RESILIENT COASTAL COMMUNITIES PROGRAM

JUNE 2024

WASHINGTON COUNTY RESILIENCE STRATEGY

Phase 1 & 2 Report

PREPARED FOR:

North Carolina
Division of Coastal Management
and Washington County

PREPARED BY:

SWCA® ENVIRONMENTAL CONSULTANTS

CONTENTS

Ctrl+Click to jump to each place in the document:

Appendices

Ctrl+Click to jump to each place in the document:

List of Figures

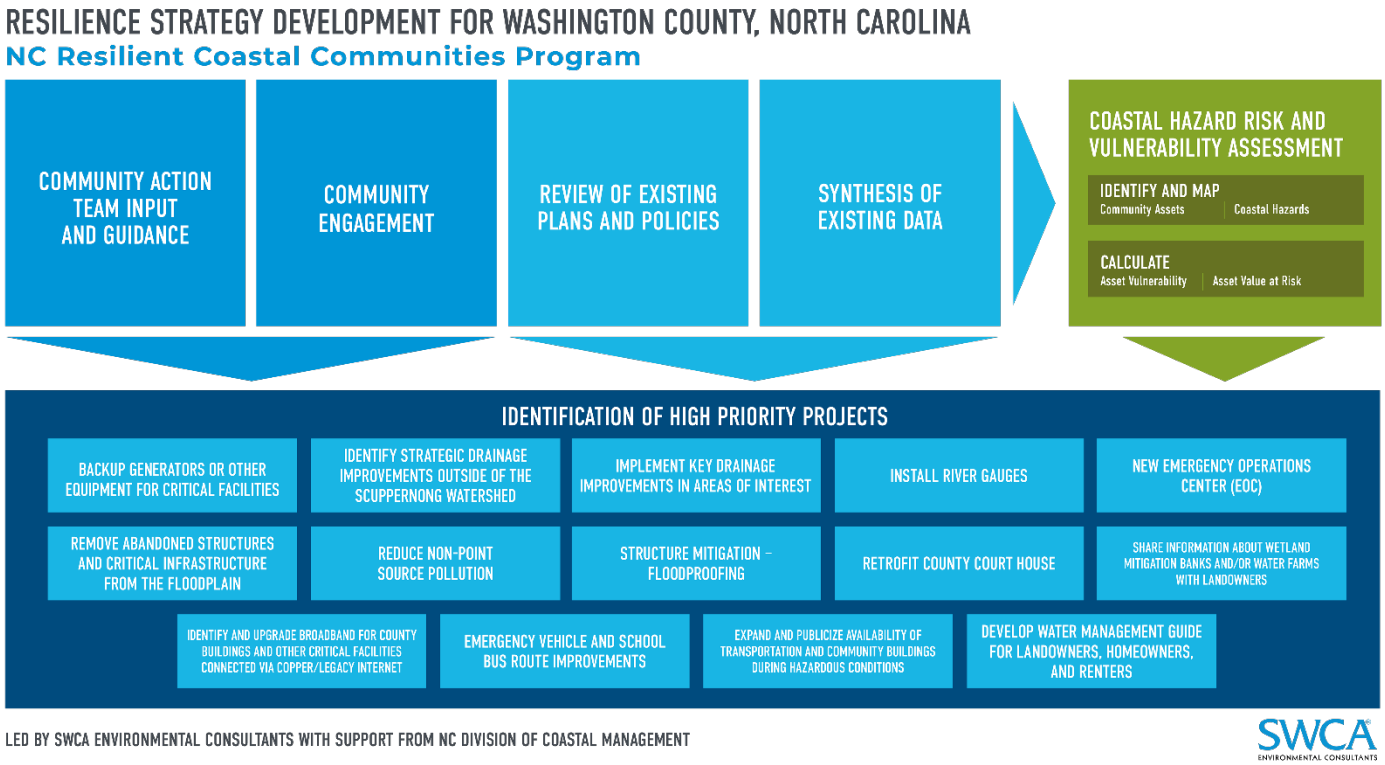
Ctrl+Click to jump to each place in the document:

List of Tables

Ctrl+Click to jump to each place in the document:

SUMMARY

Washington County faces elevated risks from coastal hazards, such as flooding, storm surge, and sea level rise, due to its low-lying position on the Albemarle-Pamlico Peninsula. This Resilience Strategy was developed for Washington County under the North Carolina Resilient Coastal Communities Program by the North Carolina Division of Coastal Management. Planning consultants worked with a local Community Action Team to develop a resilience strategy that identifies high-priority projects that would help make the county more resilient to flooding and other coastal hazards.



1 INTRODUCTION

Washington County faces elevated risks from coastal hazards such as flooding, storm surge, and sea level rise due to its low-lying position on the Albemarle-Pamlico Peninsula. This Resilience Strategy was developed for Washington County under the North Carolina Resilient Coastal Communities Program (Program) by the North Carolina Division of Coastal Management (DCM). Planning consultants, SWCA Environmental Consultants (SWCA), worked with a local Community Action Team (CAT) to develop a resilience strategy for the county. More information about the Program is available on the DCM website.

North Carolina Division of Coastal Management (DCM)

https://www.deq.nc.gov/about/divisions/coastal-management/coastal-resiliency

The purpose of the Program is to provide financial grants and technical assistance to support a proactive, locally driven, and equitable approach to coastal resilience planning and project implementation. The objectives of the Program are:

- ✓ Address barriers to coastal resilience at the local level;
- ✓ Assist communities with risk and vulnerability assessments;
- ✓ Help communities develop a portfolio of well-planned and prioritized projects;
- ✓ Advance priority projects to "shovel-ready" status;
- ✓ Link communities to funding streams for project implementation.

The Program provides a phased framework to assess coastal risks and vulnerabilities, engage community stakeholders, and develop projects to improve the resiliency of communities and their natural and built infrastructure. The Program includes four phases.

Phase 1: Community Engagement and Risk/Vulnerability Assessment

Phase 2: Planning, Project Identification, and Prioritization

Phase 3: Engineering and Design

Phase 4: Project Implementation

The NC Division of Coastal Management defines coastal resilience as:
ensuring all members and systems within a coastal community can better withstand major events and long-term stressors in a way that helps meet larger community goals.

This Resilience Strategy document includes the results of Phases 1 and 2: a risk and vulnerability assessment and a priority resilience project portfolio. This Resilience Strategy was developed between October 2023 and May 2024 and included six CAT meetings, community engagement, a community flood observations survey, and direct outreach to local stakeholders. Projects identified through this process are intended to build on and align with existing plans and ongoing studies, including the Hurricane Matthew Resilient Redevelopment Plan (2017), Northeastern NC Regional Hazard Mitigation Plan (2021), NC RISE Program Regional Climate Resilience Portfolio (2022), and Scuppernong Water Management Study (Albemarle Commission 2024). After completing Phases 1 and 2, the county is eligible to apply for additional funding through this Program to conduct engineering and design (Phase 3) and project implementation (Phase 4).

Community Overview

Washington County is in rural northeastern North Carolina, 120 miles east of Raleigh, 80 miles west of Nags Head, and fewer than 50 miles from Greenville. The county is approximately 347 acres in size with a population of 11,003 people (U.S. Census Bureau 2020). The county population is aging, with 25% of the population 65 years or older.

U.S. Route 64 bisects the county and is the main access to Plymouth, the largest town and the county seat, as well as to Roper and Creswell (Figure 1). Most of the developed land in the county is within or around these three incorporated towns. Washington County borders Tyrrell County to the east, Martin and Bertie Counties to the west, and Beaufort and Hyde Counties to the south. The Albemarle Sound, along the entire northern boundary of the county, is within the Albemarle-Chowan drainage basin. Other major waterbodies in the county include Roanoke River, Scuppernong River, Phelps Lake, and Pungo Lake.

Flooding in northeastern North Carolina can be attributed to riverine flooding, coastal flooding and associated storm surge, and flash flooding. During heavy rainfall events, the primary riverine flooding sources in the county are Welch Creek, Conaby Creek and its tributary, Kendrick Creek, Beaver Dam Branch and its tributary, and Welch Creek Tributary (North Carolina Emergency Management [NCEM] 2021). The areas susceptible to storm surge flooding are the Pamlico Sound and Albemarle Sound, which propagate farther into Maw Creek, Roanoke River, Scuppernong River, and Welch Creek.

There were eight flooding occurrences within the county between 1999 and 2018, leading to deaths, property damage, and crop loss (NCEM 2021). Flooding can lead to increased health risks and inability to access critical services due to impacts to local infrastructure during flood events. Additionally, Washington County faces economic challenges that create barriers to engaging the residents and building a foundational level of resilience and storm preparedness. The county is designated as Tier One (most distressed) in the state of North Carolina and is one of the 20 most distressed counties in the state, based on average unemployment rates, median household income, percentage growth in population, and adjusted property tax base per capita (North Carolina Department of Commerce 2023). Portions of Washington County, including the towns of Creswell and Roper, have been designated as Community Disaster Resilience Zones (CDRZ) by the Federal Emergency Management Agency (FEMA), which means they will be prioritized for targeted federal support (FEMA 2023). These designations demonstrate the need for building resilience to support the well-being of the county and those who live, work, and frequently visit there.

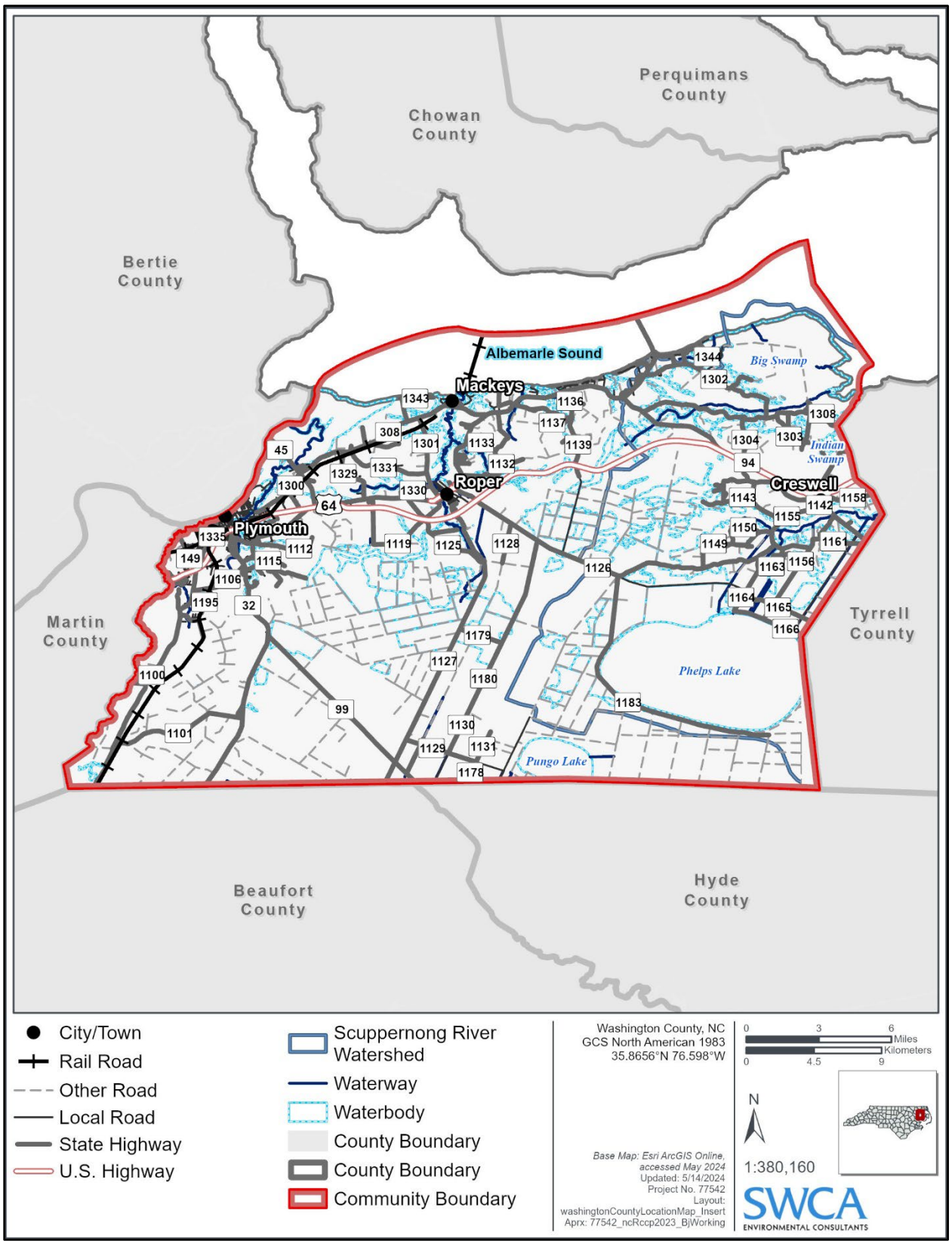


Figure 1. Map of Washington County, North Carolina, showing towns, waterways, and major roads.

2 VISION AND GOALS

The CAT developed their vision and goals for building resiliency in Washington County. The vision statement below focuses on where the community wants to be in the future (e.g., in the next 10 or more years) in relation to coastal hazards. The goals are specific measurable steps the community can take to reach their vision.

Vision

Envisioning a future where the overall well-being of the residents and tourists of Washington County are supported by a more resilient community. Washington County will use strategic planning to embrace resilience, including efforts related to transportation and infrastructure, stormwater and floodplain management, community planning and involvement, and the development of a more sustainable environment.

Goals

The goals are intended to reflect the general resilience priorities for the community and identify themes and concerns. Goals are intended to support the vision and to be used to identify priority projects.

1. **Theme: Transportation and Infrastructure**

   Goal: Investing in expansion and maintenance of roads, critical buildings, public transportation, and sustainable infrastructure systems.

2. **Theme: Stormwater and Floodplain Management**

   Goal: Analyzing potential risks and vulnerable areas throughout the county and strategically establishing flood control measures and other projects that reduce risks throughout the county.

3. **Theme: Community Planning and Involvement**

   Goal: Ensuring that everyone throughout the county has a voice and their opinions are heard. Hosting events for sharing Program updates, which allow everyone throughout the county to voice their concerns, open thoughts, and potential project ideas.

4. **Theme: Improving the Environment**

   Goal: Enhancing the quality of our surroundings by promoting conservation and preserving natural resources to create a sustainable future for generations to come.

The high-priority projects identified by the CAT are intended to align with this vision and move Washington County toward completing these goals.

3 REVIEW OF EXISTING LOCAL AND REGIONAL EFFORTS

Existing local and regional plans, ordinances, policies, and programs were reviewed to identify resilience strategies already in place, previously identified community assets (buildings, infrastructure, and other places of environmental, economic, or cultural value), previously identified coastal hazards, and potential resilience projects. Results of this review are summarized below in Table 1.

Table 1. Existing Documents Reviewed for Washington County

DOCUMENT NAME (YEAR)	INFORMATION GLEANED			
	ASSET LOCATIONS	HAZARD INFORMATION	POTENTIAL RESILIENCE PROJECTS	RESILIENCE STRATEGIES ALREADY IN PLACE
Washington County (2021) Land Use Plan		✓	✓	✓
Northeastern NC Regional Hazard Mitigation Plan (NCEM 2021)	✓	✓	✓	✓
North Carolina Climate Risk Assessment and Resilience Plan (State of North Carolina 2020)				✓
State of North Carolina Hazard Mitigation Plan (North Carolina Department of Public Safety [NCDPS] 2018)		✓		✓
Hurricane Matthew Resilient Redevelopment Plan – Washington County (NCEM 2017)			✓	✓
Climate Resilience Projects for the Albemarle Region (North Carolina Office of Recovery and Resiliency [NCORR] 2022)		✓	✓	✓
Water Management Plan and Environmental Assessment for Pocosin Lakes National Wildlife Refuge (U.S. Fish and Wildlife Service 2023)		✓	✓	✓

4 COMMUNITY ACTION TEAM (CAT)

Washington County formed their CAT consisting of key stakeholders that could provide targeted input and champion the planning effort. The intention of the CAT is to be inclusive and diverse, with members that have existing knowledge of local coastal resiliency and what gaps may exist. Members are listed below.

- Connie Barnes, County Code Enforcement Officer
- Anne Keyes, County Commissioner
- Asia Melton, Lead NC Fellow
- Carol Phelps, County Commissioner
- Allen Pittman, County Planning and Inspections Director
- Curtis Potter, County Manager
- Chris Respess, Soil and Water Conservation Technician
- Jason Squires, Assistant County Manager
- Lance Swindell, County Emergency Manager

The CAT reviewed and provided feedback on the relevant coastal hazards, helped identify asset locations, identified additional local contacts with information about community assets, provided review and feedback on the vulnerability and risk assessment results, supported planning and hosting of public open-house meetings, agreed on criteria for prioritization of projects, contributed to definition of candidate projects, and reached agreement on the final list of high-priority projects included in this Resilience Strategy document.

Five CAT meetings were held between October 2023 and March 2024, and a joint CAT meeting between the Washington County CAT, Town of Creswell CAT, and Town of Plymouth CAT was held in late May to coordinate on priority projects. Notes from the CAT meetings are provided in Appendix A.

5 STAKEHOLDER ENGAGEMENT STRATEGY

The Program goals defined by the DCM for stakeholder engagement include:

- ✓ Equitable representation and outcomes for marginalized communities and vulnerable populations.
- ✓ Building trust, relationships, and diverse partnerships within communities.
- ✓ Providing feedback and validation of the Vulnerability Assessment (Phase 1, Step 6) developed by the CAT.
- ✓ Assisting with prioritizing projects for Phases 3 and 4 of the Program.

To achieve these goals, SWCA worked with the CAT to implement community engagement during Phases 1 and 2 of the Program that included the following elements and tools: **ongoing online engagement, public open houses, and direct outreach to individual stakeholders**. SWCA also coordinated with the Engagement Team for the Scuppernong River Water Management Study to align the engagement for this Program with engagement activities conducted as part of that study.

Ongoing Online Engagement

Online engagement was conducted through the project website (Appendix B). The website included the following specific elements:

Interactive flood hazard map – This online map showed all the asset locations and hazard layers and allowed users to pan and zoom and turn hazard layers on and off to create a custom view showing the location and hazards of interest to them.

Flood survey – The survey was developed with the Scuppernong River Water Management Study to serve that study and this Program. It was available online and provided in hard copy (see Appendix B) at the first public meeting and asked respondents to identify important places (assets) in the community and the location and time where they have observed flooding. The online survey included an option for respondents to upload photographs of the flooding.

Links to additional resources about risk reduction/preparedness – These included the Ready NC Hurricane Preparedness Guide (NCDPS 2021), guidance from the North Carolina Department of Health and Human Services on preventing and cleaning up mold/moisture, what to do with drinking water wells and septic systems in flooding conditions, and post-disaster resources from Legal Aid NC.

The website also included project contact information and information about upcoming public meetings.

Public Meetings and Events

SWCA and the CAT members shared information with the community about the Program and how to become involved at open-house meetings and community events. The attendee list is provided in Appendix B. The purpose of the outreach was to listen to concerns and answer questions about coastal hazards, gather input on asset and hazard locations, gather input on potential projects, and collect contact information for interested parties to send updates.

Scuppernong Water Study Open House

Due to overlap in goals and target audience, the first community meeting was held in conjunction with the Scuppernong Water Study Community Kickoff Event, October 23, 2023, from 5:30 p.m. to 7:30 p.m. at the Eastern 4-H Center in Columbia. Dinner was provided at no charge, and free transportation was provided by the Gator Line. There was a kids' zone with watershed learning activity and a gift card raffle.

Poster used to advertise the October Open House.

The goal was to gather information about assets and flood hazards and understand from the community where flooding happens and what leads to flooding while introducing them to the Program. Maps of flooding hotspots and community assets were presented for discussion. Residents provided input on what they value about the region. Attendees helped verify the asset and hazard information initially collected. About 100 people attended.

Attendees at the October Open House learned about the Program and the Scuppernong Study and shared input on flooding concerns and community values and assets.

Creswell Christmas Parade

On December 9, 2023, SWCA and DCM hosted an informational booth at the Creswell Christmas Parade. The booth provided information about the Program, opportunity to point out areas of flooding concern in the Creswell area, and information about how to share flooding observations through the online survey. The team interacted with about 50 parade attendees at this event. Whereas the geographic focus of this booth was on the Town of Creswell, parade attenders came from around the county and spoke to issues outside the Town as well.

Washington County Drainage Board Meeting

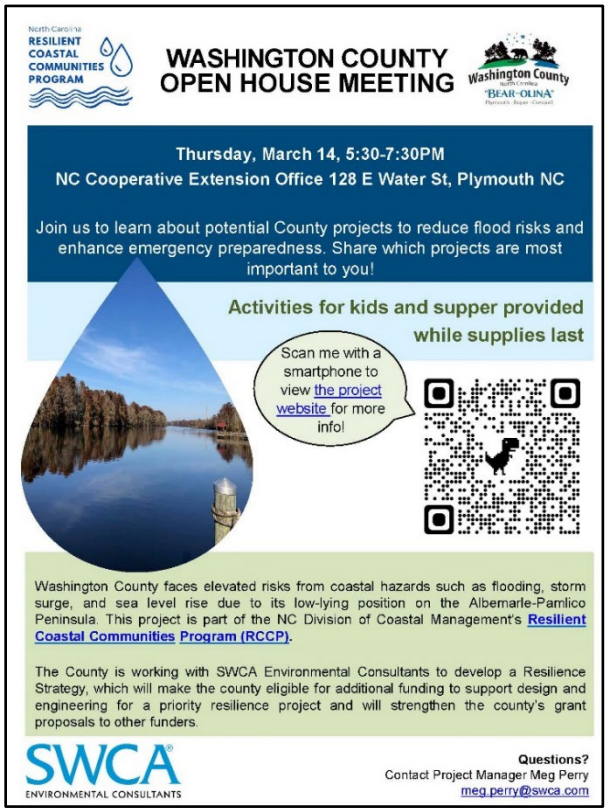
SWCA attended the Washington County Drainage Board meeting on February 9, 2024, to gather key information missing from the asset and hazard assessment and to gain a better understanding of agricultural stakeholders, which may have been underrepresented at the October event due to agricultural activities taking place at that time of year. There were 11 attendees at the meeting, representing Washington County, DCM, local farmers, landowners, Washington County Soil and Water Conservation District (WCSWCD), Albemarle-Pamlico National Estuary Partnership (APNEP), North Carolina Cooperative Extension, and SWCA.

Sunday Spanish Church Service

On February 11, 2024, SWCA conducted outreach with the Hispanic Congregation at St. Joan of Arc Catholic Church in Plymouth. SWCA attended the St. Joan of Arc Catholic mass and introduced the Program in Spanish during the announcement portion of the mass. Following the mass, SWCA shared a meal, connected with Hispanic community members, and distributed bilingual informational handouts about the Program. The goal of this outreach was to meet Hispanic community members, introduce the Program, gather input on community resiliency issues, and learn about how members of this community might like to be engaged going forward.

March Open House

SWCA and CAT members hosted a public open-house meeting on March 14, 2024, in Plymouth at the NC Cooperative Extension Office from 5:30 p.m. to 7:30 p.m. Free transportation was available through Riverlight Transit, free supper was provided, a kid's activity was available, and there was a gift card raffle.



Flyer for March Open House.

The meeting had an open-house format with stations where attendees could learn about the Program planning process and discuss and share feedback on the projects under consideration. The meeting gave CAT members an opportunity to interact with the community, discuss projects, and hear their input. Posters depicted potential projects being considered, and attendees were able to indicate their preference for specific projects by placing stickers on the project posters. The meeting had approximately 18 attendees.

Attendees at March Open House discuss potential projects.

Poster depicting a suite of options for reducing flood risk in predominantly agricultural areas like Washington County.

Direct Stakeholder Outreach

Information sharing also included individual outreach to key stakeholders. Direct outreach was conducted via email and telephone from November 2023 to March 2024 to individual stakeholders who may have had key information to share, including Washington County staff and those who serve or represent vulnerable and underrepresented groups. During this outreach, SWCA shared about the Program and asked questions to gather more specific information about potential projects and confirm asset and hazard information.

From November through March, outreach was conducted with the following stakeholders:

- Vickey Manning, Deputy Health Director, Martin-Tyrrell-Washington (MTW) District Health Department
- Carl Cox, Washington County Schools Transportation Director
- Mid-East Regional Housing Authority
- Father Vic Subb, St. Joan of Arc Catholic Church

Chris Respess, WCSWCD, reviews a map with Washington County residents.

Details of the strategies used to engage specific audiences in Washington County during stakeholder engagement are shown in Table 2.

Table 2. Engagement Strategies Used for Community Engagement in Washington County, North Carolina

STRATEGY	AUDIENCE AND TIMING	GOALS
***Two-County Public Meeting – Flooding Hotspots and Community Assets** • "Where I live and work" map at sign-in table • Input on what people value about the region • Big interactive maps for identifying assets and hazards • Collect questions for follow-up • Kids' zone with watershed learning activity	Local residents, Town and County staff, and business owners *October 23, 2023*	➢ Hear and answer questions about hazards ➢ Ground truth the asset and hazard information collected and gather input to inform the Risk and Vulnerability Assessment ➢ Collect contact information for interested parties for updates and follow-up
***Booth at Creswell Christmas Parade – Flooding Hotspots and Community Assets** • Program overview poster (English and Spanish translated) • Creswell Asset Map poster with icons • Half-page survey information sheet with QR code and survey link to handout • Full-page, write-in copy of survey and fact sheet to handout Copy of Creswell asset list for folks to look at	Local residents, Town and County staff, and business owners *December 9, 2023*	➢ Distribute flooding survey handouts with links to complete survey ➢ Have in-depth conversations with interested residents to share about the Program ➢ Hear and answer questions about the Program ➢ Identify flooding areas and critical assets in town ➢ Collect contact information for interested parties for updates and follow-up
Attendance at Drainage Board Meeting • Survey half-sheets • Asset maps to identify at risk areas in the county • Program poster explaining program	Agricultural stakeholders, Town and County staff *February 9, 2024*	➢ Share information about Program and goals ➢ Identify potential stakeholders that understand flooding and water flow within the county ➢ Hear and answer questions about the Program ➢ Identify flooding areas and critical assets in the county ➢ Collect contact information for interested parties for updates and follow-up
Direct Outreach to Individual Stakeholders Via email and telephone	People who may have key information to share, including town and county staff and those who serve or represent vulnerable and underrepresented groups *November 2023 – March 2024*	➢ Gather key information missing from asset list and hazard assessment ➢ Understand perspectives of people otherwise underrepresented in this process ➢ Consult relevant stakeholders when making decisions about project identification and prioritization
***Survey with Interactive Map** • Identifying specific locations on the map that have flooded in the past • Identifying how hazards have impacted assets and access to assets in the past • Online and linked on all public outreach materials • Hard-copy version at public meetings	Local residents and business owners, including those who were unable to attend the October open house *November 2023 – February 2024*	➢ Understand where and how often flooding occurs in the county ➢ Identify important places within the Scuppernong watershed ➢ Collect contact information for interested parties for updates/follow-up ➢ Collect photos of flooding for use in Resilience Strategy and other future grant applications for Washington County

STRATEGY	AUDIENCE AND TIMING	GOALS
Informative Program Event with Spanish-Speaking Community • Connect with Spanish-speaking community, introduce SWCA team and the Program • Bilingual poster on the Program and copies of bilingual flyers • Spanish-speaking SWCA employee gave presentation	Spanish-speaking community members *February 11, 2024*	➢ Introduce the Program ➢ Hear and answer questions about program and hazards ➢ Collect information for interested parties ➢ Discuss having a second event in the future and what would be the preferred format for that
***Public Meeting No. 2 – Priority Projects** • Posters conveying preliminary project list • Collect additional project ideas and input on which projects to prioritize • Collect questions for follow-up • Collect comments to incorporate • Kid's coloring activity	Local residents, Town and County staff, and business owners *March 14, 2024*	➢ Review preliminary project list ➢ Learn about which projects the community considers highest priority to assist with prioritizing projects
***Provide educational activities and opportunity for input for children at public meetings and events**	Youth *For both public meetings*	➢ Engage vulnerable and underrepresented populations
Provide Spanish translations of the Program handout and some risk preparedness materials	People with limited English proficiency *For both public meetings*	
Personal outreach through leaders trusted by the community	Racial and ethnic minority populations and people living in flood-prone areas *For both public meetings*	

*Indicates activities conducted in cooperation with the engagement team for the Scuppernong River Water Management Study.

6 RISK AND VULNERABILITY ASSESSMENT

To assess the overall coastal hazard risks and vulnerabilities that Washington County faces, SWCA identified important places in the county (assets) and types of coastal hazards that could impact the county (hazards), with input and oversight from the CAT. SWCA used this information to evaluate the county's key vulnerabilities and economic risks. The methods and results of this analysis are detailed below.

Identified Assets

Critical community assets were identified and mapped for the county. Critical assets may include:

1. Infrastructure (e.g., roads and evacuation routes, water and sewer lines, ditches, storm drains, floodgates
2. Community and economic services (e.g., churches, cultural sites, open space, parks)
3. Government service offices (e.g., Town Hall, courthouse, Department of Social Services)
4. Education (e.g., schools)
5. Health services (e.g., hospitals, pharmacies)
6. Public safety or emergency services (e.g., police, fire department)
7. Natural assets (i.e., wetlands, forests, or floodplains that provide ecosystem services, such as creating a natural buffer and absorbing floodwaters)

After identifying critical assets and natural infrastructure, any additional locally significant assets or infrastructure with cultural, ecological, public health, social, and/or economic value to community members were identified.

An initial asset list and map for the county was reviewed and revised by the CAT members and shared with other knowledgeable county staff for additional feedback. The types of assets are summarized in Table 3. The final detailed list of these assets is provided in Appendix C.

Table 3. Summary of Asset Types

ASSET TYPE	NUMBER OF ASSETS REVIEWED
Community and Economic Services	96
Education	8
Government Service Offices	5
Health Services	15
Infrastructure	181
Natural Assets	30
Public Safety or Emergency Services	7

Identified Hazards

SWCA looked at coastal hazards identified as high risk hazards in the Northeastern NC Regional Hazard Mitigation Plan (2021) and applied appropriate datasets to represent these hazards at the local level. Hazards evaluated for the county include sea level rise (both along coast lines and in low-lying areas where increases in the water table can result in inland flooding), storm surge inundation (including coastal storm surge from increasing high tides during simulated storm events), and inland flooding resulting from high precipitation events (areas likely to be flooded, such as FEMA-defined 100-year and 500-year floodplains, as well as historical records of event flooding). Information used to represent these hazard areas and historical accounts includes both publicly available geospatial data and input from community members. Additionally, other hazards that exacerbate the effects of an asset's exposure to the primary hazards listed above were identified and used to a lesser extent in exposure calculations. Those hazards include soil erosivity and risk of wildfires, hail, and tornadoes. Datasets used to represent community hazards were selected after an extensive review of data documentation and similar reports in the region and are detailed in Appendix D.

Vulnerability Assessment

After assets and hazards were identified, a vulnerability assessment evaluated the extent to which assets are vulnerable to current and future impacts. The vulnerability of critical assets, natural infrastructure, or populations to a hazard is a function of exposure, sensitivity, and adaptive capacity (Figure 2). These are defined in the *Resilient Coastal Communities Program Planning Handbook* (Program handbook) (DCM 2023) as:

Exposure – the presence of people, assets, and ecosystems in places where they could be adversely impacted by hazards. The overlap between asset and hazard locations were ranked from no exposure to high exposure (0 to 3).

Sensitivity – the degree to which an asset is potentially affected when exposed to an impact ranked from no sensitivity to high sensitivity (0 to 3).

Adaptive Capacity – the ability of the asset and/or population to adjust to potential impacts from hazards with minimal disruption or cost. Consider the feasibility of relocation, ability to retrofit, social vulnerability, and other criteria relevant to the community to rank from no adaptive capacity to high adaptive capacity (0 to 3).

Vulnerability can be calculated by adding exposure and sensitivity together and subtracting adaptive capacity. A greater adaptive capacity score results in a lower vulnerability score overall, so if an asset has high exposure and vulnerability and a high adaptive capacity, it can still have a low vulnerability score. A lower adaptive capacity score results in a higher vulnerability score overall, so even if an asset has moderate exposure and sensitivity, if it has no adaptive capacity, it will still yield a higher vulnerability score than the same asset if it had some level of adaptive capacity.

ASSET ID	EXPOSURE SCORE	SENSITIVITY SCORE	ADAPTIVE CAPACITY SCORE	VULNERABILITY SCORE
Asset Name	0 = No Exposure 1 = Low 2 = Medium 3 = High	0 = No Sensitivity 1 = Low 2 = Medium 3 = High	0 = No Adaptive Capacity 1 = Low 2 = Medium 3 = High	1 = Low 2 = Medium 3 = High

Vulnerability = Exposure + Sensitivity – Adaptive Capacity

Figure 2. Determining asset vulnerability (DCM 2023).

SWCA and the CAT defined thresholds and criteria used to score assets as low, medium, or high for each vulnerability metric (exposure, sensitivity, and adaptive capacity). These were then used in the formula below to determine asset vulnerability.

Exposure Score

Exposure, ranked from 0 (no exposure) to 3 (high exposure), represents the combined hazard exposure to projected sea level rise, potential flood events (storm surge, floodplain inundation and reported event inundation) and other hazards (erosion, tornado, wildfire, and hail).

$$\text{Exposure} = \frac{\text{Sea Level Rise Exposure} + \text{Flood Event Exposure} + \text{Additional Hazard Factor}}{2}$$

Sea Level Rise Exposure was calculated by assigning scores 0 to 5 to capture the likelihood of an asset being exposed to a hazard and the severity of that hazard, then classifying values using an exposure matrix (Figure 3) to classify the exposure as none (0), low (1), moderately low (2), moderate (3), moderately high (4), and high (5).

Precipitation Exposure was calculated similar to sea level rise, by classifying values using an exposure matrix of 0 to 5. The calculation included a Reported Event Inundation Factor to reflect known localized flooding during high-intensity storm events that may have been missing or underrepresented in the available modeled data.

The calculation also includes an additional hazard factor to account for the potential of exacerbating the effects of coastal hazards (increased soil erosivity) and increasing overall resource demand on assets (possible damage from other extreme events).

The final sea level and precipitation exposure scores were then processed using the three-class exposure matrix to get an exposure score of 0 to 3 required by the Program handbook. Additional information on how hazard severity and probability were assigned for Sea Level Rise Exposure, Floodplain Exposure, Reported Event Inundation Factor, Storm Surge Exposure, and Additional Hazard Factor is provided below.

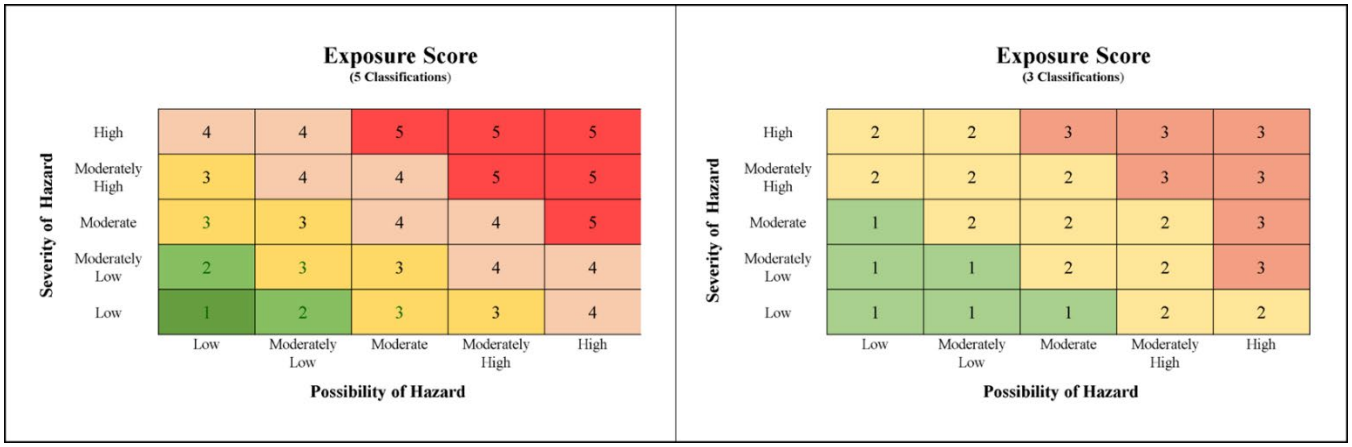


Figure 3. Exposure matrix.

- **Sea Level Rise Exposure** (Figure 4) – Maximum Sea Level Rise Exposure score calculated for the asset. This exposure rating evaluated potential inundation from encroaching coastal lines and inland flooding as a result of higher water tables under 1- to 10-foot National Oceanic and Atmospheric Administration (NOAA) sea level rise projections (NOAA Office for Coastal Management 2017). Scores for the probability of an asset being affected by sea level rise were calculated by grouping scenarios into the following categories based off projected sea level rise under different Intergovernmental Panel on Climate Change (IPCC) emission scenarios (IPCC 2023):
    - *High probability* – 1 to 3 feet of sea level rise expected under all scenarios
    - *Moderately high probability* – 4 to 5 feet of sea level rise expected under most scenarios
    - *Moderately low probability*– 6 to 7 feet of sea level rise expected under some scenario
    - *Low probability* – 8 to 10 feet of sea level rise expected under only the highest scenario

  The severity of sea level rise hazards was assigned considering the cumulative effects of subsequent increases in sea level. For example, under 1 to 2 feet of sea level rise an asset may have a moderately low severity, but under 3- to 4-foot sea level rise conditions that asset will see higher inundation levels and would have a severity score of moderate.
    - *Moderate severity* – at risk of 1 to 2 feet cumulative sea level rise
    - *Moderately high severity* – at risk of 3 to 4 feet cumulative sea level rise
    - *High severity* – at risk of 5 to 10 feet cumulative sea level rise
- **Floodplain Exposure** (Figure 5) – Current Floodplain Exposure was derived from FEMA Digital Flood Insurance Rate Map (DFIRM) data (North Carolina Floodplain Mapping Program 2020) and calculated as a function of the annual probability of precipitation flooding hazard (*moderately low*, 1% annual probability, for 100-year flooding or *low*, 0.2% annual probability, for 500-year flooding) and the severity of precipitation flooding hazard (*moderately high* for assets in the 100-year floodplain during a 100-year flood event and for assets in the 500-year floodplain during a 500-year flood event, and *high* for assets in the 100-year floodplain during a 500-year flood event). To account for increases in precipitation due to climate change, low-lying areas (within an elevation range of 1 to 10 feet above mean sea level, defined by reviewing current floodplain elevations) not currently listed as being in a floodplain were given a blanket Floodplain Exposure score of 1 to represent that they are at risk of flooding despite not currently

being within a designated floodplain. For areas with proposed changes to the floodplain type, the floodplain type with the highest corresponding exposure score was used.

- **Additional Hazard Factor** – Average of soil erosion, tornado, wildfire and hail risk. FEMA National Risk Index, U.S. Forest Service Fire Modeling Service, and U.S. National Soil Conservation Service predefined hazard risk data was converted from their original 1 through 5 risk scale to a 1 through 3 scale using the exposure matrix. The newly classified score was incorporated into the overall equation as an additive factor, not a standalone variable so that additional potential hazards were represented but sea level rise and flood inundation remain the primary drivers of hazard exposure scores.
- **Storm Surge Exposure** (Figure 6) – Maximum Storm Surge Exposure score calculated for the asset. High tide, coastal storm surges from National Hurricane Center SLOSH Model Simulated Category 1 through Category 5 storms (Zachry et al. 2015) were evaluated using the annual probability calculated from historical records for the state of North Carolina to assign probability values like Floodplain Exposure:
    - *High probability – Categories 1 and 2* storms, approximately 1 in 5 chance every year
    - *Moderate probability – Category 3* storm, approximately 1 in 20 chance every year
    - *Low probability – Categories 4 and 5* storms, 1 in 100 chance every year

  Severity of exposure was calculated by categorizing simulated feet of inundation:
    - *Low* – 1 foot of storm surge inundation
    - *Moderately low* – 2 to 3 feet of storm surge inundation
    - *Moderate* – 4 to 5 feet of storm surge inundation
    - *Moderately high* – 6 to 7 feet of storm surge inundation
    - *High* – greater than 8 feet of storm surge inundation
- **Reported Event Inundation Factor** – Additive factor used to highlight areas of known flooding during large precipitation events as reported from historical satellite imagery (Schaffer-Smith 2020) or community engagement. For areas with a Floodplain Exposure score greater than 0, one point was added for each historical flooding event recorded for that area. For areas with a Floodplain Exposure score of 0 that were reported as having historical flooding, two points were awarded to areas with at least one reported flooding event, and one point was added for each additional storm event.

Sensitivity Score

Sensitivity, ranked from 0 (no sensitivity) to 3 (highly sensitive), represents the degree to which an asset is cumulatively impacted by hazards. Sensitivity is calculated by assigning a percent threshold and/or indicating a low, medium, or high need for that asset within the community. **Sensitivity Score** is the average of asset type sensitivity, geographic social sensitivity, and service type social sensitivity.

- **Asset Type Sensitivity** – Asset type sensitivity scores were assigned categorically using assumptions about how a hazard would affect the physical infrastructure and functionality of an asset, and whether the asset provides services to vulnerable populations, particularly during natural disasters. An asset that is less able to bounce back after a hazard and serves vulnerable populations were assigned the highest Asset Type Sensitivity scores. Vulnerable populations included the elderly (e.g., nursing homes, food distribution systems), chronically ill or physically disabled people (e.g. dialysis centers, medical facilities), less wealthy or food insecure individuals and families (e.g., food pantries, schools, public fishing access, local housing authorities), and historically marginalized groups (e.g., community organizations and cultural sites of significance, such as African-American cemeteries), people without adequate health insurance (e.g., EMS and Emergency Services), incarcerated individuals (e.g., correctional facilities), those experiencing abuse or violence (e.g., law enforcement, medical

facilities), and youth and families (e.g., schools and childcare facilities, community centers, parks). For assets that were assigned multiple asset types because they serve multiple purposes, the highest categorical sensitivity score was used. Scores for asset types are as follows:

- *High* (score = 3): City/County/Federal Government (offices, buildings, post office), Communications (towers), Community Centers, Electric utilities (substations, solar), Emergency Shelter, Fire Station, Food and Supplies (supermarkets, convenience stores), Gas utilities, Hazardous waste sites (EPA-permitted), Hospital or Local Clinic, Landfill, Law Enforcement or Corrections, Pharmacy, Public health department, Roads (by section, route code, bridge structure numbers), Water and Sewer Utilities (wells, pipelines, pump stations).
- *Medium* (score = 2): Airports, Cultural Sites, Employers (large employers), Library, Nursing Home, Restaurants, Schools.
- *Low* (score = 1): Cemetery, Forest (parks/reserves), Open Space (County or Town designated), Parks and Recreation (trails, state parks, wildlife refuge), River (preserves, special areas), Wetlands (named/managed areas), Floodplain (undeveloped, easements, game lands, mitigation sites).

- **Geographic Social Sensitivity –** The geographic social vulnerability component of the vulnerability score reflects the relevance of an asset to socially vulnerable populations based on the asset's location. To ensure assets within socially vulnerable communities and assets that serve socially vulnerable communities were both represented, Social Vulnerability Index (SoVI) data (Centers for Disease Control and Prevention (CDC)/Agency for Toxic Substances and Disease Registry (ATSDR) 2020; Hazards and Vulnerability Research Institute (HVRI) 2011) were evaluated at two different spatial scales (asset location and asset service community). The asset service community was defined as all Census Blocks or Tracts that intersected a 1-mile radius of the asset. The score was averaged to create the final Geographic Social Sensitivity score. At both scales, Geographic Social Sensitivity was found by assigning threshold values to already calculated SoVI values as follows: top 10% of socially vulnerable areas (1), top 20% of socially vulnerable areas (0.75), top 30% of socially vulnerable areas (0.5), and top 50% of socially vulnerable areas (0.25). This factor was calculated as an average of two measures of social vulnerability:
  - Asset Location Social Vulnerability Score, which measures the potential negative effects on communities caused by external stresses on human health (calculated by CDC ATSDR 2020 and HVRI 2011)
  - Asset Service Community Vulnerability Score, which measures how socially vulnerable the local population is relative to other areas around the country. The asset service community was defined as all Census Blocks or Tracts that intersected a 1-mile radius of the asset (this area was assumed sufficient as vulnerability data are at the Census Block and Tract scale). Social vulnerability of the asset location and community were found by assigning threshold values to already calculated SoVI values as follows: top 10% of socially vulnerable areas (1), top 20% of socially vulnerable areas (0.75), top 30% of socially vulnerable areas (0.5), and top 50% of socially vulnerable areas (0.25)

Adaptive Capacity Score

Adaptive Capacity, ranked from 0 (no adaptive capacity) to 3 (high), was assigned on an asset-specific basis based on input from CAT members and other stakeholders. Assets were looked at individually, as there is not a blanket formula to apply. Scores considered both the current condition of each asset and the resources available for it to adapt, as related to the following factors. Note that two assets in the town of Creswell (floodgate [CW-39] and Main Street storm drain [CW-40]) were given an adaptive capacity score of −1 due to their inoperable condition.

- Resources Available
    - Social vulnerability factors in the area. Are there functioning response procedures in place, such as communication networks, functioning shelters, and emergency services available when hazards occur?
    - Ownership of asset. A state- or federally owned asset was assumed to have more resources available compared to County/Town owned. An asset owned by a large multinational corporation was assumed to have more resources available for adaptation than one owned by a local business or individual. Consideration was also given to whether the asset was in incorporated or nonincorporated boundaries.
- Condition:
    - Feasibility of relocation. Can this asset/infrastructure be relocated or is there an alternative nearby? What is the ability to retrofit/move/repair after a hazard? Are there any alternative options/routes for roadways or main thoroughfares?
    - Functionality of asset. Is the asset currently working as designed? Is anyone responsible for maintaining it?
    - Redundancy. Are any of the assets/infrastructure considered a single point of failure if they break or become inoperable?

All asset vulnerability scores, factors used to calculate asset vulnerability, and asset attribute data have been compiled into a holistic Asset List to provide additional details for planners and community members (see Appendix C).

More details regarding the specific datasets referenced in calculating each of these elements of the Vulnerability Index are summarized in Appendix D.

See Appendix E for detail maps showing assets and hazards in each of the numbered areas below (Figure 7).

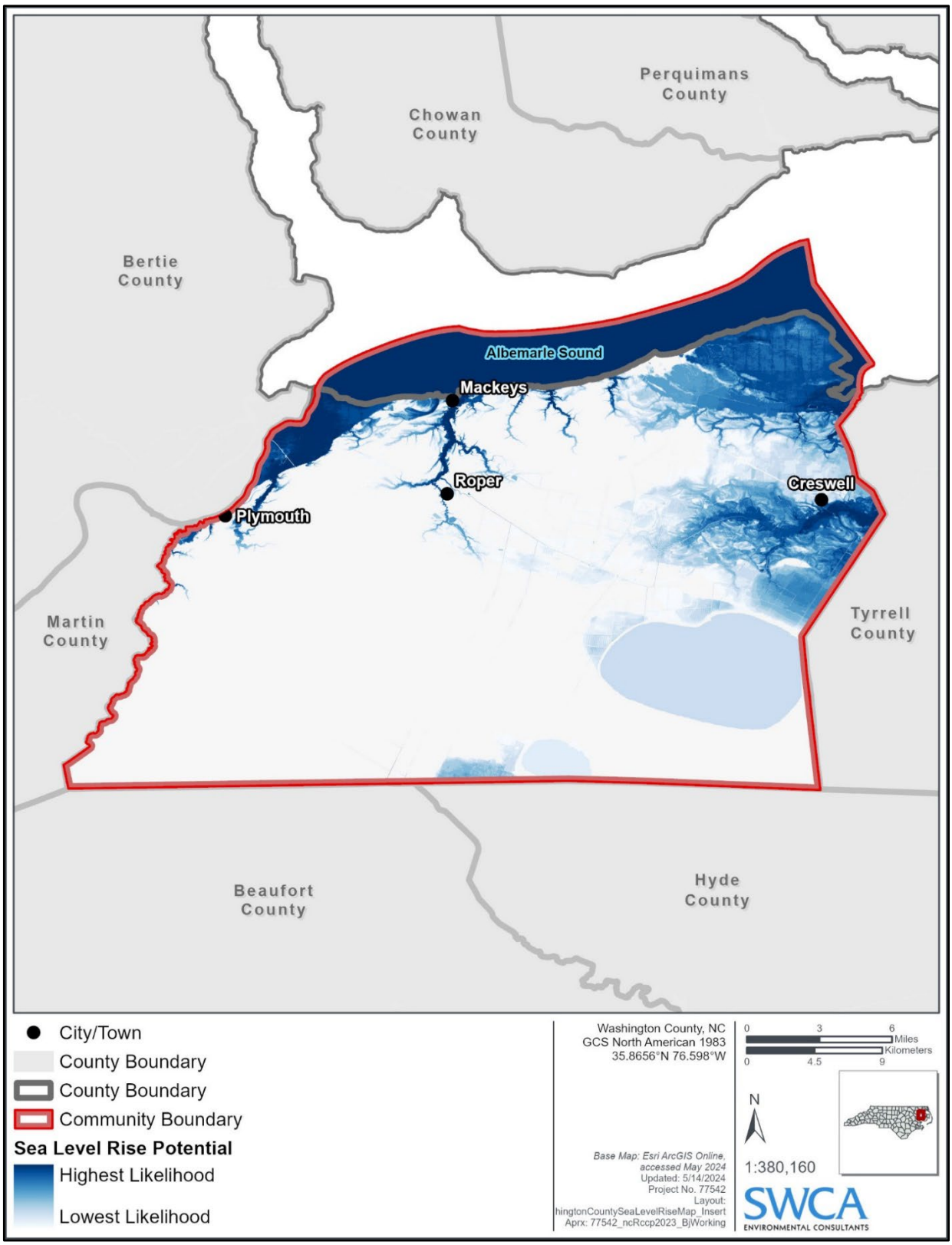


Figure 4. Areas at risk from sea level rise from high likelihood (dark blue) to lower likelihood (light blue). Note that areas along the Albemarle Sound, near waterways that flow into the sound, and in the Scuppernong River watershed are most at risk.

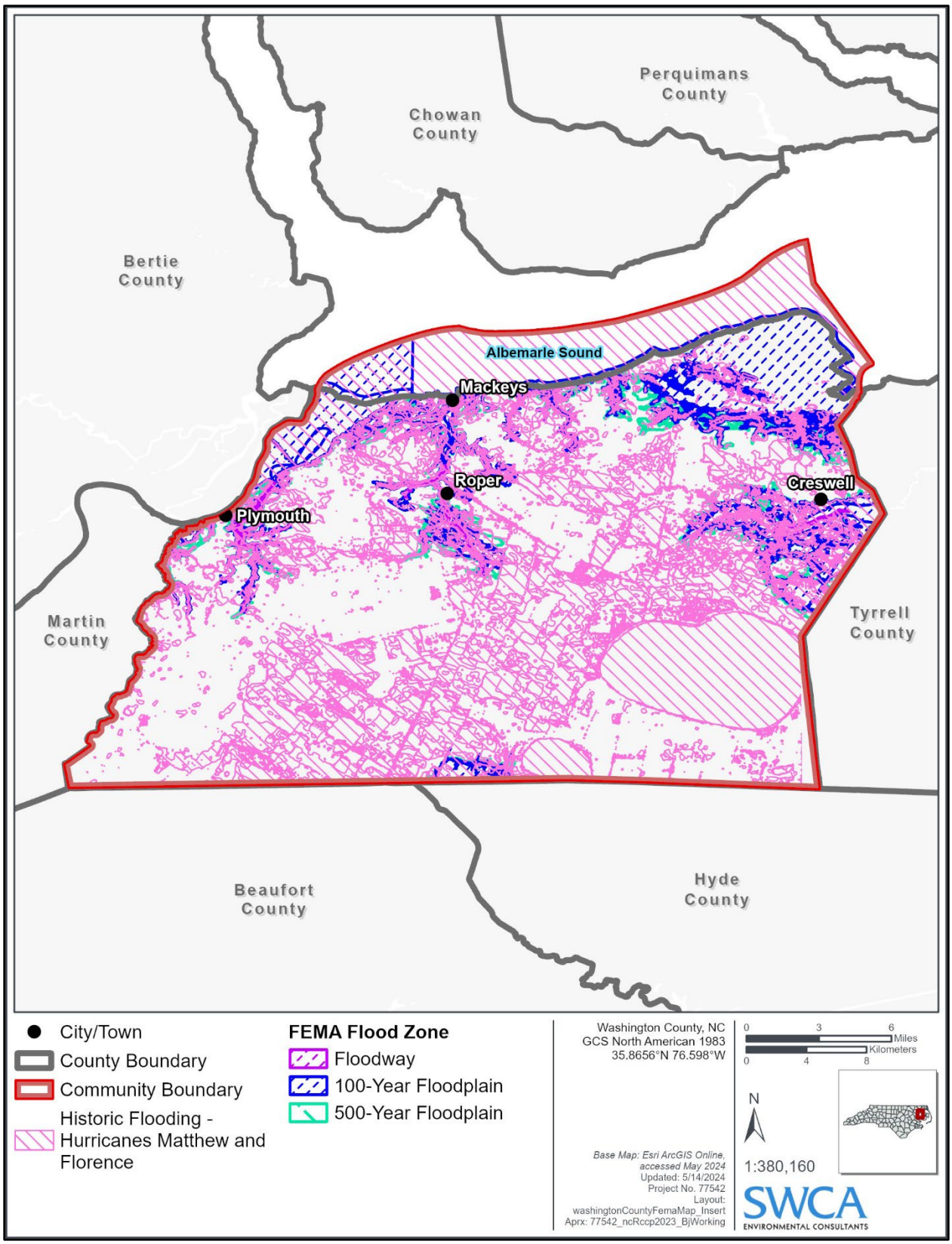


Figure 5. FEMA 100-year and 500-year floodplains and areas of historical flooding from Hurricanes Florence and Matthew.

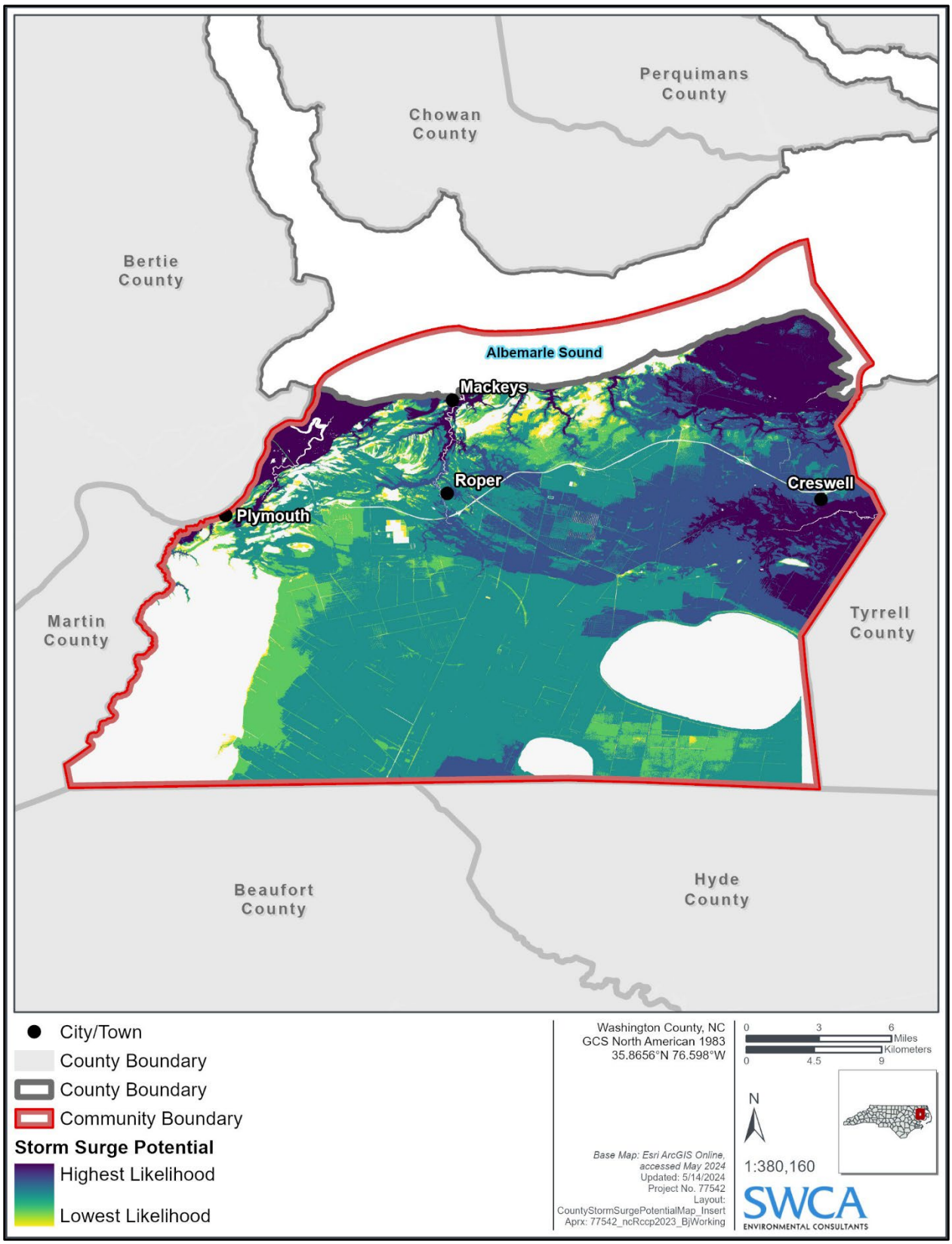


Figure 6. Areas with potential for storm surge inundation in Washington County, North Carolina. Note that most of the land within the county is at some risk.

