbox"/> A | <input type="checkbox"/> A | Dense shrub layer |
| | <input type="checkbox"/> B | <input type="checkbox"/> B | Moderate density shrub layer |
| | <input checked="" type="checkbox"/> C | <input checked="" type="checkbox"/> C | Shrub layer sparse or absent |
| Herb | <input checked="" type="checkbox"/> A | <input checked="" type="checkbox"/> A | Dense herb layer |
| | <input type="checkbox"/> B | <input type="checkbox"/> B | Moderate density herb layer |
| | <input type="checkbox"/> C | <input type="checkbox"/> C | Herb layer sparse or absent |

18. **Snags – wetland type condition metric (skip for all marshes)**

- A Large snags (more than one) are visible (> 12 inches DBH, or large relative to species present and landscape stability).
B Not A

19. **Diameter Class Distribution – wetland type condition metric (skip for all marshes)**

- A Majority of canopy trees have stems > 6 inches in diameter at breast height (DBH); many large trees (> 12 inches DBH) are present.
B Majority of canopy trees have stems between 6 and 12 inches DBH, few are > 12 inch DBH.
C Majority of canopy trees are < 6 inches DBH or no trees.

20. **Large Woody Debris – wetland type condition metric (skip for all marshes)**

Include both natural debris and man-placed natural debris.

- A Large logs (more than one) are visible (> 12 inches in diameter, or large relative to species present and landscape stability).
B Not A

21. **Vegetation/Open Water Dispersion – wetland type/open water condition metric (evaluate for Non-Tidal Freshwater Marsh only)**

Select the figure that best describes the amount of interspersed between vegetation and open water in the growing season. Patterned areas indicate vegetated areas, while solid white areas indicate open water.



22. **Hydrologic Connectivity – assessment area condition metric (evaluate for riparian wetlands and Salt/Brackish Marsh only)**

Examples of activities that may severely alter hydrologic connectivity include intensive ditching, fill, sedimentation, channelization, diversion, man-made berms, beaver dams, and stream incision. Documentation required if evaluated as B, C, or D.

- A Overbank and overland flow are not severely altered in the assessment area.
B Overbank flow is severely altered in the assessment area.
C Overland flow is severely altered in the assessment area.
D Both overbank and overland flow are severely altered in the assessment area.

Notes

NC WAM Wetland Rating Sheet
Accompanies User Manual Version 5.0

Wetland Site Name Wetland Y Date of Assessment 7/30/2020
 Wetland Type Bottomland Hardwood Forest Assessor Name/Organization C. Neaves
 Notes on Field Assessment Form (Y/N) NO
 Presence of regulatory considerations (Y/N) NO
 Wetland is intensively managed (Y/N) _____
 Assessment area is located within 50 feet of a natural tributary or other open water (Y/N) YES
 Assessment area is substantially altered by beaver (Y/N) _____
 Assessment area experiences overbank flooding during normal rainfall conditions (Y/N) _____
 Assessment area is on a coastal island (Y/N) _____

Sub-function Rating Summary

Function	Sub-function	Metrics	Rating
Hydrology	Surface Storage and Retention	Condition	LOW
	Sub-surface Storage and Retention	Condition	LOW
Water Quality	Pathogen Change	Condition	MEDIUM
		Condition/Opportunity	MEDIUM
	Particulate Change	Opportunity Presence (Y/N)	NO
		Condition	LOW
	Soluble Change	Condition/Opportunity	LOW
		Opportunity Presence (Y/N)	NO
	Physical Change	Condition	MEDIUM
		Condition/Opportunity	MEDIUM
	Pollution Change	Opportunity Presence (Y/N)	NO
		Condition	LOW
	Habitat	Condition/Opportunity	LOW
		Opportunity Presence (Y/N)	NO
	Physical Structure	Condition	LOW
	Landscape Patch Structure	Condition	LOW
	Vegetation Composition	Condition	LOW

Function Rating Summary

Function	Metrics	Rating
Hydrology	Condition	LOW
Water Quality	Condition	LOW
	Condition/Opportunity	LOW
	Opportunity Presence (Y/N)	NO
Habitat	Condition	LOW

Overall Wetland Rating LOW

NC WAM FIELD ASSESSMENT FORM
Accompanies User Manual Version 5.0

USACE AID #	SAW-2020-00047	NCDWR#	20200035
Project Name	Liberty Rock Mitigation Site	Date of Evaluation	7/30/2020
Applicant/Owner Name	Wildlands Engineering	Wetland Site Name	Wetland Z
Wetland Type	Bottomland Hardwood Forest	Assessor Name/Organization	C. Neaves
Level III Ecoregion	Piedmont	Nearest Named Water Body	Rocky River
River Basin	Cape Fear	USGS 8-Digit Catalogue Unit	03030003
County	Randolph	NCDWR Region	Winston-Salem
<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	Precipitation within 48 hrs?	Latitude/Longitude (deci-degrees)	35.820109, -79.563388

Evidence of stressors affecting the assessment area (may not be within the assessment area)
 Please circle and/or make note on the last page if evidence of stressors is apparent. Consider departure from reference, if appropriate, in recent past (for instance, within 10 years). Noteworthy stressors include, but are not limited to the following.

- Hydrological modifications (examples: ditches, dams, beaver dams, dikes, berms, ponds, etc.)
- Surface and sub-surface discharges into the wetland (examples: discharges containing obvious pollutants, presence of nearby septic tanks, underground storage tanks (USTs), hog lagoons, etc.)
- Signs of vegetation stress (examples: vegetation mortality, insect damage, storm damage, disease, salt intrusion, etc.)
- Habitat/plant community alteration (examples: mowing, clear-cutting, exotics, etc.)

Is the assessment area intensively managed? Yes No

Regulatory Considerations - Were regulatory considerations evaluated? Yes No If Yes, check all that apply to the assessment area.

- Anadromous fish
- Federally protected species or State endangered or threatened species
- NCDWR riparian buffer rule in effect
- Abuts a Primary Nursery Area (PNA)
- Publicly owned property
- N.C. Division of Coastal Management Area of Environmental Concern (AEC) (including buffer)
- Abuts a stream with a NCDWQ classification of SA or supplemental classifications of HQW, ORW, or Trout
- Designated NCNHP reference community
- Abuts a 303(d)-listed stream or a tributary to a 303(d)-listed stream

What type of natural stream is associated with the wetland, if any? (check all that apply)

- Blackwater
- Brownwater
- Tidal (if tidal, check one of the following boxes) Lunar Wind Both

Is the assessment area on a coastal island? Yes No

Is the assessment area's surface water storage capacity or duration substantially altered by beaver? Yes No

Does the assessment area experience overbank flooding during normal rainfall conditions? Yes No

- Ground Surface Condition/Vegetation Condition – assessment area condition metric**
Check a box in each column. Consider alteration to the ground surface (GS) in the assessment area and vegetation structure (VS) in the assessment area. Compare to reference wetland if applicable (see User Manual). If a reference is not applicable, then rate the assessment area based on evidence an effect.

GS	VS	
<input checked="" type="checkbox"/> A	<input type="checkbox"/> A	Not severely altered
<input type="checkbox"/> B	<input checked="" type="checkbox"/> B	Severely altered over a majority of the assessment area (ground surface alteration examples: vehicle tracks, excessive sedimentation, fire-plow lanes, skidder tracks, bedding, fill, soil compaction, obvious pollutants) (vegetation structure alteration examples: mechanical disturbance, herbicides, salt intrusion [where appropriate], exotic species, grazing, less diversity [if appropriate], hydrologic alteration)
- Surface and Sub-Surface Storage Capacity and Duration – assessment area condition metric**
Check a box in each column. Consider surface storage capacity and duration (Surf) and sub-surface storage capacity and duration (Sub). Consider both increase and decrease in hydrology. A ditch ≤ 1 foot deep is considered to affect surface water only, while a ditch > 1 foot deep is expected to affect both surface and sub-surface water. Consider tidal flooding regime, if applicable.

Surf	Sub	
<input type="checkbox"/> A	<input type="checkbox"/> A	Water storage capacity and duration are not altered.
<input checked="" type="checkbox"/> B	<input checked="" type="checkbox"/> B	Water storage capacity or duration are altered, but not substantially (typically, not sufficient to change vegetation).
<input type="checkbox"/> C	<input type="checkbox"/> C	Water storage capacity or duration are substantially altered (typically, alteration sufficient to result in vegetation change) (examples: draining, flooding, soil compaction, filling, excessive sedimentation, underground utility lines).
- Water Storage/Surface Relief – assessment area/wetland type condition metric (skip for all marshes)**
Check a box in each column. Select the appropriate storage for the assessment area (AA) and the wetland type (WT).

AA	WT	
3a. <input type="checkbox"/> A <input type="checkbox"/> A		Majority of wetland with depressions able to pond water > 1 foot deep
<input type="checkbox"/> B <input type="checkbox"/> B		Majority of wetland with depressions able to pond water 6 inches to 1 foot deep
<input type="checkbox"/> C <input type="checkbox"/> C		Majority of wetland with depressions able to pond water 3 to 6 inches deep
<input checked="" type="checkbox"/> D <input checked="" type="checkbox"/> D		Depressions able to pond water < 3 inches deep
3b. <input type="checkbox"/> A	<input type="checkbox"/> A	Evidence that maximum depth of inundation is greater than 2 feet
<input type="checkbox"/> B	<input type="checkbox"/> B	Evidence that maximum depth of inundation is between 1 and 2 feet
<input checked="" type="checkbox"/> C	<input checked="" type="checkbox"/> C	Evidence that maximum depth of inundation is less than 1 foot

4. Soil Texture/Structure – assessment area condition metric (skip for all marshes)

Check a box from each of the three soil property groups below. Dig soil profile in the dominant assessment area landscape feature. Make soil observations within the top 12 inches. Use most recent National Technical Committee for Hydric Soils guidance for regional indicators.

- 4a. A Sandy soil
 B Loamy or clayey soils exhibiting redoximorphic features (concentrations, depletions, or rhizospheres)
 C Loamy or clayey soils not exhibiting redoximorphic features
 D Loamy or clayey gleyed soil
 E Histosol or histc epipedon
- 4b. A Soil ribbon < 1 inch
 B Soil ribbon ≥ 1 inch
- 4c. A No peat or muck presence
 B A peat or muck presence

5. Discharge into Wetland – opportunity metric

Check a box in each column. Consider surface pollutants or discharges (Surf) and sub-surface pollutants or discharges (Sub). Examples of sub-surface discharges include presence of nearby septic tank, underground storage tank (UST), etc.

- | | | |
|---------------------------------------|---------------------------------------|---|
| Surf | Sub | |
| <input type="checkbox"/> A | <input checked="" type="checkbox"/> A | Little or no evidence of pollutants or discharges entering the assessment area |
| <input checked="" type="checkbox"/> B | <input type="checkbox"/> B | Noticeable evidence of pollutants or discharges entering the wetland and stressing, but not overwhelming the treatment capacity of the assessment area |
| <input type="checkbox"/> C | <input type="checkbox"/> C | Noticeable evidence of pollutants or discharges (pathogen, particulate, or soluble) entering the assessment area and potentially overwhelming the treatment capacity of the wetland (water discoloration, dead vegetation, excessive sedimentation, odor) |

6. Land Use – opportunity metric (skip for non-riparian wetlands)

Check all that apply (at least one box in each column). Evaluation involves a GIS effort with field adjustment. Consider sources draining to assessment area within entire upstream watershed (WS), within 5 miles and within the watershed draining to the assessment area (5M), and within 2 miles and within the watershed draining to the assessment area (2M).

- | | | | |
|---------------------------------------|---------------------------------------|---------------------------------------|---|
| WS | 5M | 2M | |
| <input type="checkbox"/> A | <input type="checkbox"/> A | <input type="checkbox"/> A | ≥ 10% impervious surfaces |
| <input type="checkbox"/> B | <input type="checkbox"/> B | <input type="checkbox"/> B | Confined animal operations (or other local, concentrated source of pollutants) |
| <input checked="" type="checkbox"/> C | <input checked="" type="checkbox"/> C | <input checked="" type="checkbox"/> C | ≥ 20% coverage of pasture |
| <input type="checkbox"/> D | <input type="checkbox"/> D | <input type="checkbox"/> D | ≥ 20% coverage of agricultural land (regularly plowed land) |
| <input checked="" type="checkbox"/> E | <input checked="" type="checkbox"/> E | <input checked="" type="checkbox"/> E | ≥ 20% coverage of maintained grass/herb |
| <input type="checkbox"/> F | <input type="checkbox"/> F | <input type="checkbox"/> F | ≥ 20% coverage of clear-cut land |
| <input type="checkbox"/> G | <input type="checkbox"/> G | <input type="checkbox"/> G | Little or no opportunity to improve water quality. Lack of opportunity may result from little or no disturbance in the watershed or hydrologic alterations that prevent drainage and/or overbank flow from affecting the assessment area. |

7. Wetland Acting as Vegetated Buffer – assessment area/wetland complex condition metric (skip for non-riparian wetlands)

- 7a. Is assessment area within 50 feet of a tributary or other open water?
 Yes No If Yes, continue to 7b. If No, skip to Metric 8.
 Wetland buffer need only be present on one side of the water body. Make buffer judgment based on the average width of wetland. Record a note if a portion of the buffer has been removed or disturbed.
- 7b. How much of the first 50 feet from the bank is wetland? (Wetland buffer need only be present on one side of the water body. Make buffer judgment based on the average width of wetland. Record a note if a portion of the buffer has been removed or disturbed.)
 A ≥ 50 feet
 B From 30 to < 50 feet
 C From 15 to < 30 feet
 D From 5 to < 15 feet
 E < 5 feet or buffer bypassed by ditches
- 7c. Tributary width. If the tributary is anastomosed, combine widths of channels/braids for a total width.
 ≤ 15-foot wide > 15-foot wide Other open water (no tributary present)
- 7d. Do roots of assessment area vegetation extend into the bank of the tributary/open water?
 Yes No
- 7e. Is stream or other open water sheltered or exposed?
 Sheltered – adjacent open water with width < 2500 feet and no regular boat traffic.
 Exposed – adjacent open water with width ≥ 2500 feet or regular boat traffic.

8. Wetland Width at the Assessment Area – wetland type/wetland complex condition metric (evaluate WT for all marshes and Estuarine Woody Wetland only; evaluate WC for Bottomland Hardwood Forest, Headwater Forest, and Riverine Swamp Forest only)

Check a box in each column for riverine wetlands only. Select the average width for the wetland type at the assessment area (WT) and the wetland complex at the assessment area (WC). See User Manual for WT and WC boundaries.

- | | | |
|---------------------------------------|---------------------------------------|-----------------------|
| WT | WC | |
| <input type="checkbox"/> A | <input type="checkbox"/> A | ≥ 100 feet |
| <input type="checkbox"/> B | <input type="checkbox"/> B | From 80 to < 100 feet |
| <input type="checkbox"/> C | <input type="checkbox"/> C | From 50 to < 80 feet |
| <input type="checkbox"/> D | <input type="checkbox"/> D | From 40 to < 50 feet |
| <input type="checkbox"/> E | <input type="checkbox"/> E | From 30 to < 40 feet |
| <input type="checkbox"/> F | <input type="checkbox"/> F | From 15 to < 30 feet |
| <input checked="" type="checkbox"/> G | <input checked="" type="checkbox"/> G | From 5 to < 15 feet |
| <input type="checkbox"/> H | <input type="checkbox"/> H | < 5 feet |

9. Inundation Duration – assessment area condition metric (skip for non-riparian wetlands)

Answer for assessment area dominant landform.

- A Evidence of short-duration inundation (< 7 consecutive days)
 B Evidence of saturation, without evidence of inundation
 C Evidence of long-duration inundation or very long-duration inundation (7 to 30 consecutive days or more)

10. Indicators of Deposition – assessment area condition metric (skip for non-riparian wetlands and all marshes)

Consider recent deposition only (no plant growth since deposition).

- A Sediment deposition is not excessive, but at approximately natural levels.
 B Sediment deposition is excessive, but not overwhelming the wetland.
 C Sediment deposition is excessive and is overwhelming the wetland.

11. Wetland Size – wetland type/wetland complex condition metric

Check a box in each column. Involves a GIS effort with field adjustment. This metric evaluates three aspects of the wetland area: the size of the wetland type (WT), the size of the wetland complex (WC), and the size of the forested wetland (FW) (if applicable, see User Manual). See the User Manual for boundaries of these evaluation areas. If assessment area is clear-cut, select "K" for the FW column.

- | | | |
|---------------------------------------|---------------------------------------|---|
| WT | WC | FW (if applicable) |
| <input type="checkbox"/> A | <input type="checkbox"/> A | <input type="checkbox"/> A ≥ 500 acres |
| <input type="checkbox"/> B | <input type="checkbox"/> B | <input type="checkbox"/> B From 100 to < 500 acres |
| <input type="checkbox"/> C | <input type="checkbox"/> C | <input type="checkbox"/> C From 50 to < 100 acres |
| <input type="checkbox"/> D | <input type="checkbox"/> D | <input type="checkbox"/> D From 25 to < 50 acres |
| <input type="checkbox"/> E | <input type="checkbox"/> E | <input type="checkbox"/> E From 10 to < 25 acres |
| <input type="checkbox"/> F | <input type="checkbox"/> F | <input type="checkbox"/> F From 5 to < 10 acres |
| <input type="checkbox"/> G | <input type="checkbox"/> G | <input type="checkbox"/> G From 1 to < 5 acres |
| <input type="checkbox"/> H | <input type="checkbox"/> H | <input type="checkbox"/> H From 0.5 to < 1 acre |
| <input type="checkbox"/> I | <input type="checkbox"/> I | <input type="checkbox"/> I From 0.1 to < 0.5 acre |
| <input checked="" type="checkbox"/> J | <input checked="" type="checkbox"/> J | <input type="checkbox"/> J From 0.01 to < 0.1 acre |
| <input type="checkbox"/> K | <input type="checkbox"/> K | <input checked="" type="checkbox"/> K < 0.01 acre or assessment area is clear-cut |

12. Wetland Intactness – wetland type condition metric (evaluate for Pocosins only)

- A Pocosin is the full extent (≥ 90%) of its natural landscape size.
 B Pocosin type is < 90% of the full extent of its natural landscape size.

13. Connectivity to Other Natural Areas – landscape condition metric

13a. Check appropriate box(es) (a box may be checked in each column). Involves a GIS effort with field adjustment. This metric evaluates whether the wetland is well connected (Well) and/or loosely connected (Loosely) to the landscape patch, the contiguous naturally vegetated area and open water (if appropriate). Boundaries are formed by four-lane roads, regularly maintained utility line corridors the width of a four-lane road or wider, urban landscapes, maintained fields (pasture and agriculture), or open water > 300 feet wide.

- | | | |
|---------------------------------------|----------------------------|--|
| Well | Loosely | |
| <input type="checkbox"/> A | <input type="checkbox"/> A | ≥ 500 acres |
| <input type="checkbox"/> B | <input type="checkbox"/> B | From 100 to < 500 acres |
| <input type="checkbox"/> C | <input type="checkbox"/> C | From 50 to < 100 acres |
| <input type="checkbox"/> D | <input type="checkbox"/> D | From 10 to < 50 acres |
| <input type="checkbox"/> E | <input type="checkbox"/> E | < 10 acres |
| <input checked="" type="checkbox"/> F | <input type="checkbox"/> F | Wetland type has a poor or no connection to other natural habitats |

- 13b. Evaluate for marshes only.
 Yes No Wetland type has a surface hydrology connection to open waters/stream or tidal wetlands.

14. Edge Effect – wetland type condition metric (skip for all marshes and Estuarine Woody Wetland)

May involve a GIS effort with field adjustment. Estimate distance from wetland type boundary to artificial edges. Artificial edges include non-forested areas ≥ 40 feet wide such as fields, development, roads, regularly maintained utility line corridors, and clear-cuts. Consider the eight main points of the compass. Artificial edge occurs within 150 feet in how many directions? If the assessment area is clear cut, select option "C."

- A 0
 B 1 to 4
 C 5 to 8

15. Vegetative Composition – assessment area condition metric (skip for all marshes and Pine Flat)

- A Vegetation is close to reference condition in species present and their proportions. Lower strata composed of appropriate species, with exotic plants absent or sparse within the assessment area.
 B Vegetation is different from reference condition in species diversity or proportions, but still largely composed of native species characteristic of the wetland type. This may include communities of weedy native species that develop after clearcutting or clearing. It also includes communities with exotics present, but not dominant, over a large portion of the expected strata.
 C Vegetation severely altered from reference in composition, or expected species are unnaturally absent (planted stands of non-characteristic species or at least one stratum inappropriately composed of a single species), or exotic species are dominant in at least one stratum.

16. Vegetative Diversity – assessment area condition metric (evaluate for Non-tidal Freshwater Marsh only)

- A Vegetation diversity is high and is composed primarily of native species (< 10% cover of exotics).
 B Vegetation diversity is low or has > 10% to 50% cover of exotics.
 C Vegetation is dominated by exotic species (> 50 % cover of exotics).

17. Vegetative Structure – assessment area/wetland type condition metric

17a. Is vegetation present?

Yes No If Yes, continue to 17b. If No, skip to Metric 18.

17b. Evaluate percent coverage of assessment area vegetation for all marshes only. Skip to 17c for non-marsh wetlands.

A ≥ 25% coverage of vegetation
 B < 25% coverage of vegetation

17c. Check a box in each column for each stratum. Evaluate this portion of the metric for non-marsh wetlands. Consider structure in airspace above the assessment area (AA) and the wetland type (WT) separately.

AA	WT	
Canopy		
<input type="checkbox"/> A	<input type="checkbox"/> A	Canopy closed, or nearly closed, with natural gaps associated with natural processes
<input type="checkbox"/> B	<input type="checkbox"/> B	Canopy present, but opened more than natural gaps
<input checked="" type="checkbox"/> C	<input checked="" type="checkbox"/> C	Canopy sparse or absent
Mid-Story		
<input type="checkbox"/> A	<input type="checkbox"/> A	Dense mid-story/sapling layer
<input type="checkbox"/> B	<input type="checkbox"/> B	Moderate density mid-story/sapling layer
<input checked="" type="checkbox"/> C	<input checked="" type="checkbox"/> C	Mid-story/sapling layer sparse or absent
Shrub		
<input type="checkbox"/> A	<input type="checkbox"/> A	Dense shrub layer
<input type="checkbox"/> B	<input type="checkbox"/> B	Moderate density shrub layer
<input checked="" type="checkbox"/> C	<input checked="" type="checkbox"/> C	Shrub layer sparse or absent
Herb		
<input checked="" type="checkbox"/> A	<input checked="" type="checkbox"/> A	Dense herb layer
<input type="checkbox"/> B	<input type="checkbox"/> B	Moderate density herb layer
<input type="checkbox"/> C	<input type="checkbox"/> C	Herb layer sparse or absent

18. Snags – wetland type condition metric (skip for all marshes)

A Large snags (more than one) are visible (> 12 inches DBH, or large relative to species present and landscape stability).
 B Not A

19. Diameter Class Distribution – wetland type condition metric (skip for all marshes)

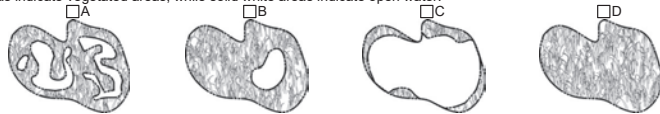
A Majority of canopy trees have stems > 6 inches in diameter at breast height (DBH); many large trees (> 12 inches DBH) are present.
 B Majority of canopy trees have stems between 6 and 12 inches DBH, few are > 12 inch DBH.
 C Majority of canopy trees are < 6 inches DBH or no trees.

20. Large Woody Debris – wetland type condition metric (skip for all marshes)

Include both natural debris and man-placed natural debris.
 A Large logs (more than one) are visible (> 12 inches in diameter, or large relative to species present and landscape stability).
 B Not A

21. Vegetation/Open Water Dispersion – wetland type/open water condition metric (evaluate for Non-Tidal Freshwater Marsh only)

Select the figure that best describes the amount of interspersed vegetation and open water in the growing season. Patterned areas indicate vegetated areas, while solid white areas indicate open water.



22. Hydrologic Connectivity – assessment area condition metric (evaluate for riparian wetlands and Salt/Brackish Marsh only)

Examples of activities that may severely alter hydrologic connectivity include intensive ditching, fill, sedimentation, channelization, diversion, man-made berms, beaver dams, and stream incision. Documentation required if evaluated as B, C, or D.

A Overbank and overland flow are not severely altered in the assessment area.
 B Overbank flow is severely altered in the assessment area.
 C Overland flow is severely altered in the assessment area.
 D Both overbank and overland flow are severely altered in the assessment area.

Notes

NC WAM Wetland Rating Sheet
 Accompanies User Manual Version 5.0

Wetland Site Name Wetland Z Date of Assessment 7/30/2020
 Wetland Type Bottomland Hardwood Forest Assessor Name/Organization C. Neaves

Notes on Field Assessment Form (Y/N) NO
 Presence of regulatory considerations (Y/N) NO
 Wetland is intensively managed (Y/N) _____
 Assessment area is located within 50 feet of a natural tributary or other open water (Y/N) YES
 Assessment area is substantially altered by beaver (Y/N) _____
 Assessment area experiences overbank flooding during normal rainfall conditions (Y/N) _____
 Assessment area is on a coastal island (Y/N) _____

Sub-function Rating Summary

Function	Sub-function	Metrics	Rating
Hydrology	Surface Storage and Retention	Condition	LOW
		Sub-surface Storage and Retention	Condition
Water Quality	Pathogen Change	Condition	MEDIUM
		Condition/Opportunity	MEDIUM
	Particulate Change	Opportunity Presence (Y/N)	NO
		Condition	LOW
Soluble Change	Condition	Condition/Opportunity	LOW
		Opportunity Presence (Y/N)	NO
	Physical Change	Condition	MEDIUM
		Condition/Opportunity	MEDIUM
Pollution Change	Condition	Opportunity Presence (Y/N)	NO
		Condition	LOW
	Condition/Opportunity	Opportunity Presence (Y/N)	NO
		Condition	NA
Habitat	Vegetation Composition	Opportunity Presence (Y/N)	NA
		Condition	LOW
		Condition	LOW

Function Rating Summary

Function	Metrics	Rating
Hydrology	Condition	LOW
	Water Quality	Condition
Water Quality	Condition/Opportunity	LOW
	Opportunity Presence (Y/N)	NO
Habitat	Condition	LOW

Overall Wetland Rating LOW

NC WAM FIELD ASSESSMENT FORM
Accompanies User Manual Version 5.0

USACE AID #	SAW-2020-00047	NCDWR#	20200035
Project Name	Liberty Rock Mitigation Site	Date of Evaluation	7/30/2020
Applicant/Owner Name	Widlands Engineering	Wetland Site Name	Wetland BB
Wetland Type	Bottomland Hardwood Forest	Assessor Name/Organization	C. Neaves
Level III Ecoregion	Piedmont	Nearest Named Water Body	Rocky River
River Basin	Cape Fear	USGS 8-Digit Catalogue Unit	03030003
County	Randolph	NCDWR Region	Winston-Salem
<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	Precipitation within 48 hrs?	Latitude/Longitude (deci-degrees)	35.819648, -79.559360

Evidence of stressors affecting the assessment area (may not be within the assessment area)

Please circle and/or make note on the last page if evidence of stressors is apparent. Consider departure from reference, if appropriate, in recent past (for instance, within 10 years). Noteworthy stressors include, but are not limited to the following.

- Hydrological modifications (examples: ditches, dams, beaver dams, dikes, berms, ponds, etc.)
- Surface and sub-surface discharges into the wetland (examples: discharges containing obvious pollutants, presence of nearby septic tanks, underground storage tanks (USTs), hog lagoons, etc.)
- Signs of vegetation stress (examples: vegetation mortality, insect damage, disease, storm damage, salt intrusion, etc.)
- Habitat/plant community alteration (examples: mowing, clear-cutting, exotics, etc.)

Is the assessment area intensively managed? Yes No

Regulatory Considerations - Were regulatory considerations evaluated? Yes No If Yes, check all that apply to the assessment area.

- Anadromous fish
- Federally protected species or State endangered or threatened species
- NCDWR riparian buffer rule in effect
- Abuts a Primary Nursery Area (PNA)
- Publicly owned property
- N.C. Division of Coastal Management Area of Environmental Concern (AEC) (including buffer)
- Abuts a stream with a NCDWQ classification of SA or supplemental classifications of HQW, ORW, or Trout
- Designated NCNHP reference community
- Abuts a 303(d)-listed stream or a tributary to a 303(d)-listed stream

What type of natural stream is associated with the wetland, if any? (check all that apply)

- Blackwater
- Brownwater
- Tidal (if tidal, check one of the following boxes) Lunar Wind Both

Is the assessment area on a coastal island? Yes No

Is the assessment area's surface water storage capacity or duration substantially altered by beaver? Yes No

Does the assessment area experience overbank flooding during normal rainfall conditions? Yes No

1. Ground Surface Condition/Vegetation Condition – assessment area condition metric

Check a box in each column. Consider alteration to the ground surface (GS) in the assessment area and vegetation structure (VS) in the assessment area. Compare to reference wetland if applicable (see User Manual). If a reference is not applicable, then rate the assessment area based on evidence an effect.

- | | | |
|---------------------------------------|---------------------------------------|--|
| GS | VS | |
| <input checked="" type="checkbox"/> A | <input type="checkbox"/> A | Not severely altered |
| <input type="checkbox"/> B | <input checked="" type="checkbox"/> B | Severely altered over a majority of the assessment area (ground surface alteration examples: vehicle tracks, excessive sedimentation, fire-plow lanes, skidder tracks, bedding, fill, soil compaction, obvious pollutants) (vegetation structure alteration examples: mechanical disturbance, herbicides, salt intrusion [where appropriate], exotic species, grazing, less diversity [if appropriate], hydrologic alteration) |

2. Surface and Sub-Surface Storage Capacity and Duration – assessment area condition metric

Check a box in each column. Consider surface storage capacity and duration (Surf) and sub-surface storage capacity and duration (Sub). Consider both increase and decrease in hydrology. A ditch ≤ 1 foot deep is considered to affect surface water only, while a ditch > 1 foot deep is expected to affect both surface and sub-surface water. Consider tidal flooding regime, if applicable.

- | | | |
|---------------------------------------|---------------------------------------|--|
| Surf | Sub | |
| <input type="checkbox"/> A | <input type="checkbox"/> A | Water storage capacity and duration are not altered. |
| <input checked="" type="checkbox"/> B | <input checked="" type="checkbox"/> B | Water storage capacity or duration are altered, but not substantially (typically, not sufficient to change vegetation). |
| <input type="checkbox"/> C | <input type="checkbox"/> C | Water storage capacity or duration are substantially altered (typically, alteration sufficient to result in vegetation change) (examples: draining, flooding, soil compaction, filling, excessive sedimentation, underground utility lines). |

3. Water Storage/Surface Relief – assessment area/wetland type condition metric (skip for all marshes)

Check a box in each column. Select the appropriate storage for the assessment area (AA) and the wetland type (WT).

- | | | |
|---|----|---|
| AA | WT | |
| 3a. <input type="checkbox"/> A <input type="checkbox"/> A | | Majority of wetland with depressions able to pond water > 1 deep |
| <input type="checkbox"/> B <input type="checkbox"/> B | | Majority of wetland with depressions able to pond water 6 inches to 1 foot deep |
| <input type="checkbox"/> C <input type="checkbox"/> C | | Majority of wetland with depressions able to pond water 3 to 6 inches deep |
| <input checked="" type="checkbox"/> D <input checked="" type="checkbox"/> D | | Depressions able to pond water < 3 inches deep |
| 3b. <input type="checkbox"/> A | | Evidence that maximum depth of inundation is greater than 2 feet |
| <input type="checkbox"/> B | | Evidence that maximum depth of inundation is between 1 and 2 feet |
| <input checked="" type="checkbox"/> C | | Evidence that maximum depth of inundation is less than 1 foot |

4. Soil Texture/Structure – assessment area condition metric (skip for all marshes)

Check a box from each of the three soil property groups below. Dig soil profile in the dominant assessment area landscape feature. Make soil observations within the top 12 inches. Use most recent National Technical Committee for Hydric Soils guidance for regional indicators.

- 4a. A Sandy soil
- B Loamy or clayey soils exhibiting redoximorphic features (concentrations, depletions, or rhizospheres)
- C Loamy or clayey soils not exhibiting redoximorphic features
- D Loamy or clayey gleyed soil
- E Histosol or histlic epipedon
- 4b. A Soil ribbon < 1 inch
- B Soil ribbon ≥ 1 inch
- 4c. A No peat or muck presence
- B A peat or muck presence

5. Discharge into Wetland – opportunity metric

Check a box in each column. Consider surface pollutants or discharges (Surf) and sub-surface pollutants or discharges (Sub). Examples of sub-surface discharges include presence of nearby septic tank, underground storage tank (UST), etc.

- | | | |
|---------------------------------------|---------------------------------------|---|
| Surf | Sub | |
| <input type="checkbox"/> A | <input checked="" type="checkbox"/> A | Little or no evidence of pollutants or discharges entering the assessment area |
| <input checked="" type="checkbox"/> B | <input type="checkbox"/> B | Noticeable evidence of pollutants or discharges entering the wetland and stressing, but not overwhelming the treatment capacity of the assessment area |
| <input type="checkbox"/> C | <input type="checkbox"/> C | Noticeable evidence of pollutants or discharges (pathogen, particulate, or soluble) entering the assessment area and potentially overwhelming the treatment capacity of the wetland (water discoloration, dead vegetation, excessive sedimentation, odor) |

6. Land Use – opportunity metric (skip for non-riparian wetlands)

Check all that apply (at least one box in each column). Evaluation involves a GIS effort with field adjustment. Consider sources draining to assessment area within entire upstream watershed (WS), within 5 miles and within the watershed draining to the assessment area (5M), and within 2 miles and within the watershed draining to the assessment area (2M).

- | | | | |
|---------------------------------------|---------------------------------------|---------------------------------------|---|
| WS | 5M | 2M | |
| <input type="checkbox"/> A | <input type="checkbox"/> A | <input type="checkbox"/> A | ≥ 10% impervious surfaces |
| <input type="checkbox"/> B | <input type="checkbox"/> B | <input type="checkbox"/> B | Confined animal operations (or other local, concentrated source of pollutants) |
| <input checked="" type="checkbox"/> C | <input checked="" type="checkbox"/> C | <input checked="" type="checkbox"/> C | ≥ 20% coverage of pasture |
| <input type="checkbox"/> D | <input type="checkbox"/> D | <input type="checkbox"/> D | ≥ 20% coverage of agricultural land (regularly plowed land) |
| <input checked="" type="checkbox"/> E | <input checked="" type="checkbox"/> E | <input checked="" type="checkbox"/> E | ≥ 20% coverage of maintained grass/herb |
| <input type="checkbox"/> F | <input type="checkbox"/> F | <input type="checkbox"/> F | ≥ 20% coverage of clear-cut land |
| <input type="checkbox"/> G | <input type="checkbox"/> G | <input type="checkbox"/> G | Little or no opportunity to improve water quality. Lack of opportunity may result from little or no disturbance in the watershed or hydrologic alterations that prevent drainage and/or overbank flow from affecting the assessment area. |

7. Wetland Acting as Vegetated Buffer – assessment area/wetland complex condition metric (skip for non-riparian wetlands)

- 7a. Is assessment area within 50 feet of a tributary or other open water?
- Yes No If Yes, continue to 7b. If No, skip to Metric 8.
- Wetland buffer need only be present on one side of the water body. Make buffer judgment based on the average width of wetland. Record a note if a portion of the buffer has been removed or disturbed.
- 7b. How much of the first 50 feet from the bank is wetland? (Wetland buffer need only be present on one side of the water body. Make buffer judgment based on the average width of wetland. Record a note if a portion of the buffer has been removed or disturbed.)
- A ≥ 50 feet
- B From 30 to < 50 feet
- C From 15 to < 30 feet
- D From 5 to < 15 feet
- E < 5 feet or buffer bypassed by ditches
- 7c. Tributary width. If the tributary is anastomosed, combine widths of channels/braids for a total width.
- ≤ 15-foot wide > 15-foot wide Other open water (no tributary present)
- 7d. Do roots of assessment area vegetation extend into the bank of the tributary/open water?
- Yes No
- 7e. Is stream or other open water sheltered or exposed?
- Sheltered – adjacent open water with width < 2500 feet and no regular boat traffic.
- Exposed – adjacent open water with width ≥ 2500 feet or regular boat traffic.

8. Wetland Width at the Assessment Area – wetland type/wetland complex condition metric (evaluate WT for all marshes and Estuarine Woody Wetland only; evaluate WC for Bottomland Hardwood Forest, Headwater Forest, and Riverine Swamp Forest only)

Check a box in each column for riverine wetlands only. Select the average width for the wetland type at the assessment area (WT) and the wetland complex at the assessment area (WC). See User Manual for WT and WC boundaries.

- | | | |
|---------------------------------------|---------------------------------------|-----------------------|
| WT | WC | |
| <input type="checkbox"/> A | <input type="checkbox"/> A | ≥ 100 feet |
| <input type="checkbox"/> B | <input type="checkbox"/> B | From 80 to < 100 feet |
| <input type="checkbox"/> C | <input type="checkbox"/> C | From 50 to < 80 feet |
| <input checked="" type="checkbox"/> D | <input checked="" type="checkbox"/> D | From 40 to < 50 feet |
| <input type="checkbox"/> E | <input type="checkbox"/> E | From 30 to < 40 feet |
| <input type="checkbox"/> F | <input type="checkbox"/> F | From 15 to < 30 feet |
| <input type="checkbox"/> G | <input type="checkbox"/> G | From 5 to < 15 feet |
| <input type="checkbox"/> H | <input type="checkbox"/> H | < 5 feet |

9. Inundation Duration – assessment area condition metric (skip for non-riparian wetlands)

- Answer for assessment area dominant landform.
[X]A Evidence of short-duration inundation (< 7 consecutive days)
[B] Evidence of saturation, without evidence of inundation
[C] Evidence of long-duration inundation or very long-duration inundation (7 to 30 consecutive days or more)

10. Indicators of Deposition – assessment area condition metric (skip for non-riparian wetlands and all marshes)

- Consider recent deposition only (no plant growth since deposition).
[X]A Sediment deposition is not excessive, but at approximately natural levels.
[B] Sediment deposition is excessive, but not overwhelming the wetland.
[C] Sediment deposition is excessive and is overwhelming the wetland.

11. Wetland Size – wetland type/wetland complex condition metric

Check a box in each column. Involves a GIS effort with field adjustment. This metric evaluates three aspects of the wetland area: the size of the wetland type (WT), the size of the wetland complex (WC), and the size of the forested wetland (FW) (if applicable, see User Manual). See the User Manual for boundaries of these evaluation areas. If assessment area is clear-cut, select "K" for the FW column.

- WT WC FW (if applicable)
[A] [A] [A] ≥ 500 acres
[B] [B] [B] From 100 to < 500 acres
[C] [C] [C] From 50 to < 100 acres
[D] [D] [D] From 25 to < 50 acres
[E] [E] [E] From 10 to < 25 acres
[F] [F] [F] From 5 to < 10 acres
[G] [G] [G] From 1 to < 5 acres
[H] [H] [H] From 0.5 to < 1 acre
[I] [I] [I] From 0.1 to < 0.5 acre
[X]J [X]J [J] From 0.01 to < 0.1 acre
[K] [K] [X]K < 0.01 acre or assessment area is clear-cut

12. Wetland Intactness – wetland type condition metric (evaluate for Pocosins only)

- [A] Pocosin is the full extent (≥ 90%) of its natural landscape size.
[B] Pocosin type is < 90% of the full extent of its natural landscape size.

13. Connectivity to Other Natural Areas – landscape condition metric

13a. Check appropriate box(es) (a box may be checked in each column). Involves a GIS effort with field adjustment. This metric evaluates whether the wetland is well connected (Well) and/or loosely connected (Loosely) to the landscape patch, the contiguous naturally vegetated area and open water (if appropriate). Boundaries are formed by four-lane roads, regularly maintained utility line corridors the width of a four-lane road or wider, urban landscapes, maintained fields (pasture and agriculture), or open water > 300 feet wide.

- Well Loosely
[A] [A] ≥ 500 acres
[B] [X]B From 100 to < 500 acres
[X]C [C] From 50 to < 100 acres
[D] [D] From 10 to < 50 acres
[E] [E] < 10 acres
[F] [F] Wetland type has a poor or no connection to other natural habitats

13b. Evaluate for marshes only.

- []Yes []No Wetland type has a surface hydrology connection to open waters/stream or tidal wetlands.

14. Edge Effect – wetland type condition metric (skip for all marshes and Estuarine Woody Wetland)

May involve a GIS effort with field adjustment. Estimate distance from wetland type boundary to artificial edges. Artificial edges include non-forested areas ≥ 40 feet wide such as fields, development, roads, regularly maintained utility line corridors, and clear-cuts. Consider the eight main points of the compass. Artificial edge occurs within 150 feet in how many directions? If the assessment area is clear cut, select option "C."

- [A] 0
[X]B 1 to 4
[C] 5 to 8

15. Vegetative Composition – assessment area condition metric (skip for all marshes and Pine Flat)

- [A] Vegetation is close to reference condition in species present and their proportions. Lower strata composed of appropriate species, with exotic plants absent or sparse within the assessment area.
[B] Vegetation is different from reference condition in species diversity or proportions, but still largely composed of native species characteristic of the wetland type. This may include communities of weedy native species that develop after clearcutting or clearing. It also includes communities with exotics present, but not dominant, over a large portion of the expected strata.
[X]C Vegetation severely altered from reference in composition, or expected species are unnaturally absent (planted stands of non-characteristic species or at least one stratum inappropriately composed of a single species), or exotic species are dominant in at least one stratum.

16. Vegetative Diversity – assessment area condition metric (evaluate for Non-tidal Freshwater Marsh only)

- [A] Vegetation diversity is high and is composed primarily of native species (< 10% cover of exotics).
[B] Vegetation diversity is low or has > 10% to 50% cover of exotics.
[X]C Vegetation is dominated by exotic species (> 50 % cover of exotics).

17. Vegetative Structure – assessment area/wetland type condition metric

17a. Is vegetation present?
[X]Yes []No If Yes, continue to 17b. If No, skip to Metric 18.

17b. Evaluate percent coverage of assessment area vegetation for all marshes only. Skip to 17c for non-marsh wetlands.

- [A] ≥ 25% coverage of vegetation
[B] < 25% coverage of vegetation

17c. Check a box in each column for each stratum. Evaluate this portion of the metric for non-marsh wetlands. Consider structure in airspace above the assessment area (AA) and the wetland type (WT) separately.

- AA WT
Canopy [A] [A] Canopy closed, or nearly closed, with natural gaps associated with natural processes
[B] [B] Canopy present, but opened more than natural gaps
[X]C [X]C Canopy sparse or absent
Mid-Story [A] [A] Dense mid-story/sapling layer
[B] [B] Moderate density mid-story/sapling layer
[X]C [X]C Mid-story/sapling layer sparse or absent
Shrub [A] [A] Dense shrub layer
[B] [B] Moderate density shrub layer
[X]C [X]C Shrub layer sparse or absent
Herb [A] [A] Dense herb layer
[X]B [X]B Moderate density herb layer
[C] [C] Herb layer sparse or absent

18. Snags – wetland type condition metric (skip for all marshes)

- []A Large snags (more than one) are visible (> 12 inches DBH, or large relative to species present and landscape stability).
[X]B Not A

19. Diameter Class Distribution – wetland type condition metric (skip for all marshes)

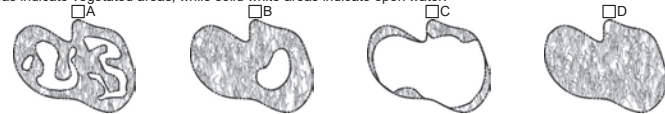
- [A] Majority of canopy trees have stems > 6 inches in diameter at breast height (DBH); many large trees (> 12 inches DBH) are present.
[B] Majority of canopy trees have stems between 6 and 12 inches DBH, few are > 12 inch DBH.
[X]C Majority of canopy trees are < 6 inches DBH or no trees.

20. Large Woody Debris – wetland type condition metric (skip for all marshes)

- Include both natural debris and man-placed natural debris.
[A] Large logs (more than one) are visible (> 12 inches in diameter, or large relative to species present and landscape stability).
[X]B Not A

21. Vegetation/Open Water Dispersion – wetland type/open water condition metric (evaluate for Non-Tidal Freshwater Marsh only)

Select the figure that best describes the amount of interspersed vegetation and open water in the growing season. Patterned areas indicate vegetated areas, while solid white areas indicate open water.



22. Hydrologic Connectivity – assessment area condition metric (evaluate for riparian wetlands and Salt/Brackish Marsh only)

Examples of activities that may severely alter hydrologic connectivity include intensive ditching, fill, sedimentation, channelization, diversion, man-made berms, beaver dams, and stream incision. Documentation required if evaluated as B, C, or D.
[A] Overbank and overland flow are not severely altered in the assessment area.
[X]B Overbank flow is severely altered in the assessment area.
[C] Overland flow is severely altered in the assessment area.
[D] Both overbank and overland flow are severely altered in the assessment area.

Notes

NC WAM Wetland Rating Sheet
Accompanies User Manual Version 5.0

Wetland Site Name Wetland BB Date of Assessment 7/30/2020
 Wetland Type Bottomland Hardwood Forest Assessor Name/Organization C. Neaves
 Notes on Field Assessment Form (Y/N) NO
 Presence of regulatory considerations (Y/N) NO
 Wetland is intensively managed (Y/N) _____
 Assessment area is located within 50 feet of a natural tributary or other open water (Y/N) YES
 Assessment area is substantially altered by beaver (Y/N) _____
 Assessment area experiences overbank flooding during normal rainfall conditions (Y/N) _____
 Assessment area is on a coastal island (Y/N) _____

Sub-function Rating Summary

Function	Sub-function	Metrics	Rating
Hydrology	Surface Storage and Retention	Condition	LOW
	Sub-surface Storage and Retention	Condition	LOW
Water Quality	Pathogen Change	Condition	MEDIUM
		Condition/Opportunity	MEDIUM
	Particulate Change	Opportunity Presence (Y/N)	NO
		Condition	LOW
	Soluble Change	Condition/Opportunity	LOW
		Opportunity Presence (Y/N)	NO
	Physical Change	Condition	MEDIUM
		Condition/Opportunity	MEDIUM
	Pollution Change	Opportunity Presence (Y/N)	NO
		Condition	LOW
	Habitat	Condition/Opportunity	LOW
		Opportunity Presence (Y/N)	NO
	Physical Structure	Condition	LOW
	Landscape Patch Structure	Condition	LOW
	Vegetation Composition	Condition	LOW

Function Rating Summary

Function	Metrics	Rating
Hydrology	Condition	LOW
Water Quality	Condition	LOW
	Condition/Opportunity	LOW
	Opportunity Presence (Y/N)	NO
Habitat	Condition	LOW

Overall Wetland Rating LOW

NC WAM FIELD ASSESSMENT FORM
Accompanies User Manual Version 5.0

USACE AID #	SAW-2020-00047	NCDWR#	20200035
Project Name	Liberty Rock Mitigation Site	Date of Evaluation	7/30/2020
Applicant/Owner Name	Wildlands Engineering	Wetland Site Name	Wetland CC
Wetland Type	Bottomland Hardwood Forest	Assessor Name/Organization	C. Neaves
Level III Ecoregion	Piedmont	Nearest Named Water Body	Rocky River
River Basin	Cape Fear	USGS 8-Digit Catalogue Unit	03030003
County	Randolph	NCDWR Region	Winston-Salem
<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	Precipitation within 48 hrs?	Latitude/Longitude (deci-degrees)	35.819644, -79.561045

Evidence of stressors affecting the assessment area (may not be within the assessment area)
 Please circle and/or make note on the last page if evidence of stressors is apparent. Consider departure from reference, if appropriate, in recent past (for instance, within 10 years). Noteworthy stressors include, but are not limited to the following.

- Hydrological modifications (examples: ditches, dams, beaver dams, dikes, berms, ponds, etc.)
- Surface and sub-surface discharges into the wetland (examples: discharges containing obvious pollutants, presence of nearby septic tanks, underground storage tanks (USTs), hog lagoons, etc.)
- Signs of vegetation stress (examples: vegetation mortality, insect damage, storm damage, disease, salt intrusion, etc.)
- Habitat/plant community alteration (examples: mowing, clear-cutting, exotics, etc.)

Is the assessment area intensively managed? Yes No

Regulatory Considerations - Were regulatory considerations evaluated? Yes No If Yes, check all that apply to the assessment area.

- Anadromous fish
- Federally protected species or State endangered or threatened species
- NCDWR riparian buffer rule in effect
- Abuts a Primary Nursery Area (PNA)
- Publicly owned property
- N.C. Division of Coastal Management Area of Environmental Concern (AEC) (including buffer)
- Abuts a stream with a NCDWQ classification of SA or supplemental classifications of HQW, ORW, or Trout
- Designated NCNHP reference community
- Abuts a 303(d)-listed stream or a tributary to a 303(d)-listed stream

What type of natural stream is associated with the wetland, if any? (check all that apply)

- Blackwater
- Brownwater
- Tidal (if tidal, check one of the following boxes) Lunar Wind Both

Is the assessment area on a coastal island? Yes No

Is the assessment area's surface water storage capacity or duration substantially altered by beaver? Yes No

Does the assessment area experience overbank flooding during normal rainfall conditions? Yes No

- Ground Surface Condition/Vegetation Condition – assessment area condition metric**
Check a box in each column. Consider alteration to the ground surface (GS) in the assessment area and vegetation structure (VS) in the assessment area. Compare to reference wetland if applicable (see User Manual). If a reference is not applicable, then rate the assessment area based on evidence an effect.

GS	VS	
<input checked="" type="checkbox"/> A	<input type="checkbox"/> A	Not severely altered
<input type="checkbox"/> B	<input checked="" type="checkbox"/> B	Severely altered over a majority of the assessment area (ground surface alteration examples: vehicle tracks, excessive sedimentation, fire-plow lanes, skidder tracks, bedding, fill, soil compaction, obvious pollutants) (vegetation structure alteration examples: mechanical disturbance, herbicides, salt intrusion [where appropriate], exotic species, grazing, less diversity [if appropriate], hydrologic alteration)
- Surface and Sub-Surface Storage Capacity and Duration – assessment area condition metric**
Check a box in each column. Consider surface storage capacity and duration (Surf) and sub-surface storage capacity and duration (Sub). Consider both increase and decrease in hydrology. A ditch ≤ 1 foot deep is considered to affect surface water only, while a ditch > 1 foot deep is expected to affect both surface and sub-surface water. Consider tidal flooding regime, if applicable.

Surf	Sub	
<input type="checkbox"/> A	<input type="checkbox"/> A	Water storage capacity and duration are not altered.
<input checked="" type="checkbox"/> B	<input checked="" type="checkbox"/> B	Water storage capacity or duration are altered, but not substantially (typically, not sufficient to change vegetation).
<input type="checkbox"/> C	<input type="checkbox"/> C	Water storage capacity or duration are substantially altered (typically, alteration sufficient to result in vegetation change) (examples: draining, flooding, soil compaction, filling, excessive sedimentation, underground utility lines).
- Water Storage/Surface Relief – assessment area/wetland type condition metric (skip for all marshes)**
Check a box in each column. Select the appropriate storage for the assessment area (AA) and the wetland type (WT).

AA	WT	
3a. <input type="checkbox"/> A <input type="checkbox"/> A		Majority of wetland with depressions able to pond water > 1 foot deep
<input type="checkbox"/> B <input type="checkbox"/> B		Majority of wetland with depressions able to pond water 6 inches to 1 foot deep
<input type="checkbox"/> C <input type="checkbox"/> C		Majority of wetland with depressions able to pond water 3 to 6 inches deep
<input checked="" type="checkbox"/> D <input checked="" type="checkbox"/> D		Depressions able to pond water < 3 inches deep
3b. <input type="checkbox"/> A	<input type="checkbox"/> A	Evidence that maximum depth of inundation is greater than 2 feet
<input type="checkbox"/> B	<input type="checkbox"/> B	Evidence that maximum depth of inundation is between 1 and 2 feet
<input checked="" type="checkbox"/> C	<input checked="" type="checkbox"/> C	Evidence that maximum depth of inundation is less than 1 foot

4. Soil Texture/Structure – assessment area condition metric (skip for all marshes)

Check a box from each of the three soil property groups below. Dig soil profile in the dominant assessment area landscape feature. Make soil observations within the top 12 inches. Use most recent National Technical Committee for Hydric Soils guidance for regional indicators.

- 4a. A Sandy soil
B Loamy or clayey soils exhibiting redoximorphic features (concentrations, depletions, or rhizospheres)
C Loamy or clayey soils not exhibiting redoximorphic features
D Loamy or clayey gleyed soil
E Histosol or histc epipedon
- 4b. A Soil ribbon < 1 inch
B Soil ribbon ≥ 1 inch
- 4c. A No peat or muck presence
B A peat or muck presence

5. Discharge into Wetland – opportunity metric

Check a box in each column. Consider surface pollutants or discharges (Surf) and sub-surface pollutants or discharges (Sub). Examples of sub-surface discharges include presence of nearby septic tank, underground storage tank (UST), etc.

- | | | |
|---------------------------------------|---------------------------------------|---|
| Surf | Sub | |
| <input type="checkbox"/> A | <input checked="" type="checkbox"/> A | Little or no evidence of pollutants or discharges entering the assessment area |
| <input checked="" type="checkbox"/> B | <input type="checkbox"/> B | Noticeable evidence of pollutants or discharges entering the wetland and stressing, but not overwhelming the treatment capacity of the assessment area |
| <input type="checkbox"/> C | <input type="checkbox"/> C | Noticeable evidence of pollutants or discharges (pathogen, particulate, or soluble) entering the assessment area and potentially overwhelming the treatment capacity of the wetland (water discoloration, dead vegetation, excessive sedimentation, odor) |

6. Land Use – opportunity metric (skip for non-riparian wetlands)

Check all that apply (at least one box in each column). Evaluation involves a GIS effort with field adjustment. Consider sources draining to assessment area within entire upstream watershed (WS), within 5 miles and within the watershed draining to the assessment area (5M), and within 2 miles and within the watershed draining to the assessment area (2M).

- | | | | |
|---------------------------------------|---------------------------------------|---------------------------------------|---|
| WS | 5M | 2M | |
| <input type="checkbox"/> A | <input type="checkbox"/> A | <input type="checkbox"/> A | ≥ 10% impervious surfaces |
| <input type="checkbox"/> B | <input type="checkbox"/> B | <input type="checkbox"/> B | Confined animal operations (or other local, concentrated source of pollutants) |
| <input checked="" type="checkbox"/> C | <input checked="" type="checkbox"/> C | <input checked="" type="checkbox"/> C | ≥ 20% coverage of pasture |
| <input type="checkbox"/> D | <input type="checkbox"/> D | <input type="checkbox"/> D | ≥ 20% coverage of agricultural land (regularly plowed land) |
| <input checked="" type="checkbox"/> E | <input checked="" type="checkbox"/> E | <input checked="" type="checkbox"/> E | ≥ 20% coverage of maintained grass/herb |
| <input type="checkbox"/> F | <input type="checkbox"/> F | <input type="checkbox"/> F | ≥ 20% coverage of clear-cut land |
| <input type="checkbox"/> G | <input type="checkbox"/> G | <input type="checkbox"/> G | Little or no opportunity to improve water quality. Lack of opportunity may result from little or no disturbance in the watershed or hydrologic alterations that prevent drainage and/or overbank flow from affecting the assessment area. |

7. Wetland Acting as Vegetated Buffer – assessment area/wetland complex condition metric (skip for non-riparian wetlands)

- 7a. Is assessment area within 50 feet of a tributary or other open water?
Yes No If Yes, continue to 7b. If No, skip to Metric 8.
 Wetland buffer need only be present on one side of the water body. Make buffer judgment based on the average width of wetland. Record a note if a portion of the buffer has been removed or disturbed.
- 7b. How much of the first 50 feet from the bank is wetland? (Wetland buffer need only be present on one side of the water body. Make buffer judgment based on the average width of wetland. Record a note if a portion of the buffer has been removed or disturbed.)
A ≥ 50 feet
B From 30 to < 50 feet
C From 15 to < 30 feet
D From 5 to < 15 feet
E < 5 feet or buffer bypassed by ditches
- 7c. Tributary width. If the tributary is anastomosed, combine widths of channels/braids for a total width.
 ≤ 15-foot wide > 15-foot wide Other open water (no tributary present)
- 7d. Do roots of assessment area vegetation extend into the bank of the tributary/open water?
Yes No
- 7e. Is stream or other open water sheltered or exposed?
 Sheltered – adjacent open water with width < 2500 feet and no regular boat traffic.
 Exposed – adjacent open water with width ≥ 2500 feet or regular boat traffic.

8. Wetland Width at the Assessment Area – wetland type/wetland complex condition metric (evaluate WT for all marshes and Estuarine Woody Wetland only; evaluate WC for Bottomland Hardwood Forest, Headwater Forest, and Riverine Swamp Forest only)

Check a box in each column for riverine wetlands only. Select the average width for the wetland type at the assessment area (WT) and the wetland complex at the assessment area (WC). See User Manual for WT and WC boundaries.

- | | | |
|---------------------------------------|---------------------------------------|-----------------------|
| WT | WC | |
| <input type="checkbox"/> A | <input type="checkbox"/> A | ≥ 100 feet |
| <input type="checkbox"/> B | <input type="checkbox"/> B | From 80 to < 100 feet |
| <input type="checkbox"/> C | <input type="checkbox"/> C | From 50 to < 80 feet |
| <input type="checkbox"/> D | <input type="checkbox"/> D | From 40 to < 50 feet |
| <input type="checkbox"/> E | <input type="checkbox"/> E | From 30 to < 40 feet |
| <input checked="" type="checkbox"/> F | <input checked="" type="checkbox"/> F | From 15 to < 30 feet |
| <input type="checkbox"/> G | <input type="checkbox"/> G | From 5 to < 15 feet |
| <input type="checkbox"/> H | <input type="checkbox"/> H | < 5 feet |

9. Inundation Duration – assessment area condition metric (skip for non-riparian wetlands)

Answer for assessment area dominant landform.

- A Evidence of short-duration inundation (< 7 consecutive days)
B Evidence of saturation, without evidence of inundation
C Evidence of long-duration inundation or very long-duration inundation (7 to 30 consecutive days or more)

10. Indicators of Deposition – assessment area condition metric (skip for non-riparian wetlands and all marshes)

Consider recent deposition only (no plant growth since deposition).

- A Sediment deposition is not excessive, but at approximately natural levels.
B Sediment deposition is excessive, but not overwhelming the wetland.
C Sediment deposition is excessive and is overwhelming the wetland.

11. Wetland Size – wetland type/wetland complex condition metric

Check a box in each column. Involves a GIS effort with field adjustment. This metric evaluates three aspects of the wetland area: the size of the wetland type (WT), the size of the wetland complex (WC), and the size of the forested wetland (FW) (if applicable, see User Manual). See the User Manual for boundaries of these evaluation areas. If assessment area is clear-cut, select "K" for the FW column.

- | | | |
|---------------------------------------|---------------------------------------|---|
| WT | WC | FW (if applicable) |
| <input type="checkbox"/> A | <input type="checkbox"/> A | <input type="checkbox"/> A ≥ 500 acres |
| <input type="checkbox"/> B | <input type="checkbox"/> B | <input type="checkbox"/> B From 100 to < 500 acres |
| <input type="checkbox"/> C | <input type="checkbox"/> C | <input type="checkbox"/> C From 50 to < 100 acres |
| <input type="checkbox"/> D | <input type="checkbox"/> D | <input type="checkbox"/> D From 25 to < 50 acres |
| <input type="checkbox"/> E | <input type="checkbox"/> E | <input type="checkbox"/> E From 10 to < 25 acres |
| <input type="checkbox"/> F | <input type="checkbox"/> F | <input type="checkbox"/> F From 5 to < 10 acres |
| <input type="checkbox"/> G | <input type="checkbox"/> G | <input type="checkbox"/> G From 1 to < 5 acres |
| <input type="checkbox"/> H | <input type="checkbox"/> H | <input type="checkbox"/> H From 0.5 to < 1 acre |
| <input type="checkbox"/> I | <input type="checkbox"/> I | <input type="checkbox"/> I From 0.1 to < 0.5 acre |
| <input checked="" type="checkbox"/> J | <input checked="" type="checkbox"/> J | <input type="checkbox"/> J From 0.01 to < 0.1 acre |
| <input type="checkbox"/> K | <input type="checkbox"/> K | <input checked="" type="checkbox"/> K < 0.01 acre or assessment area is clear-cut |

12. Wetland Intactness – wetland type condition metric (evaluate for Pocosins only)

- A Pocosin is the full extent (≥ 90%) of its natural landscape size.
B Pocosin type is < 90% of the full extent of its natural landscape size.

13. Connectivity to Other Natural Areas – landscape condition metric

13a. **Check appropriate box(es) (a box may be checked in each column).** Involves a GIS effort with field adjustment. This metric evaluates whether the wetland is well connected (Well) and/or loosely connected (Loosely) to the landscape patch, the contiguous naturally vegetated area and open water (if appropriate). Boundaries are formed by four-lane roads, regularly maintained utility line corridors the width of a four-lane road or wider, urban landscapes, maintained fields (pasture and agriculture), or open water > 300 feet wide.

- | | | |
|----------------------------|---------------------------------------|--|
| Well | Loosely | |
| <input type="checkbox"/> A | <input type="checkbox"/> A | ≥ 500 acres |
| <input type="checkbox"/> B | <input type="checkbox"/> B | From 100 to < 500 acres |
| <input type="checkbox"/> C | <input checked="" type="checkbox"/> C | From 50 to < 100 acres |
| <input type="checkbox"/> D | <input type="checkbox"/> D | From 10 to < 50 acres |
| <input type="checkbox"/> E | <input type="checkbox"/> E | < 10 acres |
| <input type="checkbox"/> F | <input type="checkbox"/> F | Wetland type has a poor or no connection to other natural habitats |

13b. **Evaluate for marshes only.**

- Yes No Wetland type has a surface hydrology connection to open waters/stream or tidal wetlands.

14. Edge Effect – wetland type condition metric (skip for all marshes and Estuarine Woody Wetland)

May involve a GIS effort with field adjustment. Estimate distance from wetland type boundary to artificial edges. Artificial edges include non-forested areas ≥ 40 feet wide such as fields, development, roads, regularly maintained utility line corridors, and clear-cuts. Consider the eight main points of the compass. Artificial edge occurs within 150 feet in how many directions? If the assessment area is clear cut, select option "C."

- A 0
B 1 to 4
C 5 to 8

15. Vegetative Composition – assessment area condition metric (skip for all marshes and Pine Flat)

- A Vegetation is close to reference condition in species present and their proportions. Lower strata composed of appropriate species, with exotic plants absent or sparse within the assessment area.
B Vegetation is different from reference condition in species diversity or proportions, but still largely composed of native species characteristic of the wetland type. This may include communities of weedy native species that develop after clearcutting or clearing. It also includes communities with exotics present, but not dominant, over a large portion of the expected strata.
C Vegetation severely altered from reference in composition, or expected species are unnaturally absent (planted stands of non-characteristic species or at least one stratum inappropriately composed of a single species), or exotic species are dominant in at least one stratum.

16. Vegetative Diversity – assessment area condition metric (evaluate for Non-tidal Freshwater Marsh only)

- A Vegetation diversity is high and is composed primarily of native species (< 10% cover of exotics).
B Vegetation diversity is low or has > 10% to 50% cover of exotics.
C Vegetation is dominated by exotic species (> 50 % cover of exotics).

17. Vegetative Structure – assessment area/wetland type condition metric

17a. Is vegetation present?

Yes No If Yes, continue to 17b. If No, skip to Metric 18.

17b. Evaluate percent coverage of assessment area vegetation for all marshes only. Skip to 17c for non-marsh wetlands.

A ≥ 25% coverage of vegetation
 B < 25% coverage of vegetation

17c. Check a box in each column for each stratum. Evaluate this portion of the metric for non-marsh wetlands. Consider structure in airspace above the assessment area (AA) and the wetland type (WT) separately.

	AA	WT	
Canopy	<input type="checkbox"/> A	<input type="checkbox"/> A	Canopy closed, or nearly closed, with natural gaps associated with natural processes
	<input type="checkbox"/> B	<input type="checkbox"/> B	Canopy present, but opened more than natural gaps
	<input checked="" type="checkbox"/> C	<input checked="" type="checkbox"/> C	Canopy sparse or absent
Mid-Story	<input type="checkbox"/> A	<input type="checkbox"/> A	Dense mid-story/sapling layer
	<input type="checkbox"/> B	<input type="checkbox"/> B	Moderate density mid-story/sapling layer
	<input checked="" type="checkbox"/> C	<input checked="" type="checkbox"/> C	Mid-story/sapling layer sparse or absent
Shrub	<input type="checkbox"/> A	<input type="checkbox"/> A	Dense shrub layer
	<input type="checkbox"/> B	<input type="checkbox"/> B	Moderate density shrub layer
	<input checked="" type="checkbox"/> C	<input checked="" type="checkbox"/> C	Shrub layer sparse or absent
Herb	<input type="checkbox"/> A	<input type="checkbox"/> A	Dense herb layer
	<input checked="" type="checkbox"/> B	<input checked="" type="checkbox"/> B	Moderate density herb layer
	<input type="checkbox"/> C	<input type="checkbox"/> C	Herb layer sparse or absent

18. Snags – wetland type condition metric (skip for all marshes)

A Large snags (more than one) are visible (> 12 inches DBH, or large relative to species present and landscape stability).
 B Not A

19. Diameter Class Distribution – wetland type condition metric (skip for all marshes)

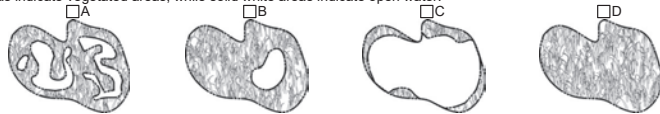
A Majority of canopy trees have stems > 6 inches in diameter at breast height (DBH); many large trees (> 12 inches DBH) are present.
 B Majority of canopy trees have stems between 6 and 12 inches DBH, few are > 12 inch DBH.
 C Majority of canopy trees are < 6 inches DBH or no trees.

20. Large Woody Debris – wetland type condition metric (skip for all marshes)

Include both natural debris and man-placed natural debris.
 A Large logs (more than one) are visible (> 12 inches in diameter, or large relative to species present and landscape stability).
 B Not A

21. Vegetation/Open Water Dispersion – wetland type/open water condition metric (evaluate for Non-Tidal Freshwater Marsh only)

Select the figure that best describes the amount of interspersed vegetation and open water in the growing season. Patterned areas indicate vegetated areas, while solid white areas indicate open water.



22. Hydrologic Connectivity – assessment area condition metric (evaluate for riparian wetlands and Salt/Brackish Marsh only)

Examples of activities that may severely alter hydrologic connectivity include intensive ditching, fill, sedimentation, channelization, diversion, man-made berms, beaver dams, and stream incision. Documentation required if evaluated as B, C, or D.

A Overbank and overland flow are not severely altered in the assessment area.
 B Overbank flow is severely altered in the assessment area.
 C Overland flow is severely altered in the assessment area.
 D Both overbank and overland flow are severely altered in the assessment area.

Notes

NC WAM Wetland Rating Sheet
 Accompanies User Manual Version 5.0

Wetland Site Name Wetland CC Date of Assessment 7/30/2020
 Wetland Type Bottomland Hardwood Forest Assessor Name/Organization C. Neaves

Notes on Field Assessment Form (Y/N) NO
 Presence of regulatory considerations (Y/N) NO
 Wetland is intensively managed (Y/N) _____
 Assessment area is located within 50 feet of a natural tributary or other open water (Y/N) YES
 Assessment area is substantially altered by beaver (Y/N) _____
 Assessment area experiences overbank flooding during normal rainfall conditions (Y/N) _____
 Assessment area is on a coastal island (Y/N) _____

Sub-function Rating Summary

Function	Sub-function	Metrics	Rating
Hydrology	Surface Storage and Retention	Condition	LOW
		Sub-surface Storage and Retention	LOW
Water Quality	Pathogen Change	Condition	MEDIUM
		Condition/Opportunity	MEDIUM
		Opportunity Presence (Y/N)	NO
	Particulate Change	Condition	LOW
		Condition/Opportunity	LOW
		Opportunity Presence (Y/N)	NO
	Soluble Change	Condition	MEDIUM
		Condition/Opportunity	MEDIUM
		Opportunity Presence (Y/N)	NO
	Physical Change	Condition	LOW
		Condition/Opportunity	LOW
		Opportunity Presence (Y/N)	NO
	Pollution Change	Condition	NA
		Condition/Opportunity	NA
		Opportunity Presence (Y/N)	NA
Habitat	Physical Structure	Condition	LOW
		Condition/Opportunity	LOW
		Opportunity Presence (Y/N)	LOW
	Landscape Patch Structure	Condition	LOW
		Condition/Opportunity	LOW
	Vegetation Composition	Condition	LOW
		Condition/Opportunity	LOW

Function Rating Summary

Function	Metrics	Rating
Hydrology	Condition	LOW
	Condition/Opportunity	LOW
	Opportunity Presence (Y/N)	NO
Water Quality	Condition	LOW
	Condition/Opportunity	LOW
	Opportunity Presence (Y/N)	NO
Habitat	Condition	LOW
	Condition/Opportunity	LOW
	Opportunity Presence (Y/N)	LOW

Overall Wetland Rating LOW

NC WAM FIELD ASSESSMENT FORM
Accompanies User Manual Version 5.0

USACE AID #	SAW-2020-00047	NCDWR#	20200035
Project Name	Liberty Rock Mitigation Site	Date of Evaluation	7/30/2020
Applicant/Owner Name	Wildlands Engineering	Wetland Site Name	Wetland DD
Wetland Type	Bottomland Hardwood Forest	Assessor Name/Organization	C. Neaves
Level III Ecoregion	Piedmont	Nearest Named Water Body	Rocky River
River Basin	Cape Fear	USGS 8-Digit Catalogue Unit	03030003
County	Randolph	NCDWR Region	Winston-Salem
<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	Precipitation within 48 hrs?	Latitude/Longitude (deci-degrees)	35.819792, -97.561725

Evidence of stressors affecting the assessment area (may not be within the assessment area)

Please circle and/or make note on the last page if evidence of stressors is apparent. Consider departure from reference, if appropriate, in recent past (for instance, within 10 years). Noteworthy stressors include, but are not limited to the following.

- Hydrological modifications (examples: ditches, dams, beaver dams, dikes, berms, ponds, etc.)
- Surface and sub-surface discharges into the wetland (examples: discharges containing obvious pollutants, presence of nearby septic tanks, underground storage tanks (USTs), hog lagoons, etc.)
- Signs of vegetation stress (examples: vegetation mortality, insect damage, disease, storm damage, salt intrusion, etc.)
- Habitat/plant community alteration (examples: mowing, clear-cutting, exotics, etc.)

Is the assessment area intensively managed? Yes No

Regulatory Considerations - Were regulatory considerations evaluated? Yes No If Yes, check all that apply to the assessment area.

- Anadromous fish
- Federally protected species or State endangered or threatened species
- NCDWR riparian buffer rule in effect
- Abuts a Primary Nursery Area (PNA)
- Publicly owned property
- N.C. Division of Coastal Management Area of Environmental Concern (AEC) (including buffer)
- Abuts a stream with a NCDWQ classification of SA or supplemental classifications of HQW, ORW, or Trout
- Designated NCNHP reference community
- Abuts a 303(d)-listed stream or a tributary to a 303(d)-listed stream

What type of natural stream is associated with the wetland, if any? (check all that apply)

- Blackwater
- Brownwater
- Tidal (if tidal, check one of the following boxes) Lunar Wind Both

Is the assessment area on a coastal island? Yes No

Is the assessment area's surface water storage capacity or duration substantially altered by beaver? Yes No

Does the assessment area experience overbank flooding during normal rainfall conditions? Yes No

1. Ground Surface Condition/Vegetation Condition – assessment area condition metric

Check a box in each column. Consider alteration to the ground surface (GS) in the assessment area and vegetation structure (VS) in the assessment area. Compare to reference wetland if applicable (see User Manual). If a reference is not applicable, then rate the assessment area based on evidence an effect.

- | | | |
|---------------------------------------|---------------------------------------|--|
| GS | VS | |
| <input checked="" type="checkbox"/> A | <input type="checkbox"/> A | Not severely altered |
| <input type="checkbox"/> B | <input checked="" type="checkbox"/> B | Severely altered over a majority of the assessment area (ground surface alteration examples: vehicle tracks, excessive sedimentation, fire-plow lanes, skidder tracks, bedding, fill, soil compaction, obvious pollutants) (vegetation structure alteration examples: mechanical disturbance, herbicides, salt intrusion [where appropriate], exotic species, grazing, less diversity [if appropriate], hydrologic alteration) |

2. Surface and Sub-Surface Storage Capacity and Duration – assessment area condition metric

Check a box in each column. Consider surface storage capacity and duration (Surf) and sub-surface storage capacity and duration (Sub). Consider both increase and decrease in hydrology. A ditch ≤ 1 foot deep is considered to affect surface water only, while a ditch > 1 foot deep is expected to affect both surface and sub-surface water. Consider tidal flooding regime, if applicable.

- | | | |
|---------------------------------------|---------------------------------------|--|
| Surf | Sub | |
| <input type="checkbox"/> A | <input type="checkbox"/> A | Water storage capacity and duration are not altered. |
| <input checked="" type="checkbox"/> B | <input checked="" type="checkbox"/> B | Water storage capacity or duration are altered, but not substantially (typically, not sufficient to change vegetation). |
| <input type="checkbox"/> C | <input type="checkbox"/> C | Water storage capacity or duration are substantially altered (typically, alteration sufficient to result in vegetation change) (examples: draining, flooding, soil compaction, filling, excessive sedimentation, underground utility lines). |

3. Water Storage/Surface Relief – assessment area/wetland type condition metric (skip for all marshes)

Check a box in each column. Select the appropriate storage for the assessment area (AA) and the wetland type (WT).

- | | | |
|---------------------------------------|---------------------------------------|---|
| AA | WT | |
| 3a. <input type="checkbox"/> A | <input type="checkbox"/> A | Majority of wetland with depressions able to pond water > 1 deep |
| <input type="checkbox"/> B | <input type="checkbox"/> B | Majority of wetland with depressions able to pond water 6 inches to 1 foot deep |
| <input type="checkbox"/> C | <input type="checkbox"/> C | Majority of wetland with depressions able to pond water 3 to 6 inches deep |
| <input checked="" type="checkbox"/> D | <input checked="" type="checkbox"/> D | Depressions able to pond water < 3 inches deep |
| 3b. <input type="checkbox"/> A | | Evidence that maximum depth of inundation is greater than 2 feet |
| <input type="checkbox"/> B | | Evidence that maximum depth of inundation is between 1 and 2 feet |
| <input checked="" type="checkbox"/> C | | Evidence that maximum depth of inundation is less than 1 foot |

4. Soil Texture/Structure – assessment area condition metric (skip for all marshes)

Check a box from each of the three soil property groups below. Dig soil profile in the dominant assessment area landscape feature. Make soil observations within the top 12 inches. Use most recent National Technical Committee for Hydric Soils guidance for regional indicators.

- 4a. A Sandy soil
- B Loamy or clayey soils exhibiting redoximorphic features (concentrations, depletions, or rhizospheres)
- C Loamy or clayey soils not exhibiting redoximorphic features
- D Loamy or clayey gleyed soil
- E Histosol or histc epipedon
- 4b. A Soil ribbon < 1 inch
- B Soil ribbon ≥ 1 inch
- 4c. A No peat or muck presence
- B A peat or muck presence

5. Discharge into Wetland – opportunity metric

Check a box in each column. Consider surface pollutants or discharges (Surf) and sub-surface pollutants or discharges (Sub). Examples of sub-surface discharges include presence of nearby septic tank, underground storage tank (UST), etc.

- | | | |
|---------------------------------------|---------------------------------------|---|
| Surf | Sub | |
| <input type="checkbox"/> A | <input checked="" type="checkbox"/> A | Little or no evidence of pollutants or discharges entering the assessment area |
| <input checked="" type="checkbox"/> B | <input type="checkbox"/> B | Noticeable evidence of pollutants or discharges entering the wetland and stressing, but not overwhelming the treatment capacity of the assessment area |
| <input type="checkbox"/> C | <input type="checkbox"/> C | Noticeable evidence of pollutants or discharges (pathogen, particulate, or soluble) entering the assessment area and potentially overwhelming the treatment capacity of the wetland (water discoloration, dead vegetation, excessive sedimentation, odor) |

6. Land Use – opportunity metric (skip for non-riparian wetlands)

Check all that apply (at least one box in each column). Evaluation involves a GIS effort with field adjustment. Consider sources draining to assessment area within entire upstream watershed (WS), within 5 miles and within the watershed draining to the assessment area (5M), and within 2 miles and within the watershed draining to the assessment area (2M).

- | | | | |
|---------------------------------------|---------------------------------------|---------------------------------------|---|
| WS | 5M | 2M | |
| <input type="checkbox"/> A | <input type="checkbox"/> A | <input type="checkbox"/> A | ≥ 10% impervious surfaces |
| <input type="checkbox"/> B | <input type="checkbox"/> B | <input type="checkbox"/> B | Confined animal operations (or other local, concentrated source of pollutants) |
| <input checked="" type="checkbox"/> C | <input checked="" type="checkbox"/> C | <input checked="" type="checkbox"/> C | ≥ 20% coverage of pasture |
| <input type="checkbox"/> D | <input type="checkbox"/> D | <input type="checkbox"/> D | ≥ 20% coverage of agricultural land (regularly plowed land) |
| <input checked="" type="checkbox"/> E | <input checked="" type="checkbox"/> E | <input checked="" type="checkbox"/> E | ≥ 20% coverage of maintained grass/herb |
| <input type="checkbox"/> F | <input type="checkbox"/> F | <input type="checkbox"/> F | ≥ 20% coverage of clear-cut land |
| <input type="checkbox"/> G | <input type="checkbox"/> G | <input type="checkbox"/> G | Little or no opportunity to improve water quality. Lack of opportunity may result from little or no disturbance in the watershed or hydrologic alterations that prevent drainage and/or overbank flow from affecting the assessment area. |

7. Wetland Acting as Vegetated Buffer – assessment area/wetland complex condition metric (skip for non-riparian wetlands)

- 7a. Is assessment area within 50 feet of a tributary or other open water?
- Yes No If Yes, continue to 7b. If No, skip to Metric 8.
- Wetland buffer need only be present on one side of the water body. Make buffer judgment based on the average width of wetland. Record a note if a portion of the buffer has been removed or disturbed.
- 7b. How much of the first 50 feet from the bank is wetland? (Wetland buffer need only be present on one side of the water body. Make buffer judgment based on the average width of wetland. Record a note if a portion of the buffer has been removed or disturbed.)
- A ≥ 50 feet
- B From 30 to < 50 feet
- C From 15 to < 30 feet
- D From 5 to < 15 feet
- E < 5 feet or buffer bypassed by ditches
- 7c. Tributary width. If the tributary is anastomosed, combine widths of channels/braids for a total width.
- ≤ 15-foot wide > 15-foot wide Other open water (no tributary present)
- 7d. Do roots of assessment area vegetation extend into the bank of the tributary/open water?
- Yes No
- 7e. Is stream or other open water sheltered or exposed?
- Sheltered – adjacent open water with width < 2500 feet and no regular boat traffic.
- Exposed – adjacent open water with width ≥ 2500 feet or regular boat traffic.

8. Wetland Width at the Assessment Area – wetland type/wetland complex condition metric (evaluate WT for all marshes and Estuarine Woody Wetland only; evaluate WC for Bottomland Hardwood Forest, Headwater Forest, and Riverine Swamp Forest only)

Check a box in each column for riverine wetlands only. Select the average width for the wetland type at the assessment area (WT) and the wetland complex at the assessment area (WC). See User Manual for WT and WC boundaries.

- | | | |
|---------------------------------------|---------------------------------------|-----------------------|
| WT | WC | |
| <input type="checkbox"/> A | <input type="checkbox"/> A | ≥ 100 feet |
| <input type="checkbox"/> B | <input type="checkbox"/> B | From 80 to < 100 feet |
| <input type="checkbox"/> C | <input type="checkbox"/> C | From 50 to < 80 feet |
| <input type="checkbox"/> D | <input type="checkbox"/> D | From 40 to < 50 feet |
| <input type="checkbox"/> E | <input type="checkbox"/> E | From 30 to < 40 feet |
| <input type="checkbox"/> F | <input type="checkbox"/> F | From 15 to < 30 feet |
| <input checked="" type="checkbox"/> G | <input checked="" type="checkbox"/> G | From 5 to < 15 feet |
| <input type="checkbox"/> H | <input type="checkbox"/> H | < 5 feet |

9. Inundation Duration – assessment area condition metric (skip for non-riparian wetlands)

Answer for assessment area dominant landform.

- XA Evidence of short-duration inundation (< 7 consecutive days)
XB Evidence of saturation, without evidence of inundation
XC Evidence of long-duration inundation or very long-duration inundation (7 to 30 consecutive days or more)

10. Indicators of Deposition – assessment area condition metric (skip for non-riparian wetlands and all marshes)

Consider recent deposition only (no plant growth since deposition).

- XA Sediment deposition is not excessive, but at approximately natural levels.
XB Sediment deposition is excessive, but not overwhelming the wetland.
XC Sediment deposition is excessive and is overwhelming the wetland.

11. Wetland Size – wetland type/wetland complex condition metric

Check a box in each column. Involves a GIS effort with field adjustment. This metric evaluates three aspects of the wetland area: the size of the wetland type (WT), the size of the wetland complex (WC), and the size of the forested wetland (FW) (if applicable, see User Manual). See the User Manual for boundaries of these evaluation areas. If assessment area is clear-cut, select "K" for the FW column.

- WT WC FW (if applicable)
XA A A ≥ 500 acres
XB B B From 100 to < 500 acres
XC C C From 50 to < 100 acres
XD D D From 25 to < 50 acres
XE E E From 10 to < 25 acres
XF F F From 5 to < 10 acres
XG G G From 1 to < 5 acres
XH H H From 0.5 to < 1 acre
XI I I From 0.1 to < 0.5 acre
XJ J J From 0.01 to < 0.1 acre
XK K K < 0.01 acre or assessment area is clear-cut

12. Wetland Intactness – wetland type condition metric (evaluate for Pocosins only)

- XA Pocosin is the full extent (≥ 90%) of its natural landscape size.
XB Pocosin type is < 90% of the full extent of its natural landscape size.

13. Connectivity to Other Natural Areas – landscape condition metric

13a. Check appropriate box(es) (a box may be checked in each column). Involves a GIS effort with field adjustment. This metric evaluates whether the wetland is well connected (Well) and/or loosely connected (Loosely) to the landscape patch, the contiguous naturally vegetated area and open water (if appropriate). Boundaries are formed by four-lane roads, regularly maintained utility line corridors the width of a four-lane road or wider, urban landscapes, maintained fields (pasture and agriculture), or open water > 300 feet wide.

- Well Loosely
XA A A ≥ 500 acres
XB B B From 100 to < 500 acres
XC C C From 50 to < 100 acres
XD D D From 10 to < 50 acres
XE E E < 10 acres
XF F F Wetland type has a poor or no connection to other natural habitats

13b. Evaluate for marshes only.

- Yes No Wetland type has a surface hydrology connection to open waters/stream or tidal wetlands.

14. Edge Effect – wetland type condition metric (skip for all marshes and Estuarine Woody Wetland)

May involve a GIS effort with field adjustment. Estimate distance from wetland type boundary to artificial edges. Artificial edges include non-forested areas ≥ 40 feet wide such as fields, development, roads, regularly maintained utility line corridors, and clear-cuts. Consider the eight main points of the compass. Artificial edge occurs within 150 feet in how many directions? If the assessment area is clear cut, select option "C."

- XA 0
XB 1 to 4
XC 5 to 8

15. Vegetative Composition – assessment area condition metric (skip for all marshes and Pine Flat)

- XA Vegetation is close to reference condition in species present and their proportions. Lower strata composed of appropriate species, with exotic plants absent or sparse within the assessment area.
XB Vegetation is different from reference condition in species diversity or proportions, but still largely composed of native species characteristic of the wetland type. This may include communities of weedy native species that develop after clearcutting or clearing. It also includes communities with exotics present, but not dominant, over a large portion of the expected strata.
XC Vegetation severely altered from reference in composition, or expected species are unnaturally absent (planted stands of non-characteristic species or at least one stratum inappropriately composed of a single species), or exotic species are dominant in at least one stratum.

16. Vegetative Diversity – assessment area condition metric (evaluate for Non-tidal Freshwater Marsh only)

- XA Vegetation diversity is high and is composed primarily of native species (< 10% cover of exotics).
XB Vegetation diversity is low or has > 10% to 50% cover of exotics.
XC Vegetation is dominated by exotic species (> 50 % cover of exotics).

17. Vegetative Structure – assessment area/wetland type condition metric

17a. Is vegetation present?

- Yes No If Yes, continue to 17b. If No, skip to Metric 18.

17b. Evaluate percent coverage of assessment area vegetation for all marshes only. Skip to 17c for non-marsh wetlands.

- XA ≥ 25% coverage of vegetation
XB < 25% coverage of vegetation

17c. Check a box in each column for each stratum. Evaluate this portion of the metric for non-marsh wetlands. Consider structure in airspace above the assessment area (AA) and the wetland type (WT) separately.

- AA WT
Canopy XA A Canopy closed, or nearly closed, with natural gaps associated with natural processes
XB B Canopy present, but opened more than natural gaps
XC C Canopy sparse or absent
Mid-Story XA A Dense mid-story/sapling layer
XB B Moderate density mid-story/sapling layer
XC C Mid-story/sapling layer sparse or absent
Shrub XA A Dense shrub layer
XB B Moderate density shrub layer
XC C Shrub layer sparse or absent
Herb XA A Dense herb layer
XB B Moderate density herb layer
XC C Herb layer sparse or absent

18. Snags – wetland type condition metric (skip for all marshes)

- XA Large snags (more than one) are visible (> 12 inches DBH, or large relative to species present and landscape stability).
XB Not A

19. Diameter Class Distribution – wetland type condition metric (skip for all marshes)

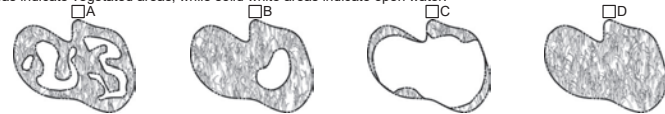
- XA Majority of canopy trees have stems > 6 inches in diameter at breast height (DBH); many large trees (> 12 inches DBH) are present.
XB Majority of canopy trees have stems between 6 and 12 inches DBH, few are > 12 inch DBH.
XC Majority of canopy trees are < 6 inches DBH or no trees.

20. Large Woody Debris – wetland type condition metric (skip for all marshes)

- XA Large logs (more than one) are visible (> 12 inches in diameter, or large relative to species present and landscape stability).
XB Not A

21. Vegetation/Open Water Dispersion – wetland type/open water condition metric (evaluate for Non-Tidal Freshwater Marsh only)

Select the figure that best describes the amount of interspersion between vegetation and open water in the growing season. Patterned areas indicate vegetated areas, while solid white areas indicate open water.



22. Hydrologic Connectivity – assessment area condition metric (evaluate for riparian wetlands and Salt/Brackish Marsh only)

Examples of activities that may severely alter hydrologic connectivity include intensive ditching, fill, sedimentation, channelization, diversion, man-made berms, beaver dams, and stream incision. Documentation required if evaluated as B, C, or D.

- XA Overbank and overland flow are not severely altered in the assessment area.
XB Overbank flow is severely altered in the assessment area.
XC Overland flow is severely altered in the assessment area.
XD Both overbank and overland flow are severely altered in the assessment area.

Notes

NC WAM Wetland Rating Sheet
Accompanies User Manual Version 5.0

Wetland Site Name Wetland DD Date of Assessment 7/30/2020
 Wetland Type Bottomland Hardwood Forest Assessor Name/Organization C. Neaves
 Notes on Field Assessment Form (Y/N) NO
 Presence of regulatory considerations (Y/N) NO
 Wetland is intensively managed (Y/N) _____
 Assessment area is located within 50 feet of a natural tributary or other open water (Y/N) NO
 Assessment area is substantially altered by beaver (Y/N) _____
 Assessment area experiences overbank flooding during normal rainfall conditions (Y/N) _____
 Assessment area is on a coastal island (Y/N) _____

Sub-function Rating Summary

Function	Sub-function	Metrics	Rating
Hydrology	Surface Storage and Retention	Condition	LOW
	Sub-surface Storage and Retention	Condition	LOW
Water Quality	Pathogen Change	Condition	MEDIUM
		Condition/Opportunity	MEDIUM
	Particulate Change	Opportunity Presence (Y/N)	NO
		Condition	LOW
Soluble Change	Condition/Opportunity	Condition	LOW
		Condition/Opportunity	LOW
	Physical Change	Opportunity Presence (Y/N)	NO
		Condition	MEDIUM
Pollution Change	Condition/Opportunity	Condition	LOW
		Condition/Opportunity	LOW
	Habitat	Opportunity Presence (Y/N)	NO
		Condition	NA
Habitat	Physical Structure	Condition	LOW
	Landscape Patch Structure	Condition	LOW
	Vegetation Composition	Condition	LOW

Function Rating Summary

Function	Metrics	Rating
Hydrology	Condition	LOW
Water Quality	Condition	LOW
	Condition/Opportunity	LOW
	Opportunity Presence (Y/N)	NO
Habitat	Condition	LOW

Overall Wetland Rating LOW

NC WAM FIELD ASSESSMENT FORM
Accompanies User Manual Version 5.0

USACE AID #	SAW-2020-00047	NCDWR#	20200035
Project Name	Liberty Rock Mitigation Site	Date of Evaluation	7/30/2020
Applicant/Owner Name	Wildlands Engineering	Wetland Site Name	Wetland EE Pasture
Wetland Type	Bottomland Hardwood Forest	Assessor Name/Organization	C. Neaves
Level III Ecoregion	Piedmont	Nearest Named Water Body	Rocky River
River Basin	Cape Fear	USGS 8-Digit Catalogue Unit	03030003
County	Randolph	NCDWR Region	Winston-Salem
<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	Precipitation within 48 hrs?	Latitude/Longitude (deci-degrees)	35.820567, -79.562707

Evidence of stressors affecting the assessment area (may not be within the assessment area)

Please circle and/or make note on the last page if evidence of stressors is apparent. Consider departure from reference, if appropriate, in recent past (for instance, within 10 years). Noteworthy stressors include, but are not limited to the following.

- Hydrological modifications (examples: ditches, dams, beaver dams, dikes, berms, ponds, etc.)
- Surface and sub-surface discharges into the wetland (examples: discharges containing obvious pollutants, presence of nearby septic tanks, underground storage tanks (USTs), hog lagoons, etc.)
- Signs of vegetation stress (examples: vegetation mortality, insect damage, storm damage, salt intrusion, etc.)
- Habitat/plant community alteration (examples: mowing, clear-cutting, exotics, etc.)

Is the assessment area intensively managed? Yes No

Regulatory Considerations - Were regulatory considerations evaluated? Yes No If Yes, check all that apply to the assessment area.

- Anadromous fish
- Federally protected species or State endangered or threatened species
- NCDWR riparian buffer rule in effect
- Abuts a Primary Nursery Area (PNA)
- Publicly owned property
- N.C. Division of Coastal Management Area of Environmental Concern (AEC) (including buffer)
- Abuts a stream with a NCDWQ classification of SA or supplemental classifications of HQW, ORW, or Trout
- Designated NCNHP reference community
- Abuts a 303(d)-listed stream or a tributary to a 303(d)-listed stream

What type of natural stream is associated with the wetland, if any? (check all that apply)

- Blackwater
- Brownwater
- Tidal (if tidal, check one of the following boxes) Lunar Wind Both

Is the assessment area on a coastal island? Yes No

Is the assessment area's surface water storage capacity or duration substantially altered by beaver? Yes No

Does the assessment area experience overbank flooding during normal rainfall conditions? Yes No

1. Ground Surface Condition/Vegetation Condition – assessment area condition metric

Check a box in each column. Consider alteration to the ground surface (GS) in the assessment area and vegetation structure (VS) in the assessment area. Compare to reference wetland if applicable (see User Manual). If a reference is not applicable, then rate the assessment area based on evidence an effect.

- | | | |
|---------------------------------------|---------------------------------------|--|
| GS | VS | |
| <input checked="" type="checkbox"/> A | <input type="checkbox"/> A | Not severely altered |
| <input type="checkbox"/> B | <input checked="" type="checkbox"/> B | Severely altered over a majority of the assessment area (ground surface alteration examples: vehicle tracks, excessive sedimentation, fire-plow lanes, skidder tracks, bedding, fill, soil compaction, obvious pollutants) (vegetation structure alteration examples: mechanical disturbance, herbicides, salt intrusion [where appropriate], exotic species, grazing, less diversity [if appropriate], hydrologic alteration) |

2. Surface and Sub-Surface Storage Capacity and Duration – assessment area condition metric

Check a box in each column. Consider surface storage capacity and duration (Surf) and sub-surface storage capacity and duration (Sub). Consider both increase and decrease in hydrology. A ditch ≤ 1 foot deep is considered to affect surface water only, while a ditch > 1 foot deep is expected to affect both surface and sub-surface water. Consider tidal flooding regime, if applicable.

- | | | |
|---------------------------------------|---------------------------------------|--|
| Surf | Sub | |
| <input type="checkbox"/> A | <input type="checkbox"/> A | Water storage capacity and duration are not altered. |
| <input checked="" type="checkbox"/> B | <input checked="" type="checkbox"/> B | Water storage capacity or duration are altered, but not substantially (typically, not sufficient to change vegetation). |
| <input type="checkbox"/> C | <input type="checkbox"/> C | Water storage capacity or duration are substantially altered (typically, alteration sufficient to result in vegetation change) (examples: draining, flooding, soil compaction, filling, excessive sedimentation, underground utility lines). |

3. Water Storage/Surface Relief – assessment area/wetland type condition metric (skip for all marshes)

Check a box in each column. Select the appropriate storage for the assessment area (AA) and the wetland type (WT).

- | | | |
|---------------------------------------|---------------------------------------|---|
| AA | WT | |
| 3a. <input type="checkbox"/> A | <input type="checkbox"/> A | Majority of wetland with depressions able to pond water > 1 foot deep |
| <input type="checkbox"/> B | <input type="checkbox"/> B | Majority of wetland with depressions able to pond water 6 inches to 1 foot deep |
| <input type="checkbox"/> C | <input type="checkbox"/> C | Majority of wetland with depressions able to pond water 3 to 6 inches deep |
| <input checked="" type="checkbox"/> D | <input checked="" type="checkbox"/> D | Depressions able to pond water < 3 inches deep |
| 3b. <input type="checkbox"/> A | <input type="checkbox"/> A | Evidence that maximum depth of inundation is greater than 2 feet |
| <input type="checkbox"/> B | <input type="checkbox"/> B | Evidence that maximum depth of inundation is between 1 and 2 feet |
| <input checked="" type="checkbox"/> C | <input checked="" type="checkbox"/> C | Evidence that maximum depth of inundation is less than 1 foot |

4. Soil Texture/Structure – assessment area condition metric (skip for all marshes)

Check a box from each of the three soil property groups below. Dig soil profile in the dominant assessment area landscape feature. Make soil observations within the top 12 inches. Use most recent National Technical Committee for Hydric Soils guidance for regional indicators.

