

# **Hurricane Matthew Resilient Redevelopment Plan**

## **Chowan 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 25 people lost their lives, and 100,000 homes, businesses, and government buildings sustained damage estimated at \$4.8 billion.<sup>1</sup> 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) initiative 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.

<sup>1</sup> 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, Chowan County has identified 12 projects in four pillars: Housing, Economic Development, Infrastructure, and Environment. Details of these projects can be found in Section IV of this plan.

Pillar	Project/Action Count
Housing	3
Economic Development	2
Infrastructure	6
Environment	1
<b>Grand Total</b>	<b>12</b>

**Table 1. Chowan County Summary of Projects by Pillar**





# 1. Background

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## 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.<sup>2</sup>

## 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.

- There were 81,832 individuals registered for FEMA/state assistance.

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<sup>2</sup> Governor McCrory’s Request for Federal Assistance for Hurricane Matthew Recovery, November 14, 2016



- 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) recommendation 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 initiative 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 initiative 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 initiative 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. Four 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.

**Meeting 4** – NCEM presented actions developed during the course of the planning process and allowed the county to rank actions; apply High, Medium, or Low Prioritization; and approve inclusion of the actions in the final 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 resilient 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.

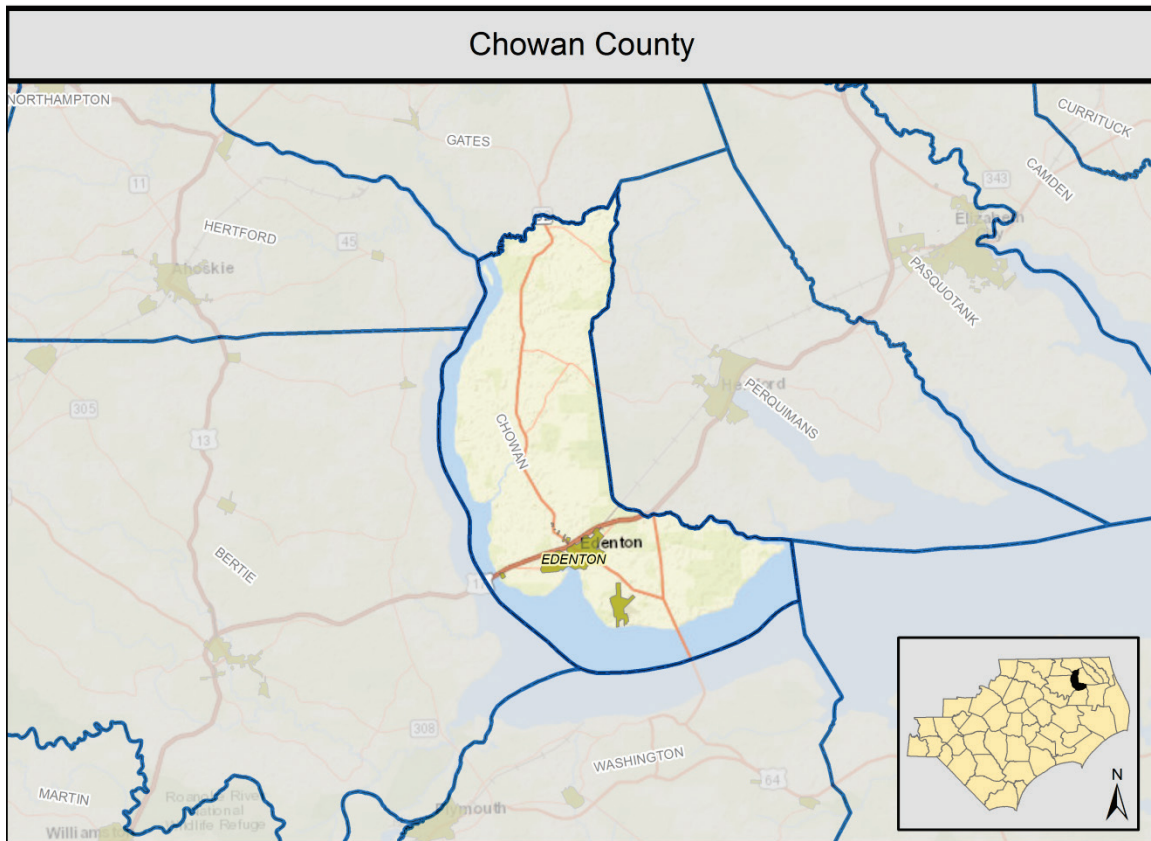


Figure 2. Chowan County and Neighboring Counties

### 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, brownish-yellow color, inundating the streets and yards of several 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 foreground is dominated by a dense forest of green trees, which appears to be a park or a wooded area adjacent to the flooded zone. The overall scene depicts a significant natural disaster impact on a community.

## 2. County Profile



## 2. County Profile

Chowan County is located in north eastern North Carolina on the northern shore of the Albemarle Sound. It is a largely rural county with one municipality, the Town of Edenton. Its current population is 14,656. This section provides a profile of housing, economics, infrastructure, environment, and administration within Chowan County.

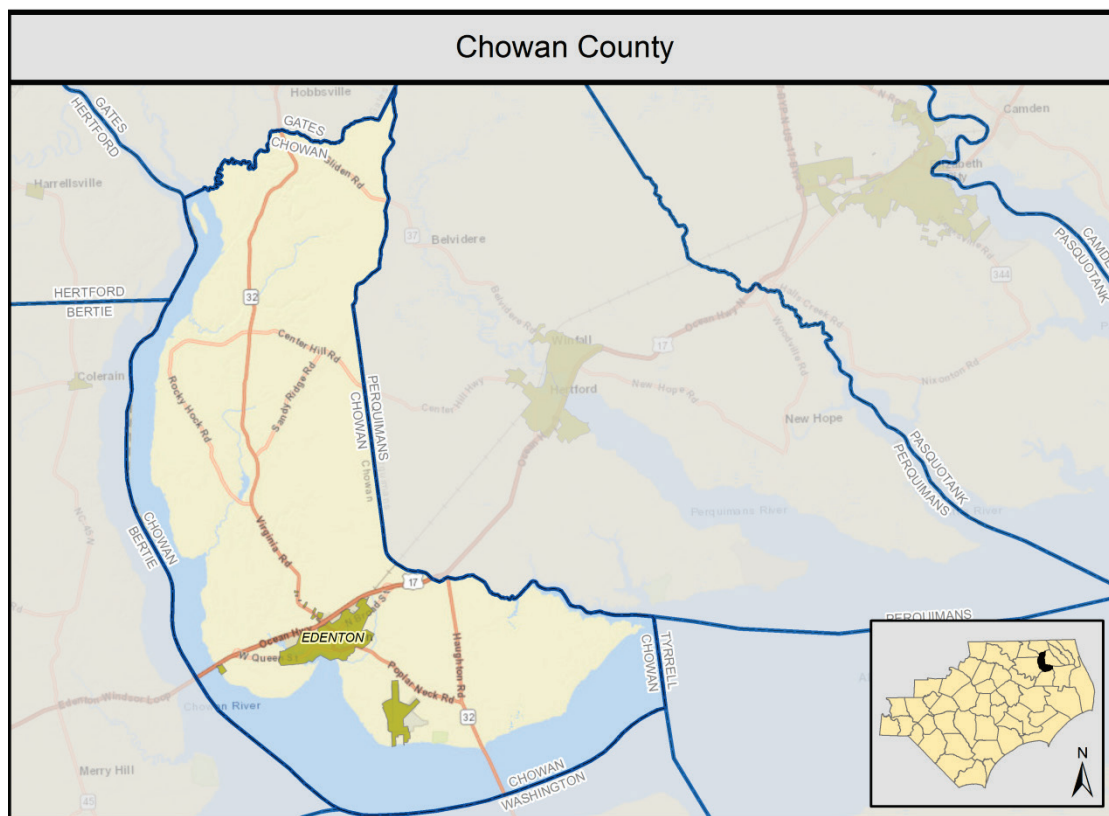


Figure 3. Chowan Base Map

### Demographic Profile

Demographics for Chowan 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

Chowan County has a population of 14,656. Edenton is the most populous place within Chowan County and has a population of 4,942.<sup>3</sup>

### Population Change (2000 to 2010)

The Chowan County population remained relatively the same between the 2000 and 2010 Census. In 2000 the population was 14,526 and in 2010 it was 14,793. This represents an increase in population of 267 people, or 1.8 percent. In comparison, North Carolina grew by 19 percent from 8,049,313 people in 2000 to 9,535,483 in 2010.