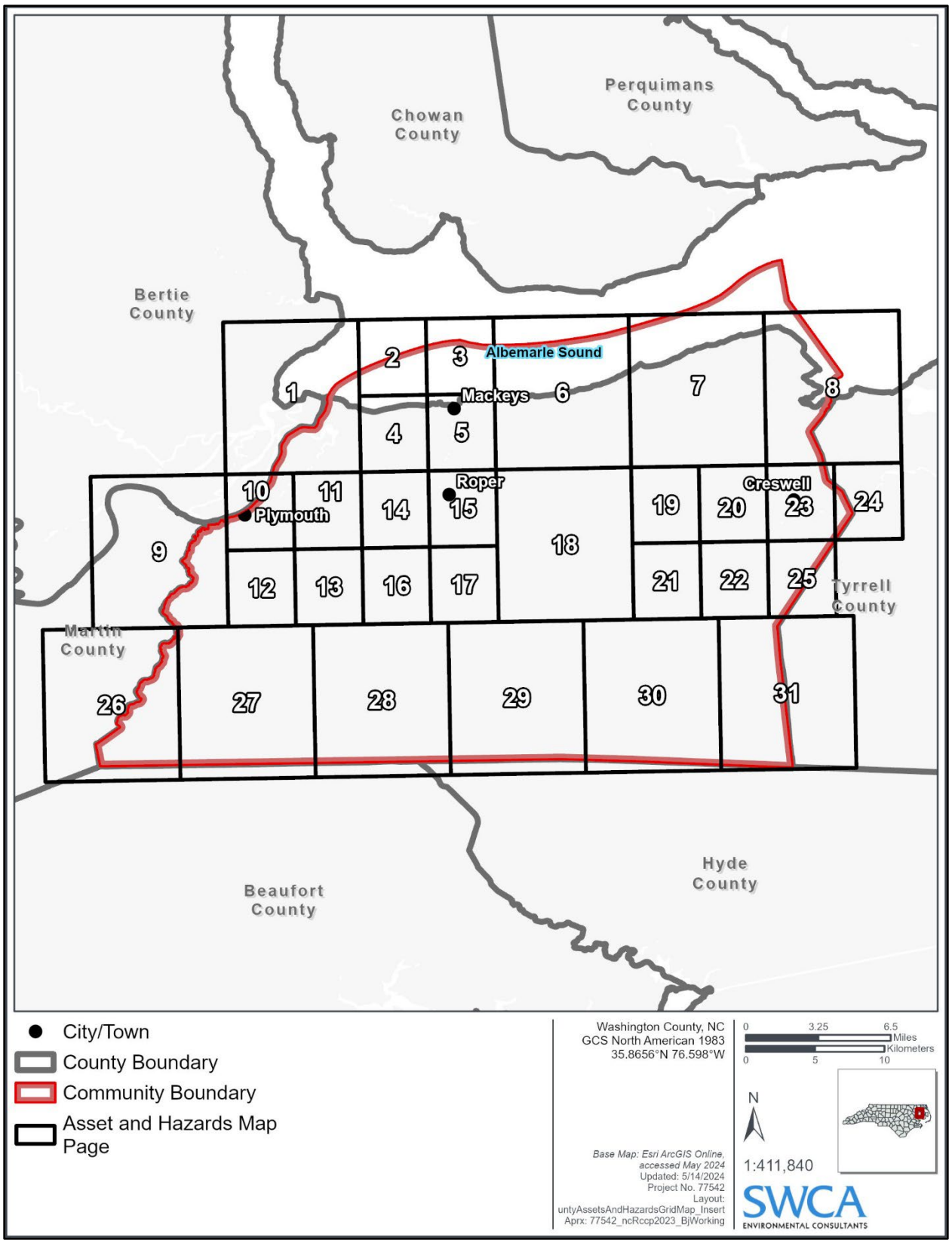


Figure 7. Map tile overview for maps showing details of assets and hazards. Individual maps are found in Appendix E.

Evaluation of Risk

To quantify the potential economic risk to assets within the county, Estimated Values for assets with a moderate to high value were summarized by asset type and ownership (Table 4 and Table 5). Estimated values were assigned by finding the maximum value (Parcel Value, Land Value, or Improvement Value) associated with an asset's parcel. This value was calculated by assuming the value of assets that overlap are reflected in the cost estimate of the larger asset area (i.e., the cost of a government building in a historic district would be captured in the overall estimated cost for the historic district). This assumption was carried over into grouped estimated value calculations, and spatial duplicates were removed within each category. Estimated values for each Asset Type should be considered independently since assets with multiple type designations were included in the evaluation of each of their assigned types (see Appendix C for individual asset details).

Table 4. Calculation of Total Asset Value at Risk by Asset Type

ASSET TYPE[1]	NUMBER OF ASSETS AT RISK	TOTAL ESTIMATED ASSET VALUE[2]
Highly Vulnerable (Value 3)[3]		
Roads	13 bridge structures, 30 road segments (approximately 2 miles)	Unknown
Schools	2	$5,840,100
Water and Sewer Utilities	5	$1,502,650
Hazardous Waste	1	$1,457,800
Food and Supplies	1	$162,100
Cultural Site	1	$89,500
Electric Utilities	1	$7,200
Moderately Vulnerable (Value 2)[3]		
River	1	$0 unknown
Roads	1 bridge structures, 47 Road Segments (approximately 9 miles)	$0 unknown
Parks and Recreation	7	$27,532,690
Hospital or Local Clinic	4	$11,440,960
Landfill	5	$7,392,830
Schools	1	$6,843,300
Water and Sewer Utilities	8	$1,389,000
Church	4	$1,086,000
Public Housing	1	$944,900
Pharmacy	1	$940,700
Hazardous Waste	3	$910,500
Electric Utilities	4	$567,470
Cemetery	3	$513,900
Communications	4	$293,790
Undeveloped Floodplain	1	$278,740
Law Enforcement or Corrections	1	$243,900
Food and Supplies	3	$166,600

ASSET TYPE[1]	NUMBER OF ASSETS AT RISK	TOTAL ESTIMATED ASSET VALUE[2]
Federal Government	1	$94,000
Restaurants	1	$89,000
Fire Station	1	$73,900
City Government	1	$64,300
Community Center	1	$41,600
Group Home	1	$35,600
Cultural Site (Plymouth Historic District)	1	unknown$0

1 **Asset Type –** Asset were categorized based on the services they provide. Those that provide multiple services were assigned a primary asset type (used in value summary) but were also assigned secondary asset types for consideration in their service to the community.

2 **Estimated Value –** Assets were assigned monetary values at the parcel level (Estimated Asset Value = Land Value and Improvement Value) with the exception of churches and cemeteries that share the same parcel. For these assets, cemeteries were assigned the land value and churches were assigned the parcel improvement value. discussed below. For Parcels that spanned multiple parcels the sum of parcel values was used. This process was selected to make conservative estimations—it is unlikely the full parcel will be affected by exposure event. However, estimates are subject to the currentness and completeness of parcel assessor records.

3 **Total Vulnerability =** Hazard Exposure + Sensitivity Score – Adaptive Capacity

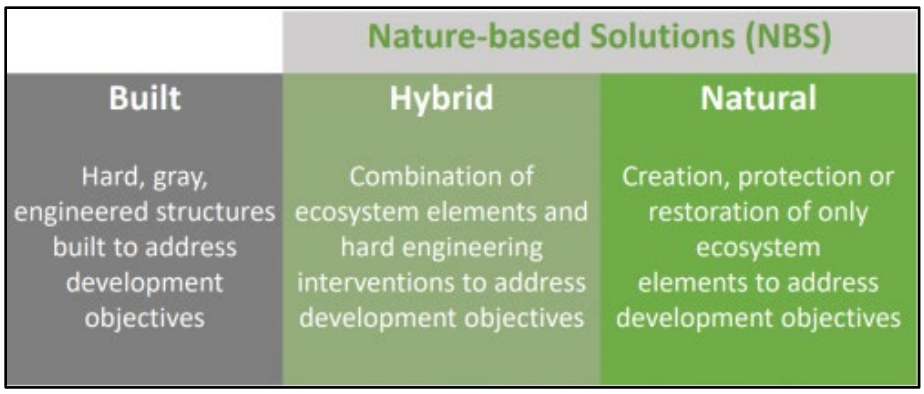
Table 5. Calculation of Total Asset Value at Risk by Ownership Type

OWNERSHIP CATEGORY	NUMBER OF ASSETS AT RISK	TOTAL ASSET VALUE AT RISK
Highly Vulnerable (Value 3)		
County	1	$5,022,000
Private, Unknown or Encumbrance	50	$3,707,840
Town of Creswell	2	$218,210
Town of Plymouth	1	$111,300
Moderately Vulnerable (Value 2)		
Other	2	$40,266,700
Private, Unknown or Encumbrance	85	$22,477,650
State	1	$22,236,040
County	6	$9,941,840
Town of Plymouth	6	$5,737,250
Town of Roper	1	$266,000
Town of Creswell	4	$249,300

7 PROJECT PORTFOLIO

The overall purpose of the Program is to support coastal communities in identifying, prioritizing, and pursuing resilience projects that reduce and minimize risks posed by coastal hazards. This project portfolio is intended to include traditional "hard" infrastructure projects, "soft" nature-based solutions, and "hybrid" solutions that include both hard and soft components and policy solutions.

Nature-based Solutions incorporate creation, protection, or restoration of ecosystem elements to improve resilience to natural disasters such as flooding. For example, projects that improve the functions of floodplains and wetlands can help alleviate flooding and improve water quality.



Built vs. Nature-Based Solutions

Identification of Resilience Projects

To develop a list of resilience projects for Washington County, a preliminary list of potential projects was created based on projects in existing plans such as the Hurricane Matthew Resilient Redevelopment Plan (2017) and Northeastern NC Regional Hazard Mitigation Plan (2021). The CAT reviewed the preliminary list of potential projects to remove projects already completed or no longer relevant to the county and add any additional projects for consideration. CAT members in consultation with SWCA then added or refined project ideas keeping the following principles in mind. Projects should:

- ✓ Support essential community functions that are critical for absorbing, adapting to, or rebounding from hazards
- ✓ Facilitate hazard preparedness, risk management, and mitigation actions that reduce hazard vulnerability
- ✓ Enable post-disaster community recovery and redevelopment that integrates community resilience objectives

Resilience projects in the portfolio are intended to reduce exposure and sensitivity to hazards as well as strengthen the adaptive capacity of community assets and vulnerable populations.

Project Prioritization

A shortened project list was reviewed at the March public meeting for feedback. CAT members refined the project list following that meeting, keeping in mind public input, the risk and vulnerability assessment results, and the following project selection criteria:

Project Impact:

- ✓ Overall benefit to the community, reflects vision and goals statement
- ✓ Advances prior efforts/aligns with other plans
- ✓ Has potential co-benefits, e.g., provides a recreational amenity, contributes to local economy, preserves a habitat, strengthens resilience to non-climate stressors like pandemics
- ✓ Important for long-term resilience (i.e., taking climate change, sea level rise, and other future conditions into account)
- ✓ Reduces vulnerability of key assets to coastal hazards (or increases the adaptive capacity of a critical asset or vulnerable population)
- ✓ Reduces economic risk posed by coastal hazards in one or more sectors

- ✓ Supports social equity

Project Feasibility:

- ✓ Capacity to implement and maintain
- ✓ Technical soundness
- ✓ Likely positive benefit-cost ratio
- ✓ Identifiable sources of funding

The high-priority projects agreed upon by the CAT are described in more detail below. Generally, these projects were understood by the CAT to have broad community-wide risk reduction benefits or to benefit vulnerable populations, to be feasible, to align with the county's long-term resilience goals, to build upon other plans, and to link to efforts already underway.

Priority Projects

The following projects were identified as high priority by the Washington County CAT. Projects are *not* listed in order of priority; they are all high-priority projects. Click the links below to jump to the details for each project:

1. Backup Generators or Other Equipment for Critical Facilities
2. Identify Strategic Drainage Improvements Outside of the Scuppernong Watershed
3. Implement Key Drainage Improvements in Areas of Interest (AOIs)
4. Install River Gauges
5. New Emergency Operations Center (EOC)
6. Remove Abandoned Structures and Critical Infrastructure from the Floodplain
7. Update Ordinances to Reduce Non-point Source Pollution
8. Structure Mitigation – Floodproofing
9. Retrofit County Court House
10. Share Information about Wetland Mitigation Banks and/or Water Farms with Landowners
11. Identify and Upgrade Broadband for County Buildings and Other Critical Facilities Connected via Copper/Legacy Internet
12. Emergency Vehicle and School Bus Route Improvements
13. Expand and Publicize Availability of Transportation and Community Buildings During Hazardous Conditions
14. Develop Water Management Guide for Landowners, Homeowners, and Renters

Project 1: Backup Generators or Other Equipment for Critical Facilities

PROJECT DESCRIPTION	Seek funding to ensure redundant power and equipment for critical facilities, including generators, backup water pumps or pump parts, or potential renewable energy solutions. Specifically: Create list of critical facilities that need a generator or other forms of redundant power, equipment, or parts and acquire/maintain these to ensure that critical facilities and infrastructure remain operational during emergencies or power outages.
LOCATION	Washington County
SOURCE	Northeastern Regional Hazard Mitigation Plan April 2021
SCOPING QUESTIONS	Who will maintain the list of generators and equipment? Who will be responsible for servicing/conducting maintenance?
HAZARD(S) ADDRESSED	All hazards
SUPPORTING FUNCTION	Emergency response, communications
TYPE OF SOLUTION	Structure and infrastructure
ESTIMATED TIMELINE	1 year
RESPONSIBLE ENTITY	Washington County Emergency Management
POTENTIAL PARTNERS	Town of Plymouth
EXISTING FUNDING	None identified by CAT
POTENTIAL FUNDING SOURCES	FEMA Emergency Management Performance Grant (EMPG); Generators for critical facilities are also eligible under the FEMA Pre-Disaster Mitigation (PDM) Program
PROJECT ESTIMATED COST	$10,000–$25,000 each
ANTICIPATED BENEFIT	High – Action would assist with maintaining emergency communications, response, and capacity. Extra pump parts will help to address flooding and reduce need for external assistance.
PRIORITY RATING	High

Project 2: Identify Strategic Drainage Improvements Outside of the Scuppernong Watershed

PROJECT DESCRIPTION	The Scuppernong Water Study will provide detailed hydrologic assessment for areas of flooding concern within the Scuppernong River watershed. This project would involve pursuing similar analysis in other areas of concern within the county that are not part of the Scuppernong Study. This analysis would help identify and prioritize areas where debris removal or other solutions, such as those mentioned in project 3, can be implemented.
LOCATION	Areas of the county outside the Scuppernong watershed
SOURCE	CAT meeting
SCOPING QUESTIONS	What areas are priorities for the study?
HAZARD(S) ADDRESSED	Runoff, storm surge, riverine flooding, sea level rise, erosion
SUPPORTING FUNCTION	Education, plans and policies, communications
TYPE OF SOLUTION	Plans and policies, ordinances, nonregulatory programs
ESTIMATED TIMELINE	1 year
RESPONSIBLE ENTITY	WCSWCD
POTENTIAL PARTNERS	APNEP, NC Cooperative Extension, NC Sea Grant, Kris Bass Engineering, Washington County Planning Department
EXISTING FUNDING	None identified by CAT
POTENTIAL FUNDING SOURCES	North Carolina Division of Water Infrastructure (DWI) Local Assistance for Stormwater Infrastructure investments (LASII) program, Golden LEAF Foundation, FEMA Hazard Mitigation Grant Program (HMGP)
PROJECT ESTIMATED COST	$100,000–$400,000
ANTICIPATED BENEFIT	High – Action would be beneficial to better understand water flow in the area and use the findings to prioritize necessary actions to address flooding and runoff.
PRIORITY RATING	High

Project 3: Implement Key Drainage Improvements in Areas of Interest

PROJECT DESCRIPTION	This could include several potential types of drainage improvement, which Project 2 above can help prioritize and site. Maps depicting potential work needed for some areas of interest already identified are included in Appendix F. Drainage improvement methods could include: • Remove debris from waterways and ditches, restoring hydraulic efficiency. • Resizing undersized culverts. • Two-stage ditch at Moccasin Canal – both as a drainage improvement and a demonstration project for landowners to see. • Water farming/wetland mitigation banks. Coastal farmlands could be converted to wetlands and established as conservation easements or mitigation banks in exchange for payments to landowners. • Aquatic weed spraying, clearing/snagging, and beaver control.
LOCATION	Countywide – specific locations to be determined with partners and study described in Project 2 above.
SOURCE	Hurricane Matthew Redevelopment Plan; Regional Resilience Portfolio for Albemarle Region; CAT discussions; public meetings.
SCOPING QUESTIONS	Identify landowners and potential partners. Prioritize locations based on Project 2.
HAZARD(S) ADDRESSED	Flooding, riverine flooding, runoff, storm surge, sea level rise
SUPPORTING FUNCTION	Business/economic development (farming), residents, transportation
TYPE OF SOLUTION	Structure and infrastructure, nature-based solutions
ESTIMATED TIMELINE	1–5 years
RESPONSIBLE ENTITY	WCSWCD, landowners
POTENTIAL PARTNERS	Town of Plymouth, Town of Creswell, Scuppernong Water Management Study partners
EXISTING FUNDING	None identified by the CAT
POTENTIAL FUNDING SOURCES	Pending Streamflow Rehabilitation Assistance Program (StRAP) grants applied for by WCSWCD, Other sources to be determined based on projects selected.
PROJECT ESTIMATED COST	$50,000–$1,000,000
ANTICIPATED BENEFIT	High – Action would have significant benefit on reducing flooding impacts for landowners and transportation throughout the county.
PRIORITY RATING	High

Project 4: Install River Gauges

PROJECT DESCRIPTION	There are currently only three gauges in the NCEM Flood Inundation Mapping and Alert Network countywide: one in Roper on Kendrick Creek, one in Plymouth on Conaby Creek, and one in Van Swamp along North Carolina Highway 32 South. This project would install additional gauges within the upstream portion of the county to help improve flood predictions and track flooding trends. The following potential locations have been identified for consideration: Eddiesmith Canal, Highland Canal, Kendrick Creek, Mackey's Creek, Main Canal, Scuppernong River, Swinson Swamp, Beaver Dam Branch. Part of this project would include confirming locations and functionality of existing gauges.
LOCATION	Upstream areas of Washington County
SOURCE	Hurricane Matthew Resilient Redevelopment Plan
SCOPING QUESTIONS	Project 2 could help to identify priority locations to install gauges. Who would be responsible for maintenance of gauges?
HAZARD(S) ADDRESSED	Flooding, riverine flooding, runoff, storm surge, sea level rise
SUPPORTING FUNCTION	Emergency response, transportation
TYPE OF SOLUTION	Structure and infrastructure
ESTIMATED TIMELINE	1–2 years
RESPONSIBLE ENTITY	Washington County Emergency Management, WCSWCD
POTENTIAL PARTNERS	National Weather Service (NWS), WCSWCD, NCDPS
EXISTING FUNDING	None identified by the CAT
POTENTIAL FUNDING SOURCES	Southeast Coastal Ocean Observing Regional Association (SECOORA), NWS, Washington County Drainage Fund
PROJECT ESTIMATED COST	$25,000–$50,000 each
ANTICIPATED BENEFIT	High – Action would have significant benefit in understanding water flow patterns in the County, flooding impacts, and areas in need of key drainage solutions.
PRIORITY RATING	High

Project 5: New Emergency Operations Center (EOC)

PROJECT DESCRIPTION	Construct a new dedicated EOC facility. Washington County has been working toward establishing a new EOC for many years. The county will continue to look for opportunities to move forward with this project. The county's existing facility is minimally adequate and relies on shared space with county administration—there is a need for a new and dedicated facility.
LOCATION	Washington County
SOURCE	Northeastern Regional Hazard Mitigation Plan April 2021
SCOPING QUESTIONS	Identify best location for facility. Ensure that facility is being constructed or upgraded with emergency shelter criteria in mind. Identify local partners.
HAZARD(S) ADDRESSED	All hazards
SUPPORTING FUNCTION	Emergency response, community resilience
TYPE OF SOLUTION	Structure and infrastructure
ESTIMATED TIMELINE	1-2 years
RESPONSIBLE ENTITY	Washington County Emergency Management
POTENTIAL PARTNERS	Washington County EMS, Washington County E911
EXISTING FUNDING	Legislative appropriations, local Washington County funding
POTENTIAL FUNDING SOURCES	NCDPS Emergency Preparedness Grants, FEMA EMPG Program includes funding for both sheltering and EOC FEMA Pre-Disaster Mitigation (PDM) Program FEMA Emergency Operations Center Grant Program
PROJECT ESTIMATED COST	High
ANTICIPATED BENEFIT	High – Action would have immediate benefit in providing emergency response capacity.
PRIORITY RATING	High

Project 6: Remove Abandoned Structures and Critical Infrastructure from the Floodplain

PROJECT DESCRIPTION	Remove an estimated 75 abandoned structures/homes in the floodplain including unanchored utilities and other debris swept into floodway by Hurricane Matthew. Replace them with green space. Removal of critical infrastructure that supports services such as transportation, water, energy, communications, and medical services from the floodplain is currently underway, but there is more to be accomplished and will require assistance from Washington County Emergency Management. Some examples of specific projects that would be beneficial include: • Adding lift stations to sewer pipes in Roper that are currently at water level. • Planning ahead to relocate larger infrastructure, such as wastewater treatment facilities, when they need to be replaced due to age or repaired after a disaster. A first step would be to create a confirmed list and map of abandoned properties and identify critical infrastructure that would benefit from upgrades or replacement.
LOCATION	Countywide; specific properties and infrastructure to be confirmed
SOURCE	Hurricane Matthew Redevelopment Plan and Northeastern Regional Hazard Mitigation Plan (April 2021)
SCOPING QUESTIONS	What are the major roadblocks to removing abandoned structures? What will be the use of the greenspace and who will manage it?
HAZARD(S) ADDRESSED	Flooding
SUPPORTING FUNCTION	Reduce debris hazards, increase resiliency of critical infrastructure.
TYPE OF SOLUTION	Structure and infrastructure
ESTIMATED TIMELINE	In progress, 5–10 years to complete
RESPONSIBLE ENTITY	Washington County Planning Department
POTENTIAL PARTNERS	Alex Crosland, Buyout Manager, and Fern Hickey, Buyout Specialist, at NCORR; Washington County Utilities
EXISTING FUNDING	County General Fund
POTENTIAL FUNDING SOURCES	FEMA Building Resilient Infrastructure and Communities (BRIC), FEMA Flood Mitigation Assistance (FMA) Program, U.S. Department of Housing and Urban Development Community Development Block Grant – Neighborhood Revitalization (CDBG-NR) Program County General Fund ($10k annually 10-4350-600)
PROJECT ESTIMATED COST	High
ANTICIPATED BENEFIT	High – Action would have significant benefit on risk reduction.
PRIORITY RATING	High

Project 7: Update Ordinances to Reduce Non-point Source Pollution

PROJECT DESCRIPTION	The Land Use Plan mentions that non-point-source pollution sources include crop production, animal feed lots, failing septic systems, forestry, and runoff from roads and parking lots. CAT members indicated these concerns would be a high priority to address for any new development (e.g., using permeable pavement on new parking lots). This project could also include policy updates within ordinances such as the zoning or subdivision ordinance to address these issues (especially for new construction within a known floodplain).
LOCATION	Washington County
SOURCE	Washington County Land Use Plan
SCOPING QUESTIONS	How severe is the pollution? What are some low-cost ways to reduce pollution from these sources? What model ordinances might the County use?
HAZARD(S) ADDRESSED	Flooding, riverine flooding, runoff, storm surge, sea level rise
SUPPORTING FUNCTION	Public Health and Safety
TYPE OF SOLUTION	Plans and policies, Structure and infrastructure, Potential for nature-based solutions to help improve runoff water quality
ESTIMATED TIMELINE	1-5 years
RESPONSIBLE ENTITY	Washington County Planning Department
POTENTIAL PARTNERS	WCSWCD, North Carolina Department of Environmental Quality (NCDEQ), USSW, Town of Plymouth, Town of Creswell
EXISTING FUNDING	None identified by the CAT
POTENTIAL FUNDING SOURCES	EPA 319 Grant, NC DWI LASII
PROJECT ESTIMATED COST	Variable – depends on project specifics
ANTICIPATED BENEFIT	High – Action would have benefit for public health and safety.
PRIORITY RATING	High

Project 8: Structure Mitigation - Floodproofing

PROJECT DESCRIPTION	Projects may include acquisition/elevation, mitigation/reconstruction, and wet/dry floodproofing to residential and nonresidential structures. Washington County and participating municipal jurisdictions will continue to list vulnerable and/or repetitive loss properties and identify treatment options as funding becomes available.
LOCATION	Countywide
SOURCE	Northeastern Regional Hazard Mitigation Plan April 2021
SCOPING QUESTIONS	What County staff would support this function? Is there interest from residents?
HAZARD(S) ADDRESSED	Flooding, sea level rise
SUPPORTING FUNCTION	Public health and safety, community resilience
TYPE OF SOLUTION	Structure and Infrastructure
ESTIMATED TIMELINE	Ongoing
RESPONSIBLE ENTITY	Washington County Planning Department
POTENTIAL PARTNERS	NC State Mitigation Program, private property owners, Towns
EXISTING FUNDING	None identified by the CAT
POTENTIAL FUNDING SOURCES	FEMA Flood Mitigation Assistance (FMA) Program, NC Strategic Buyout Program
PROJECT ESTIMATED COST	$50,000–$100,000 each
ANTICIPATED BENEFIT	High – Action would reduce long-term flood impacts and reduce repetitive loss which can result in less financial loss/recovery costs over time.
PRIORITY RATING	High

Project 9: Retrofit County Court House

PROJECT DESCRIPTION	Reroute drain spouts to a central storm drain to alleviate flooding. Upgrading elevator shaft drainage system in the basement of the courthouse. The elevator is currently functioning but threatened during flood conditions (currently reliant on sump pump) and has broken in the past. If the elevator is broken, this impacts ADA accessibility for the courthouse. Figure 8 shows a map of the courthouse location.
LOCATION	120 Adams Street, Plymouth, NC 27962, Washington County
SOURCE	Hurricane Matthew Redevelopment Plan
SCOPING QUESTIONS	
HAZARD(S) ADDRESSED	Flooding
SUPPORTING FUNCTION	Community resilience, accessibility
TYPE OF SOLUTION	Structure and Infrastructure
ESTIMATED TIMELINE	In progress, 1 year
RESPONSIBLE ENTITY	Washington County Maintenance Department
POTENTIAL PARTNERS	Town of Plymouth
EXISTING FUNDING	$125,000 local Washington County General Fund (pending board approval of FY25 County budget)
POTENTIAL FUNDING SOURCES	Washington County General Fund
PROJECT ESTIMATED COST	$25,000–$125,000
ANTICIPATED BENEFIT	High – Will improve county facility resilience and ensure ADA accessibility.
PRIORITY RATING	High

Figure 8. Location of County Courthouse to be retrofitted.

Project 10: Share Information about Wetland Mitigation Banks and/or Water Farms with Landowners

PROJECT DESCRIPTION	Coastal farmlands could be converted to wetlands and established as conservation easements or mitigation banks in exchange for payments to landowners. Or similarly, certain lands could be designated as "water farms," with payments to landowners for retaining water on the land under certain flood conditions. A first step toward this will be sharing information with landowners about this type of project and its benefits.
LOCATION	Countywide, specific locations to be determined
SOURCE	Regional Resilience Portfolio for the Albemarle Region
SCOPING QUESTIONS	What entity would administer this type of solution?
HAZARD(S) ADDRESSED	Flooding, riverine flooding, runoff, storm surge, sea level rise
SUPPORTING FUNCTION	Community resilience
TYPE OF SOLUTION	Nature-based plans and policies
ESTIMATED TIMELINE	2–5 years
RESPONSIBLE ENTITY	WCSWCD
POTENTIAL PARTNERS	NCDEQ
EXISTING FUNDING	None identified by the CAT
POTENTIAL FUNDING SOURCES	NC DWI Stream & Wetland Mitigation Program, NCDEQ Mitigation Sources
PROJECT ESTIMATED COST	Variable depending on project but likely low
ANTICIPATED BENEFIT	High – Action would have significant benefit in areas with flooding issues and can provide reliable, long-term income for landowners.
PRIORITY RATING	High

Project 11: Identify and Upgrade Broadband for County Buildings and Other Critical Facilities Connected via Copper/Legacy Internet

PROJECT DESCRIPTION	Some internet/broadband services use copper wiring that is often susceptible to water intrusion and leads to unreliable service and outages during flooding events. Make a list of county buildings/assets and other critical facilities that use copper/legacy connections and connect them to a more reliable provider, such as the Microelectronics Center of North Carolina (MCNC) fiber network.
LOCATION	Countywide, specific facilities to be determined
SOURCE	CAT Meeting #3
SCOPING QUESTIONS	Identify county buildings, assets, and critical facilities that use copper/legacy connections.
HAZARD(S) ADDRESSED	All hazards
SUPPORTING FUNCTION	Emergency communications and response
TYPE OF SOLUTION	Structure and infrastructure
ESTIMATED TIMELINE	1–2 years
RESPONSIBLE ENTITY	Washington County IT Department
POTENTIAL PARTNERS	MCNC, NC Department of Information Technology, Albemarle Commission
EXISTING FUNDING	None identified by the CAT
POTENTIAL FUNDING SOURCES	FEMA Pre-Disaster Mitigation (PDM) Program
PROJECT ESTIMATED COST	$5,000 - $100,000 depending on scope
ANTICIPATED BENEFIT	High – Action would enhance communications reliability which support emergency response.
PRIORITY RATING	High

Project 12: Emergency Vehicle and School Bus Route Improvements

PROJECT DESCRIPTION	Elevation or protection of road segments that are primary routes for emergency vehicles and school buses. Washington County Schools Transportation Department has identified some specific road segments that are frequently blocked by flooding and can result in school closures when there has been recent rain. These include Crossroad in Roper, Folly Road in Roper, Cherry Road in Creswell, and the end of Main Street into Mackey's Road in Plymouth. Natasha Earle-Young, North Carolina Department of Transportation (NCDOT) Policy Director, shared the following information in response to an inquiry about this project and offered to meet with the County to discuss further: DOT reviewed the roads and DOT did not study them due to the low traffic volume in our statewide resiliency improvement plan. However, our roadway inundation tool does say flood at the 10-year reoccurrence internal on main street in Plymouth and Cherry Road in Creswell. There is nothing in the system showing flooding in the 10 year for the other two roads in Roper. The road description needs to be more specific with the start and end points. There also needs to be information included about alternate routes that can be taken for these areas and the length of the detour. This will help define the criticality of the routes.
LOCATION	Countywide, specific locations noted above.
SOURCE	Town of Creswell, Washington County Schools Transportation Department
SCOPING QUESTIONS	Work with Washington County Schools Transportation, Washington County Emergency Management, fire departments, and law enforcement to develop comprehensive list of most commonly flooded road segments that impact school bus and emergency vehicle routes. Work with NCDOT to more accurately evaluate the impact of flooding on these road segments and identify potential solutions.
HAZARD(S) ADDRESSED	Flooding
SUPPORTING FUNCTION	Transportation, education, community resilience
TYPE OF SOLUTION	Structure and Infrastructure
ESTIMATED TIMELINE	2–10 years
RESPONSIBLE ENTITY	NCDOT, Washington County
POTENTIAL PARTNERS	Washington County School District, Washington County Emergency Management, Fire Departments, Police and Sheriff's Departments
EXISTING FUNDING	None identified by CAT
POTENTIAL FUNDING SOURCES	To be determined in consultation with NCDOT; potentially State Transportation Improvement Program
PROJECT ESTIMATED COST	High
ANTICIPATED BENEFIT	High – Action would reduce impacts to education and emergency vehicle access and improve transportation routes throughout the County.
PRIORITY RATING	High

Project 13: Expand and Publicize Availability of Transportation and Community Buildings During Hazardous Conditions

PROJECT DESCRIPTION	Expand hours and availability of countywide transportation service and community buildings such as churches and/or public facilities that serve residents (and service animals and/or household pets, if needed) during extreme heat or evacuation periods, and advertise that these services are available to residents through the existing emergency alert system.
LOCATION	Countywide
SOURCE	CAT Meetings #3 and #5
SCOPING QUESTIONS	Identify existing resources and potential partners.
HAZARD(S) ADDRESSED	All Hazards
SUPPORTING FUNCTION	Communication, transportation, community resilience
TYPE OF SOLUTION	Plans and policies, Education and outreach
ESTIMATED TIMELINE	1–2 years
RESPONSIBLE ENTITY	Washington County Emergency Management
POTENTIAL PARTNERS	Riverlight Transit, local churches, Washington County Recreation
EXISTING FUNDING	None identified by CAT
POTENTIAL FUNDING SOURCES	Both sheltering and EOC would be eligible activities under EMPG funding FEMA EMPG
PROJECT ESTIMATED COST	Low – less than $10,000
ANTICIPATED BENEFIT	High – Action would enhance emergency response capacity and build community resilience.
PRIORITY RATING	High

Project 14: Develop Water Management Guide for Landowners, Homeowners, and Renters

PROJECT DESCRIPTION	Discussion with residents has shown that most people do not know for sure what they are expected to do to maintain ditches, storm drains, and other water management systems. What are they responsible for doing? And what are they allowed to do? How does what they do on their land impact downstream neighbors and the system as a whole? This project would be to develop and distribute information in the form of key talking points and summary information tailored to local audiences. Messaging should include compelling numbers that help explain how the water management system is interconnected and what people can do to help maintain it and not pass along negative impacts to their neighbors. The messages should also touch on what water management actions are handled by entities such as Washington County or other agencies.
LOCATION	Countywide
SOURCE	Public meetings and CAT Meeting #5
SCOPING QUESTIONS	Identify potential partners for communications and the best channels to share information.
HAZARD(S) ADDRESSED	Flooding, riverine flooding, runoff, storm surge, sea level rise
SUPPORTING FUNCTION	Reducing flooding, capacity building
TYPE OF SOLUTION	Education and outreach
ESTIMATED TIMELINE	1 year
RESPONSIBLE ENTITY	WCSWCD
POTENTIAL PARTNERS	NC Cooperative Extension, Town of Plymouth
EXISTING FUNDING	None identified by CAT
POTENTIAL FUNDING SOURCES	Local Washington County General Fund allocations for advertising
PROJECT ESTIMATED COST	Low – less than $10,000
ANTICIPATED BENEFIT	High – Action would reduce actions that contribute to negative outcomes for local landowners and surrounding infrastructure.
PRIORITY RATING	High

Other Projects Considered

All other projects considered by the CAT are documented in Table 6. Some of the other projects considered were not prioritized because they had been completed or were already in progress since being identified in previous planning efforts. Others were very localized (e.g., Town-owned) and not perceived by the CAT to have sufficient benefit to the community at large to be considered high priority. Others would not substantially contribute to reducing coastal hazard risks or were considered infeasible by the CAT for any of the reasons noted in the criteria above, and so were not prioritized.

Table 6. Other Projects Considered for Washington County, North Carolina

PROJECT NAME	PROJECT DESCRIPTION	SOURCE
Housing Elevation	During Hurricane Matthew, five homes within the county experienced extensive flooding, causing serious problems for the homeowners, and were identified as likely candidates for elevation.	Hurricane Matthew Redevelopment Plan
Elevate Treatment Plant Entry Road (Town of Plymouth)	Elevate treatment plant entry road (Gage Lane).	Hurricane Matthew Redevelopment Plan
Relocate Elderly Housing Complex (Town of Plymouth)	Relocate elderly housing complex in Plymouth to prevent future flood damage, isolation and evacuation issues, emergency response issues, etc.	Hurricane Matthew Redevelopment Plan
Water and Sewer Plan	The Land Use Plan states there is a need for an updated water and sewer plan. Would need studies for any future development.	Washington County Land Use Plan
Flood Zone Structures Database	The Land Use Plan states a need for a database of existing structures within the flood zone.	Washington County Land Use Plan
Stormwater Planning	Participate in region-wide stormwater planning. Identify needs and develop collaborative approaches to reducing stormwater flooding.	Regional Resilience Portfolio for Albemarle Region
Resilience Hub	Create a resilience hub that offers information, guidance, and technical assistance to residents and business owners on hazards and mitigation options.	Regional Resilience Portfolio for Albemarle Region

8 NEXT STEPS

This Resilience Strategy can be used to continue efforts in the county including:

- Maintaining a network of team members that continue planning and addressing future resilience concerns, including the Towns of Plymouth and Creswell, which also participated in Program Phases 1 & 2
- Development of "shovel-ready" projects
- Integrating resilience strategies into the local Coastal Area Management Act land use plan and other policy documents
- Completing additional feasibility studies for existing or future resilience projects
- Leveraging the strategy and portfolio to apply for additional grant opportunities
- Providing feedback to the DCM about the Program and the strategy process

This Resilience Strategy will support the next phases in the Program:

- Phase 3: Engineering and Design
- Phase 4: Implementation

REFERENCES CITED

Albermarle Commission. 2024. Scuppernong water management study. Available at: https://storymaps.arcgis.com/stories/4ec3f59066974f789687573058035b01. Accessed May 2024.

Centers for Disease Control and Prevention (CDC)/Agency for Toxic Substances and Disease Registry (ATSDR). 2020. SVI 2018 North Carolina tract. Division of Toxicology and Human Health Sciences. Geospatial Research, Analysis & Services Program (GRASP). Available at: https://www.atsdr.cdc.gov/placeandhealth/svi/data_documentation_download.html. Accessed November 2023.

Federal Emergency Management Agency (FEMA). 2018. National Risk Index. Available at: https://hazards.fema.gov/nri/map. Accessed November 2023.

_____. 2023. Community disaster resilience zones. Available at: https://experience.arcgis.com/experience/3fdfd0639ba0403e9414d05654449d32/page/Home/. Accessed April 2024.

Fire Lab. 2023. Wildfire Hazard Potential. Available at: https://www.firelab.org/project/wildfire-hazard-potential.

Hazards and Vulnerability Research Institute (HVRI). 2011. Social Vulnerability Index (SoVI) for North Carolina based on 2000 Census Block Groups. University of South Carolina. Available at: https://coast.noaa.gov/digitalcoast/data/sovi.html. Accessed November 2023.

Intergovernmental Panel on Climate Change (IPCC). 2023. *Climate Change 2023: AR6 Synthesis Report*. Available at: https://www.ipcc.ch/report/sixth-assessment-report-cycle/. Geneva, Switzerland: Intergovernmental Panel on Climate Change. Accessed November 2023.

National Oceanic and Atmospheric Administration (NOAA) National Hurricane Center. 2024. Sea, lake, and overland surges from hurricanes (SLOSH). Available at: https://www.nhc.noaa.gov/surge/slosh.php.

National Oceanic and Atmospheric Administration (NOAA) National Weather Service (NWS). 2024. Eastern North Carolina tropical landfall and impact statistics (Through 2014). Available at: https://www.weather.gov/mhx/TropicalImpacts. Accessed 2024.

National Oceanic and Atmospheric Administration (NOAA) Office for Coastal Management. 2017. Sea level rise viewer. Available at: https://coast.noaa.gov/slrdata. Accessed November 2023.

_____. 2023. Sea level rise viewer – Local scenarios. Available at: https://coast.noaa.gov/slr/#/layer/sce/0/-8637233.885336772/4292022.257723309/8/satellite/none/0.8/2050/interHigh/midAccretion.

NC OneMap. 2016. North Carolina parcels. Updated March 2023. Available at: https://www.nconemap.gov/datasets/north-carolina-parcels-polygons/explore?location=35.120187%2C-79.919650%2C7.66.

_____. 2018a. Updated March 2023. Hurricane Matthew flood extent across the Piedmont and Coastal Plain of North Carolina. Available at: https://www.nconemap.gov/datasets/hurricane-matthew-flood-extent-across-the-piedmont-and-coastal-plain-of-north-carolina/explore. Accessed November 2023.

_____. 2018b. Updated March 2023. Hurricane Florence flood extent across the Piedmont and Coastal Plain of North Carolina. Available at: https://www.nconemap.gov/datasets/hurricane-florence-flood-extent-across-the-piedmont-and-coastal-plain-of-north-carolina/explore. Accessed November 2023.

North Carolina Department of Commerce. 2023. *2024 North Carolina Development Tier Designations*. Available at: https://www.commerce.nc.gov/report-county-tiers-ranking-memo-current-year/download?attachment. Accessed April 2024.

North Carolina Department of Public Safety (NCDPS). 2018. *State of North Carolina Hazard Mitigation Plan*. February. Available at: https://files.nc.gov/ncdps/documents/files/State%20of%20North%20Carolina%20Hazard%20Mitigation%20Plan%20Final%20As%20Adopted.pdf. Accessed April 2024.

_____. 2021. *North Carolina Hurricane Guide*. Available at: https://www.readync.gov/hurricane-guide-2021-english/open. Accessed April 2024.

North Carolina Division of Coastal Management (DCM). 2023. *Resilient Coastal Communities Program Planning Handbook*. Updated August 2023. Available at https://www.deq.nc.gov/coastal-management/resilience/rccp-planning-handbook-1-1-2024/download?attachment. Accessed October 2023.

North Carolina Emergency Management Division (NCEM). 2017. *Hurricane Matthew Resilient Redevelopment Plan – Washington County*. North Carolina Emergency Management Division. Available at: https://files.nc.gov/rebuildnc/documents/matthew/rebuildnc_washington_plan_combined.pdf. Accessed November 2023.

_____. 2021. *Northeastern NC Regional Hazard Mitigation Plan Update*. Available at: http://www.co.bertie.nc.us/departments/em/Northeastern%20NC%20HMP%20Final%20Plan_2021.pdf. Accessed November 2023.

North Carolina Floodplain Mapping Program. 2020. North Carolina effective flood zones. Available at: https://arcg.is/1zuDqD0. Accessed November 2023.

_____. 2024a. Flood Risk Information System (FRIS.) Available at: https://fris.nc.gov/fris/Home.aspx?ST=NC.

_____. 2024b. Elevation/DEM20ft_DEM. Available at: https://services.nconemap.gov/secure/rest/services/Elevation/DEM20ft_DEM/ImageServer.

North Carolina Office of Recovery and Resiliency (NCORR). 2022. *Climate Resilience Projects for the Albemarle Region*. Available at: https://www.rebuild.nc.gov/regional-resilience-project-portfolio-albemarle-region/open. Accessed April 2024.

Schaffer-Smith, D. 2020. Hurricanes Matthew and Florence: Impacts and opportunities to improve floodplain management. Available at: https://knb.ecoinformatics.org/view/doi%3A10.5063%2FF1JM280P. Accessed April 2024.

State of North Carolina. 2020. *North Carolina Climate Risk Assessment and Resilience Plan. Impacts, Vulnerability, Risks, and Preliminary Actions. A Comprehensive Strategy for Reducing North Carolina's Vulnerability to Climate Change*. June. Available at https://files.nc.gov/ncdeq/climate-change/resilience-plan/2020-Climate-Risk-Assessment-and-Resilience-Plan.pdf. Accessed November 2023.

U.S. Census Bureau. 2020. 2020 Population by County, North Carolina. Available at https://www.census.gov/library/stories/state-by-state/north-carolina-population-change-between-census-decade.html. Accessed May 2024.

U.S. Fish and Wildlife Service. 2023. *Water Management Plan and Environmental Assessment for Pocosin Lakes National Wildlife Refuge*. Available at: https://www.fws.gov/media/water-management-plan-and-environmental-assessment-pocosin-lakes-national-wildlife-refuge. Accessed November 2023.

Washington County. 2021. *Washington County North Carolina Land Use Plan*. Draft August 16, 2021. Under review.

Zachry, B. C., W. J. Booth, J. R. Rhome, and T. M. Sharon. 2015: A national view of storm surge risk and inundation. *Weather, Climate, and Society* 7(2):109–117. Available at: http://dx.doi.org/10.1175/WCAS–D–14–00049.1. Accessed April 2024.

APPENDIX A

COMMUNITY ACTION TEAM MEETING NOTES

Ctrl+Click to jump to the summary of a specific meeting:

Meeting Summary
Washington County and Town of Creswell Community Action Team (CAT) Meeting #1
Monday October 9, 2023 from 6:00 – 7:00 pm
In person at the Town of Creswell Meeting Room

Meeting Objectives

- Introduce the purpose, milestones, and schedule for the RCCP process
- Review and answer any questions about the role of the CAT members
- Review existing information available and gaps for consideration under RCCP, including:
    - Priority hazards for assessment
    - Initial discussion of assets to be mapped
    - Priority Projects
- Confirm next steps following this meeting

Participants

Town of Creswell CAT Members
Ron Ambrose, Town Mayor Pro-tem
Ray Blount, Town Mayor
Penny Chapman, Town Clerk
Joel Harris, Town Commissioner
Brenda Logan, Town Commissioner
Syble Spruill, Town Commissioner

Washington County CAT Members
Anne Keyes, County Commissioner
Carol Phelps, County Commissioner
Allen Pittman, Washington Co Planning Director

Facilitation and Support Staff
Kathryn Gardner, SWCA Environmental Consultants
Kara Giblin, SWCA Environmental Consultants
Robin Payne, Payne Consulting
Mackenzie Todd, NC Division of Coastal Management

Action Items

CAT Members

- Share additional information on hazards, assets, or project status with SWCA by Friday, Oct. 27
- Share media (Local Newspapers, Radio Stations, Town notification systems) that could be used to advertise potential public meeting at the Christmas Parade on Dec. 9
- Look for Creswell Drainage Committee files.

SWCA

- Update maps with new asset and hazard information
- Share updated hazards, assets and projects with CAT members – by Monday, Nov. 13

Summary of Key Points from Presentation and Discussion

Pre-Meeting Tour 5:30-6:00pm
Prior to the meeting at 6:00pm, Penny Chapman and Syble Spruill gave Kathryn Gardner, Kara Giblin and Mackenzie Todd a tour of the Town of Creswell and pointed out areas of flooding concern.

Program Overview
Kathryn Gardner, SWCA Environmental Consultants, introduced the four-phase Resilient Coastal Communities Program (RCCP). The four phases of the program are outlined Exhibit A at then end of this summary and explained in further detail in the Program Handbook:

Mackenzie Todd, Division of Coastal Management (DCM), explained that DCM will share information about how to apply for funding from the state for Phase 3 of the RCCP early next year. Once communities complete Phases 1 and 2, they become eligible to apply for Phase 3 funding. Phase 3 will fund the engineering and design work for one prioritized resilience project. After Phase 3, communities will have the opportunity to apply via a competitive proposal process for Phase 4 implementation and construction funds.

Community Action Team Role
Ms. Gardner explained the role of the CAT is to provide guidance and input for Phases 1 and 2 to ensure the Resilience Strategy developed by SWCA reflects the community's vision and goals and accurately reflects the issues and needs in the community.

CAT Members are encouraged to invite other community stakeholders as they see fit. The next CAT meeting is scheduled for Monday November 13 with a public meeting at the town Christmas Parade on December 9. These meetings will focus on continuing to gather information on hazards and assets. Additional CAT meetings and another public meeting will be held in early 2024 to finalize the project list and the Risk and Vulnerability Assessment process and results.

Review of Existing Materials
Kara Giblin, SWCA Environmental Consultants explained that the SWCA team has begun reviewing the existing materials related to resilience planning. She asked CAT members to review initial list of projects pulled from these resources and share any other existing information that might be relevant to SWCA's analysis. The following is a list of studies and plans SWCA is currently reviewing:

- RCCP applications
- Northeastern Regional Hazard Mitigation Plan April 2021
- Washington County Land Use Plan 8-16-21
- Washington County Hurricane Matthew Resilient Redevelopment Plan 2017
- Climate Resilience Projects for the Albemarle Region, RISE 2022

Discussion of Hazards
Initial information on flood areas was presented on maps. The areas below were discussed during the meeting and will be added to the list of risk areas:

- Ditch flooding at 5th and 4th Street prevents travel from Cherry to Creswell
- Main Street at 3rd Street floods during heavy rain events
- Ditch along Palmetto from 1st Street to 3rd Street remains full even after weeks of drought
- 4th Street at Palmetto closed due to sinkhole

- Flooding at school behind post office (ditch runs along school property). School cannot be used as emergency shelter
- Ditch at the end of paved road at 6th street also floods during heavy rain events
- Pump on Cherry Rd for levy/dike does not have a back-up generator and can only pump water out of town during moderate rain events. If water is too high, there is nowhere for the pump to send water
- Drainage ditches from two culverts under Hwy 64 funnel water south towards town bringing runoff from the highway into town instead of around town. Before the highway was built, water dispersed across farmland
- Pump Station and EMS have no permanent generators
- Washington County has flood zoning information by parcel on their GIS website

Discussion of Assets

The group identified a preliminary list of assets. SWCA will add these to the current map before the next meeting. Additional assets discussed were:

- Critical Facilities (full list sent by Allen Pittman)
- Fire Department, Town Hall
- Cherry Road is important for residents outside Creswell to be able to access groceries and supplies after a storm
- Mark's Supermarket & Dollar General
- 3 churches
- 4 restaurants
- Community Center, Ruritans
- Post Office
- Pump Station on Cherry Rd
- Red Cross location Pines Elementary/Washington Co Middle school at Hwy 64 and Hwy 45

Discussion of Projects

The group began discussing ideas for potential projects to address hazards:

- Generators for critical facilities including the pump station
- Additional pumps for redundancy
- Raising the road
- Risers to slow the flow of water flowing south under the highway towards town
- Soil and Water District previously told the town that a large retaining wall is needed
- Clean out ditches; Dredge or snag Scuppernong River, Alligator Creek

Next Steps

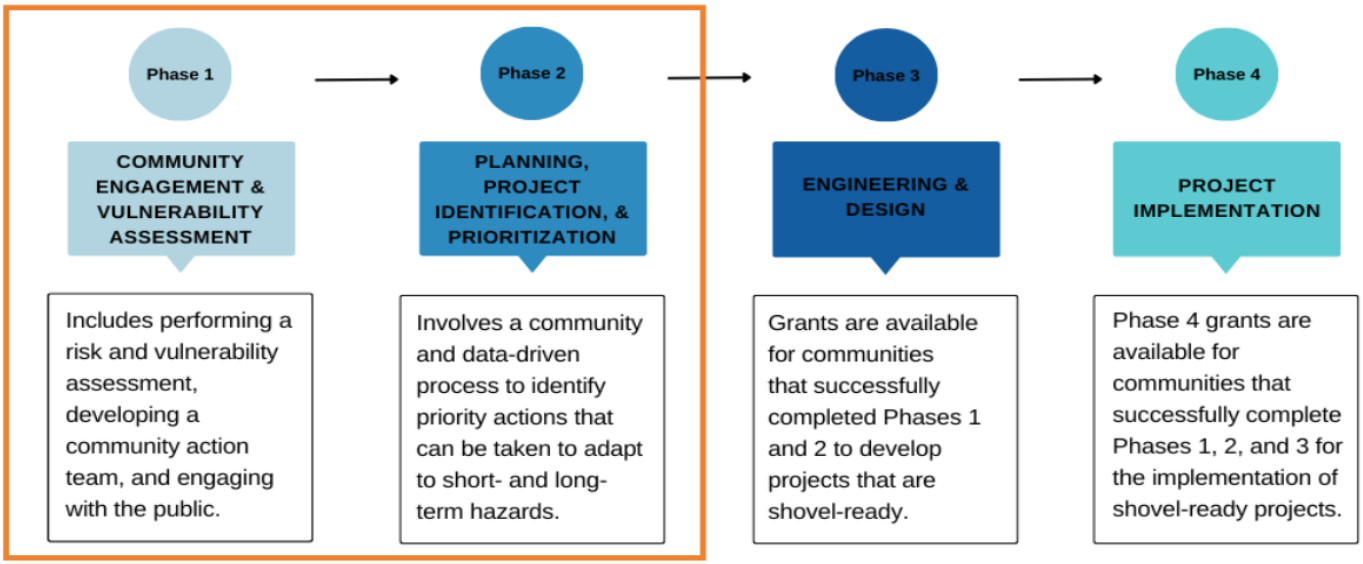
The hazards and assets discussed during this meeting will be added to Town and County maps by SWCA. We will continue to work together and build on information and prepare for the first public meeting at the Christmas Parade in December. The next meeting of the CAT is scheduled for **Monday, November 13 from 6:00 – 7:00 p.m. at the Town of Creswell Meeting Room.**

Exhibit A – Copy of Handout from Meeting

NC Resilient Coastal Communities Program – Town of Creswell and Washington County

First Community Action Team Meeting, October 9, 2023

Program Overview



Hazards Risk Assessment

Potential hazards

- Sea level rise
- Flooding (rainfall, tidal, and riverine)
- Damaging storms, tornadoes, and winds
- Storm surge
- Shoreline erosion
- Drought, Heat Waves, and Wildfire

Non-climate stressors

- Aging or potentially undersized infrastructure
- Population dynamics
- Economic shifts
- Increased subsidence
- Altered drainage patterns
- Land cover change (i.e., increased development and impervious surface area)

Assessment of Asset Vulnerability

Community assets will include at least:

- Roads/Evacuation Routes
- Water/Sewer lines (if the community has sewer)
- Government Buildings/Offices (e.g., City/Town Hall)
- Public Safety or Emergency Services (e.g., Police/Fire)
- Schools
- Health Services
- Natural Assets (e.g., natural areas, open spaces, parks, etc.)

Vision and Goals

Vision: The vision is an aspirational statement for where the community wants to be in the future (e.g., in the next ten years or more), particularly in relation to coastal hazards.

Goals: Specific, measurable goals will help the community identify steps that can be taken to achieve the vision.

Possible Components of a Vision Statement

Describing the Envisioned Community

- Resilient and vibrant
- Diverse and strong
- Culture of resilience
- Thriving and healthy

Who 'Community' Includes

- Residents
- Visitors
- Local businesses
- Neighborhoods

Resilience Goals

- Quickly rebound from hazard events
- Pro-active measures to prevent or minimize future damage
- Sustainable growth of population and economic base
- Connected community fabric
- Opportunities for all residents

Strategies

- Strategic investments
- Sound policy
- Strong/inclusive partnerships
- Protection of the natural environment
- Frequent communication with residents

Example Vision: "The Town of Hertford is a vibrant, diverse community committed to helping its residents thrive, celebrating its riverfront, history, culture, and distinctive character while promoting commercial and residential growth, showcasing the beauty and natural resources of the Perquimans River, and integrating coastal resilience practices to address adverse environmental impacts.

