

Hurricane Matthew Resilient Redevelopment Plan

Craven County



May 2017
Version 1.2

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Change Log

Version	Date	Summary of Changes
1.1	6/15/17	Minor Revisions
1.2	8/25/17	Labor and Unemployment Data Updated

Executive Summary

In October 2016, Hurricane Matthew caused widespread destruction in the Caribbean and up the Eastern Seaboard of the United States. In North Carolina, at least 26 people lost their lives, and 100,000 homes, businesses, and government buildings sustained damage estimated at \$4.8 billion.¹ At the storm's peak, 3,744 individuals fled to 109 shelters across the region. More than 800,000 households lost power and 635 roads were closed, including the major east-west and north-south corridors.

In December 2016, the North Carolina General Assembly established the North Carolina Resilient Redevelopment Planning (NCRRP) program as part of the 2016 Disaster Recovery Act (*Session Law 2016-124*). The purpose of the program is to provide a roadmap for community rebuilding and revitalization assistance for the communities that were damaged by the hurricane. The program empowers communities to prepare locally driven recovery plans to identify redevelopment strategies, innovative reconstruction projects, and other needed actions to allow each community not only to survive but also to thrive in an era when natural hazards are increasing in severity and frequency.

The NCRRP consists of planning and implementation phases and is managed through North Carolina Emergency Management.



Figure 1. NCRRP Counties

This document is a snapshot of the current needs of the County regarding holistic recovery and redevelopment. The plan will evolve as the county analyzes the risk to its assets, identifies needs and opportunities, determines the potential costs and benefits of projects, and prioritizes projects. As projects are more fully defined, the potential impact on neighboring communities and the region may lead to modifications.

Implementation of the proposed projects and actions described in this plan is subject to applicable federal, state, and local laws and regulations. Proposed projects or actions may be eligible for state or federal funding, or could be accomplished with municipal, nonprofit, or private investments. However, inclusion of a project or action in this plan does not guarantee that it will be eligible for recovery funding.

¹ State of North Carolina Supplemental Request for Federal Assistance Hurricane Matthew Recovery, <https://governor-new.s3.amazonaws.com/s3fs-public/documents/files/Hurricane%20Matthew%20Relief--2017%20Federal%20Request%20%28002%29.pdf>.

After multiple public meetings, Craven County has identified 37 projects in four pillars: Housing, Infrastructure, Economic Development, and Environmental. Details of these projects can be found in Section IV of this plan.

Pillar	Project/Action Count
Housing	5
Economic Development	2
Infrastructure	29
Environment	1
Grand Total	37

Table 1. Craven County Summary of Projects by Pillar



1. Background

1. Background

Summary of Hurricane Matthew Storm Damage

Hurricane Matthew was an extraordinarily severe and sustained event that brought record-level flooding to many areas in eastern North Carolina's coastal plain, sound, and coastal communities. Hurricane Matthew hit North Carolina on October 8, 2016, as a Category 1 storm. Communities were devastated by this slow-moving storm primarily by widespread rainfall. During a 36-hour period, up to 18 inches of heavy rainfall inundated areas in central and eastern North Carolina.

Riverine flooding began several days after Hurricane Matthew passed and lasted for more than 2 weeks. New rainfall records were set in 17 counties in the Tar, Cape Fear, Cashie, Lumber, and Neuse River watersheds. Entire towns were flooded as water levels throughout eastern North Carolina crested well beyond previously seen stages.

During the peak of the hurricane, 800,000 households lost power and 635 roads were closed, including a section of I-40 West in Johnston County that was closed for 7 days, and sections of I-95 North and South in Robeson and Cumberland Counties that were closed for 10 days.

Approximately 88,000 homes were damaged and 4,424 were completely destroyed. Losses totaled more than \$967 million, representing an economic loss as high as 68% of the damages, or \$659 million, not expected to be covered by insurance or FEMA assistance.

North Carolina Governor McCrory requested FEMA assistance on October 9, 2016, and FEMA subsequently declared a major disaster (DR-4285) for North Carolina on October 10, 2016, for 48 counties encompassing approximately 325 cities, towns, townships, and villages.

Preliminary estimates indicate more than 30,000 businesses suffered physical or economic damage, and 400,000 employees were affected as a result. Hurricane Matthew also had a significant impact on the agriculture and agribusiness economy in eastern North Carolina. The nearly 33,000 agricultural workers and 5,000 agricultural-support workers hit by the storm account for more than half of the state's agriculture and agriculture-support workforce.

Initial economic analysis of the impacts of crop and livestock losses caused by Hurricane Matthew estimated the loss of more than 1,200 jobs and roughly \$10 million in state and local income and sales tax revenue. ²

State / Legislative Response

North Carolina's response to Hurricane Matthew included 2,300 swift-water rescues using 79 boats and more than 90 air rescues. North Carolina also deployed over 1,000 National Guard and State Highway Patrol to assist with rescue and sheltering missions. There were 3,744 individuals transported to 109 shelters across central and eastern North Carolina during the storm's peak.

FEMA's disaster declaration made 50 counties eligible for FEMA assistance, 45 of which are eligible for Individual Assistance and Public Assistance and 5 of which are eligible for Public Assistance only.

² *Governors McCrory's Request for Federal Assistance for Hurricane Matthew Recovery, November 14, 2016*

- There were 81,832 individuals registered for FEMA/state assistance.
- Federal/state financial assistance in the amount of \$92.5 million was approved to help flood survivors recover.
- Small Business Administration (SBA) loans approved for individuals after Hurricane Matthew totaled \$65.6 million.
- SBA loans approved for businesses after Hurricane Matthew totaled \$23.2 million.

After the immediate response period, North Carolina Governor McCrory and the North Carolina General Assembly took the steps summarized below to obtain and allocate long-term funding for Hurricane Matthew.

November 1: The Hurricane Matthew Recovery Committee is established. Preliminary damage assessments are completed, and the State Emergency Response Task Force continues to administer programs and identify needs unmet by existing federal programs.

November 14: Governor McCrory formally submits North Carolina's request for supplemental federal disaster assistance to the delegation as Congress returns to work.

Late November/Early December: Congress appropriates supplemental disaster assistance for North Carolina. After the supplemental federal disaster recovery assistance package is received, Governor McCrory submits a supplemental state disaster assistance package (House Bill 2) recommendations to the General Assembly and calls a special session. Governor McCrory then signs the Hurricane Matthew Recovery Act to fund disaster recovery efforts.

This supplemental federal assistance was to focus on housing, infrastructure, economic development, and the environment. These four pillars were to be funded through the following programs and agencies: The U.S. Department of Housing and Urban Development's Community Development Block Grant–Disaster Recovery (CDBG-DR) program, Army Corps of Engineers Operations and Maintenance, the FEMA National Dam Safety Program, the Federal Highway Administration's Emergency Highway Funding, and the U.S. Department of Agriculture's Emergency Conservation and Watershed Protection programs.

Resilient Redevelopment Planning

The purpose of the NCRRP program is to provide a roadmap for communities in eastern North Carolina to rebuild and revitalize after being damaged by Hurricane Matthew. The program empowers communities to prepare locally driven, resilient redevelopment plans to identify redevelopment strategies, innovative reconstruction projects, and other actions to allow each community not only to survive, but also to thrive in an era when natural hazards are increasing in severity and frequency.

The NCRRP process employs a holistic approach to planning that includes four pillars: housing, infrastructure, economic development, and the environment. Redevelopment strategies and reconstruction projects for each of the four pillars is included in each plan.

The NCRRP process consists of planning and implementation phases and is managed through North Carolina Emergency Management (NCEM).

Scope of the Plan

This document is a snapshot of the County's current needs for achieving holistic recovery and redevelopment. The plan will evolve as the County analyzes the risk to its assets, identifies needs and opportunities, determines the potential costs and benefits of projects, and prioritizes the projects. As projects are more fully defined, the potential impact on neighboring communities and the region may lead to modifications.

Planning objectives are to (1) develop strategic, resilient redevelopment plans and actions, and (2) to define any unmet funding needed to implement such actions after taking into account other funding sources.

The resulting resilient redevelopment plans will be the foundation for any supplemental funding received through Congress, the North Carolina General Assembly, and other funding sources. These plans will also be the basis for the state's Recovery Action Plan, which is required by the U.S. Department of Housing and Urban Development before the state can expend funds received from the CDBG-DR program.

Local Participation and Public Engagement

Stakeholder engagement and public involvement was an essential component of the NCRRP initiative. Three robust rounds of discovery, analysis, collaboration, and interaction were held with each affected county. Each meeting had two components: an in-depth working session with county officials, subject matter experts, and planners from the affected counties and municipalities; and a public open house. The purpose of each meeting was as follows:

Meeting 1 – Initiated the planning process and validated the existing data pertaining to damage and impacts.

Meeting 2 – NCEM presented draft documentation of resilient redevelopment strategies and received feedback from community leaders and the public.

Meeting 3 – NCEM presented refined resilient redevelopment strategies based on feedback from Meeting 2 and received additional feedback for finalization of the plan.

Each of the 50 counties that were declared a major disaster by the President of the United States as a result of Hurricane Matthew under the Stafford Act (P.L. 93-288) participated in the resilience redevelopment planning process. Each municipality in those counties, as well as the five economic development regions that sustained damage from Hurricane Matthew, were also invited to participate.

The counties impacted by the storm cover the eastern half of North Carolina and occupy parts of the piedmont, sand hills, and coastal areas of the state. A map depicting Craven County and surrounding counties is shown below.

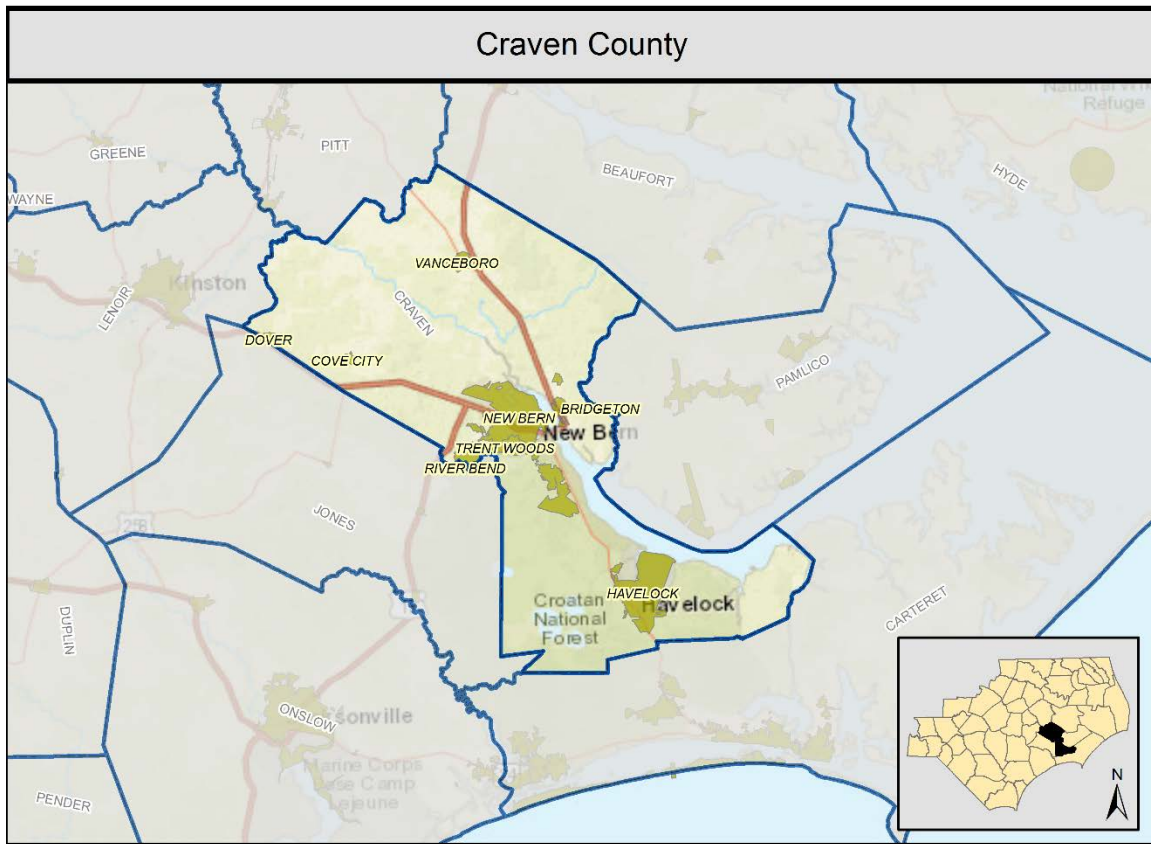


Figure 2. Craven County and Neighboring Counties

Data, Assumptions, and Methodologies

NCEM has assembled a wealth of data, resources, and technical expertise from state agencies, the private sector, and the University of North Carolina system to support the development of innovative best practice strategies.

Implementation of the proposed projects and actions described in this plan is subject to applicable federal, state, and local laws and regulations. Inclusion of a project or action in this plan does not guarantee that it will be eligible for recovery funding. However, proposed projects or actions may be eligible for state or federal funding or could be accomplished with municipal, nonprofit, or private investment.

An aerial photograph showing a residential neighborhood severely affected by flooding. The water is a murky brown color, inundating the yards and streets between houses. The houses are mostly two-story structures with light-colored siding and dark roofs. Some trees are partially submerged, with only their tops visible above the water. The overall scene depicts a significant natural disaster impact on a community.

2. County Profile

2. County Profile

Craven County is located in eastern North Carolina approximately 125 miles southeast of Raleigh and approximately 100 miles northeast of Wilmington. It includes the cities of New Bern and Havelock; the towns of Bridgeton, Cove City, Dover, River Bend, Trent Woods, and Vanceboro; and the census-designated places of Brices Creek, Fairfield Harbour, James City, and Neuse Forest. The city of New Bern is the county seat. The population is 104,450. The Marine Corps Air Station at Cherry Point, which is located in Havelock, occupies more than 29,000 acres and is home to nearly 8,600 active duty personnel. The Croatan National Forest, which covers 160,000 acres, is also located in Craven County west of Havelock and south of New Bern. This section provides a profile of housing, economics, infrastructure, environment, and administration within Craven County.

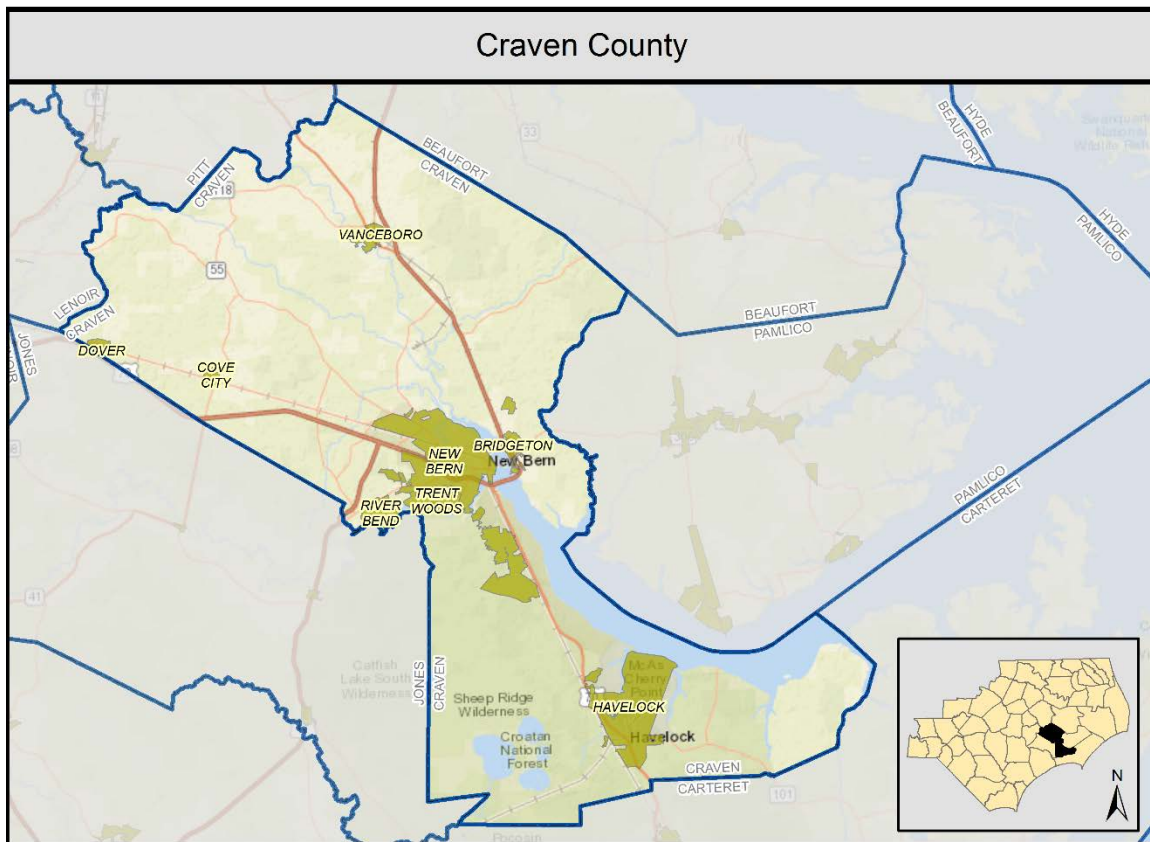


Figure 3. Craven Base Map

Demographic Profile

Demographics for Craven County and census-designated places within the county are summarized and compared to statewide averages in this profile. The demographic data is from the 2000 Census, 2010 Census, and 2011-2015 American Community Survey five-year estimates.

Population

Craven County has a population of 104,450. New Bern is the most populous place within Craven County with a population of 30,218 and the town of Dover is the least populous place with a population of 284.³

³ Source: US Census Bureau, American Community Survey 5-year Estimates (2011-2015), Table B01001, "Sex by Age."

Population Change (2000 to 2010)

The Craven County population increased between the 2000 and 2010 Census. In 2000 the population was 91,436 and in 2010 it was 103,505. The population increased by 12,069 people, or greater than 13 percent. In comparison, North Carolina grew by 19 percent from 8,049,313 people in 2000 to 9,535,483 in 2010.⁴

Age

The median age in Craven County is 36, which is less than the median age of 42 for North Carolina. Within Craven County, the Fairfield Harbour population has the oldest median age, 65.5, and the Havelock population has the youngest median age, 23.⁵

Race and Ethnicity

Craven County is mostly White (70.5 percent) and African American (22 percent) with other races constituting the remaining 7.5 percent (less than 1 percent American Indian and Alaska Native, 2.5 percent Asian, less than 1 percent Native Hawaiian/Pacific Islander, 2 percent Some Other Race, and 2.5 percent Two or More Races). Craven County's ethnic composition (see Table 2) closely mirrors that of the state of North Carolina, which is 70 percent White, 22 percent African American, 1 percent American Indian and Alaska Native, 3 percent Asian, less than 1 percent Native Hawaiian/Pacific Islander, 3 percent Some Other Race, and 2 percent Two or More Races. Refer to the table below.

Within Craven County, all census-designated places except Cove City and Dover are predominantly White, while Cove City and Dover are majority African American. The Latino population in Craven County is 7 percent compared to 9 percent for North Carolina. Havelock has the largest Latino population (13 percent) while Bridgeton, Cove City, and Dover each have fewer than 10 individuals who identify themselves are Latino. New Bern, the largest city in the county and the county seat, has a Latino population of 5 percent.⁶

Geography	White	Black or African American	American Indian and Alaska Native Alone	Asian	Native Hawaiian/Pacific Islander	Some Other Race	Two or More Races	Total Non-White
Brices Creek CDP	79.5%	13.1%	2.6%	2.7%	0.0%	0.0%	2.1%	20.5%
Bridgeton town	93.8%	6.3%	0.0%	0.0%	0.0%	0.0%	0.0%	6.3%
Cove City town	46.8%	52.3%	0.0%	0.0%	0.0%	0.4%	0.4%	53.2%
Dover town	46.8%	52.5%	0.0%	0.0%	0.0%	0.0%	0.7%	53.2%
Fairfield Harbour CDP	98.1%	1.4%	0.0%	0.0%	0.0%	0.5%	0.0%	1.9%
Havelock city	70.1%	18.2%	0.5%	2.4%	0.1%	2.5%	6.2%	29.9%
James City CDP	78.9%	14.8%	2.9%	0.0%	0.0%	2.1%	1.3%	21.1%
Neuse Forest CDP	83.1%	14.6%	0.0%	1.4%	0.9%	0.0%	0.0%	16.9%

⁴ Source: Minnesota Population Center. National Historical Geographic Information System: Version 11.0 [Database]. Minneapolis: University of Minnesota. 2016. <http://doi.org/10.18128/D050.V11.0>. Census 2000/Census 2010 Time Series Tables Geographically Standardized

⁵ Source: US Census Bureau, American Community Survey 5-year Estimates (2011-2015), Table B01001, "Sex by Age."

⁶ Source: US Census Bureau, American Community Survey 5-year Estimates (2011-2015), Table B02001, "Race" and Table B03002, "Hispanic or Latino Origin by Race."

Geography	White	Black or African American	American Indian and Alaska Native Alone	Asian	Native Hawaiian/Pacific Islander	Some Other Race	Two or More Races	Total Non-White
New Bern city	56.5%	32.1%	0.2%	6.1%	0.0%	2.5%	2.5%	43.5%
River Bend town	95.0%	2.4%	0.0%	0.0%	0.0%	0.3%	2.3%	5.0%
Trent Woods town	97.9%	0.6%	0.2%	0.0%	0.0%	1.0%	0.4%	2.1%
Vanceboro town	66.6%	30.9%	0.3%	0.0%	0.0%	0.2%	2.2%	33.4%
Craven County	70.5%	21.8%	0.6%	2.5%	0.1%	2.0%	2.5%	29.5%
North Carolina	69.5%	21.5%	1.2%	2.5%	0.1%	3.0%	2.4%	30.5%

Table 2. Craven County Race and Ethnicity

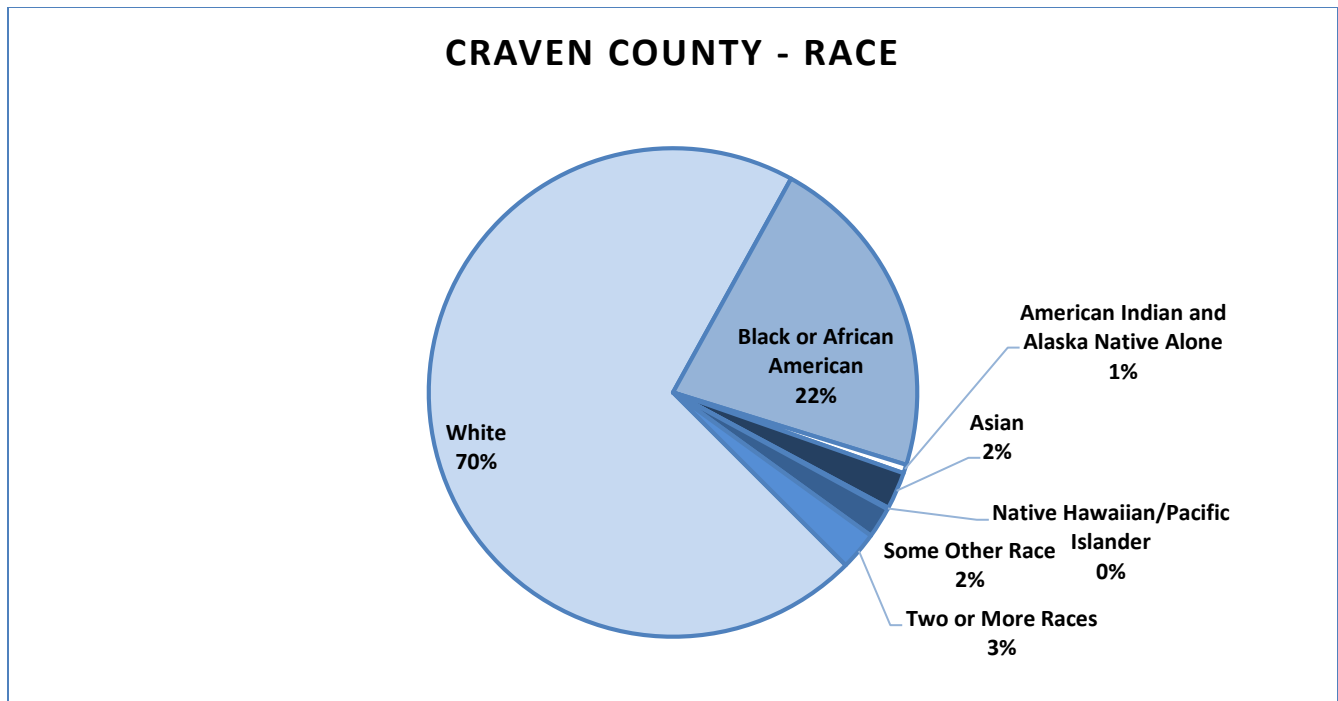


Figure 4. Breakdown of Craven County population by race.

Limited English Proficiency

Limited English Proficiency (LEP) is defined as populations 18 years or older that speak English less than very well. In Craven County, most of individuals identified as LEP speak Spanish while others speak Asian/Pacific, Indo-Euro, or other languages. Similarly, the primary language group for LEP individuals in North Carolina is Spanish. Within Craven County, New Bern has the largest LEP population by number of people. The primary language group for LEP populations in New Bern is Asian/Pacific. In Dover, Fairfield Harbour, Havelock, James City, and Trent Woods, the primary language group is Spanish while the primary LEP language in River Bend and

Cove City is Other Indo-Euro. Brices Creek, Bridgeton, and Vanceboro do not have a LEP population according to census data.⁷

Poverty

In Craven County, 16 percent of the population is below the poverty level compared to 17 percent of the North Carolina population. In Dover, 30 percent of the population is below poverty level, followed by Vanceboro with 28 percent. Both New Bern and Cove City have 20 percent of their populations below the poverty level. Havelock and James City both have 14 percent of their populations below the poverty level. In the remaining census-designated areas of Craven County, less than 10 percent of the population is living below poverty level: Brices Creek (9%), Bridgeton (6%), Fairfield Harbour (2%), Neuse Forest (3%), River Bend (7%), and Trent Woods (3%).⁸

Low and Moderate Income Individuals

In Craven County, 39 percent of the population is classified as low and moderate income (LMI) individuals based on the US Department of Housing and Urban Development's definition. Similarly, 39 percent of the North Carolina population is classified as LMI.⁹

Median Household Income

The median household income of the population 25 to 64 years old is \$54,000 in Craven County and \$53,000 in North Carolina. Brices Creek has the highest median household income for this age group, \$94,000, and Cove City has the lowest: \$44,000. Median household income was not available for Dover.¹⁰

Zero Car Households

In Craven County, 8 percent of households do not have a vehicle available compared to 7 percent of North Carolina households. Within Craven County, New Bern has the highest percentage of households without access to a vehicle, 15 percent, followed by Vanceboro with 11 percent. Bridgeton and Neuse Forest have the lowest percentage: 0 percent.¹¹

⁷ Source: US Census Bureau, American Community Survey 5-year Estimates (2011-2015), Table B16004, "Age by Language Spoken at Home by Ability to Speak English for the Population 5 Years and Over."

⁸ Source: US Census Bureau, American Community Survey 5-year Estimates (2011-2015), Table C17002, "Ratio of Income to Poverty Level in the Past 12 Months."

⁹ Source: US Department of Housing and Urban Development, Estimate of Low and Moderate Income Individuals, <https://www.hudexchange.info/programs/acs-low-mod-summary-data/acs-low-mod-summary-data-block-groups-places/>

¹⁰ Source: US Census Bureau, American Community Survey 5-year Estimates (2011-2015), Table B19094, "Median Household Income in the Past 12 Months."

¹¹ Source: US Census Bureau, American Community Survey 5-year Estimates (2011-2015), Table B25044, "Tenure by Vehicles Available."

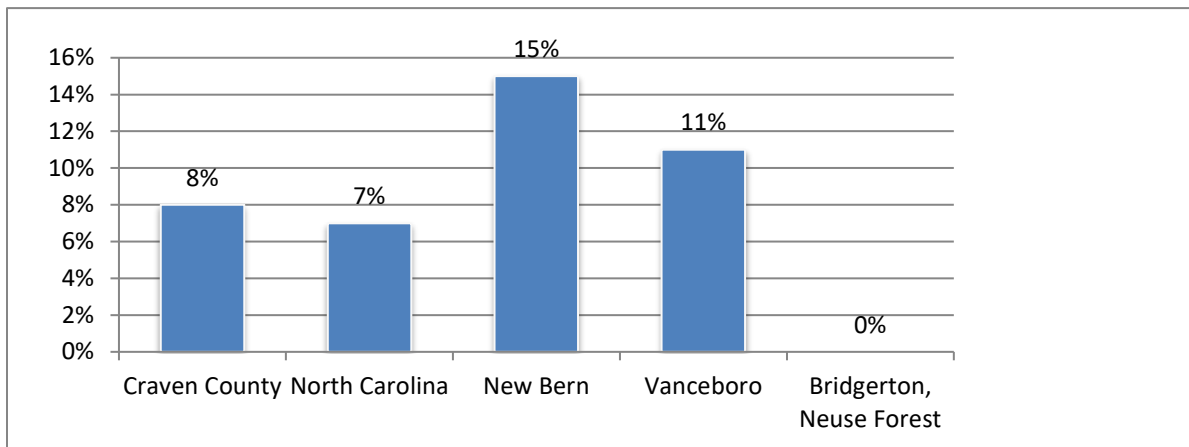


Figure 5. Zero Car Households by Percentage

Commuting: Travel Time to Work, Means of Transportation

The majority of Craven County residents commute alone to work by vehicle, 80 percent, which is similar to North Carolina average of 81 percent. Within Craven County, Neuse Forest has the largest percentage of commuters commuting alone, 95 percent, and Havelock has the least: 71 percent.

Havelock has the largest percentage of residents commuting by public transportation: 3 percent. In comparison, 1 percent of North Carolina commuters use public transportation. A greater percentage of Havelock, Vanceboro, New Bern, and James City residents commute by walking, bike, or motorcycle than the North Carolina average of 2 percent.

The mean commute time to work for Craven County residents is 20.8 minutes. In comparison, the North Carolina mean commute time is 24.7 minutes. Within Craven County, Trent Woods has the shortest mean commute time at 15.1 minutes while Brices Creek has the longest at 25.0 minutes.¹²

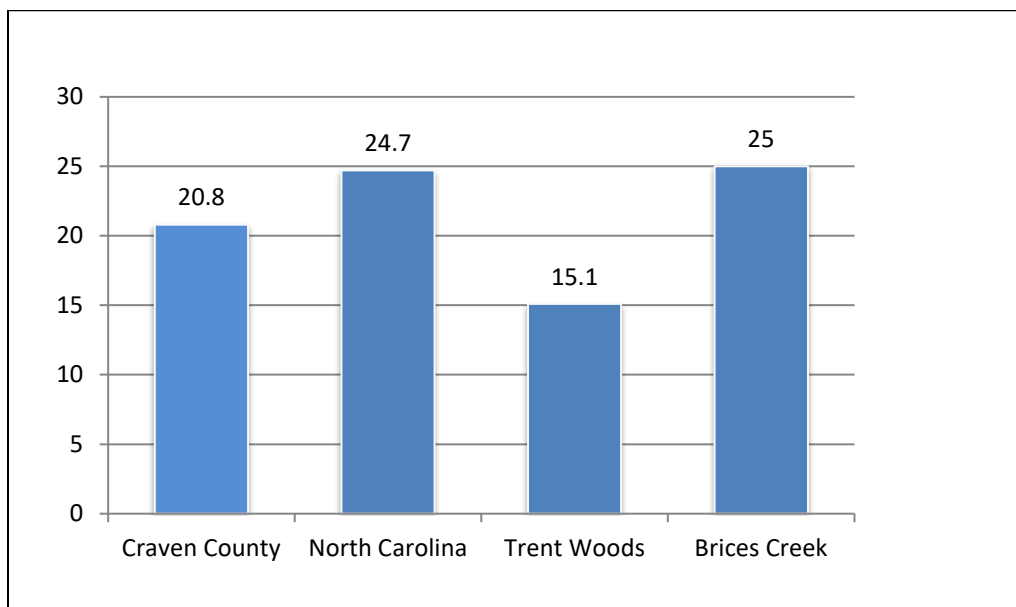


Figure 6. Mean Commute Time to Work in Minutes

¹² Source: US Census Bureau, American Community Survey 5-year Estimates (2011-2015), Table B08301, "Means of Transportation to Work" and Table GCT0801, "Mean Travel Time to Work of Workers 16 Years and Over Who Did Not Work at Home (Minutes)."

Housing Profile

Craven County has over 45,700 housing units, 71 percent of which are single-family homes, 14.5 percent multi-family units, and 14.5 percent manufactured housing.

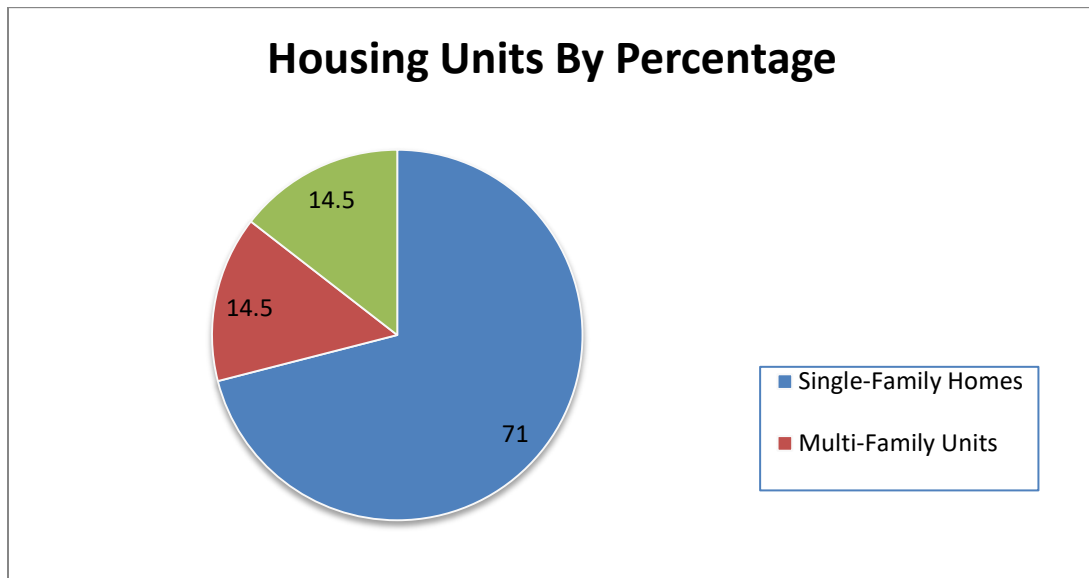


Figure 7. Housing Units by Percentage

In Craven County 12 percent of housing units are vacant, which is comparable to the statewide percentage of 14 percent. Within Craven County, Bridgeton has the largest percentage of vacant housing units, 33 percent, followed closely by Fairfield Harbour with 30 percent. Brices Creek has the least: 0 percent.

