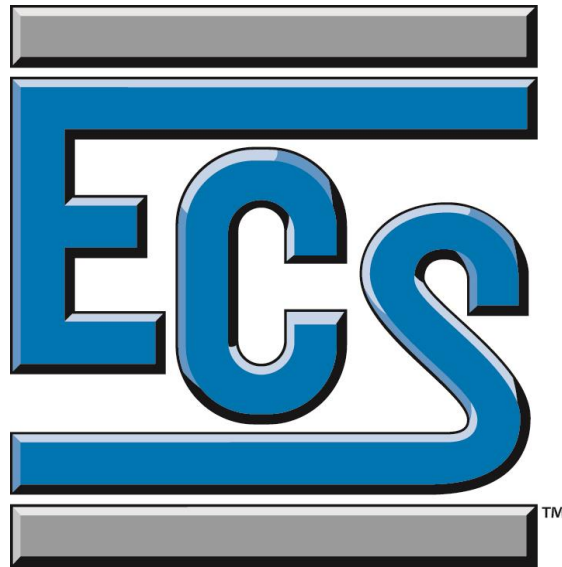


**REPORT OF ENVIRONMENTAL ASSESSMENT OF THE FUTURE MCDOWELL
SHOOTING RANGE**

ASHWORTH ROAD & INTERSTATE 40

MARION, MCDOWELL COUNTY, NORTH CAROLINA



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ECS PROJECT NUMBER 49:5541

Revised: January 12, 2018

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1.0 ACKNOWLEDGMENT

ECS CAROLINAS, LLP WOULD LIKE TO ACKNOWLEDGE AND THANK THE SUPPORT OF THE NORTH CAROLINA WILDLIFE RESOURCES COMMISSION IN THE UNDERTAKING OF THIS PROJECT.



2.0 INTRODUCTION

2.1 PROPOSED PROJECT DESCRIPTION

The North Carolina Wildlife Resource Commission (NCWRC) has commissioned Engineering Consulting Services (ECS), LLP to conduct an Environmental Assessment (EA) for the proposed outdoor shooting range in McDowell County, NC. The assessment will aid the NCWRC in the development and management of a target archery and firearm shooting range. In addition, this initiative will assist the NCWRC in providing the necessary due diligence to ensure no adverse environmental impacts are associated with the construction and development of the shooting range as well as documenting appropriate environmental stewardship and best practices for the project. The Project Study Area (PSA) is located at the intersection of Ashworth Road and Interstate 40 in Marion, McDowell County, North Carolina (Figure 1). The PSA consists of an approximate 15-acre portion of a larger parent parcel which totals a reported 266.87 acres in size. According to the McDowell County Online GIS website, the Parcel Identification Number (PIN) is 160900579508. The parent parcel consists of undeveloped, wooded land and dirt access roads. The proposed project is to improve approximately nine acres of wooded land for the construction of the target archery range and rifle range. A proposed 12 foot wide gravel and/or paved access road and 25 space gravel and/or paved parking lot are proposed to accompany the range. Additionally, the firearm range will include an open air covered structure for reloading and shooting purposes, and two baffles to allow prone shooting with no “blue sky.” A sidewalk will connect the parking area with the ranges. Stormwater control devices are not proposed for this site at this time. The latitude and longitude coordinates of the PSA are 35.631961°, -82.010568°.

2.2 PURPOSE AND NEED FOR PROPOSED PROJECT

The primary purpose of this project is to provide a safe and controlled target archery and firearm range. This will provide a venue where sportsmen and sportswomen can practice shooting arrows and rifles. Secondary purposes include the public's awareness of NCWRC and the rules and regulations of operating bows and firearms in a secure manner. Additionally, the NCWRC will advocate the continued involvement of environmental stewardship and land management in the area of the ranges. Several needs for the project are listed below:

- Need for safe and controlled archery and firearm range.
- Improved facilities to provide safety courses.
- Increased public awareness of the NCWRC.
- Improve land management and environmental stewardship.

The proposed shooting range presents an attractive location for sportsmen, sportswomen, and law enforcement to participate in firearm safety courses, conceal carry courses, and advanced training in firearms that otherwise are limited in McDowell County. The small footprint of the proposed shooting range, approximately nine acres, will help reduce anthropogenic impacts to other areas adjacent to or in close proximity to the PSA by depositing lead in a controlled manner and reducing the sporadic amount of lead from other sites in McDowell County. The overall potential lead exposure to the natural environment will be reduced by concentrating it onto a single site. The expansive natural vegetative buffer and steep elevation from the mountains and vegetation makes this an ideal location for the proposed shooting range.

2.3 ALTERNATIVE ANALYSIS

The current PSA was selected for several main benefits that would minimize total impacts compared to other sites the NCWRC had previously identified. Some of those benefits include and are not limited to:

- Location between several local municipalities including Asheville, Hickory, Marion, and Morganton.
- Distance from residences and lowering of noise intrusion.
- Ease of access to the site.
- Large areas of open space with wooded land surrounding the site.
- Ease of access for continued maintenance and monitoring.

ECS also concluded that other benefits of the site are:

- Site topography.
- Meets requirements for both archery and rifle needs.
- Local communities benefit from location and ease of access from I-40.
- Significant changes in environmental impacts are not expected due to the proposed firearm range specifications.

Based on the alternative analysis and benefits this site offers, ECS considers the development of the McDowell shooting range to be a moderate to strong candidate for site selection.

3.0 EXISTING ENVIRONMENTAL CHARACTERISTICS OF PROJECT AREA

3.1 TOPOLOGY

The topology of the McDowell Shooting Range ranges from approximately 1280 to 1440 feet above mean sea level (MSL) (Figure 2). Based on the United States Geological Survey (USGS) Topographic Map, no surface waters are depicted within the PSA. According to the Geologic Map of North Carolina, the PSA is situated in the Blue Ridge Physiographic Province. The soils encountered in this area are the residual product of in-place chemical weathering of rock presently underlying the site. In general, shallow unconfined groundwater movement within the overlying soils is controlled largely by topographic gradients. However, as the groundwater percolates downward to the bedrock, it becomes controlled by the orientation of the rock fracture systems. Thus, the direction of groundwater movement may not be consistent with the reflecting topography. Recharge occurs primarily by infiltration along higher elevations and typically discharges into streams or other surface water bodies. The elevation of the shallow water table is transient and can vary with seasonal fluctuations in precipitation. Movement of groundwater under water table conditions is generally from higher to lower elevations (NCDEQ, 2015).

3.2 SOILS

Based on the USDA – NRCS Soil Survey, dated 1995, soils depicted on site are Hayesville clay loam (HcC2). Hayesville clay loam is well drained and occurs on ridges (USDA, 1995).

Hayesville clay loam soil is ideal for a firing range due to the clay loam texture and relatively permeable composition to stop ammunition from penetrating through a backstop.

3.3 SOIL LABORATORY ANALYSIS

ECS collected eight soil samples throughout the study area for analysis. See Figure 7 for locations. Soil samples were collected in areas that would be directly impacted by construction and development activities for the shooting range, parking lot, and the access road. The results provide strong documentation of the typical soils encountered on the PSA. ECS utilized two labs to perform analysis on the soils. Those labs included Pace Laboratories and the North Carolina Department of Agriculture and Consumer Services (NCDA&CS). ECS had to utilize a private lab to ascertain heavy metal information because the NCDA&CS no longer conducts heavy metal analytical testing. Copies of these results are provided in Appendix I and are summarized in Tables 1 and 2 below.

Table 1. Soil Sample Analysis Heavy Metals							
Sample ID	Arsenic	Cadmium	Chromium	Lead	Nickle	Selenium	Soil Type
S1	ND	ND	52.8	20.0	7.5	ND	C.L
S2	1.4	ND	15.4	11.5	3.0	ND	C.L
S3	ND	ND	35.7	20.3	7.0	ND	C.L
S4	1.7	ND	13.6	14.2	3.6	ND	C.L
S5	1.6	ND	44.1	21.6	6.0	ND	C.L
S6	ND	ND	32.4	14.6	10.9	ND	C.L
S7	ND	ND	27.5	18.7	11.4	ND	C.L
S8	1.8	ND	24.3	22.8	3.2	ND	C.L

ND= Not detected

C.L= Clay Loam

Samples are in mg/kg

Table 2. Soil Sample Analysis and Acidity							
Sample ID	HM%	W/V	CEC	BS%	Ac	pH	Soil Class
S1	0.51	0.93	3.4	20	4.8	4.8	Mineral
S2	0.36	0.97	3.6	23	2.8	4.7	Mineral
S3	0.51	0.91	4.0	27	2.9	4.7	Mineral
S4	0.51	0.93	4.0	21	3.1	4.7	Mineral
S5	0.27	0.90	4.1	22	3.2	4.6	Mineral
S6	0.41	0.92	4.0	51	2.0	5.0	Mineral
S7	1.25	0.90	4.1	67	1.4	5.2	Mineral
S8	0.18	1.03	4.9	55	2.2	4.9	Mineral

Ac= Exchangeable Acidity

BS%= % CEC Occupied by Basic Cations

CEC= Cation Exchange Capacity

HM%= Percent Humic Matter

pH= Current Soil pH

W/V= Weight per Volume

3.4 LAND USE

The current land use of the site and adjacent areas are undeveloped, wooded land, residential, and agricultural. The PSA is located in a rural area of McDowell County. The closest single-family residences are located approximately 2,800 feet from the study area. This proposed shooting range will provide a controlled range environment, reducing uncontrolled firing of ammunition. The range will improve environmental stewardship, safety, and an awareness of proper handling and use of firearms. At this time, it appears the land use is not likely to significantly change.

3.5 WETLANDS

During ECS' site reconnaissance, two streams with abutting wetlands were identified within the PSA. The streams and wetlands transect the dirt access road located east of the proposed shooting range. Stream S1 is approximately fifteen feet in width and three to five feet

in depth. The stream had moderate to strongly defined bed and banks, weak sinuosity, sandy clay substrate, and strong base flow at the time of the site reconnaissance. Stream S2 is approximately five feet in width and one to two feet in depth. The stream had moderately defined bed and banks, moderate sinuosity, mixed sand and pebble substrate, and moderate base flow at the time of the site reconnaissance.

The streams bisect the dirt access road located east of the proposed shooting range. Wetlands are defined by the U.S. Army Corps of Engineers (USACE) and the United States Environmental Protection Agency (EPA) as “those areas that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and under normal circumstances, do support a prevalence of vegetation typically adapted for life in saturated soil conditions.” In order for an area to be classified as a wetland, hydrophytic vegetation, hydric soils, and wetland hydrology indicators must be present as described in the 1987 “Corps of Engineers Wetlands Delineation Manual” and the appropriate Regional Supplement.

Outside of the project area, a pond and a stream were observed east of the proposed shooting range. These areas are depicted on the United States Fish and Wildlife Service-National Wetlands Inventory mapping service (Figure 4). The ponds and stream drain south and east towards North Muddy Creek. These waters of the United States (WoUS) serve as a capacity to carry pollutants or floodwaters to Traditional Navigable Waters (TNWs), provide habitat and lifecycle support functions for fish and other aquatic species, and have the capacity to transfer nutrients and organic carbon to downstream food webs.. Wetland/stream impacts were not considered a part of this study. If future impacts to WoUS are anticipated, ECS recommends a full delineation and jurisdictional determination be conducted prior to development activities.

ECS reviewed the Federal Emergency Management Agency (FEMA) FIRM Service Center website. The PSA is depicted on FIRM panel 3710160800J, dated October 2, 2008 (Figure 5). The map indicates that the majority of the PSA is located in Zone X, an area outside the 0.2% annual chance floodplain; however, portions of the access road are located in zone AE, an area inundated by 1% annual chance flooding.

Figure 6 shows an aerial of the PSA where ECS took an upland data point. Hydrophytic vegetation, hydric soils, and wetland hydrology indicators were not observed on the PSA. A copy of this data form is provided in Appendix I.

3.6 PRIME OR UNIQUE AGRICULTURAL LANDS

The PSA is located in a rural and residential area of McDowell County, North Carolina and is currently undeveloped. According to Mr. Cortes, Assistant Soil Scientist with USDA-NRCS, the USDA contains records of soil mapped within the PSA as being classified as prime

or unique agricultural land. Soils within the PSA have been mapped as Colvard loam (0 – 2 percent slopes), Evard-Cowee complex (25 – 60 percent slopes), Hayesville clay loam (6 – 15 percent slopes), and Hayesville-Evard complex (15 – 25 percent slopes). Colvard loam is rated as All Areas are Prime Farmland. Evard-Cowee complex is rated Not Prime Farmland. Hayesville clay loam is rated Farmland of Statewide Importance. Hayesville-Evard complex is rated Farmland of Local Importance. A copy of this correspondence is attached in Appendix I. ECS contacted the McDowell County Soil and Water Conservation Department to obtain information on volunteer agricultural districts. The department stated McDowell County does not contain volunteer agricultural districts at this time (McDowell County Soil and Water Conservation).

3.7 PUBLIC LANDS AND SCENIC, RECREATIONAL, AND STATE NATURAL AREAS

The PSA does not occur in areas designated as park land, scenic or recreational areas, or State natural areas.

3.8 AREAS OF ARCHAEOLOGICAL OR HISTORICAL VALUE

The State Historic Preservation Office (SHPO) was created by the United States government in 1966 under Section 101 of the National Historic Preservation Act (NHPA). The purposes of SHPO include surveying and recognizing historic properties, reviewing nominations for properties to be included in the National Register of Historic Places, reviewing undertakings for the impact on the properties as well as supporting federal organizations, State and local governments, and the private sector.

ECS conducted a preliminary historic and archaeological resources review. The scope of work included a field reconnaissance to identify potential historic structures, a review of aerial photographs, a review of the SHPO Online Geographic Information System (GIS) mapping (Figure 7), and submittal of the PSA location to the North Carolina State Historic Preservation Office for review and comment (sent November 20th, 2017).

Based on our site visit, the review of historical aerial photographs and the SHPO Online GIS mapping service (NCSHPO website), ECS did not identify significant architectural or archaeological resources within the PSA or in the surrounding immediate vicinity.

ECS received a response from Ms. Renee Gledhill-Earley for Ms. Ramona Bartos, SHPO Representative, on December 8, 2017. The letter states that SHPO has conducted a review of the project and are aware of no historic resources which would be affected by the project. Therefore, they have no comment on the project as proposed. A copy of this correspondence is attached.

Historical artifacts are not expected within the PSA. Typical grading is proposed at this time. If during grading operations historical artifacts are identified, consultation with SHPO and other appropriate agencies should be performed.

ECS utilized the North Carolina National Heritage Program (NCNHP) Data Explorer Map to determine if records exist for rare species, important natural communities, natural areas, or conservation/managed areas within the proposed project boundaries. ECS received an automatically generated response from Mr. Rodney A. Butler, with the NCNHP on December 12, 2017. The response states that the NCNHP does not have records for rare species, important natural communities, natural areas, or conservation/managed areas within the proposed project boundary or within a one-mile radius of the PSA. A copy of this correspondence is attached.

3.9 AIR QUALITY

The PSA is located within an Unclassified or Attainment Area for ozone levels according to the EPA. This designation indicated that an air quality standard has not been classified or is being attained. As such, no specific air quality standards are imposed on the PSA (US EPA, 2017).

3.10 NOISE LEVELS

The ambient noise levels at the site are typical of a rural area of McDowell County, North Carolina. However, Interstate 40 is located approximately 1,000 feet north of the PSA which will provide typical vehicular traffic noise. The site is currently undeveloped. The vicinity of the project is considered rural with light residential, and the project should not have a significant impact on noise levels. ECS understands that a noise study was conducted on the PSA by others. ECS has not reviewed this study and cannot comment further on recommendations. However, this study, conducted by others, could be used independently of this report.

3.11 WATER RESOURCES (SURFACE AND GROUNDWATER)

ECS observed two streams with abutting wetlands within the PSA. Due to the site's topographic relief, surface water would be expected within the PSA. Typical rainfall would be expected to infiltrate into in-situ soils or drain off the PSA to the south and east towards the North Muddy Creek. McDowell County receives approximately 52 inches of rain per year and approximately 6 inches of snowfall per year (US Climate Data). Table 3 below shows the National Oceanic and Atmospheric Administration (NOAA) precipitation frequency estimates for

Marion, NC (NOAA, 2017). Marion is the most reasonably ascertainable data closest to the PSA, located approximately 3 miles north of the PSA.

Table 3. Rainfall Intensity Data for Marion, North Carolina								
T (Yrs)	5 min	10min	30min	1hr	6hr	24hr	30day	60day
2	0.448	0.716	1.24	1.56	2.44	3.78	11.0	16.5
10	0.600	0.960	1.76	2.29	3.55	5.61	14.0	20.1
25	0.688	1.10	2.06	2.74	4.30	6.74	15.6	22.0
100	0.822	1.31	2.53	3.48	5.65	8.58	18.0	24.8

Rainfall= inches*

Rainfall that is intercepted by soils in the parent parcel is expected to drain into nearby drainages that eventually flow to North Muddy Creek. As North Carolina's mountains and ridges were formed, the rock formations underwent extensive up-lifting, folding, and faulting. The stresses of these movements caused the rock to crack, creating a system of fractures. The individual fractures may extend hundreds of feet and are typically less than 1/16 of an inch wide. These bedrock fractures provide a network of channels for water movement (Huffman, 1996). These discontinuous fracture systems will intercept the majority of the storm water from the PSA. The systems are localized, complex fractured metamorphic, igneous, and sedimentary rocks that are covered by soil and loose unconsolidated rock. Most of the groundwater is stored in this shallow region above the bedrock. While the crystalline bedrock has extremely low porosity, secondary fractures contain groundwater recharged by the overlying layer (USGS, 2017). The porosity of the bedrock is often less than 1 percent which provides very little storage volume. Most of the water is stored in the unconsolidated materials overlying the bedrock, where the porosity may be as much as 20 to 40 percent (Huffman, 1996). The elevation of the shallow water table is transient and can vary greatly with seasonal fluctuations in precipitation. Movement in this water table is generally from higher to lower elevations. As such, shallow groundwater would be expected to flow south, beneath the PSA towards North Muddy Creek (Figure 2).

3.12 FOREST RESOURCES

The PSA consists primarily of undeveloped, wooded land. The wooded land has Colvard loam, Evard-Cowee complex, Hayesville clay loam, and Hayesville-Evard complex soils which are commonly dominated by forest tree species including Chestnut Oak (*Quercus montana*), White Oak (*Quercus alba*), Northern Red Oak (*Quercus rubra*), Virginia Pine (*Pinus virginiana*), Eastern White Pine (*Pinus strobus*), Sweetgum (*Liquidamber styracifula*), Yellow Poplar (*Liriodendron tulipifera*), and Canadian Hemlock (*Tsuga Canadensis*). The most common

understory plants are Flowering Dogwood (*Cornus florida*), Sourwood (*Oxydendrum arboreum*), Mountain Laurel (*Kalmia latifolia*), and Rhododendron (*Rhododendron sp.*) (USDA,1995). The herb stratum contained Christmas Fern (*Polystichum acrostichoides*), Greenbriar (*Smilax rotundifolia*), and Poison Ivy (*Toxicodendron radicans*).

3.13 SHELLFISH OR FISH AND THEIR HABITATS

ECS did identify streams or shellfish beds/fish habitats on the PSA. ECS does not recommend additional assessment.

3.14 WILDLIFE AND NATURAL VEGETATION

As previously documented in the Forest Resources section, the dominant vegetation in the forested portion is a mixture of mature and immature hardwood and pine species. The species present are indicative of a typical upland, hardwood forest. The PSA contains an existing dirt access road; however, the majority of the PSA appears natural and not influenced by anthropogenic impacts. ECS did not observe evidence of timbering, planting, grubbing, or fire maintenance. During the site reconnaissance, ECS did not identify fauna within the PSA. Typical bird species, small game, and large game animals are expected to transect the PSA.

According to the US Fish and Wildlife Service (USFWS) database (USFWS, 2017) the following federally protected Threatened and Endangered vertebrate animals, invertebrate animals, and vascular plants were listed to occur in McDowell County, North Carolina: Bog Turtle (T (S/A)), Carolina Northern Flying Squirrel (E), Gray Bat (E), Northern Long-eared Bat (T), Rusty-patched Bumble Bee (E), Mountain Golden Heather (T), and Small Whorled Pogonia (T). The Bald Eagle is currently protected under the Bald and Golden Eagle Protection Act. The proposed project, along with our assessment and findings were submitted to the USFWS service on November 20th, 2017 for review.

ECS received correspondence from Mr. Allen Ratzlaff, dated December 12, 2017, stating the proposed action is not likely to adversely affect any federally-listed endangered species, their formally designated critical habitat, or species currently proposed for listing under the Act at the site. Therefore, they believe that the requirements under Section 7(a)(2) of the Act are fulfilled. However, Mr. Ratzlaff states, though the project will result in the removal/loss of very little suitable northern long-eared bat habitat, and the probability of bats using the project area is very low, they recommend all tree felling and building demolition be accomplished between August 15 and April 15 to further lessen the likelihood of the proposed project adversely affecting this species. A copy of this correspondence is attached.

The Following is a description of the Threatened and Endangered species listed in McDowell County, their preferred habitat, and results of our assessment.

Bald Eagle

Description: Distinguished by a white head and white tail feathers, bald eagles are powerful, brown birds that may weigh 14 pounds and have a wingspan of 8 feet. Male eagles are smaller, weighing as much as 10 pounds and have a wingspan of 6 feet. Sometimes confused with Golden Eagles, Bald Eagles are mostly dark brown until they are four to five years old and acquire their characteristic coloring.

Habitat: Bald Eagles live near rivers, lakes, and marshes where they can find fish, their staple food. Bald Eagles will also feed on waterfowl, turtles, rabbits, snakes, and other small animals and carrion. Bald Eagles require a good food base, perching areas, and nesting sites. Their habitat includes estuaries, large lakes, reservoirs, rivers, and some seacoasts. In winter, the birds congregate near open water in tall trees for spotting prey and night roosts for sheltering.

