FINAL MITIGATION PLAN

MAJOR HILL STREAM AND WETLAND MITIGATION SITE

Alamance County, North Carolina

DMS Project ID No. 100015
Full Delivery Contract No. 7193
USACE Action ID No. SAW-2017-01472
RFP No. 16-006990

Cape Fear River Basin
Cataloging Unit 03030002

Prepared for:

NORTH CAROLINA DEPARTMENT OF ENVIRONMENTAL QUALITY
DIVISION OF MITIGATION SERVICES
1652 MAIL SERVICE CENTER
RALEIGH, NORTH CAROLINA 27699-1652

May 2018

January 25, 2018

Ms. Lindsay Crocker
NC DEQ – Division of Mitigation Services
1652 Mail Service Center
Raleigh, North Carolina
27699-1652

Subject: Major Hill Stream and Wetland Mitigation Site: IRT Mitigation Plan Comment Responses
DMS Contract #: 7193; DMS Project ID: 100015; RFP # 16-006990

Mac Haupt, NCDWR, December 31, 2017:

1. Table 1-Project Components Table- in the Overall Assets Summary the stream credits are listed as 3006. However, in the same summary table there is a category of Stream (Low water channel) "up to 228". Where does this stream/credit come from? In reading the "note about SMUs" what I am getting from the description is that current estimates are based on center line (GIS rendered) and final footage amounts will be based on center line of low water channel, which means the real measured footage will likely work out to the contracted stream amount… exactly. DWR prefers that the Designer/RS make the best prediction possible for the amount of stream credit in the Mitigation Plan and if the length/credit changes at the as-built stage then make the justification to the IRT in the as-built document.

The "low water channel" measurement will be removed from the text and tables. Credit generation tables will have credit from centerline of the design channel. We hope that this measurement procedure is acceptable and the standard for all Mitigation Plans in the Wilmington District. The table will include 3006 SMUs as the final amount of stream credit for the detailed restoration plan. If the length/credit changes (due to unavoidable changes that may arise during construction) at the as-built stage then we will make the justification to the IRT in the as-built document.

2. Section 3.3 Nutrient Model- DWR would recommend that while RS is monitoring water quality and macrobenthos, nutrient and fecal samples taken before the project would likely be very beneficial for showing functional uplift. Showing modeled results gives the reviewer an expected ballpark of reductions, however, they are just predictions and at some point, need to be verified. Various sections regarding the nutrient model state that the project "will result in a direct reduction of 852.4 pounds of Nitrogen and 70.6 pounds of Phosporus per year", unless the nutrients are measured, pre-and post project, the statement should reach "may result in a reduction…".

The document will be changed to state "Nitrogen, Phosphorus, and Fecal coliform may be reduced". Additional measurements for macrobenthos and water chemistry will be conducted; however, these

measurements are to be conducted in April of each year.

3. Section 5.3.1 mentions that the Worsham soil series is on site and refers to Figure 4 of Appendix A, however, I did not see Worsham mapped. It appears the dominant mapped soil series where the wetlands occur is the Local Alluvial Land series.

The proper mapped soil series is Local Alluvial Land. There is no NRCS detailed soil profile description for Local Alluvial Land. Therefore, we determined the closest published soil profile as compared to the Site includes the Worsham soil series. The text of the document will be clarified.

4. Section 7 Design Approach- particularly for the stream. DWR would like to see more information on how the stream channel will be constructed in the old pond bed. In addition, some of the structures mentioned were j-hook types. DWR does not believe that j-hooks are the best structure types for small streams. DWR would recommend installing as much wood in the channel as practicable.

J-hook vanes will be removed from the text of the document. There are no J-hook vanes in the construction plans. As far as stream restoration in the pond bed, a more detailed description of work will be inserted into the document. Text will include the following.

"Stream restoration within the abandoned pond will include 1) notching the dam to dewater sediments, 2) removal of the dam to the elevation of the adjacent floodplain, 3) excavating sediment that is unsuitable for channel bank construction, 4) backfilling areas of sediment removed with soil suitable for channel construction (if necessary), 5) excavation of the design channel, 6) stabilization of the channel with coir matting, seed, and mulch, and 7) installation of structures.

The dam will be notched in the early summer of 2018 and the pond bed will be seeded with temporary grasses to stabilize sediments remaining in the pond. Care will be taken during notching of the dam to drain the maximum amount of water; thereby allowing sediments to dewater.

Once the pond has dewatered and sediments have stabilized, the dam will be removed with finished grades matching elevations of the valley and floodplain above and below the dam location. Material removed from the dam, if suitable, may be used as channel backfill for reaches of stream to be abandoned during priority 1 stream restoration efforts. If additional backfill remains, the material will be stockpiled outside of the easement, or spread evenly across the adjacent property and seeded for stabilization. Erosion control measures, such as silt fence, seeding, and mulching will be implemented on all stockpiled or spread soil materials.

A determination on sediment quantity and quality within the abandoned pond will be made concerning the ability to work within, or to stabilize the sediment for stream construction. If sediment is deemed unsuitable for channel construction, the sediment will be removed from the vicinity of the design channel and spread along the outer margins of the pond. Subsequently, suitable soil material will be placed in the location of the design channel such that design channel banks will be stabilized without liquefaction. The removal of unsuitable material, installation of suitable material, and excavation of the design channel may occur simultaneously to reduce impacts of machinery on the pond bed.

Excavation of the design channel will occur in the pond bed similar to other reaches of restored stream, with stabilization using approved erosion control materials and techniques."

5. In the Outfall Structures portion of Section 7, the designer proposes the Terracell as an option for achieving a drop in elevation. DWR does not recommend the use of these structures. In

fact, after review of the Design Plans, DWR questions whether a drop structure is even needed in the marked location. It appears from other design sheets that the same slope is being maintained throughout the restoration reach with cross vanes. DWR recommends a constructed riffle that incorporates wood as a portion of the substrate.

Axiom Environmental, Inc. representatives discussed the use of Terracell with NC DWR representatives during a phone conversation upon the conclusion of the Site walkthrough. During this telephone conversation, NC DWR representatives agreed to allow the use of Terracell as a drop structure for the project. We believe the use of Terracell is a viable stabilization measure for outfalls of restoration reaches. The final outfall structure is calculated at a slope of 0.0425 (2.8 foot drop over 65 feet of run), which would be excessive for a typical riffle on the project.

If during channel construction adequate bed material is encountered to stabilize the outfall, alternative measures for drop structure construction will be investigated. Alternative drop structures may include constructed riffle (stone drop constructed of class B material, or similar), step-pool stone structure, or tie-in to bed rock. Designer input is expected if alterations are made and the alterations will be depicted on as-built plan sheets.

6. DWR likes that the designer is incorporating marsh treatment areas for drainage coming from outside the easement area.

Agreed.

7. DWR notes that the flow standard mentioned in Section 8.1.1 Stream Success Criteria, is 30 days. This standard was intended for wetland headwater projects. The IRT is considering an increased flow standard for streams depending on their order or landscape position. For example, for perennial streams this standard may 60-90 days of continuous flow.

We are aware of the potential for changes in flow duration success criteria. For this project, we intend to use 30-continuouos days of flow for intermittent reaches of channel.

8. Section 8.2.1- Wetland Success Criteria-DWR will accept March 1st as the beginning of the growing season if the measured soil temperature reached the required degrees at 12 inches of depth. DWR expects the soil temperature probes will be installed and reported on in each monitoring report.

Section 8.2.1 Wetland Success Criteria includes the following text - “this will be confirmed annually by soil temperatures exceeding 41 degrees Fahrenheit at 12 inches depth and/or bud burst.”

9. Also, in this section, DWR accepts the 10% saturation period during the growing season, however, DWR will not accept a comparison of % to reference as a possible alternative performance criteria for wetland hydrology.

Text will be changed to include that reference gauge data will be used for comparative purposes only and reference gauges will not be tied to success criteria.

10. DWR recommends for all permanent crossing typicals that floodplain pipes also be included along with the low flow pipe.

The typical will be updated in the text and figure to include floodplain pipes.

Andrea Hughes, USACE, December 31, 2017

1. Page 2, Section 1.4: The document states 228 linear feet of additional stream channel may be measured in the final as-built. Please note that stream credits will be based on the amounts shown in the mitigation plan which should be based on a centerline measurement. In order to receive additional credits beyond the amounts proposed in the approved mitigation plan, you must submit a modification request. Please be aware that modification requests for additional credits based on thalwag measurement may not be granted.

The "low water channel" measurement will be removed from the text and tables. Credit generation tables will have credit from centerline of the design channel. We hope that this measurement procedure is acceptable and the standard for all Mitigation Plans in the Wilmington District. The table will include 3006 SMUs as the final amount of stream credit for the detailed restoration plan. If the length/credit changes (due to unavoidable changes that may arise during construction) at the as-built stage then we will make the justification to the IRT in the as-built document.

2. The document indicates the existing site conditions include 0.52 acre of degraded wetland. Please explain the proposed amount of 0.44 acre of enhancement. If the additional .08 acre will be impacted by the project, the loss or conversion of those waters must be replaced on-site.

The reduction in wetland area from pre-project conditions (0.52 acre in approved PJD mapping) and post project conditions (0.44 acre of wetland enhancement) results from the design channel crossing wetland areas. However, the functional capacity of the remaining wetland enhancement areas are expected to be elevated, possibly offsetting the loss. In addition, with wetland restoration occurring at the Site, the overall wetland area will be increase to 0.98 acres. These items will be expanded upon in the document.

3. Page 10, Section 3.3: The document references a nutrient modeling method (NCDMS 2016). The citation was not included in the references. Please provide a copy of this document. Page 11, Table 9: For the section of UT1 proposed for restoration, please explain the range of BHR extending to 1.3. If the Causey Farm reference reach bankfull is 1.4 (functioning at risk), please provide additional information on how data from this site will be used in the design of UT 1.

Citation

NC Division of Mitigation Services (NCDMS). 2016. Quantifying Benefits to Water Quality from Livestock Exclusion and Riparian Buffer Establishment for Stream Restoration.

A copy of NCDMS 2016 will be included in the appendix of the final restoration Plan

The Causey Farm Reference Reach data will be expanded upon. This was a reach measured in 2004 for a restoration Site near the Major Hill Site. The channel was slightly incised; however, we were able to find definable bankfull indicators to assist with assigning the appropriate cross sectional area. In addition, the channel had suitable pattern (no shoot cutoffs, eroding outer bends, or excessively tight radius) with appropriate pool-to-pool spacing and meander wavelengths. The pattern and cross sectional area portions of the reference reach make it good for defining design criteria, particularly for a channel so closely located to the Site. We will expand upon this further in the document for the final restoration plan.

4. Page 15, Section 5.1: Please provide a copy of the jurisdictional delineation approval letter.

A copy of the PJD approval letter has been received and will be included as an appendix item.

5. Page 21, Section 7.0: Please include details regarding restoration of the pond removal area. When will structure removal occur? Will the restoration include removal of sediments or soil amendments? Where will excavated sediments be relocated?

Text will be added to the document, including the following.

"Stream restoration within the abandoned pond will include 1) notching the dam to dewater sediments, 2) removal of the dam to the elevation of the adjacent floodplain, 3) excavating sediment that is unsuitable for channel bank construction, 4) backfilling areas of sediment removed with soil suitable for channel construction (if necessary), 5) excavation of the design channel, 6) stabilization of the channel with coir matting, seed, and mulch, and 7) installation of structures.

The dam will be notched in the early summer of 2018 and the pond bed will be seeded with temporary grasses to stabilize sediments remaining in the pond. Care will be taken during notching of the dam to drain the maximum amount of water; thereby allowing sediments to dewater.

Once the pond has dewatered and sediments have stabilized, the dam will be removed with finished grades matching the elevations of the valley and floodplain above and below the dam location. Material removed from the dam, if suitable, may be used as channel backfill for reaches of stream to be abandoned during priority 1 stream restoration efforts. If additional backfill remains, the material will be stockpiled outside of the easement, or spread evenly across the adjacent property and seeded for stabilization. Erosion control measures, such as silt fence, seeding, and mulching will be implemented on all stockpiled or spread soil materials.

A determination on sediment quantity and quality within the abandoned pond will be made concerning the ability to work within, or to stabilize the sediment for stream construction. If sediment is deemed unsuitable for channel construction, the sediment will be removed from the vicinity of the design channel and spread along the outer margins of the pond. Subsequently, suitable soil material will be placed in the location of the design channel such that design channel banks will be stabilized without liquefaction. The removal of unsuitable material, installation of suitable material, and excavation of the design channel may occur simultaneously to reduce impacts of machinery on the pond bed.

Excavation of the design channel will occur in the pond bed similar to other reaches of restored stream, with stabilization using approved erosion control materials and techniques."

6. Page 22, Section 7.1.1: For all marsh treatment areas located within the 50-foot buffer limits, you must propose performance standards related to vegetative success and demonstrate that these areas will not require long term maintenance.

As the marsh treatment areas are approximately 1/100th acre in size and are intended to naturalize into the floodplain. The areas are slight depressions (0.5 to 1.5 feet in depth) that are to catch the first pulse of storm drainage prior to vegetation establishment. They are intended to fill over time and naturalize into the adjacent landscape. These are **not** stormwater BMPs which require maintenance to continue functioning. At this time, due to the small size and expectation of naturalization, we do not propose extensive monitoring beyond standard vegetative monitoring protocols outlined in IRT guidance.

7. Page 23, under Hydrophytic Vegetation, the Natural Plant Community Restoration is listed under Section 7.5.

Hydrophytic Vegetation on page 23 will be changed from Section 7.5 to Section 7.4.

8. Page 26, Section 8.0: This section is titled Performance Standards but includes monitoring information. These should be separated into separate sections or the title changed to reflect the content.

The title for Section 8.0 will be changed to "Performance Standards and Success Criteria" to reflect the content.

9. Page 26, Section 8.0: Please remove the statement "if specifically required by permit conditions". Since the mitigation plan proposes biological monitoring, a permit condition is unnecessary.

The text "if specifically required by permit conditions" will be removed from the document.

10. Page 26, Section 8.0: Please remove the statement regarding early termination of monitoring.

Verbiage concerning early termination of monitoring will be removed from the document.

11. Page 26, Table 16: Water quality and benthic monitoring should be added to Table 16.

Water quality and benthic monitoring will be added to Table 16.

12. Page 28, Section 8.1.1: Please revise the stream performance standards for consistency with the 2016 guidance.

Stream performance standards will be changed to match those listed below.

    a. BHR cannot exceed 1.2 at any measured riffle cross-section and ET must be no less than 1.4 for at any measured riffle cross-section (2.2 for C/E streams).
    b. BHR and ER at any measured riffle cross-section should not change by more than 10% from baseline condition during any given monitoring interval.
    c. Continuous surface water flow within the tributaries must be documented to occur every year for at least 30 consecutive days during the prescribed monitoring period.
    d. The stream project shall remain stable and all other performance standards shall be met through four separate bankfull events, occurring in separate years, during the monitoring years 1 through 7.

13. Page 29, Section 8.2: Please note that wetland monitoring requires a detailed soil description for each boring where a gauge is installed.

A detailed soil description will be collected at each gauge location. Please note, we use a 4-inch bucket

auger to install groundwater gauges. A bucket auger is not suitable for collecting, observing, and describing a detailed soil profile. We proposed to install a second hole adjacent to the gauge using a 2-inch dutch auger for soil description collection.

14. Page 30: Section 8.2.1: In order to use March 1- October 22 as growing season for meeting wetland hydrology performance standards, you must document soil temperatures exceeding 41 degrees Fahrenheit and this must be corroborated with vegetative indicators including bud burst and leaf drop. Also, please remove the statement that during atypical climatic conditions, groundwater gauges in reference wetlands may dictate threshold hydrology success criteria.

The document currently includes "soil temperature exceeding 41 degrees Fahrenheit at 12 inches depth". We will ensure corroboration with vegetation indicators, as stated above. Text will be changed to indicate that reference gauge data will be used for comparative purposes only, and reference gauges will not be tied to success criteria.

15. Appendix H: Please remove this section and replace with Section XIV, pages 28-30 from the Wilmington District Stream and Wetland Compensatory Mitigation Update dated October 24, 2016. Under the new guidance, mitigation credits are based upon the amounts listed in the approved mitigation plan. In addition, four bankfull events in separate years must be documented in order to receive the 10% bankfull credit release.

Appendix H will be changed to include Section XIV, pages 28-30 of the Mitigation Update, as stated above.

16. Appendix I: If the Terracell structure is to remain, this section should address potential maintenance/repair issues.

Terracell will remain and Appendix I will be updated to include maintenance and repair issues associated with Terracell.

Please let me know if you have any further questions or comments.

Sincerely,

Worth Creech
Project Manager
Restoration Systems

DEPARTMENT OF THE ARMY
WILMINGTON DISTRICT, CORPS OF ENGINEERS
69 DARLINGTON AVENUE
WILMINGTON, NORTH CAROLINA 28403-1343

February 15, 2018

Regulatory Division

Re: NCIRT Review and USACE Approval of the Major Hill Draft Mitigation Plan; SAW-2017-01472; DMS Project #100015

Mr. Tim Baumgartner
North Carolina Division of Mitigation Services
1652 Mail Service Center
Raleigh, NC 27699-1652

Dear Mr. Baumgartner:

The purpose of this letter is to provide the North Carolina Division of Mitigation Services (NCDMS) with all comments generated by the North Carolina Interagency Review Team (NCIRT) during the 30-day review for the Major Hill Draft Mitigation Plan, which closed on December 31, 2017. Several issues were noted during the review that required an extension of the 60-day deadline. All comments received in response to the Draft Mitigation Plan are attached for your review.

Based on our review of these comments and the provider's response, we have determined that concerns with the Draft Mitigation Plan have been adequately addressed, which is considered approved with this correspondence. Issues that were identified during the review, as described in the attached comment memo and response to comments, must be addressed in the Final Mitigation Plan.

The Final Mitigation Plan is to be submitted with the Preconstruction Notification (PCN) application for nationwide permit (NWP) approval of the project along with a copy of this letter. Issues identified in the attached memo and response must be appropriately addressed in the Final Mitigation Plan. All changes made to the Final Mitigation Plan should be summarized in an errata sheet included at the beginning of the document. If it is determined that the project does not require a Department of the Army permit, you must still provide a copy of the Final Mitigation Plan, along with a copy of this letter, to the appropriate USACE field office at least 30 days in advance of beginning construction of the project. **Please note that this approval does not preclude the inclusion of permit conditions in the permit authorization for the project, particularly if issues mentioned above are not satisfactorily addressed.** Additionally, this letter provides initial approval for the Mitigation Plan, but this does not guarantee that the project will generate the requested amount of mitigation credit. As you are aware, unforeseen issues may arise during construction or monitoring of the project that may require maintenance or reconstruction that may lead to reduced credit.

Thank you for your prompt attention to this matter, and if you have questions regarding this letter, the mitigation plan review process, or the requirements of the Mitigation Rule, please contact Andrea Hughes at (919) 554-4884 extension 59.

Sincerely,

HUGHES.ANDREA.WADE.1258339165

Digitally signed by HUGHES.ANDREA.WADE.1258339165
DN: c=US, o=U.S. Government, ou=DoD, ou=PKI, ou=USA, cn=HUGHES.ANDREA.WADE.1258339165
Date: 2018.02.15 17:06:07 -05'00'

for
Henry M. Wicker, Jr.
Deputy Chief, Regulatory

Enclosures

Electronic Copies Furnished:

NCIRT Distribution List
Lindsay Crocker, NCDMS

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Alamance County, North Carolina

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Prepared for:

NORTH CAROLINA DEPARTMENT OF ENVIRONMENTAL QUALITY
DIVISION OF MITIGATION SERVICES
1652 MAIL SERVICE CENTER
RALEIGH, NORTH CAROLINA 27699-1652

Prepared by:

Restoration Systems, LLC
1101 Haynes Street, Suite 211
Raleigh, North Carolina 27604
Contact: Worth Creech
919-755-9490 (phone)
919-755-9492 (fax)

And

Axiom Environmental, Inc.
218 Snow Avenue
Raleigh, North Carolina 27603
Contact: Grant Lewis
919-215-1693 (phone)

May 2018

"This mitigation plan has been written in conformance with the requirements of the following:

- Federal rule for compensatory mitigation project sites as described in the Federal Register Title 33 Navigation and Navigable Waters Volume 3 Chapter 2 Section § 332.8 paragraphs (c)(2) through (c)(14).
- NCDEQ Division of Mitigation Services In-Lieu Fee Instrument signed and dated July 28, 2010

These documents govern NCDMS operations and procedures for the delivery of compensatory mitigation."

This document was assembled using the June 2017 *DMS Stream and Wetland Mitigation Plan Template and Guidance* and the October 24, 2016 NC Interagency Review Team *Wilmington District Stream and Wetland Compensatory Mitigation Update*.

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1.0 PROJECT INTRODUCTION

The Major Hill Stream and Wetland Mitigation Site (hereafter referred to as the "Site") encompasses 16.7 acres of pasture and disturbed forest along warm water, unnamed tributaries to Pine Hill Branch. The Site is located approximately 3.5 miles southeast of Snow Camp and 6 miles north of Silk Hope in southern Alamance County near the Chatham County line (Figures 1 and 2, Appendix A).

1.1 Directions to Site

Directions to the Site from Raleigh, North Carolina.

- Take US-64 West out of Raleigh and travel 25 miles,
- Take exit 381 and turn right onto NC-87 N,
- After 5 miles, take a left onto Castle Rock Farm Road,
- After 5.8 miles, Castle Rock Farm Road becomes Old Switchboard Road,
- Continue for 2.1 miles, turn right onto Lindley Mill Road,
- After 0.5 mile, turn left onto Major Hill Road,
- Site can be accessed from Burnett Church Road, which is on the left after 1 mile.
    - Site Latitude, Longitude
      35.873206, -79.360906 (WGS84)

1.2 USGS Hydrologic Unit Code and NCDWR River Basin Designation

The Site is located within the Cape Fear River Basin in 14-digit United States Geological Survey (USGS) Cataloging Unit and **Targeted Local Watershed 03030002050050** of the South Atlantic/Gulf Region (North Carolina Division of Water Resources [NCDWR], formerly the North Carolina Division of Water Quality, subbasin number 03-06-04 [Figures 1 and 2, Appendix A]). Topographic features of the Site drain to Pine Hill Branch, which has been assigned Stream Index Number 16-28-5-1 and a Best Usage Classification of **WS-V, NSW** (NCDWR 2016a). Site tributaries and their immediate receiving waters are not listed on the draft 2016 or final 2014 NC 303(d) lists of impaired waters (NCDWR 2016b, NCDWR 2014).

1.3 Physiography and Land Use

The Site is located in the Carolina Slate Belt Ecoregion of the Piedmont Physiographic Province within Alamance County, North Carolina. Regional physiography is characterized by dissected irregular plains, some hills, linear ridges, isolated monadnocks, and low to moderate gradient streams with mostly boulder and cobble substrates (Griffith et al. 2002). Onsite elevations range from a high of 560 feet National Geodetic Vertical Datum (NGVD) to a low of approximately 480 feet NGVD (USGS Silk Hope, North Carolina 7.5-minute topographic quadrangle) (Figures 1 and 3, Appendix A).

The primary hydrologic features of the Site consist of three unnamed tributaries (UTs) to Pine Hill Branch. Site UT drainage areas range in size from 17.2 – 444.7 acres (0.001 – 0.70 square mile) (Figure 3, Appendix A). The Site drainage area is primarily composed of pasture, forest, agriculture land, and sparse residential property. Impervious surfaces account for less than two percent of the upstream land surface.

Site land use consists of pasture, hayfields, disturbed forest, and agricultural land used for livestock grazing and hay production. Livestock have unrestricted access to Site streams and stream banks are eroded vertically and laterally, and receive extensive sediment and nutrient inputs from stream banks and adjacent agricultural land. Riparian zones in the upper reaches of UT 1 are primarily composed of herbaceous vegetation that is sparse and disturbed due to livestock grazing, bush hogging, and regular land-management activities. The downstream reaches of UT 1, and all of UT 3 are primarily wooded with livestock disturbance to stream channels.

A query of the North Carolina Natural Heritage Program database indicates there are no records for rare species, important natural communities, natural areas, or conservation/managed areas within the proposed project boundary, or within a one-mile radius of the project boundary. However, a North Carolina Division of Mitigation Services (NCDMS) conservation easement boundary occurs approximately 0.6 mile east of the Site boundaries.

1.4 Project Components and Structure

The Site encompasses 16.7 acres of pasture along warm water, unnamed tributaries to Pine Hill Branch. Site streams have been relocated to the floodplain edge, ditched, impounded, trampled by livestock, eroded vertically and laterally, and receive extensive sediment and nutrient inputs from stream banks and adjacent agricultural land. In its current state, the Site includes 5293 linear feet of degraded stream channel, 0.52 acre of degraded wetland, and 0.30 acre of drained hydric soil (Figure 4, Appendix A). An estimate of approximately 0.24 acre of additional hydric soil underlies an agriculture impoundment at the upper reaches of UT 1.

Proposed Site restoration activities include the construction of meandering, E/C-type stream channel resulting in 1742 linear feet of Priority I stream restoration, 3161 linear feet of stream enhancement (Level II), 0.54 acre of riparian wetland restoration, and 0.44 acre of riparian wetland enhancement (Table 1) (Figures 6A-6B, Appendix A).

Completed project activities, reporting history, completion dates, project contacts, and background information are summarized in Tables 1 - 4.

Table 1. Project Components and Mitigation Credits
Major Hill Restoration Site

Reach ID	Stream Stationing/ Wetland Type	Existing Footage/ Acreage	Restoration Footage/ Acreage	Restoration Level	Restoration or Restoration Equivalent	Mitigation Ratio	Mitigation Credits	Comment
UT 1	00+00 to 16+99	1829	1699	Restoration	1699	1:1	1699	
UT 1	16+99 to 27+59	1060	1060	EII	1060	2.5:1	424	
UT 2	00+00 to 01+68	168	168	EII	168	2.5:1	67	
UT 2	01+68 to 02+11	39	43	Restoration	43	1:1	43	
UT 3	00+00 to 21+97	2197	2197	EII	2197-80-144-40=1933	2.5:1	773	80 lf and 40 lf of UT3 are not credit generating due to crossings and drainage easement. 144 lf are not credit generating due to lack of control of south bank and drainage easement.
Wetlands	Riparian Riverine	--	0.54	Restoration	0.54	1:1	0.54	Wetland Restoration
Wetlands	Riparian Riverine	0.52	0.44	Enhancement	0.44	2:1	0.22	Wetland Enhancement

Length & Area Summations by Mitigation Category		
Restoration Level	**Stream (linear footage)**	**Riparian Wetland (acreage)**
Restoration	1742	0.54
Enhancement (Level II)	3161*	--
Enhancement	--	0.44**

* An additional 264 linear feet of stream enhancement (level II) is proposed outside of the easement (at road crossings), or the sponsor controls only one bank of the stream, and is therefore not included in this total or in mitigation credit calculations.
**Approximately 0.08 acre of existing, degraded wetland will not be enhanced as the result of the design channel crossing the wetland area.

Overall Assets Summary	
Asset Category	**Overall Credits**
Stream	**3006**
Riparian Riverine Wetland	**0.76**

Table 2. Project Activity and Reporting History
Major Hill Restoration Site

Activity or Deliverable	Data Collection Complete	Completion or Delivery
Technical Proposal (RFP No. 16-006990)	February 15, 2017	February 15, 2017
Institution Date (NCDMS Contract No. 7193)	--	May 22, 2017
Mitigation Plan	--	February 2018
Construction Plans	--	--

Table 3. Project Contacts Table
Major Hill Restoration Site

Full Delivery Provider	Restoration Systems 1101 Haynes Street, Suite 211 Raleigh, North Carolina 27604 Worth Creech 919-755-9490
Designer	Axiom Environmental, Inc. 218 Snow Avenue Raleigh, NC 27603 Grant Lewis 919-215-1693

Table 4. Project Attribute Table
Major Hill Restoration Site

Project Information	
Project Name	Major Hill Restoration Site
Project County	Alamance County, North Carolina
Project Area (acres)	16.7
Project Coordinates (latitude & latitude)	35.873206, -79.360906
Planted Area (acres)	8.11
Project Watershed Summary Information	
Physiographic Province	Piedmont
Project River Basin	Cape Fear
USGS HUC for Project (14-digit)	03030002050050
NCDWR Sub-basin for Project	03-06-04
Project Drainage Area (acres)	17 to 445
Percentage of Project Drainage Area that is Impervious	<2%
CGIA Land Use Classification	Managed Herbaceous Cover & Mixed Upland Hardwoods

Table 4. Project Attribute Table
Major Hill Restoration Site (continued)

Reach Summary Information			
Parameters	**UT 1**	**UT 2**	**UT 3**
Length of reach (linear feet)	2889	207	2197
Valley Classification & Confinement	Alluvial, moderately confined to confined		
Drainage Area (acres)	71.7	17.2	444.7
NCDWR Stream ID Score	20.25 – 33.5	--	--
Perennial, Intermittent, Ephemeral	Intermittent/Perennial	Intermittent	Perennial
NCDWR Water Quality Classification	WS-V, NSW		
Existing Morphological Description (Rosgen 1996)	Cg5	C4/5	C3
Proposed Stream Classification (Rosgen 1996)	C/E 4	C4/5	C3
Existing Evolutionary Stage (Simon and Hupp 1986)	III/IV	III	I
Underlying Mapped Soils	Efland silt loam, Georgeville silt loam, Herndon silt loam, Orange silt loam, Worsham sandy loam, Local Alluvial Land		
Drainage Class	Well-drained, well-drained, well-drained, poorly drained, well-drained, poorly drained, respectively		
Hydric Soil Status	Nonhydric, nonhydric, nonhydric, nonhydric, hydric, hydric, respectively		
Slope	0.0241	0.0256	0.0130
FEMA Classification	NA		
Native Vegetation Community	Piedmont Alluvial Forest/Dry-Mesic Oak-Hickory Forest		
Watershed Land Use/Land Cover (Site)	45% forest, 35% agricultural land, 20% low density residential/impervious surface		
Watershed Land Use/Land Cover (Cedarock Reference Channel)	65% forest, 30% agricultural land, <5% low density residential/impervious surface		
Percent Composition of Exotic Invasive Vegetation	<5%		

Wetland Summary Information	
Parameters	**Wetlands**
Wetland acreage	0.54 acre drained or impounded & 0.44 acre degraded
Wetland Type	Riparian riverine
Mapped Soil Series	Worsham and Local Alluvial Land
Drainage Class	Poorly drained
Hydric Soil Status	Hydric
Source of Hydrology	Groundwater, stream overbank
Hydrologic Impairment	Incised streams, compacted soils, livestock
Native Vegetation Community	Piedmont/Low Mountain Alluvial Forest
% Composition of Exotic Invasive Vegetation	<5%
Restoration Method	Hydrologic, vegetative
Enhancement Method	Vegetative

Table 4. Project Attribute Table
Major Hill Restoration Site (continued)

Regulatory Considerations			
Regulation	**Applicable?**	**Resolved?**	**Supporting Documentation**
Waters of the United States-Section 401	Yes	Yes	JD Package (App D)
Waters of the United States-Section 404	Yes	Yes	JD Package (App D)
Endangered Species Act	No	--	CE Document (App E)
Historic Preservation Act	No	--	CE Document (App E)
Coastal Zone Management Act	No	--	NA
FEMA Floodplain Compliance	No	--	CE Document (App E)
Essential Fisheries Habitat	No	--	NA

2.0 WATERSHED APPROACH AND SITE SELECTION

The Cape Fear River basin is one of four rivers in North Carolina completely contained within the state's boundaries. Comprised of five major drainages—Haw River, Deep River, Northeast Cape Fear River, Black River, and the Cape Fear River—the basin drains portions of 26 counties and 115 municipalities with a total of 6386 stream miles. The most populated portions of the basin are located in the Triad, the Triangle, Fayetteville, and Wilmington (NCDWQ 2005).

Primary considerations for Site selection included the potential for improvement of water quality within a region of North Carolina under heavy development and livestock/agricultural pressure. More specifically, considerations included: desired aquatic resource functions; hydrologic conditions; soil characteristics; aquatic habitat diversity; habitat connectivity; compatibility with adjacent land uses; reasonably foreseeable effects the mitigation project will have on ecologically important aquatic and terrestrial resources; and potential development trends and land use changes. Site specific characteristics are summarized below, in addition to development trends and land use changes within the watershed.

Currently, the proposed Site is characterized by disturbed forest and agricultural land used for livestock grazing and hay production. A summary of existing Site characteristics in favor of proposed stream and wetland activities include the following.

- Streams and wetlands are accessible to livestock
- Stream banks are trampled by livestock
- Streams and wetlands have been cleared of forest vegetation
- Streams have been impounded
- Site receives nonpoint source inputs including agricultural chemicals and livestock waste
- Wetland soils have been compacted by livestock and agricultural equipment
- Wetland hydrology has been removed by stream channel entrenchment
- Additional wetland footprint has been flooded by agriculture impoundment
- Streams are classified as nutrient sensitive waters

In addition to the opportunity for ecological improvements at the Site, the use of the particular mitigation activities and methods proposed in the Design Approach & Mitigation Work Plan (Section 7.0) are expected to produce naturalized stream and wetland resources that will be

ecologically self-sustaining, requiring minimal long-term management (Long-term Management Plan [Section 10.0]).

Development Trends and Land Use Changes in Cape Fear 03030002 (Cape Fear 02)

Between the 2000 and 2010 censuses, the Cape Fear 02 population increased approximately 17 percent (Table 5). The general trend of population growth appears to be continuing according to recent population estimates, which indicate Guilford, Orange, Chatham, and Durham counties are all growing at faster annual rates than North Carolina's 1.02 percent (USCB 2013). These data suggest land development activities will increase in frequency, as will aquatic ecosystem impacts related to such development. Therefore, there is an immediate and prolonged need for compensatory stream mitigation in the watershed. Of further benefit, aquatic ecosystem restoration projects are capable of reducing nutrient loading in sensitive downstream receiving waters such as Jordan Lake.

Table 5. Population Growth in Cape Fear 02

Municipality	2000 Population	2010 Population	Percent Increase
Greensboro	223,891	269,666	20
Burlington	44,917	49,963	11
Chapel Hill	48,715	57,233	17
Durham*	187,035	228,330	22
Rest of Guilford County	421,048	488,406	11
Rest of Alamance County	130,800	151,131	18
Rest of Orange County	118,227	133,801	10
Chatham County	49,329	63,505	29
Rest of Durham County*	223,314	267,587	8
Totals	**942,718**	**1,104,430**	**17**

*Some portions of Durham (city) and Durham County are located in the Cape Fear 02; the majority of these areas are located in the Neuse River basin.

According to the *Cape Fear River Basinwide Water Quality Plan* (NCDWQ 2005), all land uses and discharges of wastewater and stormwater in the Cape Fear 02 subbasin 03-06-04 potentially contribute nutrients to B. Everett Jordan Lake. B. Everett Jordan Lake provides low-flow augmentation, flood control, recreation, fish and wildlife habitat, and water supply. The lake is impaired for aquatic life due to excessive levels of chlorophyll *a* in violation of current standards in all segments of the reservoir. In addition, the Site has a supplemental water quality classification of Nutrient Sensitive Waters, which designates areas with water quality problems associated with excessive plant growth resulting from nutrient enrichment. The proposed mitigation activities will reduce sediment and nutrient levels, and improve water quality within the Site and downstream watersheds. Site UTs to Pine Hill Branch converge with Pine Hill Branch approximately 1600 linear feet downstream of the Site outfall and converge with South Fork an additional 400 linear feet further downstream.

Table 6. Watershed Stressors and Usage Ratings

Site	Subbasin	Index #	Receiving Water	NCDWR Rating	303(d) status*
Pine Hill Branch	03-06-04	16-28-5-1	Cane Creek	WS-V, NSW	NL
South Fork	03-06-04	16-28-5	Cane Creek	WS-V, NSW	NL

*Draft 2016 and Final 2014 303(d) status (NCDWR 2014, NCDWR 2016b); NL = Not Listed

Project goals are based on the *Cape Fear River Basin Restoration Priorities* (RBRP) report (NCEEP 2009) and on-site data collection of channel morphology and function observed during field investigations. The Site is located within **Targeted Local Watershed (TLW) 03030002050050** (Figure 2, Appendix A). The RBRP report documents benthic ratings vary between "Fair" and "Good-Fair" possibly due to cattle, dairy, and poultry operations. The project is not located in a Regional or Local Watershed Planning Area; however, RBRP goals are addressed by project activities as follows with Site specific information following the RBRP goals in parenthesis.

1. Reduce and control sediment inputs (sediment model – reduction of 10.0 tons/year after mitigation is complete);
2. Reduce and manage nutrient inputs (nutrient model - livestock removal from streams, elimination of fertilizer application, and marsh treatment areas may result in a direct reduction of 852.4 pounds of nitrogen and 70.6 pounds of phosphorus per year);
3. Protect and augment designated natural heritage areas.

Site specific mitigation goals and objectives have been developed through the use of North Carolina Stream Assessment Method (NC SAM) and North Carolina Wetland Assessment Method (NC WAM) and are discussed further in Section 6.0 (Functional Uplift and Project Goals/Objectives).

3.0 BASELINE AND EXISTING CONDITIONS

3.1 Soils and Land Form

Soils that occur within the Site, according to the *Web Soil Survey* (USDA 2016) are described in Table 7.

Table 7. Web Soil Survey Soils Mapped within the Site

Soil Series	Hydric Status	Description
Efland silt loam (EaC)	Nonhydric	This series consists of eroded, well-drained soils found on interfluves. These soils derived from residuum weathered from metavolcanics and/or argillite. Depth to restrictive features is 20-40 inches to paralithic bedrock and 40-80 inches to lithic bedrock. Depth to the water table is more than 80 inches. Slopes are typically 6-10 percent.
Georgeville silt loam (GaC2)	Nonhydric	This series consists of eroded, well-drained soils found on hillslopes on ridges. These soils derived from residuum weathered from metavolcanics and/or argillite. Depth to restrictive features depth to the water table is more than 80 inches. Slopes are typically 6-25 percent.

Table 7. Web Soil Survey Soils Mapped within the Site (Continued)

Soil Series	Hydric Status	Description
Herndon silt loam (HdC)	Nonhydric	This series consists of eroded, well-drained soils that formed from residuum weathered from metavolcanics and/or argillite. They are on hillslopes on ridges. Depth to restrictive features and the water table is more than 80 inches. Slopes are 6-10 percent.
Local alluvial land, poorly drained (Lc)	Hydric	This series consists of poorly drained soils found on floodplains and formed of loamy alluvium derived from igneous and metamorphic rock. Depth to restrictive features is more than 80 inches and the water table is about 0-12 inches. Slopes range from 0-2 percent.
Orange silt loam (ObC)	Nonhydric	This series consists of moderately well-drained soils found on hillslopes on ridges. These soils derived from residuum weathered from metavolcanics and/or argillite. Depth to restrictive features is 20-40 inches to paralithic bedrock and 40-80 inches to lithic bedrock. Depth to the water table is about 12-36 inches. Slopes are 2-10 percent.
Worsham sandy loam (Wd)	Hydric	This series consists of poorly drained soils found in depressions and formed of alluvium and/or colluvium over saprolite derived from granite and gneiss. Depth to restrictive features is more than 80 inches and the water table is about 0-12 inches. Slopes range from 2-6 percent.

Hydric soils and jurisdictional wetlands were delineated and mapped by a licensed soil scientist in November 2016. Based on soil delineations approximately 0.52 acre of disturbed jurisdictional wetland occurs within the Site boundaries. Wetlands have been disturbed by livestock grazing and clearing of vegetation within pastureland. In addition, approximately 0.30 acre of drained and impacted hydric soil occurs within the Site boundaries. These hydric soils have been effectively drained by stream channel incision or relocation of stream channels to the margins of the floodplain. An estimate of approximately 0.24 acre of additional hydric soil underlies an agriculture impoundment at the upper reaches of UT 1.

3.2 Sediment Model

Sediment load modeling was performed using methodologies outlined in *A Practical Method of Computing Streambank Erosion Rate* (Rosgen 2009) along with *Estimating Sediment Loads using the Bank Assessment of Non-point Sources Consequences of Sediment* (Rosgen 2011). These models provide a quantitative prediction of streambank erosions by calculating Bank Erosion Hazard Index (BEHI) and Near-Bank Stress (NBS) along each Site reach. The resulting BEHI and NBS values are then compared to streambank erodibility graphs prepared for North Carolina by the NC Stream Restoration Institute and NC Sea Grant.

Streambank characteristics involve measurements of bank height, angles, materials, presence of layers, rooting depth, rooting density, and percent of the bank protected by rocks, logs, roots, or vegetation. Site reaches have been measured for each BEHI and NBS characteristic and predicted lateral erosion rate, height, and length to calculate a cubic volume of sediment contributed by the reach each year. Data forms for the analysis are available upon request and the data output is presented in Appendix B. Results of the model are presented in Table 8.

Table 8. BEHI and NBS Modeling Summary

Stream Reach	Proposed Mitigation Treatment	Predicted Sediment Contribution (tons/year)
UT 1	Restoration and Enhancement (Level II)	10.0
Total Sediment Contribution (tons/year)		**10.0**

Results of the sediment model appear to match the prescribed mitigation treatment proposed for the Site. UT 2 and UT 3 are proposed for enhancement (Level II) and are characterized by relatively stable banks, extensive bedrock outcroppings, and mature forest vegetation. Livestock have access to the stream channels; however, UT 2 and UT 3 appear very stable. Therefore, BEHI and NBS modeling were not completed for UT 2 and UT 3. UT 1 is subject to a significant amount of erosion, but is a small channel and not extensively long. Therefore, it is expected that UT 1 will contribute sediment (approximately 10.0 tons/year) to the downstream receiving waters. Based on this analysis, mitigation of Site streams will reduce streambank erosion and subsequent pollution of receiving waters.

3.3 Nutrient Model

Nutrient modeling was conducted using a method developed by NCDMS (NCDMS 2016) to determine nutrient and fecal coliform reductions from exclusion of livestock from the buffer.

The equation for nutrient reduction for this model includes the following:

TN reduction (lbs/yr) = 51.04 (lbs/ac/yr) x Area (ac)
TP reduction (lbs/yr) = 4.23 (lbs/ac/yr) x Area (ac)

Where:
TN – total nitrogen;
TP – total phosphorus; and
Area – total area of restored riparian buffers inside of livestock exclusion fences.

Equations for fecal coliform reduction for this model include the following.
Fecal coliform reduction (col) = 2.2×10^{11} (col/AU/day) x AU x 0.085

Where:
Col - quantities of Fecal Coliform bacteria
AU - animal unit (1000 lbs of livestock)

Results of the NCDMS analysis indicate approximately 852.4 lbs/yr of nitrogen, 70.6 lbs/yr of phosphorus, and 9.35×10^{11} col of fecal coliform/day may be reduced due to exclusion of livestock from the easement area.

3.4 Project Site Streams

Streams targeted for restoration and enhancement include UTs to Pine Hill Branch, which have been cleared, straightened, impounded, trampled by livestock, eroded vertically and laterally, and receive extensive sediment and nutrient inputs from livestock. Approximately 60 percent of the

existing stream channel has been degraded contributing to sediment export from the Site resulting from mechanical processes such as livestock hoof shear. In addition, streamside wetlands have been cleared and drained by channel downcutting and land uses. Current Site conditions have resulted in degraded water quality, a loss of aquatic habitat, reduced nutrient and sediment retention, and unstable channel characteristics (loss of horizontal flow vectors that maintain pools and an increase in erosive forces to channel bed and banks). Site restoration activities will restore riffle-pool morphology, aid in energy dissipation, increase aquatic habitat, stabilize channel banks, and greatly reduce sediment loss from channel banks.

3.4.1 Existing Conditions Survey

Site stream dimension, pattern, and profile were measured to characterize existing channel conditions. Locations of existing stream reaches are depicted in Figure 4 (Appendix A) and cross-section locations are depicted in Figure B1 (Appendix B). Stream geometry measurements under existing conditions are summarized in Table 9 (Essential Morphology Paramaters) and Table B1 (Appendix B).

Table 9. Essential Morphology Parameters

Parameter	Existing Condition (UT1 Restoration Reaches)	Reference Condition	Proposed Condition (UT1 Restoration Reaches)
Valley Width (ft)	60-160	50-200	60-160
Contributing Drainage Area (sq. mi.)	0.05-0.09	0.21-0.63	0.05-0.09
Channel/Reach Classification	Cg5	Eb4, E5	E/C4
Design Discharge Width (ft)	3.8-8.7	8-12.1	5.6-7.8
Design Discharge Depth (ft)	0.7-1.3	1.1-2.0	0.5-0.8
Design Discharge Area (ft^2)	2.6-25.7	8.0-14.7	2.6-3.8
Design Discharge Velocity (ft/s)	3.6-3.7	3.6-4.1	3.6-3.7
Design Discharge Discharge (cfs)	9.5-14.2	28.8-60.6	9.5-14.2
Water Surface Slope	0.0147-0.0225	0.0053-0.0258	0.0165-0.0223
Sinuosity	1.07-1.26	1.20-1.46	1.08-1.12
Width/Depth Ratio	5.4-27.0	8.0-15.1	12.0-16.0
Bank Height Ratio	1.0-2.8	1.0-1.4	1.0-1.3
Entrenchment Ratio	1.4-12.6	1.9-13	3.6-9.6
Substrate	Sand	Sand/gravel	Gravel

3.4.2 Channel Classification and Morphology

Stream geometry and substrate data have been evaluated to classify existing stream conditions based on a classification utilizing fluvial geomorphic principles (Rosgen 1996). Existing Site reaches are classified as unstable Cg-type streams with variable sinuosity. Existing Site reaches are currently impounded or characterized by sand substrate as the result of channel impacts including livestock trampling, channel straightening, and riparian vegetation removal.

3.4.3 Channel Evolution

Site streams targeted for restoration have been channelized and are continually trampled by livestock resulting primarily in channels classified as degraded (Class III) and degraded and widened (Class IV) channels throughout the Site (Simon and Hupp 1986).

3.4.4 Valley Classification

The Site is located within a small stream, headwater, alluvial valley with an average 60- to 160-foot floodplain valley width. Valley slopes of restoration reaches are typical for the Piedmont region and range from 0.0185-0.0241. Typical streams in this region include C- and E-type streams with slightly entrenched, meandering channels with a riffle-pool sequence.

3.4.5 Discharge

This hydrophysiographic region is characterized by moderate rainfall with precipitation averaging approximately 40-50 inches per year (USDA 1960). Drainage basin sizes range from 0.001-square mile for UT 2 to 0.7-square mile for the UT 3 outfall. Restoration reach (UT1) drainage basin sizes range from approximatley 0.05- to 0.09-square mile.

The Site's discharge is dominated by a combination of upstream basin catchment, groundwater flow, and precipitation. Based on regional curves (Harman et al. 1999), the bankfull discharge for the Site (0.001- to 0.7-square mile watershed) ranges from 0.6 to 68.8 cubic feet per second; bankfull discharge for UT1 restoration reaches (0.05- to 0.09-square mile watershed) will range from 9.5 to 14.2 cubic feet per second. Based on indicators of bankfull at reference reaches and on-Site, the designed channel will equal approximately 93 percent of the channel size indicated by Piedmont regional curves; this is discussed in Section 3.6 (Bankfull Verification).

3.5 Channel Stability Assessment

Channel degradation or aggradation occurs when hydraulic forces exceed or do not approach the resisting forces in the channel. The amount of degradation or aggradation is a function of relative magnitude of these forces over time. The interaction of flow within the boundary of open channels is only imperfectly understood. Adequate analytical expressions describing this interaction have yet to be developed for conditions in natural channels. Thus, means of characterizing these processes rely heavily upon empirical formulas.

Traditional approaches for characterizing stability can be placed in one of two categories: 1) maximum permissible velocity and 2) tractive force, or stream power and shear stress. The former is advantageous in that velocity can be measured directly. Shear stress and stream power cannot be measured directly and must be computed from various flow parameters. However, stream power and shear stress are generally better measures of fluid force on the channel boundary than velocity.

Stream power and shear stress were estimated for 1) existing dredged and straightened reaches, 2) the reference reaches, and 3) proposed Site conditions. Important input values and output results (including stream power, shear stress, and per unit shear power and shear stress) are presented in Table 10. Average stream velocity and bankfull discharge values were calculated for the existing Site stream reaches, the reference reach, and proposed conditions.

In order to maintain sediment transport functions of a stable stream system, the proposed channel should exhibit stream power and shear stress values so the channel is neither aggrading nor degrading. Results of the analysis indicate the proposed channel reaches are expected to maintain stream power as a function of width values of approximately 2.00-2.20 and shear stress values of approximately 0.47-0.53 (Table 10).

Table 10. Stream Power (Ω) and Shear Stress (τ) Values

	Bankfull Discharge (ft^3/s)	Water surface Slope (ft/ft)	Total Stream Power (Ω)	Ω/W	Hydraulic Radius	Shear Stress (τ)	Velocity (v)	τ v	τ_{max}
Existing Conditions									
UT1 (upstream)	9.5	0.0225	13.34	**2.38**	0.76	**1.06**	1.90	2.02	1.60
UT1 (downstream)	14.2	0.0147	13.03	**1.94**	2.12	**1.94**	0.85	1.65	2.92
Reference Conditions									
Reference Reach-Cedarock	28.8	0.0258	46.37	**5.72**	0.82	**1.33**	3.60	4.78	6.67
Reference Causey Farm	60.6	0.0053	20.04	**1.82**	1.07	**0.35**	4.12	1.45	2.10
Proposed Conditions									
UT1 (upstream)	9.5	0.0223	13.22	**2.20**	0.38	**0.53**	3.65	1.94	0.80
UT1 (downstream)	14.2	0.0165	14.62	**2.00**	0.46	**0.47**	3.74	1.76	0.71

Cedarock reference reach values for stream power and shear stress are higher due to steeper valley and water surface slopes resulting in higher stream power and shear stress values. Causey Farm reference reach values for stream power and shear stress are slightly lower due to flatter valley and water surface slopes resulting in slightly lower stream power and shear stress values.

Existing, preconstruction Site streams are not characterized by excessive scour or erosion; however, impacts are primarily caused by alteration of stream bed materials resulting in reduced channel roughness due to impounding of stream reaches, livestock trampling of the stream bed and banks, and embedding of stream bed materials. Stream power values of existing streams are not elevated as evidenced by minimal channel erosion at the Site. Stream power values of existing streams are comparable to reference reaches, residing between the Cedarock and Causey Farm. Therefore, proposed stream power values are slightly lower from existing values and should remain between reference reach values. Proposed stream power and shear stress values appear adequate to mobilize and transport sediment through the Site, without aggradation or erosion on proposed stream banks.

3.6 Bankfull Verification

Discharge estimates for the Site utilize an assumed definition of "bankfull" and the return interval associated with that bankfull discharge. For this study, the bankfull channel is defined as the channel dimensions designed to support the "channel forming" or "dominant" discharge (Gordon et al. 1992).

Based on available Piedmont regional curves, the predicted bankfull discharge for the reference reaches averages approximately 28.8 and 63.8 cubic feet per second (cfs) for Cedarock and Causey Farm, respectively (Harmen et al. 1999). The USGS regional regression equation for the Piedmont region indicates that bankfull discharge for the reference reaches at a 1.3-1.5 year return interval average approximately 27-32 and 53-65 cfs, respectively (USGS 2006).

Field indicators of bankfull, primarily topographic breaks identified on the banks, and riffle cross-sections were utilized to obtain an average bankfull cross-sectional area for the reference reaches. The Piedmont regional curves were then utilized to plot the watershed area and discharge for the reference reach cross-sectional area. Field indicators of bankfull approximate an average discharge of 31.3 and 59.8 cfs, respectively for the reference reaches, which is 108 and 94 percent of that predicted by the regional curves; which is verified by the range approximated by the USGS regional regression equation.

Based on the above analysis of methods to determine bankfull discharge, proposed conditions at the Site will be based on reference reaches, onsite indicators of bankfull (cross-section 13, Appendix B), and an undisturbed reach located upstream of the Abbey Lamm Mitigation Site (located less than 2 miles northwest of the Site and currently in its third year of successful monitoring). Based on field indicators of bankfull on-Site (93 percent of the curves), and the Causey Farm Reference Reach (94 percent of the curves) and Abbey Lamm Mitigation Site (90 percent of the curves), which both closely resemble on-Site conditions, the designed onsite channel restoration area will equal approximately 93 percent of the channel size indicated by Piedmont regional curves. Table 11 summarizes all methods analyzed for estimating bankfull discharge.

Table 11. Reference Reach Bankfull Discharge Analysis

Method	Watershed Area (square miles)	Return Interval (years)	Discharge (cfs)
Cedarock Reference Reach			
Piedmont Regional Curves (Harman et al. 1999)	0.2	1.3-1.5	28.8
Piedmont Regional Regression Model (USGS 2004)	0.2	1.3-1.5	27-32
Field Indicators of Bankfull	0.2	1.3-1.5	31.3
Causey Farm Reference Reach			
Piedmont Regional Curves (Harman et al. 1999)	0.6	1.3-1.5	63.8
Piedmont Regional Regression Model (USGS 2004)	0.6	1.3-1.5	53-65
Field Indicators of Bankfull	0.6	1.3-1.5	59.8

4.0 REFERENCE STREAMS

Two reference reaches were identified for the Site. The first reference stream (Cedarock) is located approximately 9 miles northeast of the Site in Cedarock Park on an unnamed tributary to Rock Creek (Figure 5A, Appendix A). The second reference stream (Causey Farm) is located less than

10 miles northeast of the Site, immediately north of Causey Airport on unnamed tributaries to Stinking Quarter Creek. The Causey Farm reference was measured in 2004 as a reference reach for the Causey Farm stream mitigation project, which was a successful project through five years of monitoring with no issues. The streams were measured and classified by stream type (Rosgen 1996). Stream data is available for the Causey Farm reference; however, no figures were available for inclusion with this document.

4.1 Channel Classification

The reference reaches are both characterized as E-type streams; Cedarock is a moderately sinuous (1.2) channel dominated by gravel substrate and Causey Farm had slightly higher sinuousity channel, due to a lower valley slope, with a sand-dominated substrate.

4.2 Discharge

Field indicators of bankfull approximate an average discharge of 31.3 and 59.8 cfs, respectively for the Cedar Fork and Causey Farm reference reaches, which is 108 and 94 percent of that predicted by the regional curves.

4.3 Channel Morphology

Dimension: Data collected at Cedarock and Causey Farm indicate bankfull cross-sectional areas of 8.0 and 14.7 square feet, respectively. Cedarock was slightly larger than predicted by regional curves (7.5 square feet) and Causey Farm was slightly smaller than predicted by regional curves (15.7 square feet). Cedarock and Causey exhibit a bankfull width of 8.1 and 11.0, a bankfull depth of 0.8 and 1.4 feet, and width-to-depth ratios of 10.1 and 9.0, respectively (see Table B1, Morphological Stream Characteristics). Figure 5C (Appendix A) provides plan view and cross-sectional data for the Cedarock reference reach. The reference reaches exhibit a bank-height ratio of 1.0 and 1.4, respectively. The Causey Farm reference reach was slightly incised; however, defined bankfull indicators were present, which assisted with determining the appropriate cross-sectional area.

Pattern and Profile: In-field measurements of the reference reaches have yielded an average sinuosity of 1.2 at Cedarock and 1.45 at Causey Farm (thalweg distance/straight-line distance). Onsite valley slopes of Site restoration reaches range from 0.0185-0.0241. Valley slopes exhibited by reference channels range from slightly higher (0.0310 at Cedarock) than the Site to slightly lower (0.0077 at Causey Farm), providing a good range of slopes to compare existing and proposed Site conditions. Although slightly incised, the Causey Farm reference reach had a suitable pattern with no shoot cutoffs, eroding outer bends, or excessively tight radius of curvatures, in addition to appropriate pool-to-pool spacing and meander wavelengths.

Substrate: Reference channels are characterized by substrate dominated by gravel and sand sized particles, respectively.

5.0 PROJECT SITE WETLANDS (EXISTING CONDITIONS)

5.1 Existing Jurisdictional Wetlands

Jurisdictional wetlands/hydric soils within the Site were delineated in the field following guidelines set forth in the *Corps of Engineers Wetlands Delineation Manual* and subsequent regional supplements, and located using GPS technology with reported submeter accuracy (Environmental Laboratory 1987). A jurisdictional wetland delineation was completed and verbally approved by United States Army Corps of Engineers (USACE) representative Dave Bailey during a field meeting on October 13, 2017. Existing jurisdictional wetlands are depicted in green and drained hydric soils are depicted in pink on Figure 4 (Appendix A).

5.2 Hydrological Characterization

Construction activities are expected to restore approximately 0.54 acre of drained or impounded riparian hydric soils, and enhance 0.44 acre of cleared riparian wetlands. Areas of the Site targeted for riparian wetlands will receive hydrological inputs from periodic overbank flooding of restored tributaries, groundwater migration into wetlands, upland/stormwater runoff, and, to a lesser extent, direct precipitation. Hydrological impairment in drained soils has resulted from lateral draw-down of the water table adjacent to existing, incised stream channels. Additional hydric soils underlie an agriculture impoundment at the upper reaches of UT 1.

5.3 Soil Characterization

5.3.1 Taxonomic Classification

Detailed soil mapping conducted by a North Carolina Licensed Soil Scientist (NCLSS) in November 2016 indicate that the Site is currently underlain by hydric soils of the Worsham Series (Figure 4, Appendix A). According to the *Web Soil Survey* (USDA 2016), areas of the Site proposed for wetland restoration and enhancement are mapped as Local Alluvial Land; however an Official Soil Series Description does not exist for Local Alluvial Land. Hydric soils within the Site most closely resemble published soil profiles for the Worsham Series. Wetlands have been disturbed by livestock grazing and cleared of vegetation within pastureland. These hydric soils have been effectively drained by stream channel incision or relocation of stream channels to the floodplain margins.

Onsite hydric soils are grey to gley in color and are compacted and pockmarked by livestock trampling. Livestock trampling, grazing, and clearing has resulted in an herbaceous vegetative community. Groundwater springs and surface runoff contribute hydrology to these areas, although the dominant hydrological influence is the lateral draw-down of the water table adjacent to incised stream channels or streams relocated to the floodplain margins. A detailed soil profile conducted by a NCLSS is as follows; the location is depicted on Figure 4 (Appendix A).

5.3.2 Profile Description

Depth (inches)	Color	Texture
0 - 3	10 YR 3/2	Fine Sand
3 - 9	10 YR 7/1	Fine Sand
9 +	10 YR 7/2 10 YR 7/2 Mottles 10% 10 YR 6/8 Mottles 30%	Fine Sand

5.4 Plant Community Characterization

Areas proposed for wetland restoration and enhancement are primarily vegetated by fescue and opportunistic herbaceous species with very little vegetative diversity.

5.5 Reference Forest Ecosystem

A Reference Forest Ecosystem (RFE) is a forested area on which to model restoration efforts at the Site in relation to soils and vegetation. RFEs should be ecologically stable climax communities and should be a representative model of the Site as it likely existed prior to human disturbances. Data describing plant community composition and structure should be collected at the RFEs and subsequently applied as reference data in an attempt to emulate a natural climax community.

The RFE for this project is located 1.8 miles west of the Site at the Abbey Lamm Stream and Wetland Mitigation Site. The RFE supports plant community and landform characteristics that restoration efforts will attempt to emulate. Tree and shrub species identified within the reference forest and outlined in Table 12 will be used, in addition to other relevant species in appropriate Schafale and Weakley (1990) community descriptions.

Table 12. Reference Forest Ecosystem

Piedmont/Low Mountain Alluvial Forest
red maple (*Acer rubrum*)
tag alder (*Alnus serrulata*)
ironwood (*Carpinus caroliniana*)
pignut hickory (*Carya glabra*)
green ash (*Fraxinus pennsylvanica*)
eastern red cedar (*Juniperus virginiana*)
tulip poplar (*Liriodendron tulipifera*)
sweetgum (*Liquidambar styraciflua*)
black gum (*Nyssa sylvatica*)
black cherry (*Prunus serotina*)
white oak (*Quercus alba*)
swamp chestnut oak (*Quercus michauxii*)
water oak (*Quercus nigra*)
cherrybark oak (*Quercus pagoda*)
willow oak (*Quercus phellos*)
slippery elm (*Ulmus rubra*)

6.0 FUNCTIONAL UPLIFT AND PROJECT GOALS/OBJECTIVES

Project goals are based on the *Cape Fear River Basin Restoration Priorities* (RBRP) report (NCEEP 2009) and on-site data collection of channel morphology and function observed during field investigations. The Site is located within **Targeted Local Watershed (TLW) 03030002050050** (Figure 2, Appendix A). The RBRP report documents benthic ratings vary between "Fair" and "Good-Fair" possibly due to cattle, dairy, and poultry operations. The project is not located in a Regional or Local Watershed Planning Area; however, RBRP goals are addressed by project activities as follows with Site specific information following the RBRP goals in parenthesis.

1. Reduce and control sediment inputs (sediment model [Section 3.2] – reduction of 10.0 tons/year after mitigation is complete);
2. Reduce and manage nutrient inputs (nutrient model [Section 3.3]- livestock removal from streams, elimination of fertilizer application, and marsh treatment areas may result in a direct reduction of 852.4 pounds of nitrogen and 70.6 pounds of phosphorus per year);
3. Protect and augment designated natural heritage areas.

Site specific mitigation goals and objectives have been developed through the use of North Carolina Stream Assessment Method (NC SAM) and North Carolina Wetland Assessment Method (NC WAM) analyses of existing and reference stream systems at the Site (NC SFAT 2015 and NC WFAT 2010). These methodologies rate functional metrics for streams and wetlands as high, medium, or low based on field data collected on forms and transferred into a rating calculator. Using Boolean logic, the rating calculator assigns a high, medium, or low value for each metric and overall function. Site functional assessment data forms are available upon request and model output is included in Appendix B.

Tables 13A and 13B summarize NC SAM and NC WAM metrics targeted for functional uplift and the corresponding mitigation activities proposed to provide functional uplift. Metrics targeted to meet the Site's goals and objectives are depicted in bold.

Table 13A. Major Hill Site NC SAM Summary

NC SAM Function Class Rating Summary	UT 1 (Upstream)	UT1 (Downstream)	Reference
(1) HYDROLOGY	MEDIUM	LOW	HIGH
(2) Baseflow	MEDIUM	HIGH	HIGH
(2) Flood Flow	MEDIUM	**LOW**	HIGH
(3) Streamside Area Attenuation	HIGH	**LOW**	HIGH
(4) Floodplain Access	HIGH	MEDIUM	HIGH
(4) Wooded Riparian Buffer	**LOW**	**LOW**	HIGH
(4) Microtopography	HIGH	**LOW**	HIGH
(3) Stream Stability	**LOW**	**LOW**	HIGH
(4) Channel Stability	**LOW**	**LOW**	HIGH
(4) Sediment Transport	**LOW**	**LOW**	HIGH
(4) Stream Geomorophology	MEDIUM	HIGH	HIGH
(1) WATER QUALITY	**LOW**	**LOW**	HIGH
(2) Baseflow	MEDIUM	HIGH	HIGH
(2) Stream-side Area Vegetation	**LOW**	**LOW**	HIGH
(3) Upland Pollutant Filtration	**LOW**	**LOW**	HIGH
(3) Thermoregulation	**LOW**	MEDIUM	HIGH
(2) Indicators of Stressors	YES	YES	NO
(1) HABITAT	**LOW**	**LOW**	HIGH
(2) In-stream Habitat	**LOW**	**LOW**	HIGH
(3) Baseflow	MEDIUM	HIGH	HIGH
(3) Substrate	**LOW**	**LOW**	HIGH
(3) Stream Stability	**LOW**	**LOW**	HIGH
(3) In-Stream Habitat	**LOW**	**LOW**	HIGH
(2) Stream-side Habitat	**LOW**	**LOW**	HIGH
(3) Stream-side Habitat	**LOW**	**LOW**	HIGH
(3) Thermoregulation	**LOW**	**LOW**	HIGH
OVERALL	**LOW**	**LOW**	HIGH

Based on NC SAM output, all three primary stream functional metrics (Hydrology, Water Quality, and Habitat), as well as 18 sub-metrics are under-performing as exhibited by a LOW metric rating. These same metrics measured in a relatively undisturbed reference reach exhibit HIGH metric ratings (see Figure 4, Appendix A for NC SAM data reaches). LOW performing metrics are to be targeted for functional uplift through mitigation activities, goals and objectives, as well as, monitoring and success criteria.

Table 13B. Major Hill Site NC WAM Summary

NC WAM Sub-function Rating Summary	**K1**
Wetland Type	HF
(1) HYDROLOGY	MEDIUM
(2) Surface Storage & Retention	MEDIUM
(2) Sub-surface Storage and Retention	HIGH
(1) WATER QUALITY	MEDIUM
(2) Pathogen change	HIGH
(2) Particulate Change	**LOW**
(2) Soluble change	MEDIUM
(2) Physical Change	HIGH
(1) HABITAT	**LOW**
(2) Physical Structure	**LOW**
(2) Landscape Patch Structure	**LOW**
(2) Vegetative Composition	MEDIUM
OVERALL	MEDIUM

NC WAM forms are filled out for wetland enhancement areas. Wetland restoration areas are not able to be rated by the NC SAM methodology.

Table 13C. Stream/Wetland Targeted Functions, Goals, and Objectives

Targeted Functions	Goals	Objectives
(1) HYDROLOGY		
(2) Flood Flow (Floodplain Access) (3) Streamside Area Attenuation (4) Wooded Riparian Buffer (4) Microtopography	• Attenuate flood flow across the Site. • Minimize downstream flooding to the maximum extent possible. • Connect streams to functioning wetland systems.	• Construct new channel at historic floodplain elevation to restore overbank flows and restore jurisdictional wetlands • Plant woody riparian buffer • Remove livestock • Deep rip floodplain soils to reduce compaction and increase soil surface roughness • Protect riparian buffers with a perpetual conservation easement
(3) Stream Stability (4) Channel Stability (4) Sediment Transport	• Increase stream stability within the Site so that channels are neither aggrading nor degrading.	• Construct channels with proper pattern, dimension, and longitudinal profile • Remove livestock • Construct stable channels with cobble/gravel substrate • Plant woody riparian buffer
(1) WATER QUALITY		
(2) Streamside Area Vegetation (3) Upland Pollutant Filtration (3) Thermoregulation (2) Indicators of Stressors	• Remove direct nutrient and pollutant inputs from the Site and reduce contributions to downstream waters.	• Remove livestock and reduce agricultural land/inputs • Install marsh treatment areas • Plant woody riparian buffer • Restore/enhance jurisdictional wetlands adjacent to Site streams
(1) HABITAT		
(2) In-stream Habitat (3) Substrate (3) Stream Stability (3) In-Stream Habitat (2) Stream-side Habitat (3) Stream-side Habitat (3) Thermoregulation Wetland Landscape Patch Structure Wetland Vegetation Composition	• Improve instream and stream-side habitat.	• Construct stable channels with cobble/gravel substrate • Plant woody riparian buffer to provide organic matter and shade • Construct new channel at historic floodplain elevation to restore overbank flows and plant woody riparian buffer • Protect riparian buffers with a perpetual conservation easement • Restore/enhance jurisdictional wetlands adjacent to Site streams

The proposed easement, existing conditions, and proposed mitigation activities are depicted in Figures 4 and 6A-6B (Appendix A). The Site provides for restoration and protection of aquatic resources within a conservation easement and will result in net gains in hydrology, water quality, and habitat functions.

7.0 DESIGN APPROACH AND MITIGATION WORK PLAN

7.1 Stream Design

Onsite streams targeted for restoration have endured significant disturbance from land use activities such as land clearing, livestock grazing, straightening and rerouting of channels, and other anthropogenic maintenance. Site streams will be restored to emulate historic conditions at the Site utilizing parameters from nearby, relatively undisturbed reference streams (see Section 4.0 Reference Streams).

Primary activities designed to restore Site streams include 1) stream restoration, 2) stream enhancement (Level II), 3) wetland re-establishment and enhancement, 4) construction of marsh treatment areas, and 5) vegetation planting (Figures 6A-6B, Appendix A).

7.1.1 Stream Restoration

Stream restoration efforts are designed to restore a stable stream that approximates hydrodynamics, stream geometry, and local microtopography relative to reference conditions (Figure 7, Appendix A). Restoration at the Site will be Priority I restoration; therefore, bankfull elevations will be raised to meet the adjacent valley floodplain elevation.

Stream restoration is expected to entail 1) channel excavation, 2) removal of an agriculture pond, 3) spoil stockpiling, 4) channel stabilization, 5) channel diversion, and 6) channel backfill.

Stream restoration within the abandoned pond will include 1) notching the dam to dewater sediments; 2) removal of the dam to the elevation of the adjacent floodplain; 3) excavating sediment that is unsuitable for channel bank construction; 4) backfilling areas of sediment removed with soil suitable for channel construction (if necessary); 5) excavation of the design channel, 6) stabilization of the channel with coir matting, seed, and mulch; and 7) installation of structures.

The dam will be notched in early summer of 2018 and the pond bed will be seeded with temporary grasses to stabilize sediments remaining in the pond. Care will be taken during notching of the dam to drain the maximum amount of water, thereby allowing sediments to dewater.

Once the pond has dewatered and sediments have stabilized, the dam will be removed with finished grades matching elevations of the valley and floodplain above and below the dam location. Material removed from the dam, if suitable, may be used as channel backfill for reaches of stream to be abandoned during Priority I stream restoration efforts. If additional backfill remains, the material will be stockpiled outside of the easement, or spread evenly across the adjacent property and seeded for stabilization. Erosion control measures, such as silt fence, seeding, and mulching will be implemented on all stockpiled or spread soil materials.

A determination on sediment quantity and quality within the abandoned pond will be made concerning the ability to work within, or to stabilize the sediment for stream construction. If sediment is deemed unsuitable for channel construction, the sediment will be removed from the vicinity of the design channel and spread along the outer margins of the pond. Subsequently, suitable soil material will be placed in the location of the design channel such that design channel banks will be stabilized without liquefaction. The removal of unsuitable material, installation of suitable material, and excavation of the design channel may occur simultaneously to reduce impacts of machinery on the pond bed.

Excavation of the design channel will occur in the pond bed similar to other reaches of restored stream, with stabilization using approved erosion control materials and techniques.

In-stream Structures

The use of in-stream structures for grade control and habitat is essential for successful stream restoration (Figure 8A, Appendix A). In-stream structures may be placed in the channel to elevate local water surface profiles in the channel, potentially flattening the water energy slope or gradient and directing stream energy into the center of the channel and away from banks. The structures will consist of log cross-vanes; however, at the discretion of the Engineer, rock cross-vanes may be substituted if dictated by field conditions. In addition, the structures will placed in relatively straight reaches to provide secondary (perpendicular) flow cells during bankfull events.

Piped Channel Crossings

Landowner constraints will necessitate the installation of a piped channel crossing within a break in the easement to allow access to portions of the property isolated by stream restoration activities Figures 6A-6B (Appendix A). The crossing may be constructed of properly sized pipes and hydraulically stable rip-rap or suitable rock. Crossings will be large enough to handle the weight of anticipated vehicular traffic. Approach grades to the crossing will be at an approximate 10:1 slope and constructed of hard, scour-resistant crushed rock or other permeable material, which is free of fines. Floodplain pipes will be incorporated at each channel crossing to accommodate overbank events.

Outfall Structures

One drop structure is proposed at the outfall of the UT1 restoration reach as depicted on Figure 6A (Appendix A). The drop structure may be constructed out of Terracell, or large cobble depending upon anticipated scour from the restored stream channels (Figure 8B, Appendix A). The structure should be constructed to resist erosive forces associated with hydraulic drops proposed at the Site.

TerraCell is a light weight, flexible mat made of high density polyethylene strips. The strips are bonded together to form a honeycomb configuration. The honeycomb mat is fixed in place and filled with gravel or sand. Material in the TerraCell structure may be planted with grasses and shrubs for additional erosion protection. The TerraCell structure will form a nickpoint that approximates geologic controls in stream beds.

Marsh Treatment Areas

Two shallow wetland marsh treatment areas will be excavated in the floodplain to intercept surface waters draining through agricultural areas prior to discharging into the Site. Marsh treatment areas are intended to improve the mitigation project and are not generating mitigation credit. The proposed marsh treatment area location is depicted on Figures 6A-6B (Appendix A) and will consist of shallow depressions that will provide treatment and attenuation of initial stormwater pulses (Figure 8B, Appendix A). The outfall will be constructed of hydraulically stable rip-rap or other suitable material that will protect against headcut migration into the constructed depression. It is expected that the treatment areas will fill with sediment and organic matter over time.

7.1.2 Stream Enhancement (Level II)

Stream enhancement (level II) will occur on the lower reaches of UT1, the upper reaches of UT2, and the entire reach of UT3 (Figures 6A-6B, Appendix A). These reaches are characterized by channels with mature riparian vegetation, good channel bed substrate, and little bank erosion. The reaches are accessible by livestock and will have fence erected to exclude livestock. Planting riparian buffers with native forest vegetation will occur where needed and will extend a minimum of 50 feet from the top of stream banks to facilitate stream recovery and prevent further degradation of the stream.

7.2 Hydrological Modifications (Wetland Restoration)

Alternatives for wetland restoration are designed to restore a fully functioning wetland system, which will provide surface water storage, nutrient cycling, removal of imported elements and compounds, and will create a variety and abundance of wildlife habitat. Portions of the Site underlain by hydric soils have been impacted by channel incision, ground surface compaction, vegetative clearing, and earth movement associated with agricultural practices. Wetland restoration options will focus on the removal of fill materials, restoration of vegetative communities, the reestablishment of soil structure and microtopographic variations, and redirecting normal surface hydrology back to Site floodplains. These activities will result in the restoration of 0.55 acre of riparian wetland (Figure 6A, Appendix A).

Reestablishment of Historic Groundwater Elevations

Hydric soils adjacent to the incised channels appear to have been drained due to lowering of the groundwater table and a lateral drainage effect from existing stream reaches. Reestablishment of channel inverts is expected to rehydrate soils adjacent to Site streams, resulting in the restoration of jurisdictional hydrology to riparian wetlands.

Reestablishment of Soil Structure

Soil structure throughout the Site, particularly within wetland areas, will be reestablished to allow for penetration of rain water to the groundwater table. This will be accomplished by removing livestock from the Site, ripping compacted soils, and revegetating the Site.

Hydrophytic Vegetation

Site wetland areas targeted for restoration have endured significant disturbance from land use activities such as land clearing, livestock grazing, and other anthropogenic maintenance. Wetland areas will be revegetated with native vegetation typical of wetland communities in the region. Emphasis will focus on developing a diverse plant assemblage. Section 7.5 (Natural Plant

Community Restoration) provides detailed information concerning community species associations.

7.3 Wetland Enhancement

Wetland enhancement will focus on the removal of livestock and restoration of vegetative communities resulting in the enhancement of 0.44 acre of riparian wetland (Figure 6A, Appendix A).

7.4 Soil Restoration

Soil grading will occur during stream restoration activities. Topsoils will be stockpiled during construction activities and will be spread on the soil surface once critical subgrade has been established. The replaced topsoil will serve as a viable growing medium for community restoration to provide nutrients and aid in the survival of planted species.

7.5 Natural Plant Community Restoration

Restoration of floodplain forest and stream-side habitat allows for development and expansion of characteristic species across the landscape. Ecotonal changes between community types contribute to diversity and provide secondary benefits, such as enhanced feeding and nesting opportunities for mammals, birds, amphibians, and other wildlife. Reference Forest Ecosystem (RFE) data, onsite observations, and community descriptions from *Classification of the Natural Communities of North Carolina* (Schafale and Weakley 1990) were used to develop the primary plant community associations that will be promoted during community restoration activities.

7.5.1 Planting Plan

Stream-side trees and shrubs include species with high value for sediment stabilization, rapid growth rate, and the ability to withstand hydraulic forces associated with bankfull flow and overbank flood events. Stream-side trees and shrubs will be planted within 15 feet of the channel top of bank throughout the meander belt-width. Shrub elements will be planted along the reconstructed stream banks, concentrated along outer bends. Piedmont Alluvial Forest is the target community for Site floodplains and Dry-Mesic Oak-Hickory Forest is the target community for upland side-slopes.

Bare-root seedlings within the Piedmont Alluvial and Dry-Mesic Oak-Hickory Forests will be planted at a density of approximately 680 stems per acre on 8-foot centers. Shrub species in the stream-side assemblage and Marsh Wetland Treatment Areas will be planted at a density of 2720 stems per acre on 4-foot centers.

Table 14 depicts the total number of stems and species distribution within each vegetation association (Figure 9, Appendix A). Planting will be performed between December 1 and March 15 to allow plants to stabilize during the dormant period and set root during the spring season.

Table 14. Planting Plan

Vegetation Association	Piedmont/Low Mountain Alluvial Forest*		Dry-Mesic Oak-Hickory Forest*		Marsh Treatment Wetland**		Stream-side Assemblage**		TOTAL
Area (acres)	**1.1**		**5.5**		**0.01**		**1.5**		**8.11**
Species	**# planted***	**% of total**	**# planted***	**% of total**	**# planted****	**% of total**	**# planted****	**% of total**	**# planted**
River birch (*Betula nigra*)	75	10	--	--	--	--	204	5	279
Ironwood (*Carpinus caroliniana*)	--	--	748	20	--	--	--	--	748
Buttonbush (*Cephalanthus occidentalis*)	--	--	--	--	5	20	--	--	5
Red bud (*Cercis canadensis*)	--	--	561	15	--	--	--	--	561
Sweet pepperbush (*Clethra alnifolia*)	--	--	--	--	4	15	--	--	4
Silky dogwood (*Cornus amomum*)	75	10	--	--	4	15	816	20	895
Persimmon (*Diospyros virginiana*)	--	--	374	10	--	--	--	--	374
White ash (*Fraxinus americana*)	--	--	187	5	--	--	--	--	187
Green ash (*Fraxinus pennsylvanica*)	150	20	--	--	--	--	816	20	966
Blueberry (*Vaccinium corymbosum*)	--	--	--	--	5	20	204	5	5
Tulip poplar (*Liriodendron tulipifera*)	75	10	--	--	--	--	--	--	75
Sycamore (*Platanus occidentalis*)	150	20	--	--	--	--	816	20	966
Black gum (*Nyssa sylvatica*)	--	--	561	15	--	--	--	--	561
Water oak (*Quercus nigra*)	112	15	748	20	--	--	408	10	1268
Willow oak (*Quercus phellos*)	112	15	561	15	--	--	408	10	1081
Black willow (*Salix nigra*)	--	--	--	--	--	--	408	10	408
Elderberry (*Sambucus canadensis*)	--	--	--	--	5	20	--	--	5
Possumhaw (*Viburnum nudum*)	--	--	--	--	3	10	--	--	3
TOTAL	**748**	**100**	**3740**	**100**	**27**	**100**	**4080**	**100**	**8391**

* Planted at a density of 680 stems/acre.
** Planted at a density of 2720 stems/acre.

In addition to planting seedlings, a seed mix will be spread within Marsh Treatment Wetland Areas as follows.

1. Virginia wildrye (*Elymus virginicus*)
2. Switch grass (*Panicum virgatum*)
3. Big blue stem (*Andropogon gerardii*)
4. Indian grass (*Sorghastrum nutans*)
5. Deer tongue (*Dichanthelium clandestinum*)

7.5.2 Nuisance Species Management

Nuisance species controls are not proposed at this time. Inspections for beaver and other potential nuisance species will occur throughout the course of the monitoring period. Appropriate actions may be taken to ameliorate any negative impacts regarding vegetation development and/or water management on an as-needed basis. The presences of nuisance species will be monitored over the course of the monitoring period. Appropriate actions will be taken to ameliorate any negative impacts regarding vegetation development and/or water management on an as-needed basis.

8.0 MONITORING AND SUCCESS CRITERIA

Monitoring requirements and success criteria outlined in this plan follow the October 24, 2016 NC Interagency Review Team *Wilmington District Stream and Wetland Compensatory Mitigation Update*. Monitoring data collected at the Site should include reference photos, plant survival analysis, channel stability analysis, and biological data.

Wetland hydrology is proposed to be monitored for a period of seven years (years 1-7). Riparian vegetation and stream morphology is proposed to be monitored for a period of seven years with measurements completed in years 1-3, year 5, and year 7. Monitoring will be conducted by Axiom Environmental, Inc. Annual monitoring reports of the data collected will be submitted to the NCDMS by Restoration Systems no later than December 31 of each monitoring year data is collected.

Table 15. Monitoring Schedule

Resource	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7
Streams	■	■	■		■		■
Wetlands	■	■	■	■	■	■	■
Vegetation	■	■	■		■		■
Macroinvertebrates			■		■		■
Water Quality	■	■	■	■	■	■	■
Visual Assessment	■	■	■	■	■	■	■
Report Submittal	■	■	■	■	■	■	■

8.1 Stream Monitoring

Annual monitoring will include development of channel cross-sections and substrate on riffles and pools (Figure 10, Appendix A). Data to be presented in graphic and tabular format will include 1) cross-sectional area, 2) bankfull width, 3) average depth, 4) maximum depth, and 5) width-to-depth ratio. Longitudinal profiles will not be measured routinely unless monitoring demonstrates

channel bank or bed instability, in which case, longitudinal profiles may be required by the USACE along reaches of concern to track changes and demonstrate stability.

Table 16. Stream Monitoring Summary

Parameter	Method	Schedule/Frequency	Number/Extent
Stream Profile	Full longitudinal survey	As-built (unless otherwise required)	All restored stream channels
Stream Dimension	Cross-sections	Years 1, 2, 3, 5, and 7	Two per 1000 feet of restored channels
Channel Stability	Visual Assessments	Yearly	All restored stream channels
	Bank Pins	Yearly	Only if instability is documented during monitoring
	Additional Cross-sections	Yearly	Only if instability is documented during monitoring
Stream Hydrology	Continuous monitoring water level gauges and/or trail camera	Continuous recording through monitoring period	Two gauges on UT1 (upstream and downstream)
Water Quality	Water samples	Yearly	Two locations
Macroinvertebrates	Qual 4 sampling	Years 3, 5, and 7	Two locations

Visual Assessments

Visual assessment of in-stream structures will be conducted to determine if failure has occurred. Failure of a structure may be indicated by collapse of the structure, undermining of the structure, abandonment of the channel around the structure, and/or stream flow beneath the structure. In addition, visual assessments of the entire channel will be conducted in each of the seven years of monitoring as outlined in the October 24, 2016 NC Interagency Review Team *Wilmington District Stream and Wetland Compensatory Mitigation Update*. Areas of concern will be depicted on a plan view figure identifying the location of concern along with a written assessment and photograph of the area.

Water Quality

Water quality sampling has been conducted at two locations within the Site; one in areas visibly impacted by livestock and one in downstream wooded areas that have livestock access, but are not visibly impacted by livestock (Figure 4, Appendix A). Preconstruction sampling was conducted by a NC Certified Wastewater/Groundwater Laboratory (NC State Lab Code #5642) in situ using single event sampling devices (EkStik EC500 and EkStik DO600). Parameters sampled include total dissolved solids, conductivity, temperature, dissolved oxygen, and pH. Annual water quality sampling will be used to compare preconstruction baseline data with post-construction restored conditions. At this time water quality is not proposed to be tied to success criteria, but may be used as a tool to observe gains in water quality function by proposed mitigation activities. Preconstruction water quality data is presented in the following table.

Table 17. Major Hill Water Quality Data

	Upstream		Downstream	
Parameter	**7/28/17**	**8/14/17**	**7/28/17**	**8/14/17**
TDS (ppm)	110.1	147	62.6	86.8
TDS (mg/l)	109.1	149	64.6	83.5
Conductivity (m/s)	159.2	215	92.1	128.3
Temperature (°C)	25.4	22.6	24.6	22.1
DO (mg/l)	-	1.93	-	3.06
DO (ppm)	-	1.06	-	2.53
pH	6.61	6.37	6.65	6.22

Benthic Macroinvertebrates

Benthic macroinvertebrate sampling will be conducted once before construction (baseline conditions) and once during monitoring years 3, 5, and 7. Macroinvertebrate sampling will be conducted in accordance with the "Qual 4" method described in *Standard Operating Procedures for Collection and Analysis of Benthic Macroinvertebrates, Version 5.0* (NCDWR 2016). In addition, sampling will occur during the "index period" referenced in *Small Streams Biocriteria Development* (NCDWQ 2009). Results will be presented on a site-by-site basis and will include a list of taxa collecter, an enumeration of *Ephemeroptera, Plecoptera,* and *Tricopetera* taxa as well as Biotic Index values. Benthic Macroinvertebrate sampling data will not be tied to success criteria; however, the data may be used as a tool to observe positive gains to in-stream habitat.

8.1.1 Stream Success Criteria

Monitoring and success criteria for stream restoration should relate to project goals and objectives identified from on-site NC SAM data collection. From a mitigation perspective, several of the goals and objectives are assumed to be functionally elevated by restoration activities without direct measurement. Other goals and objectives will be considered successful upon achieving vegetation success criteria. The following summarizes stream success criteria, per the October 24, 2016 NC Interagency Review Team *Wilmington District Stream and Wetland Compensatory Mitigation Update*.

- All streams must maintain an Ordinary High-Water Mark (OHWM), per RGL 05-05.
- Continuous surface flow must be documented each year for at least 30 consecutive days.
- Bank height ratio (BHR) cannot exceed 1.2 at any measured cross-section.
- Entrenchment ratio (ER) must be no less than 1.4 at any measured riffle cross-section.
- BHR and ER at any measure riffle cross-section should not change by more than 10% from baseline condition during any given monitoring period.
- The stream project shall remain stable and all other performance standards shall be met through four separate bankfull events, occurring in separate years, during the monitoring years 1-7.

8.1.2 Stream Contingency

In the event that stream success criteria are not fulfilled, a mechanism for contingency will be implemented. Stream contingency may include, but may not be limited to 1) structure repair and/or installation; 2) repair of dimension, pattern, and/or profile variables; and 3) bank stabilization. The method of contingency is expected to be dependent upon stream variables that are not in compliance with success criteria. Primary concerns, which may jeopardize stream success, include 1) structure failure, 2) headcut migration through the Site, and/or 3) bank erosion.

Structure Failure

In the event that structures are compromised the affected structure will be repaired, maintained, or replaced. Once the structure is repaired or replaced, it must function to stabilize adjacent stream banks and/or maintain grade control within the channel. Structures which remain intact, but exhibit flow around, beneath, or through the header/footer will be repaired by excavating a trench on the upstream side of the structure and reinstalling filter fabric in front of the pilings. Structures which have been compromised, resulting in shifting or collapse of a header/footer, will be removed and replaced with a structure suitable for Site flows.

Headcut Migration Through the Site

In the event that a headcut occurs within the Site (identified visually or through measurements [i.e. bank-height ratios exceeding 1.4]), provisions for impeding headcut migration and repairing damage caused by the headcut will be implemented. Headcut migration may be impeded through the installation of in-stream grade control structures (rip-rap sill and/or log cross-vane weir) and/or restoring stream geometry variables until channel stability is achieved. Channel repairs to stream geometry may include channel backfill with coarse material and stabilizing the material with erosion control matting, vegetative transplants, and/or willow stakes.

Bank Erosion

In the event that severe bank erosion occurs within the Site, resulting in incision, lateral instability, and/or elevated width-to-depth ratios locally or systemically, contingency measures to reduce bank erosion and width-to-depth ratio will be implemented. Bank erosion contingency measures may include the installation of log-vane weirs and/or other bank stabilization measures. If the resultant bank erosion induces shoot cutoffs or channel abandonment, a channel may be excavated to reduce shear stress to stable values.

8.2 Wetland Monitoring

Six groundwater monitoring gauges will be installed to take measurements after hydrological modifications are performed at the Site. Groundwater gauges are proposed to be nested in the drained pond area and spread evenly throughout the remaining wetland restoration areas (Figure 10, Appendix A). A detailed soil profile will be described adjacent to each installed groundwater gauge. Hydrological sampling will continue throughout the entire year at intervals necessary to satisfy jurisdictional hydrology success criteria. In addition, an on-site rain gauge will document rainfall data for comparison of groundwater conditions with extended drought conditions and floodplain crest gauges (or other suitable recording devices) will be installed to confirm overbank flooding events.

Table 18. Wetland Monitoring Summary

Parameter	Method	Schedule/Frequency	Number/Extent	Data Collected
Wetland Restoration	Groundwater gauges	As-built, Years 1, 2, 3, 4, 5, 6, and 7	6 gauges spread throught restored wetlands	Soil temperature at the beginning of each monitoring period, groundwater and rain data for each monitoring period

8.2.1 Wetland Success Criteria

The following summarizes wetland success criteria, per the October 24, 2016 NC Interagency Review Team *Wilmington District Stream and Wetland Compensatory Mitigation Update*.

- Saturation or inundation within the upper 12 inches of the soil surface for, at a minimum, 10 percent of the growing season, during average climatic conditions

According to the *Soil Survey of Alamance County*, the growing season for Alamance County is from April 17 – October 22 (USDA 1960). However, the start date for the growing season is not typical for the Piedmont region; therefore, for purposes of this project gauge hydrologic success will be determined using data from March 1 - October 22 to more accurately represent the period of biological activity. Based on growing season information outlined in the *Interim Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Eastern Mountains and Piedmont Region* (USACE 2010), this will be confirmed annually by soil temperatures exceeding 41 degrees Fahrenheit at 12 inches depth and/or bud burst.

Target hydrological characteristics include saturation or inundation for 10 percent of the monitored period (March 1-October 22), during average climatic conditions. During years with atypical climatic conditions, groundwater gauges in reference wetlands may be used for comparison to the Site; however, reference gauge data will not be tied to success criteria. These areas are expected to support hydrophytic vegetation. If wetland parameters are marginal as indicated by vegetation and/or hydrology monitoring, a jurisdictional determination will be performed. The jurisdictional determination will not supersede monitoring data, or overturn a failure in meeting success criteria; however, this information may be used by the IRT, at the discretion of the IRT, to make a final determination on Site wetland re-establishment success.

8.2.2 Wetland Contingency

Hydrological contingency will require consultation with hydrologists and regulatory agencies if wetland hydrology enhancement is not achieved. Floodplain surface modifications, including construction of ephemeral pools, represent a likely mechanism to increase the floodplain area in support of jurisdictional wetlands. Recommendations for contingency to establish wetland hydrology will be implemented and monitored until Hydrology Success Criteria are achieved.

8.3 Vegetation

After planting has been completed in winter or early spring, an initial evaluation will be performed to verify planting methods and to determine initial species composition and density. Supplemental planting and additional Site modifications will be implemented, if necessary.

During quantitative vegetation sampling, 7 sample plots (10-meter by 10-meter) will be installed within the Site as per guidelines established in *CVS-EEP Protocol for Recording Vegetation, Version 4.2* (Lee et al. 2008). In each sample plot, vegetation parameters to be monitored include species composition and species density. Visual observations of the percent cover of shrub and herbaceous species will also be documented by photograph.

Table 19. Vegetation Monitoring Summary

Parameter	Method	Schedule/Frequency	Number/Extent	Data Collected
Vegetation establishment and vigor	Permanent vegetation plots 0.0247 acre (100 square meters) in size	As-built, Years 1, 2, 3, 5, and 7	7 plots spread across the Site	Species, height, location, planted vs. volunteer, and age
	Annual random vegetation plots, 0.0247 acre (100 square meters) in size	As-built, Years 1, 2, 3, 5, and 7	2 plots randomly selected each year	Species and height

8.3.1 Vegetation Success Criteria

The following summarizes wetland success criteria, per the October 24, 2016 NC Interagency Review Team *Wilmington District Stream and Wetland Compensatory Mitigation Update*.

- Within planted portions of the site, a minimum of 320 stems per acre must be present at year 3; a minimum of 260 stems per acre must be present at year 4; and a minimum of 210 stems per acre must be present at year 7.
- Trees must average 7 feet in height at year 5, and 10 feet in height at year 7.
- Planted and volunteer stems are counted, provided they are included in the approved planting list for the site; natural recruits not on the planting list may be considered by the IRT on a case-by-case basis.
- Any single species can only account for 50% of the required stems within any vegetation plot.

8.3.2 Vegetation Contingency

If vegetation success criteria are not achieved, supplemental planting may be performed with tree species approved by regulatory agencies. Supplemental planting will be performed as needed until achievement of vegetation success criteria.

8.4 Compatibility with Project Goals

The following table outlines the compatibility of Site performance criteria described above to Site goals and objectives that will be utilized to evaluate if Site goals and objectives are achieved.

Table 20. Compatibility of Performance Criteria to Project Goals and Objectives

Goals	Objectives	Success Criteria
(1) HYDROLOGY		
• Attenuate flood flow across the Site. • Minimize downstream flooding to the maximum extent possible. • Connect streams to functioning wetland systems.	• Construct new channel at historic floodplain elevation to restore overbank flows and restore jurisdictional wetlands • Plant woody riparian buffer • Remove livestock • Deep rip floodplain soils to reduce compaction and increase soil surface roughness • Protect Site with a perpetual conservation easement	• BHR not to exceed 1.2 • Document four overbank events in separate monitoring years • Livestock excluded from the easement • Attain Wetland Hydrology Success Criteria • Attain Vegetation Success Criteria • Conservation Easement recorded
• Increase stream stability within the Site so that channels are neither aggrading nor degrading.	• Construct channels with proper pattern, dimension, and longitudinal profile • Remove livestock from the Site • Construct stable channels with cobble/gravel substrate • Plant woody riparian buffer	• Cross-section measurements indicate a stable channel with cobble/gravel substrate • Visual documentation of stable channels and structures • BHR not to exceed 1.2 • ER of 1.4 or greater • < 10% change in BHR and ER in any given year • Livestock excluded from the easement • Attain Vegetation Success Criteria
(1) WATER QUALITY		
• Remove direct nutrient and pollutant inputs from the Site and reduce contributions to downstream waters.	• Remove livestock and reduce agricultural land/inputs • Install marsh treatment areas • Plant woody riparian buffer • Restore/enhance wetlands adjacent to Site streams	• Livestock excluded from the easement • Attain Wetland Hydrology Success Criteria • Attain Vegetation Success Criteria
(1) HABITAT		
• Improve instream and stream-side habitat.	• Construct stable channels with cobble/gravel substrate • Plant riparian buffer to provide organic matter and shade • Construct new channel at historic floodplain elevation to restore overbank flows and plant woody riparian buffer • Protect Site with a perpetual conservation easement • Restore/enhance wetlands adjacent to Site streams	• Cross-section measurement indicate a stable channel with cobble/gravel substrate • Visual documentation of stable channels and in-stream structures. • Attain Wetland Hydrology Success Criteria • Attain Vegetation Success Criteria • Conservation Easement recorded

9.0 ADAPTIVE MANAGEMENT PLAN

In the event the mitigation Site or a specific component of the mitigation Site fails to achieve the necessary performance standards as specified in the mitigation plan, the sponsor shall notify the members of the IRT and work with the IRT to develop contingency plans and remedial actions.

10.0 LONG-TERM MANAGEMENT PLAN

The Site will be transferred to the 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. Funding will be supplied by the responsible party on a yearly basis until such time an endowment is established. 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 Stewardship Program will periodically install signage to identify boundary markings, as needed. Any livestock or associated fencing, or permanent crossings will be the responsibility of the owner of the underlying property to maintain.

11.0 REFERENCES

Environmental Laboratory. 1987. Corps of Engineers Wetlands Delineation Manual. Technical Report Y-87-1. United States Army Engineer Waterways Experiment Station, Vicksburg, Mississippi.

Gordon, N.D., T.A. McMahon, and B.L. Finlayson. 1992. Stream Hydrology: an Introduction for Ecologists. John Wiley & Sons, Ltd. West Sussex, England.

Griffith, G.E., J.M. Omernik, J.A. Comstock, M.P. Schafale, W.H. McNab, D.R. Lenat, T.F. MacPherson, J.B. Glover, and V.B. Shelbourne. 2002. Ecoregions of North Carolina and South Carolina. U.S. Geological Survey, Reston, Virginia.

Harman, W.A., G.D. Jennings, J.M. Patterson, D.R. Clinton, L.A. O'Hara, A. Jessup, R. Everhart. 1999. Bankfull Hydraulic Geometry Relationships for North Carolina Streams. N.C. State University, Raleigh, North Carolina.

Lee, M.T., R.K. Peet, S.D. Roberts, and T.R. Wentworth. 2008. CVS-EEP Protocol for Recording Vegetation. Version 4.2. North Carolina Department of Environment and Natural Resources, Ecosystem Enhancement Program. Raleigh, North Carolina.

North Carolina Division of Mitigation Services (NCDMS). 2014. Stream and Wetland Mitigation Monitoring Guidelines. North Carolina Department of Environmental Quality, Raleigh, North Carolina.

North Carolina Division of Mitigation Services (NCDMS). 2016. Quantifying Benefits to Water Quality from Livestock Exclusion and Riparian Buffer Establishment for Stream Restoration.

North Carolina Division of Water Quality (NCDWQ). 2005. Cape Fear River Basinwide Water Quality Plan. Available: https:// https://deq.nc.gov/about/divisions/water-resources/planning/basin-planning/water-resource-plans/cape-fear-2005 [December 8, 2016]. North Carolina Department of Environment and Natural Resources, Raleigh, North Carolina.

North Carolina Division of Water Resources (NCDWR). 2014. Final 2014 Category 5 Water Quality Assessments-303(d) List. Available: https://ncdenr.s3.amazonaws.com/s3fs-public/Water%20Quality/Planning/TMDL/303d/2014/2014_303dlist.pdf [December 8, 2016]. North Carolina Department of Environmental Quality, Raleigh, North Carolina.

North Carolina Division of Water Resources (NCDWR). 2016a. River Basin Classification Schedule (online). Available: https://deq.nc.gov/river-basin-classification-schedule [December 8, 2016]. North Carolina Department of Environmental Quality, Raleigh.

North Carolina Division of Water Resources (NCDWR). 2016b. Draft 2016 Category 5 Assessments EPA Submittal -303(d) List. Available: https://ncdenr.s3.amazonaws.com/s3fs-public/Water%20Quality/Planning/TMDL/303d/2016/NC_2016_Category_5_20160606.pdf [December 8, 2016]. North Carolina Department of Environmental Quality, Raleigh, North Carolina.

North Carolina Division of Environmental and Natural Resources. 2005. Updated Draft Manual of Stormwater Best Management Practices.

North Carolina Division of Water Resources (NCDWR). 2016. Standard Operating Procedures for Collection and Analysis of Benthic Macroinvertebrates (Version 5.0). (online). Available: https://files.nc.gov/ncdeq/Water%20Quality/Environmental%20Sciences/BAU/NCDWRMacroinvertebrate-SOP-February%202016_final.pdf

North Carolina Division of Water Quality (NCDWQ). 2009. Small Streams Biocriteria Development. Available: http://portal.ncdenr.org/c/document_library/get_file?uuid=2d54ad23-0345-4d6e-82fd-04005f48eaa7&groupId=38364

North Carolina Ecosystem Enhancement Program (NCEEP). 2009. Cape Fear River Basin Restoration Priorities 2009 (online). Available : http://portal.ncdenr.org/c/document_library/get_file?uuid=864e82e8-725c-415e-8ed9-c72dfcb55012&groupId=60329

North Carolina Stream Functional Assessment Team. (NC SFAT 2015). N.C. Stream Assessment Method (NC SAM) User Manual. Version 2.1.

North Carolina Wetland Functional Assessment Team. (NC WFAT 2010). N.C. Wetland Assessment Method (NC WAM) User Manual. Version 4.1.

Rosgen, D. 1996. Applied River Morphology. Wildland Hydrology (Publisher). Pagosa Springs, Colorado

Rosgen, D. 2009. A Practical Method of Computing Streambank Erosion Rate (online). Available: http://www.u-s-c.org/html/documents/Erosionrates.pdf.

Rosgen, D. 2011. Estimating Sediment Loads using the Bank Assessment of Non-point source Consequences of Sediment (BANCS). Watershed Assessment of River Stability and Sediment Supply (WARSSS). Hagerstown , Maryland.

Schafale, M.P. and A.S. Weakley. 1990. Classification of the Natural Communities of North Carolina: Third Approximation. North Carolina Natural Heritage Program, Division of

Parks and Recreation, North Carolina Department of Environment, Health, and Natural Resources. Raleigh, North Carolina.

Simon A, Hupp CR. 1986. Geomorphic and Vegetative Recovery Processes Along Modified Tennessee Streams: An Interdisciplinary Approach to Disturbed Fluvial Systems. Forest Hydrology and Watershed Management. IAHS-AISH Publ.167.

Stormwater Manager's Resource Center (SMRC). 2016. The Simple Method to Calculate Urban Stormwater Loads. Available: http://www.stormwatercenter.net/monitoring%20and%20assessment/simple%20meth/simple.htm

United States Army Corps of Engineers (USACE). 2010. Interim Regional Supplement to the Corps of Engineers Wetland Delineation Manual, Eastern Mountains and Piedmont Region.

United States Census Bureau (USCB). 2013. Population estimates V.2013. http://quickfacts.census.gov/qfd/states/37000.html

United States Department of Agriculture (USDA). 2016. Web Soil Survey (online). Available: http://websoilsurvey.nrcs.usda.gov/app/WebSoilSurvey.aspx [August 2016].

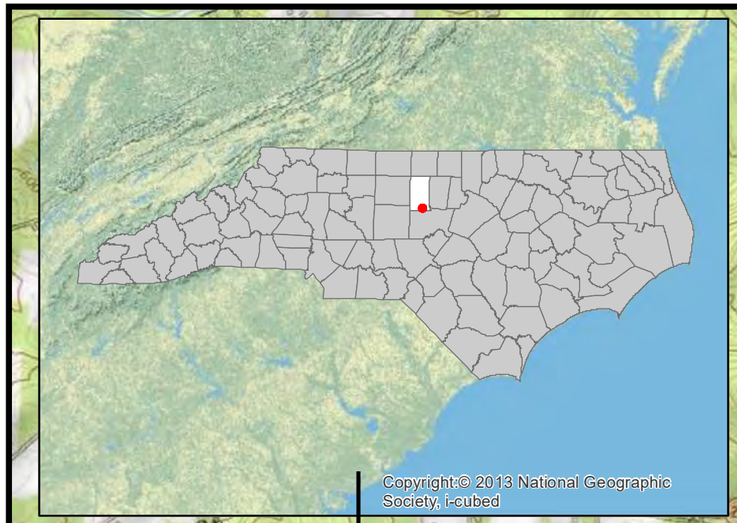
United States Department of Agriculture (USDA). 1960. Soil Survey of Alamance County, North Carolina. Soil Conservation Service.

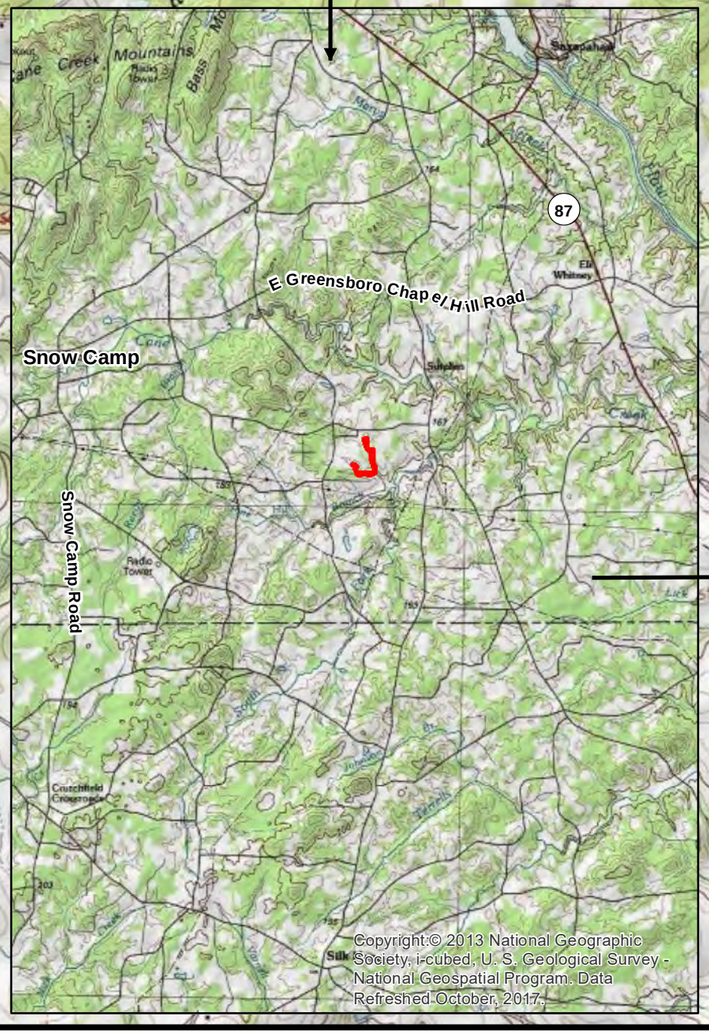
United States Department of Agriculture (USDA). 2015. Animal Manure Management (NRCS) available at http://www.nrcs.usda.gov/wps/portal/nrcs/detail/nhj/technical/cp/cta/?

