



MITIGATION PLAN
Final

June, 2016

VILE CREEK MITIGATION SITE
Alleghany County, NC
DEQ Contract No. 5999
DMS ID No. 96582

New River Basin
HUC 0505001

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

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

REPLY TO
ATTENTION OF:

CESAW-RG/Hughes April 14, 2016

MEMORANDUM FOR RECORD

SUBJECT: Vile Creek Mitigation Site - NCIRT Comments During 30-day Mitigation Plan Review

PURPOSE: The comments listed below were posted to the NCDMS Mitigation Plan Review Portal during the 30-day comment period in accordance with Section 332.8(g) of the 2008 Mitigation Rule.

NCDMS Project Name: Vile Creek Mitigation Site, Alleghany County, NC

USACE AID#: SAW-2014-01585

NCDMS #: 96582

30-Day Comment Deadline: April 6, 2016

Travis Wilson, NCWRC, March 24, 2016:

Overall the Vile Creek project looks like a good project. The draft mitigation plan is for the most part adequate, however WRC does have the following comments.
One of the primary goals of the mitigation plan is to expand Southern Appalachian Bog Habitat, and WRC supports this goal. The wetland bog habitat is included within an area of wetland reestablishment, however the actions described in the mitigation plan appear to be more aligned with creation. WRC understands it is not feasible to determine the historic presence of a bog at this location, and we support the incorporation of habitat diversity specifically micro habitats beneficial to sensitive species. WRC is not requesting to adjust the proposed credits to be more in line with creation however it is important to set a monitoring approach and target performance standards for these areas aside from those used for the adjacent wetlands. The adaptive management plan can address the circumstance of not meeting the bog performance standards but meeting those of the restored wetlands.

Mac Haupt, NCDWR, March 29, 2016:

1. DWR believes this project has excellent potential to restore both stream and wetland functions.
2. DWR supports the effort to restore bog habitat for the bog turtle (Glyptemys mulenbergii), however, DWR does not believe the design of the bog cells for all the wetland areas will be beneficial for the bog turtle or the wetland restoration acreage.
3. DWR has the following concerns and recommendations regarding the design of the bog cells;
   a. Extensive construction and manipulation of the floodplain with significant berms that would likely remove portions of the floodplain from wetland restoration status,
   b. The berms would likely result in mostly ponded water, resulting in more standing water than saturated soil needed to promote and develop the bog habitat. While some open water may be preferable for bog turtle habitat, DWR believes the current design would yield more open water and less of a wetland mosaic (saturated areas in addition to some drier areas).

c. DWR would support the design and construction of several bog cells rather than all the wetland area be dedicated to bog cells.
d. DWR would also recommend lowering the berm height on the design, which may allow the berms to be included in the wetland restoration (development of hydric soil indicators) acreage and result in less open water and more saturated soil for the respective bog cell.

4. DWR supports the planting of herbaceous plants and shrubs for the bog cells (if the design is utilized) or bog habitat areas. DWR recommends a vegetative percent cover performance criteria for these areas of 80%.
5. Section 11.3 recommends a wetland performance standard of 7.1% saturation during the growing season. DWR does not agree with a wetland hydrologic performance standard of 7.1% for a target bog community. DWR will require a wetland performance standard of at least 12% saturation during the growing season.
6. Section 6.2 discusses the reference wetlands and DWR recommends that a reference gauge be installed in the reference bog (the verbiage in the mitigation plan stated they may install a gauge in the bog).
7. DWR recommends the designer be wary of lateral hydrologic "pop-out" on the streambank where the wetland areas drain into the stream, especially if these areas drain into a meander bend as shown on design sheet 3.8. DWR recommends supplemental stabilization measures be considered for these areas.

Todd Bowers, USEPA, April 1, 2016:

1. General comment: Well-documented goals, objectives, past site activity, site information, letters and recent progress towards establishing a viable stream and wetland restoration site. Disclaimer: I have not been on-site or in any discussions with the IRT concerning this project.
2. P. 7: The goal of restoring habitat that may support bog species should clarify if flora, fauna or both. If the goal is habitat for bog turtles only then the document should specify this. Habitat includes vegetation so planting of bog vegetation should be included in the objectives.
3. P. 8: Add a programmatic goal of providing 5,139 SMUs and 5.82 WMUs for DMS In-Lieu Fee Program. Associated objective may be as simple as "Restore, enhance and reestablish streams and wetlands on-site.
4. P. 10: Include valley type (A, B) in description of streams and their alluvial valleys.
5. P. 11: Include estimated bankfull velocities for each reach in Tables 3a and 3b.
6. P. 18: Vile Creek Reach 2 has a moderate sinuosity (>1.25) rather than low.
7. P. 19: UT2 has steep slope (as stated) of greater than 0.04. This would classify UT2 as a B4a type rather than B4.
8. P. 23: Recommend the use and credit for 50-foot buffers wherever possible especially with the type of adjacent land use and the expected nutrient rich and sediment laden runoff expected with continued use by cattle. I understand that there is an arbitrary change in buffer width requirements from piedmont to mountain streams but the science behind buffer effectiveness recommends a minimum of 50 feet for riparian vegetation to be minimally useful for controlling runoff and pollutant absorption before entering the stream. I applaud Wildlands for considering and proposing those areas with buffers much greater than the minimum.
9. P. 23: I am troubled by credit being proposed for areas where the minimum riparian buffer (30') overlaps with wetland area proposed for credit. Perhaps this is negated somewhat by areas where the riparian buffer proposed is much greater than the minimum?
10. P. 24: Include loss of intermittent stream at head of UT2 for the placement of the BMP in the impacts listed in the Pre-Construction Notice.

11. P. 25: Bog Turtles “inhabits” wetland areas rather than “inhibits”.
12. P. 25: Recommend changing “no effect” to “no negative effect” or “positive effect” since one of the project goals is to have a net positive effect on habitat.
13. P. 33: Table 8 Component Summation for the streams should read “3014, 1134 and 3807 for restoration, enhancement I and enhancement II respectively.
14. P. 35: Table 9b should have a footnote relating to the 10% of the site stream credits held in reserve for two bankfull events. Text was noted in paragraph 8.2.
15. P. 44: Reach 1 of UT1 has a small ephemeral channel near the head of the project (Fig. 2.2.1). Is there a need for a small headwater water quality treatment BMP constructed at this location similar to that on UT2?
16. P. 45: I recommend that the sponsor include some sort of vegetation survey for the constructed bog cells. These cells constitute a significant amount of the restored/enhanced wetlands on site and other than reference site comparison for hydrology, have no performance standard to ensure the cells are functioning as intended. I recommend a least one vegetation monitoring plot per series to ensure that plant survival is quantified and that performance standards are considered separately from the riparian wetlands (example: > 80 percent survival, > 80 percent FACW, no invasive species). Otherwise these bog cells could wind up as pools of water with no suitable habitat or plant survival and still get full credit.
17. P. 48: Table 15 See comment on project goals and objectives noted above.
18. P. 48: Table 15 Recommend adding performance standard or contingency for goal of creating bog habitat. Add “planting bog species” as part of objectives for this goal.
19. Sheet 4.0: The inclusion of Acer saccharinium (silver maple) is notable as it does not appear in Schafale and Weakley (1990) for Montane Alluvial Forest. Why was this species selected? Recommend Betula nigra (river birch) to replace.
20. Sheet 4.0: Recommend adding some understory species for consideration such as Carpinus carolinana (ironwood) or Lindera benzoin (spicebush) in the planting for riparian buffers.
21. Sheet 4.0: Recommend adding Alnus serrulata (tag alder) live stakes in the streamside planting zone.
22. Sheet 4.0: Recommend adding Cephalanthus occidentalis (buttonbush) in wetland planting.
23. We request that the sponsor provide the IRT with a GIS shapefile polygon for this project.
24. Recommend that the sponsor explore the possibility to have the access road adjacent to UT3 moved to provide a wider riparian buffer.

Marella Buncick, USFWS, April 1, 2016:

Mountain bogs including Southern Appalachian bogs are a high priority for the USFWS Asheville Field Office given the rare and endangered species they support and the extensive loss of this habitat type (>90%) in the Southern Appalachians. We greatly appreciate the willingness of those involved to try to restore the site to Southern Appalachian bog habitat and are supportive of the project. With a few adjustments, we believe the project will benefit bog turtle, which is a high priority species for our office, and help increase mountain bog habitat.

General

There appears to be a typo in the sections about northern long-eared bats. The document incorrectly states that northern long-eared bats prefer trees that are 3 inches dbh. Northern long-eared bats use live trees and/or snags ≥3 inches dbh that have exfoliating bark, cracks, crevices, and/or cavities.

Bog Turtles

• The draft plan notes that a pedestrian survey for turtles on 12/02/2013 did not detect any

turtles (p. 25). It should be noted that bog turtles are hibernating in the mud this time of year, and would be impossible to detect. Bog turtle biologists with Project Bog Turtle and the NC Wildlife Resources Commission (NCWRC) did conduct a survey for about 3 hours on June 3, 2015. No turtles were found, but bog turtle experts did think it was highly likely turtles are present based on the existing habitat and proximity to known sites. Bog turtles spend most of their lives buried in muck and are very difficult to find. Much more survey work would be needed before we could say bog turtles are currently absent from the site. The wetland patches that look suitable for bog turtles are labeled B, C, F, N, and O on Figure 3. Gray's lily and skunk cabbage (both bog associated species) were found on the site. We recommend that the document be changed to reflect the possibility that bog turtles are already on the site. As part of this, the current goal related to bog turtles could be changed to "improve and expand Southern Appalachian Bog wetland habitat for bog turtle."
• Restoration work has the potential to injure or kill turtles and we recommend working with NCWRC and USFWS to develop a plan to minimize potential impacts to turtles that may already be on site. We are primarily concerned about the placement of plugs and the use of heavy equipment near remnant bog patches when turtles are active.
• Please ensure that the matting used along the creek is biodegradable (e.g., coconut fiber, jute mat).

Hydrology

If the IRT/Wildlands would benefit from Mountain bog hydrologic data to help calibrate design/success criteria Jeff Wilcox with UNCA currently is collecting data from various mountain bog sites as part of a characterization project for the USFWS. We can make his contact info available to whomever if this would be beneficial.

• We have concerns about the current design of the bog cells and the plugs in the ditches to result in suitable habitat for bog turtles. The remnant wetland habitat that is in the ditches along Vile Creek R1 and Vile Creek R2 currently looks good for bog turtles with appropriate hydrology and deep, mucky soils. The goal should be to expand this habitat with similar conditions in these expanded areas. Wetlands preferred by bog turtles are spring-fed with saturated soils and slow flowing water and are sedge dominated, wet meadows, with little or no canopy. Bog turtle sites do not have standing water of significant depth. The goal should be to saturate the ground without producing deep-standing water.
• Please ensure that all springs are depicted on the plan and considered as part of the overall site hydrology. We have seen a hill side seep/ spring at the base of the hill near areas N and O and we believe there may also be one at the top of area C.

Vegetation

• Staff with USFWS, NCWRC, and Wildlands Engineering met on site on 10/20/14 to discuss the bog habitat and bog turtles. As part of the restoration plan for Southern Appalachian bog, we suggested that the banks of Vile Creek be planted with shrubs and small tree species rather than large tree species. We have concerns that the dense planting of large trees will eventually shade out the bog and will also lead to more rapid succession of the bog, making the habitat unsuitable for bog turtles and eliminating many of the herbaceous species. Additionally, the area with gray's lily is close to the creek on the north side of Vile Creek R2 and may actually be in the planting area. Planting shrubs/small trees along restored streams has been successfully done at other bog turtle sites (e.g., UT-Crab Creek in Alleghany Co NC., Shady Valley in TN, and Sparta Bog in Alleghany Co. NC). We recommend planting shrubs only in VC R1 and on the north side of VC R2.The south side (with the exception of

area F – see below) could be planted in trees.
• The remnant patch of bog on the south side of Vile Creek R2 (labeled area F on Figure 3) is not categorized as a "bog cell" and is currently in the zone to be planted as trees. This is one of the best looking remnant patches of Southern Appalachian bog on the site and we recommend treating this area accordingly with any disturbed land in the vicinity planted with herbaceous plants rather than trees.
• We have concerns about the planting stem densities for trees/shrubs and think they should be lower than other typical mitigation community types since part of what is being restored is Southern Appalachian bog, which is characterized by a mosaic of shrub thickets and herb dominated areas. UT to Crab Creek mitigation site used woody shrub densities of <50 stems/acre, Shady Valley (TN) used 320 stems/ac and Sparta Bog also used 320-260 stems/acre.
• In VC R1-2 we recommend creating a mosaic of shrub/herbaceous plants by including some herbaceous plantings and/or relying on colonization from the seed bed in the areas between Vile Creek and the bog cells rather than using just densely planted wetland shrubs. We recommend including native pollinator seed mixes that include milkweeds in the herbaceous planting areas to gain the added wildlife benefit of helping pollinators including Monarch butterflies and early succession bird species of concern.
• We think that stockpiling the existing topsoil is an excellent idea. Exotics should be eliminated before topsoil is removed if it is to be reapplied to the site. In addition, construction equipment should be decontaminated prior to arriving onsite to eliminate transferring exotic species from other sites to the Vile Creek site.
• We could not find a species list other than the insets on plan sheets. The tree list is of concern because there are several species listed that are not native to the mountains of NC or appropriate for Appalachian bog communities. Specifically, eastern cottonwood, swamp chestnut oak and silver maple should not be used. Appropriate tree substitutes could be box elder or black gum. Shrubs also could be substituted including black willow (already found onsite), silky willow and silky dogwood. We also question the use of green ash given threats from emerald ash borer.

Long-term Management

• The document indicates that no long term management will be needed for this site. However, the site may require management if it is to remain suitable for bog turtles. Accelerated succession as a result of human impacts (e.g., changes in hydrology, increased nutrients, changes in natural disturbance regimes) is a threat to bog turtles and most bog turtle sites now require management to keep some areas open. Bog turtles need open areas for basking and nesting and one of the bog turtle's ultimate limitations is a closed canopy, which cuts off surface light and warmth.
• We recommend including language in the plan that allows for some management (e.g., cutting woody vegetation out of the bog to open areas for bog turtles) by partner agencies/groups involved in bog turtle conservation (e.g., NCWRC, USFWS, Project Bog Turtle) if it is needed.
• Bog turtle sites can greatly benefit from occasional grazing by cows. If possible, we recommend allowing the flexibility to include occasional, low density grazing in the bog cells to maintain the habitat and eliminate the need for more labor intensive management.

Andrea Hughes, USACE, April 13, 2016:

1. Page 20, Section 4.5: Please provide a copy of the Corps JD approval letter and associated map of existing resources.

2. Page 22, Section 4.7: Please be aware that credits will be reduced for those areas with stream buffers of less than 30 feet in width using the most current buffer guidance. For areas with a buffer of less than 15 feet in width, no credit may be generated. Areas with buffers greater than 30 feet wide may receive additional credit provided these areas do not overlap wetland mitigation areas.
3. Page 22, Section 4.7: The plan indicates that a CE cannot be obtained at this time for approximately 166 linear feet of stream channel located on the Perry property and the provider intends to relocate the stream channel onto the Crouse property. Please provide additional information related to permissions/agreements with the current landowner for the Perry property regarding relocation of this section of Vile Creek.
4. Page 26, Section 5.2.3: Regarding the conclusion that the project would have "no effect" on the bog turtle, according to the USFWS letter dated August 14, 2016, the project is not likely to adversely affect the species. Please revise the "no effect" statement.
5. The mitigation plan proposes to modify the wetland rehabilitation/re-establishment activities to facilitate development of bog turtle habitat. Therefore, the Corps recommends that the provider coordinate design and construction plans with USFWS and NCWRC to ensure appropriate habitat for the species. The Corps supports USFWS and NCWRC comments/suggestions regarding the bog habitat provided above with the exception of cattle grazing. Also, the provider should propose appropriate vegetation and hydrology monitoring and performance standards for these areas.
6. Page 53, Section 13.0: Please provide a long-term management strategy/plan for the 6.5 acres of bog turtle habitat.
7. Appendix 1, Site Protection: The site protection instruments for the Edwards and Mason properties includes a provision under Section III advising the landowners that if they have livestock, they must restrict livestock access to the easement areas and failure to do so may result in the state repairing fencing or installing cattle exclusion devices at the landowners expense. The site protection instrument for the Crouse properties (Areas A and B - restoration and EII areas) does not include this provision. The Corps believes this provision should be included in all site protection instruments to ensure that future land use activities on the property will not result in adverse impacts to the resources. Also, the provision should be modified to include tenants that may lease the land for agricultural use.

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Andrea Hughes
Mitigation Project Manager
Regulatory Division

May 2, 2016

Note: This letter was revised 6/9/2016 to include mitigation plan page numbers or plan sheet numbers where changes were made to address the IRT comments. All new text in this version of the letter is printed in bold text.

Ms. Andrea W. Hughes
Special Projects Manager
Wilmington District, Regulatory Division
U.S. Army Corps of Engineers
11405 Falls of Neuse Road
Wake Forest, NC 27587

RE: Vile Creek Mitigation Project – IRT Comments
Vile Creek Mitigation Site (DMS #96582)
New River HUC 0505001, Alleghany County, NC

Dear Ms. Hughes,

Thank you for compiling and providing comments on the Vile Creek Draft Mitigation Plan dated April 14, 2016. Wildlands has reviewed the comments and developed a response to each, which are outlined below. We understand that you wish to review the responses before we submit the final mitigation plan. Please inform us if these responses are acceptable and we will submit the revised mitigation plan. If there are any additional comments, feel free to contact me to discuss. For your convenience, the original comments are reprinted below followed by our responses in italics.

Travis Wilson, NCWRC, March 24, 2016:

Overall the Vile Creek project looks like a good project. The draft mitigation plan is for the most part adequate, however WRC does have the following comments. One of the primary goals of the mitigation plan is to expand Southern Appalachian Bog Habitat, and WRC supports this goal. The wetland bog habitat is included within an area of wetland reestablishment, however the actions described in the mitigation plan appear to be more aligned with creation. WRC understands it is not feasible to determine the historic presence of a bog at this location, and we support the incorporation of habitat diversity specifically micro habitats beneficial to sensitive species. WRC is not requesting to adjust the proposed credits to be more in line with creation however it is important to set a monitoring approach and target performance standards for these areas aside from those used for the adjacent wetlands. The adaptive management plan can address the circumstance of not meeting the bog performance standards but meeting those of the restored wetlands.

*Based on the comments of the IRT, we have revised the bog hydrologic success criteria to be free groundwater surface within 12 inches of the ground surface for 12% of the growing season **(pg. 49)**. The bog vegetation will be herbaceous and will be based on bog natural community descriptions and recommendations from agencies **(pg. 45-46)**. Therefore, we believe it appropriate to propose vegetation plots within bog areas that are monitored for coverage based on a percentage of the plot rather than a number of surviving plants. We have added text describing a visual assessment of the bog vegetation and related success criteria of 80% coverage to the mitigation plan **(pg. 50)**.*

Mac Haupt, NCDWR, March 29, 2016:

1. DWR believes this project has excellent potential to restore both stream and wetland functions.

Thank you for the comment. We agree.

2. DWR supports the effort to restore bog habitat for the bog turtle (Glyptemys mulenbergii), however, DWR does not believe the design of the bog cells for all the wetland areas will be beneficial for the bog turtle or the wetland restoration acreage.

There was a mistake on the GIS figure showing the proposed conditions submitted with the original mitigation plan. On that figure, the extent of the wetland reestablishment area was shown to be smaller than it actually is proposed to be. This figure made it appear that the bog areas took up more of the wetland area than they actually do. In fact, the bogs are only 30% of the total wetland mitigation area. The figure has been revised for the final mitigation plan ***(Figure 10)****.*

3. DWR has the following concerns and recommendations regarding the design of the bog cells;

a. Extensive construction and manipulation of the floodplain with significant berms that would likely remove portions of the floodplain from wetland restoration status,

We have reduced the number of berms from 14 down to 10. We have also redesigned the berms to be lower than they originally were – approximately half of the original height. We do think the berms will be wet and, if successful, will be counted in the acreage of wetland rehabilitation. ***Please refer to new plan sheets 3.7-3.11 and revised Figure 10.***

b. The berms would likely result in mostly ponded water, resulting in more standing water than saturated soil needed to promote and develop the bog habitat. While some open water may be preferable for bog turtle habitat, DWR believes the current design would yield more open water and less of a wetland mosaic (saturated areas in addition to some drier areas).

With the changes to the design of the berms described above there will be significantly less standing water on the site.

c. DWR would support the design and construction of several bog cells rather than all the wetland area be dedicated to bog cells.

Please refer to the response to comment #2 above. While we have not reduced the area of the bogs, they are only 30% of the total wetland mitigation area.

d. DWR would also recommend lowering the berm height on the design, which may allow the berms to be included in the wetland restoration (development of hydric soil indicators) acreage and result in less open water and more saturated soil for the respective bog cell.

Please refer to the response to comment #3a above. The berms have been redesigned to be lower.

4. DWR supports the planting of herbaceous plants and shrubs for the bog cells (if the design is utilized) or bog habitat areas. DWR recommends a vegetative percent cover performance criteria for these areas of 80%.

*We have added text to the mitigation plan that the success criteria for the bogs will be 80% coverage of the vegetation plots with planted or volunteer vegetation **(pg. 50)**. For information on the species that will be planted, please refer to the revised planting plan attached.*

5. Section 11.3 recommends a wetland performance standard of 7.1% saturation during the growing season. DWR does not agree with a wetland hydrologic performance standard of 7.1% for a target bog community. DWR will require a wetland performance standard of at least 12% saturation during the growing season.

*We agree to the performance standard of 12% for the bog areas. However, we have concerns about a performance standard that high for the surrounding wetland areas which make up 70% of the site. One concern is that the bogs will intercept runoff from the surrounding hillslopes. Another issue is that we have agreed to lower the height of the berms to reduce standing water in the bogs which will also lower the surrounding water table elevation. Given that the bog areas actually comprise much less of the wetland area than it appeared on the original Figure 10 (i.e. most of the wetlands are not bog), we are hoping that the bog performance standard of 12% does not need to apply to all of the wetlands. We propose 8.5% for the non-bog areas **(pg. 49)**.*

6. Section 6.2 discusses the reference wetlands and DWR recommends that a reference gauge be installed in the reference bog (the verbiage in the mitigation plan stated they may install a gauge in the bog).

We will install a groundwater gauge in a reference bog near the site. We have discussed using the Sparta Bog site with USFWS and they have provided contact information for NCDOT. We are in the process of obtaining permission to install a well at this location.

7. DWR recommends the designer be wary of lateral hydrologic "pop-out" on the streambank where the wetland areas drain into the stream, especially if these areas drain into a meander bend as shown on design sheet 3.8. DWR recommends supplemental stabilization measures be considered for these areas.

*We have redesigned the swale to carry overflow into the adjacent channel so that it enters the channel at the riffle upstream of the meander bend mentioned **(plan sheet 3.8)**. The swales will be armored with native rock for stability. The streambanks where the swales discharge will also be protected from erosion.*

<u>Todd Bowers, USEPA, April 1, 2016:</u>

1. General comment: Well-documented goals, objectives, past site activity, site information, letters and recent progress towards establishing a viable stream and wetland restoration site. Disclaimer: I have not been on-site or in any discussions with the IRT concerning this project.

We appreciate the comment.

2. P. 7: The goal of restoring habitat that may support bog species should clarify if flora, fauna or both. If the goal is habitat for bog turtles only, then the document should specify this. Habitat includes vegetation so planting of bog vegetation should be included in the objectives.

*The goal is to restore bog habitat and therefore we propose to plant native bog plant species. We have revised the planting plan based (attached) on information provided by IRT members **(pg. 46-47)**. Therefore, we have changed the goal to include restoring vegetation.*

3. P. 8: Add a programmatic goal of providing 5,139 SMUs and 5.82 WMUs for DMS In-Lieu Fee Program. Associated objective may be as simple as "Restore, enhance and reestablish streams and wetlands on-site.

DMS prefers not to include providing credits as a project goal and would like to keep the focus of the goals discussion on project benefits. The credit summations are described in other parts of the mitigation plan.

4. P. 10: Include valley type (A, B) in description of streams and their alluvial valleys.

*While DMS does not generally believe that Rosgen valley type assignments are valid in the Southeastern US, at your request we have added the Rosgen valley types in addition to the verbal descriptions of the valleys provided in Section 4.2 **(pg. 9-10)**.*

5. P. 11: Include estimated bankfull velocities for each reach in Tables 3a and 3b.

*We have added estimated bankfull velocities to Tables 4a – 4c **(pg. 11-17)**.*

6. P. 18: Vile Creek Reach 2 has a moderate sinuosity (>1.25) rather than low.

*We have changed the description to "moderate sinuosity" **(pg. 18)**.*

7. P. 19: UT2 has steep slope (as stated) of greater than 0.04. This would classify UT2 as a B4a type rather than B4.

*The stream type for UT2 has been changed to B4a **(pg. 19)**.*

8. P. 23: Recommend the use and credit for 50-foot buffers wherever possible especially with the type of adjacent land use and the expected nutrient rich and sediment laden runoff expected with continued use by cattle. I understand that there is an arbitrary change in buffer width requirements from piedmont to mountain streams but the science behind buffer effectiveness recommends a minimum of 50 feet for riparian vegetation to be minimally useful for controlling runoff and pollutant absorption before entering the stream. I applaud Wildlands for considering and proposing those areas with buffers much greater than the minimum.

We have planned for wider than 30 foot buffers wherever possible on this site and a large portion of the site will have buffers of much greater than 30 feet due to extra area included in the easement or adjacent wetlands. In light of this and the fact that the land acquisition is completed and easement agreements closed, no changes have been made to buffer widths in the plan.

9. P. 23: I am troubled by credit being proposed for areas where the minimum riparian buffer (30') overlaps with wetland area proposed for credit. Perhaps this is negated somewhat by areas where the riparian buffer proposed is much greater than the minimum?

According to the IRT, it is acceptable to claim wetland credit within the planted buffer zone of adjacent stream mitigation. No change has been made to proposed wetland credits.

10. P. 24: Include loss of intermittent stream at head of UT2 for the placement of the BMP in the impacts listed in the Pre-Construction Notice.

We have included the impacts from the BMP in the PCN.

11. P. 25: Bog Turtles "inhabits" wetland areas rather than "inhibits".

This correction has been made.

12. P. 25: Recommend changing "no effect" to "no negative effect" or "positive effect" since one of the project goals is to have a net positive effect on habitat.

Biological conclusions for mitigation projects must follow the FHWA-mandated environmental screening guidance and fall into one of the following categories: a) No Effect, b) Not likely to adversely affect, c) Likely to adversely affect. Written concurrence from USFWS is required for outcomes (b) and (c). USFWS has concurred with outcome (b) and we have updated the text to "Not likely to adversely affect" ***(pg. 26)****.*

13. P. 33: Table 8 Component Summation for the streams should read "3014, 1134 and 3807 for restoration, enhancement I and enhancement II respectively.

These corrections have been made ***(pg. 33)****.*

14. P. 35: Table 9b should have a footnote relating to the 10% of the site stream credits held in reserve for two bankfull events. Text was noted in paragraph 8.2.

This footnote has been added ***(pg. 35)****.*

15. P. 44: Reach 1 of UT1 has a small ephemeral channel near the head of the project (Fig. 2.2.1). Is there a need for a small headwater water quality treatment BMP constructed at this location similar to that on UT2?

There is a channel that discharges to UT1 at the upstream end of the project. This stream is jurisdictional and is partially on another landowner's property. The landowner was contacted but declined to participate. We cannot put a BMP in this location.

16. P. 45: I recommend that the sponsor include some sort of vegetation survey for the constructed bog cells. These cells constitute a significant amount of the restored/enhanced wetlands on site and other than reference site comparison for hydrology, have no performance standard to ensure the cells are functioning as intended. I recommend a least one vegetation monitoring plot per series to ensure that plant survival is quantified and that performance standards are considered separately from the riparian wetlands (example: > 80 percent survival, > 80 percent FACW, no invasive species). Otherwise these bog cells could wind up as pools of water with no suitable habitat or plant survival and still get full credit.

We have added text to the mitigation plan that the success criteria for the bog areas will be 80% coverage of the vegetation plots with planted or volunteer vegetation ***(pg. 50)****. Please review the revised planting plan attached for more detailed information on species. We propose that two percent of the bog acreage be monitored following the standard for planted area* ***(pg. 53-54)****. Invasives will be managed on the site. Text describing these issues has been added to the mitigation plan* ***(pg. 45-46)****.*

17. P. 48: Table 15 See comment on project goals and objectives noted above.

The same addition will be made to Table 15 as Table 2 ***(pg. 48-49)****.*

18. P. 48: Table 15 Recommend adding performance standard or contingency for goal of creating bog habitat. Add "planting bog species" as part of objectives for this goal.

We have added bog performance standards to Table 15 ***(pg. 48-49)****.*

19. Sheet 4.0: The inclusion of Acer saccharinium (silver maple) is notable as it does not appear in Schafale and Weakley (1990) for Montane Alluvial Forest. Why was this species selected? Recommend Betula nigra (river birch) to replace.

We have revised the planting plan including the removal of silver maple ***(pg. 46, plan sheet 4.0)****.*

20. Sheet 4.0: Recommend adding some understory species for consideration such as Carpinus carolinana (ironwood) or Lindera benzoin (spicebush) in the planting for riparian buffers.

*There is existing canopy along portions of UT3 and Vile Creek Reach 3. We have added some understory species to these areas (****plan sheets 4.3 and 4.7-4.8****).*

21. Sheet 4.0: Recommend adding Alnus serrulata (tag alder) live stakes in the streamside planting zone.

We prefer not to add tag alder to the streambank planting for the following reasons: 1) We have not had good success using tag alder as live stakes. 2) Tag alder can take over a streambank planting zone and create a dense thicket, which can affect bankfull cross sectional area. We try to avoid creating this situation on small streams. As with other recently constructed DMS projects in Alleghany County, there may be advantageous tag alder transplant opportunities identified and strategically implemented during construction.

22. Sheet 4.0: Recommend adding Cephalanthus occidentalis (buttonbush) in wetland planting.

We have added buttonbush to the wetland shrub zone ***(pg. 46, plan sheet 4.0)****.*

23. We request that the sponsor provide the IRT with a GIS shapefile polygon for this project.

We will provide the GIS shapefile(s).

24. Recommend that the sponsor explore the possibility to have the access road adjacent to UT3 moved to provide a wider riparian buffer.

Moving the road would require a significant cut into the adjacent hillslope and removal of trees. Because of these issues, the landowner requested that the road not be moved. We discussed this with the IRT chair prior to submitting the mitigation plan and understood that this existing road location would be

acceptable. Due to the location of the road and the related issue of a narrow buffer in this location, there is a credit reduction included in the credit summation.

Marella Buncick, USFWS, April 1, 2016:
Mountain bogs including Southern Appalachian bogs are a high priority for the USFWS Asheville Field Office given the rare and endangered species they support and the extensive loss of this habitat type (>90%) in the Southern Appalachians. We greatly appreciate the willingness of those involved to try to restore the site to Southern Appalachian bog habitat and are supportive of the project. With a few adjustments, we believe the project will benefit bog turtle, which is a high priority species for our office, and help increase mountain bog habitat.

Thanks for the acknowledgement of our efforts.

General
There appears to be a typo in the sections about northern long-eared bats. The document incorrectly states that northern long-eared bats prefer trees that are 3 inches dbh. Northern long-eared bats use live trees and/or snags >/= 3 inches dbh that have exfoliating bark, cracks, crevices, and/or cavities.

*This correction has been made **(pg. 26)**.*

Bog Turtles
• The draft plan notes that a pedestrian survey for turtles on 12/02/2013 did not detect any turtles (p. 25). It should be noted that bog turtles are hibernating in the mud this time of year, and would be impossible to detect. Bog turtle biologists with Project Bog Turtle and the NC Wildlife Resources Commission (NCWRC) did conduct a survey for about 3 hours on June 3, 2015. No turtles were found, but bog turtle experts did think it was highly likely turtles are present based on the existing habitat and proximity to known sites. Bog turtles spend most of their lives buried in muck and are very difficult to find. Much more survey work would be needed before we could say bog turtles are currently absent from the site. The wetland patches that look suitable for bog turtles are labeled B, C, F, N, and O on Figure 3. Gray's lily and skunk cabbage (both bog associated species) were found on the site. We recommend that the document be changed to reflect the possibility that bog turtles are already on the site. As part of this, the current goal related to bog turtles could be changed to "improve and expand Southern Appalachian Bog wetland habitat for bog turtle."

*These revisions have been made. We have amended the text to state that it is possible that bog turtles exist on the site **(pg. 25-26)**. We have changed the goal to improve and expand Southern Appalachian Bog habitat **(pg. 7)**.*

• Restoration work has the potential to injure or kill turtles and we recommend working with NCWRC and USFWS to develop a plan to minimize potential impacts to turtles that may already be on site. We are primarily concerned about the placement of plugs and the use of heavy equipment near remnant bog patches when turtles are active.

We recognize this concern and will take precautions to protect existing bog turtle habitat. We are open to recommendations on how to avoid harming bog turtles that may be present. As we discussed by phone on April 28, we agree that avoidance and minimization measures such as specific locations for crossing existing bog habitat can be discussed and agreed upon without documentation in the mitigation plan. No additional text has been added to the plan.

• Please ensure that the matting used along the creek is biodegradable (e.g., coconut fiber, jute mat).

We plan to use coconut fiber matting for the project.

Hydrology
If the IRT/Wildlands would benefit from Mountain bog hydrologic data to help calibrate design/success criteria Jeff Wilcox with UNCA currently is collecting data from various mountain bog sites as part of a characterization project for the USFWS. We can make his contact info available to whomever if this would be beneficial.

This information may be helpful at some point. Please provide the contact information to Wildlands.

• We have concerns about the current design of the bog cells and the plugs in the ditches to result in suitable habitat for bog turtles. The remnant wetland habitat that is in the ditches along Vile Creek R1 and Vile Creek R2 currently looks good for bog turtles with appropriate hydrology and deep, mucky soils. The goal should be to expand this habitat with similar conditions in these expanded areas. Wetlands preferred by bog turtles are spring-fed with saturated soils and slow flowing water and are sedge dominated, wet meadows, with little or no canopy. Bog turtle sites do not have standing water of significant depth. The goal should be to saturate the ground without producing deep-standing water.

We have altered the design to reduce the amount and height of berms. This will reduce the amount of standing water significantly. We do want to keep some berms within the existing ditches to slow the movement of water through the ditches and promote a higher groundwater table for surrounding wetlands. The area of the bogs will be significantly expanded. Please refer to new plan sheets ***(plan sheets 3.1-3.11)*** *and revised Figure 10.*

• Please ensure that all springs are depicted on the plan and considered as part of the overall site hydrology. We have seen a hill side seep/ spring at the base of the hill near areas N and O and we believe there may also be one at the top of area C.

We have depicted all of the springs that we are aware of on Figure 3.

Vegetation
• Staff with USFWS, NCWRC, and Wildlands Engineering met on site on 10/20/14 to discuss the bog habitat and bog turtles. As part of the restoration plan for Southern Appalachian bog, we suggested that the banks of Vile Creek be planted with shrubs and small tree species rather than large tree species. We have concerns that the dense planting of large trees will eventually shade out the bog and will also lead to more rapid succession of the bog, making the habitat unsuitable for bog turtles and eliminating many of the herbaceous species. Additionally, the area with gray's lily is close to the creek on the north side of Vile Creek R2 and may actually be in the planting area. Planting shrubs/small trees along restored streams has been successfully done at other bog turtle sites (e.g., UT-Crab Creek in Alleghany Co NC., Shady Valley in TN, and Sparta Bog in Alleghany Co. NC). We recommend planting shrubs only in VC R1 and on the north side of VC R2. The south side (with the exception of area F – see below) could be planted in trees.

We prefer to plant the stream side buffers with tree species as an element of the stream restoration to create stability and shade. However, as we discussed by phone, in areas where there are bogs, we will

reduce the riparian planting zone where tree species will be planted to a width of approximately 10 feet ***(pg. 45)****. In addition, there will be a zone of wetland shrubs between the trees and the bog areas. On the opposite sides of most bog areas there will be open pasture. We will avoid planting trees in the area where Gray's lily was identified. We have created a new planting plan figure to clearly show the planting zones (Figure 12).*

• The remnant patch of bog on the south side of Vile Creek R2 (labeled area F on Figure 3) is not categorized as a "bog cell" and is currently in the zone to be planted as trees. This is one of the best looking remnant patches of Southern Appalachian bog on the site and we recommend treating this area accordingly with any disturbed land in the vicinity planted with herbaceous plants rather than trees.

We will adjust the plan to include area F as a bog area. Refer to the revised Figure 10.

• We have concerns about the planting stem densities for trees/shrubs and think they should be lower than other typical mitigation community types since part of what is being restored is Southern Appalachian bog, which is characterized by a mosaic of shrub thickets and herb dominated areas. UT to Crab Creek mitigation site used woody shrub densities of <50 stems/acre, Shady Valley (TN) used 320 stems/ac and Sparta Bog also used 320-260 stems/acre.

We have adjusted the planting plan including the stems per acre. The riparian buffer planting zone stem density will remain 605 plants per acre and the success criteria will remain unchanged from the draft mitigation plan. The wetland shrub zone density will be 320 plants per acre ***(pg. 46)*** *and the success criteria will be 160 surviving plants at year 3, 130 at year 5, and 105 at year 7* ***(pg. 50)****. There will be no height requirement for shrubs.*

• In VC R1-2 we recommend creating a mosaic of shrub/herbaceous plants by including some herbaceous plantings and/or relying on colonization from the seed bed in the areas between Vile Creek and the bog cells rather than using just densely planted wetland shrubs. We recommend including native pollinator seed mixes that include milkweeds in the herbaceous planting areas to gain the added wildlife benefit of helping pollinators including Monarch butterflies and early succession bird species of concern.

We have reduced the planting density in the wetland shrub zone. We have added native pollinators including milkweed to the seed mix which will be applied to the wetland shrub zone ***(pg. 47, plan sheet 4.0)****. In addition, we believe goldenrod and cardinal flower, among others, will volunteer on the site since they are currently well established.*

• We think that stockpiling the existing topsoil is an excellent idea. Exotics should be eliminated before topsoil is removed if it is to be reapplied to the site. In addition, construction equipment should be decontaminated prior to arriving onsite to eliminate transferring exotic species from other sites to the Vile Creek site.

We will treat exotics on site prior to construction. We will ask the chosen contractor to decontaminate their equipment to the best of their ability prior to arriving on site.

• We could not find a species list other than the insets on plan sheets. The tree list is of concern because there are several species listed that are not native to the mountains of NC or appropriate for Appalachian bog communities. Specifically, eastern cottonwood, swamp chestnut oak and silver maple

should not be used. Appropriate tree substitutes could be box elder or black gum. Shrubs also could be substituted including black willow (already found onsite), silky willow and silky dogwood. We also question the use of green ash given threats from emerald ash borer.

*We have revised the planting lists **(pg. 46-47)**. The lists are now included in the mitigation plan as well as on the plan sheets. For your convenience, we have included the revised planting lists along with this letter.*

Long-term Management

• The document indicates that no long term management will be needed for this site. However, the site may require management if it is to remain suitable for bog turtles. Accelerated succession as a result of human impacts (e.g., changes in hydrology, increased nutrients, changes in natural disturbance regimes) is a threat to bog turtles and most bog turtle sites now require management to keep some areas open. Bog turtles need open areas for basking and nesting and one of the bog turtle's ultimate limitations is a closed canopy, which cuts off surface light and warmth.

*We have amended the document to state that long-term management may be needed to maintain the bog habitat but that any post-closure maintenance will need to be performed by a third party **(pg. 55)**.*

• We recommend including language in the plan that allows for some management (e.g., cutting woody vegetation out of the bog to open areas for bog turtles) by partner agencies/groups involved in bog turtle conservation (e.g., NCWRC, USFWS, Project Bog Turtle) if it is needed.

*While we are agreeable to this possibility, one or more of the suggested agencies/groups will need to be responsible for the bog maintenance. We have added text to the mitigation plan that states that a) agencies other than DEQ and Wildlands will perform any potential bog maintenance, b) any third party activities therein that may affect success criteria prior to regulatory close out will not result in credit loss at closeout, and c) that any post-closeout bog management will need to be pre-approved by the DEQ Stewardship Program **(pg. 55)**.*

• Bog turtle sites can greatly benefit from occasional grazing by cows. If possible, we recommend allowing the flexibility to include occasional, low density grazing in the bog cells to maintain the habitat and eliminate the need for more labor intensive management.

We discussed allowing cows within the easement with the USACE. We were informed that this would not be allowed.

<u>Andrea Hughes, USACE, April 13, 2016:</u>

1. Page 20, Section 4.5: Please provide a copy of the Corps JD approval letter and associated map of existing resources.

*This is included with the revised mitigation plan **(Appendix 2)**.*

2. Page 22, Section 4.7: Please be aware that credits will be reduced for those areas with stream buffers of less than 30 feet in width using the most current buffer guidance. For areas with a buffer of less than 15 feet in width, no credit may be generated. Areas with buffers greater than 30 feet wide may receive additional credit provided these areas do not overlap wetland mitigation areas.

We have already calculated the credit reductions using the buffer guidance and factored those into the credit summary in Table 8. Figure 9 shows areas where the buffer is less than or greater than 30 feet. In addition, we will provide a table of the buffer widths for areas where it will be less than or more than 30 feet and the associated credit reductions/increases for those areas ***(see attached table)****.*

3. Page 22, Section 4.7: The plan indicates that a CE cannot be obtained at this time for approximately 166 linear feet of stream channel located on the Perry property and the provider intends to relocate the stream channel onto the Crouse property. Please provide additional information related to permissions/agreements with the current landowner for the Perry property regarding relocation of this section of Vile Creek.

We have obtained a temporary construction easement to perform the work on the Perry property. We have added text to describe the arrangement to the mitigation plan ***(pg. 23)****.*

4. Page 26, Section 5.2.3: Regarding the conclusion that the project would have "no effect" on the bog turtle, according to the USFWS letter dated August 14, 2016, the project is not likely to adversely affect the species. Please revise the "no effect" statement.

We have made this revision (see previous comment and response above).

5. The mitigation plan proposes to modify the wetland rehabilitation/re-establishment activities to facilitate development of bog turtle habitat. Therefore, the Corps recommends that the provider coordinate design and construction plans with USFWS and NCWRC to ensure appropriate habitat for the species. The Corps supports USFWS and NCWRC comments/suggestions regarding the bog habitat provided above with the exception of cattle grazing. Also, the provider should propose appropriate vegetation and hydrology monitoring and performance standards for these areas.

We believe that we understand and have addressed all of the USFWS and WRC concerns with the revised mitigation plan and construction plans.

6. Page 53, Section 13.0: Please provide a long-term management strategy/plan for the 6.5 acres of bog turtle habitat.

The bog turtle habitat is only approximately 1.96 acres. We apologize for the confusion related to this acreage. See previous response to USFWS's comment regarding long-term management above.

7. Appendix 1, Site Protection: The site protection instruments for the Edwards and Mason properties includes a provision under Section III advising the landowners that if they have livestock, they must restrict livestock access to the easement areas and failure to do so may result in the state repairing fencing or installing cattle exclusion devices at the landowners expense. The site protection instrument for the Crouse properties (Areas A and B - restoration and EII areas) does not include this provision. The Corps believes this provision should be included in all site protection instruments to ensure that future land use activities on the property will not result in adverse impacts to the resources. Also, the provision should be modified to include tenants that may lease the land for agricultural use.

We understand the Corps' concern. This difference is that the Crouse parcels are used for livestock and will be fenced (with exception of the western most parcel along UT1). The Mason property is fenced and Wildlands plans to fence the Edwards and Miles properties. There should be no livestock access to the streams. We typically would not add this clause to a property where livestock are grazed and fencing is

planned. It is a special provision used when fencing is not planned. At this point, we have closed on the properties and the easements are final.

Please let me know if you have any additional comments.

Sincerely,

Jeff Keaton, Project Manager

Enclosure

Riparian Planting Zone Plant List

Species	Common Name	Spacing	Min. Caliper	Percentage
Alnus serrulata	Tag Alder	12ft x 6ft	0.25"	10%
Carpinus caroliniana	American Hornbeam	12ft x 6ft	0.25"	10%
Liriodendron tulipifera	Tulip Poplar	12ft x 6ft	0.25"	15%
Platanus occidentalis	Sycamore	12ft x 6ft	0.25"	15%
Betula nigra	River Birch	12ft x 6ft	0.25"	15%
Quercus pagoda	Cherrybark Oak	12ft x 6ft	0.25"	15%
Fraxinus pennsylvanica	Green Ash	12ft x 6ft	0.25"	10%
Diospyros virginiana	Persimmon	12ft x 6ft	0.25"	10%

Understory Planting Zone Plant List

Species	Common Name	Spacing	Min. Caliper	Percentage
Carpinus caroliniana	American Hornbeam	12ft x 12ft	0.25"	25%
Aronia arbutifolia	Red Chokeberry	12ft x 12ft	0.25"	25%
Ilex verticillata	Winter Berry	12ft x 12ft	0.25"	25%
Lindera benzoin	Spicebush	12ft x 12ft	0.25"	25%

Wetland Shrub Planting Zone Plant List

Species	Common Name	Spacing	Min. Caliper	Percentage
Aronia arbutifolia	Red Chokeberry	12ft x 12ft	0.25"	15%
Cornus amomum	Silky Dogwood	12ft x 12ft	0.25"	15%
Ilex verticillata	Winter Berry	12ft x 12ft	0.25"	15%
Lindera benzoin	Spicebush	12ft x 12ft	0.25"	15%
Sambucus nigra	Elderberry	12ft x 12ft	0.25"	10%
Vaccinium corymbosum	Highbush Blueberry	12ft x 12ft	0.25"	15%
Cephalanthus occidentalis L.	Common Buttonbush	12ft x 12ft	0.25"	15%

Herbaceous Planting Zone Plant List

Species	Common Name	Spacing	Percentage
Juncus effusus	Common Rush	8 ft	15%
Carex alata	Broadwing Sedge	8 ft	15%
Carex lurida	Shallow Sedge	8 ft	15%
Carex crinita	Fringed Sedge	8 ft	15%
Scirpus cyperinus	Woolgrass	8 ft	20%
Sagittaria latifolia	Broadleaf Arrowhead	8 ft	20%

Streambank Planting Zone Livestakes Plant List

Species	Common Name	Spacing	Min. Caliper	Percentage
Cornus amomum (livestake)	Silky Dogwood	3-5 ft	0.5"	20%
Cephalanthus occidentalis L.	Common Buttonbush	3-5 ft	0.5"	20%
Salix sericea (livestake)	Silky Willow	3-5 ft	0.5"	20%
Physocarpos opulifolius	Ninebark	3-5 ft	0.5"	20%

Species	Common Name	Spacing	Min. Caliper	Percentage
Alnus serrulata	Tag Alder	3-5 ft	0.5"	20%

Streambank Planting Zone Herbaceous Plugs Plant List

Species	Common Name	Spacing	Percentage
Juncus effusus	Common Rush	4 ft	40%
Carex alata	Broadwing Sedge	4 ft	40%
Panicum virgatum	Switchgrass	4 ft	20%

Vile Creek Mitigation Site

Stream Buffer Credit Adjustment Calculations

Vile Creek Reach 3

Stream Length (ft)	Buffer Length (Right and Left Banks Along Alignment, ft)	Approach	Ratio	Full Credit	Reduced Credit Total
714	1428	EII	2.5	285.6	**279**

Buffer Width Range (ft)	Buffer Length (Right and Left Banks Along Alignment, ft)	Full Credit (Buffer Length*Credit Ratio*1/2)	Credit Adjustment	Credit Adjustment	Adjusted Credits
0-15	28.1	5.6	-100%	-5.6	0.0
15-20	4.2	0.8	-50%	-0.4	0.4
20-25	0.0	0.0	-30%	0.0	0.0
25-30	22.5	4.5	-15%	-0.7	3.8
30-50	1373.2	274.6	0%	0.0	274.6
50-75	0.0	0.0	+9%	0.0	0.0
Total	1428.0	285.6		-6.7	278.9

UT1 Reach 1

Stream Length (ft)	Buffer Length (Right and Left Banks Along Alignment, ft)	Approach	Ratio	Full Credit	Reduced Credit Total
1107	2214	EI	1.5	738	**658**

Buffer Width Range (ft)	Buffer Length (Right and Left Banks Along Alignment, ft)	Full Credit (Buffer Length*Credit Ratio*1/2)	Credit Adjustment	Credit Adjustment	Adjusted Credits
0-15	161.8	53.9	-100%	-53.9	0.0
15-20	99.4	33.1	-50%	-16.6	16.6
20-25	65.1	21.7	-30%	-6.5	15.2
25-30	58.4	19.5	-15%	-2.9	16.6
30-50	1829.4	609.8	0%	0.0	609.8
50-75	0.0	0.0	+9%	0.0	0.0
Total	2214.0	738.0		-79.9	658.1

UT1 Reach 2

Stream Length (ft)	Buffer Length (Right and Left Banks Along Alignment, ft)	Approach	Ratio	Full Credit	Reduced Credit Total
825	1650	R	1.0	825	**815**

Buffer Width Range (ft)	Buffer Length (Right and Left Banks Along Alignment, ft)	Full Credit (Buffer Length*Credit Ratio*1/2)	Credit Adjustment	Credit Adjustment	Adjusted Credits
0-15	16.4	8.2	-100%	-8.2	0.0
15-20	4.1	2.1	-50%	-1.0	1.0
20-25	4.2	2.1	-30%	-0.6	1.5
25-30	4.4	2.2	-15%	-0.3	1.9
30-50	1621.0	810.5	0%	0.0	810.5
50-75	0.0	0.0	+9%	0.0	0.0
Total	1650.0	825.0		-10.2	814.8

UT3

Stream Length (ft)	Buffer Length (Right and Left Banks Along Alignment, ft)	Approach	Ratio	Full Credit	Reduced Credit Total
1236	2472	EII	2.5	494	**468**

Buffer Width Range (ft)	Buffer Length (Right and Left Banks Along Alignment, ft)	Full Credit (Buffer Length*Credit Ratio*1/2)	Credit Adjustment	Credit Adjustment	Adjusted Credits
0-15	59.7	11.9	-100%	-11.9	0.0
15-20	60.0	12.0	-50%	-6.0	6.0
20-25	139.2	27.8	-30%	-8.4	19.5
25-30	151.4	30.3	-15%	-4.5	25.7
30-50	1800.8	360.2	0%	0.0	360.2
50-75	260.9	52.2	+9%	4.7	56.9
Total	2472.0	494.4		-26.1	468.3

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

REPLY TO
ATTENTION OF:

May 31, 2016

Regulatory Division

Re: NCIRT Review and USACE Approval of the Vile Creek Mitigation Plan; SAW-2014-01585; NCDMS Project # 96582

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 comment period for the Vile Creek Mitigation Plan, which closed on April 6, 2016. Several concerns were noted during the review that required additional coordination and revisions to the mitigation plan. All comments received in response to the revised mitigation plan are attached for your review.

Based on our review of these comments, we have determined that no major concerns have been identified with the revised Mitigation Plan, which is considered approved with this correspondence. However, one minor issue was identified, as described in the attached comment memo, which 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 approval of the project along with a copy of this letter. Issues identified above must be 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 any questions regarding this letter, the mitigation plan review process, or the requirements of the Mitigation Rule, please call me at 919-846-2564.

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: 2016.05.31 08:53:58 -04'00'

Andrea Hughes
Mitigation Project Manager

Enclosures

Electronic Copies Furnished:

NCIRT Distribution List

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

REPLY TO
ATTENTION OF:

CESAW-RG/Hughes May 13, 2016

MEMORANDUM FOR RECORD

SUBJECT: Vile Creek Mitigation Site - NCIRT Comments/Revised Mitigation Plan

PURPOSE: The comments listed below were provided in response to proposed mitigation plan changes dated May 2, 2016.

NCDMS Project Name: Vile Creek Mitigation Site, Alleghany County, NC

USACE AID#: SAW-2014-01585

NCDMS #: 96582

30-Day Comment Deadline: April 6, 2016

Travis Wilson, NCWRC, March 24, 2016:
No additional comments received.

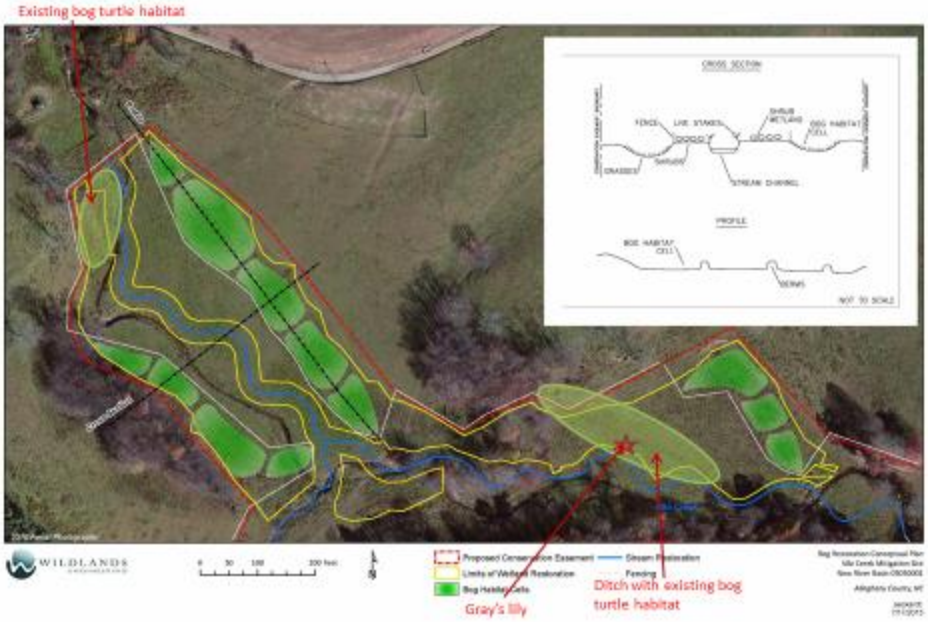
Mac Haupt, NCDWR, March 29, 2016:
No additional concerns.

Todd Bowers, USEPA, April 1, 2016:
No additional comments received.

Marella Buncick, USFWS, April 1, 2016:
We are satisfied with the responses to comments. The only additional comment is in regard to an area on Vile Creek R1 that we feel is already bog habitat (see attached). We prefer to see this area planted in herbaceous rather than shrub plants.

Andrea Hughes, USACE, April 13, 2016:
No additional concerns.

Andrea Hughes
Mitigation Project Manager
Regulatory Division


Existing bog turtle habitat
CROSS SECTION
FENCE
LIVE STAKES
SHRUB WETLAND
BOG HABITAT CELL
STREAM CHANNEL
PROFILE
BOG HABITAT CELL
BERMS
NOT TO SCALE
Proposed Conservation Easement
Limits of Wetland Restoration
Bog Habitat Cells
Stream Restoration
Fencing
Gray's lily
Ditch with existing bog turtle habitat

FINAL MITIGATION PLAN

VILE CREEK MITIGATION SITE

Alleghany County, NC
DEQ Contract No. 5999
DMS ID No. 96582

New River Basin
HUC 0505001

PREPARED FOR:

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

PREPARED BY:

Wildlands Engineering, Inc.
312 West Millbrook Road, Suite 225
Raleigh, NC 27609
Phone: (919) 851-9986

June, 2016

EXECUTIVE SUMMARY

Wildlands Engineering, Inc. (Wildlands) is completing a full-delivery stream and wetland mitigation project for the North Carolina Division of Mitigation Services (DMS) to restore and enhance 7,927 linear feet (LF) of perennial and intermittent streams and restore 6.5 acres of riparian wetlands in Alleghany County, North Carolina. The site is located on an active beef cattle farm and the streams and wetlands on the site are highly degraded. The project is intended to provide 5,146 stream mitigation units (SMUs) and 5.82 riparian wetland mitigation units (WMUs) to offset unavoidable impacts in the New River Basin.

The project is located within a DMS targeted local watershed for the New River basin identified by Hydrologic Unit Code (HUC) 05050001030020. The site is also located within the planning area for the Little River and Brush Creek Local Watershed Plan (LWP) which was completed between 2003 and 2007. The LWP describes the major stressors in the watershed which include:

- Deforested buffers
- Livestock access to streams
- Severe erosion on stream banks
- Land-disturbing activities on steep slopes
- Non-point source pollution from the Town of Sparta and surrounding areas
- Wetland areas drained and deforested for agricultural use.

The project will help offset the major stressors described in the LWP through restoration and enhancement of streams and wetlands and planting of native vegetation across the site. The primary project goals are to:

- Exclude cattle from project streams
- Stabilize eroding stream banks
- Construct stream channels that are laterally and vertical stable
- Improve instream habitat
- Reconnect channels with floodplains so that floodplains and wetlands are inundated relatively frequently
- Restore riparian wetlands
- Expand Southern Appalachian Bog habitat
- Restore and enhance native floodplain vegetation
- Permanently protect the project site from harmful uses.

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 DMS operations and procedures for the delivery of compensatory mitigation.

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1.0 Introduction

1.1 Project Overview

The Vile Creek Stream and Wetland Mitigation Site (site) is located in Alleghany County approximately one mile northeast of the Town of Sparta (Figure 1). The project is sponsored by the North Carolina Division of Mitigation Services (DMS) and involves restoration and enhancement of a mountain stream and wetland complex. Stream restoration and enhancement will result in ecological improvements to 7,927 feet of streams. Reaches of two streams will be fully restored on the site. These include Vile Creek and an unnamed tributary (UT1) to Vile Creek. A portion of Vile Creek and UT1 will also be improved through Enhancement I techniques. Reaches of five other streams including UT1b, UT1c, UT2, UT3, and the Little River (to which Vile Creek discharges) will be enhanced with an Enhancement II approach. A total of 6.5 acres of wetlands will be restored on the site including 3.0 acres of rehabilitation and 3.5 acres of re-establishment. Included in the wetlands restoration will be the expansion of Southern Appalachian Bog habitat which is intended to support populations of bog turtles (*Glyptemys muhlenbergii).* While no bog turtles have been found on the site, U.S. Fish and Wildlife Service (USFWS) biologists identified existing habitat within multiple linear man made ditches across the site. These ditches will be plugged to retain water on the site and widened to expand the bog conditions suitable for the turtles. In addition, Little River is a hatchery supported trout stream stocked by the North Carolina Wildlife Resources Commission (WRC). While there are no plans to stock Vile Creek, the stream is large enough to hold trout which migrate from Little River and fish habitat will be improved by the project. The floodplains and wetlands on the site will be planted with native tree and shrub species. Shrubs will be planted on much of the site so that the bog habitat areas will not be overly shaded. On significant portions of the site where excessive shading is not an issue and immediately adjacent to all streams, taller-growing tree species will be planted. The project will result in 5,146 stream mitigation units (SMUs) and 5.82 wetland mitigation units (WMUs).

1.2 Directions to Project Site

To reach the site from Raleigh, NC, take I-40 West toward US 70/Greensboro/Winston-Salem. Keep right at the fork to continue on I-40 Business West/US-421 North. Take exit 6B for US-52 North/US-311 North/NC-8 North toward Mount Airy/Smith Reynolds/Airport. Merge onto US-311 North/US-52 North and continue to follow US-52 North. Continue on I-74 West. Take exit 6 for NC-89 toward Mount Airy. At the end of the exit ramp, turn left onto NC-89 West. Travel 13.7 miles, turn left onto NC-18 South. Travel 14.4 miles, cross over Vile Creek. Napco Road will be on the right. Take the next left onto a gravel farm road to access the Site.

2.0 Watershed Approach and Site Selection

The site has been selected to provide SMUs and WMUs in the New River Basin. The project site was selected as a mitigation project utilizing a watershed planning approach. DMS uses a hierarchical watershed planning approach beginning at the river basin scale resulting in River Basin Restoration Plans (RBRPs) that identify restoration goals and targeted local watersheds (TLWs) in which these goals should be implemented. The project is located within a DMS TLW for the New River basin, which is identified by Hydrologic Unit Code (HUC) 05050001030020 and NCDWQ Subbasin ID 05-07-03. The site is also located within the planning area for the Little River and Brush Creek Local Watershed Plan (LWP), which is the next phase of the hierarchical planning process. The LWP was completed between 2003 and 2007 and describes the major stressors in the watershed which include:

- Deforested buffers
- Livestock access to streams
- Severe erosion on stream banks
- Land-disturbing activities on steep slopes
- Non-point source pollution from the Town of Sparta and surrounding areas
- Wetland areas drained and deforested for agricultural use.

Assets worth preserving described in the LWP documents include trout and other fisheries and meta-populations of bog turtles. The LWP documents include a prioritization of projects to offset these stressors and/or preserve assets. This site includes two stream reaches streams (VC1-03 and VC1-04) and a wetlands area (VC1-W22) that were prioritized in the Project Atlas developed for the LWP that describes high priority projects. The Vile Creek subwatershed was ranked as the eighth highest priority for restoration projects (Technical Memo 1).

The 2009 update of the New River Basin RBRP can be accessed online at: http://portal.ncdenr.org/c/document_library/get_file?uuid=554ebebf-af76-4a68-9109-5b83fb16c088&groupId=60329

The LWP documents are also available online and can be accessed through links in the following document: http://portal.ncdenr.org/c/document_library/get_file?uuid=45e02f56-bc5a-4ca0-a170-91c02c4bcb80&groupId=60329

The land required for construction, management, and stewardship of this mitigation project includes portions of the parcels listed in Table 1. Conservation easements will be recorded on the parcels to include the reams being restored and enhanced along with their corresponding riparian buffers and wetland restoration areas. A copy of the site protection instrument and recorded plat will be submitted with the final mitigation plan in Appendix 1.

Table 1: Details of Site Protection Instrument

Property Owner	Parcel ID Number	Memorandum of Option Deed Book (DB) and Page Number (PG)	Deed Book and Page Number	Acreage to be Protected
Iris Gambill Estate & Judy Gambill & Gary Crouse	3081-20-6925	DB: 00355 PG: 1436-1440 DB: 00363 PG:1382 (1st Amendment)	TBD	22.00 acres
Iris Gambill Estate & Tamara Gambill & Steve Mason	3081-41-3728	DB: 00355 PG: 1431-1435 DB: 00363 PG:1386 (1st Amendment)	TBD	2.86 acres
Jessie D. Perry & Regina Perry	3081-10-0180	DB: 00364 PG: 0222-0225*	TBD	0.00 acres
Debbie Edwards & Donna Rollins	3081-10-1188	DB: 00363 PG: 1377-1380	TBD	0.18 acres
Wayne D. Miles Jr. & Janet Miles	3081-10-4203	DB: 00363 PG: 1390-1396*	TBD	0.00 acres

*Agreement for temporary construction easement

3.0 Project Goals and Objectives

The Project will help offset the major stressors described in the LWP discussed in the previous section through restoration and enhancement activities and riparian buffer re-vegetation. Project goals are desired project outcomes and are verifiable through measurement and/or visual assessment. Objectives are activities that will result in the accomplishment of goals. The project will be monitored after construction to evaluate performance as described in Section 11 of this report. The project goals and related objectives are described in Table 2.

Table 2: Mitigation Goals and Objectives

Goals	Objectives
Reduce pollutant inputs to streams including fecal coliform, nitrogen, and phosphorous.	Exclude cattle from streams and buffers by installing fencing around conservation easements adjacent to cattle pastures. Install wells and drinkers to provide alternative water sources for cattle.
Reduce inputs of sediment into streams from eroding stream banks.	Reconstruct stream channels with stable dimensions. Add bank revetments and in-stream structures to protect restored/enhanced streams.
Return a network of streams to a stable form that is capable of supporting hydrologic, biologic, and water quality functions.	Construct stream channels that will maintain a stable pattern and profile considering the hydrologic and sediment inputs to the system, the landscape setting, and the watershed conditions.
Improve aquatic communities in project streams and provide improved habitat for trout migrating from Little River into Vile Creek. *Note: Presence of aquatic organisms and trout will not be tied to project success criteria.*	Install habitat features such as constructed riffles, cover logs, and brush toes into restored/enhanced streams. Add woody materials to channel beds. Construct pools of varying depth.
Raise local groundwater elevations and allow for more frequent overbank flows to provide a source of hydration for floodplain wetlands. Reduce shear stress on channels during larger flow events.	Reconstruct stream channels with appropriate bankfull dimensions and depth relative to the existing floodplain.
Restore wetland hydrology, soils, and plant communities.	Restore riparian wetlands by raising stream beds, plugging existing ditches, removing fill material over relict hydric soils, and planting native wetland species.
Improve and expand Southern Appalachian bog habitat to support bog species such as bog turtles. *Note: Presence of bog turtles will not be tied to project success criteria.*	Widen low lying ditched areas that represent bog conditions.
Create and improve riparian and wetland habitats by planting native vegetation. Provide a canopy to shade streams and reduce thermal loadings. Create a source of woody inputs for streams. Reduce flood flow velocities on floodplain and improve long-term lateral stability of streams. Improve bog habitat by planting herbaceous wetland plants.	Plant native tree and shrub species in riparian zone and wetland areas other than bog areas. Bog areas will be planted with herbaceous species.

Goals	Objectives
Ensure that development and agricultural uses that would damage the site or reduce the benefits of project are prevented.	Establish conservation easements on the site.

4.0 Existing Conditions

4.1 Watershed Conditions

The site is located in the Blue Ridge Mountains of Northwest North Carolina. The rugged landscape in the region is comprised of rounded mountain tops and dissected, concave valleys (NEMAC, 2015). Vile Creek and its tributaries are located in an area of highly weathered but steep mountain ridges and knobs and generally narrow valleys that widen in the downstream direction. There is significant relief within the watershed as elevations range from 3,606 feet at the highest point (Doughton Mountain) to 2,680 feet on the floodplain of the Little River. The general trend of the topography in the area is southwest to northeast, similar to that of the underlying Ashe Metamorphic Suite and Tallulah Falls Formation of the Blue Ridge Belt. Much of the bedrock in the drainage area is a muscovite-biotite gneiss (Zatm) that is interlayered with mica schist and minor amphibolite and hornblende gneiss (USGS, 2015). The natural substrate in the project streams is primarily gravel and cobble, which appears to be a product of the gneiss through weathering of the micaceous layers.

The Vile Creek watershed (Figure 2) has a drainage area of 2.7 square miles at the confluence with Little River. The watershed is rural and consists primarily of farm land and forest. The farm land is 90% pasture. There are a few single family homes and a small light industrial facility in the lower portion of the watershed. This facility used to manufacture cardboard products but is now used as a shipping facility by an evergreen tree grower. A review of aerial photography has indicated that nearly all of the residential development in the watershed occurred during the 1970's and 1980's. The only land cover change since the 1980's has been additional clearing of a few small agricultural fields and clearing of a small lot behind the shipping facility.

The UT1 watershed (Figure 2) drains 0.32 square miles at the downstream extent of the reach where it joins Vile Creek. The land use in this watershed is similar to that of Vile Creek except that a significant proportion of the drainage area is comprised of single-family homes on large lots. The headwaters of this watershed drain a small portion of the eastern edge of development in and around the Town of Sparta. Much of this development has been present since the 1960's; however, a small subdivision consisting of a few single family homes was built during the 2000's.

The drainage areas of UT1B and UT1C (Figure 2) are 0.17 square mile and 0.3 square mile, respectively. The watersheds of these intermittent streams are completely undeveloped. The upstream portions of both watersheds are forested and the downstream portions of both are cattle pasture. While the land cover in both of these watersheds has changed very little since the 1960's, the wooded areas are slightly more extensive today.

UT2 flows into Vile Creek from the north just before it joins Little River. The watershed of this small stream (Figure 2) is almost entirely pasture with only 3% of the area wooded. UT3 runs parallel to UT2 but flows into Little River downstream of the Vile Creek confluence. The watershed of UT3 is 47% wooded and the rest is pasture. The land cover in these watersheds has changed very little since the 1960's. One single family residence was built in 2015 on the ridge between these two streams.

The Little River watershed at this location (Figure 2) has a drainage area of 35.8 square miles. It is largely undeveloped, comprised primarily of pasture land and forest. Although all of the development in and around Sparta drains to it, the watershed is only 2% impervious. A detailed analysis of changes in land cover for this watershed was not performed for this analysis. However, Alleghany County is one of the least developed areas of the state and land cover throughout the county has changed little over recent decades. The downtown core of Sparta was mostly built in the early 1900's and the residential development on the outskirts of town mostly occurred between the 1950's and 1970's. Little development has occurred since the 1980's (Dowell, pers. comm., 2015).

The planners for the Town of Sparta and Alleghany County were contacted to discuss the potential for future land use changes in the project watersheds (not including Little River). The Vile Creek watershed is mostly zoned Residential/Agricultural. According to these sources, no significant development is likely to occur in the watershed in coming years other than the potential for small residential developments or individual single family homes, which will mostly be vacation or retirement homes (Dowell, pers. comm., 2015; Dalton, pers. comm., 2015). Dairy farming in the region has declined significantly in recent years, so there is potential for pasture land to be converted to forest. The cultivation of evergreen trees is a significant and increasingly common agricultural practice in the area. It is likely that some of the land in the watershed may be converted to this form of agriculture. These changes are unlikely to affect the watershed processes of the Vile Creek project reaches. The watershed of UT1 is also zoned Residential/Agricultural. According to the local planners, no significant development is planned for this area. Growth in the vicinity of Sparta has been very limited in recent years. Most recent development has occurred south of Sparta along US Highway 21. No development that would affect the UT1 portion of the project is expected. The other project watersheds (besides Little River) are very small and contained entirely on land owned by the project land owners. No land use changes are planned and the land will stay pasture and forest, likely for decades to come.

Given the rural character of the project watersheds, lack of significant land use changes in the past several decades, and limited potential for future development, the project watersheds are considered to be stable and in equilibrium with watershed processes. The hydrologic processes of the watershed have been effected by large scale clearing of trees for agriculture in the past but this disturbance occurred many decades ago and the streams have long since adjusted to the new hydrologic regime. The sediment in the streams is mostly derived from headwaters reaches and from localized livestock access. The Vile Creek channel upstream of the project area runs through a wooded area for several thousand feet and is in a tight, alluvial valley with instances of bedrock control. There are no obvious, significant sources of sediment along this reach. Based on visual assessments of project site stream beds over time, the substrate grain sizes, and limited bar formation, the bedload supply to the channels appears to be low to moderate. There are no existing and likely no future large sediment inputs to the system that will destabilize the project once completed.

4.2 Valley Description

The surrounding fluvial landforms are typical of the Blue Ridge region's mountainous topography. On the project site, Vile Creek Reach 1 and Reach 2 flow through an unconfined alluvial valley with a wide floodplain of fluvial deposition. According to the valley type classification system developed by Rosgen (2013) this valley is most similar to type VIII(b). The valley is gently sloping and supports riparian wetland communities. As Vile Creek continues to the east (Reach 3), the valley transitions to a more confined alluvial valley with a narrow floodplain (type VIII(a)). Where the valley narrows, exposed outcrops of bedrock appear in the floodplain.

UT1 Reach 1 and Reach 2 flow through a somewhat confined alluvial valley (type VIII(a)). Evidence of bedrock control is minimal compared to Vile Creek Reach 3, but steep adjacent valley walls confine the stream. The upstream end of UT2 flows through an unconfined alluvial valley (type VIII(b)), however the valley narrows as UT2 flows toward Vile Creek. UT3 flows through a tightly confined alluvial valley (type VIII(a)) with a narrow floodplain. Steep valley walls and steep valley slope create a typical Blue Ridge headwater tributary.

4.3 Surface Water Classification

Wildlands investigated on-site jurisdictional waters of the U.S. between December 9 and 11, 2014, using the U.S. Army Corps of Engineers (USACE) Routine On-Site Determination Method. This method is defined in the 1987 Corps of Engineers Wetlands Delineation Manual and subsequent Eastern Mountain and Piedmont Regional Supplement. Determination methods included stream classification utilizing the North Carolina Division of Water Resources (NCDWR) Stream Identification Form (see Appendix 2) and USACE guidance. In addition, the USACE Stream Quality Assessment Worksheet (see Appendix 2) was also utilized to further evaluate on-site channels. Potential jurisdictional wetland areas as well as typical upland areas were classified using the USACE Wetland Determination Data Form.

The results of the on-site field investigation verify that there are eight jurisdictional stream channels located within the proposed project area including the Little River, Vile Creek and six unnamed tributaries to Vile Creek (UT1, UT1B, UT1C, UT2, UT2A, and UT3). Little River, Vile Creek, UT1, UT2, and UT3 were determined to be perennial by Wildland personnel. UT1B and UT1C were classified by Wildlands as intermittent. Twenty-nine jurisdictional wetland areas were identified within the proposed project area (Wetlands A – CC), as shown on Figure 3. Appendix 2 contains a figure showing the overview of the site assessment data points. Wetland Determination Data Forms representative of on-site jurisdictional wetlands as well as non-jurisdictional upland areas have been enclosed in Appendix 2 (DP1-DP52). Site photographs are included in Appendix 3. Section 4.5 presents additional existing wetland information. A Jurisdictional Determination site visit was conducted on September 3, 2015. During this site visit, the stream and wetland determinations made by Wildlands were confirmed by U.S. Army Corps of Engineers personnel.

NCDWR assigns best usage classifications to State waters that reflect water quality conditions and potential resource usage. The Little River and Vile Creek within the project area have been classified as Class C waters for aquatic life and secondary recreation. Major water quality stressors identified by Wildlands personnel include deforested buffers, livestock access to streams, erosion on stream banks, drainage and deforestation of floodplain wetland areas, and non-point source pollution from the Town of Sparta and surrounding areas. Water quality stressors identified on-site are consistent with issues identified in the New River Basin RBRP and Little River LWP referenced in Section 2.0 of this report.

4.4 Existing Stream Conditions

On-site existing conditions assessments were conducted for each project reach by Wildlands between December of 2014 and August 2015. Data collection included surveying representative cross sections and longitudinal profiles, conducting reach-wide pebble counts, collecting bed material samples and photographing site features. Stream types were classified according the Classification of Natural Rivers (Rosgen, 1994). Channel stability was assessed with the HEC-20 method (Lagasse, 2001) and channel evolutionary stage was estimated following the Channel Evolution Model for Incised Rivers (Simon, 1989). The locations of the project reaches and surveyed cross sections are shown in Figure 3. Tables 3a and 3b present the existing reach summary information. Existing morphologic parameters for each of the project reaches are summarized in Tables 4a-4c, and morphologic survey, sediment data, and

channel stability data are included in Appendix 4. Photographs of existing site conditions are included in Appendix 3. A topographic map of the project area is shown as Figure 4.

Table 3a: Reach Summary Information

	Vile Creek Reach 1	Vile Creek Reach 2	Vile Creek Reach 3	UT1 Reach 1	UT1 Reach 2
Existing Length (LF)	927	1,293	663	1,152	882
Valley Slope (feet/ foot)	0.017	0.016	0.015	0.032	0.033
Drainage Area (acres)	1,375	1,639	1,720	190	218
Drainage Area (square miles)	2.15	2.56	2.69	0.30	0.34
NCDWQ stream ID score	45.5	45.5	45.5	43	43
Perennial or Intermittent	P	P	P	P	P
NCDWQ Classification	C	C	C	C	C
Existing Stream Type	C3	C4	C4	E4b	F4b
Simon Evolutionary Stage	IV	IV	IV	III	IV
Channel Stability	Fair	Fair	Good	Fair	Fair
FEMA classification	AE	AE	AE	AE	AE

Table 3b: Reach Summary Information

	UT1B	UT1C	UT2	Little River	UT3
Existing Length (LF)	51	152	1,262	560	1,343
Valley Slope (feet/ foot)	0.071	0.067	0.048	N/A	0.07
Drainage Area (acres)	8	8	80	22,922	38
Drainage Area (square miles)	0.01	0.01	0.13	35.8	0.06
NCDWQ stream ID score	28.25	26	27, 42.5	49.5	33.5
Perennial or Intermittent	I	I	I, P	P	P
NCDWQ Classification	C	C	C	C	C
Existing Stream Type	E4b	E4b	B4	C4	B4a
Simon Evolutionary Stage	III	III	III	I	III
Channel Stability	Good	Good	Good	Excellent	Good
FEMA classification	AE	AE	N/A	AE	AE

Table 4a: Existing Stream Morphologic Parameters

	Notation	Units	Vile Creek Reach 1		Vile Creek Reach 2		Vile Creek Reach 3	
			Min	Max	Min	Max	Min	Max
stream type[1]			C3		C4		C4	
drainage area	DA	sq mi	2.15		2.56		2.69	
bankfull cross-sectional area	A_{bkf}	SF	30.4	31.7	20.1	48.0	41.2	

	Notation	Units	Vile Creek Reach 1		Vile Creek Reach 2		Vile Creek Reach 3	
			Min	Max	Min	Max	Min	Max
estimated bankfull discharge	Q	cfs	100		120		N/A	
estimated bankfull velocity	V	ft/s	3.3	3.2	6.0	2.5	N/A	
Cross-Section								
width at bankfull	w_{bkf}	feet	19.3		22.4		34.5	
maximum depth at bankfull	d_{max}	feet	2.7		1.6		1.7	
mean depth at bankfull	d_{bkf}	feet	1.6		0.9		1.2	
bankfull width to depth ratio	w_{bkf}/d_{bkf}		12.2		25.1		28.9	
low bank height		feet	3.9		2.8		3.0	
bank height ratio	BHR		1.4		1.8		1.8	
floodprone area width	w_{fpa}	feet	333		119		74	
entrenchment ratio	ER		17.2		5.3		2.1	
Slope								
valley slope	S_{valley}	feet/ foot	0.017		0.016		0.015	
channel slope	$S_{channel}$	feet/ foot	0.014		0.011		0.014	
Profile								
riffle slope	S_{riffle}	feet/ foot	0.021	0.05	0.019	0.063	N/A[2]	N/A[2]
riffle slope ratio	$S_{riffle}/S_{channel}$		1.5	3.5	1.7	5.8	N/A[2]	N/A[2]
pool slope	S_{pool}	feet/ foot	0.001	0.006	0.002	0.007	N/A[2]	N/A[2]
pool slope ratio	$S_{pool}/S_{channel}$		0.1	0.5	0.2	0.6	N/A[2]	N/A[2]
pool-to-pool spacing	L_{p-p}	feet	39.4	69.2	33.27	88.47	N/A[2]	N/A[2]
pool spacing ratio	L_{p-p}/w_{bkf}		2.0	3.6	1.5	3.9	N/A[2]	N/A[2]
pool cross-sectional area	A_{pool}	SF	31.7		48.0		N/A[2]	
pool area ratio	A_{pool}/ A_{bkf}		1.0		2.4		N/A[2]	
maximum pool depth	d_{pool}	feet	2.9		3.1		N/A[2]	
pool depth ratio	d_{pool}/ d_{bkf}		1.8		3.4		N/A[2]	
pool width at bankfull	w_{pool}	feet	18.9		31.0		N/A[2]	
pool width ratio	w_{pool}/ w_{bkf}		1.0		1.4		N/A[2]	
Pattern								
sinuosity	K		1.27		1.25		1.10	
belt width	w_{blt}	feet	38	90	42	93	47	120

	Notation	Units	Vile Creek Reach 1		Vile Creek Reach 2		Vile Creek Reach 3	
			Min	Max	Min	Max	Min	Max
meander width ratio	w_{blt}/w_{bkf}		2.0	4.7	1.9	4.2	1.4	3.5
meander length	L_m	feet	160	190	100	330	180	250
meander length ratio	L_m/w_{bkf}		8.3	9.8	4.5	14.7	5.2	7.2
radius of curvature	R_c	feet	22	80	55	125	33	105
radius of curvature ratio	R_c/ w_{bkf}		1.1	4.1	2.4	5.6	1.3	4.3
Particle Size Distribution from Reach Wide Weighted Pebble Count								
d_{50} Description:			*Small Cobble*		*Very Coarse Gravel*		N/A[3]	
d_{16}		mm	8.7		0.16		N/A[3]	
d_{35}		mm	30.2		6.1		N/A[3]	
d_{50}		mm	99.4		38		N/A[3]	
d_{84}		mm	180		95		N/A[3]	
d_{95}		mm	243		139		N/A[3]	
d_{100}		mm	>2048		>2048		N/A[3]	
Particle Size Distribution from Pavement Samples								
d_{16}		mm	35.9		20.6		N/A[4]	
d_{35}		mm	80.9		43.4		N/A[4]	
d_{50}		mm	112		56.3		N/A[4]	
d_{84}		mm	206		120		N/A[4]	
d_{95}		mm	315		173		N/A[4]	
d_{100}		mm	>2048		362		N/A[4]	
Particle Size Distribution from Grab or Subpavement Sample								
d_{16}		mm	4.4		1.4		N/A[3]	
d_{35}		mm	19.7		16.0		N/A[3]	
d_{50}		mm	30.4		24.1		N/A[3]	
d_{84}		mm	61.0		48.9		N/A[3]	
d_{95}		mm	71.5		66.7		N/A[3]	
d_{100}		mm	76.2		76.2		N/A[3]	

Notes:
1. The Rosgen classification system is for natural streams. These channels have been heavily manipulated and the classification system has been applied only to the extent possible. Some project reaches may have parameters outside the normal range of the stated stream type.
2. Profile Survey and Pool cross-sections were not conducted on reaches slated for Enhancement II (UT1b, UT1c, UT2, UT3, and Vile Creek Reach 3).
3. Reach wide pebble counts and pavement and subpavement evaluations were not performed on these reaches based on length and/or restoration approach.

Table 4b: Existing Stream Morphologic Parameters

	Notation	Units	UT1 Reach 1		UT1 Reach 2		UT1B		UT1C	
			Min	Max	Min	Max	Min	Max	Min	Max
stream type[1]			E4b		F4b		E4b		E4b	
drainage area	DA	sq mi	0.28		0.33		0.01		0.01	
bankfull cross-sectional area	A_{bkf}	SF	7.3	10.3	8.4	11.8	2.0		6.0	
estimated bankfull discharge	Q	cfs	17		20		N/A		N/A	
estimated bankfull velocity	V	ft/s	2.3	1.7	2.4	1.7	N/A		N/A	
Cross-Section										
width at bankfull	w_{bkf}	feet	7.9		19.2		3.5		6.6	
maximum depth at bankfull	d_{max}	feet	1.7		0.9		0.8		1.2	
mean depth at bankfull	d_{bkf}	feet	0.9		0.4		0.6		0.9	
bankfull width to depth ratio	w_{bkf}/d_{bkf}		8.6		43.9		5.9		7.4	
low bank height		feet	2.2		3.6		0.8		3.4	
bank height ratio	BHR		1.3		3.8		1.0		2.8	
floodprone area width	w_{fpa}	feet	203		28		46		13	
entrenchment ratio	ER		25.6		1.5		13.2		2.0	
Slope										
valley slope	S_{valley}	feet/ foot	0.032		0.033		0.071		0.067	
channel slope	$S_{channel}$	feet/ foot	0.022		0.028		0.067		0.063	
Profile										
riffle slope	S_{riffle}	feet/ foot	0.022	0.11	0.028	0.071	N/A[2]	N/A[2]	N/A[2]	N/A[2]
riffle slope ratio	$S_{riffle}/S_{channel}$		0.99	5.00	1.00	2.54	N/A[2]	N/A[2]	N/A[2]	N/A[2]
pool slope	S_{pool}	feet/ foot	0	0.016	0	0.014	N/A[2]	N/A[2]	N/A[2]	N/A[2]
pool slope ratio	$S_{pool}/S_{channel}$		0	0.7	0	0.5	N/A[2]	N/A[2]	N/A[2]	N/A[2]
pool-to-pool spacing	L_{p-p}	feet	14.76	39.45	13.7	57.7	N/A[2]	N/A[2]	N/A[2]	N/A[2]
pool spacing ratio	L_{p-p}/w_{bkf}		1.9	5.0	0.7	3.0	N/A[2]	N/A[2]	N/A[2]	N/A[2]
pool cross-sectional area	A_{pool}	SF	10.3		11.8		N/A[2]		N/A[2]	
pool area ratio	A_{pool}/ A_{bkf}		1.4		1.4		N/A[2]		N/A[2]	
maximum pool depth	d_{pool}	feet	2.3		1.6		N/A[2]		N/A[2]	
pool depth ratio	d_{pool}/ d_{bkf}		2.5		3.7		N/A[2]		N/A[2]	
pool width at bankfull	w_{pool}	feet	7.8		19.9		N/A[2]		N/A[2]	

	Notation	Units	UT1 Reach 1		UT1 Reach 2		UT1B		UT1C	
			Min	Max	Min	Max	Min	Max	Min	Max
pool width ratio	w_{pool}/ w_{bkf}		1.0		1.0		N/A[2]		N/A[2]	
Pattern										
sinuosity	K		1.26		1.30		1.07		1.06	
belt width	w_{blt}	feet	40	55	60	80	N/A[3]	N/A[3]	N/A[3]	N/A[3]
meander width ratio	w_{blt}/w_{bkf}		5.1	7.0	3.1	4.2	N/A[3]	N/A[3]	N/A[3]	N/A[3]
meander length	L_m	feet	57	100	115	140	N/A[3]	N/A[3]	N/A[3]	N/A[3]
meander length ratio	L_m/w_{bkf}		7.2	12.7	6.0	7.3	N/A[3]	N/A[3]	N/A[3]	N/A[3]
radius of curvature	R_c	feet	12	40	15	65	N/A[3]	N/A[3]	N/A[3]	N/A[3]
radius of curvature ratio	R_c/ w_{bkf}		1.5	5.1	0.80	3.4	N/A[3]	N/A[3]	N/A[3]	N/A[3]
Particle Size Distribution from Reach Wide Weighted Pebble Count										
d_{50} Description:			*Coarse Gravel*		*Coarse Gravel*		N/A[4]		N/A[4]	
d_{16}		mm	0.4		0.17		N/A[4]		N/A[4]	
d_{35}		mm	1.7		0.55		N/A[4]		N/A[4]	
d_{50}		mm	25.9		26.9		N/A[4]		N/A[4]	
d_{84}		mm	137		133		N/A[4]		N/A[4]	
d_{95}		mm	203		205		N/A[4]		N/A[4]	
d_{100}		mm	256		256		N/A[4]		N/A[4]	
Particle Size Distribution from Pavement Sample										
d_{16}		mm	2.0		8.4		N/A[4]		N/A[4]	
d_{35}		mm	13.3		16.6		N/A[4]		N/A[4]	
d_{50}		mm	32		28.5		N/A[4]		N/A[4]	
d_{84}		mm	166		90		N/A[4]		N/A[4]	
d_{95}		mm	246		152		N/A[4]		N/A[4]	
d_{100}		mm	362		256		N/A[4]		N/A[4]	
Particle Size Distribution from Grab or Subpavement Sample										
d_{16}		mm	11		2.1		N/A[4]		N/A[4]	
d_{35}		mm	20		11.6		N/A[4]		N/A[4]	
d_{50}		mm	27		20.1		N/A[4]		N/A[4]	
d_{84}		mm	46		54.1		N/A[4]		N/A[4]	
d_{95}		mm	59		69.3		N/A[4]		N/A[4]	
d_{100}		mm	76		76		N/A[4]		N/A[4]	

Notes:
1. The Rosgen classification system is for natural streams. These channels have been heavily manipulated and the classification system has been applied only to the extent possible. Some project reaches may have parameters outside the normal range of the stated stream type.
2. Profile Survey and Pool cross-sections were not conducted on reaches slated for Enhancement II (UT1b, UT1c, UT2, UT3, and Vile Creek Reach 3).
3. Pattern data was not collected on UT1B and UT1C due to reach lengths and restoration approach.

	Notation	Units	UT1 Reach 1		UT1 Reach 2		UT1B		UT1C	
			Min	Max	Min	Max	Min	Max	Min	Max

4. Reach wide pebble counts and pavement and subpavement evaluations were not performed on these reaches based on length and/or restoration approach.

Table 4c: Existing Stream Morphologic Parameters

	Notation	Units	UT2		UT3	
			Min	Max	Min	Max
stream type[1]			B4a		B4a	
drainage area	DA	sq mi	0.13		0.06	
bankfull cross-sectional area	A_{bkf}	SF	13.1		18.4	
Cross-Section						
width at bankfull	w_{bkf}	feet	12.4		10.6	
maximum depth at bankfull	d_{max}	feet	2.0		2.4	
mean depth at bankfull	d_{bkf}	feet	1.1		1.7	
bankfull width to depth ratio	w_{bkf}/d_{bkf}		11.7		6.1	
low bank height		feet	4.0		4.0	
bank height ratio	BHR		2.1		1.6	
floodprone area width	w_{fpa}	feet	23		55.2	
entrenchment ratio	ER		1.9		5.2	
Slope						
valley slope	S_{valley}	feet/ foot	0.048		0.070	
channel slope	$S_{channel}$	feet/ foot	0.039		0.068	
Profile						
riffle slope	S_{riffle}	feet/ foot	0.0303	0.142	0.0532	0.167
riffle slope ratio	$S_{riffle}/S_{channel}$		0.8	3.6	0.8	2.5
pool slope	S_{pool}	feet/ foot	0.000	0.008	0.000	0.069
pool slope ratio	$S_{pool}l/S_{channel}$		0.0	0.2	0.0	1.0
pool-to-pool spacing	L_{p-p}	feet	11.0	56.9	6.52	24.3
pool spacing ratio	L_{p-p}/w_{bkf}		0.9	4.6	0.6	2.3
pool cross-sectional area	A_{pool}	SF	N/A^2		N/A^2	
pool area ratio	A_{pool}/ A_{bkf}		N/A^2		N/A^2	
maximum pool depth	d_{pool}	feet	N/A^2		N/A^2	
pool depth ratio	d_{pool}/ d_{bkf}		N/A^2		N/A^2	
pool width at bankfull	w_{pool}	feet	N/A^2		N/A^2	
pool width ratio	w_{pool}/ w_{bkf}		N/A^2		N/A^2	
Pattern						
sinuosity	K		1.23		1.03	
belt width	w_{blt}	feet	30	58	31	57
meander width ratio	w_{blt}/w_{bkf}		2.4	4.7	2.9	5.4
meander length	L_m	feet	97	126	78	151

	Notation	Units	UT2		UT3	
			Min	Max	Min	Max
meander length ratio	L_m/w_{bkf}		7.8	10.2	7.4	14.2
radius of curvature	R_c	feet	11	37	17	47
radius of curvature ratio	R_c/ w_{bkf}		0.90	3.0	1.6	4.4
Particle Size Distribution from Reach Wide Weighted Pebble Count[3]						
d50 Description:			*Very Coarse Gravel*		*Fine Gravel*	
d_{16}		mm	0.16		Silt/Clay	
d_{35}		mm	6.1		0.3	
d_{50}		mm	38		5.9	
d_{84}		mm	95		116	
d_{95}		mm	139		215	
d_{100}		mm	>2048		362	

Notes:

1. The Rosgen classification system is for natural streams. These channels have been heavily manipulated and the classification system has been applied only to the extent possible. Some project reaches may have parameters outside the normal range of the stated stream type.
2. Profile Survey and Pool cross-sections were not conducted on reaches slated for Enhancement II (UT1b, UT1c, UT2, UT3, and Vile Creek Reach 3).
3. Pavement and subpavement evaluations were not performed on these reaches based on length and restoration approach.

4.4.1 Vile Creek

Most of Vile Creek on the project site flows through a broad alluvial valley and probably historically meandered across the floodplain. The soils on the floodplain are silt loam, sandy loam, and clay loam with gravel in some horizons. These soils are a combination of alluvium, legacy sediments from historic farming practices upstream, and spoil from on-site ditching. Since the adjacent floodplain has been cleared for decades and other ditches have been dug on the site, it is reasonable to expect the stream was channelized at some point in the past. However, review of historic aerial photos dating back to the early 1960's show a similar alignment of the stream to what is seen today. The receiving stream of Vile Creek is the Little River, which is stable and is not incised. Therefore, while Vile Creek has incised somewhat in response to channelization, further incision was halted by the grade control provided by the River. The most likely evolutionary stage of Vile Creek on the project site based on the Channel Evolution Model (Simon, 1989) is stage V-aggradation and widening. This is because further significant incision is unlikely though some additional widening may occur. Existing width to depth ratios values are representative of the widened project reaches. There has not been sufficient aggradation to indicate transition to Stage VI where new bankfull features are formed at a lower elevation. However, it should be noted that it is difficult to determine the evolutionary stage of streams where cattle have trampled the channel banks and bed.

The stream beds are dominated by gravel and cobble but some fines are also present. Gravel and cobble found in the stream are likely the weathered product of the surrounding gneiss and appear to be feldspar-rich and quartzite rocks. The high fines content in the bed material is likely related to cattle access and bank erosion.

Vile Creek has been broken into three separate reaches for the project. Vile Creek Reach 1 enters the site flowing south after passing under E Whitehead St (NC-18) and flowing through a parcel owned by the Town of Sparta. Vile Creek Reach 1 continues south for approximately 900 LF until the confluence with UT1. Streamside vegetation consists of primarily pasture grasses such as fescue (*Fescue* spp.) with

some soft rush (*Juncus effusus*), straw-colored flatsedge (*Cyperus strigosus*), common boneset (*Eupatorium perfoliatum*), beggarstick (*Bidens* L.), and unknown sedges (*Carex* spp.) present. Clusters of the shrub coralberry (*Symphoricarpos orbiculatus*) are present towards the back of the floodplain in spots. Vile Creek Reach 1 has unstable stream banks due to the lack of streamside vegetation and frequent cattle access. Bank conditions alternate between a steep and eroding condition and a low, trampled condition. Active erosion including scour and mass wasting is occurring in multiple locations along Reach 1. The system is moderately incised with limited access to the adjacent floodplain. The channel stability rating for this reach is fair (the second lowest rating) with more lateral instability than vertical. There appears to have been some migration of a meander in Reach 1 between the 1960's and 1990's. Adjacent floodplain areas consist of ditched wetlands, previously altered for agricultural practices. Floodplain wetlands are actively grazed with evidence of active cattle wallows. The stream has a moderate width to depth ratio, a high entrenchment ratio, and a moderate sinuosity. It is most closely classified as a C3 stream type.

Vile Creek Reach 2 turns and flows east after the confluence with UT1. Reach 2 has a moderate slope with bed material dominated by gravel, small cobble, and some bedrock. Vile Creek widens significantly after the confluence with UT1 (note high width to depth ratios) and large mid-channel bars are present, indicating aggradation within the system. An old meander scroll exists in a patch of mature red maples (*Acer rubrum*) in the left floodplain. Reach 2 continues to be overly-wide until it is constricted by the right valley wall. The left floodplain is dominated by two large wetland areas that were previously ditched for agricultural practices. The right valley wall is wooded with pockets of rhododendron (*Rhododendron* L.) present. Towards the downstream end of Reach 2, Vile Creek narrows some but continues to exhibit eroded stream banks, likely due to cattle access. Just downstream from the floodplain wetlands, Vile Creek flows through a very sharp meander bend where the left valley confines the floodplain. At this point the stream is badly eroded and confined against the left valley wall. Overall, the channel stability rating for this reach is fair with more lateral instability than vertical. Vile Creek Reach 2 has a high width to depth ratio, moderate entrenchment ratio, and a moderate sinuosity. It is most closely classified as a C4 stream type.

Along Reach 3 several bedrock outcrops are present, and the creek becomes more stable with only occasional areas of bank erosion and lateral instability. Reach 3 has lower sinuosity as it abuts the right valley wall, confined by bedrock. The banks are generally low and stable along Reach 3 and there are indications of recent floodplain deposition. The channel stability rating here is good, even though the channel has become overly wide. Floodplain vegetation consists of mature trees and shrubs, including rhododendron and red maple. Reach 3 is stable all the way to the confluence with Little River. The width to depth ratio is high and the entrenchment ratio is low. The stream most is most similar to a C4 stream type.

4.4.2 UT1, UT1B, & UT1C

The UT1, UT1B, and UT1C system is a group of headwaters streams that flow into Vile Creek from the north and west. The floodplain of UT1 is narrow and confined by relatively steep valley side slopes. The stream meanders somewhat within the constraints of the narrow floodplain and it is uncertain if the stream has been channelized in the past. It is a small stream and cattle access has badly degraded it along much of its length. The bed material along UT1 has a larger component of gravel than the Vile Creek main stem, although cobble-size material is also a significant portion of the bed. The bed material also has a significant amount of fine sediment due to cattle access and bank erosion.

UT1 has been broken into two reaches for the project. UT1 Reach 1 enters the project area from a wooded parcel located southwest of the site and continues to the confluence with UT1C. Similar to Vile

Creek, a lack of vegetation and livestock access has resulted in areas of eroding and trampled stream banks. At the upstream end of UT1, there is an area of erosion on an un-vegetated outer bend. As UT1 Reach 1 continues downstream, the channel becomes overly wide where cattle have trampled the banks. The stream in less incised along Reach 1 than in Reach 2 and is likely still incising. The evolutionary stage of this reach is most likely Stage III – Degradation. The channel stability rating for UT1 reach 1 is fair and the instability is more lateral than vertical. Floodplain vegetation is dominated by pasture grasses such as fescue, with other common herbaceous species present including soft rush, straw-colored flatsedge, common boneset, asters such as beggarstick, and unknown sedges. The floodplain contains some pocket wetlands, which are currently degraded due to on-going livestock access and incised stream conditions. UT1 Reach 1 has a low width to depth ratio, moderate to steep slope, and moderate sinuosity. UT1 Reach 1 is most closely classified as an E4b type stream.

UT1 Reach 2 begins at the confluence of UT1 Reach 1 and UT1C and flows northeast until its confluence with Vile Creek. UT1 Reach 2 has a moderate slope and is more incised than Reach 1, with very high width to depth ratio, low entrenchment ratio, and moderate sinuosity. Sharp bends in the upstream section of UT1 Reach 2 have resulted in large areas of outer meander bank erosion. The stream becomes wider and more incised as it flows toward Vile Creek and the channel evolutionary stage of this reach is Stage IV – Degradation and Widening. The channel stability rating for this reach is fair. This reach is more laterally unstable than vertically. Floodplain vegetation is similar to UT1 Reach 1, dominated by pasture grasses (primarily fescue) with other common herbaceous species present. Additionally, there is a thicket of shrubs where silky dogwood (*Cornus amomum*) and tag alder (*Alnus serrulata*) have grown up along both banks. As UT1 Reach 2 nears the confluence with Vile Creek, outcrops of bedrock appear in the floodplain as well as in the existing channel. UT1 Reach 2 is most closely classified as an F4b type stream.

UT1B and UT1C are small intermittent headwater tributaries to UT1. Both tributaries flow north, intersecting UT1 on the right floodplain. The tributaries have steep slopes and flow through confined valleys. Both of these streams begin in wooded areas but flow into active cattle pastures before reaching UT1. Both reaches have been impacted by cattle but the channel stability ratings for both are good. These streams are very straight but have a low width to depth ratio and variable entrenchment ratios. UT1B and UT1C are most closely classified as E4b type streams.

4.4.3 UT2, UT3, and Little River

Three additional reaches are included as elements of the project. UT2 flows onto the site from the north passing under Farmer Road and continues south until it reaches its confluence with Vile Creek. UT2 has a moderate entrenchment ratio, moderate width to depth ratio, and steep slope. The stream flows through a confined valley with bed material dominated by coarse gravel. The channel stability rating of UT 2 is good. The evolutionary stage of this channel is most similar to Stage III – Degradation as the channel has not started to over-widen. Floodplain vegetation consists of mature trees such as red maple scattered along the stream corridor. Stream bank vegetation consists of a mix of pasture grasses, beggarstick, and sedges. There are two small pocket wetlands in the floodplain of UT2, vegetation in these areas is dominated by sedges and soft rush. Consistent with the rest of the project streams, active grazing and livestock access to the system has resulted in trampled banks and short sections of over-widened and impaired channel. UT2 is most closely classified as a B4a stream type.

UT3 begins at a spring within active pasture and enters the site after flowing through a short section of established white pine (*Pinus strobus*). UT3 continues south toward the Little River, flowing through a confined alluvial valley with a steep slope, low width to depth ratio, moderate entrenchment ratio, and low sinuosity. Bed material in UT3 is a mixture of fine gravel, silt, and some cobble. The channel stability

rating of UT 3 is good. Similar to UT2, the evolutionary stage of the channel is Stage III – Degradation. Floodplain vegetation along UT3 includes pasture grasses, sedges, beggarstick, and soft rush but the majority of vegetation is immature white pines with mountain laurel and coralberry. UT3 is most closely classified as a B6/4a stream type.

The Littler River enters the project area on the east site of the project site and continues within the project area for approximately 560 LF. The Little River is a large stream with a drainage area of 35.8 square miles and a bankfull width of approximately 45 feet. On the project site, the Little River flows through an unconfined alluvial valley with good bed form diversity including cobble-dominated riffles, pools, and large bedrock outcrops. The stream does not appear to have been modified and thus the evolutionary stage of this reach is Stage I – Equilibrium. While the channel is stable (stability rating is excellent), livestock have access to the river within the project area, which is the major stressor to the system. The system is most closely classified as a Rosgen C4 stream type.

4.5 Wetland Conditions

4.5.1 Jurisdictional Wetlands

In December 2014, Wildlands delineated jurisdictional waters of the U.S. within the project easement area. The results of the on-site jurisdictional determination indicate that there are twenty-nine jurisdictional wetlands located within the project easement. These wetlands (Wetland A – CC) range in size from 0.002 to 1.32 acres are primarily located within grazed agricultural fields (Figure 3). The wetlands exhibited one or more of the following hydrologic indicators: shallow inundation, water-stained leaves, algal mats, iron deposits, and/or saturation within the upper 12 inches of the soil profile. Wetland features exhibited low chroma soils (7.5YR 3/2 to 5Y 4/1) with common redoximorphic features (7.5 3/4 to 10YR 5/6). Vegetation within the wetlands has been heavily managed and grazed, resulting in a dominant herbaceous strata layer with little to no trees. Routine On-Site Data Forms have been included in Appendix 2.

4.5.2 Soils

Soil types within the project area include alluvial land (Ad), Chandler silt loam (CaF), Chandler stony silt loam (CdF and CdG), Chester loam (CeC), Fannin silt loam (FnE2), Tusquitee loam (TlC), and Watauga loam (WaE) (Figure 5). Alluvial land soils are very poorly drained with high permeability. These soils are found in floodplain depressions and frequently experience flooding. The Chandler silt loam and Chandler stony loams are found on ridges and mountain slopes. The soil map unit is described as somewhat excessively drained with high permeability. The Chester loam and Fannin silt loam are both well-drained soils with moderately high permeability found on ridges and mountain slopes. Tate loam is well-drained soil found on stream terraces. This soil has a moderately high permeability and typically doesn't experience flooding. Tusquitee loam is a well-drained unit with high permeability that typically doesn't experience flooding. This soil is found along mountain slope drainage ways. Watauga loam is a well-drained soil found on ridges and mountain slopes. The soil has a moderately high permeability. Soil mapping units are based on the U.S. Department of Agriculture (USDA) Natural Resources Conservation Service (NRCS) Soil Survey for Alleghany County. The alluvial land unit is listed on the National Hydric Soils List by the Natural Resource Conservation Service. Project areas proposed for wetland mitigation are primarily mapped as alluvial land with areas of Chester loam and Tate loam mapped around the edges.

A preliminary investigation of the existing soils was performed by a licensed soil scientist (LSS) on December 20, 2013. The focus of the soils investigation was directed at indicating wetland restoration potential based on hydric indicators and determining overburden depths to hydric. The investigation

described three soil units based on data collected from observations of soil borings, stream cuts, and other landscape features. Soil Unit 1 was characterized by relic hydric soils typically occurring within 15 to 20 inches of the existing surface. Portions of the unit had placed fill that has developed into hydric soil that supports wetland vegetation and are likely to be classified as jurisdictional wetlands. Soil Unit 2 was characterized as a relic hydric soil typically occurring within 20 inches of the existing surface. Similar to Unit 1, portions of the unit had overburden placed on the hydric soils likely for agricultural purposes. Very little of the overburden in Soil Unit 2 has developed hydric characteristics and most of this unit was not considered jurisdictional wetland. Soil Unit 3 was a non-hydric soil. Soil texture, Munsell chart hue, chroma and value, and hydric soil characteristics were recorded for three soil profiles. Figures and data from the investigation is included in Appendix 5.

4.5.3 Wetland Hydrology

Five groundwater monitoring gauges were installed on September 4, 2014 (Figure 3). Gauge 1 was installed on the right floodplain of Vile Creek Reach 1, gauges 2 and 3 were installed on the left floodplain of Vile Creek Reach 1, and gauges 4 and 5 were installed on the left floodplain of Vile Creek Reach 2. Gauges 1, 3, 4, and 5 were installed within jurisdictional wetlands and gauge 2 was installed in an upland area. The monitoring period for each of the five wells used in the existing conditions analysis was September 5, 2014 to August 2, 2015 (331 days). The growing season in this area of the state extends from April 26 to October 11 (167 days) based on NRCS WETS tables for Ashe County (no WETS tables exist for Alleghany County).

The groundwater gauge data were reviewed to assess the existing conditions of proposed wetland restoration zones. The hydrologic function of a wetland is determined based on the number of days during the growing season during which the water table is within 12 inches of the ground surface. Table 5 shows the largest number of consecutive days within either the 2014 or 2015 growing season (only including the portion of each growing season observed) that each well met this criterion.

Table 5: Existing Groundwater Monitoring Gauge Data Analysis Results

Groundwater Monitoring Gauge Number	2014 Growing Season	
	Largest Number of Consecutive Days Wetland Criterion Met During Growing Season	% of 167-day Growing Season Wetland Criterion Met (Consecutive Days)
1	14	8.3%
2	3	1.8%
3	61	36.5%
4	11	6.6%
5	2	1.2%

For the most part, the results of the groundwater gauge data review are not unexpected based on site conditions. The largest number of consecutive days that groundwater gauge 2 met the hydrologic performance condition was 3, which represents only 1.8% of the 167-day growing season. This gauge was the only one not located within a jurisdictional wetland. The other four groundwater gauges were located within jurisdictional wetlands. Of these gauges, three met performance condition on consecutive days for more than 5% of the growing season. However, gauge 5 met the condition on consecutive days for just 1.2% of the growing season. However, the data available do not provide a complete analysis. If more of the spring portion of the 2014 growing season had been monitored, it is

possible that this gauge would have met the hydrology criteria for a larger portion of that growing season. The existing conditions hydrologic data were also used to calibrate groundwater hydrology models used to analyze wetland designs as described in Section 9.2.2.

4.5.4 Wetland Vegetation

The existing vegetation communities within the proposed project area are predominately maintained open fields. Based on historical aerials, agriculture has been the predominant land use on this property since before 1964. Due to heavy agricultural activities and vegetation management over the past several decades, the tree and understory strata have mostly been removed. Fescue is the dominant herbaceous groundcover. Other herbaceous species present include common rush, shallow sedge (*Carex lurida*), strawcolored flatsedge, common boneset, beggarstick. Mature red maples are primarily found in a few small pockets towards the back of the floodplain. Understory species include rhododendron, silky dogwood, and tag alder. The rhododendron is only found along the right steep valley wall of Vile Creek, below the confluence with UT1. Silky dogwood and tag alder are found in a small thicket along UT1, just upstream of the confluence with UT1C.

4.6 Potential for Functional Uplift and Project Justification

Currently, functional losses at the site include degraded aquatic habitat, altered hydrology (loss of floodplain connection, lowered water table, and impacted wetlands), reduction of riparian and wetland habitats, and degraded water quality. Water quality problems at the site include sediments from eroding stream banks, pollution from cattle access, and thermal pollution due to a lack of shading. Intervention is needed to address these problems. The proposed work will address these functional losses and return the site to an ecologically functioning stream and wetland complex. By eliminating cattle access to project reaches, pollutant inputs including fecal coliform, nitrogen, and phosphorous will be reduced. By stabilizing eroding banks and constructing stable stream channels, sediment loads will be reduced and the streams will be better able to support natural hydrologic, biologic, and water quality functions. Adding habitat structures such as cover logs, constructed riffles, brush toes, and deep pools will improve habitat for aquatic communities. Terrestrial habitat will also be improved by restoring wetland areas and increasing southern Appalachian Bog habitat. Reconstruction of channels to appropriate bankfull dimensions and raising the stream beds will reconnect the streams to their floodplains and restore hydrology back to previously drained riparian wetlands. Establishing a native riparian floodplain forest will also improve existing riparian habitats as well as provide shade to reduce stream temperatures. Placing the project area under conservation easements will prevent development or agricultural uses that are currently contributing to functional losses.

4.7 Utilities and Constraints

The site includes one easement break for a ford crossing, (this portion of the site will not have cattle access), a crossing just upstream of the project area, two short lengths of reduced buffer, and a short reach where Wildlands has a construction access agreement to restore the creek but no conservation easement.

A 25-foot easement break is proposed on UT1 Reach 1 approximately 200 LF downstream from the UT1 Reach 1 /UT1B confluence. This break is designed for construction of a permanent ford crossing which will allow the landowner access to the 1.5-acre field on the southern bank of UT1. Cattle will be removed from this portion of the site, and the land use on the adjacent fields will be transitioned to row crops or hay. The crossing will not influence the stream design. The easement break was factored into the mitigation credit calculation for the site.

Approximately 471 LF downstream from the UT1 Reach 1/UT1B confluence, the existing stream flows onto a parcel formally owned by Jessie and Regina Perry (Area A on Figure 6). Currently, the property is in a state of foreclosure. Because an easement cannot currently be obtained on the foreclosed parcel, the proposed work will relocate approximately 166 LF of the existing stream from the former Perry property (PIN 3081100180) to the Crouse property (PIN 3081206925). Wildlands has obtained a temporary construction easement that describes the relocation of the stream channel off of the property. The stream will be within the limits of the proposed conservation easement, however the buffer will be limited to 5 feet off of the left bank and 20 feet off of the right bank. At some point in the future when the property is not under foreclosure it may be possible to obtain a conservation easement on the property to create a wider buffer on the left bank.

Beginning 143 feet upstream of the confluence of the UT1 and UT1c confluence, 0.2-acre triangular piece of the Gambill/Crouse parcel is landlocked by the proposed conservation easement (Area B on Figure 6). Wildlands' option with the Gambill/Crouse landowners includes purchase of this 0.2-acre triangle, which will in turn be deeded to the adjacent landowner, Mr. D. Wayne Miles, Jr. Just downstream of this area, UT1 flows onto a small wedge of the Miles property for 63 LF (Area C on Figure 6). There are currently no livestock on the Miles property and it is forested. This landowner has not agreed to a conservation easement on his land; however, as part of the land transaction between Wildlands and Mr. Miles, Wildlands has secured an option for a temporary construction easement so that the stream channel can be raised and reconstructed through this property. The temporary construction easement will make possible a Priority 1 restoration of UT1 within the conservation easement upstream of the Miles property that will continue through the Miles property (which will be outside of the conservation easement) and back into the conservation easement without having the need for Priority 2 restoration to transition the stream down and back out of the old channel.

At the upstream end of Vile Creek, north of the conservation easement and just downstream of the Town of Sparta parcel, Wildlands proposes to install a bottomless culvert. This permanent crossing will allow for cattle and farm traffic to cross over Vile Creek with no impact to the stream system. This culvert crossing will not be gated, but conservation easement fencing at the downstream end of the culvert will prevent cattle access to Vile Creek. In addition to the conservation easement fencing, fencing will be installed from Farmer Road to the culvert crossing and will connect with an existing fence line. This proposed fencing will occur outside the conservation easement and will prevent cattle from accessing Vile Creek from above the culvert.

The proposed conservation easement boundary around UT3 creates a 1.3-acre landlocked parcel on the Mason property (Area D on Figure 6). The Mason family is currently in discussions with the landowner to the east of the landlocked parcel about purchasing their land. Wildlands has discussed the landlocked parcel with the Masons and they are aware that this area will only be accessible by foot unless they complete acquisition of the adjacent land. No future issues are expected to result from this situation. There is an existing farm road that the Mason family uses that is adjacent to UT3. This road will limit the width of the right buffer in several areas on the lower section of UT3 (approximately 280 LF total) to less than 30 feet. The width of the buffer adjacent to the road ranges from approximately 8 feet to 49 feet. For most of this length the width is approximately 25 feet wide. A 35 LF section of channel at the lower end of UT3 is located outside of the conservation easement due to a property boundary with a landowner who would not participate. As a consequence of the channel running near to the property line and leaving the easement, approximately 130 feet of left bank buffer is less than 30 feet in width.

All streams proposed for mitigation credit provide the required 30-foot minimum riparian buffer for Mountain streams, except for a 70-foot-long portion of Vile Creek Reach 3 near its confluence with Little River, the 166 LF portion of UT1 Reach 1 that will be relocated off of the foreclosure property, and the

286 LF of UT3 adjacent to the road. Along Vile Creek Reach 3, the conservation easement on the right bank is only 27 feet wide; however, the buffer on the left bank extends over 30 feet wide. It should be noted that, in many areas, the riparian buffer proposed for the Site extends up to 300 feet wide, which is far in excess of the required 30-foot minimum buffer. The easement area will be marked per DMS Guidelines for Full Delivery Requirement for Completion of Survey for Conservation Easements (version 13, August 2013).

4.8 Site Access

The entire easement area can be accessed for construction, monitoring, and long term stewardship from existing site access points located along NC-18 and Farmer Rd (NC 1423) (Figure 3). The conservation easement agreements will ensure the right of entry abilities of Wildlands, its contractors, and the future easement holder in any future land transactions.

5.0 Regulatory Considerations

5.1 401/404

There are eight jurisdictional channels (Little River, Vile Creek, UT1, UT1, UT1B, UT1C, UT2, and UT3) and 29 jurisdictional wetland areas (Wetland A - CC) located in the proposed project area (Figure 3) totaling 3.49 acres. Currently all existing wetlands are impacted by cattle grazing with little to no existing shrub or canopy vegetation. Wetlands B, C, N and O have also been dredged in an effort to improve field drainage.

The project proposes to impact approximately 3.22 acres of wetlands for re-establishment and rehabilitation. The majority of impacts, approximately 2.66 acres, are proposed to Wetlands B, C, N, and O. These wetlands are proposed for bog habitat and will involve excavation to remove old dredging side casts and to establish new topography. Excavation necessary for tie-in grading will also impact existing wetlands adjacent to proposed wetland re-establishment and rehabilitation. The impacts are necessary, and generally considered beneficial to the long term viability and improvement to project wetlands.

Approximately 0.20 acres of wetlands will be converted to stream channel as part of the stream restoration and 0.001 acres of Wetland S will be filled for water quality treatment practice construction proposed near the upstream end of UT2. All impacts will be listed on the Pre-Construction Notification (PCN), included in Appendix 2 of the Final Mitigation Plan.

Impact to existing wetlands will be necessary, but ultimately will benefit the site by improving hydrology and vegetation upon completion of the project. The project proposes a net gain of wetland acreage and uplift in wetland function. The project streams and wetlands will be protected under the conservation easement placed on the property.

5.2 Endangered and Threatened Species

5.2.1 Site Evaluation Methodology

The Endangered Species Act (ESA) of 1973, amended (16 U.S.C. 1531 et seq.), defines protection for species with the Federal Classification of Threatened (T) or Endangered (E). An “Endangered Species” is defined as “any species which is in danger of extinction throughout all or a significant portion of its range” and a “Threatened Species” is defined as “any species which is likely to become an Endangered Species within the foreseeable future throughout all or a significant portion of its range” (16 U.S.C. 1532).

Wildlands utilized the U.S. Fish and Wildlife Service (USFWS) and North Carolina Natural Heritage Program (NHP) databases in order to identify federally listed Threatened and Endangered plant and animal species for Alleghany County, NC (USFWS, 2008 and NHP, 2009) summarized in Table 6.

Table 6: Listed Threatened and Endangered Species in Alleghany County, NC

Species	State Status	Federal Status	Habitat
Reptile			
Bog Turtle *(Glyptemys muhlenbergii)*	T	T(S/A)	Mud, grass and sphagnum moss of, bogs, wet pastures, wet thickets.
Northern long-eared bat (*Myotis septentrionlalis)*	-	T	Caves and mines during winter. Exfoliating bark, cavities or hollows of >/= 3" DBH trees during summer located less than a mile from a water source.

T=Threatened; E=Endangered; FSC=Federal Species of Concern

5.2.2 Threatened and Endangered Species Descriptions

Bog Turtle

The Bog turtle is North America's smallest turtle and one of the most difficult species to locate. The adults are typically smaller than 4 inches with a dark mahogany to black carapace and plastron. They have a distinctive reddish-orange to yellow patch located on the side of their head that is used as their identifying characteristic. This size and appearance is one explanation for location difficulty. The North Carolina population has few known localities but have been identified in the Blue Ridge Mountains and upper piedmont. This omnivore species inhabits wetland areas such as wet meadows, bogs, cow pastures and beaver complexes in western North Carolina. Habitat destruction and collection for pet trade has decreased their populations.

Northern Long-eared Bat

The Northern long-eared bat (*Myotis septentrionallis*) is listed as a threatened species due to the disease known as White-nose Syndrome, which has severely impacted the bat populations. This nocturnal insectivore is a medium-sized bat with a body length of 3-3.7 inches. The pelage is typically medium to dark brown on the dorsal and tan to pale-brown on the ventral. These philopatric species have a range that includes 37 states in the U.S. and all of the Canadian provinces from the Atlantic Ocean west to southern Yukon Territory and eastern British Columbia. Their hibernacula are typically caves and mines where there is a constant temperature, high humidity and minimum air current. Summer habitats include a wide array of dense forest, loose aggregate, linear features and human-made structures. The conditions of the trees, location and microclimate are all determining factors when roosting. Human disturbances such as impacts to their hibernacula and loss or degradation of summer habitats are other important factors affecting this bat's viability.

5.2.3 Biological Conclusion

A pedestrian survey was conducted on December 2, 2013 to review the site conditions for the bog turtle. It was determined that the site does provide necessary habitat for the threatened species. A second survey was conducted on June 3, 2015 by NCWRC to attempt to identify turtles on site. No turtles were found on the site but the biologists reported that they considered it likely turtles are present based on the existing habitat and proximity to known sites. Their habitats consist of mucky, open-canopy, wet meadows and pastures dominated by sedges, grass, sphagnum moss, and spring-fed

wetlands. They are secretive and bury in mud or thick organic matter when disturbed. The USFWS has concurred that the project is "not likely to adversely affect" bog turtles.

The site does also provide necessary habitat for the northern long-eared bat; however, no individuals or populations have been observed. Their summer habitats contain a variety of roosting preferences from dense forest to linear features to human-made structures. They prefer >/= 3-inch dbh trees that are exfoliating, contain cavities or hollows for roosting and located less than a mile to a water source such as a pond or stream. Their winter habitats consist of caves and mines with crevices and cracks to hibernate leaving only their nose and ears visible. No biological call has been made at this time, pending a response from the USFWS regarding the northern long-eared bat.

5.2.4 USFWS and NCWRC Concurrence

Wildlands requested review and comment from the USFWS and NCWRC on July 7, 2014 for the bog turtles and August 19, 2015 from USFWS for the northern long-eared bat, regarding the results of the site investigation and the project's potential impacts on threatened or endangered species. USFWS responded on August 14, 2014 regarding the bog turtle and on September 14, 2015 regarding the northern long-eared bat. Both letters stated USFWS has "no objection to the proposed actions" and "does not believe the project is likely to adversely affect federally endangered or threatened species." The USFWS performed a bog turtle survey during June 2015 and found no individuals. During the survey the USFWS did identify two specimens of Gray's Lily (*Lilium grayi*) that is listed as a Federal Species of Concern, which is an informal status given to species that appear to be in decline or otherwise in need of conservation but are not protected under the ESA. Wildlands will design the project to avoid impacting the Gray's Lily specimen located adjacent to Vile Creek Reach 2. NCWRC responded on August 11, 2014 regarding the bog turtle and stated they are "supportive of the project" and encourage habitat wetland enhancement, restoration, or creation for the bog turtle during the project design. All correspondence is included in Appendix 6.

5.3 Cultural Resources

5.3.1 Site Evaluation Methodology

The National Historic Preservation Act (NHPA) of 1966, as amended (16 U.S.C. 470), defines the policy of historic preservation to protect, restore, and reuse districts, sites, structures, and objects significant in American history, architecture, and culture. Section 106 of the NHPA mandates that federal agencies take into account the effect of an undertaking on any property that is included in, or is eligible for inclusion in, the National Register of Historic Places.

5.3.2 SHPO/THPO Concurrence

A letter was sent to the North Carolina State Historic Preservation Office (SHPO) on July 7, 2014 requesting review and comment on cultural resources potentially affected by the project. SHPO responded on July 25, 2014, and stated they were aware of no historic resources that would be affected by the project. All correspondence with SHPO is included in Appendix 6.

5.4 Floodplains

Vile Creek and UT1 are mapped in Zone AE Special Flood Hazard Area (SFHA) on Alleghany County Flood Insurance Rate Map Panels 3080 and 3081, as depicted in Figure 7. Base flood elevations have been defined and non-encroachment limits have been published in the Alleghany County Flood Insurance Study (FIS). UT2 and UT3 do not have designated SFHAs. The section of Little River at the confluences of Vile Creek and UT3 has a mapped floodway with floodplain areas mapped as Zone AE. The DMS

Floodplain Requirements Checklist is included in Appendix 7. The project was designed to avoid adverse floodplain impacts within the mapped areas described above or on adjacent parcels.

There are no hydrologic trespass concerns or risks associated with the proposed project activities.

6.0 Reference Sites

6.1 Reference Streams

Eight reference reaches were used to support the design of the project reaches. These reference streams were chosen because of all the streams evaluated, they were the most similar to the project streams in terms of drainage area, valley slope, bed material, and physiographic location. Detailed geomorphic parameters for reference reaches are shown in Tables 7a and 7b. Reference reach locations relative to the project area are shown in Figure 8.

The Little Pine III UT2A reference reach is located within the Little Pine III Stream & Wetland Restoration Project in Alleghany County. Similar to the Vile Creek site, the project is located within the DMS Little River & Brush Creek Local Watershed planning area. UT2A is a preservation reach within the project located in a mature canopy forest. The reach has a drainage area of 0.12 square miles. Riffle and pool cross sections and a longitudinal profile were surveyed. The stream is an A/B4/1 stream type with a width to depth ratio of 8.7 and an entrenchment ratio of 2.4. The bankfull slope is 4.3%. The estimated bankfull discharge is 9.2 cfs. The reach is located in a confined, alluvial valley. The bed form is an alternating riffle/run sequences with bedrock slides and some step pools. The riffle cross section morphology, and riffle slope ratios were used in the selection of project design morphological parameters. The UT2A reference flows through a forest of mature hardwood trees and has a good balance of canopy, understory, and herbaceous species that closely classifies as a Mesic Mixed Hardwood Forest (Schafale & Weakley, 1990). Canopy species include American Beech (*Fagus grandifolia*), Northern red oak, red maple, and tulip poplar. Common understory tree species include American holly, flowering dogwood, ironwood, red maple, and rhododendron.

The Henry Fork UT Upstream is a tributary adjacent to the Henry Fork Mitigation Site. The stream flows through a steep confined valley and has many similarities to project tributaries, primarily UT1 Reaches 1 and 2. The stream flows through a confined valley with small intermittent flood benches. The channel slope of the surveyed reach is 4.2% and the width to depth ratio varies from 5.0 to 16.0. The entrenchment ratio is 1.7 to 2.0, typical of a B type stream. The stream type classification is a B4a. Boulder/cobble and bedrock steps, pools, rock riffles, and other stable physical and habitat structure exist on this stream.

UT to Gap Branch is located in the Box Creek Wilderness near Union Mills, NC. This stream flows through a confined valley with an alluvial bottom. The overall stream slope is 6.8% and the width to depth ratio is 10.1. The entrenchment ratio is 3.4. The stream does not fit well into a single stream type classification for this reach but it is most similar to a less entrenched B4a or A4. Habitats at UT to Gap Branch include boulder/cobble steps, pools, rock riffles, runs, root mats, and undercut banks.

The Group Camp Tributary is located in Lake Norman State Park and receives drainage from a predominantly forested watershed and portions of two park shelters. The stream has a sinuosity of 1.6 and an entrenchment ratio ranging from 1.9 to 2.5. The width to depth ratio is 5.2 to 5.5. The channel slope is 1.7%. Group Camp tributary is classified as an E5b stream type. Group Camp Tributary is similar to UT1 Reach 1 and UT1 Reach 2 on the project site.

Meadow Creek near Albemarle, NC drains 2.7 square miles, has an entrenchment ratio greater than 2.0, and a width to depth ratio of 10.9. Meadow Creek is classified as a C Stream type and was used to as a consideration for defining design parameters for Vile Creek Reaches 1 and 2.

The West Fork of Chestnut Creek, Brush Creek, and Little Glade Creek are all reference sites located along the Blue Ridge Parkway (Figure 8). Little Glade Creek and Brush Creek are located in the southeast portion of Alleghany County and have 1.67 and 3.30 square miles of predominately forested drainage area. The West fork of Chestnut Creek is located in northeast Alleghany County just before the Virginia/North Carolina state line and has a 1.6 square mile drainage area. Entrenchment ratios for each site are greater than 2.2, and width to depth ratios vary from 8.3 to 15.8. Brush Creek and Little Glade Creek are classified as C4 stream types. The West Fork of Chestnut Creek is classified as a C4 stream type. These reference reaches were used as a consideration for defining design parameters for Vile Creek Reaches 1 and 2 due to their similar drainage areas and overall dimension.

Table 7a: Summary of Reference Reach Geomorphic Parameters

Parameter	Notation	Units	Little Pine III UT2A - Reference		Henry Fork UT1 Upstream		UT to Gap Branch (Box Creek J2)		Group Camp Tributary - Upstream	
			min	max	min	max	min	max	min	max
stream type			A/B		B4a		B4a/A4		E5b	
drainage area	DA	sq mi	0.12		0.20		0.04		0.10	
bankfull discharge	Q_{bkf}	cfs	9		12		19		12	
bankfull cross-sectional area	A_{bkf}	SF	18.1		1.9	3.6	3.8		3.4	3.6
average velocity during bankfull event	v_{bkf}	fps	0.5		3.8	5.4	5.0		3.4	3.6
Cross-Section										
width at bankfull	w_{bkf}	feet	12.6		3.2	7.7	6.2		4.2	4.4
maximum depth at bankfull	d_{max}	feet	2.0		0.7	0.8	1.0		1.0	1.2
mean depth at bankfull	d_{bkf}	feet	1.4		0.5	0.6	0.6		0.8	
bankfull width to depth ratio	w_{bkf}/d_{bkf}		8.7		5.2	16.4	10.1		5.2	5.5
depth ratio	d_{max}/d_{bkf}		1.4		1.3	1.5	1.7		1.3	1.4
bank height ratio	BHR		1.0		1.0	1.3	1.0		1.0	
floodprone area width	w_{fpa}	feet	31		6	13	21		9	11

Parameter	Notation	Units	Little Pine III UT2A - Reference		Henry Fork UT1 Upstream		UT to Gap Branch (Box Creek J2)		Group Camp Tributary - Upstream	
			min	max	min	max	min	max	min	max
entrenchment ratio	ER		2.4		1.7	2.0	3.4		1.9	2.5
Slope										
valley slope	S_{valley}	ft/ft	N/A		0.0460		N/A		0.0229	
channel slope	$S_{channel}$	ft/ft	0.0433		0.0420		0.068		0.0167	
Profile										
riffle slope	S_{riffle}	ft/ft	0.0404	0.0517	0.050	0.070	0.011	0.140	0.011	0.122
riffle slope ratio	$S_{riffle}/S_{channel}$		0.9	1.2	1.3	1.8	0.2	2.1	0.6	7.3
pool slope	S_{pool}	ft/ft	0.010	0.014	0.000	0.016	0.004	0.061	0.000	0.010
pool slope ratio	$S_{pool}/S_{channel}$		0.2	0.3	0.0	0.4	0.1	0.9	0.0	0.6
pool-to-pool spacing	L_{p-p}	feet	78.0		14	25	18	27	5	58
pool spacing ratio	L_{p-p}/w_{bkf}		6.2		2.6	4.6	3.0	4.4	1.2	13.4
pool cross-sectional area at bankfull	A_{pool}	SF	23.2		N/A		1.5		N/A	
pool area ratio	A_{pool}/A_{bkf}		1.3		N/A		2.5		N/A	
maximum pool depth at bankfull	d_{pool}	feet	2.2	2.5	N/A		6.1		1.8	2.8
pool depth ratio	d_{pool}/d_{bkf}		1.5	1.7	N/A		1.0		2.3	3.4
pool width at bankfull	w_{pool}	feet	16.3		N/A		7.0		N/A	
pool width ratio	w_{pool}/w_{bkf}		1.3		N/A		2.0		N/A	
Pattern										
sinuosity	K		N/A		1.1		N/A		1.6	
belt width	w_{blt}	feet	N/A		N/A		N/A		16	17
meander width ratio	w_{blt}/w_{bkf}		N/A		N/A		N/A		3.6	3.8
meander length	L_m	feet	N/A		N/A		N/A		31	34
meander length ratio	L_m/w_{bkf}		N/A		N/A		N/A		7.2	7.9
radius of curvature	R_c	feet	N/A		N/A		N/A		8	11.8

Parameter	Notation	Units	Little Pine III UT2A - Reference		Henry Fork UT1 Upstream		UT to Gap Branch (Box Creek J2)		Group Camp Tributary - Upstream	
			min	max	min	max	min	max	min	max
radius of curvature ratio	R_c/ w_{bkf}		N/A		N/A		N/A		1.9	2.7

Table 7b: Summary of Reference Reach Geomorphic Parameters

Parameter	Notation	Units	Meadow Creek		West Fork Chestnut Creek		Brush Creek		Little Glade Creek	
			min	max	min	max	min	max	min	max
stream type			C		E4		C4		C4	
drainage area	DA	sq mi	2.70		1.60		1.67		3.30	
bankfull discharge	Q_{bkf}	cfs			164	210	168		424	
bankfull cross-sectional area	A_{bkf}	SF	62.2		35.8	40.0	37.9		76.5	
average velocity during bankfull event	v_{bkf}	fps	N/A		4.6	5.3	4.4		5.5	
Cross-Section										
width at bankfull	w_{bkf}	feet	26.0		18.3	20.3	22.8		34.7	
maximum depth at bankfull	d_{max}	feet	3.3		2.2	2.8	2.3		2.4	
mean depth at bankfull	d_{bkf}	feet	2.4		1.8	2.2	1.7		2.2	
bankfull width to depth ratio	w_{bkf}/d_{bkf}		10.9		8.3	11.5	13.4		15.8	
depth ratio	d_{max}/d_{bkf}		1.4		1.3		1.4		1.1	
bank height ratio	BHR		N/A		1.3	1.4	1.1		1.5	
floodprone area width	w_{fpa}	feet	52.0		N/A		N/A		N/A	
entrenchment ratio	ER		2.0+		>2.2		>2.2		>2.2	
Slope										
valley slope	S_{valley}	ft/ft	N/A		N/A		N/A		N/A	
channel slope	$S_{channel}$	ft/ft	N/A		0.0100		0.0120		0.010	
Profile										
riffle slope	S_{riffle}	ft/ft	N/A		0.011	0.028	0.004		0.014	

Parameter	Notation	Units	Meadow Creek		West Fork Chestnut Creek		Brush Creek		Little Glade Creek	
			min	max	min	max	min	max	min	max
riffle slope ratio	$S_{riffle}/S_{channel}$		N/A		1.1	2.8	0.4		1.2	
pool slope	S_{pool}	ft/ft	N/A		0.001	0.005	0.001		0.001	
pool slope ratio	$S_{pool}/S_{channel}$		N/A		0.0	0.5	0.1		0.1	
pool-to-pool spacing	L_{p-p}	feet	N/A		31	124	N/A		N/A	
pool spacing ratio	L_{p-p}/w_{bkf}		N/A		1.5	6.8	N/A		N/A	
pool cross-sectional area at bankfull	A_{pool}	SF	N/A		45.0	55.6	N/A		N/A	
pool area ratio	A_{pool}/A_{bkf}		N/A		1.3	1.4	N/A		N/A	
maximum pool depth at bankfull	d_{pool}	feet	N/A		3.8	4.1	N/A		N/A	
pool depth ratio	d_{pool}/d_{bkf}		N/A		1.5	1.7	N/A		N/A	
pool width at bankfull	w_{pool}	feet	N/A		19.9	21.7	N/A		N/A	
pool width ratio	w_{pool}/w_{bkf}		N/A		1.0	1.1	N/A		N/A	
Pattern										
sinuosity	K		N/A		N/A		N/A		N/A	
belt width	w_{blt}	feet	N/A		64	71	N/A		N/A	
meander width ratio	w_{blt}/w_{bkf}		N/A		2.9	3.4	N/A		N/A	
meander length	L_m	feet	N/A		N/A		N/A		N/A	
meander length ratio	L_m/w_{bkf}		N/A		N/A		N/A		N/A	
radius of curvature	R_c	feet	N/A		26	40	N/A		N/A	
radius of curvature ratio	R_c/ w_{bkf}		N/A		1.3	2.0	N/A		N/A	

6.2 Reference Wetlands

Two reference wetlands, a forested riparian wetland and a bog site, have been identified for the site. These reference wetlands were selected based on proximity to the site, physiographic province, soil type (Alluvial land), similar soil texture (loams), and natural community type. The forested reference wetland is approximately 6.2 miles to the east of the project site and is part of a riparian wetland site proposed for preservation at DMS's Little Pine Creek II Restoration Project. The forested reference

wetland is located in the floodplain of Little Pine Creek in a vegetative community similar to a Montane Alluvial Forest (Schafale & Weakley, 1990). The bog reference is located approximately 2.6 miles southwest of the Site in the floodplain of a small tributary to the Little River. The bog reference is composed of primarily shrub and herbaceous species similar to a Southern Appalachian Bog (Schafale & Weakley, 1990). The reference wetlands were used in addition to other sources to develop the planting plan for the wetland restoration portions of the site (describe in Section 9.3.3). A groundwater monitoring gage will be installed at the forested reference site to document hydrology in conjunction with post-construction monitoring installation at the Vile Creek site. Based on discussions with the USFWS a second groundwater gage may be installed in the bog reference site.

7.0 Determination of Credits

Mitigation credits presented in Table 8 are projections based upon site design. Upon completion of site construction, the project components and credits data will be revised to be consistent with the as-built condition. Portions of the easement are either less than or greater than 30 feet (Figure 9). For areas where the easement is lower than 30 feet credits were adjusted based on the 2009 USACE buffer guidance. For these areas, the full credit and recued credit are shown in Table 8.

Table 8: Summary of Project Components and Mitigation Credits

Mitigation Credits									
	Stream		Riparian Wetland		Non-riparian Wetland		Buffer	Nitrogen Nutrient Offset	Phosphorus Nutrient Offset
Type	R	RE	R	RE	R	RE			
Totals	5,146	0	5.82	0	0	0	NA	NA	NA

Project Components								
Project Component or Reach ID	Stationing / Location	Existing Footage / Acreage	Approach (PI, PII, etc.)	Restoration or Restoration Equivalent	Restoration Footage or Acreage	Mitigation Ratio	Total Credits	Reduced Credits[1]
Vile Creek Reach 1	101+75 - 110+95	962	P1	R	920	1:1	920	920
Vile Creek Reach 2	110+95 - 123+54	1,247	P1	R	1,260	1:1	1,260	1,260
Vile Creek Reach 3	123+54 - 130+67	714	Fencing/ Planting	EII	714	2.5:1	286	279
UT1 Reach 1	201+57 - 212+89	1,143	Reconstructing channel to correct profile & cross section	EI	1,107	1.5:1	738	658
UT1 Reach 2	212+89 - 221+93	989	P1	R	825	1:1	825	815
UT1b	250+36 - 251+64	128	Fencing/ Planting	EII	128	2.5:1	51	51
UT1c	270+53 - 272+87	234	Fencing/ Planting	EII	227	2.5:1	91	91
UT2	300+37 - 312+62	1,226	Fencing/ Planting	EII	1,226	2.5:1	490	490
UT3	401+10 - 414+25	1,316	Fencing/ Planting	EII	1,236	2.5:1	494	468
Little River	502+33 - 505+17	284	Fencing/ Planting	EII	284	2.5:1	114	114
Wetland Rehabilitation	NA	3.02	Planting/Minor Grading	R	3.02	1.3:1	2.32	2.32
Wetland Re-establishment	NA	0	Grading/Planting	R	3.50	1:1	3.5	3.50

Component Summation						
Restoration Level	Stream (linear feet)	Riparian Wetland (acres)		Non-Riparian Wetland (acres)	Buffer (sq. ft.)	Upland (acres)
		Riverine	Non-Riv.			
Restoration	3,005	NA	NA	NA	NA	NA
Rehabilitation	NA	3.02	NA	NA	NA	NA
Re-establishment	NA	3.50	NA	NA	NA	NA
Enhancement I	1,107					
Enhancement II	3,815					
Creation		NA	NA	NA		
Preservation	NA	NA	NA	NA		NA
High Quality Preservation	NA	NA	NA	NA		NA

Notes:
1. Credits adjusted for areas where easement is restricted and the full buffer width is not possible (see Figure 9).

8.0 Credit Release Schedule

All credit releases (Tables 9a and 9b) will be based on the total credit generated as reported by the as-built survey of the mitigation site. Under no circumstances shall any mitigation project be debited until the necessary DA authorization has been received for its construction or the District Engineer (DE) has otherwise provided written approval for the project in the case where no DA authorization is required for construction of the mitigation project. The DE, in consultation with the Interagency Review Team (IRT), will determine if performance standards have been satisfied sufficiently to meet the requirements of the release schedules below. In cases where some performance standards have not been met, credits may still be released depending on the specifics of the case. Monitoring may be required to restart or be extended, depending on the extent to which the site fails to meet the specified performance standard. The release of project credits will be subject to the criteria described as follows:

Table 9a: Credit Release Schedule – Wetlands Credits

Monitoring Year	Credit Release Activity	Interim Release	Total Released
0	Initial Allocation – see requirements below	30%	30%
1	First year monitoring report demonstrates performance standards are being met	10%	40%
2	Second year monitoring report demonstrates performance standards are being met	10%	50%
3	Third year monitoring report demonstrates performance standards are being met	10%	60%
4	Fourth year monitoring report demonstrates performance standards are being met	10%	70%
5	Fifth year monitoring report demonstrates performance standards are being met; Provided that all performance standards are met, the IRT may allow the DMS to discontinue hydrologic monitoring after the fifth year, but vegetation monitoring must continue for an additional two years after the fifth year for a total of seven years.	10%	80%
6	Sixth year monitoring report demonstrates performance standards are being met	10%	90%
7	Seventh year monitoring report demonstrates performance standards are being met, and project has received close-out approval	10%	100%

Table 9b: Credit Release Schedule – Stream Credits

Monitoring Year	Credit Release Activity	Interim Release	Total Released
0	Initial Allocation – see requirements below	30%	30%
1	First year monitoring report demonstrates performance standards are being met	10%	40%
2	Second year monitoring report demonstrates performance standards are being met	10%	50% (60%*)
3	Third year monitoring report demonstrates performance standards are being met	10%	60% (70%*)
4	Fourth year monitoring report demonstrates performance	5%	65%

Monitoring Year	Credit Release Activity	Interim Release	Total Released
	standards are being met		(75%*)
5	Fifth year monitoring report demonstrates performance standards are being met	10%	75% (85%*)
6	Sixth year monitoring report demonstrates performance standards are being met	5%	80% (90%)
7	Seventh year monitoring report demonstrates performance standards are being met and the project has received closeout approval	10%	90% (100%)

*Note: 10% of the stream credits will be held in reserve for two bankfull events.

8.1 Initial Allocation of Released Credits

The initial allocation of released credits, as specified in the mitigation plan can be released by the NCEEP without prior written approval of the DE upon satisfactory completion of the following activities:

a. Approval of the final Mitigation Plan
b. Recordation of the preservation mechanism, as well as a title opinion acceptable to the USACE covering the property
c. Completion of project construction (the initial physical and biological improvements to the mitigation site) pursuant to the mitigation plan; Per the DMS Instrument, construction means that a mitigation site has been constructed in its entirety, to include planting, and an as-built report has been produced. As-built reports must be sealed by an engineer prior to project closeout, if appropriate but not prior to the initial allocation of released credits.
d. Receipt of necessary DA permit authorization or written DA approval for projects where DA permit issuance is not required.

8.2 Subsequent Credit Releases

All subsequent credit releases must be approved by the DE, in consultation with the IRT, based on a determination that required performance standards have been achieved. For stream projects a reserve of 10% of a site's total stream credits shall be released after two bank-full events have occurred, in separate years, provided the channel is stable and all other performance standards are met. In the event that less than two bank-full events occur during the monitoring period, release of these reserve credits shall be at the discretion of the IRT. As projects approach milestones associated with credit release, the DMS will submit a request for credit release to the DE along with documentation substantiating achievement of criteria required for release to occur. This documentation will be included with the annual monitoring report.

9.0 Project Site Mitigation Plan

9.1 Stream Design

9.1.1 Stream Design Overview

The project streams have been designed to be the appropriate type based on the surrounding landscape, climate, and natural vegetation communities but also with consideration for existing watershed conditions and expected watershed trajectory. The stream designs were developed to convey a range of flows up to a design bankfull discharge and to flood approximately one time per year on average. Reference reaches of similar stream type and setting were chosen to inform the selection of design parameters. Design parameters were also based on consideration of past successful projects in

mountain landscapes, engineering analyses, and the professional judgement of the design team. A sediment transport analysis was performed to verify that the designed streams would convey the sediment supplied to them yet remain stable.

The project includes stream restoration, Enhancement I, and Enhancement II reaches (Figure 10). UT1 Reach 1 has been designed as enhancement I. Treatments for this reach include raising the stream bed by adding constructed riffles and establishing a riffle cross section sized appropriately for the bankfull discharge. UT1 Reach 2 has been designed as restoration. The channel will be reconstructed mostly offline to alter the profile, planview pattern, and cross-sectional dimensions so that they are similar to a natural stream in this setting. Vile Creek Reaches 1 and 2 will also be constructed as restoration. These reaches will be constructed offline to meander through riparian wetlands. Reach 3 of Vile Creek is more stable and less incised that the upstream reaches and will be enhanced through fencing out cattle and planting riparian buffers (enhancement II). The remaining project reaches include UT1B, UT1C, UT2, UT3, and a short reach of Little River. All of the reaches will be improved through enhancement II techniques similar to Vile Creek Reach 3.

9.1.2 Design Discharge Analysis

Multiple methods were used to develop design bankfull discharges estimates for each of the project restoration and Enhancement I reaches. The resulting values were compared and concurrence between the estimates and best professional judgment were used to determine the specific design discharge for each restoration reach. The methods to estimate discharge for each restoration and Enhancement I reach are described below and the results are summarized in Table 10 and on Figure 11.

NC Rural Mountain Regional Curve Predictions

The published NC rural Piedmont curve (Harman et al., 2000) was used to estimate discharge based on drainage area.

Provisional Updated NC Piedmont/Mountain Regional Curve Predictions

Design discharges using the draft updated curve for rural Piedmont and mountain streams (Walker, unpublished) were estimated based on drainage area.

Regional Flood Frequency Analysis

A regional flood frequency analysis was developed for the Little River and Brush Creek LWP Phase I report. This analysis included the use of seven gauges and was developed following the methods of Dalrymple (1960). This method involves using ratios for discharges of different recurrence intervals to the mean annual floods for streams of different drainage areas to estimate the magnitude of the analyzed discharges. For this analysis the 1.2 and 1.5 year discharges were computed.

Basin Ratio Method

There is a decommissioned USGS stream gauging station on Vile Creek just upstream of the project site. This gauge was active from 1955 to 1971 and the drainage area at this site is 2.1 square miles. The data for this gauge were obtained and discharges were calculated for recurrence intervals of 1.1-year, 1.25-year, and 1.5-year discharges. The basin ratio method (multiplying a gauged discharge of a particular recurrence interval by the ratio of the study drainage area to the gauged drainage area) were used to calculate discharges for the project reaches for the same three recurrence intervals.

Table 10: Design Bankfull Discharge Analysis Summary

Discharge Estimate Analysis	Vile Creek Reach 1	Vile Creek Reach 2	UT1 Reach 1	UT1 Reach 2
Drainage Area (sq. mi.)	2.15	2.56	0.3	0.34
Little River LWP Regional Flood Frequency 1.25-year Discharge (CFS)	107	124	21	23
Little River LWP Regional Flood Frequency 1.5-year Discharge (CFS)	122	141	24	26
Rural Mountain Regional Curve Bankfull Discharge (CFS)	180	206	40	44
Revised Piedmont/Mountain Regional Curve Bankfull Discharge (CFS)	102	117	21	24
Basin Ratio Method 1.1-year Discharge (CFS)	101	121	14	16
Basin Ratio Method 1.25-year Discharge (CFS)	122	146	17	19
Final Design Q	**100**	**120**	**17**	**20**

9.1.3 Design Channel Morphologic Parameters

The design morphologic parameters, as shown in Tables 11a and 11b, fall within the ranges associated with B and C stream types (Rosgen, 1996). Type B streams are moderately entrenched streams with minimal floodplain width and slopes in excess of 2%. They occur in moderately steep valleys and characteristically have a riffle-pool bed morphology. They plan view pattern of B type streams is often constrained by a narrow valley. Type C streams are slightly entrenched, alluvial, meandering streams with access to a broad floodplain, and channel slopes of 2% or less. They occur within a wide range of valley types. The specific values for the design parameters were selected to meet the project goals based on morphologic data from reference reach data sets and design team's professional judgement. Tables 11a and 11b present the cross-sectional, profile, and plan form pattern parameters for each restoration and Enhancement I reach.