- 4a. A Sandy soil
 B Loamy or clayey soils exhibiting redoximorphic features (concentrations, depletions, or rhizospheres)
 C Loamy or clayey soils not exhibiting redoximorphic features
 D Loamy or clayey gleyed soil
 E Histosol or histc epipedon
- 4b. A Soil ribbon < 1 inch
 B Soil ribbon ≥ 1 inch
- 4c. A No peat or muck presence
 B A peat or muck presence

5. Discharge into Wetland – opportunity metric

Check a box in each column. Consider surface pollutants or discharges (Surf) and sub-surface pollutants or discharges (Sub). Examples of sub-surface discharges include presence of nearby septic tank, underground storage tank (UST), etc.

- | | | |
|---------------------------------------|---------------------------------------|---|
| Surf | Sub | |
| <input type="checkbox"/> A | <input checked="" type="checkbox"/> A | Little or no evidence of pollutants or discharges entering the assessment area |
| <input checked="" type="checkbox"/> B | <input type="checkbox"/> B | Noticeable evidence of pollutants or discharges entering the wetland and stressing, but not overwhelming the treatment capacity of the assessment area |
| <input type="checkbox"/> C | <input type="checkbox"/> C | Noticeable evidence of pollutants or discharges (pathogen, particulate, or soluble) entering the assessment area and potentially overwhelming the treatment capacity of the wetland (water discoloration, dead vegetation, excessive sedimentation, odor) |

6. Land Use – opportunity metric (skip for non-riparian wetlands)

Check all that apply (at least one box in each column). Evaluation involves a GIS effort with field adjustment. Consider sources draining to assessment area within entire upstream watershed (WS), within 5 miles and within the watershed draining to the assessment area (5M), and within 2 miles and within the watershed draining to the assessment area (2M).

- | | | | |
|---------------------------------------|---------------------------------------|---------------------------------------|---|
| WS | 5M | 2M | |
| <input type="checkbox"/> A | <input type="checkbox"/> A | <input type="checkbox"/> A | ≥ 10% impervious surfaces |
| <input type="checkbox"/> B | <input type="checkbox"/> B | <input type="checkbox"/> B | Confined animal operations (or other local, concentrated source of pollutants) |
| <input checked="" type="checkbox"/> C | <input checked="" type="checkbox"/> C | <input checked="" type="checkbox"/> C | ≥ 20% coverage of pasture |
| <input type="checkbox"/> D | <input type="checkbox"/> D | <input type="checkbox"/> D | ≥ 20% coverage of agricultural land (regularly plowed land) |
| <input checked="" type="checkbox"/> E | <input checked="" type="checkbox"/> E | <input checked="" type="checkbox"/> E | ≥ 20% coverage of maintained grass/herb |
| <input type="checkbox"/> F | <input type="checkbox"/> F | <input type="checkbox"/> F | ≥ 20% coverage of clear-cut land |
| <input type="checkbox"/> G | <input type="checkbox"/> G | <input type="checkbox"/> G | Little or no opportunity to improve water quality. Lack of opportunity may result from little or no disturbance in the watershed or hydrologic alterations that prevent drainage and/or overbank flow from affecting the assessment area. |

7. Wetland Acting as Vegetated Buffer – assessment area/wetland complex condition metric (skip for non-riparian wetlands)

- 7a. Is assessment area within 50 feet of a tributary or other open water?
 Yes No If Yes, continue to 7b. If No, skip to Metric 8.
 Wetland buffer need only be present on one side of the water body. Make buffer judgment based on the average width of wetland. Record a note if a portion of the buffer has been removed or disturbed.
- 7b. How much of the first 50 feet from the bank is wetland? (Wetland buffer need only be present on one side of the water body. Make buffer judgment based on the average width of wetland. Record a note if a portion of the buffer has been removed or disturbed.)
 A ≥ 50 feet
 B From 30 to < 50 feet
 C From 15 to < 30 feet
 D From 5 to < 15 feet
 E < 5 feet or buffer bypassed by ditches
- 7c. Tributary width. If the tributary is anastomosed, combine widths of channels/braids for a total width.
 ≤ 15-foot wide > 15-foot wide Other open water (no tributary present)
- 7d. Do roots of assessment area vegetation extend into the bank of the tributary/open water?
 Yes No
- 7e. Is stream or other open water sheltered or exposed?
 Sheltered – adjacent open water with width < 2500 feet and no regular boat traffic.
 Exposed – adjacent open water with width ≥ 2500 feet or regular boat traffic.

8. Wetland Width at the Assessment Area – wetland type/wetland complex condition metric (evaluate WT for all marshes and Estuarine Woody Wetland only; evaluate WC for Bottomland Hardwood Forest, Headwater Forest, and Riverine Swamp Forest only)

Check a box in each column for riverine wetlands only. Select the average width for the wetland type at the assessment area (WT) and the wetland complex at the assessment area (WC). See User Manual for WT and WC boundaries.

- | | | |
|---------------------------------------|---------------------------------------|-----------------------|
| WT | WC | |
| <input type="checkbox"/> A | <input type="checkbox"/> A | ≥ 100 feet |
| <input type="checkbox"/> B | <input type="checkbox"/> B | From 80 to < 100 feet |
| <input type="checkbox"/> C | <input type="checkbox"/> C | From 50 to < 80 feet |
| <input type="checkbox"/> D | <input type="checkbox"/> D | From 40 to < 50 feet |
| <input type="checkbox"/> E | <input type="checkbox"/> E | From 30 to < 40 feet |
| <input checked="" type="checkbox"/> F | <input checked="" type="checkbox"/> F | From 15 to < 30 feet |
| <input type="checkbox"/> G | <input type="checkbox"/> G | From 5 to < 15 feet |
| <input type="checkbox"/> H | <input type="checkbox"/> H | < 5 feet |

9. Inundation Duration – assessment area condition metric (skip for non-riparian wetlands)

Answer for assessment area dominant landform.

- A Evidence of short-duration inundation (< 7 consecutive days)
 B Evidence of saturation, without evidence of inundation
 C Evidence of long-duration inundation or very long-duration inundation (7 to 30 consecutive days or more)

10. Indicators of Deposition – assessment area condition metric (skip for non-riparian wetlands and all marshes)

Consider recent deposition only (no plant growth since deposition).

- A Sediment deposition is not excessive, but at approximately natural levels.
 B Sediment deposition is excessive, but not overwhelming the wetland.
 C Sediment deposition is excessive and is overwhelming the wetland.

11. Wetland Size – wetland type/wetland complex condition metric

Check a box in each column. Involves a GIS effort with field adjustment. This metric evaluates three aspects of the wetland area: the size of the wetland type (WT), the size of the wetland complex (WC), and the size of the forested wetland (FW) (if applicable, see User Manual). See the User Manual for boundaries of these evaluation areas. If assessment area is clear-cut, select "K" for the FW column.

- | | | |
|---------------------------------------|---------------------------------------|---|
| WT | WC | FW (if applicable) |
| <input type="checkbox"/> A | <input type="checkbox"/> A | <input type="checkbox"/> A ≥ 500 acres |
| <input type="checkbox"/> B | <input type="checkbox"/> B | <input type="checkbox"/> B From 100 to < 500 acres |
| <input type="checkbox"/> C | <input type="checkbox"/> C | <input type="checkbox"/> C From 50 to < 100 acres |
| <input type="checkbox"/> D | <input type="checkbox"/> D | <input type="checkbox"/> D From 25 to < 50 acres |
| <input type="checkbox"/> E | <input type="checkbox"/> E | <input type="checkbox"/> E From 10 to < 25 acres |
| <input type="checkbox"/> F | <input type="checkbox"/> F | <input type="checkbox"/> F From 5 to < 10 acres |
| <input type="checkbox"/> G | <input type="checkbox"/> G | <input type="checkbox"/> G From 1 to < 5 acres |
| <input type="checkbox"/> H | <input type="checkbox"/> H | <input type="checkbox"/> H From 0.5 to < 1 acre |
| <input checked="" type="checkbox"/> I | <input checked="" type="checkbox"/> I | <input type="checkbox"/> I From 0.1 to < 0.5 acre |
| <input type="checkbox"/> J | <input type="checkbox"/> J | <input type="checkbox"/> J From 0.01 to < 0.1 acre |
| <input type="checkbox"/> K | <input type="checkbox"/> K | <input checked="" type="checkbox"/> K < 0.01 acre or assessment area is clear-cut |

12. Wetland Intactness – wetland type condition metric (evaluate for Pocosins only)

- A Pocosin is the full extent (≥ 90%) of its natural landscape size.
 B Pocosin type is < 90% of the full extent of its natural landscape size.

13. Connectivity to Other Natural Areas – landscape condition metric

13a. Check appropriate box(es) (a box may be checked in each column). Involves a GIS effort with field adjustment. This metric evaluates whether the wetland is well connected (Well) and/or loosely connected (Loosely) to the landscape patch, the contiguous naturally vegetated area and open water (if appropriate). Boundaries are formed by four-lane roads, regularly maintained utility line corridors the width of a four-lane road or wider, urban landscapes, maintained fields (pasture and agriculture), or open water > 300 feet wide.

- | | | |
|----------------------------|---------------------------------------|--|
| Well | Loosely | |
| <input type="checkbox"/> A | <input type="checkbox"/> A | ≥ 500 acres |
| <input type="checkbox"/> B | <input checked="" type="checkbox"/> B | From 100 to < 500 acres |
| <input type="checkbox"/> C | <input type="checkbox"/> C | From 50 to < 100 acres |
| <input type="checkbox"/> D | <input type="checkbox"/> D | From 10 to < 50 acres |
| <input type="checkbox"/> E | <input type="checkbox"/> E | < 10 acres |
| <input type="checkbox"/> F | <input type="checkbox"/> F | Wetland type has a poor or no connection to other natural habitats |

13b. Evaluate for marshes only.

- Yes No Wetland type has a surface hydrology connection to open waters/stream or tidal wetlands.

14. Edge Effect – wetland type condition metric (skip for all marshes and Estuarine Woody Wetland)

May involve a GIS effort with field adjustment. Estimate distance from wetland type boundary to artificial edges. Artificial edges include non-forested areas ≥ 40 feet wide such as fields, development, roads, regularly maintained utility line corridors, and clear-cuts. Consider the eight main points of the compass. Artificial edge occurs within 150 feet in how many directions? If the assessment area is clear cut, select option "C."

- A 0
 B 1 to 4
 C 5 to 8

15. Vegetative Composition – assessment area condition metric (skip for all marshes and Pine Flat)

- A Vegetation is close to reference condition in species present and their proportions. Lower strata composed of appropriate species, with exotic plants absent or sparse within the assessment area.
 B Vegetation is different from reference condition in species diversity or proportions, but still largely composed of native species characteristic of the wetland type. This may include communities of weedy native species that develop after clearcutting or clearing. It also includes communities with exotics present, but not dominant, over a large portion of the expected strata.
 C Vegetation severely altered from reference in composition, or expected species are unnaturally absent (planted stands of non-characteristic species or at least one stratum inappropriately composed of a single species), or exotic species are dominant in at least one stratum.

16. Vegetative Diversity – assessment area condition metric (evaluate for Non-tidal Freshwater Marsh only)

- A Vegetation diversity is high and is composed primarily of native species (< 10% cover of exotics).
 B Vegetation diversity is low or has > 10% to 50% cover of exotics.
 C Vegetation is dominated by exotic species (> 50 % cover of exotics).

17. **Vegetative Structure – assessment area/wetland type condition metric**

17a. Is vegetation present?

Yes No If Yes, continue to 17b. If No, skip to Metric 18.

17b. Evaluate percent coverage of assessment area vegetation for all marshes only. Skip to 17c for non-marsh wetlands.

A ≥ 25% coverage of vegetation
 B < 25% coverage of vegetation

17c. **Check a box in each column for each stratum.** Evaluate this portion of the metric for non-marsh wetlands. Consider structure in airspace above the assessment area (AA) and the wetland type (WT) separately.

	AA	WT	
Canopy	<input type="checkbox"/> A	<input type="checkbox"/> A	Canopy closed, or nearly closed, with natural gaps associated with natural processes
	<input type="checkbox"/> B	<input type="checkbox"/> B	Canopy present, but opened more than natural gaps
	<input checked="" type="checkbox"/> C	<input checked="" type="checkbox"/> C	Canopy sparse or absent
Mid-Story	<input type="checkbox"/> A	<input type="checkbox"/> A	Dense mid-story/sapling layer
	<input type="checkbox"/> B	<input type="checkbox"/> B	Moderate density mid-story/sapling layer
	<input checked="" type="checkbox"/> C	<input checked="" type="checkbox"/> C	Mid-story/sapling layer sparse or absent
Shrub	<input type="checkbox"/> A	<input type="checkbox"/> A	Dense shrub layer
	<input type="checkbox"/> B	<input type="checkbox"/> B	Moderate density shrub layer
	<input checked="" type="checkbox"/> C	<input checked="" type="checkbox"/> C	Shrub layer sparse or absent
Herb	<input checked="" type="checkbox"/> A	<input checked="" type="checkbox"/> A	Dense herb layer
	<input type="checkbox"/> B	<input type="checkbox"/> B	Moderate density herb layer
	<input type="checkbox"/> C	<input type="checkbox"/> C	Herb layer sparse or absent

18. **Snags – wetland type condition metric (skip for all marshes)**

A Large snags (more than one) are visible (> 12 inches DBH, or large relative to species present and landscape stability).
 B Not A

19. **Diameter Class Distribution – wetland type condition metric (skip for all marshes)**

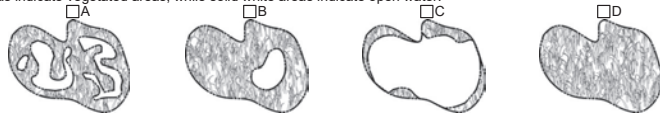
A Majority of canopy trees have stems > 6 inches in diameter at breast height (DBH); many large trees (> 12 inches DBH) are present.
 B Majority of canopy trees have stems between 6 and 12 inches DBH, few are > 12 inch DBH.
 C Majority of canopy trees are < 6 inches DBH or no trees.

20. **Large Woody Debris – wetland type condition metric (skip for all marshes)**

Include both natural debris and man-placed natural debris.
 A Large logs (more than one) are visible (> 12 inches in diameter, or large relative to species present and landscape stability).
 B Not A

21. **Vegetation/Open Water Dispersion – wetland type/open water condition metric (evaluate for Non-Tidal Freshwater Marsh only)**

Select the figure that best describes the amount of interspersed vegetation and open water in the growing season. Patterned areas indicate vegetated areas, while solid white areas indicate open water.



22. **Hydrologic Connectivity – assessment area condition metric (evaluate for riparian wetlands and Salt/Brackish Marsh only)**

Examples of activities that may severely alter hydrologic connectivity include intensive ditching, fill, sedimentation, channelization, diversion, man-made berms, beaver dams, and stream incision. Documentation required if evaluated as B, C, or D.

A Overbank and overland flow are not severely altered in the assessment area.
 B Overbank flow is severely altered in the assessment area.
 C Overland flow is severely altered in the assessment area.
 D Both overbank and overland flow are severely altered in the assessment area.

Notes

**NC WAM Wetland Rating Sheet
 Accompanies User Manual Version 5.0**

Wetland Site Name Wetland EE Pasture Date of Assessment 7/30/2020
 Wetland Type Bottomland Hardwood Forest Assessor Name/Organization C. Neaves

Notes on Field Assessment Form (Y/N) NO
 Presence of regulatory considerations (Y/N) NO
 Wetland is intensively managed (Y/N) _____
 Assessment area is located within 50 feet of a natural tributary or other open water (Y/N) NO
 Assessment area is substantially altered by beaver (Y/N) _____
 Assessment area experiences overbank flooding during normal rainfall conditions (Y/N) _____
 Assessment area is on a coastal island (Y/N) _____

Sub-function Rating Summary

Function	Sub-function	Metrics	Rating
Hydrology	Surface Storage and Retention	Condition	LOW
		Sub-surface Storage and Retention	Condition LOW
Water Quality	Pathogen Change	Condition	LOW
		Condition/Opportunity	LOW
		Opportunity Presence (Y/N)	NO
	Particulate Change	Condition	LOW
		Condition/Opportunity	LOW
		Opportunity Presence (Y/N)	NO
	Soluble Change	Condition	LOW
		Condition/Opportunity	LOW
		Opportunity Presence (Y/N)	NO
	Physical Change	Condition	LOW
		Condition/Opportunity	LOW
		Opportunity Presence (Y/N)	NO
	Pollution Change	Condition	NA
		Condition/Opportunity	NA
		Opportunity Presence (Y/N)	NA
Habitat	Physical Structure	Condition	LOW
	Landscape Patch Structure	Condition	LOW
	Vegetation Composition	Condition	LOW

Function Rating Summary

Function	Metrics	Rating
Hydrology	Condition	LOW
	Condition	LOW
	Condition/Opportunity	LOW
Water Quality	Condition	LOW
	Condition/Opportunity	LOW
	Opportunity Presence (Y/N)	NO
Habitat	Condition	LOW

Overall Wetland Rating LOW

NC WAM FIELD ASSESSMENT FORM
Accompanies User Manual Version 5.0

USACE AID #	SAW-2020-00047	NCDWR#	20200035
Project Name	Liberty Rock Mitigation Site	Date of Evaluation	7/30/2020
Applicant/Owner Name	Wildlands Engineering	Wetland Site Name	Wetland EE Woods
Wetland Type	Bottomland Hardwood Forest	Assessor Name/Organization	C. Neaves
Level III Ecoregion	Piedmont	Nearest Named Water Body	Rocky River
River Basin	Cape Fear	USGS 8-Digit Catalogue Unit	03030003
County	Randolph	NCDWR Region	Winston-Salem
<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	Precipitation within 48 hrs?	Latitude/Longitude (deci-degrees)	35.820607, -79.563226

Evidence of stressors affecting the assessment area (may not be within the assessment area)

Please circle and/or make note on the last page if evidence of stressors is apparent. Consider departure from reference, if appropriate, in recent past (for instance, within 10 years). Noteworthy stressors include, but are not limited to the following.

- Hydrological modifications (examples: ditches, dams, beaver dams, dikes, berms, ponds, etc.)
- Surface and sub-surface discharges into the wetland (examples: discharges containing obvious pollutants, presence of nearby septic tanks, underground storage tanks (USTs), hog lagoons, etc.)
- Signs of vegetation stress (examples: vegetation mortality, insect damage, disease, storm damage, salt intrusion, etc.)
- Habitat/plant community alteration (examples: mowing, clear-cutting, exotics, etc.)

Is the assessment area intensively managed? Yes No

Regulatory Considerations - Were regulatory considerations evaluated? Yes No If Yes, check all that apply to the assessment area.

- Anadromous fish
- Federally protected species or State endangered or threatened species
- NCDWR riparian buffer rule in effect
- Abuts a Primary Nursery Area (PNA)
- Publicly owned property
- N.C. Division of Coastal Management Area of Environmental Concern (AEC) (including buffer)
- Abuts a stream with a NCDWQ classification of SA or supplemental classifications of HQW, ORW, or Trout
- Designated NCNHP reference community
- Abuts a 303(d)-listed stream or a tributary to a 303(d)-listed stream

What type of natural stream is associated with the wetland, if any? (check all that apply)

- Blackwater
- Brownwater
- Tidal (if tidal, check one of the following boxes) Lunar Wind Both

Is the assessment area on a coastal island? Yes No

Is the assessment area's surface water storage capacity or duration substantially altered by beaver? Yes No

Does the assessment area experience overbank flooding during normal rainfall conditions? Yes No

1. Ground Surface Condition/Vegetation Condition – assessment area condition metric

Check a box in each column. Consider alteration to the ground surface (GS) in the assessment area and vegetation structure (VS) in the assessment area. Compare to reference wetland if applicable (see User Manual). If a reference is not applicable, then rate the assessment area based on evidence an effect.

- | | | |
|---------------------------------------|---------------------------------------|--|
| GS | VS | |
| <input checked="" type="checkbox"/> A | <input checked="" type="checkbox"/> A | Not severely altered |
| <input type="checkbox"/> B | <input type="checkbox"/> B | Severely altered over a majority of the assessment area (ground surface alteration examples: vehicle tracks, excessive sedimentation, fire-plow lanes, skidder tracks, bedding, fill, soil compaction, obvious pollutants) (vegetation structure alteration examples: mechanical disturbance, herbicides, salt intrusion [where appropriate], exotic species, grazing, less diversity [if appropriate], hydrologic alteration) |

2. Surface and Sub-Surface Storage Capacity and Duration – assessment area condition metric

Check a box in each column. Consider surface storage capacity and duration (Surf) and sub-surface storage capacity and duration (Sub). Consider both increase and decrease in hydrology. A ditch ≤ 1 foot deep is considered to affect surface water only, while a ditch > 1 foot deep is expected to affect both surface and sub-surface water. Consider tidal flooding regime, if applicable.

- | | | |
|---------------------------------------|----------------------------|--|
| Surf | Sub | |
| <input checked="" type="checkbox"/> A | <input type="checkbox"/> A | Water storage capacity and duration are not altered. |
| <input type="checkbox"/> B | <input type="checkbox"/> B | Water storage capacity or duration are altered, but not substantially (typically, not sufficient to change vegetation). |
| <input type="checkbox"/> C | <input type="checkbox"/> C | Water storage capacity or duration are substantially altered (typically, alteration sufficient to result in vegetation change) (examples: draining, flooding, soil compaction, filling, excessive sedimentation, underground utility lines). |

3. Water Storage/Surface Relief – assessment area/wetland type condition metric (skip for all marshes)

Check a box in each column. Select the appropriate storage for the assessment area (AA) and the wetland type (WT).

- | | | |
|---|----|---|
| AA | WT | |
| 3a. <input type="checkbox"/> A <input type="checkbox"/> A | | Majority of wetland with depressions able to pond water > 1 deep |
| <input type="checkbox"/> B <input type="checkbox"/> B | | Majority of wetland with depressions able to pond water 6 inches to 1 foot deep |
| <input type="checkbox"/> C <input type="checkbox"/> C | | Majority of wetland with depressions able to pond water 3 to 6 inches deep |
| <input checked="" type="checkbox"/> D <input checked="" type="checkbox"/> D | | Depressions able to pond water < 3 inches deep |
| 3b. <input type="checkbox"/> A | | Evidence that maximum depth of inundation is greater than 2 feet |
| <input type="checkbox"/> B | | Evidence that maximum depth of inundation is between 1 and 2 feet |
| <input checked="" type="checkbox"/> C | | Evidence that maximum depth of inundation is less than 1 foot |

4. Soil Texture/Structure – assessment area condition metric (skip for all marshes)

Check a box from each of the three soil property groups below. Dig soil profile in the dominant assessment area landscape feature. Make soil observations within the top 12 inches. Use most recent National Technical Committee for Hydric Soils guidance for regional indicators.

- 4a. A Sandy soil
- B Loamy or clayey soils exhibiting redoximorphic features (concentrations, depletions, or rhizospheres)
- C Loamy or clayey soils not exhibiting redoximorphic features
- D Loamy or clayey gleyed soil
- E Histosol or histc epipedon
- 4b. A Soil ribbon < 1 inch
- B Soil ribbon ≥ 1 inch
- 4c. A No peat or muck presence
- B A peat or muck presence

5. Discharge into Wetland – opportunity metric

Check a box in each column. Consider surface pollutants or discharges (Surf) and sub-surface pollutants or discharges (Sub). Examples of sub-surface discharges include presence of nearby septic tank, underground storage tank (UST), etc.

- | | | |
|---------------------------------------|---------------------------------------|---|
| Surf | Sub | |
| <input type="checkbox"/> A | <input checked="" type="checkbox"/> A | Little or no evidence of pollutants or discharges entering the assessment area |
| <input checked="" type="checkbox"/> B | <input type="checkbox"/> B | Noticeable evidence of pollutants or discharges entering the wetland and stressing, but not overwhelming the treatment capacity of the assessment area |
| <input type="checkbox"/> C | <input type="checkbox"/> C | Noticeable evidence of pollutants or discharges (pathogen, particulate, or soluble) entering the assessment area and potentially overwhelming the treatment capacity of the wetland (water discoloration, dead vegetation, excessive sedimentation, odor) |

6. Land Use – opportunity metric (skip for non-riparian wetlands)

Check all that apply (at least one box in each column). Evaluation involves a GIS effort with field adjustment. Consider sources draining to assessment area within entire upstream watershed (WS), within 5 miles and within the watershed draining to the assessment area (5M), and within 2 miles and within the watershed draining to the assessment area (2M).

- | | | | |
|---------------------------------------|---------------------------------------|---------------------------------------|---|
| WS | 5M | 2M | |
| <input type="checkbox"/> A | <input type="checkbox"/> A | <input type="checkbox"/> A | ≥ 10% impervious surfaces |
| <input type="checkbox"/> B | <input type="checkbox"/> B | <input type="checkbox"/> B | Confined animal operations (or other local, concentrated source of pollutants) |
| <input checked="" type="checkbox"/> C | <input checked="" type="checkbox"/> C | <input checked="" type="checkbox"/> C | ≥ 20% coverage of pasture |
| <input type="checkbox"/> D | <input type="checkbox"/> D | <input type="checkbox"/> D | ≥ 20% coverage of agricultural land (regularly plowed land) |
| <input checked="" type="checkbox"/> E | <input checked="" type="checkbox"/> E | <input checked="" type="checkbox"/> E | ≥ 20% coverage of maintained grass/herb |
| <input type="checkbox"/> F | <input type="checkbox"/> F | <input type="checkbox"/> F | ≥ 20% coverage of clear-cut land |
| <input type="checkbox"/> G | <input type="checkbox"/> G | <input type="checkbox"/> G | Little or no opportunity to improve water quality. Lack of opportunity may result from little or no disturbance in the watershed or hydrologic alterations that prevent drainage and/or overbank flow from affecting the assessment area. |

7. Wetland Acting as Vegetated Buffer – assessment area/wetland complex condition metric (skip for non-riparian wetlands)

- 7a. Is assessment area within 50 feet of a tributary or other open water?
 Yes No If Yes, continue to 7b. If No, skip to Metric 8.
 Wetland buffer need only be present on one side of the water body. Make buffer judgment based on the average width of wetland. Record a note if a portion of the buffer has been removed or disturbed.
- 7b. How much of the first 50 feet from the bank is wetland? (Wetland buffer need only be present on one side of the water body. Make buffer judgment based on the average width of wetland. Record a note if a portion of the buffer has been removed or disturbed.)
- | | |
|----------------------------|--|
| <input type="checkbox"/> A | ≥ 50 feet |
| <input type="checkbox"/> B | From 30 to < 50 feet |
| <input type="checkbox"/> C | From 15 to < 30 feet |
| <input type="checkbox"/> D | From 5 to < 15 feet |
| <input type="checkbox"/> E | < 5 feet or buffer bypassed by ditches |
- 7c. Tributary width. If the tributary is anastomosed, combine widths of channels/braids for a total width.
 ≤ 15-foot wide > 15-foot wide Other open water (no tributary present)
- 7d. Do roots of assessment area vegetation extend into the bank of the tributary/open water?
 Yes No
- 7e. Is stream or other open water sheltered or exposed?
 Sheltered – adjacent open water with width < 2500 feet and no regular boat traffic.
 Exposed – adjacent open water with width ≥ 2500 feet or regular boat traffic.

8. Wetland Width at the Assessment Area – wetland type/wetland complex condition metric (evaluate WT for all marshes and Estuarine Woody Wetland only; evaluate WC for Bottomland Hardwood Forest, Headwater Forest, and Riverine Swamp Forest only)

Check a box in each column for riverine wetlands only. Select the average width for the wetland type at the assessment area (WT) and the wetland complex at the assessment area (WC). See User Manual for WT and WC boundaries.

- | | | |
|---------------------------------------|---------------------------------------|-----------------------|
| WT | WC | |
| <input type="checkbox"/> A | <input type="checkbox"/> A | ≥ 100 feet |
| <input checked="" type="checkbox"/> B | <input checked="" type="checkbox"/> B | From 80 to < 100 feet |
| <input type="checkbox"/> C | <input type="checkbox"/> C | From 50 to < 80 feet |
| <input type="checkbox"/> D | <input type="checkbox"/> D | From 40 to < 50 feet |
| <input type="checkbox"/> E | <input type="checkbox"/> E | From 30 to < 40 feet |
| <input type="checkbox"/> F | <input type="checkbox"/> F | From 15 to < 30 feet |
| <input type="checkbox"/> G | <input type="checkbox"/> G | From 5 to < 15 feet |
| <input type="checkbox"/> H | <input type="checkbox"/> H | < 5 feet |

9. Inundation Duration – assessment area condition metric (skip for non-riparian wetlands)

- Answer for assessment area dominant landform.
- A Evidence of short-duration inundation (< 7 consecutive days)
- B Evidence of saturation, without evidence of inundation
- C Evidence of long-duration inundation or very long-duration inundation (7 to 30 consecutive days or more)

10. Indicators of Deposition – assessment area condition metric (skip for non-riparian wetlands and all marshes)

- Consider recent deposition only (no plant growth since deposition).
- A Sediment deposition is not excessive, but at approximately natural levels.
- B Sediment deposition is excessive, but not overwhelming the wetland.
- C Sediment deposition is excessive and is overwhelming the wetland.

11. Wetland Size – wetland type/wetland complex condition metric

Check a box in each column. Involves a GIS effort with field adjustment. This metric evaluates three aspects of the wetland area: the size of the wetland type (WT), the size of the wetland complex (WC), and the size of the forested wetland (FW) (if applicable, see User Manual). See the User Manual for boundaries of these evaluation areas. If assessment area is clear-cut, select "K" for the FW column.

- | | | |
|---------------------------------------|---------------------------------------|---|
| WT | WC | FW (if applicable) |
| <input type="checkbox"/> A | <input type="checkbox"/> A | <input type="checkbox"/> A ≥ 500 acres |
| <input type="checkbox"/> B | <input type="checkbox"/> B | <input type="checkbox"/> B From 100 to < 500 acres |
| <input type="checkbox"/> C | <input type="checkbox"/> C | <input type="checkbox"/> C From 50 to < 100 acres |
| <input type="checkbox"/> D | <input type="checkbox"/> D | <input type="checkbox"/> D From 25 to < 50 acres |
| <input type="checkbox"/> E | <input type="checkbox"/> E | <input type="checkbox"/> E From 10 to < 25 acres |
| <input type="checkbox"/> F | <input type="checkbox"/> F | <input type="checkbox"/> F From 5 to < 10 acres |
| <input type="checkbox"/> G | <input type="checkbox"/> G | <input type="checkbox"/> G From 1 to < 5 acres |
| <input type="checkbox"/> H | <input checked="" type="checkbox"/> H | <input type="checkbox"/> H From 0.5 to < 1 acre |
| <input checked="" type="checkbox"/> I | <input type="checkbox"/> I | <input checked="" type="checkbox"/> I From 0.1 to < 0.5 acre |
| <input type="checkbox"/> J | <input type="checkbox"/> J | <input type="checkbox"/> J From 0.01 to < 0.1 acre |
| <input type="checkbox"/> K | <input type="checkbox"/> K | <input type="checkbox"/> K < 0.01 acre <u>or</u> assessment area is clear-cut |

12. Wetland Intactness – wetland type condition metric (evaluate for Pocosins only)

- A Pocosin is the full extent (≥ 90%) of its natural landscape size.
- B Pocosin type is < 90% of the full extent of its natural landscape size.

13. Connectivity to Other Natural Areas – landscape condition metric

13a. Check appropriate box(es) (a box may be checked in each column). Involves a GIS effort with field adjustment. This metric evaluates whether the wetland is well connected (Well) and/or loosely connected (Loosely) to the landscape patch, the contiguous naturally vegetated area and open water (if appropriate). Boundaries are formed by four-lane roads, regularly maintained utility line corridors the width of a four-lane road or wider, urban landscapes, maintained fields (pasture and agriculture), or open water > 300 feet wide.

- | | |
|---------------------------------------|---|
| Well | Loosely |
| <input type="checkbox"/> A | <input type="checkbox"/> A ≥ 500 acres |
| <input checked="" type="checkbox"/> B | <input type="checkbox"/> B From 100 to < 500 acres |
| <input type="checkbox"/> C | <input type="checkbox"/> C From 50 to < 100 acres |
| <input type="checkbox"/> D | <input type="checkbox"/> D From 10 to < 50 acres |
| <input type="checkbox"/> E | <input type="checkbox"/> E < 10 acres |
| <input type="checkbox"/> F | <input type="checkbox"/> F Wetland type has a poor or no connection to other natural habitats |

13b. Evaluate for marshes only.

- Yes No Wetland type has a surface hydrology connection to open waters/stream or tidal wetlands.

14. Edge Effect – wetland type condition metric (skip for all marshes and Estuarine Woody Wetland)

May involve a GIS effort with field adjustment. Estimate distance from wetland type boundary to artificial edges. Artificial edges include non-forested areas ≥ 40 feet wide such as fields, development, roads, regularly maintained utility line corridors, and clear-cuts. Consider the eight main points of the compass. Artificial edge occurs within 150 feet in how many directions? If the assessment area is clear cut, select option "C."

- A 0
- B 1 to 4
- C 5 to 8

15. Vegetative Composition – assessment area condition metric (skip for all marshes and Pine Flat)

- A Vegetation is close to reference condition in species present and their proportions. Lower strata composed of appropriate species, with exotic plants absent or sparse within the assessment area.
- B Vegetation is different from reference condition in species diversity or proportions, but still largely composed of native species characteristic of the wetland type. This may include communities of weedy native species that develop after clearcutting or clearing. It also includes communities with exotics present, but not dominant, over a large portion of the expected strata.
- C Vegetation severely altered from reference in composition, or expected species are unnaturally absent (planted stands of non-characteristic species or at least one stratum inappropriately composed of a single species), or exotic species are dominant in at least one stratum.

16. Vegetative Diversity – assessment area condition metric (evaluate for Non-tidal Freshwater Marsh only)

- A Vegetation diversity is high and is composed primarily of native species (< 10% cover of exotics).
- B Vegetation diversity is low or has > 10% to 50% cover of exotics.
- C Vegetation is dominated by exotic species (> 50 % cover of exotics).

17. Vegetative Structure – assessment area/wetland type condition metric

17a. Is vegetation present?

- Yes No If Yes, continue to 17b. If No, skip to Metric 18.

17b. Evaluate percent coverage of assessment area vegetation for all marshes only. Skip to 17c for non-marsh wetlands.

- A ≥ 25% coverage of vegetation
- B < 25% coverage of vegetation

17c. Check a box in each column for each stratum. Evaluate this portion of the metric for non-marsh wetlands. Consider structure in airspace above the assessment area (AA) and the wetland type (WT) separately.

- | | | |
|-----------|---------------------------------------|--|
| AA | WT | |
| Canopy | <input checked="" type="checkbox"/> A | <input checked="" type="checkbox"/> A Canopy closed, or nearly closed, with natural gaps associated with natural processes |
| | <input type="checkbox"/> B | <input type="checkbox"/> B Canopy present, but opened more than natural gaps |
| | <input type="checkbox"/> C | <input type="checkbox"/> C Canopy sparse or absent |
| Mid-Story | <input type="checkbox"/> A | <input type="checkbox"/> A Dense mid-story/sapling layer |
| | <input checked="" type="checkbox"/> B | <input checked="" type="checkbox"/> B Moderate density mid-story/sapling layer |
| | <input type="checkbox"/> C | <input type="checkbox"/> C Mid-story/sapling layer sparse or absent |
| Shrub | <input type="checkbox"/> A | <input type="checkbox"/> A Dense shrub layer |
| | <input checked="" type="checkbox"/> B | <input checked="" type="checkbox"/> B Moderate density shrub layer |
| | <input type="checkbox"/> C | <input type="checkbox"/> C Shrub layer sparse or absent |
| Herb | <input type="checkbox"/> A | <input type="checkbox"/> A Dense herb layer |
| | <input checked="" type="checkbox"/> B | <input checked="" type="checkbox"/> B Moderate density herb layer |
| | <input type="checkbox"/> C | <input type="checkbox"/> C Herb layer sparse or absent |

18. Snags – wetland type condition metric (skip for all marshes)

- A Large snags (more than one) are visible (> 12 inches DBH, or large relative to species present and landscape stability).
- B Not A

19. Diameter Class Distribution – wetland type condition metric (skip for all marshes)

- A Majority of canopy trees have stems > 6 inches in diameter at breast height (DBH); many large trees (> 12 inches DBH) are present.
- B Majority of canopy trees have stems between 6 and 12 inches DBH, few are > 12 inch DBH.
- C Majority of canopy trees are < 6 inches DBH or no trees.

20. Large Woody Debris – wetland type condition metric (skip for all marshes)

- Include both natural debris and man-placed natural debris.
- A Large logs (more than one) are visible (> 12 inches in diameter, or large relative to species present and landscape stability).
- B Not A

21. Vegetation/Open Water Dispersion – wetland type/open water condition metric (evaluate for Non-Tidal Freshwater Marsh only)

Select the figure that best describes the amount of interspersion between vegetation and open water in the growing season. Patterned areas indicate vegetated areas, while solid white areas indicate open water.



22. Hydrologic Connectivity – assessment area condition metric (evaluate for riparian wetlands and Salt/Brackish Marsh only)

Examples of activities that may severely alter hydrologic connectivity include intensive ditching, fill, sedimentation, channelization, diversion, man-made berms, beaver dams, and stream incision. Documentation required if evaluated as B, C, or D.

- A Overbank and overland flow are not severely altered in the assessment area.
- B Overbank flow is severely altered in the assessment area.
- C Overland flow is severely altered in the assessment area.
- D Both overbank and overland flow are severely altered in the assessment area.

Notes

NC WAM Wetland Rating Sheet
Accompanies User Manual Version 5.0

Wetland Site Name Wetland EE Woods Date of Assessment 7/30/2020
 Wetland Type Bottomland Hardwood Forest Assessor Name/Organization C. Neaves
 Notes on Field Assessment Form (Y/N) NO
 Presence of regulatory considerations (Y/N) NO
 Wetland is intensively managed (Y/N) _____
 Assessment area is located within 50 feet of a natural tributary or other open water (Y/N) NO
 Assessment area is substantially altered by beaver (Y/N) _____
 Assessment area experiences overbank flooding during normal rainfall conditions (Y/N) _____
 Assessment area is on a coastal island (Y/N) _____

Sub-function Rating Summary

Function	Sub-function	Metrics	Rating
Hydrology	Surface Storage and Retention	Condition	HIGH
	Sub-surface Storage and Retention	Condition	LOW
Water Quality	Pathogen Change	Condition	HIGH
		Condition/Opportunity	HIGH
		Opportunity Presence (Y/N)	YES
	Particulate Change	Condition	HIGH
		Condition/Opportunity	HIGH
		Opportunity Presence (Y/N)	YES
	Soluble Change	Condition	HIGH
		Condition/Opportunity	HIGH
		Opportunity Presence (Y/N)	YES
	Physical Change	Condition	LOW
		Condition/Opportunity	LOW
		Opportunity Presence (Y/N)	YES
	Pollution Change	Condition	NA
		Condition/Opportunity	NA
		Opportunity Presence (Y/N)	NA
Habitat	Physical Structure	Condition	HIGH
	Landscape Patch Structure	Condition	LOW
	Vegetation Composition	Condition	HIGH

Function Rating Summary

Function	Metrics	Rating
Hydrology	Condition	HIGH
Water Quality	Condition	HIGH
	Condition/Opportunity	HIGH
	Opportunity Presence (Y/N)	YES
Habitat	Condition	HIGH

Overall Wetland Rating HIGH

NC WAM FIELD ASSESSMENT FORM
Accompanies User Manual Version 5.0

USACE AID #	SAW-2020-00047	NCDWR#	20200035
Project Name	Liberty Rock Mitigation Site	Date of Evaluation	7/30/2020
Applicant/Owner Name	Wildlands Engineering	Wetland Site Name	Wetland FF
Wetland Type	Bottomland Hardwood Forest	Assessor Name/Organization	C. Neaves
Level III Ecoregion	Piedmont	Nearest Named Water Body	Rocky River
River Basin	Cape Fear	USGS 8-Digit Catalogue Unit	03030003
County	Randolph	NCDWR Region	Winston-Salem
<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	Precipitation within 48 hrs?	Latitude/Longitude (deci-degrees)	35.820344, -79.563017

Evidence of stressors affecting the assessment area (may not be within the assessment area)
 Please circle and/or make note on the last page if evidence of stressors is apparent. Consider departure from reference, if appropriate, in recent past (for instance, within 10 years). Noteworthy stressors include, but are not limited to the following.

- Hydrological modifications (examples: ditches, dams, beaver dams, dikes, berms, ponds, etc.)
- Surface and sub-surface discharges into the wetland (examples: discharges containing obvious pollutants, presence of nearby septic tanks, underground storage tanks (USTs), hog lagoons, etc.)
- Signs of vegetation stress (examples: vegetation mortality, insect damage, storm damage, salt intrusion, etc.)
- Habitat/plant community alteration (examples: mowing, clear-cutting, exotics, etc.)

Is the assessment area intensively managed? Yes No

Regulatory Considerations - Were regulatory considerations evaluated? Yes No If Yes, check all that apply to the assessment area.

- Anadromous fish
- Federally protected species or State endangered or threatened species
- NCDWR riparian buffer rule in effect
- Abuts a Primary Nursery Area (PNA)
- Publicly owned property
- N.C. Division of Coastal Management Area of Environmental Concern (AEC) (including buffer)
- Abuts a stream with a NCDWQ classification of SA or supplemental classifications of HQW, ORW, or Trout
- Designated NCNHP reference community
- Abuts a 303(d)-listed stream or a tributary to a 303(d)-listed stream

What type of natural stream is associated with the wetland, if any? (check all that apply)

- Blackwater
- Brownwater
- Tidal (if tidal, check one of the following boxes) Lunar Wind Both

Is the assessment area on a coastal island? Yes No

Is the assessment area's surface water storage capacity or duration substantially altered by beaver? Yes No

Does the assessment area experience overbank flooding during normal rainfall conditions? Yes No

- Ground Surface Condition/Vegetation Condition – assessment area condition metric**
Check a box in each column. Consider alteration to the ground surface (GS) in the assessment area and vegetation structure (VS) in the assessment area. Compare to reference wetland if applicable (see User Manual). If a reference is not applicable, then rate the assessment area based on evidence an effect.

GS	VS	
<input type="checkbox"/> A	<input type="checkbox"/> A	Not severely altered
<input checked="" type="checkbox"/> B	<input checked="" type="checkbox"/> B	Severely altered over a majority of the assessment area (ground surface alteration examples: vehicle tracks, excessive sedimentation, fire-plow lanes, skidder tracks, bedding, fill, soil compaction, obvious pollutants) (vegetation structure alteration examples: mechanical disturbance, herbicides, salt intrusion [where appropriate], exotic species, grazing, less diversity [if appropriate], hydrologic alteration)
- Surface and Sub-Surface Storage Capacity and Duration – assessment area condition metric**
Check a box in each column. Consider surface storage capacity and duration (Surf) and sub-surface storage capacity and duration (Sub). Consider both increase and decrease in hydrology. A ditch ≤ 1 foot deep is considered to affect surface water only, while a ditch > 1 foot deep is expected to affect both surface and sub-surface water. Consider tidal flooding regime, if applicable.

Surf	Sub	
<input type="checkbox"/> A	<input type="checkbox"/> A	Water storage capacity and duration are not altered.
<input checked="" type="checkbox"/> B	<input checked="" type="checkbox"/> B	Water storage capacity or duration are altered, but not substantially (typically, not sufficient to change vegetation).
<input type="checkbox"/> C	<input type="checkbox"/> C	Water storage capacity or duration are substantially altered (typically, alteration sufficient to result in vegetation change) (examples: draining, flooding, soil compaction, filling, excessive sedimentation, underground utility lines).
- Water Storage/Surface Relief – assessment area/wetland type condition metric (skip for all marshes)**
Check a box in each column. Select the appropriate storage for the assessment area (AA) and the wetland type (WT).

AA	WT	
3a. <input type="checkbox"/> A	<input type="checkbox"/> A	Majority of wetland with depressions able to pond water > 1 foot deep
<input type="checkbox"/> B	<input type="checkbox"/> B	Majority of wetland with depressions able to pond water 6 inches to 1 foot deep
<input type="checkbox"/> C	<input type="checkbox"/> C	Majority of wetland with depressions able to pond water 3 to 6 inches deep
<input checked="" type="checkbox"/> D	<input checked="" type="checkbox"/> D	Depressions able to pond water < 3 inches deep
3b. <input type="checkbox"/> A	<input type="checkbox"/> A	Evidence that maximum depth of inundation is greater than 2 feet
<input checked="" type="checkbox"/> B	<input checked="" type="checkbox"/> B	Evidence that maximum depth of inundation is between 1 and 2 feet
<input type="checkbox"/> C	<input type="checkbox"/> C	Evidence that maximum depth of inundation is less than 1 foot

4. Soil Texture/Structure – assessment area condition metric (skip for all marshes)

Check a box from each of the three soil property groups below. Dig soil profile in the dominant assessment area landscape feature. Make soil observations within the top 12 inches. Use most recent National Technical Committee for Hydric Soils guidance for regional indicators.

- 4a. A Sandy soil
 B Loamy or clayey soils exhibiting redoximorphic features (concentrations, depletions, or rhizospheres)
 C Loamy or clayey soils not exhibiting redoximorphic features
 D Loamy or clayey gleyed soil
 E Histosol or histc epipedon
- 4b. A Soil ribbon < 1 inch
 B Soil ribbon ≥ 1 inch
- 4c. A No peat or muck presence
 B A peat or muck presence

5. Discharge into Wetland – opportunity metric

Check a box in each column. Consider surface pollutants or discharges (Surf) and sub-surface pollutants or discharges (Sub). Examples of sub-surface discharges include presence of nearby septic tank, underground storage tank (UST), etc.

- | | | |
|---------------------------------------|---------------------------------------|---|
| Surf | Sub | |
| <input type="checkbox"/> A | <input checked="" type="checkbox"/> A | Little or no evidence of pollutants or discharges entering the assessment area |
| <input checked="" type="checkbox"/> B | <input type="checkbox"/> B | Noticeable evidence of pollutants or discharges entering the wetland and stressing, but not overwhelming the treatment capacity of the assessment area |
| <input type="checkbox"/> C | <input type="checkbox"/> C | Noticeable evidence of pollutants or discharges (pathogen, particulate, or soluble) entering the assessment area and potentially overwhelming the treatment capacity of the wetland (water discoloration, dead vegetation, excessive sedimentation, odor) |

6. Land Use – opportunity metric (skip for non-riparian wetlands)

Check all that apply (at least one box in each column). Evaluation involves a GIS effort with field adjustment. Consider sources draining to assessment area within entire upstream watershed (WS), within 5 miles and within the watershed draining to the assessment area (5M), and within 2 miles and within the watershed draining to the assessment area (2M).

- | | | | |
|---------------------------------------|---------------------------------------|---------------------------------------|---|
| WS | 5M | 2M | |
| <input type="checkbox"/> A | <input type="checkbox"/> A | <input type="checkbox"/> A | ≥ 10% impervious surfaces |
| <input type="checkbox"/> B | <input type="checkbox"/> B | <input type="checkbox"/> B | Confined animal operations (or other local, concentrated source of pollutants) |
| <input checked="" type="checkbox"/> C | <input checked="" type="checkbox"/> C | <input checked="" type="checkbox"/> C | ≥ 20% coverage of pasture |
| <input type="checkbox"/> D | <input type="checkbox"/> D | <input type="checkbox"/> D | ≥ 20% coverage of agricultural land (regularly plowed land) |
| <input checked="" type="checkbox"/> E | <input checked="" type="checkbox"/> E | <input checked="" type="checkbox"/> E | ≥ 20% coverage of maintained grass/herb |
| <input type="checkbox"/> F | <input type="checkbox"/> F | <input type="checkbox"/> F | ≥ 20% coverage of clear-cut land |
| <input type="checkbox"/> G | <input type="checkbox"/> G | <input type="checkbox"/> G | Little or no opportunity to improve water quality. Lack of opportunity may result from little or no disturbance in the watershed or hydrologic alterations that prevent drainage and/or overbank flow from affecting the assessment area. |

7. Wetland Acting as Vegetated Buffer – assessment area/wetland complex condition metric (skip for non-riparian wetlands)

- 7a. Is assessment area within 50 feet of a tributary or other open water?
 Yes No If Yes, continue to 7b. If No, skip to Metric 8.
 Wetland buffer need only be present on one side of the water body. Make buffer judgment based on the average width of wetland. Record a note if a portion of the buffer has been removed or disturbed.
- 7b. How much of the first 50 feet from the bank is wetland? (Wetland buffer need only be present on one side of the water body. Make buffer judgment based on the average width of wetland. Record a note if a portion of the buffer has been removed or disturbed.)
 A ≥ 50 feet
 B From 30 to < 50 feet
 C From 15 to < 30 feet
 D From 5 to < 15 feet
 E < 5 feet or buffer bypassed by ditches
- 7c. Tributary width. If the tributary is anastomosed, combine widths of channels/braids for a total width.
 ≤ 15-foot wide > 15-foot wide Other open water (no tributary present)
- 7d. Do roots of assessment area vegetation extend into the bank of the tributary/open water?
 Yes No
- 7e. Is stream or other open water sheltered or exposed?
 Sheltered – adjacent open water with width < 2500 feet and no regular boat traffic.
 Exposed – adjacent open water with width ≥ 2500 feet or regular boat traffic.

8. Wetland Width at the Assessment Area – wetland type/wetland complex condition metric (evaluate WT for all marshes and Estuarine Woody Wetland only; evaluate WC for Bottomland Hardwood Forest, Headwater Forest, and Riverine Swamp Forest only)

Check a box in each column for riverine wetlands only. Select the average width for the wetland type at the assessment area (WT) and the wetland complex at the assessment area (WC). See User Manual for WT and WC boundaries.

- | | | |
|---------------------------------------|---------------------------------------|-----------------------|
| WT | WC | |
| <input type="checkbox"/> A | <input type="checkbox"/> A | ≥ 100 feet |
| <input type="checkbox"/> B | <input type="checkbox"/> B | From 80 to < 100 feet |
| <input type="checkbox"/> C | <input type="checkbox"/> C | From 50 to < 80 feet |
| <input type="checkbox"/> D | <input type="checkbox"/> D | From 40 to < 50 feet |
| <input type="checkbox"/> E | <input type="checkbox"/> E | From 30 to < 40 feet |
| <input type="checkbox"/> F | <input type="checkbox"/> F | From 15 to < 30 feet |
| <input checked="" type="checkbox"/> G | <input checked="" type="checkbox"/> G | From 5 to < 15 feet |
| <input type="checkbox"/> H | <input type="checkbox"/> H | < 5 feet |

9. Inundation Duration – assessment area condition metric (skip for non-riparian wetlands)

Answer for assessment area dominant landform.

- A Evidence of short-duration inundation (< 7 consecutive days)
 B Evidence of saturation, without evidence of inundation
 C Evidence of long-duration inundation or very long-duration inundation (7 to 30 consecutive days or more)

10. Indicators of Deposition – assessment area condition metric (skip for non-riparian wetlands and all marshes)

Consider recent deposition only (no plant growth since deposition).

- A Sediment deposition is not excessive, but at approximately natural levels.
 B Sediment deposition is excessive, but not overwhelming the wetland.
 C Sediment deposition is excessive and is overwhelming the wetland.

11. Wetland Size – wetland type/wetland complex condition metric

Check a box in each column. Involves a GIS effort with field adjustment. This metric evaluates three aspects of the wetland area: the size of the wetland type (WT), the size of the wetland complex (WC), and the size of the forested wetland (FW) (if applicable, see User Manual). See the User Manual for boundaries of these evaluation areas. If assessment area is clear-cut, select "K" for the FW column.

- | | | |
|---------------------------------------|---------------------------------------|---|
| WT | WC | FW (if applicable) |
| <input type="checkbox"/> A | <input type="checkbox"/> A | <input type="checkbox"/> A ≥ 500 acres |
| <input type="checkbox"/> B | <input type="checkbox"/> B | <input type="checkbox"/> B From 100 to < 500 acres |
| <input type="checkbox"/> C | <input type="checkbox"/> C | <input type="checkbox"/> C From 50 to < 100 acres |
| <input type="checkbox"/> D | <input type="checkbox"/> D | <input type="checkbox"/> D From 25 to < 50 acres |
| <input type="checkbox"/> E | <input type="checkbox"/> E | <input type="checkbox"/> E From 10 to < 25 acres |
| <input type="checkbox"/> F | <input type="checkbox"/> F | <input type="checkbox"/> F From 5 to < 10 acres |
| <input type="checkbox"/> G | <input type="checkbox"/> G | <input type="checkbox"/> G From 1 to < 5 acres |
| <input type="checkbox"/> H | <input type="checkbox"/> H | <input type="checkbox"/> H From 0.5 to < 1 acre |
| <input checked="" type="checkbox"/> I | <input checked="" type="checkbox"/> I | <input type="checkbox"/> I From 0.1 to < 0.5 acre |
| <input type="checkbox"/> J | <input type="checkbox"/> J | <input type="checkbox"/> J From 0.01 to < 0.1 acre |
| <input type="checkbox"/> K | <input type="checkbox"/> K | <input checked="" type="checkbox"/> K < 0.01 acre or assessment area is clear-cut |

12. Wetland Intactness – wetland type condition metric (evaluate for Pocosins only)

- A Pocosin is the full extent (≥ 90%) of its natural landscape size.
 B Pocosin type is < 90% of the full extent of its natural landscape size.

13. Connectivity to Other Natural Areas – landscape condition metric

13a. Check appropriate box(es) (a box may be checked in each column). Involves a GIS effort with field adjustment. This metric evaluates whether the wetland is well connected (Well) and/or loosely connected (Loosely) to the landscape patch, the contiguous naturally vegetated area and open water (if appropriate). Boundaries are formed by four-lane roads, regularly maintained utility line corridors the width of a four-lane road or wider, urban landscapes, maintained fields (pasture and agriculture), or open water > 300 feet wide.

- | | | |
|---------------------------------------|----------------------------|--|
| Well | Loosely | |
| <input type="checkbox"/> A | <input type="checkbox"/> A | ≥ 500 acres |
| <input type="checkbox"/> B | <input type="checkbox"/> B | From 100 to < 500 acres |
| <input type="checkbox"/> C | <input type="checkbox"/> C | From 50 to < 100 acres |
| <input type="checkbox"/> D | <input type="checkbox"/> D | From 10 to < 50 acres |
| <input type="checkbox"/> E | <input type="checkbox"/> E | < 10 acres |
| <input checked="" type="checkbox"/> F | <input type="checkbox"/> F | Wetland type has a poor or no connection to other natural habitats |

13b. Evaluate for marshes only.

- Yes No Wetland type has a surface hydrology connection to open waters/stream or tidal wetlands.

14. Edge Effect – wetland type condition metric (skip for all marshes and Estuarine Woody Wetland)

May involve a GIS effort with field adjustment. Estimate distance from wetland type boundary to artificial edges. Artificial edges include non-forested areas ≥ 40 feet wide such as fields, development, roads, regularly maintained utility line corridors, and clear-cuts. Consider the eight main points of the compass. Artificial edge occurs within 150 feet in how many directions? If the assessment area is clear cut, select option "C."

- A 0
 B 1 to 4
 C 5 to 8

15. Vegetative Composition – assessment area condition metric (skip for all marshes and Pine Flat)

- A Vegetation is close to reference condition in species present and their proportions. Lower strata composed of appropriate species, with exotic plants absent or sparse within the assessment area.
 B Vegetation is different from reference condition in species diversity or proportions, but still largely composed of native species characteristic of the wetland type. This may include communities of weedy native species that develop after clearcutting or clearing. It also includes communities with exotics present, but not dominant, over a large portion of the expected strata.
 C Vegetation severely altered from reference in composition, or expected species are unnaturally absent (planted stands of non-characteristic species or at least one stratum inappropriately composed of a single species), or exotic species are dominant in at least one stratum.

16. Vegetative Diversity – assessment area condition metric (evaluate for Non-tidal Freshwater Marsh only)

- A Vegetation diversity is high and is composed primarily of native species (< 10% cover of exotics).
 B Vegetation diversity is low or has > 10% to 50% cover of exotics.
 C Vegetation is dominated by exotic species (> 50 % cover of exotics).

17. **Vegetative Structure – assessment area/wetland type condition metric**

17a. Is vegetation present?

Yes No If Yes, continue to 17b. If No, skip to Metric 18.

17b. Evaluate percent coverage of assessment area vegetation for all marshes only. Skip to 17c for non-marsh wetlands.

A ≥ 25% coverage of vegetation
 B < 25% coverage of vegetation

17c. **Check a box in each column for each stratum.** Evaluate this portion of the metric for non-marsh wetlands. Consider structure in airspace above the assessment area (AA) and the wetland type (WT) separately.

	AA	WT	
Canopy	<input type="checkbox"/> A	<input type="checkbox"/> A	Canopy closed, or nearly closed, with natural gaps associated with natural processes
	<input type="checkbox"/> B	<input type="checkbox"/> B	Canopy present, but opened more than natural gaps
	<input checked="" type="checkbox"/> C	<input checked="" type="checkbox"/> C	Canopy sparse or absent
Mid-Story	<input type="checkbox"/> A	<input type="checkbox"/> A	Dense mid-story/sapling layer
	<input type="checkbox"/> B	<input type="checkbox"/> B	Moderate density mid-story/sapling layer
	<input checked="" type="checkbox"/> C	<input checked="" type="checkbox"/> C	Mid-story/sapling layer sparse or absent
Shrub	<input type="checkbox"/> A	<input type="checkbox"/> A	Dense shrub layer
	<input type="checkbox"/> B	<input type="checkbox"/> B	Moderate density shrub layer
	<input checked="" type="checkbox"/> C	<input checked="" type="checkbox"/> C	Shrub layer sparse or absent
Herb	<input type="checkbox"/> A	<input type="checkbox"/> A	Dense herb layer
	<input checked="" type="checkbox"/> B	<input checked="" type="checkbox"/> B	Moderate density herb layer
	<input type="checkbox"/> C	<input type="checkbox"/> C	Herb layer sparse or absent

18. **Snags – wetland type condition metric (skip for all marshes)**

A Large snags (more than one) are visible (> 12 inches DBH, or large relative to species present and landscape stability).
 B Not A

19. **Diameter Class Distribution – wetland type condition metric (skip for all marshes)**

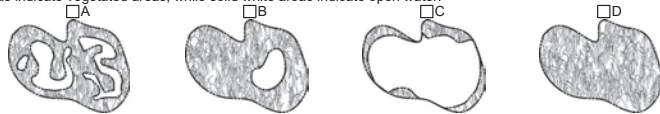
A Majority of canopy trees have stems > 6 inches in diameter at breast height (DBH); many large trees (> 12 inches DBH) are present.
 B Majority of canopy trees have stems between 6 and 12 inches DBH, few are > 12 inch DBH.
 C Majority of canopy trees are < 6 inches DBH or no trees.

20. **Large Woody Debris – wetland type condition metric (skip for all marshes)**

Include both natural debris and man-placed natural debris.
 A Large logs (more than one) are visible (> 12 inches in diameter, or large relative to species present and landscape stability).
 B Not A

21. **Vegetation/Open Water Dispersion – wetland type/open water condition metric (evaluate for Non-Tidal Freshwater Marsh only)**

Select the figure that best describes the amount of interspersed vegetation and open water in the growing season. Patterned areas indicate vegetated areas, while solid white areas indicate open water.



22. **Hydrologic Connectivity – assessment area condition metric (evaluate for riparian wetlands and Salt/Brackish Marsh only)**

Examples of activities that may severely alter hydrologic connectivity include intensive ditching, fill, sedimentation, channelization, diversion, man-made berms, beaver dams, and stream incision. Documentation required if evaluated as B, C, or D.

A Overbank and overland flow are not severely altered in the assessment area.
 B Overbank flow is severely altered in the assessment area.
 C Overland flow is severely altered in the assessment area.
 D Both overbank and overland flow are severely altered in the assessment area.

Notes

**NC WAM Wetland Rating Sheet
 Accompanies User Manual Version 5.0**

Wetland Site Name Wetland FF Date of Assessment 7/30/2020
 Wetland Type Bottomland Hardwood Forest Assessor Name/Organization C. Neaves

Notes on Field Assessment Form (Y/N) NO
 Presence of regulatory considerations (Y/N) NO
 Wetland is intensively managed (Y/N) _____
 Assessment area is located within 50 feet of a natural tributary or other open water (Y/N) NO
 Assessment area is substantially altered by beaver (Y/N) _____
 Assessment area experiences overbank flooding during normal rainfall conditions (Y/N) _____
 Assessment area is on a coastal island (Y/N) _____

Sub-function Rating Summary

Function	Sub-function	Metrics	Rating
Hydrology	Surface Storage and Retention	Condition	LOW
		Sub-surface Storage and Retention	Condition LOW
Water Quality	Pathogen Change	Condition	LOW
		Condition/Opportunity	LOW
	Particulate Change	Opportunity Presence (Y/N)	NO
		Condition	LOW
	Soluble Change	Condition/Opportunity	LOW
		Opportunity Presence (Y/N)	NO
	Physical Change	Condition	LOW
		Condition/Opportunity	LOW
	Pollution Change	Opportunity Presence (Y/N)	NO
		Condition	NA
Habitat	Physical Structure	Condition/Opportunity	NA
		Opportunity Presence (Y/N)	NA
	Landscape Patch Structure	Condition	LOW
		Condition	LOW
	Vegetation Composition	Condition	LOW
		Condition	LOW

Function Rating Summary

Function	Metrics	Rating
Hydrology	Condition	LOW
	Condition	LOW
Water Quality	Condition	LOW
	Condition/Opportunity	LOW
Habitat	Opportunity Presence (Y/N)	NO
	Condition	LOW

Overall Wetland Rating LOW

NC WAM FIELD ASSESSMENT FORM
Accompanies User Manual Version 5.0

USACE AID #	SAW-2020-00047	NCDWR#	20200035
Project Name	Liberty Rock Mitigation Site	Date of Evaluation	7/30/2020
Applicant/Owner Name	Wildlands Engineering	Wetland Site Name	Wetland GG
Wetland Type	Bottomland Hardwood Forest	Assessor Name/Organization	C. Neaves
Level III Ecoregion	Piedmont	Nearest Named Water Body	Rocky River
River Basin	Cape Fear	USGS 8-Digit Catalogue Unit	03030003
County	Randolph	NCDWR Region	Winston-Salem
<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	Precipitation within 48 hrs?	Latitude/Longitude (deci-degrees)	35.819952, -79.562644

Evidence of stressors affecting the assessment area (may not be within the assessment area)

Please circle and/or make note on the last page if evidence of stressors is apparent. Consider departure from reference, if appropriate, in recent past (for instance, within 10 years). Noteworthy stressors include, but are not limited to the following.

- Hydrological modifications (examples: ditches, dams, beaver dams, dikes, berms, ponds, etc.)
- Surface and sub-surface discharges into the wetland (examples: discharges containing obvious pollutants, presence of nearby septic tanks, underground storage tanks (USTs), hog lagoons, etc.)
- Signs of vegetation stress (examples: vegetation mortality, insect damage, disease, storm damage, salt intrusion, etc.)
- Habitat/plant community alteration (examples: mowing, clear-cutting, exotics, etc.)

Is the assessment area intensively managed? Yes No

Regulatory Considerations - Were regulatory considerations evaluated? Yes No If Yes, check all that apply to the assessment area.

- Anadromous fish
- Federally protected species or State endangered or threatened species
- NCDWR riparian buffer rule in effect
- Abuts a Primary Nursery Area (PNA)
- Publicly owned property
- N.C. Division of Coastal Management Area of Environmental Concern (AEC) (including buffer)
- Abuts a stream with a NCDWQ classification of SA or supplemental classifications of HQW, ORW, or Trout
- Designated NCNHP reference community
- Abuts a 303(d)-listed stream or a tributary to a 303(d)-listed stream

What type of natural stream is associated with the wetland, if any? (check all that apply)

- Blackwater
- Brownwater
- Tidal (if tidal, check one of the following boxes) Lunar Wind Both

Is the assessment area on a coastal island? Yes No

Is the assessment area's surface water storage capacity or duration substantially altered by beaver? Yes No

Does the assessment area experience overbank flooding during normal rainfall conditions? Yes No

1. Ground Surface Condition/Vegetation Condition – assessment area condition metric

Check a box in each column. Consider alteration to the ground surface (GS) in the assessment area and vegetation structure (VS) in the assessment area. Compare to reference wetland if applicable (see User Manual). If a reference is not applicable, then rate the assessment area based on evidence an effect.

- | | | |
|---------------------------------------|---------------------------------------|--|
| GS | VS | |
| <input checked="" type="checkbox"/> A | <input type="checkbox"/> A | Not severely altered |
| <input type="checkbox"/> B | <input checked="" type="checkbox"/> B | Severely altered over a majority of the assessment area (ground surface alteration examples: vehicle tracks, excessive sedimentation, fire-plow lanes, skidder tracks, bedding, fill, soil compaction, obvious pollutants) (vegetation structure alteration examples: mechanical disturbance, herbicides, salt intrusion [where appropriate], exotic species, grazing, less diversity [if appropriate], hydrologic alteration) |

2. Surface and Sub-Surface Storage Capacity and Duration – assessment area condition metric

Check a box in each column. Consider surface storage capacity and duration (Surf) and sub-surface storage capacity and duration (Sub). Consider both increase and decrease in hydrology. A ditch ≤ 1 foot deep is considered to affect surface water only, while a ditch > 1 foot deep is expected to affect both surface and sub-surface water. Consider tidal flooding regime, if applicable.

- | | | |
|---------------------------------------|---------------------------------------|--|
| Surf | Sub | |
| <input type="checkbox"/> A | <input type="checkbox"/> A | Water storage capacity and duration are not altered. |
| <input checked="" type="checkbox"/> B | <input checked="" type="checkbox"/> B | Water storage capacity or duration are altered, but not substantially (typically, not sufficient to change vegetation). |
| <input type="checkbox"/> C | <input type="checkbox"/> C | Water storage capacity or duration are substantially altered (typically, alteration sufficient to result in vegetation change) (examples: draining, flooding, soil compaction, filling, excessive sedimentation, underground utility lines). |

3. Water Storage/Surface Relief – assessment area/wetland type condition metric (skip for all marshes)

Check a box in each column. Select the appropriate storage for the assessment area (AA) and the wetland type (WT).

- | | | |
|---|----|---|
| AA | WT | |
| 3a. <input type="checkbox"/> A <input type="checkbox"/> A | | Majority of wetland with depressions able to pond water > 1 deep |
| <input type="checkbox"/> B <input type="checkbox"/> B | | Majority of wetland with depressions able to pond water 6 inches to 1 foot deep |
| <input type="checkbox"/> C <input type="checkbox"/> C | | Majority of wetland with depressions able to pond water 3 to 6 inches deep |
| <input checked="" type="checkbox"/> D <input checked="" type="checkbox"/> D | | Depressions able to pond water < 3 inches deep |
| 3b. <input type="checkbox"/> A | | Evidence that maximum depth of inundation is greater than 2 feet |
| <input type="checkbox"/> B | | Evidence that maximum depth of inundation is between 1 and 2 feet |
| <input checked="" type="checkbox"/> C | | Evidence that maximum depth of inundation is less than 1 foot |

4. Soil Texture/Structure – assessment area condition metric (skip for all marshes)

Check a box from each of the three soil property groups below. Dig soil profile in the dominant assessment area landscape feature. Make soil observations within the top 12 inches. Use most recent National Technical Committee for Hydric Soils guidance for regional indicators.

- 4a. A Sandy soil
- B Loamy or clayey soils exhibiting redoximorphic features (concentrations, depletions, or rhizospheres)
- C Loamy or clayey soils not exhibiting redoximorphic features
- D Loamy or clayey gleyed soil
- E Histosol or histc epipedon
- 4b. A Soil ribbon < 1 inch
- B Soil ribbon ≥ 1 inch
- 4c. A No peat or muck presence
- B A peat or muck presence

5. Discharge into Wetland – opportunity metric

Check a box in each column. Consider surface pollutants or discharges (Surf) and sub-surface pollutants or discharges (Sub). Examples of sub-surface discharges include presence of nearby septic tank, underground storage tank (UST), etc.

- | | | |
|---------------------------------------|---------------------------------------|---|
| Surf | Sub | |
| <input type="checkbox"/> A | <input checked="" type="checkbox"/> A | Little or no evidence of pollutants or discharges entering the assessment area |
| <input checked="" type="checkbox"/> B | <input type="checkbox"/> B | Noticeable evidence of pollutants or discharges entering the wetland and stressing, but not overwhelming the treatment capacity of the assessment area |
| <input type="checkbox"/> C | <input type="checkbox"/> C | Noticeable evidence of pollutants or discharges (pathogen, particulate, or soluble) entering the assessment area and potentially overwhelming the treatment capacity of the wetland (water discoloration, dead vegetation, excessive sedimentation, odor) |

6. Land Use – opportunity metric (skip for non-riparian wetlands)

Check all that apply (at least one box in each column). Evaluation involves a GIS effort with field adjustment. Consider sources draining to assessment area within entire upstream watershed (WS), within 5 miles and within the watershed draining to the assessment area (5M), and within 2 miles and within the watershed draining to the assessment area (2M).

- | | | | |
|---------------------------------------|---------------------------------------|---------------------------------------|---|
| WS | 5M | 2M | |
| <input type="checkbox"/> A | <input type="checkbox"/> A | <input type="checkbox"/> A | ≥ 10% impervious surfaces |
| <input type="checkbox"/> B | <input type="checkbox"/> B | <input type="checkbox"/> B | Confined animal operations (or other local, concentrated source of pollutants) |
| <input checked="" type="checkbox"/> C | <input checked="" type="checkbox"/> C | <input checked="" type="checkbox"/> C | ≥ 20% coverage of pasture |
| <input type="checkbox"/> D | <input type="checkbox"/> D | <input type="checkbox"/> D | ≥ 20% coverage of agricultural land (regularly plowed land) |
| <input checked="" type="checkbox"/> E | <input checked="" type="checkbox"/> E | <input checked="" type="checkbox"/> E | ≥ 20% coverage of maintained grass/herb |
| <input type="checkbox"/> F | <input type="checkbox"/> F | <input type="checkbox"/> F | ≥ 20% coverage of clear-cut land |
| <input type="checkbox"/> G | <input type="checkbox"/> G | <input type="checkbox"/> G | Little or no opportunity to improve water quality. Lack of opportunity may result from little or no disturbance in the watershed or hydrologic alterations that prevent drainage and/or overbank flow from affecting the assessment area. |

7. Wetland Acting as Vegetated Buffer – assessment area/wetland complex condition metric (skip for non-riparian wetlands)

- 7a. Is assessment area within 50 feet of a tributary or other open water?
 Yes No If Yes, continue to 7b. If No, skip to Metric 8.
 Wetland buffer need only be present on one side of the water body. Make buffer judgment based on the average width of wetland. Record a note if a portion of the buffer has been removed or disturbed.
- 7b. How much of the first 50 feet from the bank is wetland? (Wetland buffer need only be present on one side of the water body. Make buffer judgment based on the average width of wetland. Record a note if a portion of the buffer has been removed or disturbed.)
- A ≥ 50 feet
- B From 30 to < 50 feet
- C From 15 to < 30 feet
- D From 5 to < 15 feet
- E < 5 feet or buffer bypassed by ditches
- 7c. Tributary width. If the tributary is anastomosed, combine widths of channels/braids for a total width.
 ≤ 15-foot wide > 15-foot wide Other open water (no tributary present)
- 7d. Do roots of assessment area vegetation extend into the bank of the tributary/open water?
 Yes No
- 7e. Is stream or other open water sheltered or exposed?
 Sheltered – adjacent open water with width < 2500 feet and no regular boat traffic.
 Exposed – adjacent open water with width ≥ 2500 feet or regular boat traffic.

8. Wetland Width at the Assessment Area – wetland type/wetland complex condition metric (evaluate WT for all marshes and Estuarine Woody Wetland only; evaluate WC for Bottomland Hardwood Forest, Headwater Forest, and Riverine Swamp Forest only)

Check a box in each column for riverine wetlands only. Select the average width for the wetland type at the assessment area (WT) and the wetland complex at the assessment area (WC). See User Manual for WT and WC boundaries.

- | | | |
|---------------------------------------|---------------------------------------|-----------------------|
| WT | WC | |
| <input type="checkbox"/> A | <input type="checkbox"/> A | ≥ 100 feet |
| <input type="checkbox"/> B | <input type="checkbox"/> B | From 80 to < 100 feet |
| <input type="checkbox"/> C | <input type="checkbox"/> C | From 50 to < 80 feet |
| <input type="checkbox"/> D | <input type="checkbox"/> D | From 40 to < 50 feet |
| <input type="checkbox"/> E | <input type="checkbox"/> E | From 30 to < 40 feet |
| <input type="checkbox"/> F | <input type="checkbox"/> F | From 15 to < 30 feet |
| <input checked="" type="checkbox"/> G | <input checked="" type="checkbox"/> G | From 5 to < 15 feet |
| <input type="checkbox"/> H | <input type="checkbox"/> H | < 5 feet |

9. Inundation Duration – assessment area condition metric (skip for non-riparian wetlands)

Answer for assessment area dominant landform.

- A Evidence of short-duration inundation (< 7 consecutive days)
B Evidence of saturation, without evidence of inundation
C Evidence of long-duration inundation or very long-duration inundation (7 to 30 consecutive days or more)

10. Indicators of Deposition – assessment area condition metric (skip for non-riparian wetlands and all marshes)

Consider recent deposition only (no plant growth since deposition).

- A Sediment deposition is not excessive, but at approximately natural levels.
B Sediment deposition is excessive, but not overwhelming the wetland.
C Sediment deposition is excessive and is overwhelming the wetland.

11. Wetland Size – wetland type/wetland complex condition metric

Check a box in each column. Involves a GIS effort with field adjustment. This metric evaluates three aspects of the wetland area: the size of the wetland type (WT), the size of the wetland complex (WC), and the size of the forested wetland (FW) (if applicable, see User Manual). See the User Manual for boundaries of these evaluation areas. If assessment area is clear-cut, select "K" for the FW column.

- WT WC FW (if applicable)
A A A ≥ 500 acres
B B B From 100 to < 500 acres
C C C From 50 to < 100 acres
D D D From 25 to < 50 acres
E E E From 10 to < 25 acres
F F F From 5 to < 10 acres
G G G From 1 to < 5 acres
H H H From 0.5 to < 1 acre
I I I From 0.1 to < 0.5 acre
J J J From 0.01 to < 0.1 acre
K K K < 0.01 acre or assessment area is clear-cut

12. Wetland Intactness – wetland type condition metric (evaluate for Pocosins only)

- A Pocosin is the full extent (≥ 90%) of its natural landscape size.
B Pocosin type is < 90% of the full extent of its natural landscape size.

13. Connectivity to Other Natural Areas – landscape condition metric

13a. Check appropriate box(es) (a box may be checked in each column). Involves a GIS effort with field adjustment. This metric evaluates whether the wetland is well connected (Well) and/or loosely connected (Loosely) to the landscape patch, the contiguous naturally vegetated area and open water (if appropriate). Boundaries are formed by four-lane roads, regularly maintained utility line corridors the width of a four-lane road or wider, urban landscapes, maintained fields (pasture and agriculture), or open water > 300 feet wide.

- Well Loosely
A A ≥ 500 acres
B B From 100 to < 500 acres
C C From 50 to < 100 acres
D D From 10 to < 50 acres
E E < 10 acres
F F Wetland type has a poor or no connection to other natural habitats

13b. Evaluate for marshes only.

- Yes No Wetland type has a surface hydrology connection to open waters/stream or tidal wetlands.

14. Edge Effect – wetland type condition metric (skip for all marshes and Estuarine Woody Wetland)

May involve a GIS effort with field adjustment. Estimate distance from wetland type boundary to artificial edges. Artificial edges include non-forested areas ≥ 40 feet wide such as fields, development, roads, regularly maintained utility line corridors, and clear-cuts. Consider the eight main points of the compass. Artificial edge occurs within 150 feet in how many directions? If the assessment area is clear cut, select option "C."

- A 0
B 1 to 4
C 5 to 8

15. Vegetative Composition – assessment area condition metric (skip for all marshes and Pine Flat)

- A Vegetation is close to reference condition in species present and their proportions. Lower strata composed of appropriate species, with exotic plants absent or sparse within the assessment area.
B Vegetation is different from reference condition in species diversity or proportions, but still largely composed of native species characteristic of the wetland type. This may include communities of weedy native species that develop after clearcutting or clearing. It also includes communities with exotics present, but not dominant, over a large portion of the expected strata.
C Vegetation severely altered from reference in composition, or expected species are unnaturally absent (planted stands of non-characteristic species or at least one stratum inappropriately composed of a single species), or exotic species are dominant in at least one stratum.

16. Vegetative Diversity – assessment area condition metric (evaluate for Non-tidal Freshwater Marsh only)

- A Vegetation diversity is high and is composed primarily of native species (< 10% cover of exotics).
B Vegetation diversity is low or has > 10% to 50% cover of exotics.
C Vegetation is dominated by exotic species (> 50 % cover of exotics).

17. Vegetative Structure – assessment area/wetland type condition metric

17a. Is vegetation present?

- Yes No If Yes, continue to 17b. If No, skip to Metric 18.

17b. Evaluate percent coverage of assessment area vegetation for all marshes only. Skip to 17c for non-marsh wetlands.

- A ≥ 25% coverage of vegetation
B < 25% coverage of vegetation

17c. Check a box in each column for each stratum. Evaluate this portion of the metric for non-marsh wetlands. Consider structure in airspace above the assessment area (AA) and the wetland type (WT) separately.

- AA WT
Canopy A A Canopy closed, or nearly closed, with natural gaps associated with natural processes
B B Canopy present, but opened more than natural gaps
C C Canopy sparse or absent
Mid-Story A A Dense mid-story/sapling layer
B B Moderate density mid-story/sapling layer
C C Mid-story/sapling layer sparse or absent
Shrub A A Dense shrub layer
B B Moderate density shrub layer
C C Shrub layer sparse or absent
Herb A A Dense herb layer
B B Moderate density herb layer
C C Herb layer sparse or absent

18. Snags – wetland type condition metric (skip for all marshes)

- A Large snags (more than one) are visible (> 12 inches DBH, or large relative to species present and landscape stability).
B Not A

19. Diameter Class Distribution – wetland type condition metric (skip for all marshes)

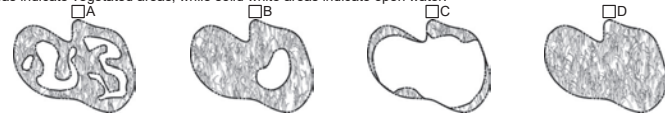
- A Majority of canopy trees have stems > 6 inches in diameter at breast height (DBH); many large trees (> 12 inches DBH) are present.
B Majority of canopy trees have stems between 6 and 12 inches DBH, few are > 12 inch DBH.
C Majority of canopy trees are < 6 inches DBH or no trees.

20. Large Woody Debris – wetland type condition metric (skip for all marshes)

- Include both natural debris and man-placed natural debris.
A Large logs (more than one) are visible (> 12 inches in diameter, or large relative to species present and landscape stability).
B Not A

21. Vegetation/Open Water Dispersion – wetland type/open water condition metric (evaluate for Non-Tidal Freshwater Marsh only)

Select the figure that best describes the amount of interspersed vegetation and open water in the growing season. Patterned areas indicate vegetated areas, while solid white areas indicate open water.



22. Hydrologic Connectivity – assessment area condition metric (evaluate for riparian wetlands and Salt/Brackish Marsh only)

Examples of activities that may severely alter hydrologic connectivity include intensive ditching, fill, sedimentation, channelization, diversion, man-made berms, beaver dams, and stream incision. Documentation required if evaluated as B, C, or D.

- A Overbank and overland flow are not severely altered in the assessment area.
B Overbank flow is severely altered in the assessment area.
C Overland flow is severely altered in the assessment area.
D Both overbank and overland flow are severely altered in the assessment area.

Notes

NC WAM Wetland Rating Sheet
Accompanies User Manual Version 5.0

Wetland Site Name Wetland GG Date of Assessment 7/30/2020
 Wetland Type Bottomland Hardwood Forest Assessor Name/Organization C. Neaves
 Notes on Field Assessment Form (Y/N) NO
 Presence of regulatory considerations (Y/N) NO
 Wetland is intensively managed (Y/N) _____
 Assessment area is located within 50 feet of a natural tributary or other open water (Y/N) YES
 Assessment area is substantially altered by beaver (Y/N) _____
 Assessment area experiences overbank flooding during normal rainfall conditions (Y/N) _____
 Assessment area is on a coastal island (Y/N) _____

Sub-function Rating Summary

Function	Sub-function	Metrics	Rating
Hydrology	Surface Storage and Retention	Condition	LOW
	Sub-surface Storage and Retention	Condition	LOW
Water Quality	Pathogen Change	Condition	LOW
		Condition/Opportunity	LOW
	Particulate Change	Opportunity Presence (Y/N)	NO
		Condition	LOW
	Soluble Change	Condition/Opportunity	LOW
		Opportunity Presence (Y/N)	NO
	Physical Change	Condition	MEDIUM
		Condition/Opportunity	MEDIUM
	Pollution Change	Opportunity Presence (Y/N)	NO
		Condition	LOW
Habitat	Physical Structure	Condition/Opportunity	LOW
	Landscape Patch Structure	Condition	LOW
	Vegetation Composition	Condition	LOW

Function Rating Summary

Function	Metrics	Rating
Hydrology	Condition	LOW
Water Quality	Condition	LOW
	Condition/Opportunity	LOW
	Opportunity Presence (Y/N)	NO
Habitat	Condition	LOW

Overall Wetland Rating LOW

NC WAM FIELD ASSESSMENT FORM
Accompanies User Manual Version 5.0

USACE AID #	SAW-2020-00047	NCDWR#	20200035
Project Name	Liberty Rock Mitigation Site	Date of Evaluation	7/30/2020
Applicant/Owner Name	Wildlands Engineering	Wetland Site Name	Wetland HH
Wetland Type	Floodplain Pool	Assessor Name/Organization	C. Neaves
Level III Ecoregion	Piedmont	Nearest Named Water Body	Rocky River
River Basin	Cape Fear	USGS 8-Digit Catalogue Unit	03030003
County	Randolph	NCDWR Region	Winston-Salem
<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	Precipitation within 48 hrs?	Latitude/Longitude (deci-degrees)	35.820005, -79.563923

Evidence of stressors affecting the assessment area (may not be within the assessment area)
 Please circle and/or make note on the last page if evidence of stressors is apparent. Consider departure from reference, if appropriate, in recent past (for instance, within 10 years). Noteworthy stressors include, but are not limited to the following.

- Hydrological modifications (examples: ditches, dams, beaver dams, dikes, berms, ponds, etc.)
- Surface and sub-surface discharges into the wetland (examples: discharges containing obvious pollutants, presence of nearby septic tanks, underground storage tanks (USTs), hog lagoons, etc.)
- Signs of vegetation stress (examples: vegetation mortality, insect damage, storm damage, salt intrusion, etc.)
- Habitat/plant community alteration (examples: mowing, clear-cutting, exotics, etc.)

Is the assessment area intensively managed? Yes No

Regulatory Considerations - Were regulatory considerations evaluated? Yes No If Yes, check all that apply to the assessment area.

- Anadromous fish
- Federally protected species or State endangered or threatened species
- NCDWR riparian buffer rule in effect
- Abuts a Primary Nursery Area (PNA)
- Publicly owned property
- N.C. Division of Coastal Management Area of Environmental Concern (AEC) (including buffer)
- Abuts a stream with a NCDWQ classification of SA or supplemental classifications of HQW, ORW, or Trout
- Designated NCNHP reference community
- Abuts a 303(d)-listed stream or a tributary to a 303(d)-listed stream

What type of natural stream is associated with the wetland, if any? (check all that apply)

- Blackwater
- Brownwater
- Tidal (if tidal, check one of the following boxes) Lunar Wind Both

Is the assessment area on a coastal island? Yes No

Is the assessment area's surface water storage capacity or duration substantially altered by beaver? Yes No

Does the assessment area experience overbank flooding during normal rainfall conditions? Yes No

- Ground Surface Condition/Vegetation Condition – assessment area condition metric**
Check a box in each column. Consider alteration to the ground surface (GS) in the assessment area and vegetation structure (VS) in the assessment area. Compare to reference wetland if applicable (see User Manual). If a reference is not applicable, then rate the assessment area based on evidence an effect.

GS	VS	
<input checked="" type="checkbox"/> A	<input type="checkbox"/> A	Not severely altered
<input type="checkbox"/> B	<input checked="" type="checkbox"/> B	Severely altered over a majority of the assessment area (ground surface alteration examples: vehicle tracks, excessive sedimentation, fire-plow lanes, skidder tracks, bedding, fill, soil compaction, obvious pollutants) (vegetation structure alteration examples: mechanical disturbance, herbicides, salt intrusion [where appropriate], exotic species, grazing, less diversity [if appropriate], hydrologic alteration)
- Surface and Sub-Surface Storage Capacity and Duration – assessment area condition metric**
Check a box in each column. Consider surface storage capacity and duration (Surf) and sub-surface storage capacity and duration (Sub). Consider both increase and decrease in hydrology. A ditch ≤ 1 foot deep is considered to affect surface water only, while a ditch > 1 foot deep is expected to affect both surface and sub-surface water. Consider tidal flooding regime, if applicable.

Surf	Sub	
<input type="checkbox"/> A	<input type="checkbox"/> A	Water storage capacity and duration are not altered.
<input type="checkbox"/> B	<input type="checkbox"/> B	Water storage capacity or duration are altered, but not substantially (typically, not sufficient to change vegetation).
<input checked="" type="checkbox"/> C	<input checked="" type="checkbox"/> C	Water storage capacity or duration are substantially altered (typically, alteration sufficient to result in vegetation change) (examples: draining, flooding, soil compaction, filling, excessive sedimentation, underground utility lines).
- Water Storage/Surface Relief – assessment area/wetland type condition metric (skip for all marshes)**
Check a box in each column. Select the appropriate storage for the assessment area (AA) and the wetland type (WT).

AA	WT	
3a. <input type="checkbox"/> A	<input type="checkbox"/> A	Majority of wetland with depressions able to pond water > 1 foot deep
<input type="checkbox"/> B	<input type="checkbox"/> B	Majority of wetland with depressions able to pond water 6 inches to 1 foot deep
<input type="checkbox"/> C	<input type="checkbox"/> C	Majority of wetland with depressions able to pond water 3 to 6 inches deep
<input checked="" type="checkbox"/> D	<input checked="" type="checkbox"/> D	Depressions able to pond water < 3 inches deep
3b. <input checked="" type="checkbox"/> A		Evidence that maximum depth of inundation is greater than 2 feet
<input type="checkbox"/> B		Evidence that maximum depth of inundation is between 1 and 2 feet
<input type="checkbox"/> C		Evidence that maximum depth of inundation is less than 1 foot

4. Soil Texture/Structure – assessment area condition metric (skip for all marshes)

Check a box from each of the three soil property groups below. Dig soil profile in the dominant assessment area landscape feature. Make soil observations within the top 12 inches. Use most recent National Technical Committee for Hydric Soils guidance for regional indicators.

- 4a. A Sandy soil
 B Loamy or clayey soils exhibiting redoximorphic features (concentrations, depletions, or rhizospheres)
 C Loamy or clayey soils not exhibiting redoximorphic features
 D Loamy or clayey gleyed soil
 E Histosol or histc epipedon
- 4b. A Soil ribbon < 1 inch
 B Soil ribbon ≥ 1 inch
- 4c. A No peat or muck presence
 B A peat or muck presence

5. Discharge into Wetland – opportunity metric

Check a box in each column. Consider surface pollutants or discharges (Surf) and sub-surface pollutants or discharges (Sub). Examples of sub-surface discharges include presence of nearby septic tank, underground storage tank (UST), etc.

- | | | |
|---------------------------------------|---------------------------------------|---|
| Surf | Sub | |
| <input type="checkbox"/> A | <input checked="" type="checkbox"/> A | Little or no evidence of pollutants or discharges entering the assessment area |
| <input checked="" type="checkbox"/> B | <input type="checkbox"/> B | Noticeable evidence of pollutants or discharges entering the wetland and stressing, but not overwhelming the treatment capacity of the assessment area |
| <input type="checkbox"/> C | <input type="checkbox"/> C | Noticeable evidence of pollutants or discharges (pathogen, particulate, or soluble) entering the assessment area and potentially overwhelming the treatment capacity of the wetland (water discoloration, dead vegetation, excessive sedimentation, odor) |

6. Land Use – opportunity metric (skip for non-riparian wetlands)

Check all that apply (at least one box in each column). Evaluation involves a GIS effort with field adjustment. Consider sources draining to assessment area within entire upstream watershed (WS), within 5 miles and within the watershed draining to the assessment area (5M), and within 2 miles and within the watershed draining to the assessment area (2M).

- | | | | |
|---------------------------------------|---------------------------------------|---------------------------------------|---|
| WS | 5M | 2M | |
| <input type="checkbox"/> A | <input type="checkbox"/> A | <input type="checkbox"/> A | ≥ 10% impervious surfaces |
| <input type="checkbox"/> B | <input type="checkbox"/> B | <input type="checkbox"/> B | Confined animal operations (or other local, concentrated source of pollutants) |
| <input checked="" type="checkbox"/> C | <input checked="" type="checkbox"/> C | <input checked="" type="checkbox"/> C | ≥ 20% coverage of pasture |
| <input type="checkbox"/> D | <input type="checkbox"/> D | <input type="checkbox"/> D | ≥ 20% coverage of agricultural land (regularly plowed land) |
| <input checked="" type="checkbox"/> E | <input checked="" type="checkbox"/> E | <input checked="" type="checkbox"/> E | ≥ 20% coverage of maintained grass/herb |
| <input type="checkbox"/> F | <input type="checkbox"/> F | <input type="checkbox"/> F | ≥ 20% coverage of clear-cut land |
| <input type="checkbox"/> G | <input type="checkbox"/> G | <input type="checkbox"/> G | Little or no opportunity to improve water quality. Lack of opportunity may result from little or no disturbance in the watershed or hydrologic alterations that prevent drainage and/or overbank flow from affecting the assessment area. |

7. Wetland Acting as Vegetated Buffer – assessment area/wetland complex condition metric (skip for non-riparian wetlands)

- 7a. Is assessment area within 50 feet of a tributary or other open water?
 Yes No If Yes, continue to 7b. If No, skip to Metric 8.
 Wetland buffer need only be present on one side of the water body. Make buffer judgment based on the average width of wetland. Record a note if a portion of the buffer has been removed or disturbed.
- 7b. How much of the first 50 feet from the bank is wetland? (Wetland buffer need only be present on one side of the water body. Make buffer judgment based on the average width of wetland. Record a note if a portion of the buffer has been removed or disturbed.)
 A ≥ 50 feet
 B From 30 to < 50 feet
 C From 15 to < 30 feet
 D From 5 to < 15 feet
 E < 5 feet or buffer bypassed by ditches
- 7c. Tributary width. If the tributary is anastomosed, combine widths of channels/braids for a total width.
 ≤ 15-foot wide > 15-foot wide Other open water (no tributary present)
- 7d. Do roots of assessment area vegetation extend into the bank of the tributary/open water?
 Yes No
- 7e. Is stream or other open water sheltered or exposed?
 Sheltered – adjacent open water with width < 2500 feet and no regular boat traffic.
 Exposed – adjacent open water with width ≥ 2500 feet or regular boat traffic.

8. Wetland Width at the Assessment Area – wetland type/wetland complex condition metric (evaluate WT for all marshes and Estuarine Woody Wetland only; evaluate WC for Bottomland Hardwood Forest, Headwater Forest, and Riverine Swamp Forest only)

Check a box in each column for riverine wetlands only. Select the average width for the wetland type at the assessment area (WT) and the wetland complex at the assessment area (WC). See User Manual for WT and WC boundaries.

- | | | |
|---------------------------------------|---------------------------------------|-----------------------|
| WT | WC | |
| <input type="checkbox"/> A | <input type="checkbox"/> A | ≥ 100 feet |
| <input type="checkbox"/> B | <input type="checkbox"/> B | From 80 to < 100 feet |
| <input type="checkbox"/> C | <input type="checkbox"/> C | From 50 to < 80 feet |
| <input type="checkbox"/> D | <input type="checkbox"/> D | From 40 to < 50 feet |
| <input type="checkbox"/> E | <input type="checkbox"/> E | From 30 to < 40 feet |
| <input type="checkbox"/> F | <input type="checkbox"/> F | From 15 to < 30 feet |
| <input checked="" type="checkbox"/> G | <input checked="" type="checkbox"/> G | From 5 to < 15 feet |
| <input type="checkbox"/> H | <input type="checkbox"/> H | < 5 feet |

9. Inundation Duration – assessment area condition metric (skip for non-riparian wetlands)

Answer for assessment area dominant landform.

- A Evidence of short-duration inundation (< 7 consecutive days)
 B Evidence of saturation, without evidence of inundation
 C Evidence of long-duration inundation or very long-duration inundation (7 to 30 consecutive days or more)

10. Indicators of Deposition – assessment area condition metric (skip for non-riparian wetlands and all marshes)

- Consider recent deposition only (no plant growth since deposition).
 A Sediment deposition is not excessive, but at approximately natural levels.
 B Sediment deposition is excessive, but not overwhelming the wetland.
 C Sediment deposition is excessive and is overwhelming the wetland.

11. Wetland Size – wetland type/wetland complex condition metric

Check a box in each column. Involves a GIS effort with field adjustment. This metric evaluates three aspects of the wetland area: the size of the wetland type (WT), the size of the wetland complex (WC), and the size of the forested wetland (FW) (if applicable, see User Manual). See the User Manual for boundaries of these evaluation areas. If assessment area is clear-cut, select "K" for the FW column.

- | | | |
|---------------------------------------|---------------------------------------|---|
| WT | WC | FW (if applicable) |
| <input type="checkbox"/> A | <input type="checkbox"/> A | <input type="checkbox"/> A ≥ 500 acres |
| <input type="checkbox"/> B | <input type="checkbox"/> B | <input type="checkbox"/> B From 100 to < 500 acres |
| <input type="checkbox"/> C | <input type="checkbox"/> C | <input type="checkbox"/> C From 50 to < 100 acres |
| <input type="checkbox"/> D | <input type="checkbox"/> D | <input type="checkbox"/> D From 25 to < 50 acres |
| <input type="checkbox"/> E | <input type="checkbox"/> E | <input type="checkbox"/> E From 10 to < 25 acres |
| <input type="checkbox"/> F | <input type="checkbox"/> F | <input type="checkbox"/> F From 5 to < 10 acres |
| <input type="checkbox"/> G | <input type="checkbox"/> G | <input type="checkbox"/> G From 1 to < 5 acres |
| <input type="checkbox"/> H | <input type="checkbox"/> H | <input type="checkbox"/> H From 0.5 to < 1 acre |
| <input type="checkbox"/> I | <input type="checkbox"/> I | <input type="checkbox"/> I From 0.1 to < 0.5 acre |
| <input type="checkbox"/> J | <input type="checkbox"/> J | <input type="checkbox"/> J From 0.01 to < 0.1 acre |
| <input checked="" type="checkbox"/> K | <input checked="" type="checkbox"/> K | <input checked="" type="checkbox"/> K < 0.01 acre or assessment area is clear-cut |

12. Wetland Intactness – wetland type condition metric (evaluate for Pocosins only)

- A Pocosin is the full extent (≥ 90%) of its natural landscape size.
 B Pocosin type is < 90% of the full extent of its natural landscape size.