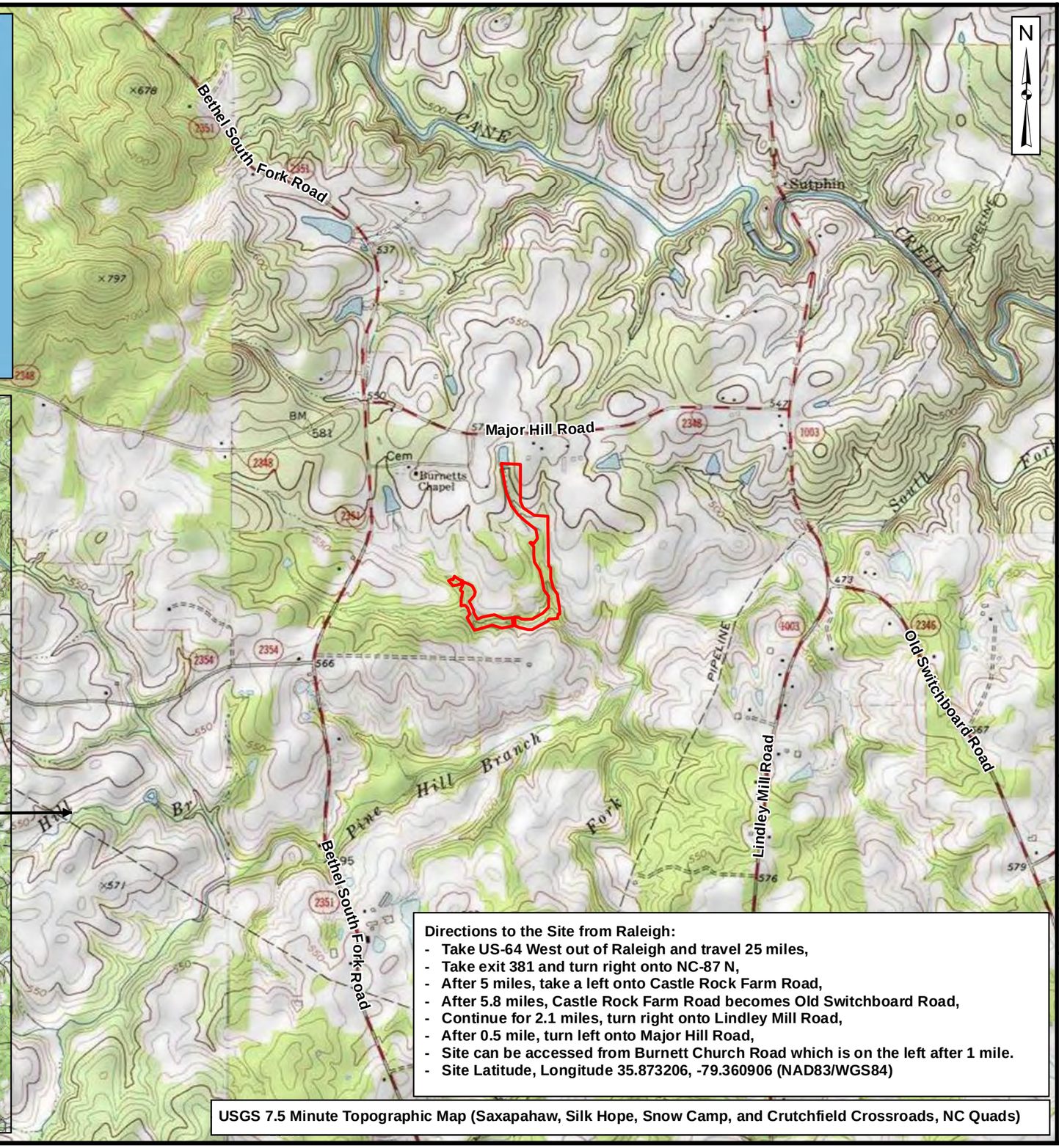
United States Geological Survey (USGS). 2006. Estimating the Magnitude and Frequency of Floods in Rural Basins of North Carolina – Recompiled. USGS Water-Resources Investigations Report 01-4207. Raleigh, North Carolina.

APPENDIX A
FIGURES

Figure 1. Project Location
Figure 2. Hydrologic Unit Map
Figure 3. Topography and Drainage Area
Figure 4. Existing Conditions
Figure 5A. Cedarock Reference Drainage Area
Figure 5B. Cedarock Reference Existing Conditions
Figure 5C. Cedarock Reference Reach Dimension, Pattern, and Profile
Figures 6A-B. Restoration Plan
Figure 7. Proposed Dimension, Pattern, and Profile
Figures 8A-B. Typical Structure Details
Figure 9. Planting Plan
Figure 10. Monitoring Plan







Directions to the Site from Raleigh:
- **Take US-64 West out of Raleigh and travel 25 miles,**
- **Take exit 381 and turn right onto NC-87 N,**
- **After 5 miles, take a left onto Castle Rock Farm Road,**
- **After 5.8 miles, Castle Rock Farm Road becomes Old Switchboard Road,**
- **Continue for 2.1 miles, turn right onto Lindley Mill Road,**
- **After 0.5 mile, turn left onto Major Hill Road,**
- **Site can be accessed from Burnett Church Road which is on the left after 1 mile.**
- **Site Latitude, Longitude 35.873206, -79.360906 (NAD83/WGS84)**

USGS 7.5 Minute Topographic Map (Saxapahaw, Silk Hope, Snow Camp, and Crutchfield Crossroads, NC Quads)

Axiom Environmental, Inc.

Prepared for:

RESTORATION SYSTEMS | LLC

Project:

MAJOR HILL STREAM AND WETLAND MITIGATION SITE

Alamance County, NC

Title:

PROJECT LOCATION

Drawn by: KRJ

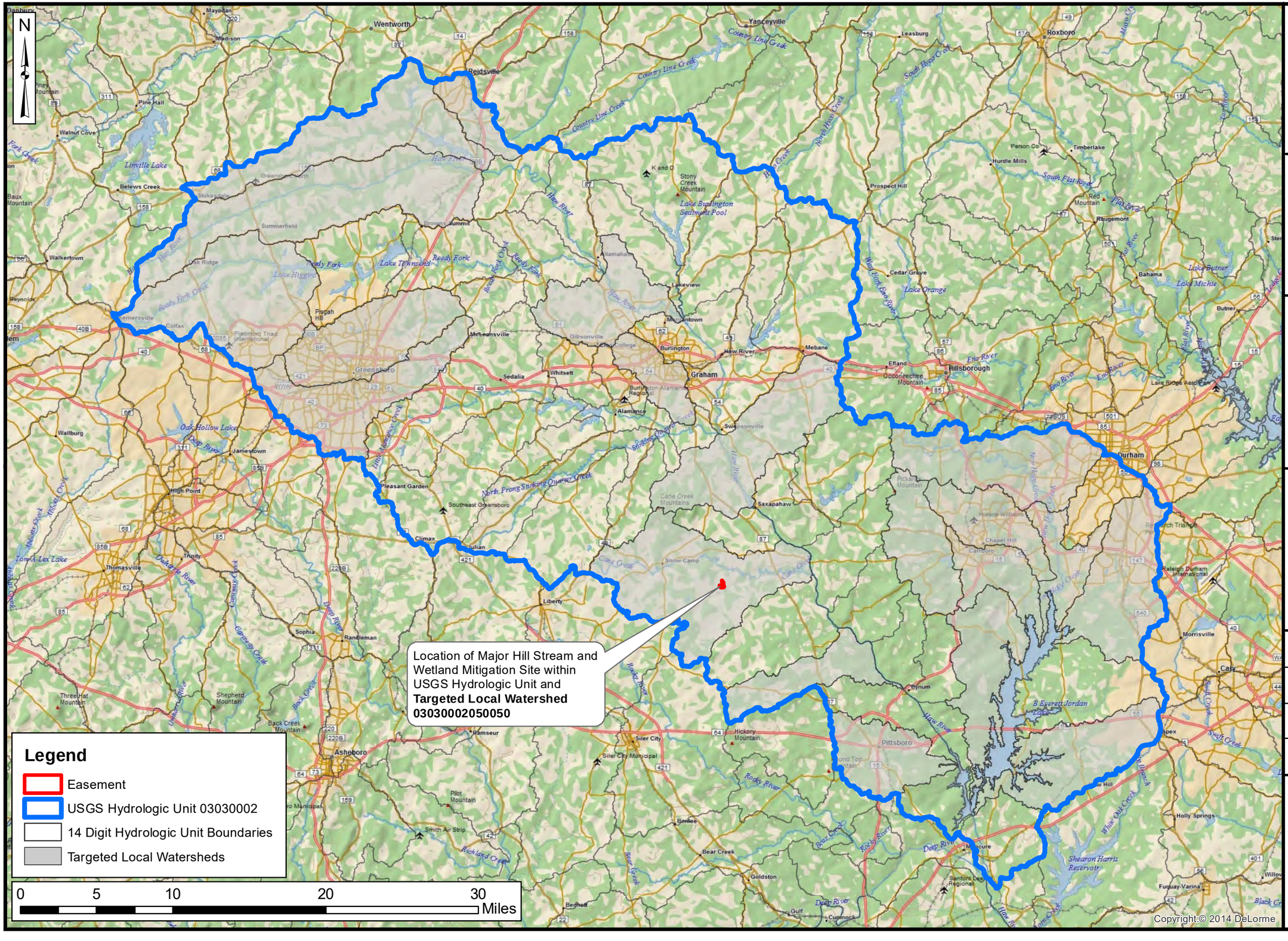
Date: NOV 2017

Scale: 1:20,000

Project No.: 17-009

FIGURE

1



Axiom Environmental, Inc.

Prepared for:

RESTORATION SYSTEMS | LLC

Project:

MAJOR HILL STREAM AND WETLAND MITIGATION SITE

Alamance County, NC

Title:

HYDROLOGIC UNIT MAP

Drawn by: KRJ

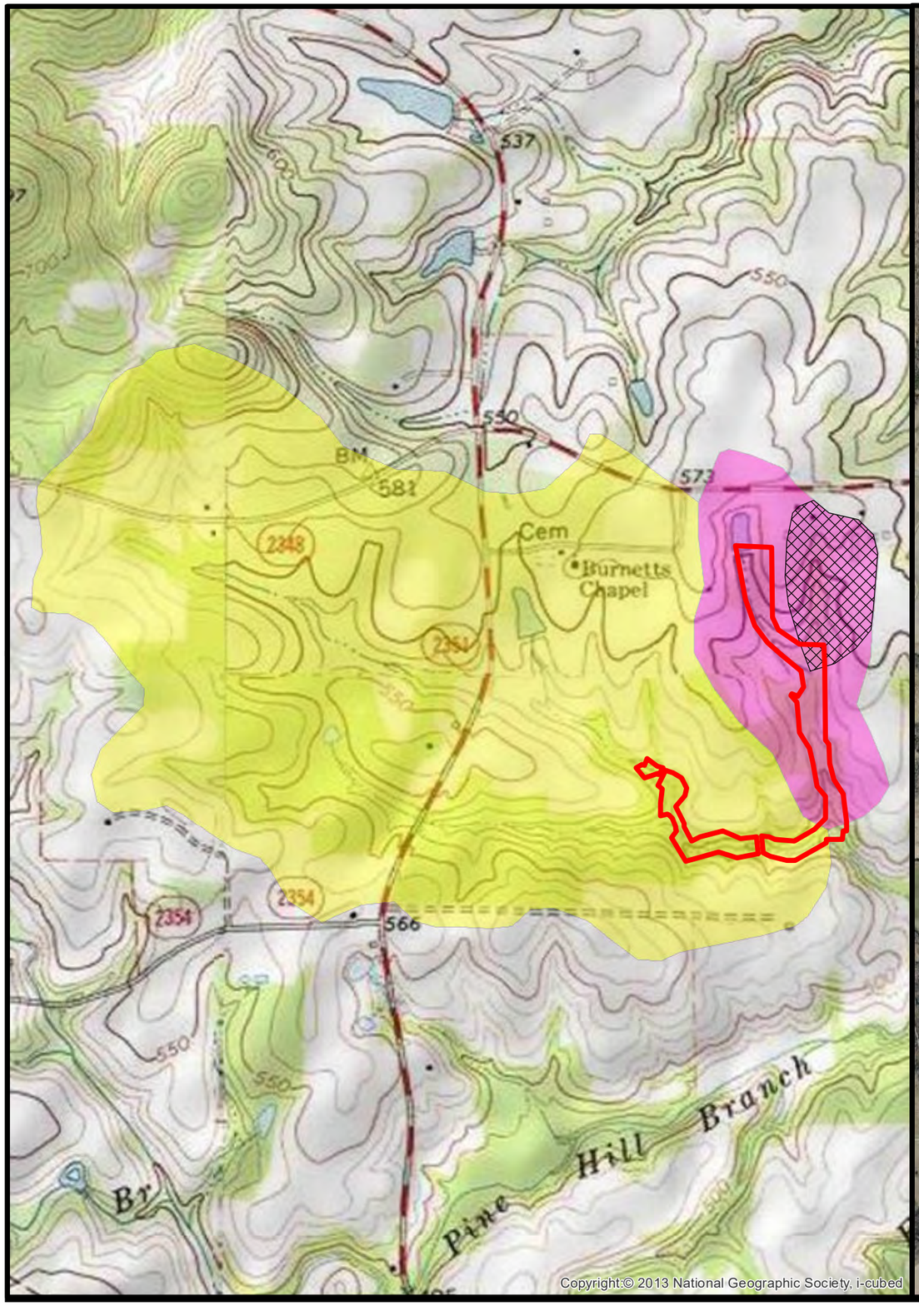
Date: NOV 2017

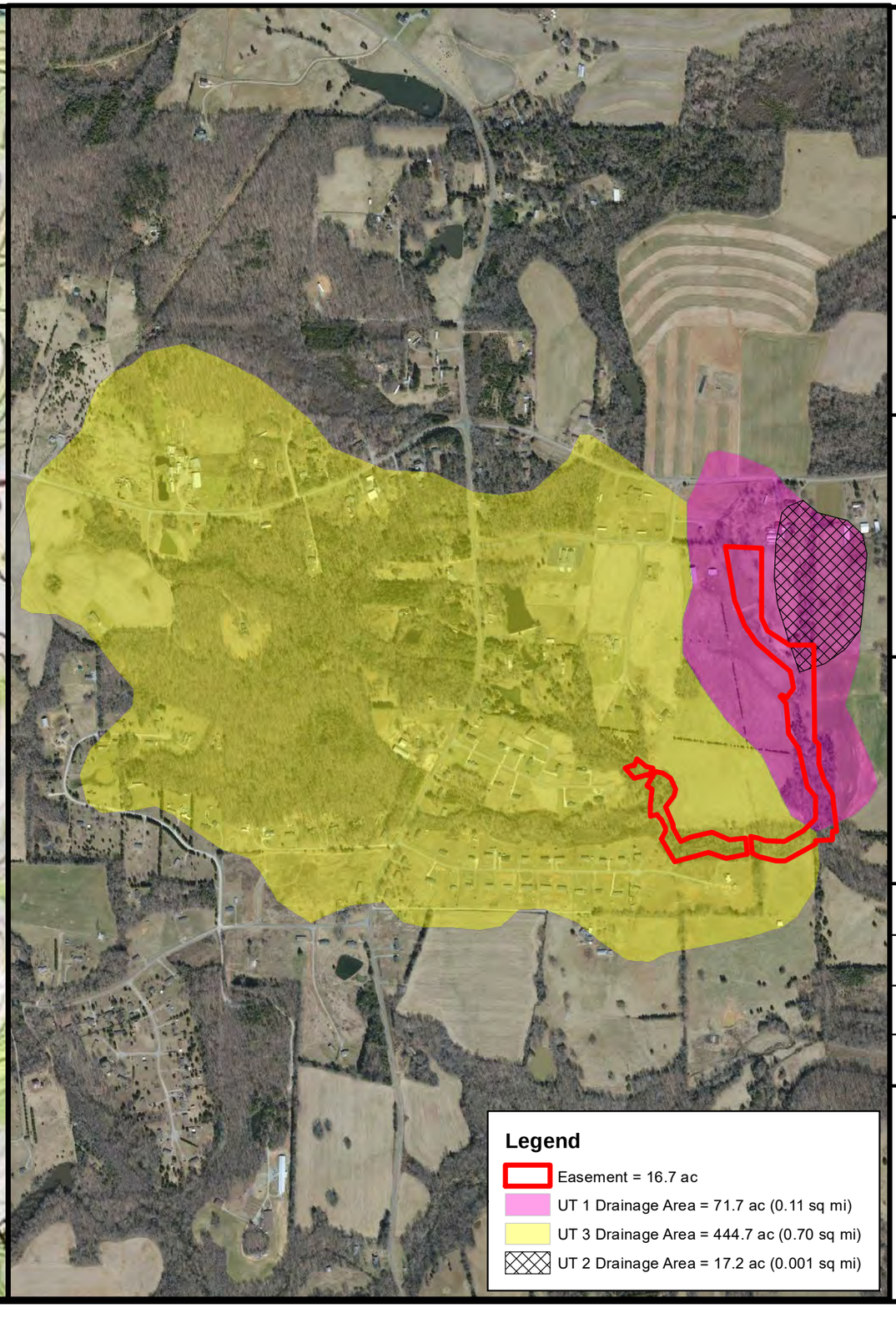
Scale: 1:375,000

Project No.: 17-009

FIGURE

2





Axiom Environmental, Inc.

Prepared for:

RESTORATION SYSTEMS | LLC

Project:

MAJOR HILL STREAM AND WETLAND MITIGATION SITE

Alamance County, NC

Title:

TOPOGRAPHY AND DRAINAGE AREA

Drawn by: KRJ

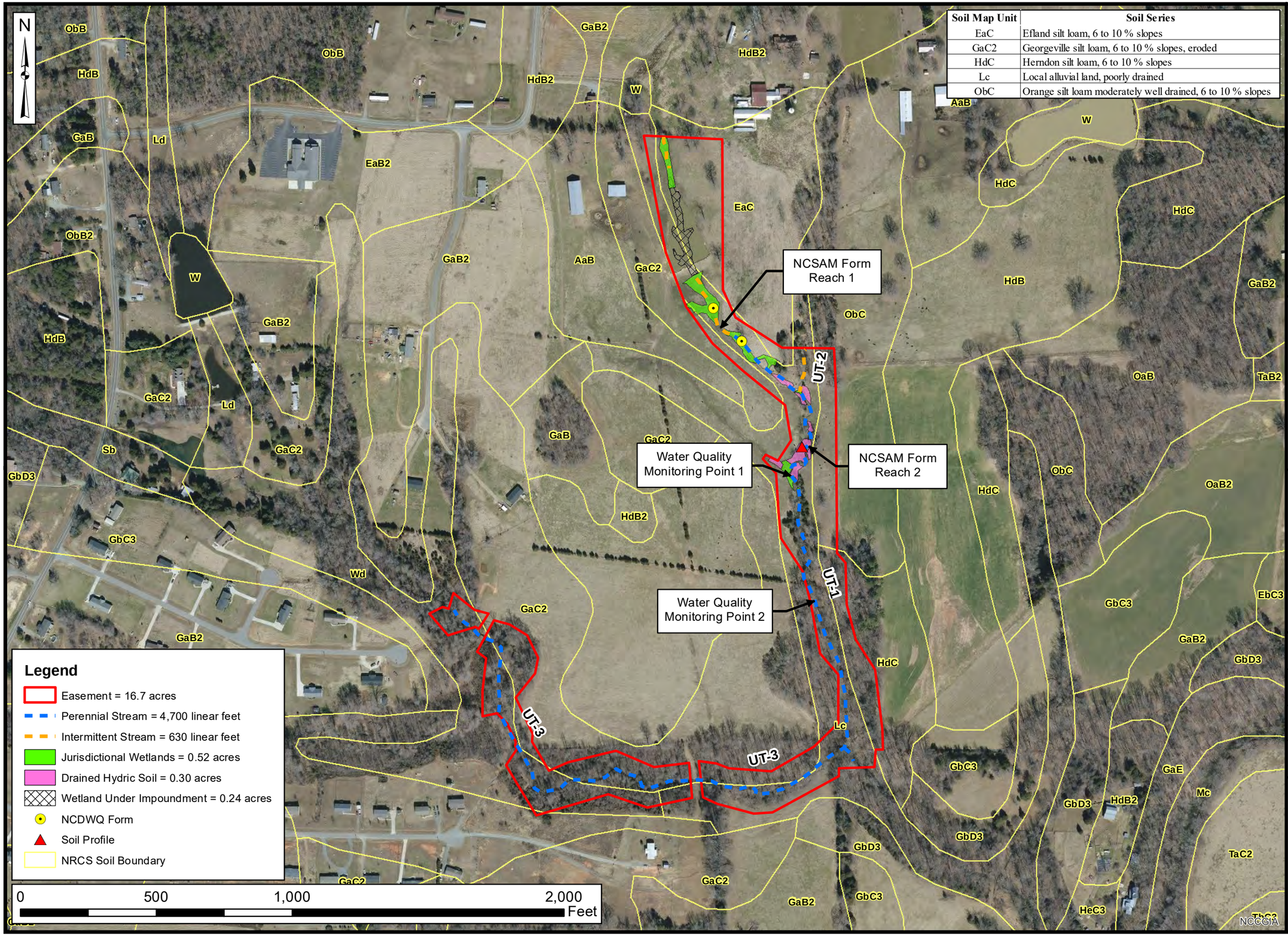
Date: NOV 2017

Scale: 1:12,000

Project No.: 17-009

FIGURE

3



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Prepared for:

RESTORATION SYSTEMS | LLC

Project:

MAJOR HILL STREAM AND WETLAND MITIGATION SITE

Alamance County, NC

Title:

EXISTING CONDITIONS

Drawn by: KRJ

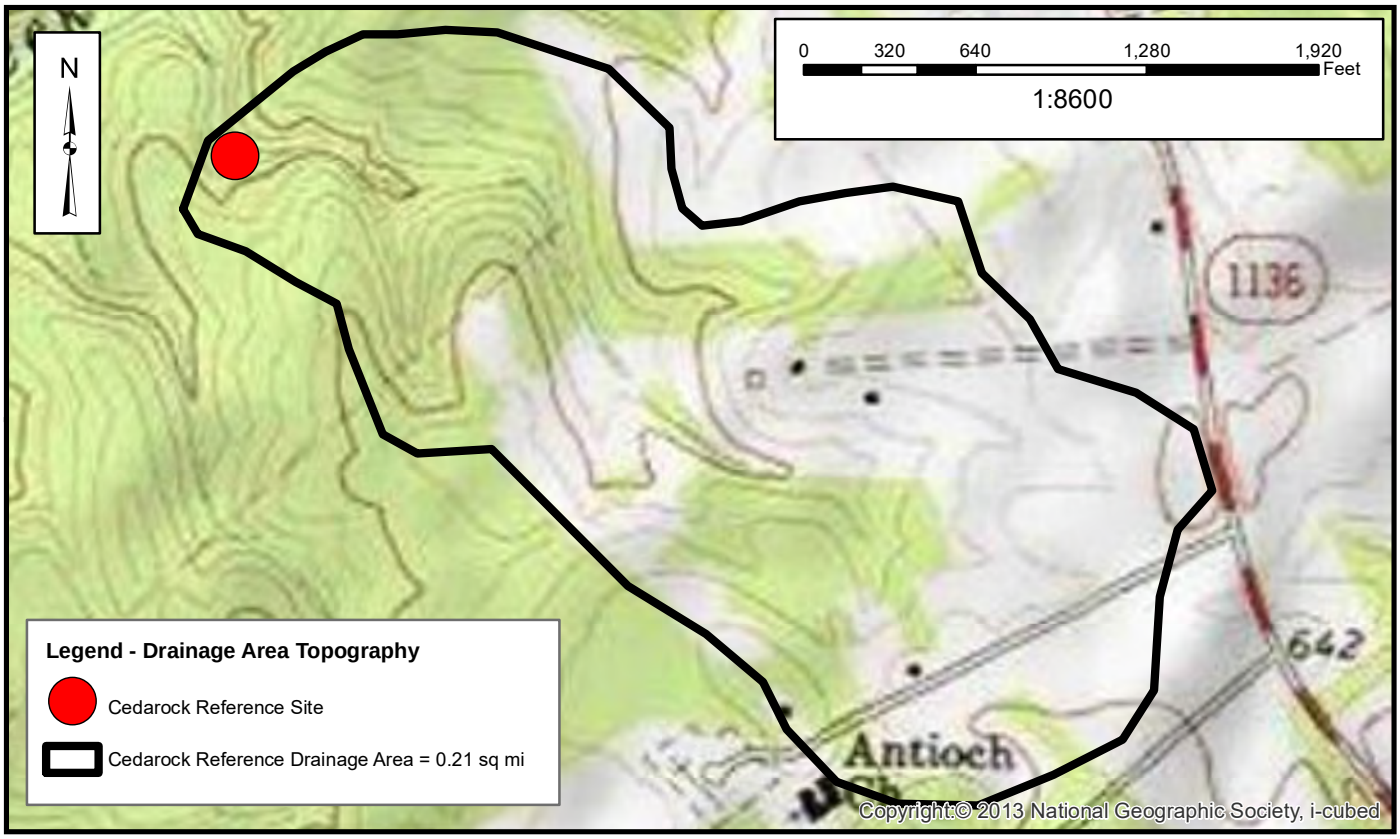
Date: NOV 2017

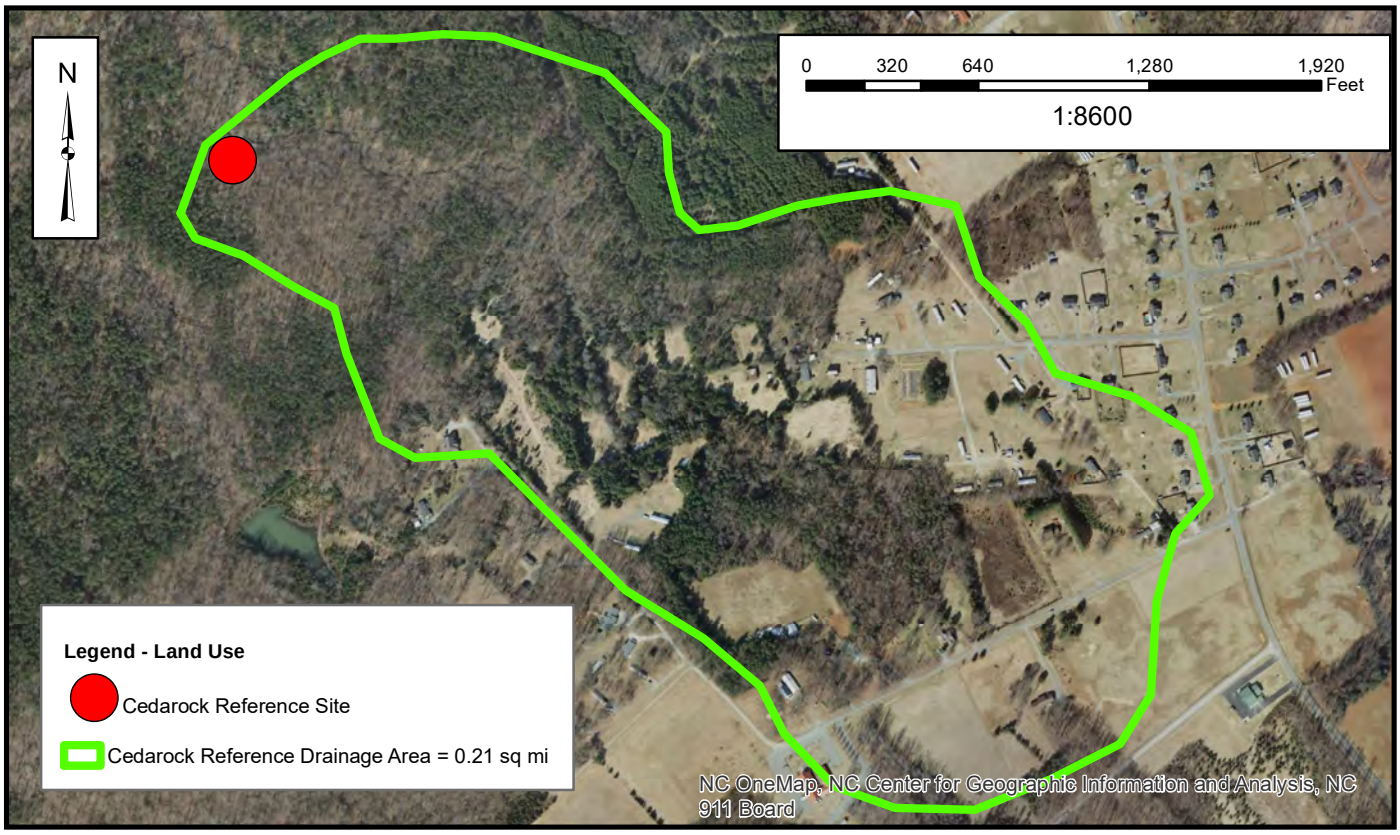
Scale: 1:4000

Project No.: 17-009

FIGURE

4



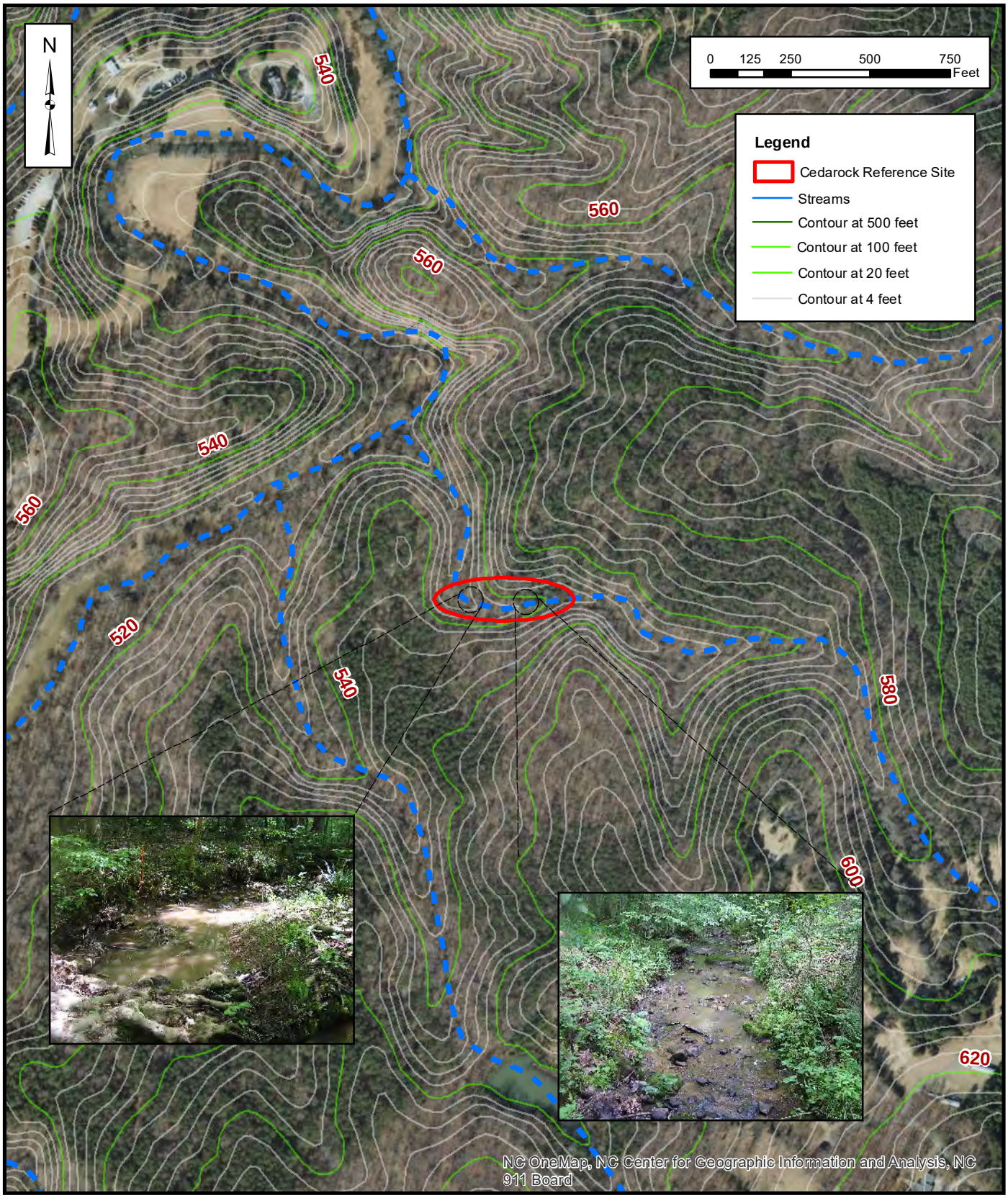


Axiom Environmental, Inc.
Axiom Environmental
218 Snow Avenue
Raleigh, NC 27603
(919) 215-1693

CEDAROCK REFERENCE DRAINAGE AREA
MAJOR HILL STREAM AND WETLAND
MITIGATION SITE
Alamance County, North Carolina

Dwn. by: WGL
Date: Mar 2014
Project: 17-009

FIGURE
5A

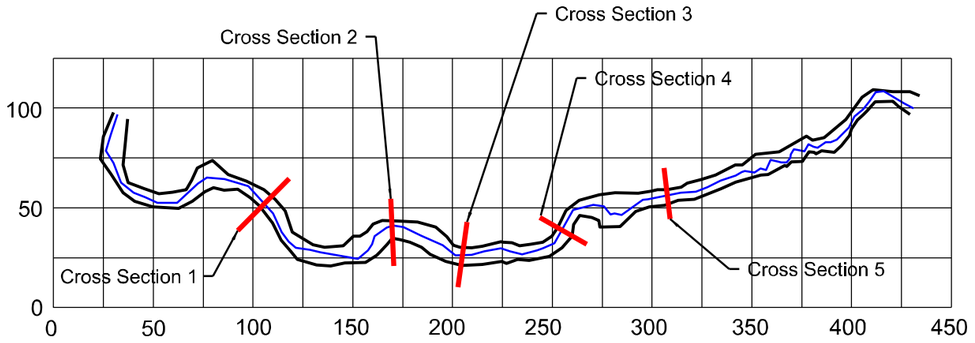


Axiom Environmental
218 Snow Avenue
Raleigh, NC 27603
(919) 215-1693
Axiom Environmental, Inc.

EXISTING CONDITIONS
CEDAROCK REFERENCE REACH
MAJOR HILL STREAM AND WETLAND
MITIGATION SITE
Alamance County, North Carolina

Dwn. by.	WGL
Date:	Mar 2014
Project:	17-009

FIGURE
5B

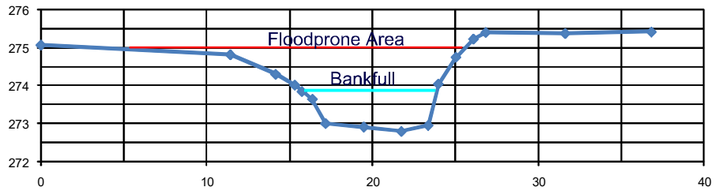


Reference Pattern

Lp-p = 37 (25 - 68) ft
Lm = 68 (44 - 116) ft
Wbelt = 23 (20 - 38) ft
Rc = 16 (11 - 27) ft
Lp-p/Wbkf = 4.6 (3.1 - 8.4)
Lm/Wbkf = 8.4 (5.5 - 14.3)
Wbelt/Wbkf = 2.8 (2.4 - 4.7)
Rc/Wbkf = 2.0 (1.4 - 3.3)
SIN = 1.20

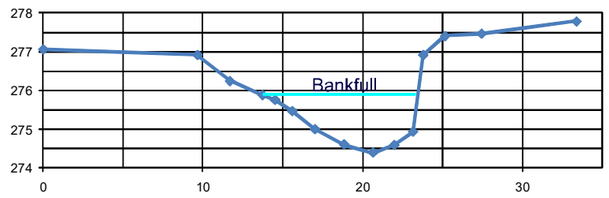
Pattern Legend

- Top of Bank
- Thalweg
- Cross Section



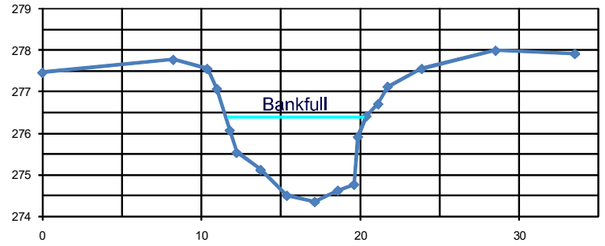
Cross Section 1 - Riffle

Abkf = 6.6 ft
Dave = 0.8 ft
Wbkf = 8.1 ft
Dmax = 1.1 ft
Bank Height = 2.0 ft
Bank Height Ratio = 1.8
W/D = 10.0
FPA = 18
ENT = 2.2
Stream Type = E



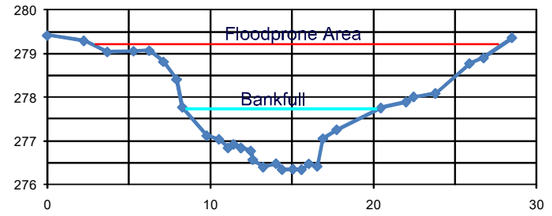
Cross Section 2 - Pool

Abkf = 9.0 ft
Wbkf = 9.7 ft
Dmax = 1.5 ft



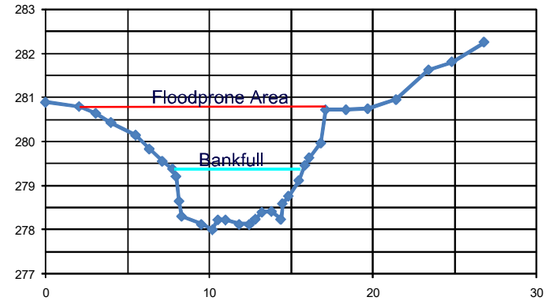
Cross Section 3 - Pool

Abkf = 13.1 ft
Wbkf = 8.9 ft
Dmax = 2.1 ft



Cross Section 4 - Riffle

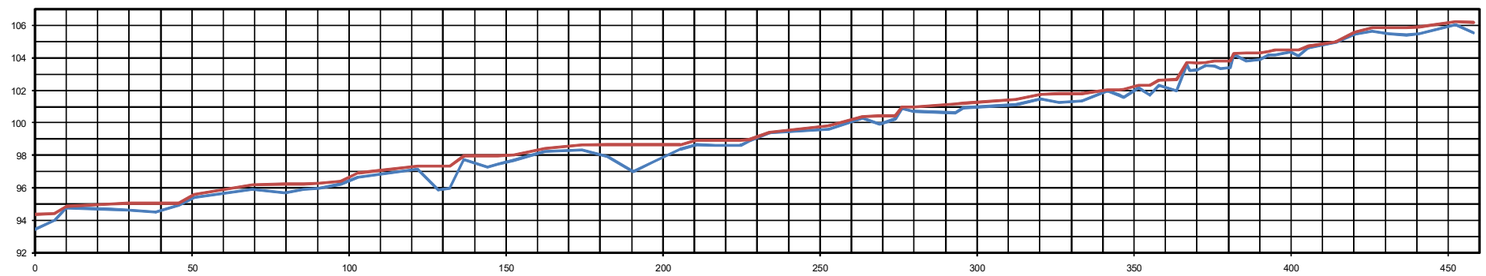
Abkf = 9.6 ft
Dave = 0.8 ft
Wbkf = 12.1 ft
Dmax = 1.4 ft
Bank Height = 1.4 ft
Bank Height Ratio = 1.0
W/D = 15.2
FPA = 25
ENT = 2.1
Stream Type = Eb



Cross Section 5 - Riffle

Abkf = 8.0 ft
Dave = 1.0 ft
Wbkf = 8.0 ft
Dmax = 1.4 ft
Bank Height = 1.4 ft
Bank Height Ratio = 1.0
W/D = 8.0
FPA = 15
ENT = 1.9
Stream Type = Eb

Cedarock Reference Reach



Profile (Reference Reach)

Save = 0.0258 rise/run
Svalley = 0.0310 rise/run
Sriffle = 0.0316 (0 - 0.0576) rise/run
Spool = 0.0007 (0 - 0.018) rise/run
Srun = 0.0353 (0 - 0.3565) rise/run
Sglide = 0.0029 (0 - 0.0431) rise/run

- Water Surface
- Channel Bed

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NOTES/REVISIONS

Project:

Major Hill Stream and Wetland Mitigation Site

Alamance County North Carolina

Title:

Cedarock Reference Reach Dimension, Pattern, and Profile

Scale: NA

Date: August 2017

Project No.: 17-009

FIGURE NO.

5C

6A

6B

UT 2
End Enhancement II
Start Restoration
Sta 01+68
Elev 520.44

UT 2
End Restoration
Sta 02+11
Elev 520.42

UT 1
End Restoration
Start Enhancement II
Sta 16+99
Elev 510.75

UT 1
End Enhancement II
Sta 27+59

UT 3
End Enhancement II
Sta 21+97

UT 2
Start Enhancement II
Sta 00+00
Elev 522.86

531.36 ISS

538.22 ISS

532.55 ISS

536.13 ISS

556.68 ISS

40 ft Removed
from Credit due to
Crossing.

UT 1
Start Restoration
Sta 00+00
Elev. 546.29

Remove Existing Dam
to the Floodplain Passage
of Floodwaters.

80 ft Removed
from Credit due to
Crossing and
Drainage Easement.

Drainage Easement

Drainage Easement

144 ft Removed
from Credit due to
Lack of Control
of South Bank and
Drainage Easement.

UT 3
Start Enhancement II
Sta 00+00

0 200 400
SCALE IN FEET

LEGEND

- Easement = 16.7 ac
- Design Stream Channel
- Cross Vane (Log)
- Vane Arm (Log)
- Drop Structure
- Marsh Treatment Area
- Piped Crossing or Bottomless Culvert
- Control Point
- Wetland Restoration = 0.54 ac
- Wetland Enhancement = 0.44 ac

Note: All Fencing within the Proposed Easement will be Removed.

Axiom Environmental, Inc.

RESTORATION SYSTEMS | LLC

NOTES/REVISIONS

Project:

Major Hill
Stream and Wetland
Mitigation Site

Alamance County
North Carolina

Title:

RESTORATION
PLAN

Scale: AS SHOWN

Date: August 2017

Project No.: 17-009

FIGURE NO.

6

6A

6B

UT 2
End Enhancement II
Start Restoration
Sta 01+68
Elev 520.44

UT 1
End Restoration
Start Enhancement II
Sta 16+99
Elev 510.75

UT 2
Start Enhancement II
Sta 00+00
Elev 522.86

UT 2
End Restoration
Sta 02+11
Elev 520.42

UT 1
Start Restoration
Sta 00+00
Elev. 546.29

Remove Existing Dam
to Allow Passage
of Floodwaters.

Note: All Fencing within the Proposed Easement will be Removed.

LEGEND

- Easement = 16.7 ac
- Design Stream Channel
- Major Topographic Line
- Minor Topographic Line
- Cross Vane (Log)
- Vane Arm (Log)
- Drop Structure
- Marsh Treatment Area
- Piped Crossing or Bottomless Culvert
- Control Point
- Wetland Restoration = 0.54 ac
- Wetland Enhancement = 0.44 ac

0 200 400

SCALE IN FEET

Axiom Environmental, Inc.

RESTORATION SYSTEMS | LLC

NOTES/REVISIONS

Project:

Major Hill
Stream and Wetland
Mitigation Site

Alamance County
North Carolina

Title:

RESTORATION
PLAN

Scale: AS SHOWN

Date: August 2017

Project No.: 17-009

FIGURE NO.

6A

6A

6B

LEGEND

- Easement = 16.7 ac
- Design Stream Channel
- Cross Vane (Log)
- Vane Arm (Log)
- Drop Structure
- Marsh Treatment Area
- Piped Crossing or Bottomless Culvert
- Control Point
- Wetland Restoration = 0.54 ac
- Wetland Enhancement = 0.44 ac

538.22
ISS

532.55
ISS

UT 1
End Restoration
Start Enhancement II
Sta 16+99
Elev 510.75

UT 3
Start Enhancement II
Sta 00+00

Drainage Easement

80 ft Removed
from Credit due to
Crossing and
Drainage Easement

UT 1
End Enhancement II
Sta 27+59

144 ft Removed
from Credit due to
Lack of Control
of South Bank and
Drainage Easement.

UT 3
End Enhancement II
Sta 21+97

Drainage Easement

40 ft Removed
from Credit due to
Crossing.

Note: All Fencing within the Proposed Easement will be Removed.

0 200 400

SCALE IN FEET

RESTORATION SYSTEMS | LLC

NOTES/REVISIONS

Project:

Major Hill
Stream and Wetland
Mitigation Site

Alamance County
North Carolina

Title:

RESTORATION
PLAN

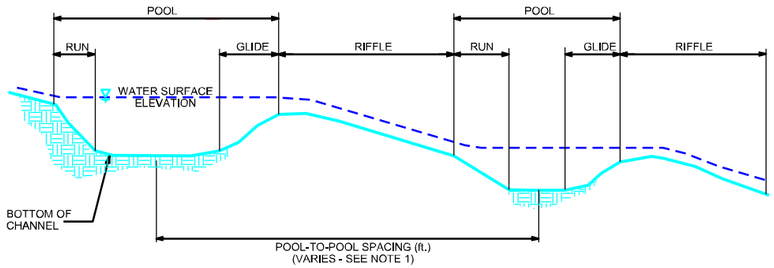
Scale:
AS SHOWN

Date:
August 2017

Project No.:
17-009

FIGURE NO.

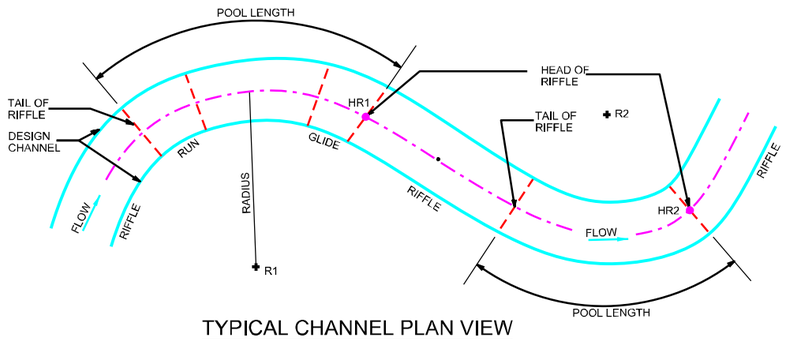
6B



TYPICAL CHANNEL PROFILE

NOTES:

1. POOL-TO-POOL SPACING IS MEASURED FROM CENTER OF POOL BEND TO CENTER OF POOL BEND.

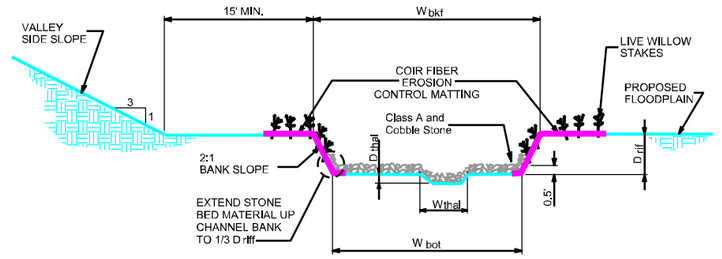


TYPICAL CHANNEL PLAN VIEW

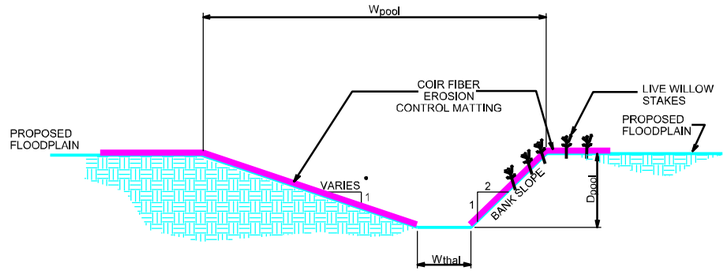
CHANNEL PLAN VIEW NOTES:

1. THE CONTRACTOR SHALL LAYOUT THE CHANNEL ALIGNMENT BY LOCATING THE RADII AND SCRIBING THE CENTER LINE FOR EACH POOL BEND. THE CONNECTING TANGENT SECTIONS SHALL COMPLETE THE LAYOUT OF THE CHANNEL.

2. FIELD ADJUSTMENTS OF THE ALIGNMENT MAY BE REQUIRED TO SAVE TREES OR AVOID OBSTACLES. THE STAKE-OUT SHALL BE APPROVED BY THE CONSTRUCTION MANAGER BEFORE CONSTRUCTION OF THE CHANNEL.



TYPICAL RIFFLE CROSS-SECTION



• MAX. 1:1 SLOPE

TYPICAL POOL CROSS-SECTION

CHANNEL CONSTRUCTION NOTES:

1. MATERIAL EXCAVATED FROM CHANNEL AND FLOODPLAIN SHALL BE USED TO BACKFILL EXISTING CHANNEL.

2. BANK PROTECTION SHALL CONSIST OF NATURAL COIR FIBER MATTING.

3. THE CONTRACTOR SHALL SUPPLY BED MATERIAL FOR THE ENTIRE BED LENGTH OF EACH RIFFLE SECTION. THE BED MATERIAL SHALL CONSIST OF A MIX OF CLASS A AND SMALLER STONE.

CROSS-SECTION DIMENSIONS

REACH	Wbkf (ft.)	Wbot (ft.)	Driff (ft.)	Dthal (ft.)	Dpool (ft.)	Wpool (ft.)	Wthal (ft.)
UT 1 (Upstream)	6.0	3.6	0.5	0.1	0.8	6.6	1.0
UT 1 (Downstream)	7.3	4.5	0.6	0.1	1.0	8.0	1.0

Axiom Environmental, Inc.

RESTORATION SYSTEMS | LLC

NOTES/REVISIONS

Project:

Major Hill Stream and Wetland Mitigation Site

Alamance County North Carolina

Title:

PROPOSED DIMENSION, PATTERN, AND PROFILE

Scale: NA

Date: August 2017

Project No.: 17-009

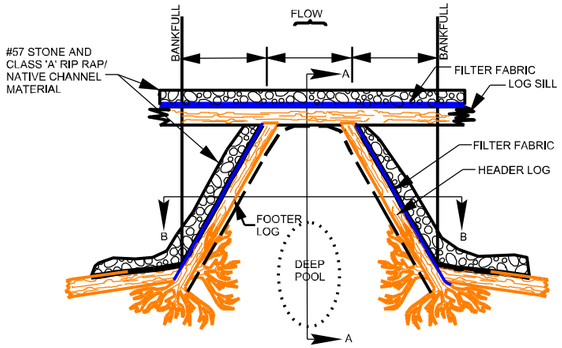
FIGURE NO.

7

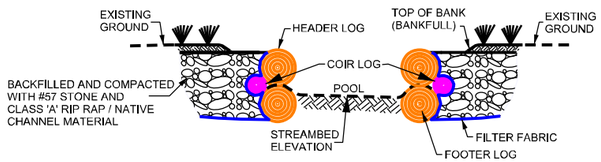
LOG CROSS VANE

SCALE:NTS

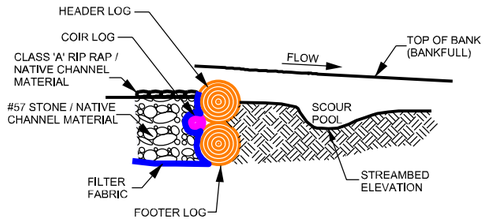
PLAN VIEW



NOTES:
1. HEADER AND FOOTER LOGS SHALL BE A MINIMUM OF 18" DIAMETER AND SHALL BE A HARDWOOD SPECIES, (FOOTER LOG MAY BE SUBSTITUTED WITH PINE)
2. A DOUBLE FOOTER LOG MAY BE REQUIRED IN SAND BED STREAMS.
3. ALL STONES ARE TO BE STRUCTURE STONES.
4. FILTER FABRIC SHALL BE PLACED ON THE UPSTREAM SIDE OF THE STRUCTURE TO PREVENT WASHOUT OF SEDIMENT THROUGH LOG GAPS. FILTER FABRIC SHALL EXTEND FROM THE BOTTOM OF THE FOOTER TO THE FINISHED GRADE ELEVATION AND SHALL BE PLACED THE ENTIRE LENGTH OF THE STRUCTURE.
5. PERPENDICULAR ROOTWAD LOGS ARE REQUIRED IF THE LOG VANE ARM DOES NOT HAVE A ROOTBALL TO TIE INTO THE BANK.



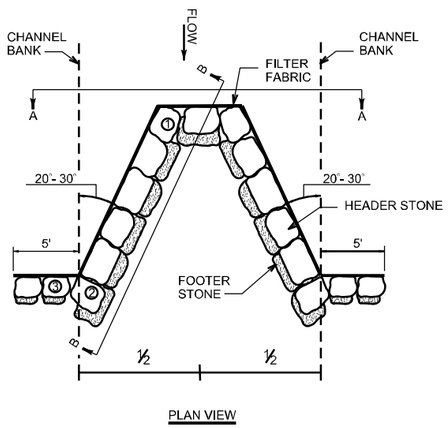
SECTION B-B



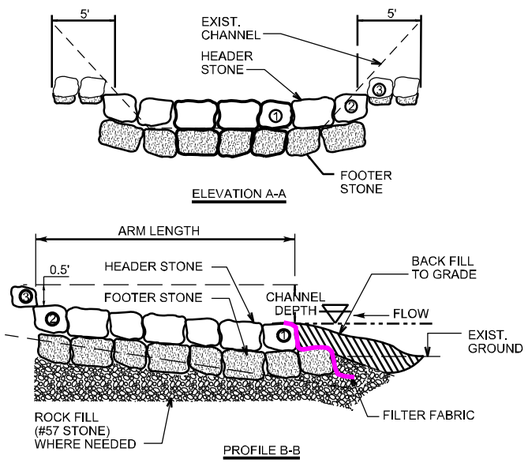
SECTION A-A

REACH	ARM LENGTH (FT.)	CHANNEL DEPTH (FT.)
UT 1 (Upstream)	6	0.5 - 0.7
UT 1 (Downstream)	7	0.6 - 0.8

NOTE:
HEADER AND FOOTER STONES ARE LARGE, ANGULAR BOULDERS MEASURING A MINIMUM OF 24" ALONG THE SHORTEST DIMENSION.

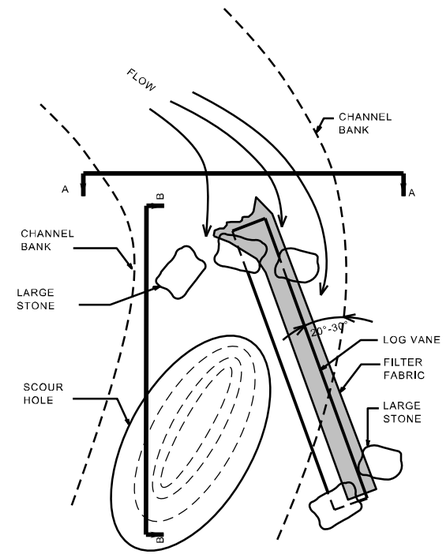


PLAN VIEW



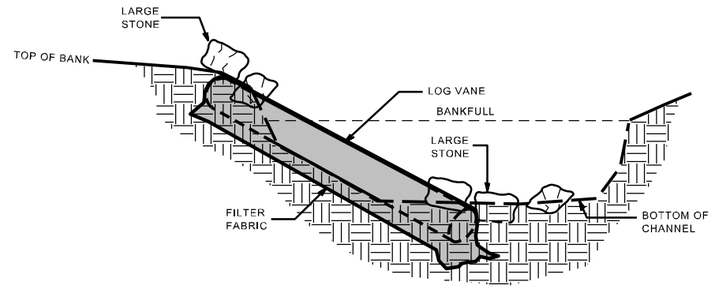
PROFILE B-B

TYPICAL CROSS-VANE

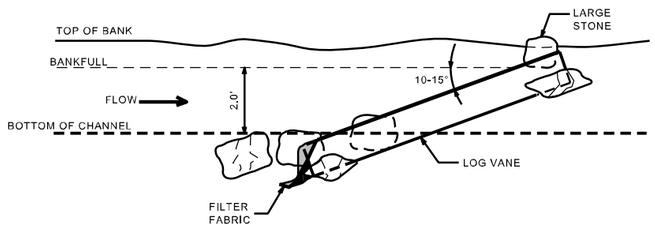


NOTE:
FILTER FABRIC TOED IN AND DRAPED ON UPSTREAM SIDE OF LOG VANE PRIOR TO BACKFILL.

PLAN VIEW
SCALE: N.T.S.



CROSS-SECTION A-A
SCALE: N.T.S.



PROFILE B-B
SCALE: N.T.S.

NOTE:
FILTER FABRIC TOED IN AND DRAPED ON UPSTREAM SIDE OF LOG VANE PRIOR TO BACKFILL.

TYPICAL LOG VANE

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RESTORATION SYSTEMS | LLC

NOTES/REVISIONS

Project:

Major Hill Stream and Wetland Mitigation Site

Alamance County North Carolina

Title:

TYPICAL STRUCTURE DETAILS

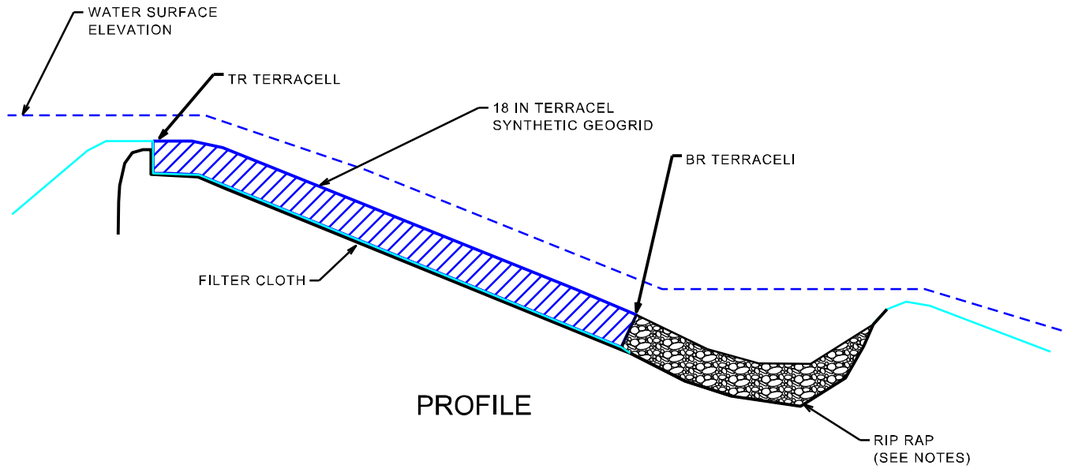
Scale: NO SCALE

Date: August 2017

Project No.: 17-009

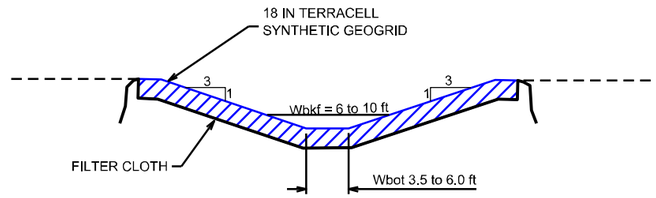
FIGURE NO.

8A



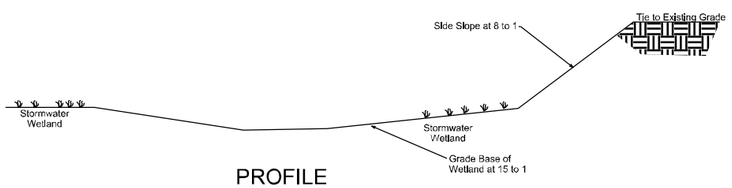
PROFILE

TERRACELL STRUCTURE NOTES:
1. CONTRACTOR WILL INSTALL 18-INCH TERRACELL SYNTHETIC GEOGRID AS PER THE MANUFACTURER'S SPECIFICATIONS.
2. AT BOTTOM RIFFLE DOWNSTREAM FROM TERRACELL STRUCTURE THE POOL WILL BE ARMORED WITH EROSION CONTROL FABRIC AND CLASS 1 RIP RAP OR OTHER SUITABLE MATERIAL.

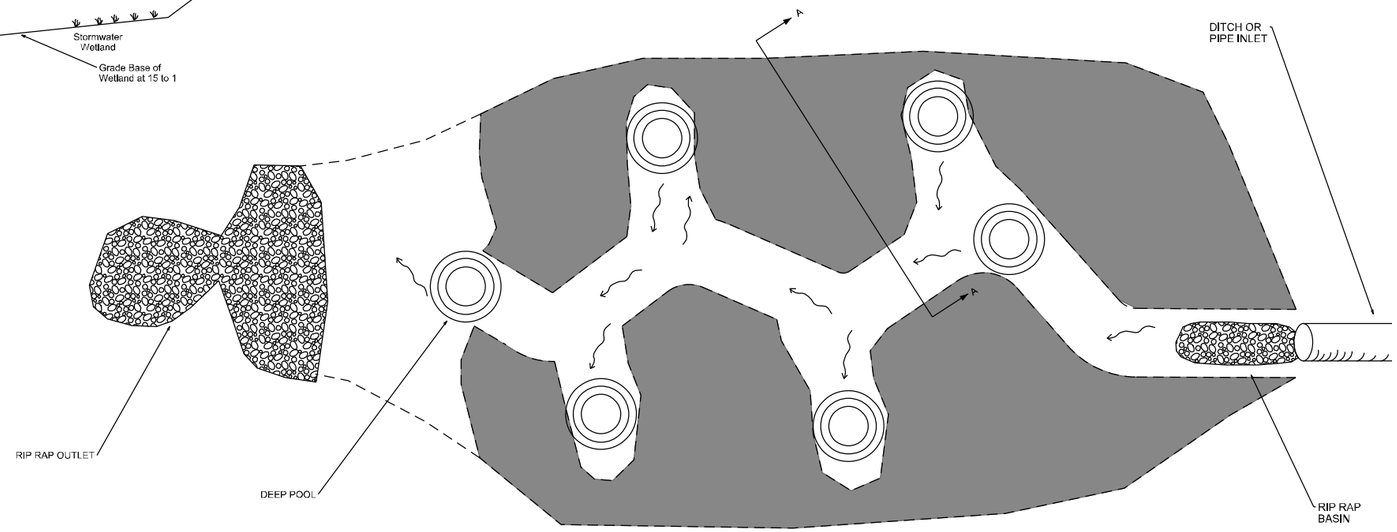


CROSS-SECTION

TERRACELL STRUCTURE NOTES:
1. CONTRACTOR WILL INSTALL 18-INCH TERRACELL SYNTHETIC GEOGRID AS PER THE MANUFACTURER'S SPECIFICATIONS.
2. ONCE THE SYNTHETIC GEOGRID HAS BEEN INSTALLED, GEOCELLS WILL BE BACKFILLED WITH GRAVEL AND TOPSOIL AND PLANTED WITH EROSION CONTROL GRASSES AND WILLOW STAKES (*SALIX NIGRA*).



PROFILE
SECTION A-A



MARSH TREATMENT AREA

Axiom Environmental, Inc.

RESTORATION SYSTEMS | LLC

NOTES/REVISIONS

Project:

Major Hill Stream and Wetland Mitigation Site

Alamance County North Carolina

Title:

TYPICAL STRUCTURE DETAILS

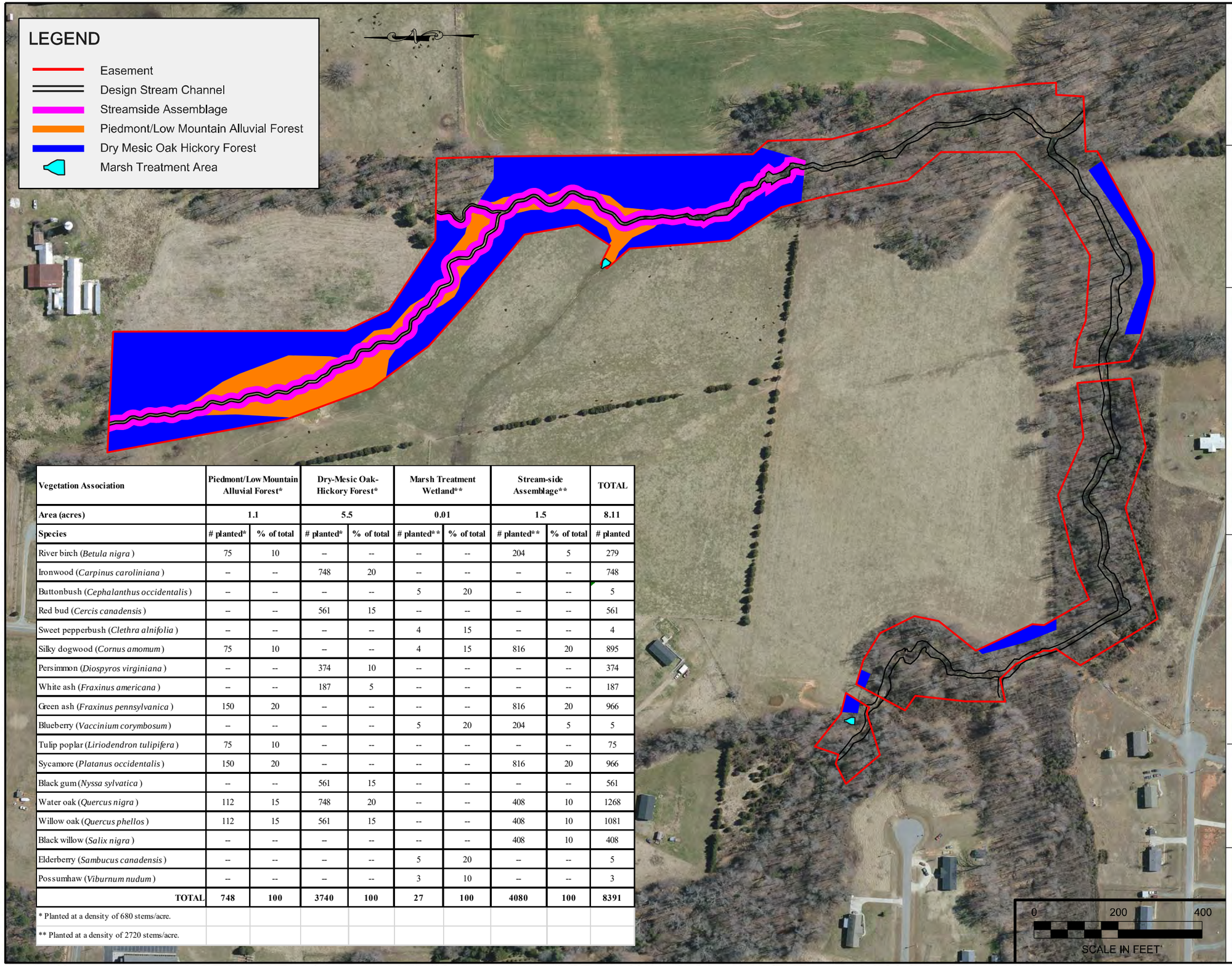
Scale: NO SCALE

Date: August 2017

Project No.: 17-009

FIGURE NO.

8B



Vegetation Association	Piedmont/Low Mountain Alluvial Forest*		Dry-Mesic Oak-Hickory Forest*		Marsh Treatment Wetland**		Stream-side Assemblage**		TOTAL
Area (acres)	1.1		5.5		0.01		1.5		8.11
Species	# planted*	% of total	# planted*	% of total	# planted**	% of total	# planted**	% of total	# planted
River birch (*Betula nigra*)	75	10	--	--	--	--	204	5	279
Ironwood (*Carpinus caroliniana*)	--	--	748	20	--	--	--	--	748
Buttonbush (*Cephalanthus occidentalis*)	--	--	--	--	5	20	--	--	5
Red bud (*Cercis canadensis*)	--	--	561	15	--	--	--	--	561
Sweet pepperbush (*Clethra alnifolia*)	--	--	--	--	4	15	--	--	4
Silky dogwood (*Cornus amomum*)	75	10	--	--	4	15	816	20	895
Persimmon (*Diospyros virginiana*)	--	--	374	10	--	--	--	--	374
White ash (*Fraxinus americana*)	--	--	187	5	--	--	--	--	187
Green ash (*Fraxinus pennsylvanica*)	150	20	--	--	--	--	816	20	966
Blueberry (*Vaccinium corymbosum*)	--	--	--	--	5	20	204	5	5
Tulip poplar (*Liriodendron tulipifera*)	75	10	--	--	--	--	--	--	75
Sycamore (*Platanus occidentalis*)	150	20	--	--	--	--	816	20	966
Black gum (*Nyssa sylvatica*)	--	--	561	15	--	--	--	--	561
Water oak (*Quercus nigra*)	112	15	748	20	--	--	408	10	1268
Willow oak (*Quercus phellos*)	112	15	561	15	--	--	408	10	1081
Black willow (*Salix nigra*)	--	--	--	--	--	--	408	10	408
Elderberry (*Sambucus canadensis*)	--	--	--	--	5	20	--	--	5
Possumhaw (*Viburnum nudum*)	--	--	--	--	3	10	--	--	3
TOTAL	748	100	3740	100	27	100	4080	100	8391

* Planted at a density of 680 stems/acre.

** Planted at a density of 2720 stems/acre.

Axiom Environmental, Inc.

RESTORATION SYSTEMS | LLC

NOTES/REVISIONS

Project:

Major Hill Stream and Wetland Mitigation Site

Alamance County North Carolina

Title:

PLANTING PLAN

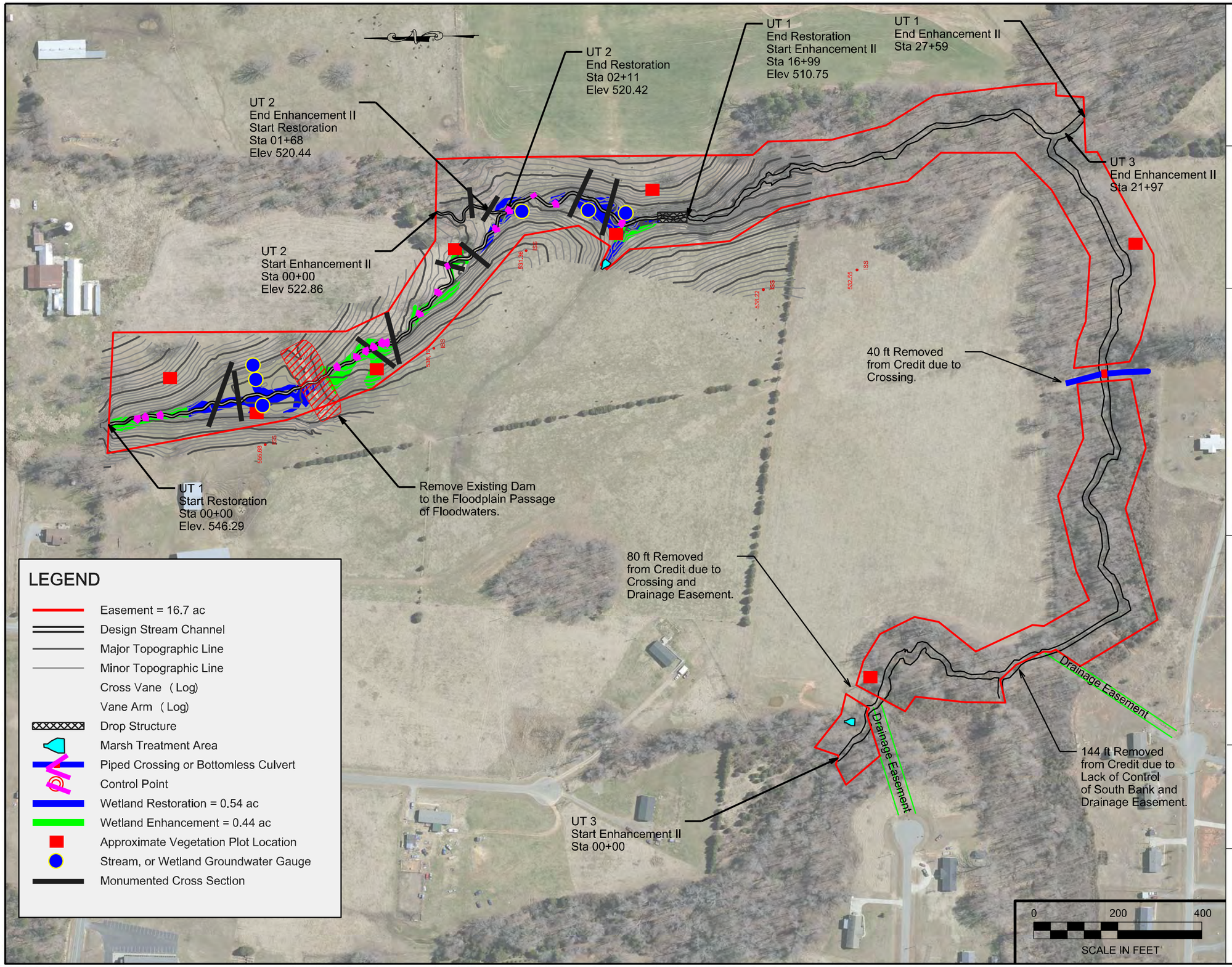
Scale: AS SHOWN

Date: August 2017

Project No.: 17-009

FIGURE NO.

9



LEGEND

- Easement = 16.7 ac
- Design Stream Channel
- Major Topographic Line
- Minor Topographic Line
- Cross Vane (Log)
- Vane Arm (Log)
- Drop Structure
- Marsh Treatment Area
- Piped Crossing or Bottomless Culvert
- Control Point
- Wetland Restoration = 0.54 ac
- Wetland Enhancement = 0.44 ac
- Approximate Vegetation Plot Location
- Stream, or Wetland Groundwater Gauge
- Monumented Cross Section

Axiom Environmental, Inc.

RESTORATION SYSTEMS LLC

NOTES/REVISIONS

Project:

Major Hill
Stream and Wetland
Mitigation Site

Alamance County
North Carolina

Title:

MONITORING
PLAN

Scale:	FIGURE NO.
AS SHOWN	10
Date: August 2017	
Project No.: 17-009	

Appendix B
Existing Stream Data

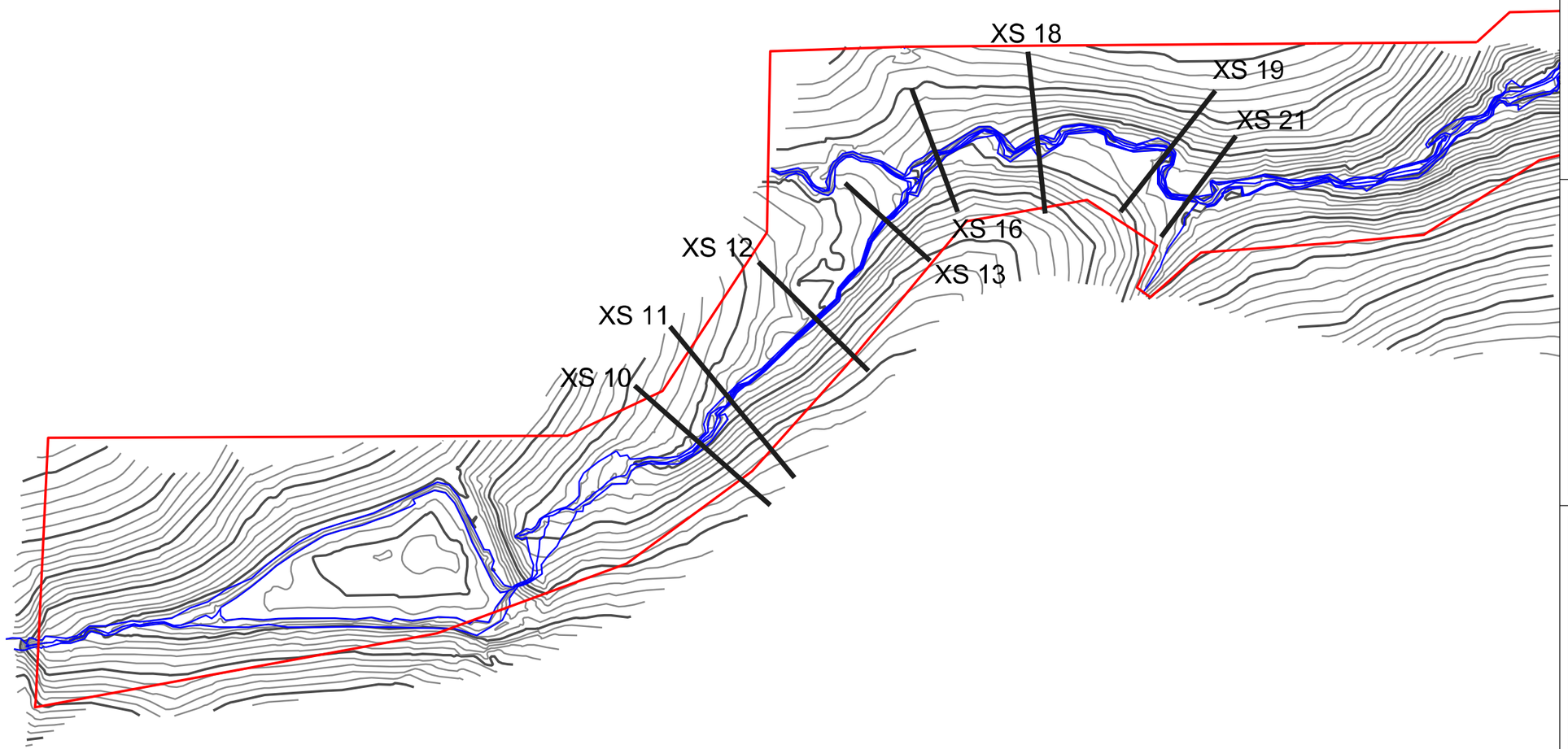
Table B1. Major Hill Morphological Stream Characteristics
Figure B1. Cross-section Locations
Existing Stream Cross-section Data
Baseline Water Quality Data
BEHI & NBS
NC SAM Forms
NC WAM Forms
NCDWQ Stream Forms

Table B1. Major Hill Morphological Stream Characteristics

Variables	REFERENCE - CEDAROCK PARK	REFERENCE - CAUSEY* FARM	Existing UT 1 (Upstream)	Proposed	Existing UT 1 (Downstream)	PROPOSED
Stream Type	Eb 4	E 5	Cg 5	E/C 4	Cg 5	E/C 4
Drainage Area (mi^2)	0.21	0.63	0.05	0.05	0.09	0.09
Bankfull Discharge (cfs)	28.8	60.6	9.5	9.5	14.2	14.2
Dimension Variables						
Bankfull Cross-Sectional Area (A_{bkf})	8.0	14.7	2.6	2.6	3.8	3.8
Existing Cross-Sectional Area at TOB ($A_{existing}$)	8.0	14.7	2.6 - 7.3	2.6	7.8 - 25.7	3.8
Bankfull Width (W_{bkf})	Mean: 8.1 Range: 8.0 - 12.1	Mean: 11.0 Range: 10.7 - 11.3	Mean: 5.6 Range: 3.8 to 8.1	Mean: 6.0 Range: 5.6 to 6.4	Mean: 6.7 Range: 4.9 to 8.7	Mean: 7.3 Range: 6.8 to 7.8
Bankfull Mean Depth (D_{bkf})	Mean: 0.8 Range: 0.8 - 1.0	Mean: 1.4 Range: 1.3 - 1.4	Mean: 0.5 Range: 0.3 to 0.7	Mean: 0.4 Range: 0.4 to 0.5	Mean: 0.6 Range: 0.4 to 0.8	Mean: 0.5 Range: 0.5 to 0.6
Bankfull Maximum Depth (D_{max})	Mean: 1.4 Range: 1.1 - 1.4	Mean: 2.0 Range: 1.9 - 2.0	Mean: 0.9 Range: 0.7 to 1.3	Mean: 0.6 Range: 0.5 to 0.7	Mean: 0.9 Range: 0.7 to 1.2	Mean: 0.7 Range: 0.6 to 0.8
Pool Width (W_{pool})	Mean: 9.3 Range: 8.9 - 9.7	Mean: 10.5 Range:	No distinct repetitive pattern of riffles and pools due to staightening activities	Mean: 6.6 Range: 6.0 to 8.4	No distinct repetitive pattern of riffles and pools due to staightening activities	Mean: 8.0 Range: 7.3 to 10.2
Maximum Pool Depth (D_{pool})	Mean: 1.8 Range: 1.5 - 2.1	Mean: 2.7 Range:		Mean: 0.8 Range: 0.6 to 0.9		Mean: 1.0 Range: 0.7 to 1.1
Width of Floodprone Area (W_{fpa})	Mean: 18 Range: 15 - 25	Mean: 131 Range: 122 - 140	Mean: 27 Range: 11 to 48	Mean: 40 Range: 20 to 60	Mean: 14 Range: 9 to 21	Mean: 50 Range: 25 to 75
Dimension Ratios						
Entrenchment Ratio (W_{fpa}/W_{bkf})	Mean: 2.1 Range: 1.9 - 2.2	Mean: 12 Range: 11 - 13	Mean: 5.8 Range: 1.4 to 12.6	Mean: 6.6 Range: 3.6 to 9.3	Mean: 2.2 Range: 1.4 to 4.3	Mean: 6.9 Range: 3.7 to 9.6
Width / Depth Ratio (W_{bkf}/D_{bkf})	Mean: 10.1 Range: 8.0 - 15.1	Mean: 9 Range: 8 - 9	Mean: 13.4 Range: 5.4 to 27.0	Mean: 14.0 Range: 12.0 to 16.0	Mean: 13.1 Range: 6.1 to 21.8	Mean: 14.0 Range: 12.0 to 16.0
Max. D_{bkf} / D_{bkf} Ratio	Mean: 1.4 Range: 1.4 - 1.8	Mean: 1.4 Range: 1.4 - 1.5	Mean: 1.9 Range: 1.4 to 2.3	Mean: 1.4 Range: 1.2 to 1.5	Mean: 1.6 Range: 1.4 to 2.0	Mean: 1.4 Range: 1.2 to 1.5
Low Bank Height / Max. D_{bkf} Ratio	Mean: 1.0 Range: 1.0 - 1.8	Mean: 1.4 Range:	Mean: 1.4 Range: 1.0 to 1.7	Mean: 1.0 Range: 1.0 to 1.3	Mean: 2.2 Range: 1.6 to 2.8	Mean: 1.0 Range: 1.0 to 1.3
Maximum Pool Depth / Bankfull Mean Depth (D_{pool}/D_{bkf})	Mean: 1.9 Range: 0 - 2.1	Mean: 2 Range:	No distinct repetitive pattern of riffles and pools due to staightening activities	Mean: 1.9 Range: 1.3 to 2.1	No distinct repetitive pattern of riffles and pools due to staightening activities	Mean: 1.9 Range: 1.3 to 2.1
Pool Width / Bankfull Width (W_{pool}/W_{bkf})	Mean: 1.1 Range: 0 - 1.2	Mean: 1 Range:		Mean: 1.1 Range: 1.0 to 1.4		Mean: 1.1 Range: 1.0 to 1.4
Pool Area / Bankfull Cross Sectional Area	Mean: 1.4 Range: 0 - 1.6	Mean: 1.4 Range:		Mean: 1.4 Range: 1.1 to 1.6		Mean: 1.4 Range: 1.1 to 1.6

Variables	REFERENCE - CEDAROCK PARK	REFERENCE - CAUSEY* FARM	Existing UT 1 (Upstream)	Proposed	Existing UT 1 (Downstream)	PROPOSED
Pattern Variables						
Pool to Pool Spacing (L_{p-p})	Med: 37.2 Range: 25 - 69	Med: 44.3 Range: 22 - 81	No distinct repetitive pattern of riffles and pools due to staightening activities	Med: 24.1 Range: 18.1 to 48.3	No distinct repetitive pattern of riffles and pools due to staightening activities	Med: 29.2 Range: 21.9 to 58.4
Meander Length (L_m)	Med: 68.4 Range: 44 - 116	Med: 62.9 Range: 10 - 91		Med: 51.3 Range: 36.2 to 72.4		Med: 62.0 Range: 43.8 to 87.5
Belt Width (W_{belt})	Med: 22.8 Range: 20 - 38	Med: 29.8 Range: 17 - 36		Med: 24.1 Range: 18.1 to 36.2		Med: 29.2 Range: 21.9 to 43.8
Radius of Curvature (R_c)	Med: 16.5 Range: 11 - 27	Med: 30.6 Range: 9 - 113		Med: 18.1 Range: 12.1 to 60.3		Med: 21.9 Range: 14.6 to 72.9
Sinuosity (Sin)	1.20	1.46	1.07	1.08	1.26	1.12
Pattern Ratios						
Pool to Pool Spacing/ Bankfull Width (L_{p-p}/W_{bkf})	Med: 4.6 Range: 3.1 - 8.4	Med: 4 Range: 2.0 - 7.4	No distinct repetitive pattern of riffles and pools due to staightening activities	Med: 4.0 Range: 3.0 to 8.0	No distinct repetitive pattern of riffles and pools due to staightening activities	Med: 4.0 Range: 3.0 to 8.0
Meander Length/ Bankfull Width (L_m/W_{bkf})	Med: 8.4 Range: 5.5 - 14.3	Med: 5.7 Range: 0.9 - 8.3		Med: 8.5 Range: 6.0 to 12.0		Med: 8.5 Range: 6.0 to 12.0
Meander Width Ratio (W_{belt}/W_{bkf})	Med: 2.8 Range: 2.4 - 4.7	Med: 2.7 Range: 1.5 - 3.5		Med: 4.0 Range: 3.0 to 6.0		Med: 4.0 Range: 3.0 to 6.0
Radius of Curvature/ Bankfull Width (Rc/W_{bkf})	Med: 2.0 Range: 1.4 - 3.3	Med: 2.8 Range: 0.8 - 10.3		Med: 3.0 Range: 2.0 to 10.0		Med: 3.0 Range: 2.0 to 10.0
Profile Variables						
Average Water Surface Slope (S_{ave})	0.0258	0.0053	0.0225	0.0223	0.0147	0.0165
Valley Slope (S_{valley})	0.0310	0.0077	0.0241	0.0241	0.0185	0.0185
Riffle Slope (S_{riffle})	Mean: 0.0316 Range: 0.01 - 0.0576	Mean: 0.0098 Range: 0.002 - 0.01198	No distinct repetitive pattern of riffles and pools due to staightening activities	Mean: 0.0357 Range: 0.0268 to 0.0401	No distinct repetitive pattern of riffles and pools due to staightening activities	Mean: 0.0264 Range: 0.0198 to 0.0297
Pool Slope (S_{pool})	Mean: 0.0007 Range: 0 - 0.018	Mean: 0.0006 Range: 0 - 0.004		Mean: 0.0022 Range: 0.0000 to 0.0156		Mean: 0.0017 Range: 0.0000 to 0.0116
Run Slope (S_{run})	Mean: 0.0353 Range: 0 - 0.3565	Mean: Range:		Mean: 0.0089 Range: 0.0000 to 0.0178		Mean: 0.0066 Range: 0.0000 to 0.0132
Glide Slope (S_{glide})	Mean: 0.0029 Range: 0 - 0.0431	Mean: Range:		Mean: 0.0025 Range: 0.0000 to 0.0178		Mean: 0.0018 Range: 0.0000 to 0.0132
Profile Ratios						
Riffle Slope/ Water Surface Slope (S_{riffle}/S_{ave})	Mean: 1.2 Range: 0.39 - 2.23	Mean: 1.6 Range: 0 - 3.7	No distinct repetitive pattern of riffles and pools due to staightening activities	Mean: 1.60 Range: 1.2 to 1.8	No distinct repetitive pattern of riffles and pools due to staightening activities	Mean: 1.60 Range: 1.2 to 1.8
Pool Slope/Water Surface Slope (S_{pool}/S_{ave})	Mean: 0.0 Range: 0 - 0.70	Mean: 0.1 Range: 0 - 0.8		Mean: 0.10 Range: 0.0 to 0.7		Mean: 0.10 Range: 0.0 to 0.7
Run Slope/Water Surface Slope (S_{run}/S_{ave})	Mean: 1.37 Range: 0 - 13.82	Mean: Range:		Mean: 0.40 Range: 0.0 to 0.8		Mean: 0.40 Range: 0.0 to 0.8
Glide Slope/Water Surface Slope (S_{glide}/S_{ave})	Mean: 0.11 Range: 0 - 1.67	Mean: Range:		Mean: 0.11 Range: 0.0 to 0.8		Mean: 0.11 Range: 0.0 to 0.8

* Causey Farm Reference includes measurments from a Reference Site measured in 2004.



Axiom Environmental, Inc.

RESTORATION SYSTEMS | LLC

NOTES/REVISIONS

Project:

Major Hill
Mitigation Site

Alamance County
North Carolina

Title:

Cross Section
Locations

0 200 400

SCALE IN FEET

Scale: AS SHOWN

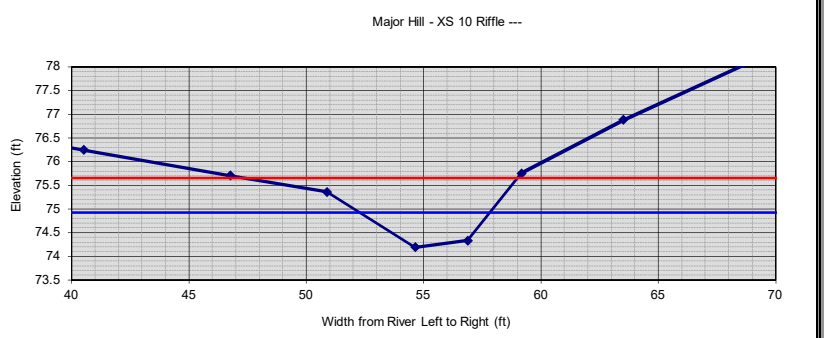
Date: August 2017

Project No.: 17-009

FIGURE NO.