Of the occupied housing units, 63 percent are owner-occupied compared to 65 percent in North Carolina; 37 percent are renter-occupied compared to 35 percent in North Carolina.

The median housing value in Craven County \$154,500. In comparison, the median housing value in North Carolina is \$140,000. Within Craven County, Brices Creek has the highest median housing value: \$231,100. Cove City has the lowest median housing value: \$70,600.

According to the National Housing Preservation Database, Craven County has 2,207 affordable housing units. Most of the affordable housing is located within New Bern. Other units are located in Vanceboro and Havelock.¹³

Economic / Business Profile

Craven County is home to manufacturing businesses, healthcare facilities, and a military air station. According to the US Census Bureau's Longitudinal-Employer Household Dynamics Program, the largest concentrations of jobs within Craven County are in downtown New Bern, in New Bern near the intersection of Neuse Boulevard and M L King Jr Boulevard, near the intersection of South Glenburnie Road and Oaks Road, near the intersection of the railroad tracks with Craven Street, and at the Marine Corps Air Station at Cherry Point. Finally, the area bounded

¹³ Sources: US Census Bureau, American Community Survey 5-year Estimates (2011-2015), Table B25002, "Occupancy Status"; Table B25003, "Tenure"; Table B25024 "Units in Structure"; Table B25077, "Median Value (Dollars)." National Housing Preservation Database

by M L King Jr Boulevard, Route 70, and South Glenburnie Road also exhibits a strong concentration of employment.¹⁴

Labor Force

According to the local area unemployment statistics (LAUS) from the Labor and Economic Analysis Division (LEAD) for the unadjusted data for all periods in 2016, the civilian labor force population of Craven County is 41,857.¹⁵ Within Craven County, Havelock has the largest percentage of residents 16 years or over in the labor force, 79 percent, while Fairfield Harbour has the smallest: 34 percent.

The civilian unemployment rate in Craven County is 5.3 percent. In comparison, the North Carolina civilian unemployment rate is 5.1 percent.¹⁵ Within Craven County, Dover has the smallest civilian unemployment rate at 4 percent while Fairfield Harbour and New Bern have the largest: 14 percent each.¹⁶

Major Employers

The top ten employers in Craven County represent the manufacturing, public administration, education and health service industries, and are listed in order of total employees:¹⁷

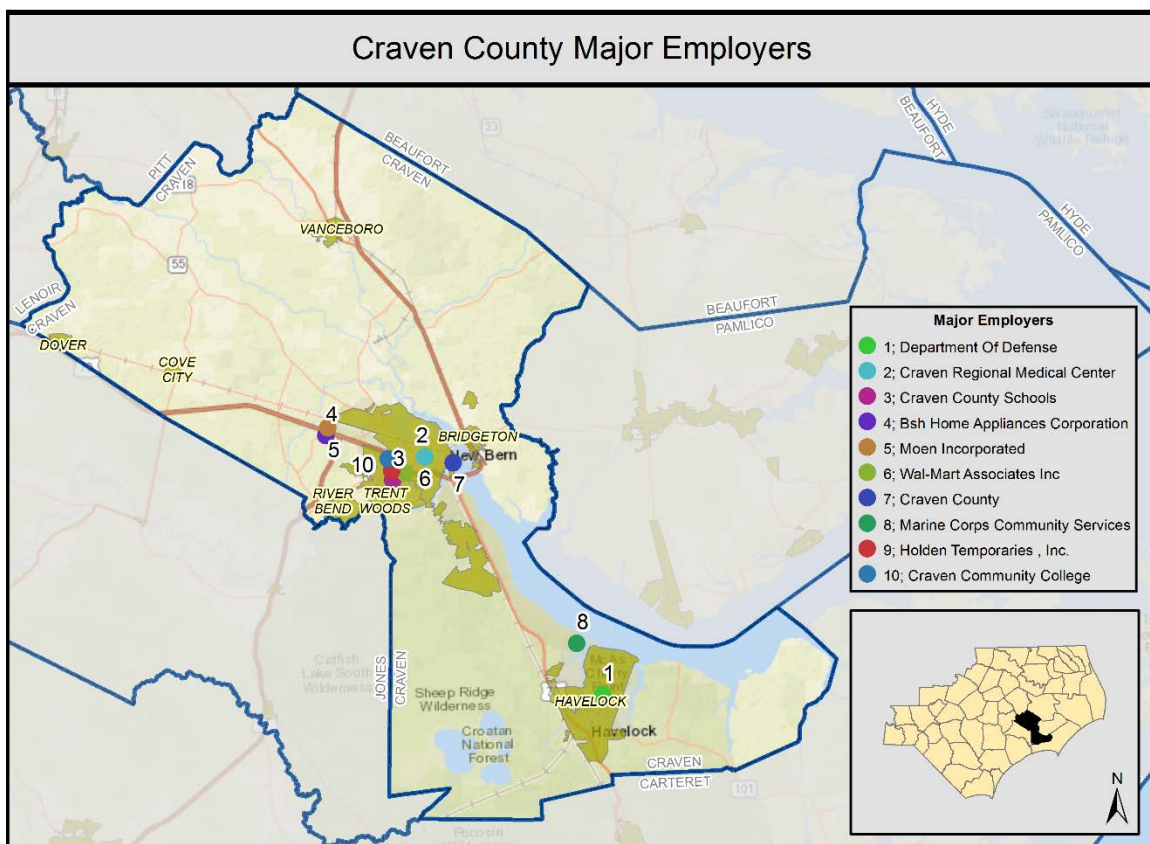


Figure 8. Major Employers by Number of Employees

¹⁴ Source: US Census Bureau Longitudinal-Employer Household Dynamics Program

¹³ Source: Civilian Population and Unemployment Rate - Labor and Economic Division (LEAD) of North Carolina Department of Commerce – Local Area Unemployment Statistics <http://d4.nccommerce.com/LausSelection.aspx>

¹⁶ Source: US Census Bureau, American Community Survey 5-year Estimates (2011-2015), Table B23025, "Employment Status For The Population 16 Years And Over."

¹⁷ Sources: NC Department of Commerce

Economic Development

The Craven County Administrator's office and the county's Economic Development Strategic Work Group undertook a planning initiative in 2013 to grow existing businesses, create an attractive business environment for new enterprises, and diversify the county's industrial base while targeting industries that match the labor pool. The organization has established goals and strategies to attract additional industry.

One goal is to provide a quality workforce and workforce/education programs. Craven Community College (CCC), located in New Bern and Havelock, offers training and job placement services through its Workforce Development classes. The college offers a FAA-certified Aviation Systems Technology program and healthcare offerings. The Bosch Advance Manufacturing Center on the New Bern campus provides state-of-the-art training in manufacturing methods to support industrial employers. The Institute of Aeronautical Technology provides training in aircraft maintenance to support the Fleet Readiness Center East at MCAS Cherry Point. CCC also offers workshops, counseling services, and free access to computer and internet tools through its Small Business Center. The East Carolina University extension offers 4-year Bachelor's degrees in Elementary, Middle Grades, and Special Education. The NC State campus in Havelock offers a 2+2 Bachelor's Degree of Engineering program with Craven Community College as well as a 4-year Mechanical Systems Engineering Bachelor's degree.

Another goal is to target specific industry clusters. The Craven County Industrial Park, off Clarks Road, is now part of a foreign trade zone created to provide additional economic growth opportunities. This arrangement is tailored to attract one of the targeted industry clusters – product manufacturing. Another targeted industry cluster – healthcare – has grown steadily and likely will continue to do so given the apparent shift in demographics toward an older population and the presence of a retirement community in Fairfield Harbour.

The county's proximity to the water and its strong agricultural base lend themselves to continued support and development of aquaculture and marine industries. Coordination with the Craven County Cooperative Extension can foster growth in these areas.¹⁸

Infrastructure Profile

Transportation, health, education, water, and power infrastructure are summarized for Craven County in the sections that follow.

¹⁸ Sources: Craven County Economic Development, Craven Community College, East Carolina University, NC State University

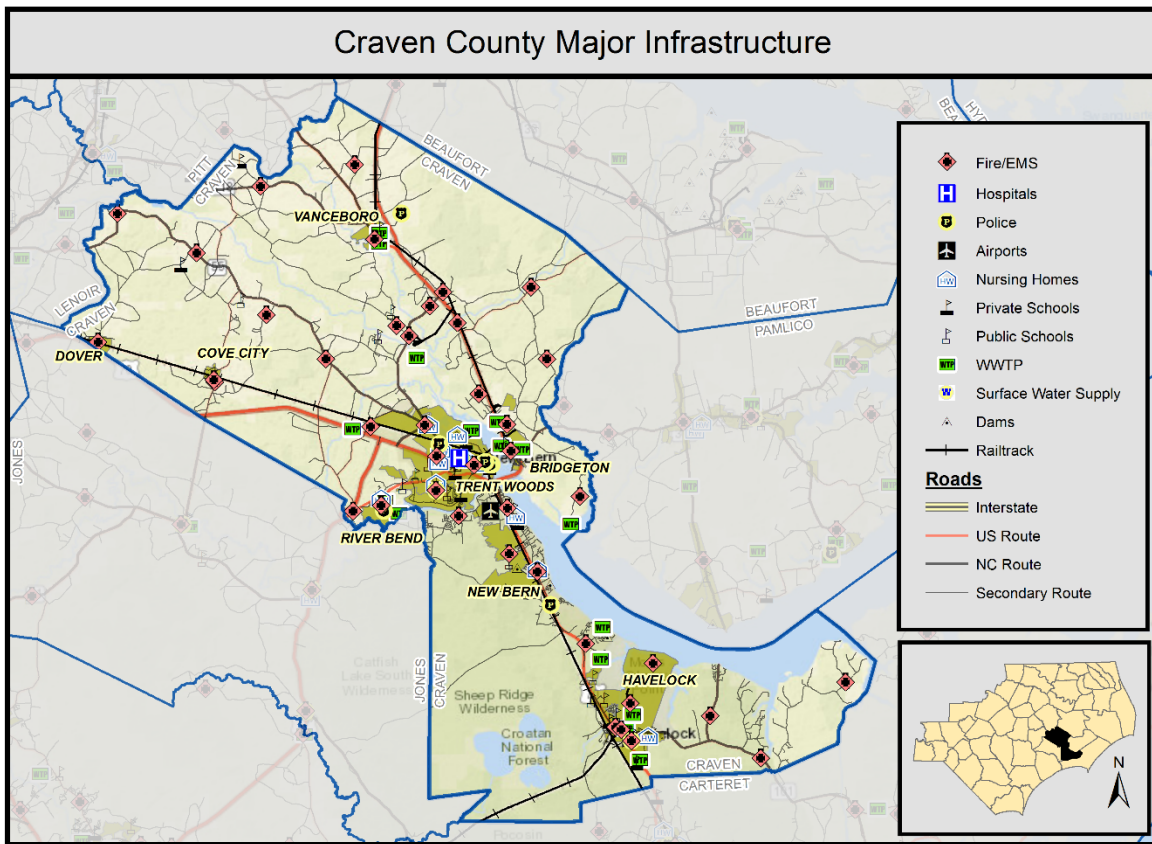


Figure 9. Craven County Major Infrastructure

Transportation

Craven County is connected to the region by US 70 and US 17. US 70 is a major east-west highway that provides Craven County with access to Goldsboro and Raleigh to the west and deep water ports to the east. US 17 is a north-south highway connecting the county with Jacksonville to the south. Craven County is also served by rail from Norfolk Southern and smaller regional operators. The Coastal Carolina Regional Airport is located in New Bern and serves the surrounding area. It handles 10 daily flights from commercial carriers American Airlines and Delta. The airport also services shipping giants Federal Express and UPS.

Health

The CarolinaEast Medical Center is the only hospital located in Craven County. It is part of the CarolinaEast Health System and is located in New Bern on Neuse Boulevard. It is a 350-bed, full-service facility and includes a heliport. There is also an outpatient surgery center located in New Bern on McCarthy Boulevard. It is part of the CarolinaEast Health System. Several urgent care and internal medicine centers are located throughout the county. There is a Naval health clinic on the Cherry Point base.

Education

Craven County Public Schools administers fifteen elementary, five middle, and seven high schools plus evening education centers at two of these locations (New Bern and West Craven High Schools). Craven Community College (CCC) has two locations, one in New Bern and one in Havelock, and is a member of the North Carolina

Community College System. CCC has partnerships with East Carolina University, North Carolina State University, and Southern Illinois University through University Connections.¹⁹

Water

The City of New Bern owns and operates the New Bern Water Treatment Plant, which has a permitted capacity of 5.5 million gallons per day (MGD) and has been designed to be expanded to 7 MGD. The system also includes 15 wells and a 2 million gallon storage tank. Cove City operates five production wells located about 10 miles west of New Bern. These wells have a permitted withdrawal capacity of 2.0 MGD. The City of Havelock's water system has a permitted capacity of 2.8 MGD and includes four wells. It has a storage capacity of 2.2 million gallons. Vanceboro has a system with a permitted capacity of 0.432 MGD and includes two wells. The storage capacity of Vanceboro's system is 0.55 million gallons. The First Craven Sanitary District serves Bridgeton (except Fairfield Harbour). It has a permitted capacity of 1.368 MGD, includes three wells, and has a storage capacity of 0.600 million gallons. River Bend, Dover, and the Marine Corps Air Station at Cherry Point also operate their own municipal water systems. The Craven County Water Department owns and operates the county water system, which provides drinking water to the rest of the residents in Craven County. Its permitted capacity is 15 million gallons per day.

The majority of rural wastewater is handled by septic systems. Municipal wastewater for New Bern is treated primarily at the main wastewater treatment plant located on Glenburnie Road. This plant, originally constructed in 1964, was last upgraded in 2003 to increase its permitted capacity to 6.5 MGD, improve influent pumping and screening structures, and to add two new secondary clarifiers with other facilities. In 2002, the city acquired the old Neuse River Sewer District system from Craven County. This plant, located on Old Airport Road, has a permitted capacity of 0.495 MGD. All of the flow handled by this plant comes from the New Bern-7 S.T.E.P. sewer system, which contains very little solids.²⁰

Power

Most electricity in Craven County is supplied by Duke-Progress Energy or New Bern Electric. Other providers include Tideland Electric and Carteret-Craven Electric Cooperative. The Craven County Wood Energy facility is a biomass-fired power plant with a 50 megawatt nominal rating. Three solar power farms are located in Craven County, each having a 5 megawatt capacity. Two are located in New Bern – Andrew Solar and Porter Solar. One is located in Ernul – New Bern Farm.²¹

Environmental Profile

Water resources, natural areas, managed areas, biodiversity, wildlife habitat, and recreation are summarized for Craven County in the sections that follow.

Water Resources

The Neuse River flows northeast-southwest through the middle of Craven County. The Trent River flows east-west. Wetlands are present throughout the county, in particular along Brice Creek, throughout the Croatan National Forest and the wilderness areas, the area south of Havelock, in a dedicated nature preserve north of

¹⁹ Sources: Craven County Public Schools and Craven Community College

²⁰ Sources: NC Division of Water Resources, Local Water Supply Plans; the Pamlico Sound Regional Hazard Mitigation Plan; First Craven Sanitary District, Craven County and City of New Bern websites

²¹ Source: US Department of Energy, US Energy Mapping System

Fairfield Harbour, and along the Neuse River and its tributaries. The most common wetland type in Craven County is freshwater forested/shrub wetland, although there are small areas of freshwater emergent wetlands east of County Club Road and along the banks of the Neuse River in New Bern.²²

Natural and Managed Areas

According to the NC Natural Heritage Program, there are natural areas of exceptional, very high, high, general, and unranked value in Craven County. Areas ranked as having exceptional value include the Little Lake/Long Lake/Sheep Ridge Wilderness, Great Lake/Pond Pine Wilderness, and Catfish Lake in the Croatan National Forest; Sweetwater Creek/Trent River Natural Area; and the Little Road Longleaf Pine Savannas north of Sheep Ridge Wilderness. Areas rated as having very high value include Pocosin Wilderness, Lake Ellis Simon, Southwest Prong Flatwoods, Havelock Station Flatwoods and Powerline Corridor, Paupers Island/Goodwin Creek Natural Area, Flanner Beach Natural Area, Neuse River Floodplain and Bluffs, Cool Springs Sand Ridge and Swamp, Deep Gully, and Reedy Branch. Many other areas of the county are rated as having high, moderate, and general value.

There are many managed areas under federal ownership within Craven County. Managed areas are properties and easements where natural resource conservation is one of the current primary management goals, or are of conservation interest. These areas include the Croatan National Forest (which includes the Sheep Ridge Wilderness, the Pine Pond Wilderness, and registered heritage areas), the Marine Corps Air Station Cherry Point Main Air Station, and a Wetland Reserve Program Easement.

There also are several managed areas under state ownership within Craven County. These include the North Carolina Department of Transportation Mitigation Site, the North Carolina Clean Water Management Trust Fund Easement, Tryon Palace State Historic Site, North Carolina Division of Mitigation Services Easement, Neuse River Game Lane, North Carolina Forest Service Easement, Conservation Reserve Enhancement Program Easement, and North Carolina Wildlife Resources Commission Easement.

Craven County government manages several open space sites in the county.

Privately-owned managed areas within Craven County include the North Carolina Land Trust Easement, North Carolina Coastal Land Trust Preserve, North American Land Trust Easement, Ducks Unlimited (Wetlands America Trust) Easement, and the Lake Ellis Simon RHA.²³

Biodiversity and Wildlife Habitat

The NC Natural Heritage Program produces a biodiversity and wildlife habitat assessment for the state. According to this assessment, areas with the highest rating for biodiversity and wildlife habitat are along the Neuse River and its tributaries, along Tucker Creek, in the Croatan National Forest, in the Sheep Ridge Wilderness, and in the Pond Pine Wilderness. These areas rank between a 7 and 10, with 10 being the highest possible score. Many other areas throughout the county rank 5 to 6, although much of the western part of the county bounded by the Neuse River to the north and Route 70 to the south is unrated.²⁴

²² Source: NC Natural Heritage Program

²³ Source: NC Natural Heritage Program

²⁴ Source: NC Natural Heritage Program

Parks and Recreation

The Craven County Recreation and Parks Department maintains several parks and facilities in Craven County. The county parks include:

- West Craven Park – Located on Streets Ferry Road in Vanceboro, West Craven Park is comprised of 90 acres and includes tennis courts, athletic fields, picnic shelters, and a playground. West Craven High School is located across the street.
- Rocky Run Park - A 5-acre neighborhood park located on Rocky Run Road in New Bern, the park has playground equipment, a picnic shelter, a basketball court, and open space.
- Creekside Park - Situated on 111 acres off in New Bern, this is the county's largest athletic park. The park has a gazebo, picnic shelters, playgrounds, athletic fields, sand volleyball courts, outdoor fitness equipment, a disc golf course, restrooms, and a walking trail. The waterfront area also has canoe and kayak access and walkways to Brices Creek.
- Latham-Whitehurst Nature Park - A 133-acre park located in New Bern, it is the county's first nature park and offers hiking, nature observation, bird watching, and access to Broad Creek by way of a boardwalk. This park also has picnic shelters, a gazebo, and restrooms.

The city of New Bern has a Parks and Recreation Department that oversees more than twenty parks in the city with amenities such as boat and fishing piers, picnic areas, athletic fields, fitness areas, walking trails, playgrounds, and a dog park. They also manage two recreation centers that house game rooms, meeting rooms with kitchen facilities, gymnasiums, a ceramic room, a walking trail, a playground, and offices.

The city of Havelock's Parks and Recreation Department operates and maintains more than 100 acres of parks and facilities. There are fifteen park sites that range in size from 0.5 acres to 50 acres; six of these sites currently are not developed. The developed parks include picnic shelters, a covered stage, playground equipment, athletic fields with concession stands, and fishing piers. The recreation center has a gymnasium, exercise/weight room, arts and crafts room, and a conference room.

The town of Trent Woods has a Parks and Recreation Department that manages and maintains two parks. Cottle Park is a new park project currently going through the planning process; it will be located on 3.5 acres on River Road. Meadows Family Park is located on Country Club Drive and has playground equipment, a pond, and restrooms.²⁵

Administrative Profile

The administrative capabilities of Craven County and the municipalities within the County are discussed in great detail within Section 4 of the Pamlico Sound Regional Hazard Mitigation Plan (2015). The assessment evaluates the capabilities of the County and municipalities to implement mitigation actions across the areas of planning and regulatory capabilities, administrative and technical capabilities, fiscal capabilities, and political capabilities. Many more details about the capabilities of Craven County and the municipalities can be found in that document.

²⁵ Sources: NC Natural Heritage Program, Craven County Recreation and Parks Department, New Bern Parks and Recreation Department, Havelock Parks and Recreation Department

In terms of administrative capabilities, the County has many of the staff and the necessary plans, policies and procedures in place that are found in communities with “high” capabilities. Craven County leads the development of the current Pamlico Sound Regional Hazard Mitigation Plan in place. They also participated in the Eastern Carolina Joint Land Use Study with the air station at Cherry Point, to identify and develop mitigation strategies associated with training exercises at the base.

Craven County has Emergency Management and Planning departments with the capacities to assist in implementing the resilience strategies proposed in this plan. Some of the other indicators of capability for the County include the following: Comprehensive Land Use Plan, Zoning Ordinance, Subdivision Regulations, and Floodplain Management Ordinance. These plans, policies and procedures help ensure that new development in the County will be managed in a responsible manner and will take place in non-hazardous areas.

New Bern and Havelock also have “high” and “moderate” capabilities. They have administrative resources that would likely be able to assist with implementing the strategies in this plan. In addition, they have the plans, policies and procedures in place that indicate higher capability. The cities of New Bern and Havelock and the Town of Trent Woods have planning, fire and rescue, and police departments that would be able to assist as well. The Towns of Vanceboro, Dover, Bridgeton, Cove City, and River Bend, and the census-designated places in the county may need assistance from other agencies in order to implement the strategies in this plan as a result of limited administrative resources.²⁶

²⁶ Sources: Craven County, City of New Bern, City of Havelock

An aerial photograph showing a residential neighborhood severely impacted by flooding. The houses, which are mostly two-story structures with grey roofs, are surrounded by deep, brown floodwater. The water has inundated the yards and streets, leaving only the roofs and some trees visible above the surface. The background shows a dense line of trees, also partially submerged. The overall scene depicts significant damage and displacement caused by a storm.

3. Storm Impact

3. Storm Impact

Rainfall Summary

Hurricane Matthew officially made landfall as a Category 1 storm southeast of McClellanville, South Carolina early on October 8, 2016. The track and speed of the storm resulted in nearly two days of heavy precipitation over much of North Carolina that caused major flooding in parts of the eastern Piedmont and Coastal Plain. The storm produced widespread rainfall of 3 to 8 inches in the central regions of North Carolina and 8 to more than 15 inches in parts of eastern North Carolina. A number of locations received all-time record, one-day rainfall amounts. Many locations in the Coastal Plain of North Carolina had received above normal rainfall in the month of September leading to wet antecedent conditions prior to Hurricane Matthew. Total rainfall depth for Craven County is highlighted graphically below.

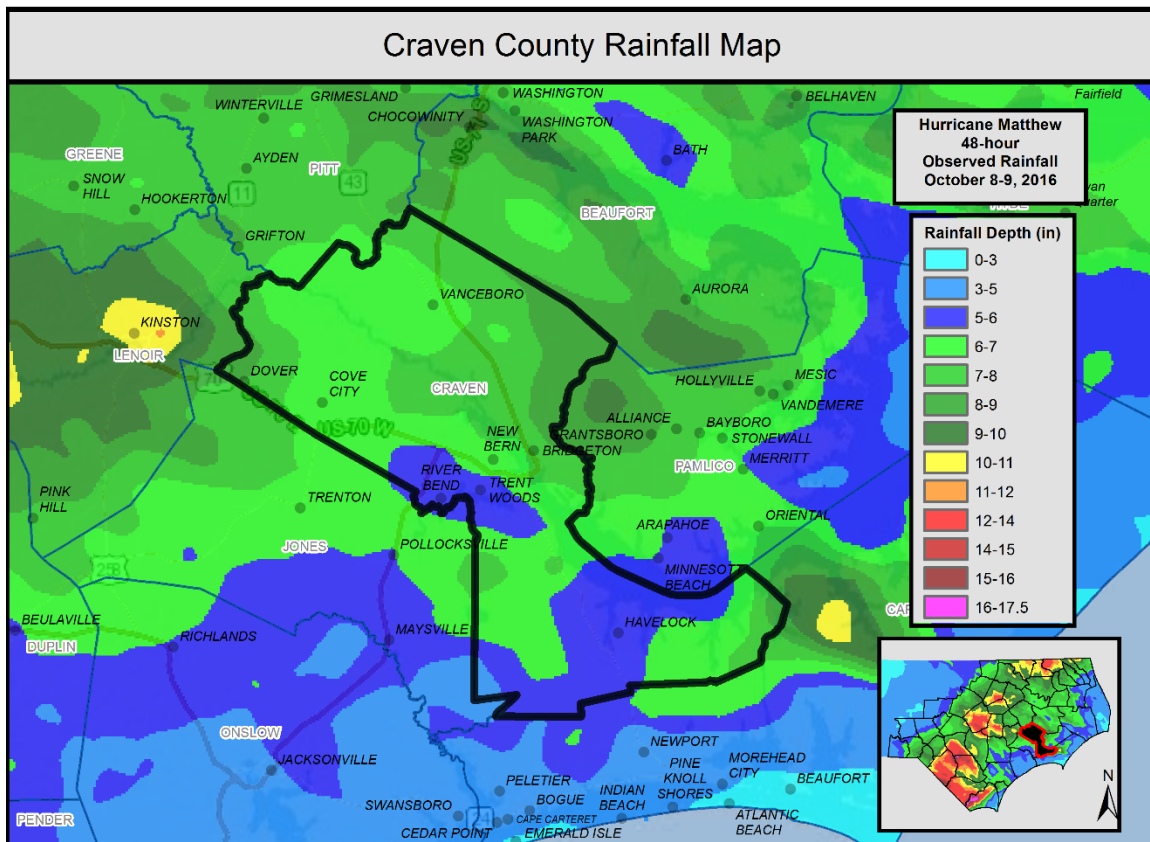


Figure 10. 48-hour Observed Rainfall Depth (October 8-9, 2016)

Riverine Flooding Summary

Craven County is the site of the confluence of the Neuse River, which originates near Durham and flows 275 miles to New Bern, and the Trent River, which runs approximately for 100 miles and originates southwest of the city of Kinston. Both of these rivers drain into Pamlico Sound. The drainage area for the Neuse River is approximately 5,630 square miles and lies entirely within the state of North Carolina. During intense and/or prolonged rain events significant quantities of runoff from the basins drain to the rivers. By the time the flows reach Craven County, they can be significantly greater than under “normal” conditions. The river gages on Swift Creek near the crossing with Route 43 (Weyerhaeuser Road) and at Fort Barnwell within Craven County do not

provide predictions of what the anticipated flood levels will be, making it difficult for officials to prepare for and warn citizens about potential flooding. USGS documented stream gage data in the report “Preliminary Peak Stage and Streamflow Data at Selected Streamgaging Stations in North Carolina and South Carolina for Flooding Following Hurricane Matthew, October 2016”. Stream gage data from the USGS report for Craven County gages is summarized in Table 3 below:

USGS Gage	County	River Name and Location	Drainage Area (sq mi)	Peak Matthew Elevation (ft)	Previous Record (ft)
0209205053	Craven	Swift Creek at HWY 43 NR Streets Ferry, NC	269	8.67 ²⁷	12.28 ²⁸
02091814	Craven	Neuse River Near Fort Barnwell, NC	3,900	20.51	22.75 ²⁹

Table 3. Craven County USGS Stream Gage Data

When compared with other events that have struck Craven County such as Hurricanes Irene (2011), Isabel (2003), and Floyd (1999), Hurricane Matthew was a lesser event. Hurricane Matthew caused flooding of homes, roads, water pump stations, and agricultural fields; a road washout on Weyerhaeuser Road east of its intersection with River Road; and county-wide power outages that lasted for 7 to 10 days. There are many roads in the county that are the only means of egress for the residents who live along them. During Matthew, several of these roads flooded, isolating the residents.

In the last several decades, the magnitude of high frequency flood events in Craven County has been increasing with the former 100-year storm flood event, now occurring approximately every eight years. These storms have caused widespread, prolonged power outages that can last two to three weeks. Flood depths in the county have been as high as 14 to 17 feet above ground elevation, blocking and washing out roads and flooding homes and vehicles. Winds knocked down power lines, power poles, and trees. Agricultural crops were destroyed by floodwaters and wind. Mixing of saltwater with freshwater adversely impacted farms, forests, and fisheries.

Coastal Flooding Summary

USGS and NOAA coastal/tidal station records were analyzed along the North Carolina Coast. The Hurricane Matthew peak surge elevations were compared to the FEMA flood recurrence intervals. Approximate recurrence interval was determined for each site and this information is summarized for Craven County in the table below.

Map ID	County	Site Description	Body of Water	Estimated Peak Surge (ft)	Estimated Recurrence Interval
61	Craven	Trent River @ US HWY 70 @ New Bern, NC	Sound	3.3	<10
45	Craven	Cherry Branch Ferry Terminal	Sound	2.9	<10

Table 4. Hurricane Matthew tidal surge estimates for Craven County

²⁷ Oct 17, 2017 https://nwis.waterdata.usgs.gov/nc/nwis/uv?cb_00065=on&format=html&site_no=0209205053&period=&begin_date=2016-09-28&end_date=2016-12-31

²⁸ Sept 20, 1999 https://nwis.waterdata.usgs.gov/nwis/peak?site_no=02091814&agency_cd=USGS&format=html

²⁹ Sept 20, 1999 https://nwis.waterdata.usgs.gov/nwis/peak?site_no=02091814&agency_cd=USGS&format=html

The primary risk to Craven County is riverine flooding from flows from upstream and tidal and storm surge from downstream. Flood depths have reached 14 to 17 feet above ground surface in some areas after major storms.

Land subsidence could pose additional risk. A study completed by the National Geodetic Survey indicates the rate of subsidence in the Cove City area of Craven County increased from 0.17 inches per year during the period 1935-1968 to 0.25 inches per year during the period 1968-1979. It is believed that the higher rates of land subsidence are related chiefly to increases in groundwater withdrawal rates. Because Craven County is bordered in part by Pamlico Sound, storm surge could also impact the county. Based on the nearest tidal gage, NOAA has established a sea level change trend of 2.89 mm/yr \pm 0.36 mm/yr (equivalent to a change of about 0.95 feet in 100 years).

Housing Impacts

According to FEMA Individual Assistance claims as of March 23, 2017, there were 624 registrations for Individual Assistance in Craven County as a result of Hurricane Matthew. It should be noted that additional claims from Hurricane Matthew may still be pending, so this number may not reflect the final claims data from the event. This also does not take into account other historic impacts to the county or other areas of concern for flooding that may not have occurred during this storm. With that in mind, the planning team attempted to take a comprehensive look at both Hurricane Matthew impacts and any historic impacts that local officials felt would validate areas that should be considered at high risk to future flooding.

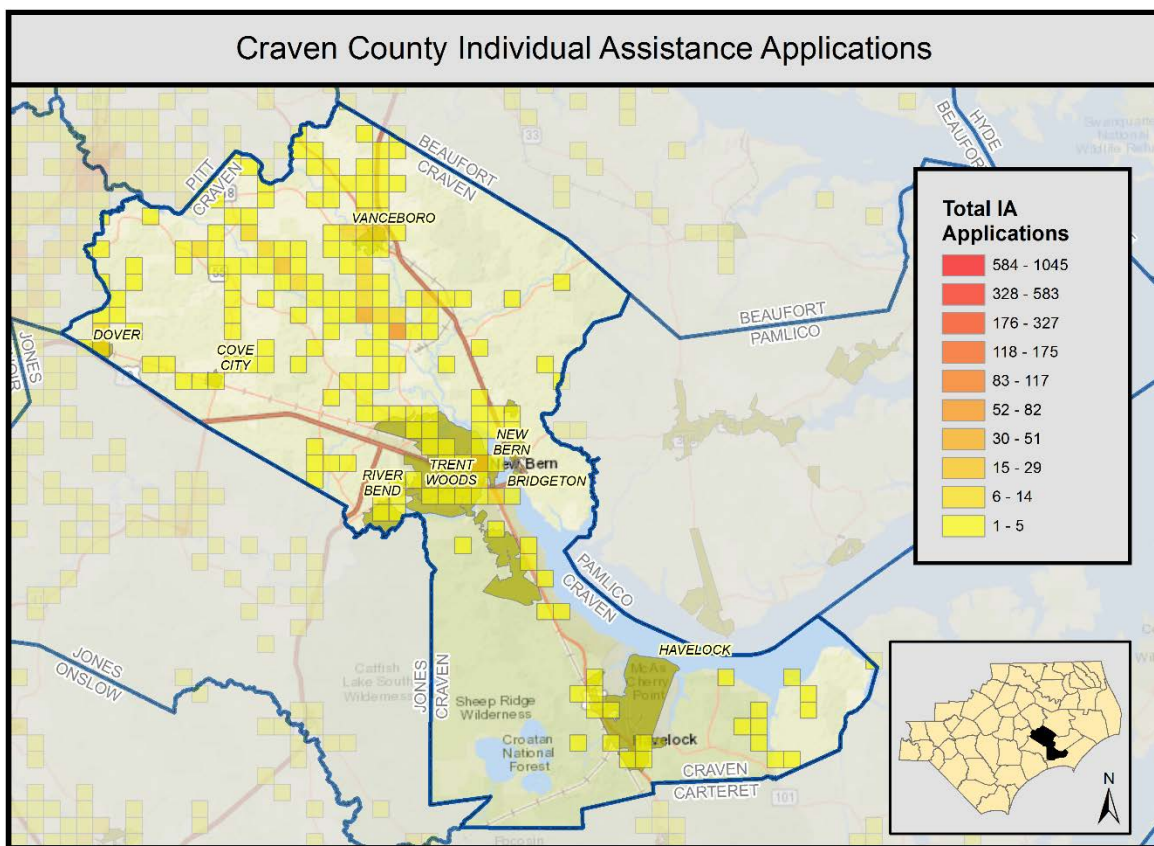


Figure 11. Craven County IA Applications by Area

Housing was impacted in Craven County as a result of Hurricane Matthew as there were several homes damaged, especially in the southeast part of the county. The bullets below summarize some of the major impacts to housing that were identified by local officials from the event.