13. Connectivity to Other Natural Areas – landscape condition metric

13a. **Check appropriate box(es) (a box may be checked in each column).** Involves a GIS effort with field adjustment. This metric evaluates whether the wetland is well connected (Well) and/or loosely connected (Loosely) to the landscape patch, the contiguous naturally vegetated area and open water (if appropriate). Boundaries are formed by four-lane roads, regularly maintained utility line corridors the width of a four-lane road or wider, urban landscapes, maintained fields (pasture and agriculture), or open water > 300 feet wide.

- | | | |
|----------------------------|---------------------------------------|--|
| Well | Loosely | |
| <input type="checkbox"/> A | <input type="checkbox"/> A | ≥ 500 acres |
| <input type="checkbox"/> B | <input checked="" type="checkbox"/> B | From 100 to < 500 acres |
| <input type="checkbox"/> C | <input type="checkbox"/> C | From 50 to < 100 acres |
| <input type="checkbox"/> D | <input type="checkbox"/> D | From 10 to < 50 acres |
| <input type="checkbox"/> E | <input type="checkbox"/> E | < 10 acres |
| <input type="checkbox"/> F | <input type="checkbox"/> F | Wetland type has a poor or no connection to other natural habitats |

- 13b. **Evaluate for marshes only.**
 Yes No Wetland type has a surface hydrology connection to open waters/stream or tidal wetlands.

14. Edge Effect – wetland type condition metric (skip for all marshes and Estuarine Woody Wetland)

May involve a GIS effort with field adjustment. Estimate distance from wetland type boundary to artificial edges. Artificial edges include non-forested areas ≥ 40 feet wide such as fields, development, roads, regularly maintained utility line corridors, and clear-cuts. Consider the eight main points of the compass. Artificial edge occurs within 150 feet in how many directions? If the assessment area is clear cut, select option "C."

- A 0
 B 1 to 4
 C 5 to 8

15. Vegetative Composition – assessment area condition metric (skip for all marshes and Pine Flat)

- A Vegetation is close to reference condition in species present and their proportions. Lower strata composed of appropriate species, with exotic plants absent or sparse within the assessment area.
 B Vegetation is different from reference condition in species diversity or proportions, but still largely composed of native species characteristic of the wetland type. This may include communities of weedy native species that develop after clearcutting or clearing. It also includes communities with exotics present, but not dominant, over a large portion of the expected strata.
 C Vegetation severely altered from reference in composition, or expected species are unnaturally absent (planted stands of non-characteristic species or at least one stratum inappropriately composed of a single species), or exotic species are dominant in at least one stratum.

16. Vegetative Diversity – assessment area condition metric (evaluate for Non-tidal Freshwater Marsh only)

- A Vegetation diversity is high and is composed primarily of native species (< 10% cover of exotics).
 B Vegetation diversity is low or has > 10% to 50% cover of exotics.
 C Vegetation is dominated by exotic species (> 50 % cover of exotics).

17. **Vegetative Structure – assessment area/wetland type condition metric**

17a. Is vegetation present?

Yes No If Yes, continue to 17b. If No, skip to Metric 18.

17b. Evaluate percent coverage of assessment area vegetation for all marshes only. Skip to 17c for non-marsh wetlands.

A ≥ 25% coverage of vegetation
 B < 25% coverage of vegetation

17c. **Check a box in each column for each stratum.** Evaluate this portion of the metric for non-marsh wetlands. Consider structure in airspace above the assessment area (AA) and the wetland type (WT) separately.

	AA	WT	
Canopy	<input type="checkbox"/> A	<input type="checkbox"/> A	Canopy closed, or nearly closed, with natural gaps associated with natural processes
	<input type="checkbox"/> B	<input type="checkbox"/> B	Canopy present, but opened more than natural gaps
	<input checked="" type="checkbox"/> C	<input checked="" type="checkbox"/> C	Canopy sparse or absent
Mid-Story	<input type="checkbox"/> A	<input type="checkbox"/> A	Dense mid-story/sapling layer
	<input type="checkbox"/> B	<input type="checkbox"/> B	Moderate density mid-story/sapling layer
	<input checked="" type="checkbox"/> C	<input checked="" type="checkbox"/> C	Mid-story/sapling layer sparse or absent
Shrub	<input type="checkbox"/> A	<input type="checkbox"/> A	Dense shrub layer
	<input type="checkbox"/> B	<input type="checkbox"/> B	Moderate density shrub layer
	<input checked="" type="checkbox"/> C	<input checked="" type="checkbox"/> C	Shrub layer sparse or absent
Herb	<input type="checkbox"/> A	<input type="checkbox"/> A	Dense herb layer
	<input checked="" type="checkbox"/> B	<input checked="" type="checkbox"/> B	Moderate density herb layer
	<input type="checkbox"/> C	<input type="checkbox"/> C	Herb layer sparse or absent

18. **Snags – wetland type condition metric (skip for all marshes)**

A Large snags (more than one) are visible (> 12 inches DBH, or large relative to species present and landscape stability).
 B Not A

19. **Diameter Class Distribution – wetland type condition metric (skip for all marshes)**

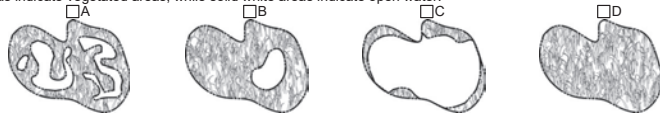
A Majority of canopy trees have stems > 6 inches in diameter at breast height (DBH); many large trees (> 12 inches DBH) are present.
 B Majority of canopy trees have stems between 6 and 12 inches DBH, few are > 12 inch DBH.
 C Majority of canopy trees are < 6 inches DBH or no trees.

20. **Large Woody Debris – wetland type condition metric (skip for all marshes)**

Include both natural debris and man-placed natural debris.
 A Large logs (more than one) are visible (> 12 inches in diameter, or large relative to species present and landscape stability).
 B Not A

21. **Vegetation/Open Water Dispersion – wetland type/open water condition metric (evaluate for Non-Tidal Freshwater Marsh only)**

Select the figure that best describes the amount of interspersed between vegetation and open water in the growing season. Patterned areas indicate vegetated areas, while solid white areas indicate open water.



22. **Hydrologic Connectivity – assessment area condition metric (evaluate for riparian wetlands and Salt/Brackish Marsh only)**

Examples of activities that may severely alter hydrologic connectivity include intensive ditching, fill, sedimentation, channelization, diversion, man-made berms, beaver dams, and stream incision. Documentation required if evaluated as B, C, or D.

A Overbank and overland flow are not severely altered in the assessment area.
 B Overbank flow is severely altered in the assessment area.
 C Overland flow is severely altered in the assessment area.
 D Both overbank and overland flow are severely altered in the assessment area.

Notes

**NC WAM Wetland Rating Sheet
 Accompanies User Manual Version 5.0**

Wetland Site Name Wetland HH Date of Assessment 7/30/2020
 Wetland Type Floodplain Pool Assessor Name/Organization C. Neaves

Notes on Field Assessment Form (Y/N) NO
 Presence of regulatory considerations (Y/N) NO
 Wetland is intensively managed (Y/N) _____
 Assessment area is located within 50 feet of a natural tributary or other open water (Y/N) YES
 Assessment area is substantially altered by beaver (Y/N) _____
 Assessment area experiences overbank flooding during normal rainfall conditions (Y/N) _____
 Assessment area is on a coastal island (Y/N) _____

Sub-function Rating Summary

Function	Sub-function	Metrics	Rating
Hydrology	Surface Storage and Retention	Condition	LOW
		Sub-surface Storage and Retention	Condition
Water Quality	Pathogen Change	Condition	LOW
		Condition/Opportunity	LOW
		Opportunity Presence (Y/N)	NO
	Particulate Change	Condition	MEDIUM
		Condition/Opportunity	MEDIUM
		Opportunity Presence (Y/N)	NO
	Soluble Change	Condition	MEDIUM
		Condition/Opportunity	MEDIUM
		Opportunity Presence (Y/N)	NO
	Physical Change	Condition	NA
		Condition/Opportunity	NA
		Opportunity Presence (Y/N)	NA
	Pollution Change	Condition	NA
		Condition/Opportunity	NA
		Opportunity Presence (Y/N)	NA
Habitat	Physical Structure	Condition	LOW
	Landscape Patch Structure	Condition	LOW
	Vegetation Composition	Condition	LOW

Function Rating Summary

Function	Metrics	Rating
Hydrology	Condition	LOW
	Condition/Opportunity	LOW
Water Quality	Condition	LOW
	Condition/Opportunity	LOW
Habitat	Opportunity Presence (Y/N)	NO
	Condition	LOW

Overall Wetland Rating LOW

NC WAM FIELD ASSESSMENT FORM
Accompanies User Manual Version 5.0

USACE AID #	SAW-2020-00047	NCDWR#	20200035
Project Name	Liberty Rock Mitigation Site	Date of Evaluation	7/30/2020
Applicant/Owner Name	Widlands Engineering	Wetland Site Name	Wetland II
Wetland Type	Riverine Swamp Forest	Assessor Name/Organization	C. Neaves
Level III Ecoregion	Piedmont	Nearest Named Water Body	Rocky River
River Basin	Cape Fear	USGS 8-Digit Catalogue Unit	03030003
County	Randolph	NCDWR Region	Winston-Salem
<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	Precipitation within 48 hrs?	Latitude/Longitude (deci-degrees)	35.819901, -79.564383

Evidence of stressors affecting the assessment area (may not be within the assessment area)

Please circle and/or make note on the last page if evidence of stressors is apparent. Consider departure from reference, if appropriate, in recent past (for instance, within 10 years). Noteworthy stressors include, but are not limited to the following.

- Hydrological modifications (examples: ditches, dams, beaver dams, dikes, berms, ponds, etc.)
- Surface and sub-surface discharges into the wetland (examples: discharges containing obvious pollutants, presence of nearby septic tanks, underground storage tanks (USTs), hog lagoons, etc.)
- Signs of vegetation stress (examples: vegetation mortality, insect damage, disease, storm damage, salt intrusion, etc.)
- Habitat/plant community alteration (examples: mowing, clear-cutting, exotics, etc.)

Is the assessment area intensively managed? Yes No

Regulatory Considerations - Were regulatory considerations evaluated? Yes No If Yes, check all that apply to the assessment area.

- Anadromous fish
- Federally protected species or State endangered or threatened species
- NCDWR riparian buffer rule in effect
- Abuts a Primary Nursery Area (PNA)
- Publicly owned property
- N.C. Division of Coastal Management Area of Environmental Concern (AEC) (including buffer)
- Abuts a stream with a NCDWQ classification of SA or supplemental classifications of HQW, ORW, or Trout
- Designated NCNHP reference community
- Abuts a 303(d)-listed stream or a tributary to a 303(d)-listed stream

What type of natural stream is associated with the wetland, if any? (check all that apply)

- Blackwater
- Brownwater
- Tidal (if tidal, check one of the following boxes) Lunar Wind Both

Is the assessment area on a coastal island? Yes No

Is the assessment area's surface water storage capacity or duration substantially altered by beaver? Yes No

Does the assessment area experience overbank flooding during normal rainfall conditions? Yes No

1. Ground Surface Condition/Vegetation Condition – assessment area condition metric

Check a box in each column. Consider alteration to the ground surface (GS) in the assessment area and vegetation structure (VS) in the assessment area. Compare to reference wetland if applicable (see User Manual). If a reference is not applicable, then rate the assessment area based on evidence an effect.

- | | | |
|---------------------------------------|---------------------------------------|--|
| GS | VS | |
| <input type="checkbox"/> A | <input type="checkbox"/> A | Not severely altered |
| <input checked="" type="checkbox"/> B | <input checked="" type="checkbox"/> B | Severely altered over a majority of the assessment area (ground surface alteration examples: vehicle tracks, excessive sedimentation, fire-plow lanes, skidder tracks, bedding, fill, soil compaction, obvious pollutants) (vegetation structure alteration examples: mechanical disturbance, herbicides, salt intrusion [where appropriate], exotic species, grazing, less diversity [if appropriate], hydrologic alteration) |

2. Surface and Sub-Surface Storage Capacity and Duration – assessment area condition metric

Check a box in each column. Consider surface storage capacity and duration (Surf) and sub-surface storage capacity and duration (Sub). Consider both increase and decrease in hydrology. A ditch ≤ 1 foot deep is considered to affect surface water only, while a ditch > 1 foot deep is expected to affect both surface and sub-surface water. Consider tidal flooding regime, if applicable.

- | | | |
|---------------------------------------|---------------------------------------|--|
| Surf | Sub | |
| <input type="checkbox"/> A | <input type="checkbox"/> A | Water storage capacity and duration are not altered. |
| <input type="checkbox"/> B | <input type="checkbox"/> B | Water storage capacity or duration are altered, but not substantially (typically, not sufficient to change vegetation). |
| <input checked="" type="checkbox"/> C | <input checked="" type="checkbox"/> C | Water storage capacity or duration are substantially altered (typically, alteration sufficient to result in vegetation change) (examples: draining, flooding, soil compaction, filling, excessive sedimentation, underground utility lines). |

3. Water Storage/Surface Relief – assessment area/wetland type condition metric (skip for all marshes)

Check a box in each column. Select the appropriate storage for the assessment area (AA) and the wetland type (WT).

- | | | |
|---|----|---|
| AA | WT | |
| 3a. <input type="checkbox"/> A <input type="checkbox"/> A | | Majority of wetland with depressions able to pond water > 1 deep |
| <input type="checkbox"/> B <input type="checkbox"/> B | | Majority of wetland with depressions able to pond water 6 inches to 1 foot deep |
| <input type="checkbox"/> C <input type="checkbox"/> C | | Majority of wetland with depressions able to pond water 3 to 6 inches deep |
| <input checked="" type="checkbox"/> D <input checked="" type="checkbox"/> D | | Depressions able to pond water < 3 inches deep |
| 3b. <input checked="" type="checkbox"/> A | | Evidence that maximum depth of inundation is greater than 2 feet |
| <input type="checkbox"/> B | | Evidence that maximum depth of inundation is between 1 and 2 feet |
| <input type="checkbox"/> C | | Evidence that maximum depth of inundation is less than 1 foot |

4. Soil Texture/Structure – assessment area condition metric (skip for all marshes)

Check a box from each of the three soil property groups below. Dig soil profile in the dominant assessment area landscape feature. Make soil observations within the top 12 inches. Use most recent National Technical Committee for Hydric Soils guidance for regional indicators.

- 4a. A Sandy soil
- B Loamy or clayey soils exhibiting redoximorphic features (concentrations, depletions, or rhizospheres)
- C Loamy or clayey soils not exhibiting redoximorphic features
- D Loamy or clayey gleyed soil
- E Histosol or histc epipedon
- 4b. A Soil ribbon < 1 inch
- B Soil ribbon ≥ 1 inch
- 4c. A No peat or muck presence
- B A peat or muck presence

5. Discharge into Wetland – opportunity metric

Check a box in each column. Consider surface pollutants or discharges (Surf) and sub-surface pollutants or discharges (Sub). Examples of sub-surface discharges include presence of nearby septic tank, underground storage tank (UST), etc.

- | | | |
|---------------------------------------|---------------------------------------|---|
| Surf | Sub | |
| <input type="checkbox"/> A | <input checked="" type="checkbox"/> A | Little or no evidence of pollutants or discharges entering the assessment area |
| <input checked="" type="checkbox"/> B | <input type="checkbox"/> B | Noticeable evidence of pollutants or discharges entering the wetland and stressing, but not overwhelming the treatment capacity of the assessment area |
| <input type="checkbox"/> C | <input type="checkbox"/> C | Noticeable evidence of pollutants or discharges (pathogen, particulate, or soluble) entering the assessment area and potentially overwhelming the treatment capacity of the wetland (water discoloration, dead vegetation, excessive sedimentation, odor) |

6. Land Use – opportunity metric (skip for non-riparian wetlands)

Check all that apply (at least one box in each column). Evaluation involves a GIS effort with field adjustment. Consider sources draining to assessment area within entire upstream watershed (WS), within 5 miles and within the watershed draining to the assessment area (5M), and within 2 miles and within the watershed draining to the assessment area (2M).

- | | | | |
|---------------------------------------|---------------------------------------|---------------------------------------|---|
| WS | 5M | 2M | |
| <input type="checkbox"/> A | <input type="checkbox"/> A | <input type="checkbox"/> A | ≥ 10% impervious surfaces |
| <input type="checkbox"/> B | <input type="checkbox"/> B | <input type="checkbox"/> B | Confined animal operations (or other local, concentrated source of pollutants) |
| <input checked="" type="checkbox"/> C | <input checked="" type="checkbox"/> C | <input checked="" type="checkbox"/> C | ≥ 20% coverage of pasture |
| <input type="checkbox"/> D | <input type="checkbox"/> D | <input type="checkbox"/> D | ≥ 20% coverage of agricultural land (regularly plowed land) |
| <input checked="" type="checkbox"/> E | <input checked="" type="checkbox"/> E | <input checked="" type="checkbox"/> E | ≥ 20% coverage of maintained grass/herb |
| <input type="checkbox"/> F | <input type="checkbox"/> F | <input type="checkbox"/> F | ≥ 20% coverage of clear-cut land |
| <input type="checkbox"/> G | <input type="checkbox"/> G | <input type="checkbox"/> G | Little or no opportunity to improve water quality. Lack of opportunity may result from little or no disturbance in the watershed or hydrologic alterations that prevent drainage and/or overbank flow from affecting the assessment area. |

7. Wetland Acting as Vegetated Buffer – assessment area/wetland complex condition metric (skip for non-riparian wetlands)

- 7a. Is assessment area within 50 feet of a tributary or other open water?
- Yes No If Yes, continue to 7b. If No, skip to Metric 8.
- Wetland buffer need only be present on one side of the water body. Make buffer judgment based on the average width of wetland. Record a note if a portion of the buffer has been removed or disturbed.
- 7b. How much of the first 50 feet from the bank is wetland? (Wetland buffer need only be present on one side of the water body. Make buffer judgment based on the average width of wetland. Record a note if a portion of the buffer has been removed or disturbed.)
- A ≥ 50 feet
- B From 30 to < 50 feet
- C From 15 to < 30 feet
- D From 5 to < 15 feet
- E < 5 feet or buffer bypassed by ditches
- 7c. Tributary width. If the tributary is anastomosed, combine widths of channels/braids for a total width.
- ≤ 15-foot wide > 15-foot wide Other open water (no tributary present)
- 7d. Do roots of assessment area vegetation extend into the bank of the tributary/open water?
- Yes No
- 7e. Is stream or other open water sheltered or exposed?
- Sheltered – adjacent open water with width < 2500 feet and no regular boat traffic.
- Exposed – adjacent open water with width ≥ 2500 feet or regular boat traffic.

8. Wetland Width at the Assessment Area – wetland type/wetland complex condition metric (evaluate WT for all marshes and Estuarine Woody Wetland only; evaluate WC for Bottomland Hardwood Forest, Headwater Forest, and Riverine Swamp Forest only)

Check a box in each column for riverine wetlands only. Select the average width for the wetland type at the assessment area (WT) and the wetland complex at the assessment area (WC). See User Manual for WT and WC boundaries.

- | | | |
|---------------------------------------|---------------------------------------|-----------------------|
| WT | WC | |
| <input type="checkbox"/> A | <input type="checkbox"/> A | ≥ 100 feet |
| <input type="checkbox"/> B | <input type="checkbox"/> B | From 80 to < 100 feet |
| <input type="checkbox"/> C | <input type="checkbox"/> C | From 50 to < 80 feet |
| <input type="checkbox"/> D | <input type="checkbox"/> D | From 40 to < 50 feet |
| <input type="checkbox"/> E | <input type="checkbox"/> E | From 30 to < 40 feet |
| <input type="checkbox"/> F | <input type="checkbox"/> F | From 15 to < 30 feet |
| <input checked="" type="checkbox"/> G | <input checked="" type="checkbox"/> G | From 5 to < 15 feet |
| <input type="checkbox"/> H | <input type="checkbox"/> H | < 5 feet |

9. **Inundation Duration – assessment area condition metric (skip for non-riparian wetlands)**

Answer for assessment area dominant landform.

- A Evidence of short-duration inundation (< 7 consecutive days)
B Evidence of saturation, without evidence of inundation
C Evidence of long-duration inundation or very long-duration inundation (7 to 30 consecutive days or more)

10. **Indicators of Deposition – assessment area condition metric (skip for non-riparian wetlands and all marshes)**

Consider recent deposition only (no plant growth since deposition).

- A Sediment deposition is not excessive, but at approximately natural levels.
B Sediment deposition is excessive, but not overwhelming the wetland.
C Sediment deposition is excessive and is overwhelming the wetland.

11. **Wetland Size – wetland type/wetland complex condition metric**

Check a box in each column. Involves a GIS effort with field adjustment. This metric evaluates three aspects of the wetland area: the size of the wetland type (WT), the size of the wetland complex (WC), and the size of the forested wetland (FW) (if applicable, see User Manual). See the User Manual for boundaries of these evaluation areas. If assessment area is clear-cut, select "K" for the FW column.

- | | | |
|---------------------------------------|---------------------------------------|--|
| WT | WC | FW (if applicable) |
| <input type="checkbox"/> A | <input type="checkbox"/> A | <input type="checkbox"/> A ≥ 500 acres |
| <input type="checkbox"/> B | <input type="checkbox"/> B | <input type="checkbox"/> B From 100 to < 500 acres |
| <input type="checkbox"/> C | <input type="checkbox"/> C | <input type="checkbox"/> C From 50 to < 100 acres |
| <input type="checkbox"/> D | <input type="checkbox"/> D | <input type="checkbox"/> D From 25 to < 50 acres |
| <input type="checkbox"/> E | <input type="checkbox"/> E | <input type="checkbox"/> E From 10 to < 25 acres |
| <input type="checkbox"/> F | <input type="checkbox"/> F | <input type="checkbox"/> F From 5 to < 10 acres |
| <input type="checkbox"/> G | <input type="checkbox"/> G | <input type="checkbox"/> G From 1 to < 5 acres |
| <input type="checkbox"/> H | <input type="checkbox"/> H | <input type="checkbox"/> H From 0.5 to < 1 acre |
| <input type="checkbox"/> I | <input type="checkbox"/> I | <input type="checkbox"/> I From 0.1 to < 0.5 acre |
| <input checked="" type="checkbox"/> J | <input checked="" type="checkbox"/> J | <input type="checkbox"/> J From 0.01 to < 0.1 acre |
| <input type="checkbox"/> K | <input type="checkbox"/> K | <input checked="" type="checkbox"/> K < 0.01 acre <u>or</u> assessment area is clear-cut |

12. **Wetland Intactness – wetland type condition metric (evaluate for Pocosins only)**

- A Pocosin is the full extent (≥ 90%) of its natural landscape size.
B Pocosin type is < 90% of the full extent of its natural landscape size.

13. **Connectivity to Other Natural Areas – landscape condition metric**

13a. **Check appropriate box(es) (a box may be checked in each column).** Involves a GIS effort with field adjustment. This metric evaluates whether the wetland is well connected (Well) and/or loosely connected (Loosely) to the landscape patch, the contiguous naturally vegetated area and open water (if appropriate). Boundaries are formed by four-lane roads, regularly maintained utility line corridors the width of a four-lane road or wider, urban landscapes, maintained fields (pasture and agriculture), or open water > 300 feet wide.

- | | |
|----------------------------|---|
| Well | Loosely |
| <input type="checkbox"/> A | <input type="checkbox"/> A ≥ 500 acres |
| <input type="checkbox"/> B | <input checked="" type="checkbox"/> B From 100 to < 500 acres |
| <input type="checkbox"/> C | <input type="checkbox"/> C From 50 to < 100 acres |
| <input type="checkbox"/> D | <input type="checkbox"/> D From 10 to < 50 acres |
| <input type="checkbox"/> E | <input type="checkbox"/> E < 10 acres |
| <input type="checkbox"/> F | <input type="checkbox"/> F Wetland type has a poor or no connection to other natural habitats |

13b. **Evaluate for marshes only.**

- Yes No Wetland type has a surface hydrology connection to open waters/stream or tidal wetlands.

14. **Edge Effect – wetland type condition metric (skip for all marshes and Estuarine Woody Wetland)**

May involve a GIS effort with field adjustment. Estimate distance from wetland type boundary to artificial edges. Artificial edges include non-forested areas ≥ 40 feet wide such as fields, development, roads, regularly maintained utility line corridors, and clear-cuts. Consider the eight main points of the compass. Artificial edge occurs within 150 feet in how many directions? If the assessment area is clear cut, select option "C."

- A 0
B 1 to 4
C 5 to 8

15. **Vegetative Composition – assessment area condition metric (skip for all marshes and Pine Flat)**

- A Vegetation is close to reference condition in species present and their proportions. Lower strata composed of appropriate species, with exotic plants absent or sparse within the assessment area.
B Vegetation is different from reference condition in species diversity or proportions, but still largely composed of native species characteristic of the wetland type. This may include communities of weedy native species that develop after clearcutting or clearing. It also includes communities with exotics present, but not dominant, over a large portion of the expected strata.
C Vegetation severely altered from reference in composition, or expected species are unnaturally absent (planted stands of non-characteristic species or at least one stratum inappropriately composed of a single species), or exotic species are dominant in at least one stratum.

16. **Vegetative Diversity – assessment area condition metric (evaluate for Non-tidal Freshwater Marsh only)**

- A Vegetation diversity is high and is composed primarily of native species (< 10% cover of exotics).
B Vegetation diversity is low or has > 10% to 50% cover of exotics.
C Vegetation is dominated by exotic species (> 50 % cover of exotics).

17. **Vegetative Structure – assessment area/wetland type condition metric**

17a. Is vegetation present?

- Yes No If Yes, continue to 17b. If No, skip to Metric 18.

17b. Evaluate percent coverage of assessment area vegetation for all marshes only. Skip to 17c for non-marsh wetlands.

- A ≥ 25% coverage of vegetation
B < 25% coverage of vegetation

17c. **Check a box in each column for each stratum.** Evaluate this portion of the metric for non-marsh wetlands. Consider structure in airspace above the assessment area (AA) and the wetland type (WT) separately.

- | | | |
|-----------|---------------------------------------|---|
| AA | WT | |
| Canopy | <input type="checkbox"/> A | <input type="checkbox"/> A Canopy closed, or nearly closed, with natural gaps associated with natural processes |
| | <input type="checkbox"/> B | <input type="checkbox"/> B Canopy present, but opened more than natural gaps |
| | <input checked="" type="checkbox"/> C | <input checked="" type="checkbox"/> C Canopy sparse or absent |
| Mid-Story | <input type="checkbox"/> A | <input type="checkbox"/> A Dense mid-story/sapling layer |
| | <input type="checkbox"/> B | <input type="checkbox"/> B Moderate density mid-story/sapling layer |
| | <input checked="" type="checkbox"/> C | <input checked="" type="checkbox"/> C Mid-story/sapling layer sparse or absent |
| Shrub | <input type="checkbox"/> A | <input type="checkbox"/> A Dense shrub layer |
| | <input type="checkbox"/> B | <input type="checkbox"/> B Moderate density shrub layer |
| | <input checked="" type="checkbox"/> C | <input checked="" type="checkbox"/> C Shrub layer sparse or absent |
| Herb | <input type="checkbox"/> A | <input type="checkbox"/> A Dense herb layer |
| | <input checked="" type="checkbox"/> B | <input checked="" type="checkbox"/> B Moderate density herb layer |
| | <input type="checkbox"/> C | <input type="checkbox"/> C Herb layer sparse or absent |

18. **Snags – wetland type condition metric (skip for all marshes)**

- A Large snags (more than one) are visible (> 12 inches DBH, or large relative to species present and landscape stability).
B Not A

19. **Diameter Class Distribution – wetland type condition metric (skip for all marshes)**

- A Majority of canopy trees have stems > 6 inches in diameter at breast height (DBH); many large trees (> 12 inches DBH) are present.
B Majority of canopy trees have stems between 6 and 12 inches DBH, few are > 12 inch DBH.
C Majority of canopy trees are < 6 inches DBH or no trees.

20. **Large Woody Debris – wetland type condition metric (skip for all marshes)**

Include both natural debris and man-placed natural debris.

- A Large logs (more than one) are visible (> 12 inches in diameter, or large relative to species present and landscape stability).
B Not A

21. **Vegetation/Open Water Dispersion – wetland type/open water condition metric (evaluate for Non-Tidal Freshwater Marsh only)**

Select the figure that best describes the amount of interspersed between vegetation and open water in the growing season. Patterned areas indicate vegetated areas, while solid white areas indicate open water.



22. **Hydrologic Connectivity – assessment area condition metric (evaluate for riparian wetlands and Salt/Brackish Marsh only)**

Examples of activities that may severely alter hydrologic connectivity include intensive ditching, fill, sedimentation, channelization, diversion, man-made berms, beaver dams, and stream incision. Documentation required if evaluated as B, C, or D.

- A Overbank and overland flow are not severely altered in the assessment area.
B Overbank flow is severely altered in the assessment area.
C Overland flow is severely altered in the assessment area.
D Both overbank and overland flow are severely altered in the assessment area.

Notes

Closed depression that appears to have been excavated.

NC WAM Wetland Rating Sheet
Accompanies User Manual Version 5.0

Wetland Site Name Wetland II Date of Assessment 7/30/2020
 Wetland Type Riverine Swamp Forest Assessor Name/Organization C. Neaves
 Notes on Field Assessment Form (Y/N) YES
 Presence of regulatory considerations (Y/N) NO
 Wetland is intensively managed (Y/N) _____
 Assessment area is located within 50 feet of a natural tributary or other open water (Y/N) YES
 Assessment area is substantially altered by beaver (Y/N) _____
 Assessment area experiences overbank flooding during normal rainfall conditions (Y/N) _____
 Assessment area is on a coastal island (Y/N) _____

Sub-function Rating Summary

Function	Sub-function	Metrics	Rating
Hydrology	Surface Storage and Retention	Condition	LOW
	Sub-surface Storage and Retention	Condition	LOW
Water Quality	Pathogen Change	Condition	LOW
		Condition/Opportunity	LOW
	Particulate Change	Opportunity Presence (Y/N)	NO
		Condition	LOW
	Soluble Change	Condition/Opportunity	LOW
		Opportunity Presence (Y/N)	NO
	Physical Change	Condition	MEDIUM
		Condition/Opportunity	MEDIUM
	Pollution Change	Opportunity Presence (Y/N)	NO
		Condition	LOW
Habitat	Physical Structure	Condition/Opportunity	LOW
	Landscape Patch Structure	Condition	LOW
	Vegetation Composition	Condition	LOW

Function Rating Summary

Function	Metrics	Rating
Hydrology	Condition	LOW
Water Quality	Condition	LOW
	Condition/Opportunity	LOW
Habitat	Opportunity Presence (Y/N)	NO
	Condition	LOW

Overall Wetland Rating LOW

NC WAM FIELD ASSESSMENT FORM
Accompanies User Manual Version 5.0

USACE AID #	SAW-2020-00047	NCDWR#	20200035
Project Name	Liberty Rock Mitigation Site	Date of Evaluation	7/30/2020
Applicant/Owner Name	Wildlands Engineering	Wetland Site Name	Wetland JJ
Wetland Type	Bottomland Hardwood Forest	Assessor Name/Organization	C. Neaves
Level III Ecoregion	Piedmont	Nearest Named Water Body	Rocky River
River Basin	Cape Fear	USGS 8-Digit Catalogue Unit	03030003
County	Randolph	NCDWR Region	Winston-Salem
<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	Precipitation within 48 hrs?	Latitude/Longitude (deci-degrees)	35.819824, -79.564530

Evidence of stressors affecting the assessment area (may not be within the assessment area)
 Please circle and/or make note on the last page if evidence of stressors is apparent. Consider departure from reference, if appropriate, in recent past (for instance, within 10 years). Noteworthy stressors include, but are not limited to the following.

- Hydrological modifications (examples: ditches, dams, beaver dams, dikes, berms, ponds, etc.)
- Surface and sub-surface discharges into the wetland (examples: discharges containing obvious pollutants, presence of nearby septic tanks, underground storage tanks (USTs), hog lagoons, etc.)
- Signs of vegetation stress (examples: vegetation mortality, insect damage, storm damage, disease, salt intrusion, etc.)
- Habitat/plant community alteration (examples: mowing, clear-cutting, exotics, etc.)

Is the assessment area intensively managed? Yes No

Regulatory Considerations - Were regulatory considerations evaluated? Yes No If Yes, check all that apply to the assessment area.

- Anadromous fish
- Federally protected species or State endangered or threatened species
- NCDWR riparian buffer rule in effect
- Abuts a Primary Nursery Area (PNA)
- Publicly owned property
- N.C. Division of Coastal Management Area of Environmental Concern (AEC) (including buffer)
- Abuts a stream with a NCDWQ classification of SA or supplemental classifications of HQW, ORW, or Trout
- Designated NCNHP reference community
- Abuts a 303(d)-listed stream or a tributary to a 303(d)-listed stream

What type of natural stream is associated with the wetland, if any? (check all that apply)

- Blackwater
- Brownwater
- Tidal (if tidal, check one of the following boxes) Lunar Wind Both

Is the assessment area on a coastal island? Yes No

Is the assessment area's surface water storage capacity or duration substantially altered by beaver? Yes No

Does the assessment area experience overbank flooding during normal rainfall conditions? Yes No

- Ground Surface Condition/Vegetation Condition – assessment area condition metric**
Check a box in each column. Consider alteration to the ground surface (GS) in the assessment area and vegetation structure (VS) in the assessment area. Compare to reference wetland if applicable (see User Manual). If a reference is not applicable, then rate the assessment area based on evidence an effect.

GS	VS	
<input checked="" type="checkbox"/> A	<input type="checkbox"/> A	Not severely altered
<input type="checkbox"/> B	<input checked="" type="checkbox"/> B	Severely altered over a majority of the assessment area (ground surface alteration examples: vehicle tracks, excessive sedimentation, fire-plow lanes, skidder tracks, bedding, fill, soil compaction, obvious pollutants) (vegetation structure alteration examples: mechanical disturbance, herbicides, salt intrusion [where appropriate], exotic species, grazing, less diversity [if appropriate], hydrologic alteration)
- Surface and Sub-Surface Storage Capacity and Duration – assessment area condition metric**
Check a box in each column. Consider surface storage capacity and duration (Surf) and sub-surface storage capacity and duration (Sub). Consider both increase and decrease in hydrology. A ditch ≤ 1 foot deep is considered to affect surface water only, while a ditch > 1 foot deep is expected to affect both surface and sub-surface water. Consider tidal flooding regime, if applicable.

Surf	Sub	
<input type="checkbox"/> A	<input type="checkbox"/> A	Water storage capacity and duration are not altered.
<input checked="" type="checkbox"/> B	<input checked="" type="checkbox"/> B	Water storage capacity or duration are altered, but not substantially (typically, not sufficient to change vegetation).
<input type="checkbox"/> C	<input type="checkbox"/> C	Water storage capacity or duration are substantially altered (typically, alteration sufficient to result in vegetation change) (examples: draining, flooding, soil compaction, filling, excessive sedimentation, underground utility lines).
- Water Storage/Surface Relief – assessment area/wetland type condition metric (skip for all marshes)**
Check a box in each column. Select the appropriate storage for the assessment area (AA) and the wetland type (WT).

AA	WT	
3a. <input type="checkbox"/> A	<input type="checkbox"/> A	Majority of wetland with depressions able to pond water > 1 foot deep
<input type="checkbox"/> B	<input type="checkbox"/> B	Majority of wetland with depressions able to pond water 6 inches to 1 foot deep
<input type="checkbox"/> C	<input type="checkbox"/> C	Majority of wetland with depressions able to pond water 3 to 6 inches deep
<input checked="" type="checkbox"/> D	<input checked="" type="checkbox"/> D	Depressions able to pond water < 3 inches deep
3b. <input type="checkbox"/> A	<input type="checkbox"/> A	Evidence that maximum depth of inundation is greater than 2 feet
<input type="checkbox"/> B	<input type="checkbox"/> B	Evidence that maximum depth of inundation is between 1 and 2 feet
<input checked="" type="checkbox"/> C	<input checked="" type="checkbox"/> C	Evidence that maximum depth of inundation is less than 1 foot

4. Soil Texture/Structure – assessment area condition metric (skip for all marshes)

Check a box from each of the three soil property groups below. Dig soil profile in the dominant assessment area landscape feature. Make soil observations within the top 12 inches. Use most recent National Technical Committee for Hydric Soils guidance for regional indicators.

- 4a. A Sandy soil
 B Loamy or clayey soils exhibiting redoximorphic features (concentrations, depletions, or rhizospheres)
 C Loamy or clayey soils not exhibiting redoximorphic features
 D Loamy or clayey gleyed soil
 E Histosol or histc epipedon
- 4b. A Soil ribbon < 1 inch
 B Soil ribbon ≥ 1 inch
- 4c. A No peat or muck presence
 B A peat or muck presence

5. Discharge into Wetland – opportunity metric

Check a box in each column. Consider surface pollutants or discharges (Surf) and sub-surface pollutants or discharges (Sub). Examples of sub-surface discharges include presence of nearby septic tank, underground storage tank (UST), etc.

- | | | |
|---------------------------------------|---------------------------------------|---|
| Surf | Sub | |
| <input type="checkbox"/> A | <input checked="" type="checkbox"/> A | Little or no evidence of pollutants or discharges entering the assessment area |
| <input checked="" type="checkbox"/> B | <input type="checkbox"/> B | Noticeable evidence of pollutants or discharges entering the wetland and stressing, but not overwhelming the treatment capacity of the assessment area |
| <input type="checkbox"/> C | <input type="checkbox"/> C | Noticeable evidence of pollutants or discharges (pathogen, particulate, or soluble) entering the assessment area and potentially overwhelming the treatment capacity of the wetland (water discoloration, dead vegetation, excessive sedimentation, odor) |

6. Land Use – opportunity metric (skip for non-riparian wetlands)

Check all that apply (at least one box in each column). Evaluation involves a GIS effort with field adjustment. Consider sources draining to assessment area within entire upstream watershed (WS), within 5 miles and within the watershed draining to the assessment area (5M), and within 2 miles and within the watershed draining to the assessment area (2M).

- | | | | |
|---------------------------------------|---------------------------------------|---------------------------------------|---|
| WS | 5M | 2M | |
| <input type="checkbox"/> A | <input type="checkbox"/> A | <input type="checkbox"/> A | ≥ 10% impervious surfaces |
| <input type="checkbox"/> B | <input type="checkbox"/> B | <input type="checkbox"/> B | Confined animal operations (or other local, concentrated source of pollutants) |
| <input checked="" type="checkbox"/> C | <input checked="" type="checkbox"/> C | <input checked="" type="checkbox"/> C | ≥ 20% coverage of pasture |
| <input type="checkbox"/> D | <input type="checkbox"/> D | <input type="checkbox"/> D | ≥ 20% coverage of agricultural land (regularly plowed land) |
| <input checked="" type="checkbox"/> E | <input checked="" type="checkbox"/> E | <input checked="" type="checkbox"/> E | ≥ 20% coverage of maintained grass/herb |
| <input type="checkbox"/> F | <input type="checkbox"/> F | <input type="checkbox"/> F | ≥ 20% coverage of clear-cut land |
| <input type="checkbox"/> G | <input type="checkbox"/> G | <input type="checkbox"/> G | Little or no opportunity to improve water quality. Lack of opportunity may result from little or no disturbance in the watershed or hydrologic alterations that prevent drainage and/or overbank flow from affecting the assessment area. |

7. Wetland Acting as Vegetated Buffer – assessment area/wetland complex condition metric (skip for non-riparian wetlands)

- 7a. Is assessment area within 50 feet of a tributary or other open water?
 Yes No If Yes, continue to 7b. If No, skip to Metric 8.
 Wetland buffer need only be present on one side of the water body. Make buffer judgment based on the average width of wetland. Record a note if a portion of the buffer has been removed or disturbed.
- 7b. How much of the first 50 feet from the bank is wetland? (Wetland buffer need only be present on one side of the water body. Make buffer judgment based on the average width of wetland. Record a note if a portion of the buffer has been removed or disturbed.)
 A ≥ 50 feet
 B From 30 to < 50 feet
 C From 15 to < 30 feet
 D From 5 to < 15 feet
 E < 5 feet or buffer bypassed by ditches
- 7c. Tributary width. If the tributary is anastomosed, combine widths of channels/braids for a total width.
 ≤ 15-foot wide > 15-foot wide Other open water (no tributary present)
- 7d. Do roots of assessment area vegetation extend into the bank of the tributary/open water?
 Yes No
- 7e. Is stream or other open water sheltered or exposed?
 Sheltered – adjacent open water with width < 2500 feet and no regular boat traffic.
 Exposed – adjacent open water with width ≥ 2500 feet or regular boat traffic.

8. Wetland Width at the Assessment Area – wetland type/wetland complex condition metric (evaluate WT for all marshes and Estuarine Woody Wetland only; evaluate WC for Bottomland Hardwood Forest, Headwater Forest, and Riverine Swamp Forest only)

Check a box in each column for riverine wetlands only. Select the average width for the wetland type at the assessment area (WT) and the wetland complex at the assessment area (WC). See User Manual for WT and WC boundaries.

- | | | |
|---------------------------------------|---------------------------------------|-----------------------|
| WT | WC | |
| <input type="checkbox"/> A | <input type="checkbox"/> A | ≥ 100 feet |
| <input type="checkbox"/> B | <input type="checkbox"/> B | From 80 to < 100 feet |
| <input type="checkbox"/> C | <input type="checkbox"/> C | From 50 to < 80 feet |
| <input type="checkbox"/> D | <input type="checkbox"/> D | From 40 to < 50 feet |
| <input type="checkbox"/> E | <input type="checkbox"/> E | From 30 to < 40 feet |
| <input checked="" type="checkbox"/> F | <input checked="" type="checkbox"/> F | From 15 to < 30 feet |
| <input type="checkbox"/> G | <input type="checkbox"/> G | From 5 to < 15 feet |
| <input type="checkbox"/> H | <input type="checkbox"/> H | < 5 feet |

9. Inundation Duration – assessment area condition metric (skip for non-riparian wetlands)

Answer for assessment area dominant landform.

- A Evidence of short-duration inundation (< 7 consecutive days)
 B Evidence of saturation, without evidence of inundation
 C Evidence of long-duration inundation or very long-duration inundation (7 to 30 consecutive days or more)

10. Indicators of Deposition – assessment area condition metric (skip for non-riparian wetlands and all marshes)

Consider recent deposition only (no plant growth since deposition).

- A Sediment deposition is not excessive, but at approximately natural levels.
 B Sediment deposition is excessive, but not overwhelming the wetland.
 C Sediment deposition is excessive and is overwhelming the wetland.

11. Wetland Size – wetland type/wetland complex condition metric

Check a box in each column. Involves a GIS effort with field adjustment. This metric evaluates three aspects of the wetland area: the size of the wetland type (WT), the size of the wetland complex (WC), and the size of the forested wetland (FW) (if applicable, see User Manual). See the User Manual for boundaries of these evaluation areas. If assessment area is clear-cut, select "K" for the FW column.

- | | | |
|---------------------------------------|---------------------------------------|---|
| WT | WC | FW (if applicable) |
| <input type="checkbox"/> A | <input type="checkbox"/> A | <input type="checkbox"/> A ≥ 500 acres |
| <input type="checkbox"/> B | <input type="checkbox"/> B | <input type="checkbox"/> B From 100 to < 500 acres |
| <input type="checkbox"/> C | <input type="checkbox"/> C | <input type="checkbox"/> C From 50 to < 100 acres |
| <input type="checkbox"/> D | <input type="checkbox"/> D | <input type="checkbox"/> D From 25 to < 50 acres |
| <input type="checkbox"/> E | <input type="checkbox"/> E | <input type="checkbox"/> E From 10 to < 25 acres |
| <input type="checkbox"/> F | <input type="checkbox"/> F | <input type="checkbox"/> F From 5 to < 10 acres |
| <input type="checkbox"/> G | <input type="checkbox"/> G | <input type="checkbox"/> G From 1 to < 5 acres |
| <input type="checkbox"/> H | <input type="checkbox"/> H | <input type="checkbox"/> H From 0.5 to < 1 acre |
| <input type="checkbox"/> I | <input type="checkbox"/> I | <input type="checkbox"/> I From 0.1 to < 0.5 acre |
| <input checked="" type="checkbox"/> J | <input checked="" type="checkbox"/> J | <input type="checkbox"/> J From 0.01 to < 0.1 acre |
| <input type="checkbox"/> K | <input type="checkbox"/> K | <input checked="" type="checkbox"/> K < 0.01 acre or assessment area is clear-cut |

12. Wetland Intactness – wetland type condition metric (evaluate for Pocosins only)

- A Pocosin is the full extent (≥ 90%) of its natural landscape size.
 B Pocosin type is < 90% of the full extent of its natural landscape size.

13. Connectivity to Other Natural Areas – landscape condition metric

13a. **Check appropriate box(es) (a box may be checked in each column).** Involves a GIS effort with field adjustment. This metric evaluates whether the wetland is well connected (Well) and/or loosely connected (Loosely) to the landscape patch, the contiguous naturally vegetated area and open water (if appropriate). Boundaries are formed by four-lane roads, regularly maintained utility line corridors the width of a four-lane road or wider, urban landscapes, maintained fields (pasture and agriculture), or open water > 300 feet wide.

- | | | |
|----------------------------|---------------------------------------|--|
| Well | Loosely | |
| <input type="checkbox"/> A | <input type="checkbox"/> A | ≥ 500 acres |
| <input type="checkbox"/> B | <input checked="" type="checkbox"/> B | From 100 to < 500 acres |
| <input type="checkbox"/> C | <input type="checkbox"/> C | From 50 to < 100 acres |
| <input type="checkbox"/> D | <input type="checkbox"/> D | From 10 to < 50 acres |
| <input type="checkbox"/> E | <input type="checkbox"/> E | < 10 acres |
| <input type="checkbox"/> F | <input type="checkbox"/> F | Wetland type has a poor or no connection to other natural habitats |

13b. **Evaluate for marshes only.**

- Yes No Wetland type has a surface hydrology connection to open waters/stream or tidal wetlands.

14. Edge Effect – wetland type condition metric (skip for all marshes and Estuarine Woody Wetland)

May involve a GIS effort with field adjustment. Estimate distance from wetland type boundary to artificial edges. Artificial edges include non-forested areas ≥ 40 feet wide such as fields, development, roads, regularly maintained utility line corridors, and clear-cuts. Consider the eight main points of the compass. Artificial edge occurs within 150 feet in how many directions? If the assessment area is clear cut, select option "C."

- A 0
 B 1 to 4
 C 5 to 8

15. Vegetative Composition – assessment area condition metric (skip for all marshes and Pine Flat)

- A Vegetation is close to reference condition in species present and their proportions. Lower strata composed of appropriate species, with exotic plants absent or sparse within the assessment area.
 B Vegetation is different from reference condition in species diversity or proportions, but still largely composed of native species characteristic of the wetland type. This may include communities of weedy native species that develop after clearcutting or clearing. It also includes communities with exotics present, but not dominant, over a large portion of the expected strata.
 C Vegetation severely altered from reference in composition, or expected species are unnaturally absent (planted stands of non-characteristic species or at least one stratum inappropriately composed of a single species), or exotic species are dominant in at least one stratum.

16. Vegetative Diversity – assessment area condition metric (evaluate for Non-tidal Freshwater Marsh only)

- A Vegetation diversity is high and is composed primarily of native species (< 10% cover of exotics).
 B Vegetation diversity is low or has > 10% to 50% cover of exotics.
 C Vegetation is dominated by exotic species (> 50 % cover of exotics).

17. Vegetative Structure – assessment area/wetland type condition metric

17a. Is vegetation present?
 Yes No If Yes, continue to 17b. If No, skip to Metric 18.

17b. Evaluate percent coverage of assessment area vegetation for all marshes only. Skip to 17c for non-marsh wetlands.
 A ≥ 25% coverage of vegetation
 B < 25% coverage of vegetation

17c. Check a box in each column for each stratum. Evaluate this portion of the metric for non-marsh wetlands. Consider structure in airspace above the assessment area (AA) and the wetland type (WT) separately.

	AA	WT	
Canopy	<input type="checkbox"/> A	<input type="checkbox"/> A	Canopy closed, or nearly closed, with natural gaps associated with natural processes
	<input type="checkbox"/> B	<input type="checkbox"/> B	Canopy present, but opened more than natural gaps
	<input checked="" type="checkbox"/> C	<input checked="" type="checkbox"/> C	Canopy sparse or absent
Mid-Story	<input type="checkbox"/> A	<input type="checkbox"/> A	Dense mid-story/sapling layer
	<input type="checkbox"/> B	<input type="checkbox"/> B	Moderate density mid-story/sapling layer
	<input checked="" type="checkbox"/> C	<input checked="" type="checkbox"/> C	Mid-story/sapling layer sparse or absent
Shrub	<input type="checkbox"/> A	<input type="checkbox"/> A	Dense shrub layer
	<input type="checkbox"/> B	<input type="checkbox"/> B	Moderate density shrub layer
	<input checked="" type="checkbox"/> C	<input checked="" type="checkbox"/> C	Shrub layer sparse or absent
Herb	<input type="checkbox"/> A	<input type="checkbox"/> A	Dense herb layer
	<input checked="" type="checkbox"/> B	<input checked="" type="checkbox"/> B	Moderate density herb layer
	<input type="checkbox"/> C	<input type="checkbox"/> C	Herb layer sparse or absent

18. Snags – wetland type condition metric (skip for all marshes)

A Large snags (more than one) are visible (> 12 inches DBH, or large relative to species present and landscape stability).
 B Not A

19. Diameter Class Distribution – wetland type condition metric (skip for all marshes)

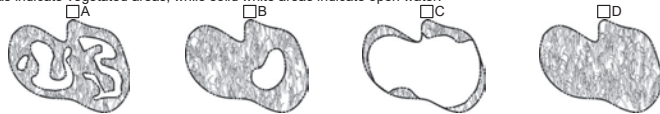
A Majority of canopy trees have stems > 6 inches in diameter at breast height (DBH); many large trees (> 12 inches DBH) are present.
 B Majority of canopy trees have stems between 6 and 12 inches DBH, few are > 12 inch DBH.
 C Majority of canopy trees are < 6 inches DBH or no trees.

20. Large Woody Debris – wetland type condition metric (skip for all marshes)

Include both natural debris and man-placed natural debris.
 A Large logs (more than one) are visible (> 12 inches in diameter, or large relative to species present and landscape stability).
 B Not A

21. Vegetation/Open Water Dispersion – wetland type/open water condition metric (evaluate for Non-Tidal Freshwater Marsh only)

Select the figure that best describes the amount of interspersed vegetation and open water in the growing season. Patterned areas indicate vegetated areas, while solid white areas indicate open water.



22. Hydrologic Connectivity – assessment area condition metric (evaluate for riparian wetlands and Salt/Brackish Marsh only)

Examples of activities that may severely alter hydrologic connectivity include intensive ditching, fill, sedimentation, channelization, diversion, man-made berms, beaver dams, and stream incision. Documentation required if evaluated as B, C, or D.

A Overbank and overland flow are not severely altered in the assessment area.
 B Overbank flow is severely altered in the assessment area.
 C Overland flow is severely altered in the assessment area.
 D Both overbank and overland flow are severely altered in the assessment area.

Notes

NC WAM Wetland Rating Sheet
 Accompanies User Manual Version 5.0

Wetland Site Name Wetland JJ Date of Assessment 7/30/2020
 Wetland Type Bottomland Hardwood Forest Assessor Name/Organization C. Neaves

Notes on Field Assessment Form (Y/N)	<u>NO</u>
Presence of regulatory considerations (Y/N)	<u>NO</u>
Wetland is intensively managed (Y/N)	<u> </u>
Assessment area is located within 50 feet of a natural tributary or other open water (Y/N)	<u>YES</u>
Assessment area is substantially altered by beaver (Y/N)	<u> </u>
Assessment area experiences overbank flooding during normal rainfall conditions (Y/N)	<u> </u>
Assessment area is on a coastal island (Y/N)	<u> </u>

Sub-function Rating Summary

Function	Sub-function	Metrics	Rating
Hydrology	Surface Storage and Retention	Condition	<u>LOW</u>
		Sub-surface Storage and Retention	Condition <u>LOW</u>
Water Quality	Pathogen Change	Condition	<u>LOW</u>
		Condition/Opportunity	<u>LOW</u>
		Opportunity Presence (Y/N)	<u>NO</u>
	Particulate Change	Condition	<u>LOW</u>
		Condition/Opportunity	<u>LOW</u>
		Opportunity Presence (Y/N)	<u>NO</u>
	Soluble Change	Condition	<u>MEDIUM</u>
		Condition/Opportunity	<u>MEDIUM</u>
		Opportunity Presence (Y/N)	<u>NO</u>
	Physical Change	Condition	<u>LOW</u>
		Condition/Opportunity	<u>LOW</u>
		Opportunity Presence (Y/N)	<u>NO</u>
	Pollution Change	Condition	<u>NA</u>
		Condition/Opportunity	<u>NA</u>
		Opportunity Presence (Y/N)	<u>NA</u>
Habitat	Physical Structure	Condition	<u>LOW</u>
	Landscape Patch Structure	Condition	<u>LOW</u>
	Vegetation Composition	Condition	<u>LOW</u>

Function Rating Summary

Function	Metrics	Rating
Hydrology	Condition	<u>LOW</u>
	Condition/Opportunity	<u>LOW</u>
	Opportunity Presence (Y/N)	<u>NO</u>
Water Quality	Condition	<u>LOW</u>
	Condition/Opportunity	<u>LOW</u>
	Opportunity Presence (Y/N)	<u>NO</u>
Habitat	Condition	<u>LOW</u>

Overall Wetland Rating LOW

NC WAM FIELD ASSESSMENT FORM
Accompanies User Manual Version 5.0

USACE AID #	SAW-2020-00047	NCDWR#	20200035
Project Name	Liberty Rock Mitigation Site	Date of Evaluation	7/30/2020
Applicant/Owner Name	Widlands Engineering	Wetland Site Name	Wetland KK
Wetland Type	Bottomland Hardwood Forest	Assessor Name/Organization	C. Neaves
Level III Ecoregion	Piedmont	Nearest Named Water Body	Rocky River
River Basin	Cape Fear	USGS 8-Digit Catalogue Unit	03030003
County	Randolph	NCDWR Region	Winston-Salem
<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	Precipitation within 48 hrs?	Latitude/Longitude (deci-degrees)	35.819912, -79.565586

Evidence of stressors affecting the assessment area (may not be within the assessment area)

Please circle and/or make note on the last page if evidence of stressors is apparent. Consider departure from reference, if appropriate, in recent past (for instance, within 10 years). Noteworthy stressors include, but are not limited to the following.

- Hydrological modifications (examples: ditches, dams, beaver dams, dikes, berms, ponds, etc.)
- Surface and sub-surface discharges into the wetland (examples: discharges containing obvious pollutants, presence of nearby septic tanks, underground storage tanks (USTs), hog lagoons, etc.)
- Signs of vegetation stress (examples: vegetation mortality, insect damage, disease, storm damage, salt intrusion, etc.)
- Habitat/plant community alteration (examples: mowing, clear-cutting, exotics, etc.)

Is the assessment area intensively managed? Yes No

Regulatory Considerations - Were regulatory considerations evaluated? Yes No If Yes, check all that apply to the assessment area.

- Anadromous fish
- Federally protected species or State endangered or threatened species
- NCDWR riparian buffer rule in effect
- Abuts a Primary Nursery Area (PNA)
- Publicly owned property
- N.C. Division of Coastal Management Area of Environmental Concern (AEC) (including buffer)
- Abuts a stream with a NCDWQ classification of SA or supplemental classifications of HQW, ORW, or Trout
- Designated NCNHP reference community
- Abuts a 303(d)-listed stream or a tributary to a 303(d)-listed stream

What type of natural stream is associated with the wetland, if any? (check all that apply)

- Blackwater
- Brownwater
- Tidal (if tidal, check one of the following boxes) Lunar Wind Both

Is the assessment area on a coastal island? Yes No

Is the assessment area's surface water storage capacity or duration substantially altered by beaver? Yes No

Does the assessment area experience overbank flooding during normal rainfall conditions? Yes No

1. Ground Surface Condition/Vegetation Condition – assessment area condition metric

Check a box in each column. Consider alteration to the ground surface (GS) in the assessment area and vegetation structure (VS) in the assessment area. Compare to reference wetland if applicable (see User Manual). If a reference is not applicable, then rate the assessment area based on evidence an effect.

- | | | |
|---------------------------------------|---------------------------------------|--|
| GS | VS | |
| <input checked="" type="checkbox"/> A | <input type="checkbox"/> A | Not severely altered |
| <input type="checkbox"/> B | <input checked="" type="checkbox"/> B | Severely altered over a majority of the assessment area (ground surface alteration examples: vehicle tracks, excessive sedimentation, fire-plow lanes, skidder tracks, bedding, fill, soil compaction, obvious pollutants) (vegetation structure alteration examples: mechanical disturbance, herbicides, salt intrusion [where appropriate], exotic species, grazing, less diversity [if appropriate], hydrologic alteration) |

2. Surface and Sub-Surface Storage Capacity and Duration – assessment area condition metric

Check a box in each column. Consider surface storage capacity and duration (Surf) and sub-surface storage capacity and duration (Sub). Consider both increase and decrease in hydrology. A ditch ≤ 1 foot deep is considered to affect surface water only, while a ditch > 1 foot deep is expected to affect both surface and sub-surface water. Consider tidal flooding regime, if applicable.

- | | | |
|---------------------------------------|---------------------------------------|--|
| Surf | Sub | |
| <input type="checkbox"/> A | <input type="checkbox"/> A | Water storage capacity and duration are not altered. |
| <input checked="" type="checkbox"/> B | <input checked="" type="checkbox"/> B | Water storage capacity or duration are altered, but not substantially (typically, not sufficient to change vegetation). |
| <input type="checkbox"/> C | <input type="checkbox"/> C | Water storage capacity or duration are substantially altered (typically, alteration sufficient to result in vegetation change) (examples: draining, flooding, soil compaction, filling, excessive sedimentation, underground utility lines). |

3. Water Storage/Surface Relief – assessment area/wetland type condition metric (skip for all marshes)

Check a box in each column. Select the appropriate storage for the assessment area (AA) and the wetland type (WT).

- | | | |
|---|----|---|
| AA | WT | |
| 3a. <input type="checkbox"/> A <input type="checkbox"/> A | | Majority of wetland with depressions able to pond water > 1 deep |
| <input type="checkbox"/> B <input type="checkbox"/> B | | Majority of wetland with depressions able to pond water 6 inches to 1 foot deep |
| <input type="checkbox"/> C <input type="checkbox"/> C | | Majority of wetland with depressions able to pond water 3 to 6 inches deep |
| <input checked="" type="checkbox"/> D <input checked="" type="checkbox"/> D | | Depressions able to pond water < 3 inches deep |
| 3b. <input type="checkbox"/> A | | Evidence that maximum depth of inundation is greater than 2 feet |
| <input checked="" type="checkbox"/> B | | Evidence that maximum depth of inundation is between 1 and 2 feet |
| <input type="checkbox"/> C | | Evidence that maximum depth of inundation is less than 1 foot |

4. Soil Texture/Structure – assessment area condition metric (skip for all marshes)

Check a box from each of the three soil property groups below. Dig soil profile in the dominant assessment area landscape feature. Make soil observations within the top 12 inches. Use most recent National Technical Committee for Hydric Soils guidance for regional indicators.

- 4a. A Sandy soil
- B Loamy or clayey soils exhibiting redoximorphic features (concentrations, depletions, or rhizospheres)
- C Loamy or clayey soils not exhibiting redoximorphic features
- D Loamy or clayey gleyed soil
- E Histosol or histc epipedon
- 4b. A Soil ribbon < 1 inch
- B Soil ribbon ≥ 1 inch
- 4c. A No peat or muck presence
- B A peat or muck presence

5. Discharge into Wetland – opportunity metric

Check a box in each column. Consider surface pollutants or discharges (Surf) and sub-surface pollutants or discharges (Sub). Examples of sub-surface discharges include presence of nearby septic tank, underground storage tank (UST), etc.

- | | | |
|---------------------------------------|---------------------------------------|---|
| Surf | Sub | |
| <input type="checkbox"/> A | <input checked="" type="checkbox"/> A | Little or no evidence of pollutants or discharges entering the assessment area |
| <input checked="" type="checkbox"/> B | <input type="checkbox"/> B | Noticeable evidence of pollutants or discharges entering the wetland and stressing, but not overwhelming the treatment capacity of the assessment area |
| <input type="checkbox"/> C | <input type="checkbox"/> C | Noticeable evidence of pollutants or discharges (pathogen, particulate, or soluble) entering the assessment area and potentially overwhelming the treatment capacity of the wetland (water discoloration, dead vegetation, excessive sedimentation, odor) |

6. Land Use – opportunity metric (skip for non-riparian wetlands)

Check all that apply (at least one box in each column). Evaluation involves a GIS effort with field adjustment. Consider sources draining to assessment area within entire upstream watershed (WS), within 5 miles and within the watershed draining to the assessment area (5M), and within 2 miles and within the watershed draining to the assessment area (2M).

- | | | | |
|---------------------------------------|---------------------------------------|---------------------------------------|---|
| WS | 5M | 2M | |
| <input type="checkbox"/> A | <input type="checkbox"/> A | <input type="checkbox"/> A | ≥ 10% impervious surfaces |
| <input type="checkbox"/> B | <input type="checkbox"/> B | <input type="checkbox"/> B | Confined animal operations (or other local, concentrated source of pollutants) |
| <input checked="" type="checkbox"/> C | <input checked="" type="checkbox"/> C | <input checked="" type="checkbox"/> C | ≥ 20% coverage of pasture |
| <input type="checkbox"/> D | <input type="checkbox"/> D | <input type="checkbox"/> D | ≥ 20% coverage of agricultural land (regularly plowed land) |
| <input checked="" type="checkbox"/> E | <input checked="" type="checkbox"/> E | <input checked="" type="checkbox"/> E | ≥ 20% coverage of maintained grass/herb |
| <input type="checkbox"/> F | <input type="checkbox"/> F | <input type="checkbox"/> F | ≥ 20% coverage of clear-cut land |
| <input type="checkbox"/> G | <input type="checkbox"/> G | <input type="checkbox"/> G | Little or no opportunity to improve water quality. Lack of opportunity may result from little or no disturbance in the watershed or hydrologic alterations that prevent drainage and/or overbank flow from affecting the assessment area. |

7. Wetland Acting as Vegetated Buffer – assessment area/wetland complex condition metric (skip for non-riparian wetlands)

- 7a. Is assessment area within 50 feet of a tributary or other open water?
- Yes No If Yes, continue to 7b. If No, skip to Metric 8.
- Wetland buffer need only be present on one side of the water body. Make buffer judgment based on the average width of wetland. Record a note if a portion of the buffer has been removed or disturbed.
- 7b. How much of the first 50 feet from the bank is wetland? (Wetland buffer need only be present on one side of the water body. Make buffer judgment based on the average width of wetland. Record a note if a portion of the buffer has been removed or disturbed.)
- A ≥ 50 feet
- B From 30 to < 50 feet
- C From 15 to < 30 feet
- D From 5 to < 15 feet
- E < 5 feet or buffer bypassed by ditches
- 7c. Tributary width. If the tributary is anastomosed, combine widths of channels/braids for a total width.
- ≤ 15-foot wide > 15-foot wide Other open water (no tributary present)
- 7d. Do roots of assessment area vegetation extend into the bank of the tributary/open water?
- Yes No
- 7e. Is stream or other open water sheltered or exposed?
- Sheltered – adjacent open water with width < 2500 feet and no regular boat traffic.
- Exposed – adjacent open water with width ≥ 2500 feet or regular boat traffic.

8. Wetland Width at the Assessment Area – wetland type/wetland complex condition metric (evaluate WT for all marshes and Estuarine Woody Wetland only; evaluate WC for Bottomland Hardwood Forest, Headwater Forest, and Riverine Swamp Forest only)

Check a box in each column for riverine wetlands only. Select the average width for the wetland type at the assessment area (WT) and the wetland complex at the assessment area (WC). See User Manual for WT and WC boundaries.

- | | | |
|---------------------------------------|---------------------------------------|-----------------------|
| WT | WC | |
| <input type="checkbox"/> A | <input type="checkbox"/> A | ≥ 100 feet |
| <input type="checkbox"/> B | <input type="checkbox"/> B | From 80 to < 100 feet |
| <input type="checkbox"/> C | <input type="checkbox"/> C | From 50 to < 80 feet |
| <input type="checkbox"/> D | <input type="checkbox"/> D | From 40 to < 50 feet |
| <input type="checkbox"/> E | <input type="checkbox"/> E | From 30 to < 40 feet |
| <input checked="" type="checkbox"/> F | <input checked="" type="checkbox"/> F | From 15 to < 30 feet |
| <input type="checkbox"/> G | <input type="checkbox"/> G | From 5 to < 15 feet |
| <input type="checkbox"/> H | <input type="checkbox"/> H | < 5 feet |

9. Inundation Duration – assessment area condition metric (skip for non-riparian wetlands)

Answer for assessment area dominant landform.

- A Evidence of short-duration inundation (< 7 consecutive days)
B Evidence of saturation, without evidence of inundation
C Evidence of long-duration inundation or very long-duration inundation (7 to 30 consecutive days or more)

10. Indicators of Deposition – assessment area condition metric (skip for non-riparian wetlands and all marshes)

Consider recent deposition only (no plant growth since deposition).

- A Sediment deposition is not excessive, but at approximately natural levels.
B Sediment deposition is excessive, but not overwhelming the wetland.
C Sediment deposition is excessive and is overwhelming the wetland.

11. Wetland Size – wetland type/wetland complex condition metric

Check a box in each column. Involves a GIS effort with field adjustment. This metric evaluates three aspects of the wetland area: the size of the wetland type (WT), the size of the wetland complex (WC), and the size of the forested wetland (FW) (if applicable, see User Manual). See the User Manual for boundaries of these evaluation areas. If assessment area is clear-cut, select "K" for the FW column.

- | | | |
|---------------------------------------|---------------------------------------|--|
| WT | WC | FW (if applicable) |
| <input type="checkbox"/> A | <input type="checkbox"/> A | <input type="checkbox"/> A ≥ 500 acres |
| <input type="checkbox"/> B | <input type="checkbox"/> B | <input type="checkbox"/> B From 100 to < 500 acres |
| <input type="checkbox"/> C | <input type="checkbox"/> C | <input type="checkbox"/> C From 50 to < 100 acres |
| <input type="checkbox"/> D | <input type="checkbox"/> D | <input type="checkbox"/> D From 25 to < 50 acres |
| <input type="checkbox"/> E | <input type="checkbox"/> E | <input type="checkbox"/> E From 10 to < 25 acres |
| <input type="checkbox"/> F | <input type="checkbox"/> F | <input type="checkbox"/> F From 5 to < 10 acres |
| <input type="checkbox"/> G | <input type="checkbox"/> G | <input type="checkbox"/> G From 1 to < 5 acres |
| <input type="checkbox"/> H | <input type="checkbox"/> H | <input type="checkbox"/> H From 0.5 to < 1 acre |
| <input type="checkbox"/> I | <input type="checkbox"/> I | <input type="checkbox"/> I From 0.1 to < 0.5 acre |
| <input checked="" type="checkbox"/> J | <input checked="" type="checkbox"/> J | <input type="checkbox"/> J From 0.01 to < 0.1 acre |
| <input type="checkbox"/> K | <input type="checkbox"/> K | <input checked="" type="checkbox"/> K < 0.01 acre <u>or</u> assessment area is clear-cut |

12. Wetland Intactness – wetland type condition metric (evaluate for Pocosins only)

- A Pocosin is the full extent (≥ 90%) of its natural landscape size.
B Pocosin type is < 90% of the full extent of its natural landscape size.

13. Connectivity to Other Natural Areas – landscape condition metric

13a. Check appropriate box(es) (a box may be checked in each column). Involves a GIS effort with field adjustment. This metric evaluates whether the wetland is well connected (Well) and/or loosely connected (Loosely) to the landscape patch, the contiguous naturally vegetated area and open water (if appropriate). Boundaries are formed by four-lane roads, regularly maintained utility line corridors the width of a four-lane road or wider, urban landscapes, maintained fields (pasture and agriculture), or open water > 300 feet wide.

- | | |
|---------------------------------------|---|
| Well | Loosely |
| <input type="checkbox"/> A | <input type="checkbox"/> A ≥ 500 acres |
| <input checked="" type="checkbox"/> B | <input type="checkbox"/> B From 100 to < 500 acres |
| <input type="checkbox"/> C | <input type="checkbox"/> C From 50 to < 100 acres |
| <input type="checkbox"/> D | <input type="checkbox"/> D From 10 to < 50 acres |
| <input type="checkbox"/> E | <input type="checkbox"/> E < 10 acres |
| <input type="checkbox"/> F | <input type="checkbox"/> F Wetland type has a poor or no connection to other natural habitats |

13b. Evaluate for marshes only.

- Yes No Wetland type has a surface hydrology connection to open waters/stream or tidal wetlands.

14. Edge Effect – wetland type condition metric (skip for all marshes and Estuarine Woody Wetland)

May involve a GIS effort with field adjustment. Estimate distance from wetland type boundary to artificial edges. Artificial edges include non-forested areas ≥ 40 feet wide such as fields, development, roads, regularly maintained utility line corridors, and clear-cuts. Consider the eight main points of the compass. Artificial edge occurs within 150 feet in how many directions? If the assessment area is clear cut, select option "C."

- A 0
B 1 to 4
C 5 to 8

15. Vegetative Composition – assessment area condition metric (skip for all marshes and Pine Flat)

- A Vegetation is close to reference condition in species present and their proportions. Lower strata composed of appropriate species, with exotic plants absent or sparse within the assessment area.
B Vegetation is different from reference condition in species diversity or proportions, but still largely composed of native species characteristic of the wetland type. This may include communities of weedy native species that develop after clearcutting or clearing. It also includes communities with exotics present, but not dominant, over a large portion of the expected strata.
C Vegetation severely altered from reference in composition, or expected species are unnaturally absent (planted stands of non-characteristic species or at least one stratum inappropriately composed of a single species), or exotic species are dominant in at least one stratum.

16. Vegetative Diversity – assessment area condition metric (evaluate for Non-tidal Freshwater Marsh only)

- A Vegetation diversity is high and is composed primarily of native species (< 10% cover of exotics).
B Vegetation diversity is low or has > 10% to 50% cover of exotics.
C Vegetation is dominated by exotic species (> 50 % cover of exotics).

17. Vegetative Structure – assessment area/wetland type condition metric

17a. Is vegetation present?

- Yes No If Yes, continue to 17b. If No, skip to Metric 18.

17b. Evaluate percent coverage of assessment area vegetation for all marshes only. Skip to 17c for non-marsh wetlands.

- A ≥ 25% coverage of vegetation
B < 25% coverage of vegetation

17c. Check a box in each column for each stratum. Evaluate this portion of the metric for non-marsh wetlands. Consider structure in airspace above the assessment area (AA) and the wetland type (WT) separately.

- | | | | |
|-----------|---------------------------------------|---------------------------------------|--|
| | AA | WT | |
| Canopy | <input type="checkbox"/> A | <input type="checkbox"/> A | Canopy closed, or nearly closed, with natural gaps associated with natural processes |
| | <input type="checkbox"/> B | <input type="checkbox"/> B | Canopy present, but opened more than natural gaps |
| | <input checked="" type="checkbox"/> C | <input checked="" type="checkbox"/> C | Canopy sparse or absent |
| Mid-Story | <input type="checkbox"/> A | <input type="checkbox"/> A | Dense mid-story/sapling layer |
| | <input type="checkbox"/> B | <input type="checkbox"/> B | Moderate density mid-story/sapling layer |
| | <input checked="" type="checkbox"/> C | <input checked="" type="checkbox"/> C | Mid-story/sapling layer sparse or absent |
| Shrub | <input type="checkbox"/> A | <input type="checkbox"/> A | Dense shrub layer |
| | <input type="checkbox"/> B | <input type="checkbox"/> B | Moderate density shrub layer |
| | <input checked="" type="checkbox"/> C | <input checked="" type="checkbox"/> C | Shrub layer sparse or absent |
| Herb | <input type="checkbox"/> A | <input type="checkbox"/> A | Dense herb layer |
| | <input checked="" type="checkbox"/> B | <input checked="" type="checkbox"/> B | Moderate density herb layer |
| | <input type="checkbox"/> C | <input type="checkbox"/> C | Herb layer sparse or absent |

18. Snags – wetland type condition metric (skip for all marshes)

- A Large snags (more than one) are visible (> 12 inches DBH, or large relative to species present and landscape stability).
B Not A

19. Diameter Class Distribution – wetland type condition metric (skip for all marshes)

- A Majority of canopy trees have stems > 6 inches in diameter at breast height (DBH); many large trees (> 12 inches DBH) are present.
B Majority of canopy trees have stems between 6 and 12 inches DBH, few are > 12 inch DBH.
C Majority of canopy trees are < 6 inches DBH or no trees.

20. Large Woody Debris – wetland type condition metric (skip for all marshes)

Include both natural debris and man-placed natural debris.

- A Large logs (more than one) are visible (> 12 inches in diameter, or large relative to species present and landscape stability).
B Not A

21. Vegetation/Open Water Dispersion – wetland type/open water condition metric (evaluate for Non-Tidal Freshwater Marsh only)

Select the figure that best describes the amount of interspersions between vegetation and open water in the growing season. Patterned areas indicate vegetated areas, while solid white areas indicate open water.



22. Hydrologic Connectivity – assessment area condition metric (evaluate for riparian wetlands and Salt/Brackish Marsh only)

Examples of activities that may severely alter hydrologic connectivity include intensive ditching, fill, sedimentation, channelization, diversion, man-made berms, beaver dams, and stream incision. Documentation required if evaluated as B, C, or D.

- A Overbank and overland flow are not severely altered in the assessment area.
B Overbank flow is severely altered in the assessment area.
C Overland flow is severely altered in the assessment area.
D Both overbank and overland flow are severely altered in the assessment area.

Notes

NC WAM Wetland Rating Sheet
Accompanies User Manual Version 5.0

Wetland Site Name Wetland KK Date of Assessment 7/30/2020
 Wetland Type Bottomland Hardwood Forest Assessor Name/Organization C. Neaves
 Notes on Field Assessment Form (Y/N) NO
 Presence of regulatory considerations (Y/N) NO
 Wetland is intensively managed (Y/N) _____
 Assessment area is located within 50 feet of a natural tributary or other open water (Y/N) YES
 Assessment area is substantially altered by beaver (Y/N) _____
 Assessment area experiences overbank flooding during normal rainfall conditions (Y/N) _____
 Assessment area is on a coastal island (Y/N) _____

Sub-function Rating Summary

Function	Sub-function	Metrics	Rating
Hydrology	Surface Storage and Retention	Condition	LOW
	Sub-surface Storage and Retention	Condition	LOW
Water Quality	Pathogen Change	Condition	LOW
		Condition/Opportunity	LOW
	Particulate Change	Opportunity Presence (Y/N)	NO
		Condition	LOW
	Soluble Change	Condition/Opportunity	LOW
		Opportunity Presence (Y/N)	NO
	Physical Change	Condition	MEDIUM
		Condition/Opportunity	MEDIUM
	Pollution Change	Opportunity Presence (Y/N)	NO
		Condition	LOW
Habitat	Physical Structure	Condition/Opportunity	LOW
	Landscape Patch Structure	Condition	LOW
	Vegetation Composition	Opportunity Presence (Y/N)	NO
		Condition	NA
		Condition/Opportunity	NA
		Opportunity Presence (Y/N)	NA

Function Rating Summary

Function	Metrics	Rating
Hydrology	Condition	LOW
Water Quality	Condition	LOW
	Condition/Opportunity	LOW
	Opportunity Presence (Y/N)	NO
Habitat	Condition	LOW

Overall Wetland Rating LOW

NC WAM FIELD ASSESSMENT FORM
Accompanies User Manual Version 5.0

USACE AID #	SAW-2020-00047	NCDWR#	20200035
Project Name	Liberty Rock Mitigation Site	Date of Evaluation	7/30/2020
Applicant/Owner Name	Wildlands Engineering	Wetland Site Name	Wetland LL Pasture
Wetland Type	Bottomland Hardwood Forest	Assessor Name/Organization	C. Neaves
Level III Ecoregion	Piedmont	Nearest Named Water Body	Rocky River
River Basin	Cape Fear	USGS 8-Digit Catalogue Unit	03030003
County	Randolph	NCDWR Region	Winston-Salem
<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	Precipitation within 48 hrs?	Latitude/Longitude (deci-degrees)	35.820532, -79.567078

Evidence of stressors affecting the assessment area (may not be within the assessment area)
 Please circle and/or make note on the last page if evidence of stressors is apparent. Consider departure from reference, if appropriate, in recent past (for instance, within 10 years). Noteworthy stressors include, but are not limited to the following.

- Hydrological modifications (examples: ditches, dams, beaver dams, dikes, berms, ponds, etc.)
- Surface and sub-surface discharges into the wetland (examples: discharges containing obvious pollutants, presence of nearby septic tanks, underground storage tanks (USTs), hog lagoons, etc.)
- Signs of vegetation stress (examples: vegetation mortality, insect damage, storm damage, disease, salt intrusion, etc.)
- Habitat/plant community alteration (examples: mowing, clear-cutting, exotics, etc.)

Is the assessment area intensively managed? Yes No

Regulatory Considerations - Were regulatory considerations evaluated? Yes No If Yes, check all that apply to the assessment area.

- Anadromous fish
- Federally protected species or State endangered or threatened species
- NCDWR riparian buffer rule in effect
- Abuts a Primary Nursery Area (PNA)
- Publicly owned property
- N.C. Division of Coastal Management Area of Environmental Concern (AEC) (including buffer)
- Abuts a stream with a NCDWQ classification of SA or supplemental classifications of HQW, ORW, or Trout
- Designated NCNHP reference community
- Abuts a 303(d)-listed stream or a tributary to a 303(d)-listed stream

What type of natural stream is associated with the wetland, if any? (check all that apply)

- Blackwater
- Brownwater
- Tidal (if tidal, check one of the following boxes) Lunar Wind Both

Is the assessment area on a coastal island? Yes No

Is the assessment area's surface water storage capacity or duration substantially altered by beaver? Yes No

Does the assessment area experience overbank flooding during normal rainfall conditions? Yes No

- Ground Surface Condition/Vegetation Condition – assessment area condition metric**
Check a box in each column. Consider alteration to the ground surface (GS) in the assessment area and vegetation structure (VS) in the assessment area. Compare to reference wetland if applicable (see User Manual). If a reference is not applicable, then rate the assessment area based on evidence an effect.

GS	VS	
<input checked="" type="checkbox"/> A	<input type="checkbox"/> A	Not severely altered
<input type="checkbox"/> B	<input checked="" type="checkbox"/> B	Severely altered over a majority of the assessment area (ground surface alteration examples: vehicle tracks, excessive sedimentation, fire-plow lanes, skidder tracks, bedding, fill, soil compaction, obvious pollutants) (vegetation structure alteration examples: mechanical disturbance, herbicides, salt intrusion [where appropriate], exotic species, grazing, less diversity [if appropriate], hydrologic alteration)
- Surface and Sub-Surface Storage Capacity and Duration – assessment area condition metric**
Check a box in each column. Consider surface storage capacity and duration (Surf) and sub-surface storage capacity and duration (Sub). Consider both increase and decrease in hydrology. A ditch ≤ 1 foot deep is considered to affect surface water only, while a ditch > 1 foot deep is expected to affect both surface and sub-surface water. Consider tidal flooding regime, if applicable.

Surf	Sub	
<input type="checkbox"/> A	<input type="checkbox"/> A	Water storage capacity and duration are not altered.
<input checked="" type="checkbox"/> B	<input checked="" type="checkbox"/> B	Water storage capacity or duration are altered, but not substantially (typically, not sufficient to change vegetation).
<input type="checkbox"/> C	<input type="checkbox"/> C	Water storage capacity or duration are substantially altered (typically, alteration sufficient to result in vegetation change) (examples: draining, flooding, soil compaction, filling, excessive sedimentation, underground utility lines).
- Water Storage/Surface Relief – assessment area/wetland type condition metric (skip for all marshes)**
Check a box in each column. Select the appropriate storage for the assessment area (AA) and the wetland type (WT).

AA	WT	
3a. <input type="checkbox"/> A	<input type="checkbox"/> A	Majority of wetland with depressions able to pond water > 1 foot deep
<input type="checkbox"/> B	<input type="checkbox"/> B	Majority of wetland with depressions able to pond water 6 inches to 1 foot deep
<input type="checkbox"/> C	<input type="checkbox"/> C	Majority of wetland with depressions able to pond water 3 to 6 inches deep
<input checked="" type="checkbox"/> D	<input checked="" type="checkbox"/> D	Depressions able to pond water < 3 inches deep
3b. <input type="checkbox"/> A	<input type="checkbox"/> A	Evidence that maximum depth of inundation is greater than 2 feet
<input type="checkbox"/> B	<input type="checkbox"/> B	Evidence that maximum depth of inundation is between 1 and 2 feet
<input checked="" type="checkbox"/> C	<input checked="" type="checkbox"/> C	Evidence that maximum depth of inundation is less than 1 foot

4. Soil Texture/Structure – assessment area condition metric (skip for all marshes)

Check a box from each of the three soil property groups below. Dig soil profile in the dominant assessment area landscape feature. Make soil observations within the top 12 inches. Use most recent National Technical Committee for Hydric Soils guidance for regional indicators.

- 4a. A Sandy soil
 B Loamy or clayey soils exhibiting redoximorphic features (concentrations, depletions, or rhizospheres)
 C Loamy or clayey soils not exhibiting redoximorphic features
 D Loamy or clayey gleyed soil
 E Histosol or histc epipedon
- 4b. A Soil ribbon < 1 inch
 B Soil ribbon ≥ 1 inch
- 4c. A No peat or muck presence
 B A peat or muck presence

5. Discharge into Wetland – opportunity metric

Check a box in each column. Consider surface pollutants or discharges (Surf) and sub-surface pollutants or discharges (Sub). Examples of sub-surface discharges include presence of nearby septic tank, underground storage tank (UST), etc.

- | | | |
|---------------------------------------|---------------------------------------|---|
| Surf | Sub | |
| <input type="checkbox"/> A | <input checked="" type="checkbox"/> A | Little or no evidence of pollutants or discharges entering the assessment area |
| <input checked="" type="checkbox"/> B | <input type="checkbox"/> B | Noticeable evidence of pollutants or discharges entering the wetland and stressing, but not overwhelming the treatment capacity of the assessment area |
| <input type="checkbox"/> C | <input type="checkbox"/> C | Noticeable evidence of pollutants or discharges (pathogen, particulate, or soluble) entering the assessment area and potentially overwhelming the treatment capacity of the wetland (water discoloration, dead vegetation, excessive sedimentation, odor) |

6. Land Use – opportunity metric (skip for non-riparian wetlands)

Check all that apply (at least one box in each column). Evaluation involves a GIS effort with field adjustment. Consider sources draining to assessment area within entire upstream watershed (WS), within 5 miles and within the watershed draining to the assessment area (5M), and within 2 miles and within the watershed draining to the assessment area (2M).

- | | | | |
|---------------------------------------|---------------------------------------|---------------------------------------|---|
| WS | 5M | 2M | |
| <input type="checkbox"/> A | <input type="checkbox"/> A | <input type="checkbox"/> A | ≥ 10% impervious surfaces |
| <input type="checkbox"/> B | <input type="checkbox"/> B | <input type="checkbox"/> B | Confined animal operations (or other local, concentrated source of pollutants) |
| <input checked="" type="checkbox"/> C | <input checked="" type="checkbox"/> C | <input checked="" type="checkbox"/> C | ≥ 20% coverage of pasture |
| <input type="checkbox"/> D | <input type="checkbox"/> D | <input type="checkbox"/> D | ≥ 20% coverage of agricultural land (regularly plowed land) |
| <input checked="" type="checkbox"/> E | <input checked="" type="checkbox"/> E | <input checked="" type="checkbox"/> E | ≥ 20% coverage of maintained grass/herb |
| <input type="checkbox"/> F | <input type="checkbox"/> F | <input type="checkbox"/> F | ≥ 20% coverage of clear-cut land |
| <input type="checkbox"/> G | <input type="checkbox"/> G | <input type="checkbox"/> G | Little or no opportunity to improve water quality. Lack of opportunity may result from little or no disturbance in the watershed or hydrologic alterations that prevent drainage and/or overbank flow from affecting the assessment area. |

7. Wetland Acting as Vegetated Buffer – assessment area/wetland complex condition metric (skip for non-riparian wetlands)

- 7a. Is assessment area within 50 feet of a tributary or other open water?
 Yes No If Yes, continue to 7b. If No, skip to Metric 8.
 Wetland buffer need only be present on one side of the water body. Make buffer judgment based on the average width of wetland. Record a note if a portion of the buffer has been removed or disturbed.
- 7b. How much of the first 50 feet from the bank is wetland? (Wetland buffer need only be present on one side of the water body. Make buffer judgment based on the average width of wetland. Record a note if a portion of the buffer has been removed or disturbed.)
 A ≥ 50 feet
 B From 30 to < 50 feet
 C From 15 to < 30 feet
 D From 5 to < 15 feet
 E < 5 feet or buffer bypassed by ditches
- 7c. Tributary width. If the tributary is anastomosed, combine widths of channels/braids for a total width.
 ≤ 15-foot wide > 15-foot wide Other open water (no tributary present)
- 7d. Do roots of assessment area vegetation extend into the bank of the tributary/open water?
 Yes No
- 7e. Is stream or other open water sheltered or exposed?
 Sheltered – adjacent open water with width < 2500 feet and no regular boat traffic.
 Exposed – adjacent open water with width ≥ 2500 feet or regular boat traffic.

8. Wetland Width at the Assessment Area – wetland type/wetland complex condition metric (evaluate WT for all marshes and Estuarine Woody Wetland only; evaluate WC for Bottomland Hardwood Forest, Headwater Forest, and Riverine Swamp Forest only)

Check a box in each column for riverine wetlands only. Select the average width for the wetland type at the assessment area (WT) and the wetland complex at the assessment area (WC). See User Manual for WT and WC boundaries.

- | | | |
|---------------------------------------|---------------------------------------|-----------------------|
| WT | WC | |
| <input type="checkbox"/> A | <input type="checkbox"/> A | ≥ 100 feet |
| <input type="checkbox"/> B | <input type="checkbox"/> B | From 80 to < 100 feet |
| <input checked="" type="checkbox"/> C | <input checked="" type="checkbox"/> C | From 50 to < 80 feet |
| <input type="checkbox"/> D | <input type="checkbox"/> D | From 40 to < 50 feet |
| <input type="checkbox"/> E | <input type="checkbox"/> E | From 30 to < 40 feet |
| <input type="checkbox"/> F | <input type="checkbox"/> F | From 15 to < 30 feet |
| <input type="checkbox"/> G | <input type="checkbox"/> G | From 5 to < 15 feet |
| <input type="checkbox"/> H | <input type="checkbox"/> H | < 5 feet |

9. Inundation Duration – assessment area condition metric (skip for non-riparian wetlands)

Answer for assessment area dominant landform.

- A Evidence of short-duration inundation (< 7 consecutive days)
 B Evidence of saturation, without evidence of inundation
 C Evidence of long-duration inundation or very long-duration inundation (7 to 30 consecutive days or more)

10. Indicators of Deposition – assessment area condition metric (skip for non-riparian wetlands and all marshes)

Consider recent deposition only (no plant growth since deposition).

- A Sediment deposition is not excessive, but at approximately natural levels.
 B Sediment deposition is excessive, but not overwhelming the wetland.
 C Sediment deposition is excessive and is overwhelming the wetland.

11. Wetland Size – wetland type/wetland complex condition metric

Check a box in each column. Involves a GIS effort with field adjustment. This metric evaluates three aspects of the wetland area: the size of the wetland type (WT), the size of the wetland complex (WC), and the size of the forested wetland (FW) (if applicable, see User Manual). See the User Manual for boundaries of these evaluation areas. If assessment area is clear-cut, select "K" for the FW column.

- | | | |
|---------------------------------------|---------------------------------------|---|
| WT | WC | FW (if applicable) |
| <input type="checkbox"/> A | <input type="checkbox"/> A | <input type="checkbox"/> A ≥ 500 acres |
| <input type="checkbox"/> B | <input type="checkbox"/> B | <input type="checkbox"/> B From 100 to < 500 acres |
| <input type="checkbox"/> C | <input type="checkbox"/> C | <input type="checkbox"/> C From 50 to < 100 acres |
| <input type="checkbox"/> D | <input type="checkbox"/> D | <input type="checkbox"/> D From 25 to < 50 acres |
| <input type="checkbox"/> E | <input type="checkbox"/> E | <input type="checkbox"/> E From 10 to < 25 acres |
| <input type="checkbox"/> F | <input type="checkbox"/> F | <input type="checkbox"/> F From 5 to < 10 acres |
| <input checked="" type="checkbox"/> G | <input checked="" type="checkbox"/> G | <input type="checkbox"/> G From 1 to < 5 acres |
| <input type="checkbox"/> H | <input type="checkbox"/> H | <input type="checkbox"/> H From 0.5 to < 1 acre |
| <input type="checkbox"/> I | <input type="checkbox"/> I | <input type="checkbox"/> I From 0.1 to < 0.5 acre |
| <input type="checkbox"/> J | <input type="checkbox"/> J | <input type="checkbox"/> J From 0.01 to < 0.1 acre |
| <input type="checkbox"/> K | <input type="checkbox"/> K | <input checked="" type="checkbox"/> K < 0.01 acre or assessment area is clear-cut |

12. Wetland Intactness – wetland type condition metric (evaluate for Pocosins only)

- A Pocosin is the full extent (≥ 90%) of its natural landscape size.
 B Pocosin type is < 90% of the full extent of its natural landscape size.

13. Connectivity to Other Natural Areas – landscape condition metric

13a. Check appropriate box(es) (a box may be checked in each column). Involves a GIS effort with field adjustment. This metric evaluates whether the wetland is well connected (Well) and/or loosely connected (Loosely) to the landscape patch, the contiguous naturally vegetated area and open water (if appropriate). Boundaries are formed by four-lane roads, regularly maintained utility line corridors the width of a four-lane road or wider, urban landscapes, maintained fields (pasture and agriculture), or open water > 300 feet wide.

- | | | |
|----------------------------|---------------------------------------|--|
| Well | Loosely | |
| <input type="checkbox"/> A | <input type="checkbox"/> A | ≥ 500 acres |
| <input type="checkbox"/> B | <input checked="" type="checkbox"/> B | From 100 to < 500 acres |
| <input type="checkbox"/> C | <input type="checkbox"/> C | From 50 to < 100 acres |
| <input type="checkbox"/> D | <input type="checkbox"/> D | From 10 to < 50 acres |
| <input type="checkbox"/> E | <input type="checkbox"/> E | < 10 acres |
| <input type="checkbox"/> F | <input type="checkbox"/> F | Wetland type has a poor or no connection to other natural habitats |

13b. Evaluate for marshes only.

- Yes No Wetland type has a surface hydrology connection to open waters/stream or tidal wetlands.

14. Edge Effect – wetland type condition metric (skip for all marshes and Estuarine Woody Wetland)

May involve a GIS effort with field adjustment. Estimate distance from wetland type boundary to artificial edges. Artificial edges include non-forested areas ≥ 40 feet wide such as fields, development, roads, regularly maintained utility line corridors, and clear-cuts. Consider the eight main points of the compass. Artificial edge occurs within 150 feet in how many directions? If the assessment area is clear cut, select option "C."

- A 0
 B 1 to 4
 C 5 to 8

15. Vegetative Composition – assessment area condition metric (skip for all marshes and Pine Flat)

- A Vegetation is close to reference condition in species present and their proportions. Lower strata composed of appropriate species, with exotic plants absent or sparse within the assessment area.
 B Vegetation is different from reference condition in species diversity or proportions, but still largely composed of native species characteristic of the wetland type. This may include communities of weedy native species that develop after clearcutting or clearing. It also includes communities with exotics present, but not dominant, over a large portion of the expected strata.
 C Vegetation severely altered from reference in composition, or expected species are unnaturally absent (planted stands of non-characteristic species or at least one stratum inappropriately composed of a single species), or exotic species are dominant in at least one stratum.

16. Vegetative Diversity – assessment area condition metric (evaluate for Non-tidal Freshwater Marsh only)

- A Vegetation diversity is high and is composed primarily of native species (< 10% cover of exotics).
 B Vegetation diversity is low or has > 10% to 50% cover of exotics.
 C Vegetation is dominated by exotic species (> 50 % cover of exotics).

17. Vegetative Structure – assessment area/wetland type condition metric

17a. Is vegetation present?

Yes No If Yes, continue to 17b. If No, skip to Metric 18.

17b. Evaluate percent coverage of assessment area vegetation for all marshes only. Skip to 17c for non-marsh wetlands.

A ≥ 25% coverage of vegetation
 B < 25% coverage of vegetation

17c. Check a box in each column for each stratum. Evaluate this portion of the metric for non-marsh wetlands. Consider structure in airspace above the assessment area (AA) and the wetland type (WT) separately.

	AA	WT	
Canopy	<input type="checkbox"/> A	<input type="checkbox"/> A	Canopy closed, or nearly closed, with natural gaps associated with natural processes
	<input type="checkbox"/> B	<input type="checkbox"/> B	Canopy present, but opened more than natural gaps
	<input checked="" type="checkbox"/> C	<input checked="" type="checkbox"/> C	Canopy sparse or absent
Mid-Story	<input type="checkbox"/> A	<input type="checkbox"/> A	Dense mid-story/sapling layer
	<input type="checkbox"/> B	<input type="checkbox"/> B	Moderate density mid-story/sapling layer
	<input checked="" type="checkbox"/> C	<input checked="" type="checkbox"/> C	Mid-story/sapling layer sparse or absent
Shrub	<input type="checkbox"/> A	<input type="checkbox"/> A	Dense shrub layer
	<input type="checkbox"/> B	<input type="checkbox"/> B	Moderate density shrub layer
	<input checked="" type="checkbox"/> C	<input checked="" type="checkbox"/> C	Shrub layer sparse or absent
Herb	<input checked="" type="checkbox"/> A	<input checked="" type="checkbox"/> A	Dense herb layer
	<input type="checkbox"/> B	<input type="checkbox"/> B	Moderate density herb layer
	<input type="checkbox"/> C	<input type="checkbox"/> C	Herb layer sparse or absent

18. Snags – wetland type condition metric (skip for all marshes)

A Large snags (more than one) are visible (> 12 inches DBH, or large relative to species present and landscape stability).
 B Not A

19. Diameter Class Distribution – wetland type condition metric (skip for all marshes)

A Majority of canopy trees have stems > 6 inches in diameter at breast height (DBH); many large trees (> 12 inches DBH) are present.
 B Majority of canopy trees have stems between 6 and 12 inches DBH, few are > 12 inch DBH.
 C Majority of canopy trees are < 6 inches DBH or no trees.