B1

Cross Section



section: **Major Hill - XS 10**

Riffle

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description: **Major Hill - XS 10**

height of instrument (ft): **100.00**

notes	omit pt.	distance (ft)	FS (ft)	elevation
	☐	**0**	**21.22466**	78.77534
	☐	**11.32494**	**21.91026**	78.08974
	☐	**32.716**	**23.03771**	76.96229
	☐	**40.51483**	**23.75684**	76.24316
	☐	**46.75931**	**24.2945**	75.7055
	☐	**50.87182**	**24.63855**	75.36145
	☐	**54.64443**	**25.81375**	74.18626
	☐	**56.87534**	**25.66565**	74.33435
	☐	**59.15972**	**24.25127**	75.74873
	☐	**63.51316**	**23.12055**	76.87945
	☐	**72.44177**	**21.08707**	78.91293
	☐	**80.25382**	**19.85817**	80.14183
	☐	**92.96824**	**18.3565**	81.6435
	☐	**103.141**	**16.88098**	83.11902
	☐	**112.3654**	**15.68455**	84.31545
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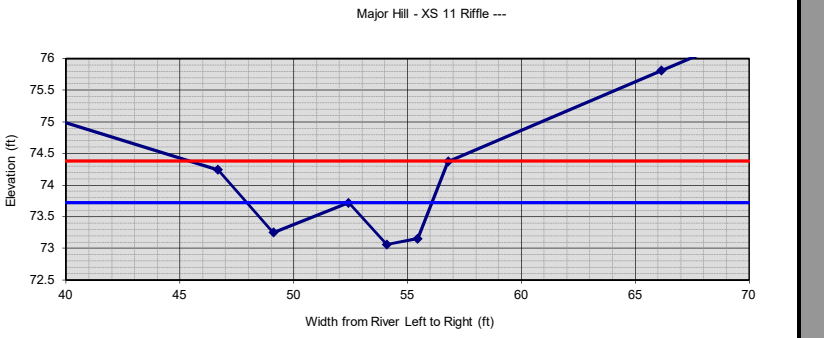
FS bankfull	FS top of bank	W fpa (ft)	channel slope (%)	Manning's "n"
25.08	**24.64**	**12.0**		
74.92	75.36			

dimensions			
2.6	x-section area	0.5	d mean
5.5	width	5.8	wet P
0.7	d max	0.4	hyd radi
1.2	bank ht	11.7	w/d ratio
12.0	W flood prone area	2.2	ent ratio

hydraulics	
0.0	velocity (ft/sec)
0.0	discharge rate, Q (cfs)
0.00	shear stress ((lbs/ft sq)
0.00	shear velocity (ft/sec)
0.000	unit stream power (lbs/ft/sec)
0.00	Froude number
0.0	friction factor u/u*
~~0.0~~	threshold grain size (mm)

check from channel material			
0	measured D84 (mm)		
0.0	relative roughness	0.0	fric. factor
0.000	Manning's n from channel material		

Cross Section



section: **Major Hill - XS 11**

Riffle

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description: **Major Hill - XS 11**

height of instrument (ft): **100.00**

notes	omit pt.	distance (ft)	FS (ft)	elevation
	☐	**0**	**22.30247**	77.69753
	☐	**13.38725**	**22.88239**	77.11762
	☐	**28.67774**	**23.81444**	76.18556
	☐	**38.96493**	**24.90284**	75.09717
	☐	**46.66575**	**25.7597**	74.2403
	☐	**49.10806**	**26.7494**	73.2506
	☐	**52.4095**	**26.27791**	73.72209
	☐	**54.08237**	**26.93989**	73.06011
	☐	**55.43899**	**26.84785**	73.15215
	☐	**56.78182**	**25.62497**	74.37504
	☐	**66.14574**	**24.19208**	75.80792
	☐	**76.71326**	**22.58253**	77.41747
	☐	**84.047**	**21.24407**	78.75593
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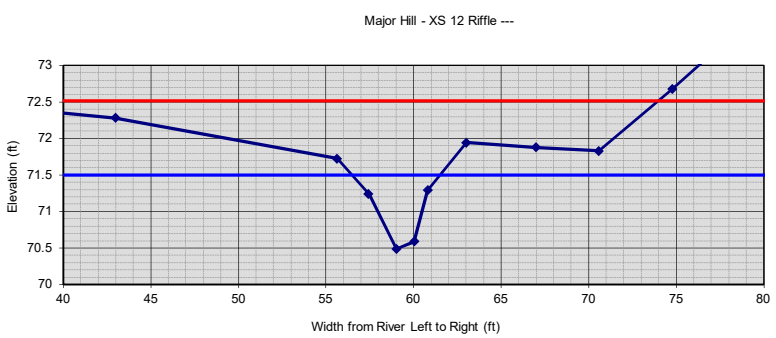
FS bankfull	FS top of bank	W fpa (ft)	channel slope (%)	Manning's "n"
26.28	**25.76**	**11.0**		
73.72	74.24			

dimensions			
2.6	x-section area	0.3	d mean
8.1	width	8.6	wet P
0.7	d max	0.3	hyd radi
1.2	bank ht	25.2	w/d ratio
11.0	W flood prone area	1.4	ent ratio

hydraulics	
0.0	velocity (ft/sec)
0.0	discharge rate, Q (cfs)
0.00	shear stress ((lbs/ft sq)
0.00	shear velocity (ft/sec)
0.000	unit stream power (lbs/ft/sec)
0.00	Froude number
0.0	friction factor u/u*
~~0.0~~	threshold grain size (mm)

check from channel material			
0	measured D84 (mm)		
0.0	relative roughness	0.0	fric. factor
0.000	Manning's n from channel material		

Cross Section



section: **Major Hill - XS 12**

Riffle

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description: **Major Hill - XS 12**

height of instrument (ft): **100.00**

notes	omit pt.	distance (ft)	FS (ft)	elevation
	☐	**0**	**25.54737**	74.45263
	☐	**14.86919**	**26.39094**	73.60906
	☐	**22.17293**	**26.7646**	73.2354
	☐	**32.81466**	**27.48145**	72.51855
	☐	**42.97031**	**27.71816**	72.28185
	☐	**55.63639**	**28.27697**	71.72303
	☐	**57.4224**	**28.75634**	71.24366
	☐	**59.01435**	**29.51518**	70.48482
	☐	**60.03552**	**29.41176**	70.58824
	☐	**60.79263**	**28.71092**	71.28908
	☐	**63.01452**	**28.05585**	71.94415
	☐	**66.99702**	**28.1227**	71.87731
	☐	**70.58041**	**28.17123**	71.82877
	☐	**74.77227**	**27.32233**	72.67767
	☐	**81.30691**	**25.92309**	74.07691
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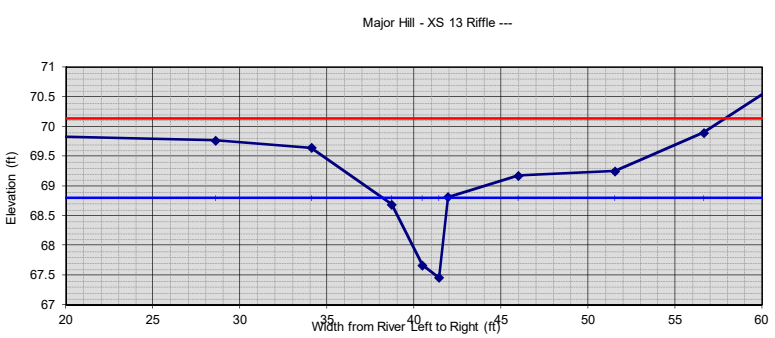
FS bankfull	FS top of bank	W fpa (ft)	channel slope (%)	Manning's "n"
28.5	**28.28**	**35.0**		
71.5	71.72			

dimensions			
2.6	x-section area	0.5	d mean
5.0	width	5.6	wet P
1.0	d max	0.5	hyd radi
1.2	bank ht	9.7	w/d ratio
35.0	W flood prone area	6.9	ent ratio

hydraulics	
0.0	velocity (ft/sec)
0.0	discharge rate, Q (cfs)
0.00	shear stress ((lbs/ft sq)
0.00	shear velocity (ft/sec)
0.000	unit stream power (lbs/ft/sec)
0.00	Froude number
0.0	friction factor u/u*
~~0.0~~	threshold grain size (mm)

check from channel material			
0	measured D84 (mm)		
0.0	relative roughness	0.0	fric. factor
0.000	Manning's n from channel material		

Cross Section



section: **Major Hill - XS 13**

Riffle

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description: **Major Hill - XS 13**

height of instrument (ft): **100.00**

notes	omit pt.	distance (ft)	FS (ft)	elevation
	☐	**0**	**29.71587**	70.28413
	☐	**15.67876**	**30.13295**	69.86705
	☐	**15.90313**	**30.14458**	69.85542
	☐	**28.56359**	**30.22923**	69.77077
	☐	**34.08261**	**30.35652**	69.64348
	☐	**38.69984**	**31.30706**	68.69294
	☐	**40.47686**	**32.33137**	67.66863
	☐	**41.42271**	**32.54241**	67.45759
	☐	**41.93971**	**31.18591**	68.81409
	☐	**45.98856**	**30.8264**	69.1736
	☐	**51.54829**	**30.74787**	69.25213
	☐	**56.63955**	**30.10402**	69.89598
	☐	**61.44363**	**29.18633**	70.81367
	☐	**66.55589**	**28.21223**	71.78778
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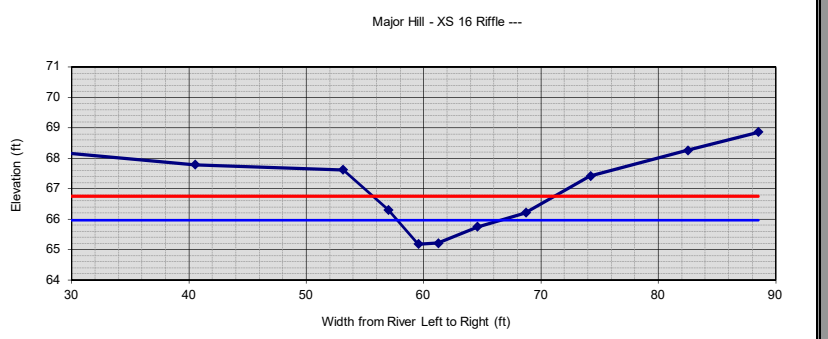
FS bankfull	FS top of bank	W fpa (ft)	channel slope (%)	Manning's "n"
31.2	**31.2**	**48.0**		
68.8	68.8			

dimensions			
2.6	x-section area	0.7	d mean
3.8	width	5.0	wet P
1.3	d max	0.5	hyd radi
1.3	bank ht	5.3	w/d ratio
48.0	W flood prone area	12.8	ent ratio

hydraulics	
0.0	velocity (ft/sec)
0.0	discharge rate, Q (cfs)
0.00	shear stress ((lbs/ft sq)
0.00	shear velocity (ft/sec)
0.000	unit stream power (lbs/ft/sec)
0.00	Froude number
0.0	friction factor u/u*
~~0.0~~	threshold grain size (mm)

check from channel material			
0	measured D84 (mm)		
0.0	relative roughness	0.0	fric. factor
0.000	Manning's n from channel material		

Cross Section



section: **Major Hill - XS 16**

Riffle

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description: **Major Hill - XS 16**

height of instrument (ft): **100.00**

notes	omit pt.	distance (ft)	FS (ft)	elevation
	☐	**0**	**29.74985**	70.25015
	☐	**12.87996**	**30.70893**	69.29107
	☐	**27.48769**	**31.75325**	68.24675
	☐	**40.52665**	**32.21247**	67.78753
	☐	**53.12952**	**32.38231**	67.61769
	☐	**56.99437**	**33.69356**	66.30644
	☐	**59.55431**	**34.8244**	65.1756
	☐	**61.23245**	**34.78739**	65.21261
	☐	**64.5982**	**34.25237**	65.74763
	☐	**68.71221**	**33.7932**	66.2068
	☐	**74.24095**	**32.58161**	67.41839
	☐	**82.50737**	**31.7436**	68.2564
	☐	**88.53412**	**31.13786**	68.86214
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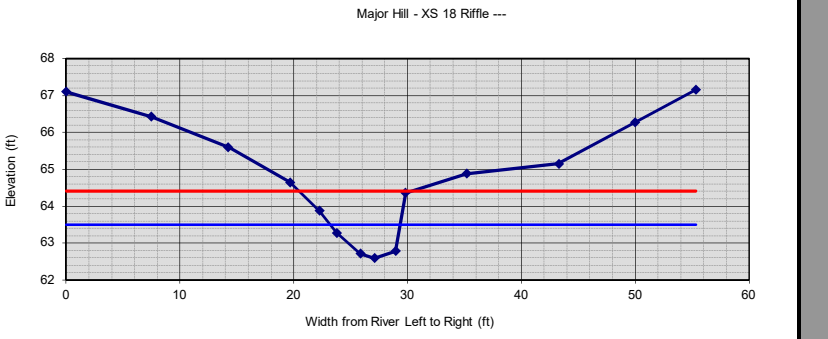
FS bankfull	FS top of bank	W fpa (ft)	channel slope (%)	Manning's "n"
34.04	**32.58**	**15.0**		
65.96	67.42			

dimensions			
3.8	x-section area	0.4	d mean
8.7	width	8.9	wet P
0.8	d max	0.4	hyd radi
2.2	bank ht	20.0	w/d ratio
15.0	W flood prone area	1.7	ent ratio

hydraulics	
0.0	velocity (ft/sec)
0.0	discharge rate, Q (cfs)
0.00	shear stress ((lbs/ft sq)
0.00	shear velocity (ft/sec)
0.000	unit stream power (lbs/ft/sec)
0.00	Froude number
0.0	friction factor u/u*
~~0.0~~	threshold grain size (mm)

check from channel material			
0	measured D84 (mm)		
0.0	relative roughness	0.0	fric. factor
0.000	Manning's n from channel material		

Cross Section



section: **Major Hill - XS 18**

Riffle

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description: **Major Hill - XS 18**

height of instrument (ft): **100.00**

notes	omit pt.	distance (ft)	FS (ft)	elevation
	☐	**0**	**32.8991**	67.1009
	☐	**7.487308**	**33.57421**	66.42579
	☐	**14.19865**	**34.40188**	65.59812
	☐	**19.6971**	**35.36454**	64.63546
	☐	**22.26744**	**36.12187**	63.87813
	☐	**23.77514**	**36.72214**	63.27786
	☐	**25.85423**	**37.28354**	62.71646
	☐	**27.09172**	**37.41262**	62.58738
	☐	**28.94069**	**37.21591**	62.78409
	☐	**29.82648**	**35.6368**	64.36321
	☐	**35.19068**	**35.12164**	64.87836
	☐	**43.2753**	**34.84923**	65.15077
	☐	**49.96165**	**33.73084**	66.26916
	☐	**55.3401**	**32.85079**	67.14921
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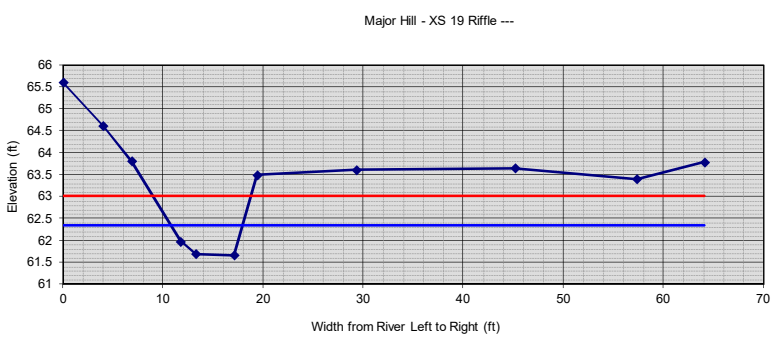
FS bankfull	FS top of bank	W fpa (ft)	channel slope (%)	Manning's "n"
36.5	**35.64**	**8.5**		
63.5	64.36			

dimensions			
3.8	x-section area	0.6	d mean
6.1	width	6.7	wet P
0.9	d max	0.6	hyd radi
1.8	bank ht	9.9	w/d ratio
8.5	W flood prone area	1.4	ent ratio

hydraulics	
0.0	velocity (ft/sec)
0.0	discharge rate, Q (cfs)
0.00	shear stress ((lbs/ft sq)
0.00	shear velocity (ft/sec)
0.000	unit stream power (lbs/ft/sec)
0.00	Froude number
0.0	friction factor u/u*
~~0.0~~	threshold grain size (mm)

check from channel material			
0	measured D84 (mm)		
0.0	relative roughness	0.0	fric. factor
0.000	Manning's n from channel material		

Cross Section



section: **Major Hill - XS 19**

Riffle

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description: **Major Hill - XS 19**

height of instrument (ft): **100.00**

notes	omit pt.	distance (ft)	FS (ft)	elevation
	☐	0	34.39539	65.60461
	☐	4.000122	35.38592	64.61409
	☐	6.863603	36.19212	63.80788
	☐	11.74897	38.02854	61.97146
	☐	13.24583	38.31118	61.68882
	☐	17.09316	38.33975	61.66025
	☐	19.39201	36.5069	63.49311
	☐	29.34762	36.39052	63.60948
	☐	45.17769	36.35517	63.64483
	☐	57.35287	36.59697	63.40303
	☐	64.08076	36.21526	63.78475
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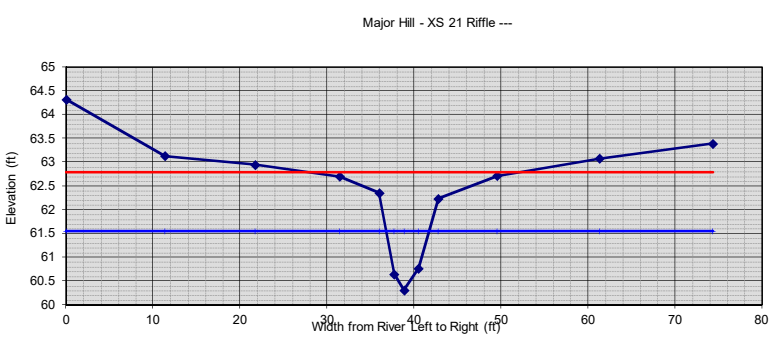
FS bankfull	FS top of bank	W fpa (ft)	channel slope (%)	Manning's "n"
37.66	36.51	10.0		
62.34	63.49			

dimensions			
3.8	x-section area	0.5	d mean
7.2	width	7.5	wet P
0.7	d max	0.5	hyd radi
1.8	bank ht	13.6	w/d ratio
10.0	W flood prone area	1.4	ent ratio

hydraulics	
0.0	velocity (ft/sec)
0.0	discharge rate, Q (cfs)
0.00	shear stress ((lbs/ft sq)
0.00	shear velocity (ft/sec)
0.000	unit stream power (lbs/ft/sec)
0.00	Froude number
0.0	friction factor u/u*
~~0.0~~	threshold grain size (mm)

check from channel material			
0	measured D84 (mm)		
0.0	relative roughness	0.0	fric. factor
0.000	Manning's n from channel material		

Cross Section



section: **Major Hill - XS 21**

Riffle

---

description: **Major Hill - XS 21**

height of instrument (ft): **100.00**

notes	omit pt.	distance (ft)	FS (ft)	elevation
	☐	0	35.67695	64.32305
	☐	11.35197	36.86983	63.13017
	☐	21.68422	37.05348	62.94652
	☐	31.43169	37.29868	62.70132
	☐	35.97616	37.64256	62.35744
	☐	37.68979	39.35688	60.64312
	☐	38.82678	39.6935	60.3065
	☐	40.5001	39.22945	60.77055
	☐	42.79461	37.76557	62.23443
	☐	49.53491	37.28805	62.71195
	☐	61.27242	36.92198	63.07802
	☐	74.35441	36.60982	63.39018
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FS bankfull	FS top of bank	W fpa (ft)	channel slope (%)	Manning's "n"
38.45	37.77	21.0		
61.55	62.23			

dimensions			
3.8	x-section area	0.8	d mean
4.9	width	5.7	wet P
1.2	d max	0.7	hyd radi
1.9	bank ht	6.4	w/d ratio
21.0	W flood prone area	4.3	ent ratio

hydraulics	
0.0	velocity (ft/sec)
0.0	discharge rate, Q (cfs)
0.00	shear stress ((lbs/ft sq)
0.00	shear velocity (ft/sec)
0.000	unit stream power (lbs/ft/sec)
0.00	Froude number
0.0	friction factor u/u*
~~0.0~~	threshold grain size (mm)

check from channel material			
0	measured D84 (mm)		
0.0	relative roughness	0.0	fric. factor
0.000	Manning's n from channel material		

Major Hill Stream Restoration Site

Baseline Water Quality Data

	7/28/2017		14-Aug-17
UPSTREAM			
TDS (ppm)	110.1		147
TDS (mg/l)	109.1		149
Cond (ms)	159.2		215
Temp	25.4		22.6
DO (mg/l)	-		1.93
DO (ppm)	-		1.06
PH	6.61		6.37
DOWNSTREAM			
TDS (ppm)	62.6		86.8
TDS (mg/l)	64.6		83.5
Cond (ms)	92.1		128.3
Temp	24.6		22.1
DO (mg/l)	-		3.06
DO (ppm)	-		2.53
PH	6.65		6.22

Site		Major Hill Steam and Wetland Mitigation Site						
Stream		UT 1			Bank Length		8500	
Observers		Grant and Alison			Date		13-Dec-16	
	Station	Bank	BEHI	NBS	Erosion Rate	Length	Bank Height	Erosion
1	120	left	low	low	0	120	1	0.0
2	510	left	low	low	0	390	1	0.0
3	600	left	moderate	low	0.02	90	1.8	3.2
4	760	left	high	low	0.1	160	2.2	35.2
5	925	left	high	low	0.1	165	3	49.5
6	1035	left	moderate	low	0.02	110	2	4.4
7	1090	left	high	low	0.1	55	2	11.0
8	4250	left	low	low	0	3160	1	0.0
9								0.0
10	120	right	low	low	0	120	1	0.0
11	510	right	low	low	0	390	1	0.0
12	600	right	moderate	low	0.02	90	1.8	3.2
13	760	right	high	low	0.1	160	2.2	35.2
14	925	right	high	low	0.1	165	3	49.5
15	1035	right	moderate	low	0.02	110	2	4.4
16	1090	right	high	low	0.1	55	2	11.0
17	4250	right	low	low	0	3160	1	0.0
18								0.0
19								0.0
20								0.0
21								0.0
22								
23								
24								
Sum erosion sub-totals for each BEHI/NBS						Total Erosion (ft3/yr)		206.7
Divide total erosion (ft3) by 27						Total Erosion (yd/yr)		7.7
Multiply Total erosion (yard3) by 1.3						Total Erosion (tons/yr)		10.0
Erosion per unit length						Total Erosion (Tons/yr/ft)		0.00

Draft NC SAM Stream Rating Sheet
Accompanies User Manual Version 2.1

Stream Site Name	Major Hill UT1 (Upstream)	Date of Assessment	12/13/16
Stream Category	Pa1	Assessor Name/Organization	Axiom Environmental

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	**MEDIUM**	**MEDIUM**
(2) Baseflow	**MEDIUM**	**MEDIUM**
(2) Flood Flow	**MEDIUM**	**MEDIUM**
(3) Streamside Area Attenuation	**HIGH**	**HIGH**
(4) Floodplain Access	**HIGH**	**HIGH**
(4) Wooded Riparian Buffer	**LOW**	**LOW**
(4) Microtopography	**HIGH**	**HIGH**
(3) Stream Stability	**LOW**	**LOW**
(4) Channel Stability	**LOW**	**LOW**
(4) Sediment Transport	**LOW**	**LOW**
(4) Stream Geomorphology	**MEDIUM**	**MEDIUM**
(2) Stream/Intertidal Zone Interaction	NA	NA
(2) Longitudinal Tidal Flow	NA	NA
(2) Tidal Marsh Stream Stability	NA	NA
(3) Tidal Marsh Channel Stability	NA	NA
(3) Tidal Marsh Stream Geomorphology	NA	NA
(1) Water Quality		
(2) Baseflow	**MEDIUM**	**MEDIUM**
(2) Streamside Area Vegetation	**LOW**	**LOW**
(3) Upland Pollutant Filtration	**LOW**	**LOW**
(3) Thermoregulation	**LOW**	**LOW**
(2) Indicators of Stressors	**YES**	**YES**
(2) Aquatic Life Tolerance		**NA**
(2) Intertidal Zone Filtration	NA	NA
(1) Habitat	**LOW**	**LOW**
(2) In-stream Habitat	**LOW**	**MEDIUM**
(3) Baseflow	**MEDIUM**	**MEDIUM**
(3) Substrate	**LOW**	**LOW**
(3) Stream Stability	**LOW**	**LOW**
(3) In-stream Habitat	**LOW**	**HIGH**
(2) Stream-side Habitat	**LOW**	**LOW**
(3) Stream-side Habitat	**LOW**	**LOW**
(3) Thermoregulation	**LOW**	**LOW**
(2) Tidal Marsh In-stream Habitat	NA	NA
(3) Flow Restriction	NA	NA
(3) Tidal Marsh Stream Stability	NA	NA
(4) Tidal Marsh Channel Stability	NA	NA
(4) Tidal Marsh Stream Geomorphology	NA	NA
(3) Tidal Marsh In-stream Habitat	NA	NA
(2) Intertidal Zone	NA	NA
Overall		

Draft NC SAM Stream Rating Sheet
Accompanies User Manual Version 2.1

Stream Site Name	Major Hill UT1 (Downstream)	Date of Assessment	12/13/16
Stream Category	Pa1	Assessor Name/Organization	Axiom Environmental

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)	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	**LOW**	
(4) Stream Geomorphology	**HIGH**	
(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		
(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		
(2) Intertidal Zone Filtration	NA	
(1) Habitat	**LOW**	
(2) In-stream Habitat	**LOW**	
(3) Baseflow	**HIGH**	
(3) Substrate	**LOW**	
(3) Stream Stability	**LOW**	
(3) In-stream Habitat	**LOW**	
(2) Stream-side Habitat	**LOW**	
(3) Stream-side Habitat	**LOW**	
(3) Thermoregulation	**LOW**	
(2) Tidal Marsh In-stream Habitat	NA	
(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	NA	
Overall		

NC WAM Wetland Rating Sheet
Accompanies User Manual Version 5.0

Wetland Site Name	All Existing Wetlands	Date	1/3/2017
Wetland Type	Headwater Forest	Assessor Name/Organization	Jernigan/Axiom

Notes on Field Assessment Form (Y/N)	NO
Presence of regulatory considerations (Y/N)	YES
Wetland is intensively managed (Y/N)	YES
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)	NO
Assessment area experiences overbank flooding during normal rainfall conditions (Y/N)	YES
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	**MEDIUM**
	Sub-Surface Storage and Retention	Condition	**HIGH**
Water Quality	Pathogen Change	Condition	**HIGH**
		Condition/Opportunity	**HIGH**
		Opportunity Presence? (Y/N)	**YES**
	Particulate Change	Condition	**LOW**
		Condition/Opportunity	NA
		Opportunity Presence? (Y/N)	NA
	Soluble Change	Condition	**MEDIUM**
		Condition/Opportunity	**HIGH**
		Opportunity Presence? (Y/N)	**YES**
	Physical Change	Condition	**HIGH**
		Condition/Opportunity	**HIGH**
		Opportunity Presence? (Y/N)	**YES**
	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	**MEDIUM**

Function Rating Summary

Function	Metrics/Notes	Rating
Hydrology	Condition	**HIGH**
Water Quality	Condition	**HIGH**
	Condition/Opportunity	**HIGH**
	Opportunity Presence? (Y/N)	**YES**
Habitat	Condition	**LOW**

Overall Wetland Rating **HIGH**

Major Hill (upstream UT1)

NC Division of Water Quality –Methodology for Identification of Intermittent and Perennial Streams and Their Origins v. 4.11

NC DWQ Stream Identification Form Version 4.11

Date: 12/13/16	**Project/Site:** Major Hill	**Latitude:** 35.876281
Evaluator: Axiom	**County:** Alamance	**Longitude:** -79.360387
Total Points: 20.25 *Stream is at least intermittent if ≥ 19 or perennial if ≥ 30**	**Stream Determination (circle one)** Ephemeral (Intermittent) Perennial	**Other** *e.g. Quad Name:*

A. Geomorphology (Subtotal = 8)	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 = 5.5)				
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 = 6.75)				
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:

Mayor Hill (Downstream) UT1

NC Division of Water Quality –Methodology for Identification of Intermittent and Perennial Streams and Their Origins v. 4.11

NC DWQ Stream Identification Form Version 4.11

Date: 12/13/16	**Project/Site:** Mayor Hill	**Latitude:** 35.875882
Evaluator: Axiom	**County:** Alamance	**Longitude:** -79.360040
Total Points: *Stream is at least intermittent if ≥ 19 or perennial if ≥ 30** 33.5	**Stream Determination (circle one)** Ephemeral Intermittent (Perennial)	**Other** *e.g. Quad Name:*

A. Geomorphology (Subtotal = 14.5)	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 = 9.5)				
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 = 9.5)				
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:

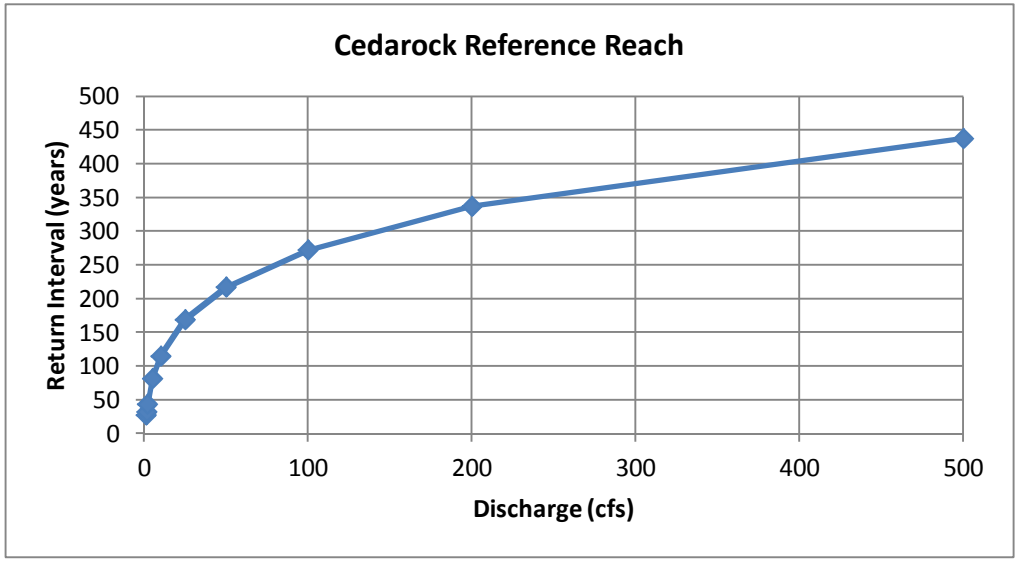
Sketch:

Appendix C
Flood Frequency Analysis Data

Reference Reaches
Flood Frequency Analaysis-Regional Regression Equation (USGS 2004)

Cedarock Reference Reach

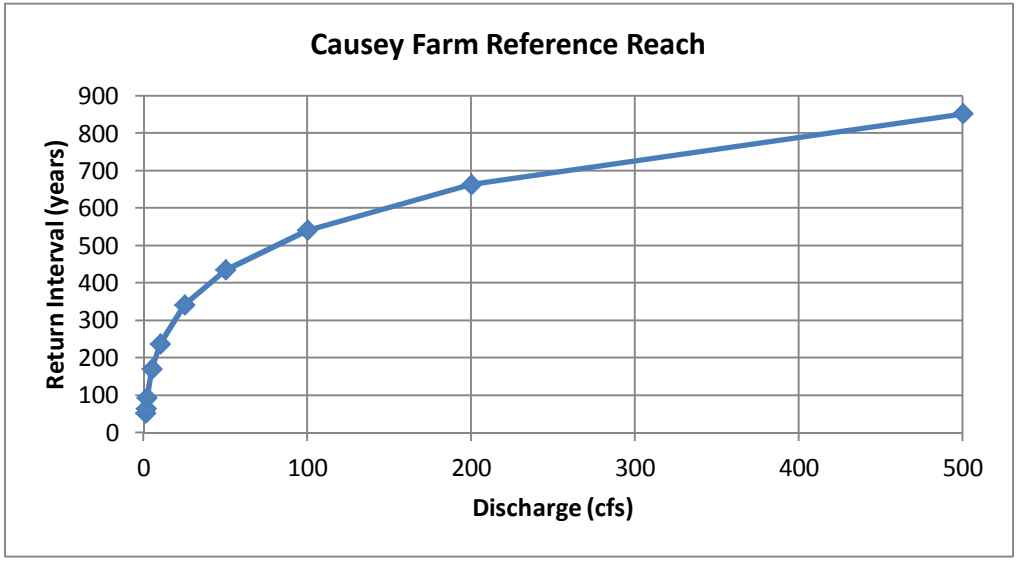
Return Interval (years)	Discharge (cfs)
1.3	**27**
1.5	**32**
2	43.6
5	81.4
10	115
25	169
50	217
100	272
200	337
500	438



Note: Bold values are interpolated.

Causey Farm Reference Reach

Return Interval (years)	Discharge (cfs)
1.3	**53**
1.5	**65**
2	94.3
5	171
10	238
25	342
50	435
100	541
200	663
500	852



Appendix D
PJD Tearsheet & Correspondence

SAW-2017-01472

U.S. ARMY CORPS OF ENGINEERS
WILMINGTON DISTRICT

Action Id. **SAW-2017-01472** County: **Alamance** U.S.G.S. Quad: **NC-Saxapahaw/Silk Hope**

NOTIFICATION OF JURISDICTIONAL DETERMINATION

Property Owner: **NCDEQ DMS**
Attn: Tim Baumgartner
Address: **1619 Mail Service Center**
Raleigh, NC 27699-1619

Size (acres) **~15** Nearest Town **Snow Camp**
Nearest Waterway **UT to Pine Hill Branch** River Basin **Cape Fear**
USGS HUC **03030002** Coordinates **36.877647 N, -79.362255 W**
Location description: **The project area is located south of Major Hill Road, and east of the eastern terminus of Shelby Drive, near Snow Camp, Alamance County, North Carolina. The Project Area is shown as the "Easement = ~15 acres" on the attached Figures 3 and 4, titled "Jurisdictional Areas." And "Wetland Detail", respectively.**

Indicate Which of the Following Apply:

A. Preliminary Determination

☒ **There appear to be waters including wetlands, on the above described project area, 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 October 2017. 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 MAP DATE. If you wish to have the delineation surveyed, the Corps can review and verify the survey upon completion. Once verified, this survey will

provide an accurate depiction of all areas subject to CWA and/or RHA 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 SURVEY SIGNED 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 **David Bailey at (919) 554-4884 X 30 or David.E.Bailey2@usace.army.mil**.

C. Basis For Determination: See the Preliminary Jurisdictional Determination form dated 12/21/2017.

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: Jason Steele, 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: 
Digitally signed by BAILEY.DAVID.E.1379283736
DN: c=US, o=U.S. Government, ou=DoD, ou=PKI, ou=USA, cn=BAILEY.DAVID.E.1379283736
Date: 2017.12.21 15:25:18 -05'00'

Date of JD: **12/21/2017** Expiration Date of JD: **Not applicable**

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 our Customer Satisfaction Survey, located online at http://corpsmapu.usace.army.mil/cm_apex/f?p=136:4:0.

Copy furnished:
Sue Homewood, NCDEQ-DWR, 450 W. Hanes Mill Rd, Suite 300, Winston-Salem, NC 27105

SAW-2017-01472

NOTIFICATION OF ADMINISTRATIVE APPEAL OPTIONS AND PROCESS AND REQUEST FOR APPEAL

Applicant: **NCDEQ DMS (Attn: Tim Baumgartner)**	File Number: **SAW-2017-01472**	Date: **12/21/2017**

Attached is:	See Section below
☐ INITIAL PROFFERED PERMIT (Standard Permit or Letter of permission)	A
☐ PROFFERED PERMIT (Standard Permit or Letter of permission)	B
☐ PERMIT DENIAL	C
☐ APPROVED JURISDICTIONAL DETERMINATION	D
☒ 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 or 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.

SAW-2017-01472

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: David E. Bailey** **Raleigh Regulatory Field Office** **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. Jason Steele, 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.		
_____ Signature of appellant or agent.	Date:	Telephone number:

For appeals on Initial Proffered Permits send this form to:

District Engineer, Wilmington Regulatory Division, **David Bailey, 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. Jason Steele, Administrative Appeal Officer, CESAD-PDO, 60 Forsyth Street, Room 10M15, Atlanta, Georgia 30303-8801
Phone: (404) 562-5137

ATTACHMENT A

PRELIMINARY JURISDICTIONAL DETERMINATION FORM

BACKGROUND INFORMATION

A. **REPORT COMPLETION DATE FOR PRELIMINARY JURISDICTIONAL DETERMINATION (JD):** 12/21/2017

B. **NAME AND ADDRESS OF PERSON REQUESTING PRELIMINARY JD:** NCDMS (Attn: Tim Baumgartner)

C. **DISTRICT OFFICE, FILE NAME, AND NUMBER:** SAW-2017-01472 (NCDMS ILF - Major Hill Stream and Wetland Mitigation Site)

D. **PROJECT LOCATION(S) AND BACKGROUND INFORMATION:**

(USE THE ATTACHED TABLE TO DOCUMENT MULTIPLE WATERBODIES AT DIFFERENT SITES)

State: NC County/parish/borough: Alamance City: Graham

Center coordinates of site (lat/long in degree decimal format):
Lat. 35.877647 °N; Long. -79.362255 °W.

Universal Transverse Mercator:

Name of nearest waterbody: Pine Hill Branch

Identify (estimate) amount of waters in the review area:
Non-wetland waters:
4403 linear feet: 3 - 10 width (ft) and/or _____ acres.

Cowardin Class: R2UB1/2

Stream Flow: Intermittent and Perennial

Wetlands: 0.204 acres.

Cowardin Class: PSS1

Name of any water bodies on the site that have been identified as Section 10 waters:
Tidal:
Non-Tidal:

E. REVIEW PERFORMED FOR SITE EVALUATION (CHECK ALL THAT APPLY):

☐ Office (Desk) Determination. Date: _____

☒ Field Determination. Date(s): 1013/2017

SUPPORTING DATA. Data reviewed for preliminary JD (check all that apply - checked items should be included in case file and, where checked and requested, appropriately reference sources below):

☑ Maps, plans, plots or plat submitted by or on behalf of the applicant/consultant: aerial, soils,and topo maps (Axiom)

☑ Data sheets prepared/submitted by or on behalf of the applicant/consultant.

- ☒ Office concurs with data sheets/delineation report.
- ☐ Office does not concur with data sheets/delineation report.

☐ 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: Saxapahaw and Silk Hope 7.5-minute

☑ USDA Natural Resources Conservation Service Soil Survey. Citation: Soil Survey of Alamance County, NC (1960)

☐ National wetlands inventory map(s). Cite name: _____

☐ State/Local wetland inventory map(s): _____

☐ FEMA/FIRM maps: _____

☐ 100-year Floodplain Elevation is: _____ (National Geodectic Vertical Datum of 1929)

☒ Photographs: ☒ Aerial (Name & Date): 2014 NC OneMap or ☐ Other (Name & Date): _____

☐ Previous determination(s). File no. and date of response letter: _____

☐ Other information (please specify): LiDAR (NC Floodmaps)

Site Number/ Feature Name	Latitude	Longitude	Cowardin Class	Estimated amount of aquatic resource in review area	Class of aquatic resources
UT 1	35.875848	-79.36001	R3UB1/2	2174 feet	Non-section 10 - Non-wetland
UT 2	35.87554	-79.359185	R3UB1/2	160 feet	Non-section 10 - Non-wetland
UT 3	35.871358	-79.360794	R3UB1/2	2131 feet	Non-section 10 - Non-wetland
GA	35.87629	-79.360328	PSS1	0.230 acres	Non-section 10 - Wetland
GB	35.875821	-79.359938	PSS1	0.122 acres	Non-section 10 - Wetland
GC	35.875323	-79.359201	PSS1	0.008 acres	Non-section 10 - Wetland
W	35.874462	-79.359294	PSS1	0.048 acres	Non-section 10 - Wetland
WB	35.87439	-79.359201	PSS1	0.003 acres	Non-section 10 - Wetland
DB	35.877628	-79.360824	PSS1	0.108 acres	Non-section 10 - Wetland

1. The Corps of Engineers believes that there may be jurisdictional waters of the United States on the subject site, and the permit applicant or other affected party who requested this preliminary JD is hereby advised of his or her option to request and obtain an approved jurisdictional determination (JD) for that site. Nevertheless, the permit applicant or other person who requested this preliminary JD has declined to exercise the option to obtain an approved JD in this instance and at this time.

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 approved JD for the activity, the permit applicant is hereby made aware of the following: (1) the permit applicant has elected to seek a permit authorization based on a preliminary JD, which does not make an official determination of jurisdictional waters; (2) that the applicant has the option to request an approved JD before accepting the terms and conditions of the permit authorization, and that basing a permit authorization on an approved JD could possibly result in less compensatory mitigation being required or different special conditions; (3) that 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) that 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) that undertaking any activity in reliance upon the subject permit authorization without requesting an approved JD constitutes the applicant's acceptance of the use of the preliminary JD, but that either form of JD will be processed as soon as is practicable; (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 preliminary JD constitutes agreement that all wetlands and other water bodies on the site affected in any way by that activity are jurisdictional waters of the United States, and precludes 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 approved JD or a preliminary JD, that JD will be processed as soon as is practicable. Further, an approved JD, 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, and that in any administrative appeal, jurisdictional issues can be raised (see 33 C.F.R. 331.5(a)(2)). If, during that administrative appeal, it becomes necessary to make an official determination whether CWA jurisdiction exists over a site, or to provide an official delineation of jurisdictional waters on the site, the Corps will provide an approved JD to accomplish that result, as soon as is practicable.

This preliminary JD finds that there *"may be"* waters of the United States on the subject project site, and identifies all aquatic features on the site that could be affected by the proposed activity, based on the following information:

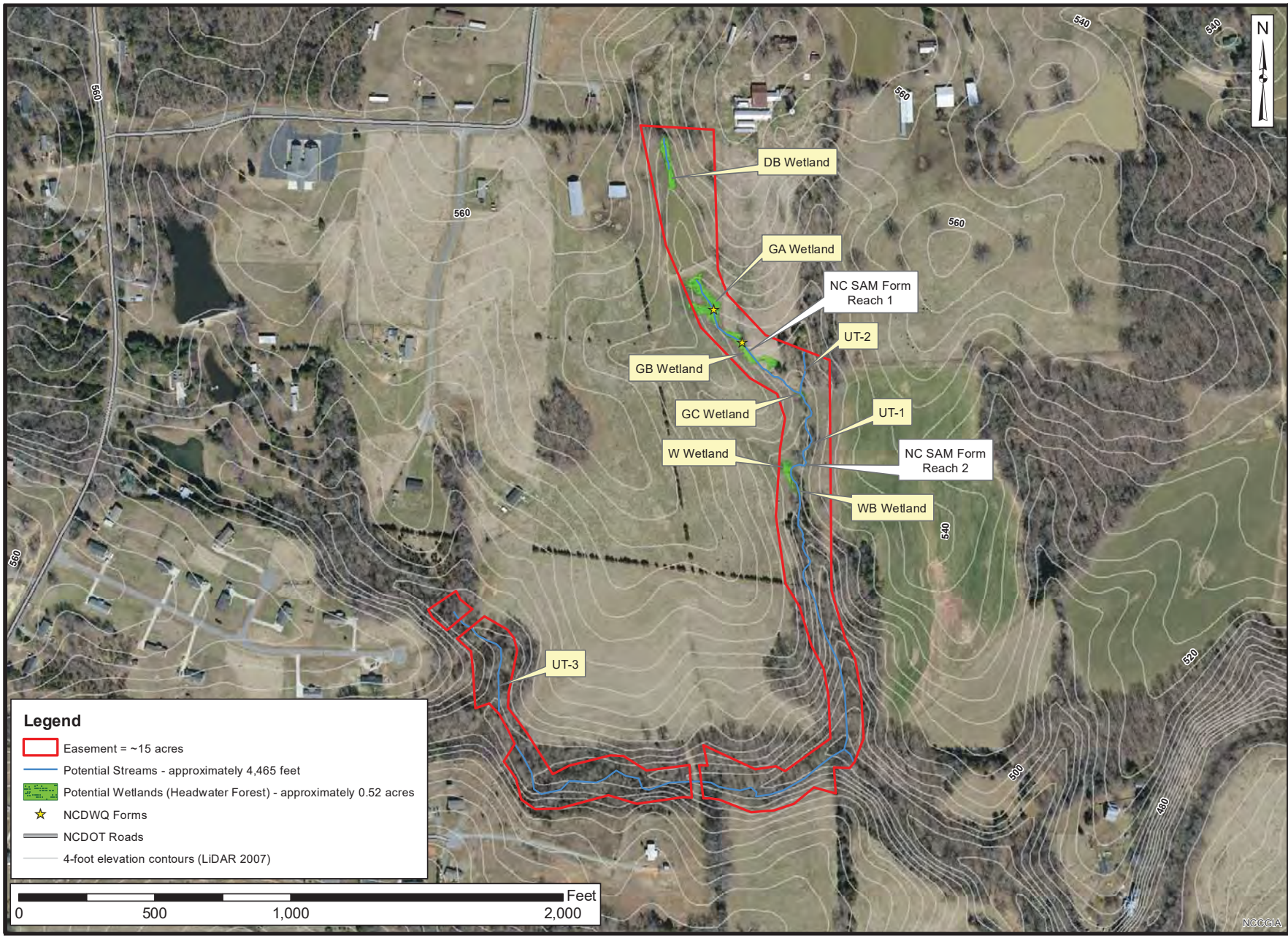
IMPORTANT NOTE: The information recorded on this form has not necessarily been verified by the Corps and should not be relied upon for later jurisdictional determinations.

Digitally signed by BAILEY.DAVID.E.1379283736
DN: c=US, o=U.S. Government, ou=DoD, ou=PKI, ou=USA, cn=BAILEY.DAVID.E.1379283736
Date: 2017.12.21 15:24:59 -05'00'

Signature and date of
Regulatory Project Manager
(REQUIRED)

W. Grant Lewis Digitally signed by W. Grant Lewis
DN: cn=W. Grant Lewis, o=Axiom Environmental, Inc., ou, emailwglewis@axiomenvironmental.org, c=US
Date: 2017.08.02 10:37:36 -04'00'

Signature and date of
person requesting preliminary JD
(REQUIRED, unless obtaining
the signature is impracticable)



Axiom Environmental, Inc.

Prepared for:

RESTORATION SYSTEMS | LLC

Project:

MAJOR HILL STREAM AND WETLAND MITIGATION SITE

Alamance County, NC

Title:

JURISDICTIONAL AREAS

Notes:

1. Background Imagery Source: 2014 aerial photography provided by the NC OneMap program (online, provided by the NCGeographic Information Coordination Council)

Drawn by:	KRJ
Date:	OCT 2017
Scale:	1:4000
Project No.:	17-009

FIGURE

3

Grant Lewis

From: Bailey, David E CIV USARMY CESAW (US) <David.E.Bailey2@usace.army.mil>
Sent: Monday, January 08, 2018 3:40 PM
To: Grant Lewis
Cc: Baumgartner, Tim; Worth Creech; Crocker, Lindsay; Homewood, Sue; Browning, Kimberly D CIV USARMY CESAW (US)
Subject: RE: Major Hill PJD Form

Thanks Grant. I re-read the documentation from our 12/21/2017 PJD document and agree with your assessment. As such, the PJD table you sent earlier this afternoon will replace the one in our 12/21/2017 PJD document; I have made the change in our file and database. This email will act as documentation of our concurrence that the acreage of Wetland GA is 0.230 acre. Please let me know if you have any questions.
-Dave Bailey

David E. Bailey, PWS
Regulatory Project Manager
US Army Corps of Engineers
CE-SAW-RG-R
3331 Heritage Trade Drive, Suite 105
Wake Forest, North Carolina 27587
Phone: (919) 554-4884, Ext. 30.
Fax: (919) 562-0421
Email: David.E.Bailey2@usace.army.mil

We would appreciate your feedback on how we are performing our duties. Our automated Customer Service Survey is located at: http://corpsmapu.usace.army.mil/cm_apex/f?p=136:4:0
Thank you for taking the time to visit this site and complete the survey.

-----Original Message-----
From: Grant Lewis [mailto:glewis@axiomenvironmental.org]
Sent: Monday, January 8, 2018 1:32 PM
To: Bailey, David E CIV USARMY CESAW (US) <David.E.Bailey2@usace.army.mil>
Cc: Worth Creech <worth@restorationsystems.com>; Crocker, Lindsay <Lindsay.Crocker@ncdenr.gov>
Subject: [EXTERNAL] Major Hill PJD Form

Hello David;

Based on our telephone conversation, I am sending you an updated PJD table that represents the correct acreage of wetlands at the Major Hill Site. The update is for wetland GA, which was changed from 0.023 acre to 0.23 acre. The table should match wetlands depicted on Figure 4 sent to you on 11/2/2017 via email from Kenan Jernigan. The correct acreage for the approved PJD should be 0.52 acre.

The initial discrepancy concerning the table was discovered by Lindsay Crocker at DMS. She noticed the PJD Form, Table, and Restoration Plan all had different acreages for wetlands at the Site.

1. PJD form - 0.204 ac
2. Revised Map - 0.52 ac
3. Revised Table - totaling 0.312 ac

The discrepancy in the PJD form and Map revolve around wetlands being added during field verification of the delineation. After the field verification, an updated map/table were sent to you in correspondence listed above (11/2/2017 email from Kenan Jernigan). When table was updated a decimal was out of place (GA wetland 0.023 ac instead of 0.23 ac). The table attached to this email should correct the error and the map/table should match at 0.52 acre.

Lindsay has a concern that the approved PJD (tear sheet) has the incorrect wetland acreage listed (0.204 ac) and the revised map/table have the different wetland acreage listed (0.52 ac). Based on our conversation today, it's not a problem that the approved PJD tear sheet and map/table have differing acreages. Is that correct?

Also, I am to understand I can update the approved PJD tear sheet by swapping out the tables. Is that also correct?

Thank you for your attention to this matter.

Grant

Grant Lewis

Senior Project Manager

Axiom Environmental, Inc.

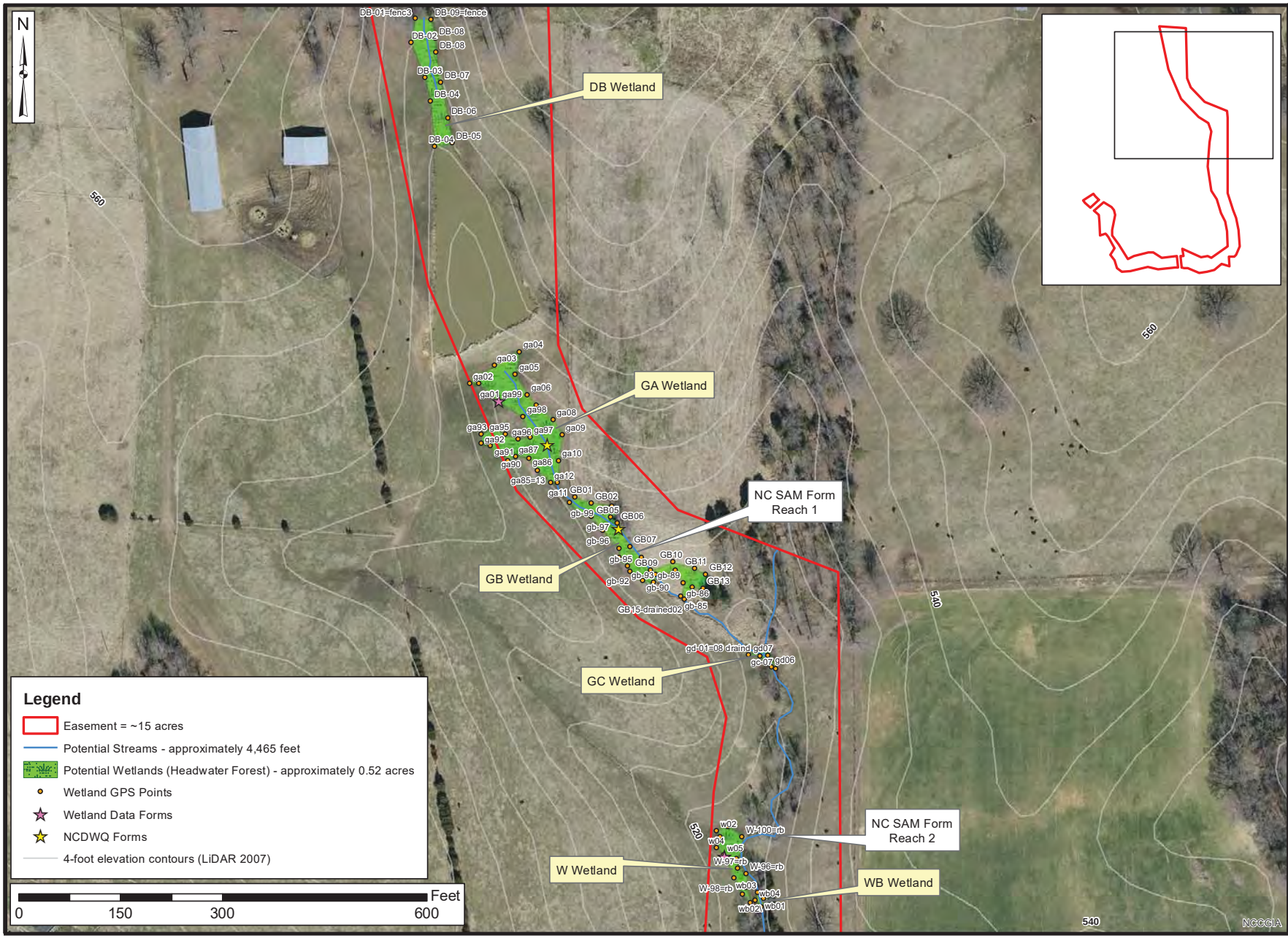
218 Snow Avenue

Raleigh, North Carolina 27603

glewis@axiomenvironmental.org <mailto:glewis@axiomenvironmental.org>

(919) 215-1693 (cell)

<file:///S:\Business\Administrative\logos\Axiom.jpg>



Axiom Environmental, Inc.

Prepared for:

RESTORATION SYSTEMS | LLC

Project:

MAJOR HILL STREAM AND WETLAND MITIGATION SITE

Alamance County, NC

Title:

WETLAND DETAIL

Notes:

1. Background Imagery Source: 2014 aerial photography provided by the NC OneMap program (online, provided by the NCGeographic Information Coordination Council)

Drawn by:	KRJ
Date:	OCT 2017
Scale:	1:1600
Project No.:	17-009

FIGURE

4

Appendix E
Categorical Exclusion Document

Appendix A

Categorical Exclusion Form for Ecosystem Enhancement Program Projects
Version 1.4

Note: Only Appendix A should to be submitted (along with any supporting documentation) as the environmental document.

Part 1: General Project Information	
Project Name:	Major Hill Stream and Wetland Mitigation Site
County Name:	Alamance County
DMS Number:	100015
Project Sponsor:	Restoration Systems, LLC
Project Contact Name:	Raymond Holz
Project Contact Address:	1101 Haynes Street, Suite 211 Raleigh, NC 27604
Project Contact E-mail:	rholz@restorationsystems.com
DMS Project Manager:	Lindsay Crocker

Project Description

The Major Hill Site encompasses approximately 15.4 acres of agricultural land used for livestock grazing and hay production. Existing Site streams have been impounded, cleared, trampled by livestock, eroded vertically and laterally. The project will restore streams and wetlands within the Site for a total of 3234 Stream Mitigation Units (SMUs) and 0.76 Riparian Wetland Mitigation Units (WMUs).

For Official Use Only

Reviewed By:

Date — **DMS Project Manager**

Conditional Approved By:

Date — **For Division Administrator FHWA**

☐ **Check this box if there are outstanding issues**

Final Approval By:

9-6-17

Date — **For Division Administrator FHWA**

Part 2: All Projects Regulation/Question	Response
Coastal Zone Management Act (CZMA)	
1. Is the project located in a CAMA county?	☐ Yes ☑ No
2. Does the project involve ground-disturbing activities within a CAMA Area of Environmental Concern (AEC)?	☐ Yes ☐ No ☑ N/A
3. Has a CAMA permit been secured?	☐ Yes ☐ No ☑ N/A
4. Has NCDCM agreed that the project is consistent with the NC Coastal Management Program?	☐ Yes ☐ No ☑ N/A
Comprehensive Environmental Response, Compensation and Liability Act (CERCLA)	
1. Is this a "full-delivery" project?	☑ Yes ☐ No
2. Has the zoning/land use of the subject property and adjacent properties ever been designated as commercial or industrial?	☐ Yes ☑ No ☐ 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?	☐ Yes ☑ No ☐ 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?	☐ Yes ☐ No ☑ N/A
5. As a result of a Phase II Site Assessment, are there known or potential hazardous waste sites within the project area?	☐ Yes ☐ No ☑ N/A
6. Is there an approved hazardous mitigation plan?	☐ Yes ☐ No ☑ 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?	☐ Yes ☑ No
2. Does the project affect such properties and does the SHPO/THPO concur?	☐ Yes ☐ No ☑ N/A
3. If the effects are adverse, have they been resolved?	☐ Yes ☐ No ☑ N/A
Uniform Relocation Assistance and Real Property Acquisition Policies Act (Uniform Act)	
1. Is this a "full-delivery" project?	☑ Yes ☐ No
2. Does the project require the acquisition of real estate?	☑ Yes ☐ No ☐ N/A
3. Was the property acquisition completed prior to the intent to use federal funds?	☐ Yes ☑ No ☐ 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?	☑ Yes ☐ No ☐ 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?	☐ Yes ☑ No
2. Is the site of religious importance to American Indians?	☐ Yes ☐ No ☑ N/A
3. Is the project listed on, or eligible for listing on, the National Register of Historic Places?	☐ Yes ☐ No ☑ N/A
4. Have the effects of the project on this site been considered?	☐ Yes ☐ No ☑ N/A
Antiquities Act (AA)	
1. Is the project located on Federal lands?	☐ Yes ☑ No
2. Will there be loss or destruction of historic or prehistoric ruins, monuments or objects of antiquity?	☐ Yes ☐ No ☑ N/A
3. Will a permit from the appropriate Federal agency be required?	☐ Yes ☐ No ☑ N/A
4. Has a permit been obtained?	☐ Yes ☐ No ☑ N/A
Archaeological Resources Protection Act (ARPA)	
1. Is the project located on federal or Indian lands (reservation)?	☐ Yes ☑ No
2. Will there be a loss or destruction of archaeological resources?	☐ Yes ☐ No ☑ N/A
3. Will a permit from the appropriate Federal agency be required?	☐ Yes ☐ No ☑ N/A
4. Has a permit been obtained?	☐ Yes ☐ No ☑ N/A
Endangered Species Act (ESA)	
1. Are federal Threatened and Endangered species and/or Designated Critical Habitat listed for the county?	☐ Yes ☑ No
2. Is Designated Critical Habitat or suitable habitat present for listed species?	☐ Yes ☐ No ☑ N/A
3. Are T&E species present or is the project being conducted in Designated Critical Habitat?	☐ Yes ☐ No ☑ N/A
4. Is the project "likely to adversely affect" the species and/or "likely to adversely modify" Designated Critical Habitat?	☐ Yes ☐ No ☑ N/A
5. Does the USFWS/NOAA-Fisheries concur in the effects determination?	☐ Yes ☐ No ☑ N/A
6. Has the USFWS/NOAA-Fisheries rendered a "jeopardy" determination?	☐ Yes ☐ No ☑ 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?	☐ Yes ☑ No
2. Has the EBCI indicated that Indian sacred sites may be impacted by the proposed project?	☐ Yes ☐ No ☑ N/A
3. Have accommodations been made for access to and ceremonial use of Indian sacred sites?	☐ Yes ☐ No ☑ N/A
Farmland Protection Policy Act (FPPA)	
1. Will real estate be acquired?	☑ Yes ☐ No
2. Has NRCS determined that the project contains prime, unique, statewide or locally important farmland?	☑ Yes ☐ No ☐ N/A
3. Has the completed Form AD-1006 been submitted to NRCS?	☑ Yes ☐ No ☐ N/A
Fish and Wildlife Coordination Act (FWCA)	
1. Will the project impound, divert, channel deepen, or otherwise control/modify any water body?	☑ Yes ☐ No
2. Have the USFWS and the NCWRC been consulted?	☑ Yes ☐ No ☐ 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?	☐ Yes ☑ No
2. Has the NPS approved of the conversion?	☐ Yes ☐ No ☑ N/A
Magnuson-Stevens Fishery Conservation and Management Act (Essential Fish Habitat)	
1. Is the project located in an estuarine system?	☐ Yes ☑ No
2. Is suitable habitat present for EFH-protected species?	☐ Yes ☐ No ☑ N/A
3. Is sufficient design information available to make a determination of the effect of the project on EFH?	☐ Yes ☐ No ☑ N/A
4. Will the project adversely affect EFH?	☐ Yes ☐ No ☑ N/A
5. Has consultation with NOAA-Fisheries occurred?	☐ Yes ☐ No ☑ N/A
Migratory Bird Treaty Act (MBTA)	
1. Does the USFWS have any recommendations with the project relative to the MBTA?	☐ Yes ☑ No
2. Have the USFWS recommendations been incorporated?	☐ Yes ☐ No ☑ N/A
Wilderness Act	
1. Is the project in a Wilderness area?	☐ Yes ☑ No
2. Has a special use permit and/or easement been obtained from the maintaining federal agency?	☐ Yes ☐ No ☑ N/A

Axiom Environmental, Inc.

218 Snow Avenue, Raleigh, North Carolina 27603 919-270-9306

July 27, 2017

John Gerber, PE, CFM
State NFIP Coordinator
NC Floodplain Management Branch
4218 Mail Service Center
Raleigh, NC 27699-4218

Re: Major Hill Stream and Wetland mitigation project in Alamance County **17-009**
FEMA Floodplain Requirements Checklist

Dear Mr. Gerber:

The purpose of this letter is to request concurrence from the National Flood Insurance Program (NFIP) concerning a stream and wetland restoration site located in Alamance County. The Site encompasses approximately 15.4 acres of agricultural land used for livestock grazing and hay production. Existing Site streams have been impounded, cleared, trampled by livestock, eroded vertically and laterally, and receive extensive sediment and nutrient inputs from livestock. Proposed activities at the Site include the restoration of perennial and intermittent stream channels, enhancement of perennial stream channel, and restoration of riparian wetlands.

The project easement is depicted on the attached figures and lengths/priority of restoration are as follows.

Reach	Length	Priority
UT 1	2227	Priority 1 Restoration and Enhancement Level II
UT 2	160	Enhancement Level II
UT 3	2015	Enhancement Level II

FEMA mapping was reviewed to determine if the project is located in a FEMA study area (DFIRM panel number 8797). Based on existing floodplain mapping, Site tributaries are not included in the latest flood mapping study. Therefore, a "Conditional Letter of Map Revision" (CLOMR) is not expected for this project. Please see the attached Project Location Map and Topographic Map for your review. Also please find attached three copies of the NCDMS Floodplain Requirements Checklist for your records.

We thank you in advance for your timely response and cooperation. Please feel free to contact me with any questions that you may have concerning the extent of site disturbance associated with this project.

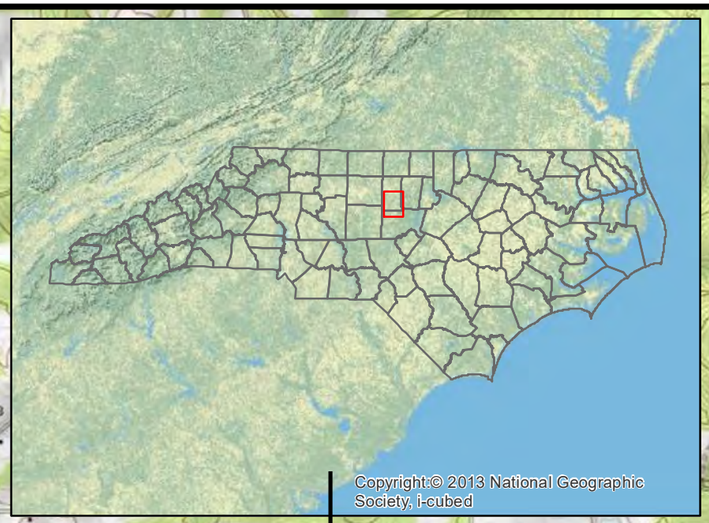
Yours truly,

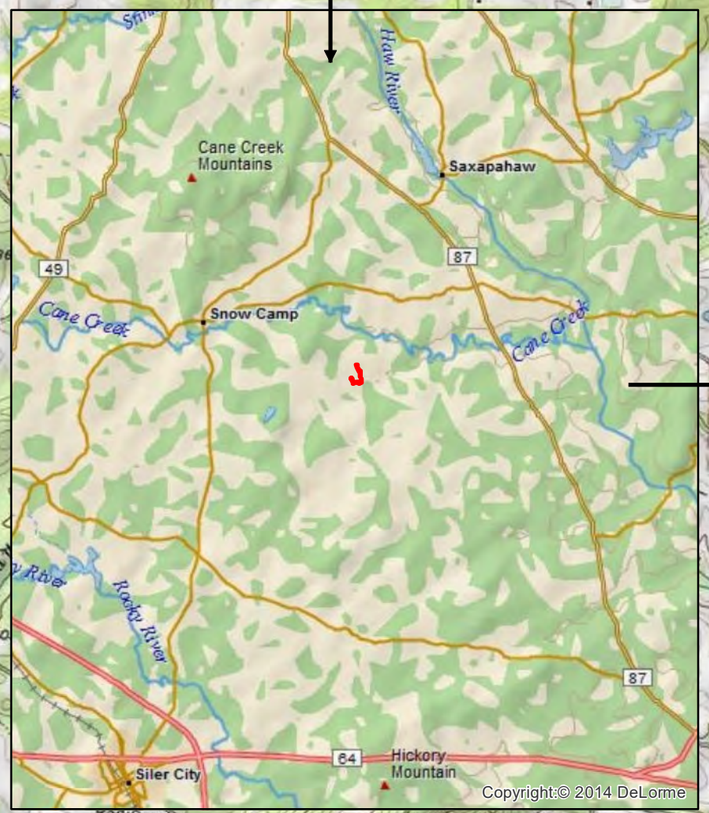
AXIOM ENVIRONMENTAL

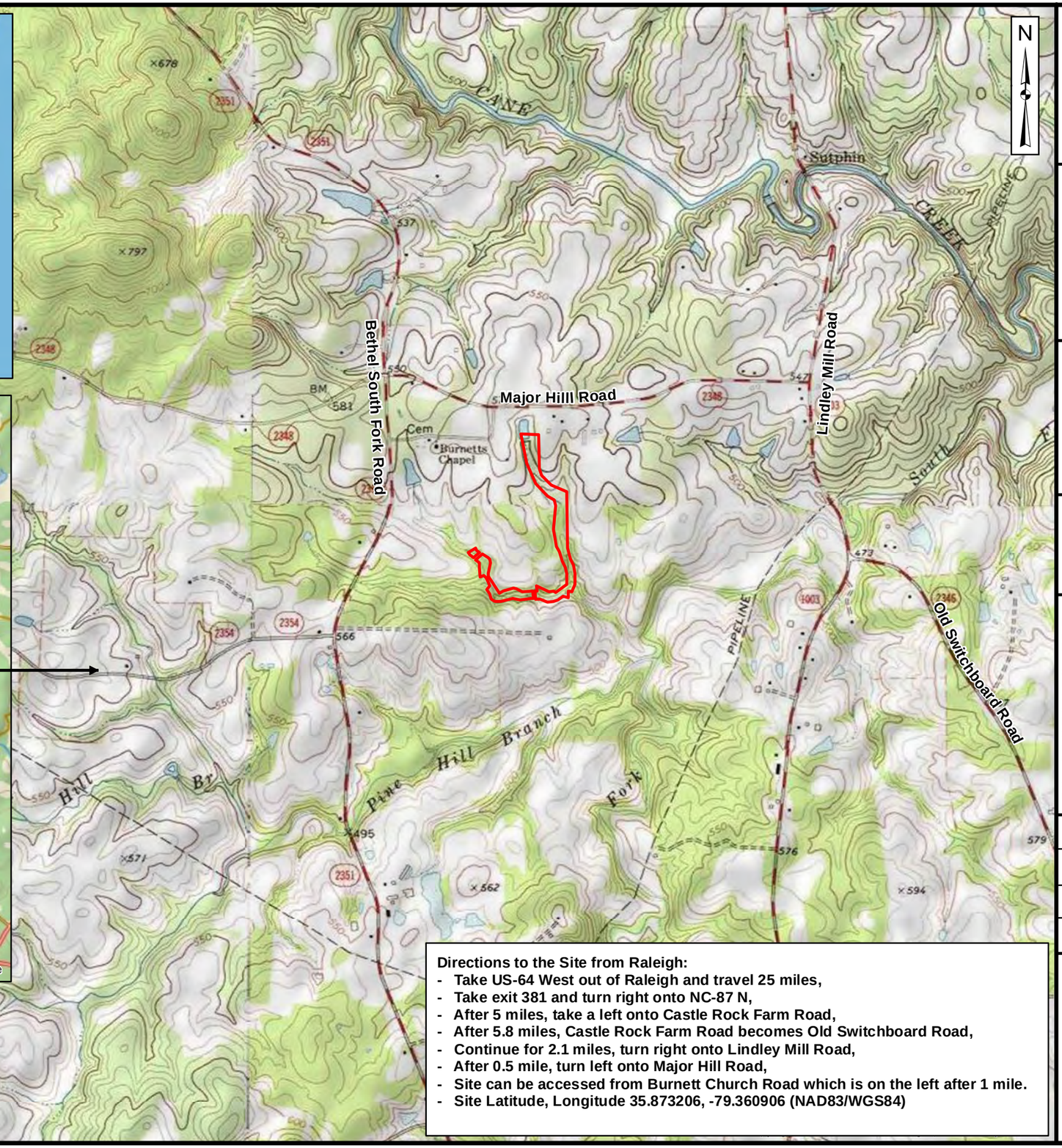
W. Grant Lewis
Senior Project Manager

Attachments

- Figure 1 Project Location and Topography
- Figure 2 Project Reaches
- NCDMS Floodplain Requirements Checklist







Directions to the Site from Raleigh:

- **Take US-64 West out of Raleigh and travel 25 miles,**
- **Take exit 381 and turn right onto NC-87 N,**
- **After 5 miles, take a left onto Castle Rock Farm Road,**
- **After 5.8 miles, Castle Rock Farm Road becomes Old Switchboard Road,**
- **Continue for 2.1 miles, turn right onto Lindley Mill Road,**
- **After 0.5 mile, turn left onto Major Hill Road,**
- **Site can be accessed from Burnett Church Road which is on the left after 1 mile.**
- **Site Latitude, Longitude 35.873206, -79.360906 (NAD83/WGS84)**

Axiom Environmental, Inc.

Prepared for:

RESTORATION SYSTEMS | LLC

Project:

MAJOR HILL STREAM AND WETLAND MITIGATION SITE

Alamance County, NC

Title:

SITE LOCATION

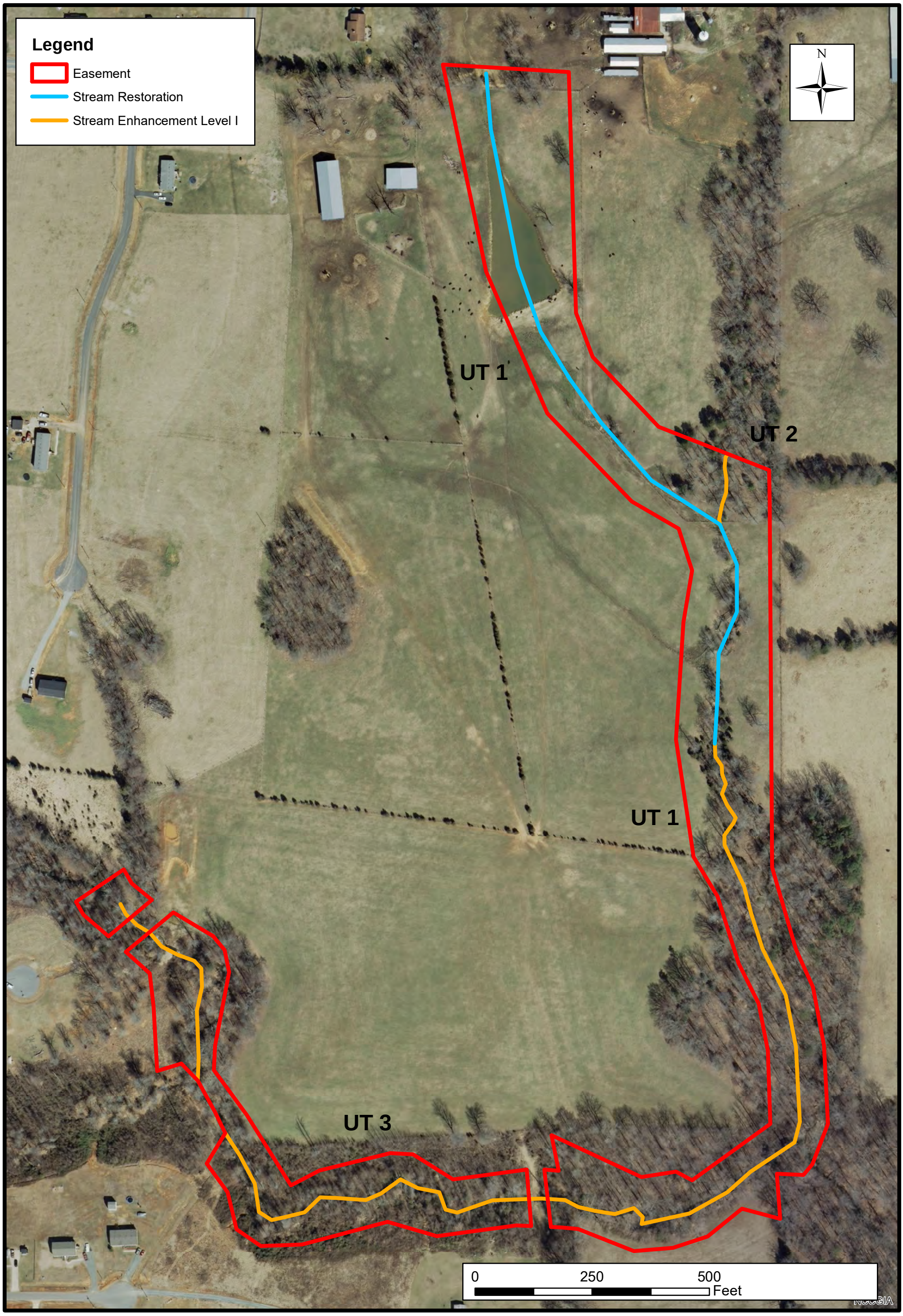
Notes:

Background Imagery Sources (Provided by ESRI Data and Maps):
1. Physical Map of the United States (2009) Created by the U.S. Park Service (Upper Inset)
2. DeLorme World Basemap digital mapping (2010, Lower Inset)
3. Saxapahaw (1977), Silk Hope (1974), Snow Camp (1978), and Crutchfield Crossroads (1974) 7.5-minute topographic quadrangles provided by the U.S. Geological Survey

Drawn by:	KRJ
Date:	MAY 2017
Scale:	1:20000
Project No.:	17-009

FIGURE

1



Axiom Environmental
218 Snow Ave
Raleigh, NC 27607
(919) 215-1693

Axiom Environmental, Inc.

Project Reaches
Major Hill Stream & Wetland Mitigation Site
Alamance County, North Carolina

Dwn. By: WGL	FIGURE
Date: May 2017	2
Project: 17-009	

EEP Floodplain Requirements Checklist

This form was developed by the National Flood Insurance program, NC Floodplain Mapping program and Ecosystem Enhancement Program to be filled for all EEP projects. The form is intended to summarize the floodplain requirements during the design phase of the projects. The form should be submitted to the Local Floodplain Administrator with three copies submitted to NFIP (attn. State NFIP Engineer), NC Floodplain Mapping Unit (attn. State NFIP Coordinator) and NC Ecosystem Enhancement Program.

Project Location

Name of project:	Major Hill Stream and Wetland Restoration Site
Name if stream or feature:	Pine Hill Branch
County:	Alamance
Name of river basin:	Cape Fear
Is project urban or rural?	Rural
Name of Jurisdictional municipality/county:	Alamance
DFIRM panel number for entire site:	8797
Consultant name:	Axiom Environmental, Inc.
Phone number:	919-215-1693
Address:	218 Snow Avenue Raleigh, NC 27603

Design Information

Provide a general description of project (one paragraph). Include project limits on a reference orthophotograph at a scale of 1" = 500". (See Attached)

Summarize stream reaches or wetland areas according to their restoration priority. (See Attached)

Example

Reach	Length	Priority
Example: Reach A	*1000*	*One (Restoration)*
Example: Reach B	*2000*	*Three (Enhancement)*

Floodplain Information

Is project located in a Special Flood Hazard Area (SFHA)?

○ Yes ◉ No

If project is located in a SFHA, check how it was determined:

☐ Redelineation

☐ Detailed Study

☐ Limited Detail Study

☐ Approximate Study

☐ Don't know

List flood zone designation: Zone X

Check if applies:

☐ AE Zone

- ○ Floodway
- ○ Non-Encroachment
- ◉ None

☐ A Zone

- ○ Local Setbacks Required
- ○ No Local Setbacks Required

If local setbacks are required, list how many feet:

Does proposed channel boundary encroach outside floodway/non-encroachment/setbacks?

○ Yes ◉ No

Land Acquisition (Check)

☐ State owned (fee simple)

☐ Conservation easment (Design Bid Build)

☑ Conservation Easement (Full Delivery Project)

Note: if the project property is state-owned, then all requirements should be addressed to the Department of Administration, State Construction Office (attn: Herbert Neily, (919) 807-4101)

Is community/county participating in the NFIP program?

◉ Yes ○ No

Note: if community is not participating, then all requirements should be addressed to NFIP (attn: State NFIP Engineer, (919) 715-8000)

Name of Local Floodplain Administrator: Libby Hodges
Phone Number: 336-570-4052

Floodplain Requirements

This section to be filled by designer/applicant following verification with the LFPA

☐ No Action

☐ No Rise

☐ Letter of Map Revision

☐ Conditional Letter of Map Revision

☐ Other Requirements

List other requirements:

Comments:

Name: W. Grant Lewis Signature: W Grant L

Title: President Date: July 27, 2017

North Carolina Department of Public Safety
Emergency Management

Roy Cooper, Governor
Erik A. Hooks, Secretary

Michael A. Sprayberry, Director

August 1, 2017

Axiom Environmental, Inc.
Attn: W. Grant Lewis
218 Snow Avenue
Raleigh, NC 27603

Subject: Heron Stream and Wetland Mitigation Project 17-008
Major Hill Stream and Wetland Mitigation Project 17-009
Alamance County, North Carolina

Dear Mr. Lewis:

Thank you for the opportunity to review the proposed Heron Stream and Wetland Mitigation Project and the Major Hill Stream and Wetland Mitigation Project. As requested, the North Carolina Department of Public Safety Division of Emergency Management Risk Management reviewed the documents provided and offers the following comments:

1) Based on the documentation provided, the Heron Stream and Wetland Mitigation Project will include areas within the Special Flood Hazard Area (SFHA) of South Fork. Any grading, fill or placement of equipment or materials in the SFHA will require a floodplain development permit issued by Alamance County. Specifically, outlined portions of Unnamed Tributaries 4, 6, 7, and 8 are within the SFHA of South Fork. Please be sure that the Alamance County Floodplain Administrator reviews and issues permits for work within the Special Flood Hazard Area.

2) Based on the documentation provided, the Major Hill Stream and Wetland Mitigation Project does not encroach on any mapped SFHA.

3) Based on the documentation provided, the proposed projects do not appear to encroach on the Non-Encroachment Areas of South Fork nor Pine Hill Branch.

4) The North Carolina Department of Public Safety Division of Emergency Management Risk Management has no objection to the projects as proposed.

MAILING ADDRESS:
4218 Mail Service Center
Raleigh NC 27699-4218
www.ncdps.gov
www.ncfloodmaps.com

An Equal Opportunity Employer

RM OFFICE LOCATION:
4105 Reedy Creek Road
Raleigh, NC 27607
Telephone: (919) 825-2341
Fax: (919) 825-0408

Thank you for your cooperation and consideration. If you have any questions concerning the above comments, please contact me at (919) 825-2300, by email at dan.brubaker@ncdps.gov or at the address shown on the footer of this document.

Sincerely,

John D Brubaker

John D. Brubaker, P.E., CFM
NFIP State Coordinator
Risk Management

cc: Milton Carpenter, NFIP Central Planner

Libby Hodges, Planning Director, Alamance County

Axiom Environmental, Inc.

Axiom Environmental, Inc.

218 Snow Avenue, Raleigh, North Carolina 27603 919-270-9306

July 27, 2017

Shannon Deaton,
Habitat Conservation Program Manager
North Carolina Wildlife Resources Commission

Re: Major Hill Stream and Wetland mitigation project **17-009**
Alamance County, NC

Dear Ms. Deaton:

The purpose of this letter is to request concurrence from the North Carolina Wildlife Resources Commission concerning a stream and wetland restoration site located in Alamance County. The project will restore stream channels through active pastureland. Please review and comment on any possible issues that might emerge with respect to the Fish and Wildlife Coordination Act from the potential wetland and stream restoration project (USGS Saxapahaw and Silk Hope, North Carolina 7.5-minute topographic quadrangle).

The Major Hill site has been identified for the purpose of providing in-kind mitigation for unavoidable stream channel and wetland impacts. Several sections of channel have been identified as significantly degraded.

We thank you in advance for your timely response and cooperation. Please feel free to contact me with any questions that you may have concerning the extent of site disturbance associated with this project.

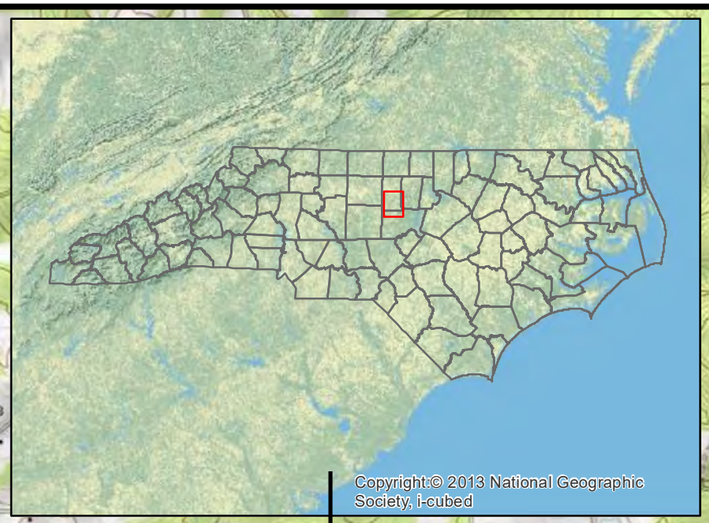
Yours truly,

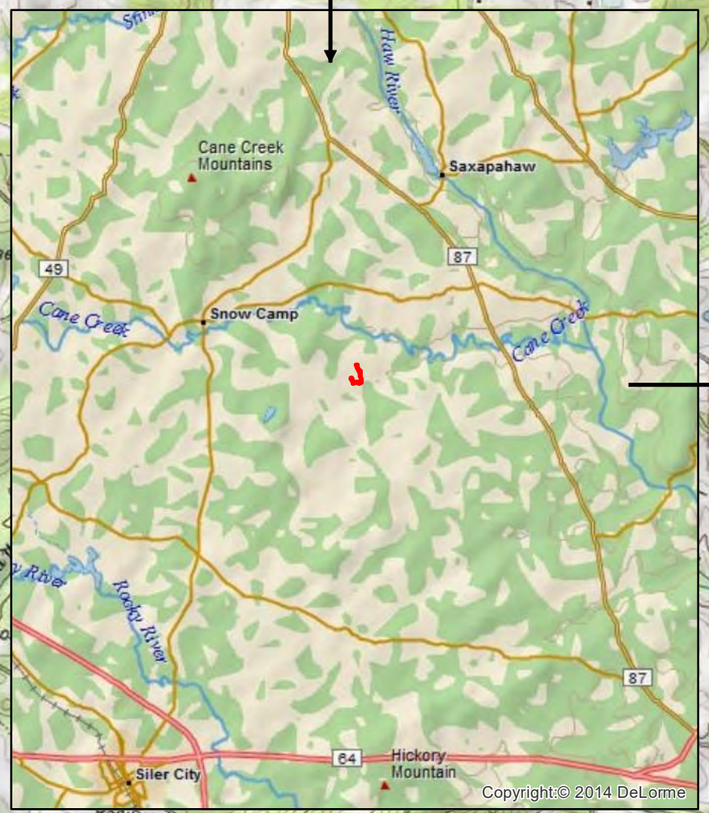
AXIOM ENVIRONMENTAL. INC.

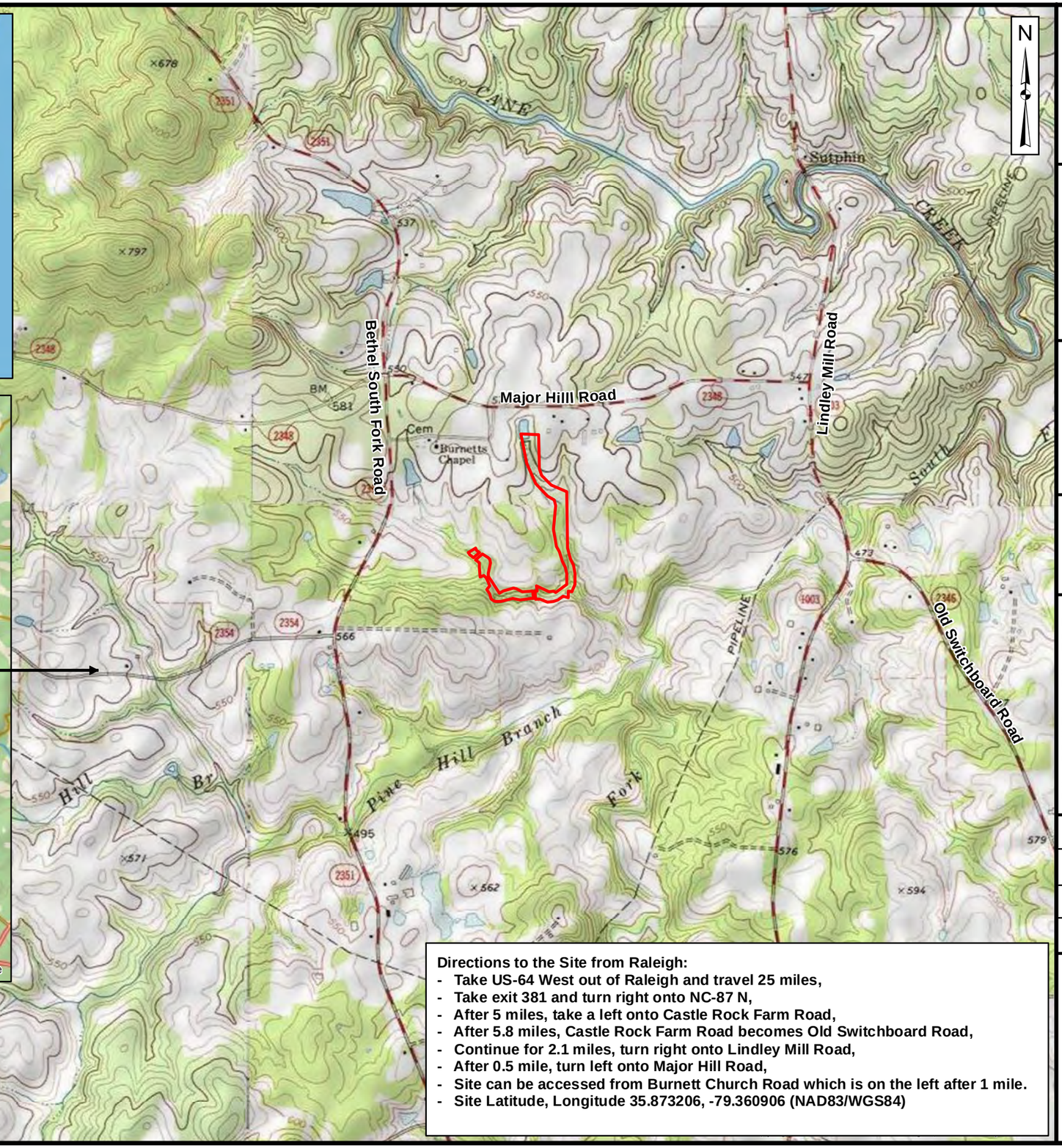
W Grant Lewis

W. Grant Lewis
Senior Project Manager

Attachments







Directions to the Site from Raleigh:
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- **Site can be accessed from Burnett Church Road which is on the left after 1 mile.**
- **Site Latitude, Longitude 35.873206, -79.360906 (NAD83/WGS84)**

Axiom Environmental, Inc.

Prepared for:

RESTORATION SYSTEMS | LLC

Project:

MAJOR HILL STREAM AND WETLAND MITIGATION SITE

Alamance County, NC

Title:

SITE LOCATION

Notes:

Background Imagery Sources (Provided by ESRI Data and Maps):
1. Physical Map of the United States (2009) Created by the U.S. Park Service (Upper Inset)
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3. Saxapahaw (1977), Silk Hope (1974), Snow Camp (1978), and Crutchfield Crossroads (1974) 7.5-minute topographic quadrangles provided by the U.S. Geological Survey

Drawn by:	KRJ
Date:	MAY 2017
Scale:	1:20000
Project No.:	17-009

FIGURE

1

North Carolina Wildlife Resources Commission

Gordon Myers, Executive Director

August 31, 2017

Mr. Grant Lewis
Axiom Environmental, Inc.
218 Snow Avenue
Raleigh, NC 27603

Subject: Request for Environmental Information for the Major Hill Stream and Wetland Mitigation Project, Alamance County, North Carolina.

Dear Mr. Lewis,

Biologists with the North Carolina Wildlife Resources Commission (NCWRC) have reviewed the proposed project description. Comments are provided in accordance with certain provisions of the Clean Water Act of 1977 (as amended), 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.).

Axiom Environmental, Inc. has developed the Major Hill Stream and Wetland Mitigation Project in order to provide in-kind mitigation for unavoidable stream channel and wetland impacts. The project site is located on active pastureland. This project will include stream and wetland restoration and enhancement. The site is located south of Major Hill Road, east of its intersection with Bethel South Fork Road, east of Snow Camp.

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. The NCWRC recommends the use of biodegradable and wildlife-friendly sediment and erosion control devices. 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 and similar products that have been reinforced with plastic or metal mesh should be avoided as they impede 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. Any invasive plant species that are found onsite should be removed.

Mailing Address: Habitat Conservation • 1721 Mail Service Center • Raleigh, NC 27699-1721
Telephone: (919) 707-0220 • **Fax:** (919) 707-0028

Thank you for the opportunity to review and comment on this project. If I can be of further assistance, please contact me at (910) 409-7350 or gabriela.garrison@ncwildlife.org.

Sincerely,

Gabriela Garrison
Eastern Piedmont Habitat Conservation Coordinator
Habitat Conservation Program

Axiom Environmental, Inc.

Axiom Environmental, Inc.

218 Snow Avenue, Raleigh, North Carolina 27603 919-270-9306

July 27, 2017

Dale Suiter,
Endangered Species Biologist
USFWS Raleigh Field Office
PO Box 33726
Raleigh, North Carolina 27636

Re: Major Hill Stream and Wetland mitigation project in Alamance County **17-009**
Alamance County, NC

Dear Mr. Suiter:

The purpose of this letter is to request a list of federally protected species in Alamance County as well as any known information for each species in the county. Please review and comment on any possible issues that might emerge with respect to endangered species, and migratory birds from a potential wetland and stream restoration project on the attached site (USGS Saxapahaw and Silk Hope, North Carolina 7.5-minute topographic quadrangle).

The Major Hill Site has been identified for the purpose of providing in-kind mitigation for unavoidable stream channel and wetland impacts. Several sections of channel have been identified as significantly degraded.

We thank you in advance for your timely response and cooperation. Please feel free to contact me with any questions that you may have concerning the extent of site disturbance associated with this project.

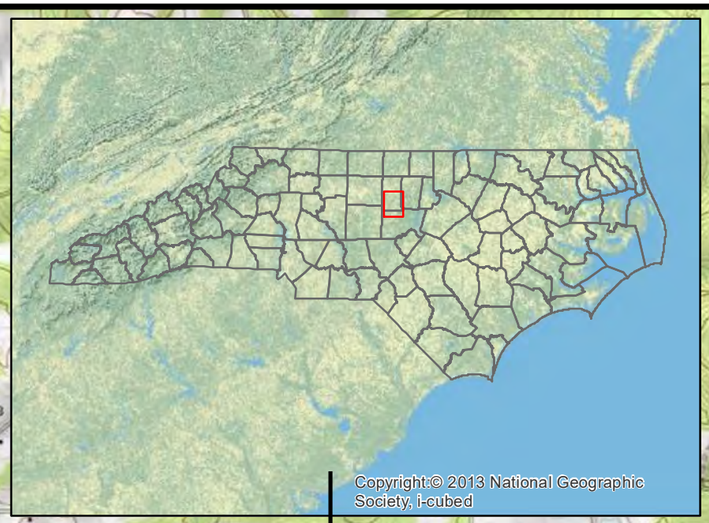
Yours truly,

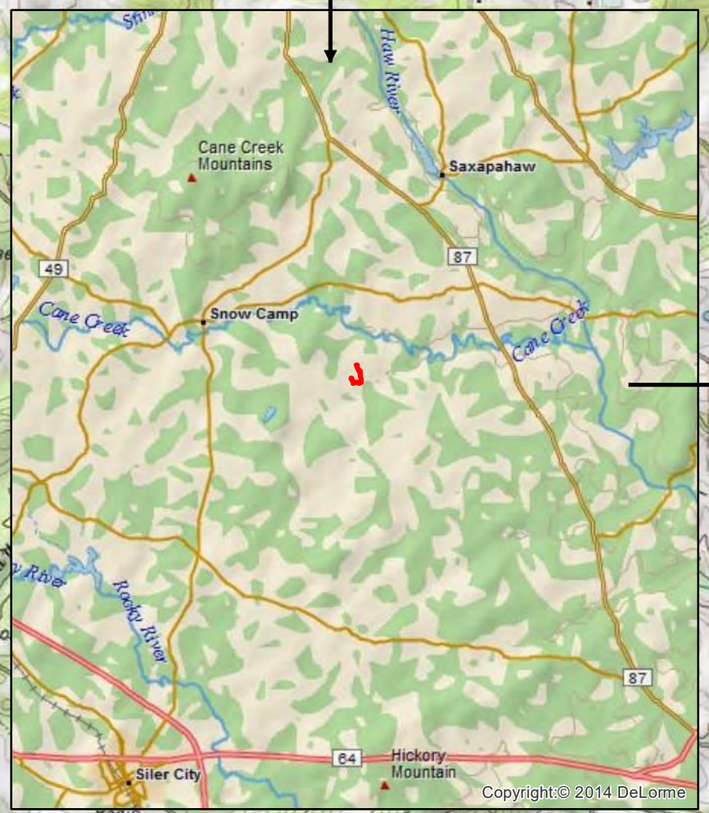
AXIOM ENVIRONMENTAL, INC.

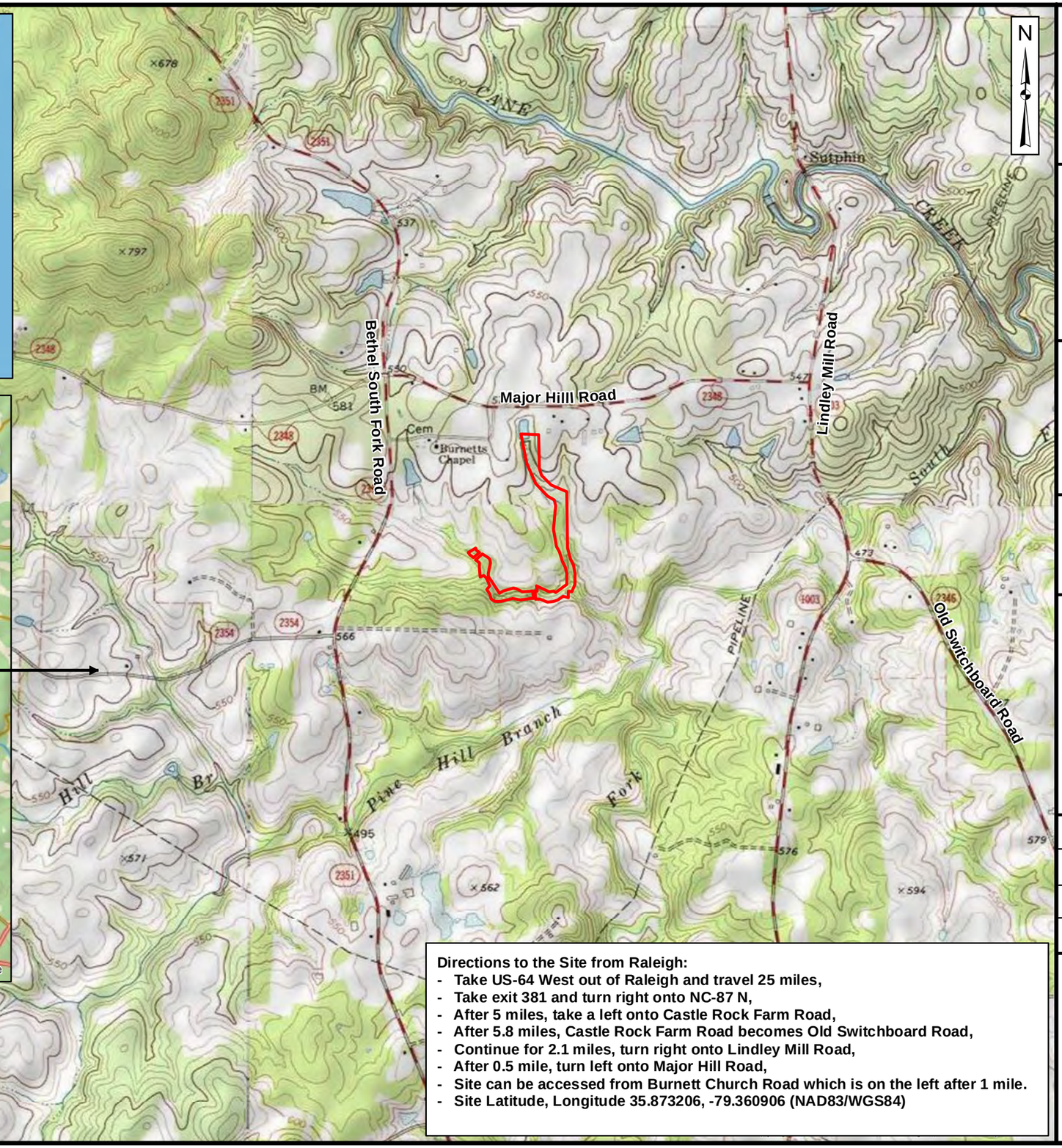
W Grant Lewis

W. Grant Lewis
Senior Project Manager

Attachments







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- **Site Latitude, Longitude 35.873206, -79.360906 (NAD83/WGS84)**

Axiom Environmental, Inc.

Prepared for:

RESTORATION SYSTEMS | LLC

Project:

MAJOR HILL STREAM AND WETLAND MITIGATION SITE

Alamance County, NC

Title:

SITE LOCATION

Notes:

Background Imagery Sources (Provided by ESRI Data and Maps):
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3. Saxapahaw (1977), Silk Hope (1974), Snow Camp (1978), and Crutchfield Crossroads (1974) 7.5-minute topographic quadrangles provided by the U.S. Geological Survey

Drawn by:	KRJ
Date:	MAY 2017
Scale:	1:20000
Project No.:	17-009

FIGURE

1

United States Department of the Interior
FISH AND WILDLIFE SERVICE
Raleigh ES Field Office
Post Office Box 33726
Raleigh, North Carolina 27636-3726

August 24, 2017

Grant Lewis
Axiom Environmental Inc.
218 Snow Avenue
Raleigh, NC 27603

Re: Major Hill Stream & Wetland Mitigation – Alamance County, NC

Dear Mr. Lewis:

This letter is to inform you that the Service has established an on-line project planning and consultation process which assists developers and consultants in determining whether a federally-listed species or designated critical habitat may be affected by a proposed project. For future projects, please visit the Raleigh Field Office's project planning website at https://www.fws.gov/raleigh/pp.html. If you are only searching for a list of species that may be present in the project's Action Area, then you may use the Service's Information, Planning, and Consultation System (IPaC) website to determine if any listed, proposed, or candidate species may be present in the Action Area and generate a species list. The IPaC website may be viewed at https://ecos.fws.gov/ipac/. The IPaC web site contains a complete and frequently updated list of all endangered and threatened species protected by the provisions of the Endangered Species Act of 1973, as amended (16 U.S.C. 1531 et seq.)(Act), a list of federal species of concern[1] that are known to occur in each county in North Carolina, and other resources.

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.

[1] The term "federal species of concern" refers to those species which the Service believes might be in need of concentrated conservation actions. Federal species of concern receive no legal protection and their designation does not necessarily imply that the species will eventually be proposed for listing as a federally endangered or threatened species. However, we recommend that all practicable measures be taken to avoid or minimize adverse impacts to federal species of concern.

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.

With regard to the above-referenced project, we offer the following remarks. Our comments are submitted pursuant to, and in accordance with, provisions of the Endangered Species Act.

Based on the information provided and other information available, it appears that the proposed action is not likely to adversely affect any federally-listed endangered or threatened species, their formally designated critical habitat, or species currently proposed for listing under the Act at these sites. We believe that the requirements of section 7(a)(2) of the Act have been satisfied for your project. Please remember that obligations under section 7 consultation must be reconsidered if: (1) new information reveals impacts of this identified action that may affect listed species or critical habitat in a manner not previously considered; (2) this action is subsequently modified in a manner that was not considered in this review; or, (3) a new species is listed or critical habitat determined that may be affected by the identified action.

However, the Service is concerned about the potential impacts the proposed action might have on aquatic species. Aquatic resources are highly susceptible to sedimentation. Therefore, we recommend that all practicable measures be taken to avoid adverse impacts to aquatic species, including implementing directional boring methods and stringent sediment and erosion control measures. An erosion and sedimentation control plan should be submitted to and approved by the North Carolina Division of Land Resources, Land Quality Section prior to construction. Erosion and sedimentation controls should be installed and maintained between the construction site and any nearby down-gradient surface waters. In addition, we recommend maintaining natural, vegetated buffers on all streams and creeks adjacent to the project site.

The North Carolina Wildlife Resources Commission has developed a Guidance Memorandum (a copy can be found on our website at (http://www.fws.gov/raleigh) to address and mitigate secondary and cumulative impacts to aquatic and terrestrial wildlife resources and water quality. We recommend that you consider this document in the development of your projects and in completing an initiation package for consultation (if necessary).

We hope you find our web page useful and informative and that following the process described above will reduce the time required, and eliminate the need, for general correspondence for species' lists. If you have any questions or comments, please contact Kathy Matthews of this office at (919) 856-4520 ext. 27.

Sincerely,

Pete Benjamin
Field Supervisor

IPaC Information for Planning and Consultation **U.S. Fish & Wildlife Service**

Regulatory review

The IPaC regulatory review process will help evaluate the potential impacts of your project on resources managed by the U.S. Fish and Wildlife Service. We'll walk through regulations covering each protected resource, and offer suggestions and assistance in designing your project.

Endangered species

Endangered species are protected under the Endangered Species Act[1].

THERE ARE NO ENDANGERED SPECIES EXPECTED TO OCCUR AT THIS LOCATION.

Migratory birds

Certain birds are protected under the Migratory Bird Treaty Act[3] and the Bald and Golden Eagle Protection Act[4].

16 migratory birds of conservation concern are expected to occur or may be affected by activities in this location.

- Contact the local U.S. Fish and Wildlife Service field office

  There is currently no regulatory review process in IPaC for migratory birds. Please contact the local U.S. Fish and Wildlife Service field office to evaluate effects and authorize take.

Facilities

U.S. Fish and Wildlife Service facilities are protected under the National Wildlife Refuge System Administration Act[5] and the National Fish Hatchery System[6].

THERE ARE NO U.S. FISH AND WILDLIFE SERVICE REFUGES OR FISH HATCHERIES AT THIS LOCATION.

Wetlands

Wetlands and other aquatic habitats may be subject to regulation under Section 404 of the Clean Water Act[Z], or other State/Federal statutes.

This project overlaps known wetland areas.

Contact the U.S. Army Corps of Engineers

Permitting for impacts to wetlands and other aquatic habitats is handled by the Regulatory Program of the local U.S. Army Corps of Engineers District.

1. The Endangered Species Act (ESA) of 1973.
2. The Migratory Birds Treaty Act of 1918.
3. The Bald and Golden Eagle Protection Act of 1940.
4. The National Wildlife Refuge System Administration Act of 1966.
5. The National Fish Hatchery System.
6. Section 404 of the Clean Water Act establishes a program to regulate the discharge of dredged and fill material into waters of the United States, including wetlands.

Axiom Environmental, Inc.

Axiom Environmental, Inc.

218 Snow Avenue, Raleigh, North Carolina 27603 919-270-9306

July 27, 2017

Brian Loadholt
Natural Resources Conservation Services
209 N. Graham-Hopedale Rd.
Burlington, NC 27217

Re: Major Hill Stream and Wetland mitigation project **17-009**
Alamance County, NC

Dear Mr. Loadholt:

The purpose of this letter is to request concurrence from the Natural Resources Conservation Service concerning a stream and wetland restoration site located in Alamance County. The Site encompasses approximately 15.4 acres of agricultural land used for livestock grazing and hay production. Existing Site streams have been cleared, dredged of cobble substrate, trampled by livestock, eroded vertically and laterally, and receive extensive sediment and nutrient inputs from livestock. Proposed activities at the Site include the restoration of perennial and intermittent stream channels, enhancement of perennial stream channel, and restoration of riparian wetlands. In support of this effort, the entire easement will be planted with native forest vegetation; thereby, removing the area within the easement from active pasture.

Please review and comment on any possible issues that might emerge with respect to the Farmland Conversion. You will find attached to this letter information including a location map, a map depicting soil types and acreages to be converted, and Form AD-1006.

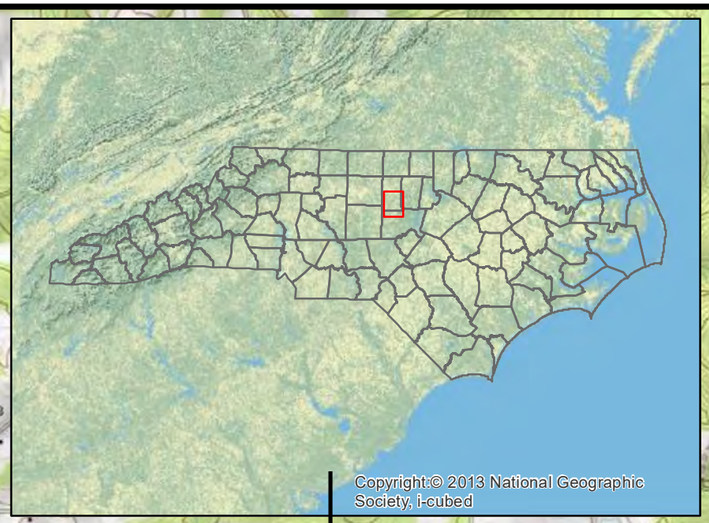
We thank you in advance for your timely response and cooperation. Please feel free to contact me with any questions that you may have concerning the extent of site disturbance associated with this project.

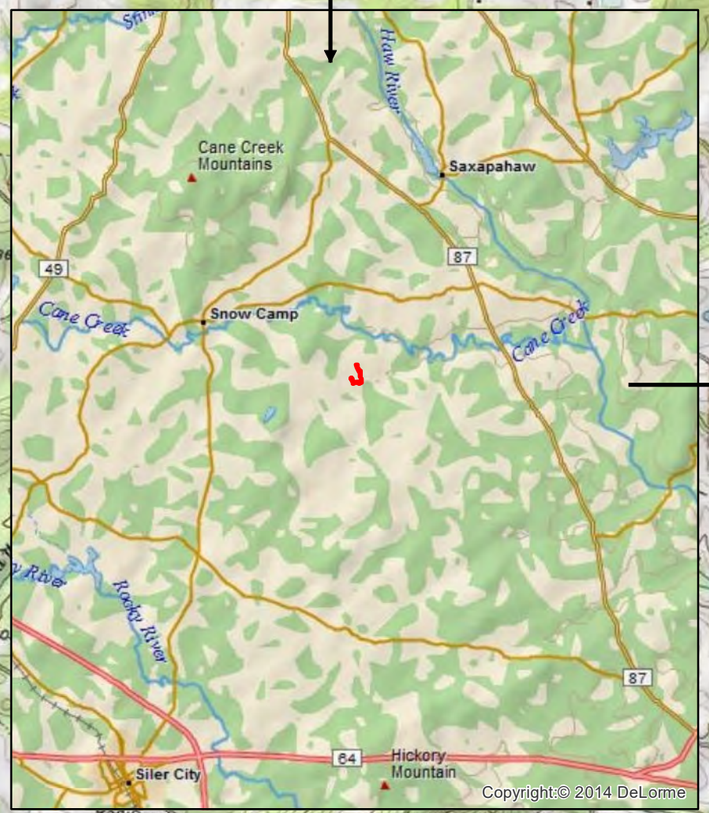
Yours truly,

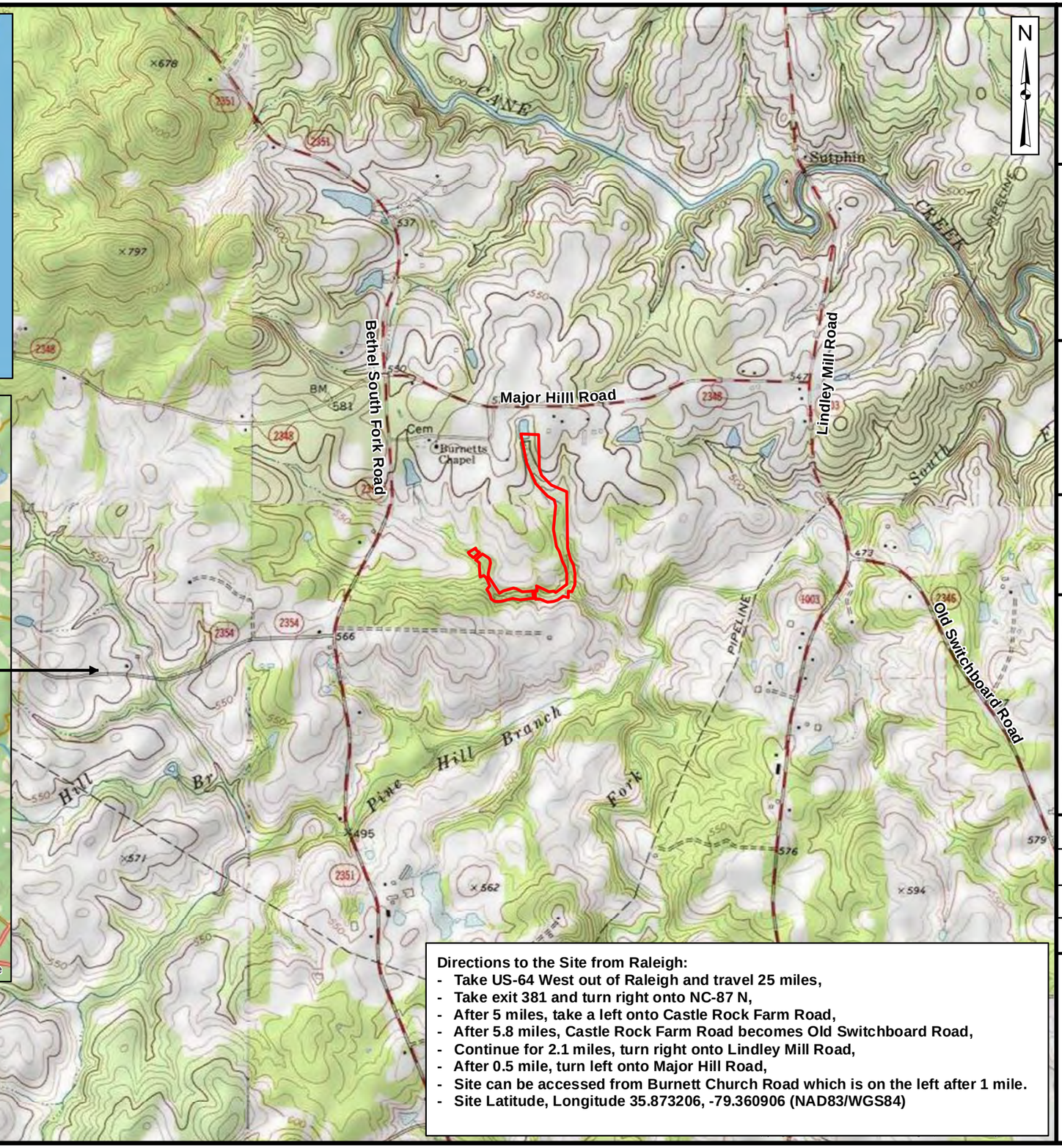
W Grant Lewis

AXIOM ENVIRONMENTAL, INC.
W. Grant Lewis
Senior Project Manager

Attachments







Directions to the Site from Raleigh:
- **Take US-64 West out of Raleigh and travel 25 miles,**
- **Take exit 381 and turn right onto NC-87 N,**
- **After 5 miles, take a left onto Castle Rock Farm Road,**
- **After 5.8 miles, Castle Rock Farm Road becomes Old Switchboard Road,**
- **Continue for 2.1 miles, turn right onto Lindley Mill Road,**
- **After 0.5 mile, turn left onto Major Hill Road,**
- **Site can be accessed from Burnett Church Road which is on the left after 1 mile.**
- **Site Latitude, Longitude 35.873206, -79.360906 (NAD83/WGS84)**

Axiom Environmental, Inc.

Prepared for:

RESTORATION SYSTEMS | LLC

Project:

MAJOR HILL STREAM AND WETLAND MITIGATION SITE

Alamance County, NC

Title:

SITE LOCATION

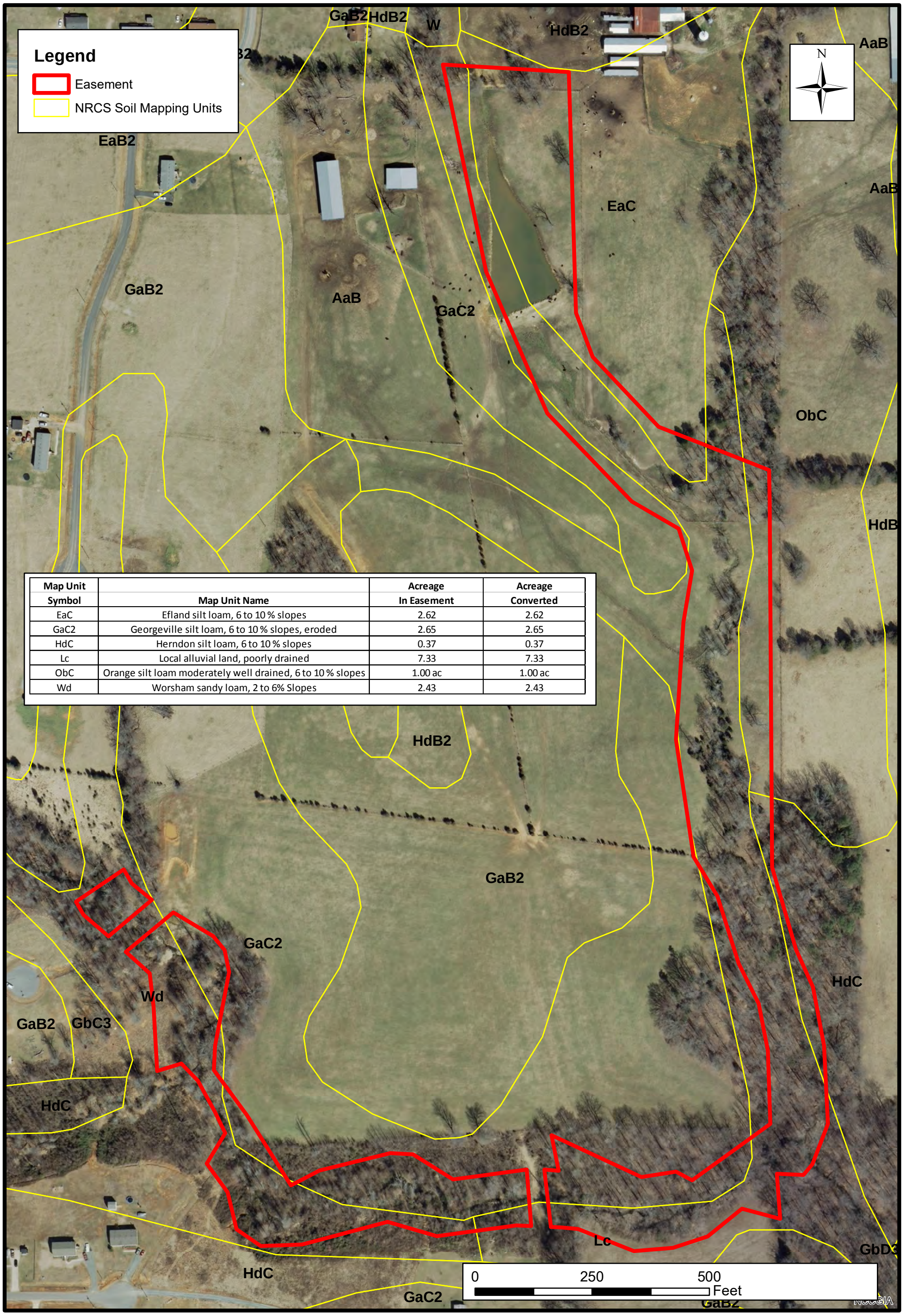
Notes:

Background Imagery Sources (Provided by ESRI Data and Maps):
1. Physical Map of the United States (2009) Created by the U.S. Park Service (Upper Inset)
2. DeLorme World Basemap digital mapping (2010, Lower Inset)
3. Saxapahaw (1977), Silk Hope (1974), Snow Camp (1978), and Crutchfield Crossroads (1974) 7.5-minute topographic quadrangles provided by the U.S. Geological Survey

Drawn by:	KRJ
Date:	MAY 2017
Scale:	1:20000
Project No.:	17-009

FIGURE

1



Map Unit Symbol	Map Unit Name	Acreage In Easement	Acreage Converted
EaC	Efland silt loam, 6 to 10 % slopes	2.62	2.62
GaC2	Georgeville silt loam, 6 to 10 % slopes, eroded	2.65	2.65
HdC	Herndon silt loam, 6 to 10 % slopes	0.37	0.37
Lc	Local alluvial land, poorly drained	7.33	7.33
ObC	Orange silt loam moderately well drained, 6 to 10 % slopes	1.00 ac	1.00 ac
Wd	Worsham sandy loam, 2 to 6% Slopes	2.43	2.43

Axiom Environmental
218 Snow Ave
Raleigh, NC 27607
(919) 215-1693
Axiom Environmental, Inc.