- Homes Flooded from Hurricane Matthew and other storms:** Wind damage from Hurricane Matthew affected 60 homes, while flooding damaged another 70 homes. In addition, Matthew further damaged residences that had previously been damaged by other events and had not yet been fully repaired. Homes at the following locations flooded during Hurricane Matthew and other storms: along Core Creek near Loop Road, east of Club Foot Creek, in Trent Woods, in Fairfield Harbour, on Belangia Road in Havelock, on Jeremy Street in Cove City, near where Core Creek crosses Dover Road in Cove City, along River Road between Streets Ferry Road and State Camp Road, on Pughtown Road, on Pitch Kettle Landing Road, on Nelson Road near the intersection of River Road, in the park on Albert Morris Road, and near the intersection of Streets Ferry Road and Route 17 Business. The home at 104 Crest Drive, Havelock is currently funded for elevation through HMGP, and 1065 Bluebill Drive, Havelock was demolished and an elevated house was reconstructed in its place.

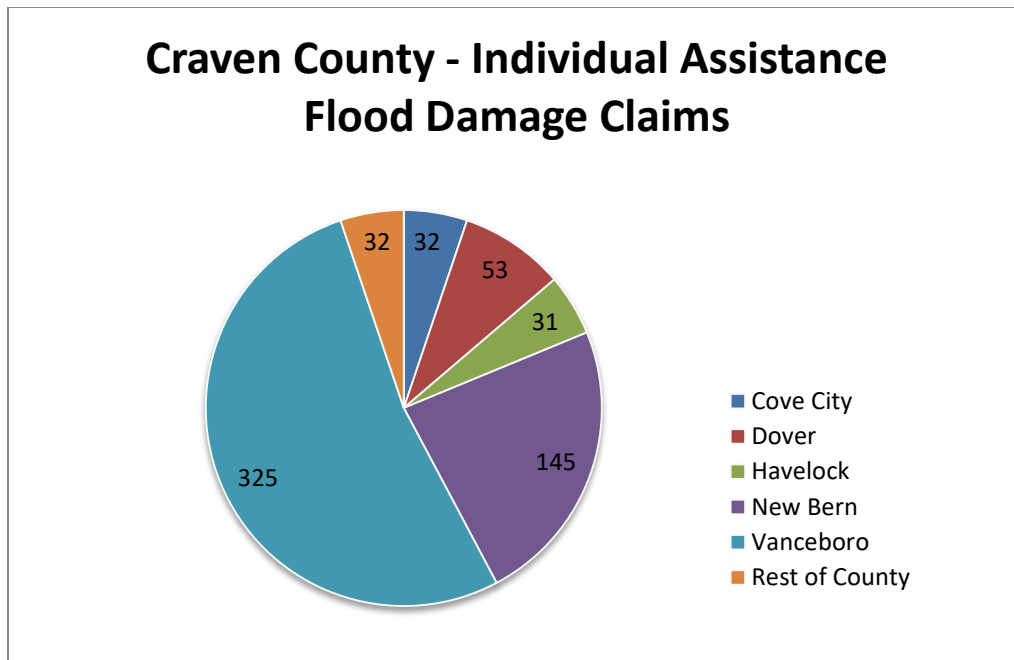


Figure 12: Number of IA Flood Damage Claims by Area

- Homes At-Risk of Future Flooding:** Some homes in the county that were prone to flooding have recently been elevated. However, in many cases the propane tanks that supply the homes were not elevated along with the rest of the utilities, nor were they strapped down. Floating residential propane tanks due to flooding is a safety and environmental concern to county and local officials.
- Insufficient Sheltering:** The community of Dover is remotely located in a rural, western part of Craven County. Flooded roads frequently cut off access to the community from the rest of the county. However, there is not a shelter facility to serve the residents of this community if their homes are damaged from storm events.

Economics / Business / Jobs

Although there were some impacts to the economy in Craven County from Hurricane Matthew these were generally minor compared to some of the other impacts the county experienced. Many of the top employers' facilities are located outside of the 100-year floodplain; typically these businesses suffer flood impacts as their employees, suppliers, and customers cannot access the business facility due to the flooding of main access roads. Table 6 and the bullets below summarize some of the impacts to the economy/businesses/jobs that were identified by local officials from the event.

Employer	Hurricane Matthew Impact
Department of Defense (2 nd Marine Aircraft Wing, Fleet Readiness Center East, Marine Corps Air Station Cherry Point)	No damage was sustained to any facilities on the campus. Some employees were unable to get to work for several days due to flooding of local roads.
Carolina East Health System	No facilities were damaged. Some employees were not able to get to work and some patients could not access the facility because flooded roadways prevented them from leaving their homes/neighborhoods.
Craven County Schools	Schools were closed 10/11-10/14 because school buses could not complete their routes due to flooded roads. West Craven High School and West Craven Middle School also were closed 10/17-10/20 due to flooding and road closures in that part of the county.
BSH Home Appliances	The facilities were not impacted by Matthew. Some employees and suppliers could not access the facilities because of flooded roads in other areas.
Moen	The facilities were not impacted by Matthew. Some employees and suppliers could not access the facilities because of flooded roads in other areas.
Wal-Mart Associates	The facilities were not impacted by Matthew. Some employees and suppliers could not access the facilities because of flooded roads in other areas.
Craven County Government	411 Craven Street where the Emergency Operations Center is located experienced some minor flooding. Some employees were unable to get to work for several days due to flooding of local roads.
Marine Corps Community Services	No damage was sustained to any facilities on the campus. Some employees were unable to get to work for several days due to flooding of local roads.
Holden Temporaries, Inc.	No damage was sustained to the company's facilities. Some employees were unable to get to work for several days due to flooding of local roads.
Craven County Community College	No damage was sustained to any facilities on the college's two campuses. Some employees and students were unable to get to campus for several days due to flooding of local roads.

Table 5. Impacts of Hurricane Matthew on Craven County's Top 10 Employers

- Other Key Employers:** Another employer regarded by many county officials as being in a critical location is International Paper. The International Paper plant is in a location that floods frequently as a result of water that backs up behind the elevated roadway on Weyerhaeuser Road, near the plant. The road floods and/or washes out, restricting access to the plant and the surrounding area for employees and suppliers.

- **Education Impact:** As a result of Hurricane Matthew, all of the traditional public schools closed due to flood-related concerns from October 11-14; West Craven Middle School and West Craven High School were also closed October 17-20 due to flooding and road closures in the western part of the county. Schools were able to make up the days through adjustments to the master schedule and the use of flexible time.
- **Identified Economic Development Zones:** Several local businesses flooded during Hurricane Matthew and other storms, in particular, Mills Country Store and A & J Canvas. Mills Country Store is the only convenience store located along River Road and serves as a gathering and information hub for the surrounding community.

Infrastructure

According to Public Assistance claims, which are often closely tied to infrastructure, as of March 30, 2017 there were \$276,000 of claims in Craven County as a result of Hurricane Matthew, with another \$11,000 identified as unmet needs. It should be noted that additional claims from Hurricane Matthew may still be pending, so this number may not reflect the final claims data from the event.

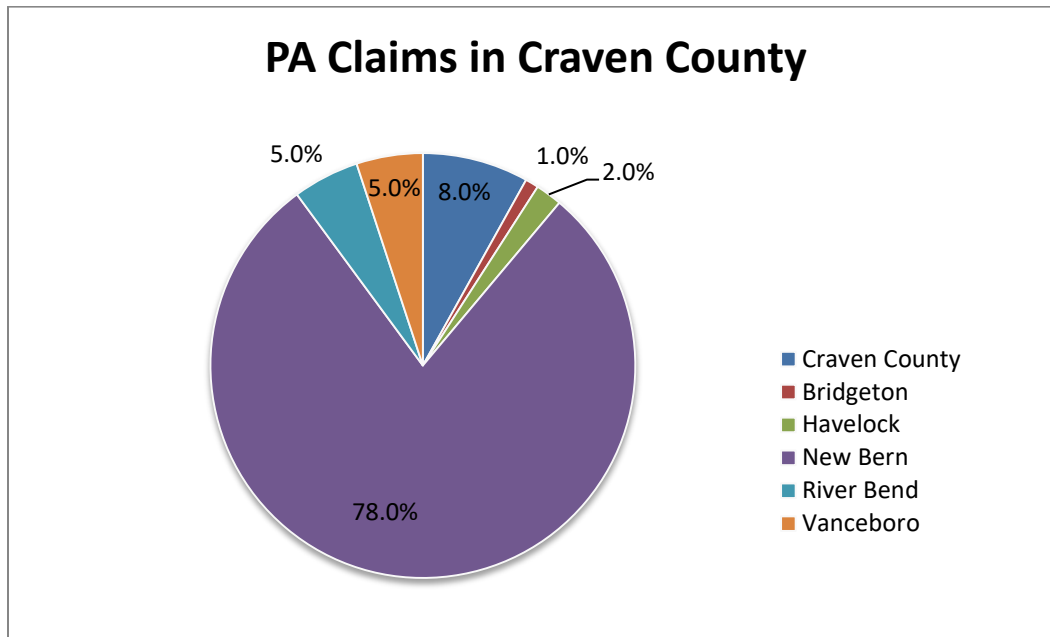


Figure 13. PA Claims by Area and Percentage

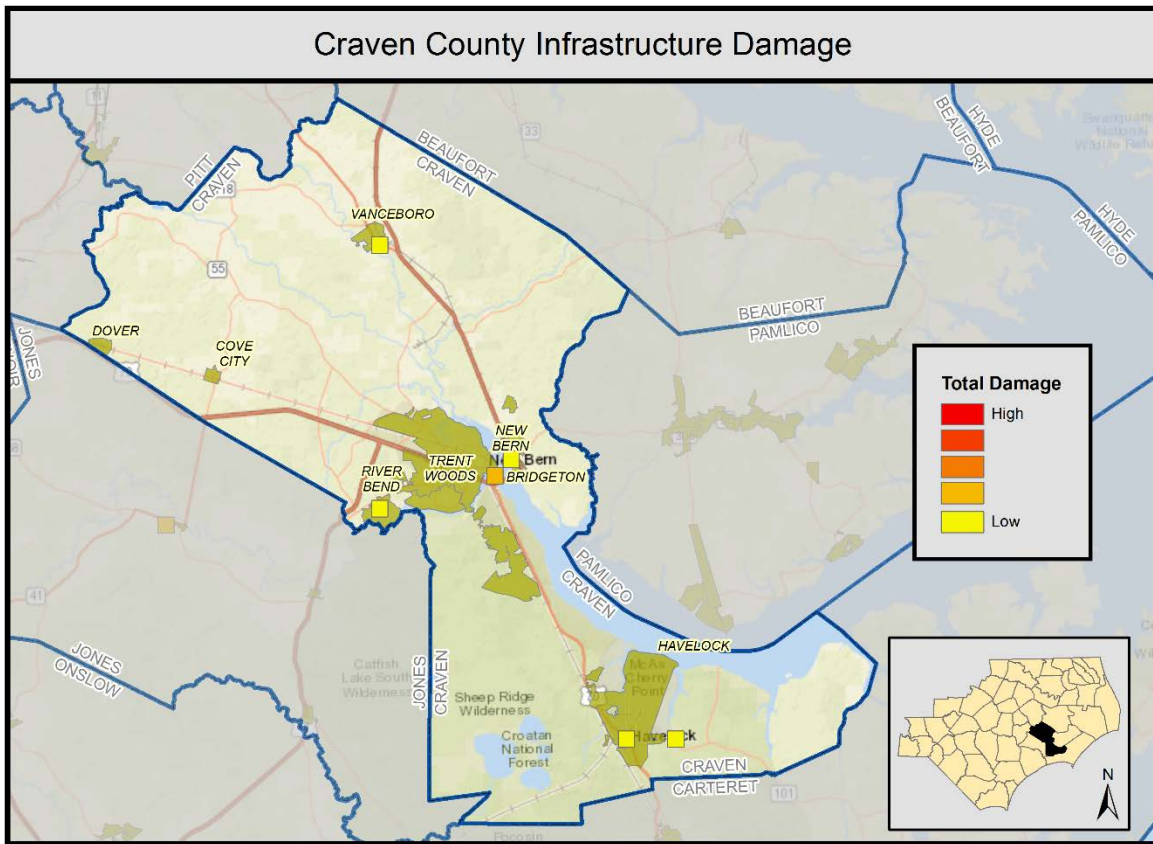


Figure 14. Craven County Infrastructure Damage

Craven County infrastructure was one of the greatest areas of concern in the wake of Hurricane Matthew and other storms, as there were several types of infrastructure that were damaged in multiple locations. The bullets below summarize some of the major impacts to infrastructure that were identified by local officials from the event.

- **Road/Bridge Flooding:** Road and bridge overtopping are common occurrences in Craven County and impacted a number of different locations during Hurricane Matthew. Many of these locations have been historical hotspots in the county and are affected even during rainfall events that are not as extreme as hurricane/tropical storm events. For example:
 - Road flooding and washouts occurred throughout the county as a result of Hurricane Matthew and other storms. County officials identified flooding of Weyerhaeuser Road just east of its intersection with River Road in front of the International Paper plant as one of their top concerns. The elevated roadway and the railroad bridge just downstream of the roadways act as dams, restricting water flows during severe events. During Hurricane Matthew, this section of Weyerhaeuser Road washed out, cutting off access to the area. County officials report that water levels in this area can be as high as 14-17 feet above surface elevation. The facility has its own backup power source, but flooding renders the plant inaccessible. As such, maintenance of the backup generators is difficult and refueling is impossible. In the past, workers have had to be flown in by helicopter to check on the power plant to ensure that it is functioning properly. If fuel supplies are becoming exhausted and refueling will not be possible, the plant must shut down operations.

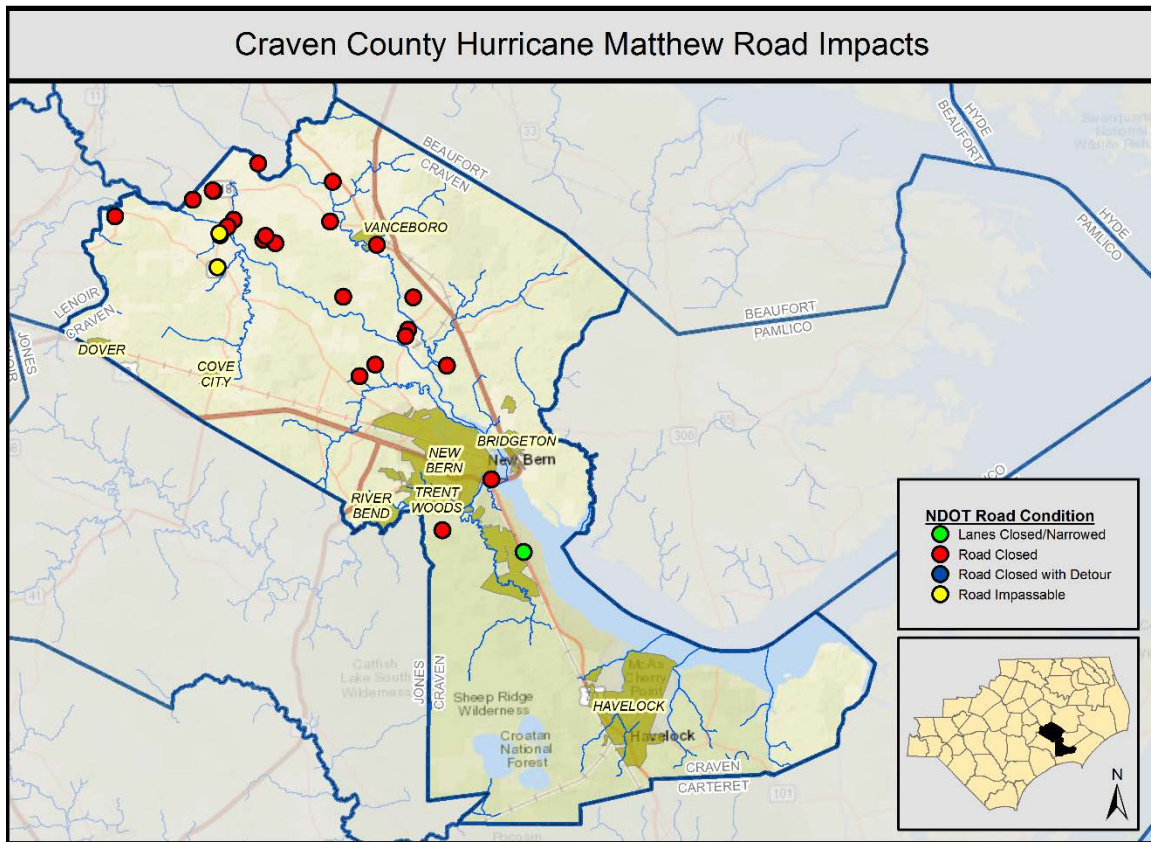


Figure 15. Impacted NCDOT Structures in Craven County



Figure 16. Route 43 (Weyerhaeuser Road) washed out near the International Paper plant. County officials have identified this location as a top concern.

- **Dam Issues:** Craven County has three earthen dams – McLawhorn Pond Dam on the Trent River, Carolina Pines Pond Dam on Anderson Creek, and Carolina Commons Dam (also called Carolina Colours) on Brice Creek. The Carolina Commons Dam is rated as having a high hazard potential, which means that

failure or mis-operation of the dam will cause loss of human life and significant property destruction. The condition of the dam is rated as satisfactory per its last inspection date of May 2010, and its status is “drained”. It is listed as not having an emergency action plan.

- The National Levee Database does not list any levees in Craven County.
- A list of critical facilities is maintained by Craven County and may be made available upon request.

County officials also mentioned that they have found the preliminary flood maps for eastern Craven County near Harlowe do not accurately reflect the areas that experience recurrent flooding. In some of these areas, historic flood depths have been as much as nine feet above ground surface elevation.

A summary of locations where flooding of roads cuts off access to parts of the county is included in table below. Figures showing the locations on maps are included as Figure 15 and Figure 16.

S No	Location	Damage Summary
1	Cherry Branch-Minnesott Beach Ferry Terminal	Shuts down during periods of high water, impacting the ability of the workforce to get to and from work, particularly at MCAS Cherry Point.
2	Fire Department on Belangia Rd.	Cannot respond to emergencies because the road floods and cuts off access to the fire station.
3	Animal rescue and distribution facility at Fairgrounds (Route 70 near Audrey Lane)	Large animals are evacuated to this location during emergencies. Need to ensure access along Route 70 is not cut off.
4	Craven Pamlico Animal Services Center (1639 Old Airport Rd.)	Facility has backup generator but cannot be refueled if county access is cut off from the west due to flooding. The generator does not have an additional backup power source.
5	County WTP on Lewis Farm Rd.	The facility is located on the edge of the 100-year floodplain. Need to ensure access, sufficient backup power capabilities.
6	Adams Creek Rd.	This 14-mile stretch of road floods and cuts off access to the community. It also has multiple dead-end turn-offs that can become inaccessible due to flooding. Drainage ditches become blocked. Power is lost and difficult to restore because of inaccessibility.
7	Belangia Rd.	Floods and cuts off the community.
8	Community Center in Dover (near W. Wilson St. and N. West St.)	The county would like to use the community center site to construct a shelter for this part of the county, which can become isolated due to flooding. The current building is decrepit and does not have the infrastructure, supplies, or staff to support a fully functioning shelter.
9	Jeremy Street/Justin Street	Jeremy Street/Justin Street floods frequently.
10	Wintergreen Rd. at Mills Branch	Mills Branch floods the road and cuts off access to part of the community.
11	Route 55 at Core Creek	Core Creek floods across Route 55, which is a major thoroughfare across the county.
12	River Rd. from Streets Ferry Rd. to State Camp Rd.	Floods frequently, sometimes due to significant rain/hurricane events, sometimes due to seepage. Residents say that flooding has become more frequent since construction of the canal.
13	New Liberty Rd.	When Route 70 was improved, New Liberty Rd. was cut in half and turned into cul-de-sacs. When New Liberty Rd. floods, access for people in this area is cut off.
14	West Craven High School	The school is located in the floodplain and floods.
15	Mills Country Store	The store floods frequently.
16	A & J Canvas	The store floods frequently.
17	Vanceboro	An area bounded by Streets Ferry Rd., River Rd., Bear Hole Rd., and Piney Neck Rd. gets cut off due to flooding.
18	Jack Smith Creek area/Duffyfield Canal	The low elevation of the area causes roads to flood. The City of New Bern undertook a hazard mitigation project to alleviate some of the flooding in the area. However, the area still floods.
19	Broad Creek Rd.	This road is the only means of ingress and egress to Fairfield Harbour. A ¼-mile stretch floods frequently and cuts off access to the community, which is primarily retirees.

S No	Location	Damage Summary
20	Culvert on Piney Neck Rd. near Ward Field Rd.	The existing culvert is a bottleneck.
21a, 21b	Stream gauges	Existing stream gages in Craven County do not predict river crest heights or timing.
22	Agriculture Buying Station (near intersection of Streets Ferry Rd. and Piney Neck Rd.)	Streets Ferry Rd., Route 17 business, Route 17, and Route 118 at Swift Creek get cut off by flooding and isolate the buying station. These roads can remain flooded for 2-3 weeks at a time. Farmers cannot get their crops to the station, nor can the station get the crops out to buyers.
23	Shoreline Dr.	Flooding from the canal inundates Shoreline Drive, isolating about 80 percent of the community, as Shoreline Drive is the primary means of ingress/egress for the community.
24	Town of River Bend (esp. Channel Run Dr.)	Drainage swales and ditches were not properly aligned and graded during construction, causing properties in the community to flood
25	Town of River Bend WWTP	The treatment plant floods, primarily due to backflow from the river into the piping system. All systems at the plant are vulnerable to flooding.
26a, 26b, 26c	Hog waste lagoons near Quinn Rd., Craven Farms Rd., and Neuse Farms	Hog waste lagoons are located in the floodplain and can become inundated
27	Weyerhaeuser Rd. (near River Rd. and Elevated Train Tracks by IP)	The existing elevated roadway and the downstream elevated train tracks restrict the flow of Swift Creek and result in flooding of the surrounding area.
28	Carolina Commons Dam	The Carolina Commons Dam, which is rated as having high hazard potential, does not have an emergency action plan.
29	Countywide	Craven County has a four-day supply of fuel available for emergency services. When flooding to the west cuts off access to the county, additional fuel cannot be trucked in, and the county's Emergency Services Department runs out of fuel.

Table 6. Summary of locations in Craven County where infrastructure is prone to flooding

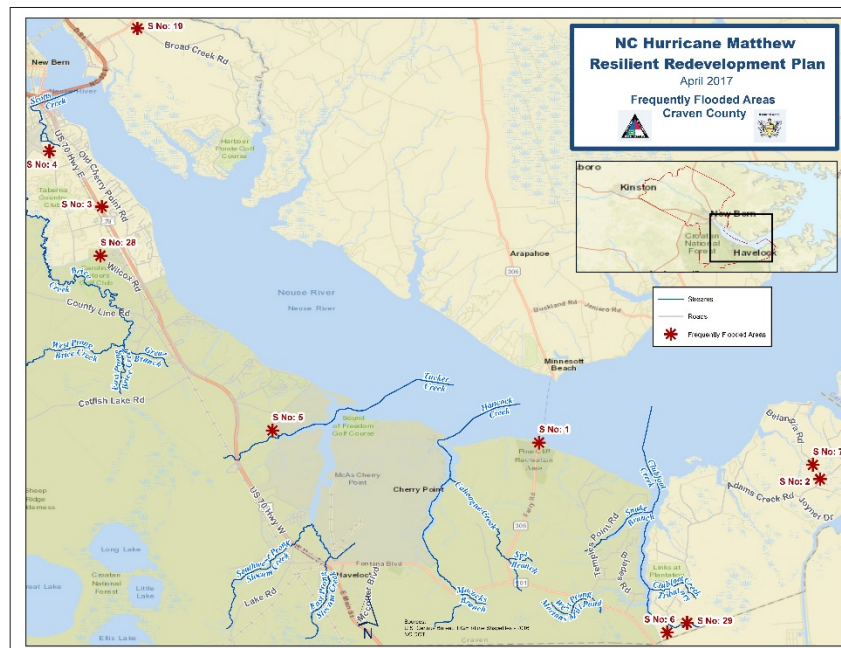


Figure 17. Flood inundation of roads in eastern Craven County cuts off access to communities.

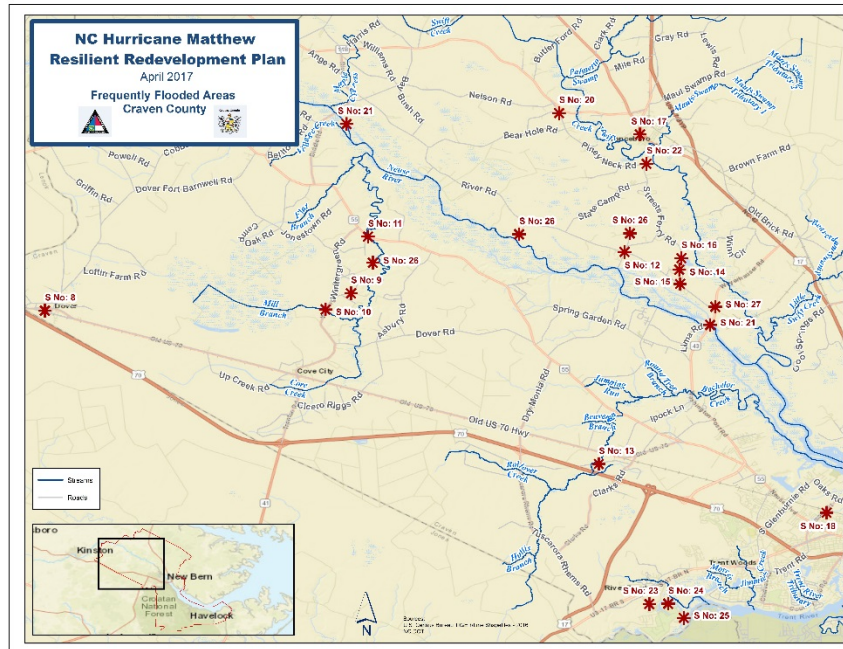


Figure 18. Flood inundation of roads in western Craven County cuts off access to communities.

Power outages occurred throughout Craven County as a result of Hurricane Matthew, leaving over 11,000 residences and businesses without power for 7 to 10 days. Other hurricanes that have impacted the county have caused power outages that lasted over two weeks; repair crews were unable to do their work in a timely manner due to the widespread flooding occurring in several parts of the county that restricted access to impacted areas.

Ecosystems / Environment

Overall, environmental impacts in Craven County as a result of Hurricane Matthew were relatively minimal. Located in the Pamlico Sound and crossed by the Neuse and Trent Rivers, Craven County is rich in ecosystem and environmental resources, with many wetlands, habitats, and wilderness areas. Flooding can threaten these resources. In particular, the county has several hog waste lagoons off of Craven Farms Road and Quinn Road that are located in the floodplain and can overflow during floods, contaminating the areas around them. One of the hog waste lagoons was inundated by floodwaters as a result of Hurricane Matthew (Figure 19).



Figure 19. A hog waste lagoon southwest of Vanceboro was inundated as a result of Hurricane Matthew. (Photos: Google Earth and Waterkeepers Alliance <http://pulse.ncpolicywatch.org/2016/11/04/week-pollution-fields-filth-hurricane-matthew/#sthash.UIRzNp6b.OMPhOeoB.dpbs>)

Agriculture

Much of Craven County is rural and covered with farmland. While Hurricane Matthew arrived after many of the crops had been harvested, past hurricanes have had adverse impacts on farms. Floodwaters can inundate crops, killing the plants and/or causing rot. Drainage ditches can become clogged and back up into the fields. Waste lagoons can flood, causing their contents to overflow and contaminate the surrounding areas, including creeks and rivers. Winds from hurricanes can cause field crops to break.

Having been hit hard by hurricanes, some farmers now try to begin the growing season early so that they can harvest before the height of hurricane season. However, the quality of the crops and yield might be impacted since they are not grown during the prime growing season.

Farmers in Craven County bring their harvested crops to a central buying facility near the fairgrounds. When severe storms threaten the harvest, farmers often rush to get their crops out of the fields and to the buying station before the storms hit. Access to this facility has been cut off by flooding from storm events, preventing the facility operators from distributing the stored crops to buyers, which can result in potential economic losses to the farmers.



4. Strategies for Resilient Redevelopment

4. Strategies for Resilient Redevelopment

This section provides details about the resilience and revitalization strategies and actions identified in Craven County. These actions were identified and refined during three public meetings with local officials and county residents held in March and April 2017. The actions are tied to impacts from Hurricane Matthew and organized by the pillars of housing, economic development, infrastructure and environment. In addition to the public meetings, frequent coordination calls with County officials and data gathered from state agencies and organizations were utilized to formulate the actions listed below.

Meeting 1 was designed to introduce the community and County points of contact to the Resilient Redevelopment Planning process and goals. This meeting allowed the planning team to capture areas within the county that were damaged during Hurricane Matthew and to hear what potential mitigation actions had already been considered. Draft resilience actions were then presented at Meeting 2 of the planning process. This was done to garner general buy-in on the draft actions from the County-level planning teams and residents. More details on the actions were collected between Meetings 2 and 3 through research and follow-up phone calls and emails with the primary points of contact. Meeting 3 provided the opportunity to collect and finalize details for the draft actions. Meeting 4, scheduled in early May 2017, allowed the county points of contact to rank the identified actions, group them into High, Medium, and Low Priorities, and to approve their inclusion in the plan.

Pillar	Project/Action Count
Housing	5
Economic Development	2
Infrastructure	29
Environment	1
Grand Total	37

Table 7. Craven County Summary of Projects by Pillar

The following table is ordered by the rankings and priorities provided by Craven County during Meeting 4:

Pillar	Action Name	Priority	Overall Ranking
Infrastructure	Adams Creek Rd.	High	1
Infrastructure	Weyerhaeuser Road (near River Rd. and Elevated Train Tracks by IP)	High	2
Infrastructure	Emergency Shelter Retrofits	High	3
Housing	Mitigation Reconstruction of Residential Properties in Craven County	High	4
Housing	Elevate Residential Properties in Craven County	High	5
Infrastructure	Generators	High	6
Infrastructure	Town of River Bend WWTP	High	7
Economic Development	Mills Country Store, Complete Floodproofing of	High	8
Infrastructure	Fuel Depot for Emergency Services	High	9
Infrastructure	Jack Smith Creek/Duffyfield Canal	High	10
Economic Development	A&J Canvas, Complete Floodproofing of	Medium	N/A
Housing	Develop Emergency Shelter in Dover	High	N/A
Housing	Acquire Residential Properties in Craven County	Medium	N/A
Housing	Develop a Citizen Emergency Preparedness Guidebook	Medium	N/A

Pillar	Action Name	Priority	Overall Ranking
Infrastructure	Microgrid	High	N/A
Infrastructure	Alternate Fuel Sources for Redundant Power	High	N/A
Infrastructure	Flood Barrier at 411 Craven Street	High	N/A
Infrastructure	West Craven High School	High	N/A
Infrastructure	Stream Gauges – Weyerhaeuser Rd., Maple Cypress Rd.	High	N/A
Infrastructure	Vanceboro	High	N/A
Infrastructure	Crop Buying Facility, Local Farms	High	N/A
Infrastructure	Animal Services Craven/Pamlico	High	N/A
Infrastructure	Belangia Road	High	N/A
Infrastructure	Shoreline Dr.	High	N/A
Infrastructure	Fire Department on Belangia Rd.	High	N/A
Infrastructure	Culvert on Piney Neck Rd. near Ward Field Rd.	High	N/A
Infrastructure	Broad Creek Rd.	High	N/A
Infrastructure	New Liberty Rd.	High	N/A
Infrastructure	Route 55 at Core Creek	High	N/A
Infrastructure	Jeremy Street/Justin Street	High	N/A
Infrastructure	River Rd. from Streets Ferry Rd. to State Camp Rd.	High	N/A
Infrastructure	Wintergreen Rd. at Mills Branch	High	N/A
Infrastructure	WTP on Lewis Farm Rd.	High	N/A
Infrastructure	Town of River Bend Drainage Swales	Medium	N/A
Infrastructure	Cherry Branch-Minnesott Beach Ferry Terminal	Medium	N/A
Infrastructure	Animal Rescue and Distribution Facility at Fairgrounds (Route 70 near Audrey Lane)	Medium	N/A
Environment	Hog Waste Lagoons near Quinn Rd., Craven Farms Rd., and Neuse Farms	High	N/A

Table 8. Craven County Projects by Priority Group and Rank

On the following pages, we have organized the projects and actions by pillar. Within each pillar, the projects are grouped by County priority. Please note that maps are provided for all projects that have a specific location within the county. Projects without maps are county-wide projects that will benefit citizens throughout the county.

Housing Strategies

High Priority Housing Strategies

Pillar	Action Name	Priority	Overall Ranking
Housing	Mitigation Reconstruction of Residential Properties in Craven County	High	4
Housing	Elevate Residential Properties in Craven County	High	5
Housing	Develop Emergency Shelter in Dover	High	N/A

Table 9. Craven County High Priority Housing Summary

These three projects represent the housing strategies that Craven County indicated are the highest priority to address. Additional detail on the projects can be found below:

- **Mitigation Reconstruction:** The County has demolished one home and reconstructed a new, elevated home in its place using HMGP funds and would like to pursue this strategy for at least 18 additional properties.

34 - Mitigation reconstruction of residential properties in Craven County

County: Craven

Priority Grouping: High Priority

Priority Ranking: 4

Project Timeframe: 1-3 years

Location: Various residential properties in Craven County

Project Summary: Flooding from area rivers and tributaries during Matthew (and other hurricanes), as well as drainage issues near culverts, caused damage to residential properties throughout Craven County, particularly in and around Vanceboro. Demolishing and reconstructing elevated homes in the same footprint is an effective mitigation measure because it significantly reduces losses and displacement during low frequency flood events and protects the local tax base by allowing residents to continue to live in their current location. Properties located in the SFHA are in constant danger of repetitive flooding. Demolishing and reconstructing elevated homes to the Design Flood Elevation (DFE = Base Flood Elevation (BFE) +2ft) reduces the risk of flood damages occurring from the 100-yr flood event. Reconstruct homes identified by the County to the DFE. Anchor propane tanks that cannot be elevated. The County maintains a list of candidate properties on file.