Meeting Summary
Washington County Community Action Team (CAT) Meeting #2
Monday November 13, 2023 from 3:00 – 4:00 pm
In person at the Washington County Manager's Office, Plymouth, NC

Meeting Objectives

- Hear an update on hazard and asset mapping process
- Debrief Oct. 23 community event and discuss next steps for engagement
- Review and discuss example vision and goals statement
- Confirm next steps following this meeting

Participants

Washington County CAT Members
Anne Keyes, County Commissioner
Asia Melton, RCCP Champion, Lead NC Fellow
Curtis Potter, County Manager
Chris Respess, Soil & Water Conservation
Lance Swindell, Emergency Manager, Wash. Co.

Facilitation and Support Staff
Molly Chamberlain, SWCA Environmental Consultants
Kathryn Gardner, SWCA Environmental Consultants
Meg Perry, SWCA Environmental Consultants
Mackenzie Todd, NC Division of Coastal Mgmt

Action Items

CAT Member	Action	Due by
Asia	Post asset list from Meg on County's file share site (BaseCamp)	Monday 11/20
All CAT Members	Review list in BaseCamp and share any assets that are missing or should be removed	Friday 12/8
Asia	Reach out to the town of Roper contacts to get their review of the asset list information for Roper sites	Friday 12/8
Asia/Curtis	Post Scuppernong Watershed survey tool to County Facebook page. Meg will share an example post for you to use.	Friday 12/8
Lance, Chris, and Anne	Identify one or more NCDOT contacts to include in future CAT discussions: • Lance to reach out to Marshall Gill – Local DOT Engineer • Chris to reach out to his DOT contact through Soil & Water • Anne to reach out to County Commissioner who is former DOT	Before next CAT meeting in January
Curtis	Provide possible meeting dates in February 2024 to host the Annual Drainage Advisory Board Meeting to serve as the 2nd public outreach meeting	Before next CAT meeting in January

SWCA Staff	Action	Due by
Meg/Molly	Send current asset list to Asia; Asia will handle distribution to CAT and Roper contacts	Friday 11/17

Meg	Share Scuppernong online survey tool with CAT members and send example post to Curtis and Asia	Friday 11/17
Meg/Molly	Follow up with additional contacts beyond the CAT: • Farm Service Agency to request damage photos from heavy rain events • Health Department, Catholic church, and State Archaeology Office to get their input on assets and community engagement	Friday 12/8

Summary of Key Points from Presentation and Discussion

Hazard and Asset Mapping Process

Meg Perry, SWCA Environmental Consultants, discussed the process and status of collecting asset and hazard information for Washington County. SWCA is developing a map of Washington County that includes assets grouped by category; known hazard risk areas; and potential project sites.

Assets are anything that is valued by the community for safety, shelter, resources, culture and recreation. Examples of assets are grocery stores and gas stations for supply restocking after a storm; emergency evacuation shelters; schools; fire departments; water treatment plants; churches; community buildings; and parks. CAT Members are asked to contribute their knowledge of local assets so SWCA can make this list as complete and accurate as possible.

A draft hazard map was shared with the group. The RCCP program is evaluating hazards including flood risk (from hurricanes, heavy seasonal rain events, tidal flooding, sea level rise); drought; heat; and wildfire. If there are specific areas that are known to have frequent or severe flooding, CAT members are encouraged to point out those areas.

Emphasis for this group is on the central and eastern portion of the county. The town of Plymouth is participating in the RCCP program as well with another consultant. Future meetings should reach out to residents of the town of Roper as well.

Summary of Scuppernong Community Event on Oct. 23

Ms. Perry provided a summary of this public outreach event where SWCA collected information about community assets for the RCCP process in conjunction with broader outreach being conducted for the Scuppernong River Water Management Study. This event served as the first of two public outreach events required by the RCCP for Washington County.

Vision and Goals

Ms. Perry introduced the Resilience Vision and Goals concept to the group. The final Resilience Strategy document produced by SWCA in collaboration with the Washington County CAT will include a Vision and Goals statement for Washington County. The group will work jointly throughout the course of CAT meetings to formalize this statement.

Initial discussion of vision and goals included:

- Focus on infrastructure
- Helping the public understand waterflow
- Public education and outreach

- Prioritizing health and safety of local residents

Additional Topics

The CAT members and SWCA also discussed general information about the county. We want to make sure that the process includes all communities. The major industries in Washington County are agriculture, forestry/timber, and fishing (although fishing is a larger industry in Tyrell County than Washington). The leader of the Catholic church may be a good point of contact to reach out Hispanic/Latino populations in the county. There is also a large Vietnamese community in neighboring Tyrell County. Vicki Manning is the point of contact for the Tri-County Health Department (Washington, Martin, & Tyrell Counties) 793-3023 or 799-1302. The State Archeology Office (Ms. Chris Barber) may have information on Native American sites.

There are many field ditches and canals with water control structures in the county. Not all are mapped and not all the water control structures are functional. Another problem is that many of the water control structures are on privately controlled land. There is a need for public education, so people understand where the water flows and how/when to use these water control structures collectively to aid in water movement. This could be a potential project (long term).

Immediate needs include a life and evacuation plan. Currently the focus in Washington County is on evacuation, not sheltering. Due to the county's proximity to neighboring evacuation areas, the county alone can't provide shelter to the large number of people evacuating from neighboring counties. Discussions are needed on a coordinated multi-county shelter system.

There are culvert sizing issues in Roper. The DOT may be able to provide more information. The group discussed potential DOT contacts to involve in the RCCP discussions.

Next Steps

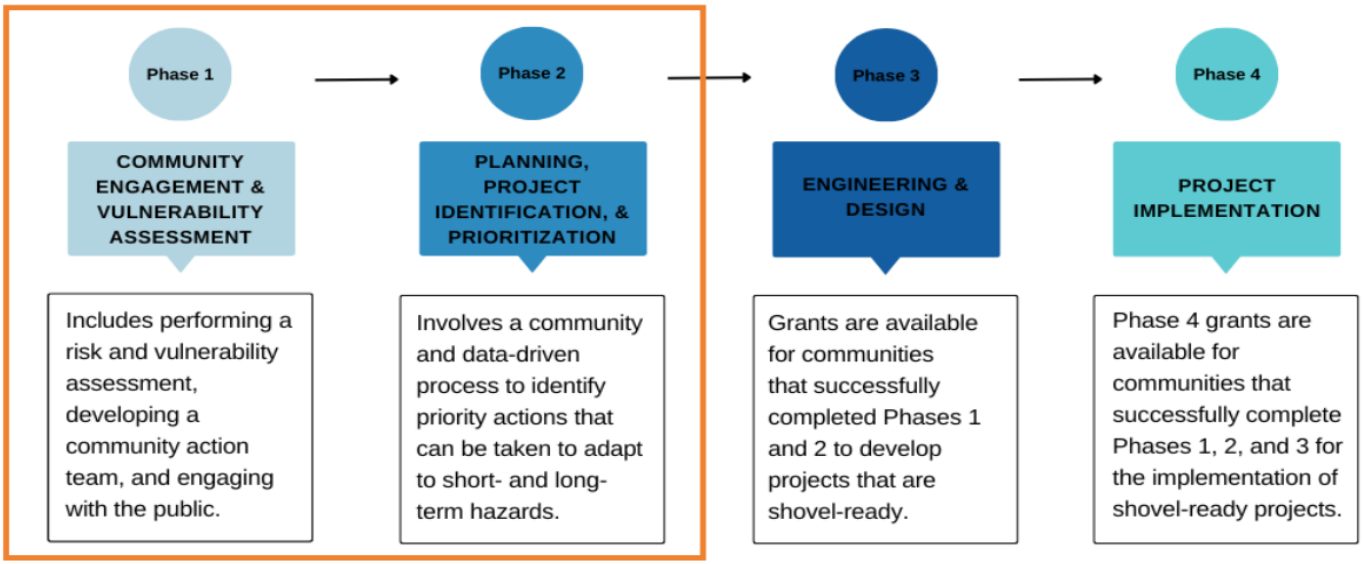
The next meeting of the CAT is tentatively scheduled for January. Specific meeting details to follow.

Attachment A – Copy of Handout from Meeting

NC Resilient Coastal Communities Program – Town of Creswell and Washington County

First Community Action Team Meeting, October 9, 2023

Program Overview



Hazards Risk Assessment

Potential hazards

- Sea level rise
- Flooding (rainfall, tidal, and riverine)
- Damaging storms, tornadoes, and winds
- Storm surge
- Shoreline erosion
- Drought, Heat Waves, and Wildfire

Non-climate stressors

- Aging or potentially undersized infrastructure
- Population dynamics
- Economic shifts
- Increased subsidence
- Altered drainage patterns
- Land cover change (i.e., increased development and impervious surface area)

Assessment of Asset Vulnerability

Community assets will include at least:

- Roads/Evacuation Routes
- Water/Sewer lines (if the community has sewer)
- Government Buildings/Offices (e.g., City/Town Hall)
- Public Safety or Emergency Services (e.g., Police/Fire)
- Schools
- Health Services
- Natural Assets (e.g., natural areas, open spaces, parks, etc.)

Vision and Goals

Vision: The vision is an aspirational statement for where the community wants to be in the future (e.g., in the next ten years or more), particularly in relation to coastal hazards.

Goals: Specific, measurable goals will help the community identify steps that can be taken to achieve the vision.

Possible Components of a Vision Statement

Describing the Envisioned Community

- Resilient and vibrant
- Diverse and strong
- Culture of resilience
- Thriving and healthy

Who 'Community' Includes

- Residents
- Visitors
- Local businesses
- Neighborhoods

Resilience Goals

- Quickly rebound from hazard events
- Pro-active measures to prevent or minimize future damage
- Sustainable growth of population and economic base
- Connected community fabric
- Opportunities for all residents

Strategies

- Strategic investments
- Sound policy
- Strong/inclusive partnerships
- Protection of the natural environment
- Frequent communication with residents

Example Vision: "The Town of Hertford is a vibrant, diverse community committed to helping its residents thrive, celebrating its riverfront, history, culture, and distinctive character while promoting commercial and residential growth, showcasing the beauty and natural resources of the Perquimans River, and integrating coastal resilience practices to address adverse environmental impacts.

Meeting Summary
Washington County Community Action Team (CAT) Meeting #3
Monday, February 12, 2024 from 2:00-3:00 pm
In person at the Washington County Manager's Office, Plymouth, NC

Meeting Objectives

- Review risk & vulnerability assessment results
- Review initial project list and identify changes needed
- Review draft project selection criteria
- Discuss plans for the 2nd community engagement event
- Confirm next steps

Participants

Washington County CAT Members
Asia Melton, Lead for NC Fellow
Carol Phelps, County Commissioner
Curtis Potter, County Manager
Chris Respess, Soil & Water Conservation
Jason Squires, Assistant County Manager
Lance Swindell, Emergency Manager, Wash. Co.

Facilitation and Support Staff
Molly Chamberlain, SWCA Environmental Consultants
Robin Payne, Robin Payne Consulting
Meg Perry, SWCA Environmental Consultants
Kasen Wally, NC Division of Coastal Mgmt.

Action Items

Who	Action	Due by
All CAT Members	Review vulnerability assessment assets and scores. Let us know if you have any feedback or see anything that requires update.	Friday 2/23
Chris Respess	Add notes/ information on condition of bridges and culverts to vulnerability assessment. Add any suggested projects to project list.	Friday 2/23
Curtis	Send copy of Vertical Asset Map to SWCA Team	Complete
SWCA	Update project list with ideas discussed at CAT meeting. Add jurisdiction and project status columns to project list.	Friday 2/16
SWCA	Ask Asia and Curtis about a good contact in Roper to review asset and vulnerability assessment	Completed
SWCA	Ask Commissioner Anne Keyes about vulnerability of public housing and nursing homes	Completed
SWCA	Ask Vickey Manning about generators for hospitals/health facilities	Completed
SWCA	Begin coordinating the next Community Engagement event and confirm location.	Friday 2/23
SWCA	Scan/make copies of Washington County Critical Facilities Map and return to CAT. Make copies and digital scan of roads and ditches map from Chris and return.	Thursday 3/14

Summary of Key Points from Presentation and Discussion

Welcome and RCCP Process Recap

Meg Perry, SWCA Environmental Consultants, discussed where we are currently in the RCCP process and the remaining project timeline and deliverables. SWCA aims to provide a draft of the Resilience Strategy Document to the CAT for review by early April. Between now and then the CAT will need to provide input on the vulnerability scores, project list, and plans for a community engagement event in March. The purpose of the community engagement event will be to share the project ideas the town is considering and gather input from residents on which projects they would like to see prioritized.

She also gave a brief recap of the February 9th Drainage Board meeting and some of the topics that were brought up, including the discussion about how dredging the riverbed can cause additional problems because digging under water pulls in additional water from the Albemarle Sound and Atlantic Ocean rather than creating additional flood capacity.

Risk and Vulnerability Assessment Results

Meg briefly reviewed the risk and vulnerability assessment process and introduced the vulnerability scoring process, which helps identify which community assets are most at risk. Molly Chamberlain, SWCA Environmental Consultants, provided more information on how exposure, sensitivity, adaptive capacity, and total vulnerability scores were calculated. Exposure, sensitivity, and adaptive capacity were scored on a scale of 0-3 and total vulnerability was a score of 0-6.

Exposure refers to the presence of people, assets, and ecosystems in places where they could be adversely impacted by hazards. We used a combination of data including storm surge, historic flooding, flood zone hazard mapping, and sea level rise to calculate exposure. A score of 0 means no exposure, 1 is low exposure, 2 is medium exposure and 3 is high exposure.

Sensitivity is defined as the degree to which an asset is potentially affected when exposed to an impact. We used data and performed scoring on multiple different sensitivity factors, including asset type sensitivity score, geographic social sensitivity, and asset service social sensitivity. Asset type sensitivity score was scored based on perceived ability of an asset type (such as hospital or school) to return to functioning after an impact or hazard. Geographic social sensitivity was calculated using the Centers for Disease Control and Prevention (CDC) Social Vulnerability Index. Asset service social sensitivity was scored based on if that asset type serves a sensitive population or if it is critical for emergency response/recovery. A score of 0 means no sensitivity, 1 is low sensitivity, 2 is medium sensitivity and 3 is high sensitivity.

Adaptive capacity is the ability of an asset or population to adjust to potential impacts from hazards with minimal disruption or cost. We looked at two factors when scoring adaptive capacity, condition of asset, and resources available. For condition, we considered if the asset is currently functioning/operating as designed. If it is not- is it broken and causing additional problems? If it is functioning, is it new or is it one of many? For resources available, we looked at ownership and jurisdiction of the asset (if known) and perceived resources available to help with cost and restoration of an asset after an impact or hazard. A score of 0 means no adaptive capacity, 1 means low adaptive capacity, 2 is medium adaptive capacity and 3 is high adaptive capacity.

The **total vulnerability** score was calculated using the following equation:

Vulnerability Score = (Exposure Score + Sensitivity Score) - Adaptive Capacity Score

Total vulnerability was scored from 0-6, with 0-2 being low vulnerability, 3-4 being medium vulnerability, and 5-6 as high vulnerability.

Vulnerability Assessment and Project List Discussion

SWCA asked CAT members some questions regarding the scoring of assets for the Vulnerability Assessment.

- **Bridges and Culverts:** Asked CAT member Chris Respess for more information on the condition of bridges and culverts in the County. Chris indicated culverts within the main canals have the biggest issues, and often NCDOT will not provide assistance with these until they are causing a major backup of water that interferes with the transportation system (example: a few days of the road being flooded).
- **Communication Towers**: Discussed communication tower ownership. Curtis said he has a copy of the vertical asset map and can provide that to SWCA to potentially integrate into the asset list. The Viper communication towers are run by highway patrol.
- **Broadband/Internet Services:** Two major providers: Mediacom and CenturyLink (NC Fiber Network is also used). Mediacom uses copper wiring that can suffer from water intrusion when there's flooding and impact facilities (including County Facilities) and residences that are served by the provider. A potential project idea is to identify critical facilities that are not connected to NC Fiber and explore upgrading these systems.
- **Sewer system**: The system is not owned at a county level. Plymouth has the youngest, healthiest water system in the county, which should make it more resilient to hazards. Both Creswell and Roper sewer systems struggle, and if something is not tied to the sewer system, it uses a septic system.
- **Other Utilities:** There are two major electric utilities that serve the County, one is Dominion, which serves the most populated part of the County, and the rest is with Tideland. These are generally very reliable.
- **Hospitals and Local Health Clinics:** Ask Vickey Manning at MTW Health Department if hospitals or local health clinics have generators (and if they do- are they maintained?).

SWCA and the CAT members also discussed some potential project ideas that were brought up during the vulnerability assessment and project list review:

- A potential project idea is to identify critical County buildings and critical facilities that are not connected to NCMC Fiber Network and explore upgrading these systems.
- Discussed the idea of house elevation and received feedback from the CAT that many of the houses/residents that were identified for this potential project in the Hurricane Matthew Resilient Redevelopment Plans were either not interested, moved, or some passed away.
- Mitigation and buy-outs: The Staff capacity for these types of projects is insufficient as administering this type of program is very time consuming.
- Removal of Dilapidated properties: One project idea that is similar but could have a larger impact/positive benefit for the County is removing dilapidated properties. This would lead to less debris following rain/wind events and could provide more room for economic and community development.
- Extreme heat was discussed as a hazard that we are also interested in as part of the RCCP process. It may be helpful for SWCA to look at some heat data/resources to get a sense of projected heat impacts and provide it to the County. There could be some potential projects related to heat, including a Heat Campaign involving extreme heat education and potential

community outreach by the MTW Health Department. Other project ideas could include a cooling center or fan distribution program.

- The idea of a gate installed in the Town of Roper to keep out the alligator weed was brought up by Chris Respess.

Meg asked the CAT members to please review the vulnerability assessment asset scores and let the SWCA team know if anything looks like it needs to be adjusted. Additionally, Chris Respess will add more project ideas to the list and SWCA will add a jurisdiction and status column to the project list.

Community Engagement Event #2

Meg provided a brief overview of the initial outreach to the Hispanic community that took place on Sunday, March 11th at St. Joan of Arc Catholic Church and asked the CAT for input for planning the next Community Engagement Event for Washington County residents and stakeholders. The CAT recommended avoiding Wednesday nights and suggested a Tuesday or Thursday evening and providing food at the event, like the October 2023 event at the 4H Center. The CAT and SWCA tentatively decided on the evening of March 14th, 5:30-7:30PM, and will look into suggested locations including the Vernon James Center and Roper Gym for the event. In addition to sharing information about the projects the County is considering under RCCP, this second community engagement event would be a great venue to provide more information about emergency response, and to ensure residents are aware of and on the Special Needs list and Hyper Reach text distribution list as appropriate. Additionally, SWCA may plan an outreach event with the Hispanic community and will keep the CAT team updated on plans for that event so County staff can plan to attend and participate.

Additional Topics:

Generators came up during the project list discussion. They require frequent maintenance to have them in working condition for when a hazard occurs, so with limited resources, it makes sense to only have them at critical facilities.

SWCA and the CAT members discussed the remaining timeline for the program and that we would like to have a complete draft of the Resilience Strategy by the end of March, including a list of the high priority projects by that point. Curtis would like to take the draft and run it through the Planning Board to ensure that they have time to provide feedback before it is finalized. Review by the County Commission is not required as part of this project, but we can present it to them if it would help explain the RCCP process and aid with buy-in.

Next Steps

SWCA will provide updates to the project list, answers to questions, and requested digital copies of the project list and vulnerability assessment results, sorted by highest vulnerability score, to the CAT with the CAT Meeting #3 Summary. The next CAT meeting will be held virtually on Wednesday, 21 February from 11-12AM on Zoom.

Meeting Summary
Washington County Community Action Team (CAT) Meeting #4
Wednesday, February 21, 2024 from 11:00am-12:00pm
Virtual meeting held via Zoom

Meeting Objectives

- Review Vision and Goals Statement and suggested edits
- Review draft project selection criteria and project list to begin developing project "short list" that will be featured at the community event
- Discuss plans for the 2nd community engagement event

Participants

Washington County CAT Members
Anne Keyes, County Commissioner
Asia Melton, Lead for NC Fellow
Allen Pittman, Planning and Inspections Director
Curtis Potter, County Manager
Jason Squires, Assistant County Manager
Lance Swindell, Emergency Manager, Wash. Co.

Facilitation and Support Staff
Molly Chamberlain, SWCA Environmental Consultants
Kara Giblin, SWCA Environmental Consultants
Meg Perry, SWCA Environmental Consultants

Action Items

Who	Action	Due by
All CAT Members	Review vulnerability assessment assets and scores. Contact SWCA with any feedback or anything that requires an update.	Friday 2/23
Asia Melton	Send SWCA a copy of the draft County Strategic Plan	COMPLETE
Lance Swindell and Chris Respess	Share locations that might be a priority for river gauge installation.	Friday 3/1
Chris Respess	Add notes/ information on condition of bridges and culverts to vulnerability assessment. Add any suggested projects to the project list.	Friday 2/23
Chris Respess	Review and provide input on Project 10: Reduce Non-Point Source Pollution.	Friday 3/1
Curtis Potter	Look into the Privacy Act of 1978 and if it precludes tracking existing structures located within a floodplain.	Friday 3/1
SWCA	Check with Albemarle Commission about the status of Projects 13 and 14.	Friday 3/1
SWCA	Send updated Vision and Goals statement and Draft Strategic Plan for CAT Team review and input	Friday 2/23
SWCA	Coordinate the next Community Engagement event and confirm location.	Ongoing
SWCA	Ask Towns about the prioritization of Project 11- Water and Sewer Plan.	Friday 3/1

SWCA	Ask Vickey Manning at MTW Health Department about Project 19-Septic Health Education/Program.	COMPLETE
SWCA	Look into examples of where Wetland Mitigation banks are working well to display/discuss at the next community engagement event.	Friday 3/1
SWCA	Get in touch with Plymouth RCCP team to ask about relocating the elderly housing complex and the elevation of the treatment plan road in Plymouth as potential projects.	Friday 3/1
SWCA	Scan/make copies of Washington County Critical Facilities Map and return to CAT. Make copies and digital scan of roads and ditches map from Chris and return.	Thursday 3/14

Summary of Key Points from Presentation and Discussion

Welcome and RCCP Process Recap

Meg Perry, SWCA Environmental Consultants, provided a summary of what was discussed at the last CAT meeting on February 12, 2024, including a reminder for the CAT to review and provide feedback on asset scoring of the vulnerability assessment. Curtis said he will send an internal reminder to the CAT to help with participation and review of the vulnerability assessment.

Vision and Goals Statement Edits

Next, Meg reviewed SWCA's suggested edits to the Vision and Goals statements with the CAT for their input and approval. Curtis said the County is currently drafting a strategic plan and would like SWCA and the CAT to review the safe and health community statement to ensure it aligns with the County's RCCP process. Asia will send a copy of the document to SWCA to send to the CAT with the updated Vision and Goals statement for their review.

Project Selection Criteria and Potential Project List Review

Meg reviewed the project selection criteria that will be important to consider as the CAT narrows the project list down. When reviewing the list, Curtis brought up that the criteria "capacity to implement" should also consider the capacity for maintaining a project once it is implemented. Meg also let the CAT know that there is no specific limit to the number of projects on the priority project list. For the final project portfolio that the CAT will need to use their criteria, vision & goals, and any community input, to select a group of "high priority" projects, but these will not need to be further ranked in order of priority.

The final list of project review criteria as discussed by the CAT is:
Impact:

- Overall benefit to the community, reflects vision & goals statement
- Advances prior efforts/aligns with other plans
- Has potential co-benefits, e.g., provides a recreational amenity, contributes to local economy, preserves a habitat, strengthens resilience to non-climate stressors like pandemics
- Important for long-term resilience (i.e., taking climate change, sea level rise, and other future conditions into account)
- Reduces vulnerability of key assets to coastal hazards (or increases the adaptive capacity of a critical asset or vulnerable population)
- Reduces economic risk posed by coastal hazards in one or more sectors

- Supports social equity

Feasibility:

- Capacity to implement and maintain
- Technical soundness
- Likely positive benefit-cost ratio
- Identifiable sources of funding

After discussing the project selection criteria, Meg reviewed the project list with the CAT and the group discussed status, outstanding questions, general priority and any additional information needed related to specific projects, as follows:

- **Project 5: Relocate Elderly Housing Complex** - this project falls under the Town of Plymouth (Albemarle Commission conducts planning) and will likely cause some political controversy as some county commissioners do not view this facility as a priority. The floodplain goes right through the location of the complex. SWCA will touch base with the Plymouth RCCP team to see if they have this project on their list and if so, how they plan to address it.
- **Project 8: Retrofit County Courthouse** - This project is still a high priority and is in progress. The elevator is needed for ADA access and compliance but is currently tied to drainage issues in the courthouse.
- **Project 9: Install River Gauges** - Lance can check with his point of contact to see what locations may be priorities to install river gauges. Chris Respess may also have insights to share.
- **Project 10: Reduce Non-Point Source Pollution** - Chris may have some good input on this project, he recently gave a presentation to the Soil and Water Board that generated a conversation about this.
- **Project 11: Water and Sewer Plan** - This project would probably be most needed if there was interest in future development or addition of industry to the County and would likely need a study conducted. All of the Towns in the County are on their own sewer system and may have insight on the prioritization of this project. SWCA will ask the Towns about their prioritization of this topic.
- **Project 12: Flood Zone Structures Database** - This project is not a very high priority for the County and can likely be addressed and merged with Project 7: Remove abandoned structures from the floodplain. The Privacy Act of 1978 may preclude tracking the details of structure ownership in the floodplain. Curtis will investigate this.
- **Project 13: Regional Stormwater Planning** - The CAT is not aware of any collaborative stormwater planning within the region, possibly because the watersheds are less interconnected across county lines here than in some other regions (e.g., Cape Fear basin). SWCA will check with the Albemarle Commission about the progress on this project. Meg mentioned that it could be an option for surrounding counties to work together to do a larger application for grant funding to accomplish shared stormwater goals.
- **Project 14: Resilience Hub** - SWCA will check with Albemarle Commission on the status of this. Curtis said much of the information, guidance, and technical assistance that would be distributed through a resilience hub is already distributed by the County and Emergency Management, so this is likely not a high priority project for the County. The upcoming community engagement event could be a good time to understand if this information is reaching people, and if it is useful to them. He also noted many people don't understand the term resilience, which is a good reminder for the SWCA to develop clear messaging for the upcoming community engagement event.

- **Project 15: Wetland Mitigation Banks** - This would be a great concept for residents to learn about and understand how it could work within the County, but beyond that, managing the conversation about ownership/control of the wetlands can be tricky. This project could be considered as a solution in specific areas if it addresses flooding issues. SWCA will look into examples to discuss/display at the public event of where this concept is working well.
- Project 19: Septic Health Education/Program: Many County residents are on Septic; this project idea would fall under the Health Department. SWCA will ask Vickey Manning at MTW Health Department about this.

Community Engagement Event #2

The Vernon James Conference Center is unavailable after 5pm on the date of the tentative community engagement event. Meg asked if there were any other locations in mind and CAT members suggested the Roper Annex/Auditorium, the boardroom in Plymouth, or partnering with a local church.

Next Steps

SWCA will work on formulating the project list into a format that can be shared with the public at the upcoming community engagement event. SWCA plans to set up another conversation with the CAT in early March, prior to the community engagement event (tentatively scheduled for March 14) to review event materials.

Meeting Summary
Washington County Community Action Team (CAT) Meeting 5
Thursday, March 21, 2024 from 10:00-11:00am
Virtual meeting held via Zoom

Meeting Objectives

- Debrief March 14 public meeting
- Review and seek agreement on final list of high priority projects

Participants

Washington County CAT Members
Asia Melton, Lead for NC Fellow
Allen Pittman, Planning and Inspections Director
Chris Respess, Washington County Soil and Water Conservation District
Jason Squires, Assistant County Manager
Lance Swindell, Emergency Manager, Wash. Co.

Facilitation and Support Staff
Molly Chamberlain, SWCA Environmental Consultants
Kara Giblin, SWCA Environmental Consultants
Meg Perry, SWCA Environmental Consultants

Action Items

Who	Action	Due by
SWCA	Send project list to CAT for additional review and input	Attached to email
SWCA	Meet with Curtis to discuss project list. Meeting scheduled for Monday, 3/25.	Monday 3/25
SWCA	Work on draft Resilience Strategy	Early April

Summary of Key Points from Presentation and Discussion

Welcome and Public Meeting Discussion
Meg Perry, SWCA Environmental Consultants, gave a brief introduction and thanked the CAT for their participation at the public meeting last Thursday, 3/14, which went well, despite low turnout. The Town of Creswell public meeting, which was Friday 3/15 and was attended by a few of the Washington County CAT members and had a good turnout. Commissioner Phelps noted that Creswell has been through a similar planning process before and they have not had projects come to fruition. It is important that there is follow-through in this process and funding for projects so the Town can make progress. He also mentioned when considering projects for the Town and County, it is important to keep Tyrrell County in mind so that projects upstream do not cause unintentional flooding there.

Meg brought up that SWCA would like to hold a joint implementation kick-off meeting in late April or May with the Towns of Creswell and Plymouth and the County as part of this process to discuss next steps and funding sources to set everyone up for success. Meg also mentioned that she recently had a conversation with the Town of Plymouth's mayor, Brian Roth, who mentioned concerns about emergency communications via cellphone and security of online systems. Lance mentioned that he can have a conversation with the mayor to make sure he is aware of the hyper-reach system. He noted the County has good participation in the hyper-reach emergency notification system, with roughly 6,000-

7,000 participants. It is used very frequently to disseminate information and can be targeted to specific areas of the county affected. The Town of Plymouth has pretty good cell service. There are other areas of the County including Cherry, near Lake Phelps, and outside of Roper that do not have good service.

Project Selection Criteria

Next, Meg reiterated the project selection criteria, which the CAT members had discussed at a previous meeting (see below).

Impact:

- Overall benefit to the community, reflects vision & goals statement
- Advances prior efforts/aligns with other plans
- Has potential co-benefits, e.g., provides a recreational amenity, contributes to local economy, preserves a habitat, strengthens resilience to non-climate stressors like pandemics
- Important for long-term resilience (i.e., taking climate change, sea level rise, and other future conditions into account)
- Reduces vulnerability of key assets to coastal hazards (or increases the adaptive capacity of a critical asset or vulnerable population)
- Reduces economic risk posed by coastal hazards in one or more sectors
- Supports social equity

Feasibility:

- Capacity to implement and maintain
- Technical soundness
- Likely positive benefit-cost ratio
- Identifiable sources of funding

Priority Project List

Meg led the CAT team in discussion of the projects, and a summary of the discussion is included below, organized by project:

- **Project 1: Backup Generators or Other Power Sources for Critical Facilities**- Lance mentioned that the water department has the generators that they need, which is good. This project can be expanded from backup power sources to include backup pumps or pump parts. Jason will talk to the Utilities Director, Lee, to see if he has a wish list for backup equipment/power sources/parts. Commissioner Phelps mentioned that it would be helpful to understand the Towns' needs for generators for their water and sewer systems. Then, a combined grant could be pursued by the County. This is a potential topic for discussion with the Towns at the join implementation kick-off meeting later this spring.
- **Project 4: Install River Gauges**: This project is a priority to help track flow and water levels over time and understand water level changesduring extreme weather. Figuring out what areas to prioritize gauge installation may be a challenge. Meg mentioned that a project like the Scuppernong Study that could include hydrologic analysis of specific areas of the county to help determine where to focus future gauge installation would be beneficial. This would involve an engineering study that could provide guidance on where to prioritize drainage upgrades and gauge installation within the county **(added to the list as project #2).**

- **Project 6: Remove Abandoned Structures**- CAT member noted there may be less than 175 abandoned structures in the County. Part of this project would include updating and refining the list of structures eligible for removal. Allen is working to get his clearance to assist with this.

The consensus among the CAT members at this point in the discussion was that projects 1-6 were all high priority

- **Project 7: Reduce Non-Point Source Pollution:** Chris mentioned that this project is already being addressed to some degree by conservation efforts with landowners. The priority for reducing non-point source pollution should be around new development. The county does not necessarily have the resources to upgrade existing infrastructure such as parking lots just for the purpose of addressing this.
- The group had listed a 2-stage ditch at Moccasin Canal as a project, but SWCA suggested moving this to serve as an example of a project under ditch/drainage improvement projects (now listed under **Project 3: Implement key drainage Improvements in Areas of Interest**).
- **Project 8: Remove Critical Infrastructure from the Floodplain**: CAT members generally agreed that this project would be a big undertaking, and moving an existing structure such as a water treatment plant just to remove it from the floodplain is not feasible at this time. Chris suggested it might be more feasible is to identify smaller projects, like constructing a lifting station for Roper Sewage pipes. Meg mentioned that following a disaster or event with large impacts to the community, the tendency can be to rebuild facilities in the floodplain to return to normal as quickly as possible. She encouraged the CAT to identify structures that could eventually be removed from the floodplain when an opportunity arises to move or replace it (e.g., via post-disaster funding).
- **Project 11: Wetland Mitigation Banks**- This project is good to keep on the project list and introduce the concept to landowners work to build understanding of and interest in projects like this.
- **Project 12: Identify and Replace broadband internet for County Buildings and other critical facilities connected to Mediacom-** This project was suggested by CAT members and remains a priority.
- **Project 13: Emergency Vehicle and School Bus Route improvements-** CAT members raised concerns that replacing or retrofitting sections of these roadways would be very expensive. DOT would need to be supportive of this project.
- **Project 14: Expand availability of transportation and community buildings during hazardous conditions** – This project was previously geared towards a potential project to address heat, but after discussion with the CAT it was broadened to include hazardous conditions/emergency events. Lance confirmed that they do use the hyper-reach emergency notification system to send alerts about high heat. Lance also mentioned that they do not have the infrastructure for a cooling center or fan distribution program. Meg suggested shifting to think about the resources the county already has and how to utilize those for emergency response and expand access for residents. This could include identifying or expanding transportation options (e.g., Riverlight transit) or expanding hours for existing facilities like libraries and the senior center during hazard events. With regards to heat, they could also work to collect data, for example work with Renee to see if there is an uptick in how many people use the Senior Center during hot days.
- **Project 15: Develop water management guide for landowners, homeowners, and renters**- This project was suggested by SWCA to address concerns and confusion that residents and landowners have expressed regarding what they are allowed to do to manage water on their property and who has jurisdiction over water management activities in the county. The CAT had

a conversation about how it can be very challenging to regulate private property and downstream impacts. Chris' recommended focusing on how individual actions can impact downstream neighbors, rather than compliance with regulations, which he has found to be a more effective approach. Jason mentioned that there is probably some good literature and information on best practices and management that could be shared on the County's social media and website. Chris mentioned that he thinks it is most effective to be able to appeal to landowners with compelling numbers such as the amount of soil lost per year. This project could be completed at relatively low cost.

Next Steps

SWCA will refine the project list based on this discussion and a conversation with Curtis Potter, County Manager on March 25. SWCA will then add funding source recommendations and other details before delivering the draft Project Portfolio to the CAT in early April, as part of the draft Resilience Strategy document.

Meeting Summary
Joint Community Action Team (CAT) Meeting
Thursday, May 23, 2024 from 3:00-4:30 pm

Meeting Objectives

- Review related RCCP projects with potential for collaboration
- Identify joint funding opportunities
- Confirm next steps to pursue projects together

Participants

Washington County CAT Members
Allen Pittman, Planning and Inspections Director
Ann Keyes, County Commissioner
Carol Phelps, County Commissioner
Chris Respess, Washington County Soil and Water Conservation District
Curtis Potter, County Manager
Jason Squires, Assistant County Manager
Lance Swindell, Emergency Manager, Wash. Co.

Town of Creswell CAT Members
Alfredia Williams, Mayor
Ryan Swain, Water & Sewer Superintendent
Thomas Patrick, Town Commissioner

Town of Plymouth CAT Members
Brian Roth, Mayor
Mike Wright, Public Works Director
Sarah Forner, CAT Member

Facilitation and Support Staff
Gordon Marsh, RK&K
Holly White, North Carolina Office of Recovery and Resilience
Jamie Heath, Mideast Commission
Kasen Wally, Division of Coastal Management
Mackenzie Todd, Division of Coastal Management
Molly Chamberlain, SWCA
Meg Perry, SWCA
Sarah Spiegler, NC Sea Grant
Tris Ford, RK&K

Action Items:

Backup Generators and Other Equipment for Critical Facilities

Who	Action	Due by
Washington County	Washington County add generators to the capital assets list in the Capital Improvement Plan at next opportunity so this can be prioritized for funding along with other county projects that may be submitted for funding from FEMA or other sources.	Next opportunity/ update to the CIP

Drainage Study Projects

Who	Action	Due by
WCSWCD/ Chris Respess	Work with Town of Plymouth for future StRAP applications to identify priority areas that weren't included in this year's application.	2025 StRAP applications

Drainage Projects/Maintenance Related Projects

Who	Action	Due by

WCSWCD/Chris Respess	Send project list to CAT for additional review and input	2025 StRAP applications

Relocation, Removal, and Retrofit Projects

Who	Action	Due by
Washington County	Continue to have follow-up conversations about the abandoned properties, develop list of properties and landowners if known and establish contact (work closely with Plymouth).	Ongoing, develop list by September 2024

Emergency Operations Projects

Who	Action	Due by
Creswell	Creswell representatives to contact a Red Cross representative to determine shelter criteria and schedule a visit to potential shelter site(s) in Creswell.	Summer 2024

Projects with Education/Public Outreach Component

Who	Action	Due by
Washington County, Creswell, Plymouth	Review policies during current/ongoing ordinance reviews, adjust rules and ordinances, and gather public feedback. The County and Towns coordinate on ordinances and use model ordinances as a guide. These projects should also be flagged for APNEP, as they may be a good future funding partner. If the Town of Plymouth's Phase 3 funding application is approved for the Stormwater Action Plan, work with Chris to develop messaging.	Summer 2024

Other County projects that may benefit from collaboration

Who	Action	Due by
Washington County	Keep Weyerhaeuser in mind as potential funding source for Broadband Project. Make connection with Giving Fund coordinator givingfund@weyerhaeuser.com for any questions.	Ongoing
SWCA	Meg will be coordinating with folks from the Scuppernong Study to discuss SECOORA funding and see if they can get additional gauges installed at key locations around the county. It will be important to confirm that the SECOORA funded gauges will be part of the FIMAN network for maximum data accessibility.	Summer 2024

NC Resilient Coastal Communities Program
Joint CAT Meeting

Summary of Key Points from Presentation and Discussion

Welcome and Announcements

The meeting started with introductions around the room and announcements. Mackenzie Todd reminded the team that applications for Phase 3 (Engineering & Design) and Phase 4 (Implementation of an engineered and designed project) are due Friday, May 31. Board signatures are required on the application, and there is flexibility to submit the application a few days late if needed. In response to a question, DCM staff confirmed that communities can apply for multiple rounds of Phase 3 Funding. Communities can also submit more than one application for the grant cycle but must indicate which of the applications is the priority project.

Holly White highlighted the Community Disaster Resilience Zone (CDRZ) designation that covers the northeastern part of the County and includes Roper and Creswell. She explained NCORR staff can assist with identifying projects and funding partners and support grant writing for any resiliency-related projects in CDRZ designated areas. Holly noted that if a project benefits a CDRZ zone but includes an area that is not classified as a CDRZ, such as the Town of Plymouth, NCORR can still provide support to pursue the project.

Meg Perry explained that the goal of this meeting is to help develop an action plan to advance projects identified through RCCP Phases 1 and 2. This meeting was intended to give the County, Town of Creswell, and Town of Plymouth an opportunity to identify projects that they may want to work together on, funding sources they may want to pursue together, and any projects that would be better pursued separately.

The meeting attendees then discussed whether to collaborate on a series of related projects excerpted from the Resilience Strategies for Washington County, Plymouth, and Creswell. Related projects that might benefit from collaboration were grouped as follows and provided as a handout during the meeting: [Backup Generator Projects, Drainage Study Projects, Drainage Projects, Relocation, Removal, and Retrofit Projects, Emergency Operations Projects, Site-Specific Infrastructure Projects, Projects with Education/Public Outreach Component, Other County Projects that May Benefit from Collaboration. The notes below include the excerpted descriptions of the projects in each grouping from the handout, followed by notes on the discussion around each project grouping, including action items and potential funding sources.

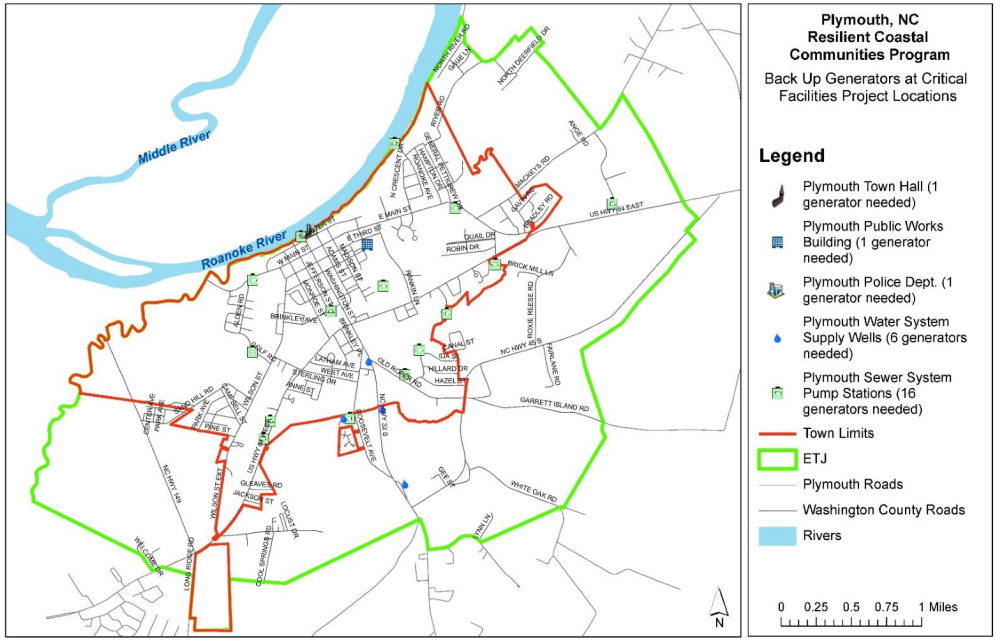
Backup Generator Projects

Washington County- Backup Generators or Other Equipment for Critical Facilities

PROJECT DESCRIPTION	Seek funding to ensure redundant power and equipment for critical facilities, including generators and backup water pumps or pump parts. Specifically: Create list of critical facilities that need a generator or other forms of redundant equipment or parts and acquire/maintain these to ensure that critical facilities and infrastructure remain operational during emergencies or power outages.
Potential Funding Sources	• FEMA Emergency Management Performance Grant (EMPG); • Generators for critical facilities are also eligible under the FEMA Pre-Disaster Mitigation (PDM) Program

Plymouth- Backup Generators at Critical Facilities

Project Scope	Acquire generators or other forms of redundant power supply to ensure that critical facilities and infrastructure remain operational where normal power supply is not available. Current generator needs include sewer lift stations (16), water supply wells (6), the Public Works building, the Police Dept., and Town Hall.
Potential Funding Sources	• Federal Emergency Management Agency (FEMA) Hazard Mitigation Grant Program (HMGP) • Federal Emergency Management Agency (FEMA) Pre-Disaster Mitigation Grant Program • Golden Leaf Disaster Recovery Grant



Backup Generator Projects

Meg asked the group if anyone has experience pursuing grant funding for generators. Ryan Swain said the Town of Creswell applied through FEMA right after Hurricane Matthew and it took 6-7 years to get the generator(s). Lance Swindell said that there are grant programs through the State that can be used, and these may be easier to pursue/obtain funding from rather than Federal funding. Lance also reminded the group that there needs to be a specific need for the generator. Commissioner Ann Keyes mentioned that applying together (e.g., Washington County and Plymouth) will be viewed more favorably.

Holly said she can talk to NC Emergency Management about potential opportunities.

Curtis Potter said that the County is looking to apply to the FEMA Facilities Grant (due in early June) for development of an Emergency Management Center, which will include generators. Curtis also said that the County should add generators to the capital assets included in the Capital Improvement Plan, which is updated every other year. Once these assets are included in the plan, they will be easier to justify need/ funding for in future grant applications. Generators should also be included for applications on current/future infrastructure, such as lift station upgrades. For FEMA grants, it may helpful to establish contact with the Federal representative.

Curtis also mentioned that a priority for the County would be a generator for the new school facility (this would be overlapping for the Town of Plymouth and County).

Brian Roth mentioned that the cost for the 25 generators that Plymouth has on their project list is roughly $900K for equipment alone.

Next steps:

- Washington County add generators to the capital assets list in the Capital Improvement Plan at next opportunity so this can be prioritized for funding along with other county projects that may be submitted for funding from FEMA or other sources.

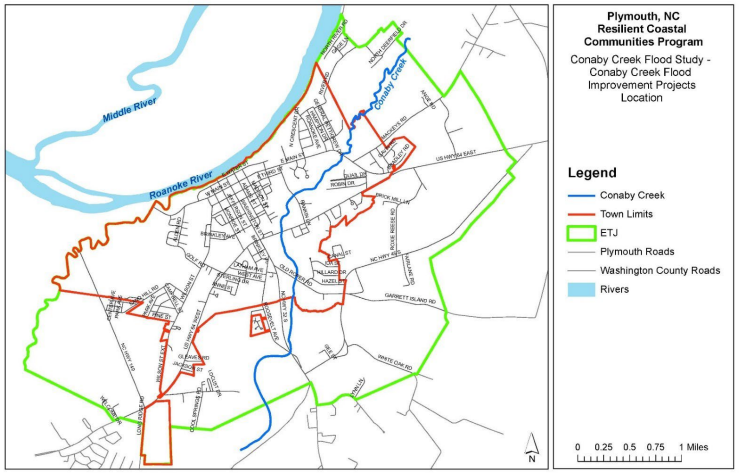
Drainage Study Projects

Washington County- Identify Strategic Drainage Improvements Outside of the Scuppernong Watershed

PROJECT DESCRIPTION	The Scuppernong Water Study will provide detailed hydrologic assessment for areas of flooding concern within the Scuppernong River watershed. This project would involve pursuing similar analysis in other areas of concern within the county that are not part of the Scuppernong Study. This analysis would help identify and prioritize areas where debris removal or other solutions, such as those mentioned in project 3, can be implemented.
POTENTIAL FUNDING SOURCES	• North Carolina Division of Water Infrastructure (DWI) Local Assistance for Stormwater Infrastructure investments (LASII) program • Golden LEAF Foundation • FEMA Hazard Mitigation Grant Program (HMGP)

Plymouth - Conaby Creek Flood Study- Conaby Creek Flood Improvement Projects

Project Description	Complete a detailed flood study and implement projects to relieve flooding from Conaby Creek. The effective FEMA model for the stream is outdated and this project will study projected rainfall, current landcover, and projected landcover. The project will then prioritize solutions and provide a final design for the solution chosen in partnership with the community.
Project Scope	Engineering/Design – Complete a detailed flood study for Conaby Creek. This study will focus on flood-prone areas, including the Highway 64 area, E. Main St. area, neighborhoods nearby Conaby Creek, and the crossings of Conaby Creek within the Town's jurisdiction. The study will evaluate conceptual projects to relieve flooding impacts from Conaby Creek. Then engineering/design will be completed for the chosen project.
Potential Funding Sources	• NC Resilient Coastal Communities Program Phase 3 (engineering), Phase 4 (implementation) • NC Environmental Enhancement Grant (EEG) • NC Land and Water Fund Grant • Federal Emergency Management Agency (FEMA) Building Resilient Infrastructure in Communities (BRIC) Grant • Federal Emergency Management Agency (FEMA) Building Resilient Infrastructure in Communities (BRIC) Capability and Capacity Building (C&CB) • Federal Emergency Management Agency (FEMA) Flood Mitigation Assistance (FMA) Grant • NC Department of Environmental Quality (DEQ) Water Resources Development Grant (WRDG)



Drainage Study Projects

Plymouth team members discussed Conaby Creek and how it causes consistent nuisance flooding and major flooding during named storms. The flood study project idea came from not knowing what type of solutions would be appropriate to address/relieve flooding, and the types of questions prompted by this type of project Where are the connectivity points to the Roanoke River?, what are the chokepoints?, what options are there to address flooding? are all questions that have been raised throughout the County.

Chris Respess mentioned that he in the process of applying for a StRAP grant that includes some of Conaby Creek, and will work with the Town of Plymouth for future StRAP applications to identify priority areas that were not included in this year's application.

The group discussed what approach would be the most helpful for pursuing drainage studies. Would a larger study, that included the Conaby Creek area, provide helpful information? Chris Respess expressed interest in a platform that could help determine which areas need the most support. Where there is opportunity to fund work in specific locations, that is preferred for some funders, though there is also value in having a large-scale study.

Commissioner Keyes mentioned that if the areas to be studied are included in the Hazard Mitigation Plan, that could help to qualify these types of projects for more funding sources.

Funding Sources Discussed: Land and Water Fund, StRAP, Golden Leaf Grant, and possibly in the future the NC Floodplain Blueprint

Drainage Projects

Washington County- Implement Key Drainage Improvements in Areas of Interest

Project Description	This could include several potential types of drainage improvement, which Project 2 above can help prioritize and site. For some areas of interest, maps helping depict potential work needed are included in Appendix F. Drainage improvement methods could include: • Remove debris from waterways and ditches, restoring hydraulic efficiency. • Resizing undersized culverts. • Two-stage ditch at Moccasin Canal – both as a drainage improvement and a demonstration project for landowners to see. • Water farming/wetland mitigation banks. Coastal farmlands could be converted to wetlands and established as conservation easements or mitigation banks in exchange for payments to landowners. • Aquatic weed spraying, clearing/snagging, and beaver control.
Potential Funding Sources	Pending StRAP grants applied for by WCSWCD, other sources to be determined based on projects selected.

Plymouth- Stream Debris Cleanout

Project Description	Complete stream cleanouts (snag and drags) with a focus on: 1. Conaby Creek from NC 32 to town limits boundary past E Main St. 2. Unnamed Tributary to Roanoke River from Bateman St. to W. Main St. 3. Unnamed Tributary to Roanoke River north of Plymouth High School (Plywood Rd. area)
Potential Funding Sources	• NC Dept. of Agriculture Streamflow Rehabilitation Assistance Program (StRAP) • NCDEQ Stream Debris Removal Program

Creswell- Critical Ditch Improvements

PROJECT DESCRIPTION	The town lies between the Scuppernong River and Interstate 64. The Program application identified issues with the dike that was built to redirect water. There are several ditches that are supposed to drain to the dike, then to the Scuppernong River. The ditches are full of debris/water and need to be cleaned out to properly drain to the dike. Scuppernong Study modeling may help pinpoint specifically which ditches will provide the best flood risk reduction for the money. Ditches are located throughout the town and as part of the existing dike system, including from 4th Street at Cherry Road east to 1st Street, the south end of Main Street, and south crossing Main Street near the school building, and extending from the gate valve to the Scuppernong River and other areas associated with the dike system.
POTENTIAL FUNDING SOURCES	• Streamflow Rehabilitation Assistance Program (StRAP) Grants

Plymouth- Neighborhood Drainage Improvement Projects

Project Description	Complete hybrid drainage improvement projects with priority areas at: 1. Riverside Plantation Community 2. 4th Street Community (including side streets such as Adams Street and Winesset Circle) 3. The block of Patton Court, Bradley Road, and Gavin Road 4. Madison Street Community
Project Scope	Engineering/Design – Design hybrid drainage improvement projects with priority areas at: 1.) Riverside Plantation Community, 2.) 4th Street Community (including side streets such as Adams St. and Winesset Cir.), 3.) The block of Patton Ct, Bradley Rd., and Gavin Rd., 4.) Madison St. Community. Implementation – Construct neighborhood drainage improvement projects based on the designs completed in the engineering/design phase. Projects could include pipe replacements (upsizing where needed), increasing the size and quantity of culverts and catch basins, redefining ditches, implementing backflow preventors, installing bioswales, bioretention cells, and other green and hybrid solutions.
Potential Funding Sources	• NC Resilient Coastal Communities Program Phase 3 (engineering), Phase 4 (implementation) • NC Environmental Enhancement Grant (EEG) • NC Land and Water Fund Grant • Federal Emergency Management Agency (FEMA) Building Resilient Infrastructure in Communities (BRIC) Grant • NC Department of Environmental Quality (DEQ) Water Resources Development Grant (WRDG)

Drainage Projects/Maintenance Related Projects

These projects all involve drainage and maintenance. For the Creswell projects/areas mentioned, the Town is waiting to get information from the Scuppernong Study to pinpoint locations where projects would have the most benefit.

For Plymouth, a future round of StRAP funding could cover the areas that are mentioned in their project list and not included in the recent StRAP funding application. Plymouth is also exploring combining these types of projects with green infrastructure (for example, adding a bioswale), and this could be a good idea to broaden the type of grants that these projects could be eligible for. Holly also suggested potentially combining a storm drain maintenance activities in applications for stormwater infrastructure inventory funding.

Next steps: WCSWCD coordinate with Town of Plymouth on the next StRAP funding application.

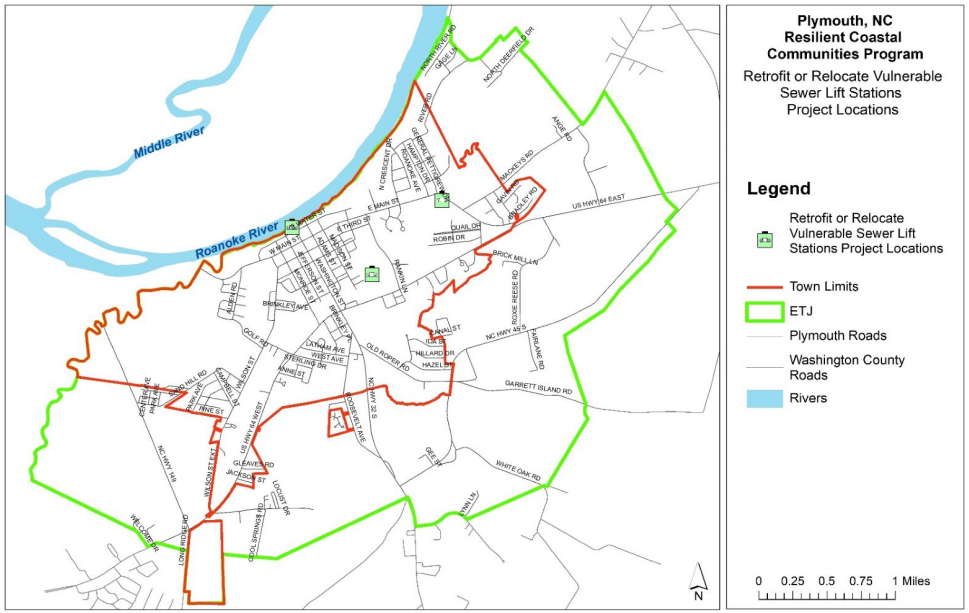
Relocation, Removal, and Retrofit Projects

Washington County- Remove Abandoned Structures and Critical Infrastructure from the Floodplain

PROJECT DESCRIPTION	Remove an estimated 75 abandoned structures/homes in the floodplain including unanchored utilities and other debris swept into floodway by Hurricane Matthew. Replace them with green space. Removal of critical infrastructure that supports services such as transportation, water, energy, communications, and medical services from the floodplain is currently underway, but there is more to be accomplished and will require assistance from Washington County Emergency Management. Some examples of specific projects that would be beneficial include: • Adding lift stations to sewer pipes in Roper that are currently at water level. • Planning ahead to relocate larger infrastructure, such as wastewater treatment facilities, when they need to be replaced due to age or repaired after a disaster. A first step would be to create a confirmed list and map of abandoned properties and identify critical infrastructure that would benefit from upgrades or replacement.
POTENTIAL FUNDING SOURCES	• FEMA Building Resilient Infrastructure and Communities (BRIC), FEMA Flood Mitigation Assistance (FMA) Program, • U.S. Department of Housing and Urban Development Community Development Block Grant – Neighborhood Revitalization (CDBG-NR) Program • County General Fund ($10k annually 10-4350-600)

Plymouth- Relocate or Retrofit Vulnerable Sewer Lift Stations

Project Description	Relocate or retrofit vulnerable sewer lift stations on Water Street, Johnson Court and East Main Street to improve risk of impacts from flooding.
Potential Funding Sources	• HUD Community Development Block Grant Mitigation Funds (CDBG-MIT) • NC Division of Water Infrastructure Programs (Clean Water State Revolving Fund, State Reserve Program, Viable Utility Reserve Program) • Golden Leaf Disaster Recovery Grant • Federal Emergency Management Agency (FEMA) Building Resilient Infrastructure in Communities (BRIC) Grant • Federal Emergency Management Agency (FEMA) Hazard Mitigation Grant Program (HMGP) • Federal Emergency Management Agency (FEMA) Flood Mitigation Assistance (FMA) Grant



Relocation, Removal, and Retrofit Projects

Jamie Heath said that Plymouth had a project for removing abandoned structures but this project was moved off the priority project list due to lack of interest at the public meeting.