Existing Conditions
Major Hill Stream & Wetland Mitigation Site
Alamance County, North Carolina

Dwn. By:	WGL
Date:	May 2017
Project:	17-009

FIGURE 2

USDA
United States Department of Agriculture

Natural Resources
Conservation Service

North Carolina
State Office

4407 Bland Road
Suite 117
Raleigh, NC 27609
Voice 919-873-2171
Fax (844) 325-2156

August 10, 2017

Grant Lewi
Senior Project Manager
Axiom Environmental, Inc.
218 Snow Avenue
Raleigh, North Carolina 27603

Dear Grant Lewis:

Thank you for your letter dated August 1, 2017, Subject: Major Hill Stream and Wetland Restoration Site in Alamance Co., North Carolina. The following guidance is provided for your information.

Projects are subject to the Farmland Protection Policy Act (FPPA) requirements if they may irreversibly convert farmland (directly or indirectly) to non-agricultural use and are completed by a federal agency or with assistance from a federal agency. Farmland means prime or unique farmlands as defined in section 1540(c)(1) of the FPPA or farmland that is determined by the appropriate state or unit of local government agency or agencies with concurrence of the Secretary of Agriculture to be farmland of statewide local importance.

For the purpose of FPPA, farmland includes prime farmland, unique farmland, and land of statewide or local importance. Farmland subject to FPPA requirements does not have to be currently used for cropland. It can be forestland, pastureland, cropland, or other land, but not water or urban built-up land.

Farmland does not include land already in or committed to urban development or water storage. Farmland *already in* urban development or water storage includes all such land with a density of 30 structures per 40-acre area. Farmland already in urban development also includes lands identified as *urbanized area* (UA) on the Census Bureau Map, or as urban area mapped with a *tint overprint* on the United States Geological Survey (USGS) topographical maps, or as *urban-built-up* on the United States Department of Agriculture (USDA) Important Farmland Maps.

The area in question meets one or more of the above criteria for Farmland. Farmland area will be affected or converted. Enclosed is the Farmland Conversion Impact Rating form AD1006 with PARTS II, IV and V completed by NRCS. The corresponding agency will need to complete the evaluation, according to the Code of Federal Regulation 7CFR 658, Farmland Protection Policy Act.

The Natural Resources Conservation Service
is an agency of the Department of Agriculture's
Natural Resources mission.

An Equal Opportunity Provider, Employer and Lender

If you have any questions, please contact Milton Cortes, Assistant State Soil Scientist at 919-873-2171 or by email: milton.cortes@nc.usda.gov.

Again, thank you for inquiry. If we can be of further assistance, please do not hesitate to contact us.

Sincerely,

Milton Cortes
Milton Cortes
Assistant State Soil Scientist

cc:
Kent Clary, State Soil Scientist, NRCS, Raleigh, NC

U.S. Department of Agriculture

FARMLAND CONVERSION IMPACT RATING

PART I *(To be completed by Federal Agency)*	Date Of Land Evaluation Request: August 1, 2017
Name Of Project: Major Hill Stream and Wetland Restoration Site	Federal Agency Involved: Federal Highway Administration
Proposed Land Use: Stream and Wetland Restoration	County And State: Alamance, NC
PART II *(To be completed by NRCS)*	Date Request Received By NRCS: August 1, 2017

Does the site contain prime, unique, statewide or local important farmland? *(If no, the FPPA does not apply -- do not complete additional parts of this form).*	Yes ☑	No ☐	Acres Irrigated: none	Average Farm Size: 114 acres
Major Crop(s): CORN	Farmable Land In Govt. Jurisdiction: Acres: 240, 623 acres % 86		Amount Of Farmland As Defined in FPPA: Acres: 179, 301 acres % 64	
Name Of Land Evaluation System Used: Alamance Co, NC LESA	Name Of Local Site Assessment System: N/A		Date Land Evaluation Returned By NRCS: August 10, 2017 By eMail	

PART III *(To be completed by Federal Agency)*	Alternative Site Rating: Site A	Site B	Site C	Site D
A. Total Acres To Be Converted Directly	16.4			
B. Total Acres To Be Converted Indirectly	0.0			
C. Total Acres In Site	16.4	0.0	0.0	0.0
PART IV *(To be completed by NRCS)* Land Evaluation Information				
A. Total Acres Prime And Unique Farmland	0.0			
B. Total Acres Statewide And Local Important Farmland	6.6			
C. Percentage Of Farmland In County Or Local Govt. Unit To Be Converted	0.00370			
D. Percentage Of Farmland In Govt. Jurisdiction With Same Or Higher Relative Value	86.0			
PART V *(To be completed by NRCS)* Land Evaluation Criterion Relative Value Of Farmland To Be Converted *(Scale of 0 to 100 Points)*				

PART VI *(To be completed by Federal Agency)* Site Assessment Criteria *(These criteria are explained in 7 CFR 658.5(b)*	Maximum Points				
1. Area In Nonurban Use		15			
2. Perimeter In Nonurban Use		10			
3. Percent Of Site Being Farmed		20			
4. Protection Provided By State And Local Government		0			
5. Distance From Urban Builtup Area		15			
6. Distance To Urban Support Services		15			
7. Size Of Present Farm Unit Compared To Average		2			
8. Creation Of Nonfarmable Farmland		0			
9. Availability Of Farm Support Services		5			
10. On-Farm Investments		8			
11. Effects Of Conversion On Farm Support Services		0			
12. Compatibility With Existing Agricultural Use		0			
TOTAL SITE ASSESSMENT POINTS	160				
PART VII *(To be completed by Federal Agency)*					
Relative Value Of Farmland *(From Part V)*	100				
Total Site Assessment *(From Part VI above or a local site assessment)*	160				
TOTAL POINTS *(Total of above 2 lines)*	260	119	0	0	0

Site Selected:	Date Of Selection	Was A Local Site Assessment Used? Yes ☐ No ☐

Reason For Selection:

(See Instructions on reverse side)

This form was electronically produced by National Production Services Staff

Clear Form

Form AD-1006 (10-83)

STEPS IN THE PROCESSING THE FARMLAND AND CONVERSION IMPACT RATING FORM

Step 1 – Federal agencies involved in proposed projects that may convert farmland, as defined in the Farmland Protection Policy Act (FPPA) to nonagricultural uses, will initially complete Parts I and III of the form.

Step 2 – Originator will send copies A, B and C together with maps indicating locations of site(s), to the Natural Resources Conservation Service (NRCS) local field office and retain copy D for their files. (Note: NRCS has a field office in most counties in the U.S. The field office is usually located in the county seat. A list of field office locations are available from the NRCS State Conservationist in each state).

Step 3 – NRCS will, within 45 calendar days after receipt of form, make a determination as to whether the site(s) of the proposed project contains prime, unique, statewide or local important farmland.

Step '4 – In cases where farmland covered by the FPPA will be converted by the proposed project, NRCS field offices will complete Parts II, IV and V of the form.

Step 5 – NRCS will return copy A and B of the form to the Federal agency involved in the project. (Copy C will be retained for NRCS records).

Step 6 – The Federal agency involved in the proposed project will complete Parts VI and VII of the form.

Step 7 – The Federal agency involved in the proposed project will make a determination as to whether the proposed conversion is consistent with the FPPA and the agency's internal policies.

INSTRUCTIONS FOR COMPLETING THE FARMLAND CONVERSION IMPACT RATING FORM

Part I: In completing the "County And State" questions list all the local governments that are responsible for local land controls where site(s) are to be evaluated.

Part III: In completing item B (Total Acres To Be Converted Indirectly), include the following:

1. Acres not being directly converted but that would no longer be capable of being farmed after the conversion, because the conversion would restrict access to them.

2. Acres planned to receive services from an infrastructure project as indicated in the project justification (e.g. highways, utilities) that will cause a direct conversion.

Part VI: Do not complete Part VI if a local site assessment is used.

Assign the maximum points for each site assessment criterion as shown in § 658.5 (b) of CFR. In cases of corridor-type projects such as transportation, powerline and flood control, criteria #5 and #6 will not apply and will, be weighed zero, however, criterion #8 will be weighed a maximum of 25 points, and criterion #11 a maximum of 25 points.

Individual Federal agencies at the national level, may assign relative weights among the 12 site assessment criteria other than those shown in the FPPA rule. In all cases where other weights are assigned relative adjustments must be made to maintain the maximum total weight points at l60.

In rating alternative sites, Federal agencies shall consider each of the criteria and assign points within the limits established in the FPPA rule. Sites most suitable for protection under these criteria will receive the highest total scores, and sites least suitable, the lowest scores.

Part VII: In computing the "Total Site Assessment Points" where a State or local site assessment is used and the total maximum number of points is other than 160, adjust the site assessment points to a base of 160. Example: if the Site Assessment maximum is 200 points, and alternative Site "A" is rated 180 points:

$$\frac{\text{Total points assigned Site A}}{\text{Maximum points possible}} = \frac{180}{200} \times 160 = 144 \text{ points for Site "A."}$$

Site Assessment Scoring for the Twelve Factors Used in FPPA

The Site Assessment criteria used in the Farmland Protection Policy Act (FPPA) rule are designed to assess important factors other than the agricultural value of the land when determining which alternative sites should receive the highest level of protection from conversion to non agricultural uses.

Twelve factors are used for Site Assessment and ten factors for corridor-type sites. Each factor is listed in an outline form, without detailed definitions or guidelines to follow in the rating process. The purpose of this document is to expand the definitions of use of each of the twelve Site Assessment factors so that all persons can have a clear understanding as to what each factor is intended to evaluate and how points are assigned for given conditions.

In each of the 12 factors a number rating system is used to determine which sites deserve the most protection from conversion to non-farm uses. The higher the number value given to a proposed site, the more protection it will receive. The maximum scores are 10, 15 and 20 points, depending upon the relative importance of each particular question. If a question significantly relates to why a parcel of land should not be converted, the question has a maximum possible protection value of 20, whereas a question which does not have such a significant impact upon whether a site would be converted, would have fewer maximum points possible, for example 10.

The following guidelines should be used in rating the twelve Site Assessment criteria:

1. How much land is in non-urban use within a radius of 1.0 mile from where the project is intended?

More than 90 percent:	15 points
90-20 percent:	14 to 1 points
Less than 20 percent:	0 points

This factor is designed to evaluate the extent to which the area within one mile of the proposed site is non-urban area. For purposes of this rule, "non-urban" should include:

- Agricultural land (crop-fruit trees, nuts, oilseed)
- Range land
- Forest land
- Golf Courses
- Non paved parks and recreational areas
- Mining sites
- Farm Storage
- Lakes, ponds and other water bodies
- Rural roads, and through roads without houses or buildings
- Open space
- Wetlands
- Fish production
- Pasture or hayland

Urban uses include:

- Houses (other than farm houses)
- Apartment buildings
- Commercial buildings
- Industrial buildings
- Paved recreational areas (i.e. tennis courts)
- Streets in areas with 30 structures per 40 acres
- Gas stations

- Equipment, supply stores
- Off-farm storage
- Processing plants
- Shopping malls
- Utilities/Services
- Medical buildings

In rating this factor, an area one-mile from the outer edge of the proposed site should be outlined on a current photo; the areas that are urban should be outlined. For rural houses and other buildings with unknown sizes, use 1 and 1/3 acres per structure. For roads with houses on only one side, use one half of road for urban and one half for non-urban.

The purpose of this rating process is to insure that the most valuable and viable farmlands are protected from development projects sponsored by the Federal Government. With this goal in mind, factor S1 suggests that the more agricultural lands surrounding the parcel boundary in question, the more protection from development this site should receive. Accordingly, a site with a large quantity of non-urban land surrounding it will receive a greater
number of points for protection from development. Thus, where more than 90 percent of the area around the proposed site (do not include the proposed site in this assessment) is non-urban, assign 15 points. Where 20 percent or less is
non-urban, assign 0 points. Where the area lies between 20 and 90 percent non-urban, assign appropriate points from 14 to 1, as noted below.

Percent Non-Urban Land within 1 mile	**Points**
90 percent or greater	15
85 to 89 percent	14
80 to 84 percent	13
75 to 79 percent	12
70 to 74 percent	11
65 to 69 percent	10
60 to 64 percent	9
55 to 59 percent	8
50 to 54 percent	7
45 to 49 percent	6
40 to 44 percent	5
35 to 39 percent	4
30 to 24 percent	3
25 to 29 percent	2
21 to 24 percent	1
20 percent or less	0

2. How much of the perimeter of the site borders on land in non-urban use?

More than 90 percent:	l0 points
90 to 20 percent:	9 to 1 point(s)
Less than 20 percent:	0 points

This factor is designed to evaluate the extent to which the land adjacent to the proposed site is non-urban use. Where factor #1 evaluates the general location of the proposed site, this factor evaluates the immediate perimeter of the site. The definition of urban and non-urban uses in factor #1 should be used for this factor.

In rating the second factor, measure the perimeter of the site that is in non-urban and urban use. Where more than 90 percent of the perimeter is in non-urban use, score this factor 10 points. Where less than 20 percent, assign 0 points. If a road is next to the perimeter, class the area according to the

use on the other side of the road for that area. Use 1 and 1/3 acre per structure if not otherwise known. Where 20 to 90 percent of the perimeter is non-urban, assign points as noted below:

Percentage of Perimeter Bordering Land	Points
90 percent or greater	10
82 to 89 percent	9
74 to 81 percent	8
65 to 73 percent	7
58 to 65 percent	6
50 to 57 percent	5
42 to 49 percent	4
34 to 41 percent	3
27 to 33 percent	2
21 to 26 percent	1
20 percent or Less	0

3. How much of the site has been farmed (managed for a scheduled harvest or timber activity) more than five of the last ten years?

More than 90 percent:	20 points
90 to 20 percent:	19 to 1 point(s)
Less than 20 percent:	0 points

This factor is designed to evaluate the extent to which the proposed conversion site has been used or managed for agricultural purposes in the past 10 years.

Land is being farmed when it is used or managed for food or fiber, to include timber products, fruit, nuts, grapes, grain, forage, oil seed, fish and meat, poultry and dairy products.

Land that has been left to grow up to native vegetation without management or harvest will be considered as abandoned and therefore not farmed. The proposed conversion site should be evaluated and rated according to the percent, of the site farmed.

If more than 90 percent of the site has been farmed 5 of the last 10 years score the site as follows:

Percentage of Site Farmed	Points
90 percent or greater	20
86 to 89 percent	19
82 to 85 percent	18
78 to 81 percent	17
74 to 77 percent	16
70 to 73 percent	15
66 to 69 percent	14
62 to 65 percent	13
58 to 61 percent	12
54 to 57 percent	11
50 to 53 percent	10
46 to 49 percent	9
42 to 45 percent	8
38 to 41 percent	7
35 to 37 percent	6
32 to 34 percent	5
29 to 31 percent	4
26 to 28 percent	3

23 to 25 percent	2
20 to 22 percent percent or Less	1
Less than 20 percent	0

4. Is the site subject to state or unit of local government policies or programs to protect farmland or covered by private programs to protect farmland?

Site is protected:	20 points
Site is not protected:	0 points

This factor is designed to evaluate the extent to which state and local government and private programs have made efforts to protect this site from conversion.

State and local policies and programs to protect farmland include:

State Policies and Programs to Protect Farmland

1. Tax Relief:

   A. Differential Assessment: Agricultural lands are taxed on their agricultural use value, rather than at market value. As a result, farmers pay fewer taxes on their land, which helps keep them in business, and therefore helps to insure that the farmland will not be converted to nonagricultural uses.

      1. Preferential Assessment for Property Tax: Landowners with parcels of land used for agriculture are given the privilege of differential assessment.

      2. Deferred Taxation for Property Tax: Landowners are deterred from converting their land to nonfarm uses, because if they do so, they must pay back taxes at market value.

      3. Restrictive Agreement for Property Tax: Landowners who want to receive Differential Assessment must agree to keep their land in - eligible use.

   B. Income Tax Credits

   Circuit Breaker Tax Credits: Authorize an eligible owner of farmland to apply some or all of the property taxes on his or her farmland and farm structures as a tax credit against the owner's state income tax.

   C. Estate and Inheritance Tax Benefits

   Farm Use Valuation for Death Tax: Exemption of state tax liability to eligible farm estates.

2. "Right to farm" laws:

   Prohibits local governments from enacting laws which will place restrictions upon normally accepted farming practices, for example, the generation of noise, odor or dust.

3. Agricultural Districting:

   Wherein farmers voluntarily organize districts of agricultural land to be legally recognized geographic areas. These farmers receive benefits, such as protection from annexation, in exchange for keeping land within the district for a given number of years.

4. Land Use Controls: Agricultural Zoning.

Types of Agricultural Zoning Ordinances include:

A. Exclusive: In which the agricultural zone is restricted to only farm-related dwellings, with, for example, a minimum of 40 acres per dwelling unit.

B. Non-Exclusive: In which non-farm dwellings are allowed, but the density remains low, such as 20 acres per dwelling unit.

Additional Zoning techniques include:

A. Slidinq Scale: This method looks at zoning according to the total size of the parcel owned. For example, the number of dwelling units per a given number of acres may change from county to county according to the existing land acreage to dwelling unit ratio of surrounding parcels of land within the specific area.

B. Point System or Numerical Approach: Approaches land use permits on a case by case basis.

LESA: The LESA system (Land Evaluation-Site Assessment) is used as a tool to help assess options for land use on an evaluation of productivity weighed against commitment to urban development.

C. Conditional Use: Based upon the evaluation on a case by case basis by the Board of Zoning Adjustment. Also may include the method of using special land use permits.

5. Development Rights:

A. Purchase of Development Rights (PDR): Where development rights are purchased by Government action.

Buffer Zoning Districts: Buffer Zoning Districts are an example of land purchased by Government action. This land is included in zoning ordinances in order to preserve and protect agricultural lands from non-farm land uses encroaching upon them.

B. Transfer of Development Rights (TDR): Development rights are transferable for use in other locations designated as receiving areas. TDR is considered a locally based action (not state), because it requires a voluntary decision on the part of the individual landowners.

6. Governor's Executive Order: Policy made by the Governor, stating the importance of agriculture, and the preservation of agricultural lands. The Governor orders the state agencies to avoid the unnecessary conversion of important farmland to nonagricultural uses.

7. Voluntary State Programs:

A. California's Program of Restrictive Agreements and Differential Assessments: The California Land Conservation Act of 1965, commonly known as the Williamson Act, allows cities, counties and individual landowners to form agricultural preserves and enter into contracts for 10 or more years to insure that these parcels of land remain strictly for agricultural use. Since 1972 the Act has extended eligibility to recreational and open space lands such as scenic highway corridors, salt ponds and wildlife preserves. These contractually restricted lands may be taxed differentially for their real value. One hundred-acre districts constitute the minimum land size eligible.

Suggestion: An improved version of the Act would state that if the land is converted after the contract expires, the landowner must pay the difference in the taxes between market value for the land and the agricultural tax value which he or she had been

paying under the Act. This measure would help to insure that farmland would not be converted after the 10 year period ends.

B. Maryland Agricultural Land Preservation Program: Agricultural landowners within agricultural districts have the opportunity to sell their development rights to the Maryland Land Preservation Foundation under the agreement that these landowners will not subdivide or develop their land for an initial period of five years. After five years the landowner may terminate the agreement with one year notice.

   As is stated above under the California Williamson Act, the landowner should pay the back taxes on the property if he or she decides to convert the land after the contract expires, in order to discourage such conversions.

C. Wisconsin Income Tax Incentive Program: The Wisconsin Farmland Preservation Program of December 1977 encourages local jurisdictions in Wisconsin to adopt agricultural preservation plans or exclusive agricultural district zoning ordinances in exchange for credit against state income tax and exemption from special utility assessment. Eligible candidates include local governments and landowners with at least 35 acres of land per dwelling unit in agricultural use and gross farm profits of at least $6.000 per year, or $18,000 over three years.

8. Mandatory State Programs:

A. The Environmental Control Act in the state of Vermont was adopted in 1970 by the Vermont State Legislature. The Act established an environmental board with 9 members (appointed by the Governor) to implement a planning process and a permit system to screen most subdivisions and development proposals according to specific criteria stated in the law. The planning process consists of an interim and a final Land Capability and Development Plan, the latter of which acts as a policy plan to control development. The policies are written in order to:

   - prevent air and water pollution;
   - protect scenic or natural beauty, historic sites and rare and irreplaceable natural areas; and
   - consider the impacts of growth and reduction of development on areas of primary agricultural soils.

B. The California State Coastal Commission: In 1976 the Coastal Act was passed to establish a permanent Coastal Commission with permit and planning authority The purpose of the Coastal Commission was and is to protect the sensitive coastal zone environment and its resources, while accommodating the social and economic needs of the state. The Commission has the power to regulate development in the coastal zones by issuing permits on a case by case basis until local agencies can develop their own coastal plans, which must be certified by the Coastal Commission.

C. Hawaii's Program of State Zoning: In 1961, the Hawaii State Legislature established Act 187, the Land Use Law, to protect the farmland and the welfare of the local people of Hawaii by planning to avoid “unnecessary urbanization”. The Law made all state lands into four districts: agricultural, conservation, rural and urban. The Governor appointed members to a State Land Use Commission, whose duties were to uphold the Law and form the boundaries of the four districts. In addition to state zoning, the Land Use Law introduced a program of Differential Assessment, wherein agricultural landowners paid taxes on their land for its agricultural use value, rather than its market value.

D. The Oregon Land Use Act of 1973: This act established the Land Conservation and Development Commission (LCDC) to provide statewide planning goals and guidelines.

Under this Act, Oregon cities and counties are each required to draw up a comprehensive plan, consistent with statewide planning goals. Agricultural land preservation is high on the list of state goals to be followed locally.

If the proposed site is subject to or has used one or more of the above farmland protection programs or policies, score the site 20 points. If none of the above policies or programs apply to this site, score 0 points.

5. How close is the site to an urban built-up area?

The site is 2 miles or more from an urban built-up area	15 points
The site is more than 1 mile but less than 2 miles from an urban built-up area	10 points
The site is less than 1 mile from, but is not adjacent to an urban built-up area	5 points
The site is adjacent to an urban built-up area	0 points

This factor is designed to evaluate the extent to which the proposed site is located next to an existing urban area. The urban built-up area must be 2500 population. The measurement from the built-up area should be made from the point at which the density is 30 structures per 40 acres and with no open or non-urban land existing between the major built-up areas and this point. Suburbs adjacent to cities or urban built-up areas should be considered as part of that urban area.

For greater accuracy, use the following chart to determine how much protection the site should receive according to its distance from an urban area. See chart below:

Distance From Perimeter of Site to Urban Area	Points
More than 10,560 feet	15
9,860 to 10,559 feet	14
9,160 to 9,859 feet	13
8,460 to 9,159 feet	12
7,760 to 8,459 feet	11
7,060 to 7,759 feet	10
6,360 to 7,059 feet	9
5,660 to 6,359 feet	8
4,960 to 5,659 feet	7
4,260 to 4,959 feet	6
3,560 to 4,259 feet	5
2,860 to 3,559 feet	4
2,160 to 2,859 feet	3
1,460 to 2,159 feet	2
760 to 1,459 feet	1
Less than 760 feet (adjacent)	0

6. How close is the site to water lines, sewer lines and/or other local facilities and services whose capacities and design would promote nonagricultural use?

None of the services exist nearer than 3 miles from the site	15 points
Some of the services exist more than one but less than 3 miles from the site	10 points
All of the services exist within 1/2 mile of the site	0 points

This question determines how much infrastructure (water, sewer, etc.) is in place which could facilitate nonagricultural development. The fewer facilities in place, the more difficult it is to develop an area. Thus, if a proposed site is further away from these services (more than 3 miles distance away), the site should be awarded the highest number of points (15). As the distance of the parcel of land to services decreases, the number of points awarded declines as well. So, when the site is equal to or further than 1 mile but less than 3 miles away from services, it should be given 10 points. Accordingly, if this distance is 1/2 mile to less than 1 mile, award 5 points; and if the distance from land to services is less than 1/2 mile, award 0 points.

Distance to public facilities should be measured from the perimeter of the parcel in question to the nearest site(s) where necessary facilities are located. If there is more than one distance (i.e. from site to water and from site to sewer), use the average distance (add all distances and then divide by the number of different distances to get the average).

Facilities which could promote nonagricultural use include:

- Water lines
- Sewer lines
- Power lines
- Gas lines
- Circulation (roads)
- Fire and police protection
- Schools

7. Is the farm unit(s) containing the site (before the project) as large as the average-size farming unit in the county? (Average farm sizes in each county are available from the NRCS field offices in each state. Data are from the latest available Census of Agriculture, Acreage of Farm Units in Operation with $1,000 or more in sales.)

As large or larger:	10 points
Below average: Deduct 1 point for each 5 percent below the average, down to 0 points if 50 percent or more is below average	9 to 0 points

This factor is designed to determine how much protection the site should receive, according to its size in relation to the average size of farming units within the county. The larger the parcel of land, the more agricultural use value the land possesses, and vice versa. Thus, if the farm unit is as large or larger than the county average, it receives the maximum number of points (10). The smaller the parcel of land compared to the county average, the fewer number of points given. Please see below:

Parcel Size in Relation to Average County Size	Points
Same size or larger than average (l00 percent)	10
95 percent of average	9
90 percent of average	8
85 percent of average	7
80 percent of average	6
75 percent of average	5
70 percent of average	4
65 percent of average	3
60 percent of average	2
55 percent of average	1
50 percent or below county average	0

State and local Natural Resources Conservation Service offices will have the average farm size information, provided by the latest available Census of Agriculture data

8. If this site is chosen for the project, how much of the remaining land on the farm will become non-farmable because of interference with land patterns?

Acreage equal to more than 25 percent of acres directly converted by the project	10 points
Acreage equal to between 25 and 5 percent of the acres directly converted by the project	9 to 1 point(s)
Acreage equal to less than 5 percent of the acres directly converted by the project	0 points

This factor tackles the question of how the proposed development will affect the rest of the land on the farm The site which deserves the most protection from conversion will receive the greatest number of points, and vice versa. For example, if the project is small, such as an extension on a house, the rest of the agricultural land would remain farmable, and thus a lower number of points is given to the site. Whereas if a large-scale highway is planned, a greater portion of the land (not including the site) will become non-farmable, since access to the farmland will be blocked; and thus, the site should receive the highest number of points (10) as protection from conversion

Conversion uses of the Site Which Would Make the Rest of the Land Non-Farmable by Interfering with Land Patterns

Conversions which make the rest of the property nonfarmable include any development which blocks accessibility to the rest of the site Examples are highways, railroads, dams or development along the front of a site restricting access to the rest of the property.

The point scoring is as follows:

Amount of Land Not Including the Site Which Will Become Non-Farmable	Points
25 percent or greater	10
23 - 24 percent	9
21 - 22 percent	8
19 - 20 percent	7
17 - 18 percent	6
15 - 16 percent	5
13 - 14 percent	4
11 - 12 percent	3
9 - 11 percent	2
6 - 8 percent	1
5 percent or less	0

9. Does the site have available adequate supply of farm support services and markets, i.e., farm suppliers, equipment dealers, processing and storage facilities and farmer's markets?

All required services are available	5 points
Some required services are available	4 to 1 point(s)
No required services are available	0 points

This factor is used to assess whether there are adequate support facilities, activities and industry to keep the farming business in business. The more support facilities available to the agricultural

landowner, the more feasible it is for him or her to stay in production. In addition, agricultural support facilities are compatible with farmland. This fact is important, because some land uses are not compatible; for example, development next to farmland cam be dangerous to the welfare of the agricultural land, as a result of pressure from the neighbors who often do not appreciate the noise, smells and dust intrinsic to farmland. Thus, when all required agricultural support services are available, the maximum number of points (5) are awarded. When some services are available, 4 to 1 point(s) are awarded; and consequently, when no services are available, no points are given. See below:

Percent of Services Available	Points
100 percent	5
75 to 99 percent	4
50 to 74 percent	3
25 to 49 percent	2
1 to 24 percent	1
No services	0

10. Does the site have substantial and well-maintained on farm investments such as barns, other storage buildings, fruit trees and vines, field terraces, drainage, irrigation, waterways, or other soil and water conservation measures?

High amount of on-farm investment	20 points
Moderate amount of non-farm investment	19 to 1 point(s)
No on-farm investments	0 points

This factor assesses the quantity of agricultural facilities in place on the proposed site. If a significant agricultural infrastructure exists, the site should continue to be used for farming, and thus the parcel will receive the highest amount of points towards protection from conversion or development. If there is little on farm investment, the site will receive comparatively less protection. See-below:

Amount of On-farm Investment	Points
As much or more than necessary to maintain production (100 percent)	20
95 to 99 percent	19
90 to 94 percent	18
85 to 89 percent	17
80 to 84 percent	16
75 to 79 percent	15
70 to 74 percent	14
65 to 69 percent	13
60 to 64 percent	12
55 to 59 percent	11
50 to 54 percent	10
45 to 49 percent	9
40 to 44 percent	8
35 to 39 percent	7
30 to 34 percent	6
25 to 29 percent	5
20 to 24 percent	4
15 to 19 percent	3
10 to 14 percent	2
5 to 9 percent	1
0 to 4 percent	0

11. Would the project at this site, by converting farmland to nonagricultural use, reduce the support for farm support services so as to jeopardize the continued existence of these support services and thus, the viability of the farms remaining in the area?

Substantial reduction in demand for support services if the site is converted	10 points
Some reduction in demand for support services if the site is converted	9 to 1 point(s)
No significant reduction in demand for support services if the site is converted	0 points

This factor determines whether there are other agriculturally related activities, businesses or jobs dependent upon the working of the pre-converted site in order for the others to remain in production. The more people and farming activities relying upon this land, the more protection it should receive from conversion. Thus, if a substantial reduction in demand for support services were to occur as a result of conversions, the proposed site would receive a high score of 10; some reduction in demand would receive 9 to 1 point(s), and no significant reduction in demand would receive no points.

Specific points are outlined as follows:

Amount of Reduction in Support Services if Site is Converted to Nonagricultural Use	**Points**
Substantial reduction (100 percent)	10
90 to 99 percent	9
80 to 89 percent	8
70 to 79 percent	7
60 to 69 percent	6
50 to 59 percent	5
40 to 49 percent	4
30 to 39 percent	3
20 to 29 percent	2
10 to 19 percent	1
No significant reduction (0 to 9 percent)	0

12. Is the kind and intensity of the proposed use of the site sufficiently incompatible with agriculture that it is likely to contribute to the eventual conversion of the surrounding farmland to nonagricultural use?

Proposed project is incompatible with existing agricultural use of surrounding farmland	10 points
Proposed project is tolerable of existing agricultural use of surrounding farmland	9 to 1 point(s)
Proposed project is fully compatible with existing agricultural use of surrounding farmland	0 points

Factor 12 determines whether conversion of the proposed agricultural site will eventually cause the conversion of neighboring farmland as a result of incompatibility of use of the first with the latter. The more incompatible the proposed conversion is with agriculture, the more protection this site receives from conversion. Therefor-, if the proposed conversion is incompatible with agriculture, the site receives 10 points. If the project is tolerable with agriculture, it receives 9 to 1 points; and if the proposed conversion is compatible with agriculture, it receives 0 points.

CORRIDOR - TYPE SITE ASSESSMENT CRITERIA

The following criteria are to be used for projects that have a linear or corridor - type site configuration connecting two distant points, and crossing several different tracts of land. These include utility lines, highways, railroads, stream improvements, and flood control systems. Federal agencies are to assess the suitability of each corridor-type site or design alternative for protection as farmland along with the land evaluation information.

For Water and Waste Programs, corridor analyses are not applicable for distribution or collection networks. Analyses are applicable for transmission or trunk lines where placement of the lines are flexible.

(1) How much land is in nonurban use within a radius of 1.0 mile form where the project is intended?

(2)	More than 90 percent	(3)	15 points
(4)	90 to 20 percent	(5)	14 to 1 point(s).
(6)	Less than 20 percent	(7)	0 points

(2) How much of the perimeter of the site borders on land in nonurban use?

(3)	More than 90 percent	(4)	10 point(s)
(5)	90 to 20 percent	(6)	9 to 1 points
(7)	less than 20 percent	(8)	0 points

(3) How much of the site has been farmed (managed for a scheduled harvest or timber activity) more than five of the last 10 years?

(4)	More than 90 percent	(5)	20 points
(6)	90 to 20 percent	(7)	19 to 1 point(s)
(8)	Less than 20 percent	(9)	0 points

(4) Is the site subject to state or unit of local government policies or programs to protect farmland or covered by private programs to protect farmland?

Site is protected	20 points
Site is not protected	0 points

(5) Is the farm unit(s) containing the site (before the project) as large as the average - size farming unit in the County? (Average farm sizes in each county are available from the NRCS field offices in each state. Data are from the latest available Census of Agriculture, Acreage of Farm Units in Operation with $1,000 or more in sales.)

As large or larger	10 points
Below average deduct 1 point for each 5 percent below the average, down to 0 points if 50 percent or more below average	9 to 0 points

(6) If the site is chosen for the project, how much of the remaining land on the farm will become non-farmable because of interference with land patterns?

Acreage equal to more than 25 percent of acres directly converted by the project	25 points
Acreage equal to between 25 and 5 percent of the acres directly convened by the project	1 to 24 point(s)
Acreage equal to less than 5 percent of the acres directly converted by the project	0 points

(7) Does the site have available adequate supply of farm support services and markets, i.e., farm suppliers, equipment dealers, processing and storage facilities and farmer's markets?

All required services are available	5 points
Some required services are available	4 to 1 point(s)
No required services are available	0 points

(8) Does the site have substantial and well-maintained on-farm investments such as barns, other storage building, fruit trees and vines, field terraces, drainage, irrigation, waterways, or other soil and water conservation measures?

High amount of on-farm investment	20 points
Moderate amount of on-farm investment	19 to 1 point(s)
No on-farm investment	0 points

(9) Would the project at this site, by converting farmland to nonagricultural use, reduce the demand for farm support services so as to jeopardize the continued existence of these support services and thus, the viability of the farms remaining in the area?

Substantial reduction in demand for support services if the site is convened	25 points
Some reduction in demand for support services if the site is convened	1 to 24 point(s)
No significant reduction in demand for support services if the site is converted	0 points

(10) Is the kind and intensity of the proposed use of the site sufficiently incompatible with agriculture that it is likely to contribute to the eventual conversion of surrounding farmland to nonagricultural use?

Proposed project is incompatible to existing agricultural use of surrounding farmland	10 points
Proposed project is tolerable to existing agricultural use of surrounding farmland	9 to 1 point(s)
Proposed project is fully compatible with existing agricultural use of surrounding farmland	0 points

Axiom Environmental, Inc.

Axiom Environmental, Inc.

218 Snow Avenue, Raleigh, North Carolina 27603 919-270-9306

July 27, 2017

Renee Gledhill-Earley,
Environmental Review Coordinator
North Carolina State Historic Preservation Office
109 East Jones Street
Raleigh, NC 27601

Re: Major Hill Stream and Wetland mitigation project in Alamance County **17-009**
Alamance County, NC

Dear Renee:

The purpose of this letter is to request written concurrence from the State Historic Preservation Office (SHPO) for the Major Hill Stream and Wetland Mitigation Project in Alamance County. Please review and comment on any possible issues that might emerge with respect to SHPO from a potential wetland and stream restoration project depicted on the attached mapping (USGS Saxapahaw and Silk Hope, North Carolina 7.5-minute topographic quadrangle).

Field visits were conducted in November and December 2016 to ascertain the presence of structures or features that may be eligible for the National Register of Historic Places. No structures were identified within the proposed Site boundary. In addition, the SHPO website was evaluated for known occurrences of sites eligible for the historic register. Based on the website review, one surveyed structure is located on Bethel South Fork Road near the Site (AM0582 Simon Hadley House); however, the structure does not appear eligible for the National Register and will not be disturbed during mitigation activities.

We thank you in advance for your timely response and cooperation. Please feel free to contact me with any questions that you may have concerning the extent of site disturbance associated with this project.

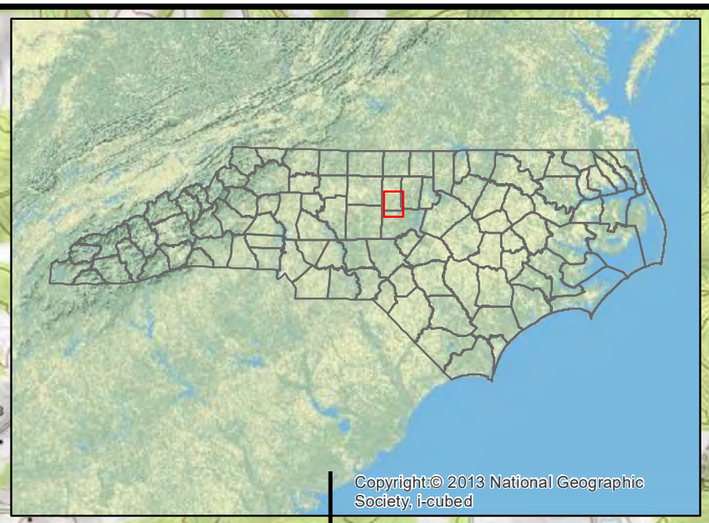
Yours truly,

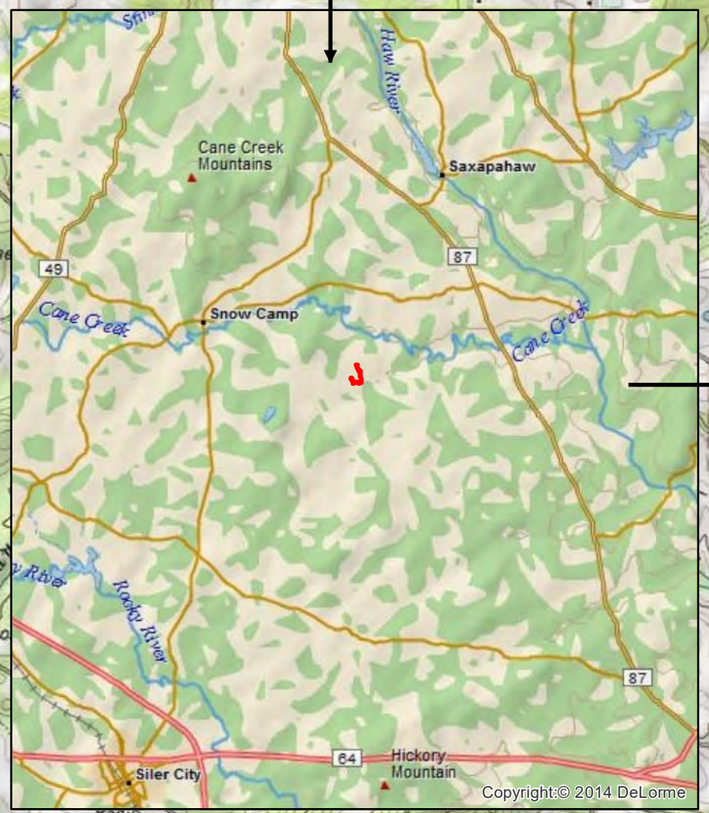
AXIOM ENVIRONMENTAL, INC.

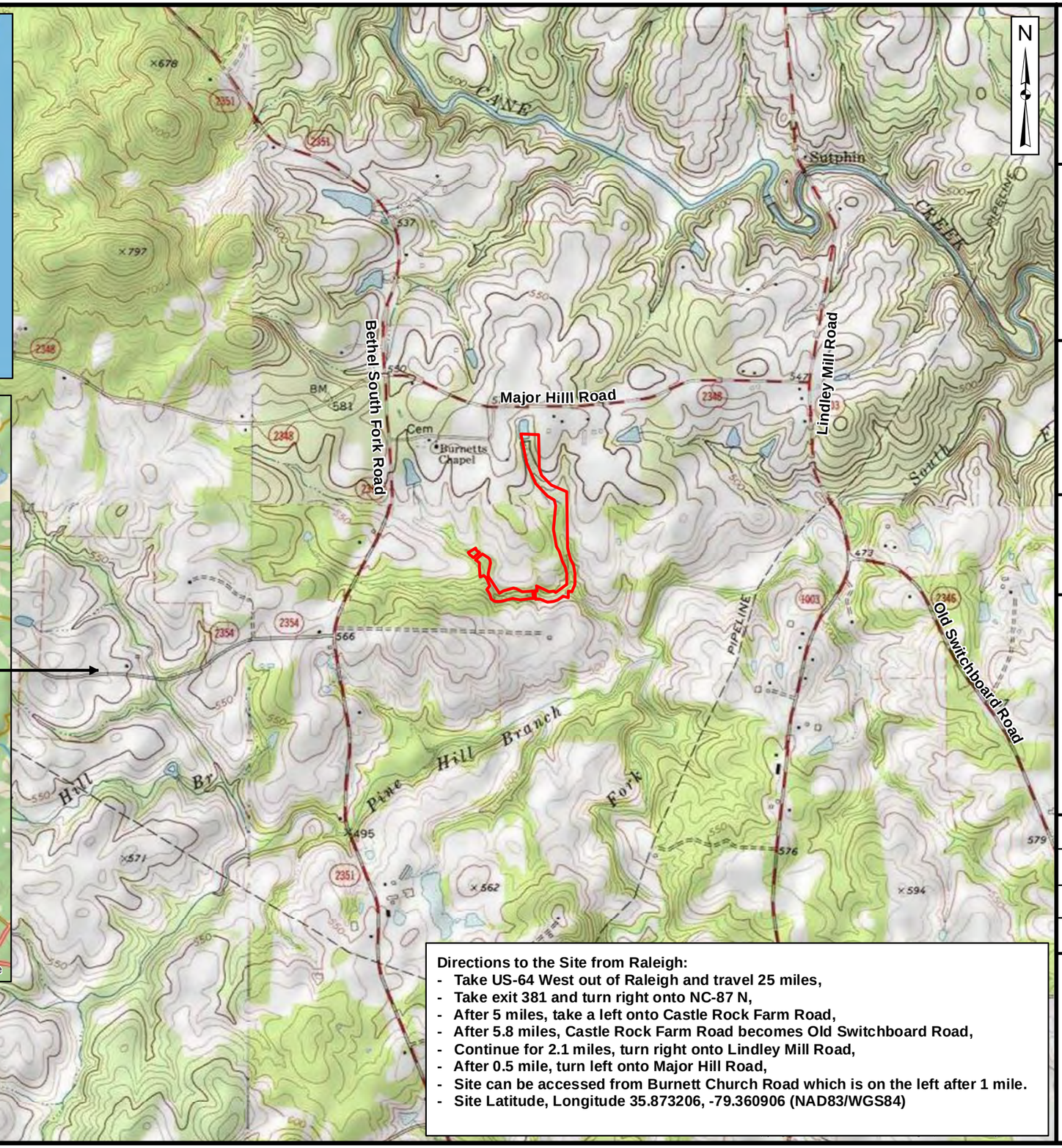
W Grant Lewis

W. Grant Lewis
Senior Project Manager

Attachments







Directions to the Site from Raleigh:
- **Take US-64 West out of Raleigh and travel 25 miles,**
- **Take exit 381 and turn right onto NC-87 N,**
- **After 5 miles, take a left onto Castle Rock Farm Road,**
- **After 5.8 miles, Castle Rock Farm Road becomes Old Switchboard Road,**
- **Continue for 2.1 miles, turn right onto Lindley Mill Road,**
- **After 0.5 mile, turn left onto Major Hill Road,**
- **Site can be accessed from Burnett Church Road which is on the left after 1 mile.**
- **Site Latitude, Longitude 35.873206, -79.360906 (NAD83/WGS84)**

Axiom Environmental, Inc.

Prepared for:

RESTORATION SYSTEMS | LLC

Project:

MAJOR HILL STREAM AND WETLAND MITIGATION SITE

Alamance County, NC

Title:

SITE LOCATION

Notes:

Background Imagery Sources (Provided by ESRI Data and Maps):
1. Physical Map of the United States (2009) Created by the U.S. Park Service (Upper Inset)
2. DeLorme World Basemap digital mapping (2010, Lower Inset)
3. Saxapahaw (1977), Silk Hope (1974), Snow Camp (1978), and Crutchfield Crossroads (1974) 7.5-minute topographic quadrangles provided by the U.S. Geological Survey

Drawn by:	KRJ
Date:	MAY 2017
Scale:	1:20000
Project No.:	17-009

FIGURE

1

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

August 10, 2017

W. Grant Lewis
Axiom Environmental, Inc.
218 Snow Avenue
Raleigh, NC 27603

Re: Major Hill Stream and Wetland mitigation project, Alamance County (ER 17-1339)

Dear Mr. Lewis:

Thank you for your letter of July 27, 2017, 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, please contact Renee Gledhill-Earley, environmental review coordinator, at 919-807-6579 or renee.gledhill-earley@ncdcr.gov. In all future communication concerning this project, please cite the above-referenced tracking number.

Sincerely,

RGledhill-Earley

Ramona M. Bartos

Major Hill Stream and Wetland Mitigation Site
2040 Burnett Church Road
Snow Camp, NC 27349

Inquiry Number: 5005690.6s
July 27, 2017

The EDR Radius Map™ Report with GeoCheck®

6 Armstrong Road, 4th floor
Shelton, CT 06484
Toll Free: 800.352.0050
www.edrnet.com

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GEOCHECK ADDENDUM

Physical Setting Source Addendum	A-1
Physical Setting Source Summary	A-2
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Physical Setting Source Records Searched	PSGR-1

Thank you for your business.
Please contact EDR at 1-800-352-0050
with any questions or comments.

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EXECUTIVE SUMMARY

A search of available environmental records was conducted by Environmental Data Resources, Inc (EDR). The report was designed to assist parties seeking to meet the search requirements of EPA's Standards and Practices for All Appropriate Inquiries (40 CFR Part 312), the ASTM Standard Practice for Environmental Site Assessments (E 1527-13) or custom requirements developed for the evaluation of environmental risk associated with a parcel of real estate.

TARGET PROPERTY INFORMATION

ADDRESS

2040 BURNETT CHURCH ROAD
SNOW CAMP, NC 27349

COORDINATES

Latitude (North):	35.8727560 - 35° 52' 21.92''
Longitude (West):	79.3613490 - 79° 21' 40.85''
Universal Tranverse Mercator:	Zone 17
UTM X (Meters):	647934.5
UTM Y (Meters):	3970875.0
Elevation:	546 ft. above sea level

USGS TOPOGRAPHIC MAP ASSOCIATED WITH TARGET PROPERTY

Target Property Map:	5945591 SILK HOPE, NC
Version Date:	2013
Northeast Map:	5945583 SAXAPAHAW, NC
Version Date:	2013
Southwest Map:	5945515 CRUTCHFIELD CROSSROADS, NC
Version Date:	2013
Northwest Map:	5945593 SNOW CAMP, NC
Version Date:	2013

AERIAL PHOTOGRAPHY IN THIS REPORT

Portions of Photo from:	20140827, 20140619
Source:	USDA

MAPPED SITES SUMMARY

Target Property Address:
2040 BURNETT CHURCH ROAD
SNOW CAMP, NC 27349

Click on Map ID to see full detail.

MAP ID	SITE NAME	ADDRESS	DATABASE ACRONYMS	RELATIVE ELEVATION	DIST (ft. & mi.) DIRECTION

NO MAPPED SITES FOUND

EXECUTIVE SUMMARY

TARGET PROPERTY SEARCH RESULTS

The target property was not listed in any of the databases searched by EDR.

DATABASES WITH NO MAPPED SITES

No mapped sites were found in EDR's search of available ("reasonably ascertainable ") government records either on the target property or within the search radius around the target property for the following databases:

STANDARD ENVIRONMENTAL RECORDS

Federal NPL site list

NPL ---------- National Priority List
Proposed NPL ---------- Proposed National Priority List Sites
NPL LIENS ---------- Federal Superfund Liens

Federal Delisted NPL site list

Delisted NPL ---------- National Priority List Deletions

Federal CERCLIS list

FEDERAL FACILITY ---------- Federal Facility Site Information listing
SEMS ---------- Superfund Enterprise Management System

Federal CERCLIS NFRAP site list

SEMS-ARCHIVE ---------- Superfund Enterprise Management System Archive

Federal RCRA CORRACTS facilities list

CORRACTS ---------- Corrective Action Report

Federal RCRA non-CORRACTS TSD facilities list

RCRA-TSDF ---------- RCRA - Treatment, Storage and Disposal

Federal RCRA generators list

RCRA-LQG ---------- RCRA - Large Quantity Generators
RCRA-SQG ---------- RCRA - Small Quantity Generators
RCRA-CESQG ---------- RCRA - Conditionally Exempt Small Quantity Generator

Federal institutional controls / engineering controls registries

LUCIS ---------- Land Use Control Information System
US ENG CONTROLS ---------- Engineering Controls Sites List

US INST CONTROL..... Sites with Institutional Controls

Federal ERNS list

ERNS..... Emergency Response Notification System

State- and tribal - equivalent NPL

NC HSDS..... Hazardous Substance Disposal Site

State- and tribal - equivalent CERCLIS

SHWS..... Inactive Hazardous Sites Inventory

State and tribal landfill and/or solid waste disposal site lists

SWF/LF..... List of Solid Waste Facilities
OLI..... Old Landfill Inventory

State and tribal leaking storage tank lists

LAST..... Leaking Aboveground Storage Tanks
LUST..... Regional UST Database
INDIAN LUST..... Leaking Underground Storage Tanks on Indian Land
LUST TRUST..... State Trust Fund Database

State and tribal registered storage tank lists

FEMA UST..... Underground Storage Tank Listing
UST..... Petroleum Underground Storage Tank Database
AST..... AST Database
INDIAN UST..... Underground Storage Tanks on Indian Land

State and tribal institutional control / engineering control registries

INST CONTROL..... No Further Action Sites With Land Use Restrictions Monitoring

State and tribal voluntary cleanup sites

INDIAN VCP..... Voluntary Cleanup Priority Listing
VCP..... Responsible Party Voluntary Action Sites

State and tribal Brownfields sites

BROWNFIELDS..... Brownfields Projects Inventory

ADDITIONAL ENVIRONMENTAL RECORDS

Local Brownfield lists

US BROWNFIELDS..... A Listing of Brownfields Sites

Local Lists of Landfill / Solid Waste Disposal Sites

SWRCY..... Recycling Center Listing

HIST LF	Solid Waste Facility Listing
INDIAN ODI	Report on the Status of Open Dumps on Indian Lands
DEBRIS REGION 9	Torres Martinez Reservation Illegal Dump Site Locations
ODI	Open Dump Inventory
IHS OPEN DUMPS	Open Dumps on Indian Land

Local Lists of Hazardous waste / Contaminated Sites

US HIST CDL	Delisted National Clandestine Laboratory Register
US CDL	National Clandestine Laboratory Register

Local Land Records

LIENS 2	CERCLA Lien Information

Records of Emergency Release Reports

HMIRS	Hazardous Materials Information Reporting System
SPILLS	Spills Incident Listing
IMD	Incident Management Database
SPILLS 90	SPILLS 90 data from FirstSearch
SPILLS 80	SPILLS 80 data from FirstSearch

Other Ascertainable Records

RCRA NonGen / NLR	RCRA - Non Generators / No Longer Regulated
FUDS	Formerly Used Defense Sites
DOD	Department of Defense Sites
SCRD DRYCLEANERS	State Coalition for Remediation of Drycleaners Listing
US FIN ASSUR	Financial Assurance Information
EPA WATCH LIST	EPA WATCH LIST
2020 COR ACTION	2020 Corrective Action Program List
TSCA	Toxic Substances Control Act
TRIS	Toxic Chemical Release Inventory System
SSTS	Section 7 Tracking Systems
ROD	Records Of Decision
RMP	Risk Management Plans
RAATS	RCRA Administrative Action Tracking System
PRP	Potentially Responsible Parties
PADS	PCB Activity Database System
ICIS	Integrated Compliance Information System
FTTS	FIFRA/ TSCA Tracking System - FIFRA (Federal Insecticide, Fungicide, & Rodenticide Act)/TSCA (Toxic Substances Control Act)
MLTS	Material Licensing Tracking System
COAL ASH DOE	Steam-Electric Plant Operation Data
COAL ASH EPA	Coal Combustion Residues Surface Impoundments List
PCB TRANSFORMER	PCB Transformer Registration Database
RADINFO	Radiation Information Database
HIST FTTS	FIFRA/TSCA Tracking System Administrative Case Listing
DOT OPS	Incident and Accident Data
CONSENT	Superfund (CERCLA) Consent Decrees
INDIAN RESERV	Indian Reservations
FUSRAP	Formerly Utilized Sites Remedial Action Program
UMTRA	Uranium Mill Tailings Sites
LEAD SMELTERS	Lead Smelter Sites

EXECUTIVE SUMMARY

US AIRS ---------- Aerometric Information Retrieval System Facility Subsystem
US MINES ---------- Mines Master Index File
ABANDONED MINES ---------- Abandoned Mines
FINDS ---------- Facility Index System/Facility Registry System
DOCKET HWC ---------- Hazardous Waste Compliance Docket Listing
ECHO ---------- Enforcement & Compliance History Information
UXO ---------- Unexploded Ordnance Sites
FUELS PROGRAM ---------- EPA Fuels Program Registered Listing
COAL ASH ---------- Coal Ash Disposal Sites
DRYCLEANERS ---------- Drycleaning Sites
Financial Assurance ---------- Financial Assurance Information Listing
NPDES ---------- NPDES Facility Location Listing
UIC ---------- Underground Injection Wells Listing

EDR HIGH RISK HISTORICAL RECORDS

EDR Exclusive Records

EDR MGP ---------- EDR Proprietary Manufactured Gas Plants
EDR Hist Auto ---------- EDR Exclusive Historic Gas Stations
EDR Hist Cleaner ---------- EDR Exclusive Historic Dry Cleaners

EDR RECOVERED GOVERNMENT ARCHIVES

Exclusive Recovered Govt. Archives

RGA HWS ---------- Recovered Government Archive State Hazardous Waste Facilities List
RGA LF ---------- Recovered Government Archive Solid Waste Facilities List
RGA LUST ---------- Recovered Government Archive Leaking Underground Storage Tank

SURROUNDING SITES: SEARCH RESULTS

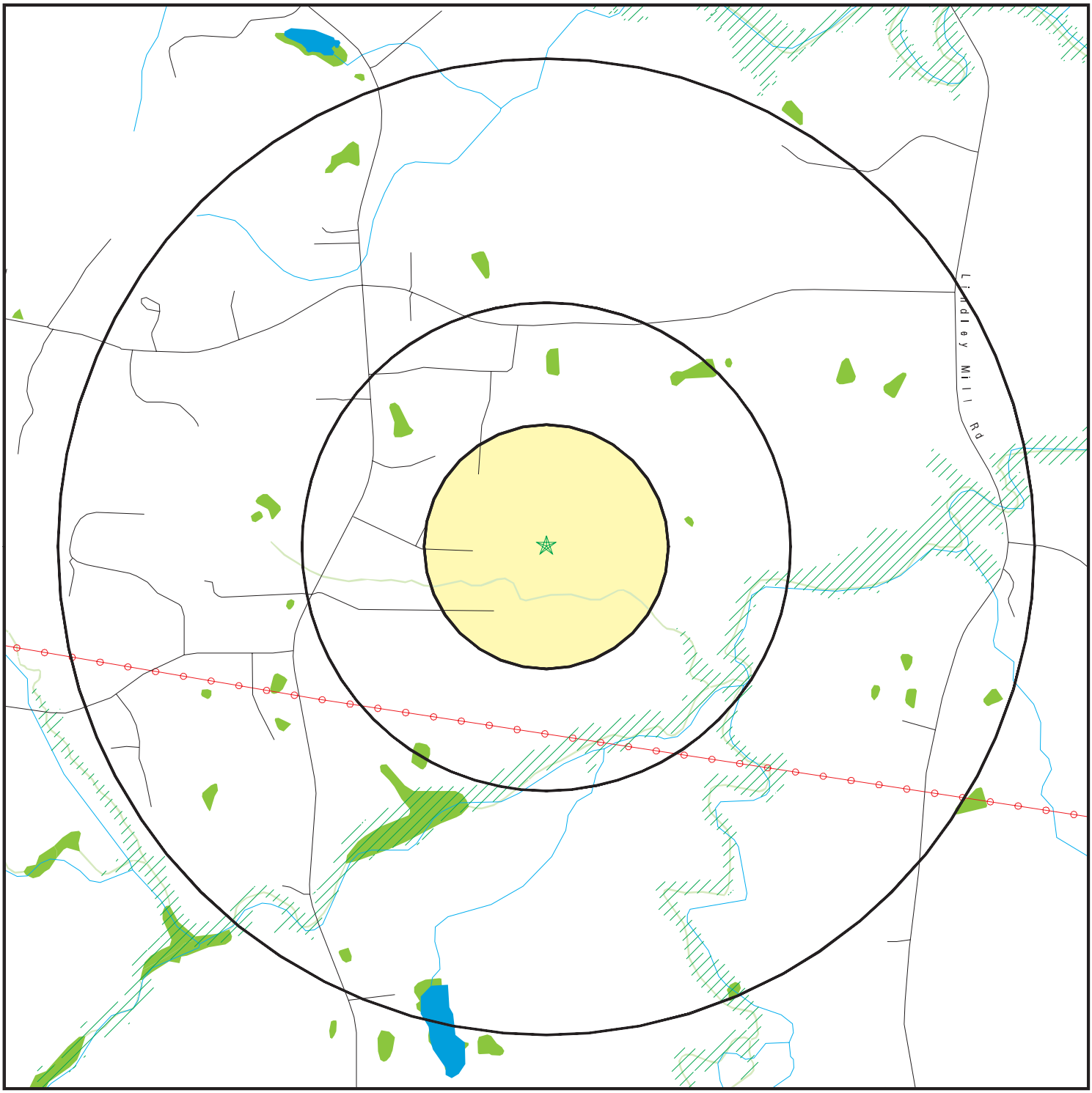
Surrounding sites were not identified.

Unmappable (orphan) sites are not considered in the foregoing analysis.

EXECUTIVE SUMMARY

There were no unmapped sites in this report.

OVERVIEW MAP - 5005690.6S



- 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

0 1/4 1/2 1 Miles

- Indian Reservations BIA
- Power transmission lines
- 100-year flood zone
- 500-year flood zone
- National Wetland Inventory
- State Wetlands

- Upgradient Area
- 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: Major Hill Stream and Wetland Mitigation Site ADDRESS: 2040 Burnett Church Road Snow Camp NC 27349 LAT/LONG: 35.872756 / 79.361349	CLIENT: Axiom Environmental CONTACT: Kenan Jernigan INQUIRY #: 5005690.6s DATE: July 27, 2017 1:48 pm

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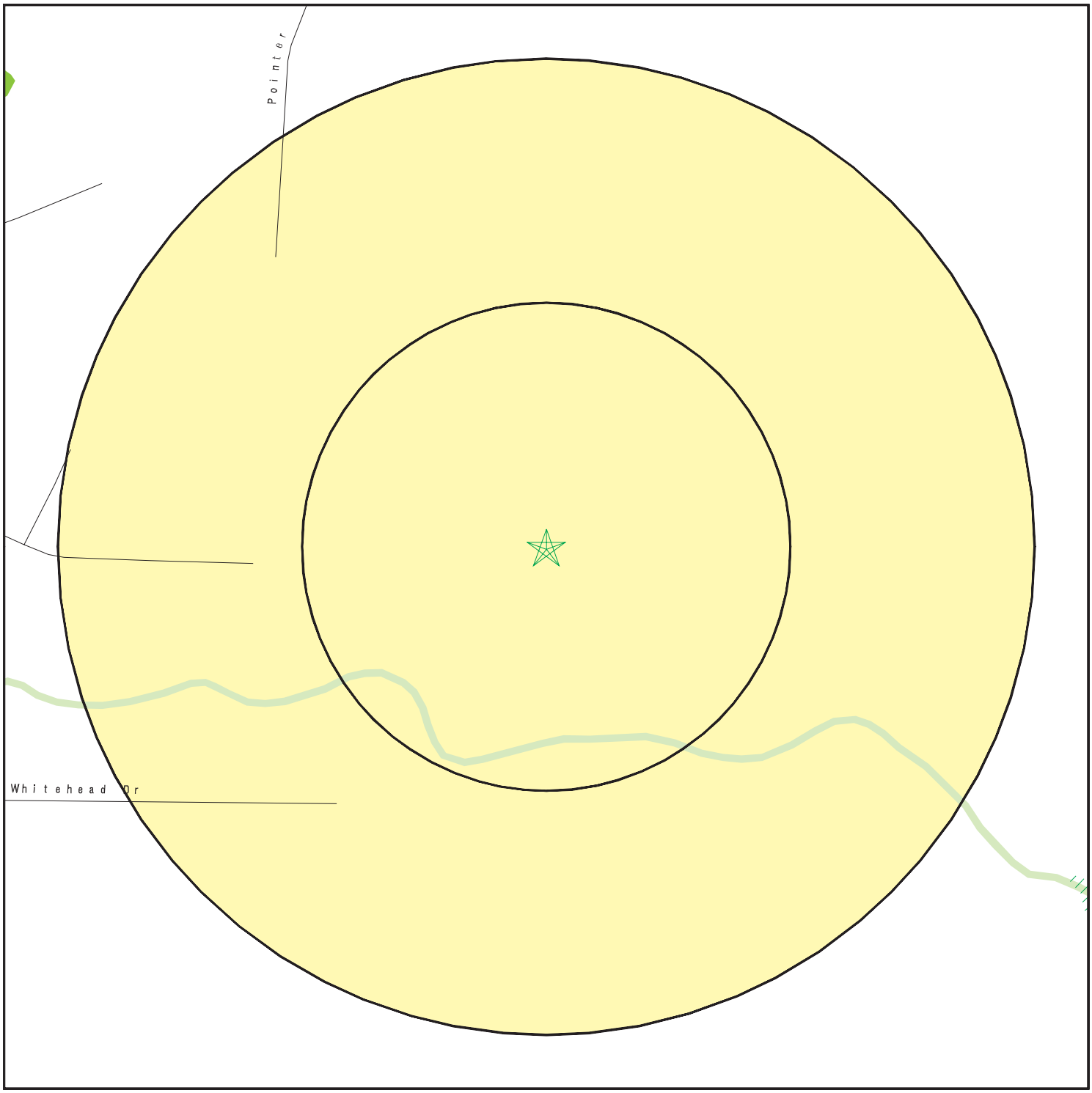
DETAIL MAP - 5005690.6S



- 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

0 1/16 1/8 1/4 Miles

- Indian Reservations BIA
- 100-year flood zone
- 500-year flood zone
- National Wetland Inventory
- State Wetlands
- Hazardous Substance Disposal Sites

N

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: Major Hill Stream and Wetland Mitigation Site ADDRESS: 2040 Burnett Church Road Snow Camp NC 27349 LAT/LONG: 35.872756 / 79.361349	CLIENT: Axiom Environmental CONTACT: Kenan Jernigan INQUIRY #: 5005690.6s DATE: July 27, 2017 1:49 pm

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MAP FINDINGS SUMMARY

Database	Search Distance (Miles)	Target Property	< 1/8	1/8 - 1/4	1/4 - 1/2	1/2 - 1	> 1	Total Plotted
STANDARD ENVIRONMENTAL RECORDS								
Federal NPL site list								
NPL	1.000		0	0	0	0	NR	0
Proposed NPL	1.000		0	0	0	0	NR	0
NPL LIENS	TP		NR	NR	NR	NR	NR	0
Federal Delisted NPL site list								
Delisted NPL	1.000		0	0	0	0	NR	0
Federal CERCLIS list								
FEDERAL FACILITY	0.500		0	0	0	NR	NR	0
SEMS	0.500		0	0	0	NR	NR	0
Federal CERCLIS NFRAP site list								
SEMS-ARCHIVE	0.500		0	0	0	NR	NR	0
Federal RCRA CORRACTS facilities list								
CORRACTS	1.000		0	0	0	0	NR	0
Federal RCRA non-CORRACTS TSD facilities list								
RCRA-TSDF	0.500		0	0	0	NR	NR	0
Federal RCRA generators list								
RCRA-LQG	0.250		0	0	NR	NR	NR	0
RCRA-SQG	0.250		0	0	NR	NR	NR	0
RCRA-CESQG	0.250		0	0	NR	NR	NR	0
Federal institutional controls / engineering controls registries								
LUCIS	0.500		0	0	0	NR	NR	0
US ENG CONTROLS	0.500		0	0	0	NR	NR	0
US INST CONTROL	0.500		0	0	0	NR	NR	0
Federal ERNS list								
ERNS	TP		NR	NR	NR	NR	NR	0
State- and tribal - equivalent NPL								
NC HSDS	1.000		0	0	0	0	NR	0
State- and tribal - equivalent CERCLIS								
SHWS	1.000		0	0	0	0	NR	0
State and tribal landfill and/or solid waste disposal site lists								
SWF/LF	0.500		0	0	0	NR	NR	0
OLI	0.500		0	0	0	NR	NR	0
State and tribal leaking storage tank lists								
LAST	0.500		0	0	0	NR	NR	0

MAP FINDINGS SUMMARY

Database	Search Distance (Miles)	Target Property	< 1/8	1/8 - 1/4	1/4 - 1/2	1/2 - 1	> 1	Total Plotted
LUST	0.500		0	0	0	NR	NR	0
INDIAN LUST	0.500		0	0	0	NR	NR	0
LUST TRUST	0.500		0	0	0	NR	NR	0
State and tribal registered storage tank lists								
FEMA UST	0.250		0	0	NR	NR	NR	0
UST	0.250		0	0	NR	NR	NR	0
AST	0.250		0	0	NR	NR	NR	0
INDIAN UST	0.250		0	0	NR	NR	NR	0
State and tribal institutional control / engineering control registries								
INST CONTROL	0.500		0	0	0	NR	NR	0
State and tribal voluntary cleanup sites								
INDIAN VCP	0.500		0	0	0	NR	NR	0
VCP	0.500		0	0	0	NR	NR	0
State and tribal Brownfields sites								
BROWNFIELDS	0.500		0	0	0	NR	NR	0
ADDITIONAL ENVIRONMENTAL RECORDS								
Local Brownfield lists								
US BROWNFIELDS	0.500		0	0	0	NR	NR	0
Local Lists of Landfill / Solid Waste Disposal Sites								
SWRCY	0.500		0	0	0	NR	NR	0
HIST LF	0.500		0	0	0	NR	NR	0
INDIAN ODI	0.500		0	0	0	NR	NR	0
DEBRIS REGION 9	0.500		0	0	0	NR	NR	0
ODI	0.500		0	0	0	NR	NR	0
IHS OPEN DUMPS	0.500		0	0	0	NR	NR	0
Local Lists of Hazardous waste / Contaminated Sites								
US HIST CDL	TP		NR	NR	NR	NR	NR	0
US CDL	TP		NR	NR	NR	NR	NR	0
Local Land Records								
LIENS 2	TP		NR	NR	NR	NR	NR	0
Records of Emergency Release Reports								
HMIRS	TP		NR	NR	NR	NR	NR	0
SPILLS	TP		NR	NR	NR	NR	NR	0
IMD	0.500		0	0	0	NR	NR	0
SPILLS 90	TP		NR	NR	NR	NR	NR	0
SPILLS 80	TP		NR	NR	NR	NR	NR	0
Other Ascertainable Records								
RCRA NonGen / NLR	0.250		0	0	NR	NR	NR	0

MAP FINDINGS SUMMARY

Database	Search Distance (Miles)	Target Property	< 1/8	1/8 - 1/4	1/4 - 1/2	1/2 - 1	> 1	Total Plotted
FUDS	1.000		0	0	0	0	NR	0
DOD	1.000		0	0	0	0	NR	0
SCRD DRYCLEANERS	0.500		0	0	0	NR	NR	0
US FIN ASSUR	TP		NR	NR	NR	NR	NR	0
EPA WATCH LIST	TP		NR	NR	NR	NR	NR	0
2020 COR ACTION	0.250		0	0	NR	NR	NR	0
TSCA	TP		NR	NR	NR	NR	NR	0
TRIS	TP		NR	NR	NR	NR	NR	0
SSTS	TP		NR	NR	NR	NR	NR	0
ROD	1.000		0	0	0	0	NR	0
RMP	TP		NR	NR	NR	NR	NR	0
RAATS	TP		NR	NR	NR	NR	NR	0
PRP	TP		NR	NR	NR	NR	NR	0
PADS	TP		NR	NR	NR	NR	NR	0
ICIS	TP		NR	NR	NR	NR	NR	0
FTTS	TP		NR	NR	NR	NR	NR	0
MLTS	TP		NR	NR	NR	NR	NR	0
COAL ASH DOE	TP		NR	NR	NR	NR	NR	0
COAL ASH EPA	0.500		0	0	0	NR	NR	0
PCB TRANSFORMER	TP		NR	NR	NR	NR	NR	0
RADINFO	TP		NR	NR	NR	NR	NR	0
HIST FTTS	TP		NR	NR	NR	NR	NR	0
DOT OPS	TP		NR	NR	NR	NR	NR	0
CONSENT	1.000		0	0	0	0	NR	0
INDIAN RESERV	1.000		0	0	0	0	NR	0
FUSRAP	1.000		0	0	0	0	NR	0
UMTRA	0.500		0	0	0	NR	NR	0
LEAD SMELTERS	TP		NR	NR	NR	NR	NR	0
US AIRS	TP		NR	NR	NR	NR	NR	0
US MINES	0.250		0	0	NR	NR	NR	0
ABANDONED MINES	0.500		0	0	0	NR	NR	0
FINDS	TP		NR	NR	NR	NR	NR	0
DOCKET HWC	TP		NR	NR	NR	NR	NR	0
ECHO	TP		NR	NR	NR	NR	NR	0
UXO	1.000		0	0	0	0	NR	0
FUELS PROGRAM	0.250		0	0	NR	NR	NR	0
COAL ASH	0.500		0	0	0	NR	NR	0
DRYCLEANERS	0.250		0	0	NR	NR	NR	0
Financial Assurance	TP		NR	NR	NR	NR	NR	0
NPDES	TP		NR	NR	NR	NR	NR	0
UIC	TP		NR	NR	NR	NR	NR	0
EDR HIGH RISK HISTORICAL RECORDS								
EDR Exclusive Records								
EDR MGP	1.000		0	0	0	0	NR	0
EDR Hist Auto	0.125		0	NR	NR	NR	NR	0
EDR Hist Cleaner	0.125		0	NR	NR	NR	NR	0
EDR RECOVERED GOVERNMENT ARCHIVES								
Exclusive Recovered Govt. Archives								
RGA HWS	TP		NR	NR	NR	NR	NR	0

MAP FINDINGS SUMMARY

Database	Search Distance (Miles)	Target Property	< 1/8	1/8 - 1/4	1/4 - 1/2	1/2 - 1	> 1	Total Plotted
RGA LF	TP		NR	NR	NR	NR	NR	0
RGA LUST	TP		NR	NR	NR	NR	NR	0
- Totals --		0	0	0	0	0	0	0

NOTES:

TP = Target Property

NR = Not Requested at this Search Distance

Sites may be listed in more than one database

MAP FINDINGS

Map ID Direction Distance Elevation	Site	Database(s)	EDR ID Number EPA ID Number

NO SITES FOUND

Count: 0 records.

ORPHAN SUMMARY

City	EDR ID	Site Name	Site Address	Zip	Database(s)
		NO SITES FOUND			

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

To maintain currency of the following federal and state databases, EDR contacts the appropriate governmental agency on a monthly or quarterly basis, as required.

Number of Days to Update: Provides confirmation that EDR is reporting records that have been updated within 90 days from the date the government agency made the information available to the public.

STANDARD ENVIRONMENTAL RECORDS

Federal NPL site list

NPL: National Priority List

National Priorities List (Superfund). The NPL is a subset of CERCLIS and identifies over 1,200 sites for priority cleanup under the Superfund Program. NPL sites may encompass relatively large areas. As such, EDR provides polygon coverage for over 1,000 NPL site boundaries produced by EPA's Environmental Photographic Interpretation Center (EPIC) and regional EPA offices.

Date of Government Version: 04/05/2017
Date Data Arrived at EDR: 04/21/2017
Date Made Active in Reports: 05/12/2017
Number of Days to Update: 21

Source: EPA
Telephone: N/A
Last EDR Contact: 07/07/2017
Next Scheduled EDR Contact: 10/16/2017
Data Release Frequency: Quarterly

NPL Site Boundaries

Sources:

EPA's Environmental Photographic Interpretation Center (EPIC)
Telephone: 202-564-7333

EPA Region 1
Telephone 617-918-1143

EPA Region 6
Telephone: 214-655-6659

EPA Region 3
Telephone 215-814-5418

EPA Region 7
Telephone: 913-551-7247

EPA Region 4
Telephone 404-562-8033

EPA Region 8
Telephone: 303-312-6774

EPA Region 5
Telephone 312-886-6686

EPA Region 9
Telephone: 415-947-4246

EPA Region 10
Telephone 206-553-8665

Proposed NPL: Proposed National Priority List Sites

A site that has been proposed for listing on the National Priorities List through the issuance of a proposed rule in the Federal Register. EPA then accepts public comments on the site, responds to the comments, and places on the NPL those sites that continue to meet the requirements for listing.

Date of Government Version: 04/05/2017
Date Data Arrived at EDR: 04/21/2017
Date Made Active in Reports: 05/12/2017
Number of Days to Update: 21

Source: EPA
Telephone: N/A
Last EDR Contact: 07/07/2017
Next Scheduled EDR Contact: 10/16/2017
Data Release Frequency: Quarterly

NPL LIENS: Federal Superfund Liens

Federal Superfund Liens. Under the authority granted the USEPA by CERCLA of 1980, the USEPA has the authority to file liens against real property in order to recover remedial action expenditures or when the property owner received notification of potential liability. USEPA compiles a listing of filed notices of Superfund Liens.

Date of Government Version: 10/15/1991
Date Data Arrived at EDR: 02/02/1994
Date Made Active in Reports: 03/30/1994
Number of Days to Update: 56

Source: EPA
Telephone: 202-564-4267
Last EDR Contact: 08/15/2011
Next Scheduled EDR Contact: 11/28/2011
Data Release Frequency: No Update Planned

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

Federal Delisted NPL site list

Delisted NPL: National Priority List Deletions

The National Oil and Hazardous Substances Pollution Contingency Plan (NCP) establishes the criteria that the EPA uses to delete sites from the NPL. In accordance with 40 CFR 300.425.(e), sites may be deleted from the NPL where no further response is appropriate.

Date of Government Version: 04/05/2017
Date Data Arrived at EDR: 04/21/2017
Date Made Active in Reports: 05/12/2017
Number of Days to Update: 21

Source: EPA
Telephone: N/A
Last EDR Contact: 07/07/2017
Next Scheduled EDR Contact: 10/16/2017
Data Release Frequency: Quarterly

Federal CERCLIS list

FEDERAL FACILITY: Federal Facility Site Information listing

A listing of National Priority List (NPL) and Base Realignment and Closure (BRAC) sites found in the Comprehensive Environmental Response, Compensation and Liability Information System (CERCLIS) Database where EPA Federal Facilities Restoration and Reuse Office is involved in cleanup activities.

Date of Government Version: 11/07/2016
Date Data Arrived at EDR: 01/05/2017
Date Made Active in Reports: 04/07/2017
Number of Days to Update: 92

Source: Environmental Protection Agency
Telephone: 703-603-8704
Last EDR Contact: 07/07/2017
Next Scheduled EDR Contact: 10/16/2017
Data Release Frequency: Varies

SEMS: Superfund Enterprise Management System

SEMS (Superfund Enterprise Management System) tracks hazardous waste sites, potentially hazardous waste sites, and remedial activities performed in support of EPA's Superfund Program across the United States. The list was formerly know as CERCLIS, renamed to SEMS by the EPA in 2015. The list contains data on potentially hazardous waste sites that have been reported to the USEPA by states, municipalities, private companies and private persons, pursuant to Section 103 of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA). This dataset also contains sites which are either proposed to or on the National Priorities List (NPL) and the sites which are in the screening and assessment phase for possible inclusion on the NPL.

Date of Government Version: 02/07/2017
Date Data Arrived at EDR: 04/19/2017
Date Made Active in Reports: 05/05/2017
Number of Days to Update: 16

Source: EPA
Telephone: 800-424-9346
Last EDR Contact: 07/21/2017
Next Scheduled EDR Contact: 10/30/2017
Data Release Frequency: Quarterly

Federal CERCLIS NFRAP site list

SEMS-ARCHIVE: Superfund Enterprise Management System Archive

SEMS-ARCHIVE (Superfund Enterprise Management System Archive) tracks sites that have no further interest under the Federal Superfund Program based on available information. The list was formerly known as the CERCLIS-NFRAP, renamed to SEMS ARCHIVE by the EPA in 2015. EPA may perform a minimal level of assessment work at a site while it is archived if site conditions change and/or new information becomes available. Archived sites have been removed and archived from the inventory of SEMS sites. Archived status indicates that, to the best of EPA's knowledge, assessment at a site has been completed and that EPA has determined no further steps will be taken to list the site on the National Priorities List (NPL), unless information indicates this decision was not appropriate or other considerations require a recommendation for listing at a later time. The decision does not necessarily mean that there is no hazard associated with a given site; it only means that. based upon available information, the location is not judged to be potential NPL site.

Date of Government Version: 02/07/2017
Date Data Arrived at EDR: 04/19/2017
Date Made Active in Reports: 05/05/2017
Number of Days to Update: 16

Source: EPA
Telephone: 800-424-9346
Last EDR Contact: 06/08/2017
Next Scheduled EDR Contact: 07/31/2017
Data Release Frequency: Quarterly

Federal RCRA CORRACTS facilities list

CORRACTS: Corrective Action Report

CORRACTS identifies hazardous waste handlers with RCRA corrective action activity.

Date of Government Version: 12/12/2016
Date Data Arrived at EDR: 12/28/2016
Date Made Active in Reports: 02/10/2017
Number of Days to Update: 44

Source: EPA
Telephone: 800-424-9346
Last EDR Contact: 06/29/2017
Next Scheduled EDR Contact: 10/09/2017
Data Release Frequency: Quarterly

Federal RCRA non-CORRACTS TSD facilities list

RCRA-TSDF: RCRA - Treatment, Storage and Disposal

RCRAInfo is EPA's comprehensive information system, providing access to data supporting the Resource Conservation and Recovery Act (RCRA) of 1976 and the Hazardous and Solid Waste Amendments (HSWA) of 1984. The database includes selective information on sites which generate, transport, store, treat and/or dispose of hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA). Transporters are individuals or entities that move hazardous waste from the generator offsite to a facility that can recycle, treat, store, or dispose of the waste. TSDFs treat, store, or dispose of the waste.

Date of Government Version: 12/12/2016
Date Data Arrived at EDR: 12/28/2016
Date Made Active in Reports: 02/10/2017
Number of Days to Update: 44

Source: Environmental Protection Agency
Telephone: (404) 562-8651
Last EDR Contact: 06/29/2017
Next Scheduled EDR Contact: 10/09/2017
Data Release Frequency: Quarterly

Federal RCRA generators list

RCRA-LQG: RCRA - Large Quantity Generators

RCRAInfo is EPA's comprehensive information system, providing access to data supporting the Resource Conservation and Recovery Act (RCRA) of 1976 and the Hazardous and Solid Waste Amendments (HSWA) of 1984. The database includes selective information on sites which generate, transport, store, treat and/or dispose of hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA). Large quantity generators (LQGs) generate over 1,000 kilograms (kg) of hazardous waste, or over 1 kg of acutely hazardous waste per month.

Date of Government Version: 12/12/2016
Date Data Arrived at EDR: 12/28/2016
Date Made Active in Reports: 02/10/2017
Number of Days to Update: 44

Source: Environmental Protection Agency
Telephone: (404) 562-8651
Last EDR Contact: 06/29/2017
Next Scheduled EDR Contact: 10/09/2017
Data Release Frequency: Quarterly

RCRA-SQG: RCRA - Small Quantity Generators

RCRAInfo is EPA's comprehensive information system, providing access to data supporting the Resource Conservation and Recovery Act (RCRA) of 1976 and the Hazardous and Solid Waste Amendments (HSWA) of 1984. The database includes selective information on sites which generate, transport, store, treat and/or dispose of hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA). Small quantity generators (SQGs) generate between 100 kg and 1,000 kg of hazardous waste per month.

Date of Government Version: 12/12/2016
Date Data Arrived at EDR: 12/28/2016
Date Made Active in Reports: 02/10/2017
Number of Days to Update: 44

Source: Environmental Protection Agency
Telephone: (404) 562-8651
Last EDR Contact: 06/29/2017
Next Scheduled EDR Contact: 10/09/2017
Data Release Frequency: Quarterly

RCRA-CESQG: RCRA - Conditionally Exempt Small Quantity Generators

RCRAInfo is EPA's comprehensive information system, providing access to data supporting the Resource Conservation and Recovery Act (RCRA) of 1976 and the Hazardous and Solid Waste Amendments (HSWA) of 1984. The database includes selective information on sites which generate, transport, store, treat and/or dispose of hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA). Conditionally exempt small quantity generators (CESQGs) generate less than 100 kg of hazardous waste, or less than 1 kg of acutely hazardous waste per month.

Date of Government Version: 12/12/2016
Date Data Arrived at EDR: 12/28/2016
Date Made Active in Reports: 02/10/2017
Number of Days to Update: 44

Source: Environmental Protection Agency
Telephone: (404) 562-8651
Last EDR Contact: 06/29/2017
Next Scheduled EDR Contact: 10/09/2017
Data Release Frequency: Varies

Federal institutional controls / engineering controls registries

LUCIS: Land Use Control Information System

LUCIS contains records of land use control information pertaining to the former Navy Base Realignment and Closure properties.

Date of Government Version: 12/28/2016
Date Data Arrived at EDR: 01/04/2017
Date Made Active in Reports: 04/07/2017
Number of Days to Update: 93

Source: Department of the Navy
Telephone: 843-820-7326
Last EDR Contact: 05/15/2017
Next Scheduled EDR Contact: 08/28/2017
Data Release Frequency: Varies

US ENG CONTROLS: Engineering Controls Sites List

A listing of sites with engineering controls in place. Engineering controls include various forms of caps, building foundations, liners, and treatment methods to create pathway elimination for regulated substances to enter environmental media or effect human health.

Date of Government Version: 02/13/2017
Date Data Arrived at EDR: 02/28/2017
Date Made Active in Reports: 06/09/2017
Number of Days to Update: 101

Source: Environmental Protection Agency
Telephone: 703-603-0695
Last EDR Contact: 05/31/2017
Next Scheduled EDR Contact: 09/11/2017
Data Release Frequency: Varies

US INST CONTROL: Sites with Institutional Controls

A listing of sites with institutional controls in place. Institutional controls include administrative measures, such as groundwater use restrictions, construction restrictions, property use restrictions, and post remediation care requirements intended to prevent exposure to contaminants remaining on site. Deed restrictions are generally required as part of the institutional controls.

Date of Government Version: 02/13/2017
Date Data Arrived at EDR: 02/28/2017
Date Made Active in Reports: 06/09/2017
Number of Days to Update: 101

Source: Environmental Protection Agency
Telephone: 703-603-0695
Last EDR Contact: 05/31/2017
Next Scheduled EDR Contact: 09/11/2017
Data Release Frequency: Varies

Federal ERNS list

ERNS: Emergency Response Notification System

Emergency Response Notification System. ERNS records and stores information on reported releases of oil and hazardous substances.

Date of Government Version: 09/26/2016
Date Data Arrived at EDR: 09/29/2016
Date Made Active in Reports: 11/11/2016
Number of Days to Update: 43

Source: National Response Center, United States Coast Guard
Telephone: 202-267-2180
Last EDR Contact: 06/28/2017
Next Scheduled EDR Contact: 10/09/2017
Data Release Frequency: Annually

State- and tribal - equivalent NPL

HSDS: Hazardous Substance Disposal Site

Locations of uncontrolled and unregulated hazardous waste sites. The file includes sites on the National Priority List as well as those on the state priority list.

Date of Government Version: 08/09/2011
Date Data Arrived at EDR: 11/08/2011
Date Made Active in Reports: 12/05/2011
Number of Days to Update: 27

Source: North Carolina Center for Geographic Information and Analysis
Telephone: 919-754-6580
Last EDR Contact: 07/26/2017
Next Scheduled EDR Contact: 11/08/2017
Data Release Frequency: Biennially

State- and tribal - equivalent CERCLIS

SHWS: Inactive Hazardous Sites Inventory

State Hazardous Waste Sites. State hazardous waste site records are the states' equivalent to CERCLIS. These sites may or may not already be listed on the federal CERCLIS list. Priority sites planned for cleanup using state funds (state equivalent of Superfund) are identified along with sites where cleanup will be paid for by potentially responsible parties. Available information varies by state.

Date of Government Version: 10/07/2016
Date Data Arrived at EDR: 12/15/2016
Date Made Active in Reports: 03/06/2017
Number of Days to Update: 81

Source: Department of Environment, Health and Natural Resources
Telephone: 919-508-8400
Last EDR Contact: 06/15/2017
Next Scheduled EDR Contact: 09/25/2017
Data Release Frequency: Quarterly

State and tribal landfill and/or solid waste disposal site lists

SWF/LF: List of Solid Waste Facilities

Solid Waste Facilities/Landfill Sites. SWF/LF type records typically contain an inventory of solid waste disposal facilities or landfills in a particular state. Depending on the state, these may be active or inactive facilities or open dumps that failed to meet RCRA Subtitle D Section 4004 criteria for solid waste landfills or disposal sites.

Date of Government Version: 11/17/2016
Date Data Arrived at EDR: 12/28/2016
Date Made Active in Reports: 03/08/2017
Number of Days to Update: 70

Source: Department of Environment and Natural Resources
Telephone: 919-733-0692
Last EDR Contact: 06/29/2017
Next Scheduled EDR Contact: 10/09/2017
Data Release Frequency: Semi-Annually

OLI: Old Landfill Inventory

Old landfill inventory location information. (Does not include no further action sites and other agency lead sites).

Date of Government Version: 08/08/2016
Date Data Arrived at EDR: 01/17/2017
Date Made Active in Reports: 03/08/2017
Number of Days to Update: 50

Source: Department of Environment & Natural Resources
Telephone: 919-733-4996
Last EDR Contact: 04/14/2017
Next Scheduled EDR Contact: 07/24/2017
Data Release Frequency: Varies

State and tribal leaking storage tank lists

LAST: Leaking Aboveground Storage Tanks
A listing of leaking aboveground storage tank site locations.

Date of Government Version: 10/07/2016
Date Data Arrived at EDR: 11/09/2016
Date Made Active in Reports: 03/06/2017
Number of Days to Update: 117
Source: Department of Environment & Natural Resources
Telephone: 877-623-6748
Last EDR Contact: 05/10/2017
Next Scheduled EDR Contact: 08/21/2017
Data Release Frequency: Quarterly

LUST: Regional UST Database
This database contains information obtained from the Regional Offices. It provides a more detailed explanation of current and historic activity for individual sites, as well as what was previously found in the Incident Management Database. Sites in this database with Incident Numbers are considered LUSTs.

Date of Government Version: 11/07/2016
Date Data Arrived at EDR: 11/09/2016
Date Made Active in Reports: 03/06/2017
Number of Days to Update: 117
Source: Department of Environment and Natural Resources
Telephone: 919-733-1308
Last EDR Contact: 05/10/2017
Next Scheduled EDR Contact: 08/21/2017
Data Release Frequency: Quarterly

INDIAN LUST R5: Leaking Underground Storage Tanks on Indian Land
Leaking underground storage tanks located on Indian Land in Michigan, Minnesota and Wisconsin.

Date of Government Version: 11/14/2016
Date Data Arrived at EDR: 01/26/2017
Date Made Active in Reports: 05/05/2017
Number of Days to Update: 99
Source: EPA, Region 5
Telephone: 312-886-7439
Last EDR Contact: 04/28/2017
Next Scheduled EDR Contact: 08/07/2017
Data Release Frequency: Varies

INDIAN LUST R1: Leaking Underground Storage Tanks on Indian Land
A listing of leaking underground storage tank locations on Indian Land.

Date of Government Version: 11/14/2016
Date Data Arrived at EDR: 01/26/2017
Date Made Active in Reports: 05/05/2017
Number of Days to Update: 99
Source: EPA Region 1
Telephone: 617-918-1313
Last EDR Contact: 04/28/2017
Next Scheduled EDR Contact: 08/07/2017
Data Release Frequency: Varies

INDIAN LUST R4: Leaking Underground Storage Tanks on Indian Land
LUSTs on Indian land in Florida, Mississippi and North Carolina.

Date of Government Version: 10/14/2016
Date Data Arrived at EDR: 01/27/2017
Date Made Active in Reports: 05/05/2017
Number of Days to Update: 98
Source: EPA Region 4
Telephone: 404-562-8677
Last EDR Contact: 04/28/2017
Next Scheduled EDR Contact: 08/07/2017
Data Release Frequency: Semi-Annually

INDIAN LUST R10: Leaking Underground Storage Tanks on Indian Land
LUSTs on Indian land in Alaska, Idaho, Oregon and Washington.

Date of Government Version: 10/07/2016
Date Data Arrived at EDR: 01/26/2017
Date Made Active in Reports: 05/05/2017
Number of Days to Update: 99
Source: EPA Region 10
Telephone: 206-553-2857
Last EDR Contact: 04/28/2017
Next Scheduled EDR Contact: 08/07/2017
Data Release Frequency: Quarterly

INDIAN LUST R9: Leaking Underground Storage Tanks on Indian Land
LUSTs on Indian land in Arizona, California, New Mexico and Nevada

Date of Government Version: 10/06/2016
Date Data Arrived at EDR: 01/26/2017
Date Made Active in Reports: 05/05/2017
Number of Days to Update: 99

Source: Environmental Protection Agency
Telephone: 415-972-3372
Last EDR Contact: 04/28/2017
Next Scheduled EDR Contact: 08/07/2017
Data Release Frequency: Quarterly

INDIAN LUST R6: Leaking Underground Storage Tanks on Indian Land
LUSTs on Indian land in New Mexico and Oklahoma.

Date of Government Version: 10/01/2016
Date Data Arrived at EDR: 01/26/2017
Date Made Active in Reports: 05/05/2017
Number of Days to Update: 99

Source: EPA Region 6
Telephone: 214-665-6597
Last EDR Contact: 04/28/2017
Next Scheduled EDR Contact: 08/07/2017
Data Release Frequency: Varies

INDIAN LUST R7: Leaking Underground Storage Tanks on Indian Land
LUSTs on Indian land in Iowa, Kansas, and Nebraska

Date of Government Version: 09/01/2016
Date Data Arrived at EDR: 01/26/2017
Date Made Active in Reports: 05/05/2017
Number of Days to Update: 99

Source: EPA Region 7
Telephone: 913-551-7003
Last EDR Contact: 04/28/2017
Next Scheduled EDR Contact: 08/07/2017
Data Release Frequency: Varies

INDIAN LUST R8: Leaking Underground Storage Tanks on Indian Land
LUSTs on Indian land in Colorado, Montana, North Dakota, South Dakota, Utah and Wyoming.

Date of Government Version: 10/17/2016
Date Data Arrived at EDR: 01/26/2017
Date Made Active in Reports: 05/05/2017
Number of Days to Update: 99

Source: EPA Region 8
Telephone: 303-312-6271
Last EDR Contact: 04/28/2017
Next Scheduled EDR Contact: 08/07/2017
Data Release Frequency: Quarterly

LUST TRUST: State Trust Fund Database
This database contains information about claims against the State Trust Funds for reimbursements for expenses incurred while remediating Leaking USTs.

Date of Government Version: 01/06/2017
Date Data Arrived at EDR: 01/12/2017
Date Made Active in Reports: 03/06/2017
Number of Days to Update: 53

Source: Department of Environment and Natural Resources
Telephone: 919-733-1315
Last EDR Contact: 07/13/2017
Next Scheduled EDR Contact: 10/23/2017
Data Release Frequency: Semi-Annually

State and tribal registered storage tank lists

FEMA UST: Underground Storage Tank Listing
A listing of all FEMA owned underground storage tanks.

Date of Government Version: 01/01/2010
Date Data Arrived at EDR: 02/16/2010
Date Made Active in Reports: 04/12/2010
Number of Days to Update: 55

Source: FEMA
Telephone: 202-646-5797
Last EDR Contact: 07/14/2017
Next Scheduled EDR Contact: 10/23/2017
Data Release Frequency: Varies

UST: Petroleum Underground Storage Tank Database
Registered Underground Storage Tanks. UST's are regulated under Subtitle I of the Resource Conservation and Recovery Act (RCRA) and must be registered with the state department responsible for administering the UST program. Available information varies by state program.

Date of Government Version: 09/30/2016
Date Data Arrived at EDR: 11/09/2016
Date Made Active in Reports: 03/06/2017
Number of Days to Update: 117

Source: Department of Environment and Natural Resources
Telephone: 919-733-1308
Last EDR Contact: 05/10/2017
Next Scheduled EDR Contact: 08/21/2017
Data Release Frequency: Quarterly

AST: AST Database

Facilities with aboveground storage tanks that have a capacity greater than 21,000 gallons.

Date of Government Version: 09/26/2016
Date Data Arrived at EDR: 12/30/2016
Date Made Active in Reports: 03/06/2017
Number of Days to Update: 66

Source: Department of Environment and Natural Resources
Telephone: 919-715-6183
Last EDR Contact: 06/19/2017
Next Scheduled EDR Contact: 10/02/2017
Data Release Frequency: Semi-Annually

INDIAN UST R10: Underground Storage Tanks on Indian Land

The Indian Underground Storage Tank (UST) database provides information about underground storage tanks on Indian land in EPA Region 10 (Alaska, Idaho, Oregon, Washington, and Tribal Nations).

Date of Government Version: 10/07/2016
Date Data Arrived at EDR: 01/26/2017
Date Made Active in Reports: 05/05/2017
Number of Days to Update: 99

Source: EPA Region 10
Telephone: 206-553-2857
Last EDR Contact: 04/28/2017
Next Scheduled EDR Contact: 08/07/2017
Data Release Frequency: Quarterly

INDIAN UST R8: Underground Storage Tanks on Indian Land

The Indian Underground Storage Tank (UST) database provides information about underground storage tanks on Indian land in EPA Region 8 (Colorado, Montana, North Dakota, South Dakota, Utah, Wyoming and 27 Tribal Nations).

Date of Government Version: 10/17/2016
Date Data Arrived at EDR: 01/26/2017
Date Made Active in Reports: 05/05/2017
Number of Days to Update: 99

Source: EPA Region 8
Telephone: 303-312-6137
Last EDR Contact: 04/28/2017
Next Scheduled EDR Contact: 08/07/2017
Data Release Frequency: Quarterly

INDIAN UST R7: Underground Storage Tanks on Indian Land

The Indian Underground Storage Tank (UST) database provides information about underground storage tanks on Indian land in EPA Region 7 (Iowa, Kansas, Missouri, Nebraska, and 9 Tribal Nations).

Date of Government Version: 09/01/2016
Date Data Arrived at EDR: 01/26/2017
Date Made Active in Reports: 05/05/2017
Number of Days to Update: 99

Source: EPA Region 7
Telephone: 913-551-7003
Last EDR Contact: 04/28/2017
Next Scheduled EDR Contact: 08/07/2017
Data Release Frequency: Varies

INDIAN UST R6: Underground Storage Tanks on Indian Land

The Indian Underground Storage Tank (UST) database provides information about underground storage tanks on Indian land in EPA Region 6 (Louisiana, Arkansas, Oklahoma, New Mexico, Texas and 65 Tribes).

Date of Government Version: 10/01/2016
Date Data Arrived at EDR: 01/26/2017
Date Made Active in Reports: 05/05/2017
Number of Days to Update: 99

Source: EPA Region 6
Telephone: 214-665-7591
Last EDR Contact: 04/28/2017
Next Scheduled EDR Contact: 08/07/2017
Data Release Frequency: Semi-Annually

INDIAN UST R5: Underground Storage Tanks on Indian Land

The Indian Underground Storage Tank (UST) database provides information about underground storage tanks on Indian land in EPA Region 5 (Michigan, Minnesota and Wisconsin and Tribal Nations).

Date of Government Version: 01/14/2017
Date Data Arrived at EDR: 01/26/2017
Date Made Active in Reports: 05/05/2017
Number of Days to Update: 99

Source: EPA Region 5
Telephone: 312-886-6136
Last EDR Contact: 04/28/2017
Next Scheduled EDR Contact: 08/07/2017
Data Release Frequency: Varies

INDIAN UST R4: Underground Storage Tanks on Indian Land

The Indian Underground Storage Tank (UST) database provides information about underground storage tanks on Indian land in EPA Region 4 (Alabama, Florida, Georgia, Kentucky, Mississippi, North Carolina, South Carolina, Tennessee and Tribal Nations)

Date of Government Version: 10/14/2016
Date Data Arrived at EDR: 01/27/2017
Date Made Active in Reports: 05/05/2017
Number of Days to Update: 98

Source: EPA Region 4
Telephone: 404-562-9424
Last EDR Contact: 04/28/2017
Next Scheduled EDR Contact: 08/07/2017
Data Release Frequency: Semi-Annually

INDIAN UST R1: Underground Storage Tanks on Indian Land

The Indian Underground Storage Tank (UST) database provides information about underground storage tanks on Indian land in EPA Region 1 (Connecticut, Maine, Massachusetts, New Hampshire, Rhode Island, Vermont and ten Tribal Nations).

Date of Government Version: 11/14/2016
Date Data Arrived at EDR: 01/26/2017
Date Made Active in Reports: 05/05/2017
Number of Days to Update: 99

Source: EPA, Region 1
Telephone: 617-918-1313
Last EDR Contact: 04/28/2017
Next Scheduled EDR Contact: 08/07/2017
Data Release Frequency: Varies

INDIAN UST R9: Underground Storage Tanks on Indian Land

The Indian Underground Storage Tank (UST) database provides information about underground storage tanks on Indian land in EPA Region 9 (Arizona, California, Hawaii, Nevada, the Pacific Islands, and Tribal Nations).

Date of Government Version: 10/06/2016
Date Data Arrived at EDR: 01/26/2017
Date Made Active in Reports: 05/05/2017
Number of Days to Update: 99

Source: EPA Region 9
Telephone: 415-972-3368
Last EDR Contact: 04/28/2017
Next Scheduled EDR Contact: 08/07/2017
Data Release Frequency: Quarterly

State and tribal institutional control / engineering control registries

INST CONTROL: No Further Action Sites With Land Use Restrictions Monitoring

A land use restricted site is a property where there are limits or requirements on future use of the property due to varying levels of cleanup possible, practical, or necessary at the site.

Date of Government Version: 10/07/2016
Date Data Arrived at EDR: 12/15/2016
Date Made Active in Reports: 03/06/2017
Number of Days to Update: 81

Source: Department of Environment, Health and Natural Resources
Telephone: 919-508-8400
Last EDR Contact: 06/15/2017
Next Scheduled EDR Contact: 09/25/2017
Data Release Frequency: Quarterly

State and tribal voluntary cleanup sites

INDIAN VCP R7: Voluntary Cleanup Priority Lisitng

A listing of voluntary cleanup priority sites located on Indian Land located in Region 7.

Date of Government Version: 03/20/2008
Date Data Arrived at EDR: 04/22/2008
Date Made Active in Reports: 05/19/2008
Number of Days to Update: 27

Source: EPA, Region 7
Telephone: 913-551-7365
Last EDR Contact: 04/20/2009
Next Scheduled EDR Contact: 07/20/2009
Data Release Frequency: Varies

INDIAN VCP R1: Voluntary Cleanup Priority Listing
A listing of voluntary cleanup priority sites located on Indian Land located in Region 1.

Date of Government Version: 07/27/2015
Date Data Arrived at EDR: 09/29/2015
Date Made Active in Reports: 02/18/2016
Number of Days to Update: 142
Source: EPA, Region 1
Telephone: 617-918-1102
Last EDR Contact: 06/27/2017
Next Scheduled EDR Contact: 10/09/2017
Data Release Frequency: Varies

VCP: Responsible Party Voluntary Action Sites
Responsible Party Voluntary Action site locations.

Date of Government Version: 10/07/2016
Date Data Arrived at EDR: 12/15/2016
Date Made Active in Reports: 03/08/2017
Number of Days to Update: 83
Source: Department of Environment and Natural Resources
Telephone: 919-508-8400
Last EDR Contact: 06/15/2017
Next Scheduled EDR Contact: 09/25/2017
Data Release Frequency: Semi-Annually

State and tribal Brownfields sites

BROWNFIELDS: Brownfields Projects Inventory
A brownfield site is an abandoned, idled, or underused property where the threat of environmental contamination has hindered its redevelopment. All of the sites in the inventory are working toward a brownfield agreement for cleanup and liabitliy control.

Date of Government Version: 01/03/2017
Date Data Arrived at EDR: 01/06/2017
Date Made Active in Reports: 03/06/2017
Number of Days to Update: 59
Source: Department of Environment and Natural Resources
Telephone: 919-733-4996
Last EDR Contact: 07/07/2017
Next Scheduled EDR Contact: 10/16/2017
Data Release Frequency: Varies

ADDITIONAL ENVIRONMENTAL RECORDS

Local Brownfield lists

US BROWNFIELDS: A Listing of Brownfields Sites
Brownfields are real property, the expansion, redevelopment, or reuse of which may be complicated by the presence or potential presence of a hazardous substance, pollutant, or contaminant. Cleaning up and reinvesting in these properties takes development pressures off of undeveloped, open land, and both improves and protects the environment. Assessment, Cleanup and Redevelopment Exchange System (ACRES) stores information reported by EPA Brownfields grant recipients on brownfields properties assessed or cleaned up with grant funding as well as information on Targeted Brownfields Assessments performed by EPA Regions. A listing of ACRES Brownfield sites is obtained from Cleanups in My Community. Cleanups in My Community provides information on Brownfields properties for which information is reported back to EPA, as well as areas served by Brownfields grant programs.

Date of Government Version: 03/02/2017
Date Data Arrived at EDR: 03/02/2017
Date Made Active in Reports: 04/07/2017
Number of Days to Update: 36
Source: Environmental Protection Agency
Telephone: 202-566-2777
Last EDR Contact: 06/20/2017
Next Scheduled EDR Contact: 10/02/2017
Data Release Frequency: Semi-Annually

Local Lists of Landfill / Solid Waste Disposal Sites

SWRCY: Recycling Center Listing
A listing of recycling center locations.

Date of Government Version: 11/30/2016
Date Data Arrived at EDR: 12/05/2016
Date Made Active in Reports: 03/08/2017
Number of Days to Update: 93
Source: Department of Environment & Natural Resources
Telephone: 919-707-8137
Last EDR Contact: 05/01/2017
Next Scheduled EDR Contact: 08/14/2017
Data Release Frequency: Varies

HIST LF: Solid Waste Facility Listing
A listing of solid waste facilities.

Date of Government Version: 11/06/2006
Date Data Arrived at EDR: 02/13/2007
Date Made Active in Reports: 03/02/2007
Number of Days to Update: 17

Source: Department of Environment & Natural Resources
Telephone: 919-733-0692
Last EDR Contact: 01/19/2009
Next Scheduled EDR Contact: N/A
Data Release Frequency: No Update Planned

INDIAN ODI: Report on the Status of Open Dumps on Indian Lands
Location of open dumps on Indian land.

Date of Government Version: 12/31/1998
Date Data Arrived at EDR: 12/03/2007
Date Made Active in Reports: 01/24/2008
Number of Days to Update: 52

Source: Environmental Protection Agency
Telephone: 703-308-8245
Last EDR Contact: 05/01/2017
Next Scheduled EDR Contact: 08/14/2017
Data Release Frequency: Varies

DEBRIS REGION 9: Torres Martinez Reservation Illegal Dump Site Locations
A listing of illegal dump sites location on the Torres Martinez Indian Reservation located in eastern Riverside County and northern Imperial County, California.

Date of Government Version: 01/12/2009
Date Data Arrived at EDR: 05/07/2009
Date Made Active in Reports: 09/21/2009
Number of Days to Update: 137

Source: EPA, Region 9
Telephone: 415-947-4219
Last EDR Contact: 07/24/2017
Next Scheduled EDR Contact: 11/08/2017
Data Release Frequency: No Update Planned

ODI: Open Dump Inventory
An open dump is defined as a disposal facility that does not comply with one or more of the Part 257 or Part 258 Subtitle D Criteria.