Conclusion: In the July 9, 2007 Federal Register(72:37346-37372), the bald eagle was declared recovered, and removed (de-listed) from the Federal List of Threatened and Endangered wildlife. This delisting took effect August 8, 2007. After delisting, the Bald and Golden Eagle Protection Act (Eagle Act) (16 U.S.C. 668-668d) becomes the primary law protecting bald eagles. The Eagle Act prohibits take of bald and golden eagles and provides a statutory definition of "take" that includes "disturb". The USFWS has developed National Bald Eagle Management Guidelines to provide guidance to land managers, landowners, and others as to how to avoid disturbing bald eagles. For more information, visit <http://www.fws.gov/migratorybirds/baldeagle.htm>. The project study area consists of undeveloped, wooded land. ECS observed an area of potential wetlands and perennial stream along the access road, east of the proposed shooting range. No large bodies of water are located on site or in the surrounding area.

Based on the site reconnaissance and observations, the site and surrounding areas do not contain suitable habitat or sufficient foraging habitat for the Bald Eagle.

Bog Turtle

Description: The Bog Turtle is the smallest turtle in North America, rarely exceeding three or four inches in length and weighing only about four ounces. Its orange to yellow patch on either side of the neck easily distinguishes it from other turtles. Bog Turtles emerge from their muddy hibernation in early to mid-April and by early May are actively seeking a mate. Adults are sexually mature at five to eight years of age. In June or July, the female lays a clutch of one to six small white elliptical eggs in a shallow “nest” she digs in a clump of sphagnum moss or tuft of grass above the water line. After seven or eight weeks of being incubated by the sun, the inch-long hatchlings emerge. Because they are born so late in the year, the hatchlings often spend their first winter near the nest.

Habitat: Bog Turtles live in the mud, grass and sphagnum moss of bogs, swamps, and marshy meadows. These wetlands are usually fed by cool springs flowing slowly over the land, creating the wet, muddy soil needed by the turtles.

Conclusion: The PSA consists of undeveloped, wooded land. ECS observed an area of potential wetlands and stream along the dirt access road, east of the proposed shooting range.

Based on the site reconnaissance and observations, and lack of slow moving waters, sphagnum moss bogs, swamps and marshes, suitable habitat for the Bog Turtle is not present within the PSA.

Carolina Northern Flying Squirrel

Description: Northern flying squirrels are brown on their backs, and their fur fades to a buff white on the belly. The endangered Carolina northern flying squirrel is a subspecies of the northern flying squirrel. Flying Squirrels are nocturnal and have large eyes to help them see at night. They cannot actually fly, but glide by extending a fold of skin that stretches from their wrists to their ankles. The flattened tail acts as a rudder. Carolina Northern Flying Squirrels are relicts of the last ice age. As the glaciers retreated northward and temperatures rose, remnant populations remained in the suitable habitat left behind on the high mountain tops along the ridges of the Southern Appalachian Mountains. They're active year-round, but more so in the warmer summer months. They nest in tree cavities in nests made almost exclusively of yellow birch bark, where two to six young are born in early spring. Groups of squirrels often occupy the same tree cavity, particularly in the colder winter months.

Habitat: Northern Flying Squirrels are typically found in areas where northern hardwoods, such as yellow birch, are adjacent to the higher-elevation red spruce-Fraser fir forests. These habitats are often moist and cool.

Conclusion: The PSA consists of undeveloped, wooded land. The site does contain large stands of northern hardwoods. However, the PSA is located at approximately 1,400 feet above sea level and is not adjacent to high elevation red spruce-Fraser fir forests.

Based on the site reconnaissance and observations, suitable habitat for the Carolina Northern Flying Squirrel is not present within the PSA.

Gray Bat

Description: The Gray Bat is the largest member of its genus in the eastern United States. Its forearm measures 40-46 mm, and it weighs from 7-16 grams. It is easily distinguished from all other bats within its range by its mono-colored fur. All other eastern bats have distinctly bi-or tri-colored fur on their backs. Following molt in July or August, Gray Bats are dark gray, but they often bleach to chestnut brown or russet between molts (especially apparent in reproductive females during May and June). The wing membrane connects to the foot at the ankle rather than at the base of the first toe, as in other species of *Myotis*.

Habitat: With rare exception, gray bats roost in caves year-round. Most winter caves are deep and vertical; all provide large volume below the lowest entrance and act as cold air traps. A much wider variety of cave types are used during spring and fall transient periods. In summer, maternity colonies prefer caves that act as warm air traps or that provide restricted rooms or domed ceilings that are capable of trapping the combined body heat from thousands of clustered individuals.

Conclusion: The PSA consists of undeveloped, wooded land. Caves were not observed during the site reconnaissance.

Based on the site reconnaissance and observations, and lack of roosting habitat, suitable habitat for the Gray Bat is not present on the site.

Northern Long-eared Bat

Description: The northern long-eared bat (NLEB) is a medium-sized bat with a body length of 3 to 3.7 inches but a wingspan of 9 to 10 inches. Their fur color can be medium to dark brown on the back and tawny to pale-brown on the underside. As its name suggests, this bat is distinguished by its long ears, particularly as compared to other bats in its genus, *Myotis*.

Habitat: During summer, NLEBs roost singly or in colonies underneath bark, in cavities, or in crevices of both live and dead trees. Males and non-reproductive females may also roost in cooler places, like caves and mines. This bat seems opportunistic in selecting roosts, using tree species based on suitability to retain bark or provide cavities or crevices. It has also been found, rarely, roosting in structures like barns and sheds. NLEBs spend winter hibernating in caves and mines, called hibernacula. They typically use large caves or mines with large passages and entrances; constant temperatures; and high humidity with no air currents. Specific areas where they hibernate have very high humidity, so much so that droplets of water are often seen on their fur. Within hibernacula, surveyors find them in small crevices or cracks, often with only the nose and ears visible.

Conclusion: The project study area consists of undeveloped, wooded land. No known hibernation sites are on or within $\frac{1}{4}$ mile to the project site. According to the USFWS website https://www.fws.gov/asheville/htmls/project_review/NLEB_in_WNC.html, McDowell County is listed as a county containing confirmed hibernation and maternity sites for this species; however, the confirmed hibernation and maternity sites are located approximately 7.5 miles north of the PSA.

Based on the site reconnaissance and observations, suitable habitat for the NLEB is present on the site; however, no known occurrences of hibernation or maternity sites are located within $\frac{1}{4}$ mile of the PSA. Therefore, this project should have no effect on the NLEB.

Rusty-patched Bumble Bee

Description: Rusty patched bumble bees live in colonies that include a single queen and female workers. The colony produces males and new queens in late summer. Queens are the largest bees in the colony, and workers are the smallest. All rusty patched bumble bees have entirely black heads, but only workers and males have a rusty reddish patch centrally located on the back.

Habitat: Rusty patched bumble bees once occupied grasslands and tallgrass prairies of the Upper Midwest and Northeast, but most grasslands and prairies have been lost, degraded, or fragmented by conversion to other uses. Bumble bees need areas that provide nectar and pollen from flowers, nesting sites (underground and abandoned rodent cavities or clumps of grasses), and overwintering sites for hibernating queens (undisturbed soil).

Conclusion: The PSA consists of, undeveloped, wooded land. No Surface waters were identified within the PSA. According to the USFWS website <https://ecos.fws.gov/ecp0/profile/speciesProfile.action?spcode=I0WI>, McDowell County is not listed as a county that the Rusty-patched Bumble Bee is known or believed to occur.

Based on the site reconnaissance and observations, suitable habitat for the Rusty-patched Bumble Bee is not present within the PSA. No known occurrences of the Rusty-patched Bumble Bee are known in McDowell County; therefore, this project should have no effect on the Rusty-patched Bumble Bee.

Mountain Golden Heather

Description: Mountain Golden Heather is a tiny, needle-leaved shrub with yellow flowers. It usually grows about 6 inches (in) (15.2 centimeters; cm) tall, in clumps from 4 - 8 in (10.1 – 20.3 cm) across. Occasionally, very vigorous plants form larger patches of a foot or more in length. The plants have the general appearance of a large moss or low juniper, but their branching is more open, their leaves are about one-quarter of an inch long, and the plant is often somewhat yellow-green in color, especially in shaded areas. The flowers appear in early or mid-June, are nearly an inch across, and have five blunt-tipped petals. Viable seeds may remain in the soil over more than one growing season when germination conditions are unfavorable. Mountain Golden Heather usually begins flowering in its third year and roots vegetatively at the edges once it forms large clumps, after perhaps ten years.

Habitat: Mountain Golden Heather usually grows on exposed quartzite cliffs at elevations of 2,800 to 4,000 feet (853 – 1219 meters).

Conclusion: The project study area consists of undeveloped, wooded land. The PSA is located at approximately 1,400 feet above sea level.

Based on the site reconnaissance and observations, and lack of high elevation habitats, suitable habitat for the Mountain Golden Heather is not present on the site.

Small Whorled Pogonia

Description: Small Whorled Pogonia has a greenish-white stem that grows between 3 – 13 inches (7.6 - 33 centimeters) tall. It gets its common name from the five or six grayish-green leaves that are displayed in a single whorl around the stem. When the leaves are well developed, a single flower or sometimes a flower pair rises from the center of the circle of leaves. The flowers are yellowish-green with a greenish-white lip. Each flower has three sepals of equal length that spread outward. The flowers are scentless, lack nectar, and are primarily self-pollinating. It produces fruit which ripens in the fall. The seeds contain very little food reserves and therefore need to fall on soil containing mycorrhizal fungi in order for the seed to germinate and seedlings to become established. An over-wintering vegetative bud may form in late August or September. Occasionally Small Whorled Pogonia will reproduce vegetatively, without the use of seeds.

Habitat: Small Whorled Pogonia can be limited by shade. The species seems to require small light gaps, or canopy breaks, and generally grows in areas with sparse to moderate ground cover. Too many other plants in an area can be harmful to this plant. This orchid typically grows under canopies that are relatively open or near features that create long-persisting breaks in the forest canopy such as a road or a stream. It grows in mixed-deciduous or mixed-deciduous/coniferous forests that are generally in second- or third-growth successional stages. The soils in which it lives are usually acidic, moist, and have very few nutrients.

Conclusion: The project study area consists of undeveloped, wooded land. No relatively open areas, or features causing open breaks in forest canopy are located within the PSA.

Based on the site reconnaissance and observations, and lack of persistent breaks in the forest canopy, suitable habitat for the Small Whorled Pogonia is not present on the site.

Other federally listed threatened and endangered species were not listed to occur in McDowell County by the USFWS.

4.0 PREDICTED ENVIRONMENTAL EFFECTS OF PROJECT

4.1 TOPOLOGY

Existing topography will not be adversely affected by the development of the shooting range due to the limited earth movement for range construction. ECS considers the proposed project to have no significant impact on site topology.

4.2 SOILS

Soils on the PSA will be impacted by development processes associated with the construction of the firing range and associated parking lot. However, typical site grading will not significantly affect or alter soils found within the PSA.

4.3 LAND USE

The site is currently undeveloped. The proposed shooting range will not significantly alter the current land use.

4.4 WETLANDS

Wetland and streams are located on site. At this time, ECS cannot determine impacts to these areas because a final development plan has not been provided. Figure 6 depicts ECS' findings of identified potential waters of the U.S. within the PSA. If future development activities require construction, maintenance, or other improvements that could potentially impact WoUS, ECS recommends these areas be delineated and verified by the USACE and NCDWR prior to development. If future impacts are anticipated, ECS recommends that the impacts be facilitated through the 404/401 regulatory permitting process.

4.5 PRIME OR UNIQUE AGRICULTURAL LANDS

According to Mr. Cortes, Assistant Soil Scientist with USDA-NRCS, the USDA contains records of the PSA being classified as prime or unique agricultural land. Please see the attached correspondence.

4.6 PUBLIC LANDS AND SCENIC, RECREATIONAL, AND STATE NATURAL AREAS

Not applicable.

4.7 AREAS OF ARCHAEOLOGICAL OR HISTORICAL VALUE:

Not applicable.

4.8 AIR QUALITY

ECS expects a temporary increase in air pollution based on dust and emissions from traveling vehicles and construction equipment on the PSA. However, ECS considers these increases to be minimal with an insignificant impact to total ambient air quality. Best

management practices should be implemented to reduce vehicle emissions or dust from the site.

4.9 NOISE LEVELS

Significant increases to noise levels are not expected due to the location of the site, topography, and surrounding vegetative buffers.

4.10 WATER RESOURCES (SURFACE AND GROUNDWATER)

Surface water quality would be typically affected by human influences, including driving to and from the site, parking, and pedestrian traffic. To offset vehicular traffic and parking in undesignated areas, a proposed parking lot and access road extension will be constructed to reduce erosion issues. Because the site will utilize gravel substrate as the permeable driveway and parking lot, surface water should infiltrate into the underlying soil, thus keeping the PSA relatively dry after storm events. Additionally, groundwater should not be significantly impacted due to the bullet backstop and routine maintenance and clean-up of bullet casings (approximately once every month). Downstream impacts are not expected to be negatively influenced by the construction of the shooting range, parking lot, and gravel driveway.

4.11 FOREST RESOURCES

Best management logging practices should be implemented during logging of the shooting range.

4.12 SHELLFISH OR FISH AND THEIR HABITATS

Not applicable.

4.13 WILDLIFE AND NATURAL VEGETATION

Significant impacts to wildlife and existing vegetation are not expected due to the relatively low construction and maintenance activities.

4.14 INTRODUCTION OF TOXIC SUBSTANCES

Lead is the primary heavy metal contaminant and major concern for firing ranges. The fate and transport of ammunition accumulating in soils poses a long term risk if not properly managed. A typical range is comprised of a series of targets down range (~50-300 feet) and a backstop or impact berm to intercept bullets. The bullets then likely fragment or penetrate into the berm and settle into the soil. Bullets generally range from small to large calibers with an average of 10 grams per bullet. The total lead deposited on the PSA is a direct correlation with the amount of users of the range. According to the North Carolina Department of Commerce (NCDC) 2015 census for McDowell County, the population was 44,691 (NCDC). By 2019, the projected population is expected to be 46,986. ECS made an assumption that a typical user will

fire 50 shots on average which would be approximately 500 grams of lead deposited during one site visit. If the 24 parking spaces are full at a given time, then on average the PSA would intercept approximately 12 kg of lead. Therefore, understanding the number of users is critical in determining the lead deposition at the site. To offset the impact of lead at the site, ECS recommends an environmental management plan be implemented to successfully cleanup excessive lead fragments and casings. ECS understands that lead concentrations will be monitored and casings will be routinely cleaned up once every month. Another way to offset contamination levels at the range is to use restrictive lining to prevent further contamination.

5.0 FEDERAL AND STATE REGULATIONS

The below table of ordinances and permits are applicable to the PSA:

Table 4. Environmental Regulations and Applicable Laws	
Regulations	Importance
USACE/NCDWR (404/401)	Verification of Wetlands/Streams
NCDENR Permitting	Stormwater, Roadways, etc.
McDowell County Zoning Ordinance	Stormwater, landscape setbacks, signage, etc.
CERCLA/RECRA	Contamination Prevention

*Other ordinances may apply.

6.0 RECOMMENDATIONS AND MITIGATIVE MEASURES

The following recommendations are made in regards to the construction of the shooting range:

- Implement a stormwater management plan.
- Prevent soil erosion and maintain stability.
- Maintain the proposed parking lot and range by routine maintenance and mowing operations.
- Facilitate public awareness of environmental stewardship and education for the local community.

7.0 CONCLUSIONS

ECS believes that the construction and installation of the outdoor shooting range will not have a significant effect on the environment and will result in a positive overall impact. Based on the proposed actions and site topology, minimal land disturbance will be required for the project. Additionally, the implementation of the new range will promote community awareness, stewardship, shooting safety, and environmental awareness.

8.0 REFERENCES:

Annual Program Report 2007-2008 Wildlife Diversity Program DWM NCWRC.

EPA Ozone Non-Attainment Areas Map.

https://www3.epa.gov/airquality/greenbook/map8hr_2008.html

Federal Emergency Management Agency, Flood Map Service Center Website. Panel 3710160800J. 2008.

https://map1.msc.fema.gov/idms/IntraList.cgi?displ=wsp/item_3710160800J.txt

Google Earth, 2017.

Huffman, R.L. "Ground Water in the Piedmont and Blue Ridge Provinces of North Carolina" Publication Number: AG 473-6, North Carolina Cooperative Extension Service, 1996.

McDowell County, GIS Website.

<https://www.webgis.net/nc/McDowell/>

McDowell County Soil and Water Conservation District.

http://www.mcdowellgov.com/index.asp?Type=B_BASIC&SEC={2F262BDA-0402-4626-B8C3-35E42751C3F3}

National Oceanic and Atmospheric Administration, (NOAA) National Weather Service Website. Precipitation Data. https://hdsc.nws.noaa.gov/hdsc/pfds/pfds_map_cont.html?bkmrk=nc

North Carolina Department of Agriculture and Consumer Services, Agronomic Division, Soil Data, 2017.

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<http://accessnc.nccommerce.com/DemoGraphicsReports/pdfs/countyProfile/NC/37111.pdf>

North Carolina Department of Environmental Quality (NCDEQ) Physiographic Provinces Website, 2015.

<http://ncdenr.maps.arcgis.com/apps/MapSeries/index.html?appid=1316f4eb4e3349298c3bd0063ab8fb89>

North Carolina State Historic Preservation Office Website.

<http://gis.ncdcr.gov/hpweb/>

North Carolina Wildlife Resource Commission Site Plan. 2017. Site & Topographic Maps.

Pace Analytical Services, Inc. Soil Data, 2017.

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http://www.ncmhtd.com/arcgis/rest/services/NRCS/NRCS_SoilData/MapServer

USDA-NRCS Letter, Prime or Unique Farmlands, 2017.

USDA NRCS Soil Survey of McDowell County North Carolina, 1995.

U.S. Fish and Wildlife Service, 2017.

U.S. Fish and Wildlife Service- National Wetland Inventory Mapping Website.

USGS South Atlantic Water Science Center - North Carolina Office Website.
https://nc.water.usgs.gov/about/faq_ground.html

US Fish and Wildlife Service (USFWS) McDowell County NC Website.
<https://www.fws.gov/raleigh/species/cntylist/mcdowell.html>

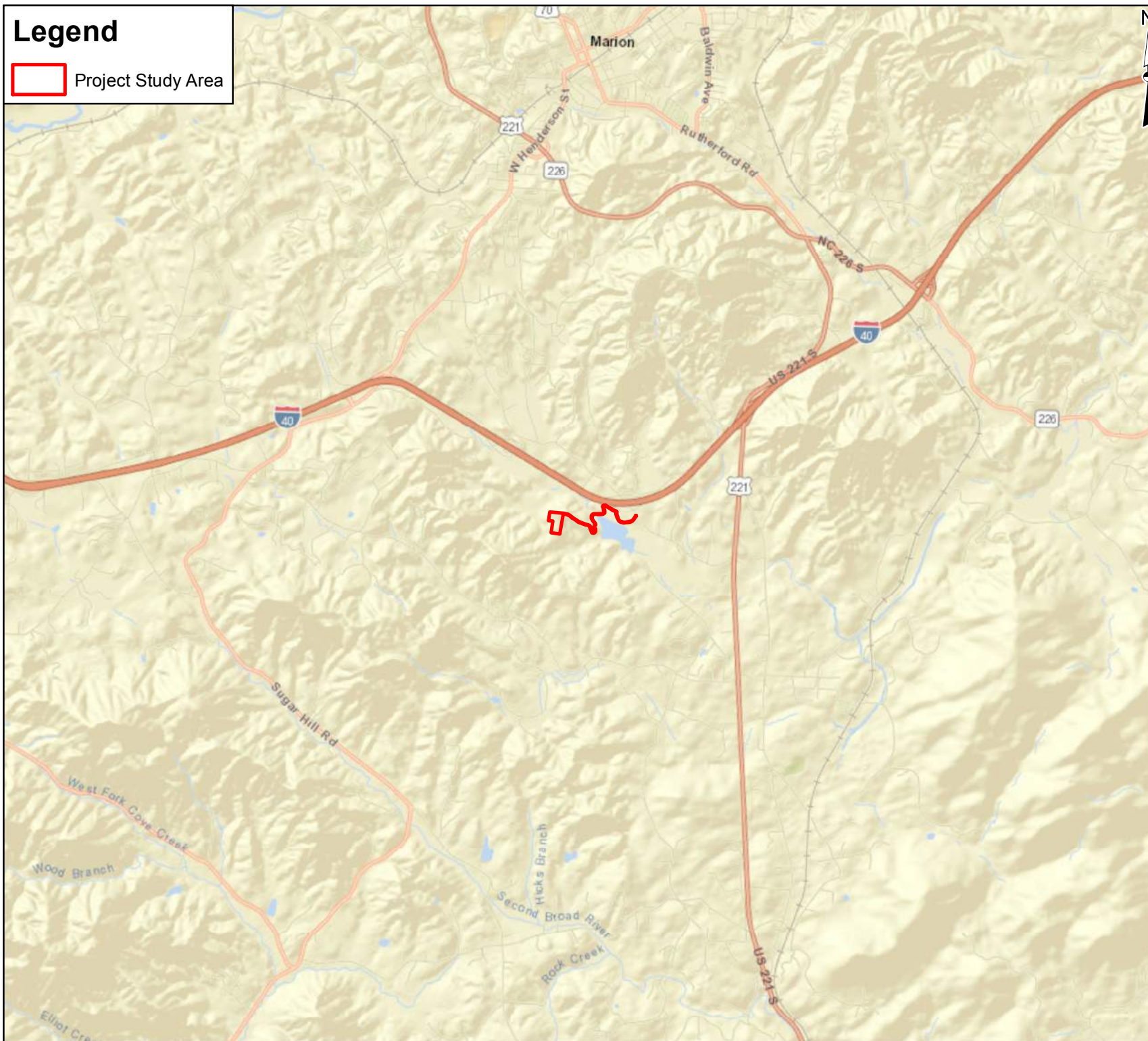
USGS Topographic Map, Marion West, 1994.