Table 11a: Summary of Design Geomorphic Parameters

	Notation	Units	Vile Creek Reach 1			Vile Creek Reach 2		
			Typical Section Values	Min	Max	Typical Section Values	Min	Max
stream type			C			C		
drainage area	DA	sq mi	2.15			2.56		
design discharge	Q	cfs	100			120		
bankfull cross-sectional area	A_{bkf}	SF	19.6			23.7		
average velocity during bankfull event	v_{bkf}	fps	4.7			5.0		
Cross-Section								
width at bankfull	w_{bkf}	feet	17.0			19.0		

	Notation	Units	Vile Creek Reach 1			Vile Creek Reach 2		
			Typical Section Values	Min	Max	Typical Section Values	Min	Max
maximum depth at bankfull	d_{max}	feet		1.4	1.7		1.5	1.9
mean depth at bankfull	d_{bkf}	feet	1.2			1.2		
maximum depth ratio	d_{max}/d_{avg}			1.2	1.5		1.2	1.5
bankfull width to depth ratio	w_{bkf}/d_{bkf}		14.7			15.2		
low bank height		feet		1.4	1.7		1.5	1.9
bank height ratio	BHR			1.0	1.0		1.0	1.0
floodprone area width	w_{fpa}	feet		37	85		42	95
entrenchment ratio	ER			2.2	5.0		2.2	5.0
Slope								
valley slope	S_{valley}	feet/ foot	0.0160			0.0170		
channel slope	S_{chnl}	feet/ foot		0.0123	0.0133		0.0131	0.0142
Profile								
riffle slope	S_{riffle}	feet/ foot		0.0148	0.0333		0.016	0.036
riffle slope ratio	S_{riffle}/S_{chnl}			1.2	2.5		1.2	2.5
pool slope	S_p	feet/ foot		0.000	0.0027		0.000	0.0028
pool slope ratio	S_p/S_{chnl}			0.00	0.20		0.00	0.20
pool-to-pool spacing	L_{p-p}	feet		34	119		38	133
pool spacing ratio	L_{p-p}/w_{bkf}			2.0	7.0		2	7
pool cross-sectional area		SF		22	39		26	47
pool area ratio				1.1	2.0		1.1	2.0
maximum pool depth		feet		1.4	2.9		1.5	3.1
pool depth ratio				1.2	2.5		1.2	2.5
pool width at bankfull		feet		17.0	25.5		19.0	28.5
pool width ratio				1.0	1.5		1.0	1.5
Pattern								
sinuosity	K			1.2 - 1.3			1.2 - 1.3	
belt width	w_{blt}	feet		51.0	119.0		57.0	133.0
meander width ratio	w_{blt}/w_{bkf}			3	7		3	7

	Notation	Units	Vile Creek Reach 1			Vile Creek Reach 2		
			Typical Section Values	Min	Max	Typical Section Values	Min	Max
meander length	L_m	feet		119	238		133	266
meander length ratio	L_m/w_{bkf}			7.0	14.0		7.0	14.0
radius of curvature	R_c	feet		34	68		38	76
radius of curvature ratio	R_c/ w_{bkf}			2	4		2	4

Table 11b: Summary of Design Geomorphic Parameters

	Notation	Units	UT1 Reach 1			UT1 Reach 2		
			Typical Section Values	Min	Max	Typical Section Values	Min	Max
stream type			B			B		
drainage area	DA	sq mi	0.28			0.32		
design discharge	Q	cfs	17			20		
bankfull cross-sectional area	A_{bkf}	SF	4.3			5.2		
average velocity during bankfull event	v_{bkf}	fps	3.8			3.9		
Cross-Section								
width at bankfull	w_{bkf}	feet	8.0			9		
maximum depth at bankfull	d_{max}	feet		0.7	0.8		0.7	0.9
mean depth at bankfull	d_{bkf}	feet	0.5			0.6		
maximum depth ratio	d_{max}/d_{avg}			1.3	1.5		1.2	1.6
bankfull width to depth ratio	w_{bkf}/d_{bkf}		14.9			15.6		
low bank height		feet		0.7	0.8		0.7	0.9
bank height ratio	BHR			1.0	1.0		1.0	1.0
floodprone area width	w_{fpa}	feet		14	18		15	20
entrenchment ratio	ER			1.8	2.3		1.7	2.2
Slope								

	Notation	Units	UT1 Reach 1			UT1 Reach 2		
			Typical Section Values	Min	Max	Typical Section Values	Min	Max
valley slope	S_{valley}	feet/ foot	0.0320			0.0310		
channel slope	S_{chnl}	feet/ foot		0.0291	0.0320		0.0282	0.3100
Profile								
riffle slope	S_{riffle}	feet/ foot		0.0291	0.064		0.0282	0.620
riffle slope ratio	S_{riffle}/S_{chnl}			1.0	2.0		1.0	2.0
pool slope	S_p	feet/ foot		0.000	0.0192		0.0000	0.1860
pool slope ratio	S_p/S_{chnl}			0.00	0.60		0.00	0.60
pool-to-pool spacing	L_{p-p}	feet		16	48		162	486
pool spacing ratio	L_{p-p}/w_{bkf}			2	6		18	54
pool cross-sectional area		SF		6	9		7	10
pool area ratio				1.3	2.0		1.3	2.0
maximum pool depth		feet		1.1	1.9		1.2	2.0
pool depth ratio				2.0	3.5		2.0	3.5
pool width at bankfull		feet		8.0	12.8		9.0	14.4
pool width ratio				1.0	1.6		1.0	1.6
Pattern								
sinuosity	K			1.0 - 1.1			1.0 - 1.1	
belt width	w_{blt}	feet		N/A[1]	N/A[1]		13.2	32.1
meander width ratio	w_{blt}/w_{bkf}			N/A[1]	N/A[1]		1.5	3.6
meander length	L_m	feet		N/A[1]	N/A[1]		63.5	109.9
meander length ratio	L_m/w_{bkf}			N/A[1]	N/A[1]		7.1	12.2
radius of curvature	R_c	feet		N/A[1]	N/A[1]		20.0	59.2
radius of curvature ratio	R_c/ w_{bkf}			N/A[1]	N/A[1]		2.2	6.6

Notes:

1. Design parameters for pattern features are not reported for UT1 Reach 1 because the channel was designed as Enhancement I.

9.1.4 Sediment Transport Analysis

The sediment transport analysis used to verify the proposed designs included evaluation of the competence and capacity of the restoration and Enhancement I reaches. The competence analysis provides an estimate of the necessary shear stress and related slope and bankfull depth needed to move the existing bed material. The capacity analysis is used to determine if the stream has the ability to pass its sediment load. Both are described below.

Competence Analysis

A competence analysis (Table 12) was performed for each of the restoration and Enhancement I reaches by comparing shear stress associated with the design bankfull discharge with the size distribution of the bed material. Standard equations based on a methodology described by Rosgen (2001) were used to calculate the critical dimensionless shear stress needed to move the bed material and the associated depth and slope combination needed to produce that stress. Critical depth and slope combinations were calculated for each proposed design reach and results were compared to existing channel depth and slope.

Table 12: Dimensionless Critical Shear Stress Calculations

	Vile Creek Reach 1 Existing	Vile Creek Reach 1 Proposed	Vile Creek Reach 2 Existing	Vile Creek Reach 2 Proposed	UT1 Reach 1 Existing	UT1 Reach 1 Proposed	UT1 Reach 2 Existing	UT1 Reach 2 Proposed
Calculated $d_{critical}$ (ft)	1.29	1.29	1.12	0.88	0.30	0.29	0.52	0.28
Riffle mean depth (ft)	1.6	1.2	0.9	1.3	0.9	0.5	0.4	0.6
Calculated $S_{critical}$ (ft/ft)	0.011	0.016	0.014	0.009	0.007	0.010	0.033	0.011
Channel Slope (ft/ft)	0.014	0.014	0.011	0.014	0.022	0.025	0.028	0.024
D100 Subpavement (mm)	125		86		76		76	
Critical shear stress required to move largest subpavement particle[1]	0.75		0.45		0.38		0.38	
Design discharge boundary shear stress (lbs/ft^2)	1.2	1.1	0.8	1.2	0.7	0.5	0.4	0.6
Mobile particle size at design discharge (mm)[1]	175	165	130	175	115	95	75	100

1. From revised Shields Diagram (Rosgen, 2001)

The results of the competence analyses for the existing and proposed conditions of Vile Creek and UT1 indicate that, for both conditions, there is enough boundary shear stress to mobilize bed material at bankfull flows. For the proposed condition, shear stress will be reduced in Vile Creek Reach 1 and UT1 Reach 1 indicating increased vertical channel stability. The results of the analysis indicate that the shear stress in Vile Creek Reach 2 and UT1 Reach 2 will rise slightly. However the increases in shear stress are not significant enough to indicate the potential for channel instability. While the gravels and small cobbles in the system will move and be replaced from upstream sources, the larger cobbles on the bed will remain in place. Measures will be taken to prevent scour at key locations in the channel and grade control structures (described in Section 9.3.1 below) will be installed at locations where bed erosion potential is significant such as steeper riffles.

Capacity Analysis

HEC-RAS models were developed for existing and proposed conditions for representative sections of both Vile Creek and UT1 in order to evaluate sediment load capacity and verify that the proposed design reaches will transport the sediment loads supplied to them. The sediment transport capacity function of the hydraulic design component in HEC-RAS was used to perform the analysis. The Meyer-Peter-Mueller (MPM) equation was used for the analysis since the ranges of channel slope, depth, and sediment size for which the equation is recommended were the most representative of the project reaches. Table 13 shows the results of the capacity analysis for the existing and proposed conditions for Vile Creek and UT1. Results indicate that proposed design conditions will be more effective at conveying the sediment load than existing conditions at bankfull discharge. In this case, aggradation of the channel bed is not expected to be a problem (since it is not currently a problem). Dissipating excess stream power is an important design consideration since there will be more stream power and capacity in the proposed condition. However, as mentioned above, the largest particles on the bed will not be entrained and additional grade control will be used to prevent erosion of the channel bed.

Table 13: Sediment Transport Capacity Analysis Results

	Sediment Transport Capacity (tons/day)	
	Existing	**Proposed**
Vile Creek	3028	4711
UT1	444	585

9.2 Wetland Design

9.2.1 Wetland Design Overview

This project includes a significant component of wetland re-establishment and rehabilitation to increase the acreage of wetlands on site and improve the existing wetlands. The re-establishment zones are areas that are no-longer wetland because they have been effectively drained and/or filled. The rehabilitation zones are areas that are currently jurisdictional but functioning poorly. In addition, the design includes expansion of Southern Appalachian Bog habitat within the wetland zones. Combined, these areas will account for 6.53 acres of riparian wetlands restoration of which 1.99 acres (30%) will be bog area. The groundwater hydrology data from the wells installed on-site (Section 4.5.3) were used as an important source of information for the wetland design along with depths to existing hydric soils. DrainMod (version 6.1) was used to model existing and proposed conditions hydrology within the proposed wetland mitigation areas of the project site. The DrainMod model was used to optimize the stream channel depth through the wetland zones and to help verify that cutting to the hydric soils layer in the re-establishment zones would result in an appropriate target hydroperiod. Based on the results of

the modeling and soils assessments, a detailed grading plan was developed for the wetlands re-establishment zones. A planting plan of native hardwood, shrub, and herbaceous vegetation was developed for the wetland zones.

9.2.2 Hydrologic Modeling

For the Vile Creek wetland mitigation areas, three models were developed to represent the existing and proposed conditions at three different groundwater monitoring gauge locations:

- Groundwater Monitoring Gauge 1 – Wetland Rehabilitation/Bog Area
- Groundwater Monitoring Gauge 2 – Wetland Re-establishment
- Groundwater Monitoring Gauge 5 – Wetland Rehabilitation

The locations of the monitoring gauges are shown in Figure 3. For each monitoring gauge location, existing conditions DrainMod models were built using site drainage, vegetation, and soil characteristics along with weather data. Weather data for calibration of the DrainMod models were obtained from a Weather Underground station (KNCSPART12) approximately 1.8 miles northeast of the site. The models were calibrated to the groundwater gauge hydrology for each of the three sites for the period of September 5, 2014 to May 12, 2015. Plots of predicted vs. observed depth of groundwater for each of the calibrated models are shown in Appendix 8.

The calibrated models were used to simulate long-term hydrology of the three gauges. Weather station KNCSPART12 is the closest to the site, however long-term data were not available for this station. Therefore, precipitation and temperature data for use in the long-term simulations were obtained from a weather station located at the Ashe County Airport (National Weather Service station KGEV). Ashe County Airport is approximately 19 miles southwest of the Vile Creek Site but has a very similar climate and rainfall patterns to the project site. The period for the long-term modeling was April 1, 1946 to June 30, 2015 based on available weather data. Incremental increases in grading depths (for re-establishment zones) and channel depths of the proposed Vile Creek reaches were analyzed with the model for each simulated gauge. The modeling results were used to determine the grading depth at which wetland hydrologic performance was optimized while maintaining an appropriate stream profile. This information was used to set the final surface grades of the wetlands and establish the wetlands hydrologic performance standard.

The wetland performance standard proposed based on the modeling results is that the water table must be within 12 inches of the ground surface at each gage for a minimum of 7.1% (12 consecutive days) of the 167-day growing season (April 26 through October 11). The growing season was determined from the long-term records from the National Weather Service provided in the WETS table for Ashe County (WETS temperature data and thus growing season data was not available for Alleghany County). When run with the long-term rainfall and temperature data, the existing conditions models results showed that gages 1 and 5 (rehabilitation zones) currently meet the success criteria approximately 23 and 35 years of the 69-year long-term simulation period, respectively. Gage 2 (re-establishment zone) does not currently meet the success criteria for any year of the simulation period. The results of the long-term proposed conditions models indicate that gauge 1 will meet the performance standard 63 of years of the 69-year simulation period, gauge 2 will meet criteria 55 years, and gauge 5 will meet criteria 60 years.

9.3 Project Implementation

This section describes the construction and planting of the mitigation site. The site design is depicted in the preliminary construction plans included with the submittal of this report.

9.3.1 Stream Restoration and Enhancement

Stream restoration will be constructed on Vile Creek Reaches 1 and 2 and UT1 Reach 2 (Figure 10). This work will primarily involve Priority 1 restoration with the exception of a short sections of Priority 2 at the upstream end of the Vile Creek restoration reaches, and the upstream and downstream ends of UT1 Reach 2. These Priority 2 sections are necessary to tie into existing channel grades. The downstream end of Vile Creek Reach 2 will tie into the Enhancement II reach of Vile Creek (Reach 3). The upstream portion of the bed of this Enhancement II reach will be raised to allow the all of Reach 2 to be Priority 1 and provide a more gradual transition to existing grade. Some floodplain grading will be done in order to re-establish wetlands adjacent to the stream channel.

The stream restoration construction will result in meandering channels sized to convey the design discharge. The sinuous plan form of the channels will be built to mimic natural mountain streams and will provide energy dissipation and the maintenance of riffle-pool bed morphology. Generally, pools will occur in the outside of the meander bends and riffles will be located in the straight sections of channel between meanders. Pools will be constructed of varying depth for habitat diversity. The reconstructed channel banks will be built with stable side slopes, planted with native species, matted, and seeded for stability. Flows above the design discharge will frequently flood the adjacent floodplain and wetlands.

Reach 1 of UT 1 will be constructed as Enhancement I. This will involve raising the channel bed to reconnect the stream to its floodplain and creating a stable cross section sized to convey the design bankfull discharge. The alignment of this reach will not be altered.

In-stream structures in restoration and Enhancement I reaches will include constructed riffles, log and boulder sills, log vanes, cover logs, and log J-hooks. The structures will reinforce channel stability and serve as habitat features. The constructed riffles will be comprised of native gravel/cobble material harvested from the existing channel and incorporate brush, wood, large cobble, and angled logs. Quarried gravel and cobble will be substituted for the portion of total riffle material that cannot be met by harvesting native gravel/cobble material on-site. The diverse range of constructed riffle types will provide grade control and heterogeneous habitat and will create varied flow vectors. Log vanes will deflect flow vectors away from banks while creating habitat diversity. Log and boulder sills will be used to allow for small grade drops across pools and provide extra grade control protection. At select outer meander bends, the channel banks will be constructed with a brush toe revetment (may include live whips) to reduce erosion potential and encourage pool formation. Cover logs will provide habitat for trout and other fish.

A small headwater water quality treatment practice will be constructed on an ephemeral drainage that discharges to UT2. This feature will retain 100% of the water quality treatment storm (1 inch of rainfall) that drains from 17 acres of active cattle pasture. No mitigation credits are requested for this treatment practice.

The five reaches of Enhancement II planned for the site include UT1B, UT1C, UT2, UT3, and a small reach along the Little River (Figure 10). The treatments for these reaches will include fencing out livestock, treatment of invasive exotic plant species, and planting native riparian species. No instream structures are planned for these reaches, however, minor bank grading to stabilize eroding, vertical banks are planned for the lower end of UT1C.

9.3.2 Wetland Restoration

This project will include riparian wetland mitigation areas on the relatively broad floodplain of Vile Creek. These wetland zones will include areas of rehabilitation of existing wetlands and re-establishment of lands that were previously wetlands as depicted in Figure 10. The wetland zones will include

increasing areas of existing Southern Appalachian Bog habitat that currently exist as linear ditches parallel to Vile Creek.

The riparian wetland re-establishment/rehabilitation zones are adjacent to the main stem of Vile Creek. The bed elevation of the incised stream will be raised to restore the natural water table elevation and the natural over-bank flooding regime. No grading will be performed in the wetland rehabilitation areas (except for the expansion of the bog areas described below). The re-establishment areas are primarily located between the rehabilitation zones and the stream channel. These areas will be graded to remove fill material over the relict hydric soils and lower floodplain elevations to be more similar to those of the rehabilitation zones. The cut in the re-establishment zones will range from zero to 2.1 feet. Multiple ditches have been previously cut through the wetland areas. These will be widened to increase the bog habitat type but also plugged in multiple locations to prevent the flow of water and promote a higher water table throughout the wetlands. This will result in creation of several bog areas on the site.

9.3.3 Planting Plan

As a final stage of construction, plants will be installed and seeded to establish native forest, shrub, and herbaceous communities within the conservation easement (Figure 12). Riparian buffers of restoration and enhancement reaches will be seeded and planted with native vegetation chosen to create a Montane Alluvial Forest community (Table 14a). Some areas within the conservation easement where mature trees currently exist, the forested area will be supplemented with understory species (Table 14b). For most of the project including UT1, UT1b, UT1c, UT2, and portions of Vile Creek with no adjacent wetlands, the planting of the hardwood forest community will extend from the top of the stream bank to the edge of the conservation easement. For the portion of Vile Creek with adjacent wetlands, the hardwood planting will extend out 10 feet from the top of the streambank. From that point to the conservation easement boundary, the wetlands will be planted with shrub and herbaceous species as described below.

Two types of wetland zones beyond the hardwood forest zone along Vile Creek will be planted with different species. The first wetland zone will be planted with shrub species creating a native shrub community (Table 14c). This will result in low growing wetland vegetation that will minimize shading of the bog areas. The hardwood forest along Vile Creek will, however, provide shade for the stream and help ensure long-term lateral stability of the channel. The shrub species for this zone are shown in Section 4 of the construction plans.

A second wetland planting zone is planned for the interior of the bog areas. These areas are intended to be Southern Appalachian Bog communities. They will be planted with herbaceous species representative of that community type and favorable for bog turtle habitat (Table 14d).

The riparian buffer areas will be planted with bare root seedlings. Species planted as bare roots will be spaced at an initial density of 605 plants per acre based on 12-ft by 6-ft spacing. In addition, the streams will be planted with live stakes (Table 14e). Live stakes will be planted on channel banks at approximately a 3-ft spacing on the outside of meander bends and a 5-ft spacing on tangent sections. For UT1, live stakes will be placed on the floodplain of tangent sections and on the bank at the outside of meander bends. For Vile Creek, all live stakes will be installed in the channel banks. Point bars will not be planted with live stakes. The channel toe will be planted with herbaceous plugs (Table 14f) with a spacing of approximately five feet. Permanent herbaceous seed will be spread on stream banks, floodplain areas, and all disturbed areas within the project easement at a rate of 20 lbs/acre (Table 14g).

To facilitate plant growth, top soil will be stockpiled and reapplied prior to planting. Top soil will only be reapplied to areas where the depth of cut was greater than six inches. Invasive species within the

riparian buffers will be treated at the time of construction. The extent of invasive species coverage will be monitored, mapped and controlled as necessary throughout the required monitoring period.

Table 14a. Riparian Planting Zone Plant List

Species	Common Name	Spacing	Min. Caliper	Percentage
Alnus serrulata	Tag Alder	12ft x 6ft	0.25"	10%
Carpinus caroliniana	American Hornbeam	12ft x 6ft	0.25"	10%
Liriodendron tulipifera	Tulip Poplar	12ft x 6ft	0.25"	15%
Platanus occidentalis	Sycamore	12ft x 6ft	0.25"	15%
Betula nigra	River Birch	12ft x 6ft	0.25"	15%
Quercus pagoda	Cherrybark Oak	12ft x 6ft	0.25"	15%
Fraxinus pennsylvanica	Green Ash	12ft x 6ft	0.25"	10%
Diospyros virginiana	Persimmon	12ft x 6ft	0.25"	10%

Table 14b. Understory Planting Zone Plant List

Species	Common Name	Spacing	Min. Caliper	Percentage
Carpinus caroliniana	American Hornbeam	12ft x 12ft	0.25"	25%
Aronia arbutifolia	Red Chokeberry	12ft x 12ft	0.25"	25%
Ilex verticillata	Winter Berry	12ft x 12ft	0.25"	25%
Lindera benzoin	Spicebush	12ft x 12ft	0.25"	25%

Table 14c. Wetland Shrub Planting Zone Plant List

Species	Common Name	Spacing	Min. Caliper	Percentage
Aronia arbutifolia	Red Chokeberry	12ft x 12ft	0.25"	15%
Cornus amomum	Silky Dogwood	12ft x 12ft	0.25"	15%
Ilex verticillata	Winter Berry	12ft x 12ft	0.25"	15%
Lindera benzoin	Spicebush	12ft x 12ft	0.25"	15%
Sambucus nigra	Elderberry	12ft x 12ft	0.25"	10%
Vaccinium corymbosum	Highbush Blueberry	12ft x 12ft	0.25"	15%
Cephalanthus occidentalis L.	Common Buttonbush	12ft x 12ft	0.25"	15%

Table 14d. Herbaceous Planting Zone Plant List

Species	Common Name	Spacing	Percentage
Juncus effusus	Common Rush	8 ft	15%
Carex alata	Broadwing Sedge	8 ft	15%
Carex lurida	Shallow Sedge	8 ft	15%
Carex crinita	Fringed Sedge	8 ft	15%
Scirpus cyperinus	Woolgrass	8 ft	20%
Sagittaria latifolia	Broadleaf Arrowhead	8 ft	20%

Table 14e. Streambank Planting Zone Livestakes Plant List

Species	Common Name	Spacing	Min. Caliper	Percentage
Cornus amomum (livestake)	Silky Dogwood	3-5 ft	0.5"	20%
Cephalanthus occidentalis L.	Common Buttonbush	3-5 ft	0.5"	20%

Salix sericea (livestake)	Silky Willow	3-5 ft	0.5"	20%
Physocarpos opulifolius	Ninebark	3-5 ft	0.5"	20%
Alnus serrulata	Tag Alder	3-5 ft	0.5"	20%

Table 14f. Streambank Planting Zone Herbaceous Plugs Plant List

Species	Common Name	Spacing	Percentage
Juncus effusus	Common Rush	4 ft	40%
Carex alata	Broadwing Sedge	4 ft	40%
Panicum virgatum	Switchgrass	4 ft	20%

Table 14g. Permanent Seed Mix

Approved Date	Species Name	Common Name	Stratum	Density (lbs/acre)
All Year	*Schizachyrium scoparium*	Little Bluestem	Herb	3.0
All Year	*Panicum virgatum*	Swithgrass	Herb	3.0
All Year	*Rudbeckia hirta*	Blackeyed Susan	Herb	3.0
All Year	*Carex vulpinoidea*	Fox Sedge	Herb	3.0
All Year	*Panicum clandestinum*	Deertongue	Herb	3.0
All Year	*Elymus virginicus*	Virginia Wild Rye	Herb	3.0
All Year	*Asclepias syrica*	Common Milkweed	Herb	0.8
All Year	*Lobelia cardinalis* **L.**	Cardinal Flower	Herb	0.2
All Year	*Eupatorium perfoliatum*	Boneset	Herb	1.0

10.0 Maintenance Plan

The site shall be monitored on a regular basis by Wildlands' staff 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 items listed in Table 15.

Table 15: Maintenance Plan

Component/Feature	Maintenance through project close-out
Stream	Routine channel maintenance and repair activities may include minor repairs to in-stream structures to prevent piping of flows, securing loose coir matting, and supplemental installations of live stakes and other target vegetation along the channel. Areas where storm water and floodplain flows intercept the channel may also require maintenance to prevent bank failures and head-cutting.
Wetlands	Routine site walks will be conducted to identify and document potential areas of concern, such as, but not limited to areas of low stem density or poor plant vigor, invasive species, encroachments, and livestock access. Maintenance will follow procedures as described below under the vegetation and site boundary components.
Vegetation	Vegetation shall be maintained to ensure the health and vigor of the targeted communities. 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.

Component/Feature	Maintenance through project close-out
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.
Ford and Culvert Crossings	Ford crossings within the site may be maintained only as allowed by Conservation Easement or existing easement, deed restrictions, rights of way, or corridor agreements.
Beaver/Wildlife Management	If beaver dams are observed on site, Wildlands will remove the dams and attempt to remove the beavers from the site. If wildlife herbivory becomes a problem for the plantings, Wildlands will take measures to manage wildlife on the site.

11.0 Performance Standards

The stream and wetland performance criteria for the project site will follow approved performance criteria presented in the DMS Mitigation Plan Template (version 2.3, 12/18/2014), the Annual Monitoring and Closeout Reporting Template (February 2014), and the Stream Mitigation Guidelines issued in April 2003 by the USACE and NCDWQ. Semi-annual site visits will be conducted to assess the condition of the finished project. The stream restoration and enhancement reaches and wetland re-establishment and rehabilitation zones of the project will be assigned specific performance criteria components for stream geomorphology, hydrology, and vegetation. Performance criteria will be evaluated throughout the (up to) seven-year post-construction monitoring. If all performance criteria have been successfully met and at least two bankfull events and at least two other geomorphically significant events have occurred during separate years, Wildlands may propose to terminate stream and/or vegetation monitoring after five years. Table 16 summarizes the performance standards for each project goal. Further explanation of certain performance criteria components is necessary and is included below in this section. The monitoring program designed to verify that performance standards are met is described in Section 12.

Table 16: Summary of Performance Standards

Goal	Objective	Performance Standard	Monitoring Approach
Reduce pollutant inputs to streams including fecal coliform, nitrogen, and phosphorous.	Exclude cattle from streams and buffers by installing fencing around conservation easements adjacent to cattle pastures. Install wells and drinkers to provide alternative water sources for cattle.	Fencing remains intact throughout the monitoring period and no signs of livestock access to streams or wetlands are observed	Visual assessment
Reduce inputs of sediment into streams from eroding stream banks.	Reconstruct stream channels with stable dimensions. Add bank revetments and in-stream structures to protect restored/enhanced streams.	Riffle cross sections will remain stable over time (note description of stability in Section 11.1.1)	Visual assessment and surveying of riffle cross sections

Goal	Objective	Performance Standard	Monitoring Approach
Return a network of streams to a stable form that is capable of supporting hydrologic, biologic, and water quality functions.	Construct stream channels that will maintain a stable pattern and profile considering the hydrologic and sediment inputs to the system, the landscape setting, and the watershed conditions.	Stream profile and pattern must remain stable (note description of stability in Section 11.1.2)	Visual assessment. Surveying of longitudinal profiles and/or planview pattern if visual assessment indicates potential instability
Improve aquatic communities in project streams and provide improved habitat for trout migrating from Little River into Vile Creek. *Note: Presence of aquatic organisms and trout will not be tied to project success criteria.*	Install habitat features such as constructed riffles, cover logs, and brush toes into restored/enhanced streams. Add woody materials to channel beds. Construct pools of varying depth.	Habitat features such as constructed riffles, cover logs, and other habitat features described in Section 9.3.1 will remain intact	Visual assessment
Raise local groundwater elevations and allow for more frequent overbank flows to provide a source of hydration for floodplain wetlands. Reduce shear stress on channels during larger flow events.	Reconstruct stream channels with appropriate bankfull dimensions and depth relative to the existing floodplain.	Two bankfull or greater flow events will be documented during the monitoring period	Crest gauges and continuous stage recorders
Restore wetland hydrology, soils, and plant communities.	Restore riparian wetlands by raising stream beds, plugging existing ditches, removing fill material over relict hydric soils, and planting native wetland species.	Free groundwater surface within 12 inches of the ground surface for 8.5 % of the growing season for wetland areas other than bogs. *Note: Bog hydrologic performance standard and vegetation performance standard described below.*	Groundwater monitoring gauges
Improve and expand Southern Appalachian bog habitat to support bog species such as bog turtles. *Note: Presence of bog turtles will not be tied*	Widen low lying ditched areas that represent bog conditions.	Free groundwater surface within 12 inches of the ground surface for 12% of the growing season for bog areas.	Groundwater monitoring gauges

Goal	Objective	Performance Standard	Monitoring Approach
to project success criteria.			
Create and improve riparian and wetland habitats by planting native vegetation. Provide a canopy to shade streams and reduce thermal loadings. Create a source of woody inputs for streams. Reduce flood flow velocities on floodplain and improve long-term lateral stability of streams. Improve bog habitat by planting herbaceous wetland plants.	Plant native tree and shrub species in riparian zone and wetland areas other than bog areas. Bog areas will be planted with herbaceous species.	Trees: Survival of 210 planted stems per acre at MY-7. Survival of at least 320 planted stems at MY-3 and at least 260 stems per acre at MY-5. Shrubs: 160 surviving plants at year 3, 130 at year 5, and 105 at year 7. Herbaceous: 80% coverage of the vegetation plots with planted or volunteer vegetation at year 7.	Vegetation plot monitoring
Ensure that development and agricultural uses that would damage the site or reduce the benefits of project are prevented.	Establish conservation easements on the site.	Record and close conservation easement prior to implementation	None

11.1 Streams

11.1.1 Dimension

Riffle cross sections on the restoration and Enhancement I reaches should be stable and should show little change in bankfull area, maximum depth ratio, and width-to-depth ratio over time after geomorphically significant flow events (defined in Section 11.1.4). Per DMS guidance, bank height ratios shall not exceed 1.2 and entrenchment ratios shall be at least 2.2 (C stream type reaches only) for restored channels to be considered stable. All riffle cross sections should fall within the parameters defined for channels of the appropriate stream type. If any changes do occur, these changes will be evaluated to assess whether the stream channel is showing signs of instability. Changes in the channel that indicate a movement toward stability or enhanced habitat include a decrease in the width-to-depth ratio in meandering channels or an increase in pool depth. Remedial action would not be taken if channel changes indicate a movement toward stability.

11.1.2 Pattern and Profile

Restoration and Enhancement I reaches must remain vertically stable throughout the monitoring period with little indication of downcutting or significant aggradation. Deposition of sediments at certain

locations (such as the inside of meander bends) is expected and acceptable. Changes in pool depth are not an indication of vertical instability. Restoration and Enhancement I reaches must remain laterally stable and major changes planform pattern dimensions and sinuosity should not occur. However, migration of meanders on alluvial channels is not an indication of instability if cross -sectional dimensions continue to meet the requirements described in Section 11.1.1.

11.1.3 Substrate

Substrate materials in the restoration reaches should indicate a progression towards or the maintenance of coarser materials in the riffle features and smaller particles in the pool features.

11.1.4 Hydrology

Two bankfull flow events, occurring in separate years, must be documented on the restoration and enhancement reaches within the seven-year monitoring period. In addition, two other geomorphically significant events must be documented. For these purposes, a geomorphically significant event is a flow event that is between 60% of the bankfull flow and the bankfull flow. The confirmation that such an event has occurred will be based on measurements of stage converted to discharge with a stage-discharge relation developed with a hydraulic model. Stream monitoring will continue until success criteria in the form of two bankfull events in separate years and two additional geomorphically significant events have been documented.

11.2 Vegetation

The final vegetative success criteria for planted trees will be the survival of 210 planted stems per acre in the riparian corridor at the end of the required monitoring period (year seven). The interim measure of vegetative success for the trees on the site will be the survival of at least 320 planted stems per acre at the end of the third monitoring year and at least 260 stems per acre at the end of the fifth year of monitoring. Planted trees must average 10 feet in height in each plot at the end of the seventh year of monitoring. The success criteria for shrubs will be 160 surviving plants at year 3, 130 at year 5, and 105 at year 7. There will be no height criteria for shrubs. The success criteria for herbaceous plants will be 80% coverage of the vegetation plots with planted or volunteer vegetation at year 7. If these performance standards are met by year five and stem density is trending towards success (i.e., no less than 260 five-year-old trees/acre, no less than 130 five-year-old shrubs/acre, and 80% coverage of herbaceous veg plots), monitoring of vegetation on the site may be terminated with written approval by the USACE in consultation with the NC Interagency Review Team. The extent of invasive species coverage will also be monitored and controlled as necessary throughout the required monitoring period (year five or seven).

11.3 Wetlands

The final performance standard for wetland hydrology will be a free groundwater surface within 12 inches of the ground surface for 8.5 % of the growing season for wetland for all wetland zones other than bog areas which is measured on consecutive days under typical precipitation conditions. The final performance stand for bog areas will be a free groundwater surface within 12 inches of the ground surface for 12 % of the growing season. If a particular gauge does not meet the performance standard for a given monitoring year, rainfall patterns will be analyzed and the hydrograph will be compared to that of the reference wetlands to assess whether atypical weather conditions occurred during the monitoring period. A soil temperature probe will be installed onsite to collect additional information to define the start and end of the growing season.

12.0 Monitoring Plan

Annual monitoring data will be reported using the DMS Annual Monitoring and Closeout Reporting Template (February 2014). The monitoring report shall provide project data chronology that will facilitate an understanding of project status and trends, population of DMS databases for analysis, research purposes, and assist in decision making regarding close-out. The monitoring period will extend seven years beyond completion of construction or until performance criteria have been met. Components of the monitoring plan are summarized in Table 17. Project monitoring locations are shown on Figure 13. All surveys will be tied to grid.

12.1 Site Specific Monitoring

Using the DMS Baseline Monitoring Plan Template (February 2014), a baseline monitoring document and as-built record drawings of the project will be developed within 60 days of the planting completion and monitoring installation on the restored site. Monitoring reports will be prepared in the fall of each year of monitoring and submitted to DMS. These reports will be based on the DMS Annual Monitoring and Closeout Report Template (February 2014). The monitoring period will extend seven years beyond completion of construction or until performance criteria have been met per the criteria stated in Section 11.

Table 17. Monitoring Plan Components

Parameter	Monitoring Feature	Quantity/ Length by Reach											Frequency	Notes
		Vile R1	Vile R2	Vile R3	UT1 R1	UT1 R2	UT1B	UT1C	UT2	UT3	Little River	RW		
Dimension	Riffle Cross Sections	1	2	n/a	2	1	n/a	n/a	n/a	n/a	n/a	n/a	Years 1, 2, 3, 5 and 7	1
	Pool Cross Sections	1	1	n/a	1	1	n/a	n/a	n/a	n/a	n/a	n/a		
Pattern	Pattern	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	Annual	2
Profile	Longitudinal Profile	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	Annual	
Substrate	Reach wide (RW), Riffle (RF) 100 pebble count	1 RW, 1 RF	1 RW, 2 RF	n/a	1 RW, 2 RF	1 RW, 1 RF	n/a	n/a	n/a	n/a	n/a	n/a	Annual	
Hydrology	Crest Gage with Continuous Stage Recorded	1			1		n/a	n/a	n/a	n/a	n/a	n/a	Annual	3
Hydrology	Ground-water Gages	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	10	Quarterly	
Vegetation – trees and shrubs	CVS Level 2	16											Years 1, 2, 3, 5 and 7	4
Vegetation – herbaceous	Visual	8											Years 1, 2, 3, 5 and 7	
Visual Assessment		Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Semi-Annual	
Exotic and nuisance vegetation													Semi-Annual	5
Project Boundary													Semi-annual	6
Reference Photos	Photographs	33											Annual	7

1. Cross-sections will be permanently marked with rebar to establish location. Surveys will include points measured at all breaks in slope, including top of bank, bankfull, edge of water, and thalweg.
2. Pattern and profile will be assessed visually during bi-annual site visits.
3. Device will be inspected quarterly or semi-annually, evidence of bankfull will be documented with a photo.
4. Vegetation monitoring will follow CVS protocols.
5. Locations of exotic and nuisance vegetation will be mapped.
6. Locations of fence damage, vegetation damage, boundary encroachments, etc. will be mapped.
7. Permanent markers will be established so that the same locations and view directions on the site are monitored.

12.2 Monitoring Plan Details

12.2.1 Vegetation

Vegetation monitoring plots will be installed and evaluated throughout the easement to measure the survival of the planted trees, shrubs, and herbaceous vegetation. The number of monitoring quadrants required is based on the DMS monitoring guidance documents. The size of individual quadrants will be 100 square meters (10m x 10m) for woody tree species and shrubs. Tree and shrub assessments will be conducted following the 2006 Carolina Vegetation Survey (CVS) Level 2 Protocol for Recording Vegetation. The size of the herbaceous vegetation plots will be twenty square meters (5m x 4m). The assessment will be conducted by visually estimating the percent coverage of the herbaceous plots.

The initial baseline survey will be conducted within 21 days from completion of site planting and used for subsequent monitoring year comparisons. The first annual vegetation monitoring activities will commence at the end of the first growing season, during the month of September. The restoration and enhancement sites will then be evaluated each subsequent year between June 1 and September 31. Species composition, density, and survival rates will be evaluated on an annual basis by plot and for the entire site. Individual plot data will be provided and will include height, density, vigor, damage (if any), and survival. Planted woody stems will be marked annually as needed and given a coordinate, based off of a known origin, so they can be found in succeeding monitoring years. Mortality will be determined from the difference between the previous year's living planted stems and the current year's living planted stems.

12.2.2 Cross Sections

In order to assess channel dimension performance, permanent cross sections will be installed per DMS Stream and Wetland Monitoring Guidelines (February 2014). Cross section surveys will include points measured at all breaks in slope, including top of bank, bankfull, edge of water, and thalweg. Cross section surveys will be conducted in monitoring years one, three, five, and seven. In addition, at least two sets of cross-sectional surveys will be conducted within each design reach after a geomorphically significant discharge event as described in the DMS Stream and Wetland Monitoring Guidelines (February 2014). These measurements may occur at any time during the seven year monitoring period.

12.2.3 Hydrology

The occurrence of bankfull events and geomorphically significant events will be documented throughout the monitoring period. Streamflow stage will be monitored using a stage monitoring station which will consist of a crest gauge and a continuous stage recorder at the same location. The stage monitoring stations will be installed within a riffle cross-section of the restored/enhanced channels in surveyed riffle cross-sections. The stage data will be downloaded at each site visit to determine if a bankfull event has occurred. Crest gauges will be read at each visit as well to verify the continuous stage data. In addition, time lapse photographs will be taken with a mounted trail camera at an interval of one hour between photos. The camera will be mounted on a metal or wooden post installed on the floodplain adjacent to a riffle cross section. Photographs taken with a handheld camera will be used to document the occurrence of debris lines and sediment deposition observed during field visits.

12.2.4 Visual Assessments

Visual assessments will be performed along all stream and wetland areas on a semi-annual basis during the seven year monitoring period. Problem areas will be noted such as channel instability (i.e. lateral and/or vertical instability, in-stream structure or habitat feature failure/instability, and/or headcuts), vegetation health (i.e. low stem density, vegetation mortality, invasive species or encroachment), or

problems with fencing/livestock access. Areas of concern will be mapped, photographed, and accompanied by a written description in the annual monitoring report. Problem areas with be re-evaluated during each subsequent visual assessment. Should remedial actions be required, recommendations will be provided in the annual monitoring report.

12.2.5 Photo Documentation

Photographs will be taken once a year with a handheld camera to visually document stability throughout the monitoring period. Permanent markers will be established and located with GPS equipment so that the same locations and view directions on the site are photographed each year. Photos will be used to monitor restoration and enhancement stream reaches as well as vegetation plots and wetland areas and demonstrate that performance criteria are being met.

Longitudinal reference photos will be established at regular intervals along the channel by taking a photo looking upstream and downstream (usually at tail of riffle feature). Cross-sectional photos will be taken of each permanent cross-section looking upstream and downstream. Reference photos will also be taken for each of the vegetation plots and within wetland areas. Representative digital photos of each permanent photo point, cross-section and vegetation plot will be taken on the same day of the stream and vegetation assessments are conducted. The photographer will make every effort to consistently maintain the same area in each photo over time.

13.0 Long-Term Management Plan

The design approach for the Vile Creek project is intended to promote a natural, self-sustaining stream and wetland system. The stream and majority of the wetlands should not need long-term management. However, the bog areas may need long-term management to maintain the open, early-successional habitat needed by bog turtles. Groups other than Wildlands and NCDEQ will be responsible for any bog maintenance performed. Groups with experience in this type of habitat management that may be able to help include NCWRC, USFWS, and the Bog Learning Network. Any third party activities to maintain bog area that may affect success criteria prior to regulatory close out will not result in credit loss at closeout. No other long-term management activities are anticipated for this site. The mitigation site will remain in private ownership and will be protected with a conservation easement based on the Full Delivery Conservation Easement model (September 2014). The State will serve as the Grantee and will be responsible for inspecting and enforcing the CE following approval of the Final Mitigation Plan.

Upon approval for close-out by the Interagency Review Team (IRT), the Site will be transferred to the NCDEQ Division of Natural Resource Planning and Conservation's Stewardship Program. This program currently houses DMS stewardship endowments within the non-reverting, interest-bearing Conservation Lands Stewardship Endowment Account. The use of funds from the Endowment Account is governed by North Carolina General Statute GS 113A-232(d)(3). Interest gained by the endowment fund may be used only for the purpose of stewardship, monitoring, stewardship administration, and land transaction costs, if applicable. The NCDEQ Stewardship Program intends to manage the account as a non-wasting endowment. Only interest generated from the endowment funds will be used to steward the compensatory mitigation sites. Interest funds not used for those purposes will be re-invested in the Endowment Account to offset losses due to inflation.

14.0 Adaptive Management Plan

Upon completion of site construction, DMS will implement the post-construction monitoring protocols previously defined in this document. Project maintenance will be performed as described previously in

this document. If, during the course of annual monitoring it is determined the Site's ability to achieve site performance standards are jeopardized, DMS will notify the USACE of the need to develop a Plan of Corrective Action. The Plan of Corrective Action may be prepared using in-house technical staff or may require engineering and consulting services. Once the Corrective Action Plan is prepared and finalized DMS will:

- Notify the USACE;
- Collaborate with the USACE and the IRT to finalize and secure authorization for the proposed remedial actions;
- Revise performance standards, maintenance requirements, and monitoring requirements as necessary and/or required by the USACE;
- Obtain any permits necessary to implement and complete the identified remedial actions; and
- Implement the Corrective Action Plan and provide the USACE with record drawings that depict the extent and nature of the work performed.

15.0 Financial Assurances

Pursuant to Section IV H and Appendix III of the Division of Mitigation Service's In-Lieu Fee Instrument dated July 28, 2010, the North Carolina Department of Environmental Quality has provided the US Army Corps of Engineers Wilmington District with a formal commitment to fund projects to satisfy mitigation requirements assumed by DMS. This commitment provides financial assurance for all mitigation projects implemented by the program.

16.0 References

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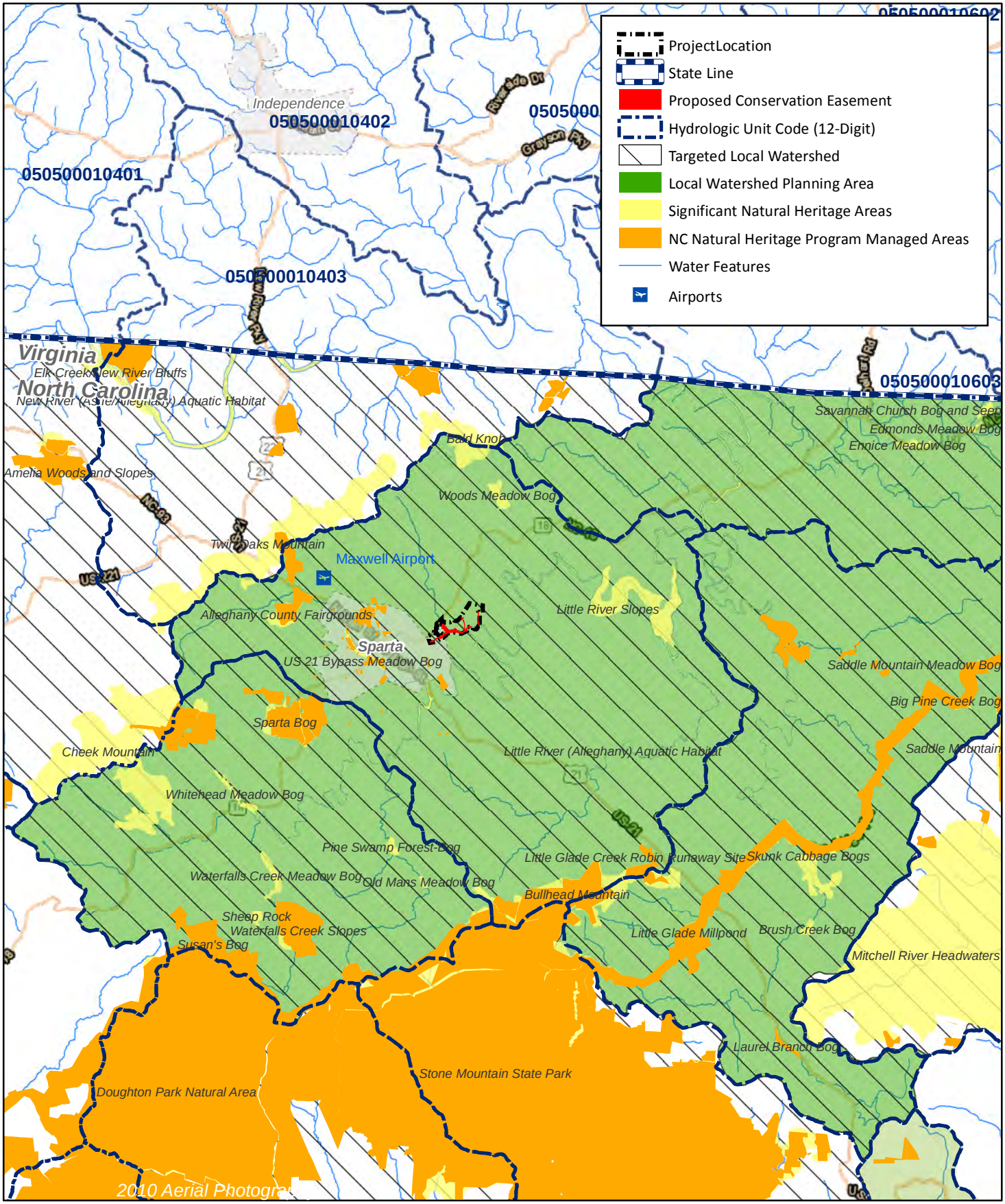
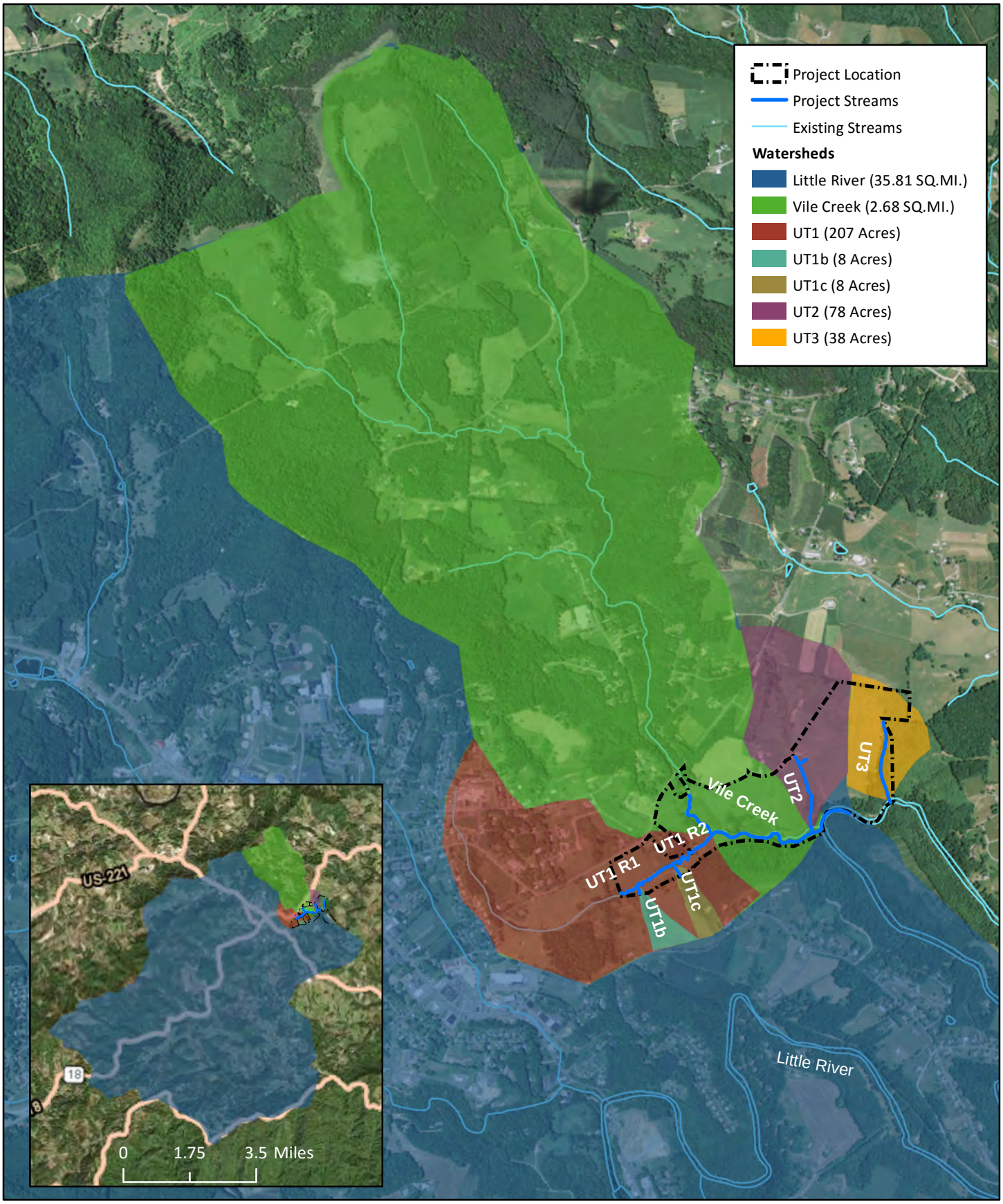
FIGURES



WILDLANDS ENGINEERING

Figure 1 Vicinity Map
Vile Creek Mitigation Site
New River Basin 05050001

Alleghany County, NC



WILDLANDS ENGINEERING

0 1,000 2,000 Feet

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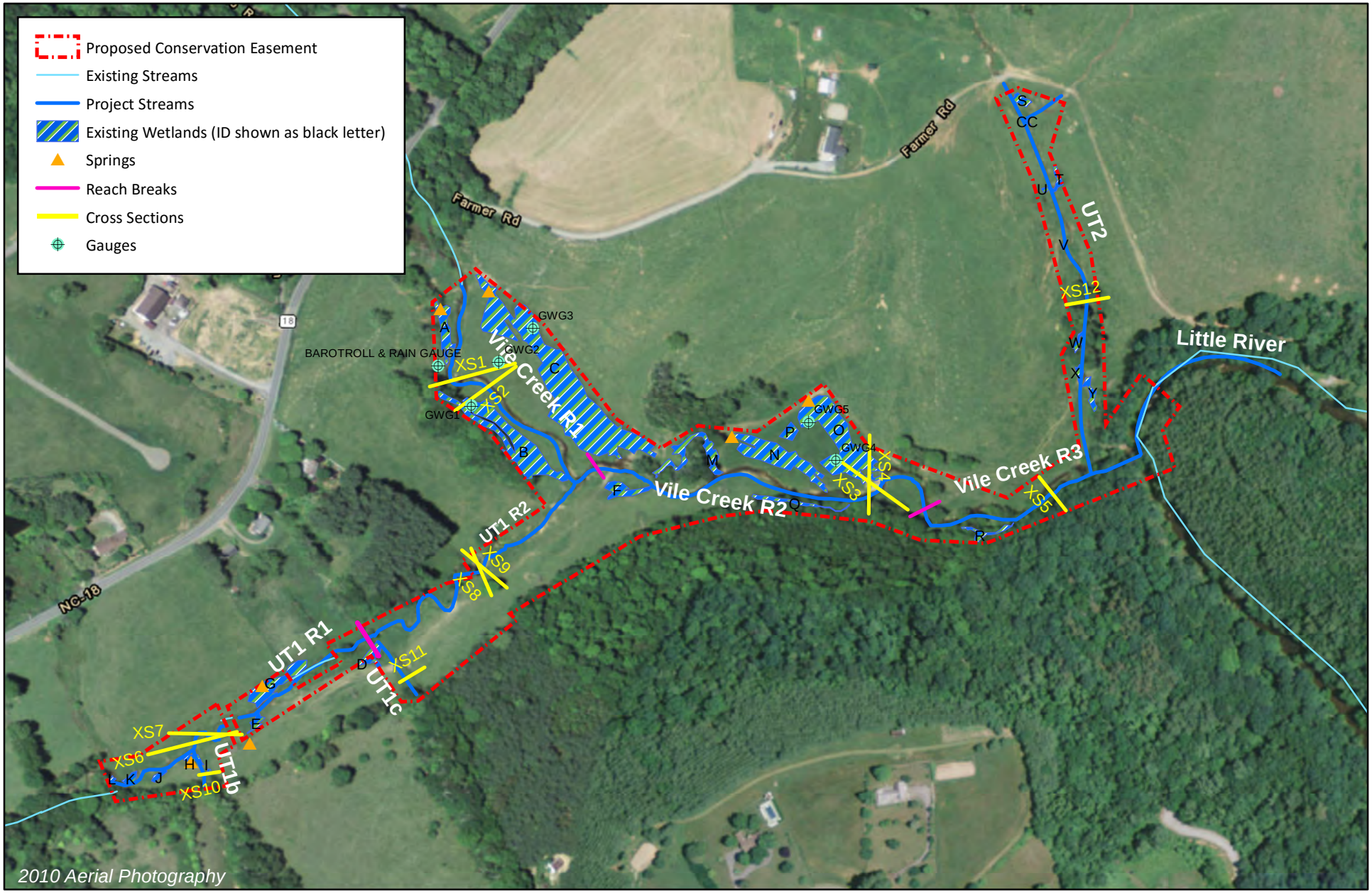
Figure 2 Project Watersheds
Vile Creek Mitigation Site
New River Basin 05050001

Alleghany County, NC



WILDLANDS ENGINEERING

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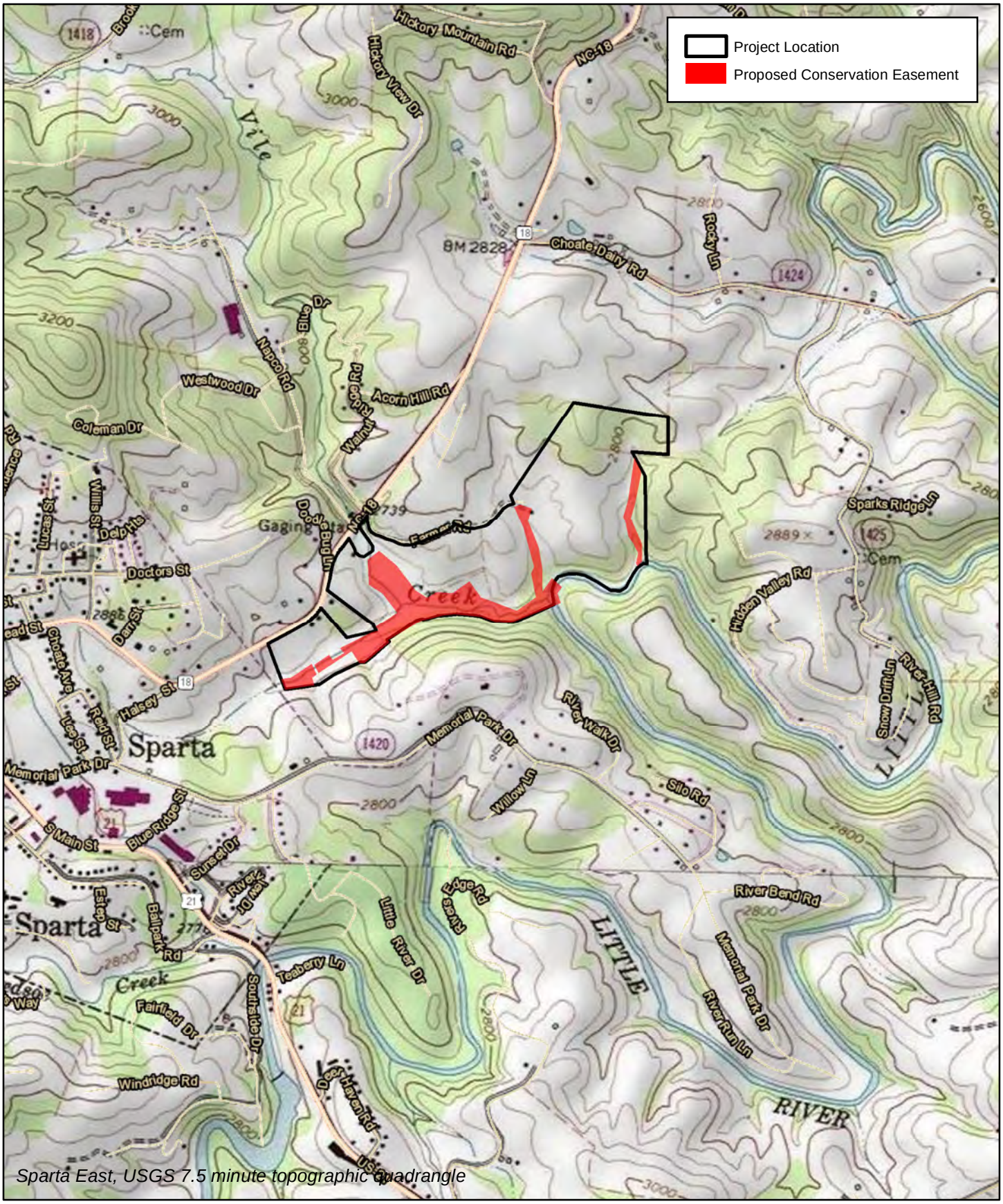
Figure 3 Existing Site Conditions
Vile Creek Mitigation Site
New River Basin 05050001

Alleghany County, NC



Sparta East, USGS 7.5 minute topographic quadrangle

WILDLANDS ENGINEERING

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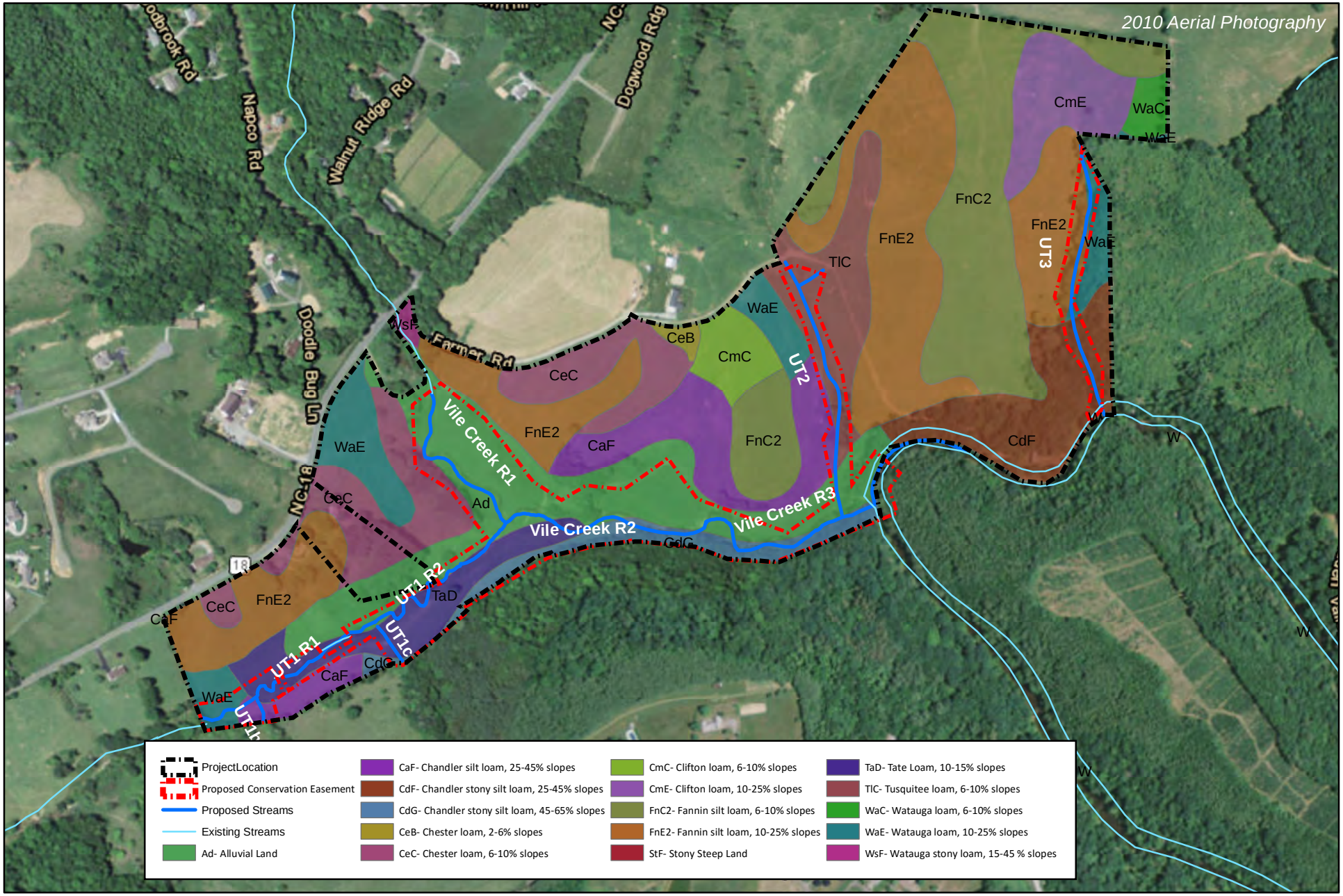
Figure 4 Topographic Map
Vile Creek Mitigation Site
New River Basin 05050001

Alleghany County, NC



WILDLANDS ENGINEERING

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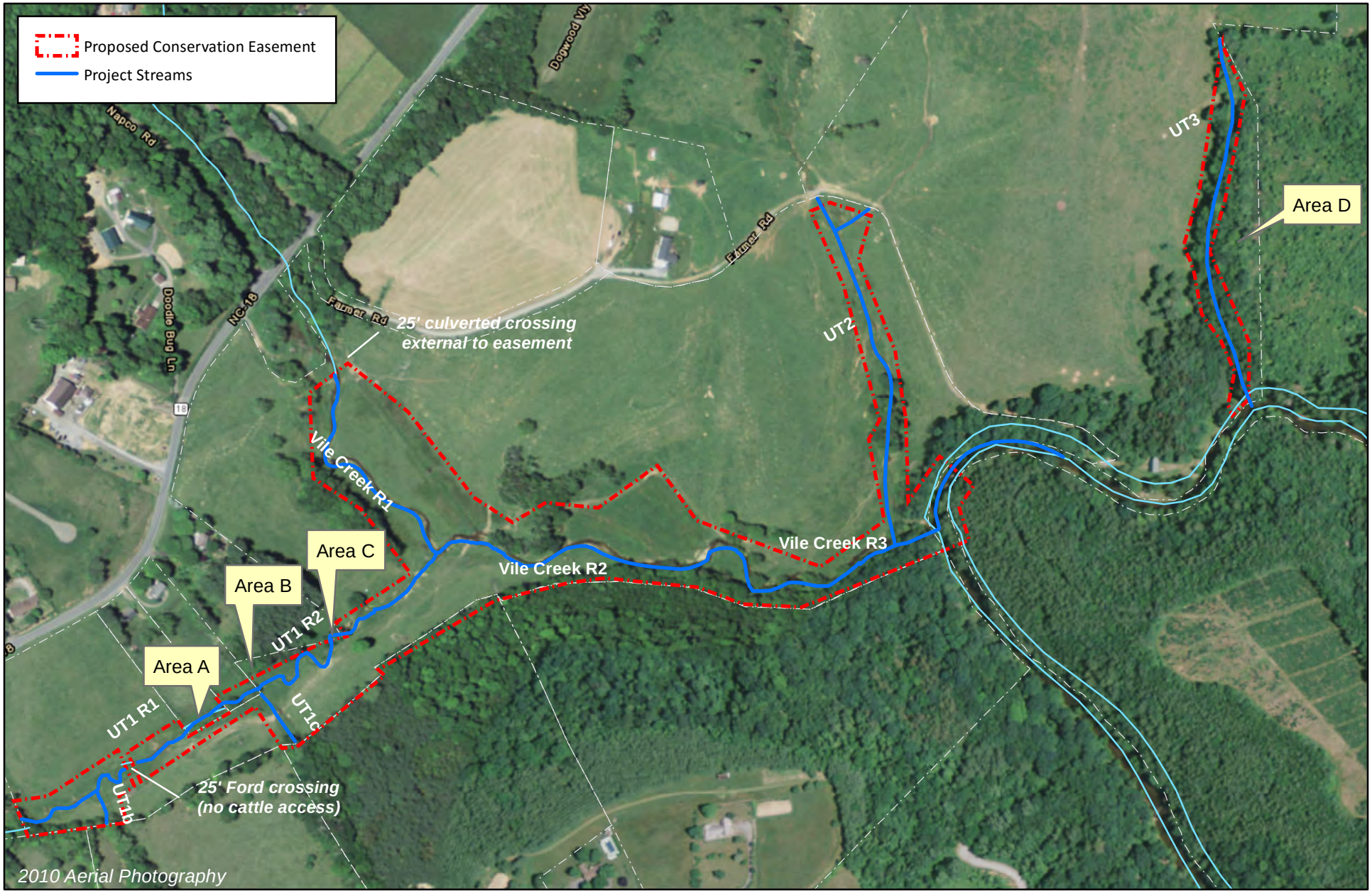
Figure 5 Soils Map
Vile Creek Mitigation Site
New River Basin 05050001

Alleghany County, NC



WILDLANDS ENGINEERING

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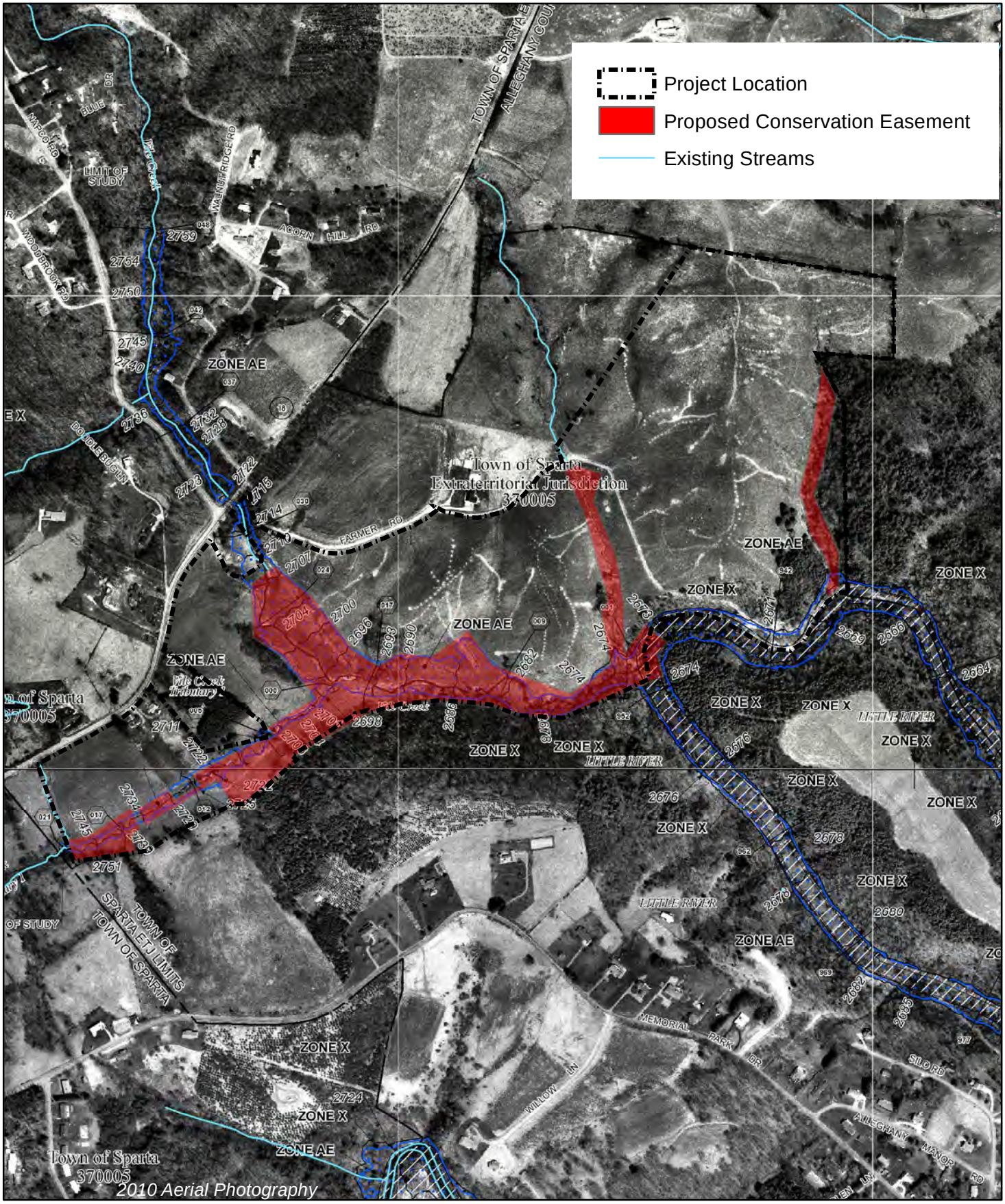
Figure 6 Property Map
Vile Creek Mitigation Site
New River Basin 05050001

Alleghany County, NC



WILDLANDS ENGINEERING

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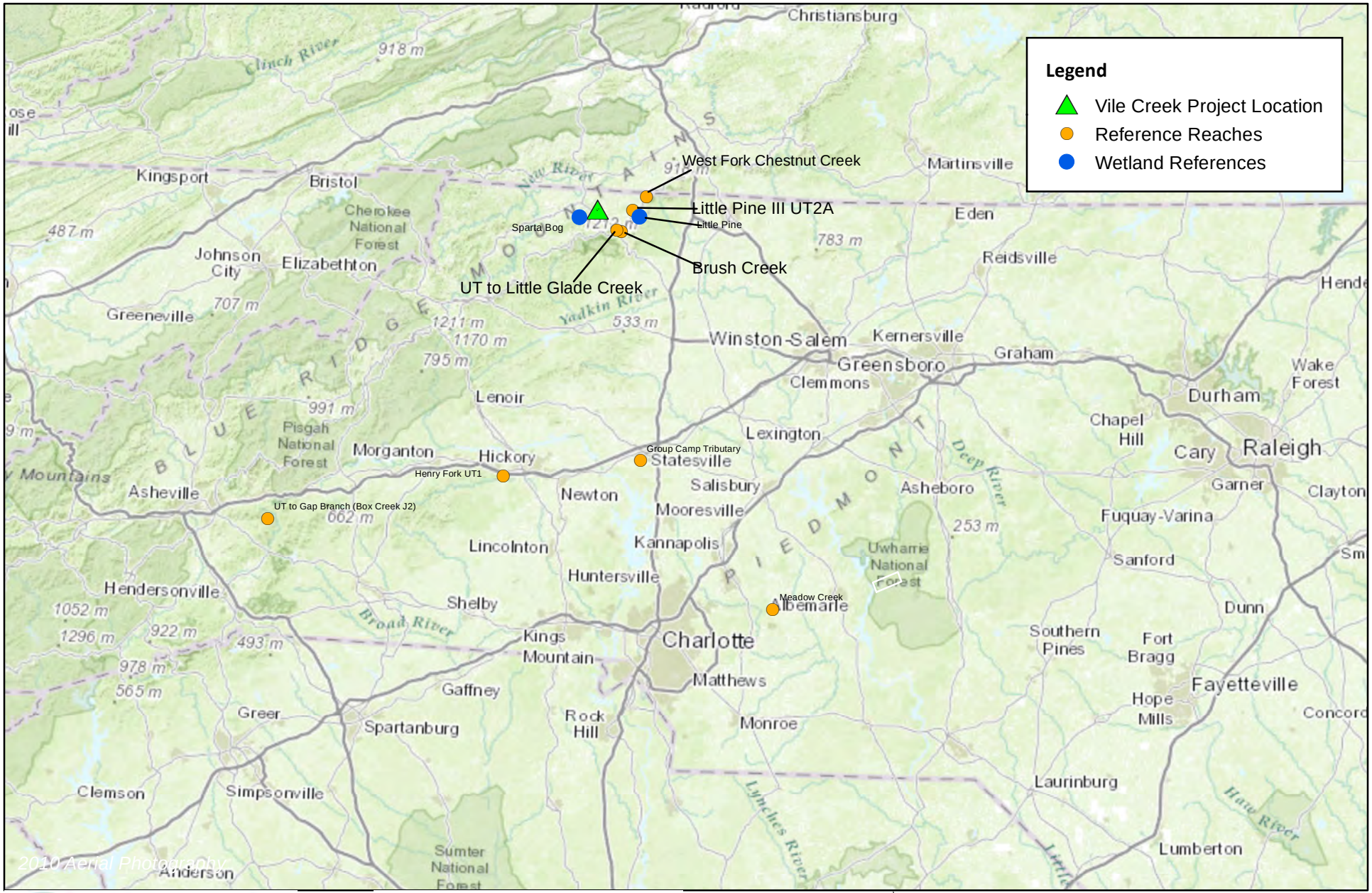
Figure 7 FEMA Flood Map
Vile Creek Mitigation Site
New River Basin 05050001

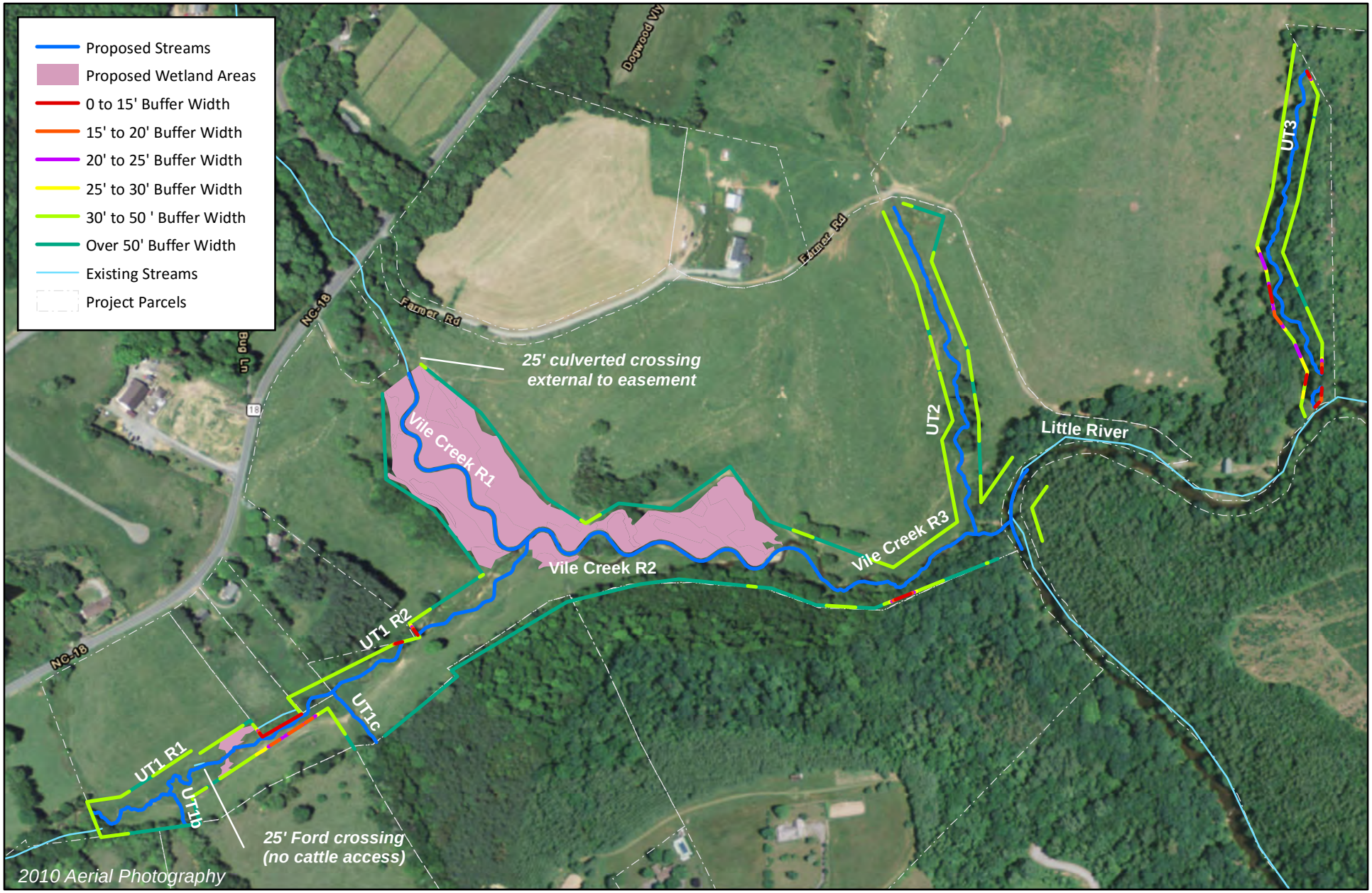
Alleghany County, NC



WILDLANDS ENGINEERING

Figure 8 Reference Site Location Map
Vile Creek Mitigation Site
New River Basin 05050001

Alleghany County, NC



WILDLANDS ENGINEERING

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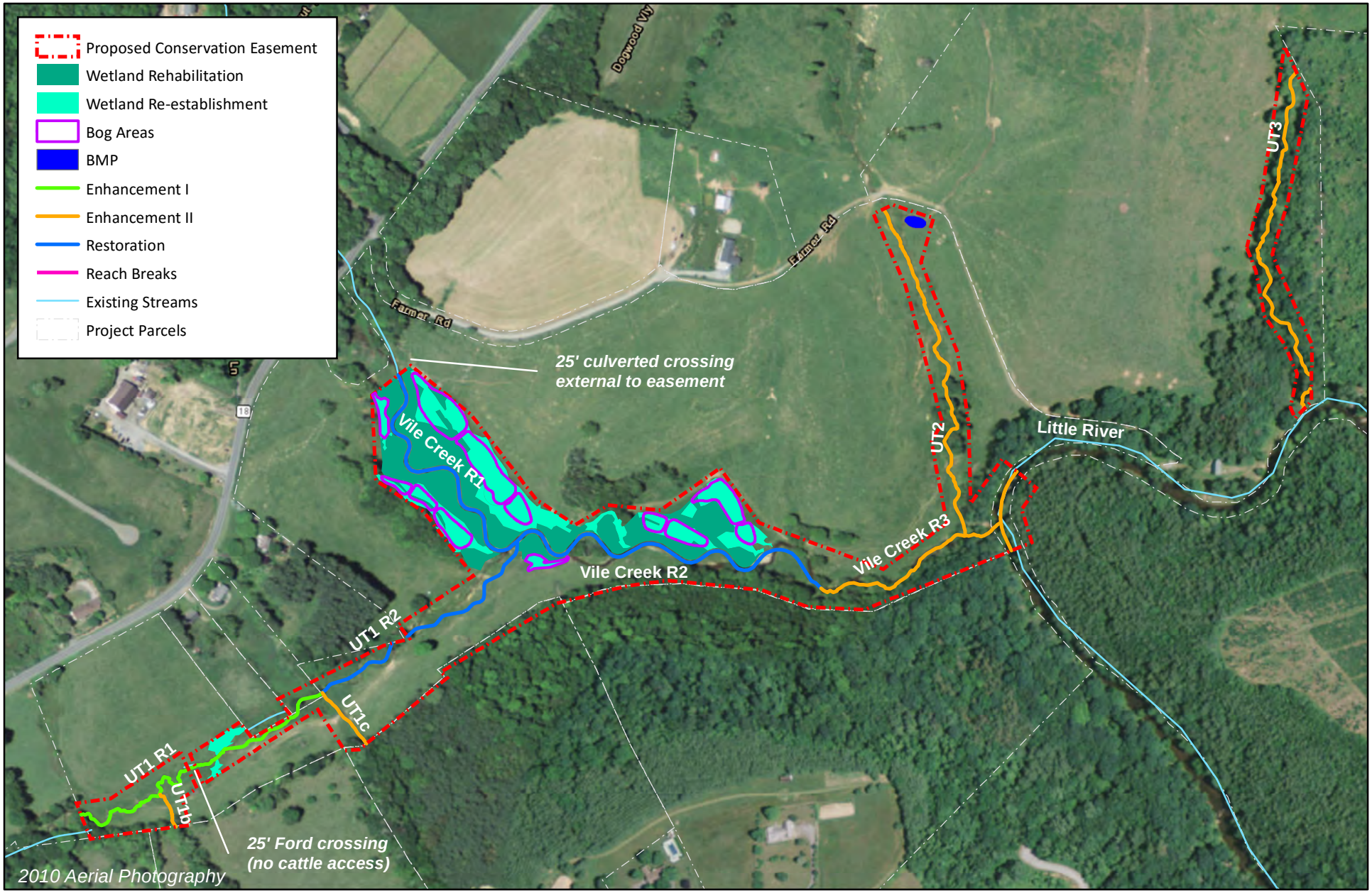
Figure 9 Buffer Width Map
Vile Creek Mitigation Site
New River Basin 05050001

Alleghany County, NC



WILDLANDS ENGINEERING

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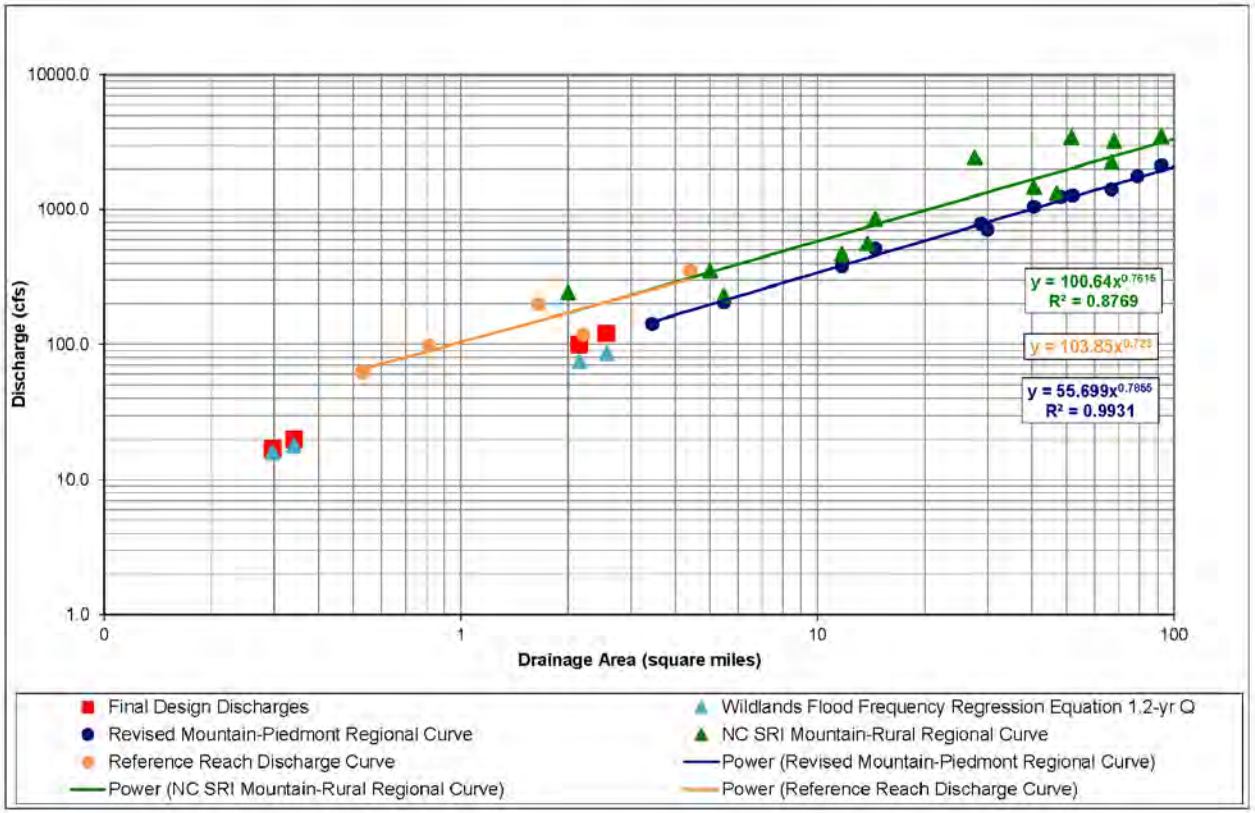
Figure 10 Proposed Design Overview
Vile Creek Mitigation Site
New River Basin 05050001

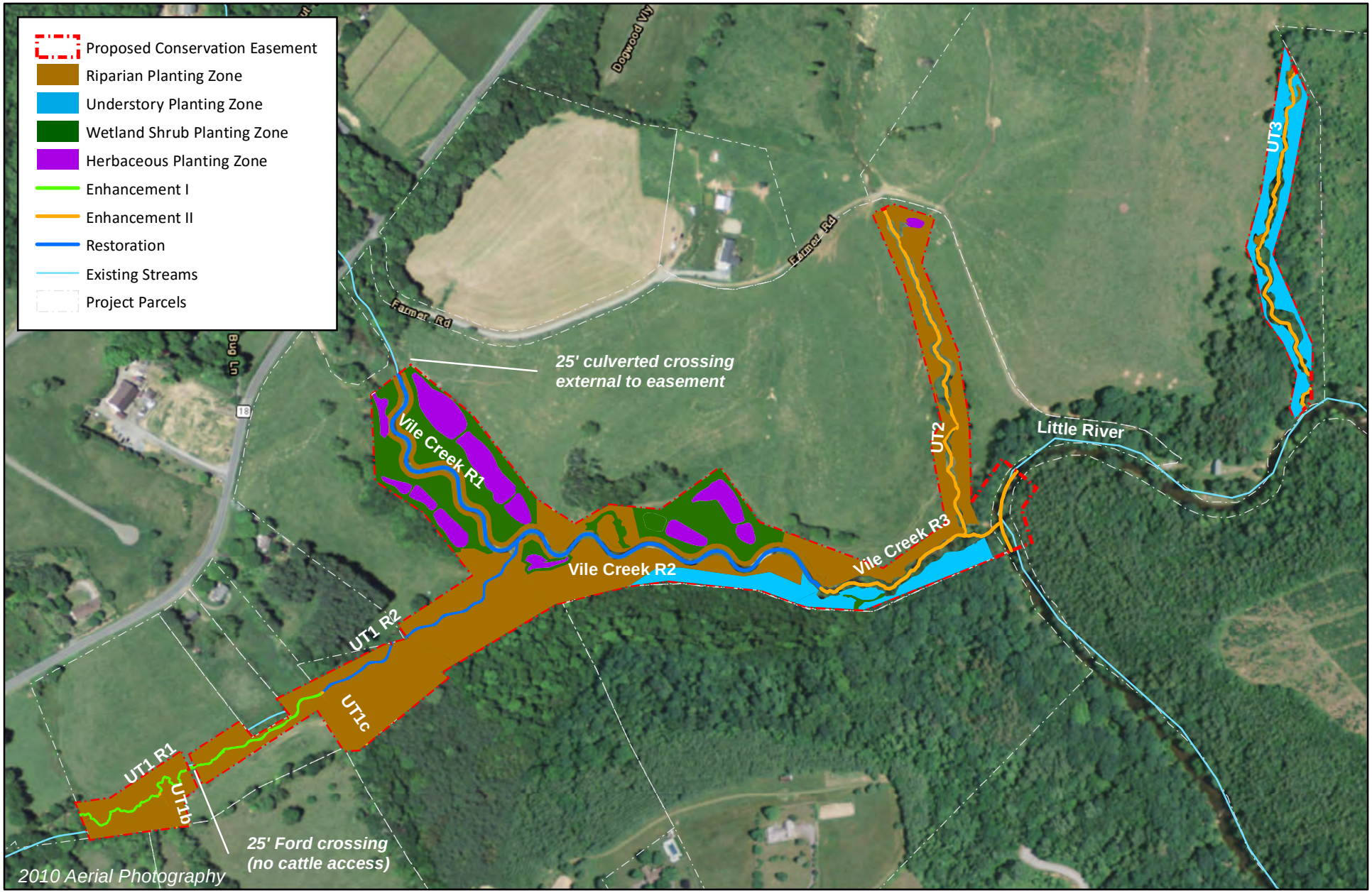
Alleghany County, NC



WILDLANDS ENGINEERING

Figure 11 Discharge Analysis Plot
Vile Creek Mitigation Site
New River Basin 05050001

Alleghany County, NC



WILDLANDS ENGINEERING

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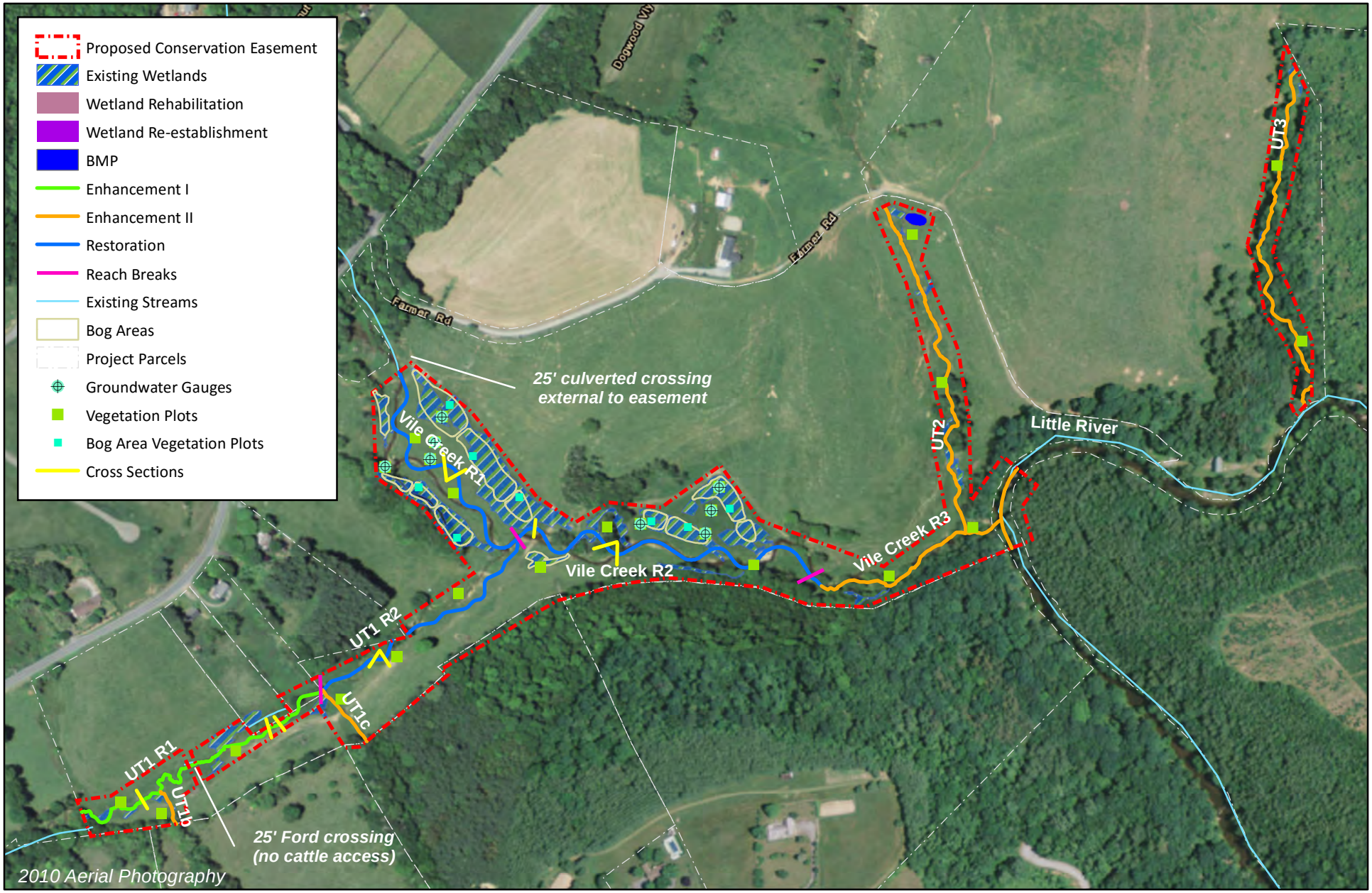
Figure 12 Proposed Planting Overview
Vile Creek Mitigation Site
New River Basin 05050001

Alleghany County, NC



WILDLANDS ENGINEERING

0 225 450 Feet

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Figure 13 Proposed Monitoring Components
Vile Creek Mitigation Site
New River Basin 05050001

Alleghany County, NC

APPENDICES

APPENDIX 1
SITE PROTECTION INSTRUMENT

BK:00376 PG:0406

FILED Jan 04, 2016 02:59:16 pm
BOOK 00376
PAGE 0406 THRU 0416
INST # 00019
EXCISE TAX $563.00

ALLEGHANY COUNTY NC
LIZABETH REEVES ROUPE
REGISTER OF DEEDS

#563.00
Pin #
3081 20 6925

STATE OF NORTH CAROLINA

DEED OF CONSERVATION EASEMENT AND RIGHT OF ACCESS PROVIDED PURSUANT TO FULL DELIVERY MITIGATION CONTRACT

ALLEGHANY COUNTY

SPO File Number:
DMS Project Number: 96582

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

TAX INFORMATION RECORDED
ALLEGHANY TAX COLLECTOR
1/04/16

THIS DEED OF CONSERVATION EASEMENT AND RIGHT OF ACCESS, made this 4 day of January, 2016, by Judy Gambill Crouse and husband Gary Crouse, ("**Grantor**"), whose mailing address is 225 Scenic View Circle, Wytheville, VA 24382, 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 formerly known as the 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 Wildlands Engineering, Inc. and the North Carolina Department of Environment and Natural Resources, to provide stream, wetland and/or buffer mitigation pursuant to the North Carolina Department of Environment and

entered into a Memorandum of Agreement, (MOA) duly executed by all parties in Greensboro, NC on July 22, 2003, which recognizes that the 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' 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 Environment and Natural Resources, 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 Gap Civil Township, Alleghany County, North Carolina (the "**Property**"), and being more particularly described as that certain parcel of land containing approximately 66.87 acres and being conveyed to the Grantor by deed as recorded in **Deed Book 347 at Page** 1445 of the Alleghany 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 Vile Creek.

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:

Conservation Easement Areas A and B containing 1.36 and 20.75 acres respectively as shown on the plats of survey entitled "Final Plat, Conservation Easement for The State of North Carolina Division of Mitigation Services, Vile Creek Stream and Wetland Mitigation Site, DMS Site No. 96582, Current Owner(s) Listed As: Judy Gambill Crouse and Husband Gary Crouse," dated 8/25/2015-09/15/2015 by Nolan R. Carmack, PLS Number 5076 and recorded in the Alleghany County, North Carolina Register of Deeds at **Plat Book** 10 **Pages** 45.

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

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 roads, trails, walkways, or paving in the Conservation Easement Area with the following exception:

Only roads and trails located within the Conservation Easement Area prior to completion of the construction of the restoration project and within crossings shown on the recorded survey plat may be maintained by Grantor, successors or assigns to allow for access to the interior of the Property, and must be repaired and maintained to prevent runoff and degradation to the Conservation Easement Area. Such roads and trails shall be covered with pervious materials such as loose gravel or permanent vegetation in order to minimize runoff and prevent sedimentation.

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 N.C. Division of Mitigation Services, whose mailing address is 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 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.

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

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
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,

IN TESTIMONY WHEREOF, the Grantor has hereunto set his hand and seal, the day and year first above written.

Gary Crouse (SEAL)

Judy G. Crouse (SEAL)

NORTH CAROLINA
COUNTY OF Alleghany

I, Jean R. Osborne, a Notary Public in and for the County and State aforesaid, do hereby certify that ~~Gary Crouse~~ Judy G. Crouse, 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 4 day of January, 2016

Jean R. Osborne
Notary Public

My commission expires:

6-12-2020

JEAN R. OSBORNE
Notary Public
Alleghany County, NC

Exhibit A

A Conservation Easement for The State of North Carolina,
Division of Mitigation Services,
"Vile Creek Stream and Wetland Mitigation Site"
Property of:
Judy Gambill Crouse and Husband, Gary Crouse SPO
DMS SITE ID: 96582

The following conservation easement areas are located off of NC-Highway 18 and Farmer Road in the Gap Civil Township, Alleghany County, North Carolina and being on a portion of that property conveyed to Judy Gambill Crouse & Husband, Gary Crouse through Deed Book 347 Page 1445 of the Alleghany County Register of Deeds and being more particularly described as follows:

Conservation Easement Area "A":

BEGINNING AT A 5/8" REBAR SET WITH A CE CAP (CORNER 1), said rebar being in a common line of Deed Book 347 Page 1445 and Deed Book 98 Page 243 of the Alleghany County Registry, and located

S 59°49'03" W a horizontal ground distance of 4067.24 feet from a 1" iron pipe set in concrete with a Kee cap having North Carolina State Plane Coordinates (2011) of Northing: 1011676.43 feet and Easting:

feet;

Thence leaving the aforesaid common line and with the conservation easement area the following (5) courses and distances:

(1) N 81°45'16" E a distance of 113.22 feet to a 5/8" rebar set with a CE cap (CORNER 2);
(2) N 56°47'45" E a distance of 277.11 feet to a 5/8" rebar set with a CE cap (CORNER 3); said rebar being located N 76°35'29'' W a distance of 31.65 feet from a 5/8" rebar set with a CE cap (CORNER 9);
(3) S 24°24'25" E a distance of 130.54 feet to a 5/8" rebar set with a CE cap (CORNER 4); said rebar being located S 56°47'26'' W a distance of 25.30 feet from a 5/8" rebar set with a CE cap (CORNER 58);
(4) S 56°47'24" W a distance of 59.74 feet to a 5/8" rebar set with a CE cap (CORNER 5);
(5) S 16°44'45" E a distance of 92.02 feet to a 5/8" rebar set with a CE cap (CORNER 6); said rebar being located in a common line of Deed Book 347 Page 1445 and Deed Book 355 Page 696 of the Alleghany County Registry, and located S 82°25'19'' W a distance of 52.30 feet from a 1'' iron pipe set with "Kee" cap; said iron pipe being at a common corner of Deed Book 347 Page 1445 and Deed Book 355 Page 696 of the aforesaid registry;

Thence with the aforesaid common line and continuing with the conservation easement area

S 82°25'19" W a distance of 139.30 feet to a 5/8" rebar set with a CE cap (CORNER 7); said rebar being at a common corner of Deed Book 347 Page 1445, Deed Book 355 Page 696 and Deed Book 62 Page 499 of the Alleghany County Registry;

Thence leaving the aforementioned common line and with the common line of Deed Book 347 Page 1445 and Deed Book 62 Page 499 of the Alleghany County Registry and continuing with the conservation easement area S 81°45'49" W a distance of 191.80 feet to a 1/2'' aluminum spike (CORNER 8), said aluminum spike being at a common corner of Deed Book 347 Page 1445, Deed Book 62 Page 499 and Deed Book 98 Page 243 of the aforesaid registry;

Thence leaving the aforementioned common line and with the common line of Deed Book 347 Page 1445 and Deed Book 98 Page 243 of the Alleghany County Registry and continuing with the conservation easement area N 21°34'23" W a distance of 126.42 feet TO THE TRUE POINT OF BEGINNING.

Being all of that area of land containing a total of 1.36 Acres, being the same more or less.

Conservation Easement Area "B":

BEGINNING AT A 5/8" REBAR SET WITH A CE CAP (CORNER 9), said rebar being located S 59°02'36" W a
horizontal ground distance of 3662.90 feet from a 1" iron pipe set in concrete with a "Kee" cap having North Carolina State Plane Coordinates (2011) of Northing: 1011676.43 feet and Easting: 1384260.04 feet;

Thence with the conservation easement area N 56°47'26" E a distance of 196.16 feet to a 5/8" rebar set with a CE cap (CORNER 10); said rebar being located in a common line of Deed Book 347 Page 1445 and Deed Book 298 Page 1461 of the Alleghany County Registry; said rebar also located S 37°21'24'' E a distance of 456.07 feet from an existing 3/4'' iron pipe, said iron pipe being in the aforesaid common line;

Thence with the aforesaid common line and continuing with conservation easement area the following

(2) courses and distances:

(1) S 37°21'24" E a distance of 66.94 feet to an existing 2" iron rod (CORNER 11);
(2) N 60°06'19" E a distance of 149.58 feet to an existing 1'' iron pipe (CORNER 12); said iron pipe being at a common corner of Deed Book 347 Page 1445, Deed book 298 Page 1461 and Deed Book 348 Page 341 of the Alleghany County Registry and located S 39°51'22'' E a distance of
531.97 feet from a 1'' iron pipe set with "Kee" cap;

Thence leaving the aforementioned common line and with the common line of Deed Book 347 Page 1445 and Deed Book 348 Page 341 of the Alleghany County Registry and continuing with the conservation easement area the following (2) courses and distances:

(1) N 59°02'36" E a distance of 118.66 feet to an existing fence post (CORNER 13);
(2) N 41°46'26" W a distance of 62.27 feet to a 5/8" rebar set with a CE cap (CORNER 14);

Thence leaving the aforementioned common line and continuing with the conservation easement area N 63°07'00" E a distance of 274.81 feet to a 5/8" rebar set with a CE cap (CORNER 15); said rebar being in a common line of Deed Book 347 Page 1445 and Deed Book 158 page 155 of the Alleghany County Registry;

Thence with the aforesaid common line and continuing with the conservation easement area the following (2) courses and distances:

(1) N 75°23'23" E a distance of 86.32 feet to a 5/8" rebar set with a CE cap (CORNER 16);
(2) N 36°20'35" W a distance of 58.42 feet to a 5/8" rebar set with a CE cap (CORNER 17); said rebar being located S 36°20'35'' E a distance of 29.35 feet from an existing 1/2" rebar, said rebar being at a common corner in the aforesaid common line;

Thence leaving the aforesaid common line and continuing with the conservation easement area the following (26) courses and distances:

(1) N 56°47'54" E a distance of 293.68 feet to a 5/8" rebar set with a CE cap (CORNER 18);
(2) N 37°32'20" W a distance of 267.20 feet to a 5/8" rebar set with a CE cap (CORNER 19);
(3) N 57°03'31" W a distance of 188.87 feet to a 5/8" rebar set with a CE cap (CORNER 20);
(4) N 02°30'48" W a distance of 282.34 feet to a 5/8" rebar set with a CE cap (CORNER 21);
(5) N 52°27'09" E a distance of 160.60 feet to a 5/8" rebar set with a CE cap (CORNER 22);
(6) S 50°59'44" E a distance of 255.28 feet to a 5/8" rebar set with a CE cap (CORNER 23);
(7) S 37°33'05" E a distance of 356.08 feet to a 5/8" rebar set with a CE cap (CORNER 24);
(8) S 57°00'55" E a distance of 152.13 feet to a 5/8" rebar set with a CE cap (CORNER 25);
(9) N 59°14'44" E a distance of 128.19 feet to a 5/8" rebar set with a CE cap (CORNER 26);
(10) S 84°13'24" E a distance of 173.10 feet to a 5/8" rebar set with a CE cap (CORNER 27);
(11) N 54°24'37" E a distance of 240.11 feet to a 5/8" rebar set with a CE cap (CORNER 28);
(12) S 35°36'08" E a distance of 223.05 feet to a 5/8" rebar set with a CE cap (CORNER 29);
(13) S 69°32'56" E a distance of 436.49 feet to a 5/8" rebar set with a CE cap (CORNER 30);
(14) N 54°22'32" E a distance of 258.99 feet to a 5/8" rebar set with a CE cap (CORNER 31);
(15) N 10°46'14" W a distance of 274.13 feet to a 5/8" rebar set with a CE cap (CORNER 32);
(16) N 29°08'22" E a distance of 73.76 feet to a 5/8" rebar set with a CE cap (CORNER 33);
(17) N 15°02'50" W a distance of 464.89 feet to a 5/8" rebar set with a CE cap (CORNER 34);
(18) N 24°08'58" W a distance of 262.62 feet to a 5/8" rebar set with a CE cap (CORNER 35);
(19) N 65°51'36" E a distance of 70.92 feet to a 5/8" rebar set with a CE cap (CORNER 36);
(20) S 70°44'09" E a distance of 141.72 feet to a 5/8" rebar set with a CE cap (CORNER 37);
(21) S 15°54'07" W a distance of 149.18 feet to a 5/8" rebar set with a CE cap (CORNER 38);
(22) S 22°10'55" E a distance of 318.89 feet to a 5/8" rebar set with a CE cap (CORNER 39);
(23) S 09°07'04" E a distance of 230.44 feet to a 5/8" rebar set with a CE cap (CORNER 40);
(24) S 01°36'16" E a distance of 273.68 feet to a 5/8" rebar set with a CE cap (CORNER 41);
(25) N 34°53'16" E a distance of 181.09 feet to a 5/8" rebar set with a CE cap (CORNER 42);
(26) S 49°27'29" E a distance of 71.12 feet to a calculated point in the center of the Little River; said calculated point being at a common corner of Deed Book 347 Page 1445 and Deed Book 347 Page 1449 of the Alleghany County Registry;

Thence with the aforesaid common line and continuing with the conservation easement area the following (5) courses and distances:

(1) S 41°10'54" W a distance of 32.31 feet to a calculated point in the Little River;
(2) S 45°33'29" W a distance of 56.04 feet to a calculated point in the Little River;
(3) S 03°59'01" W a distance of 36.05 feet to a calculated point in the Little River;
(4) S 04°31'49" E a distance of 85.32 feet to a calculated point in the Little River;

(5) S 24°39'37" E a distance of 80.26 feet to a calculated point in the Little River, said calculated point being at a common corner of Deed Book 347 Page 1445, Deed Book 93 Page 397 and Deed Book 347 Page 1449 of the Alleghany County Registry;

Thence leaving the aforementioned common line and with the common line of Deed Book 347 Page 1445 and Deed Book 93 Page 397 of the Alleghany County Registry and continuing with the conservation easement area S 68°12'06" W the following (2) distances:

(1) 40.02 feet to a 5/8" rebar set with a CE cap (CORNER 46);
(2) 483.31 feet to an existing fence post (CORNER 47);

Thence continuing with the aforementioned common line and the conservation easement area the following (5) courses and distances:

(1) N 87°05'16" W a distance of 191.40 feet to a 18'' Birch (CORNER 48);
(2) N 69°31'51" W a distance of 158.28 feet to a 30'' Birch (CORNER 49);
(3) N 84°11'53" W a distance of 308.90 feet to a 42'' Red Oak (CORNER 50);
(4) S 82°33'00" W a distance of 128.39 feet to an existing fence post (CORNER 51);
(5) S 76°09'28" W a distance of 248.72 feet to an existing fence post (CORNER 52); said fence post being at a common corner of Deed Book 347 Page 1445, Deed Book 93 Page 397 and Deed Book 306 Page 458 of the Alleghany County Registry;

Thence leaving the aforementioned common line and with the common line of Deed Book 347 Page 1445 and Deed Book 306 Page 458 of the Alleghany County Registry and continuing with the conservation easement area the following (4) courses and distances:

(1) S 59°17'22" W a distance of 443.14 feet to a 5/8" rebar set with a CE cap (CORNER 53);
(2) S 46°37'53" E a distance of 28.00 feet to a 5/8" rebar set with a CE cap (CORNER 54);
(3) S 50°47'59" W a distance of 375.09 feet to a 5/8" rebar set with a CE cap (CORNER 55);
(4) S 86°41'27" W a distance of 48.03 feet to a 5/8" rebar set with a CE cap (CORNER 56), said rebar being at a common corner of Deed Book 347 Page 1445, Deed Book 306 Page 458 and Deed Book 355 Page 696;

Thence leaving the aforementioned common line and continuing with the conservation easement area the following (3) courses and distances:

(1) N 33°12'19" W a distance of 161.98 feet to a 5/8" rebar set with a CE cap (CORNER 57);
(2) S 56°47'24" W a distance of 450.78 feet to a 5/8" rebar set with a CE cap (CORNER 58); said rebar being located N 56°47'26'' E a distance of 25.30 feet from a 5/8'' rebar set with a CE cap (CORNER 4);
(3) N 24°24'25" W a distance of 107.26 feet TO THE TRUE POINT OF BEGINNING.

Being all of that area of land containing a total of 20.75 Acres, being the same more or less.

Being all of those areas of land containing a total of 22.11 Acres, being the same more or less, according to a plat of survey entitled "A Conservation Easement Survey for: The State of North Carolina, Division of Mitigation Services, Vile Creek Stream & Wetland Mitigation Site"; on the property of Judy Gambill Crouse and Husband, Gary Crouse; Job# 141093-CE, sheet 2.

This description was prepared from an actual survey and shown on the aforementioned plat by Kee Mapping and Surveying, PA (License # C- 3039) between the dates of 08/25/15 – 09/15/15 and under the supervision of Nolan R. Carmack, NC PLS (License # L-5076).

BK:00376 PG:0372

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FILED Jan 04, 2016 01:37:43 pm
BOOK **00376**
PAGE **0372** THRU **0382**
INST # 00010
EXCISE TAX $5.00

ALLEGHANY COUNTY NC
LIZABETH REEVES ROUPE
REGISTER OF DEEDS

STATE OF NORTH CAROLINA

DEED OF CONSERVATION EASEMENT AND RIGHT OF ACCESS PROVIDED PURSUANT TO FULL DELIVERY MITIGATION CONTRACT

ALLEGHANY COUNTY

SPO File Number:
DMS Project Number: 96582

TAX INFORMATION RECORDED
ALLEGHANY TAX COLLECTOR
1/04/16

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 4 day of January, 2016, by Debbie Edwards, ("**Grantor**"), whose mailing address is 978 NC Highway 18 North, Sparta, NC 28675, 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 formerly known as the 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 Wildlands Engineering, Inc. and the North Carolina Department of Environment and Natural Resources, to provide stream, wetland and/or buffer mitigation pursuant to the North Carolina Department of Environment and Natural Resources Purchase and Services Contract Number 5999.

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 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' 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 Environment and Natural Resources, 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 Gap Civil Township, Alleghany County, North Carolina (the "**Property**"), and being more particularly described as that certain parcel of land containing approximately 1.6 acres and being

conveyed to the Grantor by deed as recorded in **Deed Book 348 at Page 341** of the Alleghany 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 Vile Creek.

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:

Conservation Easement Area C containing a total of .018 acres as shown on the plats of survey entitled "Final Plat, Conservation Easement for The State of North Carolina Division of Mitigation Services, Vile Creek Stream and Wetland Mitigation Site, DMS Site No. 96582, Current Owner(s) Listed As: Debbie Edwards," dated 8/25/2015-09/15/2015 by Nolan R. Carmack, PLS Number 5076 and recorded in the Alleghany County, North Carolina Register of Deeds at **Plat Book** 10 **Pages** 46.

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 roads, trails, walkways, or paving in the Conservation Easement Area with the following exception:

Only roads and trails located within the Conservation Easement Area prior to completion of the construction of the restoration project and within crossings shown on the recorded survey plat may be maintained by Grantor, successors or assigns to allow for access to the interior of the Property, and must be repaired and maintained to prevent runoff and degradation to the

Conservation Easement Area. Such roads and trails shall be covered with pervious materials such as loose gravel or permanent vegetation in order to minimize runoff and prevent sedimentation.

All 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 N.C. Division of Mitigation Services, whose mailing address is 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 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
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.

Debbie Edwards (SEAL)

NORTH CAROLINA
COUNTY OF Alleghany

I, Jean R. Osborne, a Notary Public in and for the County and State aforesaid, do hereby certify that Debbie Martin Edwards, 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 4 day of January, 2016.

Jean R. Osborne
Notary Public

My commission expires:

6-12-2020

JEAN R. OSBORNE
Notary Public
Alleghany County, NC

Exhibit A

A Conservation Easement for
The State of North Carolina,
Division of Mitigation Services,
"Vile Creek Stream and Wetland Mitigation Site"
Property of:
Debbie Edwards
DMS SITE ID: 96582

The following conservation easement area is located off of NC-Highway 18 in the Gap Civil Township, Alleghany County, North Carolina and being on a portion of that property conveyed to Debbie Edwards through Deed Book 348 Page 341 of the Alleghany County Register of Deeds and being more particularly described as follows:

Conservation Easement Area "C":

BEGINNING AT A 5/8" REBAR SET WITH A CE CAP (CORNER 59), said rebar being in a common line of Deed Book 348 Page 341 and Deed Book 298 Page 1461 of the Alleghany County Registry, and located S 59°10'51" W a horizontal ground distance of 3320.78 feet from a 1" iron pipe set in concrete with a Kee cap having North Carolina State Plane Coordinates (2011) of Northing: 1011676.43 feet and Easting: 1384260.04 feet, said rebar also being located S 39°51'22'' E a distance of 461.56 feet from a 1'' iron pipe set with a "Kee" cap in the aforesaid common line;

Thence leaving the aforesaid common line and with the conservation easement area N 63°07'00'' E a distance of 118.17 feet to a 5/8" rebar set with a CE cap (CORNER 14); said rebar being in a common line of Deed Book 348 Page 341 and Deed Book 347 Page 1445 of the Alleghany County Registry; and located S 41°46'26'' E a distance of 64.54 feet from a 1'' iron pipe set with a "Kee" cap in the aforesaid common line;

Thence with the aforesaid common line and continuing with the conservation easement area the following (2) courses and distances:

(1) S 41°46'26'' E a distance of 62.27 feet to an existing fence post (CORNER 13);
(2) S 59°02'36'' W a distance of 118.66 feet to an existing 1'' iron pipe (CORNER 12); said iron pipe being at a common corner of Deed Book 348 Page 341, Deed Book 347 Page 1445 and Deed Book 298 Page 1461 of the Alleghany County Registry, and located N 60°06'19'' E a distance of 149.58 feet from an existing 2'' iron rod (CORNER 11);

Thence leaving the aforementioned common line and with the common line of Deed Book 348 Page 341 and Deed Book 298 Page 1461 of the Alleghany County Registry and continuing with the conservation easement area N 39°51'22'' W a distance of 70.41 feet to the TRUE POINT OF BEGINNING.

Being all of that area of land containing a total of 0.18 Acres, being the same more or less, according to a plat of survey entitled "A Conservation Easement Survey for: The State of North Carolina, Division of Mitigation Services, Vile Creek Stream & Wetland Mitigation Site"; on the property of Debbie Edwards; Job# 141093-CE, sheet 3. This description was prepared from an actual survey and shown on the aforementioned plat by Kee Mapping and Surveying, PA (License # C-3039) between the dates of 08/25/15 – 09/15/15 and under the supervision of Nolan R. Carmack, NC PLS (License # L-5076).

DE

BK:00376 PG:0383

$72.00
Pin #
3081-41-3738

FILED Jan 04, 2016 01:41:53 pm
BOOK 00376
PAGE 0383 THRU 0395
INST # 00011
EXCISE TAX $72.00
ALLEGHANY COUNTY NC
LIZABETH REEVES ROUPE
REGISTER OF DEEDS

STATE OF NORTH CAROLINA

DEED OF CONSERVATION EASEMENT AND RIGHT OF ACCESS PROVIDED PURSUANT TO FULL DELIVERY MITIGATION CONTRACT

ALLEGHANY COUNTY

SPO File Number:
DMS Project Number: 96582

TAX INFORMATION RECORDED
ALLEGHANY TAX COLLECTOR
1/04/16

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 4 day of January, 2016, by Tamara Gambill Mason and Husband Steve Mason, ("**Grantor**"), whose mailing address is 174 S. Main Street, Sparta, NC 28675, 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 formerly known as the 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 Wildlands Engineering, Inc. and the North Carolina Department of Environment and Natural Resources, to provide stream, wetland and/or buffer mitigation pursuant to the North Carolina Department of Environment and Natural Resources Purchase and Services Contract Number 5999.

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 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' 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 Environment and Natural Resources, 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 Gap Civil Township, Alleghany County, North Carolina (the "**Property**"), and being more particularly described as that certain parcel of land containing approximately 115.22 acres and being conveyed to the Grantor by deed as recorded in **Deed Book 347 at Page** 1449 of the Alleghany 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 Vile Creek.

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:

Conservation Easement Areas D and E containing 0.44 and 2.30 acres respectively as shown on the plats of survey entitled "Final Plat, Conservation Easement for The State of North Carolina Division of Mitigation Services, Vile Creek Stream and Wetland Mitigation Site, DMS Site No. 96582, Current Owner(s) Listed As: Tamara Gambill Mason and Husband Steve Mason," dated 8/25/2015-09/15/2015 by Nolan R. Carmack, PLS Number 5076 and recorded in the Alleghany County, North Carolina Register of Deeds at **Plat Book** 10 **Pages** 447.

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 roads, trails, walkways, or paving in the Conservation Easement Area with the following exception:

Only roads and trails located within the Conservation Easement Area prior to completion of the construction of the restoration project and within crossings shown on the recorded survey plat may be maintained by Grantor, successors or assigns to allow for access to the interior of the Property, and must be repaired and maintained to prevent runoff and degradation to the Conservation Easement Area. Such roads and trails shall be covered with pervious materials such as loose gravel or permanent vegetation in order to minimize runoff and prevent sedimentation.

All 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 N.C. Division of Mitigation Services, whose mailing address is 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 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
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.

Tamara D Mason (SEAL)

(SEAL)

NORTH CAROLINA
COUNTY OF Alleghany

I, Jean R. Osborne, a Notary Public in and for the County and State aforesaid, do hereby certify that Tamara D. Mason, 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 4 day of January, 2016

Jean R. Osborne
Notary Public

My commission expires:

6-12-2020

JEAN R. OSBORNE
Notary Public
Alleghany County, NC

NORTH CAROLINA
COUNTY OF Alleghany

I, Jean R. Osborne, a Notary Public in and for the County and State aforesaid, do hereby certify that Steve Mason, 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 4 day of January, 2016

Jean R. Osborne
Notary Public

JEAN R. OSBORNE
Notary Public
Alleghany County, NC

My commission expires:

6-12-2020

Exhibit A

A Conservation Easement for The State of North Carolina, Division of Mitigation Services,"Vile Creek Stream and Wetland Mitigation Site"
Property of:
Tamara Gambill Mason & Husband Steve Mason
DMS SITE ID: 96582

The following conservation easement areas are located off of NC-Highway 18 and Farmer Road in the Gap Civil Township, Alleghany County, North Carolina and being on a portion of that property conveyed to Tamara Gambill Mason and husband, Steve Mason through Deed Book 347 Page 1449 of the Alleghany County Register of Deeds and being more particularly described as follows:

Conservation Easement Area "D":

BEGINNING AT A 5/8" REBAR SET WITH A CE CAP (CORNER 43), said rebar being located S 25°47'26" W a

horizontal ground distance of 1390.87 feet from a 1" iron pipe set in concrete with a "Kee" cap having North Carolina State Plane Coordinates (2011) of Northing: 1011676.43 feet and Easting: 1384260.04 feet;

Thence with the conservation easement area the following (3) courses and distances:

(1) S 34°54'13" W a distance of 85.78 feet to a 5/8" rebar set with a CE cap (CORNER 44);
(2) S 17°18'51" E a distance of 114.86 feet to a 5/8" rebar set with a CE cap (CORNER 45);
(3) S 68°12'06'' W a distance of 72.85 feet to a calculated point in the center of the Little River, said calculated point being at a common corner of Deed Book 347 Page 1449, Deed Book 93 Page 397 and Deed Book 347 Page 1445 of the Alleghany County Registry;

Thence with the center of the Little River and the common line of Deed Book 347 Page 1449 and Deed Book 347 Page 1445 of the Alleghany County Registry and continuing with the conservation easement area the following (5) courses and distances:

(1) N 24°39'37" W a distance of 80.26 feet to a calculated point in the Little River;
(2) N 04°31'49" W a distance of 85.32 feet to a calculated point in the Little River;
(3) N 03°59'01" E a distance of 36.05 feet to a calculated point in the Little River;
(4) N 45°33'29" E a distance of 56.04 feet to a calculated point in the Little River;
(5) N 41°10'54" E a distance of 32.31 feet to a calculated point in the Little River;

Thence leaving the aforementioned common line and continuing with the conservation easement area S 49°27'29" E a distance of 77.62 feet TO THE TRUE POINT OF BEGINNING.

Being all of that area of land containing a total of 0.44 Acres, being the same more or less.

Conservation Easement Area "E":

BEGINNING AT A 5/8" REBAR SET WITH A CE CAP (CORNER 60), said rebar being in a common line of Deed Book 347 Page 1449 and Deed Book 70 Page 144 of the Alleghany County Registry, and located

N 46°01'04" E a horizontal ground distance of 654.27 feet from a 1" iron pipe set in concrete with a Kee cap having North Carolina State Plane Coordinates (2011) of Northing: 1011676.43 feet and Easting:

feet, and also located S 24°59'38" E a distance of 67.21 feet from an existing 1/2" rebar, said rebar being at a common corner of Deed Book 347 Page 1449 and Deed book 70 Page 144 of the aforesaid registry;

Thence with the aforesaid common line and with the conservation easement area S 24°59'38" E a distance of 183.73 feet to a 5/8" rebar set with a CE cap (CORNER 61);

Thence leaving the aforementioned common line and continuing with the conservation easement area the following (3) courses and distances:

(1) S 10°53'11" W a distance of 356.20 feet to a 5/8" rebar set with a CE cap (CORNER 62);
(2) S 16°30'15" W a distance of 177.13 feet to a 5/8" rebar set with a CE cap (CORNER 63);
(3) S 23°41'07" E a distance of 325.70 feet to a 5/8" rebar set with a CE cap (CORNER 64), said rebar being in a common line of Deed Book 347 Page 1449 and Deed Book 70 Page 144;

Thence with the aforesaid common line and the conservation easement area S 00°44'27" W a distance of 188.02 feet to a 5/8" rebar set with a CE cap (CORNER 65);

Thence leaving the aforementioned common line and continuing with the conservation easement area the following (9) courses and distances:

(1) S 44°12'32" W a distance of 76.96 feet to a 5/8" rebar set with a CE cap (CORNER 66);
(2) N 22°19'19" W a distance of 38.14 feet to a 5/8" rebar set with a CE cap (CORNER 67);
(3) N 11°06'30" E a distance of 113.76 feet to a 5/8" rebar set with a CE cap (CORNER 68);
(4) N 24°08'12" W a distance of 113.37 feet to a 5/8" rebar set with a CE cap (CORNER 69);
(5) N 35°51'38" W a distance of 105.24 feet to a 5/8" rebar set with a CE cap (CORNER 70);
(6) N 10°50'29" W a distance of 151.79 feet to a 5/8" rebar set with a CE cap (CORNER 71);
(7) N 20°55'03" W a distance of 84.87 feet to a 5/8" rebar set with a CE cap (CORNER 72);
(8) N 15°37'10" E a distance of 189.23 feet to a 5/8" rebar set with a CE cap (CORNER 73);
(9) N 08°42'19" E a distance of 486.93 feet TO THE TRUE POINT OF BEGINNING.

Being all of that area of land containing a total of 2.30 Acres, being the same more or less.

Being all of those areas of land containing a total of 2.74 Acres, being the same more or less, according to a plat of survey entitled "A Conservation Easement Survey for: The State of North Carolina, Division of Mitigation Services, Vile Creek Stream & Wetland Mitigation Site"; on the property of Tamara Gambill Mason and husband, Steve Mason ; Job# 141093-CE, sheet 4. This description was prepared from an actual survey and shown on the aforementioned plat by Kee Mapping and Surveying, PA

(License # C-3039) between the dates of 08/25/15 – 09/15/15 and under the supervision of Nolan R. Carmack, NC PLS (License # L-5076).

PLAT BOOK: 10 PAGE: 444

FILED Jan 04, 2016 01:20:16 pm
BOOK 00010
PAGE 0444
INST # 00005
ALLEGHANY COUNTY NC
LIZABETH REEVES ROUPE
REGISTER OF DEEDS

CERTIFICATE OF SURVEY AND ACCURACY:

I, NOLAN R. CARMACK, CERTIFY THAT THIS PLAT WAS DRAWN UNDER MY SUPERVISION FROM AN ACTUAL SURVEY MADE UNDER MY SUPERVISION FROM DEED DESCRIPTION(S) AS SHOWN ON EACH SHEET OF THIS SET; THAT THE BOUNDARIES NOT SURVEYED ARE INDICATED AS DRAWN FROM INFORMATION AS REFERENCED; THAT THE RATIO OF PRECISION AS CALCULATED DOES NOT EXCEED 1:10,000 ; THAT THE GPS PORTION OF THIS PROJECT WAS TO PERFORM A GRID TIE TO THE NC STATE PLANE COORDINATE SYSTEM AND INFORMATION USED IS SHOWN & NOTED HEREON; THAT THIS PLAT WAS PREPARED IN ACCORDANCE WITH G.S. 47-30 AS AMENDED.

I ALSO HEREBY CERTIFY THAT THIS PLAT IS OF ONE OF THE FOLLOWING: GS 47-30 F(11) D; THAT THE SURVEY IS OF ANOTHER CATEGORY, SUCH AS THE RECOMBINATION OF EXISTING PARCELS, A COURT-ORDERED SURVEY, OR OTHER EXCEPTION TO THE DEFINITION OF SUBDIVISION.

GPS METADATA
CLASS OF SURVEY: HORIZONTAL: A VERTICAL: C
FIELD PROCEDURE: STATIC NETWORK
DATES: 10/13/14
DATUM: NAD83(2011) NAVD 88
EPOCH: 2010
GEOID: 12A
AVERAGE COMBINED FACTOR: 0.99998445
POSITIONAL ACCURACY: HORIZONTAL: 0.04' VERTICAL: 0.08'
UNITS: USFT
CORS USED: NCSR, NCWJ, DOBS, NCNW

WITNESS MY ORIGINAL SIGNATURE, REGISTRATION NUMBER, AND SEAL THIS 30TH DAY OF DECEMBER, 2015, A.D.

NORTH CAROLINA PROFESSIONAL SEAL L-5076 LAND SURVEYOR NOLAN R. CARMACK

THIS DOCUMENT IS NOT VALID UNLESS SIGNED AND SEALED.

NOLAN R. CARMACK, PLS L-5076

REGISTER OF DEEDS STAMP

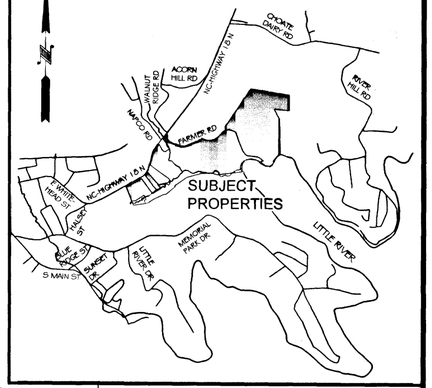
THIS PLAT DOES NOT CREATE A SUBDIVISION OF PROPERTY IN ALLEGHANY COUNTY. THE PURPOSE OF THIS SURVEY IS TO IDENTIFY THE CONSERVATION EASEMENT AREAS ONLY. NO TRANSFER OF PROPERTY IS TAKING PLACE.

I, Travis Dalton, REVIEW OFFICER FOR ALLEGHANY COUNTY, CERTIFY THAT THE MAP OR PLAT TO WHICH THIS CERTIFICATION IS AFFIXED, MEETS ALL STATUTORY REQUIREMENTS FOR RECORDING.

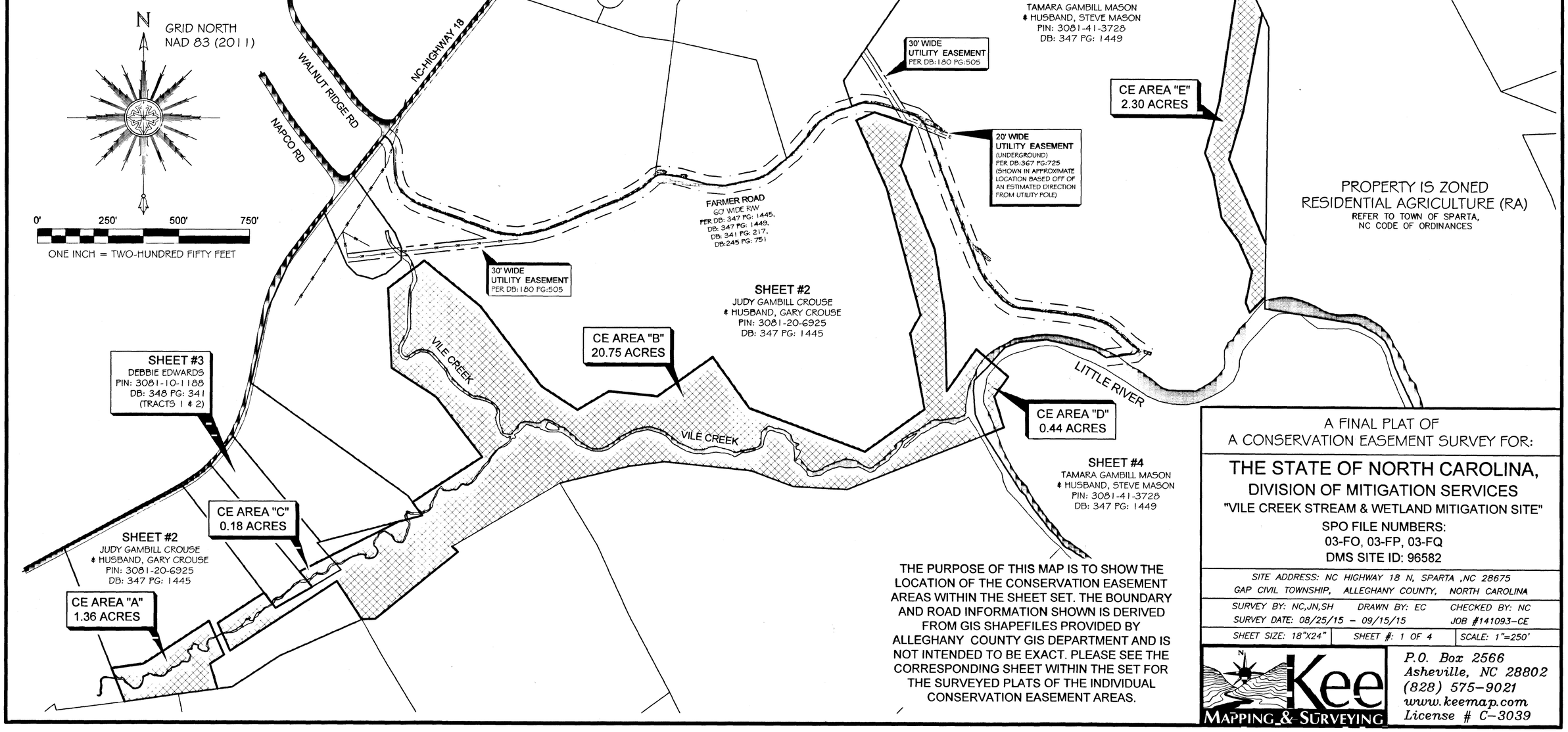
REVIEW OFFICER 11/4/16 DATE

COVER SHEET FOR:
VILE CREEK STREAM & WETLAND MITIGATION SITE
SHEET: 1 OF 4

VICINITY MAP
(NOT TO SCALE)



TOTAL CONSERVATION EASEMENT AREA: 25.03 ACRES



THE PURPOSE OF THIS MAP IS TO SHOW THE LOCATION OF THE CONSERVATION EASEMENT AREAS WITHIN THE SHEET SET. THE BOUNDARY AND ROAD INFORMATION SHOWN IS DERIVED FROM GIS SHAPEFILES PROVIDED BY ALLEGHANY COUNTY GIS DEPARTMENT AND IS NOT INTENDED TO BE EXACT. PLEASE SEE THE CORRESPONDING SHEET WITHIN THE SET FOR THE SURVEYED PLATS OF THE INDIVIDUAL CONSERVATION EASEMENT AREAS.

A FINAL PLAT OF
A CONSERVATION EASEMENT SURVEY FOR:

THE STATE OF NORTH CAROLINA,
DIVISION OF MITIGATION SERVICES
"VILE CREEK STREAM & WETLAND MITIGATION SITE"
SPO FILE NUMBERS:
03-FO, 03-FP, 03-FQ
DMS SITE ID: 96582

SITE ADDRESS: NC HIGHWAY 18 N, SPARTA ,NC 28675
GAP CIVIL TOWNSHIP, ALLEGHANY COUNTY, NORTH CAROLINA

SURVEY BY: NC,JN,SH	DRAWN BY: EC	CHECKED BY: NC
SURVEY DATE: 08/25/15 - 09/15/15		JOB #141093-CE
SHEET SIZE: 18"X24"	SHEET #: 1 OF 4	SCALE: 1"=250'

Kee MAPPING & SURVEYING
P.O. Box 2566
Asheville, NC 28802
(828) 575-9021
www.keemap.com
License # C-3039

PLAT BOOK: 10 PAGE: 445

FILED Jan 04, 2016 01:23:18 pm
BOOK 00010
PAGE 0445
INST # 00006
ALLEGHANY COUNTY NC
LIZABETH REEVES ROUPE
REGISTER OF DEEDS

CERTIFICATE OF SURVEY AND ACCURACY:

I, NOLAN R. CARMACK, CERTIFY THAT THIS PLAT WAS DRAWN UNDER MY SUPERVISION FROM AN ACTUAL SURVEY MADE UNDER MY SUPERVISION FROM DEED DESCRIPTION(S) RECORDED IN DB: 347, PG: 1445, AND PB: N/A PG: N/A; THAT THE BOUNDARIES NOT SURVEYED ARE INDICATED AS DRAWN FROM INFORMATION AS REFERENCED; THAT THE RATIO OF PRECISION AS CALCULATED DOES NOT EXCEED 1:10,000; THAT THE GPS PORTION OF THIS PROJECT WAS TO PERFORM A GRID TIE TO THE NC STATE PLANE COORDINATE SYSTEM AND INFORMATION USED IS SHOWN & NOTED HEREON; THAT THIS PLAT WAS PREPARED IN ACCORDANCE WITH G.S. 47-30 AS AMENDED.

I ALSO HEREBY CERTIFY THAT THIS PLAT IS OF ONE OF THE FOLLOWING: GS 47-30 F(11) D; THAT THE SURVEY IS OF ANOTHER CATEGORY, SUCH AS THE RECOMBINATION OF EXISTING PARCELS, A COURT-ORDERED SURVEY, OR OTHER EXCEPTION TO THE DEFINITION OF SUBDIVISION.

GPS METADATA
CLASS OF SURVEY: HORIZONTAL: A VERTICAL: C
FIELD PROCEDURE: STATIC NETWORK
DATES: 10/13/14
DATUM: NAD83(2011) NAVD 88
EPOCH: 2010
GEOID: 12A
AVERAGE COMBINED FACTOR: 0.99998445
POSITIONAL ACCURACY: HORIZONTAL: 0.04' VERTICAL: 0.08'
UNITS: USFT
CORS USED: NCSR, NCWJ, DOBS, NCHW

WITNESS MY ORIGINAL SIGNATURE, REGISTRATION NUMBER, AND SEAL THIS 30TH DAY OF DECEMBER, 2015, A.D.

NORTH CAROLINA PROFESSIONAL SEAL L-5076 LAND SURVEYOR NOLAN R. CARMACK

THIS DOCUMENT IS NOT VALID UNLESS SIGNED AND SEALED.

NOLAN R. CARMACK, PLS L-5076

REGISTER OF DEEDS STAMP

I, Travis Dalton REVIEW OFFICER FOR ALLEGHANY COUNTY, CERTIFY THAT THE MAP OR PLAT TO WHICH THIS CERTIFICATION IS AFFIXED, MEETS ALL STATUTORY REQUIREMENTS FOR RECORDING.

REVIEW OFFICER 1/4/16 DATE

CERTIFICATE OF OWNERSHIP AND DEDICATION:

I HEREBY CERTIFY THAT I AM THE OWNER OF THE PROPERTY AS SHOWN AND DESCRIBED HEREON. I ALSO HEREBY ACCEPT AND ADOPT THIS RECORD PLAT AND CONSERVATION EASEMENT WITH MY FREE CONSENT AND DEDICATED ALL EASEMENTS, RIGHT OF WAYS AND ACCESS ROADS TO PUBLIC AND/OR PRIVATE USE AS NOTED ON SAID PLAT.

Judy Gambill Crouse 1-4-16
JUDY GAMBILL CROUSE DATE

Gary Crouse 1-4-16
GARY CROUSE DATE

LEGEND:

(##) CE CORNER NUMBER
○ SET 5/8" RBC "CE CAP"
● CALCULATED POINT (NOT SET)
⊙ EXISTING IRON PIN (AS NOTED)
EXISTING FENCE POST
◎ SET 1" IRON PIPE W/ "KEE" CAP
CONCRETE MONUMENT (CON MON)
TREE (AS NOTED)
UTILITY POLE
NOT TO SCALE (NTS)
CONSERVATION EASEMENT AREA
STREAM CROSSING

WATER
ASPHALT
GRAVEL
CONSERVATION EASEMENT (CE)
BOUNDARY LINE
BOUNDARY LINE (NOT SURVEYED)
TIE LINE ONLY
ADJOINING DEED LINES
INTERNAL DEED LINES
RIGHT-OF-WAY (R/W)
EASEMENT LINE
FENCE LINE
OHW OVERHEAD WIRE
E UNDERGROUND ELECTRIC

PB: PLAT BOOK
DB: DEED BOOK
PG: PAGE
RBR REBAR
RBC REBAR WITH ID CAP
IP IRON PIPE
IR IRON ROD
NAD NORTH AMERICAN DATUM 1983
SPC STATE PLANE COORDINATES
NCGS NORTH CAROLINA GEODETIC SURVEY
CC CONTROL CORNER
CF COMBINED FACTOR
POB POINT OF BEGINNING

LINE TABLE

LINE	BEARING	DISTANCE	LINE	BEARING	DISTANCE
L1	N 81°45'16" E	113.22'	L38	S 75°01'48" E	57.40'
L2	S 24°24'25" E	130.54'	L39	N 67°46'03" E	50.76'
L3	S 56°47'24" W	59.74'	L40	N 48°30'16" E	72.35'
L4	S 16°44'45" E	92.02'	L41	N 00°40'16" E	40.78'
L5	S 76°35'29" E	31.65'	L42	N 22°35'30" W	58.30'
L6	S 37°21'24" E	66.94'	L43	S 59°27'36" E	64.25'
L7	N 60°06'19" E	149.58'	L44	S 18°27'28" E	95.91'
L8	N 59°02'36" E	118.66'	L45	S 17°19'02" E	51.46'
L9	N 41°46'26" W	62.27'	L46	N 70°10'19" E	39.55'
L10	N 63°07'00" E	274.81'	L47	S 85°25'59" E	48.10'
L11	N 36°20'35" W	58.42'	L48	S 75°03'37" E	57.57'
L12	N 52°27'09" E	160.60'	L49	S 71°47'25" E	88.21'
L13	S 57°00'55" E	152.13'	L50	S 55°19'42" E	27.60'
L14	N 59°14'44" E	128.19'	L51	S 35°58'41" E	22.40'
L15	S 84°13'24" E	173.10'	L52	S 18°52'27" E	97.10'
L16	N 65°51'36" E	70.92'	L53	S 20°23'37" E	225.99'
L17	S 70°44'09" E	141.72'	L54	S 21°06'22" E	107.87'
L18	S 15°54'07" W	149.18'	L55	S 22°08'05" E	120.61'
L19	S 01°36'16" E	273.68'	L56	S 29°37'16" E	41.19'
L20	N 34°53'16" E	181.09'	L57	S 41°54'56" E	89.59'
L21	S 49°27'29" E	71.12'	L58	S 57°28'44" E	41.08'
L22	S 41°10'54" W	32.31'	L59	S 77°45'08" E	28.42'
L23	S 45°33'29" E	56.04'	L60	S 82°55'36" E	79.32'
L24	S 03°59'01" W	36.05'	L61	S 82°53'53" E	118.96'
L25	S 04°31'49" E	85.32'	L62	S 78°24'46" E	64.58'
L26	S 24°39'37" E	80.26'	L63	S 70°16'38" E	44.05'
L27	N 69°31'51" W	158.28'	L64	S 55°39'16" E	40.06'
L28	S 82°33'00" W	128.39'	L65	S 47°26'39" E	74.09'
L29	S 46°37'53" W	28.00'	L66	S 55°28'13" E	35.40'
L30	S 86°41'27" W	48.03'	L67	S 47°09'36" W	20.55'
L31	N 33°12'19" W	161.98'	L68	S 82°04'33" W	101.70'
L32	N 56°47'26" E	25.30'	L69	N 58°17'26" W	49.44'
L33	N 24°24'25" W	107.26'	L70	N 78°08'18" W	173.26'
L34	S 41°46'26" E	64.53'	L71	S 85°21'52" W	93.49'
L35	S 70°46'46" W	12.46'	L72	S 70°28'40" W	56.84'
L36	S 36°20'35" E	29.35'	L73	S 41°10'54" W	70.55'
L37	S 45°26'40" E	49.99'			

COORDINATE TABLE

#	NORTHING	EASTING	#	NORTHING	EASTING
1	1009631.61	1380744.20	30	1010405.17	1383406.46
2	1009647.84	1380856.25	31	1010556.02	1383616.98
3	1009799.59	1381088.12	32	1010825.31	1383565.75
4	1009680.71	1381142.06	33	1010889.74	1383601.67
5	1009648.02	1381092.06	34	1011338.69	1383480.98
6	1009559.89	1381118.58	35	1011578.32	1383373.54
7	1009541.52	1380980.50	36	1011607.33	1383438.26
8	1009514.04	1380790.68	37	1011560.57	1383572.04
9	1009792.26	1381118.90	38	1011417.10	1383531.17
10	1009899.69	1381283.02	39	1011121.81	1383651.57
11	1009846.48	1381323.63	40	1010894.28	1383688.08
12	1009921.04	1381453.31	41	1010620.71	1383695.75
13	1009982.08	1381555.07	42	1010769.26	1383799.33
14	1010028.50	1381513.57	43	1010672.58	1383912.36
15	1010152.79	1381758.70	44	1010602.23	1383863.27
16	1010174.56	1381842.23	45	1010492.58	1383897.45
17	1010221.62	1381807.61	46	1010450.64	1383792.66
18	1010382.43	1382053.34	47	1010271.18	1383343.90
19	1010594.30	1381890.54	48	1010280.91	1383152.74
20	1010697.01	1381732.03	49	1010336.26	1383004.46
21	1010979.08	1381719.65	50	1010367.48	1382697.14
22	1011076.95	1381846.98	51	1010350.83	1382569.83
23	1010916.28	1382045.36	52	1010291.33	1382328.34
24	1010633.98	1382262.38	53	1010065.01	1381947.34
25	1010551.16	1382389.99	54	1010045.78	1381967.68
26	1010616.71	1382500.16	55	1009808.73	1381677.00
27	1010599.29	1382672.37	56	1009805.95	1381629.08
28	1010739.03	1382867.64	57	1009941.48	1381540.37
29	1010557.68	1382997.48	58	1009694.58	1381163.23

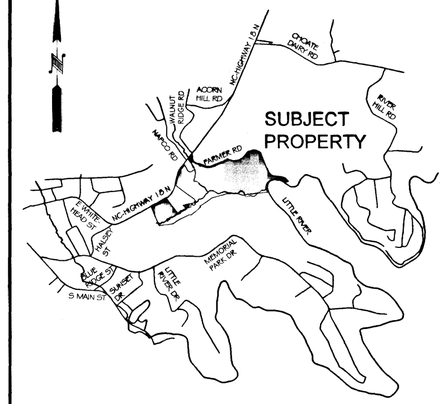
GRID TIE INFORMATION:

GPS #1
1" IPC "KEE" (CC)
NC STATE PLANE COORDINATES
EPOCH:2010 GEOID:12A
NAD83(2011)
N:1011676.43
E:1384260.04
Z:2784.95 (NAVD 88)
CF: 0.99998470

GPS #2
NCGS CON MON (CC)
"ALLEGHANY HMO5"
NC STATE PLANE COORDINATES
EPOCH:2010 GEOID:12A
NAD83(2011)
N:1012218.26
E:1382638.99
Z:2841.80 (NAVD 88)
CF: 0.99998420

BEING LOCATED S 71°31'04" E A DISTANCE OF 1709.20' (GRID) 1709.23' (GROUND) FROM GPS #2.