Abandoned structures fall under the County Planning department, and the County does not currently have the funding or capacity to oversee this process. There are many factors involved, including voluntary participation of the landowner, otherwise the property will go through the condemnation process. Many of the abandoned properties may be heirs property, which can make taking action difficult if the owner is unclear. Often, tax foreclosure is the most efficient process. Mayor Roth said that a common way of removing abandoned structures is to use the structure for a fire training exercise and burn it down.

The question was brought up of if there is a creative way to fund these properties as conservation or open space? Commissioner Keyes said that if structures are in the floodplain, they will have to be converted to open space.

A comprehensive list of abandoned structures and landowners is needed. Commissioner Keyes mentioned that there is a map from 2010 that identified all abandoned structures, this could be used to determine which of those are located in the floodplain.

For repetitive loss properties, the County or Towns can work with FEMA to remove a property from the floodplain. FEMA and the State both have Strategic Buyout programs, which could be an option for properties where the owner is known. Also, if there's a cluster of homes or areas with a large concentration of abandoned homes, Holly said the County could work with the State representative to have a meeting about this.

One idea that was mentioned was bringing in a team to educate the town landowners about recurring loss and properties that fall in the floodplain.

For lift stations, funding for these should come from the enterprise fund in the CIP. Funding for these projects could fall under the Division of Water Infrastructure, Viable Utilities Unit. Holly said that Helene can look into the Viable Utilities funding to see if it applies to these projects.

Next steps: Continue to have follow-up conversations about the abandoned properties, develop list of properties and landowners if known and establish contact.

Emergency Operations Projects

Washington County- New Emergency Operations Center

PROJECT DESCRIPTION	Construct a new dedicated EOC facility. Washington County has been working toward establishing a new EOC for many years. The county will continue to look for opportunities to move forward with this project. The county's existing facility is minimally adequate and relies on shared space with county administration—there is a need for a new and dedicated facility.
POTENTIAL FUNDING SOURCES	• NCDPS Emergency Preparedness Grants, • FEMA Emergency Management Performance Grant (EMPG) Program includes funding for both sheltering and EOC • FEMA Pre-Disaster Mitigation (PDM) Program • FEMA Emergency Operations Center Grant Program

Creswell- Designate Emergency Shelter and Emergency Operations Center

PROJECT DESCRIPTION	Designate a dedicated Emergency Operations Center (EOC) facility and Emergency Shelter. Currently there is no identified shelter to house residents in flood events. The county school building is not approved as a shelter location by the American Red Cross due to flood risk. The Pocosin Charter School was suggested by the CAT as a possible location. To pursue this project, the Town needs to identify potential locations for the facility, confirm shelter criteria that will need to be met, and then take any steps necessary to create or outfit a facility that meets the criteria.
POTENTIAL FUNDING SOURCES	• NCDPS Emergency Preparedness Grants, • FEMA Emergency Management Performance Grant (EMPG) Program includes funding for both sheltering and EOC • FEMA Pre-Disaster Mitigation (PDM) Program • FEMA Emergency Operations Center Grant Program

Emergency Operations Projects

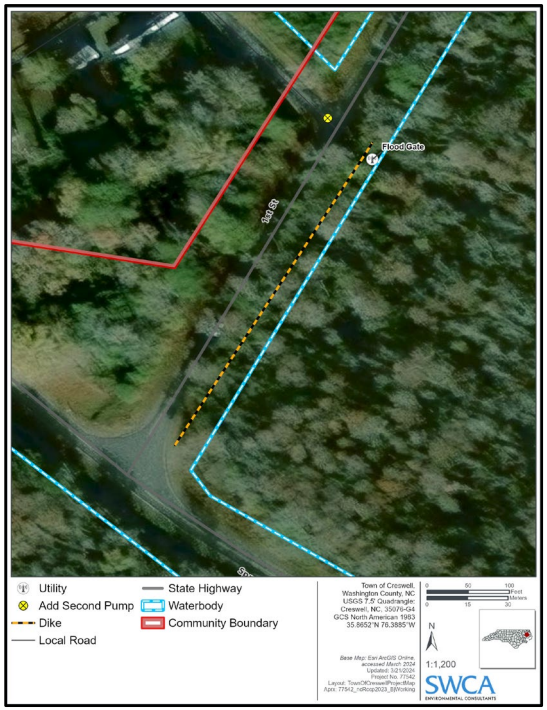
The county is already in the process of pursuing funding to upgrade the county Emergency Operations Center. Emergency Shelters and Emergency Operations Center facilities need be located outside of the floodplain to get grant funding. For a shelter in Creswell, choice of location will very important, because flooding can make parts of the town inaccessible (highwater vehicles have been used in the past to rescue people). When discussing potential shelter locations, Thomas Patrick mentioned that the area where he lives on 1st Street does not flood when other parts of the town are underwater.

Other important considerations for these projects are funding, staffing, and capacity. In order to get funding, facilities must be Red Cross approved. Commissioner Keyes said that a Red Cross representative can come out to evaluate and approve a property.

Next steps: Creswell representatives to contact a Red Cross representative to determine shelter criteria and schedule a visit to potential shelter site(s) in Creswell.

Creswell- Reduce Flooding Impacts in the 1st-4th Steet Area

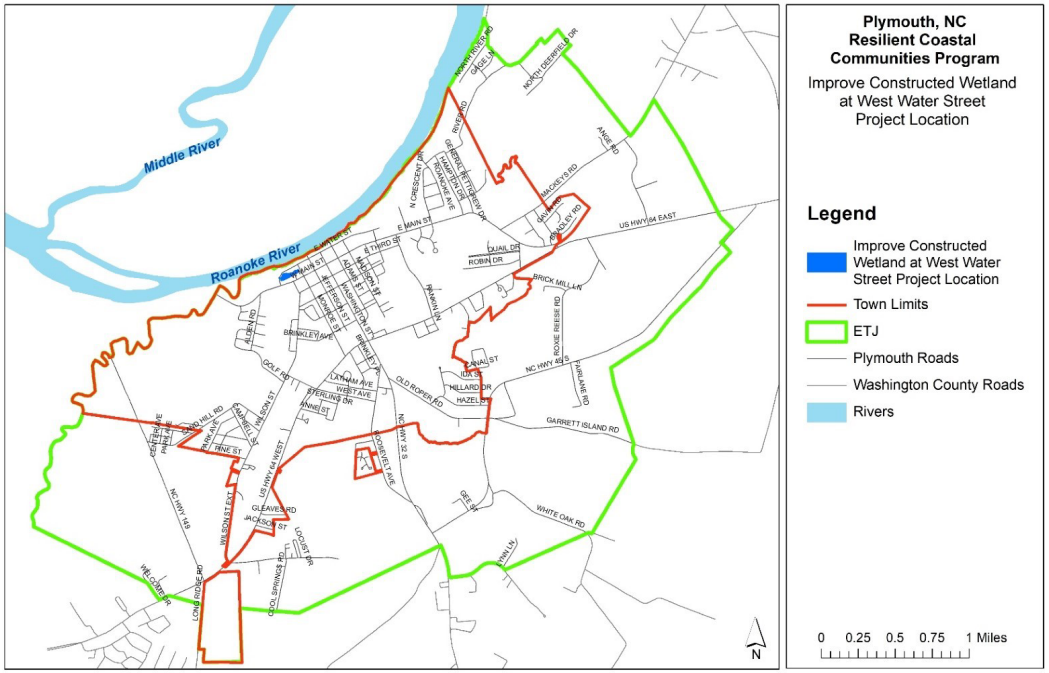
PROJECT DESCRIPTION	The area from 4th Street at Cherry Road east to 1st Street between Main St and Palmetto St experiences the worst flooding impacts in Town. This project proposes to evaluate what potential solutions could help reduce flooding impacts in this area. Possible solutions could include extending the dike from 1st Street to Main Street, adding an additional pump at Palmetto Street, and/or nature-based flood risk mitigation solutions. This evaluation would build on initial modeling under the Scuppernong Study to determine more specifically what solutions would be most effective to create the desired flood risk reduction. Based on this evaluation, the Town would then seek funding to pursue the recommended solution(s).
POTENTIAL FUNDING SOURCES	• North Carolina Division of Water Infrastructure (DWI) Local Assistance for Stormwater Infrastructure investments (LASII) program, • Golden LEAF Foundation, • FEMA Building Resilient Infrastructure and Communities (BRIC)



Site-Specific Infrastructure Projects

Plymouth- Improve Constructed Wetland at West Water Street

Project Description	Improve the function of the constructed wetland behind the senior public housing complex to address over street flooding of West Water Street.
Potential Funding Sources	• NC Resilient Coastal Communities Program Phase 3 (engineering), Phase 4 (implementation) • NC Environmental Enhancement Grant (EEG) • NC Land and Water Fund Grant • NC Department of Environmental Quality (DEQ) Water Resources Development Grant (WRDG)



Site Specific Infrastructure Projects

These projects were grouped together because they both involve infrastructure such as a gate or pump and may have similar funding sources. Plymouth and Creswell should stay in communication about where they are able to obtain funding for these projects in case the same source could be used for both.

Projects with Education/Public Outreach Component

Plymouth- Stormwater Action Plan- Stormwater System Upgrade

Project Description	Develop a Stormwater Action Plan combined with strategically upgrading the stormwater system through improved and expanded infrastructure. The project will establish mapping and condition assessments for stormwater system components and outfalls with a focus on known problem areas and areas identified via a desktop analysis. The project will promote proactive stormwater maintenance through development of interactive mapping tools and maintenance guidance. The project will encourage stormwater quality awareness through public outreach efforts and produce construction drawings for a priority project.
Potential Funding Sources	• NC Resilient Coastal Communities Program Phase 3 (Action Plan) • Federal Emergency Management Agency (FEMA) Building Resilient Infrastructure in Communities (BRIC) Capability and Capacity Building (C&CB) Grant • NC Department of Environmental Quality Water Resources Development Grant (WRDG)

Washington County- Develop Water Management Guide for Landowners, Homeowners, and Renters

PROJECT DESCRIPTION	Discussion with residents has shown that most people do not know for sure what they are expected to do to maintain ditches, storm drains, and other water management systems. What are they responsible for doing? And what are they allowed to do? How does what they do on their land impact downstream neighbors and the system as a whole? This project would be to develop and distribute information in the form of key talking points and summary information tailored to local audiences. Messaging should include compelling numbers that help explain how the water management system is interconnected and what people can do to help maintain it and not pass along negative impacts to their neighbors. The messages should also touch on what water management actions are handled by entities such as Washington County or other agencies.
POTENTIAL FUNDING SOURCE	Local Washington County General Fund advertising funds

Washington County - Share Information about Wetland Mitigation Banks and/or Water Farms with Landowners

PROJECT DESCRIPTION	Coastal farmlands could be converted to wetlands and established as conservation easements or mitigation banks in exchange for payments to landowners. Or similarly, certain lands could be designated as “water farms,” with payments to landowners for retaining water on the land under certain flood conditions. A first step toward this will be sharing information with landowners about this type of project and its benefits.
POTENTIAL FUNDING SOURCE	NC DWI Stream & Wetland Mitigation Program, NCDEQ Mitigation Sources

Projects with Education/Public Outreach Component

These projects all involve a public education component. Education around water management for landowners and stormwater quality awareness may help reduce local problems and provide collaboration opportunities. There is an education gap of what should be maintained, by whom, and when, and complex situations involving private property or multiple landowners should be considered.

Commissioner Keyes recommended identifying key leaders in the community because people have the tendency to listen to them, and holding community meetings with trusted ministers can help spread and gather information effectively.

Mayor Roth suggested an internal policy review prior to educating the public or developing and printed materials such as a management guide. They want to ensure that local policies and ordinances are clear and up to date before putting guidance out to the public. Washington County has a new intern who can review ordinances, and Creswell and Plymouth are currently reviewing theirs. This is a good time to collaborate.

Model ordinances from the state may be a helpful resource, and Holly said that NCORR is working on creating an ordinance for small communities that includes best practices.

Next steps: With ordinance reviews in progress, this is a great time for the County and Towns to review their current policies, adjust rules and ordinances, and gather public feedback. The County and Towns should coordinate on ordinances and use model ordinances as a guide. These projects should also be flagged for APNEP, as they may be a good future funding partner.

If the Town of Plymouth's Phase 3 funding application is approved for the Stormwater Action Plan, work with Chris Respess to develop messaging.

Other County Projects that May Benefit from Collaboration

Washington County- Identify and Upgrade Broadband for County Buildings and Other Critical Facilities Connected via Copper/Legacy Internet

PROJECT DESCRIPTION	Some internet/broadband services use copper wiring that is often susceptible to water intrusion and leads to unreliable service and outages during flooding events. Make a list of county buildings/assets and other critical facilities that use copper/legacy connections and connect them to a more reliable provider, such as the Microelectronics Center of North Carolina (MCNC) fiber network.
POTENTIAL FUNDING SOURCES	MCNC, NC Department of IT, Albemarle Commission

Washington County- Install River Gauges

PROJECT DESCRIPTION	There are currently only three gauges in the NCEM Flood Inundation Mapping and Alert Network countywide: one in Roper on Kendrick Creek, one in Plymouth on Conaby Creek, and one in Van Swamp along North Carolina Highway 32 South. This project would install additional gauges within the upstream portion of the county to help improve flood predictions and track flooding trends. The following potential locations have been identified for consideration: Eddiesmith Canal, Highland Canal, Kendrick Creek, Mackey's Creek, Main Canal, Scuppernong River, Swinson Swamp, Beaver Dam Branch. Part of this project would include confirming locations and functionality of existing gauges.
POTENTIAL FUNDING SOURCES	Southeast Coastal Ocean Observing Regional Association (SECOORA), National Weather Service, Washington County Drainage Fund

Other County projects that may benefit from collaboration

A potential funding source for Washington County's Broadband upgrade project is Weyerhaeuser. Their website includes information on the Rural Communities program Phase 2 (2023-2025), which mentions broadband expansion. The County has applied for their funding in the past.

For the River Gauge installation project, Meg will be coordinating with folks from the Scuppernong Study to discuss SECOORA funding and see if they can get additional gauges installed at key locations around the county. It will be important to confirm that the SECOORA funded gauges will be part of the FIMAN network for maximum data accessibility.

APPENDIX B

STAKEHOLDER ENGAGEMENT

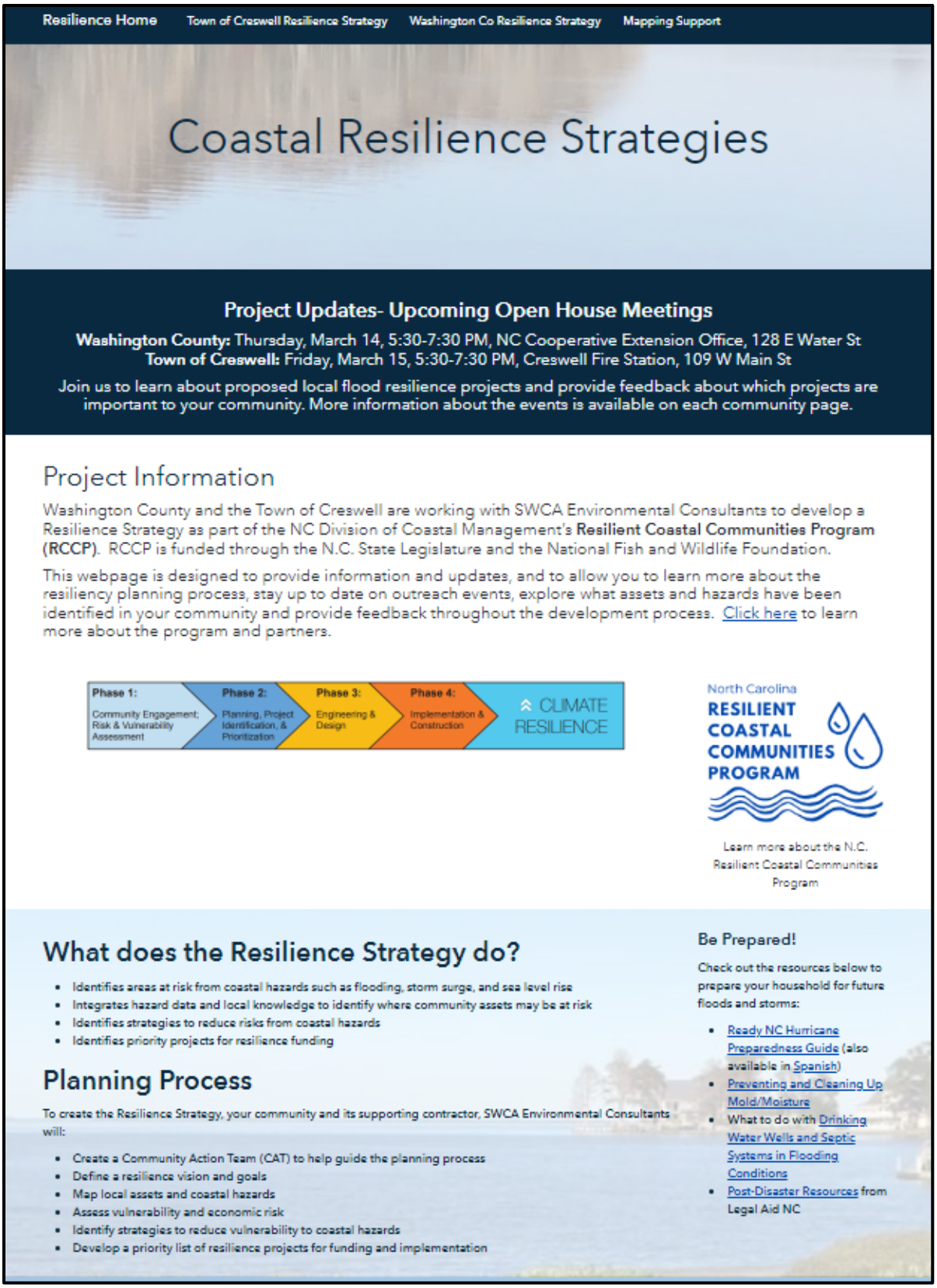
Table B-1. Attendance at the Public Meetings held in October 2023 and March 2024

FIRST NAME	LAST NAME	AFFILIATION	OCT 23	MARCH 14	MARCH 15
Attendees					
Wade	Alexander	Creswell resident			X
W. V.	Alexandra	Tyrrell County resident	X		
Lloyd	Armstrong	Tyrrell County resident	X		
Deanna	Armstrong	Tyrrell County resident	X		
Jeene	Bailey	Tyrrell County resident	X		
Breynn	Bailey	Tyrrell County resident	X		
Glenn	Bailey	Tyrrell County resident	X		
Sarah	Baird-Forner	Town of Plymouth CAT member		X	
Vicky	Barber	Tyrrell County resident	X		
Dennie	Biggs	Creswell resident			X
Ray	Blount	Creswell resident	X		
Glenn	Brickhous	Creswell resident	X		
Harvey	Brickhous	Creswell resident	X		
Charles	Broome	Creswell resident	X		
Dianne	Bryant	Tyrrell County resident	X		
Christopher	Bullock	Tyrrell County resident	X		
Penny	Chapman	Creswell CAT member	X		
Karen	Clough	Tyrrell County resident	X		
Mark	Clough	Tyrrell County resident	X		
Elizabeth Renee	Collier	NC Senior Center		X	
Colby	Davenport	Creswell resident			X
Lindey	Davenport	Creswell resident			X
Tony	Davenport	Creswell resident	X		
Gordon	Deaver	Creswell resident	X		
Florian	Deltgen	Tyrrell County resident	X		
Edith	Deltgen	Tyrrell County resident	X		
Nellie	Dyers	Tyrrell County resident	X		
Nathan “Tommy”	Evoroit	Tyrrell County resident	X		
Stacey	Feken	APNEP	X	X	X
V. Kay	Fenner	Tyrrell County resident	X		
Joyce	Fitch	Tyrrell County resident	X		
Nellie	Flemming	Creswell resident			X
Bill	Forbes	Creswell resident	X		X
Jean	Furlough	Creswell resident	X		
Kenny	Furlough	Creswell resident	X		

FIRST NAME	LAST NAME	AFFILIATION	OCT 23	MARCH 14	MARCH 15
Attendees					
Hal	Furlough	Tyrrell County resident	X		
Ruby	Hall	Tyrrell County resident	X		
Chris	Hardee	Creswell resident	X		
Joel	Harris	Creswell CAT member	X		X
Robin	Harris	Creswell resident			X
Riley	Harris	Creswell resident			X
Thomas	Holmes	Washington County resident			X
Arin	Hornug	Tyrrell County resident	X		
Connie	Hudson	Tyrrell County resident	X		
Roger	Hudson	Tyrrell County resident	X		
Sherlene	Jacques	Tyrrell County resident	X		
Jimmy	Johnson	APNEP		X	
Ann	Keyes	Washington County CAT member	X	X	
Debbie	Knieper	Washington County Manager's Office		X	
Elliana	Knieper	Washington County resident		X	
Keith	Larick	Wake County resident	X		
Rebecca	Liverman	NC Cooperative Extension Office, Plymouth	X	X	
Amy	Lowdermilk	Tyrrell County resident	X		
Moses	Matthews		X		
Carolyn	Matthews	Martin County resident	X		
Rob	Maxwell	Creswell resident	X		X
Charlotte	Maxwell	Creswell resident	X	X	X
Doug	Maxwell	Washington County resident	X	X	
Daphanie	McClees	Tyrrell County resident	X		
Jughead	McClees	Tyrrell County resident	X		
Betty	McCleese	Creswell resident	X		
Bobbie	McElfish	Tyrrell County resident	X		
Joe	McElfish	Tyrrell County resident	X		
Mark	Mixon	Tyrrell County resident	X		
Christine	Muthler	Tyrrell County resident	X		
Mackenzie	Odom	Tyrrell County resident	X		
William	Odom	Tyrrell County resident	X		
Jeremy	Oliver	Creswell resident			X
Hailey	Oliver	Creswell resident			X
Debbie	Olson	Tyrrell County resident	X		

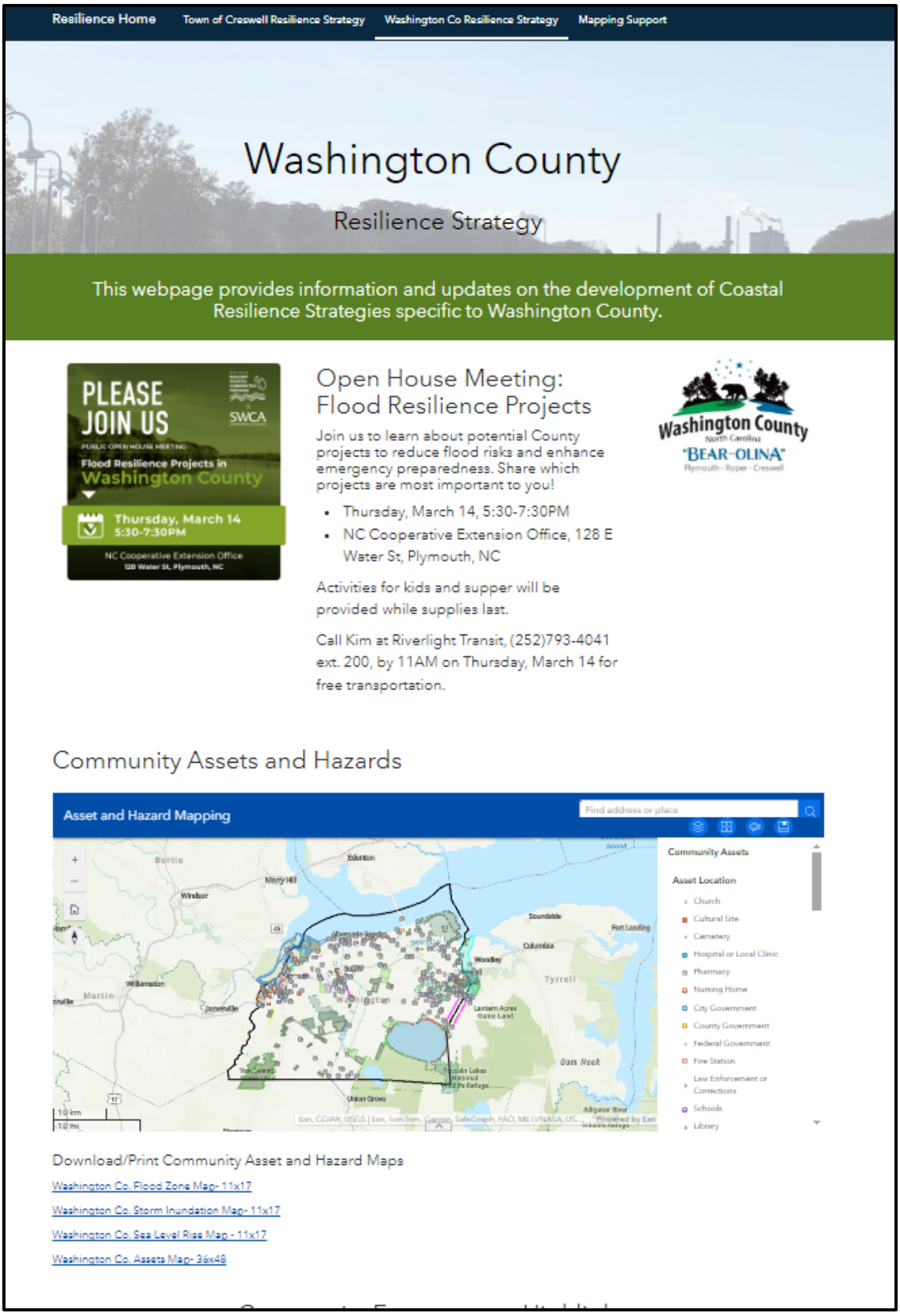
FIRST NAME	LAST NAME	AFFILIATION	OCT 23	MARCH 14	MARCH 15
Attendees					
Sharon	Owens	Creswell resident	X		X
Ray	Owens	Creswell resident	X		X
Robbie	Owens	Creswell resident	X		
Sandra	Owens	Tyrrell County resident	X		
Jacob	Parker	Tyrrell County resident	X		
Thomas	Patrick	Creswell CAT member			X
Debra	Phelps	Creswell resident			X
Sherrial	Phelps	Creswell resident			X
Carol	Phelps	Washington County CAT member		X	X
Chuck	Phelyn	Creswell resident	X		
Howard	Phillips	Tyrrell County resident	X		
Curtis	Potter	Washington County CAT member		X	
Gerald	Reed	Creswell resident			X
Chris	Respess	Washington County CAT member		X	
Gail	Reynolds	Tyrrell County resident	X		
Royce	Reynolds	Tyrrell County resident	X		
Addie	Roberts	Creswell resident	X		
David	Ronson	Washington County resident	X		
Lataya	Sawyer	Creswell resident			X
Alfreida	Simpson	Creswell resident	X		
Janette	Simpson	Tyrrell County resident	X		
Don	Spencer	Creswell resident	X		
Patty	Spencer	Creswell resident	X		
Johny	Spencer	Tyrrell County resident	X		
Pauline	Spencer	Tyrrell County resident	X		
Robin	Spencer	Tyrrell County resident	X		
Joie	Spencer	Tyrrell County resident	X		
Barbara	Spencer	Tyrrell County resident	X		
Christine	Spencer	Tyrrell County resident	X		
Sarah	Spiegler	North Carolina Sea Grant		X	
Lessel	Spruill	Creswell resident			X
Syble	Spruill	Creswell resident	X		
Katherine	Spruill	Creswell resident	X		
Tim	Spruill	Tyrrell County resident	X		
Rachel	Spruill	Tyrrell County resident	X		

FIRST NAME	LAST NAME	AFFILIATION	OCT 23	MARCH 14	MARCH 15
Attendees					
Jason	Squires	Washington County CAT member		X	
John	Stanton	Tyrrell County resident	X		
Fr. Vic	Subb	St. Joan of Arc Catholic Church		X	
Ricky	Suxton	Creswell resident	X		
Ryan	Swain	Creswell CAT member			X
Robert	Thompson	Tyrrell County resident	X		
Anthony	Toler	Creswell resident			X
Tara	Toler	Creswell resident			X
Ron	Toppin	Tyrrell County resident	X		
Christal	Watkins	Creswell resident			X
Katie	Webster	Tyrrell County resident	X		
Helene	Wetherington	NCORR		X	X
Holly	White	NCORR	X	X	X
Rhett	White	Tyrrell County resident	X		
Alfreida	Williams	Creswell CAT member, Mayor	X		X
Eroy	Williams	Creswell resident	X		
Alberta	Wilson	Tyrrell County resident	X		
Andrea	Wright	Tyrrell County resident	X		
Chris	Yeomans	Carteret County resident	X		
		Total Attendees	**91**	**18**	**31**
Program Support Staff					
Molly	Chamberlain	SWCA		X	X
Meg	Perry	SWCA	X	X	X
Mackenzie	Todd	DCM	X	X	X
Tancred	Miller	DCM	X		



https://nc-rccp-community-portal-2024-swcagis.hub.arcgis.com/

Figure B-1. Home page of the project website.

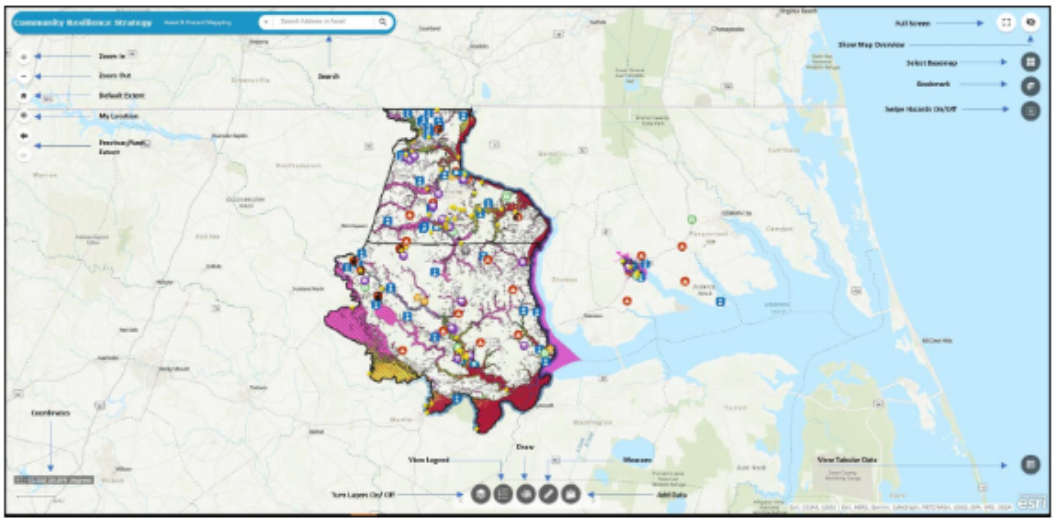


https://nc-rccp-community-portal-2024-swcagis.hub.arcgis.com/pages/washington-co-resilience-strategy

Figure B-2. Washington County page of the project website.

Resilience Home | Town of Creswell Resilience Strategy | Washington Co Resilience Strategy | Mapping Support

Utilize the Asset and Hazard Mapping Platform



Quick Tips and Tricks

- **Applications are supported in Internet Explorer but work best in Google Chrome.**
- Some data is scale dependent. Layers that are not visible at the map scale will appear light grey in the Turn layers On/Off widget and the View Legend widget will automatically update as you zoom in and out.
- Navigate the map faster: Use the customized Search tool that allows users to search by address, parcel number, asset name and asset ID.
- Utilize multiple tools at once- Applications can have as many as three tools from the bottom toolbar active at one time.
  - Click and hold the top of the active tool dialog box to move it around the application. Click the Minimize symbol at the top right corner of the tool dialog box to collapse (not close) the tool.
  - Active tool icons are elevated in the bottom toolbar; clicking the elevated icon will close the tool.
- Applications have a lot of data with complex symbology.
  - Use the Swipe Hazard tool to quickly compare an area with and without hazard data.
  - If you select an area with multiple features, arrows in the pop-up headers allow you to see information on each layer.
  - Use the Turn Layers On/Off tool, but be careful that all nested boxes are selected. Try only turning layers on/off at the highest or lowest nested level.
  - Open the Legend tool, move it to the side of the map, and leave it open to easily see what layers are visible on the map.
- The Turn Layers On/Off tool does more than turn layers on and off. Select the ellipsis by any layer name and zoom to layer, adjust transparency, or view the item's tabular data.

https://nc-rccp-community-portal-2024-swcagis.hub.arcgis.com/pages/mapping-support

Figure B-3. Mapping support page of the project website.

HELP US UNDERSTAND FLOODING IN THE REGION

Scuppernong Water Study Phase 1 Community Survey

Please fill out this survey with your feedback and mail to the address below **by January 15, 2024.** Alternatively, you can provide your input through the online survey on the project website at bit.ly/scuppernongwaterstudy or using the QR code.

Mailing Address: Woody Webster, PO Box 262, Columbia, NC 27925

Submit Survey Online

Name: _____ **Do you live in the study area?** (Circle yes or no) YES NO

Who do you represent i.e. resident of Columbia, Creswell, Cherry, Washington County, Tyrrell County, or other?

_____

Do you want to be added to the project email list? Email: _____

What do you value about the Scuppernong River watershed? What makes it special? _____

_____

_____

What are the important places in the watershed? Please provide an address, cross streets, or identifiable landmarks. _____

_____

Please complete the sentence: "This project will be successful if _____**."**

Please indicate up to three locations on the map below where you know flooding occurs. Be specific with cross streets, addresses, or identifiable landmarks. For each location, please describe the following:

- When and under what conditions does flooding happen (wind, rainfall, large events, high water table, rainfall upstream, etc.)
- Other factors that make flooding worse (infrastructure issues, blocked roadways, drains more slowly than other areas, etc.)

1. _____

_____

_____

_____

2. _____

_____

_____

_____

3. _____

_____

_____

_____

How did you hear about the project?

- ☐ Flyer around town
- ☐ Social media
- ☐ From a friend or co-worker
- ☐ Other _____

Figure B-4. Community survey.

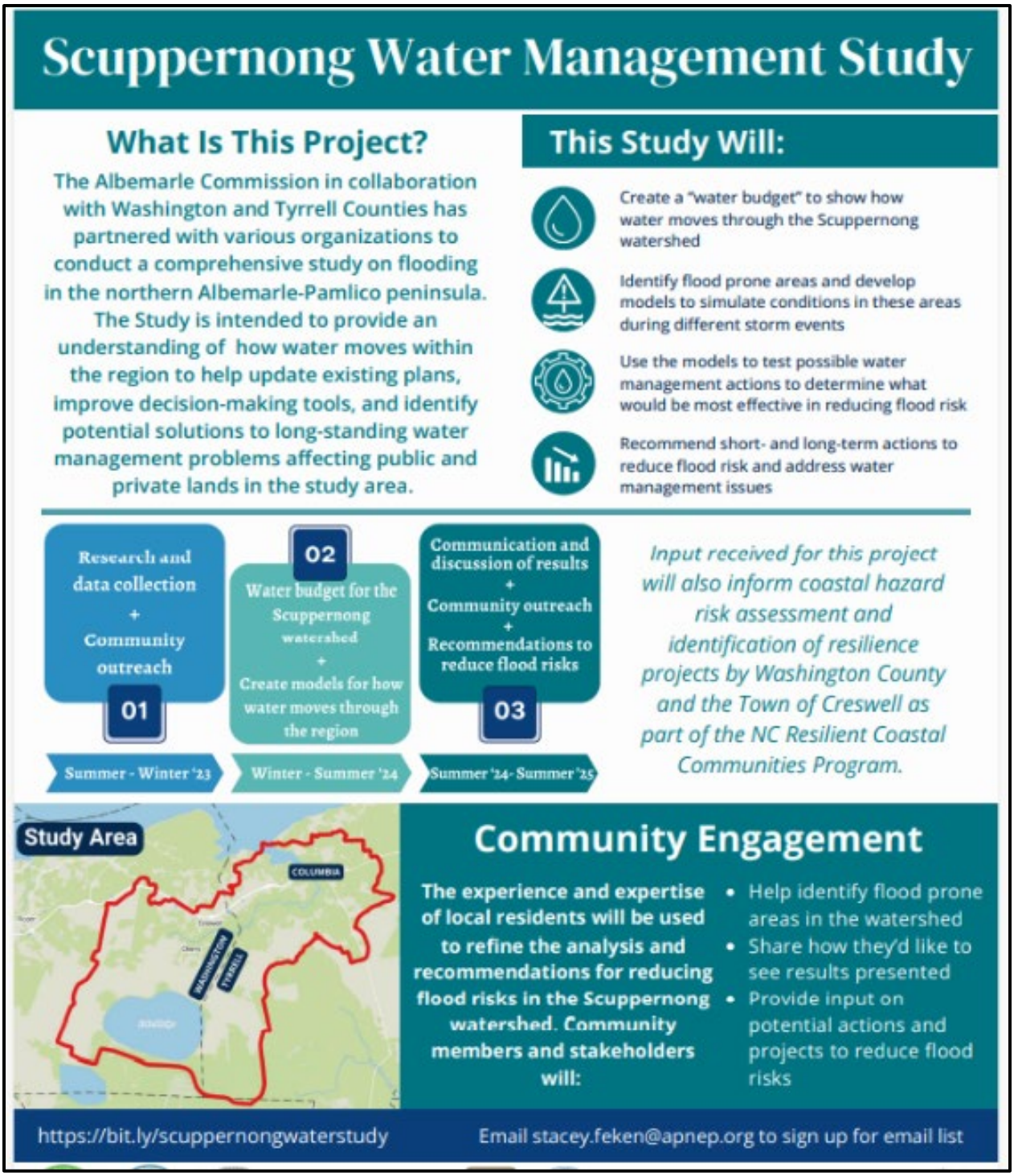


Figure B-5. Scuppernong study fact sheet.

APPENDIX C

IDENTIFIED ASSETS

Table C-1. Asset Information and Calculation of Vulnerability Index for Each Asset in Washington County, North Carolina. Assets are listed from highest vulnerability to lowest vulnerability index.

ASSET ID	ASSET NAME	PRIMARY ASSET TYPE	LOCATION	TOTAL ESTIMATED VALUE	AVERAGE SENSITIVITY SCORE	AVERAGE HAZARD EXPOSURE SCORE	AVERAGE ADAPTIVE CAPACITY SCORE	FINAL VULNERABILITY SCORE
WC-1	Washington County Airport	Infrastructure	1069 Airport Rd, Plymouth, NC 27962	$6,243,840	2	1	1	1
WC-2	Mount Hermon United Methodist Church Cemetery	Community and Economic Services	11425 Newland Rd	$10,300	1	2	1	1
WC-3	Mount Tabor Free Will Baptist Church Cemetery	Community and Economic Services	2075 Mount Tabor Rd	$4,900	2	2	1	1
WC-4	Christian Hope Church of Christ Cemetery	Community and Economic Services	6727 Long Ridge Rd, Plymouth, NC 27962	$68,500	1	1	1	0
WC-5	Hebron United Methodist Church Cemetery	Community and Economic Services	300 W Buncombe St, Roper NC 27970	$21,100	2	2	1	1
WC-6	Plymouth Town Cemetery (African American)	Community and Economic Services	417 West Ave, Plymouth, NC 27962	$37,200	2	1	1	1
WC-7	Saint Luke Episcopal Church Cemetery	Community and Economic Services	799 Cross Rd, Roper, NC 27970	$16,000	2	1	0	1
WC-8	Second Zion Grove Baptist Church Cemetery (African American)	Community and Economic Services	2225 Mackeys Rd, Plymouth, NC 27962	$82,300	2	3	1	2
WC-9	St Anne's Episcopal Church Cemetery (African-American	Community and Economic Services	203 Cross Rd, Roper NC 27970	$36,600	2	1	1	1
WC-10	St. Mary Church of Christ Cemetery (African American)	Community and Economic Services	1972 Cherry Rd, Creswell, NC 27928	$408,900	2	3	1	2
WC-11	Toodles Cemetery (African American)	Community and Economic Services	307 Wilson St Ext, Plymouth, NC 27962	$49,900	2	1	1	1
WC-12	Zion's Chapel Church of Christ Cemetery	Community and Economic Services	6001 NC-32, Roper, NC 27970	$39,500	2	1	1	1
WC-13	Scuppernong Church of Christ Cemetery	Community and Economic Services	3510 Davenport Forks Rd, Creswell, NC 27928	$22,700	2	3	1	2
WC-14	Christ Holiness Church of Christ Disciples Cemetery (African-American)	Community and Economic Services	301 N Railroad St, Roper, NC 27970	$11,200	2	2	1	1
WC-15	Christian Hope Church of Christ	Community and Economic Services	6727 Long Ridge Rd, Plymouth, NC 27962	$527,269	1	1	1	0
WC-16	Hebron United Methodist Church	Community and Economic Services	300 W Buncombe St, Roper NC 27970	$167,800	2	2	1	1
WC-17	Holly Neck Church of Christ	Community and Economic Services	2100 Holly Neck Rd, Roper, NC 27970	$155,800	2	1	1	1
WC-18	Morning Star AME Zion Church	Community and Economic Services	411 Bush St, Roper, NC 27970	$36,900	2	1	1	1
WC-19	Mount Hermon United Methodist Church	Community and Economic Services	11425 Newland Rd	$192,500	1	2	1	1
WC-20	Mount Tabor Free Will Baptist Church	Community and Economic Services	2095 Mount Tabor Rd	$336,700	2	2	1	1
WC-21	Mt. Eprew Missionary Baptist Church	Community and Economic Services	201 Newby St, Roper, NC 27970	$236,300	2	1	1	1
WC-22	Philippi Church of Christ	Community and Economic Services	74 Old Cherry Rd, Creswell, NC 27928	$539,380	1	2	1	1
WC-23	Rehoboth Methodist Church	Community and Economic Services	15700 NC-32 N, Roper, NC 27970	$63,300	2	1	1	1
WC-24	Roper Pentecostal Holiness Church	Community and Economic Services	311 Buncombe Ave, Roper, NC 27970	$697,100	1	2	1	1
WC-25	Saint's Delight Church of Christ	Community and Economic Services	4670 Mackeys Rd, Roper, NC 27970	$282,300	2	1	1	1
WC-26	Saint Mary's Church of Christ	Community and Economic Services	1972 Cherry Rd, Creswell, NC 27928	$384,700	2	3	1	2
WC-27	Scuppernong Church of Christ	Community and Economic Services	3510 Davenport Forks Rd, Creswell, NC 27928	$176,700	2	3	1	2
WC-28	Shiloh Church of Christ (African-American)	Community and Economic Services	17191 NC-32, Roper, NC 27970	$302,200	2	1	1	1
WC-29	St. Joan of Arc Catholic Church	Community and Economic Services	506 E Main St, Plymouth, NC 27962	$322,500	2	1	1	1
WC-30	Zion's Chapel Church of Christ	Community and Economic Services	6001 NC-32, Roper, NC 27970	$737,500	2	1	1	1
WC-31	Second Zion Grove Baptist Church	Community and Economic Services	2225 Mackeys Rd, Plymouth, NC 27962	$342,100	2	3	1	2
WC-32	Christ Holiness Church of Christ Disciples (African-American)	Community and Economic Services	301 N Railroad St, Roper, NC 27970	$137,700	2	2	1	1
WC-33	Town of Roper	Government Service Offices	301 W Buncombe St, Roper, NC 27970	$110,000	3	1	1	1
WC-34	Cell Tower	Infrastructure	7096 U.S. Hwy 64 W	$0	3	2	1	2

ASSET ID	ASSET NAME	PRIMARY ASSET TYPE	LOCATION	TOTAL ESTIMATED VALUE	AVERAGE SENSITIVITY SCORE	AVERAGE HAZARD EXPOSURE SCORE	AVERAGE ADAPTIVE CAPACITY SCORE	FINAL VULNERABILITY SCORE
WC-35	Tower #1005005/Tower #Knkn844	Infrastructure	444 U.S. Hwy 64 E, Plymouth, NC 27962	$72,400	3	2	1	2
WC-36	Tower #1005115/Tower #Knkn641	Infrastructure	348 Industrial Park Rd, Plymouth, NC 27962	$101,900	3	1	1	1
WC-37	Tower #1056526	Infrastructure	2702 Ambrose Rd, Creswell, NC 27928	$7,300	3	2	1	2
WC-38	Tower #1204469/Tower #Knkn641	Infrastructure	794 Alligood Rd, Creswell, NC 27928	$214,090	3	2	1	2
WC-39	Tower #1213770	Infrastructure	820 Roosevelt Ave, Plymouth, NC 27962	$30,500	3	1	1	1
WC-40	Tower #1225577/Tower #Knkn844	Infrastructure	4095 Backwoods Rd, Roper, NC 27970	$64,600	3	1	1	1
WC-41	Tower #1233766	Infrastructure	13146 NC-94 N, Creswell, NC 27928	$184,000	3	1	1	1
WC-42	Tower #1251153	Infrastructure	221 Griffin Rd, Roper, NC 27970	$127,440	3	1	1	1
WC-43	Tower #1283954	Infrastructure	2124 U.S. Hwy 64 W, Plymouth, NC 27962	$38,700	3	1	1	1
WC-44	Washington County Government Complex – Admin Office, EOC, Washington County Courthouse and Washington County Jail	Government Service Offices	116 Adams St Plymouth NC 27962	$2,424,200	3	1	1	1
WC-45	Davenport House	Community and Economic Services	2377 Mount Tabor Rd, Creswell, NC 27928	$89,500	2	3	0	3
WC-46	Garrett's Island House	Community and Economic Services	1650-1720 Garretts Island Rd, Plymouth, NC 27962	$80,750	1	1	0	1
WC-47	Latham House	Community and Economic Services	311 E Main St, Plymouth, NC 27962	$180,400	2	1	0	1
WC-48	Perry-Spruill House	Community and Economic Services	326 Washington St, Plymouth, NC 27962	$113,800	2	1	0	1
WC-49	Plymouth Historic District	Community and Economic Services	Downtown Plymouth	$40,231,100	2	3	1	2
WC-50	Albemarle Beach Solar	Infrastructure	7307 Mackeys Rd, Roper, NC 27970	$341,070	3	3	2	2
WC-51	Creswell Substation and Tap #146951	Infrastructure	7964 NC-94 N, Creswell, NC 27928	$9,100	3	2	1	2
WC-52	Mackey's Substation and Communications Tower	Infrastructure	7436 Mackeys Rd, Roper, NC 27970	$49,000	3	2	1	2
WC-53	Plymouth Solar	Infrastructure	348 Industrial Park Rd, Plymouth, NC 27962	$1,015,220	3	1	2	1
WC-54	Solar Field	Infrastructure	South of Railroad between Mackeys Rd and Woodlawn Rd	$5,920,630	3	2	2	1
WC-55	Solar Field	Infrastructure	Corner of Mackeys Rd and Cross Rd	$6,484,290	3	2	2	1
WC-56	Tap #146952	Infrastructure	708 Madison St, Plymouth, NC 27962	$7,200	3	3	1	3
WC-57	Trowbridge Substation	Infrastructure	202 Cashie St, Plymouth, NC 27962	$168,300	3	2	1	2
WC-58	Washington CO Union	Infrastructure	37 E Mill Pond Rd, Roper, NC 27970	$2,005,300	3	1	1	1
WC-59	Coles Farms Inc.	Community and Economic Services	1563 Railroad Bed Rd, Roper, NC 27970	$3,642,490	1	1	1	0
WC-60	Joshua Spear Farm	Community and Economic Services	3197 Ambrose Rd, Creswell, NC 27928	$363,120	2	2	1	1
WC-61	Somerset Farm. Swine State Coc. Aws940001	Community and Economic Services	2315 Beasley Rd, Roper, NC 27970	$10,539,790	2	1	1	1
WC-62	Tidewater Research Station	Community and Economic Services	1189 Research Station Rd, Plymouth, NC 27962	$3,246,920	1	1	1	0
WC-63	Bus Garage and Tower #1252454	Education	1344 U.S. Hwy 64 W, Plymouth, NC	$314,300	1	1	1	0
WC-64	Maintenance Shop	Education	120 Adams St, Plymouth, NC	$127,300	2	2	1	1
WC-65	Lake Phelps Volunteer Fire Department Station #1	Public Safety or Emergency Services	9688 Newland Rd, Creswell, NC 27928	$151,400	2	1	1	1
WC-66	Mid-County Volunteer Fire Department Station #1	Public Safety or Emergency Services	18135 NC-32 N, Roper, NC 27970	$560,700	3	1	1	1
WC-67	Plymouth Fire Department Station #1	Public Safety or Emergency Services	775 U.S. Hwy 64 E, Plymouth, NC 27962	$521,300	3	1	1	1
WC-68	Roper Volunteer Fire Department Station #1	Public Safety or Emergency Services	7103 NC-32 N, Roper, NC 27970	$118,700	3	1	1	1
WC-69	CNB	Community and Economic Services	4361 Pea Ridge Rd, Roper, NC 27970	$67,000	3	2	1	2
WC-70	Duck Thru #49	Community and Economic Services	22 U.S. Hwy 64 E, Plymouth, NC 27962	$599,500	3	1	1	1
WC-71	Quality Plus	Community and Economic Services	280 U.S. Hwy 64 W, Plymouth, NC 27962	$207,400	3	1	1	1

ASSET ID	ASSET NAME	PRIMARY ASSET TYPE	LOCATION	TOTAL ESTIMATED VALUE	AVERAGE SENSITIVITY SCORE	AVERAGE HAZARD EXPOSURE SCORE	AVERAGE ADAPTIVE CAPACITY SCORE	FINAL VULNERABILITY SCORE
WC-72	Roper Food Mart	Community and Economic Services	7103 NC-32 N, Roper, NC 27970	$99,600	3	1	0	2
WC-73	Speedway #6966	Community and Economic Services	1109 U.S. Hwy 64 E, Plymouth, NC 27962	$411,400	3	1	1	1
WC-74	Speedway #8288	Community and Economic Services	2029 U.S. Hwy 64 W, Plymouth, NC 27962	$1,245,400	3	1	1	1
WC-75	Speedway #8668	Community and Economic Services	630 U.S. Hwy 64 E, Plymouth, NC 27962	$513,100	3	1	1	1
WC-76	Duke Transmission Gas Easement	Infrastructure	Along Parker Rd Starting at NC-32 S	$0	2	1	2	0
WC-77	Duke Transmission Gas Easement	Infrastructure	Along Parker Rd Starting near intersection with NC-32 S	$0	2	1	2	0
WC-78	Duke Transmission Gas Easement	Infrastructure	Along Parker Rd Starting near intersection with NC-32 S	$0	2	1	2	0
WC-79	Duke Transmission Gas Easement	Infrastructure	Along Parker Rd Starting near intersection with Railroad Bed Rd	$0	2	1	2	0
WC-80	Duke Transmission Gas Easement	Infrastructure	Along NC-149 N near intersection with U.S. Hwy 64 W	$0	2	1	2	0
WC-81	Duke Transmission Gas Easement	Infrastructure	Along NC-149 N near intersection with Sanhill Rd	$0	2	1	2	0
WC-82	Duke Transmission Gas Easement	Infrastructure	Along NC-149 N north of U.S. Hwy 64 W and Long Ridge Rd intersection	$0	2	1	2	0
WC-83	Duke Transmission Gas Easement	Infrastructure	Along NC-149 N north of U.S. Hwy 64 W and Long Ridge Rd intersection	$0	2	1	2	0
WC-84	Duke Transmission Gas Easement	Infrastructure	Along NC-149 N near intersection with Sanhill R	$0	2	2	2	1
WC-85	Duke Transmission Gas Easement	Infrastructure	Along NC-149 N at Welch Creek Crossing	$0	2	3	2	1
WC-86	Duke Transmission Gas Easement	Infrastructure	Along NC-149 N at Welch Creek Crossing	$0	2	3	2	1
WC-87	Duke Transmission Gas Easement	Infrastructure	Near intersection of U.S. Hwy 64 W and Long Ridge Rd	$0	2	1	2	0
WC-88	Duke Transmission Gas Easement	Infrastructure	Along NC-149 N north of U.S. Hwy 64 W and Long Ridge Rd intersection	$0	2	1	2	0
WC-89	Washington County Group Home #2	Community and Economic Services	121 Old Roper Rd, Plymouth, NC 27962	$35,600	3	2	1	2
WC-90	Washington County Group Home #3	Community and Economic Services	102 Hampton Dr, Plymouth, NC 27962	$68,900	2	1	1	1
WC-91	Wilson Street Group Home	Community and Economic Services	1012 Wilson St Ext, Plymouth, NC 27962	$147,600	2	1	1	1
WC-92	Carolina Aluminum (Permit #NCD981015746)	Infrastructure	2246 E Mill Pond Rd, Roper, NC 27970	$99,500	3	2	1	2
WC-93	Crystal Ford Mercury	Infrastructure	454 U.S. Hwy 64 W, Plymouth, NC 27962	$571,600	3	1	1	1
WC-94	Domtar Paper Company	Infrastructure	800 NC-149 N, Plymouth, NC 27962	$285,600	3	1	1	1
WC-95	Ga-pacific Corp / Ncd000813592	Infrastructure	188 Plywood Rd, Plymouth, NC 27962	$778,300	3	2	1	2
WC-96	Lebanon Chemical Corporation (Permit #NONCD0001985)	Infrastructure	1665 U.S. Hwy 64 E, Plymouth, NC 27962	$1,522,300	3	1	1	1
WC-97	Plymouth Wood Treating Company	Infrastructure	2414 NC-45 N, Plymouth, NC 27962	$32,700	3	2	1	2
WC-98	Roanoke River Barge	Infrastructure	188 Plymouth Rd Plymouth	$1,457,800	3	3	1	3
WC-99	Carefocus	Health Services	111 E Water St, Plymouth, NC 27962	$78,100	3	1	1	1
WC-100	Carol's Variety Home Health Agency	Health Services	703 E Main St, Plymouth, NC 27962	$27,000	3	1	1	1
WC-101	Faith Works Home Health Care, Inc.	Health Services	101 E Main St, Plymouth, NC 27962	$21,200	3	1	1	1
WC-102	Fresenius Medical Care Dialysis Care	Health Services	734 NC-64 East Plymouth, NC 27962	$1,085,100	3	1	1	1
WC-103	Interim Healthcare	Health Services	328 U.S. Hwy 64 E, Plymouth, NC 27962	$807,200	3	2	1	2
WC-104	Roanoke Developmental Center, Inc.	Health Services	603 Adams St, Plymouth, NC 27962	$217,500	3	1	1	1
WC-105	Roanoke Home Care/hospice	Health Services	3312 NC-45 S, Plymouth, NC 27962	$105,200	3	1	1	1
WC-106	Roanoke Landing Nursing and Rehab	Health Services	1084 U.S. Hwy 64 E, Plymouth, NC 27962	$3,082,600	3	2	1	2
WC-107	Tideland MHC Washington Street Facility	Health Services	708 Washington St, Plymouth, NC 27962	$113,835	3	1	1	1