20. Large Woody Debris – wetland type condition metric (skip for all marshes)

Include both natural debris and man-placed natural debris.
 A Large logs (more than one) are visible (> 12 inches in diameter, or large relative to species present and landscape stability).
 B Not A

21. Vegetation/Open Water Dispersion – wetland type/open water condition metric (evaluate for Non-Tidal Freshwater Marsh only)

Select the figure that best describes the amount of interspersed vegetation and open water in the growing season. Patterned areas indicate vegetated areas, while solid white areas indicate open water.



22. Hydrologic Connectivity – assessment area condition metric (evaluate for riparian wetlands and Salt/Brackish Marsh only)

Examples of activities that may severely alter hydrologic connectivity include intensive ditching, fill, sedimentation, channelization, diversion, man-made berms, beaver dams, and stream incision. Documentation required if evaluated as B, C, or D.

A Overbank and overland flow are not severely altered in the assessment area.
 B Overbank flow is severely altered in the assessment area.
 C Overland flow is severely altered in the assessment area.
 D Both overbank and overland flow are severely altered in the assessment area.

Notes

NC WAM Wetland Rating Sheet
 Accompanies User Manual Version 5.0

Wetland Site Name Wetland LL Pasture Date of Assessment 7/30/2020
 Wetland Type Bottomland Hardwood Forest Assessor Name/Organization C. Neaves

Notes on Field Assessment Form (Y/N) NO
 Presence of regulatory considerations (Y/N) NO
 Wetland is intensively managed (Y/N) _____
 Assessment area is located within 50 feet of a natural tributary or other open water (Y/N) YES
 Assessment area is substantially altered by beaver (Y/N) _____
 Assessment area experiences overbank flooding during normal rainfall conditions (Y/N) _____
 Assessment area is on a coastal island (Y/N) _____

Sub-function Rating Summary

Function	Sub-function	Metrics	Rating
Hydrology	Surface Storage and Retention	Condition	LOW
		Sub-surface Storage and Retention	LOW
Water Quality	Pathogen Change	Condition	MEDIUM
		Condition/Opportunity	MEDIUM
		Opportunity Presence (Y/N)	NO
	Particulate Change	Condition	LOW
		Condition/Opportunity	LOW
		Opportunity Presence (Y/N)	NO
	Soluble Change	Condition	MEDIUM
		Condition/Opportunity	MEDIUM
		Opportunity Presence (Y/N)	NO
	Physical Change	Condition	LOW
		Condition/Opportunity	LOW
		Opportunity Presence (Y/N)	NO
	Pollution Change	Condition	NA
		Condition/Opportunity	NA
		Opportunity Presence (Y/N)	NA
Habitat	Physical Structure	Condition	LOW
	Landscape Patch Structure	Condition	LOW
	Vegetation Composition	Condition	LOW

Function Rating Summary

Function	Metrics	Rating
Hydrology	Condition	LOW
Water Quality	Condition	LOW
	Condition/Opportunity	LOW
	Opportunity Presence (Y/N)	NO
Habitat	Condition	LOW

Overall Wetland Rating LOW

NC WAM FIELD ASSESSMENT FORM
Accompanies User Manual Version 5.0

USACE AID #	SAW-2020-00047	NCDWR#	20200035
Project Name	Liberty Rock Mitigation Site	Date of Evaluation	7/30/2020
Applicant/Owner Name	Widlands Engineering	Wetland Site Name	Wetland LL Woods
Wetland Type	Bottomland Hardwood Forest	Assessor Name/Organization	C. Neaves
Level III Ecoregion	Piedmont	Nearest Named Water Body	Rocky River
River Basin	Cape Fear	USGS 8-Digit Catalogue Unit	03030003
County	Randolph	NCDWR Region	Winston-Salem
<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	Precipitation within 48 hrs?	Latitude/Longitude (deci-degrees)	35.820858, -79.567367

Evidence of stressors affecting the assessment area (may not be within the assessment area)

Please circle and/or make note on the last page if evidence of stressors is apparent. Consider departure from reference, if appropriate, in recent past (for instance, within 10 years). Noteworthy stressors include, but are not limited to the following.

- Hydrological modifications (examples: ditches, dams, beaver dams, dikes, berms, ponds, etc.)
- Surface and sub-surface discharges into the wetland (examples: discharges containing obvious pollutants, presence of nearby septic tanks, underground storage tanks (USTs), hog lagoons, etc.)
- Signs of vegetation stress (examples: vegetation mortality, insect damage, disease, storm damage, salt intrusion, etc.)
- Habitat/plant community alteration (examples: mowing, clear-cutting, exotics, etc.)

Is the assessment area intensively managed? Yes No

Regulatory Considerations - Were regulatory considerations evaluated? Yes No If Yes, check all that apply to the assessment area.

- Anadromous fish
- Federally protected species or State endangered or threatened species
- NCDWR riparian buffer rule in effect
- Abuts a Primary Nursery Area (PNA)
- Publicly owned property
- N.C. Division of Coastal Management Area of Environmental Concern (AEC) (including buffer)
- Abuts a stream with a NCDWQ classification of SA or supplemental classifications of HQW, ORW, or Trout
- Designated NCNHP reference community
- Abuts a 303(d)-listed stream or a tributary to a 303(d)-listed stream

What type of natural stream is associated with the wetland, if any? (check all that apply)

- Blackwater
- Brownwater
- Tidal (if tidal, check one of the following boxes) Lunar Wind Both

Is the assessment area on a coastal island? Yes No

Is the assessment area's surface water storage capacity or duration substantially altered by beaver? Yes No

Does the assessment area experience overbank flooding during normal rainfall conditions? Yes No

1. Ground Surface Condition/Vegetation Condition – assessment area condition metric

Check a box in each column. Consider alteration to the ground surface (GS) in the assessment area and vegetation structure (VS) in the assessment area. Compare to reference wetland if applicable (see User Manual). If a reference is not applicable, then rate the assessment area based on evidence an effect.

- | | | |
|---------------------------------------|---------------------------------------|--|
| GS | VS | |
| <input checked="" type="checkbox"/> A | <input checked="" type="checkbox"/> A | Not severely altered |
| <input type="checkbox"/> B | <input type="checkbox"/> B | Severely altered over a majority of the assessment area (ground surface alteration examples: vehicle tracks, excessive sedimentation, fire-plow lanes, skidder tracks, bedding, fill, soil compaction, obvious pollutants) (vegetation structure alteration examples: mechanical disturbance, herbicides, salt intrusion [where appropriate], exotic species, grazing, less diversity [if appropriate], hydrologic alteration) |

2. Surface and Sub-Surface Storage Capacity and Duration – assessment area condition metric

Check a box in each column. Consider surface storage capacity and duration (Surf) and sub-surface storage capacity and duration (Sub). Consider both increase and decrease in hydrology. A ditch ≤ 1 foot deep is considered to affect surface water only, while a ditch > 1 foot deep is expected to affect both surface and sub-surface water. Consider tidal flooding regime, if applicable.

- | | | |
|---------------------------------------|---------------------------------------|--|
| Surf | Sub | |
| <input checked="" type="checkbox"/> A | <input checked="" type="checkbox"/> A | Water storage capacity and duration are not altered. |
| <input type="checkbox"/> B | <input type="checkbox"/> B | Water storage capacity or duration are altered, but not substantially (typically, not sufficient to change vegetation). |
| <input type="checkbox"/> C | <input type="checkbox"/> C | Water storage capacity or duration are substantially altered (typically, alteration sufficient to result in vegetation change) (examples: draining, flooding, soil compaction, filling, excessive sedimentation, underground utility lines). |

3. Water Storage/Surface Relief – assessment area/wetland type condition metric (skip for all marshes)

Check a box in each column. Select the appropriate storage for the assessment area (AA) and the wetland type (WT).

- | | | |
|---|----|---|
| AA | WT | |
| 3a. <input type="checkbox"/> A <input type="checkbox"/> A | | Majority of wetland with depressions able to pond water > 1 deep |
| <input type="checkbox"/> B <input type="checkbox"/> B | | Majority of wetland with depressions able to pond water 6 inches to 1 foot deep |
| <input type="checkbox"/> C <input type="checkbox"/> C | | Majority of wetland with depressions able to pond water 3 to 6 inches deep |
| <input checked="" type="checkbox"/> D <input checked="" type="checkbox"/> D | | Depressions able to pond water < 3 inches deep |
| 3b. <input type="checkbox"/> A | | Evidence that maximum depth of inundation is greater than 2 feet |
| <input type="checkbox"/> B | | Evidence that maximum depth of inundation is between 1 and 2 feet |
| <input checked="" type="checkbox"/> C | | Evidence that maximum depth of inundation is less than 1 foot |

4. Soil Texture/Structure – assessment area condition metric (skip for all marshes)

Check a box from each of the three soil property groups below. Dig soil profile in the dominant assessment area landscape feature. Make soil observations within the top 12 inches. Use most recent National Technical Committee for Hydric Soils guidance for regional indicators.

- 4a. A Sandy soil
- B Loamy or clayey soils exhibiting redoximorphic features (concentrations, depletions, or rhizospheres)
- C Loamy or clayey soils not exhibiting redoximorphic features
- D Loamy or clayey gleyed soil
- E Histosol or histlic epipedon
- 4b. A Soil ribbon < 1 inch
- B Soil ribbon ≥ 1 inch
- 4c. A No peat or muck presence
- B A peat or muck presence

5. Discharge into Wetland – opportunity metric

Check a box in each column. Consider surface pollutants or discharges (Surf) and sub-surface pollutants or discharges (Sub). Examples of sub-surface discharges include presence of nearby septic tank, underground storage tank (UST), etc.

- | | | |
|---------------------------------------|---------------------------------------|---|
| Surf | Sub | |
| <input type="checkbox"/> A | <input checked="" type="checkbox"/> A | Little or no evidence of pollutants or discharges entering the assessment area |
| <input checked="" type="checkbox"/> B | <input type="checkbox"/> B | Noticeable evidence of pollutants or discharges entering the wetland and stressing, but not overwhelming the treatment capacity of the assessment area |
| <input type="checkbox"/> C | <input type="checkbox"/> C | Noticeable evidence of pollutants or discharges (pathogen, particulate, or soluble) entering the assessment area and potentially overwhelming the treatment capacity of the wetland (water discoloration, dead vegetation, excessive sedimentation, odor) |

6. Land Use – opportunity metric (skip for non-riparian wetlands)

Check all that apply (at least one box in each column). Evaluation involves a GIS effort with field adjustment. Consider sources draining to assessment area within entire upstream watershed (WS), within 5 miles and within the watershed draining to the assessment area (5M), and within 2 miles and within the watershed draining to the assessment area (2M).

- | | | | |
|---------------------------------------|---------------------------------------|---------------------------------------|---|
| WS | 5M | 2M | |
| <input type="checkbox"/> A | <input type="checkbox"/> A | <input type="checkbox"/> A | ≥ 10% impervious surfaces |
| <input type="checkbox"/> B | <input type="checkbox"/> B | <input type="checkbox"/> B | Confined animal operations (or other local, concentrated source of pollutants) |
| <input checked="" type="checkbox"/> C | <input checked="" type="checkbox"/> C | <input checked="" type="checkbox"/> C | ≥ 20% coverage of pasture |
| <input type="checkbox"/> D | <input type="checkbox"/> D | <input type="checkbox"/> D | ≥ 20% coverage of agricultural land (regularly plowed land) |
| <input checked="" type="checkbox"/> E | <input checked="" type="checkbox"/> E | <input checked="" type="checkbox"/> E | ≥ 20% coverage of maintained grass/herb |
| <input type="checkbox"/> F | <input type="checkbox"/> F | <input type="checkbox"/> F | ≥ 20% coverage of clear-cut land |
| <input type="checkbox"/> G | <input type="checkbox"/> G | <input type="checkbox"/> G | Little or no opportunity to improve water quality. Lack of opportunity may result from little or no disturbance in the watershed or hydrologic alterations that prevent drainage and/or overbank flow from affecting the assessment area. |

7. Wetland Acting as Vegetated Buffer – assessment area/wetland complex condition metric (skip for non-riparian wetlands)

- 7a. Is assessment area within 50 feet of a tributary or other open water?
- Yes No If Yes, continue to 7b. If No, skip to Metric 8.
- Wetland buffer need only be present on one side of the water body. Make buffer judgment based on the average width of wetland. Record a note if a portion of the buffer has been removed or disturbed.
- 7b. How much of the first 50 feet from the bank is wetland? (Wetland buffer need only be present on one side of the water body. Make buffer judgment based on the average width of wetland. Record a note if a portion of the buffer has been removed or disturbed.)
- A ≥ 50 feet
- B From 30 to < 50 feet
- C From 15 to < 30 feet
- D From 5 to < 15 feet
- E < 5 feet or buffer bypassed by ditches
- 7c. Tributary width. If the tributary is anastomosed, combine widths of channels/braids for a total width.
- ≤ 15-foot wide > 15-foot wide Other open water (no tributary present)
- 7d. Do roots of assessment area vegetation extend into the bank of the tributary/open water?
- Yes No
- 7e. Is stream or other open water sheltered or exposed?
- Sheltered – adjacent open water with width < 2500 feet and no regular boat traffic.
- Exposed – adjacent open water with width ≥ 2500 feet or regular boat traffic.

8. Wetland Width at the Assessment Area – wetland type/wetland complex condition metric (evaluate WT for all marshes and Estuarine Woody Wetland only; evaluate WC for Bottomland Hardwood Forest, Headwater Forest, and Riverine Swamp Forest only)

Check a box in each column for riverine wetlands only. Select the average width for the wetland type at the assessment area (WT) and the wetland complex at the assessment area (WC). See User Manual for WT and WC boundaries.

- | | | |
|---------------------------------------|---------------------------------------|-----------------------|
| WT | WC | |
| <input type="checkbox"/> A | <input type="checkbox"/> A | ≥ 100 feet |
| <input checked="" type="checkbox"/> B | <input checked="" type="checkbox"/> B | From 80 to < 100 feet |
| <input type="checkbox"/> C | <input type="checkbox"/> C | From 50 to < 80 feet |
| <input type="checkbox"/> D | <input type="checkbox"/> D | From 40 to < 50 feet |
| <input type="checkbox"/> E | <input type="checkbox"/> E | From 30 to < 40 feet |
| <input type="checkbox"/> F | <input type="checkbox"/> F | From 15 to < 30 feet |
| <input type="checkbox"/> G | <input type="checkbox"/> G | From 5 to < 15 feet |
| <input type="checkbox"/> H | <input type="checkbox"/> H | < 5 feet |

9. Inundation Duration – assessment area condition metric (skip for non-riparian wetlands)

Answer for assessment area dominant landform.

- A Evidence of short-duration inundation (< 7 consecutive days)
B Evidence of saturation, without evidence of inundation
C Evidence of long-duration inundation or very long-duration inundation (7 to 30 consecutive days or more)

10. Indicators of Deposition – assessment area condition metric (skip for non-riparian wetlands and all marshes)

Consider recent deposition only (no plant growth since deposition).

- A Sediment deposition is not excessive, but at approximately natural levels.
B Sediment deposition is excessive, but not overwhelming the wetland.
C Sediment deposition is excessive and is overwhelming the wetland.

11. Wetland Size – wetland type/wetland complex condition metric

Check a box in each column. Involves a GIS effort with field adjustment. This metric evaluates three aspects of the wetland area: the size of the wetland type (WT), the size of the wetland complex (WC), and the size of the forested wetland (FW) (if applicable, see User Manual). See the User Manual for boundaries of these evaluation areas. If assessment area is clear-cut, select "K" for the FW column.

- | | | |
|---------------------------------------|---------------------------------------|---|
| WT | WC | FW (if applicable) |
| <input type="checkbox"/> A | <input type="checkbox"/> A | <input type="checkbox"/> A ≥ 500 acres |
| <input type="checkbox"/> B | <input type="checkbox"/> B | <input type="checkbox"/> B From 100 to < 500 acres |
| <input type="checkbox"/> C | <input type="checkbox"/> C | <input type="checkbox"/> C From 50 to < 100 acres |
| <input type="checkbox"/> D | <input type="checkbox"/> D | <input type="checkbox"/> D From 25 to < 50 acres |
| <input type="checkbox"/> E | <input type="checkbox"/> E | <input type="checkbox"/> E From 10 to < 25 acres |
| <input type="checkbox"/> F | <input type="checkbox"/> F | <input type="checkbox"/> F From 5 to < 10 acres |
| <input type="checkbox"/> G | <input type="checkbox"/> G | <input type="checkbox"/> G From 1 to < 5 acres |
| <input type="checkbox"/> H | <input type="checkbox"/> H | <input type="checkbox"/> H From 0.5 to < 1 acre |
| <input checked="" type="checkbox"/> I | <input checked="" type="checkbox"/> I | <input checked="" type="checkbox"/> I From 0.1 to < 0.5 acre |
| <input type="checkbox"/> J | <input type="checkbox"/> J | <input type="checkbox"/> J From 0.01 to < 0.1 acre |
| <input type="checkbox"/> K | <input type="checkbox"/> K | <input type="checkbox"/> K < 0.01 acre <u>or</u> assessment area is clear-cut |

12. Wetland Intactness – wetland type condition metric (evaluate for Pocosins only)

- A Pocosin is the full extent (≥ 90%) of its natural landscape size.
B Pocosin type is < 90% of the full extent of its natural landscape size.

13. Connectivity to Other Natural Areas – landscape condition metric

13a. Check appropriate box(es) (a box may be checked in each column). Involves a GIS effort with field adjustment. This metric evaluates whether the wetland is well connected (Well) and/or loosely connected (Loosely) to the landscape patch, the contiguous naturally vegetated area and open water (if appropriate). Boundaries are formed by four-lane roads, regularly maintained utility line corridors the width of a four-lane road or wider, urban landscapes, maintained fields (pasture and agriculture), or open water > 300 feet wide.

- | | |
|---------------------------------------|---|
| Well | Loosely |
| <input type="checkbox"/> A | <input type="checkbox"/> A ≥ 500 acres |
| <input checked="" type="checkbox"/> B | <input type="checkbox"/> B From 100 to < 500 acres |
| <input type="checkbox"/> C | <input type="checkbox"/> C From 50 to < 100 acres |
| <input type="checkbox"/> D | <input type="checkbox"/> D From 10 to < 50 acres |
| <input type="checkbox"/> E | <input type="checkbox"/> E < 10 acres |
| <input type="checkbox"/> F | <input type="checkbox"/> F Wetland type has a poor or no connection to other natural habitats |

13b. Evaluate for marshes only.

- Yes No Wetland type has a surface hydrology connection to open waters/stream or tidal wetlands.

14. Edge Effect – wetland type condition metric (skip for all marshes and Estuarine Woody Wetland)

May involve a GIS effort with field adjustment. Estimate distance from wetland type boundary to artificial edges. Artificial edges include non-forested areas ≥ 40 feet wide such as fields, development, roads, regularly maintained utility line corridors, and clear-cuts. Consider the eight main points of the compass. Artificial edge occurs within 150 feet in how many directions? If the assessment area is clear cut, select option "C."

- A 0
B 1 to 4
C 5 to 8

15. Vegetative Composition – assessment area condition metric (skip for all marshes and Pine Flat)

- A Vegetation is close to reference condition in species present and their proportions. Lower strata composed of appropriate species, with exotic plants absent or sparse within the assessment area.
B Vegetation is different from reference condition in species diversity or proportions, but still largely composed of native species characteristic of the wetland type. This may include communities of weedy native species that develop after clearcutting or clearing. It also includes communities with exotics present, but not dominant, over a large portion of the expected strata.
C Vegetation severely altered from reference in composition, or expected species are unnaturally absent (planted stands of non-characteristic species or at least one stratum inappropriately composed of a single species), or exotic species are dominant in at least one stratum.

16. Vegetative Diversity – assessment area condition metric (evaluate for Non-tidal Freshwater Marsh only)

- A Vegetation diversity is high and is composed primarily of native species (< 10% cover of exotics).
B Vegetation diversity is low or has > 10% to 50% cover of exotics.
C Vegetation is dominated by exotic species (> 50 % cover of exotics).

17. Vegetative Structure – assessment area/wetland type condition metric

17a. Is vegetation present?

- Yes No If Yes, continue to 17b. If No, skip to Metric 18.

17b. Evaluate percent coverage of assessment area vegetation for all marshes only. Skip to 17c for non-marsh wetlands.

- A ≥ 25% coverage of vegetation
B < 25% coverage of vegetation

17c. Check a box in each column for each stratum. Evaluate this portion of the metric for non-marsh wetlands. Consider structure in airspace above the assessment area (AA) and the wetland type (WT) separately.

- | | | |
|-----------|---------------------------------------|--|
| AA | WT | |
| Canopy | <input checked="" type="checkbox"/> A | <input checked="" type="checkbox"/> A Canopy closed, or nearly closed, with natural gaps associated with natural processes |
| | <input type="checkbox"/> B | <input type="checkbox"/> B Canopy present, but opened more than natural gaps |
| | <input type="checkbox"/> C | <input type="checkbox"/> C Canopy sparse or absent |
| Mid-Story | <input type="checkbox"/> A | <input type="checkbox"/> A Dense mid-story/sapling layer |
| | <input checked="" type="checkbox"/> B | <input checked="" type="checkbox"/> B Moderate density mid-story/sapling layer |
| | <input type="checkbox"/> C | <input type="checkbox"/> C Mid-story/sapling layer sparse or absent |
| Shrub | <input type="checkbox"/> A | <input type="checkbox"/> A Dense shrub layer |
| | <input checked="" type="checkbox"/> B | <input checked="" type="checkbox"/> B Moderate density shrub layer |
| | <input type="checkbox"/> C | <input type="checkbox"/> C Shrub layer sparse or absent |
| Herb | <input type="checkbox"/> A | <input type="checkbox"/> A Dense herb layer |
| | <input checked="" type="checkbox"/> B | <input checked="" type="checkbox"/> B Moderate density herb layer |
| | <input type="checkbox"/> C | <input type="checkbox"/> C Herb layer sparse or absent |

18. Snags – wetland type condition metric (skip for all marshes)

- A Large snags (more than one) are visible (> 12 inches DBH, or large relative to species present and landscape stability).
B Not A

19. Diameter Class Distribution – wetland type condition metric (skip for all marshes)

- A Majority of canopy trees have stems > 6 inches in diameter at breast height (DBH); many large trees (> 12 inches DBH) are present.
B Majority of canopy trees have stems between 6 and 12 inches DBH, few are > 12 inch DBH.
C Majority of canopy trees are < 6 inches DBH or no trees.

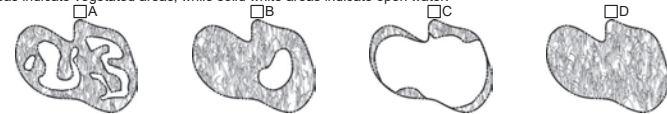
20. Large Woody Debris – wetland type condition metric (skip for all marshes)

Include both natural debris and man-placed natural debris.

- A Large logs (more than one) are visible (> 12 inches in diameter, or large relative to species present and landscape stability).
B Not A

21. Vegetation/Open Water Dispersion – wetland type/open water condition metric (evaluate for Non-Tidal Freshwater Marsh only)

Select the figure that best describes the amount of interspersed between vegetation and open water in the growing season. Patterned areas indicate vegetated areas, while solid white areas indicate open water.



22. Hydrologic Connectivity – assessment area condition metric (evaluate for riparian wetlands and Salt/Brackish Marsh only)

Examples of activities that may severely alter hydrologic connectivity include intensive ditching, fill, sedimentation, channelization, diversion, man-made berms, beaver dams, and stream incision. Documentation required if evaluated as B, C, or D.

- A Overbank and overland flow are not severely altered in the assessment area.
B Overbank flow is severely altered in the assessment area.
C Overland flow is severely altered in the assessment area.
D Both overbank and overland flow are severely altered in the assessment area.

Notes

NC WAM Wetland Rating Sheet
Accompanies User Manual Version 5.0

Wetland Site Name Wetland LL Woods Date of Assessment 7/30/2020
 Wetland Type Bottomland Hardwood Forest Assessor Name/Organization C. Neaves
 Notes on Field Assessment Form (Y/N) NO
 Presence of regulatory considerations (Y/N) NO
 Wetland is intensively managed (Y/N) NO
 Assessment area is located within 50 feet of a natural tributary or other open water (Y/N) NO
 Assessment area is substantially altered by beaver (Y/N) NO
 Assessment area experiences overbank flooding during normal rainfall conditions (Y/N) NO
 Assessment area is on a coastal island (Y/N) NO

Sub-function Rating Summary

Function	Sub-function	Metrics	Rating
Hydrology	Surface Storage and Retention	Condition	HIGH
	Sub-surface Storage and Retention	Condition	LOW
Water Quality	Pathogen Change	Condition	HIGH
		Condition/Opportunity	HIGH
		Opportunity Presence (Y/N)	YES
	Particulate Change	Condition	HIGH
		Condition/Opportunity	HIGH
		Opportunity Presence (Y/N)	YES
	Soluble Change	Condition	HIGH
		Condition/Opportunity	HIGH
		Opportunity Presence (Y/N)	YES
	Physical Change	Condition	LOW
		Condition/Opportunity	LOW
		Opportunity Presence (Y/N)	YES
	Pollution Change	Condition	NA
		Condition/Opportunity	NA
		Opportunity Presence (Y/N)	NA
Habitat	Physical Structure	Condition	HIGH
	Landscape Patch Structure	Condition	LOW
	Vegetation Composition	Condition	HIGH

Function Rating Summary

Function	Metrics	Rating
Hydrology	Condition	HIGH
Water Quality	Condition	HIGH
	Condition/Opportunity	HIGH
	Opportunity Presence (Y/N)	YES
Habitat	Condition	HIGH

Overall Wetland Rating HIGH

NC WAM FIELD ASSESSMENT FORM
Accompanies User Manual Version 5.0

USACE AID #	SAW-2020-00047	NCDWR#	20200035
Project Name	Liberty Rock Mitigation Site	Date of Evaluation	7/30/2020
Applicant/Owner Name	Wildlands Engineering	Wetland Site Name	Wetland MM
Wetland Type	Bottomland Hardwood Forest	Assessor Name/Organization	C. Neaves
Level III Ecoregion	Piedmont	Nearest Named Water Body	Rocky River
River Basin	Cape Fear	USGS 8-Digit Catalogue Unit	03030003
County	Randolph	NCDWR Region	Winston-Salem
<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	Precipitation within 48 hrs?	Latitude/Longitude (deci-degrees)	35.820415, -79.564068

Evidence of stressors affecting the assessment area (may not be within the assessment area)
 Please circle and/or make note on the last page if evidence of stressors is apparent. Consider departure from reference, if appropriate, in recent past (for instance, within 10 years). Noteworthy stressors include, but are not limited to the following.

- Hydrological modifications (examples: ditches, dams, beaver dams, dikes, berms, ponds, etc.)
- Surface and sub-surface discharges into the wetland (examples: discharges containing obvious pollutants, presence of nearby septic tanks, underground storage tanks (USTs), hog lagoons, etc.)
- Signs of vegetation stress (examples: vegetation mortality, insect damage, storm damage, disease, salt intrusion, etc.)
- Habitat/plant community alteration (examples: mowing, clear-cutting, exotics, etc.)

Is the assessment area intensively managed? Yes No

Regulatory Considerations - Were regulatory considerations evaluated? Yes No If Yes, check all that apply to the assessment area.

- Anadromous fish
- Federally protected species or State endangered or threatened species
- NCDWR riparian buffer rule in effect
- Abuts a Primary Nursery Area (PNA)
- Publicly owned property
- N.C. Division of Coastal Management Area of Environmental Concern (AEC) (including buffer)
- Abuts a stream with a NCDWQ classification of SA or supplemental classifications of HQW, ORW, or Trout
- Designated NCNHP reference community
- Abuts a 303(d)-listed stream or a tributary to a 303(d)-listed stream

What type of natural stream is associated with the wetland, if any? (check all that apply)

- Blackwater
- Brownwater
- Tidal (if tidal, check one of the following boxes) Lunar Wind Both

Is the assessment area on a coastal island? Yes No

Is the assessment area's surface water storage capacity or duration substantially altered by beaver? Yes No

Does the assessment area experience overbank flooding during normal rainfall conditions? Yes No

- Ground Surface Condition/Vegetation Condition – assessment area condition metric**
Check a box in each column. Consider alteration to the ground surface (GS) in the assessment area and vegetation structure (VS) in the assessment area. Compare to reference wetland if applicable (see User Manual). If a reference is not applicable, then rate the assessment area based on evidence an effect.

GS	VS	
<input checked="" type="checkbox"/> A	<input type="checkbox"/> A	Not severely altered
<input type="checkbox"/> B	<input checked="" type="checkbox"/> B	Severely altered over a majority of the assessment area (ground surface alteration examples: vehicle tracks, excessive sedimentation, fire-plow lanes, skidder tracks, bedding, fill, soil compaction, obvious pollutants) (vegetation structure alteration examples: mechanical disturbance, herbicides, salt intrusion [where appropriate], exotic species, grazing, less diversity [if appropriate], hydrologic alteration)
- Surface and Sub-Surface Storage Capacity and Duration – assessment area condition metric**
Check a box in each column. Consider surface storage capacity and duration (Surf) and sub-surface storage capacity and duration (Sub). Consider both increase and decrease in hydrology. A ditch ≤ 1 foot deep is considered to affect surface water only, while a ditch > 1 foot deep is expected to affect both surface and sub-surface water. Consider tidal flooding regime, if applicable.

Surf	Sub	
<input type="checkbox"/> A	<input type="checkbox"/> A	Water storage capacity and duration are not altered.
<input checked="" type="checkbox"/> B	<input checked="" type="checkbox"/> B	Water storage capacity or duration are altered, but not substantially (typically, not sufficient to change vegetation).
<input type="checkbox"/> C	<input type="checkbox"/> C	Water storage capacity or duration are substantially altered (typically, alteration sufficient to result in vegetation change) (examples: draining, flooding, soil compaction, filling, excessive sedimentation, underground utility lines).
- Water Storage/Surface Relief – assessment area/wetland type condition metric (skip for all marshes)**
Check a box in each column. Select the appropriate storage for the assessment area (AA) and the wetland type (WT).

AA	WT	
3a. <input type="checkbox"/> A <input type="checkbox"/> A		Majority of wetland with depressions able to pond water > 1 foot deep
<input type="checkbox"/> B <input type="checkbox"/> B		Majority of wetland with depressions able to pond water 6 inches to 1 foot deep
<input type="checkbox"/> C <input type="checkbox"/> C		Majority of wetland with depressions able to pond water 3 to 6 inches deep
<input checked="" type="checkbox"/> D <input checked="" type="checkbox"/> D		Depressions able to pond water < 3 inches deep
3b. <input type="checkbox"/> A	<input type="checkbox"/> A	Evidence that maximum depth of inundation is greater than 2 feet
<input type="checkbox"/> B	<input type="checkbox"/> B	Evidence that maximum depth of inundation is between 1 and 2 feet
<input checked="" type="checkbox"/> C	<input checked="" type="checkbox"/> C	Evidence that maximum depth of inundation is less than 1 foot

4. Soil Texture/Structure – assessment area condition metric (skip for all marshes)

Check a box from each of the three soil property groups below. Dig soil profile in the dominant assessment area landscape feature. Make soil observations within the top 12 inches. Use most recent National Technical Committee for Hydric Soils guidance for regional indicators.

- 4a. A Sandy soil
 B Loamy or clayey soils exhibiting redoximorphic features (concentrations, depletions, or rhizospheres)
 C Loamy or clayey soils not exhibiting redoximorphic features
 D Loamy or clayey gleyed soil
 E Histosol or histc epipedon
- 4b. A Soil ribbon < 1 inch
 B Soil ribbon ≥ 1 inch
- 4c. A No peat or muck presence
 B A peat or muck presence

5. Discharge into Wetland – opportunity metric

Check a box in each column. Consider surface pollutants or discharges (Surf) and sub-surface pollutants or discharges (Sub). Examples of sub-surface discharges include presence of nearby septic tank, underground storage tank (UST), etc.

- | | | |
|---------------------------------------|---------------------------------------|---|
| Surf | Sub | |
| <input type="checkbox"/> A | <input checked="" type="checkbox"/> A | Little or no evidence of pollutants or discharges entering the assessment area |
| <input checked="" type="checkbox"/> B | <input type="checkbox"/> B | Noticeable evidence of pollutants or discharges entering the wetland and stressing, but not overwhelming the treatment capacity of the assessment area |
| <input type="checkbox"/> C | <input type="checkbox"/> C | Noticeable evidence of pollutants or discharges (pathogen, particulate, or soluble) entering the assessment area and potentially overwhelming the treatment capacity of the wetland (water discoloration, dead vegetation, excessive sedimentation, odor) |

6. Land Use – opportunity metric (skip for non-riparian wetlands)

Check all that apply (at least one box in each column). Evaluation involves a GIS effort with field adjustment. Consider sources draining to assessment area within entire upstream watershed (WS), within 5 miles and within the watershed draining to the assessment area (5M), and within 2 miles and within the watershed draining to the assessment area (2M).

- | | | | |
|---------------------------------------|---------------------------------------|---------------------------------------|---|
| WS | 5M | 2M | |
| <input type="checkbox"/> A | <input type="checkbox"/> A | <input type="checkbox"/> A | ≥ 10% impervious surfaces |
| <input type="checkbox"/> B | <input type="checkbox"/> B | <input type="checkbox"/> B | Confined animal operations (or other local, concentrated source of pollutants) |
| <input checked="" type="checkbox"/> C | <input checked="" type="checkbox"/> C | <input checked="" type="checkbox"/> C | ≥ 20% coverage of pasture |
| <input type="checkbox"/> D | <input type="checkbox"/> D | <input type="checkbox"/> D | ≥ 20% coverage of agricultural land (regularly plowed land) |
| <input checked="" type="checkbox"/> E | <input checked="" type="checkbox"/> E | <input checked="" type="checkbox"/> E | ≥ 20% coverage of maintained grass/herb |
| <input type="checkbox"/> F | <input type="checkbox"/> F | <input type="checkbox"/> F | ≥ 20% coverage of clear-cut land |
| <input type="checkbox"/> G | <input type="checkbox"/> G | <input type="checkbox"/> G | Little or no opportunity to improve water quality. Lack of opportunity may result from little or no disturbance in the watershed or hydrologic alterations that prevent drainage and/or overbank flow from affecting the assessment area. |

7. Wetland Acting as Vegetated Buffer – assessment area/wetland complex condition metric (skip for non-riparian wetlands)

- 7a. Is assessment area within 50 feet of a tributary or other open water?
 Yes No If Yes, continue to 7b. If No, skip to Metric 8.
 Wetland buffer need only be present on one side of the water body. Make buffer judgment based on the average width of wetland. Record a note if a portion of the buffer has been removed or disturbed.
- 7b. How much of the first 50 feet from the bank is wetland? (Wetland buffer need only be present on one side of the water body. Make buffer judgment based on the average width of wetland. Record a note if a portion of the buffer has been removed or disturbed.)
 A ≥ 50 feet
 B From 30 to < 50 feet
 C From 15 to < 30 feet
 D From 5 to < 15 feet
 E < 5 feet or buffer bypassed by ditches
- 7c. Tributary width. If the tributary is anastomosed, combine widths of channels/braids for a total width.
 ≤ 15-foot wide > 15-foot wide Other open water (no tributary present)
- 7d. Do roots of assessment area vegetation extend into the bank of the tributary/open water?
 Yes No
- 7e. Is stream or other open water sheltered or exposed?
 Sheltered – adjacent open water with width < 2500 feet and no regular boat traffic.
 Exposed – adjacent open water with width ≥ 2500 feet or regular boat traffic.

8. Wetland Width at the Assessment Area – wetland type/wetland complex condition metric (evaluate WT for all marshes and Estuarine Woody Wetland only; evaluate WC for Bottomland Hardwood Forest, Headwater Forest, and Riverine Swamp Forest only)

Check a box in each column for riverine wetlands only. Select the average width for the wetland type at the assessment area (WT) and the wetland complex at the assessment area (WC). See User Manual for WT and WC boundaries.

- | | | |
|---------------------------------------|---------------------------------------|-----------------------|
| WT | WC | |
| <input type="checkbox"/> A | <input type="checkbox"/> A | ≥ 100 feet |
| <input type="checkbox"/> B | <input type="checkbox"/> B | From 80 to < 100 feet |
| <input type="checkbox"/> C | <input type="checkbox"/> C | From 50 to < 80 feet |
| <input type="checkbox"/> D | <input type="checkbox"/> D | From 40 to < 50 feet |
| <input type="checkbox"/> E | <input type="checkbox"/> E | From 30 to < 40 feet |
| <input checked="" type="checkbox"/> F | <input checked="" type="checkbox"/> F | From 15 to < 30 feet |
| <input type="checkbox"/> G | <input type="checkbox"/> G | From 5 to < 15 feet |
| <input type="checkbox"/> H | <input type="checkbox"/> H | < 5 feet |

9. Inundation Duration – assessment area condition metric (skip for non-riparian wetlands)

Answer for assessment area dominant landform.

- A Evidence of short-duration inundation (< 7 consecutive days)
 B Evidence of saturation, without evidence of inundation
 C Evidence of long-duration inundation or very long-duration inundation (7 to 30 consecutive days or more)

10. Indicators of Deposition – assessment area condition metric (skip for non-riparian wetlands and all marshes)

Consider recent deposition only (no plant growth since deposition).

- A Sediment deposition is not excessive, but at approximately natural levels.
 B Sediment deposition is excessive, but not overwhelming the wetland.
 C Sediment deposition is excessive and is overwhelming the wetland.

11. Wetland Size – wetland type/wetland complex condition metric

Check a box in each column. Involves a GIS effort with field adjustment. This metric evaluates three aspects of the wetland area: the size of the wetland type (WT), the size of the wetland complex (WC), and the size of the forested wetland (FW) (if applicable, see User Manual). See the User Manual for boundaries of these evaluation areas. If assessment area is clear-cut, select "K" for the FW column.

- | | | |
|----------------------------|---------------------------------------|---|
| WT | WC | FW (if applicable) |
| <input type="checkbox"/> A | <input type="checkbox"/> A | <input type="checkbox"/> A ≥ 500 acres |
| <input type="checkbox"/> B | <input type="checkbox"/> B | <input type="checkbox"/> B From 100 to < 500 acres |
| <input type="checkbox"/> C | <input type="checkbox"/> C | <input type="checkbox"/> C From 50 to < 100 acres |
| <input type="checkbox"/> D | <input type="checkbox"/> D | <input type="checkbox"/> D From 25 to < 50 acres |
| <input type="checkbox"/> E | <input type="checkbox"/> E | <input type="checkbox"/> E From 10 to < 25 acres |
| <input type="checkbox"/> F | <input type="checkbox"/> F | <input type="checkbox"/> F From 5 to < 10 acres |
| <input type="checkbox"/> G | <input type="checkbox"/> G | <input type="checkbox"/> G From 1 to < 5 acres |
| <input type="checkbox"/> H | <input type="checkbox"/> H | <input type="checkbox"/> H From 0.5 to < 1 acre |
| <input type="checkbox"/> I | <input type="checkbox"/> I | <input type="checkbox"/> I From 0.1 to < 0.5 acre |
| <input type="checkbox"/> J | <input checked="" type="checkbox"/> J | <input type="checkbox"/> J From 0.01 to < 0.1 acre |
| <input type="checkbox"/> K | <input type="checkbox"/> K | <input checked="" type="checkbox"/> K < 0.01 acre or assessment area is clear-cut |

12. Wetland Intactness – wetland type condition metric (evaluate for Pocosins only)

- A Pocosin is the full extent (≥ 90%) of its natural landscape size.
 B Pocosin type is < 90% of the full extent of its natural landscape size.

13. Connectivity to Other Natural Areas – landscape condition metric

13a. Check appropriate box(es) (a box may be checked in each column). Involves a GIS effort with field adjustment. This metric evaluates whether the wetland is well connected (Well) and/or loosely connected (Loosely) to the landscape patch, the contiguous naturally vegetated area and open water (if appropriate). Boundaries are formed by four-lane roads, regularly maintained utility line corridors the width of a four-lane road or wider, urban landscapes, maintained fields (pasture and agriculture), or open water > 300 feet wide.

- | | | |
|----------------------------|---------------------------------------|--|
| Well | Loosely | |
| <input type="checkbox"/> A | <input type="checkbox"/> A | ≥ 500 acres |
| <input type="checkbox"/> B | <input type="checkbox"/> B | From 100 to < 500 acres |
| <input type="checkbox"/> C | <input type="checkbox"/> C | From 50 to < 100 acres |
| <input type="checkbox"/> D | <input type="checkbox"/> D | From 10 to < 50 acres |
| <input type="checkbox"/> E | <input type="checkbox"/> E | < 10 acres |
| <input type="checkbox"/> F | <input checked="" type="checkbox"/> F | Wetland type has a poor or no connection to other natural habitats |

13b. Evaluate for marshes only.

- Yes No Wetland type has a surface hydrology connection to open waters/stream or tidal wetlands.

14. Edge Effect – wetland type condition metric (skip for all marshes and Estuarine Woody Wetland)

May involve a GIS effort with field adjustment. Estimate distance from wetland type boundary to artificial edges. Artificial edges include non-forested areas ≥ 40 feet wide such as fields, development, roads, regularly maintained utility line corridors, and clear-cuts. Consider the eight main points of the compass. Artificial edge occurs within 150 feet in how many directions? If the assessment area is clear cut, select option "C."

- A 0
 B 1 to 4
 C 5 to 8

15. Vegetative Composition – assessment area condition metric (skip for all marshes and Pine Flat)

- A Vegetation is close to reference condition in species present and their proportions. Lower strata composed of appropriate species, with exotic plants absent or sparse within the assessment area.
 B Vegetation is different from reference condition in species diversity or proportions, but still largely composed of native species characteristic of the wetland type. This may include communities of weedy native species that develop after clearcutting or clearing. It also includes communities with exotics present, but not dominant, over a large portion of the expected strata.
 C Vegetation severely altered from reference in composition, or expected species are unnaturally absent (planted stands of non-characteristic species or at least one stratum inappropriately composed of a single species), or exotic species are dominant in at least one stratum.

16. Vegetative Diversity – assessment area condition metric (evaluate for Non-tidal Freshwater Marsh only)

- A Vegetation diversity is high and is composed primarily of native species (< 10% cover of exotics).
 B Vegetation diversity is low or has > 10% to 50% cover of exotics.
 C Vegetation is dominated by exotic species (> 50 % cover of exotics).

17. Vegetative Structure – assessment area/wetland type condition metric

17a. Is vegetation present?

Yes No If Yes, continue to 17b. If No, skip to Metric 18.

17b. Evaluate percent coverage of assessment area vegetation for all marshes only. Skip to 17c for non-marsh wetlands.

A ≥ 25% coverage of vegetation
 B < 25% coverage of vegetation

17c. Check a box in each column for each stratum. Evaluate this portion of the metric for non-marsh wetlands. Consider structure in airspace above the assessment area (AA) and the wetland type (WT) separately.

AA	WT	
Canopy		
<input type="checkbox"/> A	<input type="checkbox"/> A	Canopy closed, or nearly closed, with natural gaps associated with natural processes
<input type="checkbox"/> B	<input type="checkbox"/> B	Canopy present, but opened more than natural gaps
<input checked="" type="checkbox"/> C	<input checked="" type="checkbox"/> C	Canopy sparse or absent
Mid-Story		
<input type="checkbox"/> A	<input type="checkbox"/> A	Dense mid-story/sapling layer
<input type="checkbox"/> B	<input type="checkbox"/> B	Moderate density mid-story/sapling layer
<input checked="" type="checkbox"/> C	<input checked="" type="checkbox"/> C	Mid-story/sapling layer sparse or absent
Shrub		
<input type="checkbox"/> A	<input type="checkbox"/> A	Dense shrub layer
<input type="checkbox"/> B	<input type="checkbox"/> B	Moderate density shrub layer
<input checked="" type="checkbox"/> C	<input checked="" type="checkbox"/> C	Shrub layer sparse or absent
Herb		
<input checked="" type="checkbox"/> A	<input checked="" type="checkbox"/> A	Dense herb layer
<input type="checkbox"/> B	<input type="checkbox"/> B	Moderate density herb layer
<input type="checkbox"/> C	<input type="checkbox"/> C	Herb layer sparse or absent

18. Snags – wetland type condition metric (skip for all marshes)

A Large snags (more than one) are visible (> 12 inches DBH, or large relative to species present and landscape stability).
 B Not A

19. Diameter Class Distribution – wetland type condition metric (skip for all marshes)

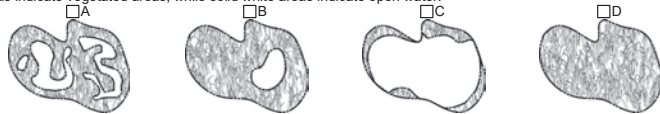
A Majority of canopy trees have stems > 6 inches in diameter at breast height (DBH); many large trees (> 12 inches DBH) are present.
 B Majority of canopy trees have stems between 6 and 12 inches DBH, few are > 12 inch DBH.
 C Majority of canopy trees are < 6 inches DBH or no trees.

20. Large Woody Debris – wetland type condition metric (skip for all marshes)

Include both natural debris and man-placed natural debris.
 A Large logs (more than one) are visible (> 12 inches in diameter, or large relative to species present and landscape stability).
 B Not A

21. Vegetation/Open Water Dispersion – wetland type/open water condition metric (evaluate for Non-Tidal Freshwater Marsh only)

Select the figure that best describes the amount of interspersed vegetation and open water in the growing season. Patterned areas indicate vegetated areas, while solid white areas indicate open water.



22. Hydrologic Connectivity – assessment area condition metric (evaluate for riparian wetlands and Salt/Brackish Marsh only)

Examples of activities that may severely alter hydrologic connectivity include intensive ditching, fill, sedimentation, channelization, diversion, man-made berms, beaver dams, and stream incision. Documentation required if evaluated as B, C, or D.

A Overbank and overland flow are not severely altered in the assessment area.
 B Overbank flow is severely altered in the assessment area.
 C Overland flow is severely altered in the assessment area.
 D Both overbank and overland flow are severely altered in the assessment area.

Notes

NC WAM Wetland Rating Sheet
 Accompanies User Manual Version 5.0

Wetland Site Name Wetland MM Date of Assessment 7/30/2020
 Wetland Type Bottomland Hardwood Forest Assessor Name/Organization C. Neaves

Notes on Field Assessment Form (Y/N) NO
 Presence of regulatory considerations (Y/N) NO
 Wetland is intensively managed (Y/N) _____
 Assessment area is located within 50 feet of a natural tributary or other open water (Y/N) NO
 Assessment area is substantially altered by beaver (Y/N) _____
 Assessment area experiences overbank flooding during normal rainfall conditions (Y/N) _____
 Assessment area is on a coastal island (Y/N) _____

Sub-function Rating Summary

Function	Sub-function	Metrics	Rating
Hydrology	Surface Storage and Retention	Condition	LOW
		Sub-surface Storage and Retention	Condition
Water Quality	Pathogen Change	Condition	MEDIUM
		Condition/Opportunity	MEDIUM
	Particulate Change	Opportunity Presence (Y/N)	NO
		Condition	LOW
Soluble Change	Condition	Condition/Opportunity	LOW
		Opportunity Presence (Y/N)	NO
	Physical Change	Condition	MEDIUM
		Condition/Opportunity	MEDIUM
Pollution Change	Condition	Opportunity Presence (Y/N)	NO
		Condition	LOW
	Condition/Opportunity	Opportunity Presence (Y/N)	NO
		Condition	NA
Habitat	Vegetation Composition	Opportunity Presence (Y/N)	NA
		Condition	LOW
		Condition	LOW

Function Rating Summary

Function	Metrics	Rating
Hydrology	Condition	LOW
	Condition	LOW
	Condition/Opportunity	LOW
Water Quality	Condition	LOW
	Condition/Opportunity	LOW
	Opportunity Presence (Y/N)	NO
Habitat	Condition	LOW

Overall Wetland Rating LOW

NC WAM FIELD ASSESSMENT FORM
Accompanies User Manual Version 5.0

USACE AID #	SAW-2020-00047	NCDWR#	20200035
Project Name	Liberty Rock Mitigation Site	Date of Evaluation	7/30/2020
Applicant/Owner Name	Widlands Engineering	Wetland Site Name	Wetland NN
Wetland Type	Bottomland Hardwood Forest	Assessor Name/Organization	C. Neaves
Level III Ecoregion	Piedmont	Nearest Named Water Body	Rocky River
River Basin	Cape Fear	USGS 8-Digit Catalogue Unit	03030003
County	Randolph	NCDWR Region	Winston-Salem
<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	Precipitation within 48 hrs?	Latitude/Longitude (deci-degrees)	35.820206, -79.564532

Evidence of stressors affecting the assessment area (may not be within the assessment area)

Please circle and/or make note on the last page if evidence of stressors is apparent. Consider departure from reference, if appropriate, in recent past (for instance, within 10 years). Noteworthy stressors include, but are not limited to the following.

- Hydrological modifications (examples: ditches, dams, beaver dams, dikes, berms, ponds, etc.)
- Surface and sub-surface discharges into the wetland (examples: discharges containing obvious pollutants, presence of nearby septic tanks, underground storage tanks (USTs), hog lagoons, etc.)
- Signs of vegetation stress (examples: vegetation mortality, insect damage, disease, storm damage, salt intrusion, etc.)
- Habitat/plant community alteration (examples: mowing, clear-cutting, exotics, etc.)

Is the assessment area intensively managed? Yes No

Regulatory Considerations - Were regulatory considerations evaluated? Yes No If Yes, check all that apply to the assessment area.

- Anadromous fish
- Federally protected species or State endangered or threatened species
- NCDWR riparian buffer rule in effect
- Abuts a Primary Nursery Area (PNA)
- Publicly owned property
- N.C. Division of Coastal Management Area of Environmental Concern (AEC) (including buffer)
- Abuts a stream with a NCDWQ classification of SA or supplemental classifications of HQW, ORW, or Trout
- Designated NCNHP reference community
- Abuts a 303(d)-listed stream or a tributary to a 303(d)-listed stream

What type of natural stream is associated with the wetland, if any? (check all that apply)

- Blackwater
- Brownwater
- Tidal (if tidal, check one of the following boxes) Lunar Wind Both

Is the assessment area on a coastal island? Yes No

Is the assessment area's surface water storage capacity or duration substantially altered by beaver? Yes No

Does the assessment area experience overbank flooding during normal rainfall conditions? Yes No

1. Ground Surface Condition/Vegetation Condition – assessment area condition metric

Check a box in each column. Consider alteration to the ground surface (GS) in the assessment area and vegetation structure (VS) in the assessment area. Compare to reference wetland if applicable (see User Manual). If a reference is not applicable, then rate the assessment area based on evidence an effect.

- | | | |
|---------------------------------------|---------------------------------------|--|
| GS | VS | |
| <input checked="" type="checkbox"/> A | <input type="checkbox"/> A | Not severely altered |
| <input type="checkbox"/> B | <input checked="" type="checkbox"/> B | Severely altered over a majority of the assessment area (ground surface alteration examples: vehicle tracks, excessive sedimentation, fire-plow lanes, skidder tracks, bedding, fill, soil compaction, obvious pollutants) (vegetation structure alteration examples: mechanical disturbance, herbicides, salt intrusion [where appropriate], exotic species, grazing, less diversity [if appropriate], hydrologic alteration) |

2. Surface and Sub-Surface Storage Capacity and Duration – assessment area condition metric

Check a box in each column. Consider surface storage capacity and duration (Surf) and sub-surface storage capacity and duration (Sub). Consider both increase and decrease in hydrology. A ditch ≤ 1 foot deep is considered to affect surface water only, while a ditch > 1 foot deep is expected to affect both surface and sub-surface water. Consider tidal flooding regime, if applicable.

- | | | |
|---------------------------------------|---------------------------------------|--|
| Surf | Sub | |
| <input type="checkbox"/> A | <input type="checkbox"/> A | Water storage capacity and duration are not altered. |
| <input checked="" type="checkbox"/> B | <input checked="" type="checkbox"/> B | Water storage capacity or duration are altered, but not substantially (typically, not sufficient to change vegetation). |
| <input type="checkbox"/> C | <input type="checkbox"/> C | Water storage capacity or duration are substantially altered (typically, alteration sufficient to result in vegetation change) (examples: draining, flooding, soil compaction, filling, excessive sedimentation, underground utility lines). |

3. Water Storage/Surface Relief – assessment area/wetland type condition metric (skip for all marshes)

Check a box in each column. Select the appropriate storage for the assessment area (AA) and the wetland type (WT).

- | | | |
|---|----|---|
| AA | WT | |
| 3a. <input type="checkbox"/> A <input type="checkbox"/> A | | Majority of wetland with depressions able to pond water > 1 deep |
| <input type="checkbox"/> B <input type="checkbox"/> B | | Majority of wetland with depressions able to pond water 6 inches to 1 foot deep |
| <input type="checkbox"/> C <input type="checkbox"/> C | | Majority of wetland with depressions able to pond water 3 to 6 inches deep |
| <input checked="" type="checkbox"/> D <input checked="" type="checkbox"/> D | | Depressions able to pond water < 3 inches deep |
| 3b. <input type="checkbox"/> A | | Evidence that maximum depth of inundation is greater than 2 feet |
| <input type="checkbox"/> B | | Evidence that maximum depth of inundation is between 1 and 2 feet |
| <input checked="" type="checkbox"/> C | | Evidence that maximum depth of inundation is less than 1 foot |

4. Soil Texture/Structure – assessment area condition metric (skip for all marshes)

Check a box from each of the three soil property groups below. Dig soil profile in the dominant assessment area landscape feature. Make soil observations within the top 12 inches. Use most recent National Technical Committee for Hydric Soils guidance for regional indicators.

- 4a. A Sandy soil
- B Loamy or clayey soils exhibiting redoximorphic features (concentrations, depletions, or rhizospheres)
- C Loamy or clayey soils not exhibiting redoximorphic features
- D Loamy or clayey gleyed soil
- E Histosol or histc epipedon
- 4b. A Soil ribbon < 1 inch
- B Soil ribbon ≥ 1 inch
- 4c. A No peat or muck presence
- B A peat or muck presence

5. Discharge into Wetland – opportunity metric

Check a box in each column. Consider surface pollutants or discharges (Surf) and sub-surface pollutants or discharges (Sub). Examples of sub-surface discharges include presence of nearby septic tank, underground storage tank (UST), etc.

- | | | |
|---------------------------------------|---------------------------------------|---|
| Surf | Sub | |
| <input type="checkbox"/> A | <input checked="" type="checkbox"/> A | Little or no evidence of pollutants or discharges entering the assessment area |
| <input checked="" type="checkbox"/> B | <input type="checkbox"/> B | Noticeable evidence of pollutants or discharges entering the wetland and stressing, but not overwhelming the treatment capacity of the assessment area |
| <input type="checkbox"/> C | <input type="checkbox"/> C | Noticeable evidence of pollutants or discharges (pathogen, particulate, or soluble) entering the assessment area and potentially overwhelming the treatment capacity of the wetland (water discoloration, dead vegetation, excessive sedimentation, odor) |

6. Land Use – opportunity metric (skip for non-riparian wetlands)

Check all that apply (at least one box in each column). Evaluation involves a GIS effort with field adjustment. Consider sources draining to assessment area within entire upstream watershed (WS), within 5 miles and within the watershed draining to the assessment area (5M), and within 2 miles and within the watershed draining to the assessment area (2M).

- | | | | |
|---------------------------------------|---------------------------------------|---------------------------------------|---|
| WS | 5M | 2M | |
| <input type="checkbox"/> A | <input type="checkbox"/> A | <input type="checkbox"/> A | ≥ 10% impervious surfaces |
| <input type="checkbox"/> B | <input type="checkbox"/> B | <input type="checkbox"/> B | Confined animal operations (or other local, concentrated source of pollutants) |
| <input checked="" type="checkbox"/> C | <input checked="" type="checkbox"/> C | <input checked="" type="checkbox"/> C | ≥ 20% coverage of pasture |
| <input type="checkbox"/> D | <input type="checkbox"/> D | <input type="checkbox"/> D | ≥ 20% coverage of agricultural land (regularly plowed land) |
| <input checked="" type="checkbox"/> E | <input checked="" type="checkbox"/> E | <input checked="" type="checkbox"/> E | ≥ 20% coverage of maintained grass/herb |
| <input type="checkbox"/> F | <input type="checkbox"/> F | <input type="checkbox"/> F | ≥ 20% coverage of clear-cut land |
| <input type="checkbox"/> G | <input type="checkbox"/> G | <input type="checkbox"/> G | Little or no opportunity to improve water quality. Lack of opportunity may result from little or no disturbance in the watershed or hydrologic alterations that prevent drainage and/or overbank flow from affecting the assessment area. |

7. Wetland Acting as Vegetated Buffer – assessment area/wetland complex condition metric (skip for non-riparian wetlands)

- 7a. Is assessment area within 50 feet of a tributary or other open water?
 Yes No If Yes, continue to 7b. If No, skip to Metric 8.
 Wetland buffer need only be present on one side of the water body. Make buffer judgment based on the average width of wetland. Record a note if a portion of the buffer has been removed or disturbed.
- 7b. How much of the first 50 feet from the bank is wetland? (Wetland buffer need only be present on one side of the water body. Make buffer judgment based on the average width of wetland. Record a note if a portion of the buffer has been removed or disturbed.)
- A ≥ 50 feet
- B From 30 to < 50 feet
- C From 15 to < 30 feet
- D From 5 to < 15 feet
- E < 5 feet or buffer bypassed by ditches
- 7c. Tributary width. If the tributary is anastomosed, combine widths of channels/braids for a total width.
 ≤ 15-foot wide > 15-foot wide Other open water (no tributary present)
- 7d. Do roots of assessment area vegetation extend into the bank of the tributary/open water?
 Yes No
- 7e. Is stream or other open water sheltered or exposed?
 Sheltered – adjacent open water with width < 2500 feet and no regular boat traffic.
 Exposed – adjacent open water with width ≥ 2500 feet or regular boat traffic.

8. Wetland Width at the Assessment Area – wetland type/wetland complex condition metric (evaluate WT for all marshes and Estuarine Woody Wetland only; evaluate WC for Bottomland Hardwood Forest, Headwater Forest, and Riverine Swamp Forest only)

Check a box in each column for riverine wetlands only. Select the average width for the wetland type at the assessment area (WT) and the wetland complex at the assessment area (WC). See User Manual for WT and WC boundaries.

- | | | |
|---------------------------------------|---------------------------------------|-----------------------|
| WT | WC | |
| <input type="checkbox"/> A | <input type="checkbox"/> A | ≥ 100 feet |
| <input type="checkbox"/> B | <input type="checkbox"/> B | From 80 to < 100 feet |
| <input type="checkbox"/> C | <input type="checkbox"/> C | From 50 to < 80 feet |
| <input type="checkbox"/> D | <input type="checkbox"/> D | From 40 to < 50 feet |
| <input type="checkbox"/> E | <input type="checkbox"/> E | From 30 to < 40 feet |
| <input type="checkbox"/> F | <input type="checkbox"/> F | From 15 to < 30 feet |
| <input checked="" type="checkbox"/> G | <input checked="" type="checkbox"/> G | From 5 to < 15 feet |
| <input type="checkbox"/> H | <input type="checkbox"/> H | < 5 feet |

9. Inundation Duration – assessment area condition metric (skip for non-riparian wetlands)

Answer for assessment area dominant landform.

- A Evidence of short-duration inundation (< 7 consecutive days)
B Evidence of saturation, without evidence of inundation
C Evidence of long-duration inundation or very long-duration inundation (7 to 30 consecutive days or more)

10. Indicators of Deposition – assessment area condition metric (skip for non-riparian wetlands and all marshes)

Consider recent deposition only (no plant growth since deposition).

- A Sediment deposition is not excessive, but at approximately natural levels.
B Sediment deposition is excessive, but not overwhelming the wetland.
C Sediment deposition is excessive and is overwhelming the wetland.

11. Wetland Size – wetland type/wetland complex condition metric

Check a box in each column. Involves a GIS effort with field adjustment. This metric evaluates three aspects of the wetland area: the size of the wetland type (WT), the size of the wetland complex (WC), and the size of the forested wetland (FW) (if applicable, see User Manual). See the User Manual for boundaries of these evaluation areas. If assessment area is clear-cut, select "K" for the FW column.

- | | | |
|---------------------------------------|---------------------------------------|--|
| WT | WC | FW (if applicable) |
| <input type="checkbox"/> A | <input type="checkbox"/> A | <input type="checkbox"/> A ≥ 500 acres |
| <input type="checkbox"/> B | <input type="checkbox"/> B | <input type="checkbox"/> B From 100 to < 500 acres |
| <input type="checkbox"/> C | <input type="checkbox"/> C | <input type="checkbox"/> C From 50 to < 100 acres |
| <input type="checkbox"/> D | <input type="checkbox"/> D | <input type="checkbox"/> D From 25 to < 50 acres |
| <input type="checkbox"/> E | <input type="checkbox"/> E | <input type="checkbox"/> E From 10 to < 25 acres |
| <input type="checkbox"/> F | <input type="checkbox"/> F | <input type="checkbox"/> F From 5 to < 10 acres |
| <input type="checkbox"/> G | <input type="checkbox"/> G | <input type="checkbox"/> G From 1 to < 5 acres |
| <input type="checkbox"/> H | <input type="checkbox"/> H | <input type="checkbox"/> H From 0.5 to < 1 acre |
| <input type="checkbox"/> I | <input type="checkbox"/> I | <input type="checkbox"/> I From 0.1 to < 0.5 acre |
| <input type="checkbox"/> J | <input type="checkbox"/> J | <input type="checkbox"/> J From 0.01 to < 0.1 acre |
| <input checked="" type="checkbox"/> K | <input checked="" type="checkbox"/> K | <input checked="" type="checkbox"/> K < 0.01 acre <u>or</u> assessment area is clear-cut |

12. Wetland Intactness – wetland type condition metric (evaluate for Pocosins only)

- A Pocosin is the full extent (≥ 90%) of its natural landscape size.
B Pocosin type is < 90% of the full extent of its natural landscape size.

13. Connectivity to Other Natural Areas – landscape condition metric

13a. Check appropriate box(es) (a box may be checked in each column). Involves a GIS effort with field adjustment. This metric evaluates whether the wetland is well connected (Well) and/or loosely connected (Loosely) to the landscape patch, the contiguous naturally vegetated area and open water (if appropriate). Boundaries are formed by four-lane roads, regularly maintained utility line corridors the width of a four-lane road or wider, urban landscapes, maintained fields (pasture and agriculture), or open water > 300 feet wide.

- | | |
|----------------------------|--|
| Well | Loosely |
| <input type="checkbox"/> A | <input type="checkbox"/> A ≥ 500 acres |
| <input type="checkbox"/> B | <input type="checkbox"/> B From 100 to < 500 acres |
| <input type="checkbox"/> C | <input type="checkbox"/> C From 50 to < 100 acres |
| <input type="checkbox"/> D | <input type="checkbox"/> D From 10 to < 50 acres |
| <input type="checkbox"/> E | <input type="checkbox"/> E < 10 acres |
| <input type="checkbox"/> F | <input checked="" type="checkbox"/> F Wetland type has a poor or no connection to other natural habitats |

13b. Evaluate for marshes only.

- Yes No Wetland type has a surface hydrology connection to open waters/stream or tidal wetlands.

14. Edge Effect – wetland type condition metric (skip for all marshes and Estuarine Woody Wetland)

May involve a GIS effort with field adjustment. Estimate distance from wetland type boundary to artificial edges. Artificial edges include non-forested areas ≥ 40 feet wide such as fields, development, roads, regularly maintained utility line corridors, and clear-cuts. Consider the eight main points of the compass. Artificial edge occurs within 150 feet in how many directions? If the assessment area is clear cut, select option "C."

- A 0
B 1 to 4
C 5 to 8

15. Vegetative Composition – assessment area condition metric (skip for all marshes and Pine Flat)

- A Vegetation is close to reference condition in species present and their proportions. Lower strata composed of appropriate species, with exotic plants absent or sparse within the assessment area.
B Vegetation is different from reference condition in species diversity or proportions, but still largely composed of native species characteristic of the wetland type. This may include communities of weedy native species that develop after clearcutting or clearing. It also includes communities with exotics present, but not dominant, over a large portion of the expected strata.
C Vegetation severely altered from reference in composition, or expected species are unnaturally absent (planted stands of non-characteristic species or at least one stratum inappropriately composed of a single species), or exotic species are dominant in at least one stratum.

16. Vegetative Diversity – assessment area condition metric (evaluate for Non-tidal Freshwater Marsh only)

- A Vegetation diversity is high and is composed primarily of native species (< 10% cover of exotics).
B Vegetation diversity is low or has > 10% to 50% cover of exotics.
C Vegetation is dominated by exotic species (> 50 % cover of exotics).

17. Vegetative Structure – assessment area/wetland type condition metric

17a. Is vegetation present?

- Yes No If Yes, continue to 17b. If No, skip to Metric 18.

17b. Evaluate percent coverage of assessment area vegetation for all marshes only. Skip to 17c for non-marsh wetlands.

- A ≥ 25% coverage of vegetation
B < 25% coverage of vegetation

17c. Check a box in each column for each stratum. Evaluate this portion of the metric for non-marsh wetlands. Consider structure in airspace above the assessment area (AA) and the wetland type (WT) separately.

- | | | | |
|-----------|---------------------------------------|---------------------------------------|--|
| | AA | WT | |
| Canopy | <input type="checkbox"/> A | <input type="checkbox"/> A | Canopy closed, or nearly closed, with natural gaps associated with natural processes |
| | <input type="checkbox"/> B | <input type="checkbox"/> B | Canopy present, but opened more than natural gaps |
| | <input checked="" type="checkbox"/> C | <input checked="" type="checkbox"/> C | Canopy sparse or absent |
| Mid-Story | <input type="checkbox"/> A | <input type="checkbox"/> A | Dense mid-story/sapling layer |
| | <input type="checkbox"/> B | <input type="checkbox"/> B | Moderate density mid-story/sapling layer |
| | <input checked="" type="checkbox"/> C | <input checked="" type="checkbox"/> C | Mid-story/sapling layer sparse or absent |
| Shrub | <input type="checkbox"/> A | <input type="checkbox"/> A | Dense shrub layer |
| | <input type="checkbox"/> B | <input type="checkbox"/> B | Moderate density shrub layer |
| | <input checked="" type="checkbox"/> C | <input checked="" type="checkbox"/> C | Shrub layer sparse or absent |
| Herb | <input checked="" type="checkbox"/> A | <input checked="" type="checkbox"/> A | Dense herb layer |
| | <input type="checkbox"/> B | <input type="checkbox"/> B | Moderate density herb layer |
| | <input type="checkbox"/> C | <input type="checkbox"/> C | Herb layer sparse or absent |

18. Snags – wetland type condition metric (skip for all marshes)

- A Large snags (more than one) are visible (> 12 inches DBH, or large relative to species present and landscape stability).
B Not A

19. Diameter Class Distribution – wetland type condition metric (skip for all marshes)

- A Majority of canopy trees have stems > 6 inches in diameter at breast height (DBH); many large trees (> 12 inches DBH) are present.
B Majority of canopy trees have stems between 6 and 12 inches DBH, few are > 12 inch DBH.
C Majority of canopy trees are < 6 inches DBH or no trees.

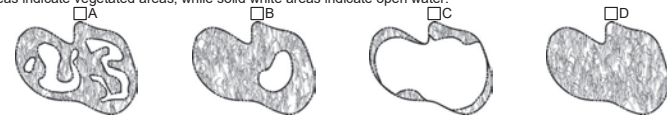
20. Large Woody Debris – wetland type condition metric (skip for all marshes)

Include both natural debris and man-placed natural debris.

- A Large logs (more than one) are visible (> 12 inches in diameter, or large relative to species present and landscape stability).
B Not A

21. Vegetation/Open Water Dispersion – wetland type/open water condition metric (evaluate for Non-Tidal Freshwater Marsh only)

Select the figure that best describes the amount of interspersed between vegetation and open water in the growing season. Patterned areas indicate vegetated areas, while solid white areas indicate open water.



22. Hydrologic Connectivity – assessment area condition metric (evaluate for riparian wetlands and Salt/Brackish Marsh only)

Examples of activities that may severely alter hydrologic connectivity include intensive ditching, fill, sedimentation, channelization, diversion, man-made berms, beaver dams, and stream incision. Documentation required if evaluated as B, C, or D.

- A Overbank and overland flow are not severely altered in the assessment area.
B Overbank flow is severely altered in the assessment area.
C Overland flow is severely altered in the assessment area.
D Both overbank and overland flow are severely altered in the assessment area.

Notes

NC WAM Wetland Rating Sheet
Accompanies User Manual Version 5.0

Wetland Site Name Wetland NN Date of Assessment 7/30/2020
 Wetland Type Bottomland Hardwood Forest Assessor Name/Organization C. Neaves
 Notes on Field Assessment Form (Y/N) NO
 Presence of regulatory considerations (Y/N) NO
 Wetland is intensively managed (Y/N) _____
 Assessment area is located within 50 feet of a natural tributary or other open water (Y/N) YES
 Assessment area is substantially altered by beaver (Y/N) _____
 Assessment area experiences overbank flooding during normal rainfall conditions (Y/N) _____
 Assessment area is on a coastal island (Y/N) _____

Sub-function Rating Summary

Function	Sub-function	Metrics	Rating
Hydrology	Surface Storage and Retention	Condition	LOW
	Sub-surface Storage and Retention	Condition	LOW
Water Quality	Pathogen Change	Condition	MEDIUM
		Condition/Opportunity	MEDIUM
	Opportunity Presence (Y/N)	NO	
	Particulate Change	Condition	LOW
		Condition/Opportunity	LOW
	Opportunity Presence (Y/N)	NO	
	Soluble Change	Condition	MEDIUM
		Condition/Opportunity	MEDIUM
	Opportunity Presence (Y/N)	NO	
	Physical Change	Condition	LOW
		Condition/Opportunity	LOW
	Opportunity Presence (Y/N)	NO	
	Pollution Change	Condition	NA
		Condition/Opportunity	NA
	Opportunity Presence (Y/N)	NA	
Habitat	Physical Structure	Condition	LOW
	Landscape Patch Structure	Condition	LOW
	Vegetation Composition	Condition	LOW

Function Rating Summary

Function	Metrics	Rating
Hydrology	Condition	LOW
Water Quality	Condition	LOW
	Condition/Opportunity	LOW
	Opportunity Presence (Y/N)	NO
Habitat	Condition	LOW

Overall Wetland Rating LOW

NC WAM FIELD ASSESSMENT FORM
Accompanies User Manual Version 5.0

USACE AID #	SAW-2020-00047	NCDWR#	20200035
Project Name	Liberty Rock Mitigation Site	Date of Evaluation	7/30/2020
Applicant/Owner Name	Wildlands Engineering	Wetland Site Name	Wetland OO
Wetland Type	Bottomland Hardwood Forest	Assessor Name/Organization	C. Neaves
Level III Ecoregion	Piedmont	Nearest Named Water Body	Rocky River
River Basin	Cape Fear	USGS 8-Digit Catalogue Unit	03030003
County	Randolph	NCDWR Region	Winston-Salem
<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	Precipitation within 48 hrs?	Latitude/Longitude (deci-degrees)	35.820243, -79.564033

Evidence of stressors affecting the assessment area (may not be within the assessment area)
 Please circle and/or make note on the last page if evidence of stressors is apparent. Consider departure from reference, if appropriate, in recent past (for instance, within 10 years). Noteworthy stressors include, but are not limited to the following.

- Hydrological modifications (examples: ditches, dams, beaver dams, dikes, berms, ponds, etc.)
- Surface and sub-surface discharges into the wetland (examples: discharges containing obvious pollutants, presence of nearby septic tanks, underground storage tanks (USTs), hog lagoons, etc.)
- Signs of vegetation stress (examples: vegetation mortality, insect damage, storm damage, salt intrusion, etc.)
- Habitat/plant community alteration (examples: mowing, clear-cutting, exotics, etc.)

Is the assessment area intensively managed? Yes No

Regulatory Considerations - Were regulatory considerations evaluated? Yes No If Yes, check all that apply to the assessment area.

- Anadromous fish
- Federally protected species or State endangered or threatened species
- NCDWR riparian buffer rule in effect
- Abuts a Primary Nursery Area (PNA)
- Publicly owned property
- N.C. Division of Coastal Management Area of Environmental Concern (AEC) (including buffer)
- Abuts a stream with a NCDWQ classification of SA or supplemental classifications of HQW, ORW, or Trout
- Designated NCNHP reference community
- Abuts a 303(d)-listed stream or a tributary to a 303(d)-listed stream

What type of natural stream is associated with the wetland, if any? (check all that apply)

- Blackwater
- Brownwater
- Tidal (if tidal, check one of the following boxes) Lunar Wind Both

Is the assessment area on a coastal island? Yes No

Is the assessment area's surface water storage capacity or duration substantially altered by beaver? Yes No

Does the assessment area experience overbank flooding during normal rainfall conditions? Yes No

- Ground Surface Condition/Vegetation Condition – assessment area condition metric**
Check a box in each column. Consider alteration to the ground surface (GS) in the assessment area and vegetation structure (VS) in the assessment area. Compare to reference wetland if applicable (see User Manual). If a reference is not applicable, then rate the assessment area based on evidence an effect.

GS	VS	
<input checked="" type="checkbox"/> A	<input type="checkbox"/> A	Not severely altered
<input type="checkbox"/> B	<input checked="" type="checkbox"/> B	Severely altered over a majority of the assessment area (ground surface alteration examples: vehicle tracks, excessive sedimentation, fire-plow lanes, skidder tracks, bedding, fill, soil compaction, obvious pollutants) (vegetation structure alteration examples: mechanical disturbance, herbicides, salt intrusion [where appropriate], exotic species, grazing, less diversity [if appropriate], hydrologic alteration)
- Surface and Sub-Surface Storage Capacity and Duration – assessment area condition metric**
Check a box in each column. Consider surface storage capacity and duration (Surf) and sub-surface storage capacity and duration (Sub). Consider both increase and decrease in hydrology. A ditch ≤ 1 foot deep is considered to affect surface water only, while a ditch > 1 foot deep is expected to affect both surface and sub-surface water. Consider tidal flooding regime, if applicable.

Surf	Sub	
<input type="checkbox"/> A	<input type="checkbox"/> A	Water storage capacity and duration are not altered.
<input checked="" type="checkbox"/> B	<input checked="" type="checkbox"/> B	Water storage capacity or duration are altered, but not substantially (typically, not sufficient to change vegetation).
<input type="checkbox"/> C	<input type="checkbox"/> C	Water storage capacity or duration are substantially altered (typically, alteration sufficient to result in vegetation change) (examples: draining, flooding, soil compaction, filling, excessive sedimentation, underground utility lines).
- Water Storage/Surface Relief – assessment area/wetland type condition metric (skip for all marshes)**
Check a box in each column. Select the appropriate storage for the assessment area (AA) and the wetland type (WT).

AA	WT	
3a. <input type="checkbox"/> A	<input type="checkbox"/> A	Majority of wetland with depressions able to pond water > 1 foot deep
<input type="checkbox"/> B	<input type="checkbox"/> B	Majority of wetland with depressions able to pond water 6 inches to 1 foot deep
<input type="checkbox"/> C	<input type="checkbox"/> C	Majority of wetland with depressions able to pond water 3 to 6 inches deep
<input checked="" type="checkbox"/> D	<input checked="" type="checkbox"/> D	Depressions able to pond water < 3 inches deep
3b. <input type="checkbox"/> A	<input type="checkbox"/> A	Evidence that maximum depth of inundation is greater than 2 feet
<input type="checkbox"/> B	<input type="checkbox"/> B	Evidence that maximum depth of inundation is between 1 and 2 feet
<input checked="" type="checkbox"/> C	<input checked="" type="checkbox"/> C	Evidence that maximum depth of inundation is less than 1 foot

4. Soil Texture/Structure – assessment area condition metric (skip for all marshes)

Check a box from each of the three soil property groups below. Dig soil profile in the dominant assessment area landscape feature. Make soil observations within the top 12 inches. Use most recent National Technical Committee for Hydric Soils guidance for regional indicators.

- 4a. A Sandy soil
 B Loamy or clayey soils exhibiting redoximorphic features (concentrations, depletions, or rhizospheres)
 C Loamy or clayey soils not exhibiting redoximorphic features
 D Loamy or clayey gleyed soil
 E Histosol or histc epipedon
- 4b. A Soil ribbon < 1 inch
 B Soil ribbon ≥ 1 inch
- 4c. A No peat or muck presence
 B A peat or muck presence

5. Discharge into Wetland – opportunity metric

Check a box in each column. Consider surface pollutants or discharges (Surf) and sub-surface pollutants or discharges (Sub). Examples of sub-surface discharges include presence of nearby septic tank, underground storage tank (UST), etc.

- | | | |
|---------------------------------------|---------------------------------------|---|
| Surf | Sub | |
| <input type="checkbox"/> A | <input checked="" type="checkbox"/> A | Little or no evidence of pollutants or discharges entering the assessment area |
| <input checked="" type="checkbox"/> B | <input type="checkbox"/> B | Noticeable evidence of pollutants or discharges entering the wetland and stressing, but not overwhelming the treatment capacity of the assessment area |
| <input type="checkbox"/> C | <input type="checkbox"/> C | Noticeable evidence of pollutants or discharges (pathogen, particulate, or soluble) entering the assessment area and potentially overwhelming the treatment capacity of the wetland (water discoloration, dead vegetation, excessive sedimentation, odor) |

6. Land Use – opportunity metric (skip for non-riparian wetlands)

Check all that apply (at least one box in each column). Evaluation involves a GIS effort with field adjustment. Consider sources draining to assessment area within entire upstream watershed (WS), within 5 miles and within the watershed draining to the assessment area (5M), and within 2 miles and within the watershed draining to the assessment area (2M).

- | | | | |
|---------------------------------------|---------------------------------------|---------------------------------------|---|
| WS | 5M | 2M | |
| <input type="checkbox"/> A | <input type="checkbox"/> A | <input type="checkbox"/> A | ≥ 10% impervious surfaces |
| <input type="checkbox"/> B | <input type="checkbox"/> B | <input type="checkbox"/> B | Confined animal operations (or other local, concentrated source of pollutants) |
| <input checked="" type="checkbox"/> C | <input checked="" type="checkbox"/> C | <input checked="" type="checkbox"/> C | ≥ 20% coverage of pasture |
| <input type="checkbox"/> D | <input type="checkbox"/> D | <input type="checkbox"/> D | ≥ 20% coverage of agricultural land (regularly plowed land) |
| <input checked="" type="checkbox"/> E | <input checked="" type="checkbox"/> E | <input checked="" type="checkbox"/> E | ≥ 20% coverage of maintained grass/herb |
| <input type="checkbox"/> F | <input type="checkbox"/> F | <input type="checkbox"/> F | ≥ 20% coverage of clear-cut land |
| <input type="checkbox"/> G | <input type="checkbox"/> G | <input type="checkbox"/> G | Little or no opportunity to improve water quality. Lack of opportunity may result from little or no disturbance in the watershed or hydrologic alterations that prevent drainage and/or overbank flow from affecting the assessment area. |

7. Wetland Acting as Vegetated Buffer – assessment area/wetland complex condition metric (skip for non-riparian wetlands)

- 7a. Is assessment area within 50 feet of a tributary or other open water?
 Yes No If Yes, continue to 7b. If No, skip to Metric 8.
 Wetland buffer need only be present on one side of the water body. Make buffer judgment based on the average width of wetland. Record a note if a portion of the buffer has been removed or disturbed.
- 7b. How much of the first 50 feet from the bank is wetland? (Wetland buffer need only be present on one side of the water body. Make buffer judgment based on the average width of wetland. Record a note if a portion of the buffer has been removed or disturbed.)
 A ≥ 50 feet
 B From 30 to < 50 feet
 C From 15 to < 30 feet
 D From 5 to < 15 feet
 E < 5 feet or buffer bypassed by ditches
- 7c. Tributary width. If the tributary is anastomosed, combine widths of channels/braids for a total width.
 ≤ 15-foot wide > 15-foot wide Other open water (no tributary present)
- 7d. Do roots of assessment area vegetation extend into the bank of the tributary/open water?
 Yes No
- 7e. Is stream or other open water sheltered or exposed?
 Sheltered – adjacent open water with width < 2500 feet and no regular boat traffic.
 Exposed – adjacent open water with width ≥ 2500 feet or regular boat traffic.

8. Wetland Width at the Assessment Area – wetland type/wetland complex condition metric (evaluate WT for all marshes and Estuarine Woody Wetland only; evaluate WC for Bottomland Hardwood Forest, Headwater Forest, and Riverine Swamp Forest only)

Check a box in each column for riverine wetlands only. Select the average width for the wetland type at the assessment area (WT) and the wetland complex at the assessment area (WC). See User Manual for WT and WC boundaries.

- | | | |
|---------------------------------------|---------------------------------------|-----------------------|
| WT | WC | |
| <input type="checkbox"/> A | <input type="checkbox"/> A | ≥ 100 feet |
| <input type="checkbox"/> B | <input type="checkbox"/> B | From 80 to < 100 feet |
| <input type="checkbox"/> C | <input type="checkbox"/> C | From 50 to < 80 feet |
| <input type="checkbox"/> D | <input type="checkbox"/> D | From 40 to < 50 feet |
| <input type="checkbox"/> E | <input type="checkbox"/> E | From 30 to < 40 feet |
| <input type="checkbox"/> F | <input type="checkbox"/> F | From 15 to < 30 feet |
| <input checked="" type="checkbox"/> G | <input checked="" type="checkbox"/> G | From 5 to < 15 feet |
| <input type="checkbox"/> H | <input type="checkbox"/> H | < 5 feet |

9. Inundation Duration – assessment area condition metric (skip for non-riparian wetlands)

Answer for assessment area dominant landform.

- A Evidence of short-duration inundation (< 7 consecutive days)
 B Evidence of saturation, without evidence of inundation
 C Evidence of long-duration inundation or very long-duration inundation (7 to 30 consecutive days or more)

10. Indicators of Deposition – assessment area condition metric (skip for non-riparian wetlands and all marshes)

Consider recent deposition only (no plant growth since deposition).

- A Sediment deposition is not excessive, but at approximately natural levels.
 B Sediment deposition is excessive, but not overwhelming the wetland.
 C Sediment deposition is excessive and is overwhelming the wetland.

11. Wetland Size – wetland type/wetland complex condition metric

Check a box in each column. Involves a GIS effort with field adjustment. This metric evaluates three aspects of the wetland area: the size of the wetland type (WT), the size of the wetland complex (WC), and the size of the forested wetland (FW) (if applicable, see User Manual). See the User Manual for boundaries of these evaluation areas. If assessment area is clear-cut, select "K" for the FW column.

- | | | |
|---------------------------------------|---------------------------------------|---|
| WT | WC | FW (if applicable) |
| <input type="checkbox"/> A | <input type="checkbox"/> A | <input type="checkbox"/> A ≥ 500 acres |
| <input type="checkbox"/> B | <input type="checkbox"/> B | <input type="checkbox"/> B From 100 to < 500 acres |
| <input type="checkbox"/> C | <input type="checkbox"/> C | <input type="checkbox"/> C From 50 to < 100 acres |
| <input type="checkbox"/> D | <input type="checkbox"/> D | <input type="checkbox"/> D From 25 to < 50 acres |
| <input type="checkbox"/> E | <input type="checkbox"/> E | <input type="checkbox"/> E From 10 to < 25 acres |
| <input type="checkbox"/> F | <input type="checkbox"/> F | <input type="checkbox"/> F From 5 to < 10 acres |
| <input type="checkbox"/> G | <input type="checkbox"/> G | <input type="checkbox"/> G From 1 to < 5 acres |
| <input type="checkbox"/> H | <input type="checkbox"/> H | <input type="checkbox"/> H From 0.5 to < 1 acre |
| <input type="checkbox"/> I | <input type="checkbox"/> I | <input type="checkbox"/> I From 0.1 to < 0.5 acre |
| <input type="checkbox"/> J | <input type="checkbox"/> J | <input type="checkbox"/> J From 0.01 to < 0.1 acre |
| <input checked="" type="checkbox"/> K | <input checked="" type="checkbox"/> K | <input checked="" type="checkbox"/> K < 0.01 acre or assessment area is clear-cut |

12. Wetland Intactness – wetland type condition metric (evaluate for Pocosins only)

- A Pocosin is the full extent (≥ 90%) of its natural landscape size.
 B Pocosin type is < 90% of the full extent of its natural landscape size.

13. Connectivity to Other Natural Areas – landscape condition metric

13a. Check appropriate box(es) (a box may be checked in each column). Involves a GIS effort with field adjustment. This metric evaluates whether the wetland is well connected (Well) and/or loosely connected (Loosely) to the landscape patch, the contiguous naturally vegetated area and open water (if appropriate). Boundaries are formed by four-lane roads, regularly maintained utility line corridors the width of a four-lane road or wider, urban landscapes, maintained fields (pasture and agriculture), or open water > 300 feet wide.

- | | | |
|----------------------------|---------------------------------------|--|
| Well | Loosely | |
| <input type="checkbox"/> A | <input type="checkbox"/> A | ≥ 500 acres |
| <input type="checkbox"/> B | <input type="checkbox"/> B | From 100 to < 500 acres |
| <input type="checkbox"/> C | <input type="checkbox"/> C | From 50 to < 100 acres |
| <input type="checkbox"/> D | <input type="checkbox"/> D | From 10 to < 50 acres |
| <input type="checkbox"/> E | <input type="checkbox"/> E | < 10 acres |
| <input type="checkbox"/> F | <input checked="" type="checkbox"/> F | Wetland type has a poor or no connection to other natural habitats |

13b. Evaluate for marshes only.

- Yes No Wetland type has a surface hydrology connection to open waters/stream or tidal wetlands.

14. Edge Effect – wetland type condition metric (skip for all marshes and Estuarine Woody Wetland)

May involve a GIS effort with field adjustment. Estimate distance from wetland type boundary to artificial edges. Artificial edges include non-forested areas ≥ 40 feet wide such as fields, development, roads, regularly maintained utility line corridors, and clear-cuts. Consider the eight main points of the compass. Artificial edge occurs within 150 feet in how many directions? If the assessment area is clear cut, select option "C."

- A 0
 B 1 to 4
 C 5 to 8

15. Vegetative Composition – assessment area condition metric (skip for all marshes and Pine Flat)

- A Vegetation is close to reference condition in species present and their proportions. Lower strata composed of appropriate species, with exotic plants absent or sparse within the assessment area.
 B Vegetation is different from reference condition in species diversity or proportions, but still largely composed of native species characteristic of the wetland type. This may include communities of weedy native species that develop after clearcutting or clearing. It also includes communities with exotics present, but not dominant, over a large portion of the expected strata.
 C Vegetation severely altered from reference in composition, or expected species are unnaturally absent (planted stands of non-characteristic species or at least one stratum inappropriately composed of a single species), or exotic species are dominant in at least one stratum.

16. Vegetative Diversity – assessment area condition metric (evaluate for Non-tidal Freshwater Marsh only)

- A Vegetation diversity is high and is composed primarily of native species (< 10% cover of exotics).
 B Vegetation diversity is low or has > 10% to 50% cover of exotics.
 C Vegetation is dominated by exotic species (> 50 % cover of exotics).

17. Vegetative Structure – assessment area/wetland type condition metric

17a. Is vegetation present?

Yes No If Yes, continue to 17b. If No, skip to Metric 18.

17b. Evaluate percent coverage of assessment area vegetation for all marshes only. Skip to 17c for non-marsh wetlands.

A ≥ 25% coverage of vegetation
 B < 25% coverage of vegetation

17c. Check a box in each column for each stratum. Evaluate this portion of the metric for non-marsh wetlands. Consider structure in airspace above the assessment area (AA) and the wetland type (WT) separately.

	AA	WT	
Canopy	<input type="checkbox"/> A	<input type="checkbox"/> A	Canopy closed, or nearly closed, with natural gaps associated with natural processes
	<input type="checkbox"/> B	<input type="checkbox"/> B	Canopy present, but opened more than natural gaps
	<input checked="" type="checkbox"/> C	<input checked="" type="checkbox"/> C	Canopy sparse or absent
Mid-Story	<input type="checkbox"/> A	<input type="checkbox"/> A	Dense mid-story/sapling layer
	<input type="checkbox"/> B	<input type="checkbox"/> B	Moderate density mid-story/sapling layer
	<input checked="" type="checkbox"/> C	<input checked="" type="checkbox"/> C	Mid-story/sapling layer sparse or absent
Shrub	<input type="checkbox"/> A	<input type="checkbox"/> A	Dense shrub layer
	<input type="checkbox"/> B	<input type="checkbox"/> B	Moderate density shrub layer
	<input checked="" type="checkbox"/> C	<input checked="" type="checkbox"/> C	Shrub layer sparse or absent
Herb	<input checked="" type="checkbox"/> A	<input checked="" type="checkbox"/> A	Dense herb layer
	<input type="checkbox"/> B	<input type="checkbox"/> B	Moderate density herb layer
	<input type="checkbox"/> C	<input type="checkbox"/> C	Herb layer sparse or absent

18. Snags – wetland type condition metric (skip for all marshes)

A Large snags (more than one) are visible (> 12 inches DBH, or large relative to species present and landscape stability).
 B Not A

19. Diameter Class Distribution – wetland type condition metric (skip for all marshes)

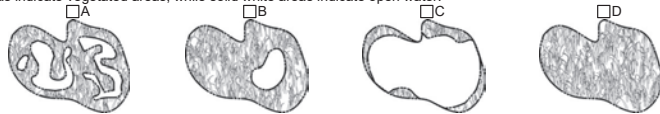
A Majority of canopy trees have stems > 6 inches in diameter at breast height (DBH); many large trees (> 12 inches DBH) are present.
 B Majority of canopy trees have stems between 6 and 12 inches DBH, few are > 12 inch DBH.
 C Majority of canopy trees are < 6 inches DBH or no trees.

20. Large Woody Debris – wetland type condition metric (skip for all marshes)

Include both natural debris and man-placed natural debris.
 A Large logs (more than one) are visible (> 12 inches in diameter, or large relative to species present and landscape stability).
 B Not A

21. Vegetation/Open Water Dispersion – wetland type/open water condition metric (evaluate for Non-Tidal Freshwater Marsh only)

Select the figure that best describes the amount of interspersed vegetation and open water in the growing season. Patterned areas indicate vegetated areas, while solid white areas indicate open water.



22. Hydrologic Connectivity – assessment area condition metric (evaluate for riparian wetlands and Salt/Brackish Marsh only)

Examples of activities that may severely alter hydrologic connectivity include intensive ditching, fill, sedimentation, channelization, diversion, man-made berms, beaver dams, and stream incision. Documentation required if evaluated as B, C, or D.

A Overbank and overland flow are not severely altered in the assessment area.
 B Overbank flow is severely altered in the assessment area.
 C Overland flow is severely altered in the assessment area.
 D Both overbank and overland flow are severely altered in the assessment area.

Notes

NC WAM Wetland Rating Sheet
 Accompanies User Manual Version 5.0

Wetland Site Name Wetland OO Date of Assessment 7/30/2020
 Wetland Type Bottomland Hardwood Forest Assessor Name/Organization C. Neaves

Notes on Field Assessment Form (Y/N) NO
 Presence of regulatory considerations (Y/N) NO
 Wetland is intensively managed (Y/N) _____
 Assessment area is located within 50 feet of a natural tributary or other open water (Y/N) YES
 Assessment area is substantially altered by beaver (Y/N) _____
 Assessment area experiences overbank flooding during normal rainfall conditions (Y/N) _____
 Assessment area is on a coastal island (Y/N) _____

Sub-function Rating Summary

Function	Sub-function	Metrics	Rating
Hydrology	Surface Storage and Retention	Condition	LOW
		Sub-surface Storage and Retention	LOW
Water Quality	Pathogen Change	Condition	MEDIUM
		Condition/Opportunity	MEDIUM
	Particulate Change	Opportunity Presence (Y/N)	NO
		Condition	LOW
Soluble Change	Condition	Condition/Opportunity	LOW
		Opportunity Presence (Y/N)	NO
	Physical Change	Condition	MEDIUM
		Condition/Opportunity	MEDIUM
Pollution Change	Condition	Opportunity Presence (Y/N)	NO
		Condition/Opportunity	LOW
	Opportunity Presence (Y/N)	Condition	NO
		Condition/Opportunity	NA
Habitat	Physical Structure	Opportunity Presence (Y/N)	NA
		Condition	LOW
		Condition/Opportunity	LOW
Vegetation Composition	Condition	Condition	LOW

Function Rating Summary

Function	Metrics	Rating
Hydrology	Condition	LOW
	Condition/Opportunity	LOW
	Opportunity Presence (Y/N)	NO
Water Quality	Condition	LOW
	Condition/Opportunity	LOW
Habitat	Opportunity Presence (Y/N)	NO
	Condition	LOW

Overall Wetland Rating LOW

NC WAM FIELD ASSESSMENT FORM
Accompanies User Manual Version 5.0

USACE AID #	SAW-2020-00047	NCDWR#	20200035
Project Name	Liberty Rock Mitigation Site	Date of Evaluation	7/30/2020
Applicant/Owner Name	Widlands Engineering	Wetland Site Name	Wetland PP
Wetland Type	Bottomland Hardwood Forest	Assessor Name/Organization	C. Neaves
Level III Ecoregion	Piedmont	Nearest Named Water Body	Rocky River
River Basin	Cape Fear	USGS 8-Digit Catalogue Unit	03030003
County	Randolph	NCDWR Region	Winston-Salem
<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	Precipitation within 48 hrs?	Latitude/Longitude (deci-degrees)	35.820326, -79.563979

Evidence of stressors affecting the assessment area (may not be within the assessment area)

Please circle and/or make note on the last page if evidence of stressors is apparent. Consider departure from reference, if appropriate, in recent past (for instance, within 10 years). Noteworthy stressors include, but are not limited to the following.

- Hydrological modifications (examples: ditches, dams, beaver dams, dikes, berms, ponds, etc.)
- Surface and sub-surface discharges into the wetland (examples: discharges containing obvious pollutants, presence of nearby septic tanks, underground storage tanks (USTs), hog lagoons, etc.)
- Signs of vegetation stress (examples: vegetation mortality, insect damage, disease, storm damage, salt intrusion, etc.)
- Habitat/plant community alteration (examples: mowing, clear-cutting, exotics, etc.)

Is the assessment area intensively managed? Yes No

Regulatory Considerations - Were regulatory considerations evaluated? Yes No If Yes, check all that apply to the assessment area.