VICINITY MAP
(NOT TO SCALE)



KAREN GAMBILL & MARION LEYS
PIN: 3081-32-2215
DB: 341 PG: 217

KAREN GAMBILL & MARION LEYS
PIN: 3081-21-8558
DB: 245 PG: 751

KAREN GAMBILL & MARION LEYS
PIN: 3081-21-2529
DB: 341 PG: 217

TOWN OF SPARTA
PIN: 3081-11-5069
DB: 84 PG: 480

JUDY GAMBILL CROUSE & HUSBAND, GARY CROUSE
PIN: 3081-20-6925
DB: 347 PG: 1445

DEBBIE EDWARDS
PIN: 3081-10-1188
DB: 348 PG: 341
(TRACTS 1 & 2)

JESSIE D. PERRY & WIFE, REGINA PERRY
PIN: 3081-10-0180
DB: 298 PG: 1461

D. WAYNE MILES, JR. & WIFE, JANET POE MILES
PIN: 3081-10-4203
DB: 158 PG: 155

ROBERT DEAN CLEARY & WIFE, LOUISE M. CLEARY
PIN: 3080-09-4645
DB: 98 PG: 243

CLAUDIA BUSIC ARTON
PIN: 3080-08-5875
ESTATE DEED: 08-E-154
REF: DB: 62 PG: 499

BARBARA G. BRYANT
PIN: 3080-19-4087
DB: 355 PG: 696 (TRACT 1)

KENNETH E. RICHARDSON & BETTY W. RICHARDSON
PIN: 3080-29-1518
DB: 306 PG: 458
PB: 1 PG: 84 (LOT 9)

KENNETH E. RICHARDSON & BETTY W. RICHARDSON
PIN: 3080-29-1518
DB: 306 PG: 458
PB: 1 PG: 84 (LOT 8)

EDITH B. RICHARDSON
PIN: 3080-39-0682
DB: 93 PG: 397

TAMARA GAMBILL MASON & HUSBAND, STEVE MASON
PIN: 3081-41-3728
DB: 347 PG: 1449

TAMARA GAMBILL MASON & HUSBAND, STEVE MASON
PIN: 3081-41-3728
DB: 347 PG: 1449

JUDY GAMBILL CROUSE & HUSBAND, GARY CROUSE
PIN: 3081-20-6925
DB: 347 PG: 1445

FARMER ROAD
60' WIDE R/W
PER DB: 347 PG: 1445, DB: 347 PG: 1449, DB: 341 PG: 217, DB:245 PG: 751

30' WIDE UTILITY EASEMENT
PER DB: 180 PG:505

30' WIDE UTILITY EASEMENT
PER DB: 180 PG:505

20' WIDE UTILITY EASEMENT
(UNDERGROUND)
PER DB: 367 PG: 725
(SHOWN IN APPROXIMATE LOCATION BASED OFF OF AN ESTIMATED DIRECTION FROM UTILITY POLE)

BOUNDARY LINE FOLLOWS CENTERLINE OF EXISTING 60' WIDE R/W
PER DB: 282 PG: 301
LINE CALLS L46 - L68

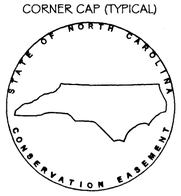
GRID NORTH
NAD 83 (2011)

PROPERTY IS ZONED RESIDENTIAL AGRICULTURE (RA)
REFER TO TOWN OF SPARTA, NC CODE OF ORDINANCES

CE AREA "A" 1.36 ACRES

CE AREA "B" 20.75 ACRES

CONSERVATION EASEMENT CORNER CAP (TYPICAL)



5/8" RBC W/ "CE" CAP (1) POB
N: 1009631.61
E: 1380744.20
BEING LOCATED S 59°49'03" W A DISTANCE OF 4067.24' FROM GPS #1

5/8" RBC W/ "CE" CAP (9) POB
N: 1009792.26
E: 1381118.90
BEING LOCATED S 59°02'36" W A DISTANCE OF 3662.90' FROM GPS #1

5/8" RBC W/ "CE" CAP (46)
S 68°12'06" W 4.66' FROM A 10" LOCUST SNAG

4" X 4" CON MON

1/2" RBR

1/2" ALUMINUM SPIKE (8)

3/4" IP

1" IP

2" IR

DOUBLE HICKORY (NTS)

42" RED OAK (50)

30" BIRCH (49)

18" BIRCH (48)

SURVEYOR'S NOTES:

1. ALL DISTANCES ARE GROUND MEASUREMENTS IN US SURVEY FEET UNLESS OTHERWISE NOTED.
2. AREAS CALCULATED BY THE COORDINATE METHOD.
3. PROPERTY SUBJECT TO ALL EASEMENTS, RIGHT OF WAYS AND RESTRICTIONS THAT ARE RECORDED, UNRECORDED, WRITTEN AND UNWRITTEN.
4. ALLEGHANY COUNTY GIS WEBSITE USED TO IDENTIFY ADJOINING PROPERTY OWNERS.
5. THE PROFESSIONAL SURVEYOR HAS MADE NO INVESTIGATION OR INDEPENDENT SEARCH FOR EASEMENTS, RIGHT OF WAYS, ENCUMBRANCES, RESTRICTIVE COVENANTS, CORRECT OWNERSHIP OR ANY OTHER FACTS THAT AN ACCURATE AND CURRENT TITLE SEARCH MAY DISCLOSE. A NC LICENSED ATTORNEY SHOULD BE CONSULTED.
6. UTILITIES WERE LOCATED BASED ON VISIBLE ABOVE GROUND STRUCTURES. THEREFORE THE LOCATION OF UNDERGROUND UTILITIES ARE APPROXIMATE OR MAY BE PRESENT AND NOT SHOWN HEREON. CALL 1-800-632-4949 BEFORE DIGGING.
7. BY GRAPHIC DETERMINATION, A PORTION OF THE SUBJECT PROPERTY APPEARS TO LIE WITHIN A SPECIAL FLOOD HAZARD AREA (SFHA) ZONE AE AS DETERMINED BY THE F.E.M.A. MAP# 3711308100J & 3711308000J DATED 09/02/2009.
8. ALL EXISTING FENCES WITHIN THE CONSERVATION EASEMENT AREAS ARE TO BE REMOVED.
9. THE STATE OF NORTH CAROLINA, ITS EMPLOYEES AND AGENTS, SUCCESSORS AND ASSIGNS, RECEIVE A PERPETUAL RIGHT OF ACCESS TO THE EASEMENT AREA OVER THE PROPERTY AT REASONABLE TIMES TO UNDERTAKE ANY ACTIVITIES TO RESTORE, CONSTRUCT, MANAGE, MAINTAIN, ENHANCE, AND MONITOR THE STREAM, WETLAND AND ANY OTHER RIPARIAN RESOURCES IN THE EASEMENT AREA, IN ACCORDANCE WITH RESTORATION ACTIVITIES OR A LONG-TERM MANAGEMENT PLAN AS DESCRIBED IN SECTION III-A OF THE CONSERVATION EASEMENT AGREEMENT.

THIS PLAT DOES NOT CREATE A SUBDIVISION OF PROPERTY IN ALLEGHANY COUNTY. THE PURPOSE OF THIS SURVEY IS TO IDENTIFY THE CONSERVATION EASEMENT AREAS ONLY. NO TRANSFER OF PROPERTY IS TAKING PLACE.

TOTAL CONSERVATION EASEMENT AREA: 22.11 ACRES
AREA A: 1.36 ACRES
AREA B: 20.75 ACRES

0' 200' 400' 600'
ONE INCH = TWO-HUNDRED FEET

A FINAL PLAT OF
A CONSERVATION EASEMENT SURVEY FOR:

THE STATE OF NORTH CAROLINA,
DIVISION OF MITIGATION SERVICES
"VILE CREEK STREAM & WETLAND MITIGATION SITE"
SPO FILE NUMBER: 03-FP DMS SITE ID: 96582

PARCEL IDENTIFICATION #: 3081-20-6925

CURRENT OWNER LISTED AS:
JUDY GAMBILL CROUSE & HUSBAND, GARY CROUSE
SITE ADDRESS: NC HIGHWAY 18 N, SPARTA, NC 28675

DEED REFERENCE: BOOK: 347 PAGE: 1445
GAP CIVIL TOWNSHIP, ALLEGHANY COUNTY, NORTH CAROLINA

SURVEY BY: NC,JN,SH DRAWN BY: EC CHECKED BY: NC
SURVEY DATE: 08/25/15-09/15/15 JOB #141093-CE

SHEET SIZE: 18"X24" | SHEET #: 2 OF 4 | SCALE: 1"=200'

Kee MAPPING & SURVEYING
P.O. Box 2566
Asheville, NC 28802
(828) 575-9021
www.keemap.com
License # C-3039

PLAT BOOK: 10 PAGE: 446

N

GRID NORTH
NAD 83 (2011)

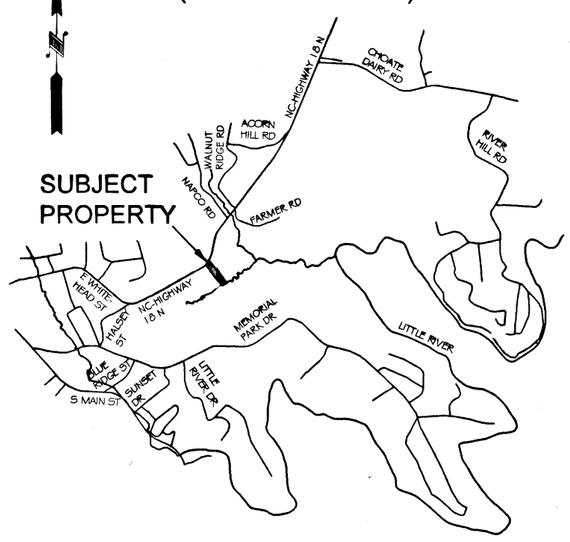
REGISTER OF
DEEDS STAMP

THIS PLAT DOES NOT CREATE A SUBDIVISION OF PROPERTY IN ALLEGHANY COUNTY. THE PURPOSE OF THIS SURVEY IS TO IDENTIFY THE CONSERVATION EASEMENT AREAS ONLY. NO TRANSFER OF PROPERTY IS TAKING PLACE.

I, Travis Dalton, REVIEW OFFICER FOR ALLEGHANY COUNTY, CERTIFY THAT THE MAP OR PLAT TO WHICH THIS CERTIFICATION IS AFFIXED, MEETS ALL STATUTORY REQUIREMENTS FOR RECORDING.

Li Dalton 1/4/16
REVIEW OFFICER DATE

VICINITY MAP
(NOT TO SCALE)



PROPERTY IS ZONED
RESIDENTIAL AGRICULTURE (RA)
REFER TO TOWN OF SPARTA,
NC CODE OF ORDINANCES

CERTIFICATE OF OWNERSHIP AND DEDICATION:

I HEREBY CERTIFY THAT I AM THE OWNER OF THE PROPERTY AS SHOWN AND DESCRIBED HEREON. I ALSO HEREBY ACCEPT AND ADOPT THIS RECORD PLAT AND CONSERVATION EASEMENT WITH MY FREE CONSENT AND DEDICATED ALL EASEMENTS, RIGHT OF WAYS AND ACCESS ROADS TO PUBLIC AND/OR PRIVATE USE AS NOTED ON SAID PLAT.

Debbie Edwards 1-4-16
DEBBIE EDWARDS DATE

SURVEYOR'S NOTES:

1. ALL DISTANCES ARE GROUND MEASUREMENTS IN US SURVEY FEET UNLESS OTHERWISE NOTED.
2. AREAS CALCULATED BY THE COORDINATE METHOD.
3. PROPERTY SUBJECT TO ALL EASEMENTS, RIGHT OF WAYS AND RESTRICTIONS THAT ARE RECORDED, UNRECORDED, WRITTEN AND UNWRITTEN.
4. ALLEGHANY COUNTY GIS WEBSITE USED TO IDENTIFY ADJOINING PROPERTY OWNERS.
5. THE PROFESSIONAL SURVEYOR HAS MADE NO INVESTIGATION OR INDEPENDENT SEARCH FOR EASEMENTS, RIGHT OF WAYS, ENCUMBRANCES, RESTRICTIVE COVENANTS, CORRECT OWNERSHIP OR ANY OTHER FACTS THAT AN ACCURATE AND CURRENT TITLE SEARCH MAY DISCLOSE. A NC LICENSED ATTORNEY SHOULD BE CONSULTED.
6. UTILITIES WERE LOCATED BASED ON VISIBLE ABOVE GROUND STRUCTURES, THEREFORE THE LOCATION OF UNDERGROUND UTILITIES ARE APPROXIMATE OR MAY BE PRESENT AND NOT SHOWN HEREON. CALL 1-800-632-4949 BEFORE DIGGING.
7. BY GRAPHIC DETERMINATION, A PORTION OF THE SUBJECT PROPERTY APPEARS TO LIE WITHIN A SPECIAL FLOOD HAZARD AREA (SFHA) ZONE AE AS DETERMINED BY THE F.E.M.A. MAP# 3711308100J & 3711308000J DATED 09/02/2009.
8. ALL EXISTING FENCES WITHIN THE CONSERVATION EASEMENT AREAS ARE TO BE REMOVED.
9. THE STATE OF NORTH CAROLINA, ITS EMPLOYEES AND AGENTS, SUCCESSORS AND ASSIGNS, RECEIVE A PERPETUAL RIGHT OF ACCESS TO THE EASEMENT AREA OVER THE PROPERTY AT REASONABLE TIMES TO UNDERTAKE ANY ACTIVITIES TO RESTORE, CONSTRUCT, MANAGE, MAINTAIN, ENHANCE, AND MONITOR THE STREAM, WETLAND AND ANY OTHER RIPARIAN RESOURCES IN THE EASEMENT AREA, IN ACCORDANCE WITH RESTORATION ACTIVITIES OR A LONG-TERM MANAGEMENT PLAN AS DESCRIBED IN SECTION III-A OF THE CONSERVATION EASEMENT AGREEMENT.

JESSIE D. PERRY &
WIFE, REGINA PERRY
PIN: 3081-10-0180
DB: 298 PG: 1461

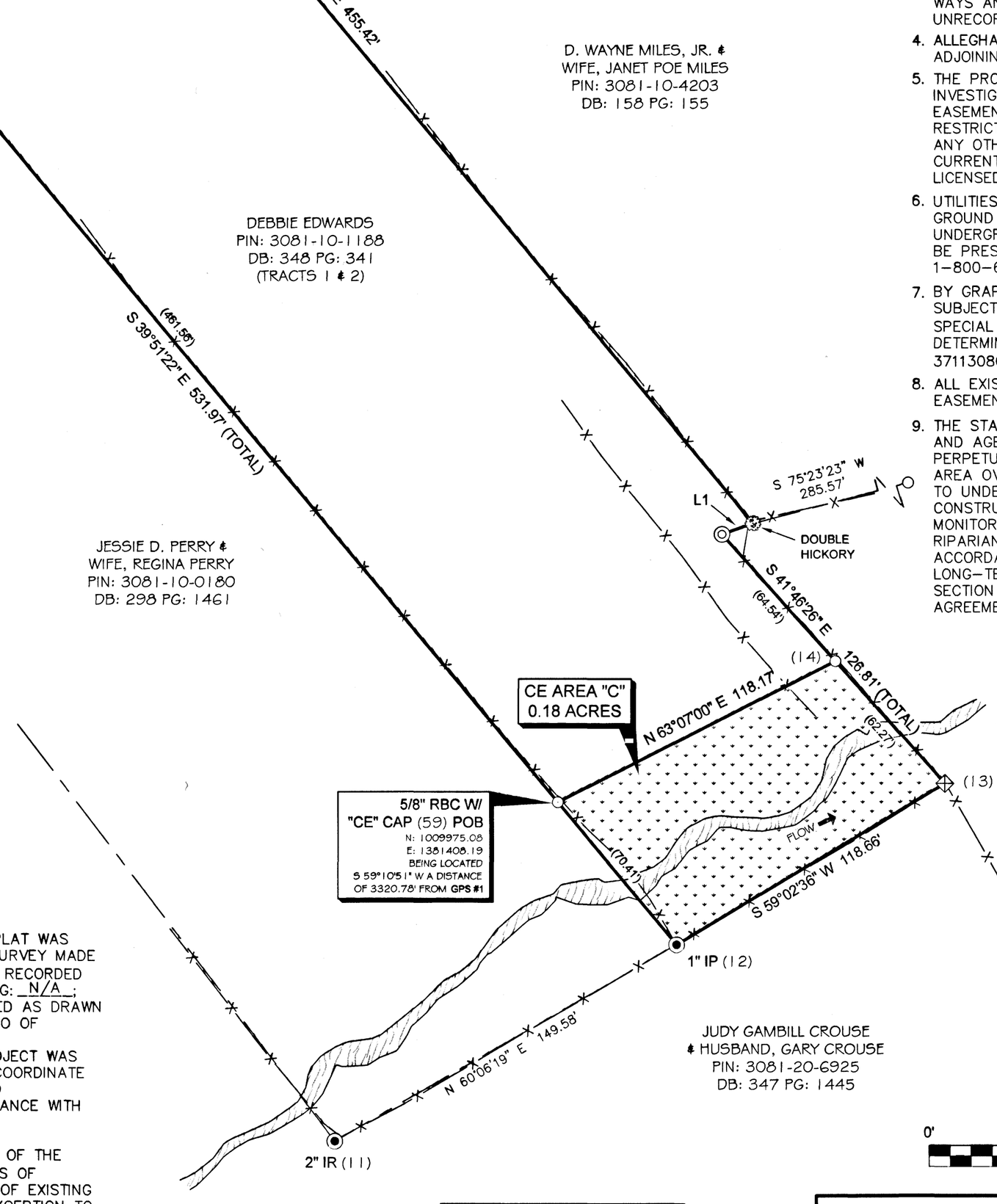
D. WAYNE MILES, JR. &
WIFE, JANET POE MILES
PIN: 3081-10-4203
DB: 158 PG: 155

DEBBIE EDWARDS
PIN: 3081-10-1188
DB: 348 PG: 341
(TRACTS 1 & 2)

JESSIE D. PERRY &
WIFE, REGINA PERRY
PIN: 3081-10-0180
DB: 298 PG: 1461

JUDY GAMBILL CROUSE
& HUSBAND, GARY CROUSE
PIN: 3081-20-6925
DB: 347 PG: 1445

JUDY GAMBILL CROUSE
& HUSBAND, GARY CROUSE
PIN: 3081-20-6925
DB: 347 PG: 1445



LEGEND:

(##)	CE CORNER NUMBER
○	SET 5/8" RBC "CE CAP"
●	CALCULATED POINT (NOT SET)
◉	EXISTING IRON PIN (AS NOTED)
⊕	EXISTING FENCE POST
◎	SET 1" IRON PIPE W/ "KEE" CAP
	TREE (AS NOTED)
	NOT TO SCALE (NTS)
	CONSERVATION EASEMENT AREA
	WATER
	ASPHALT
	CONSERVATION EASEMENT (CE)
	BOUNDARY LINE
	BOUNDARY LINE (NOT SURVEYED)
	ADJOINING DEED LINES
—X—	FENCE LINE
PB:	PLAT BOOK
DB:	DEED BOOK
PG:	PAGE
RBR	REBAR
RBC	REBAR WITH ID CAP
IP	IRON PIPE
IR	IRON ROD
NAD	NORTH AMERICAN DATUM 1983
SPC	STATE PLANE COORDINATES
NCGS	NORTH CAROLINA GEODETIC SURVEY
CC	CONTROL CORNER
CF	COMBINED FACTOR
POB	POINT OF BEGINNING

LINE TABLE		
LINE	BEARING	DISTANCE
L1	S 70°46'46" W	12.46'

COORDINATE TABLE		
#	NORTHING	EASTING
12	1009921.04	1381453.31
13	1009982.08	1381555.07
14	1010028.50	1381513.57
59	1009975.08	1381408.19

0' 40' 80' 120'
ONE INCH = FORTY FEET

CERTIFICATE OF SURVEY AND ACCURACY:

I, NOLAN R. CARMACK, CERTIFY THAT THIS PLAT WAS DRAWN UNDER MY SUPERVISION FROM AN ACTUAL SURVEY MADE UNDER MY SUPERVISION FROM DEED DESCRIPTION(S) RECORDED IN DB: 348, PG: 341, AND PB: N/A, PG: N/A; THAT THE BOUNDARIES NOT SURVEYED ARE INDICATED AS DRAWN FROM INFORMATION AS REFERENCED; THAT THE RATIO OF PRECISION AS CALCULATED DOES NOT EXCEED 1:10,000; THAT THE GPS PORTION OF THIS PROJECT WAS TO PERFORM A GRID TIE TO THE NC STATE PLANE COORDINATE SYSTEM AND INFORMATION USED IS SHOWN & NOTED HEREON; THAT THIS PLAT WAS PREPARED IN ACCORDANCE WITH G.S. 47-30 AS AMENDED.

I ALSO HEREBY CERTIFY THAT THIS PLAT IS OF ONE OF THE FOLLOWING: GS 47-30 F(11) D; THAT THE SURVEY IS OF ANOTHER CATEGORY, SUCH AS THE RECOMBINATION OF EXISTING PARCELS, A COURT-ORDERED SURVEY, OR OTHER EXCEPTION TO THE DEFINITION OF SUBDIVISION.

GPS METADATA
CLASS OF SURVEY: HORIZONTAL: A VERTICAL: C
FIELD PROCEDURE: STATIC NETWORK
DATES: 10/13/14
DATUM: NAD83(2011) NAVD 88
EPOCH: 2010
GEOID: 12A
AVERAGE COMBINED FACTOR: 0.99998445
POSITIONAL ACCURACY: HORIZONTAL: 0.04' VERTICAL: 0.08'
UNITS: USFT
CORS USED: NCSR, NCWJ, DOBS, NCNW

WITNESS MY ORIGINAL SIGNATURE, REGISTRATION NUMBER, AND SEAL THIS 30TH DAY OF DECEMBER, 2015, A.D.

NORTH CAROLINA PROFESSIONAL SEAL L-5076 LAND SURVEYOR NOLAN R. CARMACK

THIS DOCUMENT IS NOT VALID UNLESS SIGNED AND SEALED.

NOLAN R. CARMACK, PLS L-5076

CONSERVATION EASEMENT CORNER CAP (TYPICAL)

STATE OF NORTH CAROLINA CONSERVATION EASEMENT

GRID TIE INFORMATION:

GPS #1
1" IPC "KEE" (CC)
NC STATE PLANE COORDINATES
EPOCH:2010 GEOID:12A
NAD83(2011)
N:1011676.43
E:1384260.04
Z:2784.95 (NAVD 88)
CF: 0.99998470
BEING LOCATED S 71°31'04" E
A DISTANCE OF 1709.20' (GRID)
1709.23' (GROUND) FROM GPS #2.

GPS #2
NCGS CON MON (CC)
"ALLEGHANY HMO5"
NC STATE PLANE COORDINATES
EPOCH:2010 GEOID:12A
NAD83(2011)
N:1012218.26
E:1382638.99
Z:2841.80 (NAVD 88)
CF: 0.99998420

A FINAL PLAT OF
A CONSERVATION EASEMENT SURVEY FOR:

THE STATE OF NORTH CAROLINA,
DIVISION OF MITIGATION SERVICES
"VILE CREEK STREAM & WETLAND MITIGATION SITE"
SPO FILE NUMBER: 03-FQ DMS SITE ID: 96582

PARCEL IDENTIFICATION #: 3081-10-1188

CURRENT OWNER LISTED AS:
DEBBIE EDWARDS
SITE ADDRESS: NC HIGHWAY 18 N, SPARTA ,NC 28675

DEED REFERENCE: BOOK: 348 PAGE: 341
GAP CIVIL TOWNSHIP, ALLEGHANY COUNTY, NORTH CAROLINA

SURVEY BY: NC,JN,SH DRAWN BY: EC CHECKED BY: NC
SURVEY DATE: 08/25/15 - 09/15/15 JOB #141093-CE

SHEET SIZE: 18"X24" | SHEET #: 3 OF 4 | SCALE: 1"=40'

Kee MAPPING & SURVEYING
P.O. Box 2566
Asheville, NC 28802
(828) 575-9021
www.keemap.com
License # C-3039

FILED Jan 04, 2016 01:26:18 pm
BOOK 00010
PAGE 0446
INST # 00007
ALLEGHANY COUNTY NC
LIZABETH REEVES ROUPE
REGISTER OF DEEDS

CERTIFICATE OF SURVEY AND ACCURACY:

I, NOLAN R. CARMACK, CERTIFY THAT THIS PLAT WAS DRAWN UNDER MY SUPERVISION FROM AN ACTUAL SURVEY MADE UNDER MY SUPERVISION FROM DEED DESCRIPTION(S) RECORDED IN DB: 347, PG: 1449, AND PB: N/A, PG: N/A; THAT THE BOUNDARIES NOT SURVEYED ARE INDICATED AS DRAWN FROM INFORMATION AS REFERENCED; THAT THE RATIO OF PRECISION AS CALCULATED DOES NOT EXCEED 1:10,000; THAT THE GPS PORTION OF THIS PROJECT WAS TO PERFORM A GRID TIE TO THE NC STATE PLANE COORDINATE SYSTEM AND INFORMATION USED IS SHOWN & NOTED HEREON; THAT THIS PLAT WAS PREPARED IN ACCORDANCE WITH G.S. 47-30 AS AMENDED.

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GPS METADATA
CLASS OF SURVEY: HORIZONTAL: A VERTICAL: C
FIELD PROCEDURE: STATIC NETWORK
DATES: 10/13/14
DATUM: NAD83(2011) NAVD 88
EPOCH: 2010
GEOID: 12A
AVERAGE COMBINED FACTOR: 0.99998445
POSITIONAL ACCURACY: HORIZONTAL: 0.04' VERTICAL: 0.08'
UNITS: USFT
CORS USED: NCSR, NCWJ, DOBS, NCNW

WITNESS MY ORIGINAL SIGNATURE, REGISTRATION NUMBER, AND SEAL THIS 30TH DAY OF DECEMBER, 2015, A.D.

NORTH CAROLINA PROFESSIONAL SEAL L-5076 LAND SURVEYOR NOLAN R. CARMACK

THIS DOCUMENT IS NOT VALID UNLESS SIGNED AND SEALED.

NOLAN R. CARMACK, PLS L-5076

REGISTER OF DEEDS STAMP

I, Travis Dalton, REVIEW OFFICER FOR ALLEGHANY COUNTY, CERTIFY THAT THE MAP OR PLAT TO WHICH THIS CERTIFICATION IS AFFIXED, MEETS ALL STATUTORY REQUIREMENTS FOR RECORDING.

REVIEW OFFICER 1/4/16 DATE

CERTIFICATE OF OWNERSHIP AND DEDICATION:

I HEREBY CERTIFY THAT I AM THE OWNER OF THE PROPERTY AS SHOWN AND DESCRIBED HEREON. I ALSO HEREBY ACCEPT AND ADOPT THIS RECORD PLAT AND CONSERVATION EASEMENT WITH MY FREE CONSENT AND DEDICATED ALL EASEMENTS, RIGHT OF WAYS AND ACCESS ROADS TO PUBLIC AND/OR PRIVATE USE AS NOTED ON SAID PLAT.

Tamara Gambill Mason 1-4-2016
TAMARA GAMBILL MASON DATE

1/4/2016
STEVE MASON DATE

CONSERVATION EASEMENT CORNER CAP (TYPICAL)

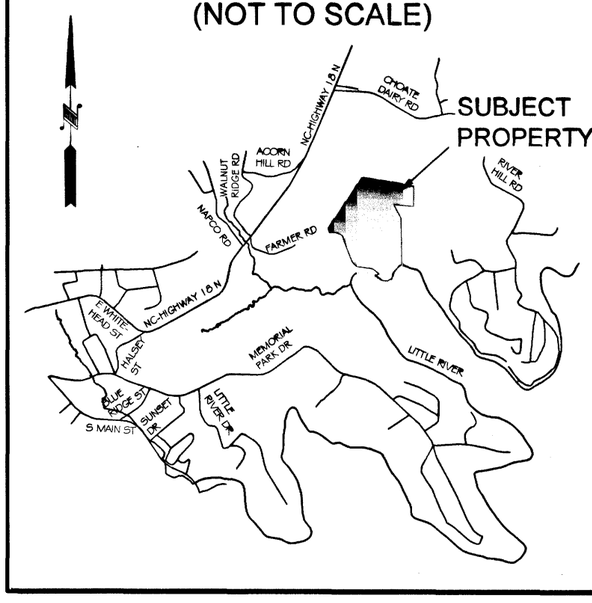
STATE OF NORTH CAROLINA CONSERVATION EASEMENT

N
GRID NORTH
NAD 83 (2011)

TOTAL CONSERVATION EASEMENT AREA: 2.74 ACRES
AREA D: 0.44 ACRES
AREA E: 2.30 ACRES

THIS PLAT DOES NOT CREATE A SUBDIVISION OF PROPERTY IN ALLEGHANY COUNTY. THE PURPOSE OF THIS SURVEY IS TO IDENTIFY THE CONSERVATION EASEMENT AREAS ONLY. NO TRANSFER OF PROPERTY IS TAKING PLACE.

VICINITY MAP
(NOT TO SCALE)



KAREN GAMBILL LEYS & HUSBAND, MARION LEYS
PIN: 3081-32-2215
DB: 341 PG: 217

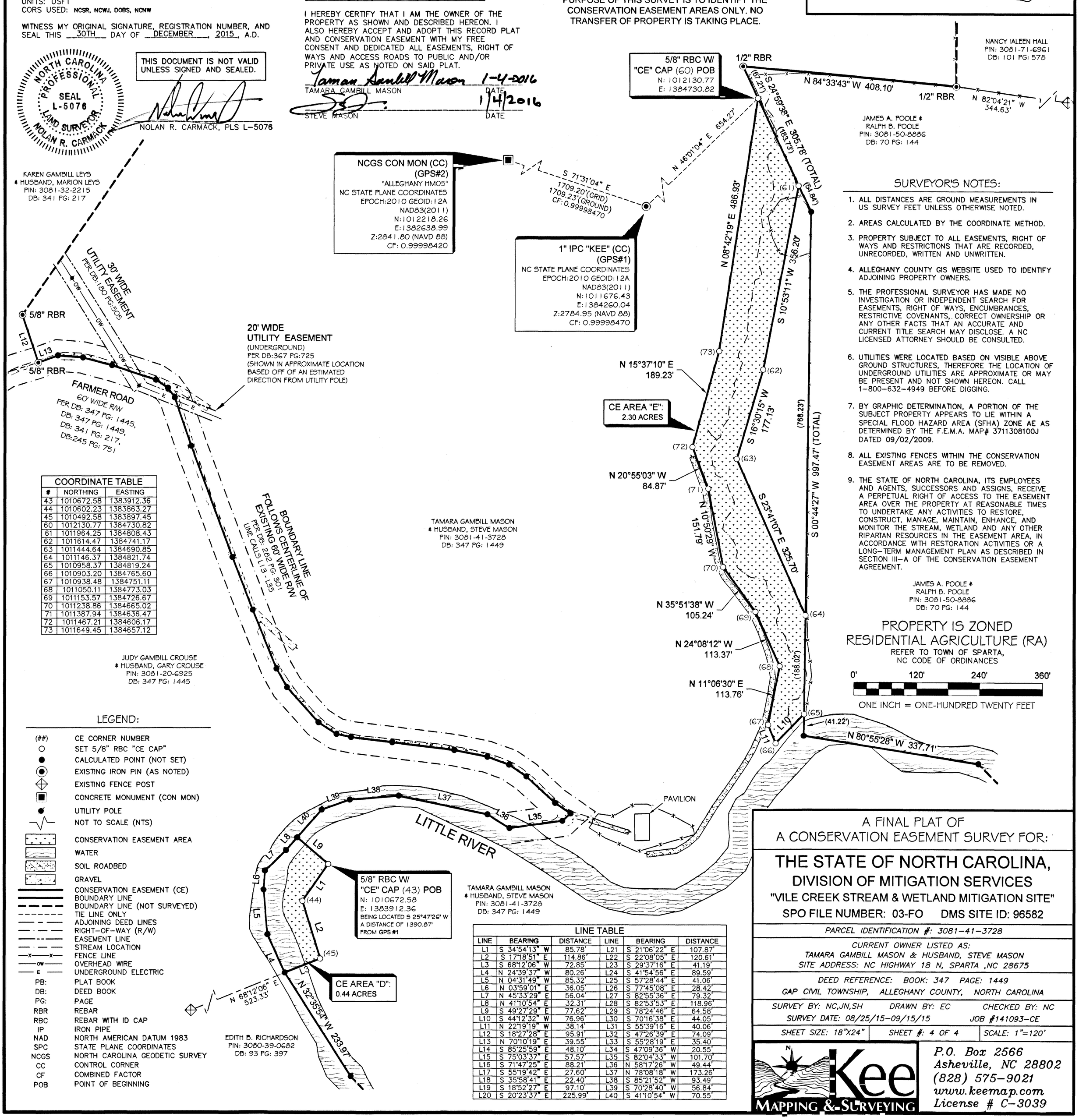
NANCY IALEEN HALL
PIN: 3081-71-6961
DB: 101 PG: 578

JAMES A. POOLE & RALPH B. POOLE
PIN: 3081-50-8886
DB: 70 PG: 144

TAMARA GAMBILL MASON & HUSBAND, STEVE MASON
PIN: 3081-41-3728
DB: 347 PG: 1449

JUDY GAMBILL CROUSE & HUSBAND, GARY CROUSE
PIN: 3081-20-6925
DB: 347 PG: 1445

EDITH B. RICHARDSON
PIN: 3080-39-0682
DB: 93 PG: 397



COORDINATE TABLE

#	NORTHING	EASTING
43	1010672.58	1383912.36
44	1010602.23	1383863.27
45	1010492.58	1383897.45
60	1012130.77	1384730.82
61	1011964.25	1384808.43
62	1011614.47	1384741.17
63	1011444.64	1384690.85
64	1011146.37	1384821.74
65	1010958.37	1384819.24
66	1010903.20	1384765.60
67	1010938.48	1384751.11
68	1011050.11	1384773.03
69	1011153.57	1384726.67
70	1011238.86	1384665.02
71	1011387.94	1384636.47
72	1011467.21	1384606.17
73	1011649.45	1384657.12

LEGEND:

(##)	CE CORNER NUMBER
○	SET 5/8" RBC "CE CAP"
●	CALCULATED POINT (NOT SET)
◉	EXISTING IRON PIN (AS NOTED)
⟡	EXISTING FENCE POST
■	CONCRETE MONUMENT (CON MON)
●	UTILITY POLE
	NOT TO SCALE (NTS)
	CONSERVATION EASEMENT AREA
	WATER
	SOIL ROADBED
	GRAVEL
	CONSERVATION EASEMENT (CE)
	BOUNDARY LINE
	BOUNDARY LINE (NOT SURVEYED)
	TIE LINE ONLY
	ADJOINING DEED LINES
	RIGHT-OF-WAY (R/W)
	EASEMENT LINE
	STREAM LOCATION
	FENCE LINE
OW	OVERHEAD WIRE
E	UNDERGROUND ELECTRIC
PB:	PLAT BOOK
DB:	DEED BOOK
PG:	PAGE
RBR	REBAR
RBC	REBAR WITH ID CAP
IP	IRON PIPE
NAD	NORTH AMERICAN DATUM 1983
SPC	STATE PLANE COORDINATES
NCGS	NORTH CAROLINA GEODETIC SURVEY
CC	CONTROL CORNER
CF	COMBINED FACTOR
POB	POINT OF BEGINNING

SURVEYOR'S NOTES:

1. ALL DISTANCES ARE GROUND MEASUREMENTS IN US SURVEY FEET UNLESS OTHERWISE NOTED.
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7. BY GRAPHIC DETERMINATION, A PORTION OF THE SUBJECT PROPERTY APPEARS TO LIE WITHIN A SPECIAL FLOOD HAZARD AREA (SFHA) ZONE AE AS DETERMINED BY THE F.E.M.A. MAP# 3711308100J DATED 09/02/2009.
8. ALL EXISTING FENCES WITHIN THE CONSERVATION EASEMENT AREAS ARE TO BE REMOVED.
9. THE STATE OF NORTH CAROLINA, ITS EMPLOYEES AND AGENTS, SUCCESSORS AND ASSIGNS, RECEIVE A PERPETUAL RIGHT OF ACCESS TO THE EASEMENT AREA OVER THE PROPERTY AT REASONABLE TIMES TO UNDERTAKE ANY ACTIVITIES TO RESTORE, CONSTRUCT, MANAGE, MAINTAIN, ENHANCE, AND MONITOR THE STREAM, WETLAND AND ANY OTHER RIPARIAN RESOURCES IN THE EASEMENT AREA, IN ACCORDANCE WITH RESTORATION ACTIVITIES OR A LONG-TERM MANAGEMENT PLAN AS DESCRIBED IN SECTION III-A OF THE CONSERVATION EASEMENT AGREEMENT.

JAMES A. POOLE & RALPH B. POOLE
PIN: 3081-50-8886
DB: 70 PG: 144

PROPERTY IS ZONED RESIDENTIAL AGRICULTURE (RA)
REFER TO TOWN OF SPARTA, NC CODE OF ORDINANCES

0' 120' 240' 360'
ONE INCH = ONE-HUNDRED TWENTY FEET

LINE TABLE

LINE	BEARING	DISTANCE	LINE	BEARING	DISTANCE
L1	S 34°54'13" W	85.78'	L21	S 21°06'22" E	107.87'
L2	S 17°18'51" E	114.86'	L22	S 22°08'05" E	120.61'
L3	S 68°12'06" W	72.85'	L23	S 29°37'16" E	41.19'
L4	N 24°39'37" W	80.26'	L24	S 41°54'56" E	89.59'
L5	N 04°31'49" W	85.32'	L25	S 57°28'44" E	41.06'
L6	N 03°59'01" E	36.05'	L26	S 77°45'08" E	28.42'
L7	N 45°33'29" E	56.04'	L27	S 82°55'36" E	79.32'
L8	N 41°10'54" E	32.31'	L28	S 82°53'53" E	118.96'
L9	S 49°27'29" E	77.62'	L29	S 78°24'46" E	64.58'
L10	S 44°12'32" W	76.96'	L30	S 70°16'38" E	44.05'
L11	N 22°19'19" W	38.14'	L31	S 55°39'16" E	40.06'
L12	S 18°27'28" E	95.91'	L32	S 47°26'39" E	74.09'
L13	N 70°10'19" E	39.55'	L33	S 55°28'19" E	35.40'
L14	S 85°25'59" E	48.10'	L34	S 47°09'36" W	20.55'
L15	S 75°03'37" E	57.57'	L35	S 82°04'33" W	101.70'
L16	S 71°47'25" E	88.21'	L36	N 58°17'26" W	49.44'
L17	S 55°19'42" E	27.60'	L37	N 78°08'18" W	173.26'
L18	S 35°58'41" E	22.40'	L38	S 85°21'52" W	93.49'
L19	S 18°52'27" E	97.10'	L39	S 70°28'40" W	56.84'
L20	S 20°23'37" E	225.99'	L40	S 41°10'54" W	70.55'

A FINAL PLAT OF
A CONSERVATION EASEMENT SURVEY FOR:

THE STATE OF NORTH CAROLINA,
DIVISION OF MITIGATION SERVICES
"VILE CREEK STREAM & WETLAND MITIGATION SITE"
SPO FILE NUMBER: 03-FO DMS SITE ID: 96582

PARCEL IDENTIFICATION #: 3081-41-3728

CURRENT OWNER LISTED AS:
TAMARA GAMBILL MASON & HUSBAND, STEVE MASON
SITE ADDRESS: NC HIGHWAY 18 N, SPARTA, NC 28675

DEED REFERENCE: BOOK: 347 PAGE: 1449
GAP CIVIL TOWNSHIP, ALLEGHANY COUNTY, NORTH CAROLINA

SURVEY BY: NC,JN,SH DRAWN BY: EC CHECKED BY: NC
SURVEY DATE: 08/25/15-09/15/15 JOB #141093-CE

SHEET SIZE: 18"X24" SHEET #: 4 OF 4 SCALE: 1"=120'

Kee MAPPING & SURVEYING
P.O. Box 2566
Asheville, NC 28802
(828) 575-9021
www.keemap.com
License # C-3039

FILED Jan 04, 2016 01:27:47 pm
BOOK 00010
PAGE 0447
INST # 00008
ALLEGHANY COUNTY NC
LIZABETH REEVES ROUPE
REGISTER OF DEEDS

APPENDIX 2

USACE ROUTINE WETLAND DETERMINATION DATA FORMS, JURISDICTIONAL DETEMRINATION, AND PRE-CONSTRUCTION NOTIFICATION

Office Use Only:
Corps action ID no. _____
DWQ project no. _____
Form Version 1.3 Dec 10 2008

Pre-Construction Notification (PCN) Form

A. Applicant Information

1. Processing

1a. Type(s) of approval sought from the Corps:	☒ Section 404 Permit ☐ Section 10 Permit	
1b. Specify Nationwide Permit (NWP) number: No. 27 or General Permit (GP) number:		
1c. Has the NWP or GP number been verified by the Corps?	☐ Yes	☒ No
1d. Type(s) of approval sought from the DWQ (check all that apply): ☒ 401 Water Quality Certification – Regular ☐ Non-404 Jurisdictional General Permit ☐ 401 Water Quality Certification – Express ☐ Riparian Buffer Authorization		
1e. Is this notification solely for the record because written approval is not required?	For the record only for DWQ 401 Certification: ☐ Yes ☒ No	For the record only for Corps Permit: ☐ Yes ☒ No
1f. Is payment into a mitigation bank or in-lieu fee program proposed for mitigation of impacts? If so, attach the acceptance letter from mitigation bank or in-lieu fee program.	☐ Yes	☒ No
1g. Is the project located in any of NC's twenty coastal counties. If yes, answer 1h below.	☐ Yes	☒ No
1h. Is the project located within a NC DCM Area of Environmental Concern (AEC)?	☐ Yes	☒ No

2. Project Information

2a. Name of project:	Vile Creek Mitigation Site
2b. County:	Alleghany
2c. Nearest municipality / town:	Sparta, NC
2d. Subdivision name:	N/A
2e. NCDOT only, T.I.P. or state project no:	

3. Owner Information	
3a. Name(s) on Recorded Deed:	1.) Iris Gambill Estate & Gary & Judy Crouse 2.) Iris Gambill Estate & Steve & Tamara Mason 3.) Jessie D. Perry & Regina Perry 4.) Debbie Edwards & Donna Rollins 5.) Wayne D Miles Jr. & Janet Miles
3b. Deed Book and Page No.	1.) DB 347 PN 1445 2.) DB 347 PN 1449 3.) DB 298 PN 1461 4.) DB 348 PN 341 5.) DB 148 PN 3155
3c. Responsible Party (for LLC if applicable):	NCDEQ – Division of Mitigation Services Contact: Tim Baumgartner, Deputy Director
3d. Street address:	217 West Jones Street, Suite 3000A
3e. City, state, zip:	Raleigh, NC 27603
3f. Telephone no.:	919-707-8543
3g. Fax no.:	919-707-8976
3h. Email address:	Tim.Baumgartner@ncdenr.gov
4. Applicant Information (if different from owner)	
4a. Applicant is:	☐ Agent ☒ Other, specify: State agency
4b. Name:	Tim Baumgartner
4c. Business name (if applicable):	NCDEQ- Division of Mitigation Services
4d. Street address:	217 W. Jones St, Suite 3000A
4e. City, state, zip:	Raleigh, NC 27603
4f. Telephone no.:	919-707-8543
4g. Fax no.:	919-707-8976
4h. Email address:	Tim.Baumgartner@ncdenr.gov
5. Agent/Consultant Information (if applicable)	
5a. Name:	Ian Eckardt
5b. Business name (if applicable):	Wildlands Engineering, Inc.
5c. Street address:	1430 South Mint Street, Suite 104
5d. City, state, zip:	Charlotte, NC 28203
5e. Telephone no.:	704-332-7754
5f. Fax no.:	704-332-3306
5g. Email address:	ieckardt@wildlandseng.com

B. Project Information and Prior Project History	
1. Property Identification	
1a. Property identification no. (tax PIN or parcel ID):	PIN#'s 1.) 3081-20-6925 2.) 3081-41-3728 3.) 3081-10-0180 4.) 3081-10-1188 5.) 3081-10-4203
1b. Site coordinates (in decimal degrees):	Upstream Project Limits along Vile Creek: Latitude: 36.509754° N/ Longitude: 81.103348° W Downstream Project Limits along Vile Creek: Latitude: 36.508565° N/ Longitude: 81.096721° W
1c. Property size:	Final protected easement acreage will be 25.04 Acres
2. Surface Waters	
2a. Name of nearest body of water (stream, river, etc.) to proposed project:	Vile Creek & Little River
2b. Water Quality Classification of nearest receiving water:	Class C
2c. River basin:	New River: 05050001
3. Project Description	
3a. Describe the existing conditions on the site and the general land use in the vicinity of the project at the time of this application: The project area is located within a primarily rural watershed in central Alleghany County, NC approximately one-mile northeast of the Town of Sparta. Land use in and immediate adjacent to the project area is a mix of agriculture fields (pasture) and forest. A small amount of adjacent land is also used for low density rural residential.	
3b. List the total estimated acreage of all existing wetlands on the property: Approximately 3.49 acres of wetlands on multiple parcels	
3c. List the total estimated linear feet of all existing streams (intermittent and perennial) on the property: Approximately 8,285 linear feet (LF) of intermittent and perennial channel on multiple parcels.	
3d. Explain the purpose of the proposed project: The purpose of the project is to provide stream and wetland mitigation to offset unavoidable impacts in the New River Basin. Mitigation will include stream restoration and enhancement to approximately 7,927 linear feet of perennial and intermittent streams and restoration of 6.5 acres of riparian wetlands.	
3e. Describe the overall project in detail, including the type of equipment to be used: The project involves restoration and enhancement along the Little River, Vile Creek, and several unnamed tributaries to Vile Creek within the project area. Stream restoration activities will involve excavation of new channel and floodplain, installation of in-stream structures, planting a native riparian buffer and fencing out of cattle. Enhancement I will include raising the stream bed by adding constructed riffles and establishing a riffle cross section sized appropriately for the bankfull discharge in addition to buffer planting and fencing out cattle. Enhancement II will primarily involve fencing out cattle and planting of native riparian buffer. Stream enhancement and restoration will be achieved through natural channel design. Wetland restoration will include rehabilitation and re-establishment. Wetland rehabilitation will involve excavation and fill necessary to improve functionality in existing wetlands. Wetland re-establishment will involve excavation in areas of historic wetlands and buried hydric soils. Trackhoes will be used for stream, wetland, and floodplain work. A conservation easement will be recorded on the project streams and corresponding riparian buffer. See Section 9 of the mitigation plan for additional design information.	

4. Jurisdictional Determinations	
4a. Have jurisdictional wetland or stream determinations by the Corps or State been requested or obtained for this property / project (including all prior phases) in the past? Comments:	☒ Yes ☐ No ☐ Unknown
4b. If the Corps made the jurisdictional determination, what type of determination was made?	☒ Preliminary ☐ Final
4c. If yes, who delineated the jurisdictional areas? Name (if known): Ian Eckardt	Agency/Consultant Company: Wildlands Engineering, Inc. Other:
4d. If yes, list the dates of the Corps jurisdictional determinations or State determinations and attach documentation. A Jurisdictional Determination was issued by Tasha Alexander of the USACE on October 28, 2015. A copy of the issued Preliminary Jurisdictional Determination is included in Appendix 2 (Action Id. 2014-01585).	
5. Project History	
5a. Have permits or certifications been requested or obtained for this project (including all prior phases) in the past?	☐ Yes ☒ No ☐ Unknown
5b. If yes, explain in detail according to “help file” instructions.	
6. Future Project Plans	
6a. Is this a phased project?	☐ Yes ☒ No
6b. If yes, explain.	

C. Proposed Impacts Inventory

1. Impacts Summary

1a. Which sections were completed below for your project (check all that apply):

☒ Wetlands ☒ Streams - tributaries ☐ Buffers

☐ Open Waters ☐ Pond Construction

2. Wetland Impacts

If there are wetland impacts proposed on the site, then complete this question for each wetland area impacted.

2a. Wetland impact number – Permanent (P) or Temporary (T)	2b. Type of impact	2c. Type of wetland (if known)	2d. Forested	2e. Type of jurisdiction (Corps - 404, 10 DWQ – non-404, other)	2f. Area of impact (acres)
W1 – Wetland A ☐ P ☒ T	Excavation– wetland rehabilitation	Bottomland Hardwood Forest	☐ Yes ☒ No	☒ Corps ☒ DWQ	0.10
W2 – Wetland B ☐ P ☒ T	Excavation – wetland rehabilitation	Bottomland Hardwood Forest	☐ Yes ☒ No	☒ Corps ☒ DWQ	0.43
W3 – Wetland B ☐ P ☒ T	Fill – wetland rehabilitation	Bottomland Hardwood Forest	☐ Yes ☒ No	☒ Corps ☒ DWQ	0.04
W4– Wetland B ☒ P ☐ T	Excavation – stream channel construction	Bottomland Hardwood Forest	☐ Yes ☒ No	☒ Corps ☒ DWQ	0.003
W5– Wetland C ☐ P ☒ T	Excavation – wetland rehabilitation	Bottomland Hardwood Forest	☐ Yes ☒ No	☒ Corps ☒ DWQ	0.35
W6 – Wetland C ☐ P ☒ T	Fill – wetland rehabilitation	Bottomland Hardwood Forest	☐ Yes ☒ No	☒ Corps ☒ DWQ	0.01
W7 – Wetland C ☐ P ☒ T	Excavation – wetland rehabilitation	Bottomland Hardwood Forest	☐ Yes ☒ No	☒ Corps ☒ DWQ	0.88
W8 – Wetland C ☐ P ☒ T	Fill – wetland rehabilitation	Bottomland Hardwood Forest	☐ Yes ☒ No	☒ Corps ☒ DWQ	0.06
W9 – Wetland C ☐ P ☒ T	Fill – wetland rehabilitation	Bottomland Hardwood Forest	☐ Yes ☒ No	☒ Corps ☒ DWQ	0.01
W10 – Wetland C ☒ P ☐ T	Excavation – stream channel construction	Bottomland Hardwood Forest	☐ Yes ☒ No	☒ Corps ☒ DWQ	0.01
W11 – Wetland D ☐ P ☒ T	Construction access	Headwater forest	☐ Yes ☒ No	☒ Corps ☒ DWQ	0.06
W12 – Wetland E ☐ P ☒ T	Construction access	Seep	☐ Yes ☒ No	☒ Corps ☒ DWQ	0.04
W13 – Wetland F ☐ P ☒ T	Fill – wetland rehabilitation	Bottomland Hardwood Forest	☐ Yes ☒ No	☒ Corps ☒ DWQ	0.06
W14 – Wetland F ☐ P ☒ T	Excavation – wetland rehabilitation	Bottomland Hardwood Forest	☐ Yes ☒ No	☒ Corps ☒ DWQ	0.01
W15 – Wetland G ☐ P ☒ T	Construction access	Headwater Forest	☐ Yes ☒ No	☒ Corps ☒ DWQ	0.08
W16– Wetland H ☐ P ☒ T	Construction access	Headwater Forest	☐ Yes ☒ No	☒ Corps ☒ DWQ	0.02
W17 – Wetland I ☐ P ☒ T	Construction access	Headwater Forest	☐ Yes ☒ No	☒ Corps ☒ DWQ	0.002
W18– Wetland J ☐ P ☒ T	Construction access	Headwater forest	☐ Yes ☒ No	☒ Corps ☒ DWQ	0.01
W19 – Wetland K ☐ P ☒ T	Construction access	Headwater Forest	☐ Yes ☒ No	☒ Corps ☒ DWQ	0.02
W20 – Wetland L ☐ P ☒ T	Construction access	Headwater forest	☐ Yes ☒ No	☒ Corps ☒ DWQ	0.005

W21 – Wetland M ☒ P ☐ T	Excavation – stream channel construction	Bottomland Hardwood Forest	☒ Yes ☐ No	☒ Corps ☒ DWQ	0.02
W22 – Wetland M ☒ P ☐ T	Fill – floodplain grading	Bottomland Hardwood Forest	☒ Yes ☐ No	☒ Corps ☒ DWQ	0.01
W23 – Wetland M ☒ P ☐ T	Excavation – stream channel construction	Bottomland Hardwood Forest	☒ Yes ☐ No	☒ Corps ☒ DWQ	0.01
W24 – Wetland M ☐ P ☒ T	Fill – wetland rehabilitation	Bottomland Hardwood Forest	☒ Yes ☐ No	☒ Corps ☒ DWQ	0.02
W25 – Wetland M ☐ P ☒ T	Fill – wetland rehabilitation	Bottomland Hardwood Forest	☒ Yes ☐ No	☒ Corps ☒ DWQ	0.01
W26 – Wetland N ☐ P ☒ T	Excavation – wetland rehabilitation	Bottomland Hardwood Forest	☐ Yes ☒ No	☒ Corps ☒ DWQ	0.07
W27– Wetland N ☐ P ☒ T	Fill – wetland rehabilitation	Bottomland Hardwood Forest	☐ Yes ☒ No	☒ Corps ☒ DWQ	0.04
W28 – Wetland N ☒ P ☐ T	Excavation – stream channel construction	Bottomland Hardwood Forest	☐ Yes ☒ No	☒ Corps ☒ DWQ	0.15
W29 – Wetland N ☐ P ☒ T	Fill – wetland rehabilitation	Bottomland Hardwood Forest	☐ Yes ☒ No	☒ Corps ☒ DWQ	0.02
W30 – Wetland N ☒ P ☐ T	Excavation – stream channel construction	Bottomland Hardwood Forest	☐ Yes ☒ No	☒ Corps ☒ DWQ	0.01
W31 – Wetland N ☒ P ☐ T	Fill – floodplain grading	Bottomland Hardwood Forest	☐ Yes ☒ No	☒ Corps ☒ DWQ	0.01
W32 – Wetland P ☐ P ☒ T	Construction access	Bottomland Hardwood Forest	☐ Yes ☒ No	☒ Corps ☒ DWQ	0.04
W33 – Wetland O ☐ P ☒ T	Excavation – wetland rehabilitation	Bottomland Hardwood Forest	☐ Yes ☐ No	☒ Corps ☒ DWQ	0.27
W34 – Wetland O ☐ P ☒ T	Fill – wetland rehabilitation	Bottomland Hardwood Forest	☐ Yes ☒ No	☒ Corps ☒ DWQ	0.02
W35 – Wetland O ☐ P ☒ T	Excavation – wetland rehabilitation	Bottomland Hardwood Forest	☐ Yes ☒ No	☒ Corps ☒ DWQ	0.17
W36 – Wetland O ☐ P ☒ T	Fill – wetland rehabilitation	Bottomland Hardwood Forest	☐ Yes ☒ No	☒ Corps ☒ DWQ	0.06
W37– Wetland O ☒ P ☐ T	Excavation – stream channel construction	Bottomland Hardwood Forest	☐ Yes ☒ No	☒ Corps ☒ DWQ	0.004
W38 – Wetland Q ☐ P ☒ T	Construction access	Bottomland Hardwood Forest	☐ Yes ☒ No	☒ Corps ☒ DWQ	0.04
W39 – Wetland S ☐ P ☒ T	Construction access/stream stabilization	Headwater Forest	☐ Yes ☒ No	☒ Corps ☒ DWQ	0.01
W40 – Wetland S ☒ P ☐ T	Fill – BMP construction	Headwater Forest	☐ Yes ☒ No	☒ Corps ☒ DWQ	0.001
W41 – Wetland T ☐ P ☒ T	Construction access/stream stabilization	Headwater Forest	☐ Yes ☒ No	☒ Corps ☒ DWQ	0.03
W42 – Wetland U ☐ P ☒ T	Construction access/stream stabilization	Headwater Forest	☐ Yes ☒ No	☒ Corps ☒ DWQ	0.005
W43 – Wetland V ☐ P ☒ T	Construction access/stabilization	Headwater Forest	☐ Yes ☒ No	☒ Corps ☒ DWQ	0.004
				2g. **Total wetland impacts**	3.224

2h. Comments: The project proposes a net gain of approximately 3.5 acres of wetlands through re-establishment techniques.

3. Stream Impacts

If there are perennial or intermittent stream impacts (including temporary impacts) proposed on the site, then complete this question for all stream sites impacted.

3a. Stream impact number - Permanent (P) or Temporary (T)	3b. Type of impact	3c. Stream name	3d. Perennial (PER) or intermittent (INT)?	3e. Type of jurisdiction (Corps - 404, 10 DWQ – non-404, other)	3f. Average stream width (feet)	3g. Impact length (linear feet)
S1 ☐ P ☒ T	Relocate/Fill/Excavate	Vile Creek - Reach 1	☒ PER ☐ INT	☒ Corps ☒ DWQ	19	927
S2 ☐ P ☒ T	Relocate/Fill/Excavate	Vile Creek – Reach 2	☒ PER ☐ INT	☒ Corps ☒ DWQ	22	1,293
S3 ☐ P ☒ T	Stabilization	Vile Creek – Reach 3 (Stations 123+13 to 125+00)	☒ PER ☐ INT	☒ Corps ☒ DWQ	35	187
S4 ☐ P ☒ T	Stabilization	UT1 – Reach 1 (Stations 201+57 to 209+00)	☒ PER ☐ INT	☒ Corps ☒ DWQ	8	743
S5 ☐ P ☒ T	Relocate/Fill/Excavate	UT1 – Reach 1 (Stations 209+00 to 213+09)	☒ PER ☐ INT	☒ Corps ☒ DWQ	8	409
S6 ☐ P ☒ T	Relocate/Fill/Excavate	UT1 – Reach 2	☒ PER ☐ INT	☒ Corps ☒ DWQ	19	882
S7 ☐ P ☒ T	Culvert removal / Stabilization	UT1B	☐ PER ☒ INT	☒ Corps ☒ DWQ	3	15
S8 ☐ P ☒ T	Temporary construction crossing (mud mat)	UT1C – Station 271+82	☐ PER ☒ INT	☒ Corps ☒ DWQ	3	15
S9 ☐ P ☒ T	Stabilization	UT2 (Stations 300+65 to 308+00)	☒ PER ☐ INT	☒ Corps ☒ DWQ	5	735
				3h. **Total stream and tributary impacts**		5,206

3i. Comments: Impacts are temporary enhancement and restoration activities that will result in an increase in resource function. The majority of Vile Reach 3 will only be planted and fenced however minor stream work including a constructed riffle will be installed near the top of the reach (Station 123+13 to 125+00).

4. Open Water Impacts

If there are proposed impacts to lakes, ponds, estuaries, tributaries, sounds, the Atlantic Ocean, or any other open water of the U.S. then individually list all open water impacts below.

4a. Open water impact number – Permanent (P) or Temporary (T)	4b. Name of waterbody (if applicable)	4c. Type of impact	4d. Waterbody type	4e. Area of impact (acres)
O1 ☐ P ☐ T				
O2 ☐ P ☐ T				
O3 ☐ P ☐ T				
			4f. Total open water impacts	

4g. Comments:

5. Pond or Lake Construction

If pond or lake construction proposed, then complete the chart below.

5a. Pond ID number	5b. Proposed use or purpose of pond	5c. Wetland Impacts (acres)			5d. Stream Impacts (feet)			5e. Upland (acres)
		Flooded	Filled	Excavated	Flooded	Filled	Excavated	Flooded
P1								
P2								
	5f. Total							

5g. Comments:

5h. Is a dam high hazard permit required?	☐ Yes ☐ No If yes, permit ID no:
5i. Expected pond surface area (acres):	
5j. Size of pond watershed (acres):	
5k. Method of construction:	

6. Buffer Impacts (for DWQ)

If project will impact a protected riparian buffer, then complete the chart below. If yes, then individually list all buffer impacts below. If any impacts require mitigation, then you **MUST** fill out Section D of this form.

6a. Project is in which protected basin?	☐ Neuse ☐ Tar-Pamlico ☐ Other: ☐ Catawba ☐ Randleman

6b. Buffer impact number – Permanent (P) or Temporary (T)	6c. Reason for impact	6d. Stream name	6e. Buffer mitigation required?	6f. Zone 1 impact (square feet)	6g. Zone 2 impact (square feet)
B1 ☐ P ☐ T			☐ Yes ☐ No		
B2 ☐ P ☐ T			☐ Yes ☐ No		
B3 ☐ P ☐ T			☐ Yes ☐ No		
		6h. **Total buffer impacts**			

6i. Comments:

D. Impact Justification and Mitigation

1. Avoidance and Minimization

1a. Specifically describe measures taken to avoid or minimize the proposed impacts in designing project.

Due to the nature of stream and wetland mitigation projects, impacts to on-site resources are necessary. Stream restoration and enhancement will use natural channel design techniques throughout to have an overall positive impact, enhancing and restoring stream function and habitat by improving bed features in the streams and establishing flood storage. Stream and wetland impacts will be avoided or minimized to project reaches that exhibit less instability and incision. These reaches are generally proposed for Enhancement II which will primarily only involve riparian buffer planting and fencing out cattle. Proposed stream alignments for restoration reaches were designed to avoid existing wetlands as much as possible while still reconnecting the channels with the riparian wetlands. The majority of wetland impacts are excavation or fill necessary for wetland restoration. The majority of impacts, approximately 2.62 acres, are proposed to Wetlands B, C, N, and O. These wetlands are proposed for bog habitat and will involve excavation to remove old dredging sidecasts and to establish new topography. The project proposes a net gain of approximately 3.5 acres of riparian wetlands. Existing wetlands are currently grazed by cattle.

1b. Specifically describe measures taken to avoid or minimize the proposed impacts through construction techniques.

During construction, Priority I restoration will involve constructing offline channel sections which will minimize sedimentation from these areas. Newly constructed channel banks will be stabilized using biodegradable coir fiber matting, seeded, and planted with native riparian species. During construction culverts and mud mats will be utilized for temporary crossings. Construction practices will follow guidelines from the NC Erosion and Sediment Control Planning and Design Manual.

2. Compensatory Mitigation for Impacts to Waters of the U.S. or Waters of the State

2a. Does the project require Compensatory Mitigation for impacts to Waters of the U.S. or Waters of the State?	☐ Yes ☒ No
2b. If yes, mitigation is required by (check all that apply):	☐ DWQ ☐ Corps
2c. If yes, which mitigation option will be used for this project?	☐ Mitigation bank ☐ Payment to in-lieu fee program ☐ Permittee Responsible Mitigation

3. Complete if Using a Mitigation Bank

3a. Name of Mitigation Bank:

3b. Credits Purchased (attach receipt and letter)	Type	Quantity

3c. Comments:

4. Complete if Making a Payment to In-lieu Fee Program

4a. Approval letter from in-lieu fee program is attached.	☐ Yes
4b. Stream mitigation requested:	linear feet
4c. If using stream mitigation, stream temperature:	☐ warm ☐ cool ☐ cold
4d. Buffer mitigation requested (DWQ only):	square feet
4e. Riparian wetland mitigation requested:	acres
4f. Non-riparian wetland mitigation requested:	acres
4g. Coastal (tidal) wetland mitigation requested:	acres

4h. Comments:

5. Complete if Using a Permittee Responsible Mitigation Plan

5a. If using a permittee responsible mitigation plan, provide a description of the proposed mitigation plan.

6. Buffer Mitigation (State Regulated Riparian Buffer Rules) – required by DWQ

6a. Will the project result in an impact within a protected riparian buffer that requires buffer mitigation?	☐ Yes ☒ No

6b. If yes, then identify the square feet of impact to each zone of the riparian buffer that requires mitigation. Calculate the amount of mitigation required.

Zone	6c. Reason for impact	6d. Total impact (square feet)	Multiplier	6e. Required mitigation (square feet)
Zone 1			3 (2 for Catawba)	
Zone 2			1.5	
	6f. **Total buffer mitigation required:**			

6g. If buffer mitigation is required, discuss what type of mitigation is proposed (e.g., payment to private mitigation bank, permittee responsible riparian buffer restoration, payment into an approved in-lieu fee fund).

6h. Comments:

E. Stormwater Management and Diffuse Flow Plan (required by DWQ)	
1. Diffuse Flow Plan	
1a. Does the project include or is it adjacent to protected riparian buffers identified within one of the NC Riparian Buffer Protection Rules?	☐ Yes ☒ No
1b. If yes, then is a diffuse flow plan included? If no, explain why. Comments: The project is located in the New River Watershed (HUC 05050001) which isn't included with the NC Riparian Buffer Protection Rules.	☐ Yes ☐ No
2. Stormwater Management Plan	
2a. What is the overall percent imperviousness of this project?	0%
2b. Does this project require a Stormwater Management Plan?	☐ Yes ☒ No
2c. If this project DOES NOT require a Stormwater Management Plan, explain why: This project involves the restoration and enhancement of on-site jurisdictional streams and wetlands. No increase in impervious cover will result from the construction of this project.	
2d. If this project DOES require a Stormwater Management Plan, then provide a brief, narrative description of the plan:	
2e. Who will be responsible for the review of the Stormwater Management Plan?	☐ Certified Local Government ☐ DWQ Stormwater Program ☐ DWQ 401 Unit
3. Certified Local Government Stormwater Review	
3a. In which local government's jurisdiction is this project?	
3b. Which of the following locally-implemented stormwater management programs apply (check all that apply):	☐ Phase II ☐ NSW ☐ USMP ☐ Water Supply Watershed ☐ Other:
3c. Has the approved Stormwater Management Plan with proof of approval been attached?	☐ Yes ☐ No
4. DWQ Stormwater Program Review	
4a. Which of the following state-implemented stormwater management programs apply (check all that apply):	☐ Coastal counties ☐ HQW ☐ ORW ☐ Session Law 2006-246 ☐ Other:
4b. Has the approved Stormwater Management Plan with proof of approval been attached?	☐ Yes ☐ No
5. DWQ 401 Unit Stormwater Review	
5a. Does the Stormwater Management Plan meet the appropriate requirements?	☐ Yes ☐ No
5b. Have all of the 401 Unit submittal requirements been met?	☐ Yes ☐ No

F. Supplementary Information		
1. Environmental Documentation (DWQ Requirement)		
1a. Does the project involve an expenditure of public (federal/state/local) funds or the use of public (federal/state) land?	☒ Yes	☐ No
1b. If you answered "yes" to the above, does the project require preparation of an environmental document pursuant to the requirements of the National or State (North Carolina) Environmental Policy Act (NEPA/SEPA)?	☒ Yes	☐ No
1c. If you answered "yes" to the above, has the document review been finalized by the State Clearing House? (If so, attach a copy of the NEPA or SEPA final approval letter.) Comments: The approved Categorical Exclusion is attached in Appendix 6 of the mitigation plan.	☒ Yes	☐ No
2. Violations (DWQ Requirement)		
2a. Is the site in violation of DWQ Wetland Rules (15A NCAC 2H .0500), Isolated Wetland Rules (15A NCAC 2H .1300), DWQ Surface Water or Wetland Standards, or Riparian Buffer Rules (15A NCAC 2B .0200)?	☐ Yes	☒ No
2b. Is this an after-the-fact permit application?	☐ Yes	☒ No
2c. If you answered "yes" to one or both of the above questions, provide an explanation of the violation(s):		
3. Cumulative Impacts (DWQ Requirement)		
3a. Will this project (based on past and reasonably anticipated future impacts) result in additional development, which could impact nearby downstream water quality?	☐ Yes	☒ No
3b. If you answered "yes" to the above, submit a qualitative or quantitative cumulative impact analysis in accordance with the most recent DWQ policy. If you answered "no," provide a short narrative description. This is a stream and wetland mitigation project and will not cause an increase in development nor will it negatively impact downstream water quality. The project area will be protected in perpetuity from future development through a conservation easement.		
4. Sewage Disposal (DWQ Requirement)		
4a. Clearly detail the ultimate treatment methods and disposition (non-discharge or discharge) of wastewater generated from the proposed project, or available capacity of the subject facility.		

5. Endangered Species and Designated Critical Habitat (Corps Requirement)	
5a. Will this project occur in or near an area with federally protected species or habitat?	☒ Yes ☐ No
5b. Have you checked with the USFWS concerning Endangered Species Act impacts?	☒ Yes ☐ No
5c. If yes, indicate the USFWS Field Office you have contacted.	☐ Raleigh ☒ Asheville

5d. What data sources did you use to determine whether your site would impact Endangered Species or Designated Critical Habitat?

Utilized the U.S. Fish and Wildlife Service (USFWS) database in order to identify federally listed Threatened and Endangered plant and animal species for Ashe County, NC. Two federally protected threatened or endangered species are listed for Alleghany County including the bog turtle (*Glyptempys muhlenbergii*) and the Northern long-eared bat (*Myotis septentrionlalis*). Review and comment from the USFWS was requested on potential project impacts to threatened and endangered species. The USFWS commented that "the subject project is not likely to adversely affect any federally-listed endangered or threatened species, their formally designated habitat, or species currently proposed for listing." Correspondence with the USFWS is included in Appendix 6 of the mitigation plan.

6. Essential Fish Habitat (Corps Requirement)	
6a. Will this project occur in or near an area designated as essential fish habitat?	☐ Yes ☒ No

6b. What data sources did you use to determine whether your site would impact Essential Fish Habitat?

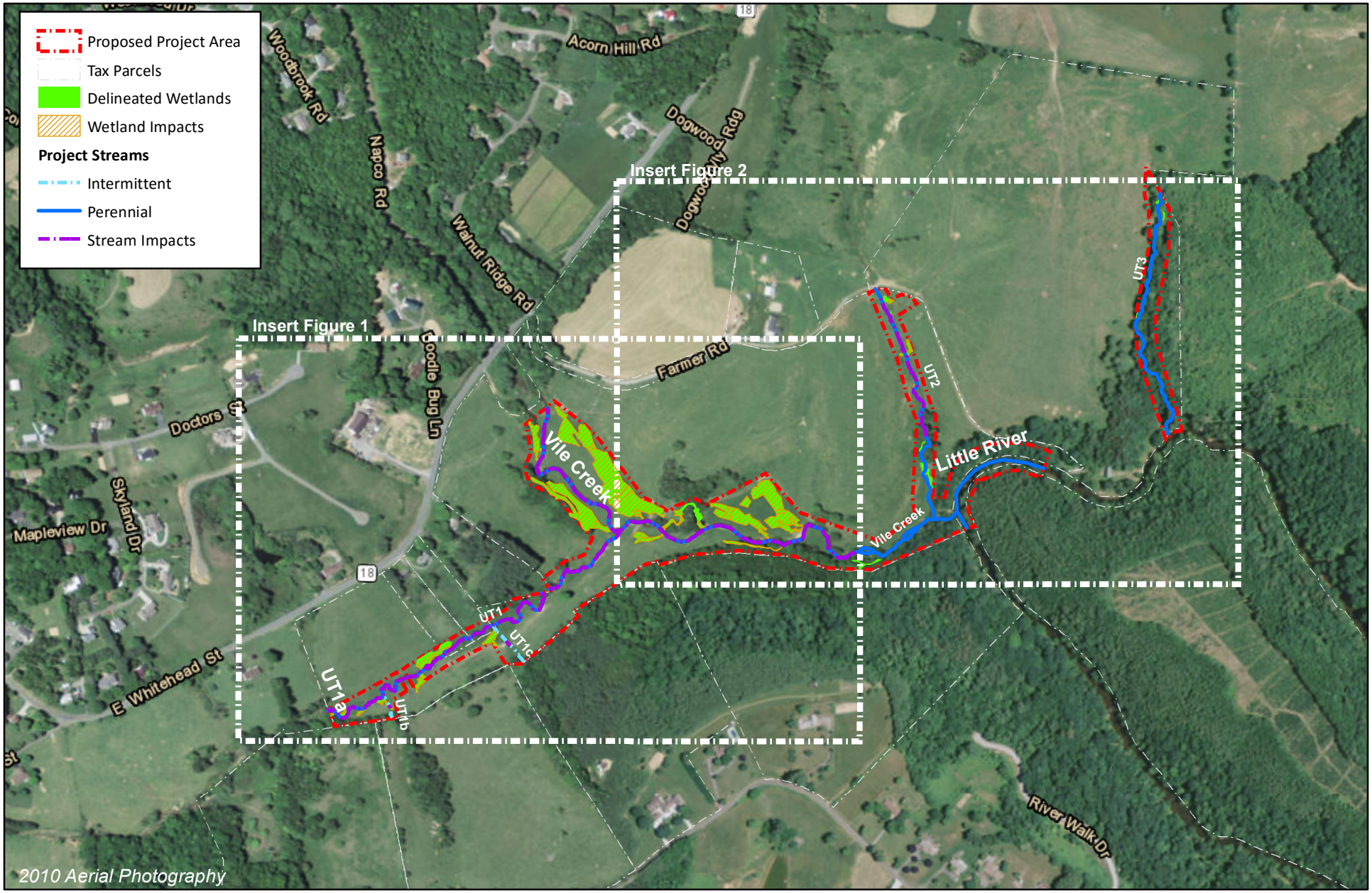
In addition to the USFWS, the NC Wildlife Resource Commission (NCWRC) were contacted for comment related to wildlife issues associated with the proposed project (see correspondence in Appendix 6 of the mitigation plan). The NCWRC commented that they "are supportive of the project" however there is a potential to affect habitat for the sharpnose darter (*Precina oxyrhynchus*) and green floater (*Lasmigona subviridis*) as well as known populations of hellbender and mudpuppies. They requested that bog turtle habitat requirements be considered in the design of wetlands.

7. Historic or Prehistoric Cultural Resources (Corps Requirement)	
7a. Will this project occur in or near an area that the state, federal or tribal governments have designated as having historic or cultural preservation status (e.g., National Historic Trust designation or properties significant in North Carolina history and archaeology)?	☐ Yes ☒ No

7b. What data sources did you use to determine whether your site would impact historic or archeological resources?

The NC State Historic Preservation Office (SHPO) was contacted regarding the presence historic properties or cultural resources within the project area. SHPO responded on 7/25/14 and stated they were "aware of no historic resources that would be affected by the project "(see correspondence in Appendix 6 of the mitigation plan).

8. Flood Zone Designation (Corps Requirement)		
8a. Will this project occur in a FEMA-designated 100-year floodplain?	☒ Yes	☐ No
8b. If yes, explain how project meets FEMA requirements: Within the project area Vile Creek, UT1, and the Little River are mapped in Zone AE Special Flood Hazard Area. Base flood elevations have been defined and non-encroachment limits have been published in the Alleghany County Flood Insurance Study (FIS). The project was designed to avoid adverse floodplain impacts within the mapped areas described above or on adjacent parcels. There are no hydrologic trespass concerns or risks associated with the proposed project activities. The NC DMS Floodplain Requirements Checklist is included in Appendix 7 of the mitigation plan.		
8c. What source(s) did you use to make the floodplain determination? Alleghany County Flood Insurance Rate Map Panels 3080 and 3081		
Tim Baumgartner Deputy Director, NCDEQ - DMS Applicant/Agent's Printed Name	_____ Applicant/Agent's Signature (Agent's signature is valid only if an authorization letter from the applicant is provided.)	Date



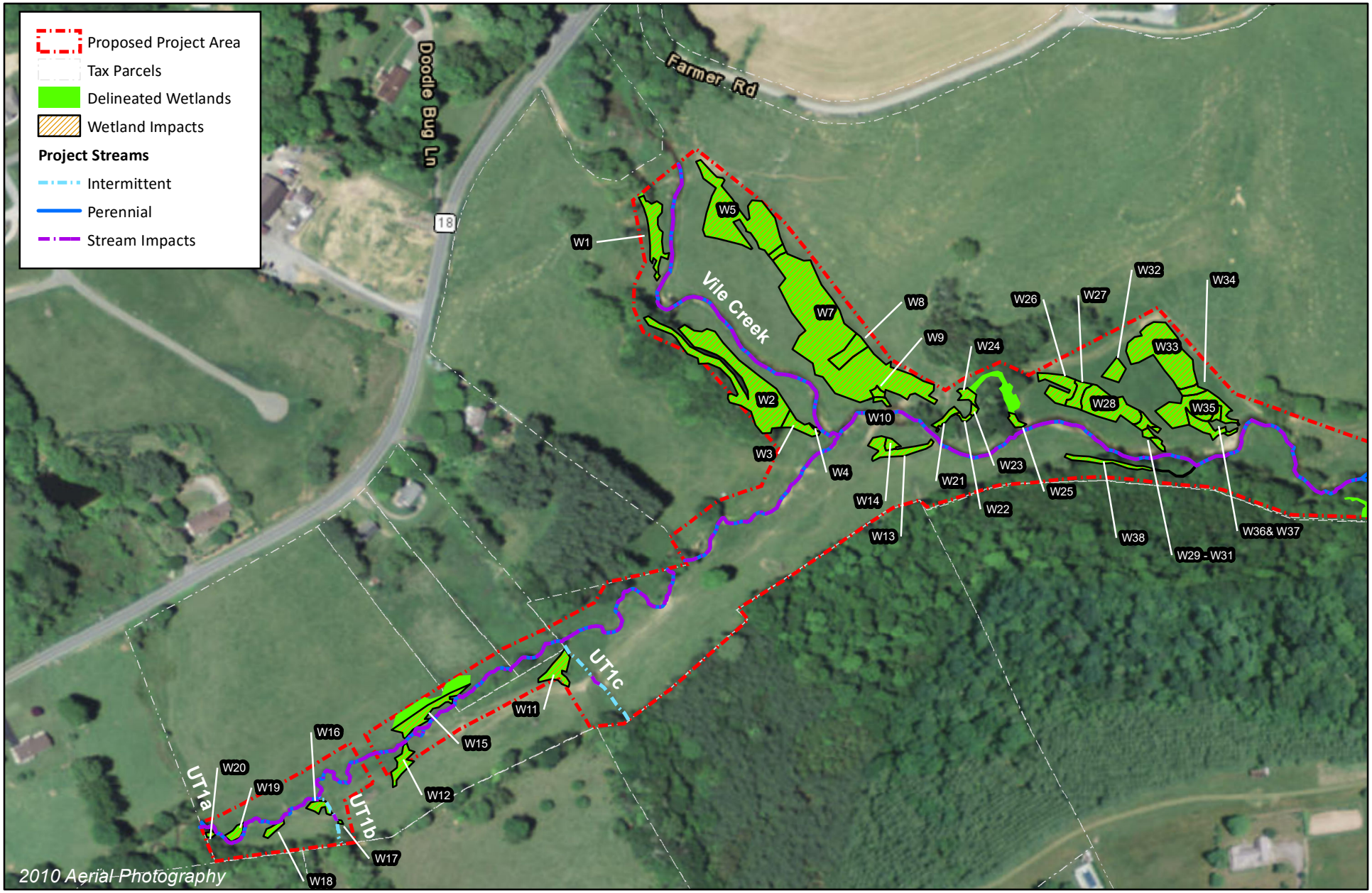
WILDLANDS ENGINEERING

0 250 500 1,000 Feet

N

Overall Impact Figure
Vile Creek Mitigation Site
New River Basin 05050001

Alleghany County, NC



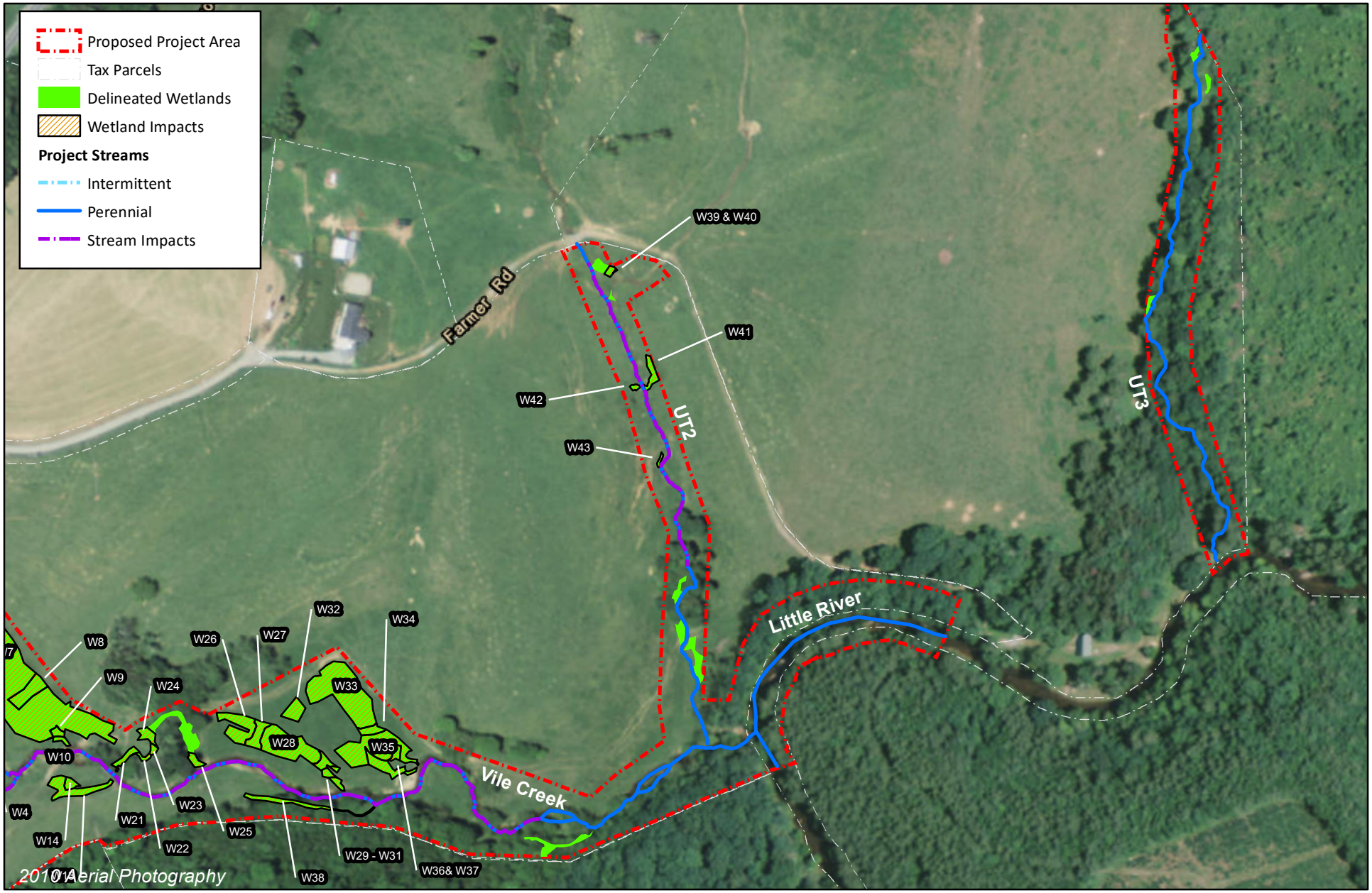
WILDLANDS ENGINEERING

0 100 200 400 Feet

N

Insert Figure 1
Vile Creek Mitigation Site
New River Basin 05050001

Alleghany County, NC



WILDLANDS ENGINEERING

0 100 200 400 Feet

N

Insert Figure 2
Vile Creek Mitigation Site
New River Basin 05050001

Alleghany County, NC

WETLAND DETERMINATION DATA FORM – Eastern Mountains and Piedmont

Project/Site: Vile Creek Mitigation Site City/County: Alleghany Sampling Date: 12/10/14

Applicant/Owner: Wildlands Engineering State: NC Sampling Point: DP1 - Wetland A

Investigator(s): Ian Eckardt & Kenton Beal Section, Township, Range:

Landform (hillslope, terrace, etc.): floodplain Local relief (concave, convex, none): concave Slope (%): 0

Subregion (LRR or MLRA): LRR N Lat: N 36.509386 Long: W -81.103518 Datum:

Soil Map Unit Name: Alluvial land (Ad) NWI classification:

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No ____ (If no, explain in Remarks.)

Are Vegetation ✓, Soil ____, or Hydrology ✓ significantly disturbed? Are "Normal Circumstances" present? Yes ____ No ✓

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓	No ____	**Is the Sampled Area within a Wetland?** **Yes ✓** **No ____**
Hydric Soil Present?	Yes ✓	No ____	
Wetland Hydrology Present?	Yes ✓	No ____	

Remarks:

Sampling point located within an actively grazed pasture. Trees and saplings have been removed. The wetland has been ditched to improve drainage.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ✓ Surface Water (A1)
- ___ High Water Table (A2)
- ✓ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ✓ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ True Aquatic Plants (B14)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ✓ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ✓ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ✓ No ____ Depth (inches): 1

Water Table Present? Yes ____ No ✓ Depth (inches): -

Saturation Present? (includes capillary fringe) Yes ✓ No ____ Depth (inches): 0 (Saturated at surface)

Wetland Hydrology Present? Yes ✓ No ____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION (Four Strata) – Use scientific names of plants.

Sampling Point: DP1 - Wetland A

Tree Stratum (Plot size: 30')	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
	= Total Cover		
Sapling/Shrub Stratum (Plot size: 15')			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
	= Total Cover		
Herb Stratum (Plot size: 5')			
1. Carex lurida	90	Yes	OBL
2. Juncus effusus	5	No	FACW
3. Polygonum sagittatum	1	No	OBL
4. Ludwigia sp.	1	No	OBL
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	97 = Total Cover		
Woody Vine Stratum (Plot size: 30')			
1.			
2.			
3.			
4.			
5.			
6.			
	= Total Cover		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: _____ (A)

Total Number of Dominant Species Across All Strata: _____ (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: _____ (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species _____	x 1 = _____
FACW species _____	x 2 = _____
FAC species _____	x 3 = _____
FACU species _____	x 4 = _____
UPL species _____	x 5 = _____
Column Totals: _____ (A)	_____ (B)

Prevalence Index = B/A = _____

Hydrophytic Vegetation Indicators:

✓ 1 - Rapid Test for Hydrophytic Vegetation

___ 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Four Vegetation Strata:

Tree – Woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/Shrub – Woody plants, excluding vines, less than 3 in. DBH and greater than 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vine – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** ✓ **No** _____

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: DP1 - Wetland A

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0-12	10YR 4/1	100					silty sand	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ 2 cm Muck (A10) **(LRR N)**
- ✓ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1) **(LRR N, MLRA 147, 148)**
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7)
- ___ Polyvalue Below Surface (S8) **(MLRA 147, 148)**
- ___ Thin Dark Surface (S9) **(MLRA 147, 148)**
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Iron-Manganese Masses (F12) **(LRR N, MLRA 136)**
- ___ Umbric Surface (F13) **(MLRA 136, 122)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 148)**

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) **(MLRA 147)**
- ___ Coast Prairie Redox (A16) **(MLRA 147, 148)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 136, 147)**
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ✓ **No** _____

Remarks:

WETLAND DETERMINATION DATA FORM – Eastern Mountains and Piedmont

Project/Site: Vile Creek Mitigation Site City/County: Alleghany Sampling Date: 12/10/14

Applicant/Owner: Wildlands Engineering State: NC Sampling Point: DP2 - Upland A

Investigator(s): Ian Eckardt & Kenton Beal Section, Township, Range: _____

Landform (hillslope, terrace, etc.): floodplain Local relief (concave, convex, none): none Slope (%): 0

Subregion (LRR or MLRA): LRR N Lat: N 36.509412 Long: W -81.103418 Datum: _____

Soil Map Unit Name: Alluvial land (Ad) NWI classification: _____

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)

Are Vegetation ✓, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes _____ No ✓

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓	No _____	**Is the Sampled Area within a Wetland?** Yes _____ No ✓
Hydric Soil Present?	Yes _____	No ✓	
Wetland Hydrology Present?	Yes _____	No ✓	

Remarks:

Sampling point located within an actively grazed pasture. Trees and saplings have been removed.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ True Aquatic Plants (B14)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes _____	No ✓	Depth (inches): -
Water Table Present?	Yes _____	No ✓	Depth (inches): -
Saturation Present? (includes capillary fringe)	Yes _____	No ✓	Depth (inches): -

Wetland Hydrology Present? Yes _____ No ✓

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION (Four Strata) – Use scientific names of plants.

Sampling Point: DP2 - Upland A

Tree Stratum (Plot size: 30')	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
	= Total Cover		
Sapling/Shrub Stratum (Plot size: 15')			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
	= Total Cover		
Herb Stratum (Plot size: 5')			
1. Festuca sp.	90	Yes	FAC
2. Solidago sp.	5	No	Unknown
3. Plantago sp.	4	No	Unknown
4. Rosa carolina	1	No	FACU
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	100 = Total Cover		
Woody Vine Stratum (Plot size: 30')			
1.			
2.			
3.			
4.			
5.			
6.			
	= Total Cover		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species		x 1 =	
FACW species		x 2 =	
FAC species		x 3 =	
FACU species		x 4 =	
UPL species		x 5 =	
Column Totals:	(A)		(B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

✓ 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Four Vegetation Strata:

Tree – Woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/Shrub – Woody plants, excluding vines, less than 3 in. DBH and greater than 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vine – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** ✓ **No** ___

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: DP2 - Upland A

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0-4	10YR 3/3	100					loam	
4-8	7.5YR 4/3	100					sandy loam	
8-12	7.5YR 4/4	100					sandy loam	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ 2 cm Muck (A10) **(LRR N)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1) **(LRR N, MLRA 147, 148)**
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7)
- ___ Polyvalue Below Surface (S8) **(MLRA 147, 148)**
- ___ Thin Dark Surface (S9) **(MLRA 147, 148)**
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Iron-Manganese Masses (F12) **(LRR N, MLRA 136)**
- ___ Umbric Surface (F13) **(MLRA 136, 122)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 148)**

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) **(MLRA 147)**
- ___ Coast Prairie Redox (A16) **(MLRA 147, 148)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 136, 147)**
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** _____ **No** ✓

Remarks:

WETLAND DETERMINATION DATA FORM – Eastern Mountains and Piedmont

Project/Site: Vile Creek Mitigation Site City/County: Alleghany Sampling Date: 12/10/14

Applicant/Owner: Wildlands Engineering State: NC Sampling Point: DP3 - Wetland B

Investigator(s): Ian Eckardt & Kenton Beal Section, Township, Range:

Landform (hillslope, terrace, etc.): floodplain Local relief (concave, convex, none): concave Slope (%): 0

Subregion (LRR or MLRA): LRR N Lat: N 36.508296 Long: W -81.102603 Datum:

Soil Map Unit Name: Alluvial land (Ad) and Chester loam (CeC) NWI classification:

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No ____ (If no, explain in Remarks.)

Are Vegetation ✓, Soil ____, or Hydrology ✓ significantly disturbed? Are "Normal Circumstances" present? Yes ____ No ✓

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓	No ____	**Is the Sampled Area within a Wetland?** **Yes ✓** **No ____**
Hydric Soil Present?	Yes ✓	No ____	
Wetland Hydrology Present?	Yes ✓	No ____	

Remarks:

Sampling point located within an actively grazed pasture. Trees and saplings have been removed. The wetland has been ditched to improve drainage.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ✓ Surface Water (A1)
- ___ High Water Table (A2)
- ✓ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ✓ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ✓ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ True Aquatic Plants (B14)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ✓ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ✓ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ✓	No ____	Depth (inches): 2
Water Table Present?	Yes ____	No ✓	Depth (inches): -
Saturation Present? (includes capillary fringe)	Yes ✓	No ____	Depth (inches): 0 (Saturated at surface)

Wetland Hydrology Present? **Yes ✓** **No ____**

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION (Four Strata) – Use scientific names of plants.

Sampling Point: DP3 - Wetland B

Tree Stratum (Plot size: 30')	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
	= Total Cover		
Sapling/Shrub Stratum (Plot size: 15')			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
	= Total Cover		
Herb Stratum (Plot size: 5')			
1. Carex lurida	90	Yes	OBL
2. Juncus effusus	5	No	FACW
3. Polygonum sagittatum	3	No	OBL
4. Solidago sp.	2	No	Unknown
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	100 = Total Cover		
Woody Vine Stratum (Plot size: 30')			
1.			
2.			
3.			
4.			
5.			
6.			
	= Total Cover		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: _____ (A)

Total Number of Dominant Species Across All Strata: _____ (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: _____ (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species _____	x 1 = _____
FACW species _____	x 2 = _____
FAC species _____	x 3 = _____
FACU species _____	x 4 = _____
UPL species _____	x 5 = _____
Column Totals: _____ (A)	_____ (B)

Prevalence Index = B/A = _____

Hydrophytic Vegetation Indicators:

✓ 1 - Rapid Test for Hydrophytic Vegetation

___ 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Four Vegetation Strata:

Tree – Woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/Shrub – Woody plants, excluding vines, less than 3 in. DBH and greater than 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vine – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** ✓ **No** _____

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: DP3 - Wetland B

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-2	7.5YR 3/2	100					silt loam	organics within layer
2-12	10YR 3/1	98	7.5YR 3/4	2	C	PL	sandy loam	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ 2 cm Muck (A10) **(LRR N)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1) **(LRR N, MLRA 147, 148)**
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7)
- ___ Polyvalue Below Surface (S8) **(MLRA 147, 148)**
- ___ Thin Dark Surface (S9) **(MLRA 147, 148)**
- ___ Loamy Gleyed Matrix (F2)
- ✓ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Iron-Manganese Masses (F12) **(LRR N, MLRA 136)**
- ___ Umbric Surface (F13) **(MLRA 136, 122)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 148)**

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) **(MLRA 147)**
- ___ Coast Prairie Redox (A16) **(MLRA 147, 148)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 136, 147)**
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ✓ **No** ___

Remarks:

WETLAND DETERMINATION DATA FORM – Eastern Mountains and Piedmont

Project/Site: Vile Creek Mitigation Site City/County: Alleghany Sampling Date: 12/10/14

Applicant/Owner: Wildlands Engineering State: NC Sampling Point: DP4 - Upland B

Investigator(s): Ian Eckardt & Kenton Beal Section, Township, Range: _____

Landform (hillslope, terrace, etc.): floodplain Local relief (concave, convex, none): none Slope (%): 0

Subregion (LRR or MLRA): LRR N Lat: N 36.508399 Long: W -81.102429 Datum: _____

Soil Map Unit Name: Chester loam (CeC) NWI classification: _____

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)

Are Vegetation ✓, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes _____ No ✓

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓	No _____	**Is the Sampled Area within a Wetland?** Yes _____ No ✓
Hydric Soil Present?	Yes _____	No ✓	
Wetland Hydrology Present?	Yes _____	No ✓	

Remarks:

Sampling point located within an actively grazed pasture. Trees and saplings have been removed.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ True Aquatic Plants (B14)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes _____	No ✓	Depth (inches): -
Water Table Present?	Yes _____	No ✓	Depth (inches): -
Saturation Present? (includes capillary fringe)	Yes _____	No ✓	Depth (inches): -

Wetland Hydrology Present? Yes _____ No ✓

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION (Four Strata) – Use scientific names of plants.

Sampling Point: DP4 - Upland B

Tree Stratum (Plot size: 30')	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
	= Total Cover		
Sapling/Shrub Stratum (Plot size: 15')			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
	= Total Cover		
Herb Stratum (Plot size: 5')			
1. Festuca sp.	90	Yes	FAC
2. Solidago sp.	5	No	Unknown
3. Juncus effusus	2	No	FACW
4. Plantago sp.	2	No	Unknown
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	99 = Total Cover		
Woody Vine Stratum (Plot size: 30')			
1.			
2.			
3.			
4.			
5.			
6.			
	= Total Cover		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species		x 1 =	
FACW species		x 2 =	
FAC species		x 3 =	
FACU species		x 4 =	
UPL species		x 5 =	
Column Totals:	(A)		(B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:

- ___ 1 - Rapid Test for Hydrophytic Vegetation
- ✓ 2 - Dominance Test is >50%
- ___ 3 - Prevalence Index is ≤3.0[1]
- ___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Four Vegetation Strata:

Tree – Woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/Shrub – Woody plants, excluding vines, less than 3 in. DBH and greater than 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vine – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** ✓ **No** ___

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: DP4 - Upland B

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0-4	10YR 5/4	100					sandy loam	
4-12	10YR 4/6	100					sandy loam	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ 2 cm Muck (A10) **(LRR N)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1) **(LRR N, MLRA 147, 148)**
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7)
- ___ Polyvalue Below Surface (S8) **(MLRA 147, 148)**
- ___ Thin Dark Surface (S9) **(MLRA 147, 148)**
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Iron-Manganese Masses (F12) **(LRR N, MLRA 136)**
- ___ Umbric Surface (F13) **(MLRA 136, 122)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 148)**

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) **(MLRA 147)**
- ___ Coast Prairie Redox (A16) **(MLRA 147, 148)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 136, 147)**
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** _____ **No** ✓

Remarks:

WETLAND DETERMINATION DATA FORM – Eastern Mountains and Piedmont

Project/Site: Vile Creek Mitigation Site City/County: Alleghany Sampling Date: 12/10/14

Applicant/Owner: Wildlands Engineering State: NC Sampling Point: DP5 - Wetland C

Investigator(s): Ian Eckardt & Kenton Beal Section, Township, Range:

Landform (hillslope, terrace, etc.): floodplain Local relief (concave, convex, none): concave Slope (%): 0

Subregion (LRR or MLRA): LRR N Lat: N 36.50858 Long: W -81.102126 Datum:

Soil Map Unit Name: Alluvial land (Ad) NWI classification:

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No ____ (If no, explain in Remarks.)

Are Vegetation ✓, Soil ____, or Hydrology ✓ significantly disturbed? Are "Normal Circumstances" present? Yes ____ No ✓

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓	No ____	**Is the Sampled Area within a Wetland?** Yes ✓ No ____
Hydric Soil Present?	Yes ✓	No ____	
Wetland Hydrology Present?	Yes ✓	No ____	

Remarks:

Sampling point located within an actively grazed pasture. Trees and saplings have been removed. The wetland has been ditched to improve drainage.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ✓ Surface Water (A1)
- ___ High Water Table (A2)
- ✓ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ✓ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ✓ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ True Aquatic Plants (B14)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ✓ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ✓	No ____	Depth (inches): 2
Water Table Present?	Yes ____	No ✓	Depth (inches): -
Saturation Present? (includes capillary fringe)	Yes ✓	No ____	Depth (inches): 0 (Saturated at surface)

Wetland Hydrology Present? Yes ✓ No ____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION (Four Strata) – Use scientific names of plants.

Sampling Point: DP5 - Wetland C

Tree Stratum (Plot size: 30')	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
	= Total Cover		
Sapling/Shrub Stratum (Plot size: 15')			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
	= Total Cover		
Herb Stratum (Plot size: 5')			
1. Carex lurida	40	Yes	OBL
2. Juncus effusus	40	No	FACW
3. Solidago sp.	10	No	Unknown
4. Fescue	10	No	FAC
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	100 = Total Cover		
Woody Vine Stratum (Plot size: 30')			
1.			
2.			
3.			
4.			
5.			
6.			
	= Total Cover		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: _____ (A)

Total Number of Dominant Species Across All Strata: _____ (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: _____ (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species _____	x 1 = _____
FACW species _____	x 2 = _____
FAC species _____	x 3 = _____
FACU species _____	x 4 = _____
UPL species _____	x 5 = _____
Column Totals: _____ (A)	_____ (B)

Prevalence Index = B/A = _____

Hydrophytic Vegetation Indicators:

✓ 1 - Rapid Test for Hydrophytic Vegetation

___ 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Four Vegetation Strata:

Tree – Woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/Shrub – Woody plants, excluding vines, less than 3 in. DBH and greater than 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vine – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** ✓ **No** _____

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: DP5 - Wetland C

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0-3	10YR 4/1	98	7.5YR 3/4	2	C	PL	silt loam	
3-12	10YR 3/1	98	7.5YR 3/4	2	C	PL	silt loam	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ 2 cm Muck (A10) **(LRR N)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1) **(LRR N, MLRA 147, 148)**
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7)
- ___ Polyvalue Below Surface (S8) **(MLRA 147, 148)**
- ___ Thin Dark Surface (S9) **(MLRA 147, 148)**
- ___ Loamy Gleyed Matrix (F2)
- ✓ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Iron-Manganese Masses (F12) **(LRR N, MLRA 136)**
- ___ Umbric Surface (F13) **(MLRA 136, 122)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 148)**

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) **(MLRA 147)**
- ___ Coast Prairie Redox (A16) **(MLRA 147, 148)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 136, 147)**
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ✓ **No** _____

Remarks:

WETLAND DETERMINATION DATA FORM – Eastern Mountains and Piedmont

Project/Site: Vile Creek Mitigation Site City/County: Alleghany Sampling Date: 12/10/14

Applicant/Owner: Wildlands Engineering State: NC Sampling Point: DP6 - Upland C

Investigator(s): Ian Eckardt & Kenton Beal Section, Township, Range:

Landform (hillslope, terrace, etc.): floodplain Local relief (concave, convex, none): none Slope (%): 0

Subregion (LRR or MLRA): LRR N Lat: N 36.508403 Long: W -81.102169 Datum:

Soil Map Unit Name: Alluvial land (Ad) NWI classification:

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)

Are Vegetation ✓, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes _____ No ✓

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓	No _____	**Is the Sampled Area within a Wetland?** Yes _____ No ✓
Hydric Soil Present?	Yes ✓	No _____	
Wetland Hydrology Present?	Yes _____	No ✓	

Remarks:

Sampling point located within an actively grazed pasture. Trees and saplings have been removed. Sampling location is primarily covered in fescue which can't be identified to species level but has been assigned a FAC rating. The area has hydric soil indicators but lacks hydrology indicators.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ True Aquatic Plants (B14)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes _____	No ✓	Depth (inches): -
Water Table Present?	Yes _____	No ✓	Depth (inches): -
Saturation Present? (includes capillary fringe)	Yes _____	No ✓	Depth (inches): -

Wetland Hydrology Present? Yes _____ No ✓

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION (Four Strata) – Use scientific names of plants.

Sampling Point: DP6 - Upland C

Tree Stratum (Plot size: 30')	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
	= Total Cover		
Sapling/Shrub Stratum (Plot size: 15')			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
	= Total Cover		
Herb Stratum (Plot size: 5')			
1. Festuca sp.	90	Yes	FAC
2. Juncus effusus	5	No	FACW
3. Aster sp.	3	No	Unknown
4. Solidago sp.	2	No	FACU
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	100 = Total Cover		
Woody Vine Stratum (Plot size: 30')			
1.			
2.			
3.			
4.			
5.			
6.			
	= Total Cover		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species		x 1 =	
FACW species		x 2 =	
FAC species		x 3 =	
FACU species		x 4 =	
UPL species		x 5 =	
Column Totals:	(A)		(B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

✓ 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Four Vegetation Strata:

Tree – Woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/Shrub – Woody plants, excluding vines, less than 3 in. DBH and greater than 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vine – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** ✓ **No** ___

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: DP6 - Upland C

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0-4	10YR 3/4	100					loam	
4-12	10YR 4/2	95	7.5YR 3/4	5	C	PL	loam	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ 2 cm Muck (A10) **(LRR N)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1) **(LRR N, MLRA 147, 148)**
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7)
- ___ Polyvalue Below Surface (S8) **(MLRA 147, 148)**
- ___ Thin Dark Surface (S9) **(MLRA 147, 148)**
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Iron-Manganese Masses (F12) **(LRR N, MLRA 136)**
- ___ Umbric Surface (F13) **(MLRA 136, 122)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 148)**

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) **(MLRA 147)**
- ___ Coast Prairie Redox (A16) **(MLRA 147, 148)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 136, 147)**
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ✓ **No** _____

Remarks:

WETLAND DETERMINATION DATA FORM – Eastern Mountains and Piedmont

Project/Site: Vile Creek Mitigation Site City/County: Alleghany Sampling Date: 12/10/14

Applicant/Owner: Wildlands Engineering State: NC Sampling Point: DP7 - Wetland D

Investigator(s): Ian Eckardt & Kenton Beal Section, Township, Range:

Landform (hillslope, terrace, etc.): floodplain Local relief (concave, convex, none): concave Slope (%): 0

Subregion (LRR or MLRA): LRR N Lat: N 36.506743 Long: W -81.104175 Datum:

Soil Map Unit Name: Tate loam (TaD) NWI classification:

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No ____ (If no, explain in Remarks.)

Are Vegetation ✓, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes ____ No ✓

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓	No ____	**Is the Sampled Area within a Wetland?** **Yes ✓** **No ____**
Hydric Soil Present?	Yes ✓	No ____	
Wetland Hydrology Present?	Yes ✓	No ____	

Remarks:

Sampling point located within an actively grazed pasture.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ✓ Surface Water (A1)
- ___ High Water Table (A2)
- ✓ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ✓ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ True Aquatic Plants (B14)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ✓ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ✓ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ✓	No ____	Depth (inches): 1
Water Table Present?	Yes ____	No ✓	Depth (inches): -
Saturation Present? (includes capillary fringe)	Yes ✓	No ____	Depth (inches): 0 (Saturated at surface)

Wetland Hydrology Present? **Yes ✓** **No ____**

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION (Four Strata) – Use scientific names of plants.

Sampling Point: DP7 - Wetland D

Tree Stratum (Plot size: 30')	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
	= Total Cover		
Sapling/Shrub Stratum (Plot size: 15')			
1. Alnus serrulata	10	Yes	OBL
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
	10 = Total Cover		
Herb Stratum (Plot size: 5')			
1. Carex lurida	80	Yes	OBL
2. Juncus effusus	15	No	FACW
3. Solidago sp.	5	No	Unknown
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	97 = Total Cover		
Woody Vine Stratum (Plot size: 30')			
1.			
2.			
3.			
4.			
5.			
6.			
	= Total Cover		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: _____ (A)

Total Number of Dominant Species Across All Strata: _____ (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: _____ (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species _____	x 1 = _____
FACW species _____	x 2 = _____
FAC species _____	x 3 = _____
FACU species _____	x 4 = _____
UPL species _____	x 5 = _____
Column Totals: _____ (A)	_____ (B)

Prevalence Index = B/A = _____

Hydrophytic Vegetation Indicators:

✓ 1 - Rapid Test for Hydrophytic Vegetation

___ 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Four Vegetation Strata:

Tree – Woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/Shrub – Woody plants, excluding vines, less than 3 in. DBH and greater than 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vine – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** ✓ **No** _____

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: DP7 - Wetland D

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0-2	2.5Y 2.5/1	100					silt loam	organics present in thin surface horizon
2-12	2.5Y 2.5/1	100					silt loam	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ 2 cm Muck (A10) **(LRR N)**
- ✓ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1) **(LRR N, MLRA 147, 148)**
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7)
- ___ Polyvalue Below Surface (S8) **(MLRA 147, 148)**
- ___ Thin Dark Surface (S9) **(MLRA 147, 148)**
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Iron-Manganese Masses (F12) **(LRR N, MLRA 136)**
- ___ Umbric Surface (F13) **(MLRA 136, 122)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 148)**

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) **(MLRA 147)**
- ___ Coast Prairie Redox (A16) **(MLRA 147, 148)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 136, 147)**
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ✓ **No** _____

Remarks:

WETLAND DETERMINATION DATA FORM – Eastern Mountains and Piedmont

Project/Site: Vile Creek Mitigation Site City/County: Alleghany Sampling Date: 12/10/14

Applicant/Owner: Wildlands Engineering State: NC Sampling Point: DP8 - Upland D

Investigator(s): Ian Eckardt & Kenton Beal Section, Township, Range: _____

Landform (hillslope, terrace, etc.): floodplain Local relief (concave, convex, none): none Slope (%): 0

Subregion (LRR or MLRA): LRR N Lat: N 36.506678 Long: W -81.104038 Datum: _____

Soil Map Unit Name: Tate loam (TaD) NWI classification: _____

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)

Are Vegetation ✓, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes _____ No ✓

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓	No _____	**Is the Sampled Area within a Wetland?** Yes _____ No ✓
Hydric Soil Present?	Yes _____	No ✓	
Wetland Hydrology Present?	Yes _____	No ✓	

Remarks:

Sampling point located within an actively grazed pasture. Trees and saplings have been removed.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ True Aquatic Plants (B14)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes _____	No ✓	Depth (inches): -
Water Table Present?	Yes _____	No ✓	Depth (inches): -
Saturation Present? (includes capillary fringe)	Yes _____	No ✓	Depth (inches): -

Wetland Hydrology Present? Yes _____ No ✓

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION (Four Strata) – Use scientific names of plants.

Sampling Point: DP8 - Upland D

Tree Stratum (Plot size: 30')	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
	= Total Cover		
Sapling/Shrub Stratum (Plot size: 15')			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
	= Total Cover		
Herb Stratum (Plot size: 5')			
1. Festuca sp.	90	Yes	FAC
2. Solidago sp.	5	No	Unknown
3. Plantago sp.	5	No	Unknown
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	100 = Total Cover		
Woody Vine Stratum (Plot size: 30')			
1.			
2.			
3.			
4.			
5.			
6.			
	= Total Cover		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species		x 1 =	
FACW species		x 2 =	
FAC species		x 3 =	
FACU species		x 4 =	
UPL species		x 5 =	
Column Totals:	(A)		(B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

✓ 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Four Vegetation Strata:

Tree – Woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/Shrub – Woody plants, excluding vines, less than 3 in. DBH and greater than 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vine – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** ✓ **No** ___

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: DP8 - Upland D

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0-12	10YR 4/6	100					loam	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ 2 cm Muck (A10) **(LRR N)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1) **(LRR N, MLRA 147, 148)**
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7)
- ___ Polyvalue Below Surface (S8) **(MLRA 147, 148)**
- ___ Thin Dark Surface (S9) **(MLRA 147, 148)**
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Iron-Manganese Masses (F12) **(LRR N, MLRA 136)**
- ___ Umbric Surface (F13) **(MLRA 136, 122)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 148)**

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) **(MLRA 147)**
- ___ Coast Prairie Redox (A16) **(MLRA 147, 148)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 136, 147)**
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** _____ **No** ✓

Remarks:

WETLAND DETERMINATION DATA FORM – Eastern Mountains and Piedmont

Project/Site: Vile Creek Mitigation Site City/County: Alleghany Sampling Date: 12/10/14

Applicant/Owner: Wildlands Engineering State: NC Sampling Point: DP9 - Wetland E

Investigator(s): Ian Eckardt & Kenton Beal Section, Township, Range:

Landform (hillslope, terrace, etc.): floodplain Local relief (concave, convex, none): concave Slope (%): 0

Subregion (LRR or MLRA): LRR N Lat: N 36.506151 Long: W -81.105312 Datum:

Soil Map Unit Name: Chandler silt loam (CaF) and Tate loam (TaD) NWI classification:

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No ____ (If no, explain in Remarks.)

Are Vegetation ✓, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes ____ No ✓

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓	No ____	**Is the Sampled Area within a Wetland?** **Yes ✓** **No ____**
Hydric Soil Present?	Yes ✓	No ____	
Wetland Hydrology Present?	Yes ✓	No ____	

Remarks:

Hillside seep located within an actively grazed pasture.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ✓ Surface Water (A1)
- ___ High Water Table (A2)
- ✓ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ✓ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ True Aquatic Plants (B14)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ✓ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ✓ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ✓	No ____	Depth (inches): 1
Water Table Present?	Yes ____	No ✓	Depth (inches): -
Saturation Present? (includes capillary fringe)	Yes ✓	No ____	Depth (inches): 0 (Saturated at surface)

Wetland Hydrology Present? Yes ✓ No ____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION (Four Strata) – Use scientific names of plants.

Sampling Point: DP9 - Wetland E

Tree Stratum (Plot size: 30')	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
	= Total Cover		
Sapling/Shrub Stratum (Plot size: 15')			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
	= Total Cover		
Herb Stratum (Plot size: 5')			
1. Carex lurida	75	Yes	OBL
2. Juncus effusus	15	No	FACW
3. Aster sp.	10	No	Unknown
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	100 = Total Cover		
Woody Vine Stratum (Plot size: 30')			
1.			
2.			
3.			
4.			
5.			
6.			
	= Total Cover		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: _____ (A)

Total Number of Dominant Species Across All Strata: _____ (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: _____ (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species _____	x 1 = _____
FACW species _____	x 2 = _____
FAC species _____	x 3 = _____
FACU species _____	x 4 = _____
UPL species _____	x 5 = _____
Column Totals: _____ (A)	_____ (B)

Prevalence Index = B/A = _____

Hydrophytic Vegetation Indicators:

✓ 1 - Rapid Test for Hydrophytic Vegetation

___ 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Four Vegetation Strata:

Tree – Woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/Shrub – Woody plants, excluding vines, less than 3 in. DBH and greater than 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vine – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** ✓ **No** _____

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: DP9 - Wetland E

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0-2	10YR 4/2	100					silt loam	
2-9	10YR 4/1	90	7.5YR 3/4	10	C	PL	silt loam	
9-12	10YR 4/1	90	7.5YR 3/4	10	C	PL	sandy loam	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ 2 cm Muck (A10) **(LRR N)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1) **(LRR N, MLRA 147, 148)**
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7)
- ___ Polyvalue Below Surface (S8) **(MLRA 147, 148)**
- ___ Thin Dark Surface (S9) **(MLRA 147, 148)**
- ___ Loamy Gleyed Matrix (F2)
- ✓ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Iron-Manganese Masses (F12) **(LRR N, MLRA 136)**
- ___ Umbric Surface (F13) **(MLRA 136, 122)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 148)**

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) **(MLRA 147)**
- ___ Coast Prairie Redox (A16) **(MLRA 147, 148)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 136, 147)**
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ✓ **No** _____

Remarks:

WETLAND DETERMINATION DATA FORM – Eastern Mountains and Piedmont

Project/Site: Vile Creek Mitigation Site City/County: Alleghany Sampling Date: 12/10/14

Applicant/Owner: Wildlands Engineering State: NC Sampling Point: DP10 - Upland E

Investigator(s): Ian Eckardt & Kenton Beal Section, Township, Range:

Landform (hillslope, terrace, etc.): floodplain Local relief (concave, convex, none): none Slope (%): 0

Subregion (LRR or MLRA): LRR N Lat: N 36.506258 Long: W -81.105318 Datum:

Soil Map Unit Name: Tate loam (TaD) NWI classification:

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)

Are Vegetation ✓, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes _____ No ✓

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓	No _____	**Is the Sampled Area within a Wetland?** Yes _____ No ✓
Hydric Soil Present?	Yes _____	No ✓	
Wetland Hydrology Present?	Yes _____	No ✓	

Remarks:

Sampling point located within an actively grazed pasture. Trees and saplings have been removed.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ True Aquatic Plants (B14)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes _____	No ✓	Depth (inches): -
Water Table Present?	Yes _____	No ✓	Depth (inches): -
Saturation Present? (includes capillary fringe)	Yes _____	No ✓	Depth (inches): -

Wetland Hydrology Present? Yes _____ No ✓

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION (Four Strata) – Use scientific names of plants.

Sampling Point: DP10 - Upland E

Tree Stratum (Plot size: 30')	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
	= Total Cover		
Sapling/Shrub Stratum (Plot size: 15')			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
	= Total Cover		
Herb Stratum (Plot size: 5')			
1. Festuca sp.	90	Yes	FAC
2. Solidago sp.	5	No	Unknown
3. Juncus effusus	5	No	FACW
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	100 = Total Cover		
Woody Vine Stratum (Plot size: 30')			
1.			
2.			
3.			
4.			
5.			
6.			
	= Total Cover		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species		x 1 =	
FACW species		x 2 =	
FAC species		x 3 =	
FACU species		x 4 =	
UPL species		x 5 =	
Column Totals:	(A)		(B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

✓ 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Four Vegetation Strata:

Tree – Woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/Shrub – Woody plants, excluding vines, less than 3 in. DBH and greater than 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vine – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** ✓ **No** ___

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: DP10 - Upland E

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0-12	10YR 4/3	100					loam	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ 2 cm Muck (A10) **(LRR N)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1) **(LRR N, MLRA 147, 148)**
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7)
- ___ Polyvalue Below Surface (S8) **(MLRA 147, 148)**
- ___ Thin Dark Surface (S9) **(MLRA 147, 148)**
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Iron-Manganese Masses (F12) **(LRR N, MLRA 136)**
- ___ Umbric Surface (F13) **(MLRA 136, 122)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 148)**

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) **(MLRA 147)**
- ___ Coast Prairie Redox (A16) **(MLRA 147, 148)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 136, 147)**
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** _____ **No** ✓

Remarks:

WETLAND DETERMINATION DATA FORM – Eastern Mountains and Piedmont

Project/Site: Vile Creek Mitigation Site City/County: Alleghany Sampling Date: 12/11/14

Applicant/Owner: Wildlands Engineering State: NC Sampling Point: DP11 - Wetland F

Investigator(s): Ian Eckardt & Kenton Beal Section, Township, Range:

Landform (hillslope, terrace, etc.): floodplain Local relief (concave, convex, none): concave Slope (%): 0

Subregion (LRR or MLRA): LRR N Lat: N 36.508143 Long: W -81.101748 Datum:

Soil Map Unit Name: Alluvial land (Ad) and Tate loam (TaD) NWI classification:

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No ____ (If no, explain in Remarks.)

Are Vegetation ✓, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes ____ No ✓

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓	No ____	**Is the Sampled Area within a Wetland?** Yes ✓ No ____
Hydric Soil Present?	Yes ✓	No ____	
Wetland Hydrology Present?	Yes ✓	No ____	

Remarks:

Sampling point located within an actively grazed pasture.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ✓ Surface Water (A1)
- ___ High Water Table (A2)
- ✓ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ✓ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ True Aquatic Plants (B14)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ✓ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ✓ No ____ Depth (inches): 1

Water Table Present? Yes ____ No ✓ Depth (inches): -

Saturation Present? (includes capillary fringe) Yes ✓ No ____ Depth (inches): 0 (Saturated at surface)

Wetland Hydrology Present? Yes ✓ No ____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION (Four Strata) – Use scientific names of plants.

Sampling Point: DP11 - Wetland F

Tree Stratum (Plot size: 30')	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
	= Total Cover		
Sapling/Shrub Stratum (Plot size: 15')			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
	= Total Cover		
Herb Stratum (Plot size: 5')			
1. Carex lurida	85	Yes	OBL
2. Juncus effusus	13	No	FACW
3. Moss sp.	2	No	Unknown
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	100 = Total Cover		
Woody Vine Stratum (Plot size: 30')			
1.			
2.			
3.			
4.			
5.			
6.			
	= Total Cover		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: _____ (A)

Total Number of Dominant Species Across All Strata: _____ (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: _____ (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species _____	x 1 = _____
FACW species _____	x 2 = _____
FAC species _____	x 3 = _____
FACU species _____	x 4 = _____
UPL species _____	x 5 = _____
Column Totals: _____ (A)	_____ (B)

Prevalence Index = B/A = _____

Hydrophytic Vegetation Indicators:

✓ 1 - Rapid Test for Hydrophytic Vegetation

___ 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Four Vegetation Strata:

Tree – Woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/Shrub – Woody plants, excluding vines, less than 3 in. DBH and greater than 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vine – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** ✓ **No** _____

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: DP11 - Wetland F

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0-3	5Y 2.5/1	100					silt	
3-12	5Y 4/1	98	10YR 4/6	2	C	PL	silt loam	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ 2 cm Muck (A10) **(LRR N)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1) **(LRR N, MLRA 147, 148)**
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7)
- ___ Polyvalue Below Surface (S8) **(MLRA 147, 148)**
- ___ Thin Dark Surface (S9) **(MLRA 147, 148)**
- ___ Loamy Gleyed Matrix (F2)
- ✓ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Iron-Manganese Masses (F12) **(LRR N, MLRA 136)**
- ___ Umbric Surface (F13) **(MLRA 136, 122)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 148)**

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) **(MLRA 147)**
- ___ Coast Prairie Redox (A16) **(MLRA 147, 148)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 136, 147)**
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ✓ **No** _____

Remarks:

WETLAND DETERMINATION DATA FORM – Eastern Mountains and Piedmont

Project/Site: Vile Creek Mitigation Site City/County: Alleghany Sampling Date: 12/11/14

Applicant/Owner: Wildlands Engineering State: NC Sampling Point: DP12 - Upland F

Investigator(s): Ian Eckardt & Kenton Beal Section, Township, Range: _____

Landform (hillslope, terrace, etc.): hillslope Local relief (concave, convex, none): none Slope (%): 0

Subregion (LRR or MLRA): LRR N Lat: N 36.508021 Long: W -81.101674 Datum: _____

Soil Map Unit Name: Tate loam (TaD) NWI classification: _____

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)

Are Vegetation ✓, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes _____ No ✓

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓	No _____	**Is the Sampled Area within a Wetland?** Yes _____ No ✓
Hydric Soil Present?	Yes _____	No ✓	
Wetland Hydrology Present?	Yes _____	No ✓	

Remarks:

Sampling point located within an actively grazed pasture. Trees and saplings have been removed.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ True Aquatic Plants (B14)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes _____	No ✓	Depth (inches): -
Water Table Present?	Yes _____	No ✓	Depth (inches): -
Saturation Present? (includes capillary fringe)	Yes _____	No ✓	Depth (inches): -

Wetland Hydrology Present? Yes _____ No ✓

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION (Four Strata) – Use scientific names of plants.

Sampling Point: DP12 - Upland F

Tree Stratum (Plot size: 30')	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
	= Total Cover		
Sapling/Shrub Stratum (Plot size: 15')			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
	= Total Cover		
Herb Stratum (Plot size: 5')			
1. Festuca sp.	98	Yes	FAC
2. Solidago sp.	2	No	Unknown
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	100 = Total Cover		
Woody Vine Stratum (Plot size: 30')			
1.			
2.			
3.			
4.			
5.			
6.			
	= Total Cover		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species	x 1 =
FACW species	x 2 =
FAC species	x 3 =
FACU species	x 4 =
UPL species	x 5 =
Column Totals: (A)	(B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:

- ___ 1 - Rapid Test for Hydrophytic Vegetation
- ✓ 2 - Dominance Test is >50%
- ___ 3 - Prevalence Index is ≤3.0[1]
- ___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Four Vegetation Strata:

Tree – Woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/Shrub – Woody plants, excluding vines, less than 3 in. DBH and greater than 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vine – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** ✓ **No** ___

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: DP12 - Upland F

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0-12	10YR 4/4	100					loam	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ 2 cm Muck (A10) **(LRR N)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1) **(LRR N, MLRA 147, 148)**
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7)
- ___ Polyvalue Below Surface (S8) **(MLRA 147, 148)**
- ___ Thin Dark Surface (S9) **(MLRA 147, 148)**
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Iron-Manganese Masses (F12) **(LRR N, MLRA 136)**
- ___ Umbric Surface (F13) **(MLRA 136, 122)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 148)**

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) **(MLRA 147)**
- ___ Coast Prairie Redox (A16) **(MLRA 147, 148)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 136, 147)**
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** _____ **No** ✓

Remarks:

WETLAND DETERMINATION DATA FORM – Eastern Mountains and Piedmont

Project/Site: Vile Creek Mitigation Site City/County: Alleghany Sampling Date: 12/11/14

Applicant/Owner: Wildlands Engineering State: NC Sampling Point: DP14 - Upland G

Investigator(s): Ian Eckardt & Kenton Beal Section, Township, Range:

Landform (hillslope, terrace, etc.): floodplain Local relief (concave, convex, none): none Slope (%): 0

Subregion (LRR or MLRA): LRR N Lat: N 36.506424 Long: W -81.10526 Datum:

Soil Map Unit Name: Alluvial land (Ad) and Tate loam (TaD) NWI classification:

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No ____ (If no, explain in Remarks.)

Are Vegetation ✓, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes ____ No ✓

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓	No ____	**Is the Sampled Area within a Wetland?** Yes ✓ No ____
Hydric Soil Present?	Yes ✓	No ____	
Wetland Hydrology Present?	Yes ✓	No ____	

Remarks:

Sampling point is located within an actively grazed pasture.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ✓ Surface Water (A1)
- ___ High Water Table (A2)
- ✓ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ✓ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ True Aquatic Plants (B14)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ✓	No ____	Depth (inches): 0.5
Water Table Present?	Yes ____	No ✓	Depth (inches): -
Saturation Present? (includes capillary fringe)	Yes ✓	No ____	Depth (inches): 0 (Saturated at surface)

Wetland Hydrology Present? Yes ✓ No ____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION (Four Strata) – Use scientific names of plants.

Sampling Point: DP14 - Upland G

Tree Stratum (Plot size: 30')	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
	= Total Cover		
Sapling/Shrub Stratum (Plot size: 15')			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
	= Total Cover		
Herb Stratum (Plot size: 5')			
1. Carex lurida	80	Yes	OBL
2. Juncus effusus	5	No	FACW
3. Festuca sp.	5	No	FAC
4. Aster sp.	3	No	Unknown
5. Solidago sp.	3	No	Unknown
6. Berberis thunbergii	2	No	FACU
7. Trifolium repens	2	No	FACU
8.			
9.			
10.			
11.			
12.			
	100 = Total Cover		
Woody Vine Stratum (Plot size: 30')			
1.			
2.			
3.			
4.			
5.			
6.			
	= Total Cover		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: _____ (A)

Total Number of Dominant Species Across All Strata: _____ (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: _____ (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species _____	x 1 = _____
FACW species _____	x 2 = _____
FAC species _____	x 3 = _____
FACU species _____	x 4 = _____
UPL species _____	x 5 = _____
Column Totals: _____ (A)	_____ (B)

Prevalence Index = B/A = _____

Hydrophytic Vegetation Indicators:

✓ 1 - Rapid Test for Hydrophytic Vegetation

___ 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Four Vegetation Strata:

Tree – Woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/Shrub – Woody plants, excluding vines, less than 3 in. DBH and greater than 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vine – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** ✓ **No** _____

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: DP14 - Upland G

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0-2	10YR 3/2	100					silt	
2-12	2.5Y 4/2	100					silt loam	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ 2 cm Muck (A10) **(LRR N)**
- ✓ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1) **(LRR N, MLRA 147, 148)**
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7)
- ___ Polyvalue Below Surface (S8) **(MLRA 147, 148)**
- ___ Thin Dark Surface (S9) **(MLRA 147, 148)**
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Iron-Manganese Masses (F12) **(LRR N, MLRA 136)**
- ___ Umbric Surface (F13) **(MLRA 136, 122)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 148)**

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) **(MLRA 147)**
- ___ Coast Prairie Redox (A16) **(MLRA 147, 148)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 136, 147)**
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ✓ **No** _____

Remarks:

WETLAND DETERMINATION DATA FORM – Eastern Mountains and Piedmont

Project/Site: Vile Creek Mitigation Site City/County: Alleghany Sampling Date: 12/10/14

Applicant/Owner: Wildlands Engineering State: NC Sampling Point: DP14 - Upland G

Investigator(s): Ian Eckardt & Kenton Beal Section, Township, Range:

Landform (hillslope, terrace, etc.): floodplain Local relief (concave, convex, none): none Slope (%): 0

Subregion (LRR or MLRA): LRR N Lat: N 36.506348 Long: W -81.105494 Datum:

Soil Map Unit Name: Chandler silt loam (CaF) NWI classification:

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)

Are Vegetation ✓, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes _____ No ✓

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓	No _____	**Is the Sampled Area within a Wetland?** Yes _____ No ✓
Hydric Soil Present?	Yes _____	No ✓	
Wetland Hydrology Present?	Yes _____	No ✓	

Remarks:

Sampling point located within an actively grazed pasture. Trees and saplings have been removed.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ True Aquatic Plants (B14)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes _____	No ✓	Depth (inches): -
Water Table Present?	Yes _____	No ✓	Depth (inches): -
Saturation Present? (includes capillary fringe)	Yes _____	No ✓	Depth (inches): -

Wetland Hydrology Present? Yes _____ No ✓

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION (Four Strata) – Use scientific names of plants.

Sampling Point: DP14 - Upland G

Tree Stratum (Plot size: 30')	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
	= Total Cover		
Sapling/Shrub Stratum (Plot size: 15')			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
	= Total Cover		
Herb Stratum (Plot size: 5')			
1. Festuca sp.	90	Yes	FAC
2. Solidago sp.	5	No	Unknown
3. Trifolium repens	5	No	FACU
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	100 = Total Cover		
Woody Vine Stratum (Plot size: 30')			
1.			
2.			
3.			
4.			
5.			
6.			
	= Total Cover		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species		x 1 =	
FACW species		x 2 =	
FAC species		x 3 =	
FACU species		x 4 =	
UPL species		x 5 =	
Column Totals:	(A)		(B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

✓ 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Four Vegetation Strata:

Tree – Woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/Shrub – Woody plants, excluding vines, less than 3 in. DBH and greater than 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vine – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** ✓ **No** ___

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: DP14 - Upland G

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Redox Features Type[1]	Redox Features Loc[2]	Texture	Remarks
0-12	5YR 4/4	100					loam	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ 2 cm Muck (A10) **(LRR N)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1) **(LRR N, MLRA 147, 148)**
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7)
- ___ Polyvalue Below Surface (S8) **(MLRA 147, 148)**
- ___ Thin Dark Surface (S9) **(MLRA 147, 148)**
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Iron-Manganese Masses (F12) **(LRR N, MLRA 136)**
- ___ Umbric Surface (F13) **(MLRA 136, 122)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 148)**

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) **(MLRA 147)**
- ___ Coast Prairie Redox (A16) **(MLRA 147, 148)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 136, 147)**
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** _____ **No** ✓

Remarks:

WETLAND DETERMINATION DATA FORM – Eastern Mountains and Piedmont

Project/Site: Vile Creek Mitigation Site City/County: Alleghany Sampling Date: 12/11/14

Applicant/Owner: Wildlands Engineering State: NC Sampling Point: DP15 - Wetland H

Investigator(s): Ian Eckardt & Kenton Beal Section, Township, Range: _____

Landform (hillslope, terrace, etc.): floodplain Local relief (concave, convex, none): _____ Slope (%): 0

Subregion (LRR or MLRA): LRR N Lat: N 36.50892 Long: W -81.105952 Datum: _____

Soil Map Unit Name: Chandler silt loam (CaF) NWI classification: _____

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)

Are Vegetation ✓, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes _____ No ✓

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓	No _____	**Is the Sampled Area within a Wetland?** Yes ✓ No _____
Hydric Soil Present?	Yes ✓	No _____	
Wetland Hydrology Present?	Yes ✓	No _____	

Remarks:

Sampling point located within an actively grazed pasture. Trees and saplings have been removed.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ✓ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ✓ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ True Aquatic Plants (B14)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ✓ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ✓ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes _____	No ✓	Depth (inches): -
Water Table Present?	Yes _____	No ✓	Depth (inches): -
Saturation Present? (includes capillary fringe)	Yes ✓	No _____	Depth (inches): 0 (Saturated to surface)

Wetland Hydrology Present? Yes ✓ No _____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION (Four Strata) – Use scientific names of plants.

Sampling Point: DP15 - Wetland H

Tree Stratum (Plot size: 30')	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
	= Total Cover		
Sapling/Shrub Stratum (Plot size: 15')			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
	= Total Cover		
Herb Stratum (Plot size: 5')			
1. Carex lurida	40	Yes	OBL
2. Festuca sp.	30	Yes	FAC
3. Aster sp.	10	No	Unknown
4. Plantago sp.	10	No	Unknown
5. Juncus effusus	5	No	FACW
6. Solidago sp.	5	No	Unknown
7.			
8.			
9.			
10.			
11.			
12.			
	100 = Total Cover		
Woody Vine Stratum (Plot size: 30')			
1.			
2.			
3.			
4.			
5.			
6.			
	= Total Cover		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species	x 1 =
FACW species	x 2 =
FAC species	x 3 =
FACU species	x 4 =
UPL species	x 5 =
Column Totals: (A)	(B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:

- ___ 1 - Rapid Test for Hydrophytic Vegetation
- ✓ 2 - Dominance Test is >50%
- ___ 3 - Prevalence Index is ≤3.0[1]
- ___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Four Vegetation Strata:

Tree – Woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/Shrub – Woody plants, excluding vines, less than 3 in. DBH and greater than 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vine – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** ✓ **No** ___

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: DP15 - Wetland H

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0-3	7.5YR 3/1	90	5YR 4/6	10	C	PL	silt loam	
3-12	7.5YR 3/1	100					silt loam	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ 2 cm Muck (A10) **(LRR N)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1) **(LRR N, MLRA 147, 148)**
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7)
- ___ Polyvalue Below Surface (S8) **(MLRA 147, 148)**
- ___ Thin Dark Surface (S9) **(MLRA 147, 148)**
- ___ Loamy Gleyed Matrix (F2)
- ✓ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Iron-Manganese Masses (F12) **(LRR N, MLRA 136)**
- ___ Umbric Surface (F13) **(MLRA 136, 122)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 148)**

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) **(MLRA 147)**
- ___ Coast Prairie Redox (A16) **(MLRA 147, 148)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 136, 147)**
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ✓ **No** _____

Remarks:

WETLAND DETERMINATION DATA FORM – Eastern Mountains and Piedmont

Project/Site: Vile Creek Mitigation Site City/County: Alleghany Sampling Date: 12/10/14

Applicant/Owner: Wildlands Engineering State: NC Sampling Point: DP16 - Upland H&I

Investigator(s): Ian Eckardt & Kenton Beal Section, Township, Range: _____

Landform (hillslope, terrace, etc.): floodplain Local relief (concave, convex, none): none Slope (%): 0

Subregion (LRR or MLRA): LRR N Lat: N 36.505833 Long: W -81.105795 Datum: _____

Soil Map Unit Name: Chandler silt loam (CaF) NWI classification: _____

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)

Are Vegetation ✓, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes _____ No ✓

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓	No _____	**Is the Sampled Area within a Wetland?** Yes _____ No ✓
Hydric Soil Present?	Yes _____	No ✓	
Wetland Hydrology Present?	Yes _____	No ✓	

Remarks:

Sampling point located within an actively grazed pasture. Trees and saplings have been removed.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ True Aquatic Plants (B14)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes _____	No ✓	Depth (inches): -
Water Table Present?	Yes _____	No ✓	Depth (inches): -
Saturation Present? (includes capillary fringe)	Yes _____	No ✓	Depth (inches): -

Wetland Hydrology Present? Yes _____ No ✓

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION (Four Strata) – Use scientific names of plants.

Sampling Point: DP16 - Upland H&I

Tree Stratum (Plot size: 30')	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
	= Total Cover		
Sapling/Shrub Stratum (Plot size: 15')			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
	= Total Cover		
Herb Stratum (Plot size: 5')			
1. Festuca sp.	90	Yes	FAC
2. Trifolium repens	5	No	FACU
3. Solidago sp.	5	No	Unknown
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	100 = Total Cover		
Woody Vine Stratum (Plot size: 30')			
1.			
2.			
3.			
4.			
5.			
6.			
	= Total Cover		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species		x 1 =	
FACW species		x 2 =	
FAC species		x 3 =	
FACU species		x 4 =	
UPL species		x 5 =	
Column Totals:	(A)		(B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:

- ___ 1 - Rapid Test for Hydrophytic Vegetation
- ✓ 2 - Dominance Test is >50%
- ___ 3 - Prevalence Index is ≤3.0[1]
- ___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Four Vegetation Strata:

Tree – Woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/Shrub – Woody plants, excluding vines, less than 3 in. DBH and greater than 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vine – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** ✓ **No** ___

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: DP16 - Upland H&I

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0-7	7.5YR 3/4	100					loam	
7-12	7.5YR 4/6	100					loam	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ 2 cm Muck (A10) **(LRR N)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1) **(LRR N, MLRA 147, 148)**
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7)
- ___ Polyvalue Below Surface (S8) **(MLRA 147, 148)**
- ___ Thin Dark Surface (S9) **(MLRA 147, 148)**
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Iron-Manganese Masses (F12) **(LRR N, MLRA 136)**
- ___ Umbric Surface (F13) **(MLRA 136, 122)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 148)**

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) **(MLRA 147)**
- ___ Coast Prairie Redox (A16) **(MLRA 147, 148)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 136, 147)**
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** _____ **No** ✓

Remarks:

WETLAND DETERMINATION DATA FORM – Eastern Mountains and Piedmont

Project/Site: Vile Creek Mitigation Site City/County: Alleghany Sampling Date: 12/11/14

Applicant/Owner: Wildlands Engineering State: NC Sampling Point: DP17 - Wetland I

Investigator(s): Ian Eckardt & Kenton Beal Section, Township, Range: _____

Landform (hillslope, terrace, etc.): floodplain Local relief (concave, convex, none): _____ Slope (%): 0

Subregion (LRR or MLRA): LRR N Lat: N 36.505802 Long: W -81.105775 Datum: _____

Soil Map Unit Name: Chandler silt loam (CaF) NWI classification: _____

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)

Are Vegetation ✓, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes _____ No ✓

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓	No _____	**Is the Sampled Area within a Wetland?** Yes ✓ No _____
Hydric Soil Present?	Yes ✓	No _____	
Wetland Hydrology Present?	Yes ✓	No _____	

Remarks:

Sampling point located within an actively grazed pasture. Trees and saplings have been removed.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ✓ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ True Aquatic Plants (B14)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ✓ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ✓ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ✓ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes _____	No ✓	Depth (inches): -
Water Table Present?	Yes _____	No ✓	Depth (inches): -
Saturation Present? (includes capillary fringe)	Yes ✓	No _____	Depth (inches): 0 (Saturated at surface)

Wetland Hydrology Present? Yes ✓ No _____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION (Four Strata) – Use scientific names of plants.

Sampling Point: DP17 - Wetland I

Tree Stratum (Plot size: 30')	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
	= Total Cover		
Sapling/Shrub Stratum (Plot size: 15')			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
	= Total Cover		
Herb Stratum (Plot size: 5')			
1. Carex lurida	90	Yes	OBL
2. Festuca sp.	10	No	FACW
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	100 = Total Cover		
Woody Vine Stratum (Plot size: 30')			
1.			
2.			
3.			
4.			
5.			
6.			
	= Total Cover		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: _____ (A)

Total Number of Dominant Species Across All Strata: _____ (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: _____ (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species _____	x 1 = _____
FACW species _____	x 2 = _____
FAC species _____	x 3 = _____
FACU species _____	x 4 = _____
UPL species _____	x 5 = _____
Column Totals: _____ (A)	_____ (B)

Prevalence Index = B/A = _____

Hydrophytic Vegetation Indicators:

✓ 1 - Rapid Test for Hydrophytic Vegetation

___ 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Four Vegetation Strata:

Tree – Woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/Shrub – Woody plants, excluding vines, less than 3 in. DBH and greater than 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vine – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** ✓ **No** _____

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: DP17 - Wetland I

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0-12	10YR 3/1	100					loam	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ 2 cm Muck (A10) **(LRR N)**
- ✓ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1) **(LRR N, MLRA 147, 148)**
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7)
- ___ Polyvalue Below Surface (S8) **(MLRA 147, 148)**
- ___ Thin Dark Surface (S9) **(MLRA 147, 148)**
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Iron-Manganese Masses (F12) **(LRR N, MLRA 136)**
- ___ Umbric Surface (F13) **(MLRA 136, 122)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 148)**

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) **(MLRA 147)**
- ___ Coast Prairie Redox (A16) **(MLRA 147, 148)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 136, 147)**
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ✓ **No** _____

Remarks:

WETLAND DETERMINATION DATA FORM – Eastern Mountains and Piedmont

Project/Site: Vile Creek Mitigation Site City/County: Alleghany Sampling Date: 12/11/14

Applicant/Owner: Wildlands Engineering State: NC Sampling Point: DP18 - Wetland J

Investigator(s): Ian Eckardt & Kenton Beal Section, Township, Range: _____

Landform (hillslope, terrace, etc.): floodplain Local relief (concave, convex, none): _____ Slope (%): 0

Subregion (LRR or MLRA): LRR N Lat: N 36.505762 Long: W -81.106257 Datum: _____

Soil Map Unit Name: Watauga loam (WaE) NWI classification: _____

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)

Are Vegetation ✓, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes _____ No ✓

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓	No _____	**Is the Sampled Area within a Wetland?** Yes ✓ No _____
Hydric Soil Present?	Yes ✓	No _____	
Wetland Hydrology Present?	Yes ✓	No _____	

Remarks:

Sampling point located within an actively grazed pasture. Trees and saplings have been removed.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ✓ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ True Aquatic Plants (B14)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ✓ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes _____	No ✓	Depth (inches): -
Water Table Present?	Yes _____	No ✓	Depth (inches): -
Saturation Present? (includes capillary fringe)	Yes ✓	No _____	Depth (inches): 0 (Saturated to surface)

Wetland Hydrology Present? Yes ✓ No _____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION (Four Strata) – Use scientific names of plants.

Sampling Point: DP18 - Wetland J

Tree Stratum (Plot size: 30')	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
	= Total Cover		
Sapling/Shrub Stratum (Plot size: 15')			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
	= Total Cover		
Herb Stratum (Plot size: 5')			
1. Festuca sp.	90	Yes	FAC
2. Juncus effusus	5	No	FACW
3. Aster sp.	2.5	No	Unknown
4. Solidago sp.	2.5	No	Unknown
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	100 = Total Cover		
Woody Vine Stratum (Plot size: 30')			
1.			
2.			
3.			
4.			
5.			
6.			
	= Total Cover		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species		x 1 =	
FACW species		x 2 =	
FAC species		x 3 =	
FACU species		x 4 =	
UPL species		x 5 =	
Column Totals:	(A)		(B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:

- ___ 1 - Rapid Test for Hydrophytic Vegetation
- ✓ 2 - Dominance Test is >50%
- ___ 3 - Prevalence Index is ≤3.0[1]
- ___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Four Vegetation Strata:

Tree – Woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/Shrub – Woody plants, excluding vines, less than 3 in. DBH and greater than 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vine – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** ✓ **No** ___

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: DP18 - Wetland J

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0-1	7.5YR 4/4	100					silt loam	
1-8	10YR 4/1	100					silt loam	
8-12	10YR 5/1	60	7.5YR 5/6	40	C	PL	clay loam	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ 2 cm Muck (A10) **(LRR N)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1) **(LRR N, MLRA 147, 148)**
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7)
- ___ Polyvalue Below Surface (S8) **(MLRA 147, 148)**
- ___ Thin Dark Surface (S9) **(MLRA 147, 148)**
- ___ Loamy Gleyed Matrix (F2)
- ✓ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Iron-Manganese Masses (F12) **(LRR N, MLRA 136)**
- ___ Umbric Surface (F13) **(MLRA 136, 122)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 148)**

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) **(MLRA 147)**
- ___ Coast Prairie Redox (A16) **(MLRA 147, 148)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 136, 147)**
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ✓ **No** _____

Remarks:

WETLAND DETERMINATION DATA FORM – Eastern Mountains and Piedmont

Project/Site: Vile Creek Mitigation Site City/County: Alleghany Sampling Date: 12/10/14

Applicant/Owner: Wildlands Engineering State: NC Sampling Point: DP19 - Upland J

Investigator(s): Ian Eckardt & Kenton Beal Section, Township, Range: _____

Landform (hillslope, terrace, etc.): floodplain Local relief (concave, convex, none): none Slope (%): 0

Subregion (LRR or MLRA): LRR N Lat: N 36.50573 Long: W -81.106196 Datum: _____

Soil Map Unit Name: Watauga loam (WaE) NWI classification: _____

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)

Are Vegetation ✓, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes _____ No ✓

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓	No _____	**Is the Sampled Area within a Wetland?** Yes _____ No ✓
Hydric Soil Present?	Yes _____	No ✓	
Wetland Hydrology Present?	Yes _____	No ✓	

Remarks:

Sampling point located within an actively grazed pasture. Trees and saplings have been removed.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ True Aquatic Plants (B14)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes _____	No ✓	Depth (inches): -
Water Table Present?	Yes _____	No ✓	Depth (inches): -
Saturation Present? (includes capillary fringe)	Yes _____	No ✓	Depth (inches): -

Wetland Hydrology Present? Yes _____ No ✓

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION (Four Strata) – Use scientific names of plants.

Sampling Point: DP19 - Upland J

Tree Stratum (Plot size: 30')	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
	= Total Cover		
Sapling/Shrub Stratum (Plot size: 15')			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
	= Total Cover		
Herb Stratum (Plot size: 5')			
1. Festuca sp.	80	Yes	FAC
2. Trifolium repens	10	No	FACU
3. Berberis thunbergii	5	No	FACU
4. Trifolium pratense	5	No	FACU
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	100 = Total Cover		
Woody Vine Stratum (Plot size: 30')			
1.			
2.			
3.			
4.			
5.			
6.			
	= Total Cover		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species		x 1 =	
FACW species		x 2 =	
FAC species		x 3 =	
FACU species		x 4 =	
UPL species		x 5 =	
Column Totals:	(A)		(B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:

- ___ 1 - Rapid Test for Hydrophytic Vegetation
- ✓ 2 - Dominance Test is >50%
- ___ 3 - Prevalence Index is ≤3.0[1]
- ___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Four Vegetation Strata:

Tree – Woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/Shrub – Woody plants, excluding vines, less than 3 in. DBH and greater than 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vine – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** ✓ **No** ___

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: DP19 - Upland J

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0-4	7.5YR 3/4	100					loam	
4-12	7.5YR 4/4	100					clay loam	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ 2 cm Muck (A10) **(LRR N)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1) **(LRR N, MLRA 147, 148)**
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7)
- ___ Polyvalue Below Surface (S8) **(MLRA 147, 148)**
- ___ Thin Dark Surface (S9) **(MLRA 147, 148)**
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Iron-Manganese Masses (F12) **(LRR N, MLRA 136)**
- ___ Umbric Surface (F13) **(MLRA 136, 122)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 148)**

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) **(MLRA 147)**
- ___ Coast Prairie Redox (A16) **(MLRA 147, 148)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 136, 147)**
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** _____ **No** ✓

Remarks:

WETLAND DETERMINATION DATA FORM – Eastern Mountains and Piedmont

Project/Site: Vile Creek Mitigation Site City/County: Alleghany Sampling Date: 12/11/14

Applicant/Owner: Wildlands Engineering State: NC Sampling Point: DP20 - Wetland K

Investigator(s): Ian Eckardt & Kenton Beal Section, Township, Range: _____

Landform (hillslope, terrace, etc.): floodplain Local relief (concave, convex, none): _____ Slope (%): 0

Subregion (LRR or MLRA): LRR N Lat: N 36.505722 Long: W -81.106538 Datum: _____

Soil Map Unit Name: Watauga loam (WaE) NWI classification: _____

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)

Are Vegetation ✓, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes _____ No ✓

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓	No _____	**Is the Sampled Area within a Wetland?** Yes ✓ No _____
Hydric Soil Present?	Yes ✓	No _____	
Wetland Hydrology Present?	Yes ✓	No _____	

Remarks:

Sampling point located within an actively grazed pasture. Trees and saplings have been removed.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ✓ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ True Aquatic Plants (B14)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ✓ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ✓ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes _____	No ✓	Depth (inches): -
Water Table Present?	Yes _____	No ✓	Depth (inches): -
Saturation Present? (includes capillary fringe)	Yes _____	No ✓	Depth (inches): -

Wetland Hydrology Present? Yes ✓ No _____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION (Four Strata) – Use scientific names of plants.