Date of Government Version: 06/30/1985
Date Data Arrived at EDR: 08/09/2004
Date Made Active in Reports: 09/17/2004
Number of Days to Update: 39

Source: Environmental Protection Agency
Telephone: 800-424-9346
Last EDR Contact: 06/09/2004
Next Scheduled EDR Contact: N/A
Data Release Frequency: No Update Planned

IHS OPEN DUMPS: Open Dumps on Indian Land
A listing of all open dumps located on Indian Land in the United States.

Date of Government Version: 04/01/2014
Date Data Arrived at EDR: 08/06/2014
Date Made Active in Reports: 01/29/2015
Number of Days to Update: 176

Source: Department of Health & Human Serivces, Indian Health Service
Telephone: 301-443-1452
Last EDR Contact: 05/05/2017
Next Scheduled EDR Contact: 08/14/2017
Data Release Frequency: Varies

Local Lists of Hazardous waste / Contaminated Sites

US HIST CDL: National Clandestine Laboratory Register
A listing of clandestine drug lab locations that have been removed from the DEAs National Clandestine Laboratory Register.

Date of Government Version: 02/09/2017
Date Data Arrived at EDR: 03/08/2017
Date Made Active in Reports: 06/09/2017
Number of Days to Update: 93

Source: Drug Enforcement Administration
Telephone: 202-307-1000
Last EDR Contact: 02/28/2017
Next Scheduled EDR Contact: 06/12/2017
Data Release Frequency: No Update Planned

US CDL: Clandestine Drug Labs

A listing of clandestine drug lab locations. The U.S. Department of Justice ("the Department") provides this web site as a public service. It contains addresses of some locations where law enforcement agencies reported they found chemicals or other items that indicated the presence of either clandestine drug laboratories or dumpsites. In most cases, the source of the entries is not the Department, and the Department has not verified the entry and does not guarantee its accuracy. Members of the public must verify the accuracy of all entries by, for example, contacting local law enforcement and local health departments.

Date of Government Version: 02/09/2017
Date Data Arrived at EDR: 03/08/2017
Date Made Active in Reports: 06/09/2017
Number of Days to Update: 93

Source: Drug Enforcement Administration
Telephone: 202-307-1000
Last EDR Contact: 05/31/2017
Next Scheduled EDR Contact: 09/11/2017
Data Release Frequency: Quarterly

Local Land Records

LIENS 2: CERCLA Lien Information

A Federal CERCLA ('Superfund') lien can exist by operation of law at any site or property at which EPA has spent Superfund monies. These monies are spent to investigate and address releases and threatened releases of contamination. CERCLIS provides information as to the identity of these sites and properties.

Date of Government Version: 02/18/2014
Date Data Arrived at EDR: 03/18/2014
Date Made Active in Reports: 04/24/2014
Number of Days to Update: 37

Source: Environmental Protection Agency
Telephone: 202-564-6023
Last EDR Contact: 07/26/2017
Next Scheduled EDR Contact: 11/08/2017
Data Release Frequency: Varies

Records of Emergency Release Reports

HMIRS: Hazardous Materials Information Reporting System

Hazardous Materials Incident Report System. HMIRS contains hazardous material spill incidents reported to DOT.

Date of Government Version: 12/28/2016
Date Data Arrived at EDR: 12/28/2016
Date Made Active in Reports: 02/03/2017
Number of Days to Update: 37

Source: U.S. Department of Transportation
Telephone: 202-366-4555
Last EDR Contact: 06/28/2017
Next Scheduled EDR Contact: 10/09/2017
Data Release Frequency: Annually

SPILLS: Spills Incident Listing

A listing spills, hazardous material releases, sanitary sewer overflows, wastewater treatment plant bypasses and upsets, citizen complaints, and any other environmental emergency calls reported to the agency.

Date of Government Version: 12/14/2016
Date Data Arrived at EDR: 12/16/2016
Date Made Active in Reports: 03/08/2017
Number of Days to Update: 82

Source: Department of Environment & Natural Resources
Telephone: 919-807-6308
Last EDR Contact: 06/12/2017
Next Scheduled EDR Contact: 09/25/2017
Data Release Frequency: Varies

IMD: Incident Management Database

Groundwater and/or soil contamination incidents

Date of Government Version: 07/21/2006
Date Data Arrived at EDR: 08/01/2006
Date Made Active in Reports: 08/23/2006
Number of Days to Update: 22

Source: Department of Environment and Natural Resources
Telephone: 919-733-3221
Last EDR Contact: 07/01/2011
Next Scheduled EDR Contact: 10/17/2011
Data Release Frequency: No Update Planned

SPILLS 90: SPILLS90 data from FirstSearch

Spills 90 includes those spill and release records available exclusively from FirstSearch databases. Typically, they may include chemical, oil and/or hazardous substance spills recorded after 1990. Duplicate records that are already included in EDR incident and release records are not included in Spills 90.

Date of Government Version: 09/27/2012
Date Data Arrived at EDR: 01/03/2013
Date Made Active in Reports: 03/06/2013
Number of Days to Update: 62

Source: FirstSearch
Telephone: N/A
Last EDR Contact: 01/03/2013
Next Scheduled EDR Contact: N/A
Data Release Frequency: No Update Planned

SPILLS 80: SPILLS80 data from FirstSearch

Spills 80 includes those spill and release records available from FirstSearch databases prior to 1990. Typically, they may include chemical, oil and/or hazardous substance spills recorded before 1990. Duplicate records that are already included in EDR incident and release records are not included in Spills 80.

Date of Government Version: 06/14/2001
Date Data Arrived at EDR: 01/03/2013
Date Made Active in Reports: 03/06/2013
Number of Days to Update: 62

Source: FirstSearch
Telephone: N/A
Last EDR Contact: 01/03/2013
Next Scheduled EDR Contact: N/A
Data Release Frequency: No Update Planned

Other Ascertainable Records

RCRA NonGen / NLR: RCRA - Non Generators / No Longer Regulated

RCRAInfo is EPA's comprehensive information system, providing access to data supporting the Resource Conservation and Recovery Act (RCRA) of 1976 and the Hazardous and Solid Waste Amendments (HSWA) of 1984. The database includes selective information on sites which generate, transport, store, treat and/or dispose of hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA). Non-Generators do not presently generate hazardous waste.

Date of Government Version: 12/12/2016
Date Data Arrived at EDR: 12/28/2016
Date Made Active in Reports: 02/10/2017
Number of Days to Update: 44

Source: Environmental Protection Agency
Telephone: (404) 562-8651
Last EDR Contact: 06/29/2017
Next Scheduled EDR Contact: 10/09/2017
Data Release Frequency: Varies

FUDS: Formerly Used Defense Sites

The listing includes locations of Formerly Used Defense Sites properties where the US Army Corps of Engineers is actively working or will take necessary cleanup actions.

Date of Government Version: 01/31/2015
Date Data Arrived at EDR: 07/08/2015
Date Made Active in Reports: 10/13/2015
Number of Days to Update: 97

Source: U.S. Army Corps of Engineers
Telephone: 202-528-4285
Last EDR Contact: 02/24/2017
Next Scheduled EDR Contact: 06/05/2017
Data Release Frequency: Varies

DOD: Department of Defense Sites

This data set consists of federally owned or administered lands, administered by the Department of Defense, that have any area equal to or greater than 640 acres of the United States, Puerto Rico, and the U.S. Virgin Islands.

Date of Government Version: 12/31/2005
Date Data Arrived at EDR: 11/10/2006
Date Made Active in Reports: 01/11/2007
Number of Days to Update: 62

Source: USGS
Telephone: 888-275-8747
Last EDR Contact: 07/12/2017
Next Scheduled EDR Contact: 10/23/2017
Data Release Frequency: Semi-Annually

FEDLAND: Federal and Indian Lands

Federally and Indian administrated lands of the United States. Lands included are administrated by: Army Corps of Engineers, Bureau of Reclamation, National Wild and Scenic River, National Wildlife Refuge, Public Domain Land, Wilderness, Wilderness Study Area, Wildlife Management Area, Bureau of Indian Affairs, Bureau of Land Management, Department of Justice, Forest Service, Fish and Wildlife Service, National Park Service.

Date of Government Version: 12/31/2005
Date Data Arrived at EDR: 02/06/2006
Date Made Active in Reports: 01/11/2007
Number of Days to Update: 339

Source: U.S. Geological Survey
Telephone: 888-275-8747
Last EDR Contact: 07/14/2017
Next Scheduled EDR Contact: 10/23/2017
Data Release Frequency: N/A

SCRD DRYCLEANERS: State Coalition for Remediation of Drycleaners Listing

The State Coalition for Remediation of Drycleaners was established in 1998, with support from the U.S. EPA Office of Superfund Remediation and Technology Innovation. It is comprised of representatives of states with established drycleaner remediation programs. Currently the member states are Alabama, Connecticut, Florida, Illinois, Kansas, Minnesota, Missouri, North Carolina, Oregon, South Carolina, Tennessee, Texas, and Wisconsin.

Date of Government Version: 01/01/2017
Date Data Arrived at EDR: 02/03/2017
Date Made Active in Reports: 04/07/2017
Number of Days to Update: 63

Source: Environmental Protection Agency
Telephone: 615-532-8599
Last EDR Contact: 05/19/2017
Next Scheduled EDR Contact: 08/28/2017
Data Release Frequency: Varies

US FIN ASSUR: Financial Assurance Information

All owners and operators of facilities that treat, store, or dispose of hazardous waste are required to provide proof that they will have sufficient funds to pay for the clean up, closure, and post-closure care of their facilities.

Date of Government Version: 02/13/2017
Date Data Arrived at EDR: 02/15/2017
Date Made Active in Reports: 05/12/2017
Number of Days to Update: 86

Source: Environmental Protection Agency
Telephone: 202-566-1917
Last EDR Contact: 05/17/2017
Next Scheduled EDR Contact: 08/28/2017
Data Release Frequency: Quarterly

EPA WATCH LIST: EPA WATCH LIST

EPA maintains a "Watch List" to facilitate dialogue between EPA, state and local environmental agencies on enforcement matters relating to facilities with alleged violations identified as either significant or high priority. Being on the Watch List does not mean that the facility has actually violated the law only that an investigation by EPA or a state or local environmental agency has led those organizations to allege that an unproven violation has in fact occurred. Being on the Watch List does not represent a higher level of concern regarding the alleged violations that were detected, but instead indicates cases requiring additional dialogue between EPA, state and local agencies - primarily because of the length of time the alleged violation has gone unaddressed or unresolved.

Date of Government Version: 08/30/2013
Date Data Arrived at EDR: 03/21/2014
Date Made Active in Reports: 06/17/2014
Number of Days to Update: 88

Source: Environmental Protection Agency
Telephone: 617-520-3000
Last EDR Contact: 05/08/2017
Next Scheduled EDR Contact: 08/21/2017
Data Release Frequency: Quarterly

2020 COR ACTION: 2020 Corrective Action Program List

The EPA has set ambitious goals for the RCRA Corrective Action program by creating the 2020 Corrective Action Universe. This RCRA cleanup baseline includes facilities expected to need corrective action. The 2020 universe contains a wide variety of sites. Some properties are heavily contaminated while others were contaminated but have since been cleaned up. Still others have not been fully investigated yet, and may require little or no remediation. Inclusion in the 2020 Universe does not necessarily imply failure on the part of a facility to meet its RCRA obligations.

Date of Government Version: 04/22/2013
Date Data Arrived at EDR: 03/03/2015
Date Made Active in Reports: 03/09/2015
Number of Days to Update: 6

Source: Environmental Protection Agency
Telephone: 703-308-4044
Last EDR Contact: 05/05/2017
Next Scheduled EDR Contact: 08/21/2017
Data Release Frequency: Varies

TSCA: Toxic Substances Control Act

Toxic Substances Control Act. TSCA identifies manufacturers and importers of chemical substances included on the TSCA Chemical Substance Inventory list. It includes data on the production volume of these substances by plant site.

Date of Government Version: 12/31/2012
Date Data Arrived at EDR: 01/15/2015
Date Made Active in Reports: 01/29/2015
Number of Days to Update: 14

Source: EPA
Telephone: 202-260-5521
Last EDR Contact: 06/21/2017
Next Scheduled EDR Contact: 10/02/2017
Data Release Frequency: Every 4 Years

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

TRIS: Toxic Chemical Release Inventory System

Toxic Release Inventory System. TRIS identifies facilities which release toxic chemicals to the air, water and land in reportable quantities under SARA Title III Section 313.

Date of Government Version: 12/31/2014
Date Data Arrived at EDR: 11/24/2015
Date Made Active in Reports: 04/05/2016
Number of Days to Update: 133

Source: EPA
Telephone: 202-566-0250
Last EDR Contact: 05/26/2017
Next Scheduled EDR Contact: 09/04/2017
Data Release Frequency: Annually

SSTS: Section 7 Tracking Systems

Section 7 of the Federal Insecticide, Fungicide and Rodenticide Act, as amended (92 Stat. 829) requires all registered pesticide-producing establishments to submit a report to the Environmental Protection Agency by March 1st each year. Each establishment must report the types and amounts of pesticides, active ingredients and devices being produced, and those having been produced and sold or distributed in the past year.

Date of Government Version: 12/31/2009
Date Data Arrived at EDR: 12/10/2010
Date Made Active in Reports: 02/25/2011
Number of Days to Update: 77

Source: EPA
Telephone: 202-564-4203
Last EDR Contact: 04/26/2017
Next Scheduled EDR Contact: 08/07/2017
Data Release Frequency: Annually

ROD: Records Of Decision

Record of Decision. ROD documents mandate a permanent remedy at an NPL (Superfund) site containing technical and health information to aid in the cleanup.

Date of Government Version: 11/25/2013
Date Data Arrived at EDR: 12/12/2013
Date Made Active in Reports: 02/24/2014
Number of Days to Update: 74

Source: EPA
Telephone: 703-416-0223
Last EDR Contact: 06/09/2017
Next Scheduled EDR Contact: 09/18/2017
Data Release Frequency: Annually

RMP: Risk Management Plans

When Congress passed the Clean Air Act Amendments of 1990, it required EPA to publish regulations and guidance for chemical accident prevention at facilities using extremely hazardous substances. The Risk Management Program Rule (RMP Rule) was written to implement Section 112(r) of these amendments. The rule, which built upon existing industry codes and standards, requires companies of all sizes that use certain flammable and toxic substances to develop a Risk Management Program, which includes a(n): Hazard assessment that details the potential effects of an accidental release, an accident history of the last five years, and an evaluation of worst-case and alternative accidental releases; Prevention program that includes safety precautions and maintenance, monitoring, and employee training measures; and Emergency response program that spells out emergency health care, employee training measures and procedures for informing the public and response agencies (e.g the fire department) should an accident occur.

Date of Government Version: 02/01/2017
Date Data Arrived at EDR: 02/09/2017
Date Made Active in Reports: 04/07/2017
Number of Days to Update: 57

Source: Environmental Protection Agency
Telephone: 202-564-8600
Last EDR Contact: 07/24/2017
Next Scheduled EDR Contact: 11/08/2017
Data Release Frequency: Varies

RAATS: RCRA Administrative Action Tracking System

RCRA Administration Action Tracking System. RAATS contains records based on enforcement actions issued under RCRA pertaining to major violators and includes administrative and civil actions brought by the EPA. For administration actions after September 30, 1995, data entry in the RAATS database was discontinued. EPA will retain a copy of the database for historical records. It was necessary to terminate RAATS because a decrease in agency resources made it impossible to continue to update the information contained in the database.

Date of Government Version: 04/17/1995
Date Data Arrived at EDR: 07/03/1995
Date Made Active in Reports: 08/07/1995
Number of Days to Update: 35

Source: EPA
Telephone: 202-564-4104
Last EDR Contact: 06/02/2008
Next Scheduled EDR Contact: 09/01/2008
Data Release Frequency: No Update Planned

PRP: Potentially Responsible Parties
A listing of verified Potentially Responsible Parties

Date of Government Version: 10/25/2013
Date Data Arrived at EDR: 10/17/2014
Date Made Active in Reports: 10/20/2014
Number of Days to Update: 3
Source: EPA
Telephone: 202-564-6023
Last EDR Contact: 06/06/2017
Next Scheduled EDR Contact: 08/21/2017
Data Release Frequency: Quarterly

PADS: PCB Activity Database System
PCB Activity Database. PADS Identifies generators, transporters, commercial storers and/or brokers and disposers of PCB's who are required to notify the EPA of such activities.

Date of Government Version: 01/20/2016
Date Data Arrived at EDR: 04/28/2016
Date Made Active in Reports: 09/02/2016
Number of Days to Update: 127
Source: EPA
Telephone: 202-566-0500
Last EDR Contact: 04/10/2017
Next Scheduled EDR Contact: 07/24/2017
Data Release Frequency: Annually

ICIS: Integrated Compliance Information System
The Integrated Compliance Information System (ICIS) supports the information needs of the national enforcement and compliance program as well as the unique needs of the National Pollutant Discharge Elimination System (NPDES) program.

Date of Government Version: 11/18/2016
Date Data Arrived at EDR: 11/23/2016
Date Made Active in Reports: 02/10/2017
Number of Days to Update: 79
Source: Environmental Protection Agency
Telephone: 202-564-2501
Last EDR Contact: 07/24/2017
Next Scheduled EDR Contact: 10/23/2017
Data Release Frequency: Quarterly

FTTS: FIFRA/ TSCA Tracking System - FIFRA (Federal Insecticide, Fungicide, & Rodenticide Act)/TSCA (Toxic Substances Control Act)
FTTS tracks administrative cases and pesticide enforcement actions and compliance activities related to FIFRA, TSCA and EPCRA (Emergency Planning and Community Right-to-Know Act). To maintain currency, EDR contacts the Agency on a quarterly basis.

Date of Government Version: 04/09/2009
Date Data Arrived at EDR: 04/16/2009
Date Made Active in Reports: 05/11/2009
Number of Days to Update: 25
Source: EPA/Office of Prevention, Pesticides and Toxic Substances
Telephone: 202-566-1667
Last EDR Contact: 05/19/2017
Next Scheduled EDR Contact: 09/04/2017
Data Release Frequency: Quarterly

FTTS INSP: FIFRA/ TSCA Tracking System - FIFRA (Federal Insecticide, Fungicide, & Rodenticide Act)/TSCA (Toxic Substances Control Act)
A listing of FIFRA/TSCA Tracking System (FTTS) inspections and enforcements.

Date of Government Version: 04/09/2009
Date Data Arrived at EDR: 04/16/2009
Date Made Active in Reports: 05/11/2009
Number of Days to Update: 25
Source: EPA
Telephone: 202-566-1667
Last EDR Contact: 05/19/2017
Next Scheduled EDR Contact: 09/04/2017
Data Release Frequency: Quarterly

MLTS: Material Licensing Tracking System
MLTS is maintained by the Nuclear Regulatory Commission and contains a list of approximately 8,100 sites which possess or use radioactive materials and which are subject to NRC licensing requirements. To maintain currency, EDR contacts the Agency on a quarterly basis.

Date of Government Version: 08/30/2016
Date Data Arrived at EDR: 09/08/2016
Date Made Active in Reports: 10/21/2016
Number of Days to Update: 43
Source: Nuclear Regulatory Commission
Telephone: 301-415-7169
Last EDR Contact: 05/08/2017
Next Scheduled EDR Contact: 08/21/2017
Data Release Frequency: Quarterly

COAL ASH DOE: Steam-Electric Plant Operation Data
A listing of power plants that store ash in surface ponds.

Date of Government Version: 12/31/2005
Date Data Arrived at EDR: 08/07/2009
Date Made Active in Reports: 10/22/2009
Number of Days to Update: 76
Source: Department of Energy
Telephone: 202-586-8719
Last EDR Contact: 06/05/2017
Next Scheduled EDR Contact: 09/18/2017
Data Release Frequency: Varies

COAL ASH EPA: Coal Combustion Residues Surface Impoundments List
A listing of coal combustion residues surface impoundments with high hazard potential ratings.

Date of Government Version: 07/01/2014
Date Data Arrived at EDR: 09/10/2014
Date Made Active in Reports: 10/20/2014
Number of Days to Update: 40
Source: Environmental Protection Agency
Telephone: N/A
Last EDR Contact: 06/05/2017
Next Scheduled EDR Contact: 09/18/2017
Data Release Frequency: Varies

PCB TRANSFORMER: PCB Transformer Registration Database
The database of PCB transformer registrations that includes all PCB registration submittals.

Date of Government Version: 02/01/2011
Date Data Arrived at EDR: 10/19/2011
Date Made Active in Reports: 01/10/2012
Number of Days to Update: 83
Source: Environmental Protection Agency
Telephone: 202-566-0517
Last EDR Contact: 04/28/2017
Next Scheduled EDR Contact: 08/07/2017
Data Release Frequency: Varies

RADINFO: Radiation Information Database
The Radiation Information Database (RADINFO) contains information about facilities that are regulated by U.S. Environmental Protection Agency (EPA) regulations for radiation and radioactivity.

Date of Government Version: 01/04/2017
Date Data Arrived at EDR: 01/06/2017
Date Made Active in Reports: 02/10/2017
Number of Days to Update: 35
Source: Environmental Protection Agency
Telephone: 202-343-9775
Last EDR Contact: 07/12/2017
Next Scheduled EDR Contact: 10/16/2017
Data Release Frequency: Quarterly

HIST FTTS: FIFRA/TSCA Tracking System Administrative Case Listing
A complete administrative case listing from the FIFRA/TSCA Tracking System (FTTS) for all ten EPA regions. The information was obtained from the National Compliance Database (NCDB). NCDB supports the implementation of FIFRA (Federal Insecticide, Fungicide, and Rodenticide Act) and TSCA (Toxic Substances Control Act). Some EPA regions are now closing out records. Because of that, and the fact that some EPA regions are not providing EPA Headquarters with updated records, it was decided to create a HIST FTTS database. It included records that may not be included in the newer FTTS database updates. This database is no longer updated.

Date of Government Version: 10/19/2006
Date Data Arrived at EDR: 03/01/2007
Date Made Active in Reports: 04/10/2007
Number of Days to Update: 40
Source: Environmental Protection Agency
Telephone: 202-564-2501
Last EDR Contact: 12/17/2007
Next Scheduled EDR Contact: 03/17/2008
Data Release Frequency: No Update Planned

HIST FTTS INSP: FIFRA/TSCA Tracking System Inspection & Enforcement Case Listing
A complete inspection and enforcement case listing from the FIFRA/TSCA Tracking System (FTTS) for all ten EPA regions. The information was obtained from the National Compliance Database (NCDB). NCDB supports the implementation of FIFRA (Federal Insecticide, Fungicide, and Rodenticide Act) and TSCA (Toxic Substances Control Act). Some EPA regions are now closing out records. Because of that, and the fact that some EPA regions are not providing EPA Headquarters with updated records, it was decided to create a HIST FTTS database. It included records that may not be included in the newer FTTS database updates. This database is no longer updated.

Date of Government Version: 10/19/2006
Date Data Arrived at EDR: 03/01/2007
Date Made Active in Reports: 04/10/2007
Number of Days to Update: 40

Source: Environmental Protection Agency
Telephone: 202-564-2501
Last EDR Contact: 12/17/2008
Next Scheduled EDR Contact: 03/17/2008
Data Release Frequency: No Update Planned

DOT OPS: Incident and Accident Data

Department of Transporation, Office of Pipeline Safety Incident and Accident data.

Date of Government Version: 07/31/2012
Date Data Arrived at EDR: 08/07/2012
Date Made Active in Reports: 09/18/2012
Number of Days to Update: 42

Source: Department of Transporation, Office of Pipeline Safety
Telephone: 202-366-4595
Last EDR Contact: 05/02/2017
Next Scheduled EDR Contact: 08/14/2017
Data Release Frequency: Varies

CONSENT: Superfund (CERCLA) Consent Decrees

Major legal settlements that establish responsibility and standards for cleanup at NPL (Superfund) sites. Released periodically by United States District Courts after settlement by parties to litigation matters.

Date of Government Version: 09/30/2016
Date Data Arrived at EDR: 11/18/2016
Date Made Active in Reports: 02/03/2017
Number of Days to Update: 77

Source: Department of Justice, Consent Decree Library
Telephone: Varies
Last EDR Contact: 06/21/2017
Next Scheduled EDR Contact: 10/09/2017
Data Release Frequency: Varies

BRS: Biennial Reporting System

The Biennial Reporting System is a national system administered by the EPA that collects data on the generation and management of hazardous waste. BRS captures detailed data from two groups: Large Quantity Generators (LQG) and Treatment, Storage, and Disposal Facilities.

Date of Government Version: 12/31/2013
Date Data Arrived at EDR: 02/24/2015
Date Made Active in Reports: 09/30/2015
Number of Days to Update: 218

Source: EPA/NTIS
Telephone: 800-424-9346
Last EDR Contact: 05/26/2017
Next Scheduled EDR Contact: 09/04/2017
Data Release Frequency: Biennially

INDIAN RESERV: Indian Reservations

This map layer portrays Indian administered lands of the United States that have any area equal to or greater than 640 acres.

Date of Government Version: 12/31/2014
Date Data Arrived at EDR: 07/14/2015
Date Made Active in Reports: 01/10/2017
Number of Days to Update: 546

Source: USGS
Telephone: 202-208-3710
Last EDR Contact: 07/11/2017
Next Scheduled EDR Contact: 10/23/2017
Data Release Frequency: Semi-Annually

FUSRAP: Formerly Utilized Sites Remedial Action Program

DOE established the Formerly Utilized Sites Remedial Action Program (FUSRAP) in 1974 to remediate sites where radioactive contamination remained from Manhattan Project and early U.S. Atomic Energy Commission (AEC) operations.

Date of Government Version: 12/23/2016
Date Data Arrived at EDR: 12/27/2016
Date Made Active in Reports: 02/17/2017
Number of Days to Update: 52

Source: Department of Energy
Telephone: 202-586-3559
Last EDR Contact: 05/05/2017
Next Scheduled EDR Contact: 08/21/2017
Data Release Frequency: Varies

UMTRA: Uranium Mill Tailings Sites

Uranium ore was mined by private companies for federal government use in national defense programs. When the mills shut down, large piles of the sand-like material (mill tailings) remain after uranium has been extracted from the ore. Levels of human exposure to radioactive materials from the piles are low; however, in some cases tailings were used as construction materials before the potential health hazards of the tailings were recognized.

Date of Government Version: 09/14/2010
Date Data Arrived at EDR: 10/07/2011
Date Made Active in Reports: 03/01/2012
Number of Days to Update: 146

Source: Department of Energy
Telephone: 505-845-0011
Last EDR Contact: 05/22/2017
Next Scheduled EDR Contact: 09/04/2017
Data Release Frequency: Varies

LEAD SMELTER 1: Lead Smelter Sites

A listing of former lead smelter site locations.

Date of Government Version: 12/05/2016
Date Data Arrived at EDR: 01/05/2017
Date Made Active in Reports: 02/10/2017
Number of Days to Update: 36

Source: Environmental Protection Agency
Telephone: 703-603-8787
Last EDR Contact: 07/07/2017
Next Scheduled EDR Contact: 10/16/2017
Data Release Frequency: Varies

LEAD SMELTER 2: Lead Smelter Sites

A list of several hundred sites in the U.S. where secondary lead smelting was done from 1931and 1964. These sites may pose a threat to public health through ingestion or inhalation of contaminated soil or dust

Date of Government Version: 04/05/2001
Date Data Arrived at EDR: 10/27/2010
Date Made Active in Reports: 12/02/2010
Number of Days to Update: 36

Source: American Journal of Public Health
Telephone: 703-305-6451
Last EDR Contact: 12/02/2009
Next Scheduled EDR Contact: N/A
Data Release Frequency: No Update Planned

US AIRS (AFS): Aerometric Information Retrieval System Facility Subsystem (AFS)

The database is a sub-system of Aerometric Information Retrieval System (AIRS). AFS contains compliance data on air pollution point sources regulated by the U.S. EPA and/or state and local air regulatory agencies. This information comes from source reports by various stationary sources of air pollution, such as electric power plants, steel mills, factories, and universities, and provides information about the air pollutants they produce. Action, air program, air program pollutant, and general level plant data. It is used to track emissions and compliance data from industrial plants.

Date of Government Version: 10/12/2016
Date Data Arrived at EDR: 10/26/2016
Date Made Active in Reports: 02/03/2017
Number of Days to Update: 100

Source: EPA
Telephone: 202-564-2496
Last EDR Contact: 06/21/2017
Next Scheduled EDR Contact: 10/09/2017
Data Release Frequency: Annually

US AIRS MINOR: Air Facility System Data

A listing of minor source facilities.

Date of Government Version: 10/12/2016
Date Data Arrived at EDR: 10/26/2016
Date Made Active in Reports: 02/03/2017
Number of Days to Update: 100

Source: EPA
Telephone: 202-564-2496
Last EDR Contact: 06/21/2017
Next Scheduled EDR Contact: 10/09/2017
Data Release Frequency: Annually

US MINES: Mines Master Index File

Contains all mine identification numbers issued for mines active or opened since 1971. The data also includes violation information.

Date of Government Version: 02/08/2017
Date Data Arrived at EDR: 02/28/2017
Date Made Active in Reports: 04/07/2017
Number of Days to Update: 38

Source: Department of Labor, Mine Safety and Health Administration
Telephone: 303-231-5959
Last EDR Contact: 05/31/2017
Next Scheduled EDR Contact: 09/11/2017
Data Release Frequency: Semi-Annually

US MINES 2: Ferrous and Nonferrous Metal Mines Database Listing

This map layer includes ferrous (ferrous metal mines are facilities that extract ferrous metals, such as iron ore or molybdenum) and nonferrous (Nonferrous metal mines are facilities that extract nonferrous metals, such as gold, silver, copper, zinc, and lead) metal mines in the United States.

Date of Government Version: 12/05/2005
Date Data Arrived at EDR: 02/29/2008
Date Made Active in Reports: 04/18/2008
Number of Days to Update: 49

Source: USGS
Telephone: 703-648-7709
Last EDR Contact: 05/31/2017
Next Scheduled EDR Contact: 09/11/2017
Data Release Frequency: Varies

US MINES 3: Active Mines & Mineral Plants Database Listing

Active Mines and Mineral Processing Plant operations for commodities monitored by the Minerals Information Team of the USGS.

Date of Government Version: 04/14/2011
Date Data Arrived at EDR: 06/08/2011
Date Made Active in Reports: 09/13/2011
Number of Days to Update: 97

Source: USGS
Telephone: 703-648-7709
Last EDR Contact: 06/02/2017
Next Scheduled EDR Contact: 09/11/2017
Data Release Frequency: Varies

ABANDONED MINES: Abandoned Mines

An inventory of land and water impacted by past mining (primarily coal mining) is maintained by OSMRE to provide information needed to implement the Surface Mining Control and Reclamation Act of 1977 (SMCRA). The inventory contains information on the location, type, and extent of AML impacts, as well as, information on the cost associated with the reclamation of those problems. The inventory is based upon field surveys by State, Tribal, and OSMRE program officials. It is dynamic to the extent that it is modified as new problems are identified and existing problems are reclaimed.

Date of Government Version: 03/14/2017
Date Data Arrived at EDR: 03/17/2017
Date Made Active in Reports: 04/07/2017
Number of Days to Update: 21

Source: Department of Interior
Telephone: 202-208-2609
Last EDR Contact: 06/09/2017
Next Scheduled EDR Contact: 09/25/2017
Data Release Frequency: Quarterly

FINDS: Facility Index System/Facility Registry System

Facility Index System. FINDS contains both facility information and 'pointers' to other sources that contain more detail. EDR includes the following FINDS databases in this report: PCS (Permit Compliance System), AIRS (Aerometric Information Retrieval System), DOCKET (Enforcement Docket used to manage and track information on civil judicial enforcement cases for all environmental statutes), FURS (Federal Underground Injection Control), C-DOCKET (Criminal Docket System used to track criminal enforcement actions for all environmental statutes), FFIS (Federal Facilities Information System), STATE (State Environmental Laws and Statutes), and PADS (PCB Activity Data System).

Date of Government Version: 04/04/2017
Date Data Arrived at EDR: 04/07/2017
Date Made Active in Reports: 05/12/2017
Number of Days to Update: 35

Source: EPA
Telephone: (404) 562-9900
Last EDR Contact: 06/07/2017
Next Scheduled EDR Contact: 09/18/2017
Data Release Frequency: Quarterly

DOCKET HWC: Hazardous Waste Compliance Docket Listing

A complete list of the Federal Agency Hazardous Waste Compliance Docket Facilities.

Date of Government Version: 06/02/2016
Date Data Arrived at EDR: 06/03/2016
Date Made Active in Reports: 09/02/2016
Number of Days to Update: 91

Source: Environmental Protection Agency
Telephone: 202-564-0527
Last EDR Contact: 05/24/2017
Next Scheduled EDR Contact: 09/11/2017
Data Release Frequency: Varies

UXO: Unexploded Ordnance Sites

A listing of unexploded ordnance site locations

Date of Government Version: 10/25/2015
Date Data Arrived at EDR: 01/29/2016
Date Made Active in Reports: 04/05/2016
Number of Days to Update: 67

Source: Department of Defense
Telephone: 571-373-0407
Last EDR Contact: 07/17/2017
Next Scheduled EDR Contact: 10/30/2017
Data Release Frequency: Varies

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

ECHO: Enforcement & Compliance History Information

ECHO provides integrated compliance and enforcement information for about 800,000 regulated facilities nationwide.

Date of Government Version: 03/19/2017
Date Data Arrived at EDR: 03/21/2017
Date Made Active in Reports: 05/12/2017
Number of Days to Update: 52

Source: Environmental Protection Agency
Telephone: 202-564-2280
Last EDR Contact: 06/07/2017
Next Scheduled EDR Contact: 09/18/2017
Data Release Frequency: Quarterly

FUELS PROGRAM: EPA Fuels Program Registered Listing

This listing includes facilities that are registered under the Part 80 (Code of Federal Regulations) EPA Fuels Programs. All companies now are required to submit new and updated registrations.

Date of Government Version: 02/22/2017
Date Data Arrived at EDR: 02/22/2017
Date Made Active in Reports: 05/12/2017
Number of Days to Update: 79

Source: EPA
Telephone: 800-385-6164
Last EDR Contact: 05/24/2017
Next Scheduled EDR Contact: 09/04/2017
Data Release Frequency: Quarterly

COAL ASH: Coal Ash Disposal Sites

A listing of coal combustion products distribution permits issued by the Division for the treatment, storage, transportation, use and disposal of coal combustion products.

Date of Government Version: 12/14/2015
Date Data Arrived at EDR: 02/23/2016
Date Made Active in Reports: 05/18/2016
Number of Days to Update: 85

Source: Department of Environment & Natural Resources
Telephone: 919-807-6359
Last EDR Contact: 05/15/2017
Next Scheduled EDR Contact: 08/14/2017
Data Release Frequency: Varies

DRYCLEANERS: Drycleaning Sites

Potential and known drycleaning sites, active and abandoned, that the Drycleaning Solvent Cleanup Program has knowledge of and entered into this database.

Date of Government Version: 12/13/2016
Date Data Arrived at EDR: 12/20/2016
Date Made Active in Reports: 06/02/2017
Number of Days to Update: 164

Source: Department of Environment & Natural Resources
Telephone: 919-508-8400
Last EDR Contact: 06/20/2017
Next Scheduled EDR Contact: 10/02/2017
Data Release Frequency: Varies

Financial Assurance 1: Financial Assurance Information Listing

A listing of financial assurance information for underground storage tank facilities. Financial assurance is intended to ensure that resources are available to pay for the cost of closure, post-closure care, and corrective measures if the owner or operator of a regulated facility is unable or unwilling to pay.

Date of Government Version: 09/30/2016
Date Data Arrived at EDR: 11/09/2016
Date Made Active in Reports: 03/06/2017
Number of Days to Update: 117

Source: Department of Environment & Natural Resources
Telephone: 919-733-1322
Last EDR Contact: 05/10/2017
Next Scheduled EDR Contact: 08/21/2017
Data Release Frequency: Quarterly

Financial Assurance 2: Financial Assurance Information Listing

Information for solid waste facilities. Financial assurance is intended to ensure that resources are available to pay for the cost of closure, post-closure care, and corrective measures if the owner or operator of a regulated facility is unable or unwilling to pay.

Date of Government Version: 10/02/2012
Date Data Arrived at EDR: 10/03/2012
Date Made Active in Reports: 10/26/2012
Number of Days to Update: 23

Source: Department of Environmental & Natural Resources
Telephone: 919-508-8496
Last EDR Contact: 06/23/2017
Next Scheduled EDR Contact: 10/09/2017
Data Release Frequency: Varies

Financial Assurance 3: Financial Assurance Information
Hazardous waste financial assurance information.

Date of Government Version: 09/14/2016
Date Data Arrived at EDR: 09/16/2016
Date Made Active in Reports: 10/05/2016
Number of Days to Update: 19

Source: Department of Environment & Natural Resources
Telephone: 919-707-8222
Last EDR Contact: 06/12/2017
Next Scheduled EDR Contact: 09/25/2017
Data Release Frequency: Varies

NPDES: NPDES Facility Location Listing
General information regarding NPDES(National Pollutant Discharge Elimination System) permits.

Date of Government Version: 02/17/2016
Date Data Arrived at EDR: 02/19/2016
Date Made Active in Reports: 05/03/2016
Number of Days to Update: 74

Source: Department of Environment & Natural Resources
Telephone: 919-733-7015
Last EDR Contact: 06/15/2017
Next Scheduled EDR Contact: 08/14/2017
Data Release Frequency: Varies

UIC: Underground Injection Wells Listing
A listing of uncerground injection wells locations.

Date of Government Version: 12/07/2016
Date Data Arrived at EDR: 12/09/2016
Date Made Active in Reports: 03/08/2017
Number of Days to Update: 89

Source: Department of Environment & Natural Resources
Telephone: 919-807-6412
Last EDR Contact: 06/05/2017
Next Scheduled EDR Contact: 09/18/2017
Data Release Frequency: Varies

EDR HIGH RISK HISTORICAL RECORDS

EDR Exclusive Records

EDR MGP: EDR Proprietary Manufactured Gas Plants
The EDR Proprietary Manufactured Gas Plant Database includes records of coal gas plants (manufactured gas plants) compiled by EDR's researchers. Manufactured gas sites were used in the United States from the 1800's to 1950's to produce a gas that could be distributed and used as fuel. These plants used whale oil, rosin, coal, or a mixture of coal, oil, and water that also produced a significant amount of waste. Many of the byproducts of the gas production, such as coal tar (oily waste containing volatile and non-volatile chemicals), sludges, oils and other compounds are potentially hazardous to human health and the environment. The byproduct from this process was frequently disposed of directly at the plant site and can remain or spread slowly, serving as a continuous source of soil and groundwater contamination.

Date of Government Version: N/A
Date Data Arrived at EDR: N/A
Date Made Active in Reports: N/A
Number of Days to Update: N/A

Source: EDR, Inc.
Telephone: N/A
Last EDR Contact: N/A
Next Scheduled EDR Contact: N/A
Data Release Frequency: No Update Planned

EDR Hist Auto: EDR Exclusive Historic Gas Stations
EDR has searched selected national collections of business directories and has collected listings of potential gas station/filling station/service station sites that were available to EDR researchers. EDR's review was limited to those categories of sources that might, in EDR's opinion, include gas station/filling station/service station establishments. The categories reviewed included, but were not limited to gas, gas station, gasoline station, filling station, auto, automobile repair, auto service station, service station, etc. This database falls within a category of information EDR classifies as "High Risk Historical Records", or HRHR. EDR's HRHR effort presents unique and sometimes proprietary data about past sites and operations that typically create environmental concerns, but may not show up in current government records searches.

Date of Government Version: N/A
Date Data Arrived at EDR: N/A
Date Made Active in Reports: N/A
Number of Days to Update: N/A

Source: EDR, Inc.
Telephone: N/A
Last EDR Contact: N/A
Next Scheduled EDR Contact: N/A
Data Release Frequency: Varies

EDR Hist Cleaner: EDR Exclusive Historic Dry Cleaners

EDR has searched selected national collections of business directories and has collected listings of potential dry cleaner sites that were available to EDR researchers. EDR's review was limited to those categories of sources that might, in EDR's opinion, include dry cleaning establishments. The categories reviewed included, but were not limited to dry cleaners, cleaners, laundry, laundromat, cleaning/laundry, wash & dry etc. This database falls within a category of information EDR classifies as "High Risk Historical Records", or HRHR. EDR's HRHR effort presents unique and sometimes proprietary data about past sites and operations that typically create environmental concerns, but may not show up in current government records searches.

Date of Government Version: N/A
Date Data Arrived at EDR: N/A
Date Made Active in Reports: N/A
Number of Days to Update: N/A

Source: EDR, Inc.
Telephone: N/A
Last EDR Contact: N/A
Next Scheduled EDR Contact: N/A
Data Release Frequency: Varies

EDR RECOVERED GOVERNMENT ARCHIVES

Exclusive Recovered Govt. Archives

RGA HWS: Recovered Government Archive State Hazardous Waste Facilities List

The EDR Recovered Government Archive State Hazardous Waste database provides a list of SHWS incidents derived from historical databases and includes many records that no longer appear in current government lists. Compiled from Records formerly available from the Department of Environment, Health and Natural Resources in North Carolina.

Date of Government Version: N/A
Date Data Arrived at EDR: 07/01/2013
Date Made Active in Reports: 12/24/2013
Number of Days to Update: 176

Source: Department of Environment, Health and Natural Resources
Telephone: N/A
Last EDR Contact: 06/01/2012
Next Scheduled EDR Contact: N/A
Data Release Frequency: Varies

RGA LF: Recovered Government Archive Solid Waste Facilities List

The EDR Recovered Government Archive Landfill database provides a list of landfills derived from historical databases and includes many records that no longer appear in current government lists. Compiled from Records formerly available from the Department of Environment, Health and Natural Resources in North Carolina.

Date of Government Version: N/A
Date Data Arrived at EDR: 07/01/2013
Date Made Active in Reports: 01/13/2014
Number of Days to Update: 196

Source: Department of Environment, Health and Natural Resources
Telephone: N/A
Last EDR Contact: 06/01/2012
Next Scheduled EDR Contact: N/A
Data Release Frequency: Varies

RGA LUST: Recovered Government Archive Leaking Underground Storage Tank

The EDR Recovered Government Archive Leaking Underground Storage Tank database provides a list of LUST incidents derived from historical databases and includes many records that no longer appear in current government lists. Compiled from Records formerly available from the Department of Environment, Health and Natural Resources in North Carolina.

Date of Government Version: N/A
Date Data Arrived at EDR: 07/01/2013
Date Made Active in Reports: 12/20/2013
Number of Days to Update: 172

Source: Department of Environment, Health and Natural Resources
Telephone: N/A
Last EDR Contact: 06/01/2012
Next Scheduled EDR Contact: N/A
Data Release Frequency: Varies

OTHER DATABASE(S)

Depending on the geographic area covered by this report, the data provided in these specialty databases may or may not be complete. For example, the existence of wetlands information data in a specific report does not mean that all wetlands in the area covered by the report are included. Moreover, the absence of any reported wetlands information does not necessarily mean that wetlands do not exist in the area covered by the report.

CT MANIFEST: Hazardous Waste Manifest Data

Facility and manifest data. Manifest is a document that lists and tracks hazardous waste from the generator through transporters to a tsd facility.

Date of Government Version: 07/30/2013
Date Data Arrived at EDR: 08/19/2013
Date Made Active in Reports: 10/03/2013
Number of Days to Update: 45

Source: Department of Energy & Environmental Protection
Telephone: 860-424-3375
Last EDR Contact: 05/15/2017
Next Scheduled EDR Contact: 08/28/2017
Data Release Frequency: No Update Planned

NJ MANIFEST: Manifest Information

Hazardous waste manifest information.

Date of Government Version: 12/31/2015
Date Data Arrived at EDR: 09/29/2016
Date Made Active in Reports: 01/03/2017
Number of Days to Update: 96

Source: Department of Environmental Protection
Telephone: N/A
Last EDR Contact: 07/10/2017
Next Scheduled EDR Contact: 10/23/2017
Data Release Frequency: Annually

NY MANIFEST: Facility and Manifest Data

Manifest is a document that lists and tracks hazardous waste from the generator through transporters to a TSD facility.

Date of Government Version: 01/30/2017
Date Data Arrived at EDR: 02/01/2017
Date Made Active in Reports: 02/13/2017
Number of Days to Update: 12

Source: Department of Environmental Conservation
Telephone: 518-402-8651
Last EDR Contact: 05/03/2017
Next Scheduled EDR Contact: 08/14/2017
Data Release Frequency: Annually

PA MANIFEST: Manifest Information

Hazardous waste manifest information.

Date of Government Version: 12/31/2015
Date Data Arrived at EDR: 07/22/2016
Date Made Active in Reports: 11/22/2016
Number of Days to Update: 123

Source: Department of Environmental Protection
Telephone: 717-783-8990
Last EDR Contact: 07/17/2017
Next Scheduled EDR Contact: 10/30/2017
Data Release Frequency: Annually

RI MANIFEST: Manifest information

Hazardous waste manifest information

Date of Government Version: 12/31/2013
Date Data Arrived at EDR: 06/19/2015
Date Made Active in Reports: 07/15/2015
Number of Days to Update: 26

Source: Department of Environmental Management
Telephone: 401-222-2797
Last EDR Contact: 05/22/2017
Next Scheduled EDR Contact: 09/04/2017
Data Release Frequency: Annually

WI MANIFEST: Manifest Information

Hazardous waste manifest information.

Date of Government Version: 12/31/2016
Date Data Arrived at EDR: 04/13/2017
Date Made Active in Reports: 07/14/2017
Number of Days to Update: 92

Source: Department of Natural Resources
Telephone: N/A
Last EDR Contact: 06/12/2017
Next Scheduled EDR Contact: 09/25/2017
Data Release Frequency: Annually

Oil/Gas Pipelines

Source: PennWell Corporation

Petroleum Bundle (Crude Oil, Refined Products, Petrochemicals, Gas Liquids (LPG/NGL), and Specialty Gases (Miscellaneous)) N = Natural Gas Bundle (Natural Gas, Gas Liquids (LPG/NGL), and Specialty Gases (Miscellaneous)). This map includes information copyrighted by PennWell Corporation. This information is provided on a best effort basis and PennWell Corporation does not guarantee its accuracy nor warrant its fitness for any particular purpose. Such information has been reprinted with the permission of PennWell.

Electric Power Transmission Line Data

Source: PennWell Corporation

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GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

Sensitive Receptors: There are individuals deemed sensitive receptors due to their fragile immune systems and special sensitivity to environmental discharges. These sensitive receptors typically include the elderly, the sick, and children. While the location of all sensitive receptors cannot be determined, EDR indicates those buildings and facilities - schools, daycares, hospitals, medical centers, and nursing homes - where individuals who are sensitive receptors are likely to be located.

AHA Hospitals:
Source: American Hospital Association, Inc.
Telephone: 312-280-5991
The database includes a listing of hospitals based on the American Hospital Association's annual survey of hospitals.

Medical Centers: Provider of Services Listing
Source: Centers for Medicare & Medicaid Services
Telephone: 410-786-3000
A listing of hospitals with Medicare provider number, produced by Centers of Medicare & Medicaid Services, a federal agency within the U.S. Department of Health and Human Services.

Nursing Homes
Source: National Institutes of Health
Telephone: 301-594-6248
Information on Medicare and Medicaid certified nursing homes in the United States.

Public Schools
Source: National Center for Education Statistics
Telephone: 202-502-7300
The National Center for Education Statistics' primary database on elementary and secondary public education in the United States. It is a comprehensive, annual, national statistical database of all public elementary and secondary schools and school districts, which contains data that are comparable across all states.

Private Schools
Source: National Center for Education Statistics
Telephone: 202-502-7300
The National Center for Education Statistics' primary database on private school locations in the United States.

Daycare Centers: Child Care Facility List
Source: Department of Health & Human Services
Telephone: 919-662-4499

Flood Zone Data: This data was obtained from the Federal Emergency Management Agency (FEMA). It depicts 100-year and 500-year flood zones as defined by FEMA. It includes the National Flood Hazard Layer (NFHL) which incorporates Flood Insurance Rate Map (FIRM) data and Q3 data from FEMA in areas not covered by NFHL.
Source: FEMA
Telephone: 877-336-2627
Date of Government Version: 2003, 2015

NWI: National Wetlands Inventory. This data, available in select counties across the country, was obtained by EDR in 2002, 2005 and 2010 from the U.S. Fish and Wildlife Service.

State Wetlands Data: Wetland Inventory
Source: US Fish & Wildlife Service
Telephone: 703-358-2171

Current USGS 7.5 Minute Topographic Map
Source: U.S. Geological Survey

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

STREET AND ADDRESS INFORMATION

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GEOCHECK ®- PHYSICAL SETTING SOURCE ADDENDUM

TARGET PROPERTY ADDRESS

MAJOR HILL STREAM AND WETLAND MITIGATION SITE
2040 BURNETT CHURCH ROAD
SNOW CAMP, NC 27349

TARGET PROPERTY COORDINATES

Latitude (North):	35.872756 - 35° 52' 21.92''
Longitude (West):	79.361349 - 79° 21' 40.86''
Universal Tranverse Mercator:	Zone 17
UTM X (Meters):	647934.5
UTM Y (Meters):	3970875.0
Elevation:	546 ft. above sea level

USGS TOPOGRAPHIC MAP

Target Property Map:	5945591 SILK HOPE, NC
Version Date:	2013
Northeast Map:	5945583 SAXAPAHAW, NC
Version Date:	2013
Southwest Map:	5945515 CRUTCHFIELD CROSSROADS, NC
Version Date:	2013
Northwest Map:	5945593 SNOW CAMP, NC
Version Date:	2013

EDR's GeoCheck Physical Setting Source Addendum is provided to assist the environmental professional in forming an opinion about the impact of potential contaminant migration.

Assessment of the impact of contaminant migration generally has two principal investigative components:

1. Groundwater flow direction, and
2. Groundwater flow velocity.

Groundwater flow direction may be impacted by surface topography, hydrology, hydrogeology, characteristics of the soil, and nearby wells. Groundwater flow velocity is generally impacted by the nature of the geologic strata.

GEOCHECK® - PHYSICAL SETTING SOURCE SUMMARY

GROUNDWATER FLOW DIRECTION INFORMATION

Groundwater flow direction for a particular site is best determined by a qualified environmental professional using site-specific well data. If such data is not reasonably ascertainable, it may be necessary to rely on other sources of information, such as surface topographic information, hydrologic information, hydrogeologic data collected on nearby properties, and regional groundwater flow information (from deep aquifers).

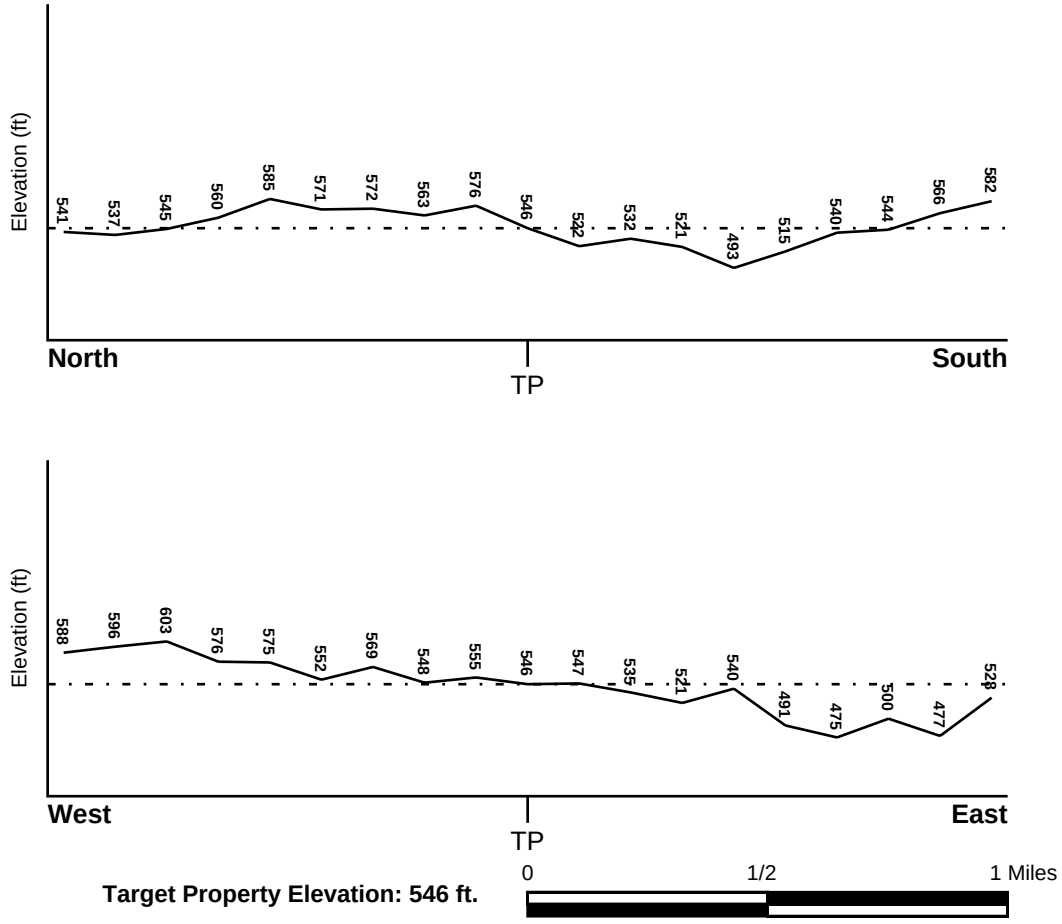
TOPOGRAPHIC INFORMATION

Surface topography may be indicative of the direction of surficial groundwater flow. This information can be used to assist the environmental professional in forming an opinion about the impact of nearby contaminated properties or, should contamination exist on the target property, what downgradient sites might be impacted.

TARGET PROPERTY TOPOGRAPHY

General Topographic Gradient: General SSE

SURROUNDING TOPOGRAPHY: ELEVATION PROFILES



Source: Topography has been determined from the USGS 7.5' Digital Elevation Model and should be evaluated on a relative (not an absolute) basis. Relative elevation information between sites of close proximity should be field verified.

GEOCHECK® - PHYSICAL SETTING SOURCE SUMMARY

HYDROLOGIC INFORMATION

Surface water can act as a hydrologic barrier to groundwater flow. Such hydrologic information can be used to assist the environmental professional in forming an opinion about the impact of nearby contaminated properties or, should contamination exist on the target property, what downgradient sites might be impacted.

Refer to the Physical Setting Source Map following this summary for hydrologic information (major waterways and bodies of water).

FEMA FLOOD ZONE

Flood Plain Panel at Target Property	FEMA Source Type
3710879700J	FEMA FIRM Flood data

Additional Panels in search area:	FEMA Source Type
3710878700J	FEMA FIRM Flood data
3710879600K	FEMA FIRM Flood data
3710878600J	FEMA FIRM Flood data

NATIONAL WETLAND INVENTORY

NWI Quad at Target Property	NWI Electronic Data Coverage
SILK HOPE	YES - refer to the Overview Map and Detail Map

HYDROGEOLOGIC INFORMATION

Hydrogeologic information obtained by installation of wells on a specific site can often be an indicator of groundwater flow direction in the immediate area. Such hydrogeologic information can be used to assist the environmental professional in forming an opinion about the impact of nearby contaminated properties or, should contamination exist on the target property, what downgradient sites might be impacted.

AQUIFLOW®

Search Radius: 1.000 Mile.

EDR has developed the AQUIFLOW Information System to provide data on the general direction of groundwater flow at specific points. EDR has reviewed reports submitted by environmental professionals to regulatory authorities at select sites and has extracted the date of the report, groundwater flow direction as determined hydrogeologically, and the depth to water table.

MAP ID	LOCATION FROM TP	GENERAL DIRECTION GROUNDWATER FLOW
Not Reported		

GEOCHECK® - PHYSICAL SETTING SOURCE SUMMARY

GROUNDWATER FLOW VELOCITY INFORMATION

Groundwater flow velocity information for a particular site is best determined by a qualified environmental professional using site specific geologic and soil strata data. If such data are not reasonably ascertainable, it may be necessary to rely on other sources of information, including geologic age identification, rock stratigraphic unit and soil characteristics data collected on nearby properties and regional soil information. In general, contaminant plumes move more quickly through sandy-gravelly types of soils than silty-clayey types of soils.

GEOLOGIC INFORMATION IN GENERAL AREA OF TARGET PROPERTY

Geologic information can be used by the environmental professional in forming an opinion about the relative speed at which contaminant migration may be occurring.

ROCK STRATIGRAPHIC UNIT

Era:	Paleozoic
System:	Cambrian
Series:	Cambrian volcanic rocks
Code:	Cv *(decoded above as Era, System & Series)*

GEOLOGIC AGE IDENTIFICATION

Category: Volcanic Rocks

Geologic Age and Rock Stratigraphic Unit Source: P.G. Schruben, R.E. Arndt and W.J. Bawiec, Geology of the Conterminous U.S. at 1:2,500,000 Scale - a digital representation of the 1974 P.B. King and H.M. Beikman Map, USGS Digital Data Series DDS - 11 (1994).

DOMINANT SOIL COMPOSITION IN GENERAL AREA OF TARGET PROPERTY

The U.S. Department of Agriculture's (USDA) Soil Conservation Service (SCS) leads the National Cooperative Soil Survey (NCSS) and is responsible for collecting, storing, maintaining and distributing soil survey information for privately owned lands in the United States. A soil map in a soil survey is a representation of soil patterns in a landscape. Soil maps for STATSGO are compiled by generalizing more detailed (SSURGO) soil survey maps. The following information is based on Soil Conservation Service STATSGO data.

Soil Component Name:	HERNDON
Soil Surface Texture:	silt loam
Hydrologic Group:	Class B - Moderate infiltration rates. Deep and moderately deep, moderately well and well drained soils with moderately coarse textures.
Soil Drainage Class:	Well drained. Soils have intermediate water holding capacity. Depth to water table is more than 6 feet.

Hydric Status: Soil does not meet the requirements for a hydric soil.

Corrosion Potential - Uncoated Steel: HIGH

Depth to Bedrock Min: > 60 inches

Depth to Bedrock Max: > 60 inches

GEOCHECK® - PHYSICAL SETTING SOURCE SUMMARY

Soil Layer Information							
	Boundary			Classification			
Layer	Upper	Lower	Soil Texture Class	AASHTO Group	Unified Soil	Permeability Rate (in/hr)	Soil Reaction (pH)
1	0 inches	9 inches	silt loam	Silt-Clay Materials (more than 35 pct. passing No. 200), Silty Soils.	FINE-GRAINED SOILS, Silts and Clays (liquid limit less than 50%), silt.	Max: 2.00 Min: 0.60	Max: 6.50 Min: 4.50
2	9 inches	48 inches	silty clay loam	Silt-Clay Materials (more than 35 pct. passing No. 200), Clayey Soils.	FINE-GRAINED SOILS, Silts and Clays (liquid limit 50% or more), Elastic silt.	Max: 2.00 Min: 0.60	Max: 5.50 Min: 3.60
3	48 inches	68 inches	silt loam	Silt-Clay Materials (more than 35 pct. passing No. 200), Clayey Soils.	FINE-GRAINED SOILS, Silts and Clays (liquid limit 50% or more), Elastic silt.	Max: 2.00 Min: 0.60	Max: 5.50 Min: 3.60

OTHER SOIL TYPES IN AREA

Based on Soil Conservation Service STATSGO data, the following additional subordinant soil types may appear within the general area of target property.

Soil Surface Textures: sandy loam
gravelly - silt loam
stony - silt loam
clay loam
channery - silt loam
loam

Surficial Soil Types: sandy loam
gravelly - silt loam
stony - silt loam
clay loam
channery - silt loam
loam

Shallow Soil Types: silty clay loam
sandy clay
silt loam
loam
clay loam
very channery - silt loam

Deeper Soil Types: silty clay loam
weathered bedrock
unweathered bedrock
sandy clay loam
clay

GEOCHECK® - PHYSICAL SETTING SOURCE SUMMARY

LOCAL / REGIONAL WATER AGENCY RECORDS

EDR Local/Regional Water Agency records provide water well information to assist the environmental professional in assessing sources that may impact ground water flow direction, and in forming an opinion about the impact of contaminant migration on nearby drinking water wells.

WELL SEARCH DISTANCE INFORMATION

DATABASE	SEARCH DISTANCE (miles)
Federal USGS	1.000
Federal FRDS PWS	Nearest PWS within 1 mile
State Database	1.000

FEDERAL USGS WELL INFORMATION

MAP ID	WELL ID	LOCATION FROM TP
No Wells Found		

FEDERAL FRDS PUBLIC WATER SUPPLY SYSTEM INFORMATION

MAP ID	WELL ID	LOCATION FROM TP
2	NC0201423	1/2 - 1 Mile NNW

Note: PWS System location is not always the same as well location.

STATE DATABASE WELL INFORMATION

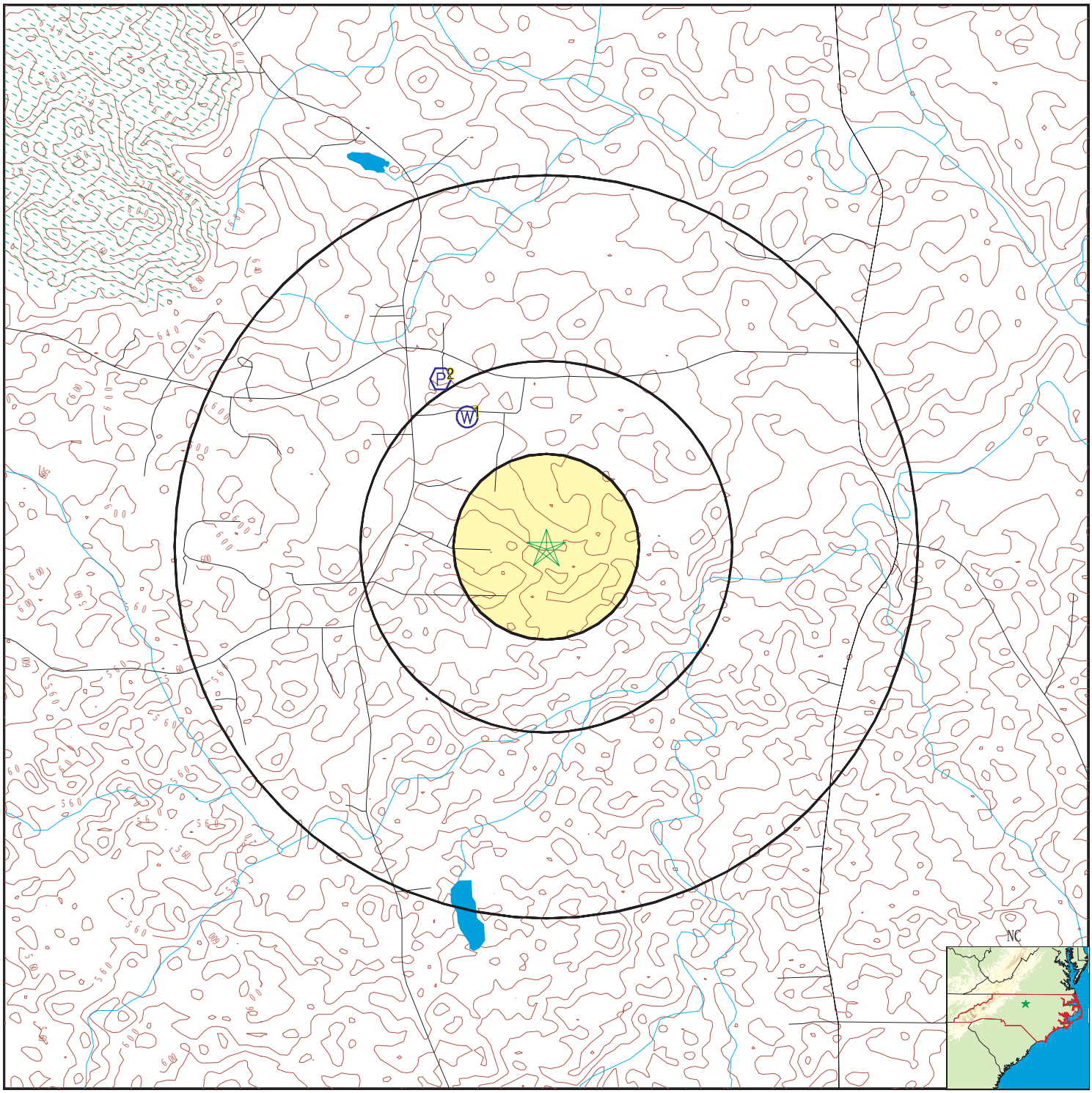
MAP ID	WELL ID	LOCATION FROM TP
1	NC2000000006624	1/4 - 1/2 Mile NNW

OTHER STATE DATABASE INFORMATION

NORTH CAROLINA SIGNIFICANT NATURAL HERITAGE AREAS DATABASE:

ID	Name
NC10002696	MAJOR HILL MONADNOCK

PHYSICAL SETTING SOURCE MAP - 5005690.6s



- County Boundary
- Major Roads
- Contour Lines
- Earthquake epicenter, Richter 5 or greater
- Water Wells
- Public Water Supply Wells
- Cluster of Multiple Icons

- Groundwater Flow Direction
- GI Indeterminate Groundwater Flow at Location
- GV Groundwater Flow Varies at Location
- Wildlife Areas
- Natural Areas
- Rare & Endangered Species

SITE NAME:	Major Hill Stream and Wetland Mitigation Site	CLIENT:	Axiom Environmental
ADDRESS:	2040 Burnett Church Road Snow Camp NC 27349	CONTACT:	Kenan Jernigan
LAT/LONG:	35.872756 / 79.361349	INQUIRY #:	5005690.6s
		DATE:	July 27, 2017 1:49 pm

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GEOCHECK® - PHYSICAL SETTING SOURCE MAP FINDINGS

Map ID
Direction
Distance
Elevation

Database	EDR ID Number
NC WELLS	**NC2000000006624**

1
NNW
1/4 - 1/2 Mile
Higher

Pwsidentif:	NC0201423
System nam:	BURNETTS UNITED METH CHURCH
Pws type:	NC
County:	ALAMANCE
City:	GRAHAM
Primary so:	GW
Water type:	GW
Facility n:	WELL #1
Facility a:	001
Latitude m:	35.877823
Longitude :	-79.365136
Availavili:	A
Well depth:	337
Well dep 1:	FT
Owner name:	BURNETTS UMC_201423
Site id:	NC2000000006624

2
NNW
1/2 - 1 Mile
Higher

Database	EDR ID Number
FRDS PWS	**NC0201423**

Epa region:	04	State:	NC
Pwsid:	NC0201423		
Pwsname:	BURNETTS UNITED CHURCH OF CHRIST		
City served:	Not Reported	State served:	NC
Zip served:	Not Reported	Fips county:	37001
Status:	Active	Pop srvd:	25
Pwssvcconn:	1	Source:	Groundwater
Pws type:	TNCWS	Owner:	Private
Contact:	WHITE, JIMMY		
Contactor gname:	WHITE, JIMMY		
Contact phone:	336-376-3014	Contact address1:	1957 BURNETT CH RD
Contact address2:	Not Reported	Contact city:	GRAHAM
Contact state:	NC	Contact zip:	27253
Activity code:	A		

Facid:	3979		
Facname:	TREATMENT_PLT_WELL #1		
Facility type:	Treatment_plant	Activity code:	I
Treatment obj:	disinfection	Treatment process:	hypochlorination, post

Location Information:

Name:	BURNETTS UNITED CHURCH OF CHRIST		
Pwstypcd:	TNCWS	Primsrccd:	GW
Popserved:	25		
Add1:	1957 BURNETT CH RD		
Add2:	Not Reported		
City:	GRAHAM	State:	NC
Zip:	27253	Phone:	336-376-3014
Cityserv:	GRAHAM	Cntyserv:	Alamance
Stateserv:	NC	Zipserv:	Not Reported

Enforcement Information:

Violation id:	900	Orig cd:	S
Enf fy:	2000	Enf act date:	03/20/2000
Enf act detail:	St Formal NOV issued	Enf act cat:	Informal

Enforcement Information:

Violation id:	900	Orig cd:	S
Enf fy:	2000	Enf act date:	03/20/2000
Enf act detail:	St Public Notif requested	Enf act cat:	Informal

Enforcement Information:

Violation id:	800	Orig cd:	S
Enf fy:	2000	Enf act date:	02/04/2000
Enf act detail:	St Formal NOV issued	Enf act cat:	Informal

Enforcement Information:

Violation id:	800	Orig cd:	S
Enf fy:	2000	Enf act date:	02/04/2000
Enf act detail:	St Public Notif requested	Enf act cat:	Informal

Enforcement Information:

Violation id:	4836306	Orig cd:	S
Enf fy:	2011	Enf act date:	03/04/2011
Enf act detail:	St Compliance achieved	Enf act cat:	Resolving

Enforcement Information:

Violation id:	4836305	Orig cd:	S
Enf fy:	2010	Enf act date:	01/22/2010
Enf act detail:	St AO (w/penalty) issued	Enf act cat:	Formal

Enforcement Information:

Violation id:	4836305	Orig cd:	S
Enf fy:	2011	Enf act date:	03/04/2011
Enf act detail:	St Public Notif received	Enf act cat:	Informal

Enforcement Information:

Violation id:	4836305	Orig cd:	S
Enf fy:	2011	Enf act date:	12/31/2010
Enf act detail:	St Compliance achieved	Enf act cat:	Resolving

Enforcement Information:

Violation id:	4836305	Orig cd:	S
Enf fy:	2010	Enf act date:	10/22/2009
Enf act detail:	St Formal NOV issued	Enf act cat:	Informal

Enforcement Information:

Violation id:	4836305	Orig cd:	S
Enf fy:	2010	Enf act date:	10/22/2009
Enf act detail:	St Public Notif requested	Enf act cat:	Informal

Enforcement Information:

Violation id:	4836303	Orig cd:	S
Enf fy:	2010	Enf act date:	04/17/2010
Enf act detail:	St Intentional no-action	Enf act cat:	Resolving

Enforcement Information:

Violation id:	4836303	Orig cd:	S
Enf fy:	2010	Enf act date:	04/17/2010
Enf act detail:	St Compliance achieved	Enf act cat:	Resolving

Enforcement Information:

Violation id:	4730804	Orig cd:	S
Enf fy:	2010	Enf act date:	04/17/2010
Enf act detail:	St Intentional no-action	Enf act cat:	Resolving

Enforcement Information:

Violation id:	4730804	Orig cd:	S
Enf fy:	2010	Enf act date:	04/17/2010
Enf act detail:	St Compliance achieved	Enf act cat:	Resolving

Enforcement Information:

Violation id:	4614204	Orig cd:	S
Enf fy:	2010	Enf act date:	04/17/2010
Enf act detail:	St Intentional no-action	Enf act cat:	Resolving

Enforcement Information:

Violation id:	4614204	Orig cd:	S
Enf fy:	2010	Enf act date:	04/17/2010
Enf act detail:	St Compliance achieved	Enf act cat:	Resolving

Enforcement Information:

Violation id:	4481903	Orig cd:	S
Enf fy:	2010	Enf act date:	04/17/2010
Enf act detail:	St Intentional no-action	Enf act cat:	Resolving

Enforcement Information:

Violation id:	4481903	Orig cd:	S
Enf fy:	2010	Enf act date:	04/17/2010
Enf act detail:	St Compliance achieved	Enf act cat:	Resolving

Enforcement Information:

Violation id:	4316503	Orig cd:	S
Enf fy:	2010	Enf act date:	04/17/2010
Enf act detail:	St Intentional no-action	Enf act cat:	Resolving

Enforcement Information:

Violation id:	4316503	Orig cd:	S
Enf fy:	2010	Enf act date:	04/17/2010
Enf act detail:	St Compliance achieved	Enf act cat:	Resolving

Enforcement Information:

Violation id:	3908605	Orig cd:	S
Enf fy:	2010	Enf act date:	04/17/2010
Enf act detail:	St Compliance achieved	Enf act cat:	Resolving

Enforcement Information:

Violation id:	3908605	Orig cd:	S
Enf fy:	2010	Enf act date:	04/17/2010
Enf act detail:	St Intentional no-action	Enf act cat:	Resolving

Enforcement Information:

Violation id:	3623205	Orig cd:	S
Enf fy:	2010	Enf act date:	04/17/2010
Enf act detail:	St Intentional no-action	Enf act cat:	Resolving

Enforcement Information:

Violation id:	3623205	Orig cd:	S
Enf fy:	2010	Enf act date:	04/17/2010
Enf act detail:	St Compliance achieved	Enf act cat:	Resolving

Enforcement Information:

Violation id:	2249506	Orig cd:	S
Enf fy:	2010	Enf act date:	04/17/2010
Enf act detail:	St Compliance achieved	Enf act cat:	Resolving

Enforcement Information:

Violation id:	2249506	Orig cd:	S
Enf fy:	2010	Enf act date:	04/17/2010
Enf act detail:	St Intentional no-action	Enf act cat:	Resolving

Enforcement Information:

Violation id:	2205	Orig cd:	S
Enf fy:	2010	Enf act date:	06/11/2010
Enf act detail:	St Intentional no-action	Enf act cat:	Informal

Enforcement Information:

Violation id:	2205	Orig cd:	S
Enf fy:	2005	Enf act date:	05/05/2005
Enf act detail:	St Public Notif requested	Enf act cat:	Informal

Enforcement Information:

Violation id:	2205	Orig cd:	S
Enf fy:	2005	Enf act date:	05/05/2005
Enf act detail:	St Formal NOV issued	Enf act cat:	Informal

Enforcement Information:

Violation id:	2205	Orig cd:	S
Enf fy:	2010	Enf act date:	06/11/2010
Enf act detail:	St Compliance achieved	Enf act cat:	Resolving

Enforcement Information:

Violation id:	2205	Orig cd:	S
Enf fy:	2010	Enf act date:	01/22/2010
Enf act detail:	St AO (w/penalty) issued	Enf act cat:	Formal

Enforcement Information:

Violation id:	2105	Orig cd:	S
Enf fy:	2010	Enf act date:	06/11/2010
Enf act detail:	St Intentional no-action	Enf act cat:	Informal

Enforcement Information:

Violation id:	2105	Orig cd:	S
Enf fy:	2010	Enf act date:	06/11/2010
Enf act detail:	St Compliance achieved	Enf act cat:	Resolving

Enforcement Information:

Violation id:	2105	Orig cd:	S
Enf fy:	2005	Enf act date:	04/25/2005
Enf act detail:	St Public Notif received	Enf act cat:	Informal

Enforcement Information:

Violation id:	2105	Orig cd:	S
Enf fy:	2005	Enf act date:	03/31/2005
Enf act detail:	St Public Notif requested	Enf act cat:	Informal

Enforcement Information:

Violation id:	2105	Orig cd:	S
Enf fy:	2005	Enf act date:	03/31/2005
Enf act detail:	St Formal NOV issued	Enf act cat:	Informal

Enforcement Information:

Violation id:	2105	Orig cd:	S
Enf fy:	2010	Enf act date:	01/22/2010
Enf act detail:	St AO (w/penalty) issued	Enf act cat:	Formal

Enforcement Information:

Violation id:	2005	Orig cd:	S
Enf fy:	2005	Enf act date:	03/07/2005
Enf act detail:	St Public Notif requested	Enf act cat:	Informal

Enforcement Information:

Violation id:	2005	Orig cd:	S
Enf fy:	2005	Enf act date:	02/07/2005
Enf act detail:	St Compliance achieved	Enf act cat:	Resolving

Enforcement Information:

Violation id:	2005	Orig cd:	S
Enf fy:	2005	Enf act date:	03/07/2005
Enf act detail:	St Formal NOV issued	Enf act cat:	Informal

Enforcement Information:

Violation id:	1905	Orig cd:	S
Enf fy:	2005	Enf act date:	11/09/2004
Enf act detail:	St Public Notif requested	Enf act cat:	Informal

Enforcement Information:

Violation id:	1905	Orig cd:	S
Enf fy:	2005	Enf act date:	11/09/2004
Enf act detail:	St Formal NOV issued	Enf act cat:	Informal

Enforcement Information:

Violation id:	1905	Orig cd:	S
Enf fy:	2010	Enf act date:	06/11/2010
Enf act detail:	St Intentional no-action	Enf act cat:	Informal

Enforcement Information:

Violation id:	1905	Orig cd:	S
Enf fy:	2010	Enf act date:	06/11/2010
Enf act detail:	St Compliance achieved	Enf act cat:	Resolving

Enforcement Information:

Violation id:	1905	Orig cd:	S
Enf fy:	2010	Enf act date:	01/22/2010
Enf act detail:	St AO (w/penalty) issued	Enf act cat:	Formal

Enforcement Information:

Violation id:	1804	Orig cd:	S
Enf fy:	2004	Enf act date:	08/10/2004
Enf act detail:	St Public Notif requested	Enf act cat:	Informal

Enforcement Information:

Violation id:	1804	Orig cd:	S
Enf fy:	2004	Enf act date:	08/10/2004
Enf act detail:	St Formal NOV issued	Enf act cat:	Informal

Enforcement Information:

Violation id:	1804	Orig cd:	S
Enf fy:	2010	Enf act date:	01/22/2010
Enf act detail:	St AO (w/penalty) issued	Enf act cat:	Formal

Enforcement Information:

Violation id:	1804	Orig cd:	S
Enf fy:	2010	Enf act date:	06/11/2010
Enf act detail:	St Intentional no-action	Enf act cat:	Informal

Enforcement Information:

Violation id:	1804	Orig cd:	S
Enf fy:	2010	Enf act date:	06/11/2010
Enf act detail:	St Compliance achieved	Enf act cat:	Resolving

Enforcement Information:

Violation id:	1704	Orig cd:	S
Enf fy:	2010	Enf act date:	06/11/2010
Enf act detail:	St Intentional no-action	Enf act cat:	Informal

Enforcement Information:

Violation id:	1704	Orig cd:	S
Enf fy:	2010	Enf act date:	06/11/2010
Enf act detail:	St Compliance achieved	Enf act cat:	Resolving

Enforcement Information:

Violation id:	1704	Orig cd:	S
Enf fy:	2004	Enf act date:	02/06/2004
Enf act detail:	St Public Notif requested	Enf act cat:	Informal

Enforcement Information:

Violation id:	1704	Orig cd:	S
Enf fy:	2004	Enf act date:	02/06/2004
Enf act detail:	St Formal NOV issued	Enf act cat:	Informal

Enforcement Information:

Violation id:	1704	Orig cd:	S
Enf fy:	2010	Enf act date:	01/22/2010
Enf act detail:	St AO (w/penalty) issued	Enf act cat:	Formal

Enforcement Information:

Violation id:	1603	Orig cd:	S
Enf fy:	2003	Enf act date:	07/31/2003
Enf act detail:	St Formal NOV issued	Enf act cat:	Informal

Enforcement Information:

Violation id:	1603	Orig cd:	S
Enf fy:	2010	Enf act date:	06/11/2010
Enf act detail:	St Intentional no-action	Enf act cat:	Informal

Enforcement Information:

Violation id:	1603	Orig cd:	S
Enf fy:	2010	Enf act date:	06/11/2010
Enf act detail:	St Compliance achieved	Enf act cat:	Resolving

Enforcement Information:

Violation id:	1603	Orig cd:	S
Enf fy:	2010	Enf act date:	01/22/2010
Enf act detail:	St AO (w/penalty) issued	Enf act cat:	Formal

Enforcement Information:

Violation id:	1603	Orig cd:	S
Enf fy:	2003	Enf act date:	07/31/2003
Enf act detail:	St Public Notif requested	Enf act cat:	Informal

Enforcement Information:

Violation id:	1503	Orig cd:	S
Enf fy:	2010	Enf act date:	06/11/2010
Enf act detail:	St Compliance achieved	Enf act cat:	Resolving

Enforcement Information:

Violation id:	1503	Orig cd:	S
Enf fy:	2003	Enf act date:	01/30/2003
Enf act detail:	St Public Notif requested	Enf act cat:	Informal

Enforcement Information:

Violation id:	1503	Orig cd:	S
Enf fy:	2003	Enf act date:	01/30/2003
Enf act detail:	St Formal NOV issued	Enf act cat:	Informal

Enforcement Information:

Violation id:	1503	Orig cd:	S
Enf fy:	2010	Enf act date:	01/22/2010
Enf act detail:	St AO (w/penalty) issued	Enf act cat:	Formal

Enforcement Information:

Violation id:	1503	Orig cd:	S
Enf fy:	2010	Enf act date:	06/11/2010
Enf act detail:	St Intentional no-action	Enf act cat:	Informal

Enforcement Information:

Violation id:	1402	Orig cd:	S
Enf fy:	2010	Enf act date:	01/22/2010
Enf act detail:	St AO (w/penalty) issued	Enf act cat:	Formal

Enforcement Information:
Violation id: 1402 Orig cd: S
Enf fy: 2010 Enf act date: 06/11/2010
Enf act detail: St Intentional no-action Enf act cat: Informal

Enforcement Information:
Violation id: 1402 Orig cd: S
Enf fy: 2010 Enf act date: 06/11/2010
Enf act detail: St Compliance achieved Enf act cat: Resolving

Enforcement Information:
Violation id: 1402 Orig cd: S
Enf fy: 2002 Enf act date: 08/02/2002
Enf act detail: St Public Notif requested Enf act cat: Informal

Enforcement Information:
Violation id: 1402 Orig cd: S
Enf fy: 2002 Enf act date: 08/02/2002
Enf act detail: St Formal NOV issued Enf act cat: Informal

Enforcement Information:
Violation id: 1302 Orig cd: S
Enf fy: 2002 Enf act date: 04/26/2002
Enf act detail: St Formal NOV issued Enf act cat: Informal

Enforcement Information:
Violation id: 1302 Orig cd: S
Enf fy: 2010 Enf act date: 01/22/2010
Enf act detail: St AO (w/penalty) issued Enf act cat: Formal

Enforcement Information:
Violation id: 1302 Orig cd: S
Enf fy: 2010 Enf act date: 06/11/2010
Enf act detail: St Intentional no-action Enf act cat: Informal

Enforcement Information:
Violation id: 1302 Orig cd: S
Enf fy: 2010 Enf act date: 06/11/2010
Enf act detail: St Compliance achieved Enf act cat: Resolving

Enforcement Information:
Violation id: 1302 Orig cd: S
Enf fy: 2002 Enf act date: 04/26/2002
Enf act detail: St Public Notif requested Enf act cat: Informal

Enforcement Information:
Violation id: 1202 Orig cd: S
Enf fy: 2010 Enf act date: 06/11/2010
Enf act detail: St Compliance achieved Enf act cat: Resolving

Enforcement Information:
Violation id: 1202 Orig cd: S
Enf fy: 2010 Enf act date: 06/11/2010
Enf act detail: St Intentional no-action Enf act cat: Informal

Enforcement Information:

Violation id:	1202	Orig cd:	S
Enf fy:	2010	Enf act date:	01/22/2010
Enf act detail:	St AO (w/penalty) issued	Enf act cat:	Formal

Enforcement Information:

Violation id:	1202	Orig cd:	S
Enf fy:	2002	Enf act date:	11/07/2001
Enf act detail:	St Public Notif requested	Enf act cat:	Informal

Enforcement Information:

Violation id:	1202	Orig cd:	S
Enf fy:	2002	Enf act date:	11/07/2001
Enf act detail:	St Formal NOV issued	Enf act cat:	Informal

Enforcement Information:

Violation id:	1101	Orig cd:	S
Enf fy:	2010	Enf act date:	06/11/2010
Enf act detail:	St Intentional no-action	Enf act cat:	Informal

Enforcement Information:

Violation id:	1101	Orig cd:	S
Enf fy:	2010	Enf act date:	01/22/2010
Enf act detail:	St AO (w/penalty) issued	Enf act cat:	Formal

Enforcement Information:

Violation id:	1101	Orig cd:	S
Enf fy:	2001	Enf act date:	05/01/2001
Enf act detail:	St Formal NOV issued	Enf act cat:	Informal

Enforcement Information:

Violation id:	1101	Orig cd:	S
Enf fy:	2001	Enf act date:	05/01/2001
Enf act detail:	St Public Notif requested	Enf act cat:	Informal

Enforcement Information:

Violation id:	1101	Orig cd:	S
Enf fy:	2010	Enf act date:	06/11/2010
Enf act detail:	St Compliance achieved	Enf act cat:	Resolving

Enforcement Information:

Violation id:	1001	Orig cd:	S
Enf fy:	2001	Enf act date:	11/08/2000
Enf act detail:	St Formal NOV issued	Enf act cat:	Informal

Enforcement Information:

Violation id:	1001	Orig cd:	S
Enf fy:	2001	Enf act date:	11/08/2000
Enf act detail:	St Public Notif requested	Enf act cat:	Informal

Violations Information:

Violation id:	900	Orig cd:	S
State:	NC	Viol fy:	2000
Contamcd:	3100		
Contamnm:	Coliform (TCR)		
Viol code:	23		
Viol name:	Monitoring, Routine Major (TCR)		
Rule code:	110		
Rule name:	TCR		
Violmeasur:	Not Reported	Unitmeasur:	Not Reported

State mcl:	Not Reported	Cmpbdt:	01/01/2000
Cmpedt:	01/31/2000		

Violations Information:

Violation id:	4836306	Orig cd:	S
State:	NC	Viol fy:	2010
Contamcd:	7500		
Contamnm:	Public Notice		
Viol code:	75		
Viol name:	PN Violation for NPDWR Violation		
Rule code:	410		
Rule name:	PN rule		
Violmeasur:	Not Reported	Unitmeasur:	Not Reported
State mcl:	Not Reported	Cmpbdt:	10/23/2010
Cmpedt:	Not Reported		

Violations Information:

Violation id:	4836305	Orig cd:	S
State:	NC	Viol fy:	2009
Contamcd:	3100		
Contamnm:	Coliform (TCR)		
Viol code:	25		
Viol name:	Monitoring, Repeat Major (TCR)		
Rule code:	110		
Rule name:	TCR		
Violmeasur:	Not Reported	Unitmeasur:	Not Reported
State mcl:	Not Reported	Cmpbdt:	04/01/2009
Cmpedt:	06/30/2009		

Violations Information:

Violation id:	4836303	Orig cd:	S
State:	NC	Viol fy:	2002
Contamcd:	7500		
Contamnm:	Public Notice		
Viol code:	76		
Viol name:	PN Violation without NPDWR Violation		
Rule code:	410		
Rule name:	PN rule		
Violmeasur:	Not Reported	Unitmeasur:	Not Reported
State mcl:	Not Reported	Cmpbdt:	11/18/2002
Cmpedt:	Not Reported		

Violations Information:

Violation id:	4730804	Orig cd:	S
State:	NC	Viol fy:	2004
Contamcd:	7500		
Contamnm:	Public Notice		
Viol code:	76		
Viol name:	PN Violation without NPDWR Violation		
Rule code:	410		
Rule name:	PN rule		
Violmeasur:	Not Reported	Unitmeasur:	Not Reported
State mcl:	Not Reported	Cmpbdt:	02/10/2004
Cmpedt:	Not Reported		

Violations Information:

Violation id:	4614204	Orig cd:	S
State:	NC	Viol fy:	2004
Contamcd:	7500		
Contamnm:	Public Notice		
Viol code:	76		
Viol name:	PN Violation without NPDWR Violation		
Rule code:	410		
Rule name:	PN rule		
Violmeasur:	Not Reported	Unitmeasur:	Not Reported
State mcl:	Not Reported	Cmpbdt:	08/10/2004
Cmpedt:	Not Reported		

Violations Information:

Violation id:	4481903	Orig cd:	S
State:	NC	Viol fy:	2003
Contamcd:	7500		
Contamnm:	Public Notice		
Viol code:	76		
Viol name:	PN Violation without NPDWR Violation		
Rule code:	410		
Rule name:	PN rule		
Violmeasur:	Not Reported	Unitmeasur:	Not Reported
State mcl:	Not Reported	Cmpbdt:	08/13/2003
Cmpedt:	Not Reported		

Violations Information:

Violation id:	4316503	Orig cd:	S
State:	NC	Viol fy:	2003
Contamcd:	7500		
Contamnm:	Public Notice		
Viol code:	76		
Viol name:	PN Violation without NPDWR Violation		
Rule code:	410		
Rule name:	PN rule		
Violmeasur:	Not Reported	Unitmeasur:	Not Reported
State mcl:	Not Reported	Cmpbdt:	05/07/2003
Cmpedt:	Not Reported		

Violations Information:

Violation id:	3908605	Orig cd:	S
State:	NC	Viol fy:	2005
Contamcd:	7500		
Contamnm:	Public Notice		
Viol code:	76		
Viol name:	PN Violation without NPDWR Violation		
Rule code:	410		
Rule name:	PN rule		
Violmeasur:	Not Reported	Unitmeasur:	Not Reported
State mcl:	Not Reported	Cmpbdt:	08/21/2005
Cmpedt:	Not Reported		

Violations Information:

Violation id:	3623205	Orig cd:	S
State:	NC	Viol fy:	2005
Contamcd:	7500		
Contamnm:	Public Notice		
Viol code:	76		
Viol name:	PN Violation without NPDWR Violation		
Rule code:	410		
Rule name:	PN rule		
Violmeasur:	Not Reported	Unitmeasur:	Not Reported

State mcl:	Not Reported	Cmpbdt:	02/16/2005
Cmpedt:	Not Reported		

Violations Information:

Violation id:	2249506	Orig cd:	S
State:	NC	Viol fy:	2005
Contamcd:	7500		
Contamnm:	Public Notice		
Viol code:	76		
Viol name:	PN Violation without NPDWR Violation		
Rule code:	410		
Rule name:	PN rule		
Violmeasur:	Not Reported	Unitmeasur:	Not Reported
State mcl:	Not Reported	Cmpbdt:	11/20/2005
Cmpedt:	Not Reported		

Violations Information:

Violation id:	2205	Orig cd:	S
State:	NC	Viol fy:	2005
Contamcd:	3100		
Contamnm:	Coliform (TCR)		
Viol code:	23		
Viol name:	Monitoring, Routine Major (TCR)		
Rule code:	110		
Rule name:	TCR		
Violmeasur:	Not Reported	Unitmeasur:	Not Reported
State mcl:	Not Reported	Cmpbdt:	03/01/2005
Cmpedt:	03/31/2005		

Violations Information:

Violation id:	2105	Orig cd:	S
State:	NC	Viol fy:	2005
Contamcd:	3100		
Contamnm:	Coliform (TCR)		
Viol code:	26		
Viol name:	Monitoring, Repeat Minor (TCR)		
Rule code:	110		
Rule name:	TCR		
Violmeasur:	Not Reported	Unitmeasur:	Not Reported
State mcl:	Not Reported	Cmpbdt:	02/01/2005
Cmpedt:	02/28/2005		

Violations Information:

Violation id:	2005	Orig cd:	S
State:	NC	Viol fy:	2004
Contamcd:	1040		
Contamnm:	Nitrate		
Viol code:	03		
Viol name:	Monitoring, Regular		
Rule code:	331		
Rule name:	Nitrates		
Violmeasur:	Not Reported	Unitmeasur:	Not Reported
State mcl:	Not Reported	Cmpbdt:	01/01/2004
Cmpedt:	12/31/2004		

Violations Information:

Violation id:	1905	Orig cd:	S
State:	NC	Viol fy:	2004
Contamcd:	3100		
Contamnm:	Coliform (TCR)		
Viol code:	23		
Viol name:	Monitoring, Routine Major (TCR)		
Rule code:	110		
Rule name:	TCR		
Violmeasur:	Not Reported	Unitmeasur:	Not Reported
State mcl:	Not Reported	Cmpbdt:	07/01/2004
Cmpedt:	09/30/2004		

Violations Information:

Violation id:	1804	Orig cd:	S
State:	NC	Viol fy:	2004
Contamcd:	3100		
Contamnm:	Coliform (TCR)		
Viol code:	23		
Viol name:	Monitoring, Routine Major (TCR)		
Rule code:	110		
Rule name:	TCR		
Violmeasur:	Not Reported	Unitmeasur:	Not Reported
State mcl:	Not Reported	Cmpbdt:	04/01/2004
Cmpedt:	06/30/2004		

Violations Information:

Violation id:	1704	Orig cd:	S
State:	NC	Viol fy:	2003
Contamcd:	3100		
Contamnm:	Coliform (TCR)		
Viol code:	23		
Viol name:	Monitoring, Routine Major (TCR)		
Rule code:	110		
Rule name:	TCR		
Violmeasur:	Not Reported	Unitmeasur:	Not Reported
State mcl:	Not Reported	Cmpbdt:	10/01/2003
Cmpedt:	12/31/2003		

Violations Information:

Violation id:	1603	Orig cd:	S
State:	NC	Viol fy:	2003
Contamcd:	3100		
Contamnm:	Coliform (TCR)		
Viol code:	23		
Viol name:	Monitoring, Routine Major (TCR)		
Rule code:	110		
Rule name:	TCR		
Violmeasur:	Not Reported	Unitmeasur:	Not Reported
State mcl:	Not Reported	Cmpbdt:	04/01/2003
Cmpedt:	06/30/2003		

Violations Information:

Violation id:	1503	Orig cd:	S
State:	NC	Viol fy:	2002
Contamcd:	3100		
Contamnm:	Coliform (TCR)		
Viol code:	23		
Viol name:	Monitoring, Routine Major (TCR)		
Rule code:	110		
Rule name:	TCR		
Violmeasur:	Not Reported	Unitmeasur:	Not Reported

State mcl:	Not Reported	Cmpbdt:	10/01/2002
Cmpedt:	12/31/2002		

Violations Information:

Violation id:	1402	Orig cd:	S
State:	NC	Viol fy:	2002
Contamcd:	3100		
Contamnm:	Coliform (TCR)		
Viol code:	23		
Viol name:	Monitoring, Routine Major (TCR)		
Rule code:	110		
Rule name:	TCR		
Violmeasur:	Not Reported	Unitmeasur:	Not Reported
State mcl:	Not Reported	Cmpbdt:	04/01/2002
Cmpedt:	06/30/2002		

Violations Information:

Violation id:	1302	Orig cd:	S
State:	NC	Viol fy:	2002
Contamcd:	3100		
Contamnm:	Coliform (TCR)		
Viol code:	23		
Viol name:	Monitoring, Routine Major (TCR)		
Rule code:	110		
Rule name:	TCR		
Violmeasur:	Not Reported	Unitmeasur:	Not Reported
State mcl:	Not Reported	Cmpbdt:	01/01/2002
Cmpedt:	03/31/2002		

Violations Information:

Violation id:	1202	Orig cd:	S
State:	NC	Viol fy:	2001
Contamcd:	3100		
Contamnm:	Coliform (TCR)		
Viol code:	23		
Viol name:	Monitoring, Routine Major (TCR)		
Rule code:	110		
Rule name:	TCR		
Violmeasur:	Not Reported	Unitmeasur:	Not Reported
State mcl:	Not Reported	Cmpbdt:	07/01/2001
Cmpedt:	09/30/2001		

Violations Information:

Violation id:	1101	Orig cd:	S
State:	NC	Viol fy:	2001
Contamcd:	3100		
Contamnm:	Coliform (TCR)		
Viol code:	23		
Viol name:	Monitoring, Routine Major (TCR)		
Rule code:	110		
Rule name:	TCR		
Violmeasur:	Not Reported	Unitmeasur:	Not Reported
State mcl:	Not Reported	Cmpbdt:	01/01/2001
Cmpedt:	03/31/2001		

Violations Information:

Violation id:	1001	Orig cd:	S
State:	NC	Viol fy:	2000
Contamcd:	3100		
Contamnm:	Coliform (TCR)		
Viol code:	23		
Viol name:	Monitoring, Routine Major (TCR)		
Rule code:	110		
Rule name:	TCR		
Violmeasur:	Not Reported	Unitmeasur:	Not Reported
State mcl:	Not Reported	Cmpbdt:	07/01/2000
Cmpedt:	09/30/2000		

PWS ID: NC0201423
Date Initiated: 8304 Date Deactivated: Not Reported
PWS Name: BURNETT'S CHAPEL CHURCH
SNOW CAMP, NC 27253

Addressee / Facility: System Owner/Responsible Party
STEVE OLDHAM OR PASTOR
ROUTE 2
GRAHAM, NC 27253

Addressee / Facility: System Owner/Responsible Party
STEVE OLDHAM
747 BROOKWOOD AT SILER CITY
GRAHAM, NC 27253

Facility Latitude:	36 04 08	Facility Longitude:	079 24 02
Facility Latitude:	35 52 45	Facility Longitude:	079 22 00
City Served:	SNOW CAMP		
Treatment Class:	Untreated	Population:	00000200

Violations information not reported.