FIGURES

Legend



Project Study Area



Client:

NORTH CAROLINA
WILDLIFE RESOURCE
COMMISSION

Project:

MCDOWELL
SHOOTING
RANGE

ASHWORTH ROAD &
INTERSTATE 40
MARION
MCDOWELL COUNTY
NORTH CAROLINA

Title:

**SITE LOCATION
MAP**

1 in = 1 mile

MCDOWELL COUNTY



Drawn By:

KCF

Checked By:

CBD

Approved By:

WBF

Date:

11/7/2017

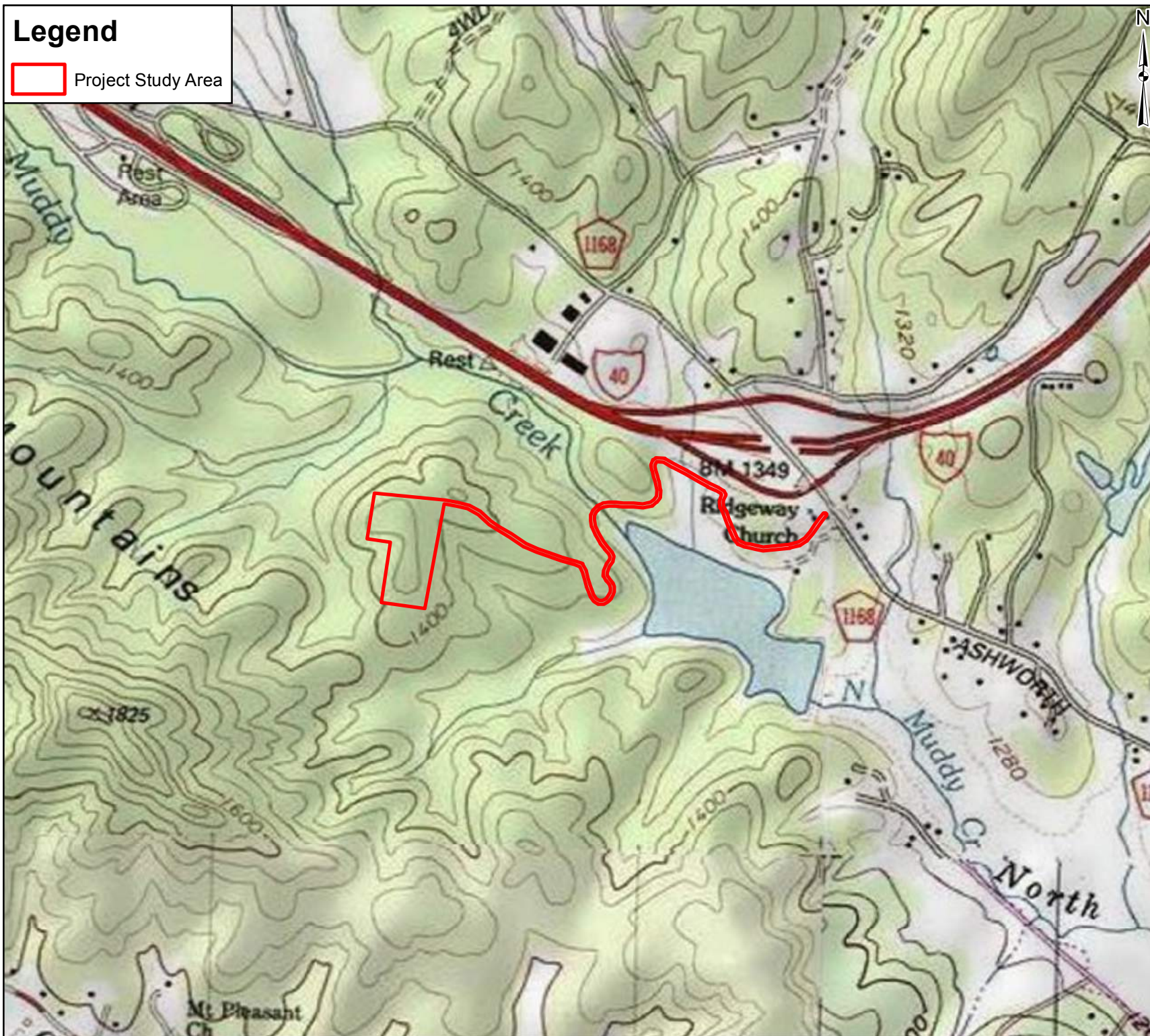
ECS Project No.

49:5341

FIGURE 1

Legend

 Project Study Area



Client:

NORTH CAROLINA
WILDLIFE RESOURCE
COMMISSION

Project:

MCDOWELL
SHOOTING
RANGE

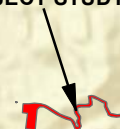
ASHWORTH ROAD &
INTERSTATE 40
MARION
MCDOWELL COUNTY
NORTH CAROLINA

Title:

USGS
TOPOGRAPHIC
MAP

MARION WEST
DATED 1994
1 in = 1,000 ft

PROJECT STUDY AREA



Drawn By:

KCF

Checked By:

CBD

Approved By:

WBF

Date:

11/7/2017

ECS Project No.

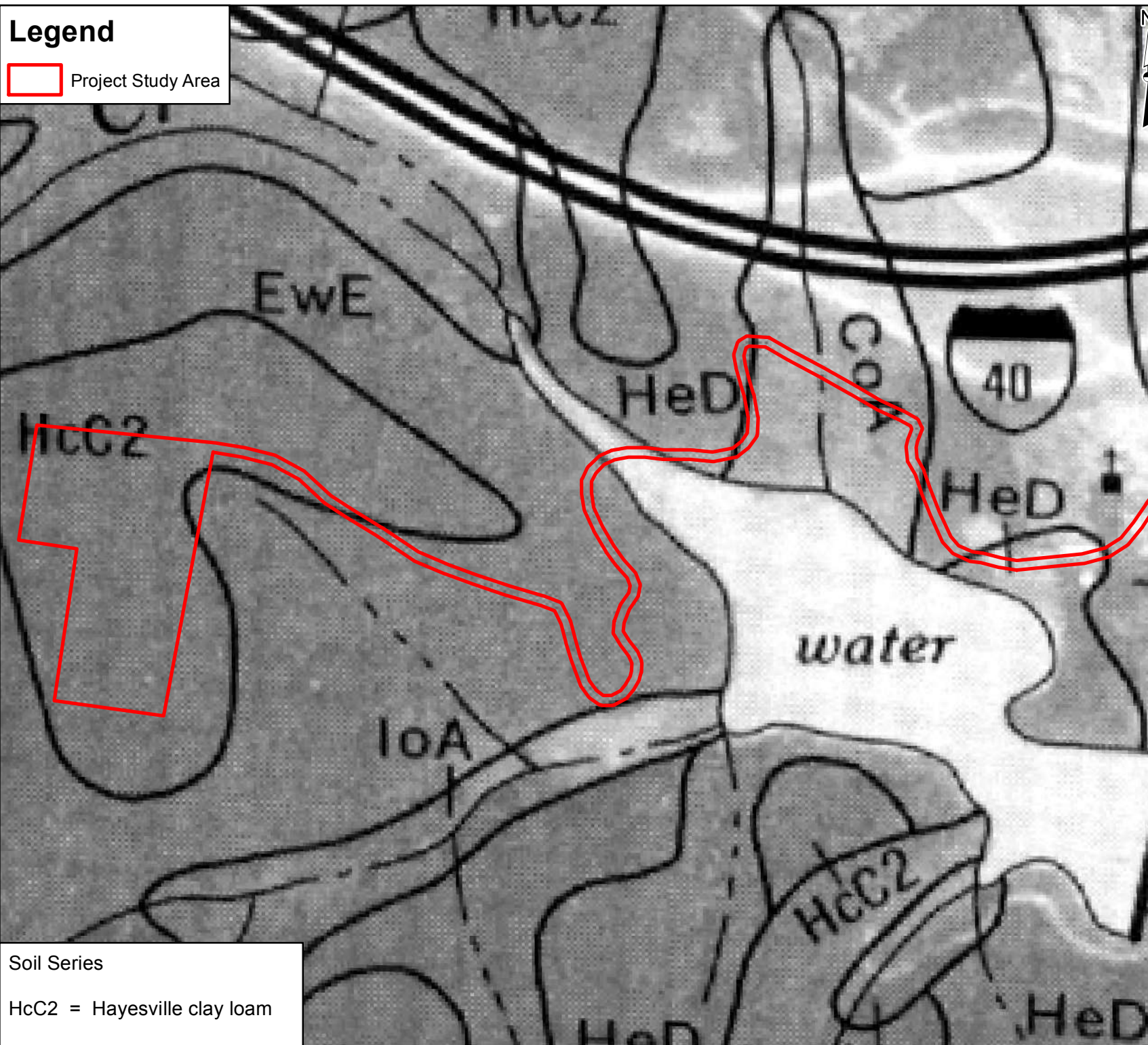
49:5341

FIGURE 2

Legend



Project Study Area



Client:

NORTH CAROLINA
WILDLIFE RESOURCE
COMMISSION

Project:

MCDOWELL
SHOOTING
RANGE

ASHWORTH ROAD &
INTERSTATE 40
MARION
MCDOWELL COUNTY
NORTH CAROLINA

Title:

USDA - NRCS
SOIL SURVEY MAP

MCDOWELL
COUNTY, NC
DATED 1995
1 in = 400 ft

PROJECT STUDY AREA



Drawn By:

KCF

Checked By:

CBD

Approved By:

WBF

Date:

11/7/2017

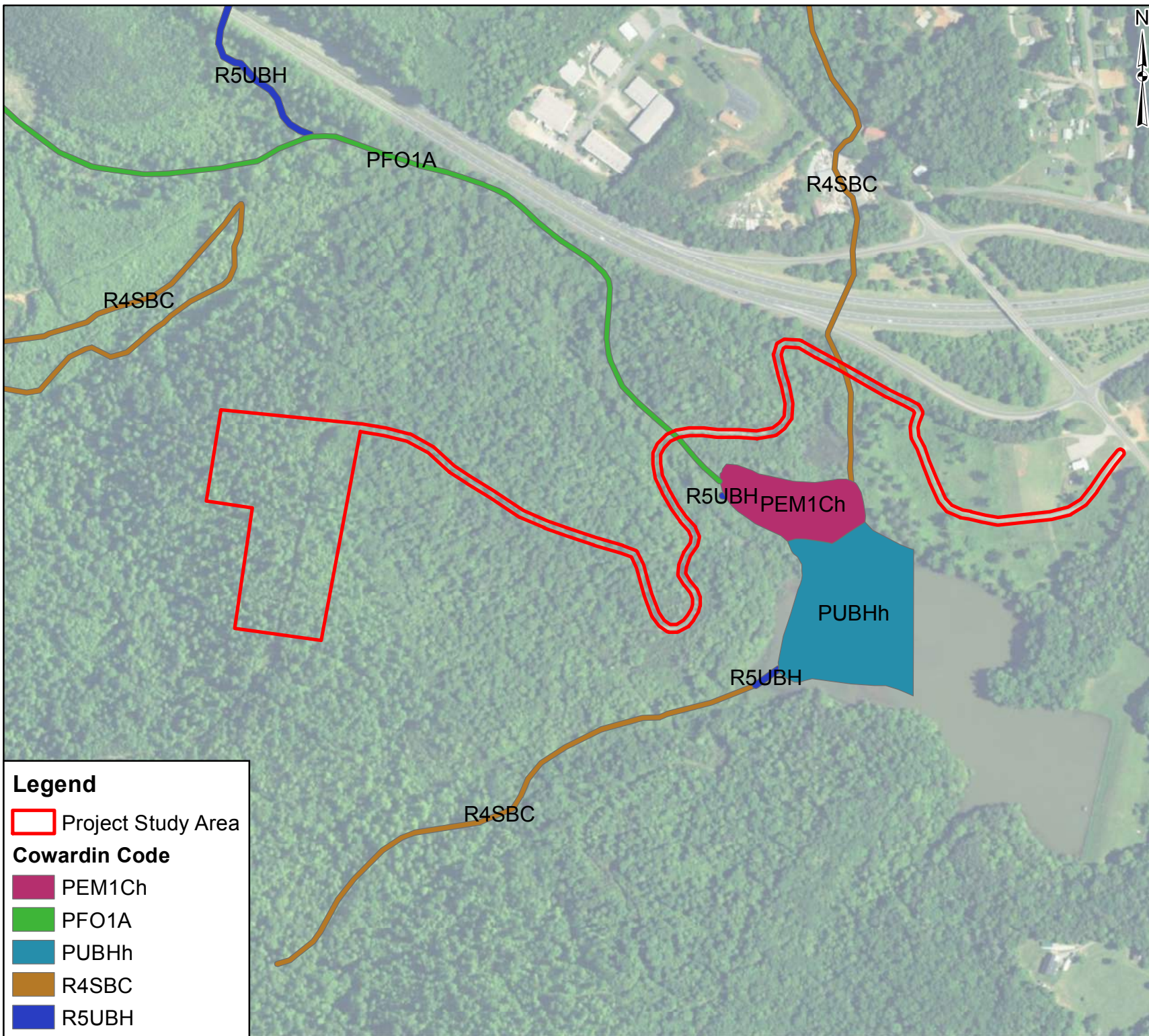
ECS Project No.

49:5341

FIGURE 3

Soil Series

HcC2 = Hayesville clay loam



Client:

NORTH CAROLINA
WILDLIFE RESOURCE
COMMISSION

Project:

MCDOWELL
SHOOTING
RANGE

ASHWORTH ROAD &
INTERSTATE 40
MARION
MCDOWELL COUNTY
NORTH CAROLINA

Title:

**NATIONAL WETLANDS
INVENTORY MAP**

1 in = 500 ft

PROJECT STUDY AREA



Drawn By:

KCF

Checked By:

CBD

Approved By:

WBF

Date:

11/7/2017

ECS Project No.

49:5341

FIGURE 4

Legend

- Project Study Area
- Zone A, AH, AO, A99, V
- Zone AE, Zone AE 1% Annual Chance Flood Hazard Contained In Structure
- Zone AE Floodway Zone X, 1% Annual Chance Flood Hazard Contained In Channel, Floodway
- Zone AE, Community Encroachment Area
- Zone VE
- Zone X, 0.2% Annual Chance Flood Hazard, 0.2% Annual Chance Flood Hazard Contained In Channel
- Zone X, 1% Annual Chance Future Conditions, 1% Annual Chance Contained In Structure
- Zone X, 1% Future Conditions Contained In Channel, Community Encroachment Area
- Zone D
- Open Water
- Zone X



Client:

NORTH CAROLINA
WILDLIFE RESOURCE
COMMISSION

Project:

MCDOWELL
SHOOTING
RANGE

ASHWORTH ROAD &
INTERSTATE 40
MARION
MCDOWELL COUNTY
NORTH CAROLINA

Title:

**FEMA FLOOD
ZONES MAP**

PANEL : 3710160800J

DATED 10/02/2008

1 in = 500 ft

PROJECT STUDY AREA



Drawn By:

KCF

Checked By:

CBD

Approved By:

WBF

Date:

11/7/2017

ECS Project No.

49:5341

FIGURE 5

Legend

- Project Study Area
- Approximate Wetland Location
- Approximate Stream Location
- Data Point Location

Body of Water: North Muddy Creek

River Basin: Catawba

Classification: Class C

Buffers: None

ECS PERFORMED A WETLAND/STREAM DELINEATION ON 15 NOVEMBER, 2017. ECS'S FINDINGS HAVE NOT BEEN SURVEYED OR VERIFIED BY THE USACE OR NCDWR. THIS FIGURE SHOULD BE USED FOR PRELIMINARY PLANNING PURPOSES. ECS RECOMMENDS CONSULTATION WITH A CIVIL ENGINEER TO CONFIRM THE LOCAL BUFFER REQUIREMENTS.



Client:

NORTH CAROLINA
WILDLIFE RESOURCE
COMMISSION

Project:

MCDOWELL
SHOOTING
RANGE

ASHWORTH ROAD &
INTERSTATE 40
MARION
MCDOWELL COUNTY
NORTH CAROLINA

Title:

**STREAM/WETLAND
LOCATION MAP**

1 in = 500 ft

PROJECT STUDY AREA



Drawn By:

KCF

Checked By:

CBD

Approved By:

WBF

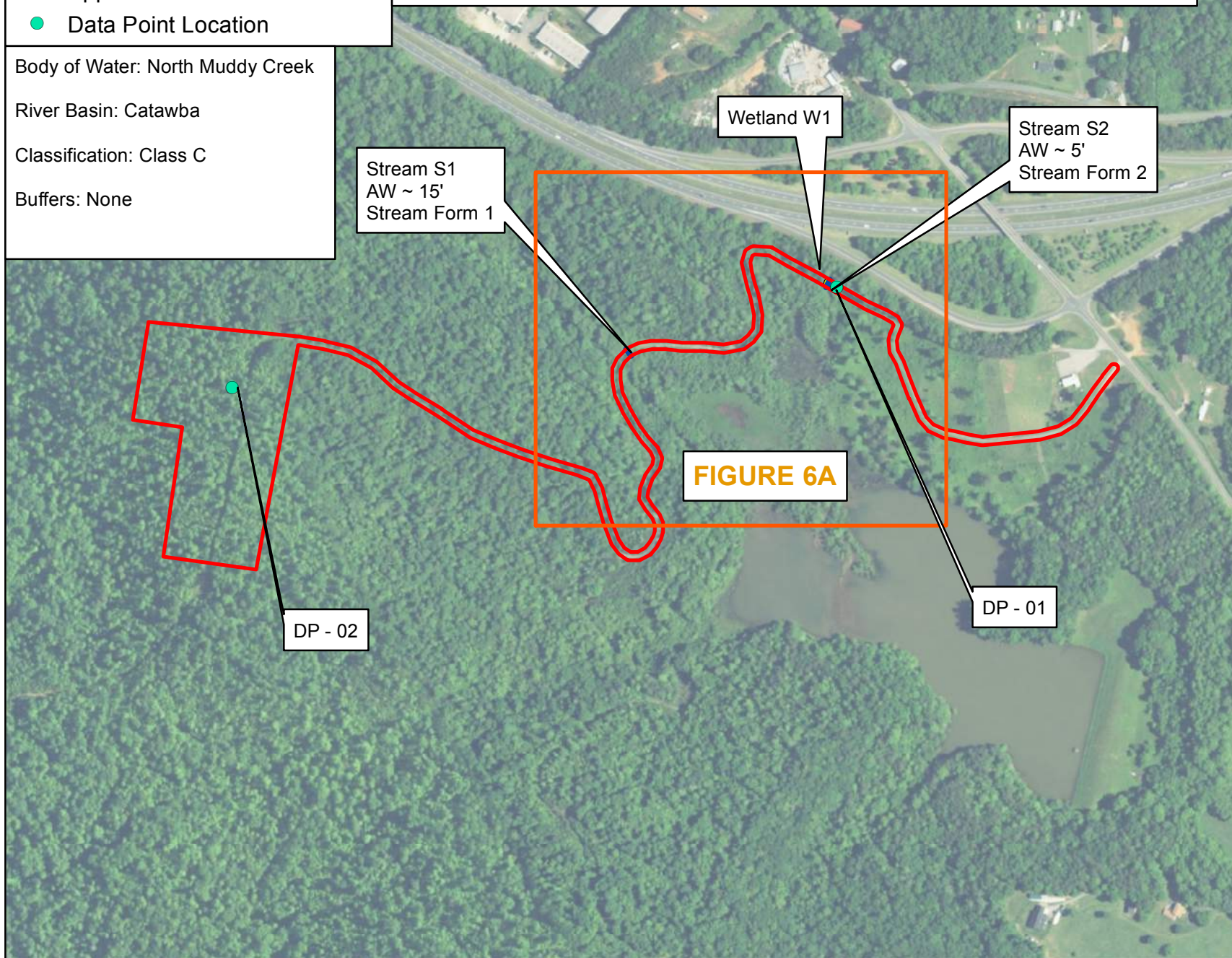
Date:

12/3/2017





ECS Project No.

49:5341

FIGURE 6



Legend

-  Project Study Area
-  Approximate Wetland Location
-  Approximate Stream Location
-  Data Point Location

Body of Water: North Muddy Creek

River Basin: Catawba

Classification: Class C

Buffers: None

ECS PERFORMED A WETLAND/STREAM DELINEATION ON 15 NOVEMBER, 2017. ECS'S FINDINGS HAVE NOT BEEN SURVEYED OR VERIFIED BY THE USACE OR NCDWR. THIS FIGURE SHOULD BE USED FOR PRELIMINARY PLANNING PURPOSES. ECS RECOMMENDS CONSULTATION WITH A CIVIL ENGINEER TO CONFIRM THE LOCAL BUFFER REQUIREMENTS.



Client:

NORTH CAROLINA
WILDLIFE RESOURCE
COMMISSION

Project:

MCDOWELL
SHOOTING
RANGE

ASHWORTH ROAD &
INTERSTATE 40
MARION
MCDOWELL COUNTY
NORTH CAROLINA

Title:

**STREAM/WETLAND
LOCATION MAP**

1 in = 100 ft

PROJECT STUDY AREA



Drawn By:

KCF

Checked By:

CBD

Approved By:

WBF

Date:

12/3/2017

ECS Project No.

49:5341

FIGURE 6A



Stream S1
AW ~ 15'
Stream Form 1

Stream S2
AW ~ 5'
Stream Form 2

Wetland W1

DP - 01

Legend

-  Project Study Area
 NCSHPO Location



Client:

NORTH CAROLINA
WILDLIFE RESOURCE
COMMISSION

Project:

MCDOWELL
SHOOTING
RANGE

ASHWORTH ROAD &
INTERSTATE 40
MARION
MCDOWELL COUNTY
NORTH CAROLINA

Title:

**NCSHPO
MAP**

$$1 \text{ in} = 1,000 \text{ ft}$$

PROJECT STUDY AREA



Drawn By:

KCF

Checked By:

CBD

Approved By:



Date:	11/13/2017
--------------	------------

ECS Project No.