ASSET ID	ASSET NAME	PRIMARY ASSET TYPE	LOCATION	TOTAL ESTIMATED VALUE	AVERAGE SENSITIVITY SCORE	AVERAGE HAZARD EXPOSURE SCORE	AVERAGE ADAPTIVE CAPACITY SCORE	FINAL VULNERABILITY SCORE
WC-108	Washington County EMS, Town of Plymouth	Health Services	124 E Water St, Plymouth, NC 27962	$423,500	3	2	1	2
WC-109	Washington Regional Medical Ctr	Health Services	958 U.S. Hwy 64 E, Plymouth, NC 27962	$7,127,660	3	2	1	2
WC-110	Creswell Refuse Disposal (Permit #NONCD0000620)	Infrastructure	481 Spruill Bridge Rd, Creswell, NC 27928	$5,820	2	3	1	2
WC-111	Domtar Paper Company Landfill/Weyerhaeuser Landfill	Infrastructure	Plymouth Township, NC	$4,022,370	2	3	1	2
WC-112	Mackey's Dump (Permit #NONCD0000619)	Infrastructure	508 Landfill Rd, Roper, NC 27970	$1,504,800	2	3	1	2
WC-113	Roper Refuse Disposal	Infrastructure	799 Cross Rd, Roper, NC 27970	$455,040	3	1	1	1
WC-114	Washington County C&D Landfill	Infrastructure	Lees Mill Township, NC	$1,568,660	2	3	1	2
WC-115	Washington County Landfill	Infrastructure	718 Landfill Rd, Roper, NC 27970	$291,180	2	3	1	2
WC-116	Plymouth Police Department	Public Safety or Emergency Services	132 E Water St, Plymouth, NC 27962	$243,900	3	2	1	2
WC-117	Roper Police Department	Public Safety or Emergency Services	303 W Buncombe St, Roper, NC 27970	$53,300	3	1	1	1
WC-118	Pettigrew Regional Library	Community and Economic Services	217 Adams St, Plymouth, NC 27962	$46,900	2	1	1	1
WC-119	Cypress Manor	Community and Economic Services	503 W Buncombe St, Roper, NC 27970	$1,067,800	3	1	1	1
WC-120	Old Roper Road Group Home	Community and Economic Services	201 Old Roper Rd, Plymouth, NC 27962	$53,200	3	1	1	1
WC-121	Town of Roper Open Space – Mill Creek South and North Carolina Land and Water Fund Conservation Agreement (NCL-WFCA) land	Community and Economic Services	Near intersection of Bullock St and NC-32 N	$859,150	2	3	1	2
WC-122	Roanoke River Preserve including the Bachelor Bay - Bear Management Area and NCL-WFCA	Community and Economic Services	Mackeys Rd	$0	1	3	1	1
WC-123	Town of Plymouth Open Space	Community and Economic Services	Corner of Hampton Dr and E Main St	$248,400	1	2	1	1
WC-124	Town of Plymouth Open Space	Community and Economic Services	Washington St	$291,850	2	2	1	1
WC-125	Conaby Creek Wetland and Town of Plymouth Open Space	Community and Economic Services	Weland between E Main St and railroad	$4,004,600	2	3	1	2
WC-126	Roanoke River, Town of Plymouth Open Space, and NCL-WFCA easement	Community and Economic Services	Water St	$159,200	2	3	1	2
WC-127	Town of Roper Open Space – Mill Creek North	Community and Economic Services	N Railroad St	$266,000	2	3	1	2
WC-128	Washington County Open Space	Community and Economic Services	Weston Rd at SR-1126	$14,200	1	3	1	1
WC-129	Washington County Open Space	Community and Economic Services	Washington St/NC-32 S	$16,200	2	2	1	1
WC-130	Albemarle Sound Paddle Trail	Community and Economic Services	361 Mackey Ferry Rd, Roper, NC 27970	$0	1	2	1	1
WC-131	Bear Track Landing and Conaby Creek Trail Access Parking/Dock	Community and Economic Services	1101 E Main St, Plymouth, NC 27962	$84,600	1	3	1	1
WC-132	Conaby Creek Paddle Trail	Community and Economic Services	Conaby Creek	$0	1	2	1	1
WC-133	Conaby Creek Paddle Trail	Community and Economic Services	310 N Deerfield Dr, Plymouth, NC 27962	$0	1	2	1	1
WC-134	Conaby Creek Trail Access B	Community and Economic Services	61 Conaby Ln, Plymouth, NC 27962	$0	1	2	1	1
WC-135	Kendrick Creek Paddling Trail	Community and Economic Services	333 Mackeys Creek Rd, Roper, NC 27970	$0	1	2	1	1
WC-136	Kendrick Creek Trail	Community and Economic Services	300 W Buncombe St, Roper, NC 27970	$15,780	2	2	1	1
WC-137	Pocosin Lakes National Wildlife Refuge	Community and Economic Services	Shore Drive near Pettigrew State Park	$31,271,410	1	3	2	1
WC-138	Upper Scuppernong River Trail	Community and Economic Services	1590 Cherry Rd, Creswell, NC 27928	$0	1	3	1	1
WC-139	Van Swamp Game Land	Community and Economic Services	Southwest corner of Washington County	$3,398,890	1	1	1	0
WC-140	Washington County Recreation Park	Community and Economic Services	NC-32 N	$277,880	1	2	1	1
WC-141	Creswell Primary Care Pharmacy	Health Services	9500 NC-94 N, Creswell, NC 27928	$840,700	3	1	1	1

ASSET ID	ASSET NAME	PRIMARY ASSET TYPE	LOCATION	TOTAL ESTIMATED VALUE	AVERAGE SENSITIVITY SCORE	AVERAGE HAZARD EXPOSURE SCORE	AVERAGE ADAPTIVE CAPACITY SCORE	FINAL VULNERABILITY SCORE
WC-142	Walgreens #16130	Health Services	11 U.S. Hwy 64 E, Plymouth, NC 27962	$940,700	3	2	1	2
WC-143	Womble Drug Store #2	Health Services	432 U.S. Hwy 64 E, Plymouth, NC 27962	$927,300	3	1	1	1
WC-144	Washington County Health Department	Health Services	198 NC-45 N, Plymouth, NC 27962	$951,840	3	1	1	1
WC-145	Union Court	Community and Economic Services	Union Court, Roper, NC 27970	$1,841,300	3	1	1	1
WC-146	Wilkins Court	Community and Economic Services	56 Bullock St, Roper, NC 27970	$1,987,500	3	1	1	1
WC-147	Lower Roanoke River Aquatic Habitat	Natural Assets	NC-45 N over Roanoke River	$0	2	3	1	2
WC-148	Roanoke River Delta – Conaby Creek	Natural Assets	Conaby Creek	$0	1	3	1	1
WC-149	Albemarle Beach Rd	Infrastructure	50 feet of Route Code 3718720050624354	$0	2	3	1	2
WC-150	Alligood Rd	Infrastructure	150 feet of Route Code 3718720050624593	$0	3	3	1	3
WC-151	Ambrose Rd	Infrastructure	400 feet of Route Code 3718720050624654	$0	2	3	1	2
WC-152	Ambrose Rd	Infrastructure	2000 feet between Gus Town Rd and Cherry Rd	$0	2	3	1	2
WC-153	Arnold Hill Rd	Infrastructure	100 feet of Route Code 3718720050624597	$0	2	3	1	2
WC-154	Barber Rd	Infrastructure	1570 feet of Route Code 3718720050624488	$0	2	3	1	2
WC-155	Beech Bay Rd	Infrastructure	30 feet of Route Code 3718720050624451	$0	2	3	1	2
WC-156	Bridge Structure #070007	Infrastructure	NC-45 N over Roanoke River	$0	3	3	1	3
WC-157	Bridge Structure #570033	Infrastructure	U.S. Hwy 64 W over Welch Creek	$0	3	3	1	3
WC-158	Bridge Structure #570237	Infrastructure	U.S. Hwy W over Welch Creek	$0	3	3	1	3
WC-159	Bridge Structure #880022	Infrastructure	2796 S Fork Creek Rd, Creswell, NC 27928	$0	3	3	1	3
WC-160	Bridge Structure #930008	Infrastructure	10095 NC-32 N, Roper, NC 27970	$0	3	3	1	3
WC-161	Bridge Structure #930009	Infrastructure	61 Conaby Ln, Plymouth, NC 27962	$0	3	3	1	3
WC-162	Bridge Structure #930011	Infrastructure	8103 Mackeys Rd, Roper, NC 27970	$0	3	3	1	3
WC-163	Bridge Structure #930012	Infrastructure	525 Cross Rd, Roper, NC 27970	$0	3	3	1	3
WC-164	Bridge Structure #930020	Infrastructure	481 Spruill Bridge Rd, Creswell, NC 27928	$0	3	3	1	3
WC-165	Bridge Structure #930026	Infrastructure	1590 Cherry Rd, Creswell, NC 27928	$0	3	3	1	3
WC-166	Bridge Structure #930029	Infrastructure	215 Spruill Town Rd W, Creswell, NC 27928	$0	2	3	1	2
WC-167	Bridge Structure #930033	Infrastructure	1952 Cherry Rd, Creswell, NC 27928	$0	3	3	1	3
WC-168	Bridge Structure #930089	Infrastructure	1002 E Main St, Plymouth, NC 27962	$0	3	3	1	3
WC-169	Bridge Structure #930098	Infrastructure	122 Somerset Dr, Plymouth, NC 27962	$0	3	3	1	3
WC-170	Burris Rd	Infrastructure	286 feet of Route Code 3718720050624584	$0	2	3	1	2
WC-171	Cherry Rd	Infrastructure	5000 feet south and northeast of Scuppernong River crossing	$0	2	3	1	2
WC-172	Cooper Rd	Infrastructure	199 feet of Route Code 3718720050624508	$0	3	3	1	3
WC-173	Craddock Rd	Infrastructure	198 feet of Route Code 3718720050624611	$0	2	3	1	2
WC-174	Crescent DR	Infrastructure	768 feet of Route Code 3718720050624791	$0	2	3	1	2
WC-175	Cross Rd	Infrastructure	800 feet near Beaver Dam Branch crossing	$0	3	3	1	3
WC-176	Cross Rd	Infrastructure	370 feet of Route Code 3718720050624324	$0	3	3	1	3
WC-177	Crystal L	Infrastructure	300 feet of Route Code 3718720050624429	$0	2	3	1	2
WC-178	Davenport Forks Rd	Infrastructure	150 feet of Route Code 3718720050624506	$0	3	3	1	3
WC-179	Davenport Forks Rd	Infrastructure	390 feet of Route Code 3718720050624608	$0	3	3	1	3

ASSET ID	ASSET NAME	PRIMARY ASSET TYPE	LOCATION	TOTAL ESTIMATED VALUE	AVERAGE SENSITIVITY SCORE	AVERAGE HAZARD EXPOSURE SCORE	AVERAGE ADAPTIVE CAPACITY SCORE	FINAL VULNERABILITY SCORE
WC-180	Davenport Forks Rd	Infrastructure	400 feet of Route Code 3718720050624511	$0	3	3	1	3
WC-181	Davenport Forks Rd	Infrastructure	90 feet of Route Code 3718720050624609	$0	3	3	1	3
WC-182	Deep Creek Landing	Infrastructure	2394 feet of Route Code 3718720050624502	$0	3	3	1	3
WC-183	Deep Creek Rd	Infrastructure	510 feet near intersection with Cooper Rd	$0	3	3	1	3
WC-184	Deep Creek Rd	Infrastructure	1284 feet of Route Code 3718720050624507	$0	3	3	1	3
WC-185	E Main St	Infrastructure	700 feet of Route Code 3718720050624825	$0	2	3	1	2
WC-186	E Spruill Town Rd	Infrastructure	800 feet of Route Code 3718720050624627	$0	2	3	1	2
WC-187	E Spruill Town Rd	Infrastructure	200 feet of Route Code 3718720050624625	$0	2	3	1	2
WC-188	E U.S. Hwy 64	Infrastructure	425 feet of Route Code 3718720050624376	$0	2	3	2	1
WC-189	E U.S. Hwy 64	Infrastructure	500 feet of Route Code 3718720050624366 and 3718720050624497	$0	2	3	2	1
WC-190	E U.S. Hwy 64	Infrastructure	130 feet of Route Code 3718720050624494 and 3718720050624495	$0	2	3	2	1
WC-191	E U.S. Hwy 64	Infrastructure	280 feet of Route Code 3718720050624496	$0	2	3	2	1
WC-192	Gus Town Rd	Infrastructure	420 feet of Route Code 3718720050624617	$0	2	3	1	2
WC-193	Gus Town Rd	Infrastructure	724 feet of Route Code 3718720050624614	$0	2	3	1	2
WC-194	Hollywood Ave	Infrastructure	100 feet of Route Code 3718720050624864	$0	2	3	1	2
WC-195	Hunters Crossing Rd	Infrastructure	875 feet of Route Code 37187200506241164	$0	2	3	1	2
WC-196	Mackeys Creek Rd	Infrastructure	1300 feet near creek crossing	$0	2	3	1	2
WC-197	Mallard Dr	Infrastructure	1650 feet of Route Code 3718720050624279 and 3718720050624291	$0	2	3	1	2
WC-198	Middle St	Infrastructure	181 feet of Route Code 3718720050624837	$0	2	3	1	2
WC-199	Monroe St	Infrastructure	115 feet of Route Code 3718720050624912	$0	2	3	1	2
WC-200	Mount Pleasant Rd	Infrastructure	420 feet of Route Code 3718720050624510	$0	3	3	1	3
WC-201	Mount Tabor Rd	Infrastructure	100 feet of Route Code 3718720050624583	$0	3	3	1	3
WC-202	Mount Tabor Rd	Infrastructure	100 feet of Route Code 3718720050624571	$0	3	3	1	3
WC-203	Myrtle Ave	Infrastructure	105 feet of Route Code 3718720050624850	$0	2	3	1	2
WC-204	N NC-32	Infrastructure	25 feet of Route Code 3718720050624409	$0	2	3	2	1
WC-205	N NC-45	Infrastructure	400 feet of Route Code 3718720050624240	$0	2	3	2	1
WC-206	N River Rd	Infrastructure	819 feet of Route Code 37187200506241160	$0	2	3	1	2
WC-207	NC 149 Hwy	Infrastructure	500 feet of Route Code 3718720050624186	$0	2	3	2	1
WC-208	Newberry Landing	Infrastructure	1004 feet of Route Code 3718720050624408	$0	2	3	1	2
WC-209	Newland Rd	Infrastructure	50 feet of Route Code 3718720050624628	$0	2	3	1	2
WC-210	Oakland Ave	Infrastructure	100 feet of Route Code 3718720050624831	$0	2	3	1	2
WC-211	Old Cherry Rd	Infrastructure	4000 feet east of intersection with Spruill Bridge Rd	$0	2	3	1	2
WC-212	Old Cherry Rd	Infrastructure	1800 feet of Route Code 3718720050624623, 37187200506241196 and 3718720050624624	$0	2	3	1	2
WC-213	Old Cherry Rd	Infrastructure	1262 feet of Route Code 3718720050624662	$0	2	3	1	2
WC-214	Pintail Ln	Infrastructure	350 feet of Route Code 3718720050624136	$0	2	3	1	2
WC-215	Rabbit Cross Rd	Infrastructure	80 feet of Route Code 3718720050624527	$0	2	3	1	2
WC-216	Rankin St	Infrastructure	60 feet of Route Code 3718720050624973	$0	3	3	1	3
WC-217	River Rd	Infrastructure	550 feet between N River Rd and Deerfield Rd	$0	2	3	1	2

ASSET ID	ASSET NAME	PRIMARY ASSET TYPE	LOCATION	TOTAL ESTIMATED VALUE	AVERAGE SENSITIVITY SCORE	AVERAGE HAZARD EXPOSURE SCORE	AVERAGE ADAPTIVE CAPACITY SCORE	FINAL VULNERABILITY SCORE
WC-218	Roanoke Ave	Infrastructure	90 feet of Route Code 3718720050624789	$0	2	3	1	2
WC-219	Roanoke Ave	Infrastructure	150 feet of Route Code 3718720050624781	$0	3	3	1	3
WC-220	S River Rd	Infrastructure	300 feet of Route Code 37187200506241163	$0	2	3	1	2
WC-221	Spruill Bridge Rd	Infrastructure	550 feet of Route Code 3718720050624589	$0	2	3	1	2
WC-222	Spruill Bridge Rd	Infrastructure	1600 feet between Old Cherry Rd and Burris Rd	$0	2	3	1	2
WC-223	Spruill Bridge Rd	Infrastructure	1200 feet of Route Code 3718720050624592	$0	2	3	1	2
WC-224	Spruill Bridge Rd	Infrastructure	200 feet of Route Code 3718720050624579	$0	3	3	1	3
WC-225	Spruill Rd	Infrastructure	976 feet of Route Code 3718720050624443	$0	2	3	1	2
WC-226	Summerby Rd	Infrastructure	664 feet of Route Code 37187200506241230	$0	2	3	1	2
WC-227	Thirty FT Canal Rd	Infrastructure	300 feet of Route Code 3718720050624591	$0	2	3	1	2
WC-228	Tom Pepper Rd	Infrastructure	2200 feet of road	$0	2	3	1	2
WC-229	Gage Ln	Infrastructure	3000 feet starting at treatment plant	$0	2	3	1	2
WC-230	W Main St	Infrastructure	2500 feet between W Waters Rd and Welch Creek	$0	2	3	1	2
WC-231	W Spruill Town Rd	Infrastructure	120 feet of Route Code 3718720050624631 and 3718720050624629	$0	2	3	1	2
WC-232	W Water St	Infrastructure	360 feet of Route Code 3718720050624925	$0	2	3	1	2
WC-233	Weston Rd	Infrastructure	3420 feet of Route Code 3718720050624626	$0	2	3	1	2
WC-234	Woodley Station Rd	Infrastructure	450 feet of Route Code 3718720050624513	$0	3	3	1	3
WC-235	Northeast Regional School - Biotech/Agriscience	Education	3569 Research Station Rd, Roper, NC 27970	$2,113,320	2	1	1	1
WC-236	Pines Elementary	Education	3177 U.S. Hwy 64 E, Plymouth, NC 27962	$3,106,711	2	1	1	1
WC-237	Plymouth/Washington County High School	Education	800 E Main St, Plymouth, NC 27962	$6,843,300	2	3	1	2
WC-238	Washington County Elementary School	Education	609 Adams St	$1,815,000	2	2	1	1
WC-239	Conservation Reserve Enhancement Program Easement	Natural Assets	Spruill Town Rd W (rear)	$52,770	1	2	1	1
WC-240	Conservation Reserve Enhancement Program Easement	Natural Assets	Main Canal/Benkendorf Farm	$506,370	1	1	1	0
WC-241	Conservation Reserve Enhancement Program Easement	Natural Assets	Railroad Bed Rd	$133,750	1	1	1	0
WC-242	Conservation Reserve Enhancement Program Easement	Natural Assets	NC-32	$50,770	1	1	1	0
WC-243	Conservation Reserve Enhancement Program Easement	Natural Assets	1816 Hollis Rd	$25,450	1	1	1	0
WC-244	Conservation Reserve Enhancement Program Easement	Natural Assets	5276 NC-32 S	$135,530	1	1	1	0
WC-245	Conservation Reserve Enhancement Program Easement	Natural Assets	Hollis Rd	$61,930	1	1	1	0
WC-246	Conservation Reserve Enhancement Program Easement	Natural Assets	7274 NC-32 S	$281,320	1	1	1	0
WC-247	Conservation Reserve Enhancement Program Easement	Natural Assets	Weston Rd	$35,670	1	3	1	1
WC-248	East Dismal Swamp including NC Coastal Land Trust Easement	Natural Assets	East of NC-32 S and south of U.S. Hwy 64	$5,623,630	1	1	1	0
WC-249	Lantern Acres Game Land	Natural Assets	Tom Pepper Rd	$153,740	1	3	1	1

ASSET ID	ASSET NAME	PRIMARY ASSET TYPE	LOCATION	TOTAL ESTIMATED VALUE	AVERAGE SENSITIVITY SCORE	AVERAGE HAZARD EXPOSURE SCORE	AVERAGE ADAPTIVE CAPACITY SCORE	FINAL VULNERABILITY SCORE
WC-250	NCDOT Mitigation Site	Natural Assets	Between U.S. Hwy 64 and Onramp at Benson Rd	$0	2	1	1	1
WC-251	NC Swine Buyout Easement #11318	Natural Assets	Plots off Hwy 99 S	$3,740,320	1	1	1	0
WC-252	NC Swine Buyout Easement #11319	Natural Assets	Off A Canal Rd near Pocosin Lakes Wildlife Refuge	$470,500	1	1	1	0
WC-253	NC Swine Buyout Easement #11329	Natural Assets	Cooper Rd near Davenport Fork Rd	$278,740	2	3	1	2
WC-254	USFWS Easement #10637 and # 10638	Natural Assets	South of Pea Ridge Rd near intersection with Breezy Banks Rd	$150,100	1	2	1	1
WC-255	USFWS Easement #10647	Natural Assets	Near Pettigrew State Park	$182,490	1	3	1	1
WC-256	USFWS Easement #10648	Natural Assets	Old Cherry Rd	$93,760	1	2	1	1
WC-257	Wetlands Reserve Program (WRP) Easement #115470	Natural Assets	Pungo Lake Rd	$42,660	1	1	1	0
WC-258	WRP Easement #11562	Natural Assets	Shore Dr/Etheridge Rd	$1,185,710	1	1	1	0
WC-259	WRP Easement #11563 and #11566	Natural Assets	Newland Rd	$77,260	1	1	1	0
WC-260	WRP Easement #11564	Natural Assets	Railroad Bed Rd (off road)	$3,377,340	1	1	1	0
WC-261	WRP Easement #11565	Natural Assets	1694 Railroad Bed Rd	$618,910	1	1	1	0
WC-262	WRP Easement #11567 and Conservation Reserve Enhancement Program Easement	Natural Assets	Northline Rd	$129,790	1	1	1	0
WC-263	WRP Easement #11568	Natural Assets	Folly Rd	$217,280	1	1	1	0
WC-264	WRP Easement #11569	Natural Assets	Jones White Rd	$200,400	1	2	1	1
WC-265	Culvert #930002	Infrastructure	88 U.S. Hwy 64 E, Plymouth, NC 27962	$0	3	2	1	2
WC-266	Culvert #930004	Infrastructure	9443 NC-32 S, Plymouth, NC 27962	$0	2	1	1	1
WC-267	Culvert #930006	Infrastructure	301 Blount St, Roper, NC 27970	$0	3	2	1	2
WC-268	Culvert #930007	Infrastructure	989 Old U.S. Hwy 64, Roper, NC 27970	$0	3	1	1	1
WC-269	Culvert #930016	Infrastructure	457 Phelps Rd, Roper, NC 27970	$0	2	2	1	1
WC-270	Culvert #930019	Infrastructure	15347 NC-94 N, Roper, NC 27970	$0	2	1	1	1
WC-271	Culvert #930107	Infrastructure	U.S. Hwy 64, Roper, NC 27970	$0	2	1	1	1
WC-272	Culvert #930118	Infrastructure	4916 NC-32 N, Plymouth, NC 27962	$0	2	1	1	1
WC-273	Pipe #930001	Infrastructure	NC-99 S Pike Rd	$0	2	1	1	1
WC-274	Pipe #930014	Infrastructure	13110 NC-32 N, Roper, NC 27970	$0	2	3	1	2
WC-275	Pipe #930027	Infrastructure	224 Old Cherry Rd, Creswell, NC 27928	$0	2	2	1	1
WC-276	Pipe #930046	Infrastructure	1904 Mountain Canal Rd, Creswell, NC 27928	$0	2	2	1	1
WC-277	Pipe #930097	Infrastructure	Shore Drive near Pettigrew State Park	$0	2	1	1	1
WC-278	Pipe #930131	Infrastructure	White Oak Rd, Plymouth, NC	$0	2	1	1	1
WC-279	Resource Building Well	Infrastructure	1375 Ken Trowbridge Rd Plymouth, NC 27962	$1,173,140	3	3	1	3
WC-280	Water Tower	Infrastructure	2045 Morrattock Rd	$259,100	3	1	1	1
WC-281	Water Tower	Infrastructure	971 Breezy Banks Rd	$75,100	3	1	1	1
WC-282	Water Tower	Infrastructure	West of Industrial Park Rd and south of the railroad tracks	$115,100	3	1	1	1
WC-283	Water Tower	Infrastructure	Corner of Longdale St and Newby St	$82,200	3	1	1	1
WC-284	Water Tower	Infrastructure	101 Mount Tabor Rd	$99,200	3	2	1	2
WC-285	Water Tower	Infrastructure	394 West Mill Pond Rd	$227,800	3	1	1	1
WC-286	Water Tower and Well #1 (Permit #NC0494010)	Infrastructure	807 Washington St, Plymouth, NC 27962	$51,400	3	1	1	1

ASSET ID	ASSET NAME	PRIMARY ASSET TYPE	LOCATION	TOTAL ESTIMATED VALUE	AVERAGE SENSITIVITY SCORE	AVERAGE HAZARD EXPOSURE SCORE	AVERAGE ADAPTIVE CAPACITY SCORE	FINAL VULNERABILITY SCORE
WC-287	Water Treatment Plant	Infrastructure	Conaby Drive, Plymouth, NC 2762	$111,300	3	3	1	3
WC-288	Well #1 (Permit #NC0494025), Water Cistern, Water Tower and Communication Tower #1063177	Infrastructure	310 W Mill Pond Rd, Roper, NC 27970	$1,131,800	3	2	1	2
WC-289	Well #1 (Permit #NC0494405)/(Permit #NC0494426)	Infrastructure	2572 Lake Shore Rd, Creswell, NC 27928	$274,000	2	1	1	1
WC-290	Well #2 (Permit #NC0494025)	Infrastructure	733 W Mill Pond Rd, Roper, NC 27970	$27,700	3	1	1	1
WC-291	Well #3 (Permit #NC0494010)	Infrastructure	685 NC-32 S, Plymouth, NC 27962	$46,900	3	2	1	2
WC-292	Well #3 (Permit #NC0494025)	Infrastructure	749 Slough Rd, Roper, NC 27970	$26,200	3	1	1	1
WC-293	Well #4 (Permit #NC0494010)	Infrastructure	103 Ausbon Dr, Plymouth, NC 27962	$19,400	3	1	1	1
WC-294	Well #6 (Permit #NC0494010)	Infrastructure	521 Plymouth Airport Rd, Plymouth, NC 27962	$0	2	1	1	1
WC-295	Well #7 (Permit #NC0494010)	Infrastructure	897 Plymouth Landing, Plymouth, NC 27962	$0	2	1	1	1
WC-296	Well #5 (Permit #NC0494010)	Infrastructure	93 Sitterson Loop, Plymouth, NC 27962	$7,500	3	1	1	1
WC-297	Bull Neck Swamp	Natural Assets	Laurel Point and Deep Creek Landing	$2,854,070	1	3	1	1
WC-298	Department of Social Services	Government Service Offices	209 E Main St, Plymouth NC 27962	$489,500	3	1	1	1
CW-1	St. John Missionary Baptist Church Cemetery (African American)	Community and Economic Services	601 W Main St, Creswell, NC 27928	$35,200	2	2	1	1
CW-2	St. David's Episcopal Church Cemetery	Community and Economic Services	344 Saint David Rd, Creswell, NC 27928	$104,800	2	2	1	1
CW-3	Christ Episcopal Church	Community and Economic Services	100 S 6th St, Creswell, NC 27928	$125,800	2	2	1	1
CW-4	Creswell Baptist Church	Community and Economic Services	106 7th St, Creswell, NC 27928	$282,600	2	2	1	1
CW-5	Creswell United Methodist Church	Community and Economic Services	209 S 6th St, Creswell, NC 27928	$136,400	2	2	1	1
CW-6	Faith Christian Fellowship	Community and Economic Services	360 1st St, Creswell, NC	$182,500	2	3	1	2
CW-7	St. David's Episcopal Church	Community and Economic Services	344 Saint David Rd, Creswell, NC 27928	$111,600	2	2	1	1
CW-8	St. John Missionary Baptist Church	Community and Economic Services	601 W Main St, Creswell, NC 27928	$333,300	2	2	1	1
CW-9	St. Mark A.M.E. Zion	Community and Economic Services	201 N 6th St, Creswell, NC 27928	$91,600	2	2	1	1
CW-10	Town of Creswell	Government Service Offices	104 S 6th St. Creswell NC 27928	$64,300	3	2	1	2
CW-11	Ruritan Club	Community and Economic Services	105 N 6th St, Creswell, NC 27928-943	$41,600	3	2	1	2
CW-12	Creswell Historic District	Community and Economic Services	Area south of W U.S. Hwy 64, north of W Main St between 8th St and 6th St	$1,735,800	2	2	1	1
CW-13	Post Office	Government Service Offices	201 W Main St, Creswell, NC 27928	$94,000	3	2	1	2
CW-14	Creswell Volunteer Fire Department Station #1	Public Safety or Emergency Services	109 W Main St, Creswell, NC 27928	$73,900	3	2	1	2
CW-15	Dollar General	Community and Economic Services	117 U.S. Hwy 64 E, Creswell, NC 27928	$0	3	2	1	2
CW-16	Mark's Supermarket	Community and Economic Services	317 U.S. Hwy 64 W, Creswell, NC 27928	$162,100	3	2	0	3
CW-17	Washington County Open Space	Community and Economic Services	Cherry Rd	$7,700	2	3	1	2
CW-18	Pettigrew (Lake Phelps) State Park Registered Heritage Area including the Somerset Place Historic Site	Community and Economic Services	2252 Lake Shore Rd, Creswell, NC 27928,	$21,506,870	2	3	1	2
CW-19	Pettigrew State Park (Scuppernong River Section) Dedicated Nature Preserve	Community and Economic Services	Spruill Bridge Rd	$729,170	2	3	1	2
CW-20	Somerset Court	Community and Economic Services	101 Somerset Ct, Creswell, NC 27928	$944,900	3	2	1	2
CW-21	Barnyard Betsy Cheesesteak & Hoagies	Community and Economic Services	106 E Main St, Creswell, NC 27928	$77,700	2	2	1	1
CW-22	Big Blue 252 Coffee Bar	Community and Economic Services	109 E Main St, Creswell, NC 27928	$36,600	2	2	1	1

ASSET ID	ASSET NAME	PRIMARY ASSET TYPE	LOCATION	TOTAL ESTIMATED VALUE	AVERAGE SENSITIVITY SCORE	AVERAGE HAZARD EXPOSURE SCORE	AVERAGE ADAPTIVE CAPACITY SCORE	FINAL VULNERABILITY SCORE
CW-23	Cahoon's Pizza and Wings	Community and Economic Services	316 U.S. Hwy 64 W, Creswell, NC 27928	$89,000	2	2	0	2
CW-24	Mood Swings Restaurant	Community and Economic Services	410 U.S. Hwy 64 W, Creswell, NC 27928	$74,300	2	2	1	1
CW-25	Cherry Rd	Infrastructure	1500 feet of West of 5th St	$0	3	3	1	3
CW-26	E Main St	Infrastructure	1700 feet of between 5th St and 1st St	$0	3	3	1	3
CW-27	E Palmetto St	Infrastructure	1600 feet between Leigh St and 1st St	$0	3	3	1	3
CW-28	1st St	Infrastructure	1500 feet starting at the intersection to Spruill Bridge Rd	$0	3	3	1	3
CW-29	N 5th St	Infrastructure	131 feet of Route Code 3718720050624551	$0	3	3	1	3
CW-30	N 4th St	Infrastructure	391 feet of Route Code 3718720050624556	$0	3	3	1	3
CW-31	Pudding Rd	Infrastructure	445 feet of Route Code 3718720050624577	$0	3	3	1	3
CW-32	S 4th St	Infrastructure	408 feet of Route Code 3718720050624561	$0	3	3	1	3
CW-33	S 6th St	Infrastructure	150 feet of Route Code 3718720050624558	$0	3	3	1	3
CW-34	2nd St	Infrastructure	439 feet of Route Code 3718720050624569	$0	3	3	1	3
CW-35	Spruill Bridge Rd	Infrastructure	1600 feet of Route Code 3718720050624578 and 3718720050624575	$0	3	3	1	3
CW-36	3rd St	Infrastructure	402 feet of Route Code 3718720050624563	$0	3	3	1	3
CW-37	Creswell High and Elementary School	Education	115 Middle St, Creswell, NC 27928	$5,022,000	3	3	1	3
CW-38	Pocosin Innovative Charter School	Education	500 1st St, Creswell NC 27928	$818,100	3	3	1	3
CW-39	Floodgate	Infrastructure	Corner of 1st Stand Palmetto St	$20,580	3	3	0	3
CW-40	Main Street Storm Drain (3rd St to 2nd St)	Infrastructure	E Main St between 2nd St and 3rd St)	$0	3	3	0	3
CW-41	Pump Station on Cherry Rd.	Infrastructure	South side of Cherry Rd between 5th St and Pudding Rd	$197,630	3	3	1	3
CW-42	Water Tower & Well #1 (Permit #NC0494020)	Infrastructure	110 Palmetto St, Creswell, NC 27928	$96,800	3	2	1	2
CW-43	Well #2 (Permit #NC0494020)	Infrastructure	213 N 6th St, Creswell, NC 27928	$14,300	3	2	1	2
CW-44	Scuppernong River Swamp Forest	Natural Assets	1590 Cherry Rd, Creswell, NC 27928	$8,188,590	2	3	2	1

APPENDIX D

DATA USED IN VULNERABILITY AND RISK ASSESSMENT

Table D-1. Data Used in Assessment of Asset Vulnerability and Risk

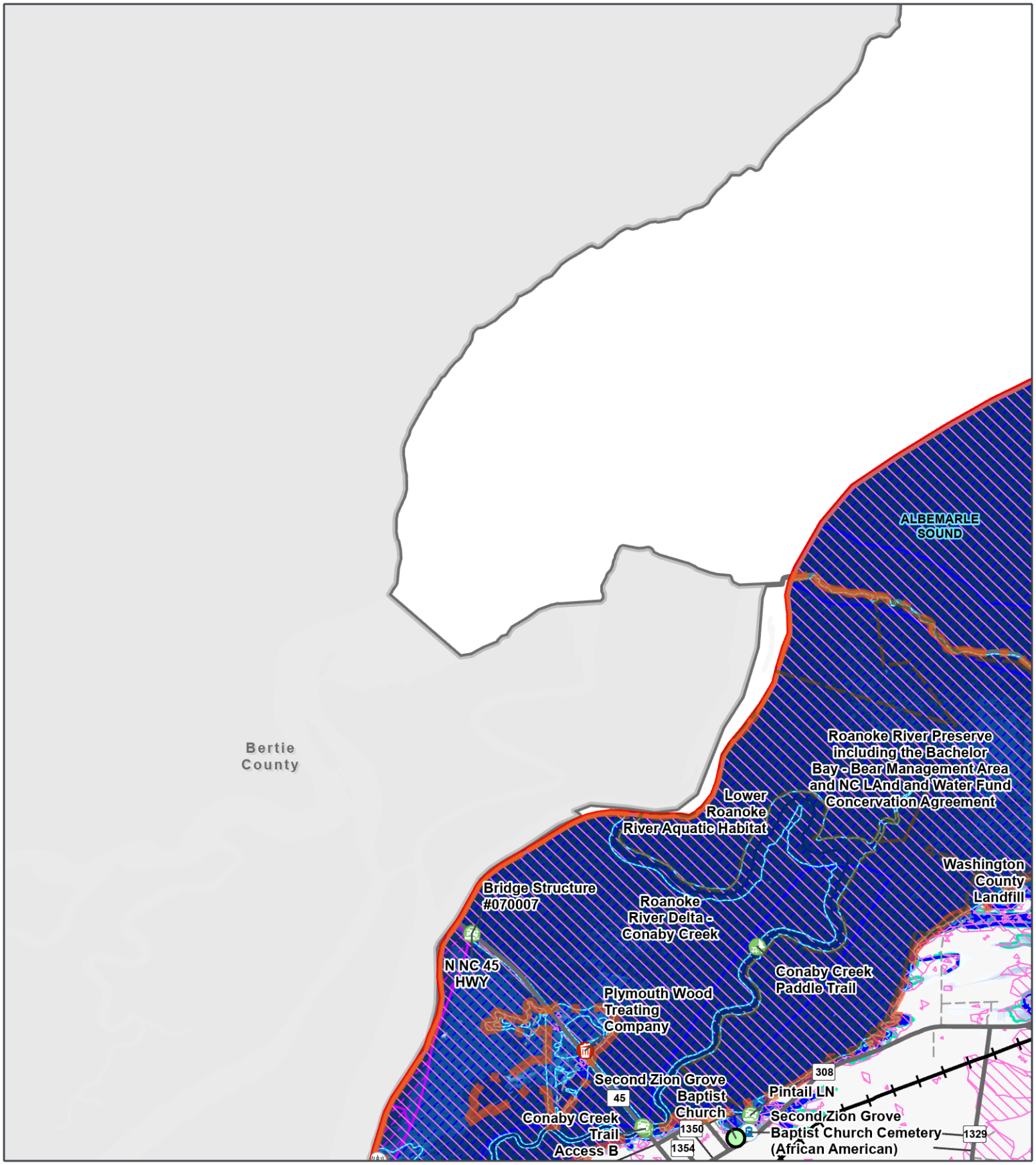
FIELD/VARIABLE	DATA USED TO DEFINE FIELD/ VARIABLE	DATA SUMMARY	USE IN RISK AND VULNERABILITY ASSESSMENT	ADDITIONAL INFORMATION ON SOURCE DATA
Flood Plain Exposure	NC Preliminary and Effective Flood Zones (North Carolina Floodplain Mapping Program 2024a)	Areas representing the area within the flood mapping boundaries defined by the engineering models for the 100-year (1% annual chance), 500-year (0.2% annual chance), and floodway (river channel and adjacent land areas for flood discharge).	Floodplain type was categorized and used to assess current climate precipitation induced flood risk under varying conditions across the landscape.	Data were produced by NC Floodplain Mapping Program in 2020 at 6-m spatial resolution and updated in 2021
Flood Plain Exposure	High Resolution Elevation (DEM 20') (North Carolina Floodplain Mapping Program 2024b)	Elevation data was created using LiDAR collected by NC Floodplain Mapping Program	Elevation data was processed to find low-lying areas outside the current 500-year flood plains that have the potential for precipitation induced flood risk under future climate conditions across the landscape.	Data were produced by NCDOT in conjunction with the NC Floodplain Mapping Program in 2020 at 6-m spatial resolution, updated 2022
Reported Event Inundation Factor	Hurricane Matthew Inundated Areas (NC OneMap 2018a)	Areas that experienced flooding during Hurricane Matthew, based on aerial photographs taken October 8–16, 2016.	Inundated areas were used assess extreme precipitation event flood risk across the landscape.	Data were produced by the Center for Biodiversity Outcomes, Arizona State University in 2020 at 5-m spatial resolution
Reported Event Inundation Factor	Hurricane Florence Inundated Areas (NC OneMap 2018b)	Areas that experienced flooding during Hurricane Florence, based on aerial photographs taken September 18–22, 2018.	Inundated areas were used assess extreme precipitation event flood risk across the landscape	Data were produced by the Center for Biodiversity Outcomes, Arizona State University in 2020 at 5-m spatial resolution
Reported Event Inundation Factor	Community Flood Reporting Point	Areas outside of the 100- and 500-year floodplains that were identified by the public as having frequent or severe flooding during large precipitation events.	Point locations were converted to inundated areas based on the underlying elevation and topography. These inundated areas were used to assess extreme precipitation flood risk across the landscape.	Data were collected via analog maps at community stakeholder engagement meetings
Sea Level Rise Exposure	Sea Level Rise (SLR) Inundation Extent 1-foot to 10-foot Scenarios (NOAA Office for Coastal Management 2017)	Data represent where water would be present along coast lines and intertidal waterways (under normal, non-flood conditions) at increasing sea levels. This is based on a "modified bathtub model," which identified the areas of land that would be covered with water if you increased the water height by a specific amount. It does not address when or how quickly sea level might increase.	Simulated scenario data were combined with SLR (Low) Inundation data and categorized into severity values 1 through 5 used to assess sea level rise risk under varying conditions across the landscape.	Data were produced by the NOAA Office for Coastal Management in 2017 at 10-m spatial resolution, updated 2023

FIELD/VARIABLE	DATA USED TO DEFINE FIELD/ VARIABLE	DATA SUMMARY	USE IN RISK AND VULNERABILITY ASSESSMENT	ADDITIONAL INFORMATION ON SOURCE DATA
Sea Level Rise Exposure	Sea Level Rise (Low) Inundation Extent 1-foot to 10-foot Scenarios (NOAA Office for Coastal Management 2017)	Data represent where water would be present in inland areas (under normal, non-flood conditions) at increasing sea levels. This is based on a "modified bathtub model," which identified the areas of land that would be covered with water if you increased the water height by a specific amount. It does not address when or how quickly sea level might increase.	Simulated scenario data were combined with SLR Inundation data and categorized into severity values 1 through 5 used to assess sea level rise risk under varying conditions across the landscape.	Data were produced by the NOAA Office for Coastal Management in 2017 at 10-m spatial resolution, updated 2023
Sea Level Rise Exposure	Duck Pier Local Sea Level Rise Scenario Statistics (NOAA Office for Coastal Management 2023)	Data list northern NC regional projected sea level rise in feet sea for five IPCC emissions scenarios.	Data were used to determine the likelihood of sea level rise inundation per emission scenario.	Data were produced by the NOAA NWS, in coordination with the IPCC in 2023
Storm Surge Exposure	Sea, Lake, and Overland Surges from Hurricanes (SLOSH) Category 1-5 High Tide Simulations (NOAA National Hurricane Center 2024)	Data depict simulated storm surges from tropical cyclones, developed using tens of thousands of simulations of climatology-based hypothetical tropical cyclones.	Modeled data from Category 1 through 5 storms were combined and inundation depth was categorized into severity values 1 through 5 used to assess storm surge risk under varying conditions across the landscape.	Data were produced by the NOAA NWS National Hurricane Center in 2021 at 30-m spatial resolution
Storm Surge Exposure	Hurricane Landfall Statistics (NOAA NWS 2024)	Data list all recorded hurricanes by category that have made landfall in North Carolina since 1851.	Data were used to determine likelihood of storm surge exposure event by hurricane category.	Data were produced by the NOAA NWS
Additional Hazard Factor	USA Wildfire Hazard Potential-Block Level (Fire Lab 2023)	Data integrate fire simulation and field collected data to depict the relative potential for wildfire that would be difficult for fire crews to contain.	Data were used to represent the likelihood of an area experiencing high-intensity fire behavior.	Data were produced by the U.S. Forest Service, Fire Modeling Institute in 2023 at the Block Level
Additional Hazard Factor	National Risk Index (FEMA 2018)	Data represent nationwide aggregated and normalized natural hazard data.	Data were used to represent a subset of additional hazards that could negatively impact assets in the community.	Data were produced by FEMA in 2023 at the Tract Scale
Social Vulnerability (geographic)	Social Vulnerability Index (SVI) 2018 (CDC ATSDR 2020)	Data represent a combination of socioeconomic factors that are used to identify and map the communities that will most likely need support before, during, and after a hazardous event.	Total SVI rankings were categorized using the flag approach and used to assess the most current socially vulnerable populations in the community.	Data were produced by the CDC ATSDR Geospatial Research, Analysis & Services Program (GRASP) in 2020 at the tract level
Social Vulnerability (geographic)	Social Vulnerability Index (SoVI) 2000 (HVRI 2011)	Data represent a combination of socioeconomic factors that are used to identify and map the communities that will most likely need support before, during, and after a hazardous event.	Total SoVI rankings were categorized using the flag approach and used to assess the socially vulnerable populations in the community at a localized scale.	Data were produced by HVRI, University of South Carolina in 2011 at the block group level.

FIELD/VARIABLE	DATA USED TO DEFINE FIELD/ VARIABLE	DATA SUMMARY	USE IN RISK AND VULNERABILITY ASSESSMENT	ADDITIONAL INFORMATION ON SOURCE DATA
Estimated Cost	Assessor Parcel Boundaries (NC OneMap 2016)	Data represent county-level parcels with standardized attributes such as ownership, addresses and assessed monetary values	Monetary value fields such as parcel value, land value, and improvement value were used to calculate total estimated cost values for assets considered at risk.	Data were produced by the NC Geographic Information Coordinating Council in coordination with local government agencies and last updated 2023

APPENDIX E

DETAIL MAPS OF ASSETS AND HAZARDS



NORTH CAROLINA RESILIENT COASTAL COMMUNITIES PROGRAM

Assets and Hazards Map

- Rail Road
- Other Road
- Local Road
- State Highway
- County Boundary
- County Boundary
- Community Boundary
- Waterway
- Waterbody

Asset Location

- Cemetery
- Church
- Hazardous Waste
- Parks and Recreation
- Roadways

Asset Area

- Landfill
- Natural Area
- Parks and Recreation
- Historic Flooding - Hurricanes Matthew and Florence

FEMA Flood Zone

- Floodway
- 100-Year Floodplain
- 500-Year Floodplain

Sea Level Rise Potential

- Highest Likelihood
- Lowest Likelihood

Washington County, NC
GCS North American 1983
35.9429°N 76.7161°W

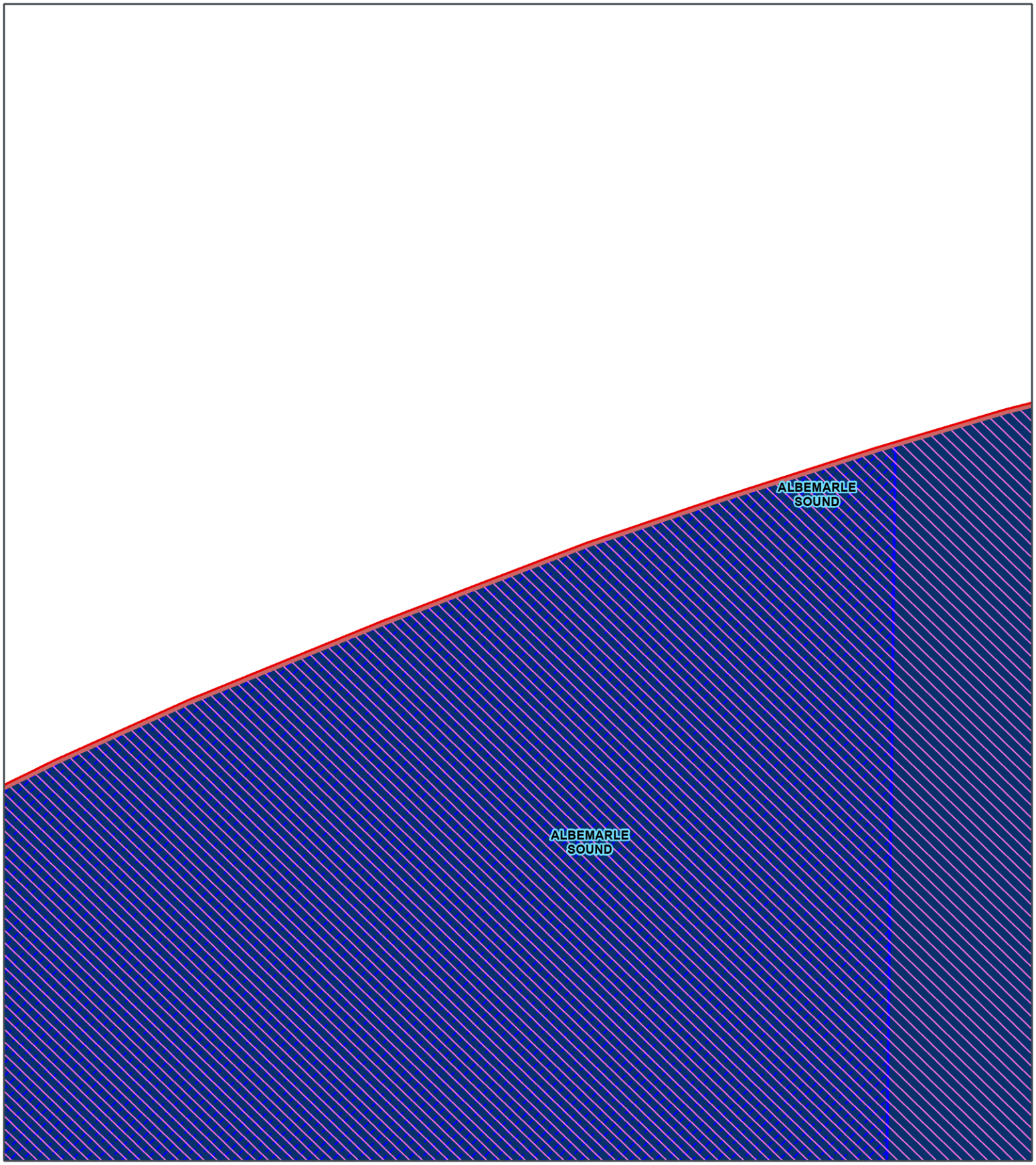
0 1,000 2,000 Feet
0 500 1,000 Meters

N

1:48,000

Base Map: Esri ArcGIS Online, accessed May 2024
Updated: 5/15/2024
Project No. 77542
Layout: ntyAssetsAndHazardsMap_Attachment
Aprx: 77542_ncRccp2023_BjWorking

SWCA ENVIRONMENTAL CONSULTANTS



NORTH CAROLINA RESILIENT COASTAL COMMUNITIES PROGRAM

Assets and Hazards Map

Community Boundary

Historic Flooding - Hurricanes Matthew and Florence

FEMA Flood Zone

100-Year Floodplain

Sea Level Rise Potential

Highest Likelihood

Lowest Likelihood

Washington County, NC
GCS North American 1983
35.9675°N 76.6503°W

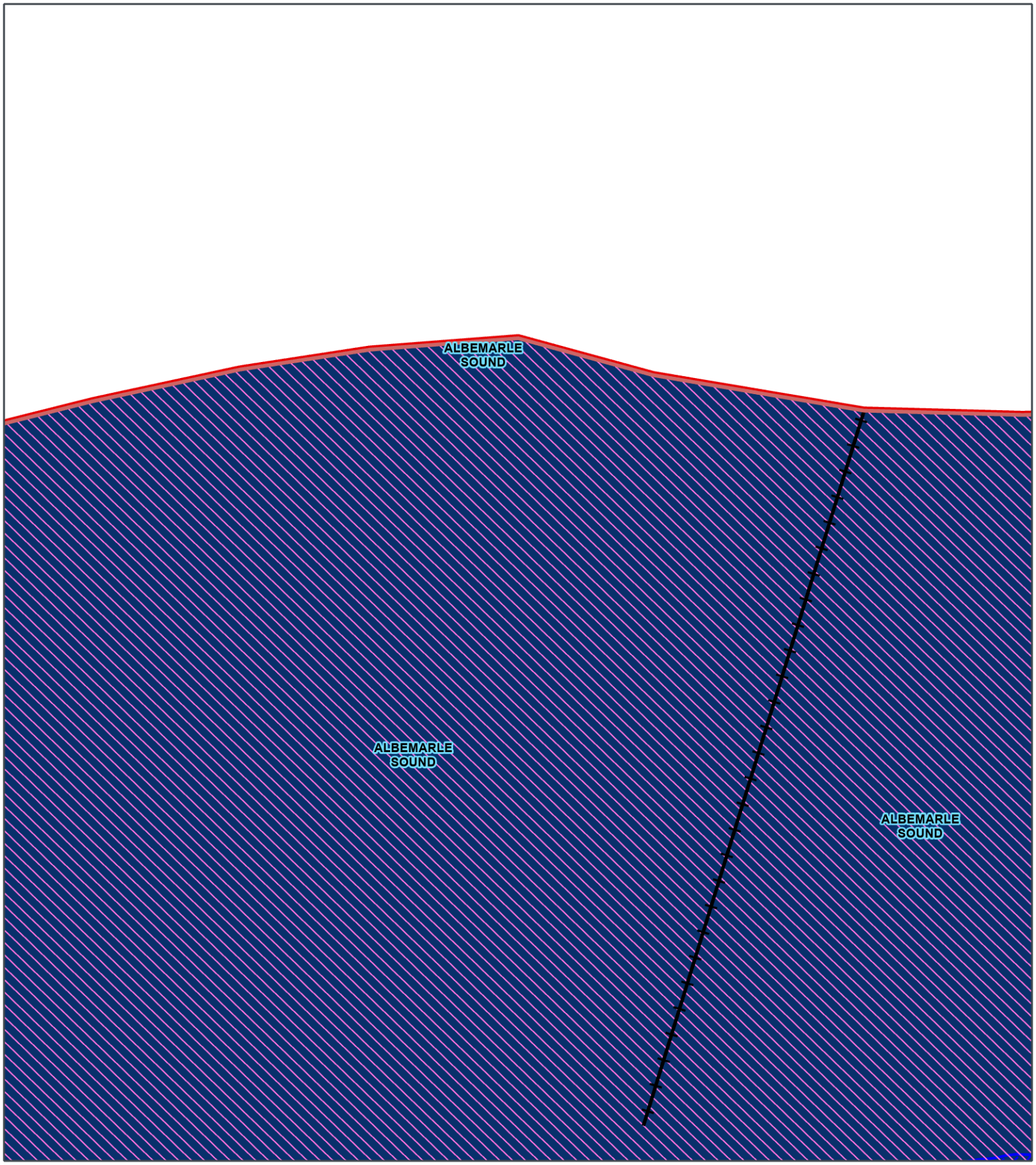
0 1,000 2,000 Feet
0 250 500 Meters

N

1:24,000

Base Map: Esri ArcGIS Online, accessed May 2024
Updated: 5/15/2024
Project No. 77542
Layout: ntyAssetsAndHazardsMap_Attachment
Aprx: 77542_ncRccp2023_BjWorking