ENFORCEMENT INFORMATION:

Truedate:	03/31/2009	Pwsid:	NC0201423
Pwsname:	BURNETTS UNITED METH CHURCH		
Retpopsrvd:	25	Pwstypecod:	NC
Vioid:	1001	Contaminant:	COLIFORM (TCR)
Viol. Type:	Monitoring, Routine Major (TCR)		
Complperbe:	7/1/2000 0:00:00		
Complperen:	9/30/2000 0:00:00	Enfdate:	11/8/2000 0:00:00
Enf action:	State Formal NOV Issued		
Violmeasur:	Not Reported		

Truedate:	03/31/2009	Pwsid:	NC0201423
Pwsname:	BURNETTS UNITED METH CHURCH		
Retpopsrvd:	25	Pwstypecod:	NC
Vioid:	1001	Contaminant:	COLIFORM (TCR)
Viol. Type:	Monitoring, Routine Major (TCR)		
Complperbe:	7/1/2000 0:00:00		
Complperen:	9/30/2000 0:00:00	Enfdate:	11/8/2000 0:00:00
Enf action:	State Public Notif Requested		
Violmeasur:	Not Reported		

Truedate:	03/31/2009	Pwsid:	NC0201423
Pwsname:	BURNETTS UNITED METH CHURCH		
Retpopsrvd:	25	Pwstypecod:	NC
Vioid:	1101	Contaminant:	COLIFORM (TCR)
Viol. Type:	Monitoring, Routine Major (TCR)		
Complperbe:	1/1/2001 0:00:00		
Complperen:	3/31/2001 0:00:00	Enfdate:	5/1/2001 0:00:00
Enf action:	State Formal NOV Issued		
Violmeasur:	Not Reported		

Truedate:	03/31/2009	Pwsid:	NC0201423
Pwsname:	BURNETTS UNITED METH CHURCH		
Retpopsrvd:	25	Pwstypecod:	NC
Vioid:	1101	Contaminant:	COLIFORM (TCR)
Viol. Type:	Monitoring, Routine Major (TCR)		
Complperbe:	1/1/2001 0:00:00		
Complperen:	3/31/2001 0:00:00	Enfdate:	5/1/2001 0:00:00
Enf action:	State Public Notif Requested		
Violmeasur:	Not Reported		

Truedate:	03/31/2009	Pwsid:	NC0201423
Pwsname:	BURNETTS UNITED METH CHURCH		
Retpopsrvd:	25	Pwstypecod:	NC
Vioid:	1202	Contaminant:	COLIFORM (TCR)
Viol. Type:	Monitoring, Routine Major (TCR)		
Complperbe:	7/1/2001 0:00:00		
Complperen:	9/30/2001 0:00:00	Enfdate:	11/7/2001 0:00:00
Enf action:	State Formal NOV Issued		
Violmeasur:	Not Reported		

Truedate:	03/31/2009	Pwsid:	NC0201423
Pwsname:	BURNETTS UNITED METH CHURCH		
Retpopsrvd:	25	Pwstypecod:	NC
Vioid:	1202	Contaminant:	COLIFORM (TCR)
Viol. Type:	Monitoring, Routine Major (TCR)		
Complperbe:	7/1/2001 0:00:00		
Complperen:	9/30/2001 0:00:00	Enfdate:	11/7/2001 0:00:00
Enf action:	State Public Notif Requested		
Violmeasur:	Not Reported		

Truedate:	03/31/2009	Pwsid:	NC0201423
Pwsname:	BURNETTS UNITED METH CHURCH		
Retpopsrvd:	25	Pwstypecod:	NC
Vioid:	1302	Contaminant:	COLIFORM (TCR)
Viol. Type:	Monitoring, Routine Major (TCR)		
Complperbe:	1/1/2002 0:00:00		
Complperen:	3/31/2002 0:00:00	Enfdate:	4/26/2002 0:00:00
Enf action:	State Formal NOV Issued		
Violmeasur:	Not Reported		

Truedate:	03/31/2009	Pwsid:	NC0201423
Pwsname:	BURNETTS UNITED METH CHURCH		
Retpopsrvd:	25	Pwstypecod:	NC
Vioid:	1302	Contaminant:	COLIFORM (TCR)
Viol. Type:	Monitoring, Routine Major (TCR)		
Complperbe:	1/1/2002 0:00:00		
Complperen:	3/31/2002 0:00:00	Enfdate:	4/26/2002 0:00:00
Enf action:	State Public Notif Requested		
Violmeasur:	Not Reported		

Truedate:	03/31/2009	Pwsid:	NC0201423
Pwsname:	BURNETTS UNITED METH CHURCH		
Retpopsrvd:	25	Pwstypecod:	NC
Vioid:	1402	Contaminant:	COLIFORM (TCR)
Viol. Type:	Monitoring, Routine Major (TCR)		
Complperbe:	4/1/2002 0:00:00		
Complperen:	6/30/2002 0:00:00	Enfdate:	8/2/2002 0:00:00
Enf action:	State Formal NOV Issued		
Violmeasur:	Not Reported		

Truedate:	03/31/2009	Pwsid:	NC0201423
Pwsname:	BURNETTS UNITED METH CHURCH		
Retpopsrvd:	25	Pwstypecod:	NC
Vioid:	1402	Contaminant:	COLIFORM (TCR)
Viol. Type:	Monitoring, Routine Major (TCR)		
Complperbe:	4/1/2002 0:00:00		
Complperen:	6/30/2002 0:00:00	Enfdate:	8/2/2002 0:00:00
Enf action:	State Public Notif Requested		
Violmeasur:	Not Reported		

Truedate:	03/31/2009	Pwsid:	NC0201423
Pwsname:	BURNETTS UNITED METH CHURCH		
Retpopsrvd:	25	Pwstypecod:	NC
Vioid:	1503	Contaminant:	COLIFORM (TCR)
Viol. Type:	Monitoring, Routine Major (TCR)		
Complperbe:	10/1/2002 0:00:00		
Complperen:	12/31/2002 0:00:00	Enfdate:	1/30/2003 0:00:00
Enf action:	State Formal NOV Issued		
Violmeasur:	Not Reported		

Truedate:	03/31/2009	Pwsid:	NC0201423
Pwsname:	BURNETTS UNITED METH CHURCH		
Retpopsrvd:	25	Pwstypecod:	NC
Vioid:	1503	Contaminant:	COLIFORM (TCR)
Viol. Type:	Monitoring, Routine Major (TCR)		
Complperbe:	10/1/2002 0:00:00		
Complperen:	12/31/2002 0:00:00	Enfdate:	1/30/2003 0:00:00
Enf action:	State Public Notif Requested		
Violmeasur:	Not Reported		

Truedate:	03/31/2009	Pwsid:	NC0201423
Pwsname:	BURNETTS UNITED METH CHURCH		
Retpopsrvd:	25	Pwstypecod:	NC
Vioid:	1603	Contaminant:	COLIFORM (TCR)
Viol. Type:	Monitoring, Routine Major (TCR)		
Complperbe:	4/1/2003 0:00:00		
Complperen:	6/30/2003 0:00:00	Enfdate:	7/31/2003 0:00:00
Enf action:	State Formal NOV Issued		
Violmeasur:	Not Reported		

Truedate:	03/31/2009	Pwsid:	NC0201423
Pwsname:	BURNETTS UNITED METH CHURCH		
Retpopsrvd:	25	Pwstypecod:	NC
Vioid:	1603	Contaminant:	COLIFORM (TCR)
Viol. Type:	Monitoring, Routine Major (TCR)		
Complperbe:	4/1/2003 0:00:00		
Complperen:	6/30/2003 0:00:00	Enfdate:	7/31/2003 0:00:00
Enf action:	State Public Notif Requested		
Violmeasur:	Not Reported		

Truedate:	03/31/2009	Pwsid:	NC0201423
Pwsname:	BURNETTS UNITED METH CHURCH		
Retpopsrvd:	25	Pwstypecod:	NC
Vioid:	1704	Contaminant:	COLIFORM (TCR)
Viol. Type:	Monitoring, Routine Major (TCR)		
Complperbe:	10/1/2003 0:00:00		
Complperen:	12/31/2003 0:00:00	Enfdate:	2/6/2004 0:00:00
Enf action:	State Formal NOV Issued		
Violmeasur:	Not Reported		

Truedate:	03/31/2009	Pwsid:	NC0201423
Pwsname:	BURNETTS UNITED METH CHURCH		
Retpopsrvd:	25	Pwstypecod:	NC
Vioid:	1704	Contaminant:	COLIFORM (TCR)
Viol. Type:	Monitoring, Routine Major (TCR)		
Complperbe:	10/1/2003 0:00:00		
Complperen:	12/31/2003 0:00:00	Enfdate:	2/6/2004 0:00:00
Enf action:	State Public Notif Requested		
Violmeasur:	Not Reported		

Truedate:	03/31/2009	Pwsid:	NC0201423
Pwsname:	BURNETTS UNITED METH CHURCH		
Retpopsrvd:	25	Pwstypecod:	NC
Vioid:	1804	Contaminant:	COLIFORM (TCR)
Viol. Type:	Monitoring, Routine Major (TCR)		
Complperbe:	4/1/2004 0:00:00		
Complperen:	6/30/2004 0:00:00	Enfdate:	8/10/2004 0:00:00
Enf action:	State Formal NOV Issued		
Violmeasur:	Not Reported		

Truedate:	03/31/2009	Pwsid:	NC0201423
Pwsname:	BURNETTS UNITED METH CHURCH		
Retpopsrvd:	25	Pwstypecod:	NC
Vioid:	1804	Contaminant:	COLIFORM (TCR)
Viol. Type:	Monitoring, Routine Major (TCR)		
Complperbe:	4/1/2004 0:00:00		
Complperen:	6/30/2004 0:00:00	Enfdate:	8/10/2004 0:00:00
Enf action:	State Public Notif Requested		
Violmeasur:	Not Reported		

Truedate:	03/31/2009	Pwsid:	NC0201423
Pwsname:	BURNETTS UNITED METH CHURCH		
Retpopsrvd:	25	Pwstypecod:	NC
Vioid:	1905	Contaminant:	COLIFORM (TCR)
Viol. Type:	Monitoring, Routine Major (TCR)		
Complperbe:	7/1/2004 0:00:00		
Complperen:	9/30/2004 0:00:00	Enfdate:	11/9/2004 0:00:00
Enf action:	State Formal NOV Issued		
Violmeasur:	Not Reported		

Truedate:	03/31/2009	Pwsid:	NC0201423
Pwsname:	BURNETTS UNITED METH CHURCH		
Retpopsrvd:	25	Pwstypecod:	NC
Vioid:	1905	Contaminant:	COLIFORM (TCR)
Viol. Type:	Monitoring, Routine Major (TCR)		
Complperbe:	7/1/2004 0:00:00		
Complperen:	9/30/2004 0:00:00	Enfdate:	11/9/2004 0:00:00
Enf action:	State Public Notif Requested		
Violmeasur:	Not Reported		

Truedate:	03/31/2009	Pwsid:	NC0201423
Pwsname:	BURNETTS UNITED METH CHURCH		
Retpopsrvd:	25	Pwstypecod:	NC
Vioid:	2005	Contaminant:	NITRATE
Viol. Type:	3		
Complperbe:	1/1/2004 0:00:00		
Complperen:	12/31/2004 0:00:00	Enfdate:	2/7/2005 0:00:00
Enf action:	State Compliance Achieved		
Violmeasur:	Not Reported		

Truedate:	03/31/2009	Pwsid:	NC0201423
Pwsname:	BURNETTS UNITED METH CHURCH		
Retpopsrvd:	25	Pwstypecod:	NC
Vioid:	2005	Contaminant:	NITRATE
Viol. Type:	3		
Complperbe:	1/1/2004 0:00:00		
Complperen:	12/31/2004 0:00:00	Enfdate:	3/7/2005 0:00:00
Enf action:	State Formal NOV Issued		
Violmeasur:	Not Reported		

Truedate:	03/31/2009	Pwsid:	NC0201423
Pwsname:	BURNETTS UNITED METH CHURCH		
Retpopsrvd:	25	Pwstypecod:	NC
Vioid:	2005	Contaminant:	NITRATE
Viol. Type:	3		
Complperbe:	1/1/2004 0:00:00		
Complperen:	12/31/2004 0:00:00	Enfdate:	3/7/2005 0:00:00
Enf action:	State Public Notif Requested		
Violmeasur:	Not Reported		

Truedate:	03/31/2009	Pwsid:	NC0201423
Pwsname:	BURNETTS UNITED METH CHURCH		
Retpopsrvd:	25	Pwstypecod:	NC
Vioid:	2105	Contaminant:	COLIFORM (TCR)
Viol. Type:	Monitoring, Repeat Minor (TCR)		
Complperbe:	2/1/2005 0:00:00		
Complperen:	2/28/2005 0:00:00	Enfdate:	3/31/2005 0:00:00
Enf action:	State Formal NOV Issued		
Violmeasur:	Not Reported		

Truedate:	03/31/2009	Pwsid:	NC0201423
Pwsname:	BURNETTS UNITED METH CHURCH		
Retpopsrvd:	25	Pwstypecod:	NC
Vioid:	2105	Contaminant:	COLIFORM (TCR)
Viol. Type:	Monitoring, Repeat Minor (TCR)		
Complperbe:	2/1/2005 0:00:00		
Complperen:	2/28/2005 0:00:00	Enfdate:	3/31/2005 0:00:00
Enf action:	State Public Notif Requested		
Violmeasur:	Not Reported		

Truedate:	03/31/2009	Pwsid:	NC0201423
Pwsname:	BURNETTS UNITED METH CHURCH		
Retpopsrvd:	25	Pwstypecod:	NC
Vioid:	2105	Contaminant:	COLIFORM (TCR)
Viol. Type:	Monitoring, Repeat Minor (TCR)		
Complperbe:	2/1/2005 0:00:00		
Complperen:	2/28/2005 0:00:00	Enfdate:	4/25/2005 0:00:00
Enf action:	State Public Notif Received		
Violmeasur:	Not Reported		

Truedate:	03/31/2009	Pwsid:	NC0201423
Pwsname:	BURNETTS UNITED METH CHURCH		
Retpopsrvd:	25	Pwstypecod:	NC
Vioid:	2205	Contaminant:	COLIFORM (TCR)
Viol. Type:	Monitoring, Routine Major (TCR)		
Complperbe:	3/1/2005 0:00:00		
Complperen:	3/31/2005 0:00:00	Enfdate:	5/5/2005 0:00:00
Enf action:	State Formal NOV Issued		
Violmeasur:	Not Reported		

Truedate:	03/31/2009	Pwsid:	NC0201423
Pwsname:	BURNETTS UNITED METH CHURCH		
Retpopsrvd:	25	Pwstypecod:	NC
Vioid:	2205	Contaminant:	COLIFORM (TCR)
Viol. Type:	Monitoring, Routine Major (TCR)		
Complperbe:	3/1/2005 0:00:00		
Complperen:	3/31/2005 0:00:00	Enfdate:	5/5/2005 0:00:00
Enf action:	State Public Notif Requested		
Violmeasur:	Not Reported		

Truedate:	03/31/2009	Pwsid:	NC0201423
Pwsname:	BURNETTS UNITED METH CHURCH		
Retpopsrvd:	25	Pwstypecod:	NC
Vioid:	2249506	Contaminant:	7500
Viol. Type:	Other Non-NPDWR Potential Health Risks		
Complperbe:	11/20/2005 0:00:00		
Complperen:	12/31/2025 0:00:00	Enfdate:	No Enf Action as of
Enf action:	7/8/2009 0:00:00		
Violmeasur:	Not Reported		

Truedate:	03/31/2009	Pwsid:	NC0201423
Pwsname:	BURNETTS UNITED METH CHURCH		
Retpopsrvd:	25	Pwstypecod:	NC
Vioid:	3623205	Contaminant:	7500
Viol. Type:	Other Non-NPDWR Potential Health Risks		
Complperbe:	2/16/2005 0:00:00		
Complperen:	12/31/2025 0:00:00	Enfdate:	No Enf Action as of
Enf action:	7/8/2009 0:00:00		
Violmeasur:	Not Reported		

Truedate:	03/31/2009	Pwsid:	NC0201423
Pwsname:	BURNETTS UNITED METH CHURCH		
Retpopsrvd:	25	Pwstypecod:	NC
Vioid:	3908605	Contaminant:	7500
Viol. Type:	Other Non-NPDWR Potential Health Risks		
Complperbe:	8/21/2005 0:00:00		
Complperen:	12/31/2025 0:00:00	Enfdate:	No Enf Action as of
Enf action:	7/8/2009 0:00:00		
Violmeasur:	Not Reported		

Truedate:	03/31/2009	Pwsid:	NC0201423
Pwsname:	BURNETTS UNITED METH CHURCH		
Retpopsrvd:	25	Pwstypecod:	NC
Vioid:	4316503	Contaminant:	7500
Viol. Type:	Other Non-NPDWR Potential Health Risks		
Complperbe:	5/7/2003 0:00:00		
Complperen:	12/31/2025 0:00:00	Enfdate:	No Enf Action as of
Enf action:	7/8/2009 0:00:00		
Violmeasur:	Not Reported		

Truedate:	03/31/2009	Pwsid:	NC0201423
Pwsname:	BURNETTS UNITED METH CHURCH		
Retpopsrvd:	25	Pwstypecod:	NC
Vioid:	4481903	Contaminant:	7500
Viol. Type:	Other Non-NPDWR Potential Health Risks		
Complperbe:	8/13/2003 0:00:00		
Complperen:	12/31/2025 0:00:00	Enfdate:	No Enf Action as of
Enf action:	7/8/2009 0:00:00		
Violmeasur:	Not Reported		

Truedate:	03/31/2009	Pwsid:	NC0201423
Pwsname:	BURNETTS UNITED METH CHURCH		
Retpopsrvd:	25	Pwstypecod:	NC
Vioid:	4614204	Contaminant:	7500
Viol. Type:	Other Non-NPDWR Potential Health Risks		
Complperbe:	8/10/2004 0:00:00		
Complperen:	12/31/2025 0:00:00	Enfdate:	No Enf Action as of
Enf action:	7/8/2009 0:00:00		
Violmeasur:	Not Reported		

Truedate:	03/31/2009	Pwsid:	NC0201423
Pwsname:	BURNETTS UNITED METH CHURCH		
Retpopsrvd:	25	Pwstypecod:	NC
Vioid:	4730804	Contaminant:	7500
Viol. Type:	Other Non-NPDWR Potential Health Risks		
Complperbe:	2/10/2004 0:00:00		
Complperen:	12/31/2025 0:00:00	Enfdate:	No Enf Action as of
Enf action:	7/8/2009 0:00:00		
Violmeasur:	Not Reported		

Truedate:	03/31/2009	Pwsid:	NC0201423
Pwsname:	BURNETTS UNITED METH CHURCH		
Retpopsrvd:	25	Pwstypecod:	NC
Vioid:	4836303	Contaminant:	7500
Viol. Type:	Other Non-NPDWR Potential Health Risks		
Complperbe:	11/18/2002 0:00:00		
Complperen:	12/31/2025 0:00:00	Enfdate:	No Enf Action as of
Enf action:	7/8/2009 0:00:00		
Violmeasur:	Not Reported		

Truedate:	03/31/2009	Pwsid:	NC0201423
Pwsname:	BURNETTS UNITED METH CHURCH		
Retpopsrvd:	25	Pwstypecod:	NC
Vioid:	900	Contaminant:	COLIFORM (TCR)
Viol. Type:	Monitoring, Routine Major (TCR)		
Complperbe:	1/1/2000 0:00:00		
Complperen:	1/31/2000 0:00:00	Enfdate:	3/20/2000 0:00:00
Enf action:	State Formal NOV Issued		
Violmeasur:	Not Reported		

Truedate:	03/31/2009	Pwsid:	NC0201423
Pwsname:	BURNETTS UNITED METH CHURCH		
Retpopsrvd:	25	Pwstypecod:	NC
Vioid:	900	Contaminant:	COLIFORM (TCR)
Viol. Type:	Monitoring, Routine Major (TCR)		
Complperbe:	1/1/2000 0:00:00		
Complperen:	1/31/2000 0:00:00	Enfdate:	3/20/2000 0:00:00
Enf action:	State Public Notif Requested		
Violmeasur:	Not Reported		

ENFORCEMENT INFORMATION:

System Name:	BURNETTS UMC		
Violation Type:	Monitoring, Repeat Major (TCR)		
Contaminant:	COLIFORM (TCR)		
Compliance Period:	1999-12-01 - 1999-12-31		
Violation ID:	0000819		
Enforcement Date:	2000-02-04	Enf. Action:	State Formal NOV Issued
System Name:	BURNETTS UMC		
Violation Type:	Monitoring, Routine Major (TCR)		
Contaminant:	COLIFORM (TCR)		
Compliance Period:	1999-04-01 - 1999-06-30		
Violation ID:	0000819		
Enforcement Date:	1999-08-12	Enf. Action:	State Public Notif Requested
System Name:	BURNETTS UMC		
Violation Type:	Monitoring, Repeat Major (TCR)		
Contaminant:	COLIFORM (TCR)		
Compliance Period:	1999-12-01 - 1999-12-31		
Violation ID:	0003870		
Enforcement Date:	2000-02-04	Enf. Action:	State Public Notif Requested
System Name:	BURNETTS UNITED METH CHURCH		
Violation Type:	Monitoring, Routine Major (TCR)		
Contaminant:	COLIFORM (TCR)		
Compliance Period:	7/1/2000 0:00:00 - 9/30/2000 0:00:00		
Violation ID:	1001		
Enforcement Date:	11/8/2000 0:00:00	Enf. Action:	State Formal NOV Issued
System Name:	BURNETTS UNITED METH CHURCH		
Violation Type:	Monitoring, Routine Major (TCR)		
Contaminant:	COLIFORM (TCR)		
Compliance Period:	7/1/2000 0:00:00 - 9/30/2000 0:00:00		
Violation ID:	1001		
Enforcement Date:	11/8/2000 0:00:00	Enf. Action:	State Public Notif Requested
System Name:	BURNETTS UNITED METH CHURCH		
Violation Type:	Monitoring, Routine Major (TCR)		
Contaminant:	COLIFORM (TCR)		
Compliance Period:	7/1/2000 0:00:00 - 9/30/2000 0:00:00		
Violation ID:	1001		
Enforcement Date:	11/8/2000 0:00:00	Enf. Action:	State Public Notif Requested
System Name:	BURNETTS UNITED METH CHURCH		
Violation Type:	Monitoring, Routine Major (TCR)		
Contaminant:	COLIFORM (TCR)		
Compliance Period:	7/1/2000 0:00:00 - 9/30/2000 0:00:00		
Violation ID:	1001		
Enforcement Date:	11/8/2000 0:00:00	Enf. Action:	State Formal NOV Issued
System Name:	BURNETTS UNITED METH CHURCH		
Violation Type:	Monitoring, Routine Major (TCR)		
Contaminant:	COLIFORM (TCR)		
Compliance Period:	1/1/2001 0:00:00 - 3/31/2001 0:00:00		
Violation ID:	1101		
Enforcement Date:	5/1/2001 0:00:00	Enf. Action:	State Formal NOV Issued
System Name:	BURNETTS UNITED METH CHURCH		
Violation Type:	Monitoring, Routine Major (TCR)		
Contaminant:	COLIFORM (TCR)		
Compliance Period:	1/1/2001 0:00:00 - 3/31/2001 0:00:00		
Violation ID:	1101		
Enforcement Date:	5/1/2001 0:00:00	Enf. Action:	State Public Notif Requested

ENFORCEMENT INFORMATION:

System Name: BURNETTS UNITED METH CHURCH
Violation Type: Monitoring, Routine Major (TCR)
Contaminant: COLIFORM (TCR)
Compliance Period: 1/1/2001 0:00:00 - 3/31/2001 0:00:00
Violation ID: 1101
Enforcement Date: 5/1/2001 0:00:00 Enf. Action: State Public Notif Requested

System Name: BURNETTS UNITED METH CHURCH
Violation Type: Monitoring, Routine Major (TCR)
Contaminant: COLIFORM (TCR)
Compliance Period: 1/1/2001 0:00:00 - 3/31/2001 0:00:00
Violation ID: 1101
Enforcement Date: 5/1/2001 0:00:00 Enf. Action: State Formal NOV Issued

System Name: BURNETTS UNITED METH CHURCH
Violation Type: Monitoring, Routine Major (TCR)
Contaminant: COLIFORM (TCR)
Compliance Period: 7/1/2001 0:00:00 - 9/30/2001 0:00:00
Violation ID: 1202
Enforcement Date: 11/7/2001 0:00:00 Enf. Action: State Formal NOV Issued

System Name: BURNETTS UNITED METH CHURCH
Violation Type: Monitoring, Routine Major (TCR)
Contaminant: COLIFORM (TCR)
Compliance Period: 7/1/2001 0:00:00 - 9/30/2001 0:00:00
Violation ID: 1202
Enforcement Date: 11/7/2001 0:00:00 Enf. Action: State Formal NOV Issued

System Name: BURNETTS UNITED METH CHURCH
Violation Type: Monitoring, Routine Major (TCR)
Contaminant: COLIFORM (TCR)
Compliance Period: 7/1/2001 0:00:00 - 9/30/2001 0:00:00
Violation ID: 1202
Enforcement Date: 11/7/2001 0:00:00 Enf. Action: State Public Notif Requested

System Name: BURNETTS UNITED METH CHURCH
Violation Type: Monitoring, Routine Major (TCR)
Contaminant: COLIFORM (TCR)
Compliance Period: 7/1/2001 0:00:00 - 9/30/2001 0:00:00
Violation ID: 1202
Enforcement Date: 11/7/2001 0:00:00 Enf. Action: State Public Notif Requested

System Name: BURNETTS UNITED METH CHURCH
Violation Type: Monitoring, Routine Major (TCR)
Contaminant: COLIFORM (TCR)
Compliance Period: 1/1/2002 0:00:00 - 3/31/2002 0:00:00
Violation ID: 1302
Enforcement Date: 4/26/2002 0:00:00 Enf. Action: State Public Notif Requested

System Name: BURNETTS UNITED METH CHURCH
Violation Type: Monitoring, Routine Major (TCR)
Contaminant: COLIFORM (TCR)
Compliance Period: 1/1/2002 0:00:00 - 3/31/2002 0:00:00
Violation ID: 1302
Enforcement Date: 4/26/2002 0:00:00 Enf. Action: State Public Notif Requested

System Name: BURNETTS UNITED METH CHURCH
Violation Type: Monitoring, Routine Major (TCR)
Contaminant: COLIFORM (TCR)
Compliance Period: 1/1/2002 0:00:00 - 3/31/2002 0:00:00
Violation ID: 1302
Enforcement Date: 4/26/2002 0:00:00 Enf. Action: State Formal NOV Issued

ENFORCEMENT INFORMATION:

System Name:	BURNETTS UNITED METH CHURCH		
Violation Type:	Monitoring, Routine Major (TCR)		
Contaminant:	COLIFORM (TCR)		
Compliance Period:	1/1/2002 0:00:00 - 3/31/2002 0:00:00		
Violation ID:	1302		
Enforcement Date:	4/26/2002 0:00:00	Enf. Action:	State Formal NOV Issued
System Name:	BURNETTS UNITED METH CHURCH		
Violation Type:	Monitoring, Routine Major (TCR)		
Contaminant:	COLIFORM (TCR)		
Compliance Period:	4/1/2002 0:00:00 - 6/30/2002 0:00:00		
Violation ID:	1402		
Enforcement Date:	8/2/2002 0:00:00	Enf. Action:	State Public Notif Requested
System Name:	BURNETTS UNITED METH CHURCH		
Violation Type:	Monitoring, Routine Major (TCR)		
Contaminant:	COLIFORM (TCR)		
Compliance Period:	4/1/2002 0:00:00 - 6/30/2002 0:00:00		
Violation ID:	1402		
Enforcement Date:	8/2/2002 0:00:00	Enf. Action:	State Formal NOV Issued
System Name:	BURNETTS UNITED METH CHURCH		
Violation Type:	Monitoring, Routine Major (TCR)		
Contaminant:	COLIFORM (TCR)		
Compliance Period:	4/1/2002 0:00:00 - 6/30/2002 0:00:00		
Violation ID:	1402		
Enforcement Date:	8/2/2002 0:00:00	Enf. Action:	State Public Notif Requested
System Name:	BURNETTS UNITED METH CHURCH		
Violation Type:	Monitoring, Routine Major (TCR)		
Contaminant:	COLIFORM (TCR)		
Compliance Period:	4/1/2002 0:00:00 - 6/30/2002 0:00:00		
Violation ID:	1402		
Enforcement Date:	8/2/2002 0:00:00	Enf. Action:	State Formal NOV Issued
System Name:	BURNETTS UNITED METH CHURCH		
Violation Type:	Monitoring, Routine Major (TCR)		
Contaminant:	COLIFORM (TCR)		
Compliance Period:	10/1/2002 0:00:00 - 12/31/2002 0:00:00		
Violation ID:	1503		
Enforcement Date:	1/30/2003 0:00:00	Enf. Action:	State Public Notif Requested
System Name:	BURNETTS UNITED METH CHURCH		
Violation Type:	Monitoring, Routine Major (TCR)		
Contaminant:	COLIFORM (TCR)		
Compliance Period:	10/1/2002 0:00:00 - 12/31/2002 0:00:00		
Violation ID:	1503		
Enforcement Date:	1/30/2003 0:00:00	Enf. Action:	State Formal NOV Issued
System Name:	BURNETTS UNITED METH CHURCH		
Violation Type:	Monitoring, Routine Major (TCR)		
Contaminant:	COLIFORM (TCR)		
Compliance Period:	10/1/2002 0:00:00 - 12/31/2002 0:00:00		
Violation ID:	1503		
Enforcement Date:	1/30/2003 0:00:00	Enf. Action:	State Public Notif Requested
System Name:	BURNETTS UNITED METH CHURCH		
Violation Type:	Monitoring, Routine Major (TCR)		
Contaminant:	COLIFORM (TCR)		
Compliance Period:	10/1/2002 0:00:00 - 12/31/2002 0:00:00		
Violation ID:	1503		
Enforcement Date:	1/30/2003 0:00:00	Enf. Action:	State Formal NOV Issued

ENFORCEMENT INFORMATION:

System Name:	BURNETTS UNITED METH CHURCH		
Violation Type:	Monitoring, Routine Major (TCR)		
Contaminant:	COLIFORM (TCR)		
Compliance Period:	4/1/2003 0:00:00 - 6/30/2003 0:00:00		
Violation ID:	1603		
Enforcement Date:	7/31/2003 0:00:00	Enf. Action:	State Formal NOV Issued
System Name:	BURNETTS UNITED METH CHURCH		
Violation Type:	Monitoring, Routine Major (TCR)		
Contaminant:	COLIFORM (TCR)		
Compliance Period:	4/1/2003 0:00:00 - 6/30/2003 0:00:00		
Violation ID:	1603		
Enforcement Date:	7/31/2003 0:00:00	Enf. Action:	State Public Notif Requested
System Name:	BURNETTS UNITED METH CHURCH		
Violation Type:	Monitoring, Routine Major (TCR)		
Contaminant:	COLIFORM (TCR)		
Compliance Period:	4/1/2003 0:00:00 - 6/30/2003 0:00:00		
Violation ID:	1603		
Enforcement Date:	7/31/2003 0:00:00	Enf. Action:	State Formal NOV Issued
System Name:	BURNETTS UNITED METH CHURCH		
Violation Type:	Monitoring, Routine Major (TCR)		
Contaminant:	COLIFORM (TCR)		
Compliance Period:	4/1/2003 0:00:00 - 6/30/2003 0:00:00		
Violation ID:	1603		
Enforcement Date:	7/31/2003 0:00:00	Enf. Action:	State Public Notif Requested
System Name:	BURNETTS UNITED METH CHURCH		
Violation Type:	Monitoring, Routine Major (TCR)		
Contaminant:	COLIFORM (TCR)		
Compliance Period:	10/1/2003 0:00:00 - 12/31/2003 0:00:00		
Violation ID:	1704		
Enforcement Date:	2/6/2004 0:00:00	Enf. Action:	State Public Notif Requested
System Name:	BURNETTS UNITED METH CHURCH		
Violation Type:	Monitoring, Routine Major (TCR)		
Contaminant:	COLIFORM (TCR)		
Compliance Period:	10/1/2003 0:00:00 - 12/31/2003 0:00:00		
Violation ID:	1704		
Enforcement Date:	2/6/2004 0:00:00	Enf. Action:	State Formal NOV Issued
System Name:	BURNETTS UNITED METH CHURCH		
Violation Type:	Monitoring, Routine Major (TCR)		
Contaminant:	COLIFORM (TCR)		
Compliance Period:	10/1/2003 0:00:00 - 12/31/2003 0:00:00		
Violation ID:	1704		
Enforcement Date:	2/6/2004 0:00:00	Enf. Action:	State Formal NOV Issued
System Name:	BURNETTS UNITED METH CHURCH		
Violation Type:	Monitoring, Routine Major (TCR)		
Contaminant:	COLIFORM (TCR)		
Compliance Period:	10/1/2003 0:00:00 - 12/31/2003 0:00:00		
Violation ID:	1704		
Enforcement Date:	2/6/2004 0:00:00	Enf. Action:	State Public Notif Requested
System Name:	BURNETTS UNITED METH CHURCH		
Violation Type:	Monitoring, Routine Major (TCR)		
Contaminant:	COLIFORM (TCR)		
Compliance Period:	4/1/2004 0:00:00 - 6/30/2004 0:00:00		
Violation ID:	1804		
Enforcement Date:	8/10/2004 0:00:00	Enf. Action:	State Formal NOV Issued

ENFORCEMENT INFORMATION:

System Name:	BURNETTS UNITED METH CHURCH		
Violation Type:	Monitoring, Routine Major (TCR)		
Contaminant:	COLIFORM (TCR)		
Compliance Period:	4/1/2004 0:00:00 - 6/30/2004 0:00:00		
Violation ID:	1804		
Enforcement Date:	8/10/2004 0:00:00	Enf. Action:	State Public Notif Requested
System Name:	BURNETTS UNITED METH CHURCH		
Violation Type:	Monitoring, Routine Major (TCR)		
Contaminant:	COLIFORM (TCR)		
Compliance Period:	4/1/2004 0:00:00 - 6/30/2004 0:00:00		
Violation ID:	1804		
Enforcement Date:	8/10/2004 0:00:00	Enf. Action:	State Public Notif Requested
System Name:	BURNETTS UNITED METH CHURCH		
Violation Type:	Monitoring, Routine Major (TCR)		
Contaminant:	COLIFORM (TCR)		
Compliance Period:	4/1/2004 0:00:00 - 6/30/2004 0:00:00		
Violation ID:	1804		
Enforcement Date:	8/10/2004 0:00:00	Enf. Action:	State Formal NOV Issued
System Name:	BURNETTS UNITED METH CHURCH		
Violation Type:	Monitoring, Routine Major (TCR)		
Contaminant:	COLIFORM (TCR)		
Compliance Period:	7/1/2004 0:00:00 - 9/30/2004 0:00:00		
Violation ID:	1905		
Enforcement Date:	11/9/2004 0:00:00	Enf. Action:	State Formal NOV Issued
System Name:	BURNETTS UNITED METH CHURCH		
Violation Type:	Monitoring, Routine Major (TCR)		
Contaminant:	COLIFORM (TCR)		
Compliance Period:	7/1/2004 0:00:00 - 9/30/2004 0:00:00		
Violation ID:	1905		
Enforcement Date:	11/9/2004 0:00:00	Enf. Action:	State Formal NOV Issued
System Name:	BURNETTS UNITED METH CHURCH		
Violation Type:	Monitoring, Routine Major (TCR)		
Contaminant:	COLIFORM (TCR)		
Compliance Period:	7/1/2004 0:00:00 - 9/30/2004 0:00:00		
Violation ID:	1905		
Enforcement Date:	11/9/2004 0:00:00	Enf. Action:	State Public Notif Requested
System Name:	BURNETTS UNITED METH CHURCH		
Violation Type:	Monitoring, Routine Major (TCR)		
Contaminant:	COLIFORM (TCR)		
Compliance Period:	7/1/2004 0:00:00 - 9/30/2004 0:00:00		
Violation ID:	1905		
Enforcement Date:	11/9/2004 0:00:00	Enf. Action:	State Public Notif Requested
System Name:	BURNETTS UNITED METH CHURCH		
Violation Type:	3		
Contaminant:	NITRATE		
Compliance Period:	1/1/2004 0:00:00 - 12/31/2004 0:00:00		
Violation ID:	2005		
Enforcement Date:	2/7/2005 0:00:00	Enf. Action:	State Compliance Achieved
System Name:	BURNETTS UNITED METH CHURCH		
Violation Type:	3		
Contaminant:	NITRATE		
Compliance Period:	1/1/2004 0:00:00 - 12/31/2004 0:00:00		
Violation ID:	2005		
Enforcement Date:	3/7/2005 0:00:00	Enf. Action:	State Formal NOV Issued

ENFORCEMENT INFORMATION:

System Name:	BURNETTS UNITED METH CHURCH		
Violation Type:	3		
Contaminant:	NITRATE		
Compliance Period:	1/1/2004 0:00:00 - 12/31/2004 0:00:00		
Violation ID:	2005		
Enforcement Date:	3/7/2005 0:00:00	Enf. Action:	State Public Notif Requested
System Name:	BURNETTS UNITED METH CHURCH		
Violation Type:	3		
Contaminant:	NITRATE		
Compliance Period:	1/1/2004 0:00:00 - 12/31/2004 0:00:00		
Violation ID:	2005		
Enforcement Date:	3/7/2005 0:00:00	Enf. Action:	State Public Notif Requested
System Name:	BURNETTS UNITED METH CHURCH		
Violation Type:	3		
Contaminant:	NITRATE		
Compliance Period:	1/1/2004 0:00:00 - 12/31/2004 0:00:00		
Violation ID:	2005		
Enforcement Date:	3/7/2005 0:00:00	Enf. Action:	State Formal NOV Issued
System Name:	BURNETTS UNITED METH CHURCH		
Violation Type:	3		
Contaminant:	NITRATE		
Compliance Period:	1/1/2004 0:00:00 - 12/31/2004 0:00:00		
Violation ID:	2005		
Enforcement Date:	2/7/2005 0:00:00	Enf. Action:	State Compliance Achieved
System Name:	BURNETTS UNITED METH CHURCH		
Violation Type:	Monitoring, Repeat Minor (TCR)		
Contaminant:	COLIFORM (TCR)		
Compliance Period:	2/1/2005 0:00:00 - 2/28/2005 0:00:00		
Violation ID:	2105		
Enforcement Date:	3/31/2005 0:00:00	Enf. Action:	State Formal NOV Issued
System Name:	BURNETTS UNITED METH CHURCH		
Violation Type:	Monitoring, Repeat Minor (TCR)		
Contaminant:	COLIFORM (TCR)		
Compliance Period:	2/1/2005 0:00:00 - 2/28/2005 0:00:00		
Violation ID:	2105		
Enforcement Date:	4/25/2005 0:00:00	Enf. Action:	State Public Notif Received
System Name:	BURNETTS UNITED METH CHURCH		
Violation Type:	Monitoring, Repeat Minor (TCR)		
Contaminant:	COLIFORM (TCR)		
Compliance Period:	2/1/2005 0:00:00 - 2/28/2005 0:00:00		
Violation ID:	2105		
Enforcement Date:	4/25/2005 0:00:00	Enf. Action:	State Public Notif Received
System Name:	BURNETTS UNITED METH CHURCH		
Violation Type:	Monitoring, Repeat Minor (TCR)		
Contaminant:	COLIFORM (TCR)		
Compliance Period:	2/1/2005 0:00:00 - 2/28/2005 0:00:00		
Violation ID:	2105		
Enforcement Date:	3/31/2005 0:00:00	Enf. Action:	State Public Notif Requested
System Name:	BURNETTS UNITED METH CHURCH		
Violation Type:	Monitoring, Repeat Minor (TCR)		
Contaminant:	COLIFORM (TCR)		
Compliance Period:	2/1/2005 0:00:00 - 2/28/2005 0:00:00		
Violation ID:	2105		
Enforcement Date:	3/31/2005 0:00:00	Enf. Action:	State Public Notif Requested

ENFORCEMENT INFORMATION:

System Name:	BURNETTS UNITED METH CHURCH		
Violation Type:	Monitoring, Repeat Minor (TCR)		
Contaminant:	COLIFORM (TCR)		
Compliance Period:	2/1/2005 0:00:00 - 2/28/2005 0:00:00		
Violation ID:	2105		
Enforcement Date:	3/31/2005 0:00:00	Enf. Action:	State Formal NOV Issued
System Name:	BURNETTS UNITED METH CHURCH		
Violation Type:	Monitoring, Routine Major (TCR)		
Contaminant:	COLIFORM (TCR)		
Compliance Period:	3/1/2005 0:00:00 - 3/31/2005 0:00:00		
Violation ID:	2205		
Enforcement Date:	5/5/2005 0:00:00	Enf. Action:	State Public Notif Requested
System Name:	BURNETTS UNITED METH CHURCH		
Violation Type:	Monitoring, Routine Major (TCR)		
Contaminant:	COLIFORM (TCR)		
Compliance Period:	3/1/2005 0:00:00 - 3/31/2005 0:00:00		
Violation ID:	2205		
Enforcement Date:	5/5/2005 0:00:00	Enf. Action:	State Public Notif Requested
System Name:	BURNETTS UNITED METH CHURCH		
Violation Type:	Monitoring, Routine Major (TCR)		
Contaminant:	COLIFORM (TCR)		
Compliance Period:	3/1/2005 0:00:00 - 3/31/2005 0:00:00		
Violation ID:	2205		
Enforcement Date:	5/5/2005 0:00:00	Enf. Action:	State Formal NOV Issued
System Name:	BURNETTS UNITED METH CHURCH		
Violation Type:	Monitoring, Routine Major (TCR)		
Contaminant:	COLIFORM (TCR)		
Compliance Period:	3/1/2005 0:00:00 - 3/31/2005 0:00:00		
Violation ID:	2205		
Enforcement Date:	5/5/2005 0:00:00	Enf. Action:	State Formal NOV Issued
System Name:	BURNETTS UNITED METH CHURCH		
Violation Type:	Other Non-NPDWR Potential Health Risks		
Contaminant:	7500		
Compliance Period:	11/20/2005 0:00:00 - 12/31/2025 0:00:00		
Violation ID:	2249506		
Enforcement Date:	4/12/2007 0:00:00	Enf. Action:	Not Reported
System Name:	BURNETTS UNITED METH CHURCH		
Violation Type:	Other Non-NPDWR Potential Health Risks		
Contaminant:	7500		
Compliance Period:	11/20/2005 0:00:00 - 12/31/2025 0:00:00		
Violation ID:	2249506		
Enforcement Date:	No Enf Action as of	Enf. Action:	10/17/2006 0:00:00
System Name:	BURNETTS UNITED METH CHURCH		
Violation Type:	Other Non-NPDWR Potential Health Risks		
Contaminant:	7500		
Compliance Period:	2/16/2005 0:00:00 - 12/31/2025 0:00:00		
Violation ID:	3623205		
Enforcement Date:	4/12/2007 0:00:00	Enf. Action:	Not Reported

CONTACT INFORMATION:

Name:	BURNETTS UNITED METH CHURCH	Population:	25
Contact:	WHITE, JIMMY	Phone:	Not Reported
Address:	1957 BURNETT CH RD		
Address 2:	GRAHAM		
	NC, 27 336-3		

GEOCHECK® - PHYSICAL SETTING SOURCE MAP FINDINGS

Map ID
Direction
Distance

Database | EDR ID Number

NC_SNHA **NC10002696**

Site Name:	MAJOR HILL MONADNOCK
Quality:	Not Reported
Acres per Polygon:	327.21

GEOCHECK® - PHYSICAL SETTING SOURCE MAP FINDINGS
RADON

AREA RADON INFORMATION

Federal EPA Radon Zone for ALAMANCE County: 3

Note: Zone 1 indoor average level > 4 pCi/L.
: Zone 2 indoor average level >= 2 pCi/L and <= 4 pCi/L.
: Zone 3 indoor average level < 2 pCi/L.

Federal Area Radon Information for ALAMANCE COUNTY, NC

Number of sites tested: 11

Area	Average Activity	% <4 pCi/L	% 4-20 pCi/L	% >20 pCi/L
Living Area - 1st Floor	0.527 pCi/L	100%	0%	0%
Living Area - 2nd Floor	Not Reported	Not Reported	Not Reported	Not Reported
Basement	Not Reported	Not Reported	Not Reported	Not Reported

PHYSICAL SETTING SOURCE RECORDS SEARCHED

TOPOGRAPHIC INFORMATION

USGS 7.5' Digital Elevation Model (DEM)
Source: United States Geologic Survey
EDR acquired the USGS 7.5' Digital Elevation Model in 2002 and updated it in 2006. The 7.5 minute DEM corresponds to the USGS 1:24,000- and 1:25,000-scale topographic quadrangle maps. The DEM provides elevation data with consistent elevation units and projection.

Current USGS 7.5 Minute Topographic Map
Source: U.S. Geological Survey

HYDROLOGIC INFORMATION

Flood Zone Data: This data was obtained from the Federal Emergency Management Agency (FEMA). It depicts 100-year and 500-year flood zones as defined by FEMA. It includes the National Flood Hazard Layer (NFHL) which incorporates Flood Insurance Rate Map (FIRM) data and Q3 data from FEMA in areas not covered by NFHL.
Source: FEMA
Telephone: 877-336-2627
Date of Government Version: 2003, 2015

NWI: National Wetlands Inventory. This data, available in select counties across the country, was obtained by EDR in 2002, 2005 and 2010 from the U.S. Fish and Wildlife Service.

State Wetlands Data: Wetland Inventory
Source: US Fish & Wildlife Service
Telephone: 703-358-2171

HYDROGEOLOGIC INFORMATION

AQUIFLOW^{R} Information System
Source: EDR proprietary database of groundwater flow information
EDR has developed the AQUIFLOW Information System (AIS) to provide data on the general direction of groundwater flow at specific points. EDR has reviewed reports submitted to regulatory authorities at select sites and has extracted the date of the report, hydrogeologically determined groundwater flow direction and depth to water table information.

GEOLOGIC INFORMATION

Geologic Age and Rock Stratigraphic Unit
Source: P.G. Schruben, R.E. Arndt and W.J. Bawiec, Geology of the Conterminous U.S. at 1:2,500,000 Scale - A digital representation of the 1974 P.B. King and H.M. Beikman Map, USGS Digital Data Series DDS - 11 (1994).

STATSGO: State Soil Geographic Database
Source: Department of Agriculture, Natural Resources Conservation Service (NRCS)
The U.S. Department of Agriculture's (USDA) Natural Resources Conservation Service (NRCS) leads the national Conservation Soil Survey (NCSS) and is responsible for collecting, storing, maintaining and distributing soil survey information for privately owned lands in the United States. A soil map in a soil survey is a representation of soil patterns in a landscape. Soil maps for STATSGO are compiled by generalizing more detailed (SSURGO) soil survey maps.

SSURGO: Soil Survey Geographic Database
Source: Department of Agriculture, Natural Resources Conservation Service (NRCS)
Telephone: 800-672-5559
SSURGO is the most detailed level of mapping done by the Natural Resources Conservation Service, mapping scales generally range from 1:12,000 to 1:63,360. Field mapping methods using national standards are used to construct the soil maps in the Soil Survey Geographic (SSURGO) database. SSURGO digitizing duplicates the original soil survey maps. This level of mapping is designed for use by landowners, townships and county natural resource planning and management.

PHYSICAL SETTING SOURCE RECORDS SEARCHED

LOCAL / REGIONAL WATER AGENCY RECORDS

FEDERAL WATER WELLS

PWS: Public Water Systems
Source: EPA/Office of Drinking Water
Telephone: 202-564-3750
Public Water System data from the Federal Reporting Data System. A PWS is any water system which provides water to at least 25 people for at least 60 days annually. PWSs provide water from wells, rivers and other sources.

PWS ENF: Public Water Systems Violation and Enforcement Data
Source: EPA/Office of Drinking Water
Telephone: 202-564-3750
Violation and Enforcement data for Public Water Systems from the Safe Drinking Water Information System (SDWIS) after August 1995. Prior to August 1995, the data came from the Federal Reporting Data System (FRDS).

USGS Water Wells: USGS National Water Inventory System (NWIS)
This database contains descriptive information on sites where the USGS collects or has collected data on surface water and/or groundwater. The groundwater data includes information on wells, springs, and other sources of groundwater.

STATE RECORDS

North Carolina Public Water Supply Wells
Source: Department of Environmental Health
Telephone: 919-715-3243

OTHER STATE DATABASE INFORMATION

NC Natural Areas: Significant Natural Heritage Areas
Source: Center for Geographic Information and Analysis
Telephone: 919-733-2090
A polygon converage identifying sites (terrestrial or aquatic that have particular biodiversity significance. A site's significance may be due to the presenceof rare species, rare or hight quality natural communities, or other important ecological features.

NC Game Lands: Wildlife Resources Commission Game Lands
Source: Center for Geographic Information and Analysis
Telephone: 919-733-2090
All publicly owned game lands managed by the North Carolina Wildlife Resources Commission and as listed in Hunting and Fishing Maps.

NC Natural Heritage Sites: Natural Heritage Element Occurrence Sites
Source: Center for Geographic Information and Analysis
Telephone: 919-733-2090
A point coverage identifying locations of rare and endangered species, occurrences of exemplary or unique natural ecosystems (terrestrial or aquatic), and special animal habitats (e.g., colonial waterbird nesting sites).

RADON

State Database: NC Radon
Source: Department of Environment & Natural Resources
Telephone: 919-733-4984
Radon Statistical and Non Statiscal Data

Area Radon Information
Source: USGS
Telephone: 703-356-4020
The National Radon Database has been developed by the U.S. Environmental Protection Agency (USEPA) and is a compilation of the EPA/State Residential Radon Survey and the National Residential Radon Survey. The study covers the years 1986 - 1992. Where necessary data has been supplemented by information collected at private sources such as universities and research institutions.

PHYSICAL SETTING SOURCE RECORDS SEARCHED

EPA Radon Zones
Source: EPA
Telephone: 703-356-4020
Sections 307 & 309 of IRAA directed EPA to list and identify areas of U.S. with the potential for elevated indoor radon levels.

OTHER

Airport Landing Facilities: Private and public use landing facilities
Source: Federal Aviation Administration, 800-457-6656

Epicenters: World earthquake epicenters, Richter 5 or greater
Source: Department of Commerce, National Oceanic and Atmospheric Administration

Earthquake Fault Lines: The fault lines displayed on EDR's Topographic map are digitized quaternary faultlines, prepared in 1975 by the United State Geological Survey

STREET AND ADDRESS INFORMATION

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Appendix F
Financial Assurances

Per the NC EEP RFP #: 16-006990, Restoration Systems will provide financial assurance in one of the following forms:

1) Performance Bonding – The Offeror must provide security in the form of acceptable performance bonds as described in the following paragraph to guarantee delivery of the maximum number of originally contracted Mitigation Units. The performance bonds must be obtained from a company licensed in North Carolina as shown in the Federal Treasury Listing of Approved Sureties (Circular 570). The maximum allowable amount provided by a surety may not exceed the "underwriting limitation" for the surety as identified in the Federal Treasury Listing. Although this RFP is a request for mitigation and not construction, the performance bonds shall follow the prescribed wording provided in N.C.G.S. § 44A-33. The Offeror must provide two performance bonds. The first bond must be for 100% of the total value of the contract and must be in effect and submitted with the Task 3 deliverable (see Section 8. SCOPE OF WORK – Task 3) before EEP will authorize payment for that deliverable. The bond must remain in effect until the Offeror has received written notification from the EEP that the requirements of Task 6 (submittal of baseline monitoring report) have been met. After the successful completion of Task 6, the bond can be retired and a second bond must be substituted for the first. The second bond must be for 40% of the value of the contract, which covers the monitoring period. The Monitoring Phase Performance Bond can be reduced yearly concurrent with the payment schedule once the yearly deliverable is approved by EEP and credits are released by the IRT.

2) Letters of Credit- LOCs must be drawn from a reputable Bank identified by the FDIC as "Well Capitalized" or "Adequately Capitalized" and follow the submittal timing, contract amounts and schedules for reduction as those described above for the performance bonds. Evergreen or irrevocable Letters of Credit shall be required to provide a 120 day notice of cancellation, termination or non-renewal.

3) Casualty Insurance on underlying performance of Credits or Units of Restoration – Must follow the same submittal timing, contract amounts and reduction schedules as those described above in performance bonds. The insurance must contain the following information.
    a) The "NC DENR" must be named as the "Regulatory Body". NC DENR shall have the sole right to place a claim against the policy. NC DENR shall have the sole right and obligation as the responsible "regulatory body" to approve any claim settlement.
    b) Initial insurance must be for a 10 year period.

The process of evaluating these options is underway. Once obtained, RS will provide digital and hard copies of the assurance of distribution to IRT members.

Appendix G
Site Protection Instrument

STATE OF NORTH CAROLINA

DEED OF CONSERVATION EASEMENT AND RIGHT OF ACCESS PROVIDED PURSUANT TO FULL DELIVERY MITIGATION CONTRACT

_____ COUNTY

SPO File Number:
DMS Project Number:

Prepared by: Office of the Attorney General
Property Control Section
Return to: NC Department of Administration
State Property Office
1321 Mail Service Center
Raleigh, NC 27699-1321

THIS DEED OF CONSERVATION EASEMENT AND RIGHT OF ACCESS, made this _____day of _____, 20__, by _____ *Landowner name goes here* , ("**Grantor**"), whose mailing address is _____ *Landowner address goes here* _____, to the State of North Carolina, ("**Grantee**"), whose mailing address is State of North Carolina, Department of Administration, State Property Office, 1321 Mail Service Center, Raleigh, NC 27699-1321. The designations of Grantor and Grantee as used herein shall include said parties, their heirs, successors, and assigns, and shall include singular, plural, masculine, feminine, or neuter as required by context.

WITNESSETH:

WHEREAS, pursuant to the provisions of N.C. Gen. Stat. § 143-214.8 et seq., the State of North Carolina has established the Division of Mitigation Services (formerly known as the Ecosystem Enhancement Program and Wetlands Restoration Program) within the Department of Environment and Natural Resources for the purposes of acquiring, maintaining, restoring, enhancing, creating and preserving wetland and riparian resources that contribute to the

protection and improvement of water quality, flood prevention, fisheries, aquatic habitat, wildlife habitat, and recreational opportunities; and

WHEREAS, this Conservation Easement from Grantor to Grantee has been negotiated, arranged and provided for as a condition of a full delivery contract between *(insert name and address of full delivery contract provider)* and the North Carolina Department of Environmental Quality, to provide stream, wetland and/or buffer mitigation pursuant to the North Carolina Department of Environmental Quality Purchase and Services Contract Number _____.

WHEREAS, The State of North Carolina is qualified to be the Grantee of a Conservation Easement pursuant to N.C. Gen. Stat. § 121-35; and

WHEREAS, the Department of Environment and Natural Resources and the United States Army Corps of Engineers, Wilmington District entered into a Memorandum of Understanding, (MOU) duly executed by all parties on November 4, 1998. This MOU recognized that the Wetlands Restoration Program was to provide effective compensatory mitigation for authorized impacts to wetlands, streams and other aquatic resources by restoring, enhancing and preserving the wetland and riparian areas of the State; and

WHEREAS, the Department of Environment and Natural Resources, the North Carolina Department of Transportation and the United States Army Corps of Engineers, Wilmington District entered into a Memorandum of Agreement, (MOA) duly executed by all parties in Greensboro, NC on July 22, 2003, which recognizes that the Division of Mitigation Services (formerly Ecosystem Enhancement Program) is to provide for compensatory mitigation by effective protection of the land, water and natural resources of the State by restoring, enhancing and preserving ecosystem functions; and

WHEREAS, the Department of Environment and Natural Resources, the U.S. Army Corps of Engineers, the U.S. Environmental Protection Agency, the U.S. Fish and Wildlife Service, the North Carolina Wildlife Resources Commission, the North Carolina Division of Water Quality, the North Carolina Division of Coastal Management, and the National Marine Fisheries Service entered into an agreement to continue the In-Lieu Fee operations of the North Carolina Department of Natural Resources' Division of Mitigation Services (formerly Ecosystem Enhancement Program) with an effective date of 28 July, 2010, which supersedes and replaces the previously effective MOA and MOU referenced above; and

WHEREAS, the acceptance of this instrument for and on behalf of the State of North Carolina was granted to the Department of Administration by resolution as approved by the Governor and Council of State adopted at a meeting held in the City of Raleigh, North Carolina, on the 8th day of February 2000; and

WHEREAS, the Division of Mitigation Services in the Department of Environmental Quality, which has been delegated the authority authorized by the Governor and Council of State to the Department of Administration, has approved acceptance of this instrument; and

WHEREAS, Grantor owns in fee simple certain real property situated, lying, and being in _____ Township, _____ County, North Carolina (the "**Property**"), and being more particularly described as that certain parcel of land containing approximately _____ acres and being conveyed to the Grantor by deed as recorded in **Deed Book _____ at Page ____** of the _____ County Registry, North Carolina; and

WHEREAS, Grantor is willing to grant a Conservation Easement and Right of Access over the herein described areas of the Property, thereby restricting and limiting the use of the areas of the Property subject to the Conservation Easement to the terms and conditions and purposes hereinafter set forth, and Grantee is willing to accept said Easement and Access Rights. The Conservation Easement shall be for the protection and benefit of the waters of ***if known, insert name of stream, branch, river or waterway here***.

NOW, THEREFORE, in consideration of the mutual covenants, terms, conditions, and restrictions hereinafter set forth, Grantor unconditionally and irrevocably hereby grants and conveys unto Grantee, its successors and assigns, forever and in perpetuity, a Conservation Easement along with a general Right of Access.

The Conservation Easement Area consists of the following:

Tracts Number _____ containing a total of _____ **acres** as shown on the plats of survey entitled "Final Plat, Conservation Easement for North Carolina Division of Mitigation Services, Project Name: _____, SPO File No._____, EEP Site No. _____, Property of _____," dated _____, 20__ by *name of surveyor*, PLS Number _____ and recorded in the _____ County, North Carolina Register of Deeds at **Plat Book _____ Pages _____.**

See attached "**Exhibit A**", Legal Description of area of the Property hereinafter referred to as the "Conservation Easement Area"

The purposes of this Conservation Easement are to maintain, restore, enhance, construct, create and preserve wetland and/or riparian resources in the Conservation Easement Area that contribute to the protection and improvement of water quality, flood prevention, fisheries, aquatic habitat, wildlife habitat, and recreational opportunities; to maintain permanently the Conservation Easement Area in its natural condition, consistent with these purposes; and to prevent any use of the Easement Area that will significantly impair or interfere with these purposes. To achieve these purposes, the following conditions and restrictions are set forth:

I. DURATION OF EASEMENT

Pursuant to law, including the above referenced statutes, this Conservation Easement and Right of Access shall be perpetual and it shall run with, and be a continuing restriction upon the use of, the Property, and it shall be enforceable by the Grantee against the Grantor and against Grantor's heirs, successors and assigns, personal representatives, agents, lessees, and licensees.

II. GRANTOR RESERVED USES AND RESTRICTED ACTIVITIES

The Conservation Easement Area shall be restricted from any development or usage that would impair or interfere with the purposes of this Conservation Easement. Unless expressly reserved as a compatible use herein, any activity in, or use of, the Conservation Easement Area by the Grantor is prohibited as inconsistent with the purposes of this Conservation Easement. Any rights not expressly reserved hereunder by the Grantor have been acquired by the Grantee. Any rights not expressly reserved hereunder by the Grantor, including the rights to all mitigation credits, including, but not limited to, stream, wetland, and riparian buffer mitigation units, derived from each site within the area of the Conservation Easement, are conveyed to and belong to the Grantee. Without limiting the generality of the foregoing, the following specific uses are prohibited, restricted, or reserved as indicated:

A. Recreational Uses. Grantor expressly reserves the right to undeveloped recreational uses, including hiking, bird watching, hunting and fishing, and access to the Conservation Easement Area for the purposes thereof.

B. Motorized Vehicle Use. Motorized vehicle use in the Conservation Easement Area is prohibited except within a Crossing Area(s) or Road or Trail as shown on the recorded survey plat**.**

C. Educational Uses. The Grantor reserves the right to engage in and permit others to engage in educational uses in the Conservation Easement Area not inconsistent with this Conservation Easement, and the right of access to the Conservation Easement Area for such purposes including organized educational activities such as site visits and observations. Educational uses of the property shall not alter vegetation, hydrology or topography of the site.

D. **Damage to Vegetation.** Except within Crossing Area(s) as shown on the recorded survey plat and as related to the removal of non-native plants, diseased or damaged trees, or vegetation that destabilizes or renders unsafe the Conservation Easement Area to persons or natural habitat, all cutting, removal, mowing, harming, or destruction of any trees and vegetation in the Conservation Easement Area is prohibited.

E. Industrial, Residential and Commercial Uses. All industrial, residential and commercial uses are prohibited in the Conservation Easement Area.

F. Agricultural Use. All agricultural uses are prohibited within the Conservation Easement Area including any use for cropland, waste lagoons, or pastureland.

G. New Construction. There shall be no building, facility, mobile home, antenna, utility pole, tower, or other structure constructed or placed in the Conservation Easement Area.

H. **Roads and Trails.** There shall be no construction or maintenance of new roads, trails, walkways, or paving in the Conservation Easement.

All existing roads, trails and crossings within the Conservation Easement Area shall be shown on the recorded survey plat.

I. Signs. No signs shall be permitted in the Conservation Easement Area except interpretive signs describing restoration activities and the conservation values of the Conservation Easement Area, signs identifying the owner of the Property and the holder of the Conservation Easement, signs giving directions, or signs prescribing rules and regulations for the use of the Conservation Easement Area.

J. Dumping or Storing. Dumping or storage of soil, trash, ashes, garbage, waste, abandoned vehicles, appliances, machinery, or any other material in the Conservation Easement Area is prohibited.

K. Grading, Mineral Use, Excavation, Dredging. There shall be no grading, filling, excavation, dredging, mining, drilling, hydraulic fracturing; removal of topsoil, sand, gravel, rock, peat, minerals, or other materials.

L. Water Quality and Drainage Patterns. There shall be no diking, draining, dredging, channeling, filling, leveling, pumping, impounding or diverting, causing, allowing or permitting the diversion of surface or underground water in the Conservation Easement Area. No altering or tampering with water control structures or devices, or disruption or alteration of the restored, enhanced, or created drainage patterns is allowed. All removal of wetlands, polluting or discharging into waters, springs, seeps, or wetlands, or use of pesticide or biocides in the Conservation Easement Area is prohibited. In the event of an emergency interruption or shortage of all other water sources, water from within the Conservation Easement Area may temporarily be withdrawn for good cause shown as needed for the survival of livestock on the Property.

M. Subdivision and Conveyance. Grantor voluntarily agrees that no further subdivision, partitioning, or dividing of the Conservation Easement Area portion of the Property owned by the Grantor in fee simple ("fee") that is subject to this Conservation Easement is allowed. Any future transfer of the Property shall be subject to this Conservation Easement and Right of Access and to the Grantee's right of unlimited and repeated ingress and egress over and across the Property to the Conservation Easement Area for the purposes set forth herein.

N. Development Rights. All development rights are permanently removed from the Conservation Easement Area and are non-transferrable.

O. Disturbance of Natural Features. Any change, disturbance, alteration or impairment of the natural features of the Conservation Easement Area or any intentional introduction of non-native plants, trees and/or animal species by Grantor is prohibited.

The Grantor may request permission to vary from the above restrictions for good cause shown, provided that any such request is not inconsistent with the purposes of this Conservation Easement, and the Grantor obtains advance written approval from the Division of Mitigation Services, 1652 Mail Services Center, Raleigh, NC 27699-1652.

III. GRANTEE RESERVED USES

A. Right of Access, Construction, and Inspection. The Grantee, its employees and agents, successors and assigns, receive a perpetual Right of Access to the Conservation Easement Area over the Property at reasonable times to undertake any activities on the property to restore, construct, manage, maintain, enhance, protect, and monitor the stream, wetland and any other riparian resources in the Conservation Easement Area, in accordance with restoration activities or a long-term management plan. Unless otherwise specifically set forth in this Conservation Easement, the rights granted herein do not include or establish for the public any access rights.

B. Restoration Activities. These activities include planting of trees, shrubs and herbaceous vegetation, installation of monitoring wells, utilization of heavy equipment to grade, fill, and prepare the soil, modification of the hydrology of the site, and installation of natural and manmade materials as needed to direct in-stream, above ground, and subterraneous water flow.

C. Signs. The Grantee, its employees and agents, successors or assigns, shall be permitted to place signs and witness posts on the Property to include any or all of the following: describe the project, prohibited activities within the Conservation Easement, or identify the project boundaries and the holder of the Conservation Easement.

D. Fences. Conservation Easements are purchased to protect the investments by the State (Grantee) in natural resources. Livestock within conservations easements damages the investment and can result in reductions in natural resource value and mitigation credits which would cause financial harm to the State. Therefore, Landowners (Grantor) with livestock are required to restrict livestock access to the Conservation Easement area. Repeated failure to do so may result in the State (Grantee) repairing or installing livestock exclusion devices (fences) within the conservation area for the purpose of restricting livestock access. In such cases, the landowner (Grantor) must provide access to the State (Grantee) to make repairs.

E. Crossing Area(s). The Grantee is not responsible for maintenance of crossing area(s), however, the Grantee, its employees and agents, successors or assigns, reserve the right to repair crossing area(s), at its sole discretion and to recover the cost of such repairs from the Grantor if such repairs are needed as a result of activities of the Grantor, his successors or assigns.

IV. ENFORCEMENT AND REMEDIES

A. Enforcement. To accomplish the purposes of this Conservation Easement, Grantee is allowed to prevent any activity within the Conservation Easement Area that is inconsistent with the purposes of this Conservation Easement and to require the restoration of such areas or features in the Conservation Easement Area that may have been damaged by such unauthorized activity or use. Upon any breach of the terms of this Conservation Easement by Grantor, the Grantee shall, except as provided below, notify the Grantor in writing of such breach and the Grantor shall have ninety (90) days after receipt of such notice to correct the damage caused by such breach. If the breach and damage remains uncured after ninety (90) days, the Grantee may enforce this Conservation Easement by bringing appropriate legal proceedings including an action to recover damages, as well as injunctive and other relief. The Grantee shall also have the

power and authority, consistent with its statutory authority: (a) to prevent any impairment of the Conservation Easement Area by acts which may be unlawful or in violation of this Conservation Easement; (b) to otherwise preserve or protect its interest in the Property; or (c) to seek damages from any appropriate person or entity. Notwithstanding the foregoing, the Grantee reserves the immediate right, without notice, to obtain a temporary restraining order, injunctive or other appropriate relief, if the breach is or would irreversibly or otherwise materially impair the benefits to be derived from this Conservation Easement, and the Grantor and Grantee acknowledge that the damage would be irreparable and remedies at law inadequate. The rights and remedies of the Grantee provided hereunder shall be in addition to, and not in lieu of, all other rights and remedies available to Grantee in connection with this Conservation Easement.

B. Inspection. The Grantee, its employees and agents, successors and assigns, have the right, with reasonable notice, to enter the Conservation Easement Area over the Property at reasonable times for the purpose of inspection to determine whether the Grantor is complying with the terms, conditions and restrictions of this Conservation Easement.

C. Acts Beyond Grantor's Control. Nothing contained in this Conservation Easement shall be construed to entitle Grantee to bring any action against Grantor for any injury or change in the Conservation Easement Area caused by third parties, resulting from causes beyond the Grantor's control, including, without limitation, fire, flood, storm, and earth movement, or from any prudent action taken in good faith by the Grantor under emergency conditions to prevent, abate, or mitigate significant injury to life or damage to the Property resulting from such causes.

D. Costs of Enforcement. Beyond regular and typical monitoring expenses, any costs incurred by Grantee in enforcing the terms of this Conservation Easement against Grantor, including, without limitation, any costs of restoration necessitated by Grantor's acts or omissions in violation of the terms of this Conservation Easement, shall be borne by Grantor.

E. No Waiver. Enforcement of this Easement shall be at the discretion of the Grantee and any forbearance, delay or omission by Grantee to exercise its rights hereunder in the event of any breach of any term set forth herein shall not be construed to be a waiver by Grantee.

V. MISCELLANEOUS

A. This instrument sets forth the entire agreement of the parties with respect to the Conservation Easement and supersedes all prior discussions, negotiations, understandings or agreements relating to the Conservation Easement. If any provision is found to be invalid, the remainder of the provisions of the Conservation Easement, and the application of such provision to persons or circumstances other than those as to which it is found to be invalid, shall not be affected thereby.

B. Grantor is responsible for any real estate taxes, assessments, fees, or charges levied upon the Property. Grantee shall not be responsible for any costs or liability of any kind related to the ownership, operation, insurance, upkeep, or maintenance of the Property, except as expressly provided herein. Upkeep of any constructed bridges, fences, or other amenities on the Property are the sole responsibility of the Grantor. Nothing herein shall relieve the Grantor of the

obligation to comply with federal, state or local laws, regulations and permits that may apply to the exercise of the Reserved Rights.

C. Any notices shall be sent by registered or certified mail, return receipt requested to the parties at their addresses shown herein or to other addresses as either party establishes in writing upon notification to the other.

D. Grantor shall notify Grantee in writing of the name and address and any party to whom the Property or any part thereof is to be transferred at or prior to the time said transfer is made. Grantor further agrees that any subsequent lease, deed, or other legal instrument by which any interest in the Property is conveyed is subject to the Conservation Easement herein created.

E. The Grantor and Grantee agree that the terms of this Conservation Easement shall survive any merger of the fee and easement interests in the Property or any portion thereof.

F. This Conservation Easement and Right of Access may be amended, but only in writing signed by all parties hereto, or their successors or assigns, if such amendment does not affect the qualification of this Conservation Easement or the status of the Grantee under any applicable laws, and is consistent with the purposes of the Conservation Easement. The owner of the Property shall notify the State Property Office and the U.S. Army Corps of Engineers in writing sixty (60) days prior to the initiation of any transfer of all or any part of the Property or of any request to void or modify this Conservation Easement. Such notifications and modification requests shall be addressed to:

Division of Mitigation Services Program Manager
NC State Property Office
1321 Mail Service Center
Raleigh, NC 27699-1321

and

General Counsel
US Army Corps of Engineers
69 Darlington Avenue
Wilmington, NC 28403

G. The parties recognize and agree that the benefits of this Conservation Easement are in gross and assignable provided, however, that the Grantee hereby covenants and agrees, that in the event it transfers or assigns this Conservation Easement, the organization receiving the interest will be a qualified holder under N.C. Gen. Stat. § 121-34 et seq. and § 170(h) of the Internal Revenue Code, and the Grantee further covenants and agrees that the terms of the transfer or assignment will be such that the transferee or assignee will be required to continue in perpetuity the conservation purposes described in this document.

VI. QUIET ENJOYMENT

Grantor reserves all remaining rights accruing from ownership of the Property, including the right to engage in or permit or invite others to engage in only those uses of the Conservation Easement Area that are expressly reserved herein, not prohibited or restricted herein, and are not inconsistent with the purposes of this Conservation Easement. Without limiting the generality of the foregoing, the Grantor expressly reserves to the Grantor, and the Grantor's invitees and licensees, the right of access to the Conservation Easement Area, and the right of quiet enjoyment of the Conservation Easement Area,

TO HAVE AND TO HOLD, the said rights and easements perpetually unto the State of North Carolina for the aforesaid purposes,

AND Grantor covenants that Grantor is seized of said premises in fee and has the right to convey the permanent Conservation Easement herein granted; that the same is free from encumbrances and that Grantor will warrant and defend title to the same against the claims of all persons whomsoever.

IN TESTIMONY WHEREOF, the Grantor has hereunto set his hand and seal, the day and year first above written.

_____ (SEAL)

NORTH CAROLINA
COUNTY OF _____

I, _____, a Notary Public in and for the County and State aforesaid, do hereby certify that _____, Grantor, personally appeared before me this day and acknowledged the execution of the foregoing instrument.

IN WITNESS WHEREOF, I have hereunto set my hand and Notary Seal this the _____ day of _____, 20__.

_____
Notary Public

My commission expires:

_____

Exhibit A

[INSERT LEGAL DESCRIPTION]

Appendix H
Credit Release Schedule

Table 3 – Schedule of Monitoring Events

Monitoring Event	Monitoring Activities Required	
	Streams	**Wetlands**
Pre-Construction	• Water Quality (Section VII(A)) • Macroinvertebrate & Fish (Section VII(B-C))*	• Per Mitigation Plan
Year 0 (As-Built)	• As-built Survey (includes longitudinal profile and sampling point locations)	• As-built Survey
Year 1	• Vegetation (Section V) • Stream Channel Stability/Hydrology (Section VI) • Water Quality (Section VII(A))* • Visual, two times (Section X)	• Vegetation (Section V) • Wetland Hydrology (Section IX) • Visual, two times (Section X)
Year 2	• Vegetation (Section V) • Stream Channel Stability/Hydrology (Section VI) • Water Quality (Section VII(A))* • Visual, two times (Section X)	• Vegetation (Section V) • Wetland Hydrology (Section IX) • Visual, two times (Section X)
Year 3	• Vegetation (Section V) • Stream Channel Stability/Hydrology (Section VI) • Water Quality (Section VII(A))* • Macroinvertebrate & Fish (Section VII(B-C))* • Visual, two times (Section X)	• Vegetation (Section V) • Wetland Hydrology (Section IX) • Visual, two times (Section X)
Year 4	• Water Quality (Section VII(A)) * • Visual, two times (Section X)	• Visual (Section X) • Wetland Hydrology (Section IX)
Year 5	• Vegetation (Section V) • Stream Channel Stability/Hydrology (Section VI) • Water Quality (Section VII(A)) * • Macroinvertebrate & Fish (Section VII(B-C)) * • Visual, two times (Section X)	• Vegetation (Section V) • Wetland Hydrology (Section IX) • Visual, two times (Section X)
Year 6	• Water Quality (Section VII(A)) * • Visual, two times (Section X)	• Wetland Hydrology (Section IX) • Visual, two times (Section X)
Year 7	• Vegetation (Section V) • Stream Channel Stability/Hydrology (Section VI) • Water Quality (Section VII(A)) * • Macroinvertebrate & Fish (Section VII(B-C)) * • Visual, two times (Section X)	• Vegetation (Section V) • Wetland Hydrology (Section IX) • Visual, two times (Section X)

*Indicates optional monitoring activities

XIV. Credit Release Schedules

The standard release schedule for mitigation bank and ILF credits generated through stream and wetland mitigation projects has been modified to meet the new standards for the monitoring timeframes provided in this guidance document. For mitigation banks, the first credit release (15% of the bank's total stream restoration and/or enhancement credits) will occur upon establishment of the mitigation bank, and upon completion following criteria:

1) Execution of the MBI or UMBI by the Sponsor and the USACE
2) Approval of the final Mitigation Plan

3) The mitigation bank site must be secured
4) Delivery of the financial assurances described in the Mitigation Plan
5) Recordation of the long-term protection mechanism and title opinion acceptable to the USACE
6) Issuance of the 404 permit verification for construction of the site, if required.

For mitigation sites that include preservation-only credits, 100% of the preservation credits will be released with the completion of the six criteria stated above.

For ILF sites (including all NCDMS projects), no initial release of credits (Milestone 1) is provided because ILF programs utilized advance credits, so no initial release is necessary to help fund site construction. To account for this, the 15% credit release associated with the first milestone (bank establishment) is held until the second milestone, so that the total credits release at the second milestone is 30%. In order for NCDMS to receive the 30% release (shown in the schedules as Milestone 2), they must comply with the credit release requirements stated in Section IV(I)(3) of the approved NCDMS Instrument.

The following conditions apply to the credit release schedules:

A. A reserve of 10% of a site's total stream credits will 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 four bankfull events occur during the monitoring period, release of these reserve credits is at the discretion of the NCIRT.

B. For mitigation banks, implementation of the approved Mitigation Plan must be initiated no later than the first full growing season after the date of the first credit transaction (credit sale).

C. After the second milestone, the credit releases are scheduled to occur on an annual basis, assuming that the annual monitoring report has been provided to the USACE in accordance with Section IV (General Monitoring Requirements) of this document, and that the monitoring report demonstrates that interim performance standards are being met and that no other concerns have been identified on-site during the visual monitoring. All credit releases require written approval from the USACE.

D. The credits associated with the final credit release milestone will be released only upon a determination by the USACE, in consultation with the NCIRT, of functional success as defined in the Mitigation Plan.

The schedules below list the updated credit release schedules for stream and wetland mitigation projects developed by bank and ILF sites in North Carolina:

Credit Release Schedule and Milestones for Wetlands					
Credit Release Milestone	Release Activity	Banks		ILF/NCDMS	
		Interim Release	Total Released	Interim Release	Total Released
1	Site Establishment (includes all required criteria stated above)	15%	15%	0%	0%
2	Completion of all initial physical and biological improvements made pursuant to the Mitigation Plan	15%	30%	30%	30%
3	Year 1 monitoring report demonstrates that interim performance standards have been met	10%	40%	10%	40%
4	Year 2 monitoring report demonstrates that interim performance standards have been met	10%	50%	10%	50%
5	Year 3 monitoring report demonstrates that interim performance standards have been met	15%	65%	15%	65%
6*	Year 4 monitoring report demonstrates that interim performance standards have been met	5%	70%	5%	70%
7	Year 5 monitoring report demonstrates that interim performance standards have been met	15%	85%	15%	85%
8*	Year 6 monitoring report demonstrates that interim performance standards have been met	5%	90%	5%	90%
9	Year 7 monitoring report demonstrates that performance standards have been met	10%	100%	10%	100%

*Please note that vegetation plot 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.

Credit Release Schedule and Milestones for Coastal Marsh Wetlands					
Credit Release Milestone	Release Activity	Banks		ILF/NCDMS	
		Interim Release	Total Released	Interim Release	Total Released
1	Site Establishment (includes all required criteria stated above)	15%	15%	0%	0%
2	Completion of all initial physical and biological improvements made pursuant to the Mitigation Plan	15%	30%	30%	30%
3	Year 1 monitoring report demonstrates that interim performance standards have been met	10%	40%	10%	40%
4	Year 2 monitoring report demonstrates that interim performance standards have been met	15%	55%	15%	55%
5	Year 3 monitoring report demonstrates that interim performance standards have been met	20%	75%	20%	75%
6	Year 4 monitoring report demonstrates that interim performance standards have been met	10%	85%	10%	85%
7	Year 5 monitoring report demonstrates that performance standards have been met	15%	100%	15%	100%

Credit Release Schedule and Milestones for Streams					
Credit Release Milestone	Release Activity	Banks		ILF/NCDMS	
		Interim Release	Total Released	Interim Release	Total Released
1	Site Establishment (includes all required criteria stated above)	15%	15%	0%	0%
2	Completion of all initial physical and biological improvements made pursuant to the Mitigation Plan	15%	30%	30%	30%
3	Year 1 monitoring report demonstrates that channels are stable and interim performance standards have been met	10%	40%	10%	40%
4	Year 2 monitoring report demonstrates that channels are stable and interim performance standards have been met	10%	50%	10%	50%
5	Year 3 monitoring report demonstrates that channels are stable and interim performance standards have been met	10%	60%	10%	60%
6*	Year 4 monitoring report demonstrates that channels are stable and interim performance standards have been met	5%	65% (75%**)	5%	65% (75%**)
7	Year 5 monitoring report demonstrates that channels are stable and interim performance standards have been met	10%	75% (85%**)	10%	75% (85%**)
8*	Year 6 monitoring report demonstrates that channels are stable and interim performance standards have been met	5%	80% (90%**)	5%	80% (90%**)
9	Year 7 monitoring report demonstrates that channels are stable, performance standards have been met	10%	90% (100%**)	10%	90% (100%**)

*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.

**10% reserve of credits to be held back until the bankfull event performance standard has been met.

Appendix I
Maintenance Plan

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 years following site construction and may include the following:

Component/Feature	**Maintenance through project close-out**
Stream	Routine channel maintenance and repair activities may include securing of loose coir matting and supplemental installations of live stakes and other target vegetation along the channel. Areas where stormwater and floodplain flows intercept the channel may also require maintenance to prevent bank failures and head-cutting.
Vegetation	Vegetation shall be maintained to ensure the health and vigor of the targeted plant 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.
Beaver	Beaver and associated dams are to be removed as they colonize and until the project is closed.
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.
Road Crossing	Road crossings within the site may be maintained only as allowed by Conservation Easement or existing easement, deed restrictions, rights of way, or corridor agreements.
Terracell Drop Structure	Routine maintenance and repair activities may include removal of debris and supplemental installation of live stakes and other target vegetation along the channel. Undermining of the structure may require repair or replacement.

Appendix J
Quantifying Benefits to Water Quality from Livestock Exclusion and Riparian Buffer Establishment for Stream Restoration (NCDMS 2016)

Quantifying Benefits to Water Quality from Livestock Exclusion and Riparian Buffer Establishment for Stream Restoration
June 15, 2016

When a stream restoration project is proposed in areas with grazing and/or row crops, water quality improvements from buffer restoration and livestock exclusion is always noted and emphasized by providers. The 2014 Monitoring Guidance and the 2015 Mitigation Plan Guidance both require that all claims for improvement be measureable. In the case of establishment of buffer and/or cattle exclusion, the performance standards and monitoring rarely include measurement. For the functional uplift associated with these water quality issues to be fully recognized, quantification of nutrient and/or fecal coliform reductions related to loading and filtering is required (see supplement document "Fecal Coliform Attenuation by Riparian Buffers" for more information). Using simple tools, these reductions can be estimated and included in the mitigation plan goals, monitoring plan and performance standards. NC Division of Mitigation Services (DMS) requires the use of the simple equations below to estimate reduction in nutrient and/or bacteria loading associated with restoring riparian buffers. These equations are applicable for a minimum width of 50ft riparian buffers and/or cattle exclusion (50ft from top of bank). Other innovative and alternative quantification tools can be submitted to DMS for consideration and approval.

Estimating Nutrients (Total Nitrogen and Total Phosphorus) Reduction

Agriculture (Row Crops): The annual rate of nutrient removal can be calculated by using "NC Division of Water Quality – Methodology and Calculation (1998) for determining nutrient reductions associated with Riparian Buffer Establishment.". Under this methodology, one acre of restored riparian buffer area adjacent to row crop fields removes 75.77 lbs of total nitrogen (TN) and 4.88 lbs of total phosphorus (TP) annually.

Nutrient Reduction from Buffer Adjacent to Agricultural Fields
TN reduction (lbs/yr) = 75.77 (lbs/ac/yr) x Area (ac)
TP reduction (lbs/yr) = 4.88 (lbs/ac/yr) x Area (ac)

Where:

TN – total nitrogen;
TP – total phosphorus; and
Area – total area of restored riparian buffers adjacent to agricultural fields.

Cattle Exclusion (Grazing Pasture) : It is estimated that one acre of livestock exclusion areas removes 51.04 lbs of total nitrogen (TN) and 4.23 lbs of total phosphorus (TP) annually.

TN reduction (lbs/yr) = 51.04 (lbs/ac/yr) x Area (ac)
TP reduction (lbs/yr) = 4.23 (lbs/ac/yr) x Area (ac)

Where:

TN – total nitrogen;
TP – total phosphorus; and
Area – total area of restored riparian buffers inside of livestock exclusion fences.

Estimating Fecal Coliform Reduction due to Livestock Exclusion

Human and animal waste contribute to aquatic degradation through the introduction of pathogenic microorganisms and concentrated organic matter contributing to the biochemical oxygen demand (BOD), thereby contributing to the reduction of oxygen levels in the water. Fecal coliform is used as an indicator of these pollution sources/stressors. Agricultural practices such as allowing livestock to graze near water bodies, spreading manure as fertilizer on fields during wet periods, and allowing livestock to water in streams can all contribute to fecal coliform contamination. Fecal coliform reduction can be estimated by quantifying the amount of fecal coliform that would no longer be directly deposited in the subject stream as a result of excluding livestock and by estimating the amount filtered out as a result of the restored buffer. The combination of both types of reduction is described in the equation:

Total Fecal Coliform Reduction (col) = Fecal Coliform Reduction from Direct Input + Fecal Coliform Reduction from Riparian Buffer Filtration

1. Estimating the Amount of Fecal Coliform Prevented from Entering Stream due to Livestock Exclusion (Fecal Coliform Reduction from Direct Input)

Fecal Coliform Reduction from Direct Input (col) = 2.2×10^{11} (col/AU/day) x AU x 0.085

Where:

Quantities of Fecal Coliform bacteria as numbers of colonies (col).
It is estimated that one animal unit (AU) of cattle produces 2.2×10^{11} colonies of fecal coliform bacteria per day on average.
An animal unit (AU) is one thousand pounds of livestock. It can be calculated by Combined weight of all livestock / 1000.
It is estimated that between 6.7 to 10% of fecal coliform bacteria are directly deposited into a stream if livestock are not excluded, and the water from the

stream is the only source of the drinking water for livestock. An average of 8.5% is used in the equation.

2. Estimating Fecal Coliform Reduction Due to Riparian Buffer Filtration (Fecal Coliform Reduction from Riparian Buffer Filtering)

Fecal Coliform Reduction from Buffer Filtration (col) = Runoff's fecal coliform concentration (col/gal) x Runoff volume (Gal) x 0.85

Common Fecal Coliform Concentration from Grazed Pasture

Livestock Operation	Fecal Coliform Concentration (col/gal)
Pastures under Continually Grazing Year-round	1.894×10^6
Pastures Grazed for Half of Year	3.295×10^5
Pastures Grazed for Two Months of Year	3.409×10^5

The volume of runoff from pastures can be estimated by using SCS runoff curve number (USDA Natural Resources Conservation Service).

$$Q = (P - 0.2S)^2 / (P + 0.8S)$$

$$S = (1000 / CN) - 10$$

Where:

Q – accumulated direct runoff (in);
P – accumulated rainfall (in);
S – Potential maximum retention; and
CN – the runoff curve number.

References

Buckhouse, John C., and Gerald F. Gifford. "Water quality implications of cattle grazing on a semiarid watershed in southeastern Utah." *Journal of Range Management* (1976): 109-113.

Coyne, M. S., et al. "Soil and fecal coliform trapping by grass filter strips during simulated rain." *Journal of Soil and Water Conservation* 50.4 (1995): 405-408.

Doran, John W., and D. M. Linn. "Bacteriological quality of runoff water from pastureland." *Applied and Environmental Microbiology* 37.5 (1979): 985-991.

Douglas-Mankin, Kyle R., and Cairo G. Okoren. "Field assessment of bacteria and nutrient removal by vegetative filter strips." *International Journal of Agricultural and Biological Engineering* 4.2 (2011): 43-49.

Edwards, D. R., B. T. Larson, and T. T. Lim. "RUNOFF NUTRIENT AND FECAL COLIFORM CONTENT FROM CATTLE MANURE APPLICATION TO FESCUE PLOTS1." (2000): 711-721.

Edwards, D. R., et al. "FECAL COLIFORM AND STREPTOCOCCUS CONCENTRATIONS IN RUNOFF FROM GRAZED PASTURES IN NORTHWEST ARKANSAS1." (1997): 413-422.

Fajardo, J. J., J. W. Bauder, and S. D. Cash. "Managing nitrate and bacteria in runoff from livestock confinement areas with vegetative filter strips." *Journal of Soil and Water Conservation* 56.3 (2001): 185-191.

Fox, Garey A., et al. "Load reduction from runoff by vegetative filter strips: a laboratory-scale study." *Journal of environmental quality* 40.3 (2011): 980-988.

Gary, Howard L., Steven R. Johnson, and Stanley L. Ponce. "Cattle grazing impact on surface water quality in a Colorado front range stream." *Journal of Soil and Water Conservation* 38.2 (1983): 124-128.

Howell, J. M., Mark S. Coyne, and P. Cornelius. "Fecal bacteria in agricultural waters of the bluegrass region of Kentucky." *Journal of Environmental Quality*24.3 (1995): 411-419.

Jawson, M. D., et al. "The effect of cattle grazing on indicator bacteria in runoff from a Pacific Northwest watershed." *Journal of Environmental Quality* 11.4 (1982): 621-627.

Larsen, Royce E., et al. "Water-quality benefits of having cattle manure deposited away from streams." *Bioresource Technology* 48.2 (1994): 113-118.

Lau, M. M., and S. C. Ingham. "Survival of faecal indicator bacteria in bovine manure incorporated into soil." *Letters in applied microbiology* 33.2 (2001): 131-136.

Lim, T. T., et al. "Vegetated filter strip removal of cattle manure constituents in runoff." *Transactions of the ASAE* 41.5 (1998): 1375-1381.

Lin, J. P. (2004). "Review of published export coefficient and event mean concentration (EMC) data," WRAP Technical Notes Collection (ERDC TN-WRAP-04-3), U.S. Army Engineer Research and Development Center, Vicksburg, MS.

Line, D. E. "Changes in a stream's physical and biological conditions following livestock exclusion." *Transactions of the ASAE* 46.2 (2003): 287-293.

Mankin, Kyle R., et al. "Field evaluation of vegetative filter effectiveness and runoff quality from unstocked feedlots." *Journal of soil and water conservation*61.4 (2006): 209-217.

NC Division of Water Quality (DWQ). 1998. NC DWQ – Methodology and Calculation for Determining Nutrient Reductions Associated with Riparian Buffer Establishment.

Roodsari, R. M., et al. "Fecal coliform transport as affected by surface condition." *Transactions of the ASAE* 48.3 (2005): 1055-1061.

Soupir, M. L., et al. "Transport of fecal bacteria from poultry litter and cattle manures applied to pastureland." *Water, Air, and Soil Pollution* 169.1-4 (2006): 125-136.

Tate, Kenneth W., et al. "Significant attenuation by vegetative buffers on annual grasslands." *Journal of Environmental Quality* 35.3 (2006): 795-805.

Appendix K

Riparian Buffer Mitigation Plan
(Haw River Arm of the Jordan Lake Watershed – Cape Fear 02)

RIPARIAN BUFFER MITIGATION PLAN
MAJOR HILL MITIGATION SITE
Alamance County, North Carolina

DMS Project ID No. 100015
Full Delivery Contract No. 7193
USACE Action ID No. SAW-2017-01472
RFP No. 16-006990

Cape Fear River Basin – Haw River Arm
Cataloging Unit 03030002

Prepared for:

NORTH CAROLINA DEPARTMENT OF ENVIRONMENTAL QUALITY
DIVISION OF MITIGATION SERVICES
1652 MAIL SERVICE CENTER
RALEIGH, NORTH CAROLINA 27699-1652

May 2018

This mitigation plan was written in conformance with the following:
North Carolina consolidated buffer mitigation rule 15A NCAC 02B .0295, effective November 1, 2015
and the Jordan Lake Buffer Protection Rule (15A NCAC 02B .0267 & 15A NCAC 02B .0268)

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1.0 MITIGATION PROJECT SUMMARY

The Site is located in the Carolina Slate Belt Ecoregion of the Piedmont Physiographic Province within Alamance County, North Carolina. Regional physiography is characterized by dissected irregular plains, some hills, linear ridges, isolated monadnocks, and low to moderate gradient streams with mostly boulder and cobble substrates (Griffith et al. 2002). Onsite elevations range from a high of 560 feet National Geodetic Vertical Datum (NGVD) to a low of approximately 480 feet NGVD (USGS Silk Hope, North Carolina 7.5-minute topographic quadrangle) (Figures 1 and 3, Appendix A).

The primary hydrologic features of the Site consist of three unnamed tributaries (UTs) to Pine Hill Branch. Site UT drainage areas range in size from 17.2 – 444.7 acres (0.001 – 0.70 square mile) (Figure 3, Appendix A).The Site drainage area is primarily composed of pasture, forest, agriculture land, and sparse residential property. Impervious surfaces account for less than five percent of the upstream land surface.

Site land use consists of pasture, hayfields, disturbed forest, and agricultural land used for livestock grazing and hay production. Livestock has unrestricted access to Site streams, and stream banks are eroded vertically and laterally and receive extensive sediment and nutrient inputs. Riparian zones in the upper reaches of UT 1 are primarily composed of herbaceous vegetation that is sparse and disturbed due to livestock grazing, bush hogging, and regular land-management activities. The downstream reaches of UT 1 and all of UT 3 is primarily wooded with livestock disturbance to stream channels. UT 2 is the lone tributary not subject to continuous, unrestricted livestock access. Immediate riparian areas adjacent to UT 2 are forested. An existing fence protects this area from livestock access.

The riparian areas will be restored in concurrence with the Major Hill Stream and Wetland Mitigation Site (NC DMS Project ID 10015, SAW-2017-01472) and will involve restoring riparian buffers adjacent to restored streams to help reduce non-point source contaminant discharges to downstream waters in the Haw River sub-watershed of Jordan Lake. All riparian areas were assessed by DWR (Katie Merritt and Sue Homewood) during an onsite visit February 20th, 2018 to determine viability for buffer mitigation (DWR Site Viability Letter, Attachment B). RS completed a DMS Categorical Exclusions Form was approved by the Donnie Brew (Preconstruction & Environment Engineer – Federal Highway Administration) on September 6th, 2017. The entire document is attached to the Major Hill Stream and Wetland Mitigation Plan as Appendix E.

The Site will be protected with a permanent conservation easement. Riparian restoration, enhancement, and preservation area widths adjacent to restored streams will extend out to a maximum of 200 feet from the top of stream banks with a minimum width of 50 from the top of banks. Riparian buffer enhancement and preservation credits generated on this Site are allowed pursuant to 15A NCAC 02B .0295 (o). No riparian restoration areas that are less than 20 feet wide from Top of Banks can be used to generate riparian buffer credit. Figure 6, Credit Determination Map and Section 2.1, provide details of the riparian buffer mitigation determination on the Site.

Riparian buffer mitigation credit will not be generated in areas that are generating wetland mitigation credit.

1.1 Project Location

The Major Hill Stream and Wetland Mitigation Site (hereafter referred to as the "Site") encompasses 16.7 acres of pasture and disturbed forest along warm water, unnamed tributaries to Pine Hill Branch. The Site is located approximately 3.5 miles southeast of Snow Camp and 6 miles north of Silk Hope in southern Alamance County near the Chatham County line (Figure 1, Attachment A).

1.2 Directions to Site

Directions to the Site from Raleigh, North Carolina.

- Take US-64 West out of Raleigh and travel 25 miles,
- Take exit 381 and turn right onto NC-87 N,
- After 5 miles, take a left onto Castle Rock Farm Road,
- After 5.8 miles, Castle Rock Farm Road becomes Old Switchboard Road,
- Continue for 2.1 miles, turn right onto Lindley Mill Road,
- After 0.5 mile, turn left onto Major Hill Road,
- The site can be accessed from Burnett Church Road, which is on the left after 1 mile.
    - Site Latitude, Longitude
      35.873206, -79.360906 (WGS84)

2.0 REGULATORY CONSIDERATIONS

Credit determination for a riparian restoration site follows North Carolina consolidated buffer mitigation rule 15A NCAC 02B .0295, effective November 1, 2015.

2.1 Determination of Credits

Table 1. Major Hill: Jordan Lake, Haw River Sub-Watershed, Credit Determination Table

Buffer Width/Zone	Credit Type	Total Area (Sq. Ft.)	Mitigation Ratio	% of Full Credit	RBM Units (in sq. ft.)
TOB - 100 ft.	Restoration	228,254	1:1	100%	228,254
101 - 200 ft.	Restoration (15A NCAC 02B .0295 (n)(1)	31,363	1:1	33%	10,349
TOB - 100 ft.	Enhancement via Cattle Exclusion (15A NCAC 02B .0295 (o)(6)	340,639	2:1	100%	170,319
TOB - 100 ft.	Preservation (Non-Subject Stream)(15A NCAC 02B .0295 (o)(4)	25,264	5:1	100%	5,052
101 - 200 ft.	Preservation (Non-Subject Stream)(15A NCAC 02B .0295 (o)(4)	2,613	5:1	33%	172
				Total Riparian Buffer Mitigation Units:	**414,146**

2.3 Permits

Implementation of the riparian buffer mitigation plan will be completed in conjuncture with the Major Hill Stream and Wetland Mitigation Plan. Permits required will be a 404 Nation Wide 27 permit and appropriate NC Division of Water Resources 401 certifications, as well as a NC Division of Land Quality Sediment and Erosion Control permit. Application for permits will begin upon approval of the said mitigation plans.

3.0 RIPARIAN RESTORATION, ENHANCEMENT, & PRESERVATION PLAN

This site is also being proposed as a stream and wetland mitigation project; therefore, restoration of riparian areas will be accomplished through the goals and methods outlined by the Major Hill Stream and Wetland Mitigation Plan. All applicable federal, state, and local documentation, permits, and/or authorizations will be acquired as part of implementing the above-mentioned mitigation plan. Primary goals focus on 1) improving water quality, 2) enhancing flood attenuation and hydrology, 3) improving aquatic resources, and 4) restoring riparian habitat. Proposed mitigation activities will provide floodplain connectivity, floodplain resistance, stream stability, sediment transport, surface and subsurface storage and retention, in-stream habitat, riparian habitat and structure, thermal regulation, floodplain biogeochemical processing, and pollutant filtration as well as remove sources of pollutants. The riparian area will be restored through the revegetation of native plant communities.

All riparian restoration activities will commence in concurrence with the stream mitigation activities and not before. Therefore, the mitigation area where riparian restoration is being performed may be altered slightly depending on the approval of the Stream Mitigation Plan. The riparian restoration areas will be surveyed and information provided in the As-Built report. Areas where existing mature vegetation will potentially be negatively impacted by stream restoration activities are not eligible for riparian buffer restoration credit; however, these areas are eligible for riparian buffer enhancement via cattle exclusion credit (Figure 6, Attachment A).

3.1 Riparian Area Restoration Activities

3.1.1 Natural Plant Community Restoration

Restoration of floodplain forest and stream-side habitat allows for development and expansion of characteristic species across the landscape. Ecotonal changes between community types contribute to diversity and provide secondary benefits, such as enhanced feeding and nesting opportunities for mammals, birds, amphibians, and other wildlife. Reference Forest Ecosystem data, onsite observations, and community descriptions from *Classification of the Natural Communities of North Carolina* (Schafale and Weakley 1990) were used to develop the primary plant community associations that will be promoted during community restoration activities.

3.1.2 Site Preparation

Soil grading will occur during stream restoration activities. Topsoils will be stockpiled during construction activities and will be spread on the soil surface once critical subgrade has been established. The replaced topsoil will serve as a viable growing medium for community restoration to provide nutrients and aid in the survival of planted species. Restoration Systems (RS) may elect

to control weed competition and kill fescue with glyphosate before planting. If so, RS will follow all NC Pesticide regulations. RS may also choose to prepare riparian restoration areas by aerating the soil to a depth of 6", this will improve infiltration and break up surface compaction.

Farm Pond Removal

To complete the stream and wetland restoration activities and subsequent riparian buffer restoration, the removal of a small farm pond, ~0.58 acres will occur. Stream, wetland and riparian area restoration within the abandoned pond will include 1) notching the dam to dewater; 2) removal of the dam to the elevation of the adjacent floodplain; 3) excavating sediment that is unsuitable for channel bank construction; 4) backfilling areas of sediment removed with soil suitable for channel construction (if necessary); 5) excavation of the design channel, 6) stabilization of the channel with coir matting, seed, and mulch; and 7) installation of structures. If necessary, RS may amend impounded soils with soil from the earthen dam or other additives to prevent cracking and prepare the riparian areas for planting. No additional permits will be required to carry out this work beyond those mentioned in Section 2.3 above.

3.2.3 Planting Plan

Stream-side trees and shrubs include species with high value for sediment stabilization, rapid growth rate, and the ability to withstand hydraulic forces associated with bankfull flow and overbank flood events. Stream-side trees and shrubs will be planted within 15 feet of the channel throughout the meander belt-width. Shrub elements will be planted along the reconstructed stream banks, concentrated along outer bends. Piedmont Alluvial Forest is the target community for Site floodplains and Dry-Mesic Oak-Hickory Forest is the target community for upland side-slopes.

Bare-root seedlings within the Piedmont Alluvial and Dry-Mesic Oak-Hickory Forests will be planted at a density of approximately 680 stems per acre on 8-foot centers. Shrub species in the stream-side assemblage and Marsh Wetland Treatment Areas will be planted at a density of 2720 stems per acre on 4-foot centers.

Table 2 (following page) depicts the total number of stems and species distribution within each vegetation association (Figure 4, Attachment A). Planting will be performed between December 1 and March 15 to allow plants to stabilize during the dormant period and set root during the spring season.

In addition to planting seedlings, a seed mix will be spread within Marsh Treatment Wetland Areas as follows.

1. Virginia wildrye (*Elymus virginicus*)
2. Switch grass (*Panicum virgatum*)
3. Big blue stem (*Andropogon gerardii*)
4. Indian grass (*Sorghastrum nutans*)
5. Deer tongue (*Dichanthelium clandestinum*)

3.2 Riparian Buffer Enhancement via Cattle Exclusion Activities

Riparian buffer enhancement will include permanently protecting existing riparian buffer from livestock via exclusionary fencing, cutting, clearing, filling, grading, and any similar activities that would affect the functionality of the riparian buffer (Figure 6, Attachment A). These areas are defined primarily as disturbed mixed hardwoods. Buffer credits sought in the enhancement area are allowed under 15A NCAC 02B .0295 (o)(6). The enhancement area will extend a maximum of 200 feet from the top of the bank with a minimum width of 20 from top of banks.

A small portion of UT-3 is generating riparian buffer enhancement credit from only one side of the stream. Cattle currently have access to the entire area but only have access from the pasture on the northern side of the stream, the Parcel owned by Mr. Lamm. Once fencing has been installed to prevent cattle access from Mr. Lamm's parcel to the stream, cattle will no longer be able to access the south side of the stream. This action will result in compliance with 15A NCAC 02B .0295 (o)(6) which states that the permanent exclusion of grazing livestock must be done such that the livestock are fenced out of the stream and its adjacent buffer. The southern parcel, which is not apart of the conservation easement, is owned by the Caviness family and is a single family home. Cattle will not be grazing within their parcel post construction. Figure 5 dipicts where fencing will be constructed to exclude cattle.

3.3 Riparian Buffer Preservation Activities

Riparian buffer preservation will include permanently protecting existing riparian buffer from cutting, clearing, filling, grading, and any similar activities that would affect the functionality of the riparian buffer. Areas specified for Preservation, as defined in 15A NCAC 02B .0295, are shown in Figure 6 (Attachment A). These areas are defined primarily as disturbed mixed hardwoods, with the number of high-value species above 200 per acre. They are areas where livestock are currently fenced out, and there has been little or no historical livestock access.

3.4 Marsh Treatment Area

Two marsh treatment areas will be constructed to intercept surface waters draining through agricultural areas before discharging into subject streams (UT1 and UT3). The marsh treatment areas are excluded from credit calculations (Figure 6, Attachment A).

Table 2. Planting Plan

Vegetation Association	Piedmont/Low Mountain Alluvial Forest*		Dry-Mesic Oak-Hickory Forest*		Marsh Treatment Wetland**		Stream-side Assemblage**		TOTAL
Area (acres)	**1.1**		**5.5**		**0.01**		**1.5**		**8.11**
Species	**# planted***	**% of total**	**# planted***	**% of total**	**# planted****	**% of total**	**# planted****	**% of total**	**# planted**
River birch (*Betula nigra*)	75	10	--	--	--	--	204	5	279
Ironwood (*Carpinus caroliniana*)	--	--	748	20	--	--	--	--	748
Buttonbush (*Cephalanthus occidentalis*)	--	--	--	--	5	20	--	--	5
Red bud (*Cercis canadensis*)	--	--	561	15	--	--	--	--	561
Sweet pepperbush (*Clethra alnifolia*)	--	--	--	--	4	15	--	--	4
Silky dogwood (*Cornus amomum*)	75	10	--	--	4	15	816	20	895
Persimmon (*Diospyros virginiana*)	--	--	374	10	--	--	--	--	374
White ash (*Fraxinus americana*)	--	--	187	5	--	--	--	--	187
Green ash (*Fraxinus pennsylvanica*)	150	20	--	--	--	--	816	20	966
Blueberry (*Vaccinium corymbosum*)	--	--	--	--	5	20	204	5	5
Tulip poplar (*Liriodendron tulipifera*)	75	10	--	--	--	--	--	--	75
Sycamore (*Platanus occidentalis*)	150	20	--	--	--	--	816	20	966
Black gum (*Nyssa sylvatica*)	--	--	561	15	--	--	--	--	561
Water oak (*Quercus nigra*)	112	15	748	20	--	--	408	10	1268
Willow oak (*Quercus phellos*)	112	15	561	15	--	--	408	10	1081
Black willow (*Salix nigra*)	--	--	--	--	--	--	408	10	408
Elderberry (*Sambucus canadensis*)	--	--	--	--	5	20	--	--	5
Possumhaw (*Viburnum nudum*)	--	--	--	--	3	10	--	--	3
TOTAL	**748**	**100**	**3740**	**100**	**27**	**100**	**4080**	**100**	**8391**

* Planted at a density of 680 stems/acre.
** Planted at a density of 2720 stems/acre.

3.5 Nuisance Species Management

Nuisance species controls are not proposed at this time. Inspections for beaver and other potential nuisance species will occur throughout the course of the monitoring period. Appropriate actions may be taken to ameliorate any negative impacts regarding vegetation development and/or water management on an as-needed basis. The presences of nuisance species will be monitored over the course of the monitoring period. Appropriate actions will be taken to ameliorate any negative impacts regarding vegetation development and/or water management on an as-needed basis.

4.0 MONITORING PLAN

After planting has been completed in winter or early spring, an initial evaluation will be performed to verify planting methods and to determine initial species composition and density. Supplemental planting and additional Site modifications will be implemented, if necessary.

4.1 Monitoring

Vegetation monitoring plots will be installed and monitored across the Site in accordance with the NC Division of Mitigation Services' Riparian Buffer and Nutrient Offset Buffer Annual Monitoring Report Template (ver. 1.0) dated Feb. 2, 2014, to include a level 2 CVS monitoring protocol. At least 2% of the area generating riparian buffer restoration credit will be monitored. Six (6) sample plots (10-meter by 10-meter) will be installed within the Site as per guidelines established in *CVS-EEP Protocol for Recording Vegetation*, *Version 4.2* (Lee et al. 2008). Vegetation monitoring will occur annually in the fall (between September and November), prior to the loss of leaves for a period of five monitoring years following planting. Parameters to be monitored include species composition and species density. Visual observations of the percent cover of shrub and herbaceous species will also be documented by photograph.

4.2 Reporting

Annual monitoring data will be reported using the NC Division of Mitigation Services' Riparian Buffer and Nutrient Offset Buffer Annual Monitoring Report Template (ver. 1.0) dated Feb. 2, 2014. The monitoring report shall provide a project data chronology that will facilitate an understanding of project status and trends, population of NC Division of Mitigation Services' databases for analysis, research purposes, and assist in decision making regarding project close-out. The following table outlines monitoring requirements for this project; monitoring parameter descriptions follow.

Required	Parameter	Quantity	Frequency	Notes
Yes	Vegetation	Six (6) plots located across all restored buffer zones.	Annual	Vegetation will be monitored for five years or until performance standards are met. Visual monitoring of the site will be done all five years. Analysis of vegetation will be recorded using level 2 CVS Monitoring protocol.
Yes	Project Boundary	NA	Annual	Locations of fence damage, vegetation damage, boundary encroachments, etc. will be mapped.

5.0 PROJECT PERFORMANCE STANDARDS

Performance standards were established to verify that the vegetation component supports community elements necessary for forest development and the maintenance of diffuse flow through the riparian buffer in accordance with North Carolina Division of Water Resources Administrative Code 15A NCAC 02B.0295 (Mitigation Program Requirements for Protection and Maintenance of Riparian Buffers). Performance standards are dependent upon the density and growth of at least four native hardwood tree species where no one species is greater than 50% of the stems. After five years of monitoring, an average density of 260 woody stems per acre, including planted shrubs (Silky dogwood and Blueberry), must be surviving, and diffuse flow maintained. 15A NCAC 02b .0295 (2)(E) dictates that monitoring for planted stems would also include the health of planted stems. Level 2 CVS monitoring protocol requires the vigor, a determinant of health, of a monitored stem be recorded. If requested, RS will make available during the monitoring years, planted stem health, e.g. vigor.

5.1 Vegetation Contingency

If vegetation performance standards are not achieved based on average density calculations from combined plots over the entire restoration area, supplemental planting may be performed with tree species approved by regulatory agencies. Supplemental planting will be performed as needed until achievement of vegetation performance standards.

6.0 LONG-TERM MANAGEMENT

The Site will be transferred to the 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. Funding will be supplied by the responsible party on a yearly basis until such time an endowment is established. 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 Stewardship Program will periodically install signage to identify boundary markings, as needed. Any livestock or associated fencing, or permanent crossings will be the responsibility of the owner of the underlying property to maintain.

7.0 REFERENCES

Griffith, G.E., J.M. Omernik, J.A. Comstock, M.P. Schafale, W.H. McNab, D.R. Lenat, T.F. MacPherson, J.B. Glover, and V.B. Shelbourne. 2002. *Ecoregions of North Carolina and South Carolina*. U.S. Geological Survey, Reston, Virginia.

Jordan Lake Water Supply Watershed Buffer Rules 15A NCAC 02B .0267, 15A NCAC 02B .0268, and 15A NCAC 02B .0295

Lee, M.T., R.K. Peet, S.D. Roberts, and T.R. Wentworth. 2008. CVS-EEP Protocol for Recording Vegetation, Level 1-2 Plot Version 4.2. Ecosystem Enhancement Program, North Carolina Department of Environment and Natural Resources.

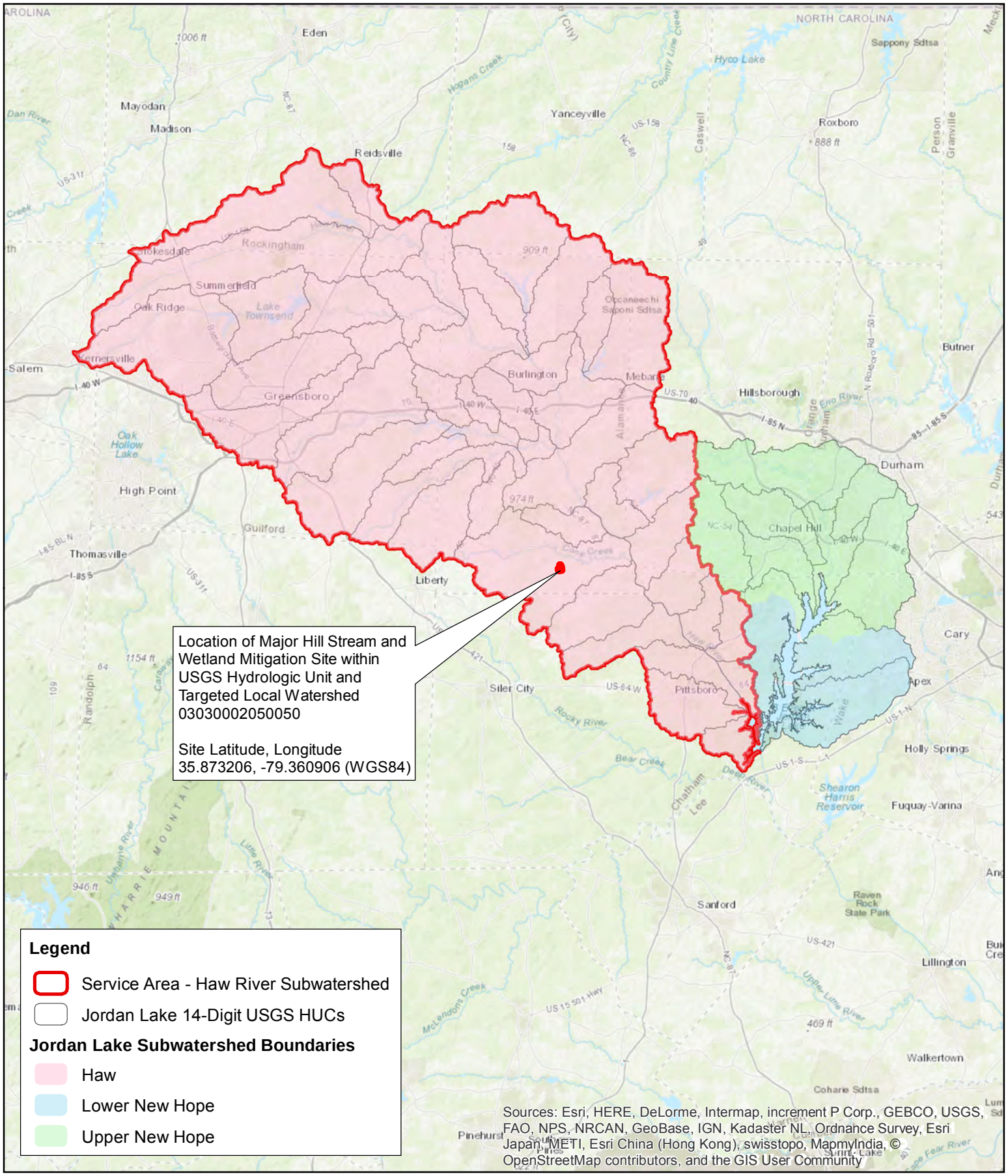
Natural Resources Conservation Service (NRCS). 2014. Web Soil Survey (online). Available: http://websoilsurvey.nrcs.usda.gov/app/ [January 9, 2014]. United States Department of Agriculture.