49:5341

FIGURE 7

Legend

-  Project Study Area
-  Approximate Soil Sample Location



Client:

NORTH CAROLINA
WILDLIFE RESOURCE
COMMISSION

Project:

MCDOWELL
SHOOTING
RANGE

ASHWORTH ROAD &
INTERSTATE 40
MARION
MCDOWELL COUNTY
NORTH CAROLINA

Title:

**SOIL SAMPLE
LOCATION MAP**

1 in = 500 ft

PROJECT STUDY AREA



Drawn By:

KCF

Checked By:

CBD

Approved By:

WBF

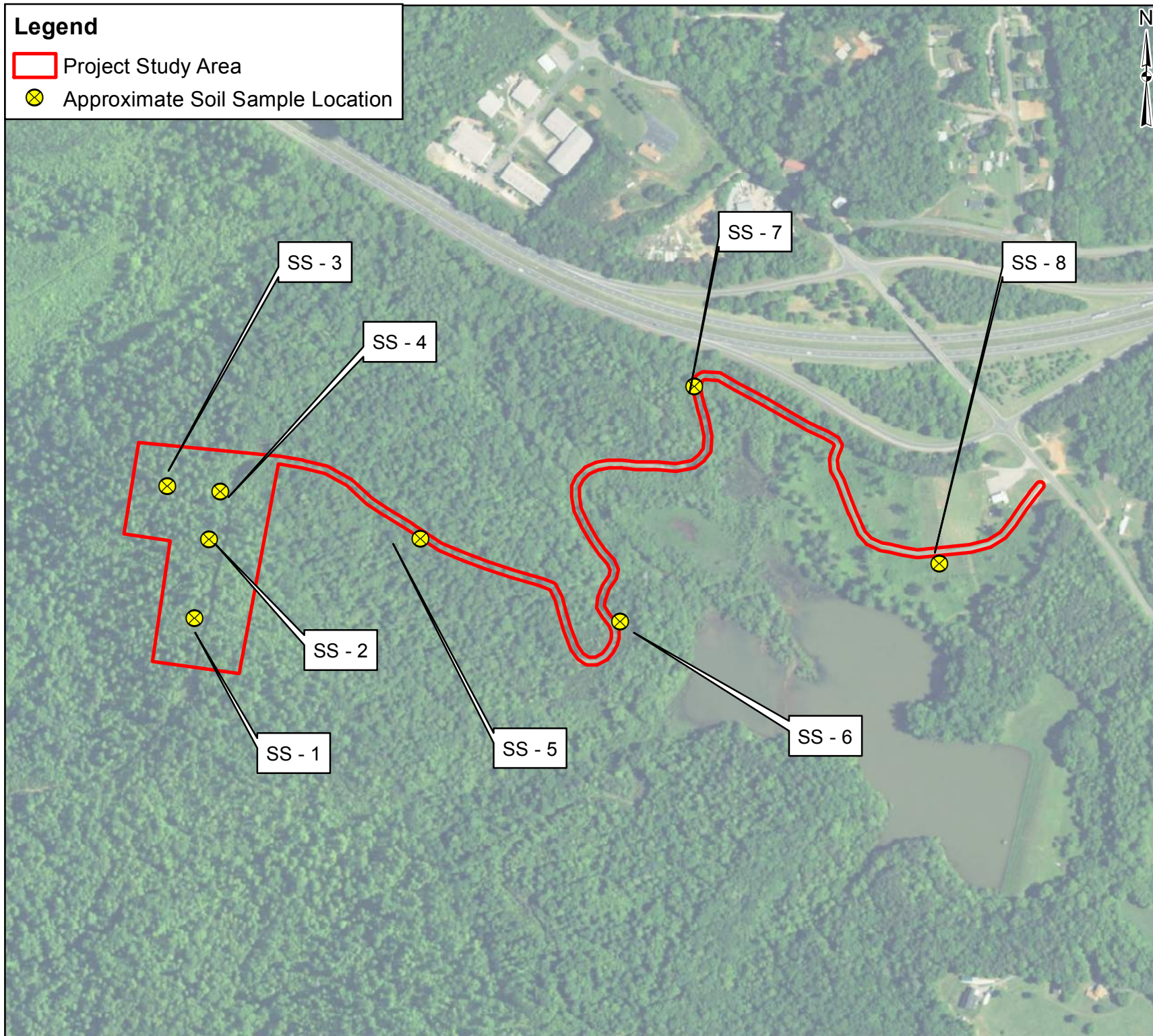
Date:

11/13/2017

ECS Project No.

49:5341

FIGURE 8



COUNTY OF McDOWELL
D.B. 825, PG. 736

CENTERLINE OF 60° RIGHT-OF-WAY (D.B. #225, PG. 736)		
Course	Bearing	Distance
L1	S 38°08'40" W	140.32
L2	Rad: 480.500'	Arct: 63.16°
	Tan: 28.622'	55.12'
	Chd: 3.5975' 26" W	32.27'
L3	S 43°45'45" W	52.27'
	Rad: 100.000'	Arct: 47.77°
	Tan: 37.000'	CA: 40°36' 23"
L4	Rad: 3.64104' 06" W	69.40
	Rad: 500.000'	Arct: 12.518°
	Tan: 61.664'	52.76'
	Chd: N 64°01' 06" W	120.76'
L7	N 72°24' 28" W	112.55'
	Rad: 100.000'	Arct: 17.361°
	Tan: 46.96'	CA: 49°29' 26"
	Chd: R 47°39' 42" W	83.72'
	N 22°55' 56" W	121.85'
L10	Rad: 17.78' 42"	Arct: 90.46°
	Rad: 500.000'	CA: 28°53' 17"
	Chd: N 28°36' 16" W	100.22'
L11	Rad: 62.93'	Arct: 100.22°
	Tan: 64.321'	89.86'
	Chd: N 39°35' 06" W	89.86'
L12	Rad: 33.05' 05"	Arct: 60.50°
	Tan: 25.581'	49.48'
	Chd: N 70°57' 11" W	155.22'
L13	Rad: 1814.78'	Arct: 155.22°
	Tan: 208.653'	CA: 13°47' 34"
	Chd: N 63°31' 03" W	114.32'
L14	Rad: 50.000'	Arct: 90.00°
	Tan: 101.303'	CA: 27°26' 38"
	Chd: S 40°40' 48" W	89.69'
L15	S 17°14' 36" W	45.91'
L16	Rad: 90.000'	Arct: 174.63°
	Tan: 131.32'	CA: 11°00' 58"
	Chd: S 89°50' 32" W	114.32'
L17	N 88°04' 53" W	290.92
	Rad: 50.000'	Arct: 37.26°
	Tan: 19.855'	CA: 17°47' 55"
	Chd: S 72°33' 26" W	36.42'

"NOTE CONCERNING NCDOT SECONDARY ROAD RIGHT OF WAY AGREEMENT"

A "SECONDARY ROAD RIGHT OF WAY AGREEMENT" TRAVERSTING THIS PROPERTY IS RECORDED IN D.B. 985 AT PAGES 245-246. THERE IS NO METES AND BOUNDS DESCRIPTION CONTAINED IN THIS DOCUMENT. A REFERENCE IS MADE TO AN "ATTACHMENT A" BUT NO SUCH ATTACHMENT IS RECORDED. THE DOCUMENT STATES THAT THE RIGHT OF WAY IS 60 FEET IN WIDTH, 30 FEET ON EACH SIDE OF THE CENTERLINE, AND THAT SAID RIGHT OF WAY HAS BEEN STAKED ON THE GROUND. IT ALSO STATES THAT THE RIGHT OF WAY IS 40 FEET IN WIDTH IN THE VICINITY OF THE INTERSECTION OF THE ROAD WITH R.D. #450. THE SURVEYOR FOUND NOTHING ACTUALLY RECORDED THAT WOULD ALLOW HIM TO PLOT THIS RIGHT OF WAY ON A MAP OR TO STAKE IT ON THE GROUND. THE DISTRICT ENGINEER STATED THAT IT WAS A DESIGN BY MCGILL ENGINEERING THAT WAS STAKED. HOWEVER NO SUCH DESIGN IS APPARENTLY A PART OF THE PUBLIC RECORD. THIS AGREEMENT WAS SUGGESTED TO REPLACE THE RIGHT OF WAY AGREEMENT WITH A "WHICH COULD BE SUBJECT TO STATE ATTORNEYS' FEEL THE DISTRICT ENGINEER BELIEVES THE ENFORCEABILITY OF THE DOCUMENT IS EXPRESSED OR IMPLIED BY R.L. GREENE SURVEYING AND ENGINEERING

COMPOSITE MAP OF THAT PROPERTY DESCRIBED IN A DEED TO
STEPHEN M. HENRY TRUST 11/05/04

DEED BOOK 917, PAGE 853

AND ALSO REFLECTING A PROPERTY EXCHANGE RECORDED IN
DEED BOOK 1066, PAGE 707 (HENRY) AND DEED BOOK 1066, PAGE 704 (CHURCH)
AND ALSO
SHOWING THAT RIGHT-OF-WAY DESCRIBED IN A DEED TO
COUNTY OF McDOWELL
DEED BOOK 825, PAGE 736

Curve	Radius	Tangent	Length	Delta	Degree	Chord	Chord Bear.
C1	1844.79'	282.04'	559.75'	17°23'05"	3°06'21"	557.60'	S 85°00'14" E
C2	509.26'	128.24'	251.26'	28°16'03"	11°15'03"	248.71'	S 73°34'22" E

REVISED 1/02/2013. THIS IS THE 4TH REVISION TO THIS PLAT. NO NEW SURVEY WAS MADE. REVISIONS INCLUDE REMOVAL OF CULVERT LOCATIONS UNDER THE ROAD (THESE ARE PRESENT BUT NOT SHOWN ON THIS VERSION OF THE PLAT), ADDITION OF THE LOCATION OF THE NOTICE OF RESIDUAL PETROLEUM (D.B. 1082, PG. 200) AND VERBIAGE CONCERNING A SECONDARY ROAD RIGHT OF WAY AGREEMENT WITH THE N.C. D.O.T.

2013005015
MCDOWELL CO, NC FEE \$21.00
PENDING TO MCDOWELL
10-07-2013 09:12:32 AM
TONIA R HAMPTON
REGISTER OF DEEDS
C/O WARREN BURELL
DEPUTY REGISTER OF DEEDS
BK: PL 22
PG: 99-99

NOTES:

- * TAX ID NO: 1609.00-87-0025 & 1609.00-77-9727.
- * REFERENCE IS MADE TO THE FOLLOWING PLATS OF SURVEY:
 - BY R.L. GREENE SURVEYING AND MAPPING FOR STEPHEN M. HENRY, 8/19/02.
 - BY K.D. SUTLES SURVEYING, FOR LEONA A. OWNSBY, 7/1/02.
 - BY ALPINE LAND SURVEYING FOR McDOWELL COUNTY, 12/22/03.
 - BY JAMES S. BALLINGER, PLS, FOR PERSHING L. WILSON, ET AL., 4/22/04.
- * HORIZONTAL GROUND DISTANCES, COMBINED SCALE AND ELLIPSOID FACTOR IS 0.99983675.
- * IT WAS DISCOVERED DURING THE COURSE OF THIS SURVEY THAT THERE WAS A LAPPAGE BETWEEN THE ALPINE LAND SURVEYING PLAT FOR McDOWELL COUNTY AND THE JAMES BALLINGER PLAT OF THE WILSON PROPERTY. THIS LAPPAGE DOES NOT AFFECT THE CURRENT SURVEY AND NO OPINION IS EXPRESSED AS TO THE VALIDITY OF EITHER OF THE TWO SURVEYS REFERRED TO HEREIN.
- * REVISED 5/4/06 TO SHOW ADDITIONAL FEATURES AND REMOVE PROPOSED RIGHT-OF-WAY. NO CHANGE TO BOUNDARY.
- * REVISED 9/8/11 TO SHOW IMPROVEMENTS, PAVING, ETC. ON PROPERTY OF RIDGEWAY FNB CHURCH. ALSO TO ADD A PROPOSED RIGHT-OF-WAY AS DESCRIBED IN THAT SECONDARY ROAD RIGHT OF WAY AGREEMENT RECORDED IN D.B. 985, PG. 245, McDOWELL COUNTY REGISTRY. DATE OF RECORDATION WAS FEB. 12, 2008. TITLE WAS ALSO CHANGED. NO LINES WERE REVISED. BECAUSE NO RECORDED METES AND BOUNDS DESCRIPTION OF THE AFOREMENTIONED SECONDARY ROAD RIGHT OF WAY EXISTS, IT HAS SINCE BEEN REMOVED.
- * REVISED 6/21/2012 TO REFLECT A PROPERTY EXCHANGE WHICH OCCURRED ON 3/15/2012 BETWEEN THE TRUSTEES OF RIDGEWAY FREWILL BAPTIST CHURCH AND THE STEPHEN M. HENRY TRUST. THIS SURVEY FOR SAID EXCHANGE WAS CONDUCTED BY R.L. SURVEYING ON 2/22/2012 (PLAT # 12-016). ADDITIONAL SURVEYING WAS CONDUCTED ON 6/20/2012 TO LOCATE WOODEN FENCES SOME OF WHICH WERE ERECTED FOLLOWING THE PROPERTY EXCHANGE. NONE OF THE ORIGINAL OUTSIDE LINES WERE REVISED. ALSO, A PORTION OF THE PLAT WAS DELETED FROM THE GIS WEBSITE AND PLOTTED. LOCATION IS NOT CLAIMED TO BE EXACT.
- * A SECONDARY ROAD RIGHT-OF-WAY AGREEMENT FROM STEPHEN M. HENRY TO THE DEPARTMENT OF TRANSPORTATION FOR ASHWORTH INDUSTRIAL PARK ACCESS ROAD IS RECORDED IN D.B. 985, PG. 245-246. WHILE NO METES AND BOUNDS WERE FOUND IT IS CLEAR THIS AGREEMENT WILL NOT FOLLOW THE RIGHT-OF-WAY SHOWN. SEE NOTE ON FACE OF PLAT.

1. Deborah E. Gadsden, REVIEW OFFICER OF McGowan
COUNTY, CERTIFY THAT THIS PLAT MEETS ALL STATUTORY RE-
QUIREMENTS FOR RECORDING.
DATE: 10/7/13 Deborah E. Gadsden
REVIEW OFFICER

FILED FOR RECORD IN THE McDOWELL COUNTY REGISTER OF
DEEDS OFFICE AT ____AM/PM ON THE ____ DAY OF ____
20____ & RECORDED IN BOOK _____, PAGE _____.

REGISTER OF DEEDS

LEGEND

- △ EXISTING ROUND IRON PIPE
- EXISTING CONCRETE RIGHT-OF-WAY MONUMENT
- ⊠ EXISTING N.C.G.S. CONTROL MONUMENT
- ⊙ EXISTING IRON REBAR
- ⊗ EXISTING CRIMPED IRON PIPE
- UNMARKED POINT
- ⊕ 5/8" REBAR SET
- ⊗ EXISTING 1" FLAT IRON
- WOODEN FENCE
- EXISTING 60" RIGHT-OF-WAY LINES — DB 825, PG 738
- EXISTING ROAD
- CENTERLINE EXISTING 60' RIGHT-OF-WAY

VICINITY MAP not to scale

Subject—

I, R. Larry Greene PLS. certify that this plat was drawn under my supervision from an actual survey made under my supervision; that the boundaries not surveyed are clearly indicated as drawn from information found in Deed Book _____, Page _____; that the ratio of precision as calculated is 1: 7500+; that this plat was prepared in accordance with G. S. 47-30 as amended, witness my original signature, registration number _____ and seal this 26th day of April, 2006.

I further certify that this plat is of a survey of an existing parcel of land and does not create a new street or change an existing street. GS 47-30(f)(11)c.

Signature B. Amy Green
Land Supervisor L-1517

RUG R.L. GREENE SURVEYING AND MAPPING
Telephone (828) 652-3220
61 Logan Street, Marion, North Carolina 28752

SURVEY FOR: **STEPHEN M. HENRY**

location: MARION TOWNSHIP

McDOWELL COUNTY, NORTH CAROLINA

field: TO,DS	map: RLG	date: 04/26/06
--------------	----------	---------------------------

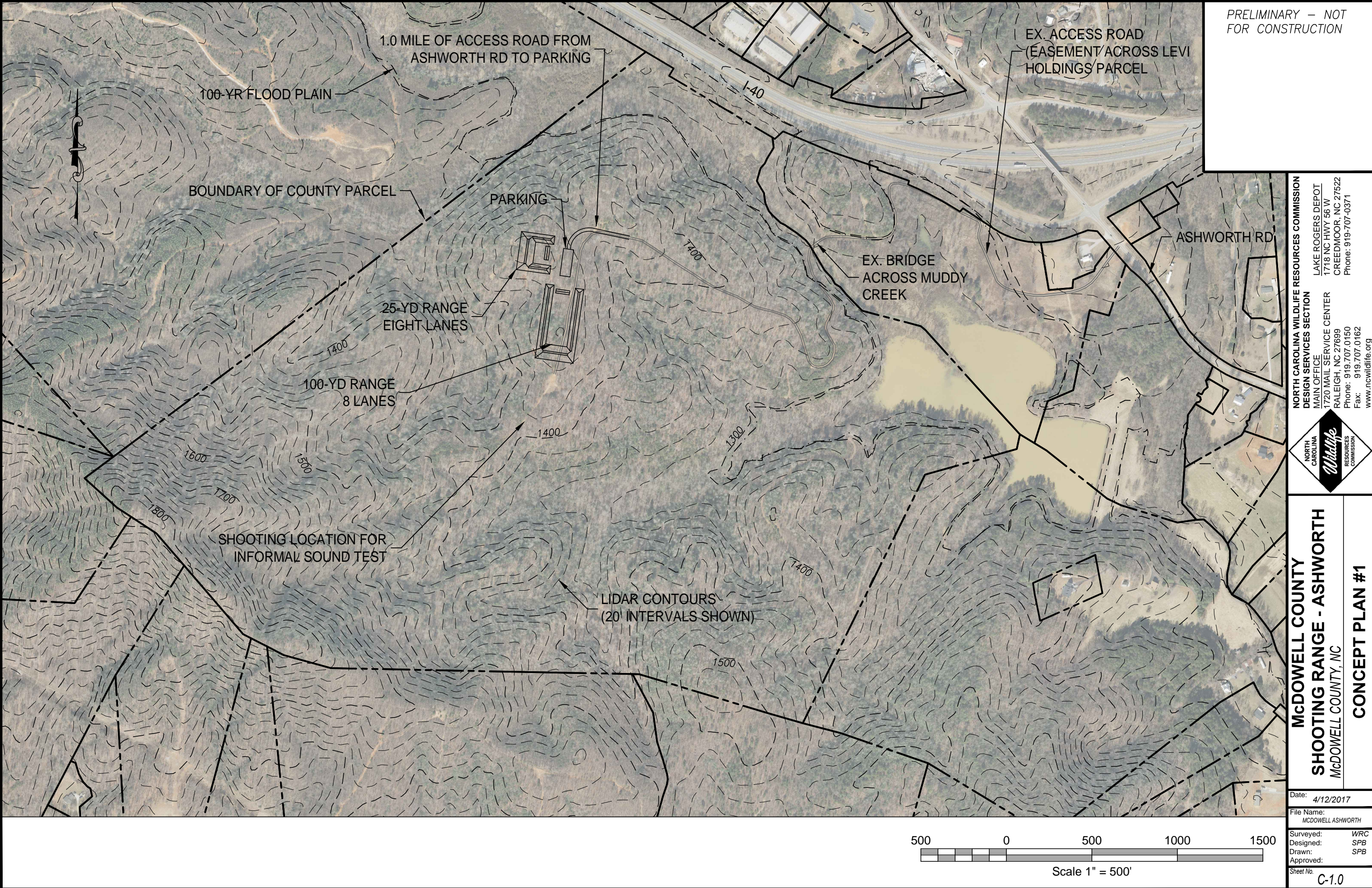
01/02/2013

area: 35.96 total acres by coordinate computation

100	0	100	200
-----	---	-----	-----

6-025R4

Scale: one inch equals one hundred feet



PRELIMINARY — NOT
FOR CONSTRUCTION

NORTH CAROLINA WILDLIFE RESOURCES COMMISSION
DESIGN SERVICES SECTION
MAIN OFFICE
1720 MAIL SERVICE CENTER
RALEIGH, NC 27699
Phone: 919.707.0150
Fax: 919.707.0162
www.ncwildlife.org



MCDOWELL COUNTY
SHOOTING RANGE - ASHWORTH
MCDOWELL COUNTY, NC
CONCEPT PLAN #1

Date: 4/12/2017
File Name: MCDOWELL ASHWORTH
Surveyed: WRC
Designed: SPB
Drawn: SPB
Approved:
Sheet No. C-1.0

APPENDIX I

November 30, 2017

Cory Darnell
ECS Raleigh
9001 Glenwood Ave
Raleigh, NC 27617

RE: Project: MCDOWELL SHOOTING RANGE
Pace Project No.: 92363943

Dear Cory Darnell:

Enclosed are the analytical results for sample(s) received by the laboratory on November 17, 2017. The results relate only to the samples included in this report. Results reported herein conform to the most current, applicable TNI/NELAC standards and the laboratory's Quality Assurance Manual, where applicable, unless otherwise noted in the body of the report.

If you have any questions concerning this report, please feel free to contact me.

Sincerely,



Taylor Ezell
taylor.ezell@pacelabs.com
(704)875-9092
Project Manager

Enclosures



REPORT OF LABORATORY ANALYSIS

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CERTIFICATIONS

Project: MCDOWELL SHOOTING RANGE

Pace Project No.: 92363943

Charlotte Certification IDs

9800 Kincey Ave. Ste 100, Huntersville, NC 28078
Louisiana/NELAP Certification # LA170028
North Carolina Drinking Water Certification #: 37706
North Carolina Field Services Certification #: 5342
North Carolina Wastewater Certification #: 12

South Carolina Certification #: 99006001
Florida/NELAP Certification #: E87627
Kentucky UST Certification #: 84
Virginia/VELAP Certification #: 460221

Asheville Certification IDs

2225 Riverside Drive, Asheville, NC 28804
Florida/NELAP Certification #: E87648
Massachusetts Certification #: M-NC030
North Carolina Drinking Water Certification #: 37712

North Carolina Wastewater Certification #: 40
South Carolina Certification #: 99030001
Virginia/VELAP Certification #: 460222

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SAMPLE ANALYTE COUNT

Project: MCDOWELL SHOOTING RANGE

Pace Project No.: 92363943

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
92363943001	SS-1	EPA 6010	SH1	6	PASI-A
		ASTM D2974-87	KDF	1	PASI-C
92363943002	SS-2	EPA 6010	SH1	6	PASI-A
		ASTM D2974-87	KDF	1	PASI-C
92363943003	SS-3	EPA 6010	SH1	6	PASI-A
		ASTM D2974-87	KDF	1	PASI-C
92363943004	SS-4	EPA 6010	SH1	6	PASI-A
		ASTM D2974-87	KDF	1	PASI-C
92363943005	SS-5	EPA 6010	SH1	6	PASI-A
		ASTM D2974-87	KDF	1	PASI-C
92363943006	SS-6	EPA 6010	SH1	6	PASI-A
		ASTM D2974-87	KDF	1	PASI-C
92363943007	SS-7	EPA 6010	SH1	6	PASI-A
		ASTM D2974-87	KDF	1	PASI-C
92363943008	SS-8	EPA 6010	SH1	6	PASI-A
		ASTM D2974-87	KDF	1	PASI-C

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: MCDOWELL SHOOTING RANGE

Pace Project No.: 92363943

Sample: SS-1 **Lab ID: 92363943001** Collected: 11/15/17 13:10 Received: 11/17/17 12:07 Matrix: Solid

Results reported on a "dry weight" basis and are adjusted for percent moisture, sample size and any dilutions.