SWCA ENVIRONMENTAL CONSULTANTS



NORTH CAROLINA RESILIENT COASTAL COMMUNITIES PROGRAM

Assets and Hazards Map

Rail Road

Community Boundary

Historic Flooding - Hurricanes Matthew and Florence

FEMA Flood Zone

100-Year Floodplain

Sea Level Rise Potential

Highest Likelihood

Lowest Likelihood

Washington County, NC
GCS North American 1983
35.9675°N 76.6064°W

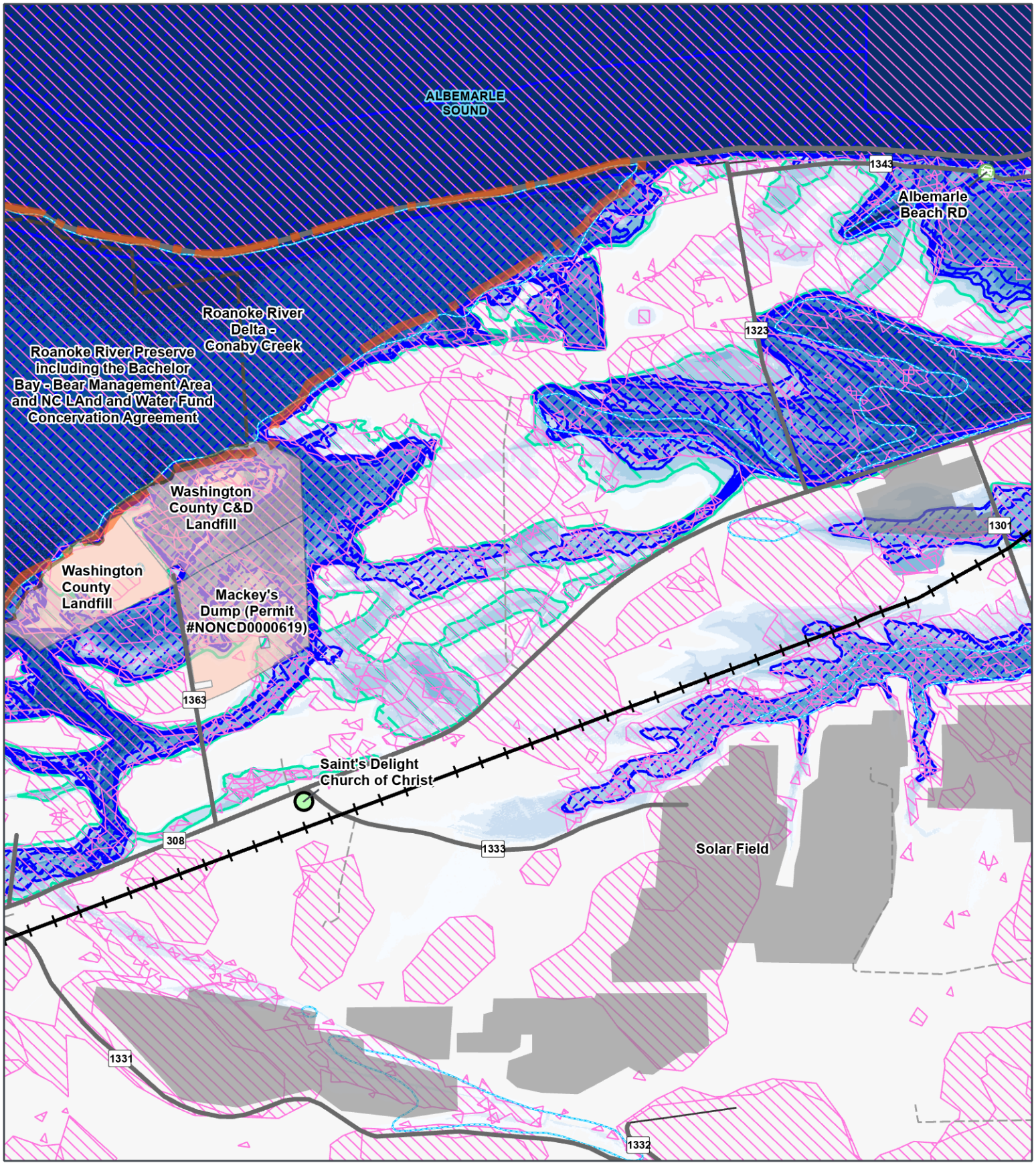
0 1,000 2,000 Feet
0 250 500 Meters

N

1:24,000

Base Map: Esri ArcGIS Online, accessed May 2024
Updated: 5/15/2024
Project No. 77542
Layout: ntyAssetsAndHazardsMap_Attachment
Aprx: 77542_ncRccp2023_BjWorking

SWCA ENVIRONMENTAL CONSULTANTS



NORTH CAROLINA RESILIENT COASTAL COMMUNITIES PROGRAM

Assets and Hazards Map

- Rail Road
- Other Road
- Local Road
- State Highway
- County Boundary
- Community Boundary
- Waterbody

Asset Location
- Church
- Roadways

Asset Area
- Landfill
- Natural Area
- Parks and Recreation
- Utility

- Historic Flooding - Hurricanes Matthew and Florence

FEMA Flood Zone
- 100-Year Floodplain
- 500-Year Floodplain

Sea Level Rise Potential
- Highest Likelihood
- Lowest Likelihood

Washington County, NC
GCS North American 1983
35.9182°N 76.6503°W

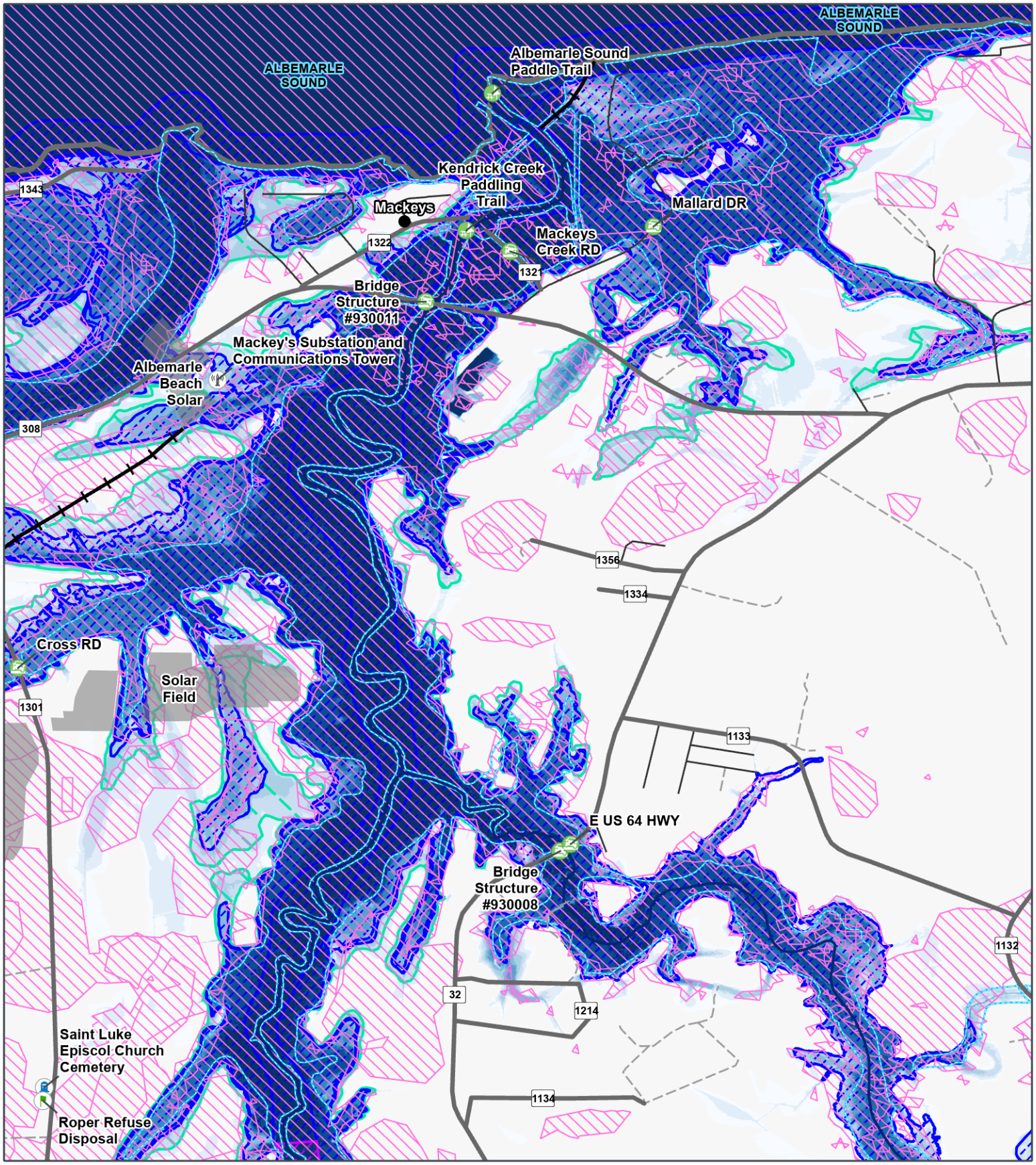
0 1,000 2,000 Feet
0 250 500 Meters

N

1:24,000

Base Map: Esri ArcGIS Online, accessed May 2024
Updated: 5/15/2024
Project No. 77542
Layout: ntyAssetsAndHazardsMap_Attachment
Aprx: 77542_ncRccp2023_BjWorking

SWCA ENVIRONMENTAL CONSULTANTS



NORTH CAROLINA RESILIENT COASTAL COMMUNITIES PROGRAM

Assets and Hazards Map

- City/Town
- Rail Road
- Other Road
- Local Road
- State Highway
- County Boundary
- Community Boundary
- Waterway
- Waterbody

Asset Location

- Cemetery
- Landfill
- Parks and Recreation
- Roadways
- Utility

Asset Area

- Utility

FEMA Flood Zone

- Floodway
- Historic Flooding - Hurricanes Matthew and Florence
- 100-Year Floodplain
- 500-Year Floodplain

Sea Level Rise Potential

- Highest Likelihood
- Lowest Likelihood

Washington County, NC
GCS North American 1983
35.9182°N 76.6064°W

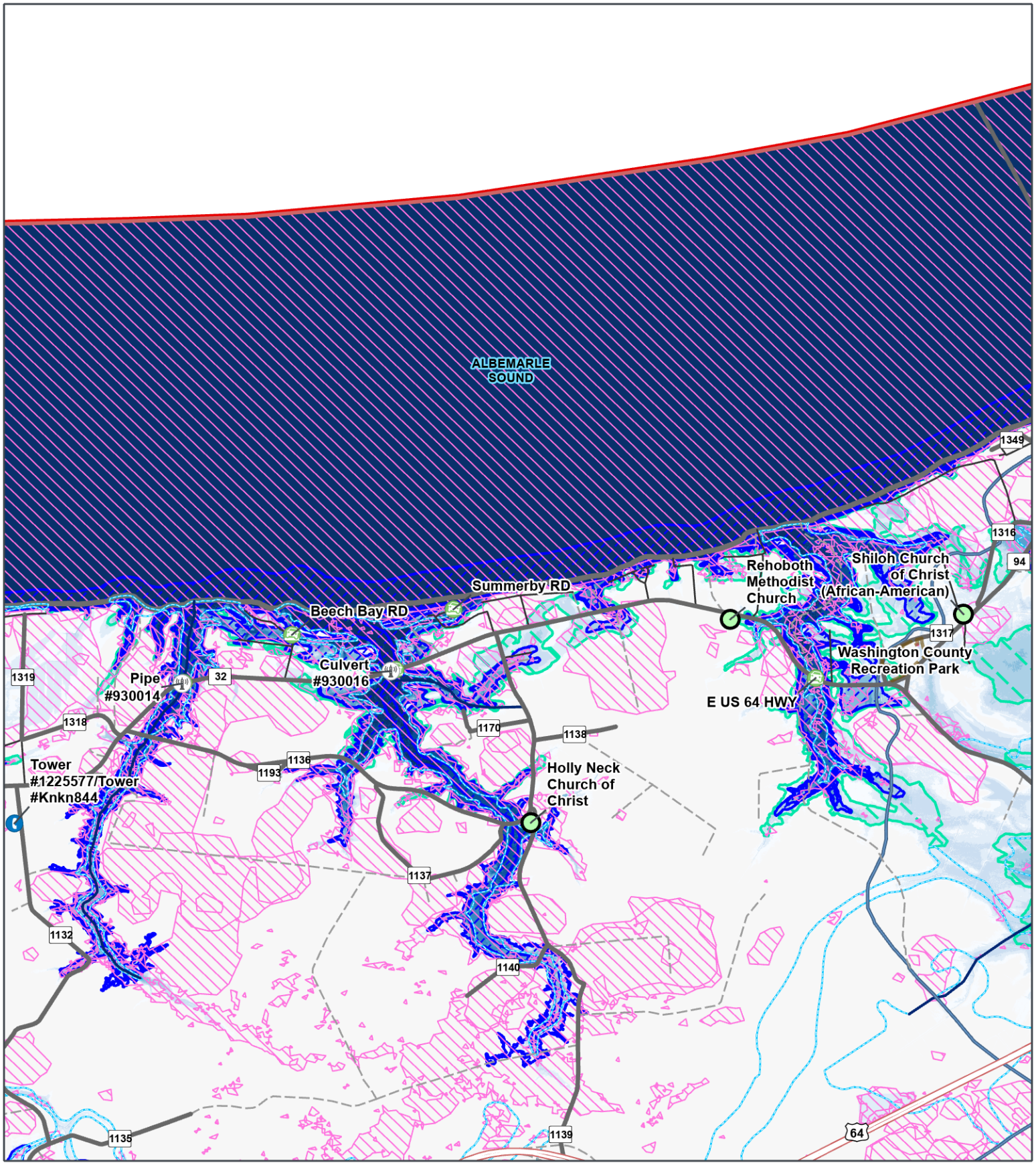
0 1,000 2,000 Feet
0 250 500 Meters

N

1:24,000

Base Map: Esri ArcGIS Online, accessed May 2024
Updated: 5/15/2024
Project No. 77542
Layout: ntyAssetsAndHazardsMap_Attachment
Aprx: 77542_ncRccp2023_BjWorking

SWCA ENVIRONMENTAL CONSULTANTS



NORTH CAROLINA RESILIENT COASTAL COMMUNITIES PROGRAM

Assets and Hazards Map

- Other Road
- Local Road
- State Highway
- U.S. Highway
- County Boundary
- Community Boundary
- Scuppernong River Watershed
- Waterway
- Waterbody

Asset Location

- Church
- Communications
- Roadways
- Utility

Asset Area

- Parks and Recreation
- Historic Flooding - Hurricanes Matthew and Florence

FEMA Flood Zone

- 100-Year Floodplain
- 500-Year Floodplain

Sea Level Rise Potential

- Highest Likelihood
- Lowest Likelihood

Washington County, NC
GCS North American 1983
35.9429°N 76.5406°W

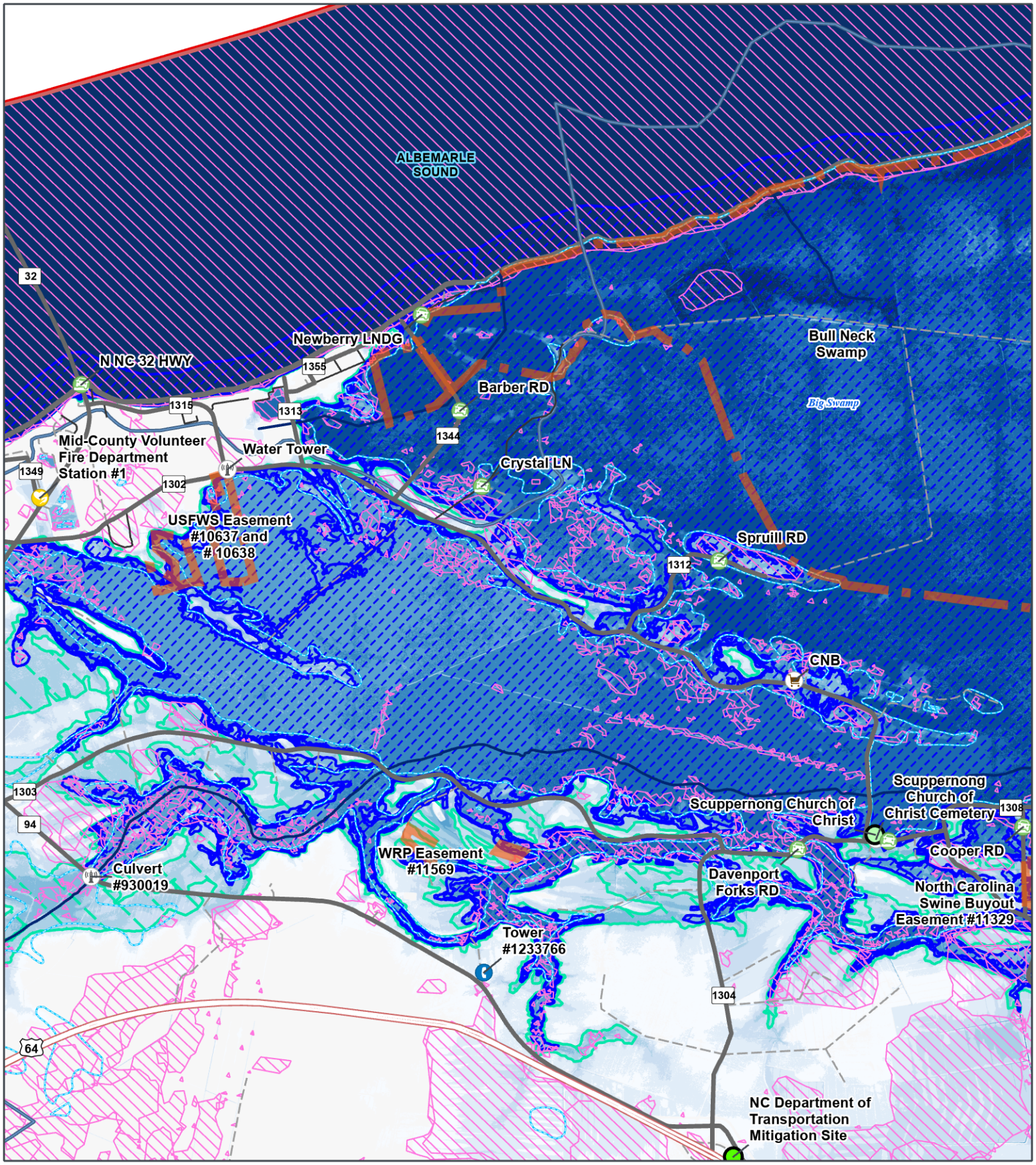
0 1,000 2,000 Feet
0 500 1,000 Meters

N

1:48,000

Base Map: Esri ArcGIS Online, accessed May 2024
Updated: 5/15/2024
Project No. 77542
Layout: ntyAssetsAndHazardsMap_Attachment
Aprx: 77542_ncRccp2023_BjWorking

SWCA ENVIRONMENTAL CONSULTANTS



NORTH CAROLINA RESILIENT COASTAL COMMUNITIES PROGRAM

Assets and Hazards Map

- Other Road
- Local Road
- State Highway
- U.S. Highway
- County Boundary
- Community Boundary
- Scuppernong River Watershed
- Waterway
- Waterbody

Asset Location

- Cemetery
- Church
- Communications
- Emergency Services
- Food and Supplies
- Natual Area
- Roadways
- Utility

Asset Area

- Natural Area
- Historic Flooding - Hurricanes Matthew and Florence

FEMA Flood Zone

- 100-Year Floodplain
- 500-Year Floodplain

Sea Level Rise Potential

- Highest Likelihood
- Lowest Likelihood

Washington County, NC
GCS North American 1983
35.9429°N 76.4529°W

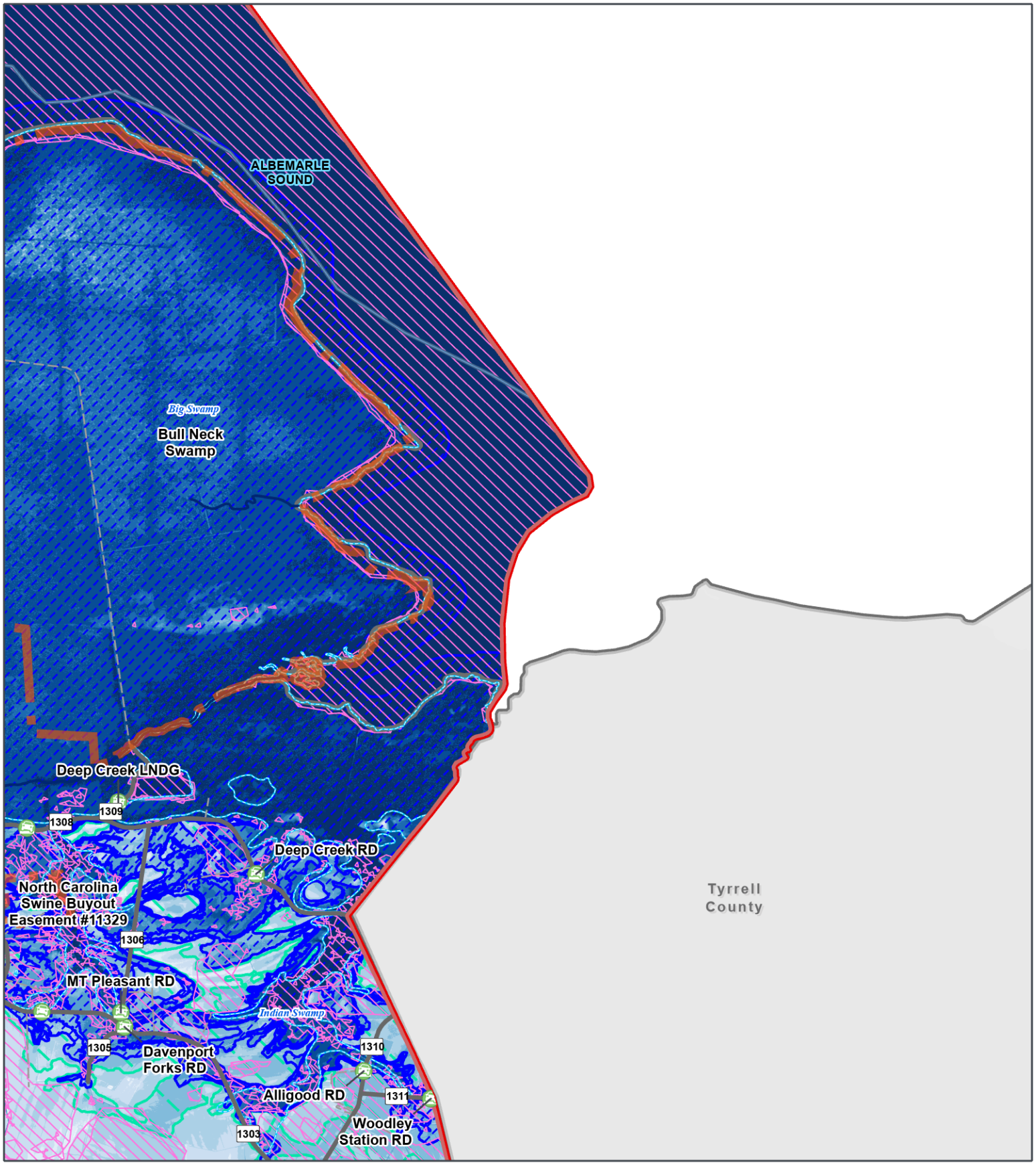
0 1,000 2,000 Feet
0 500 1,000 Meters

N

1:48,000

Base Map: Esri ArcGIS Online, accessed May 2024
Updated: 5/15/2024
Project No. 77542
Layout: ntyAssetsAndHazardsMap_Attachment
Aprx: 77542_ncRccp2023_BjWorking

SWCA ENVIRONMENTAL CONSULTANTS



NORTH CAROLINA RESILIENT COASTAL COMMUNITIES PROGRAM

Assets and Hazards Map

- Other Road
- Local Road
- State Highway
- County Boundary
- County Boundary
- Community Boundary
- Scuppernong River Watershed
- Waterway
- Waterbody

Asset Location
- Roadways

Asset Area
- Natural Area

- Historic Flooding - Hurricanes Matthew and Florence

FEMA Flood Zone
- 100-Year Floodplain
- 500-Year Floodplain

Sea Level Rise Potential
- Highest Likelihood
- Lowest Likelihood

Washington County, NC
GCS North American 1983
35.9429°N 76.3652°W

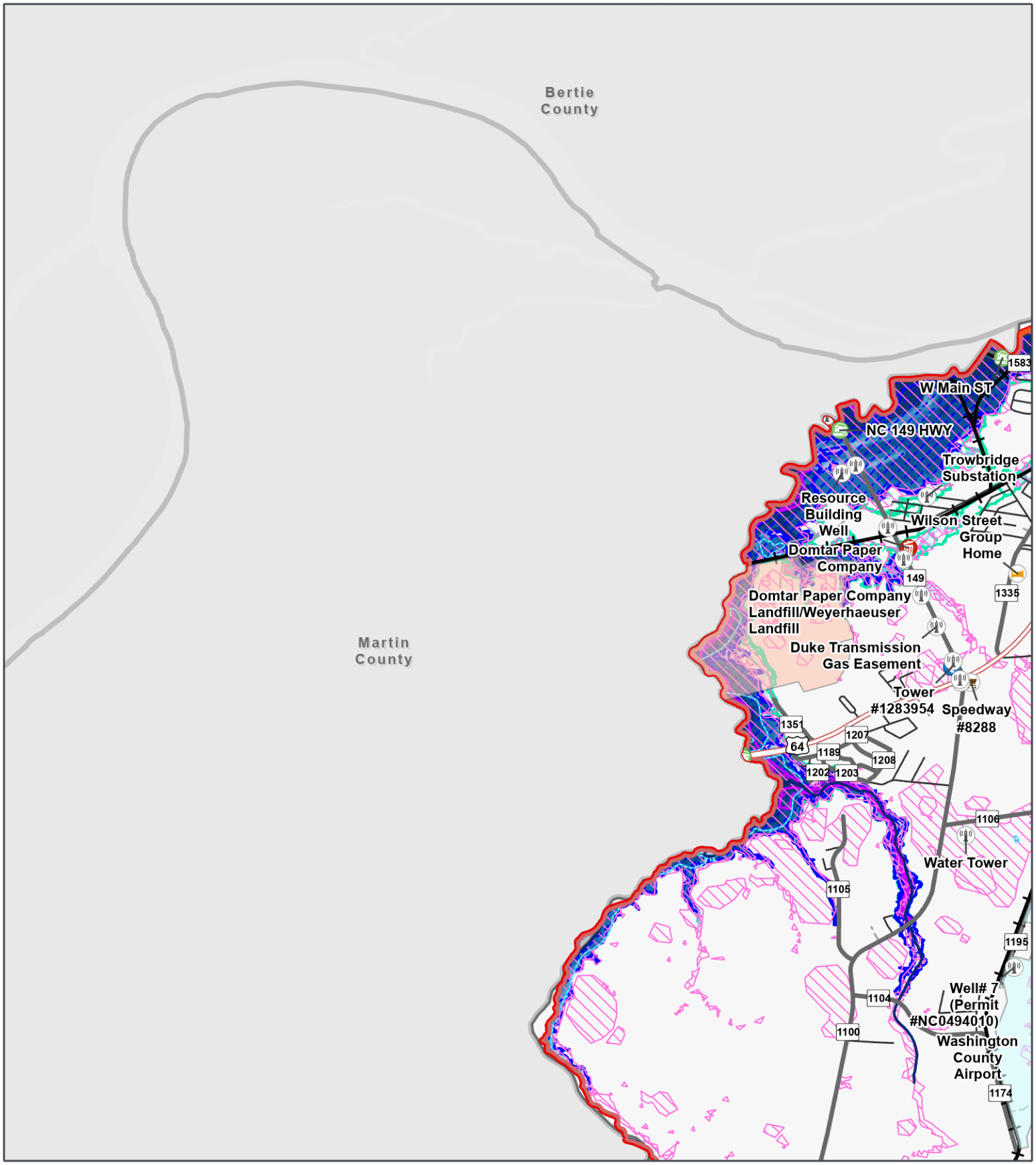
0 1,000 2,000 Feet
0 500 1,000 Meters

N

1:48,000

Base Map: Esri ArcGIS Online, accessed May 2024
Updated: 5/15/2024
Project No. 77542
Layout: ntyAssetsAndHazardsMap_Attachment
Aprx: 77542_ncRccp2023_BjWorking

SWCA ENVIRONMENTAL CONSULTANTS



NORTH CAROLINA RESILIENT COASTAL COMMUNITIES PROGRAM

Assets and Hazards Map

- Rail Road
- Other Road
- Local Road
- State Highway
- U.S. Highway
- County Boundary
- County Boundary
- Community Boundary
- Waterway
- Waterbody

Asset Location

- Communications
- Food and Supplies
- Group Home
- Hazardous Waste
- Roadways
- Utility

Asset Area

- Airfield
- Landfill
- Natural Area
- Historic Flooding - Hurricanes Matthew and Florence

FEMA Flood Zone

- Floodway
- 100-Year Floodplain
- 500-Year Floodplain

Sea Level Rise Potential

- Highest Likelihood
- Lowest Likelihood

Washington County, NC
GCS North American 1983
35.8442°N 76.8038°W

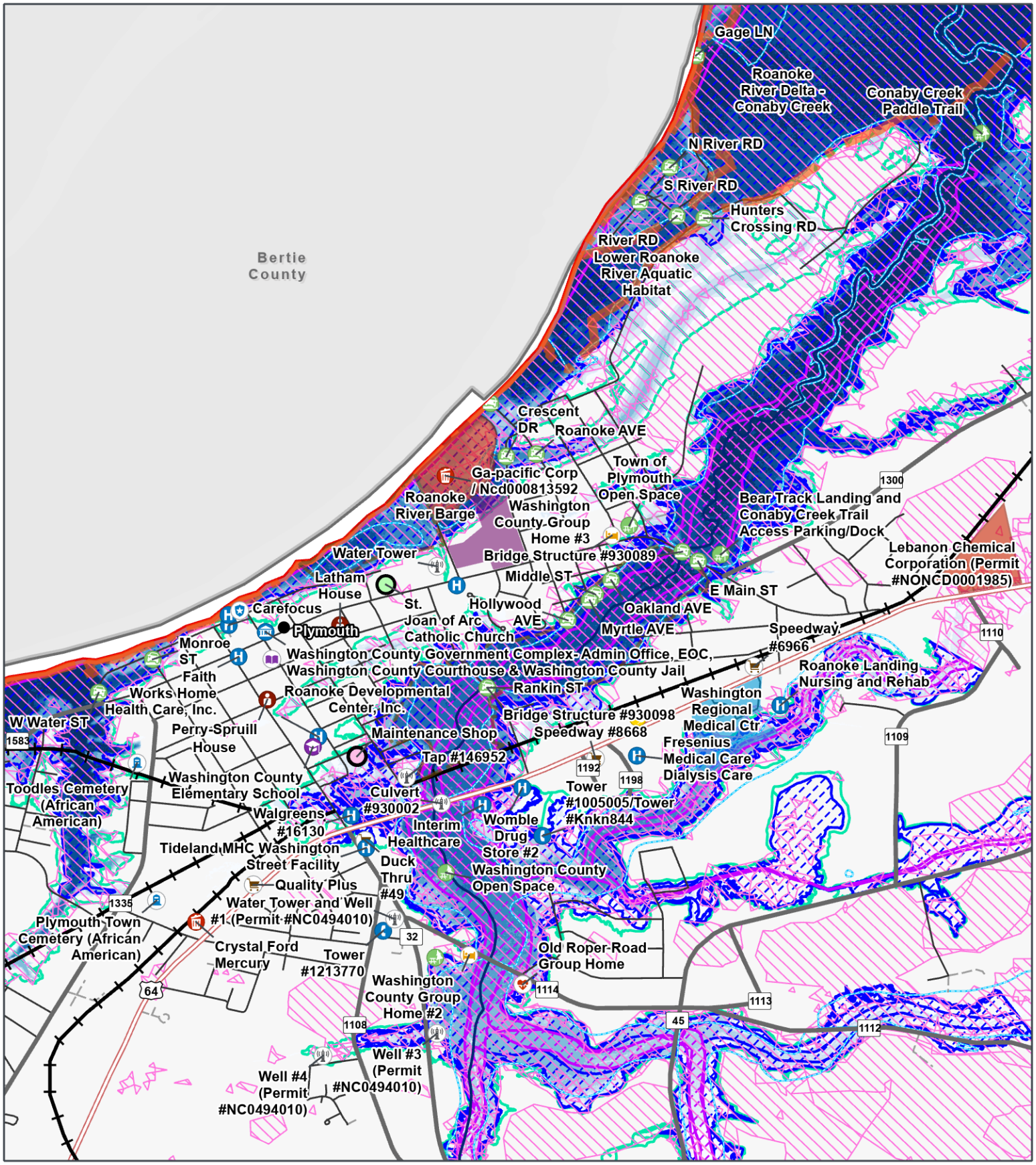
0 1,000 2,000 Feet
0 500 1,000 Meters

N

1:48,000

Base Map: Esri ArcGIS Online, accessed May 2024
Updated: 5/15/2024
Project No. 77542
Layout: ntyAssetsAndHazardsMap_Attachment
Aprx: 77542_ncRccp2023_BjWorking

SWCA ENVIRONMENTAL CONSULTANTS



NORTH CAROLINA RESILIENT COASTAL COMMUNITIES PROGRAM

Assets and Hazards Map

- City/Town
- Rail Road
- Other Road
- Local Road
- State Highway
- U.S. Highway
- County Boundary
- County Boundary
- Community Boundary
- Waterway
- Waterbody

Asset Location

- Cemetery
- Church
- Communications
- Cultural Site
- Emergency Services
- Facilities
- Food and Supplies
- Government
- Group Home
- Hazardous Waste
- Health and Medical
- Law Enforcement/ Corrections
- Library
- Nursing Home
- Parks and Recreation
- Roadways
- Schools
- Utility

Asset Area

- Hazardous Waste
- Health and Medical
- Natural Area
- Parks and Recreation
- Schools

Washington County, NC
GCS North American 1983
35.8688°N 76.738°W

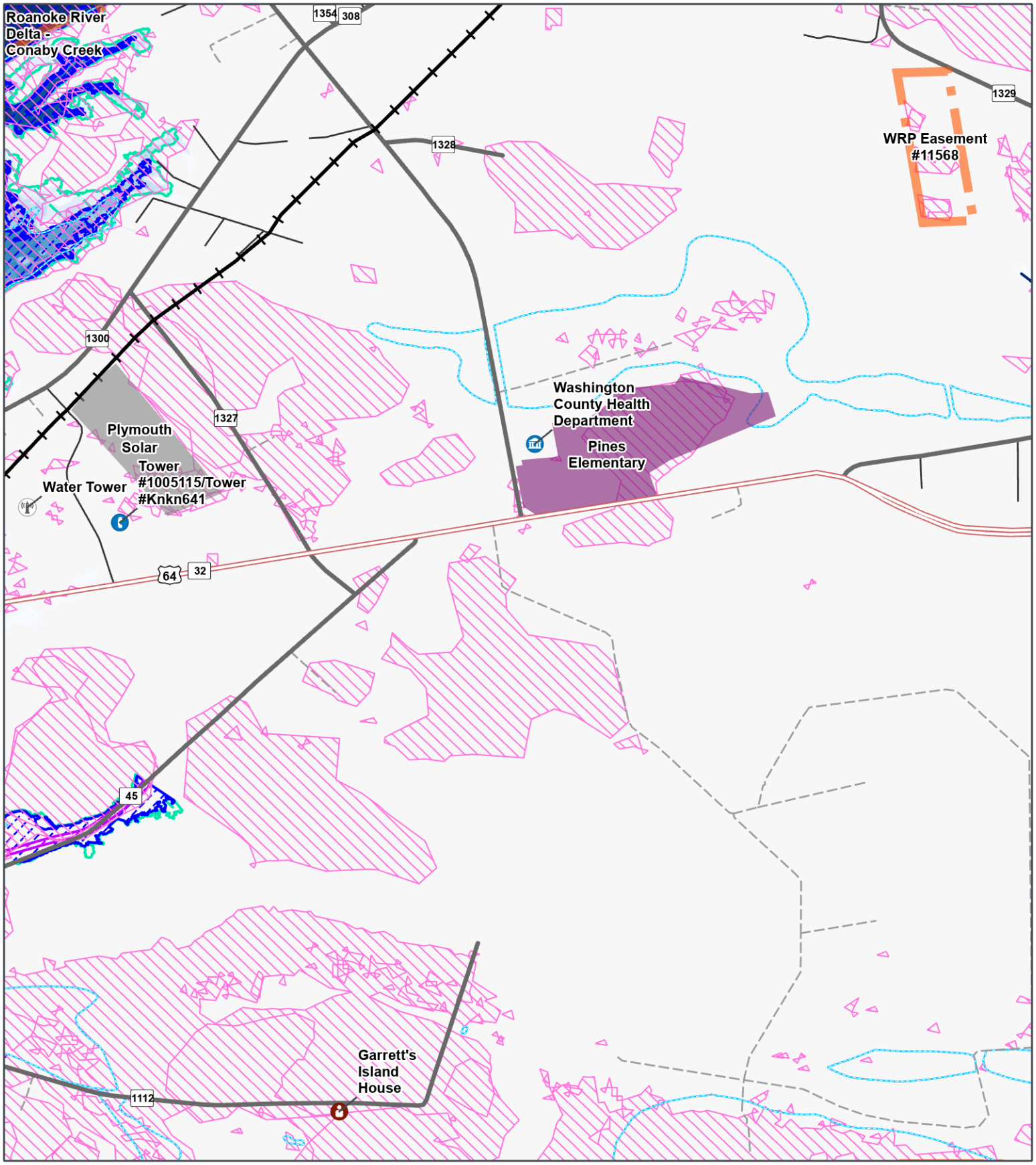
0 1,000 2,000 Feet
0 250 500 Meters

N

1:24,000

Base Map: Esri ArcGIS Online, accessed May 2024
Updated: 5/15/2024
Project No. 77542
Layout: ntyAssetsAndHazardsMap_Attachment
Aprx: 77542_ncRccp2023_BjWorking

SWCA ENVIRONMENTAL CONSULTANTS



NORTH CAROLINA RESILIENT COASTAL COMMUNITIES PROGRAM

Assets and Hazards Map

- Rail Road
- Other Road
- Local Road
- State Highway
- U.S. Highway
- County Boundary
- Community Boundary
- Waterway
- Waterbody

Asset Location
- Communications
- Cultural Site
- Government
- Utility

Asset Area
- Natural Area
- Schools
- Utility
- Historic Flooding - Hurricanes Matthew and Florence

FEMA Flood Zone
- Floodway
- 100-Year Floodplain
- 500-Year Floodplain

Sea Level Rise Potential
- Highest Likelihood
- Lowest Likelihood

Washington County, NC
GCS North American 1983
35.8688°N 76.6941°W

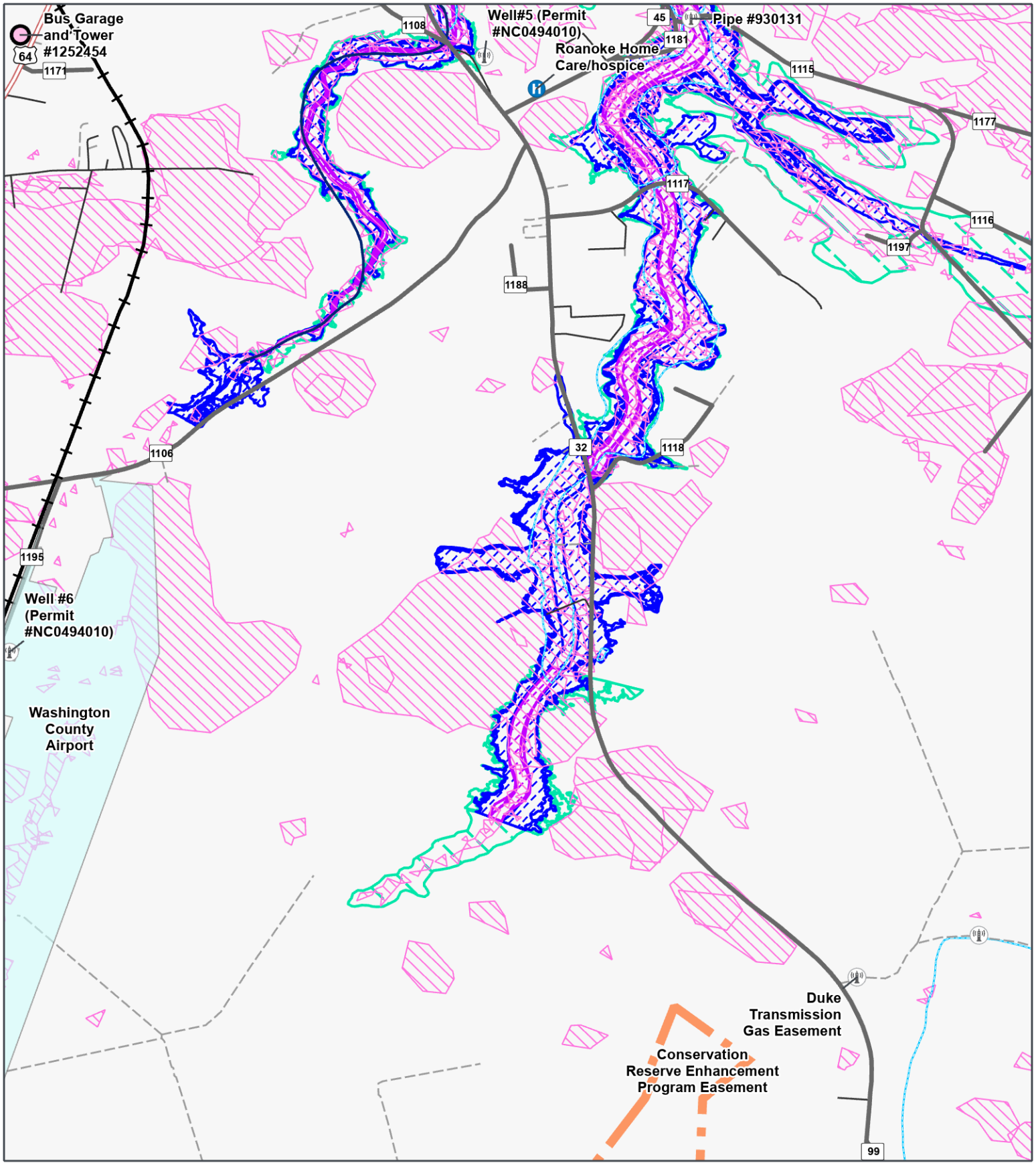
0 1,000 2,000 Feet
0 250 500 Meters

N

1:24,000

Base Map: Esri ArcGIS Online, accessed May 2024
Updated: 5/15/2024
Project No. 77542
Layout: ntyAssetsAndHazardsMap_Attachment
Aprx: 77542_ncRccp2023_BjWorking

SWCA ENVIRONMENTAL CONSULTANTS



NORTH CAROLINA RESILIENT COASTAL COMMUNITIES PROGRAM

Assets and Hazards Map

- Rail Road
- Other Road
- Local Road
- State Highway
- U.S. Highway
- County Boundary
- Community Boundary
- Waterway
- Waterbody

Asset Location

- Facilities
- Health and Medical
- Utility

Asset Area

- Airfield
- Natural Area
- Historic Flooding - Hurricanes Matthew and Florence

FEMA Flood Zone

- Floodway
- 100-Year Floodplain
- 500-Year Floodplain

Sea Level Rise Potential

- Highest Likelihood
- Lowest Likelihood

Washington County, NC
GCS North American 1983
35.8195°N 76.738°W

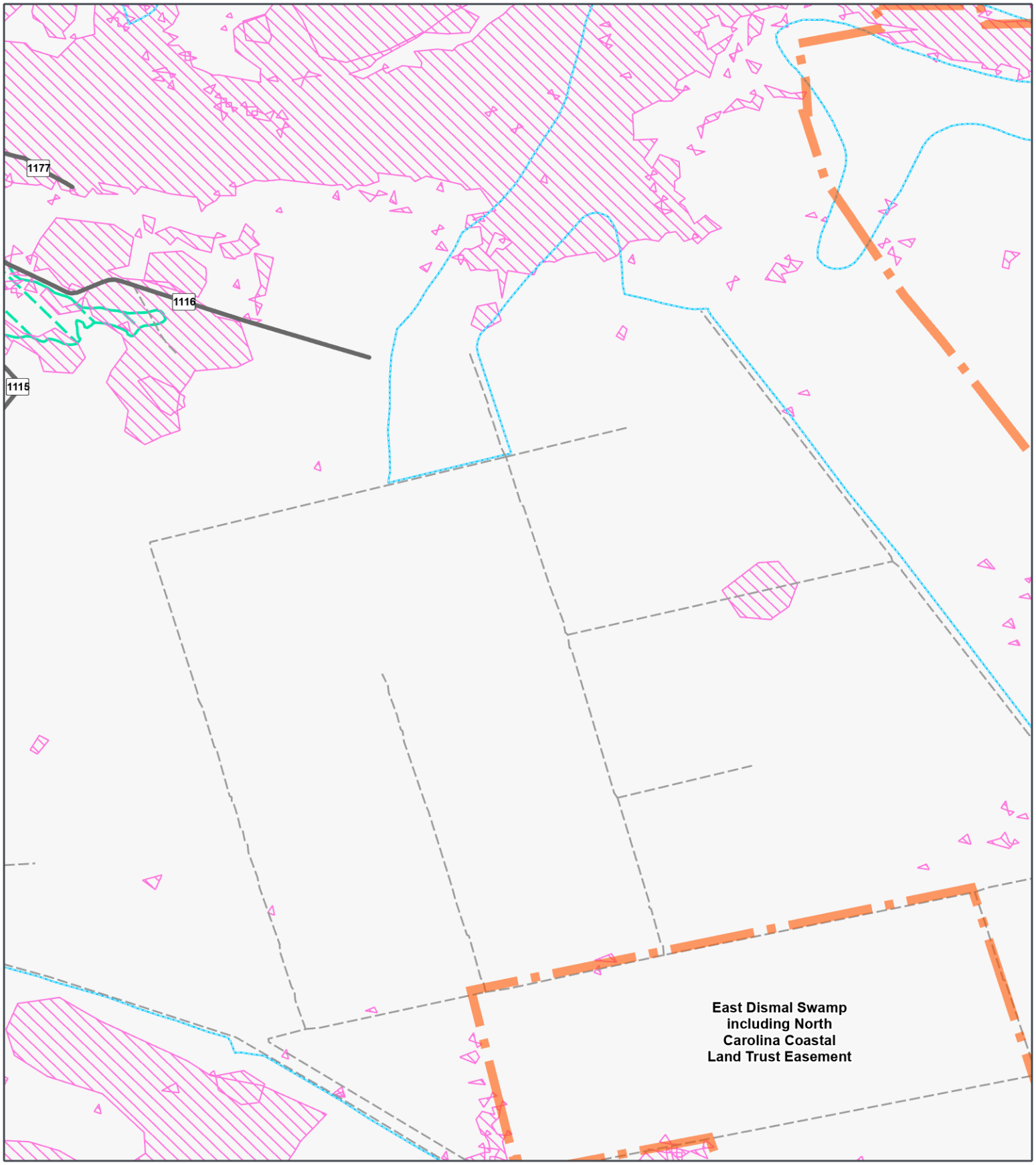
0 1,000 2,000 Feet
0 250 500 Meters

N

1:24,000

Base Map: Esri ArcGIS Online, accessed May 2024
Updated: 5/15/2024
Project No. 77542
Layout: ntyAssetsAndHazardsMap_Attachment
Aprx: 77542_ncRccp2023_BjWorking

SWCA ENVIRONMENTAL CONSULTANTS



NORTH CAROLINA RESILIENT COASTAL COMMUNITIES PROGRAM

Assets and Hazards Map

- Other Road
- Local Road
- State Highway
- County Boundary
- Community Boundary
- Waterbody

Asset Area

- Natural Area
- Historic Flooding - Hurricanes Matthew and Florence

FEMA Flood Zone

- 500-Year Floodplain

Sea Level Rise Potential

- Highest Likelihood
- Lowest Likelihood

Washington County, NC
GCS North American 1983
35.8195°N 76.6941°W

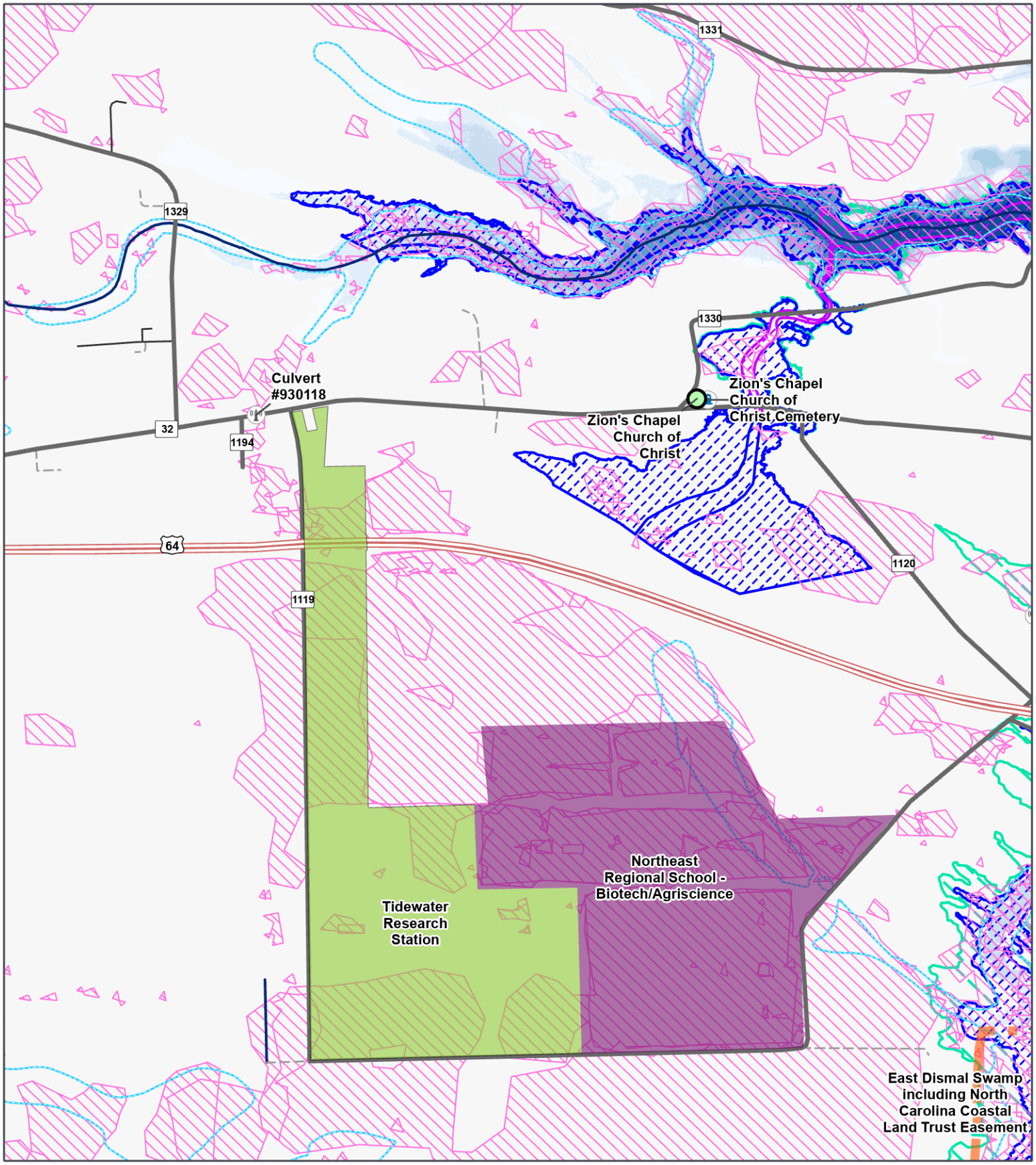
0 1,000 2,000 Feet
0 250 500 Meters

N

1:24,000

Base Map: Esri ArcGIS Online, accessed May 2024
Updated: 5/15/2024
Project No. 77542
Layout: ntyAssetsAndHazardsMap_Attachment
Aprx: 77542_ncRccp2023_BjWorking

SWCA ENVIRONMENTAL CONSULTANTS



NORTH CAROLINA RESILIENT COASTAL COMMUNITIES PROGRAM

Assets and Hazards Map

- Other Road
- Local Road
- State Highway
- U.S. Highway
- County Boundary
- Community Boundary
- Waterway
- Waterbody

Asset Location
- Cemetery
- Church
- Utility

Asset Area
- Employers
- Natural Area
- Schools

- Historic Flooding - Hurricanes Matthew and Florence

FEMA Flood Zone
- Floodway
- 100-Year Floodplain
- 500-Year Floodplain

Sea Level Rise Potential
- Highest Likelihood
- Lowest Likelihood

Washington County, NC
GCS North American 1983
35.8688°N 76.6503°W

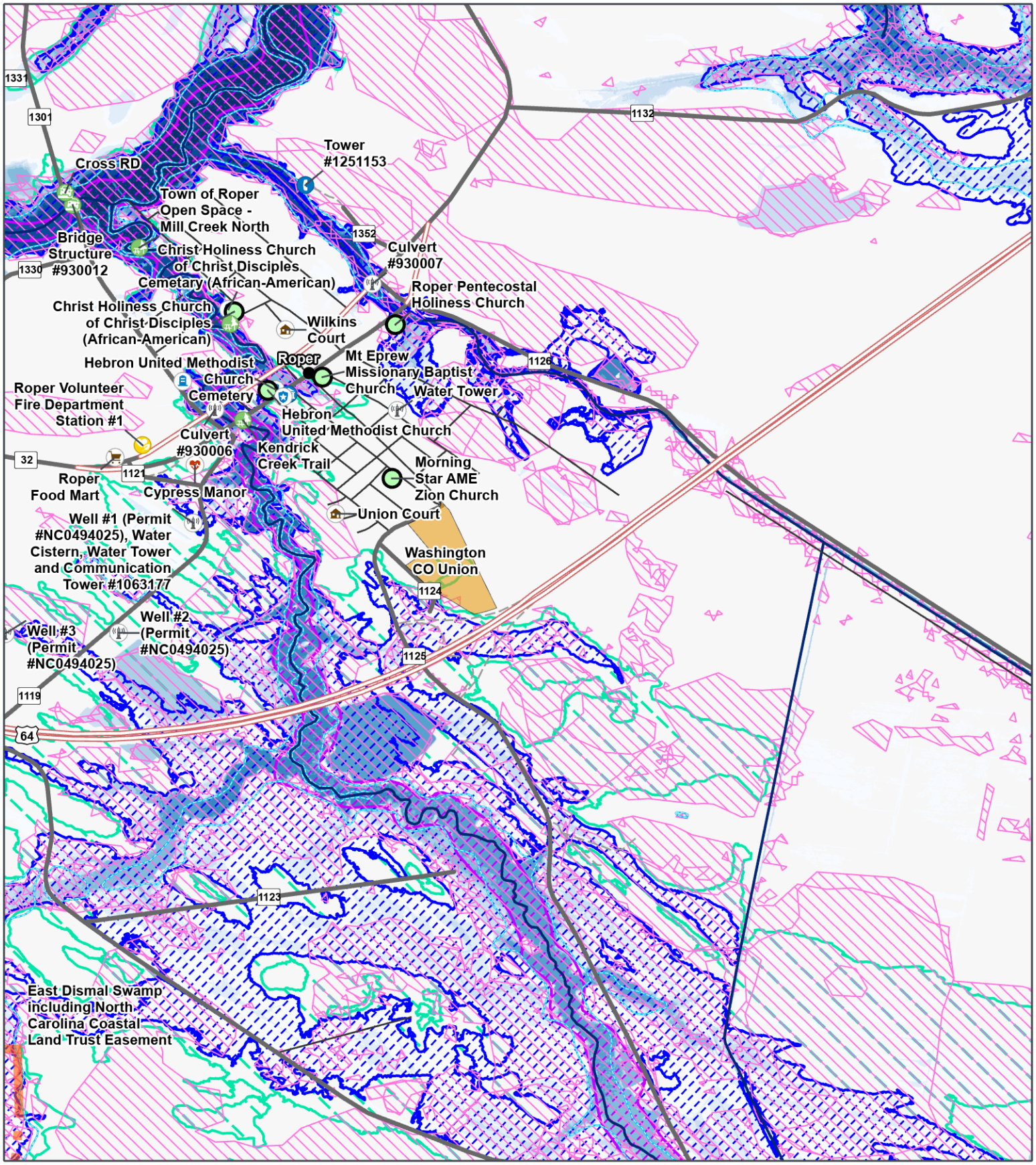
0 1,000 2,000 Feet
0 250 500 Meters

N

1:24,000

Base Map: Esri ArcGIS Online, accessed May 2024
Updated: 5/15/2024
Project No. 77542
Layout: ntyAssetsAndHazardsMap_Attachment
Aprx: 77542_ncRccp2023_BjWorking

SWCA ENVIRONMENTAL CONSULTANTS



NORTH CAROLINA RESILIENT COASTAL COMMUNITIES PROGRAM

Assets and Hazards Map

- City/Town
- Other Road
- Local Road
- State Highway
- U.S. Highway
- County Boundary
- Community Boundary
- Waterway
- Waterbody

Asset Location

- Cemetery
- Church
- Communications
- Emergency Services
- Food and Supplies
- Government
- Law Enforcement/ Corrections
- Nursing Home
- Parks and Recreation
- Public Housing
- Roadways
- Utility