- Anadromous fish
- Federally protected species or State endangered or threatened species
- NCDWR riparian buffer rule in effect
- Abuts a Primary Nursery Area (PNA)
- Publicly owned property
- N.C. Division of Coastal Management Area of Environmental Concern (AEC) (including buffer)
- Abuts a stream with a NCDWQ classification of SA or supplemental classifications of HQW, ORW, or Trout
- Designated NCNHP reference community
- Abuts a 303(d)-listed stream or a tributary to a 303(d)-listed stream

What type of natural stream is associated with the wetland, if any? (check all that apply)

- Blackwater
- Brownwater
- Tidal (if tidal, check one of the following boxes) Lunar Wind Both

Is the assessment area on a coastal island? Yes No

Is the assessment area's surface water storage capacity or duration substantially altered by beaver? Yes No

Does the assessment area experience overbank flooding during normal rainfall conditions? Yes No

1. Ground Surface Condition/Vegetation Condition – assessment area condition metric

Check a box in each column. Consider alteration to the ground surface (GS) in the assessment area and vegetation structure (VS) in the assessment area. Compare to reference wetland if applicable (see User Manual). If a reference is not applicable, then rate the assessment area based on evidence an effect.

- | | | |
|---------------------------------------|---------------------------------------|--|
| GS | VS | |
| <input checked="" type="checkbox"/> A | <input type="checkbox"/> A | Not severely altered |
| <input type="checkbox"/> B | <input checked="" type="checkbox"/> B | Severely altered over a majority of the assessment area (ground surface alteration examples: vehicle tracks, excessive sedimentation, fire-plow lanes, skidder tracks, bedding, fill, soil compaction, obvious pollutants) (vegetation structure alteration examples: mechanical disturbance, herbicides, salt intrusion [where appropriate], exotic species, grazing, less diversity [if appropriate], hydrologic alteration) |

2. Surface and Sub-Surface Storage Capacity and Duration – assessment area condition metric

Check a box in each column. Consider surface storage capacity and duration (Surf) and sub-surface storage capacity and duration (Sub). Consider both increase and decrease in hydrology. A ditch ≤ 1 foot deep is considered to affect surface water only, while a ditch > 1 foot deep is expected to affect both surface and sub-surface water. Consider tidal flooding regime, if applicable.

- | | | |
|---------------------------------------|---------------------------------------|--|
| Surf | Sub | |
| <input type="checkbox"/> A | <input type="checkbox"/> A | Water storage capacity and duration are not altered. |
| <input checked="" type="checkbox"/> B | <input checked="" type="checkbox"/> B | Water storage capacity or duration are altered, but not substantially (typically, not sufficient to change vegetation). |
| <input type="checkbox"/> C | <input type="checkbox"/> C | Water storage capacity or duration are substantially altered (typically, alteration sufficient to result in vegetation change) (examples: draining, flooding, soil compaction, filling, excessive sedimentation, underground utility lines). |

3. Water Storage/Surface Relief – assessment area/wetland type condition metric (skip for all marshes)

Check a box in each column. Select the appropriate storage for the assessment area (AA) and the wetland type (WT).

- | | | |
|---|----|---|
| AA | WT | |
| 3a. <input type="checkbox"/> A <input type="checkbox"/> A | | Majority of wetland with depressions able to pond water > 1 deep |
| <input type="checkbox"/> B <input type="checkbox"/> B | | Majority of wetland with depressions able to pond water 6 inches to 1 foot deep |
| <input type="checkbox"/> C <input type="checkbox"/> C | | Majority of wetland with depressions able to pond water 3 to 6 inches deep |
| <input checked="" type="checkbox"/> D <input checked="" type="checkbox"/> D | | Depressions able to pond water < 3 inches deep |
| 3b. <input type="checkbox"/> A | | Evidence that maximum depth of inundation is greater than 2 feet |
| <input type="checkbox"/> B | | Evidence that maximum depth of inundation is between 1 and 2 feet |
| <input checked="" type="checkbox"/> C | | Evidence that maximum depth of inundation is less than 1 foot |

4. Soil Texture/Structure – assessment area condition metric (skip for all marshes)

Check a box from each of the three soil property groups below. Dig soil profile in the dominant assessment area landscape feature. Make soil observations within the top 12 inches. Use most recent National Technical Committee for Hydric Soils guidance for regional indicators.

- 4a. A Sandy soil
- B Loamy or clayey soils exhibiting redoximorphic features (concentrations, depletions, or rhizospheres)
- C Loamy or clayey soils not exhibiting redoximorphic features
- D Loamy or clayey gleyed soil
- E Histosol or histc epipedon
- 4b. A Soil ribbon < 1 inch
- B Soil ribbon ≥ 1 inch
- 4c. A No peat or muck presence
- B A peat or muck presence

5. Discharge into Wetland – opportunity metric

Check a box in each column. Consider surface pollutants or discharges (Surf) and sub-surface pollutants or discharges (Sub). Examples of sub-surface discharges include presence of nearby septic tank, underground storage tank (UST), etc.

- | | | |
|---------------------------------------|---------------------------------------|---|
| Surf | Sub | |
| <input type="checkbox"/> A | <input checked="" type="checkbox"/> A | Little or no evidence of pollutants or discharges entering the assessment area |
| <input checked="" type="checkbox"/> B | <input type="checkbox"/> B | Noticeable evidence of pollutants or discharges entering the wetland and stressing, but not overwhelming the treatment capacity of the assessment area |
| <input type="checkbox"/> C | <input type="checkbox"/> C | Noticeable evidence of pollutants or discharges (pathogen, particulate, or soluble) entering the assessment area and potentially overwhelming the treatment capacity of the wetland (water discoloration, dead vegetation, excessive sedimentation, odor) |

6. Land Use – opportunity metric (skip for non-riparian wetlands)

Check all that apply (at least one box in each column). Evaluation involves a GIS effort with field adjustment. Consider sources draining to assessment area within entire upstream watershed (WS), within 5 miles and within the watershed draining to the assessment area (5M), and within 2 miles and within the watershed draining to the assessment area (2M).

- | | | | |
|---------------------------------------|---------------------------------------|---------------------------------------|---|
| WS | 5M | 2M | |
| <input type="checkbox"/> A | <input type="checkbox"/> A | <input type="checkbox"/> A | ≥ 10% impervious surfaces |
| <input type="checkbox"/> B | <input type="checkbox"/> B | <input type="checkbox"/> B | Confined animal operations (or other local, concentrated source of pollutants) |
| <input checked="" type="checkbox"/> C | <input checked="" type="checkbox"/> C | <input checked="" type="checkbox"/> C | ≥ 20% coverage of pasture |
| <input type="checkbox"/> D | <input type="checkbox"/> D | <input type="checkbox"/> D | ≥ 20% coverage of agricultural land (regularly plowed land) |
| <input checked="" type="checkbox"/> E | <input checked="" type="checkbox"/> E | <input checked="" type="checkbox"/> E | ≥ 20% coverage of maintained grass/herb |
| <input type="checkbox"/> F | <input type="checkbox"/> F | <input type="checkbox"/> F | ≥ 20% coverage of clear-cut land |
| <input type="checkbox"/> G | <input type="checkbox"/> G | <input type="checkbox"/> G | Little or no opportunity to improve water quality. Lack of opportunity may result from little or no disturbance in the watershed or hydrologic alterations that prevent drainage and/or overbank flow from affecting the assessment area. |

7. Wetland Acting as Vegetated Buffer – assessment area/wetland complex condition metric (skip for non-riparian wetlands)

- 7a. Is assessment area within 50 feet of a tributary or other open water?
- Yes No If Yes, continue to 7b. If No, skip to Metric 8.
- Wetland buffer need only be present on one side of the water body. Make buffer judgment based on the average width of wetland. Record a note if a portion of the buffer has been removed or disturbed.
- 7b. How much of the first 50 feet from the bank is wetland? (Wetland buffer need only be present on one side of the water body. Make buffer judgment based on the average width of wetland. Record a note if a portion of the buffer has been removed or disturbed.)
- A ≥ 50 feet
- B From 30 to < 50 feet
- C From 15 to < 30 feet
- D From 5 to < 15 feet
- E < 5 feet or buffer bypassed by ditches
- 7c. Tributary width. If the tributary is anastomosed, combine widths of channels/braids for a total width.
- ≤ 15-foot wide > 15-foot wide Other open water (no tributary present)
- 7d. Do roots of assessment area vegetation extend into the bank of the tributary/open water?
- Yes No
- 7e. Is stream or other open water sheltered or exposed?
- Sheltered – adjacent open water with width < 2500 feet and no regular boat traffic.
- Exposed – adjacent open water with width ≥ 2500 feet or regular boat traffic.

8. Wetland Width at the Assessment Area – wetland type/wetland complex condition metric (evaluate WT for all marshes and Estuarine Woody Wetland only; evaluate WC for Bottomland Hardwood Forest, Headwater Forest, and Riverine Swamp Forest only)

Check a box in each column for riverine wetlands only. Select the average width for the wetland type at the assessment area (WT) and the wetland complex at the assessment area (WC). See User Manual for WT and WC boundaries.

- | | | |
|---------------------------------------|---------------------------------------|-----------------------|
| WT | WC | |
| <input type="checkbox"/> A | <input type="checkbox"/> A | ≥ 100 feet |
| <input type="checkbox"/> B | <input type="checkbox"/> B | From 80 to < 100 feet |
| <input type="checkbox"/> C | <input type="checkbox"/> C | From 50 to < 80 feet |
| <input type="checkbox"/> D | <input type="checkbox"/> D | From 40 to < 50 feet |
| <input type="checkbox"/> E | <input type="checkbox"/> E | From 30 to < 40 feet |
| <input type="checkbox"/> F | <input type="checkbox"/> F | From 15 to < 30 feet |
| <input checked="" type="checkbox"/> G | <input checked="" type="checkbox"/> G | From 5 to < 15 feet |
| <input type="checkbox"/> H | <input type="checkbox"/> H | < 5 feet |

9. Inundation Duration – assessment area condition metric (skip for non-riparian wetlands)

- Answer for assessment area dominant landform.
[X]A Evidence of short-duration inundation (< 7 consecutive days)
[B] Evidence of saturation, without evidence of inundation
[C] Evidence of long-duration inundation or very long-duration inundation (7 to 30 consecutive days or more)

10. Indicators of Deposition – assessment area condition metric (skip for non-riparian wetlands and all marshes)

- Consider recent deposition only (no plant growth since deposition).
[X]A Sediment deposition is not excessive, but at approximately natural levels.
[B] Sediment deposition is excessive, but not overwhelming the wetland.
[C] Sediment deposition is excessive and is overwhelming the wetland.

11. Wetland Size – wetland type/wetland complex condition metric

Check a box in each column. Involves a GIS effort with field adjustment. This metric evaluates three aspects of the wetland area: the size of the wetland type (WT), the size of the wetland complex (WC), and the size of the forested wetland (FW) (if applicable, see User Manual). See the User Manual for boundaries of these evaluation areas. If assessment area is clear-cut, select "K" for the FW column.

- WT WC FW (if applicable)
[A] [A] [A] ≥ 500 acres
[B] [B] [B] From 100 to < 500 acres
[C] [C] [C] From 50 to < 100 acres
[D] [D] [D] From 25 to < 50 acres
[E] [E] [E] From 10 to < 25 acres
[F] [F] [F] From 5 to < 10 acres
[G] [G] [G] From 1 to < 5 acres
[H] [H] [H] From 0.5 to < 1 acre
[I] [I] [I] From 0.1 to < 0.5 acre
[J] [J] [J] From 0.01 to < 0.1 acre
[X]K [X]K [X]K < 0.01 acre or assessment area is clear-cut

12. Wetland Intactness – wetland type condition metric (evaluate for Pocosins only)

- [A] Pocosin is the full extent (≥ 90%) of its natural landscape size.
[B] Pocosin type is < 90% of the full extent of its natural landscape size.

13. Connectivity to Other Natural Areas – landscape condition metric

13a. Check appropriate box(es) (a box may be checked in each column). Involves a GIS effort with field adjustment. This metric evaluates whether the wetland is well connected (Well) and/or loosely connected (Loosely) to the landscape patch, the contiguous naturally vegetated area and open water (if appropriate). Boundaries are formed by four-lane roads, regularly maintained utility line corridors the width of a four-lane road or wider, urban landscapes, maintained fields (pasture and agriculture), or open water > 300 feet wide.

- Well Loosely
[A] [A] ≥ 500 acres
[B] [B] From 100 to < 500 acres
[C] [C] From 50 to < 100 acres
[D] [D] From 10 to < 50 acres
[E] [E] < 10 acres
[F] [X]F Wetland type has a poor or no connection to other natural habitats

13b. Evaluate for marshes only.

- []Yes []No Wetland type has a surface hydrology connection to open waters/stream or tidal wetlands.

14. Edge Effect – wetland type condition metric (skip for all marshes and Estuarine Woody Wetland)

May involve a GIS effort with field adjustment. Estimate distance from wetland type boundary to artificial edges. Artificial edges include non-forested areas ≥ 40 feet wide such as fields, development, roads, regularly maintained utility line corridors, and clear-cuts. Consider the eight main points of the compass. Artificial edge occurs within 150 feet in how many directions? If the assessment area is clear cut, select option "C."

- [A] 0
[B] 1 to 4
[X]C 5 to 8

15. Vegetative Composition – assessment area condition metric (skip for all marshes and Pine Flat)

- [A] Vegetation is close to reference condition in species present and their proportions. Lower strata composed of appropriate species, with exotic plants absent or sparse within the assessment area.
[B] Vegetation is different from reference condition in species diversity or proportions, but still largely composed of native species characteristic of the wetland type. This may include communities of weedy native species that develop after clearcutting or clearing. It also includes communities with exotics present, but not dominant, over a large portion of the expected strata.
[X]C Vegetation severely altered from reference in composition, or expected species are unnaturally absent (planted stands of non-characteristic species or at least one stratum inappropriately composed of a single species), or exotic species are dominant in at least one stratum.

16. Vegetative Diversity – assessment area condition metric (evaluate for Non-tidal Freshwater Marsh only)

- [A] Vegetation diversity is high and is composed primarily of native species (< 10% cover of exotics).
[X]B Vegetation diversity is low or has > 10% to 50% cover of exotics.
[C] Vegetation is dominated by exotic species (> 50 % cover of exotics).

17. Vegetative Structure – assessment area/wetland type condition metric

17a. Is vegetation present?
[X]Yes []No If Yes, continue to 17b. If No, skip to Metric 18.

17b. Evaluate percent coverage of assessment area vegetation for all marshes only. Skip to 17c for non-marsh wetlands.

- [A] ≥ 25% coverage of vegetation
[B] < 25% coverage of vegetation

17c. Check a box in each column for each stratum. Evaluate this portion of the metric for non-marsh wetlands. Consider structure in airspace above the assessment area (AA) and the wetland type (WT) separately.

- AA WT
Canopy [A] [A] Canopy closed, or nearly closed, with natural gaps associated with natural processes
[B] [B] Canopy present, but opened more than natural gaps
[X]C [X]C Canopy sparse or absent
Mid-Story [A] [A] Dense mid-story/sapling layer
[B] [B] Moderate density mid-story/sapling layer
[X]C [X]C Mid-story/sapling layer sparse or absent
Shrub [A] [A] Dense shrub layer
[B] [B] Moderate density shrub layer
[X]C [X]C Shrub layer sparse or absent
Herb [X]A [X]A Dense herb layer
[B] [B] Moderate density herb layer
[C] [C] Herb layer sparse or absent

18. Snags – wetland type condition metric (skip for all marshes)

- [A] Large snags (more than one) are visible (> 12 inches DBH, or large relative to species present and landscape stability).
[X]B Not A

19. Diameter Class Distribution – wetland type condition metric (skip for all marshes)

- [A] Majority of canopy trees have stems > 6 inches in diameter at breast height (DBH); many large trees (> 12 inches DBH) are present.
[B] Majority of canopy trees have stems between 6 and 12 inches DBH, few are > 12 inch DBH.
[X]C Majority of canopy trees are < 6 inches DBH or no trees.

20. Large Woody Debris – wetland type condition metric (skip for all marshes)

- Include both natural debris and man-placed natural debris.
[A] Large logs (more than one) are visible (> 12 inches in diameter, or large relative to species present and landscape stability).
[X]B Not A

21. Vegetation/Open Water Dispersion – wetland type/open water condition metric (evaluate for Non-Tidal Freshwater Marsh only)

Select the figure that best describes the amount of interspersed vegetation and open water in the growing season. Patterned areas indicate vegetated areas, while solid white areas indicate open water.



22. Hydrologic Connectivity – assessment area condition metric (evaluate for riparian wetlands and Salt/Brackish Marsh only)

Examples of activities that may severely alter hydrologic connectivity include intensive ditching, fill, sedimentation, channelization, diversion, man-made berms, beaver dams, and stream incision. Documentation required if evaluated as B, C, or D.

- [A] Overbank and overland flow are not severely altered in the assessment area.
[X]B Overbank flow is severely altered in the assessment area.
[C] Overland flow is severely altered in the assessment area.
[D] Both overbank and overland flow are severely altered in the assessment area.

Notes

**NC WAM Wetland Rating Sheet
Accompanies User Manual Version 5.0**

Wetland Site Name Wetland PP Date of Assessment 7/30/2020
 Wetland Type Bottomland Hardwood Forest Assessor Name/Organization C. Neaves

Notes on Field Assessment Form (Y/N) NO
 Presence of regulatory considerations (Y/N) NO
 Wetland is intensively managed (Y/N) _____
 Assessment area is located within 50 feet of a natural tributary or other open water (Y/N) NO
 Assessment area is substantially altered by beaver (Y/N) _____
 Assessment area experiences overbank flooding during normal rainfall conditions (Y/N) _____
 Assessment area is on a coastal island (Y/N) _____

Sub-function Rating Summary

Function	Sub-function	Metrics	Rating
Hydrology	Surface Storage and Retention	Condition	LOW
	Sub-surface Storage and Retention	Condition	LOW
Water Quality	Pathogen Change	Condition	MEDIUM
		Condition/Opportunity	MEDIUM
		Opportunity Presence (Y/N)	NO
	Particulate Change	Condition	LOW
		Condition/Opportunity	LOW
		Opportunity Presence (Y/N)	NO
	Soluble Change	Condition	MEDIUM
		Condition/Opportunity	MEDIUM
		Opportunity Presence (Y/N)	NO
	Physical Change	Condition	LOW
		Condition/Opportunity	LOW
		Opportunity Presence (Y/N)	NO
Pollution Change	Condition	NA	
	Condition/Opportunity	NA	
	Opportunity Presence (Y/N)	NA	
Habitat	Physical Structure	Condition	LOW
	Landscape Patch Structure	Condition	LOW
	Vegetation Composition	Condition	LOW

Function Rating Summary

Function	Metrics	Rating
Hydrology	Condition	LOW
Water Quality	Condition	LOW
	Condition/Opportunity	LOW
	Opportunity Presence (Y/N)	NO
Habitat	Condition	LOW

Overall Wetland Rating LOW

Appendix 4

U.S. ARMY CORPS OF ENGINEERS
WILMINGTON DISTRICT

Action Id. SAW-2020-00047 County: Randolph U.S.G.S. Quad: NC- Liberty

NOTIFICATION OF JURISDICTIONAL DETERMINATION

Requestor: Wildlands Engineering
Carlynn Walker
Address: 312 W. Millbrook Rd., suite 225
Raleigh, NC 27609
Telephone Number: 919-851-9986 ext 120
E-mail: cwalker@wildlandseng.com

Size (acres)	<u>50</u>	Nearest Town	<u>Liberty</u>
Nearest Waterway	<u>Rocky River</u>	River Basin	<u>Cape Fear</u>
USGS HUC	<u>03030003</u>	Coordinates	Latitude: <u>35.8204</u> Longitude: <u>-79.5622</u>

Location description: The project site is approximately 50 acres located adjacent to US Hwy 421, near the town of Liberty, Randolph County, North Carolina.

Indicate Which of the Following Apply:

A. Preliminary Determination

- There appear to be **waters, including wetlands** on the above described project area/property, that may be subject to Section 404 of the Clean Water Act (CWA)(33 USC § 1344) and/or Section 10 of the Rivers and Harbors Act (RHA) (33 USC § 403). The **waters, including wetlands** have been delineated, and the delineation has been verified by the Corps to be sufficiently accurate and reliable. The approximate boundaries of these waters are shown on the enclosed delineation map dated 11/16/2020. Therefore this preliminary jurisdiction determination may be used in the permit evaluation process, including determining compensatory mitigation. For purposes of computation of impacts, compensatory mitigation requirements, and other resource protection measures, a permit decision made on the basis of a preliminary JD will treat all waters and wetlands that would be affected in any way by the permitted activity on the site as if they are jurisdictional waters of the U.S. This preliminary determination is not an appealable action under the Regulatory Program Administrative Appeal Process (Reference 33 CFR Part 331). However, you may request an approved JD, which is an appealable action, by contacting the Corps district for further instruction.
- There appear to be **waters, including wetlands** on the above described project area/property, that may be subject to Section 404 of the Clean Water Act (CWA)(33 USC § 1344) and/or Section 10 of the Rivers and Harbors Act (RHA) (33 USC § 403). However, since the **waters, including wetlands** have not been properly delineated, this preliminary jurisdiction determination may not be used in the permit evaluation process. Without a verified wetland delineation, this preliminary determination is merely an effective presumption of CWA/RHA jurisdiction over all of the **waters, including wetlands** at the project area, which is not sufficiently accurate and reliable to support an enforceable permit decision. We recommend that you have the **waters, including wetlands** on your project area/property delineated. As the Corps may not be able to accomplish this wetland delineation in a timely manner, you may wish to obtain a consultant to conduct a delineation that can be verified by the Corps.

B. Approved Determination

- There are Navigable Waters of the United States within the above described project area/property subject to the permit requirements of Section 10 of the Rivers and Harbors Act (RHA) (33 USC § 403) and Section 404 of the Clean Water Act (CWA)(33 USC § 1344). Unless there is a change in law or our published regulations, this determination may be relied upon for a period not to exceed five years from the date of this notification.
- There are **waters, including wetlands** on the above described project area/property subject to the permit requirements of Section 404 of the Clean Water Act (CWA) (33 USC § 1344). Unless there is a change in the law or our published regulations, this determination may be relied upon for a period not to exceed five years from the date of this notification.
- We recommend you have the **waters, including wetlands** on your project area/property delineated. As the Corps may not be able to accomplish this wetland delineation in a timely manner, you may wish to obtain a consultant to conduct a delineation that can be verified by the Corps.
- The **waters, including wetlands** on your project area/property have been delineated and the delineation has been verified by the Corps. The approximate boundaries of these waters are shown on the enclosed delineation map dated DATE. We strongly suggest you have this delineation surveyed. Upon completion, this survey should be reviewed and verified by the Corps. Once

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verified, this survey will provide an accurate depiction of all areas subject to CWA jurisdiction on your property which, provided there is no change in the law or our published regulations, may be relied upon for a period not to exceed five years.

- The **waters, including wetlands** have been delineated and surveyed and are accurately depicted on the plat signed by the Corps Regulatory Official identified below on **DATE**. Unless there is a change in the law or our published regulations, this determination may be relied upon for a period not to exceed five years from the date of this notification.
- There are no waters of the U.S., to include wetlands, present on the above described project area/property which are subject to the permit requirements of Section 404 of the Clean Water Act (33 USC 1344). Unless there is a change in the law or our published regulations, this determination may be relied upon for a period not to exceed five years from the date of this notification.
- The property is located in one of the 20 Coastal Counties subject to regulation under the Coastal Area Management Act (CAMA). You should contact the Division of Coastal Management in **Morehead City, NC, at (252) 808-2808** to determine their requirements.

Placement of dredged or fill material within waters of the US, including wetlands, without a Department of the Army permit may constitute a violation of Section 301 of the Clean Water Act (33 USC § 1311). Placement of dredged or fill material, construction or placement of structures, or work within navigable waters of the United States without a Department of the Army permit may constitute a violation of Sections 9 and/or 10 of the Rivers and Harbors Act (33 USC § 401 and/or 403). If you have any questions regarding this determination and/or the Corps regulatory program, please contact **James Lastinger at 919-554-4884 ext 32 or James.C.Lastinger@usace.army.mil.**

C. Basis For Determination: Basis For Determination: See the preliminary jurisdictional determination form dated 11/16/2020.

D. Remarks: None.

E. Attention USDA Program Participants

This delineation/determination has been conducted to identify the limits of Corps' Clean Water Act jurisdiction for the particular site identified in this request. The delineation/determination may not be valid for the wetland conservation provisions of the Food Security Act of 1985. If you or your tenant are USDA Program participants, or anticipate participation in USDA programs, you should request a certified wetland determination from the local office of the Natural Resources Conservation Service, prior to starting work.


F. Appeals Information (This information applies only to approved jurisdictional determinations as indicated in B. above)

This correspondence constitutes an approved jurisdictional determination for the above described site. If you object to this determination, you may request an administrative appeal under Corps regulations at 33 CFR Part 331. Enclosed you will find a Notification of Appeal Process (NAP) fact sheet and request for appeal (RFA) form. If you request to appeal this determination you must submit a completed RFA form to the following address:

US Army Corps of Engineers
South Atlantic Division
Attn: Phillip Shannin, Review Officer
60 Forsyth Street SW, Room 10M15
Atlanta, Georgia 30303-8801

In order for an RFA to be accepted by the Corps, the Corps must determine that it is complete, that it meets the criteria for appeal under 33 CFR part 331.5, and that it has been received by the Division Office within 60 days of the date of the NAP. Should you decide to submit an RFA form, it must be received at the above address by **Not applicable**.

It is not necessary to submit an RFA form to the Division Office if you do not object to the determination in this correspondence.

Corps Regulatory Official: _____  _____

Date of JD: **11/16/2020** Expiration Date of JD: **Not applicable**

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The Wilmington District is committed to providing the highest level of support to the public. To help us ensure we continue to do so, please complete the Customer Satisfaction Survey located at http://corpsmapu.usace.army.mil/cm_apex/f?p=136:4:0

Copy furnished:

Property Owner:

Lyn and Jeffrey Richardson

Address:

PO Box 542

Liberty, NC 27298

Telephone Number:

336-215-8939

E-mail:

**NOTIFICATION OF ADMINISTRATIVE APPEAL OPTIONS AND PROCESS AND
REQUEST FOR APPEAL**

Applicant: Wildlands Engineering, Carlynn Walker | File Number: SAW-2020-00047 | Date: 11/16/2020

Attached is: | See Section below

<input type="checkbox"/>	INITIAL PROFFERED PERMIT (Standard Permit or Letter of permission)	A
<input type="checkbox"/>	PROFFERED PERMIT (Standard Permit or Letter of permission)	B
<input type="checkbox"/>	PERMIT DENIAL	C
<input type="checkbox"/>	APPROVED JURISDICTIONAL DETERMINATION	D
<input checked="" type="checkbox"/>	PRELIMINARY JURISDICTIONAL DETERMINATION	E

SECTION I - The following identifies your rights and options regarding an administrative appeal of the above decision. Additional information may be found at <http://www.usace.army.mil/Missions/CivilWorks/RegulatoryProgramandPermits.aspx> or the Corps regulations at 33 CFR Part 331.

A: INITIAL PROFFERED PERMIT: You may accept or object to the permit.

- **ACCEPT:** If you received a Standard Permit, you may sign the permit document and return it to the district engineer for final authorization. If you received a Letter of Permission (LOP), you may accept the LOP and your work is authorized. Your signature on the Standard Permit or acceptance of the LOP means that you accept the permit in its entirety, and waive all rights to appeal the permit, including its terms and conditions, and approved jurisdictional determinations associated with the permit.
- **OBJECT:** If you object to the permit (Standard or LOP) because of certain terms and conditions therein, you may request that the permit be modified accordingly. You must complete Section II of this form and return the form to the district engineer. Your objections must be received by the district engineer within 60 days of the date of this notice, or you will forfeit your right to appeal the permit in the future. Upon receipt of your letter, the district engineer will evaluate your objections and may: (a) modify the permit to address all of your concerns, (b) modify the permit to address some of your objections, or (c) not modify the permit having determined that the permit should be issued as previously written. After evaluating your objections, the district engineer will send you a proffered permit for your reconsideration, as indicated in Section B below.

B: PROFFERED PERMIT: You may accept or appeal the permit

- **ACCEPT:** If you received a Standard Permit, you may sign the permit document and return it to the district engineer for final authorization. If you received a Letter of Permission (LOP), you may accept the LOP and your work is authorized. Your signature on the Standard Permit or acceptance of the LOP means that you accept the permit in its entirety, and waive all rights to appeal the permit, including its terms and conditions, and approved jurisdictional determinations associated with the permit.
- **APPEAL:** If you choose to decline the proffered permit (Standard or LOP) because of certain terms and conditions therein, you may appeal the declined permit under the Corps of Engineers Administrative Appeal Process by completing Section II of this form and sending the form to the division engineer. This form must be received by the division engineer within 60 days of the date of this notice.

C: PERMIT DENIAL: You may appeal the denial of a permit under the Corps of Engineers Administrative Appeal Process by completing Section II of this form and sending the form to the division engineer. This form must be received by the division engineer within 60 days of the date of this notice.

D: APPROVED JURISDICTIONAL DETERMINATION: You may accept or appeal the approved JD or provide new information.

- **ACCEPT:** You do not need to notify the Corps to accept an approved JD. Failure to notify the Corps within 60 days of the date of this notice, means that you accept the approved JD in its entirety, and waive all rights to appeal the approved JD.
- **APPEAL:** If you disagree with the approved JD, you may appeal the approved JD under the Corps of Engineers Administrative Appeal Process by completing Section II of this form and sending the form to the district engineer. This form must be received by the division engineer within 60 days of the date of this notice.

E: PRELIMINARY JURISDICTIONAL DETERMINATION: You do not need to respond to the Corps regarding the preliminary JD. The Preliminary JD is not appealable. If you wish, you may request an approved JD (which may be appealed), by contacting the Corps district for further instruction. Also you may provide new information for further consideration by the Corps to reevaluate the JD.

SECTION II - REQUEST FOR APPEAL or OBJECTIONS TO AN INITIAL PROFFERED PERMIT

REASONS FOR APPEAL OR OBJECTIONS: (Describe your reasons for appealing the decision or your objections to an initial proffered permit in clear concise statements. You may attach additional information to this form to clarify where your reasons or objections are addressed in the administrative record.)

ADDITIONAL INFORMATION: The appeal is limited to a review of the administrative record, the Corps memorandum for the record of the appeal conference or meeting, and any supplemental information that the review officer has determined is needed to clarify the administrative record. Neither the appellant nor the Corps may add new information or analyses to the record. However, you may provide additional information to clarify the location of information that is already in the administrative record.

POINT OF CONTACT FOR QUESTIONS OR INFORMATION:

If you have questions regarding this decision and/or the appeal process you may contact:

**District Engineer, Wilmington Regulatory Division
Attn: James Lastinger
Raleigh Regulatory Office
U.S Army Corps of Engineers
3331 Heritage Trade Drive, Suite 105
Wake Forest, North Carolina 27587**

If you only have questions regarding the appeal process you may also contact:

**Mr. Phillip Shannin, Administrative Appeal Review Officer
CESAD-PDO
U.S. Army Corps of Engineers, South Atlantic Division
60 Forsyth Street, Room 10M15
Atlanta, Georgia 30303-8801
Phone: (404) 562-5137**

RIGHT OF ENTRY: Your signature below grants the right of entry to Corps of Engineers personnel, and any government consultants, to conduct investigations of the project site during the course of the appeal process. You will be provided a 15-day notice of any site investigation, and will have the opportunity to participate in all site investigations.

<hr/> Signature of appellant or agent.	Date:	Telephone number:
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For appeals on Initial Proffered Permits send this form to:

District Engineer, Wilmington Regulatory Division, Attn: James Lastinger , 69 Darlington Avenue, Wilmington, North Carolina 28403

For Permit denials, Proffered Permits and Approved Jurisdictional Determinations send this form to:

**Division Engineer, Commander, U.S. Army Engineer Division, South Atlantic, Attn: Mr. Phillip Shannin, Administrative Appeal Officer, CESAD-PDO, 60 Forsyth Street, Room 10M15, Atlanta, Georgia 30303-8801
Phone: (404) 562-5137**

PRELIMINARY JURISDICTIONAL DETERMINATION (PJD) FORM

BACKGROUND INFORMATION

- A. REPORT COMPLETION DATE FOR PJD:** 11/16/2020
- B. NAME AND ADDRESS OF PERSON REQUESTING PJD:** Wildlands Engineering, Carlynn Walker, 312 W. Millbrook Rd., suite 225, Raleigh, NC 27609
- C. DISTRICT OFFICE, FILE NAME, AND NUMBER:** Wilmington District, Liberty Rock mitigation site, SAW-2020-00047
- D. PROJECT LOCATION(S) AND BACKGROUND INFORMATION:** The project site is approximately 50 acres located adjacent to US Hwy 421, near the town of Liberty, Randolph County, North Carolina.

(USE THE TABLE BELOW TO DOCUMENT MULTIPLE AQUATIC RESOURCES AND/OR AQUATIC RESOURCES AT DIFFERENT SITES)

State: NC County: Randolph City: Liberty
 Center coordinates of site (lat/long in degree decimal format): Latitude: 35.8204 Longitude: -79.5622

Universal Transverse Mercator:

Name of nearest waterbody: Rocky River

E. REVIEW PERFORMED FOR SITE EVALUATION (CHECK ALL THAT APPLY):

Office (Desk) Determination. Date: November 16, 2020

Field Determination. Date(s):

TABLE OF AQUATIC RESOURCES IN REVIEW AREA WHICH "MAY BE" SUBJECT TO REGULATORY JURISDICTION

Site Number	Latitude (decimal degrees)	Longitude (decimal degrees)	Estimated amount of aquatic resources in review area (acreage and linear feet, if applicable)	Type of aquatic resources (i.e., wetland vs. non-wetland waters)	Geographic authority to which the aquatic resource "may be" subject (i.e., Section 404 or Section 10/404)
Rocky River	35.820264	-79.567787	2914 LF	Non-wetland	Section 404
Schist Creek	35.819899	-79.566588	285 LF	Non-wetland	Section 404
Gypsum Creek	35.819663	-79.564575	131 LF	Non-wetland	Section 404
Dolomite Creek	35.819730	-79.562743	176 LF	Non-wetland	Section 404
Mica Creek	35.821982	-79.561730	1121 LF	Non-wetland	Section 404
Wetland A	35.822445	-79.561830	0.174 acre	Wetland	Section 404
Wetland B	35.821753	-79.561723	0.002 acre	Wetland	Section 404
Wetland C	35.821473	-79.561633	0.017 acre	Wetland	Section 404
Wetland D	35.820998	-79.561274	0.019 acre	Wetland	Section 404
Wetland E	35.820884	-79.561718	0.006 acre	Wetland	Section 404
Wetland F	35.820567	-79.561757	0.017 acre	Wetland	Section 404
Wetland G	35.820442	-79.561788	0.017 acre	Wetland	Section 404
Wetland H	35.820287	-79.561288	0.011 acre	Wetland	Section 404
Wetland I	35.820467	-79.560841	0.545 acre	Wetland	Section 404
Wetland J	35.820430	-79.560053	0.114 acre	Wetland	Section 404
Wetland K	35.819998	-79.559667	0.028 acre	Wetland	Section 404
Wetland L	35.820242	-79.563800	0.006 acre	Wetland	Section 404

Wetland M	35.820270	-79.563613	0.005 acre	Wetland	Section 404
Wetland N	35.820583	-79.563803	0.004 acre	Wetland	Section 404
Wetland O	35.820686	-79.566166	0.006 acre	Wetland	Section 404
Wetland P	35.820215	-79.565051	0.002 acre	Wetland	Section 404
Wetland Q	35.820229	-79.565778	0.016 acre	Wetland	Section 404
Wetland R	35.820235	-79.565986	0.007 acre	Wetland	Section 404
Wetland S	35.820237	-79.566207	0.01 acre	Wetland	Section 404
Wetland T	35.820272	-79.566460	0.01 acre	Wetland	Section 404
Wetland U	35.820474	-79.566083	0.009 acre	Wetland	Section 404
Wetland V	35.820429	-79.566486	0.014 acre	Wetland	Section 404
Wetland W	35.820122	-79.562637	0.021 acre	Wetland	Section 404
Wetland X	35.820211	-79.563238	0.005 acre	Wetland	Section 404
Wetland Y	35.820070	-79.562969	0.005 acre	Wetland	Section 404
Wetland Z	35.820109	-79.563388	0.03 acre	Wetland	Section 404
Wetland AA	35.819507	-79.558887	0.047 acre	Wetland	Section 404
Wetland BB	35.819648	-79.559360	0.088 acre	Wetland	Section 404
Wetland CC	35.819644	-79.561045	0.067 acre	Wetland	Section 404
Wetland DD	35.819792	-79.561725	0.02 acre	Wetland	Section 404
Wetland EE	35.820552	-79.563192	0.715 acre	Wetland	Section 404
Wetland FF	35.820344	-79.563017	0.147 acre	Wetland	Section 404
Wetland GG	35.819952	-79.562644	0.021 acre	Wetland	Section 404
Wetland HH	35.820005	-79.563923	0.004 acre	Wetland	Section 404
Wetland II	35.819901	-79.564383	0.013 acre	Wetland	Section 404
Wetland JJ	35.819824	-79.564530	0.047 acre	Wetland	Section 404
Wetland KK	35.819912	-79.565586	0.047 acre	Wetland	Section 404
Wetland LL	35.820858	-79.567367	2.78 acres	Wetland	Section 404
Wetland MM	35.820415	-79.564068	0.023 acre	Wetland	Section 404
Wetland NN	35.820206	-79.564532	0.004 acre	Wetland	Section 404
Wetland OO	35.820243	-79.564033	0.01 acre	Wetland	Section 404
Wetland PP	35.820328	-79.563979	0.004 acre	Wetland	Section 404

1. The Corps of Engineers believes that there may be jurisdictional aquatic resources in the review area, and the requestor of this PJD is hereby advised of his or her option to request and obtain an approved JD (AJD) for that review area based on an informed decision after having discussed the various types of JDs and their characteristics and circumstances when they may be appropriate.
2. In any circumstance where a permit applicant obtains an individual permit, or a Nationwide General Permit (NWP) or other general permit verification requiring "pre-construction notification" (PCN), or requests verification for a non-reporting NWP or other general permit, and the permit applicant has not requested an AJD for the activity, the permit applicant is hereby made aware that: (1) the permit applicant has elected to seek a permit authorization based on a PJD, which does not make an official determination of jurisdictional aquatic resources; (2) the applicant has the option to request an AJD before accepting the terms and conditions of the permit authorization, and that basing a permit authorization on an AJD could possibly result in less compensatory mitigation being required or different special conditions; (3) the applicant has the right to request an individual permit rather than accepting the terms and conditions of the NWP or other general permit authorization; (4) the applicant can accept a permit authorization and thereby agree to comply with all the terms and conditions of that permit, including whatever mitigation requirements the Corps has determined to be necessary; (5) undertaking any activity in reliance upon the subject permit authorization without requesting an AJD constitutes the applicant's acceptance of the use of the PJD; (6) accepting a permit authorization (e.g., signing a proffered individual permit) or undertaking any activity in reliance on any form of Corps permit authorization based on a PJD constitutes agreement that all aquatic resources in the review area affected in any way by that activity will be treated as jurisdictional, and waives any challenge to such jurisdiction in any administrative or judicial compliance or enforcement action, or in any administrative appeal or in any Federal court; and (7) whether the applicant elects to use either an AJD or a PJD, the JD will be processed as soon as practicable. Further, an AJD, a proffered individual permit (and all terms and conditions contained therein), or individual permit denial can be administratively appealed pursuant to 33 C.F.R. Part 331. If, during an administrative appeal, it becomes appropriate to make an official determination whether geographic jurisdiction exists over aquatic resources in the review area, or to provide an official delineation of jurisdictional aquatic resources in the review area, the Corps will provide an AJD to accomplish that result, as soon as is practicable. This PJD finds that there "*may be*" waters of the U.S. and/or that there "*may be*" navigable waters of the U.S. on the subject review area, and identifies all aquatic features in the review area that could be affected by the proposed activity, based on the following information:

SUPPORTING DATA. Data reviewed for PJD (check all that apply) Checked items are included in the administrative record and are appropriately cited:

Maps, plans, plots or plat submitted by or on behalf of the PJD requestor:

Map: Attached dated November 16, 2020

Data sheets prepared/submitted by or on behalf of the PJD requestor. Datasheets:

Office concurs with data sheets/delineation report.

Office does not concur with data sheets/delineation report. Rationale: _____

Data sheets prepared by the Corps: _____

Corps navigable waters' study:

U.S. Geological Survey Hydrologic Atlas:

USGS NHD data:

USGS 8 and 12 digit HUC maps:

U.S. Geological Survey map(s). Cite scale & quad name: Liberty Quad

Natural Resources Conservation Service Soil Survey. Citation: NRCS websoil survey

National wetlands inventory map(s). Cite name: USFWS NWI

State/local wetland inventory map(s): _____

FEMA/FIRM maps: NC FIRM maps

100-year Floodplain Elevation is: _____ (National Geodetic Vertical Datum of 1929)

Photographs: Aerial (Name & Date): 2018

or Other (Name & Date): site photos

Previous determination(s). File no. and date of response letter: _____

Other information (please specify):

IMPORTANT NOTE: The information recorded on this form has not necessarily been verified by the Corps and should not be relied upon for later jurisdictional determinations.



Signature and date of Regulatory staff member completing PJD
11/16/2020

Signature and date of person requesting PJD (REQUIRED, unless obtaining the signature is impracticable)¹

¹ Districts may establish timeframes for requester to return signed PJD forms. If the requester does not respond within the established time frame, the district may presume concurrence and no additional follow up is necessary prior to finalizing an action.

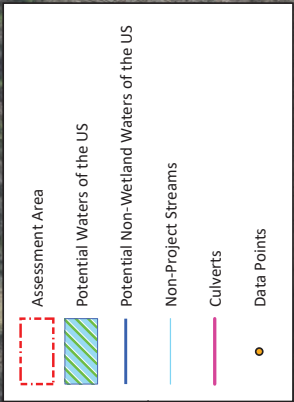
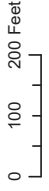


Figure 3. Site Map Overview
 Liberty Rock Mitigation Site
 Cape Fear River Basin (03030003)



November 16, 2020



Randolph County, NC

2018 Aerial Photography

U.S. Army Corps of Engineers WETLAND DETERMINATION DATA SHEET – Eastern Mountains and Piedmont Region See ERDC/EL TR-07-24; the proponent agency is CECW-CO-R	OMB Control #: 0710-xxxx, Exp: Pending Requirement Control Symbol EXEMPT: (Authority: AR 335-15, paragraph 5-2a)
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Project/Site: Liberty Rock Mitigation Site City/County: Randolph Sampling Date: 7/30/20
 Applicant/Owner: Wildlands Engineering State: NC Sampling Point: DP 1
 Investigator(s): C. Neaves Section, Township, Range: _____
 Landform (hillside, terrace, etc.): Floodplain Local relief (concave, convex, none): concave Slope (%): <1%
 Subregion (LRR or MLRA): LRR P, MLRA 136 Lat: 35.820818 Long: -79.565391 Datum: _____
 Soil Map Unit Name: Chewacla and Wehadkee soils NWI classification: _____
 Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No _____ (If no, explain in Remarks.)
 Are Vegetation X, Soil _____, or Hydrology X significantly disturbed? Are "Normal Circumstances" present? Yes X No _____
 Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes <u>X</u> No _____	Is the Sampled Area	Yes <u>X</u> No _____
Hydric Soil Present?	Yes <u>X</u> No _____	within a Wetland?	Yes <u>X</u> No _____
Wetland Hydrology Present?	Yes <u>X</u> No _____		
Remarks: Representative of wetlands LL, EE, and FF.			

HYDROLOGY

Wetland Hydrology Indicators:	Secondary Indicators (minimum of two required)
Primary Indicators (minimum of one is required; check all that apply)	
<input type="checkbox"/> Surface Water (A1)	<input type="checkbox"/> Surface Soil Cracks (B6)
<input type="checkbox"/> High Water Table (A2)	<input type="checkbox"/> True Aquatic Plants (B14)
<input type="checkbox"/> Saturation (A3)	<input type="checkbox"/> Sparsely Vegetated Concave Surface (B8)
<input type="checkbox"/> Water Marks (B1)	<input type="checkbox"/> Hydrogen Sulfide Odor (C1)
<input type="checkbox"/> Sediment Deposits (B2)	<input type="checkbox"/> Drainage Patterns (B10)
<input type="checkbox"/> Drift Deposits (B3)	<input type="checkbox"/> Moss Trim Lines (B16)
<input type="checkbox"/> Algal Mat or Crust (B4)	<input type="checkbox"/> Oxidized Rhizospheres on Living Roots (C3)
<input type="checkbox"/> Iron Deposits (B5)	<input type="checkbox"/> Presence of Reduced Iron (C4)
<input type="checkbox"/> Inundation Visible on Aerial Imagery (B7)	<input type="checkbox"/> Dry-Season Water Table (C2)
<input type="checkbox"/> Water-Stained Leaves (B9)	<input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6)
<input type="checkbox"/> Aquatic Fauna (B13)	<input type="checkbox"/> Crayfish Burrows (C8)
	<input type="checkbox"/> Saturation Visible on Aerial Imagery (C9)
	<input type="checkbox"/> Stunted or Stressed Plants (D1)
	<input checked="" type="checkbox"/> Geomorphic Position (D2)
	<input type="checkbox"/> Shallow Aquitard (D3)
	<input type="checkbox"/> Microtopographic Relief (D4)
	<input checked="" type="checkbox"/> FAC-Neutral Test (D5)

Field Observations:	Wetland Hydrology Present?
Surface Water Present? Yes _____ No <u>X</u> Depth (inches): _____	Yes <u>X</u> No _____
Water Table Present? Yes _____ No <u>X</u> Depth (inches): _____	
Saturation Present? Yes _____ No <u>X</u> Depth (inches): _____ (includes capillary fringe)	

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION (Four Strata) – Use scientific names of plants.

Sampling Point: DP 1

Tree Stratum (Plot size: <u>30'</u>)	Absolute % Cover	Dominant Species?	Indicator Status	
1. _____	_____	_____	_____	
2. _____	_____	_____	_____	
3. _____	_____	_____	_____	
4. _____	_____	_____	_____	
5. _____	_____	_____	_____	
6. _____	_____	_____	_____	
7. _____	_____	_____	_____	
=Total Cover				
50% of total cover: _____		20% of total cover: _____		
Sapling/Shrub Stratum (Plot size: <u>15'</u>)	Absolute % Cover	Dominant Species?	Indicator Status	
1. _____	_____	_____	_____	
2. _____	_____	_____	_____	
3. _____	_____	_____	_____	
4. _____	_____	_____	_____	
5. _____	_____	_____	_____	
6. _____	_____	_____	_____	
7. _____	_____	_____	_____	
8. _____	_____	_____	_____	
9. _____	_____	_____	_____	
=Total Cover				
50% of total cover: _____		20% of total cover: _____		
Herb Stratum (Plot size: <u>5'</u>)	Absolute % Cover	Dominant Species?	Indicator Status	
1. <u>Juncus effusus</u>	30	Yes	FACW	
2. <u>Juncus tenuis</u>	30	Yes	FAC	
3. <u>Polygonum persicaria</u>	15	No	FACW	
4. <u>Murdannia keisak</u>	15	No	OBL	
5. <u>Carex lurida</u>	5	No	OBL	
6. <u>Cyperus striquosus</u>	5	No	FACW	
7. <u>Eupatorium capillifolium</u>	10	No	FACU	
8. _____	_____	_____	_____	
9. _____	_____	_____	_____	
10. _____	_____	_____	_____	
11. _____	_____	_____	_____	
=Total Cover				
50% of total cover: <u>55</u>		20% of total cover: <u>22</u>		
Woody Vine Stratum (Plot size: <u>30'</u>)	Absolute % Cover	Dominant Species?	Indicator Status	
1. _____	_____	_____	_____	
2. _____	_____	_____	_____	
3. _____	_____	_____	_____	
4. _____	_____	_____	_____	
5. _____	_____	_____	_____	
=Total Cover				
50% of total cover: _____		20% of total cover: _____		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species <u>20</u>	x 1 = <u>20</u>
FACW species <u>50</u>	x 2 = <u>100</u>
FAC species <u>30</u>	x 3 = <u>90</u>
FACU species <u>10</u>	x 4 = <u>40</u>
UPL species <u>0</u>	x 5 = <u>0</u>
Column Totals: <u>110</u> (A)	<u>250</u> (B)
Prevalence Index = B/A = <u>2.27</u>	

Hydrophytic Vegetation Indicators:

1 - Rapid Test for Hydrophytic Vegetation
X 2 - Dominance Test is >50%
X 3 - Prevalence Index is $\leq 3.0^1$
4 - Morphological Adaptations¹ (Provide supporting data in Remarks or on a separate sheet)
 _____ Problematic Hydrophytic Vegetation¹ (Explain)

¹Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Four Vegetation Strata:

Tree – Woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/Shrub – Woody plants, excluding vines, less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody Vine – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? Yes X No _____

Remarks: (Include photo numbers here or on a separate sheet.)

U.S. Army Corps of Engineers WETLAND DETERMINATION DATA SHEET – Eastern Mountains and Piedmont Region See ERDC/EL TR-07-24; the proponent agency is CECW-CO-R	OMB Control #: 0710-xxxx, Exp: Pending Requirement Control Symbol EXEMPT: Authority: AR 335-15, paragraph 5-2a
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Project/Site: Liberty Rock Mitigation Site City/County: Randolph Sampling Date: 7/30/20
 Applicant/Owner: Wildlands Engineering State: NC Sampling Point: DP3
 Investigator(s): C. Neaves Section, Township, Range: _____
 Landform (hillside, terrace, etc.): Floodplain Local relief (concave, convex, none): None Slope (%): <1%
 Subregion (LRR or MLRA): LRR P, MLRA 136 Lat: 35.820414 Long: -79.566587 Datum: _____
 Soil Map Unit Name: Chewacla and Wehadkee soils NWI classification: _____
 Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No _____ (If no, explain in Remarks.)
 Are Vegetation X, Soil _____, or Hydrology X significantly disturbed? Are "Normal Circumstances" present? Yes X No _____
 Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes <u>X</u>	No <u>X</u>	Is the Sampled Area within a Wetland?	Yes _____	No <u>X</u>
Hydric Soil Present?	Yes <u>X</u>	No _____			
Wetland Hydrology Present?	Yes _____	No <u>X</u>			
Remarks:					

HYDROLOGY

Wetland Hydrology Indicators:	Secondary Indicators (minimum of two required)
<i>Primary Indicators (minimum of one is required; check all that apply)</i>	
<input type="checkbox"/> Surface Water (A1)	<input type="checkbox"/> Surface Soil Cracks (B6)
<input type="checkbox"/> High Water Table (A2)	<input type="checkbox"/> Sparsely Vegetated Concave Surface (B8)
<input type="checkbox"/> Saturation (A3)	<input type="checkbox"/> Drainage Patterns (B10)
<input type="checkbox"/> Water Marks (B1)	<input type="checkbox"/> Oxidized Rhizospheres on Living Roots (C3)
<input type="checkbox"/> Sediment Deposits (B2)	<input type="checkbox"/> Moss Trim Lines (B16)
<input type="checkbox"/> Drift Deposits (B3)	<input type="checkbox"/> Dry-Season Water Table (C2)
<input type="checkbox"/> Algal Mat or Crust (B4)	<input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6)
<input type="checkbox"/> Iron Deposits (B5)	<input type="checkbox"/> Crayfish Burrows (C8)
<input type="checkbox"/> Inundation Visible on Aerial Imagery (B7)	<input type="checkbox"/> Saturation Visible on Aerial Imagery (C9)
<input type="checkbox"/> Water-Stained Leaves (B9)	<input type="checkbox"/> Stunted or Stressed Plants (D1)
<input type="checkbox"/> Aquatic Fauna (B13)	<input type="checkbox"/> Geomorphic Position (D2)
	<input type="checkbox"/> Shallow Aquitard (D3)
	<input type="checkbox"/> Microtopographic Relief (D4)
	<input type="checkbox"/> FAC-Neutral Test (D5)

Field Observations:		
Surface Water Present? Yes _____ No <u>X</u> Depth (inches): _____		Wetland Hydrology Present? Yes _____ No <u>X</u>
Water Table Present? Yes _____ No <u>X</u> Depth (inches): _____		
Saturation Present? Yes _____ No <u>X</u> Depth (inches): _____ (includes capillary fringe)		

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION (Four Strata) – Use scientific names of plants.

Sampling Point: DP3

Tree Stratum (Plot size: <u>30'</u>)	Absolute % Cover	Dominant Species?	Indicator Status	
1. _____				
2. _____				
3. _____				
4. _____				
5. _____				
6. _____				
7. _____				
=Total Cover				
50% of total cover: _____		20% of total cover: _____		
Sapling/Shrub Stratum (Plot size: <u>15'</u>)				
1. _____				
2. _____				
3. _____				
4. _____				
5. _____				
6. _____				
7. _____				
8. _____				
9. _____				
=Total Cover				
50% of total cover: _____		20% of total cover: _____		
Herb Stratum (Plot size: <u>5'</u>)				
1. <i>Paspalum dilatatum</i>	80	Yes	FAC	
2. <i>Schedonorus arundinaceus</i>	5	No	FACU	
3. <i>Eupatorium capillifolium</i>	10	No	FACU	
4. <i>Juncus tenuis</i>	5	No	FAC	
5. _____				
6. _____				
7. _____				
8. _____				
9. _____				
10. _____				
11. _____				
=Total Cover				
50% of total cover: <u>50</u>		20% of total cover: <u>20</u>		
Woody Vine Stratum (Plot size: <u>30'</u>)				
1. _____				
2. _____				
3. _____				
4. _____				
5. _____				
=Total Cover				
50% of total cover: _____		20% of total cover: _____		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species <u>0</u>	x 1 = <u>0</u>
FACW species <u>0</u>	x 2 = <u>0</u>
FAC species <u>85</u>	x 3 = <u>255</u>
FACU species <u>15</u>	x 4 = <u>60</u>
UPL species <u>0</u>	x 5 = <u>0</u>
Column Totals: <u>100</u> (A)	<u>315</u> (B)
Prevalence Index = B/A = <u>3.15</u>	

Hydrophytic Vegetation Indicators:

1 - Rapid Test for Hydrophytic Vegetation

X 2 - Dominance Test is >50%

3 - Prevalence Index is ≥3.0¹

4 - Morphological Adaptations¹ (Provide supporting data in Remarks or on a separate sheet)

_____ Problematic Hydrophytic Vegetation¹ (Explain)

¹Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Four Vegetation Strata:

Tree – Woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/Shrub – Woody plants, excluding vines, less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody Vine – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? Yes X No X

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: DP3

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²		
0-4	10YR 5/3	95	7.5YR 5/6	5	C	PL	Loamy/Clayey	Prominent redox concentrations
4-8	10YR 7/2	90	10YR 6/6	10	C	PL	Loamy/Clayey	Prominent redox concentrations
8-12	2.5Y 7/1	95	10YR 6/6	5	C	M	Sandy	Prominent redox concentrations

¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. ²Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

<input type="checkbox"/> Histosol (A1)	<input type="checkbox"/> Polyvalue Below Surface (S8) (MLRA 147, 148)	<input type="checkbox"/> 2 cm Muck (A10) (MLRA 147)
<input type="checkbox"/> Histic Epipedon (A2)	<input type="checkbox"/> Thin Dark Surface (S9) (MLRA 147, 148)	<input type="checkbox"/> Coast Prairie Redox (A16) (MLRA 147, 148)
<input type="checkbox"/> Black Histic (A3)	<input type="checkbox"/> Loamy Mucky Mineral (F1) (MLRA 136)	<input type="checkbox"/> Piedmont Floodplain Soils (F19) (MLRA 136, 147)
<input type="checkbox"/> Hydrogen Sulfide (A4)	<input type="checkbox"/> Loamy Gleyed Matrix (F2)	<input type="checkbox"/> Red Parent Material (F21) (outside MLRA 127, 147, 148)
<input type="checkbox"/> Stratified Layers (A5)	<input checked="" type="checkbox"/> Depleted Matrix (F3)	<input type="checkbox"/> Very Shallow Dark Surface (F22)
<input type="checkbox"/> 2 cm Muck (A10) (LRR N)	<input type="checkbox"/> Redox Dark Surface (F6)	<input type="checkbox"/> Other (Explain in Remarks)
<input type="checkbox"/> Depleted Below Dark Surface (A11)	<input type="checkbox"/> Depleted Dark Surface (F7)	
<input type="checkbox"/> Thick Dark Surface (A12)	<input type="checkbox"/> Redox Depressions (F8)	
<input type="checkbox"/> Sandy Mucky Mineral (S1)	<input type="checkbox"/> Iron-Manganese Masses (F12) (LRR N, MLRA 136)	
<input type="checkbox"/> Sandy Gleyed Matrix (S4)	<input type="checkbox"/> Umbric Surface (F13) (MLRA 122, 136)	
<input type="checkbox"/> Sandy Redox (S5)	<input type="checkbox"/> Piedmont Floodplain Soils (F19) (MLRA 148)	
<input type="checkbox"/> Stripped Matrix (S6)	<input type="checkbox"/> Red Parent Material (F21) (MLRA 127, 147, 148)	
<input type="checkbox"/> Dark Surface (S7)		

³Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes No _____

Remarks:

<p>U.S. Army Corps of Engineers WETLAND DETERMINATION DATA SHEET – Eastern Mountains and Piedmont Region See ERDC/EL TR-07-24; the proponent agency is CECW-CO-R</p>	<p><i>OMB Control #: 0710-xxxx, Exp: Pending Requirement Control Symbol EXEMPT: (Authority: AR 335-15, paragraph 5-2a)</i></p>
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Project/Site: Liberty Rock Mitigation Site City/County: Randolph Sampling Date: 7/30/20

Applicant/Owner: Wildlands Engineering State: NC Sampling Point: DP4

Investigator(s): C. Neaves Section, Township, Range: _____

Landform (hillside, terrace, etc.): Floodplain Local relief (concave, convex, none): Concave Slope (%): 0

Subregion (LRR or MLRA): LRR P, MLRA 136 Lat: 35.820429 Long: -79.566486 Datum: _____

Soil Map Unit Name: Chewacla and Wehadkee soils NWI classification: _____

Are climatic / hydrologic conditions on the site typical for this time of year? Yes No _____ (If no, explain in Remarks.)

Are Vegetation , Soil _____, or Hydrology significantly disturbed? Are "Normal Circumstances" present? Yes No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes <input checked="" type="checkbox"/> No _____	<p>Is the Sampled Area within a Wetland?</p> <p>Yes <input checked="" type="checkbox"/> No _____</p>
Hydric Soil Present? Yes <input checked="" type="checkbox"/> No _____	
Wetland Hydrology Present? Yes <input checked="" type="checkbox"/> No _____	
<p>Remarks:</p> <p>Represents Wetlands: A, B, C, L, M, N, O, P, Q, R, S, T, U, V, W, X, Y, Z, MM, NN, OO, and PP.</p>	

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)	Secondary Indicators (minimum of two required)
<input type="checkbox"/> Surface Water (A1)	<input type="checkbox"/> Surface Soil Cracks (B6)
<input type="checkbox"/> High Water Table (A2)	<input type="checkbox"/> Sparsely Vegetated Concave Surface (B8)
<input type="checkbox"/> Saturation (A3)	<input type="checkbox"/> Drainage Patterns (B10)
<input type="checkbox"/> Water Marks (B1)	<input type="checkbox"/> Moss Trim Lines (B16)
<input type="checkbox"/> Sediment Deposits (B2)	<input type="checkbox"/> Dry-Season Water Table (C2)
<input type="checkbox"/> Drift Deposits (B3)	<input type="checkbox"/> Crayfish Burrows (C8)
<input type="checkbox"/> Algal Mat or Crust (B4)	<input type="checkbox"/> Saturation Visible on Aerial Imagery (C9)
<input type="checkbox"/> Iron Deposits (B5)	<input type="checkbox"/> Stunted or Stressed Plants (D1)
<input type="checkbox"/> Inundation Visible on Aerial Imagery (B7)	<input checked="" type="checkbox"/> Geomorphic Position (D2)
<input type="checkbox"/> Water-Stained Leaves (B9)	<input type="checkbox"/> Shallow Aquitard (D3)
<input type="checkbox"/> Aquatic Fauna (B13)	<input type="checkbox"/> Microtopographic Relief (D4)
	<input checked="" type="checkbox"/> FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes _____ No <input checked="" type="checkbox"/> Depth (inches): _____	<p>Wetland Hydrology Present?</p> <p>Yes <input checked="" type="checkbox"/> No _____</p>
Water Table Present? Yes _____ No <input checked="" type="checkbox"/> Depth (inches): _____	
Saturation Present? Yes _____ No <input checked="" type="checkbox"/> Depth (inches): _____	

(includes capillary fringe)

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

U.S. Army Corps of Engineers WETLAND DETERMINATION DATA SHEET – Eastern Mountains and Piedmont Region See ERDC/EL TR-07-24; the proponent agency is CECW-CO-R	OMB Control #: 0710-xxxx, Exp: Pending Requirement Control Symbol EXEMPT: Authority: AR 335-15, paragraph 5-2a
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Project/Site: Liberty Rock Mitigation Site City/County: Randolph Sampling Date: 7/30/20
 Applicant/Owner: Wildlands Engineering State: NC Sampling Point: DP5
 Investigator(s): C. Walker Section, Township, Range: _____
 Landform (hillside, terrace, etc.): Floodplain Local relief (concave, convex, none): concave Slope (%): 0
 Subregion (LRR or MLRA): LRR P, MLRA 136 Lat: 35.820422 Long: -79.560137 Datum: NAD 83
 Soil Map Unit Name: Vance sandy loam NWI classification: N/A

Are climatic / hydrologic conditions on the site typical for this time of year? Yes No (If no, explain in Remarks.)
 Are Vegetation , Soil , or Hydrology significantly disturbed? Are "Normal Circumstances" present? Yes No
 Are Vegetation , Soil , or Hydrology naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	Is the Sampled Area within a Wetland? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
Hydric Soil Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	
Wetland Hydrology Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	
Remarks: Represents Wetlands: I, J, AA, BB, CC, DD, GG, HH, II, JJ and KK.	

HYDROLOGY

Wetland Hydrology Indicators:	Secondary Indicators (minimum of two required)
Primary Indicators (minimum of one is required; check all that apply)	
<input checked="" type="checkbox"/> Surface Water (A1)	<input type="checkbox"/> Surface Soil Cracks (B6)
<input type="checkbox"/> High Water Table (A2)	<input type="checkbox"/> Sparsely Vegetated Concave Surface (B8)
<input checked="" type="checkbox"/> Saturation (A3)	<input type="checkbox"/> Drainage Patterns (B10)
<input type="checkbox"/> Water Marks (B1)	<input type="checkbox"/> Moss Trim Lines (B16)
<input type="checkbox"/> Sediment Deposits (B2)	<input type="checkbox"/> Dry-Season Water Table (C2)
<input type="checkbox"/> Drift Deposits (B3)	<input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6)
<input type="checkbox"/> Algal Mat or Crust (B4)	<input type="checkbox"/> Saturation Visible on Aerial Imagery (C9)
<input type="checkbox"/> Iron Deposits (B5)	<input type="checkbox"/> Stunted or Stressed Plants (D1)
<input type="checkbox"/> Inundation Visible on Aerial Imagery (B7)	<input checked="" type="checkbox"/> Geomorphic Position (D2)
<input type="checkbox"/> Water-Stained Leaves (B9)	<input type="checkbox"/> Shallow Aquitard (D3)
<input type="checkbox"/> Aquatic Fauna (B13)	<input type="checkbox"/> Microtopographic Relief (D4)
	<input checked="" type="checkbox"/> FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Depth (inches): <u>1</u>	Wetland Hydrology Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
Water Table Present? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> Depth (inches): _____	
Saturation Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Depth (inches): <u>6</u> (includes capillary fringe)	

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION (Four Strata) – Use scientific names of plants.

Sampling Point: DP5

Tree Stratum (Plot size: <u>30'</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. <u>Acer rubrum</u>	5	Yes	FAC
2. _____			
3. _____			
4. _____			
5. _____			
6. _____			
7. _____			
5 = Total Cover			

50% of total cover: 3 20% of total cover: 1

Sapling/Shrub Stratum (Plot size: <u>15'</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. _____			
2. _____			
3. _____			
4. _____			
5. _____			
6. _____			
7. _____			
8. _____			
9. _____			
= Total Cover			

50% of total cover: _____ 20% of total cover: _____

Herb Stratum (Plot size: <u>5'</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. <u>Juncus effusus</u>	40	Yes	FACW
2. <u>Murdannia keisak</u>	30	Yes	OBL
3. <u>Myriophyllum aquaticum</u>	5	No	OBL
4. <u>Eupatorium capillifolium</u>	5	No	FACU
5. _____			
6. _____			
7. _____			
8. _____			
9. _____			
10. _____			
11. _____			
80 = Total Cover			

50% of total cover: 40 20% of total cover: 16

Woody Vine Stratum (Plot size: <u>30'</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. _____			
2. _____			
3. _____			
4. _____			
5. _____			
= Total Cover			

50% of total cover: _____ 20% of total cover: _____

Remarks: (Include photo numbers here or on a separate sheet.)

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 3 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species <u>35</u>	x 1 = <u>35</u>
FACW species <u>40</u>	x 2 = <u>80</u>
FAC species <u>5</u>	x 3 = <u>15</u>
FACU species <u>5</u>	x 4 = <u>20</u>
UPL species <u>0</u>	x 5 = <u>0</u>
Column Totals: <u>85</u> (A)	<u>150</u> (B)
Prevalence Index = B/A = <u>1.76</u>	

Hydrophytic Vegetation Indicators:

1 - Rapid Test for Hydrophytic Vegetation
 2 - Dominance Test is >50%
 3 - Prevalence Index is $\leq 3.0^1$
4 - Morphological Adaptations¹ (Provide supporting data in Remarks or on a separate sheet)
 Problematic Hydrophytic Vegetation¹ (Explain)

¹Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Four Vegetation Strata:

Tree – Woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/Shrub – Woody plants, excluding vines, less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody Vine – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? Yes No

U.S. Army Corps of Engineers WETLAND DETERMINATION DATA SHEET – Eastern Mountains and Piedmont Region See ERDC/EL TR-07-24; the proponent agency is CECW-CO-R	OMB Control #: 0710-xxxx, Exp: Pending Requirement Control Symbol EXEMPT: Authority: AR 335-15, paragraph 5-2a
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Project/Site: Liberty Rock Mitigation Site City/County: Randolph Sampling Date: 7/30/20
 Applicant/Owner: Wildlands Engineering State: NC Sampling Point: DP7
 Investigator(s): C. Walker Section, Township, Range: _____
 Landform (hillside, terrace, etc.): Floodplain Local relief (concave, convex, none): concave Slope (%): 0
 Subregion (LRR or MLRA): LRR P, MLRA 136 Lat: 35.820088 Long: -79.560783 Datum: NAD 83
 Soil Map Unit Name: Chewada and Wehadkee soils NWI classification: N/A
 Are climatic / hydrologic conditions on the site typical for this time of year? Yes No (If no, explain in Remarks.)
 Are Vegetation , Soil , or Hydrology significantly disturbed? Are "Normal Circumstances" present? Yes No
 Are Vegetation , Soil , or Hydrology naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Hydric Soil Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Wetland Hydrology Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	Is the Sampled Area within a Wetland? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
Remarks: Represents Wetlands: D, E, F, G, H, and K.	

HYDROLOGY

Wetland Hydrology Indicators: <u>Primary Indicators (minimum of one is required; check all that apply)</u> <input type="checkbox"/> Surface Water (A1) <input type="checkbox"/> True Aquatic Plants (B14) <input type="checkbox"/> High Water Table (A2) <input type="checkbox"/> Hydrogen Sulfide Odor (C1) <input type="checkbox"/> Saturation (A3) <input checked="" type="checkbox"/> Oxidized Rhizospheres on Living Roots (C3) <input type="checkbox"/> Water Marks (B1) <input type="checkbox"/> Presence of Reduced Iron (C4) <input type="checkbox"/> Sediment Deposits (B2) <input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6) <input type="checkbox"/> Drift Deposits (B3) <input type="checkbox"/> Thin Muck Surface (C7) <input type="checkbox"/> Algal Mat or Crust (B4) <input type="checkbox"/> Other (Explain in Remarks) <input type="checkbox"/> Iron Deposits (B5) <input type="checkbox"/> Inundation Visible on Aerial Imagery (B7) <input type="checkbox"/> Water-Stained Leaves (B9) <input type="checkbox"/> Aquatic Fauna (B13)	<u>Secondary Indicators (minimum of two required)</u> <input type="checkbox"/> Surface Soil Cracks (B6) <input type="checkbox"/> Sparsely Vegetated Concave Surface (B8) <input type="checkbox"/> Drainage Patterns (B10) <input type="checkbox"/> Moss Trim Lines (B16) <input type="checkbox"/> Dry-Season Water Table (C2) <input type="checkbox"/> Crayfish Burrows (C8) <input type="checkbox"/> Saturation Visible on Aerial Imagery (C9) <input type="checkbox"/> Stunted or Stressed Plants (D1) <input checked="" type="checkbox"/> Geomorphic Position (D2) <input type="checkbox"/> Shallow Aquitard (D3) <input type="checkbox"/> Microtopographic Relief (D4) <input checked="" type="checkbox"/> FAC-Neutral Test (D5)
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Field Observations: Surface Water Present? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> Depth (inches): _____ Water Table Present? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> Depth (inches): _____ Saturation Present? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> Depth (inches): _____ (includes capillary fringe)	Wetland Hydrology Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
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Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION (Four Strata) – Use scientific names of plants. Sampling Point: DP7

Tree Stratum (Plot size: <u>30'</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. _____			
2. _____			
3. _____			
4. _____			
5. _____			
6. _____			
7. _____			
=Total Cover			

50% of total cover: _____	20% of total cover: _____		
Sapling/Shrub Stratum (Plot size: <u>15'</u>)			
1. _____			
2. _____			
3. _____			
4. _____			
5. _____			
6. _____			
7. _____			
8. _____			
9. _____			
=Total Cover			
50% of total cover: _____	20% of total cover: _____		

Herb Stratum (Plot size: <u>5'</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. <u>Juncus effusus</u>	60	Yes	FACW
2. <u>Murdannia keisak</u>	20	Yes	OBL
3. <u>Eleocharis obtusa</u>	10	No	OBL
4. <u>Eupatorium capillifolium</u>	5	No	FACU
5. _____			
6. _____			
7. _____			
8. _____			
9. _____			
10. _____			
11. _____			
=Total Cover	95		
50% of total cover: <u>48</u>	20% of total cover: <u>19</u>		

Woody Vine Stratum (Plot size: <u>30'</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. _____			
2. _____			
3. _____			
4. _____			
5. _____			
=Total Cover			
50% of total cover: _____	20% of total cover: _____		

Remarks: (Include photo numbers here or on a separate sheet.)

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species <u>30</u>	x 1 = <u>30</u>
FACW species <u>60</u>	x 2 = <u>120</u>
FAC species <u>0</u>	x 3 = <u>0</u>
FACU species <u>5</u>	x 4 = <u>20</u>
UPL species <u>0</u>	x 5 = <u>0</u>
Column Totals: <u>95</u> (A)	<u>170</u> (B)
Prevalence Index = B/A = <u>1.79</u>	

Hydrophytic Vegetation Indicators:

1 - Rapid Test for Hydrophytic Vegetation
 2 - Dominance Test is >50%
 3 - Prevalence Index is $\leq 3.0^1$
4 - Morphological Adaptations¹ (Provide supporting data in Remarks or on a separate sheet)
 Problematic Hydrophytic Vegetation¹ (Explain)

¹Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Four Vegetation Strata:

Tree – Woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/Shrub – Woody plants, excluding vines, less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody Vine – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? Yes No

VEGETATION (Four Strata) – Use scientific names of plants.

Sampling Point: DP8

Tree Stratum (Plot size: 30')	Absolute % Cover	Dominant Species?	Indicator Status	
1. _____	_____	_____	_____	Dominance Test worksheet: Number of Dominant Species That Are OBL, FACW, or FAC: <u>1</u> (A) Total Number of Dominant Species Across All Strata: <u>1</u> (B) Percent of Dominant Species That Are OBL, FACW, or FAC: <u>100.0%</u> (A/B) Prevalence Index worksheet: Total % Cover of: _____ Multiply by: _____ OBL species <u>0</u> x 1 = <u>0</u> FACW species <u>0</u> x 2 = <u>0</u> FAC species <u>70</u> x 3 = <u>210</u> FACU species <u>15</u> x 4 = <u>60</u> UPL species <u>0</u> x 5 = <u>0</u> Column Totals: <u>85</u> (A) <u>270</u> (B) Prevalence Index = B/A = <u>3.18</u> Hydrophytic Vegetation Indicators: <input type="checkbox"/> 1 - Rapid Test for Hydrophytic Vegetation <input checked="" type="checkbox"/> 2 - Dominance Test is >50% <input type="checkbox"/> 3 - Prevalence Index is ≤3.0 ¹ <input type="checkbox"/> 4 - Morphological Adaptations ¹ (Provide supporting data in Remarks or on a separate sheet) <input type="checkbox"/> Problematic Hydrophytic Vegetation ¹ (Explain)
2. _____	_____	_____	_____	
3. _____	_____	_____	_____	
4. _____	_____	_____	_____	
5. _____	_____	_____	_____	
6. _____	_____	_____	_____	
7. _____	_____	_____	_____	
=Total Cover				
50% of total cover: _____		20% of total cover: _____		
Sapling/Shrub Stratum (Plot size: 15')	Absolute % Cover	Dominant Species?	Indicator Status	
1. _____	_____	_____	_____	Definitions of Four Vegetation Strata: Tree – Woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height. Sapling/Shrub – Woody plants, excluding vines, less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall. Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall. Woody Vine – All woody vines greater than 3.28 ft in height. Hydrophytic Vegetation Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
2. _____	_____	_____	_____	
3. _____	_____	_____	_____	
4. _____	_____	_____	_____	
5. _____	_____	_____	_____	
6. _____	_____	_____	_____	
7. _____	_____	_____	_____	
8. _____	_____	_____	_____	
9. _____	_____	_____	_____	
10. _____	_____	_____	_____	
11. _____	_____	_____	_____	
=Total Cover				
50% of total cover: <u>43</u>		20% of total cover: <u>17</u>		
Herb Stratum (Plot size: 5')	Absolute % Cover	Dominant Species?	Indicator Status	
1. <i>Paspalum dilatatum</i>	70	Yes	FAC	
2. <i>Schedonorus arundinaceus</i>	10	No	FACU	
3. <i>Eupatorium capillifolium</i>	5	No	FACU	
4. _____	_____	_____	_____	
5. _____	_____	_____	_____	
6. _____	_____	_____	_____	
7. _____	_____	_____	_____	
8. _____	_____	_____	_____	
9. _____	_____	_____	_____	
10. _____	_____	_____	_____	
11. _____	_____	_____	_____	
=Total Cover				
50% of total cover: _____		20% of total cover: _____		
Woody Vine Stratum (Plot size: 30')	Absolute % Cover	Dominant Species?	Indicator Status	
1. _____	_____	_____	_____	
2. _____	_____	_____	_____	
3. _____	_____	_____	_____	
4. _____	_____	_____	_____	
5. _____	_____	_____	_____	
=Total Cover				
50% of total cover: _____		20% of total cover: _____		
Remarks: (Include photo numbers here or on a separate sheet.)				

SOIL

Sampling Point: DP8

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)									
Depth (inches)	Matrix			Redox Features				Texture	Remarks
	Color (moist)	%		Color (moist)	%	Type ¹	Loc ²		
0-3	10YR 4/4	100						Loamy/Clayey	
3-7	10YR 6/4	85		7.5YR 5/8	15	C	M	Loamy/Clayey	Prominent redox concentrations
7-14	2.5YR 6/2	95		7.5YR 6/6	5	C	M	Loamy/Clayey	Prominent redox concentrations
¹ Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. ² Location: PL=Pore Lining, M=Matrix.									
Hydric Soil Indicators:					Indicators for Problematic Hydric Soils ³ :				
<input type="checkbox"/> Histosol (A1)	<input type="checkbox"/> Polyvalue Below Surface (S8) (MLRA 147, 148)				<input type="checkbox"/> 2 cm Muck (A10) (MLRA 147)				
<input type="checkbox"/> Histic Epipedon (A2)	<input type="checkbox"/> Thin Dark Surface (S9) (MLRA 147, 148)				<input type="checkbox"/> Coast Prairie Redox (A16)				
<input type="checkbox"/> Black Histic (A3)	<input type="checkbox"/> Loamy Mucky Mineral (F1) (MLRA 136)				<input type="checkbox"/> (MLRA 147, 148)				
<input type="checkbox"/> Hydrogen Sulfide (A4)	<input type="checkbox"/> Loamy Gleyed Matrix (F2)				<input type="checkbox"/> Piedmont Floodplain Soils (F19)				
<input type="checkbox"/> Stratified Layers (A5)	<input type="checkbox"/> Depleted Matrix (F3)				<input type="checkbox"/> (MLRA 136, 147)				
<input type="checkbox"/> 2 cm Muck (A10) (LRR N)	<input type="checkbox"/> Redox Dark Surface (F6)				<input type="checkbox"/> Red Parent Material (F21)				
<input type="checkbox"/> Depleted Below Dark Surface (A11)	<input type="checkbox"/> Depleted Dark Surface (F7)				<input type="checkbox"/> (outside MLRA 127, 147, 148)				
<input type="checkbox"/> Thick Dark Surface (A12)	<input type="checkbox"/> Redox Depressions (F8)				<input type="checkbox"/> Very Shallow Dark Surface (F22)				
<input type="checkbox"/> Sandy Mucky Mineral (S1)	<input type="checkbox"/> Iron-Manganese Masses (F12) (LRR N, MLRA 136)				<input type="checkbox"/> Other (Explain in Remarks)				
<input type="checkbox"/> Sandy Gleyed Matrix (S4)	<input type="checkbox"/> Umbric Surface (F13) (MLRA 122, 136)				³ Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.				
<input type="checkbox"/> Sandy Redox (S5)	<input type="checkbox"/> Piedmont Floodplain Soils (F19) (MLRA 148)								
<input type="checkbox"/> Stripped Matrix (S6)	<input type="checkbox"/> Red Parent Material (F21) (MLRA 127, 147, 148)								
<input type="checkbox"/> Dark Surface (S7)									
Restrictive Layer (if observed):									
Type: _____								Hydric Soil Present? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	
Depth (inches): _____									
Remarks:									

Appendix 5



MEETING SUMMARY

MEETING: IRT Site Walk
Liberty Rock Mitigation Site – Option 3
Cape Fear 03030003; Randolph County, NC
DEQ Contract No. 7877-01
DMS Project No. 100135
Wildlands Project No. 005-02185

DATE: Tuesday, February 18, 2020

LOCATION: Liberty Park Avenue
Liberty, NC

Attendees

Todd Tugwell, USACE	Erin Davis, DWR	Olivia Munzer, WRC
Kim Browning, USACE	Jeremiah Dow, DMS	Shawn Wilkerson, Wildlands
Mac Haupt, DWR	Lindsay Crocker, DMS	Greg Turner, Wildlands

Materials

- Wildlands Engineering Liberty Rock Mitigation Site Technical Proposal dated August 13, 2019 (in response to RFP #16-007877)

Meeting Notes

Shawn Wilkerson of Wildlands Engineering, Inc. (Wildlands) led the group on a tour of the proposed mitigation site on February 18, 2020. The purpose of the tour was to present the site to the group of IRT members and to get their input into the management/mitigation options proposed for the site. During the tour, the group discussed the stream and wetland approaches proposed by Wildlands and the manner which they felt would be most appropriate to preserve, enhance, and restore the onsite streams and to rehabilitate and re-establish onsite wetlands.

1. Mica Creek

- The tour began at the upstream project extent of Mica Creek, a tributary to the Rocky River that is proposed as a restoration reach. The group discussed a short length of proposed channel work that will tie into a Norfolk Southern Railway culvert, which is currently perched by approximately 2 feet. Shawn Wilkerson stated that Wildlands would fill and stabilize the severely eroded and incised section of channel at the outfall of the existing culvert. Some of this work may occur within the railroad right-of-way. Approximately 25% of the way downstream, along the right streambank, a small wetland area was seen by the group. Shawn noted that a Jurisdictional Determination is planned for the entire project area but that no credit was being sought at this wetland. The group agreed that Mica Creek's condition warranted restoration and that the 1:1 credit being proposed was appropriate.

2. Wetland Re-establishment and Rehabilitation Areas

- The group continued into the wetland re-establishment and rehabilitation areas in the floodplain of the Rocky River. The group looked at soils in several locations and agreed that hydric soils were extremely prevalent. Kim Browning pointed out an area of potentially jurisdictional wetlands in the woods along the left edge of the Rocky River floodplain, approximately 40% of the way downstream. Wildlands agreed that this area would be encompassed in the easement and that it would be evaluated for preservation credit or low-level enhancement. Todd Tugwell asked about Wildlands' plans for plugging existing swales that currently act as wetland drains. Wildlands and Todd agreed that partially filling deeper sections of the swales to prevent significant ponding within the proposed wetland areas, while also eliminating the drainage effect, would be appropriate. Olivia Munzer pointed out a wetland in the left floodplain of the Rocky River, which drains into Reach 5, was dominated by the invasive aquatic plant parrot feather (*Myriophyllum aquaticum*). This invasive plant, among others, was noted in the technical proposal and will be treated by Wildlands. Overall, the group agreed that the wetland approaches on the site were warranted. Todd did mention that he thought there were likely more jurisdictional wetlands on the site and, therefore, more rehabilitation. However, Todd also mentioned that there was likely more overall onsite wetland potential, so credit totals should not be in jeopardy.

3. Rocky River

- The group next looked at the Rocky River, which is the main project stream. This stream consists of five project reaches, all of which are proposed as Priority 1 restoration. Significant deposits of sand were seen throughout the floodplain and along the length of the channel. Wildlands pointed out that, while not overly incised, the channel was actively eroding and restoring the channel will improve pool habitat, bank stability, wetland hydrology, and buffer condition. Multiple group members pointed out that parrot feather was present throughout the project length of the Rocky River. Olivia noticed several mussel shells along the Rocky River. She advised that the project length of Rocky River may be home to one or more rare mussel species and/or the Greensboro Burrowing Crayfish, a species listed as Special Concern in North Carolina. Shawn said the Rocky River is proposed to be rebuilt largely offline and substrate from the existing channel will be reused in the proposed channel. The IRT supported restoration of the Rocky River but Olivia had some reservations due to the bedform habitat. She will get back to Wildlands about how best to support mussel habitat during restoration activities.

4. Schist Creek

- Next, Shawn showed the group Schist Creek. This is the largest tributary to the Rocky River within the project area, beginning just downstream of an existing culvert that flows underneath US 421. Schist Creek is proposed for restoration along its entire length, which the IRT supported. Todd mentioned that if the restoration is reasonably extended to a new location of the Rocky River then that length may be included in the restoration credit.

5. Gypsum Creek

- The group moved downstream along the right floodplain of the Rocky River to look at another of its tributaries, Gypsum Creek. This stream begins at a spring head within the project area and is proposed for preservation but will be restored as it ties into the Rocky River. The IRT warned



that a defined channel must be maintained all the way through the riparian wetlands at the end of the reach until the confluence with the Rocky River.

6. Dolomite Creek

- The final stream Shawn showed the group was a small tributary to the Rocky River called Dolomite Creek that is proposed for preservation from its origin until it reaches the floodplain of the Rocky River. Enhancement II credit is proposed for the remaining length, which will be improved in its connection to the Rocky River post-realignment. Shawn mentioned the existing culvert crossing immediately upstream of the ephemeral-intermittent transition will be removed. As with Gypsum Creek, the group agreed that a defined channel must be maintained through the wetlands at the end of the reach.

Summary and Conclusion

- The IRT agreed with the approaches proposed by Wildlands for the project streams and wetlands.
- Todd and Mac iterated that an official Jurisdictional Determination will be extremely important for the wetland component of the project. They mentioned there may be more existing wetlands within the project area than Wildlands' estimate from the technical proposal.
- Olivia mentioned she wrote an environmental review of the project site for species of special concern in North Carolina and will get back to Wildlands with recommendations regarding mussel habitat.

These meeting notes were prepared by Greg Turner on February 19, 2020 and reviewed by Shawn Wilkerson on February 19, 2020 and represent the authors' interpretation of events. Revisions were made by Greg Turner on March 2, 2020 per Olivia Munzer's February 29, 2020 email to note the presence of parrot feather in a wetland that drains to Reach 5 of the Rocky River. The revisions were reviewed by Jeff Keaton on March 4, 2020.





MEETING SUMMARY

MEETING: IRT virtual meeting to discuss mussels and restoration approach
Liberty Rock Mitigation Site – Option 3
Cape Fear 03030003; Randolph County, NC
DEQ Contract No. 7877-01
DMS Project No. 100135
Wildlands Project No. 005-02185

DATE: Monday October 26, 2020

LOCATION: Virtual Meeting

Attendees

Todd Tugwell, USACE
Kim Browning, USACE
Erin Davis, DWR
Jeremiah Dow, DMS
Olivia Munzer, WRC
Travis Wilson, WRC
Brena Jones, WRC
Todd Bowers, EPA
Kathryn Matthews, FWS
John Hutton, Wildlands
Angela Allen, Wildlands

Meeting Purpose

The meeting was set in response to WRC findings of rare mussel species on site in October 2020, and a subsequent email sent to the IRT dated 10/9/2020 listing concerns with the restoration approach set forth in the Liberty Rock Mitigation Site Technical Proposal dated August 13, 2019 (in response to RFP #16-007877).

Meeting Notes

1. Jeremiah Dow (DMS project manager) started the meeting introducing the issue at hand.
2. Angela Allen led the group through an Arc-GIS map that showed the existing conditions of the Rocky River as compared to the conditions in 2010. There is visible widening of the stream, lateral instability, and livestock impact. Ms. Allen also walked the group through photographs along the length of the project and showed an overlay of the proposed alignment for the Rocky River in the left floodplain of the existing river. The river is proposed to be constructed entirely off-line.
3. Travis Wilson asked about the adjacent proposed wetlands and the ability to raise the stream up to existing floodplain elevations without causing backwater off-site

- a. John Hutton responded that Rocky River is able to achieve a priority 1 restoration without causing backwater off-site.
 - b. Todd Tugwell reiterated that the majority of the Rocky River is not incised on-site, but that the main source of instability is lateral migration and livestock access causing mass-wasting of banks.
 - c. Kim Browning commented that moving the channel to the center of the valley away from the hillsides will help wet up the wetland areas.
4. Brena Jones was then asked to discuss the on-site findings of mussel species during the October site visit. Ms. Jones summarized the findings outlined in the email from October 9, 2020, stating species of snail, crayfish, and three native mussel species were found on site. The mussels included large numbers of reproducing mussels. She discussed that while relocation was possible, it was a last resort option as there is not much data on relocation success. Ms. Jones noted that the best habitat for mussels was found on the lower third of the Rocky River.
5. The idea of restoring the upper two thirds of the Rocky River off-line and performing enhancement on the lower third was brought up as a potential compromise. The group was generally in agreement of this, though it was acknowledged that an improved credit ratio from the traditional 2.5:1 for enhancement would need to be agreed upon to make the project financially viable for Wildlands.
6. In determining final credit ratios, the IRT would like to see the mussel survey, relocation, and monitoring plan that Wildlands has developed as well as the plan for bank grading and/or habitat features. Wider buffers than proposed on Mica Creek were also brought up as a potential for increasing credits on site.
7. Travis Wilson asked about stewardship, as this parcel is being bought fee simple by Wildlands. Mr. Hutton stated that the site would have an easement and convey to the state as in other traditional DMS mitigation projects.
8. The group agreed that the next step would be for Wildlands to work with DMS and provide a technical memorandum to distribute to the IRT showing the proposed 2/3 to 1/3 restoration to enhancement approach. The mussel sampling contract will be included in this memorandum.
9. It is noted that emails regarding this meeting were sent to IRT members after the meeting finished regarding additional questions and concerns, as there were technical difficulties with some audio lines.

These meeting notes were prepared by Angela Allen on October 28, 2020 and reviewed by John Hutton on October 28, 2020 and represent the authors' interpretation of events.



Technical Memorandum

To: North Carolina Interagency Review Team

From: Wildlands Engineering, Inc.

Re: Restoration Approach on Rocky River, mussel population considerations
Liberty Rock Mitigation Site – Option 3
Cape Fear 03030003; Randolph County, NC
DEQ Contract No. 7877-01
DMS Project No. 100135
Wildlands Project No. 005-02185

DATE: Tuesday 12/15/ 2020

Introduction

Wildlands Engineering submitted a Full Delivery Proposal to the Division of Mitigation Services (DMS) on August 13, 2019 to fulfill stream and wetland mitigation needs in the Cape Fear 03030003 River Basin (RFP-16-007877). The project was contracted with NCDMS on November 14, 2019. The NC IRT site walk February 18, 2020. The IRT agreed that off-line restoration of the Rocky River was the best approach for ecological uplift. Olivia Munzer (WRC) mentioned that there may be some rare mussel species on-site, and that she would contact Wildlands with suggestions of appropriate habitat to support the mussel species.

In April 2020, WRC agreed to help Wildlands develop a relocation plan for mussels on the restoration reaches of the Rocky River. Wildlands Engineering worked with WRC and a subcontractor, SEPI, Inc., to develop a scope of work for the relocation and monitoring of mussels on the Rocky River prior to construction, and throughout the seven-year monitoring period. The contract with SEPI includes the following tasks

Phase 1 – Pre-Construction

Task 1 – Identify freshwater mussel relocation reaches (Upstream off-site relocation reach has been identified)

Task 2 – A maximum of three separate freshwater mussel surveys and relocation efforts to take place within the project limits.

Phase 2 – Post-Construction

Task 3 – MY-01: Freshwater mussel survey (upstream off-site relocation reach and downstream of project restoration reach)

Task 4 – MY-02: Freshwater mussel survey (upstream off-site relocation reach only)

Task 5 – MY-03: Freshwater mussel survey (restored reaches only)

Task 6 – MY-05: Freshwater mussel survey (upstream off-site relocation reach and downstream of restoration project reach)

Task 7 – MY-07: Freshwater mussel survey (restored reaches only)

During Task 1, Phase 1, from the mussel relocation plan, additional rare mussel species were found that gave WRC concerns on proceeding with restoration on the Rocky River. The IRT was contacted on October 9, 2020 with this information. The IRT held a virtual meeting on October 26, 2020 (meeting minutes in Appendix). Wildlands was tasked on preparing an updated concept plan for the restoration of the Rocky River that takes into account limiting streambed disturbance on the areas where high concentrations of rare mussel species were found, while providing the highest ecological uplift possible for all reaches of the Rocky River and riparian wetlands.

Proposed Restoration Approach

Wildlands developed a restoration plan for the Rocky River that balances the need to rehydrate riparian wetlands, provide long term lateral stability, and provide high quality habitat for aquatic species, including existing mussel populations. The proposed alignment of the stream, wetland areas, and riparian buffer extents, are shown in Figure 1.

At the upstream limit, the Rocky River will transition off-line for approximately 1,990 feet. Moving the stream entirely into the left floodplain places the new channel in the existing valley center to promote wetland rehydration. It also allows for this reach to be built entirely off-line and reduce the impacts of sediment on mussel populations during construction.

During the October 26th meeting it was noted that the greatest density of rare mussels was found in the lower third of the project reach. This was identified as starting in the riffle areas upstream of the confluence with Mica Creek. Wildlands did an evaluation of this area after the October 26th meeting. The bedform appeared the most diverse and stable starting at the confluence of Dolomite Creek and proceeding downstream for approximately 580'. At that point, the stream incises further, has lower quality bedform, and higher lateral instability. Wildlands proposes to bring the channel back on-line for this 580' as an enhancement reach. As this reach is overwidened and has bank scour and failure along its length, nearly all streambanks will require a combination of grading, vegetated soil lifts, brush toe, or rock toe, to reestablish a stable channel.

After the enhancement reach, the Rocky River will go offline for 420 feet and then tie back into the existing channel for the last 50 feet. Wildlands determined that moving the channel away from the valley wall in this section provided the most lateral stability, and best potential for rehydrating riparian wetlands.

Wildlands proposes to continue with the mussel relocation plan as described above and as guided by WRC for the reaches of the Rocky River being relocated. This will either be for relocation up or downstream of project extents, or by direct relocation to the new channel during construction.

Proposed Stream Credits

Wildlands proposes to credit all restoration sections and enhancement sections on the Rocky River to be credited at a 1:1 ratio. The level of intervention, and potential for ecological uplift along the enhancement reach coupled with the extensive mussel monitoring program warrants the higher ratio. Wildlands is also proposing to extend the riparian buffer along Mica Creek and to apply the USACE Wilmington District Stream Buffer Credit Calculator to

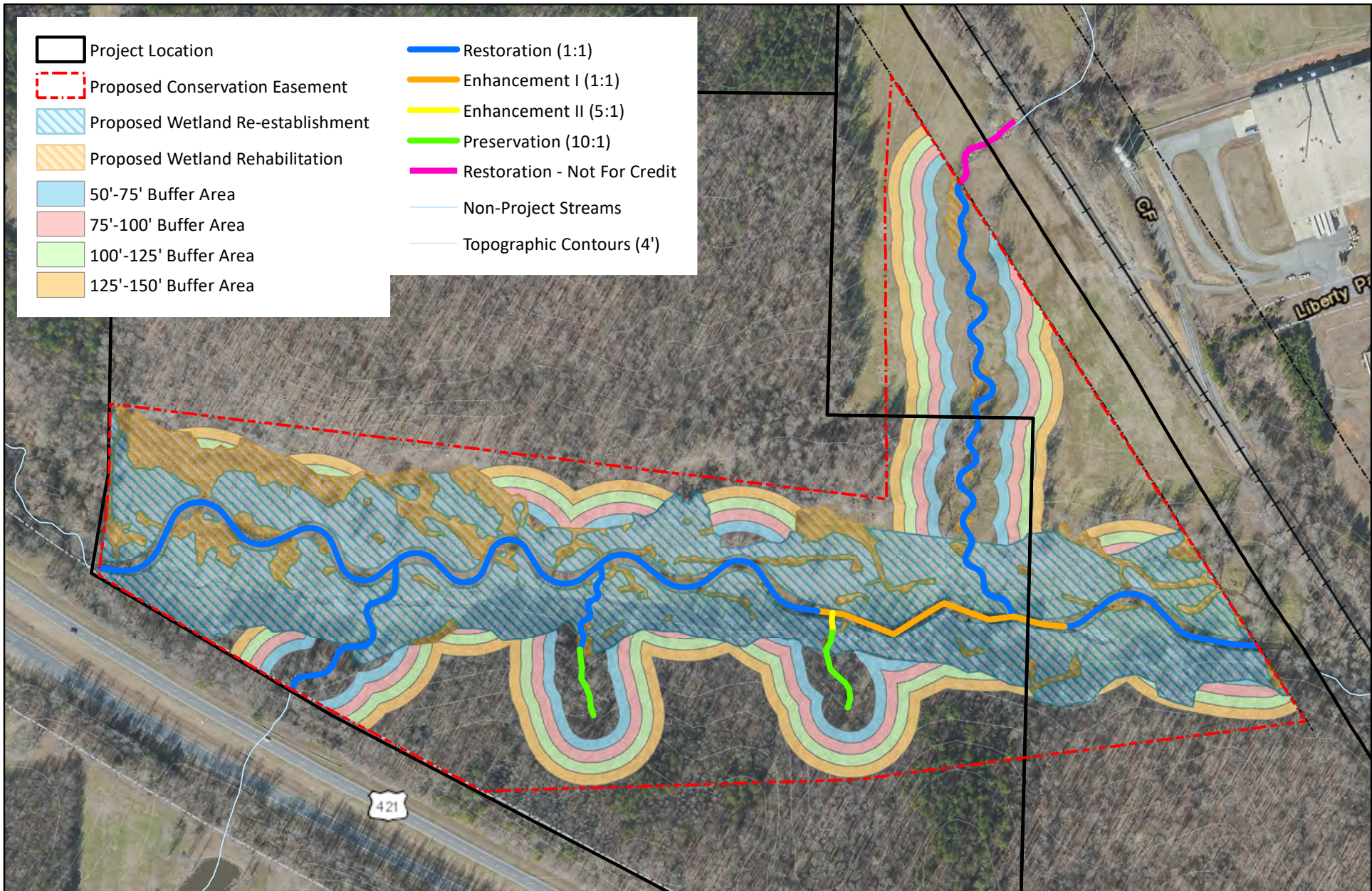
add additional stream credits to the project. The table below shows the credit breakdown from the proposal compared to this updated technical memo.