Question	Response	Disposition
Articulate how this project addresses an unmet need that has been created by damage from Hurricane Matthew.	Some homes were damaged by Matthew and others that were previously damaged by other events were not repaired because of the financial limitations of the owners and their condition was worsened by Hurricane Matthew.	N/A
Consistent with existing plans (describe points of intersection/departure)	This project is consistent with Strategy CR9 in the regional hazard mitigation plan (HMP). Anchoring propane tanks is consistent with Strategy CR3 in the HMP.	N/A
Does this project comply with existing Local and State authority (codes, plan and ordinance)?	Yes	N/A
Does this project meet the intents and goals for the Hurricane Matthew Recovery Act?	Yes	N/A
Explain any benefits or impacts to the economy of the county from this project.	Demolition and elevated reconstruction of residential homes is an effective mitigation measure because it significantly reduces losses and displacement during low frequency flood events and protects the local tax base by allowing residents to continue to live in their current location.	N/A
For how long will this solution be effective?	More than 50 years	N/A
How effective is the risk reduction?	50-100 year event	N/A
How many public facilities are involved in this project (buildings and infrastructure)?	0	N/A
Is coordination with other communities/counties needed to complete this project?	Yes	N/A
Is this project consistent with Federal Laws	Yes	N/A
To what degree does this project adversely impact local floodplain/coastal zone management?	No Impact	N/A
To what degree will it be possible to positively quantify the environmental benefits and ROI of this project?	High confidence	N/A
What impact will this action have on the local economy/tax base?	Unknown	N/A
What impacts to the environment of the county will result from this project?	None	N/A
What is the capability of the local government to administer this project?	Medium	N/A

What is the financial range of this project?	\$101K - \$250K	N/A
What is the level of public support for this project?	High	N/A
What is the technical feasibility of this project?	Higher than 75%	N/A
Who will administer this project?	County	N/A

- **Elevate Residential Properties:** The County has identified at least 11 homes for elevation. They have already elevated a number of homes through FEMA's Hazard Mitigation Grant Program (HMGP) and have found this approach to be effective in protecting homes against flooding. It is important to ensure that all associated utilities, including air conditioning units, propane tanks, and other items, are elevated along with the housing itself. Additionally, propane tanks that cannot be elevated should be tied down to avoid floating away if ever inundated.

30 - Elevate residential properties in Craven County

County: Craven

Priority Grouping: High Priority

Priority Ranking: 5

Project Timeframe: 1-3 years

Location: Various residential properties in Craven County

Project Summary: Flooding from area rivers and tributaries during Matthew (and other hurricanes), as well as drainage issues near culverts, caused damage to residential properties throughout Craven County, particularly in and around Vanceboro. Elevation of residential homes is an effective mitigation measure because it significantly reduces losses and displacement during low frequency flood events and protects the local tax base by allowing residents to continue to live in their current location. Properties located in the SFHA are in constant danger of repetitive flooding. Elevating Properties to the Design Flood Elevation (DFE = Base Flood Elevation (BFE) +2ft) reduces the risk of flood damages occurring from the 100-yr flood event. Elevate homes identified by the County to the DFE. Anchor propane tanks that cannot be elevated. The County maintains a list of candidate properties on file.

Question	Response	Disposition
Articulate how this project addresses an unmet need that has been created by damage from Hurricane Matthew.	Some homes that were previously damaged by other events were not repaired because of the financial limitations of the owners and their condition was worsened by Hurricane Matthew.	N/A
Consistent with existing plans (describe points of intersection/departure)	This project is consistent with Strategy CR9 in the regional hazard mitigation plan (HMP). Anchoring propane tanks is consistent with Strategy CR3 in the HMP.	N/A
Does this project comply with existing Local and State authority (codes, plan and ordinance)?	Yes	N/A
Does this project meet the intents and goals for the Hurricane Matthew Recovery Act?	Yes	N/A
Explain any benefits or impacts to the economy of the county from this project.	Elevation of residential homes is an effective mitigation measure because it significantly reduces losses and displacement during low frequency flood events and protects the local tax base by allowing residents to continue to live in their current location.	N/A
For how long will this solution be effective?	More than 50 years	N/A
How effective is the risk reduction?	50-100 year event	N/A
How many public facilities are involved in this project (buildings and infrastructure)?	0	N/A
Is coordination with other communities/counties needed to complete this project?	Yes	N/A
Is this project consistent with Federal Laws	Yes	N/A
To what degree does this project adversely impact local floodplain/coastal zone management?	No Impact	N/A
To what degree will it be possible to positively quantify the environmental benefits and ROI of this project?	High confidence	N/A
What impact will this action have on the local economy/tax base?	Unknown	N/A
What impacts to the environment of the county will result from this project?	Elevating properties above the floodplain will remove obstructions allowing freer flow of water and promoting infiltration.	N/A
What is the capability of the local government to administer this project?	Medium	N/A

What is the financial range of this project?	\$101K - \$250K	N/A
What is the level of public support for this project?	High	N/A
What is the technical feasibility of this project?	Higher than 75%	N/A
Who will administer this project?	County	N/A

- Develop Emergency Shelter in Dover:** The community of Dover is rural and remote, and access roads are frequently flooded, cutting off the community from the rest of the county. Craven County would like to establish an emergency shelter on the existing Dover community center site to provide temporary, safe shelter for citizens affected by hurricanes, many of whom are low to moderate income. Figure 18 shows the existing facility and potential location of the proposed shelter. Since the entire area is topographically low, the proposed facility should be constructed on an elevated concrete pad, and all utility components (HVAC, propane tanks, etc.) and support structures (e.g., storage sheds) around the new facility should be elevated above the DFE (BFE + 2 feet).

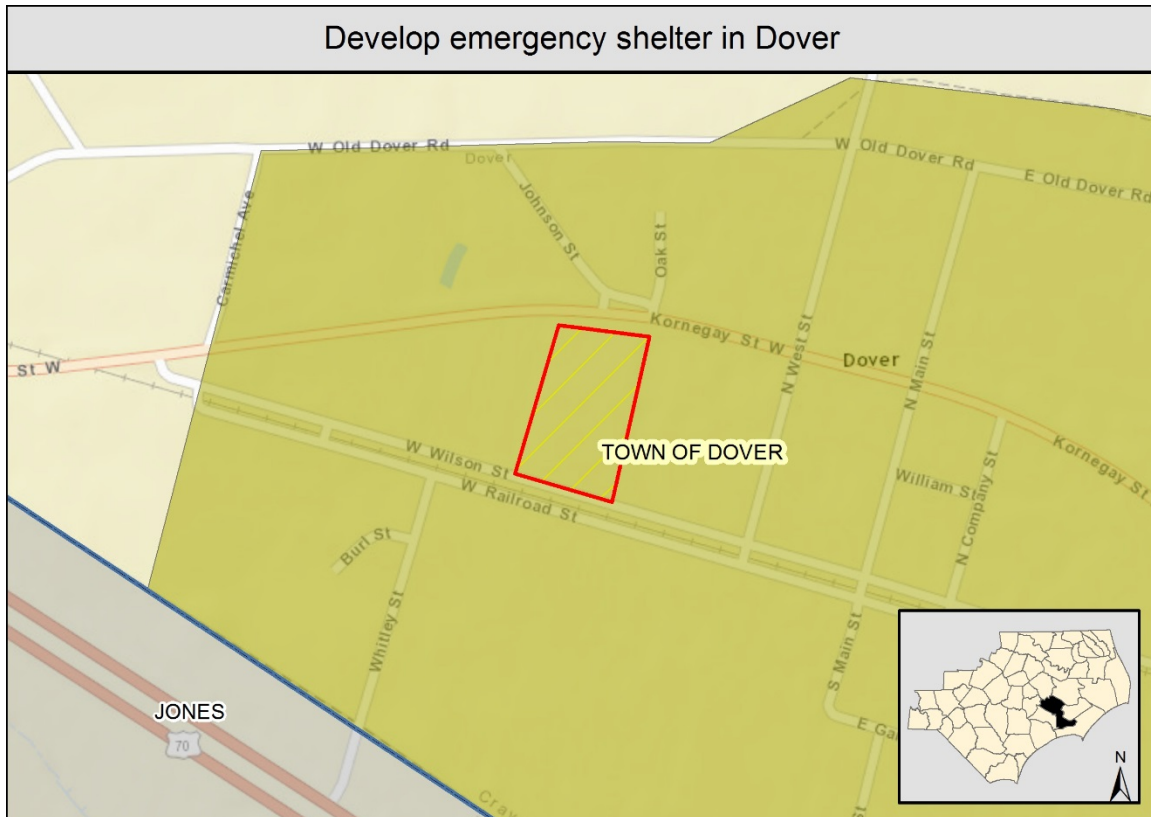


Figure 20. Housing: Construct a Community Shelter in Dover



Figure 21. Craven County would like to use the existing community center site in Dover to construct an emergency shelter.

08 - Develop emergency shelter in Dover

County: Craven

Priority Grouping: High Priority

Priority Ranking: 0

Project Timeframe: 1-3 years

Location: Community of Dover

Project Summary: The community of Dover is rural and remote. Roads to Dover are flooded frequently from hurricanes and severe storms and cut off access to the community. Establishing an emergency shelter at the existing community center site would provide residents a safe place for temporary shelter during severe storm events. Construct a new shelter on an elevated pad on the parking lot of the existing community center site. After the shelter is constructed, demolish the community center, which is outdated and decrepit, and convert that part of the site to a parking lot that is elevated out of the floodplain.

Question	Response	Disposition
Articulate how this project addresses an unmet need that has been created by damage from Hurricane Matthew.	Citizens who are cut off from the rest of the county due to flooded roads would have a safe place to stay temporarily until floodwaters recede.	N/A
Consistent with existing plans (describe points of intersection/departure)	Consistent with the hazard mitigation plan	N/A
Does this project comply with existing Local and State authority (codes, plan and ordinance)?	Yes	N/A
Does this project meet the intents and goals for the Hurricane Matthew Recovery Act?	Yes	N/A
Explain any benefits or impacts to the economy of the county from this project.	This community will have a safe haven for residents so the number of requests for emergency services during floods should decrease.	N/A
For how long will this solution be effective?	More than 50 years	N/A
How effective is the risk reduction?	50-100 year event	N/A
How many public facilities are involved in this project (buildings and infrastructure)?	1-3	N/A
Is coordination with other communities/counties needed to complete this project?	No	N/A
Is this project consistent with Federal Laws	Yes	N/A
To what degree does this project adversely impact local floodplain/coastal zone management?	No Impact	N/A
To what degree will it be possible to positively quantify the environmental benefits and ROI of this project?	Unknown	N/A
What impact will this action have on the local economy/tax base?	Unknown	N/A
What impacts to the environment of the county will result from this project?	Unknown	N/A
What is the capability of the local government to administer this project?	Unknown	N/A
What is the financial range of this project?	\$1M+	N/A
What is the level of public support for this project?	Unknown	N/A
What is the technical feasibility of this project?	Higher than 75%	N/A
Who will administer this project?	County	N/A

Medium Priority Housing Strategies

Pillar	Action Name	Priority	Overall Ranking
Housing	Acquire Residential Properties in Craven County	Medium	N/A
Housing	Develop a Citizen Emergency Preparedness Guidebook	Medium	N/A

Table 10. Craven County Medium Priority Housing Summary

These projects represent the housing strategies that Craven County indicated are of a medium priority to address. Additional detail on the projects can be found below:

- **Acquire Residential Properties:** Acquiring property that floods repeatedly and turning it into open space is an option. However, the County has already done this for a number of other properties and prefers to explore Elevation or Mitigation Reconstruction first.

35 - Acquire residential properties in Craven County

County: Craven

Priority Grouping: Medium Priority

Priority Ranking: 0

Project Timeframe: 1-3 years

Location: Various residential properties in Craven County

Project Summary: Flooding from area rivers and tributaries during Matthew (and other hurricanes), as well as drainage issues near culverts, caused damage to residential properties throughout Craven County, particularly in and around Vanceboro. Acquiring properties, demolishing the structures on them, and returning the land to open green space eliminates future flood damages while enhancing the local landscape.

Question	Response	Disposition
Articulate how this project addresses an unmet need that has been created by damage from Hurricane Matthew.	Some homes that were previously damaged by other events and/or were in poor condition prior to Matthew were not repaired because of the financial limitations of the owners and their condition was worsened by Hurricane Matthew.	N/A
Consistent with existing plans (describe points of intersection/departure)	This project is consistent with Strategy CR9 in the regional hazard mitigation plan (HMP).	N/A
Does this project comply with existing Local and State authority (codes, plan and ordinance)?	Yes	N/A
Does this project meet the intents and goals for the Hurricane Matthew Recovery Act?	Yes	N/A
Explain any benefits or impacts to the economy of the county from this project.	The County prefers to elevate or use mitigation reconstruction wherever possible as acquisition/demolition erodes the tax base.	N/A
For how long will this solution be effective?	More than 50 years	N/A
How effective is the risk reduction?	>200 year event	N/A
How many public facilities are involved in this project (buildings and infrastructure)?	0	N/A
Is coordination with other communities/counties needed to complete this project?	Yes	N/A
Is this project consistent with Federal Laws	Yes	N/A
To what degree does this project adversely impact local floodplain/coastal zone management?	No Impact	N/A
To what degree will it be possible to positively quantify the environmental benefits and ROI of this project?	High confidence	N/A
What impact will this action have on the local economy/tax base?	Unknown	N/A
What impacts to the environment of the county will result from this project?	Creating more open green space improves water retention rate mitigating flood potential. Removing obstructions from the floodplain allows water to flow more naturally.	N/A
What is the capability of the local government to administer this project?	Medium	N/A
What is the financial range of this project?	\$251K - \$500K	N/A
What is the level of public support for this project?	Unknown	N/A
What is the technical feasibility of this project?	Higher than 75%	N/A
Who will administer this project?	County	N/A

- **Develop a Citizen Emergency Preparedness Guidebook:** The County, together with the cities and towns, would like to prepare an emergency guidebook that explains best practices to citizens for remaining self-sufficient during the first 72 hours after a major natural hazard event. The guidebooks would be available for distribution to all county residents.

33 - Develop a citizen emergency preparedness guidebook

County: Craven

Priority Grouping: Medium Priority

Priority Ranking: 0

Project Timeframe: 1 year

Location: Countywide

Project Summary: Many areas of Craven County become isolated due to flooded roads during Matthew and other events. Citizens need to be prepared to be self-sufficient for up to 72 hours after a significant storm event. The County, together with the cities and towns, should prepare a guidebook for citizens that explains best practices for being self-sufficient for up to 72 hours after a significant storm event. The guidebook should identify what should be included in an emergency kit, including food, water, and supplies, and where it should be stored. It should also address preparedness for pet owners, parents with babies, and people with functional needs. Having citizens be self-sufficient for several days will allow rescue workers to reach those at greatest risk first.

Question	Response	Disposition
Articulate how this project addresses an unmet need that has been created by damage from Hurricane Matthew.	Many areas of Craven County become isolated due to flooded roads such as parts of Vanceboro did during Matthew. Citizens need to be prepared to be self-sufficient for up to 72 hours after a significant storm event.	N/A
Consistent with existing plans (describe points of intersection/departure)	This approach supports the regional hazard mitigation plan.	N/A
Does this project comply with existing Local and State authority (codes, plan and ordinance)?	Yes	N/A
Does this project meet the intents and goals for the Hurricane Matthew Recovery Act?	Yes	N/A
Explain any benefits or impacts to the economy of the county from this project.	Less need to activate mutual aid agreements. Allows emergency response personnel to focus on the geographic areas and people who need support the most such as those people with special needs. Allows some time for floodwaters to recede from flooded roads before people will need access to them.	N/A
For how long will this solution be effective?	Less than 10 years	N/A
How effective is the risk reduction?	Unknown	N/A
How many public facilities are involved in this project (buildings and infrastructure)?	0	N/A
Is coordination with other communities/counties needed to complete this project?	No	N/A
Is this project consistent with Federal Laws	Yes	N/A
To what degree does this project adversely impact local floodplain/coastal zone management?	No Impact	N/A
To what degree will it be possible to positively quantify the environmental benefits and ROI of this project?	Unknown	N/A
What impact will this action have on the local economy/tax base?	Unknown	N/A
What impacts to the environment of the county will result from this project?	N/A	N/A
What is the capability of the local government to administer this project?	Medium	N/A
What is the financial range of this project?	\$0- \$50K	N/A

What is the level of public support for this project?	Unknown	N/A
What is the technical feasibility of this project?	Higher than 75%	N/A
Who will administer this project?	County	N/A

Economic Development Strategies

High Priority Economic Development Strategies

Pillar	Action Name	Priority	Overall Ranking
Economic Development	Complete Floodproofing of Mills Country Store	High	8

Table 11. Craven County High Priority Economic Development Summary

This project represents an economic development strategy that Craven County indicated is the highest priority to address. Additional detail on the project can be found below:

- Complete Floodproofing of Mills Country Store:** Local businesses become flooded and cannot operate, which impacts their revenues as well as workers' incomes. Mills Country Store is an information hub for this part of the county, and was flooded during Hurricane Matthew. This project seeks to construct a berm/bulkhead around the store to protect it from flooding. The project also will elevate utilities to the BFE + 2 feet wherever possible, otherwise as high as possible. Inside the store, the project will elevate shelves above the BFE and/or construct platforms that can be raised and lowered using pulleys suspended from the ceiling. For business continuity, the project will support the owners to develop a storm preparedness plan, which will include strategies for storing hard and electronic copies of critical records at a floodproof location and/or on the Cloud.



Figure 22. Economic Development: Complete Floodproofing of Mills Country Store

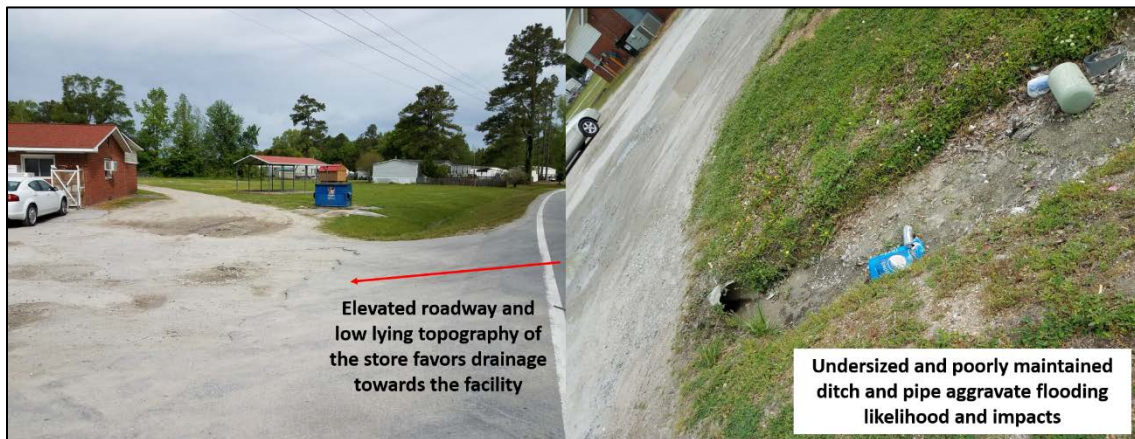


Figure 23. Mills County store, which serves as a local information hub, floods frequently due to local topography.

15 - Complete Floodproofing of Mills Country Store

County: Craven

Priority Grouping: High Priority

Priority Ranking: 8

Project Timeframe: 1-3 years

Location: Mills Country Store

Project Summary: Local businesses become flooded and cannot operate, which impacts their revenues as well as workers' incomes. Mills County Store is an information hub for this part of the county, and was flooded during Hurricane Matthew. Construct a berm/bulkhead around the store to protect it from flooding. Elevate utilities to the BFE + 2 feet wherever possible, otherwise elevate utilities as high as possible. Elevate shelves above the BFE and/or construct platforms that can be raised and lowered using pulleys suspended from the ceiling. Develop a storm preparedness plan, which will include strategies for storing hard and electronic copies of critical records at a floodproof location and/or on the cloud.

Question	Response	Disposition
Articulate how this project addresses an unmet need that has been created by damage from Hurricane Matthew.	Local businesses become flooded and cannot operate which impacts their revenues as well as workers' incomes.	N/A
Consistent with existing plans (describe points of intersection/departure)	Consistent with the hazard mitigation plan and local economic development plan	N/A
Does this project comply with existing Local and State authority (codes, plan and ordinance)?	Yes	N/A
Does this project meet the intents and goals for the Hurricane Matthew Recovery Act?	Yes	N/A
Explain any benefits or impacts to the economy of the county from this project.	This business is located along roads that flood frequently. It is considered to be a gathering hub for this part of the community. By protecting this business from flooding it will be able to recover faster thus contributing to the economy.	N/A
For how long will this solution be effective?	Between 31 and 50 years	N/A
How effective is the risk reduction?	50-100 year event	N/A
How many public facilities are involved in this project (buildings and infrastructure)?	0	N/A
Is coordination with other communities/counties needed to complete this project?	No	N/A
Is this project consistent with Federal Laws	Yes	N/A
To what degree does this project adversely impact local floodplain/coastal zone management?	Unknown	N/A
To what degree will it be possible to positively quantify the environmental benefits and ROI of this project?	Unknown	N/A
What impact will this action have on the local economy/tax base?	Unknown	N/A
What impacts to the environment of the county will result from this project?	Unknown	N/A
What is the capability of the local government to administer this project?	Unknown	N/A
What is the financial range of this project?	\$251K - \$500K	N/A
What is the level of public support for this project?	High	N/A
What is the technical feasibility of this project?	Higher than 75%	N/A
Who will administer this project?	County	N/A

Medium Priority Economic Development Strategies

Pillar	Action Name	Priority	Overall Ranking
Economic Development	A&J Canvas, Complete Floodproofing of	Medium	N/A

Table 12. Craven County Medium Priority Economic Development Summary

This project represents an economic development strategy that Craven County indicated is the highest priority to address. Additional detail on the project can be found below:

- Complete Floodproofing of A&J Canvas:** Local businesses become flooded and cannot operate, which impacts their revenues as well as workers' incomes. A&J Canvas serves the boating industry and was flooded during Hurricane Matthew. This project seeks to construct a berm/bulkhead around the store to protect it from flooding. The project also will elevate utilities to the BFE + 2 feet wherever possible, otherwise as high as possible. Inside the store, the project will elevate shelves above the BFE and/or construct platforms that can be raised and lowered using pulleys suspended from the ceiling. For business continuity, the project will support the owners to develop a storm preparedness plan, which will include strategies for storing hard and electronic copies of critical records at a floodproof location and/or on the Cloud.

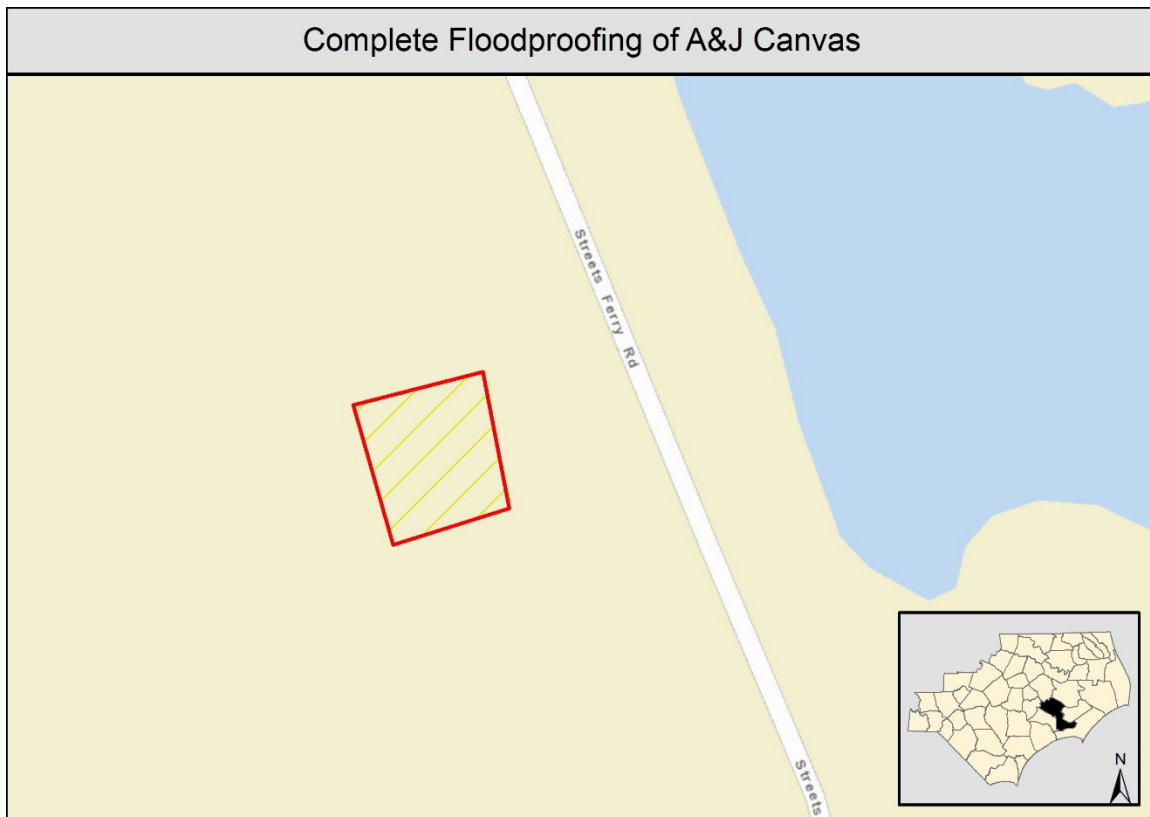


Figure 24. Economic Development: A & J Canvas



Figure 25. A & J Canvas, a local business that serves the boating industry, floods frequently due to low topography.

16 - A&J Canvas, Complete Floodproofing of

County: Craven

Priority Grouping: Medium Priority

Priority Ranking: 0

Project Timeframe: 1-3 years

Location: A&J Canvas

Project Summary: Local businesses become flooded and cannot operate, which impacts their revenues as well as workers' incomes. A&J Canvas serves the boating industry and was flooded during Hurricane Matthew. Construct a berm/bulkhead around the store to protect it from flooding. Elevate utilities to the BFE + 2 feet wherever possible, otherwise elevate utilities as high as possible. Elevate shelves above the BFE and/or construct platforms that can be raised and lowered using pulleys suspended from the ceiling. Develop a storm preparedness plan, which will include strategies for storing hard and electronic copies of critical records at a floodproof location and/or on the Cloud.

Question	Response	Disposition
Articulate how this project addresses an unmet need that has been created by damage from Hurricane Matthew.	Local businesses become flooded and cannot operate which impacts their revenues as well as workers' incomes.	N/A
Consistent with existing plans (describe points of intersection/departure)	Consistent with the hazard mitigation plan and the local economic development plan	N/A
Does this project comply with existing Local and State authority (codes, plan and ordinance)?	Yes	N/A
Does this project meet the intents and goals for the Hurricane Matthew Recovery Act?	Yes	N/A
Explain any benefits or impacts to the economy of the county from this project.	This business is located along roads that flood frequently. By protecting this business from flooding it will be able to recover faster after flooding events thus contributing to the economy.	N/A
For how long will this solution be effective?	Between 31 and 50 years	N/A
How effective is the risk reduction?	50-100 year event	N/A
How many public facilities are involved in this project (buildings and infrastructure)?	0	N/A
Is coordination with other communities/counties needed to complete this project?	No	N/A
Is this project consistent with Federal Laws	Yes	N/A
To what degree does this project adversely impact local floodplain/coastal zone management?	Unknown	N/A
To what degree will it be possible to positively quantify the environmental benefits and ROI of this project?	Unknown	N/A
What impact will this action have on the local economy/tax base?	Unknown	N/A
What impacts to the environment of the county will result from this project?	Unknown	N/A
What is the capability of the local government to administer this project?	Unknown	N/A
What is the financial range of this project?	\$251K - \$500K	N/A
What is the level of public support for this project?	Unknown	N/A
What is the technical feasibility of this project?	Higher than 75%	N/A
Who will administer this project?	County	N/A

Infrastructure Strategies

The purpose of the strategies related to Craven County's infrastructure is to protect critical facilities and key routes needed to foster community resilience, sustainability, and safety before, during, and after disasters. These strategies are essential in protecting citizen and community well-being, while augmenting an effective recovery from a potential future storm like Hurricane Matthew or Hurricane Irene. In working with local officials, the planning team developed the following infrastructure strategies:

High Priority Infrastructure Strategies

Pillar	Action Name	Priority	Overall Ranking
Infrastructure	Adams Creek Rd.	High	1
Infrastructure	Weyerhaeuser Road (Near River Rd. and Elevated Train Tracks by IP)	High	2
Infrastructure	Emergency Shelter Retrofits	High	3
Infrastructure	Generators	High	6
Infrastructure	Town of River Bend WWTP	High	7
Infrastructure	Fuel Depot for Emergency Services	High	9
Infrastructure	Jack Smith Creek/Duffyfield Canal	High	10
Infrastructure	Microgrid	High	N/A
Infrastructure	Alternate Fuel Sources for Redundant Power	High	N/A
Infrastructure	Flood Barrier at 411 Craven Street	High	N/A
Infrastructure	West Craven High School	High	N/A
Infrastructure	Stream Gauges – Weyerhaeuser Rd., Maple Cypress Rd.	High	N/A
Infrastructure	Vanceboro	High	N/A
Infrastructure	Crop Buying Facility, Local Farms	High	N/A
Infrastructure	Animal Services Craven/Pamlico	High	N/A
Infrastructure	Belangia Road	High	N/A
Infrastructure	Shoreline Dr.	High	N/A
Infrastructure	Fire Department on Belangia Rd.	High	N/A
Infrastructure	Culvert on Piney Neck Rd. Near Ward Field Rd.	High	N/A
Infrastructure	Broad Creek Rd.	High	N/A
Infrastructure	New Liberty Rd.	High	N/A
Infrastructure	Route 55 at Core Creek	High	N/A
Infrastructure	Jeremy Street/Justin Street	High	N/A
Infrastructure	River Rd. from Streets Ferry Rd. to State Camp Rd.	High	N/A
Infrastructure	Wintergreen Rd. at Mills Branch	High	N/A
Infrastructure	WTP on Lewis Farm Rd.	High	N/A

Table 13. Craven County High Priority Infrastructure Summary

These projects represent the infrastructure strategies that Craven County indicated are the highest priority to address. Additional details can be found below. Projects in the Top 10 rankings are discussed individually. The projects that are grouped as “High” but are not ranked have been grouped according to the type of project they include (e.g., power, roads and culverts, etc.) and then each project is described in greater detail.

Infrastructure Projects Ranked in the Top 10:

- Adams Creek Road:** This 14-mile stretch of road floods and cuts off access to the community. It also has multiple dead-end turn-offs that can become inaccessible due to flooding. Drainage ditches become blocked. Localized flooding occurred throughout the Adams Creek Area during Hurricane Matthew. Portions of the roadway that are below the 100-year flood elevation should be raised above this level. Drainage ditches should be cleared and maintained. Culverts should be upsized to accommodate 100-year flood flows.

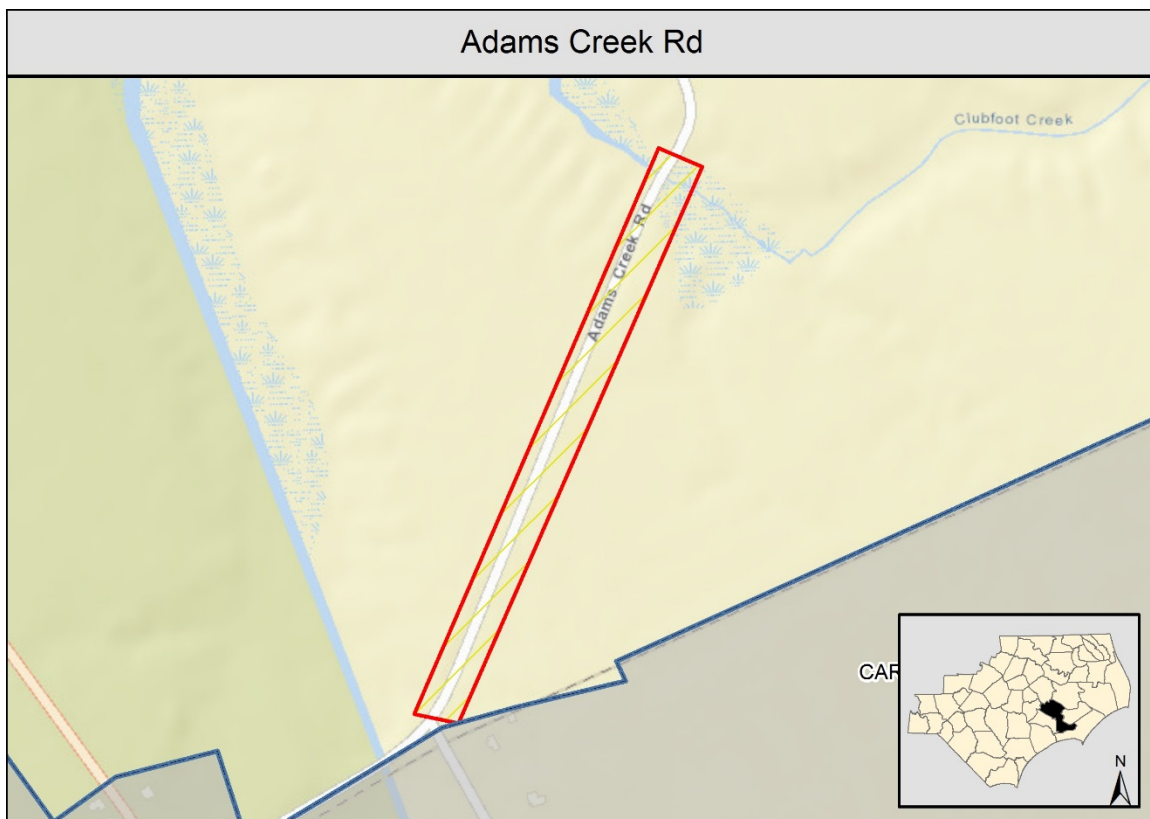


Figure 26. Infrastructure: Adams Creek Road Improvements

06 - Adams Creek Rd

County: Craven

Priority Grouping: High Priority

Priority Ranking: 1

Project Timeframe: Approx. 1-3 years

Location: Adams Creek Rd

Project Summary: This 14-mile stretch of road floods and cuts off access to the community. It also has multiple dead-end turn-offs that can become inaccessible due to flooding. Drainage ditches become blocked. Localized flooding occurred throughout the Adams Creek Area during Hurricane Matthew. Portions of the roadway that are below the 100-year flood elevation should be raised above this level. Drainage ditches should be cleared and maintained. Culverts should be upsized to accommodate 100-year flood flows.