Asset Area

- Emergency Services
- Natural Area

- Historic Flooding - Hurricanes Matthew and Florence

FEMA Flood Zone

- Floodway

Washington County, NC
GCS North American 1983
35.8688°N 76.6064°W

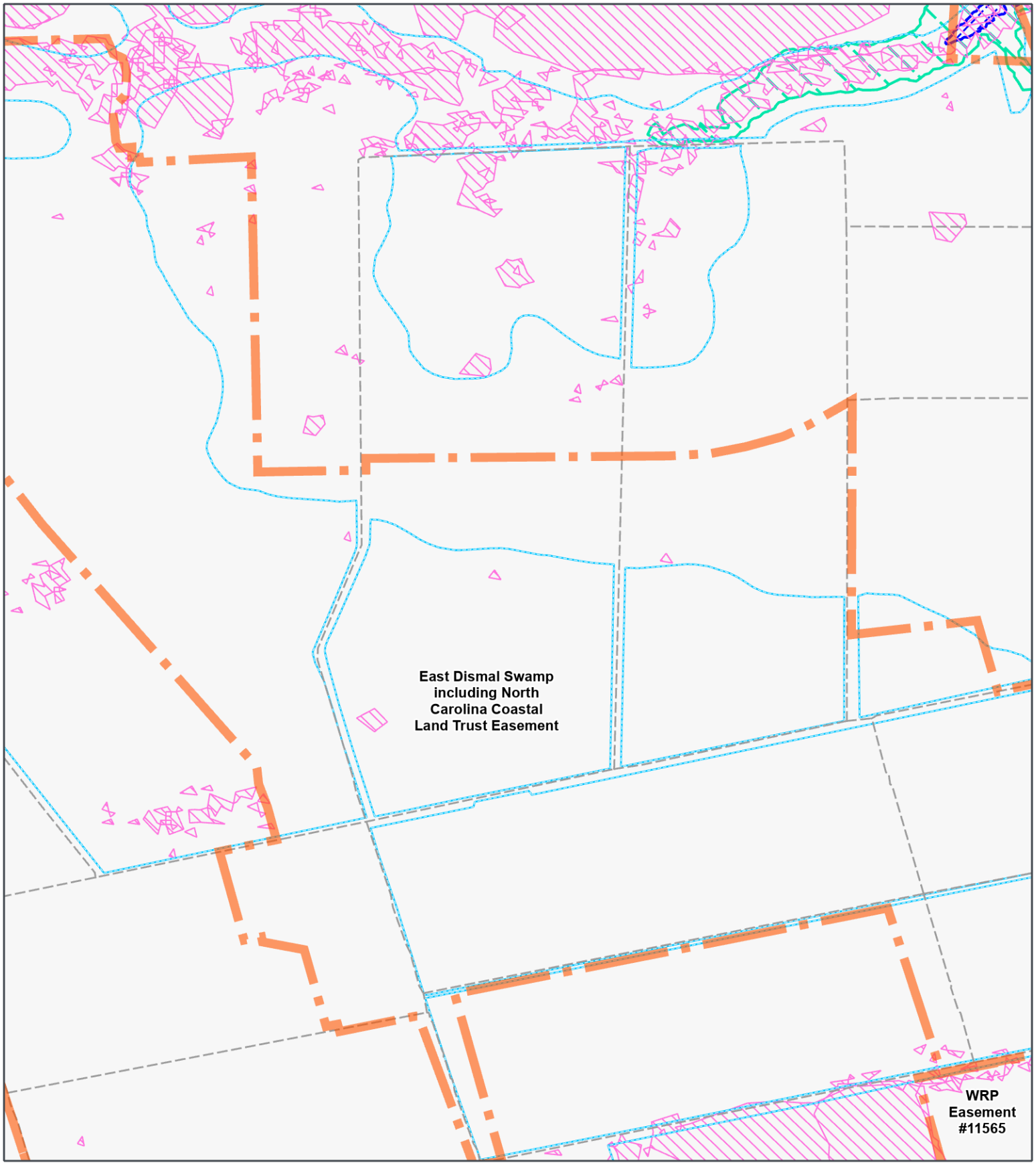
0 1,000 2,000 Feet
0 250 500 Meters

N

1:24,000

Base Map: Esri ArcGIS Online, accessed May 2024
Updated: 5/15/2024
Project No. 77542
Layout: ntyAssetsAndHazardsMap_Attachment
Aprx: 77542_ncRccp2023_BjWorking

SWCA ENVIRONMENTAL CONSULTANTS



NORTH CAROLINA RESILIENT COASTAL COMMUNITIES PROGRAM

Assets and Hazards Map

- Other Road
- County Boundary
- Community Boundary
- Waterbody

Asset Area

- Natural Area

- Historic Flooding - Hurricanes Matthew and Florence

FEMA Flood Zone

- 100-Year Floodplain
- 500-Year Floodplain

Sea Level Rise Potential

Highest Likelihood

Lowest Likelihood

Washington County, NC
GCS North American 1983
35.8195°N 76.6503°W

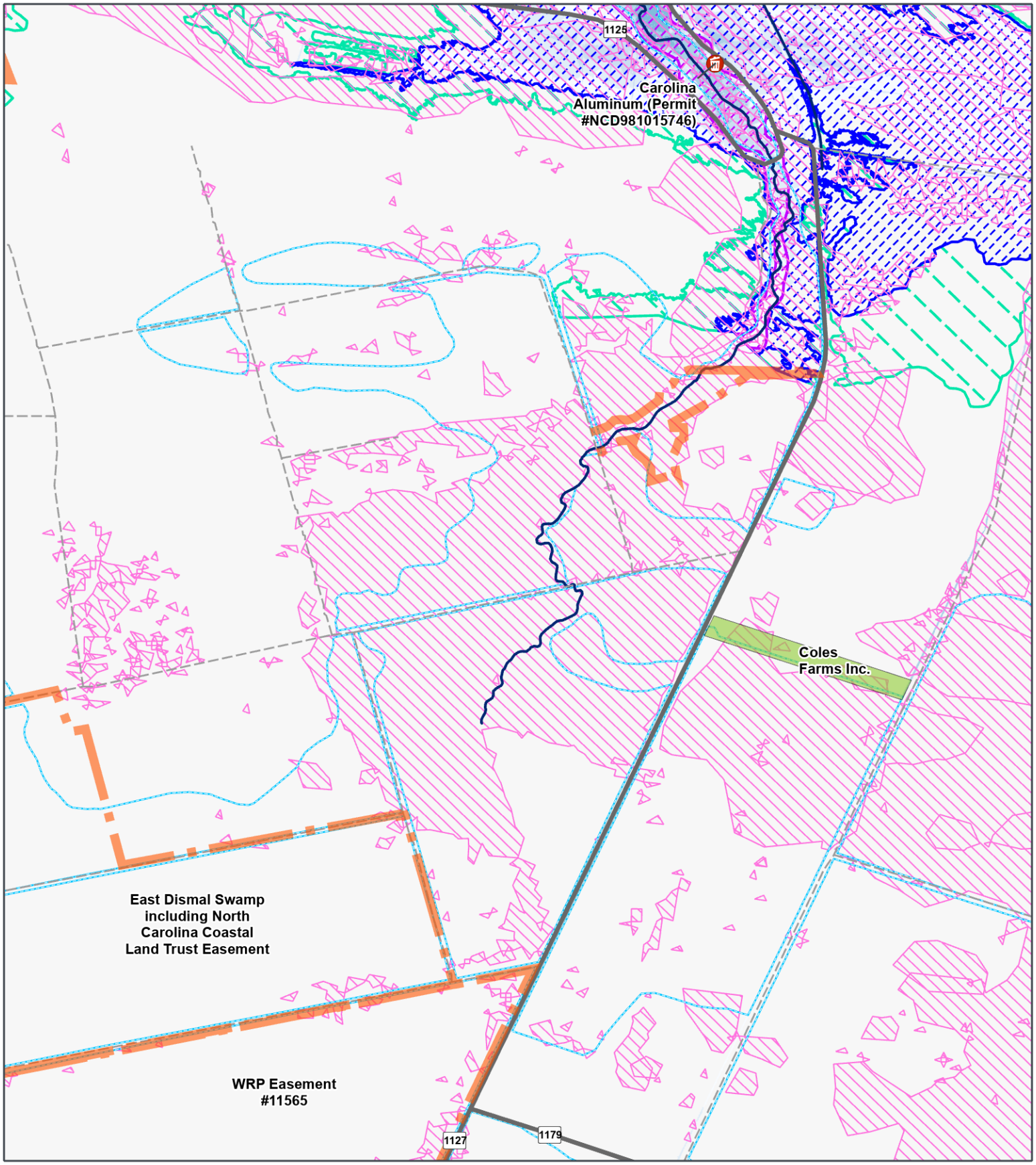
0 1,000 2,000 Feet
0 250 500 Meters

N

1:24,000

Base Map: Esri ArcGIS Online, accessed May 2024
Updated: 5/15/2024
Project No. 77542
Layout: ntyAssetsAndHazardsMap_Attachment
Aprx: 77542_ncRccp2023_BjWorking

SWCA ENVIRONMENTAL CONSULTANTS



NORTH CAROLINA RESILIENT COASTAL COMMUNITIES PROGRAM

Assets and Hazards Map

- Other Road
- Local Road
- State Highway
- County Boundary
- Community Boundary
- Waterway
- Waterbody

Asset Location
- Hazardous Waste

Asset Area
- Employers
- Natural Area

- Historic Flooding - Hurricanes Matthew and Florence

FEMA Flood Zone
- Floodway
- 100-Year Floodplain
- 500-Year Floodplain

Sea Level Rise Potential
- Highest Likelihood
- Lowest Likelihood

Washington County, NC
GCS North American 1983
35.8195°N 76.6064°W

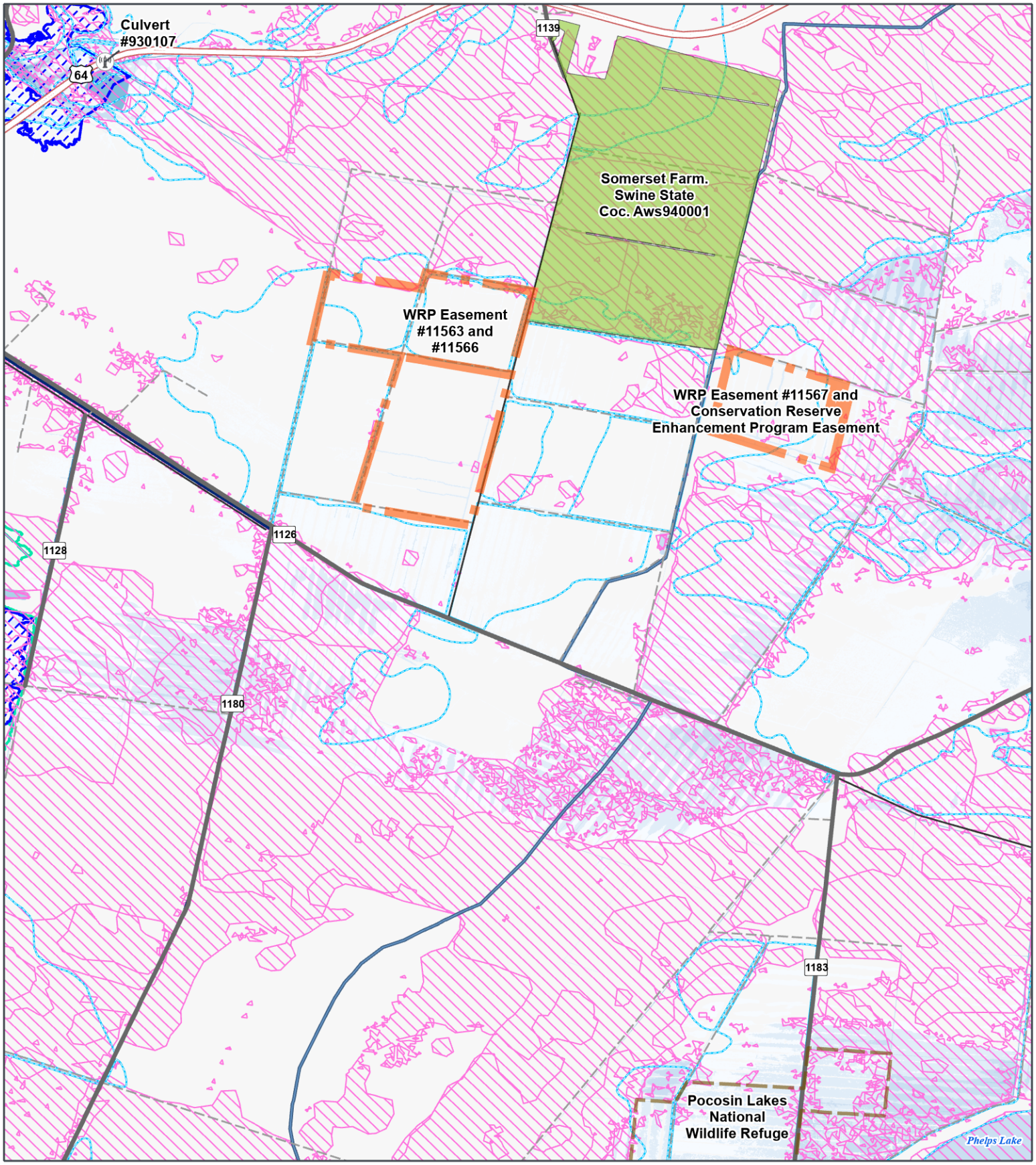
0 1,000 2,000 Feet
0 250 500 Meters

N

1:24,000

Base Map: Esri ArcGIS Online, accessed May 2024
Updated: 5/15/2024
Project No. 77542
Layout: ntyAssetsAndHazardsMap_Attachment
Aprx: 77542_ncRccp2023_BjWorking

SWCA ENVIRONMENTAL CONSULTANTS



NORTH CAROLINA RESILIENT COASTAL COMMUNITIES PROGRAM

Assets and Hazards Map

- Other Road
- Local Road
- State Highway
- U.S. Highway
- County Boundary
- Community Boundary
- Scuppernong River Watershed
- Waterway
- Waterbody

Asset Location

- Utility

Asset Area

- Employers
- Natural Area
- Parks and Recreation

FEMA Flood Zone

- Historic Flooding - Hurricanes Matthew and Florence
- 100-Year Floodplain
- 500-Year Floodplain

Sea Level Rise Potential

- Highest Likelihood
- Lowest Likelihood

Washington County, NC
GCS North American 1983
35.8442°N 76.5406°W

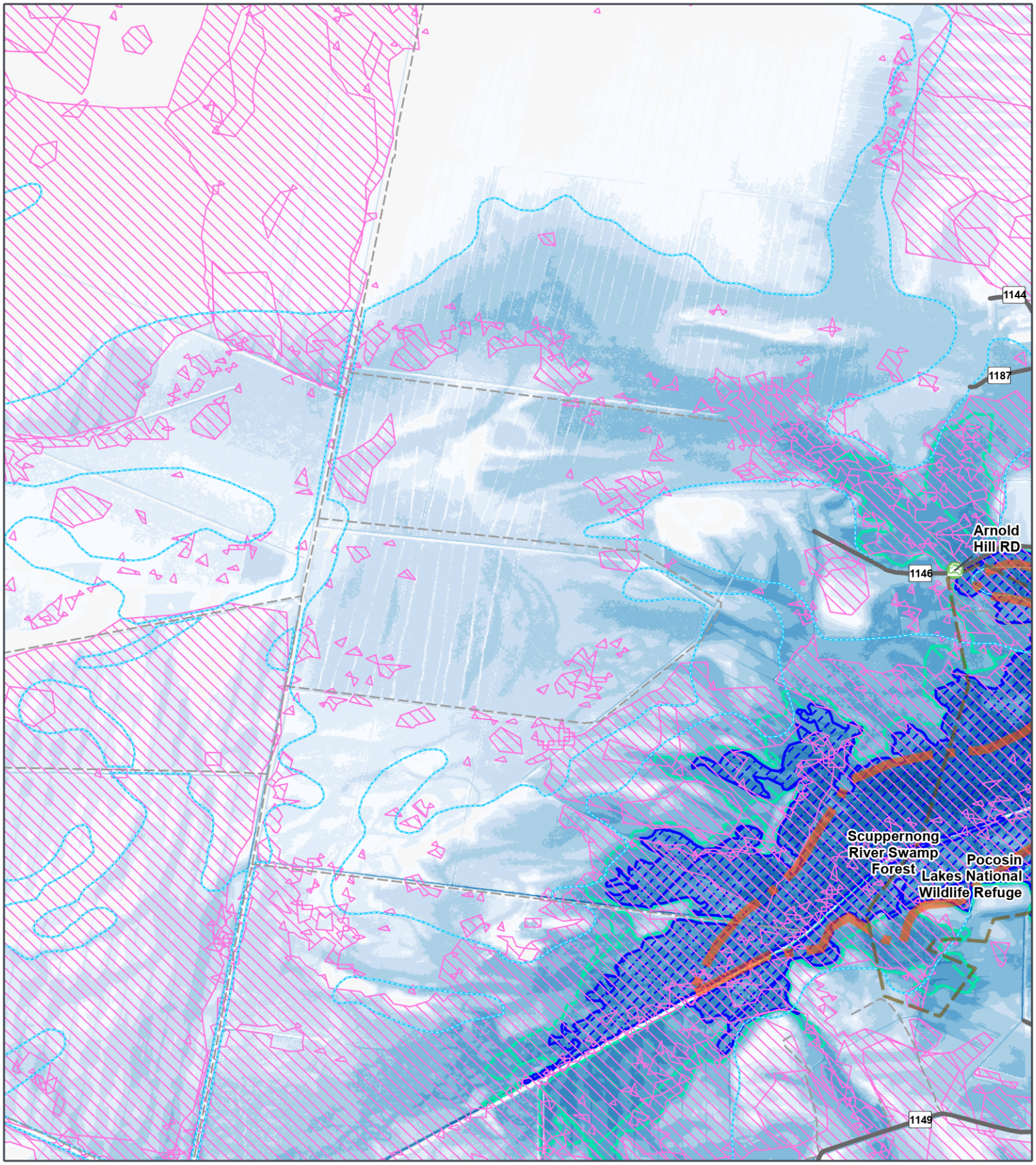
0 1,000 2,000 Feet
0 500 1,000 Meters

N

1:48,000

Base Map: Esri ArcGIS Online, accessed May 2024
Updated: 5/15/2024
Project No. 77542
Layout: ntyAssetsAndHazardsMap_Attachment
Aprx: 77542_ncRccp2023_BjWorking

SWCA ENVIRONMENTAL CONSULTANTS



NORTH CAROLINA RESILIENT COASTAL COMMUNITIES PROGRAM

Assets and Hazards Map

- Other Road
- Local Road
- State Highway
- County Boundary
- Community Boundary
- Scuppernong River Watershed
- Waterbody

Asset Location

- Roadways

Asset Area

- Natural Area
- Parks and Recreation
- Historic Flooding - Hurricanes Matthew and Florence

FEMA Flood Zone

- 100-Year Floodplain
- 500-Year Floodplain

Sea Level Rise Potential

- Highest Likelihood
- Lowest Likelihood

Washington County, NC
GCS North American 1983
35.8688°N 76.4748°W

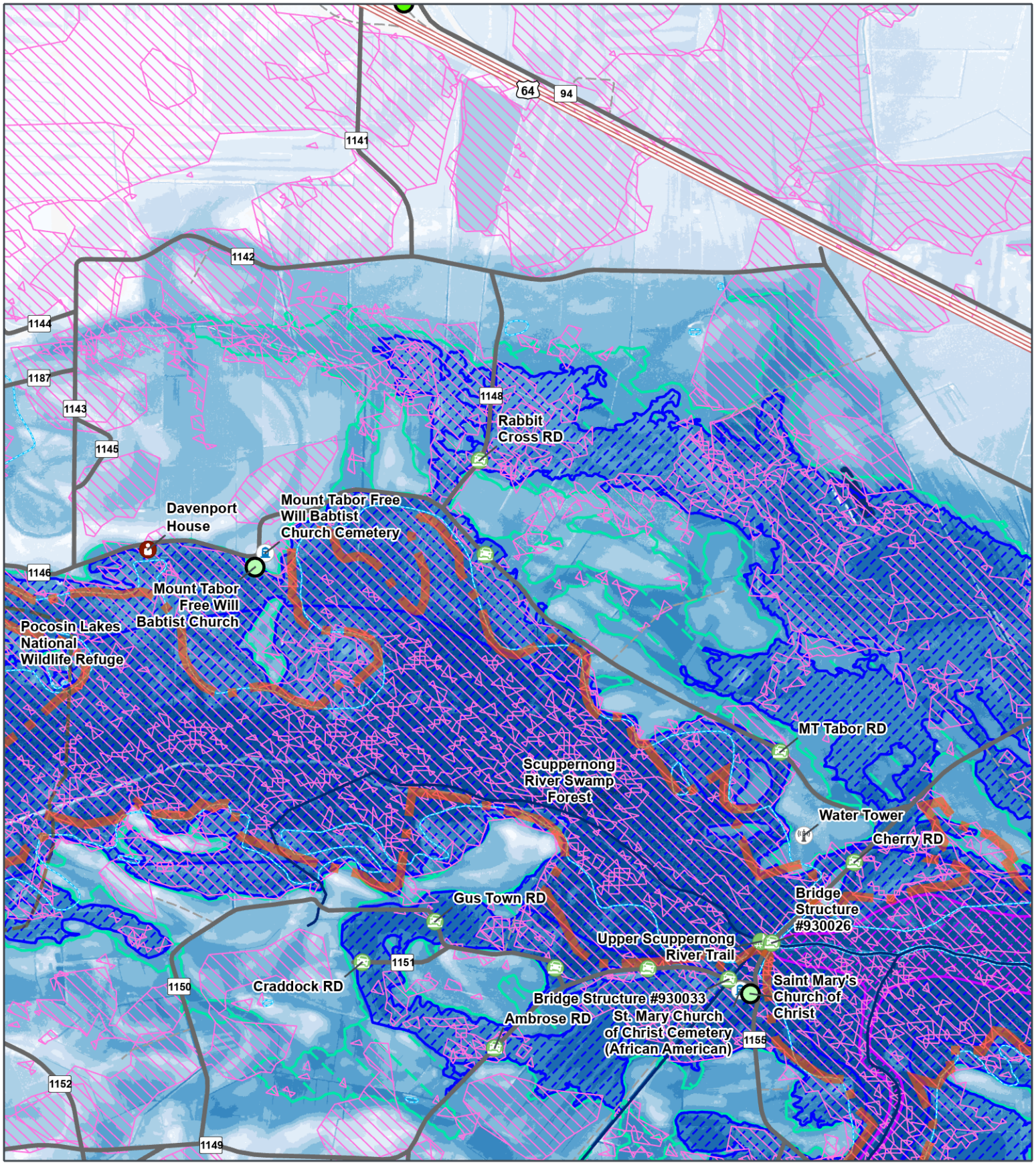
0 1,000 2,000 Feet
0 250 500 Meters

N

1:24,000

Base Map: Esri ArcGIS Online, accessed May 2024
Updated: 5/15/2024
Project No. 77542
Layout: ntyAssetsAndHazardsMap_Attachment
Aprx: 77542_ncRccp2023_BjWorking

SWCA ENVIRONMENTAL CONSULTANTS



NORTH CAROLINA RESILIENT COASTAL COMMUNITIES PROGRAM

Assets and Hazards Map

- Other Road
- Local Road
- State Highway
- U.S. Highway
- County Boundary
- Community Boundary
- Scuppernong River Watershed
- Waterway
- Waterbody

Asset Location

- Cemetery
- Church
- Cultural Site
- Parks and Recreation
- Roadways
- Utility

Asset Area

- Natural Area
- Parks and Recreation

- Historic Flooding - Hurricanes Matthew and Florence

FEMA Flood Zone

- Floodway
- 100-Year Floodplain
- 500-Year Floodplain

Sea Level Rise Potential

- Highest Likelihood
- Lowest Likelihood

Washington County, NC
GCS North American 1983
35.8688°N 76.431°W

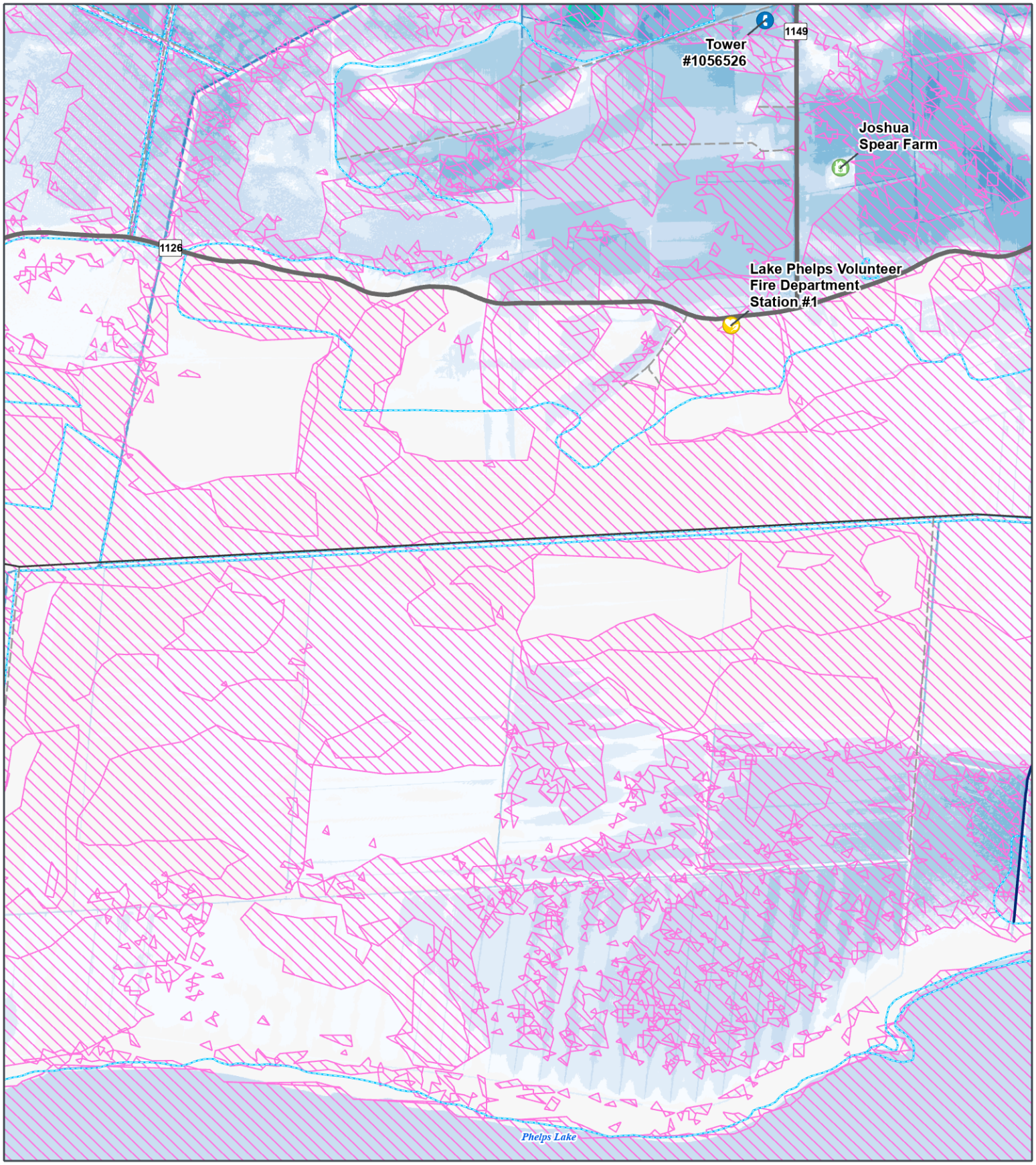
0 1,000 2,000 Feet
0 250 500 Meters

N

1:24,000

Base Map: Esri ArcGIS Online, accessed May 2024
Updated: 5/15/2024
Project No. 77542
Layout: ntyAssetsAndHazardsMap_Attachment
Aprx: 77542_ncRccp2023_BjWorking

SWCA ENVIRONMENTAL CONSULTANTS



NORTH CAROLINA RESILIENT COASTAL COMMUNITIES PROGRAM

Assets and Hazards Map

- Other Road
- Local Road
- State Highway
- County Boundary
- Community Boundary
- Scuppernong River Watershed
- Waterway
- Waterbody

Asset Location

- Communications
- Emergency Services
- Employers

Historic Flooding - Hurricanes Matthew and Florence

FEMA Flood Zone

- 500-Year Floodplain

Sea Level Rise Potential

- Highest Likelihood
- Lowest Likelihood

Washington County, NC
GCS North American 1983
35.8195°N 76.4748°W

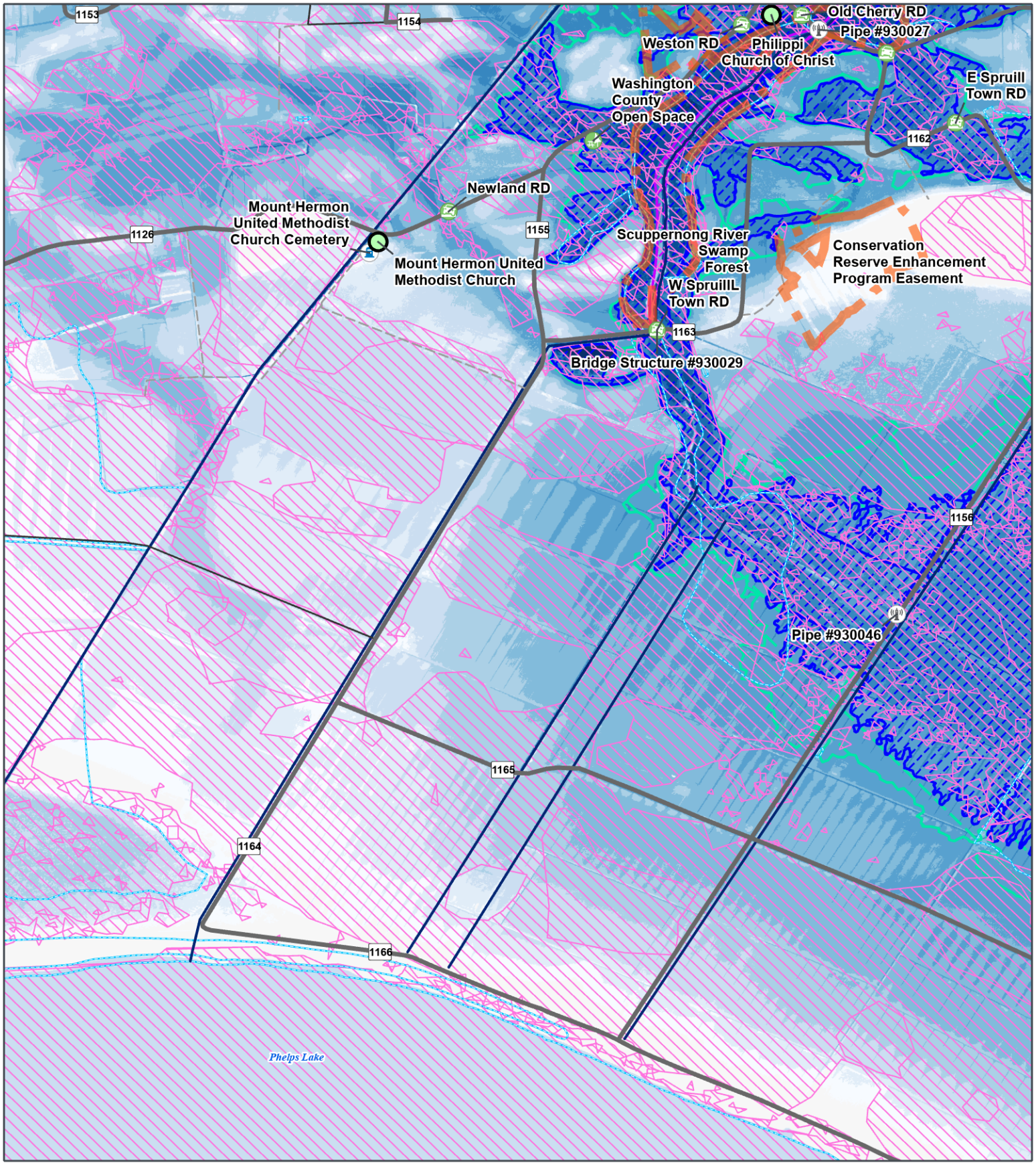
0 1,000 2,000 Feet
0 250 500 Meters

N

1:24,000

Base Map: Esri ArcGIS Online, accessed May 2024
Updated: 5/15/2024
Project No. 77542
Layout: ntyAssetsAndHazardsMap_Attachment
Aprx: 77542_ncRccp2023_BjWorking

SWCA ENVIRONMENTAL CONSULTANTS



NORTH CAROLINA RESILIENT COASTAL COMMUNITIES PROGRAM

Assets and Hazards Map

- Other Road
- Local Road
- State Highway
- County Boundary
- Community Boundary
- Scuppernong River Watershed
- Waterway
- Waterbody

Asset Location

- Cemetery
- Church
- Parks and Recreation
- Roadways
- Utility

Asset Area

- Natural Area
- Historic Flooding - Hurricanes Matthew and Florence

FEMA Flood Zone

- Floodway
- 100-Year Floodplain
- 500-Year Floodplain

Sea Level Rise Potential

- Highest Likelihood
- Lowest Likelihood

Washington County, NC
GCS North American 1983
35.8195°N 76.431°W

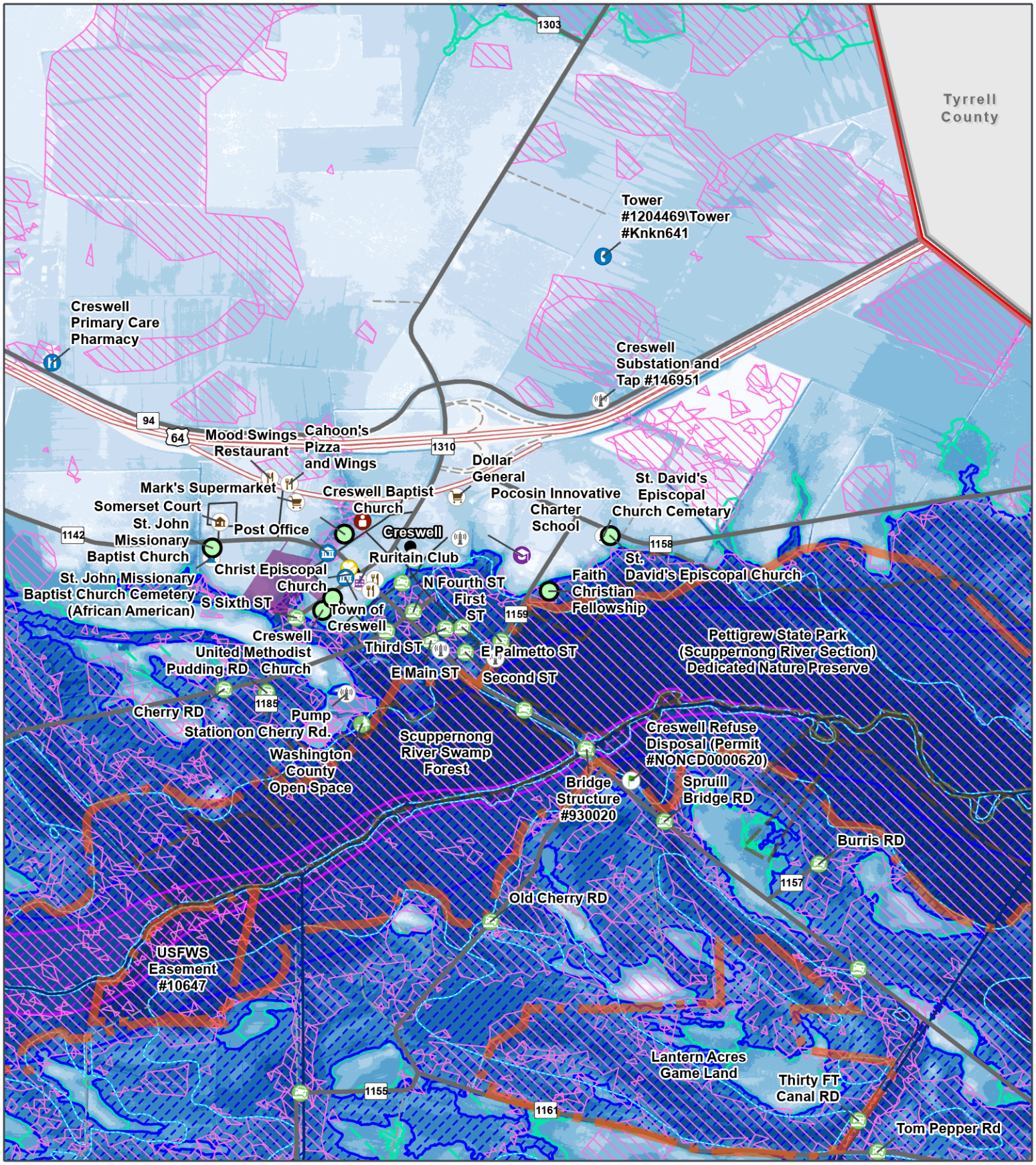
0 1,000 2,000 Feet
0 250 500 Meters

N

1:24,000

Base Map: Esri ArcGIS Online, accessed May 2024
Updated: 5/15/2024
Project No. 77542
Layout: ntyAssetsAndHazardsMap_Attachment
Aprx: 77542_ncRccp2023_BjWorking

SWCA ENVIRONMENTAL CONSULTANTS



NORTH CAROLINA RESILIENT COASTAL COMMUNITIES PROGRAM

Assets and Hazards Map

- City/Town
- Other Road
- Local Road
- State Highway
- U.S. Highway
- County Boundary
- County Boundary
- Community Boundary
- Scuppernong River Watershed
- Waterway
- Waterbody

Asset Location

- Cemetery
- Church
- Communications
- Community Center
- Cultural Site
- Emergency Services
- Food and Supplies
- Government
- Health and Medical
- Landfill
- Parks and Recreation
- Public Housing
- Restaurants
- Roadways
- Schools
- Utility

Asset Area

- Natural Area
- Parks and Recreation
- Schools
- Historic Flooding - Hurricanes Matthew and Florence

Washington County, NC
GCS North American 1983
35.8688°N 76.3871°W

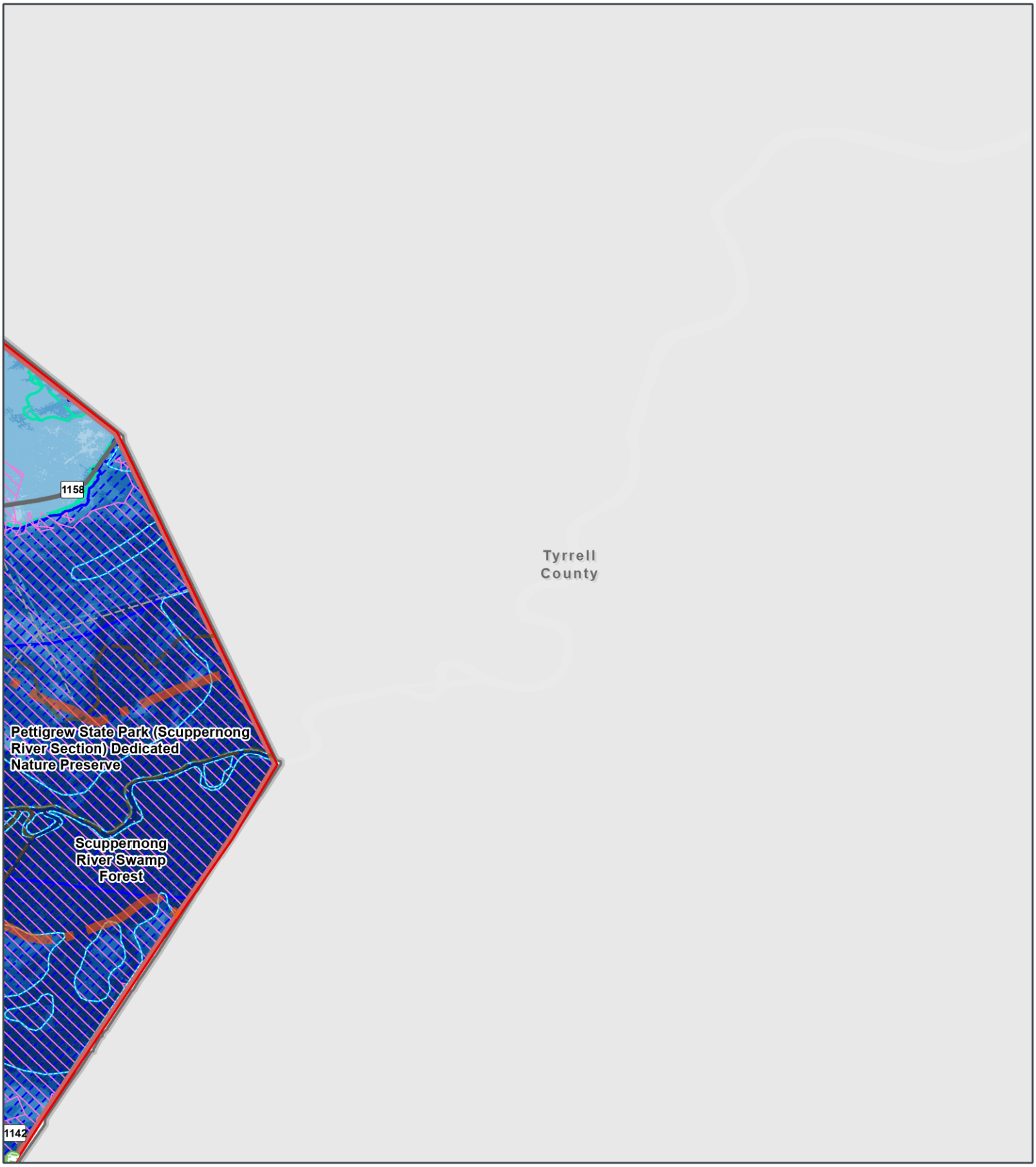
0 1,000 2,000 Feet
0 250 500 Meters

N

1:24,000

Base Map: Esri ArcGIS Online, accessed May 2024
Updated: 5/15/2024
Project No. 77542
Layout: ntyAssetsAndHazardsMap_Attachment
Aprx: 77542_ncRccp2023_BjWorking

SWCA ENVIRONMENTAL CONSULTANTS



NORTH CAROLINA RESILIENT COASTAL COMMUNITIES PROGRAM

Assets and Hazards Map

- Other Road
- Local Road
- State Highway
- County Boundary
- County Boundary
- Community Boundary
- Scuppernong River Watershed
- Waterway
- Waterbody

Asset Location

- Roadways

Asset Area

- Natural Area
- Parks and Recreation
- Historic Flooding - Hurricanes Matthew and Florence

FEMA Flood Zone

- 100-Year Floodplain
- 500-Year Floodplain

Sea Level Rise Potential

- Highest Likelihood
- Lowest Likelihood

Washington County, NC
GCS North American 1983
35.8688°N 76.3433°W

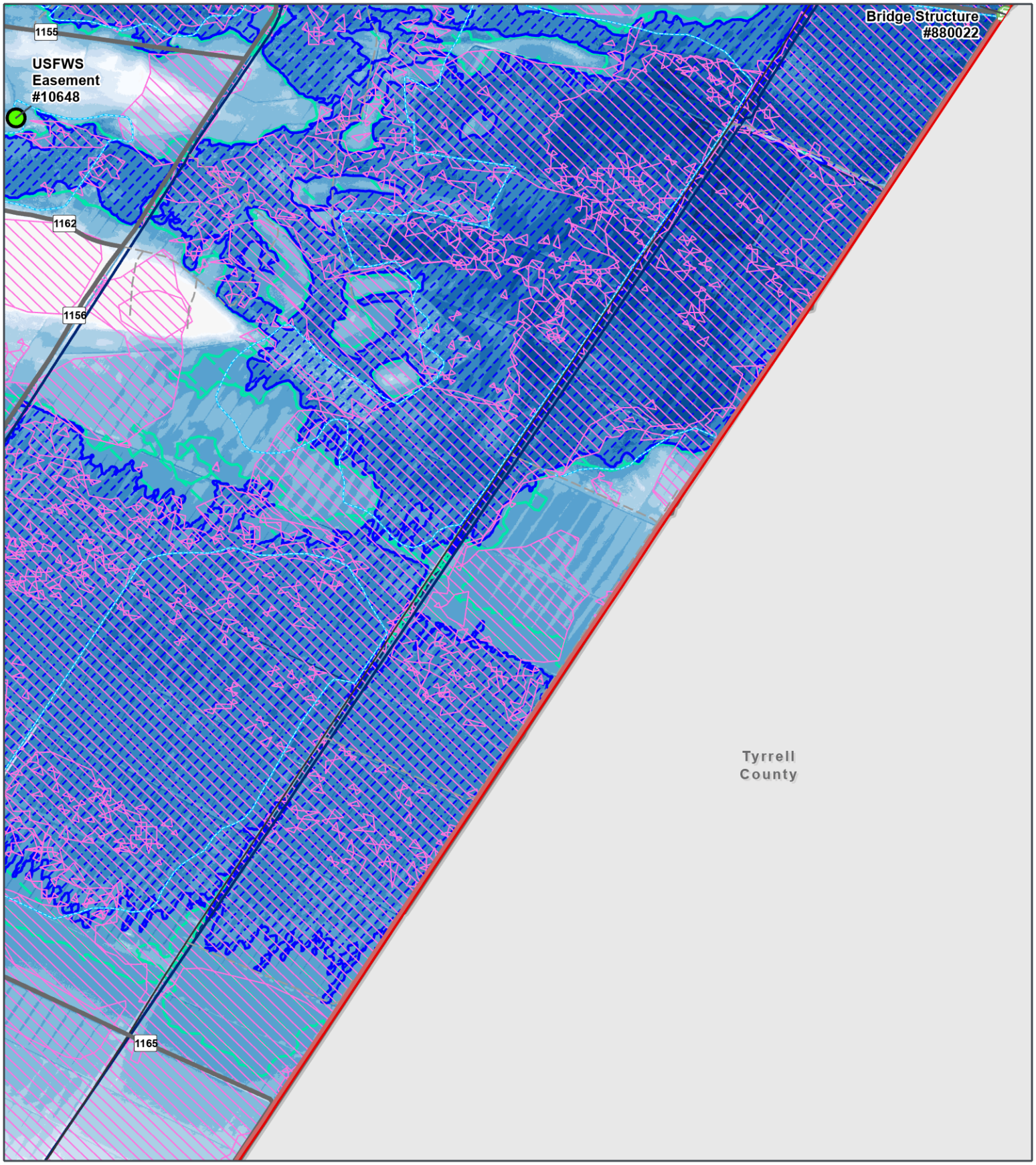
0 1,000 2,000 Feet
0 250 500 Meters

N

1:24,000

Base Map: Esri ArcGIS Online, accessed May 2024
Updated: 5/15/2024
Project No. 77542
Layout: ntyAssetsAndHazardsMap_Attachment
Aprx: 77542_ncRccp2023_BjWorking

SWCA ENVIRONMENTAL CONSULTANTS



NORTH CAROLINA RESILIENT COASTAL COMMUNITIES PROGRAM

Assets and Hazards Map

- Other Road
- Local Road
- State Highway
- County Boundary
- County Boundary
- Community Boundary
- Scuppernong River Watershed
- Waterway
- Waterbody

Asset Location

- Natual Area
- Roadways

- Historic Flooding - Hurricanes Matthew and Florence

FEMA Flood Zone

- 100-Year Floodplain
- 500-Year Floodplain

Sea Level Rise Potential

- Highest Likelihood
- Lowest Likelihood

Washington County, NC
GCS North American 1983
35.8195°N 76.3871°W

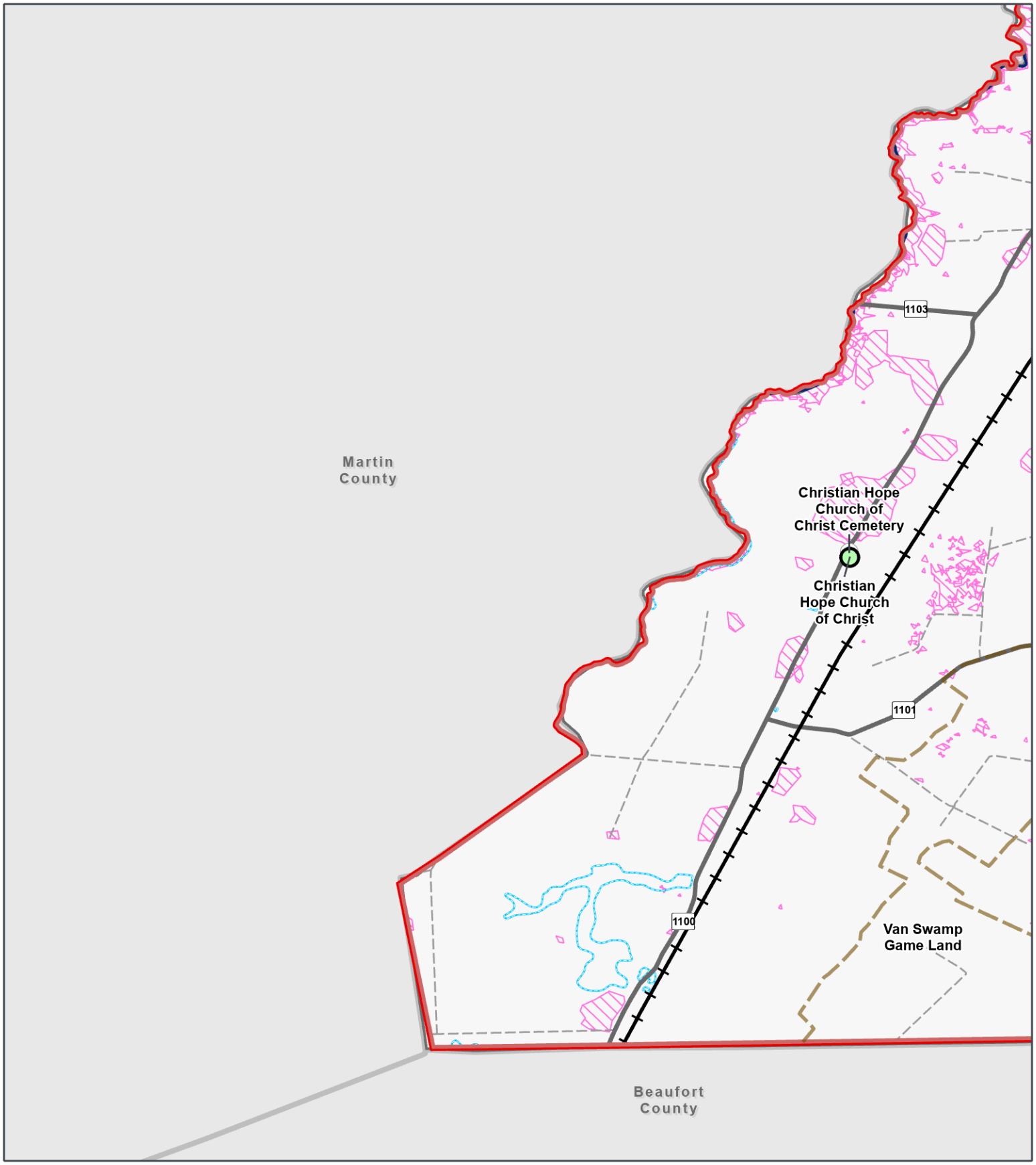
0 1,000 2,000 Feet
0 250 500 Meters

N

1:24,000

Base Map: Esri ArcGIS Online, accessed May 2024
Updated: 5/15/2024
Project No. 77542
Layout: ntyAssetsAndHazardsMap_Attachment
Aprx: 77542_ncRccp2023_BjWorking

SWCA ENVIRONMENTAL CONSULTANTS



NORTH CAROLINA RESILIENT COASTAL COMMUNITIES PROGRAM

Assets and Hazards Map

- Rail Road
- Other Road
- Local Road
- State Highway
- County Boundary
- County Boundary
- Community Boundary
- Waterway
- Waterbody

Asset Location

- Cemetery
- Church

Asset Area

- Parks and Recreation
- Historic Flooding - Hurricanes Matthew and Florence

Sea Level Rise Potential

- Highest Likelihood
- Lowest Likelihood

Washington County, NC
GCS North American 1983
35.7454°N 76.8365°W

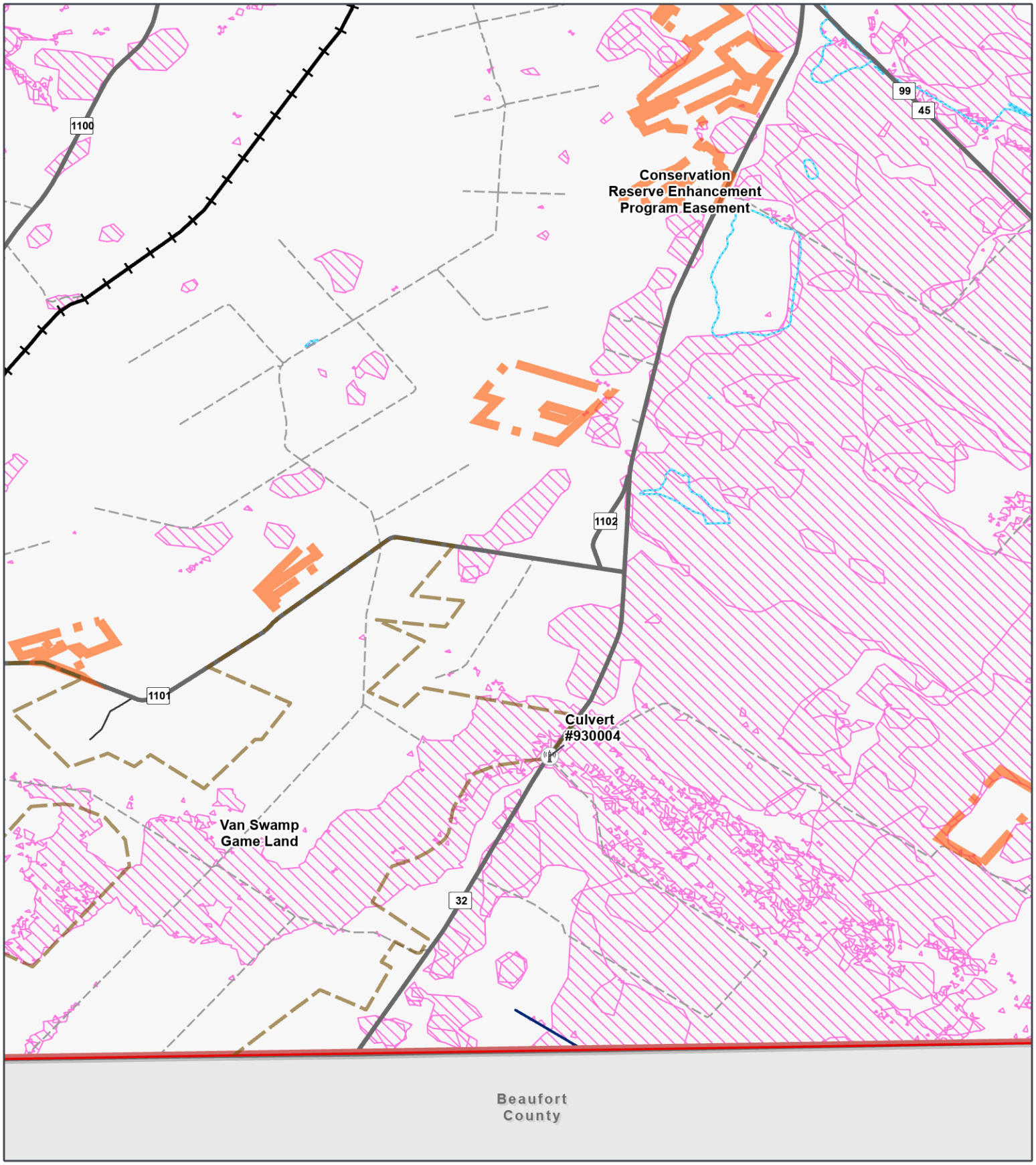
0 1,000 2,000 Feet
0 500 1,000 Meters

N

1:48,000

Base Map: Esri ArcGIS Online, accessed May 2024
Updated: 5/15/2024
Project No. 77542
Layout: ntyAssetsAndHazardsMap_Attachment
Aprx: 77542_ncRccp2023_BjWorking