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP		Analytical Method: EPA 6010 Preparation Method: EPA 3050						
Arsenic	ND	mg/kg	11.5	10	11/22/17 23:10	11/28/17 12:00	7440-38-2	M6
Cadmium	ND	mg/kg	1.2	10	11/22/17 23:10	11/28/17 12:00	7440-43-9	D3
Chromium	52.8	mg/kg	5.8	10	11/22/17 23:10	11/28/17 12:00	7440-47-3	
Lead	20.0	mg/kg	5.8	10	11/22/17 23:10	11/28/17 12:00	7439-92-1	M6
Nickel	7.5	mg/kg	5.8	10	11/22/17 23:10	11/28/17 12:00	7440-02-0	M6
Selenium	ND	mg/kg	11.5	10	11/22/17 23:10	11/28/17 12:00	7782-49-2	D3,M6
Percent Moisture		Analytical Method: ASTM D2974-87						
Percent Moisture	25.3	%	0.10	1		11/19/17 11:33		

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ANALYTICAL RESULTS

Project: MCDOWELL SHOOTING RANGE

Pace Project No.: 92363943

Sample: SS-2 **Lab ID: 92363943002** Collected: 11/15/17 13:15 Received: 11/17/17 12:07 Matrix: Solid

Results reported on a "dry weight" basis and are adjusted for percent moisture, sample size and any dilutions.

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP		Analytical Method: EPA 6010 Preparation Method: EPA 3050						
Arsenic	1.4	mg/kg	0.85	1	11/22/17 23:10	11/28/17 07:36	7440-38-2	
Cadmium	ND	mg/kg	0.085	1	11/22/17 23:10	11/28/17 07:36	7440-43-9	
Chromium	15.4	mg/kg	0.42	1	11/22/17 23:10	11/28/17 07:36	7440-47-3	
Lead	11.5	mg/kg	0.42	1	11/22/17 23:10	11/28/17 07:36	7439-92-1	
Nickel	3.0	mg/kg	0.42	1	11/22/17 23:10	11/28/17 07:36	7440-02-0	
Selenium	ND	mg/kg	0.85	1	11/22/17 23:10	11/28/17 07:36	7782-49-2	
Percent Moisture		Analytical Method: ASTM D2974-87						
Percent Moisture	19.1	%	0.10	1		11/19/17 11:33		

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ANALYTICAL RESULTS

Project: MCDOWELL SHOOTING RANGE

Pace Project No.: 92363943

Sample: SS-3 **Lab ID: 92363943003** Collected: 11/15/17 13:25 Received: 11/17/17 12:07 Matrix: Solid

Results reported on a "dry weight" basis and are adjusted for percent moisture, sample size and any dilutions.

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP		Analytical Method: EPA 6010 Preparation Method: EPA 3050						
Arsenic	ND	mg/kg	0.80	1	11/22/17 23:10	11/28/17 07:40	7440-38-2	
Cadmium	ND	mg/kg	0.080	1	11/22/17 23:10	11/28/17 07:40	7440-43-9	
Chromium	35.7	mg/kg	0.40	1	11/22/17 23:10	11/28/17 07:40	7440-47-3	
Lead	20.3	mg/kg	0.40	1	11/22/17 23:10	11/28/17 07:40	7439-92-1	
Nickel	7.0	mg/kg	0.40	1	11/22/17 23:10	11/28/17 07:40	7440-02-0	
Selenium	ND	mg/kg	0.80	1	11/22/17 23:10	11/28/17 07:40	7782-49-2	
Percent Moisture		Analytical Method: ASTM D2974-87						
Percent Moisture	24.1	%	0.10	1		11/19/17 11:33		

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ANALYTICAL RESULTS

Project: MCDOWELL SHOOTING RANGE

Pace Project No.: 92363943

Sample: SS-4 **Lab ID: 92363943004** Collected: 11/15/17 13:30 Received: 11/17/17 12:07 Matrix: Solid

Results reported on a "dry weight" basis and are adjusted for percent moisture, sample size and any dilutions.

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP		Analytical Method: EPA 6010 Preparation Method: EPA 3050						
Arsenic	1.7	mg/kg	0.87	1	11/22/17 23:10	11/28/17 07:44	7440-38-2	
Cadmium	ND	mg/kg	0.087	1	11/22/17 23:10	11/28/17 07:44	7440-43-9	
Chromium	13.6	mg/kg	0.43	1	11/22/17 23:10	11/28/17 07:44	7440-47-3	
Lead	14.2	mg/kg	0.43	1	11/22/17 23:10	11/28/17 07:44	7439-92-1	
Nickel	3.6	mg/kg	0.43	1	11/22/17 23:10	11/28/17 07:44	7440-02-0	
Selenium	ND	mg/kg	0.87	1	11/22/17 23:10	11/28/17 07:44	7782-49-2	
Percent Moisture		Analytical Method: ASTM D2974-87						
Percent Moisture	21.0	%	0.10	1		11/19/17 11:34		

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: MCDOWELL SHOOTING RANGE

Pace Project No.: 92363943

Sample: SS-5 **Lab ID: 92363943005** Collected: 11/15/17 13:40 Received: 11/17/17 12:07 Matrix: Solid

Results reported on a "dry weight" basis and are adjusted for percent moisture, sample size and any dilutions.

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP		Analytical Method: EPA 6010 Preparation Method: EPA 3050						
Arsenic	1.6	mg/kg	1.2	1	11/22/17 23:10	11/28/17 07:48	7440-38-2	
Cadmium	ND	mg/kg	0.12	1	11/22/17 23:10	11/28/17 07:48	7440-43-9	
Chromium	44.1	mg/kg	0.61	1	11/22/17 23:10	11/28/17 07:48	7440-47-3	
Lead	21.6	mg/kg	0.61	1	11/22/17 23:10	11/28/17 07:48	7439-92-1	
Nickel	6.0	mg/kg	0.61	1	11/22/17 23:10	11/28/17 07:48	7440-02-0	
Selenium	ND	mg/kg	1.2	1	11/22/17 23:10	11/28/17 07:48	7782-49-2	
Percent Moisture		Analytical Method: ASTM D2974-87						
Percent Moisture	27.6	%	0.10	1		11/19/17 11:34		

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ANALYTICAL RESULTS

Project: MCDOWELL SHOOTING RANGE

Pace Project No.: 92363943

Sample: SS-6 **Lab ID: 92363943006** Collected: 11/15/17 13:50 Received: 11/17/17 12:07 Matrix: Solid

Results reported on a "dry weight" basis and are adjusted for percent moisture, sample size and any dilutions.

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP		Analytical Method: EPA 6010 Preparation Method: EPA 3050						
Arsenic	ND	mg/kg	6.1	5	11/22/17 23:10	11/28/17 12:12	7440-38-2	D3
Cadmium	ND	mg/kg	0.61	5	11/22/17 23:10	11/28/17 12:12	7440-43-9	D3
Chromium	32.4	mg/kg	3.0	5	11/22/17 23:10	11/28/17 12:12	7440-47-3	
Lead	14.6	mg/kg	3.0	5	11/22/17 23:10	11/28/17 12:12	7439-92-1	
Nickel	10.9	mg/kg	3.0	5	11/22/17 23:10	11/28/17 12:12	7440-02-0	
Selenium	ND	mg/kg	6.1	5	11/22/17 23:10	11/28/17 12:12	7782-49-2	D3
Percent Moisture		Analytical Method: ASTM D2974-87						
Percent Moisture	24.9	%	0.10	1		11/19/17 11:34		

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ANALYTICAL RESULTS

Project: MCDOWELL SHOOTING RANGE

Pace Project No.: 92363943

Sample: SS-7 **Lab ID: 92363943007** Collected: 11/15/17 14:00 Received: 11/17/17 12:07 Matrix: Solid

Results reported on a "dry weight" basis and are adjusted for percent moisture, sample size and any dilutions.

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP		Analytical Method: EPA 6010 Preparation Method: EPA 3050						
Arsenic	ND	mg/kg	9.6	10	11/22/17 23:10	11/28/17 12:16	7440-38-2	D3
Cadmium	ND	mg/kg	0.96	10	11/22/17 23:10	11/28/17 12:16	7440-43-9	D3
Chromium	27.5	mg/kg	4.8	10	11/22/17 23:10	11/28/17 12:16	7440-47-3	
Lead	18.7	mg/kg	4.8	10	11/22/17 23:10	11/28/17 12:16	7439-92-1	
Nickel	11.4	mg/kg	4.8	10	11/22/17 23:10	11/28/17 12:16	7440-02-0	
Selenium	ND	mg/kg	9.6	10	11/22/17 23:10	11/28/17 12:16	7782-49-2	D3
Percent Moisture		Analytical Method: ASTM D2974-87						
Percent Moisture	21.4	%	0.10	1		11/19/17 11:34		

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ANALYTICAL RESULTS

Project: MCDOWELL SHOOTING RANGE

Pace Project No.: 92363943

Sample: SS-8 **Lab ID: 92363943008** Collected: 11/15/17 14:10 Received: 11/17/17 12:07 Matrix: Solid

Results reported on a "dry weight" basis and are adjusted for percent moisture, sample size and any dilutions.

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP		Analytical Method: EPA 6010 Preparation Method: EPA 3050						
Arsenic	1.8	mg/kg	0.99	1	11/22/17 23:10	11/28/17 08:02	7440-38-2	
Cadmium	ND	mg/kg	0.099	1	11/22/17 23:10	11/28/17 08:02	7440-43-9	
Chromium	24.3	mg/kg	0.50	1	11/22/17 23:10	11/28/17 08:02	7440-47-3	
Lead	22.8	mg/kg	0.50	1	11/22/17 23:10	11/28/17 08:02	7439-92-1	
Nickel	3.2	mg/kg	0.50	1	11/22/17 23:10	11/28/17 08:02	7440-02-0	
Selenium	ND	mg/kg	0.99	1	11/22/17 23:10	11/28/17 08:02	7782-49-2	
Percent Moisture		Analytical Method: ASTM D2974-87						
Percent Moisture	11.7	%	0.10	1		11/19/17 11:34		

REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: MCDOWELL SHOOTING RANGE

Pace Project No.: 92363943

QC Batch:	388103	Analysis Method:	EPA 6010
QC Batch Method:	EPA 3050	Analysis Description:	6010 MET
Associated Lab Samples:	92363943001, 92363943002, 92363943003, 92363943004, 92363943005, 92363943006, 92363943007, 92363943008		

METHOD BLANK: 2153529 Matrix: Solid
Associated Lab Samples: 92363943001, 92363943002, 92363943003, 92363943004, 92363943005, 92363943006, 92363943007, 92363943008

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Arsenic	mg/kg	ND	1.0	11/28/17 07:07	
Cadmium	mg/kg	ND	0.10	11/28/17 07:07	
Chromium	mg/kg	ND	0.50	11/28/17 07:07	
Lead	mg/kg	ND	0.50	11/28/17 07:07	
Nickel	mg/kg	ND	0.50	11/28/17 07:07	
Selenium	mg/kg	ND	1.0	11/28/17 07:07	

LABORATORY CONTROL SAMPLE: 2153530

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Arsenic	mg/kg	50	47.6	95	80-120	
Cadmium	mg/kg	50	48.6	97	80-120	
Chromium	mg/kg	50	48.0	96	80-120	
Lead	mg/kg	50	48.0	96	80-120	
Nickel	mg/kg	50	47.8	96	80-120	
Selenium	mg/kg	50	48.5	97	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2153531 2153532

Parameter	92363943001		MS	MSD	MS		MSD	MS	MSD	% Rec	RPD	Qual
	Units	Result	Spike Conc.	Spike Conc.	Result	Result	Result	% Rec	% Rec	Limits		
Arsenic	mg/kg	ND	47.8	42.3	29.6	26.5	53	53	75-125	11 M6		
Cadmium	mg/kg	ND	47.8	42.3	38.4	31.6	80	75	75-125	19		
Chromium	mg/kg	52.8	47.8	42.3	96.8	101	92	113	75-125	4		
Lead	mg/kg	20.0	47.8	42.3	58.0	51.4	79	74	75-125	12 M6		
Nickel	mg/kg	7.5	47.8	42.3	45.5	38.3	80	73	75-125	17 M6		
Selenium	mg/kg	ND	47.8	42.3	23.3	19.7	42	39	75-125	16 M6		

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

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QUALITY CONTROL DATA

Project: MCDOWELL SHOOTING RANGE

Pace Project No.: 92363943

QC Batch:	387346	Analysis Method:	ASTM D2974-87
QC Batch Method:	ASTM D2974-87	Analysis Description:	Dry Weight/Percent Moisture
Associated Lab Samples:	92363943001, 92363943002, 92363943003, 92363943004, 92363943005, 92363943006, 92363943007, 92363943008		

SAMPLE DUPLICATE: 2149009

Parameter	Units	92363705001 Result	Dup Result	RPD	Qualifiers
Percent Moisture	%	41.8	40.6	3	

SAMPLE DUPLICATE: 2149010

Parameter	Units	92363898011 Result	Dup Result	RPD	Qualifiers
Percent Moisture	%	12.8	12.3	5	

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

REPORT OF LABORATORY ANALYSIS

This report shall not be reproduced, except in full,
without the written consent of Pace Analytical Services, LLC.

QUALIFIERS

Project: MCDOWELL SHOOTING RANGE

Pace Project No.: 92363943

DEFINITIONS

DF - Dilution Factor, if reported, represents the factor applied to the reported data due to dilution of the sample aliquot.

ND - Not Detected at or above adjusted reporting limit.

TNTC - Too Numerous To Count

J - Estimated concentration above the adjusted method detection limit and below the adjusted reporting limit.

MDL - Adjusted Method Detection Limit.

PQL - Practical Quantitation Limit.

RL - Reporting Limit.

S - Surrogate

1,2-Diphenylhydrazine decomposes to and cannot be separated from Azobenzene using Method 8270. The result for each analyte is a combined concentration.

Consistent with EPA guidelines, unrounded data are displayed and have been used to calculate % recovery and RPD values.

LCS(D) - Laboratory Control Sample (Duplicate)

MS(D) - Matrix Spike (Duplicate)

DUP - Sample Duplicate

RPD - Relative Percent Difference

NC - Not Calculable.

SG - Silica Gel - Clean-Up

U - Indicates the compound was analyzed for, but not detected.

Acid preservation may not be appropriate for 2 Chloroethylvinyl ether.

A separate vial preserved to a pH of 4-5 is recommended in SW846 Chapter 4 for the analysis of Acrolein and Acrylonitrile by EPA Method 8260.

N-Nitrosodiphenylamine decomposes and cannot be separated from Diphenylamine using Method 8270. The result reported for each analyte is a combined concentration.

Pace Analytical is TNI accredited. Contact your Pace PM for the current list of accredited analytes.

TNI - The NELAC Institute.

LABORATORIES

PASI-A Pace Analytical Services - Asheville

PASI-C Pace Analytical Services - Charlotte

ANALYTE QUALIFIERS

D3 Sample was diluted due to the presence of high levels of non-target analytes or other matrix interference.

M6 Matrix spike and Matrix spike duplicate recovery not evaluated against control limits due to sample dilution.

REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA CROSS REFERENCE TABLE


Project: MCDOWELL SHOOTING RANGE

Pace Project No.: 92363943

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
92363943001	SS-1	EPA 3050	388103	EPA 6010	388251
92363943002	SS-2	EPA 3050	388103	EPA 6010	388251
92363943003	SS-3	EPA 3050	388103	EPA 6010	388251
92363943004	SS-4	EPA 3050	388103	EPA 6010	388251
92363943005	SS-5	EPA 3050	388103	EPA 6010	388251
92363943006	SS-6	EPA 3050	388103	EPA 6010	388251
92363943007	SS-7	EPA 3050	388103	EPA 6010	388251
92363943008	SS-8	EPA 3050	388103	EPA 6010	388251
92363943001	SS-1	ASTM D2974-87	387346		
92363943002	SS-2	ASTM D2974-87	387346		
92363943003	SS-3	ASTM D2974-87	387346		
92363943004	SS-4	ASTM D2974-87	387346		
92363943005	SS-5	ASTM D2974-87	387346		
92363943006	SS-6	ASTM D2974-87	387346		
92363943007	SS-7	ASTM D2974-87	387346		
92363943008	SS-8	ASTM D2974-87	387346		


REPORT OF LABORATORY ANALYSIS

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	Document Name: Sample Condition Upon Receipt(SCUR)	Document Revised: August 4, 2017 Page 1 of 2
	Document No.: F-CAR-CS-033-Rev.04	Issuing Authority: Pace Quality Office

Laboratory receiving samples:

Asheville ☐ Eden ☐ Greenwood ☐ Huntersville ☒ Raleigh ☐ Mechanicsville ☐

Sample Condition Upon Receipt Courier: <input type="checkbox"/> Commercial <input type="checkbox"/> Fed Ex <input type="checkbox"/> Pace <input type="checkbox"/> UPS <input type="checkbox"/> USPS <input type="checkbox"/> Other: _____ <input type="checkbox"/> Client Custody Seal Present? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No Seals Intact? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No Packing Material: <input type="checkbox"/> Bubble Wrap <input checked="" type="checkbox"/> Bubble Bags <input type="checkbox"/> None <input type="checkbox"/> Other Thermometer: <input type="checkbox"/> IR Gun ID: <u>T1701</u> Type of Ice: <input checked="" type="checkbox"/> Wet <input type="checkbox"/> Blue <input type="checkbox"/> None Correction Factor: Cooler Temp Corrected (°C): <u>3.7</u>	Client Name: <u>ECS</u> Project #: WO# : 92363943  92363943 Date/Initials Person Examining Contents: <u>11-17-17</u> Biological Tissue Frozen? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A Temp should be above freezing to 6°C <input type="checkbox"/> Samples out of temp criteria. Samples on ice, cooling process has begun
--	---

USDA Regulated Soil (☒ N/A, water sample)

Did samples originate in a quarantine zone within the United States: CA, NY, or SC (check maps)?

☐ Yes ☒ No

Did samples originate from a foreign source (internationally, including Hawaii and Puerto Rico)? ☐ Yes ☒ No

Chain of Custody/Analysis			Comments/Discrepancy:
Chain of Custody Present?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	1.	
Samples Arrived within Hold Time?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	2.	
Short Hold Time Analysis (<72 hr.)?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A	3.	
Rush Turn Around Time Requested?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A	4.	
Sufficient Volume?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	5.	
Correct Containers Used?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	6.	
-Pace Containers Used?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A		
Containers Intact?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	7.	
Dissolved analysis: Samples Field Filtered?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A	8.	
Sample Labels Match COC?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A	9.	
-Includes Date/Time/ID/Analysis Matrix: <u>SL</u>			
Headspace in VOA Vials (>5-6mm)?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	10.	
Trip Blank Present?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A	11.	
Trip Blank Custody Seals Present?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A		

CLIENT NOTIFICATION/RESOLUTION

Field Data Required? ☐ Yes ☐ No

Person Contacted: _____ Date/Time: _____

Comments/Sample Discrepancy: _____

Lot ID of split containers: _____

Project Manager SCURF Review: (TS)

Date: 11/21

Project Manager SRF Review: (TS)

Date: 11/21

Note: Whenever there is a discrepancy affecting North Carolina compliance samples, a copy of this form will be sent to the North Carolina DEHNR Certification Office (i.e. Out of hold, incorrect preservative, out of temp, incorrect containers)



Document Name:
Sample Condition Upon Receipt(SCUR)
Document No.:
F-CAR-CS-033-Rev.04

Document Revised: August 4, 2017
Page 2 of 2
Issuing Authority:
Pace Quality Office

*Check mark top half of box if pH and/or dechlorination
is verified and within the acceptance range for
preservation samples.

Project #

WO#: 92363943

PM: PTE

Due Date: 11/28/17

CLIENT: 92-ECS RAL

**Bottom half of box is to list number of bottles

Item#	BP4U-125 mL Plastic Unpreserved (N/A) (Cl-)	BP3U-250 mL Plastic Unpreserved (N/A)	BP2U-500 mL Plastic Unpreserved (N/A)	BP1U-1 liter Plastic Unpreserved (N/A)	BP4S-125 mL Plastic H2SO4 (pH < 2) (Cl-)	BP3N-250 mL plastic HNO3 (pH < 2)	BP4Z-125 mL Plastic Zn Acetate & NaOH (>9)	BP4C-125 mL Plastic NaOH (pH > 12) (Cl-)	WGFU-Wide-mouthed Glass jar Unpreserved	AG1U-1 liter Amber Unpreserved (N/A) (Cl-)	AG1H-1 liter Amber HCl (pH < 2)	AG3U-250 mL Amber Unpreserved (N/A) (Cl-)	AG1S-1 liter Amber H2SO4 (pH < 2)	AG3S-250 mL Amber H2SO4 (pH < 2)	AG3A(DG3A)-250 mL Amber NH4Cl (N/A)(Cl-)	DG9H-40 mL VOA HCl (N/A)	VG9T-40 mL VOA Na2S2O3 (N/A)	VG9U-40 mL VOA Unp (N/A)	DG9P-40 mL VOA H3PO4 (N/A)	VOAK (6 vials per kit)-5035 kit (N/A)	V/GK (3 vials per kit)-VPH/Gas kit (N/A)	SP5T-125 mL Sterile Plastic (N/A – lab)	SP2T-250 mL Sterile Plastic (N/A – lab)		BP3A-250 mL Plastic (NH2)2SO4 (9.3-9.7)	Cubitainer	VSGU-20 mL Scintillation vials (N/A)	GN
1																												
2																												
3																												
4																												
5																												
6																												
7																												
8																												
9																												
10																												
11																												
12																												

pH Adjustment Log for Preserved Samples

Sample ID	Type of Preservative	pH upon receipt	Date preservation adjusted	Time preservation adjusted	Amount of Preservative added	Lot #



CHAIN-OF-CUSTODY / Analytical Request Document

The Chain-of-Custody is a LEGAL DOCUMENT. All relevant fields must be completed accurately.