### Age

The median age in Chowan County is 44.5 years, older than North Carolina as a whole, which has a median age of 42 years. Within Chowan County, Edenton has a median age of 38.2 years.<sup>3</sup>

### Race and Ethnicity

Chowan County is mostly White (63.1 percent) and African American (34.2 percent) with other races constituting the remaining 2.8 percent. In comparison, North Carolina 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.

Within Chowan County, Edenton is much more racially diverse, with the African Americans making up 50.9 percent of the population, followed by the White population at 47.1 percent.

The Latino population in Chowan County is 3.3 percent compared to 9 percent for North Carolina. Edenton has a small Latino population (0.1 percent).<sup>4</sup>

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
Edenton	47.1%	50.9%	1.3%	0.0%	0.0%	0.0%	0.7%	52.9%
<b>Chowan County</b>	<b>63.1%</b>	<b>34.2%</b>	<b>1.1%</b>	<b>0.2%</b>	<b>0.0%</b>	<b>0.8%</b>	<b>0.7%</b>	<b>36.9%</b>
<b>North Carolina</b>	<b>69.5%</b>	<b>21.5%</b>	<b>1.2%</b>	<b>2.5%</b>	<b>0.1%</b>	<b>3.0%</b>	<b>2.4%</b>	<b>30.5%</b>

Table 2. Chowan County Race and Ethnicity

### Limited English Proficiency

Limited English Proficiency (LEP) is defined as populations 18 years or older that speak English less than very well. In Chowan County, most of individuals identified as LEP speak Spanish while others speak Indo-Euro, and Asian/Pacific languages. Similarly, the primary language group for LEP individuals in North Carolina is Spanish. In Edenton, the primary language group for LEP populations is Spanish followed by other Indo-Euro languages.<sup>5</sup>

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

<sup>4</sup> Source: US Census Bureau, American Community Survey 5-year Estimates (2011-2015), Table B02001, Race and Table B03002, Hispanic or Latino Origin by Race.

<sup>5</sup> 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.

## Poverty

In Chowan County, 26.6 percent of the population is below the poverty level compared to 17.4 percent of the North Carolina population. In Edenton, 39.9 percent of the population is below the poverty level.<sup>6</sup>

## Low and Moderate Income Individuals

In Chowan County, 41.0 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. In comparison, 39 percent of the North Carolina population is classified as LMI.<sup>7</sup>

## Median Household Income

The median household income for Chowan County is \$38,800 and \$46,900 in North Carolina. Median household income was not available for Edenton.<sup>8</sup>

## Zero Car Households<sup>9</sup>

In Chowan County, 11.8 percent of households do not have a vehicle available compared to 6.5 percent of North Carolina households. The percentage of households in Edenton without a vehicle is 24.4 percent, nearly three times that of North Carolina. Not having a car available directly impacts the ability to evacuate in an emergency. The residents of Edenton would have the greatest need for assistance in the event of an evacuation.