Sampling Point: DP20 - Wetland K

Tree Stratum (Plot size: 30')	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
	= Total Cover		
Sapling/Shrub Stratum (Plot size: 15')			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
	= Total Cover		
Herb Stratum (Plot size: 5')			
1. Carex lurida	75	Yes	OBL
2. Festuca sp.	15	No	FAC
3. Aster sp.	5	No	Unknown
4. Solidago sp.	2.5	No	Unknown
5. Berberis thunbergii	2.5	No	FACU
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	100 = Total Cover		
Woody Vine Stratum (Plot size: 30')			
1.			
2.			
3.			
4.			
5.			
6.			
	= Total Cover		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: _____ (A)

Total Number of Dominant Species Across All Strata: _____ (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: _____ (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species _____	x 1 = _____
FACW species _____	x 2 = _____
FAC species _____	x 3 = _____
FACU species _____	x 4 = _____
UPL species _____	x 5 = _____
Column Totals: _____ (A)	_____ (B)

Prevalence Index = B/A = _____

Hydrophytic Vegetation Indicators:

✓ 1 - Rapid Test for Hydrophytic Vegetation

___ 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Four Vegetation Strata:

Tree – Woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/Shrub – Woody plants, excluding vines, less than 3 in. DBH and greater than 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vine – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** ✓ **No** _____

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: DP20 - Wetland K

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0-4	10YR 4/2	100					sand	
4-10	10YR 4/1	90	2.5YR 3/6	10	C	PL	sandy loam	
10-12	10YR 4/3						sand	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ 2 cm Muck (A10) **(LRR N)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1) **(LRR N, MLRA 147, 148)**
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7)
- ___ Polyvalue Below Surface (S8) **(MLRA 147, 148)**
- ___ Thin Dark Surface (S9) **(MLRA 147, 148)**
- ___ Loamy Gleyed Matrix (F2)
- ✓ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Iron-Manganese Masses (F12) **(LRR N, MLRA 136)**
- ___ Umbric Surface (F13) **(MLRA 136, 122)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 148)**

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) **(MLRA 147)**
- ___ Coast Prairie Redox (A16) **(MLRA 147, 148)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 136, 147)**
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ✓ **No** _____

Remarks:

WETLAND DETERMINATION DATA FORM – Eastern Mountains and Piedmont

Project/Site: Vile Creek Mitigation Site City/County: Alleghany Sampling Date: 12/11/14

Applicant/Owner: Wildlands Engineering State: NC Sampling Point: DP21 - Upland K&L

Investigator(s): Ian Eckardt & Kenton Beal Section, Township, Range:

Landform (hillslope, terrace, etc.): floodplain Local relief (concave, convex, none): none Slope (%): 0

Subregion (LRR or MLRA): LRR N Lat: N 36.505771 Long: W -81.10667 Datum:

Soil Map Unit Name: Watauga loam (WaE) NWI classification:

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No ____ (If no, explain in Remarks.)

Are Vegetation ✓, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes ____ No ✓

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓	No ____	**Is the Sampled Area within a Wetland?** Yes ____ No ✓
Hydric Soil Present?	Yes ____	No ✓	
Wetland Hydrology Present?	Yes ____	No ✓	

Remarks:

Sampling point located within an actively grazed pasture. Trees and saplings have been removed.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ True Aquatic Plants (B14)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ____	No ✓	Depth (inches): -
Water Table Present?	Yes ____	No ✓	Depth (inches): -
Saturation Present? (includes capillary fringe)	Yes ____	No ✓	Depth (inches): -

Wetland Hydrology Present? Yes ____ No ✓

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION (Four Strata) – Use scientific names of plants.

Sampling Point: DP21 - Upland K&L

Tree Stratum (Plot size: 30')	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
	= Total Cover		
Sapling/Shrub Stratum (Plot size: 15')			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
	= Total Cover		
Herb Stratum (Plot size: 5')			
1. Festuca sp.	80	Yes	FAC
2. Berberis thunbergii	10	No	FACU
3. Solidago sp.	10	No	Unknown
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	100 = Total Cover		
Woody Vine Stratum (Plot size: 30')			
1.			
2.			
3.			
4.			
5.			
6.			
	= Total Cover		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species		x 1 =	
FACW species		x 2 =	
FAC species		x 3 =	
FACU species		x 4 =	
UPL species		x 5 =	
Column Totals:	(A)		(B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:

- ___ 1 - Rapid Test for Hydrophytic Vegetation
- ✓ 2 - Dominance Test is >50%
- ___ 3 - Prevalence Index is ≤3.0[1]
- ___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Four Vegetation Strata:

Tree – Woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/Shrub – Woody plants, excluding vines, less than 3 in. DBH and greater than 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vine – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** ✓ **No** ___

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: DP21 - Upland K&L

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Redox Features Type[1]	Redox Features Loc[2]	Texture	Remarks
0-6	7.5YR 4/6	100					loam	
6-12	7.5YR 5/4	100					loam	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ 2 cm Muck (A10) **(LRR N)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1) **(LRR N, MLRA 147, 148)**
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7)
- ___ Polyvalue Below Surface (S8) **(MLRA 147, 148)**
- ___ Thin Dark Surface (S9) **(MLRA 147, 148)**
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Iron-Manganese Masses (F12) **(LRR N, MLRA 136)**
- ___ Umbric Surface (F13) **(MLRA 136, 122)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 148)**

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) **(MLRA 147)**
- ___ Coast Prairie Redox (A16) **(MLRA 147, 148)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 136, 147)**
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** _____ **No** ✓

Remarks:

WETLAND DETERMINATION DATA FORM – Eastern Mountains and Piedmont

Project/Site: Vile Creek Mitigation Site City/County: Alleghany Sampling Date: 12/11/14

Applicant/Owner: Wildlands Engineering State: NC Sampling Point: DP22 - Wetland L

Investigator(s): Ian Eckardt & Kenton Beal Section, Township, Range: _____

Landform (hillslope, terrace, etc.): floodplain Local relief (concave, convex, none): _____ Slope (%): 0

Subregion (LRR or MLRA): LRR N Lat: N 36.505705 Long: W -81.106737 Datum: _____

Soil Map Unit Name: Watauga (WaE) NWI classification: _____

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)

Are Vegetation ✓, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes _____ No ✓

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓	No _____	**Is the Sampled Area within a Wetland?** Yes ✓ No _____
Hydric Soil Present?	Yes ✓	No _____	
Wetland Hydrology Present?	Yes ✓	No _____	

Remarks:

Sampling point located within an actively grazed pasture. Trees and saplings have been removed.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ✓ Surface Water (A1)
- ___ High Water Table (A2)
- ✓ Saturation (A3)
- ___ Water Marks (B1)
- ✓ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ✓ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ True Aquatic Plants (B14)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ✓ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ✓	No _____	Depth (inches): 2
Water Table Present?	Yes _____	No ✓	Depth (inches): -
Saturation Present? (includes capillary fringe)	Yes ✓	No _____	Depth (inches): 0 (Saturated at surface)

Wetland Hydrology Present? Yes ✓ No _____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION (Four Strata) – Use scientific names of plants.

Sampling Point: DP22 - Wetland L

Tree Stratum (Plot size: 30')	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
	= Total Cover		
Sapling/Shrub Stratum (Plot size: 15')			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
	= Total Cover		
Herb Stratum (Plot size: 5')			
1. Carex lurida	80	Yes	OBL
2. Festuca sp.	15	No	FAC
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	95 = Total Cover		
Woody Vine Stratum (Plot size: 30')			
1.			
2.			
3.			
4.			
5.			
6.			
	= Total Cover		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: _____ (A)

Total Number of Dominant Species Across All Strata: _____ (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: _____ (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species _____	x 1 = _____
FACW species _____	x 2 = _____
FAC species _____	x 3 = _____
FACU species _____	x 4 = _____
UPL species _____	x 5 = _____
Column Totals: _____ (A)	_____ (B)

Prevalence Index = B/A = _____

Hydrophytic Vegetation Indicators:

✓ 1 - Rapid Test for Hydrophytic Vegetation

___ 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Four Vegetation Strata:

Tree – Woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/Shrub – Woody plants, excluding vines, less than 3 in. DBH and greater than 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vine – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** ✓ **No** _____

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: DP22 - Wetland L

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0-12	10YR 3/1	100					sandy loam	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ 2 cm Muck (A10) **(LRR N)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1) **(LRR N, MLRA 147, 148)**
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7)
- ___ Polyvalue Below Surface (S8) **(MLRA 147, 148)**
- ___ Thin Dark Surface (S9) **(MLRA 147, 148)**
- ___ Loamy Gleyed Matrix (F2)
- ✓ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Iron-Manganese Masses (F12) **(LRR N, MLRA 136)**
- ___ Umbric Surface (F13) **(MLRA 136, 122)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 148)**

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) **(MLRA 147)**
- ___ Coast Prairie Redox (A16) **(MLRA 147, 148)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 136, 147)**
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ✓ **No** _____

Remarks:

WETLAND DETERMINATION DATA FORM – Eastern Mountains and Piedmont

Project/Site: Vile Creek Mitigation Site City/County: Alleghany Sampling Date: 12/11/14

Applicant/Owner: Wildlands Engineering State: NC Sampling Point: DP23 - Wetland M

Investigator(s): Ian Eckardt & Kenton Beal Section, Township, Range: _____

Landform (hillslope, terrace, etc.): floodplain Local relief (concave, convex, none): _____ Slope (%): 0

Subregion (LRR or MLRA): LRR N Lat: N 36.508485 Long: W -81.101129 Datum: _____

Soil Map Unit Name: Alluvial land (Ad) NWI classification: _____

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)

Are Vegetation ✓, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes _____ No ✓

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓	No _____	**Is the Sampled Area within a Wetland?** Yes ✓ No _____
Hydric Soil Present?	Yes ✓	No _____	
Wetland Hydrology Present?	Yes ✓	No _____	

Remarks:

Sampling point located within an actively grazed pasture. Trees and saplings have been removed.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ✓ Surface Water (A1)
- ___ High Water Table (A2)
- ✓ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ✓ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ True Aquatic Plants (B14)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ✓ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ✓	No _____	Depth (inches): 1
Water Table Present?	Yes _____	No ✓	Depth (inches): -
Saturation Present? (includes capillary fringe)	Yes ✓	No _____	Depth (inches): 0 (saturated to surface)

Wetland Hydrology Present? Yes ✓ No _____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION (Four Strata) – Use scientific names of plants.

Sampling Point: DP23 - Wetland M

Tree Stratum (Plot size: 30')	Absolute % Cover	Dominant Species?	Indicator Status
1. Acer rubrum	50	Yes	FAC
2. Betula nigra	10	No	FACW
3.			
4.			
5.			
6.			
7.			
8.			
	60	= Total Cover	

Sapling/Shrub Stratum (Plot size: 15')			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
		= Total Cover	

Herb Stratum (Plot size: 5')			
1. Carex lurida	20	Yes	OBL
2. Festuca sp.	20	Yes	FAC
3. Ludwigia sp.	20	Yes	OBL
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	60	= Total Cover	

Woody Vine Stratum (Plot size: 30')			
1.			
2.			
3.			
4.			
5.			
6.			
		= Total Cover	

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 4 (A)

Total Number of Dominant Species Across All Strata: 4 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species		x 1 =	
FACW species		x 2 =	
FAC species		x 3 =	
FACU species		x 4 =	
UPL species		x 5 =	
Column Totals:	(A)		(B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:

- ___ 1 - Rapid Test for Hydrophytic Vegetation
- ✓ 2 - Dominance Test is >50%
- ___ 3 - Prevalence Index is ≤3.0[1]
- ___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Four Vegetation Strata:

Tree – Woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/Shrub – Woody plants, excluding vines, less than 3 in. DBH and greater than 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vine – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** ✓ **No** ___

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: DP23 - Wetland M

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0-2	10YR 3/1	90	10YR 4/6	10	C	PL	silt loam	
2-12	10YR 4/1	100					sandy loam	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ 2 cm Muck (A10) **(LRR N)**
- ✓ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1) **(LRR N, MLRA 147, 148)**
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7)
- ___ Polyvalue Below Surface (S8) **(MLRA 147, 148)**
- ___ Thin Dark Surface (S9) **(MLRA 147, 148)**
- ___ Loamy Gleyed Matrix (F2)
- ✓ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Iron-Manganese Masses (F12) **(LRR N, MLRA 136)**
- ___ Umbric Surface (F13) **(MLRA 136, 122)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 148)**

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) **(MLRA 147)**
- ___ Coast Prairie Redox (A16) **(MLRA 147, 148)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 136, 147)**
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ✓ **No** ___

Remarks:

WETLAND DETERMINATION DATA FORM – Eastern Mountains and Piedmont

Project/Site: Vile Creek Mitigation Site City/County: Alleghany Sampling Date: 12/11/14

Applicant/Owner: Wildlands Engineering State: NC Sampling Point: DP24 - Upland M

Investigator(s): Ian Eckardt & Kenton Beal Section, Township, Range:

Landform (hillslope, terrace, etc.): floodplain Local relief (concave, convex, none): none Slope (%): 0

Subregion (LRR or MLRA): LRR N Lat: N 36.508463 Long: W -81.101017 Datum:

Soil Map Unit Name: Alluvial land (Ad) NWI classification:

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)

Are Vegetation ✓, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes _____ No ✓

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓	No _____	**Is the Sampled Area within a Wetland?** Yes _____ No ✓
Hydric Soil Present?	Yes _____	No ✓	
Wetland Hydrology Present?	Yes _____	No ✓	

Remarks:

Sampling point located within an actively grazed pasture. Trees and saplings have been removed.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ True Aquatic Plants (B14)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes _____	No ✓	Depth (inches): -
Water Table Present?	Yes _____	No ✓	Depth (inches): -
Saturation Present? (includes capillary fringe)	Yes _____	No ✓	Depth (inches): -

Wetland Hydrology Present? Yes _____ No ✓

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION (Four Strata) – Use scientific names of plants.

Sampling Point: DP24 - Upland M

Tree Stratum (Plot size: 30')	Absolute % Cover	Dominant Species?	Indicator Status
1. Acer rubrum	50	Yes	FAC
2.			
3.			
4.			
5.			
6.			
7.			
8.			
	50 = Total Cover		
Sapling/Shrub Stratum (Plot size: 15')			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
	= Total Cover		
Herb Stratum (Plot size: 5')			
1. Festuca sp.	100	Yes	FAC
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	100 = Total Cover		
Woody Vine Stratum (Plot size: 30')			
1.			
2.			
3.			
4.			
5.			
6.			
	= Total Cover		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species		x 1 =	
FACW species		x 2 =	
FAC species		x 3 =	
FACU species		x 4 =	
UPL species		x 5 =	
Column Totals:	(A)		(B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:

- ___ 1 - Rapid Test for Hydrophytic Vegetation
- ✓ 2 - Dominance Test is >50%
- ___ 3 - Prevalence Index is ≤3.0[1]
- ___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Four Vegetation Strata:

Tree – Woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/Shrub – Woody plants, excluding vines, less than 3 in. DBH and greater than 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vine – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** ✓ **No** ___

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: DP24 - Upland M

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0-3	10YR 3/4	100					loam	
3-12	10YR 4/6	100					loam	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ 2 cm Muck (A10) **(LRR N)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1) **(LRR N, MLRA 147, 148)**
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7)
- ___ Polyvalue Below Surface (S8) **(MLRA 147, 148)**
- ___ Thin Dark Surface (S9) **(MLRA 147, 148)**
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Iron-Manganese Masses (F12) **(LRR N, MLRA 136)**
- ___ Umbric Surface (F13) **(MLRA 136, 122)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 148)**

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) **(MLRA 147)**
- ___ Coast Prairie Redox (A16) **(MLRA 147, 148)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 136, 147)**
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** _____ **No** ✓

Remarks:

WETLAND DETERMINATION DATA FORM – Eastern Mountains and Piedmont

Project/Site: Vile Creek Mitigation Site City/County: Alleghany Sampling Date: 12/11/14

Applicant/Owner: Wildlands Engineering State: NC Sampling Point: DP25 - Wetland N

Investigator(s): Ian Eckardt & Kenton Beal Section, Township, Range: _____

Landform (hillslope, terrace, etc.): floodplain Local relief (concave, convex, none): _____ Slope (%): 0

Subregion (LRR or MLRA): LRR N Lat: N 36.508423 Long: W -81.100029 Datum: _____

Soil Map Unit Name: Alluvial land (Ad) NWI classification: _____

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)

Are Vegetation ✓, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes _____ No ✓

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓	No _____	**Is the Sampled Area within a Wetland?** Yes ✓ No _____
Hydric Soil Present?	Yes ✓	No _____	
Wetland Hydrology Present?	Yes ✓	No _____	

Remarks:

Sampling point located within an actively grazed pasture. Trees and saplings have been removed.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ✓ Surface Water (A1)
- ___ High Water Table (A2)
- ✓ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ✓ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ✓ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ True Aquatic Plants (B14)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ✓	No _____	Depth (inches): 5
Water Table Present?	Yes _____	No ✓	Depth (inches): -
Saturation Present? (includes capillary fringe)	Yes ✓	No _____	Depth (inches): 0 (saturated to surface)

Wetland Hydrology Present? Yes ✓ No _____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION (Four Strata) – Use scientific names of plants.

Sampling Point: DP25 - Wetland N

Tree Stratum (Plot size: 30')	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
	60 = Total Cover		
Sapling/Shrub Stratum (Plot size: 15')			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
	= Total Cover		
Herb Stratum (Plot size: 5')			
1. Carex lurida	70	Yes	OBL
2. Juncus effusus	20	Yes	FACW
3. Festuca sp.	10	Yes	FAC
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	100 = Total Cover		
Woody Vine Stratum (Plot size: 30')			
1.			
2.			
3.			
4.			
5.			
6.			
	= Total Cover		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: _____ (A)

Total Number of Dominant Species Across All Strata: _____ (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: _____ (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species _____	x 1 = _____
FACW species _____	x 2 = _____
FAC species _____	x 3 = _____
FACU species _____	x 4 = _____
UPL species _____	x 5 = _____
Column Totals: _____ (A)	_____ (B)

Prevalence Index = B/A = _____

Hydrophytic Vegetation Indicators:

✓ 1 - Rapid Test for Hydrophytic Vegetation

___ 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Four Vegetation Strata:

Tree – Woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/Shrub – Woody plants, excluding vines, less than 3 in. DBH and greater than 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vine – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** ✓ **No** _____

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: DP25 - Wetland N

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0-2	10YR 4/1	85	7.5YR 3/6	15	C	PL	silt	
2-10	10YR 3/1	95	10YR 3/6	5	C	PL	silt loam	
10-12	10YR 3/2	100					sandy loam	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ 2 cm Muck (A10) **(LRR N)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1) **(LRR N, MLRA 147, 148)**
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7)
- ___ Polyvalue Below Surface (S8) **(MLRA 147, 148)**
- ___ Thin Dark Surface (S9) **(MLRA 147, 148)**
- ___ Loamy Gleyed Matrix (F2)
- ✓ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Iron-Manganese Masses (F12) **(LRR N, MLRA 136)**
- ___ Umbric Surface (F13) **(MLRA 136, 122)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 148)**

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) **(MLRA 147)**
- ___ Coast Prairie Redox (A16) **(MLRA 147, 148)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 136, 147)**
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ✓ **No** _____

Remarks:

WETLAND DETERMINATION DATA FORM – Eastern Mountains and Piedmont

Project/Site: Vile Creek Mitigation Site City/County: Alleghany Sampling Date: 12/11/14

Applicant/Owner: Wildlands Engineering State: NC Sampling Point: DP26 - Upland N

Investigator(s): Ian Eckardt & Kenton Beal Section, Township, Range:

Landform (hillslope, terrace, etc.): floodplain Local relief (concave, convex, none): none Slope (%): 0

Subregion (LRR or MLRA): LRR N Lat: N 36.508293 Long: W -81.100102 Datum:

Soil Map Unit Name: Alluvial land (Ad) NWI classification:

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)

Are Vegetation ✓, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes _____ No ✓

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓	No _____	**Is the Sampled Area within a Wetland?** Yes _____ No ✓
Hydric Soil Present?	Yes _____	No ✓	
Wetland Hydrology Present?	Yes _____	No ✓	

Remarks:

Sampling point located within an actively grazed pasture. Trees and saplings have been removed.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ True Aquatic Plants (B14)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes _____	No ✓	Depth (inches): -
Water Table Present?	Yes _____	No ✓	Depth (inches): -
Saturation Present? (includes capillary fringe)	Yes _____	No ✓	Depth (inches): -

Wetland Hydrology Present? Yes _____ No ✓

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION (Four Strata) – Use scientific names of plants.

Sampling Point: DP26 - Upland N

Tree Stratum (Plot size: 30')	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
	= Total Cover		
Sapling/Shrub Stratum (Plot size: 15')			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
	= Total Cover		
Herb Stratum (Plot size: 5')			
1. Festuca sp.	80	Yes	FAC
2. Plantago sp.	10	No	Unknown
3. Solidago sp.	10	No	Unknown
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	100 = Total Cover		
Woody Vine Stratum (Plot size: 30')			
1.			
2.			
3.			
4.			
5.			
6.			
	= Total Cover		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species		x 1 =	
FACW species		x 2 =	
FAC species		x 3 =	
FACU species		x 4 =	
UPL species		x 5 =	
Column Totals:	(A)		(B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

✓ 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Four Vegetation Strata:

Tree – Woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/Shrub – Woody plants, excluding vines, less than 3 in. DBH and greater than 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vine – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** ✓ **No** ___

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: DP26 - Upland N

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0-4	10YR 4/4	100					loam	
4-12	10YR 4/6	100					loam	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ 2 cm Muck (A10) **(LRR N)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1) **(LRR N, MLRA 147, 148)**
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7)
- ___ Polyvalue Below Surface (S8) **(MLRA 147, 148)**
- ___ Thin Dark Surface (S9) **(MLRA 147, 148)**
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Iron-Manganese Masses (F12) **(LRR N, MLRA 136)**
- ___ Umbric Surface (F13) **(MLRA 136, 122)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 148)**

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) **(MLRA 147)**
- ___ Coast Prairie Redox (A16) **(MLRA 147, 148)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 136, 147)**
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** _____ **No** ✓

Remarks:

WETLAND DETERMINATION DATA FORM – Eastern Mountains and Piedmont

Project/Site: Vile Creek Mitigation Site City/County: Alleghany Sampling Date: 12/11/14

Applicant/Owner: Wildlands Engineering State: NC Sampling Point: DP27 - Wetland O

Investigator(s): Ian Eckardt & Kenton Beal Section, Township, Range: _____

Landform (hillslope, terrace, etc.): floodplain Local relief (concave, convex, none): _____ Slope (%): 0

Subregion (LRR or MLRA): LRR N Lat: N 36.508425 Long: W -81.099344 Datum: _____

Soil Map Unit Name: Alluvial land (Ad) NWI classification: _____

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)

Are Vegetation ✓, Soil _____, or Hydrology ✓ significantly disturbed? Are "Normal Circumstances" present? Yes _____ No ✓

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓	No _____	**Is the Sampled Area within a Wetland?** Yes ✓ No _____
Hydric Soil Present?	Yes ✓	No _____	
Wetland Hydrology Present?	Yes ✓	No _____	

Remarks:

Sampling point located within an actively grazed pasture. Trees and saplings have been removed. Feature has been ditched to improve drainage.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ✓ Surface Water (A1)
- ___ High Water Table (A2)
- ✓ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ✓ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ True Aquatic Plants (B14)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ✓	No _____	Depth (inches): 1
Water Table Present?	Yes _____	No ✓	Depth (inches): -
Saturation Present? (includes capillary fringe)	Yes ✓	No _____	Depth (inches): 0 (saturated to surface)

Wetland Hydrology Present? Yes ✓ No _____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION (Four Strata) – Use scientific names of plants.

Sampling Point: DP27 - Wetland O

Tree Stratum (Plot size: 30')	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
	= Total Cover		
Sapling/Shrub Stratum (Plot size: 15')			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
	= Total Cover		
Herb Stratum (Plot size: 5')			
1. Carex lurida	70	Yes	OBL
2. Juncus effusus	20	Yes	FACW
3. Festuca sp.	5	No	Unknown
4. Plantago sp.	2.5	No	Unknown
5. Aster sp.	2.5	No	Unknown
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	100 = Total Cover		
Woody Vine Stratum (Plot size: 30')			
1.			
2.			
3.			
4.			
5.			
6.			
	= Total Cover		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: _____ (A)

Total Number of Dominant Species Across All Strata: _____ (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: _____ (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species		x 1 =	
FACW species		x 2 =	
FAC species		x 3 =	
FACU species		x 4 =	
UPL species		x 5 =	
Column Totals:	(A)		(B)

Prevalence Index = B/A = _____

Hydrophytic Vegetation Indicators:

✓ 1 - Rapid Test for Hydrophytic Vegetation

___ 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Four Vegetation Strata:

Tree – Woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/Shrub – Woody plants, excluding vines, less than 3 in. DBH and greater than 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vine – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** ✓ **No** _____

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: DP27 - Wetland O

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0-3	10YR 3/1	100					silt loam	
3-12	10YR 4/1	95	10YR 5/6	5	C	PL	silt loam	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ 2 cm Muck (A10) **(LRR N)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1) **(LRR N, MLRA 147, 148)**
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7)
- ___ Polyvalue Below Surface (S8) **(MLRA 147, 148)**
- ___ Thin Dark Surface (S9) **(MLRA 147, 148)**
- ___ Loamy Gleyed Matrix (F2)
- ✓ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Iron-Manganese Masses (F12) **(LRR N, MLRA 136)**
- ___ Umbric Surface (F13) **(MLRA 136, 122)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 148)**

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) **(MLRA 147)**
- ___ Coast Prairie Redox (A16) **(MLRA 147, 148)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 136, 147)**
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ✓ **No** _____

Remarks:

WETLAND DETERMINATION DATA FORM – Eastern Mountains and Piedmont

Project/Site: Vile Creek Mitigation Site City/County: Alleghany Sampling Date: 12/11/14

Applicant/Owner: Wildlands Engineering State: NC Sampling Point: DP28 - Wetland P

Investigator(s): Ian Eckardt & Kenton Beal Section, Township, Range: _____

Landform (hillslope, terrace, etc.): floodplain Local relief (concave, convex, none): _____ Slope (%): 0

Subregion (LRR or MLRA): LRR N Lat: N 36.508628 Long: W -81.100064 Datum: _____

Soil Map Unit Name: Alluvial land (Ad) NWI classification: _____

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)

Are Vegetation ✓, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes _____ No ✓

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓	No _____	**Is the Sampled Area within a Wetland?** **Yes ✓** **No _____**
Hydric Soil Present?	Yes ✓	No _____	
Wetland Hydrology Present?	Yes ✓	No _____	

Remarks:

Sampling point located within an actively grazed pasture. Trees and saplings have been removed.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ✓ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ True Aquatic Plants (B14)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ✓ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ✓ No _____ Depth (inches): 1

Water Table Present? Yes _____ No ✓ Depth (inches): -

Saturation Present? (includes capillary fringe) Yes ✓ No _____ Depth (inches): 0 (saturated to surface)

Wetland Hydrology Present? Yes ✓ No _____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION (Four Strata) – Use scientific names of plants.

Sampling Point: DP28 - Wetland P

Tree Stratum (Plot size: 30')	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
	= Total Cover		
Sapling/Shrub Stratum (Plot size: 15')			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
	= Total Cover		
Herb Stratum (Plot size: 5')			
1. Juncus effusus	50	Yes	FACW
2. Solidago sp.	40	Yes	Unknown
3. Festuca sp.	10	No	FAC
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	100 = Total Cover		
Woody Vine Stratum (Plot size: 30')			
1.			
2.			
3.			
4.			
5.			
6.			
	= Total Cover		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 50 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species		x 1 =	
FACW species	50	x 2 =	100
FAC species	10	x 3 =	30
FACU species		x 4 =	
UPL species		x 5 =	
Column Totals:	60 (A)		130 (B)

Prevalence Index = B/A = 2.2

Hydrophytic Vegetation Indicators:

- ___ 1 - Rapid Test for Hydrophytic Vegetation
- ___ 2 - Dominance Test is >50%
- ✓ 3 - Prevalence Index is ≤3.0[1]
- ___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Four Vegetation Strata:

Tree – Woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/Shrub – Woody plants, excluding vines, less than 3 in. DBH and greater than 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vine – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? Yes ✓ No ___

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: DP28 - Wetland P

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0-3	10YR 2/2	100					loam	
3-12	10YR 2/1	100					loam	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ 2 cm Muck (A10) **(LRR N)**
- ✓ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1) **(LRR N, MLRA 147, 148)**
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7)
- ___ Polyvalue Below Surface (S8) **(MLRA 147, 148)**
- ___ Thin Dark Surface (S9) **(MLRA 147, 148)**
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Iron-Manganese Masses (F12) **(LRR N, MLRA 136)**
- ___ Umbric Surface (F13) **(MLRA 136, 122)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 148)**

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) **(MLRA 147)**
- ___ Coast Prairie Redox (A16) **(MLRA 147, 148)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 136, 147)**
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ✓ **No** _____

Remarks:

WETLAND DETERMINATION DATA FORM – Eastern Mountains and Piedmont

Project/Site: Vile Creek Mitigation Site City/County: Alleghany Sampling Date: 12/11/14

Applicant/Owner: Wildlands Engineering State: NC Sampling Point: DP29 - Wetland Q

Investigator(s): Ian Eckardt & Kenton Beal Section, Township, Range: _____

Landform (hillslope, terrace, etc.): floodplain Local relief (concave, convex, none): _____ Slope (%): 0

Subregion (LRR or MLRA): LRR N Lat: N 36.508073 Long: W -81.100263 Datum: _____

Soil Map Unit Name: Chandler stony silt loam (CdG) NWI classification: _____

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)

Are Vegetation ✓, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes _____ No ✓

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓	No _____	**Is the Sampled Area within a Wetland?** Yes ✓ No _____
Hydric Soil Present?	Yes ✓	No _____	
Wetland Hydrology Present?	Yes ✓	No _____	

Remarks:

Sampling point located within an actively grazed pasture. Trees and saplings have been removed.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ✓ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ✓ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ True Aquatic Plants (B14)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ✓ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes _____	No ✓	Depth (inches): -
Water Table Present?	Yes _____	No ✓	Depth (inches): -
Saturation Present? (includes capillary fringe)	Yes ✓	No _____	Depth (inches): 0 (saturated to surface)

Wetland Hydrology Present? Yes ✓ No _____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION (Four Strata) – Use scientific names of plants.

Sampling Point: DP29 - Wetland Q

Tree Stratum (Plot size: 30')	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
	= Total Cover		
Sapling/Shrub Stratum (Plot size: 15')			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
	= Total Cover		
Herb Stratum (Plot size: 5')			
1. Carex lurida	80	Yes	OBL
2. Juncus effusus	20	Yes	FACW
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	100 = Total Cover		
Woody Vine Stratum (Plot size: 30')			
1.			
2.			
3.			
4.			
5.			
6.			
	= Total Cover		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: _____ (A)

Total Number of Dominant Species Across All Strata: _____ (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: _____ (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species _____	x 1 = _____
FACW species _____	x 2 = _____
FAC species _____	x 3 = _____
FACU species _____	x 4 = _____
UPL species _____	x 5 = _____
Column Totals: _____ (A)	_____ (B)

Prevalence Index = B/A = _____

Hydrophytic Vegetation Indicators:

✓ 1 - Rapid Test for Hydrophytic Vegetation

___ 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Four Vegetation Strata:

Tree – Woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/Shrub – Woody plants, excluding vines, less than 3 in. DBH and greater than 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vine – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** ✓ **No** _____

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: DP29 - Wetland Q

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-3	10YR 2/1	90	10YR 3/6	10	C	PL	loam	
3-12	10YR 3/1	95	5YR 3/4	5	C	PL	loam	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ 2 cm Muck (A10) **(LRR N)**
- ✓ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1) **(LRR N, MLRA 147, 148)**
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7)
- ___ Polyvalue Below Surface (S8) **(MLRA 147, 148)**
- ___ Thin Dark Surface (S9) **(MLRA 147, 148)**
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Iron-Manganese Masses (F12) **(LRR N, MLRA 136)**
- ___ Umbric Surface (F13) **(MLRA 136, 122)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 148)**

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) **(MLRA 147)**
- ___ Coast Prairie Redox (A16) **(MLRA 147, 148)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 136, 147)**
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ✓ **No** ___

Remarks:

WETLAND DETERMINATION DATA FORM – Eastern Mountains and Piedmont

Project/Site: Vile Creek Mitigation Site City/County: Alleghany Sampling Date: 12/11/14

Applicant/Owner: Wildlands Engineering State: NC Sampling Point: DP30 - Upland Q

Investigator(s): Ian Eckardt & Kenton Beal Section, Township, Range:

Landform (hillslope, terrace, etc.): floodplain Local relief (concave, convex, none): convex Slope (%): 0

Subregion (LRR or MLRA): LRR N Lat: N 36.50813 Long: W -81.100274 Datum:

Soil Map Unit Name: Chandler stony silt loam (CdG) NWI classification:

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)

Are Vegetation ✓, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes _____ No ✓

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓	No _____	**Is the Sampled Area within a Wetland?** Yes _____ No ✓
Hydric Soil Present?	Yes ✓	No _____	
Wetland Hydrology Present?	Yes _____	No ✓	

Remarks:

Sampling point located within an actively grazed pasture. Trees and saplings have been removed. Sampling point located exhibited hydric soils at the surface but lacks hydrology.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ True Aquatic Plants (B14)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes _____	No ✓	Depth (inches): -
Water Table Present?	Yes _____	No ✓	Depth (inches): -
Saturation Present? (includes capillary fringe)	Yes _____	No ✓	Depth (inches): -

Wetland Hydrology Present? Yes _____ No ✓

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION (Four Strata) – Use scientific names of plants.

Sampling Point: DP30 - Upland Q

Tree Stratum (Plot size: 30')	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
	= Total Cover		
Sapling/Shrub Stratum (Plot size: 15')			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
	= Total Cover		
Herb Stratum (Plot size: 5')			
1. Festuca sp.	90	Yes	FAC
2. Juncus effusus	5	No	FACW
3. Solidago sp.	5	No	Unknown
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	100 = Total Cover		
Woody Vine Stratum (Plot size: 30')			
1.			
2.			
3.			
4.			
5.			
6.			
	= Total Cover		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species		x 1 =	
FACW species		x 2 =	
FAC species		x 3 =	
FACU species		x 4 =	
UPL species		x 5 =	
Column Totals:	(A)		(B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

✓ 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Four Vegetation Strata:

Tree – Woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/Shrub – Woody plants, excluding vines, less than 3 in. DBH and greater than 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vine – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** ✓ **No** ___

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: DP30 - Upland Q

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0-4	10YR 4/2	100					sand	
4-12	10YR 4/4	85	5YR 5/6	15	C	PL	loam	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ 2 cm Muck (A10) **(LRR N)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1) **(LRR N, MLRA 147, 148)**
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7)
- ___ Polyvalue Below Surface (S8) **(MLRA 147, 148)**
- ___ Thin Dark Surface (S9) **(MLRA 147, 148)**
- ___ Loamy Gleyed Matrix (F2)
- ✓ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Iron-Manganese Masses (F12) **(LRR N, MLRA 136)**
- ___ Umbric Surface (F13) **(MLRA 136, 122)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 148)**

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) **(MLRA 147)**
- ___ Coast Prairie Redox (A16) **(MLRA 147, 148)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 136, 147)**
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ✓ **No** _____

Remarks:

WETLAND DETERMINATION DATA FORM – Eastern Mountains and Piedmont

Project/Site: Vile Creek Mitigation Site City/County: Alleghany Sampling Date: 12/10/14

Applicant/Owner: Wildlands Engineering State: NC Sampling Point: DP31 - Wetland R

Investigator(s): Ian Eckardt & Kenton Beal Section, Township, Range: _____

Landform (hillslope, terrace, etc.): floodplain Local relief (concave, convex, none): _____ Slope (%): 0

Subregion (LRR or MLRA): LRR N Lat: N 36.507856 Long: W -81.098108 Datum: _____

Soil Map Unit Name: Chandler stony silt loam (CdG) NWI classification: _____

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓	No _____	**Is the Sampled Area within a Wetland?** Yes ✓ No _____
Hydric Soil Present?	Yes ✓	No _____	
Wetland Hydrology Present?	Yes ✓	No _____	

Remarks:

Sampling point located within a linear feature located at the toe slope of an adjacent hillslope.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ✓ Surface Water (A1)
- ___ High Water Table (A2)
- ✓ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ✓ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ True Aquatic Plants (B14)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ✓ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ✓	No _____	Depth (inches): 1
Water Table Present?	Yes _____	No ✓	Depth (inches): -
Saturation Present? (includes capillary fringe)	Yes ✓	No _____	Depth (inches): 0 (saturated to surface)

Wetland Hydrology Present? Yes ✓ No _____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION (Four Strata) – Use scientific names of plants.

Sampling Point: DP31 - Wetland R

Tree Stratum (Plot size: 30')	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
	= Total Cover		
Sapling/Shrub Stratum (Plot size: 15')			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
	= Total Cover		
Herb Stratum (Plot size: 5')			
1. Lysimachia nummularia	75	Yes	FACW
2. Ludwigia sp.	25	Yes	OBL
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	100 = Total Cover		
Woody Vine Stratum (Plot size: 30')			
1.			
2.			
3.			
4.			
5.			
6.			
	= Total Cover		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: _____ (A)

Total Number of Dominant Species Across All Strata: _____ (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: _____ (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species _____	x 1 = _____
FACW species _____	x 2 = _____
FAC species _____	x 3 = _____
FACU species _____	x 4 = _____
UPL species _____	x 5 = _____
Column Totals: _____ (A)	_____ (B)

Prevalence Index = B/A = _____

Hydrophytic Vegetation Indicators:

✓ 1 - Rapid Test for Hydrophytic Vegetation

___ 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Four Vegetation Strata:

Tree – Woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/Shrub – Woody plants, excluding vines, less than 3 in. DBH and greater than 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vine – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** ✓ **No** _____

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: DP31 - Wetland R

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0-3	10YR 3/2	95	10YR 4/4	10	C	PL	silt loam	
3-12	10YR 3/1	98	10YR 4/4	2	C	PL	silt loam	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ 2 cm Muck (A10) **(LRR N)**
- ✓ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1) **(LRR N, MLRA 147, 148)**
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7)
- ___ Polyvalue Below Surface (S8) **(MLRA 147, 148)**
- ___ Thin Dark Surface (S9) **(MLRA 147, 148)**
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Iron-Manganese Masses (F12) **(LRR N, MLRA 136)**
- ___ Umbric Surface (F13) **(MLRA 136, 122)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 148)**

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) **(MLRA 147)**
- ___ Coast Prairie Redox (A16) **(MLRA 147, 148)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 136, 147)**
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ✓ **No** ___

Remarks:

WETLAND DETERMINATION DATA FORM – Eastern Mountains and Piedmont

Project/Site: Vile Creek Mitigation Site City/County: Alleghany Sampling Date: 12/10/14

Applicant/Owner: Wildlands Engineering State: NC Sampling Point: DP32 - Upland R

Investigator(s): Ian Eckardt & Kenton Beal Section, Township, Range: _____

Landform (hillslope, terrace, etc.): floodplain Local relief (concave, convex, none): none Slope (%): 0

Subregion (LRR or MLRA): LRR N Lat: N 36.507923 Long: W -81.09811 Datum: _____

Soil Map Unit Name: Chandler stony silt loam (CdG) NWI classification: _____

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)

Are Vegetation ✓, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes _____ No ✓

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes _____	No ✓	**Is the Sampled Area within a Wetland?** **Yes** _____ **No** ✓
Hydric Soil Present?	Yes _____	No ✓	
Wetland Hydrology Present?	Yes _____	No ✓	

Remarks:

Sampling point located within an actively grazed pasture. The majority of trees and saplings have been removed.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ True Aquatic Plants (B14)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes _____	No ✓	Depth (inches): -
Water Table Present?	Yes _____	No ✓	Depth (inches): -
Saturation Present? (includes capillary fringe)	Yes _____	No ✓	Depth (inches): -

Wetland Hydrology Present? **Yes** _____ **No** ✓

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION (Four Strata) – Use scientific names of plants.

Sampling Point: DP32 - Upland R

Tree Stratum (Plot size: 30')	Absolute % Cover	Dominant Species?	Indicator Status
1. Liriodendron tulipiferia	20	Yes	FACU
2. Celtis laevigata	10	Yes	FACW
3.			
4.			
5.			
6.			
7.			
8.			
	30	= Total Cover	
Sapling/Shrub Stratum (Plot size: 15')			
1. Berberis thunbergii	35	Yes	FACU
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
	35	= Total Cover	
Herb Stratum (Plot size: 5')			
1. Festuca sp.	70	Yes	FAC
2. Rosa multiflora	5	No	FACU
3. Plantago sp.	5	No	Unknown
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	80	= Total Cover	
Woody Vine Stratum (Plot size: 30')			
1.			
2.			
3.			
4.			
5.			
6.			
		= Total Cover	

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 4 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 50 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species		x 1 =	
FACW species	10	x 2 =	20
FAC species	70	x 3 =	210
FACU species	60	x 4 =	240
UPL species		x 5 =	
Column Totals:	140 (A)		470 (B)

Prevalence Index = B/A = 3.35

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

___ 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Four Vegetation Strata:

Tree – Woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/Shrub – Woody plants, excluding vines, less than 3 in. DBH and greater than 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vine – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? Yes _____ No ✓

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: DP32 - Upland R

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0-5	7.5YR 5/4	100					sand	
5-12	7.5YR 4/4	100					sandy loam	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ 2 cm Muck (A10) **(LRR N)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1) **(LRR N, MLRA 147, 148)**
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7)
- ___ Polyvalue Below Surface (S8) **(MLRA 147, 148)**
- ___ Thin Dark Surface (S9) **(MLRA 147, 148)**
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Iron-Manganese Masses (F12) **(LRR N, MLRA 136)**
- ___ Umbric Surface (F13) **(MLRA 136, 122)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 148)**

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) **(MLRA 147)**
- ___ Coast Prairie Redox (A16) **(MLRA 147, 148)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 136, 147)**
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** _____ **No** ✓

Remarks:

WETLAND DETERMINATION DATA FORM – Eastern Mountains and Piedmont

Project/Site: Vile Creek Mitigation Site City/County: Alleghany Sampling Date: 12/11/14

Applicant/Owner: Wildlands Engineering State: NC Sampling Point: DP33 - Wetland S

Investigator(s): Ian Eckardt & Kenton Beal Section, Township, Range:

Landform (hillslope, terrace, etc.): floodplain Local relief (concave, convex, none): concave Slope (%): 0

Subregion (LRR or MLRA): LRR N Lat: N 36.511334 Long: W -81.097789 Datum:

Soil Map Unit Name: Tusquitee loam (TlC) NWI classification:

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No ____ (If no, explain in Remarks.)

Are Vegetation ✓, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No ____

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓	No ____	**Is the Sampled Area within a Wetland?** **Yes ✓** **No ____**
Hydric Soil Present?	Yes ✓	No ____	
Wetland Hydrology Present?	Yes ✓	No ____	

Remarks:

Sampling point located within an active grazing pasture where trees and saplings have been removed.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ✓ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ✓ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ True Aquatic Plants (B14)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ✓ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ____	No ✓	Depth (inches): -
Water Table Present?	Yes ____	No ✓	Depth (inches): -
Saturation Present? (includes capillary fringe)	Yes ✓	No ____	Depth (inches): 0 (saturated to surface)

Wetland Hydrology Present? **Yes ✓** **No ____**

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION (Four Strata) – Use scientific names of plants.

Sampling Point: DP33 - Wetland S

Tree Stratum (Plot size: 30')	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
	= Total Cover		
Sapling/Shrub Stratum (Plot size: 15')			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
	= Total Cover		
Herb Stratum (Plot size: 5')			
1. Festuca sp.	40	Yes	FAC
2. Juncus effusus	30	Yes	FACW
3. Carex lurida	20	Yes	OBL
4. Solidago sp.	5	No	Unknown
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	95 = Total Cover		
Woody Vine Stratum (Plot size: 30')			
1.			
2.			
3.			
4.			
5.			
6.			
	= Total Cover		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 3 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species		x 1 =	
FACW species		x 2 =	
FAC species		x 3 =	
FACU species		x 4 =	
UPL species		x 5 =	
Column Totals:	(A)		(B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:

- ___ 1 - Rapid Test for Hydrophytic Vegetation
- ✓ 2 - Dominance Test is >50%
- ___ 3 - Prevalence Index is ≤3.0[1]
- ___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Four Vegetation Strata:

Tree – Woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/Shrub – Woody plants, excluding vines, less than 3 in. DBH and greater than 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vine – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** ✓ **No** ___

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: DP33 - Wetland S

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0-1	10YR 5/6	100					silt loam	
1-9	10YR 4/2	90	10YR 4/6	10	C	PL	silt loam	
9-12	10YR 3/2	100					silt loam	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ 2 cm Muck (A10) **(LRR N)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1) **(LRR N, MLRA 147, 148)**
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7)
- ___ Polyvalue Below Surface (S8) **(MLRA 147, 148)**
- ___ Thin Dark Surface (S9) **(MLRA 147, 148)**
- ___ Loamy Gleyed Matrix (F2)
- ✓ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Iron-Manganese Masses (F12) **(LRR N, MLRA 136)**
- ___ Umbric Surface (F13) **(MLRA 136, 122)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 148)**

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) **(MLRA 147)**
- ___ Coast Prairie Redox (A16) **(MLRA 147, 148)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 136, 147)**
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ✓ **No** _____

Remarks:

WETLAND DETERMINATION DATA FORM – Eastern Mountains and Piedmont

Project/Site: Vile Creek Mitigation Site City/County: Alleghany Sampling Date: 12/11/14

Applicant/Owner: Wildlands Engineering State: NC Sampling Point: DP34 - Upland S

Investigator(s): Ian Eckardt & Kenton Beal Section, Township, Range: _____

Landform (hillslope, terrace, etc.): floodplain Local relief (concave, convex, none): none Slope (%): 0

Subregion (LRR or MLRA): LRR N Lat: N 36.51142 Long: W -81.097826 Datum: _____

Soil Map Unit Name: Tusquitee loam (TlC) NWI classification: _____

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)

Are Vegetation ✓, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes _____ No ✓

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓	No _____	**Is the Sampled Area within a Wetland?** Yes _____ No ✓
Hydric Soil Present?	Yes _____	No ✓	
Wetland Hydrology Present?	Yes _____	No ✓	

Remarks:

Sampling point located within an actively grazed pasture. Trees and saplings have been removed.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ True Aquatic Plants (B14)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes _____	No ✓	Depth (inches): -
Water Table Present?	Yes _____	No ✓	Depth (inches): -
Saturation Present? (includes capillary fringe)	Yes _____	No ✓	Depth (inches): -

Wetland Hydrology Present? Yes _____ No ✓

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION (Four Strata) – Use scientific names of plants.

Sampling Point: DP34 - Upland S

Tree Stratum (Plot size: 30')	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
	= Total Cover		
Sapling/Shrub Stratum (Plot size: 15')			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
	= Total Cover		
Herb Stratum (Plot size: 5')			
1. Festuca sp.	100	Yes	FAC
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	100 = Total Cover		
Woody Vine Stratum (Plot size: 30')			
1.			
2.			
3.			
4.			
5.			
6.			
	= Total Cover		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species		x 1 =	
FACW species		x 2 =	
FAC species		x 3 =	
FACU species		x 4 =	
UPL species		x 5 =	
Column Totals:	(A)		(B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:

- ___ 1 - Rapid Test for Hydrophytic Vegetation
- ✓ 2 - Dominance Test is >50%
- ___ 3 - Prevalence Index is ≤3.0[1]
- ___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Four Vegetation Strata:

Tree – Woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/Shrub – Woody plants, excluding vines, less than 3 in. DBH and greater than 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vine – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** ✓ **No** ___

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: DP34 - Upland S

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0-3	10YR 4/6	100					loam	
3-12	7.5YR 4/6	100					loam	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ 2 cm Muck (A10) **(LRR N)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1) **(LRR N, MLRA 147, 148)**
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7)
- ___ Polyvalue Below Surface (S8) **(MLRA 147, 148)**
- ___ Thin Dark Surface (S9) **(MLRA 147, 148)**
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Iron-Manganese Masses (F12) **(LRR N, MLRA 136)**
- ___ Umbric Surface (F13) **(MLRA 136, 122)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 148)**

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) **(MLRA 147)**
- ___ Coast Prairie Redox (A16) **(MLRA 147, 148)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 136, 147)**
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** _____ **No** ✓

Remarks:

WETLAND DETERMINATION DATA FORM – Eastern Mountains and Piedmont

Project/Site: Vile Creek Mitigation Site City/County: Alleghany Sampling Date: 12/11/14

Applicant/Owner: Wildlands Engineering State: NC Sampling Point: DP35 - Wetland T

Investigator(s): Ian Eckardt & Kenton Beal Section, Township, Range: _____

Landform (hillslope, terrace, etc.): floodplain Local relief (concave, convex, none): _____ Slope (%): 0

Subregion (LRR or MLRA): LRR N Lat: N 36.510686 Long: W -81.097413 Datum: _____

Soil Map Unit Name: Tusquitee loam (TlC) NWI classification: _____

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)

Are Vegetation ✓, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓	No _____	**Is the Sampled Area within a Wetland?** **Yes ✓** **No _____**
Hydric Soil Present?	Yes ✓	No _____	
Wetland Hydrology Present?	Yes ✓	No _____	

Remarks:

Sampling point located within an active grazing pasture where trees and saplings have been removed.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ✓ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ True Aquatic Plants (B14)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ✓ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes _____	No ✓	Depth (inches): -
Water Table Present?	Yes _____	No ✓	Depth (inches): -
Saturation Present? (includes capillary fringe)	Yes ✓	No _____	Depth (inches): 0 (saturated to surface)

Wetland Hydrology Present? **Yes ✓** **No _____**

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION (Four Strata) – Use scientific names of plants.

Sampling Point: DP35 - Wetland T

Tree Stratum (Plot size: 30')	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
	= Total Cover		
Sapling/Shrub Stratum (Plot size: 15')			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
	= Total Cover		
Herb Stratum (Plot size: 5')			
1. Festuca sp.	75	Yes	FAC
2. Juncus effusus	20	Yes	FACW
3. Solidago sp.	5	No	Unknown
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	100 = Total Cover		
Woody Vine Stratum (Plot size: 30')			
1.			
2.			
3.			
4.			
5.			
6.			
	= Total Cover		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species		x 1 =	
FACW species		x 2 =	
FAC species		x 3 =	
FACU species		x 4 =	
UPL species		x 5 =	
Column Totals:	(A)		(B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

✓ 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Four Vegetation Strata:

Tree – Woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/Shrub – Woody plants, excluding vines, less than 3 in. DBH and greater than 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vine – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** ✓ **No** ___

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: DP35 - Wetland T

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0-2	2.5YR 3/1	100					silt loam	
2-12	2.5YR 3/1	100					loam	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ 2 cm Muck (A10) **(LRR N)**
- ✓ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1) **(LRR N, MLRA 147, 148)**
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7)
- ___ Polyvalue Below Surface (S8) **(MLRA 147, 148)**
- ___ Thin Dark Surface (S9) **(MLRA 147, 148)**
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Iron-Manganese Masses (F12) **(LRR N, MLRA 136)**
- ___ Umbric Surface (F13) **(MLRA 136, 122)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 148)**

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) **(MLRA 147)**
- ___ Coast Prairie Redox (A16) **(MLRA 147, 148)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 136, 147)**
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ✓ **No** _____

Remarks:

WETLAND DETERMINATION DATA FORM – Eastern Mountains and Piedmont

Project/Site: Vile Creek Mitigation Site City/County: Alleghany Sampling Date: 12/11/14

Applicant/Owner: Wildlands Engineering State: NC Sampling Point: DP36 - Upland T

Investigator(s): Ian Eckardt & Kenton Beal Section, Township, Range:

Landform (hillslope, terrace, etc.): hillslope Local relief (concave, convex, none): none Slope (%): 0

Subregion (LRR or MLRA): LRR N Lat: N 36.510619 Long: W -81.097399 Datum:

Soil Map Unit Name: Tusquitee loam (TlC) NWI classification:

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)

Are Vegetation ✓, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes _____ No ✓

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓	No _____	**Is the Sampled Area within a Wetland?** Yes _____ No ✓
Hydric Soil Present?	Yes _____	No ✓	
Wetland Hydrology Present?	Yes _____	No ✓	

Remarks:

Sampling point located within an actively grazed pasture. Trees and saplings have been removed.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ True Aquatic Plants (B14)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes _____	No ✓	Depth (inches): -
Water Table Present?	Yes _____	No ✓	Depth (inches): -
Saturation Present? (includes capillary fringe)	Yes _____	No ✓	Depth (inches): -

Wetland Hydrology Present? Yes _____ No ✓

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION (Four Strata) – Use scientific names of plants.

Sampling Point: DP36 - Upland T

Tree Stratum (Plot size: 30')	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
	= Total Cover		
Sapling/Shrub Stratum (Plot size: 15')			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
	= Total Cover		
Herb Stratum (Plot size: 5')			
1. Festuca sp.	100	Yes	FAC
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	100 = Total Cover		
Woody Vine Stratum (Plot size: 30')			
1.			
2.			
3.			
4.			
5.			
6.			
	= Total Cover		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species		x 1 =	
FACW species		x 2 =	
FAC species		x 3 =	
FACU species		x 4 =	
UPL species		x 5 =	
Column Totals:	(A)		(B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

✓ 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Four Vegetation Strata:

Tree – Woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/Shrub – Woody plants, excluding vines, less than 3 in. DBH and greater than 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vine – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** ✓ **No** ___

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: DP36 - Upland T

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0-3	10YR 4/3	95	7.5YR 5/6	5	C	PL	loam	
3-12	7.5YR 5/4	90	5YR 5/6	10	C	PL	loam	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ 2 cm Muck (A10) **(LRR N)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1) **(LRR N, MLRA 147, 148)**
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7)
- ___ Polyvalue Below Surface (S8) **(MLRA 147, 148)**
- ___ Thin Dark Surface (S9) **(MLRA 147, 148)**
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Iron-Manganese Masses (F12) **(LRR N, MLRA 136)**
- ___ Umbric Surface (F13) **(MLRA 136, 122)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 148)**

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) **(MLRA 147)**
- ___ Coast Prairie Redox (A16) **(MLRA 147, 148)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 136, 147)**
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** _____ **No** ✓

Remarks:

WETLAND DETERMINATION DATA FORM – Eastern Mountains and Piedmont

Project/Site: Vile Creek Mitigation Site City/County: Alleghany Sampling Date: 12/11/14

Applicant/Owner: Wildlands Engineering State: NC Sampling Point: DP37 - Wetland U

Investigator(s): Ian Eckardt & Kenton Beal Section, Township, Range:

Landform (hillslope, terrace, etc.): floodplain Local relief (concave, convex, none): concave Slope (%): 0

Subregion (LRR or MLRA): LRR N Lat: N 36.510622 Long: W -81.097556 Datum:

Soil Map Unit Name: Tusquitee loam (TlC) NWI classification:

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)

Are Vegetation ✓, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓	No _____	**Is the Sampled Area within a Wetland?** Yes ✓ No _____
Hydric Soil Present?	Yes ✓	No _____	
Wetland Hydrology Present?	Yes ✓	No _____	

Remarks:

Sampling point located within an active grazing pasture where trees and saplings have been removed.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ✓ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ True Aquatic Plants (B14)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ✓ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ✓ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes _____	No ✓	Depth (inches): -
Water Table Present?	Yes _____	No ✓	Depth (inches): -
Saturation Present? (includes capillary fringe)	Yes ✓	No _____	Depth (inches): 0 (saturated to surface)

Wetland Hydrology Present? Yes ✓ No _____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION (Four Strata) – Use scientific names of plants.

Sampling Point: DP37 - Wetland U

Tree Stratum (Plot size: 30')	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
	= Total Cover		
Sapling/Shrub Stratum (Plot size: 15')			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
	= Total Cover		
Herb Stratum (Plot size: 5')			
1. Juncus effusus	70	Yes	FACW
2. Carex lurida	20	Yes	OBL
3. Aster sp.	10	No	Unknown
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	100 = Total Cover		
Woody Vine Stratum (Plot size: 30')			
1.			
2.			
3.			
4.			
5.			
6.			
	= Total Cover		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: _____ (A)

Total Number of Dominant Species Across All Strata: _____ (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: _____ (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species _____	x 1 = _____
FACW species _____	x 2 = _____
FAC species _____	x 3 = _____
FACU species _____	x 4 = _____
UPL species _____	x 5 = _____
Column Totals: _____ (A)	_____ (B)

Prevalence Index = B/A = _____

Hydrophytic Vegetation Indicators:

✓ 1 - Rapid Test for Hydrophytic Vegetation

___ 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Four Vegetation Strata:

Tree – Woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/Shrub – Woody plants, excluding vines, less than 3 in. DBH and greater than 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vine – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** ✓ **No** _____

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: DP37 - Wetland U

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0-5	10YR 4/2	95	10YR 4/6	5	C	PL	silt loam	
5-12	10YR 3/1	100					loam	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ 2 cm Muck (A10) **(LRR N)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1) **(LRR N, MLRA 147, 148)**
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7)
- ___ Polyvalue Below Surface (S8) **(MLRA 147, 148)**
- ___ Thin Dark Surface (S9) **(MLRA 147, 148)**
- ___ Loamy Gleyed Matrix (F2)
- ✓ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Iron-Manganese Masses (F12) **(LRR N, MLRA 136)**
- ___ Umbric Surface (F13) **(MLRA 136, 122)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 148)**

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) **(MLRA 147)**
- ___ Coast Prairie Redox (A16) **(MLRA 147, 148)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 136, 147)**
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ✓ **No** _____

Remarks:

WETLAND DETERMINATION DATA FORM – Eastern Mountains and Piedmont

Project/Site: Vile Creek Mitigation Site City/County: Alleghany Sampling Date: 12/11/14

Applicant/Owner: Wildlands Engineering State: NC Sampling Point: DP38 - Upland U

Investigator(s): Ian Eckardt & Kenton Beal Section, Township, Range:

Landform (hillslope, terrace, etc.): hillslope Local relief (concave, convex, none): none Slope (%): 0

Subregion (LRR or MLRA): LRR N Lat: N 36.510581 Long: W -81.097534 Datum:

Soil Map Unit Name: Tusquitee loam (TlC) NWI classification:

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)

Are Vegetation ✓, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes _____ No ✓

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓	No _____	**Is the Sampled Area within a Wetland?** Yes _____ No ✓
Hydric Soil Present?	Yes _____	No ✓	
Wetland Hydrology Present?	Yes _____	No ✓	

Remarks:

Sampling point located within an actively grazed pasture. Trees and saplings have been removed.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ True Aquatic Plants (B14)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes _____	No ✓	Depth (inches): -
Water Table Present?	Yes _____	No ✓	Depth (inches): -
Saturation Present? (includes capillary fringe)	Yes _____	No ✓	Depth (inches): -

Wetland Hydrology Present? Yes _____ No ✓

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION (Four Strata) – Use scientific names of plants.

Sampling Point: DP38 - Upland U

Tree Stratum (Plot size: 30')	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
	= Total Cover		
Sapling/Shrub Stratum (Plot size: 15')			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
	= Total Cover		
Herb Stratum (Plot size: 5')			
1. Festuca sp.	90	Yes	FAC
2. Solidago sp.	10	No	Unknown
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	100 = Total Cover		
Woody Vine Stratum (Plot size: 30')			
1.			
2.			
3.			
4.			
5.			
6.			
	= Total Cover		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species		x 1 =	
FACW species		x 2 =	
FAC species		x 3 =	
FACU species		x 4 =	
UPL species		x 5 =	
Column Totals:	(A)		(B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

✓ 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Four Vegetation Strata:

Tree – Woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/Shrub – Woody plants, excluding vines, less than 3 in. DBH and greater than 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vine – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** ✓ **No** ___

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: DP38 - Upland U

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0-3	7.5YR 4/4	100					loam	
3-12	7.5YR 5/6	100					loam	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ 2 cm Muck (A10) **(LRR N)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1) **(LRR N, MLRA 147, 148)**
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7)
- ___ Polyvalue Below Surface (S8) **(MLRA 147, 148)**
- ___ Thin Dark Surface (S9) **(MLRA 147, 148)**
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Iron-Manganese Masses (F12) **(LRR N, MLRA 136)**
- ___ Umbric Surface (F13) **(MLRA 136, 122)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 148)**

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) **(MLRA 147)**
- ___ Coast Prairie Redox (A16) **(MLRA 147, 148)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 136, 147)**
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** _____ **No** ✓

Remarks:

WETLAND DETERMINATION DATA FORM – Eastern Mountains and Piedmont

Project/Site: Vile Creek Mitigation Site City/County: Alleghany Sampling Date: 12/11/14

Applicant/Owner: Wildlands Engineering State: NC Sampling Point: DP39 - Wetland V

Investigator(s): Ian Eckardt & Kenton Beal Section, Township, Range:

Landform (hillslope, terrace, etc.): floodplain Local relief (concave, convex, none): concave Slope (%): 0

Subregion (LRR or MLRA): LRR N Lat: N 36.510163 Long: W -81.097366 Datum:

Soil Map Unit Name: Tusquitee loam (TlC) and Chandler silt loam (CaF) NWI classification:

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No ____ (If no, explain in Remarks.)

Are Vegetation ✓, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No ____

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓	No ____	**Is the Sampled Area within a Wetland?** **Yes ✓** **No ____**
Hydric Soil Present?	Yes ✓	No ____	
Wetland Hydrology Present?	Yes ✓	No ____	

Remarks:

Sampling point located within an active grazing pasture where trees and saplings have been removed.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ✓ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ True Aquatic Plants (B14)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ✓ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ✓ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ____	No ✓	Depth (inches): -
Water Table Present?	Yes ____	No ✓	Depth (inches): -
Saturation Present? (includes capillary fringe)	Yes ✓	No ____	Depth (inches): 0 (saturated to surface)

Wetland Hydrology Present? **Yes ✓** **No ____**

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION (Four Strata) – Use scientific names of plants.

Sampling Point: DP39 - Wetland V

Tree Stratum (Plot size: 30')	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
	= Total Cover		
Sapling/Shrub Stratum (Plot size: 15')			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
	= Total Cover		
Herb Stratum (Plot size: 5')			
1. Carex lurida	40	Yes	OBL
2. Festuca sp.	40	Yes	FAC
3. Juncus effusus	20	Yes	FACW
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	100 = Total Cover		
Woody Vine Stratum (Plot size: 30')			
1.			
2.			
3.			
4.			
5.			
6.			
	= Total Cover		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 3 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species		x 1 =	
FACW species		x 2 =	
FAC species		x 3 =	
FACU species		x 4 =	
UPL species		x 5 =	
Column Totals:	(A)		(B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

✓ 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Four Vegetation Strata:

Tree – Woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/Shrub – Woody plants, excluding vines, less than 3 in. DBH and greater than 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vine – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** ✓ **No** ___

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: DP39 - Wetland V

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0-3	10YR 4/3	100					sandy loam	
3-12	5YR 4/2	98	7.5YR 4/4	2	C	PL	sandy loam	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ 2 cm Muck (A10) **(LRR N)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1) **(LRR N, MLRA 147, 148)**
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7)
- ___ Polyvalue Below Surface (S8) **(MLRA 147, 148)**
- ___ Thin Dark Surface (S9) **(MLRA 147, 148)**
- ___ Loamy Gleyed Matrix (F2)
- ✓ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Iron-Manganese Masses (F12) **(LRR N, MLRA 136)**
- ___ Umbric Surface (F13) **(MLRA 136, 122)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 148)**

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) **(MLRA 147)**
- ___ Coast Prairie Redox (A16) **(MLRA 147, 148)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 136, 147)**
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ✓ **No** _____

Remarks:

WETLAND DETERMINATION DATA FORM – Eastern Mountains and Piedmont

Project/Site: Vile Creek Mitigation Site City/County: Alleghany Sampling Date: 12/11/14

Applicant/Owner: Wildlands Engineering State: NC Sampling Point: DP40 - Upland V

Investigator(s): Ian Eckardt & Kenton Beal Section, Township, Range: _____

Landform (hillslope, terrace, etc.): hillslope Local relief (concave, convex, none): none Slope (%): 0

Subregion (LRR or MLRA): LRR N Lat: N 36.510195 Long: W -81.097385 Datum: _____

Soil Map Unit Name: Chandler silt loam (CaF) NWI classification: _____

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)

Are Vegetation ✓, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes _____ No ✓

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓	No _____	**Is the Sampled Area within a Wetland?** Yes _____ No ✓
Hydric Soil Present?	Yes _____	No ✓	
Wetland Hydrology Present?	Yes _____	No ✓	

Remarks:

Sampling point located within an actively grazed pasture. Trees and saplings have been removed.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ True Aquatic Plants (B14)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes _____	No ✓	Depth (inches): -
Water Table Present?	Yes _____	No ✓	Depth (inches): -
Saturation Present? (includes capillary fringe)	Yes _____	No ✓	Depth (inches): -

Wetland Hydrology Present? Yes _____ No ✓

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION (Four Strata) – Use scientific names of plants.

Sampling Point: DP40 - Upland V

Tree Stratum (Plot size: 30')	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
	= Total Cover		
Sapling/Shrub Stratum (Plot size: 15')			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
	= Total Cover		
Herb Stratum (Plot size: 5')			
1. Festuca sp.	85	Yes	FAC
2. Solidago sp.	15	No	Unknown
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	100 = Total Cover		
Woody Vine Stratum (Plot size: 30')			
1.			
2.			
3.			
4.			
5.			
6.			
	= Total Cover		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species		x 1 =	
FACW species		x 2 =	
FAC species		x 3 =	
FACU species		x 4 =	
UPL species		x 5 =	
Column Totals:	(A)		(B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:

- ___ 1 - Rapid Test for Hydrophytic Vegetation
- ✓ 2 - Dominance Test is >50%
- ___ 3 - Prevalence Index is ≤3.0[1]
- ___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Four Vegetation Strata:

Tree – Woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/Shrub – Woody plants, excluding vines, less than 3 in. DBH and greater than 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vine – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** ✓ **No** ___

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: DP40 - Upland V

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0-12	5YR 4/6	100					loam	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ 2 cm Muck (A10) **(LRR N)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1) **(LRR N, MLRA 147, 148)**
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7)
- ___ Polyvalue Below Surface (S8) **(MLRA 147, 148)**
- ___ Thin Dark Surface (S9) **(MLRA 147, 148)**
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Iron-Manganese Masses (F12) **(LRR N, MLRA 136)**
- ___ Umbric Surface (F13) **(MLRA 136, 122)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 148)**

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) **(MLRA 147)**
- ___ Coast Prairie Redox (A16) **(MLRA 147, 148)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 136, 147)**
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** _____ **No** ✓

Remarks:

WETLAND DETERMINATION DATA FORM – Eastern Mountains and Piedmont

Project/Site: Vile Creek Mitigation Site City/County: Alleghany Sampling Date: 12/11/14

Applicant/Owner: Wildlands Engineering State: NC Sampling Point: DP41- Wetland W

Investigator(s): Ian Eckardt & Kenton Beal Section, Township, Range:

Landform (hillslope, terrace, etc.): floodplain Local relief (concave, convex, none): concave Slope (%): 0

Subregion (LRR or MLRA): LRR N Lat: N 36.509385 Long: W -81.097195 Datum:

Soil Map Unit Name: Chandler silt loam (CaF) and Tusquitee loam (TlC) NWI classification:

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No ____ (If no, explain in Remarks.)

Are Vegetation ✓, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No ____

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓	No ____	**Is the Sampled Area within a Wetland?** **Yes ✓** **No ____**
Hydric Soil Present?	Yes ✓	No ____	
Wetland Hydrology Present?	Yes ✓	No ____	

Remarks:

Sampling point located within an active grazing pasture where trees and saplings have been removed.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ✓ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ True Aquatic Plants (B14)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ✓ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ✓ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ____	No ✓	Depth (inches): -
Water Table Present?	Yes ____	No ✓	Depth (inches): -
Saturation Present? (includes capillary fringe)	Yes ✓	No ____	Depth (inches): 0 (saturated to surface)

Wetland Hydrology Present? **Yes ✓** **No ____**

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION (Four Strata) – Use scientific names of plants.

Sampling Point: DP41- Wetland W

Tree Stratum (Plot size: 30')	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
	= Total Cover		
Sapling/Shrub Stratum (Plot size: 15')			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
	= Total Cover		
Herb Stratum (Plot size: 5')			
1. Carex lurida	30	Yes	OBL
2. Festuca sp.	30	Yes	FAC
3. Juncus effusus	20	Yes	FACW
4. Trifolium repens	10	No	FACU
5. Solidago sp.	5	No	Unknown
6. Rosa multiflora	5	No	FACU
7.			
8.			
9.			
10.			
11.			
12.			
	100 = Total Cover		
Woody Vine Stratum (Plot size: 30')			
1.			
2.			
3.			
4.			
5.			
6.			
	= Total Cover		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 3 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species		x 1 =	
FACW species		x 2 =	
FAC species		x 3 =	
FACU species		x 4 =	
UPL species		x 5 =	
Column Totals:	(A)		(B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:

- ___ 1 - Rapid Test for Hydrophytic Vegetation
- ✓ 2 - Dominance Test is >50%
- ___ 3 - Prevalence Index is ≤3.0[1]
- ___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Four Vegetation Strata:

Tree – Woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/Shrub – Woody plants, excluding vines, less than 3 in. DBH and greater than 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vine – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** ✓ **No** ___

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: DP41- Wetland W

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0-3	10YR 4/1	100					sandy loam	
3-12	10YR 4/2	98	7.5YR 4/4	2	C	PL	sandy loam	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ 2 cm Muck (A10) **(LRR N)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1) **(LRR N, MLRA 147, 148)**
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7)
- ___ Polyvalue Below Surface (S8) **(MLRA 147, 148)**
- ___ Thin Dark Surface (S9) **(MLRA 147, 148)**
- ___ Loamy Gleyed Matrix (F2)
- ✓ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Iron-Manganese Masses (F12) **(LRR N, MLRA 136)**
- ___ Umbric Surface (F13) **(MLRA 136, 122)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 148)**

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) **(MLRA 147)**
- ___ Coast Prairie Redox (A16) **(MLRA 147, 148)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 136, 147)**
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ✓ **No** _____

Remarks:

WETLAND DETERMINATION DATA FORM – Eastern Mountains and Piedmont

Project/Site: Vile Creek Mitigation Site City/County: Alleghany Sampling Date: 12/11/14

Applicant/Owner: Wildlands Engineering State: NC Sampling Point: DP42 - Upland W

Investigator(s): Ian Eckardt & Kenton Beal Section, Township, Range: _____

Landform (hillslope, terrace, etc.): hillslope Local relief (concave, convex, none): none Slope (%): 0

Subregion (LRR or MLRA): LRR N Lat: N 36.509406 Long: W -81.097278 Datum: _____

Soil Map Unit Name: Chandler silt loam (CaF) NWI classification: _____

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)

Are Vegetation ✓, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes _____ No ✓

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes _____	No ✓	**Is the Sampled Area within a Wetland?** Yes _____ No ✓
Hydric Soil Present?	Yes _____	No ✓	
Wetland Hydrology Present?	Yes _____	No ✓	

Remarks:

Sampling point located within an actively grazed pasture.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ True Aquatic Plants (B14)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes _____	No ✓	Depth (inches): -
Water Table Present?	Yes _____	No ✓	Depth (inches): -
Saturation Present? (includes capillary fringe)	Yes _____	No ✓	Depth (inches): -

Wetland Hydrology Present? Yes _____ No ✓

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION (Four Strata) – Use scientific names of plants.

Sampling Point: DP42 - Upland W

Tree Stratum (Plot size: 30')	Absolute % Cover	Dominant Species?	Indicator Status
1. Acer rubrum	80	Yes	FAC
2. Pinus strobus	10	No	FACU
3.			
4.			
5.			
6.			
7.			
8.			
	90	= Total Cover	
Sapling/Shrub Stratum (Plot size: 15')			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
		= Total Cover	
Herb Stratum (Plot size: 5')			
1. Festuca sp.	5	Yes	FAC
2. Galax ureceolata	5	Yes	FACU
3. Trifolium repens	5	Yes	FACU
4. Polystichum acrostichoides	5	Yes	FACU
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	20	= Total Cover	
Woody Vine Stratum (Plot size: 30')			
1.			
2.			
3.			
4.			
5.			
6.			
		= Total Cover	

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 5 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 40 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species		x 1 =	
FACW species		x 2 =	
FAC species	85	x 3 =	255
FACU species	25	x 4 =	100
UPL species		x 5 =	
Column Totals:	110 (A)		355 (B)

Prevalence Index = B/A = 3.23

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

___ 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Four Vegetation Strata:

Tree – Woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/Shrub – Woody plants, excluding vines, less than 3 in. DBH and greater than 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vine – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** ____ **No** ✓

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: DP42 - Upland W

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0-4	7.5YR 4/6	100					loam	
4-12	7.5YR 5/6	100					loam	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ 2 cm Muck (A10) **(LRR N)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1) **(LRR N, MLRA 147, 148)**
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7)
- ___ Polyvalue Below Surface (S8) **(MLRA 147, 148)**
- ___ Thin Dark Surface (S9) **(MLRA 147, 148)**
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Iron-Manganese Masses (F12) **(LRR N, MLRA 136)**
- ___ Umbric Surface (F13) **(MLRA 136, 122)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 148)**

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) **(MLRA 147)**
- ___ Coast Prairie Redox (A16) **(MLRA 147, 148)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 136, 147)**
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** _____ **No** ✓

Remarks:

WETLAND DETERMINATION DATA FORM – Eastern Mountains and Piedmont

Project/Site: Vile Creek Mitigation Site City/County: Alleghany Sampling Date: 12/11/14

Applicant/Owner: Wildlands Engineering State: NC Sampling Point: DP43- Wetland X

Investigator(s): Ian Eckardt & Kenton Beal Section, Township, Range:

Landform (hillslope, terrace, etc.): floodplain Local relief (concave, convex, none): concave Slope (%): 0

Subregion (LRR or MLRA): LRR N Lat: N 36.509148 Long: W -81.097179 Datum:

Soil Map Unit Name: Chandler silt loam (CaF) NWI classification:

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)

Are Vegetation ✓, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓	No _____	**Is the Sampled Area within a Wetland?** Yes ✓ No _____
Hydric Soil Present?	Yes ✓	No _____	
Wetland Hydrology Present?	Yes ✓	No _____	

Remarks:

Sampling point located within an active grazing pasture where trees and saplings have been removed.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ✓ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ True Aquatic Plants (B14)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ✓ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ✓ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes _____	No ✓	Depth (inches): -
Water Table Present?	Yes _____	No ✓	Depth (inches): -
Saturation Present? (includes capillary fringe)	Yes ✓	No _____	Depth (inches): 0 (saturated to surface)

Wetland Hydrology Present? Yes ✓ No _____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION (Four Strata) – Use scientific names of plants.

Sampling Point: DP43- Wetland X

Tree Stratum (Plot size: 30')	Absolute % Cover	Dominant Species?	Indicator Status
1. Acer rubrum	50	Yes	FAC
2.			
3.			
4.			
5.			
6.			
7.			
8.			
	50 = Total Cover		
Sapling/Shrub Stratum (Plot size: 15')			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
	= Total Cover		
Herb Stratum (Plot size: 5')			
1. Carex lurida	30	Yes	OBL
2. Festuca sp.	30	Yes	FAC
3. Juncus effusus	20	Yes	FACW
4. Trifolium repens	10	No	FACU
5. Solidago sp.	10	No	Unknown
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	100 = Total Cover		
Woody Vine Stratum (Plot size: 30')			
1.			
2.			
3.			
4.			
5.			
6.			
	= Total Cover		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 3 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species		x 1 =	
FACW species		x 2 =	
FAC species		x 3 =	
FACU species		x 4 =	
UPL species		x 5 =	
Column Totals:	(A)		(B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

✓ 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Four Vegetation Strata:

Tree – Woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/Shrub – Woody plants, excluding vines, less than 3 in. DBH and greater than 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vine – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** ✓ **No** ___

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: DP43- Wetland X

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0-2	10YR 4/1	95	5YR 4/6	5	C	PL	sandy loam	
2-6	7.5YR 4/1	95	5YR 4/6	5	C	PL	silt loam	
6-12	7.5YR 4/1						sandy loam	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ 2 cm Muck (A10) **(LRR N)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1) **(LRR N, MLRA 147, 148)**
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7)
- ___ Polyvalue Below Surface (S8) **(MLRA 147, 148)**
- ___ Thin Dark Surface (S9) **(MLRA 147, 148)**
- ___ Loamy Gleyed Matrix (F2)
- ✓ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Iron-Manganese Masses (F12) **(LRR N, MLRA 136)**
- ___ Umbric Surface (F13) **(MLRA 136, 122)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 148)**

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) **(MLRA 147)**
- ___ Coast Prairie Redox (A16) **(MLRA 147, 148)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 136, 147)**
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ✓ **No** _____

Remarks:

WETLAND DETERMINATION DATA FORM – Eastern Mountains and Piedmont

Project/Site: Vile Creek Mitigation Site City/County: Alleghany Sampling Date: 12/11/14

Applicant/Owner: Wildlands Engineering State: NC Sampling Point: DP44 - Upland X&Y

Investigator(s): Ian Eckardt & Kenton Beal Section, Township, Range: _____

Landform (hillslope, terrace, etc.): hillslope Local relief (concave, convex, none): none Slope (%): 0

Subregion (LRR or MLRA): LRR N Lat: N 36.509235 Long: W -81.097217 Datum: _____

Soil Map Unit Name: Chandler silt loam (CaF) NWI classification: _____

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)

Are Vegetation ✓, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes _____ No ✓

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes _____	No ✓	**Is the Sampled Area within a Wetland?** Yes _____ No ✓
Hydric Soil Present?	Yes _____	No ✓	
Wetland Hydrology Present?	Yes _____	No ✓	

Remarks:

Sampling point located within an actively grazed pasture.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ True Aquatic Plants (B14)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes _____	No ✓	Depth (inches): -
Water Table Present?	Yes _____	No ✓	Depth (inches): -
Saturation Present? (includes capillary fringe)	Yes _____	No ✓	Depth (inches): -

Wetland Hydrology Present? Yes _____ No ✓

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION (Four Strata) – Use scientific names of plants.

Sampling Point: DP44 - Upland X&Y

Tree Stratum (Plot size: 30')	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
	= Total Cover		
Sapling/Shrub Stratum (Plot size: 15')			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
	= Total Cover		
Herb Stratum (Plot size: 5')			
1. Festuca sp.	80	Yes	FAC
2. Trifolium repens	20	Yes	FACU
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	100 = Total Cover		
Woody Vine Stratum (Plot size: 30')			
1.			
2.			
3.			
4.			
5.			
6.			
	= Total Cover		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 50 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species		x 1 =	
FACW species		x 2 =	
FAC species	80	x 3 =	240
FACU species	20	x 4 =	80
UPL species		x 5 =	
Column Totals:	100 (A)		320 (B)

Prevalence Index = B/A = 3.2

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

___ 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Four Vegetation Strata:

Tree – Woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/Shrub – Woody plants, excluding vines, less than 3 in. DBH and greater than 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vine – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** ____ **No** ✓

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: DP44 - Upland X&Y

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Redox Features Type[1]	Redox Features Loc[2]	Texture	Remarks
0-2	10YR 3/3	100					loam	
2-12	10YR 5/3	100					loam	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ 2 cm Muck (A10) **(LRR N)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1) **(LRR N, MLRA 147, 148)**
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7)
- ___ Polyvalue Below Surface (S8) **(MLRA 147, 148)**
- ___ Thin Dark Surface (S9) **(MLRA 147, 148)**
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Iron-Manganese Masses (F12) **(LRR N, MLRA 136)**
- ___ Umbric Surface (F13) **(MLRA 136, 122)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 148)**

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) **(MLRA 147)**
- ___ Coast Prairie Redox (A16) **(MLRA 147, 148)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 136, 147)**
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** _____ **No** ✓

Remarks:

WETLAND DETERMINATION DATA FORM – Eastern Mountains and Piedmont

Project/Site: Vile Creek Mitigation Site City/County: Alleghany Sampling Date: 12/11/14

Applicant/Owner: Wildlands Engineering State: NC Sampling Point: DP45- Wetland Y

Investigator(s): Ian Eckardt & Kenton Beal Section, Township, Range: _____

Landform (hillslope, terrace, etc.): floodplain Local relief (concave, convex, none): concave Slope (%): 0

Subregion (LRR or MLRA): LRR N Lat: N 36.508992 Long: W -81.097036 Datum: _____

Soil Map Unit Name: Alluvial land (Ad) and Tusquitee loam (TlC) NWI classification: _____

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)

Are Vegetation ✓, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes _____ No ✓

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓	No _____	**Is the Sampled Area within a Wetland?** **Yes ✓** **No _____**
Hydric Soil Present?	Yes ✓	No _____	
Wetland Hydrology Present?	Yes ✓	No _____	

Remarks:

Sampling point located within an active grazing pasture where trees and saplings have been removed.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ True Aquatic Plants (B14)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ✓ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ✓ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes _____	No ✓	Depth (inches): -
Water Table Present?	Yes _____	No ✓	Depth (inches): -
Saturation Present? (includes capillary fringe)	Yes _____	No ✓	Depth (inches): -

Wetland Hydrology Present? Yes ✓ No _____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION (Four Strata) – Use scientific names of plants.

Sampling Point: DP45- Wetland Y

Tree Stratum (Plot size: 30')	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
	= Total Cover		
Sapling/Shrub Stratum (Plot size: 15')			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
	= Total Cover		
Herb Stratum (Plot size: 5')			
1. Carex lurida	45	Yes	OBL
2. Festuca sp.	40	Yes	FAC
3. Trifolium repens	5	No	FACU
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	95 = Total Cover		
Woody Vine Stratum (Plot size: 30')			
1.			
2.			
3.			
4.			
5.			
6.			
	= Total Cover		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species		x 1 =	
FACW species		x 2 =	
FAC species		x 3 =	
FACU species		x 4 =	
UPL species		x 5 =	
Column Totals:	(A)		(B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

✓ 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Four Vegetation Strata:

Tree – Woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/Shrub – Woody plants, excluding vines, less than 3 in. DBH and greater than 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vine – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** ✓ **No** ___

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: DP45- Wetland Y

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-5	10YR 4/3	98	7.5YR 4/6	2	C	PL	sandy loam	
5-12	2.5Y 4/2	95	2.5YR 4/6	5	C	PL	sandy loam	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ 2 cm Muck (A10) **(LRR N)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1) **(LRR N, MLRA 147, 148)**
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7)
- ___ Polyvalue Below Surface (S8) **(MLRA 147, 148)**
- ___ Thin Dark Surface (S9) **(MLRA 147, 148)**
- ___ Loamy Gleyed Matrix (F2)
- ✓ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Iron-Manganese Masses (F12) **(LRR N, MLRA 136)**
- ___ Umbric Surface (F13) **(MLRA 136, 122)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 148)**

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) **(MLRA 147)**
- ___ Coast Prairie Redox (A16) **(MLRA 147, 148)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 136, 147)**
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ✓ **No** _____

Remarks:

WETLAND DETERMINATION DATA FORM – Eastern Mountains and Piedmont

Project/Site: Vile Creek Mitigation Site City/County: Alleghany Sampling Date: 12/11/14

Applicant/Owner: Wildlands Engineering State: NC Sampling Point: DP46 - Upland Y

Investigator(s): Ian Eckardt & Kenton Beal Section, Township, Range:

Landform (hillslope, terrace, etc.): hillslope Local relief (concave, convex, none): none Slope (%): 0

Subregion (LRR or MLRA): LRR N Lat: N 36.509054 Long: W -81.097028 Datum:

Soil Map Unit Name: Chandler silt loam (CaF) NWI classification:

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No ____ (If no, explain in Remarks.)

Are Vegetation ✓, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes ____ No ✓

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓	No ____	**Is the Sampled Area within a Wetland?** Yes ____ No ✓
Hydric Soil Present?	Yes ____	No ✓	
Wetland Hydrology Present?	Yes ____	No ✓	

Remarks:

Sampling point located within an actively grazed pasture.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ True Aquatic Plants (B14)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ____	No ✓	Depth (inches): -
Water Table Present?	Yes ____	No ✓	Depth (inches): -
Saturation Present? (includes capillary fringe)	Yes ____	No ✓	Depth (inches): -

Wetland Hydrology Present? Yes ____ No ✓

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION (Four Strata) – Use scientific names of plants.

Sampling Point: DP46 - Upland Y

Tree Stratum (Plot size: 30')	Absolute % Cover	Dominant Species?	Indicator Status
1. Acer rubrum	50	Yes	FAC
2.			
3.			
4.			
5.			
6.			
7.			
8.			
	50 = Total Cover		
Sapling/Shrub Stratum (Plot size: 15')			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
	= Total Cover		
Herb Stratum (Plot size: 5')			
1. Festuca sp.	80	Yes	FAC
2. Solidago sp.	10	No	Unknown
3. Plantago sp.	5	No	Unknown
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	95 = Total Cover		
Woody Vine Stratum (Plot size: 30')			
1.			
2.			
3.			
4.			
5.			
6.			
	= Total Cover		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species	x 1 =
FACW species	x 2 =
FAC species	x 3 =
FACU species	x 4 =
UPL species	x 5 =
Column Totals: (A)	(B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:

- ___ 1 - Rapid Test for Hydrophytic Vegetation
- ✓ 2 - Dominance Test is >50%
- ___ 3 - Prevalence Index is ≤3.0[1]
- ___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Four Vegetation Strata:

Tree – Woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/Shrub – Woody plants, excluding vines, less than 3 in. DBH and greater than 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vine – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** ✓ **No** ___

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: DP46 - Upland Y

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0-2	7.5YR 4/3	100					loam	
2-12	5YR 4/6	100					loam	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ 2 cm Muck (A10) **(LRR N)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1) **(LRR N, MLRA 147, 148)**
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7)
- ___ Polyvalue Below Surface (S8) **(MLRA 147, 148)**
- ___ Thin Dark Surface (S9) **(MLRA 147, 148)**
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Iron-Manganese Masses (F12) **(LRR N, MLRA 136)**
- ___ Umbric Surface (F13) **(MLRA 136, 122)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 148)**

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) **(MLRA 147)**
- ___ Coast Prairie Redox (A16) **(MLRA 147, 148)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 136, 147)**
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** _____ **No** ✓

Remarks:

WETLAND DETERMINATION DATA FORM – Eastern Mountains and Piedmont

Project/Site: Vile Creek Mitigation Site City/County: Alleghany Sampling Date: 12/11/14

Applicant/Owner: Wildlands Engineering State: NC Sampling Point: DP47- Wetland Z

Investigator(s): Ian Eckardt & Kenton Beal Section, Township, Range:

Landform (hillslope, terrace, etc.): drainageway Local relief (concave, convex, none): none Slope (%): 0

Subregion (LRR or MLRA): LRR N Lat: N 36.512696 Long: W -81.09342 Datum:

Soil Map Unit Name: Watauga loam (WaE) NWI classification:

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No ____ (If no, explain in Remarks.)

Are Vegetation ✓, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes ____ No ✓

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓	No ____	**Is the Sampled Area within a Wetland?** Yes ✓ No ____
Hydric Soil Present?	Yes ✓	No ____	
Wetland Hydrology Present?	Yes ✓	No ____	

Remarks:

Sampling point located near a trampled low bench along UT3.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ✓ Surface Water (A1)
- ___ High Water Table (A2)
- ✓ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ✓ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ True Aquatic Plants (B14)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ✓	No ____	Depth (inches): 1
Water Table Present?	Yes ____	No ✓	Depth (inches): -
Saturation Present? (includes capillary fringe)	Yes ____	No ✓	Depth (inches): 0 (saturated to surface)

Wetland Hydrology Present? Yes ✓ No ____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION (Four Strata) – Use scientific names of plants.

Sampling Point: DP47- Wetland Z

Tree Stratum (Plot size: 30')	Absolute % Cover	Dominant Species?	Indicator Status
1. Acer rubrum	80	Yes	FAC
2.			
3.			
4.			
5.			
6.			
7.			
8.			
	80 = Total Cover		
Sapling/Shrub Stratum (Plot size: 15')			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
	= Total Cover		
Herb Stratum (Plot size: 5')			
1. Juncus effusus	20	Yes	FACW
2. Festuca sp.	20	Yes	FAC
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	40 = Total Cover		
Woody Vine Stratum (Plot size: 30')			
1.			
2.			
3.			
4.			
5.			
6.			
	= Total Cover		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 3 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species	x 1 =
FACW species	x 2 =
FAC species	x 3 =
FACU species	x 4 =
UPL species	x 5 =
Column Totals: (A)	(B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:

- ___ 1 - Rapid Test for Hydrophytic Vegetation
- ✓ 2 - Dominance Test is >50%
- ___ 3 - Prevalence Index is ≤3.0[1]
- ___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Four Vegetation Strata:

Tree – Woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/Shrub – Woody plants, excluding vines, less than 3 in. DBH and greater than 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vine – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** ✓ **No** ___

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: DP47- Wetland Z

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0-4	2.5Y 4/2	100					silt	
4-12	10YR 4/1	95	10YR 3/4	5	C	PL	silt loam	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ 2 cm Muck (A10) **(LRR N)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1) **(LRR N, MLRA 147, 148)**
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7)
- ___ Polyvalue Below Surface (S8) **(MLRA 147, 148)**
- ___ Thin Dark Surface (S9) **(MLRA 147, 148)**
- ___ Loamy Gleyed Matrix (F2)
- ✓ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Iron-Manganese Masses (F12) **(LRR N, MLRA 136)**
- ___ Umbric Surface (F13) **(MLRA 136, 122)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 148)**

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) **(MLRA 147)**
- ___ Coast Prairie Redox (A16) **(MLRA 147, 148)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 136, 147)**
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ✓ **No** _____

Remarks:

WETLAND DETERMINATION DATA FORM – Eastern Mountains and Piedmont

Project/Site: Vile Creek Mitigation Site City/County: Alleghany Sampling Date: 12/11/14

Applicant/Owner: Wildlands Engineering State: NC Sampling Point: DP48 - Upland Z

Investigator(s): Ian Eckardt & Kenton Beal Section, Township, Range: _____

Landform (hillslope, terrace, etc.): hillslope Local relief (concave, convex, none): none Slope (%): 0

Subregion (LRR or MLRA): LRR N Lat: N 36.512696 Long: W -81.093497 Datum: _____

Soil Map Unit Name: Watauga loam (WaE) NWI classification: _____

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)

Are Vegetation ✓, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes _____ No ✓

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓	No _____	**Is the Sampled Area within a Wetland?** Yes _____ No ✓
Hydric Soil Present?	Yes _____	No ✓	
Wetland Hydrology Present?	Yes _____	No ✓	

Remarks:

Sampling point located within an actively grazed pasture.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ True Aquatic Plants (B14)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes _____	No ✓	Depth (inches): -
Water Table Present?	Yes _____	No ✓	Depth (inches): -
Saturation Present? (includes capillary fringe)	Yes _____	No ✓	Depth (inches): -

Wetland Hydrology Present? Yes _____ No ✓

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION (Four Strata) – Use scientific names of plants.

Sampling Point: DP48 - Upland Z

Tree Stratum (Plot size: 30')	Absolute % Cover	Dominant Species?	Indicator Status
1. Acer rubrum	60	Yes	FAC
2.			
3.			
4.			
5.			
6.			
7.			
8.			
	60 = Total Cover		
Sapling/Shrub Stratum (Plot size: 15')			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
	= Total Cover		
Herb Stratum (Plot size: 5')			
1. Festuca sp.	90	Yes	FAC
2. Solidago sp.	10	No	Unknown
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	100 = Total Cover		
Woody Vine Stratum (Plot size: 30')			
1.			
2.			
3.			
4.			
5.			
6.			
	= Total Cover		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species	x 1 =
FACW species	x 2 =
FAC species	x 3 =
FACU species	x 4 =
UPL species	x 5 =
Column Totals: (A)	(B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:

- ___ 1 - Rapid Test for Hydrophytic Vegetation
- ✓ 2 - Dominance Test is >50%
- ___ 3 - Prevalence Index is ≤3.0[1]
- ___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Four Vegetation Strata:

Tree – Woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/Shrub – Woody plants, excluding vines, less than 3 in. DBH and greater than 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vine – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** ✓ **No** ___

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: DP48 - Upland Z

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0-3	5YR 4/4	100					loam	
3-12	5YR 5/6	100					loam	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ 2 cm Muck (A10) **(LRR N)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1) **(LRR N, MLRA 147, 148)**
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7)
- ___ Polyvalue Below Surface (S8) **(MLRA 147, 148)**
- ___ Thin Dark Surface (S9) **(MLRA 147, 148)**
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Iron-Manganese Masses (F12) **(LRR N, MLRA 136)**
- ___ Umbric Surface (F13) **(MLRA 136, 122)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 148)**

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) **(MLRA 147)**
- ___ Coast Prairie Redox (A16) **(MLRA 147, 148)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 136, 147)**
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** _____ **No** ✓

Remarks:

WETLAND DETERMINATION DATA FORM – Eastern Mountains and Piedmont

Project/Site: Vile Creek Mitigation Site City/County: Alleghany Sampling Date: 12/11/14

Applicant/Owner: Wildlands Engineering State: NC Sampling Point: DP49- Wetland AA

Investigator(s): Ian Eckardt & Kenton Beal Section, Township, Range:

Landform (hillslope, terrace, etc.): valley bottom Local relief (concave, convex, none): concave Slope (%): 0

Subregion (LRR or MLRA): LRR N Lat: N 36.512535 Long: W -81.093312 Datum:

Soil Map Unit Name: Watauga loam (WaE) NWI classification:

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓	No _____	**Is the Sampled Area within a Wetland?** **Yes ✓** **No _____**
Hydric Soil Present?	Yes ✓	No _____	
Wetland Hydrology Present?	Yes ✓	No _____	

Remarks:

Sampling point located in a small linear depression that ties into the left top of bank of UT3.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ✓ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ True Aquatic Plants (B14)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ✓ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes _____	No ✓	Depth (inches): -
Water Table Present?	Yes _____	No ✓	Depth (inches): -
Saturation Present? (includes capillary fringe)	Yes _____	No ✓	Depth (inches): -

Wetland Hydrology Present? **Yes ✓** **No _____**

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION (Four Strata) – Use scientific names of plants.

Sampling Point: DP49- Wetland AA

Tree Stratum (Plot size: 30')	Absolute % Cover	Dominant Species?	Indicator Status
1. Acer rubrum	40	Yes	FAC
2.			
3.			
4.			
5.			
6.			
7.			
8.			
	40	= Total Cover	
Sapling/Shrub Stratum (Plot size: 15')			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
		= Total Cover	
Herb Stratum (Plot size: 5')			
1. Festuca sp.	10	Yes	FAC
2. Dichanthelium clandestinum	10	Yes	FAC
3. Solidago sp.	5	No	Unknown
4. Aster sp.	5	No	Unknown
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	30	= Total Cover	
Woody Vine Stratum (Plot size: 30')			
1.			
2.			
3.			
4.			
5.			
6.			
		= Total Cover	

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 3 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species		x 1 =	
FACW species		x 2 =	
FAC species		x 3 =	
FACU species		x 4 =	
UPL species		x 5 =	
Column Totals:	(A)		(B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:

- ___ 1 - Rapid Test for Hydrophytic Vegetation
- ✓ 2 - Dominance Test is >50%
- ___ 3 - Prevalence Index is ≤3.0[1]
- ___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Four Vegetation Strata:

Tree – Woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/Shrub – Woody plants, excluding vines, less than 3 in. DBH and greater than 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vine – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** ✓ **No** ___

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: DP49- Wetland AA

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-12	10YR 4/2	95	10YR 5/6	5	C	PL	loam	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ 2 cm Muck (A10) **(LRR N)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1) **(LRR N, MLRA 147, 148)**
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7)
- ___ Polyvalue Below Surface (S8) **(MLRA 147, 148)**
- ___ Thin Dark Surface (S9) **(MLRA 147, 148)**
- ___ Loamy Gleyed Matrix (F2)
- ✓ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Iron-Manganese Masses (F12) **(LRR N, MLRA 136)**
- ___ Umbric Surface (F13) **(MLRA 136, 122)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 148)**

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) **(MLRA 147)**
- ___ Coast Prairie Redox (A16) **(MLRA 147, 148)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 136, 147)**
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ✓ **No** _____

Remarks:

WETLAND DETERMINATION DATA FORM – Eastern Mountains and Piedmont

Project/Site: Vile Creek Mitigation Site City/County: Alleghany Sampling Date: 12/11/14

Applicant/Owner: Wildlands Engineering State: NC Sampling Point: DP50 - Upland AA

Investigator(s): Ian Eckardt & Kenton Beal Section, Township, Range: _____

Landform (hillslope, terrace, etc.): hillslope Local relief (concave, convex, none): none Slope (%): 0

Subregion (LRR or MLRA): LRR N Lat: N 36.51254 Long: W -81.093263 Datum: _____

Soil Map Unit Name: Watauga loam (WaE) NWI classification: _____

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes _____	No ✓	**Is the Sampled Area within a Wetland?** Yes _____ No ✓
Hydric Soil Present?	Yes _____	No ✓	
Wetland Hydrology Present?	Yes _____	No ✓	

Remarks:

Sampling point located within an actively grazed pasture.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ True Aquatic Plants (B14)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes _____	No ✓	Depth (inches): -
Water Table Present?	Yes _____	No ✓	Depth (inches): -
Saturation Present? (includes capillary fringe)	Yes _____	No ✓	Depth (inches): -

Wetland Hydrology Present? Yes _____ No ✓

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION (Four Strata) – Use scientific names of plants.

Sampling Point: DP50 - Upland AA

Tree Stratum (Plot size: 30')	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
	= Total Cover		
Sapling/Shrub Stratum (Plot size: 15')			
1. Berberis thumbergii	20	Yes	FACU
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
	20 = Total Cover		
Herb Stratum (Plot size: 5')			
1. Festuca sp.	50	Yes	FAC
2. Solidago sp.	20	Yes	Unknown
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	70 = Total Cover		
Woody Vine Stratum (Plot size: 30')			
1.			
2.			
3.			
4.			
5.			
6.			
	= Total Cover		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 50 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species		x 1 =	
FACW species		x 2 =	
FAC species	50	x 3 =	150
FACU species	20	x 4 =	80
UPL species		x 5 =	
Column Totals:	70 (A)		230 (B)

Prevalence Index = B/A = 3.3

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

___ 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Four Vegetation Strata:

Tree – Woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/Shrub – Woody plants, excluding vines, less than 3 in. DBH and greater than 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vine – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** ___ **No** ✓

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: DP50 - Upland AA

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0-2	5YR 4/4	100					loam	
2-6	5YR 4/6	100					loam	
6-12	5YR 4/6	95	5YR 6/8	5	C	PL	loam	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ 2 cm Muck (A10) **(LRR N)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1) **(LRR N, MLRA 147, 148)**
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7)
- ___ Polyvalue Below Surface (S8) **(MLRA 147, 148)**
- ___ Thin Dark Surface (S9) **(MLRA 147, 148)**
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Iron-Manganese Masses (F12) **(LRR N, MLRA 136)**
- ___ Umbric Surface (F13) **(MLRA 136, 122)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 148)**

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) **(MLRA 147)**
- ___ Coast Prairie Redox (A16) **(MLRA 147, 148)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 136, 147)**
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** _____ **No** ✓

Remarks:

WETLAND DETERMINATION DATA FORM – Eastern Mountains and Piedmont

Project/Site: Vile Creek Mitigation Site City/County: Alleghany Sampling Date: 12/11/14

Applicant/Owner: Wildlands Engineering State: NC Sampling Point: DP51 Wetland BB

Investigator(s): Ian Eckardt & Kenton Beal Section, Township, Range:

Landform (hillslope, terrace, etc.): valley bottom Local relief (concave, convex, none): concave Slope (%): 0

Subregion (LRR or MLRA): LRR N Lat: N 36.511186 Long: W -81.093747 Datum:

Soil Map Unit Name: Fannin silt loam (FnE2) NWI classification:

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No ____ (If no, explain in Remarks.)

Are Vegetation ✓, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No ____

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓	No ____	**Is the Sampled Area within a Wetland?** **Yes ✓** **No ____**
Hydric Soil Present?	Yes ✓	No ____	
Wetland Hydrology Present?	Yes ✓	No ____	

Remarks:

Sampling point located in a seep near the toe of the hillslope.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ✓ Surface Water (A1)
- ___ High Water Table (A2)
- ✓ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ True Aquatic Plants (B14)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ✓ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ✓ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ✓	No ____	Depth (inches): 1
Water Table Present?	Yes ____	No ✓	Depth (inches): -
Saturation Present? (includes capillary fringe)	Yes ✓	No ____	Depth (inches): 0 (saturated to surface)

Wetland Hydrology Present? **Yes ✓** **No ____**

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION (Four Strata) – Use scientific names of plants.

Sampling Point: DP51 Wetland BB

Tree Stratum (Plot size: 30')	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
	= Total Cover		
Sapling/Shrub Stratum (Plot size: 15')			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
	= Total Cover		
Herb Stratum (Plot size: 5')			
1. Carex lurida	50	Yes	OBL
2. Juncus effusus	40	Yes	FACW
3. Aster sp.	5	No	Unknown
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	95 = Total Cover		
Woody Vine Stratum (Plot size: 30')			
1.			
2.			
3.			
4.			
5.			
6.			
	= Total Cover		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: _____ (A)

Total Number of Dominant Species Across All Strata: _____ (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: _____ (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species _____	x 1 = _____
FACW species _____	x 2 = _____
FAC species _____	x 3 = _____
FACU species _____	x 4 = _____
UPL species _____	x 5 = _____
Column Totals: _____ (A)	_____ (B)

Prevalence Index = B/A = _____

Hydrophytic Vegetation Indicators:

✓ 1 - Rapid Test for Hydrophytic Vegetation

___ 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Four Vegetation Strata:

Tree – Woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/Shrub – Woody plants, excluding vines, less than 3 in. DBH and greater than 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vine – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** ✓ **No** _____

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: DP51 Wetland BB

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-4	7.5YR 4/4						silt loam	
4-12	10YR 4/2	95	10YR 4/4	5	C	PL	loam	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ 2 cm Muck (A10) **(LRR N)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1) **(LRR N, MLRA 147, 148)**
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7)
- ___ Polyvalue Below Surface (S8) **(MLRA 147, 148)**
- ___ Thin Dark Surface (S9) **(MLRA 147, 148)**
- ___ Loamy Gleyed Matrix (F2)
- ✓ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Iron-Manganese Masses (F12) **(LRR N, MLRA 136)**
- ___ Umbric Surface (F13) **(MLRA 136, 122)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 148)**

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) **(MLRA 147)**
- ___ Coast Prairie Redox (A16) **(MLRA 147, 148)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 136, 147)**
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ✓ **No** _____

Remarks:

WETLAND DETERMINATION DATA FORM – Eastern Mountains and Piedmont

Project/Site: Vile Creek Mitigation Site City/County: Alleghany Sampling Date: 12/11/14

Applicant/Owner: Wildlands Engineering State: NC Sampling Point: DP52 - Upland BB

Investigator(s): Ian Eckardt & Kenton Beal Section, Township, Range: _____

Landform (hillslope, terrace, etc.): hillslope Local relief (concave, convex, none): none Slope (%): 0

Subregion (LRR or MLRA): LRR N Lat: N 36.511249 Long: W -81.093812 Datum: _____

Soil Map Unit Name: Fannin silt loam (FnE2) NWI classification: _____

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)

Are Vegetation ✓, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes _____ No ✓

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓	No _____	**Is the Sampled Area within a Wetland?** Yes _____ No ✓
Hydric Soil Present?	Yes _____	No ✓	
Wetland Hydrology Present?	Yes _____	No ✓	

Remarks:

Sampling point located within an actively grazed pasture.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ True Aquatic Plants (B14)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes _____	No ✓	Depth (inches): -
Water Table Present?	Yes _____	No ✓	Depth (inches): -
Saturation Present? (includes capillary fringe)	Yes _____	No ✓	Depth (inches): -

Wetland Hydrology Present? Yes _____ No ✓

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION (Four Strata) – Use scientific names of plants.

Sampling Point: DP52 - Upland BB

Tree Stratum (Plot size: 30')	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
	= Total Cover		
Sapling/Shrub Stratum (Plot size: 15')			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
	= Total Cover		
Herb Stratum (Plot size: 5')			
1. Festuca sp.	85	Yes	FAC
2. Solidago sp.	15	No	Unknown
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	70 = Total Cover		
Woody Vine Stratum (Plot size: 30')			
1.			
2.			
3.			
4.			
5.			
6.			
	= Total Cover		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species		x 1 =	
FACW species		x 2 =	
FAC species		x 3 =	
FACU species		x 4 =	
UPL species		x 5 =	
Column Totals:	(A)		(B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

___ 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Four Vegetation Strata:

Tree – Woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/Shrub – Woody plants, excluding vines, less than 3 in. DBH and greater than 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vine – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** ✓ **No** ___

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: DP52 - Upland BB

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0-1	2.5YR 4/4	100					loam	
1-12	5YR 4/6	98	5YR 5/8	2	C	PL	loam	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ 2 cm Muck (A10) **(LRR N)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1) **(LRR N, MLRA 147, 148)**
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7)
- ___ Polyvalue Below Surface (S8) **(MLRA 147, 148)**
- ___ Thin Dark Surface (S9) **(MLRA 147, 148)**
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Iron-Manganese Masses (F12) **(LRR N, MLRA 136)**
- ___ Umbric Surface (F13) **(MLRA 136, 122)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 148)**

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) **(MLRA 147)**
- ___ Coast Prairie Redox (A16) **(MLRA 147, 148)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 136, 147)**
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** _____ **No** ✓

Remarks:

NC DWQ Stream Identification Form Version 4.11

Date: 12-2-13	**Project/Site:** VILE CK	**Latitude:** 36.509315°N
Evaluator: AKT, IE	**County:** Alleghany	**Longitude:** -81.103397°W
Total Points: *Stream is at least intermittent if ≥ 19 or perennial if ≥ 30** 45.5	**Stream Determination (circle one)** Ephemeral Intermittent Perennial	**Other** SCP1 - Vile Creek *e.g. Quad Name:*

A. Geomorphology (Subtotal = 25)	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 = 11)				
18. Fibrous roots in streambed	(3)	2	1	0
19. Rooted upland plants in streambed	(3)	2	1	0
20. Macrobenthos (note diversity and abundance)	0	1	(2)	3
21. Aquatic Mollusks	0	1	(2)	3
22. Fish	0	(0.5)	1	1.5
23. Crayfish	(0)	0.5	1	1.5
24. Amphibians	(0)	0.5	1	1.5
25. Algae	0	(0.5)	1	1.5
26. Wetland plants in streambed	FACW = 0.75; OBL = 1.5 (Other = 0)			

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

Notes:

Sketch:

NC DWQ Stream Identification Form Version 4.11

Date: 12-2-13	**Project/Site:** VILE CK	**Latitude:** 36.505901°N
Evaluator: AKT	**County:** Alleghany	**Longitude:** 81.106094°W
Total Points: *Stream is at least intermittent if ≥ 19 or perennial if ≥ 30** 43	**Stream Determination (circle one)** Ephemeral Intermittent Perennial	**Other** SCP 2 - UT1 *e.g. Quad Name:*

A. Geomorphology (Subtotal = 26)	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)				
12. Presence of Baseflow	0	1	2	3
13. Iron oxidizing bacteria	0	1	2	3
14. Leaf litter	1.5	1	0.5	0
15. Sediment on plants or debris	0	0.5	1	1.5
16. Organic debris lines or piles	0	0.5	1	1.5
17. Soil-based evidence of high water table?	No = 0		Yes = 3	

C. Biology (Subtotal = 8)				
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: Mollusks - snail, caddes fres (house building)

Sketch:

NC DWQ Stream Identification Form Version 4.11

Date: 12-2-13	**Project/Site:** VILE CK	**Latitude:** 36.506383°N
Evaluator: AKT	**County:** Alleghany	**Longitude:** 81.107193°W
Total Points: 36 *Stream is at least intermittent if ≥ 19 or perennial if ≥ 30**	**Stream Determination (circle one)** Ephemeral Intermittent (Perennial)	**Other** SCP3-UT1A *e.g. Quad Name:*

A. Geomorphology (Subtotal = 17.5)	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)				
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: Mollusks (see sketch), house building caddies fly

Sketch:

NC DWQ Stream Identification Form Version 4.11

Date: 12-2-13	**Project/Site:** VILE CK	**Latitude:** 36.505758°N
Evaluator: AKT	**County:** Alleghany	**Longitude:** 81.105830°W
Total Points: *Stream is at least intermittent if ≥ 19 or perennial if ≥ 30** 28.25	**Stream Determination (circle one)** Ephemeral (Intermittent) Perennial	**Other** SCP4-UT1B *e.g. Quad Name:*

A. Geomorphology (Subtotal = 12)	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 = 7.5)				
12. Presence of Baseflow	0	1	2	(3)
13. Iron oxidizing bacteria	(0)	1	2	3
14. Leaf litter	1.5	(1)	0.5	0
15. Sediment on plants or debris	(0)	0.5	1	1.5
16. Organic debris lines or piles	0	(0.5)	1	1.5
17. Soil-based evidence of high water table?	No = 0		(Yes = 3)	

C. Biology (Subtotal = 8.75)				
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:

NC DWQ Stream Identification Form Version 4.11

Date: 12-2-13	**Project/Site:** VILE	**Latitude:** 36.506550°N
Evaluator: AKT	**County:** Alleghany	**Longitude:** 81.103856°W
Total Points: *Stream is at least intermittent if ≥ 19 or perennial if ≥ 30** 26	**Stream Determination (circle one)** Ephemeral Intermittent Perennial	**Other** SCP 5 - UT1C *e.g. Quad Name:*

A. Geomorphology (Subtotal = 10)	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 = 7.5)				
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:

NC DWQ Stream Identification Form Version 4.11

Date: 12-2-13	**Project/Site:** VILE	**Latitude:** 36.510271°N
Evaluator: AKT	**County:** Alleghany	**Longitude:** 81.097368°W
Total Points: *Stream is at least intermittent if ≥ 19 or perennial if ≥ 30** 42.5	**Stream Determination (circle one)** Ephemeral Intermittent (Perennial)	**Other** SCP 6-UT2 *e.g. Quad Name:* below UT2A

A. Geomorphology (Subtotal = 23)	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 = 10)				
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: hydropsyche, house building caddis, free caddis mayflies, snails, fish (one spotted)

Sketch:

NC DWQ Stream Identification Form Version 4.11

Date: 12-2-2013	**Project/Site:** Vile	**Latitude:** 36.511335°N
Evaluator: IJE	**County:** Alleghany	**Longitude:** 81.097941349°W
Total Points: *Stream is at least intermittent if ≥ 19 or perennial if ≥ 30** 27	**Stream Determination (circle one)** Ephemeral Intermittent (Perennial)	**Other** SCP7 - UT2 *e.g. Quad Name:* Above UT2A

A. Geomorphology (Subtotal = 13.5)	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 = 4)				
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: hydropsychidae = caddisfly

Sketch:

NC DWQ Stream Identification Form Version 4.11

Date: 12-2-13	**Project/Site:** Vile Creek	**Latitude:** 36.512692°N
Evaluator: IE ; AKT	**County:** Alleghany	**Longitude:** 81.093547°W
Total Points: *Stream is at least intermittent if ≥ 19 or perennial if ≥ 30** 33.5	**Stream Determination (circle one)** Ephemeral Intermittent (Perennial)	**Other** SCP 9 - UT3 *e.g. Quad Name:*

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

[a] artificial ditches are not rated; see discussions in manual

B. Hydrology (Subtotal = 9)				
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:

NC DWQ Stream Identification Form Version 4.11

Date: 12/2/13	**Project/Site:** Vile Creek	**Latitude:** 36.508680°N
Evaluator: J. Eckardt	**County:** Alleghany	**Longitude:** 81.096389°W
Total Points: *Stream is at least intermittent if ≥ 19 or perennial if ≥ 30** 49.5	**Stream Determination (circle one)** Ephemeral Intermittent (Perennial)	**Other** SCP 10 - Little River *e.g. Quad Name:*

A. Geomorphology (Subtotal = 2.6)	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 = 10)				
12. Presence of Baseflow	0	1	2	(3)
13. Iron oxidizing bacteria	(0)	1	2	3
14. Leaf litter	(1.5)	1	0.5	0
15. Sediment on plants or debris	0	0.5	(1)	1.5
16. Organic debris lines or piles	0	0.5	1	(1.5)
17. Soil-based evidence of high water table?	No = 0		(Yes = 3)	

C. Biology (Subtotal = 13.5)				
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.

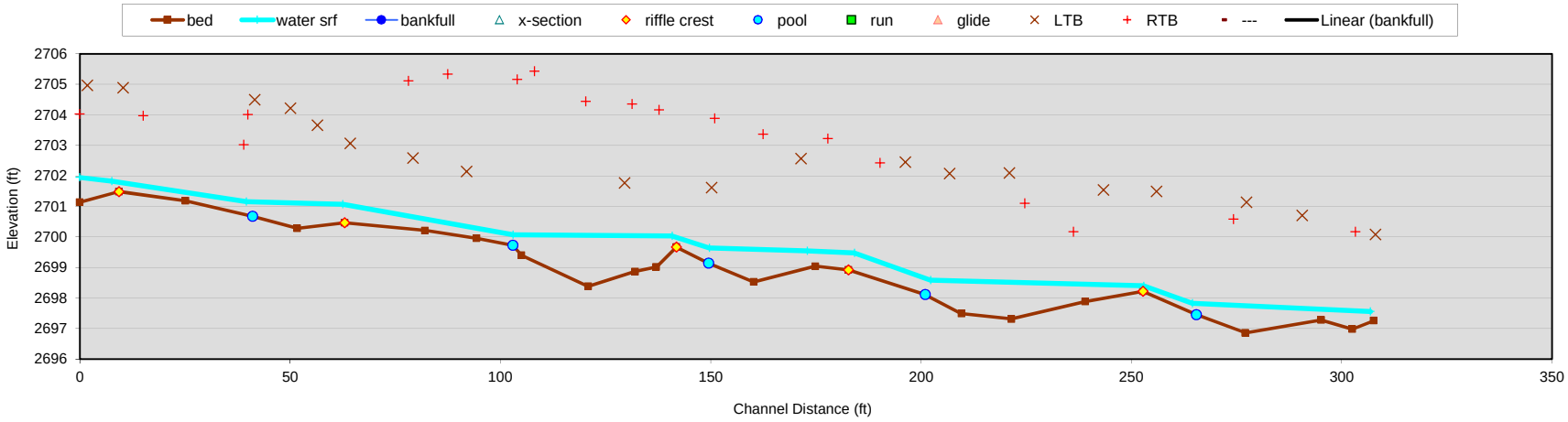
Notes:

Sketch:

APPENDIX 3
EXISTING GEOMORPHIC SURVEY DATA

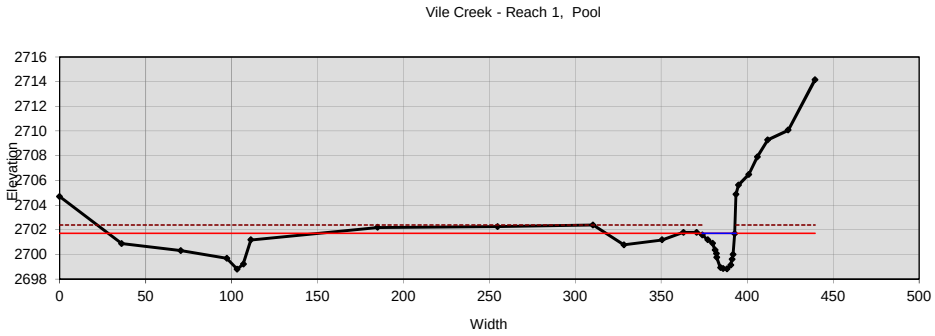
Longitudinal Slope Profile

Vile Creek - Reach 1



	slope (%)		slope ratio		length (ft)		length ratio		pool-pool spacing (ft)		p-p ratio	
reach	1.4		---		308.0	(16 channel widths)	---		---		---	
riffle	4.3	(1.8 - 6.9)	3.1	(1.3 - 4.9)	22.1	(7.7 - 40)	1.1	(0.4 - 2.1)	---		---	
pool	0.4	(0 - 0.96)	0.3	(0 - 0.7)	37.6	(21.9 - 51.8)	1.9	(1.1 - 2.7)	56.1	(46.54 - 64.5)	2.9	(2.4 - 3.3)
	---		---		---		---		---		---	
	---		---		---		---		---		---	

Cross Section 1



Bankfull Dimensions		Flood Dimensions		Materials	
31.7	x-section area (ft.sq.)	185.6	W flood prone area (ft)	---	D50 (mm)
18.9	width (ft)	9.8	entrenchment ratio	---	D84 (mm)
1.7	mean depth (ft)	3.6	low bank height (ft)	66	threshold grain size (mm):
2.9	max depth (ft)	1.2	low bank height ratio		
20.7	wetted parimeter (ft)				
1.5	hyd radi (ft)				
11.3	width-depth ratio				

Bankfull Flow		Flow Resistance		Forces & Power	
---	velocity (ft/s)	---	Manning's roughness	1.4	channel slope (%)
---	discharge rate (cfs)	---	D'Arcy-Weisbach fric.	1.34	shear stress (lb/sq.ft.)
---	Froude number	---	resistance factor u/u*	0.83	shear velocity (ft/s)
		---	relative roughness	---	unit strm power (lb/ft/s)

Cross Section

reference ID: 1
instrument height: 2715 ---
longitudinal station: ---

Bankfull Stage

FS: ---
elevation: 2701.7 ---

Low Bank Height

FS: ---
elevation: 2702.371 ---

Flood Prone Area

width fpa: 185.6

Channel Slope

percent slope: 1.4

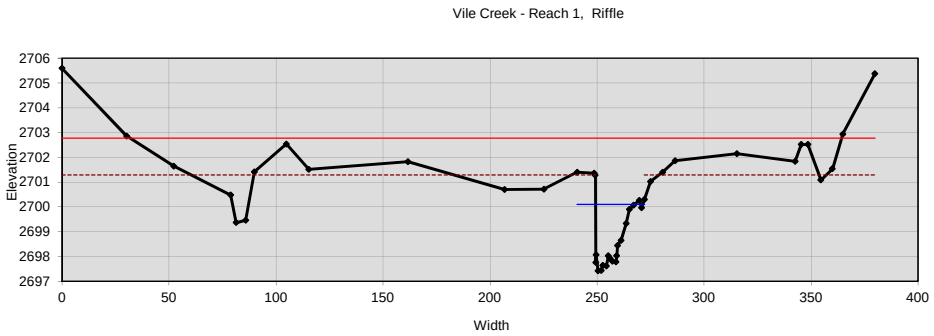
Flow Resistance

Manning's "n": ---
D'Arcy - Weisbach "f": ---

Note:

Distance (ft)	BS (ft)	HI (ft)	FS (ft)	Elevation (ft)	Omit Bkf	Notes
0		2715	10.31	2704.69	☑	pool
36.07		2715	14.129	2700.871	☑	
70.47		2715	14.686	2700.314	☑	
97.25		2715	15.315	2699.685	☑	
103.23		2715	16.209	2698.791	☑	
106.89		2715	15.782	2699.218	☑	
111.27		2715	13.826	2701.174	☑	
184.93		2715	12.815	2702.185	☑	
254.8		2715	12.741	2702.259	☑	
310.18		2715	12.629	2702.371	☑	
328.23		2715	14.231	2700.769	☑	
350.51		2715	13.829	2701.171	☑	
362.82		2715	13.215	2701.785	☑	
370.56		2715	13.21	2701.79	☑	
373.83		2715	13.439	2701.561	☐	bkf ltb
376.98		2715	13.823	2701.177	☐	
379.81		2715	14.099	2700.901	☐	
381.23		2715	14.655	2700.345	☐	
382.05		2715	14.932	2700.068	☐	lew
382.27		2715	15.255	2699.745	☐	lch
384.42		2715	16.08	2698.92	☐	
385.9		2715	16.163	2698.837	☐	twg
388.25		2715	16.177	2698.823	☐	
390.37		2715	15.879	2699.121	☐	
391.24		2715	15.399	2699.601	☐	
391.78		2715	15.012	2699.988	☐	rch/rew
392.72		2715	13.33	2701.67	☐	
393.44		2715	10.132	2704.868	☐	rtb
394.97		2715	9.38	2705.62	☑	
400.89		2715	8.519	2706.481	☑	
405.9		2715	7.086	2707.914	☑	
411.81		2715	5.727	2709.273	☑	
423.78		2715	4.926	2710.074	☑	
439.41		2715	0.84	2714.16	☑	
					☐	
					☐	

Cross Section 2



Bankfull Dimensions		Flood Dimensions		Materials	
30.4	x-section area (ft.sq.)	332.5	W flood prone area (ft)	---	D50 (mm)
19.3	width (ft)	17.2	entrenchment ratio	---	D84 (mm)
1.6	mean depth (ft)	3.9	low bank height (ft)	58	threshold grain size (mm):
2.7	max depth (ft)	1.4	low bank height ratio		
22.5	wetted parimeter (ft)				
1.4	hyd radi (ft)				
12.2	width-depth ratio				

Bankfull Flow		Flow Resistance		Forces & Power	
---	velocity (ft/s)	---	Manning's roughness	1.4	channel slope (%)
---	discharge rate (cfs)	---	D'Arcy-Weisbach fric.	1.18	shear stress (lb/sq.ft.)
---	Froude number	---	resistance factor u/u*	0.78	shear velocity (ft/s)
		---	relative roughness	---	unit strm power (lb/ft/s)

Cross Section

reference ID: 2
instrument height: 2715 ---
longitudinal station: --- ---

Bankfull Stage

FS: --- ---
elevation: 2700.1 ---

Low Bank Height

FS: --- ---
elevation: 2701.288

Flood Prone Area

width fpa: 332.5

Channel Slope

percent slope: 1.4

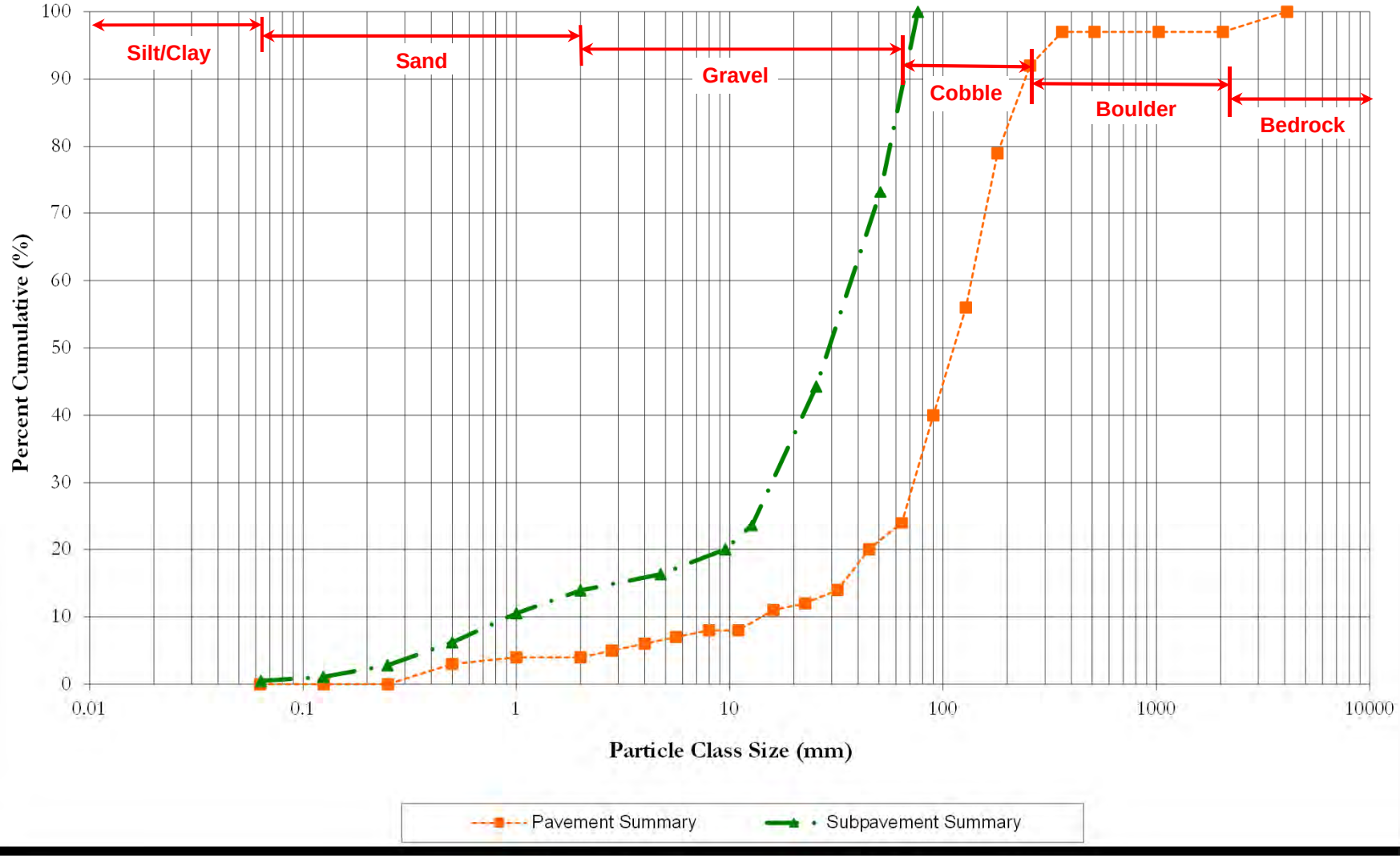
Flow Resistance

Manning's "n": --- ---
D'Arcy - Weisbach "f": --- ---

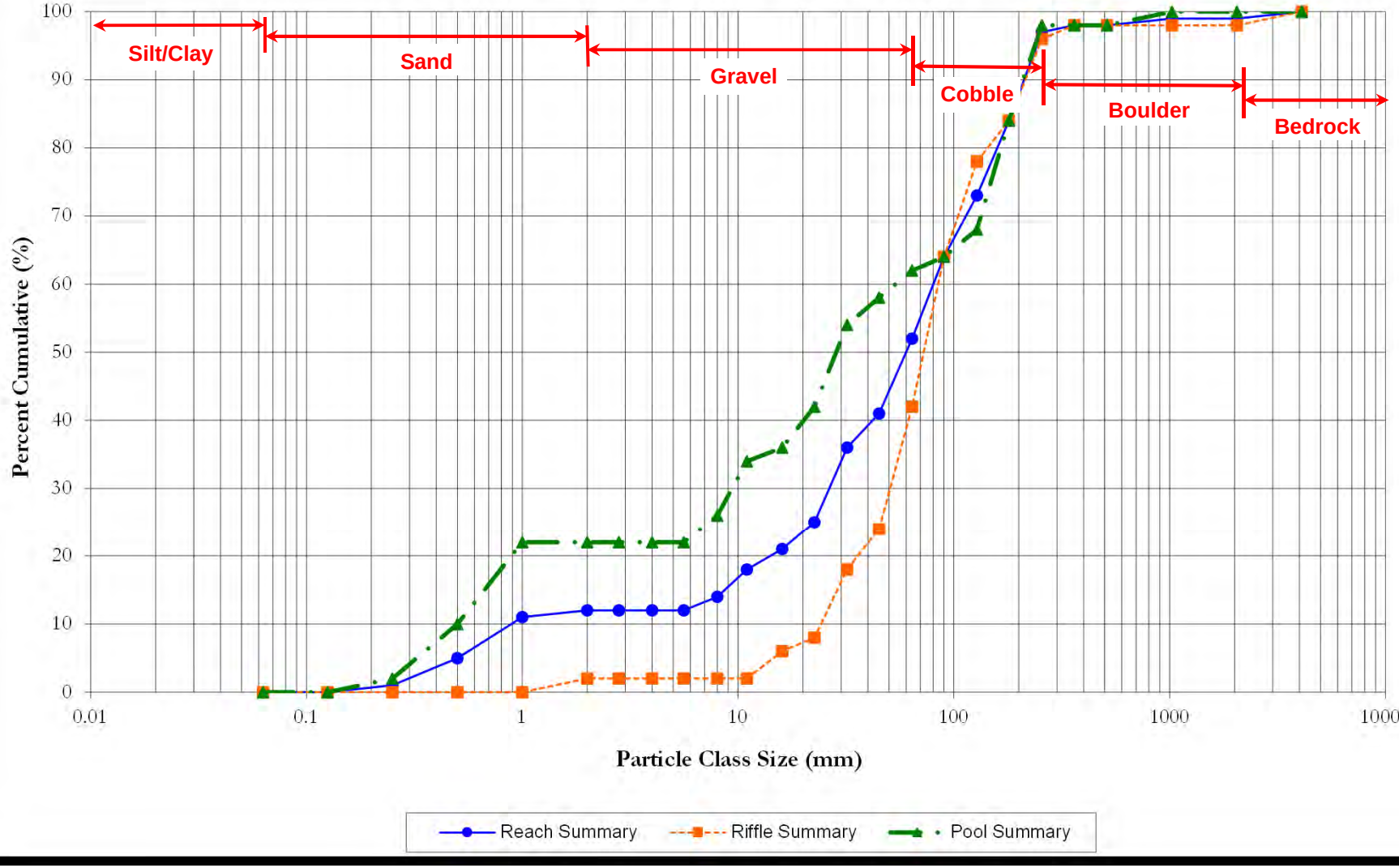
Note:

Distance (ft)	BS (ft)	HI (ft)	FS (ft)	Elevation (ft)	Omit Bkf	Notes
0		2715	9.411	2705.589	☑	XS2 RIFF
30.26		2715	12.143	2702.857	☑	
52.23		2715	13.355	2701.645	☑	
78.8		2715	14.524	2700.476	☑	
81.36		2715	15.634	2699.366	☑	
85.8		2715	15.533	2699.467	☑	
89.86		2715	13.587	2701.413	☑	
104.84		2715	12.468	2702.532	☑	
115.25		2715	13.488	2701.512	☑	
161.69		2715	13.176	2701.824	☑	
206.79		2715	14.301	2700.699	☑	
225.17		2715	14.288	2700.712	☑	
240.75		2715	13.6	2701.4	☐	
248.74		2715	13.635	2701.365	☐	
249.19		2715	13.712	2701.288	☐	XS2 LTB
249.45		2715	17.241	2697.759	☐	XS2 LCH
249.54		2715	16.937	2698.063	☐	XS2 LEW
250.49		2715	17.573	2697.427	☐	
251.99		2715	17.564	2697.436	☐	
252.71		2715	17.356	2697.644	☐	XS2 TWG
254.35		2715	17.381	2697.619	☐	
255.34		2715	16.972	2698.028	☐	
256.03		2715	17.069	2697.931	☐	
257.22		2715	17.193	2697.807	☐	
258.85		2715	17.218	2697.782	☐	XS2 RCH
259.21		2715	16.97	2698.03	☐	XS2 REW
259.64		2715	16.562	2698.438	☐	
261.27		2715	16.348	2698.652	☐	
263.58		2715	15.67	2699.33	☐	
265.18		2715	15.098	2699.902	☐	
267.11		2715	14.934	2700.066	☐	XS2 RBKF
269.73		2715	14.74	2700.26	☐	
270.85		2715	15.029	2699.971	☐	
272.14		2715	14.7	2700.3	☐	
274.94		2715	13.976	2701.024	☑	XS2 RTB
280.67		2715	13.605	2701.395	☑	
286.51		2715	13.137	2701.863	☑	
315.38		2715	12.85	2702.15	☑	
342.6		2715	13.16	2701.84	☑	
345.46		2715	12.478	2702.522	☑	
348.58		2715	12.484	2702.516	☑	
354.63		2715	13.918	2701.082	☑	
360.01		2715	13.465	2701.535	☑	
364.81		2715	12.066	2702.934	☑	
379.89		2715	9.625	2705.375	☑	
					☐	

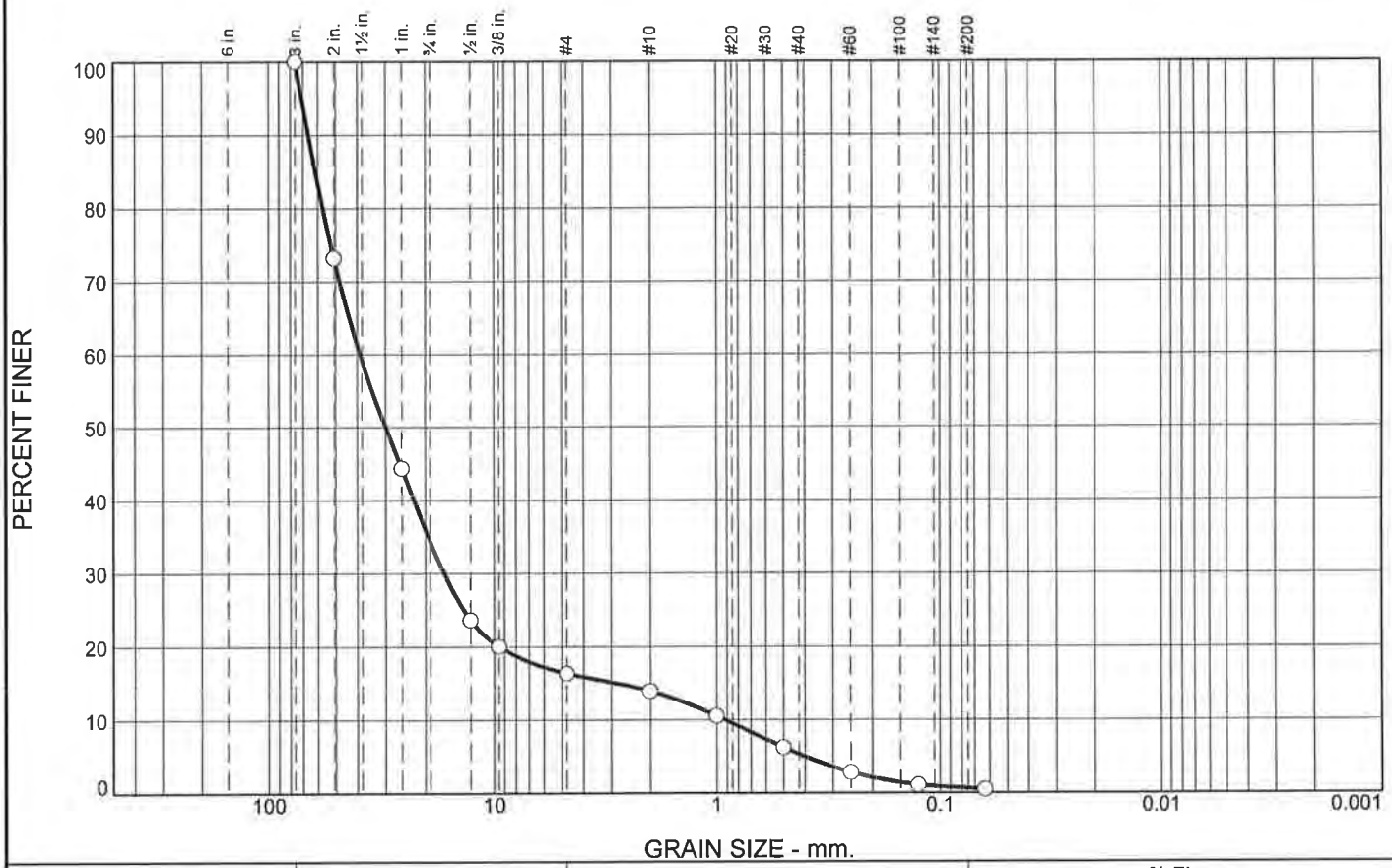
Vile Creek - XS2
Pavement-Subpavement Particle Distribution



Vile Creek - Reach 1
Pebble Count Particle Distribution



Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	65.6	18.1	2.4	8.6	4.7	0.6	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
3	100.0		
2	73.2		
1	44.3		
0.5	23.6		
0.375	20.0		
#4	16.3		
#10	13.9		
#18	10.5		
#35	6.2		
#60	2.8		
#120	1.1		
#230	0.5		

* (no specification provided)

Material Description

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= 66.0930 D_{85}= 61.4138 D_{60}= 38.8335
D_{50}= 29.9055 D_{30}= 16.5449 D_{15}= 2.8773
D_{10}= 0.9203 C_u= 42.20 C_c= 7.66

Classification

USCS= GP AASHTO=

Remarks

S-1: 547.38g @ 4.9" max. diameter
S-2: 157.16g @ 3.10" max. diameter

Location: Reach 1, Bar Sample, IE/RD

Date: 02-23-15

Summit Engineering

Ft. Mill, South Carolina

Client: Wildlands Engineering Inc.
Project: Vile Creek

Project No: SL-262-11 **Figure**

Tested By: Mimi Hourani

GRAIN SIZE DISTRIBUTION TEST DATA

2/23/2015

Client: Wildlands Engineering Inc.
Project: Vile Creek
Project Number: SL-262-11
Location: Reach 1, Bar Sample, IE/RD
Date: 02-23-15
USCS Classification: GP
Testing Remarks: S-1: 547.38g @ 4.9" max. diameter
S-2: 157.16g @ 3.10" max. diameter
Tested by: Mimi Hourani

Sieve Test Data

Dry Sample and Tare (grams)	Tare (grams)	Cumulative Pan Tare Weight (grams)	Sieve Opening Size	Cumulative Weight Retained (grams)	Percent Finer
5903.20	0.00	0.00	3	0.00	100.0
			2	1584.65	73.2
			1	3288.20	44.3
			0.5	4510.10	23.6
			0.375	4721.10	20.0
			#4	4938.70	16.3
			#10	5082.70	13.9
			#18	5283.30	10.5
			#35	5537.20	6.2
			#60	5737.90	2.8
			#120	5838.30	1.1
			#230	5873.70	0.5

Fractional Components

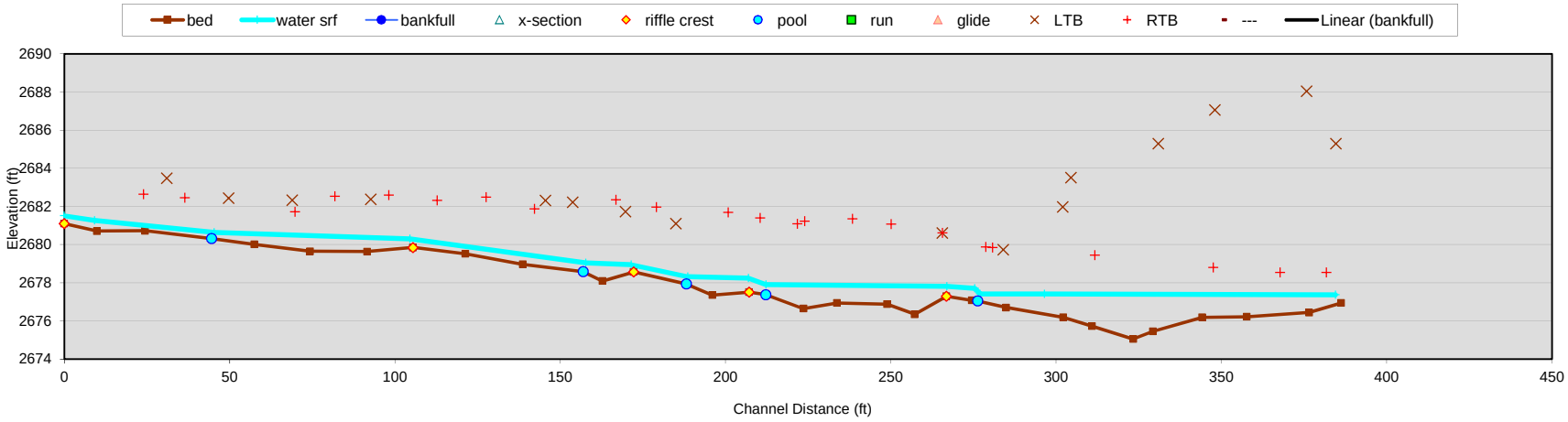
Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	65.6	18.1	83.7	2.4	8.6	4.7	15.7			0.6

D_{10}	D_{15}	D_{20}	D_{30}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
0.9203	2.8773	9.4977	16.5449	29.9055	38.8335	56.8897	61.4138	66.0930	70.9975

Fineness Modulus	C_u	C_c
7.32	42.20	7.66

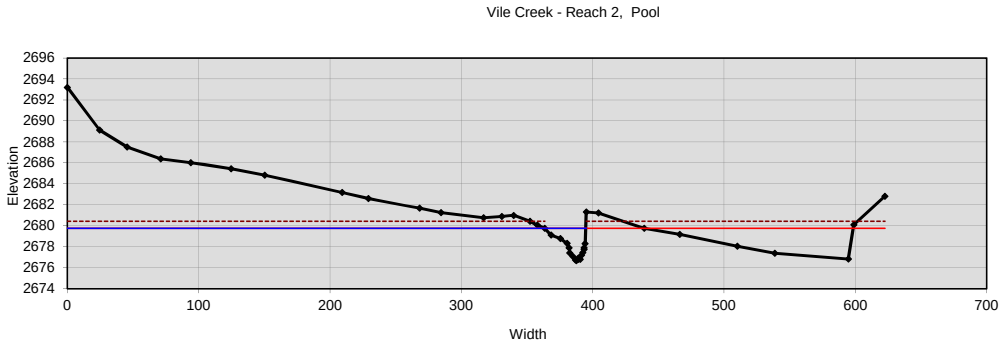
Longitudinal Slope Profile

Vile Creek - Reach 2



	slope (%)		slope ratio		length (ft)		length ratio		pool-pool spacing (ft)		p-p ratio	
reach	11		---		386.3	(17.2 channel widths)	---		---		---	
riffle	2.7	(1.8 - 4)	0.2	(0.2 - 0.4)	25.3	(5 - 51.5)	1.1	(0.2 - 2.3)	---		---	
pool	0.05	(0.02 - 0.07)	0	(0 - 0)	51.6	(15.3 - 108.4)	2.3	(0.7 - 4.8)	57.9	(23.96 - 112.39)	2.6	(1.1 - 5)
	---		---		---		---		---		---	
	---		---		---		---		---		---	

Cross Section 4



Bankfull Dimensions		Flood Dimensions		Materials	
48.0	x-section area (ft.sq.)	189.8	W flood prone area (ft)	---	D50 (mm)
31.0	width (ft)	6.1	entrenchment ratio	---	D84 (mm)
1.5	mean depth (ft)	3.7	low bank height (ft)	493	threshold grain size (mm):
3.1	max depth (ft)	1.2	low bank height ratio		
32.8	wetted parimeter (ft)				
1.5	hyd radi (ft)				
20.0	width-depth ratio				

Bankfull Flow		Flow Resistance		Forces & Power	
---	velocity (ft/s)	---	Manning's roughness	11	channel slope (%)
---	discharge rate (cfs)	---	D'Arcy-Weisbach fric.	10.03	shear stress (lb/sq.ft.)
---	Froude number	---	resistance factor u/u*	2.28	shear velocity (ft/s)
		---	relative roughness	---	unit strm power (lb/ft/s)

Cross Section

reference ID: 4
instrument height: 2715 ---
longitudinal station: --- ---

Bankfull Stage

FS: --- ---
elevation: 2679.75 ---

Low Bank Height

FS: --- ---
elevation: 2680.433

Flood Prone Area

width fpa: 189.8

Channel Slope

percent slope: 11

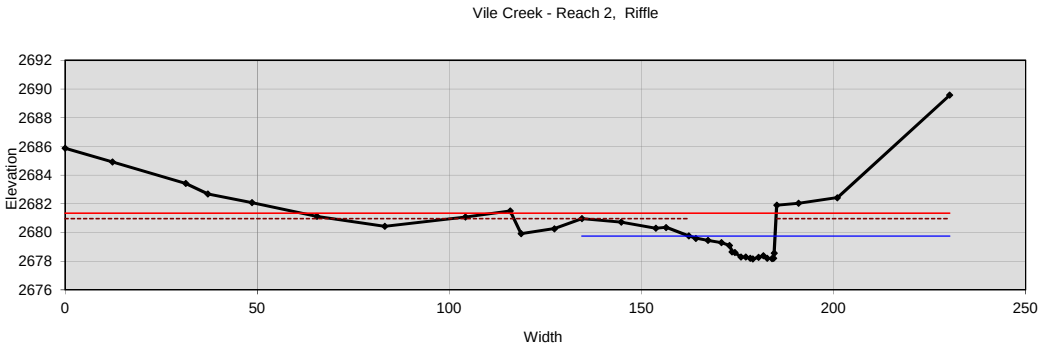
Flow Resistance

Manning's "n": ---
D'Arcy - Weisbach "f": ---

Note:

Distance (ft)	BS (ft)	HI (ft)	FS (ft)	Elevation (ft)	Omit Bkf	Notes
0		2715	21.802	2693.198	☐	XS 4 POOL
24.53		2715	25.888	2689.112	☐	
45.57		2715	27.483	2687.517	☐	
71.13		2715	28.62	2686.38	☐	
94.02		2715	28.986	2686.014	☐	
124.67		2715	29.562	2685.438	☐	
150.21		2715	30.183	2684.817	☐	
209.27		2715	31.83	2683.17	☐	
229.08		2715	32.401	2682.599	☐	
268.27		2715	33.311	2681.689	☐	
284.44		2715	33.755	2681.245	☐	
316.88		2715	34.239	2680.761	☐	
330.72		2715	34.122	2680.878	☐	
339.89		2715	34.007	2680.993	☐	
352.28		2715	34.567	2680.433	☐	XS 4 LTB
357.78		2715	34.943	2680.057	☐	XS 5
363.56		2715	35.246	2679.754	☐	XS 4 LBKF
368.21		2715	35.879	2679.121	☐	
375.36		2715	36.22	2678.78	☐	
380.39		2715	36.678	2678.322	☐	
381.93		2715	37.089	2677.911	☐	XS 4 LEW\LCH
382.44		2715	37.6	2677.4	☐	
385.01		2715	37.927	2677.073	☐	
386.76		2715	38.261	2676.739	☐	
387.61		2715	38.314	2676.686	☐	
388.75		2715	38.106	2676.894	☐	
389.15		2715	38.188	2676.812	☐	XS 4 TWG
390.61		2715	38.216	2676.784	☐	
391.53		2715	37.798	2677.202	☐	
392.46		2715	37.561	2677.439	☐	
393.32		2715	37.266	2677.734	☐	XS 4 RCH
393.43		2715	37.112	2677.888	☐	XS 4 REW
394.12		2715	36.717	2678.283	☐	XS 5
395.04		2715	33.691	2681.309	☐	XS 4 RTB
404.31		2715	33.787	2681.213	☑	
439.11		2715	35.242	2679.758	☑	
466.28		2715	35.827	2679.173	☑	
510.06		2715	36.949	2678.051	☑	
538.66		2715	37.624	2677.376	☑	
594.57		2715	38.171	2676.829	☑	
598.8		2715	34.901	2680.099	☑	
622.39		2715	32.203	2682.797	☑	
					☐	

Cross Section 3



Bankfull Dimensions		Flood Dimensions		Materials	
20.1	x-section area (ft.sq.)	119.1	W flood prone area (ft)	---	D50 (mm)
22.4	width (ft)	5.3	entrenchment ratio	---	D84 (mm)
0.9	mean depth (ft)	2.8	low bank height (ft)	284	threshold grain size (mm):
1.6	max depth (ft)	1.8	low bank height ratio		
23.9	wetted parimeter (ft)				
0.8	hyd radi (ft)				
25.1	width-depth ratio				

Bankfull Flow		Flow Resistance		Forces & Power	
---	velocity (ft/s)	---	Manning's roughness	11	channel slope (%)
---	discharge rate (cfs)	---	D'Arcy-Weisbach fric.	5.78	shear stress (lb/sq.ft.)
---	Froude number	---	resistance factor u/u*	1.73	shear velocity (ft/s)
		---	relative roughness	---	unit strm power (lb/ft/s)