Section A

Section B

Section C

Page: 1 of 1

Company: **ECS**

Address: **9001 Glenwood**

City: **Atlanta, GA 30327**

Phone: **404-881-9814**

Requested Due Date/TAT: **Standard**

Report To: **McDonnell@cedimaterial.com**

Copy To: **NA**

Purchase Order No.: **49-9541**

Project Name: **McDonnell Shoring Range**

Project Number: **49-9541**

Attention: **Cory Darnell**

Company Name: **ECS**

Address: **cedimaterial.com**

Reference: **McDonnell Shoring Range**

Site Location: **NC**

State: **NC**

REGULATORY AGENCY

NPDES ☐ GROUND WATER ☐ DRINKING WATER ☐

UST ☐ RCRA ☐ OTHER ☐

Section D

Matrix Codes

Matrix / CODE

COLLECTED

COMPOSITE

COMPOSITE

Preservatives

Analysis Test

Requested Analysis Filtered (Y/N)

Residual Chlorine (Y/N)

*Only analyze

SAMPLE ID
(A-Z, 0-9 / -)
Sample IDs MUST BE UNIQUE

Drinking Water
Water
Waste Water
Product
Soil/Solid
Oil
Wipe
Air
Tissue
Other

MATRIX CODE (see valid codes to left)

SAMPLE TYPE (G=GRAB C=COMP)

DATE

TIME

DATE

TIME

OF CONTAINERS

Unpreserved

H₂SO₄

HNO₃

HCl

NaOH

Na₂S₂O₃

Methanol

Other

Analysis Test

EPA 6010

SEE NOTES

Residual Chlorine (Y/N)

*Only analyze

Drinking Water
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Na₂S₂O₃

Methanol

Other

Analysis Test

EPA 6010

SEE NOTES

Residual Chlorine (Y/N)



Predictive

Soil Report

[Links to Helpful Information](#)

Mehlich-3 Extraction

Client: Kevin Ferguson
9001 Glenwood Ave
Raleigh, NC 27617

Advisor:

Sampled County : McDowell

Farm: NA

Sampled: 11/15/2017
Received: 11/15/2017
Completed: 12/13/2017

Client ID: 479818**Advisor ID:**

Sample ID: ss1		Recommendations:					Lime (tons/acre)	Nutrients (lb/acre)										More Information			
Crop							N	P2O5	K2O	Mg	S	Mn	Zn	Cu	B						
Lime History:		1 - Small Grain (SG)					1.8	80-100	140	100	25	0	0	6	0	0	Note: 3				
		2 -																			
Test Results [units - W/V in g/cm³; CEC and Na in meq/100 cm³; NO3-N in mg/dm³]:															Soil Class: Mineral						
HM%	W/V	CEC	BS%	Ac	pH	P-I	K-I	Ca%	Mg%	S-I	Mn-I	Mn-Al1	Mn-Al2	Zn-I	Zn-Al	Cu-I	Na	ESP	SS-I	NO3-N	
0.51	0.93	3.4	20	2.7	4.8	2	20	11	6	257	36	32		20	20	65	0.1	3			
Sample ID: ss2		Recommendations:					Lime (tons/acre)	Nutrients (lb/acre)										More Information			
Crop							N	P2O5	K2O	Mg	S	Mn	Zn	Cu	B						
Lime History:		1 - Small Grain (SG)					1.9	80-100	140	110	25	0	0	6	0	0	Note: 3				
		2 -																			
Test Results [units - W/V in g/cm³; CEC and Na in meq/100 cm³; NO3-N in mg/dm³]:															Soil Class: Mineral						
HM%	W/V	CEC	BS%	Ac	pH	P-I	K-I	Ca%	Mg%	S-I	Mn-I	Mn-Al1	Mn-Al2	Zn-I	Zn-Al	Cu-I	Na	ESP	SS-I	NO3-N	
0.36	0.97	3.6	23	2.8	4.7	3	17	14	7	140	51	41		22	22	45	0.1	3			
Sample ID: ss3		Recommendations:					Lime (tons/acre)	Nutrients (lb/acre)										More Information			
Crop							N	P2O5	K2O	Mg	S	Mn	Zn	Cu	B						
Lime History:		1 - Small Grain (SG)					2.0	80-100	140	60	0	0	0	0	0	0	Note: 3				
		2 -																			
Test Results [units - W/V in g/cm³; CEC and Na in meq/100 cm³; NO3-N in mg/dm³]:															Soil Class: Mineral						
HM%	W/V	CEC	BS%	Ac	pH	P-I	K-I	Ca%	Mg%	S-I	Mn-I	Mn-Al1	Mn-Al2	Zn-I	Zn-Al	Cu-I	Na	ESP	SS-I	NO3-N	
0.51	0.91	4.0	27	2.9	4.7	3	38	12	11	74	65	49		30	30	79	0.1	3			

NCDA&CS Agronomic Division				Phone: (919) 733-2655				Website: www.ncagr.gov/agronomi/										Report No. FY18-SL016835					
Kevin Ferguson																				Page 2 of 4			
Sample ID: ss4		Recommendations:		Lime		Nutrients (lb/acre)										More Information Note: 3							
Crop		(tons/acre)		N		P2O5		K2O		Mg		S		Mn				Zn		Cu		B	
Lime History:		1 - Small Grain (SG)		2.1		80-100		140		80		25		0				0		0		0	
2 -																							
Test Results [units - W/V in g/cm³; CEC and Na in meq/100 cm³; NO3-N in mg/dm³]:																				Soil Class: Mineral			
HM%	W/V	CEC	BS%	Ac	pH	P-I	K-I	Ca%	Mg%	S-I	Mn-I	Mn-Al1	Mn-Al2	Zn-I	Zn-Al	Cu-I	Na	ESP	SS-I	NO3-N			
0.51	0.93	4.0	21	3.1	4.7	4	29	10	7	93	208	135		31	31	51	0.1	3					
Sample ID: ss5		Recommendations:		Lime		Nutrients (lb/acre)										More Information Note: 3							
Crop		(tons/acre)		N		P2O5		K2O		Mg		S		Mn				Zn		Cu		B	
Lime History:		1 - Small Grain (SG)		2.2		80-100		140		50		25		0				10		6		0	
2 -														0									
Test Results [units - W/V in g/cm³; CEC and Na in meq/100 cm³; NO3-N in mg/dm³]:																				Soil Class: Mineral			
HM%	W/V	CEC	BS%	Ac	pH	P-I	K-I	Ca%	Mg%	S-I	Mn-I	Mn-Al1	Mn-Al2	Zn-I	Zn-Al	Cu-I	Na	ESP	SS-I	NO3-N			
0.27	0.90	4.1	22	3.2	4.6	3	43	11	6	112	20	22		25	25	50	0.1	2					
Sample ID: ss6		Recommendations:		Lime		Nutrients (lb/acre)										More Information Note: 3							
Crop		(tons/acre)		N		P2O5		K2O		Mg		S		Mn				Zn		Cu		B	
Lime History:		1 - Small Grain (SG)		1.3		80-100		140		50		0		0				0		6		0	
2 -																							
Test Results [units - W/V in g/cm³; CEC and Na in meq/100 cm³; NO3-N in mg/dm³]:																				Soil Class: Mineral			
HM%	W/V	CEC	BS%	Ac	pH	P-I	K-I	Ca%	Mg%	S-I	Mn-I	Mn-Al1	Mn-Al2	Zn-I	Zn-Al	Cu-I	Na	ESP	SS-I	NO3-N			
0.41	0.92	4.0	51	2.0	5.0	2	43	25	20	240	69	51		14	14	36	0.1	3					
Sample ID: ss7		Recommendations:		Lime		Nutrients (lb/acre)										More Information Note: 3							
Crop		(tons/acre)		N		P2O5		K2O		Mg		S		Mn				Zn		Cu		B	
Lime History:		1 - Small Grain (SG)		0.8		80-100		130		20		0		0				0		6		0	
2 -																							
Test Results [units - W/V in g/cm³; CEC and Na in meq/100 cm³; NO3-N in mg/dm³]:																				Soil Class: Mineral			
HM%	W/V	CEC	BS%	Ac	pH	P-I	K-I	Ca%	Mg%	S-I	Mn-I	Mn-Al1	Mn-Al2	Zn-I	Zn-Al	Cu-I	Na	ESP	SS-I	NO3-N			
0.18	0.90	4.1	67	1.4	5.2	6	66	29	30	77	793	486		24	24	60	0.1	2					

Sample ID: ss8	Recommendations:	Lime	Nutrients (lb/acre)								More	
	Crop	(tons/acre)	N	P2O5	K2O	Mg	S	Mn	Zn	Cu	B	Information
	Lime History:	1 - Small Grain (SG)	1.4	80-100	140	80	0	0	10	6	0	0
		2 -						0				

Test Results [units - W/V in g/cm ³ ; CEC and Na in meq/100 cm ³ ; NO ₃ -N in mg/dm ³]:													Soil Class: Mineral								
HM%	W/V	CEC	BS%	Ac	pH	P-I	K-I	Ca%	Mg%	S-I	Mn-I	Mn-Al1	Mn-Al2	Zn-I	Zn-Al	Cu-I	Na	ESP	SS-I	NO ₃ -N	
0.18	1.03	4.9	55	2.2	4.9	3	27	33	20	136	23	24		16	16	46	0.1	2			

Understanding the Soil Report: explanation of measurements, abbreviations and units

Recommendations

Lime

If testing finds that soil pH is too low for the crop(s) indicated, a **lime recommendation** will be given in units of either ton/acre or lb/1000 sq ft. For best results, mix the lime into the top 6 to 8 inches of soil several months before planting. For no-till or established plantings where this is not possible, apply no more than 1 to 1.5 ton/acre (50 lb/1000 sq ft) at one time, even if the report recommends more. You can apply the rest in similar increments every six months until the full rate is applied. If MG is recommended and lime is needed, use dolomitic lime.

Fertilizer

Recommendations **for field crops or other large areas** are listed separately for each nutrient to be added (in units of lb/acre unless otherwise specified). Recommendations for N (and sometimes for B) are based on research/field studies for the crop being grown, not on soil test results. K-I and P-I values are based on test results and should be > 50. If they are not, follow the fertilizer recommendations given. If Mg is needed and no lime is recommended, 0-0-22 (11.5% Mg) is an excellent source; 175 to 250 lb per acre alone or in a fertilizer blend will usually satisfy crop needs, SS-I levels appear only on reports for greenhouse soil or problem samples.

Farmers and other commercial producers should pay special attention to **micronutrient levels**. If \$, pH\$, \$pH, C or Z notations appear on the soil report, refer to [\\$Note: Secondary Nutrients and Micronutrients](#). In general, homeowners do not need to be concerned about micronutrients. Various crop notes also address lime fertilizer needs; visit ncagr.gov/agronomi/pubs.htm.

Recommendations **for small areas, such as home lawns/gardens**, are listed in units of lb/1000 sq ft. If you cannot find the exact fertilizer grade recommended on the report, visit www.ncagr.gov/agronomi/obpart4.htm to find information that may help you choose a comparable alternate. For more information, read [A Homeowner's Guide to Fertilizer](#).

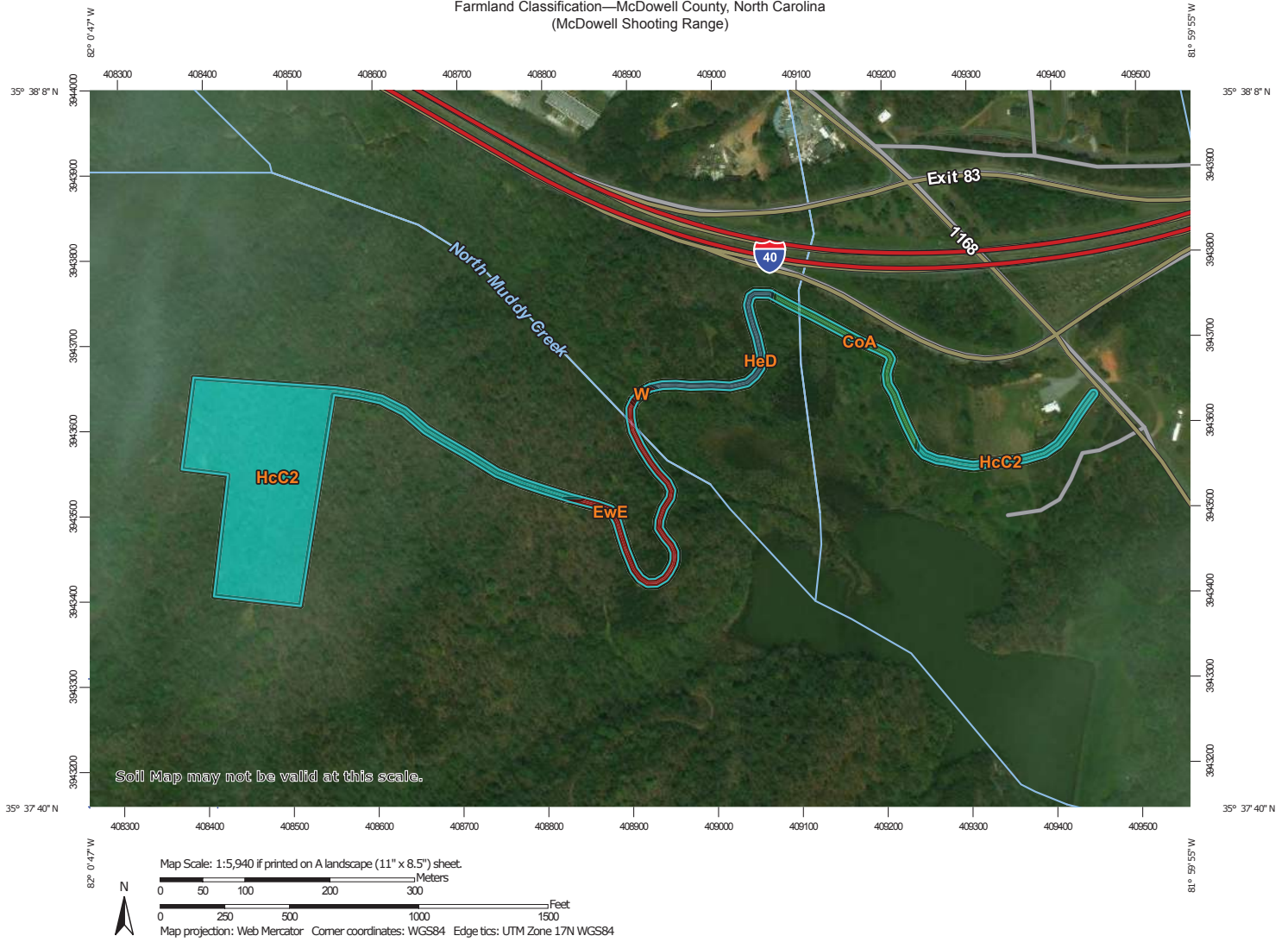
Test Results

The first seven values [soil class, HM%, W/V, CEC, BS%, Ac and pH] describe the soil and its degree of acidity. The remaining 16 [P-I, K-I, Ca%, Mg%, Mn-I, Mn-AI1, Mn-AI2, Zn-I, Zn-AI, Cu-I, S-I, SS-I, Na, ESP, SS-I, NO₃-N (not routinely available)] indicate levels of plant nutrients or other fertility measurement. Visit www.ncagr.gov/agronomi/uyrst.htm

Report Abbreviations

Ac	exchangeable acidity
B	boron
BS%	% CEC occupied by basic cations
Ca%	% CEC occupied by calcium
CEC	cation exchange capacity
Cu-I	copper index
ESP	exchangeable sodium percent
HM%	percent humic matter
K-I	potassium index
K₂O	potash
Mg%	% CEC occupied by magnesium
MIN	mineral soil class
Mn	manganese
Mn-AI1	Mn-availability index for crop 1
Mn-AI2	Mn-availability index for crop 2
Mn-I	manganese index
M-O	mineral-organic soil class
N	nitrogen
Na	sodium
NO₃-N	nitrate nitrogen
ORG	organic soil class
pH	current soil pH
P-I	phosphorus index
P₂O₅	phosphate
S-I	sulfur index
SS-I	soluble salt index
W/V	weight per volume
Zn-AI	zinc availability index
Zn-I	zinc index

Farmland Classification—McDowell County, North Carolina
(McDowell Shooting Range)



Natural Resources
Conservation Service


Web Soil Survey
National Cooperative Soil Survey

11/21/2017
Page 1 of 4

Farmland Classification—McDowell County, North Carolina
(McDowell Shooting Range)









MAP LEGEND








Area of Interest (AOI)

 Area of Interest (AOI)




Soils








Soil Rating Polygons






-  Not prime farmland
-  All areas are prime farmland
-  Prime farmland if drained
-  Prime farmland if protected from flooding or not frequently flooded during the growing season
-  Prime farmland if irrigated
-  Prime farmland if drained and either protected from flooding or not frequently flooded during the growing season
-  Prime farmland if irrigated and drained
-  Prime farmland if irrigated and either protected from flooding or not frequently flooded during the growing season

-  Prime farmland if subsoiled, completely removing the root inhibiting soil layer
-  Prime farmland if irrigated and the product of I (soil erodibility) x C (climate factor) does not exceed 60
-  Prime farmland if irrigated and reclaimed of excess salts and sodium
-  Farmland of statewide importance
-  Farmland of local importance
-  Farmland of unique importance
-  Not rated or not available







Soil Rating Lines










-  Not prime farmland
-  All areas are prime farmland
-  Prime farmland if drained

-  Prime farmland if protected from flooding or not frequently flooded during the growing season
-  Prime farmland if irrigated
-  Prime farmland if drained and either protected from flooding or not frequently flooded during the growing season
-  Prime farmland if irrigated and drained
-  Prime farmland if irrigated and either protected from flooding or not frequently flooded during the growing season
-  Prime farmland if subsoiled, completely removing the root inhibiting soil layer
-  Prime farmland if irrigated and the product of I (soil erodibility) x C (climate factor) does not exceed 60

-  Prime farmland if irrigated and reclaimed of excess salts and sodium
-  Farmland of statewide importance
-  Farmland of local importance
-  Farmland of unique importance
-  Not rated or not available

Soil Rating Points


-  Not prime farmland
-  All areas are prime farmland
-  Prime farmland if drained
-  Prime farmland if protected from flooding or not frequently flooded during the growing season
-  Prime farmland if irrigated
-  Prime farmland if drained and either protected from flooding or not frequently flooded during the growing season

-  Prime farmland if irrigated and drained
-  Prime farmland if irrigated and either protected from flooding or not frequently flooded during the growing season
-  Prime farmland if subsoiled, completely removing the root inhibiting soil layer
-  Prime farmland if irrigated and the product of I (soil erodibility) x C (climate factor) does not exceed 60
-  Prime farmland if irrigated and reclaimed of excess salts and sodium
-  Farmland of statewide importance
-  Farmland of local importance
-  Farmland of unique importance
-  Not rated or not available

Water Features

Farmland Classification—McDowell County, North Carolina
(McDowell Shooting Range)

MAP INFORMATION

 Streams and Canals


Transportation

 Rails


 Interstate Highways

 US Routes

 Major Roads

 Local Roads

Background

 Aerial Photography

The soil surveys that comprise your AOI were mapped at 1:24,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service

Web Soil Survey URL:

Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: McDowell County, North Carolina

Survey Area Data: Version 18, Sep 26, 2017

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Jan 15, 2014—Feb 5, 2017

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Farmland Classification

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
CoA	Colvard loam, 0 to 2 percent slopes, occasionally flooded	All areas are prime farmland	0.6	5.2%
EwE	Evard-Cowee complex, 25 to 60 percent slopes	Not prime farmland	0.9	7.6%
HcC2	Hayesville clay loam, 6 to 15 percent slopes, eroded	Farmland of statewide importance	9.7	81.8%
HeD	Hayesville-Evard complex, 15 to 25 percent slopes	Farmland of local importance	0.6	4.8%
W	Water	Not prime farmland	0.1	0.6%
Totals for Area of Interest			11.8	100.0%

Description

Farmland classification identifies map units as prime farmland, farmland of statewide importance, farmland of local importance, or unique farmland. It identifies the location and extent of the soils that are best suited to food, feed, fiber, forage, and oilseed crops. NRCS policy and procedures on prime and unique farmlands are published in the "Federal Register," Vol. 43, No. 21, January 31, 1978.

Rating Options

Aggregation Method: No Aggregation Necessary

Tie-break Rule: Lower

WETLAND DETERMINATION DATA SHEET – Eastern Mountains and Piedmont Region

Project/Site: McDowell Shooting Range City/County: Marion, McDowell Sampling Date: 11/15/2017
 Applicant/Owner: NCWRC State: NC Sampling Point: DP - 01
 Investigator(s): Ferguson, Darnell Section, Township, Range: NA
 Landform (hillside, terrace, etc.): Depression Local relief (concave, convex, none): Concave Slope (%): <2%
 Subregion (LRR or MLRA): LRR N Lat: 35.633539, Long: -82.007667 Datum: NAD 83
 Soil Map Unit Name: COA NWI classification: R4SBC

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No (If no, explain in Remarks.)
 Are Vegetation , Soil , or Hydrology significantly disturbed? Are "Normal Circumstances" present? Yes No X
 Are Vegetation , Soil , or Hydrology naturally problematic? (If needed, explain any answers in Remarks.)