Schafale, M.P. and A.S. Weakley. 1990. *Classification of the Natural Communities of North Carolina: Third Approximation*. North Carolina Natural Heritage Program, Division of Parks and Recreation, N.C. Department of Environment, Health, and Natural Resources. Raleigh, North Carolina.

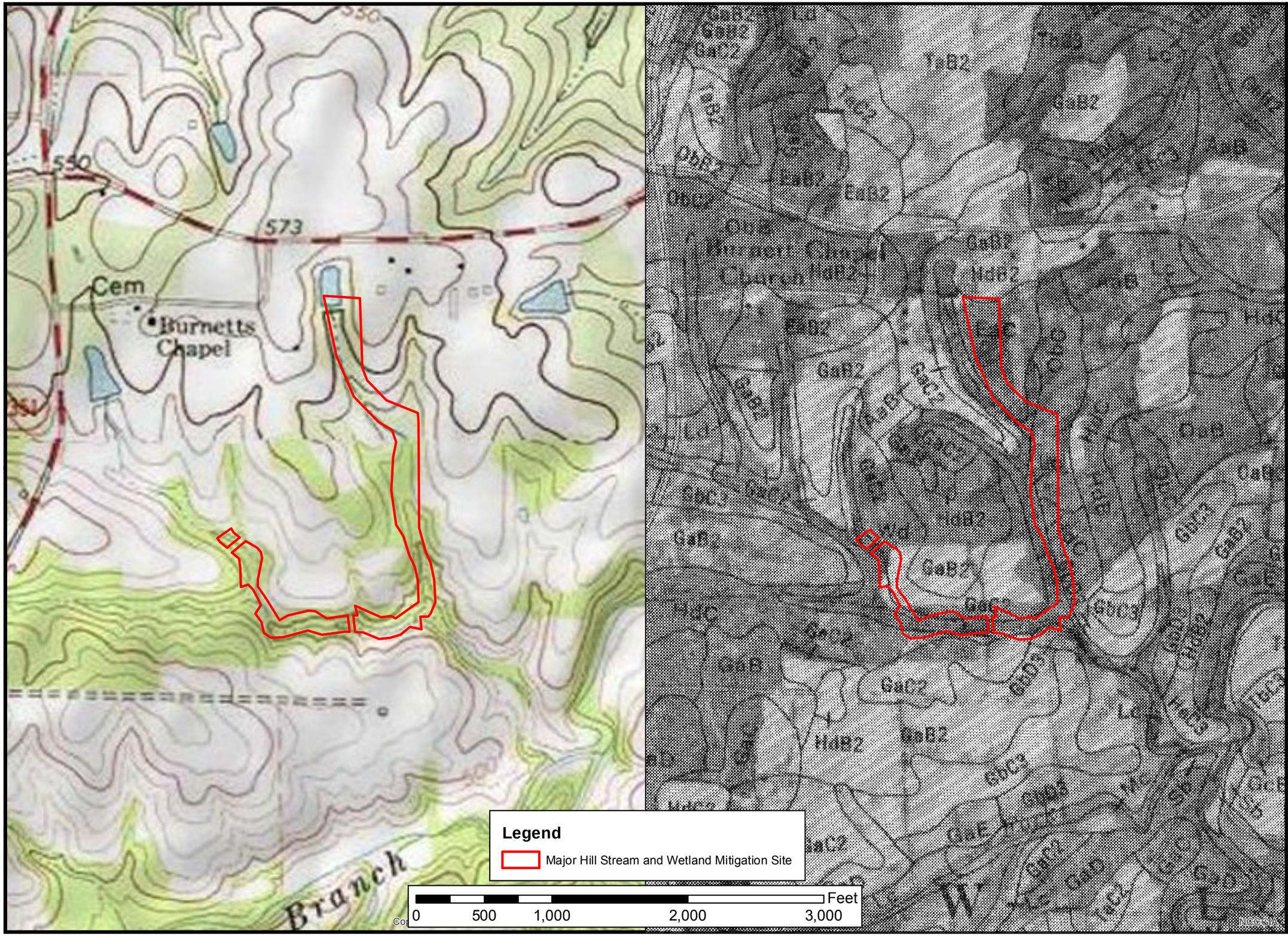
ATTACHMENT A

Figures

Figure 1. Site Location & Service Area
Figure 2. USGS 1:24000 Topographic Map & NRCS Overview
Figure 3. Existing Conditions Plan View
Figure 4. Restoration Plan
Figure 5. Fencing Plan
Figure 6. Credit Determination



RESTORATION SYSTEMS, LLC 1101 HAYNES ST, SUITE 211 RALEIGH, NC 27604 PHONE : 919.755.9490 FAX : 919.755.9492	SCALE:1 in = 54,167 ft DATE: 04-2018 PROJECT: Major Hill	**Riparian Buffer Appendix** **Major Hill Stream & Wetland Mitigation Site**
This map and all data contained within are supplied as is with no warranty. Restoration Systems, LLC expressly disclaims responsibility for damages or liability from any claims that may arise out of the use or misuse of this map. It is the sole responsibility of the user to determine if the data on this map is compatible with the user's needs. This map was not created as survey data, nor should it be used as such. It is the user's responsibility to obtain proper survey data, prepared by a licensed surveyor, where required by law.	**Figure 1: Site Location & Service Area**	AERIAL PHOTOGRAPHY (c) 2014 NC One Map COORDINATE SYSTEM: NAD 1983 SPLAS FEET



Axiom Environmental, Inc.

Prepared for:

RESTORATION SYSTEMS | LLC

Project:

Riparian Buffer Appendix
Major Hill Stream &
Wetland Mitigation Site

Alamance County, NC

Title:

PROJECT MAPPING

Notes:

1. Background Imagery Sources
a. Saxapahaw (1977) and Silk Hope (1974) 7.5-minute topographic quadrangles provided by the U.S. Geological Survey (USGS, left window).
b. Soil Survey of Alamance County (1960) provided by the Natural Resources Conservation Service, sheet 35 (right window)

Drawn by:	KRJ
Date:	MAY 2017
Scale:	1:8000
Project No.:	17-009

FIGURE

2

Soil Map Unit	Soil Series
EaC	Efland silt loam, 6 to 10 % slopes
GaC2	Georgeville silt loam, 6 to 10 % slopes, eroded
HdC	Herndon silt loam, 6 to 10 % slopes
Lc	Local alluvial land, poorly drained
ObC	Orange silt loam moderately well drained, 6 to 10 % slopes

NCSAM Form Reach 1

NCSAM Form Reach 2

UT-1

UT-2

UT-3

UT-3

Legend

- Easement = 15.5 acres
- Perennial Stream = 4,663 linear feet
- Intermittent Stream = 630 linear feet
- Jurisdictional Wetlands = 0.41 acres
- Drained Hydric Soil = 0.25 acres
- Wetland Under Impoundment = 0.3 acres
- NCDWQ Form
- Soil Profile
- NRCS Soil Boundary

0 500 1,000 2,000 Feet

NCCGIA

Axiom Environmental, Inc.

Prepared for:

RESTORATION SYSTEMS | LLC

Project:

Riparian Buffer Appendix
Major Hill Stream &
Wetland Mitigation Site

Alamance County, NC

Title:

EXISTING CONDITIONS

Drawn by: KRJ

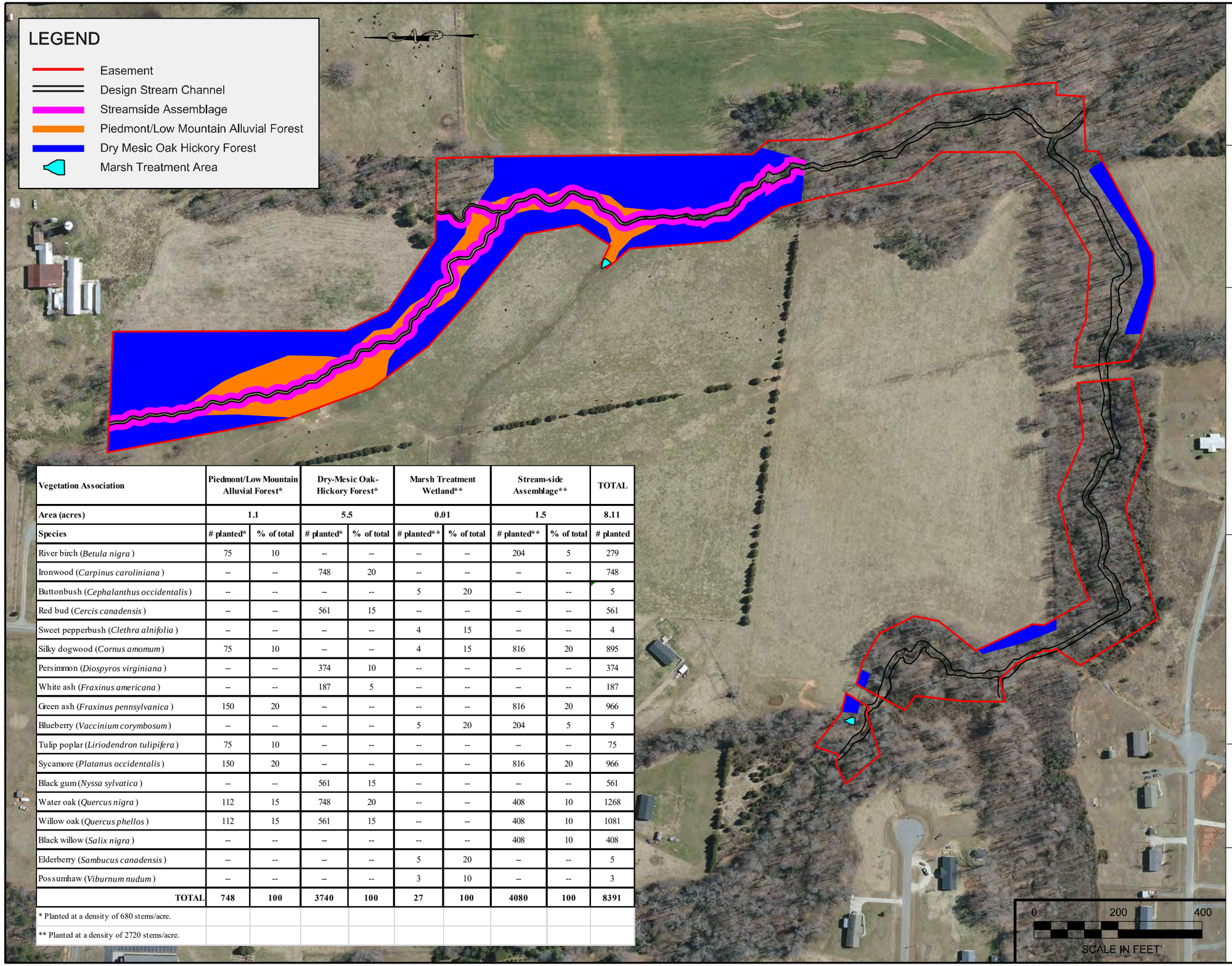
Date: AUG 2017

Scale: 1:4000

Project No.: 17-009

FIGURE

3



Vegetation Association	Piedmont/Low Mountain Alluvial Forest*		Dry-Mesic Oak-Hickory Forest*		Marsh Treatment Wetland**		Stream-side Assemblage**		TOTAL
Area (acres)	1.1		5.5		0.01		1.5		8.11
Species	# planted*	% of total	# planted*	% of total	# planted**	% of total	# planted**	% of total	# planted
River birch (*Betula nigra*)	75	10	--	--	--	--	204	5	279
Ironwood (*Carpinus caroliniana*)	--	--	748	20	--	--	--	--	748
Buttonbush (*Cephalanthus occidentalis*)	--	--	--	--	5	20	--	--	5
Red bud (*Cercis canadensis*)	--	--	561	15	--	--	--	--	561
Sweet pepperbush (*Clethra alnifolia*)	--	--	--	--	4	15	--	--	4
Silky dogwood (*Cornus amomum*)	75	10	--	--	4	15	816	20	895
Persimmon (*Diospyros virginiana*)	--	--	374	10	--	--	--	--	374
White ash (*Fraxinus americana*)	--	--	187	5	--	--	--	--	187
Green ash (*Fraxinus pennsylvanica*)	150	20	--	--	--	--	816	20	966
Blueberry (*Vaccinium corymbosum*)	--	--	--	--	5	20	204	5	5
Tulip poplar (*Liriodendron tulipifera*)	75	10	--	--	--	--	--	--	75
Sycamore (*Platanus occidentalis*)	150	20	--	--	--	--	816	20	966
Black gum (*Nyssa sylvatica*)	--	--	561	15	--	--	--	--	561
Water oak (*Quercus nigra*)	112	15	748	20	--	--	408	10	1268
Willow oak (*Quercus phellos*)	112	15	561	15	--	--	408	10	1081
Black willow (*Salix nigra*)	--	--	--	--	--	--	408	10	408
Elderberry (*Sambucus canadensis*)	--	--	--	--	5	20	--	--	5
Possumhaw (*Viburnum nudum*)	--	--	--	--	3	10	--	--	3
TOTAL	748	100	3740	100	27	100	4080	100	8391

* Planted at a density of 680 stems/acre.

** Planted at a density of 2720 stems/acre.

Axiom Environmental, Inc.

RESTORATION SYSTEMS | LLC

NOTES/REVISIONS

Project:

Riparian Buffer Appendix
Major Hill Stream &
Wetland Mitigation Site

Alamance County
North Carolina

Title:

EXISTING
CONDITIONS

Scale: AS SHOWN

Date: August 2017

Project No.: 17-009

FIGURE NO. 4

RESTORATION SYSTEMS, LLC
1101 HAYNES ST, SUITE 211
RALEIGH, NC 27604
PHONE : 919.755.9490
FAX : 919.755.9492

This map and all data contained within are supplied as is with no warranty. Restoration Systems, LLC expressly disclaims responsibility for damages or liability from any claims that may arise out of the use or misuse of this map. It is the sole responsibil ity of the user to determine if the data on this map is compatible with the user's needs. This map was not created as survey data, nor should it be used as such. It is the user's responsibility to obtain proper survey data, prepared by a licensed surveyor, where required by law.

SCALE:1 in = 208 ft

DATE: 5-15-2018

PROJECT: Major HIll

Riparian Buffer Appendix
Major Hill Stream & Wetland Mitigation Site

Figure 5:
Fencing Plan

AERIAL PHOTOGRAPHY
(c) 2014 NC One Map

COORDINATE SYSTEM: NAD 1983 SPLAS FEET

UT1

UT2

UT3

Marsh Treatment Area
(No Buffer Credit)

UT1

UT3

Marsh Treatment Area
(No Buffer Credit)

Legend

- New Fencing for Cattle Exclusion
- Existing Fencing - To Remain for Cattle Exclusion
- Existing Fencing - To-Be Removed/Reworked for Cattle Exclusion
- Easement
- Major Hill Wetland Mitigation - Removed From Buffer Cals
- Proposed Stream TOB-TOB
- TOB to 50 feet
- 100 foot line
- 150 foot line
- 200 foor line

Riparian Buffer Mitigation Type

- TOB - 100 ft. Restoration (1:1) - 5.24 Acres
- 101 ft. - 200 ft. Restoration (1:1 but 33% credit per Rule) - 0.72 Acres
- TOB - 100 ft. Enhancement (2:1 Cattle Ex. per Rule) - 7.82 Acres
- TOB - 100 ft. Preservation (Non-Subject Stream 5:1) - 0.58 Acres
- 101 ft. - 200 ft. Preservation (Non-Subject Stream 5:1 33% Credit per Rule) - 0.06 Acres
- None Credit Generating (Less than 20 ft.)

Legend

- Easement
- Proposed Stream TOB-TOB
- TOB to 50 feet
- 100 foot line
- 150 foot line
- 200 foor line
- Major Hill Wetland Mitigation - Removed From Buffer Cals

Riparian Buffer Mitigation Type

- TOB - 100 ft. Restoration (1:1) - 5.24 Acres
- 101 ft. - 200 ft. Restoration (1:1 but 33% credit per Rule) - 0.72 Acres
- TOB - 100 ft. Enhancement (2:1 Cattle Ex. per Rule) - 7.82 Acres
- TOB - 100 ft. Preservation (Non-Subject Stream 5:1) - 0.58 Acres
- 101 ft. - 200 ft. Preservation (Non-Subject Stream 5:1 33% Credit per Rule) - 0.06 Acres
- None Credit Generating (Less than 20 ft.)
- Proposed Vegitation Monitoring Locations

UT1

UT2

UT3

Marsh Treatment Area
(No Buffer Credit)

UT1

UT3

Marsh Treatment Area
(No Buffer Credit)

Table 1. Major Hill: Jordan Lake, Haw River Sub-Watershed, Credit Determination Table

Buffer Width/Zone	Credit Type	Total Area (Sq. Ft.)	Mitigation Ratio	% of Full Credit	RBM Units (in sq. ft.)
TOB - 100 ft.	Restoration	228,254	1:1	100%	228,254
101 - 200 ft.	Restoration (15A NCAC 02B .0295 (n)(1)	31,363	1:1	33%	10,349
TOB - 100 ft.	Enhancement via Cattle Exclusion (15A NCAC 02B .0295 (o)(6)	340,639	2:1	100%	170,319
TOB - 100 ft.	Preservation (Non-Subject Stream)(15A NCAC 02B .0295 (o)(4)	25,264	5:1	100%	5,052
101 - 200 ft.	Preservation (Non-Subject Stream)(15A NCAC 02B .0295 (o)(4)	2,613	5:1	33%	172
				Total Riparian Buffer Mitigation Units:	**414,146**

RESTORATION SYSTEMS, LLC
1101 HAYNES ST, SUITE 211
RALEIGH, NC 27604
PHONE : 919.755.9490
FAX : 919.755.9492

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SCALE:1 in = 188 ft

DATE: 2-23-2018

PROJECT: Major Hlll

Riparian Buffer Appendix
Major Hill Stream & Wetland Mitigation Site

Figure 6: Riparian Buffer Credit Determination

AERIAL PHOTOGRAPHY
(c) 2014 NC One Map

COORDINATE SYSTEM: NAD 1983 SPLAS FEET

ATTACHMENT B

NCDWR Site Viability Letter & Buffer Determination

Water Resources
Environmental Quality

ROY COOPER
Governor
MICHAEL S. REGAN
Secretary
LINDA CULPEPPER
Interim Director

March 8, 2018

Worth Creech
Restoration Systems LLC
1101 Haynes St, Suite 211
Raleigh NC 27604

Subject: On-Site Determination for Applicability to the Buffer Mitigation Rules (15A NCAC 2B .0295)

Subject Property: Major Hill Restoration Site, Graham NC, Alamance County

Dear Mr. Creech:

On February 12, 2018, at your request, Sue Homewood conducted an on-site determination to review features located on the subject project for stream determinations with regards to the above noted state regulations.

Based on the on-site determination as well as a review of the Alamance County Soil Survey and the USGS 1:24,000 topographic map, it was determined that UT1 as shown on the attached map is an intermittent stream which begins at the outlet of the existing pond. UT2 as shown on the attached map was determined to be an intermittent stream throughout the proposed project boundary.

Please note that the Jordan Lake Buffer Rules (15A NCAC 02B .0267) apply to UT1 and UT3 as shown on the attached map.

The owner (or future owners) should notify the Division (and other relevant agencies) of this decision in any future correspondences concerning this property. This on-site determination shall expire five (5) years from the date of this letter.

Landowners or affected parties that dispute a determination made by the Division or Delegated Local Authority that a surface water exists and that it is subject to the buffer rule may request a determination by the Director. A request for a determination by the Director shall be referred to the Director in writing c/o 401 & Buffer Permitting Branch, 1650 Mail Service Center, Raleigh, NC 27699-1650. Individuals that dispute a determination by the Division or Delegated Local Authority that "exempts" surface water from the buffer rule may ask for an adjudicatory hearing. You must act within 60 days of the date that you receive this letter. Applicants are hereby notified that the 60-day statutory appeal time does not start until the affected party (including downstream and adjacent landowners) is notified of this decision. The Division recommends that the applicant conduct this notification in order to be certain that third party appeals are made in a timely manner. To ask for a hearing, send a written petition, which conforms to Chapter 150B of the North Carolina General Statutes to the Office of Administrative Hearings, 6714 Mail Service Center, Raleigh, N.C. 27699-6714. This determination is final and binding unless you ask for a hearing within 60 days.

Water Resources
ENVIRONMENTAL QUALITY

ROY COOPER
Governor
MICHAEL S. REGAN
Secretary
LINDA CULPEPPER
Interim Director

March 9, 2018

Worth Creech
Restoration Systems, LLC
1101 Haynes St., Suite 211
Raleigh, NC 27604
(via electronic mail: worth@restorationsystems.com)

Re: Site Viability for Buffer Mitigation – Major Hill Site
2039 Burnett Church Rd, Graham
Alamance County

Dear Mr. Creech,

On February 20, 2018, Katie Merritt, with the Division of Water Resources (DWR), assisted you and Raymond Holz with Restoration Systems, LLC (RS) at the proposed Major Hill Site (Site) in Graham, NC. The Site is located in the Haw River Subwatershed of Jordan Lake. The Site is being proposed as part of a full-delivery stream restoration project for the Division of Mitigation Services (RFP #16-006990). At your request, Ms. Merritt performed an onsite assessment of riparian land uses adjacent to waterbodies onsite, which are shown on the attached map labeled "Figure 1".

Ms. Merritt's evaluation of the features onsite and their associated mitigation determination for the riparian areas are provided in the table below. This evaluation was made from Top of Bank (TOB) out to 200' from each feature for buffer mitigation pursuant to 15A NCAC 02B .0295 (effective November 1, 2015).

Feature	Classification onsite	[1]Subject to Buffer Rule	Riparian Land uses adjacent to Feature (0-200')	Buffer Credit Viable	[2]Nutrient Offset Viable at 2,273 lbs/acre	Mitigation Type Determination w/in riparian areas
A	Wetland (proposed to Be restored Into a Stream)	No	Non-forested pasture grazed by cattle	Yes*	Yes*	Restoration Site per 15A NCAC 02B .0295 (o)(3) ***Mitigation Note**: *Only viable for mitigation if stream is restored through wetland.*
Pond A	In-line pond *(proposed to be breached & restored Into stream)*	Yes	Non-forested pasture grazed by cattle	Yes	Yes	Restoration Site per 15A NCAC 02B .0295 (n) If stream channel is restored through the pond, the new riparian areas will be viable as a Restoration Site

Feature	Classification onsite	[1]Subject to Buffer Rule	Riparian Land uses adjacent to Feature (0-200')	Buffer Credit Viable	[2]Nutrient Offset Viable at 2,273 lbs/acre	Mitigation Type Determination w/in riparian areas
B/UT-1 (below pond)	Stream	Yes	Combination of forested pasture and non-forested pasture	Yes	Yes (fields only)	**Fields** - Restoration Site per 15A NCAC 02B .0295 (n) **Forested Areas** - Enhancement Site per 15A NCAC 02B .0295 (o) (6)
C	Stream	No	Forested/mostly undisturbed (no livestock) Fields are a combination of row crops and pasture	Yes[3,4]	Yes (fields only)	**Fields** - Restoration Site per 15A NCAC 02B .0295 (o)(3) **Forested Areas** - Preservation Site per 15A NCAC 02B (o)(4)
D/UT-3	Stream	Yes	Combination of forested pasture, non-forested pasture and hay crop	Yes[4]	Yes (fields only)	**Fields** - Restoration Site per 15A NCAC 02B .0295 (n) **Forested Areas** - Enhancement Site per 15A NCAC 02B .0295 (o) (6)

[1]Subjectivity calls for this feature were determined in correspondence dated March 8, 2018 using the 1:24,000 scale quadrangle topographic map prepared by USGS and the most recent printed version of the soil survey map prepared by the NRCS

[2] *NC Division of Water Resources - Methodology and Calculations for determining Nutrient Reductions associated with Riparian Buffer Establishment*

[3]The area of preservation credit within a buffer mitigation site shall comprise of no more than 25 percent (25%) of the total area of buffer mitigation per 15A NCAC 0295 (o)(5) and 15A NCAC 0295 (o)(4). Site cannot be a Preservation only site to comply with this rule.

[4] The area described as an Enhancement Site was assessed and determined to comply with all 15A NCAC 02B .0295(o)(6).

The attached map (Figure 1) showing the project site and features was provided by Restoration Systems, LLC and was initialed by Ms. Merritt on March 9, 2018. This letter should be provided in any future stream, wetland, buffer and/or nutrient offset mitigation plans for this Site.

This letter does not constitute an approval of this site to generate mitigation credits. Pursuant to 15A NCAC 02B .0295, a mitigation proposal and a mitigation plan shall be submitted to DWR for written approval **prior** to conducting any mitigation activities in riparian areas and/or surface waters for buffer mitigation credit. Pursuant to 15A NCAC 02B .0240, a proposal regarding a proposed nutrient load-reducing measure for nutrient offset credit shall be submitted to DWR for approval prior to any mitigation activities in riparian areas and/or surface waters.

All vegetative plantings, performance criteria and other mitigation requirements for riparian restoration, enhancement and preservation must follow the requirements in 15A NCAC 02B .0295 to be eligible for buffer and/or nutrient offset mitigation credits. For any areas depicted as not being viable for nutrient offset credit above, one could propose a different measure, along with supporting calculations and sufficient detail to support estimates of load reduction, for review by the DWR to determine viability for nutrient offset in accordance with 15A NCAC 02B .0240. For any areas generating wetland mitigation credit, no buffer or nutrient offset credit can be generated.

This viability assessment will expire on March 9, 2020 or upon the submittal of an As-Built Report to the DWR, whichever comes first. Please contact Katie Merritt at (919)-807-6371 if you have any questions regarding this correspondence.

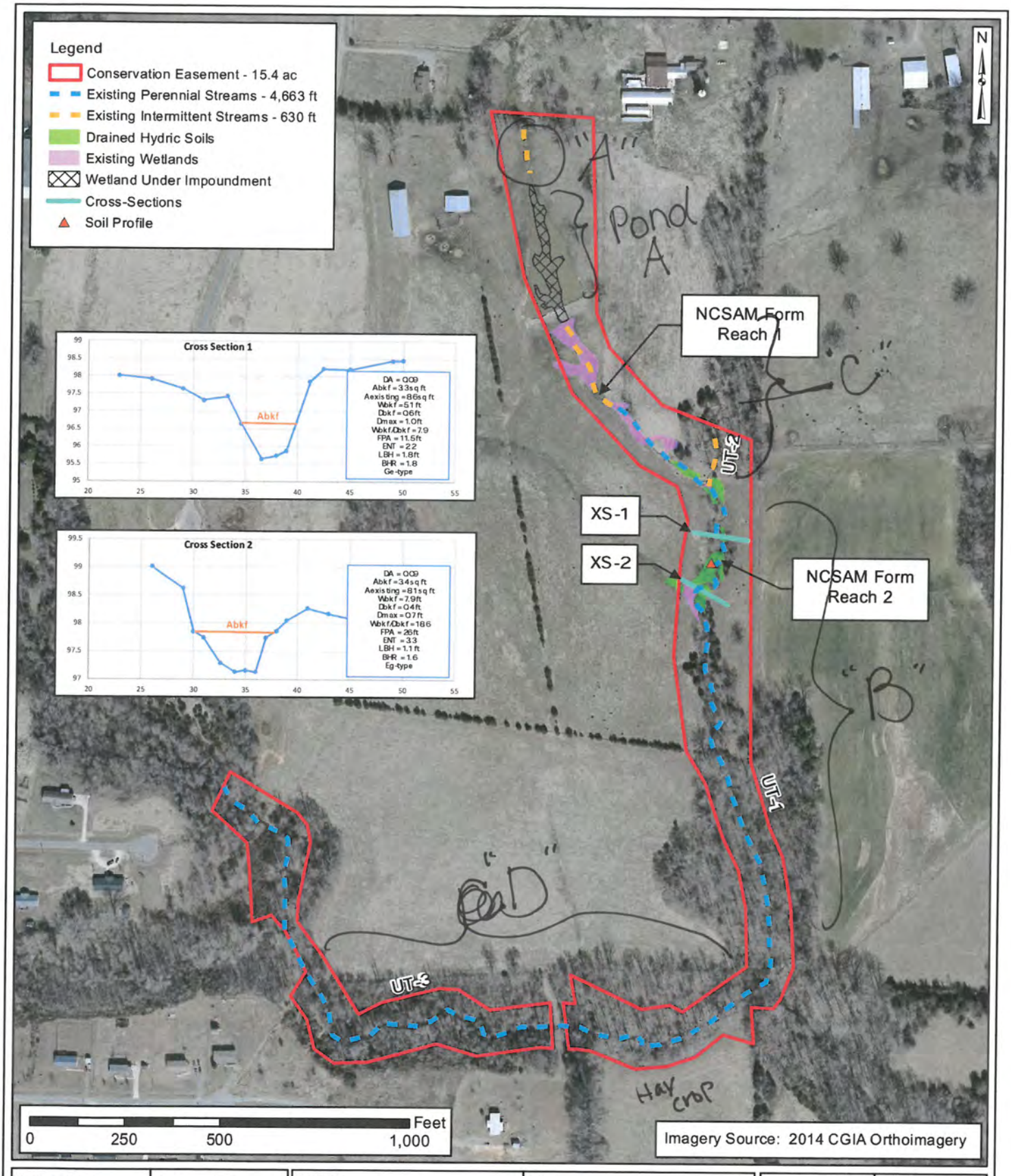
Sincerely,

Karen Higgins

Karen Higgins, Supervisor
401 and Buffer Permitting Branch

KAH/*km*
Attachments: Figure 10

cc: File Copy (Katie Merritt)
DMS – Lindsay Crocker (via electronic mail)



Prepared by:	Prepared for:	Project:	Title:	Dwn. by.	FIGURE
Axiom Environmental, Inc.	RESTORATION SYSTEMS LLC	MAJOR HILL STREAM AND WETLAND MITIGATION SITE Alamance County, NC	PRE-MONITORING FEATURE LOCATIONS	KRJ Date: Dec. 2016 Project: 15-005	1

3/9/18

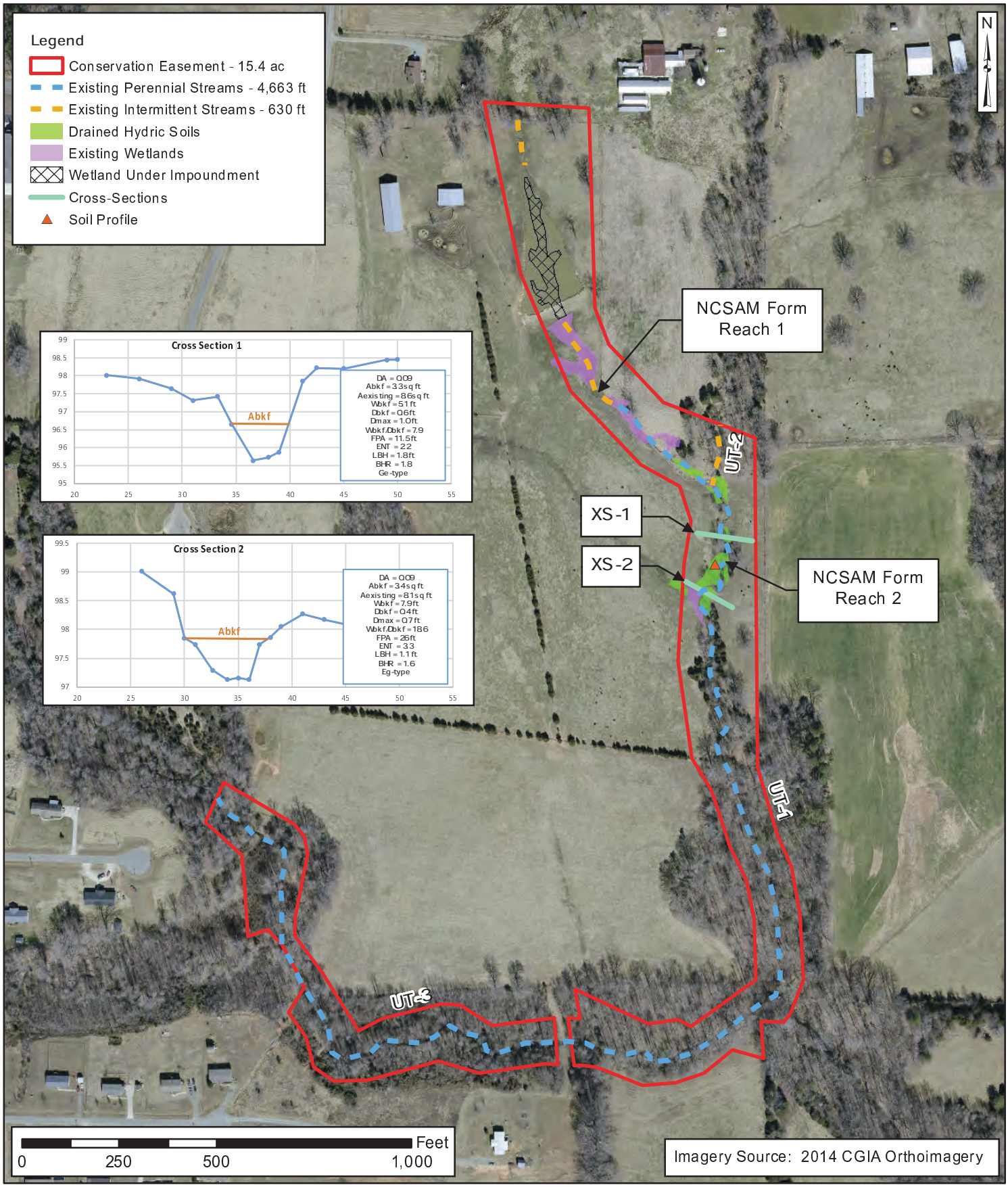
This letter only addresses the applicability to the mitigation rules and the buffer rules and does not approve any activity within Waters of the United States or Waters of the State or their associated buffers. If you have any additional questions or require additional information, please contact me at 336-776-9693 or sue.homewood@ncdenr.gov.

Sincerely,

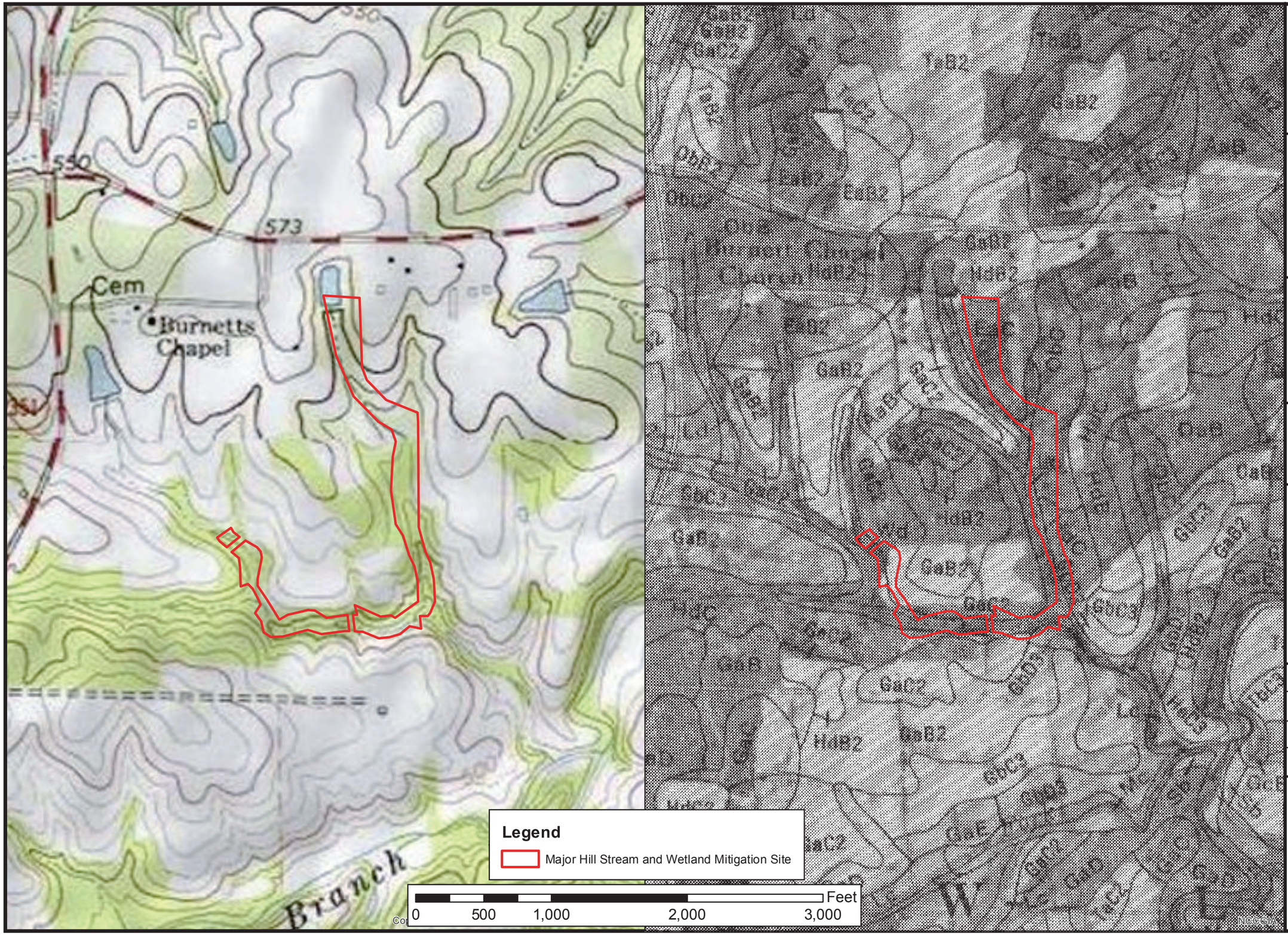
Sue Homewood
Winston-Salem Regional Office

Enclosures: USGS Topo Map
Restoration Systems Pre Monitoring Feature Locations Map

Cc: James D Lamm, 7354 Lindley Mill Rd, Graham NC 27253
Katie Merrit, 401 & Buffer Permitting Branch
DWR, Winston-Salem Regional Office



Prepared by: Axiom Environmental, Inc.	Prepared for: Restoration Systems, LLC	Project: MAJOR HILL STREAM AND WETLAND MITIGATION SITE, Alamance County, NC	Title: PRE-MONITORING FEATURE LOCATIONS	Dwn. by. KRJ Date: Dec. 2016 Project: 15-005	FIGURE 1



Axiom Environmental, Inc.

Prepared for:

RESTORATION SYSTEMS | LLC

Project:

MAJOR HILL STREAM AND WETLAND MITIGATION SITE

Alamance County, NC

Title:

PROJECT MAPPING

Notes:

1. Background Imagery Sources
a. Saxapahaw (1977) and Silk Hope (1974) 7.5-minute topographic quadrangles provided by the U.S. Geological Survey (USGS, left window).
b. Soil Survey of Alamance County (1960) provided by the Natural Resources Conservation Service, sheet 35 (right window)

Drawn by:	KRJ
Date:	MAY 2017
Scale:	1:8000
Project No.:	17-009

FIGURE

3

ATTACHMENT C

Existing Condition Photos

EXISTING CONDITIONS : 05-08-2018

Top of UT-1 looking downstream

EXISTING CONDITIONS : 05-08-2018

Top of UT-1 looking across valley

EXISTING CONDITIONS : 05-08-2018

Earthen dam along UT-1 looking upstream

EXISTING CONDITIONS : 05-08-2018

Adjacent to earthen dam along UT-1 looking downstream

EXISTING CONDITIONS : 05-08-2018

Pasture area adjacent to UT-1 looking upstream

EXISTING CONDITIONS : 05-08-2018

UT-2 preservation area and existing fence line

EXISTING CONDITIONS : 05-08-2018

Below UT-1 & UT-2 confluence looking downstream within pasture area

EXISTING CONDITIONS : 05-08-2018

Below UT-1 & UT-2 confluence looking downstream within pasture area (opposite side of valley from photo above

EXISTING CONDITIONS : 05-08-2018

Below UT-1 & UT-2 confluence looking downstream within pasture area

EXISTING CONDITIONS : 05-08-2018

Looking down toward UT-1 where marsh treatment area will be constructed

ATTACHMENT D

Document Review Correspondence

DWR# 2017-0921

Mitigation Plan Checklist for Riparian Buffer Restoration Mitigation Sites –created 7/15/13

*Additional comments are attached

Major Hill F/D
Project Name
Katie Merritt
Reviewed By
5/2/18
Date

- ☑ DWR Stream Determination
- ☑ DWR Site Viability Letter
- ☑ Site Location
  - ☑ Directions including Lat & Long
  - ☑ 8-digit HUC &/or 14 digit (if applicable)
  - ☑ County
  - ☑ EMC approved Soil map, Topo and Aerial Maps
  - ☑ Sub-watershed where applicable Haw
- ☑ Existing Site Conditions w/ photos - no photos included but needed w/ onsite date stamps (partial, partial)
- ☑ All proposed mitigation activities, including a brief summary of stream and/or wetland mitigation w/ a detailed planting plan - no detail or comments on the pond + what RS intends to do.
- ☑ Monitoring & Maintenance Plan - are the plots perm? what does the Template say? (partial)
- ☐ Financial Assurance (if applicable) - not applicable
- ☑ Associated buffer ~~and/or nutrient offset credit calc~~s, which shall include credit generation, service area, etc. - This is for buffer only.
- ☑ Credit Determination Table/Map
- ☐ Verification that the site does not have an impact on threatened or endangered species
- ☐ Verification that the site is not affected by on-site or nearby sources of contamination as provided by Environmental Data Resources, Inc.
- ☐ Verification that the site can be constructed on land if it is an archaeological site;
- ☐ A list of all permits that will be required and obtained prior to constructing the mitigation site for nutrient offset and/or buffer mitigation (*e.g. Sediment and Erosion Control Plan from Division of Land Resources, NCG010000 Stormwater Permit from NCDWQ, 404 permit from the Army Corps of Engineers and corresponding 401 Water Quality Certification from NCDWQ*).

Was a categorical exclusion form provided? *need statements in Section 2.0 that the site will or will not impact these

~~Boosevelt~~ no acknowledgement of the permits that are likely needed for this site

Major Hill Riparian Buffer Mitigation Plan DWR# 2017-0921 - DWR staff (Katie Merritt) Comments:

- General comments
  - Provide site photos in Appendix showing existing conditions of riparian areas proposed for restoration & enhancement and include dates of photos taken
  - Include the categorical exclusion or acknowledge that it has been done and approved by DMS.
  - Buffer assets are proposed within the relic pond bottom where a stream is proposed for restoration. Please add details regarding pond preparation for planting - (breaching, dam removal, drained, draw-down time, etc.), permitting, stabilization efforts, etc.
  - UT-3 has a section Enhancement where only one side of the buffer is within the easement. 15A NCAC 02B .0295 (o)(6) states that the permanent exclusion of grazing livestock must be done such that the livestock are fenced out of the stream and its adjacent buffer. This implies the fence must be installed in a manner to permanently remove cattle from the stream, from both sides. RS needs to provide an explanation why this section of UT-3 is proposed for enhancement along only one side and needs to confirm that exclusionary fencing will be installed along the left and right banks of the stream if requesting Enhancement credit.
  - Show where RS is installing fencing on the parcel on Figure 5
  - Note that this site cannot be used to generate nutrient offset credits. If nutrient offset credits are proposed for this site, DMS must provide an asset table and corresponding asset map that shows both "generated" and "delivered" credits. The Nitrogen & Phosphorus delivery factors must be applied at mitigation plan stage and not at closeout. Enhancement and Preservation credits generated on this site are not viable for generating nutrient offsets.
- Section 3.2.3 states there will be shrubs planted within the 15' streamside area. Since this includes buffer credit areas, will shrubs be included towards your performance standards? If so, section 5.0 needs to include shrubs.
- Section 4.1-4.2:
  - Attach the document that RS is referencing as the "monitoring template" as an Appendix to this Plan.
  - Describe what type of plots are being used (fixed, random, etc.)
  - Add a statement clarifying that vegetation monitoring will begin no earlier than at least 5 months post-planting efforts.
  - Add a statement that the monitoring will be for a period of five monitoring years or until DWR approval.
  - Clarify that the parameters being monitored are mainly for planted stems. If you want to include volunteer species in the report, that's fine. Clarify that only "desirable volunteers may be included to meet performance standards and upon DWR approval".
- Section 5.1 - 0295 (2)(E) indicates that the monitoring plan shall also include the "*health* and average stem densities" (emphasis added). Add clarity to this section to meet the rule expectation that vigor is an important parameter to note in the annual reports

- Section 5.0 - Instead of Success Criteria, please use "Performance Standards" to be consistent with 15A NCAC 02B .0295.

Ray Holz

From: Crocker, Lindsay <Lindsay.Crocker@ncdenr.gov>
Sent: Friday, May 11, 2018 1:51 PM
To: Merritt, Katie
Cc: Ray Holz
Subject: RE: Major Hill DWR Comments

Thanks!

Lindsay Crocker
NC DEQ Division of Mitigation Services
217 West Jones St., Raleigh, NC 27603
Office 919.707.8944
Cell 919.594.3910
lindsay.crocker@ncdenr.gov

Email correspondence to and from this address is subject to the North Carolina Public Records Law and may be disclosed to third parties unless the content is exempt by statute or other regulation.

From: Merritt, Katie
Sent: Friday, May 11, 2018 11:54 AM
To: Crocker, Lindsay <Lindsay.Crocker@ncdenr.gov>
Cc: Raymond Holz (rholz@restorationsystems.com) <rholz@restorationsystems.com>
Subject: Re: Major Hill DWR Comments

Hey Lindsay,

That's fine regarding the template. I didn't know if I had that one in our files, now I do. Regarding the categorical exclusion part - RS needs to acknowledge with written text in the buffer mitigation plan, that the categorical exclusion form was done, was submitted with the Stream Mitigation Plan, and was approved by DMS. Otherwise, I didn't have a clue it had been done.

Let me know if there is anything else.

Thank you,

Katie

From: Crocker, Lindsay
Sent: Friday, May 11, 2018 11:38:12 AM
To: Merritt, Katie
Cc: Raymond Holz (rholz@restorationsystems.com)
Subject: RE: Major Hill DWR Comments

Thanks for your review Katie,

Quick question on your comment to add the monitoring template comment…the monitoring template RS is referring to is the one that is required for all DMS full delivery contracts. It's the same one you see on all of our projects, and is specified in their contract. These templates are updated frequently and we typically ask providers to use the most updated version, which is available on our spreadsheet like this one (attached). Is it ok with you to omit the actual template as it doesn't provide anything useful to the mitigation plan?

Also, all mitigation plans include the full Categorical exclusion signed form (by US FHA) and supporting documentation. It wasn't included on the buffer appendix to make it easier and smaller file size, the current mitigation plan is already 310 pages (not including the buffer appendix).

Let me know if this is ok with you, and RS will get started adding this to the final mitigation plan and going out for permits.

Thanks again and hope you have a great Mother's Day,
Lindsay

Lindsay Crocker
NC DEQ Division of Mitigation Services
217 West Jones St., Raleigh, NC 27603
Office 919.707.8944
Cell 919.594.3910
lindsay.crocker@ncdenr.gov

Email correspondence to and from this address is subject to the North Carolina Public Records Law and may be disclosed to third parties unless the content is exempt by statute or other regulation.

From: Merritt, Katie
Sent: Thursday, May 10, 2018 4:46 PM
To: Crocker, Lindsay <Lindsay.Crocker@ncdenr.gov>
Cc: Higgins, Karen <karen.higgins@ncdenr.gov>
Subject: Major Hill DWR Comments

Hey Lindsay,
DWR has finalized their review of Appendix K (Riparian Buffer Mitigation Plan) for the Major Hill Mitigation Site. Please see the attached document for your files. Don't hesitate to give us a call when you get a chance if you need to discuss anything.

Thank You,
Katie

Katie Merritt
Nutrient Offset & Buffer Banking Coordinator
401 & Buffer Permitting Unit
North Carolina Department of Environmental Quality
Work: 919-807-6371
Website: http://portal.ncdenr.org/web/wq/401bufferpermitting

512 N. Salisbury Street, Raleigh, NC 27620
1617 Mail Service Center, Raleigh, NC 27699-1617

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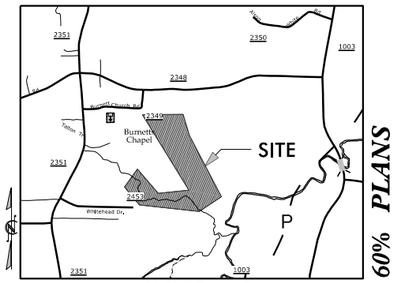
09/08/99

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	MAJOR HILL SITE	1	

CONSTRUCTION PLANS
MAJOR HILL SITE

LOCATION: ALAMANCE COUNTY, NORTH CAROLINA

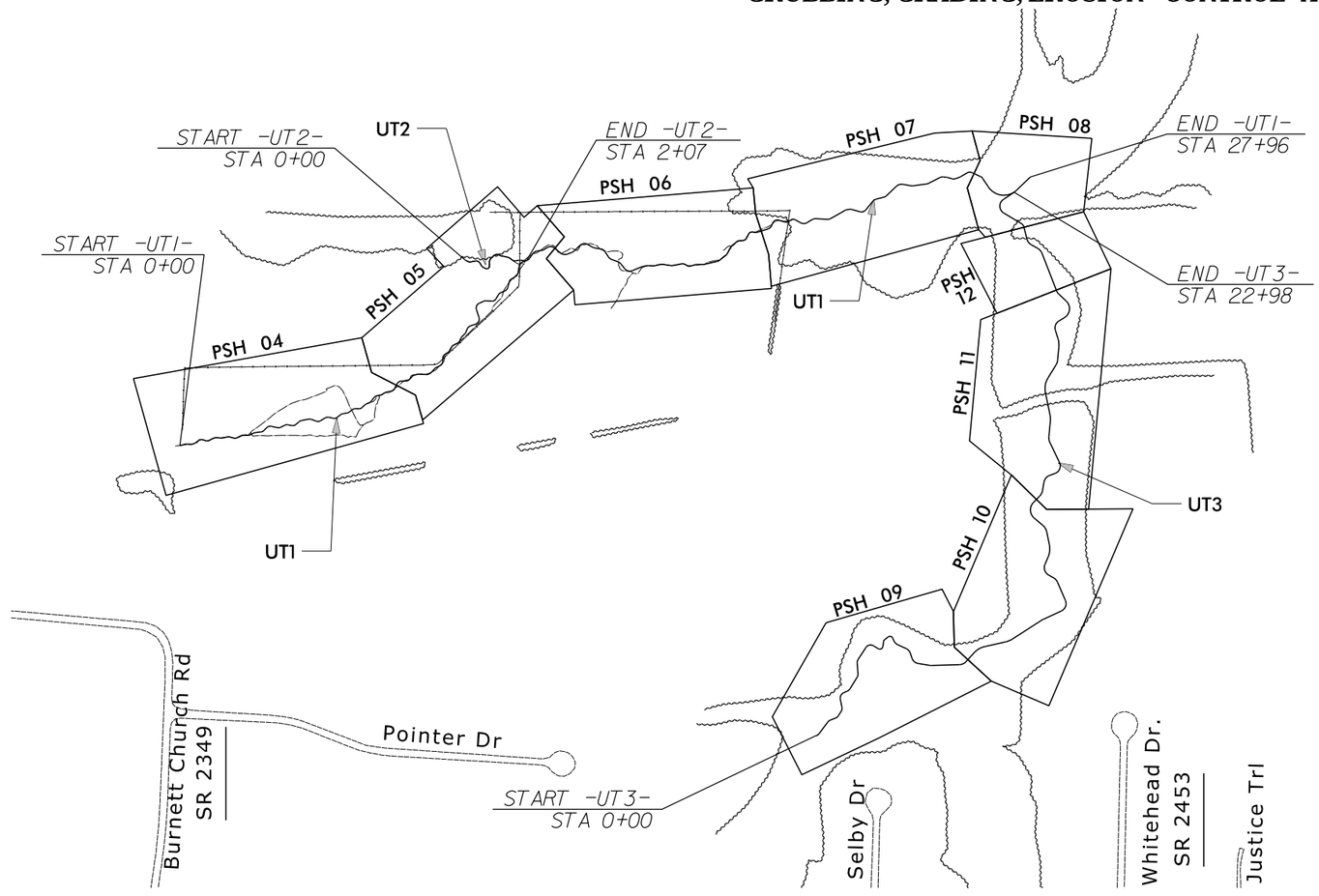
TYPE OF WORK: STREAM RESTORATION AND ENHANCEMENT (CLEARING, GRUBBING, GRADING, EROSION CONTROL AND PLANTING)



VICINITY MAP
Not to Scale

60% PLANS

CONTRACT: MAJOR HILL SITE



LIMITS OF CONSTRUCTION:
3.1 ACRES

INDEX OF SHEETS

SHEET NUMBER	SHEET
C1	Title Sheet
C2 THRU 02C	Typicals
C2D	Control Points and Location Map
C3 THRU 03B	-UT 1- Horizontal Control Data
C3C	-UT 2- Horizontal Control Data
C3D THRU 03F	-UT 3- Horizontal Control Data
C4 THRU 12	Plan and Profile Sheets
E-02A	Erosion Control Notes
E-03 THRU E-03E	Erosion Control Details
E-03F	Haul Road Locations
E-04 THRU E-13	Erosion Control Plan Sheets

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

GRAPHIC SCALES

50 25 0 50 100
PLANS

50 25 0 50 100
PROFILE (HORIZONTAL)

10 5 0 10 5
PROFILE (VERTICAL)

PROPOSED LENGTH OF UT1 = 2796 LF
PROPOSED LENGTH OF UT2 = 207 LF
PROPOSED LENGTH OF UT3 = 2298 LF
TOTAL STREAM LENGTH = 5301 LF

RESTORATION LEVEL	STREAM (linear footage)	RIPARIAN WETLAND (acreage)	NONRIPARIAN WETLAND (acreage)
RESTORATION	–	–	–
ENHANCEMENT	–	–	–
TOTALS	–	–	–
MITIGATION UNITS	– SMUs	– RIPARIAN WMUs	– NONRIPARIAN WMUs

Designed By:
Axiom Environmental, Inc.
Axiom Environmental
218 Snow Ave
Raleigh, NC 27603
GRANT LEWIS
PROJECT DESIGNER

RESTORATION SYSTEMS | LLC
Restoration Systems
1101 Haynes St.
Suite 211
Raleigh, NC 27604
WORTH CREECH
SITE CONSTRUCTION MANAGER

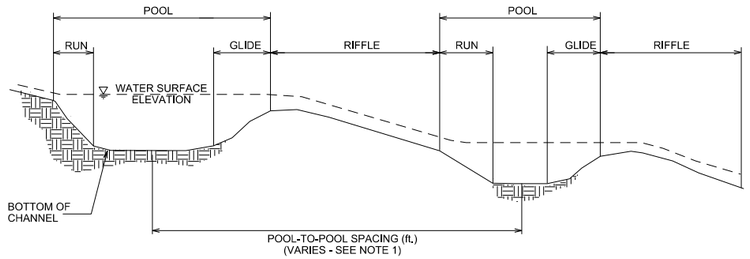
Prepared in the Office of:
SUNGATE DESIGN GROUP, P.A.
905 JONES FRANKLIN ROAD
RALEIGH, NORTH CAROLINA 27606
TEL (919) 859-2243
ENG FIRM LICENSE NO. C-890

JOSHUA G. DALTON, P.E.
PROJECT ENGINEER

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL JOSHUA G. DALTON

DATE:

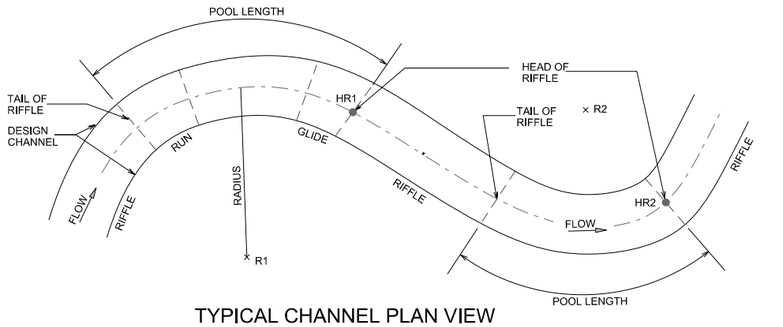
11/7/2017
Major Hill_Hyd_PSH_01.dgn
bsmith



TYPICAL CHANNEL PROFILE

NOTES:

1. POOL-TO-POOL SPACING IS MEASURED FROM CENTER OF POOL BEND TO CENTER OF POOL BEND.

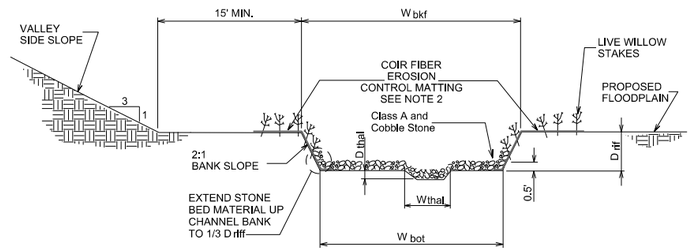


TYPICAL CHANNEL PLAN VIEW

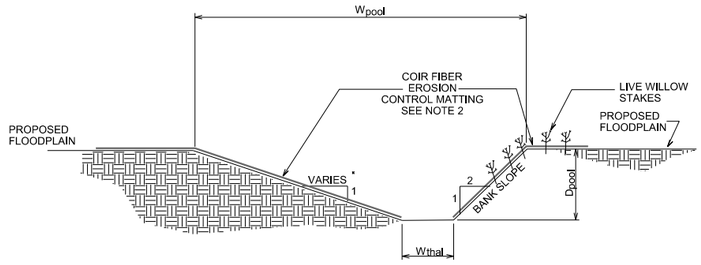
CHANNEL PLAN VIEW NOTES:

1. THE CONTRACTOR SHALL LAYOUT THE CHANNEL ALIGNMENT BY LOCATING THE RADII AND SCRIBING THE CENTER LINE FOR EACH POOL BEND. THE CONNECTING TANGENT SECTIONS SHALL COMPLETE THE LAYOUT OF THE CHANNEL.

2. FIELD ADJUSTMENTS OF THE ALIGNMENT MAY BE REQUIRED TO SAVE TREES OR AVOID OBSTACLES. THE STAKE-OUT SHALL BE APPROVED BY THE CONSTRUCTION MANAGER BEFORE CONSTRUCTION OF THE CHANNEL.



TYPICAL RIFFLE CROSS-SECTION



TYPICAL POOL CROSS-SECTION

CHANNEL CONSTRUCTION NOTES:

1. MATERIAL EXCAVATED FROM CHANNEL AND FLOODPLAIN SHALL BE USED TO BACKFILL EXISTING CHANNEL.

2. BANK PROTECTION SHALL CONSIST OF NATURAL COIR FIBER MATTING AND PLACED TO THE TOP OF BANK. (SEE DETAIL COIR FIBER MATTING, SHEET E-3D)

3. THE CONTRACTOR SHALL SUPPLY BED MATERIAL FOR THE ENTIRE BED LENGTH OF EACH RIFFLE SECTION. THE BED MATERIAL SHALL CONSIST OF A MIX OF CLASS A AND SMALLER STONE.

CROSS-SECTION DIMENSIONS							
REACH	Wbkf (ft.)	Wbot (ft.)	Driff (ft.)	Dthal (ft.)	Dpool (ft.)	Wpool (ft.)	Wthal (ft.)
UT 1 (Upstream)	6.0	3.6	0.5	0.1	0.8	6.6	1.0
UT 1 (Downstream)	7.3	4.5	0.6	0.1	1.0	8.0	1.0

SHEET NAME		SHEET NUMBER
TYPICALS		2
PROJECT NAME: MAJOR HILL STREAM AND WETLAND RESTORATION SITE		
	COUNTY: ALAMANCE	DATE: 2018

Axiom Environmental, Inc.

SUNGATE DESIGN GROUP, P.A.
905 JONES FRANKLIN ROAD
RALEIGH, NORTH CAROLINA 27606
TEL (919) 859-2243
ENG FIRM LICENSE NO. C-890

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 28 JOSEPH C. DALTON

DATE:

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bsmith

SHEET NAME		SHEET NUMBER
TYPICALS		2A
PROJECT NAME: MAJOR HILL STREAM AND WETLAND RESTORATION SITE		
	COUNTY: ALAMANCE	DATE: 2018

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SUNGATE DESIGN GROUP, P.A.
905 JONES FRANKLIN ROAD
RALEIGH, NORTH CAROLINA 27606
TEL (919) 859-2243
ENG FIRM LICENSE NO. C-890

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 28881 JOSEPH C. DALTON

DATE:

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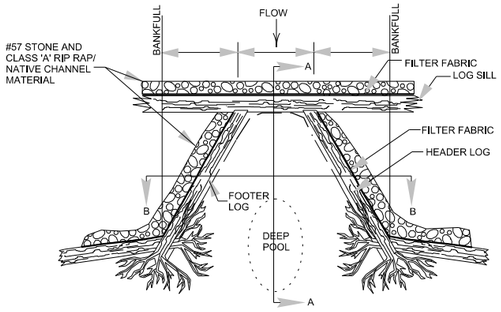
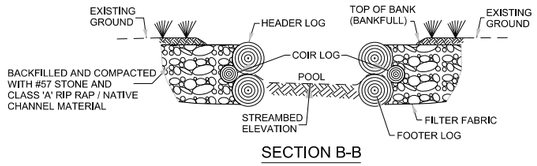
LOG CROSS VANE

SCALE:NTS

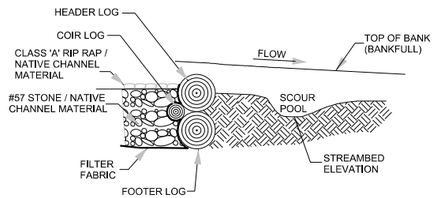
PLAN VIEW



NOTES:
1. HEADER AND FOOTER LOGS SHALL BE A MINIMUM OF 18" DIAMETER AND SHALL BE A HARDWOOD SPECIES. (FOOTER LOG MAY BE SUBSTITUTED WITH PINE)
2. A DOUBLE FOOTER LOG MAY BE REQUIRED IN SAND BED STREAMS.
3. ALL STONES ARE TO BE STRUCTURE STONES.
4. FILTER FABRIC SHALL BE PLACED ON THE UPSTREAM SIDE OF THE STRUCTURE TO PREVENT WASHOUT OF SEDIMENT THROUGH LOG GAPS. FILTER FABRIC SHALL EXTEND FROM THE BOTTOM OF THE FOOTER TO THE FINISHED GRADE ELEVATION AND SHALL BE PLACED THE ENTIRE LENGTH OF THE STRUCTURE.
5. PERPENDICULAR ROOTWAD LOGS ARE REQUIRED IF THE LOG VANE ARM DOES NOT HAVE A ROOTBALL TO TIE INTO THE BANK.



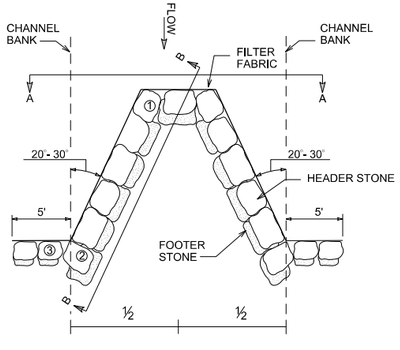
SECTION B-B



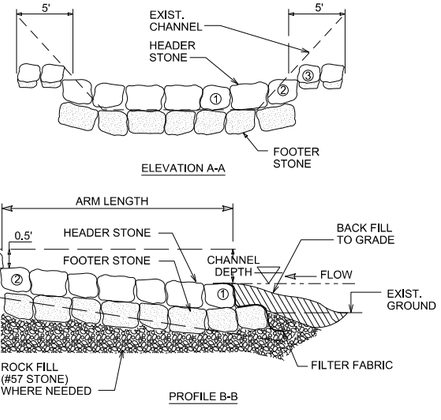
SECTION A-A

REACH	ARM LENGTH (FT.)	CHANNEL DEPTH (FT.)
UT 1 (Upstream)	6	0.5 - 0.7
UT 1 (Downstream)	7	0.6 - 0.8

NOTE:
HEADER AND FOOTER STONES ARE LARGE, ANGULAR BOULDERS MEASURING A MINIMUM OF 24" ALONG THE SHORTEST DIMENSION.

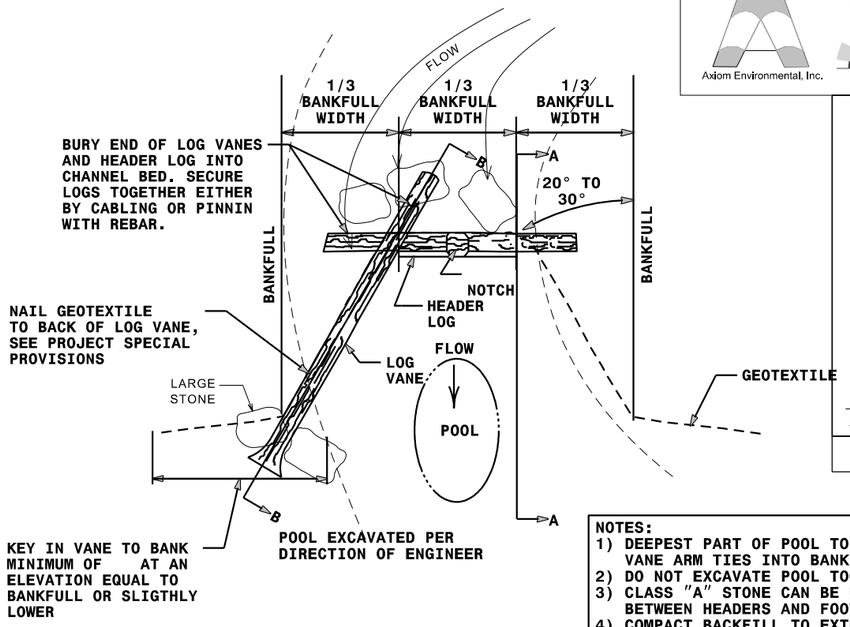


PLAN VIEW



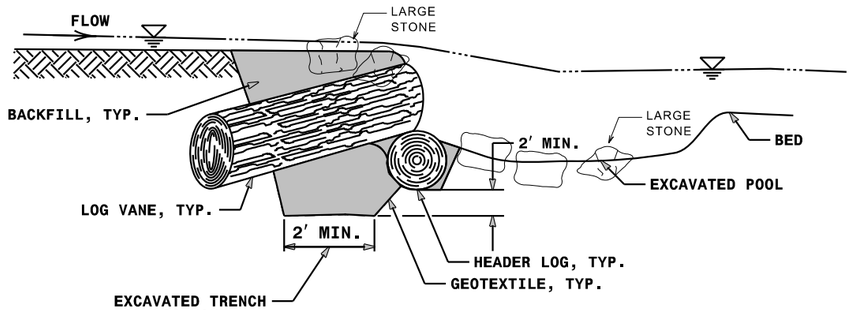
TYPICAL CROSS-VANE

TYPICAL LOG VANE

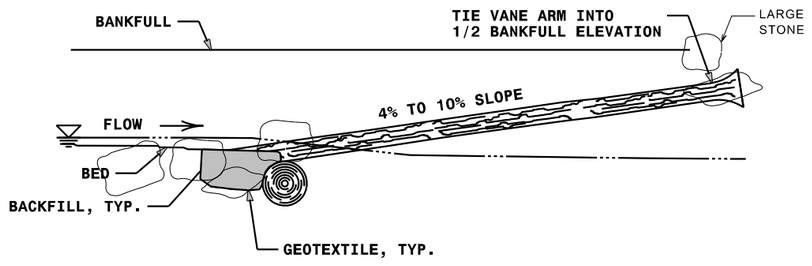


NOTES:
1) DEEPEST PART OF POOL TO BE IN LINE WITH WHERE VANE ARM TIES INTO BANKFULL.
2) DO NOT EXCAVATE POOL TOO CLOSE TO FOOTER BOULDERS.
3) CLASS "A" STONE CAN BE USED TO REDUCE VOIDS BETWEEN HEADERS AND FOOTERS.
4) COMPACT BACKFILL TO EXTENT POSSIBLE OR AT THE DIRECTION OF THE ENGINEER.
5) POOL DEPTH SHOULD BE 2 TO 3 TIMES BANKFULL DEPTH.

PLAN VIEW



SECTION A-A



SECTION B-B

11/7/2017
Major Hill_Hyd_PSH_02A.dgn
bsmith

SHEET NAME		SHEET NUMBER
TYPICALS		2B
PROJECT NAME: MAJOR HILL STREAM AND WETLAND RESTORATION SITE		
	COUNTY: ALAMANCE	DATE: 2018

SUNGATE DESIGN GROUP, P.A.
905 JONES FRANKLIN ROAD
RALEIGH, NORTH CAROLINA 27606
TEL (919) 859-2243
ENG FIRM LICENSE NO. C-890
Axiom Environmental, Inc.

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 28 JOSEPH G. DALTON PRELIMINARY NOT FOR CONSTRUCTION

DATE:

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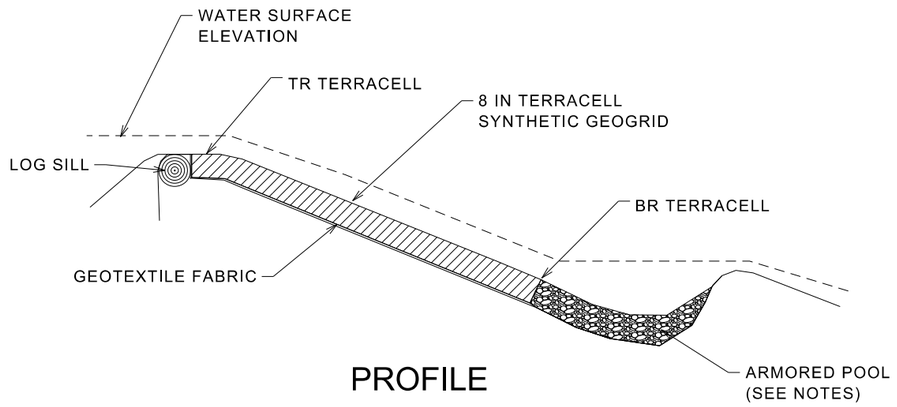
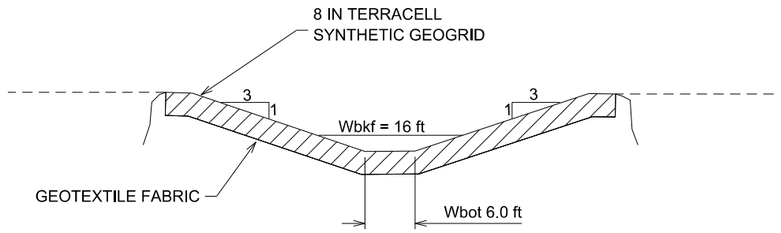
DROP STRUCTURE - TERRACELL



PROFILE

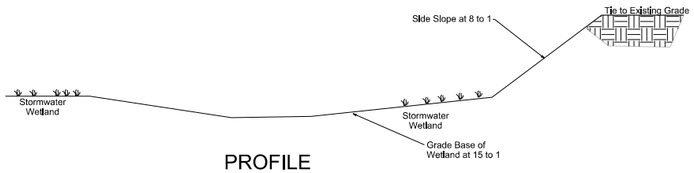
TERRACELL STRUCTURE NOTES:
1. CONTRACTOR WILL INSTALL 8-INCH TERRACELL SYNTHETIC GEOGRID AS PER THE MANUFACTURER'S SPECIFICATIONS.
2. THE POOL AT THE BOTTOM OF THE DROP STRUCTURE WILL BE ARMORED WITH GEOTEXTILE FABRIC AND SUITABLE NATURAL BED MATERIAL.
3. NATURAL BED MATERIAL IS DEFINED AS MATERIAL OBTAINED FROM STOCKPILES AT THE SITE RANGING IN SIZE FROM 5" - 17" AVERAGE DIAMETER WITH THE MAJORITY OF MATERIAL HAVING 10" AVERAGE DIAMETER, OR EQUIVALENT MATERIAL.



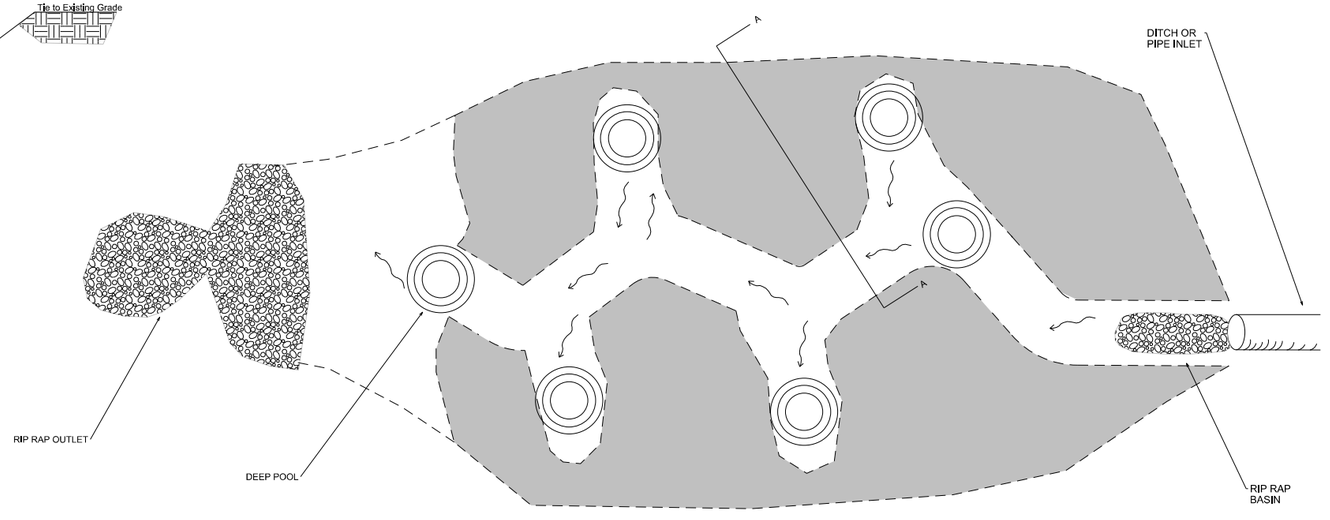
CROSS-SECTION

TERRACELL STRUCTURE NOTES:
1. CONTRACTOR WILL INSTALL 8-INCH TERRACELL SYNTHETIC GEOGRID AS PER THE MANUFACTURER'S SPECIFICATIONS.
2. ONCE THE SYNTHETIC GEOGRID HAS BEEN INSTALLED, GEOCELLS WILL BE BACKFILLED WITH GRAVEL AND TOPSOIL AND PLANTED WITH EROSION CONTROL GRASSES AND WILLOW STAKES (*SALIX NIGRA*).

MARSH TREATMENT AREA



PROFILE
SECTION A-A



11/7/2017
Major Hill_Hyd_PSH_02B.dgn
bsmith

SHEET NAME		SHEET NUMBER
TYPICALS		2C
PROJECT NAME: MAJOR HILL STREAM AND WETLAND RESTORATION SITE		
	COUNTY: ALAMANCE	DATE: 2018

Axiom Environmental, Inc.

SUNGATE DESIGN GROUP, P.A.
905 JONES FRANKLIN ROAD
RALEIGH, NORTH CAROLINA 27606
TEL (919) 859-2243
ENG FIRM LICENSE NO. C-890

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 26891 JOSEPH C. DALTON

DATE:

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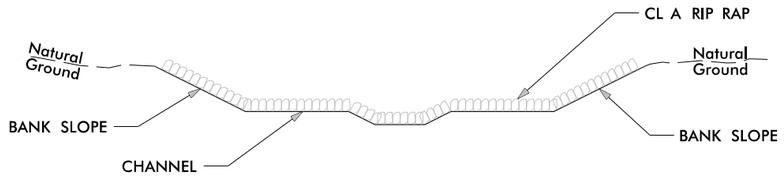
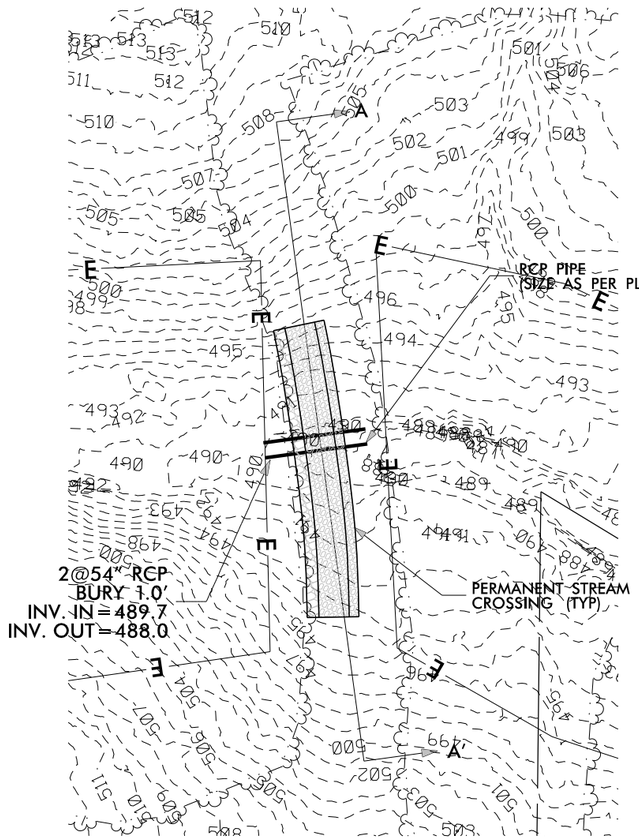
ENGINEERED RIFFLE

SCALE: N.T.S.



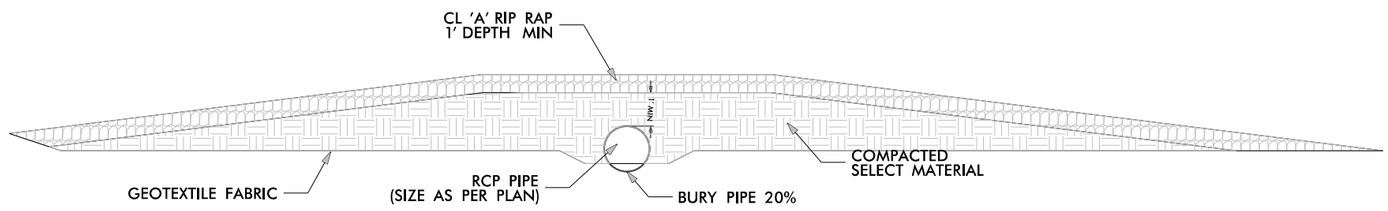
NOTES:
1) PLACE CLASS A RIP RAP IN CHANNEL AND ON BANK SLOPES.
2) RIP RAP SIZE MAY BE ADJUSTED BASED ON FIELD CONDITIONS AS DIRECTED BY ENGINEER OR DESIGNER.



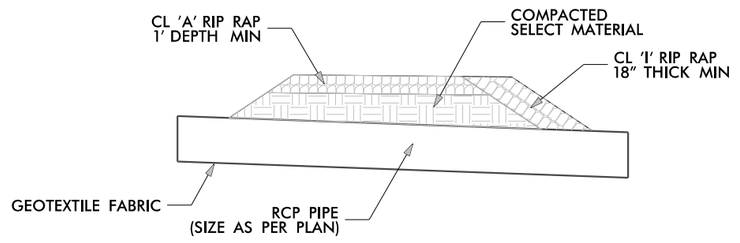
PERMANMENT CROSSING

SCALE: N.T.S.

NOTES:
1) INSTALL PERMANENT CROSSING WHILE CONSTRUCTION LOCATION WITHIN STREAM HAS BEEN DEWATERED.
2) IF UNABLE TO INSTALL WHILE LOCATION IS DRY, PLACE MATTING ON EXPOSED SOILS.



SECTION A-A'



SECTION B-B'

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bsmith

SHEET NAME		SHEET NUMBER
CONTROL POINTS		2D
PROJECT NAME: MAJOR HILL STREAM AND WETLAND RESTORATION SITE		
	COUNTY: ALAMANCE	DATE: 2018

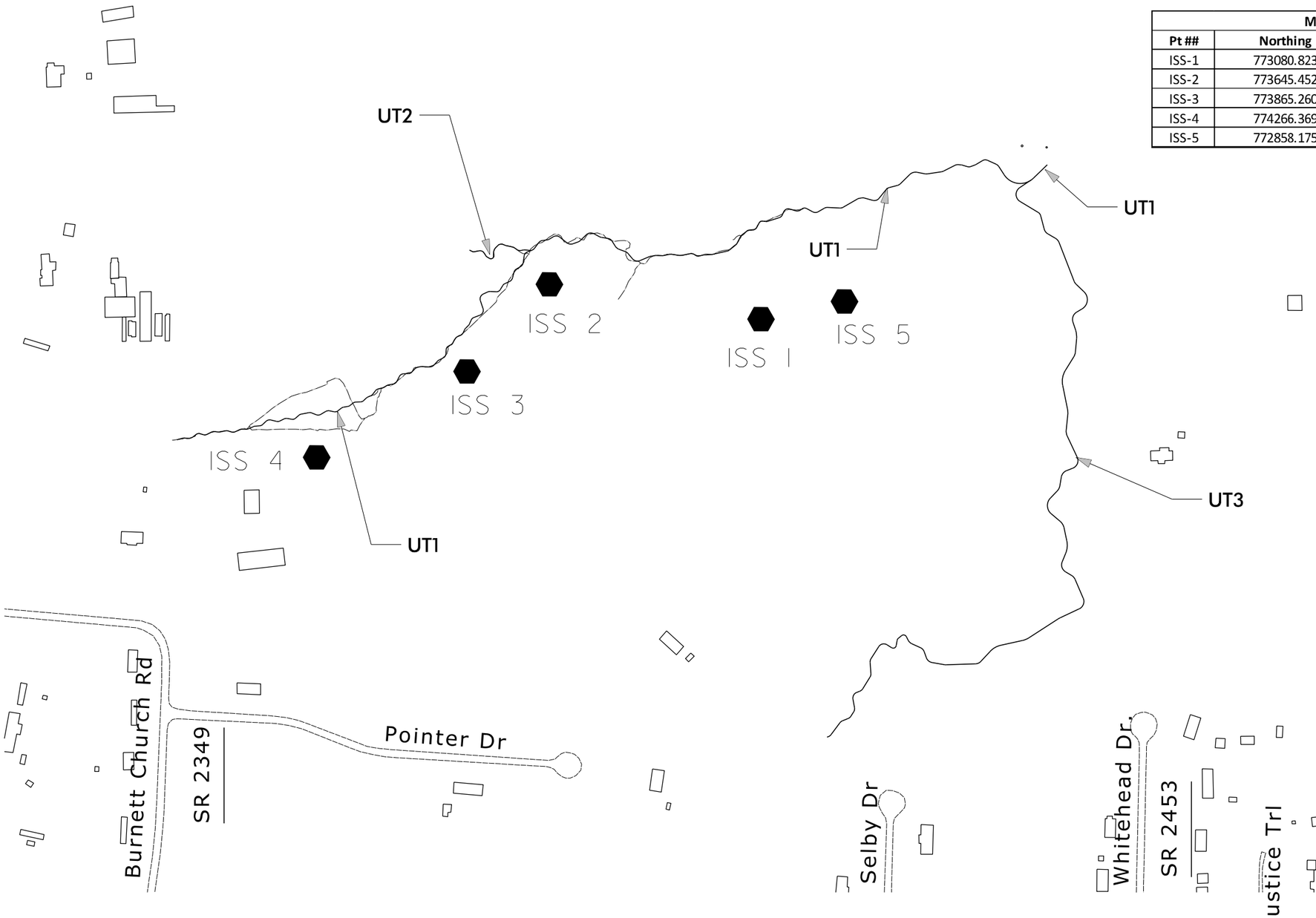
SUNGATE DESIGN GROUP, P.A.
905 JONES FRANKLIN ROAD
RALEIGH, NORTH CAROLINA 27606
TEL (919) 859-2243
ENG FIRM LICENSE NO. C-890

Axiom Environmental, Inc.

SURVEY INFORMATION PROPERTY/
EASEMENT PROVIDED BY:
K2 DESIGN GROUP, P.A.
5688 U.S. HIGHWAY 70 EAST
GOLDSBORO, NC 27534

300' 150' 0 300' 600'
SCALE: 1" = 600'

Major Hill Control Points				
Pt ##	**Northing**	**Easting**	**Elevation**	**Type**
ISS-1	773080.823	1893410.468	538.22	ISS CAP
ISS-2	773645.452	1893503.197	531.36	ISS CAP
ISS-3	773865.260	1893270.805	538.13	ISS CAP
ISS-4	774266.369	1893041.485	555.68	ISS CAP
ISS-5	772858.175	1893457.350	532.55	ISS CAP



11/7/2017
Major_Hill_Hyd_PSH_02E_ctrl.dgn
bsmith

E E DENOTES ENHANCEMENT IN WETLAND

R R DENOTES RESTORED WETLANDS

-UT 1- STRUCTURE LOCATIONS

STR. TYPE	STATION	OFFSET	NORTHING	EASTING
CROSS VANE	0+65.85	0	774,577.16	1,893,104.72
CROSS VANE	0+85.97	0	774,557.75	1,893,103.27
CROSS VANE	1+22.76	0	774,522.74	1,893,109.50
CROSS VANE	5+84.88	0	774,101.95	1,893,224.30
CROSS VANE	6+39.61	0	774,052.52	1,893,244.46

SHEET NAME		SHEET NUMBER
STRUCTURES		4
PROJECT NAME: MAJOR HILL STREAM AND WETLAND RESTORATION SITE		
	COUNTY: ALAMANCE	DATE: 2018

Axiom Environmental, Inc.

SUNGATE DESIGN GROUP, P.A.
905 JONES FRANKLIN ROAD
RALEIGH, NORTH CAROLINA 27606
TEL (919) 859-2243
ENG FIRM LICENSE NO. C-890

NORTH CAROLINA PROFESSIONAL SEAL 036858 ENGINEER JOSEPH G. DALTON

DATE:

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TINNIN, ANDREW M
DEED BK 2514
DEED PG 0756

LAMM, JAMES D
AND CAROL L
DEED BK 2789
DEED PG 0896

SURVEY BOUNDARY

-UT1- 0+00

-UT1- 1+00

-UT1- 2+00

-UT1- 3+00

-UT1- 4+00

-UT1- 5+00

-UT1- 6+00

-UT1- 6+50

REMOVE EXISTING DAM
POND SHALL BE DRAINED
BY PUMP-AROUND METHOD
PRIOR TO DAM REMOVAL

REMOVE PIPE

PROPOSED BANKFULL

REMOVE DRAINAGE STRUCTURE

12" PVC OUTLET

12" HDPE

MATCHLINE STA 6+50 -UT1- SEE SHEET 5

CROSS VANE

-UT1- BEGIN RESTORATION
STA 0+00 -UT1-
ELEV=546.29

EIP

TOPOGRAPHY BASED ON SURVEY PERMFORMED BY K2 SURVEYING ON 4-2017. TOPOGRAHY OUTSIDE OF SURVEY LIMITS BASED ON NC SPATIAL DATA QL2 LIDAR

UT 1

EXST GROUND AT PROP THALWEG

REMOVE STRUCTURE

PROP THALWEG

REMOVE PIPE

-UT 1-
BEGIN RESTORATION
STA 0+00
ELEV= 546.29

MATCHLINE STA 6+50 -UT1- SEE SHEET 5

550 545 540 535 530

00 +50 01 +50 02 +50 03 +50 04 +50 05 +50 06 +50

11/7/2017
Major_Hill_Hyd_PSH_04.dgn
bsmith

-UT 1- STRUCTURE LOCATIONS				
STR. TYPE	STATION	OFFSET	NORTHING	EASTING
CROSS VANE	6+69.08	0	774,033.76	1,893,264.84
CROSS VANE	6+91.26	0	774,012.64	1,893,268.84
CROSS VANE	7+13.27	0	773,995.89	1,893,282.41
CROSS VANE	7+24.80	0	773,984.48	1,893,283.97
CROSS VANE	8+40.22	0	773,903.17	1,893,347.00
CROSS VANE	9+09.99	0	773,858.45	1,893,397.75
LOG VANE	9+92.83	0	773,829.56	1,893,459.92
CROSS VANE	11+49.43	0	773,722.14	1,893,550.59
CROSS VANE	12+08.55	0	773,691.47	1,893,594.65
LOG VANE	12+79.21	0	773,634.20	1,893,630.53

SHEET NAME	SHEET NUMBER
STRUCTURES	5
PROJECT NAME: MAJOR HILL STREAM AND WETLAND RESTORATION SITE	
COUNTY: ALAMANCE	DATE: 2018

Axiom Environmental, Inc.

SUNGATE DESIGN GROUP, P.A.
905 JONES FRANKLIN ROAD
RALEIGH, NORTH CAROLINA 27606
TEL (919) 859-2243
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NORTH CAROLINA PROFESSIONAL ENGINEER ... C. DALTON
PRELIMINARY DESIGN NOT FOR CONSTRUCTION

DATE:

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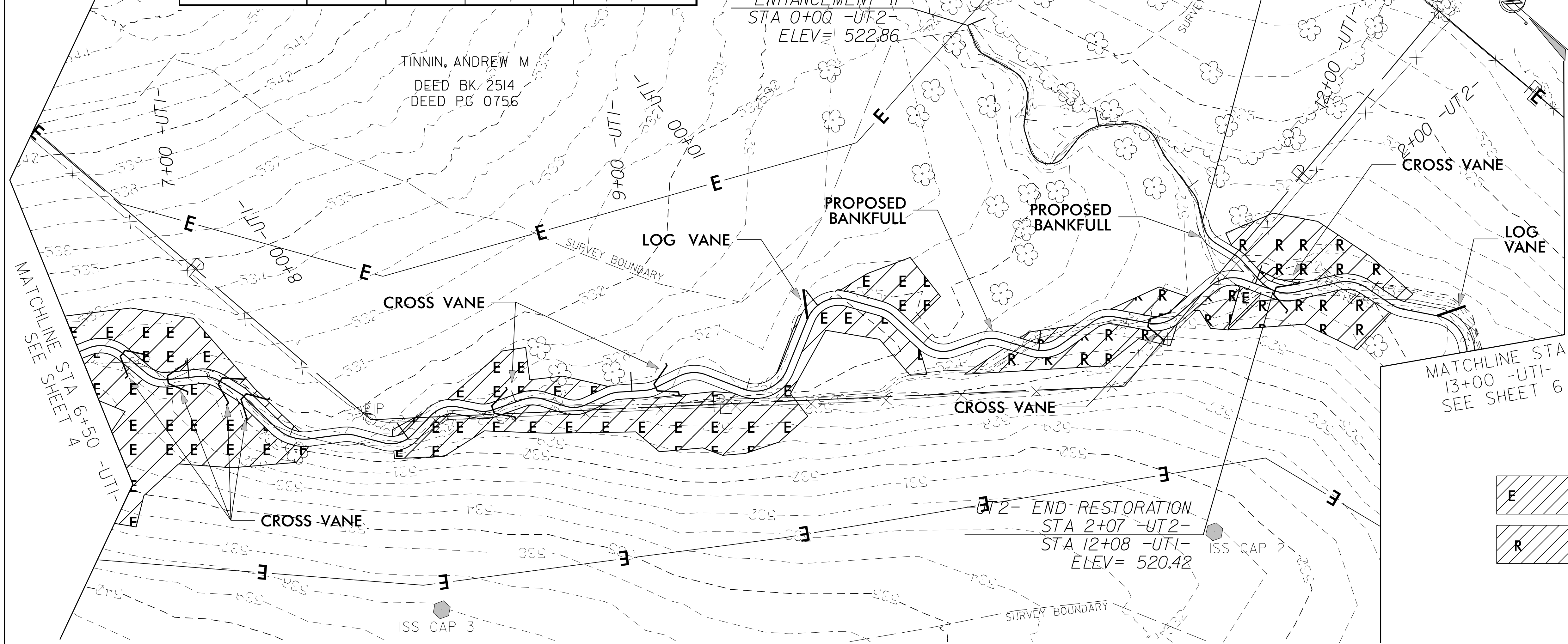
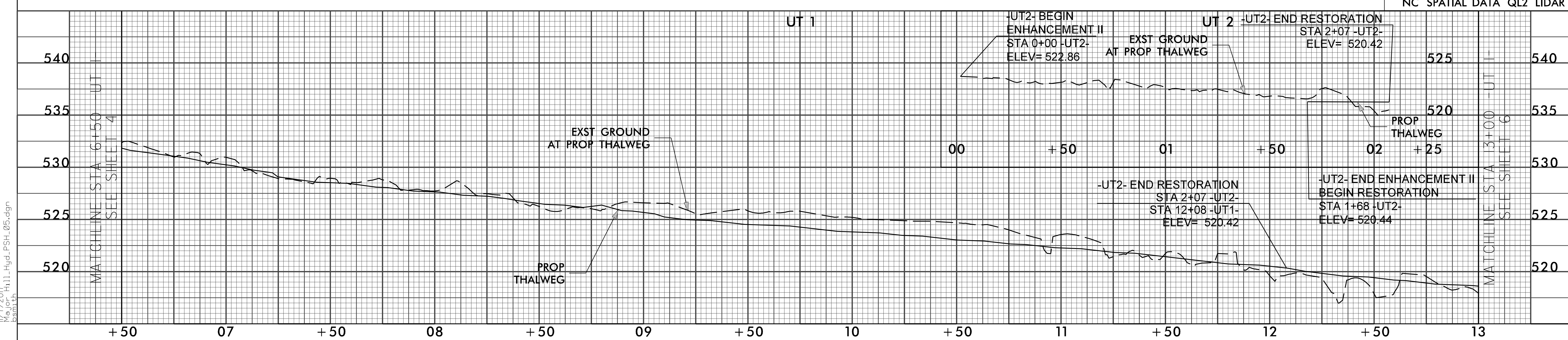


DENOTES ENHANCEMENT IN WETLAND

DENOTES RESTORED WETLANDS

TOPOGRAPHY BASED ON SURVEY PERMFORMED BY K2 SURVEYING ON 4-2017. TOPOGRAHY OUTSIDE OF SURVEY LIMITS BASED ON NC SPATIAL DATA QL2 LIDAR



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E E DENOTES ENHANCEMENT IN WETLAND

R R DENOTES RESTORED WETLANDS

DENOTES MARSH TREATMENT

-UT 1- STRUCTURE LOCATIONS

STR. TYPE	STATION	OFFSET	NORTHING	EASTING
CROSS VANE	13+39.15	0	773,581.65	1,893,611.71
CROSS VANE	15+32.58	0	773,423.40	1,893,571.06
DROP STRUCTURE	16+34.29	0	773,326.26	1,893,583.18

SHEET NAME		SHEET NUMBER
STRUCTURES		6
PROJECT NAME: MAJOR HILL STREAM AND WETLAND RESTORATION SITE		
	COUNTY: ALAMANCE	DATE: 2018

SUNGATE DESIGN GROUP, P.A.
905 JONES FRANKLIN ROAD
RALEIGH, NORTH CAROLINA 27606
TEL (919) 859-2243
ENG FIRM LICENSE NO. C-890
Axiom Environmental, Inc.