Question	Response	Disposition
Articulate how this project addresses an unmet need that has been created by damage from Hurricane Matthew.	People who are cut off from the rest of the county will continue to have access so that they require fewer emergency services related to flooding and they can return to work faster.	N/A
Consistent with existing plans (describe points of intersection/departure)	Consistent with the hazard mitigation plan.	N/A
Does this project comply with existing Local and State authority (codes, plan and ordinance)?	Yes	N/A
Does this project meet the intents and goals for the Hurricane Matthew Recovery Act?	Yes	N/A
Explain any benefits or impacts to the economy of the county from this project.	This project will decrease the number of people requiring emergency services since they will have access to the community. People will be able to return to work faster.	N/A
For how long will this solution be effective?	More than 50 years	N/A
How effective is the risk reduction?	50-100 year event	N/A
How many public facilities are involved in this project (buildings and infrastructure)?	1-3	N/A
Is coordination with other communities/counties needed to complete this project?	Yes	N/A
Is this project consistent with Federal Laws	Yes	N/A
To what degree does this project adversely impact local floodplain/coastal zone management?	No Impact	N/A
To what degree will it be possible to positively quantify the environmental benefits and ROI of this project?	Unknown	N/A
What impact will this action have on the local economy/tax base?	Unknown	N/A
What impacts to the environment of the county will result from this project?	Unknown	N/A
What is the capability of the local government to administer this project?	Unknown	N/A
What is the financial range of this project?	\$1M+	N/A
What is the level of public support for this project?	Unknown	N/A
What is the technical feasibility of this project?	Higher than 75%	N/A
Who will administer this project?	State	N/A

- Weyerhaeuser Road Near River Road and Elevated Train Tracks:** Roadways and road crossings (bridges and culverts) were inundated with water and damage occurred to structural components impacting overall integrity of the structures. These issues occurred due to high rains during Hurricane Matthew, including a washout of Weyerhaeuser Road east of the International Paper plant, but these infrastructure elements are also impacted during more frequent (yearly) significant rain events. They also act as bottlenecks for water flows, resulting in inundation of the surrounding area. Elevate the roadway and railroad tracks above the floodplain to remove the bottleneck. An H&H Study should be completed as part of the project to ensure that removing the bridges, which act as bottlenecks to Swift Creek, will not adversely impact downstream areas such as New Bern.

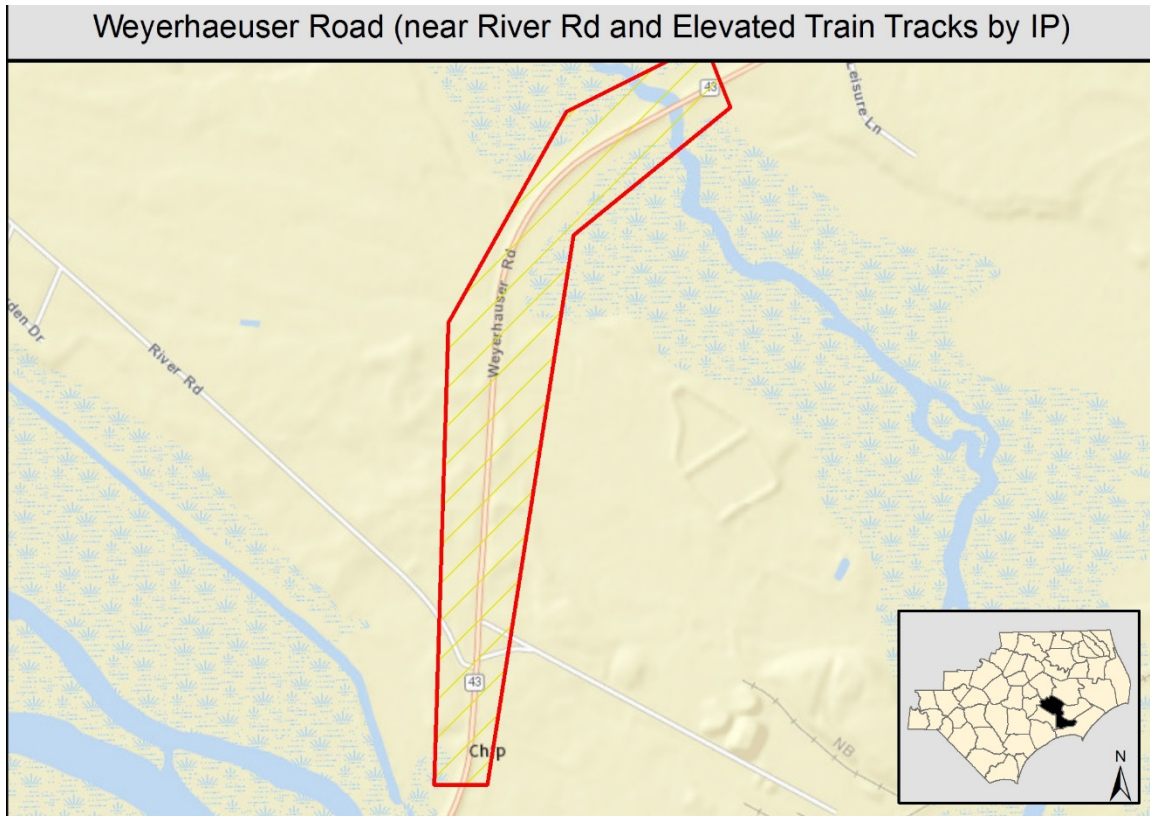


Figure 27. Infrastructure: Weyerhaeuser Road Improvements

27 - Weyerhaeuser Road (near River Rd and Elevated Train Tracks by IP)

County: Craven

Priority Grouping: High Priority

Priority Ranking: 2

Project Timeframe: 1-3 years

Location: Weyerhaeuser Road near the intersection of River Road. Elevated train crossing downstream of International Paper plant

Project Summary: Roadways and road crossings (bridges and culverts) were inundated with water and damage occurred to structural components impacting overall integrity of the structures. These issues occurred due to high rains during Hurricane Matthew, including a washout of Weyerhaeuser Road east of the International Paper plant, but these infrastructure elements are also impacted during more frequent (yearly) significant rain events. They also act as bottlenecks for water flows, resulting in inundation of the surrounding area. Elevate the roadway and railroad tracks above the floodplain to remove the bottleneck. An H&H Study should be completed as part of the project to ensure that removing the bridges, which act as bottlenecks to Swift Creek, will not adversely impact downstream areas such as New Bern.

Question	Response	Disposition
Articulate how this project addresses an unmet need that has been created by damage from Hurricane Matthew.	During Hurricane Matthew a section of Weyerhaeuser Road east of the International Paper plant near the creek crossing was washed out. Alleviating recurrent flooding near the International Paper plant by further elevating the nearby elevated roadway and railroad crossing and removing other impediments to river flow was identified by Craven County officials as their top priority.	N/A
Consistent with existing plans (describe points of intersection/departure)	Consistent with the hazard mitigation plan	N/A
Does this project comply with existing Local and State authority (codes, plan and ordinance)?	Yes	N/A
Does this project meet the intents and goals for the Hurricane Matthew Recovery Act?	Yes	N/A
Explain any benefits or impacts to the economy of the county from this project.	Damages avoided to the physical structures is a strong consideration in the valuation of benefits for these types of projects. Outside of events like Hurricane Matthew communities are often affected by repetitive nuisance flooding and frequent minor repairs can add up to significant costs for communities. These impacts can be an especially burdensome on the financial resources of smaller counties with limited resources and tax base. Furthermore inaccessibility and flooded roadways can cause.	N/A
For how long will this solution be effective?	More than 50 years	N/A
How effective is the risk reduction?	50-100 year event	N/A
How many public facilities are involved in this project (buildings and infrastructure)?	>6	N/A
Is coordination with other communities/counties needed to complete this project?	No	N/A
Is this project consistent with Federal Laws	Yes	N/A
To what degree does this project adversely impact local floodplain/coastal zone management?	Unknown	N/A
To what degree will it be possible to positively quantify the environmental benefits and ROI of this project?	High confidence	N/A

What impact will this action have on the local economy/tax base?	Unknown	N/A
What impacts to the environment of the county will result from this project?	None	N/A
What is the capability of the local government to administer this project?	Unknown	N/A
What is the financial range of this project?	\$1M+	N/A
What is the level of public support for this project?	Medium	N/A
What is the technical feasibility of this project?	Between 51 and 75%	N/A
Who will administer this project?	State	N/A

- **Emergency Shelter Retrofits:** Craven County uses areas within the public schools as community shelters. Many of these facilities were constructed decades ago and may not meet current code requirements for hurricane sheltering, particularly long-span roofs, windows, and doors. Conduct a study to evaluate the compliance of shelter areas, especially cafeterias, gymnasiums, and auditoriums, with current code requirements (particularly roof uplift structural capacity, window wind pressure resistance, and building envelope impact capacity). Design and construct upgrades to shelters as recommended in the study; some upgrades might include but are not limited to installing roof straps and ties, adding fasteners, anchoring rooftop equipment, replacing the roof, installing hurricane shutters, and replacing windows and doors.

29 - Emergency Shelter Retrofits

County: Craven

Priority Grouping: High Priority

Priority Ranking: 3

Project Timeframe: 1-2 years

Location: Emergency shelters countywide

Project Summary: Craven County uses areas within the public schools as community shelters. Many of these facilities were constructed decades ago and may not meet current code requirements for hurricane sheltering, particularly long-span roofs, windows, and doors. Conduct a study to evaluate the compliance of shelter areas, especially cafeterias, gymnasiums, and auditoriums, with current code requirements (particularly roof uplift structural capacity, window wind pressure resistance, and building envelope impact capacity). Design and construct upgrades to shelters as recommended in the study; some upgrades might include but are not limited to installing roof straps and ties, adding fasteners, anchoring rooftop equipment, replacing the roof, installing hurricane shutters, and replacing windows and doors.

Question	Response	Disposition
Articulate how this project addresses an unmet need that has been created by damage from Hurricane Matthew.	The county opened a shelter during Matthew but had concerns about the ability of some elements of the facility to withstand hurricane-force winds and water. Retrofitting designated shelters to meet current shelter and code requirements would provide safe havens for citizens during and after natural disasters.	N/A
Consistent with existing plans (describe points of intersection/departure)	This project is consistent with the hazard mitigation and emergency operations plans.	N/A
Does this project comply with existing Local and State authority (codes, plan and ordinance)?	Yes	N/A
Does this project meet the intents and goals for the Hurricane Matthew Recovery Act?	Yes	N/A
Explain any benefits or impacts to the economy of the county from this project.	Providing safe reliable shelters for citizens to go to can cut down on the number (and expense) of emergency response calls during and immediately after disasters.	N/A
For how long will this solution be effective?	Between 11 and 30 years	N/A
How effective is the risk reduction?	100-200 year event	N/A
How many public facilities are involved in this project (buildings and infrastructure)?	>6	N/A
Is coordination with other communities/counties needed to complete this project?	No	N/A
Is this project consistent with Federal Laws	Yes	N/A
To what degree does this project adversely impact local floodplain/coastal zone management?	No Impact	N/A
To what degree will it be possible to positively quantify the environmental benefits and ROI of this project?	Unknown	N/A
What impact will this action have on the local economy/tax base?	Unknown	N/A
What impacts to the environment of the county will result from this project?	N/A	N/A
What is the capability of the local government to administer this project?	Medium	N/A
What is the financial range of this project?	\$1M+	N/A

What is the level of public support for this project?	High	N/A
What is the technical feasibility of this project?	Higher than 75%	N/A
Who will administer this project?	County	N/A

- **Generators:** Hurricane Matthew caused power outages that lasted up to 7 to 10 days in some parts of the county. Overall, back-up, supplemental and redundant power is needed to create better energy assurance post-disaster and to make sure that critical facilities have sufficient power to maintain operations. Identify which critical facilities require generators, particularly well pumps, communications towers, and emergency shelters. Determine power needs for generator sizing. Procure and install an appropriately sized generator, fuel tank, and fuel pump at each location. Include an alternate power source such as a solar panel and/or backup battery. Establish and implement a regular testing and maintenance program.

31 - Generators

County: Craven

Priority Grouping: High Priority

Priority Ranking: 6

Project Timeframe: 1-2 years

Location: Critical facilities throughout the county, particularly at well pumps, communications towers, and a proposed new shelter in Dover.

Project Summary: Hurricane Matthew caused power outages that lasted up to 7 to 10 days in some parts of the county. Overall, back-up, supplemental and redundant power is needed to create better energy assurance post-disaster and to make sure that critical facilities have sufficient power to maintain operations. Identify which critical facilities require generators, particularly well pumps, communications towers, and emergency shelters. Determine power needs for generator sizing. Procure and install an appropriately sized generator, fuel tank, and fuel pump at each location. Include an alternate power source such as a solar panel and/or backup battery. Establish and implement a regular testing and maintenance program.

Question	Response	Disposition
Articulate how this project addresses an unmet need that has been created by damage from Hurricane Matthew.	Overall back-up supplemental and redundant power is needed to create better energy assurance post-disaster and to make sure that critical facilities have sufficient power to maintain operations. Hurricane Matthew knocked out power in the county for 7-10 days. Many generators run out of fuel after 2-4 days and cannot be refueled because either the generators are inaccessible or fuel trucks cannot access the county from the west.	N/A
Consistent with existing plans (describe points of intersection/departure)	Consistent with the hazard mitigation plan.	N/A
Does this project comply with existing Local and State authority (codes, plan and ordinance)?	Yes	N/A
Does this project meet the intents and goals for the Hurricane Matthew Recovery Act?	Yes	N/A
Explain any benefits or impacts to the economy of the county from this project.	Providing reliable sources of power to critical facilities throughout the county will allow the government to continue to function emergency and medical services to be provided and water and wastewater facilities to continue to operate all of which contribute to the local economy.	N/A
For how long will this solution be effective?	Between 11 and 30 years	N/A
How effective is the risk reduction?	50-100 year event	N/A
How many public facilities are involved in this project (buildings and infrastructure)?	>6	N/A
Is coordination with other communities/counties needed to complete this project?	Yes	N/A
Is this project consistent with Federal Laws	Yes	N/A
To what degree does this project adversely impact local floodplain/coastal zone management?	No Impact	N/A
To what degree will it be possible to positively quantify the environmental benefits and ROI of this project?	Unknown	N/A
What impact will this action have on the local economy/tax base?	Unknown	N/A
What impacts to the environment of the county will result from this project?	No impact	N/A

What is the capability of the local government to administer this project?	Unknown	N/A
What is the financial range of this project?	\$101K - \$250K	N/A
What is the level of public support for this project?	Unknown	N/A
What is the technical feasibility of this project?	Higher than 75%	N/A
Who will administer this project?	County	N/A

- Town of River Bend WWTP:** Some damage experienced during Hurricane Matthew and other storms resulted from wastewater treatment system failures. Tidal surge flows through existing outlet pipes can cause wastewater treatment plants to flood. Install backflow preventers to stop tidal surge backflows into the pipes. Elevate utilities, computers, and other sensitive equipment out of the floodplain to protect wastewater system assets. Ensure system pumps have backup generators with sustainable fuel sources such as solar panels/batteries.

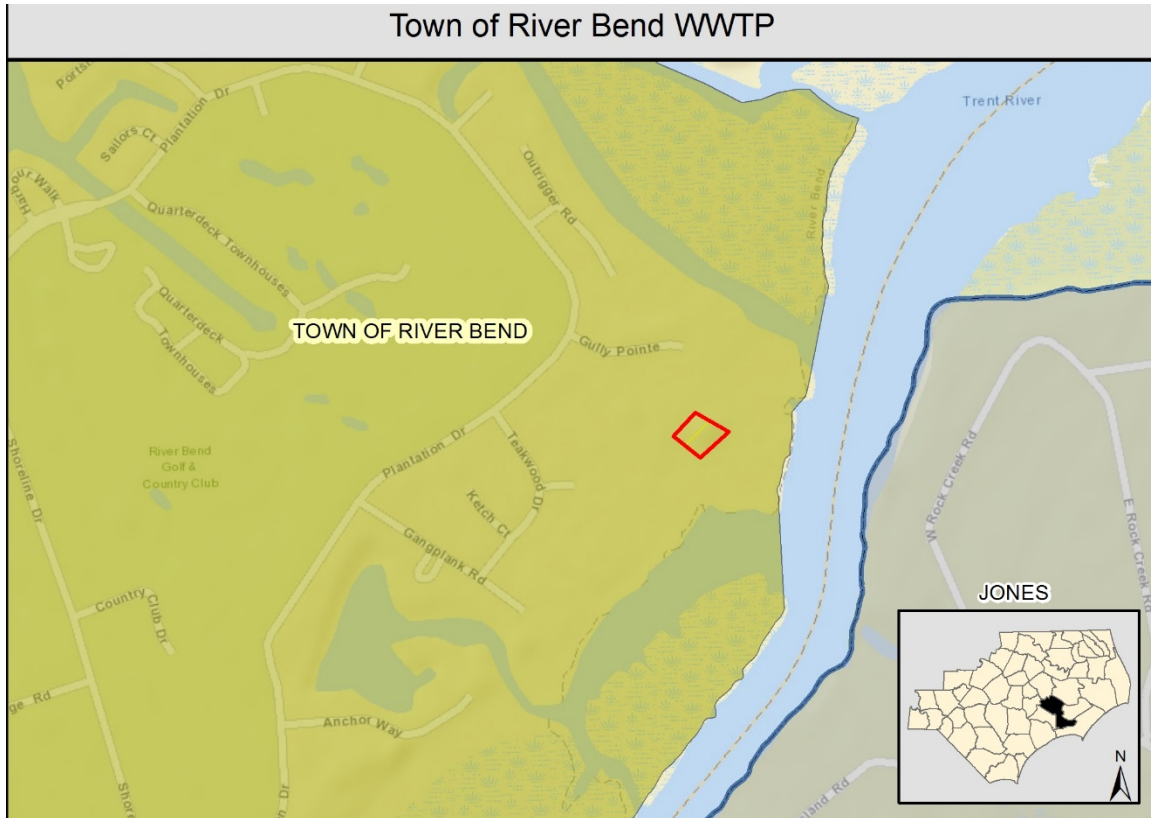


Figure 28. Infrastructure: River Bend Wastewater Treatment Plant Floodproofing

25 - Town of River Bend WWTP

County: Craven

Priority Grouping: High Priority

Priority Ranking: 7

Project Timeframe: 1-3 years

Location: River Bend

Project Summary: Some damage experienced during Hurricane Matthew and other storms resulted from wastewater treatment system failures. Tidal surge flows through existing outlet pipes can cause wastewater treatment plants to flood. Install backflow preventers to stop tidal surge backflows into the pipes. Elevate utilities, computers, and other sensitive equipment out of the floodplain to protect wastewater system assets. Ensure system pumps have backup generators with sustainable fuel sources such as solar panels/batteries.

Question	Response	Disposition
Articulate how this project addresses an unmet need that has been created by damage from Hurricane Matthew.	Some damage experienced during Hurricane Matthew and other storms resulted from wastewater treatment system failures. Tidal surge flows through existing outlet pipes can cause wastewater treatment plants to flood.	N/A
Consistent with existing plans (describe points of intersection/departure)	Yes	N/A
Does this project comply with existing Local and State authority (codes, plan and ordinance)?	Yes	N/A
Does this project meet the intents and goals for the Hurricane Matthew Recovery Act?	Yes	N/A
Explain any benefits or impacts to the economy of the county from this project.	The treatment plant will continue to function during flood events supporting homes and businesses in the area.	N/A
For how long will this solution be effective?	Between 11 and 30 years	N/A
How effective is the risk reduction?	50-100 year event	N/A
How many public facilities are involved in this project (buildings and infrastructure)?	1-3	N/A
Is coordination with other communities/counties needed to complete this project?	No	N/A
Is this project consistent with Federal Laws	Yes	N/A
To what degree does this project adversely impact local floodplain/coastal zone management?	Unknown	N/A
To what degree will it be possible to positively quantify the environmental benefits and ROI of this project?	Unknown	N/A
What impact will this action have on the local economy/tax base?	Unknown	N/A
What impacts to the environment of the county will result from this project?	Decreases the likelihood that accidental releases of sewage occur due to flooding of the system	N/A
What is the capability of the local government to administer this project?	Unknown	N/A
What is the financial range of this project?	\$251K - \$500K	N/A
What is the level of public support for this project?	Unknown	N/A
What is the technical feasibility of this project?	Higher than 75%	N/A
Who will administer this project?	Local	N/A

- **Fuel Depot for Emergency Services:** Craven County has a four-day supply of fuel available for emergency services. When flooding to the west, such as what occurred during Hurricane Matthew, cuts off access to the county, additional fuel cannot be trucked in and the county's Emergency Services Department runs out of fuel. Construct a fuel depot that has sufficient capacity for a 10-day supply of fuel for emergency services vehicles.

32 - Fuel depot for emergency services

County: Craven

Priority Grouping: High Priority

Priority Ranking: 9

Project Timeframe: 3 years

Location: Countywide

Project Summary: Craven County has a four-day supply of fuel available for emergency services. When flooding to the west, such as what occurred during Hurricane Matthew, cuts off access to the county, additional fuel cannot be trucked in and the county's Emergency Services Department runs out of fuel. Construct a fuel depot that has sufficient capacity for a 10-day supply of fuel for emergency services vehicles.

Question	Response	Disposition
Articulate how this project addresses an unmet need that has been created by damage from Hurricane Matthew.	Emergency services vehicles runs out of fuel after about four days (power was out for 7-10 days during Matthew). When access to the county from the west is cut off for longer than that fuel trucks cannot access the county to refill tanks.	N/A
Consistent with existing plans (describe points of intersection/departure)	This project is consistent with the hazard mitigation plan and emergency operations plan.	N/A
Does this project comply with existing Local and State authority (codes, plan and ordinance)?	Yes	N/A
Does this project meet the intents and goals for the Hurricane Matthew Recovery Act?	Yes	N/A
Explain any benefits or impacts to the economy of the county from this project.	Providing emergency services for more than four days after a disaster allows responders to keep working and facilitates recovery of the community.	N/A
For how long will this solution be effective?	More than 50 years	N/A
How effective is the risk reduction?	100-200 year event	N/A
How many public facilities are involved in this project (buildings and infrastructure)?	>6	N/A
Is coordination with other communities/counties needed to complete this project?	No	N/A
Is this project consistent with Federal Laws	Yes	N/A
To what degree does this project adversely impact local floodplain/coastal zone management?	No Impact	N/A
To what degree will it be possible to positively quantify the environmental benefits and ROI of this project?	Unknown	N/A
What impact will this action have on the local economy/tax base?	Unknown	N/A
What impacts to the environment of the county will result from this project?	Unknown	N/A
What is the capability of the local government to administer this project?	Unknown	N/A
What is the financial range of this project?	\$1M+	N/A
What is the level of public support for this project?	Unknown	N/A
What is the technical feasibility of this project?	Higher than 75%	N/A
Who will administer this project?	County	N/A

- Jack Smith Creek/Duffyfield Canal:** The low elevation of the area causes roads to flood during severe storm events, including Matthew. The City of New Bern undertook a hazard mitigation project to alleviate some of the flooding in the area. However, the area still floods. Complete additional studies to determine how Craven County can augment the City of New Bern's wetland mitigation project near Jack Smith Creek to further alleviate flooding in the area. In particular, evaluate the sufficiency of the pipe sizes along the Duffyfield Canal. Implement the measures recommended by the study, which might include increasing wetland area and increasing the pipe sizes along the canal.

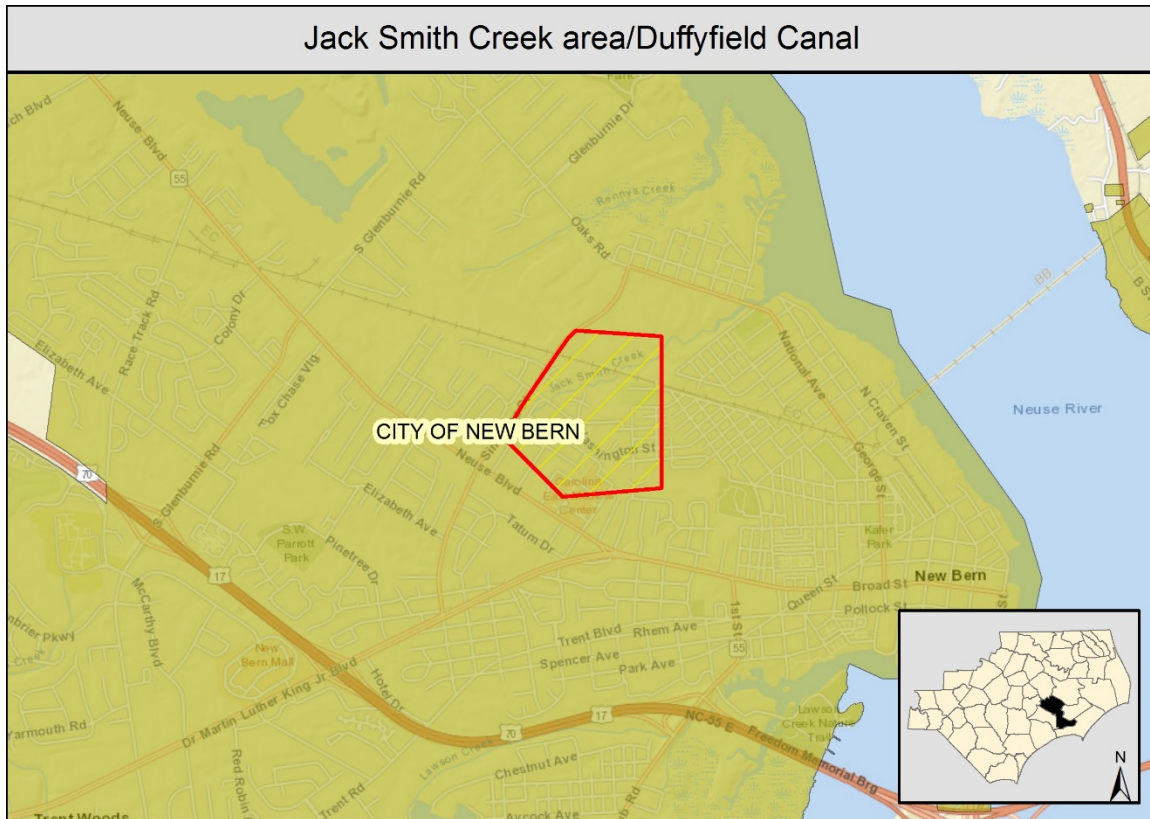


Figure 29. Infrastructure: Jack Smith Creek/Duffyfield Canal Flood Mitigation

18 - Jack Smith Creek area/Duffyfield Canal

County: Craven

Priority Grouping: High Priority

Priority Ranking: 10

Project Timeframe: 1-2 years

Location: Jack Smith Creek area/Duffyfield Canal

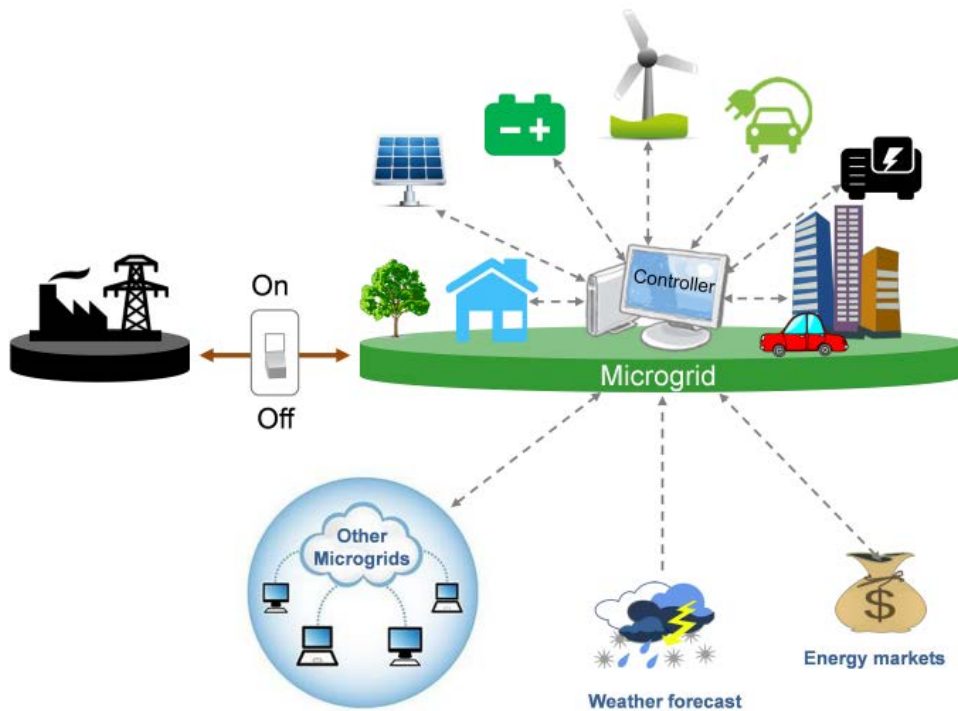
Project Summary: The low elevation of the area causes roads to flood during severe storm events, including Matthew. The City of New Bern undertook a hazard mitigation project to alleviate some of the flooding in the area. However, the area still floods. Complete additional studies to determine how Craven County can augment the City of New Bern's wetland mitigation project near Jack Smith Creek to further alleviate flooding in the area. In particular, evaluate the sufficiency of the pipe sizes along the Duffyfield Canal. Implement the measures recommended by the study, such as increasing wetland area and increasing the pipe sizes along the canal.

Question	Response	Disposition
Articulate how this project addresses an unmet need that has been created by damage from Hurricane Matthew.	Ultimately this project will reduce flooding by increasing natural water storage and promoting flow-through of flood waters reducing flood damages to roads buildings and other infrastructure.	N/A
Consistent with existing plans (describe points of intersection/departure)	Consistent with the hazard mitigation plan	N/A
Does this project comply with existing Local and State authority (codes, plan and ordinance)?	Yes	N/A
Does this project meet the intents and goals for the Hurricane Matthew Recovery Act?	Yes	N/A
Explain any benefits or impacts to the economy of the county from this project.	Unknown	N/A
For how long will this solution be effective?	More than 50 years	N/A
How effective is the risk reduction?	Unknown	N/A
How many public facilities are involved in this project (buildings and infrastructure)?	>6	N/A
Is coordination with other communities/counties needed to complete this project?	Yes	N/A
Is this project consistent with Federal Laws	Yes	N/A
To what degree does this project adversely impact local floodplain/coastal zone management?	No Impact	N/A
To what degree will it be possible to positively quantify the environmental benefits and ROI of this project?	Unknown	N/A
What impact will this action have on the local economy/tax base?	Unknown	N/A
What impacts to the environment of the county will result from this project?	Augmenting wetlands will return some of the land back to its natural function promoting drainage and water storage.	N/A
What is the capability of the local government to administer this project?	Unknown	N/A
What is the financial range of this project?	\$501K - \$1M	N/A
What is the level of public support for this project?	High	N/A
What is the technical feasibility of this project?	Unknown	N/A
Who will administer this project?	County	N/A

Infrastructure Projects Grouped as High Priority but not Ranked:

POWER PROJECTS

- Microgrid:** Hurricane Matthew caused power outages that lasted up to 7 to 10 days in some parts of the county. Overall, back-up, supplemental and redundant power is needed to create better energy assurance post-disaster and to make sure that critical facilities have sufficient power to maintain operations. Determine if critical facilities could be connected to a microgrid (Figure 28). Coordinate with power companies on the status of power feeds. Design and construct a microgrid to accommodate critical facilities identified for connection.



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Figure 30. Microgrids can provide power to communities and facilities during and after severe weather events.

37 - Microgrid

County: Craven

Priority Grouping: High Priority

Priority Ranking: 0

Project Timeframe: 1-3 years

Location: Critical facilities throughout Craven County

Project Summary: Hurricane Matthew caused power outages that lasted up to 7 to 10 days in some parts of the county. Overall, back-up, supplemental and redundant power is needed to create better energy assurance post-disaster and to make sure that critical facilities have sufficient power to maintain operations. Determine if critical facilities could be connected to a microgrid. Coordinate with power companies on the status of power feeds. Design and construct a microgrid to accommodate critical facilities identified for connection.

Question	Response	Disposition
Articulate how this project addresses an unmet need that has been created by damage from Hurricane Matthew.	Overall redundant power is needed to create better energy assurance post-disaster and to make sure that critical facilities have sufficient power to maintain operations. A microgrid would decrease the need for generators and their associated fueling and maintenance requirements.	N/A
Consistent with existing plans (describe points of intersection/departure)	Yes	N/A
Does this project comply with existing Local and State authority (codes, plan and ordinance)?	Yes	N/A
Does this project meet the intents and goals for the Hurricane Matthew Recovery Act?	Yes	N/A
Explain any benefits or impacts to the economy of the county from this project.	Providing reliable sources of power to critical facilities throughout the county will allow the government to continue to function emergency and medical services to be provided and water and wastewater facilities to continue to operate all of which contribute to the local economy.	N/A
For how long will this solution be effective?	More than 50 years	N/A
How effective is the risk reduction?	100-200 year event	N/A
How many public facilities are involved in this project (buildings and infrastructure)?	>6	N/A
Is coordination with other communities/counties needed to complete this project?	Yes	N/A
Is this project consistent with Federal Laws	Yes	N/A
To what degree does this project adversely impact local floodplain/coastal zone management?	No Impact	N/A
To what degree will it be possible to positively quantify the environmental benefits and ROI of this project?	Unknown	N/A
What impact will this action have on the local economy/tax base?	Between 51 and 75%	N/A
What impacts to the environment of the county will result from this project?	Unknown	N/A
What is the capability of the local government to administer this project?	Unknown	N/A
What is the financial range of this project?	\$1M+	N/A

What is the level of public support for this project?	High	N/A
What is the technical feasibility of this project?	Unknown	N/A
Who will administer this project?	County	N/A

- **Alternative Fuel Sources for Redundant Power:** Hurricane Matthew caused power outages that lasted up to 7 to 10 days in some parts of the county. Many backup generators could not be refueled because they were inaccessible due to road flooding. Identify sustainable sources such as solar panels for power generation and evaluate feasibility of use for generators, communications towers, and well pumps. Procure and install renewable backup power source to generators.

36 - Alternate fuel sources for redundant power

County: Craven

Priority Grouping: High Priority

Priority Ranking: 0

Project Timeframe: 1-2 years

Location: Generators throughout Craven County

Project Summary: Hurricane Matthew caused power outages that lasted up to 7 to 10 days in some parts of the county. Many backup generators could not be refueled because they were inaccessible due to road flooding. Identify sustainable sources such as solar panels for power generation and evaluate feasibility of use for generators, communications towers, and well pumps. Procure and install renewable backup power source to generators.

Question	Response	Disposition
Articulate how this project addresses an unmet need that has been created by damage from Hurricane Matthew.	Overall back-up supplemental and redundant power is needed to create better energy assurance post-disaster and to make sure that critical facilities have sufficient power to maintain operations. Many generators ran out of fuel after 2-4 days and could not be refueled because either the generators are inaccessible or fuel trucks cannot access the county from the west.	N/A
Consistent with existing plans (describe points of intersection/departure)	This project supports the hazard mitigation plan.	N/A
Does this project comply with existing Local and State authority (codes, plan and ordinance)?	Yes	N/A
Does this project meet the intents and goals for the Hurricane Matthew Recovery Act?	Yes	N/A
Explain any benefits or impacts to the economy of the county from this project.	Ensuring that generators continue to function during power outages when refueling is not possible will allow the local government to continue to function emergency and medical services to be provided and water and wastewater facilities to continue to operate all of which contribute to the local economy.	N/A
For how long will this solution be effective?	Between 11 and 30 years	N/A
How effective is the risk reduction?	50-100 year event	N/A
How many public facilities are involved in this project (buildings and infrastructure)?	>6	N/A
Is coordination with other communities/counties needed to complete this project?	Yes	N/A
Is this project consistent with Federal Laws	Yes	N/A
To what degree does this project adversely impact local floodplain/coastal zone management?	No Impact	N/A
To what degree will it be possible to positively quantify the environmental benefits and ROI of this project?	Unknown	N/A
What impact will this action have on the local economy/tax base?	Unknown	N/A
What impacts to the environment of the county will	Solar power is a renewable resource.	N/A

result from this project?		
What is the capability of the local government to administer this project?	Unknown	N/A
What is the financial range of this project?	\$251K - \$500K	N/A
What is the level of public support for this project?	High	N/A
What is the technical feasibility of this project?	Unknown	N/A
Who will administer this project?	County	N/A

FLOOD PROTECTION PROJECTS

- **Flood Barrier at 411 Craven Street:** The building at 411 Craven Street houses the Emergency Operations Center. There is a subterranean entrance to the building that floods from runoff from the adjacent street. Install flip-up flood barriers with uninterrupted power supply (UPS) and manual backups in the sidewalk in front of the entrance to seal the building against flooding.