Restoration Activity	Credit Ratio	Proposal Credits	Credits as of 12/8/2020
Stream Restoration	1:1	5,051	4,273
Stream Enhancement I	1:1	0	580
Stream Enhancement II	5:1	25	7
Preservation	10:1	42	34
Credit from Additional Buffers		-	252
Total Stream Credits		5,118	5,146

Wetland credits are not anticipated to be affected by this change in stream restoration approach along the Rocky River. Wetland credits will be updated according to results of the preliminary JD and stream design in the draft mitigation plan.

Next Steps

Wildlands requests concurrence with the restoration and monitoring approaches provided in this memorandum for the development of the draft mitigation plan.



Mussel Surveys and Relocation Efforts

SCOPE OF WORK

Stream restoration will consist of realigning 3375 linear feet of stream channel throughout the proposed conservation easement. Three freshwater mussel species known in the Cape Fear River Basin are federally listed as “At Risk Species” (ARS) by the United States Fish and Wildlife Services (Table 1). Of the listed ARS, the State “Endangered” Atlantic pigtoe was listed as “Proposed “Threatened” in October 2018. The brook floater is State “Endangered” and the Savannah lilliput is State “Threatened” (Table 1).

Table 1. Protected Freshwater Mussel Species located in the Randolph County Cape Fear River Basin

Common Name	Species Name	Federal Status	State Status
Atlantic pigtoe	<i>Fusconaia masoni</i>	ARS* (Proposed Threatened)	Endangered
Brook floater	<i>Alasmidonta varicosa</i>	ARS*	Threatened
Savannah lilliput	<i>Toxolasma pullus</i>	ARS*	Endangered

*ARS =At Risk Species. Species that are Petitioned, Candidates or Proposed for Listing under the Endangered Species Act. Consultation under Section 7(a)(2) of the ESA is not required for Candidate or Proposed species; although a Conference, as described under Section 7(a)(4) of the ESA is recommended for actions affecting species proposed for listing.

SEPI will conduct the tasks in two phases: Phase 1 (Pre-construction) and Phase 2 (Post-Construction). The following tasks are based on recommendations from the North Carolina Wildlife Resources Commission.

Phase 1 (Pre-Construction)

Task 1- Identify freshwater mussel relocation reach (2 people)

Task 2- A maximum of three separate freshwater mussel surveys and relocations efforts will take place within the proposed 3375 ft reach proposed for realignment, and within the downstream reach (600 ft section between the railroad and Old 421). If no mussels are found during the second survey effort, then a third survey will not be necessary. (3 people)

Phase 2 (Post-Construction Monitoring)

Task 3- MY-01 Freshwater Mussel Surveys (Relocation Reach and Downstream Reach) (3 people)

Task 4- MY-02 Freshwater Mussel Surveys (Relocation Reach Only) (3 people)

Task 5- MY-03 Freshwater Mussel Surveys (Restored Reach Only) (3 people)

Task 6- MY-05 Freshwater Mussel Surveys (Relocation Reach and Downstream Reach) (3 people)

Task 7- MY-07 Freshwater Mussel Surveys (Restored Reach Only) (3 people)

FRESHWATER MUSSEL SURVEY METHODOLOGIES

During the freshwater mussel survey efforts, areas of appropriate habitat will be searched, concentrating on the habitats preferred by freshwater mussels. The survey team will spread out across the creek into survey lanes using bathyscopes, snorkeling, and tactile methods. Freshwater mussels observed during Phase 1 will be moved to the relocation reach. Ones observed during Phase 2 will be recorded and placed back in the stream. During all surveys, fish observations will be recorded, and timed survey efforts will provide a Catch Per Unit Effort (CPUE) for freshwater mussels. A memo of the findings will be provided for each task, and the aquatic species data will be provided to the North Carolina Wildlife Resources Commission.



REPLY TO
ATTENTION OF:

DEPARTMENT OF THE ARMY
WILMINGTON DISTRICT, CORPS OF ENGINEERS
69 DARLINGTON AVENUE
WILMINGTON, NORTH CAROLINA 28403-1343

CESAW-RG/Browning

January 5, 2021

MEMORANDUM FOR RECORD

SUBJECT: Liberty Rock Mitigation Project - NCIRT Comments during 15-Day Updated Technical Memo Review

PURPOSE: The comments listed below were received during 15-day comment period in accordance with Section 332.8(o)(9) of the 2008 Mitigation Rule in response to the NCDMS Technical Proposal Update Review.

NCDMS Project Name: Liberty Rock Mitigation Site, Randolph County, NC

USACE AID#: SAW-2020-00047

15-Day Comment Deadline: January 4, 2021

USACE Comments, Kim Browning:

We agree with the revised proposal. The IRT requests copies of the mussel survey memos each time they are conducted, and will need to be reviewed prior to construction. We also request that we are notified prior to construction so we can schedule an IRT site visit.

WRC Comments, Travis Wilson:

We have reviewed memo and had some internal discussion and are in agreement with the information outlined. Obviously moving forward there will need to be additional coordination associated with specific issues such as identifying the relocation reaches etc. But we are in agreement with the new approach and it accurately captures our IRT discussions and WRC comments.

However what is still unclear is if Wildlands has the necessary mussel survey data to use during design. Wildlands needs a thorough survey of the reach that will be retained in place, plus some minimal additional upstream area in case adjustments are necessary for the tie in point. That survey information is important to identify sensitive areas that are currently providing habitat for mussels populations and can be accounted for during design and construction. We are not sure what level of mussel survey was conducted by their consultant, so it's possible they may have the necessary information we just aren't aware. Once that information is available WRC would like to see the results of the survey. Again, It's not necessary to have survey information for the reach that will be abandoned as those mussels, if present, will be relocated. If you have any additional questions please give me a call.

EPA Comments, Todd Bowers:

I have reviewed the technical memo concerning enhancement work, mussel habitat protection and the monitoring schedule for the mussels as well as revised credits for the work at Liberty Rock. I will defer to the wildlife agencies to provide critical input as far as the mussels are concerned with this site as it their purview and area of expertise. With that I have no further concerns or comments as it pertains to the Liberty Rock mitigation site technical Memo Option 3 dated 14 December 2020. Wildlands appears to have offered a reasonable and sound approach to providing functional uplift as well as gaining extra credit for wider riparian buffers and monitoring of important mussel species. Thank you for the opportunity to provide feedback on the aforementioned technical memo.

DWR Comments, Erin Davis:

DWR requests that the IRT get copies of the mussel survey memos (not just WRC), ideally as an appendix to the annual monitoring reports if the timing lines up.

USFWS Comments, Kathy Matthews:

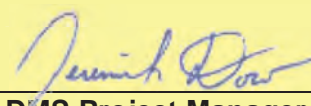

Emily and are comfortable with the proposal also, as long as the surveys are completed as required, and survey data and reports are shared with the USFWS. If a federally-listed species is documented, we would like to know that ASAP.

Kim Browning
Mitigation Project Manager
Regulatory Division

Appendix 6

Categorical Exclusion Form for Ecosystem Enhancement Program Projects Version 2

Note: Only Appendix A should be submitted (along with any supporting documentation) as the environmental document.

Part 1: General Project Information	
Project Name:	Liberty Rock Mitigation Site
County Name:	Randolph County
DMS Number:	100135
Project Sponsor:	Wildlands Engineering, Inc.
Project Contact Name:	Kirsten Gimbert
Project Contact Address:	1430 S. Mint Street, Suite 104, Charlotte, NC 28203
Project Contact E-mail:	kgimbert@wildlandseng.com
DMS Project Manager:	Jeremiah Dow
Project Description	
<p>The project includes stream restoration and preservation and wetland re-establishment and rehabilitation. The site is located on an active livestock operation where cattle have access to proposed easement area. Mitigation project goals are to provide ecological and water quality enhancements to the Cape Fear River Basin while creating a functional riparian corridor at the site level. This will be accomplished by excluding livestock from stream channels, restoring and enhancing native floodplain and wetland vegetation, improving the stability of stream channels, improving instream habitat, re-establishing and rehabilitating riparian wetlands, and permanently protecting and preserving the project site through establishing a conservation easement.</p>	
For Official Use Only	
Reviewed By: <div style="text-align: center; border-bottom: 1px solid black; width: 100px; margin: 0 auto;">03/23/2020</div>	<div style="text-align: center; margin-bottom: 10px;">  DMS Project Manager </div>
Conditional Approved By: <div style="text-align: center; border-bottom: 1px solid black; width: 100px; margin: 0 auto;"> </div>	<div style="text-align: center; margin-bottom: 10px;"> For Division Administrator FHWA </div>
<input type="checkbox"/> Check this box if there are outstanding issues	
Final Approval By: <div style="text-align: center; border-bottom: 1px solid black; width: 100px; margin: 0 auto;">3-23-20</div>	<div style="text-align: center; margin-bottom: 10px;">  For Division Administrator FHWA </div>
Date	Date

Part 2: All Projects Regulation/Question		Response
Coastal Zone Management Act (CZMA)		
1. Is the project located in a CAMA county?		<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
2. Does the project involve ground-disturbing activities within a CAMA Area of Environmental Concern (AEC)?		<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A
3. Has a CAMA permit been secured?		<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A
4. Has NCDRCM agreed that the project is consistent with the NC Coastal Management Program?		<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A
Comprehensive Environmental Response, Compensation and Liability Act (CERCLA)		
1. Is this a "full-delivery" project?		<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
2. Has the zoning/land use of the subject property and adjacent properties ever been designated as commercial or industrial?		<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A
3. As a result of a limited Phase I Site Assessment, are there known or potential hazardous waste sites within or adjacent to the project area?		<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A
4. As a result of a Phase I Site Assessment, are there known or potential hazardous waste sites within or adjacent to the project area?		<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A
5. As a result of a Phase II Site Assessment, are there known or potential hazardous waste sites within the project area?		<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A
6. Is there an approved hazardous mitigation plan?		<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A
National Historic Preservation Act (Section 106)		
1. Are there properties listed on, or eligible for listing on, the National Register of Historic Places in the project area?		<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
2. Does the project affect such properties and does the SHPO/THPO concur?		<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A
3. If the effects are adverse, have they been resolved?		<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A
Uniform Relocation Assistance and Real Property Acquisition Policies Act (Uniform Act)		
1. Is this a "full-delivery" project?		<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
2. Does the project require the acquisition of real estate?		<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A
3. Was the property acquisition completed prior to the intent to use federal funds?		<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A
4. Has the owner of the property been informed: * prior to making an offer that the agency does not have condemnation authority; and * what the fair market value is believed to be?		<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A

Part 3: Ground-Disturbing Activities Regulation/Question		Response
American Indian Religious Freedom Act (AIRFA)		
1. Is the project located in a county claimed as "territory" by the Eastern Band of Cherokee Indians?		<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
2. Is the site of religious importance to American Indians?		<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A
3. Is the project listed on, or eligible for listing on, the National Register of Historic Places?		<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A
4. Have the effects of the project on this site been considered?		<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A
Antiquities Act (AA)		
1. Is the project located on Federal lands?		<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
2. Will there be loss or destruction of historic or prehistoric ruins, monuments or objects of antiquity?		<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A
3. Will a permit from the appropriate Federal agency be required?		<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A
4. Has a permit been obtained?		<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A
Archaeological Resources Protection Act (ARPA)		
1. Is the project located on federal or Indian lands (reservation)?		<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
2. Will there be a loss or destruction of archaeological resources?		<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A
3. Will a permit from the appropriate Federal agency be required?		<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A
4. Has a permit been obtained?		<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A
Endangered Species Act (ESA)		
1. Are federal Threatened and Endangered species and/or Designated Critical Habitat listed for the county?		<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
2. Is Designated Critical Habitat or suitable habitat present for listed species?		<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A
3. Are T&E species present or is the project being conducted in Designated Critical Habitat?		<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A
4. Is the project "likely to adversely affect" the species and/or "likely to adversely modify" Designated Critical Habitat?		<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A
5. Does the USFWS/NOAA-Fisheries concur in the effects determination?		<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A
6. Has the USFWS/NOAA-Fisheries rendered a "jeopardy" determination?		<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A

Executive Order 13007 (Indian Sacred Sites)	
1. Is the project located on Federal lands that are within a county claimed as "territory" by the EBCI?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
2. Has the EBCI indicated that Indian sacred sites may be impacted by the proposed project?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A
3. Have accommodations been made for access to and ceremonial use of Indian sacred sites?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A
Farmland Protection Policy Act (FPPA)	
1. Will real estate be acquired?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
2. Has NRCS determined that the project contains prime, unique, statewide or locally important farmland?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A
3. Has the completed Form AD-1006 been submitted to NRCS?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A
Fish and Wildlife Coordination Act (FWCA)	
1. Will the project impound, divert, channel deepen, or otherwise control/modify any water body?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
2. Have the USFWS and the NCWRC been consulted?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A
Land and Water Conservation Fund Act (Section 6(f))	
1. Will the project require the conversion of such property to a use other than public, outdoor recreation?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
2. Has the NPS approved of the conversion?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A
Magnuson-Stevens Fishery Conservation and Management Act (Essential Fish Habitat)	
1. Is the project located in an estuarine system?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
2. Is suitable habitat present for EFH-protected species?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A
3. Is sufficient design information available to make a determination of the effect of the project on EFH?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A
4. Will the project adversely affect EFH?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A
5. Has consultation with NOAA-Fisheries occurred?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A
Migratory Bird Treaty Act (MBTA)	
1. Does the USFWS have any recommendations with the project relative to the MBTA?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
2. Have the USFWS recommendations been incorporated?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A
Wilderness Act	
1. Is the project in a Wilderness area?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
2. Has a special use permit and/or easement been obtained from the maintaining federal agency?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A

Liberty Rock Mitigation Site
Categorical Exclusion

SUMMARY

Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA)

The Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) provides a Federal “Superfund” to clean up uncontrolled or abandoned hazardous-waste sites as well as accidents, spills, and other emergency releases of pollutants and contaminants into the environment.

As the Liberty Rock Mitigation Site is a full-delivery project; an EDR Radius Map Report with Geocheck was ordered for the site through Environmental Data Resources, Inc on January 10, 2020. Neither the target property nor the adjacent properties were listed in any of the Federal, State, or Tribal environmental databases searched by the EDR.

The EDR Radius Map Report identified one site within 0.5 mile from the target property having both a leaking underground storage tank (LUST) and a recorded report within the Incident Management Database (IMD). In addition, two sites identified within 1 mile from target property were reported being a state hazardous waste site (SHWS). These sites are all located outside of the target property, south of US-421. Overall, the assessment revealed no evidence of any “recognized environmental conditions” in connection with the target property.

The Executive Summary of the EDR report is included in the Appendix. The full report is available if needed.

National Historic Preservation Act (Section 106)

The National Historic Preservation Act declares a national policy of historic preservation to protect, rehabilitate, restore, and reuse districts, sites, buildings, structures, and objects significant in American architecture, history, archaeology, and culture, and Section 106 mandates that federal agencies take into account the effect of an undertaking on a property that is included in, or is eligible for inclusion in, the National Register of Historic Places.

One surveyed site is listed on the North Carolina State Historic Preservation Office within a five-mile radius of the site. The town of Liberty, north of the Site, is a historic district (SHPO Site ID: RD0025). The State Historic Preservation Office (SHPO) responded to a scoping letter requesting comment on the Liberty Rock Mitigation Site on January 28, 2020. SHPO stated they were aware of “no historic resources which would be affected by the project” and would have no further comment. All correspondence related to Section 106 is included in the Appendix.

Uniform Relocation Assistance and Real Property Acquisition Policies Act (Uniform Act)

These acts, collectively known as the Uniform Act, provide for uniform and equitable treatment of persons displaced from their homes, businesses, non-profit associations, or farms by federal and federally-assisted programs, and establish uniform and equitable land acquisition policies.

Liberty Rock Mitigation Site is a full-delivery project that includes land acquisition. Notification of the fair market value of the project property and the lack of condemnation authority by Wildlands was included in the signed Option Agreements for the project properties. A copy of the relevant section of each of the Option Agreements are included in the Appendix.

Endangered Species Act (ESA)

Section 7 of the ESA requires federal agencies, in consultation with and with the assistance of the Secretary of the Interior or of Commerce, as appropriate, to ensure that actions they authorize, fund or carry out are not likely to jeopardize the continued existence of threatened or endangered species or result in the destruction or adverse modification of critical habitat for these species.

The United States Fish and Wildlife Service (USFWS) Information for Planning and Consultation database



(IPaC) list of endangered species for the site includes the Cape Fear Shiner (*Notropis mekistocholas*), Atlantic Pigtoe (*Fusconaia masoni*), and the Schweinitz's Sunflower (*Helianthus schweinitzii*). The USFWS does not currently list any Critical Habitat Designations for the Federally listed species within Randolph County nor are there any current known occurrences of the above listed species within a 2-mile radius of the project site. Results of pedestrian surveys conducted on September 25, 2019 and December 18, 2019, indicated that the project area provides areas of suitable habitat for all three species on the list of threatened and endangered species that may occur within the project area. Wildlands conclusions and determinations are noted below and included in the Appendix.

Cape Fear Shiner

Wildlands identified areas within the river consistent with the Cape Fear shiner habitat preferences – gravel and cobble substrates with areas that offer cover and sufficient flow all year round. While the substrate and flow may offer habitat for the Cape Fear shiner, the water quality may not, as cattle have access to all streams on site. The project area was surveyed on December 18, 2019 and no individuals of the species were found. Wildlands' scientists walked the project streams and looked for specimens where potential habitat was found using a dip net. Two specimens were collected, however, neither were identified as the species of concern (Cape Fear Shiner). According to the North Carolina Natural Heritage Data Explorer database, the closest known population is approximately 13 miles from this project. Therefore, given the poor water quality, lack of specimens present, and the distance from known populations, Wildlands determined that the project “may affect, but is not likely to adversely affect” the Cape Fear shiner.

Atlantic Pigtoe

The proposed project will restore a portion of the Rocky River, the substrate of the river in this area consists of sand, gravel, and cobble with sufficient flow to push silt through the area. However, as stated above, the cattle have access to all streams on site so it is likely the water quality is too low for the Atlantic pigtoe. The project area was surveyed on December 18, 2019 and no individuals of the species were found. Wildlands' scientists walked the project streams and looked for specimens where potential habitat was found, digging into the substrate by hand. According to the North Carolina Natural Heritage Data Explorer database, the closest known population is approximately 7 miles from this project. Therefore, given the poor water quality, lack of specimens present, and the distance from known populations, Wildlands determined that the project “may affect, but is not likely to adversely affect” the Atlantic pigtoe.

Schweinitz's Sunflower

Wildlands identified open areas and pastures, as well as a railroad right-of-way adjacent to the site. However, no populations resembling the species were found during the pedestrian survey. The survey was performed within the blooming season from late August until frost (September 25, 2019). Because potential habitat was present, but no species were identified in the area, Wildlands determined the project will have a “no effect” on the Schweinitz's sunflower.

To meet regulatory requirements, a self-certification letter was submitted through the USFWS IPaC requesting comment from USFWS dated December 20, 2019. No written response from the USFWS was received within the 45-day response period. Therefore, Wildlands assumes USFWS has no comments regarding associated laws and do not have any information relevant to the project at the current time.



Farmland Protection Policy Act (FPPA)

The FPPA requires that, before taking or approving any federal action that would result in conversion of farmland, the agency must examine the effects of the action using the criteria set forth in the FPPA, and, if there are adverse effects, must consider alternatives to lessen them.

Liberty Rock Mitigation Site includes the conversion of prime farmland. As such, Form AD-1006 has been completed and submitted to the Natural Resources Conservation Service (NRCS). The completed form and correspondence documenting its submittal is included in the Appendix.

Fish and Wildlife Coordination Act (FWCA)

The FWCA requires consultation with the USFWS and the appropriate state wildlife agency on projects that alter or modify a water body. Reports and recommendations prepared by these agencies document project effects on wildlife and identify measures that may be adopted to prevent loss or damage to wildlife resources.

The Liberty Rock Mitigation Site includes stream restoration, enhancement, and preservation. Wildlands requested comment on the project from both the USFWS and the North Carolina Wildlife Resources Commission (NCWRC) on December 20 and 23, 2019, respectively. No response from the USFWS was received within the 45-day response period. Therefore, Wildlands assumes USFWS has no comments regarding associated laws and do not have any information relevant to the project at the current time. NCWRC responded to the scoping letter on January 13, 2020 noting it is unlikely that stream and wetland mitigation will adversely affect any federal or state-listed species.

In addition, NCWRC also provided recommendations to minimize impacts to aquatic and terrestrial wildlife. Wildlands has reviewed these requests and will incorporate their recommendations as follows (Wildlands response to NCWRC comments below in *italics*).

1. We recommend a preliminary site inspection for mussels and potential Greensboro burrowing crayfish burrows. We have included an information sheet on preliminary site inspections for the Greensboro burrowing crayfish. Please notify Brena Jones, Central Aquatic Wildlife Diversity Coordinator (brena.jones@ncwildlife.org, 919-707-0369), if any potential mussels or Greensboro burrowing crayfish or burrows are located.

Wildlands contacted Ms. Jones to coordinate a site inspection with the NCWRC agency. A site visit was conducted by NCWRC on February 28, 2020, no Greensboro crayfish specimens were found. However, NCWRC identified mussel species that are native and a NC species of concern. Wildlands has coordinated with NCWRC and will develop a relocation plan with NCWRC oversight. A summary of the results and the relocation plan will be provided in the mitigation plan.

2. Due to the decline in bat populations, we recommend leaving snags and mature trees, or if necessary, remove trees outside the maternity roosting season for bats (May 15 – August 15).

Yes, Wildlands will plan to leave snags and mature trees where possible, especially for the enhancement areas and the wooded preservation portion of the project.

3. We recommend that riparian buffers are as wide as possible, given site constraints and landowner needs. NCWRC generally recommends a woody buffer of 100 feet on perennial streams to maximize the benefits of buffers, including bank stability, stream shading, treatment of overland runoff, and wildlife habitat.

All project streams will have adequate riparian buffers.



4. Due to the potential for state-listed species to occur downstream of the site, we request stringent sediment and erosion control measures.

Wildlands will receive all necessary erosion and sediment control permits prior to constructing the project.

5. The use of biodegradable and wildlife-friendly sediment and erosion control devices is strongly recommended. Silt fencing, fiber rolls and/or other products should have loose-weave netting that is made of natural fiber materials with movable joints between the vertical and horizontal twines. Silt fencing that has been reinforced with plastic or metal mesh should be avoided as it impedes the movement of terrestrial wildlife species. Excessive silt and sediment loads can have detrimental effects on aquatic resources including destruction of spawning habitat, suffocation of eggs, and clogging of gills.

As stated above, Wildlands will receive all necessary erosion and sediment control permits prior to constructing the project.

All correspondence with the two agencies is included in the appendix.

Migratory Bird Treaty Act (MBTA)

The MBTA makes it unlawful for anyone to kill, capture, collect, possess, buy, sell, trade, ship, import, or export any migratory bird. The indirect killing of birds by destroying their nests and eggs is covered by the MBTA, so construction in nesting areas during nesting seasons can constitute a taking.

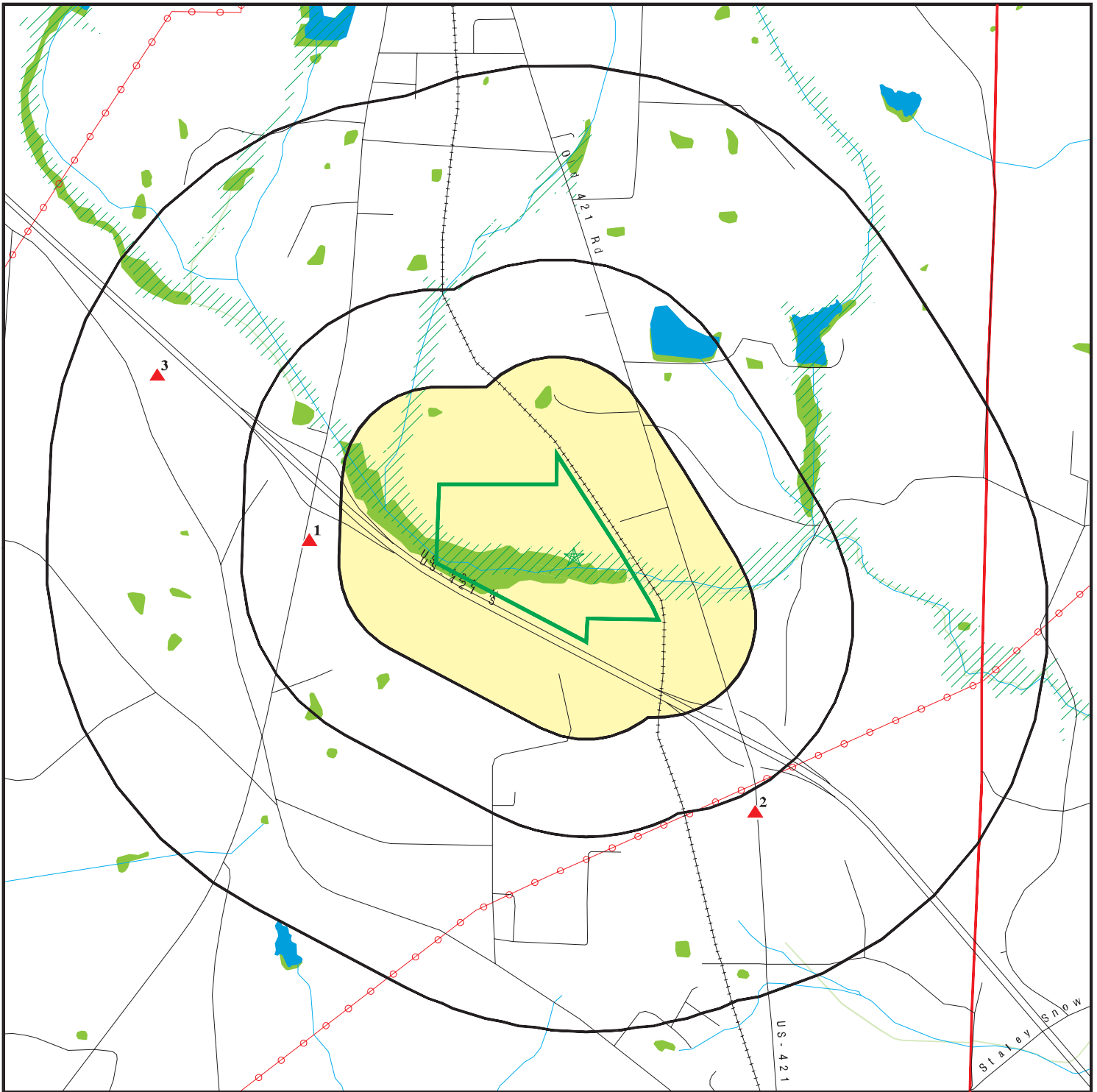
Wildlands requested comment on the Liberty Rock Site from the USFWS in regard to migratory birds on December 20, 2019. The USFWS has not responded at this time. All correspondence with USFWS is included in the Appendix.



Liberty Rock Mitigation Site
Categorical Exclusion

APPENDIX

OVERVIEW MAP - 5931062.2S



Target Property

Sites at elevations higher than or equal to the target property

Sites at elevations lower than the target property

Manufactured Gas Plants

National Priority List Sites

Dept. Defense Sites

Indian Reservations BIA

County Boundary

Power transmission lines

Special Flood Hazard Area (1%)

0.2% Annual Chance Flood Hazard

National Wetland Inventory

State Wetlands

Hazardous Substance Disposal Sites

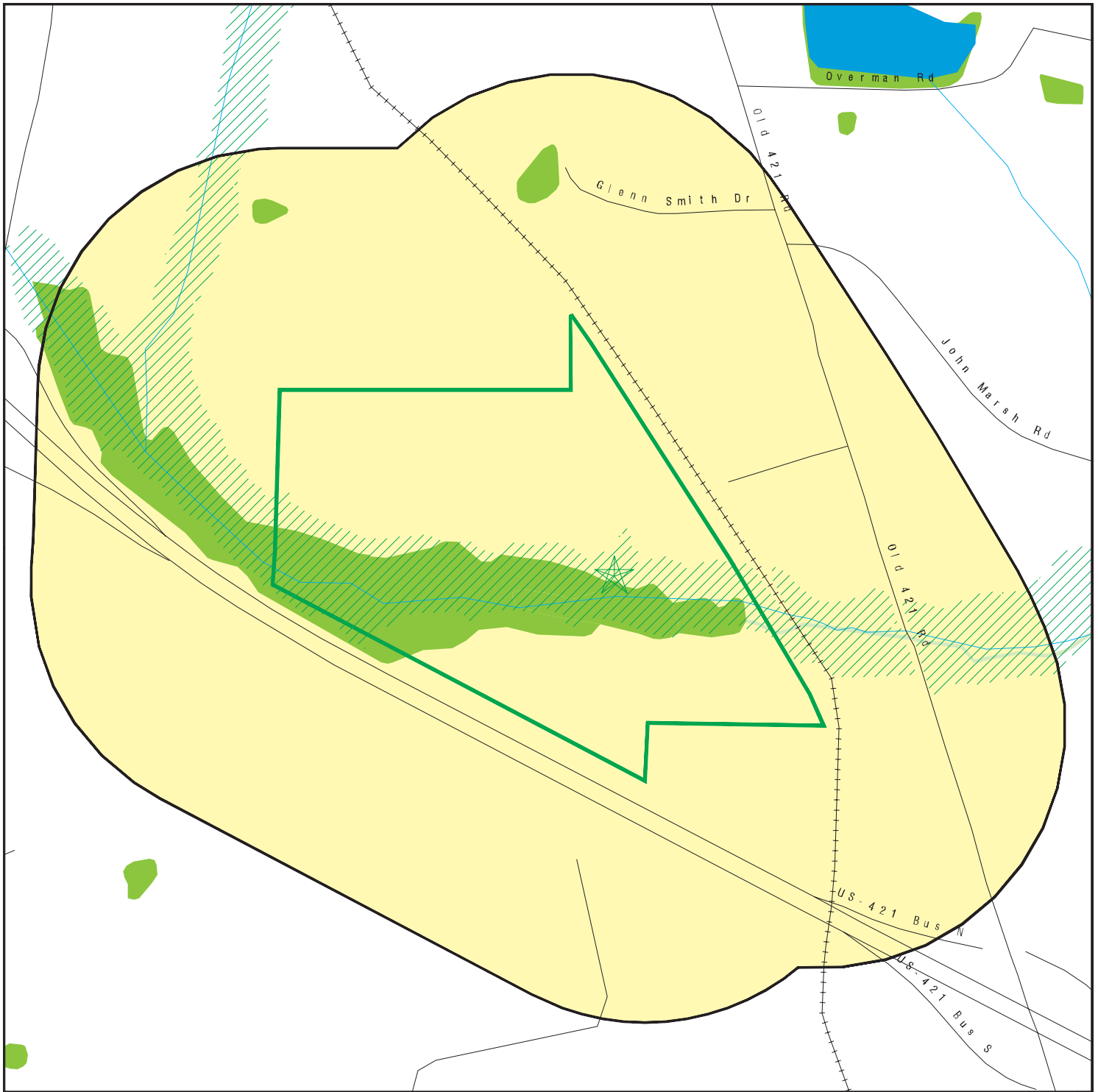









This report includes Interactive Map Layers to display and/or hide map information. The legend includes only those icons for the default map view.







SITE NAME: Liberty Rock Mitigation Site
 ADDRESS: PO BOX 542
 Liberty NC 27298
 LAT/LONG: 35.820399 / 79.561923

CLIENT: Wildlands Eng, Inc.
 CONTACT: Kirsten Gimbert
 INQUIRY #: 5931062.2s
 DATE: January 10, 2020 11:16 am

DETAIL MAP - 5931062.2S



-  Target Property
-  Sites at elevations higher than or equal to the target property
-  Sites at elevations lower than the target property
-  Manufactured Gas Plants
-  Sensitive Receptors
-  National Priority List Sites
-  Dept. Defense Sites

-  Indian Reservations BIA
-  Special Flood Hazard Area (1%)
-  0.2% Annual Chance Flood Hazard
-  National Wetland Inventory
-  State Wetlands
-  Hazardous Substance Disposal Sites

This report includes Interactive Map Layers to display and/or hide map information. The legend includes only those icons for the default map view.

SITE NAME: Liberty Rock Mitigation Site
 ADDRESS: PO BOX 542
 Liberty NC 27298
 LAT/LONG: 35.820399 / 79.561923

CLIENT: Wildlands Eng, Inc.
 CONTACT: Kirsten Gimbert
 INQUIRY #: 5931062.2s
 DATE: January 10, 2020 11:16 am



December 23, 2019

Renee Gledhill-Earley

State Historic Preservation Office
4617 Mail Service Center
Raleigh, NC 27699-4617

Subject: Liberty Rock Mitigation Site
Randolph County, North Carolina

Dear Ms. Gledhill-Earley,

Wildlands Engineering, Inc. requests review and comment on any possible issues that might emerge with respect to archaeological or cultural resources associated with a potential stream and wetland restoration project on the Liberty Rock Mitigation Site located in Randolph County, NC. A USGS Topographic Map and a Site Map showing the approximate project area are enclosed. The topographic figure was prepared from the Liberty 7.5-Minute USGS Topographic Quadrangle, and the site is located at latitude 35.823 longitude -79.561.

The Liberty Rock Mitigation Site is being developed to provide stream and wetland mitigation in the Cape Fear River basin. The project includes stream restoration and preservation on Rocky River and four of its unnamed tributaries. In addition, riparian wetlands will be re-established and rehabilitated. The Rocky River drains to the Siler City Water Supply Lake approximately six miles downstream from the project site. The site is an active livestock operation where cattle have access to the entire area of proposed easement. The major goals of the stream and wetland mitigation project are to provide ecological and water quality enhancements to the Cape Fear River Basin while creating a functional riparian corridor at the site level. This will be accomplished by excluding livestock from stream channels, restoring and enhancing native floodplain and wetland vegetation, improving the stability of stream channels, improving instream habitat, re-establishing and rehabilitating riparian wetlands, and permanently protecting and preserving the project site through establishing a conservation easement. These actions will reduce fecal, nutrient, and sediment inputs to the Rocky River, and ultimately the Siler City water supply reservoir, as well as reconnect instream and terrestrial habitats on the site.

No surveyed sites listed on the North Carolina State Historic Preservation office are located within the project area. However, one surveyed site is listed on the North Carolina State Historic Preservation Office within the five-mile radius of the site. The town of Liberty, north of the Site, is a historic district (SHPO Site ID: RD0025). No other architectural structures or archaeological artifacts have been observed or noted during preliminary surveys of the site for restoration purposes. We ask that you review the site based on the attached information to determine the presence of any historic properties.

We thank you in advance for your timely response and cooperation. Please feel free to contact us with any questions that you may have concerning the extent of site disturbance associated with this project.

Sincerely,

A handwritten signature in cursive script that reads "Kirsten J. Gimbert".

Kirsten Gimbert, Senior Environmental Scientist

kgimbert@wildlandseng.com

704.941.9093

Attachment:

Figure 1 Site Map

Figure 2 USGS Topographic Map



North Carolina Department of Natural and Cultural Resources
State Historic Preservation Office

Ramona M. Bartos, Administrator

Governor Roy Cooper
Secretary Susi H. Hamilton

Office of Archives and History
Deputy Secretary Kevin Cherry

January 28, 2020

Kirsten Gimbert
Wildlands Engineering, Inc.
1430 South Mint Street
Suite 104
Charlotte, NC 28203

Re: Liberty Rock Mitigation Site, Randolph County, ER 20-0048

Dear Ms. Gimbert:

Thank you for your email of December 23, 2019, concerning the above project.

We have conducted a review of the project and are aware of no historic resources which would be affected by the project. Therefore, we have no comment on the project as proposed.

The above comments are made pursuant to Section 106 of the National Historic Preservation Act and the Advisory Council on Historic Preservation's Regulations for Compliance with Section 106 codified at 36 CFR Part 800.

Thank you for your cooperation and consideration. If you have questions concerning the above comment, contact Renee Gledhill-Earley, environmental review coordinator, at 919-814-6579 or environmental.review@ncdcr.gov. In all future communication concerning this project, please cite the above referenced tracking number.

Sincerely,

A handwritten signature in blue ink that reads "Renee Gledhill-Earley".

 Ramona Bartos, Deputy
State Historic Preservation Officer

TO BUYER: Wildlands Engineering, Inc.
1430 S. Mint Street, Suite 104
Charlotte, North Carolina 28203
Attention: Shawn D. Wilkerson
e-mail: swilkerson@wildlandseng.com

TO SELLER: Lyn Richardson
P.O. Box 542
Liberty, NC 27298
Email: lsrichardson@rtelco.net

Notice of change of address shall be given by written notice in the manner described in this paragraph.

3.6 **Assignment.** Buyer has the right to assign this agreement without the consent of Seller. No assignment will be effective unless the assignee has delivered to Seller a written assumption of Buyer's obligations under this agreement. Seller hereby releases Buyer from any obligations under this agreement arising after the effective date of any assignment of this agreement by Buyer.

3.7 **Value of Fee Simple Area; No Power of Eminent Domain.** In accordance with the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970, Buyer hereby notifies Seller that: (i) Buyer believes that the fair market value the Fee Simple Area is an amount equal to the Purchase Price; and (ii) Buyer does not have the power of eminent domain.

3.8 **Modification; Waiver.** No amendment of this agreement will be effective unless it is in writing and signed by the parties. No waiver of satisfaction of a condition or failure to comply with an obligation under this agreement will be effective unless it is in writing and signed by the party granting the waiver, and no such waiver will constitute a waiver of satisfaction of any other condition or failure to comply with any other obligation.

3.9 **Attorneys' Fees.** If either party commences an action against the other to interpret or enforce any of the terms of this agreement or because of the breach by the other party of any of the terms of this agreement, the losing party shall pay to the prevailing party reasonable attorneys' fees, expenses, court costs, litigation costs and any other expenses incurred in connection with the prosecution or defense of such action, whether or not the action is prosecuted to a final judgment.

3.10 **Memorandum of Option Agreement.** Concurrently with the signing of this agreement, Buyer and Seller agree to sign a Memorandum of Option which will be recorded against the Property in the Register of Deeds of the County stated in paragraph A.

3.11 **Tax Deferred Exchange.** If Seller desires to implement a tax-deferred exchange (the "Exchange") in connection with Buyer's purchase of the Fee Simple Area, the parties agree to cooperate in affecting the Exchange. Seller is responsible for all additional costs associated with the Exchange and Buyer shall not have any additional liability with respect to the Exchange. The parties will execute any additional documents required for the Exchange at no cost to Buyer.

3.12 **Brokers.** Shawn D. Wilkerson, Robert W. Bugg and Ian Hazelhoff are North Carolina Real Estate Brokers. Neither Buyer nor Seller has incurred any liability for any brokerage fee, commission or finder's fee in connection with this agreement or the transactions contemplated by this agreement.

Seller 
Seller  Buyer 



United States Department of the Interior

FISH AND WILDLIFE SERVICE



Raleigh Field Office
P.O. Box 33726
Raleigh, NC 27636-3726

Date: 12/20/2019

Self-Certification Letter

Project Name Liberty Rock

Dear Applicant:

Thank you for using the U.S. Fish and Wildlife Service (Service) Raleigh Ecological Services online project review process. By printing this letter in conjunction with your project review package, you are certifying that you have completed the online project review process for the project named above in accordance with all instructions provided, using the best available information to reach your conclusions. This letter, and the enclosed project review package, completes the review of your project in accordance with the Endangered Species Act of 1973 (16 U.S.C. 1531-1544, 87 Stat. 884), as amended (ESA), and the Bald and Golden Eagle Protection Act (16 U.S.C. 668-668c, 54 Stat. 250), as amended (Eagle Act). This letter also provides information for your project review under the National Environmental Policy Act of 1969 (P.L. 91-190, 42 U.S.C. 4321-4347, 83 Stat. 852), as amended. A copy of this letter and the project review package must be submitted to this office for this certification to be valid. This letter and the project review package will be maintained in our records.

The species conclusions table in the enclosed project review package summarizes your ESA and Eagle Act conclusions. Based on your analysis, mark all the determinations that apply:

- “no effect” determinations for proposed/listed species and/or proposed/designated critical habitat; and/or
- “may affect, not likely to adversely affect” determinations for proposed/listed species and/or proposed/designated critical habitat; and/or
- “may affect, likely to adversely affect” determination for the Northern long-eared bat (*Myotis septentrionalis*) and relying on the findings of the January 5, 2016, Programmatic Biological Opinion for the Final 4(d) Rule on the Northern long-eared bat;
- “no Eagle Act permit required” determinations for eagles.

We certify that use of the online project review process in strict accordance with the instructions provided as documented in the enclosed project review package results in reaching the appropriate determinations. Therefore, we concur with the “no effect” or “not likely to adversely affect” determinations for proposed and listed species and proposed and designated critical habitat; the “may affect” determination for Northern long-eared bat; and/or the “no Eagle Act permit required” determinations for eagles. Additional coordination with this office is not needed. Candidate species are not legally protected pursuant to the ESA. However, the Service encourages consideration of these species by avoiding adverse impacts to them. Please contact this office for additional coordination if your project action area contains candidate species. Should project plans change or if additional information on the distribution of proposed or listed species, proposed or designated critical habitat, or bald eagles becomes available, this determination may be reconsidered. This certification letter is valid for 1 year. Information about the online project review process including instructions, species information, and other information regarding project reviews within North Carolina is available at our website <http://www.fws.gov/raleigh/pp.html>. If you have any questions, you can write to us at Raleigh@fws.gov or please contact Leigh Mann of this office at 919-856-4520, ext. 10.

Sincerely,

/s/Pete Benjamin

Pete Benjamin
Field Supervisor
Raleigh Ecological Services

Enclosures - project review package

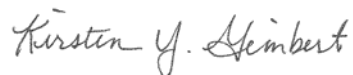
Species Conclusions Table

Project Name: Liberty Rock Mitigation Site

Date: 12/20/2019 (REV 3/13/2020)

Species / Resource Name	Conclusion	ESA Section 7 / Eagle Act Determination	Notes / Documentation
Cape Fear Shiner (<i>Notropis mekistocholas</i>)	Suitable habitat present	May affect, not likely to adversely affect	A field survey was conducted on December 18, 2019 and, although there is suitable habitat, no individuals of the species were found. Sampling for species was conducted where suitable in-stream habitat was located along the project streams using a dip net. Two specimens were collected, however, neither were identified as the Cape Fear Shiner. Per NCNHP data explorer, no known element occurrences exist within the proposed project area. The proposed project is approximately 13 miles from the closest known population recorded and is not located in the critical habitat area designated by USFWS for this species.
Atlantic Pigtoe (<i>Fusconaia masoni</i>)	Suitable habitat present	May affect, not likely to adversely affect	A Field Survey was conducted on December 18, 2019 and, although there is suitable habitat, no individuals of the species were found. Sampling for species was conducted where suitable in-stream habitat was located along the project streams, digging into the substrate by hand. Per NCNHP data explorer, no known element occurrences exist within the proposed project area. The proposed project is approximately 7 miles from the closest known population and is not located in the proposed critical habitat area designated by USFWS for this species.
Schweinitz's Sunflower (<i>Helianthus schweinitzii</i>)	Suitable habitat present	No effect	A Field Survey was conducted on September 25, 2019 during the blooming season of the plant and, although there is suitable habitat, no individuals of the species were found. No critical habitat has been designated by USFWS for this species. Per NCNHP data explorer, no known element occurrences exist within the proposed project area.
Bald Eagle	Unlikely to disturb nesting bald eagles	No Eagle Act Permit Required	Per NCNHP data explorer, no known element occurrences or nests exist within the proposed project area.
Critical Habitat	No critical habitat present		

Acknowledgement: I agree that the above information about my proposed project is true. I used all of the provided resources to make an informed decision about impacts in the immediate and surrounding areas.



Senior Environmental Scientist

12/20/2019 (REV 3/13/2020)

Signature /Title

Date



United States Department of the Interior



FISH AND WILDLIFE SERVICE
Raleigh Ecological Services Field Office
Post Office Box 33726
Raleigh, NC 27636-3726
Phone: (919) 856-4520 Fax: (919) 856-4556

In Reply Refer To:
Consultation Code: 04EN2000-2020-SLI-0326
Event Code: 04EN2000-2020-E-00742
Project Name: Liberty Rock

December 06, 2019

Subject: List of threatened and endangered species that may occur in your proposed project location, and/or may be affected by your proposed project

To Whom It May Concern:

The species list generated pursuant to the information you provided identifies threatened, endangered, proposed and candidate species, as well as proposed and final designated critical habitat, that may occur within the boundary of your proposed project and/or may be affected by your proposed project. The species list fulfills the requirements of the U.S. Fish and Wildlife Service (Service) under section 7(c) of the Endangered Species Act (Act) of 1973, as amended (16 U.S.C. 1531 *et seq.*).

New information based on updated surveys, changes in the abundance and distribution of species, changed habitat conditions, or other factors could change this list. Please feel free to contact us if you need more current information or assistance regarding the potential impacts to federally proposed, listed, and candidate species and federally designated and proposed critical habitat. Please note that under 50 CFR 402.12(e) of the regulations implementing section 7 of the Act, the accuracy of this species list should be verified after 90 days. This verification can be completed formally or informally as desired. The Service recommends that verification be completed by visiting the ECOS-IPaC website at regular intervals during project planning and implementation for updates to species lists and information. An updated list may be requested through the ECOS-IPaC system by completing the same process used to receive the enclosed list.

Section 7 of the Act requires that all federal agencies (or their designated non-federal representative), in consultation with the Service, insure that any action federally authorized, funded, or carried out by such agencies is not likely to jeopardize the continued existence of any federally-listed endangered or threatened species. A biological assessment or evaluation may be prepared to fulfill that requirement and in determining whether additional consultation with the Service is necessary. In addition to the federally-protected species list, information on the species' life histories and habitats and information on completing a biological assessment or

evaluation and can be found on our web page at <http://www.fws.gov/raleigh>. Please check the web site often for updated information or changes

If your project contains suitable habitat for any of the federally-listed species known to be present within the county where your project occurs, the proposed action has the potential to adversely affect those species. As such, we recommend that surveys be conducted to determine the species' presence or absence within the project area. The use of North Carolina Natural Heritage program data should not be substituted for actual field surveys.

If you determine that the proposed action may affect (i.e., likely to adversely affect or not likely to adversely affect) a federally-protected species, you should notify this office with your determination, the results of your surveys, survey methodologies, and an analysis of the effects of the action on listed species, including consideration of direct, indirect, and cumulative effects, before conducting any activities that might affect the species. If you determine that the proposed action will have no effect (i.e., no beneficial or adverse, direct or indirect effect) on federally listed species, then you are not required to contact our office for concurrence (unless an Environmental Impact Statement is prepared). However, you should maintain a complete record of the assessment, including steps leading to your determination of effect, the qualified personnel conducting the assessment, habitat conditions, site photographs, and any other related articles.

Please be aware that bald and golden eagles are protected under the Bald and Golden Eagle Protection Act (16 U.S.C. 668 *et seq.*), and projects affecting these species may require development of an eagle conservation plan (http://www.fws.gov/windenergy/eagle_guidance.html). Additionally, wind energy projects should follow the wind energy guidelines (<http://www.fws.gov/windenergy/>) for minimizing impacts to migratory birds and bats.

Guidance for minimizing impacts to migratory birds for projects including communications towers (e.g., cellular, digital television, radio, and emergency broadcast) can be found at: <http://www.fws.gov/migratorybirds/CurrentBirdIssues/Hazards/towers/towers.htm>; <http://www.towerkill.com>; and <http://www.fws.gov/migratorybirds/CurrentBirdIssues/Hazards/towers/comtow.html>.

Not all Threatened and Endangered Species that occur in North Carolina are subject to section 7 consultation with the U.S Fish and Wildlife Service. Atlantic and shortnose sturgeon, sea turtles, when in the water, and certain marine mammals are under purview of the National Marine Fisheries Service. If your project occurs in marine, estuarine, or coastal river systems you should also contact the National Marine Fisheries Service, <http://www.nmfs.noaa.gov/>

We appreciate your concern for threatened and endangered species. The Service encourages Federal agencies to include conservation of threatened and endangered species into their project planning to further the purposes of the Act. Please include the Consultation Tracking Number in the header of this letter with any request for consultation or correspondence about your project that you submit to our office. If you have any questions or comments, please contact John Ellis of this office at john_ellis@fws.gov.

Attachment(s):

- Official Species List

Official Species List

This list is provided pursuant to Section 7 of the Endangered Species Act, and fulfills the requirement for Federal agencies to "request of the Secretary of the Interior information whether any species which is listed or proposed to be listed may be present in the area of a proposed action".

This species list is provided by:

Raleigh Ecological Services Field Office

Post Office Box 33726

Raleigh, NC 27636-3726

(919) 856-4520

Project Summary

Consultation Code: 04EN2000-2020-SLI-0326

Event Code: 04EN2000-2020-E-00742

Project Name: Liberty Rock

Project Type: LAND - RESTORATION / ENHANCEMENT

Project Description: Mitigation Site

Project Location:

Approximate location of the project can be viewed in Google Maps: <https://www.google.com/maps/place/35.821171917681596N79.56151331870429W>



Counties: Randolph, NC

Endangered Species Act Species

There is a total of 3 threatened, endangered, or candidate species on this species list.

Species on this list should be considered in an effects analysis for your project and could include species that exist in another geographic area. For example, certain fish may appear on the species list because a project could affect downstream species.

IPaC does not display listed species or critical habitats under the sole jurisdiction of NOAA Fisheries¹, as USFWS does not have the authority to speak on behalf of NOAA and the Department of Commerce.

See the "Critical habitats" section below for those critical habitats that lie wholly or partially within your project area under this office's jurisdiction. Please contact the designated FWS office if you have questions.

-
1. [NOAA Fisheries](#), also known as the National Marine Fisheries Service (NMFS), is an office of the National Oceanic and Atmospheric Administration within the Department of Commerce.

Fishes

NAME	STATUS
Cape Fear Shiner <i>Notropis mekistocholas</i> There is final critical habitat for this species. Your location is outside the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/6063	Endangered

Clams

NAME	STATUS
Atlantic Pigtoe <i>Fusconaia masoni</i> There is proposed critical habitat for this species. Your location is outside the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/5164	Proposed Threatened

Flowering Plants

NAME	STATUS
Schweinitz's Sunflower <i>Helianthus schweinitzii</i> No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/3849	Endangered

Critical habitats

THERE ARE NO CRITICAL HABITATS WITHIN YOUR PROJECT AREA UNDER THIS OFFICE'S JURISDICTION.

Kirsten Gimbert

From: Kirsten Gimbert
Sent: Friday, February 21, 2020 1:38 PM
To: Cortes, Milton - NRCS, Raleigh, NC
Subject: AD1006 FPPA -Liberty Rock
Attachments: FPPA_AD1006 Liberty Rock 2.21.2020.pdf

Milton,

Please find attached to the email the completed FPPA AD1006 Form for the Liberty Rock Mitigation Site.

Thank You,

Kirsten Gimbert | *Senior Environmental Scientist*
M: 704.941.9093

Wildlands Engineering, Inc.
1430 S. Mint St, Suite 104
Charlotte, NC 28203

FARMLAND CONVERSION IMPACT RATING

PART I <i>(To be completed by Federal Agency)</i>	Date Of Land Evaluation Request
Name Of Project	Federal Agency Involved
Proposed Land Use	County And State

PART II <i>(To be completed by NRCS)</i>		Date Request Received By NRCS	
Does the site contain prime, unique, statewide or local important farmland? <i>(If no, the FPPA does not apply -- do not complete additional parts of this form).</i>	Yes <input type="checkbox"/>	No <input type="checkbox"/>	Acres Irrigated
Major Crop(s)	Farmable Land In Govt. Jurisdiction Acres: %	Average Farm Size Amount Of Farmland As Defined in FPPA Acres: %	
Name Of Land Evaluation System Used	Name Of Local Site Assessment System	Date Land Evaluation Returned By NRCS	

PART III <i>(To be completed by Federal Agency)</i>	Alternative Site Rating			
	Site A	Site B	Site C	Site D
A. Total Acres To Be Converted Directly				
B. Total Acres To Be Converted Indirectly				
C. Total Acres In Site				

PART IV <i>(To be completed by NRCS)</i> Land Evaluation Information				
A. Total Acres Prime And Unique Farmland				
B. Total Acres Statewide And Local Important Farmland				
C. Percentage Of Farmland In County Or Local Govt. Unit To Be Converted				
D. Percentage Of Farmland In Govt. Jurisdiction With Same Or Higher Relative Value				

PART V <i>(To be completed by NRCS)</i> Land Evaluation Criterion Relative Value Of Farmland To Be Converted <i>(Scale of 0 to 100 Points)</i>				
--	--	--	--	--

PART VI <i>(To be completed by Federal Agency)</i> Site Assessment Criteria <i>(These criteria are explained in 7 CFR 658.5(b))</i>	Maximum Points				
1. Area In Nonurban Use					
2. Perimeter In Nonurban Use					
3. Percent Of Site Being Farmed					
4. Protection Provided By State And Local Government					
5. Distance From Urban Builtup Area					
6. Distance To Urban Support Services					
7. Size Of Present Farm Unit Compared To Average					
8. Creation Of Nonfarmable Farmland					
9. Availability Of Farm Support Services					
10. On-Farm Investments					
11. Effects Of Conversion On Farm Support Services					
12. Compatibility With Existing Agricultural Use					
TOTAL SITE ASSESSMENT POINTS	160				

PART VII <i>(To be completed by Federal Agency)</i>					
Relative Value Of Farmland <i>(From Part V)</i>	100				
Total Site Assessment <i>(From Part VI above or a local site assessment)</i>	160				
TOTAL POINTS <i>(Total of above 2 lines)</i>	260				

Site Selected:	Date Of Selection	Was A Local Site Assessment Used? Yes <input type="checkbox"/> No <input type="checkbox"/>
----------------	-------------------	---

Reason For Selection:



December 23, 2019

Olivia Munzer

North Carolina Wildlife Resource Commission
Western Piedmont Coordinator
2430 Turner Road
Mebane, NC 27302

Subject: Liberty Rock Mitigation Site
Randolph County, North Carolina

Dear Ms. Munzer,

Wildlands Engineering, Inc. requests review and comment on any possible issues that might emerge with respect to fish and wildlife issues associated with a potential stream and wetland restoration project on the Liberty Rock Mitigation Site located in Randolph County, NC. A USGS Topographic Map and a Site Map showing the approximate project area are enclosed. The topographic figure was prepared from the Liberty 7.5-Minute USGS Topographic Quadrangle, and the site is located at latitude 35.823 longitude -79.561.

The Liberty Rock Mitigation Site is being developed to provide stream and wetland mitigation in the Cape Fear River basin. The project includes stream restoration and preservation on Rocky River and four of its unnamed tributaries. In addition, riparian wetlands will be re-established and rehabilitated. The Rocky River drains to the Siler City Water Supply Lake approximately six miles downstream from the project site. The site is an active livestock operation where cattle have access to the entire area of proposed easement. The major goals of the stream and wetland mitigation project are to provide ecological and water quality enhancements to the Cape Fear River Basin while creating a functional riparian corridor at the site level. This will be accomplished by excluding livestock from stream channels, restoring and enhancing native floodplain and wetland vegetation, improving the stability of stream channels, improving instream habitat, re-establishing and rehabilitating riparian wetlands, and permanently protecting and preserving the project site through establishing a conservation easement. These actions will reduce fecal, nutrient, and sediment inputs to the Rocky River, and ultimately the Siler City water supply reservoir, as well as reconnect instream and terrestrial habitats on the site.

We thank you in advance for your timely response and cooperation. Please feel free to contact us with any questions that you may have concerning the extent of site disturbance associated with this project.

Sincerely,

A handwritten signature in cursive script that reads "Kirsten J. Gimbert".

Kirsten Gimbert, *Senior Environmental Scientist*

kgimbert@wildlandseng.com

704.941.9093

Attachment:

Figure 1 Site Map

Figure 2 USGS Topographic Map



◊ North Carolina Wildlife Resources Commission ◊

Gordon Myers, Executive Director

13 January 2020

Ms. Kirsten Gimbert
Wildlands Engineering, Inc.
1430 South Mint Street, Suite 104
Charlotte, North Carolina 28203

Subject: Request for Project Review and Comments
Liberty Rock Mitigation Site
Randolph County, North Carolina.

Dear Ms. Gimbert,

Biologists with the North Carolina Wildlife Resource Commission (NCWRC) received your request to review and comment on any possible concerns regarding the Liberty Rock Mitigation Site. Biologists with NCWRC have reviewed the provided documents. Comments are provided in accordance with provisions of the Fish and Wildlife Coordination Act (48 Stat. 401, as amended; 16 U.S.C. 661-667e) and North Carolina General Statutes (G.S. 113-131 et seq.).

The Liberty Rock Mitigation Site is located north of the intersection of Liberty Park Avenue and Scuffeltown Road near Liberty, Randolph County, North Carolina. The site occurs within an existing cattle pasture. The proposed project will remove cattle access to onsite stream channels, restoring and enhancing native floodplain and wetland vegetation, improve stability of stream channels, improve instream habitat, and re-establish and restore riparian wetlands. As a result, the proposed project is expected to reduce fecal coliform, nutrients, and sediment inputs to Rocky River in the Cape Fear River Basin, and eventually the Siler City water supply reservoir.

We have records for the state threatened notched rainbow (*Villosa constricta*) and state significantly rare eastern creekshell mussel (*V. delumbis*) downstream of the site in the Rocky River. The state special concern Greensboro burrowing crayfish (*Cambarus catagius*) has been documented in portions of Randolph County; however, the full extent of its distribution in this watershed is unknown due to lack of targeted surveys. The Greensboro burrowing crayfish has been found in all types of soils from sandy loams to hard clay and burrows are not usually directly associated with any drainage or stream flow (McGrath 1994). The lack of records from the site does not imply or confirm the absence of federal or state rare, threatened, or endangered species.

13 January 2020
Liberty Rock Mitigation Site
Randolph County

Stream restoration projects often improve water quality and aquatic habitat. Establishing native, forested buffers in riparian areas will help protect water quality, improve aquatic and terrestrial habitats, and provide a travel corridor for wildlife species. Based upon the information provided to NCWRC, it is unlikely that stream and wetland mitigation will adversely affect any federal or state-listed species. However, we offer the following recommendations to minimize impacts to aquatic and terrestrial wildlife resources:

1. We recommend a preliminary site inspection for mussels and potential Greensboro burrowing crayfish burrows. We have included an information sheet on preliminary site inspections for the Greensboro burrowing crayfish. Please notify Brena Jones, Central Aquatic Wildlife Diversity Coordinator (brena.jones@ncwildlife.org, 919-707-0369), if any potential mussels or Greensboro burrowing crayfish or burrows are located.
2. Due to the decline in bat populations, we recommend leaving snags and mature trees, or if necessary, remove trees outside the maternity roosting season for bats (May 15 – August 15).
3. We recommend that riparian buffers are as wide as possible, given site constraints and landowner needs. NCWRC generally recommends a woody buffer of 100 feet on perennial streams to maximize the benefits of buffers, including bank stability, stream shading, treatment of overland runoff, and wildlife habitat.
4. Due to the potential for state-listed species to occur downstream of the site, we request stringent sediment and erosion control measures.
5. The use of biodegradable and wildlife-friendly sediment and erosion control devices is strongly recommended. Silt fencing, fiber rolls and/or other products should have loose-weave netting that is made of natural fiber materials with movable joints between the vertical and horizontal twines. Silt fencing that has been reinforced with plastic or metal mesh should be avoided as it impedes the movement of terrestrial wildlife species. Excessive silt and sediment loads can have detrimental effects on aquatic resources including destruction of spawning habitat, suffocation of eggs, and clogging of gills.

Thank you for the opportunity to provide comments. If I can be of additional assistance, please call (919) 707-0364 or email olivia.munzer@ncwildlife.org.

Sincerely,



Olivia Munzer
Western Piedmont Habitat Conservation Coordinator
Habitat Conservation Program

Literature Cited

McGrath, C. 1994. Status survey for the Greensboro burrowing crayfish. Proceedings of the annual conference, Southeastern Association of Game and Fish Commissioners, 48: 343–349.

Ec: Mac Haupt, NCDWR
Brena Jones, NCDWR



Burrowing Crayfish Preliminary Site Inspection

The NC Wildlife Resources Commission (NCWRC) is seeking information on the Greensboro Burrowing Crayfish (GBC; *Cambarus catagius*), a rare endemic species and state listed as Special Concern. We are requesting assistance from consultants and other workers in the field to help identify sites in the permit review process which may have populations of GBC. This entails simply looking for signs of activity (details below) while you are already on the property. This may assist both the applicant and NCWRC with a more efficient project review. NCWRC is also interested in expanding and updating the understanding of GBC distribution and biology.

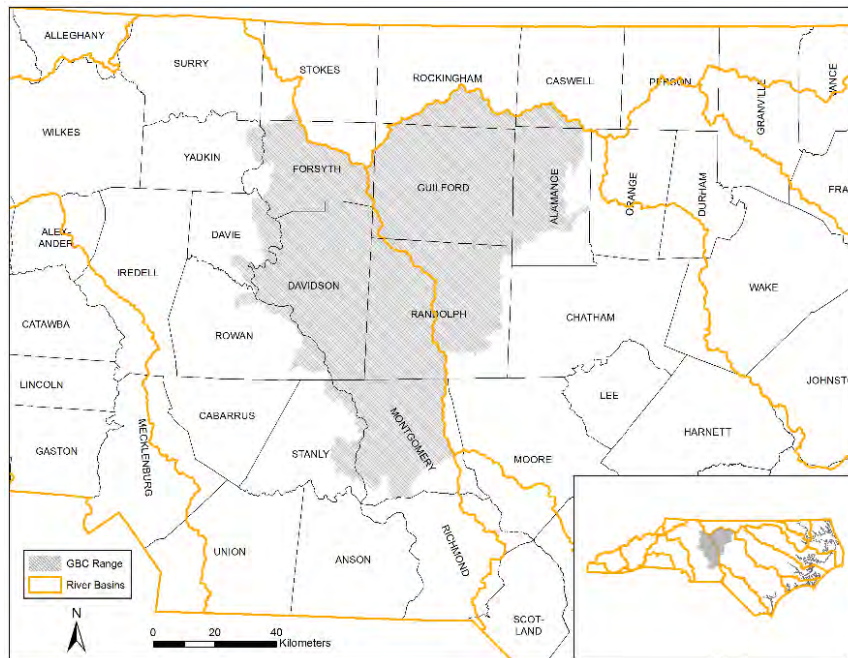
While walking the property, look for signs of burrowing crayfish activity. This may include entrance holes in the ground or in the banks/sides of ditches and streams, approximately 1-3” in diameter, or crayfish (photos on pg. 2). Greensboro Burrowing Crayfish are not currently known to build chimneys at burrow entrances but have been found near other chimney-building species.

This species does not require flowing surface water and can dig extensive burrows over 4’ deep, so they can be found in lawns or even dirt floors of garages or outbuildings.

If an inspection for crayfish is conducted, please note:

- How much and which portion of the property was inspected and by whom.
- If signs of activity are seen, please make note of where they are. Photographs are welcome.
- If no activity is seen after a targeted inspection, please note that information as well.

Include this information with permit application materials. If signs of burrowing crayfish activity are noted, a follow-up survey is recommended to determine whether GBC are present. If onsite staff have appropriate permits (state Scientific Collection Permit for Endangered Species) & expertise, they may conduct the survey. Contact Olivia Munzer with the NCWRC at olivia.munzer@ncwildlife.org with questions.



Greensboro Burrowing Crayfish Range Map



Greensboro Burrowing Crayfish, *Cambarus catagius* (photos by NCWRC)



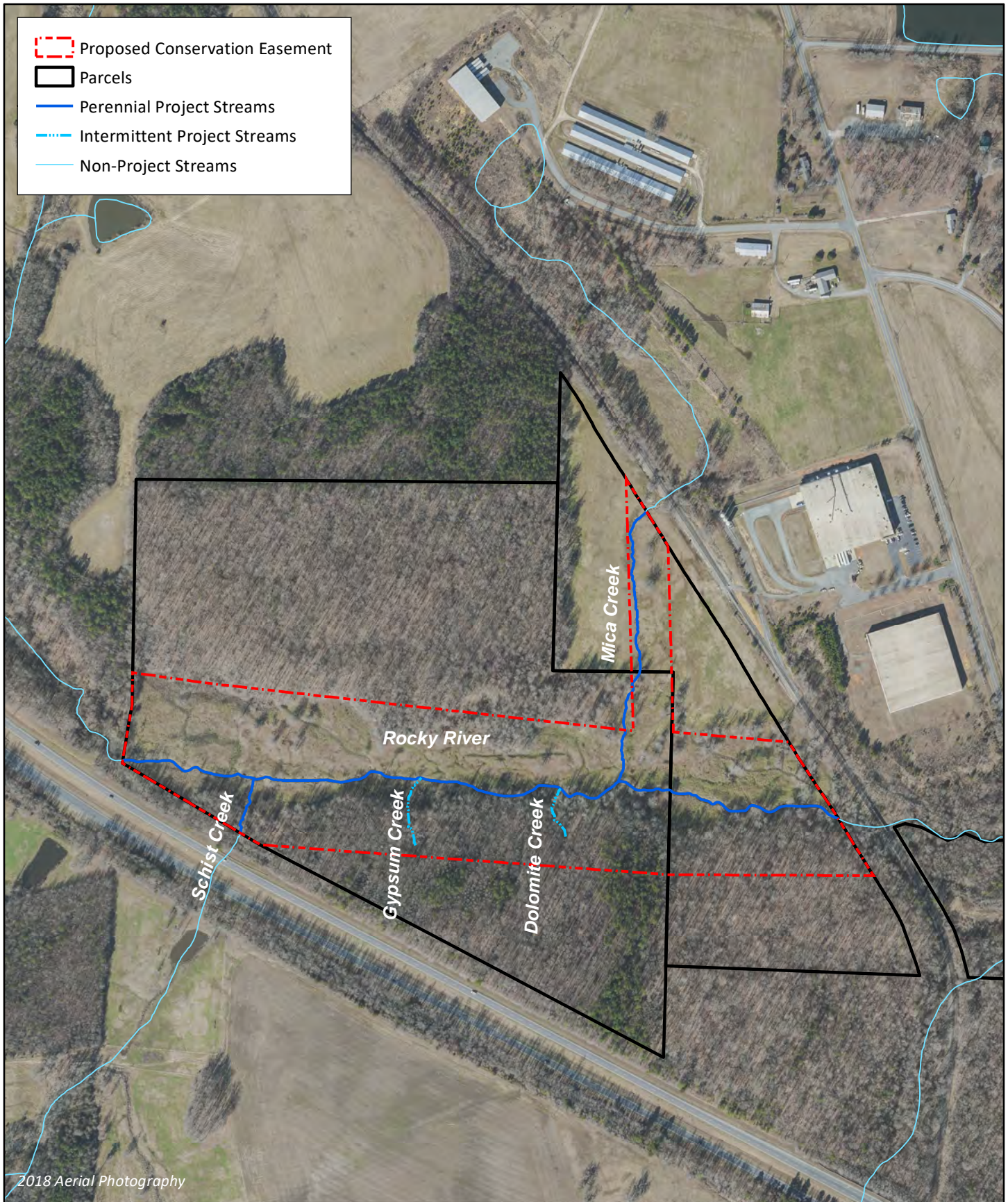
Examples of crayfish burrow holes



Example of crayfish chimney

Liberty Rock Mitigation Site
Categorical Exclusion

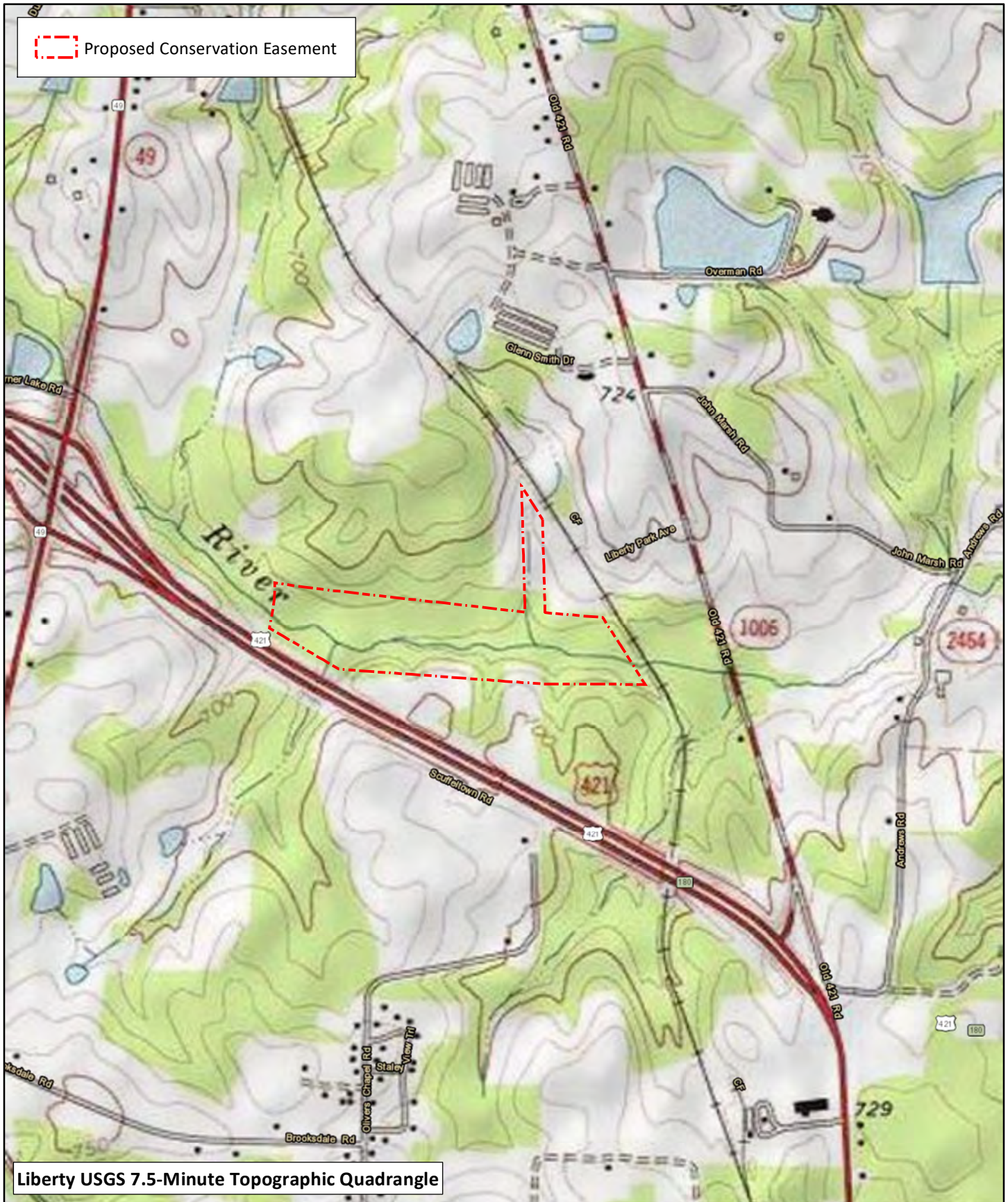
FIGURES



- Proposed Conservation Easement
- Parcels
- Perennial Project Streams
- Intermittent Project Streams
- Non-Project Streams



Figure 1 Site Map
 Liberty Rock Mitigation Site
 Cape Fear River Basin (03030003)
 Randolph County, NC



0 1,000 Feet



Figure 2 USGS Topographic Map
 Liberty Rock Mitigation Site
 Cape Fear River Basin (03030003)

Randolph County, NC

Appendix 7

Credit Release Schedule

All credit releases will be based on the total credit generated as reported in the approved final mitigation plan. Under no circumstances shall any mitigation project be debited until the necessary DA authorization has been received for its construction or the District Engineer (DE) has otherwise provided written approval for the project in the case where no DA authorization is required for construction of the mitigation project. The DE, in consultation with the Interagency Review Team (IRT), will determine if performance standards have been satisfied sufficiently to meet the requirements of the release schedules below. In cases where some performance standards have not been met, credits may still be released depending on the specifics of the case. Monitoring may be required to restart or be extended, depending on the extent to which the site fails to meet the specified performance standard. The release of project credits will be subject to the criteria described as follows:

Table A: Credit Release Schedule – Stream Credits

Credit Release Milestone	Credit Release Activity	Interim Release	Total Released
1	Site establishment	0%	0%
2	Completion of all initial physical and biological improvements made pursuant to the Mitigation Plan	30%	30%
3	Year 1 monitoring report demonstrates that channels are stable and interim performance standards have been met	10%	40%
4	Year 2 monitoring report demonstrates that channels are stable and interim performance standards have been met	10%	50%
5	Year 3 monitoring report demonstrates that channels are stable and interim performance standards have been met	10%	60%
6	Year 4 monitoring report demonstrates that channels are stable and interim performance standards have been met	5%	65% (75%*)
7	Year 5 monitoring report demonstrates that channels are stable and interim performance standards have been met	10%	75% (85%*)
8**	Year 6 monitoring report demonstrates that channels are stable and interim performance standards have been met	5%	80% (90%*)
9	Year 7 monitoring report demonstrates that channels are stable and interim performance standards have been met	10%	90% (100%*)

*10% reserve credits to be held back until the bankfull performance standard has been met.

**Please note that vegetation data may not be required with monitoring reports submitted during these monitoring years unless otherwise required by the Mitigation Plan or directed by the NCIRT.

Table B: Credit Release Schedule – Wetlands Credits

Credit Release Milestone	Credit Release Activity	Interim Release	Total Released
1	Site establishment	0%	0%
2	Completion of all initial physical and biological improvements made pursuant to the Mitigation Plan	30%	30%
3	First year monitoring report demonstrates performance standards are being met	10%	40%
4	Second year monitoring report demonstrates performance standards are being met	10%	50%
5	Third year monitoring report demonstrates performance standards are being met	15%	65%
6	Fourth year monitoring report demonstrates performance standards are being met	5%	70%
7	Fifth year monitoring report demonstrates performance standards are being met; Provided that all performance standards are met, the IRT may allow the DMS to discontinue hydrologic monitoring after the fifth year, but vegetation monitoring must continue for an additional two years after the fifth year for a total of seven years.	15%	85%
8	Sixth year monitoring report demonstrates performance standards are being met	5%	90%
9	Seventh year monitoring report demonstrates performance standards are being met, and project has received close-out approval	10%	100%

1.1 Initial Allocation of Released Credits

For In-Lieu-Fee (ILF) sites (including all NCDMS projects), no initial release of credits (Milestone 1) is provided because ILF programs utilize advance credits, so no initial release is necessary to help fund construction. To account for this, the 15% credit release associated with the first milestone (Site Establishment) is held until the second milestone, so the total credit release at the second milestone is 30%. In order for NCDMS to release (shown in schedules as Milestone 2) they must comply with the credit release requirements stated in Section IV(I)(3) of the approved NCDMS instrument. The Milestone 2 credit release, as specified in the mitigation plan, can be released by NCDMS without prior written approval of the DE upon satisfactory completion of the following activities:

- a. Approval of the final Mitigation Plan.
- b. Recordation of the preservation mechanism, as well as a title opinion acceptable to the USACE covering the property.
- c. Completion of project construction (the initial physical and biological improvements to the mitigation site) pursuant to the mitigation plan; per the DMS Instrument, construction means that a mitigation site has been constructed in its entirety, to include planting, and an as-built report has been produced. As-built reports must be sealed by an engineer prior to project closeout, if appropriate but not prior to the initial allocation of released credits.
- d. Receipt of necessary DA permit authorization or written DA approval for projects where DA permit issuance is not required.

1.2 Subsequent Credit Releases

All subsequent credit releases must be approved by the DE, in consultation with the IRT, based on a determination that required performance standards have been achieved. For stream projects a reserve

of 10% of a site's total stream credits shall be released after four bankfull events have occurred, in separate years, provided the channel is stable and all other performance standards are met. In the event that less than two bankfull events occur during the monitoring period, release of these reserve credits shall be at the discretion of the IRT. As projects approach milestones associated with credit release, the DMS will submit a request for credit release to the DE along with documentation substantiating achievement of criteria required for release to occur. This documentation will be included with the annual monitoring report.

Wilmington District Stream Buffer Credit Calculator

Site Name:	Liberty Rock Mitigation Site
USACE Action ID:	
NCDWR Project Number:	
Sponsor:	
Number of Exempt Terminal Stream Ends ¹ :	4
County:	Randolph
Minimum Required Buffer Width ² :	50

Mitigation Type	Mitigation Ratio Multiplier ³	Creditable Stream Length ⁴	Include in Buffer Calculations	Baseline Stream Credit	Buffered Stream Length	Credit From Buffered Streams
Restoration (1:1)	1	4247	Yes	4247.00	4247.00	4247.00
Enhancement I (1.5:1)	1.5					
Enhancement II (2.5:1)	2.5					
Preservation (5:1)	5					
Other (7.5:1)	7.5					
Other (10:1)	10	340	Yes	34.00	340.00	34.00
Custom Ratio 1	1	580	Yes	580.00	580.00	580.00
Custom Ratio 2	5	36	Yes	7.20	36.00	7.20
Custom Ratio 3						
Custom Ratio 4						
Custom Ratio 5						
Totals		5203.00		4868.20	5203.00	4868.20

Buffer Width Zone (feet from Ordinary High Water Mark)

Buffer Zones	less than 15 feet	>15 to 20 feet	>20 to 25 feet	>25 to 30 feet	>30 to 35 feet	>35 to 40 feet	>40 to 45 feet	>45 to 50 feet	>50 to 75 feet	>75 to 100 feet	>100 to 125 feet	>125 to 150 feet
Max Possible Buffer (square feet) ⁵	157503	53129	53443	53757	54071	54385	54699	55013	279775	287625	295475	303325
Ideal Buffer (square feet) ⁶	151160.73	49618.31	49354.63	49179.10	49026.40	48782.30	48484.45	48299.19	238870.32	235513.52	234745.04	235046.84
Actual Buffer (square feet) ⁷	148249.94	47795.70	47130.73	46554.50	46028.05	45425.15	44766.12	44218.57	79882.62	90680.08	107572.95	127225.27
Zone Multiplier	50%	10%	10%	10%	5%	5%	5%	5%	7%	5%	4%	4%
Buffer Credit Equivalent	2434.10	486.82	486.82	486.82	243.41	243.41	243.41	243.41	340.77	243.41	194.73	194.73
Percent of Ideal Buffer	99%	97%	97%	96%	96%	95%	95%	94%	33%	39%	46%	54%
Credit Adjustment	-35.66	-12.63	-15.18	-17.74	-10.03	-11.14	-12.31	-13.46	113.96	93.72	89.23	105.40

Total Baseline Credit	Credit Loss in Required Buffer	Credit Gain for Additional Buffer	Net Change in Credit from Buffers	Total Credit
4868.20	-128.17	402.32	274.15	5142.35

¹Number of terminal stream ends, including all points where streams enter or exit the project boundaries, but not including internal crossings even if they are not protected by the easement.

²Minimum standard buffer width measured from the top of bank (50 feet in piedmont and coastal plain counties or 30 feet in mountain counties)

³Use the Custom Ratio fields to enter non-standard ratios, which are equal to the number of feet in the feet-to-credit mitigation ratio (e.g., for a preservation ratio of 8 feet to 1 credit, the multiplier would be 8).

⁴Equal to the number of feet of stream in each Mitigation Type. If stream reaches are not creditable, they should be excluded from this measurement, even if they fall within the easement.

⁵This amount is the maximum buffer area possible based on the linear footage of stream length if channel were perfectly straight with full buffer width and no internal crossings. This number is not used in calculations, but is provided as a reference.

⁶Maximum potential size (in square feet) of each buffer zone measured around all creditable stream reaches, calculated using GIS, including areas outside of the easement. The inner zone (0-15') should be measured from the top of the OHWM or the edge of the average stream width if OHWM is not known. Non-creditable stream reaches within the easement should be removed prior to calculating this area with GIS.

⁷Square feet in each buffer zone, as measured by GIS, excluding non-forested areas, all other credit type (e.g., wetland, nutrient offset, buffer), easement exceptions, open water, areas failing to meet the vegetation performance standard, etc. Additional credit is given to 150 feet in buffer width, so areas within the easement that are more than 150 feet from creditable streams should not be included in this measurement. Non-creditable stream reaches within the easement should be removed prior to calculating this area with GIS.

Appendix 8

Financial Assurances

Pursuant to Section IV H and Appendix III of the Division of Mitigation Service's In-Lieu Fee Instrument dated July 28, 2010, the North Carolina Department of Environment and Natural Resources has provided the US Army Corps of Engineers Wilmington District with a formal commitment to fund projects to satisfy mitigation requirements assumed by DMS. This commitment provides financial assurance for all mitigation projects implemented by the program.

Appendix 9

Maintenance Plan

The site shall be monitored on a regular basis and a physical inspection of the site shall be conducted a minimum of once per year throughout the post-construction monitoring period until performance standards are met. These site inspections may identify site components and features that require routine maintenance. Routine maintenance should be expected most often in the first two (2) years following site construction and may include the following:

Table1: Maintenance Plan

Component/Feature	Maintenance through project close-out
Stream/ Wetlands	Routine channel maintenance and repair activities may include chinking of in-stream structures to prevent piping, securing of loose coir matting, and supplemental installations of live stakes and other target vegetation along the channel. Areas where storm water and floodplain flows intercept the channel may also require maintenance to prevent bank erosion. Beaver dams that inundate the stream channels shall be removed and the beaver shall be trapped if deemed necessary.
Vegetation	Vegetation shall be maintained to ensure the health and vigor of the targeted community. Routine vegetation maintenance and repair activities may include supplemental planting, pruning, mulching, and fertilizing. Exotic invasive plant species shall be controlled by mechanical and/or chemical methods. Any vegetation control requiring herbicide application will be performed in accordance with NC Department of Agriculture (NCDA) rules and regulations.
Site boundary	Site boundaries shall be identified in the field to ensure clear distinction between the mitigation site and adjacent properties. Boundaries may be identified by fence, marker, bollard, post, tree-blazing, or other means as allowed by site conditions and/or conservation easement. Boundary markers disturbed, damaged, or destroyed will be repaired and/or replaced on an as-needed basis.

Additional maintenance activities are discussed in the Vegetation and Land Management section of the mitigation plan.