Cross Section

reference ID	3	
instrument height	2715	---
longitudinal station		---

Bankfull Stage

FS		---
elevation	2679.75	---

Low Bank Height

FS		---
elevation	2680.962	

Flood Prone Area

width fpa		119.1

Channel Slope

percent slope		11

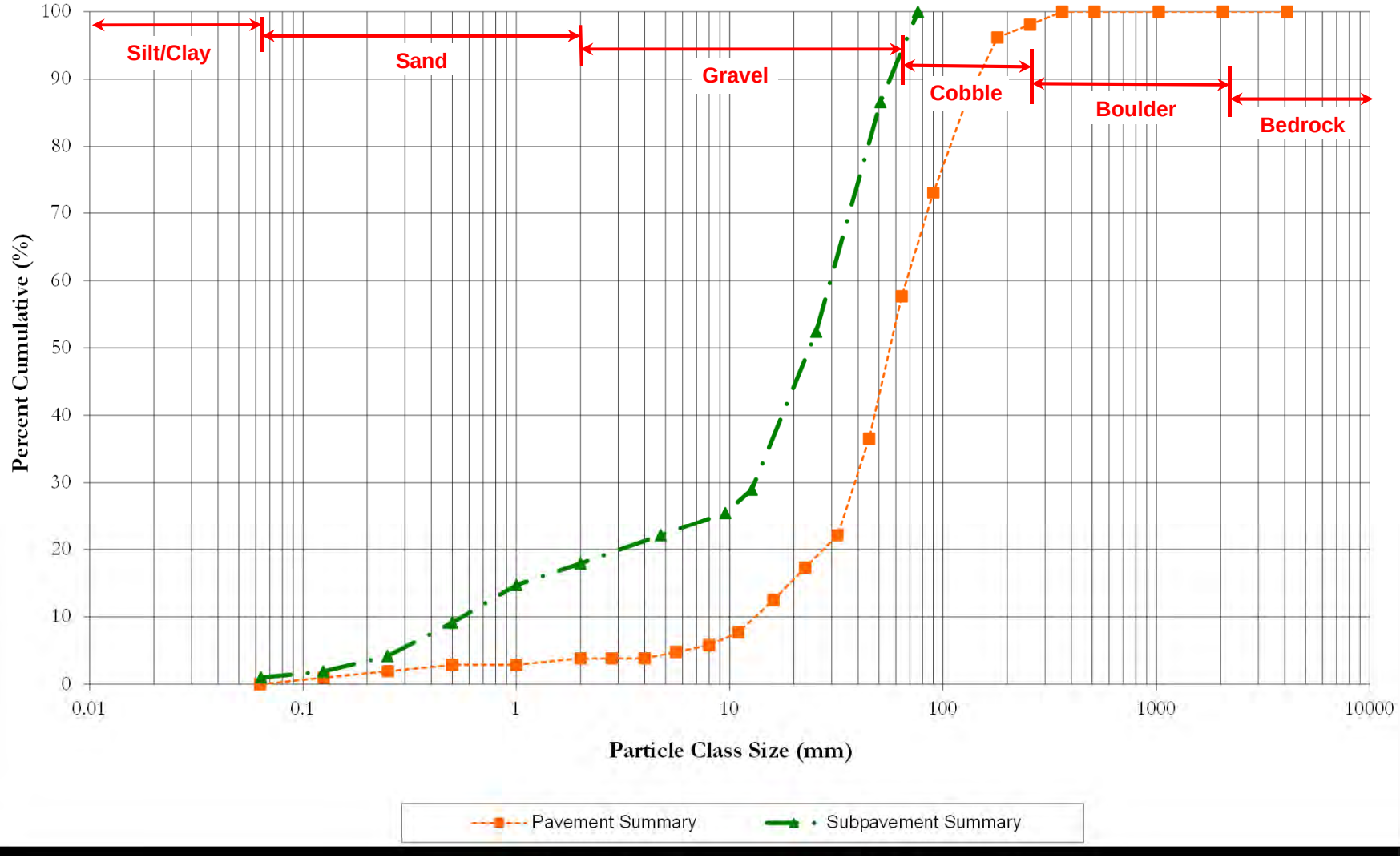
Flow Resistance

Manning's "n"		---
D'Arcy - Weisbach "f"		---

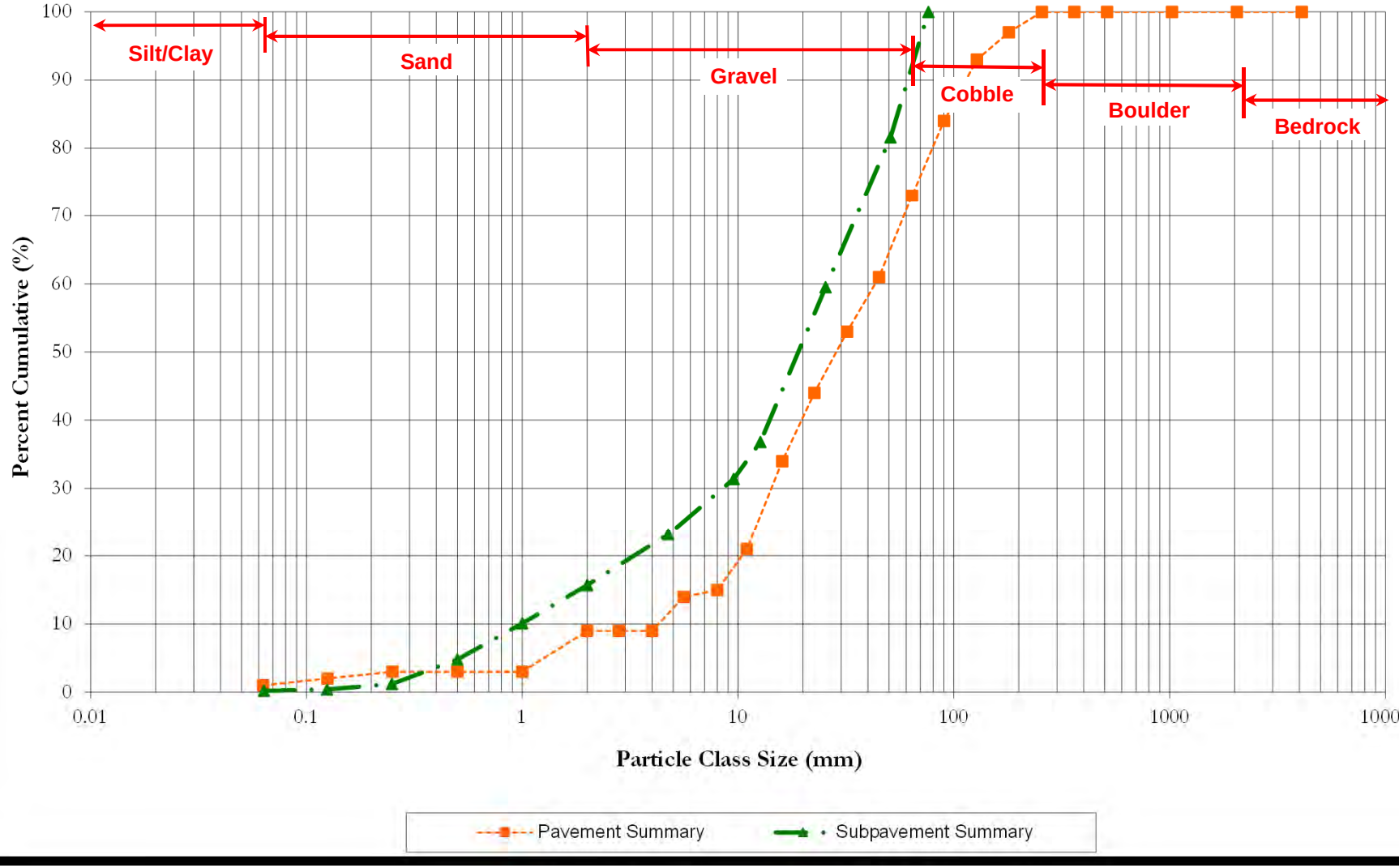
Note:

Distance (ft)	BS (ft)	HI (ft)	FS (ft)	Elevation (ft)	Omit Bkf	Notes
0		2715	29.127	2685.873	☑	XS 3 RIFFLE
12.36		2715	30.08	2684.92	☑	
31.38		2715	31.577	2683.423	☑	
37.17		2715	32.32	2682.68	☑	
48.65		2715	32.912	2682.088	☑	
65.53		2715	33.887	2681.113	☑	
83.2		2715	34.572	2680.428	☑	
104.18		2715	33.92	2681.08	☑	
115.85		2715	33.503	2681.497	☑	
118.68		2715	35.08	2679.92	☑	
127.37		2715	34.738	2680.262	☑	
134.49		2715	34.038	2680.962	☐	
144.77		2715	34.287	2680.713	☐	
153.72		2715	34.699	2680.301	☐	
156.45		2715	34.652	2680.348	☐	XS 3 LTB
162.35		2715	35.248	2679.752	☐	XS 3 LBKF
164.2		2715	35.41	2679.59	☐	
167.34		2715	35.56	2679.44	☐	
170.83		2715	35.718	2679.282	☐	
172.95		2715	35.914	2679.086	☐	
173.58		2715	36.362	2678.638	☐	XS 3 LEW\LCH
174.37		2715	36.393	2678.607	☐	
175.95		2715	36.713	2678.287	☐	
177.15		2715	36.717	2678.283	☐	
178.33		2715	36.801	2678.199	☐	
178.97		2715	36.844	2678.156	☐	XS 3 TWG
180.52		2715	36.742	2678.258	☐	
181.75		2715	36.629	2678.371	☐	
182.75		2715	36.81	2678.19	☐	
183.99		2715	36.822	2678.178	☐	
184.43		2715	36.802	2678.198	☐	XS 3 RCH
184.58		2715	36.441	2678.559	☐	XS 3 REW
185.26		2715	33.105	2681.895	☐	XS 3 RTB
190.92		2715	32.965	2682.035	☐	
201.02		2715	32.575	2682.425	☐	
230.25		2715	25.425	2689.575	☐	
					☐	
					☐	
					☐	
					☐	
					☐	
					☐	
					☐	

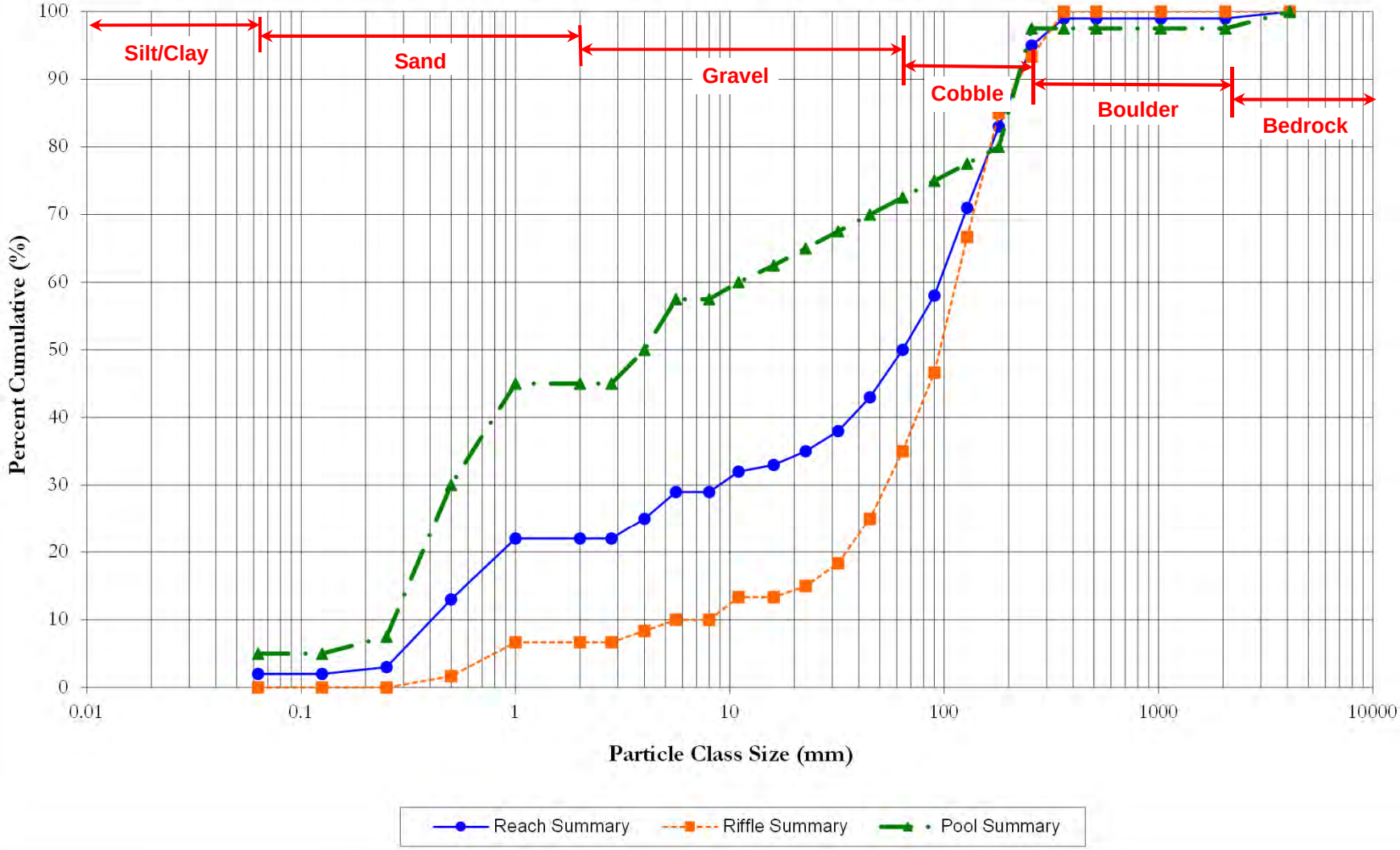
Vile Creek-R2 - XS3
Pavement-Subpavement Particle Distribution



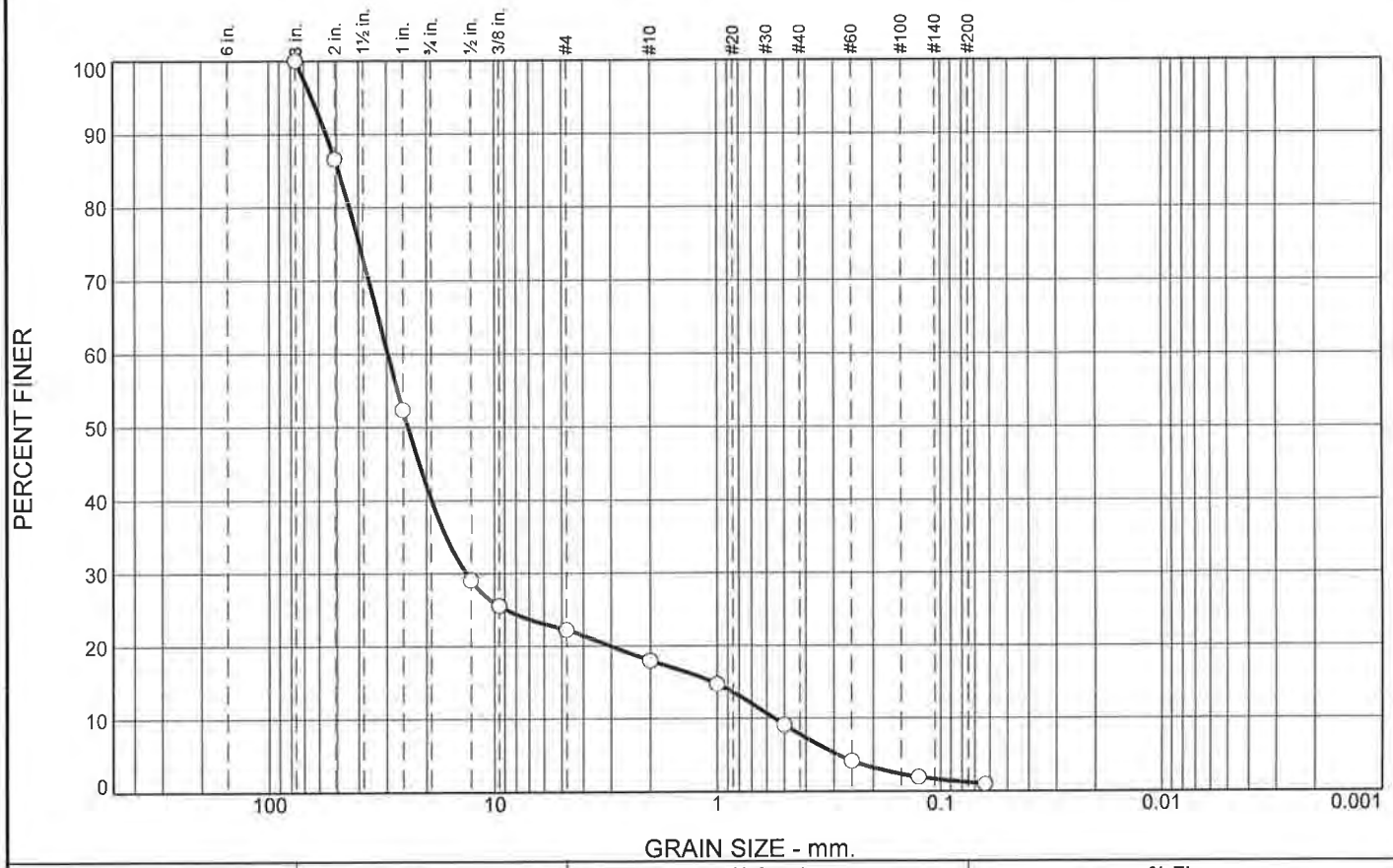
Vile Creek-R2 - XS8
Pavement-Subpavement Particle Distribution



Vile Creek - Reach 2
Pebble Count Particle Distribution



Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	59.8	18.1	4.2	10.1	6.6	1.2	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
3	100.0		
2	86.6		
1	52.4		
0.5	29.0		
0.375	25.5		
#4	22.1		
#10	17.9		
#18	14.7		
#35	9.1		
#60	4.2		
#120	1.9		
#230	1.0		

* (no specification provided)

Material Description

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= 55.5511 D_{85}= 48.9154 D_{60}= 29.6137
D_{50}= 24.1526 D_{30}= 13.3487 D_{15}= 1.0507
D_{10}= 0.5551 C_u= 53.35 C_c= 10.84

Classification

USCS= GP AASHTO=

Remarks

S-1: 325.10g @ 3.38" max. diameter
S-2: 158.18g @ 2.70" max. diameter

Location: Reach 2, Bar Sample, IE/RD

Date: 02-23-15

Summit Engineering

Ft. Mill, South Carolina

Client: Wildlands Engineering Inc.
Project: Vile Creek

Project No: SL-262-11 **Figure**

Tested By: Mimi Hourani

GRAIN SIZE DISTRIBUTION TEST DATA

2/23/2015

Client: Wildlands Engineering Inc.
Project: Vile Creek
Project Number: SL-262-11
Location: Reach 2, Bar Sample, IE/RD
Date: 02-23-15
USCS Classification: GP
Testing Remarks: S-1: 325.10g @ 3.38" max. diameter
S-2: 158.18g @ 2.70" max. diameter
Tested by: Mimi Hourani

Sieve Test Data

Dry Sample and Tare (grams)	Tare (grams)	Cumulative Pan Tare Weight (grams)	Sieve Opening Size	Cumulative Weight Retained (grams)	Percent Finer
4968.00	0.00	0.00	3	0.00	100.0
			2	667.00	86.6
			1	2367.10	52.4
			0.5	3524.90	29.0
			0.375	3699.50	25.5
			#4	3868.60	22.1
			#10	4078.70	17.9
			#18	4237.70	14.7
			#35	4515.90	9.1
			#60	4759.30	4.2
			#120	4873.60	1.9
			#230	4918.30	1.0

Fractional Components

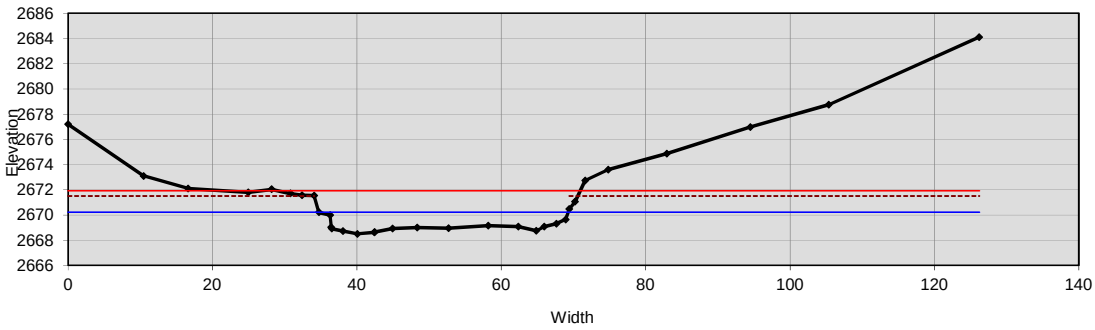
Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	59.8	18.1	77.9	4.2	10.1	6.6	20.9			1.2

D_{10}	D_{15}	D_{20}	D_{30}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
0.5551	1.0507	3.0487	13.3487	24.1526	29.6137	43.7884	48.9154	55.5511	64.4996

Fineness Modulus	C_u	C_c
6.86	53.35	10.84

Cross Section 5

Vile Creek - Reach 3, Riffle



Bankfull Dimensions		Flood Dimensions		Materials	
41.2	x-section area (ft.sq.)	74.0	W flood prone area (ft)	---	D50 (mm)
34.5	width (ft)	2.1	entrenchment ratio	---	D84 (mm)
1.2	mean depth (ft)	3.0	low bank height (ft)	---	threshold grain size (mm):
1.7	max depth (ft)	1.8	low bank height ratio		
35.9	wetted parimeter (ft)				
1.1	hyd radi (ft)				
28.9	width-depth ratio				

Bankfull Flow		Flow Resistance		Forces & Power	
---	velocity (ft/s)	---	Manning's roughness	---	channel slope (%)
---	discharge rate (cfs)	---	D'Arcy-Weisbach fric.	---	shear stress (lb/sq.ft.)
---	Froude number	---	resistance factor u/u*	---	shear velocity (ft/s)
		---	relative roughness	---	unit strm power (lb/ft/s)

Cross Section

reference ID	5	
instrument height	2715	---
longitudinal station		---

Bankfull Stage

FS		---
elevation	2670.21	---

Low Bank Height

FS		---
elevation	2671.5	

Flood Prone Area

width fpa	74	47.0

Channel Slope

percent slope		---

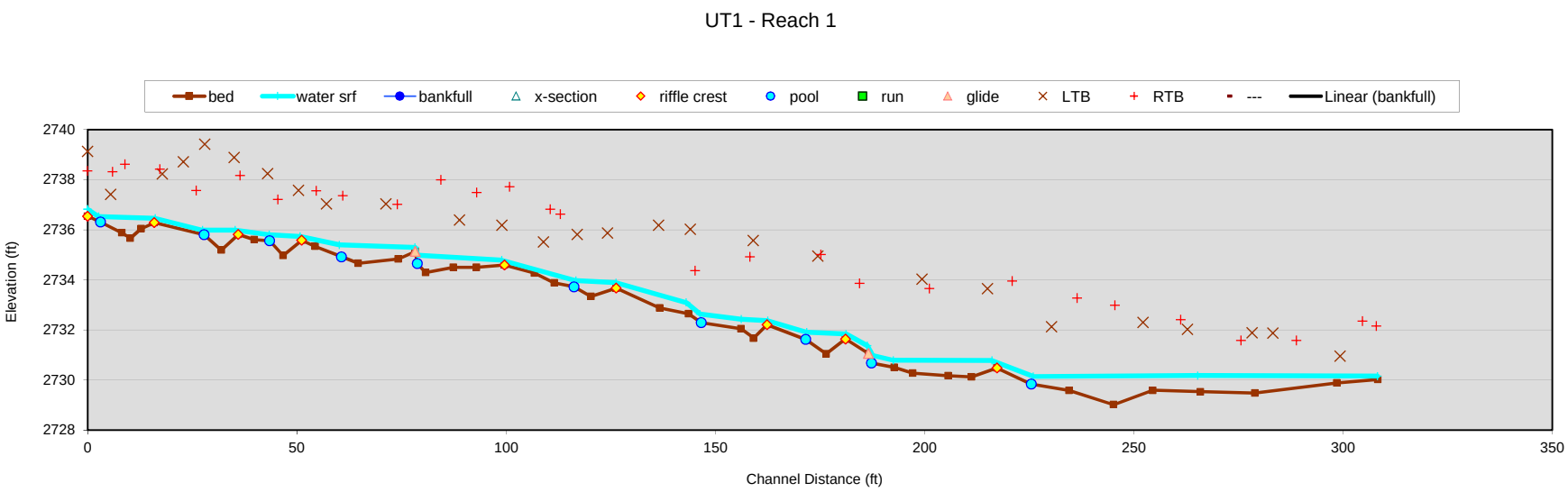
Flow Resistance

Manning's "n"		---
D'Arcy - Weisbach "f"		---

Note:

Distance (ft)	BS (ft)	HI (ft)	FS (ft)	Elevation (ft)	Omit Bkf	Notes
0		2715	37.802	2677.198	☐	XS 5 RIFFLE
10.48		2715	41.908	2673.092	☐	
16.62		2715	42.91	2672.09	☐	
24.95		2715	43.212	2671.788	☐	
28.2		2715	42.966	2672.034	☐	
30.81		2715	43.296	2671.704	☐	
32.39		2715	43.437	2671.563	☐	
34.07		2715	43.462	2671.538	☐	XS 5 LTB\LBKF
34.74		2715	44.792	2670.208	☐	
36.3		2715	45.01	2669.99	☐	
36.45		2715	45.973	2669.027	☐	XS 5 LEW
36.54		2715	46.087	2668.913	☐	XS 5 LCH
38.08		2715	46.283	2668.717	☐	
40.07		2715	46.496	2668.504	☐	XS 5 TWG
42.4		2715	46.377	2668.623	☐	
42.47		2715	46.363	2668.637	☐	
44.95		2715	46.068	2668.932	☐	
48.37		2715	46.007	2668.993	☐	
52.7		2715	46.057	2668.943	☐	
58.19		2715	45.84	2669.16	☐	
62.36		2715	45.92	2669.08	☐	
64.86		2715	46.263	2668.737	☐	
65.96		2715	45.926	2669.074	☐	XS 5 REW
67.64		2715	45.702	2669.298	☐	XS 5 RCH
68.91		2715	45.371	2669.629	☐	
69.43		2715	44.52	2670.48	☐	
70.23		2715	43.936	2671.064	☐	
71.61		2715	42.259	2672.741	☐	XS 5 RTB
74.81		2715	41.415	2673.585	☐	
82.93		2715	40.135	2674.865	☐	
94.52		2715	38.024	2676.976	☐	
105.36		2715	36.249	2678.751	☐	
126.21		2715	30.891	2684.109	☐	
					☐	
					☐	

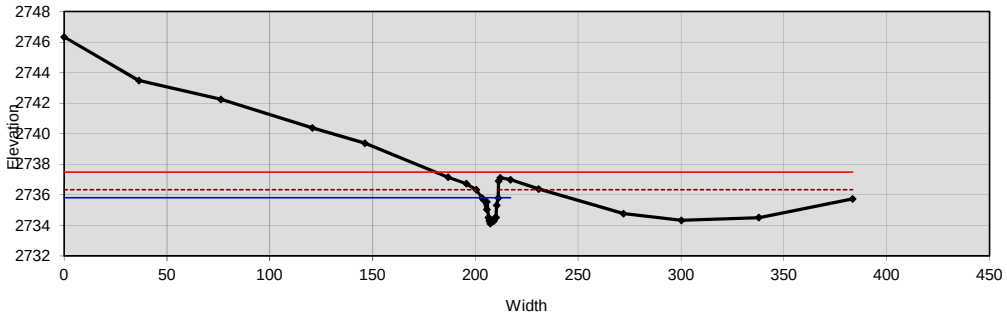
Longitudinal Slope Profile



	slope (%)		slope ratio		length (ft)		length ratio		pool-pool spacing (ft)		p-p ratio	
reach	2.2		---		308.3	(38.9 channel widths)	---		---		---	
riffle	5.84	(2.17 - 11)	2.7	(1 - 5)	10.2	(2.63 - 20.12)	1.3	(0.3 - 2.5)	---		---	
pool	0.702	(0 - 1.59)	0.3	(0 - 0.7)	21.3	(7.39 - 82.24)	2.7	(0.9 - 10.4)	26.1	(14.76 - 39.45)	3.3	(1.9 - 5)
	---		---		---		---		---		---	
glide	81	(54 - 110)	36.8	(24.5 - 50)	0.6	(0.5 - 0.7)	0.1	(0.1 - 0.1)	---		---	

Cross Section 6

UT1 - Reach 1, Riffle



Bankfull Dimensions		Flood Dimensions		Materials	
7.3	x-section area (ft.sq.)	203.0	W flood prone area (ft)	---	D50 (mm)
7.9	width (ft)	25.6	entrenchment ratio	---	D84 (mm)
0.9	mean depth (ft)	2.2	low bank height (ft)	49	threshold grain size (mm):
1.7	max depth (ft)	1.3	low bank height ratio		
10.1	wetted parimeter (ft)				
0.7	hyd radi (ft)				
8.6	width-depth ratio				

Bankfull Flow		Flow Resistance		Forces & Power	
4.0	velocity (ft/s)	0.045	Manning's roughness	2.2	channel slope (%)
29.1	discharge rate (cfs)	0.26	D'Arcy-Weisbach fric.	1.00	shear stress (lb/sq.ft.)
0.82	Froude number	---	resistance factor u/u*	0.72	shear velocity (ft/s)
		---	relative roughness	5	unit strm power (lb/ft/s)

Cross Section

reference ID: 6
instrument height: 2750 ---
longitudinal station: --- ---

Bankfull Stage

FS: --- ---
elevation: 2735.81 ---

Low Bank Height

FS: --- ---
elevation: 2736.33

Flood Prone Area

width fpa: 203 202.9

Channel Slope

percent slope: 2.2 2.2

Flow Resistance

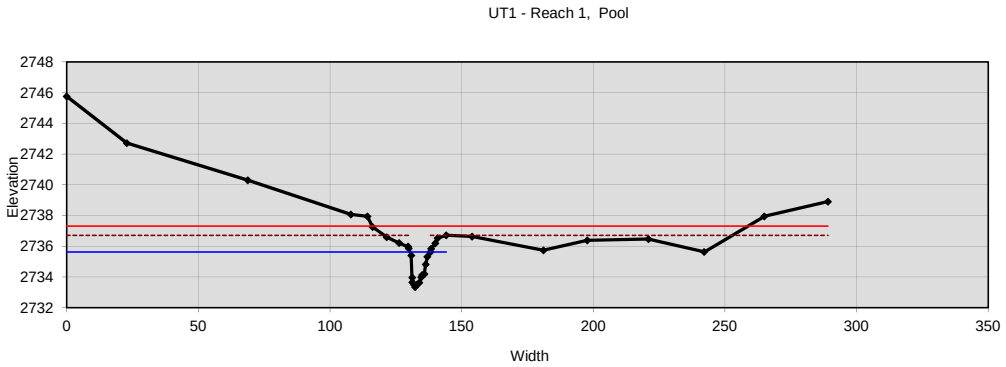
Manning's "n": 0.045 ---
D'Arcy - Weisbach "f": --- ---

Note:

WSF elevation = 2734.45
Height above WSF = 1.35

Distance (ft)	BS (ft)	HI (ft)	FS (ft)	Elevation (ft)	Omit Bkf	Notes
0		2750	3.667	2746.333	☐	XS 6 RIFF
36.41		2750	6.52	2743.48	☐	
76.3		2750	7.759	2742.241	☐	
120.67		2750	9.614	2740.386	☐	
146.33		2750	10.628	2739.372	☐	
186.68		2750	12.841	2737.159	☐	
195.53		2750	13.261	2736.739	☐	
200.49		2750	13.661	2736.339	☐	LTB
203.19		2750	14.195	2735.805	☐	LBKF
204.11		2750	14.355	2735.645	☐	
205.53		2750	14.96	2735.04	☐	
205.57		2750	14.45	2735.55	☐	
206.34		2750	15.483	2734.517	☐	LCH
206.75		2750	15.702	2734.298	☐	
206.76		2750	15.554	2734.446	☐	LEW
207.22		2750	15.876	2734.124	☐	TWG
207.94		2750	15.754	2734.246	☐	
208.98		2750	15.71	2734.29	☐	
209.62		2750	15.509	2734.491	☐	REW
210.01		2750	15.478	2734.522	☐	RCH
210.34		2750	14.686	2735.314	☐	
211.09		2750	14.211	2735.789	☐	
211.27		2750	13.105	2736.895	☐	RTB
212.01		2750	12.883	2737.117	☐	
217.05		2750	13.005	2736.995	☐	
230.77		2750	13.619	2736.381	☑	
271.97		2750	15.227	2734.773	☑	
300.13		2750	15.663	2734.337	☑	
337.86		2750	15.489	2734.511	☑	
383.44		2750	14.259	2735.741	☑	
					☐	

Cross Section 7



Bankfull Dimensions		Flood Dimensions		Materials	
10.3	x-section area (ft.sq.)	142.5	W flood prone area (ft)	---	D50 (mm)
7.8	width (ft)	18.3	entrenchment ratio	---	D84 (mm)
1.3	mean depth (ft)	3.4	low bank height (ft)	67	threshold grain size (mm):
2.3	max depth (ft)	1.5	low bank height ratio		
10.4	wetted parimeter (ft)				
1.0	hyd radi (ft)				
5.9	width-depth ratio				

Bankfull Flow		Flow Resistance		Forces & Power	
---	velocity (ft/s)	---	Manning's roughness	2.2	channel slope (%)
---	discharge rate (cfs)	---	D'Arcy-Weisbach fric.	1.36	shear stress (lb/sq.ft.)
---	Froude number	---	resistance factor u/u*	0.84	shear velocity (ft/s)
		---	relative roughness	---	unit strm power (lb/ft/s)

Cross Section

reference ID: 7
instrument height: 2750 ---
longitudinal station: ---

Bankfull Stage

FS: ---
elevation: 2735.62 ---

Low Bank Height

FS: ---
elevation: 2736.7

Flood Prone Area

width fpa: 142.5

Channel Slope

percent slope: 2.2

Flow Resistance

Manning's "n": ---
D'Arcy - Weisbach "f": ---

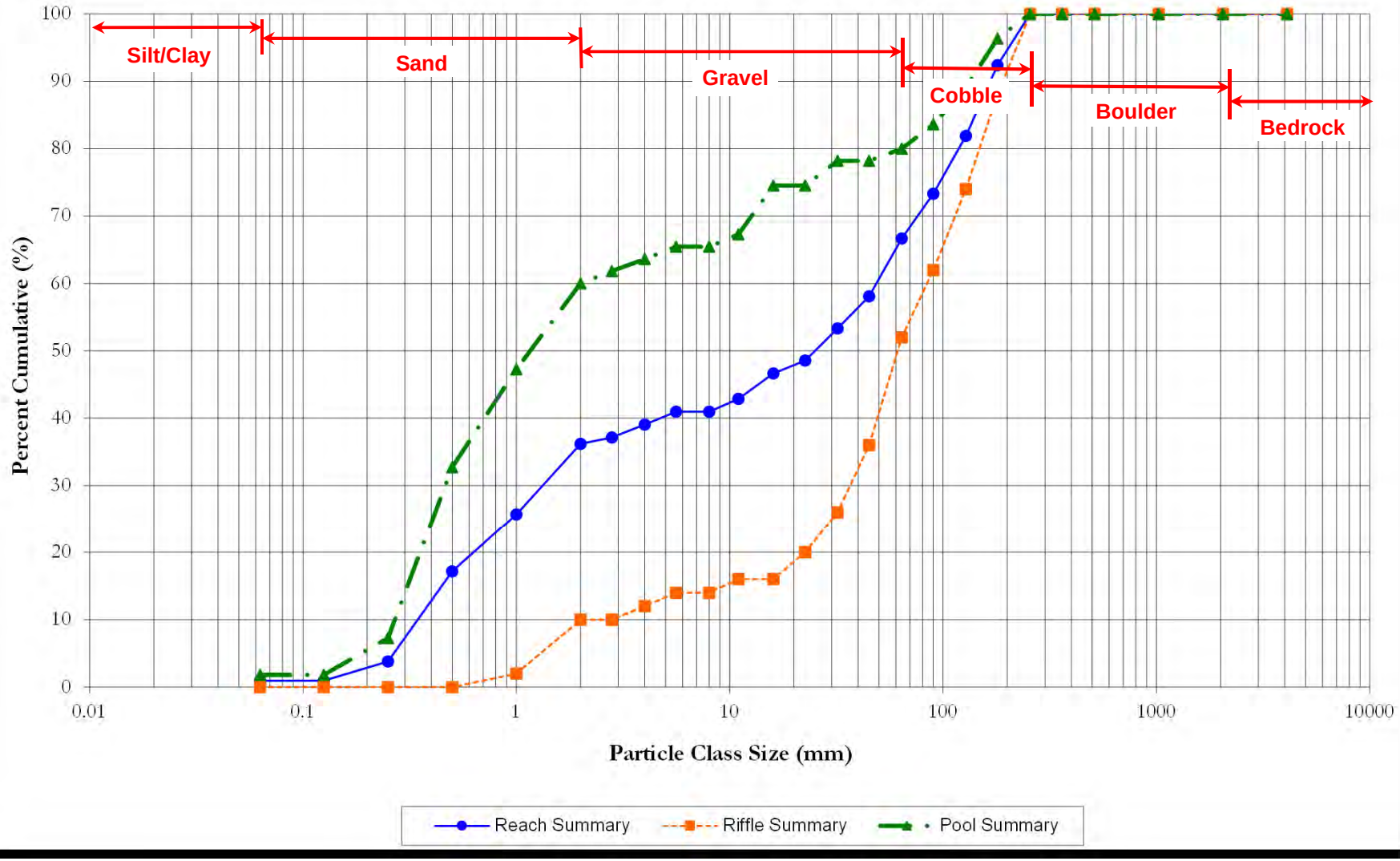
Note:

WSF elevation = 2733.96
Height above WSF = 1.64

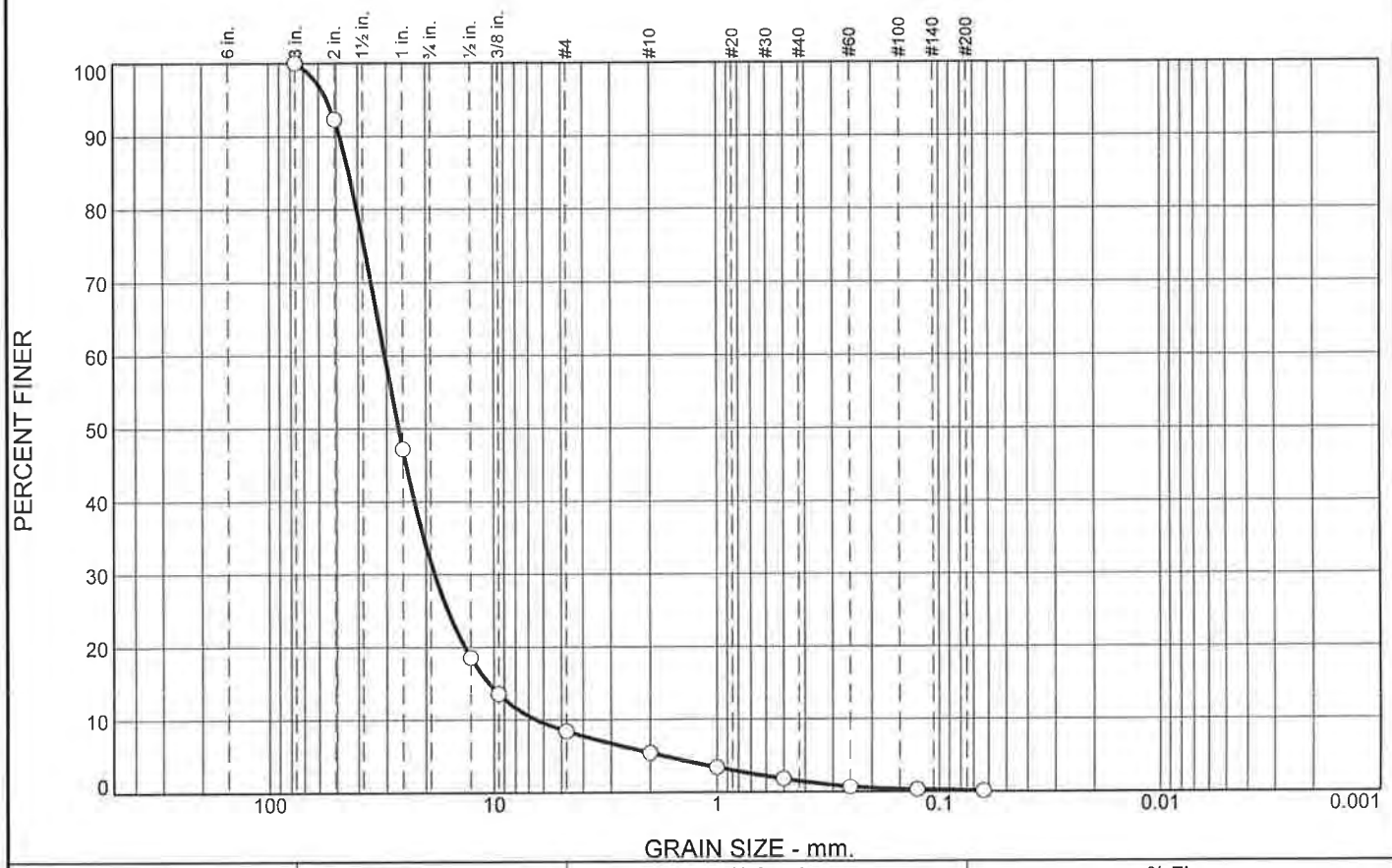
Distance (ft)	BS (ft)	HI (ft)	FS (ft)	Elevation (ft)	Omit Bkf	Notes
0		2750	4.243	2745.757	☐	XS 7 POOL
22.84		2750	7.294	2742.706	☐	
68.76		2750	9.707	2740.293	☐	
107.95		2750	11.928	2738.072	☐	
114.19		2750	12.066	2737.934	☐	
116.21		2750	12.744	2737.256	☐	
121.58		2750	13.412	2736.588	☐	
126.26		2750	13.795	2736.205	☐	
129.62		2750	14.029	2735.971	☐	
129.95		2750	14.146	2735.854	☐	LTB
130.89		2750	14.604	2735.396	☐	
131.22		2750	16.348	2733.652	☐	LCH
131.22		2750	16.045	2733.955	☐	LEW
131.93		2750	16.526	2733.474	☐	
132.37		2750	16.668	2733.332	☐	TWG
133.04		2750	16.501	2733.499	☐	
133.92		2750	16.383	2733.617	☐	
134.69		2750	16.025	2733.975	☐	REW
135.07		2750	15.88	2734.12	☐	
135.81		2750	15.807	2734.193	☐	RCH
136.33		2750	15.19	2734.81	☐	
137.02		2750	14.682	2735.318	☐	
138.21		2750	14.38	2735.62	☐	RBKF
138.48		2750	14.173	2735.827	☐	
140		2750	13.812	2736.188	☐	
140.9		2750	13.483	2736.517	☐	RTB
144.11		2750	13.282	2736.718	☐	
153.93		2750	13.372	2736.628	☑	
181.07		2750	14.277	2735.723	☑	
197.69		2750	13.627	2736.373	☑	
220.94		2750	13.535	2736.465	☑	
242.14		2750	14.366	2735.634	☑	
264.88		2750	12.053	2737.947	☑	
289.06		2750	11.109	2738.891	☑	
					☐	
					☐	

Vile Creek-UT1-R1 - XS6
Pavement-Subpavement Particle Distribution

Vile Creek-UT1-R1
Pebble Count Particle Distribution



Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	68.3	23.3	3.0	3.9	1.4	0.1	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
3	100.0		
2	92.3		
1	47.2		
0.5	18.5		
0.375	13.5		
#4	8.4		
#10	5.4		
#18	3.4		
#35	1.8		
#60	0.7		
#120	0.3		
#230	0.1		

* (no specification provided)

Material Description

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= 48.1852 D_{85}= 43.8223 D_{60}= 30.5322
D_{50}= 26.5117 D_{30}= 18.2991 D_{15}= 10.5440
D_{10}= 6.5237 C_u= 4.68 C_c= 1.68

Classification

USCS= GW AASHTO=

Remarks

Location: UT-1, Reach 1, XS-6 Riffle Subpave

Date: 02-23-15

Summit Engineering

Ft. Mill, South Carolina

Client: Wildlands Engineering Inc.
Project: Vile Creek
Project No: SL-262-11 **Figure**

Tested By: Mimi Hourani

GRAIN SIZE DISTRIBUTION TEST DATA

2/23/2015

Client: Wildlands Engineering Inc.
Project: Vile Creek
Project Number: SL-262-11
Location: UT-1, Reach 1, XS-6 Riffle Subpave
Date: 02-23-15
USCS Classification: GW
Tested by: Mimi Hourani

Sieve Test Data

Dry Sample and Tare (grams)	Tare (grams)	Cumulative Pan Tare Weight (grams)	Sieve Opening Size	Cumulative Weight Retained (grams)	Percent Finer
2370.00	0.00	0.00	3	0.00	100.0
			2	182.90	92.3
			1	1251.90	47.2
			0.5	1930.70	18.5
			0.375	2049.20	13.5
			#4	2170.40	8.4
			#10	2242.00	5.4
			#18	2289.40	3.4
			#35	2327.30	1.8
			#60	2353.40	0.7
			#120	2362.90	0.3
			#230	2367.60	0.1

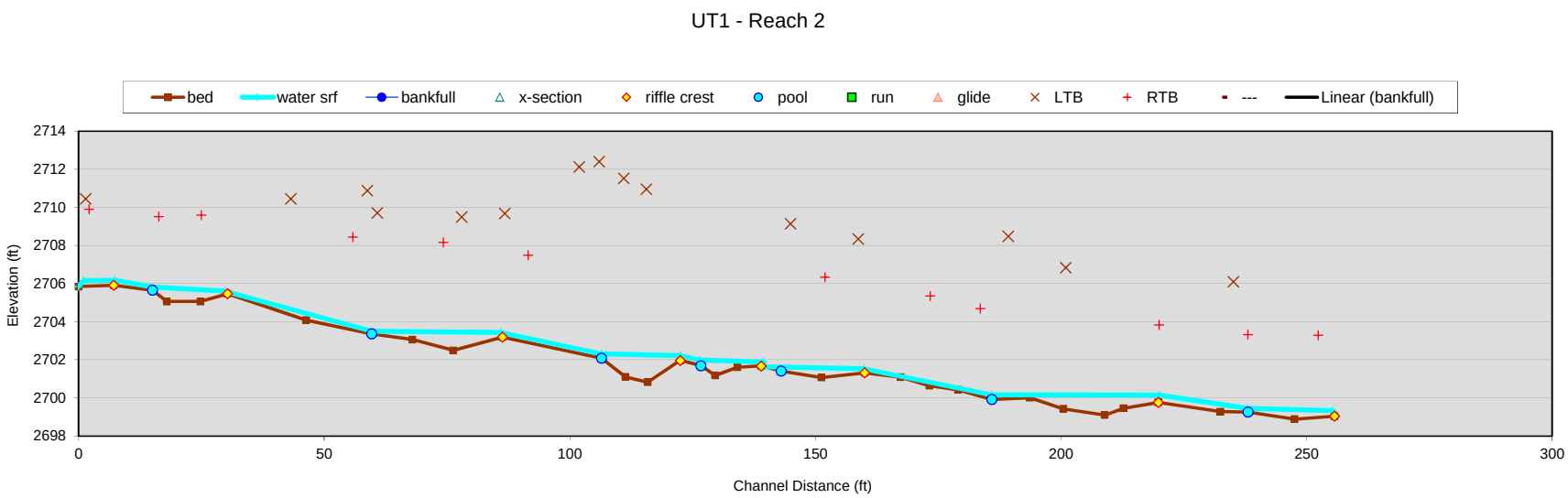
Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	68.3	23.3	91.6	3.0	3.9	1.4	8.3			0.1

D_{10}	D_{15}	D_{20}	D_{30}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
6.5237	10.5440	13.5035	18.2991	26.5117	30.5322	40.4142	43.8223	48.1852	55.0645

Fineness Modulus	C_u	C_c
7.57	4.68	1.68

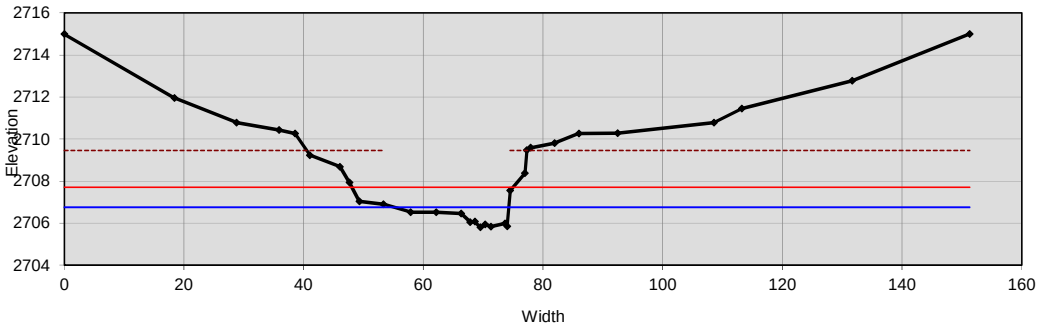
Longitudinal Slope Profile



	slope (%)		slope ratio		length (ft)		length ratio		pool-pool spacing (ft)		p-p ratio	
reach	2.8		---		255.7	(13.3 channel widths)	---		---		---	
riffle	5.3	(2.8 - 11)	1.9	(1 - 3.9)	15.7	(4.1 - 29.4)	0.8	(0.2 - 1.5)	---		---	
pool	0	(0 - 1.6)	0	(0 - 0.6)	19.8	(12.3 - 33.9)	1	(0.6 - 1.8)	37.2	(16.35 - 52.18)	1.9	(0.9 - 2.7)
	---		---		---		---		---		---	
	---		---		---		---		---		---	

Cross Section 8

UT1 - Reach 2, Riffle



Bankfull Dimensions		Flood Dimensions		Materials	
8.4	x-section area (ft.sq.)	28.3	W flood prone area (ft)	---	D50 (mm)
19.2	width (ft)	1.5	entrenchment ratio	---	D84 (mm)
0.4	mean depth (ft)	3.6	low bank height (ft)	36	threshold grain size (mm):
0.9	max depth (ft)	3.8	low bank height ratio		
20.0	wetted parimeter (ft)				
0.4	hyd radi (ft)				
43.9	width-depth ratio				

Bankfull Flow		Flow Resistance		Forces & Power	
---	velocity (ft/s)	---	Manning's roughness	2.8	channel slope (%)
---	discharge rate (cfs)	---	D'Arcy-Weisbach fric.	0.73	shear stress (lb/sq.ft.)
---	Froude number	---	resistance factor u/u*	0.61	shear velocity (ft/s)
		---	relative roughness	---	unit strm power (lb/ft/s)

Cross Section

reference ID	8	
instrument height	2720	---
longitudinal station		---

Bankfull Stage

FS		---
elevation	2706.75	---

Low Bank Height

FS		---
elevation	2709.45	

Flood Prone Area

width fpa	28.3	26.9

Channel Slope

percent slope		2.8

Flow Resistance

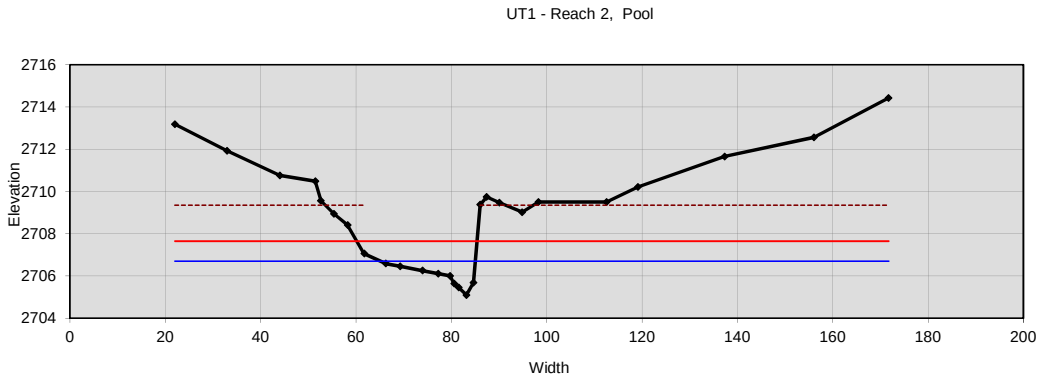
Manning's "n"		---
D'Arcy - Weisbach "f"		---

Note:

WSF Elevation = 2706.07
BKF Height above WSF = 0.83

Distance (ft)	BS (ft)	HI (ft)	FS (ft)	Elevation (ft)	Omit Bkf	Notes
0		2720	5.008	2714.992	☐	XS8 RIFFL
18.4		2720	8.041	2711.959	☐	
28.79		2720	9.219	2710.781	☐	
35.88		2720	9.565	2710.435	☐	
38.55		2720	9.732	2710.268	☐	LTB
41.03		2720	10.768	2709.232	☐	
46.06		2720	11.323	2708.677	☐	
47.63		2720	12.063	2707.937	☐	
49.3		2720	12.963	2707.037	☐	
53.31		2720	13.098	2706.902	☐	LBKF
57.88		2720	13.485	2706.515	☐	
62.14		2720	13.478	2706.522	☐	
66.3		2720	13.539	2706.461	☐	
67.82		2720	13.956	2706.044	☐	LCH
68.61		2720	13.932	2706.068	☐	LEW
69.51		2720	14.198	2705.802	☐	
70.3		2720	14.06	2705.94	☐	
71.29		2720	14.165	2705.835	☐	TWG
73.64		2720	14.016	2705.984	☐	REW
74		2720	14.154	2705.846	☐	RCH
74.52		2720	12.448	2707.552	☐	
76.96		2720	11.626	2708.374	☐	
77.28		2720	10.525	2709.475	☐	
77.9		2720	10.415	2709.585	☐	RTB
81.95		2720	10.189	2709.811	☐	
85.99		2720	9.741	2710.259	☐	
92.44		2720	9.727	2710.273	☐	
108.54		2720	9.221	2710.779	☐	
113.23		2720	8.544	2711.456	☐	
131.68		2720	7.223	2712.777	☐	
151.31		2720	5.001	2714.999	☐	
					☐	
					☐	

Cross Section 9



Bankfull Dimensions		Flood Dimensions		Materials	
11.8	x-section area (ft.sq.)	25.2	W flood prone area (ft)	---	D50 (mm)
19.9	width (ft)	1.3	entrenchment ratio	---	D84 (mm)
0.6	mean depth (ft)	4.3	low bank height (ft)	49	threshold grain size (mm):
1.6	max depth (ft)	2.7	low bank height ratio		
20.8	wetted parimeter (ft)				
0.6	hyd radi (ft)				
33.5	width-depth ratio				

Bankfull Flow		Flow Resistance		Forces & Power	
---	velocity (ft/s)	---	Manning's roughness	2.8	channel slope (%)
---	discharge rate (cfs)	---	D'Arcy-Weisbach fric.	0.99	shear stress (lb/sq.ft.)
---	Froude number	---	resistance factor u/u*	0.71	shear velocity (ft/s)
		---	relative roughness	---	unit strm power (lb/ft/s)

Cross Section

reference ID	9	
instrument height	2715	---
longitudinal station		---

Bankfull Stage

FS		---
elevation	2706.7	---

Low Bank Height

FS		---
elevation	2709.35	

Flood Prone Area

width fpa		25.2

Channel Slope

percent slope		2.8

Flow Resistance

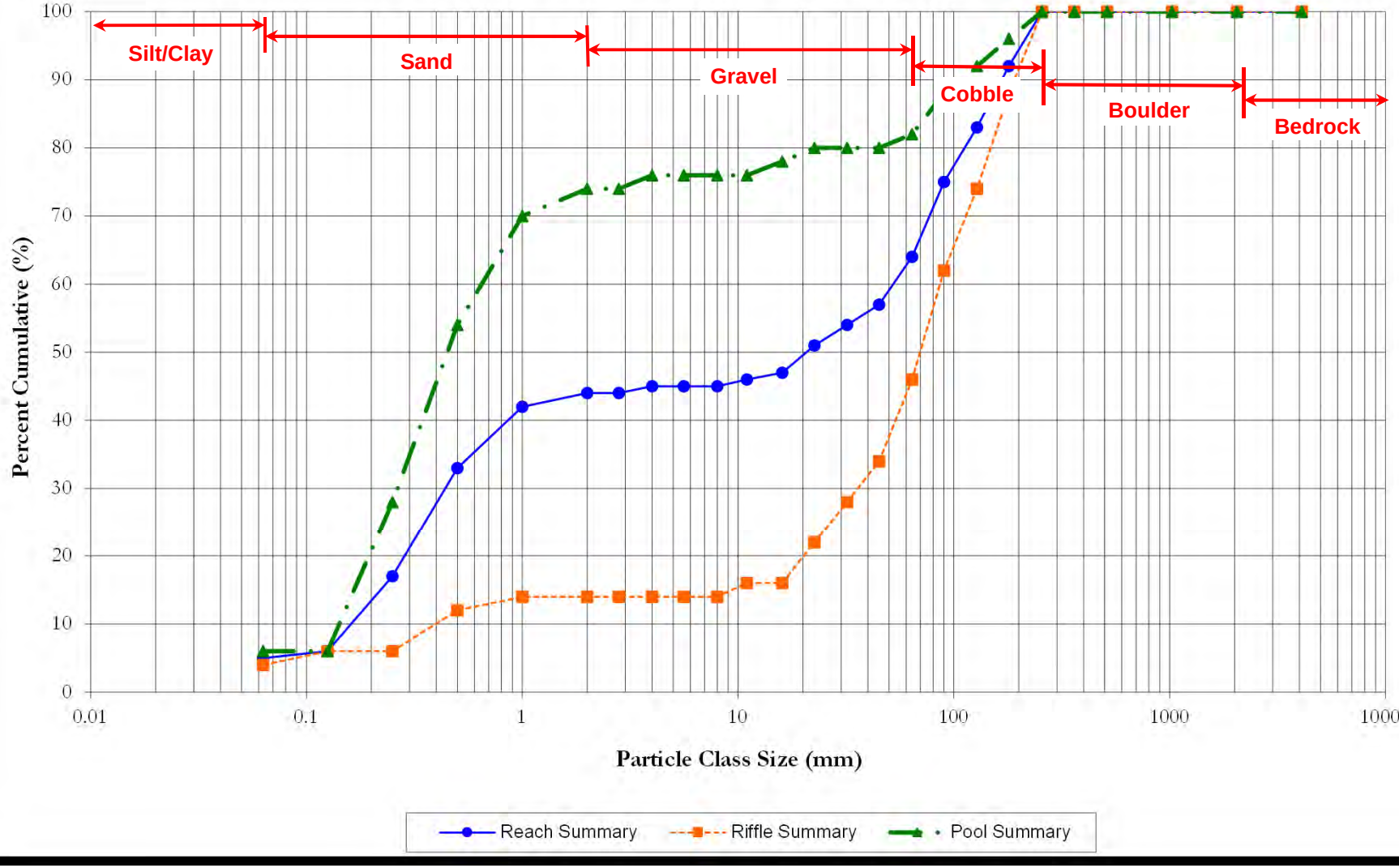
Manning's "n"		---
D'Arcy - Weisbach "f"		---

Note:

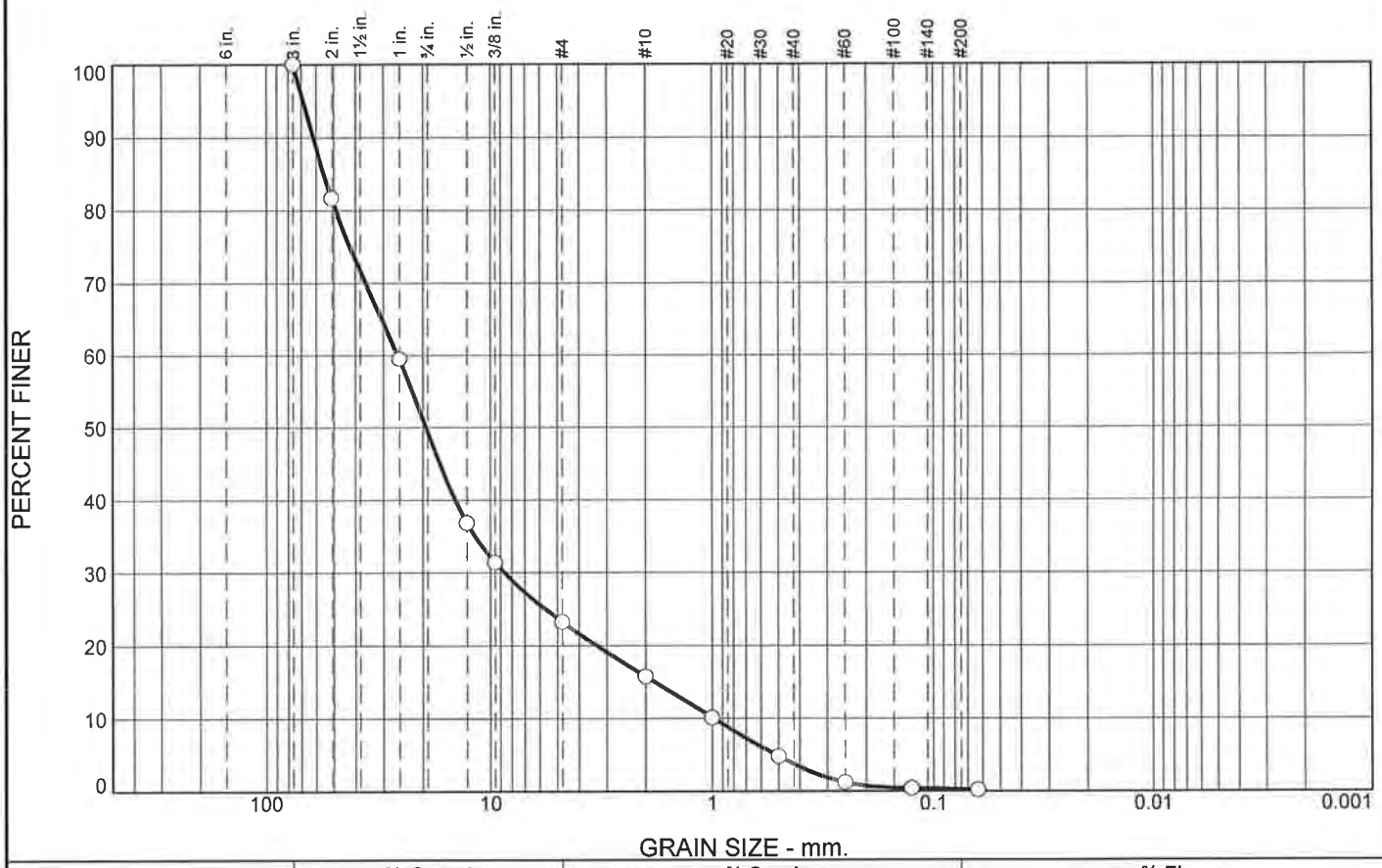
WSF Elevation = 2705.64
BKF Height above WSF = .96

Distance (ft)	BS (ft)	HI (ft)	FS (ft)	Elevation (ft)	Omit Bkf	Notes
22.01		2715	1.814	2713.186	☐	XS9 POOL
32.94		2715	3.067	2711.933	☐	
44.05		2715	4.235	2710.765	☐	
51.44		2715	4.512	2710.488	☐	LTB
52.62		2715	5.435	2709.565	☐	
55.38		2715	6.062	2708.938	☐	
58.22		2715	6.588	2708.412	☐	
61.71		2715	7.945	2707.055	☐	
66.25		2715	8.414	2706.586	☐	LBKF
69.27		2715	8.538	2706.462	☐	
73.96		2715	8.747	2706.253	☐	
77.26		2715	8.897	2706.103	☐	
79.75		2715	8.993	2706.007	☐	
80.57		2715	9.36	2705.64	☐	LEW\LCH
81.54		2715	9.55	2705.45	☐	
83.18		2715	9.901	2705.099	☐	TWG
84.61		2715	9.322	2705.678	☐	REW\RCH
86.02		2715	5.615	2709.385	☐	
87.4		2715	5.259	2709.741	☐	RTB
90.09		2715	5.532	2709.468	☐	
94.82		2715	5.978	2709.022	☐	
98.24		2715	5.502	2709.498	☐	
112.53		2715	5.503	2709.497	☐	
119.14		2715	4.785	2710.215	☐	
137.33		2715	3.34	2711.66	☐	
156.07		2715	2.439	2712.561	☐	
171.72		2715	0.568	2714.432	☐	
					☐	
					☐	
					☐	
					☐	
					☐	
					☐	

Vile Creek-UT1-R2
Pebble Count Particle Distribution



Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	50.6	26.2	7.5	12.0	3.4	0.3	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
3	100.0		
2	81.6		
1	59.5		
0.5	36.8		
0.375	31.4		
#4	23.2		
#10	15.7		
#18	10.1		
#35	4.8		
#60	1.2		
#120	0.4		
#230	0.2		

* (no specification provided)

Material Description

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= 61.7141 D_{85}= 55.1270 D_{60}= 25.8330
D_{50}= 19.3548 D_{30}= 8.6552 D_{15}= 1.8354
D_{10}= 0.9876 C_u= 26.16 C_c= 2.94

Classification

USCS= GW AASHTO=

Remarks

Location: UT-1, Reach 2, XS-8 Riffle Subpave, IE/RD

Date: 02-23-15

Summit Engineering

Ft. Mill, South Carolina

Client: Wildlands Engineering Inc.
Project: Vile Creek
Project No: SL-262-11 **Figure**

Tested By: Mimi Hourani

GRAIN SIZE DISTRIBUTION TEST DATA

2/23/2015

Client: Wildlands Engineering Inc.
Project: Vile Creek
Project Number: SL-262-11
Location: UT-1, Reach 2, XS-8 Riffle Subpave, IE/RD
Date: 02-23-15
USCS Classification: GW
Tested by: Mimi Hourani

Sieve Test Data

Dry Sample and Tare (grams)	Tare (grams)	Cumulative Pan Tare Weight (grams)	Sieve Opening Size	Cumulative Weight Retained (grams)	Percent Finer
3141.60	0.00	0.00	3	0.00	100.0
			2	576.50	81.6
			1	1273.90	59.5
			0.5	1986.40	36.8
			0.375	2155.50	31.4
			#4	2412.70	23.2
			#10	2648.40	15.7
			#18	2824.30	10.1
			#35	2990.80	4.8
			#60	3103.90	1.2
			#120	3129.00	0.4
			#230	3135.30	0.2

Fractional Components

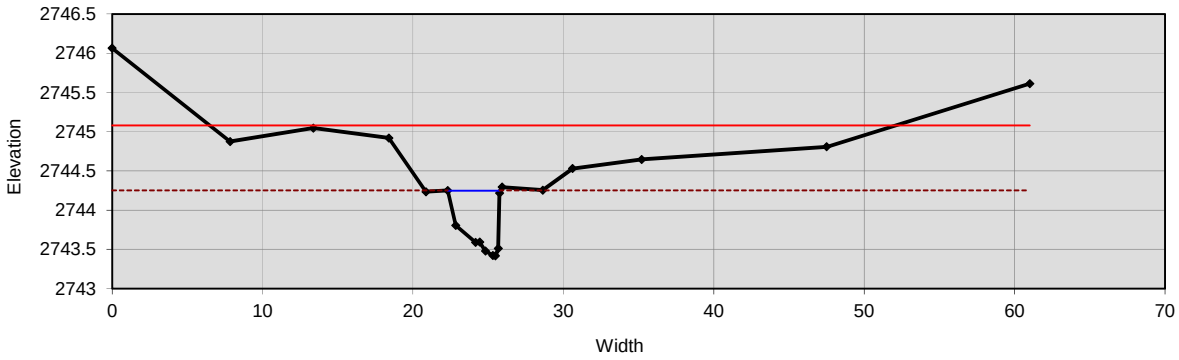
Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	50.6	26.2	76.8	7.5	12.0	3.4	22.9			0.3

D_{10}	D_{15}	D_{20}	D_{30}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
0.9876	1.8354	3.3438	8.6552	19.3548	25.8330	48.6639	55.1270	61.7141	68.6672

Fineness Modulus	C_u	C_c
6.87	26.16	2.94

Cross Section 10

UT1B, Riffle



Bankfull Dimensions		Flood Dimensions		Materials	
2.0	x-section area (ft.sq.)	45.6	W flood prone area (ft)	---	D50 (mm)
3.5	width (ft)	13.2	entrenchment ratio	---	D84 (mm)
0.6	mean depth (ft)	0.8	low bank height (ft)	---	threshold grain size (mm):
0.8	max depth (ft)	1.0	low bank height ratio		
4.3	wetted parimeter (ft)				
0.5	hyd radi (ft)				
5.9	width-depth ratio				

Bankfull Flow		Flow Resistance		Forces & Power	
---	velocity (ft/s)	---	Manning's roughness	---	channel slope (%)
---	discharge rate (cfs)	---	D'Arcy-Weisbach fric.	---	shear stress (lb/sq.ft.)
---	Froude number	---	resistance factor u/u*	---	shear velocity (ft/s)
		---	relative roughness	---	unit strm power (lb/ft/s)

Cross Section

reference ID	10	
instrument height	2750	---
longitudinal station		---

Bankfull Stage

FS		---
elevation	2744.25	---

Low Bank Height

FS	5.748	= 2744.252 elev
elevation		

Flood Prone Area

width fpa		45.6

Channel Slope

percent slope		---

Flow Resistance

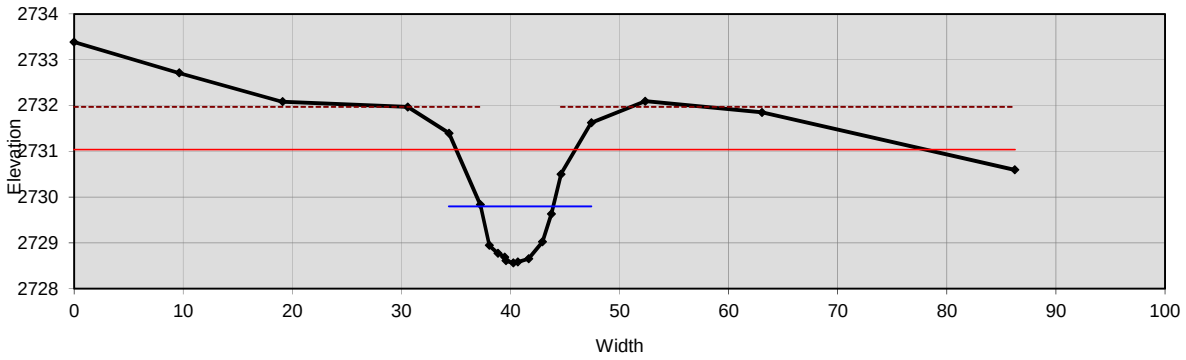
Manning's "n"		---
D'Arcy - Weisbach "f"		---

Note:

Distance (ft)	BS (ft)	HI (ft)	FS (ft)	Elevation (ft)	Omit Bkf	Notes
0		2750	3.936	2746.064	☑	XS 10 RIF
7.84		2750	5.124	2744.876	☑	
13.37		2750	4.954	2745.046	☑	
18.39		2750	5.082	2744.918	☑	
20.86		2750	5.766	2744.234	☑	
22.3		2750	5.748	2744.252	☐	LTB
22.84		2750	6.192	2743.808	☐	
24.17		2750	6.409	2743.591	☐	LCH
24.44		2750	6.407	2743.593	☐	LEW
24.82		2750	6.518	2743.482	☐	
25.3		2750	6.577	2743.423	☐	TWG
25.49		2750	6.579	2743.421	☐	RCH
25.67		2750	6.487	2743.513	☐	REW
25.76		2750	5.782	2744.218	☐	
25.93		2750	5.706	2744.294	☑	RTB
28.62		2750	5.744	2744.256	☑	
30.61		2750	5.47	2744.53	☑	
35.21		2750	5.353	2744.647	☑	
47.49		2750	5.193	2744.807	☑	
61		2750	4.389	2745.611	☑	
					☐	
					☐	
					☐	
					☐	
					☐	
					☐	
					☐	
					☐	

Cross Section 11

UT1C, Riffle



Bankfull Dimensions		Flood Dimensions		Materials	
6.0	x-section area (ft.sq.)	13.0	W flood prone area (ft)	---	D50 (mm)
6.6	width (ft)	2.0	entrenchment ratio	---	D84 (mm)
0.9	mean depth (ft)	3.4	low bank height (ft)	---	threshold grain size (mm):
1.2	max depth (ft)	2.8	low bank height ratio		
7.4	wetted parimeter (ft)				
0.8	hyd radi (ft)				
7.4	width-depth ratio				

Bankfull Flow		Flow Resistance		Forces & Power	
---	velocity (ft/s)	---	Manning's roughness	---	channel slope (%)
---	discharge rate (cfs)	---	D'Arcy-Weisbach fric.	---	shear stress (lb/sq.ft.)
---	Froude number	---	resistance factor u/u*	---	shear velocity (ft/s)
		---	relative roughness	---	unit strm power (lb/ft/s)

Cross Section

reference ID	11	
instrument height	2740	---
longitudinal station		---

Bankfull Stage

FS		---
elevation	2729.8	---

Low Bank Height

FS	8.03	= 2731.97 elev
elevation		

Flood Prone Area

width fpa	13	19.1

Channel Slope

percent slope		---

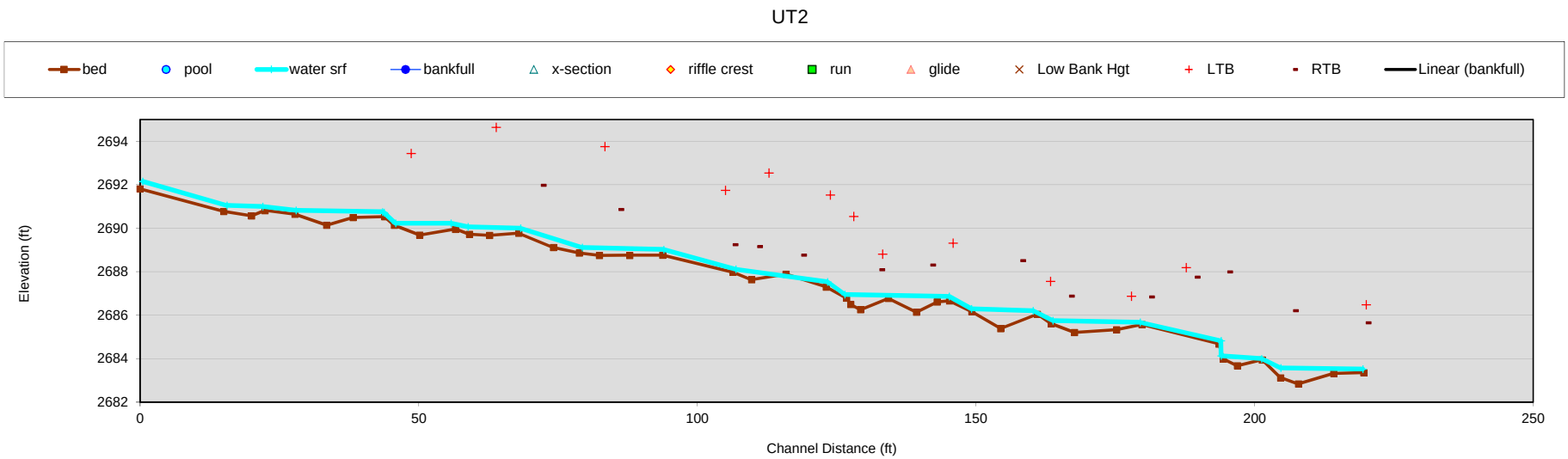
Flow Resistance

Manning's "n"		---
D'Arcy - Weisbach "f"		---

Note:

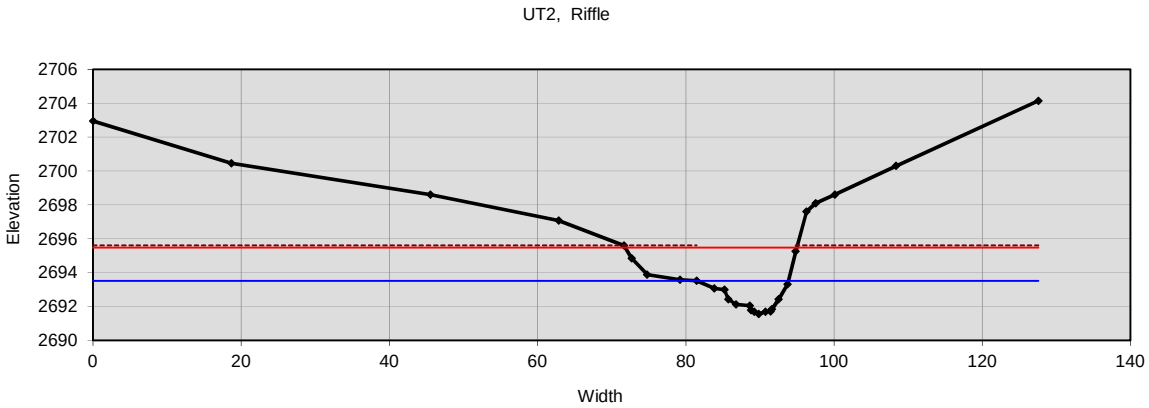
Distance (ft)	BS (ft)	HI (ft)	FS (ft)	Elevation (ft)	Omit Bkf	Notes
0		2740	6.613	2733.387	☑	XS 11 LTE
9.63		2740	7.287	2732.713	☑	
19.11		2740	7.916	2732.084	☑	
30.57		2740	8.03	2731.97	☑	
34.36		2740	8.605	2731.395	☐	LTB
37.25		2740	10.167	2729.833	☐	
38.06		2740	11.054	2728.946	☐	
38.86		2740	11.223	2728.777	☐	
39.46		2740	11.307	2728.693	☐	LCH
39.58		2740	11.389	2728.611	☐	LEW
40.25		2740	11.438	2728.562	☐	TWG
40.66		2740	11.417	2728.583	☐	REW
41.67		2740	11.342	2728.658	☐	RCH
42.94		2740	10.976	2729.024	☐	
43.74		2740	10.365	2729.635	☐	
44.63		2740	9.497	2730.503	☐	
47.41		2740	8.372	2731.628	☐	RTB
52.35		2740	7.908	2732.092	☑	
63.05		2740	8.152	2731.848	☑	
86.23		2740	9.404	2730.596	☑	
					☐	
					☐	
					☐	
					☐	
					☐	
					☐	
					☐	
					☐	

Longitudinal Slope Profile



	slope (%)		slope ratio		length (ft)		length ratio	pool-pool spacing (ft)		p-p ratio
reach	3.9		---		220.0		---	---		---
riffle	8.4	(3 - 14)	2.2	(0.8 - 3.6)	8.2	(3.1 - 15.1)	---	---		---
pool	0.64	(0 - 0.8)	0.2	(0 - 0.2)	12.3	(6.4 - 18.7)	---	21.0	(10.68 - 47.12)	---
run	#N/A		---		5.6	(0 - 19.6)	---	---		---
	---		---		---		---	---		---

Cross Section 12



Bankfull Dimensions		Flood Dimensions		Materials	
13.1	x-section area (ft.sq.)	23.1	W flood prone area (ft)	---	D50 (mm)
12.4	width (ft)	1.9	entrenchment ratio	---	D84 (mm)
1.1	mean depth (ft)	4.0	low bank height (ft)	---	threshold grain size (mm):
2.0	max depth (ft)	2.1	low bank height ratio		
13.5	wetted parimeter (ft)				
1.0	hyd radi (ft)				
11.7	width-depth ratio				

Bankfull Flow		Flow Resistance		Forces & Power	
---	velocity (ft/s)	---	Manning's roughness	---	channel slope (%)
---	discharge rate (cfs)	---	D'Arcy-Weisbach fric.	---	shear stress (lb/sq.ft.)
---	Froude number	---	resistance factor u/u*	---	shear velocity (ft/s)
		---	relative roughness	---	unit strm power (lb/ft/s)

Cross Section

reference ID	12	
instrument height	2705	---
longitudinal station		---

Bankfull Stage

FS		---
elevation	2693.52	---

Low Bank Height

FS		---
elevation	2695.61	

Flood Prone Area

width fpa	23.1	23.1

Channel Slope

percent slope		---

Flow Resistance

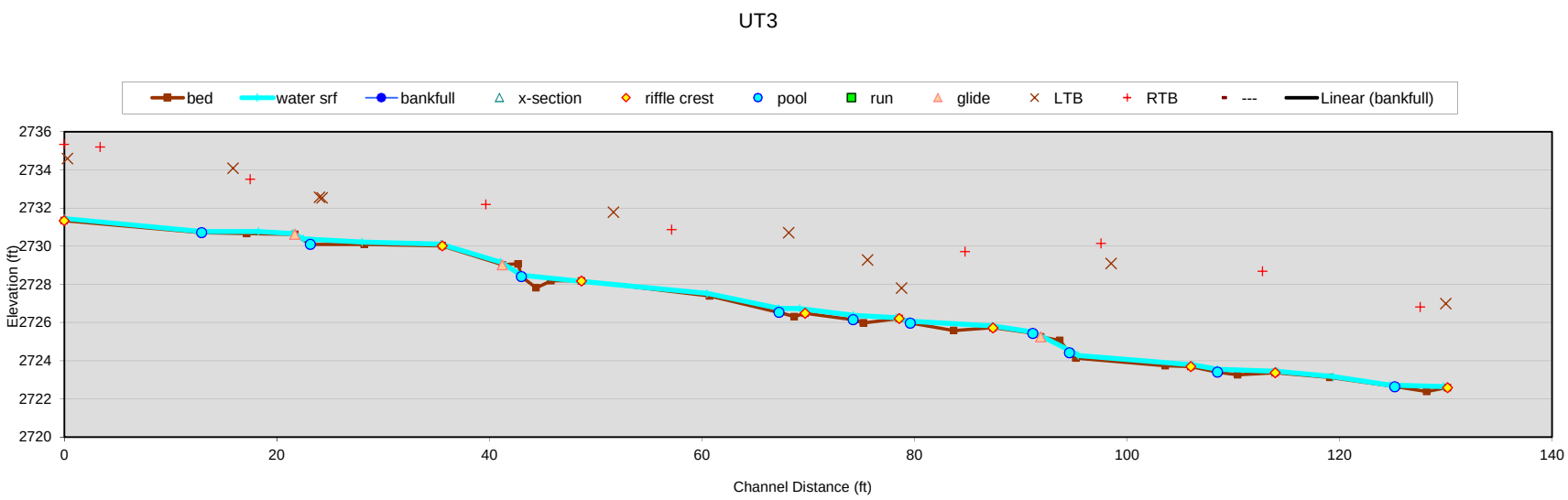
Manning's "n"		---
D'Arcy - Weisbach "f"		---

Note:

Distance (ft)	BS (ft)	HI (ft)	FS (ft)	Elevation (ft)	Omit Bkf	Notes
0		2705	2.054	2702.946	☐	XS 12 RIFF
18.65		2705	4.547	2700.453	☐	
45.53		2705	6.393	2698.607	☐	
62.84		2705	7.927	2697.073	☐	
71.64		2705	9.387	2695.613	☐	LTB
72.69		2705	10.155	2694.845	☐	
74.78		2705	11.109	2693.891	☐	
79.19		2705	11.418	2693.582	☐	
81.44		2705	11.478	2693.522	☐	LBKF
83.85		2705	11.931	2693.069	☐	
85.21		2705	12.002	2692.998	☐	
85.72		2705	12.568	2692.432	☐	
86.78		2705	12.877	2692.123	☐	
88.62		2705	12.938	2692.062	☐	
88.79		2705	13.216	2691.784	☐	LEW
89.25		2705	13.299	2691.701	☐	
89.84		2705	13.439	2691.561	☐	TWG
90.74		2705	13.31	2691.69	☐	
91.42		2705	13.288	2691.712	☐	RCH
91.61		2705	13.161	2691.839	☐	REW
92.52		2705	12.562	2692.438	☐	
93.71		2705	11.69	2693.31	☐	
94.81		2705	9.738	2695.262	☐	
96.28		2705	7.395	2697.605	☐	
97.5		2705	6.904	2698.096	☐	RTB
100.11		2705	6.394	2698.606	☐	
108.36		2705	4.701	2700.299	☐	
127.58		2705	0.85	2704.15	☐	
					☐	
					☐	

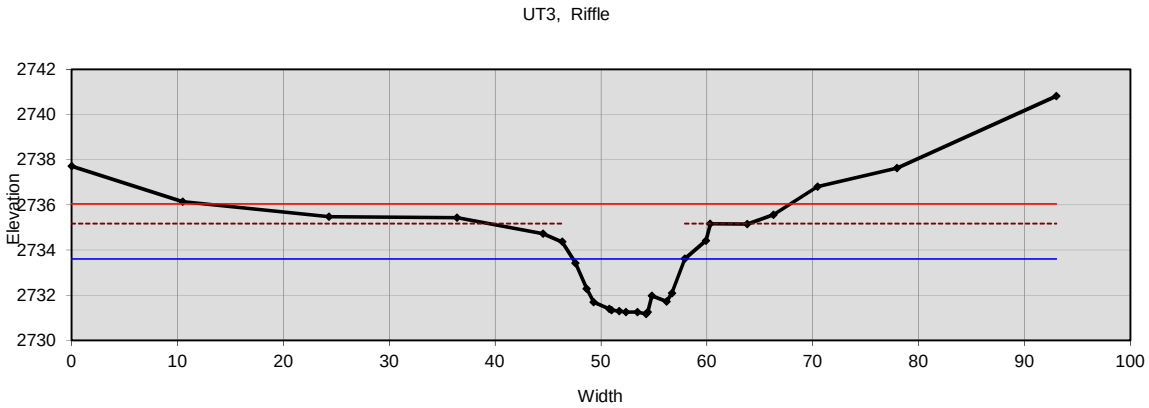
Vile Creek - UT2
Pebble Count Particle Distribution

Longitudinal Slope Profile



	slope (%)		slope ratio	length (ft)		length ratio		pool-pool spacing (ft)		p-p ratio	
reach	---		---	130.2	(12.3 channel widths)	---		---		---	
riffle	11	(4.9 - 22)	---	7.5	(1.1 - 18.6)	0.7	(0.1 - 1.8)	---		---	
pool	3	(0 - 6.9)	---	6.4	(0.7 - 12.4)	0.6	(0.1 - 1.2)	12.5	(3.45 - 24.25)	1.2	(0.3 - 2.3)
	---		---	---		---		---		---	
glide	33	(31 - 35)	---	2.0	(1.5 - 2.7)	0.2	(0.1 - 0.3)	---		---	

Cross Section 13



Bankfull Dimensions		Flood Dimensions		Materials	
18.4	x-section area (ft.sq.)	55.2	W flood prone area (ft)	---	D50 (mm)
10.6	width (ft)	5.2	entrenchment ratio	---	D84 (mm)
1.7	mean depth (ft)	4.0	low bank height (ft)	---	threshold grain size (mm):
2.4	max depth (ft)	1.6	low bank height ratio		
12.7	wetted parimeter (ft)				
1.4	hyd radi (ft)				
6.1	width-depth ratio				

Bankfull Flow		Flow Resistance		Forces & Power	
---	velocity (ft/s)	---	Manning's roughness	---	channel slope (%)
---	discharge rate (cfs)	---	D'Arcy-Weisbach fric.	---	shear stress (lb/sq.ft.)
---	Froude number	---	resistance factor u/u*	---	shear velocity (ft/s)
		---	relative roughness	---	unit strm power (lb/ft/s)

Cross Section

reference ID	13	
instrument height	2741	---
longitudinal station		---

Bankfull Stage

FS		---
elevation	2733.61	---

Low Bank Height

FS		---
elevation	2735.17	

Flood Prone Area

width fpa		55.2

Channel Slope

percent slope		---

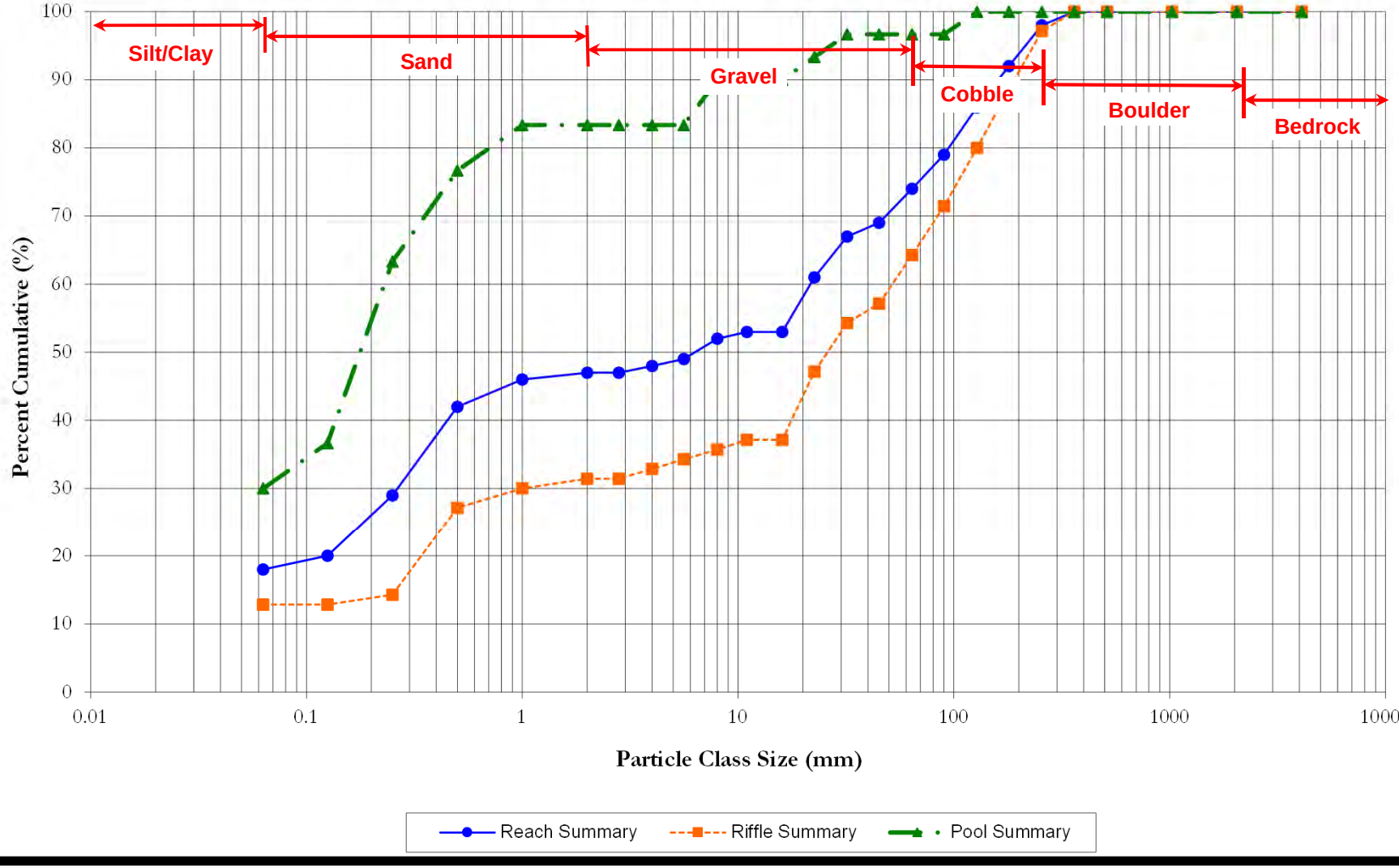
Flow Resistance

Manning's "n"		---
D'Arcy - Weisbach "f"		---

Note:

Distance (ft)	BS (ft)	HI (ft)	FS (ft)	Elevation (ft)	Omit Bkf	Notes
0		2741	3.289	2737.711	☐	XS 13 RIFF
10.49		2741	4.851	2736.149	☐	
24.32		2741	5.519	2735.481	☐	
36.41		2741	5.569	2735.431	☐	
44.53		2741	6.266	2734.734	☐	
46.33		2741	6.633	2734.367	☐	LTB
47.59		2741	7.572	2733.428	☐	
48.65		2741	8.705	2732.295	☐	
49.31		2741	9.306	2731.694	☐	
50.77		2741	9.606	2731.394	☐	LCH
51		2741	9.655	2731.345	☐	LEW
51.73		2741	9.704	2731.296	☐	
52.36		2741	9.746	2731.254	☐	TWG
53.44		2741	9.736	2731.264	☐	
54.26		2741	9.824	2731.176	☐	RCH
54.4		2741	9.75	2731.25	☐	REW
54.8		2741	9.024	2731.976	☐	
56.2		2741	9.271	2731.729	☐	
56.69		2741	8.912	2732.088	☐	
57.92		2741	7.371	2733.629	☐	
59.91		2741	6.586	2734.414	☐	
60.31		2741	5.833	2735.167	☐	RTB
63.82		2741	5.844	2735.156	☐	
66.28		2741	5.43	2735.57	☐	
70.45		2741	4.19	2736.81	☐	
77.96		2741	3.368	2737.632	☐	
93		2741	0.18	2740.82	☐	
					☐	
					☐	
					☐	

Vile Creek-UT3
Pebble Count Particle Distribution



APPENDIX 4
PROJECT SITE PHOTOGRAPHS

Vile Creek Reach 1

Vile Creek Reach 2

UT1 Reach 1

UT1 Reach 2

UT2

UT2 Headwaters Water Quality Treatment Area

	
UT3	**Little River**
	
Wetland Restoration Area Adjacent to Vile Creek Reach 1 Left	**Wetland Restoration Area Adjacent to Vile Creek Reach 1 Right**
	
Wetland Restoration Area Adjacent to Vile Creek Reach 2 Left	**UT1B**

APPENDIX 5
HYDRIC SOILS EVALUATION DATA

HYDRIC SOIL INVESTIGATION

Vile Creek Mitigation Site

Alleghany County, North Carolina

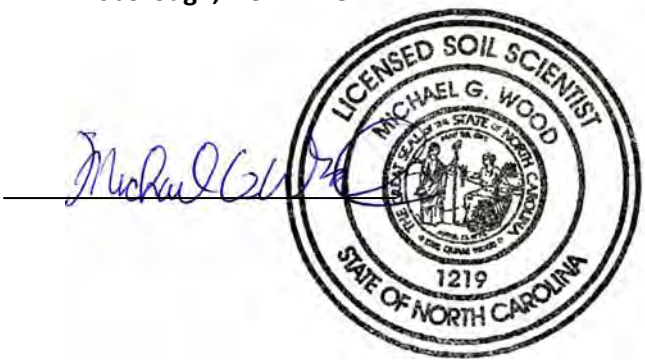
Prepared for:

Wildlands Engineering, Inc.
5605 Chapel Hill Road, Suite 122
Raleigh, NC 27607

Prepared by:

The Catena Group

410B Millstone Drive
Hillsborough, NC 27278



January 7, 2014

INTRODUCTION

Wildlands Engineering, Inc. is investigating the feasibility of constructing a mitigation site located on the southeast side o NC 18 near Sparta, Alleghany County, NC. The Catena Group (Catena) has been retained to perform a general soil and site evaluation that describes and classifies the soil throughout the study area and to make a determination as to its hydric status. The study area consists of flat riparian areas adjacent to Little River, Vile Creek, and several small unnamed tributaries. Four ditches were observed in the floodplain of Vile Creek. The site is primarily used for livestock, with sparse wooded areas.

METHODOLOGY

Prior to performing the evaluation, NRCS soils maps and USGS topographic maps were reviewed. The field investigation was performed on December 20, 2013. Hand-turned soil auger borings were advanced within the study area and three soil profiles were completed (Figure 1). Soil boring locations were located with a GPS Unit with sub-meter accuracy. Hydric soil status is based upon the NRCS Field Indicators of Hydric Soils in the Unities States - A Guide for Identifying and Delineating Hydric Soils (Version 7.0, 2010).

RESULTS

Three Soil Units were created based on data collected from observations of soil borings, stream cuts, and other landscape site features (Figure 1).

Soil Unit 1. This unit was mapped within the nearly level floodplain portion of Vile Creek. Portions of this soil unit clearly had overburden material deposited as a result of human manipulation, likely for agricultural purposes. The soil beneath the overburden was relatively undisturbed other than a compressed soil structure from the added fill. Soil Profiles 1 and 3 describe the specific soil properties noted throughout this soil unit and are appended. Buried soil horizons typically occurred within 15 to 20 inches of the existing surface, had a sandy loam texture, and typically met hydric indicator F3 Depleted Matrix.

F3 Depleted Matrix. A layer that has a depleted matrix with 60 percent or more chroma of 2 or less and that has a minimum thickness of either:

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

Also observed within Soil Unit 1 are areas where the overburden has developed into a hydric soil that supports wetland vegetation species and are likely to be classified as jurisdictional wetlands. The location of these areas are consistent with those previously provided by Wildlands, Inc. and are shown on Figure 1. Soil Unit 1 is approximately 6.9 acres, excluding the existing wetlands.

Soil Unit 2. Soil Unit 2 was mapped along an unnamed tributary of Vile Creek in the western part of the study area. Portions of this soil unit clearly had overburden material deposited as a result of human

manipulation, likely for agricultural purposes. The soil beneath the overburden was relatively undisturbed other than a compressed soil structure from the added fill. Buried soil horizons typically occurred within 20 inches of the existing surface, had a sandy loam texture, and typically met hydric indicator F3 Depleted Matrix. These areas were limited to flat linear portions along the floodplain. Soil Unit 2 is approximately 2.9 acres.

Also observed within Soil Unit 2 are areas that of hydric soil that support wetland vegetation species and are likely to be classified as jurisdictional wetlands. The location of these areas are consistent with those previously provided by Wildlands, Inc. and are shown on Figure 1. Soil Profile 2 lists specific soil properties of hydric soils identified in these jurisdictional areas.

Soil Unit 3. Soil Unit 3 typically consisted of non-hydric soil and occurred along narrow floodplains and steeper sloping drainages throughout the study area. This soil unit is not adequate for wetland restoration. Soil Unit 3 is approximately 12.2 acres.

CONCLUSION

Soil Unit 1 is a prime candidate for wetland restoration through rehabilitation. It is anticipated that through Priority 1 stream restoration, removal of the livestock, and revegetation, the hydrology will be restored and the soils will eventually form structure, which will allow the wetland to regain its normal functions. Portions of Soil Unit 2 also appear applicable for wetland restoration through rehabilitation. Maximizing the potential restoration credits in this unit will depend on the type of stream restoration proposed. Soil Unit 3 does not appear adequate to support wetland restoration. Soil units mapped within the study area are not homogenous and will have inclusions with different soil types. Due to the soil variability, typically associated with manipulated soils and landscapes, it is recommended additional soil borings be advanced to determine a more accurate soil unit boundary.

The findings presented herein represent Catena's professional opinion based on our Hydric Soil Investigation and knowledge of the current regulations regarding wetland mitigation in North Carolina and national criteria for determining hydric soil.

The Catena Group

Client: WILDLANDS ENGINEERING

Hydric Soil Investigation

Vile Creek

Alleghany County, North Carolina

Date: January 2014

Scale: 0 200 400 Feet

Job No.: 4169

Figure 1

SOIL EVALUATION FORM

The Catena Group, Inc
410-B Millstone Drive
Hillsborough, NC 27278
919.732.1300

Vile Creek M.H. Site

Catena Job: 4169 Vile Creek
County: Alleghany
Date: 12-20-13
Sheet: 1 of 1

Profile #	Horizon	Horizon Depth (In)	Structure / Texture	Consistence / Mineralogy	Matrix Color	Mottle Colors (Quantity, Size, Contrast, Color)
1	A	3	2, M, GR / SiL	FR / SS, SP	10YR 4/3	c, 2, F 10YR 4/2 ; c, 2, D 10YR 5/6; O.R.
	Bw1	10	1, M, SBK / L	FR / SS, SP	7.5YR 4/4	m 2. F 7.5YR 4/6
	Bw2	12	1, M, SBK / L	FR / SS, SP	10YR 4/6	m, 2, F 7.5YR 4/6
	Ab	15	1, M, GR / SL	VF / SS, SP	10YR 2/1	
			AR @ 15			
2	A1	6	1, Co, GR / SiL	FR / SS, SP	10YR 4/4	
	A2	15	1, Co, SBK / SiL	FR / SS, SP	10YR 4/2	C, 1, D 10YR 4/4
3	A1	2	2, M, GR / SL	FR / SS, SP	10YR 3/2	
	A2	8	2, M, GR / SL	FR / SS, SP	10YR 3/2	C, 2, F 2.5Y 4/2, C, 2, F 10YR 4/3
	Bw	13	1, M, SBK / SiL	FR / SS, SP	2.5Y 5/3	m, 2, D 2.5Y 5/6 ; m, 2, D 10YR 5/6
	Bwg	19	1, M, SBK / L	FR / SS, SP	2.5Y 5/2	m, 2, D 10YR 5/6
	Bwg	26	0, m / CL	FI / SS, SP	2.5Y 4/1	m, 2, D 10YR 5/6
	Ab	30	0, M / CL	FR / SS, SP	2.5Y 3/2	

Evaluated by: MW, JR

APPENDIX 6
CATEGORICAL EXCLUSION WITH RESOURCE AGENCY CORRESPONDENCE

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:	Vile Creek Mitigation Site
County Name:	Alleghany County
EEP Number:	96582
Project Sponsor:	Wildlands Engineering, Inc.
Project Contact Name:	John Hutton
Project Contact Address:	312 West Millbrook Rd Suite 225 Raleigh, NC 27609
Project Contact E-mail:	jhutton@wildlandseng.com
EEP Project Manager:	Harry Tsomides

Project Description

The Vile Creek Mitigation Site is a stream and wetland mitigation project located in Alleghany County, NC just east of the town of Sparta. The project contains Vile Creek and Little River as well as associated unnamed tributaries. The project will provide stream and wetland mitigation units to NCEEP in the New River Basin (05050001).

For Official Use Only

Reviewed By:

9/15/2014
Date

Harry Tsomides
EEP Project Manager

Conditional Approved By:

Date

For Division Administrator
FHWA

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

Final Approval By:

9-15-14
Date

For Division Administrator
FHWA

Categorical Exclusion Summary

September 10, 2014

VILE CREEK MITIGATION SITE

Alleghany County, NC
DENR Contract No. 5999
EEP ID No. 96582

New River Basin
HUC 05050001

PREPARED FOR:

NC Department of Environment and Natural Resources
Ecosystem Enhancement Program
1652 Mail Service Center
Raleigh, NC 27699-1652

CATEGORICAL EXCLUSION SUMMARY

VILE CREEK MITIGATION SITE
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PREPARED FOR:

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1652 Mail Service Center
Raleigh, NC 27699-1652

PREPARED BY:

Wildlands Engineering, Inc.
312 West Millbrook Road, Suite 225
Raleigh, NC 27609
Phone: 919-851-9986

September 11, 2014

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1.0 INTRODUCTION

The Vile Creek Mitigation Site (Site) is a stream and wetland restoration project located in Alleghany County approximately one mile northeast of the Town of Sparta (Figure 1). The project will include a combination of restoration and enhancement on approximately 7,730 linear feet (LF) of streams and restoration of approximately six acres of wetlands. The project will provide approximately 5,000 stream mitigation units (SMUs) and 5.0 wetland mitigation units (WMUs). The project is located within the North Carolina Ecosystem Enhancement Program's (EEP) targeted local watershed for the New River Basin Hydrologic Unit Code (HUC) 05050001030020 and North Carolina Division of Water Resources (NCDWR) Subasin 05-07-03 and is being submitted for mitigation credit in the New River Basin HUC 05050001.

2.0 PROJECT BACKGROUND

The proposed Site is located within the Little River & Brush Creek Local Watershed Plan (LWP) study area and is included in the Project Atlas for the LWP. EEP's 2009 River Basin Restoration Priorities document cites HUC 05050001030020 as having the highest number of animal farms in the New River Basin leading to increased direct cattle access to several streams. Cattle access on tributaries to the Little River is specifically noted and fecal coliform impacts have been seen in receiving waters. In addition, it is noted that 41 percent of non-forested riparian buffers within the targeted watershed are degraded. Restoration of the Site would directly and indirectly address stressors identified in the RBRP including removing cattle access to Vile Creek and other tributaries to the Little River, restoring a forested riparian buffer that is currently lacking, and reducing fecal coliforms to receiving waters.

The Little River watershed is also discussed in the 2005 North Carolina Wildlife Resource Commission's (WRC) Wildlife Action Plan. In the report, aquatic habitat degradation is attributed to erosion and sedimentation within the watershed. Causes of erosion and sedimentation are cited as poorly managed livestock grazing resulting in increased run-off and stream bank degradation along with general loss of riparian vegetation. Restoration at the Site will directly address non-point source stressors by removing cattle from the streams, creating stable stream banks, restoring a riparian corridor, and placing 26.9 acres of land under permanent conservation easement.

This project will slow surface runoff, increase retention times, and reconnect the streams to their historic floodplains which will reduce sediment and nutrient loading. In addition, restoration will provide and improve in-stream, terrestrial (riparian), and wetland habitats while improving stream stability, wetland hydrology, and overall hydrology. The Site will be fenced to eliminate livestock grazing and re-establish a native riparian buffer. The proposed project directly and indirectly addresses many issues presented in both the LWP and RBRP documentation.

3.0 PROJECT GOALS AND OBJECTIVES

The major goals of the proposed stream mitigation project are to provide ecological and water quality enhancements to the New River Basin while creating a functional riparian corridor at the site level, providing floodplain habitat and ecological function, and restoring a Montane Alluvial Forest community as described by Schafale and Weakley (1990). Specific enhancements to water quality and ecological processes are outlined below in Table 1.

Table 1 Ecological and Water Quality Goals of the Mitigation Project

Water Quality Goals	
Decrease nutrient and adverse chemical and bacteria levels (RBRP goal to implement agricultural BMPS in rural sub-watersheds to address nutrient stressors)	Nutrient, chemical, and bacterial input will be decreased by cattle exclusion throughout the Site. Off-site nutrient-laden runoff from adjacent farms will be absorbed on-site by filtering flood flows through restored floodplain areas and vernal pools where flood flows can disperse through native vegetation. Increased surface water residency time will provide contact treatment time and groundwater recharge potential.
Decrease sediment input (LWP goal) (RBRP goal to implement agricultural BMPS in rural sub-watersheds to address sediment stressors)	A large volume of sediment is being contributed to the system through the failure of onsite stream banks and cattle disturbance. Sediment input from unprotected stream banks will be reduced by installing bioengineering and in-stream structures while creating a stable channel form using natural channel design principles on the restoration reaches. Sediment input from trampled stream banks on enhancement reaches will be decreased by preventing further cattle disturbance and planting the banks. Sediment from off-site sources will be captured by allowing deposition on restored floodplain areas where native vegetation will slow overland flow velocities.
Decrease water temperature and increase dissolved oxygen concentrations	Stream bed form will be restored and woody structures will be installed to promote re-aeration; this will also help to maintain oxygen levels in the perennial stream reaches. Creation of deep pool zones will lower temperature, helping to maintain dissolved oxygen concentrations. Establishment and maintenance of riparian buffers will create long-term shading of the channel flow to minimize thermal heating.
Ecological Goals	
Provide and improve terrestrial habitat	Adjacent riparian buffer areas will be restored by planting native vegetation. These areas will receive more regular inundating flows, encouraging establishment of a native natural community that connects with other forested areas.
Provide and improve in-stream habitat	A stable channel form and structure appropriate for the streams on the project site will be constructed. Introduction of large woody debris, root wads, brush toe meander bends, and native stream bank vegetation will substantially increase habitat value.

4.0 CATEGORICAL EXCLUSION SUMMARY

The *Categorical Exclusion Form for Ecosystem Enhancement Program Projects Version 1.4 is included in the Appendix*. Below is an explanation of the federal laws that were applicable to the Vile Creek Stream Mitigation Project as well as a summary of their potential impacts.

4.1.1 Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA)

The Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) provides a Federal "Superfund" to clean up uncontrolled or abandoned hazardous-waste sites as well as accidents, spills, and other emergency releases of pollutants and contaminants into the environment.

As the Vile Creek Mitigation Site is a full-delivery project; an EDR Radius Map Report with Geocheck was ordered for the site through Environmental Data Resources, Inc. on July 2, 2014. Neither the target property nor the adjacent properties were listed in any of the Federal, State, or Tribal environmental databases searched by EDR. There is one known potential hazardous waste site

identified approximately one mile south of the project area. The Sparta Industries site is geographically separated from the mitigation property and is not within the watershed of any of the project streams. There is no potential for site contamination from this listed disposal site. The Executive Summary of the EDR report is included in the Appendix. The full report is available if needed.

4.1.2 National Historic Preservation Act (Section 106)

The National Historic Preservation Act declares a national policy of historic preservation to protect, rehabilitate, restore, and reuse districts, sites, buildings, structures, and objects significant in American architecture, history, archaeology, and culture, and Section 106 mandates that federal agencies take into account the effect of an undertaking on a property that is included in, or is eligible for inclusion in, the National Register of Historic Places.

Wildlands Engineering, Inc. (Wildlands) requested review and comment from the State Historic Preservation Office (SHPO) with respect to any archeological and architectural resources related to the Vile Creek Mitigation Site on July 7, 2014. SHPO responded on July 25, 2014 and stated they were aware of no historic resources that would be affected by the project. All correspondence related to Section 106 is included in the Appendix.

4.1.3 Uniform Relocation Assistance and Real Property Acquisition Policies Act (Uniform Act)

These acts, collectively known as the Uniform Act, provide for uniform and equitable treatment of persons displaced from their homes, businesses, non-profit associations, or farms by federal and federally-assisted programs, and establish uniform and equitable land acquisition policies.

Vile Creek Mitigation Site is a full-delivery project that includes land acquisition. Notification of the fair market value of the project property and the lack of condemnation authority by Wildlands was included in the signed option agreements for the project property. Copies of the relevant sections of the option agreements are included in the Appendix.

4.1.4 Endangered Species Act (ESA)

Section 7 of the ESA requires federal agencies, in consultation with and with the assistance of the Secretary of the Interior or of Commerce, as appropriate, to ensure that actions they authorize, fund or carry out are not likely to jeopardize the continued existence of threatened or endangered species or result in the destruction or adverse modification of critical habitat for these species.

The only listed threatened or endangered species in Alleghany County is the bog turtle (*Glyptemys muhlenbergii*). The northern long-eared bat (Myotis septentrionalis) is listed as a proposed species. The USFWS does not currently list any Critical Habitat Designations for the Federally-listed species within Alleghany County. Wildlands requested review and comment from the United States Fish and Wildlife Service (USFWS) on July 7, 2014 in respect to the Vile Creek Mitigation Site and its potential impacts on threatened or endangered species. USFWS responded on August 14, 2014 and stated 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”. All correspondence with USFWS is included in the Appendix.

As a result of a pedestrian survey conducted on December 2, 2013, no individual species or critical habitat were found to exist on the site for the bog turtle or northern long-eared bat. The site does provide necessary habitat for the threatened Bog Turtle however, as mentioned previously, no individuals were found on site. Following the Interagency Review Team site review on August 27, 2014, Marella Buncick (USFWS) requested that she be allowed to perform an additional survey at the site to inspect for presence of bog turtle and to examine existing habitat for the purpose of providing design recommendations. This survey is scheduled for October 20, 2014. The bog turtle is listed as threatened due to similarity of appearance and as such is not subject to Section 7 consultation. It was determined that the project would result in "no effect" on the listed species.

4.1.5 Farmland Protection Policy Act (FPPA)

The FPPA requires that, before taking or approving any federal action that would result in conversion of farmland, the agency must examine the effects of the action using the criteria set forth in the FPPA, and, if there are adverse effects, must consider alternatives to lessen them.

The Vile Creek Mitigation Site includes the conversion of prime farmland. As such, Form AD-1006 has been completed and submitted to the Natural Resources Conservation Service (NRCS). The completed form and correspondence documenting its submittal is included in the Appendix.

4.1.6 Fish and Wildlife Coordination Act (FWCA)

The FWCA requires consultation with the USFWS and the appropriate state wildlife agency on projects that alter or modify a water body. Reports and recommendations prepared by these agencies document project effects on wildlife and identify measures that may be adopted to prevent loss or damage to wildlife resources.

The Vile Creek Mitigation Site includes stream and wetland restoration. Wildlands requested comment on the project from both the USFWS and the North Carolina Wildlife Resources Commission (NCWRC) on July 7, 2014. NCWRC responded on August 11, 2014 and stated they "are supportive of the project" however there is potential to affect habitat for sharpnose darter (*Precina oxyrhynchus*) and green floater as well as known populations of hellbender and mudpuppies. They requested that bog turtle habitat requirements be considered in the design of wetlands. The USFWS responded on August 14, 2014 and had no objections to the project. All correspondence with the two agencies is included in the Appendix.

4.1.7 American Indian Religious Freedom Act (AIRFA)

The American Indian Religious Freedom Act is intended to protect and preserve for American Indians their inherent right of freedom to believe, express, and exercise the traditional religions of the American Indian, Eskimo, Aleut, and Native Hawaiians, including but not limited to access to sites, use and possession of sacred objects, and the freedom to worship through ceremonials and traditional rites.

Wildlands requested review and comment from the Tribal Historic Preservation Office (THPO) with respect to any archeological and religious resources related to the Vile Creek Mitigation Site on July 7, 2014. THPO did not respond to this request for comments. All correspondence related to AIRFA is included in the Appendix.

4.1.8 Migratory Bird Treaty Act (MBTA)

The MBTA makes it unlawful for anyone to kill, capture, collect, possess, buy, sell, trade, ship, import, or export any migratory bird. The indirect killing of birds by destroying their nests and eggs is covered by the MBTA, so construction in nesting areas during nesting seasons can constitute a taking.

Wildlands requested comment on the Vile Creek Stream Mitigation Site from the USFWS in regards to migratory birds on July 7, 2014. USFWS responded on August 14, 2014, but had no comments regarding migratory birds. All correspondence with USFWS is included in the Appendix.

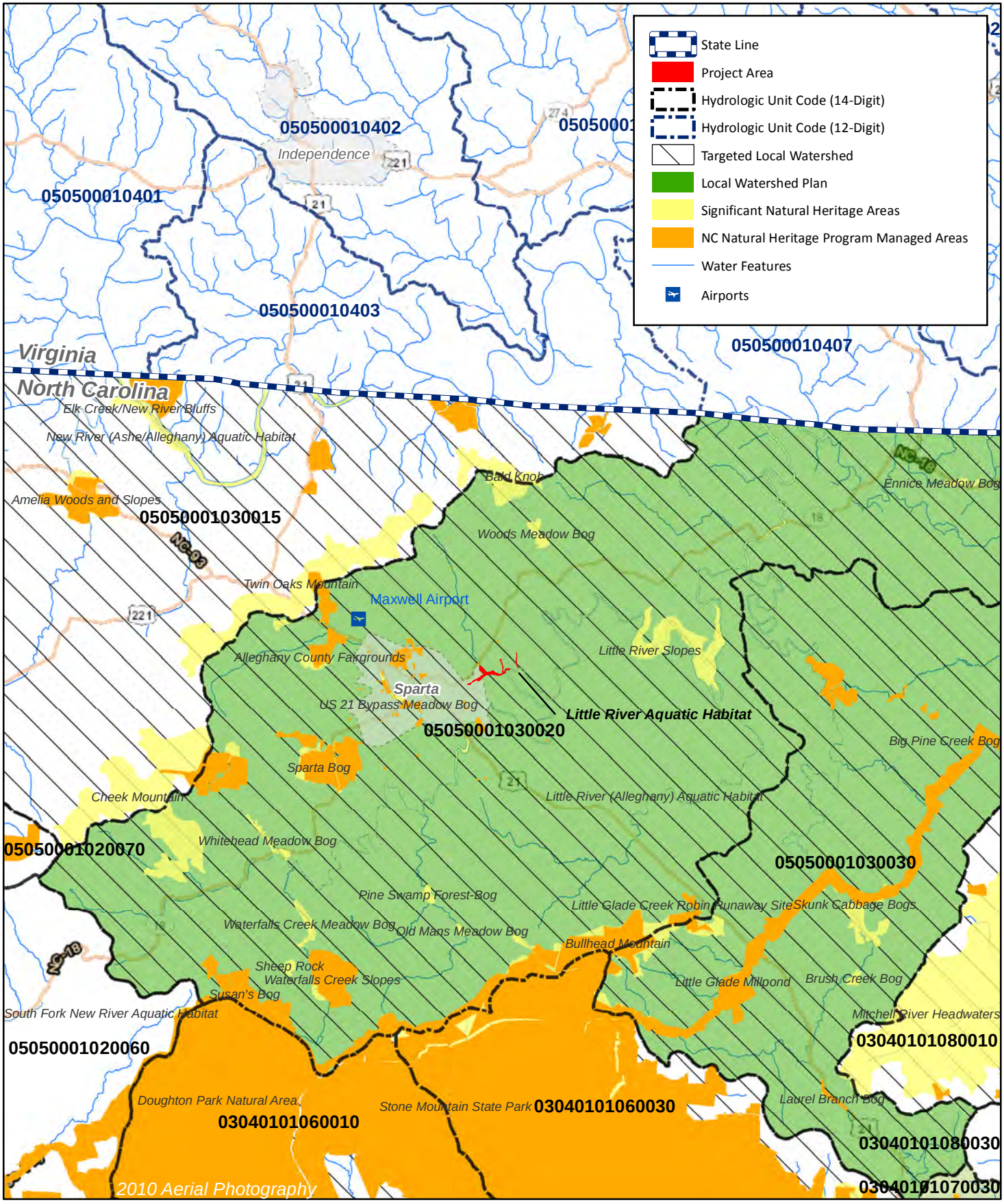
5.0 CONCLUSION

No significant impacts from the Vile Creek Mitigation Project were identified during the development of the Categorical Exclusion.

6.0 REFERENCES

Schafale, M.P. and A.S. Weakley. 1990. Classification of the Natural Communities of North Carolina, 3rd approx. North Carolina Natural Heritage Program, Raleigh, North Carolina.

FIGURES



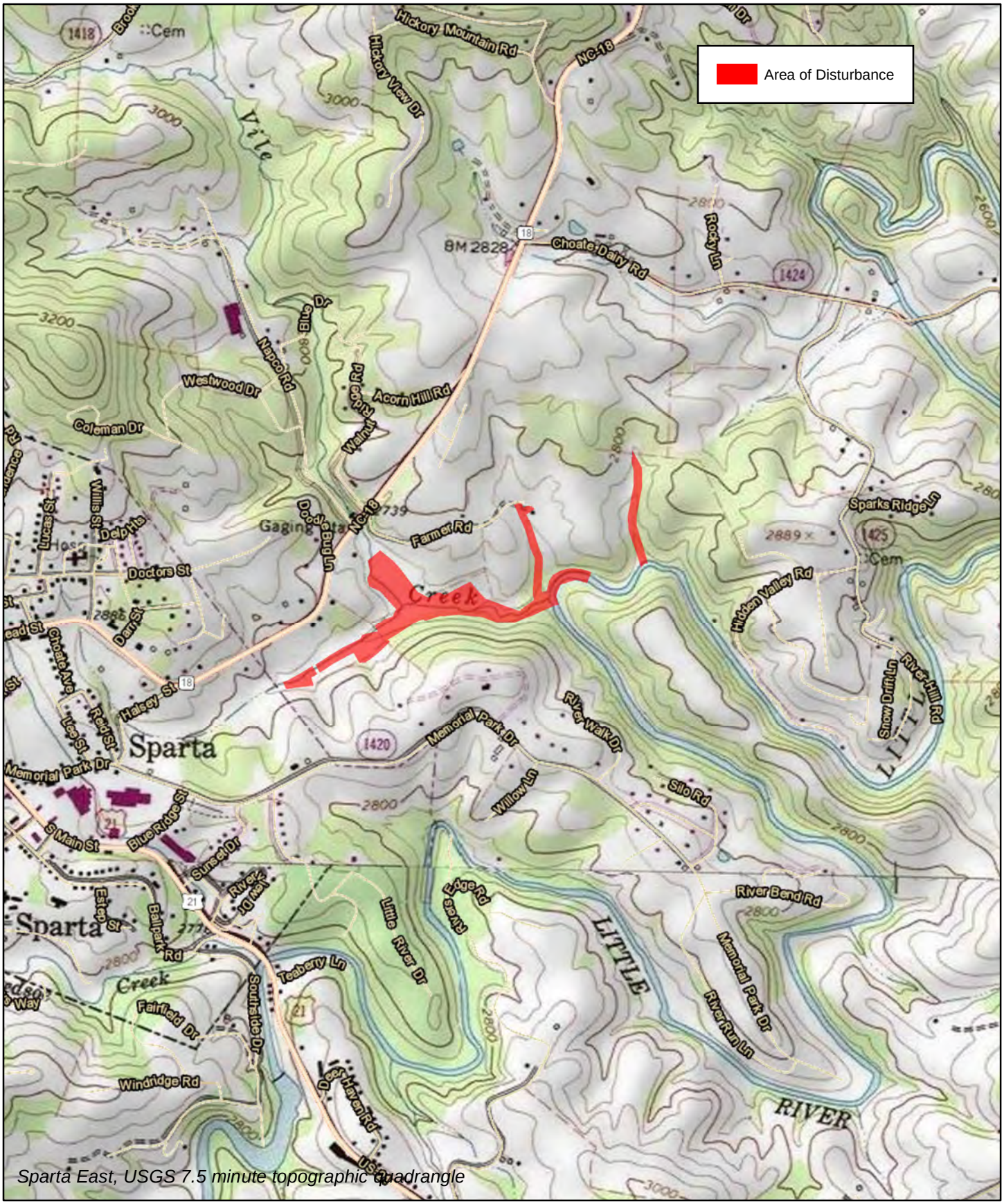
WILDLANDS ENGINEERING

0 2 Miles

N

Figure 1 Vicinity Map
Vile Creek Mitigation Site
New River Basin 05050001

Alleghany County, NC



Sparta East, USGS 7.5 minute topographic quadrangle

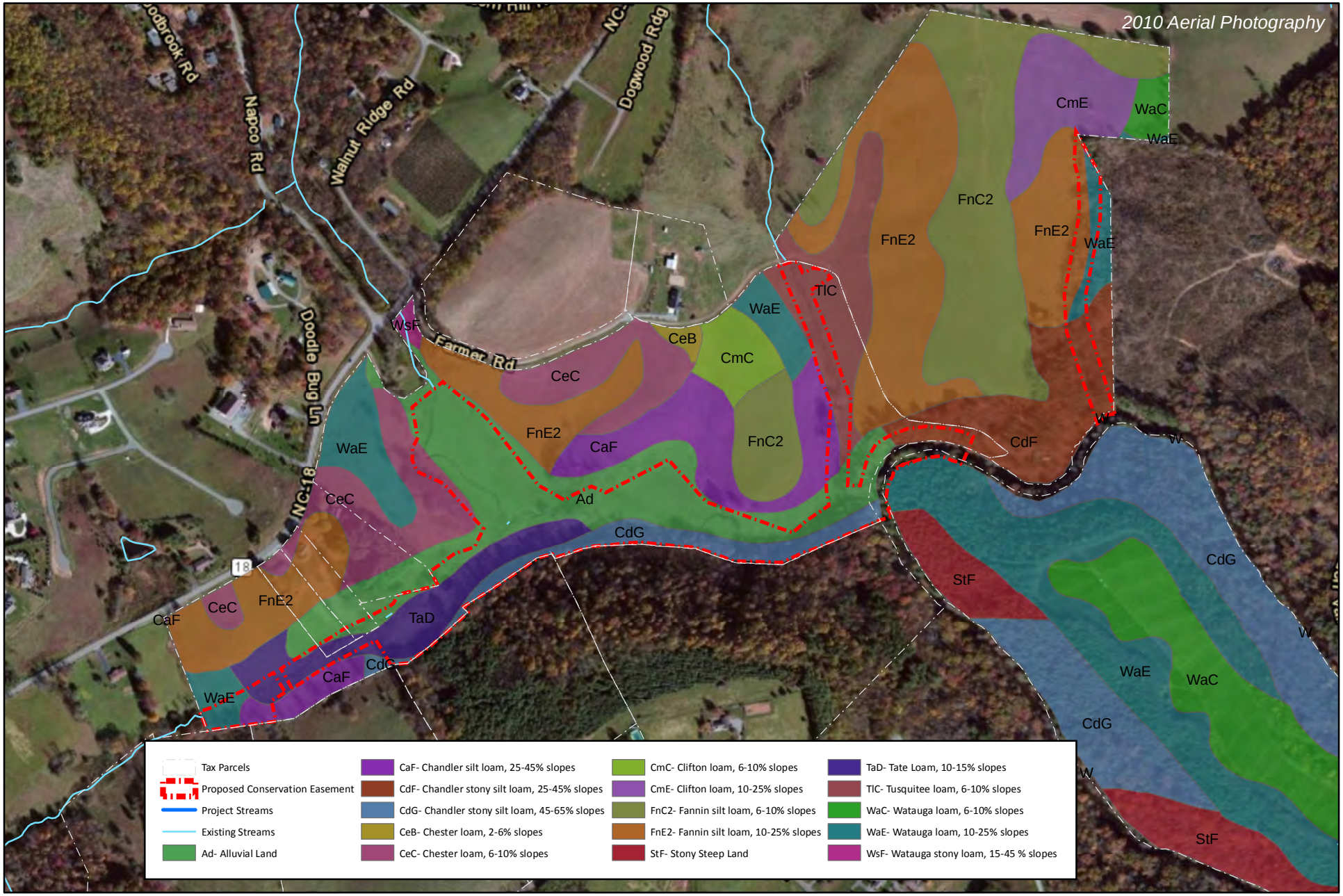
WILDLANDS ENGINEERING

0 750 1,500 Feet

N

Figure 2 USGS Topographic Map
Vile Creek Mitigation Site
New River Basin 05050001

Alleghany County, NC



WILDLANDS ENGINEERING

0 300 600 Feet

N

Figure 3 Soils Map
Vile Creek Mitigation Site
New River Basin 05050001

Alleghany County, NC

APPENDIX

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:	Vile Creek Mitigation Site
County Name:	Alleghany County
EEP Number:	96582
Project Sponsor:	Wildlands Engineering, Inc.
Project Contact Name:	John Hutton
Project Contact Address:	312 West Millbrook Rd Suite 225 Raleigh, NC 27609
Project Contact E-mail:	jhutton@wildlandseng.com
EEP Project Manager:	Harry Tsomides

Project Description

The Vile Creek Mitigation Site is a stream and wetland mitigation project located in Alleghany County, NC just east of the town of Sparta. The project contains Vile Creek and Little River as well as associated unnamed tributaries. The project will provide stream and wetland mitigation units to NCEEP in the New River Basin (05050001).

For Official Use Only

Reviewed By:

Date | **EEP Project Manager**

Conditional Approved By:

Date | **For Division Administrator FHWA**

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

Final Approval By:

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

NC 1423
NC 1423
Sparta, NC 28675

Inquiry Number: 3994310.2s
July 02, 2014

The EDR Radius Map™ Report with GeoCheck®

EDR® Environmental Data Resources Inc

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

TABLE OF CONTENTS

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

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

NC 1423
SPARTA, NC 28675

COORDINATES

Latitude (North):	36.5083000 - 36° 30' 29.88''
Longitude (West):	81.1017000 - 81° 6' 6.12''
Universal Tranverse Mercator:	Zone 17
UTM X (Meters):	490893.0
UTM Y (Meters):	4040131.8
Elevation:	2710 ft. above sea level

USGS TOPOGRAPHIC MAP ASSOCIATED WITH TARGET PROPERTY

Target Property Map:	36081-E1 SPARTA EAST, NC VA
Most Recent Revision:	1991
South Map:	36081-D1 GLADE VALLEY, NC
Most Recent Revision:	1968

AERIAL PHOTOGRAPHY IN THIS REPORT

Portions of Photo from:	20120816
Source:	USDA

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

EXECUTIVE SUMMARY

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

CERCLIS ---------- Comprehensive Environmental Response, Compensation, and Liability Information System
FEDERAL FACILITY ---------- Federal Facility Site Information listing

Federal CERCLIS NFRAP site List

CERC-NFRAP ---------- CERCLIS No Further Remedial Action Planned

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

US ENG CONTROLS ---------- Engineering Controls Sites List
US INST CONTROL ---------- Sites with Institutional Controls
LUCIS ---------- Land Use Control Information System

Federal ERNS list

ERNS ---------- Emergency Response Notification System

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

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

EXECUTIVE SUMMARY

State and tribal registered storage tank lists

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

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

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

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

DEBRIS REGION 9 ---------- Torres Martinez Reservation Illegal Dump Site Locations
ODI ---------- Open Dump Inventory
HIST LF ---------- Solid Waste Facility Listing
SWRCY ---------- Recycling Center Listing
INDIAN ODI ---------- Report on the Status of Open Dumps on Indian Lands

Local Lists of Hazardous waste / Contaminated Sites

US CDL ---------- Clandestine Drug Labs
US HIST CDL ---------- National Clandestine Laboratory Register

Local Land Records

LIENS 2 ---------- CERCLA Lien Information

Records of Emergency Release Reports

HMIRS ---------- Hazardous Materials Information Reporting System
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

EXECUTIVE SUMMARY

DOT OPS	Incident and Accident Data
DOD	Department of Defense Sites
FUDS	Formerly Used Defense Sites
CONSENT	Superfund (CERCLA) Consent Decrees
ROD	Records Of Decision
UMTRA	Uranium Mill Tailings Sites
US MINES	Mines Master Index File
TRIS	Toxic Chemical Release Inventory System
TSCA	Toxic Substances Control Act
FTTS	FIFRA/ TSCA Tracking System - FIFRA (Federal Insecticide, Fungicide, & Rodenticide Act)/TSCA (Toxic Substances Control Act)
HIST FTTS	FIFRA/TSCA Tracking System Administrative Case Listing
SSTS	Section 7 Tracking Systems
ICIS	Integrated Compliance Information System
PADS	PCB Activity Database System
MLTS	Material Licensing Tracking System
RADINFO	Radiation Information Database
FINDS	Facility Index System/Facility Registry System
RAATS	RCRA Administrative Action Tracking System
RMP	Risk Management Plans
UIC	Underground Injection Wells Listing
DRYCLEANERS	Drycleaning Sites
NPDES	NPDES Facility Location Listing
INDIAN RESERV	Indian Reservations
SCRD DRYCLEANERS	State Coalition for Remediation of Drycleaners Listing
PRP	Potentially Responsible Parties
US FIN ASSUR	Financial Assurance Information
2020 COR ACTION	2020 Corrective Action Program List
LEAD SMELTERS	Lead Smelter Sites
EPA WATCH LIST	EPA WATCH LIST
COAL ASH	Coal Ash Disposal Sites
COAL ASH EPA	Coal Combustion Residues Surface Impoundments List
PCB TRANSFORMER	PCB Transformer Registration Database
Financial Assurance	Financial Assurance Information Listing
US AIRS	Aerometric Information Retrieval System Facility Subsystem
COAL ASH DOE	Steam-Electric Plant Operation Data

EDR HIGH RISK HISTORICAL RECORDS

EDR Exclusive Records

EDR MGP	EDR Proprietary Manufactured Gas Plants
EDR US Hist Auto Stat	EDR Exclusive Historic Gas Stations
EDR US Hist Cleaners	EDR Exclusive Historic Dry Cleaners

EDR RECOVERED GOVERNMENT ARCHIVES

Exclusive Recovered Govt. Archives

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

SURROUNDING SITES: SEARCH RESULTS

Surrounding sites were identified in the following databases.

EXECUTIVE SUMMARY

Elevations have been determined from the USGS 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. Sites with an elevation equal to or higher than the target property have been differentiated below from sites with an elevation lower than the target property.
Page numbers and map identification numbers refer to the EDR Radius Map report where detailed data on individual sites can be reviewed.

Sites listed in ***bold italics*** are in multiple databases.

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

STANDARD ENVIRONMENTAL RECORDS

State- and tribal - equivalent NPL

NC HSDS: The Hazardous Substance Disposal Sites list contains locations of uncontrolled and unregulated hazardous waste sites. The file contains sites on the national priority list as well as the state priority list. The data source is the North Carolina Center for Geographic Information and Analysis.

A review of the NC HSDS list, as provided by EDR, and dated 08/09/2011 has revealed that there is 1 NC HSDS site within approximately 1 mile of the target property.

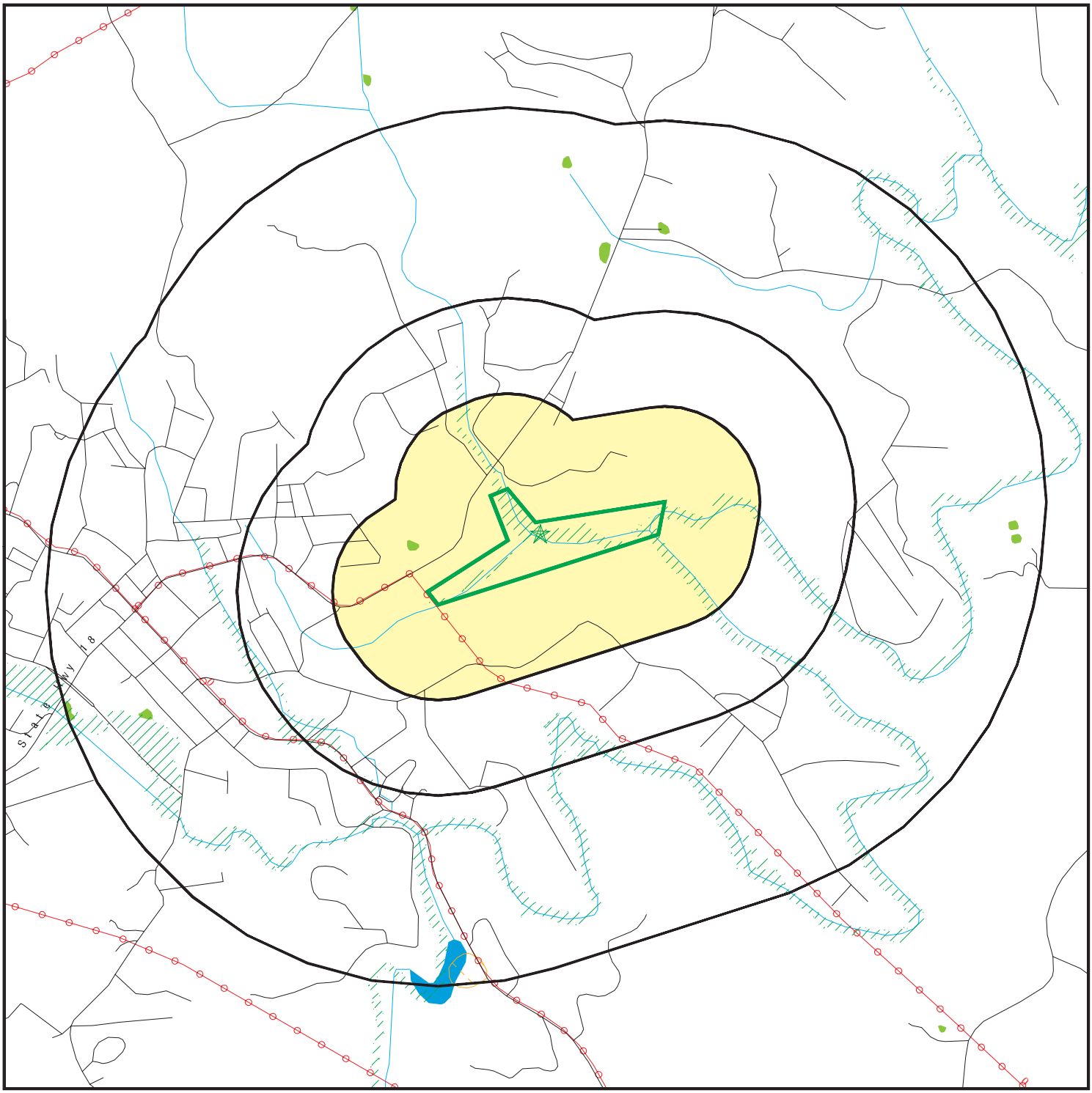
Equal/Higher Elevation	Address	Direction / Distance	Map ID	Page
SPARTA INDUSTRIES		S 1/2 - 1 (0.918 mi.)	0	8

EXECUTIVE SUMMARY

Due to poor or inadequate address information, the following sites were not mapped. Count: 20 records.

Site Name	Database(s)
G & B OIL CO. SPARTA-AST	LAST
TWIN OAKS	LAST
ALLEGHANY COUNTY LANDFILL	SWF/LF, HIST LF
SPARTA INDUSTIRES	SHWS
HILL'S GROCERY	LUST
J E WOODIE & SONS, INC.	LUST
HILLTOP GROCERY	LUST
SPARTA TEXACO FORMERLY MURPHYS	UST
HANES PRINTABLES	UST
J.E. WOODIE & SONS, INC.	UST
ABSHERS GROCERY	UST
HILLTOP GROCERY	UST
DIVISION OF HWYS. (ALLEGHANY CO. M	AST
FRANCIS MOTORS	RCRA NonGen / NLR
TOMMYS GARAGE	RCRA NonGen / NLR
HAL'S PARTS & SERVICE	RCRA NonGen / NLR
T & H WOODWORKS	RCRA-CESQG
JE WPPD;E & SONS INC.	IMD
SPARTA TEXACO	IMD
HILLIS GROCERY	IMD

OVERVIEW MAP - 3994310.2s



- Target Property
- Sites at elevations higher than or equal to the target property
- Sites at elevations lower than the target property
- Manufactured Gas Plants
- National Priority List Sites
- Dept. Defense Sites

0 1/4 1/2 1 Miles

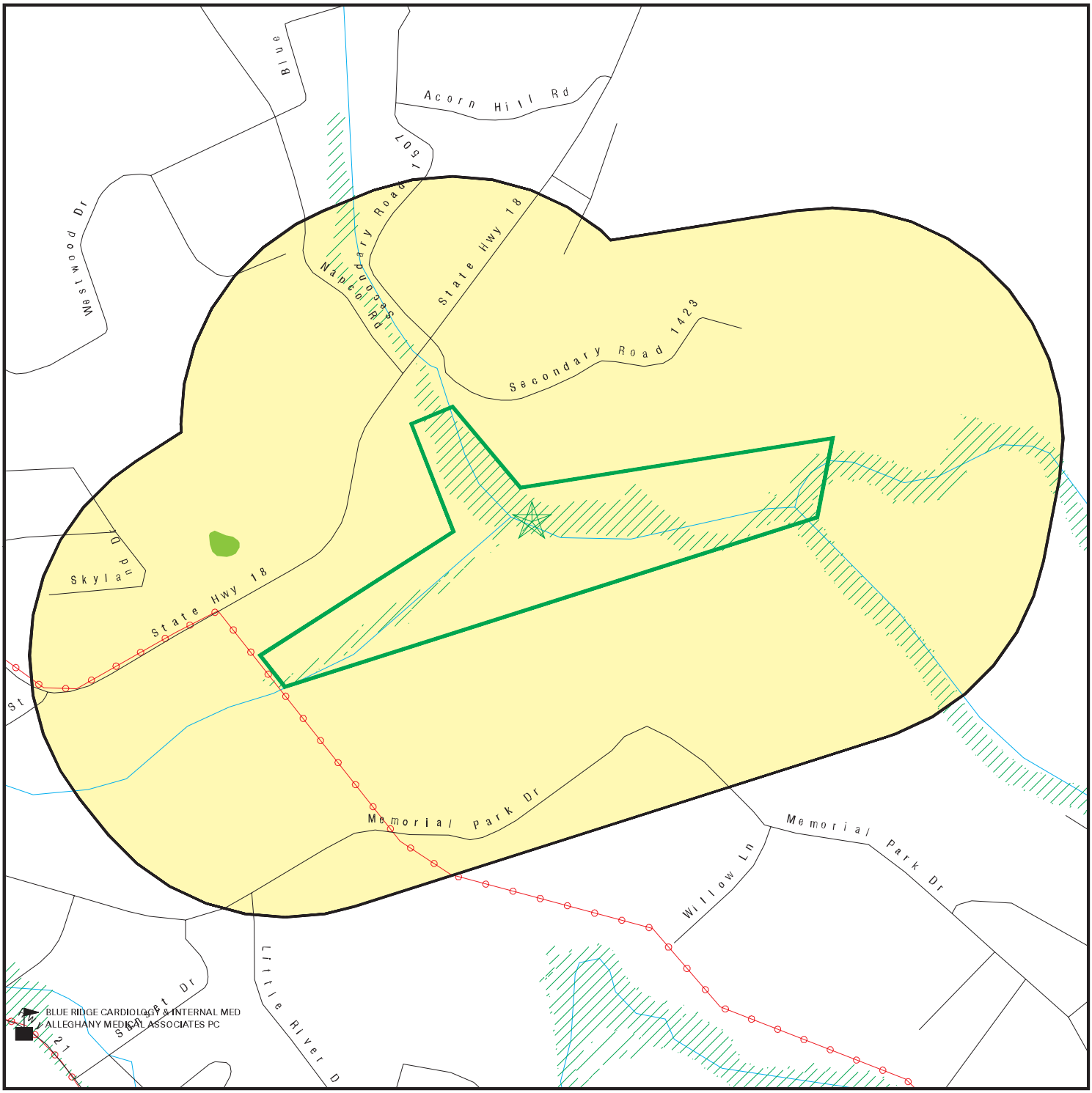
- Indian Reservations BIA
- Power transmission lines
- Oil & Gas pipelines from USGS
- 100-year flood zone
- 500-year flood zone
- National Wetland Inventory
- State Wetlands
- Hazardous Substance Disposal Sites

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: NC 1423 ADDRESS: NC 1423 Sparta NC 28675 LAT/LONG: 36.5083 / 81.1017	CLIENT: Wildlands Eng, Inc. CONTACT: John Hutton INQUIRY #: 3994310.2s DATE: July 02, 2014 9:33 am

DETAIL MAP - 3994310.2s



- Target Property
- Sites at elevations higher than or equal to the target property
- Sites at elevations lower than the target property
- Manufactured Gas Plants
- Sensitive Receptors
- National Priority List Sites
- Dept. Defense Sites
- Indian Reservations BIA
- Power transmission lines
- Oil & Gas pipelines from USGS
- 100-year flood zone
- 500-year flood zone
- National Wetland Inventory
- State Wetlands
- Hazardous Substance Disposal Sites

0 1/8 1/4 1/2 Miles

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: NC 1423	CLIENT: Wildlands Eng, Inc.
ADDRESS: NC 1423	CONTACT: John Hutton
Sparta NC 28675	INQUIRY #: 3994310.2s
LAT/LONG: 36.5083 / 81.1017	DATE: July 02, 2014 9:33 am

NC 1423
NC 1423
Sparta, NC 28675

Inquiry Number: 3994310.9
July 02, 2014

The EDR Aerial Photo Decade Package

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

EDR Aerial Photo Decade Package

Environmental Data Resources, Inc. (EDR) Aerial Photo Decade Package is a screening tool designed to assist environmental professionals in evaluating potential liability on a target property resulting from past activities. EDR's professional researchers provide digitally reproduced historical aerial photographs, and when available, provide one photo per decade.

When delivered electronically by EDR, the aerial photo images included with this report are for ONE TIME USE ONLY. Further reproduction of these aerial photo images is prohibited without permission from EDR. For more information contact your EDR Account Executive.

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

Date EDR Searched Historical Sources:

Aerial Photography July 02, 2014

Target Property:

NC 1423

Sparta, NC 28675

Year	***Scale***	***Details***	***Source***
1964	Aerial Photograph. Scale: 1"=750'	Panel #: 36081-E1, Sparta East, NC;/Flight Date: March 16, 1964	EDR
1976	Aerial Photograph. Scale: 1"=1000'	Panel #: 36081-E1, Sparta East, NC;/Flight Date: February 12, 1976	EDR
1991	Aerial Photograph. Scale: 1"=750'	Panel #: 36081-E1, Sparta East, NC;/Flight Date: April 03, 1991	EDR
1996	Aerial Photograph. Scale: 1"=500'	Panel #: 36081-E1, Sparta East, NC;/DOQQ - acquisition dates: April 17, 1996	EDR
2001	Aerial Photograph. Scale: 1"=750'	Panel #: 36081-E1, Sparta East, NC;/Flight Date: April 23, 2001	EDR
2005	Aerial Photograph. Scale: 1"=500'	Panel #: 36081-E1, Sparta East, NC;/Flight Year: 2005	EDR
2006	Aerial Photograph. Scale: 1"=500'	Panel #: 36081-E1, Sparta East, NC;/Flight Year: 2006	EDR
2008	Aerial Photograph. Scale: 1"=500'	Panel #: 36081-E1, Sparta East, NC;/Flight Year: 2008	EDR
2009	Aerial Photograph. Scale: 1"=500'	Panel #: 36081-E1, Sparta East, NC;/Flight Year: 2009	EDR
2010	Aerial Photograph. Scale: 1"=500'	Panel #: 36081-E1, Sparta East, NC;/Flight Year: 2010	EDR
2012	Aerial Photograph. Scale: 1"=500'	Panel #: 36081-E1, Sparta East, NC;/Flight Year: 2012	EDR


INQUIRY #: 3994310.9
YEAR: 1964
= 750'
N
EDR


INQUIRY #: 3994310.9
YEAR: 1976
= 1000'
N
EDR


INQUIRY #: 3994310.9
YEAR: 1991
= 750'
N
EDR


INQUIRY #: 3994310.9
YEAR: 1996
= 500'
N
EDR


INQUIRY #: 3994310.9
YEAR: 2001
= 750'
N
EDR


INQUIRY #: 3994310.9
YEAR: 2005
= 500'
N
EDR

WILDLANDS
ENGINEERING

July 7, 2014

Renee Gledhill-Earley
State Historic Preservation Office
4617 Mail Service Center
Raleigh, NC 27699-4617

Subject: EEP Stream and wetland mitigation project in Alleghany County, NC
Vile Creek Stream and Wetland Mitigation Site

Dear Ms. Gledhill-Earley,

The Ecosystem Enhancement Program (EEP) requests review and comment on any possible issues that might emerge with respect to archaeological or cultural resources associated with a potential stream and wetland restoration project on the attached site (USGS site map and aerial map with approximate areas of potential ground disturbance are enclosed).