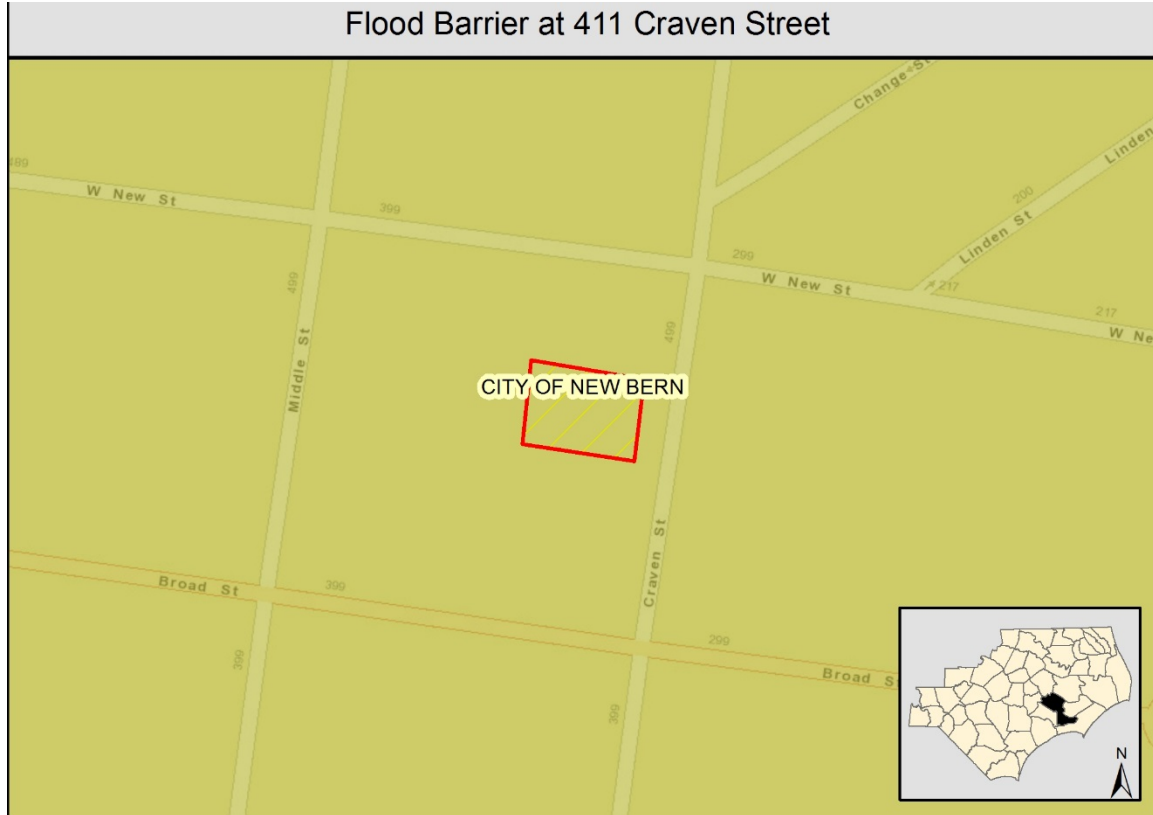


Figure 31. Infrastructure: Flood Barrier at 411 Craven Street

28- Flood Barrier at 411 Craven Street

County: Craven

Priority Grouping: High Priority

Priority Ranking: 0

Project Timeframe: 1-2 years

Location: 411 Craven Street

Project Summary: The subterranean level of 411 Craven Street, where the Emergency Operations Center is housed, can flood and experienced minor flooding during Hurricane Matthew. Install automatic flip-up flood barriers with uninterrupted power supply (UPS) and manual backups in the sidewalk in front of the entrances to this level to seal the building against flooding.

Question	Response	Disposition
Articulate how this project addresses an unmet need that has been created by damage from Hurricane Matthew.	N/A	N/A
Consistent with existing plans (describe points of intersection/departure)	This project is consistent with the hazard mitigation and emergency operations plans.	N/A
Does this project comply with existing Local and State authority (codes, plan and ordinance)?	Yes	N/A
Does this project meet the intents and goals for the Hurricane Matthew Recovery Act?	Yes	N/A
Explain any benefits or impacts to the economy of the county from this project.	If the EOC is impacted the county could incur additional costs associated with mutual aid requests.	N/A
For how long will this solution be effective?	Between 11 and 30 years	N/A
How effective is the risk reduction?	Unknown	N/A
How many public facilities are involved in this project (buildings and infrastructure)?	1-3	N/A
Is coordination with other communities/counties needed to complete this project?	Yes	N/A
Is this project consistent with Federal Laws	Yes	N/A
To what degree does this project adversely impact local floodplain/coastal zone management?	No Impact	N/A
To what degree will it be possible to positively quantify the environmental benefits and ROI of this project?	Unknown	N/A
What impact will this action have on the local economy/tax base?	Unknown	N/A
What impacts to the environment of the county will result from this project?	N/A	N/A
What is the capability of the local government to administer this project?	Medium	N/A
What is the financial range of this project?	\$101K - \$250K	N/A
What is the level of public support for this project?	Medium	N/A
What is the technical feasibility of this project?	Higher than 75%	N/A
Who will administer this project?	County	N/A

- **West Craven High School:** The school floods. It was flooded by Hurricane Matthew and closed for one week. Construct a berm/bulkhead around the school campus to protect the facilities. Elevate the utilities above the BFE + 2 feet wherever possible. Otherwise, elevate utilities as high as possible.



Figure 32. Infrastructure: West Craven High School Floodproofing

14 - West Craven High School

County: Craven

Priority Grouping: High Priority

Priority Ranking: 0

Project Timeframe: 1-2 years

Location: West Craven High School

Project Summary: The school floods. It was flooded by Hurricane Matthew and closed for one week. Construct a berm/bulkhead around the school campus to protect the facilities. Elevate the utilities above the BFE + 2 feet wherever possible. Otherwise, elevate utilities as high as possible.

Question	Response	Disposition
Articulate how this project addresses an unmet need that has been created by damage from Hurricane Matthew.	The school was flooded and closed as a result of Hurricane Matthew. Floodproofing the school will help protect it and allow it to open more quickly after a future flood.	N/A
Consistent with existing plans (describe points of intersection/departure)	Consistent with the hazard mitigation plan	N/A
Does this project comply with existing Local and State authority (codes, plan and ordinance)?	Yes	N/A
Does this project meet the intents and goals for the Hurricane Matthew Recovery Act?	Yes	N/A
Explain any benefits or impacts to the economy of the county from this project.	If kids can continue to go to school working parents will not need to stay home with them and can go to work. The County will not have to pay to repair flood damage to the school.	N/A
For how long will this solution be effective?	Between 31 and 50 years	N/A
How effective is the risk reduction?	50-100 year event	N/A
How many public facilities are involved in this project (buildings and infrastructure)?	1-3	N/A
Is coordination with other communities/counties needed to complete this project?	No	N/A
Is this project consistent with Federal Laws	Yes	N/A
To what degree does this project adversely impact local floodplain/coastal zone management?	Unknown	N/A
To what degree will it be possible to positively quantify the environmental benefits and ROI of this project?		N/A
What impact will this action have on the local economy/tax base?	Unknown	N/A
What impacts to the environment of the county will result from this project?	None	N/A
What is the capability of the local government to administer this project?	Unknown	N/A
What is the financial range of this project?	\$1M+	N/A
What is the level of public support for this project?	Unknown	N/A
What is the technical feasibility of this project?	Higher than 75%	N/A
Who will administer this project?	County	N/A

- **Stream Gages – Weyerhaeuser Road and Maple Cypress Road:** Existing stream gages in Craven County do not predict river crest heights or timing. Install predictive river gages at river crossings on Swift Creek at the Weyerhaeuser Road crossing and the Neuse River at the Maple Cypress Road crossing and tie them to the county's Code Red warning system.

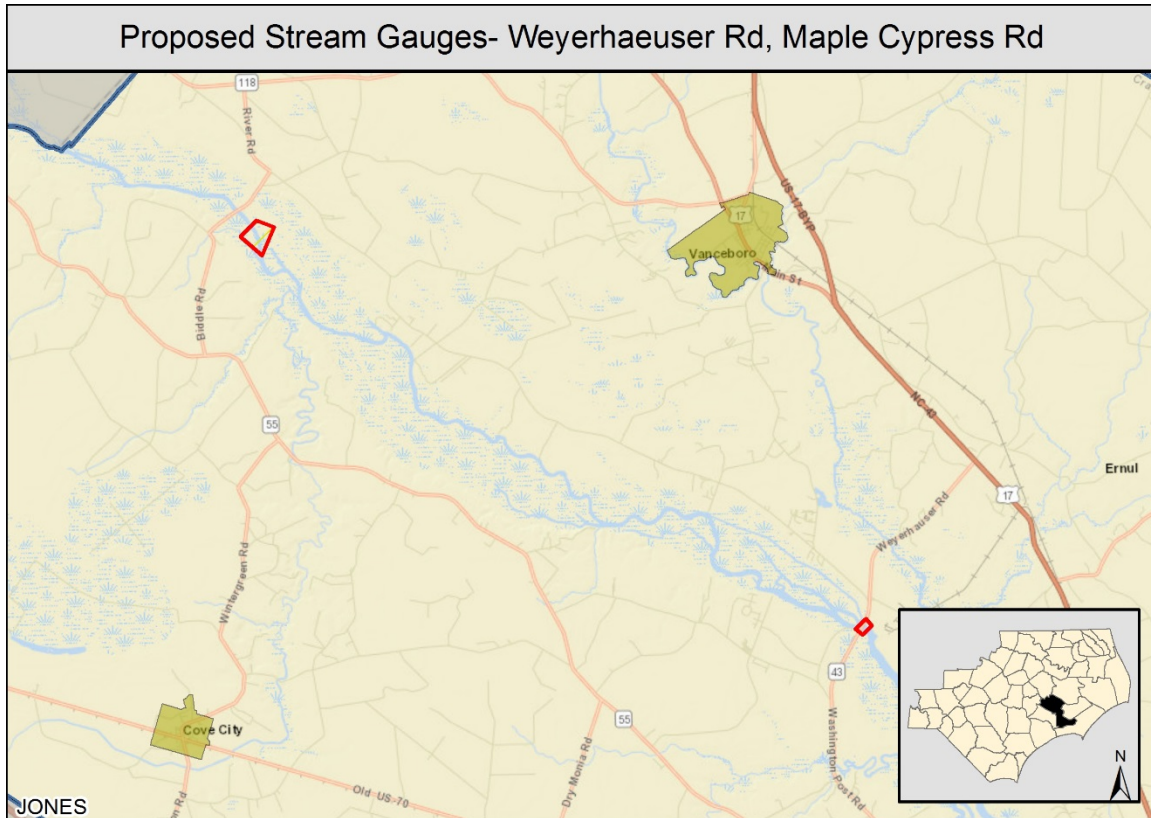


Figure 33. Infrastructure: Predictive Flood Gages

21 - Stream Gauges- Weyerhaeuser Rd, Maple Cypress Rd

County: Craven

Priority Grouping: High Priority

Priority Ranking: 0

Project Timeframe: 1-3 years

Location: Weyerhaeuser Rd, Maple Cypress Rd

Project Summary: Existing stream gages in Craven County do not predict river crest heights or timing. Install predictive river gages at river crossings on Swift Creek at the Weyerhaeuser Road crossing and the Neuse River at the Maple Cypress Road crossing and tie them to the county's Code Red warning system.

Question	Response	Disposition
Articulate how this project addresses an unmet need that has been created by damage from Hurricane Matthew.	Existing gages in the county do not predict flood flows. The closest predictive gage is located near Kinston and does not account for the effects of the convergence of tidal flows with surface water runoff and river flows.	N/A
Consistent with existing plans (describe points of intersection/departure)	The project is consistent with the hazard mitigation plan.	N/A
Does this project comply with existing Local and State authority (codes, plan and ordinance)?	Yes	N/A
Does this project meet the intents and goals for the Hurricane Matthew Recovery Act?	Yes	N/A
Explain any benefits or impacts to the economy of the county from this project.	Advance warning will allow businesses to implement their business continuity plans.	N/A
For how long will this solution be effective?	More than 50 years	N/A
How effective is the risk reduction?	>200 year event	N/A
How many public facilities are involved in this project (buildings and infrastructure)?	1-3	N/A
Is coordination with other communities/counties needed to complete this project?	No	N/A
Is this project consistent with Federal Laws	Yes	N/A
To what degree does this project adversely impact local floodplain/coastal zone management?	No Impact	N/A
To what degree will it be possible to positively quantify the environmental benefits and ROI of this project?	Unknown	N/A
What impact will this action have on the local economy/tax base?	Unknown	N/A
What impacts to the environment of the county will result from this project?	Actions can be taken to lower the levels in retention ponds prior to a flood event to reduce the likelihood of inundation.	N/A
What is the capability of the local government to administer this project?	High	N/A
What is the financial range of this project?	\$51K - \$100K	N/A
What is the level of public support for this project?	High	N/A
What is the technical feasibility of this project?	Higher than 75%	N/A
Who will administer this project?	County	N/A

- Vanceboro:** An area bounded by Streets Ferry Rd., River Rd., Bear Hole Rd., and Piney Neck Rd. gets cut off due to flooding. Parts of it flooded during Hurricane Matthew. Conduct an H&H study to identify effective ways of redirecting flows away from the area and/or directing the flows to facilities that can convey them away from the area. Construct the measures that are found to be effective. Likely projects include road and culvert improvements and the construction of bioswales, wetlands, and rain gardens.

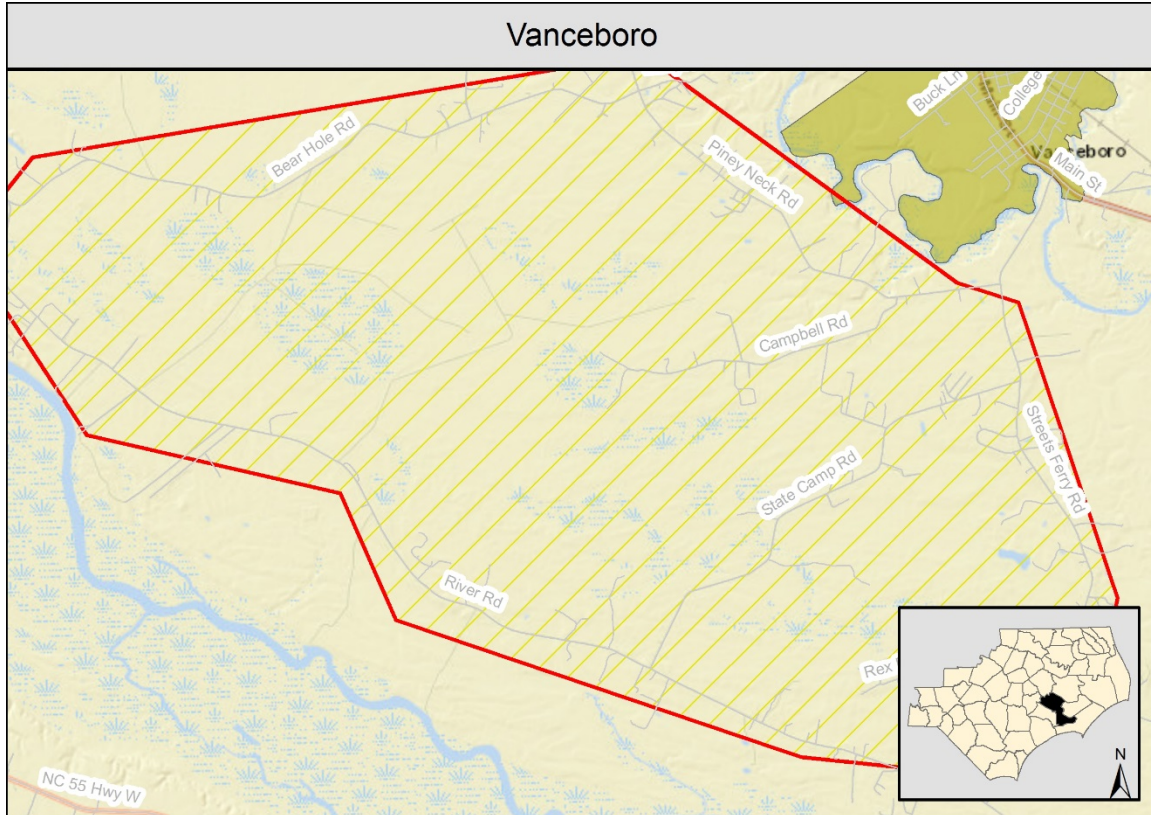


Figure 34. Infrastructure: Flood Mitigation Near Vanceboro

17 - Vanceboro

County: Craven

Priority Grouping: High Priority

Priority Ranking: 0

Project Timeframe: 2-4 years

Location: Vanceboro

Project Summary: An area bounded by Streets Ferry Rd., River Rd., Bear Hole Rd., and Piney Neck Rd. gets cut off due to flooding. Parts of it flooded during Hurricane Matthew. Conduct an H&H study to identify effective ways of redirecting flows away from the area and/or directing the flows to facilities that can convey them away from the area. Construct the measures that are found to be effective. Likely projects include road and culvert improvements and the construction of bioswales, wetlands, and rain gardens.

Question	Response	Disposition
Articulate how this project addresses an unmet need that has been created by damage from Hurricane Matthew.	Roads that are flooded will be mitigated against future flooding. Homes and businesses that suffered damage should not suffer similar damages from future events.	N/A
Consistent with existing plans (describe points of intersection/departure)	Consistent with the hazard mitigation plan	N/A
Does this project comply with existing Local and State authority (codes, plan and ordinance)?	Yes	N/A
Does this project meet the intents and goals for the Hurricane Matthew Recovery Act?	Yes	N/A
Explain any benefits or impacts to the economy of the county from this project.	The project(s) that results from the study such as road and culvert improvements bioswales wetlands and rain gardens will help to decrease flooding of homes businesses and roads in the area which will decrease damages. It will also allow people to return to work sooner.	N/A
For how long will this solution be effective?	Between 31 and 50 years	N/A
How effective is the risk reduction?	50-100 year event	N/A
How many public facilities are involved in this project (buildings and infrastructure)?	>6	N/A
Is coordination with other communities/counties needed to complete this project?	Yes	N/A
Is this project consistent with Federal Laws	Yes	N/A
To what degree does this project adversely impact local floodplain/coastal zone management?	Unknown	N/A
To what degree will it be possible to positively quantify the environmental benefits and ROI of this project?	Unknown	N/A
What impact will this action have on the local economy/tax base?	Unknown	N/A
What impacts to the environment of the county will result from this project?	The use of green infrastructure techniques could reduce runoff and improve water quality.	N/A
What is the capability of the local government to administer this project?	Unknown	N/A
What is the financial range of this project?	\$1M+	N/A
What is the level of public support for this project?	Unknown	N/A
What is the technical feasibility of this project?	Unknown	N/A
Who will administer this project?	County	N/A

- **Crop Buying Facility, Local Farms:** Vanceboro experienced widespread flooding during Hurricane Matthew. The one crop buying location in the county, which is located in Vanceboro, becomes inaccessible to farmers and distributors due to flooding of access roads. Farmers are not able to take harvested crops to the storage facility, and the storage facility is not able to get stored crops out to distributors. Elevate access roads leading to the facility out of the 100-year floodplain. Identify a location outside of the SFHA where an alternate facility could be constructed and construct an alternate facility. Determine the feasibility of constructing on-site storage (e.g., silos) at farms and construct facilities at feasible locations.



Figure 35. Infrastructure: Crop Buying Facility Access

22 - Crop buying facility, local farms

County: Craven

Priority Grouping: High Priority

Priority Ranking: 0

Project Timeframe: 1-3 years

Location: Near the intersection of Streets Ferry Rd. and Piney Neck Rd. in Vanceboro

Project Summary: Vanceboro experienced widespread flooding during Hurricane Matthew. The one crop buying location in the county, which is located in Vanceboro, becomes inaccessible to farmers and distributors due to flooding of access roads. Farmers are not able to take harvested crops to the storage facility, and the storage facility is not able to get stored crops out to distributors. Elevate access roads leading to the facility out of the 100-year floodplain. Identify a location outside of the SFHA where an alternate facility could be constructed and construct an alternate facility. Determine the feasibility of constructing on-site storage at farms and construct facilities at feasible locations.

Question	Response	Disposition
Articulate how this project addresses an unmet need that has been created by damage from Hurricane Matthew.	Crop farmers were unable to get to the distribution facility. However crops left in the field are ruined when high floods occur.	N/A
Consistent with existing plans (describe points of intersection/departure)	Unknown	N/A
Does this project comply with existing Local and State authority (codes, plan and ordinance)?	Yes	N/A
Does this project meet the intents and goals for the Hurricane Matthew Recovery Act?	Yes	N/A
Explain any benefits or impacts to the economy of the county from this project.	Providing access to the existing facility during floods and developing additional crop storage facilities within the county (at an alternate site or on farms) will protect stored crops from flood-related damages and rot and will enable crops to be distributed promptly to buyers.	N/A
For how long will this solution be effective?	More than 50 years	N/A
How effective is the risk reduction?	50-100 year event	N/A
How many public facilities are involved in this project (buildings and infrastructure)?	0	N/A
Is coordination with other communities/counties needed to complete this project?	No	N/A
Is this project consistent with Federal Laws	Yes	N/A
To what degree does this project adversely impact local floodplain/coastal zone management?	Unknown	N/A
To what degree will it be possible to positively quantify the environmental benefits and ROI of this project?	Unknown	N/A
What impact will this action have on the local economy/tax base?	Unknown	N/A
What impacts to the environment of the county will result from this project?	The project would protect the county from having to dispose of rotten harvested crops.	N/A
What is the capability of the local government to administer this project?	Unknown	N/A
What is the financial range of this project?	\$1M+	N/A
What is the level of public support for this project?	Unknown	N/A
What is the technical feasibility of this project?	Higher than 75%	N/A
Who will administer this project?	County	N/A

ROAD AND CULVERT PROJECTS

- **Animal Services Craven/Pamlico:** Facility has backup generator but cannot be refueled if road access is cut off due to flooding. The road in front of the facility needs to be elevated out of the 100-year floodplain and/or the culverts need to be upsized to handle 100-year flood flows.



Figure 36. Infrastructure: Road Improvements Near Animal Services

04 - Animal Services Craven/Pamlico

County: Craven

Priority Grouping: High Priority

Priority Ranking: 0

Project Timeframe: N/A

Location: Craven Pamlico Animal Services Center (1639 Old Airport Rd)

Project Summary: Facility has backup generator but cannot be refueled if road access is cut off due to flooding. While access was not affected by Hurricane Matthew, it has been affected by other hurricanes and severe storms. The road in front of the facility needs to be elevated out of the 100-year floodplain and/or the culverts need to be upsized to handle 100-year flood flows.

Question	Response	Disposition
Articulate how this project addresses an unmet need that has been created by damage from Hurricane Matthew.	People who need to go to shelters but cannot bring their pets with them will be able to safely house their pets temporarily.	N/A
Consistent with existing plans (describe points of intersection/departure)	Yes	N/A
Does this project comply with existing Local and State authority (codes, plan and ordinance)?	Yes	N/A
Does this project meet the intents and goals for the Hurricane Matthew Recovery Act?	Yes	N/A
Explain any benefits or impacts to the economy of the county from this project.	N/A	N/A
For how long will this solution be effective?	More than 50 years	N/A
How effective is the risk reduction?	50-100 year event	N/A
How many public facilities are involved in this project (buildings and infrastructure)?	1-3	N/A
Is coordination with other communities/counties needed to complete this project?	Yes	N/A
Is this project consistent with Federal Laws	Yes	N/A
To what degree does this project adversely impact local floodplain/coastal zone management?	Unknown	N/A
To what degree will it be possible to positively quantify the environmental benefits and ROI of this project?	Unknown	N/A
What impact will this action have on the local economy/tax base?	Unknown	N/A
What impacts to the environment of the county will result from this project?	None	N/A
What is the capability of the local government to administer this project?	Unknown	N/A
What is the financial range of this project?		N/A
What is the level of public support for this project?	Unknown	N/A
What is the technical feasibility of this project?	Higher than 75%	N/A
Who will administer this project?	State	N/A

- **Belangia Road:** The road floods and cuts off the community. Portions of the road need to be elevated out of the 100-year floodplain, and culverts should be upsized to handle the flood flows.

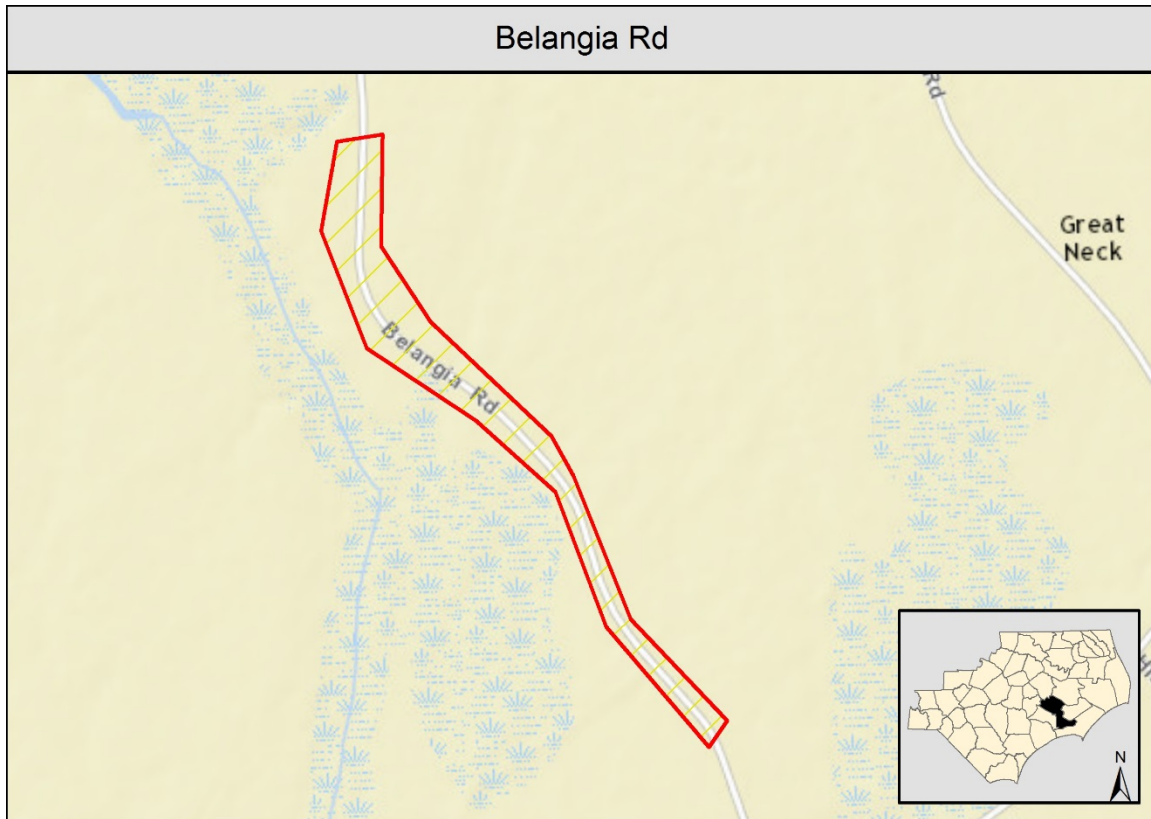


Figure 37. Infrastructure: Belangia Road Improvements

07 - Belangia Rd

County: Craven

Priority Grouping: High Priority

Priority Ranking: 0

Project Timeframe: 1-3 years

Location: Belangia Rd

Project Summary: The road floods and cuts off the community. Portions of the road need to be elevated out of the 100-year floodplain, and culverts should be upsized to handle the flood flows.

Question	Response	Disposition
Articulate how this project addresses an unmet need that has been created by damage from Hurricane Matthew.	People who are cut off from the rest of the county will continue to have access so that they can continue to work.	N/A
Consistent with existing plans (describe points of intersection/departure)	Consistent with the hazard mitigation plan.	N/A
Does this project comply with existing Local and State authority (codes, plan and ordinance)?	Yes	N/A
Does this project meet the intents and goals for the Hurricane Matthew Recovery Act?	Yes	N/A
Explain any benefits or impacts to the economy of the county from this project.	Maintaining access between this part of the community and the rest of the county will allow people to continue to go to work and contribute to the local economy as consumers. When they are isolated they cannot do either of these things.	N/A
For how long will this solution be effective?	More than 50 years	N/A
How effective is the risk reduction?	50-100 year event	N/A
How many public facilities are involved in this project (buildings and infrastructure)?	1-3	N/A
Is coordination with other communities/counties needed to complete this project?	No	N/A
Is this project consistent with Federal Laws	Yes	N/A
To what degree does this project adversely impact local floodplain/coastal zone management?	Unknown	N/A
To what degree will it be possible to positively quantify the environmental benefits and ROI of this project?	Unknown	N/A
What impact will this action have on the local economy/tax base?		N/A
What impacts to the environment of the county will result from this project?	None	N/A
What is the capability of the local government to administer this project?	Unknown	N/A
What is the financial range of this project?	\$251K - \$500K	N/A
What is the level of public support for this project?	Medium	N/A
What is the technical feasibility of this project?	Higher than 75%	N/A
Who will administer this project?	State	N/A

- **Fire Department on Belangia Road:** The fire department cannot respond to emergencies because the road floods and cuts off access to the fire station. This area flooded during Hurricane Matthew. Need to elevate the roadway at the intersection of Adams Creek Rd. and Belangia Rd. out of the 100-year floodplain and/or enlarge the culverts to facilitate drainage of the area so that the fire station remains accessible.

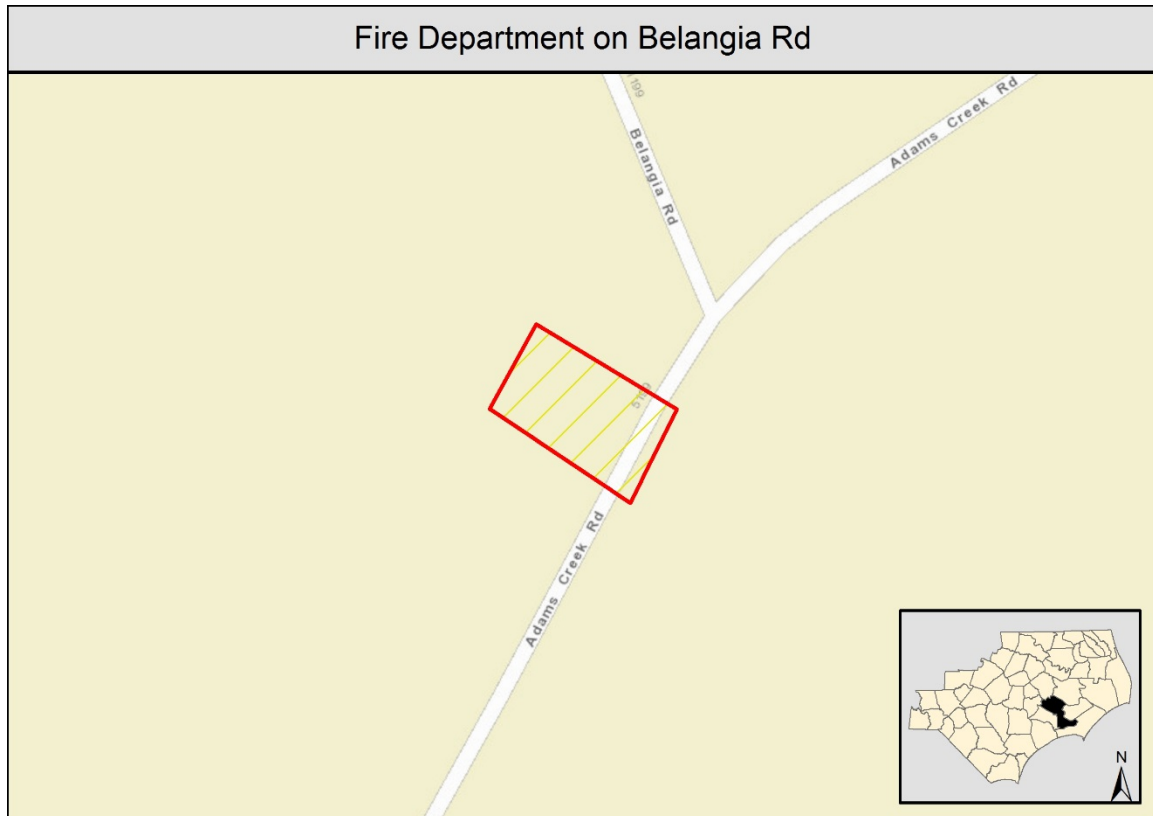


Figure 38. Infrastructure: Road Improvements Near Fire Station on Belangia Road

02 - Fire Department on Belangia Rd

County: Craven

Priority Grouping: High Priority

Priority Ranking: 0

Project Timeframe: 1-2 years

Location: Fire Department on Belangia Rd

Project Summary: The fire department cannot respond to emergencies because the road floods and cuts off access to the fire station. This area flooded during Hurricane Matthew. Need to elevate the roadway at the intersection of Adams Creek Rd. and Belangia Rd. out of the 100-year floodplain and/or enlarge the culverts to facilitate drainage of the area so that the fire station remains accessible.