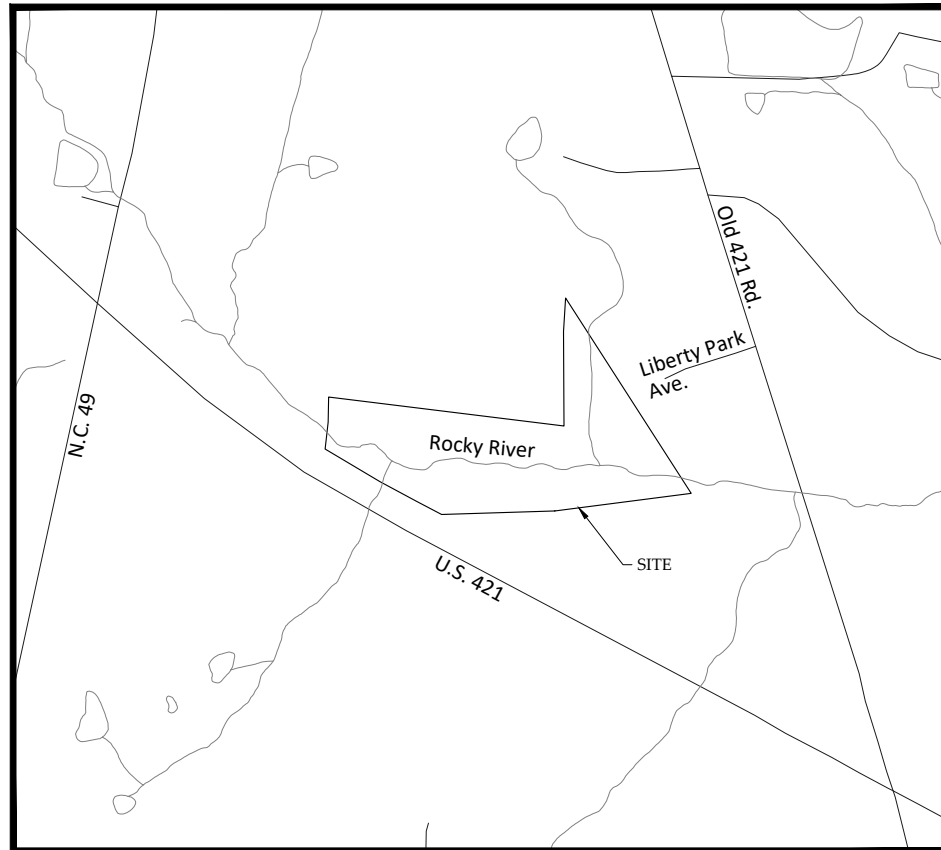
Appendix 10

Liberty Rock Mitigation Site

Randolph County, North Carolina

for NCDEQ

Division of Mitigation Services



Vicinity Map
Not to Scale

Project Location
35°49'12.34" N , 79°33'43.89" W

**CONSTRUCTION PLANS
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Erosion and Sediment Control Plan	Not Included
Details	5.1-5.7

Project Directory

Engineering:
Wildlands Engineering, Inc
License No. F-0831
312 W. Millbrook Rd, Suite 225
Raleigh, NC 27609
Angela Allen, PE, Project Manager
Abigail Vieira, PE, Project Engineer
919-851-9986

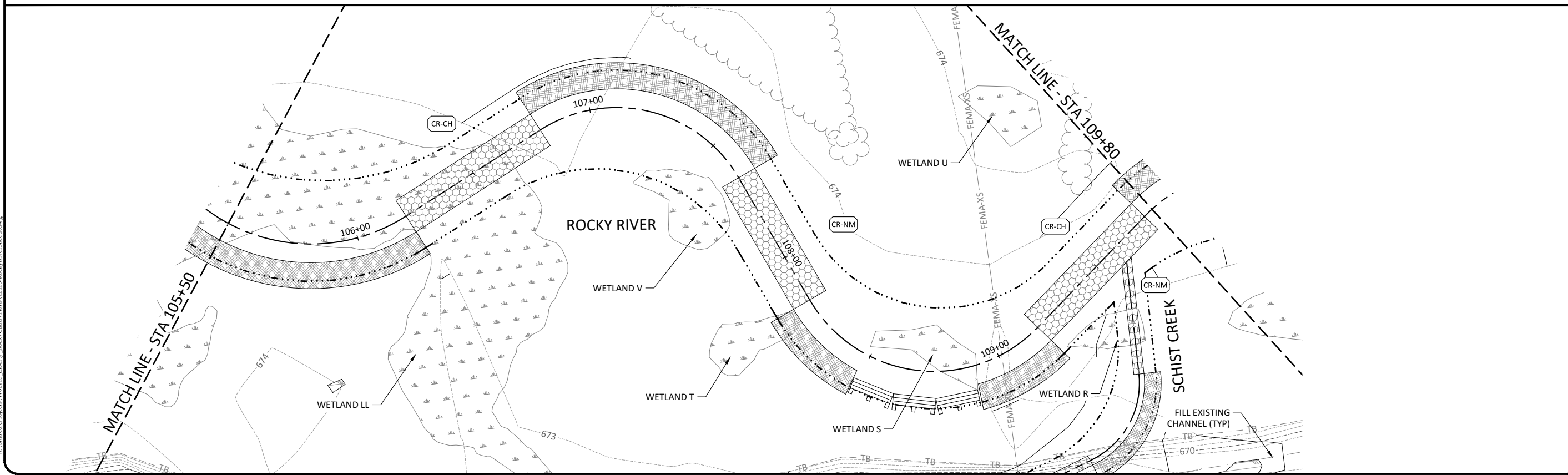
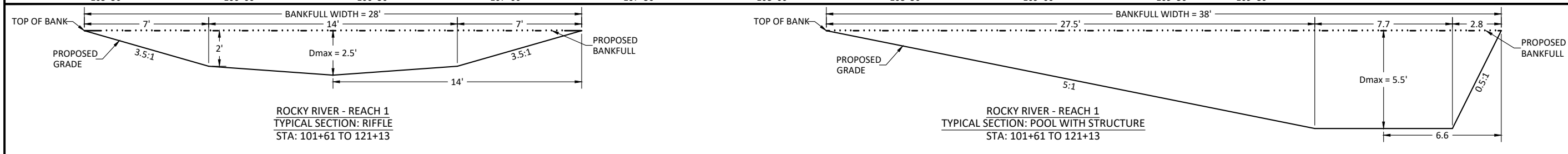
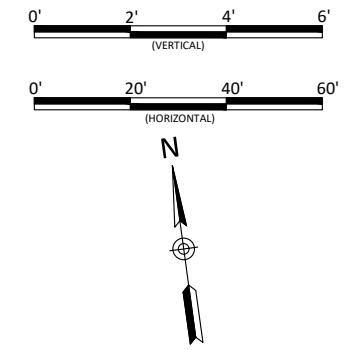
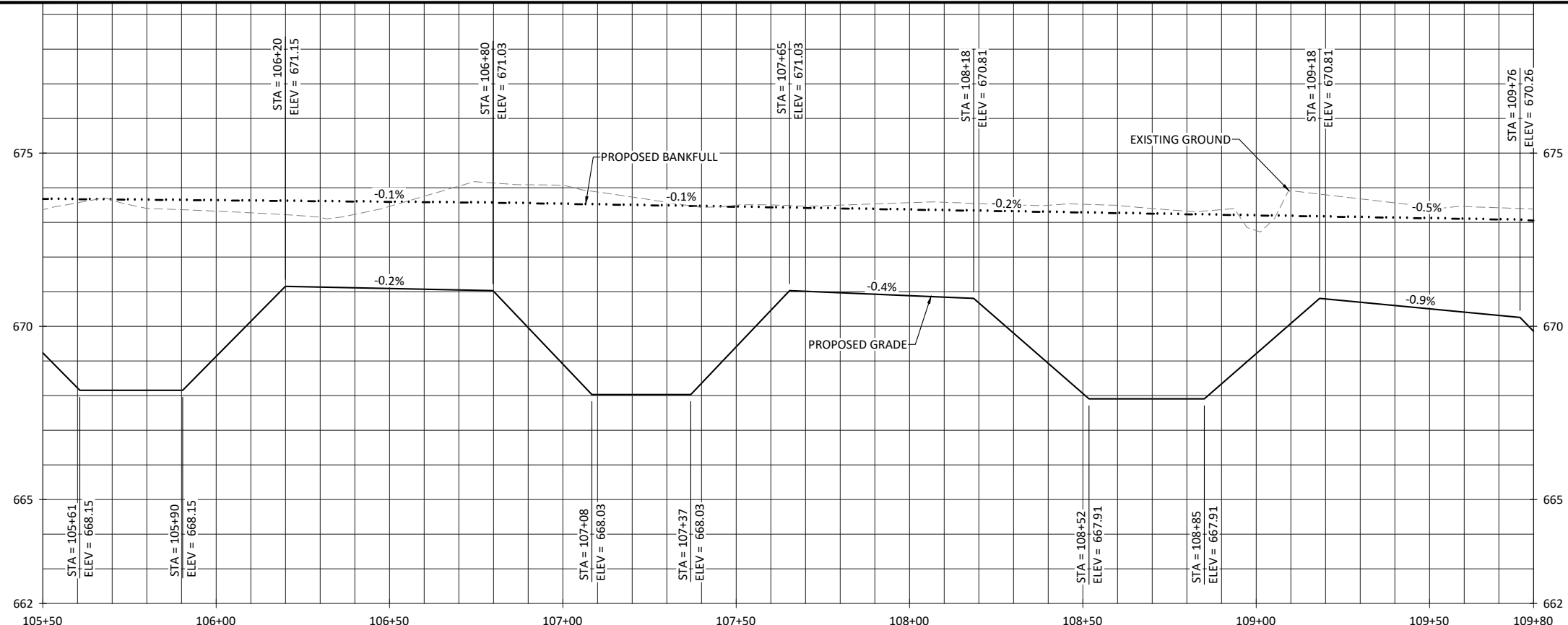
Owner:
NCDEQ DMS
1652 Mail Service Center
Raleigh, NC 27699-1652
Attention: Jeremiah Dow
919-707-8976

Surveying:
Turner Land Surveying
P.O. Box 148
Swannanoa, NC 28778
David S. Turner, PLS
919-827-0745

NCDEQ Contract No. 7877-01
DMS ID No. 100135
USACE Action ID No. 2020-00047
DWR No. 20200035

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Date:	10-21-21
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Liberty Rock Mitigation Site
 Randolph County, North Carolina
 Rocky River
 Stream Plan and Profile



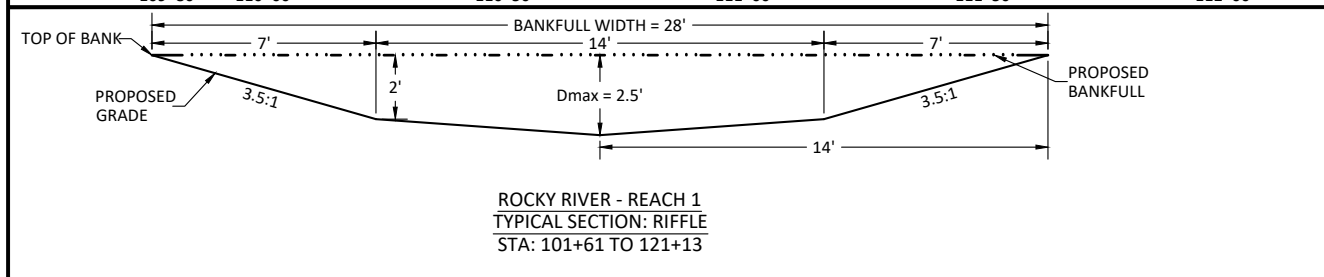
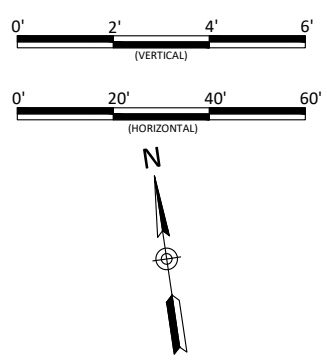
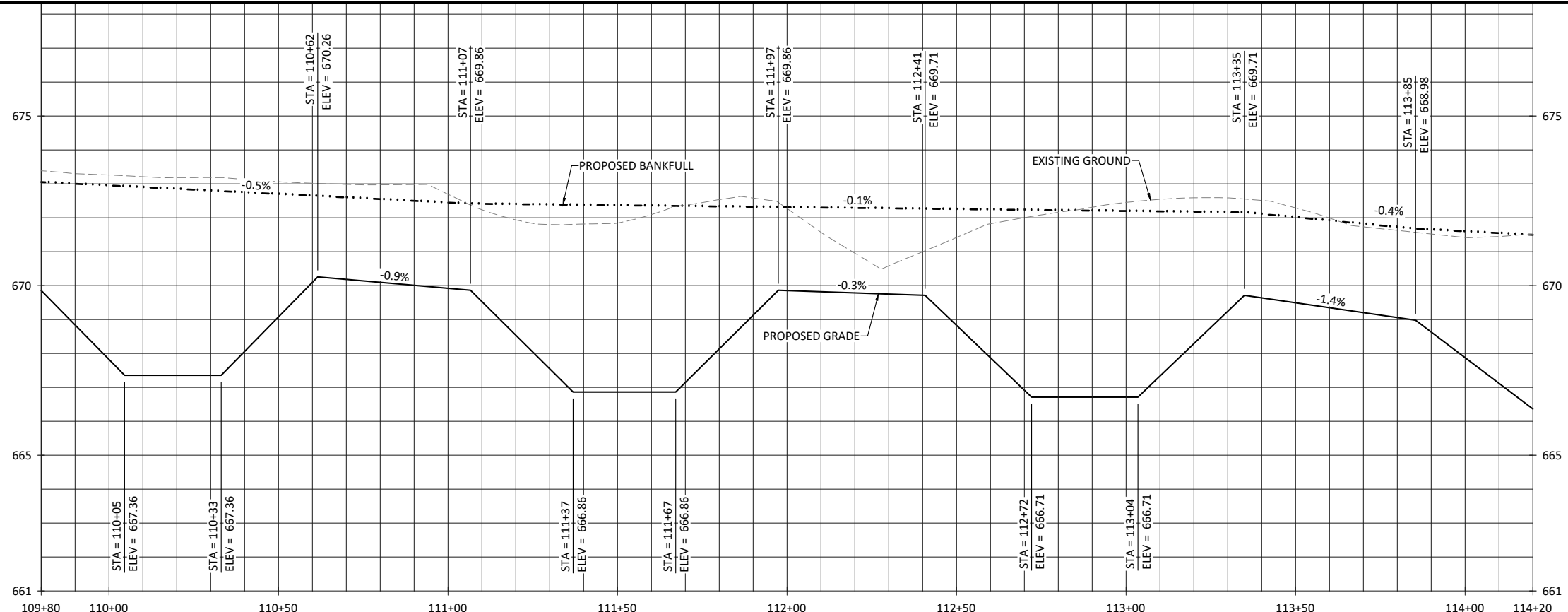
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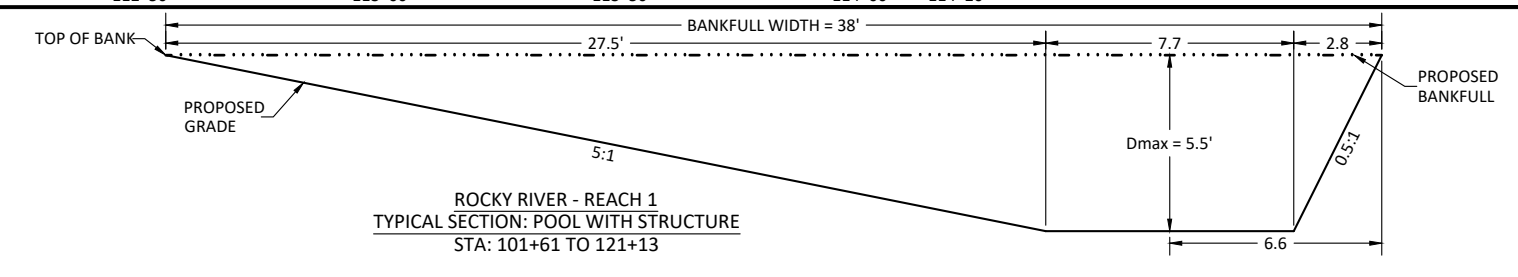
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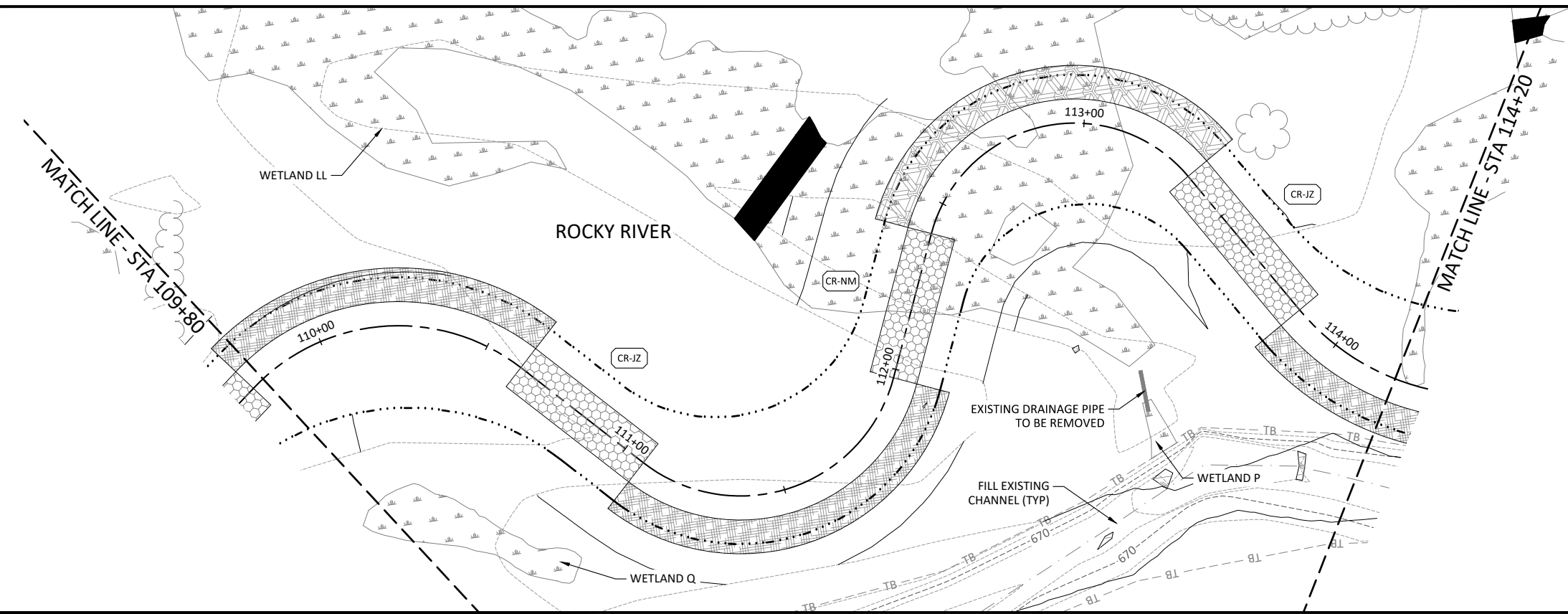
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ROCKY RIVER - REACH 1
TYPICAL SECTION: RIFFLE
STA: 101+61 TO 121+13



ROCKY RIVER - REACH 1
TYPICAL SECTION: POOL WITH STRUCTURE
STA: 101+61 TO 121+13



Liberty Rock Mitigation Site
Randolph County, North Carolina

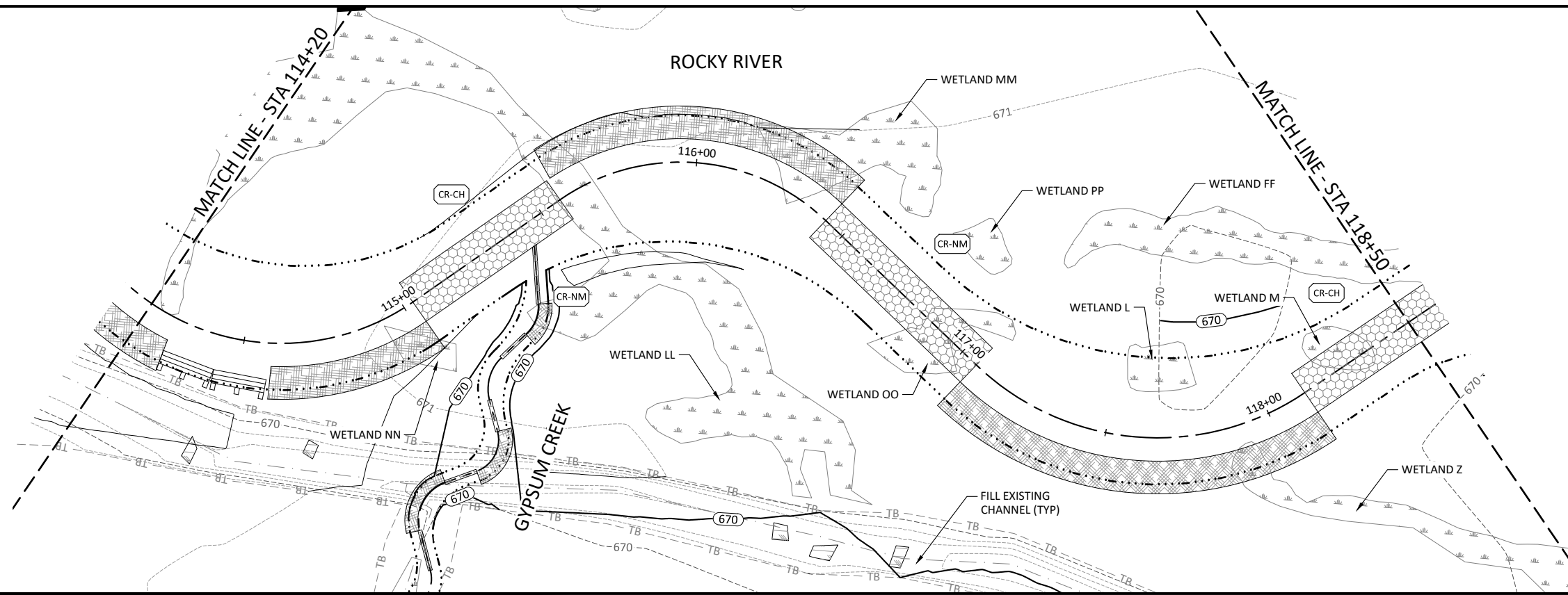
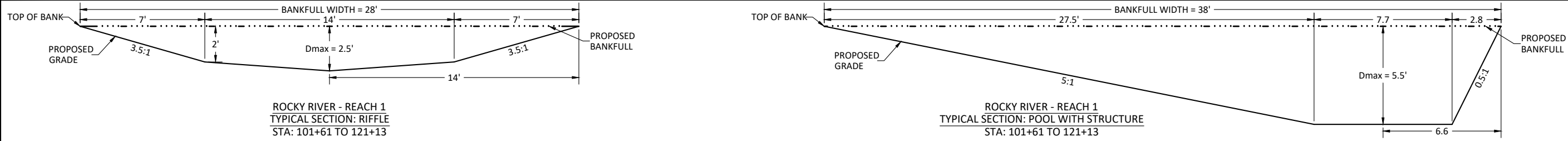
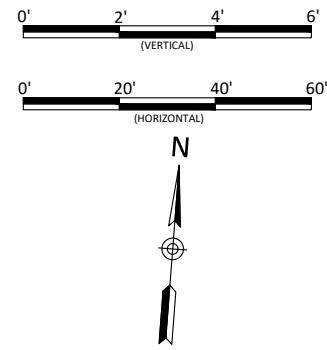
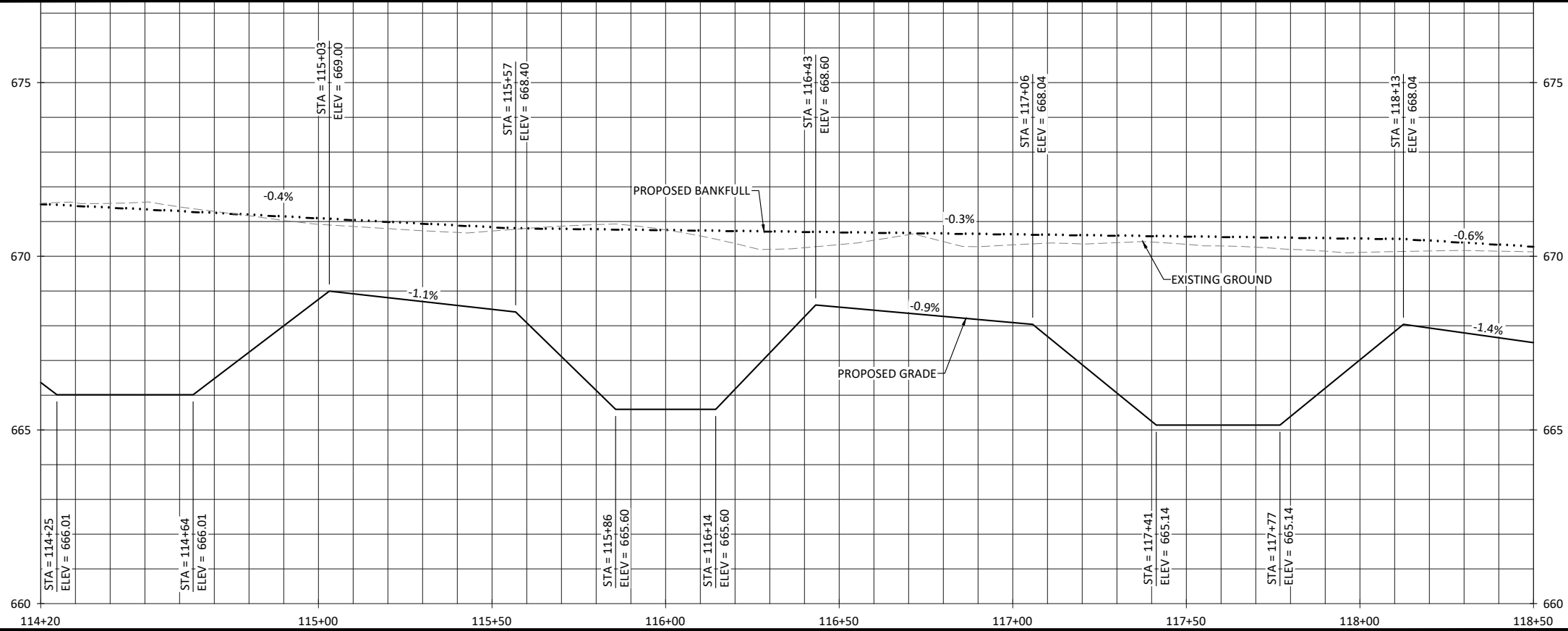
Rocky River
Stream Plan and Profile

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Raleigh, NC 27609
Tel: 919.851.9886
License No. F-0831

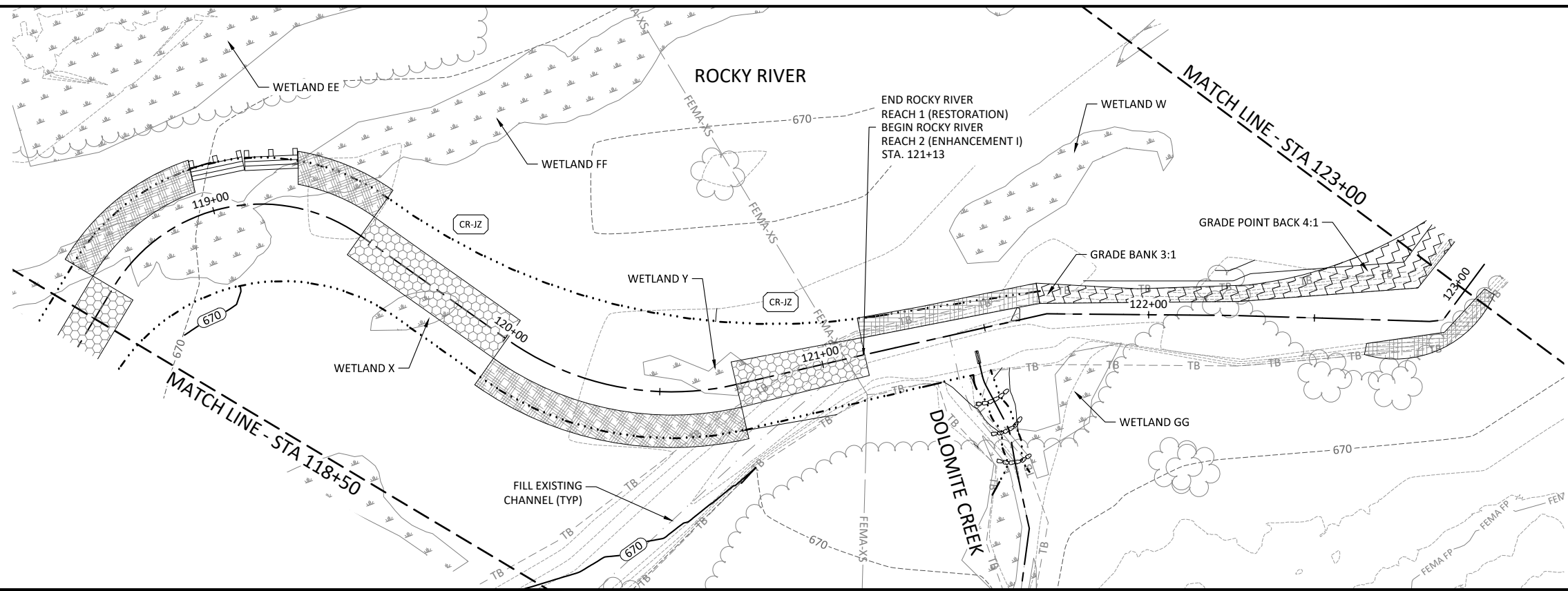
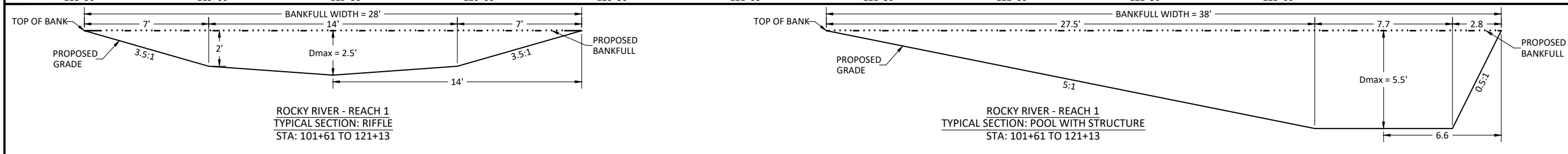
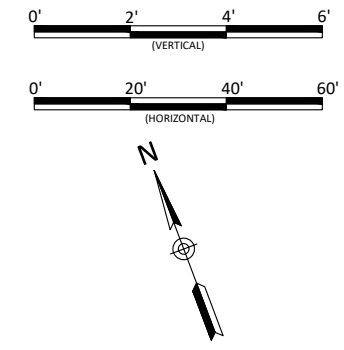
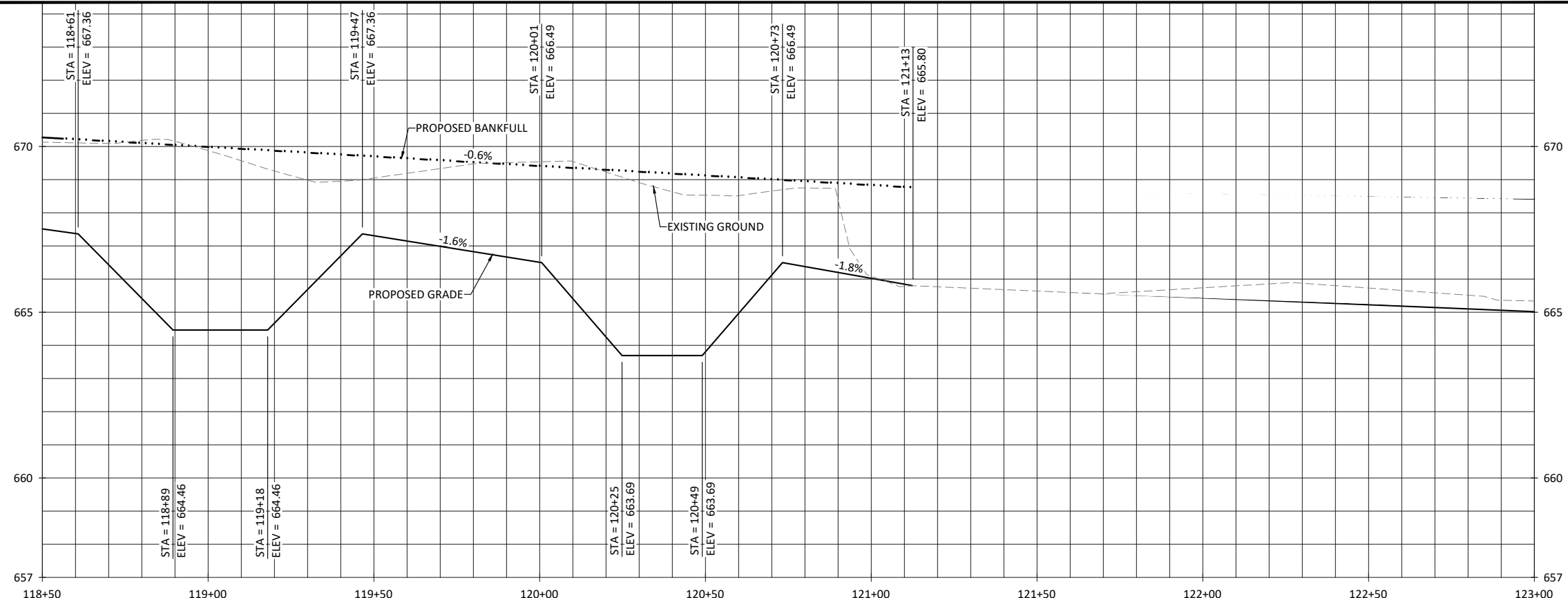


Liberty Rock Mitigation Site
 Randolph County, North Carolina
 Rocky River
 Stream Plan and Profile



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Project Engineer:	AV
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Liberty Rock Mitigation Site
Randolph County, North Carolina

Rocky River
Stream Plan and Profile

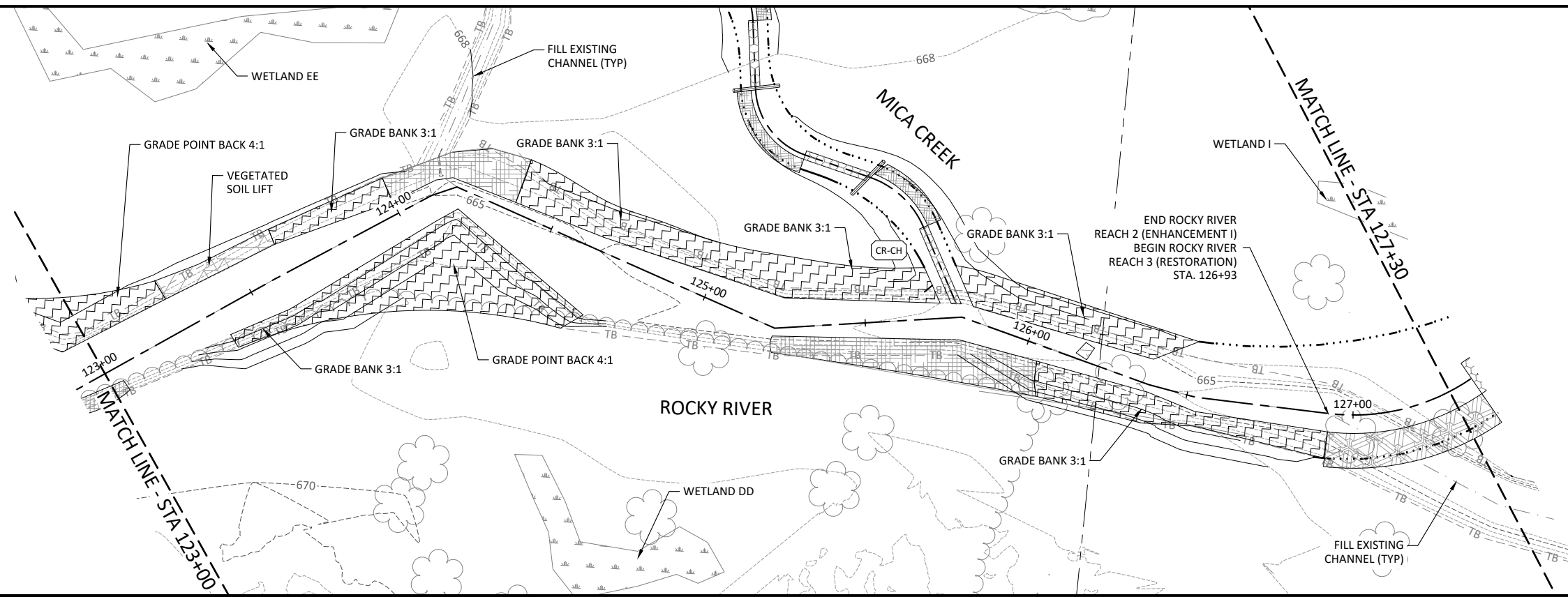
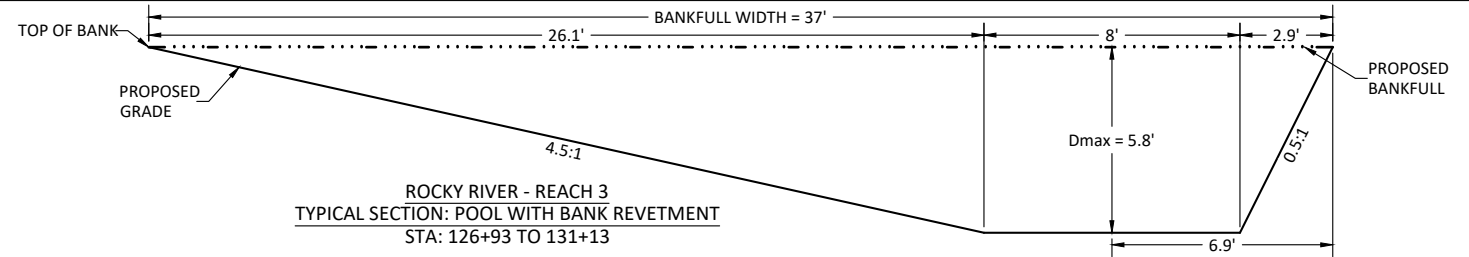
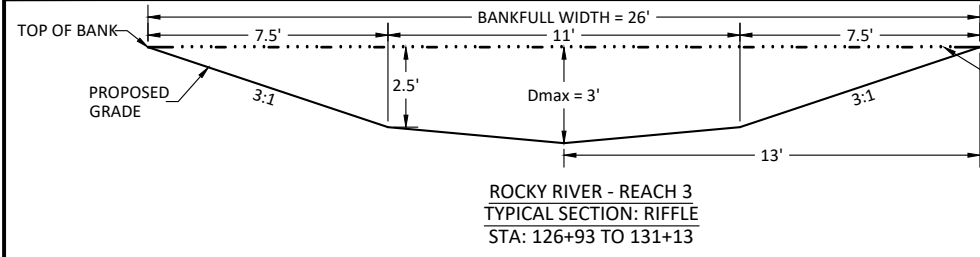
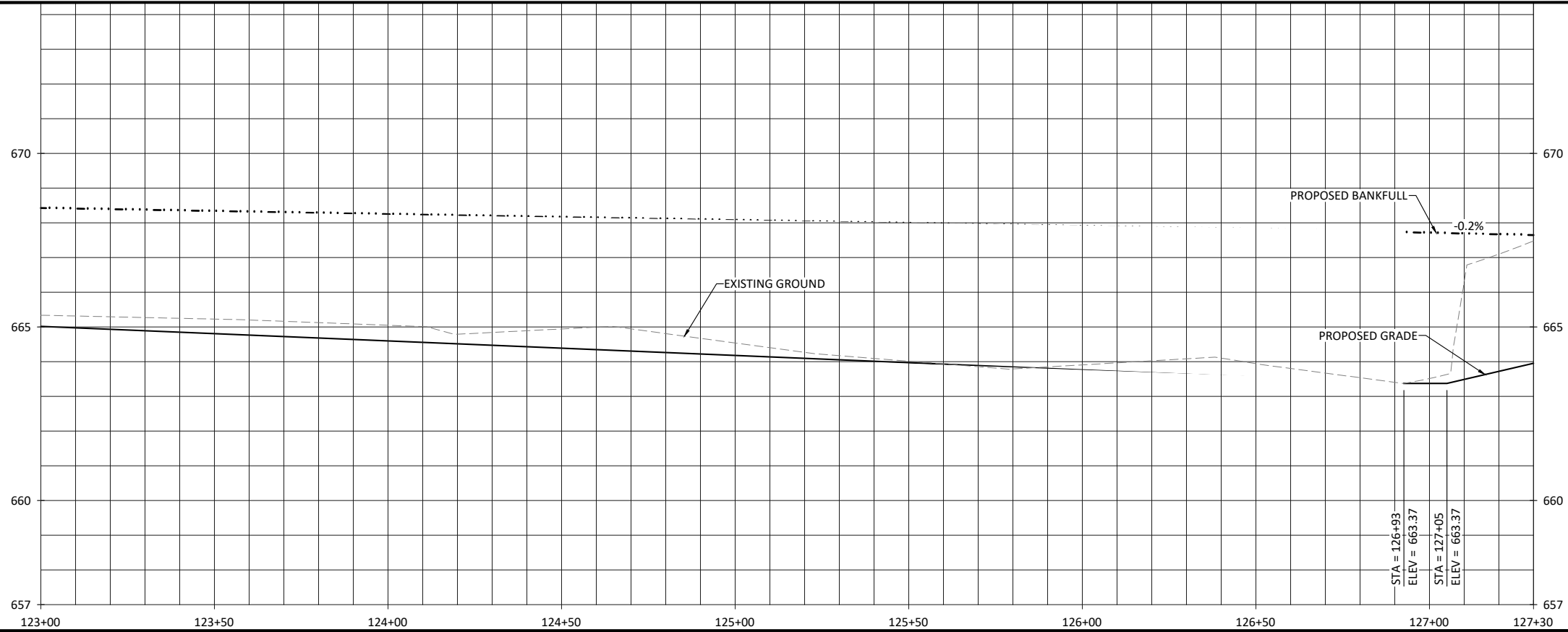
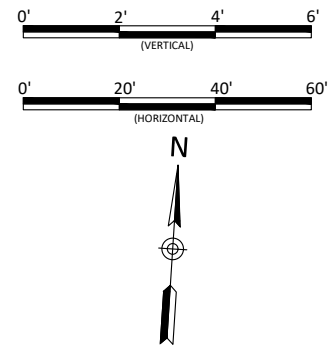
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Liberty Rock Mitigation Site
Randolph County, North Carolina

Rocky River
Stream Plan and Profile

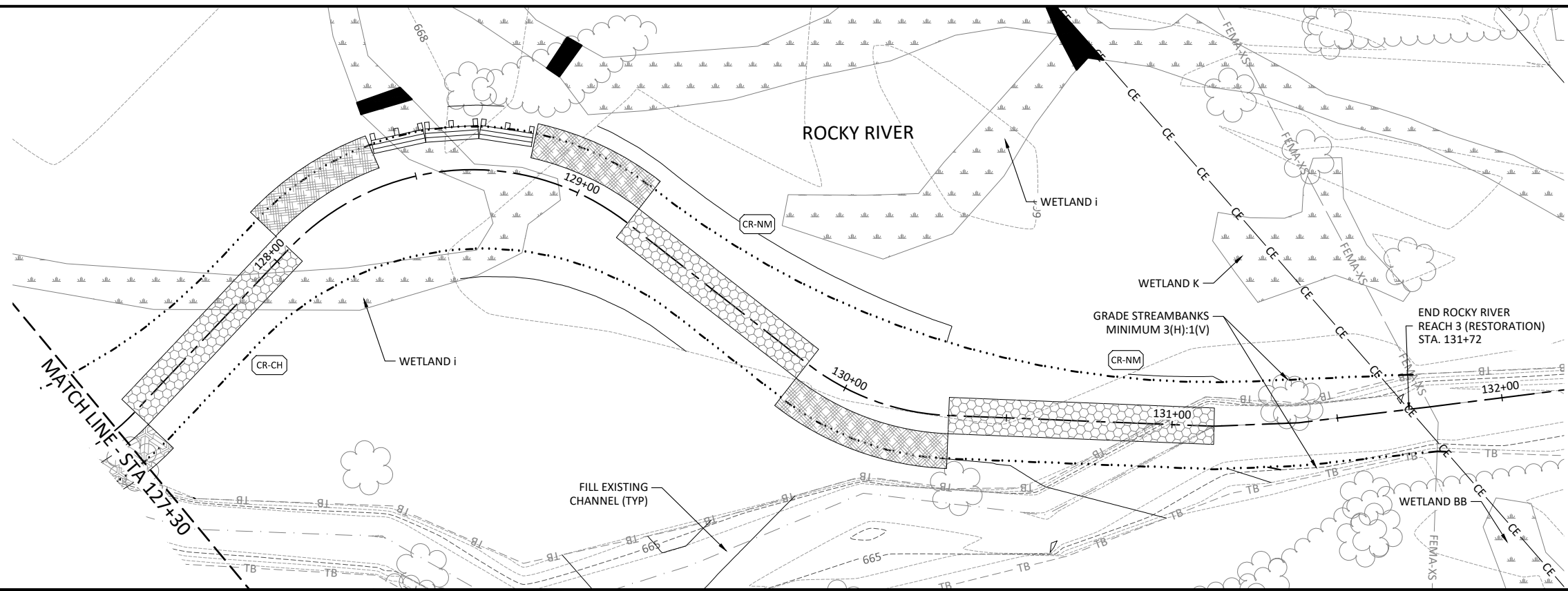
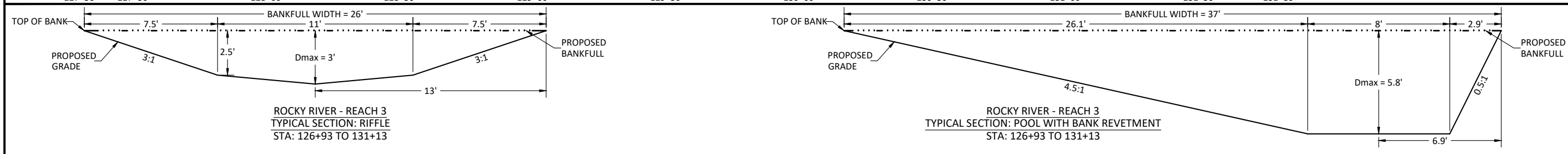
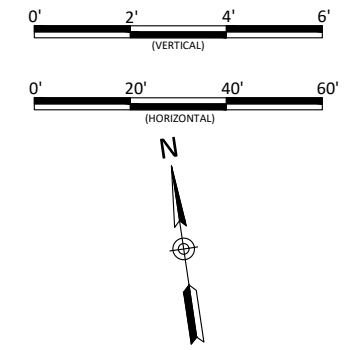
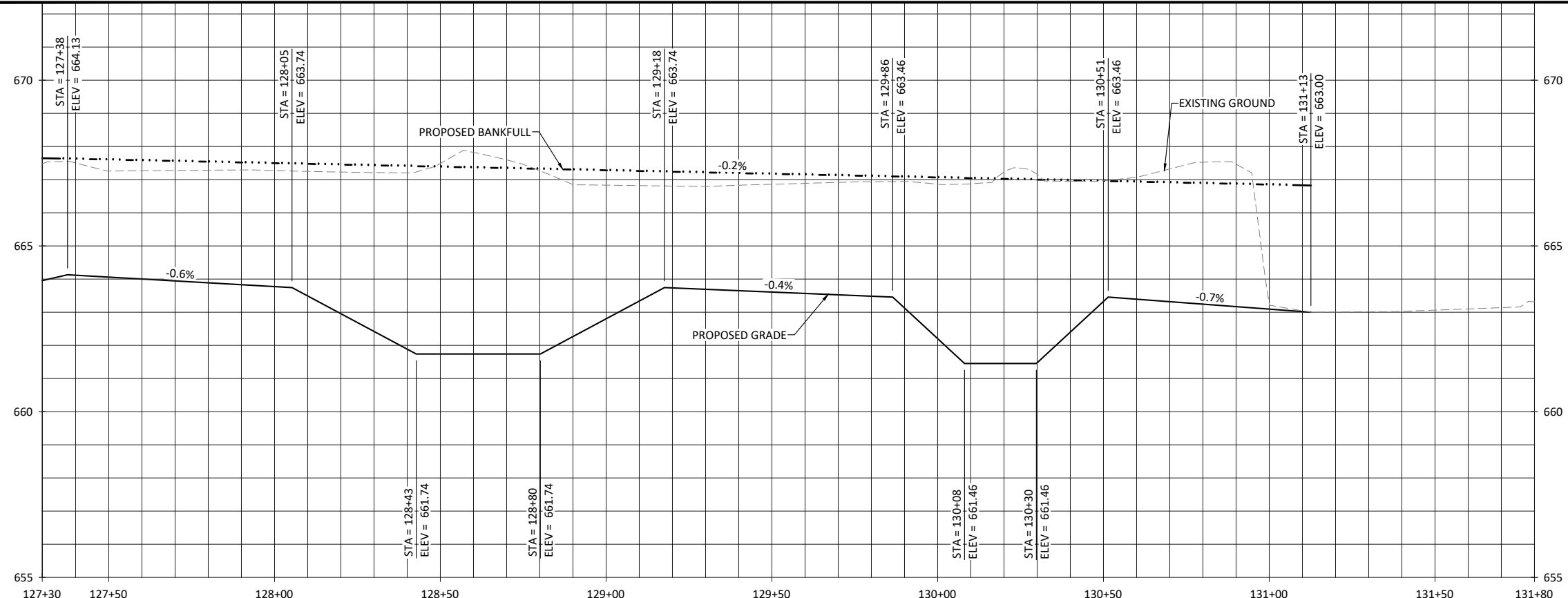


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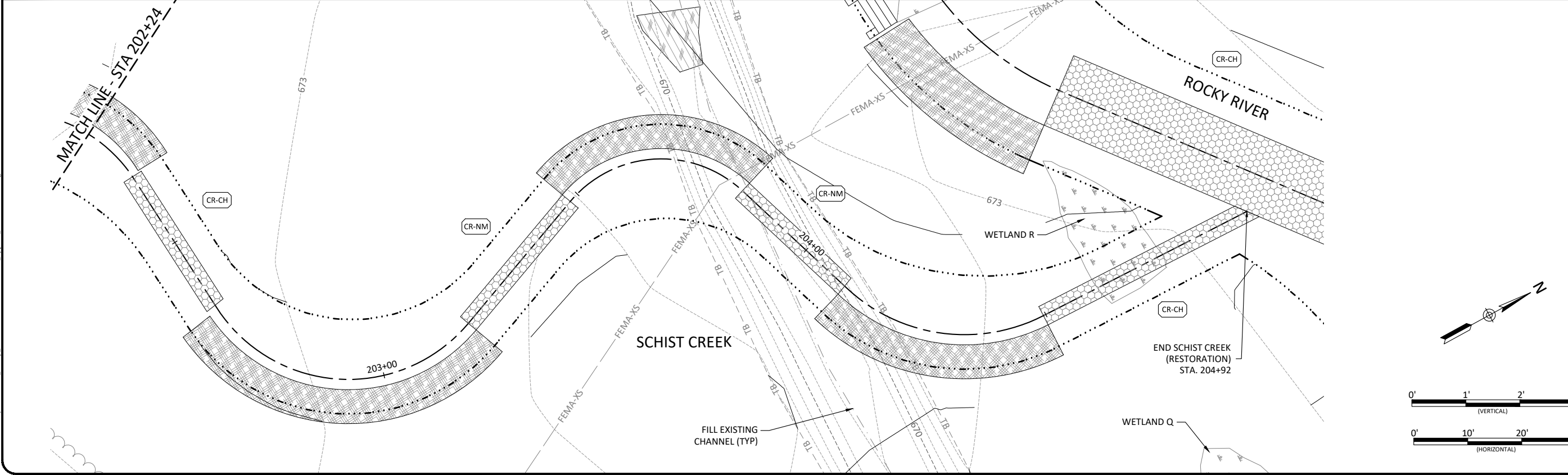
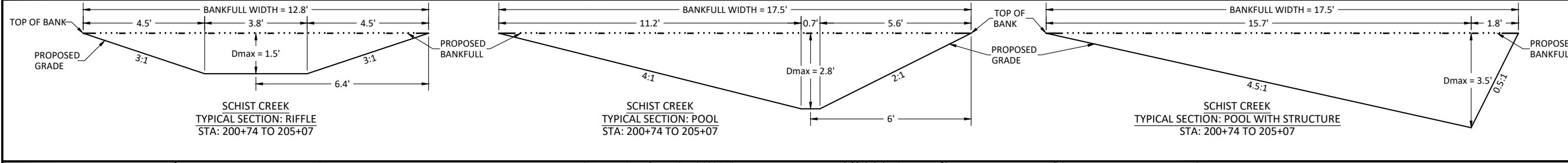
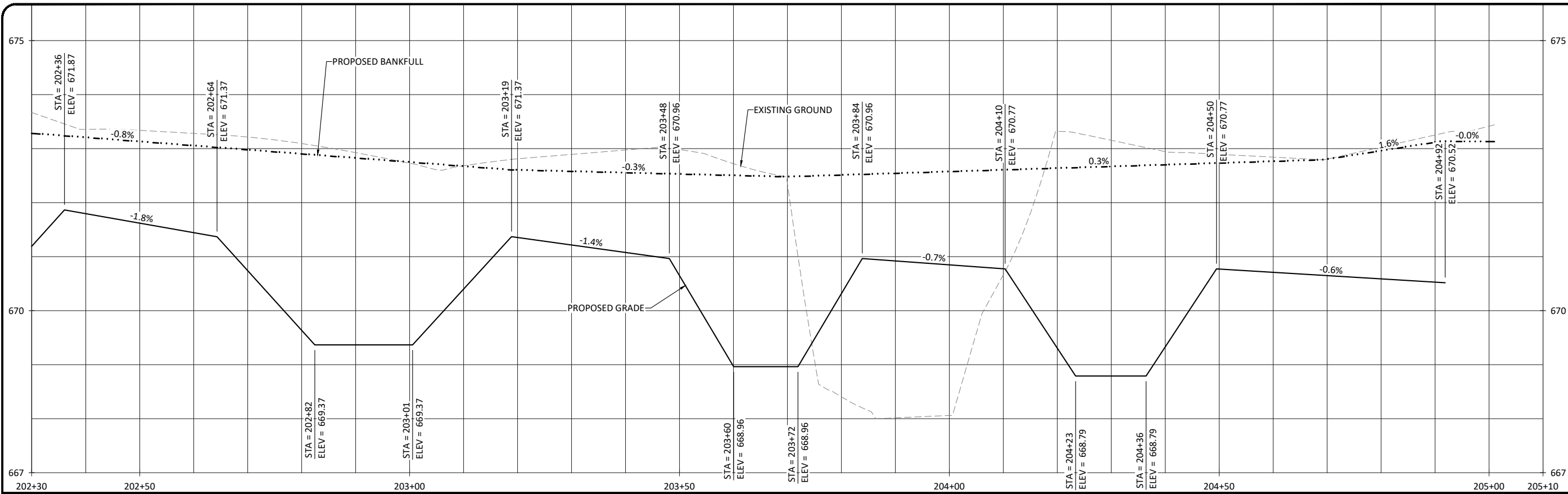
Liberty Rock Mitigation Site
Randolph County, North Carolina

Rocky River
Stream Plan and Profile

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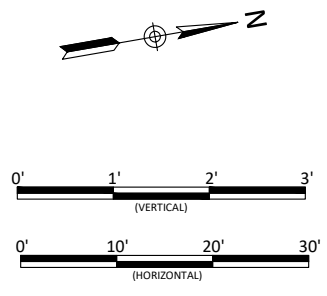
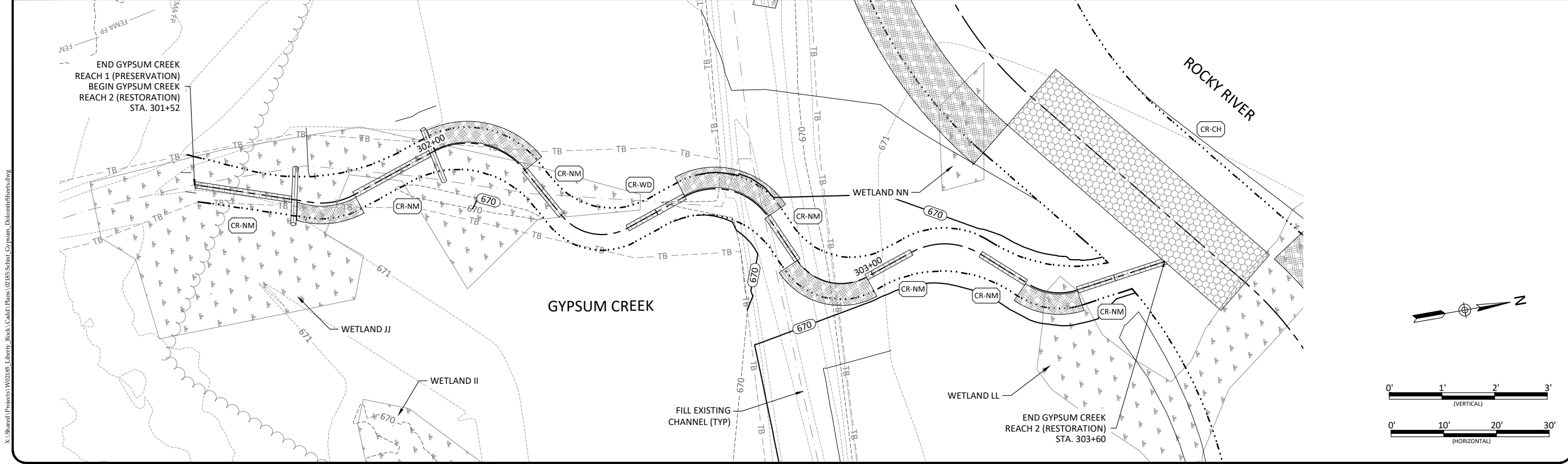
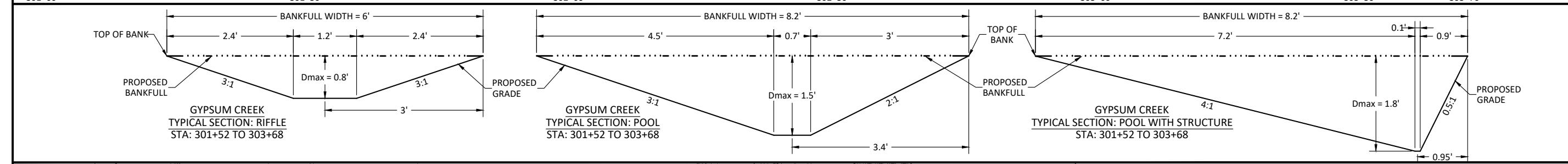
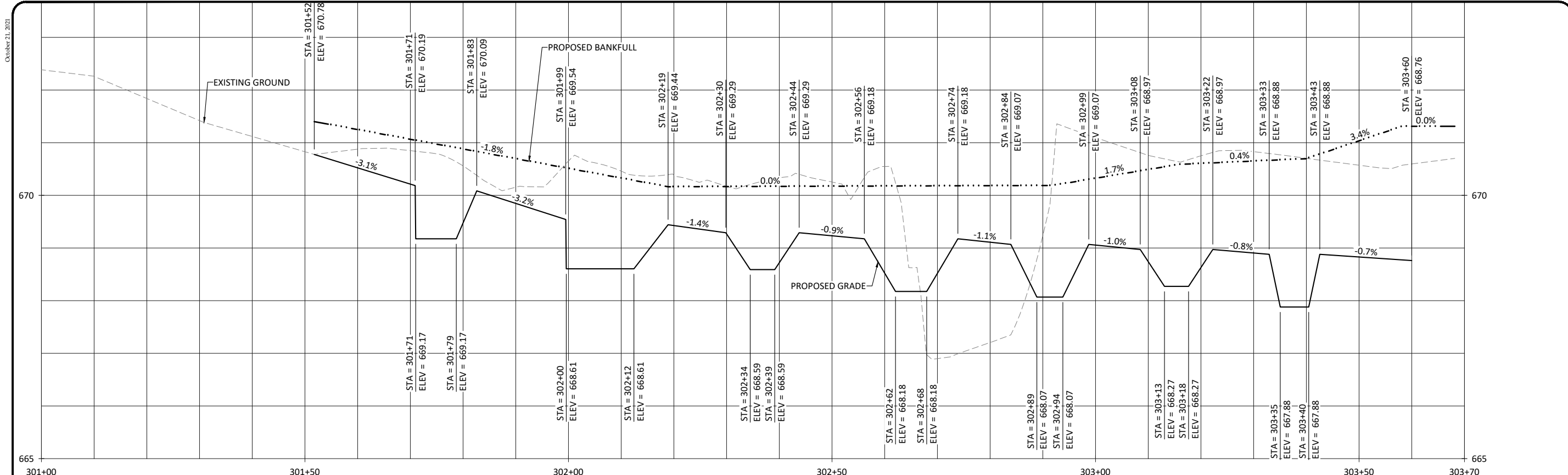


Liberty Rock Mitigation Site
Randolph County, North Carolina

Schist Creek
Stream Plan and Profile

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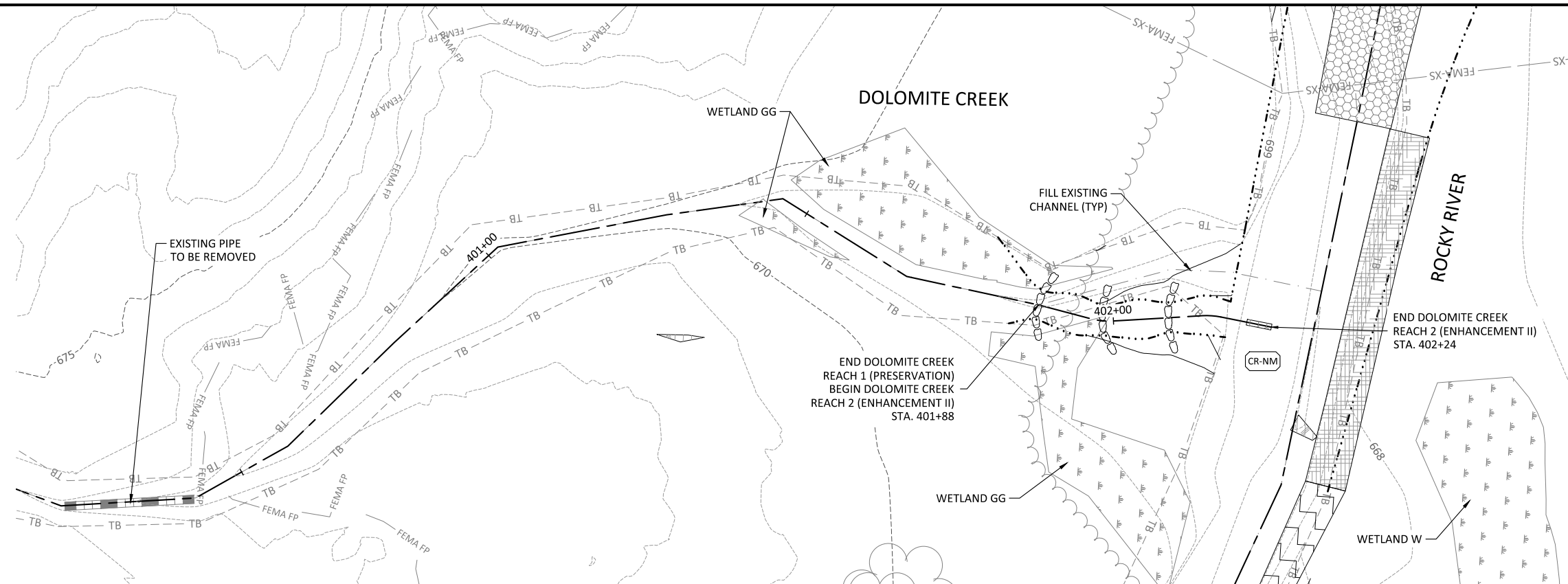
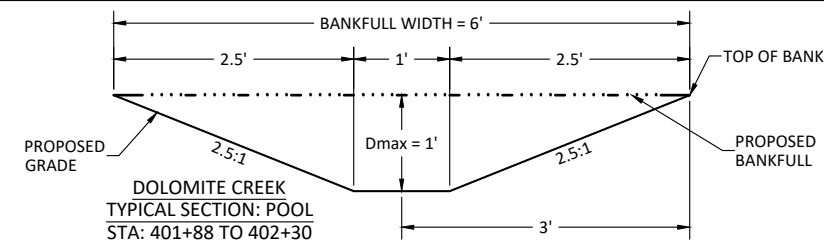
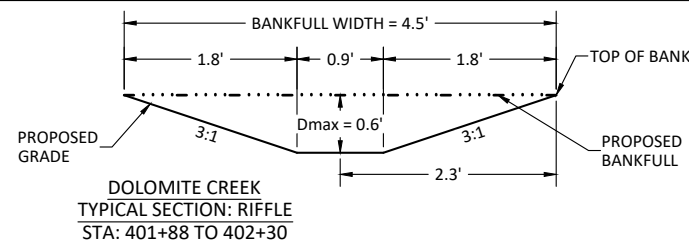
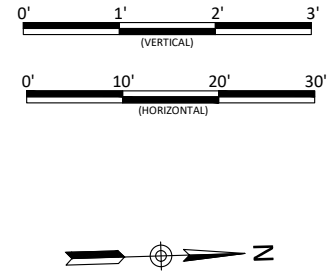
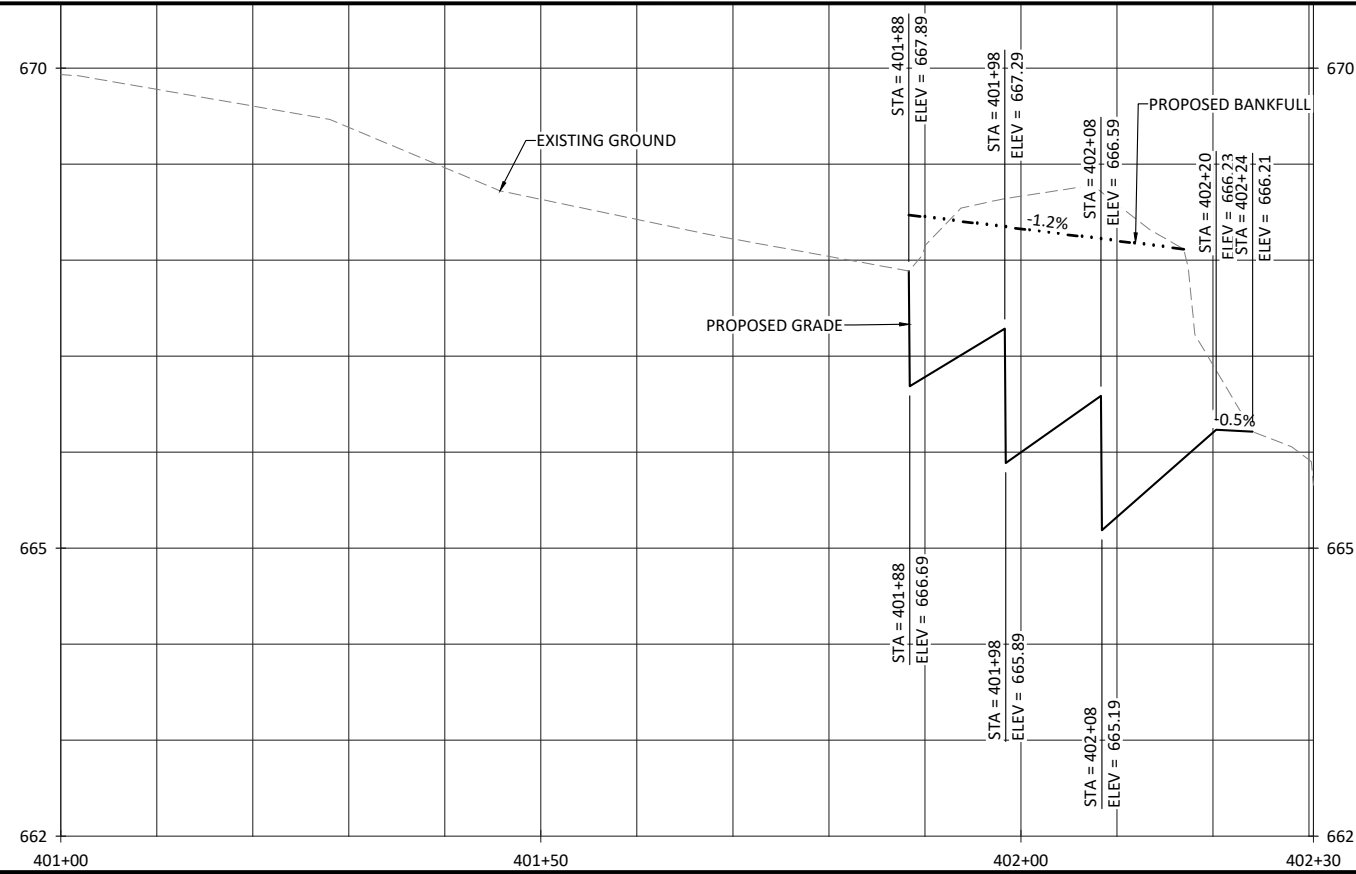
Liberty Rock Mitigation Site
Randolph County, North Carolina
Gypsum Creek Reach 2
Stream Plan and Profile

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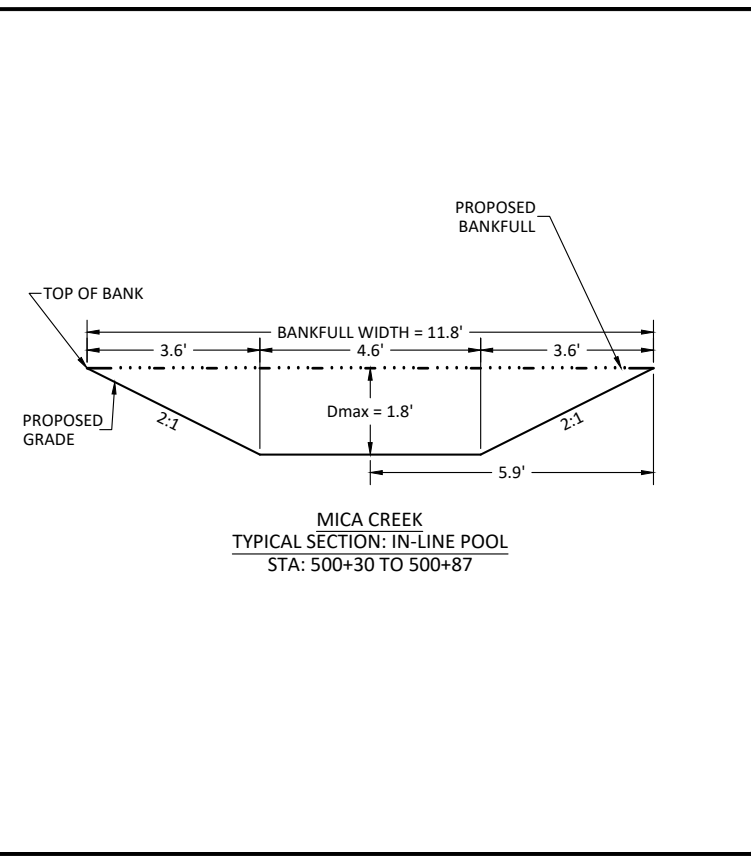
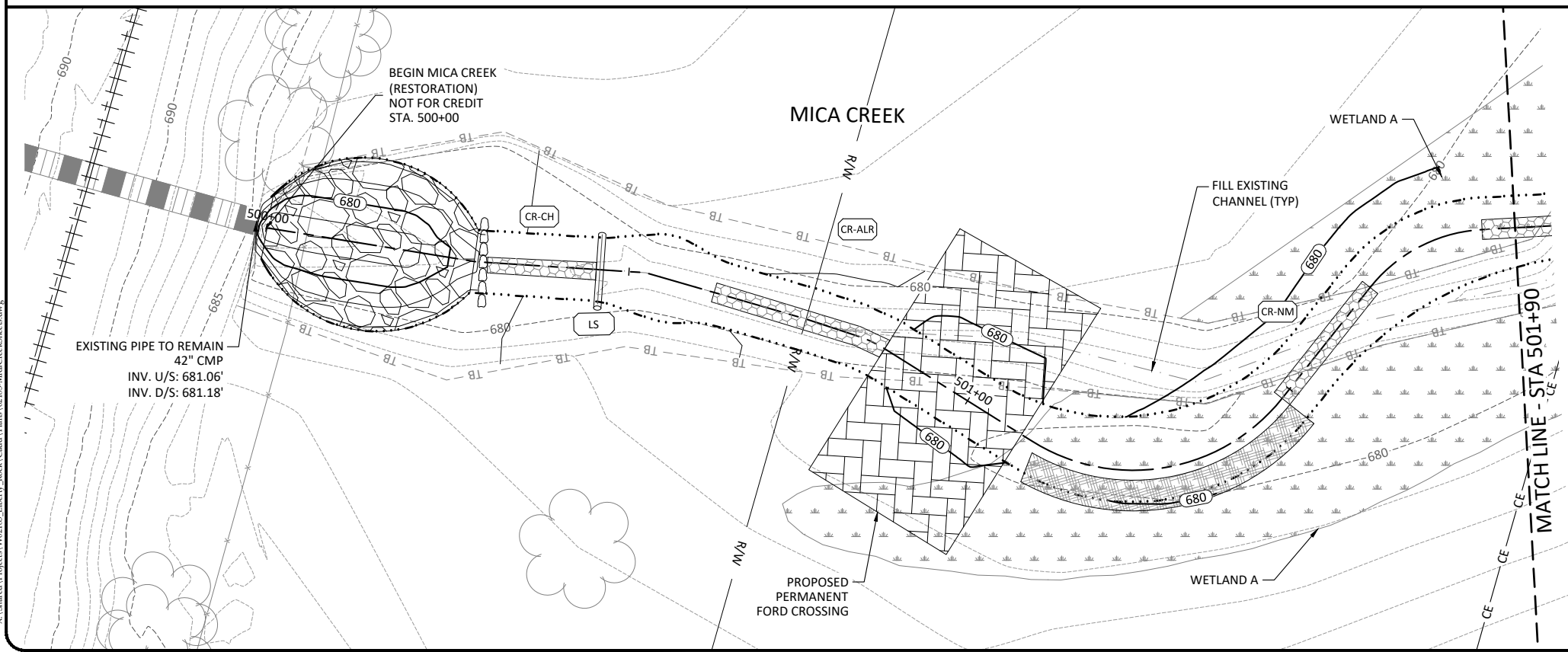
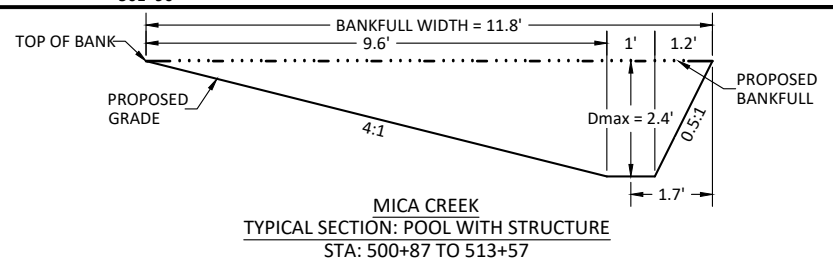
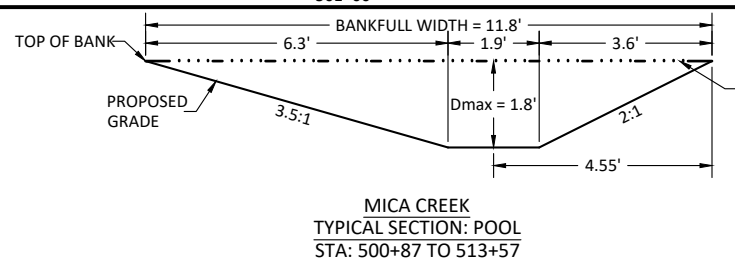
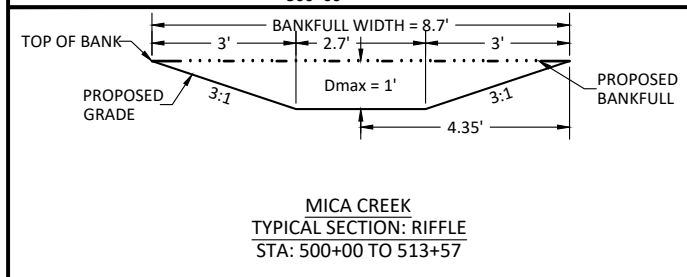
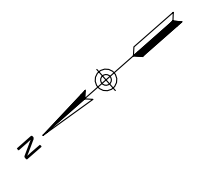
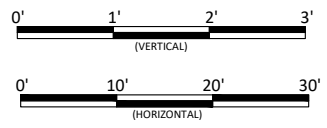
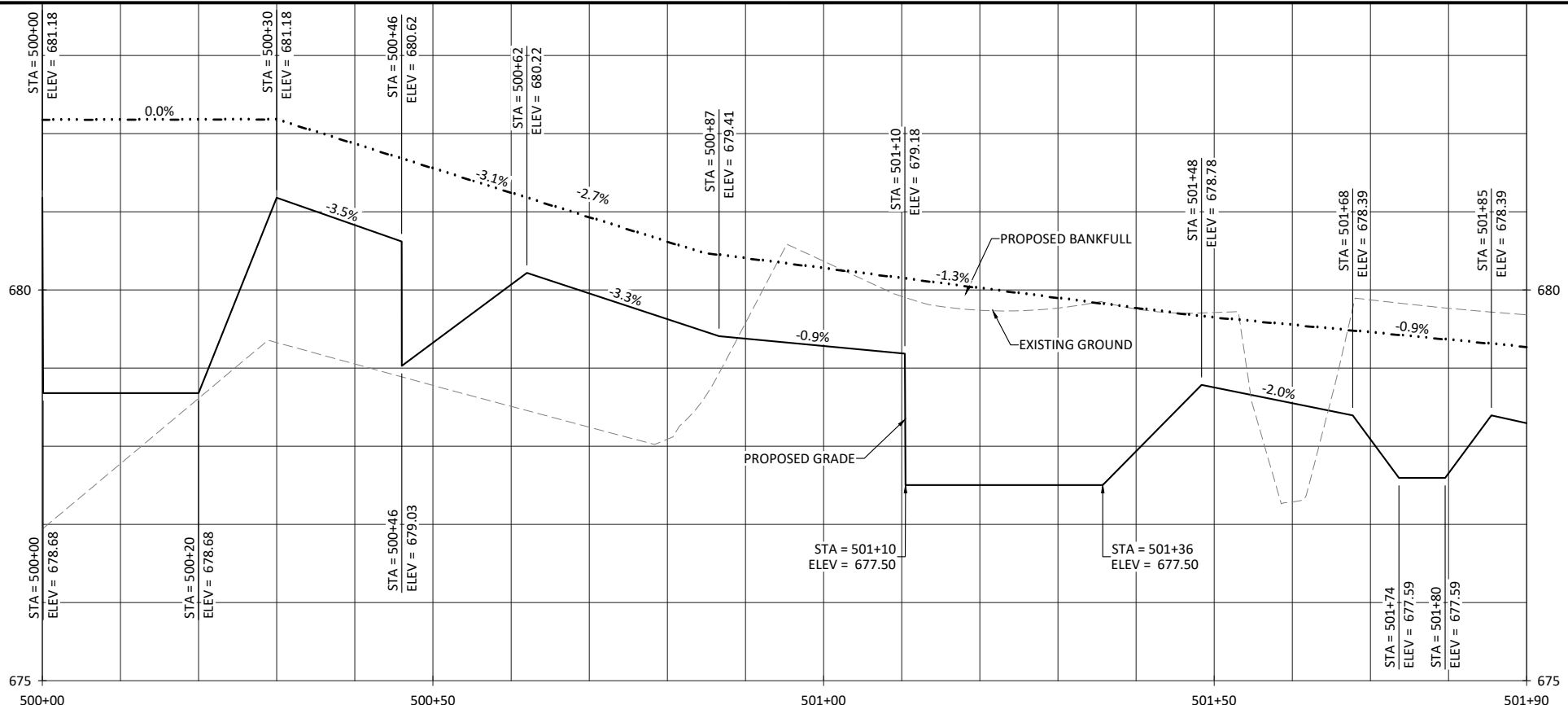
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Liberty Rock Mitigation Site
Randolph County, North Carolina
Dolomite Creek Reach 2
Stream Plan and Profile

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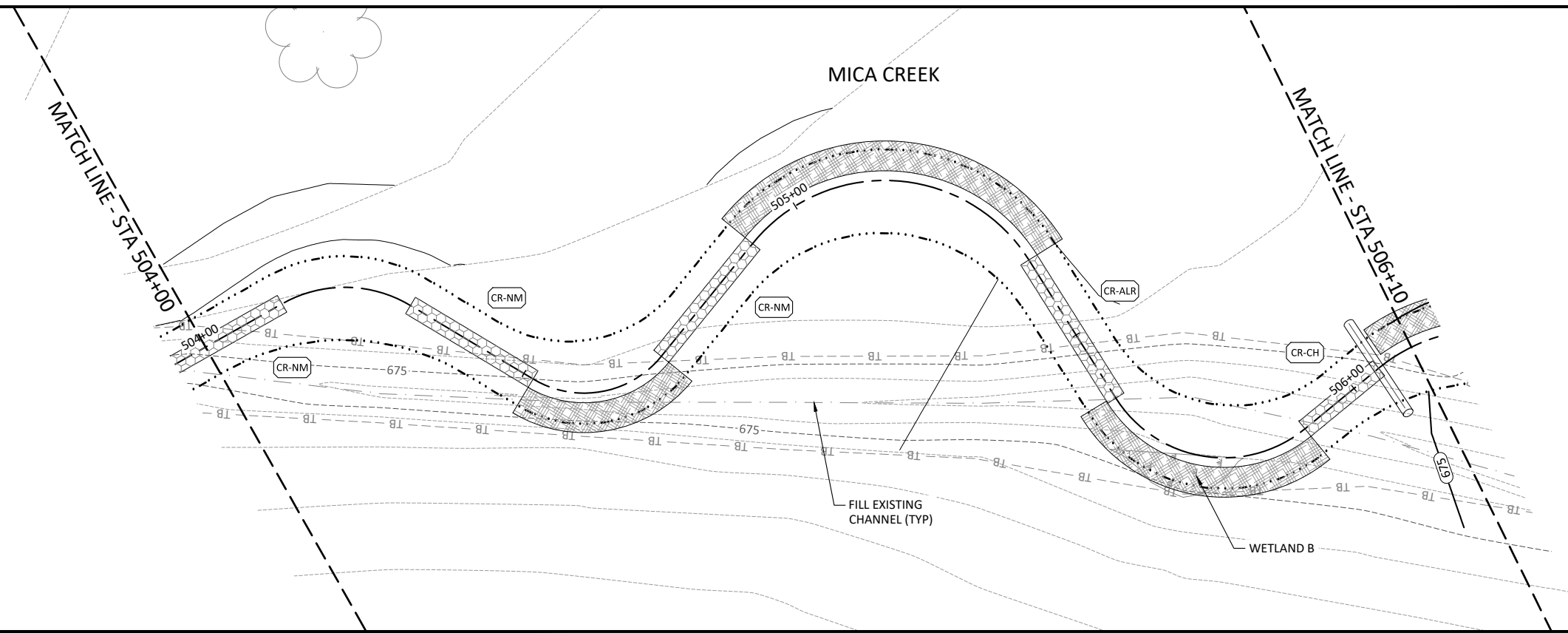
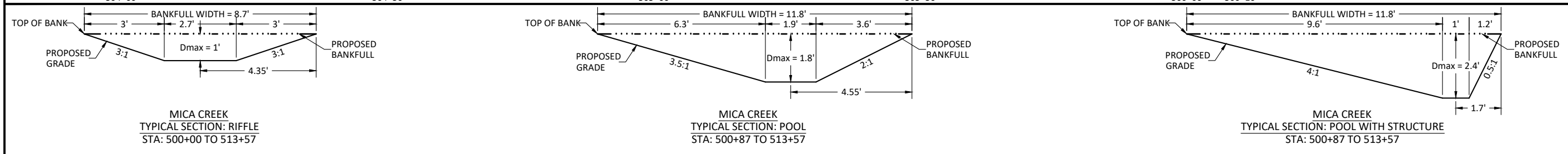
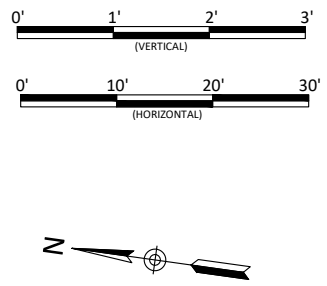
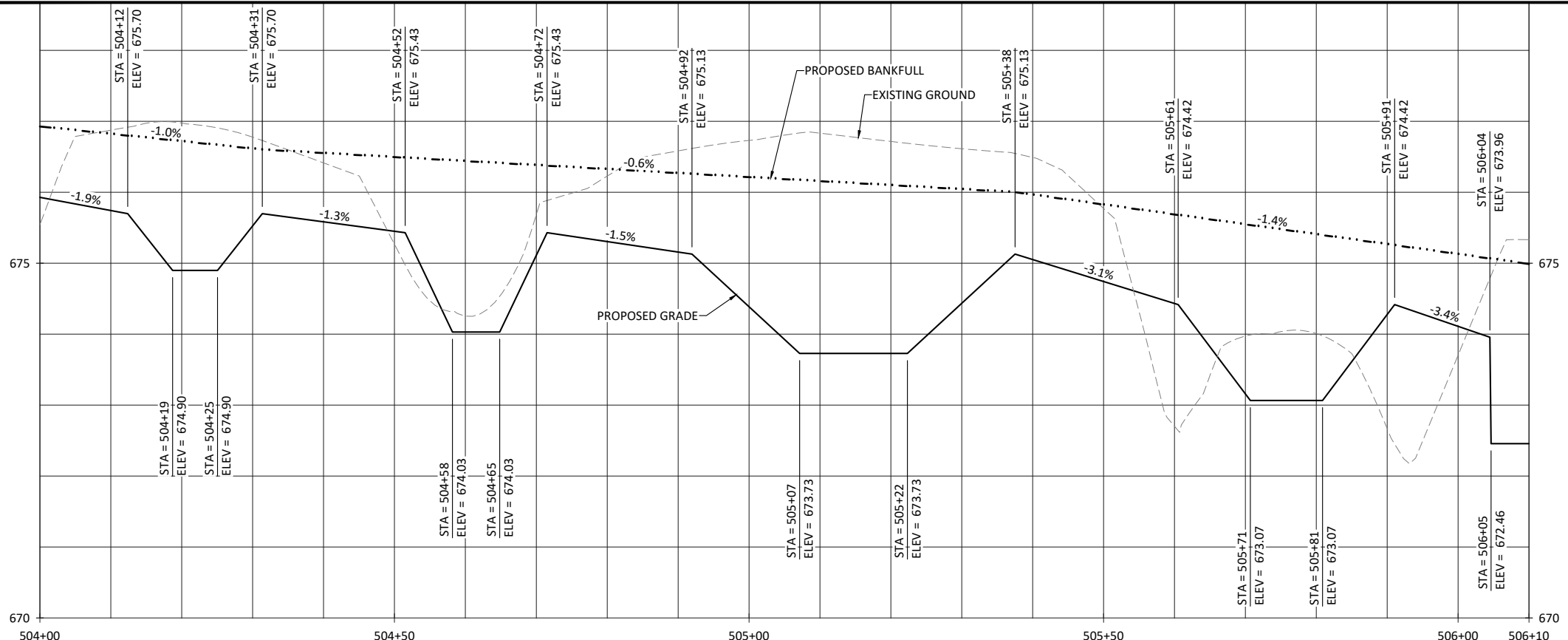
**Liberty Rock Mitigation Site
Randolph County, North Carolina**

**Mica Creek
Stream Plan and Profile**



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Liberty Rock Mitigation Site
 Randolph County, North Carolina

Mica Creek
 Stream Plan and Profile

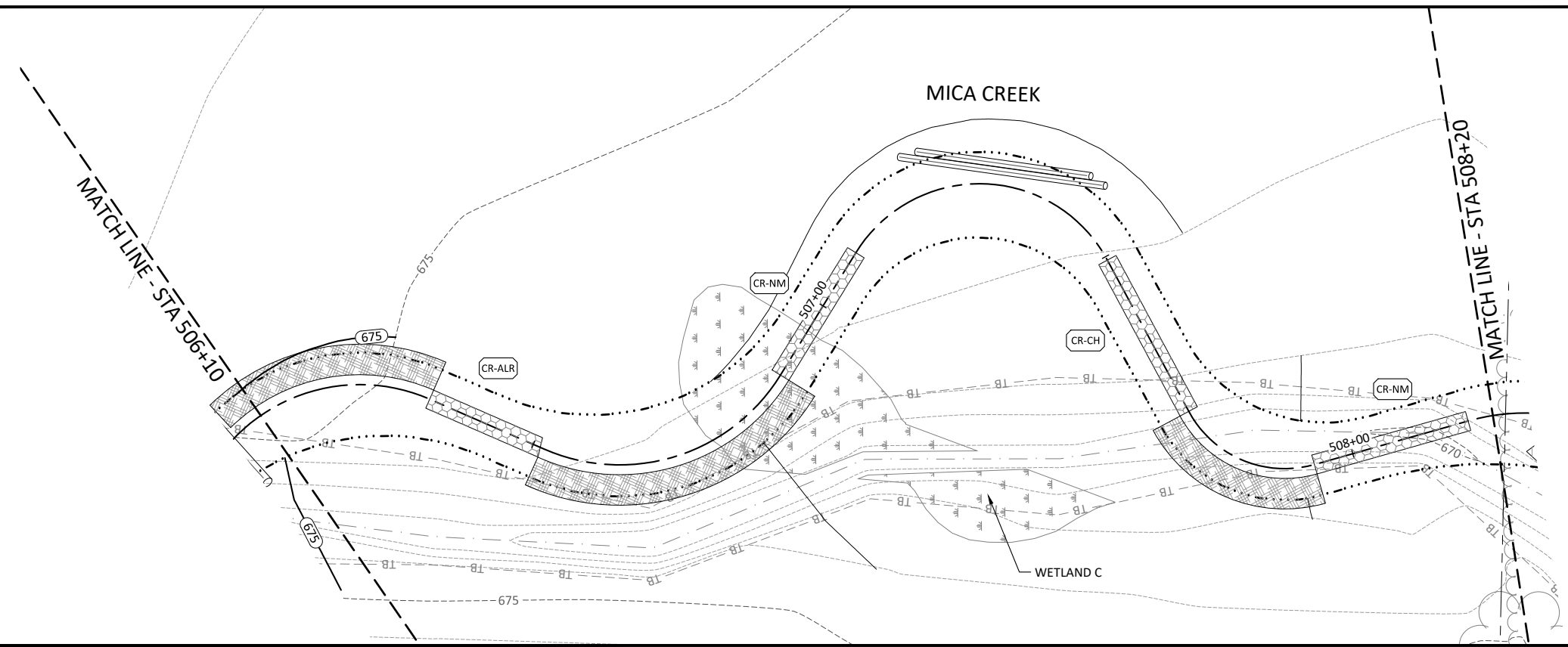
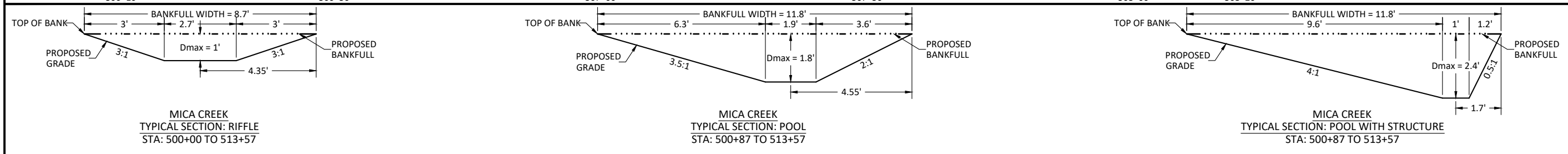
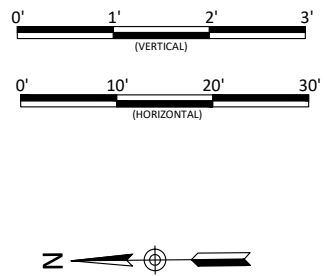
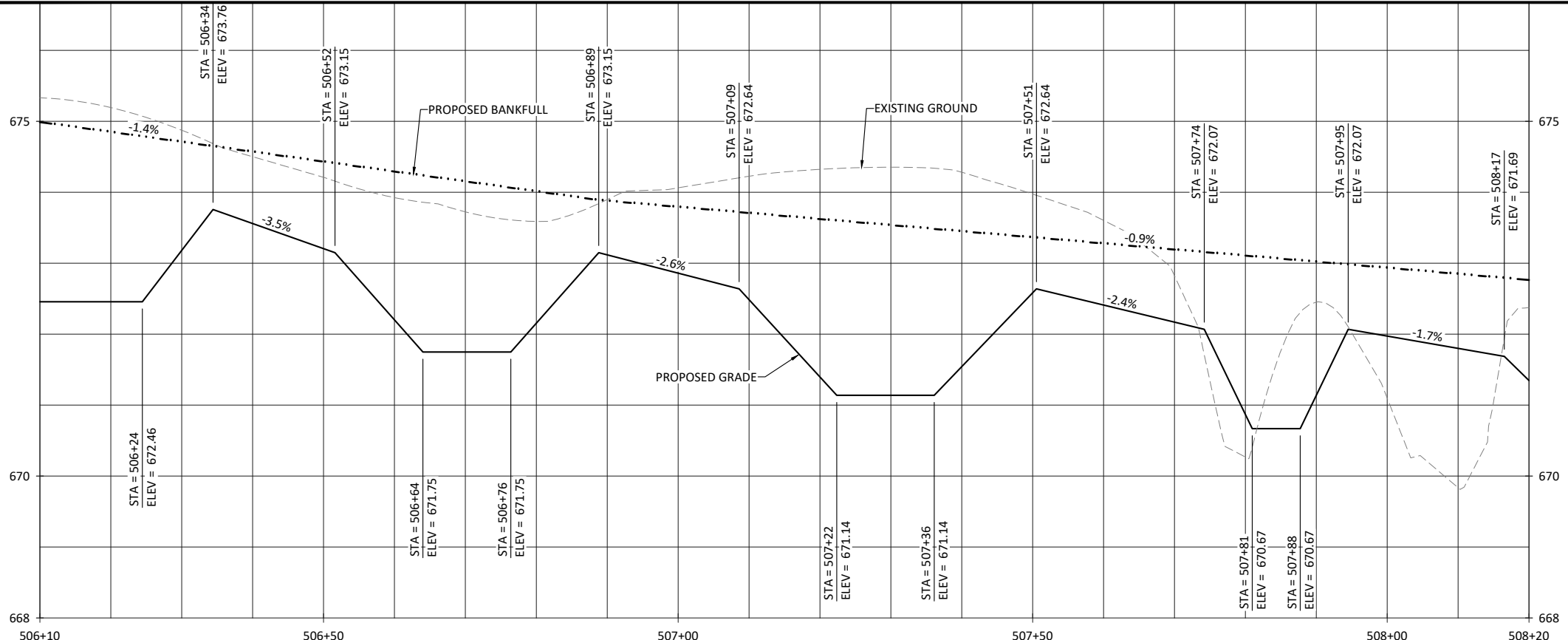
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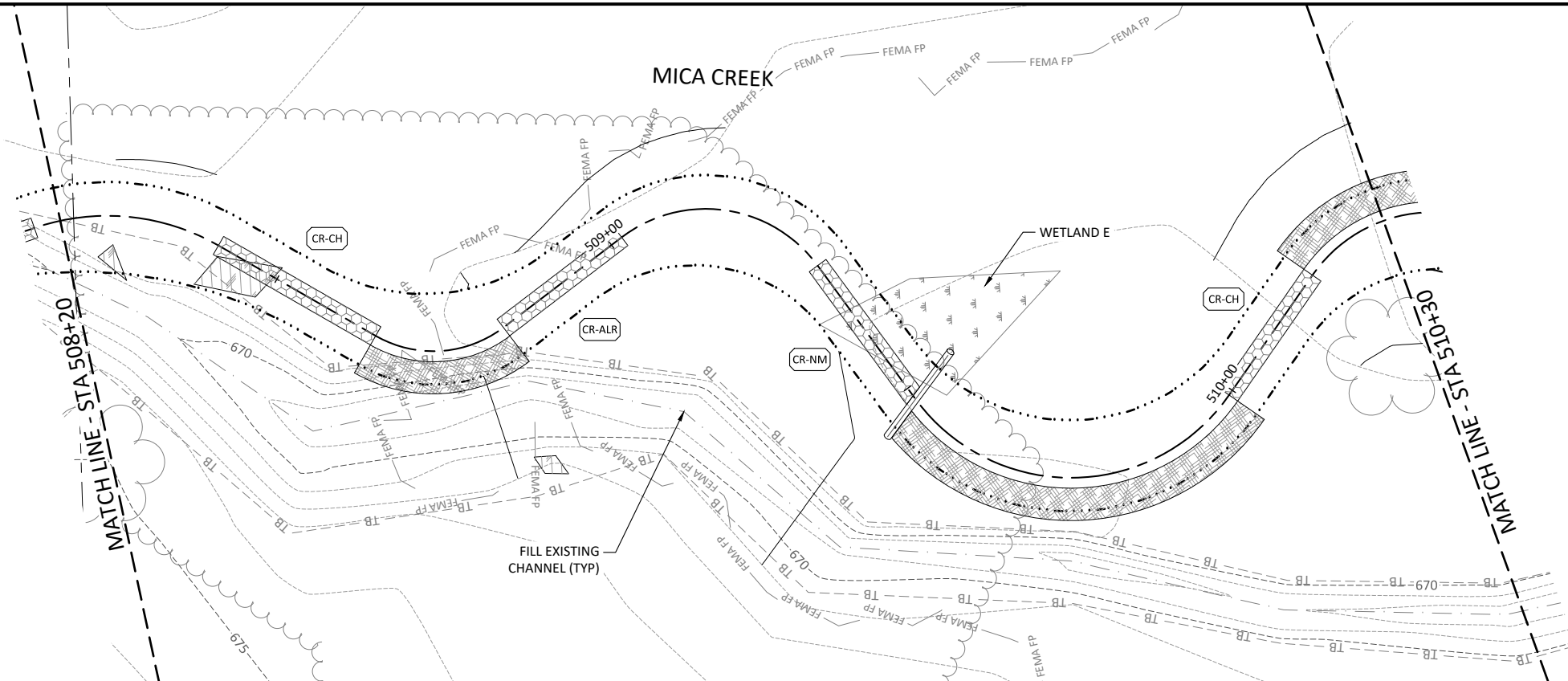
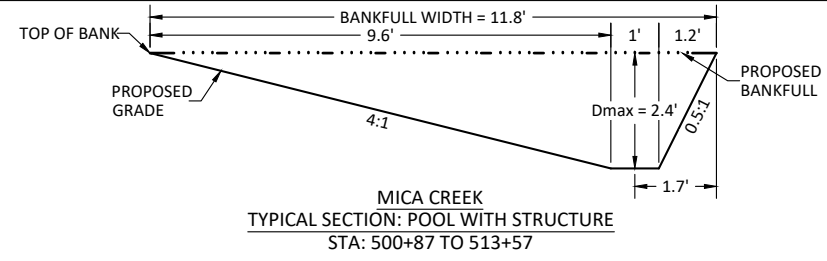
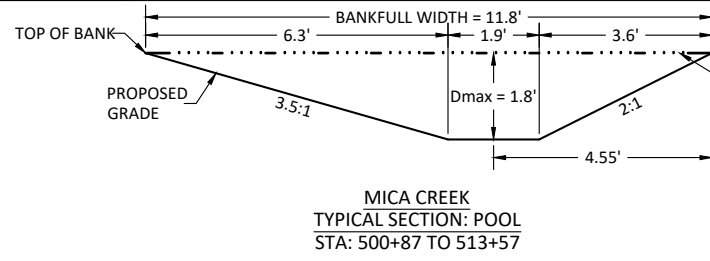
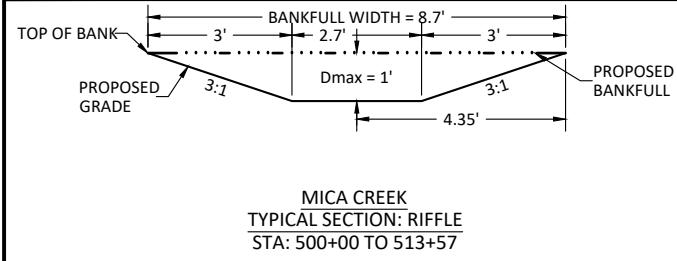
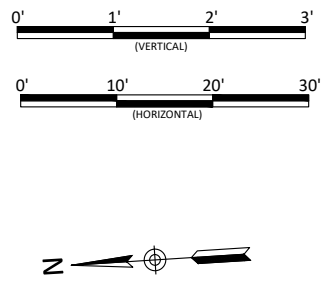
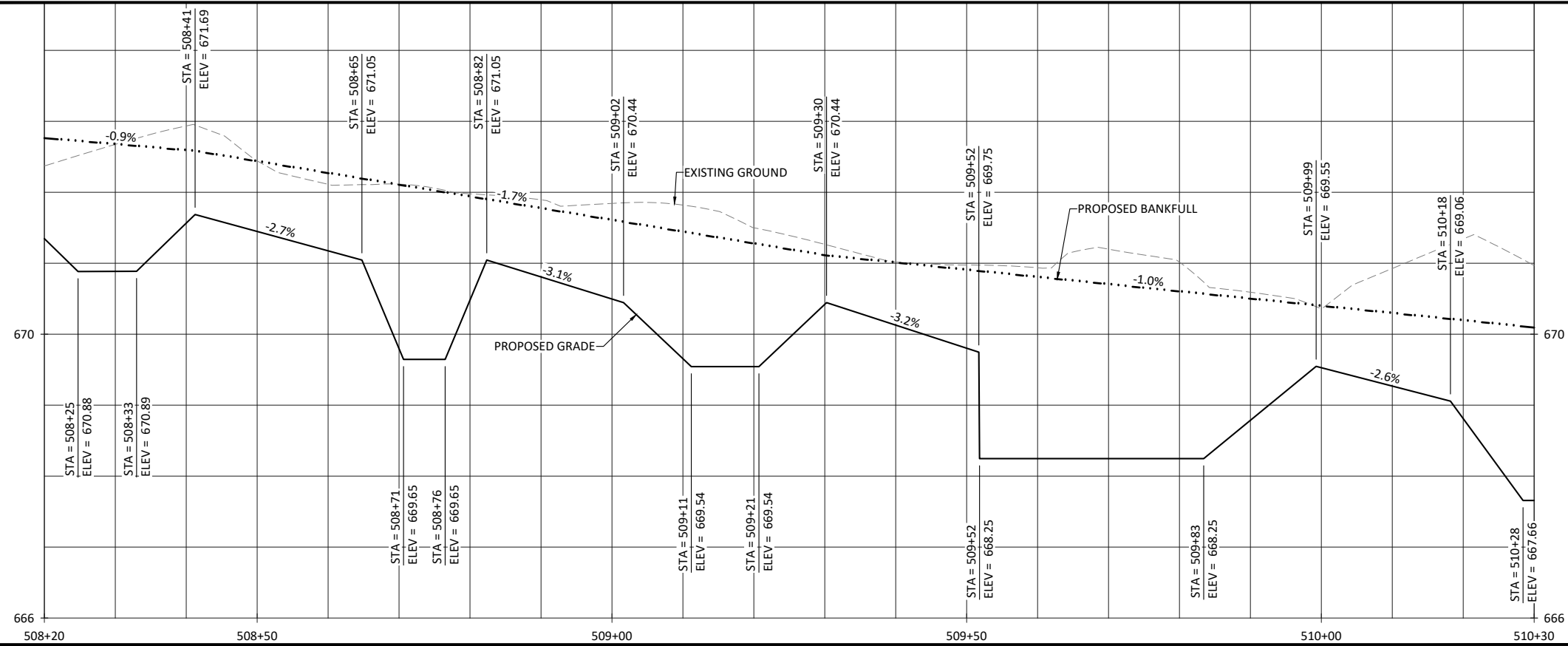
Liberty Rock Mitigation Site
Randolph County, North Carolina