The Vile Creek site has been identified for the purpose of providing in-kind mitigation for unavoidable stream and wetland impacts. Several sections of channel have been identified as significantly degraded. The site has historically been disturbed due to agricultural use, including cattle pasture and farmland. There are also forested areas on the site. No architectural structures or archaeological artifacts have been observed or noted during preliminary surveys of the site for restoration purposes.

We ask that you review this site based on the attached information to determine the presence of any historic properties.

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

Sincerely,

John Hutton
Vice President
jhutton@wildlandseng.com

North Carolina Department of Cultural Resources

State Historic Preservation Office

Ramona M. Bartos, Administrator

Governor Pat McCrory
Secretary Susan Kluttz

Office of Archives and History
Deputy Secretary Kevin Cherry

July 25, 2014

John Hutton
Wildlands Engineering
1430 South Mint Street, Suite 104
Charlotte, NC 28203

Re: Vile Creek Stream and Wetland Mitigation, Alleghany County, ER 14-1572

Dear Mr. Hutton:

Thank you for your letter of July 7, 2014, concerning the above project.

We have conducted a review of the project and are aware of no historic resources which would be affected by the project. Therefore, we have no comment on the project as proposed.

The above comments are made pursuant to Section 106 of the National Historic Preservation Act and the Advisory Council on Historic Preservation's Regulations for Compliance with Section 106 codified at 36 CFR Part 800.

Thank you for your cooperation and consideration. If you have questions concerning the above comment, contact Renee Gledhill-Earley, environmental review coordinator, at 919-807-6579 or renee.gledhill-earley@ncdcr.gov. In all future communication concerning this project, please cite the above referenced tracking number.

Sincerely,

Renee Gledhill-Earley

for Ramona M. Bartos

eMail: rbugg@wildlandsinc.com

TO OPTIONOR: Gary Crouse
225 Scenic View Circle
Wytheville, VA 24382
eMail: garycrouse5@yahoo.com

Notice of change of address shall be given by written notice in the manner described in this Paragraph.

3.3 Assignment. Optionee shall have the right to assign this Agreement without the consent of Optionor. No assignment shall be effective, however, unless the assignee has delivered to Optionor a written assumption of Optionee's obligations under this Agreement. Optionor hereby releases Optionee from any obligations under this Agreement arising after the effective date of any assignment of this Agreement by Optionee.

3.4 Value of Conservation Easement; No Power of Eminent Domain. in accordance with the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970, Optionee hereby notifies Optionor that: (i) Optionee believes that the fair market value of the Conservation Easement is an amount equal to the Purchase Price; and (ii) Optionee does not have the power of eminent domain.

3.5 Waivers. No waiver of any breach of any covenant or provision herein contained shall be deemed a waiver of any preceding or succeeding breach thereof, or of any other covenant or provision herein contained.

3.6 Survival of Obligations. Notwithstanding any provision of this Agreement, the covenants, representations, warranties, hold harmless, defense and indemnification obligations made by each party herein shall survive the Closing.

3.7 Successors and Assigns. This Agreement shall be binding upon and shall inure to the benefit of the successors and assigns of the parties hereto.

3.8 Attorneys' Fees. If either party commences an action against the other to interpret or enforce any of the terms of this Agreement or because of the breach by the other party of any of the terms hereof, the losing party shall pay to the prevailing party reasonable attorneys' fees, costs and expenses and court costs and other costs of action incurred in connection with the prosecution or defense of such action, whether or not the action is prosecuted to a final judgment.

3.9 Memorandum of Option. Concurrently with the execution of this Agreement, Optionee and Optionor agree to execute, acknowledge and record a **"Memorandum of Agreement,"** which shall be in the form attached hereto as Exhibit C. Optionor and Optionee shall record the Memorandum of Agreement against the Property in the Official Records of Alleghany County within five (5) days after the Effective Date of this Agreement.

3.10 Entire Agreement. This Agreement (including all exhibits attached hereto) is the final expression of, and contains the entire agreement between, the parties with respect to the subject matter hereof and supersedes all prior understandings with respect thereto. This Agreement may not be modified, changed, supplemented, superseded, canceled or terminated, nor may any obligations hereunder be waived, except by written instrument signed by the party to be charged or by its agent duly authorized in writing or as otherwise expressly permitted herein. Notwithstanding any rule or maxim of construction to the contrary, any ambiguity or uncertainty shall not be construed against either Optionor Optionee based upon authorship of any of the provisions hereof.

3.11 Time of Essence. Optionor and Optionee hereby acknowledge and agree that time is strictly of the essence with respect to each and every term, condition, obligation and provision hereof and that failure to timely perform any of the terms, conditions, obligations or provisions hereof by either party shall constitute a material breach of and a non-curable default under this Agreement by the party so failing to perform.

3.12 Governing Law. The parties hereto acknowledge that this Agreement has been negotiated and entered into in the State of North Carolina. The parties hereto expressly agree that this Agreement shall be governed by, interpreted under, and construed and enforced in accordance with the laws of the State of North Carolina.

3.13 Counterparts. This Agreement may be executed in counterparts, each of which shall be deemed an original, but all of which, together, shall constitute one and the same instrument.

TO OPTIONEE: Wildlands Engineering, Inc.
1430 S. Mint Street, Suite 104
Charlotte, North Carolina 28203
Attention: Robert W. Bugg
eMail: rbugg@wildlandseng.com
Facsimile: (704) 332-3306

TO OPTIONOR: Debbie Edwards
978 NC Hwy. 18 N.
Sparta, NC 28675

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Attention: Robert W. Bugg
eMail: rbugg@wildlandsinc.com

TO OPTIONOR: Steve Mason
13211 Chandler Court
Fredericksburg, VA 22407
eMail: steve.mason@manheim.com

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3.12 Governing Law. The parties hereto acknowledge that this Agreement has been negotiated and entered into in the State of North Carolina. The parties hereto expressly agree that this Agreement shall be governed by, interpreted under, and construed and enforced in accordance with the laws of the State of North Carolina.

eMail: rbugg@wildlandseng.com
Facsimile: (704) 332-3306

TO OPTIONOR: Jessie D. & Regina Perry
157 Stratford Road,
Sparta, NC 28675

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3.5 Value of Conservation Easement; No Power of Eminent Domain. in accordance with the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970, Optionee hereby notifies Optionor that: (i) Optionee believes that the fair market value of the Conservation Easement is an amount equal to the Purchase Price; and (ii) Optionee does not have the power of eminent domain.

3.6 Waivers. No waiver of any breach of any covenant or provision herein contained shall be deemed a waiver of any preceding or succeeding breach thereof, or of any other covenant or provision herein contained.

3.7 Survival of Obligations. Notwithstanding any provision of this Agreement, the covenants, representations, warranties, hold harmless, defense and indemnification obligations made by each party herein shall survive the Closing.

3.8 Successors and Assigns. This Agreement shall be binding upon and shall inure to the benefit of the successors and assigns of the parties hereto.

3.9 Attorneys' Fees. If either party commences an action against the other to interpret or enforce any of the terms of this Agreement or because of the breach by the other party of any of the terms hereof, the losing party shall pay to the prevailing party reasonable attorneys' fees, costs and expenses and court costs and other costs of action incurred in connection with the prosecution or defense of such action, whether or not the action is prosecuted to a final judgment.

3.10 Memorandum of Option. Concurrently with the execution of this Agreement, Optionee and Optionor agree to execute, acknowledge and record a **"Memorandum of Agreement,"** which shall be in the form attached hereto as Exhibit C. Optionor and Optionee shall record the Memorandum of Agreement against the Property in the Official Records of Alleghany County within five (5) days after the Effective Date of this Agreement.

3.11 Entire Agreement. This Agreement (including all exhibits attached hereto) is the final expression of, and contains the entire agreement between, the parties with respect to the subject matter hereof and supersedes all prior understandings with respect thereto. This Agreement may not be modified, changed, supplemented, superseded, canceled or terminated, nor may any obligations hereunder be waived, except by written instrument signed by the party to be charged or by its agent duly authorized in writing or as otherwise expressly permitted herein. Notwithstanding any rule or maxim of construction to the contrary, any ambiguity or uncertainty shall not be construed against either Optionor or Optionee based upon authorship of any of the provisions hereof.

3.12 Time of Essence. Optionor and Optionee hereby acknowledge and agree that time is strictly of the essence with respect to each and every term, condition, obligation and provision hereof and that failure to timely perform any of the terms, conditions, obligations or provisions hereof by either party shall constitute a material breach of and a non-curable default under this Agreement by the party so failing to perform.

3.13 Governing Law. The parties hereto acknowledge that this Agreement has been negotiated and entered into in the State of North Carolina. The parties hereto expressly agree that this Agreement shall be governed by, interpreted under, and construed and enforced in accordance with the laws of the State of North Carolina.

WILDLANDS
ENGINEERING

July 7, 2014

Dale Suiter
US Fish and Wildlife Service
Raleigh Field Office
PO Box 33726
Raleigh, NC 27636

Subject: **Vile Creek Stream & Wetland Mitigation Site**
Alleghany County, North Carolina

Dear Mr. Suiter,

The Vile Creek Stream and Wetlands Mitigation Site has been identified for the purpose of providing in-kind mitigation for unavoidable stream and wetland impacts. Several sections of stream channels throughout the site have been identified as significantly degraded as a result of agricultural activities, including its use as a cattle pasture and farmland. There are areas that are forested as well.

We have already obtained an updated species list for Alleghany County from your web site (http://www.fws.gov/raleigh/species/cntylist/nc_counties.html). The threatened or endangered species for this county are: the green floater (*Lasmigona subviridis*), bog turtle (*Glyptemys muhlenbergii),* tall larkspur *(Delphinium exaltatum),* Gray's lily *(Lilium grayi),* and large-leaved grass-of-parnassus (*Parnassia grandifolia).* We are requesting that you please provide any known information for each species in the county. The USFWS will be contacted if suitable habitat for any listed species is found or if we determine that the project may affect one or more federally listed species or designated critical habitat.

Please provide comments on any possible issues that might emerge with respect to endangered species, migratory birds or other trust resources from the construction of a stream and wetland restoration project on the subject property. A USGS map showing the approximate area of potential ground disturbance is enclosed. The figure was prepared from the Sparta East, 7.5-Minute USGS Topographic Quadrangle. An aerial map is also attached.

If we have not heard from you in 30 days we will assume that you do not have any comments regarding associated laws and that you do not have any information relevant to this project at the current time.

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

Sincerely,

John Hutton
Vice President

1430 South Mint Street, Suite 104 Charlotte, NC 28203 ◦ (P) 704-332-7754 ◦ (F) 704-332-3306

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Asheville Field Office
160 Zillicoa Street
Asheville, North Carolina 28801

August 14, 2014

Mr. John Hutton
Wildlands Engineering
1430 South Mint Street, Suite 104
Charlotte, North Carolina 28203

Dear Mr.Hutton:

Subject: Federally Endangered and Threatened Species Assessment, Vile Creek Stream and Wetland Mitigation Site, Alleghany County, North Carolina

On July 14, 2014, we received a letter from you in which you requested our review and comments on the proposed project. We have reviewed the information presented and we are providing the following comments in accordance with the provisions of the Fish and Wildlife Coordination Act, as amended (16 U.S.C. 661-667e), and section 7 of the Endangered Species Act of 1973, as amended (16 U.S.C. 1531-1543) (Act).

According to the information provided, the Vile Creek Stream and Welands Mitigation Site has been identified as a site to conduct restoration activities to mitigate for unavoidable stream and wetland impacts in the watershed. The site consists of agricultural pasture and farmland, as well as some forested areas. The streams on the site are significantly degraded from the past agricultural practices on the site.

We have no objection to the proposed actions and support any efforts to restore and protect the water quality in the project area. Based on the information provided and a review of our records, we do not believe the subject project is likely to adversely affect federally listed endangered or threatened species or critical habitat. Thus, the requirements of section 7(c) of the Act are fulfilled. However, obligations under section 7 of the Act must be reconsidered if: (1) new information reveals impacts of this identified action that may affect endangered or threatened species or critical habitat in a manner not previously considered, (2) this action is subsequently modified in a manner not considered in this review, or (3) a new species is listed or critical habitat is determined that may be affected by the action.

We appreciate the opportunity to provide these comments. If we can be of assistance or if you have any questions, please do not hesitate to contact Mr. Bryan Tompkins of our staff at 828/258-3939, Ext. 240. In any future correspondence concerning this project, please reference our Log Number 4-2-14-304.

Sincerely,

- - original signed - -

Janet Mizzi
Field Supervisor

John Hutton

From: Cortes, Milton - NRCS, Raleigh, NC <Milton.Cortes@nc.usda.gov>
Sent: Thursday, July 10, 2014 10:13 AM
To: John Hutton
Subject: RE: Stream & Wetland Mitigation Project
Attachments: Stream & Wetland Mitigation Project-response-signed.pdf; Vile Creek AD1006-signed.pdf; Vile_soilsmap.pdf

Importance: High

Mr. Hutton;

Please find attached the letter of response and the AD1006 for this project.

If I can be of further assistance, please let me know.

Have a nice day!

Milton Cortés
Assistant State Soil Scientist/
NC NRCS Hispanic Special Emphasis Program Manager
USDA **Natural Resources Conservation Service**
4407 Bland Rd., Suite 117
Raleigh, NC 27609
(919) 873-2171/ Fax (919) 873-2157
milton.cortes@nc.usda.gov
Helping People Help the Land...

From: John Hutton [mailto:jhutton@wildlandseng.com]
Sent: Wednesday, July 09, 2014 4:29 PM
To: Cortes, Milton - NRCS, Raleigh, NC
Subject: Stream & Wetland Mitigation Project

Hello Milton,

We are beginning work on a stream and wetland mitigation project in Alleghany County for the Ecosystem Enhancement Program. Andrea Eckhardt normally coordinates with you on these projects for us but she is out on maternity leave so I am her stand in. I have attached a draft AD1006 form and soils map for the project. Can you take a look and let me know if you need anything else for your review?

Thank you in advance for your attention to this matter.

. . . . . .

John Hutton | *Vice President*
O: 919.851.9986 x102 **M**: 919.723.8203

Wildlands Engineering, Inc.
312 West Millbrook Road, Suite 225
Raleigh, NC 27609

U.S. Department of Agriculture

FARMLAND CONVERSION IMPACT RATING

PART I *(To be completed by Federal Agency)*	Date Of Land Evaluation Request 7/3/14
Name Of Project Vile Creek Stream & Wetland Mitigation Site	Federal Agency Involved FHWA - NCEEP
Proposed Land Use Stream & Wetland Restoration	County And State Alleghany County, NC
PART II *(To be completed by NRCS)*	Date Request Received By NRCS 7/10/14

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 - 0	Average Farm Size 148 acres	
Major Crop(s) CORN	Farmable Land In Govt. Jurisdiction Acres: 99,057 % 77	Amount Of Farmland As Defined in FPPA Acres: 5,952 % 19	
Name Of Land Evaluation System Used Alleghany Co., NC LESA	Name Of Local Site Assessment System None	Date Land Evaluation Returned By NRCS 7/10/14	

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	27.0			
B. Total Acres To Be Converted Indirectly				
C. Total Acres In Site	27.0	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	9.2			
C. Percentage Of Farmland In County Or Local Govt. Unit To Be Converted	0.2			
D. Percentage Of Farmland In Govt. Jurisdiction With Same Or Higher Relative Value	66.0			
PART V *(To be completed by NRCS)* Land Evaluation Criterion Relative Value Of Farmland To Be Converted *(Scale of 0 to 100 Points)*	33	0	0	0

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	10			
2. Perimeter In Nonurban Use	10	10			
3. Percent Of Site Being Farmed	20	17			
4. Protection Provided By State And Local Government	20	20			
5. Distance From Urban Builtup Area	15	5			
6. Distance To Urban Support Services	15	10			
7. Size Of Present Farm Unit Compared To Average	10	6			
8. Creation Of Nonfarmable Farmland	10	0			
9. Availability Of Farm Support Services	5	5			
10. On-Farm Investments	20	15			
11. Effects Of Conversion On Farm Support Services	10	0			
12. Compatibility With Existing Agricultural Use	10	0			
TOTAL SITE ASSESSMENT POINTS	160	98	0	0	0
PART VII *(To be completed by Federal Agency)*					
Relative Value Of Farmland *(From Part V)*	100	33	0	0	0
Total Site Assessment *(From Part VI above or a local site assessment)*	160	98	0	0	0
TOTAL POINTS *(Total of above 2 lines)*	260	131	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)

WILDLANDS
ENGINEERING

July 7, 2014

Shannon Deaton
North Carolina Wildlife Resource Commission
Division of Inland Fisheries
1721 Mail Service Center
Raleigh, NC 27699

Subject: **Vile Creek Stream & Wetland Mitigation Site**
Alleghany County, North Carolina

Dear Ms. Deaton,

The purpose of this letter is to request review and comment on any possible issues that might emerge with respect to fish and wildlife issues associated with a potential stream and wetland restoration project on the attached site. A USGS map and an aerial map showing the approximate area of potential ground disturbance are enclosed. The topographic figure was prepared from the Sparta East, 7.5-Minute USGS Topographic Quadrangle.

The Vile Creek Stream and Wetland Mitigation Site has been identified for the purpose of providing in-kind mitigation for unavoidable stream and wetland impacts. There are several stream channels located on the site that have been identified as significantly degraded due to past agricultural activities including cattle pasture and farmland. There are forested areas on the site as well.

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

Sincerely,

John Hutton
Vice President

Attachment:
USGS Topographic Map
Aerial Map

John Hutton

From: Besler, Doug A. <doug.besler@ncwildlife.org>
Sent: Monday, August 11, 2014 5:53 AM
To: John Hutton
Cc: Leslie, Andrea J
Subject: Vile Creek Stream & Wetland Mitigation Site

Good morning Mr. Hutton,
We received your letter requesting review and comment on issues associated with the Vile Creek Stream and Wetland Mitigation Site. I forwarded the inquiry to regional staff. In general, we are supportive of the project.

We do not have any wild trout resources in the vicinity of the proposed project. As such, we would not request the trout spawning moratorium for this project. This project has the potential to impact the only known population of Sharpnose darter (Precina oxyrhynchus) in the state and the last remaining population of Green floater (Lasmigona subviridis) known in the New River system in North Carolina. There are also know populations of hellbender and mudpuppies in the vicinity. Also, this system supports bog turtles so we would suggest that the project consider bog turtle habitat requirements when designing wetland enhancement, restoration, or creation. The project should follow Sediment & Erosion Control Practices for Sensitive Watersheds. Runoff of sediment from the site should be closely controlled and monitored.

Please let me know if you have any additonal questions,

Doug

Doug Besler
Mountain Region Fisheries Supervisor
North Carolina Wildlife Resources Commission
645 Fish Hatchery Rd.
Marion, NC 28752
828-659-8684 Ext. 221 (Office)
919-818-7886 (Mobile)
doug.besler@ncwildlife.org

_____

WILDLANDS
ENGINEERING

July 7, 2014

Tyler Howe
Tribal Historic Preservation Specialist
Eastern Band of Cherokee Indians
Tribal Historic Preservation Office
P.O. Box 455
Cherokee, NC 28719

Subject: EEP Wetland and Stream mitigation project in Alleghany County.
Vile Creek Mitigation Project

Dear Mr. Howe,

The Ecosystem Enhancement Program (EEP) requests review and comment on any possible issues that might emerge with respect to archaeological or religious resources associated with a potential wetland and stream restoration project on the attached site (a USGS site map using the Sparta East, NC 7.5 Minute Topographic Quadrangle is enclosed). The figure shows the parcel boundary and areas of potential ground disturbance. A similar letter has been sent to the North Carolina State Preservation Office for compliance with Section 106 of the Historic Preservation Act.

The Vile Creek Mitigation 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. No architectural structures or archeological artifacts have been observed or noted during preliminary surveys of the site for restoration purposes. The majority of the site has historically been disturbed as a result of agricultural activities, including its use as a cattle pasture and farmland.

We ask that you review this site based on the attached information to determine if you know of any existing resources that we need to know about. In addition, please let us know the level your future involvement with this project needs to be (if any).

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

Sincerely,

John Hutton
Vice President

1430 South Mint Street, Suite 104 Charlotte, NC 28203 ◦ (P) 704-332-7754 ◦ (F) 704-332-3306

WILDLANDS
ENGINEERING

August 19, 2015

Marella Buncick
US Fish and Wildlife Service
Asheville Field Office
160 Zillicoa Street
Asheville, NC 28801

Subject: **Vile Creek Stream & Wetland Mitigation Site**
Division of Mitigation Services Full Delivery Project
Alleghany, North Carolina

Dear Ms. Buncick,

The purpose of this letter is to request comment from the USFWS with regard to the recent status change of the Northern long-ear bat (*Myotis septentrionalis)* and the Vile Creek Stream & Wetland Mitigation Site. Construction of the project, located at Latitude: 36°30'26.38"N; Longitude: 81° 6'12.07"W, is scheduled to start August 2016.

Currently, we have an approved Categorical Exclusion from DMS (formerly EEP) for this stream restoration project. We had not received any previous comments from your office with regard to the listed species referenced in our original letter to USFWS dated July 7, 2014.

Please review the attached map, which indicates the 0.60 acre area to be cleared of trees during construction and provide comments on any possible issues that might emerge with respect to the newly listed bat and this particular stream and wetland restoration project. If we have not heard from you in 30 days we will assume that you do not have any comments regarding associated laws and that you do not have any information relevant to this project at the current time.

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

Sincerely,

Ruby Davis
Environmental Scientist

Attachment:
Tree removal map

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Asheville Field Office
160 Zillicoa Street
Asheville, North Carolina 28801

September 14, 2015

Ms. Ruby Davis
Wildlands Engineering
1430 South Mint Street, Suite 104
Charlotte, North Carolina 28203

Dear Ms. Davis:

Subject: Federally Endangered and Threatened Species Assessment, Vile Creek Stream and Wetland Mitigation Site, Alleghany County, North Carolina

On August 19, 2015, we received a letter from you in which you requested our review and comments on the proposed project. We originally provided comments to Wildlands Engineering for this project on August 14, 2014. We have reviewed the information presented and we are providing the following comments in accordance with the provisions of the Fish and Wildlife Coordination Act, as amended (16 U.S.C. 661-667e), and section 7 of the Endangered Species Act of 1973, as amended (16 U.S.C. 1531-1543) (Act).

According to the information provided, the Vile Creek Stream and Welands Mitigation Site has been identified as a site to conduct restoration activities to mitigate for unavoidable stream and wetland impacts in the watershed. The site consists of agricultural pasture and farmland, as well as some forested areas. The streams on the site are significantly degraded from the past agricultural practices on the site. The project will require about 0.6-acre of tree clearing along a section of the creek.

We have no objection to the proposed actions and support any efforts to restore and protect the water quality in the project area. Based on the information provided and a review of our records, we do not believe the subject project is likely to adversely affect federally listed endangered or threatened species or critical habitat. Thus, the requirements of section 7(c) of the Act are fulfilled. However, obligations under section 7 of the Act must be reconsidered if: (1) new information reveals impacts of this identified action that may affect endangered or threatened species or critical habitat in a manner not previously considered, (2) this action is subsequently modified in a manner not considered in this review, or (3) a new species is listed or critical habitat is determined that may be affected by the action.

We appreciate the opportunity to provide these comments. If we can be of assistance or if you have any questions, please do not hesitate to contact Mr. Bryan Tompkins of our staff at 828/258-3939, Ext. 240. In any future correspondence concerning this project, please reference our Log Number 4-2-14-304.

Sincerely,

- - original signed - -

Janet Mizzi
Field Supervisor

APPENDIX 7
FLOODPLAIN REQUIREMENTS CHECKLIST

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:	Vile Creek Mitigation Site
Name if stream or feature:	Vile Creek, Unnamed Tributary 1, and Little River
County:	Alleghany
Name of river basin:	New
Is project urban or rural?	Rural
Name of Jurisdictional municipality/county:	Alleghany County
DFIRM panel number for entire site:	3080 and 3081
Consultant name:	Wildlands Engineering, Inc.
Phone number:	919-851-9986
Address:	312 West Millbrook Road Suite 225 Raleigh, NC 27609

Design Information

The project Involves the restoration and enhancement of 7,955 linear feet (LF) of perennial and intermittent streams and restoration of 6.5 acres of riparian wetlands in Alleghany County, NC. The site is located on an active cattle farm and the streams and wetlands on the site are highly degraded. The will provide 5,139 stream mitigation units (SMUs) and 5.82 riparian wetland mitigation units (WMUs) to offset unavoidable impacts in the New River Basin.

Summarize stream reaches or wetland areas according to their restoration priority.

Reach	Length/Acreage	Priority
Vile Creek Reach 1	920	R-P1
Vile Creek Reach 2	1,260	R-P1
Vile Creek Reach 3	0	EII
UT1 Reach 1	0	EI
UT1 Reach 2	834	R-P
UT1b	0	EII
UT1c	0	EII
UT2	0	EII
UT3	0	EII
Little River	0	EII
Wetland Rehabilitation	3.02	R
Wetland Re-establishment	3.50	R

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
- [x] Detailed Study
- [x] Limited Detail Study
- [ ] Approximate Study
- [ ] Don't know

List flood zone designation:

Check if applies:

- [x] AE Zone
  - ( ) Floodway

- (•) Non-Encroachment
- ( ) None

☐ A Zone

- ( ) Local Setbacks Required
- ( ) No Local Setbacks Required

If local setbacks are required, list how many feet: N/A

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: Kevin Dowell
Phone Number: (336) 372-4257

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

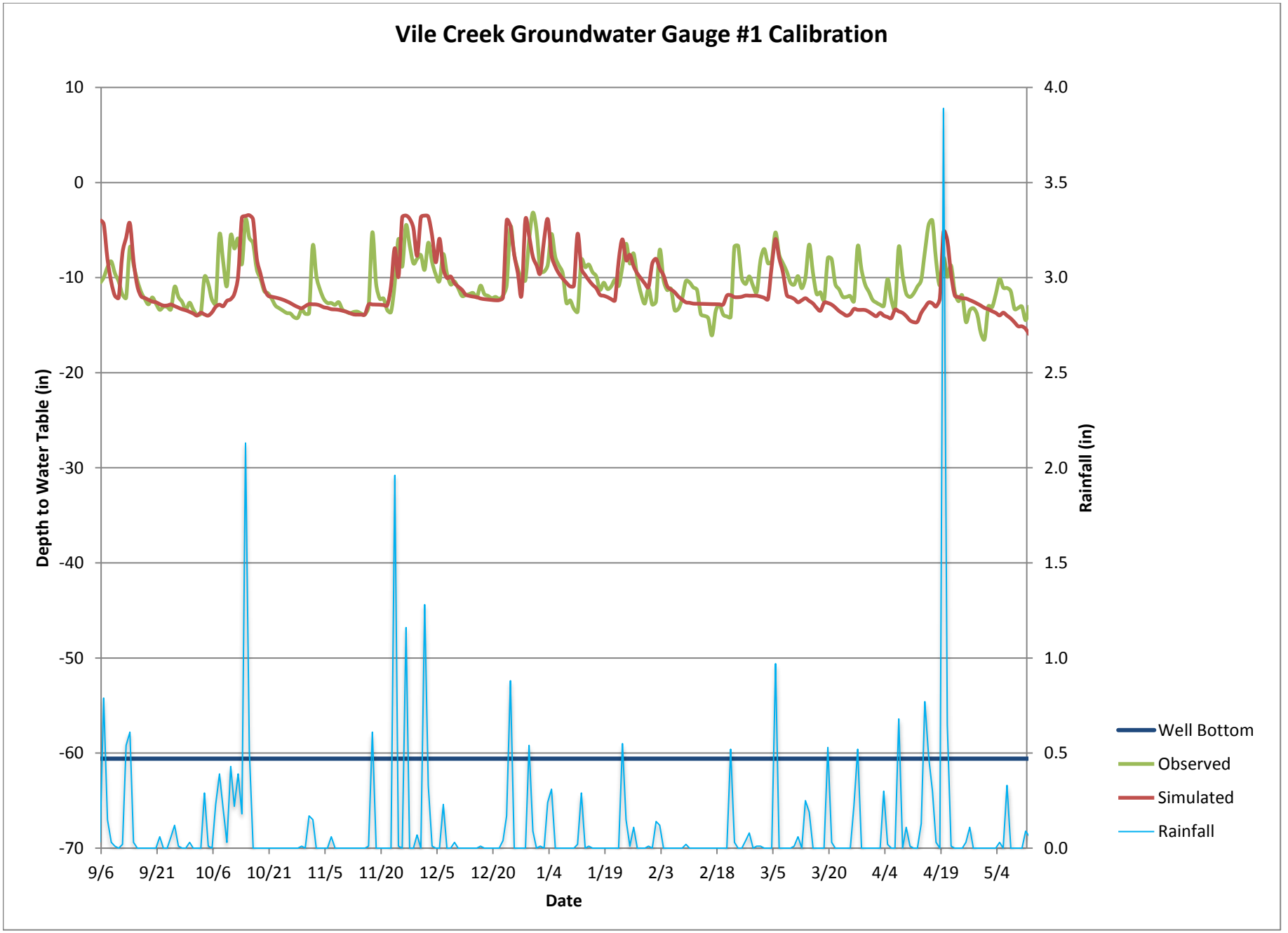
List other requirements:

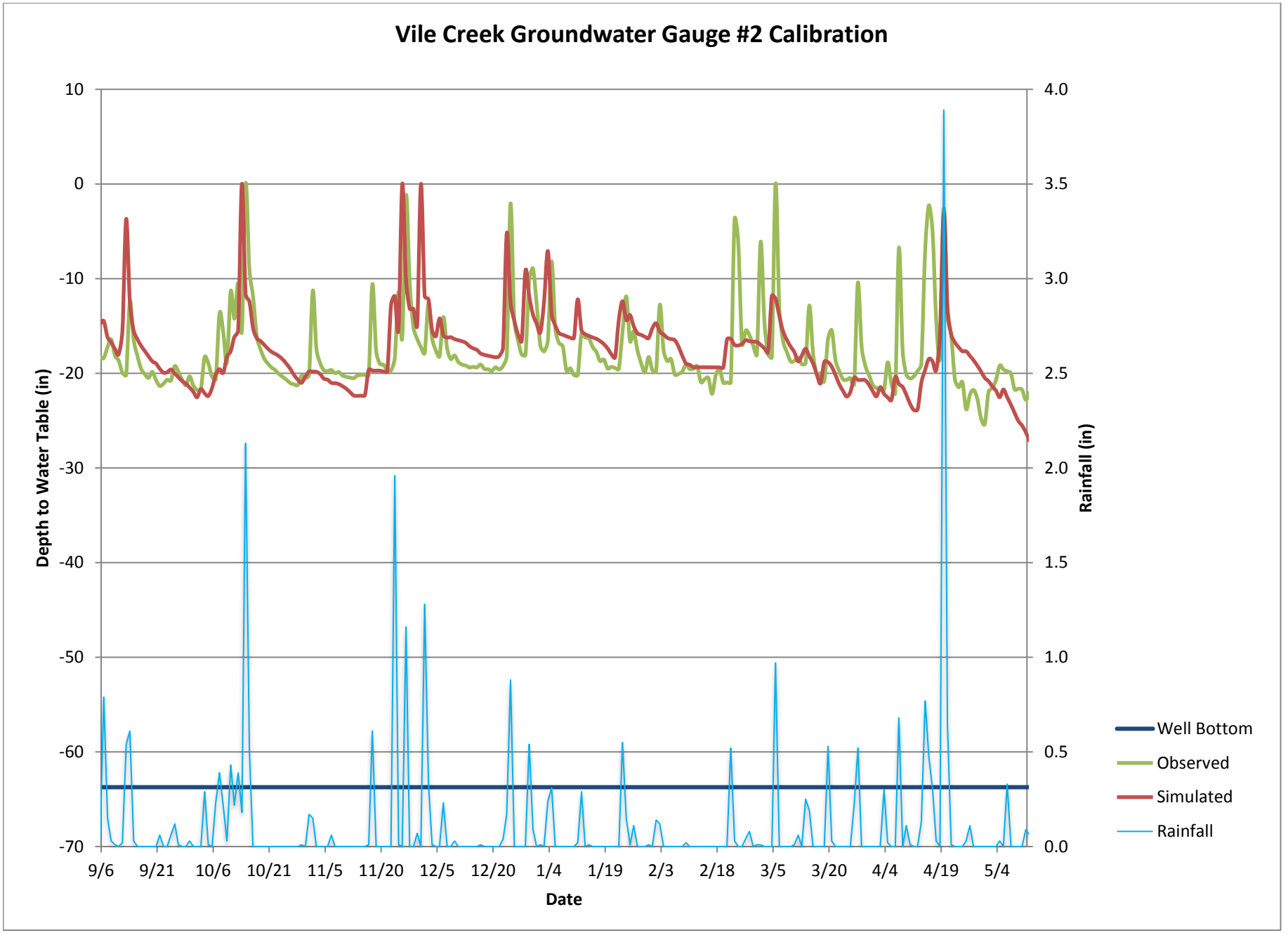
Comments:
It is unclear at this point if a CLOMR will be required or if a no-rise will be possible. Wildlands will perform a flood study and coordinate with NCFMP to make that determination.

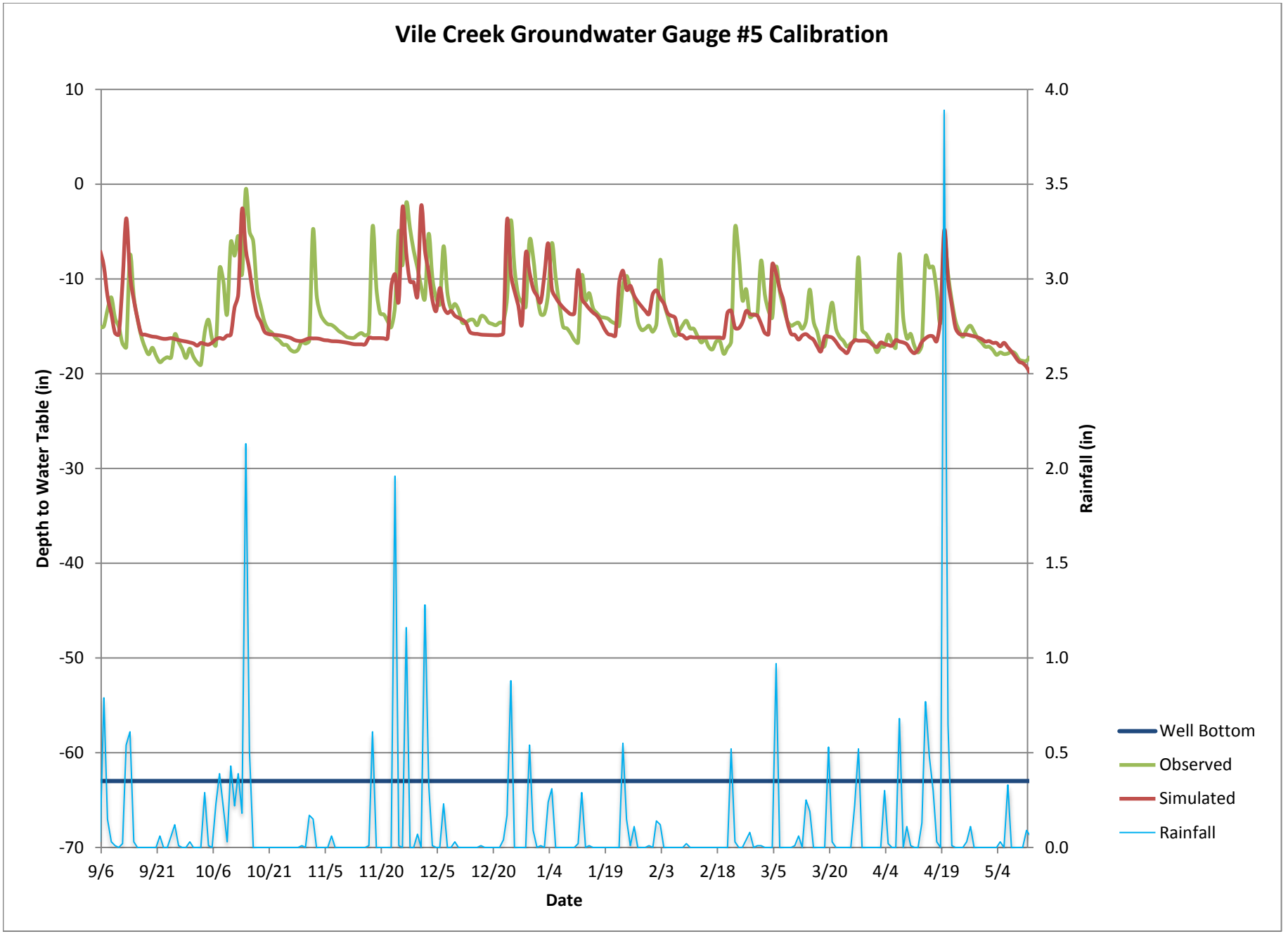
Name: Jeff Keaton, PE Signature:

Title: Senior Water Resources Engineer Date: 9-28-15

APPENDIX 8
DRAINMOD CALIBRATION PLOTS


Vile Creek Groundwater Gauge #1 Calibration
Depth to Water Table (in)
Rainfall (in)
Date
10
0
-10
-20
-30
-40
-50
-60
-70
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
9/6
9/21
10/6
10/21
11/5
11/20
12/5
12/20
1/4
1/19
2/3
2/18
3/5
3/20
4/4
4/19
5/4
Well Bottom
Observed
Simulated
Rainfall


Vile Creek Groundwater Gauge #2 Calibration
Depth to Water Table (in)
Rainfall (in)
Date
10
0
-10
-20
-30
-40
-50
-60
-70
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
9/6
9/21
10/6
10/21
11/5
11/20
12/5
12/20
1/4
1/19
2/3
2/18
3/5
3/20
4/4
4/19
5/4
Well Bottom
Observed
Simulated
Rainfall


Vile Creek Groundwater Gauge #5 Calibration
Depth to Water Table (in)
Rainfall (in)
Date
10
0
-10
-20
-30
-40
-50
-60
-70
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
9/6
9/21
10/6
10/21
11/5
11/20
12/5
12/20
1/4
1/19
2/3
2/18
3/5
3/20
4/4
4/19
5/4
Well Bottom
Observed
Simulated
Rainfall

APPENDIX 9
PRE-CONSTRUCTION NOTIFICATION

Office Use Only:
Corps action ID no. _____
DWQ project no. _____
Form Version 1.3 Dec 10 2008

Pre-Construction Notification (PCN) Form

A. Applicant Information

1. Processing

1a. Type(s) of approval sought from the Corps:	☒ Section 404 Permit ☐ Section 10 Permit	
1b. Specify Nationwide Permit (NWP) number: No. 27 or General Permit (GP) number:		
1c. Has the NWP or GP number been verified by the Corps?	☐ Yes	☒ No
1d. Type(s) of approval sought from the DWQ (check all that apply): ☒ 401 Water Quality Certification – Regular ☐ Non-404 Jurisdictional General Permit ☐ 401 Water Quality Certification – Express ☐ Riparian Buffer Authorization		
1e. Is this notification solely for the record because written approval is not required?	For the record only for DWQ 401 Certification: ☐ Yes ☒ No	For the record only for Corps Permit: ☐ Yes ☒ No
1f. Is payment into a mitigation bank or in-lieu fee program proposed for mitigation of impacts? If so, attach the acceptance letter from mitigation bank or in-lieu fee program.	☐ Yes	☒ No
1g. Is the project located in any of NC's twenty coastal counties. If yes, answer 1h below.	☐ Yes	☒ No
1h. Is the project located within a NC DCM Area of Environmental Concern (AEC)?	☐ Yes	☒ No

2. Project Information

2a. Name of project:	Vile Creek Mitigation Site
2b. County:	Alleghany
2c. Nearest municipality / town:	Sparta, NC
2d. Subdivision name:	N/A
2e. NCDOT only, T.I.P. or state project no:	

3. Owner Information	
3a. Name(s) on Recorded Deed:	1.) Iris Gambill Estate & Gary & Judy Crouse 2.) Iris Gambill Estate & Steve & Tamara Mason 3.) Jessie D. Perry & Regina Perry 4.) Debbie Edwards & Donna Rollins 5.) Wayne D Miles Jr. & Janet Miles
3b. Deed Book and Page No.	1.) DB 347 PN 1445 2.) DB 347 PN 1449 3.) DB 298 PN 1461 4.) DB 348 PN 341 5.) DB 148 PN 3155
3c. Responsible Party (for LLC if applicable):	NCDEQ – Division of Mitigation Services Contact: Tim Baumgartner, Deputy Director
3d. Street address:	217 West Jones Street, Suite 3000A
3e. City, state, zip:	Raleigh, NC 27603
3f. Telephone no.:	919-707-8543
3g. Fax no.:	919-707-8976
3h. Email address:	Tim.Baumgartner@ncdenr.gov
4. Applicant Information (if different from owner)	
4a. Applicant is:	☐ Agent ☒ Other, specify: State agency
4b. Name:	Tim Baumgartner
4c. Business name (if applicable):	NCDEQ- Division of Mitigation Services
4d. Street address:	217 W. Jones St, Suite 3000A
4e. City, state, zip:	Raleigh, NC 27603
4f. Telephone no.:	919-707-8543
4g. Fax no.:	919-707-8976
4h. Email address:	Tim.Baumgartner@ncdenr.gov
5. Agent/Consultant Information (if applicable)	
5a. Name:	Ian Eckardt
5b. Business name (if applicable):	Wildlands Engineering, Inc.
5c. Street address:	1430 South Mint Street, Suite 104
5d. City, state, zip:	Charlotte, NC 28203
5e. Telephone no.:	704-332-7754
5f. Fax no.:	704-332-3306
5g. Email address:	ieckardt@wildlandseng.com

B. Project Information and Prior Project History	
1. Property Identification	
1a. Property identification no. (tax PIN or parcel ID):	PIN#'s 1.) 3081-20-6925 2.) 3081-41-3728 3.) 3081-10-0180 4.) 3081-10-1188 5.) 3081-10-4203
1b. Site coordinates (in decimal degrees):	Upstream Project Limits along Vile Creek: Latitude: 36.509754° N/ Longitude: 81.103348° W Downstream Project Limits along Vile Creek: Latitude: 36.508565° N/ Longitude: 81.096721° W
1c. Property size:	Final protected easement acreage will be 25.04 Acres
2. Surface Waters	
2a. Name of nearest body of water (stream, river, etc.) to proposed project:	Vile Creek & Little River
2b. Water Quality Classification of nearest receiving water:	Class C
2c. River basin:	New River: 05050001
3. Project Description	
3a. Describe the existing conditions on the site and the general land use in the vicinity of the project at the time of this application: The project area is located within a primarily rural watershed in central Alleghany County, NC approximately one-mile northeast of the Town of Sparta. Land use in and immediate adjacent to the project area is a mix of agriculture fields (pasture) and forest. A small amount of adjacent land is also used for low density rural residential.	
3b. List the total estimated acreage of all existing wetlands on the property: Approximately 3.49 acres of wetlands on multiple parcels	
3c. List the total estimated linear feet of all existing streams (intermittent and perennial) on the property: Approximately 8,285 linear feet (LF) of intermittent and perennial channel on multiple parcels.	
3d. Explain the purpose of the proposed project: The purpose of the project is to provide stream and wetland mitigation to offset unavoidable impacts in the New River Basin. Mitigation will include stream restoration and enhancement to approximately 7,927 linear feet of perennial and intermittent streams and restoration of 6.5 acres of riparian wetlands.	
3e. Describe the overall project in detail, including the type of equipment to be used: The project involves restoration and enhancement along the Little River, Vile Creek, and several unnamed tributaries to Vile Creek within the project area. Stream restoration activities will involve excavation of new channel and floodplain, installation of in-stream structures, planting a native riparian buffer and fencing out of cattle. Enhancement I will include raising the stream bed by adding constructed riffles and establishing a riffle cross section sized appropriately for the bankfull discharge in addition to buffer planting and fencing out cattle. Enhancement II will primarily involve fencing out cattle and planting of native riparian buffer. Stream enhancement and restoration will be achieved through natural channel design. Wetland restoration will include rehabilitation and re-establishment. Wetland rehabilitation will involve excavation and fill necessary to improve functionality in existing wetlands. Wetland re-establishment will involve excavation in areas of historic wetlands and buried hydric soils. Trackhoes will be used for stream, wetland, and floodplain work. A conservation easement will be recorded on the project streams and corresponding riparian buffer. See Section 9 of the mitigation plan for additional design information.	

4. Jurisdictional Determinations	
4a. Have jurisdictional wetland or stream determinations by the Corps or State been requested or obtained for this property / project (including all prior phases) in the past? Comments:	☒ Yes ☐ No ☐ Unknown
4b. If the Corps made the jurisdictional determination, what type of determination was made?	☒ Preliminary ☐ Final
4c. If yes, who delineated the jurisdictional areas? Name (if known): Ian Eckardt	Agency/Consultant Company: Wildlands Engineering, Inc. Other:
4d. If yes, list the dates of the Corps jurisdictional determinations or State determinations and attach documentation. A Jurisdictional Determination was issued by Tasha Alexander of the USACE on October 28, 2015. A copy of the issued Preliminary Jurisdictional Determination is included in Appendix 2 (Action Id. 2014-01585).	
5. Project History	
5a. Have permits or certifications been requested or obtained for this project (including all prior phases) in the past?	☐ Yes ☒ No ☐ Unknown
5b. If yes, explain in detail according to “help file” instructions.	
6. Future Project Plans	
6a. Is this a phased project?	☐ Yes ☒ No
6b. If yes, explain.	

C. Proposed Impacts Inventory

1. Impacts Summary

1a. Which sections were completed below for your project (check all that apply):

☒ Wetlands ☒ Streams - tributaries ☐ Buffers

☐ Open Waters ☐ Pond Construction

2. Wetland Impacts

If there are wetland impacts proposed on the site, then complete this question for each wetland area impacted.

2a. Wetland impact number – Permanent (P) or Temporary (T)	2b. Type of impact	2c. Type of wetland (if known)	2d. Forested	2e. Type of jurisdiction (Corps - 404, 10 DWQ – non-404, other)	2f. Area of impact (acres)
W1 – Wetland A ☐ P ☒ T	Excavation– wetland rehabilitation	Bottomland Hardwood Forest	☐ Yes ☒ No	☒ Corps ☒ DWQ	0.10
W2 – Wetland B ☐ P ☒ T	Excavation – wetland rehabilitation	Bottomland Hardwood Forest	☐ Yes ☒ No	☒ Corps ☒ DWQ	0.43
W3 – Wetland B ☐ P ☒ T	Fill – wetland rehabilitation	Bottomland Hardwood Forest	☐ Yes ☒ No	☒ Corps ☒ DWQ	0.04
W4– Wetland B ☒ P ☐ T	Excavation – stream channel construction	Bottomland Hardwood Forest	☐ Yes ☒ No	☒ Corps ☒ DWQ	0.003
W5– Wetland C ☐ P ☒ T	Excavation – wetland rehabilitation	Bottomland Hardwood Forest	☐ Yes ☒ No	☒ Corps ☒ DWQ	0.35
W6 – Wetland C ☐ P ☒ T	Fill – wetland rehabilitation	Bottomland Hardwood Forest	☐ Yes ☒ No	☒ Corps ☒ DWQ	0.01
W7 – Wetland C ☐ P ☒ T	Excavation – wetland rehabilitation	Bottomland Hardwood Forest	☐ Yes ☒ No	☒ Corps ☒ DWQ	0.88
W8 – Wetland C ☐ P ☒ T	Fill – wetland rehabilitation	Bottomland Hardwood Forest	☐ Yes ☒ No	☒ Corps ☒ DWQ	0.06
W9 – Wetland C ☐ P ☒ T	Fill – wetland rehabilitation	Bottomland Hardwood Forest	☐ Yes ☒ No	☒ Corps ☒ DWQ	0.01
W10 – Wetland C ☒ P ☐ T	Excavation – stream channel construction	Bottomland Hardwood Forest	☐ Yes ☒ No	☒ Corps ☒ DWQ	0.01
W11 – Wetland D ☐ P ☒ T	Construction access	Headwater forest	☐ Yes ☒ No	☒ Corps ☒ DWQ	0.06
W12 – Wetland E ☐ P ☒ T	Construction access	Seep	☐ Yes ☒ No	☒ Corps ☒ DWQ	0.04
W13 – Wetland F ☐ P ☒ T	Fill – wetland rehabilitation	Bottomland Hardwood Forest	☐ Yes ☒ No	☒ Corps ☒ DWQ	0.06
W14 – Wetland F ☐ P ☒ T	Excavation – wetland rehabilitation	Bottomland Hardwood Forest	☐ Yes ☒ No	☒ Corps ☒ DWQ	0.01
W15 – Wetland G ☐ P ☒ T	Construction access	Headwater Forest	☐ Yes ☒ No	☒ Corps ☒ DWQ	0.08
W16– Wetland H ☐ P ☒ T	Construction access	Headwater Forest	☐ Yes ☒ No	☒ Corps ☒ DWQ	0.02
W17 – Wetland I ☐ P ☒ T	Construction access	Headwater Forest	☐ Yes ☒ No	☒ Corps ☒ DWQ	0.002
W18– Wetland J ☐ P ☒ T	Construction access	Headwater forest	☐ Yes ☒ No	☒ Corps ☒ DWQ	0.01
W19 – Wetland K ☐ P ☒ T	Construction access	Headwater Forest	☐ Yes ☒ No	☒ Corps ☒ DWQ	0.02
W20 – Wetland L ☐ P ☒ T	Construction access	Headwater forest	☐ Yes ☒ No	☒ Corps ☒ DWQ	0.005

W21 – Wetland M ☒ P ☐ T	Excavation – stream channel construction	Bottomland Hardwood Forest	☒ Yes ☐ No	☒ Corps ☒ DWQ	0.02
W22 – Wetland M ☒ P ☐ T	Fill – floodplain grading	Bottomland Hardwood Forest	☒ Yes ☐ No	☒ Corps ☒ DWQ	0.01
W23 – Wetland M ☒ P ☐ T	Excavation – stream channel construction	Bottomland Hardwood Forest	☒ Yes ☐ No	☒ Corps ☒ DWQ	0.01
W24 – Wetland M ☐ P ☒ T	Fill – wetland rehabilitation	Bottomland Hardwood Forest	☒ Yes ☐ No	☒ Corps ☒ DWQ	0.02
W25 – Wetland M ☐ P ☒ T	Fill – wetland rehabilitation	Bottomland Hardwood Forest	☒ Yes ☐ No	☒ Corps ☒ DWQ	0.01
W26 – Wetland N ☐ P ☒ T	Excavation – wetland rehabilitation	Bottomland Hardwood Forest	☐ Yes ☒ No	☒ Corps ☒ DWQ	0.07
W27– Wetland N ☐ P ☒ T	Fill – wetland rehabilitation	Bottomland Hardwood Forest	☐ Yes ☒ No	☒ Corps ☒ DWQ	0.04
W28 – Wetland N ☒ P ☐ T	Excavation – stream channel construction	Bottomland Hardwood Forest	☐ Yes ☒ No	☒ Corps ☒ DWQ	0.15
W29 – Wetland N ☐ P ☒ T	Fill – wetland rehabilitation	Bottomland Hardwood Forest	☐ Yes ☒ No	☒ Corps ☒ DWQ	0.02
W30 – Wetland N ☒ P ☐ T	Excavation – stream channel construction	Bottomland Hardwood Forest	☐ Yes ☒ No	☒ Corps ☒ DWQ	0.01
W31 – Wetland N ☒ P ☐ T	Fill – floodplain grading	Bottomland Hardwood Forest	☐ Yes ☒ No	☒ Corps ☒ DWQ	0.01
W32 – Wetland P ☐ P ☒ T	Construction access	Bottomland Hardwood Forest	☐ Yes ☒ No	☒ Corps ☒ DWQ	0.04
W33 – Wetland O ☐ P ☒ T	Excavation – wetland rehabilitation	Bottomland Hardwood Forest	☐ Yes ☐ No	☒ Corps ☒ DWQ	0.27
W34 – Wetland O ☐ P ☒ T	Fill – wetland rehabilitation	Bottomland Hardwood Forest	☐ Yes ☒ No	☒ Corps ☒ DWQ	0.02
W35 – Wetland O ☐ P ☒ T	Excavation – wetland rehabilitation	Bottomland Hardwood Forest	☐ Yes ☒ No	☒ Corps ☒ DWQ	0.17
W36 – Wetland O ☐ P ☒ T	Fill – wetland rehabilitation	Bottomland Hardwood Forest	☐ Yes ☒ No	☒ Corps ☒ DWQ	0.06
W37– Wetland O ☒ P ☐ T	Excavation – stream channel construction	Bottomland Hardwood Forest	☐ Yes ☒ No	☒ Corps ☒ DWQ	0.004
W38 – Wetland Q ☐ P ☒ T	Construction access	Bottomland Hardwood Forest	☐ Yes ☒ No	☒ Corps ☒ DWQ	0.04
W39 – Wetland S ☐ P ☒ T	Construction access/stream stabilization	Headwater Forest	☐ Yes ☒ No	☒ Corps ☒ DWQ	0.01
W40 – Wetland S ☒ P ☐ T	Fill – BMP construction	Headwater Forest	☐ Yes ☒ No	☒ Corps ☒ DWQ	0.001
W41 – Wetland T ☐ P ☒ T	Construction access/stream stabilization	Headwater Forest	☐ Yes ☒ No	☒ Corps ☒ DWQ	0.03
W42 – Wetland U ☐ P ☒ T	Construction access/stream stabilization	Headwater Forest	☐ Yes ☒ No	☒ Corps ☒ DWQ	0.005
W43 – Wetland V ☐ P ☒ T	Construction access/stabilization	Headwater Forest	☐ Yes ☒ No	☒ Corps ☒ DWQ	0.004
				2g. **Total wetland impacts**	3.224

2h. Comments: The project proposes a net gain of approximately 3.5 acres of wetlands through re-establishment techniques.

3. Stream Impacts

If there are perennial or intermittent stream impacts (including temporary impacts) proposed on the site, then complete this question for all stream sites impacted.

3a. Stream impact number - Permanent (P) or Temporary (T)	3b. Type of impact	3c. Stream name	3d. Perennial (PER) or intermittent (INT)?	3e. Type of jurisdiction (Corps - 404, 10 DWQ – non-404, other)	3f. Average stream width (feet)	3g. Impact length (linear feet)
S1 ☐ P ☒ T	Relocate/Fill/Excavate	Vile Creek - Reach 1	☒ PER ☐ INT	☒ Corps ☒ DWQ	19	927
S2 ☐ P ☒ T	Relocate/Fill/Excavate	Vile Creek – Reach 2	☒ PER ☐ INT	☒ Corps ☒ DWQ	22	1,293
S3 ☐ P ☒ T	Stabilization	Vile Creek – Reach 3 (Stations 123+13 to 125+00)	☒ PER ☐ INT	☒ Corps ☒ DWQ	35	187
S4 ☐ P ☒ T	Stabilization	UT1 – Reach 1 (Stations 201+57 to 209+00)	☒ PER ☐ INT	☒ Corps ☒ DWQ	8	743
S5 ☐ P ☒ T	Relocate/Fill/Excavate	UT1 – Reach 1 (Stations 209+00 to 213+09)	☒ PER ☐ INT	☒ Corps ☒ DWQ	8	409
S6 ☐ P ☒ T	Relocate/Fill/Excavate	UT1 – Reach 2	☒ PER ☐ INT	☒ Corps ☒ DWQ	19	882
S7 ☐ P ☒ T	Culvert removal / Stabilization	UT1B	☐ PER ☒ INT	☒ Corps ☒ DWQ	3	15
S8 ☐ P ☒ T	Temporary construction crossing (mud mat)	UT1C – Station 271+82	☐ PER ☒ INT	☒ Corps ☒ DWQ	3	15
S9 ☐ P ☒ T	Stabilization	UT2 (Stations 300+65 to 308+00)	☒ PER ☐ INT	☒ Corps ☒ DWQ	5	735
				3h. **Total stream and tributary impacts**		5,206

3i. Comments: Impacts are temporary enhancement and restoration activities that will result in an increase in resource function. The majority of Vile Reach 3 will only be planted and fenced however minor stream work including a constructed riffle will be installed near the top of the reach (Station 123+13 to 125+00).

4. Open Water Impacts

If there are proposed impacts to lakes, ponds, estuaries, tributaries, sounds, the Atlantic Ocean, or any other open water of the U.S. then individually list all open water impacts below.

4a. Open water impact number – Permanent (P) or Temporary (T)	4b. Name of waterbody (if applicable)	4c. Type of impact	4d. Waterbody type	4e. Area of impact (acres)
O1 ☐ P ☐ T				
O2 ☐ P ☐ T				
O3 ☐ P ☐ T				
			4f. Total open water impacts	

4g. Comments:

5. Pond or Lake Construction

If pond or lake construction proposed, then complete the chart below.

5a. Pond ID number	5b. Proposed use or purpose of pond	5c. Wetland Impacts (acres)			5d. Stream Impacts (feet)			5e. Upland (acres)
		Flooded	Filled	Excavated	Flooded	Filled	Excavated	Flooded
P1								
P2								
	5f. Total							

5g. Comments:

5h. Is a dam high hazard permit required?	☐ Yes ☐ No If yes, permit ID no:
5i. Expected pond surface area (acres):	
5j. Size of pond watershed (acres):	
5k. Method of construction:	

6. Buffer Impacts (for DWQ)

If project will impact a protected riparian buffer, then complete the chart below. If yes, then individually list all buffer impacts below. If any impacts require mitigation, then you **MUST** fill out Section D of this form.

6a. Project is in which protected basin?	☐ Neuse ☐ Tar-Pamlico ☐ Other: ☐ Catawba ☐ Randleman

6b. Buffer impact number – Permanent (P) or Temporary (T)	6c. Reason for impact	6d. Stream name	6e. Buffer mitigation required?	6f. Zone 1 impact (square feet)	6g. Zone 2 impact (square feet)
B1 ☐ P ☐ T			☐ Yes ☐ No		
B2 ☐ P ☐ T			☐ Yes ☐ No		
B3 ☐ P ☐ T			☐ Yes ☐ No		
		6h. **Total buffer impacts**			

6i. Comments:

D. Impact Justification and Mitigation

1. Avoidance and Minimization

1a. Specifically describe measures taken to avoid or minimize the proposed impacts in designing project.

Due to the nature of stream and wetland mitigation projects, impacts to on-site resources are necessary. Stream restoration and enhancement will use natural channel design techniques throughout to have an overall positive impact, enhancing and restoring stream function and habitat by improving bed features in the streams and establishing flood storage. Stream and wetland impacts will be avoided or minimized to project reaches that exhibit less instability and incision. These reaches are generally proposed for Enhancement II which will primarily only involve riparian buffer planting and fencing out cattle. Proposed stream alignments for restoration reaches were designed to avoid existing wetlands as much as possible while still reconnecting the channels with the riparian wetlands. The majority of wetland impacts are excavation or fill necessary for wetland restoration. The majority of impacts, approximately 2.62 acres, are proposed to Wetlands B, C, N, and O. These wetlands are proposed for bog habitat and will involve excavation to remove old dredging sidecasts and to establish new topography. The project proposes a net gain of approximately 3.5 acres of riparian wetlands. Existing wetlands are currently grazed by cattle.

1b. Specifically describe measures taken to avoid or minimize the proposed impacts through construction techniques.

During construction, Priority I restoration will involve constructing offline channel sections which will minimize sedimentation from these areas. Newly constructed channel banks will be stabilized using biodegradable coir fiber matting, seeded, and planted with native riparian species. During construction culverts and mud mats will be utilized for temporary crossings. Construction practices will follow guidelines from the NC Erosion and Sediment Control Planning and Design Manual.

2. Compensatory Mitigation for Impacts to Waters of the U.S. or Waters of the State

2a. Does the project require Compensatory Mitigation for impacts to Waters of the U.S. or Waters of the State?	☐ Yes ☒ No
2b. If yes, mitigation is required by (check all that apply):	☐ DWQ ☐ Corps
2c. If yes, which mitigation option will be used for this project?	☐ Mitigation bank ☐ Payment to in-lieu fee program ☐ Permittee Responsible Mitigation

3. Complete if Using a Mitigation Bank

3a. Name of Mitigation Bank:

3b. Credits Purchased (attach receipt and letter)	Type	Quantity

3c. Comments:

4. Complete if Making a Payment to In-lieu Fee Program

4a. Approval letter from in-lieu fee program is attached.	☐ Yes
4b. Stream mitigation requested:	linear feet
4c. If using stream mitigation, stream temperature:	☐ warm ☐ cool ☐ cold
4d. Buffer mitigation requested (DWQ only):	square feet
4e. Riparian wetland mitigation requested:	acres
4f. Non-riparian wetland mitigation requested:	acres
4g. Coastal (tidal) wetland mitigation requested:	acres

4h. Comments:

5. Complete if Using a Permittee Responsible Mitigation Plan

5a. If using a permittee responsible mitigation plan, provide a description of the proposed mitigation plan.

6. Buffer Mitigation (State Regulated Riparian Buffer Rules) – required by DWQ

6a. Will the project result in an impact within a protected riparian buffer that requires buffer mitigation?	☐ Yes ☒ No

6b. If yes, then identify the square feet of impact to each zone of the riparian buffer that requires mitigation. Calculate the amount of mitigation required.

Zone	6c. Reason for impact	6d. Total impact (square feet)	Multiplier	6e. Required mitigation (square feet)
Zone 1			3 (2 for Catawba)	
Zone 2			1.5	
	6f. **Total buffer mitigation required:**			

6g. If buffer mitigation is required, discuss what type of mitigation is proposed (e.g., payment to private mitigation bank, permittee responsible riparian buffer restoration, payment into an approved in-lieu fee fund).

6h. Comments:

E. Stormwater Management and Diffuse Flow Plan (required by DWQ)	
1. Diffuse Flow Plan	
1a. Does the project include or is it adjacent to protected riparian buffers identified within one of the NC Riparian Buffer Protection Rules?	☐ Yes ☒ No
1b. If yes, then is a diffuse flow plan included? If no, explain why. Comments: The project is located in the New River Watershed (HUC 05050001) which isn't included with the NC Riparian Buffer Protection Rules.	☐ Yes ☐ No
2. Stormwater Management Plan	
2a. What is the overall percent imperviousness of this project?	0%
2b. Does this project require a Stormwater Management Plan?	☐ Yes ☒ No
2c. If this project DOES NOT require a Stormwater Management Plan, explain why: This project involves the restoration and enhancement of on-site jurisdictional streams and wetlands. No increase in impervious cover will result from the construction of this project.	
2d. If this project DOES require a Stormwater Management Plan, then provide a brief, narrative description of the plan:	
2e. Who will be responsible for the review of the Stormwater Management Plan?	☐ Certified Local Government ☐ DWQ Stormwater Program ☐ DWQ 401 Unit
3. Certified Local Government Stormwater Review	
3a. In which local government's jurisdiction is this project?	
3b. Which of the following locally-implemented stormwater management programs apply (check all that apply):	☐ Phase II ☐ NSW ☐ USMP ☐ Water Supply Watershed ☐ Other:
3c. Has the approved Stormwater Management Plan with proof of approval been attached?	☐ Yes ☐ No
4. DWQ Stormwater Program Review	
4a. Which of the following state-implemented stormwater management programs apply (check all that apply):	☐ Coastal counties ☐ HQW ☐ ORW ☐ Session Law 2006-246 ☐ Other:
4b. Has the approved Stormwater Management Plan with proof of approval been attached?	☐ Yes ☐ No
5. DWQ 401 Unit Stormwater Review	
5a. Does the Stormwater Management Plan meet the appropriate requirements?	☐ Yes ☐ No
5b. Have all of the 401 Unit submittal requirements been met?	☐ Yes ☐ No

F. Supplementary Information		
1. Environmental Documentation (DWQ Requirement)		
1a. Does the project involve an expenditure of public (federal/state/local) funds or the use of public (federal/state) land?	☒ Yes	☐ No
1b. If you answered "yes" to the above, does the project require preparation of an environmental document pursuant to the requirements of the National or State (North Carolina) Environmental Policy Act (NEPA/SEPA)?	☒ Yes	☐ No
1c. If you answered "yes" to the above, has the document review been finalized by the State Clearing House? (If so, attach a copy of the NEPA or SEPA final approval letter.) Comments: The approved Categorical Exclusion is attached in Appendix 6 of the mitigation plan.	☒ Yes	☐ No
2. Violations (DWQ Requirement)		
2a. Is the site in violation of DWQ Wetland Rules (15A NCAC 2H .0500), Isolated Wetland Rules (15A NCAC 2H .1300), DWQ Surface Water or Wetland Standards, or Riparian Buffer Rules (15A NCAC 2B .0200)?	☐ Yes	☒ No
2b. Is this an after-the-fact permit application?	☐ Yes	☒ No
2c. If you answered "yes" to one or both of the above questions, provide an explanation of the violation(s):		
3. Cumulative Impacts (DWQ Requirement)		
3a. Will this project (based on past and reasonably anticipated future impacts) result in additional development, which could impact nearby downstream water quality?	☐ Yes	☒ No
3b. If you answered "yes" to the above, submit a qualitative or quantitative cumulative impact analysis in accordance with the most recent DWQ policy. If you answered "no," provide a short narrative description. This is a stream and wetland mitigation project and will not cause an increase in development nor will it negatively impact downstream water quality. The project area will be protected in perpetuity from future development through a conservation easement.		
4. Sewage Disposal (DWQ Requirement)		
4a. Clearly detail the ultimate treatment methods and disposition (non-discharge or discharge) of wastewater generated from the proposed project, or available capacity of the subject facility.		

5. Endangered Species and Designated Critical Habitat (Corps Requirement)	
5a. Will this project occur in or near an area with federally protected species or habitat?	☒ Yes ☐ No
5b. Have you checked with the USFWS concerning Endangered Species Act impacts?	☒ Yes ☐ No
5c. If yes, indicate the USFWS Field Office you have contacted.	☐ Raleigh ☒ Asheville

5d. What data sources did you use to determine whether your site would impact Endangered Species or Designated Critical Habitat?

Utilized the U.S. Fish and Wildlife Service (USFWS) database in order to identify federally listed Threatened and Endangered plant and animal species for Ashe County, NC. Two federally protected threatened or endangered species are listed for Alleghany County including the bog turtle (*Glyptempys muhlenbergii*) and the Northern long-eared bat (*Myotis septentrionlalis*). Review and comment from the USFWS was requested on potential project impacts to threatened and endangered species. The USFWS commented that "the subject project is not likely to adversely affect any federally-listed endangered or threatened species, their formally designated habitat, or species currently proposed for listing." Correspondence with the USFWS is included in Appendix 6 of the mitigation plan.

6. Essential Fish Habitat (Corps Requirement)	
6a. Will this project occur in or near an area designated as essential fish habitat?	☐ Yes ☒ No

6b. What data sources did you use to determine whether your site would impact Essential Fish Habitat?

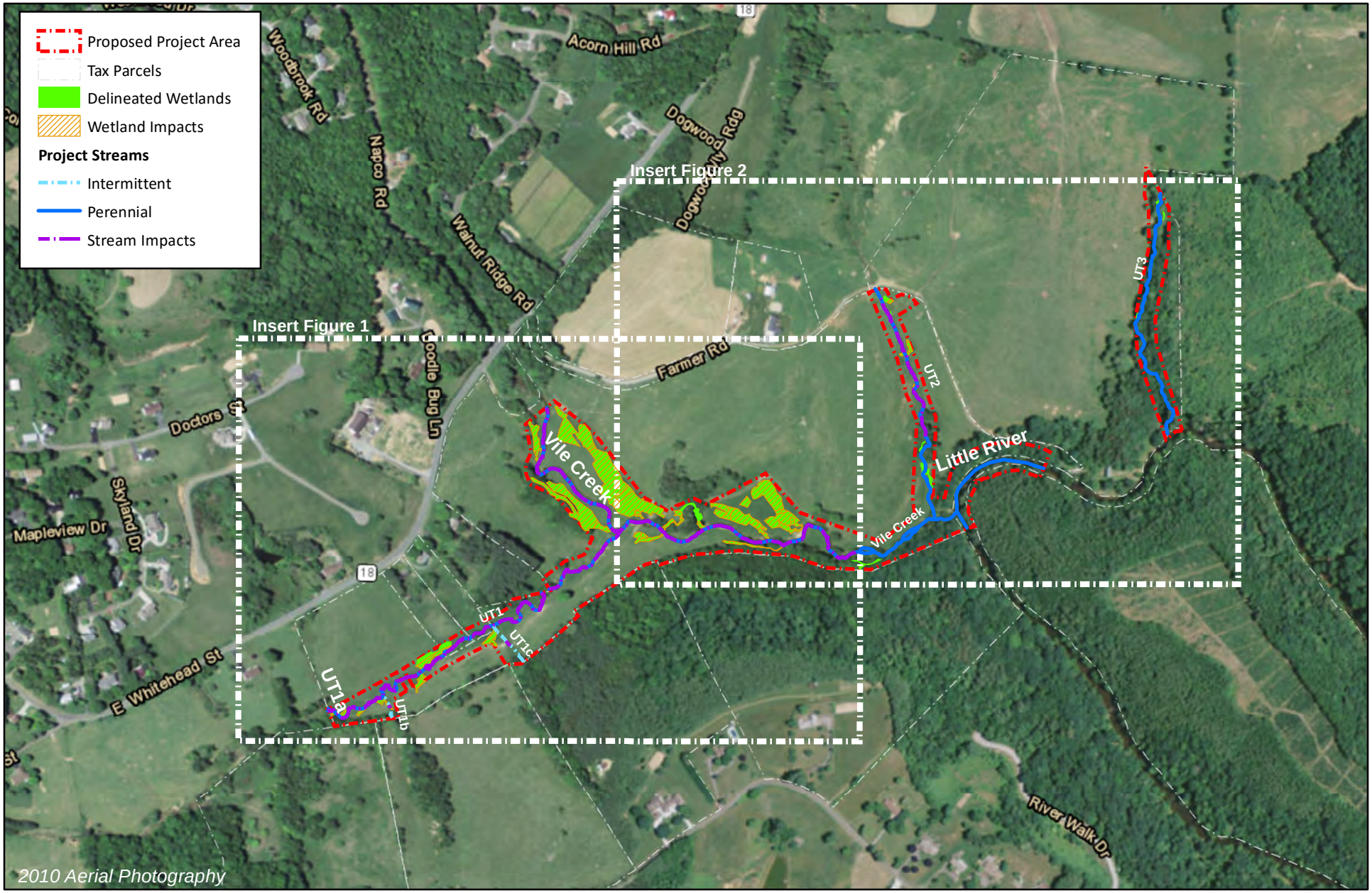
In addition to the USFWS, the NC Wildlife Resource Commission (NCWRC) were contacted for comment related to wildlife issues associated with the proposed project (see correspondence in Appendix 6 of the mitigation plan). The NCWRC commented that they "are supportive of the project" however there is a potential to affect habitat for the sharpnose darter (*Precina oxyrhynchus*) and green floater (*Lasmigona subviridis*) as well as known populations of hellbender and mudpuppies. They requested that bog turtle habitat requirements be considered in the design of wetlands.

7. Historic or Prehistoric Cultural Resources (Corps Requirement)	
7a. Will this project occur in or near an area that the state, federal or tribal governments have designated as having historic or cultural preservation status (e.g., National Historic Trust designation or properties significant in North Carolina history and archaeology)?	☐ Yes ☒ No

7b. What data sources did you use to determine whether your site would impact historic or archeological resources?

The NC State Historic Preservation Office (SHPO) was contacted regarding the presence historic properties or cultural resources within the project area. SHPO responded on 7/25/14 and stated they were "aware of no historic resources that would be affected by the project "(see correspondence in Appendix 6 of the mitigation plan).

8. Flood Zone Designation (Corps Requirement)		
8a. Will this project occur in a FEMA-designated 100-year floodplain?	☒ Yes	☐ No
8b. If yes, explain how project meets FEMA requirements: Within the project area Vile Creek, UT1, and the Little River are mapped in Zone AE Special Flood Hazard Area. Base flood elevations have been defined and non-encroachment limits have been published in the Alleghany County Flood Insurance Study (FIS). The project was designed to avoid adverse floodplain impacts within the mapped areas described above or on adjacent parcels. There are no hydrologic trespass concerns or risks associated with the proposed project activities. The NC DMS Floodplain Requirements Checklist is included in Appendix 7 of the mitigation plan.		
8c. What source(s) did you use to make the floodplain determination? Alleghany County Flood Insurance Rate Map Panels 3080 and 3081		
Tim Baumgartner Deputy Director, NCDEQ - DMS Applicant/Agent's Printed Name	_____ Applicant/Agent's Signature (Agent's signature is valid only if an authorization letter from the applicant is provided.)	Date



WILDLANDS ENGINEERING

0 250 500 1,000 Feet

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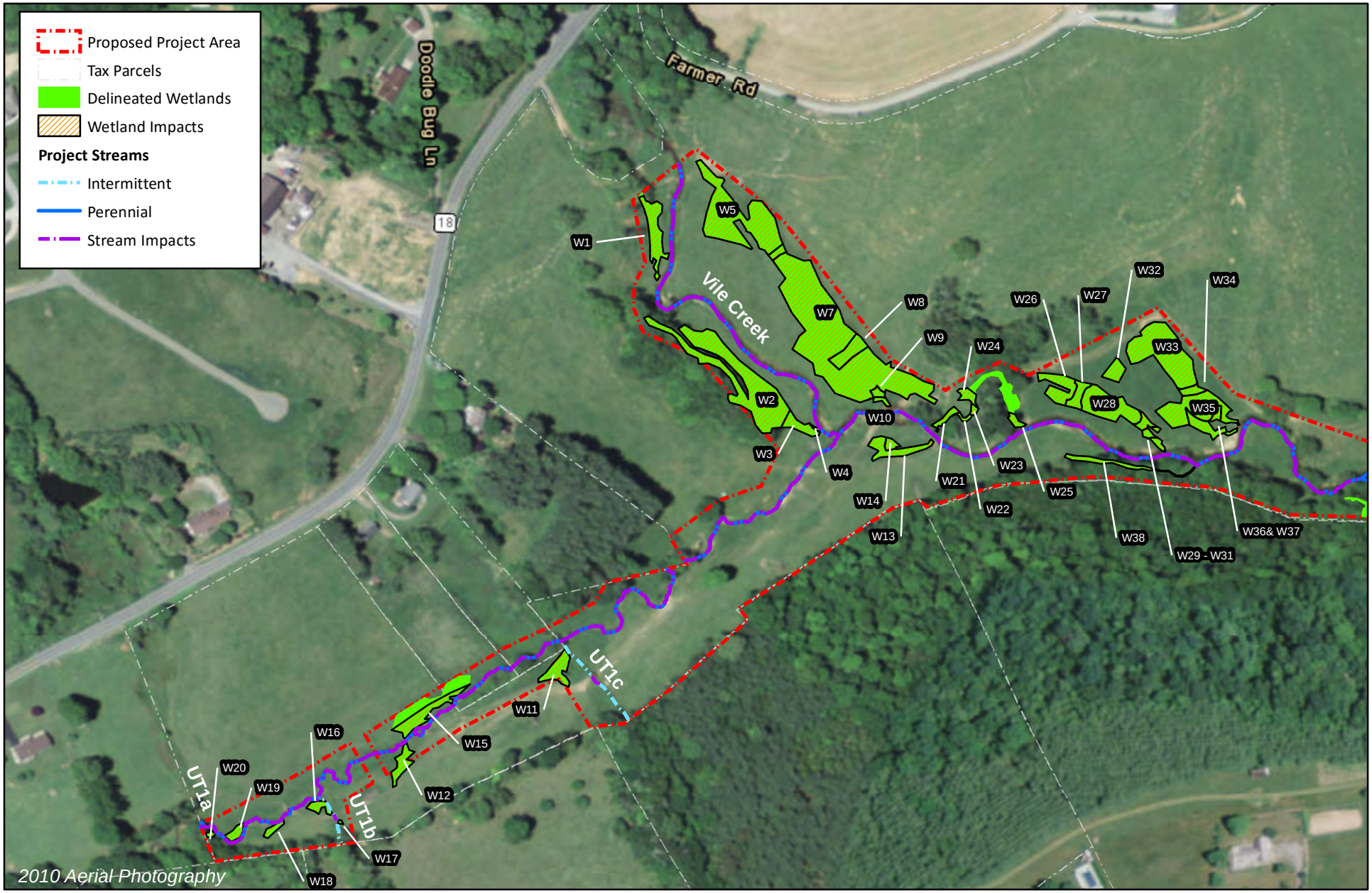
Overall Impact Figure
Vile Creek Mitigation Site
New River Basin 05050001

Alleghany County, NC



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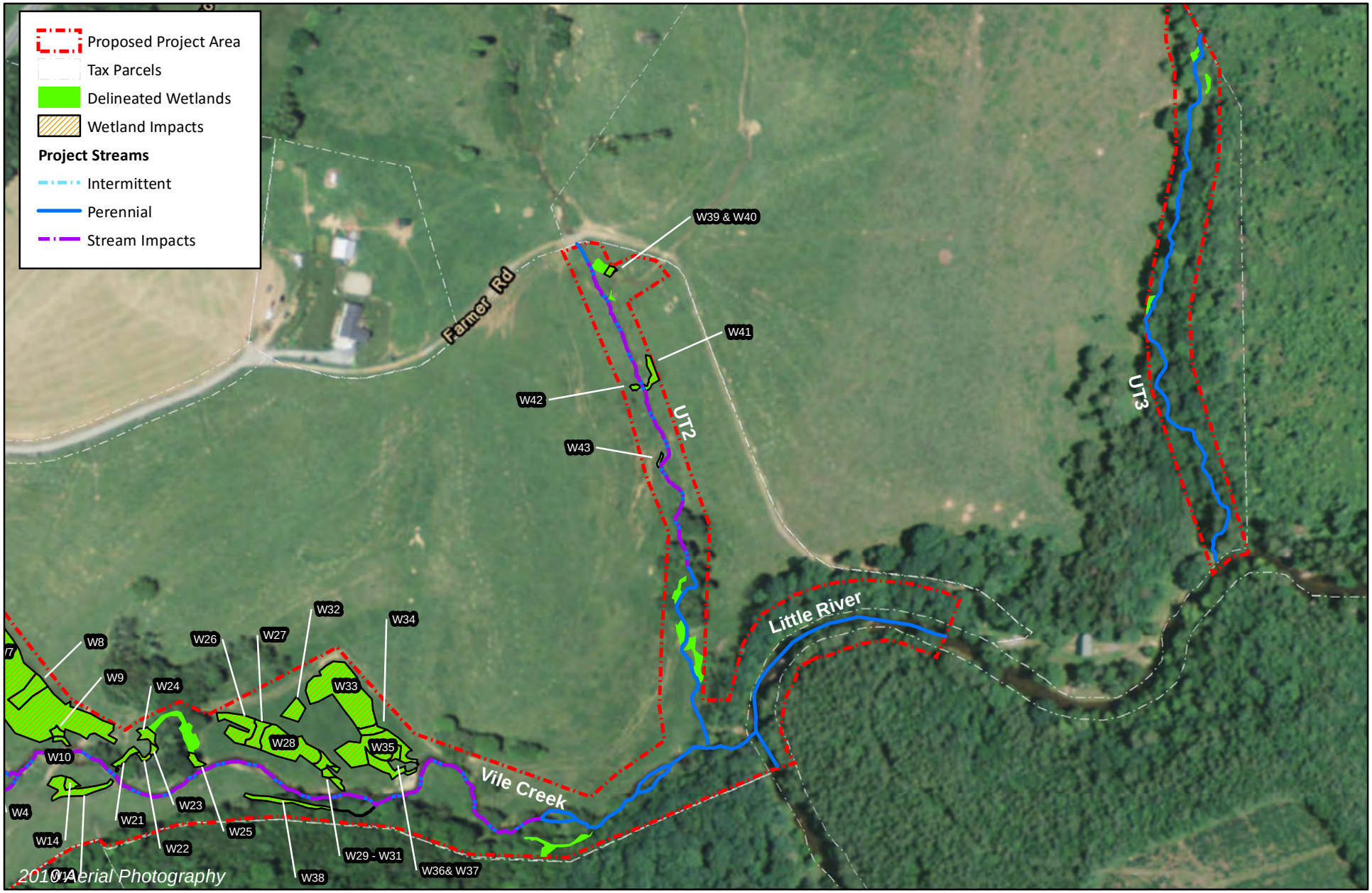
Insert Figure 1
Vile Creek Mitigation Site
New River Basin 05050001

Alleghany County, NC



WILDLANDS ENGINEERING

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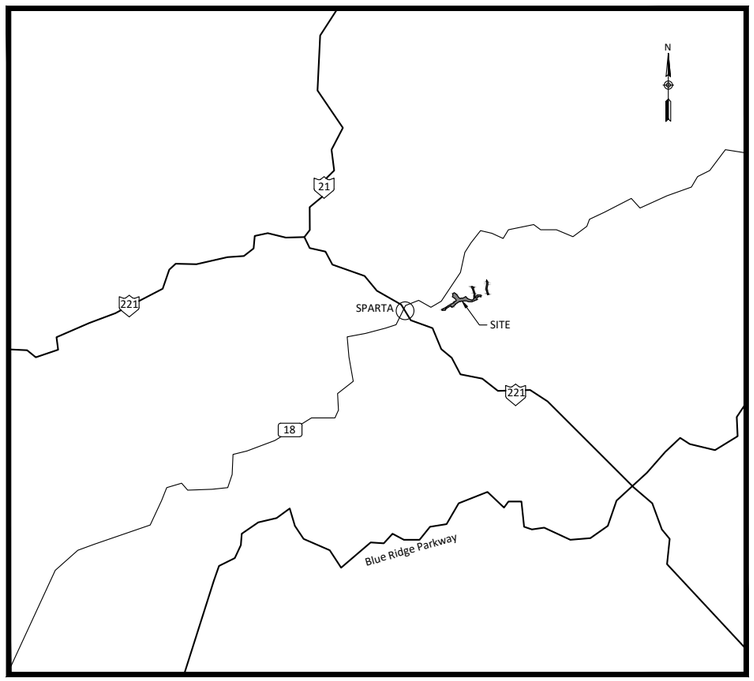
Insert Figure 2
Vile Creek Mitigation Site
New River Basin 05050001

Alleghany County, NC

Vile Creek Mitigation Site

Alleghany County, North Carolina
for
NCDEQ
Division of Mitigation Services



Vicinity Map
Not to Scale

BEFORE YOU DIG!
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N.C. ONE-CALL CENTER
IT'S THE LAW!

PRELIMINARY PLANS
ISSUED MAY 25, 2016

Sheet Index

Project Directory

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Jeff Keaton, PE
919-851-9986

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Kee Mapping and Surveying, PA
111 Central Avenue
Asheville, NC 28801
Brad Kee, PLS
828-645-8275

Owner:
NCDEQ
Division of Mitigation Services
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Raleigh, NC 27603
Harry Tsomides
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Vile Creek Mitigation Site
Alleghany County, North Carolina

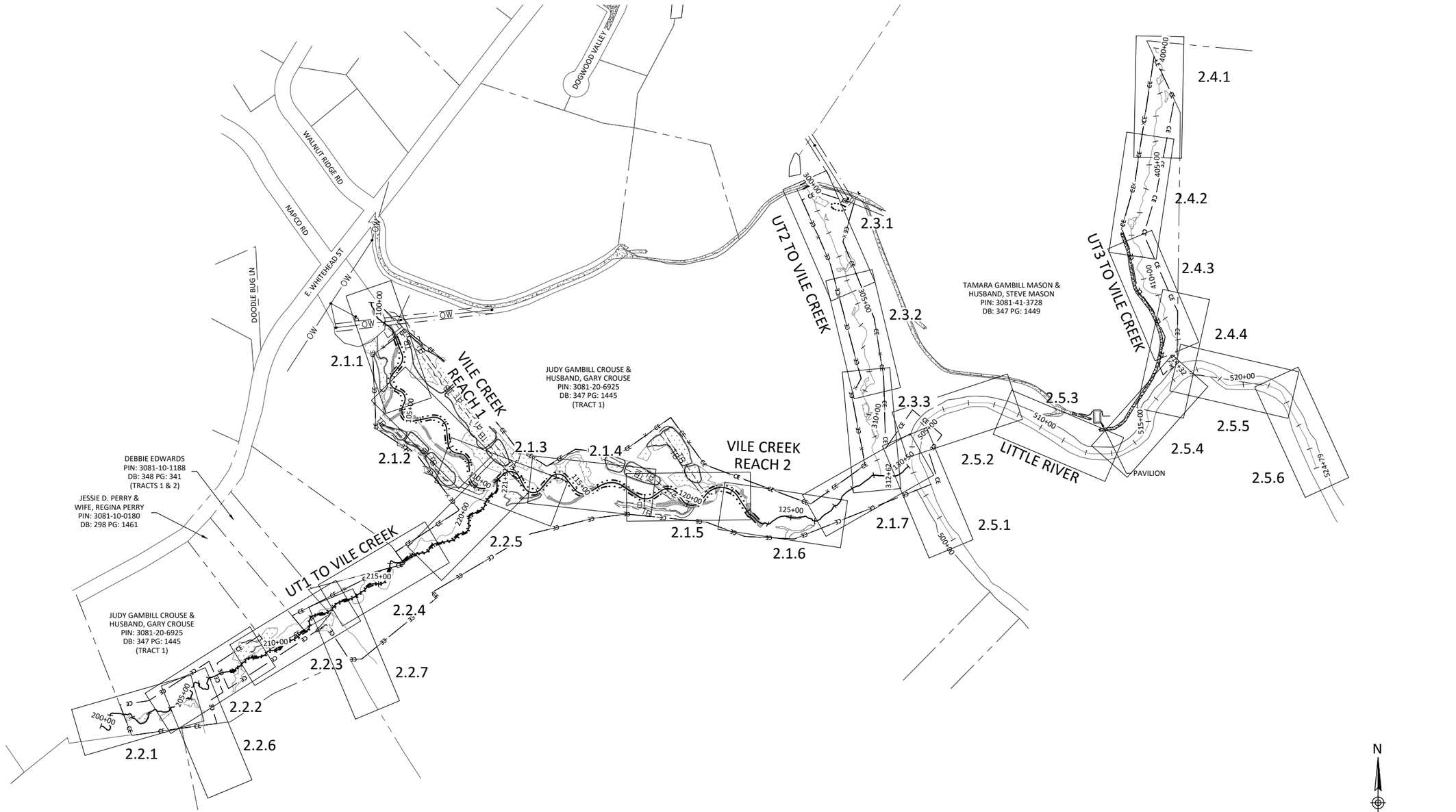
Title Sheet

Revisions:

Date: May 25 2016
Job Number: 005-02147
Project Engineer: JNK
Drawn By: JCK
Checked By: AJB

Sheet 0.1

May 26, 2016



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Alleghany County, North Carolina

Project Overview

Revisions:

Date:	May 25 2016
Job Number:	005-02147
Project Engineer:	JNK
Drawn By:	JCK
Checked By:	AOB

Sheet 0.2

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May 25, 2016

GENERAL CONSTRUCTION NOTES

1. ALL EROSION AND SEDIMENT CONTROL PRACTICES SHALL COMPLY WITH THE NORTH CAROLINA EROSION AND SEDIMENT CONTROL PLANNING AND DESIGN MANUAL.
2. CONTRACTOR IS ADVISED THAT NC-18 FROM WHICH THE SITE IS ACCESSED IS A BUSY ROAD WITH THE POTENTIAL FOR BLIND CURVES. TRAFFIC CONTROL AND COORDINATION WITH LOCAL OFFICIALS AND NCDOT AS NECESSARY WILL BE THE RESPONSIBILITY OF THE CONTRACTOR.
3. CONTRACTOR WILL INSTALL PUMP-AROUND SYSTEMS TO DIVERT FLOW WHILE WORKING IN LIVE, FLOWING CHANNELS. THE CONTRACTOR SHALL OPERATE AND MAINTAIN THE PUMP-AROUND SYSTEM 24 HOURS A DAY UNLESS ALL DISTURBED AREAS WITHIN THE PUMP-AROUND WORK AREA CAN BE STABILIZED BY THE END OF THE WORK DAY. CONTRACTOR SHALL NOT REMOVE PUMP-AROUND SYSTEMS AND ADVANCE TO THE NEXT WORK AREA UNTIL THE CURRENT WORK AREA IS COMPLETED AND STABILIZED.
4. NO MATERIAL FROM THE OFF-LINE PROPOSED STREAM CHANNEL EXCAVATION MAY BE BACKFILLED INTO THE ADJACENT EXISTING STREAM CHANNEL UNTIL THE NEWLY-CONSTRUCTED PROPOSED STREAM SECTION IS COMPLETED, STABILIZED, AND THE STREAM FLOW HAS BEEN DIVERTED INTO IT, EVEN IF THAT SECTION OF OLD/ EXISTING STREAM IS BEING PUMPED.
5. IN AREAS WITHOUT A PUMP-AROUND SYSTEM, CONTRACTOR SHALL DISTURB ONLY AS MUCH CHANNEL BANK AS CAN BE STABILIZED WITH TEMPORARY SEEDING, MULCH, AND EROSION CONTROL MATTING BY THE END OF EACH WORK DAY.
6. CLEARING AND GRUBBING ACTIVITIES SHALL NOT EXTEND MORE THAN 150 LINEAR FEET AHEAD OF IN-STREAM WORK.
7. WHEN CROSSING AN ACTIVE SECTION OF NEW OR OLD STREAM CHANNEL, A TEMPORARY STREAM CROSSING SHALL BE INSTALLED ACCORDING TO THE DETAILS AND SPECIFICATIONS.
8. ALL GRADED AREAS WITH SLOPES STEEPER THAN 3:1 WILL BE STABILIZED WITHIN SEVEN (7) WORKIENG DAYS. ALL OTHER AREAS WILL BE STABILIZED WITHIN 14 WORKING DAYS.
9. LOCATIONS FOR STAGING AND STOCKPILE AREAS AND TEMPORARY STREAM AND WETLAND CROSSINGS HAVE BEEN PROVIDED ON THE PLANS. ANY ADDITIONAL OR ALTERNATIVE STAGING AREAS, STOCKPILE AREAS AND STREAM AND WETLAND CROSSINGS MUST BE APPROVED BY ENGINEER PRIOR TO IMPLEMENTATION AND MUST COMPLY WITH THE NORTH CAROLINA EROSION AND SEDIMENT CONTROL PLANNING AND DESIGN MANUAL.
10. VARIOUS TYPES OF CONSTRUCTED RIFFLES ARE SPECIFIED ON THE PLANS. CONTRACTOR SHALL BUILD THE SPECIFIC TYPES OF CONSTRUCTED RIFFLES AT LOCATIONS SHOWN ON THE PLANS. CHANGES IN CONSTRUCTED RIFFLE TYPE MUST BE APPROVED BY THE ENGINEER.
11. CONTRACTOR IS TO MAKE EVERY EFFORT TO AVOID DAMAGING OR REMOVING EXISTING TREES.
12. UNDER NO CIRCUMSTANCES WILL THE CONTRACTOR EXCEED THE LIMITS OF DISTURBANCE AS SHOWN ON THE PLANS.

CONSTRUCTION SEQUENCE

1. CONTACT NORTH CAROLINA "ONE CALL" CENTER (1.800.632.4949) BEFORE ANY EXCAVATION.
2. CONTACT LAND QUALITY (919-707-9220) BEFORE ANY WORK BEGINS ON THE PROJECT AND NOTIFY THEM OF THE START DATE.
3. MOBILIZE EQUIPMENT AND MATERIALS TO THE SITE.
4. IDENTIFY AND ESTABLISH CONSTRUCTION ENTRANCE, STAGING AND STOCKPILE AREAS, HAUL ROADS, SILT FENCE, TREE PROTECTION FENCING, SAFETY FENCING, AND TEMPORARY STREAM AND WETLAND CROSSINGS AS INDICATED ON THE PLANS FOR WORK AREAS. NOTE: ALL CONSTRUCTION TRAFFIC WILL ENTER THE SITE FROM THE CONSTRUCTION ENTRANCE SHOWN ON HOLMAN MILL ROAD.
5. ALL HAUL ROADS SHALL BE MONITORED FOR SEDIMENT LOSS ON A DAILY BASIS. IN THE EVENT OF SEDIMENT LOSS, SILT FENCE OR OTHER ACCEPTABLE SEDIMENT AND EROSION CONTROL PRACTICES SHALL BE INSTALLED. SILT FENCE OUTLETS SHALL BE LOCATED AT POINTS OF LOW ELEVATION OR A MINIMUM SPACING OF 150 FT.
6. SET UP TEMPORARY FACILITIES, LOCATE EQUIPMENT WITHIN THE STAGING AREA, AND STOCKPILE MATERIALS NEEDED FOR THE INITIAL STAGES OF CONSTRUCTION WITHIN THE STOCKPILE AREA(S).
7. INSTALL AND MAINTAIN AN ONSITE RAIN GAUGE AND LOG BOOK TO RECORD THE RAINFALL AMOUNTS AND DATES. COMPLETE THE SELF-INSPECTION AS REQUIRED BY DEQ PERMIT.
8. PERFORM ANY NECESSARY CLEARING AND GRUBBING IN PHASES AS WORK PROGRESSES. BANK VEGETATION AND VEGETATION IMMEDIATELY ADJACENT TO LIVE CHANNELS SHALL BE LEFT UNDISTURBED AS LONG AS POSSIBLE. REMOVE ALL NON-NATIVE AND INVASIVE VEGETATION PRIOR TO BEGINNING THE CHANNEL CONSTRUCTION.
9. AS WORK PROGRESSES, REMOVE AND STOCKPILE THE TOP THREE INCHES OF SOIL FROM THE ACTIVE GRADING AREA. STOCKPILED TOPSOIL SHALL BE KEPT SEPARATE FOR ONSITE REPLACEMENT PRIOR TO FLOODPLAIN SEEDING.
10. CONSTRUCTION OF ALL CHANNELS IS TO BE DONE IN THE DRY. CONSTRUCTION SHOULD GENERALLY PROGRESS FROM UPSTREAM TO DOWNSTREAM TO PREVENT SEDIMENT RUNOFF FROM UPSTREAM CONSTRUCTION AFFECTING COMPLETED DOWNSTREAM REACHES. USE A PUMP AROUND AS SHOWN ON THE PLANS AND DISCUSSED IN THE GENERAL NOTES.
11. WHERE FEASIBLE, MORE THAN ONE OFFLINE SECTION MAY BE CONSTRUCTED CONCURRENTLY. OFFLINE SECTIONS SHALL BE TIED ONLINE SEQUENTIALLY FROM DOWNSTREAM TO UPSTREAM.
12. CONSTRUCT THE PROPOSED STREAM CHANNEL TO THE GRADE SPECIFIED IN THE CROSS-SECTIONS AND PROFILE. TRANSFER COARSE MATERIAL FROM ABANDONED CHANNEL RIFFLES TO NEW CHANNEL RIFFLES UTILIZING A PUMP-AROUND WHEN DOING SO.
13. GRADE THE ADJACENT FLOODPLAIN AND WETLAND AREAS ACCORDING TO GRADES SHOWN ON THE PLAN.
14. INSTALL IN-STREAM STRUCTURES (RIFFLES, LOG VANE, LOG DROP, LOG J-HOOK, COVER LOG, BOULDER SILL, BOULDER J-HOOK WITH SILL) AND BANK REVETMENTS AFTER CHANNEL GRADING IS COMPLETED ACCORDING TO DETAILS AND SPECIFICATIONS.
15. SEED (WITH SPECIFIED TEMPORARY SEED MIX) AND STRAW MULCH GRADED STREAMBANKS AND FLOODPLAIN AREAS ACCORDING TO PLANS AND DETAILS.
16. INSTALL COIR FIBER MATTING ON STREAMBANKS ACCORDING TO PLANS AND SPECIFICATIONS.
17. BACKFILL ABANDONED CHANNEL SECTIONS WITH STOCKPILED SOIL ACCORDING TO THE GRADES SHOWN ON THE PLANS. NON-NATIVE AND INVASIVE VEGETATION SHALL BE REMOVED FROM THE EXISTING CHANNEL PRIOR TO BACKFILLING.
18. PREPARE FLOODPLAIN FOR SEEDING BY APPLYING STOCKPILED TOPSOIL TO THE FLOODPLAIN BETWEEN BANKFULL ELEVATION AND THE GRADING LIMITS, RIPPING, AND RAKING/SMOOTHING. SEED WITH SPECIFIED PERMANENT SEED MIX AND MULCH. ANY AREAS WITHIN THE CONSERVATION EASEMENT THAT HAVE NOT BEEN GRADED SHALL BE TREATED ACCORDING TO THE PLANTING PLAN.
19. IF AT ANY TIME CIRCUMSTANCES SHOULD ARISE WHERE WATER HAS BEEN TURNED INTO THE NEW CHANNEL AND ADDITIONAL WORK MUST BE DONE ON THE FLOODPLAIN, EROSION CONTROL DEVICES WILL BE INSTALLED TO PROTECT THE NEW CHANNEL FROM SEDIMENTATION.
20. ONCE ALL PHASES OF CHANNEL AND FLOODPLAIN CONSTRUCTION ARE COMPLETE, PREPARE THE FLOODPLAIN AREAS FOR PLANTING PER THE SPECIFICATIONS.
21. INSTALL FENCING AND GATES ACCORDING TO PLANS, DETAILS, AND SPECIFICATIONS.
22. REMOVE TEMPORARY STREAM CROSSINGS.
23. ENSURE THAT THE SITE IS FREE OF TRASH AND LEFTOVER MATERIALS PRIOR TO DEMOBILIZATION OF EQUIPMENT FROM THE SITE.
24. COMPLETE THE REMOVAL OF ANY ADDITIONAL STOCKPILED MATERIAL FROM THE SITE.
25. DEMOBILIZE GRADING EQUIPMENT FROM THE SITE.
26. ALL ROCK AND OTHER STOCKPILED MATERIALS MUST BE REMOVED FROM THE LIMITS OF DISTURBANCE AND CONSERVATION EASEMENT. ALL AREAS OUTSIDE THE CONSERVATION EASEMENT SHALL BE RETURNED TO PRE-PROJECT CONDITIONS OR BETTER.
27. SEED, MULCH, AND STABILIZE STAGING AREAS, STOCKPILE AREAS, HAUL ROADS, AND CONSTRUCTION ENTRANCES. PASTURE SEED MIX IS TO BE APPLIED TO AREAS OF DISTURBANCE OUTSIDE OF THE CONSERVATION EASEMENT. REMOVE ALL TEMPORARY FENCING.

Existing Features

- Existing Property Line
- Existing Alignment (10+00)
- Existing Major Contour (5' Interval) (100)
- Existing Minor Contour (1' interval)
- Existing Overhead Electric (OHE)
- Existing Power Pole
- Existing Easement
- Existing Fence (x)
- Existing Top of Bank (TB)
- Existing Bankfull
- Existing Treeline

Existing Features

- Existing Storm Pipe
- Existing Gravel Road
- Existing Wetland
- Existing Tree
- Existing Groundwater Gauge
- Existing Bedrock
- Existing Spring
- Existing Water

Proposed Features

- Proposed Conservation Easement (CE)
- Proposed Thalweg Alignment (10+00)
- Proposed Bankfull
- Proposed Major Contour (5' Interval) (100)
- Proposed Minor Contour (1' interval)
- Proposed Bog Area

Proposed Structures

- Proposed Channel Plug
  See Detail 4, Sheet 5.5
- Proposed Various Constructed Riffles
  See Details Sheet 5.1
- Proposed Brush Toe
  See Sheet 5.7
- Floodplain Outlets and Berm Spillways

Proposed Structures

- Proposed Log Sill
  See Detail 3, Sheet 5.2
- Proposed Cover Log
  See Detail 2, Sheet 5.2
- Proposed Log J-Hook
  See Detail 1, Sheet 5.2
- Proposed Log Vane
  See Detail 4, Sheet 5.6
- Proposed Root Wad
  See Detail 4, Sheet 5.2
- Proposed Culvert Crossing

PROJECT NOTES:

Topographic survey completed by Kee Mapping and Surveying in January 2015. Parcel boundary survey completed by Kee Mapping and Surveying in January 2015.

Types of Constructed Riffles used at certain locations may be modified at Engineer's discretion.

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Fax: 919.851.9985
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Vile Creek Mitigation Site
Alleghany County, North Carolina
General Notes and Symbols

Revisions:

Date: May 25, 2016
Job Number: 085-02147
Project Engineer: JNK
Drawn By: JCK
Checked By: ADB

Sheet 0.3

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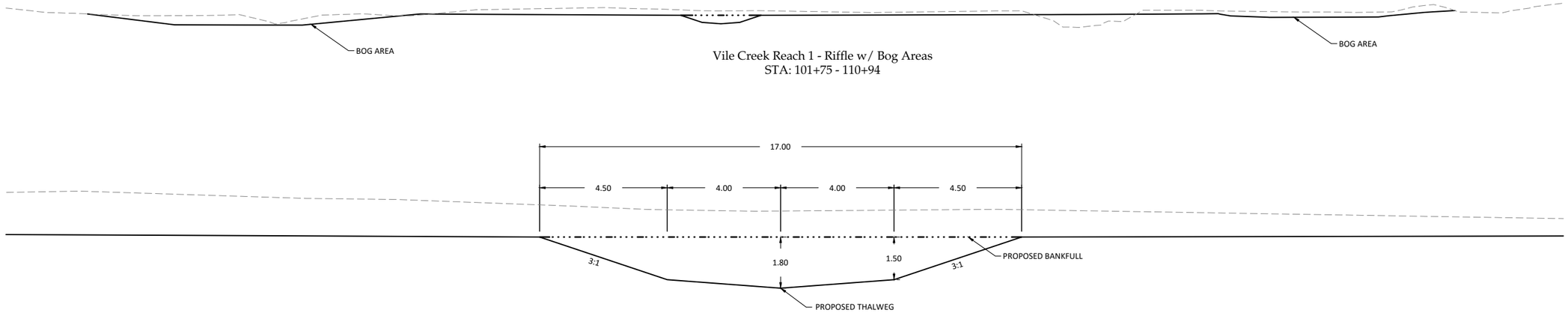
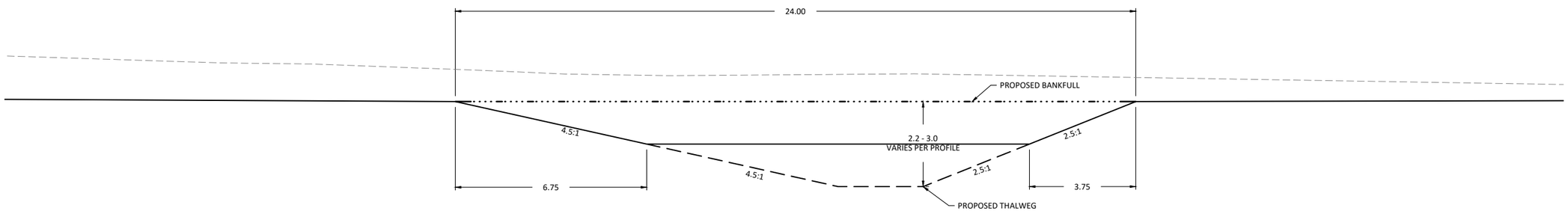


Vile Creek Reach 1 - Riffle w/ Bog Areas
STA: 101+75 - 110+94

Vile Creek Reach 1 - Riffle
STA: 101+75 - 110+94



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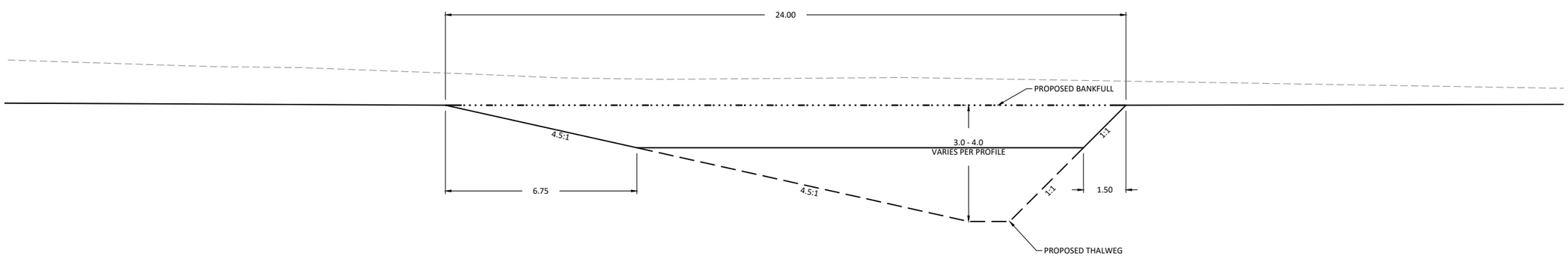

Vile Creek Reach 1 - Pool w/Structure
STA: 101+75 - 110+94

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Vile Creek Reach 1
Typical Sections

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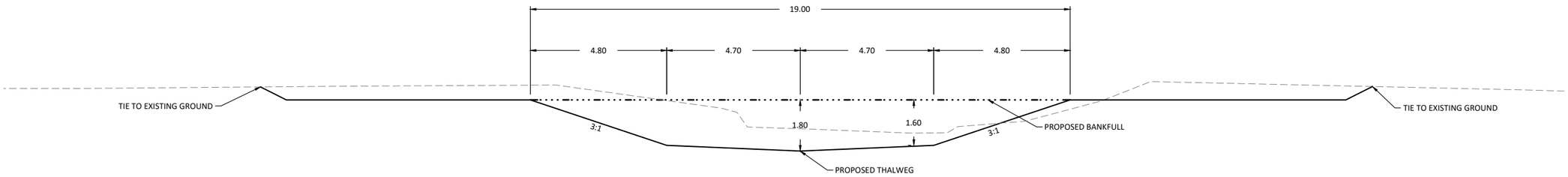
Sheet 1.1

Vile Creek Reach 2 - Riffle w/ Bog Area
STA: 110+94 - 123+13



Vile Creek Reach 2 - Riffle
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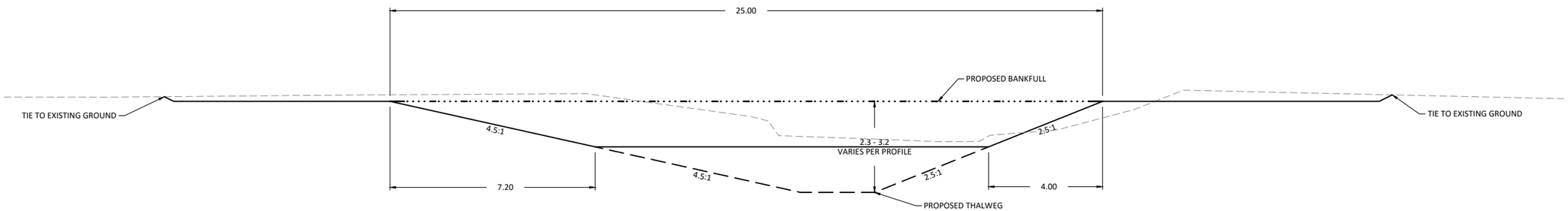
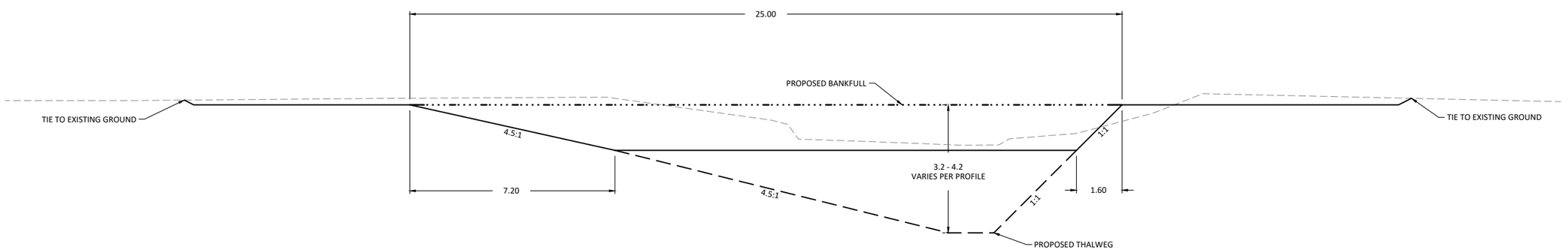


Vile Creek Reach 2 - Pool
STA: 110+94 - 123+13



Vile Creek Reach 2 - Pool w/ Structures
STA: 110+94 - 123+13

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Vile Creek Reach 2
Typical Sections

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Sheet 1.2

UT1 Reach 1 - Riffle
STA: 201+57 - 212+90

UT1 Reach 1 - Pool
STA: 201+57 - 212+90

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UT1 Reach 1
Typical Sections

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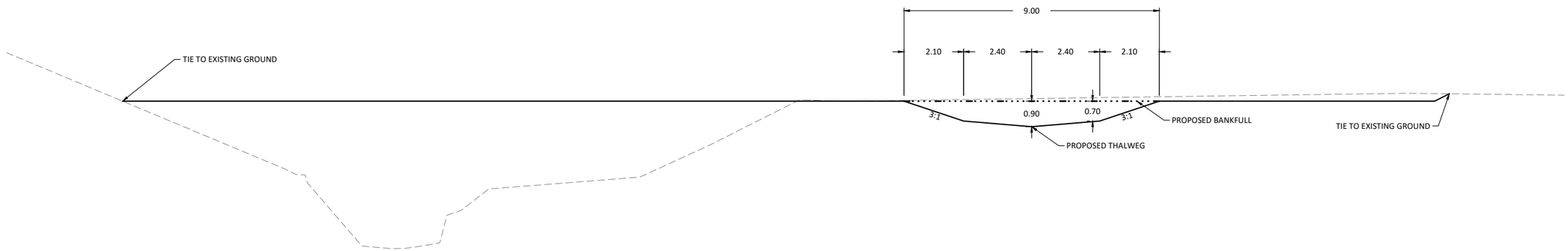
Sheet 1.3



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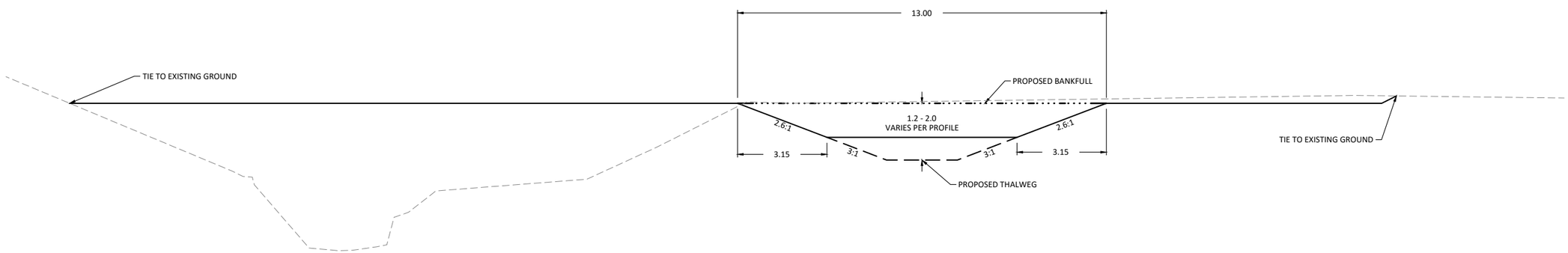

UT1 Reach 2 - Pool
STA: 212+90 - 221+92

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Alleghany County, North Carolina

UT1 Reach 2
Typical Sections

Revisions:

Date: May 25 2016
Job Number: 005-02147
Project Engineer: JNK
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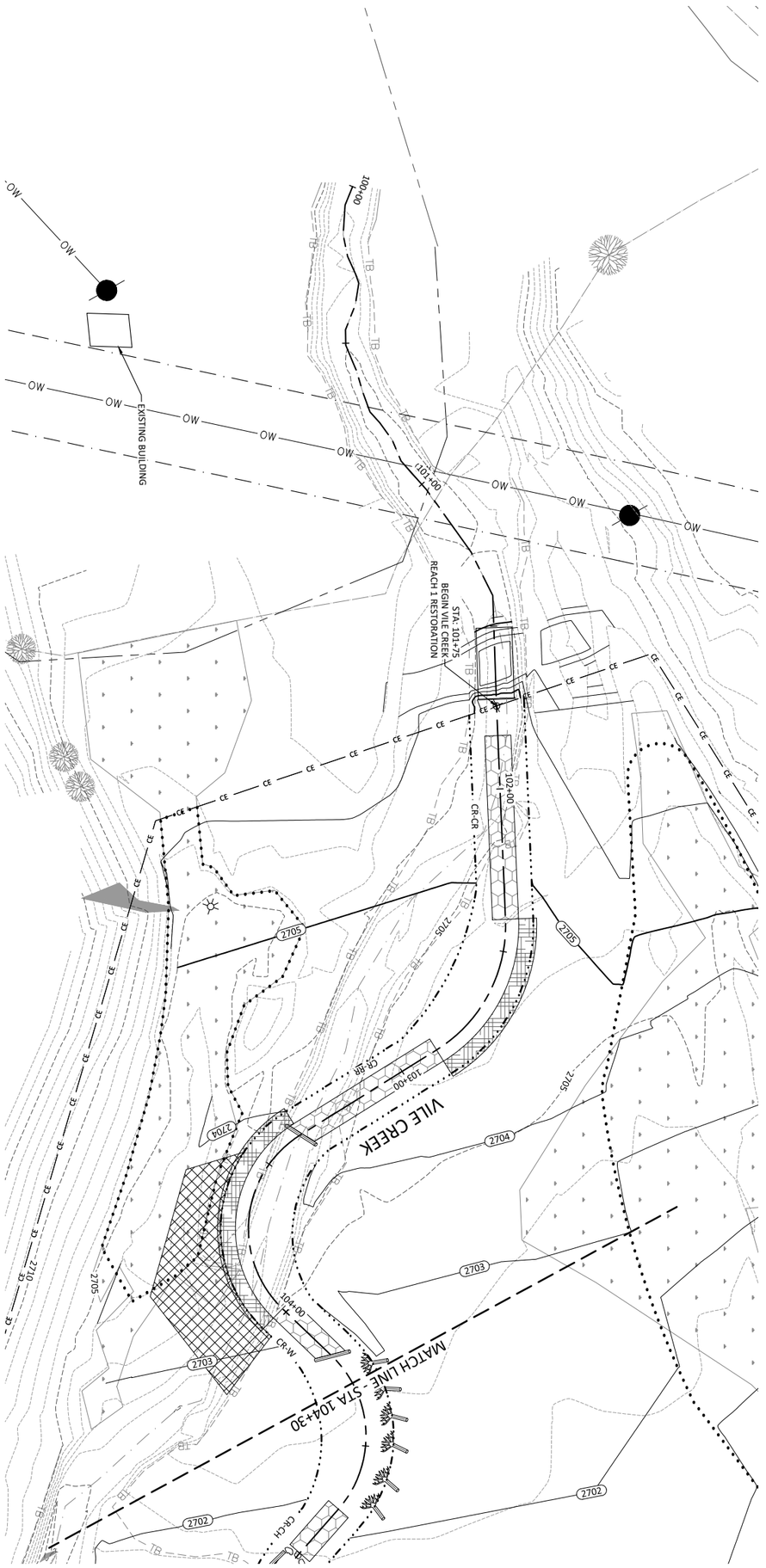
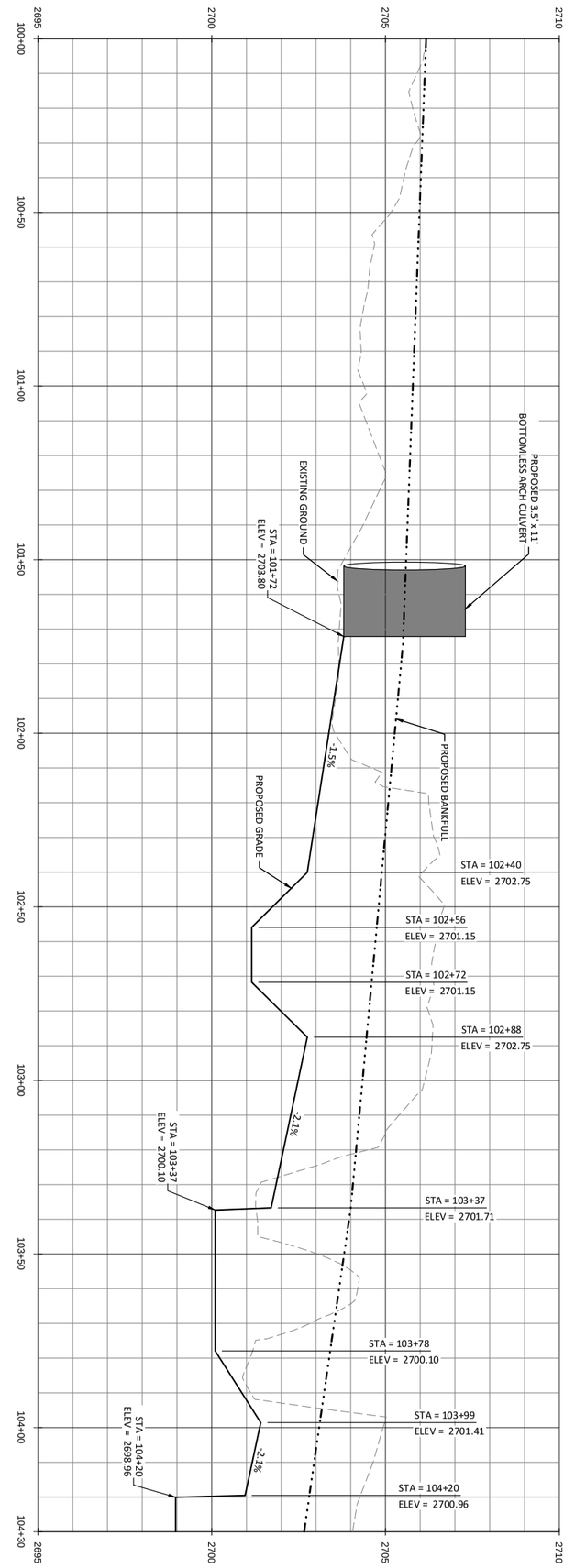
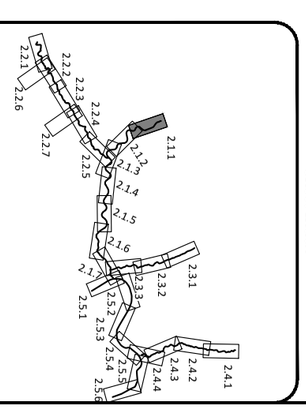
Sheet 1.4







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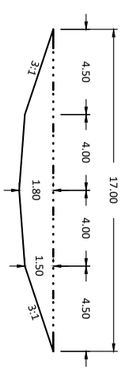
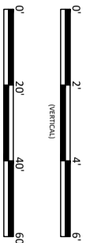


Reach 1

Typical Riffle Section



Date:	May 25, 2016
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Vile Creek Mitigation Site
Alleghany County, North Carolina

Vile Creek Reach 1
Stream Plan and Profile

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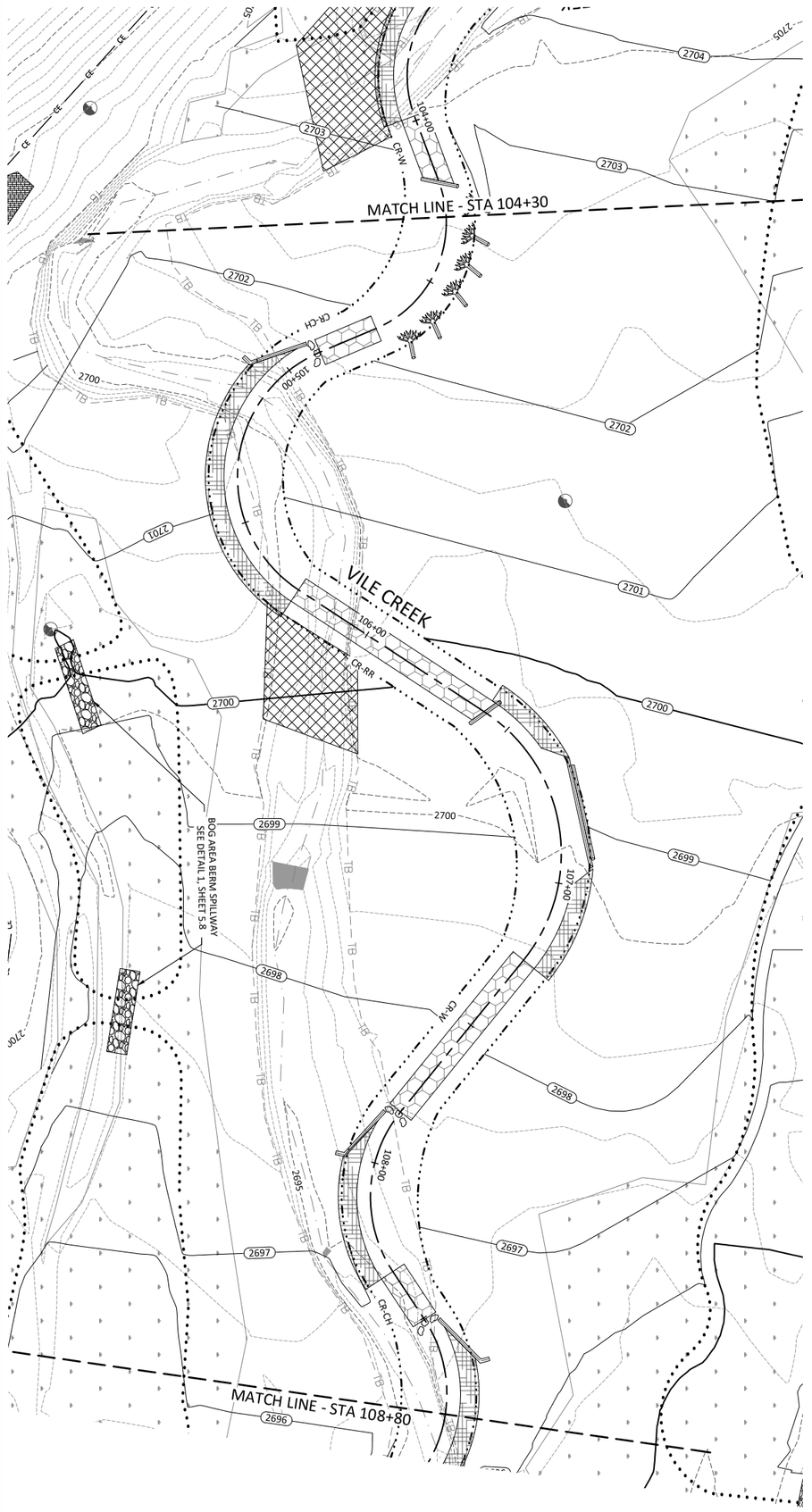

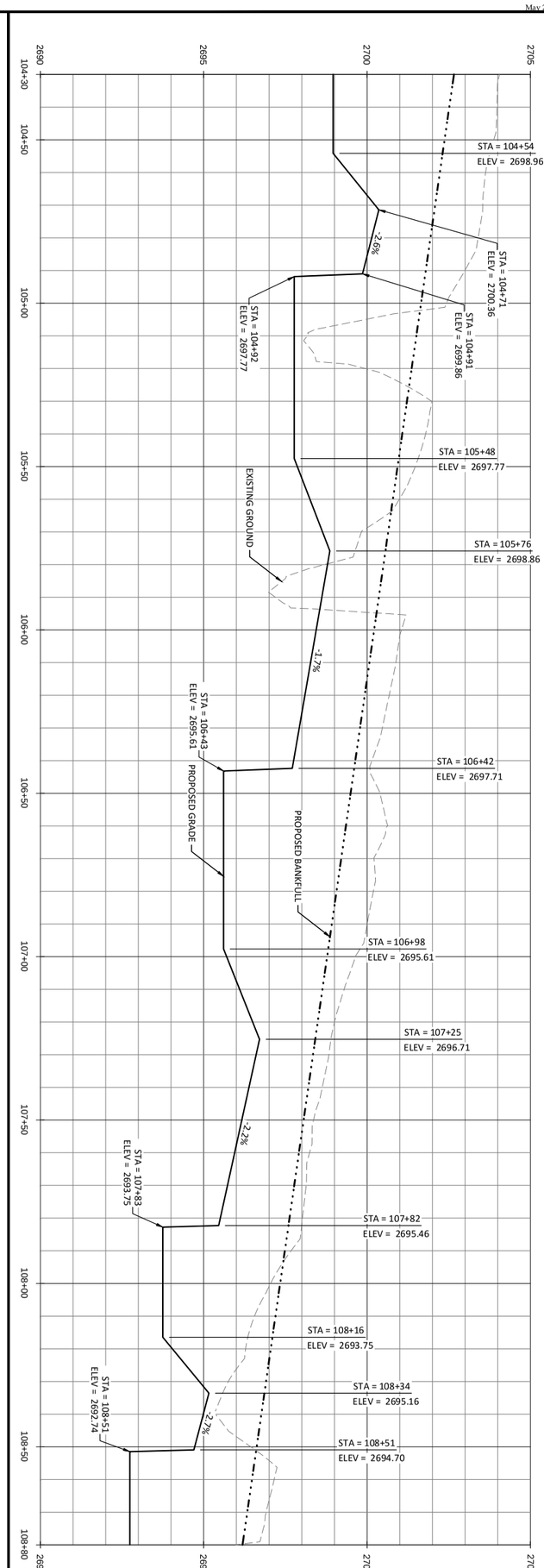

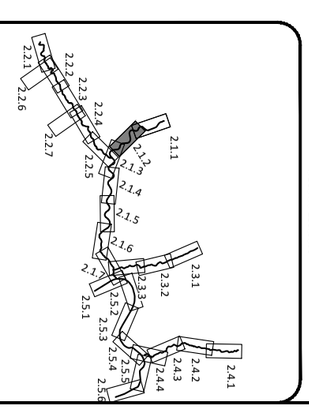

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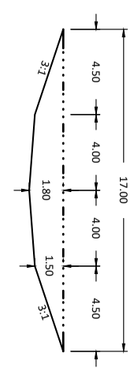
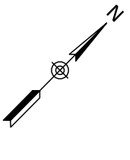
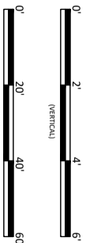


Reach 1

Typical Riffle Section





Date:	May 25, 2016
Job Number:	005-02147
Project Engineer:	JNK
Drawn By:	JCK
Checked By:	ADB

Revisions:

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Vile Creek Mitigation Site
Alleghany County, North Carolina

Vile Creek Reach 1
Stream Plan and Profile

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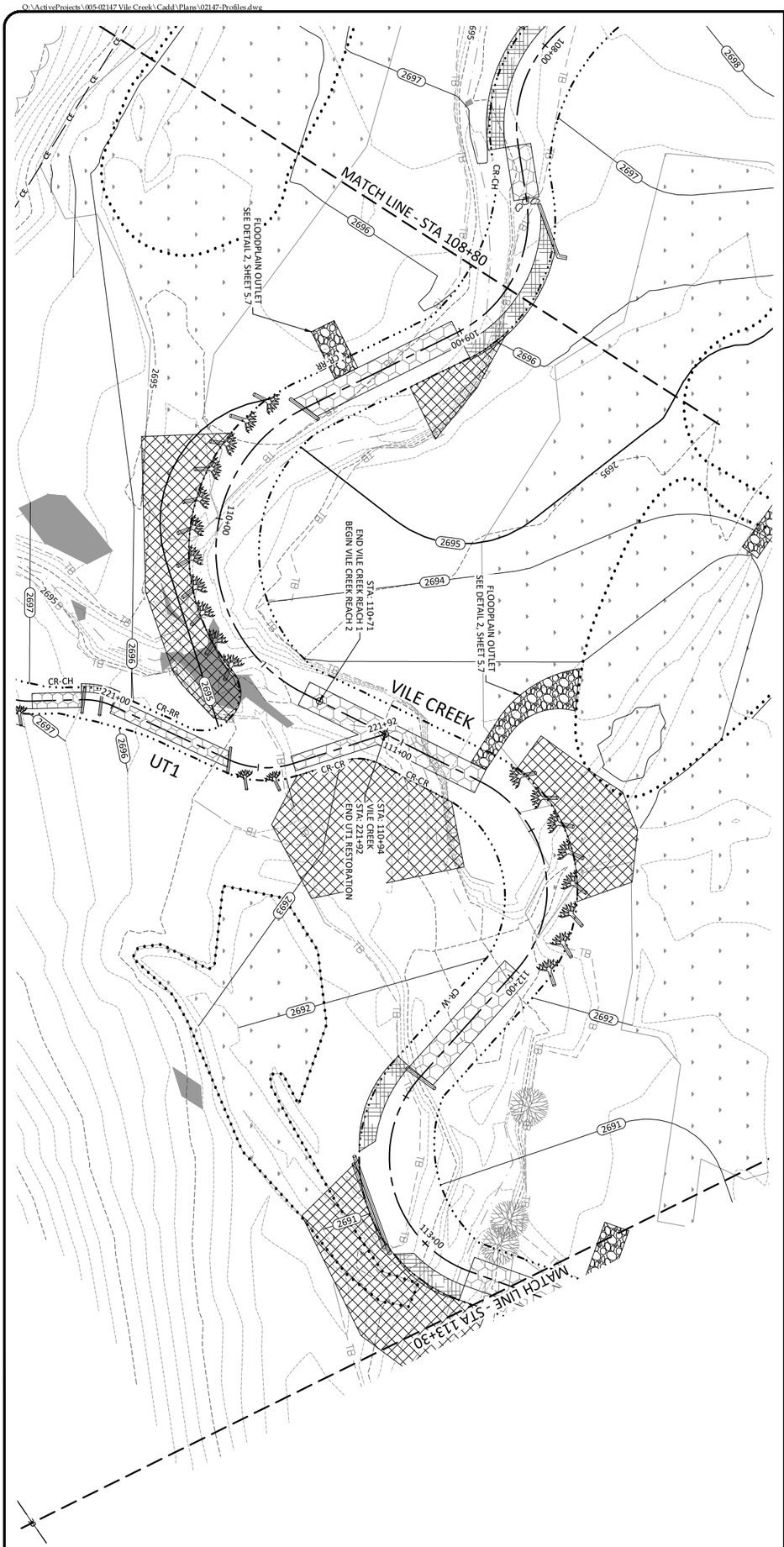

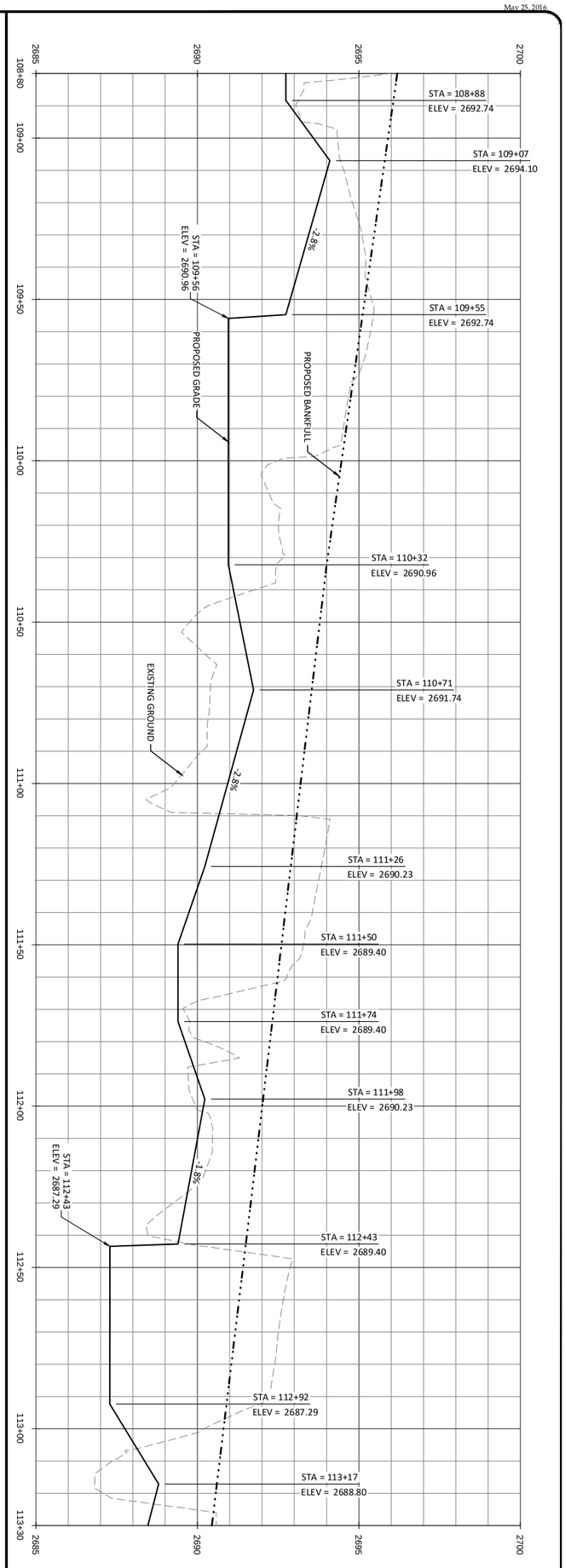

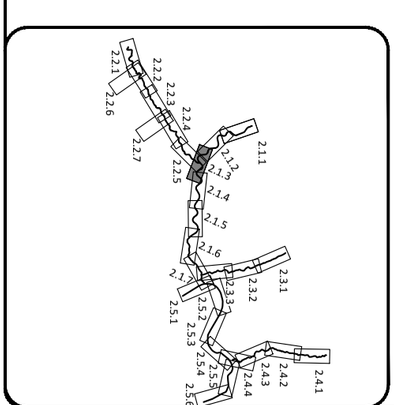

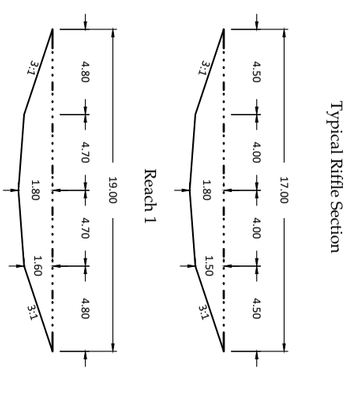

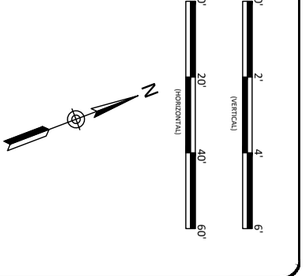

Date:	May 25, 2016
Job Number:	005-02147
Project Engineer:	JNK
Drawn By:	JCK
Checked By:	ADB

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Vile Creek Mitigation Site
Alleghany County, North Carolina

Vile Creek Reach 1 & 2
Stream Plan and Profile

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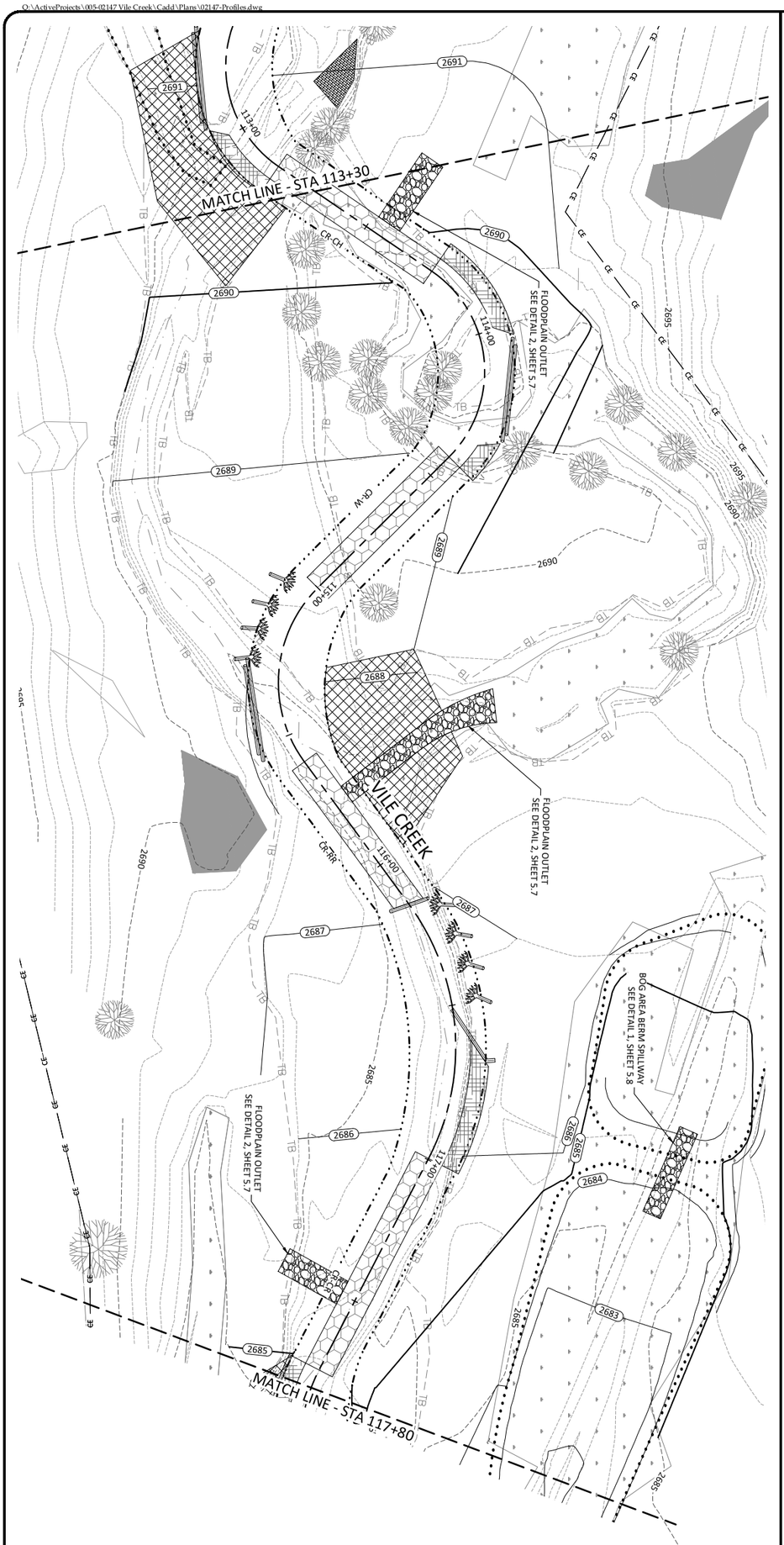

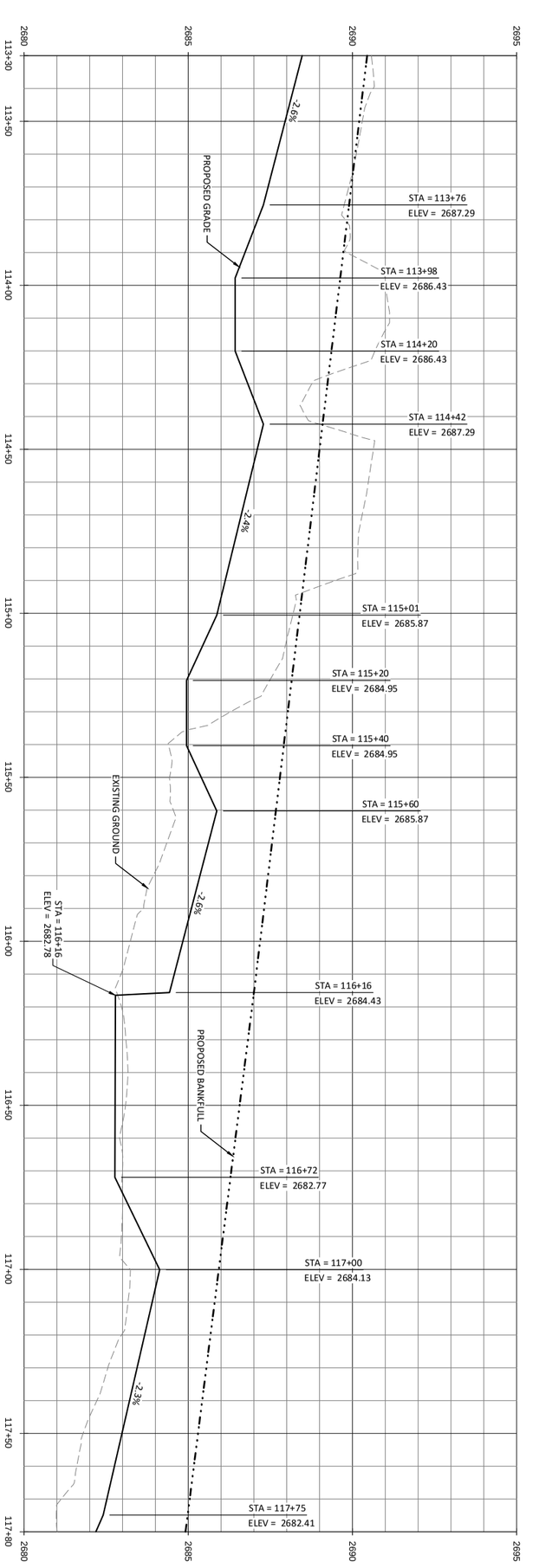

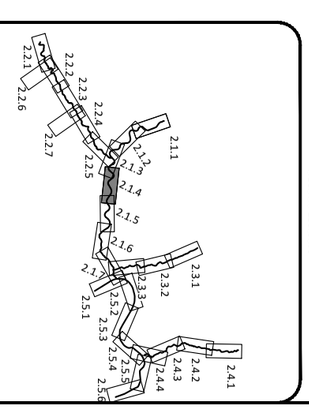

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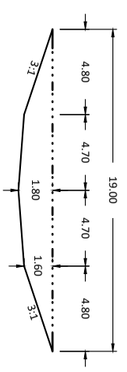
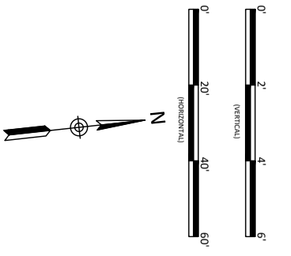


Reach 2

Typical Riffle Section



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Project Engineer:	JNK
Drawn By:	JCK
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Vile Creek Mitigation Site
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Vile Creek Reach 2
Stream Plan and Profile

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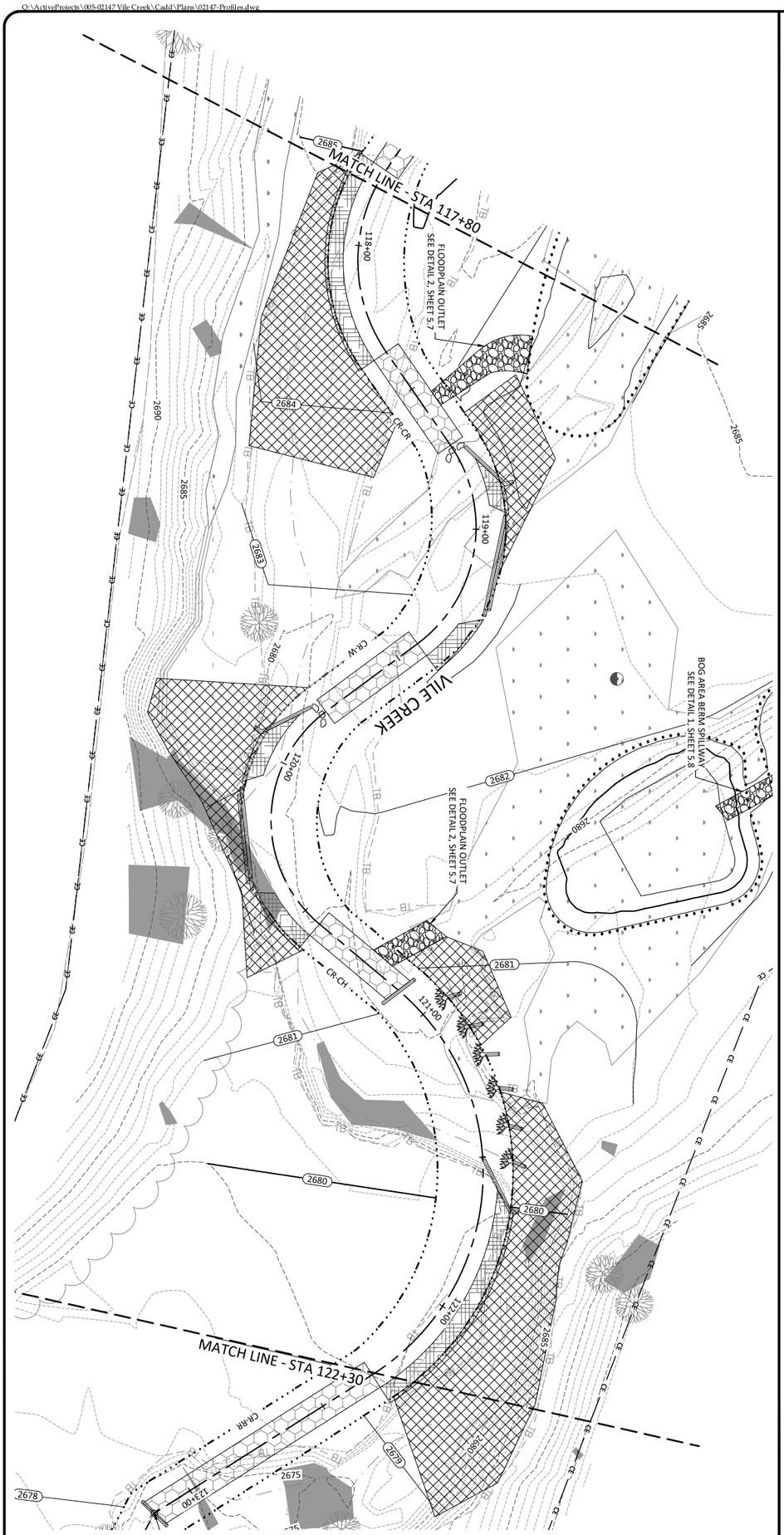