Question	Response	Disposition
Articulate how this project addresses an unmet need that has been created by damage from Hurricane Matthew.	The Harlowe area of the county experienced localized flooding during Hurricane Matthew and access to it due to flooding has been cut off due to other hurricanes and storm events with flood depths reaching 9 feet or more above ground surface elevation. Losing an emergency response facility under these conditions further stresses an already-stressed emergency services department.	N/A
Consistent with existing plans (describe points of intersection/departure)	Consistent with the hazard mitigation plan	N/A
Does this project comply with existing Local and State authority (codes, plan and ordinance)?	Yes	N/A
Does this project meet the intents and goals for the Hurricane Matthew Recovery Act?	Yes	N/A
Explain any benefits or impacts to the economy of the county from this project.	The County's emergency services department will not have to deploy rescue teams from remote locations.	N/A
For how long will this solution be effective?	More than 50 years	N/A
How effective is the risk reduction?	50-100 year event	N/A
How many public facilities are involved in this project (buildings and infrastructure)?	1-3	N/A
Is coordination with other communities/counties needed to complete this project?	No	N/A
Is this project consistent with Federal Laws	Yes	N/A
To what degree does this project adversely impact local floodplain/coastal zone management?	No Impact	N/A
To what degree will it be possible to positively quantify the environmental benefits and ROI of this project?	Unknown	N/A
What impact will this action have on the local economy/tax base?	Unknown	N/A
What impacts to the environment of the county will result from this project?	None	N/A
What is the capability of the local government to administer this project?	Unknown	N/A
What is the financial range of this project?	\$1M+	N/A
What is the level of public support for this project?	High	N/A
What is the technical feasibility of this project?	Higher than 75%	N/A
Who will administer this project?	State	N/A

- **Broad Creek Road:** This road is the only means of ingress and egress to Fairfield Harbour. A ¾-mile stretch floods frequently during severe storms and cuts off access to the community, which is primarily retirees. Elevate the stretch of roadway above the 100-year floodplain and upsize culverts to handle the flood flows.

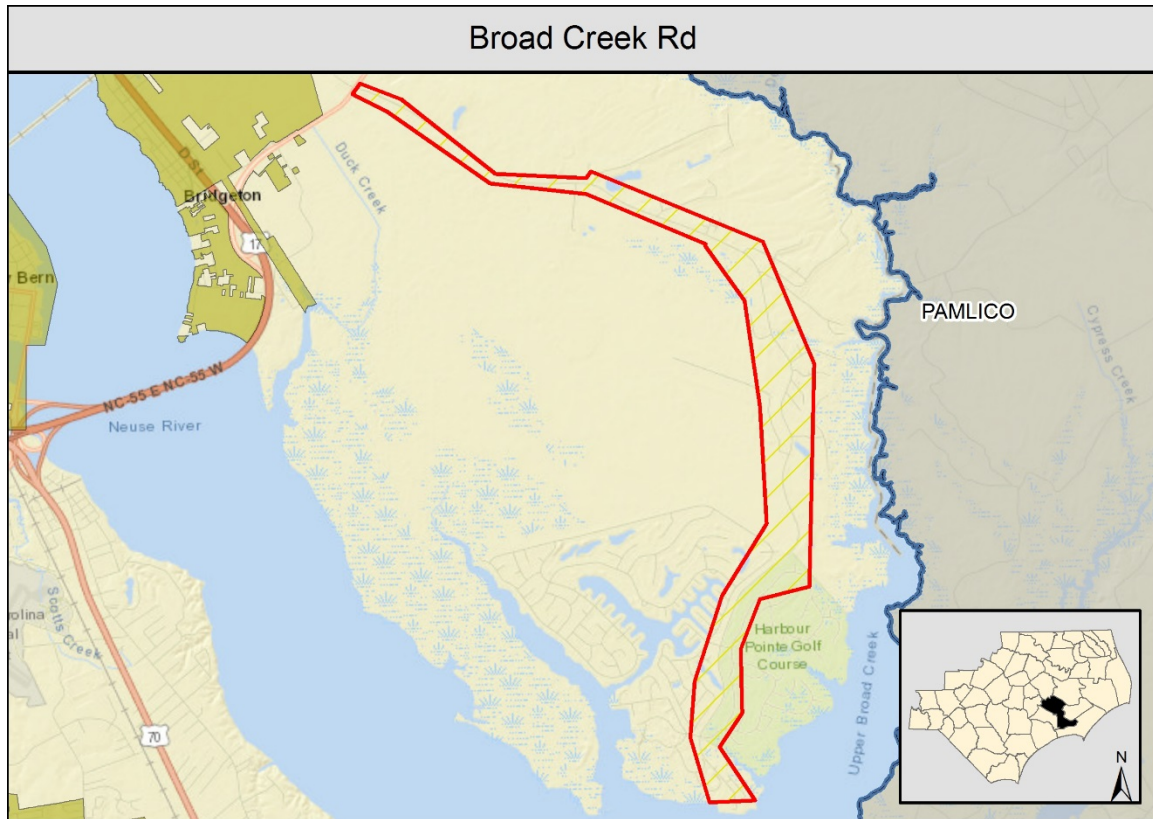


Figure 39. Infrastructure: Broad Creek Road Improvements

19 - Broad Creek Rd

County: Craven

Priority Grouping: High Priority

Priority Ranking: 0

Project Timeframe: 3-5 years

Location: Broad Creek Rd

Project Summary: This road is the only means of ingress and egress to Fairfield Harbour. A ¾-mile stretch floods frequently during severe storms and cuts off access to the community, which is primarily retirees. Elevate the stretch of roadway above the 100-year floodplain and upsize culverts to handle the flood flows.

Question	Response	Disposition
Articulate how this project addresses an unmet need that has been created by damage from Hurricane Matthew.	People who have been cut off from the rest of the county due to flooding will continue to have access.	N/A
Consistent with existing plans (describe points of intersection/departure)	Consistent with the hazard mitigation plan	N/A
Does this project comply with existing Local and State authority (codes, plan and ordinance)?	Yes	N/A
Does this project meet the intents and goals for the Hurricane Matthew Recovery Act?	Yes	N/A
Explain any benefits or impacts to the economy of the county from this project.	The project will provide access to a part of the community that becomes isolated during flooding. It will provide access to businesses located along the road. It also could reduce the number of emergency responses required during flooding due to access issues.	N/A
For how long will this solution be effective?	More than 50 years	N/A
How effective is the risk reduction?	50-100 year event	N/A
How many public facilities are involved in this project (buildings and infrastructure)?	1-3	N/A
Is coordination with other communities/counties needed to complete this project?	No	N/A
Is this project consistent with Federal Laws	Yes	N/A
To what degree does this project adversely impact local floodplain/coastal zone management?	Unknown	N/A
To what degree will it be possible to positively quantify the environmental benefits and ROI of this project?	Unknown	N/A
What impact will this action have on the local economy/tax base?		N/A
What impacts to the environment of the county will result from this project?	Unknown	N/A
What is the capability of the local government to administer this project?	Unknown	N/A
What is the financial range of this project?	\$1M+	N/A
What is the level of public support for this project?	High	N/A
What is the technical feasibility of this project?	Higher than 75%	N/A
Who will administer this project?	State	N/A

- **New Liberty Road:** When Route 70 was improved, New Liberty Rd. was cut in half and turned into cul-de-sacs. When New Liberty Rd. floods during hurricanes, access for people in this area is cut off. Elevate the roadway out of the floodplain and upsize culverts to handle the flood flows.

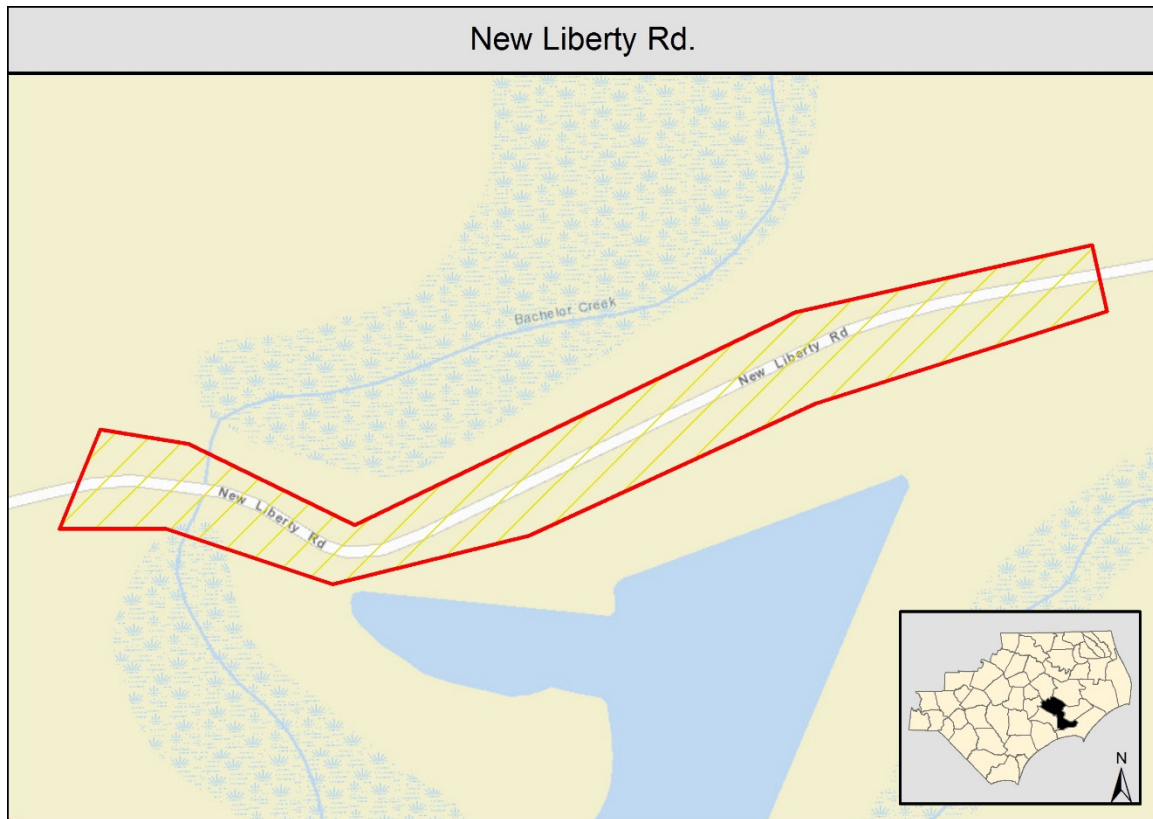


Figure 40. Infrastructure: New Liberty Road Improvements

13 - New Liberty Rd.

County: Craven

Priority Grouping: High Priority

Priority Ranking: 0

Project Timeframe: 1-3 years

Location: New Liberty Rd.

Project Summary: When Route 70 was improved, New Liberty Rd. was cut in half and turned into cul-de-sacs. When New Liberty Rd. floods during hurricanes, access for people in this area is cut off. Elevate the roadway out of the floodplain and upsize culverts to handle the flood flows.

Question	Response	Disposition
Articulate how this project addresses an unmet need that has been created by damage from Hurricane Matthew.	People who are cut off from the rest of the county will continue to have access.	N/A
Consistent with existing plans (describe points of intersection/departure)	Consistent with the hazard mitigation plan	N/A
Does this project comply with existing Local and State authority (codes, plan and ordinance)?	Yes	N/A
Does this project meet the intents and goals for the Hurricane Matthew Recovery Act?	Yes	N/A
Explain any benefits or impacts to the economy of the county from this project.	This project will decrease the number of people requiring emergency services since they will have access to the community.	N/A
For how long will this solution be effective?	More than 50 years	N/A
How effective is the risk reduction?	50-100 year event	N/A
How many public facilities are involved in this project (buildings and infrastructure)?	1-3	N/A
Is coordination with other communities/counties needed to complete this project?	No	N/A
Is this project consistent with Federal Laws	Yes	N/A
To what degree does this project adversely impact local floodplain/coastal zone management?	No Impact	N/A
To what degree will it be possible to positively quantify the environmental benefits and ROI of this project?	Unknown	N/A
What impact will this action have on the local economy/tax base?	Unknown	N/A
What impacts to the environment of the county will result from this project?	Unknown	N/A
What is the capability of the local government to administer this project?	Unknown	N/A
What is the financial range of this project?	\$1M+	N/A
What is the level of public support for this project?	Unknown	N/A
What is the technical feasibility of this project?	Higher than 75%	N/A
Who will administer this project?	State	N/A

- **Route 55 at Core Creek:** Core Creek floods across Route 55, which is a major thoroughfare across the county. This area flooded during Matthew. Elevate this portion of the roadway above the 100-year flood elevation. Upsize culverts to handle the flood flows.

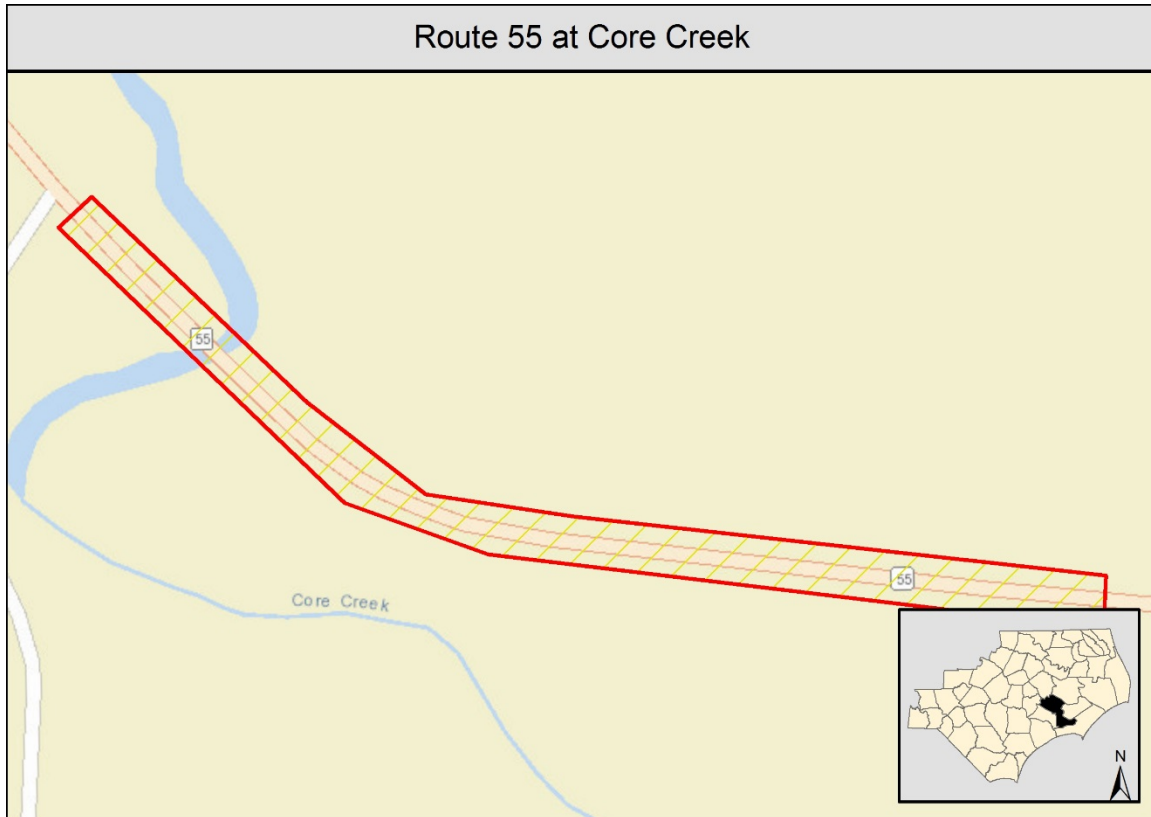


Figure 41. Infrastructure: Route 55 at Core Creek Improvements

11 - Route 55 at Core Creek

County: Craven

Priority Grouping: High Priority

Priority Ranking: 0

Project Timeframe: 1-3 years

Location: Route 55 at Core Creek

Project Summary: Core Creek floods across Route 55, which is a major thoroughfare across the county. This area flooded during Matthew. Elevate this portion of the roadway above the 100-year flood elevation. Upsize culverts to handle the flood flows.

Question	Response	Disposition
Articulate how this project addresses an unmet need that has been created by damage from Hurricane Matthew.	People who are cut off from the rest of the county will continue to have access so that they can continue to work. Goods and supplies can continue to reach their destinations within the county.	N/A
Consistent with existing plans (describe points of intersection/departure)	Supports the hazard mitigation plan	N/A
Does this project comply with existing Local and State authority (codes, plan and ordinance)?	Yes	N/A
Does this project meet the intents and goals for the Hurricane Matthew Recovery Act?	Yes	N/A
Explain any benefits or impacts to the economy of the county from this project.	This project will decrease the number of people requiring emergency services since they will have access to the community. As a major transportation corridor in the county it will allow goods to continue to flow into and out of the county.	N/A
For how long will this solution be effective?	More than 50 years	N/A
How effective is the risk reduction?	50-100 year event	N/A
How many public facilities are involved in this project (buildings and infrastructure)?	1-3	N/A
Is coordination with other communities/counties needed to complete this project?	No	N/A
Is this project consistent with Federal Laws	Yes	N/A
To what degree does this project adversely impact local floodplain/coastal zone management?	No Impact	N/A
To what degree will it be possible to positively quantify the environmental benefits and ROI of this project?	Unknown	N/A
What impact will this action have on the local economy/tax base?	Unknown	N/A
What impacts to the environment of the county will result from this project?	Unknown	N/A
What is the capability of the local government to administer this project?	Unknown	N/A
What is the financial range of this project?	\$1M+	N/A
What is the level of public support for this project?	Unknown	N/A
What is the technical feasibility of this project?	Higher than 75%	N/A
Who will administer this project?	State	N/A

- **Jeremy Street/Justin Street:** Jeremy Street/Justin Street floods frequently, including after hurricanes, isolating the residents along the road. Elevate the road out of the floodplain. Upsize culverts to handle flood flows.

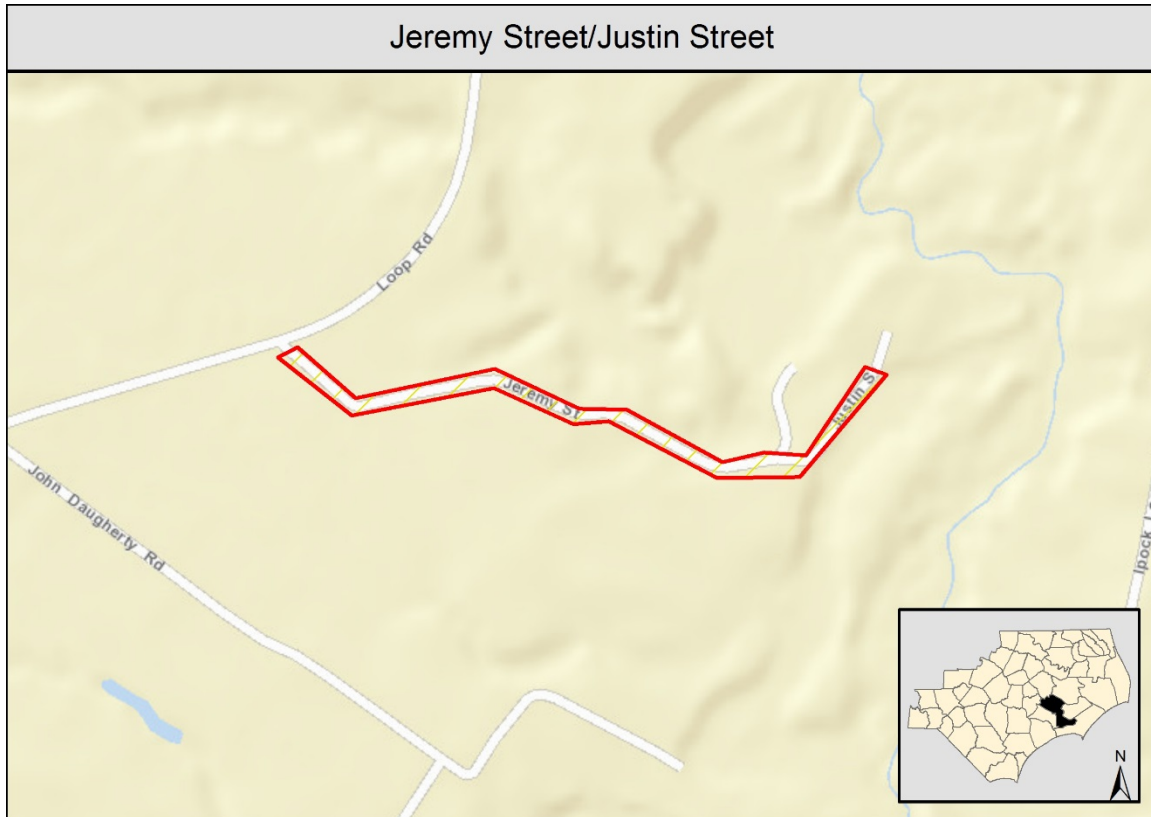


Figure 42. Infrastructure: Jeremy Street and Justin Street Improvements

09 - Jeremy Street/Justin Street

County: Craven

Priority Grouping: High Priority

Priority Ranking: 0

Project Timeframe: 1-3 years

Location: Jeremy Street/Justin Street

Project Summary: Jeremy Street/Justin Street floods frequently, including after hurricanes, isolating the residents along the road. Elevate the road out of the floodplain. Upsize culverts to handle flood flows.

Question	Response	Disposition
Articulate how this project addresses an unmet need that has been created by damage from Hurricane Matthew.	People who were cut off from the rest of the county due to flooding will continue to have access.	N/A
Consistent with existing plans (describe points of intersection/departure)	Yes	N/A
Does this project comply with existing Local and State authority (codes, plan and ordinance)?	Yes	N/A
Does this project meet the intents and goals for the Hurricane Matthew Recovery Act?	Yes	N/A
Explain any benefits or impacts to the economy of the county from this project.	This project will decrease the number of people requiring emergency services since they will have access to the community.	N/A
For how long will this solution be effective?	More than 50 years	N/A
How effective is the risk reduction?	50-100 year event	N/A
How many public facilities are involved in this project (buildings and infrastructure)?	1-3	N/A
Is coordination with other communities/counties needed to complete this project?	No	N/A
Is this project consistent with Federal Laws	Yes	N/A
To what degree does this project adversely impact local floodplain/coastal zone management?	No Impact	N/A
To what degree will it be possible to positively quantify the environmental benefits and ROI of this project?	Unknown	N/A
What impact will this action have on the local economy/tax base?	Unknown	N/A
What impacts to the environment of the county will result from this project?	None	N/A
What is the capability of the local government to administer this project?	Unknown	N/A
What is the financial range of this project?	\$1M+	N/A
What is the level of public support for this project?	Unknown	N/A
What is the technical feasibility of this project?	Higher than 75%	N/A
Who will administer this project?	State	N/A

- River Road from Streets Ferry Road to State Camp Road:** River Rd. from Streets Ferry Rd. to State Camp Rd. Flooded during Hurricane Matthew. Floods frequently, sometimes due to significant rain/hurricane events, sometimes due to seepage. Residents say that flooding has become more frequent since construction of the canal. Elevate roadway out of the 100-year floodplain and upsize culverts to handle flood flows.

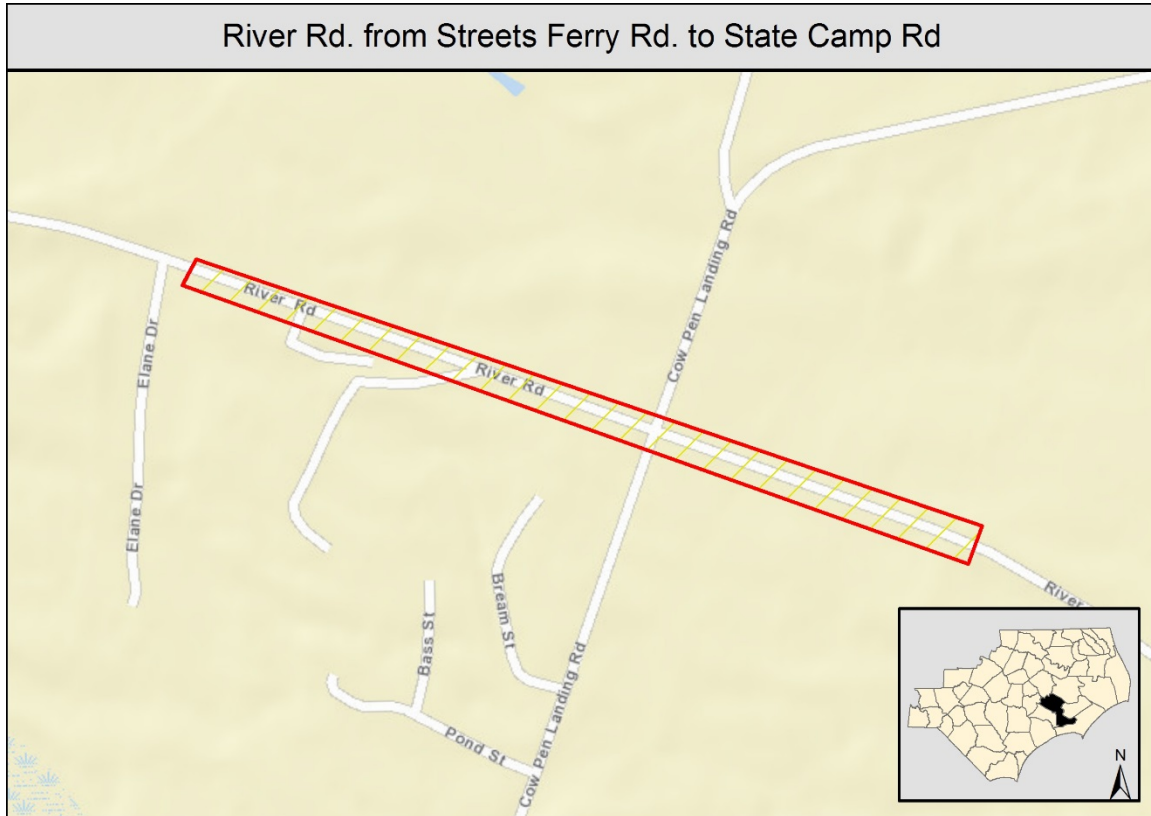


Figure 43. Infrastructure: River Road Improvements

12 - River Rd. from Streets Ferry Rd. to State Camp Rd

County: Craven

Priority Grouping: High Priority

Priority Ranking: 0

Project Timeframe: 1-3 years

Location: River Rd. from Streets Ferry Rd. to State Camp Rd

Project Summary: Flooded during Hurricane Matthew. Floods frequently, sometimes due to significant rain/hurricane events, sometimes due to seepage. Residents say that flooding has become more frequent since construction of the canal. Elevate roadway out of the 100-year floodplain and upsize culverts to handle flood flows.

Question	Response	Disposition
Articulate how this project addresses an unmet need that has been created by damage from Hurricane Matthew.	People who are cut off from the rest of the county will continue to have access so that they can continue to work. Goods and supplies can continue to reach their destinations within the county.	N/A
Consistent with existing plans (describe points of intersection/departure)	Consistent with the hazard mitigation plan	N/A
Does this project comply with existing Local and State authority (codes, plan and ordinance)?	Yes	N/A
Does this project meet the intents and goals for the Hurricane Matthew Recovery Act?	Yes	N/A
Explain any benefits or impacts to the economy of the county from this project.	This project will decrease the number of people requiring emergency services since they will have access to the community. As a major transportation corridor in the county it will allow goods to continue to flow into and out of the county.	N/A
For how long will this solution be effective?	More than 50 years	N/A
How effective is the risk reduction?	50-100 year event	N/A
How many public facilities are involved in this project (buildings and infrastructure)?	1-3	N/A
Is coordination with other communities/counties needed to complete this project?	No	N/A
Is this project consistent with Federal Laws	Yes	N/A
To what degree does this project adversely impact local floodplain/coastal zone management?	No Impact	N/A
To what degree will it be possible to positively quantify the environmental benefits and ROI of this project?	Unknown	N/A
What impact will this action have on the local economy/tax base?	Unknown	N/A
What impacts to the environment of the county will result from this project?	Unknown	N/A
What is the capability of the local government to administer this project?	Unknown	N/A
What is the financial range of this project?	\$1M+	N/A
What is the level of public support for this project?	High	N/A
What is the technical feasibility of this project?	Higher than 75%	N/A
Who will administer this project?	State	N/A

- **Wintergreen Road at Mills Branch:** Mills Branch floods Wintergreen Road and cuts off access to part of the community. Elevate the road out of the 100-year floodplain. Upsize culverts to handle the flood flows.

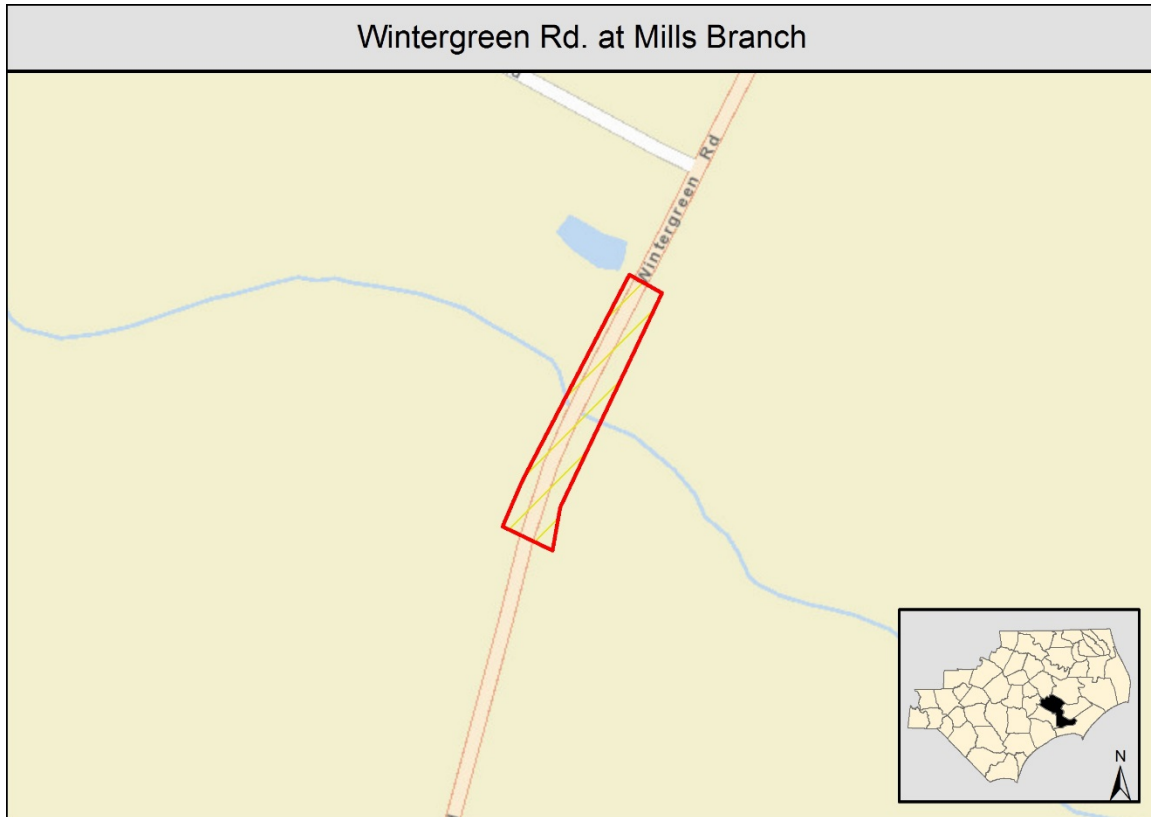


Figure 44. Infrastructure: Wintergreen Road Improvements

10 - Wintergreen Rd. at Mills Branch

County: Craven

Priority Grouping: High Priority

Priority Ranking: 0

Project Timeframe: 1-3 years

Location: Wintergreen Rd. at Mills Branch

Project Summary: Mills Branch floods Wintergreen Road and cuts off access to part of the community. Elevate the road out of the 100-year floodplain. Upsize culverts to handle the flood flows.

Question	Response	Disposition
Articulate how this project addresses an unmet need that has been created by damage from Hurricane Matthew.	People who were cut off from the rest of the county by flooding will continue to have access.	N/A
Consistent with existing plans (describe points of intersection/departure)	Consistent with the hazard mitigation plan	N/A
Does this project comply with existing Local and State authority (codes, plan and ordinance)?	Yes	N/A
Does this project meet the intents and goals for the Hurricane Matthew Recovery Act?	Yes	N/A
Explain any benefits or impacts to the economy of the county from this project.	This project will decrease the number of people requiring emergency services since they will have access to the community. People will have access to the rest of the county and can travel to work sooner after a flood event.	N/A
For how long will this solution be effective?	More than 50 years	N/A
How effective is the risk reduction?	50-100 year event	N/A
How many public facilities are involved in this project (buildings and infrastructure)?	1-3	N/A
Is coordination with other communities/counties needed to complete this project?	No	N/A
Is this project consistent with Federal Laws	Yes	N/A
To what degree does this project adversely impact local floodplain/coastal zone management?	No Impact	N/A
To what degree will it be possible to positively quantify the environmental benefits and ROI of this project?	Unknown	N/A
What impact will this action have on the local economy/tax base?	Unknown	N/A
What impacts to the environment of the county will result from this project?	None	N/A
What is the capability of the local government to administer this project?	Unknown	N/A
What is the financial range of this project?	\$1M+	N/A
What is the level of public support for this project?	High	N/A
What is the technical feasibility of this project?	Higher than 75%	N/A
Who will administer this project?	State	N/A

- Water Treatment Plant on Lewis Farm Road:** The WTP on Lewis Farm Rd. is located on the edge of the 100-year floodplain. While it remained accessible during Hurricane Matthew, flood waters during other hurricanes and severe storms have inundated the roadway and cut off access to the plant. Need to ensure access, sufficient backup power capabilities to keep the plant running, as it is a major source of potable water for the county. Upsize culverts to ensure they can handle 100-year flood flows. Provide a backup generator with an alternative fuel source such as a solar panel with battery.