Mica Creek
Stream Plan and Profile

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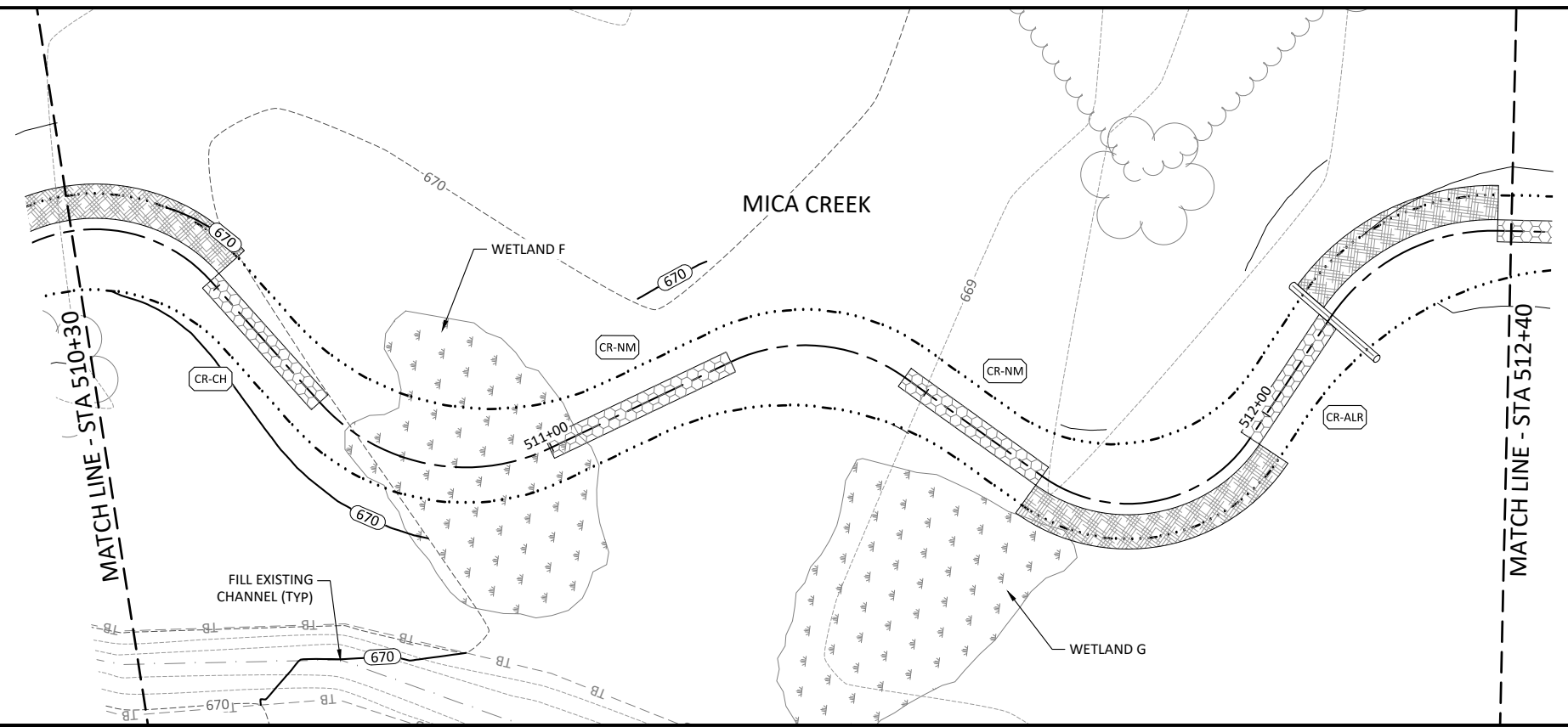
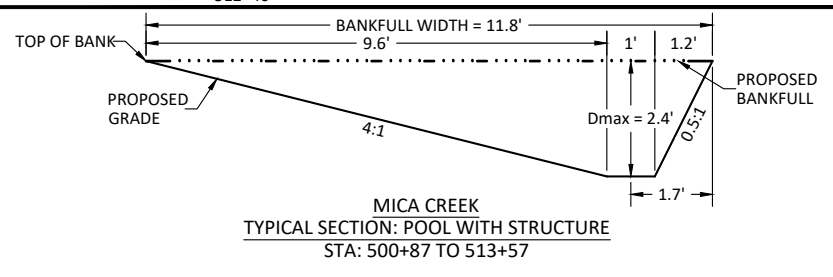
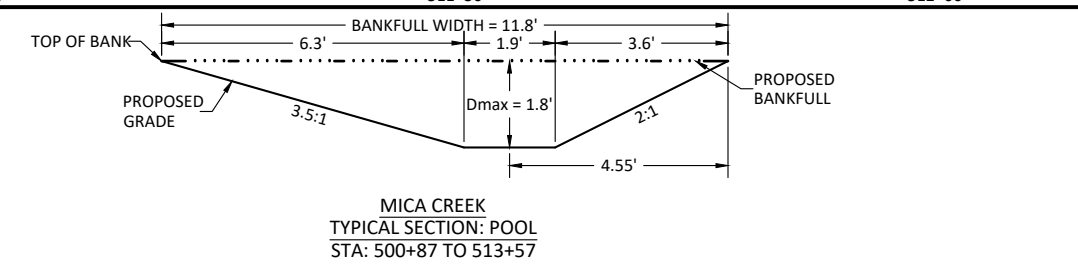
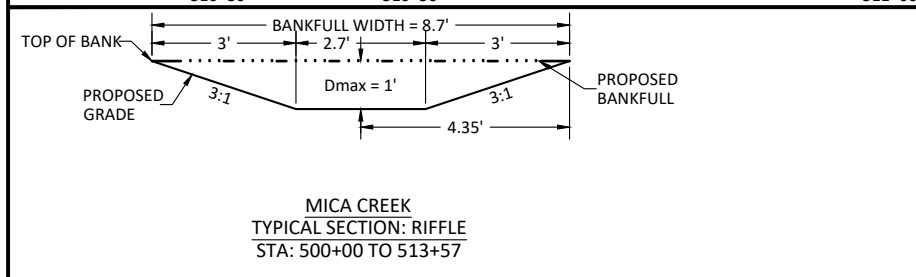
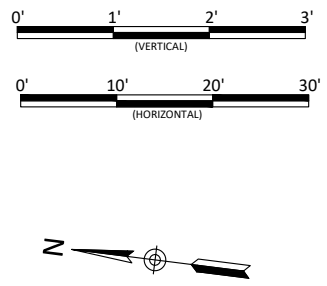
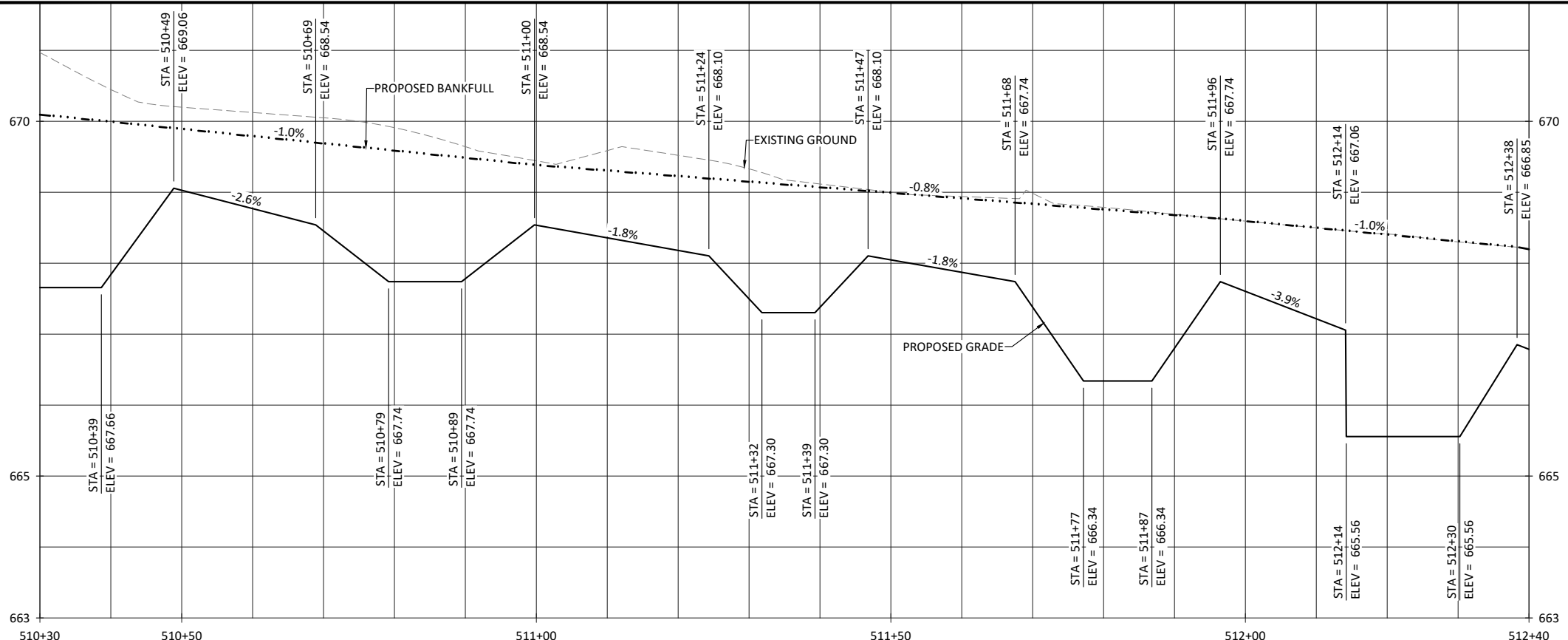


Liberty Rock Mitigation Site
Randolph County, North Carolina

Mica Creek
Stream Plan and Profile

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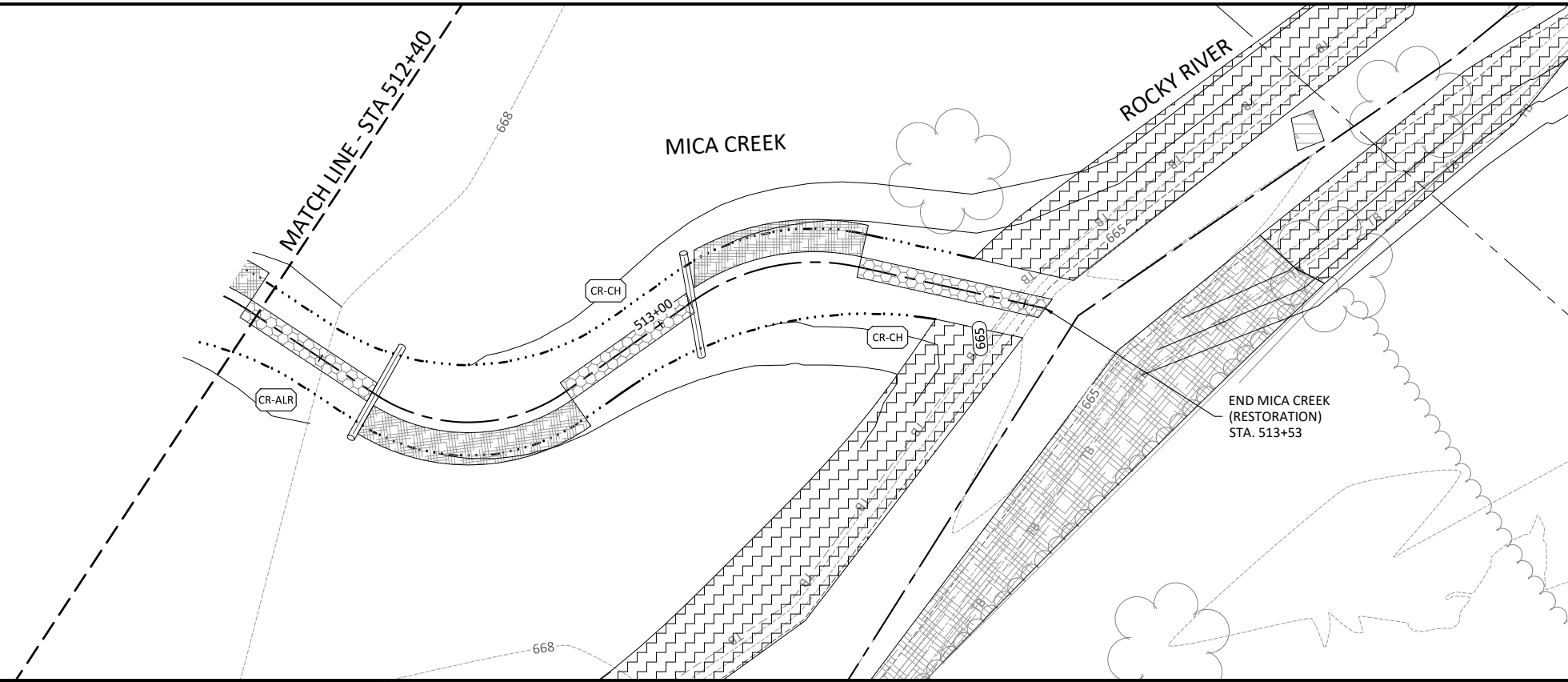
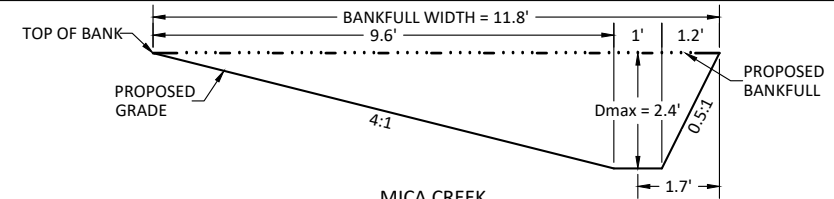
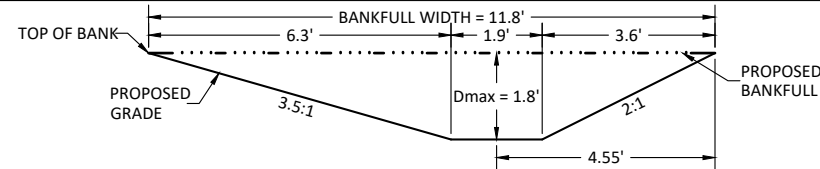
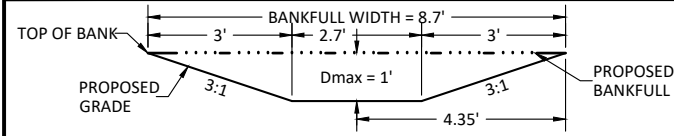
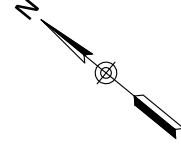
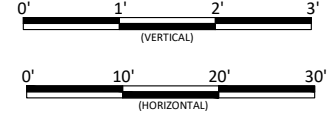
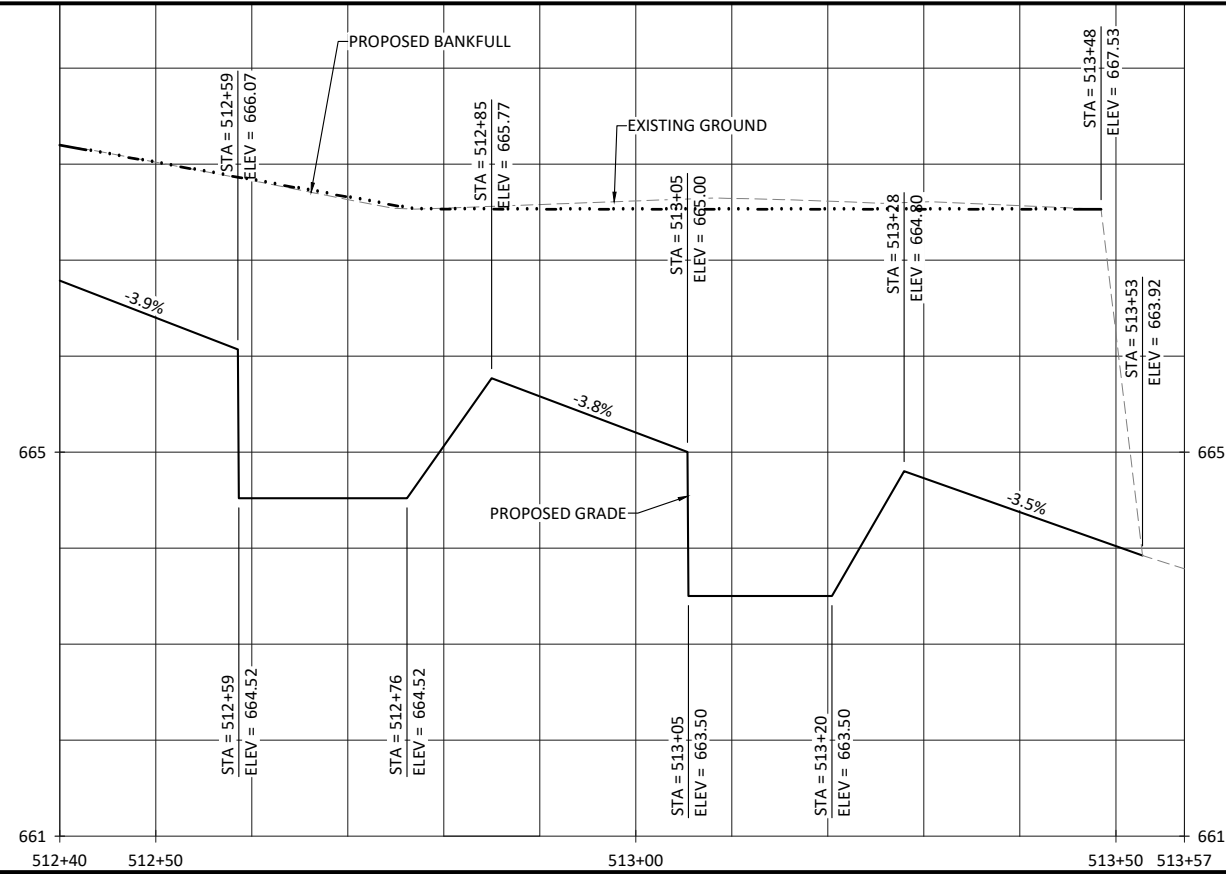
Liberty Rock Mitigation Site
Randolph County, North Carolina

Mica Creek
Stream Plan and Profile



Date:	10-21-21
Job Number:	005-02185
Project Engineer:	AV
Drawn By:	CW
Checked By:	GAT

1.17



Liberty Rock Mitigation Site
Randolph County, North Carolina

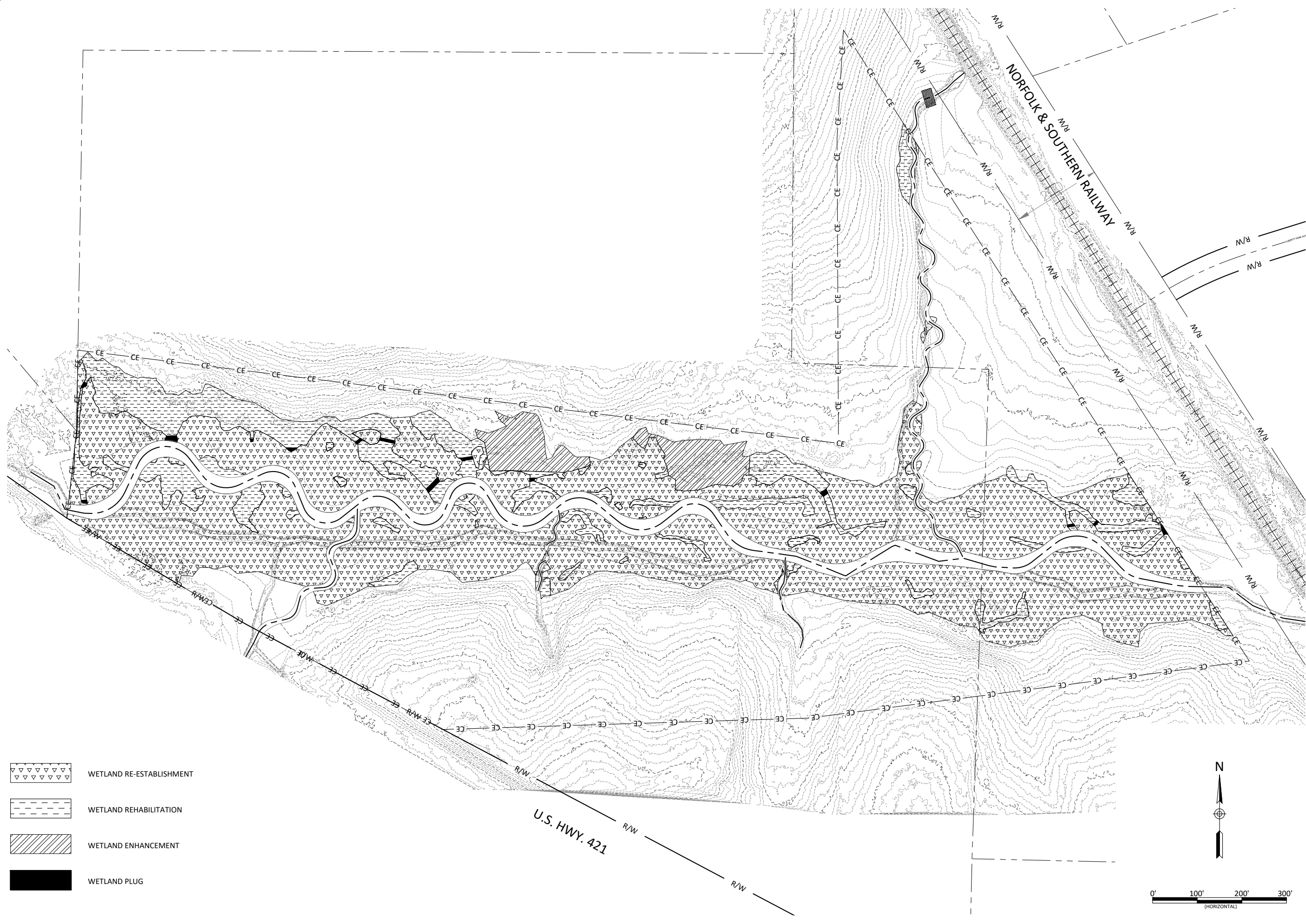
Mica Creek
Stream Plan and Profile

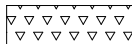

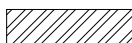



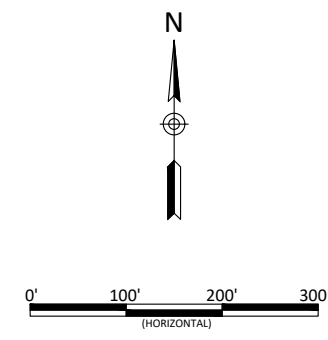
Revisions:

Date: 10-21-21
Job Number: 005-02185
Project Engineer: AV
Drawn By: CW
Checked By: GAT

1.18



-  WETLAND RE-ESTABLISHMENT
-  WETLAND REHABILITATION
-  WETLAND ENHANCEMENT
-  WETLAND PLUG

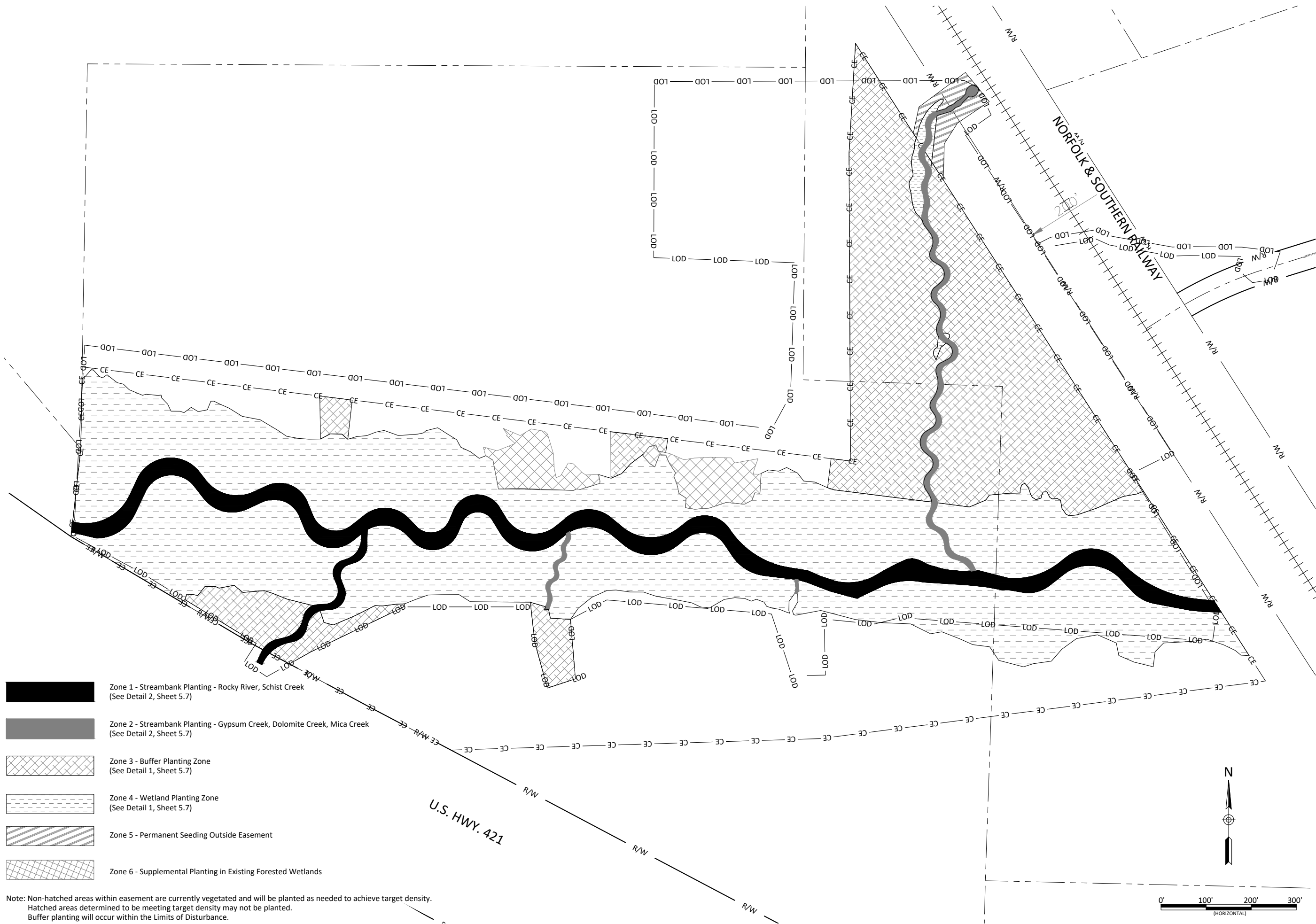


Liberty Rock Mitigation Site
Randolph County, North Carolina

Revisions:	

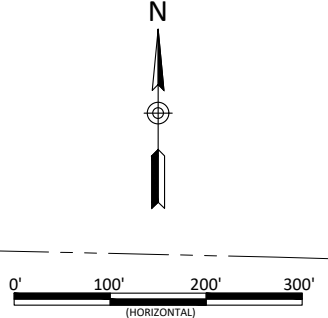
Date: 10-21-21
 Job Number: 005-02185
 Project Engineer: AV
 Drawn By: CW
 Checked By: GAT

2.0



-  Zone 1 - Streambank Planting - Rocky River, Schist Creek
(See Detail 2, Sheet 5.7)
-  Zone 2 - Streambank Planting - Gypsum Creek, Dolomite Creek, Mica Creek
(See Detail 2, Sheet 5.7)
-  Zone 3 - Buffer Planting Zone
(See Detail 1, Sheet 5.7)
-  Zone 4 - Wetland Planting Zone
(See Detail 1, Sheet 5.7)
-  Zone 5 - Permanent Seeding Outside Easement
-  Zone 6 - Supplemental Planting in Existing Forested Wetlands

Note: Non-hatched areas within easement are currently vegetated and will be planted as needed to achieve target density.
 Hatched areas determined to be meeting target density may not be planted.
 Buffer planting will occur within the Limits of Disturbance.



Liberty Rock Mitigation Site
 Randolph County, North Carolina

Planting Overview

Date:	10-21-21
Job Number:	005-02185
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Checked By:	GAT

3.0

Streambank Planting Zone 1 (2.3 acres)

Live Stakes						
Species	Common Name	Indiv. Spacing	Size	Stratum	Wetland Indicator Status	% of Stems
<i>Salix nigra</i>	Black Willow	3-6 ft.	0.5"-1.5" cal.	Canopy	OBL	50%
<i>Salix sericea</i>	Silky Willow	3-6 ft.	0.5"-1.5" cal.	Subcanopy	OBL	25%
<i>Cornus amomum</i>	Silky Dogwood	3-6 ft.	0.5"-1.5" cal.	Subcanopy	FACW	15%
<i>Cephalanthus occidentalis</i>	Buttonbush	3-6 ft.	0.5"-1.5" cal.	Shrub	OBL	10%
						100%
Herbaceous Plugs						
<i>Juncus Effusus</i>	Soft Rush	4 ft.	1.0"- 2.0" plug	Herb	FACW	50%
<i>Carex lurida</i>	Lurid Sedge	4 ft.	1.0"- 2.0" plug	Herb	OBL	15%
<i>Carex crinita</i>	Fringed Sedge	4 ft.	1.0"- 2.0" plug	Herb	OBL	10%
<i>Scirpus cyperinus</i>	Woolgrass	4 ft.	1.0"- 2.0" plug	Herb	OBL	15%
<i>Lobelia cardinalis</i>	Cardinal flower	5 ft.	1.0"- 2.0" plug	Herb	FACW	5%
<i>Hibiscus moschuetos</i>	Crimsoneyed Marshmallow	6 ft.	1.0"- 2.0" plug	Shrub	OBL	5%
						100%

Streambank Planting Zone 2 (0.3 acres)

Live Stakes						
Species	Common Name	Indiv. Spacing	Size	Stratum	Wetland Indicator Status	% of Stems
<i>Salix sericea</i>	Silky Willow	3-6 ft.	0.5"-1.5" cal.	Subcanopy	OBL	50%
<i>Cornus amomum</i>	Silky Dogwood	3-6 ft.	0.5"-1.5" cal.	Subcanopy	FACW	25%
<i>Cephalanthus occidentalis</i>	Buttonbush	3-6 ft.	0.5"-1.5" cal.	Shrub	OBL	15%
<i>Sambucus canadensis</i>	Elderberry	3-6 ft.	0.5"-1.5" cal.	Subcanopy	FACW	10%
						100%
Herbaceous Plugs						
<i>Juncus Effusus</i>	Soft Rush	4 ft.	1.0"- 2.0" plug	Herb	FACW	50%
<i>Carex lurida</i>	Lurid Sedge	4 ft.	1.0"- 2.0" plug	Herb	OBL	15%
<i>Carex crinita</i>	Fringed Sedge	4 ft.	1.0"- 2.0" plug	Herb	OBL	10%
<i>Scirpus cyperinus</i>	Woolgrass	4 ft.	1.0"- 2.0" plug	Herb	OBL	15%
<i>Helianthus angustifolius</i>	Swamp Sunflower	5 ft.	1.0"- 2.0" plug	Herb	FACW	5%
<i>Hibiscus moschuetos</i>	Crimsoneyed Marshmallow	6 ft.	1.0"- 2.0" plug	Shrub	OBL	5%
						100%

Buffer Planting Zone (7.7 acres)

Bare Root						
Species	Common Name	Indiv. Spacing	Caliper Size	Stratum	Wetland Indicator Status	% of Stems
<i>Platanus occidentalis</i>	Sycamore	6-12 ft.	0.25"-1.0"	Canopy	FACW	15%
<i>Betula nigra</i>	River Birch	6-12 ft.	0.25"-1.0"	Canopy	FACW	15%
<i>Acer negundo</i>	Boxelder	6-12 ft.	0.25"-1.0"	Canopy	FAC	10%
<i>Diospyros virginiana</i>	Persimmon	6-12 ft.	0.25"-1.0"	Canopy	FAC	10%
<i>Ulmus americana</i>	American Elm	6-12 ft.	0.25"-1.0"	Canopy	FACW	7%
<i>Quercus michauxii</i>	Swamp Chestnut Oak	6-12 ft.	0.25"-1.0"	Canopy	FACW	10%
<i>Quercus phellos</i>	Willow Oak	6-12 ft.	0.25"-1.0"	Canopy	FAC	5%
<i>Ulmus alata</i>	Winged Elm	6-12 ft.	0.25"-1.0"	Canopy	FAC	5%
<i>Quercus rubra</i>	Northern Red Oak	6-12 ft.	0.25"-1.0"	Canopy	FACU	5%
<i>Celtis laevigata</i>	Sugarberry	6-12 ft.	0.25"-1.0"	Canopy	FACW	8%
<i>Asimina triloba</i>	Pawpaw	6-12 ft.	0.25"-1.0"	Subcanopy	FAC	5%
<i>Euonymus americana</i>	Strawberry Bush	6-12 ft.	0.25"-1.0"	Shrub	FAC	5%
						100%

Wetland Planting Zone (18.8 acres)

Bare Root						
Species	Common Name	Indiv. Spacing	Caliper Size	Stratum	Wetland Indicator Status	% of Stems
<i>Platanus occidentalis</i>	Sycamore	6-12 ft.	0.25"-1.0"	Canopy	FACW	15%
<i>Betula nigra</i>	River Birch	6-12 ft.	0.25"-1.0"	Canopy	FACW	15%
<i>Acer negundo</i>	Boxelder	6-12 ft.	0.25"-1.0"	Canopy	FAC	7%
<i>Ulmus americana</i>	American Elm	6-12 ft.	0.25"-1.0"	Canopy	FACW	10%
<i>Quercus phellos</i>	Willow Oak	6-12 ft.	0.25"-1.0"	Canopy	FAC	6%
<i>Quercus michauxii</i>	Swamp Chestnut Oak	6-12 ft.	0.25"-1.0"	Canopy	FACW	7%
<i>Quercus lyrata</i>	Overcup Oak	6-12 ft.	0.25"-1.0"	Canopy	OBL	10%
<i>Salix nigra</i>	Black Willow	6-12 ft.	0.25"-1.0"	Canopy	OBL	10%
<i>Alnus serrulata</i>	Tag Alder	6-12 ft.	0.25"-1.0"	Subcanopy	OBL	5%
<i>Salix sericea</i>	Silky Willow	6-12 ft.	0.25"-1.0"	Subcanopy	OBL	5%
<i>Sambucus canadensis</i>	Elderberry	6-12 ft.	0.25"-1.0"	Subcanopy	FACW	5%
<i>Cephalanthus occidentalis</i>	Buttonbush	6-12 ft.	0.25"-1.0"	Shrub	OBL	5%

Note: Wetland zone species to be planted on 6' spacing in rows spaced 12' apart.

Temporary Seeding (26.8 acres)

Pure Live Seed				
Approved Dates	Species Name	Common Name	Stratum	Density (lbs/acre)
August 15 - April 15	<i>Secale cereale</i>	Rye Grain	Herb	110
August 15 - April 15	<i>Avena sativa</i>	Winter Oats	Herb	30
April 15 - August 15	<i>Setaria italica</i>	German Millet	Herb	50
All Year	<i>Trifolium incarnatum</i>	Crimson Clover	Herb	5
All Year	<i>Trifolium repens</i>	Ladino Clover	Herb	5

Permanent Riparian Seeding (7.7 acres)

Pure Live Seed (20 lbs/acre)					
Approved Dates	Species Name	Common Name	Stratum	Wetland Indicator Status	lbs/acre
All Year	<i>Elymus virginicus</i>	Virginia Wildrye	Herb	FACW	3.0
All Year	<i>Panicum virgatum</i>	Switchgrass	Herb	FAC	1.0
All Year	<i>Schizachyrium scoparium</i>	Little Bluestem	Herb	FACU	3.0
All Year	<i>Tripsacum dactyloides</i>	Eastern Gamagrass	Herb	FACW	2.0
All Year	<i>Dichanthelium clandestinum</i>	Deertongue	Herb	FAC	3.0
All Year	<i>Chasmanthium latifolium</i>	River Oats	Herb	FACU	1.0
All Year	<i>Sorghastrum nutans</i>	Indiangrass	Herb	FACU	1.6
All Year	<i>Juncus tenuis</i>	Path rush	Herb	FAC	0.4
All Year	<i>Rudbeckia hirta</i>	Blackeyed Susan	Herb	FACU	1.0
All Year	<i>Bidens aristosa</i>	Bur Marigold	Herb	FACW	1.0
All Year	<i>Helianthus angustifolia</i>	Swamp Sunflower	Herb	FACW	1.0
All Year	<i>Coreopsis lanceolata</i>	Lanceleaf Coreopsis	Herb	FACU	1.0
All Year	<i>Chamaecrista fasciculata</i> var. <i>fasciculata</i>	Partridge Pea	Herb	FACU	1.0

Permanent Seeding Outside Easement (0.3 acres)

Approved Dates	Species Name	Common Name	Stratum	Density (lbs/acre)	Percentage
All Year	<i>Festuca arundinacea</i>	Tall Fescue	Herb	30	55%
All Year	<i>Dactylis glomerata</i>	Orchardgrass	Herb	20	36%
All Year	<i>Trifolium repens</i>	Ladino Clover	Herb	5	9%
					100%

Permanent Wetland Seeding (18.8 acres)

Pure Live Seed (20 lbs/acre)					
Approved Dates	Species Name	Common Name	Stratum	Wetland Indicator Status	Density (lbs/acre)
All Year	<i>Coleataenia rigidula</i>	Redtop Panicgrass	Herb	FACW	4
All Year	<i>Elymus virginicus</i>	Virginia wildrye	Herb	FACW	4
All Year	<i>Panicum virgatum</i>	Switchgrass	Herb	FAC	1
All Year	<i>Juncus effusus</i>	Soft Rush	Herb	FACW	1
All Year	<i>Juncus coriaceus</i>	Leathery Rush	Herb	FACW	1
All Year	<i>Carex vulpinoidea</i>	Fox Sedge	Herb	OBL	2
All Year	<i>Carex lurida</i>	Lurid Sedge	Herb	OBL	1
All Year	<i>Carex lupulina</i>	Hop Sedge	Herb	OBL	1
All Year	<i>Carex albuletscens</i>	Greenwhite Sedge	Herb	FACW	1
All Year	<i>Bidens aristosa</i>	Bur Marigold	Herb	FACW	2
All Year	<i>Helianthus angustifolia</i>	Swamp Sunflower	Herb	FACW	2

Wetland Indicator Status Legend

Abbreviation	Indicator Status	Ecological Description
OBL	Obligate	Almost always a hydrophyte, rarely in uplands
FACW	Facultative Wetland	Usually a hydrophyte but occasionally found in uplands
FAC	Facultative	Commonly occurs as either a hydrophyte or nonhydrophyte
FACU	Facultative Upland	Occasionally a hydrophyte, but usually occurs in uplands
UPL	Upland	Rarely a hydrophyte, almost always in uplands

Liberty Rock Forested Wetland Supplemental Planting

Species	Common Name	Max Spacing	Indiv. Spacing	Min. Caliper Size	Stratum	Percent of Stems
Plugs						
<i>Conoclinium coelestinum</i>	Blue Mistflower	12 ft	8-12 ft	1.0"- 2.0" plug	Herb	5%
<i>Carex crinita</i>	fringed Sedge	12 ft	8-12 ft	1.0"- 2.0" plug	Herb	10%
<i>Eleocharis acicularis</i>	Needle Spikerush	12 ft	8-12 ft	1.0"- 2.0" plug	Herb	7%
<i>Juncus effusus</i>	Soft Rush	12 ft	8-12 ft	1.0"- 2.0" plug	Herb	10%
<i>Eutrochium fistulosum</i>	Hollow Joe-Pye Weed	12 ft	8-12 ft	1.0"- 2.0" plug	Herb	10%
<i>Vernonia noveboracensis</i>	New York Ironweed	12 ft	8-12 ft	1.0"- 2.0" plug	Herb	10%
<i>Eupatorium pefoliatum</i>	Boneset	12 ft	8-12 ft	1.0"- 2.0" plug	Herb	10%
<i>Lobelia cardinalis</i>	Cardinal Flower	12 ft	8-12 ft	1.0"- 2.0" plug	Herb	5%
Bare Roots						
<i>Viburnum nudum</i>	Possumhaw Viburnum	12 ft	12 ft	0.25"-1.0"	Shrub	5%
<i>Viburnum recognitum</i>	Northern Arrowwood	12 ft	12 ft	0.25"-1.0"	Shrub	5%
<i>Ilex decidua</i>	Possumhaw Holly	12 ft	12 ft	0.25"-1.0"	Subcanopy	5%
<i>Xanthorhiza simplicissima</i>	Yellowroot	12 ft	12 ft	0.25"-1.0"	Shrub	4%
<i>Cornus amomum</i>	Silky Dogwood	12 ft	12 ft	0.25"-1.0"	Subcanopy	5%
<i>Sambucus canadensis</i>	Elderberry	12 ft	12 ft	0.25"-1.0"	Subcanopy	5%
<i>Aesculus sylvatica</i>	Painted Buckeye	12 ft	12 ft	0.25"-1.0"	Shrub	4%
						100%

NOTE: A minimum of four species of plugs and bare roots for Supplemental Planting will be planted. selection will be based on seasonal availability

Liberty Rock Mitigation Site
Randolph County, North Carolina

Planting Tables

Revisions:

Date: 10-21-21

Job Number: 005-02185

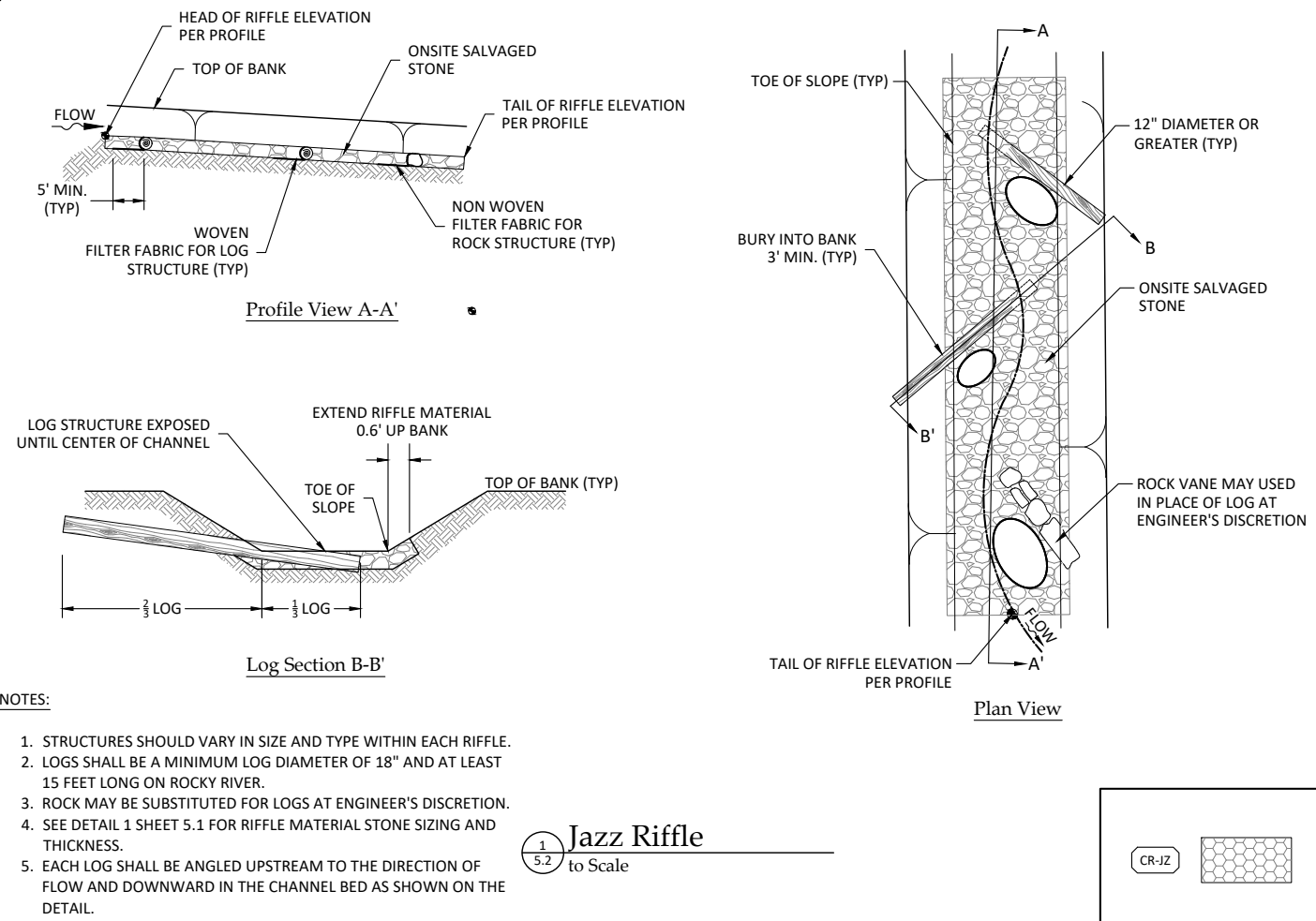
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Drawn By: CW

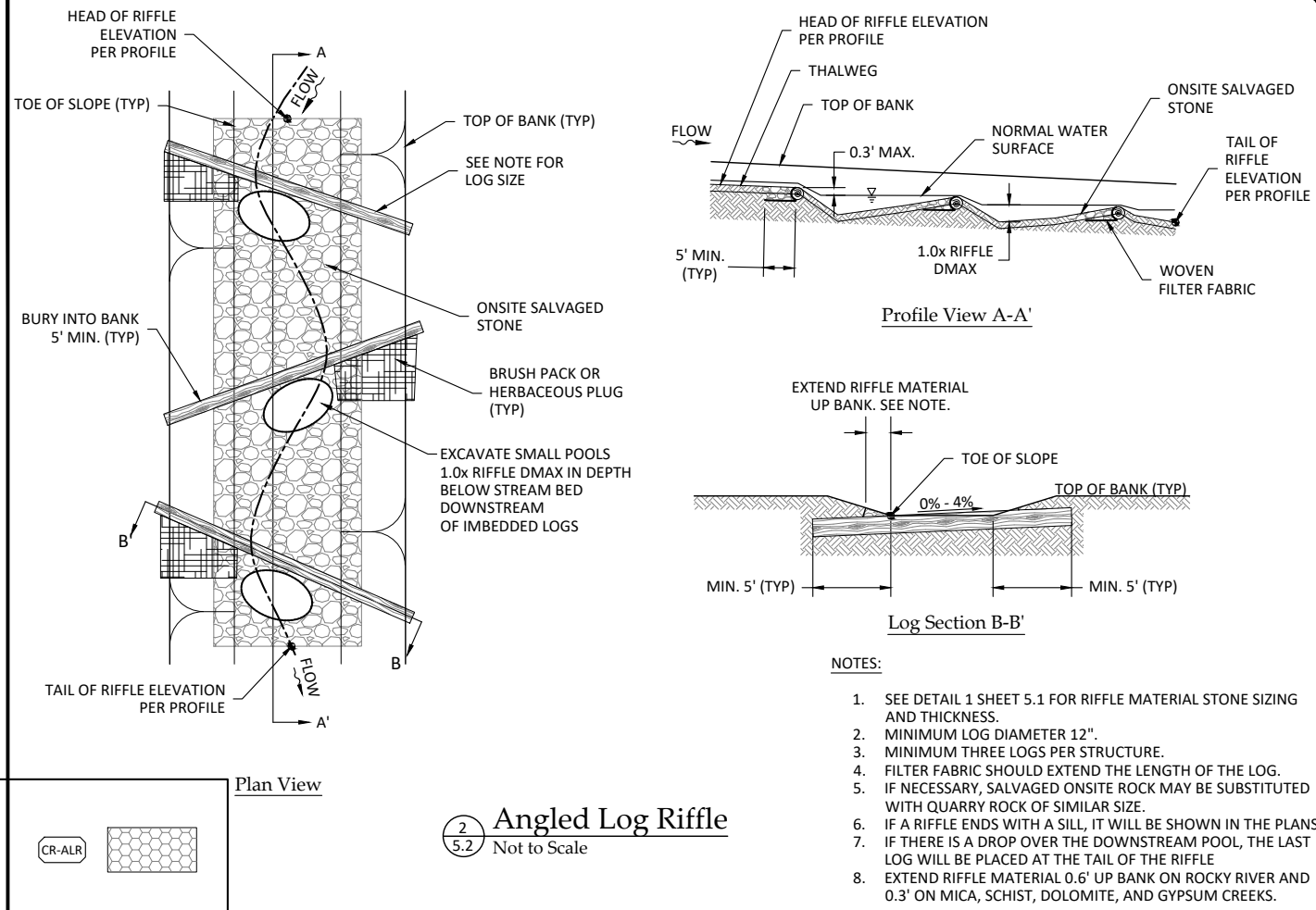
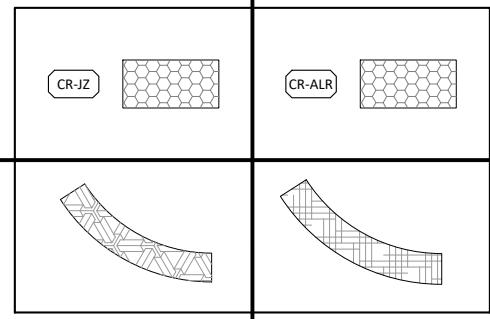
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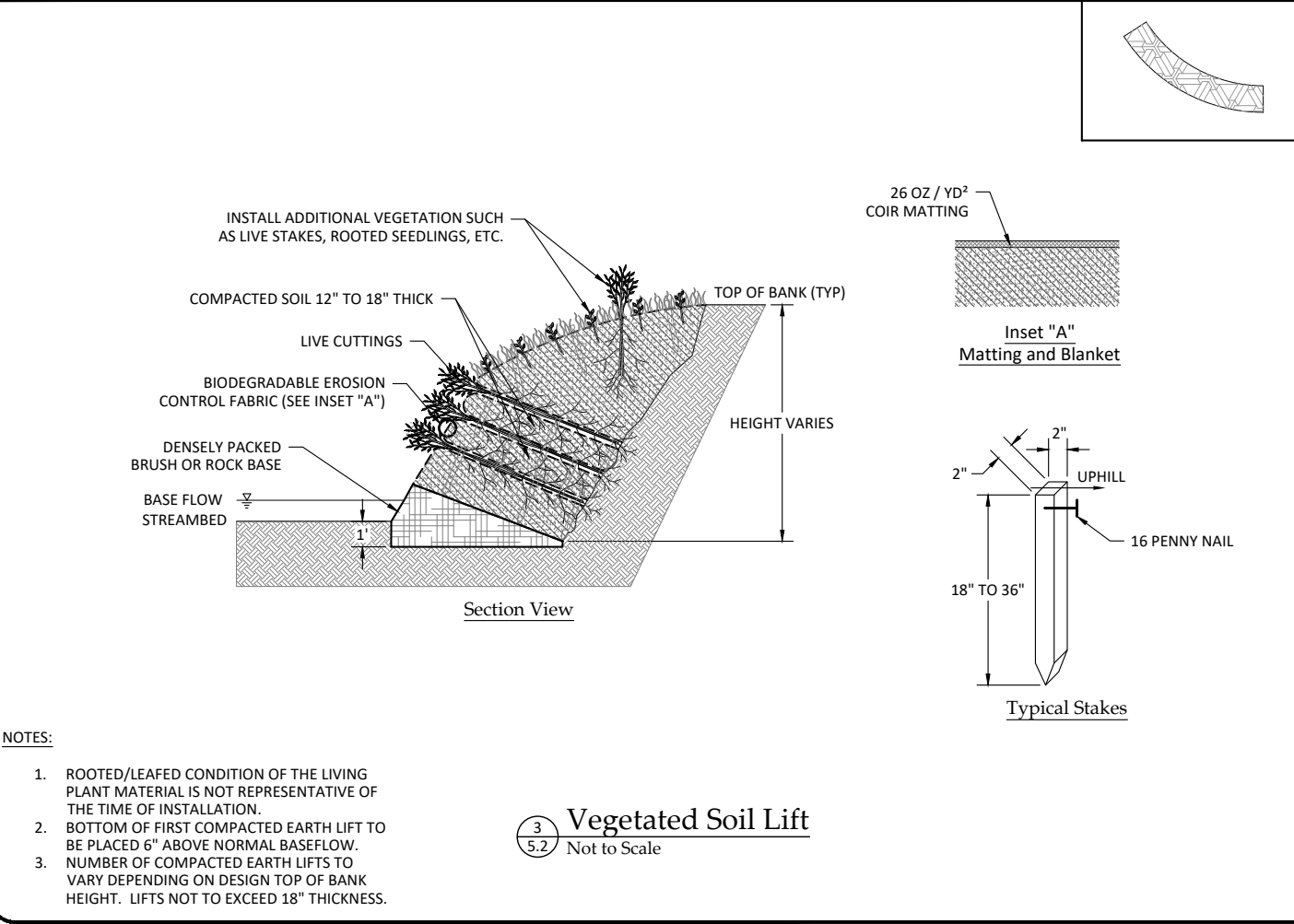
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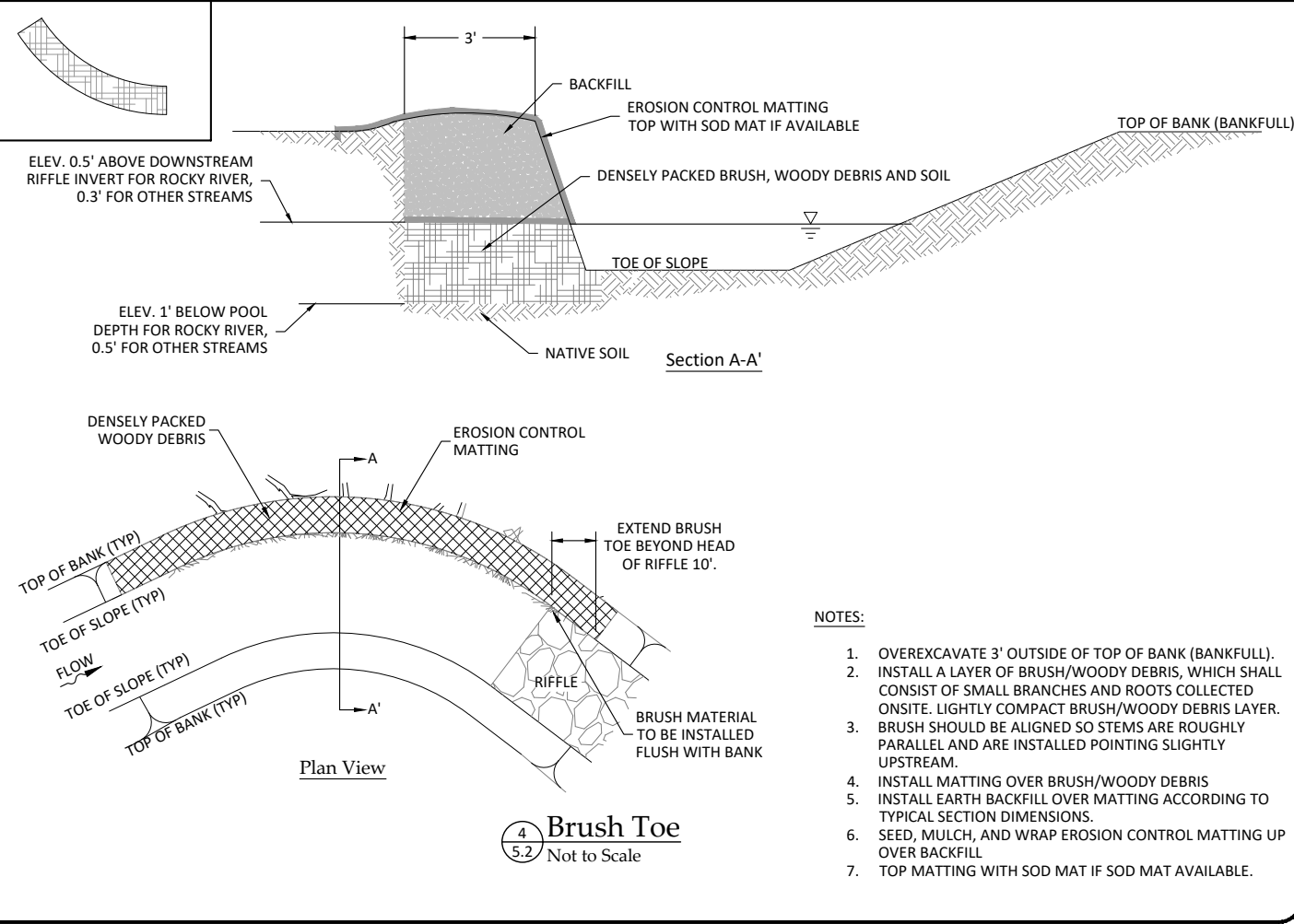
1 5.2 Jazz Riffle to Scale



2 5.2 Angled Log Riffle Not to Scale

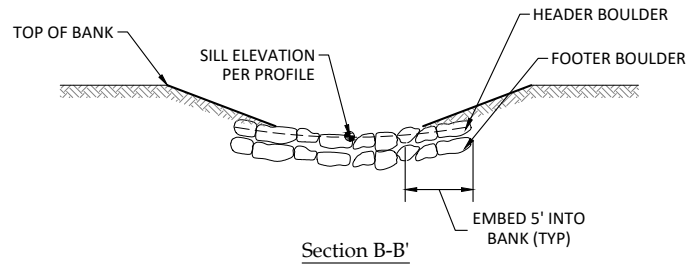
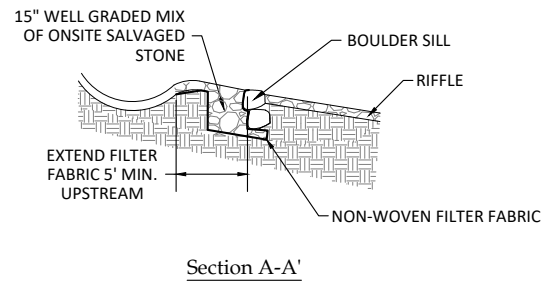
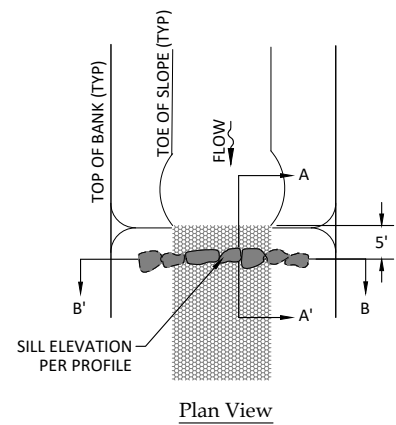


3 5.2 Vegetated Soil Lift Not to Scale



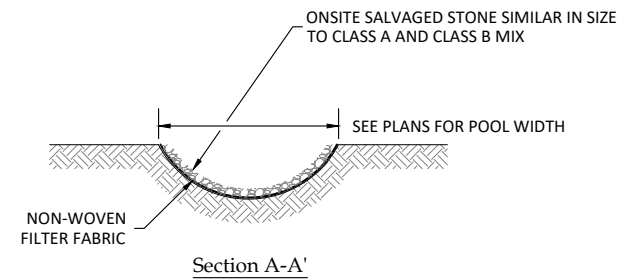
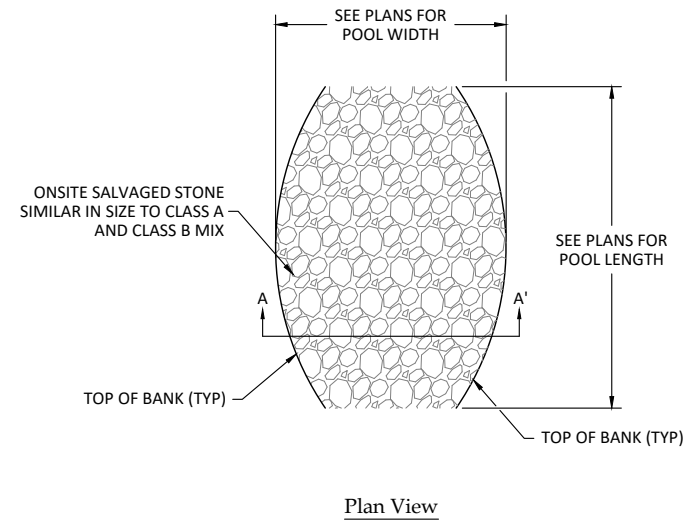
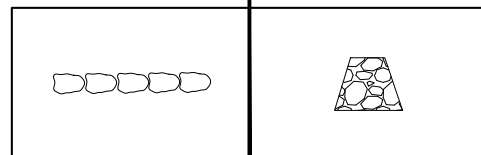
4 5.2 Brush Toe Not to Scale

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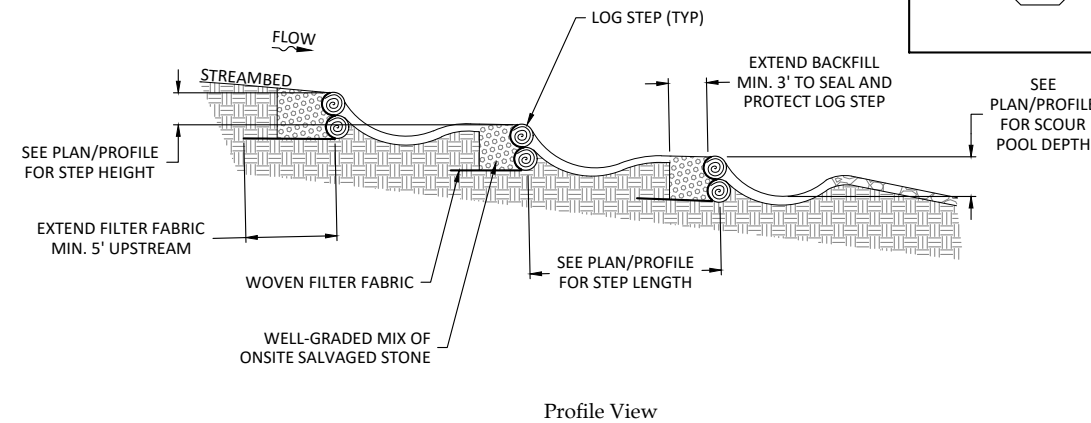
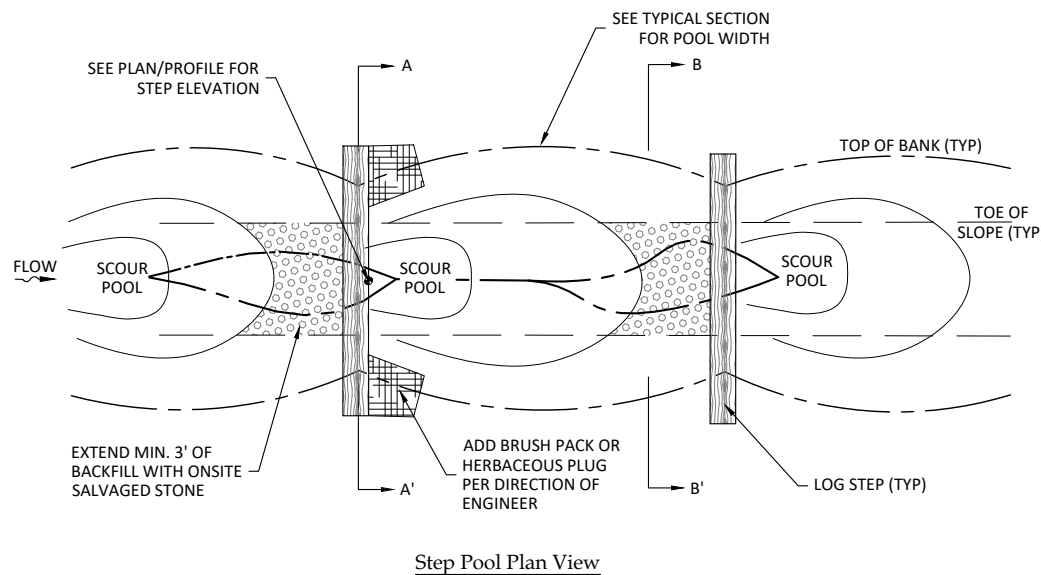
- NOTES:**
- BOULDERS TO BE MINIMUM 2X2X1 FT.
 - BOULDERS CAN BE SALVAGED ONSITE OR CONSIST OF ROUGH UNHEWN QUARRY STONE.
 - BOULDERS SHALL BE SOUND, DENSE, AND FREE OF FRACTURES.
 - BOULDERS SHALL BE BLOCKY IN SHAPE SUCH THAT THEY ARE STACKABLE.

1
5.4 Boulder Sill
Not to Scale

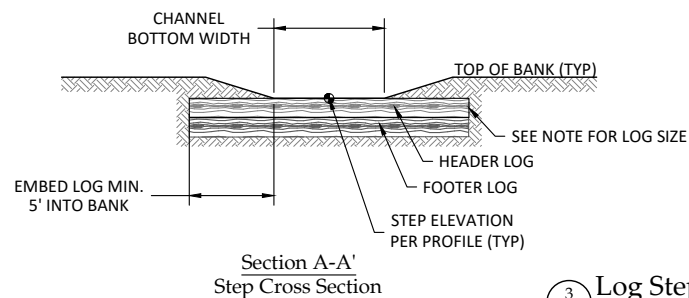


- NOTES:**
- IF NECESSARY, ONSITE SALVAGED STONE MAY BE SUBSTITUTED WITH QUARRY ROCK OF SIMILAR SIZE.
 - THE AVERAGE THICKNESS OF ONSITE SALVAGED STONE ON THE BANKS OF THE POOL SHALL BE 6 INCHES.

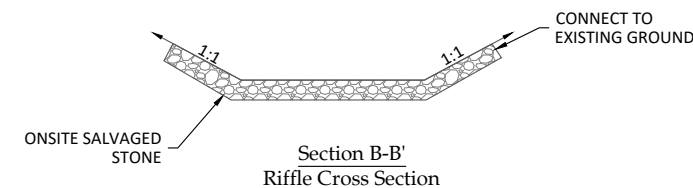
2
5.4 Rock Pipe Outlet
Not to Scale



- NOTES:**
- MINIMUM LOG DIAMETER OF 12 INCHES.
 - FOOTER LOGS TO BE ADDED AS NECESSARY IF POOL DEPTH IS MORE THAN HEADER LOG DIAMETER.
 - THE TOP EDGE OF FILTER FABRIC SHALL BE FOLDED AND NAILED TO HEADER LOG.
 - SEE PLAN AND PROFILE SHEETS FOR LOCATIONS AND ELEVATION OF INDIVIDUAL STEPS.
 - SEE DETAIL 1 SHEET 4.4 FOR RIFFLE MATERIAL STONE SIZING AND THICKNESS.
 - A MINIMUM OF 16 INCHES OF ONSITE SALVAGED STONE SHALL BE PLACED OVER FILTER FABRIC UPSTREAM OF THE LOG STEP.



3
5.4 Log Step
Not to Scale

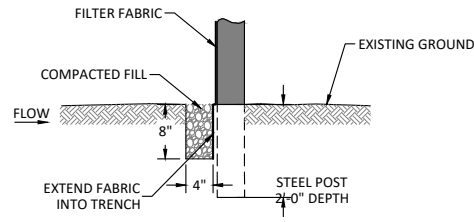
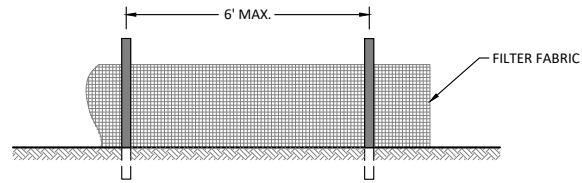


Liberty Rock Mitigation Site
Randolph County, North Carolina

Details

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Job Number:	005-02185
Project Engineer:	AV
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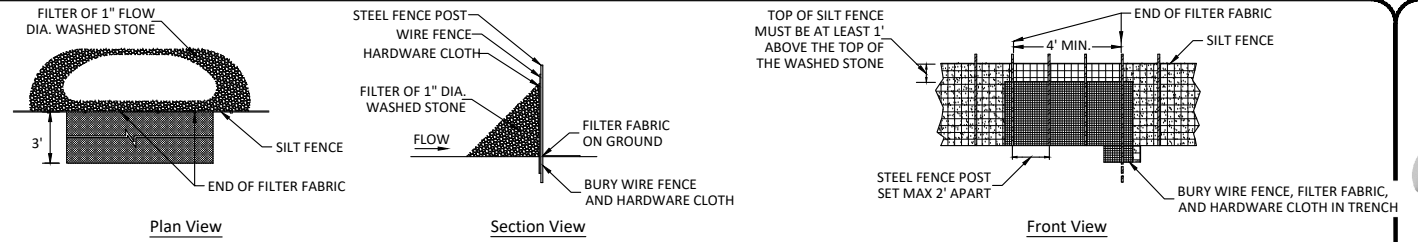
5.4



NOTES:

- USE WIRE A MINIMUM OF 32" IN WIDTH AND WITH A MINIMUM OF 6 LINES OF WIRES WITH 12" STAY SPACING.
- USE FILTER FABRIC A MINIMUM OF 36" IN WIDTH AND FASTEN ADEQUATELY TO THE WIRES AS DIRECTED BY THE ENGINEER.
- FILTER FABRIC WILL BE BURIED A MINIMUM OF 8" IN THE GROUND WITH A 4" SKIRT.
- PROVIDE 5' STEEL POST OF THE SELF-FASTENER ANGLE STEEL TYPE.
- SILT FENCING SHOULD BE PLACED AT LEAST 10-FEET AWAY FROM THE TOE OF SLOPE OF STOCKPILE AREAS TO PROVIDE ADEQUATE SEDIMENT STORAGE.
- INSPECT AFTER EACH RAIN EVENT AND MAINTAIN ACCORDING TO NCDEQ DESIGN MANUAL.
 - SHOULD FABRIC COLLAPSE, TEAR, DECOMPOSE, OR BECOME INEFFECTIVE, REPLACE IMMEDIATELY.
 - REMOVE SEDIMENT DEPOSITS AS NECESSARY TO PROVIDE ADEQUATE STORAGE VOLUME FOR THE NEXT RAIN AND TO REDUCE PRESSURE ON THE FENCE. TAKE CARE TO AVOID UNDERMINING THE FENCE DURING CLEAN OUT.
 - REMOVE ALL FENCING MATERIALS AND UNSTABLE SEDIMENT DEPOSITS AND BRING AREA TO GRADE AND STABILIZE IT AFTER THE CONTRIBUTING DRAINAGE AREA HAS BEEN PROPERLY STABILIZED.

1
5.8 Temporary Silt Fence
Not to Scale



INSTALLATION
REFER TO THE PLANS FOR LOCATIONS AND SPECIFICATIONS. DURING INSTALLATION OF THE SILT BARRIER OR SILT FENCE, INSPECT THE INSTALLATION TO DETERMINE IF OUTLETS ARE NEEDED ACCORDING TO THE CRITERIA SET FORTH IN THE SPECIFICATIONS FOR THE BARRIER AND FENCE. IF THERE ARE QUESTIONS OR PROBLEMS WITH THE LOCATION, EXTENT, OR METHOD OF INSTALLATION, CONTACT THE ENGINEER, ARCHITECT, OR RESPONSIBLE PERSONNEL ON THE SITE FOR ASSISTANCE. EROSION CONTROL PERSONNEL HAVE COPIES OF INSTRUCTIONS AND MAY HAVE PHOTOGRAPHS OF PROPERLY INSTALLED OUTLETS AS AN AID TO INSTALLATION.

IF THE SILT FENCE OUTLET IS NOT INSTALLED CORRECTLY THE FIRST TIME, IT WILL HAVE TO BE REBUILT.
DETERMINE THE EXACT LOCATION ON THE GROUND BEFORE COMPLETING INSTALLATION OF THE SILT FENCE, TAKING INTO CONSIDERATION:

INSTALL THE OUTLET AT THE LOWEST POINT (S) IN THE BARRIER OR FENCE WHERE WATER WILL POND.
INSTALL THE OUTLET WHERE IT IS ACCESSIBLE FOR INSTALLATION, MAINTENANCE, AND REMOVAL.

ALLOW AT LEAST:
15 FEET BETWEEN THE BARRIER OR FENCE AND SINGLE-STORY BUILDINGS.
25 FEET FOR FORK LIFTS BETWEEN THE BARRIER OR FENCE AND MULTIPLE-STORY BUILDINGS.
10 FEET BETWEEN THE BARRIER OR FENCE AND THE TOE OF FILL SLOPES.

PLACE THE OUTLET SO THAT WATER FLOWING THROUGH IT WILL NOT CREATE AN EROSION HAZARD BELOW: AVOID STEEP SLOPES BELOW THE OUTLET AND AREAS WITHOUT PROTECTIVE VEGETATION. USE SLOPE DRAINS IF NECESSARY.

DETERMINE THE LOCATION OF THE OUTLET: FOR A SILT BARRIER, WHEN THE TRENCH IS DUG TO BURY THE BOTTOM OF THE FABRIC BECAUSE THE BARRIER WILL BE OMITTED AT THE OUTLET; FOR A SILT FENCE, WHEN THE WIRE FENCE IS IN PLACE BECAUSE THE FILTER FABRIC WILL BE OMITTED AT THE OUTLET.

REFER TO THE ILLUSTRATIONS OF THE OUTLET IN THE PLAN.

CLEAR STUMPS AND ROOTS FROM THE LOCATION OF THE OUTLET. CLEAR ADEQUATE ACCESS FOR THE EQUIPMENT NEEDED FOR INSTALLATION, MAINTENANCE, AND REMOVAL.

FOR A SILT BARRIER:
JUST BELOW THE GAP IN THE BARRIER, PLACE A LAYER OF FILTER FABRIC ON THE GROUND TO PROTECT THE SOIL FROM EROSION BY OUTFLOW FROM THE OUTLET; PLACE 6 INCHES OF THE UPPER EDGE OF THE TRENCH. STAKE THE REMAINING EDGES OF THE FABRIC TO HOLD IT IN PLACE.

ALONG THE GAP WHERE THE OUTLET WILL GO, PLACE STEEL FENCE POSTS FOR STRENGTH. THE POSTS MUST BE A MAXIMUM OF 2 FEET APART AND DRIVEN INTO SOLID GROUND AT LEAST 18 INCHES.

PLACE HARDWARE CLOTH (WELDED GALVANIZED SCREEN WITH SQUARE 1/4 - 1/2-INCH HOLES) ON THE UPHILL SIDE OF THE POSTS TO HOLD THE WASHED STONE IN PLACE. PUT 6 INCHES OF THE BOTTOM OF THE CLOTH IN THE TRENCH AND FASTEN IT TO THE POSTS WITH LENGTHS OF WIRE.

BURY THE BOTTOM OF THE HARDWARE CLOTH AND THE UPPER EDGE OF THE FILTER FABRIC BELOW THE OUTLET IN THE TRENCH AND COMPACT THE FILL.

PLACE A FILTER OF 1-INCH DIAMETER WASHED STONE ON THE UPHILL SIDE OF THE OUTLET. PILE THE STONE UP TO THE TOP OF THE HARDWARE CLOTH AND OVER THE JOINT BETWEEN THE OUTLET AND THE BARRIER.

FOR A SILT FENCE:
JUST BELOW THE GAP IN THE BARRIER, PLACE A LAYER OF FILTER FABRIC ON THE GROUND TO PROTECT THE SOIL FROM EROSION BY OUTFLOW FROM THE OUTLET. PLACE 6 INCHES OF THE UPPER EDGE IN THE TRENCH. STAKE THE OTHER EDGES OF THE FABRIC TO HOLD IT IN PLACE.

ALONG THE GAP WHERE THE OUTLET WILL GO, PLACE ADDITIONAL STEEL FENCE POSTS FOR STRENGTH. THE POSTS MUST BE A MAXIMUM OF 2 FEET APART AND DRIVEN INTO SOLID GROUND AT LEAST 18 INCHES.

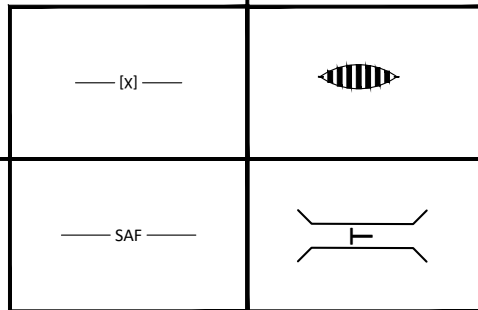
PLACE HARDWARE CLOTH (WELDED GALVANIZED SCREEN WITH SQUARE 1/4 - 1/2-INCH HOLES) ON THE UPHILL SIDE OF THE POSTS TO HOLD THE WASHED STONE IN PLACE. PUT 6 INCHES OF THE BOTTOM OF THE CLOTH IN THE TRENCH AND FASTEN IT TO THE POSTS WITH LENGTHS OF WIRE.

BURY THE BOTTOM OF THE HARDWARE CLOTH, THE UPPER EDGE OF THE FILTER FABRIC BELOW THE OUTLET, AND THE WIRE FENCE IN THE TRENCH AND COMPACT THE FILL.

PLACE A FILTER OF 1-INCH DIAMETER WASHED STONE ON THE UPHILL SIDE OF THE OUTLET. PILE THE STONE UP TO THE TOP OF THE HARDWARE CLOTH AND OVER THE JOINT BETWEEN THE OUTLET AND THE SILT FENCE.

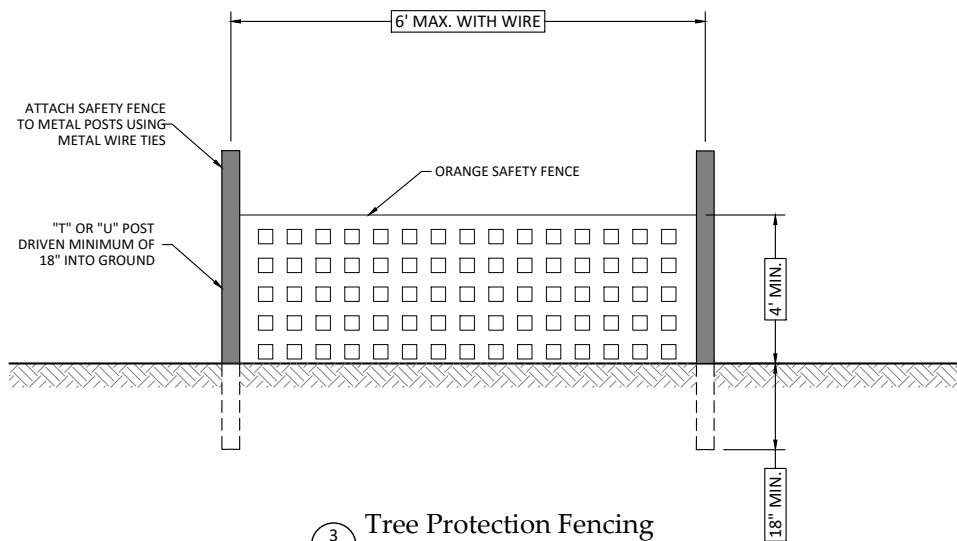
MAINTENANCE:
CHECK OUTLET FOR EROSION, PIPING, AND ROCK DISPLACEMENT WEEKLY AND AFTER EACH SIGNIFICANT (1/2 INCH OR GREATER) RAINFALL AND REPAIR IMMEDIATELY.

REMOVE THE STRUCTURE AND ANY UNSTABLE SEDIMENT IMMEDIATELY AFTER CONSTRUCTION SITE HAS BEEN PERMANENTLY STABILIZED.

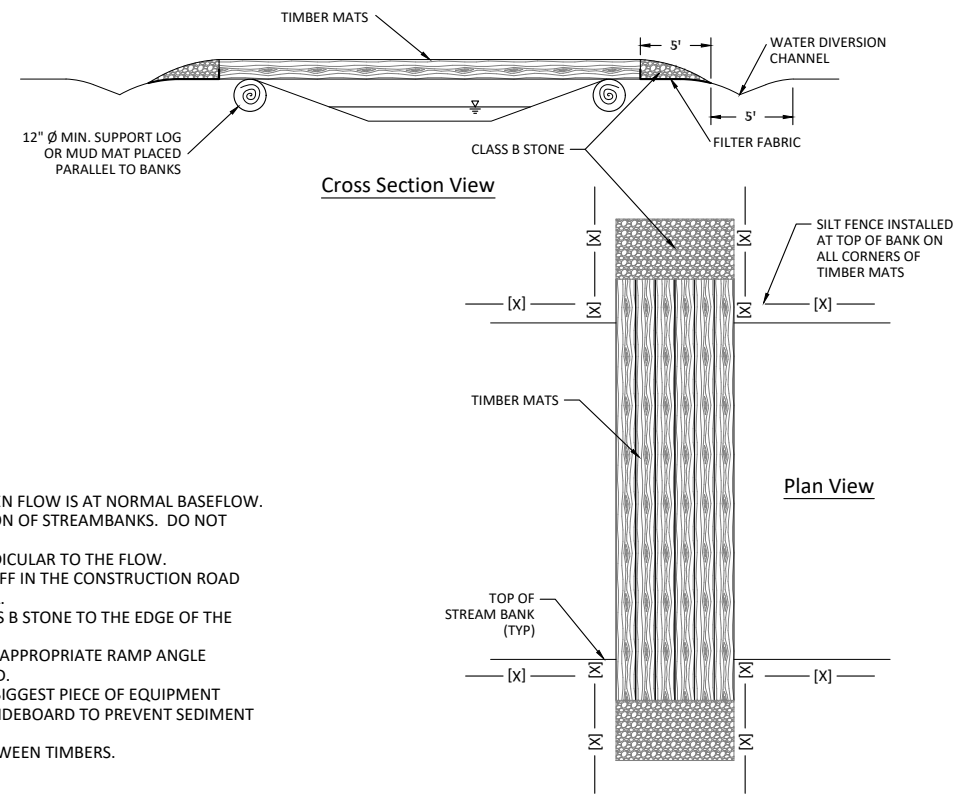


2
5.8 Temporary Silt Fence Gravel Outlet
Not to Scale

MATERIAL SPECIFICATIONS		
PHYSICAL PROPERTY	TESTS	REQUIREMENTS
MATERIAL	N/A	POLYETHYLENE
RECOMMENDED COLOR	N/A	"INTERNATIONAL ORANGE"
TENSILE YIELD	ASTM D638	AVE. 2000 LBS. PER 4' WIDE
ULTIMATE TENSILE STRENGTH	ASTM D638	AVE. 2900 LBS. PER 4' WIDE
ELONGATION AT BREAK (%)	ASTM D638	GREATER THAN 1000%
CHEMICAL RESISTANCE	N/A	INERT TO MOST CHEMICALS AND ACIDS



3
5.8 Tree Protection Fencing
Not to Scale

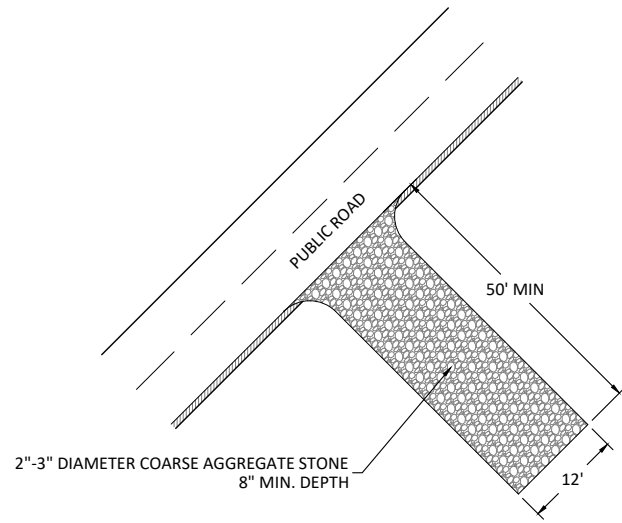


NOTES:

- CONSTRUCT STREAM CROSSING WHEN FLOW IS AT NORMAL BASEFLOW.
- MINIMIZE CLEARING AND EXCAVATION OF STREAMBANKS. DO NOT EXCAVATE CHANNEL BOTTOM.
- INSTALL STREAM CROSSING PERPENDICULAR TO THE FLOW.
- MAINTAIN CROSSING SO THAT RUNOFF IN THE CONSTRUCTION ROAD DOES NOT ENTER EXISTING CHANNEL.
- STABILIZE AN ACCESS RAMP OF CLASS B STONE TO THE EDGE OF THE TIMBER MAT.
- CONTRACTOR SHALL DETERMINE AN APPROPRIATE RAMP ANGLE ACCORDING TO EQUIPMENT UTILIZED.
- TIMBER MAT IS TO BE WIDER THAN BIGGEST PIECE OF EQUIPMENT CROSSING IT WITH A SOLID DECK & SIDEBORD TO PREVENT SEDIMENT LOSS TO STREAM.
- ALL MATS SHALL HAVE NO GAPS BETWEEN TIMBERS.

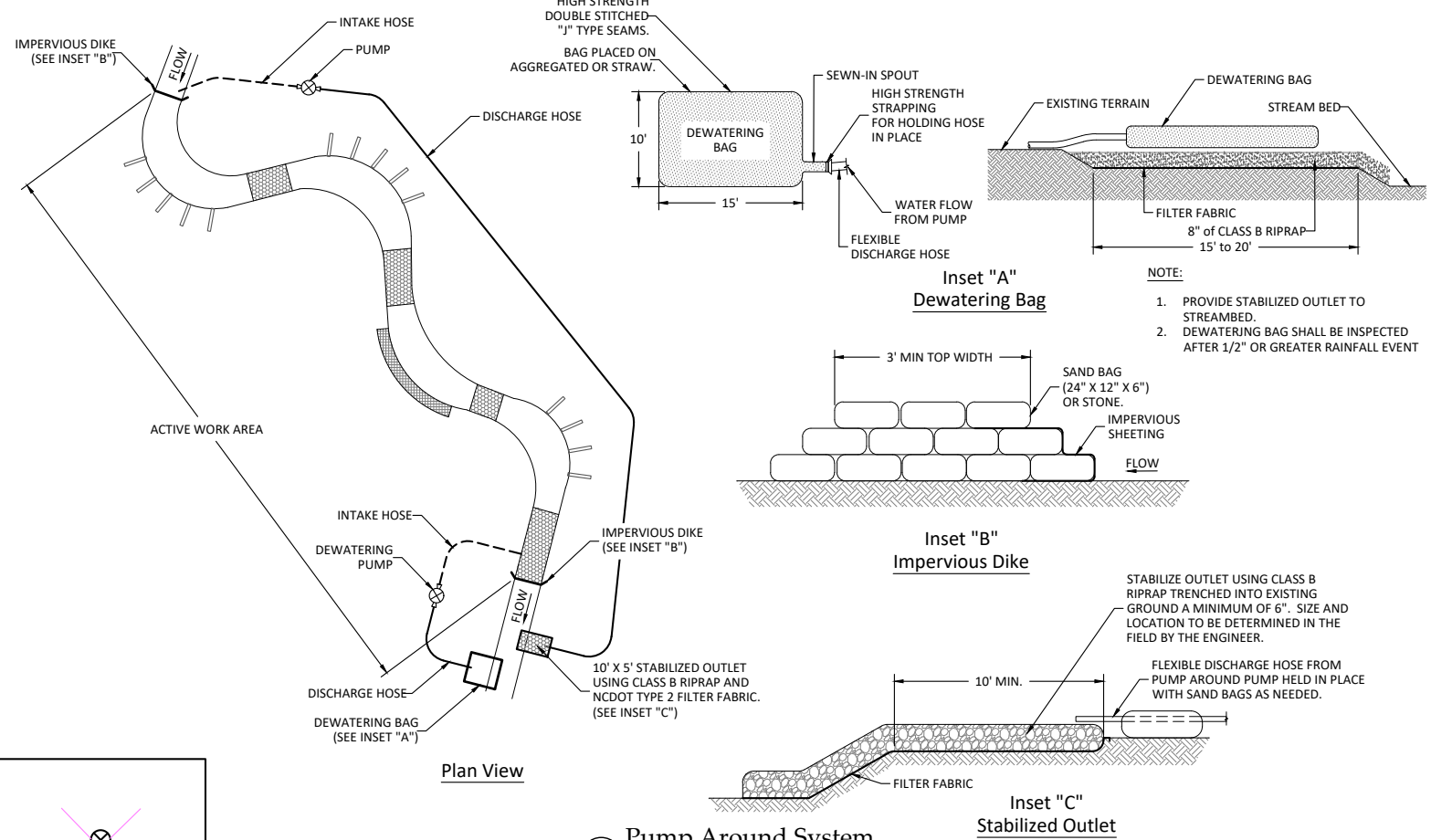
4
5.8 Temporary Stream Crossing with Silt Fence - Timber Mat
Not to Scale

Revisions:

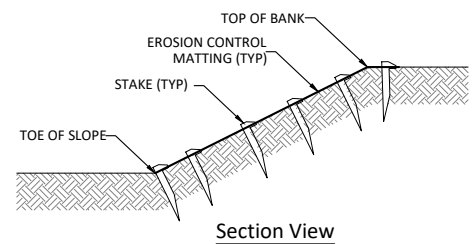
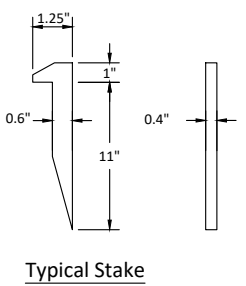
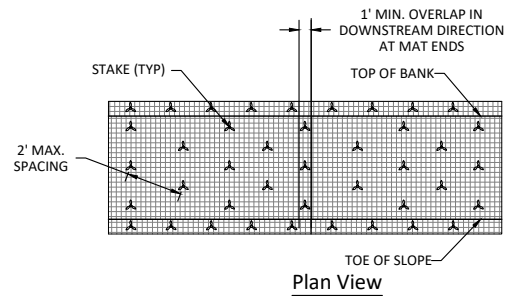


- NOTES:**
1. PROVIDE TURNING RADIUS SUFFICIENT TO ACCOMMODATE LARGE TRUCKS.
 2. LOCATE CONSTRUCTION ENTRANCE AT ALL POINTS OF INGRESS AND EGRESS UNTIL SITE IS STABILIZED. PROVIDE FREQUENT CHECKS OF THE DEVICE AND TIMELY MAINTENANCE.
 3. MUST BE MAINTAINED IN A CONDITION WHICH WILL PREVENT TRACKING OR DIRECT FLOW OF MUD ONTO STREETS. PERIODIC TOP DRESSING WITH STONE WILL BE NECESSARY.
 4. ENTRANCE WILL BE EXTENDED AS NEEDED TO PROVIDE ADEQUATE SEDIMENT REMOVAL.
 5. ANY MATERIAL TRACKED ONTO THE ROADWAY MUST BE CLEANED IMMEDIATELY.
 6. USE CLASS A STONE OR OTHER COARSE AGGREGATE APPROVED BY THE ENGINEER.
 7. PLACE FILTER FABRIC BENEATH STONE.
 8. AFTER EACH RAINFALL, INSPECT ANY STRUCTURE USED TO TRAP SEDIMENT AND CLEAN IT OUT AS NECESSARY. IMMEDIATELY REMOVE ALL OBJECTIONABLE MATERIALS SPILLED, WASHED, OR TRACKED ONTO PUBLIC ROADWAYS.
 9. REMOVE CONSTRUCTION ENTRANCE UPON COMPLETION OF THE PROJECT AND RETURN TO PRE-PROJECT GRADES, ELEVATIONS, AND CONDITIONS, UNLESS DIRECTED TO KEEP CONSTRUCTION ENTRANCE BY LANDOWNER.

1
5.9 Construction Entrance
Not to Scale



2
5.9 Pump Around System
Not to Scale



Materials
Coir Fiber Matting is to be machine-produced mat made of 100% coconut fiber and must adhere to the specifications listed in the table above. A hardwood Eco-STAKE™ or similar biodegradable stakes shall be used to secure matting. No metal staples will be used on this project.

Construction Methods
The Contractor will install Coir Fiber Matting in locations and to the widths and lengths as shown on the plans and details or as directed. Coir Fiber Matting will be secured with wooden stakes and installed at three (3) feet on center in offset rows to affect a diamond pattern. Overlap the Coir Fiber Matting at seams a minimum of six inches. Coir Fiber Matting will be overlapped so that the upstream mat end is on top of the downstream mat start. Stakes will secure matting at three foot spacing on the overlapping seams. Coir Fiber Matting will be dry when installed placed on slopes not too loosely but not in tension.

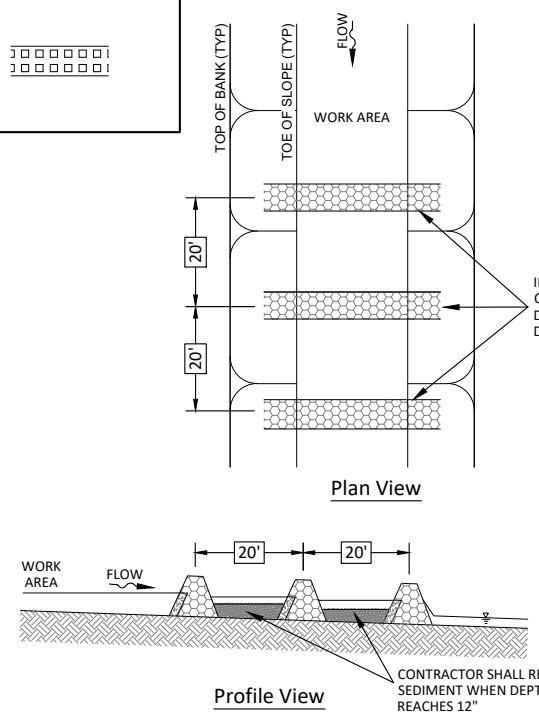
Prior to mat placement, proposed grades shall be achieved and no voids will occur in the slope. The area will be treated with soil amendments and seeding as specified elsewhere in the plans and specifications. Straw mulch will be used to cover the finished grade to achieve a 60% coverage on the soil.

- Maintenance**
1. Inspect coir fiber matting at least weekly and after each significant 1/2 inch rain event and repair immediately.
 2. Good contact with the ground must be maintained and erosion must not occur beneath the matting
 3. Any areas of the matting that are damaged or not in close contact with the ground shall be repaired and staked.
 4. If erosion occurs due to poorly controlled drainage, the problem shall be fixed and the eroded area protected.
 5. Monitor and repair matting as necessary until ground cover is established.

Coir Fiber Matting Specifications		
Property	Requirement	Test Method
matrix	100% coconut fiber	ECTC*
roll size	6.6 feet x 164 feet	ECTC*
thickness	0.30 inches (minimum)	ASTM D5199
elongation	34% x 38% (maximum)	ECTC*
flexibility	65030 x 29590 mg cm	ECTC*
mass per unit area	20 ounces per square yard (minimum)	ASTM D5261
stable flow velocity	11 feet per second (minimum)	ECTC*
open area (measured)	50% (maximum)	ECTC*
tensile strength	1348 x 626 pounds per foot	ASTM D5035
'C' factor	0.002	ASTM D5035

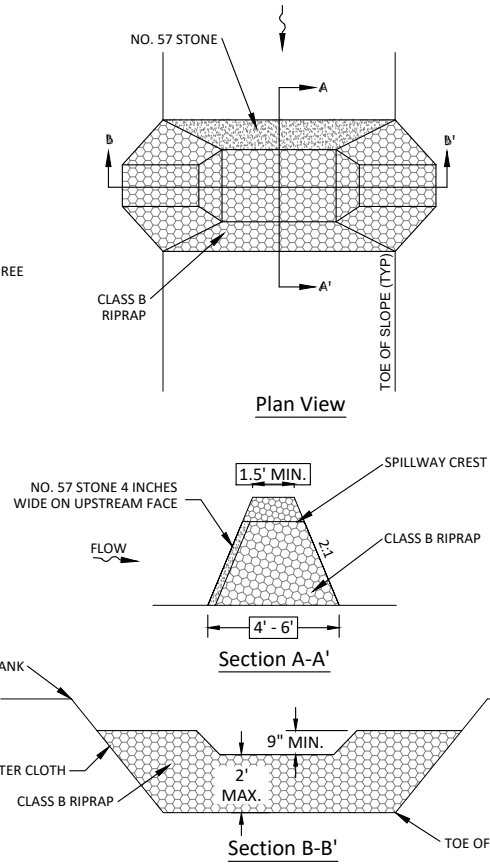
*Testing methods specified by Erosion Control Technology Council (ECTC) guidelines.

3
5.9 Erosion Control Matting
Not to Scale



- NOTES:**
1. CHECK DAM TO BE INSTALLED AS DIRECTED BY ENGINEER, DEPENDING ON FLOW CONDITIONS IN THE CHANNEL.
 2. INSPECT CHECK DAM WEEKLY AND AFTER 1/2" OR GREATER RAINFALL EVENT. REMOVE ANY ACCUMULATED SEDIMENT, STRAW, LIMBS, OR OTHER DEBRIS.
 3. USE PROTECTIVE RIP RAP LINER TO REPAIR EROSION FROM HIGH FLOWS AROUND THE EDGES OF THE DAM
 4. ADD MATERIAL, AS NECESSARY, TO MAINTAIN DESIGN HEIGHT OF DAM

4
5.9 Temporary Rock Sediment Dam
Not to Scale



Revisions:

Date	By	Description
10-21-21	AV	5.9
05-02-18	CW	
	GAT	

Date: 10-21-21
Job Number: 005-02185
Project Engineer: AV
Drawn By: CW
Checked By: GAT