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

Hydrophytic Vegetation Present?	Yes <u>X</u> No <u> </u>	Is the Sampled Area within a Wetland?	Yes <u>X</u> No <u> </u>
Hydric Soil Present?	Yes <u>X</u> No <u> </u>		
Wetland Hydrology Present?	Yes <u>X</u> No <u> </u>		
Remarks:			

HYDROLOGY

Wetland Hydrology Indicators: <u>Primary Indicators (minimum of one is required; check all that apply)</u> <u>X</u> Surface Water (A1) <u> </u> True Aquatic Plants (B14) <u>X</u> High Water Table (A2) <u> </u> Hydrogen Sulfide Odor (C1) <u> </u> Saturation (A3) <u> </u> Oxidized Rhizospheres on Living Roots (C3) <u> </u> Water Marks (B1) <u> </u> Presence of Reduced Iron (C4) <u> </u> Sediment Deposits (B2) <u> </u> Recent Iron Reduction in Tilled Soils (C6) <u> </u> Drift Deposits (B3) <u> </u> Thin Muck Surface (C7) <u> </u> Algal Mat or Crust (B4) <u> </u> Other (Explain in Remarks) <u> </u> Iron Deposits (B5) <u> </u> Inundation Visible on Aerial Imagery (B7) <u> </u> Water-Stained Leaves (B9) <u> </u> Aquatic Fauna (B13)		<u>Secondary Indicators (minimum of two required)</u> <u> </u> Surface Soil Cracks (B6) <u> </u> Sparsely Vegetated Concave Surface (B8) <u> </u> Drainage Patterns (B10) <u> </u> Moss Trim Lines (B16) <u> </u> Dry-Season Water Table (C2) <u> </u> Crayfish Burrows (C8) <u> </u> Saturation Visible on Aerial Imagery (C9) <u> </u> Stunted or Stressed Plants (D1) <u> </u> Geomorphic Position (D2) <u> </u> Shallow Aquitard (D3) <u> </u> Microtopographic Relief (D4) <u>X</u> FAC-Neutral Test (D5)	
Field Observations: Surface Water Present? Yes <u>X</u> No <u> </u> Depth (inches): <u>2</u> Water Table Present? Yes <u>X</u> No <u> </u> Depth (inches): <u>0</u> Saturation Present? Yes <u>X</u> No <u> </u> Depth (inches): <u>0</u> (includes capillary fringe)		Wetland Hydrology Present? Yes <u>X</u> No <u> </u>	
Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:			
Remarks:			

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

 Sampling Point: DP - 01

Tree Stratum (Plot size: <u>30'</u>)	Absolute % Cover	Dominant Species?	Indicator Status																	
1. <u>Acer rubrum</u>	<u>15</u>	<u>Yes</u>	<u>FAC</u>	Dominance Test worksheet: Number of Dominant Species That Are OBL, FACW, or FAC: <u>8</u> (A) Total Number of Dominant Species Across All Strata: <u>8</u> (B) Percent of Dominant Species That Are OBL, FACW, or FAC: <u>100.0%</u> (A/B)																
2. <u>Liquidambar styraciflua</u>	<u>10</u>	<u>Yes</u>	<u>FAC</u>																	
3. <u>Salix nigra</u>	<u>5</u>	<u>No</u>	<u>OBL</u>																	
4. _____	_____	_____	_____																	
5. _____	_____	_____	_____																	
6. _____	_____	_____	_____																	
7. _____	_____	_____	_____																	
30 = Total Cover				Prevalence Index worksheet: <table style="width: 100%;"> <tr> <th style="width: 50%;">Total % Cover of:</th> <th style="width: 50%;">Multiply by:</th> </tr> <tr> <td>OBL species <u>15</u></td> <td>x 1 = <u>15</u></td> </tr> <tr> <td>FACW species <u>25</u></td> <td>x 2 = <u>50</u></td> </tr> <tr> <td>FAC species <u>55</u></td> <td>x 3 = <u>165</u></td> </tr> <tr> <td>FACU species <u>0</u></td> <td>x 4 = <u>0</u></td> </tr> <tr> <td>UPL species <u>0</u></td> <td>x 5 = <u>0</u></td> </tr> <tr> <td>Column Totals: <u>95</u> (A)</td> <td><u>230</u> (B)</td> </tr> <tr> <td colspan="2" style="text-align: center;">Prevalence Index = B/A = <u>2.42</u></td> </tr> </table>	Total % Cover of:	Multiply by:	OBL species <u>15</u>	x 1 = <u>15</u>	FACW species <u>25</u>	x 2 = <u>50</u>	FAC species <u>55</u>	x 3 = <u>165</u>	FACU species <u>0</u>	x 4 = <u>0</u>	UPL species <u>0</u>	x 5 = <u>0</u>	Column Totals: <u>95</u> (A)	<u>230</u> (B)	Prevalence Index = B/A = <u>2.42</u>	
Total % Cover of:	Multiply by:																			
OBL species <u>15</u>	x 1 = <u>15</u>																			
FACW species <u>25</u>	x 2 = <u>50</u>																			
FAC species <u>55</u>	x 3 = <u>165</u>																			
FACU species <u>0</u>	x 4 = <u>0</u>																			
UPL species <u>0</u>	x 5 = <u>0</u>																			
Column Totals: <u>95</u> (A)	<u>230</u> (B)																			
Prevalence Index = B/A = <u>2.42</u>																				
50% of total cover: <u>15</u> 20% of total cover: <u>6</u>																				
Sapling/Shrub Stratum (Plot size: <u>30'</u>)																				
1. <u>Acer rubrum</u>	<u>5</u>	<u>Yes</u>	<u>FAC</u>	Hydrophytic Vegetation Indicators: <u>1</u> - Rapid Test for Hydrophytic Vegetation <u>X</u> <u>2</u> - Dominance Test is >50% <u>X</u> <u>3</u> - Prevalence Index is ≤3.0 ¹ <u>4</u> - Morphological Adaptations ¹ (Provide supporting data in Remarks or on a separate sheet) <u>Problematic Hydrophytic Vegetation¹ (Explain)</u> ¹ Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.																
2. <u>Salix nigra</u>	<u>10</u>	<u>Yes</u>	<u>OBL</u>																	
3. _____	_____	_____	_____																	
4. _____	_____	_____	_____																	
5. _____	_____	_____	_____																	
6. _____	_____	_____	_____																	
7. _____	_____	_____	_____																	
15 = Total Cover																				
50% of total cover: <u>8</u> 20% of total cover: <u>3</u>																				
Herb Stratum (Plot size: <u>30'</u>)																				
1. <u>Juncus effusus</u>	<u>20</u>	<u>Yes</u>	<u>FACW</u>	Definitions of Four Vegetation Strata: Tree – Woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height. Sapling/Shrub – Woody plants, excluding vines, less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall. Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall. Woody Vine – All woody vines greater than 3.28 ft in height.																
2. <u>Arundinaria gigantea</u>	<u>5</u>	<u>No</u>	<u>FACW</u>																	
3. <u>Carex abscondita</u>	<u>10</u>	<u>Yes</u>	<u>FAC</u>																	
4. <u>Festuca paradoxa</u>	<u>10</u>	<u>Yes</u>	<u>FAC</u>																	
5. _____	_____	_____	_____																	
6. _____	_____	_____	_____																	
7. _____	_____	_____	_____																	
8. _____	_____	_____	_____																	
9. _____	_____	_____	_____																	
10. _____	_____	_____	_____																	
11. _____	_____	_____	_____																	
45 = Total Cover																				
50% of total cover: <u>23</u> 20% of total cover: <u>9</u>																				
Woody Vine Stratum (Plot size: <u>30'</u>)																				
1. <u>Smilax rotundifolia</u>	<u>5</u>	<u>Yes</u>	<u>FAC</u>	Hydrophytic Vegetation Present? Yes <u>X</u> No _____																
2. _____	_____	_____	_____																	
3. _____	_____	_____	_____																	
4. _____	_____	_____	_____																	
5. _____	_____	_____	_____																	
5 = Total Cover																				
50% of total cover: <u>3</u> 20% of total cover: <u>1</u>																				
Remarks: (Include photo numbers here or on a separate sheet.)																				

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

 Sampling Point: DP - 01

Tree Stratum (Plot size: _____)	Absolute % Cover	Dominant Species?	Indicator Status																	
1. _____	_____	_____	_____	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)																
2. _____	_____	_____	_____																	
3. _____	_____	_____	_____																	
4. _____	_____	_____	_____																	
5. _____	_____	_____	_____																	
6. _____	_____	_____	_____																	
_____ = Total Cover				Prevalence Index worksheet: <table style="width: 100%;"> <tr> <td style="width: 50%;">Total % Cover of:</td> <td style="width: 50%;">Multiply by:</td> </tr> <tr> <td>OBL species _____</td> <td>x 1 = _____</td> </tr> <tr> <td>FACW species _____</td> <td>x 2 = _____</td> </tr> <tr> <td>FAC species _____</td> <td>x 3 = _____</td> </tr> <tr> <td>FACU species _____</td> <td>x 4 = _____</td> </tr> <tr> <td>UPL species _____</td> <td>x 5 = _____</td> </tr> <tr> <td>Column Totals: _____</td> <td>(A) _____ (B) _____</td> </tr> <tr> <td colspan="2" style="text-align: center;">Prevalence Index = B/A = _____</td> </tr> </table>	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 = _____	
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 = _____																				
50% of total cover: _____ 20% of total cover: _____																				
Sapling Stratum (Plot size: _____)																				
1. _____	_____	_____	_____																	
2. _____	_____	_____	_____																	
3. _____	_____	_____	_____																	
4. _____	_____	_____	_____																	
5. _____	_____	_____	_____																	
6. _____	_____	_____	_____																	
_____ = Total Cover																				
50% of total cover: _____ 20% of total cover: _____																				
Shrub Stratum (Plot size: _____)																				
1. _____	_____	_____	_____																	
2. _____	_____	_____	_____																	
3. _____	_____	_____	_____																	
4. _____	_____	_____	_____																	
5. _____	_____	_____	_____																	
6. _____	_____	_____	_____																	
_____ = Total Cover																				
50% of total cover: _____ 20% of total cover: _____																				
Herb Stratum (Plot size: _____)																				
1. _____	_____	_____	_____																	
2. _____	_____	_____	_____																	
3. _____	_____	_____	_____																	
4. _____	_____	_____	_____																	
5. _____	_____	_____	_____																	
6. _____	_____	_____	_____																	
7. _____	_____	_____	_____																	
8. _____	_____	_____	_____																	
9. _____	_____	_____	_____																	
10. _____	_____	_____	_____																	
11. _____	_____	_____	_____																	
_____ = Total Cover																				
50% of total cover: _____ 20% of total cover: _____																				
Woody Vine Stratum (Plot size: _____)																				
1. _____	_____	_____	_____																	
2. _____	_____	_____	_____																	
3. _____	_____	_____	_____																	
4. _____	_____	_____	_____																	
5. _____	_____	_____	_____																	
_____ = Total Cover																				
50% of total cover: _____ 20% of total cover: _____																				
Remarks: (Include photo numbers here or on a separate sheet.)																				

Definitions of Five Vegetation Strata:

Tree – Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

Sapling – Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

Shrub - Woody Plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

Herb – All herbaceous (non-woody) plants, including herbaceous vines, regardless of size, and woody plants, except woody vines, less than approximately 3 ft (1 m) in height.

Woody Vine – All woody vines, regardless of height.

Hydrophytic Vegetation Present? Yes No

SOIL

Sampling Point: DP - 01

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

Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²		
0-1	10YR 3/1						Muck	
1-12	10YR 4/2	90	10YR 5/6	10	C	M	Loamy/Clayey	Prominent redox concentrations
12-24	10YR 4/1	80	10YR 5/6	20	C	M	Loamy/Clayey	Prominent redox concentrations

¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains.²Location: PL=Pore Lining, M=Matrix.**Hydric Soil Indicators:**

<input type="checkbox"/> Histosol (A1)	<input type="checkbox"/> Polyvalue Below Surface (S8) (MLRA 147, 148)
<input type="checkbox"/> Histic Epipedon (A2)	<input type="checkbox"/> Thin Dark Surface (S9) (MLRA 147, 148)
<input type="checkbox"/> Black Histic (A3)	<input type="checkbox"/> Loamy Mucky Mineral (F1) (MLRA 136)
<input type="checkbox"/> Hydrogen Sulfide (A4)	<input type="checkbox"/> Loamy Gleyed Matrix (F2)
<input type="checkbox"/> Stratified Layers (A5)	<input checked="" type="checkbox"/> Depleted Matrix (F3)
<input checked="" type="checkbox"/> 2 cm Muck (A10) (LRR N)	<input type="checkbox"/> Redox Dark Surface (F6)
<input checked="" type="checkbox"/> Depleted Below Dark Surface (A11)	<input type="checkbox"/> Depleted Dark Surface (F7)
<input type="checkbox"/> Thick Dark Surface (A12)	<input type="checkbox"/> Redox Depressions (F8)
<input type="checkbox"/> Sandy Mucky Mineral (S1)	<input type="checkbox"/> Iron-Manganese Masses (F12) (LRR N, MLRA 136)
<input type="checkbox"/> Sandy Gleyed Matrix (S4)	<input type="checkbox"/> Umbric Surface (F13) (MLRA 122, 136)
<input type="checkbox"/> Sandy Redox (S5)	<input type="checkbox"/> Piedmont Floodplain Soils (F19) (MLRA 148)
<input type="checkbox"/> Stripped Matrix (S6)	<input type="checkbox"/> Red Parent Material (F21) (MLRA 127, 147, 148)
<input type="checkbox"/> Dark Surface (S7)	

Indicators for Problematic Hydric Soils³:

<input type="checkbox"/> 2 cm Muck (A10) (MLRA 147)
<input type="checkbox"/> Coast Prairie Redox (A16) (MLRA 147, 148)
<input type="checkbox"/> Piedmont Floodplain Soils (F19) (MLRA 136, 147)
<input type="checkbox"/> Red Parent Material (F21) (outside MLRA 127, 147, 148)
<input type="checkbox"/> Very Shallow Dark Surface (F22)
<input type="checkbox"/> Other (Explain in Remarks)

³Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.**Restrictive Layer (if observed):**
 Type: _____
 Depth (inches): _____
Hydric Soil Present? Yes ☒ No ☐**Remarks:**

This data sheet is revised from Eastern Mountains and Piedmont Regional Supplement Version 2.0 to include the NRCS Field Indicators of Hydric Soils, Version 8.0, 2016.

WETLAND DETERMINATION DATA SHEET – Eastern Mountains and Piedmont Region

Project/Site: McDowell Shooting Range City/County: Marion, McDowell Sampling Date: 11/15/2017
 Applicant/Owner: NCWRC State: NC Sampling Point: DP - 02
 Investigator(s): Ferguson, Darnell Section, Township, Range: NA
 Landform (hillside, terrace, etc.): Hillslope Local relief (concave, convex, none): Convex Slope (%): >3%
 Subregion (LRR or MLRA): LRR N Lat: 35.631912, Long: -82.010787 Datum: NAD 83
 Soil Map Unit Name: HcC2 NWI classification: None

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No (If no, explain in Remarks.)
 Are Vegetation , Soil , or Hydrology significantly disturbed? Are "Normal Circumstances" present? Yes No X
 Are Vegetation , Soil , or Hydrology naturally problematic? (If needed, explain any answers in Remarks.)

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

Hydrophytic Vegetation Present? Yes <u>X</u> No <u> </u> Hydric Soil Present? Yes <u> </u> No <u>X</u> Wetland Hydrology Present? Yes <u> </u> No <u>X</u>	Is the Sampled Area within a Wetland? Yes <u> </u> No <u>X</u>
Remarks:	

HYDROLOGY

Wetland Hydrology Indicators: <u>Primary Indicators (minimum of one is required; check all that apply)</u> <div style="display: flex; flex-wrap: wrap;"> <div style="width: 50%;"> <u> </u> Surface Water (A1) <u> </u> High Water Table (A2) <u> </u> Saturation (A3) <u> </u> Water Marks (B1) <u> </u> Sediment Deposits (B2) <u> </u> Drift Deposits (B3) <u> </u> Algal Mat or Crust (B4) <u> </u> Iron Deposits (B5) <u> </u> Inundation Visible on Aerial Imagery (B7) <u> </u> Water-Stained Leaves (B9) <u> </u> Aquatic Fauna (B13) </div> <div style="width: 50%;"> <u> </u> True Aquatic Plants (B14) <u> </u> Hydrogen Sulfide Odor (C1) <u> </u> Oxidized Rhizospheres on Living Roots (C3) <u> </u> Presence of Reduced Iron (C4) <u> </u> Recent Iron Reduction in Tilled Soils (C6) <u> </u> Thin Muck Surface (C7) <u> </u> Other (Explain in Remarks) </div> </div>	<u>Secondary Indicators (minimum of two required)</u> <u> </u> Surface Soil Cracks (B6) <u> </u> Sparsely Vegetated Concave Surface (B8) <u> </u> Drainage Patterns (B10) <u> </u> Moss Trim Lines (B16) <u> </u> Dry-Season Water Table (C2) <u> </u> Crayfish Burrows (C8) <u> </u> Saturation Visible on Aerial Imagery (C9) <u> </u> Stunted or Stressed Plants (D1) <u> </u> Geomorphic Position (D2) <u> </u> Shallow Aquitard (D3) <u> </u> Microtopographic Relief (D4) <u> </u> FAC-Neutral Test (D5)
Field Observations: Surface Water Present? Yes <u> </u> No <u>X</u> Depth (inches): <u> </u> Water Table Present? Yes <u> </u> No <u>X</u> Depth (inches): <u> </u> Saturation Present? Yes <u> </u> No <u>X</u> Depth (inches): <u> </u> (includes capillary fringe)	Wetland Hydrology Present? Yes <u> </u> No <u>X</u>
Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:	
Remarks:	

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

 Sampling Point: DP - 02

Tree Stratum (Plot size: <u>30'</u>)	Absolute % Cover	Dominant Species?	Indicator Status																	
1. <u>Acer rubrum</u>	<u>15</u>	<u>Yes</u>	<u>FAC</u>	Dominance Test worksheet: Number of Dominant Species That Are OBL, FACW, or FAC: <u>7</u> (A) Total Number of Dominant Species Across All Strata: <u>12</u> (B) Percent of Dominant Species That Are OBL, FACW, or FAC: <u>58.3%</u> (A/B)																
2. <u>Liquidambar styraciflua</u>	<u>10</u>	<u>Yes</u>	<u>FAC</u>																	
3. <u>Quercus rubra</u>	<u>10</u>	<u>Yes</u>	<u>FACU</u>																	
4. <u>Pinus virginiana</u>	<u>15</u>	<u>Yes</u>	<u>UPL</u>																	
5. <u>Quercus montana</u>	<u>10</u>	<u>Yes</u>	<u>UPL</u>																	
6. <u>Oxydendrum arboreum</u>	<u>10</u>	<u>Yes</u>	<u>UPL</u>																	
7. _____	_____	_____	_____																	
		<u>70</u> =Total Cover		Prevalence Index worksheet: <table style="width: 100%;"> <tr> <th style="width: 50%;">Total % Cover of:</th> <th style="width: 50%;">Multiply by:</th> </tr> <tr> <td>OBL species <u>0</u></td> <td>x 1 = <u>0</u></td> </tr> <tr> <td>FACW species <u>0</u></td> <td>x 2 = <u>0</u></td> </tr> <tr> <td>FAC species <u>70</u></td> <td>x 3 = <u>210</u></td> </tr> <tr> <td>FACU species <u>20</u></td> <td>x 4 = <u>80</u></td> </tr> <tr> <td>UPL species <u>35</u></td> <td>x 5 = <u>175</u></td> </tr> <tr> <td>Column Totals: <u>125</u> (A)</td> <td><u>465</u> (B)</td> </tr> <tr> <td colspan="2">Prevalence Index = B/A = <u>3.72</u></td> </tr> </table>	Total % Cover of:	Multiply by:	OBL species <u>0</u>	x 1 = <u>0</u>	FACW species <u>0</u>	x 2 = <u>0</u>	FAC species <u>70</u>	x 3 = <u>210</u>	FACU species <u>20</u>	x 4 = <u>80</u>	UPL species <u>35</u>	x 5 = <u>175</u>	Column Totals: <u>125</u> (A)	<u>465</u> (B)	Prevalence Index = B/A = <u>3.72</u>	
Total % Cover of:	Multiply by:																			
OBL species <u>0</u>	x 1 = <u>0</u>																			
FACW species <u>0</u>	x 2 = <u>0</u>																			
FAC species <u>70</u>	x 3 = <u>210</u>																			
FACU species <u>20</u>	x 4 = <u>80</u>																			
UPL species <u>35</u>	x 5 = <u>175</u>																			
Column Totals: <u>125</u> (A)	<u>465</u> (B)																			
Prevalence Index = B/A = <u>3.72</u>																				
50% of total cover: <u>35</u>		20% of total cover: <u>14</u>																		
Sapling/Shrub Stratum (Plot size: <u>30'</u>)																				
1. <u>Acer rubrum</u>	<u>5</u>	<u>Yes</u>	<u>FAC</u>	Hydrophytic Vegetation Indicators: <u>1</u> - Rapid Test for Hydrophytic Vegetation <u>X</u> <u>2</u> - Dominance Test is >50% <u>3</u> - Prevalence Index is ≤3.0 ¹ <u>4</u> - Morphological Adaptations ¹ (Provide supporting data in Remarks or on a separate sheet) <u> </u> Problematic Hydrophytic Vegetation ¹ (Explain) ¹ Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.																
2. <u>Liquidambar styraciflua</u>	<u>10</u>	<u>Yes</u>	<u>FAC</u>																	
3. _____	_____	_____	_____																	
4. _____	_____	_____	_____																	
5. _____	_____	_____	_____																	
6. _____	_____	_____	_____																	
7. _____	_____	_____	_____																	
		<u>15</u> =Total Cover																		
50% of total cover: <u>8</u>		20% of total cover: <u>3</u>																		
Herb Stratum (Plot size: <u>30'</u>)																				
1. <u>Chasmanthium laxum</u>	<u>10</u>	<u>Yes</u>	<u>FAC</u>	Definitions of Four Vegetation Strata: Tree – Woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height. Sapling/Shrub – Woody plants, excluding vines, less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall. Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall. Woody Vine – All woody vines greater than 3.28 ft in height.																
2. <u>Polystichum acrostichoides</u>	<u>10</u>	<u>Yes</u>	<u>FACU</u>																	
3. _____	_____	_____	_____																	
4. _____	_____	_____	_____																	
5. _____	_____	_____	_____																	
6. _____	_____	_____	_____																	
7. _____	_____	_____	_____																	
		<u>20</u> =Total Cover																		
50% of total cover: <u>10</u>		20% of total cover: <u>4</u>																		
Woody Vine Stratum (Plot size: <u>30'</u>)																				
1. <u>Smilax rotundifolia</u>	<u>10</u>	<u>Yes</u>	<u>FAC</u>	Hydrophytic Vegetation Present? Yes <u>X</u> No _____																
2. <u>Vitis rotundifolia</u>	<u>10</u>	<u>Yes</u>	<u>FAC</u>																	
3. _____	_____	_____	_____																	
4. _____	_____	_____	_____																	
5. _____	_____	_____	_____																	
		<u>20</u> =Total Cover																		
50% of total cover: <u>10</u>		20% of total cover: <u>4</u>																		
Remarks: (Include photo numbers here or on a separate sheet.)																				