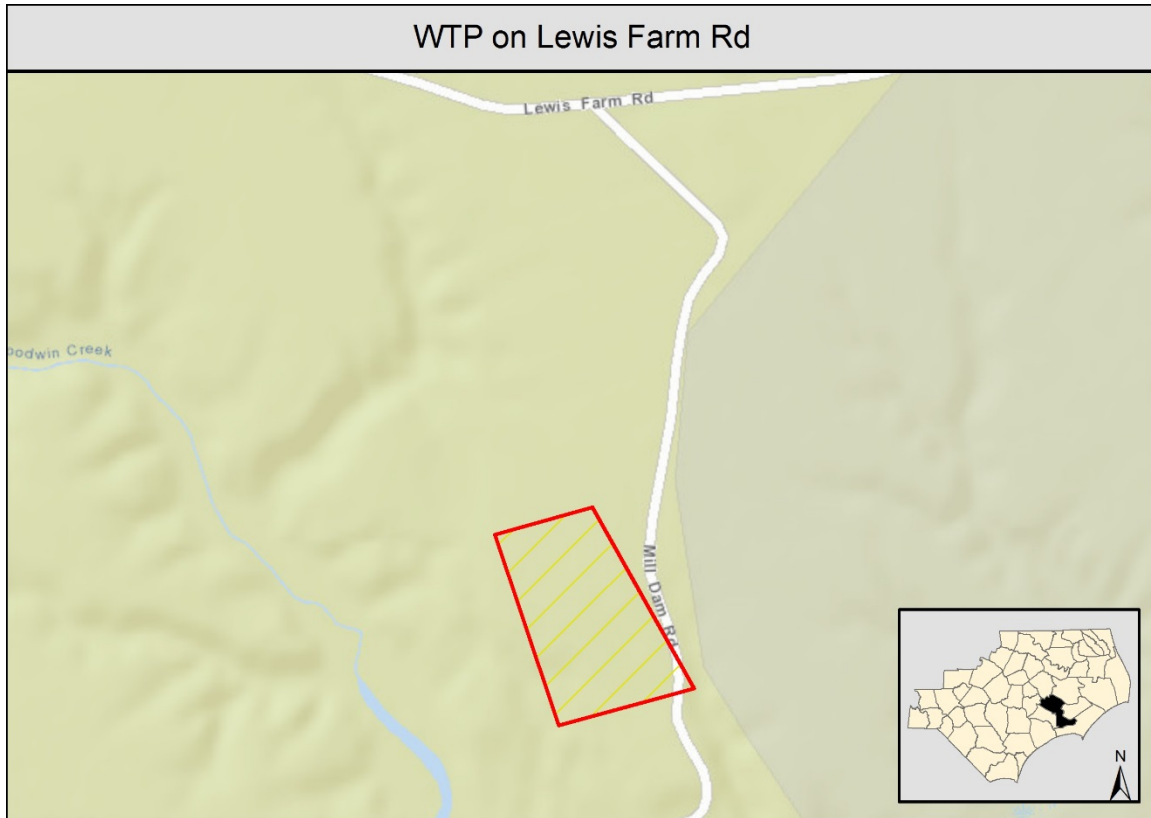


Figure 45. Infrastructure: Road Improvements Near the Water Treatment Plant

05 - WTP on Lewis Farm Rd

County: Craven

Priority Grouping: High Priority

Priority Ranking: 0

Project Timeframe: 1-3 years

Location: County WTP on Lewis Farm Rd

Project Summary: The facility is located on the edge of the 100-year floodplain. While it remained accessible during Hurricane Matthew, flood waters during other hurricanes and severe storms have inundated the roadway and cut off access to the plant. Need to ensure access, sufficient backup power capabilities to keep the plant running, as it is a major source of potable water for the county. Upsize culverts to ensure they can handle 100-year flood flows. Provide a backup generator with an alternative fuel source such as a solar panel with battery.

Question	Response	Disposition
Articulate how this project addresses an unmet need that has been created by damage from Hurricane Matthew.	Facilities that rely on generators for continued operation during power outages need to have the generators refueled. When flood waters inundate roads and cut off access to the facilities generators cannot be refueled resulting in shutdowns of critical facilities.	N/A
Consistent with existing plans (describe points of intersection/departure)	Yes - supports hazard mitigation plan	N/A
Does this project comply with existing Local and State authority (codes, plan and ordinance)?	Yes	N/A
Does this project meet the intents and goals for the Hurricane Matthew Recovery Act?	Yes	N/A
Explain any benefits or impacts to the economy of the county from this project.	If the water treatment plant continues to function during floods the county will not need to import and pay for potable water. Businesses that rely on potable water for operations such as restaurants and hotels as well as healthcare facilities will be able to continue to function.	N/A
For how long will this solution be effective?	More than 50 years	N/A
How effective is the risk reduction?	50-100 year event	N/A
How many public facilities are involved in this project (buildings and infrastructure)?	1-3	N/A
Is coordination with other communities/counties needed to complete this project?	No	N/A
Is this project consistent with Federal Laws	Yes	N/A
To what degree does this project adversely impact local floodplain/coastal zone management?	No Impact	N/A
To what degree will it be possible to positively quantify the environmental benefits and ROI of this project?	Unknown	N/A
What impact will this action have on the local economy/tax base?	Higher than 75%	N/A
What impacts to the environment of the county will result from this project?	Water will continue to be treated for drinking purposes. Boil water advisories will not be needed nor will bottled water need to be trucked in.	N/A
What is the capability of the local government to administer this project?	Low	N/A
What is the financial range of this project?	\$1M+	N/A

What is the level of public support for this project?	High	N/A
What is the technical feasibility of this project?	Higher than 75%	N/A
Who will administer this project?	State	N/A

- **Shoreline Drive:** The Town of River Bend is accessible primarily by only one road, Shoreline Drive, which floods frequently from the overtopping of a nearby canal. Determine the feasibility of designing and constructing a new road to connect the west end of Plantation Drive to Old Pollocksville Road to provide a second means of ingress/egress to the Town of River Bend.

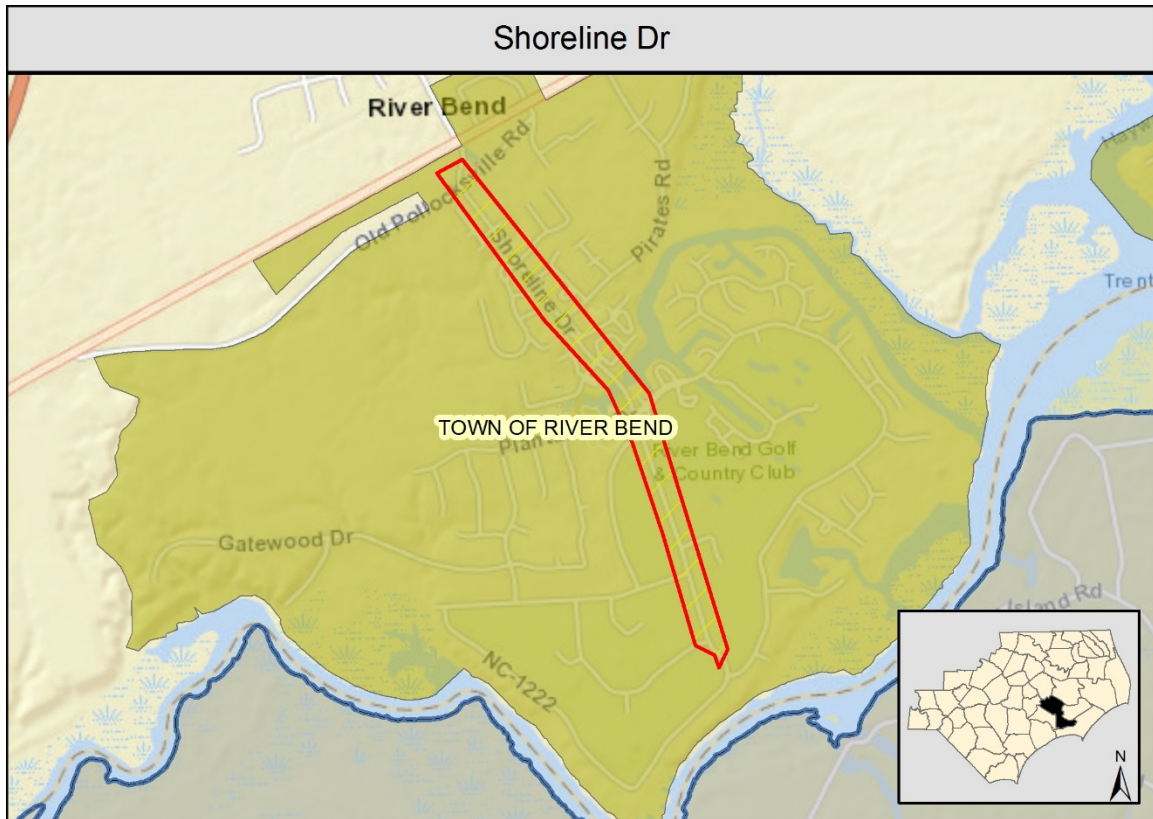


Figure 46. Infrastructure: Shoreline Drive Redundant Access

23 - Shoreline Dr

County: Craven

Priority Grouping: High Priority

Priority Ranking: 0

Project Timeframe: 2-4 years

Location: Shoreline Dr

Project Summary: When the canal overflows due to inundation from severe rain storms such as Hurricanes Matthew and Irene, Shoreline Drive floods, isolating about 80 percent of the community, as Shoreline Drive is the primary means of ingress/egress for the community. Construct a road above the 100-year floodplain that connects Old Pollocksville Road and the west end of Plantation Drive to provide another means of access to the community.

Question	Response	Disposition
Articulate how this project addresses an unmet need that has been created by damage from Hurricane Matthew.	The project will provide a second means of access to the River Bend community and decrease the number of people needing emergency services during flood events.	N/A
Consistent with existing plans (describe points of intersection/departure)	Consistent with the hazard mitigation plan	N/A
Does this project comply with existing Local and State authority (codes, plan and ordinance)?	Yes	N/A
Does this project meet the intents and goals for the Hurricane Matthew Recovery Act?	Yes	N/A
Explain any benefits or impacts to the economy of the county from this project.	The project will increase accessibility to the River Bend community and decrease the number of people needing emergency services during disasters.	N/A
For how long will this solution be effective?	More than 50 years	N/A
How effective is the risk reduction?	50-100 year event	N/A
How many public facilities are involved in this project (buildings and infrastructure)?	1-3	N/A
Is coordination with other communities/counties needed to complete this project?	Yes	N/A
Is this project consistent with Federal Laws	Yes	N/A
To what degree does this project adversely impact local floodplain/coastal zone management?	Unknown	N/A
To what degree will it be possible to positively quantify the environmental benefits and ROI of this project?	Unknown	N/A
What impact will this action have on the local economy/tax base?	Unknown	N/A
What impacts to the environment of the county will result from this project?	Unknown	N/A
What is the capability of the local government to administer this project?	Unknown	N/A
What is the financial range of this project?	\$1M+	N/A
What is the level of public support for this project?	Unknown	N/A
What is the technical feasibility of this project?	Higher than 75%	N/A
Who will administer this project?	State	N/A

Medium Priority Infrastructure Strategies

Pillar	Action Name	Priority	Overall Ranking
Infrastructure	Town of River Bend Drainage Swales	Medium	N/A
Infrastructure	Cherry Branch-Minnesott Beach Ferry Terminal	Medium	N/A
Infrastructure	Animal Rescue and Distribution Facility at Fairgrounds (Route 70 Near Audrey Lane)	Medium	N/A

Table 14. Craven County Medium Priority Infrastructure Summary

These projects represent the infrastructure strategy that Craven County indicated is of a medium priority to address. Additional detail can be found below:

- Town of River Bend Drainage Swales:** Many of the drainage ditches and swales in the Town of River Bend slope toward private property, resulting in frequent flooding of the homes in this area. Figure 45 shows locations in the vicinity of Channel Run Road and Portside Lane that have undersized, submerged and blocked drainage culverts connecting drainage swales that are undersized and improperly designed. These have resulted in stormwater runoff draining towards the property rather than away from them. These ditches and swales should be re-graded to drain away from private property and discharge into an adequately sized and connected stormwater management system.

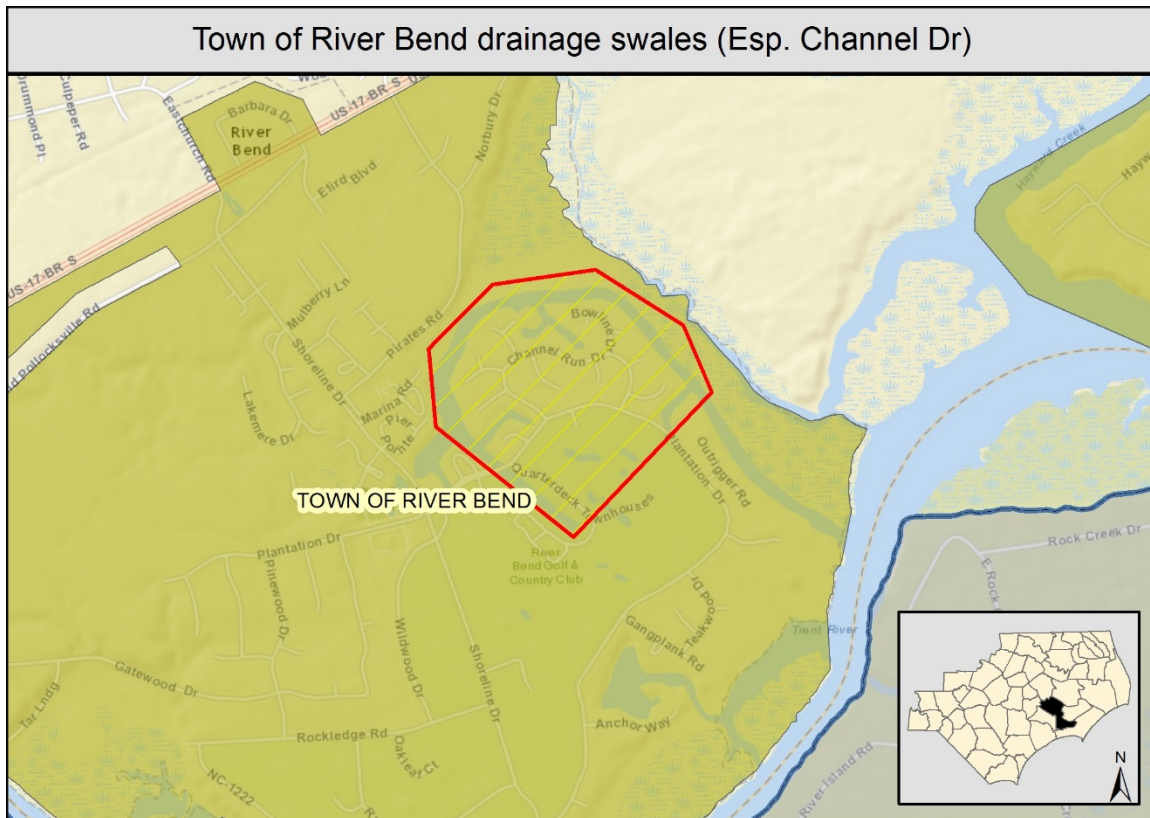


Figure 47. Infrastructure: Realign and Reconstruct Drainage Swales



Figure 48. Drainage ditches and swales in River Bend drain toward houses rather than away from them, resulting in frequent flooding of these properties.

24 - Town of River Bend drainage swales (Esp. Channel Dr)

County: Craven

Priority Grouping: Medium Priority

Priority Ranking: 0

Project Timeframe: 2-4 years

Location: Town of River Bend (Esp. Channel Dr)

Project Summary: Drainage swales and ditches overflowed during Hurricane Mathew, inundating private property. The drainage swales and ditches should be regarded/reconstructed to direct water away from private property into the stormwater conveyance system.

Question	Response	Disposition
Articulate how this project addresses an unmet need that has been created by damage from Hurricane Matthew.	Private property will be less likely to flood	N/A
Consistent with existing plans (describe points of intersection/departure)	Supports the hazard mitigation plan	N/A
Does this project comply with existing Local and State authority (codes, plan and ordinance)?	Yes	N/A
Does this project meet the intents and goals for the Hurricane Matthew Recovery Act?	Yes	N/A
Explain any benefits or impacts to the economy of the county from this project.	The project will decrease the damages from flooding to private property and support stormwater management objectives.	N/A
For how long will this solution be effective?	More than 50 years	N/A
How effective is the risk reduction?	Unknown	N/A
How many public facilities are involved in this project (buildings and infrastructure)?	>6	N/A
Is coordination with other communities/counties needed to complete this project?	Yes	N/A
Is this project consistent with Federal Laws	Yes	N/A
To what degree does this project adversely impact local floodplain/coastal zone management?	No Impact	N/A
To what degree will it be possible to positively quantify the environmental benefits and ROI of this project?		N/A
What impact will this action have on the local economy/tax base?	Unknown	N/A
What impacts to the environment of the county will result from this project?	Unknown	N/A
What is the capability of the local government to administer this project?	Unknown	N/A
What is the financial range of this project?	\$1M+	N/A
What is the level of public support for this project?	High	N/A
What is the technical feasibility of this project?	Higher than 75%	N/A
Who will administer this project?	Local	N/A

- **Cherry Branch-Minnesott Beach Ferry Terminal:** The Cherry Branch-Minnesott Beach Ferry is used by many people who live on the north side of the Neuse River and work at MCAS Cherry Point on the south side of the river. When winds blow water into the mooring area, the water elevation rises enough to cause the angle of the automobile ramps between the ferry and the dock to become too steep to use safely. The dock should be reconfigured to allow the ramps to extend sufficiently during times of high water such that the ramp angle between the ferry and the dock accommodates vehicle entry and exit.

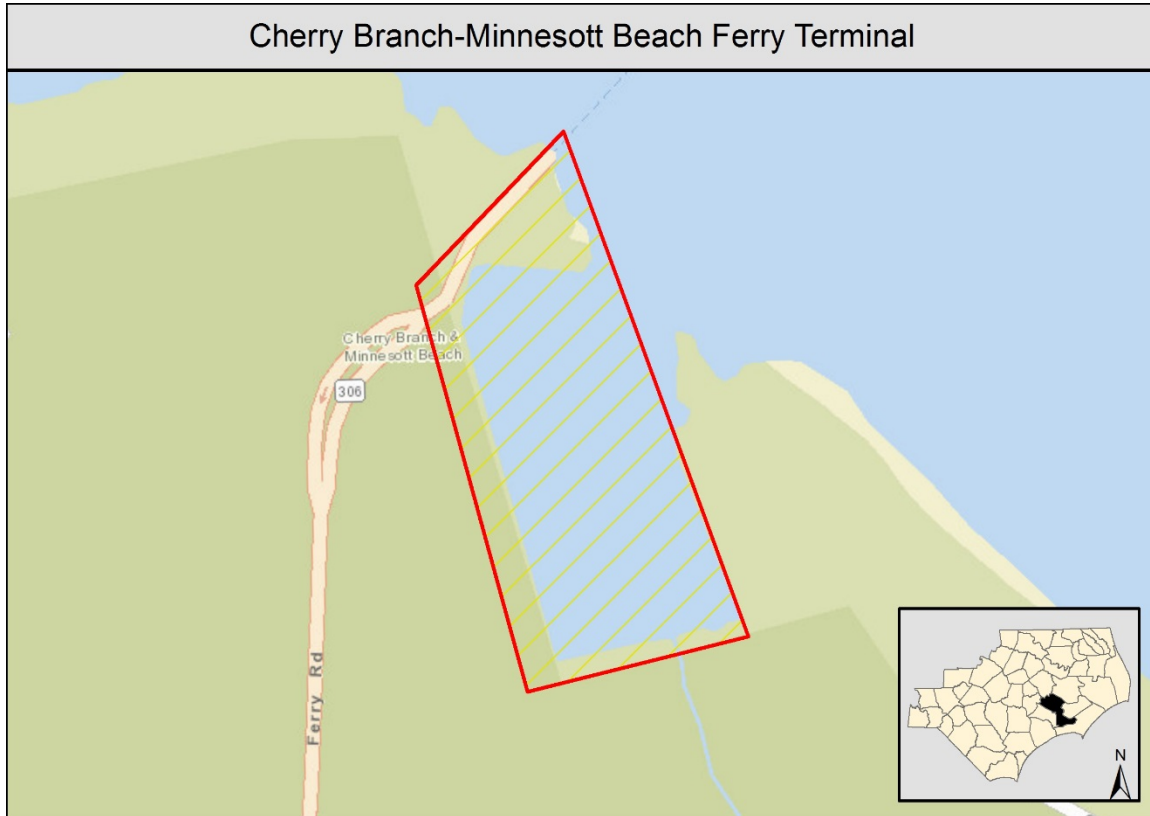


Figure 49. Infrastructure: Reconfigure Cherry Branch-Minnesott Beach Ferry Terminal

01 - Cherry Branch-Minnesott Beach Ferry Terminal

County: Craven

Priority Grouping: Medium Priority

Priority Ranking: 0

Project Timeframe: 3-5 years

Location: Cherry Branch-Minnesott Beach Ferry Terminal

Project Summary: While not directly related to Hurricane Matthew, the ferry terminal shuts down when strong winds blow water into the dock area, causing water levels to rise to levels that prohibit the automobile ramps from being used safely. Some citizens in Craven County rely on the ferry to get to and from their places of employment, particularly MCAS Cherry Point. The ferry terminal at Cherry Point needs to be resilient to elevated water levels so that it can remain open. Reconfigure the docks to allow the ramps to extend sufficiently during times of high water such that the ramp angle between the ferry and the dock accommodates vehicle entry and exit.

Question	Response	Disposition
Articulate how this project addresses an unmet need that has been created by damage from Hurricane Matthew.	While the project is not directly related to Hurricane Matthew hurricane-force winds and other strong wind events can cause water levels in the dock area to rise to levels that are unsafe for using the automobile ramp. Maintaining ferry operations will alleviate stresses on surface roads and emergency evacuation routes. It could also allow riders many of whom are employed at MCAS Cherry Point to continue to work when surface roads used to travel between the Minnesott Beach ferry dock....	N/A
Consistent with existing plans (describe points of intersection/departure)	This project is consistent with the hazard mitigation plan and economic development plan.	N/A
Does this project comply with existing Local and State authority (codes, plan and ordinance)?	Yes	N/A
Does this project meet the intents and goals for the Hurricane Matthew Recovery Act?	Yes	N/A
Explain any benefits or impacts to the economy of the county from this project.	Maintaining ferry operations will alleviate stresses on surface roads and emergency evacuation routes. It could also allow riders many of whom are employed at MCAS Cherry Point to continue to work when surface roads used to travel between the Minnesott Beach ferry dock and the Cherry Branch ferry dock become impassable due to flooding. MCAS Cherry Point is one of the largest employers in the county.	N/A
For how long will this solution be effective?	More than 50 years	N/A
How effective is the risk reduction?	50-100 year event	N/A
How many public facilities are involved in this project (buildings and infrastructure)?	1-3	N/A
Is coordination with other communities/counties needed to complete this project?	No	N/A
Is this project consistent with Federal Laws	Yes	N/A
To what degree does this project adversely impact local floodplain/coastal zone management?	Unknown	N/A
To what degree will it be possible to positively quantify the environmental benefits and ROI of this project?	Unknown	N/A
What impact will this action have on the local economy/tax base?	Unknown	N/A

What impacts to the environment of the county will result from this project?	Unknown	N/A
What is the capability of the local government to administer this project?	Unknown	N/A
What is the financial range of this project?	\$1M+	N/A
What is the level of public support for this project?	High	N/A
What is the technical feasibility of this project?	Unknown	N/A
Who will administer this project?	State	N/A

- **Animal Rescue and Distribution Facility at Fairgrounds:** Large animals are evacuated to this location during emergencies. Flooding of Route 70 can cut off access during hurricanes and severe storms. Need to ensure access along Route 70 is not cut off by elevating the roadway between Audrey Lane and Taberna Way above the 100-year floodplain and/or upsizing culverts to handle the flood flows.

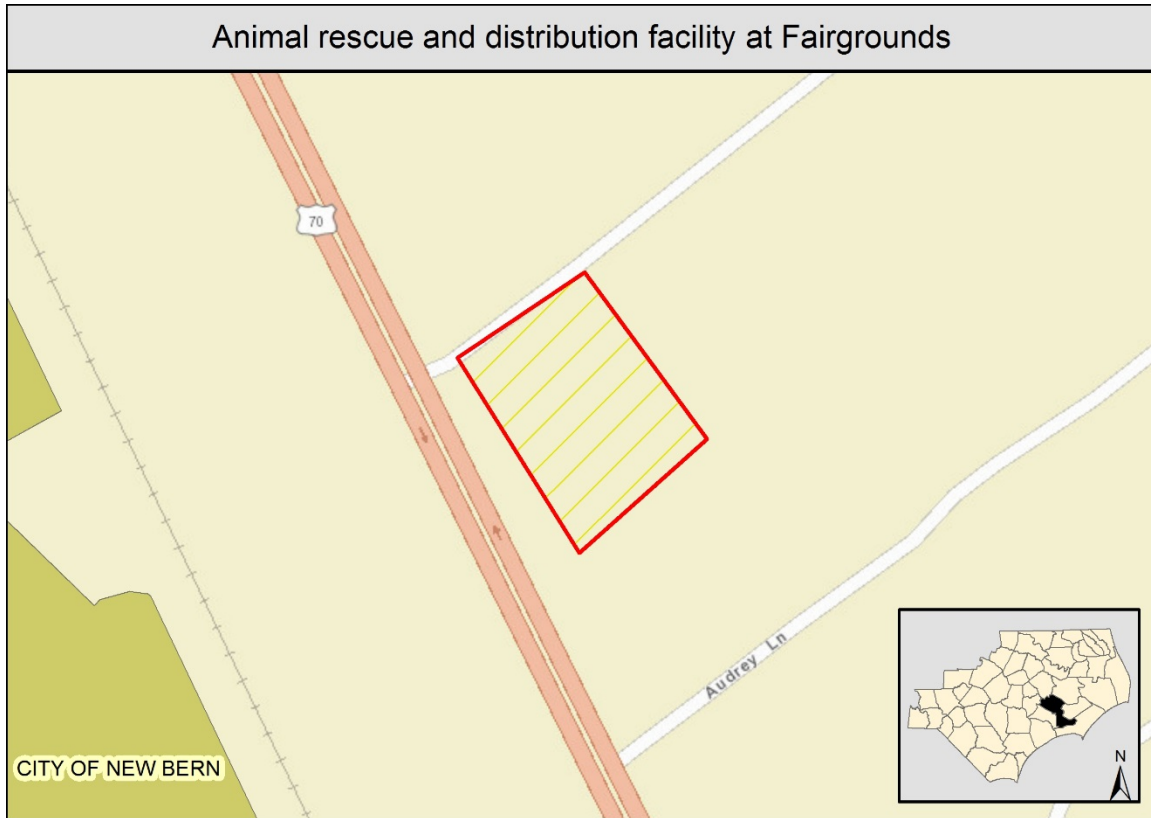


Figure 50. Infrastructure: Route 70 Improvements Near Animal Rescue and Distribution Facility

03 - Animal rescue and distribution facility at Fairgrounds (Route 70 near Audrey Lane)

County: Craven

Priority Grouping: Medium Priority

Priority Ranking: 0

Project Timeframe: 1-3 years

Location: Animal rescue and distribution facility at Fairgrounds (Route 70 near Audrey Lane)

Project Summary: Large animals are evacuated to this location during emergencies. Flooding of Route 70 can cut off access during hurricanes and severe storms. Need to ensure access along Route 70 is not cut off by elevating the roadway between Audrey Lane and Taberna Way above the 100-year floodplain and/or upsizing culverts to handle the flood flows.

Question	Response	Disposition
Articulate how this project addresses an unmet need that has been created by damage from Hurricane Matthew.	Farmers will be able to safely move shelter and retrieve their livestock during a flood event.	N/A
Consistent with existing plans (describe points of intersection/departure)	Consistent with CR14 in the regional hazard mitigation plan	N/A
Does this project comply with existing Local and State authority (codes, plan and ordinance)?	Yes	N/A
Does this project meet the intents and goals for the Hurricane Matthew Recovery Act?	Yes	N/A
Explain any benefits or impacts to the economy of the county from this project.	Livestock can be safely housed before flood events enabling farmers to continue livestock operations after floodwaters have receded.	N/A
For how long will this solution be effective?	More than 50 years	N/A
How effective is the risk reduction?	50-100 year event	N/A
How many public facilities are involved in this project (buildings and infrastructure)?	1-3	N/A
Is coordination with other communities/counties needed to complete this project?	Yes	N/A
Is this project consistent with Federal Laws	Yes	N/A
To what degree does this project adversely impact local floodplain/coastal zone management?	Unknown	N/A
To what degree will it be possible to positively quantify the environmental benefits and ROI of this project?	Unknown	N/A
What impact will this action have on the local economy/tax base?	Unknown	N/A
What impacts to the environment of the county will result from this project?	If large animals/livestock can be safely relocated to an animal rescue facility before a flood event the number of animal carcasses requiring cleanup will be reduced.	N/A
What is the capability of the local government to administer this project?	Unknown	N/A
What is the financial range of this project?	\$1M+	N/A
What is the level of public support for this project?	Unknown	N/A
What is the technical feasibility of this project?	Higher than 75%	N/A
Who will administer this project?	County	N/A

Environmental, Ecosystem, and Agricultural Strategies

High Priority Environmental Strategies

Pillar	Action Name	Priority	Overall Ranking
Environment	Hog Waste Lagoons Near Quinn Rd., Craven Farms Rd., and Neuse Farms	High	N/A

Table 15. Craven County Medium Priority Environmental Summary

This project represents the environmental strategy that Craven County indicated is high priority to address. Additional detail can be found below:

- Hog Waste Lagoons Near Quinn Road, Craven Farms Road, and Neuse Farms:** Several hog farms are located in or within 100 feet of the SFHA. The waste lagoons on these farms have been inundated by flood waters and could become breached, releasing their contents into the Neuse River. One of the lagoons was inundated during Hurricane Matthew. This contamination would affect residents and businesses downstream, including those in New Bern. Buyout lagoon operating permits if feasible and if farmers are willing to sell. Otherwise, cover lagoons to prevent water from accumulating in the lagoons and/or pump lagoon contents to slurry holding tanks.

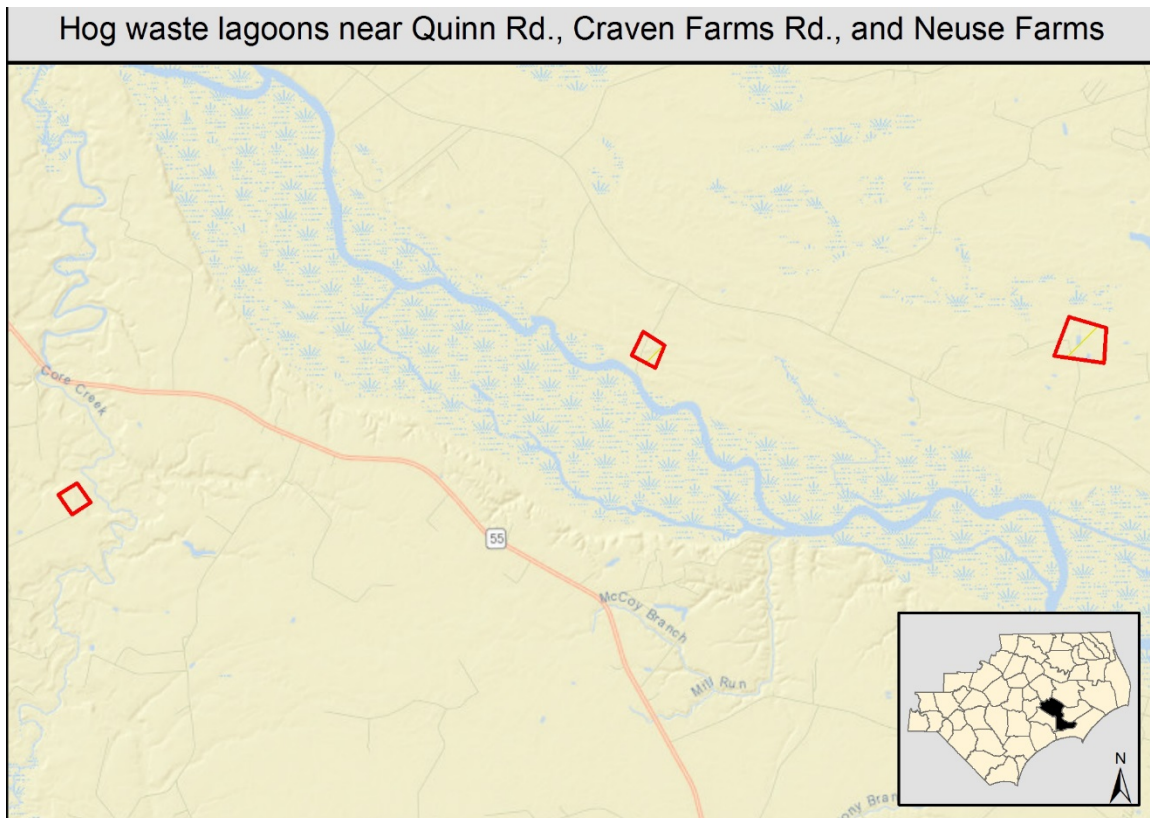


Figure 51. Environment: Hog Waste Lagoon Flood Mitigation

26 - Hog waste lagoons near Quinn Rd., Craven Farms Rd., and Neuse Farms

County: Craven

Priority Grouping: High Priority

Priority Ranking: 0

Project Timeframe: 1-3 years

Location: Hog farms in the SFHA in Craven County

Project Summary: Several hog farms are located in or within 100 feet of the SFHA. The waste lagoons on these farms have been inundated by flood waters and could become breached, releasing their contents into the Neuse River. One of the lagoons was inundated during Hurricane Matthew. This contamination would affect residents and businesses downstream, including those in New Bern. Buyout lagoon operating permits if feasible and if farmers are willing to sell. Otherwise, cover lagoons to prevent water from accumulating in the lagoons and/or pump lagoon contents to slurry holding tanks.

Question	Response	Disposition
Articulate how this project addresses an unmet need that has been created by damage from Hurricane Matthew.	The waste lagoons on these farms have been inundated by flood waters and could become breached releasing their contents into the Neuse River. This contamination would affect residents and businesses downstream including those in New Bern.	N/A
Consistent with existing plans (describe points of intersection/departure)	Consistent with the hazard mitigation plan.	N/A
Does this project comply with existing Local and State authority (codes, plan and ordinance)?	Yes	N/A
Does this project meet the intents and goals for the Hurricane Matthew Recovery Act?	Yes	N/A
Explain any benefits or impacts to the economy of the county from this project.	Providing additional education and training to farmers that sell their hog permits will enable them to engage in other agricultural practices which are important to the local economy.	N/A
For how long will this solution be effective?	Less than 10 years	N/A
How effective is the risk reduction?	Unknown	N/A
How many public facilities are involved in this project (buildings and infrastructure)?	0	N/A
Is coordination with other communities/counties needed to complete this project?	No	N/A
Is this project consistent with Federal Laws	Yes	N/A
To what degree does this project adversely impact local floodplain/coastal zone management?	Unknown	N/A
To what degree will it be possible to positively quantify the environmental benefits and ROI of this project?	High confidence	N/A
What impact will this action have on the local economy/tax base?	Unknown	N/A
What impacts to the environment of the county will result from this project?	Preventing accidental releases of hog waste to the Neuse River and Swift Creek will help to maintain their water quality.	N/A
What is the capability of the local government to administer this project?	Medium	N/A
What is the financial range of this project?	\$51K - \$100K	N/A
What is the level of public support for this project?	Unknown	N/A

What is the technical feasibility of this project?	Between 51 and 75%	N/A
Who will administer this project?	County	N/A

Summary

Implementation has already begun for some of these actions but for those that have not already been funded, the State of North Carolina will begin a process of prioritizing the actions and seeking to match a funding stream to each action. Those that are not matched with a funding source will be added to the State's Unmet Needs Report. Funding for Unmet Needs will be sought through additional funding from Congress and from the North Carolina General Assembly. Any action that cannot be matched to a funding source should be incorporated into the County's Hazard Mitigation Plan for consideration for future funding. It is important to seek to implement as many of these actions as feasible. Doing so will significantly contribute to helping improve the resiliency of North Carolina's communities.