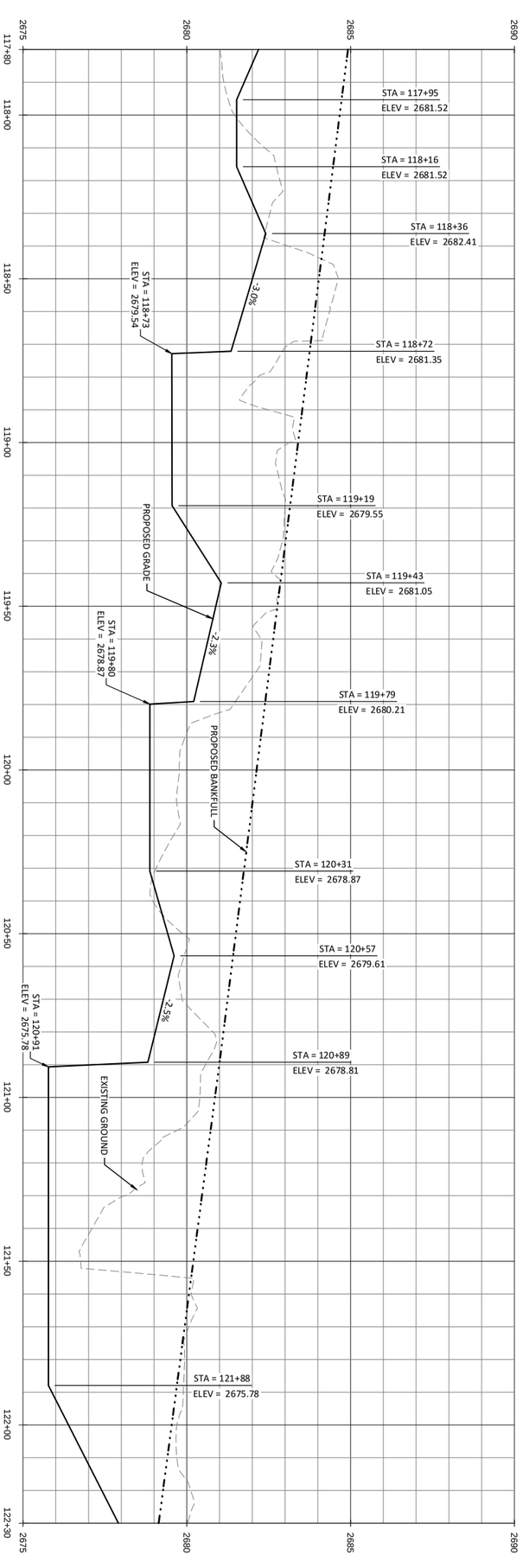

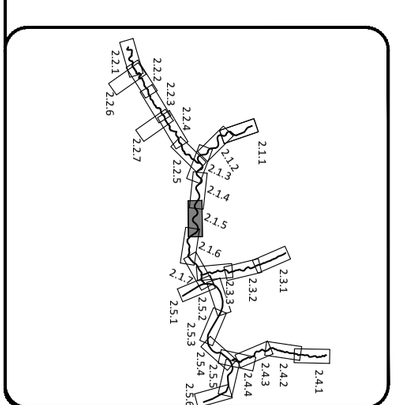

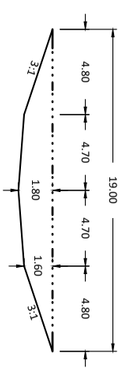

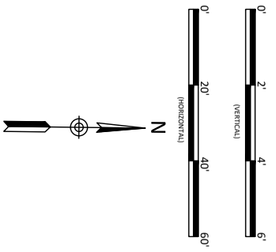

Date:	May 25, 2016
Job Number:	005-02147
Project Engineer:	JNK
Drawn By:	JCK
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Vile Creek Mitigation Site
Alleghany County, North Carolina

Vile Creek Reach 2
Stream Plan and Profile

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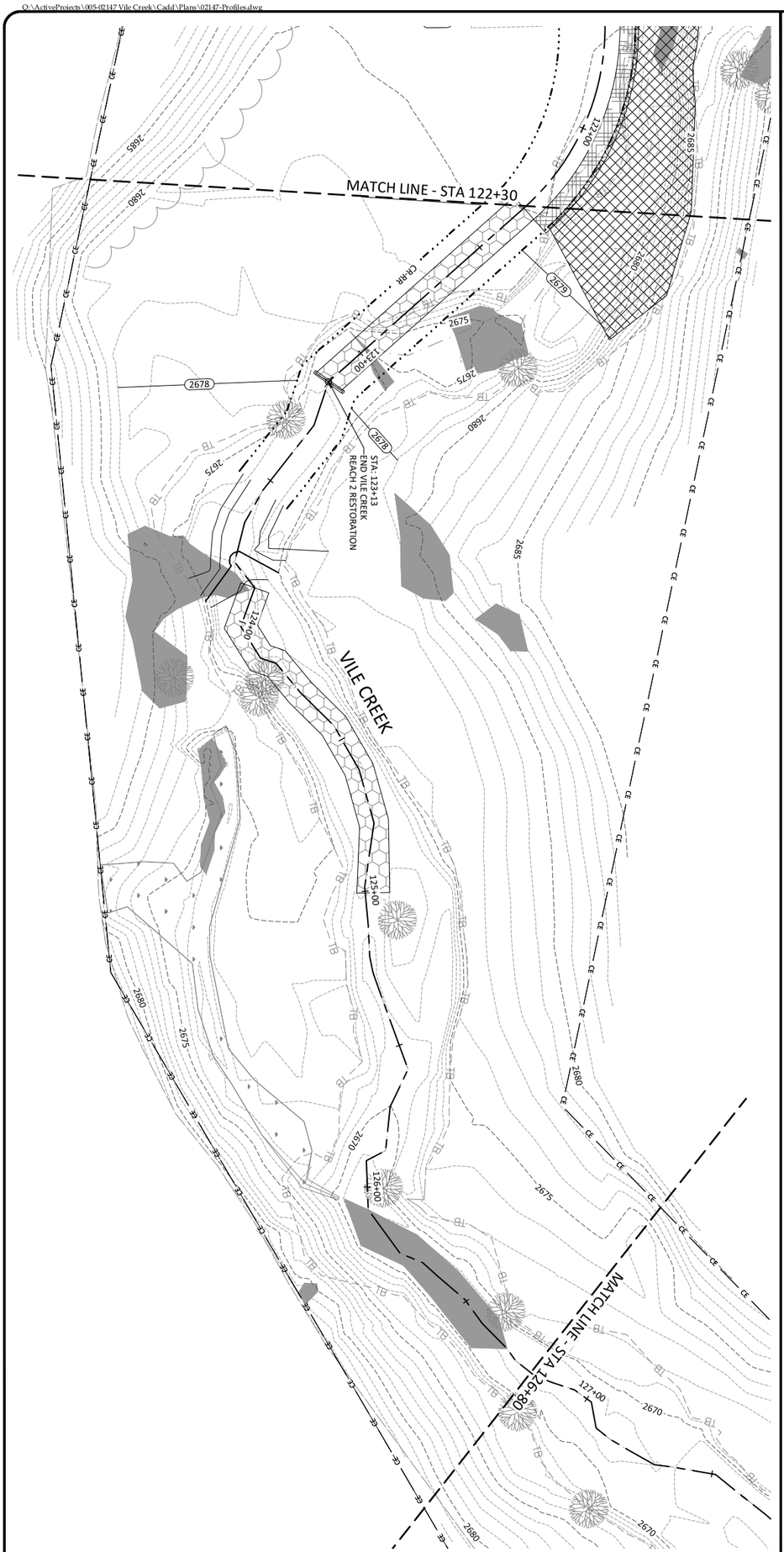

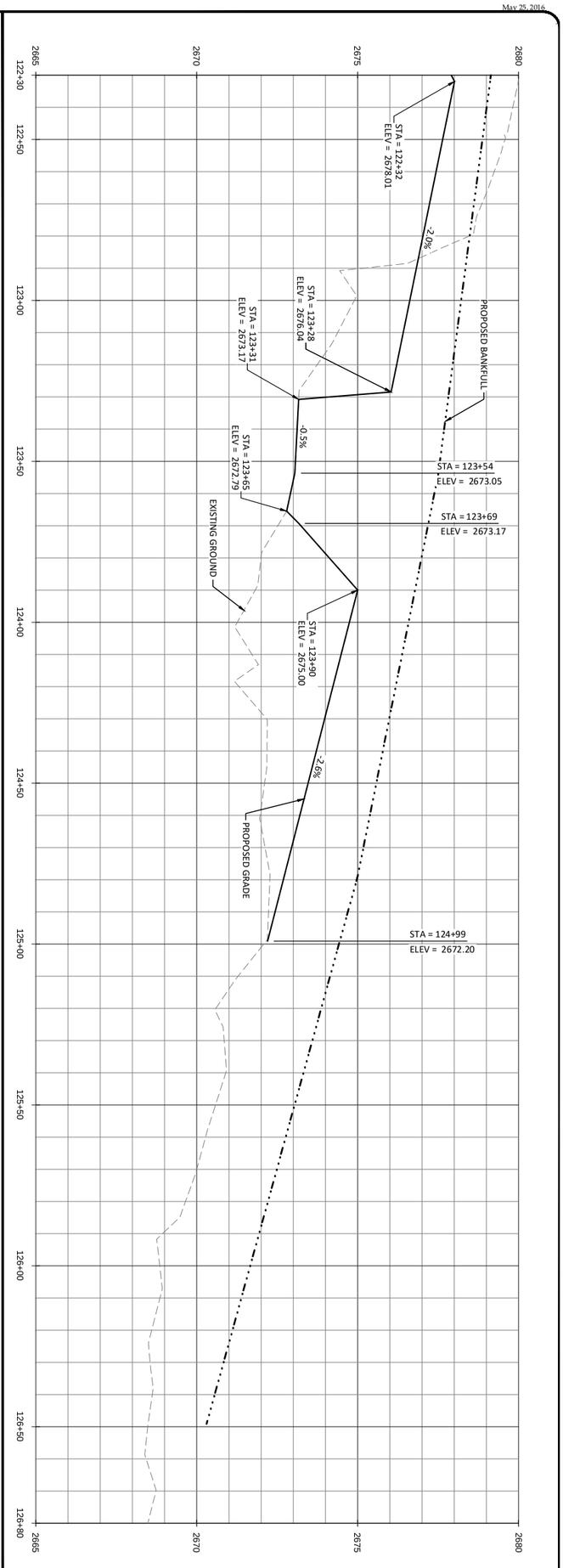

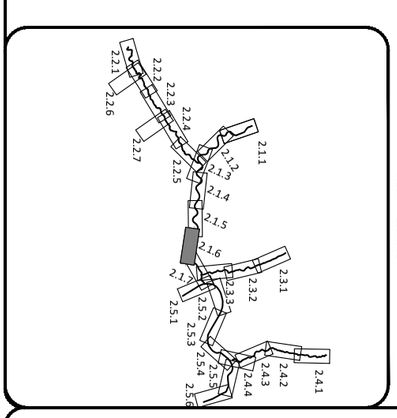

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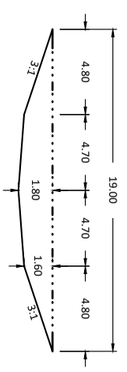
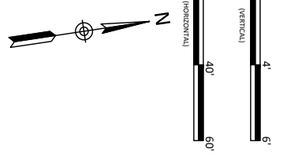


Reach 2

Typical Riffle Section



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Job Number:	005-02147
Project Engineer:	JNK
Drawn By:	JCK
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Vile Creek Mitigation Site
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Vile Creek Reach 2
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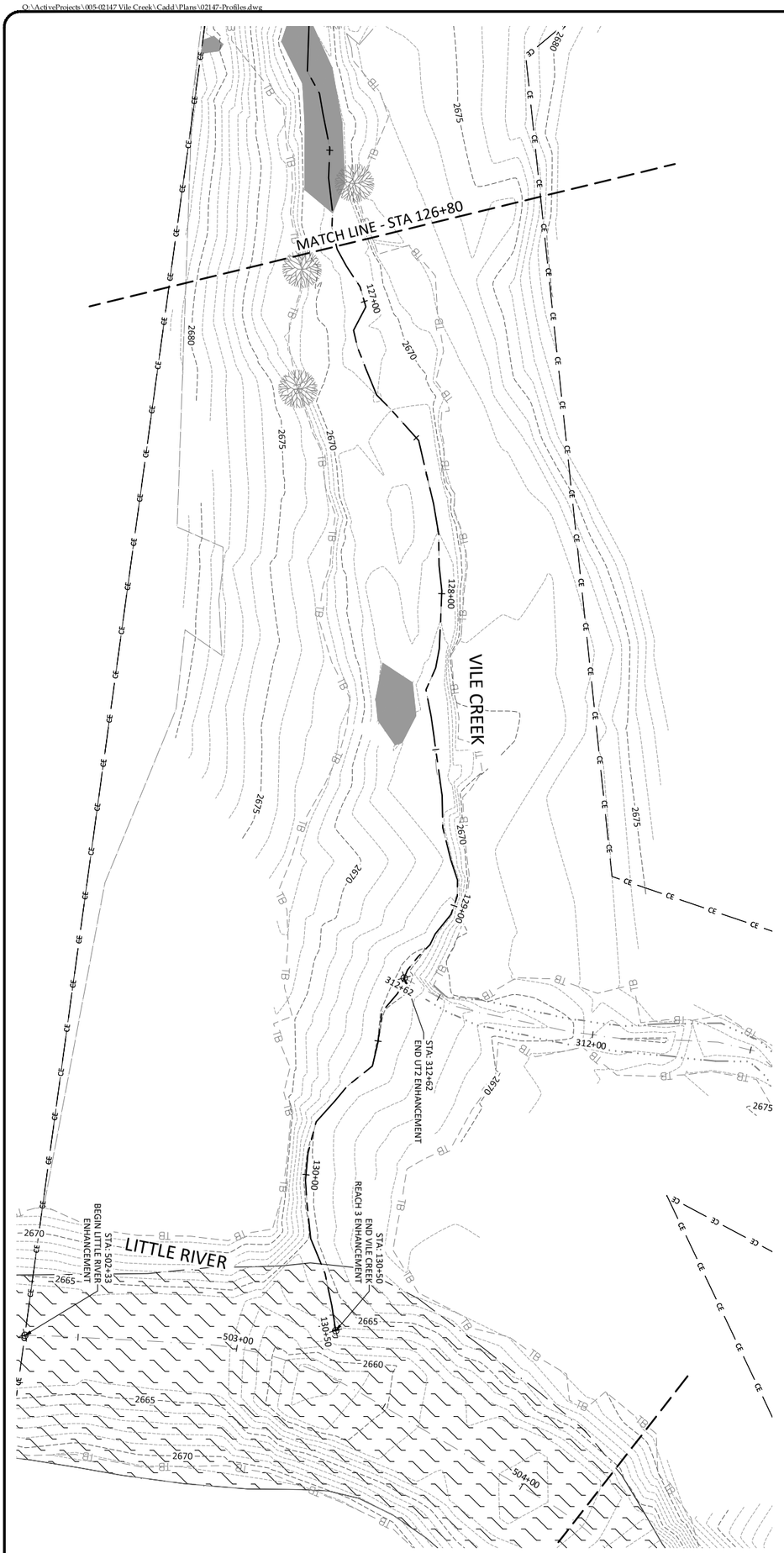

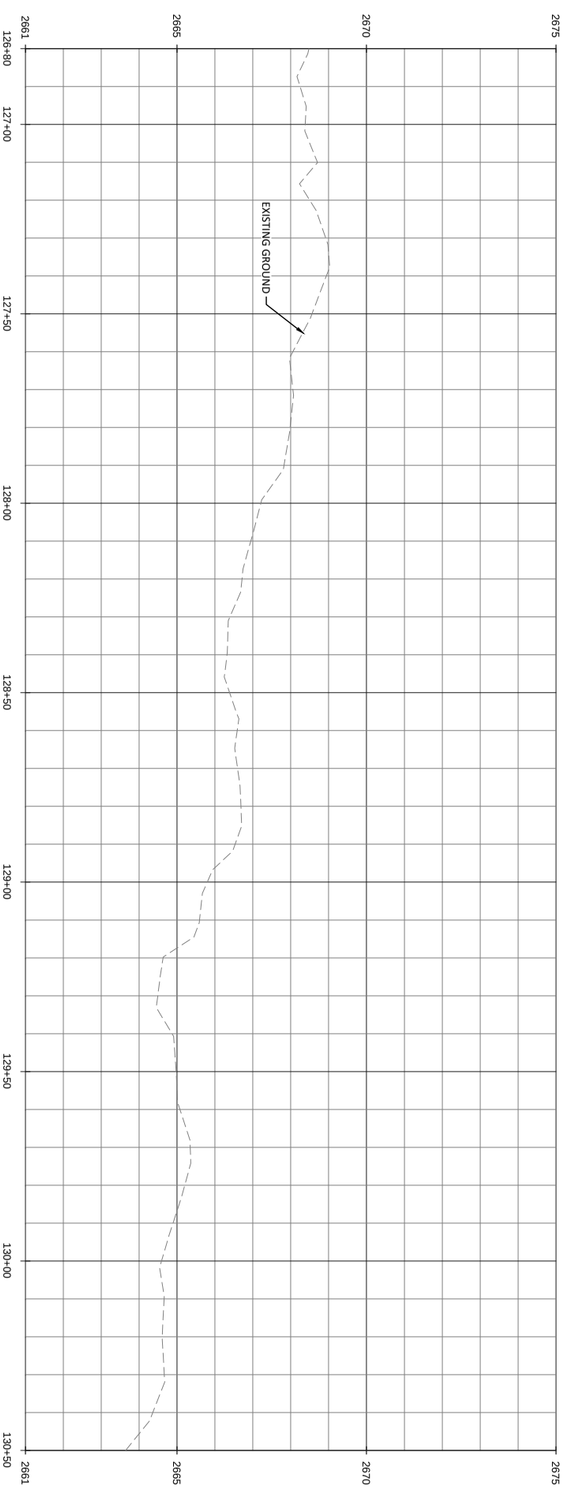

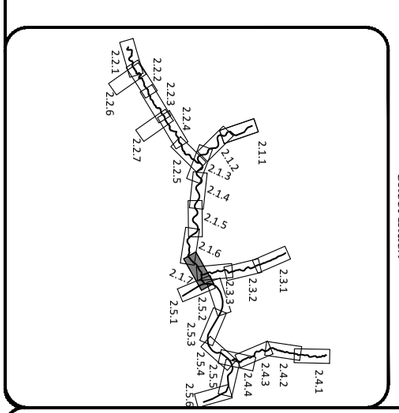

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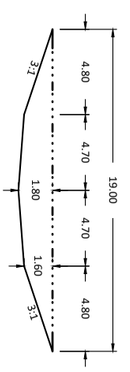

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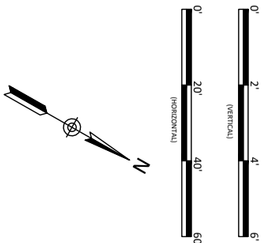

Date:	May 25, 2016
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Project Engineer:	JNK
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Vile Creek Mitigation Site
Alleghany County, North Carolina

Vile Creek Reach 2
Stream Plan and Profile

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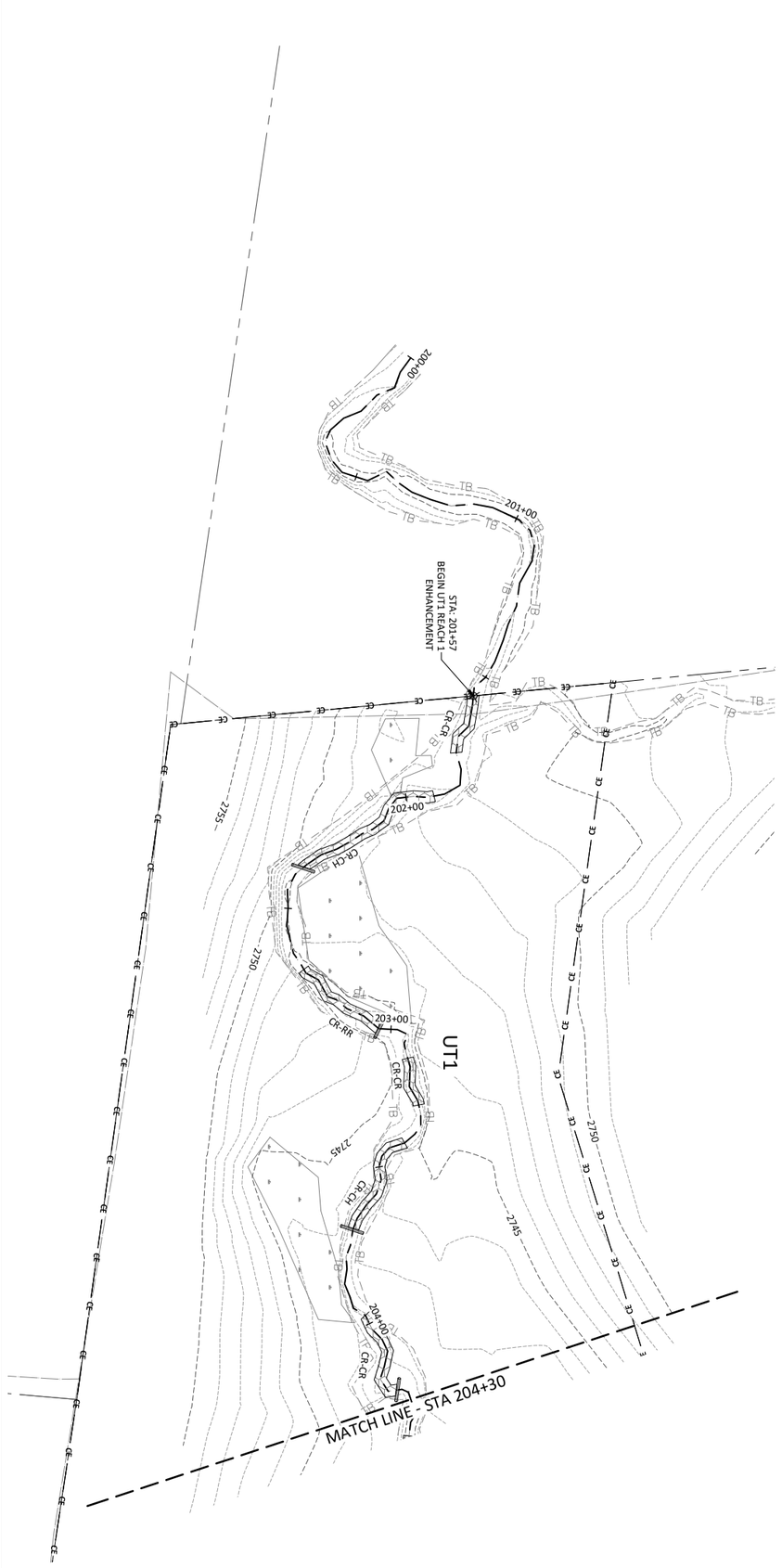

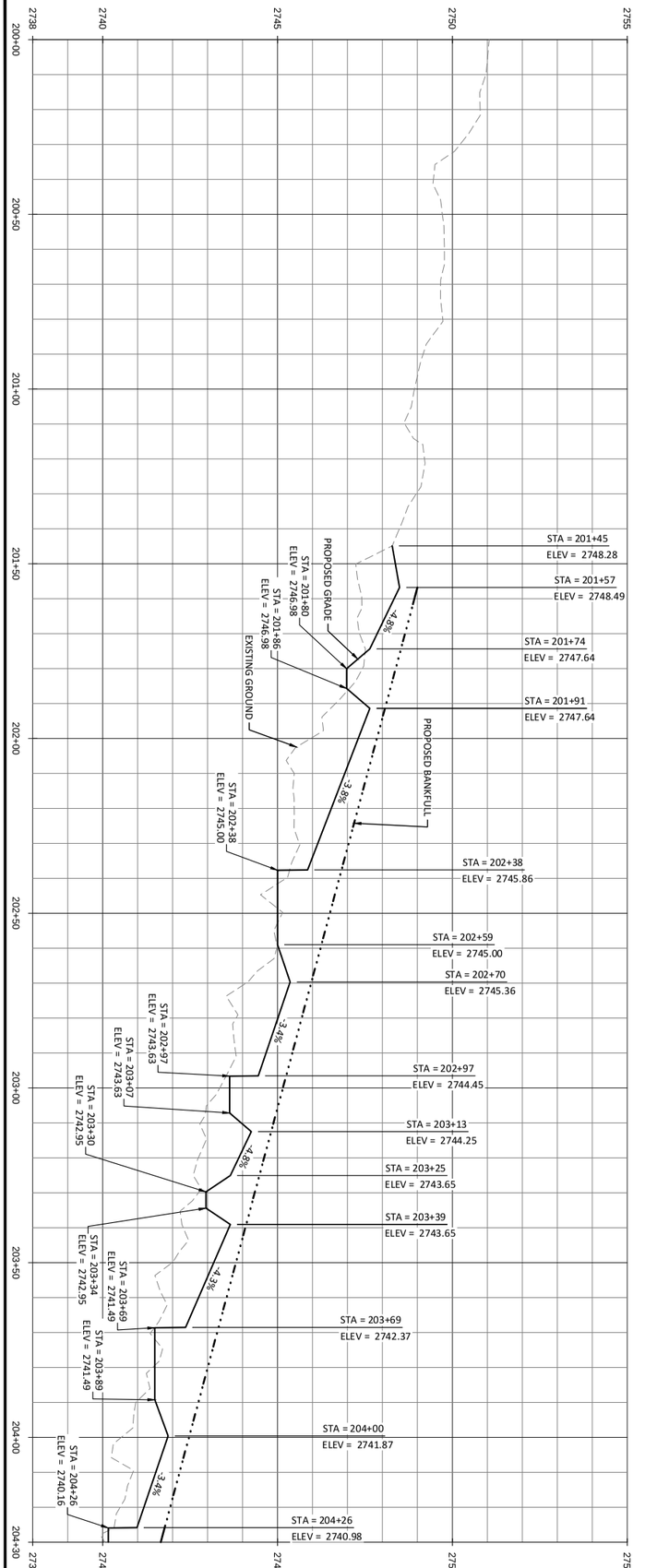

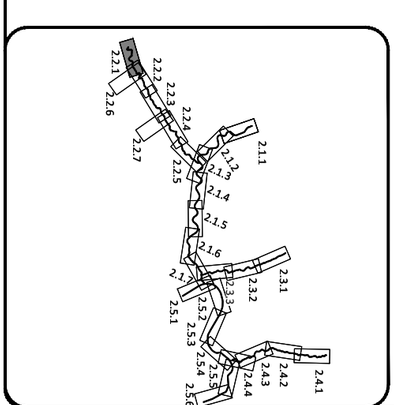

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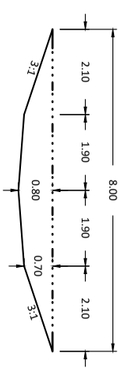

Reach 1

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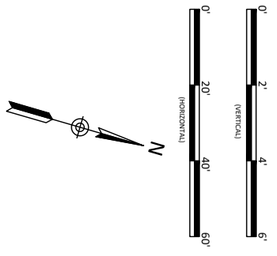

Date:	May 25, 2016
Job Number:	005-02147
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Vile Creek Mitigation Site
Alleghany County, North Carolina

UT1 Reach 1
Stream Plan and Profile

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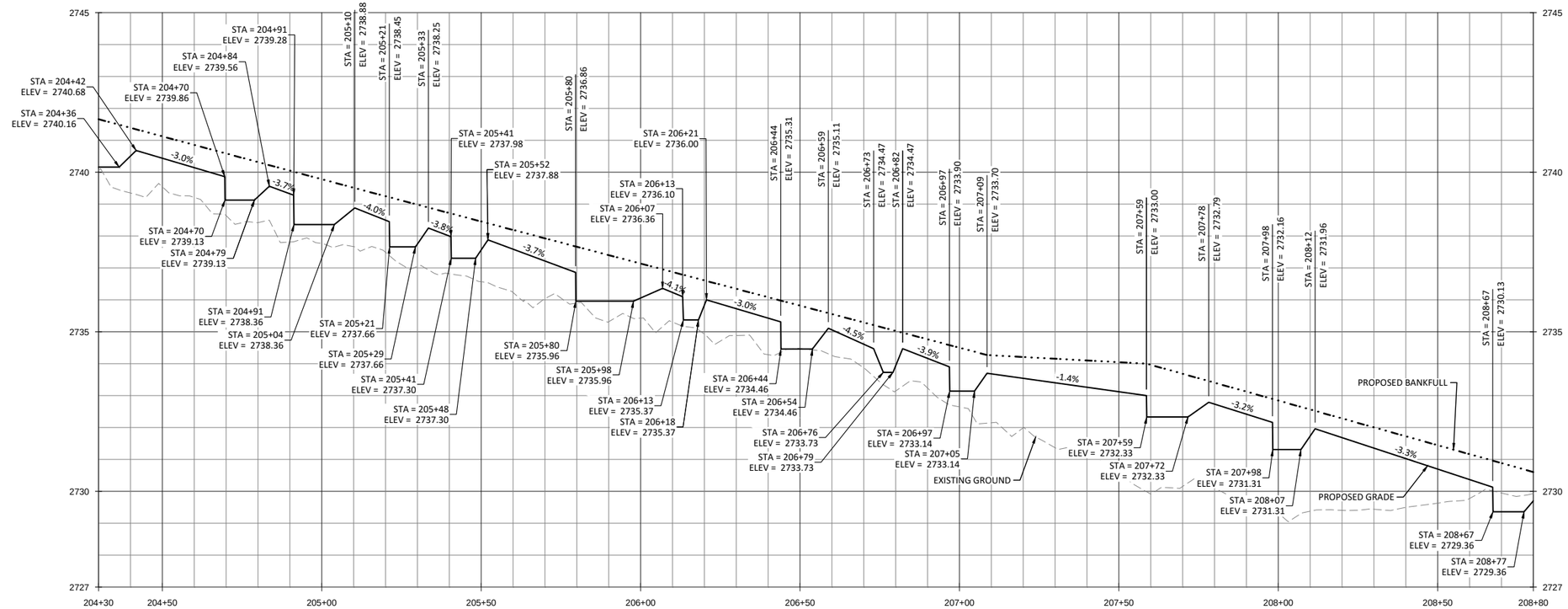

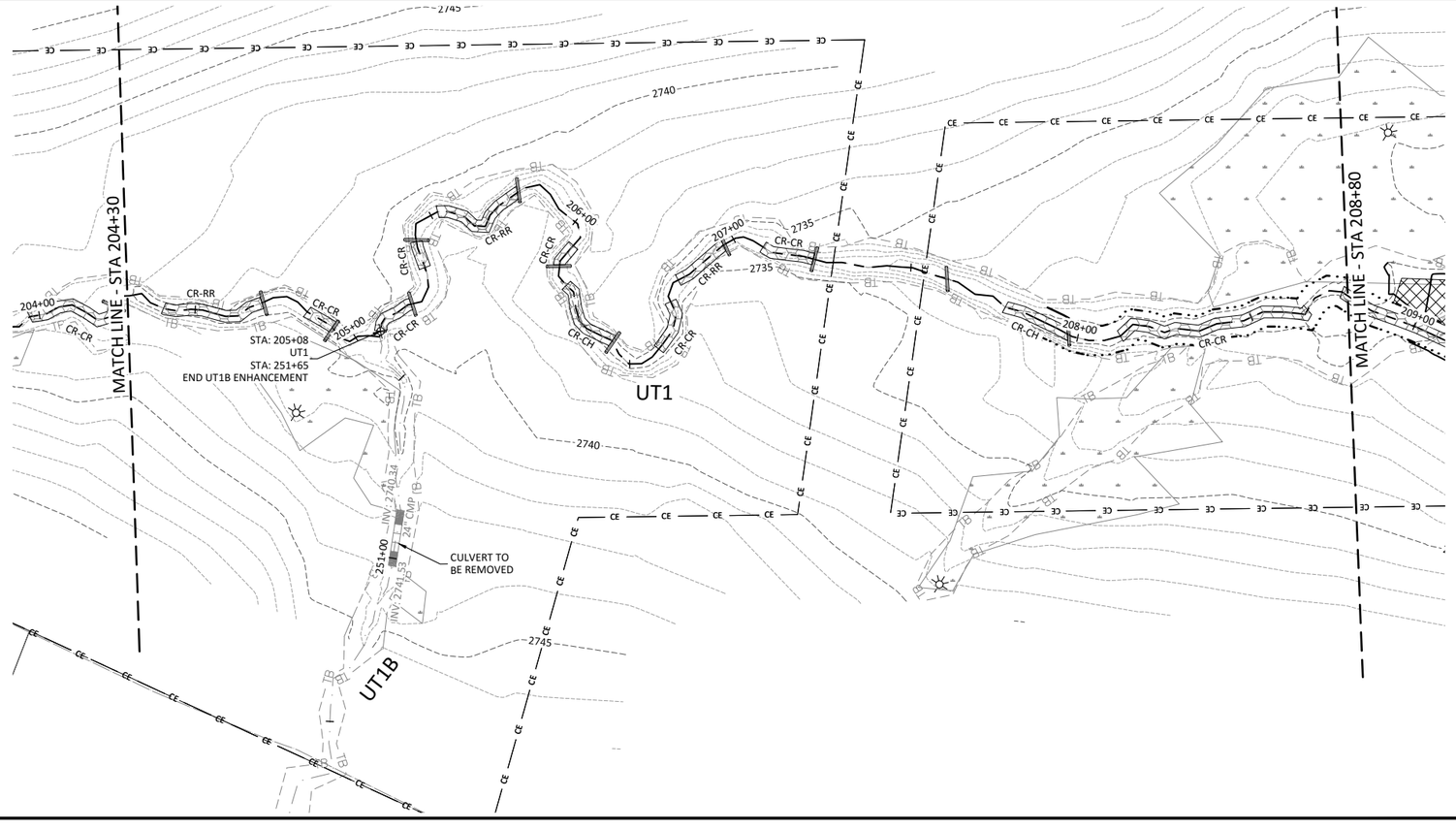

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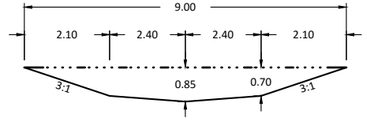

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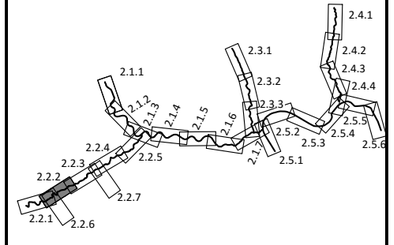

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Vile Creek Mitigation Site
Alleghany County, North Carolina

UT1 Reach 1
Stream Plan and Profile

Revisions:

Date:	May 25 2016
Job Number:	405-02147
Project Engineer:	JNK
Drawn By:	JCK
Checked By:	AOB

Sheet 2.2.2

May 26, 2016

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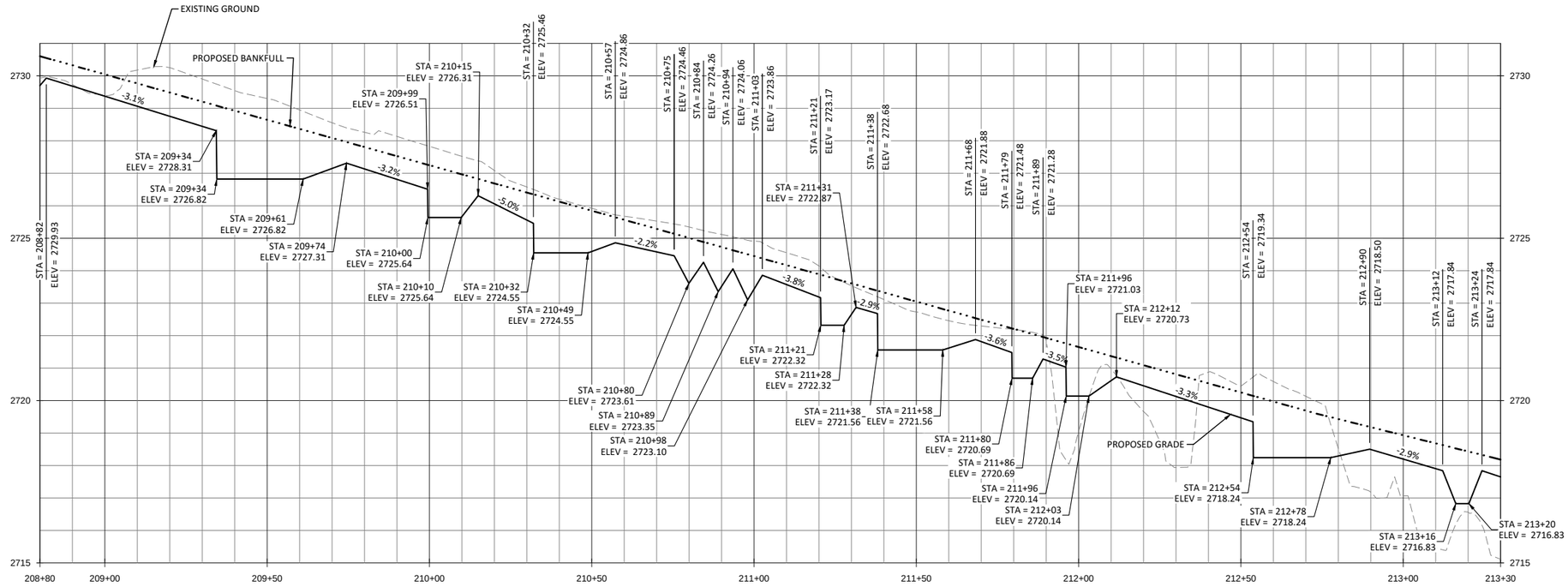
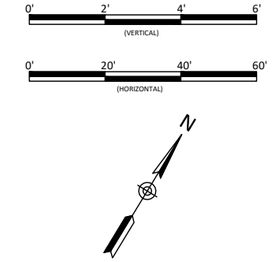
May 26, 2016





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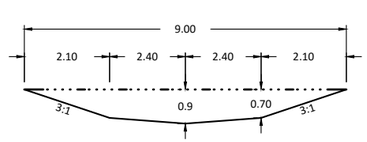

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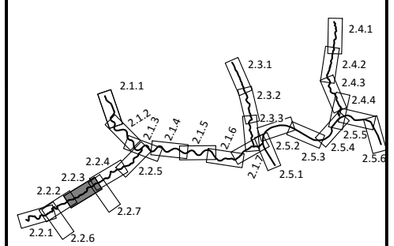

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UT1 Reach 1 & 2
Stream Plan and Profile

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Checked By:	AJB

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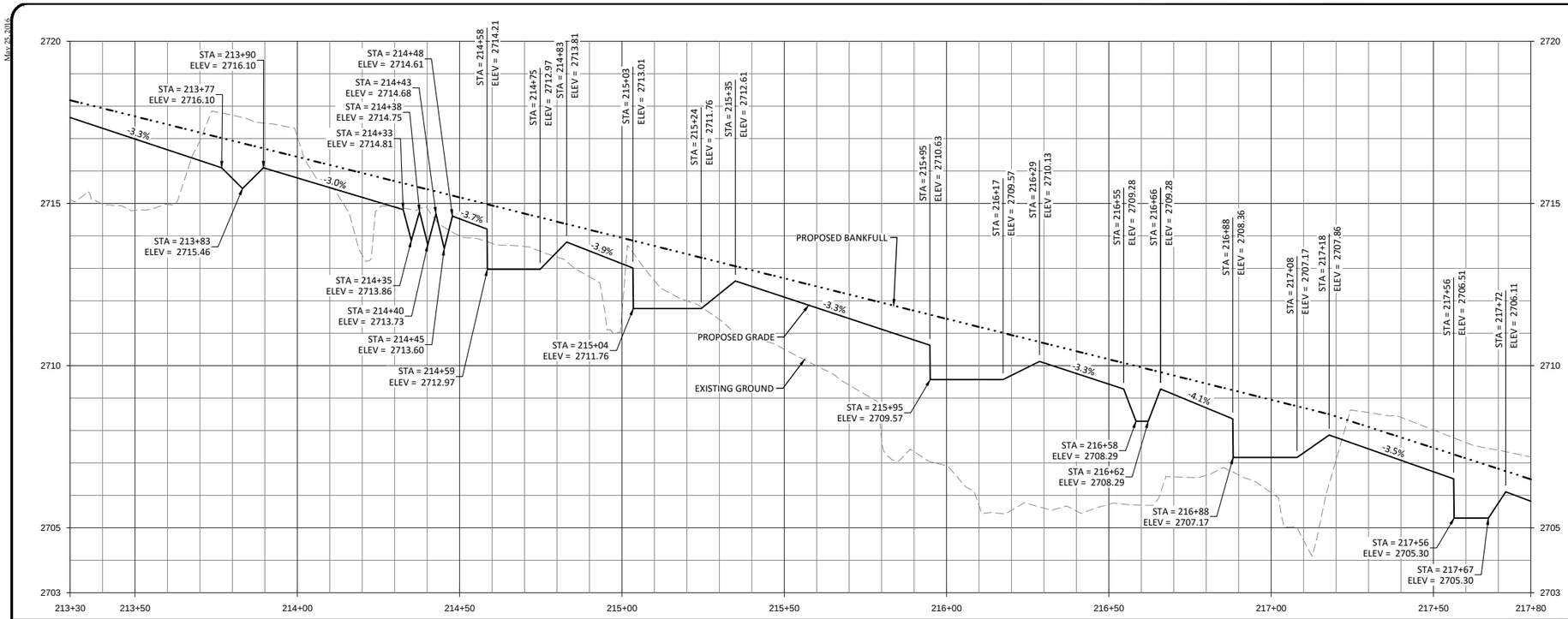

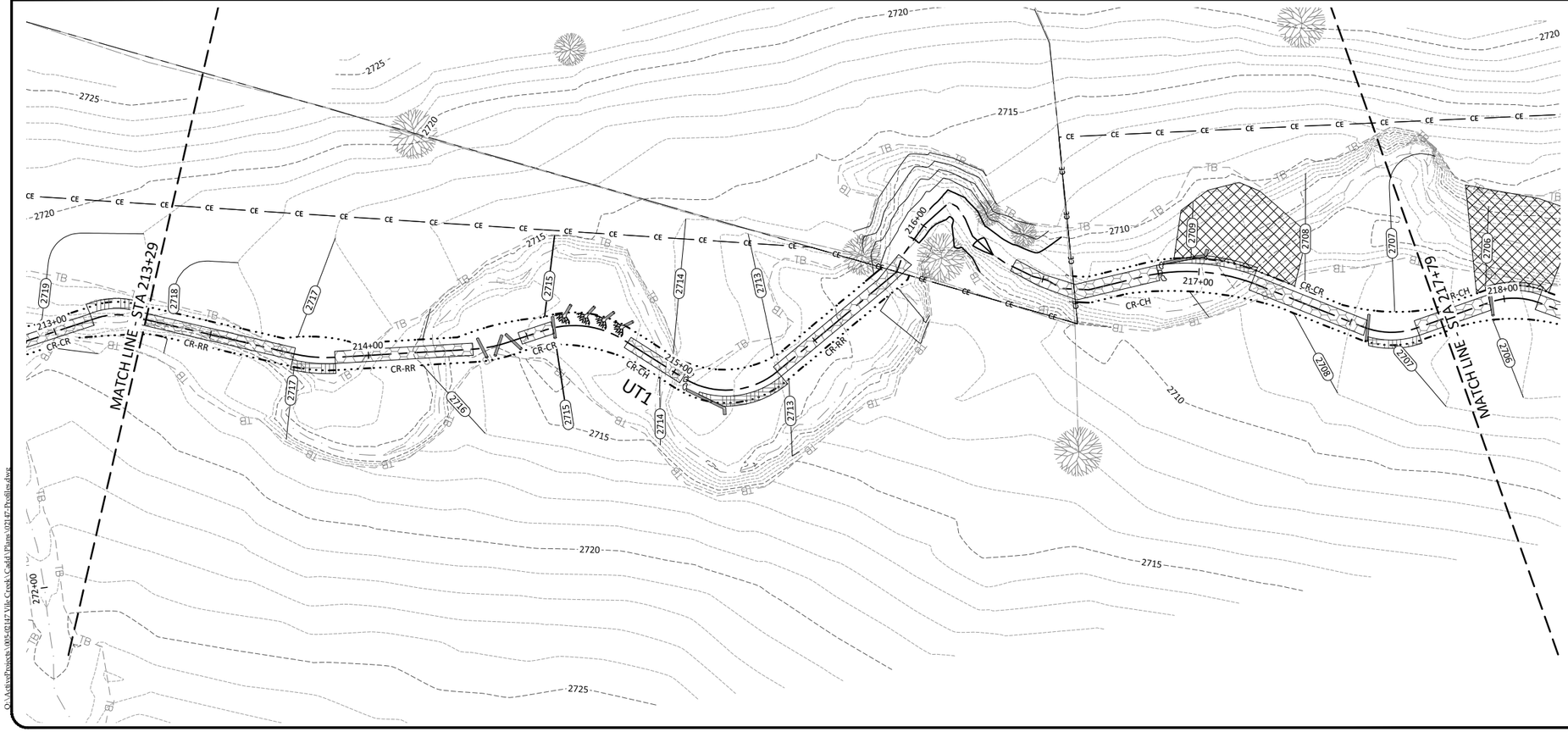

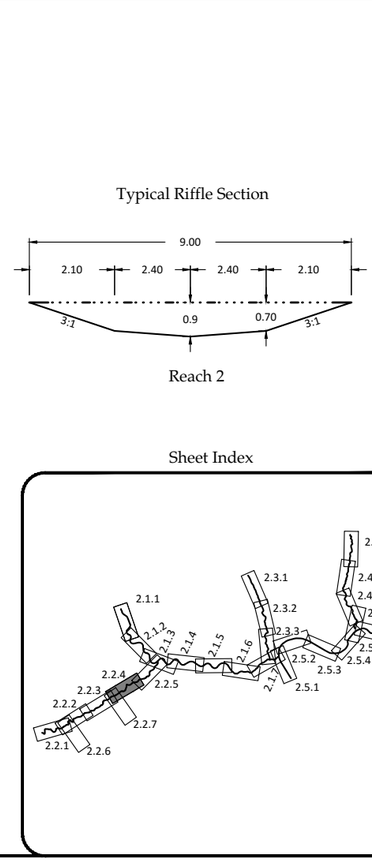

Typical Riffle Section

Reach 2

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Alleghany County, North Carolina

UT1 Reach 2
Stream Plan and Profile

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Project Engineer:	JNK
Drawn By:	JCK
Checked By:	ADB

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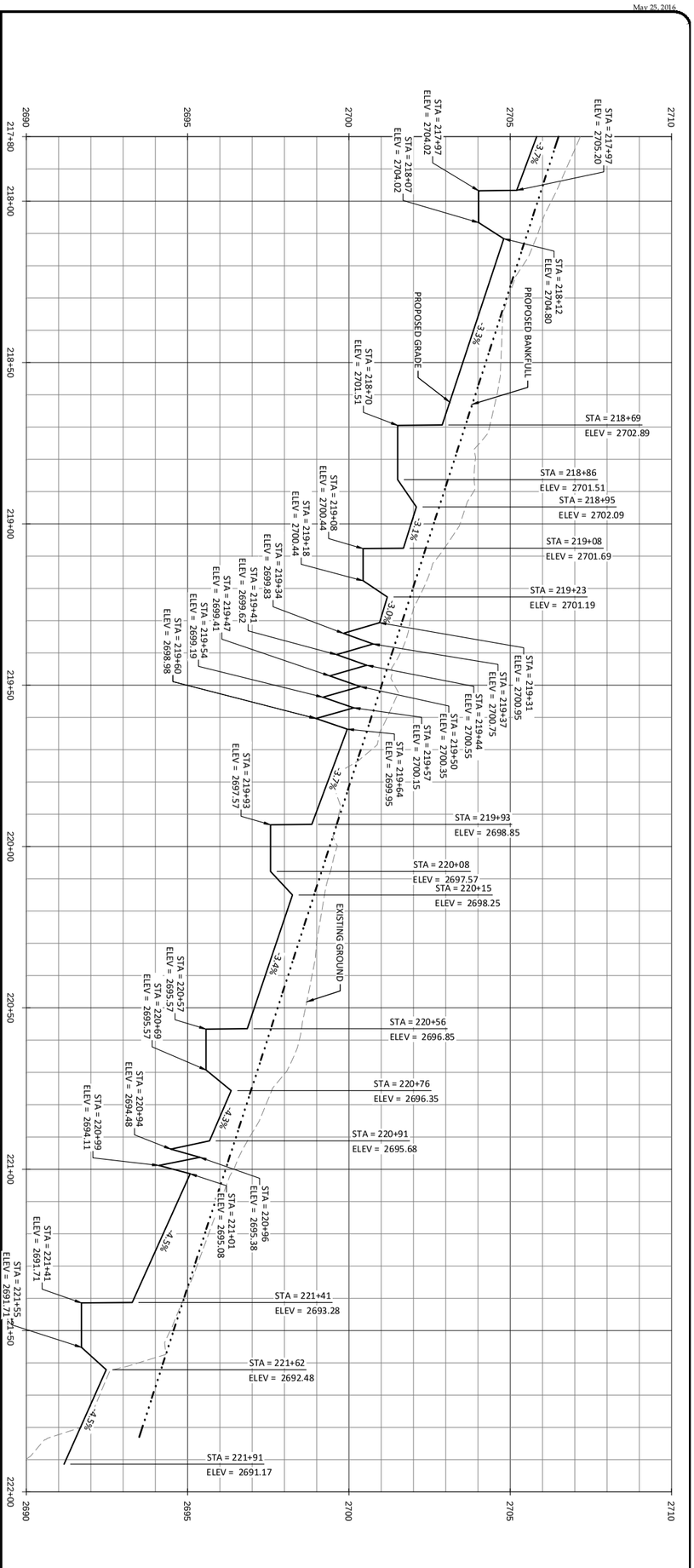
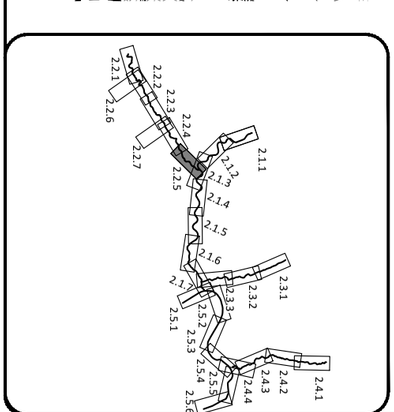
May 26, 2016





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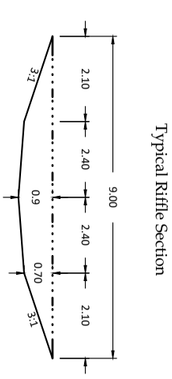

Reach 2

Typical Riffle Section

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Vile Creek Mitigation Site
Alleghany County, North Carolina

UT1 Reach 2
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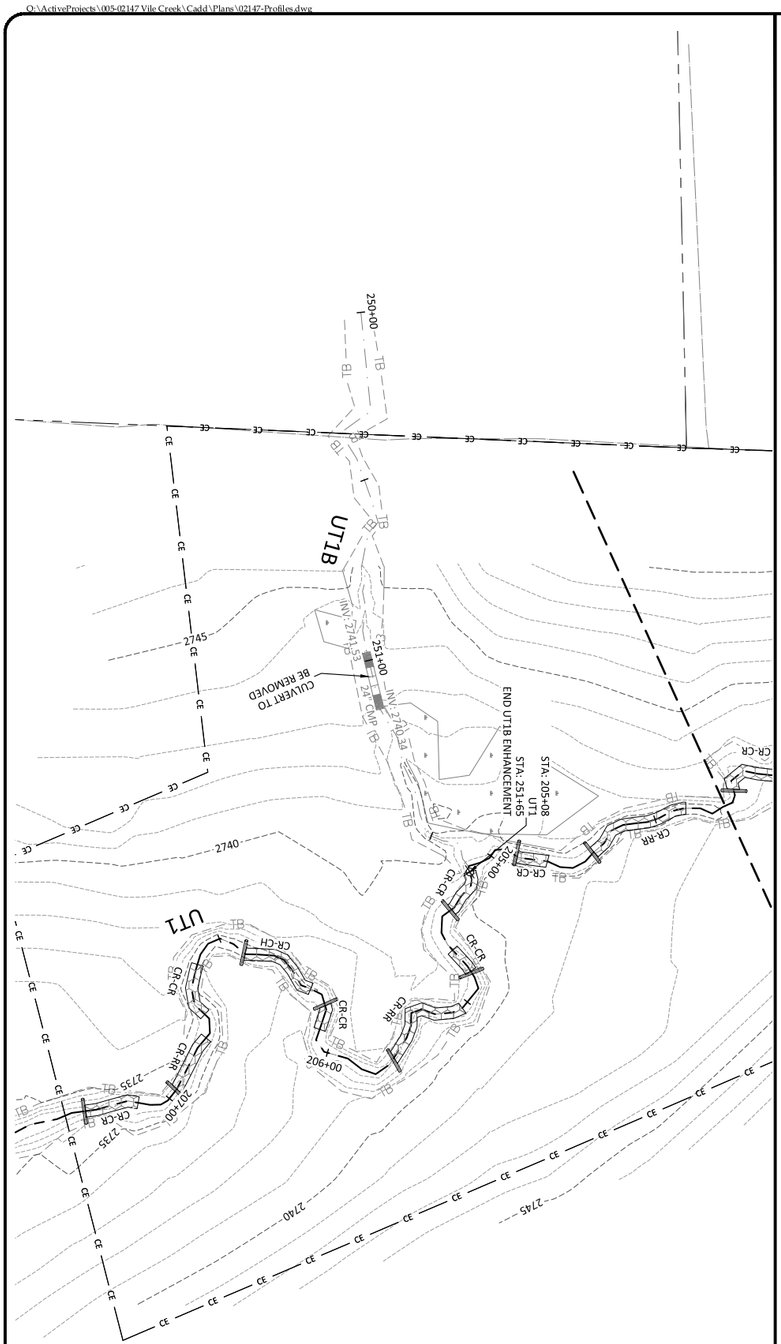

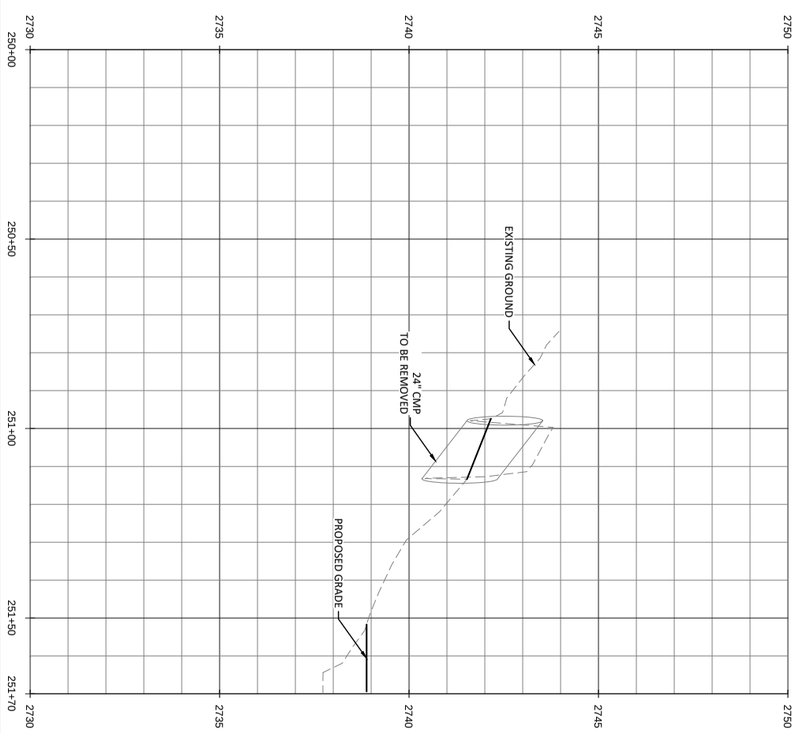

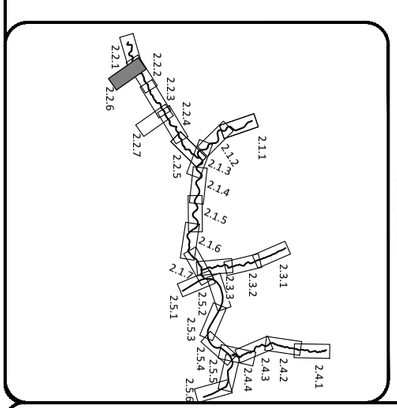

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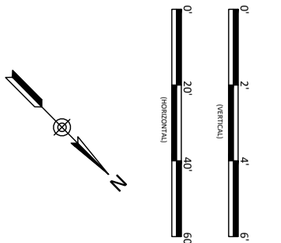

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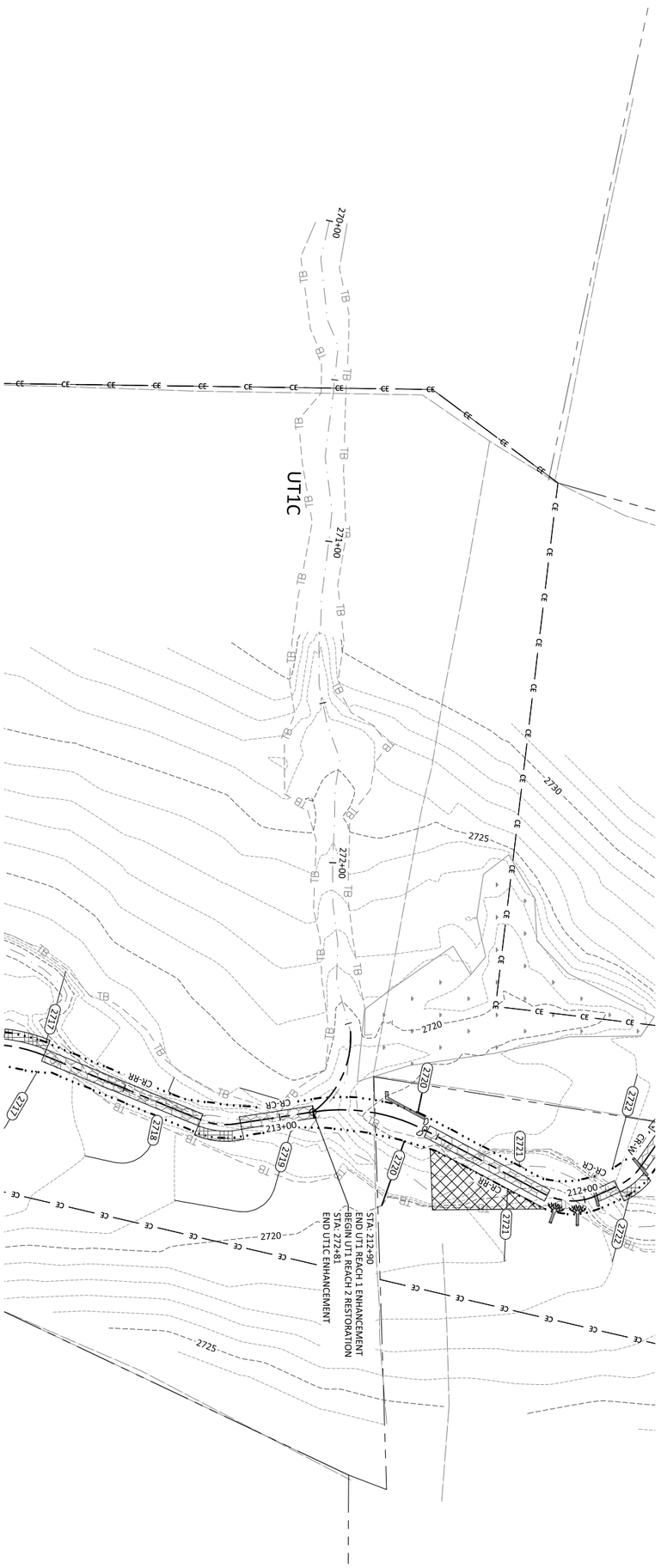

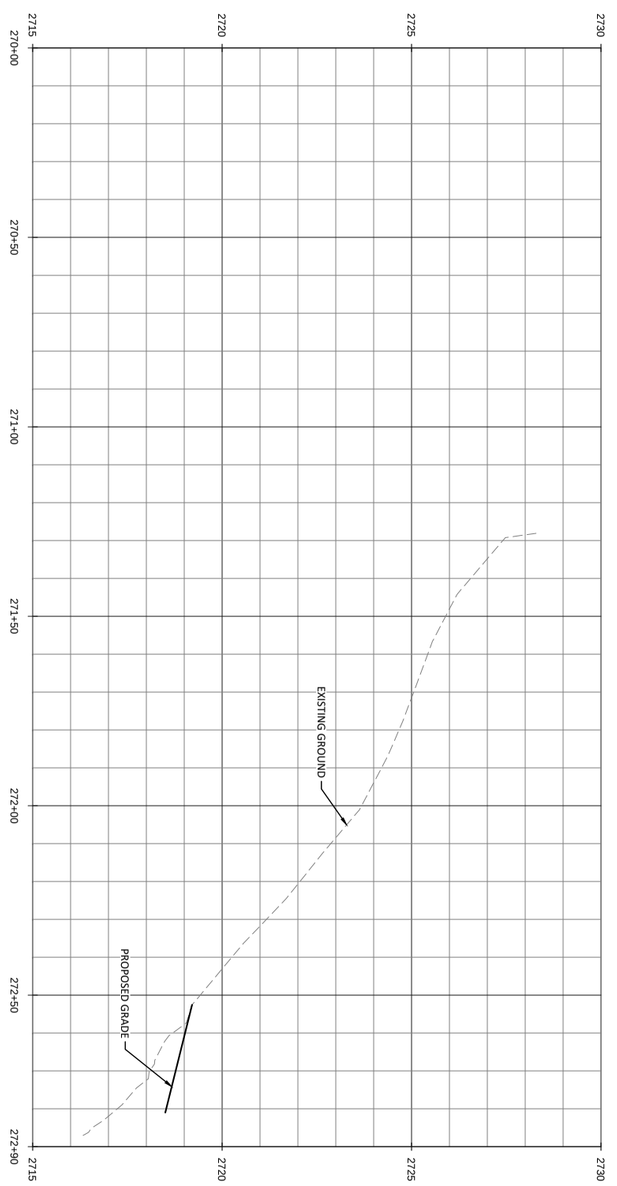

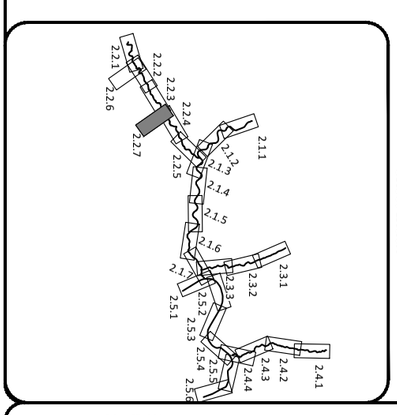

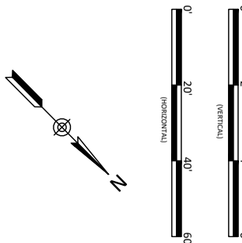

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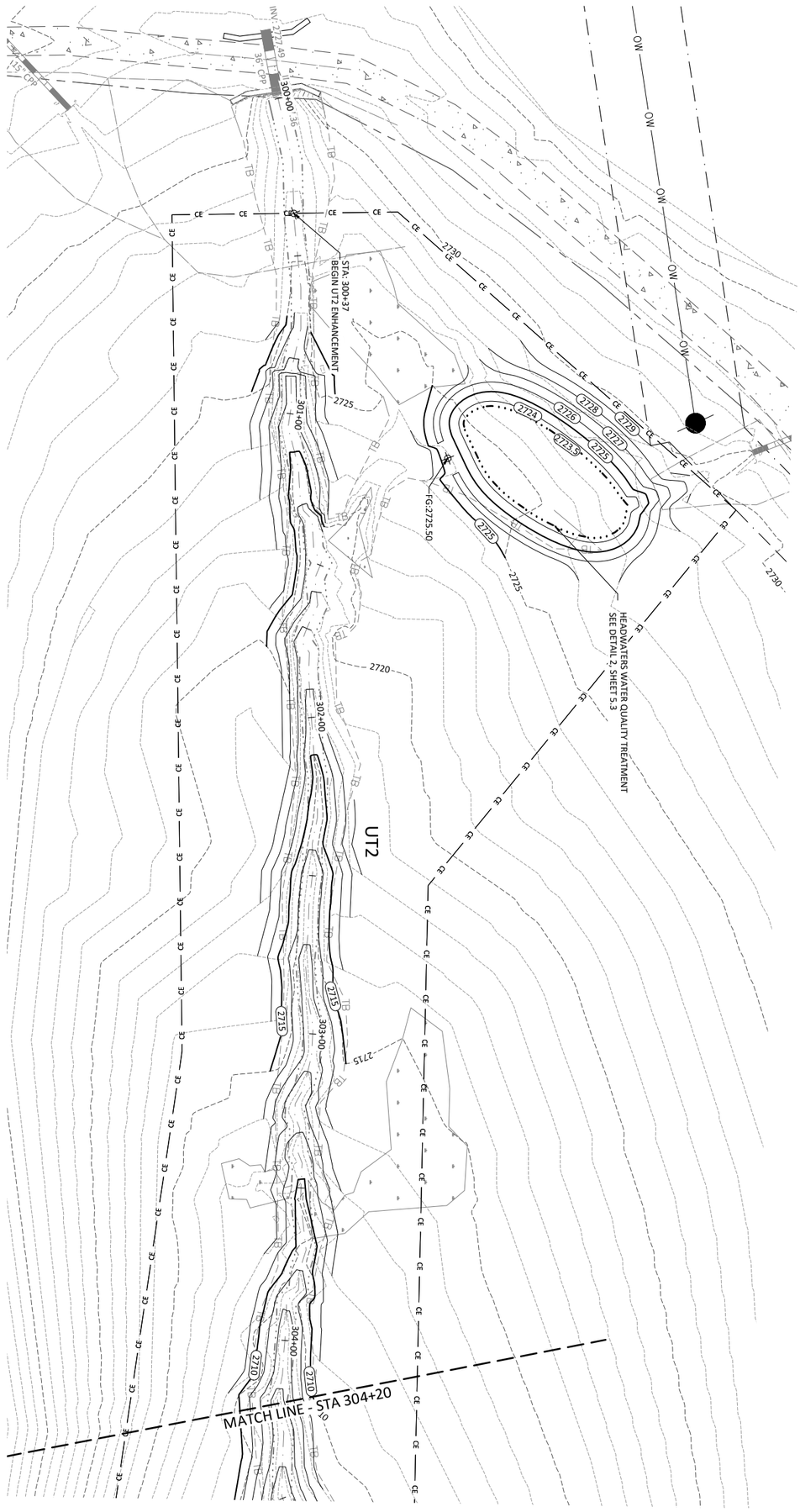

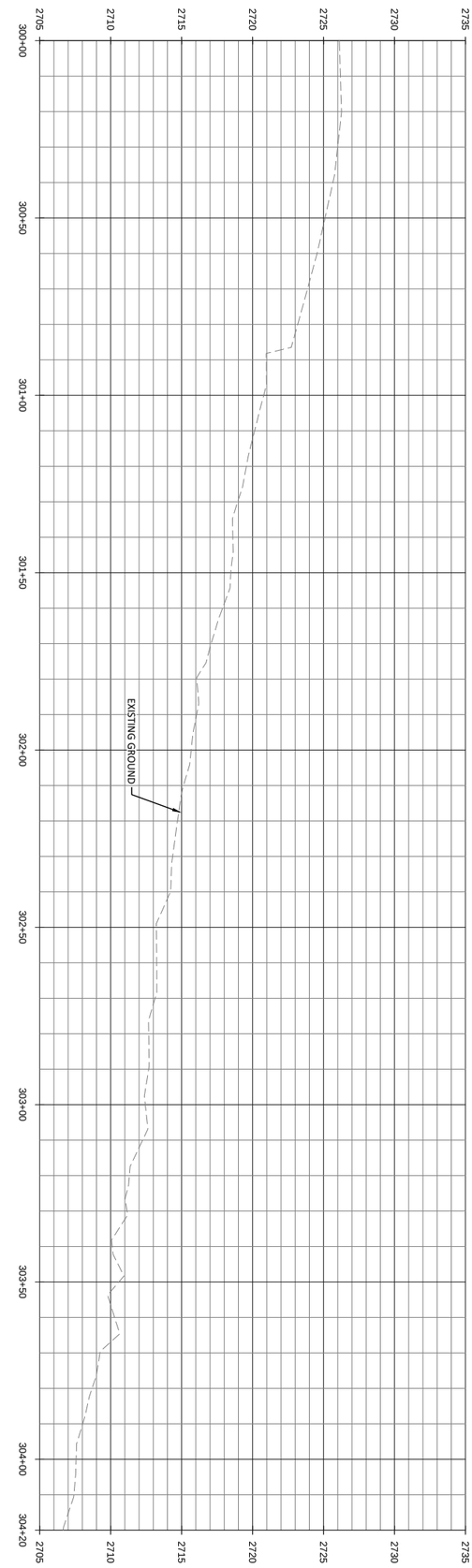

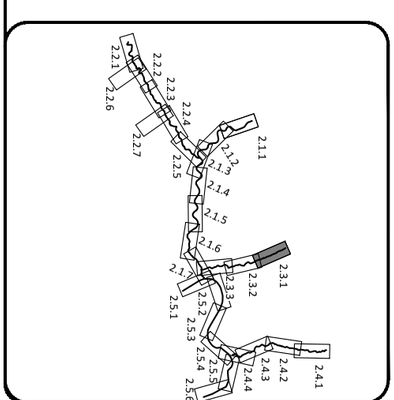

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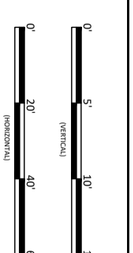

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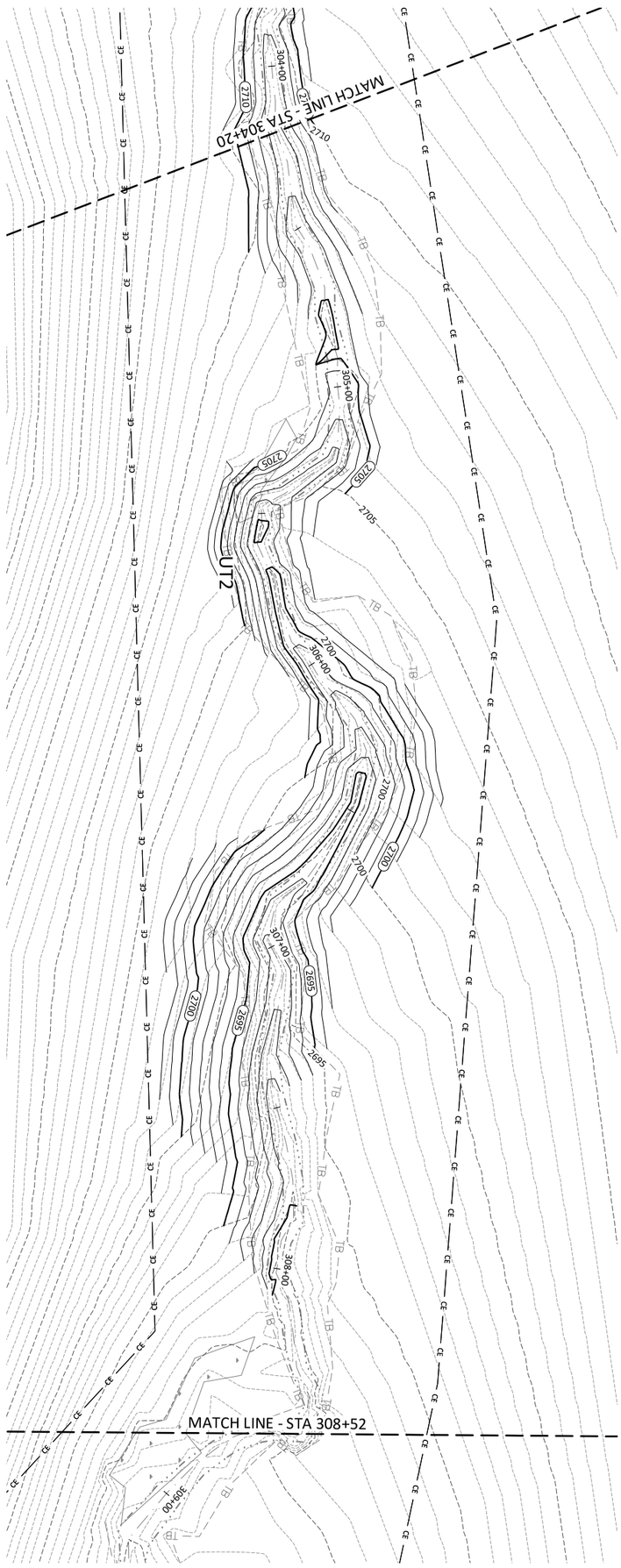

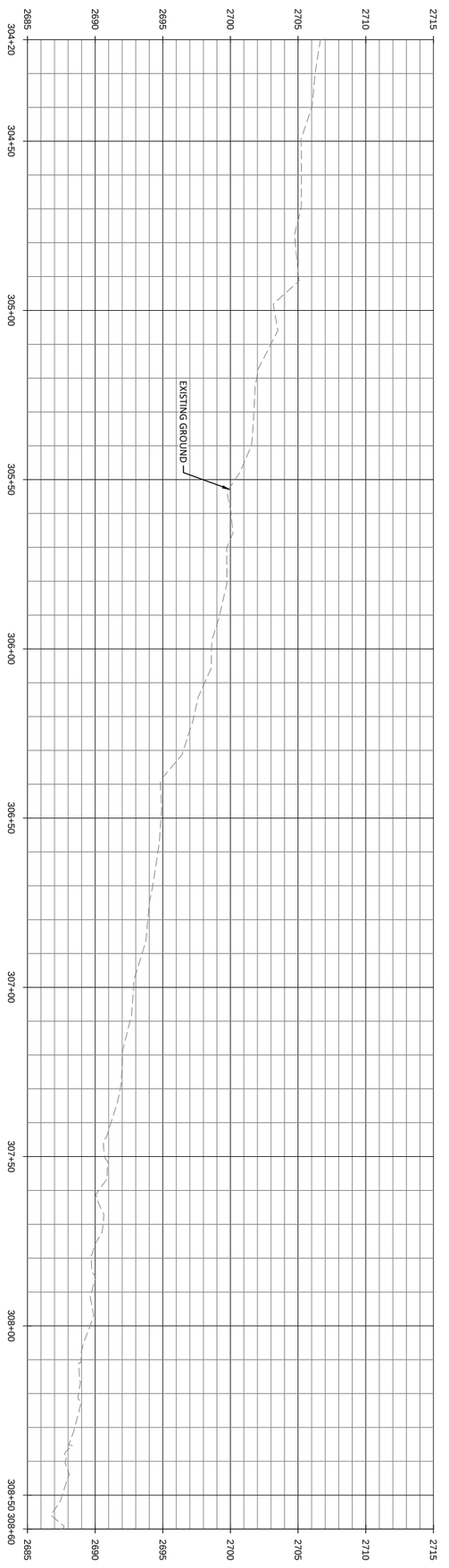

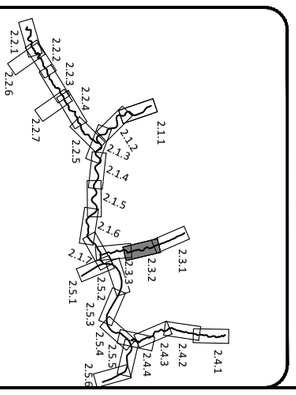

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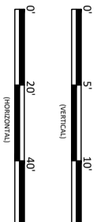

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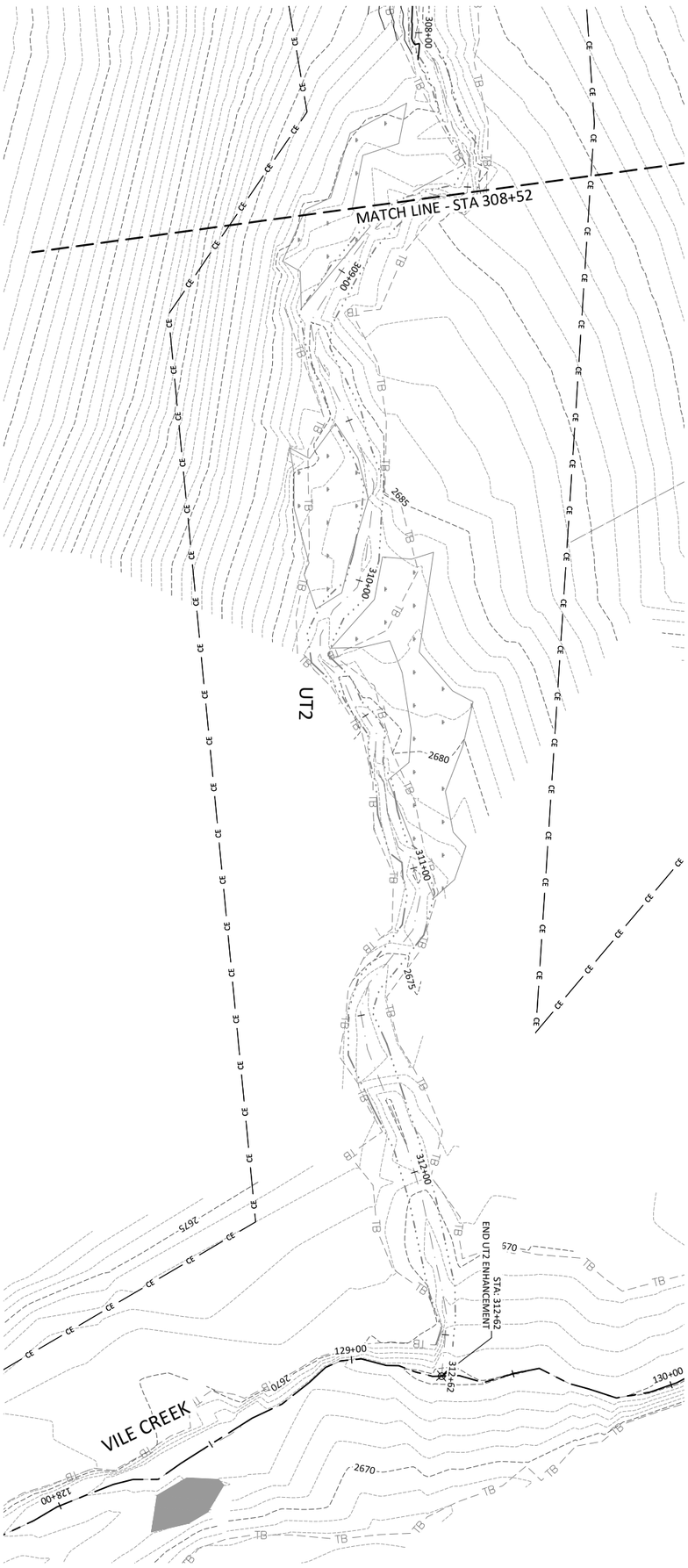

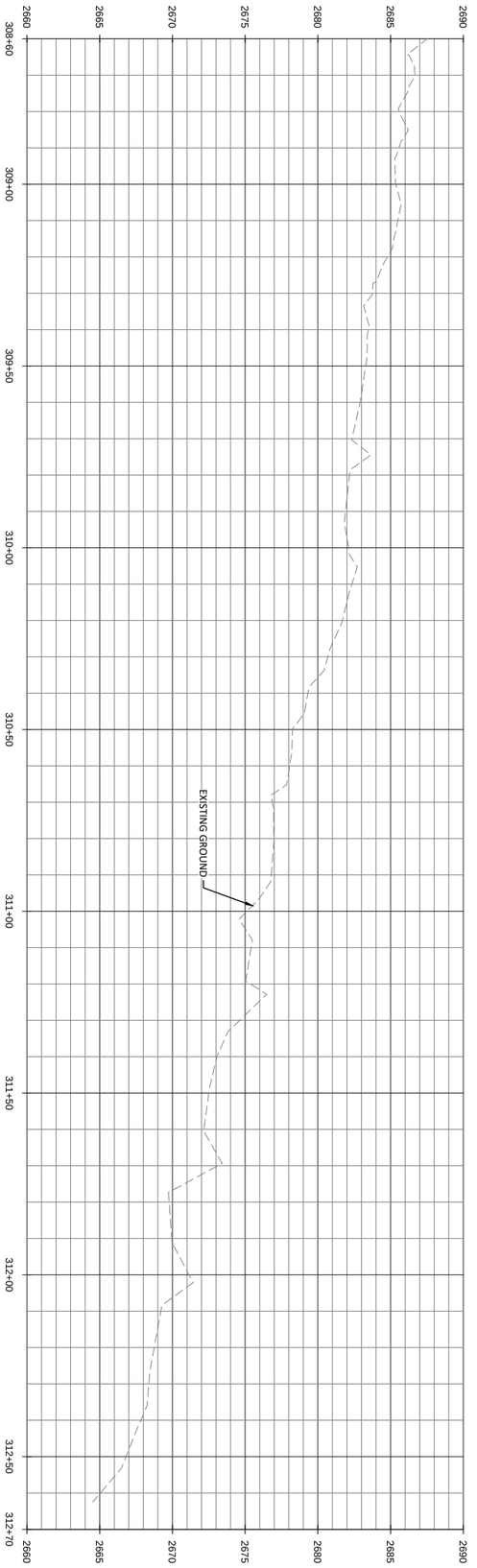

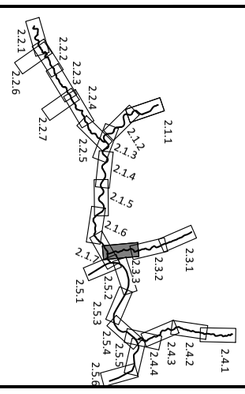

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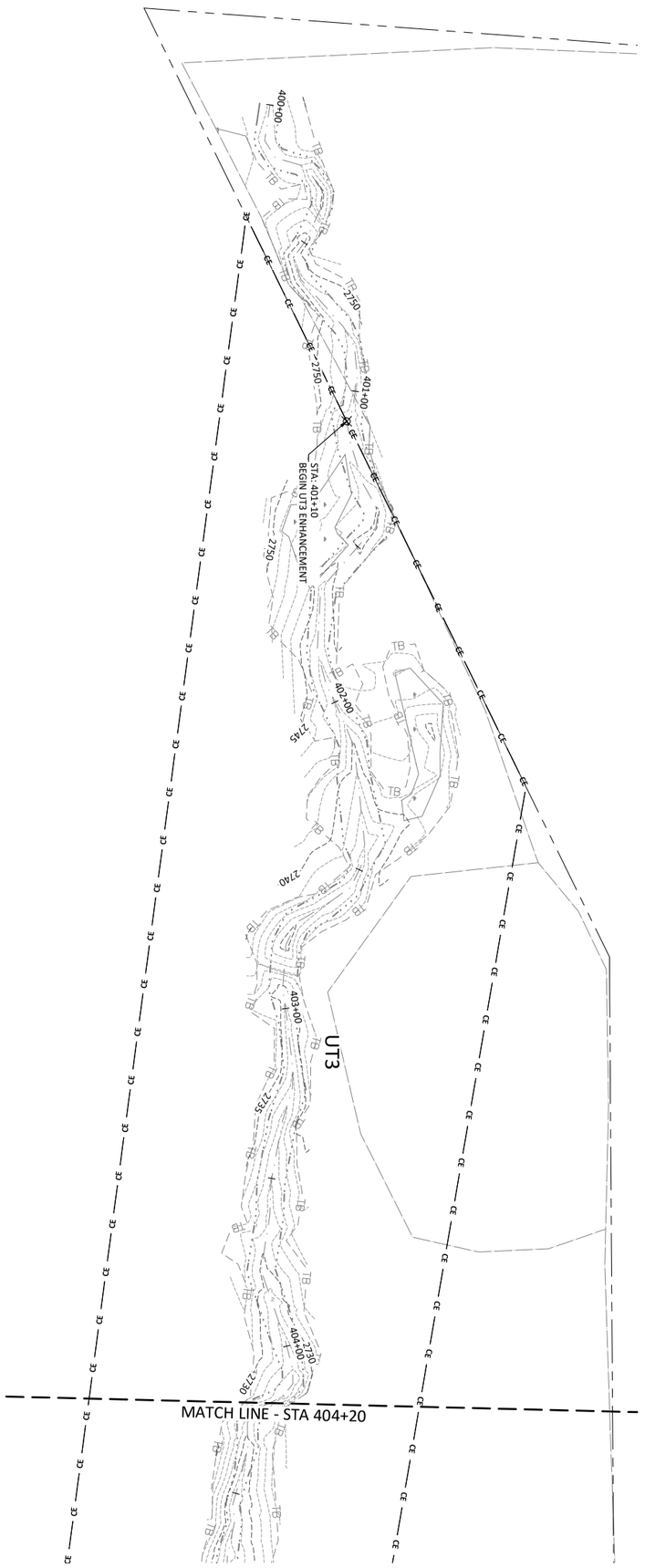

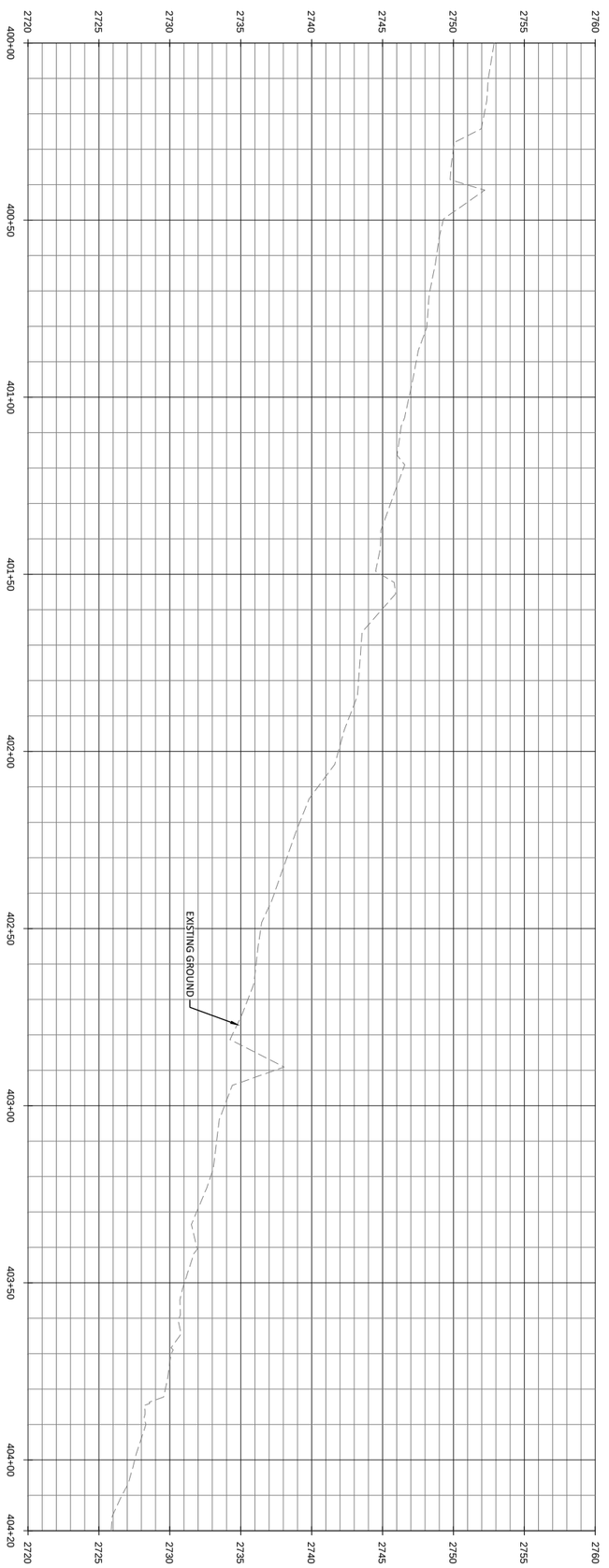

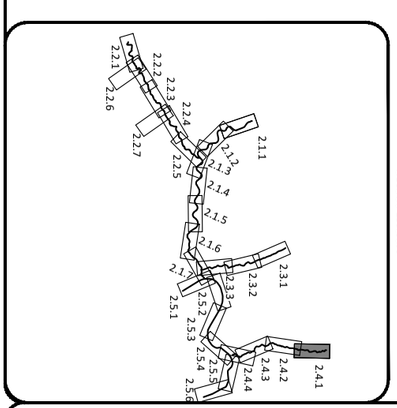

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0' 20' 40' 60' (HORIZONTAL)

0' 5' 10' 15' (VERTICAL)

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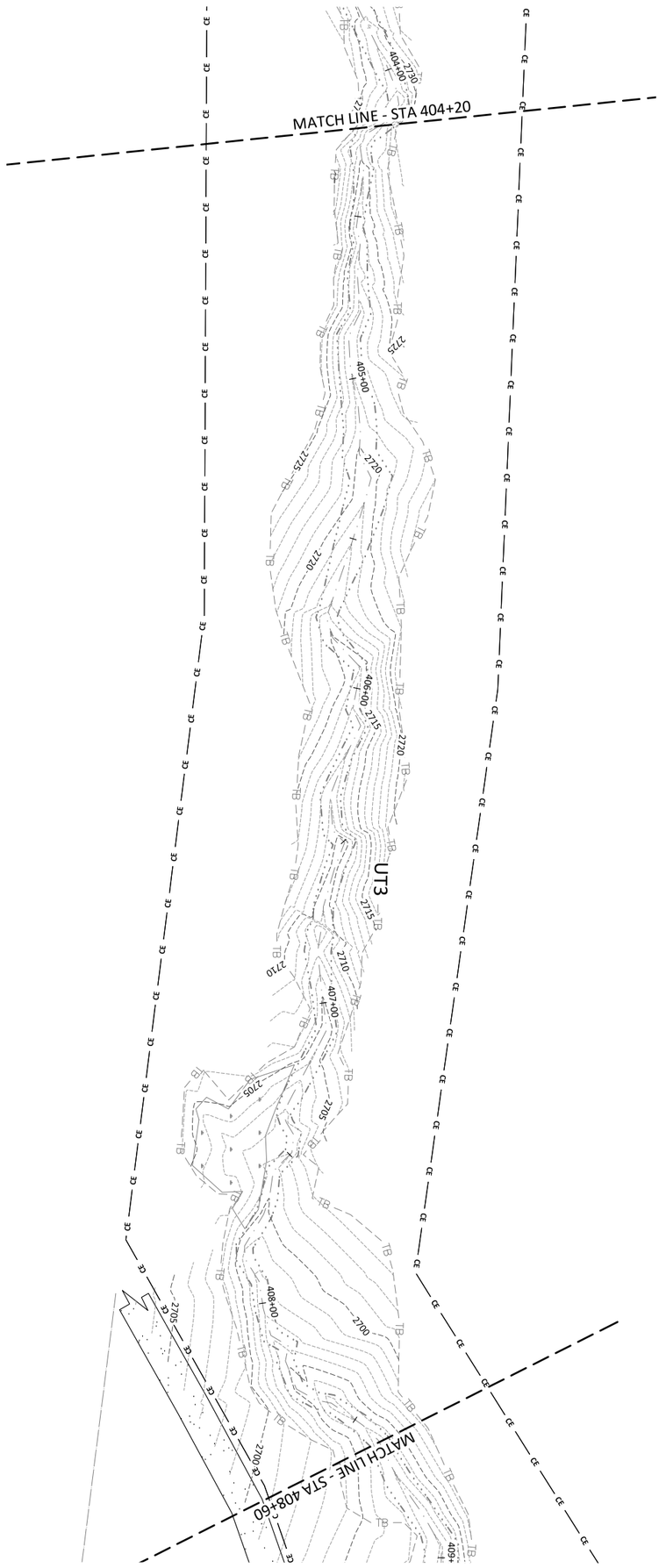

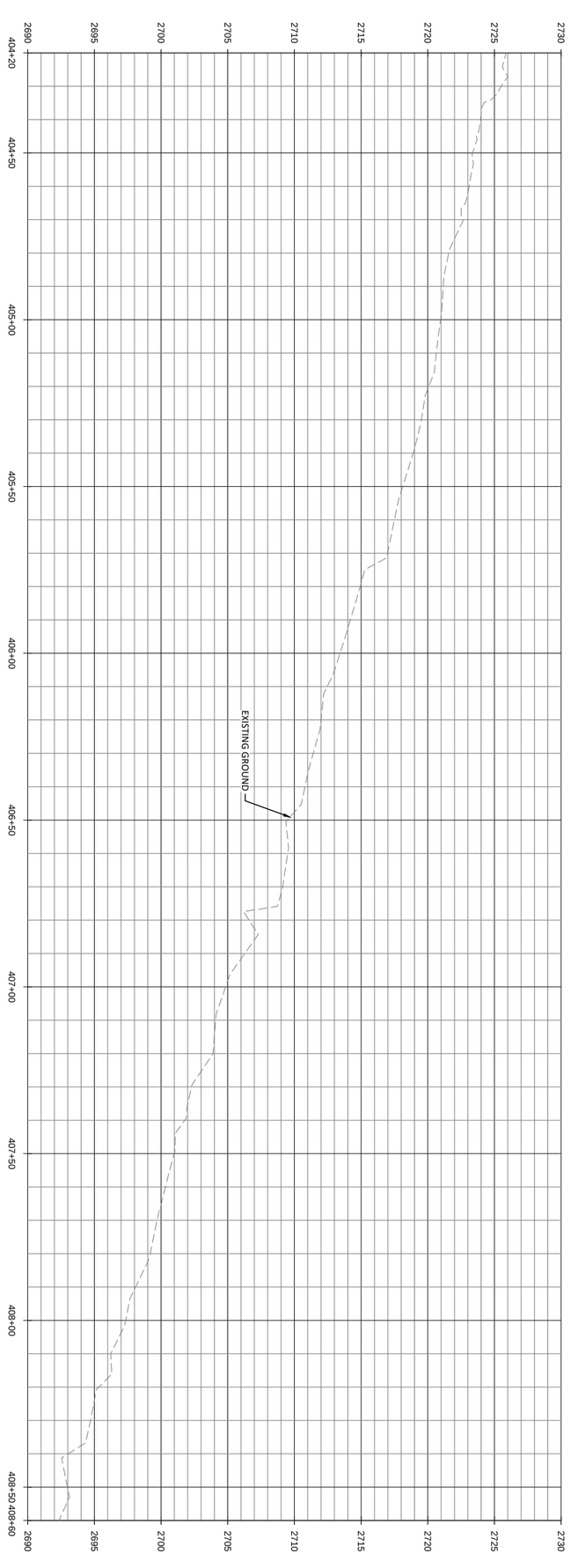

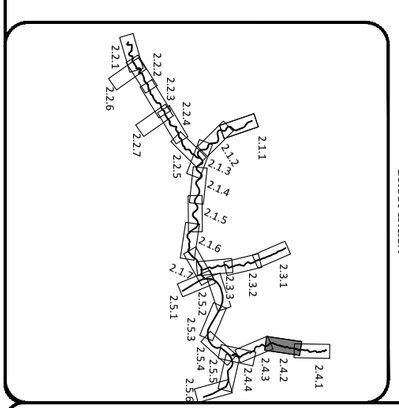

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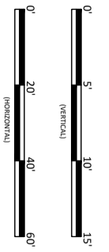

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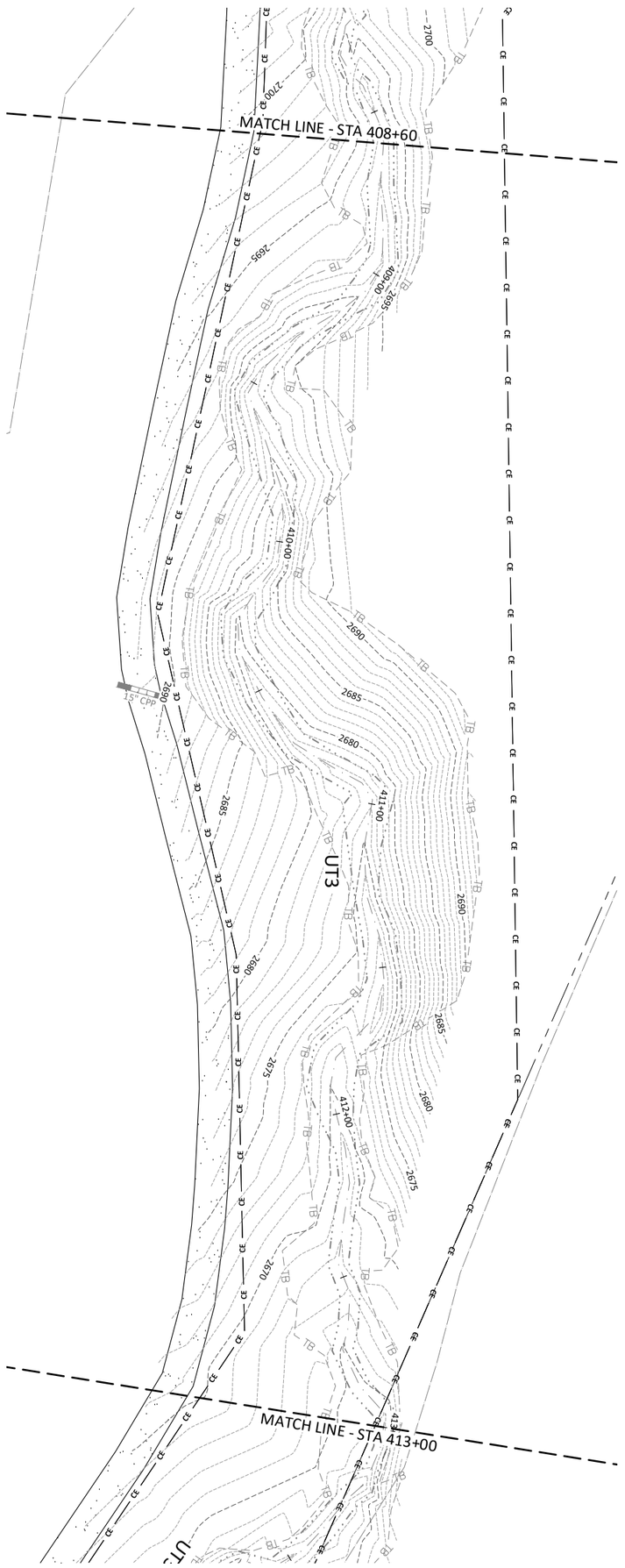

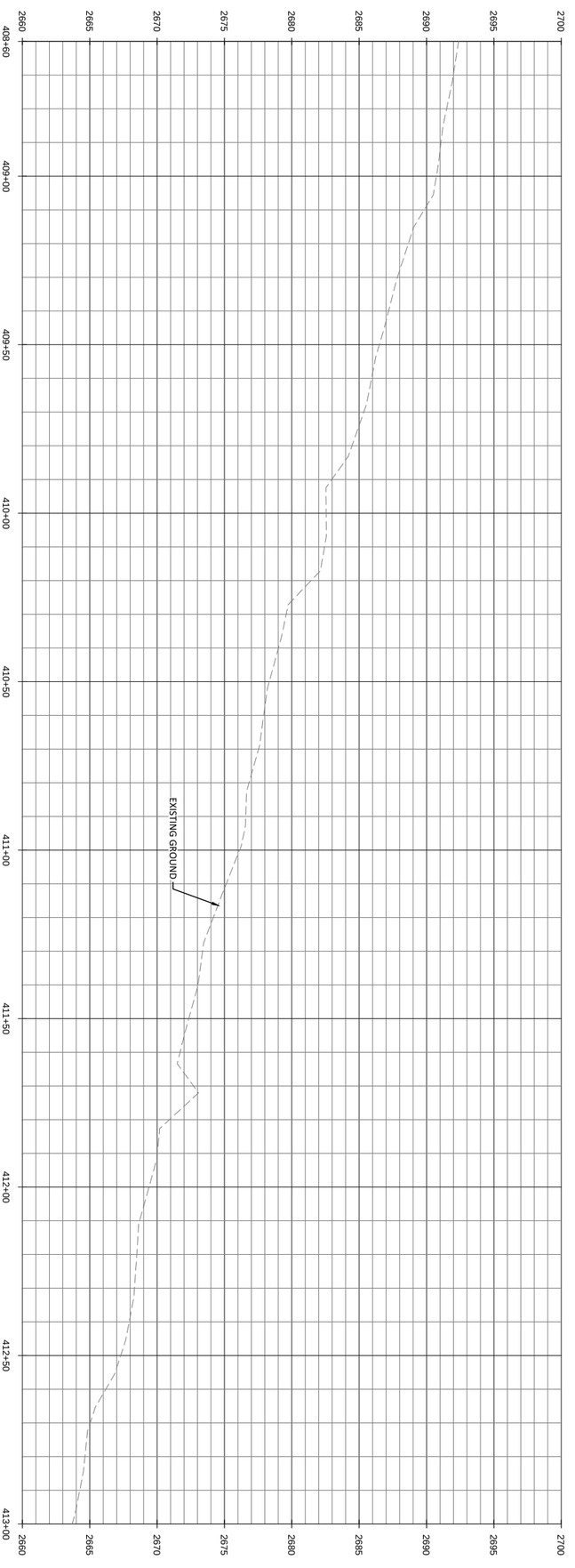

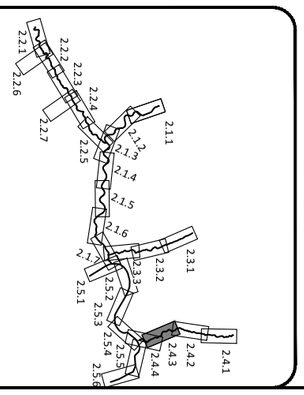

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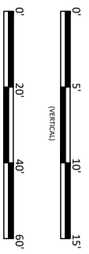

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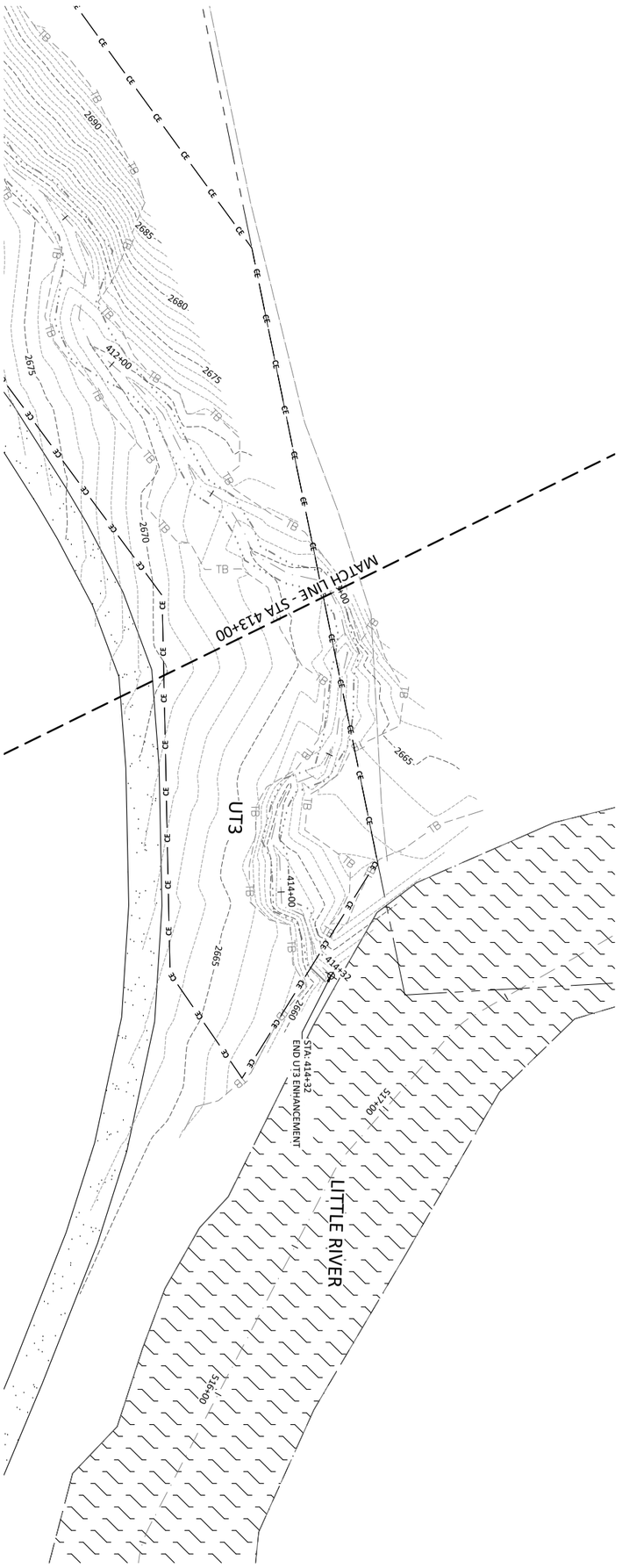

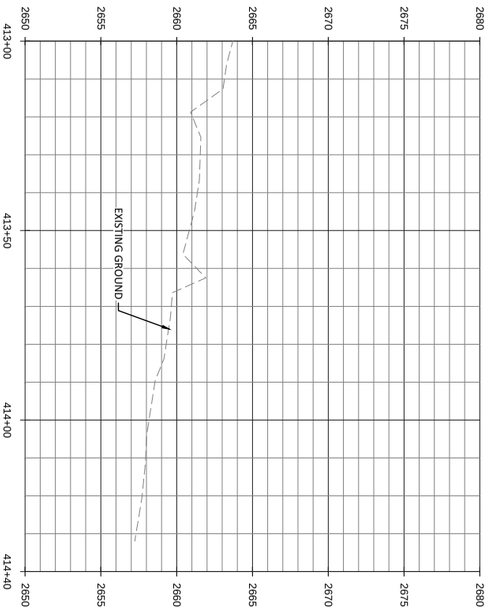

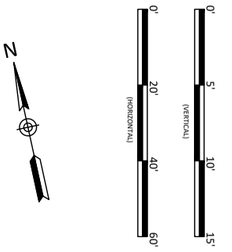

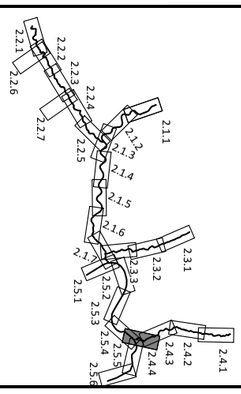

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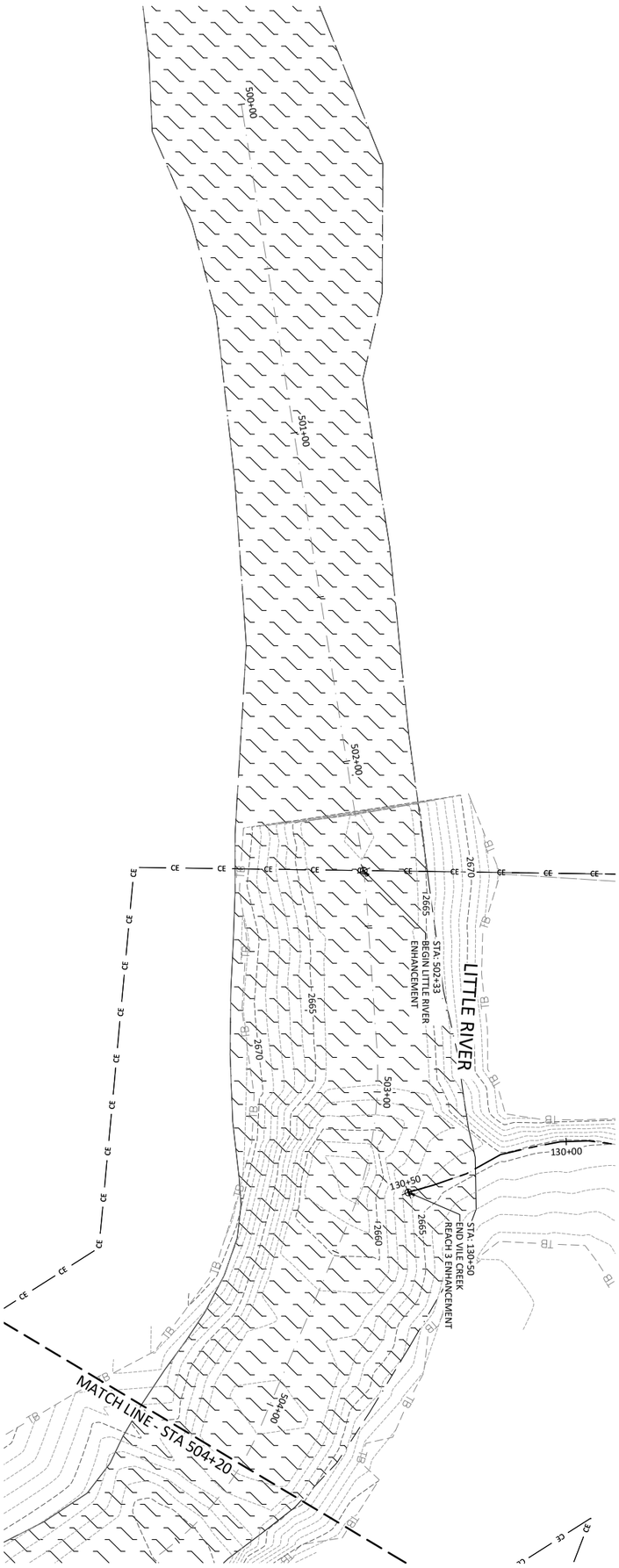

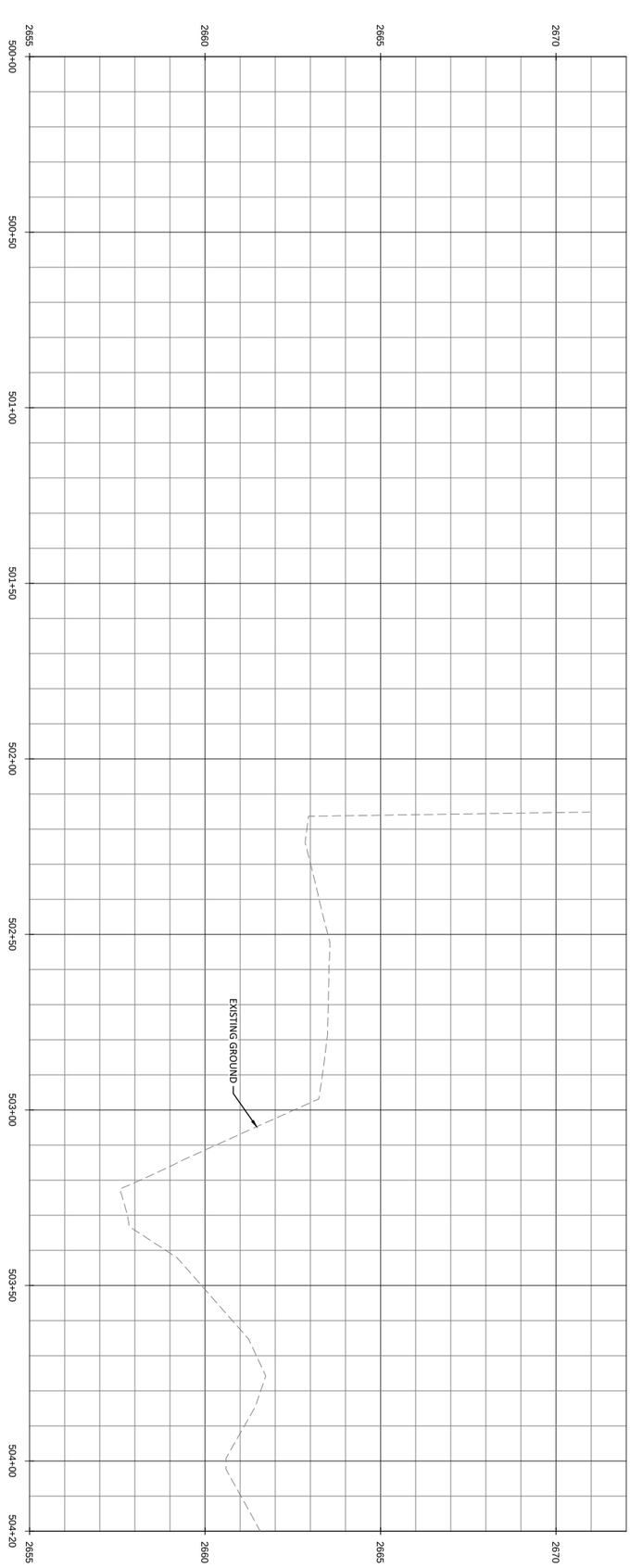

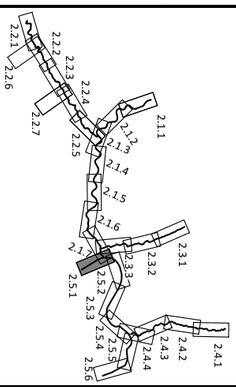

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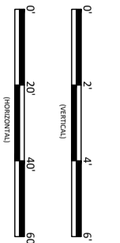

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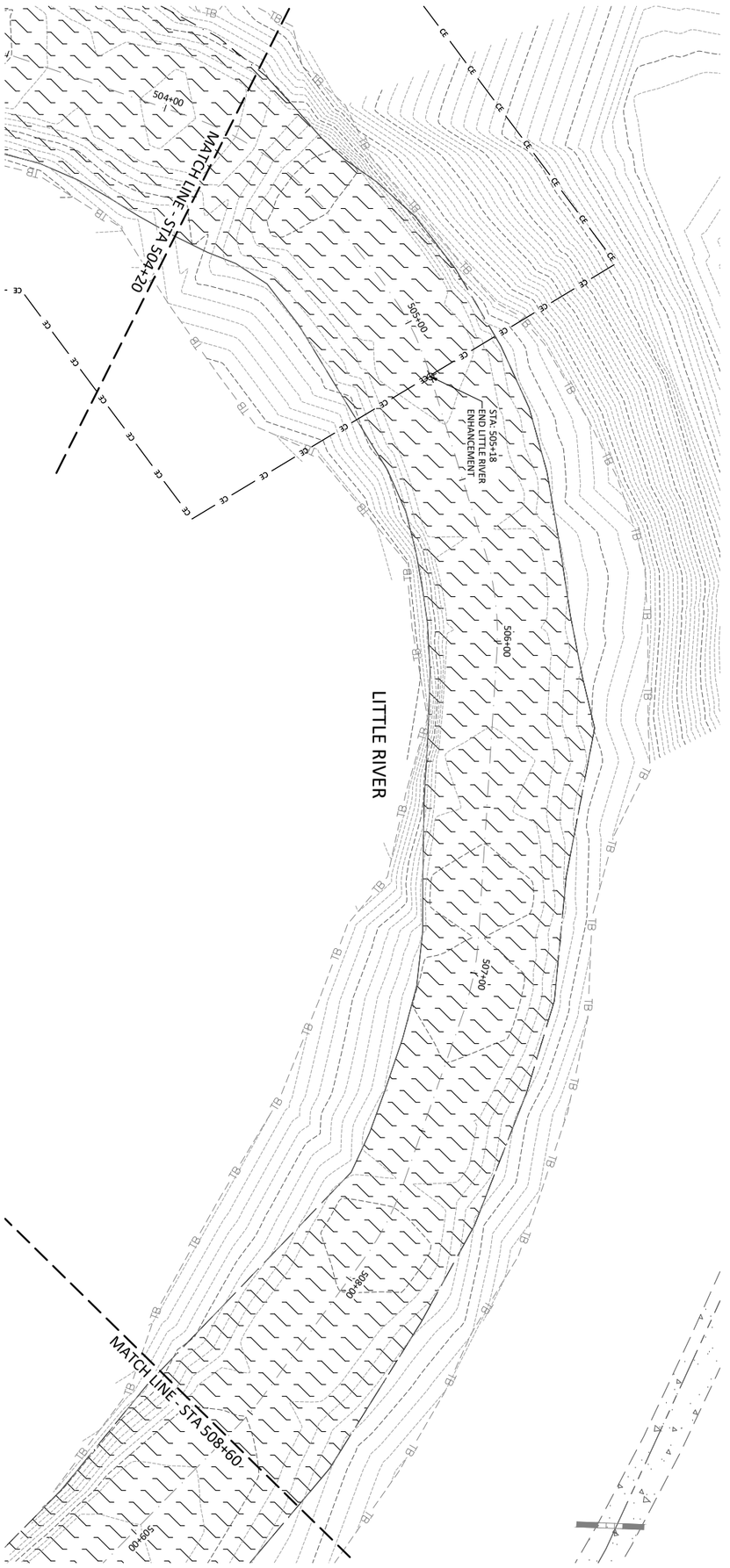

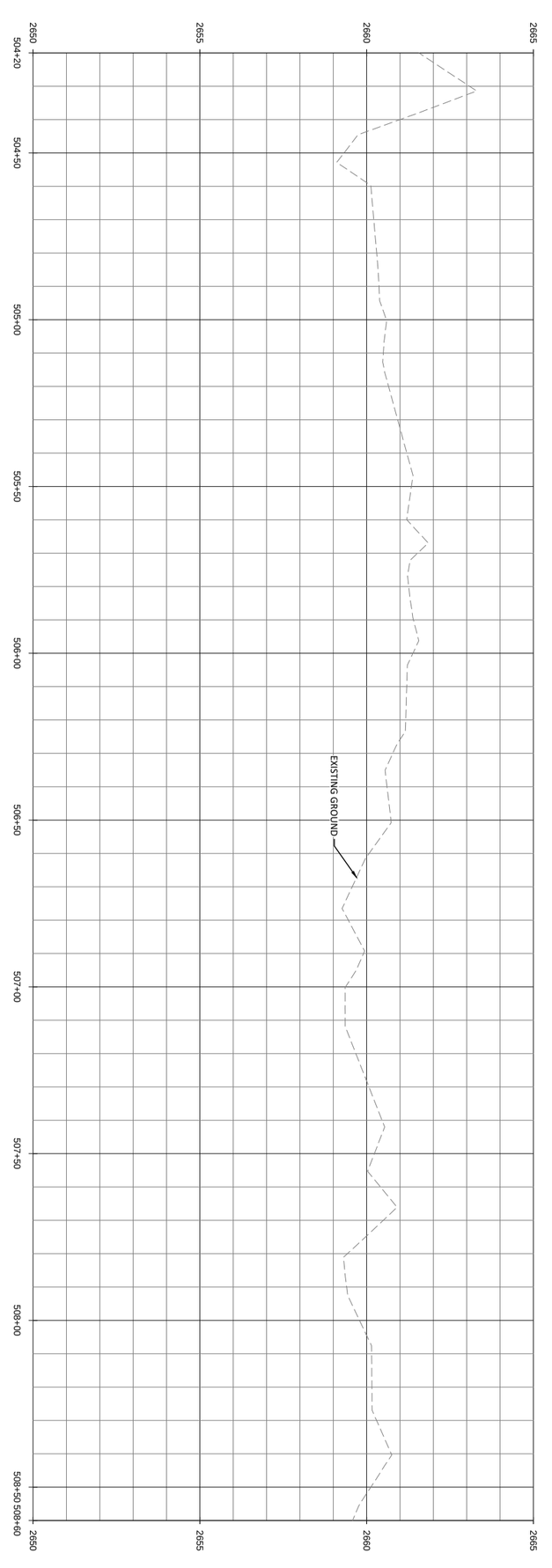

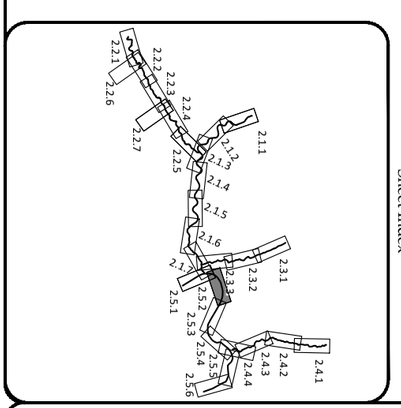

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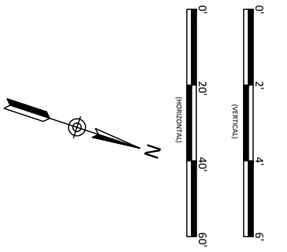

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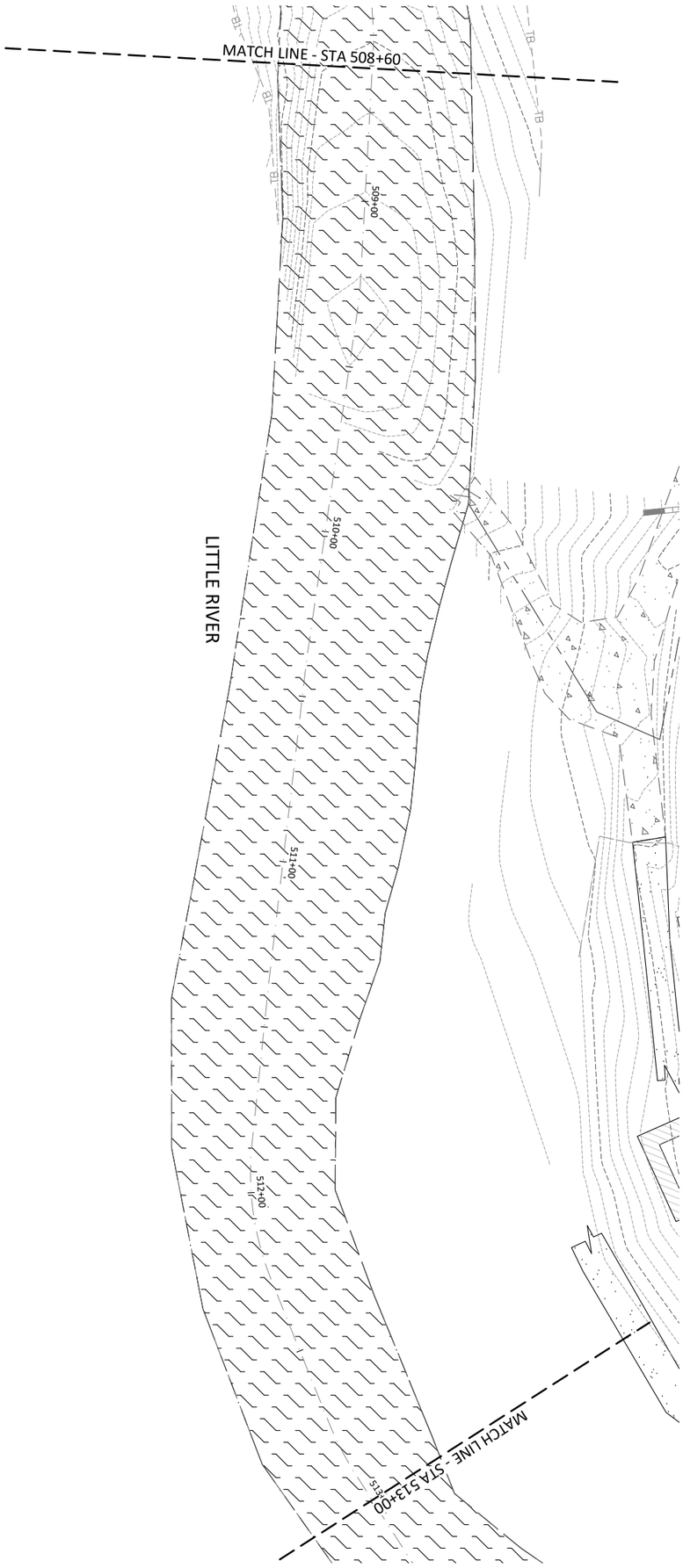

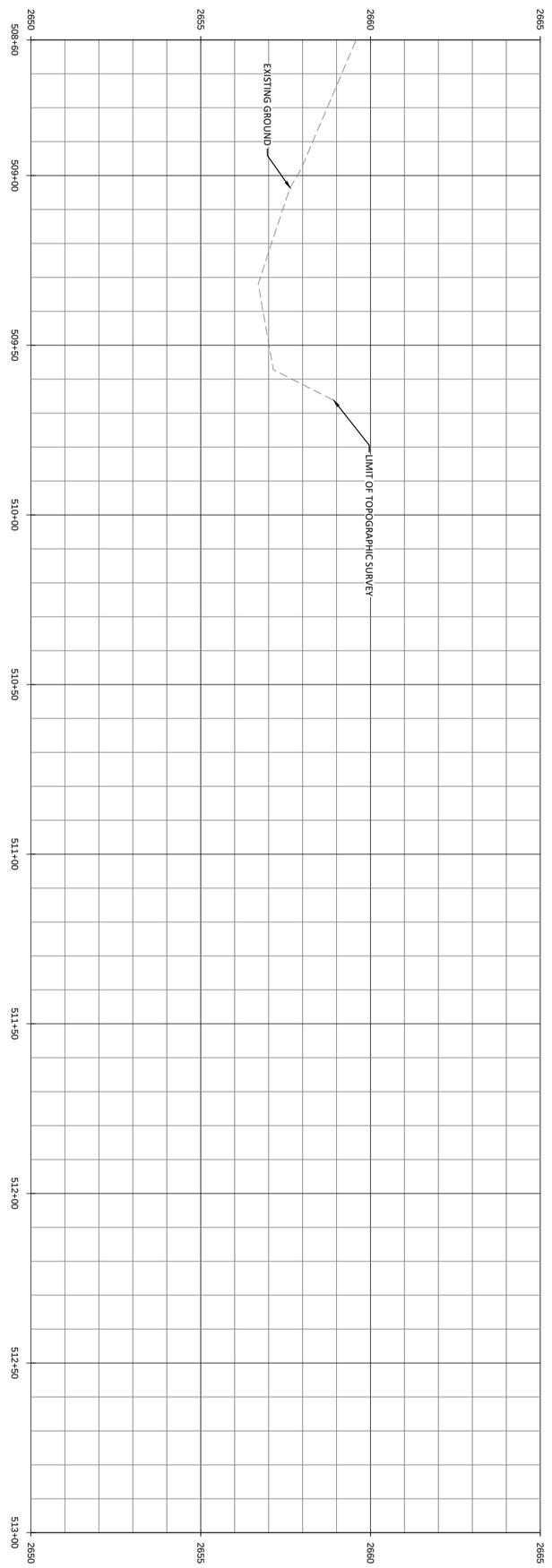

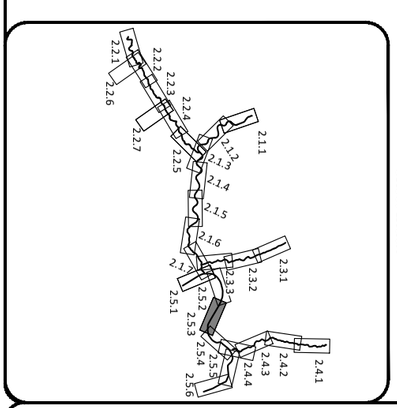

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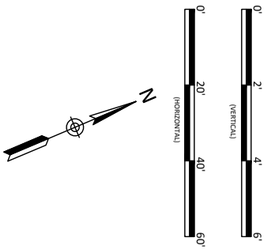

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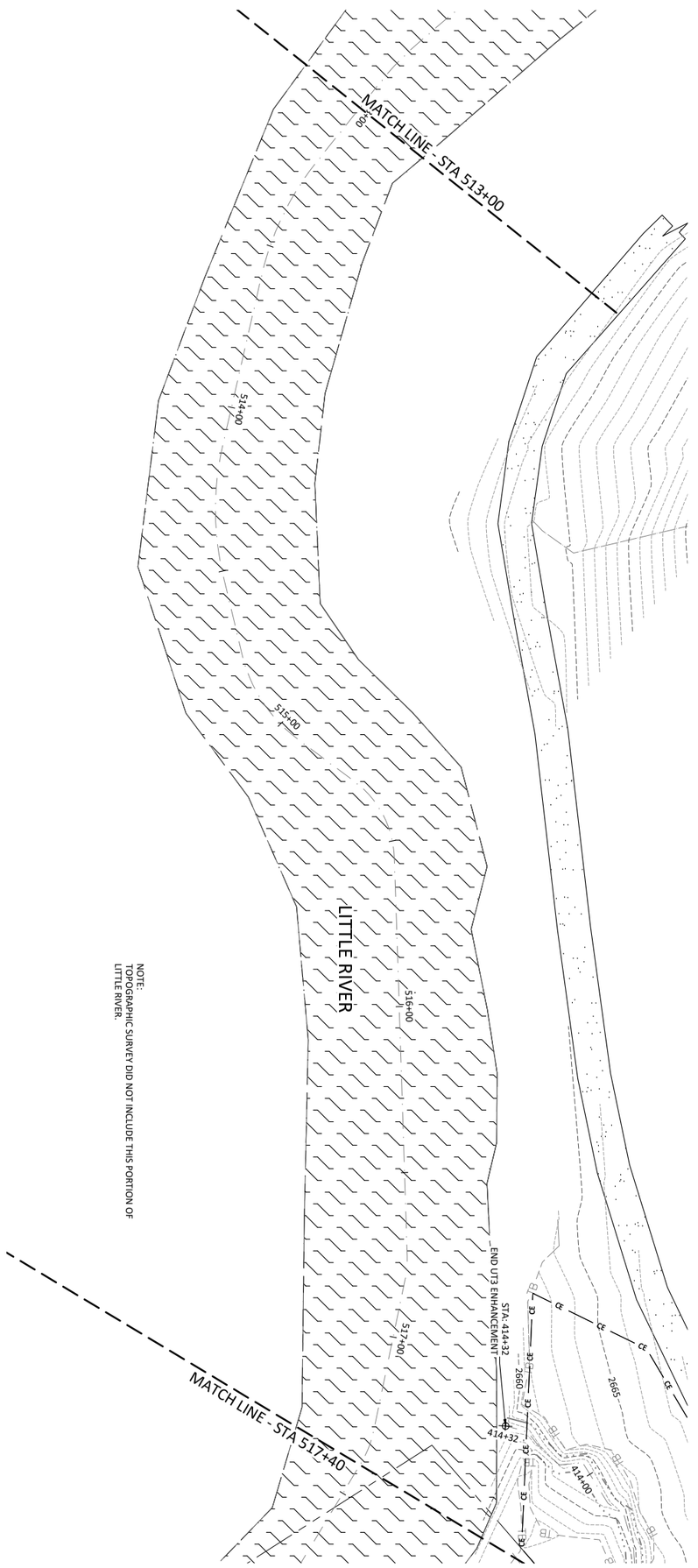
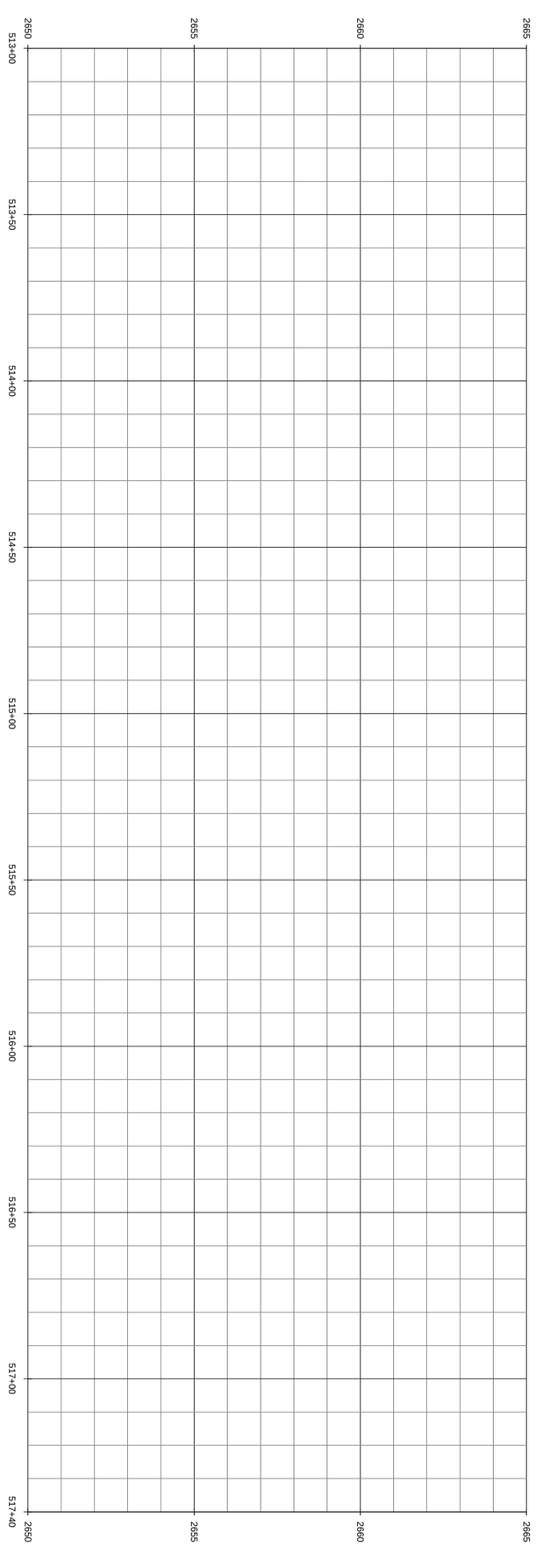
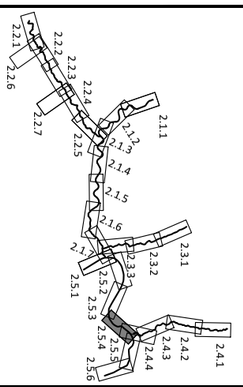


NOTE:
TOPOGRAPHIC SURVEY DID NOT INCLUDE THIS PORTION OF LITTLE RIVER.