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

 Sampling Point: DP - 02

Tree Stratum (Plot size: _____)	Absolute % Cover	Dominant Species?	Indicator Status																	
1. _____	_____	_____	_____	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)																
2. _____	_____	_____	_____																	
3. _____	_____	_____	_____																	
4. _____	_____	_____	_____																	
5. _____	_____	_____	_____																	
6. _____	_____	_____	_____																	
_____ = Total Cover				Prevalence Index worksheet: <table style="width: 100%;"> <tr> <td style="width: 50%;">Total % Cover of:</td> <td style="width: 50%;">Multiply by:</td> </tr> <tr> <td>OBL species _____</td> <td>x 1 = _____</td> </tr> <tr> <td>FACW species _____</td> <td>x 2 = _____</td> </tr> <tr> <td>FAC species _____</td> <td>x 3 = _____</td> </tr> <tr> <td>FACU species _____</td> <td>x 4 = _____</td> </tr> <tr> <td>UPL species _____</td> <td>x 5 = _____</td> </tr> <tr> <td>Column Totals: _____</td> <td>(A) _____ (B) _____</td> </tr> <tr> <td colspan="2" style="text-align: center;">Prevalence Index = B/A = _____</td> </tr> </table>	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 = _____	
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 = _____																				
50% of total cover: _____ 20% of total cover: _____																				
Sapling Stratum (Plot size: _____)																				
1. _____	_____	_____	_____																	
2. _____	_____	_____	_____																	
3. _____	_____	_____	_____																	
4. _____	_____	_____	_____																	
5. _____	_____	_____	_____																	
6. _____	_____	_____	_____																	
_____ = Total Cover																				
50% of total cover: _____ 20% of total cover: _____																				
Shrub Stratum (Plot size: _____)																				
1. _____	_____	_____	_____																	
2. _____	_____	_____	_____																	
3. _____	_____	_____	_____																	
4. _____	_____	_____	_____																	
5. _____	_____	_____	_____																	
6. _____	_____	_____	_____																	
_____ = Total Cover																				
50% of total cover: _____ 20% of total cover: _____																				
Herb Stratum (Plot size: _____)																				
1. _____	_____	_____	_____																	
2. _____	_____	_____	_____																	
3. _____	_____	_____	_____																	
4. _____	_____	_____	_____																	
5. _____	_____	_____	_____																	
6. _____	_____	_____	_____																	
7. _____	_____	_____	_____																	
8. _____	_____	_____	_____																	
9. _____	_____	_____	_____																	
10. _____	_____	_____	_____																	
11. _____	_____	_____	_____																	
_____ = Total Cover																				
50% of total cover: _____ 20% of total cover: _____																				
Woody Vine Stratum (Plot size: _____)																				
1. _____	_____	_____	_____																	
2. _____	_____	_____	_____																	
3. _____	_____	_____	_____																	
4. _____	_____	_____	_____																	
5. _____	_____	_____	_____																	
_____ = Total Cover																				
50% of total cover: _____ 20% of total cover: _____																				
Remarks: (Include photo numbers here or on a separate sheet.)																				

Definitions of Five Vegetation Strata:

Tree – Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

Sapling – Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

Shrub - Woody Plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

Herb – All herbaceous (non-woody) plants, including herbaceous vines, regardless of size, and woody plants, except woody vines, less than approximately 3 ft (1 m) in height.

Woody Vine – All woody vines, regardless of height.

Hydrophytic Vegetation Present? Yes _____ No _____

SOIL

Sampling Point: DP - 02

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

Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²		
0-24	10YR 5/6						Loamy/Clayey	

¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains.²Location: PL=Pore Lining, M=Matrix.**Hydric Soil Indicators:**

<input type="checkbox"/> Histosol (A1)	<input type="checkbox"/> Polyvalue Below Surface (S8) (MLRA 147, 148)
<input type="checkbox"/> Histic Epipedon (A2)	<input type="checkbox"/> Thin Dark Surface (S9) (MLRA 147, 148)
<input type="checkbox"/> Black Histic (A3)	<input type="checkbox"/> Loamy Mucky Mineral (F1) (MLRA 136)
<input type="checkbox"/> Hydrogen Sulfide (A4)	<input type="checkbox"/> Loamy Gleyed Matrix (F2)
<input type="checkbox"/> Stratified Layers (A5)	<input type="checkbox"/> Depleted Matrix (F3)
<input type="checkbox"/> 2 cm Muck (A10) (LRR N)	<input type="checkbox"/> Redox Dark Surface (F6)
<input type="checkbox"/> Depleted Below Dark Surface (A11)	<input type="checkbox"/> Depleted Dark Surface (F7)
<input type="checkbox"/> Thick Dark Surface (A12)	<input type="checkbox"/> Redox Depressions (F8)
<input type="checkbox"/> Sandy Mucky Mineral (S1)	<input type="checkbox"/> Iron-Manganese Masses (F12) (LRR N, MLRA 136)
<input type="checkbox"/> Sandy Gleyed Matrix (S4)	<input type="checkbox"/> Umbric Surface (F13) (MLRA 122, 136)
<input type="checkbox"/> Sandy Redox (S5)	<input type="checkbox"/> Piedmont Floodplain Soils (F19) (MLRA 148)
<input type="checkbox"/> Stripped Matrix (S6)	<input type="checkbox"/> Red Parent Material (F21) (MLRA 127, 147, 148)
<input type="checkbox"/> Dark Surface (S7)	

Indicators for Problematic Hydric Soils³:

<input type="checkbox"/> 2 cm Muck (A10) (MLRA 147)
<input type="checkbox"/> Coast Prairie Redox (A16)
<input type="checkbox"/> (MLRA 147, 148)
<input type="checkbox"/> Piedmont Floodplain Soils (F19)
<input type="checkbox"/> (MLRA 136, 147)
<input type="checkbox"/> Red Parent Material (F21)
<input type="checkbox"/> (outside MLRA 127, 147, 148)
<input type="checkbox"/> Very Shallow Dark Surface (F22)
<input type="checkbox"/> Other (Explain in Remarks)

³Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.**Restrictive Layer (if observed):**Type: _____
Depth (inches): _____Hydric Soil Present? Yes _____ No X**Remarks:**

This data sheet is revised from Eastern Mountains and Piedmont Regional Supplement Version 2.0 to include the NRCS Field Indicators of Hydric Soils, Version 8.0, 2016.

NC DWQ Stream Identification Form Version 4.11

Date: 11/15/2007	Project/Site: McDowell shooting range	Latitude: 35.632389
Evaluator: Ferguson	County: McDowell	Longitude: -82.005958
Total Points: Stream is at least intermittent if ≥ 19 or perennial if ≥ 30 34.5	Stream Determination (circle one) Ephemeral Intermittent <u>Perennial</u>	Other e.g. Quad Name: —

A. Geomorphology (Subtotal = 18)

	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 = 8.5)

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)

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

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

Notes:

Sketch:

#2

NC DWQ Stream Identification Form Version 4.11

52

Date: 11/15/2017	Project/Site: McDowell Shooting Range	Latitude: 35.633114
Evaluator: Ferguson	County: McDowell	Longitude: -82.003488
Total Points: 28.5 Stream is at least intermittent if ≥ 19 or perennial if ≥ 30 *	Stream Determination (circle one) Ephemeral Intermittent Perennial	Other e.g. Quad Name: _____

A. Geomorphology (Subtotal = 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 = 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 = 5)				
18. Fibrous roots in streambed	3	2	1	0
19. Rooted upland plants in streambed	3	2	1	0
20. Macroinvertebrates (note diversity and abundance)	0	1	2	3
21. Aquatic Mollusks	0	1	2	3
22. Fish	0	0.5	1	1.5
23. Crayfish	0	0.5	1	1.5
24. Amphibians	0	0.5	1	1.5
25. Algae	0	0.5	1	1.5
26. Wetland plants in streambed	FACW = 0.75; OBL = 1.5 Other = 0			

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

Notes:
Sketch:



United States Department of the Interior

FISH AND WILDLIFE SERVICE

Asheville Field Office
160 Zillicoa Street Suite #B
Asheville, North Carolina 28801

December 12, 2017



Mr. Kevin Ferguson
Mr. W. Brandon Fulton
ECS Southeast, LLP
4811 Koger Blvd.
Greensboro, North Carolina 27407

Dear Mr. Ferguson and Mr. Fulton:

Subject: Proposed McDowell Shooting Range, Ashworth Road and Interstate 40, Marion,
McDowell County, North Carolina (ECS Project No: 49:5541)

We received your letter of November 20, 2017 (received via email on that same date), requesting our comments on the subject project. The following comments are provided in accordance with the provisions of the National Environmental Policy Act (42 U.S.C. §4321 et seq.) and section 7 of the Endangered Species Act of 1973, as amended (16 U.S.C. 1531-1543) (Act).

Stream and Wetland Buffers – As noted in your letter, there is a perennial stream (North Muddy Creek) within the project boundary – a permit from the U.S. Army Corps of Engineers may be necessary to impact this feature. Natural, forested riparian buffers are critical to the health of aquatic ecosystems. They accomplish the following:

1. catch and filter runoff, thereby helping to prevent nonpoint-source pollutants from reaching streams;
2. enhance the in-stream processing of both point- and nonpoint-source pollutants;
3. act as “sponges” by absorbing runoff (which reduces the severity of floods) and by allowing runoff to infiltrate and recharge groundwater levels (which maintains stream flows during dry periods);
4. catch and help prevent excess woody debris from entering the stream and creating logjams;
5. stabilize stream banks and maintain natural channel morphology;

6. provide coarse woody debris for habitat structure and most of the dissolved organic carbon and other nutrients necessary for the aquatic food web; and
7. maintain air and water temperatures around the stream.

Forested riparian buffers (a minimum 50 feet wide along intermittent streams and 100 feet wide along perennial streams [or the full extent of the 100-year floodplain, whichever is greater]) should be created and/or maintained along all aquatic areas. Impervious surfaces, ditches, pipes, roads, utility lines (sewer, water, gas, transmission, etc.), and other infrastructures that require maintained, cleared rights-of-way and/or compromise the functions and values of the forested buffers should not occur within these riparian areas.

Stream Crossings - Bridges or spanning structures should be used for all permanent roadway crossings of streams and associated wetlands. Structures should span the channel and the floodplain in order to minimize impacts to aquatic resources, allow for the movement of aquatic and terrestrial organisms, and eliminate the need to place fill in streams and floodplains.

Bridges should be designed and constructed so that no piers or bents are placed in the stream, approaches and abutments do not constrict the stream channel, and the crossing is perpendicular to the stream. Spanning some or all of the floodplain allows the stream to access its floodplain and dissipate energy during high flows and also provides for terrestrial wildlife passage. When bank stabilization is necessary, we recommend that the use of riprap be minimized and that a riprap-free buffer zone be maintained under the bridge to allow for wildlife movement. If fill in the floodplain is necessary, floodplain culverts should be added through the fill to allow the stream access to the floodplain during high flows.

If bridges are not possible and culverts are the only option, we suggest using bottomless culverts. Bottomless culverts preserve the natural stream substrate, create less disturbance during construction and provide a more natural post-construction channel. Culverts should be sufficiently sized to mimic natural stream functions and habitats located at the crossing site; allow for water depth, volume (flow), and velocity levels that will permit aquatic organism passage; and accommodate the movement of debris and bed material during bank-full events. Widening the stream channel must be avoided.

In the event that a traditional culvert is the only option, the culvert design should provide for a minimum water depth in the structure during low-flow/dry periods. Sufficient water depth should be maintained in all flow regimes so as to accommodate both the upstream and downstream movement of aquatic species. Water depth inside the culvert must be adequate for fish to be completely immersed and all other aquatic life to move freely. The culvert should be designed and installed at the same slope as the stream grade to maintain an acceptable water velocity for aquatic life passage and for stream substrate characteristics to be retained within the culvert.

Where feasible, we recommend the use of multiple barrels, in addition to the low-flow barrel, to accommodate flood flows. Floodplain barrels should be placed on or near stream bank-full or floodplain bench elevation and discharge onto floodplain benches. Where appropriate, install sills on the upstream end of floodplain barrels to restrict or divert the base stream flow to a

single barrel. If the culvert is longer than 40 linear feet, alternating or notched baffles should be installed in a manner that mimics the existing stream pattern. This will enhance the passage of aquatic life by: (1) depositing and retaining sediment in the barrel, (2) maintaining channel depth and flow regimes, and (3) providing resting places for fish and other aquatic organisms.

Measures to control sediment and erosion should be installed before any ground-disturbing activities occur. Grading and backfilling should be minimized, and existing native vegetation should be retained (if possible) to maintain riparian cover for fish and wildlife. Disturbed areas should be revegetated with native grass and tree species as soon as the project is completed.

The proper planning, design, and installation of stream crossings provide year-round passage for aquatic organisms and preserve healthy streams. We recommend the following Web site for additional information regarding stream-crossing activities:

<http://www.stream.fs.fed.us/fishxing/pointers.html>.

Federally Listed Endangered and Threatened Species - Because the entire project is more than 17 miles from nearest known northern long-eared bat maternity site or hibernacula and there is suitable habitat in the surrounding area, the low probability/amount of “take” occurring as a result of this project is discountable and we believe this project is “not likely to adversely affect” this species. Though the project will result in the removal/loss of very little suitable northern long-eared bat habitat, and the probability of bats using the project area is very low, we recommend all tree felling occur before May 15 (or after August 15) to further lessen the likelihood of the proposed project adversely affecting this species. Our concurrence with a “not likely to adversely affect” determination is not dependent on this action - the cutting moratorium is a measure that can be implemented to further reduce the probability of “take” of this species. Obligations under section 7 of the Endangered Species Act must be reconsidered if: (1) new information reveals impacts of this identified action that may affect listed species or critical habitat in a manner not previously considered, (2) this action is subsequently modified in a manner that was not considered in this review, or (3) a new species is listed or critical habitat is determined that may be affected by the identified action.

We appreciate the opportunity to provide these comments and request that you continue to keep us informed as to the progress of this proposed project. If we can be of assistance or if you have any questions, please contact Mr. Allen Ratzlaff of our staff at 828/258-3939, Ext. 229. In any future correspondence concerning this project, please reference our Log Number 4-2-18-064.

E-Copy: Andrea Leslie, North Carolina Wildlife Resources Commission,
andrea.leslie@ncwildlife.org



**North Carolina Department of Natural and Cultural Resources
Natural Heritage Program**

Governor Roy Cooper

Secretary Susi H. Hamilton

NCNHDE-4878

December 12, 2017

Kevin Ferguson
ECS Southeast, LLP
9001 Glenwood Avenue
Raleigh, NC 27617
RE: McDowell Shooting Range; 49:5541

Dear Kevin Ferguson:

The North Carolina Natural Heritage Program (NCNHP) appreciates the opportunity to provide information about natural heritage resources for the project referenced above.

A query of the NCNHP database, based on the project area mapped with your request, indicates that there are no records for rare species, important natural communities, natural areas, or conservation/managed areas within the proposed project boundary, or within a one-mile radius of the project boundary.

Please note that although there may be no documentation of natural heritage elements within or near the project boundary, it does not imply or confirm their absence; the area may not have been surveyed. The results of this query should not be substituted for field surveys where suitable habitat exists. In the event that rare species are found within the project area, please contact the NCNHP so that we may update our records.

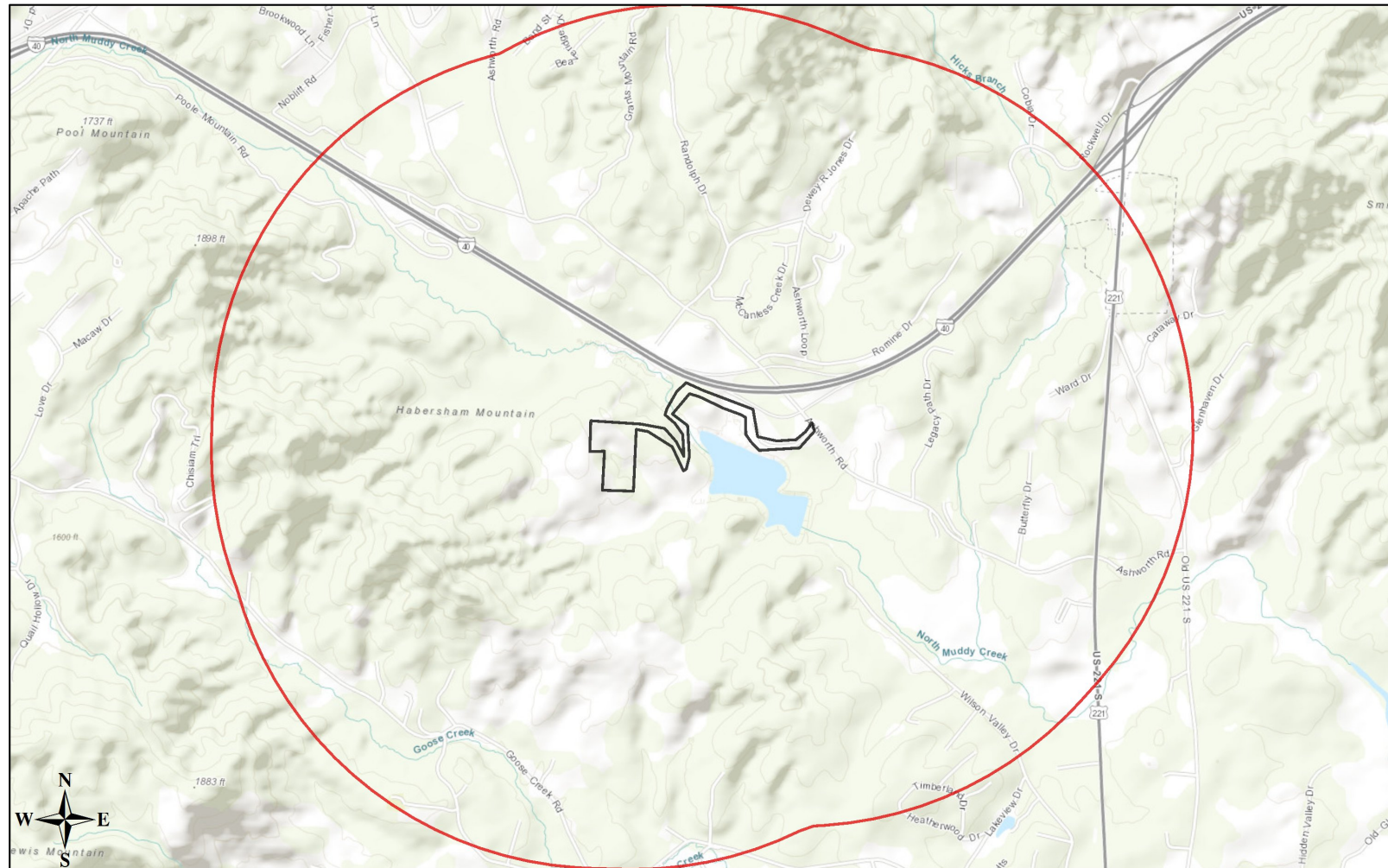
Please also note that natural heritage element data are maintained for the purposes of conservation planning, project review, and scientific research, and are not intended for use as the primary criteria for regulatory decisions. Information provided by the NCNHP database may not be published without prior written notification to the NCNHP, and the NCNHP must be credited as an information source in these publications. Maps of NCNHP data may also not be redistributed without permission.

If you have questions regarding the information provided in this letter or need additional assistance, please contact Rodney A. Butler at rodney.butler@ncdcr.gov or 919.707.8603.

Sincerely,

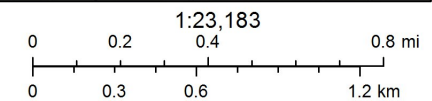
NC Natural Heritage Program

NCNHDE-4878: McDowell Shooting Range



December 12, 2017

- Project Boundary
- Buffered Project Boundary



Sources: Esri, HERE, DeLorme, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), swisstopo, MapmyIndia, © OpenStreetMap contributors, and the GIS User Community



North Carolina Department of Natural and Cultural Resources
State Historic Preservation Office

Ramona M. Bartos, Administrator

Governor Roy Cooper
Secretary Susi H. Hamilton

Office of Archives and History
Deputy Secretary Kevin Cherry

December 8, 2017

Kevin Ferguson
ECS Southeast, LLP
9001 Glenwood Avenue
Raleigh, NC 27617

kferguson@ecslimited.com

Re: McDowell Shooting Range, Marion, McDowell County, ECS Project No. 49:5541, ER 17-2903

Dear Mr. Ferguson:

Thank you for your letter of November 20, 2017, concerning the above project.

We have conducted a review of the project and are aware of no historic resources which would be affected by the project. Therefore, we have no comment on the project as proposed.

The above comments are made pursuant to Section 106 of the National Historic Preservation Act and the Advisory Council on Historic Preservation's Regulations for Compliance with Section 106 codified at 36 CFR Part 800.

Thank you for your cooperation and consideration. If you have questions concerning the above comment, contact Renee Gledhill-Earley, environmental review coordinator, at 919-807-6579 or environmental.review@ncdcr.gov. In all future communication concerning this project, please cite the above referenced tracking number.

Sincerely,

for Ramona M. Bartos



Photo 1: View of the access road on the central portion of the PSA, facing west.



Photo 2: View of the area for the proposed shooting range on the western portion of the PSA, facing northwest.



Photo 3: View of the stream (S1) located on the eastern portion of the PSA bisecting the access road, facing east.



Photo 4: View of wooden bridge on the western portion of the PSA crossing S1, facing south.



Photo 5: View of the stream (S2) located on the western portion of the PSA bisecting the access road, facing south.



Photo 6: View the wetland (W1) along the access road located on the western portion of the PSA, facing east.