SWCA ENVIRONMENTAL CONSULTANTS



NORTH CAROLINA RESILIENT COASTAL COMMUNITIES PROGRAM

Assets and Hazards Map

- Rail Road
- Other Road
- Local Road
- State Highway
- County Boundary
- County Boundary
- Community Boundary
- Waterway
- Waterbody

Asset Location

- Utility

Asset Area

- Natural Area
- Parks and Recreation
- Historic Flooding - Hurricanes Matthew and Florence

Sea Level Rise Potential

- Highest Likelihood
- Lowest Likelihood

Washington County, NC
GCS North American 1983
35.7454°N 76.7488°W

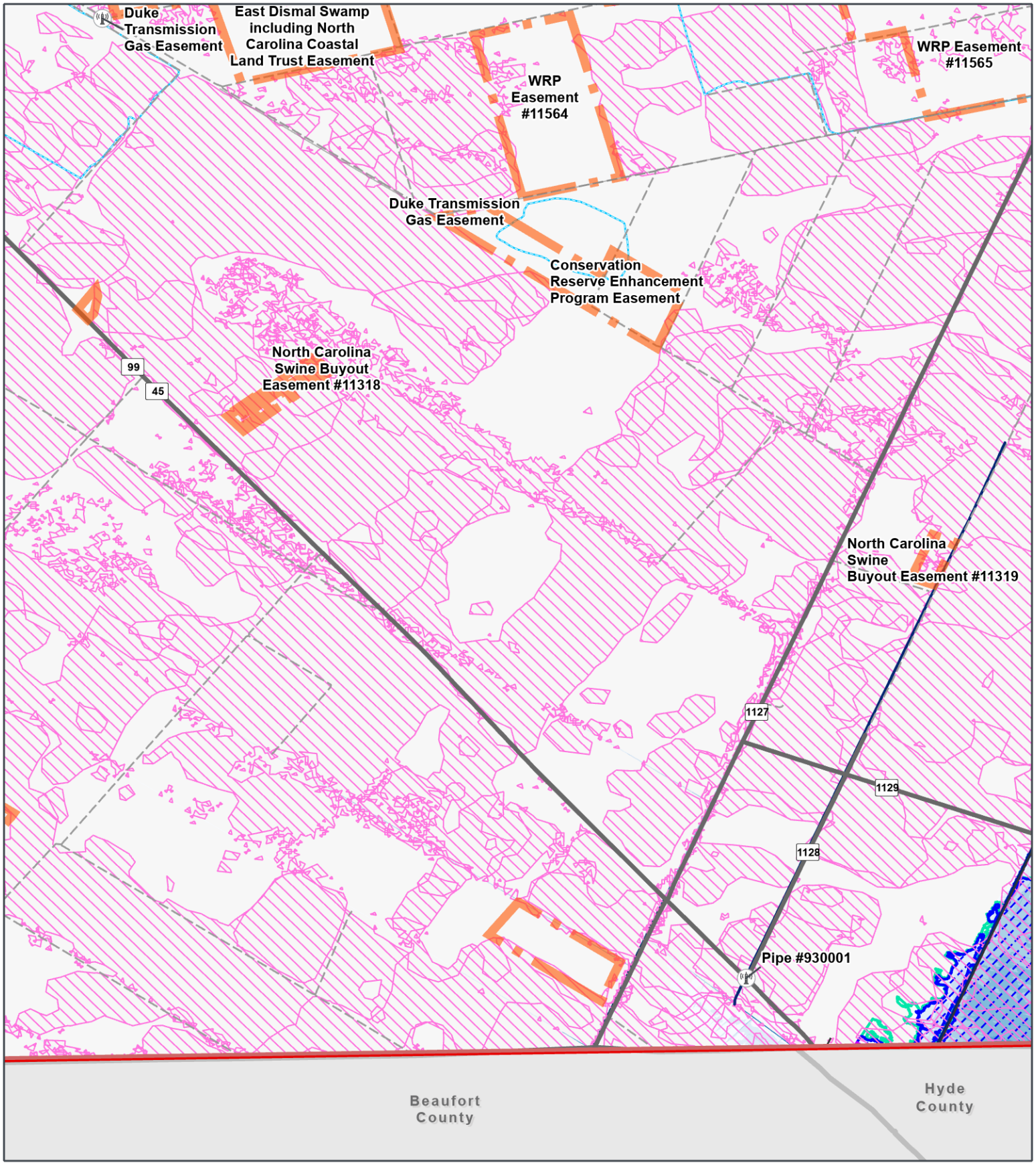
0 1,000 2,000 Feet
0 500 1,000 Meters

N

1:48,000

Base Map: Esri ArcGIS Online, accessed May 2024
Updated: 5/15/2024
Project No. 77542
Layout: ntyAssetsAndHazardsMap_Attachment
Aprx: 77542_ncRccp2023_BjWorking

SWCA ENVIRONMENTAL CONSULTANTS



NORTH CAROLINA RESILIENT COASTAL COMMUNITIES PROGRAM

Assets and Hazards Map

- Other Road
- Local Road
- State Highway
- County Boundary
- County Boundary
- Community Boundary
- Waterway
- Waterbody

Asset Location

- Utility

Asset Area

- Natural Area
- Utility

- Historic Flooding - Hurricanes Matthew and Florence

FEMA Flood Zone

- Floodway
- 100-Year Floodplain
- 500-Year Floodplain

Sea Level Rise Potential

- Highest Likelihood
- Lowest Likelihood

Washington County, NC
GCS North American 1983
35.7454°N 76.6611°W

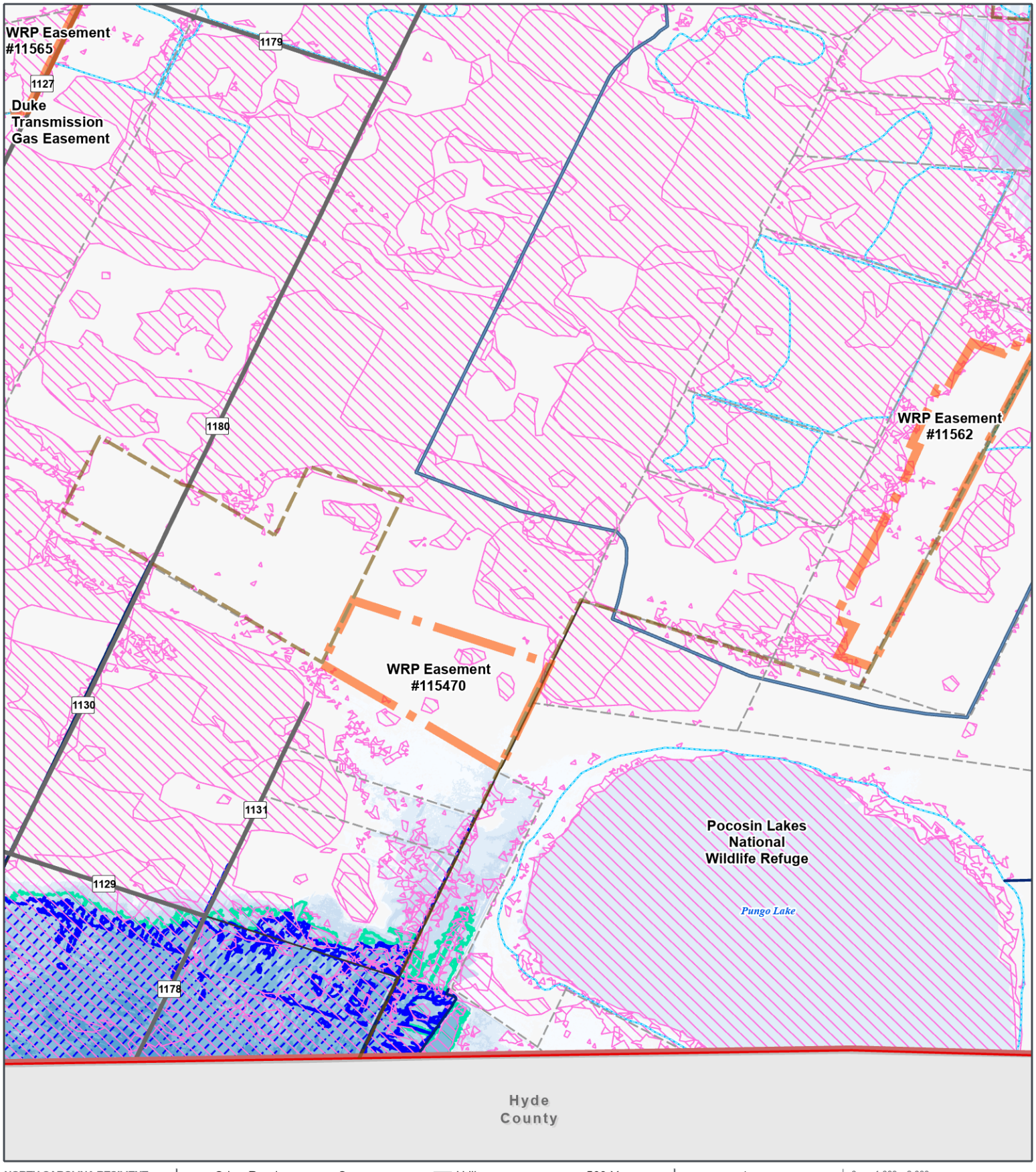
0 1,000 2,000 Feet
0 500 1,000 Meters

N

1:48,000

Base Map: Esri ArcGIS Online, accessed May 2024
Updated: 5/15/2024
Project No. 77542
Layout: ntyAssetsAndHazardsMap_Attachment
Aprx: 77542_ncRccp2023_BjWorking

SWCA ENVIRONMENTAL CONSULTANTS



NORTH CAROLINA RESILIENT COASTAL COMMUNITIES PROGRAM

Assets and Hazards Map

- Other Road
- Local Road
- State Highway
- County Boundary
- County Boundary
- Community Boundary
- Scuppernong River Watershed
- Waterway
- Waterbody

Asset Area

- Natural Area
- Parks and Recreation
- Utility
- Historic Flooding - Hurricanes Matthew and Florence

FEMA Flood Zone

- 100-Year Floodplain
- 500-Year Floodplain

Sea Level Rise Potential

- Highest Likelihood
- Lowest Likelihood

Washington County, NC
GCS North American 1983
35.7454°N 76.5734°W

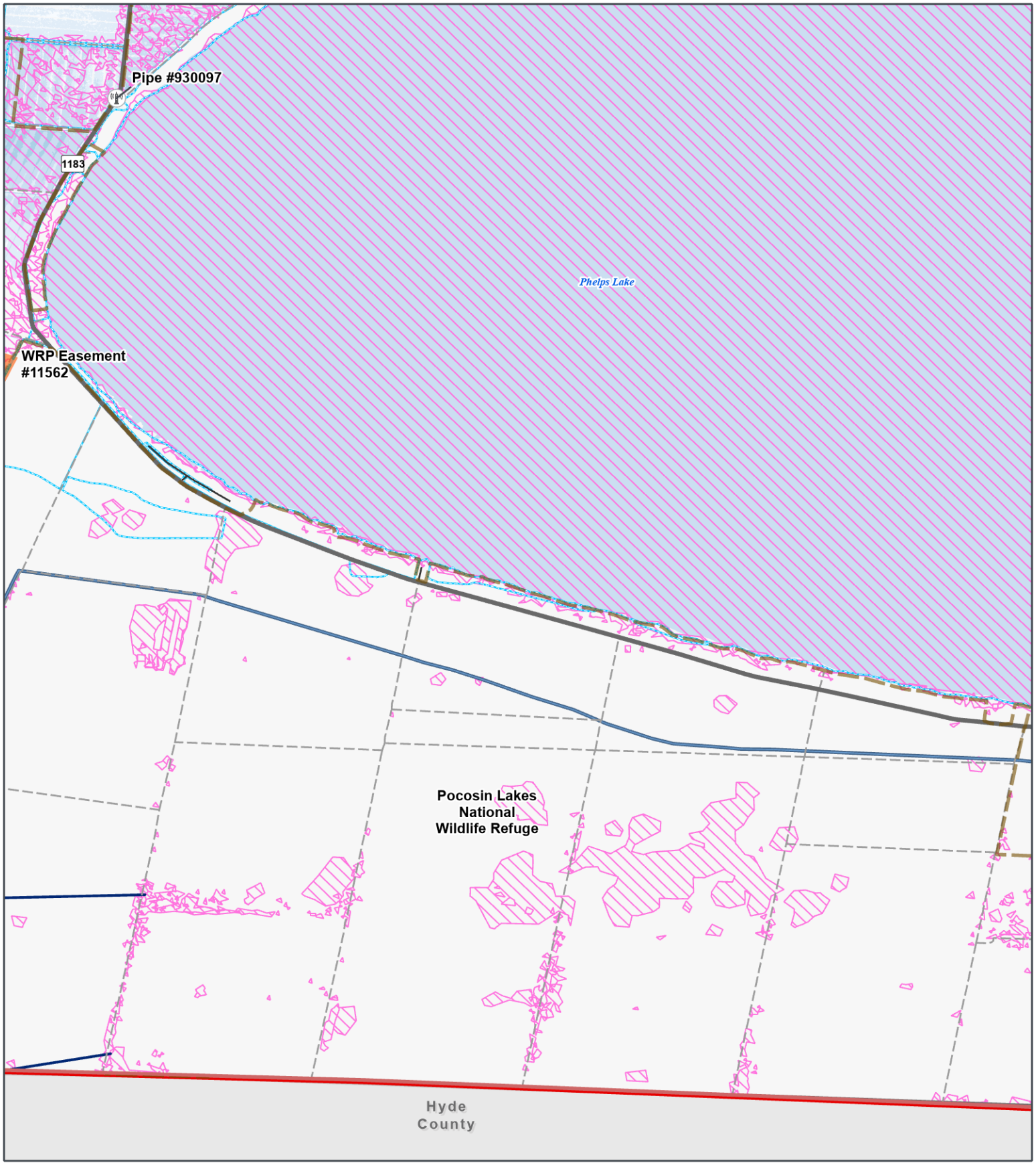
0 1,000 2,000 Feet
0 500 1,000 Meters

N

1:48,000

Base Map: Esri ArcGIS Online, accessed May 2024
Updated: 5/15/2024
Project No. 77542
Layout: ntyAssetsAndHazardsMap_Attachment
Aprx: 77542_ncRccp2023_BjWorking

SWCA ENVIRONMENTAL CONSULTANTS



NORTH CAROLINA RESILIENT COASTAL COMMUNITIES PROGRAM

Assets and Hazards Map

- Other Road
- Local Road
- State Highway
- County Boundary
- County Boundary
- Community Boundary
- Scuppernong River Watershed
- Waterway
- Waterbody

Asset Location

- Utility

Asset Area

- Natural Area
- Parks and Recreation
- Historic Flooding - Hurricanes Matthew and Florence

Sea Level Rise Potential

- Highest Likelihood
- Lowest Likelihood

Washington County, NC
GCS North American 1983
35.7454°N 76.4856°W

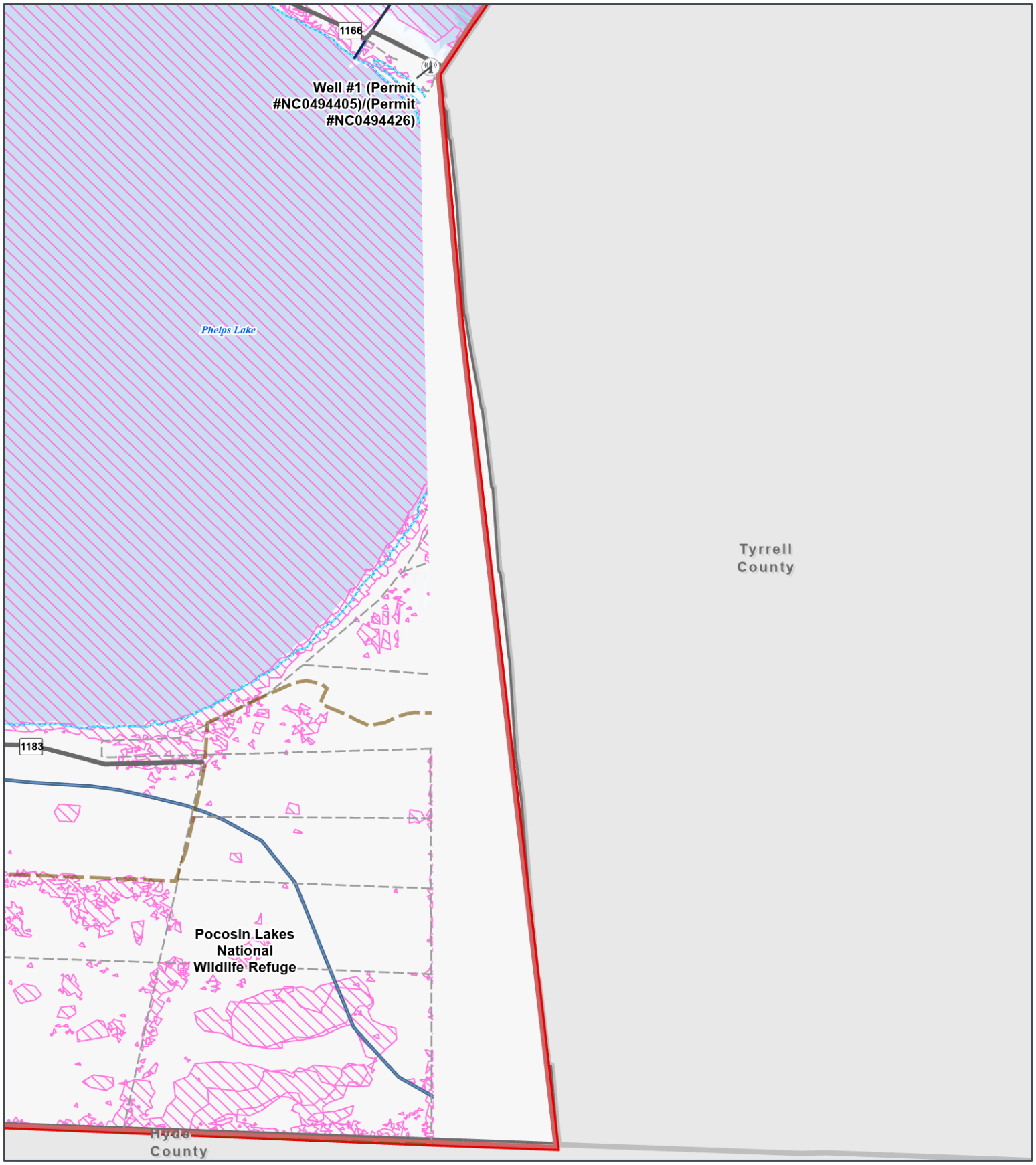
0 1,000 2,000 Feet
0 500 1,000 Meters

N

1:48,000

Base Map: Esri ArcGIS Online, accessed May 2024
Updated: 5/15/2024
Project No. 77542
Layout: ntyAssetsAndHazardsMap_Attachment
Aprx: 77542_ncRccp2023_BjWorking

SWCA ENVIRONMENTAL CONSULTANTS



NORTH CAROLINA RESILIENT COASTAL COMMUNITIES PROGRAM

Assets and Hazards Map

- Other Road
- Local Road
- State Highway
- County Boundary
- County Boundary
- Community Boundary
- Scuppernong River Watershed
- Waterway
- Waterbody

Asset Location

- Utility

Asset Area

- Parks and Recreation
- Historic Flooding - Hurricanes Matthew and Florence

Sea Level Rise Potential

- Highest Likelihood
- Lowest Likelihood

Washington County, NC
GCS North American 1983
35.7454°N 76.3979°W

0 1,000 2,000 Feet
0 500 1,000 Meters

N

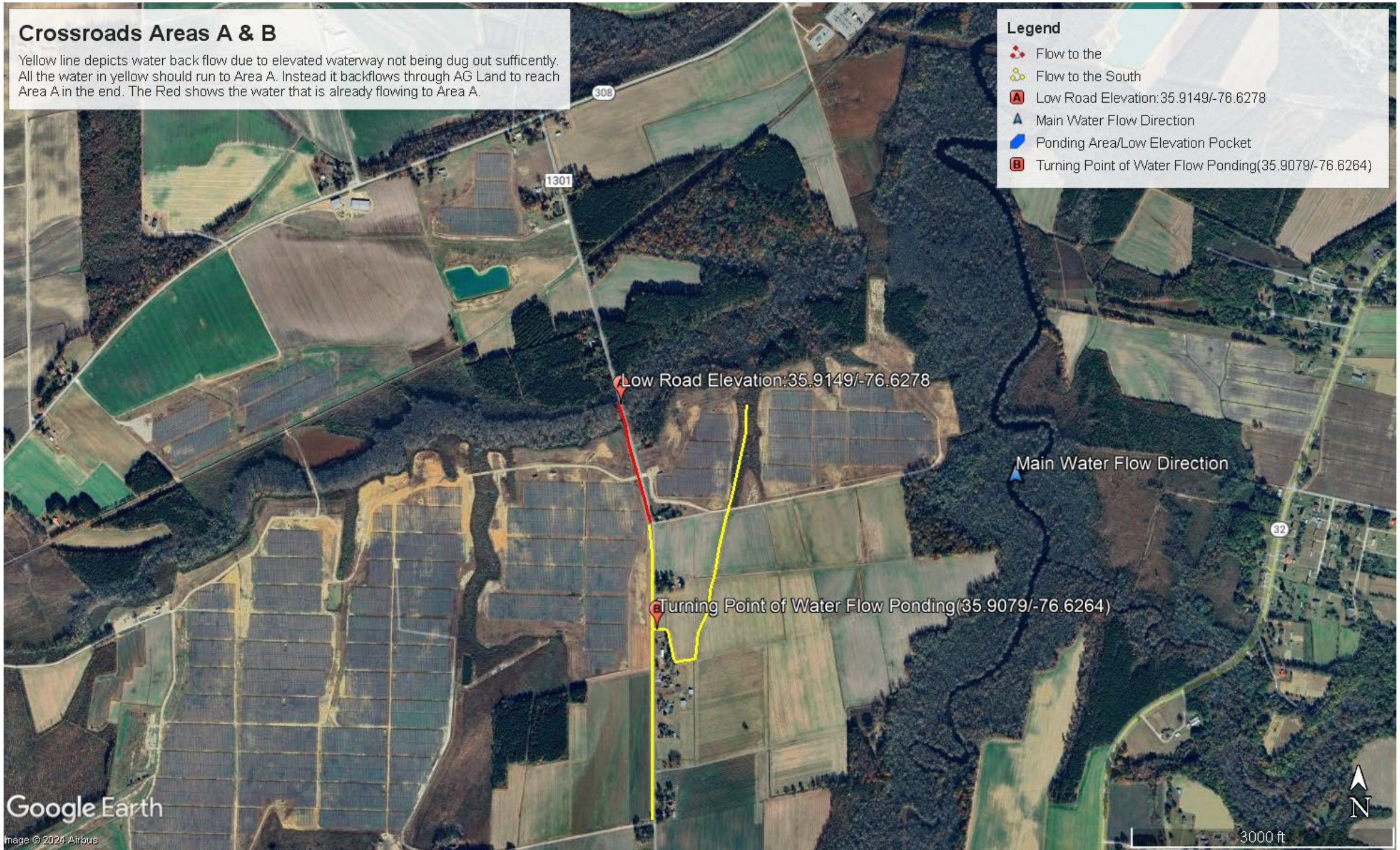
1:48,000

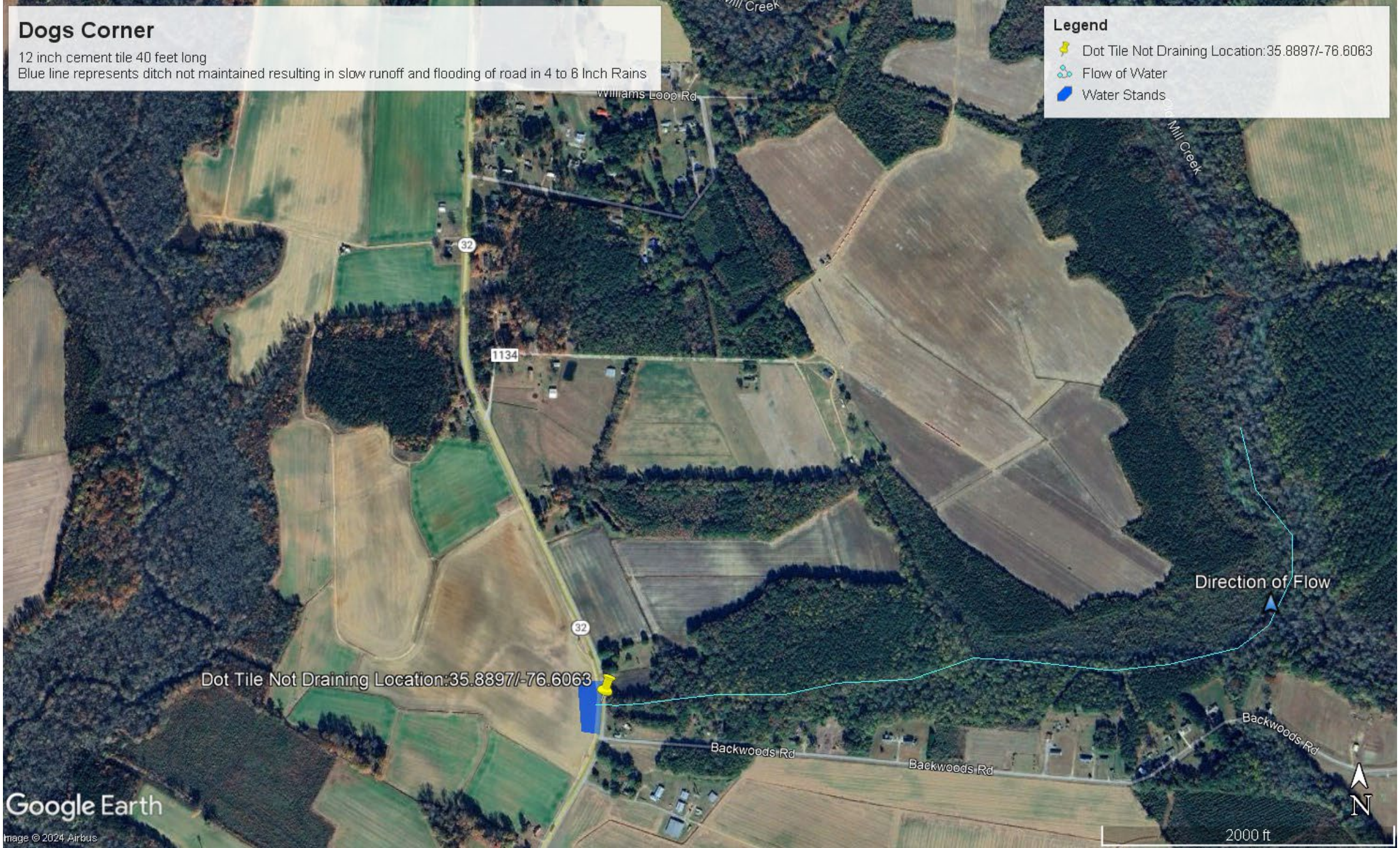
Base Map: Esri ArcGIS Online, accessed May 2024
Updated: 5/15/2024
Project No. 77542
Layout: ntyAssetsAndHazardsMap_Attachment
Aprx: 77542_ncRccp2023_BjWorking

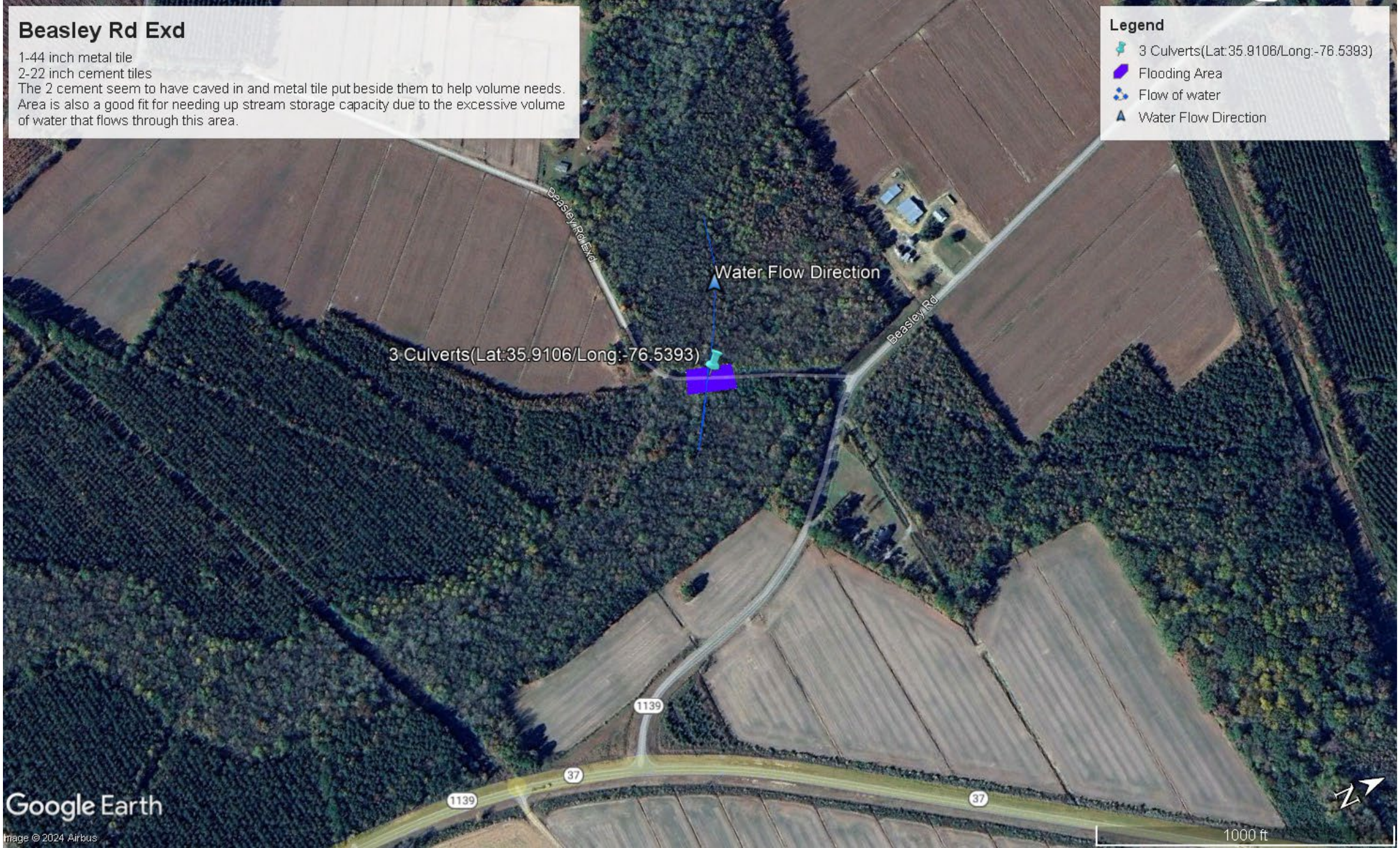
SWCA ENVIRONMENTAL CONSULTANTS

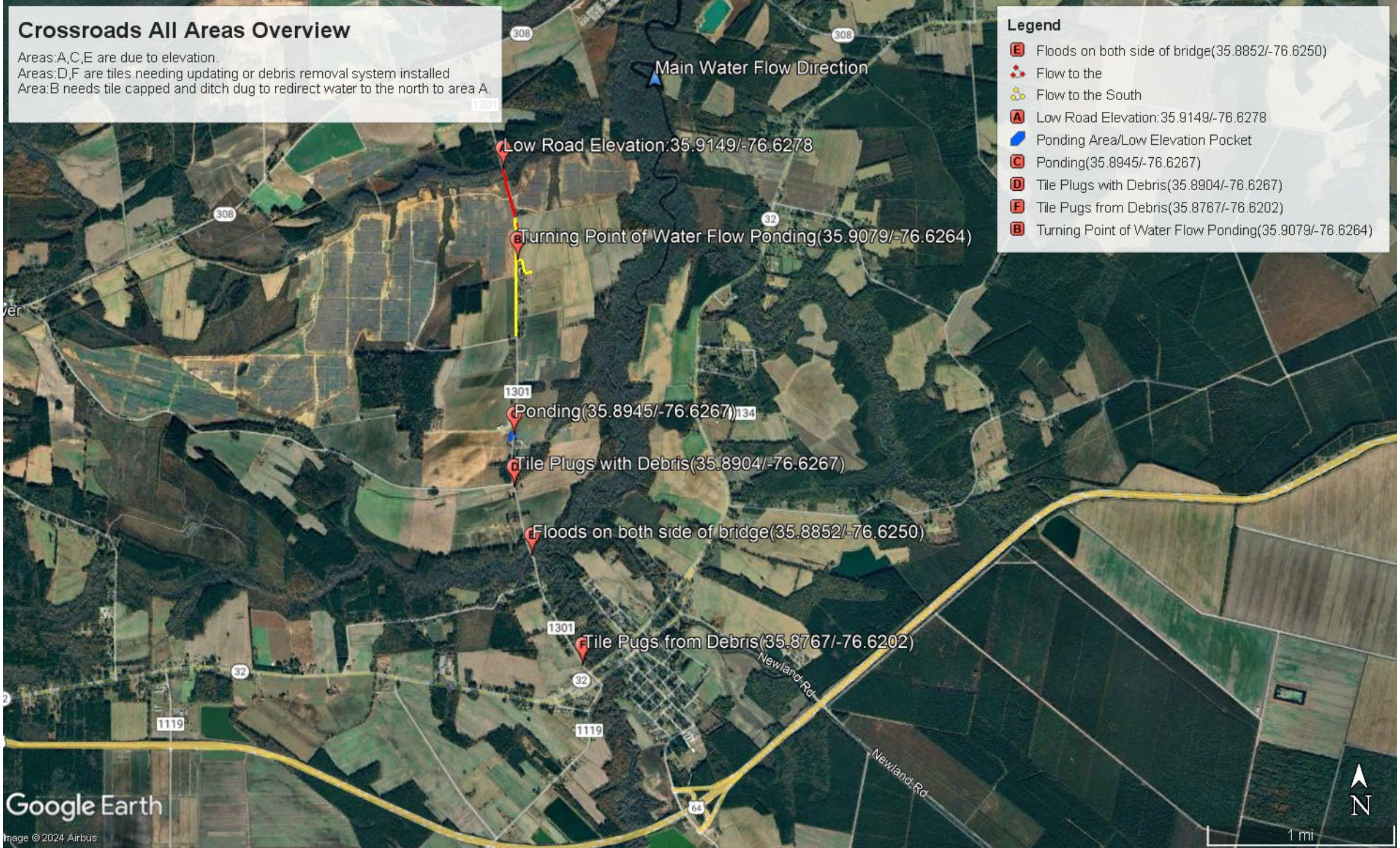
APPENDIX F

PROPOSED KEY DRAINAGE IMPROVEMENTS MAPS

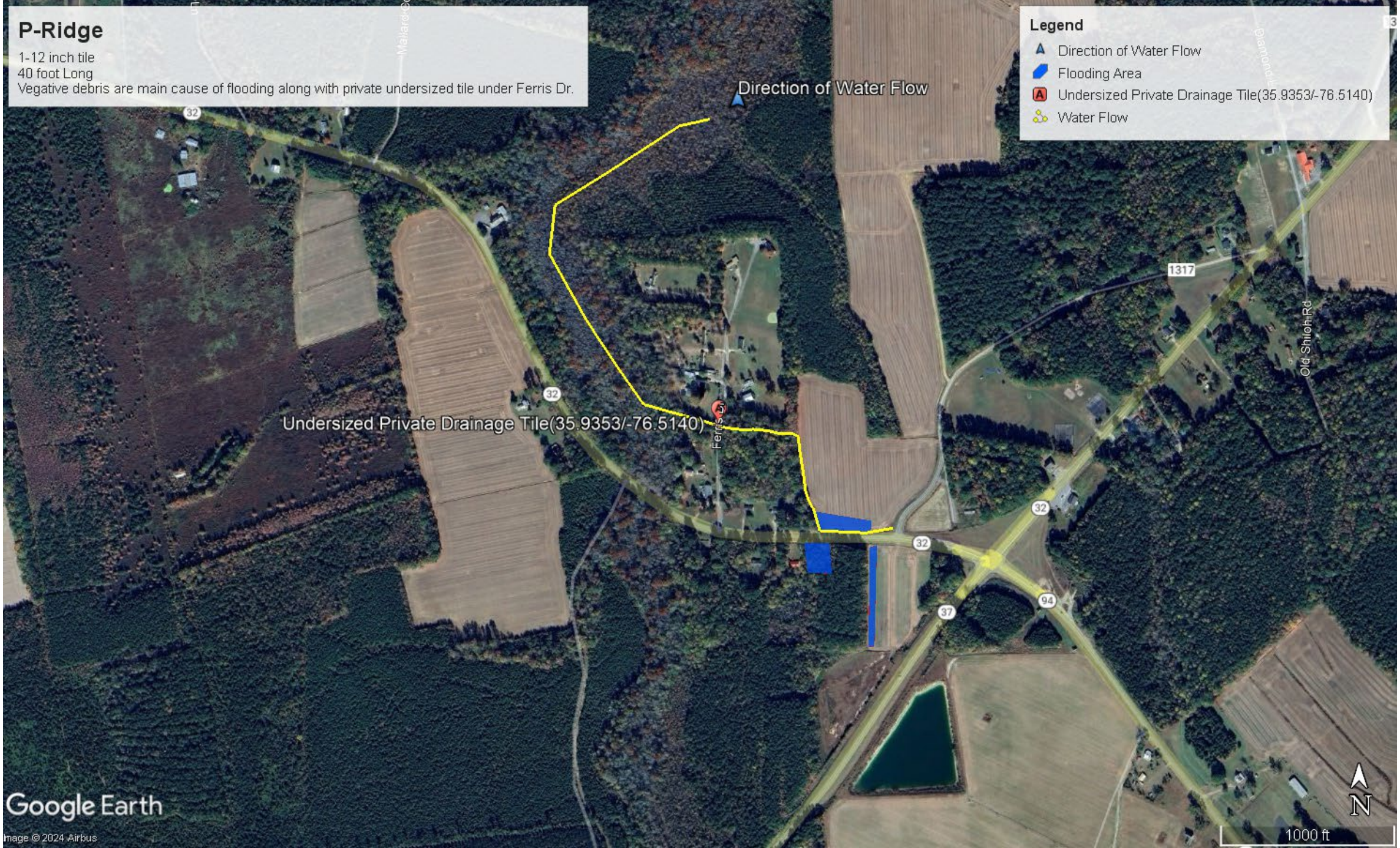

Crossroads Areas A & B
Yellow line depicts water back flow due to elevated waterway not being dug out sufficently. All the water in yellow should run to Area A. Instead it backflows through AG Land to reach Area A in the end. The Red shows the water that is already flowing to Area A.
Legend
Flow to the
Flow to the South
A Low Road Elevation:35.9149/-76.6278
Main Water Flow Direction
Ponding Area/Low Elevation Pocket
B Turning Point of Water Flow Ponding(35.9079/-76.6264)
308
1301
32
A Low Road Elevation:35.9149/-76.6278
Main Water Flow Direction
B Turning Point of Water Flow Ponding(35.9079/-76.6264)
Google Earth
Image © 2024 Airbus
N
3000 ft


Dogs Corner
12 inch cement tile 40 feet long
Blue line represents ditch not maintained resulting in slow runoff and flooding of road in 4 to 6 Inch Rains
Legend
Dot Tile Not Draining Location:35.8897/-76.6063
Flow of Water
Water Stands
Williams Loop Rd
Mill Creek
32
1134
Direction of Flow
Dot Tile Not Draining Location:35.8897/-76.6063
Backwoods Rd
Backwoods Rd
Backwoods Rd
N
2000 ft
Google Earth
Image © 2024 Airbus

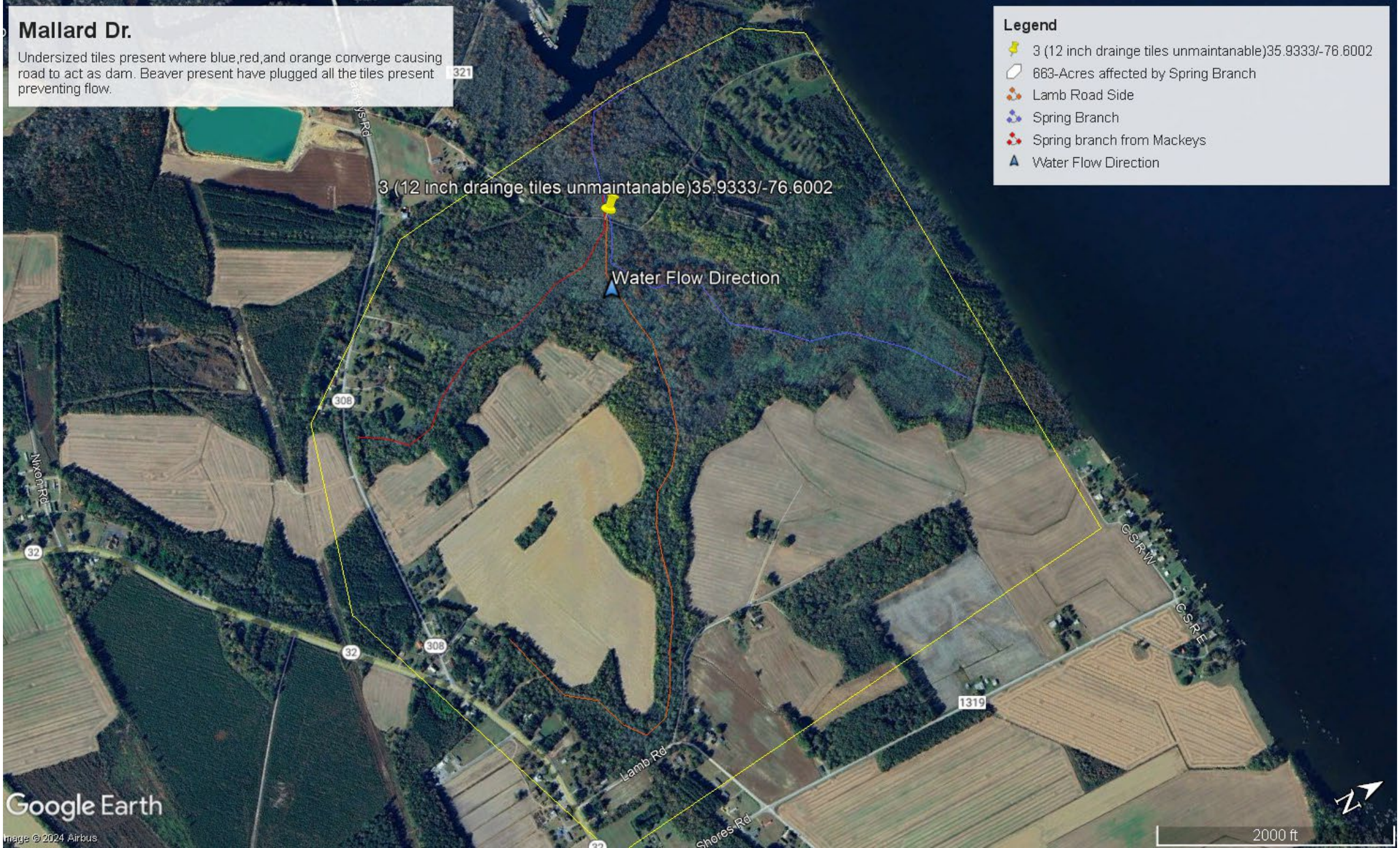

Beasley Rd Exd
1-44 inch metal tile
2-22 inch cement tiles
The 2 cement seem to have caved in and metal tile put beside them to help volume needs. Area is also a good fit for needing up stream storage capacity due to the excessive volume of water that flows through this area.
Legend
3 Culverts(Lat:35.9106/Long:-76.5393)
Flooding Area
Flow of water
Water Flow Direction
Water Flow Direction
3 Culverts(Lat:35.9106/Long:-76.5393)
Beasley Rd Exd
Beasley Rd
1139
37
1139
37
Google Earth
Image © 2024 Airbus
1000 ft

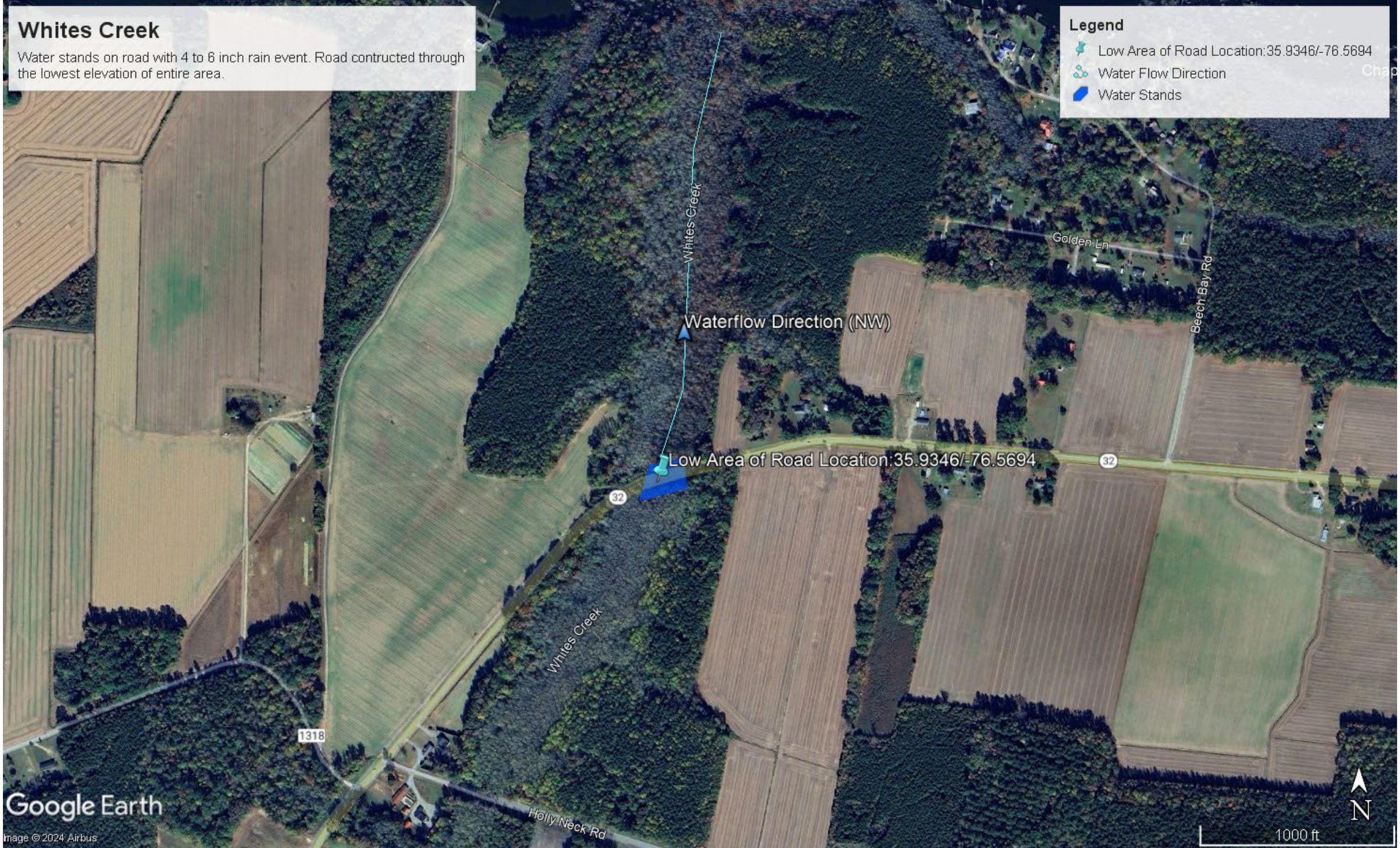

Crossroads All Areas Overview
Areas:A,C,E are due to elevation.
Areas:D,F are tiles needing updating or debris removal system installed
Area:B needs tile capped and ditch dug to redirect water to the north to area A.
Legend
E Floods on both side of bridge(35.8852/-76.6250)
Flow to the
Flow to the South
A Low Road Elevation:35.9149/-76.6278
Ponding Area/Low Elevation Pocket
C Ponding(35.8945/-76.6267)
D Tile Plugs with Debris(35.8904/-76.6267)
F Tile Pugs from Debris(35.8767/-76.6202)
B Turning Point of Water Flow Ponding(35.9079/-76.6264)
Main Water Flow Direction
Low Road Elevation:35.9149/-76.6278
Turning Point of Water Flow Ponding(35.9079/-76.6264)
Ponding(35.8945/-76.6267)
Tile Plugs with Debris(35.8904/-76.6267)
Floods on both side of bridge(35.8852/-76.6250)
Tile Pugs from Debris(35.8767/-76.6202)
Newland Rd
Newland Rd
308
308
308
32
32
32
1301
1301
1301
134
1119
1119
64
Google Earth
Image © 2024 Airbus
N
1 mi

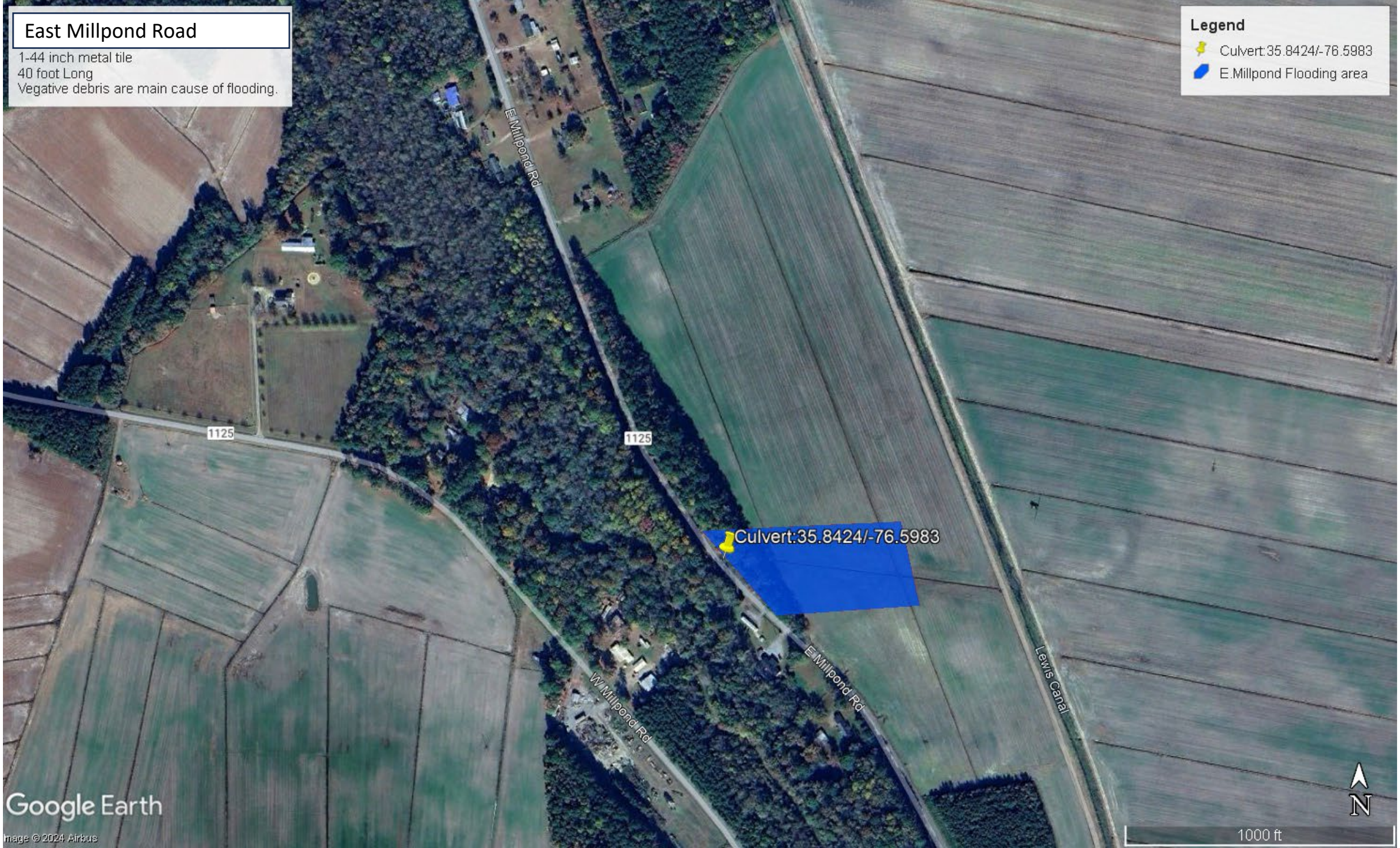

Main Canal Triple Corridor Infrastructure
The marked area has a constant build up of aquatic weeds and other vegative debris. Only aid is local farmers with equipment come to clean out and pile on the side of the road until DOT can remove it. Area could be utilized for trying out different removal devices that are stationed within the stream.
Legend
Direction of Flow
Flow of water
Triple Corridor Infrastruture(35.8816/-76.6123)
Direction of Flow
Triple Corridor Infrastruture(35.8816/-76.6123)
N Railroad St
Bullock St
Plume St
Fountain Of Life Blvd
E US Hwy 64
Buncombe Ave
Newby St
Back St
Railroad
Newand
1352
32
N
1000 ft
Google Earth
Image © 2024 Airbus


P-Ridge
1-12 inch tile
40 foot Long
Vegative debris are main cause of flooding along with private undersized tile under Ferris Dr.
Legend
Direction of Water Flow
Flooding Area
Undersized Private Drainage Tile(35.9353/-76.5140)
Water Flow
Direction of Water Flow
Undersized Private Drainage Tile(35.9353/-76.5140)
Ferris Dr
Old Shiloh Rd
1317
32
37
94
Google Earth
Image © 2024 Airbus
N
1000 ft


Chapel Swamp
Beavers present multiple times of the year. Possible location for beaver control structures.
Legend
Beavers active all the time plugging up tile Location:35.9354/-76.5515
Direction of Flow(NW)
Flow of water
Chapel Swamp
Direction of Flow(NW)
Beech Bay Rd
32
Summerby Rd
Beavers active all the time plugging up tile Location:35.9354/-76.5515
32
1170
32
Holly Neck Rd
Fray Ln
Holly Neck Rd
Google Earth
Image © 2024 Airbus
N
1000 ft


Mallard Dr.
Undersized tiles present where blue,red,and orange converge causing road to act as dam. Beaver present have plugged all the tiles present preventing flow.
Legend
3 (12 inch drainge tiles unmaintanable)35.9333/-76.6002
663-Acres affected by Spring Branch
Lamb Road Side
Spring Branch
Spring branch from Mackeys
Water Flow Direction
3 (12 inch drainge tiles unmaintanable)35.9333/-76.6002
Water Flow Direction
321
308
32
Nixon Rd
Lamb Rd
Shores Rd
1319
C S R W
C S R E
Google Earth
2000 ft


Whites Creek
Water stands on road with 4 to 6 inch rain event. Road contructed through the lowest elevation of entire area.
Legend
Low Area of Road Location:35.9346/-76.5694
Water Flow Direction
Water Stands
Whites Creek
Golden Ln
Beech Bay Rd
Waterflow Direction (NW)
Low Area of Road Location:35.9346/-76.5694
32
32
Whites Creek
1318
Holly Neck Rd
Google Earth
Image © 2024 Airbus
N
1000 ft


East Millpond Road
1-44 inch metal tile
40 foot Long
Vegative debris are main cause of flooding.
Legend
Culvert:35.8424/-76.5983
E.Millpond Flooding area
E Millpond Rd
1125
1125
Culvert:35.8424/-76.5983
W Millpond Rd
E Millpond Rd
Lewis Canal
N
1000 ft
Google Earth
Image © 2024 Airbus