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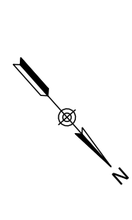

Date:	May 25, 2016
Job Number:	005-02147
Project Engineer:	JNK
Drawn By:	JCK
Checked By:	ADB

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Vile Creek Mitigation Site
Alleghany County, North Carolina

Little River
Stream Plan and Profile

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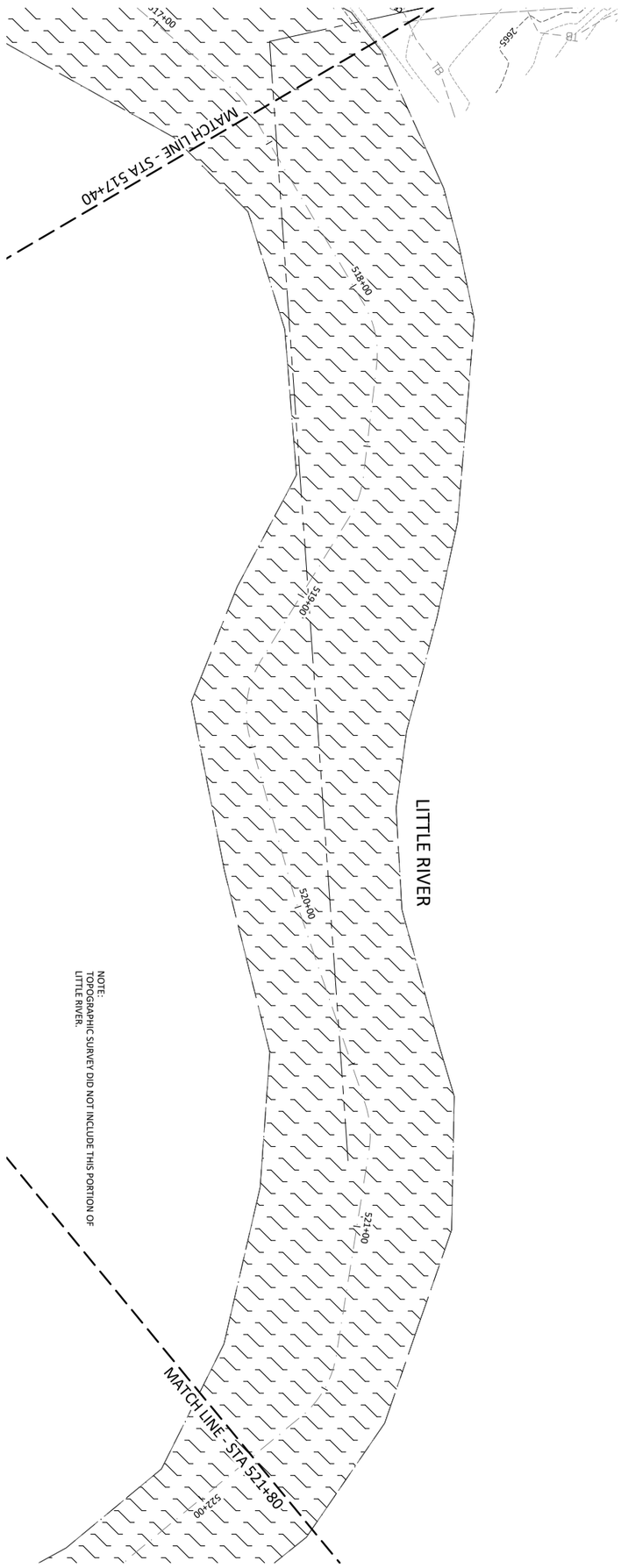

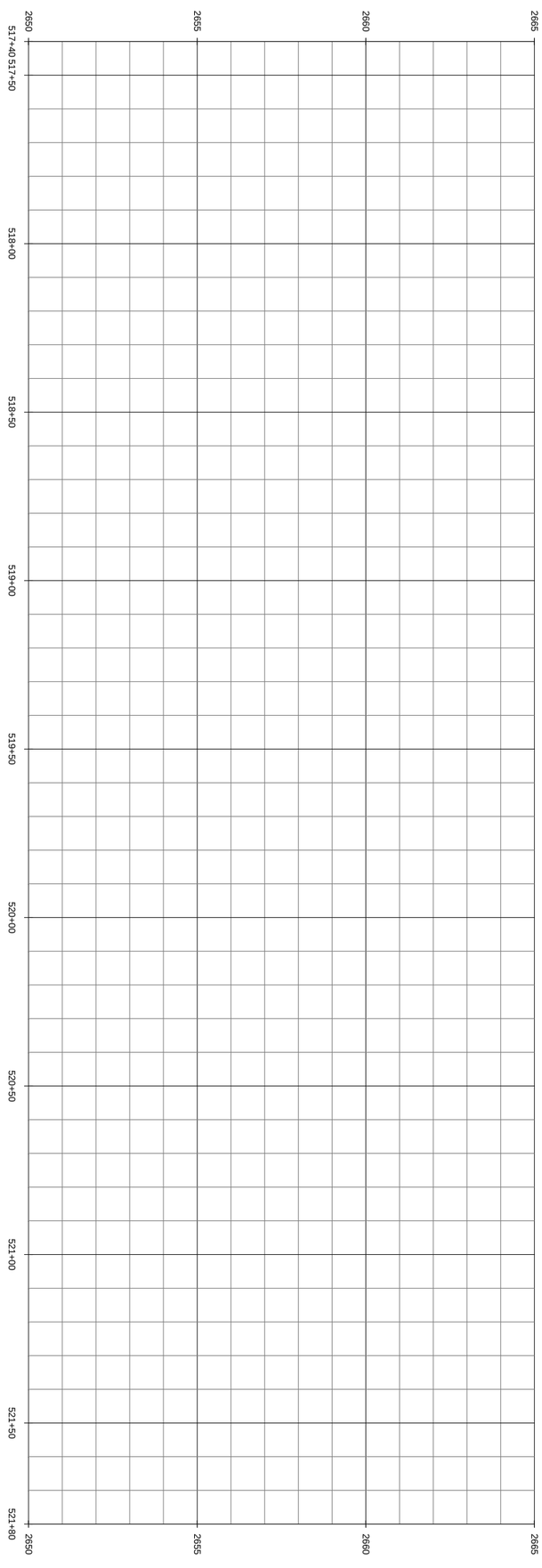

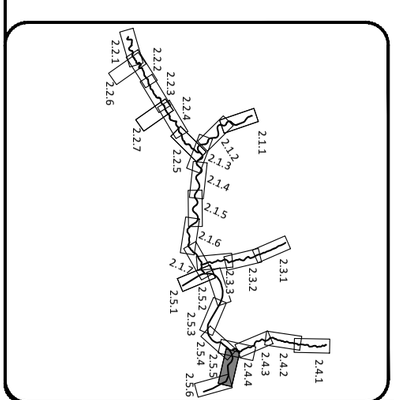

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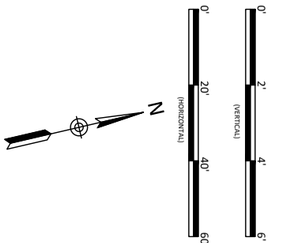

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Job Number:	005-02147
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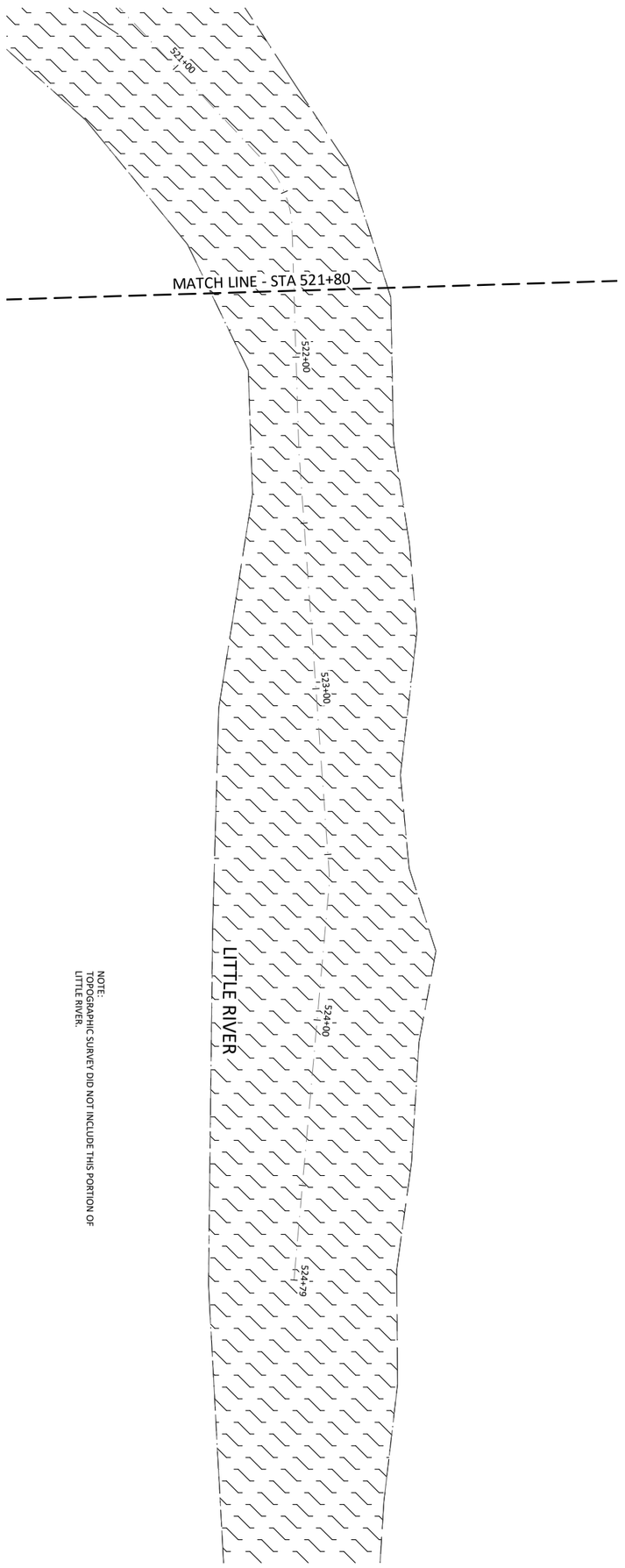

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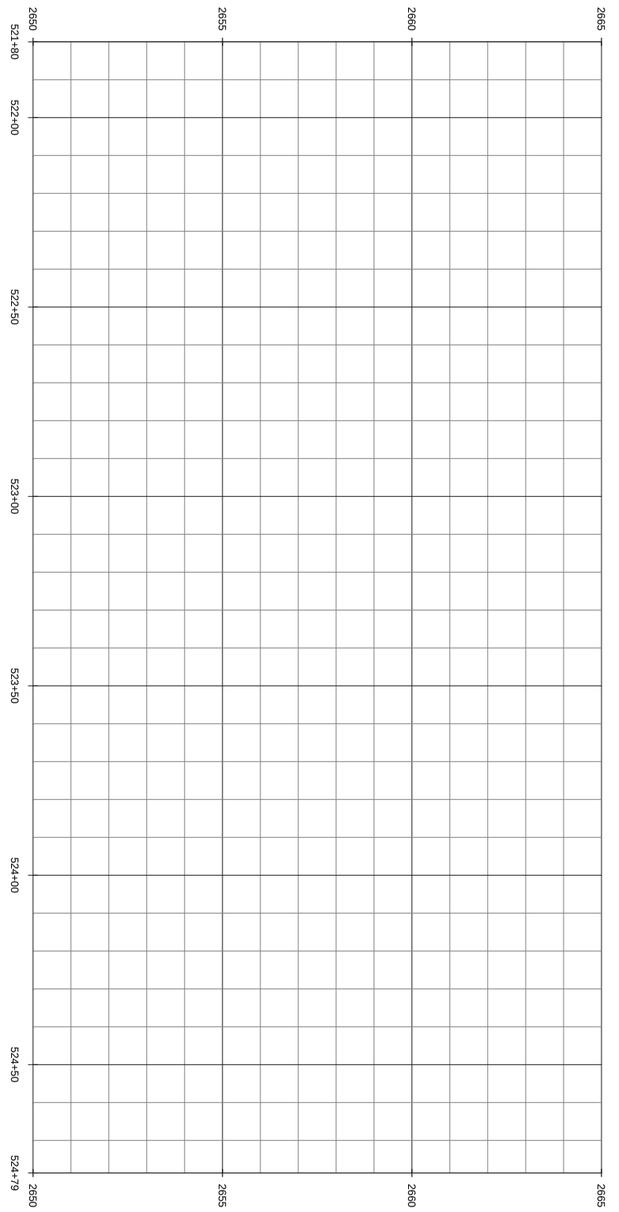

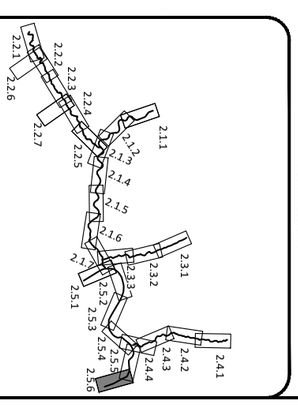

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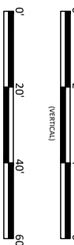

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Vile Creek Mitigation Site
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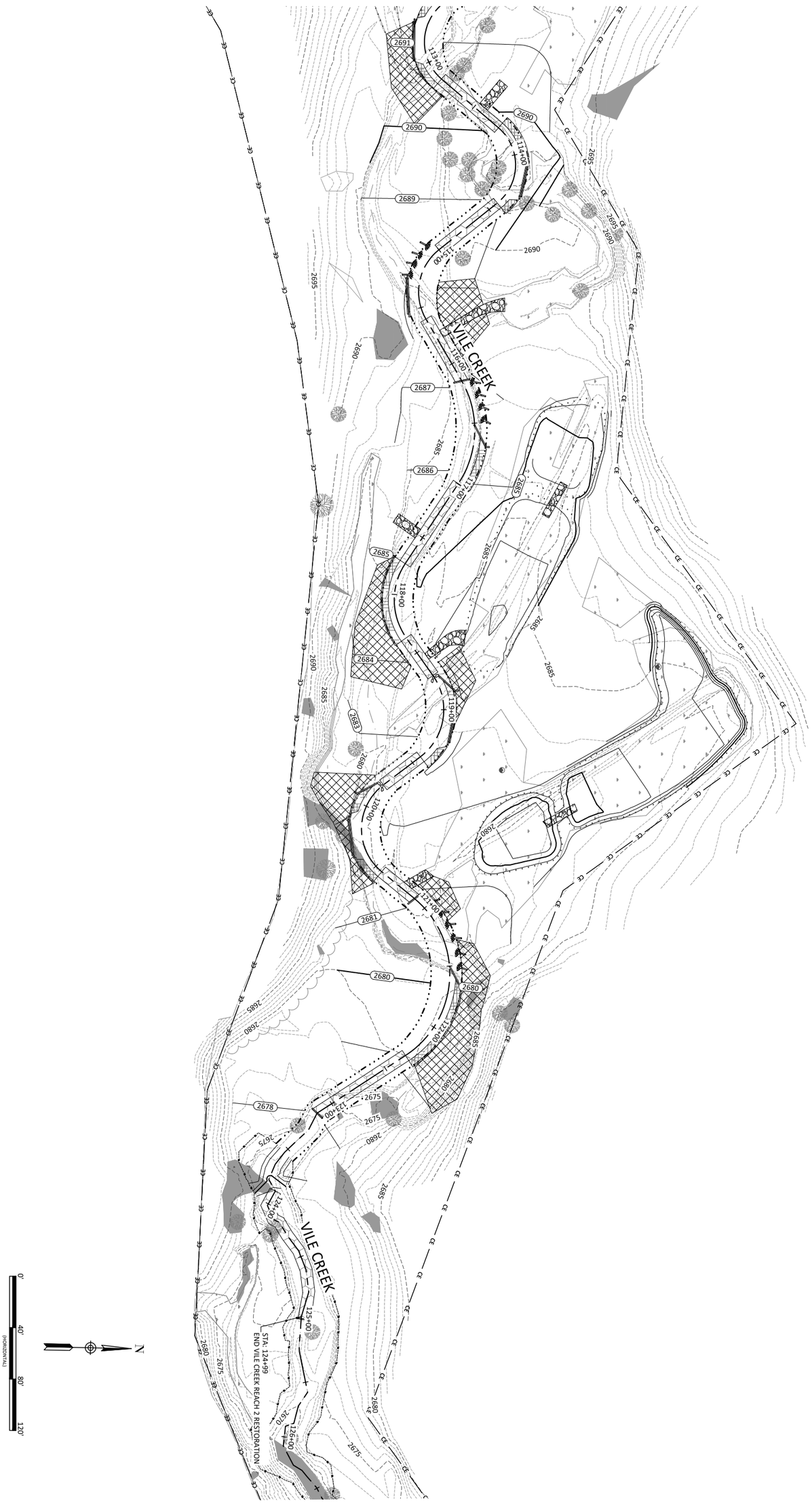

Date:	May 25, 2016
Job Number:	005-02147
Project Engineer:	JNK
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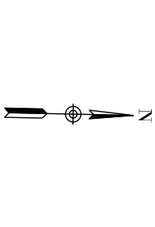

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Job Number:	005-02147
Project Engineer:	JNK
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Cross Sections and Profiles Overview
Wetland Grading

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May 26, 2016

102+07

103+12

104+09

104+81

106+09

107+54

108+42

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Sections
Wetland Grading

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Date: May 25, 2016
Job Number: 005-02147
Project Engineer: JNK
Drawn By: JCK
Checked By: AJB

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May 26, 2016

0' 4' 8' 12'
(VERTICAL)

0' 40' 80' 120'
(HORIZONTAL)

109+31

113+46

114+71

112+20

115+87

117+37

118+54

119+60

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Wetland Grading

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Date: May 25, 2016
Job Number: 005-021-17
Project Engineer: JNK
Drawn By: JCK
Checked By: AJB

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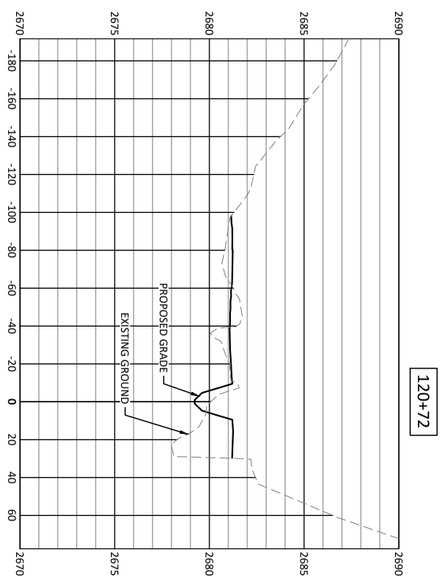

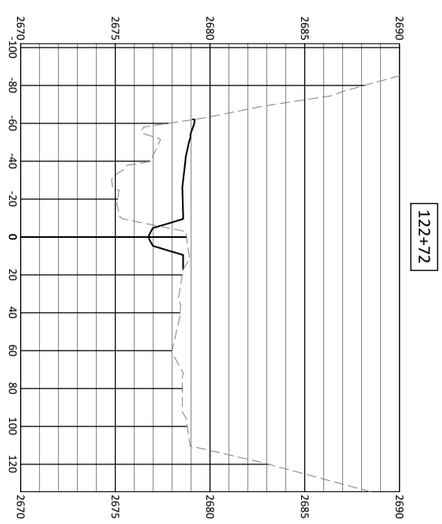

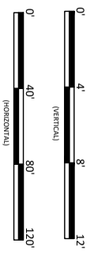

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Job Number: 005-02147
Project Engineer: JNK
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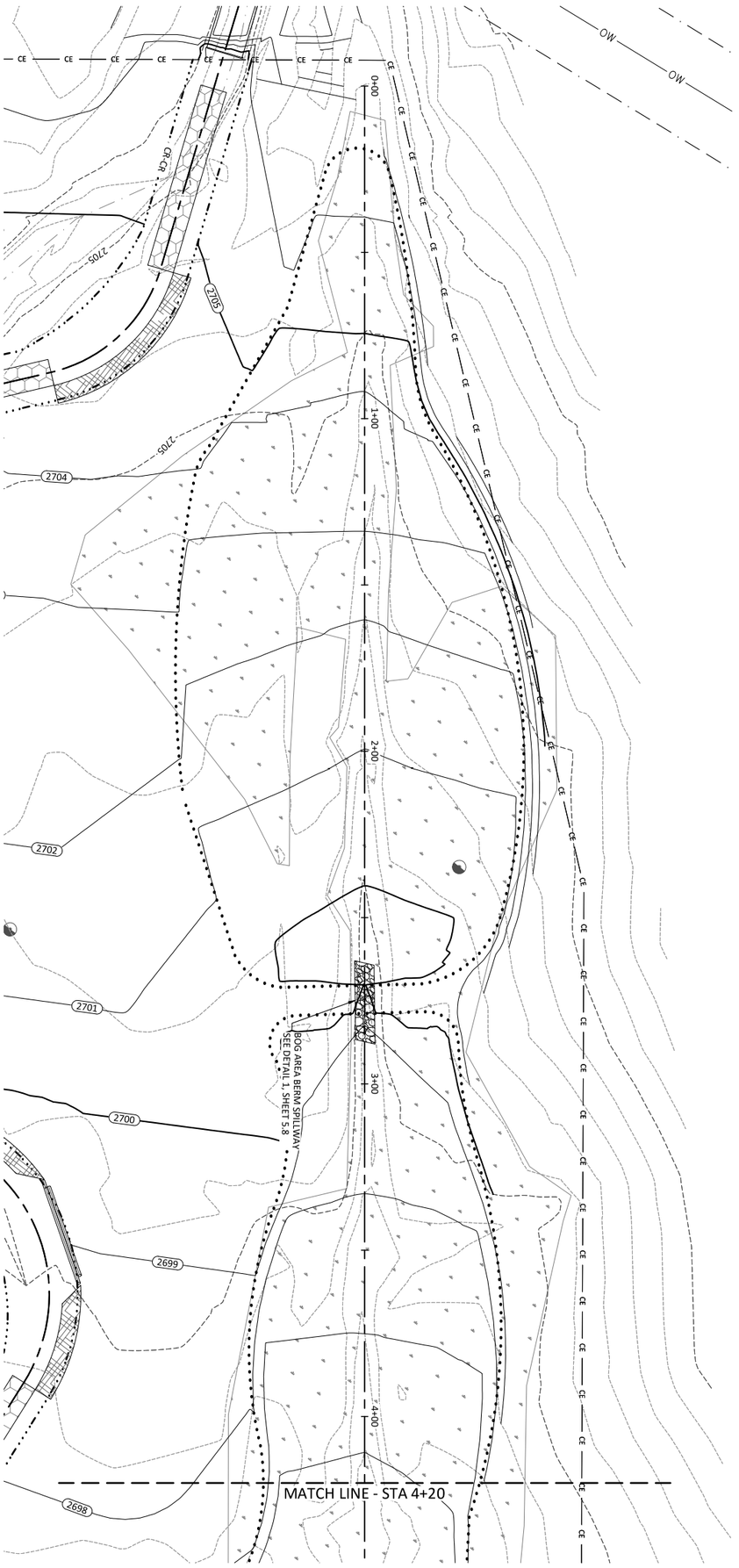

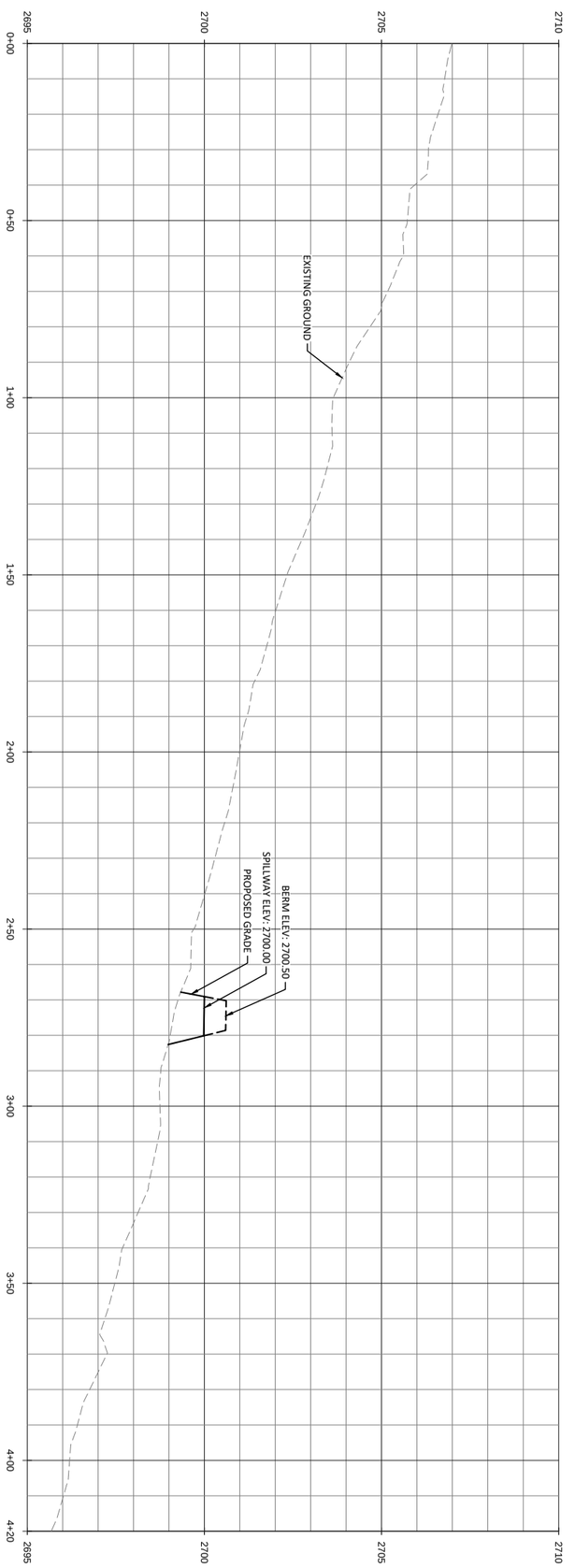

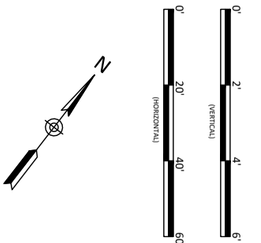

Date:	May 25, 2016
Job Number:	005-02147
Project Engineer:	JNK
Drawn By:	JCK
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Vile Creek Mitigation Site
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Bog Area 1
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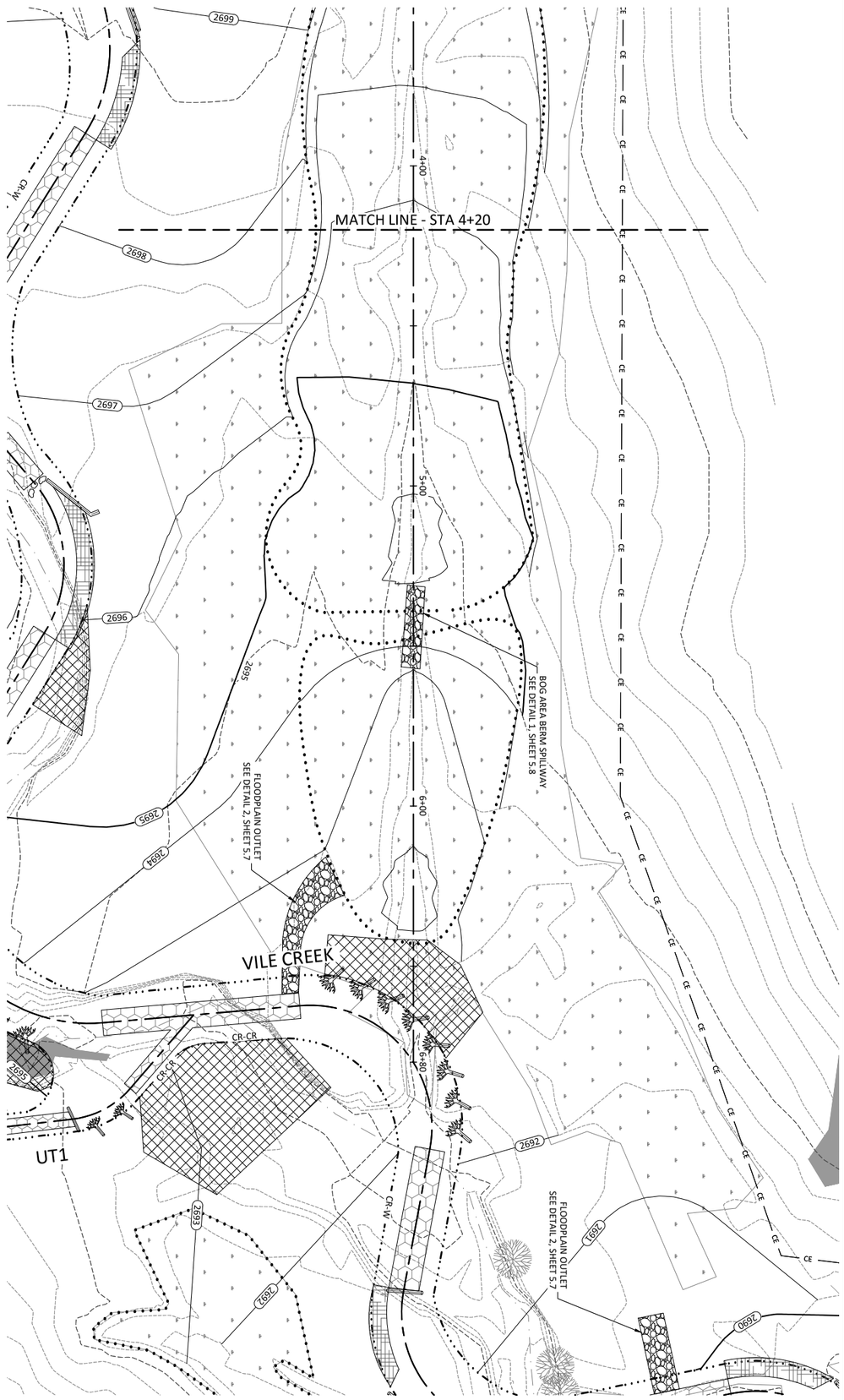

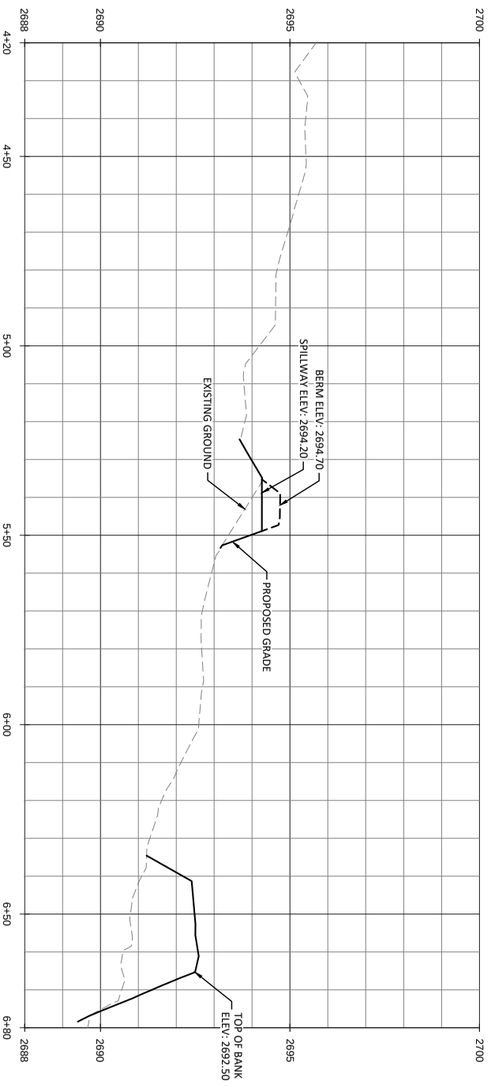

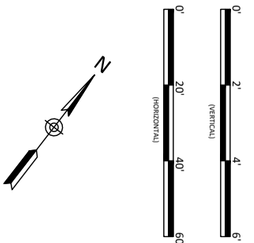

Date: May 25, 2016
Job Number: 005-02147
Project Engineer: JNK
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Vile Creek Mitigation Site
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Bog Area 1
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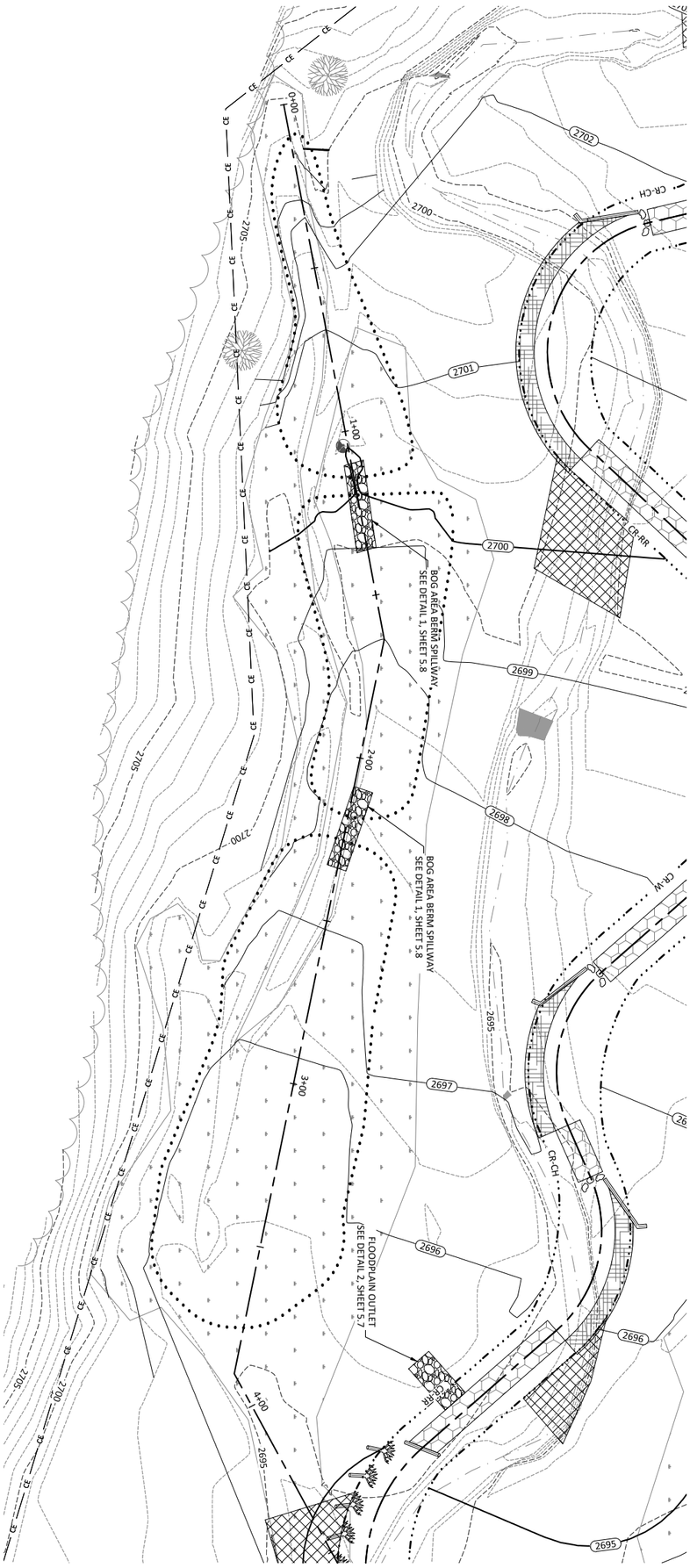

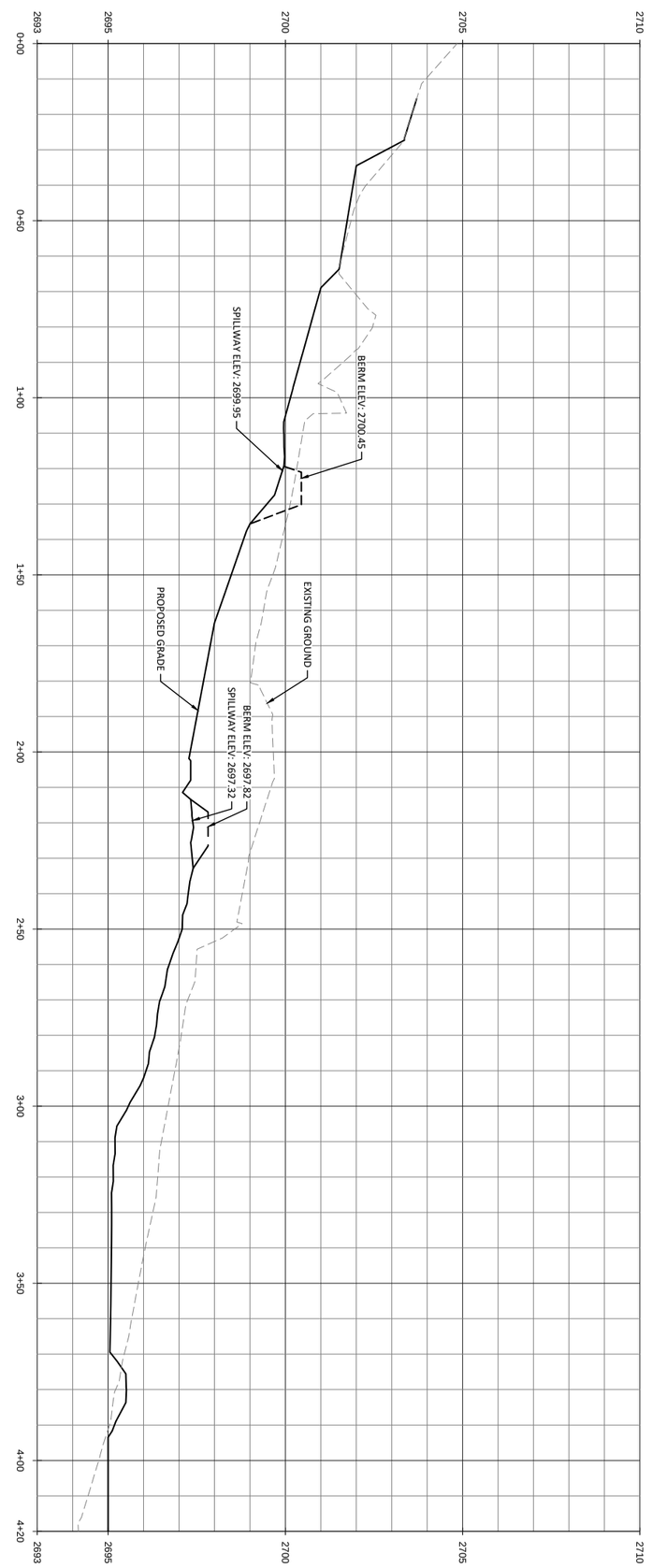

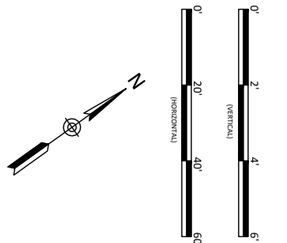

Date: May 25, 2016
Job Number: 005-02147
Project Engineer: JNK
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Bog Area 2
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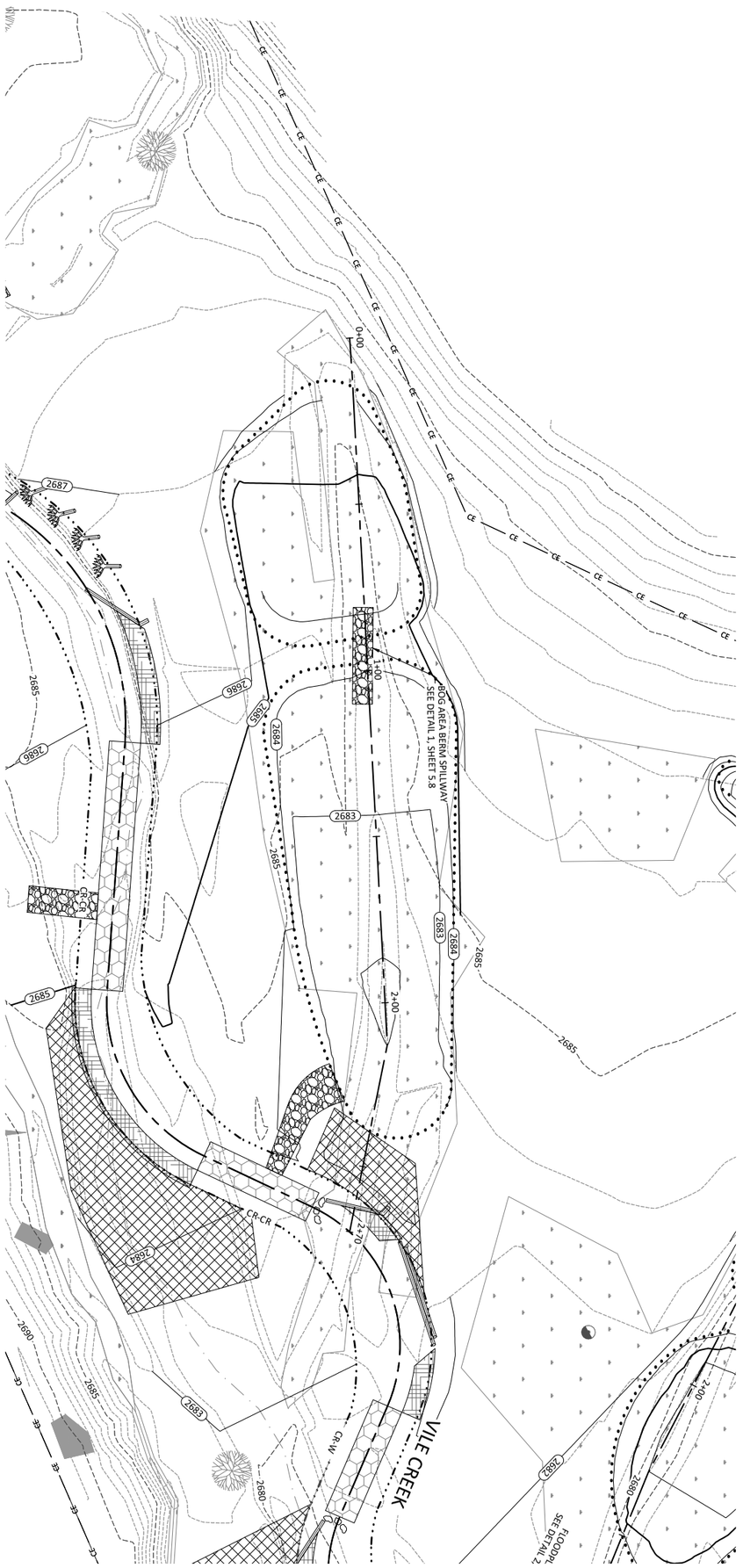

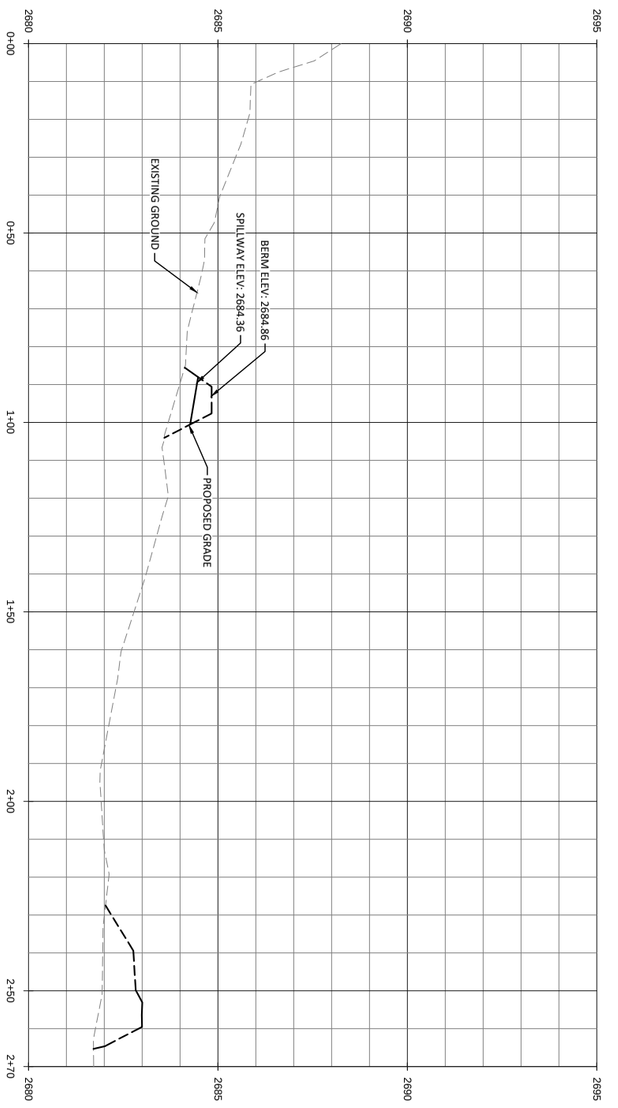

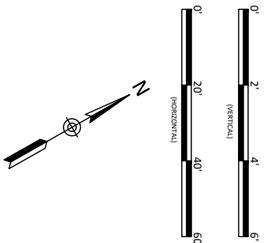

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Bog Area 3
Wetland Grading - Profiles

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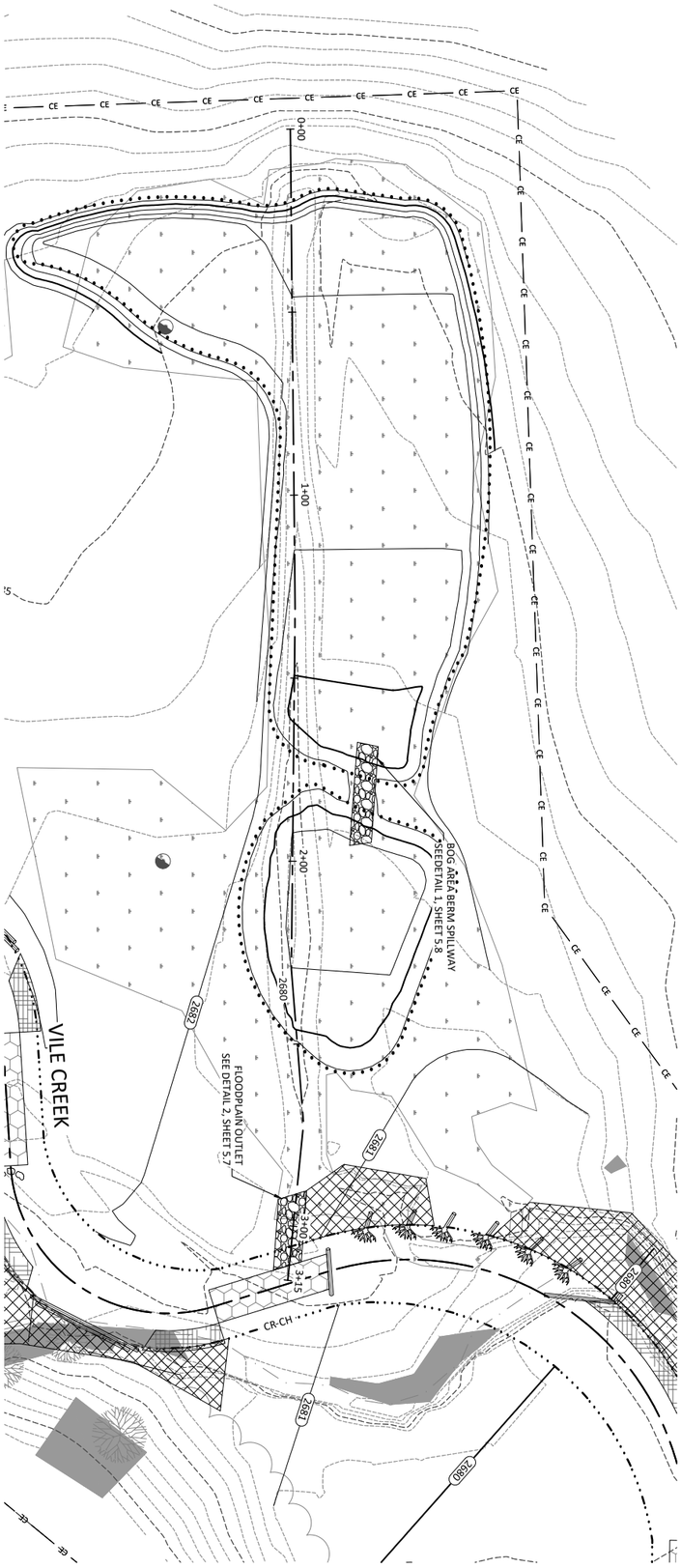

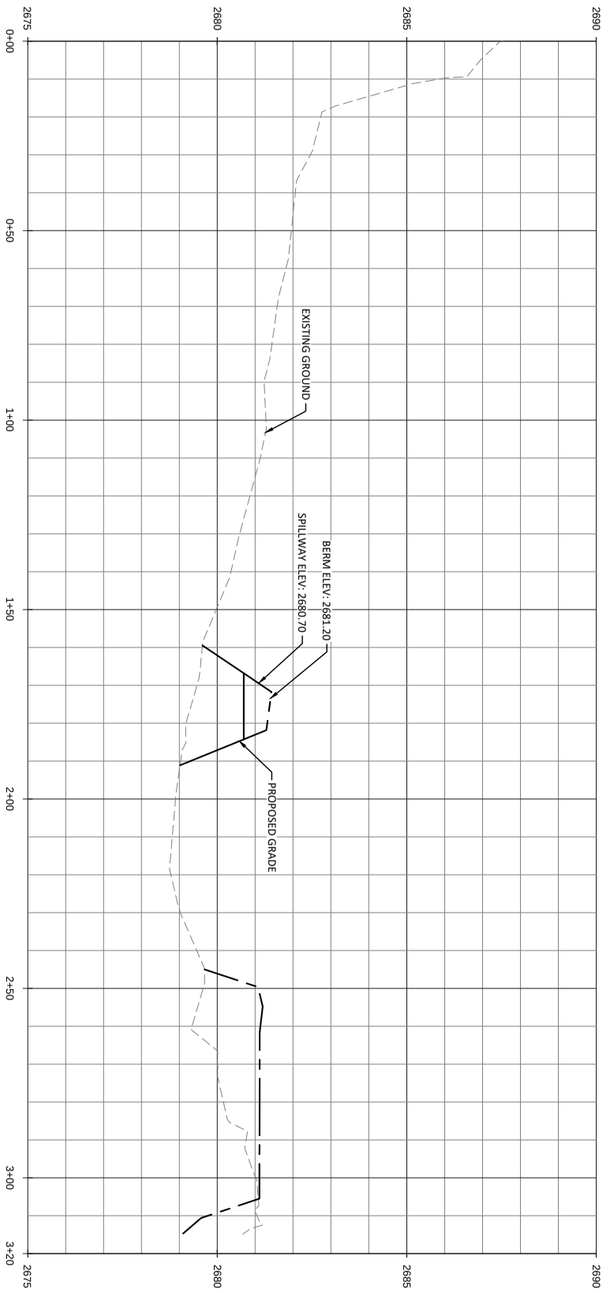

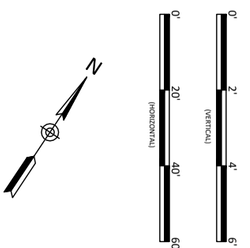

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Project Engineer: JNK
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Bog Area 4
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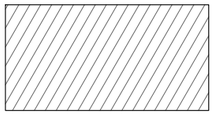
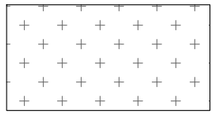


RIPARIAN ZONE				
Species	**Common Name**	**Spacing**	**Min. Caliper**	**Percentage**
Alnus serrulata	Tag Alder	12ft x 6ft	0.25"	10%
Carpinus caroliniana	American Hornbeam	12ft x 6ft	0.25"	10%
Liriodendron tulipifera	Tulip Poplar	12ft x 6ft	0.25"	15%
Platanus occidentalis	Sycamore	12ft x 6ft	0.25"	15%
Betula nigra	River Birch	12ft x 6ft	0.25"	15%
Quercus pagoda	Cherrybark Oak	12ft x 6ft	0.25"	15%
Fraxinus pennsylvanica	Green Ash	12ft x 6ft	0.25"	10%
Diospyros virginiana	Persimmon	12ft x 6ft	0.25"	10%

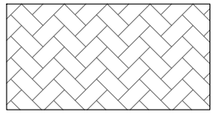
STREAM BANK ZONE - Livestakes				
Species	**Common Name**	**Indiv. Spacing**	**Min. Caliper**	**Percentage**
Cornus amomum (livestake)	Silky Dogwood	3-6 ft	0.5"	20%
Cephalanthus occidentalis L.	Common Buttonbush	3-6 ft	0.5"	20%
Salix sericea (livestake)	Silky Willow	3-6 ft	0.5"	20%
Physocarpos opulifolius	Ninebark	3-6 ft	0.5"	20%
Alnus serrulata	Tag Alder	3-6 ft	0.5"	20%

STREAM BANK ZONE - Herbaceous Plugs			
Species	**Common Name**	**Indiv. Spacing**	**Percentage**
Juncus effusus	Common Rush	3-6 ft	40%
Carex alata	Broadwing Sedge	3-6 ft	40%
Panicum virgatum	Switchgrass	3-6 ft	20%

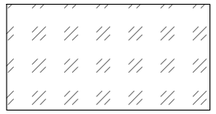
NOTE:
1. TOP SOIL TO BE STOCK PILED AND REAPPLIED TO ALL AREAS WHERE FLOODPLAIN AND WETLAND EXCAVATION IS GREATER THAN 6".
2. FERTILIZER AND LIME TO BE ADDED TO PLANTED AREAS BASED ON SOIL TEST RESULTS.



WETLAND SHRUB ZONE				
Species	**Common Name**	**Spacing**	**Min. Caliper**	**Percentage**
Aronia arbutifolia	Red Chokeberry	12ft x 6ft	0.25"	15%
Cornus amomum	Silky Dogwood	12ft x 6ft	0.25"	15%
Ilex verticillata	Winter Berry	12ft x 6ft	0.25"	15%
Lindera benzoin	Spicebush	12ft x 6ft	0.25"	15%
Sambucus nigra	Elderberry	12ft x 6ft	0.25"	10%
Vaccinium corymbosum	Highbush Blueberry	12ft x 6ft	0.25"	15%
Cephalanthus occidentalis L.	Common Buttonbush	12ft x 6ft	0.25"	15%



HERBACEOUS ZONE			
Species	**Common Name**	**Indiv. Spacing**	**Percentage**
Juncus effusus	Common Rush	4 ft	15%
Carex alata	Broadwing Sedge	4 ft	15%
Carex lurida	Shallow Sedge	4 ft	15%
Carex crinita	Fringed Sedge	4 ft	15%
Scirpus cyperinus	Woolgrass	4 ft	20%
Sagittaria latifolia	Broadleaf Arrowhead	4 ft	20%



UNDERSTORY ZONE				
Species	**Common Name**	**Spacing**	**Min. Caliper**	**Percentage**
Carpinus caroliniana	American Hornbeam	12ft x 6ft	0.25"	25%
Aronia arbutifolia	Red Chokeberry	12ft x 6ft	0.25"	25%
Ilex verticillata	Winter Berry	12ft x 6ft	0.25"	25%
Lindera benzoin	Spicebush	12ft x 6ft	0.25"	25%

Permanent Riparian Seeding				
Pure Live Seed (20 lbs/ acre)				
Approved Date	**Species Name**	**Common Name**	**Stratum**	**Density (lbs/acre)**
All Year	*Schizachyrium scoparium*	Little Bluestem	Herb	3.0
All Year	*Panicum virgatum*	Swithgrass	Herb	3.0
All Year	*Rudbeckia hirta*	Blackeyed Susan	Herb	3.0
All Year	*Carex vulpinoidea*	Fox Sedge	Herb	3.0
All Year	*Panicum clandestinum*	Deertongue	Herb	3.0
All Year	*Elymus virginicus*	Virginia Wild Rye	Herb	3.0
All Year	*Asclepias syrica*	Common Milkweed	Herb	0.8
All Year	Lobelia cardinalis L.	Cardinal Flower	Herb	0.2
All Year	*Eupatorium perfoliatum*	Boneset	Herb	1.0

TEMPORARY SEEDING		
APPROVED DATE	**TYPE**	**PLANTING RATE (lbs/acre)**
Jan 1 – May 1	Rye Grain (Secale Cereale)	120
	Ground Agricultural Limestone	2,000
	10-10-10 Fertilizer	750
	Straw Mulch	4,000
May 1 – Aug 15	German Millet (Setaria italica)	40
	Ground Agricultural Limestone	2,000
	10-10-10 Fertilizer	750
	Straw Mulch	4,000
Aug 15 – Dec 30	Rye Grain (Secale Cereale)	120
	Ground Agricultural Limestone	2,000
	10-10-10 Fertilizer	1,000
	Straw Mulch	4,000

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Alleghany County, North Carolina

Plant Lists
Planting

Revisions:

Date: May 25, 2016
Job Number: 005-02147
Project Engineer: JNK
Drawn By: JCK
Checked By: AJB

Sheet 4.0

Sheet Index

Date:	May 25, 2016
Job Number:	005-02147
Project Engineer:	JNK
Drawn By:	JCK
Checked By:	ADB

Revisions:

4.1
Sheet

Vile Creek Mitigation Site
Alleghany County, North Carolina

Vile Creek & UT1
Planting

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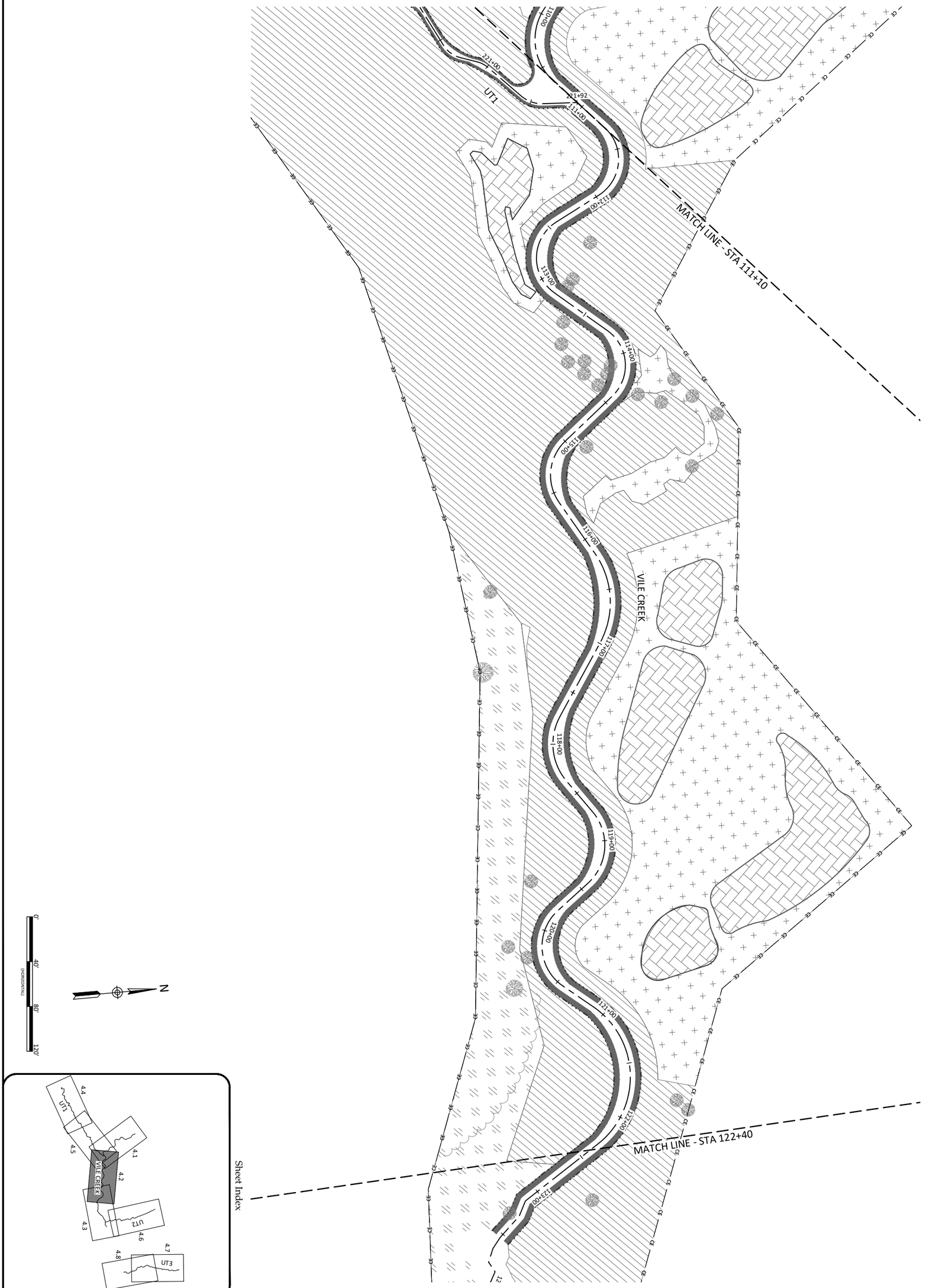

Sheet Index

Date:	May 25, 2016
Job Number:	005-02147
Project Engineer:	JNK
Drawn By:	JCK
Checked By:	ADB

Revisions:

4.2
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Vile Creek Mitigation Site
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Vile Creek
Planting

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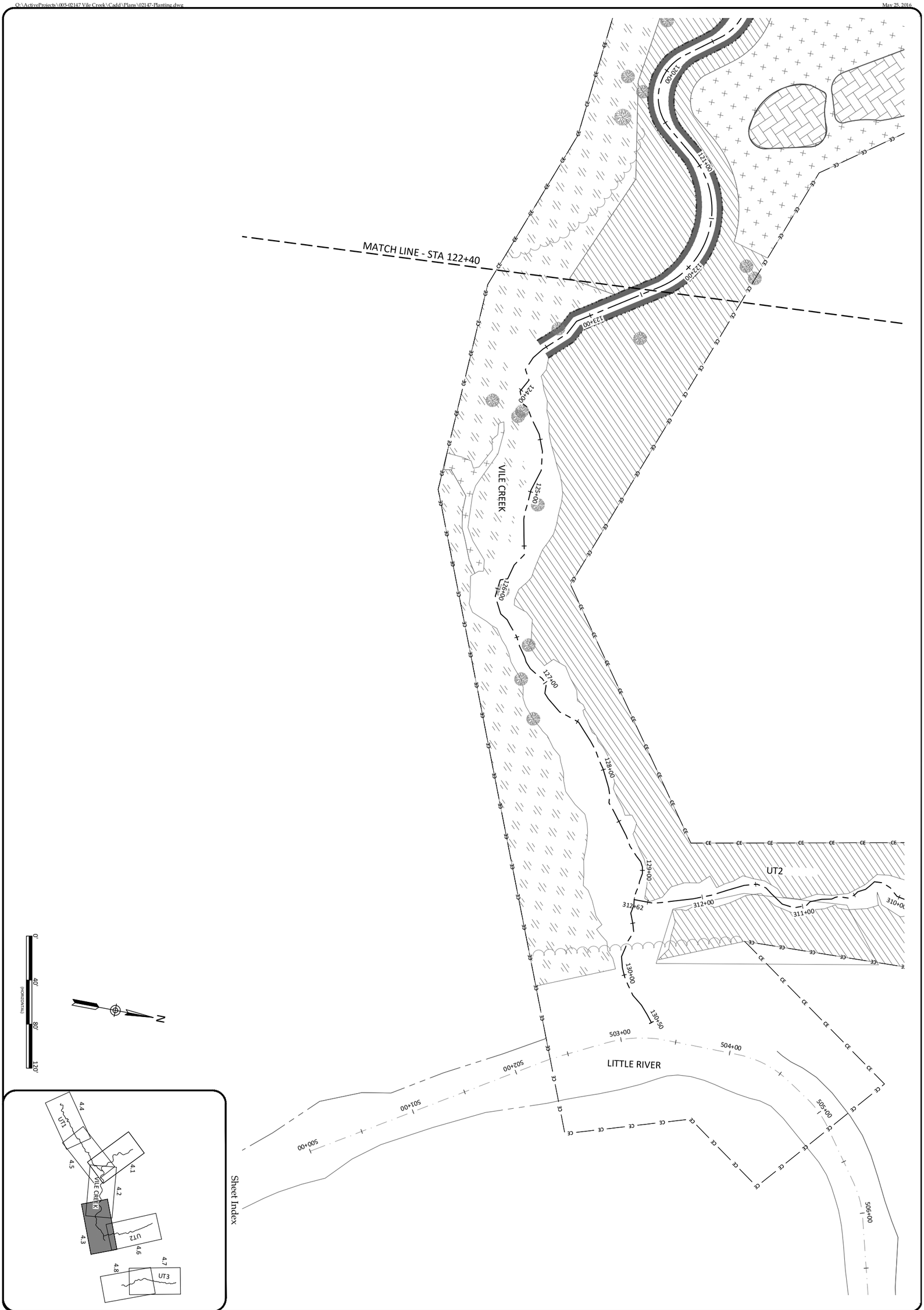

Date:	May 25, 2016
Job Number:	005-02147
Project Engineer:	JNK
Drawn By:	JCK
Checked By:	ADB

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Sheet

Revisions:

Vile Creek Mitigation Site
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Vile Creek
Planting

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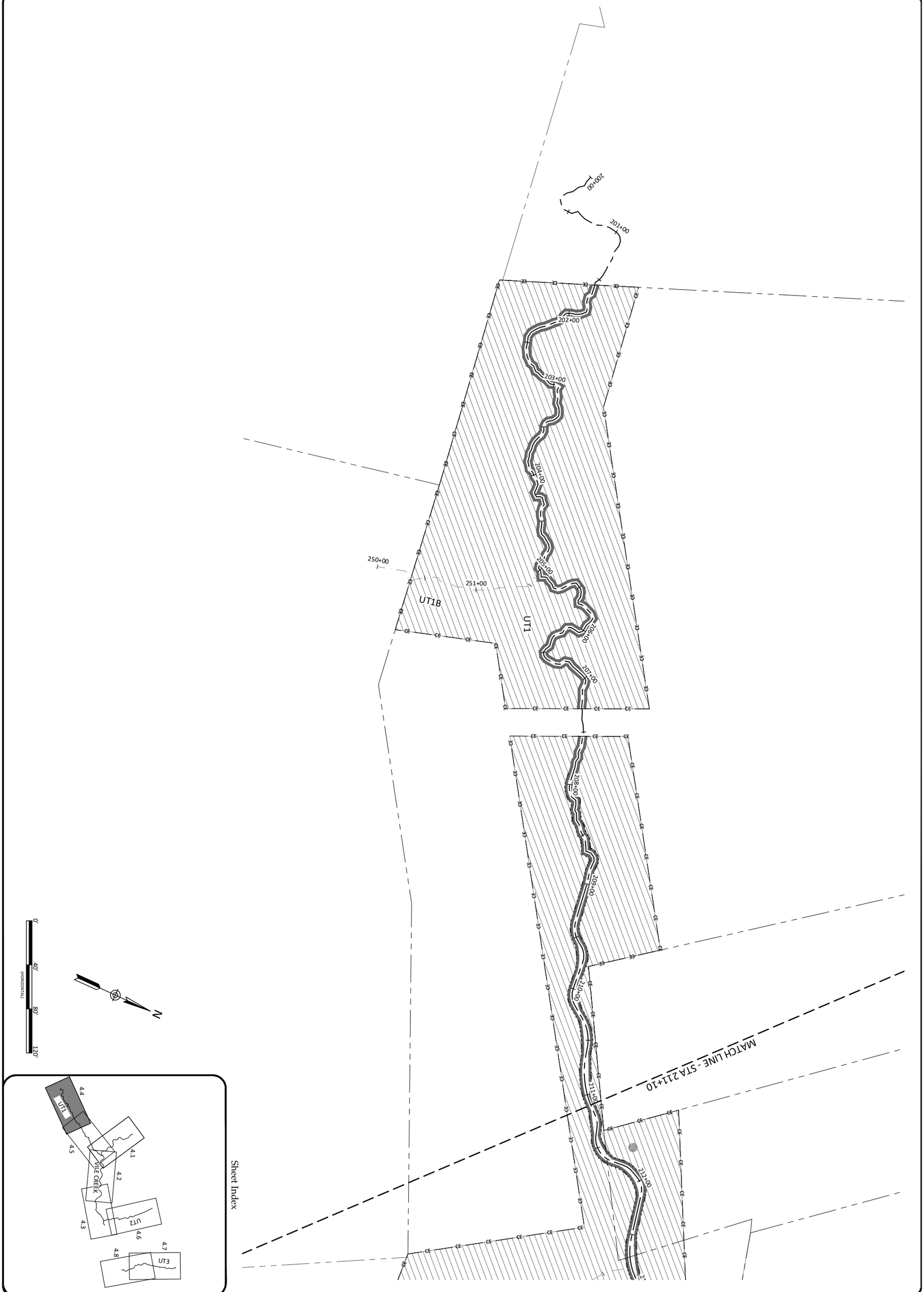

Sheet Index

Date:	May 25, 2016
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Project Engineer:	JNK
Drawn By:	JCK
Checked By:	ADB

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4.4
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Vile Creek Mitigation Site
Alleghany County, North Carolina

UT1 & UT1B
Planting

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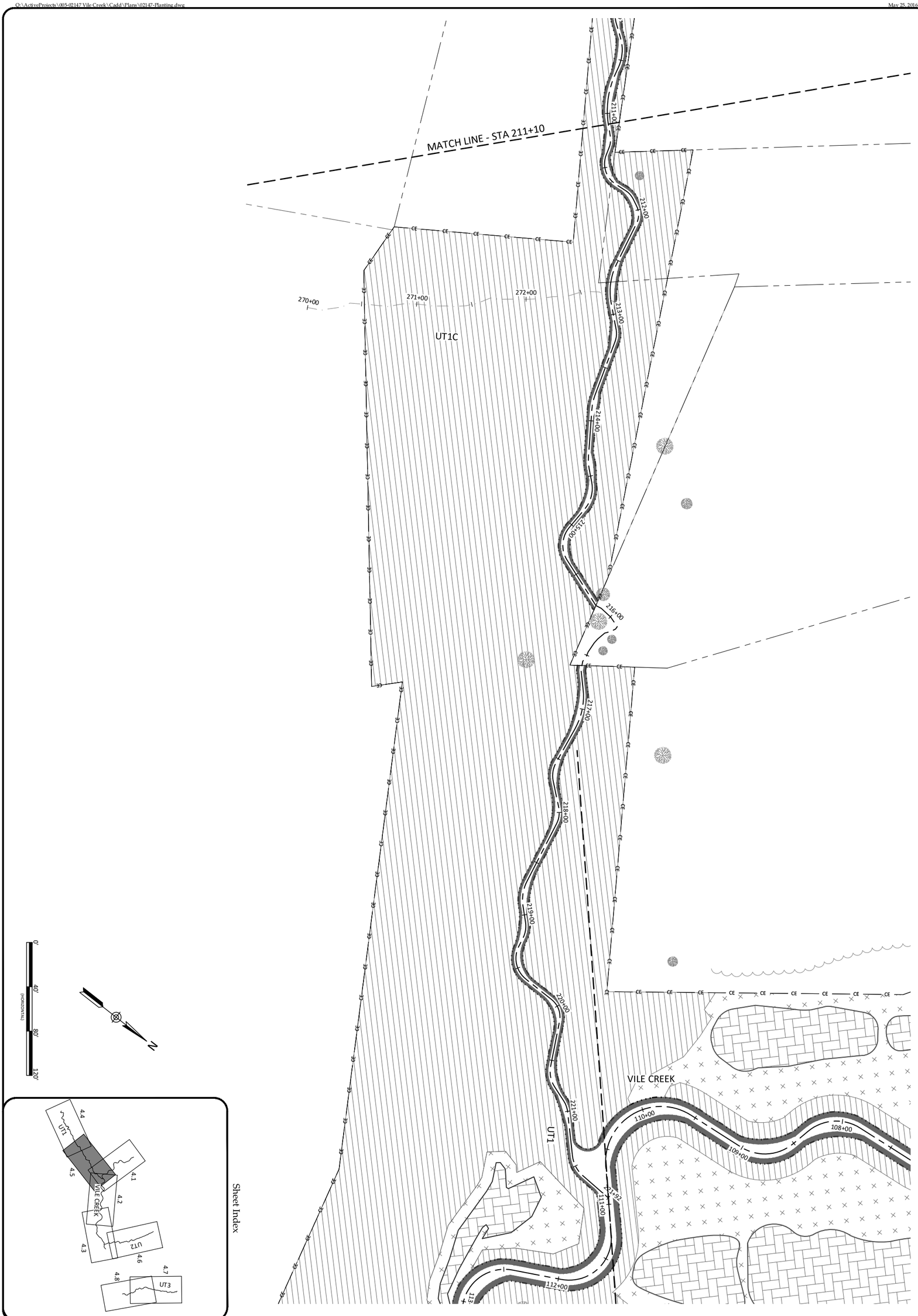

Sheet Index

Date:	May 25, 2016
Job Number:	005-02147
Project Engineer:	JNK
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Revisions:

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Vile Creek Mitigation Site
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UT1 & UT1C
Planting

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Sheet Index

Date:	May 25, 2016
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Revisions:

Vile Creek Mitigation Site
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UT2
Planting

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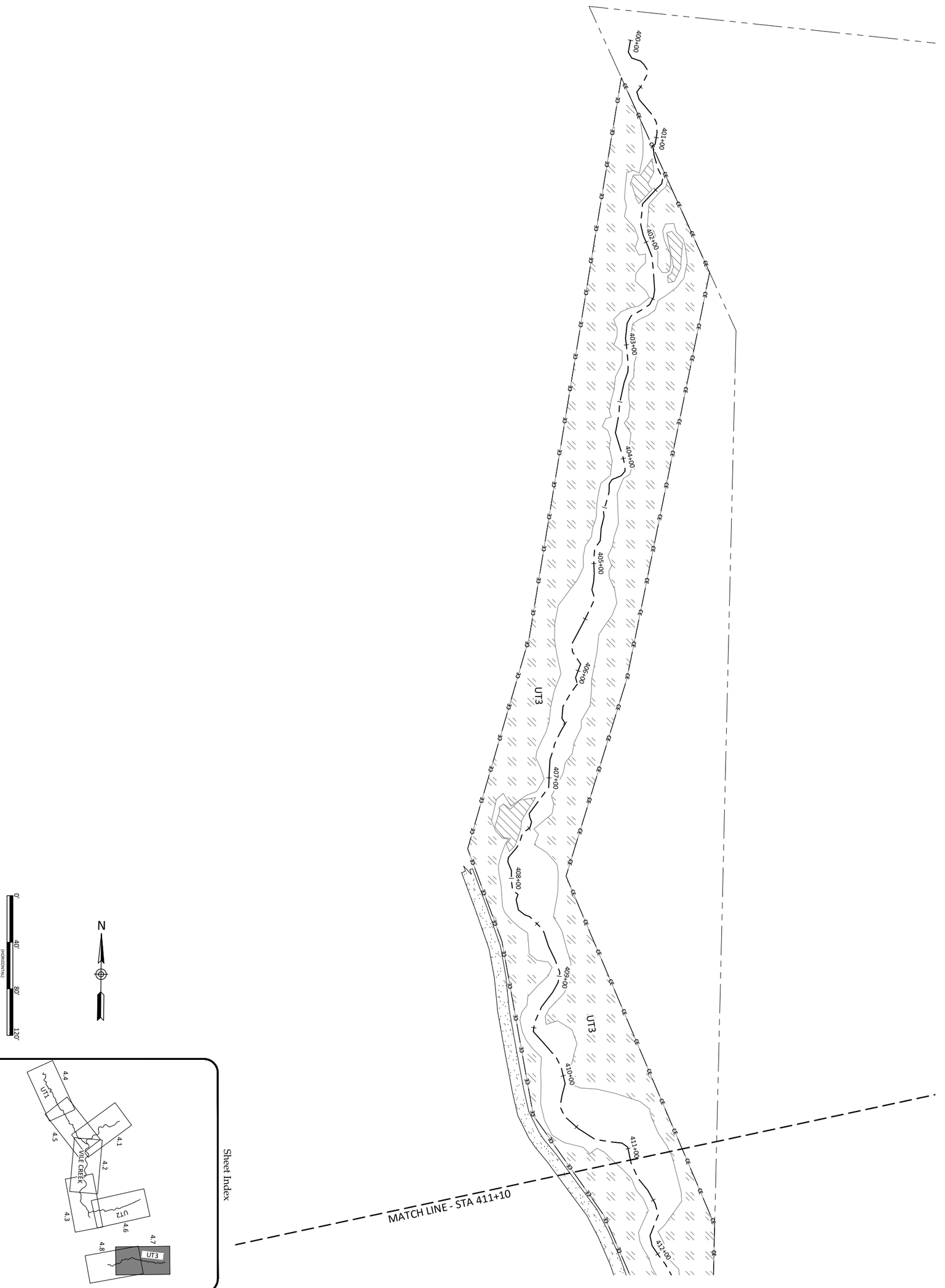

Sheet Index

Date:	May 25, 2016
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Revisions:

Vile Creek Mitigation Site
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UT3
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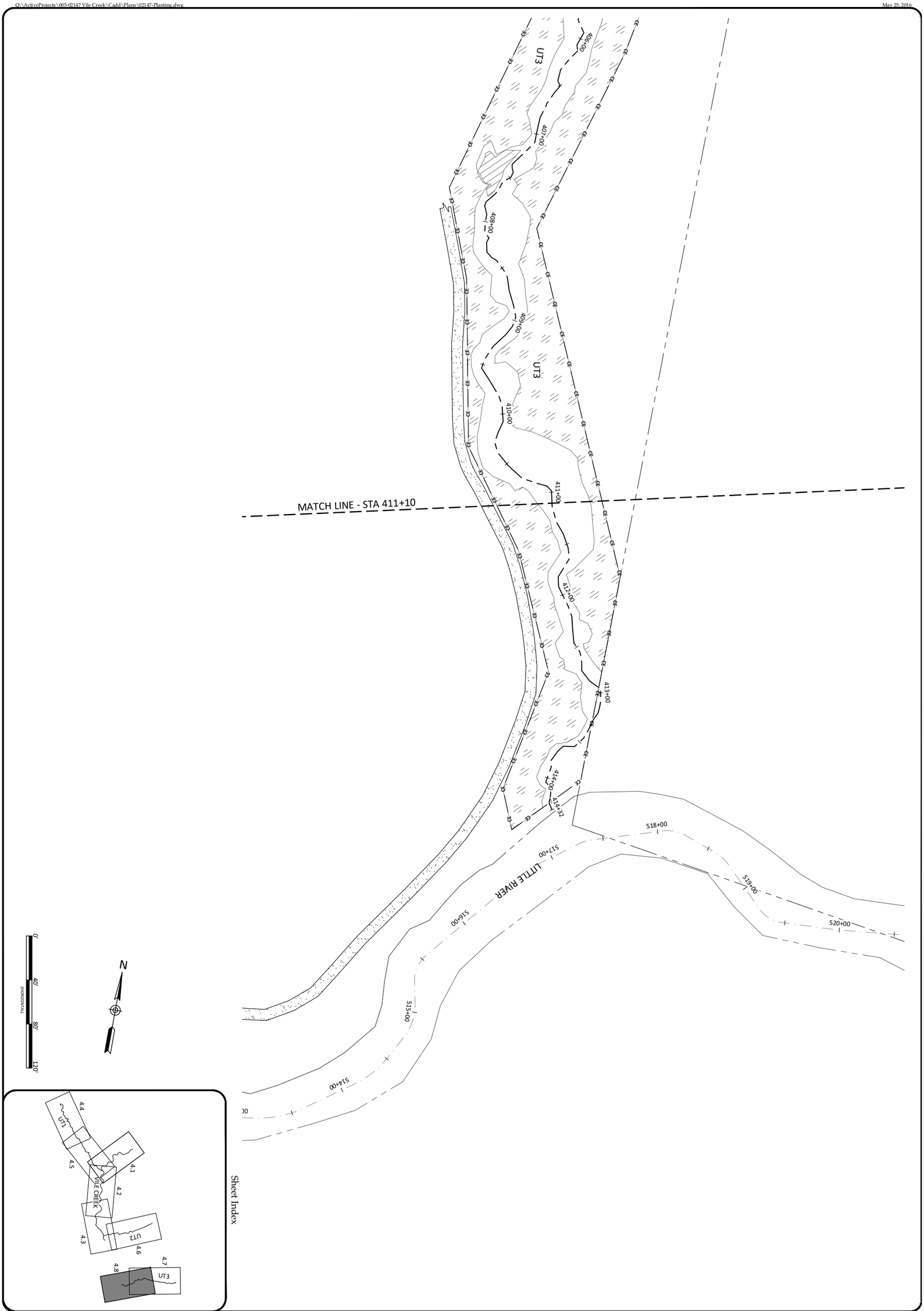

Sheet Index

Date:	May 25, 2016
Job Number:	005-02147
Project Engineer:	JNK
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Vile Creek Mitigation Site
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UT3
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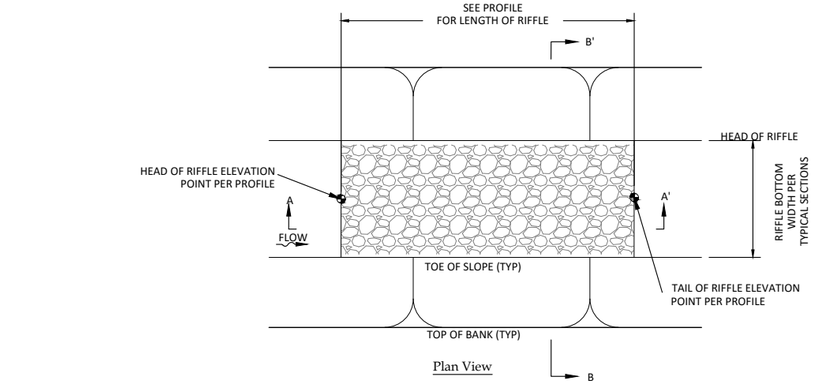
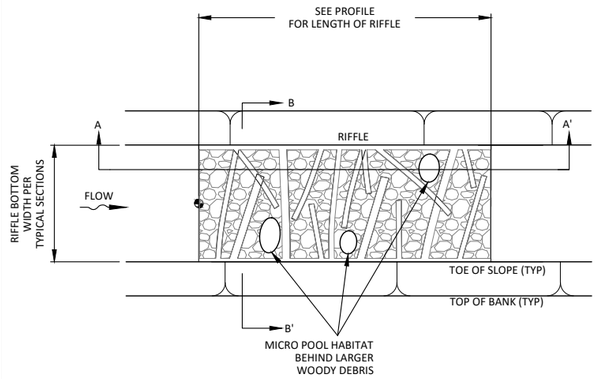
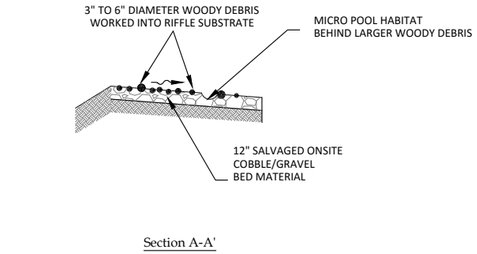
March 7, 2012

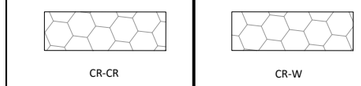


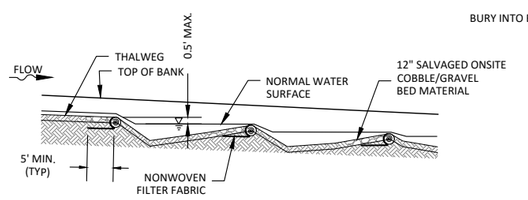
1/5.1 Constructed Riffle
Not to Scale

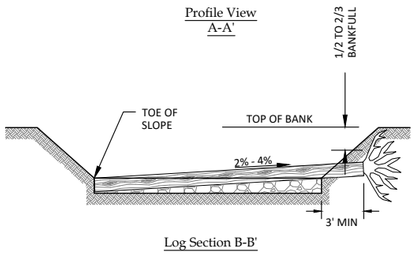




2/5.1 Woody Riffle
Not to Scale

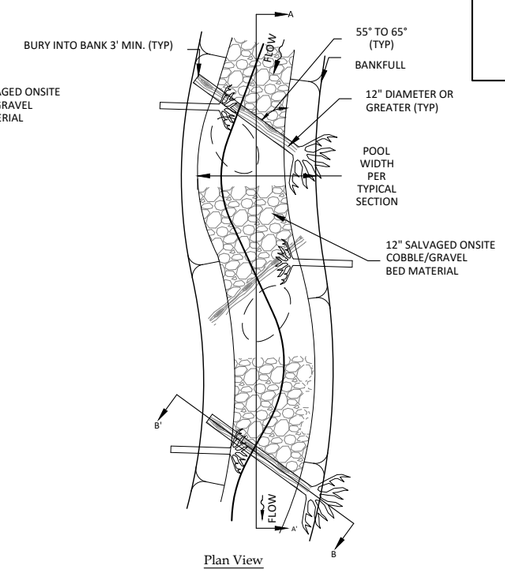






NOTE:

1. LOGS WITHOUT ROOT MASS MAY BE USED ONLY IF APPROVED BY THE PROJECT ENGINEER.
2. BOULDER MATERIAL CAN BE SUBSTITUTED IN PLACE OF ANGLED LOGS WITH APPROVAL OF ENGINEER.



3/5.1 Rock and Roll Riffle
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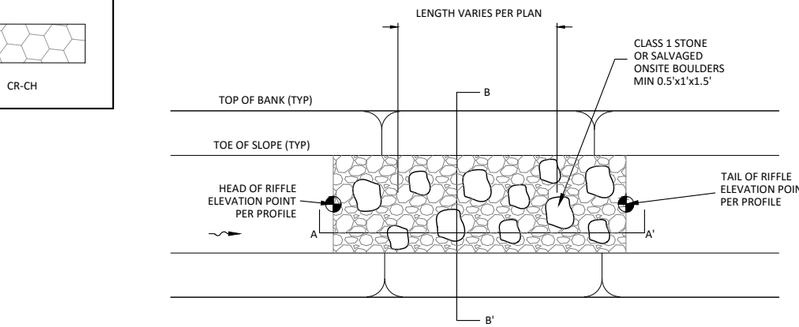

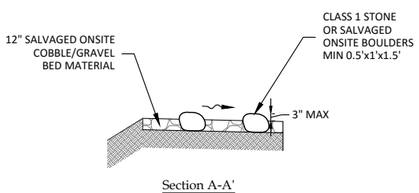

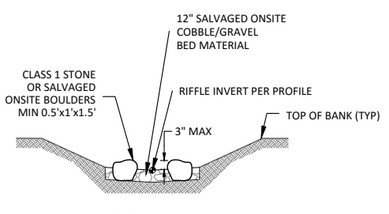

4/5.1 Chunky Riffle
Not to Scale

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Alleghany County, North Carolina
Details

Revisions:

Date: May 25, 2016
Job Number: 005-02147
Project Engineer: JCK
Drawn By: JCK
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Sheet 5.1

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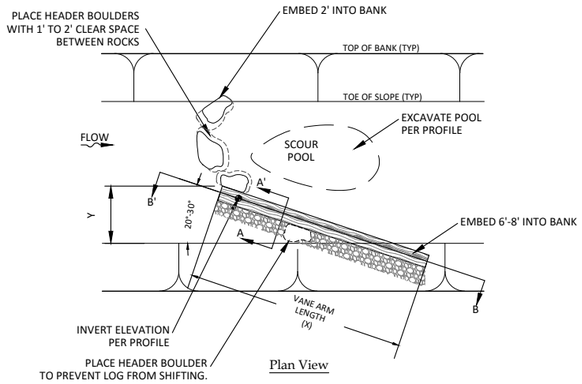
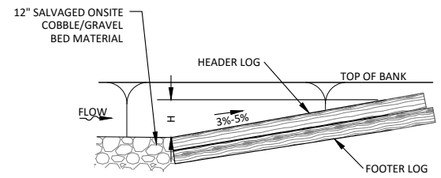
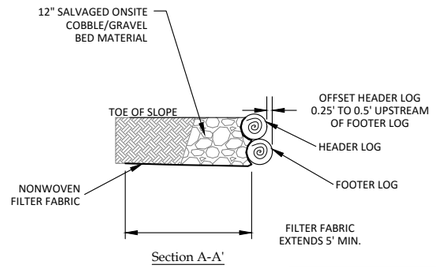
March 7, 2012



Plan View



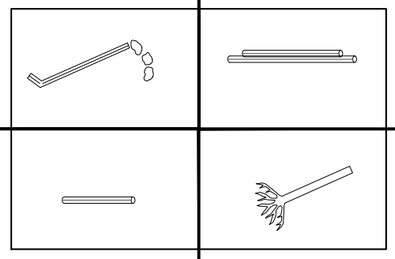
Section B-B'

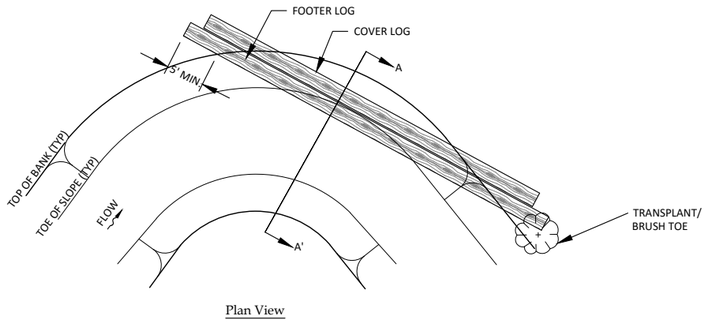


Section A-A'

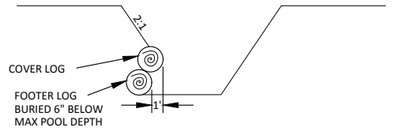
	Vile R1	Vile R2	UT1 R1	UT1 RS
H	0.8'	0.8'	0.4'	0.4'
X	11.1'	12.1'	7.8'	8.5'
Y	2.7'	3.1'	1.3'	1.6'

1/5.2 Log J-Hook
Not to Scale



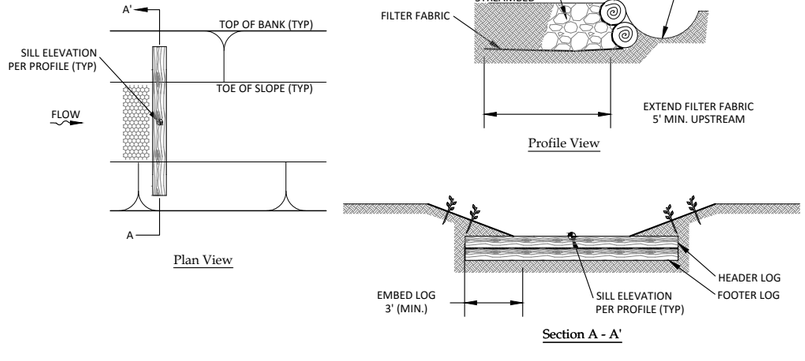


Plan View



Section A-A'

2/5.2 Cover Log
Not to Scale

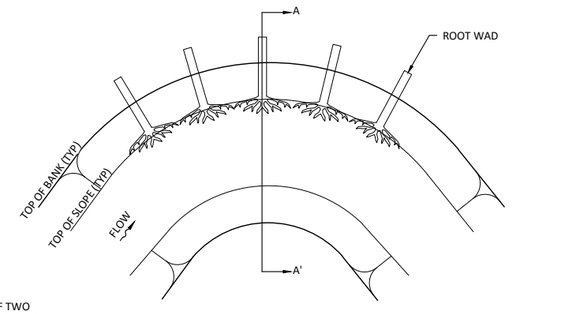


Profile View

Plan View

Section A - A'

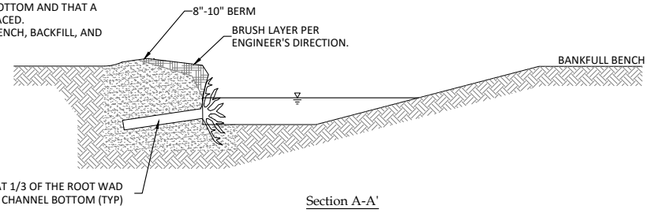
3/5.2 Log Sill
Not to Scale



Plan View

ROOT WAD INSTALLATION:

1. EXCAVATE A TRENCH A MINIMUM OF TWO TIMES THE WIDTH OF THE TRUNK AND DEEP ENOUGH SUCH THAT ½ OF THE ROOTMASS IS BELOW THE CHANNEL BOTTOM AND THAT A FOOTER LOG CAN BE PLACED.
2. PLACE ROOT WAD IN TRENCH, BACKFILL, AND COMPACT.



Section A-A'

4/5.2 Root Wad with Brush Layer
Not to Scale

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Revisions:

Date: May 23, 2016
Job Number: 05-002147
Project Engineer: DVK
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Checked By: ADB

Sheet 5.2

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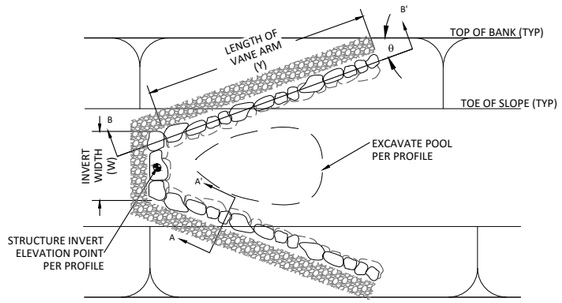
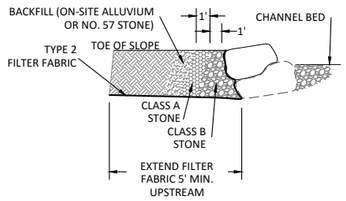
March 7, 2012

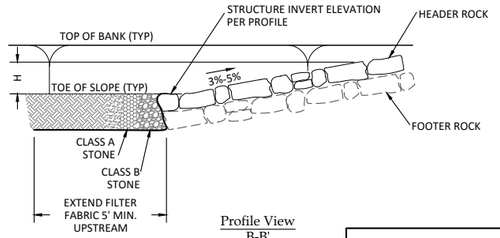


Plan View

Structure Dimensions				
REACH	Vile R1	Vile R2	UT1 R1	UT1 R2
H (FT)	0.8	0.8	0.4	0.4
W (FT)	4.0	4.7	1.9	2.7
Y (FT)	20.0	20.0	10.0	10.0
θ (DEGREE)	23	23	23	23

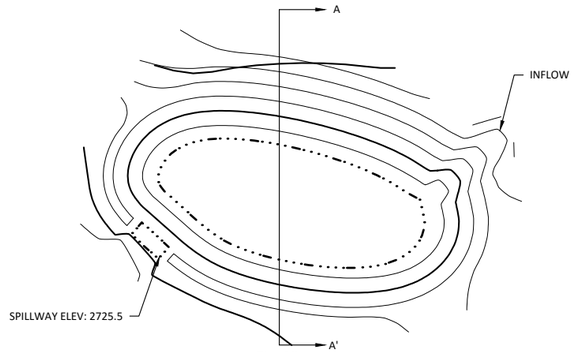


Section A-A'

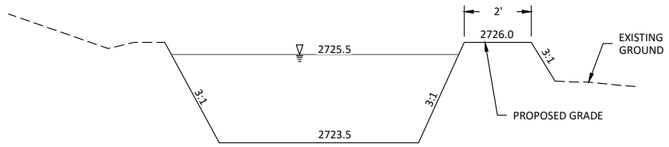


Profile View
B-B'

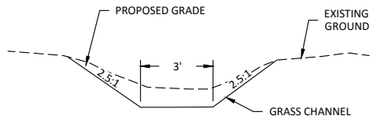
1/5.3 Rock Cross Vane
Not to Scale



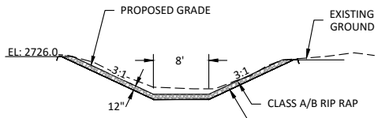
Plan View



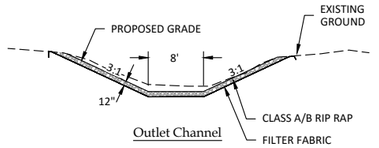
Section A-A'



Inflow Channel

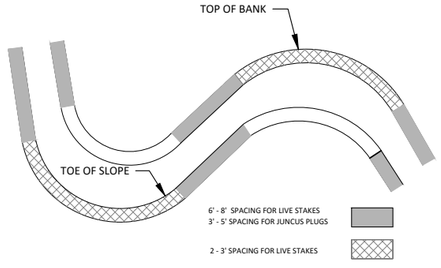


Stone Weir

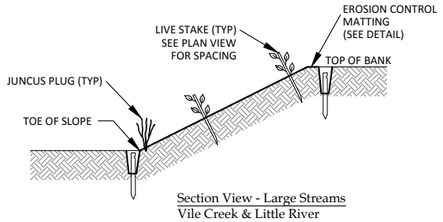


Outlet Channel

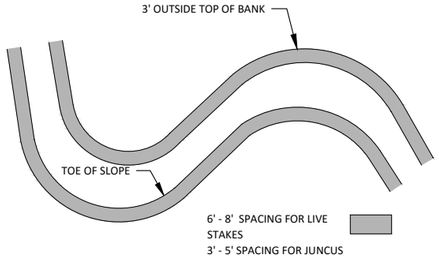
2/5.3 Headwaters Water Quality Treatment
Not to Scale



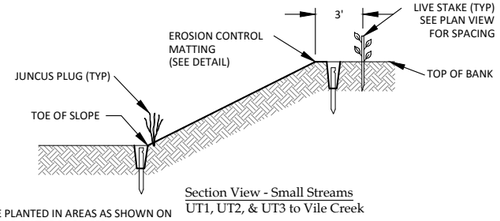
Plan View - Large Streams



Section View - Large Streams
Vile Creek & Little River



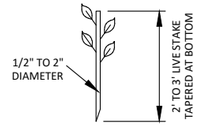
Plan View - Small Streams



Section View - Small Streams
UT1, UT2, & UT3 to Vile Creek

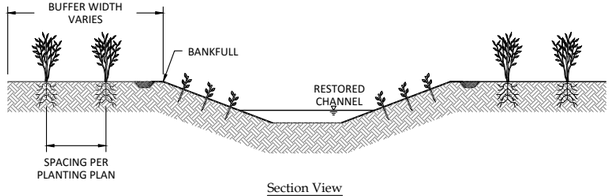
NOTE:

1. LIVE STAKES TO BE PLANTED IN AREAS AS SHOWN ON PLANS AND DIRECTED BY THE ENGINEER.
2. ONE ROW OF LIVE STAKES WILL BE PLANTED ON CHANNEL BANKS AT APPROXIMATELY A 3FT SPACING ON THE OUTSIDE OF MEANDER BENDS AND A 5FT SPACING ON TANGENT SECTIONS.
3. FOR UT1, LIVE STAKES WILL BE PLACED ON THE FLOODPLAIN OF TANGENT SECTIONS AND ON THE BANK AT THE OUTSIDE OF MEANDER BENDS.
4. FOR VILE CREEK, ALL LIVE STAKES WILL BE INSTALLED IN THE CHANNEL BANKS.
5. POINT BARS WILL NOT BE PLANTED WITH LIVE STAKES.



Live Stake Detail

3/5.3 Live Staking & Juncus Plugs
Not to Scale



Section View

DIBBLE BAR

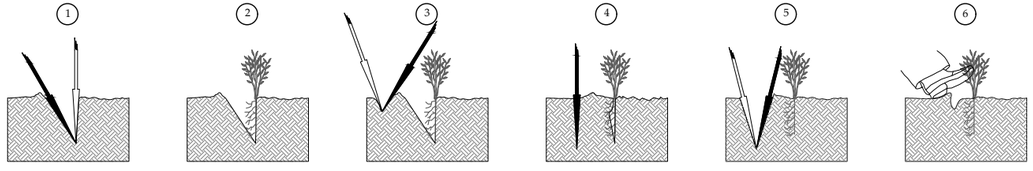
PLANTING BAR SHALL HAVE A BLADE WITH A TRIANGULAR CROSS-SECTION, AND SHALL BE 12 INCHES LONG, 4 INCHES WIDE AND 1 INCH THICK AT CENTER.

ROOTING PRUNING

ALL ROOTS SHALL BE PRUNED TO AN APPORIATE LENGTH TO PREVENT J-ROOTING.

NOTES:

1. ALL SOILS WITHIN THE BUFFER PLANTING AREA SHALL BE DISKED, AS REQUIRED, PRIOR TO PLANTING.
2. ALL PLANTS SHALL BE PROPERLY HANDLED PRIOR TO INSTALLATION TO INSURE SURVIVAL.



1. INSERT THE DIBBLE, OR SHOVEL, STRAIGHT DOWN INTO THE SOIL TO THE FULL DEPTH OF THE BLADE AND PULL BACK ON THE HANDLE TO OPEN THE PLANTING HOLE. (DO NOT ROCK THE SHOVEL BACK AND FORTH AS THIS CAUSES SOIL IN THE PLANTING HOLE TO BE COMPACTED, INHIBITING ROOT GROWTH.
2. REMOVE THE DIBBLE, OR SHOVEL, AND PUSH THE SEEDLING ROOTS DEEP INTO THE PLANTING HOLE. PULL THE SEEDLING BACK UP TO THE CORRECT PLANTING DEPTH (THE ROOT COLLAR SHOULD BE 1 TO 3 INCHES BELOW THE SOIL SURFACE). GENTLY SHAKE THE SEEDLING TO ALLOW THE ROOTS TO STRAIGHTEN OUT. DO NOT TWIST OR SPIN THE SEEDLING OR LEAVE THE ROOTS J-ROOTED.
3. INSERT THE DIBBLE, OR SHOVEL, SEVERAL INCHES IN FRONT OF THE SEEDLING AND PUSH THE BLADE HALFWAY INTO THE SOIL. TWIST AND PUSH THE HANDLE FORWARD TO CLOSE THE TOP OF THE SLIT TO HOLD THE SEEDLING IN PLACE.
4. PUSH THE DIBBLE, OR SHOVEL, DOWN TO THE FULL DEPTH OF THE BLADE.
5. PULL BACK ON THE HANDLE TO CLOSE THE BOTTOM OF THE PLANTING HOLD. THEN PUSH FORWARD TO CLOSE THE TOP, ELIMINATING AIR POCKETS AROUND THE ROOT.
6. REMOVE THE DIBBLE, OR SHOVEL, AND CLOSE AND FIRM UP THE OPENING WITH YOUR HEEL. BE CAREFUL TO AVOID DAMAGING THE SEEDLING.

4/5.3 Bare Root Planting
Not to Scale

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Vile Creek Mitigation Site
Alleghany County, North Carolina
Details

Revisions:

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Job Number: 0351021F
Project Engineer: DVK
Drawn By: JCK
Checked By: ADB

Sheet 5.3

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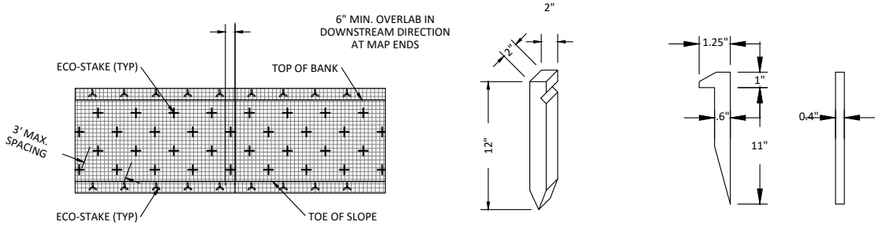
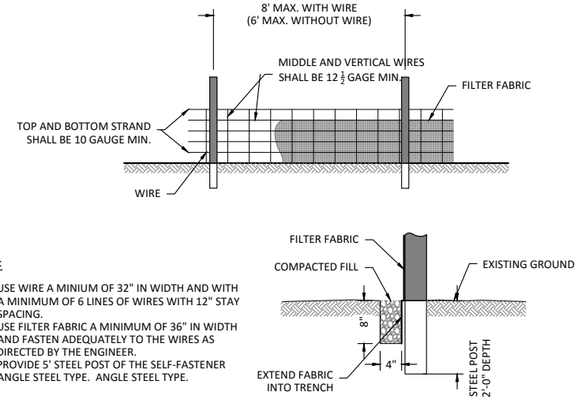
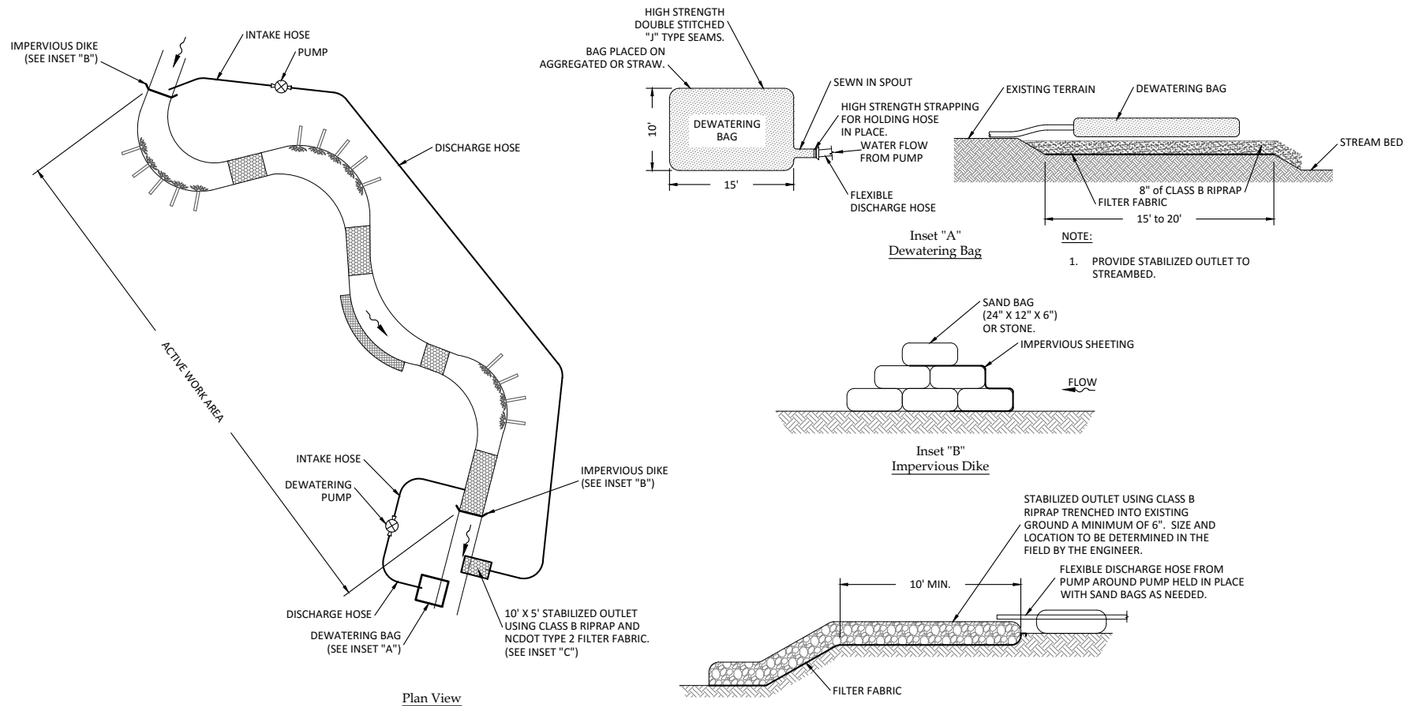
March 7, 2012



1/5.4 Erosion Control Matting
Not to Scale



2/5.4 Temporary Silt Fence
Not to Scale



3/5.4 Pump Around System
Not to Scale

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Alleghany County, North Carolina

Details

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Job Number: 005-021-F
Project Engineer: JNK
Drawn By: JCK
Checked By: ADB

Sheet 5.4

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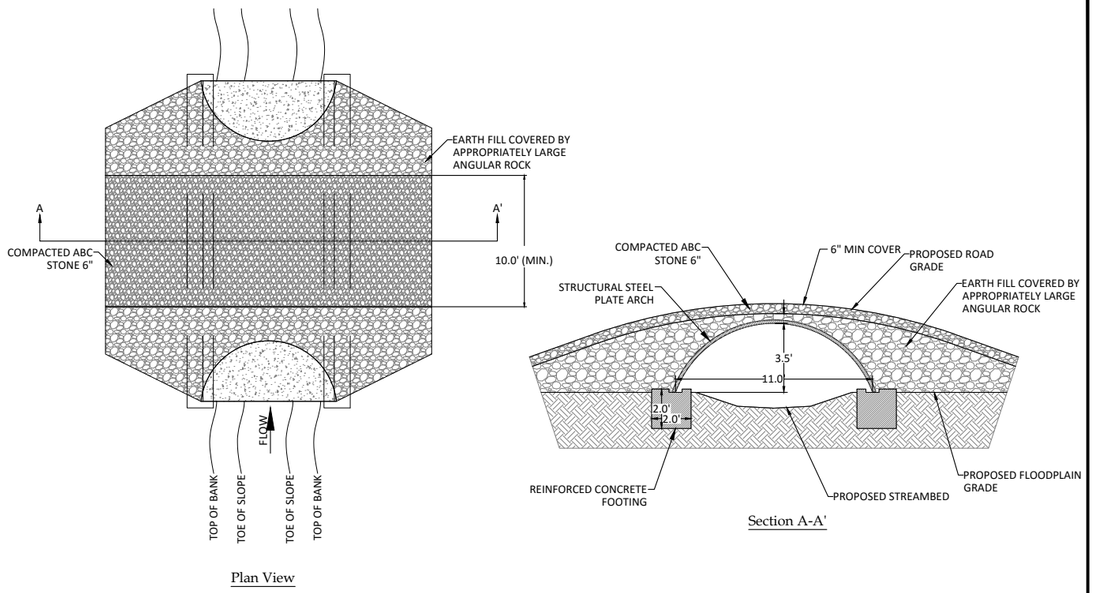
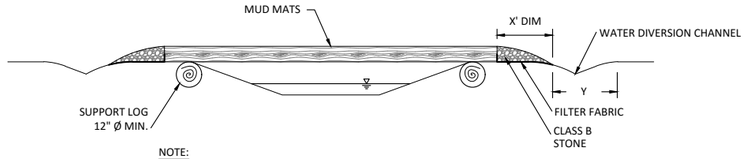
March 7, 2017



Plan View

Section A-A'

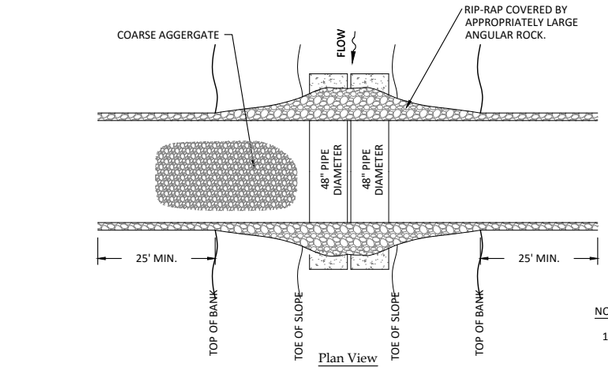
3 / 5.5 Bottomless Arch Crossing
Not to Scale



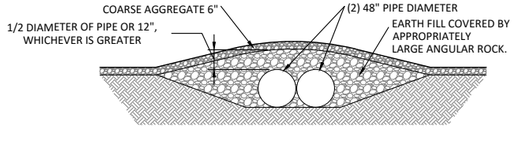
NOTE:

1. CONSTRUCT STREAM CROSSING WHEN FLOW IS AT NORMAL BASEFLOW.
2. MINIMIZE CLEARING AND EXCAVATION OF STREAMBANKS. DO NOT EXCAVATE CHANNEL BOTTOM.
3. INSTALL STREAM CROSSING PERPENDICULAR TO THE FLOW.
4. MAINTAIN CROSSING SO THAT RUNOFF IN THE CONSTRUCTION ROAD DOES NOT ENTER EXISTING CHANNEL.
5. STABILIZE AN ACCESS RAMP OF CLASS B STONE TO THE EDGE OF THE MUD MAT.
6. CONTRACTOR SHALL DETERMINE AN APPROPRIATE RAMP ANGLE ACCORDING TO EQUIPMENT UTILIZED.

2 / 5.5 Temporary Stream Crossing - Mud Mat
Not to Scale



Plan View

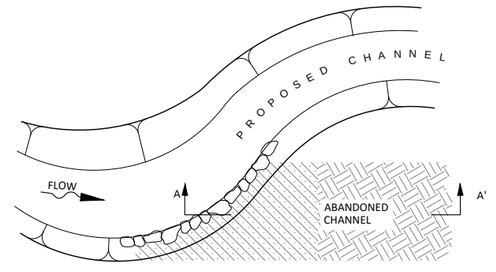


Section View

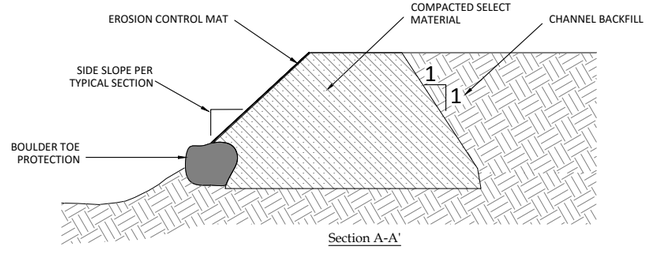
NOTES:

1. THIS TYPE OF CROSSING CAN BE INSTALLED IN BOTH A WET OR DRY WEATHER STREAM CONDITION WHERE THE DRAINAGE AREA EXCEEDS 10 ACRES.
2. REMOVE DURING CLEANUP.
3. CONTRACTOR MAY ELECT TO USE A TEMPORARY BRIDGE CROSSING. IF HE/SHE DOES, IT MUST CONFORM TO THE "MANUAL FOR EROSION AND SEDIMENT CONTROL IN [STATE]".

3 / 5.5 Temporary Stream Crossing - Culvert
Not to Scale



Plan View



Section A-A'

4 / 5.5 Channel Plug
Not to Scale

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Vile Creek Mitigation Site
Alleghany County, North Carolina
Details

Revisions:

Date: May 25, 2016
Job Number: 0545-02-UT
Project Engineer: DJK
Drawn By: JCK
Checked By: ADB

Sheet 5.5

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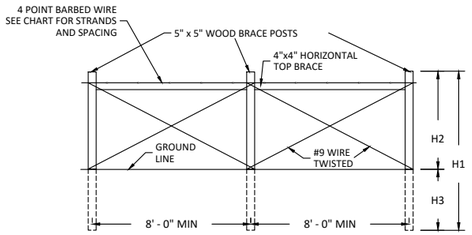
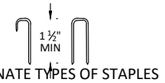
March 7, 2012

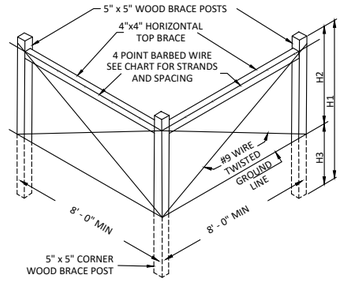


LINE BRACES
(MAXIMUM SPACING 330')

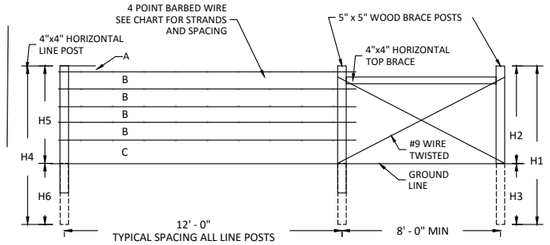


ALTERNATE TYPES OF STAPLES
USE ONE #9 STAPLE OR TWO #16 STAPLES
AT EACH POINT OF ATTACHMENT.

BARBED WIRE FENCE CHART			
NUMBER OF BARBED WIRE STRANDS			5
STRAND SPACING		A	2"
		B	10"
		C	12"
BRACE POSTS	LENGTH	H1	8' - 0"
	EXPOSED	H2	4' - 5"
	EMBEDMENT	H3	3' - 5"
LINE POSTS	LENGTH	H4	6' - 6"
	EXPOSED	H5	4' - 5"
	EMBEDMENT	H6	2' - 0"
HORIZONTAL BRACE			8' - 0"



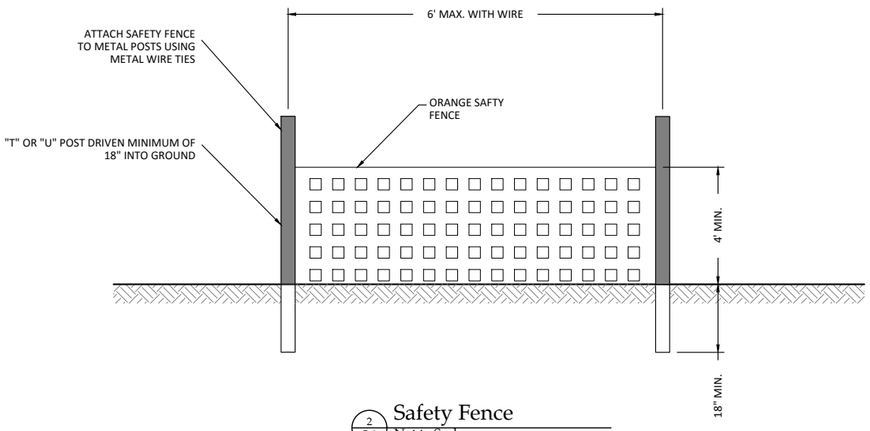
CORNER BRACE
USE WHEN CORNER ANGLE IS 15° OR GREATER



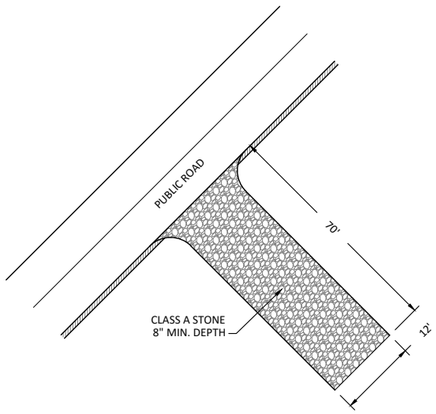
END OR GATE BRACES

1/5.6 Barbed Wire Fence
NCDOT Detail No. 866.04
Not to Scale

MATERIAL SPECIFICATIONS		
PHYSICAL PROPERTY	TESTS	REQUIREMENTS
MATERIAL	N/A	POLYETHYLENE
RECOMENDED COLOR	N/A	"INTERNATIONAL ORANGE"
TENSILE YIELD	ASTM D638	AVE. 2000 LBS. PER 4' WIDE
ULTIMATE TENSILE STRENGTH	ASTM D638	AVE. 2900 LBS. PER 4' WIDE
ELONGATION AT BREAK (%)	ASTM D638	GREATER THAN 1000%
CHEMICAL RESISTANCE	N/A	INERT TO MOST CHEMICALS AND ACIDS



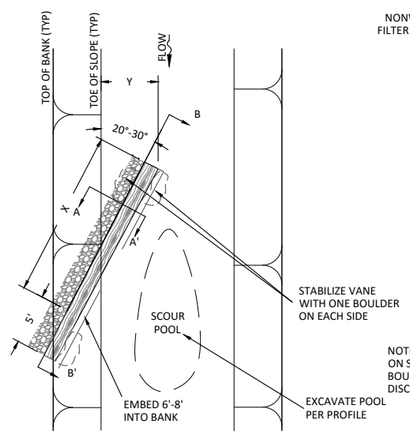
2/5.6 Safety Fence
Not to Scale



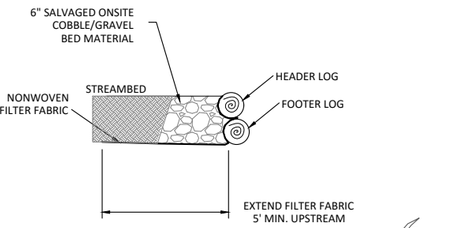
NOTES:

1. PROVIDE TURNING RADIUS SUFFICIENT TO ACCOMMODATE LARGE TRUCKS.
5. LOCATE CONSTRUCTION ENTRANCE AT ALL POINTS OF INGRESS AND EGRESS UNTIL SITE IS STABILIZED. PROVIDE FREQUENT CHECKS OF THE DEVICE AND TIMELY MAINTENANCE.
6. MUST BE MAINTAINED IN A CONDITION WHICH WILL PREVENT TRACKING OR DIRECT FLOW OF MUD ONTO STREETS. PERIODIC TOP DRESSING WITH STONE WILL BE NECESSARY.
7. ANY MATERIAL TRACKED ONTO THE ROADWAY MUST BE CLEANED IMMEDIATELY.
8. USE CLASS A STONE OR OTHER COARSE AGGREGATE APPROVED BY THE ENGINEER.
9. PLACE FILTER FABRIC BENEATH STONE.

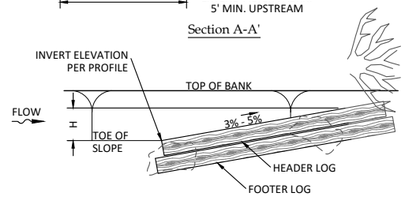
3/5.6 Construction Entrance
Not to Scale



Plan View



Section A-A'



Profile B - B'

NOTE:
ON SMALLER STREAMS THE STABILIZATION BOUNDER MAY BE REMOVED PER ENGINEER'S DISCRETION.

	Vile Creek Reach 2
H	1.0
X	7
Y	3.1

4/5.6 Log Vane
Not to Scale

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Vile Creek Mitigation Site
Alleghany County, North Carolina

Details

Revisions:

Date: May 25, 2016
Job Number: 005-02147
Project Engineer: DNK
Drawn By: JCK
Checked By: ADB

5.6
Sheet

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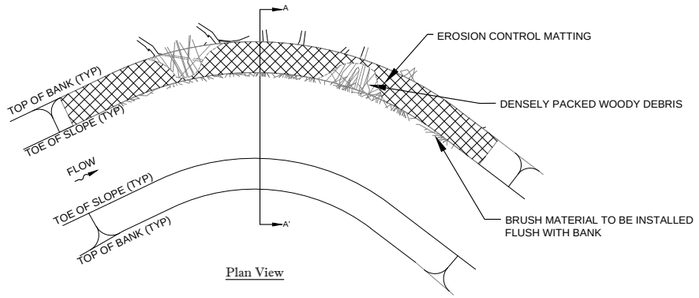
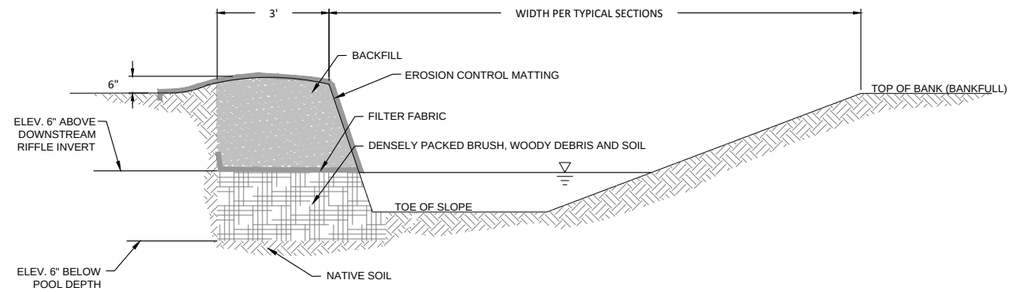


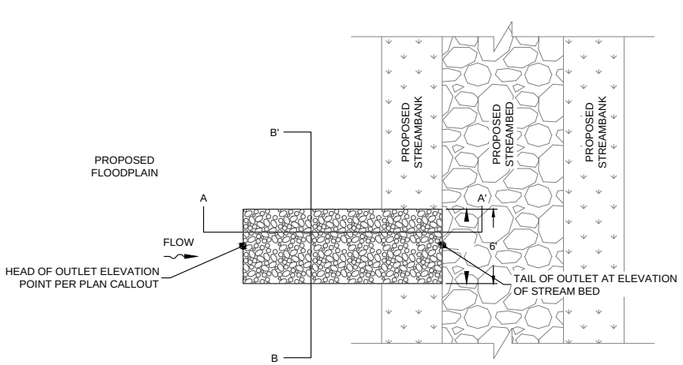
Plan View



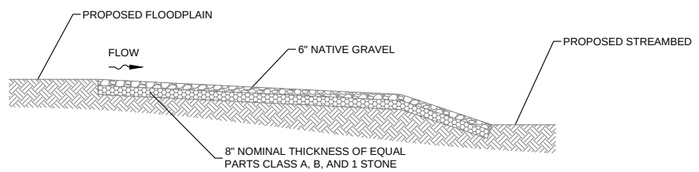
Section A-A'

NOTES:
1. OVEREXCAVATE 3' OUTSIDE OF TOP OF BANK (BANKFULL).
2. INSTALL A DENSE LAYER OF BRUSH/WOODY DEBRIS, WHICH SHALL CONSIST OF SMALL BRANCHES AND ROOTS COLLECTED ON-SITE AND SOIL TO FILL ANY VOID SPACE. LIGHTLY COMPACT BRUSH/WOODY DEBRIS LAYER.
3. BRUSH SHOULD BE ALIGNED SO STEMS ARE ROUGHLY PARALLEL AND IS INSTALLED POINTING SLIGHTLY UPSTREAM.
4. INSTALL FILTER FABRIC OVER BRUSH/WOODY DEBRIS.
5. INSTALL EARTH BACKFILL OVER BRUSH/WOODY LAYER ACCORDING TO TYPICAL SECTION DIMENSIONS.
6. SEED, MULCH AND INSTALL EROSION CONTROL MATTING AND BANK STABILIZATION PER PLANS.

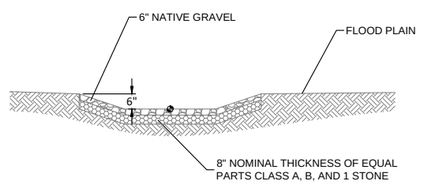
1/5.7 Brush Toe
Not to Scale



Plan View



Profile A-A'



Section B-B'

2/5.7 Floodplain Outlet
Not to Scale

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Alleghany County, North Carolina

Details

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Drawn By: JCK
Checked By: ADB

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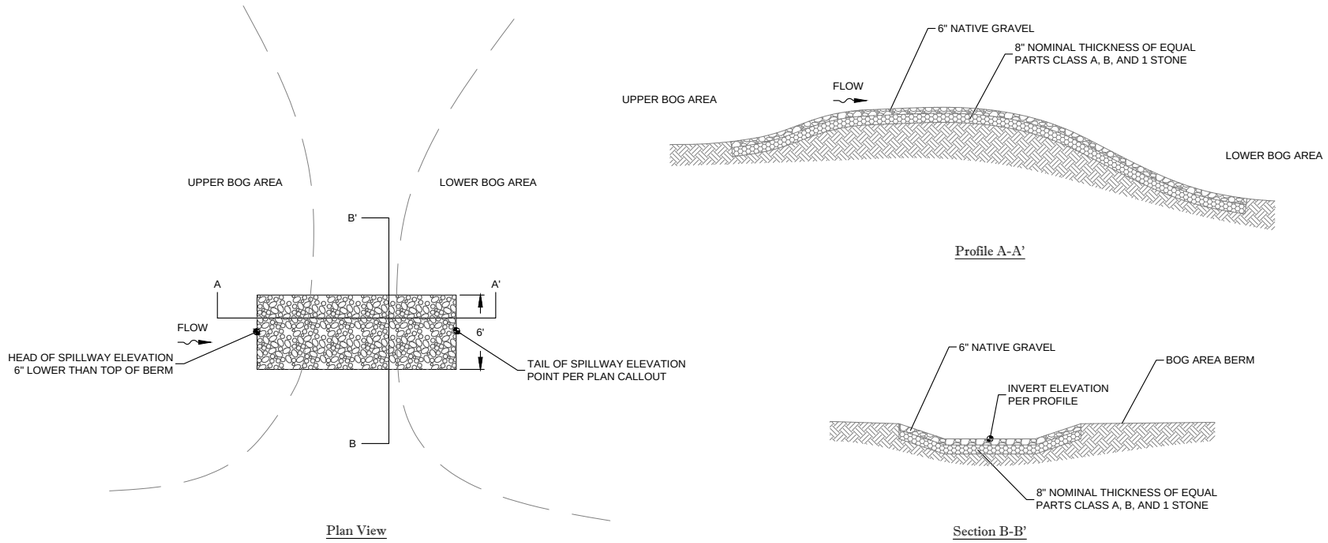
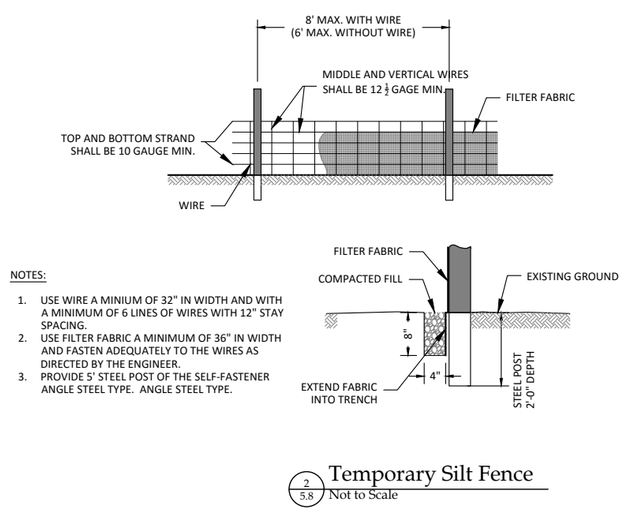


1 / 5.8 Bog Area Berm Spillway
Not to Scale



NOTES:

1. USE WIRE A MINIUM OF 32" IN WIDTH AND WITH A MINIMUM OF 6 LINES OF WIRES WITH 12" STAY SPACING.
2. USE FILTER FABRIC A MINIMUM OF 36" IN WIDTH AND FASTEN ADEQUATELY TO THE WIRES AS DIRECTED BY THE ENGINEER.
3. PROVIDE 5' STEEL POST OF THE SELF-FASTENER ANGLE STEEL TYPE. ANGLE STEEL TYPE.

2 / 5.8 Temporary Silt Fence
Not to Scale

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Details

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Project Engineer: JNK
Drawn By: JCK
Checked By: ADB

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Job Number:	005-02147
Project Engineer:	JNK
Drawn By:	JCK
Checked By:	ADB

6.0
Sheet

Revisions:

Vile Creek Mitigation Site
Alleghany County, North Carolina

Overview
Erosion and Sediment Control

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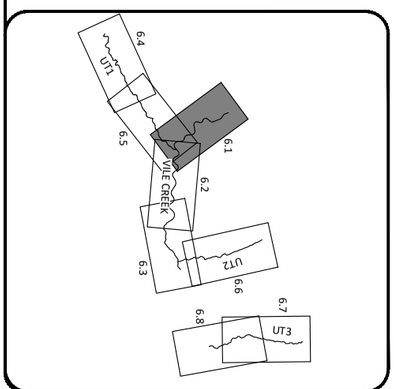
Sheet Index



Date:	May 25, 2016
Job Number:	005-02147
Project Engineer:	JNK
Drawn By:	JCK
Checked By:	ADB

Revisions:

6.1
Sheet

Vile Creek Mitigation Site
Alleghany County, North Carolina

Vile Creek & UT1
Erosion and Sediment Control

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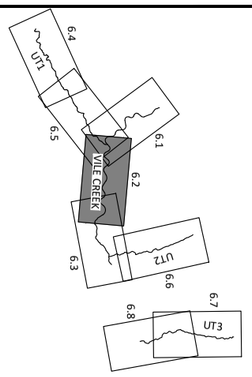
Sheet Index



Date:	May 25, 2016
Job Number:	005-02147
Project Engineer:	JNK
Drawn By:	JCK
Checked By:	ADB

Revisions:

6.2
Sheet

Vile Creek Mitigation Site
Alleghany County, North Carolina

Vile Creek
Erosion and Sediment Control

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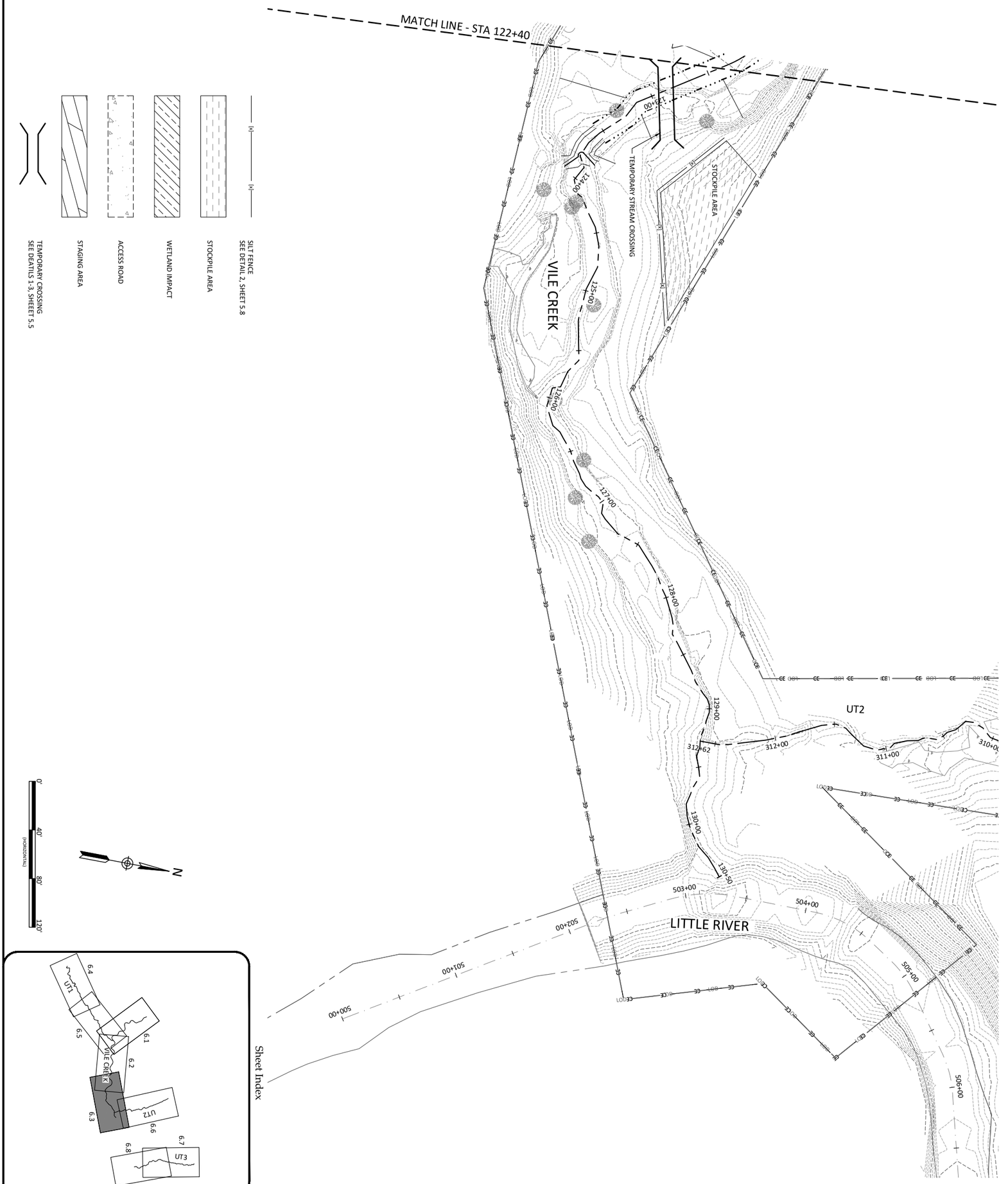

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Job Number:	005-02147
Project Engineer:	JNK
Drawn By:	JCK
Checked By:	ADB

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Vile Creek Mitigation Site
Alleghany County, North Carolina

Vile Creek
Erosion and Sediment Control

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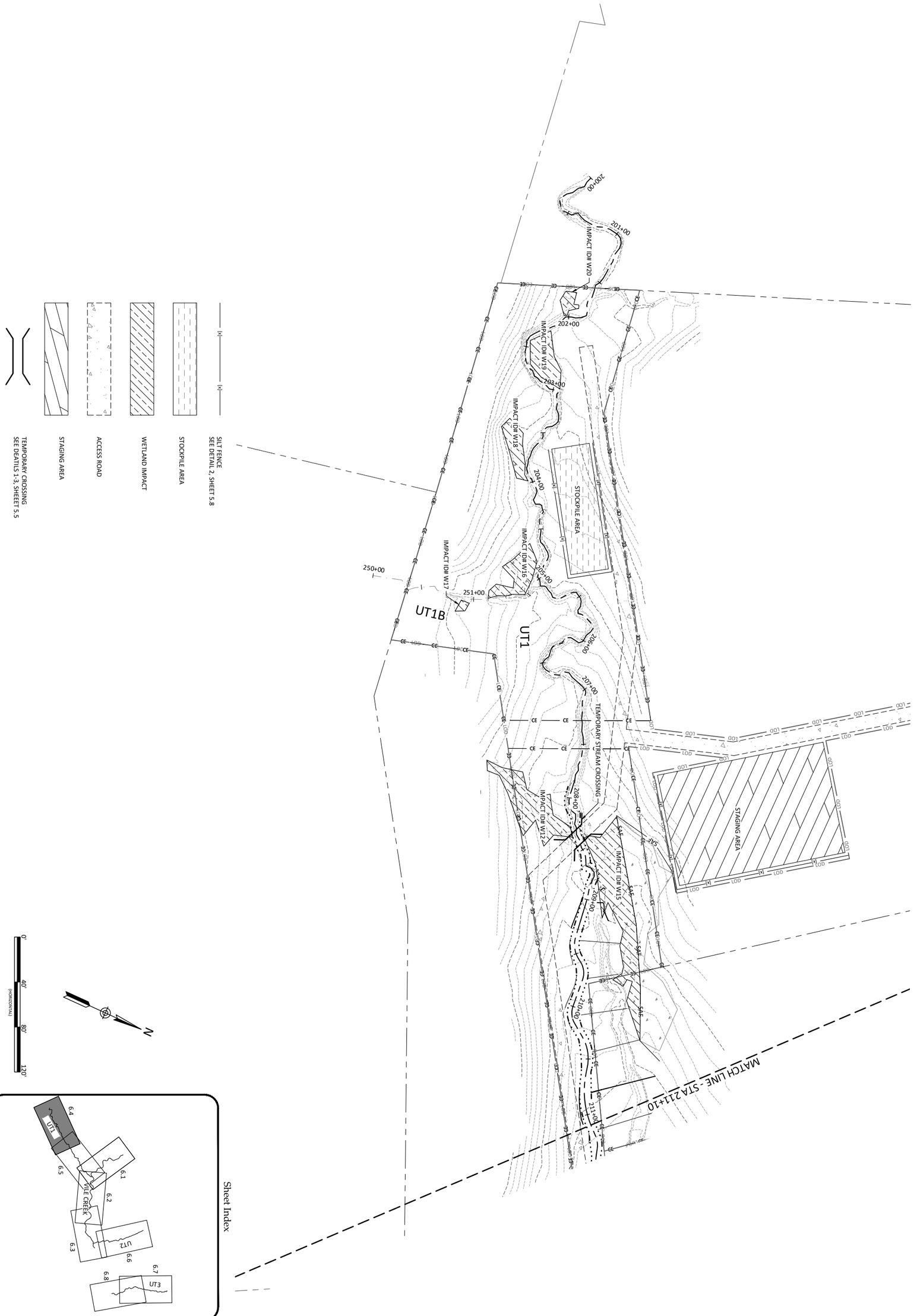

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Vile Creek Mitigation Site
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UT1 & UT1B
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Vile Creek Mitigation Site
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UT1 & UT1C
Erosion and Sediment Control

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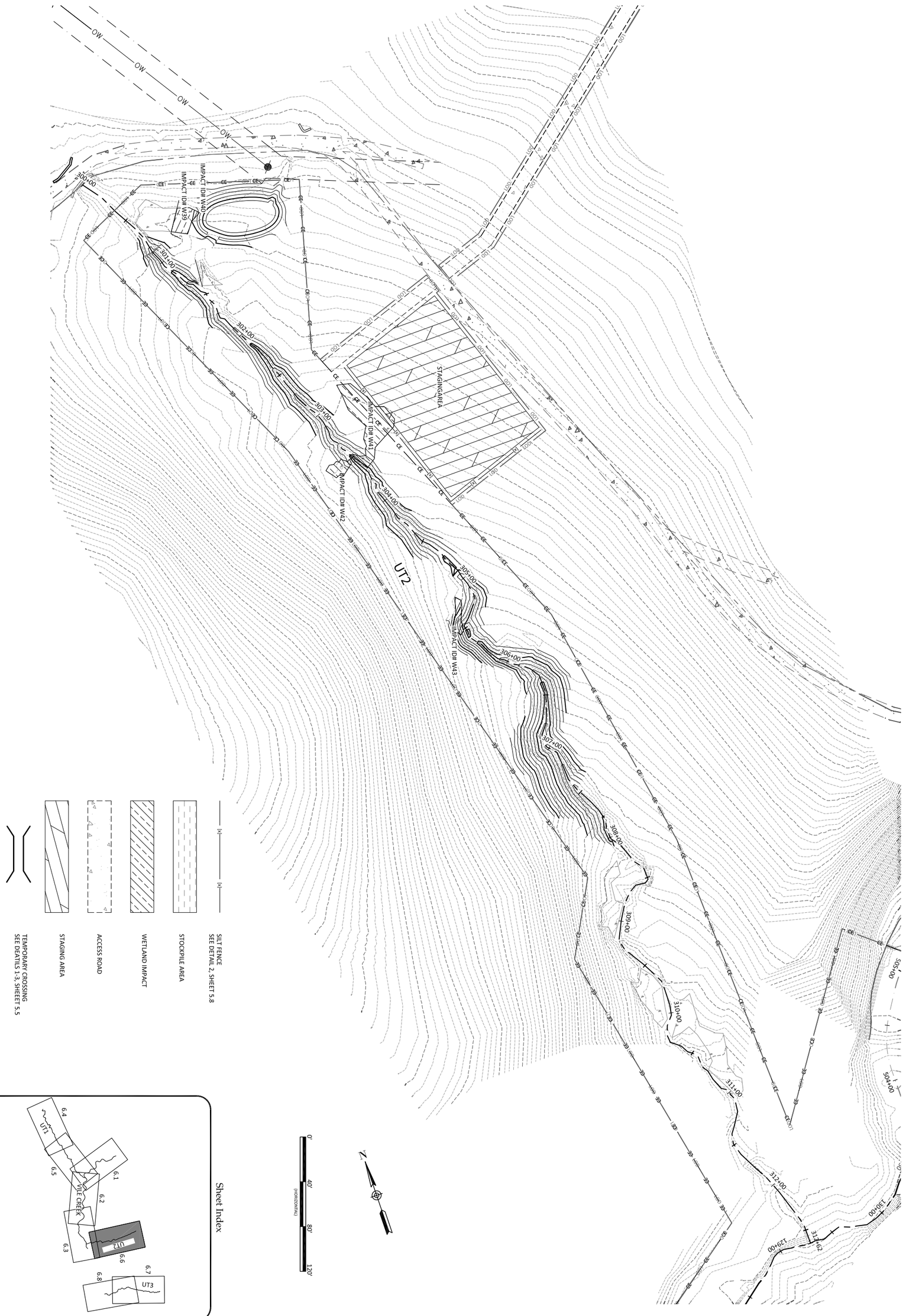

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Vile Creek Mitigation Site
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UT2
Erosion and Sediment Control

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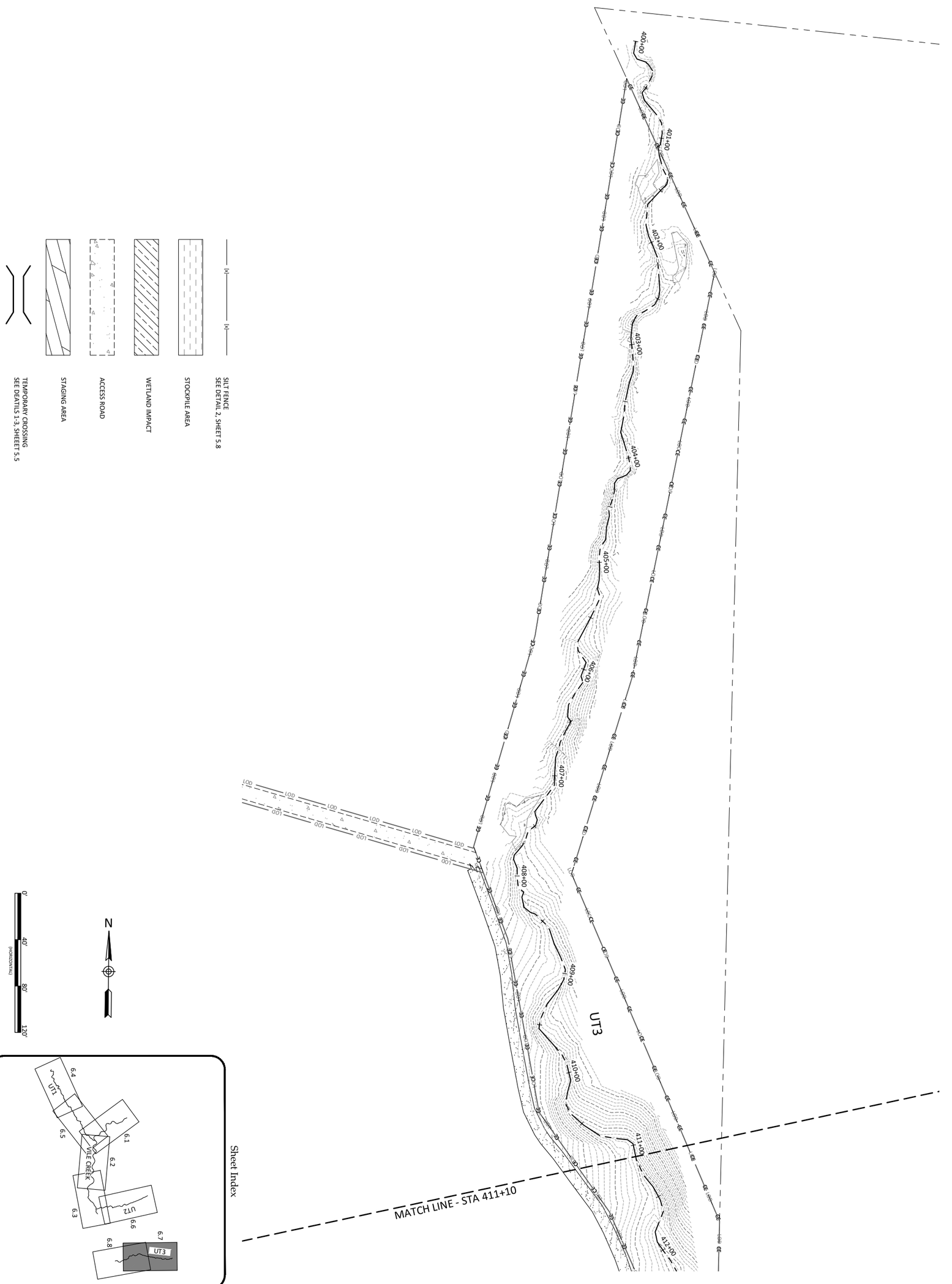

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Vile Creek Mitigation Site
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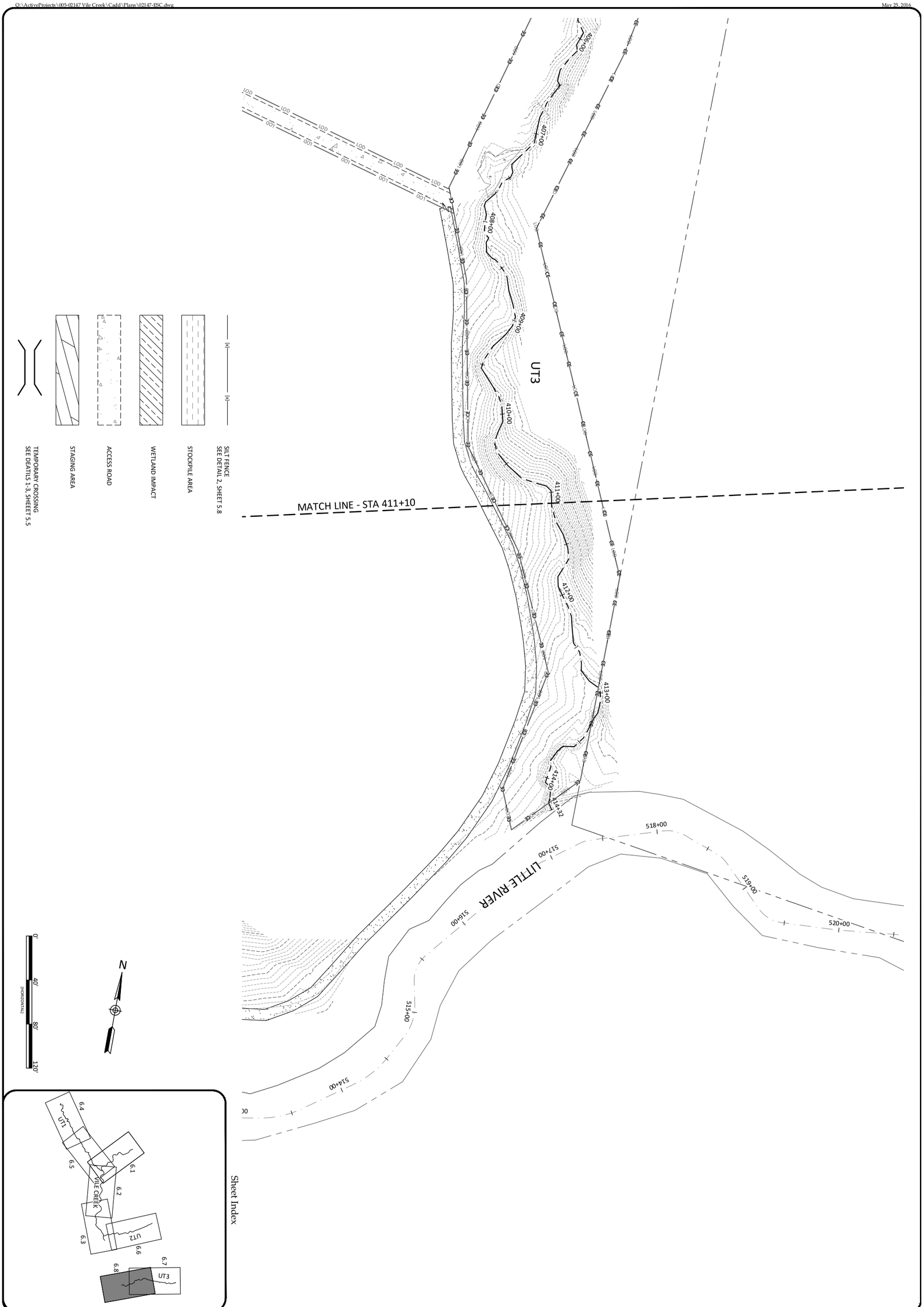

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Vile Creek Mitigation Site
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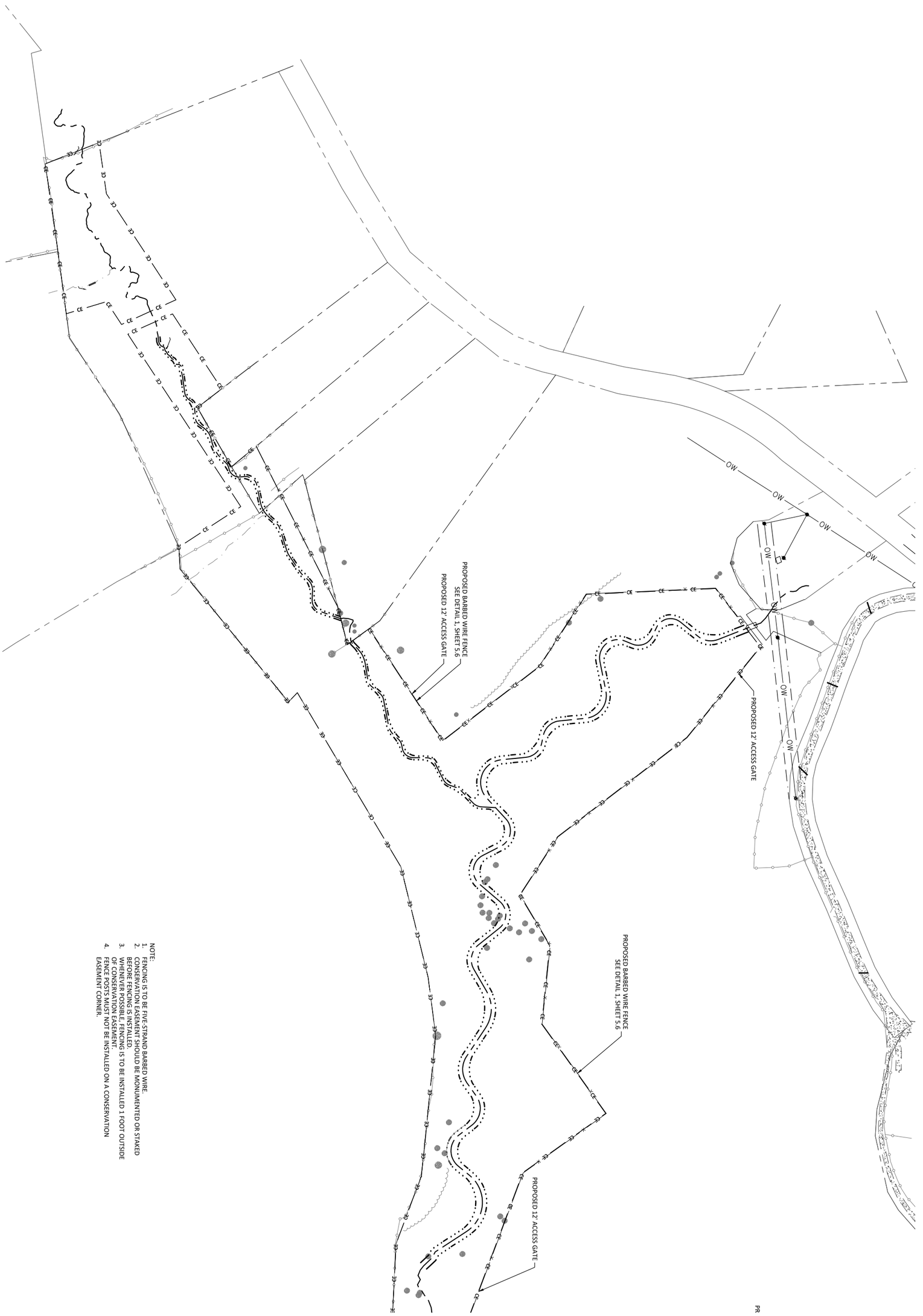

NOTE:
1. FENCING IS TO BE FIVE-STRAND BARBED WIRE.
2. CONSERVATION EASEMENT SHOULD BE MONUMENTED OR STAKED BEFORE FENCING IS INSTALLED.
3. WHENEVER POSSIBLE, FENCING IS TO BE INSTALLED 1 FOOT OUTSIDE OF CONSERVATION EASEMENT.
4. FENCE POSTS MUST NOT BE INSTALLED ON A CONSERVATION EASEMENT CORNER.

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Vile Creek Mitigation Site
Alleghany County, North Carolina

Fencing Plan

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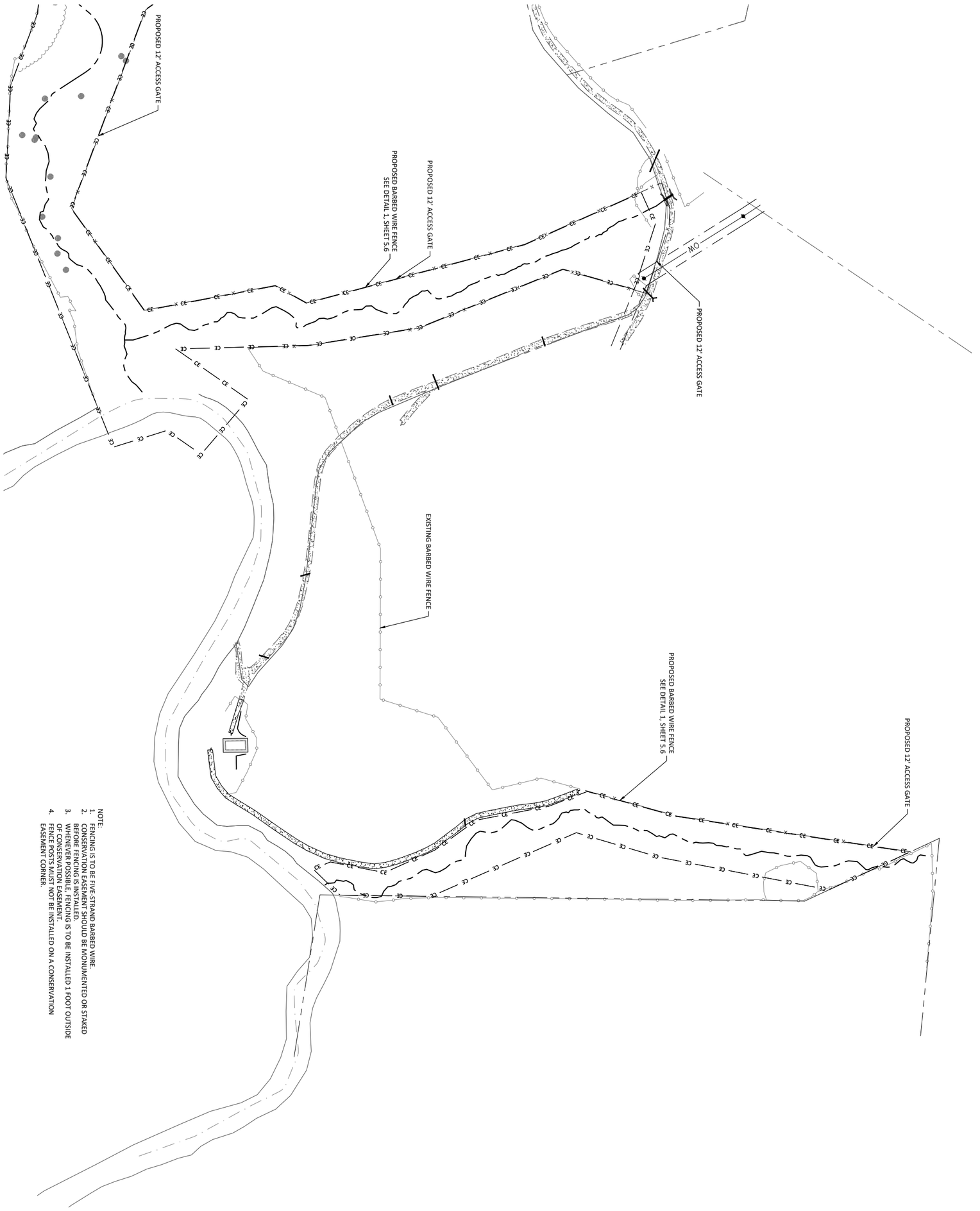

NOTE:
1. FENCING IS TO BE FIVE-STRAND BARBED WIRE.
2. CONSERVATION EASEMENT SHOULD BE MONUMENTED OR STAKED BEFORE FENCING IS INSTALLED.
3. WHERE PRACTICABLE, FENCING IS TO BE INSTALLED 1 FOOT OUTSIDE OF CONSERVATION EASEMENT.
4. FENCE POSTS MUST NOT BE INSTALLED ON A CONSERVATION EASEMENT CORNER.

Date:	May 25, 2016
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Project Engineer:	JNK
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Fencing Plan

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