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 26811 JOSEPH T. DALTON
PRELIMINARY DESIGN NOT FOR CONSTRUCTION

DATE:

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-UT1- STA 14+00
-UT1- STA 15+00
-UT1- STA 16+00
-UT1- STA 17+00
-UT1- STA 18+00
-UT1- STA 19+50

SURVEY BOUNDARY

WILLIARD ENTERPRISES, LLC
DEED BK 3143
DEED PG 0270

LAMM, JAMES D AND CAROL L
DEED BK 2789
DEED PG 0896

MATCHLINE STA 13+00 -UT1- SEE SHEET 5

MATCHLINE STA 19+50 -UT1- SEE SHEET 7

PROPOSED BANKFULL

CROSS VANE

CROSS VANE

PROPOSED BANKFULL

DROP STRUCTURE

MARSH TREATMENT

-UT1- END RESTORATION
BEGIN ENHANCEMENT II
STA 16+99 -UT1-
ELEV= 511.16

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UT 1

EXST GROUND AT PROP THALWEG

PROP THALWEG

MATCHLINE STA 13+00 -UT1- SEE SHEET 5

MATCHLINE STA 19+50 -UT1- SEE SHEET 7

520 515 510 505 500

13 +50 14 +50 15 +50 16 +50 17 +50 18 +50 19 +50

-UT1- END RESTORATION
BEGIN ENHANCEMENT II
STA 16+99 -UT1-
ELEV= 511.16

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TOPOGRAPHY BASED ON SURVEY PERMFORMED BY K2 SURVEYING ON 4-2017. TOPOGRAHY OUTSIDE OF SURVEY LIMITS BASED ON NC SPATIAL DATA QL2 LIDAR

SHEET NAME		SHEET NUMBER
STRUCTURES		7
PROJECT NAME: MAJOR HILL STREAM AND WETLAND RESTORATION SITE		
	COUNTY: ALAMANCE	DATE: 2018

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905 JONES FRANKLIN ROAD
RALEIGH, NORTH CAROLINA 27606
TEL (919) 859-2243
ENG FIRM LICENSE NO. C-890

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 24681 JOSEPH T. DALTON
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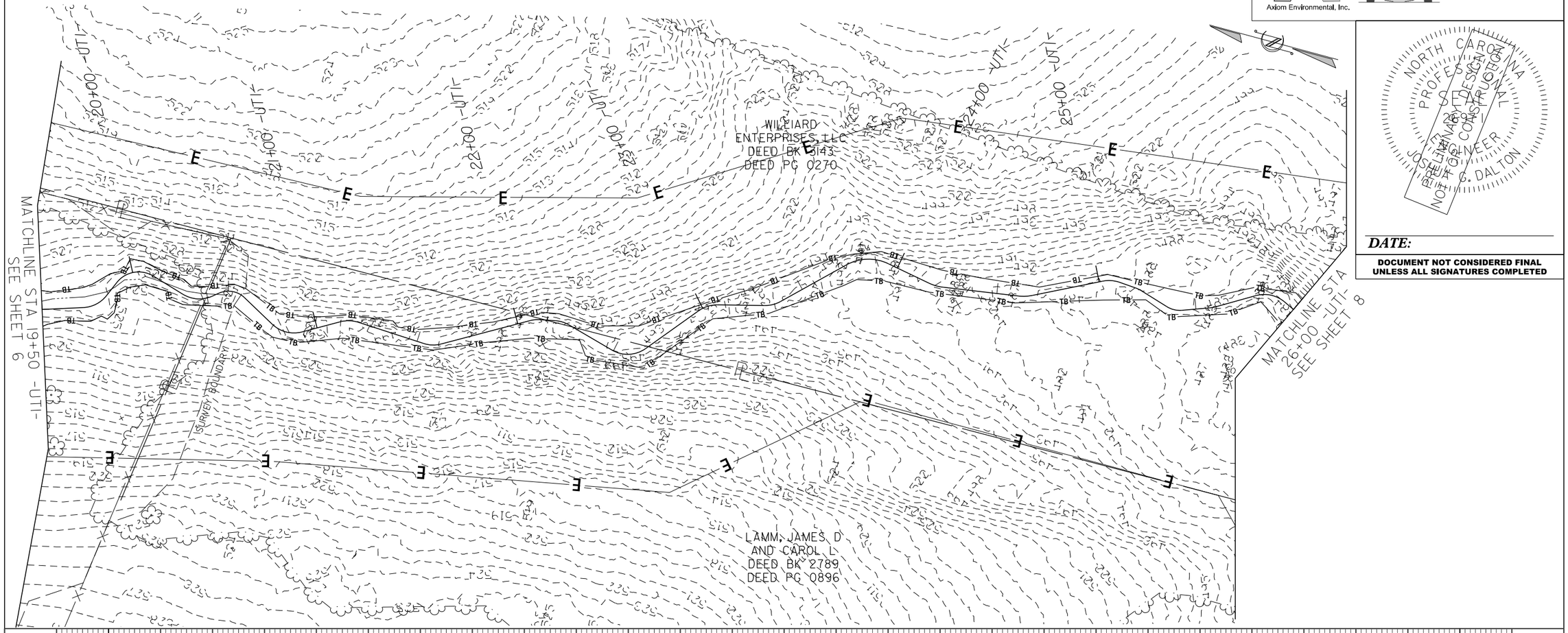

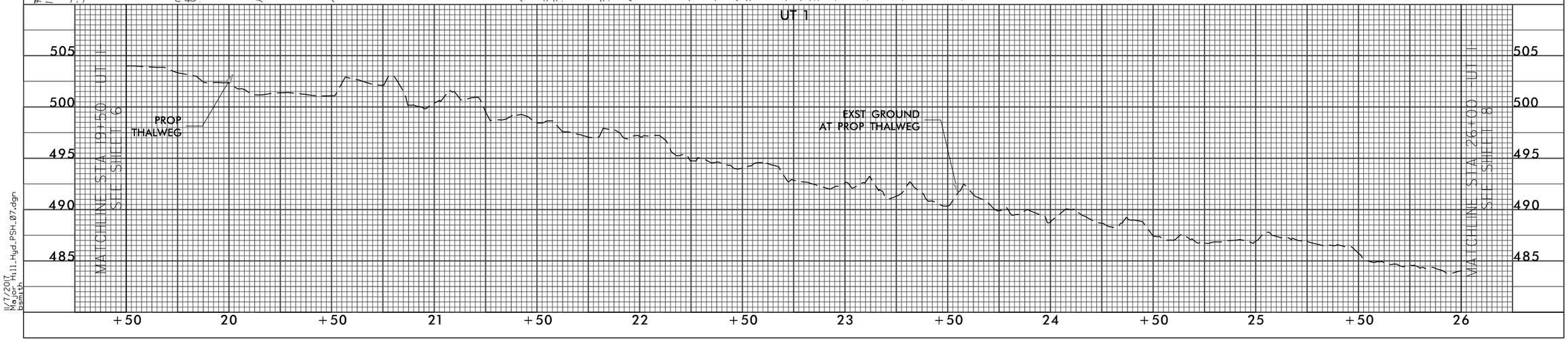

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TOPOGRAHY OUTSIDE
OF SURVEY LIMITS BASED ON
NC SPATIAL DATA QL2 LIDAR

SHEET NAME		SHEET NUMBER
STRUCTURES		8
PROJECT NAME: MAJOR HILL STREAM AND WETLAND RESTORATION SITE		
	COUNTY: ALAMANCE	DATE: 2018

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905 JONES FRANKLIN ROAD
RALEIGH, NORTH CAROLINA 27606
TEL (919) 859-2243
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DATE:

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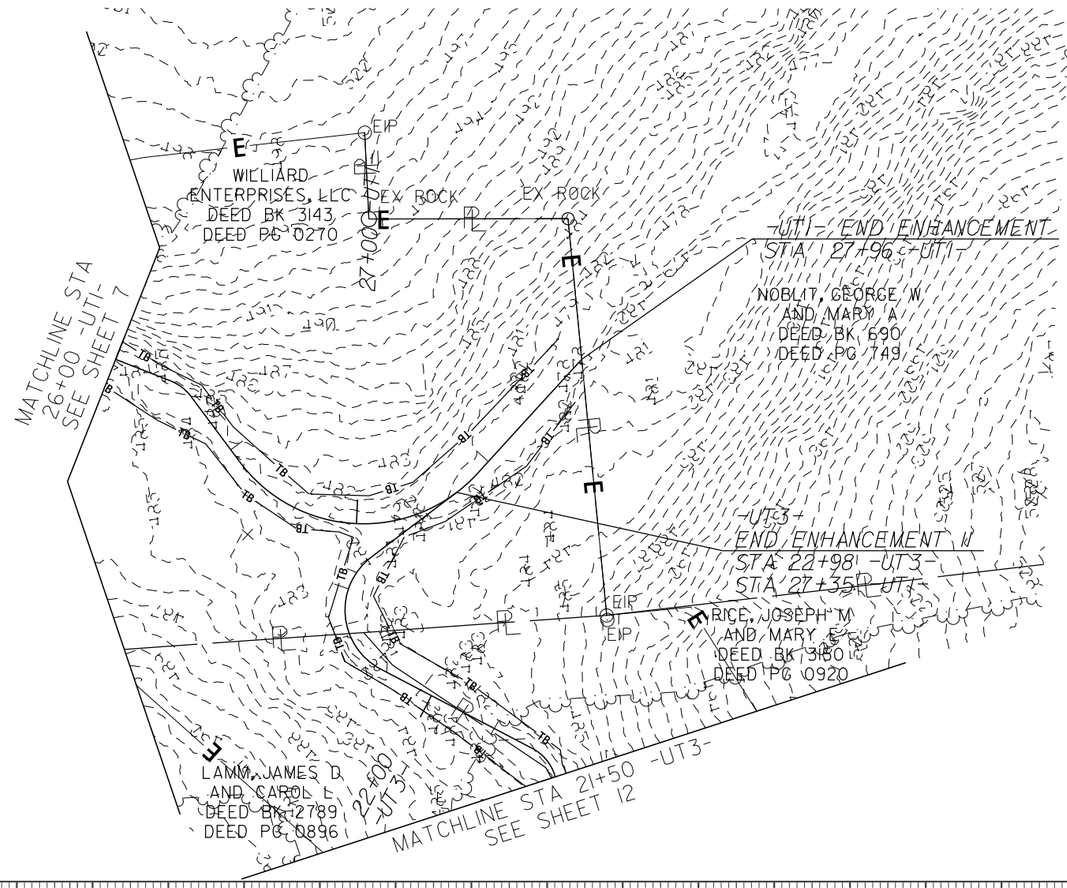

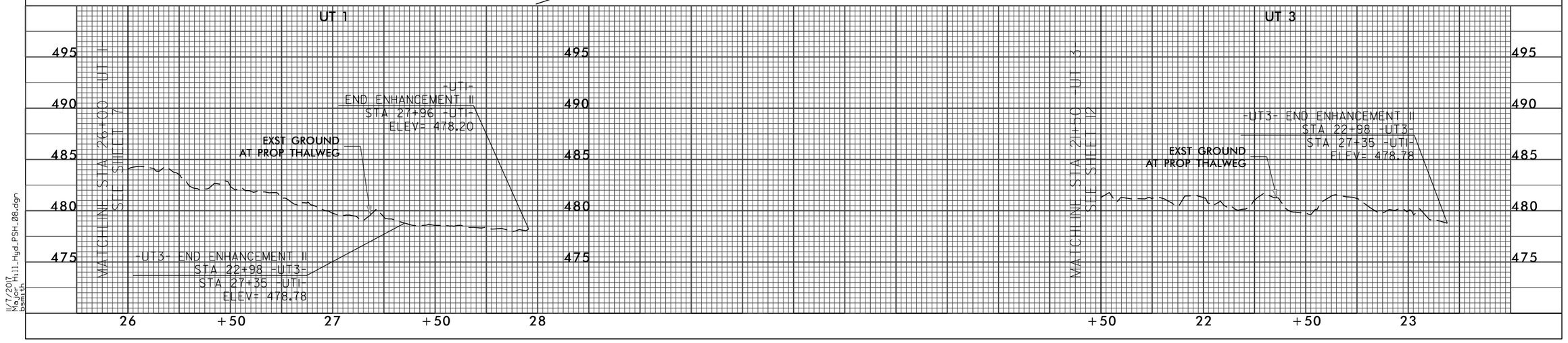

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SHEET NAME	SHEET NUMBER
STRUCTURES	9

PROJECT NAME: MAJOR HILL STREAM AND WETLAND RESTORATION SITE

COUNTY: ALAMANCE DATE: 2018

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905 JONES FRANKLIN ROAD
RALEIGH, NORTH CAROLINA 27606
TEL (919) 859-2243
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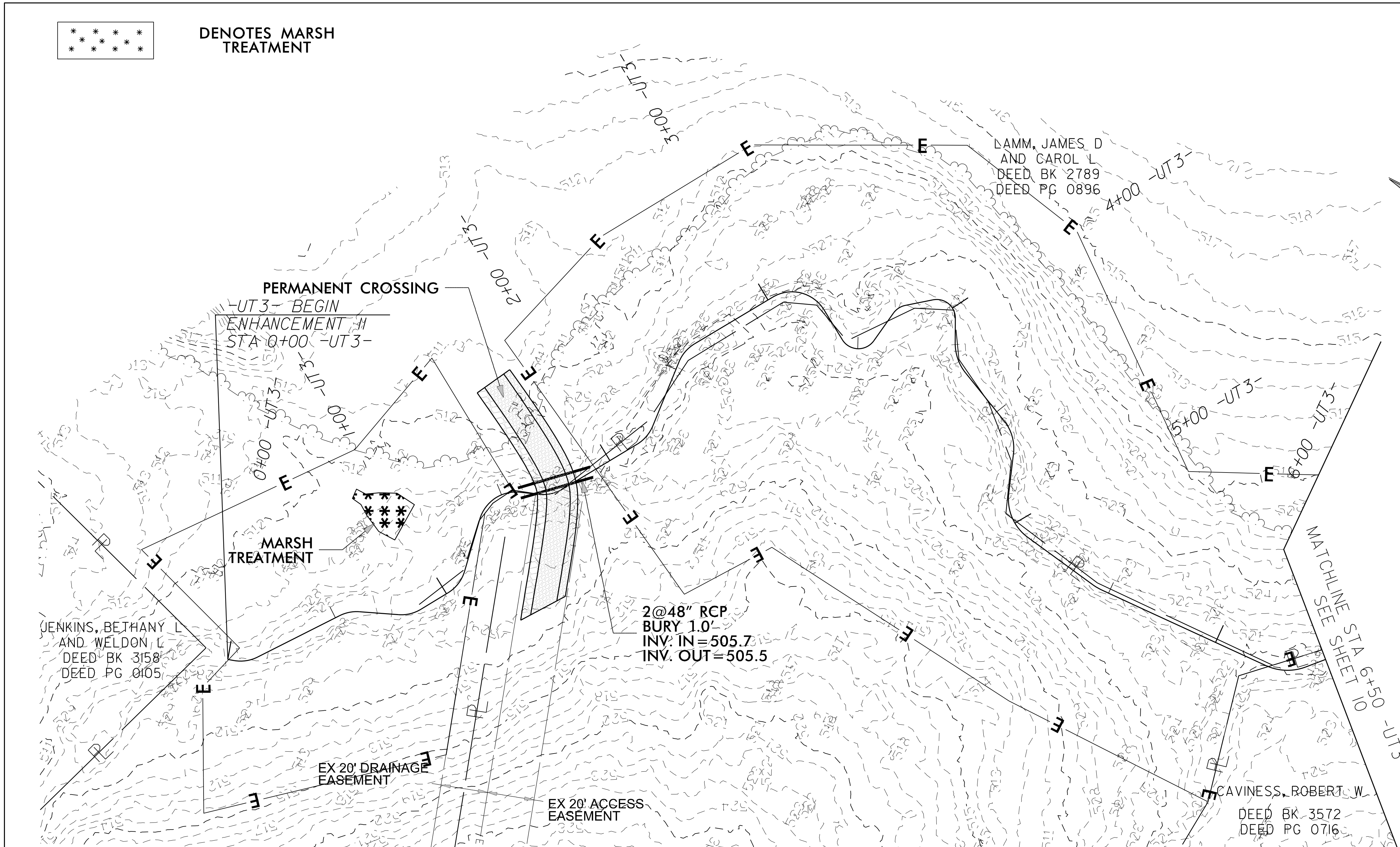
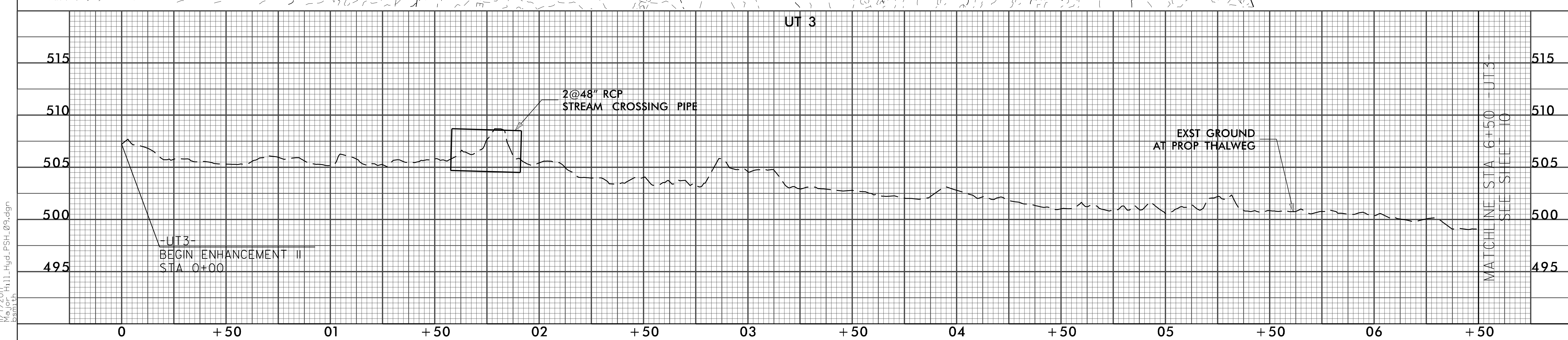


TOPOGRAHY OUTSIDE OF SURVEY LIMITS BASED ON NC SPATIAL DATA QL2 LIDAR



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SHEET NAME		SHEET NUMBER
STRUCTURES		10
PROJECT NAME: MAJOR HILL STREAM AND WETLAND RESTORATION SITE		
	COUNTY: ALAMANCE	DATE: 2018

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905 JONES FRANKLIN ROAD
RALEIGH, NORTH CAROLINA 27606
TEL (919) 859-2243
ENG FIRM LICENSE NO. C-890
Axiom Environmental, Inc.

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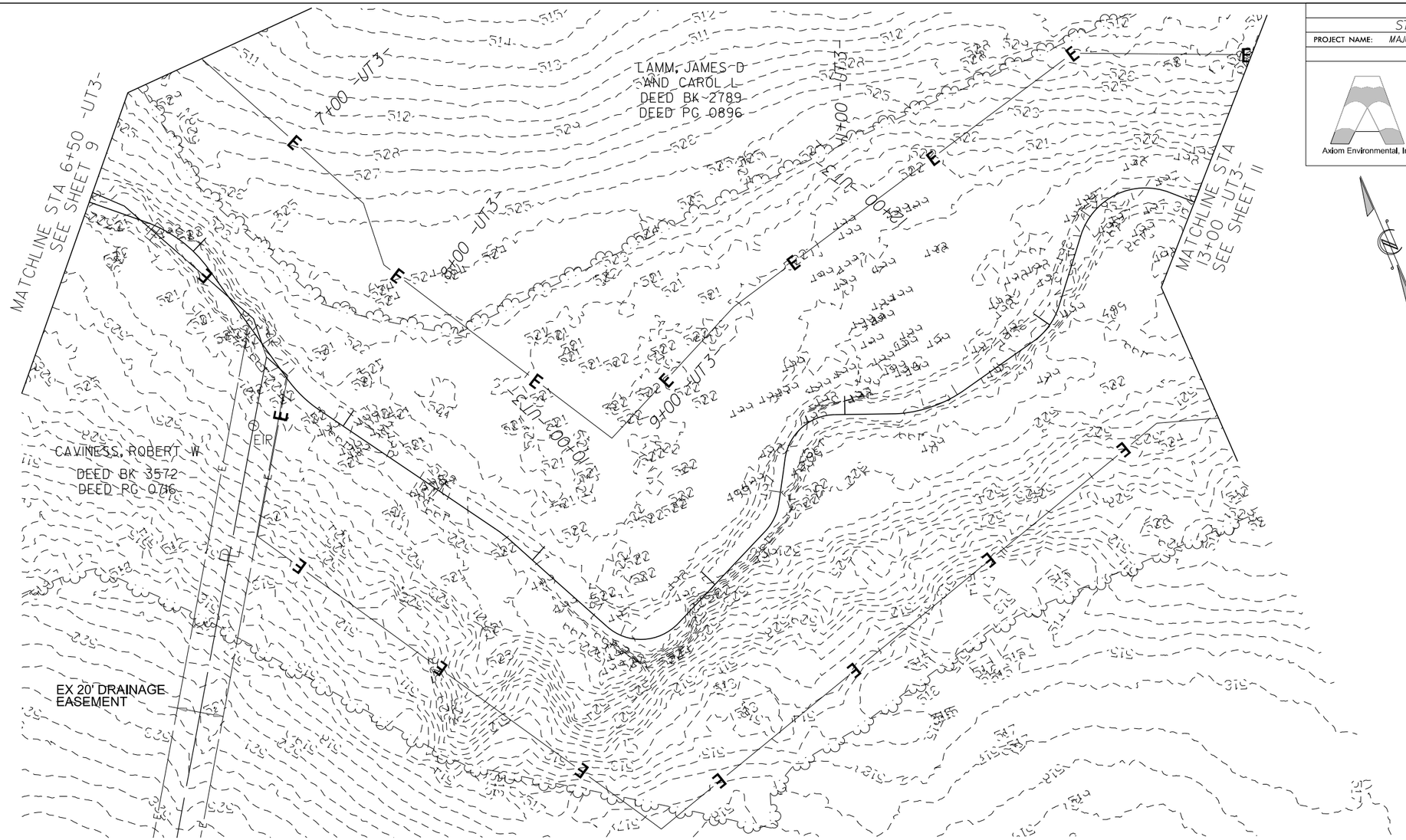
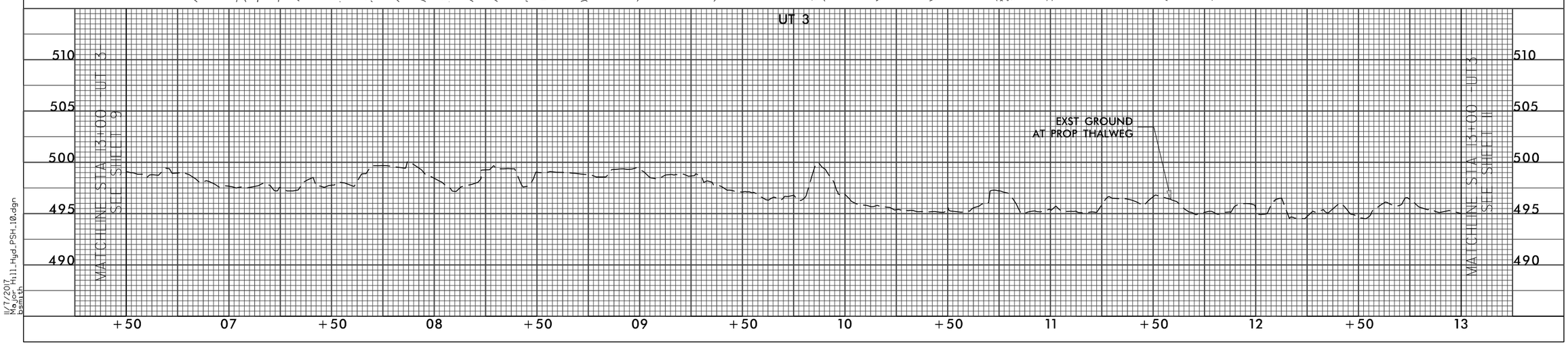


TOPOGRAHY OUTSIDE OF SURVEY LIMITS BASED ON NC SPATIAL DATA QL2 LIDAR



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SHEET NAME		SHEET NUMBER
STRUCTURES		11
PROJECT NAME: MAJOR HILL STREAM AND WETLAND RESTORATION SITE		
	COUNTY: ALAMANCE	DATE: 2018

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905 JONES FRANKLIN ROAD
RALEIGH, NORTH CAROLINA 27606
TEL (919) 859-2243
ENG FIRM LICENSE NO. C-890

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 26681 JOSEPH C. DALTON
PRELIMINARY NOT FOR CONSTRUCTION

DATE:

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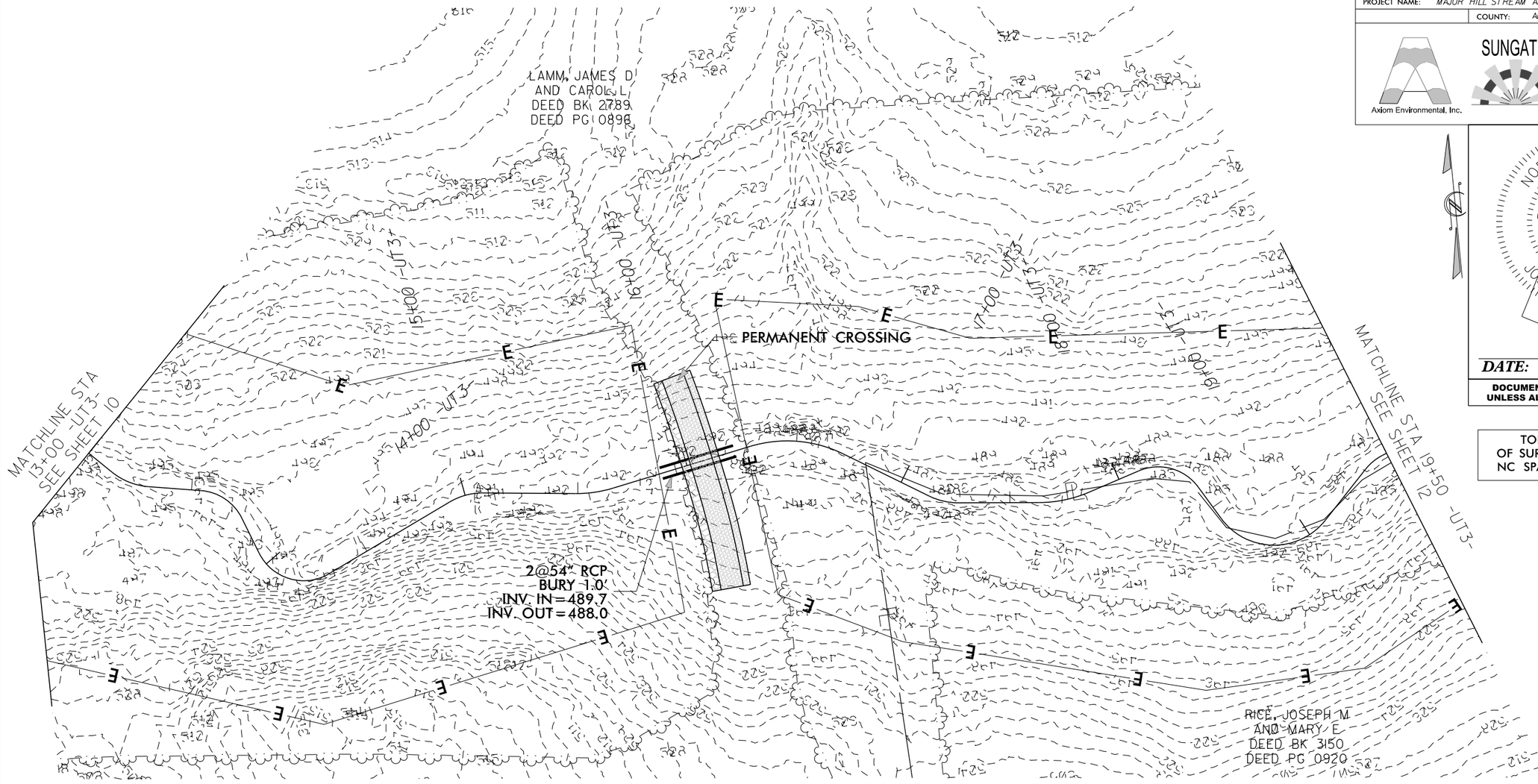
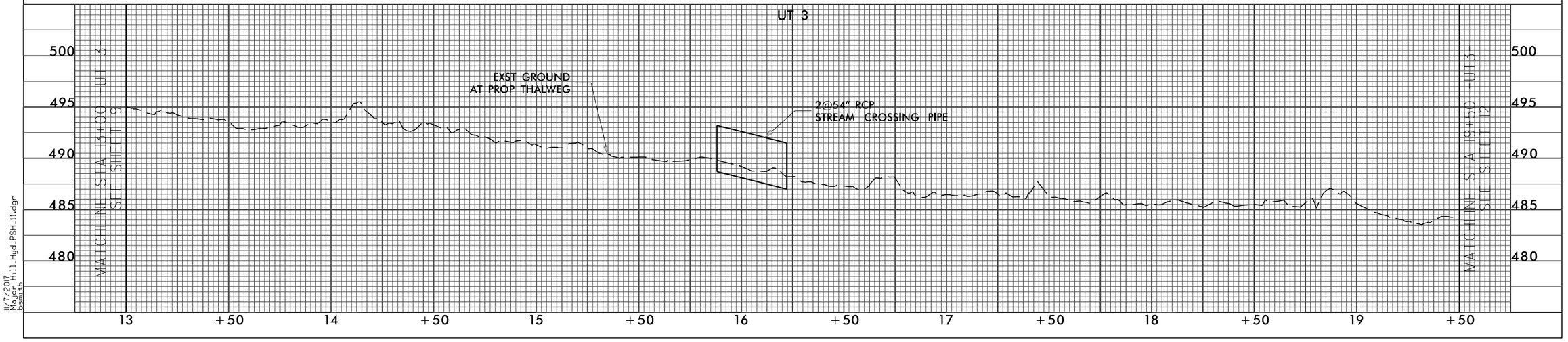
TOPOGRAHY OUTSIDE OF SURVEY LIMITS BASED ON NC SPATIAL DATA QL2 LIDAR





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SHEET NAME	SHEET NUMBER
STRUCTURES	12

PROJECT NAME: MAJOR HILL STREAM AND WETLAND RESTORATION SITE

COUNTY: ALAMANCE DATE: 2018

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SUNGATE DESIGN GROUP, P.A.
905 JONES FRANKLIN ROAD
RALEIGH, NORTH CAROLINA 27606
TEL (919) 859-2243
ENG FIRM LICENSE NO. C-890

NORTH CAROLINA PROFESSIONAL ENGINEER
JOSHUA G. DALTON
PRELIMINARY DESIGN NOT FOR CONSTRUCTION

DATE:

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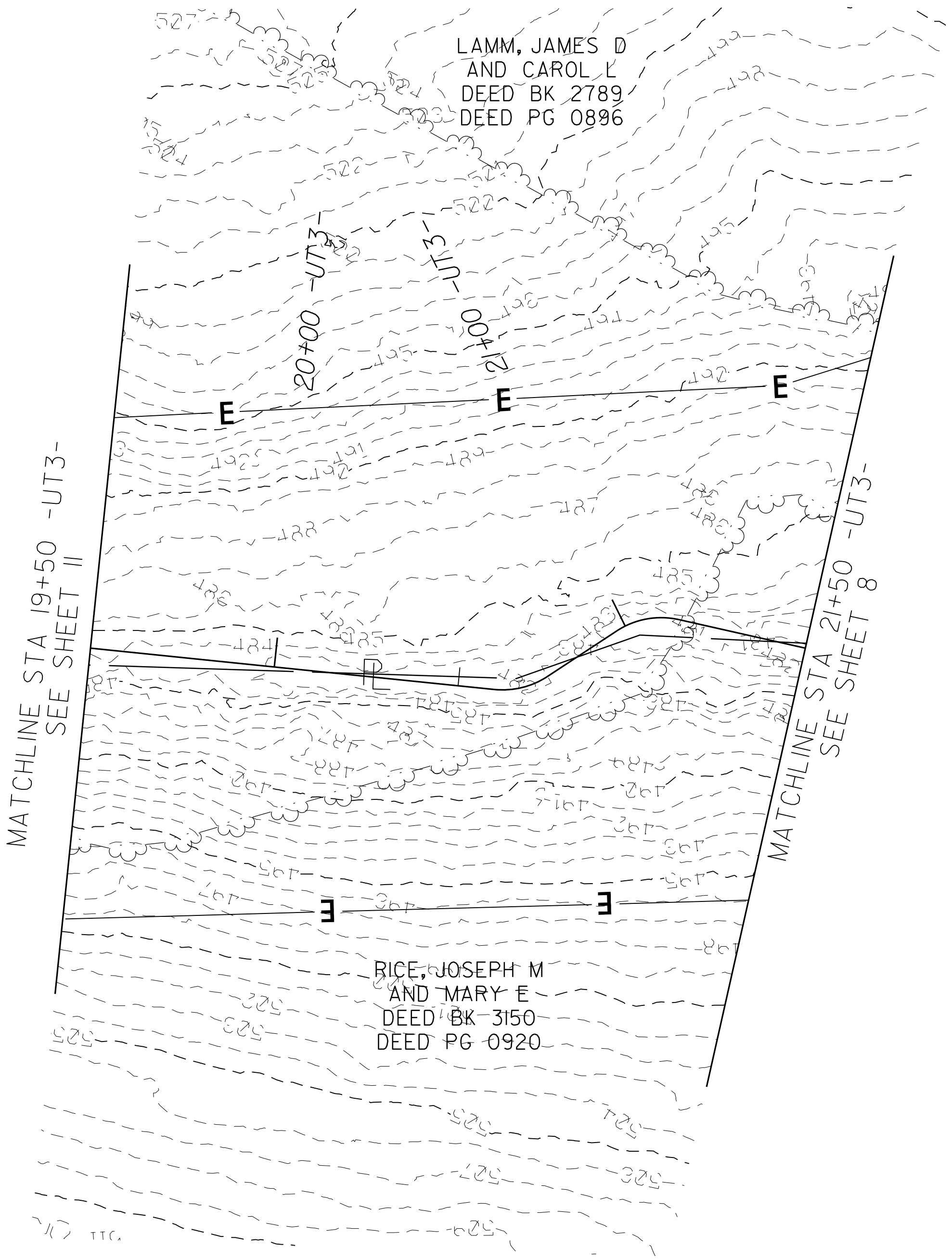

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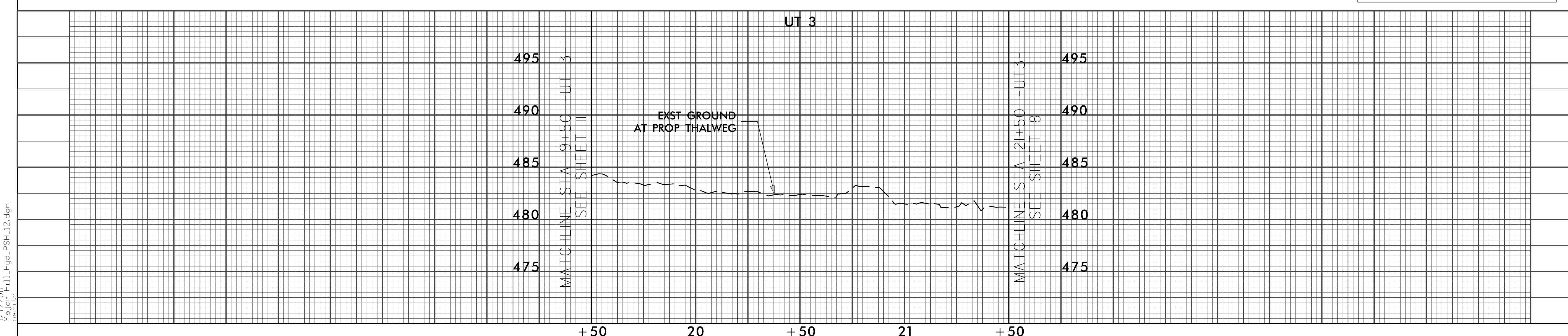

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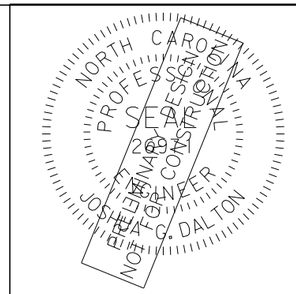
EROSION CONTROL NOTES



DATE:

SHEET NAME		SHEET NUMBER
EROSION CONTROL		E-2A
PROJECT NAME: MAJOR HILL STREAM AND WETLAND RESTORATION SITE		
	COUNTY: ALAMANCE	DATE: 2018

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EROSION CONTROL CONSTRUCTION SEQUENCE

1) Obtain grading permit.
2) Install temporary construction entrances, silt fencing, access roads, and other measures shown on the approved erosion and sedimentation control plan.
3) Install rain gage on site. Contractor shall provide a log book at the project site and shall read and record rain amounts at the same time each day.
4) Contact local Soil Erosion Authority or State for on-site inspection by Environmental Inspector and obtain certificate of compliance.
5) Begin clearing - maintain devices as necessary.
6) Begin channel construction - stockpile waste material in designated spoil areas and surround with silt fencing.
7) Temporary or permanent ground cover stabilization shall occur within 7 calendar days from the last land-disturbing activity, with the following exceptions in which temporary or permanent ground cover shall be provided within 14 calendar days from the last land-disturbing activity:

    - Slopes between 2:1 and 3:1, with a slope length of 10 feet or less
    - Slopes 3:1 or flatter, with a slope length of 50 feet or less
    - Slopes 4:1 or flatter

8) All graded stream banks must be seeded, mulched, and matted at the end of each day. For this reason, daily disturbance is limited to the length of stream that can be completed within daily work hours.
9) Once a newly constructed channel section is stabilized, impervious dikes and pump around stations may be removed, and water may be reintroduced to the channel.
10) When construction is complete and all areas are stabilized completely, call for inspection by Environmental Inspector.
11) If site is approved, remove silt fencing, access roads, etc. and seed out any resulting bare areas.
12) When vegetation has been established, call for final site inspection by Environmental Inspector.

SEEDING SCHEDULE

TEMPORARY HERBACEOUS SEED

Common Name	Scientific Name	Application Rate	Application Dates
Grain Rye [A]	*Secale cereale*	130 lbs. per acre (3 lbs. per 1,000 ft^2)	Year-round
Orchard Grass [B]	*Dactylis glomerata*	15 lbs per acre (0.35 lbs. per 1,000 ft^2)	September - March
Brown Top Millet [B]	*Panicum ramosum*	40 lbs. per acre (1.0 lbs. per 1,000 ft^2)	May – September
German Millet [B]	*Setaria italica*	25 lbs. per acre (0.5 lbs. per 1,000 ft^2)	May – September

[A] Primarily utilized on disturbed or stockpiled areas.
[B] Primarily utilized near stream channels and streambanks.

SOIL AMENDMENTS

In lieu of a soil test:

Fertilizer	10 – 10 -10 1000 lb./acre
Lime *	4000 lb./acre

- Use ground, agricultural limestone, or pelletized dolomitic limestone.

Mulch

Small grain mulch must be applied at a rate of 2 tons/acre to all seeded areas.

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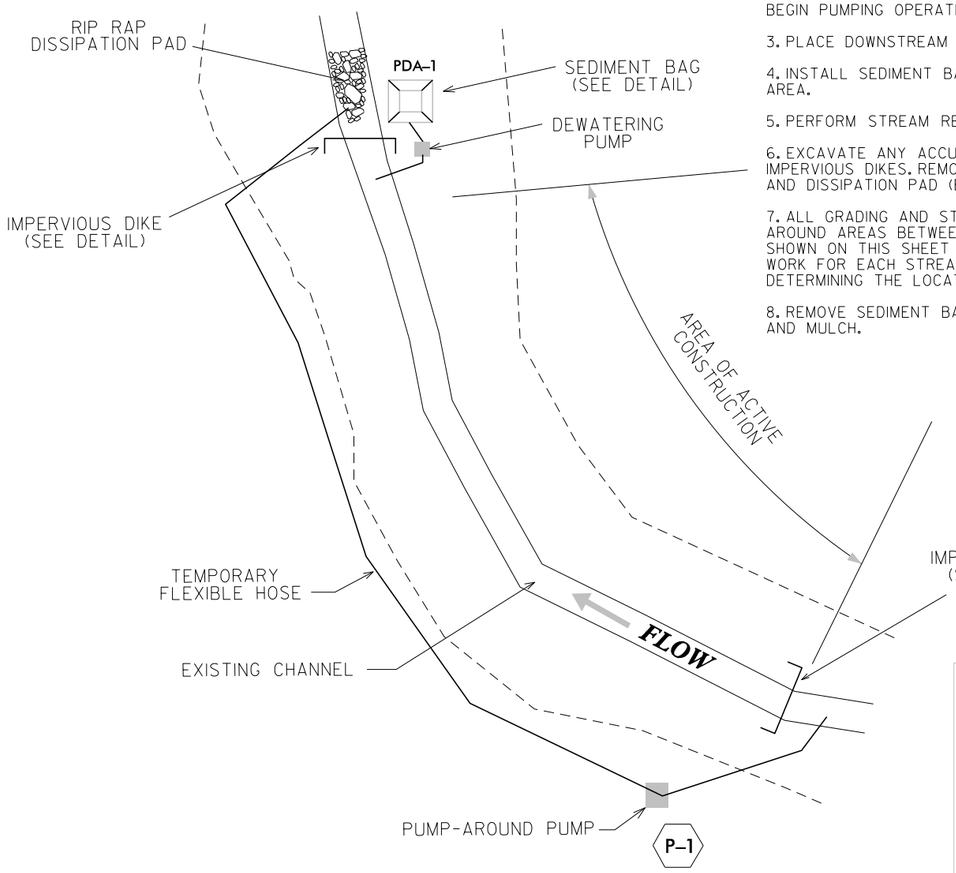


CONSTRUCTION SEQUENCE FOR TYPICAL PUMP-AROUND:

1. INSTALL UPSTREAM PUMP AND TEMPORARY FLEXIBLE HOSE.

2. PLACE UPSTREAM IMPERVIOUS DIKE, DOWNSTREAM RIP RAP DISSIPATION PAD, AND BEGIN PUMPING OPERATIONS FOR STREAM DIVERSION.

3. PLACE DOWNSTREAM IMPERVIOUS DIKE.

4. INSTALL SEDIMENT BAG AND ASSOCIATED PUMP. DEWATER THE ENTRAPPED AREA.

5. PERFORM STREAM RESTORATION WORK IN ACCORDANCE WITH THE PLANS.

6. EXCAVATE ANY ACCUMULATED SILT AND DEWATER BEFORE REMOVAL OF IMPERVIOUS DIKES. REMOVE IMPERVIOUS DIKES, PUMPS, TEMPORARY FLEXIBLE HOSE, AND DISSIPATION PAD (BEGIN WITH DOWNSTREAM IMPERVIOUS DIKE FIRST).

7. ALL GRADING AND STABILIZATION MUST BE COMPLETED WITHIN THE PUMP AROUND AREAS BETWEEN THE IMPERVIOUS DIKES. THE IMPERVIOUS LOCATIONS AS SHOWN ON THIS SHEET ONLY REPRESENT THE UPPER AND LOWER EXTENT OF WORK FOR EACH STREAM SEGMENT. THE CONTRACTOR IS RESPONSIBLE FOR DETERMINING THE LOCATION OF THE IMPERVIOUS DIKES.

8. REMOVE SEDIMENT BAG(S) AND BACKFILL. STABILIZE DISTURBED AREA WITH SEED AND MULCH.

NOTES:

1. ALL EXCAVATION SHALL BE PERFORMED IN ONLY DRY OR ISOLATED SECTIONS OF CHANNEL

2. IMPERVIOUS DIKES ARE TO BE USED TO ISOLATE WORK FROM STREAM FLOW WHEN NECESSARY

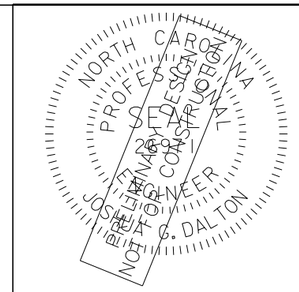
3. ALL GRADED STREAM BANKS SHALL BE SEEDED, MULCHED, AND MATTED AT THE END OF EACH WORKING DAY. ALL OTHER GRADED AREAS SHALL BE SEEDED IN ACCORDANCE WITH THE CONSTRUCTION DOCUMENTS.

4. MAINTENANCE OF STREAM FLOW OPERATIONS SHALL BE INCIDENTAL TO THE WORK, THIS INCLUDES POLYETHYLENE SHEETING, DIVERSION PIPES, PUMPS, AND HOSES.

5. PUMPS AND HOSES SHALL BE OF A SUFFICIENT SIZE AND NUMBER TO DEWATER THE WORK AREA.

6. RIP RAP DISSIPATION PAD TO BE INSTALLED DOWNSTREAM OF LOWER IMPERVIOUS DIKE

TYPICAL PUMP-AROUND OPERATION



DATE:

SHEET NAME		SHEET NUMBER
EROSION CONTROL TYPICAL		E-3
PROJECT NAME: MAJOR HILL STREAM AND WETLAND RESTORATION SITE		
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SUNGATE DESIGN GROUP, P.A.
905 JONES FRANKLIN ROAD
RALEIGH, NORTH CAROLINA 27606
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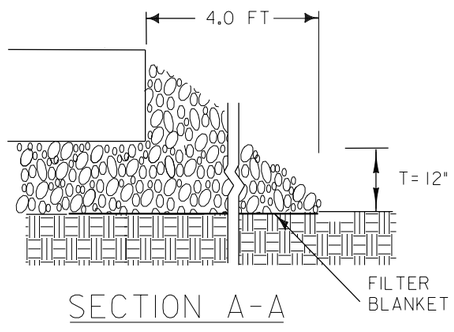
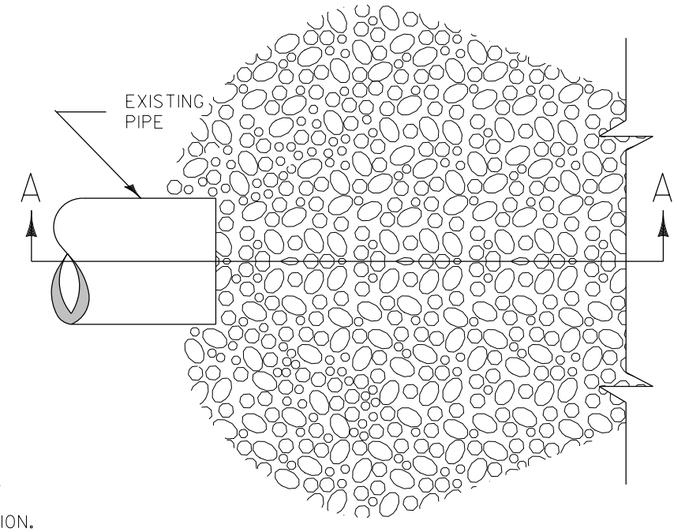
RIPRAP DISSIPATION PAD



SECTION A-A

PLAN VIEW



NOTES:

1. La IS THE LENGTH OF THE RIPRAP APRON.
2. T = THICKNESS
3. IN A WELL-DEFINED CHANNEL EXTEND THE APRON UP THE CHANNEL BANKS TO THE TOP OF THE BANK.
4. A FILTER BLANKET OR FILTER FABRIC SHOULD BE INSTALLED BETWEEN THE RIPRAP AND SOIL FOUNDATION.

RIP RAP DISIPATION PAD SPECIFICATIONS

ASSUMED HOSE SIZE (IN)	PERMANENT (Y/N)	LENGTH La (FT)	WIDTH Wo (FT)	STONE SIZE d50 (IN)	STONE CLASS	THICKNESS (IN)
4"	N	4.0	1.0	3	A	12

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SHEET NAME	SHEET NUMBER
EROSION CONTROL TYPICAL	E-3A

PROJECT NAME: MAJOR HILL STREAM AND WETLAND RESTORATION SITE

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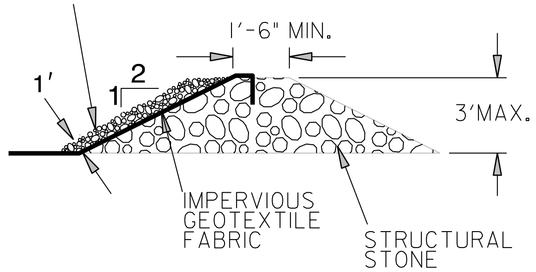
DATE:

IMPERVIOUS DIKE



CROSS SECTION VIEW

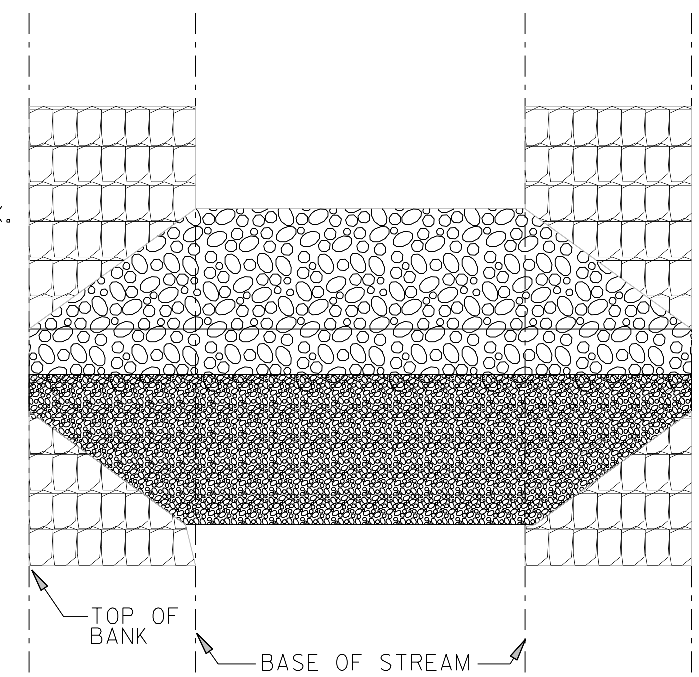
NOTES:
1. USE CLASS B STONE FOR STRUCTURAL STONE.

2. USE NO. 5 OR NO. 57 STONE FOR SEDIMENT CONTROL.

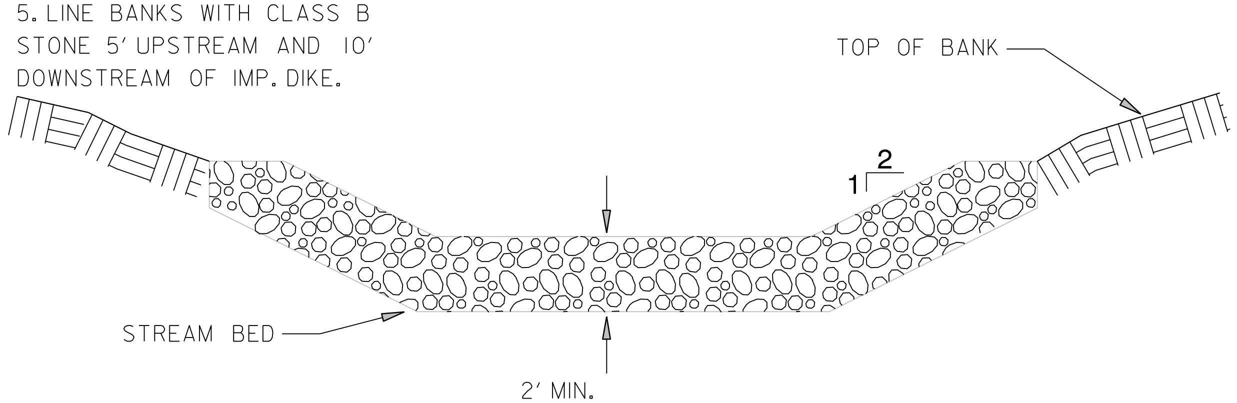
3. CONSTRUCT DAM A MAXIMUM OF 1 FT. ABOVE NORMAL FLOW DEPTH.

4. TOE IN IMPERVIOUS MATERIAL

5. LINE BANKS WITH CLASS B STONE 5' UPSTREAM AND 10' DOWNSTREAM OF IMP. DIKE.

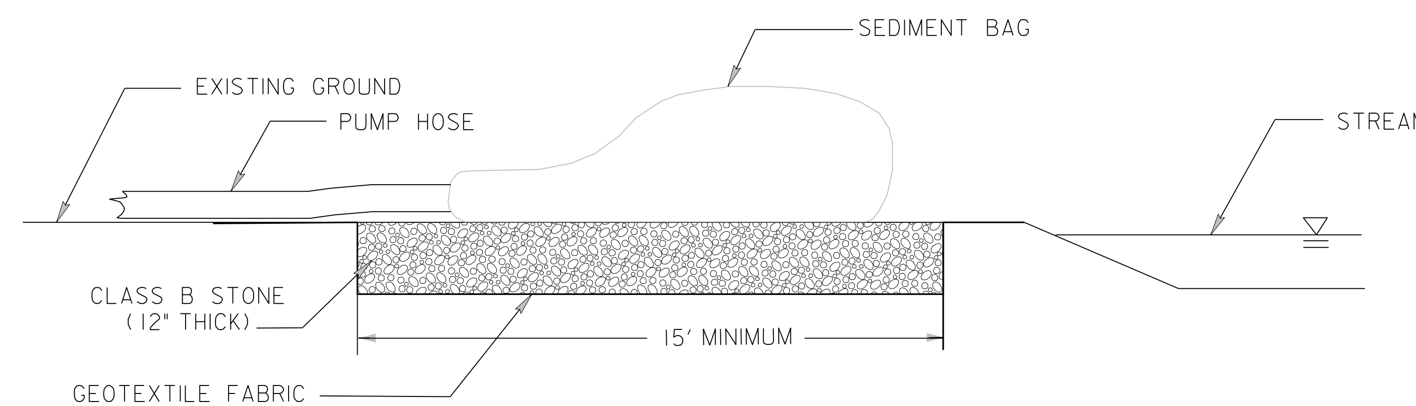


TOP VIEW



FRONT VIEW

SEDIMENT BAG



INSTALLATION:
1. INSTALL SEDIMENT BAG ON A SLOPE SO INCOMING WATER FLOWS DOWNHILL THROUGH BAG WITHOUT CREATING MORE EROSION. TO INCREASE THE EFFICIENCY OF FILTRATION, PLACE THE BAG ON A GRAVEL BED IN ORDER TO MAXIMIZE WATER FLOW THROUGH THE SURFACE AREA OF THE BAG.

2. BAG IS FULL WHEN IT NO LONGER CAN EFFICIENTLY FILTER SEDIMENT OR ALLOW WATER TO PASS AT A REASONABLE RATE. FLOW RATES WILL VARY DEPENDING ON THE SIZE OF SEDIMENT BAG, THE TYPE AND AMOUNT OF SEDIMENT DISCHARGED INTO THE BAG, THE TYPE OF GROUND, ROCK OR OTHER SUBSTANCE UNDER THE BAG AND THE DEGREE OF THE SLOPE ON WHICH THE BAG LIES. UNDER MOST CIRCUMSTANCES THE SEDIMENT BAG WILL ACCOMMODATE FLOW RATES OF 1100 GALLONS PER MINUTE. USE OF EXCESSIVE FLOW RATES OR OVERFILLING WITH SEDIMENT WILL CAUSE THE BAG TO RUPTURE OR FAILURE OF THE HOSE ATTACHMENT STRAPS.

3. DISPOSE OF SEDIMENT BAG AS DIRECTED BY THE SITE DESIGNER. IF ALLOWED, BAG MAY BE CUT OPEN AND THE CONTENTS SEEDED AFTER REMOVING VISIBLE FABRIC.

4. REFER TO DETAIL REGARDING GEOTEXTILE FABRIC ATTRIBUTES.

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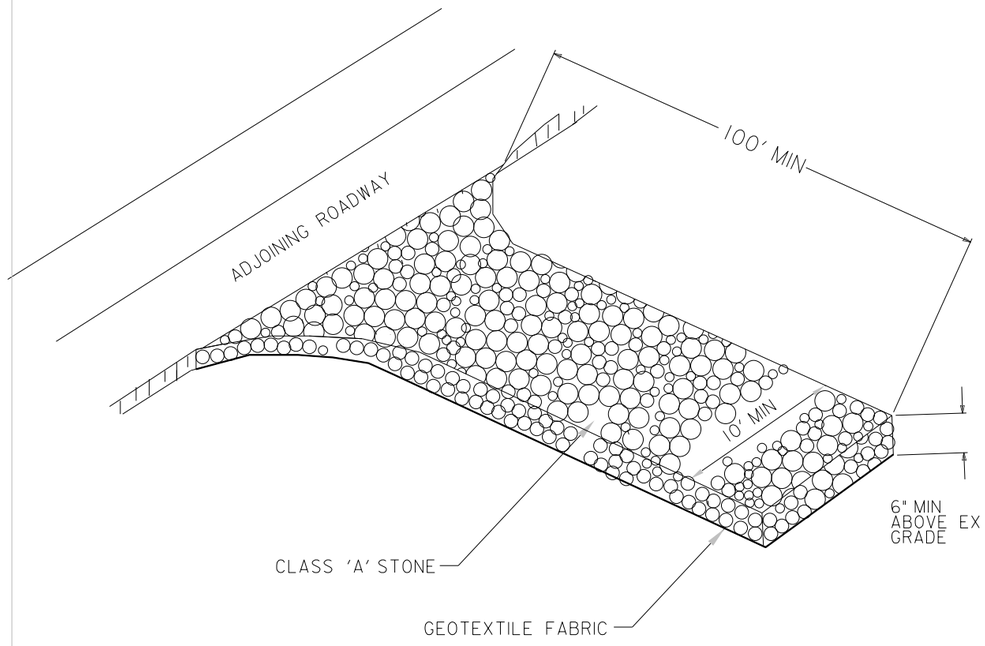
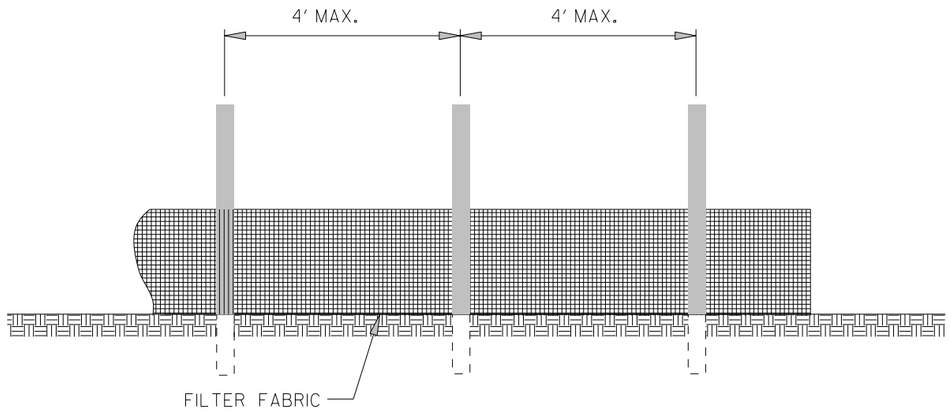
NOTES:

1. USE CLASS 'A' STONE ON PAD. PAD TO BE MINIMUM 100' LONG x 12' WIDE x 6" DEEP.
2. TURNING RADIUS SHOULD BE SUFFICIENT TO ACCOMODATE LARGE TRUCKS.
3. ENTRANCE(S) SHOULD BE LOCATED AS TO PROVIDE MAXIMUM UTILITY BY ALL CONSTRUCTION VEHICLES.
4. ENTRANCE(S) MUST BE MAINTAINED IN A CONDITION WHICH WILL PREVENT TRACKING OR DIRECT FLOW OF MUD ONTO ADJACENT ROADWAYS. PERIODIC TOP DRESSING WITH STONE MAY BE NECESSARY.
5. ANY MATERIAL WHICH FINDS ITS WAY ONTO THE ADJACENT ROADWAY MUST BE CLEANED UP IMMEDIATELY.

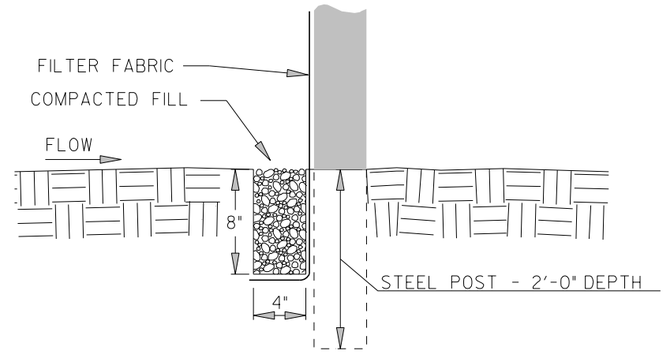


TEMPORARY CONSTRUCTION ENTRANCE/EXIT



NOTES:

1. FILTER FABRIC SHALL BE A MINIMUM OF 36" IN WIDTH AND SHALL BE FASTENED SECURELY TO THE POSTS.
2. STEEL POST SHALL BE 5'-0" IN HEIGHT AND BE OF THE SELF-FASTENER ANGLE STEEL TYPE.
3. WHEN JOINTS ARE NECESSARY, SECURELY FASTEN THE FABRIC AT A SUPPORT POST WITH OVERLAP TO THE NEXT POST.
4. FILTER FABRIC TO BE NYLON, POLYESTER, PROPYLENE, OR ETHYLENE YARN WITH EXTRA STRENGTH (50 LB/LIN. INCH MINIMUM) AND WITH A MINIMUM FLOW RATE OF 0.3 GAL/FT/MIN. FABRIC SHOULD CONTAIN ULTRAVIOLET RAY INHIBITORS AND STABILIZERS.



SILT FENCE

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 036887 JOSEPH C. DALTON

DATE:

SHEET NAME		SHEET NUMBER
EROSION CONTROL TYPICAL		E-3B
PROJECT NAME: MAJOR HILL STREAM AND WETLAND RESTORATION SITE		
	COUNTY: ALAMANCE	DATE: 2018

Axiom Environmental, Inc.

SUNGATE DESIGN GROUP, P.A.
905 JONES FRANKLIN ROAD
RALEIGH, NORTH CAROLINA 27606
TEL (919) 859-2243
ENG FIRM LICENSE NO. C-890

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bsmith

SHEET NAME		SHEET NUMBER
EROSION CONTROL TYPICAL		E-3C
PROJECT NAME: MAJOR HILL STREAM AND WETLAND RESTORATION SITE		
	COUNTY: ALAMANCE	DATE: 2018

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NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 20893 JOSEPH C. DALTON NOT TO BE USED FOR CONSTRUCTION

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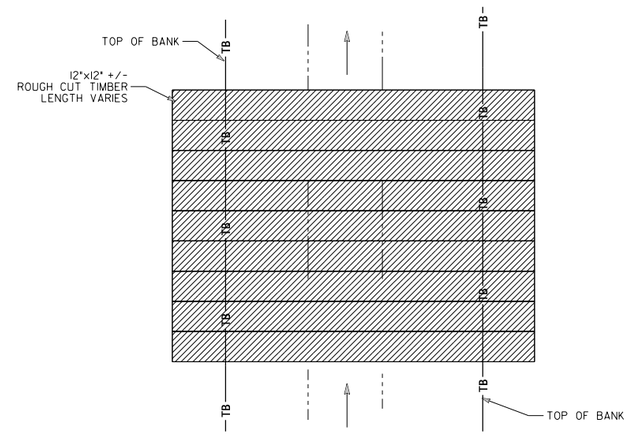
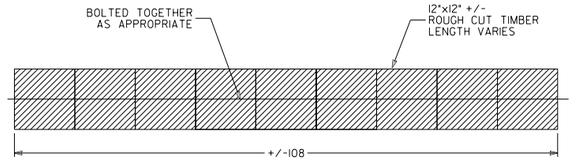
LOG MAT BRIDGE

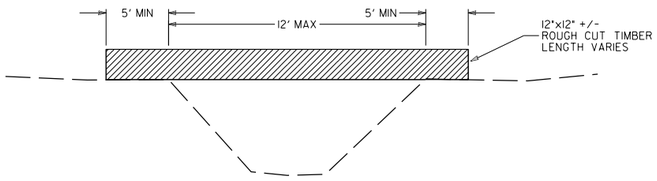


PLAN VIEW

NOTE:
DETAIL PROVIDED FOR INFORMATIONAL PURPOSES. USE OF LOG MAT BRIDGE IS AT CONTRACTORS DISCRETION.



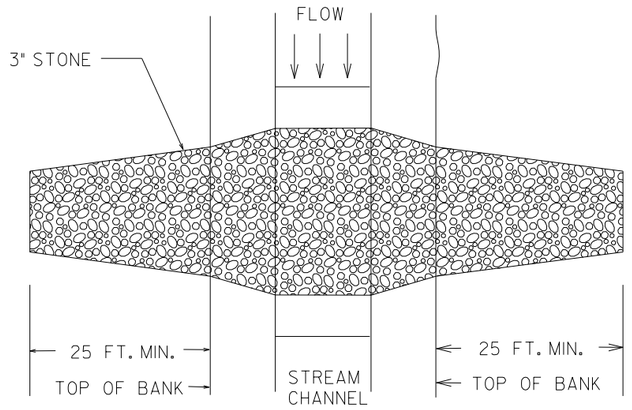
SECTION THROUGH LOG MAT BRIDGE



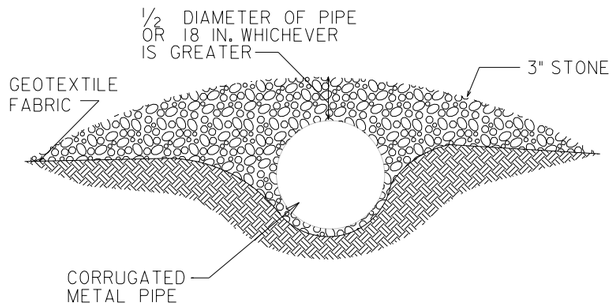
CROSS SECTION VIEW

TEMPORARY CULVERTED STREAM CROSSING

NOTE: FOR USE IN EXISTING CHANNELS ONLY.
NOT FOR USE IN RESTORED STREAMS.



PLAN VIEW



PROFILE VIEW

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Major_Hill_Hyd_PSH_E03c (typ).dgn
bsmith

SHEET NAME		SHEET NUMBER
EROSION CONTROL TYPICAL		E-3D
PROJECT NAME: MAJOR HILL STREAM AND WETLAND RESTORATION SITE		
	COUNTY: ALAMANCE	DATE: 2018

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905 JONES FRANKLIN ROAD
RALEIGH, NORTH CAROLINA 27606
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NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 26931 JOSHUA C. DALTON PRELIMINARY NOT FOR CONSTRUCTION

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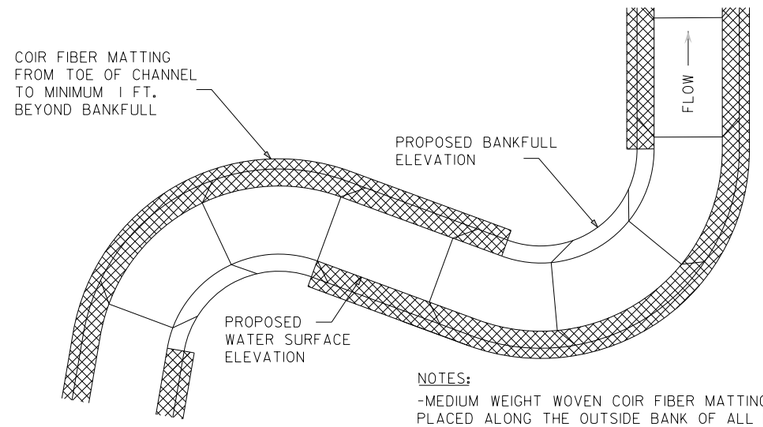
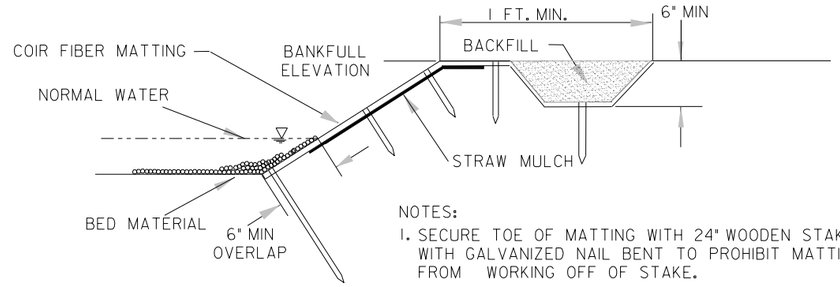
TYPICAL MATTING LOCATION



NOTES:

-MEDIUM WEIGHT WOVEN COIR FIBER MATTING SHALL BE PLACED ALONG THE OUTSIDE BANK OF ALL BENDS AND ALONG BOTH SIDES OFTHE CHANNEL IN TANGENT AREAS.
-FIELD ADJUSTMENTS TO MATTING LOCATION MAY BE MADE AT THE DESIGNERS OR CONTRACTORS DISCRETION AS NECESSARY.

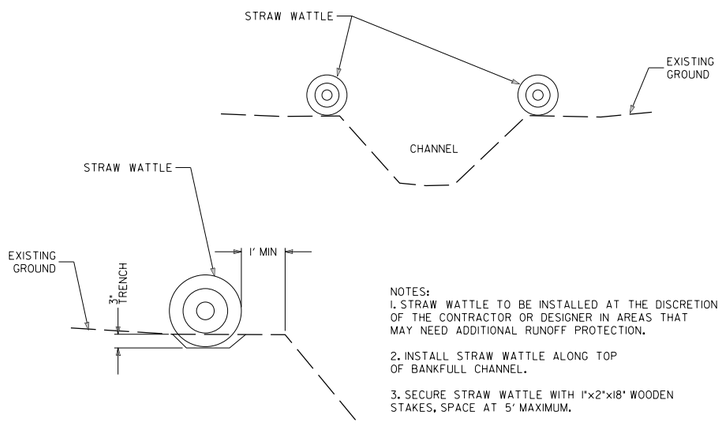
COIR MATTING CROSS SECTION



NOTES:

1. SECURE TOE OF MATTING WITH 24" WOODEN STAKES WITH GALVANIZED NAIL BENT TO PROHIBIT MATTING FROM WORKING OFF OF STAKE.
2. USE 12" WOODEN STAKES ON 5' CENTERS OR AS DIRECTED BY MANUFACTURER'S RECOMMENDATIONS.
3. MINIMUM 1' WIDE, 6" DEEP TRENCH OVER TOP OF BANK WITH MATTING LAID FLAT AND STAKED. TRENCH TO BE BACKFILLED WITH EXCAVATED MATERIAL.

STRAW WATTLE



NOTES:

1. STRAW WATTLE TO BE INSTALLED AT THE DISCRETION OF THE CONTRACTOR OR DESIGNER IN AREAS THAT MAY NEED ADDITIONAL RUNOFF PROTECTION.
2. INSTALL STRAW WATTLE ALONG TOP OF BANKFULL CHANNEL.
3. SECURE STRAW WATTLE WITH 1"x2"x18" WOODEN STAKES, SPACE AT 5' MAXIMUM.
4. STRAW SHALL BE CERTIFIED WEED FREE.

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bsmith

SHEET NAME	SHEET NUMBER
EROSION CONTROL TYPICAL	E-3E

PROJECT NAME: MAJOR HILL STREAM AND WETLAND RESTORATION SITE

COUNTY: ALAMANCE DATE: 2018

Axiom Environmental, Inc.

SUNGATE DESIGN GROUP, P.A.

905 JONES FRANKLIN ROAD
RALEIGH, NORTH CAROLINA 27606
TEL (919) 859-2243
ENG FIRM LICENSE NO. C-890

NORTH CAROLINA PROFESSIONAL ENGINEER JOSEPH G. DALTON

PRELIMINARY DESIGN NOT FOR CONSTRUCTION

DATE:

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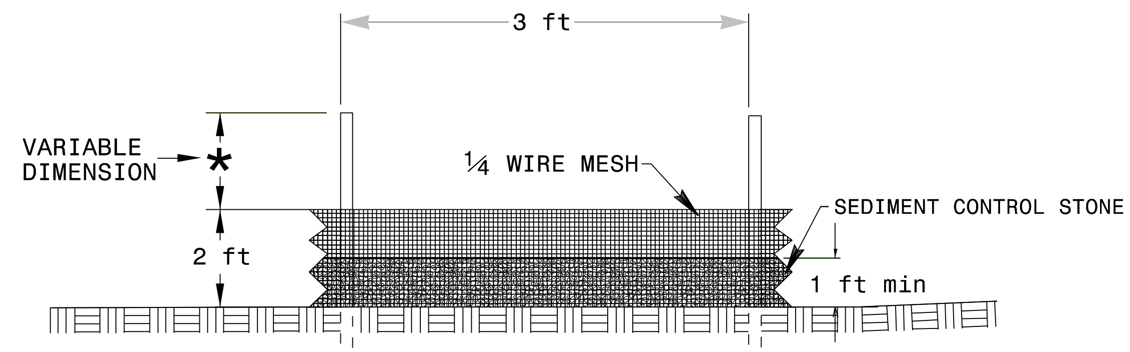
SPECIAL SEDIMENT CONTROL FENCE BREAK

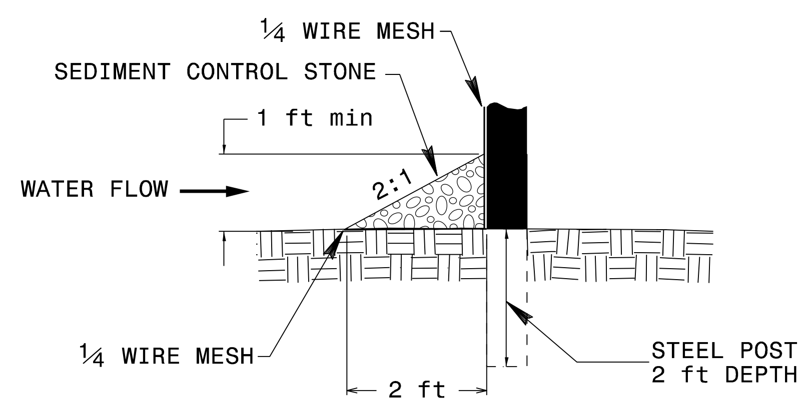


NOTE:

-INSTALL 9 FT SECTION OF SEDIMENT CONTROL FENCE AS A BREAK IN TEMPORARY SILT FENCE TO RELIEVE ACCUMULATION OF RUNOFF AS DIRECTED ON PLANS AND AS DEEMED NECESSARY BY CONTRACTOR OR DESIGNER.

CONSTRUCTION NOTES:

1. USE NO. 5 OR NO. 57 STONE FOR SEDIMENT CONTROL STONE.
2. USE HARDWARE CLOTH 24 GAUGE WIRE MESH WITH 1/4 INCH MESH OPENINGS.
3. INSTALL 5 FT. SELF FASTENER ANGLE STEEL POST 2 FT. DEEP MINIMUM.
4. SPACE POST A MAXIMUM OF 3 FT.



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Major_Hill_Hyd_PSH_E03e (typ).dgn
bsmith

SURVEY INFORMATION PROPERTY/
EASEMENT PROVIDED BY:
K2 DESIGN GROUP, P.A.
5688 U.S. HIGHWAY 70 EAST
GOLDSBORO, NC 27534

NORTH CAROLINA
PROFESSIONAL ENGINEER SEAL
JOSEPH C. DALTON
PRELIMINARY NOT FOR CONSTRUCTION

DATE:

SHEET NAME		SHEET NUMBER
EROSION CONTROL HAUL ROADS		E-3F
PROJECT NAME: MAJOR HILL STREAM AND WETLAND RESTORATION SITE		
	COUNTY: ALAMANCE	DATE: 2018

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RALEIGH, NORTH CAROLINA 27606
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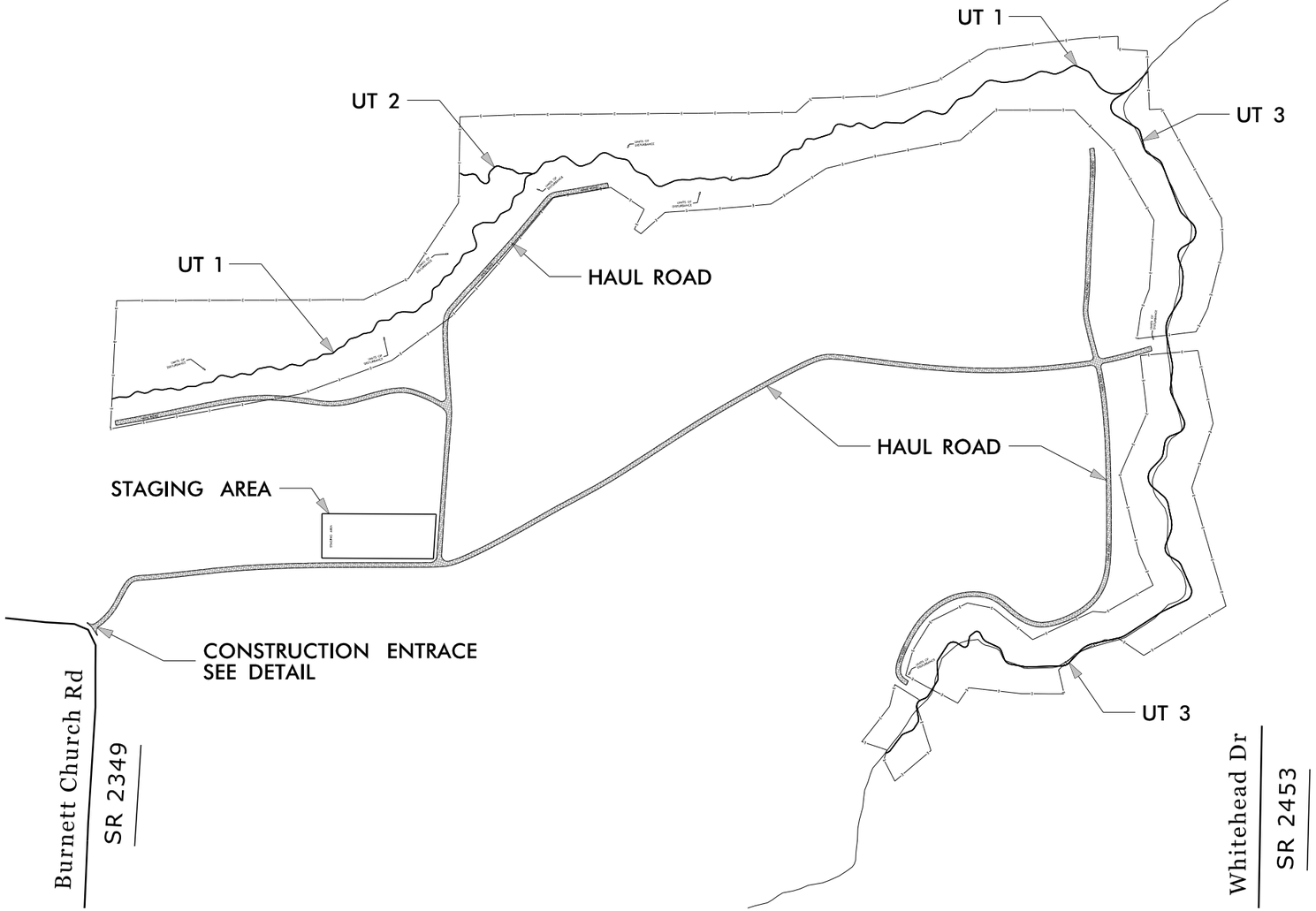
300′ 150′ 0 300′ 600′
SCALE: 1″ = 600′



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bsmith

SHEET NAME		SHEET NUMBER
EROSION CONTROL		E-4
PROJECT NAME: MAJOR HILL STREAM AND WETLAND RESTORATION SITE		
	COUNTY: ALAMANCE	DATE: 2018

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RALEIGH, NORTH CAROLINA 27606
TEL (919) 859-2243
ENG FIRM LICENSE NO. C-890

Axiom Environmental, Inc.

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 21681 JOSHUA C. DALTON

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DATE:

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TINNIN, ANDREW M
DEED BK 2514
DEED PG 0756

LAMM, JAMES D
AND CAROL L
DEED BK 2789
DEED PG 0896

SURVEY BOUNDARY

TINNIN, ANDREW M
DEED BK 2514
DEED PG 0756

REMOVE EXISTING DAM
POND SHALL BE DRAINED
BY PUMP-AROUND METHOD
PRIOR TO DAM REMOVAL

REMOVE PIPE

MATCHLINE STA 6+50 -UTI-
SEE SHEET E-5

PROPOSED BANKFULL

LIMITS OF DISTURBANCE

REMOVE DRAINAGE STRUCTURE

12" PVC OUTLET

12" HDPE

HAUL ROAD

CROSS VANE

-UTI- BEGIN RESTORATION
STA 0+00 -UTI-
ELEV=546.29

CROSS VANE

LIMITS OF DISTURBANCE

EIP

ISS CAP 4

0+00 -UTI-
1+00 -UTI-
2+00 -UTI-
3+00 -UTI-
4+00 -UTI-
5+00 -UTI-
6+00 -UTI-

TOPOGRAPHY BASED ON SURVEY PERMFORMED BY K2 SURVEYING ON . TOPOGRAHY OUTSIDE OF SURVEY LIMITS BASED ON NC SPATIAL DATA QL2 LIDAR

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Major_Hill_Hyd_PSH_E04.dgn
bsmith

SHEET NAME	SHEET NUMBER
EROSION CONTROL	E-5

PROJECT NAME: MAJOR HILL STREAM AND WETLAND RESTORATION SITE

COUNTY: ALAMANCE DATE: 2018

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905 JONES FRANKLIN ROAD
RALEIGH, NORTH CAROLINA 27606
TEL (919) 859-2243
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NORTH CAROLINA PROFESSIONAL ENGINEER JOSEPH G. DALTON
PRELIMINARY DESIGN NOT FOR CONSTRUCTION

DATE:

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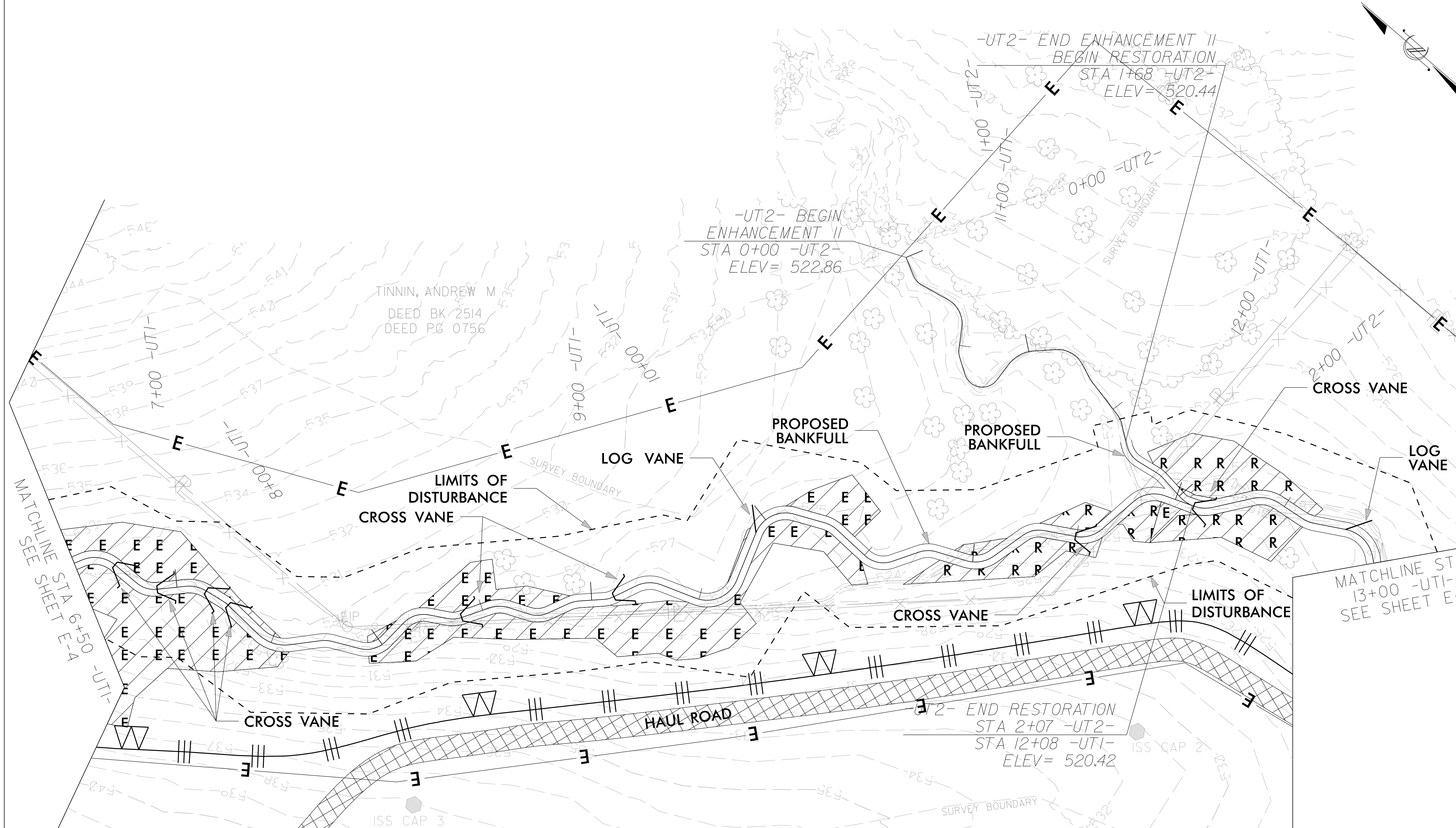

TOPOGRAPHY BASED ON SURVEY PERMFORMED BY K2 SURVEYING ON . TOPOGRAHY OUTSIDE OF SURVEY LIMITS BASED ON NC SPATIAL DATA QL2 LIDAR

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Major_Hill_Hyd_PSH_E05.dgn
bsmith

SHEET NAME		SHEET NUMBER
EROSION CONTROL		E-6
PROJECT NAME: MAJOR HILL STREAM AND WETLAND RESTORATION SITE		
	COUNTY: ALAMANCE	DATE: 2018

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RALEIGH, NORTH CAROLINA 27606
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Axiom Environmental, Inc.

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 29881 JOSEPH C. DALTON
PRELIMINARY PLANS NOT FOR CONSTRUCTION

DATE:

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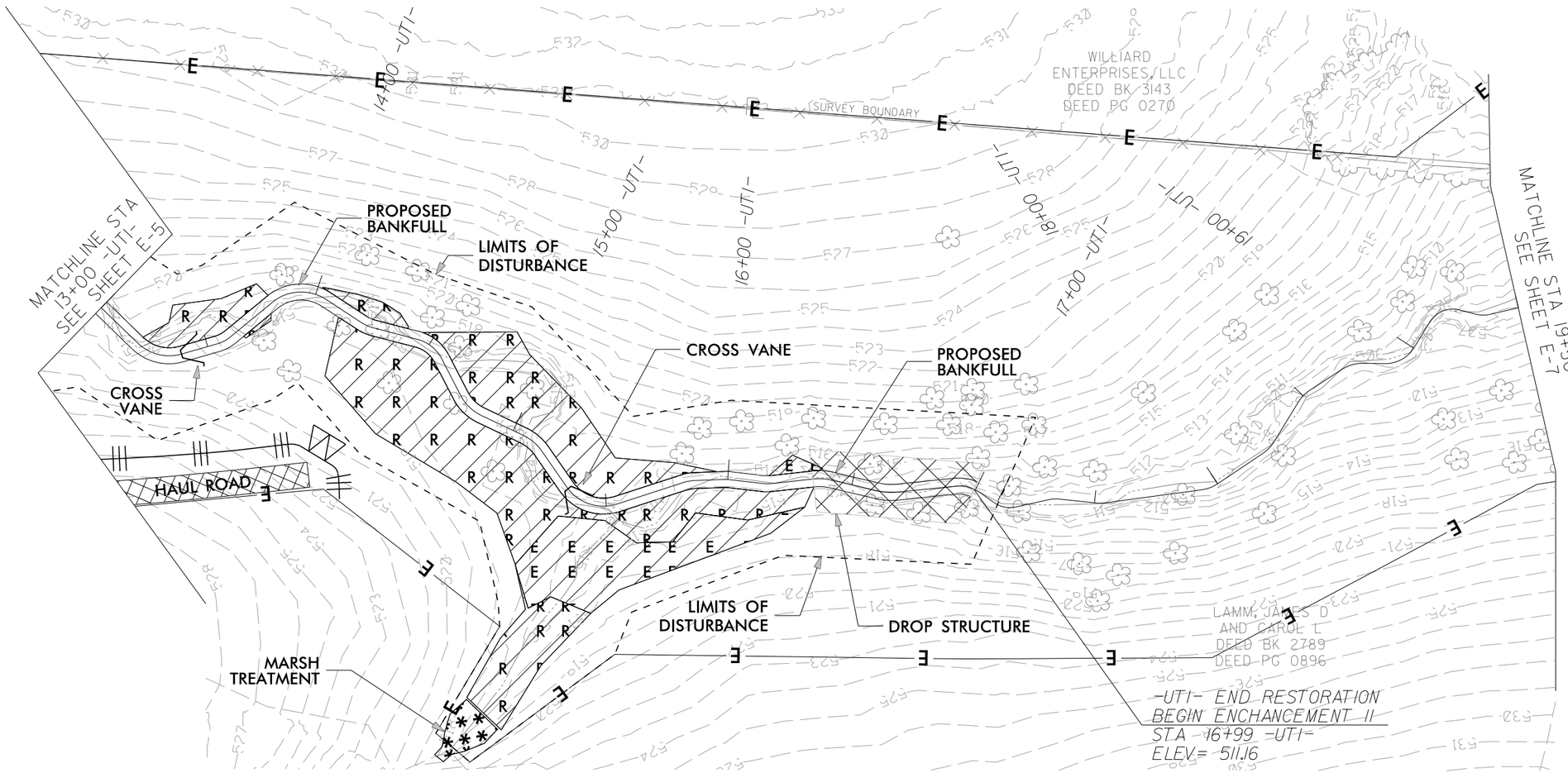

TOPOGRAPHY BASED ON SURVEY PERMFORMED BY K2 SURVEYING ON . TOPOGRAHY OUTSIDE OF SURVEY LIMITS BASED ON NC SPATIAL DATA QL2 LIDAR

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Major Hill-Hyd_PSH_E06.dgn
bsmith

TOPOGRAPHY BASED ON SURVEY PERMFORMED BY K2 SURVEYING ON . TOPOGRAHY OUTSIDE OF SURVEY LIMITS BASED ON NC SPATIAL DATA QL2 LIDAR

SHEET NAME		SHEET NUMBER
EROSION CONTROL		E-7
PROJECT NAME: MAJOR HILL STREAM AND WETLAND RESTORATION SITE		
	COUNTY: ALAMANCE	DATE: 2018

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RALEIGH, NORTH CAROLINA 27606
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NORTH CAROLINA PROFESSIONAL ENGINEER SEAL JOSEPH G. DALTON

DATE:

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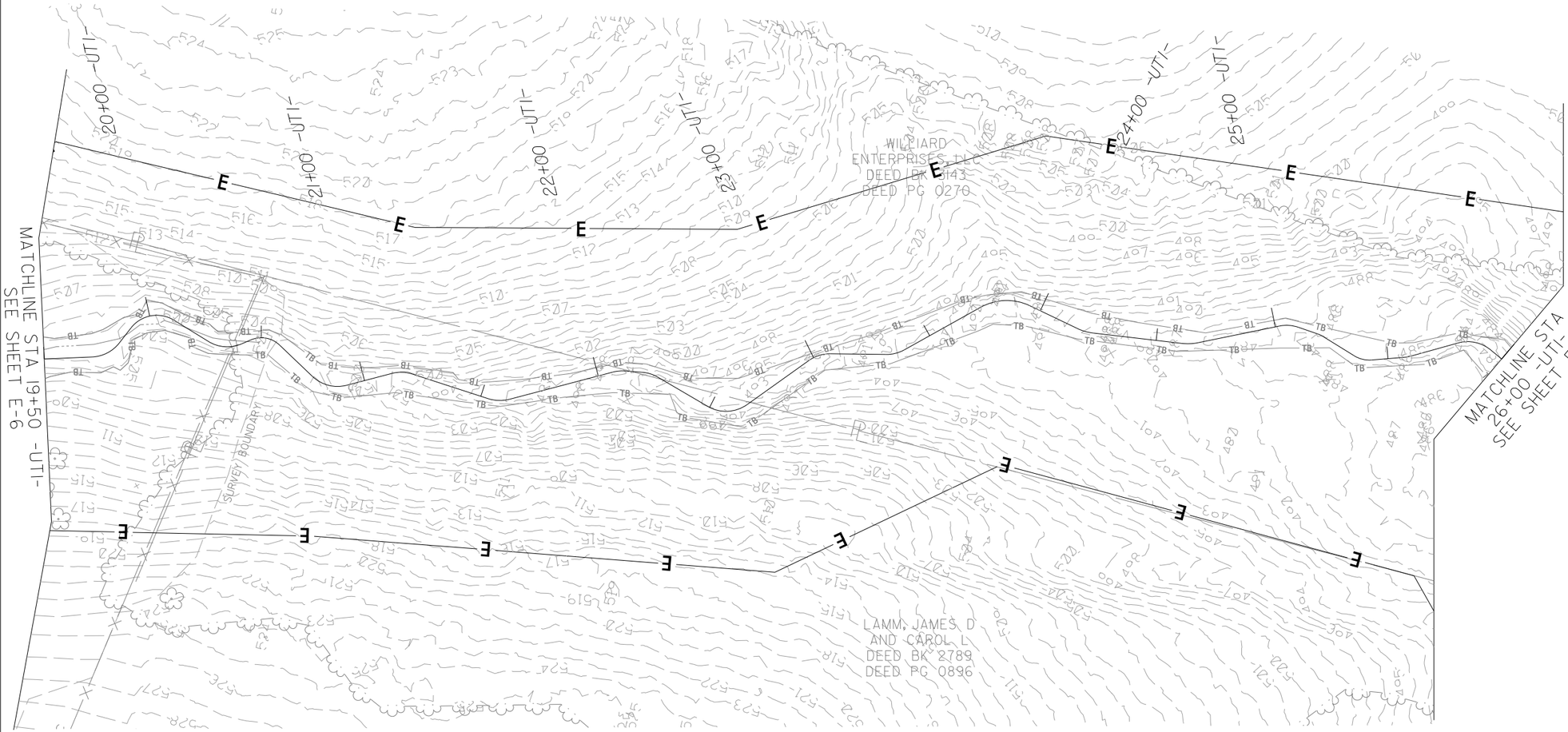

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bsmith

TOPOGRAHY OUTSIDE
OF SURVEY LIMITS BASED ON
NC SPATIAL DATA QL2 LIDAR

SHEET NAME		SHEET NUMBER
EROSION CONTROL		E-8
PROJECT NAME: MAJOR HILL STREAM AND WETLAND RESTORATION SITE		
	COUNTY: ALAMANCE	DATE: 2018

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NORTH CAROLINA PROFESSIONAL ENGINEER SEAL
JOSEPH C. DALTON
PRELIMINARY DESIGN
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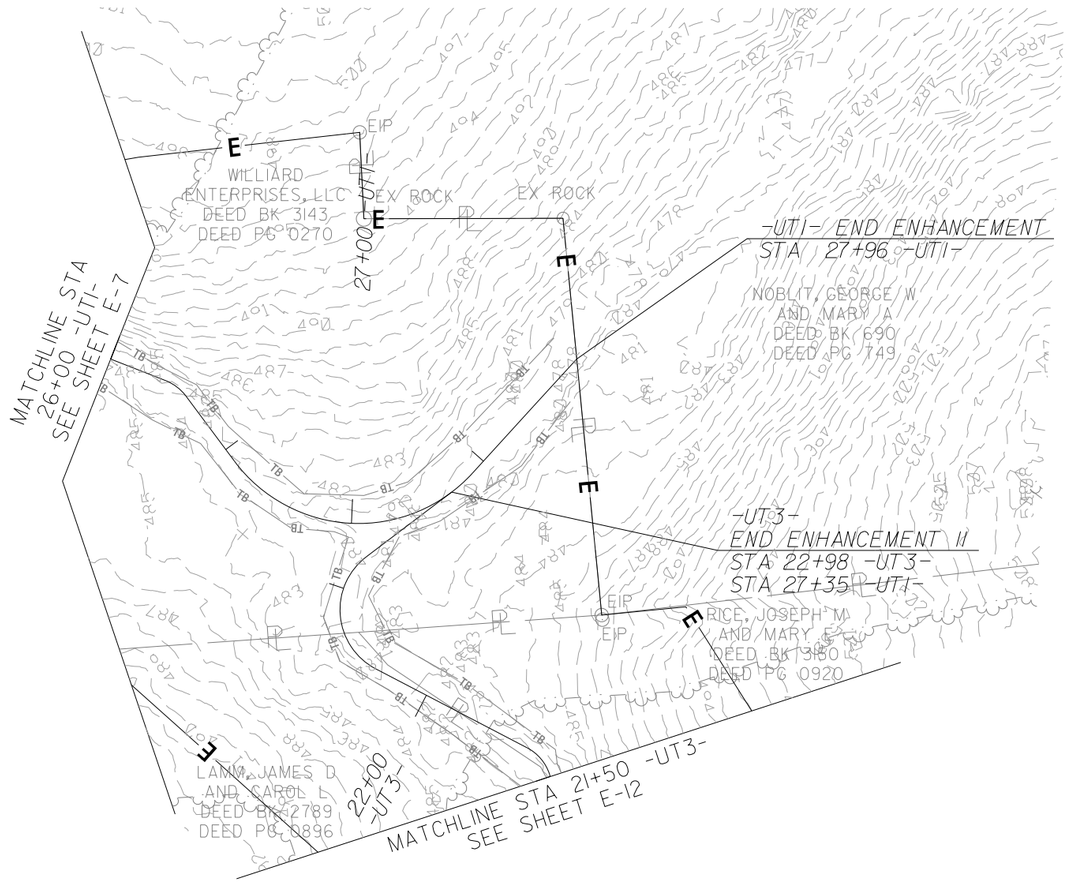

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Major_Hill_Hyd_PSH_E08.dgn
bsmith

SHEET NAME		SHEET NUMBER
EROSION CONTROL		E-9
PROJECT NAME: MAJOR HILL STREAM AND WETLAND RESTORATION SITE		
	COUNTY: ALAMANCE	DATE: 2018

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NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 28 JOSEPH C. DALTON

DATE:

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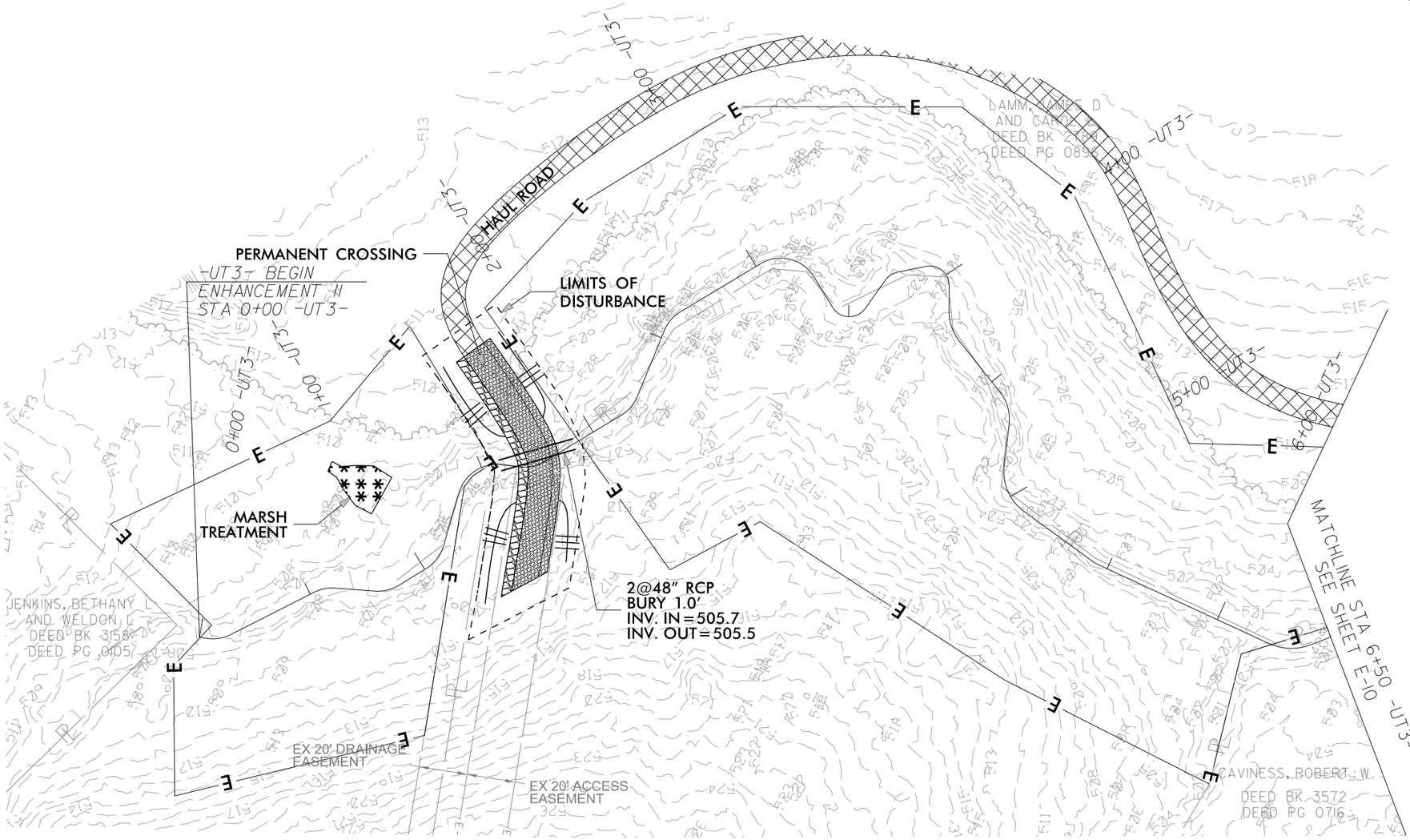

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Major_Hill_Hyd_PSH_E09.dgn
bsmith

SHEET NAME	SHEET NUMBER
EROSION CONTROL	E-10

PROJECT NAME: MAJOR HILL STREAM AND WETLAND RESTORATION SITE

COUNTY: ALAMANCE | DATE: 2018

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RALEIGH, NORTH CAROLINA 27606
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DATE:

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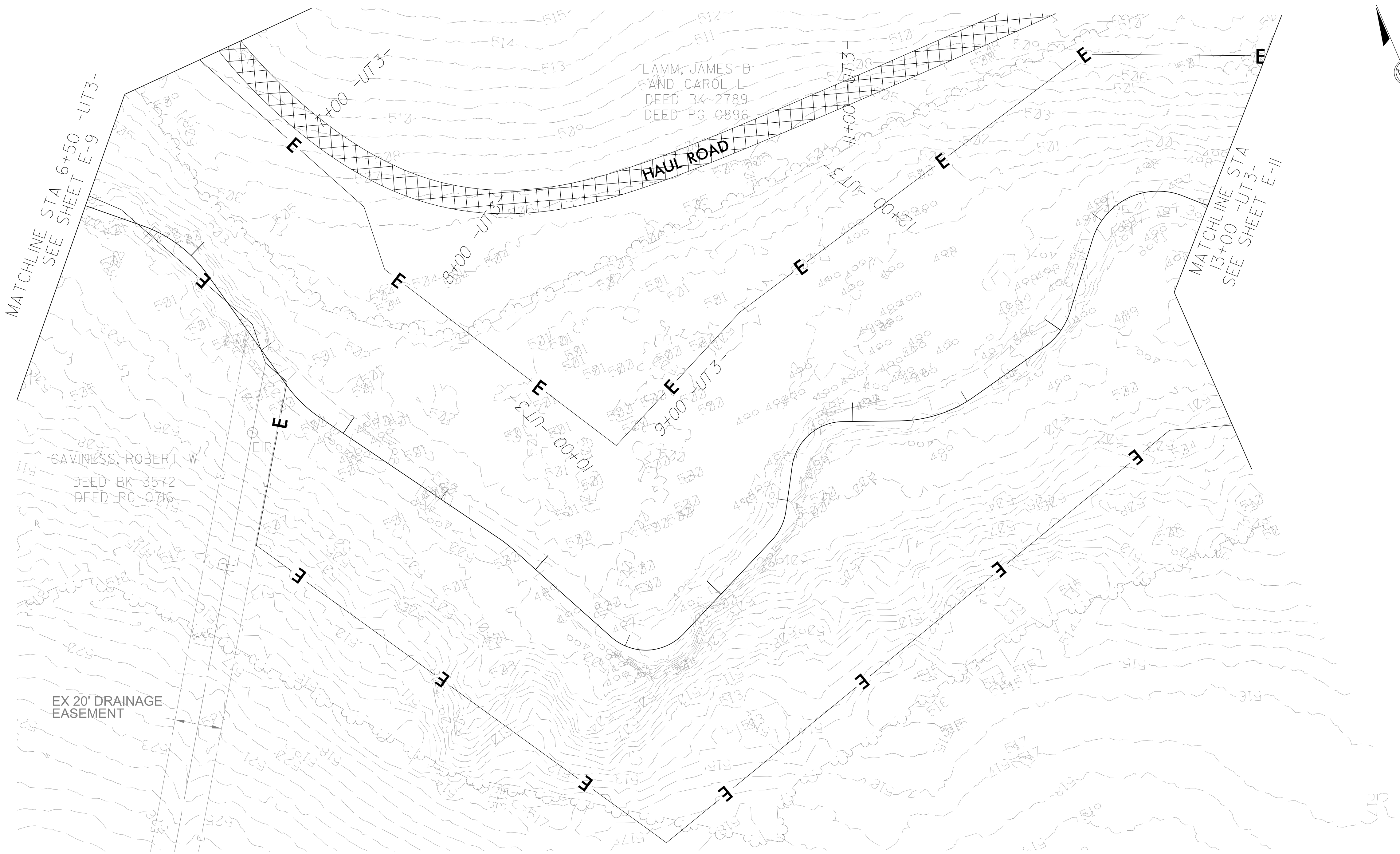

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Major Hill_Hyd_PSH_E10.dgn
bsmith

SHEET NAME		SHEET NUMBER
EROSION CONTROL		E-11
PROJECT NAME: MAJOR HILL STREAM AND WETLAND RESTORATION SITE		
	COUNTY: ALAMANCE	DATE: 2018

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905 JONES FRANKLIN ROAD
RALEIGH, NORTH CAROLINA 27606
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NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 21681 JOSEPH G. DALTON
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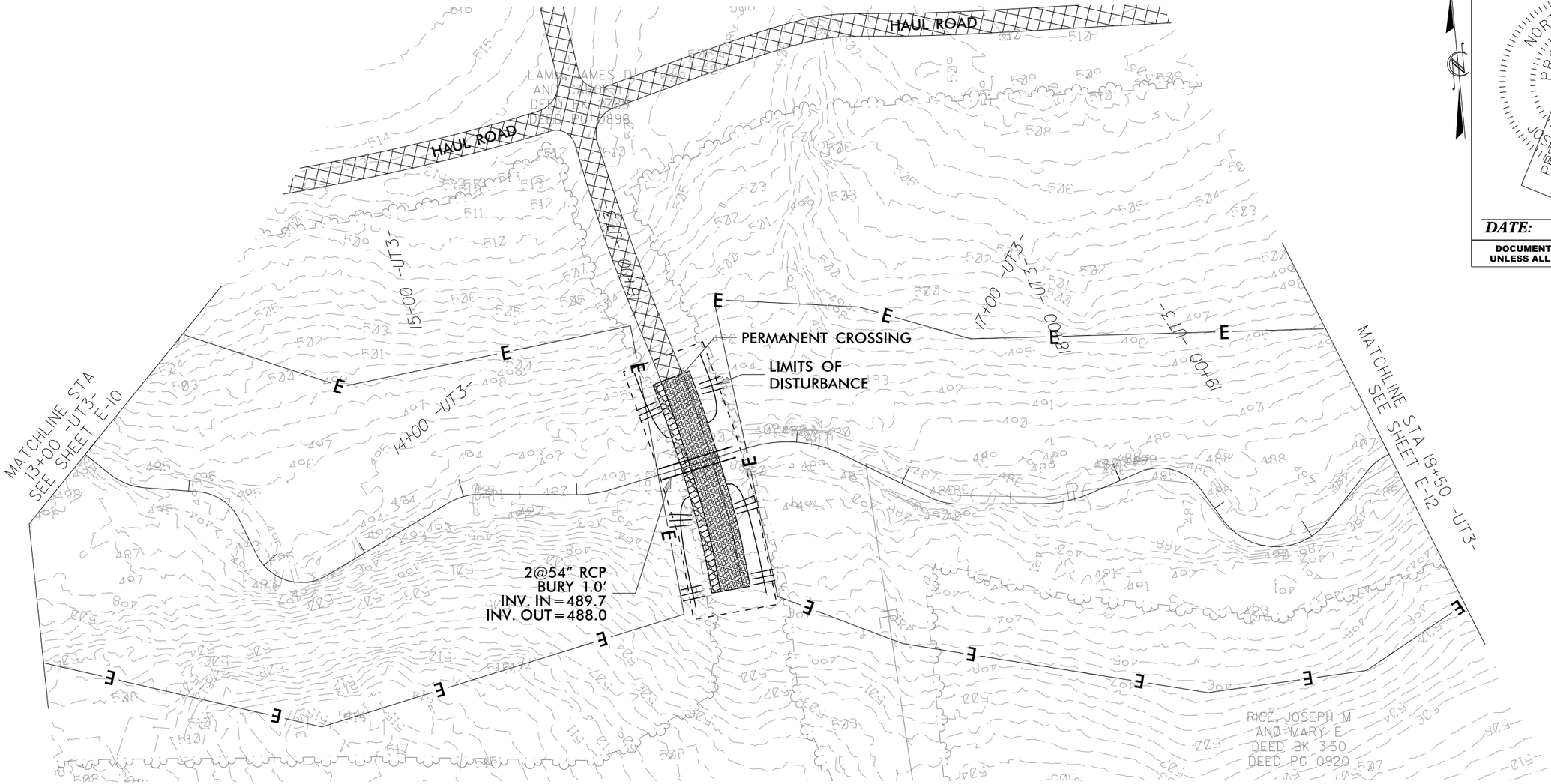

11/7/2017
Major Hill_Hyd_PSH_E11.dgn
bsmith

SHEET NAME		SHEET NUMBER
EROSION CONTROL		E-12
PROJECT NAME: MAJOR HILL STREAM AND WETLAND RESTORATION SITE		
	COUNTY: ALAMANCE	DATE: 2018

Axiom Environmental, Inc.

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RALEIGH, NORTH CAROLINA 27606
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NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 038161 JOSEPH C. DALTON

DATE:

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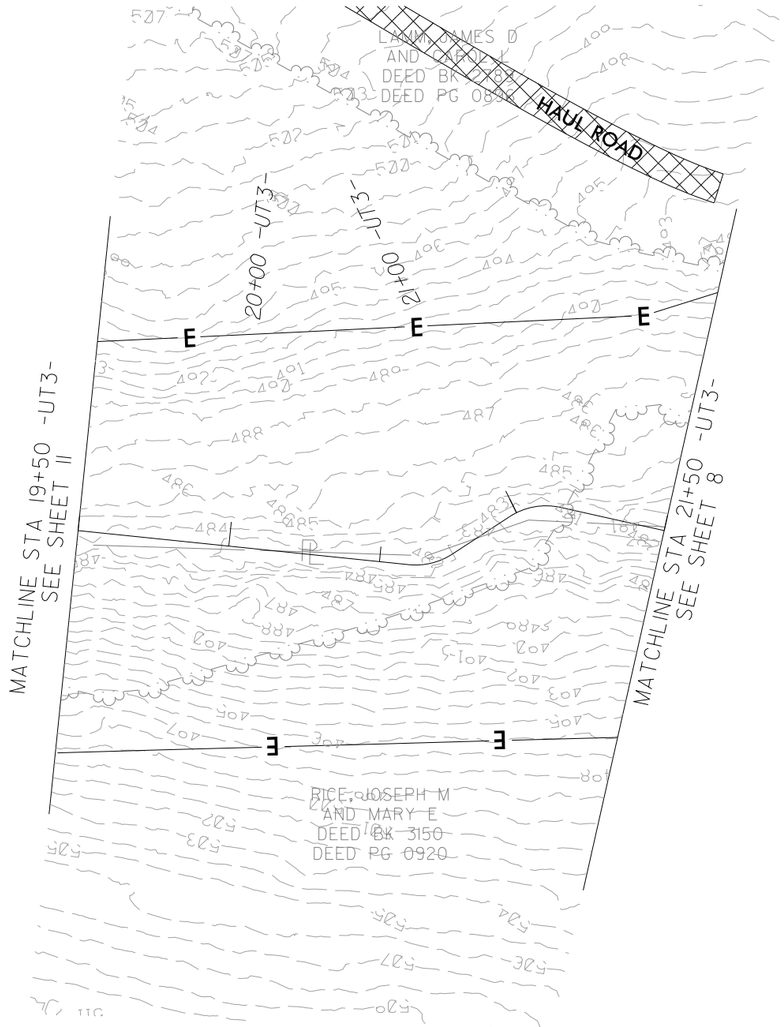

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Major_Hill_Hyd_PSH_E12.dgn
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