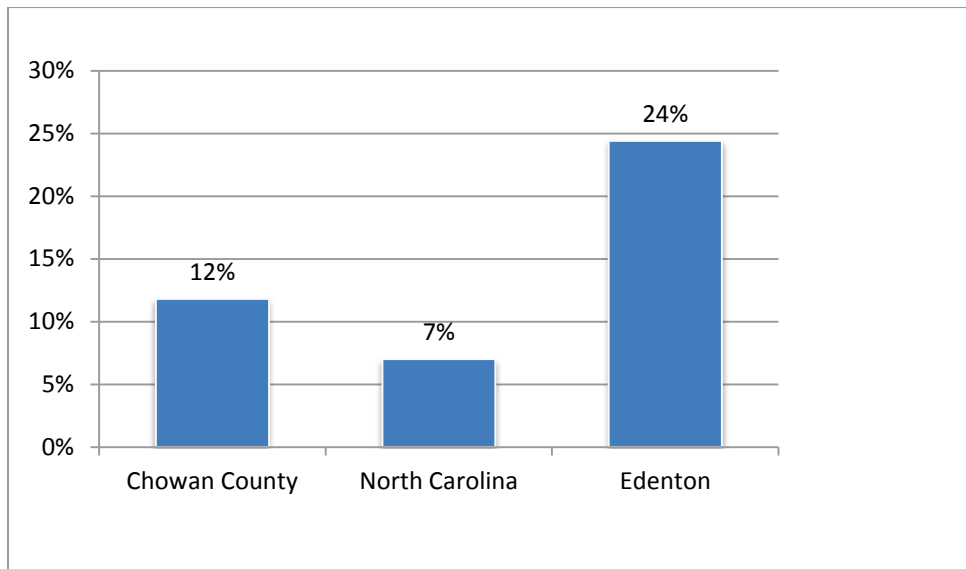


Figure 4. Zero Car Households by Percentage

6 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."

7 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/>

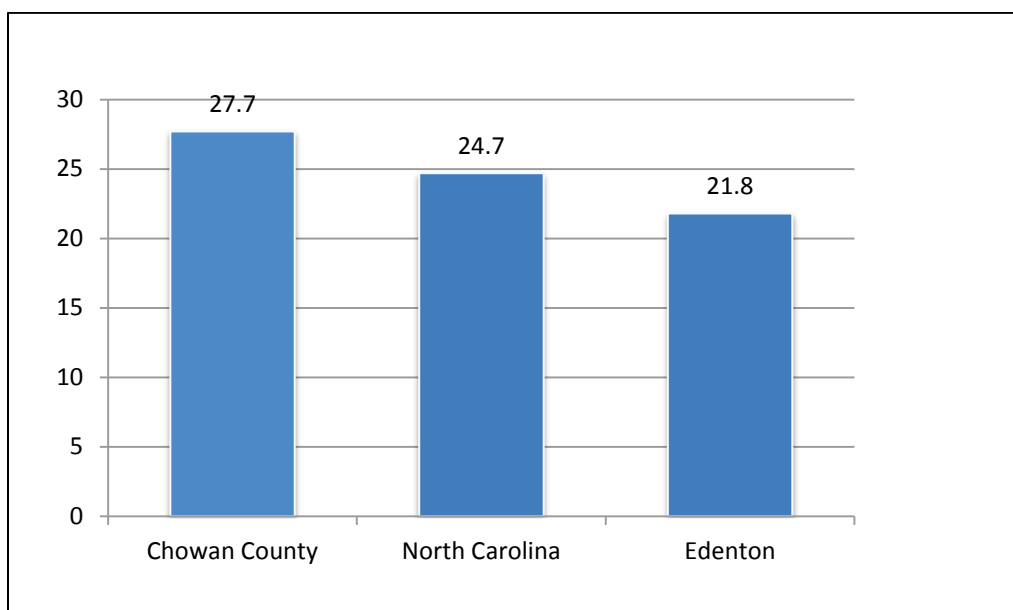
8 Source: US Census Bureau, American Community Survey 5-year Estimates (2011-2015), Table B19094, "Median Household Income in the Past 12 Months."

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

**Commuting: Travel Time to Work, Means of Transportation<sup>10</sup>**

The majority of Chowan County residents commute alone to work by vehicle, 82.6 percent, which is similar to North Carolina average of 81.1 percent. The majority of Edenton workers, 76.2 percent, also commute by vehicle, but a much larger percentage commute by bicycle, walking or motorcycle than the state share – 12.9 percent versus 2.2 percent, respectively. No workers in the County or in Edenton commute using public transportation.

The mean commute time to work for Chowan County residents is 27.7 minutes. In comparison, the North Carolina mean commute time is 24.7 minutes. Workers in Edenton have a shorter commute time at 21.8 minutes than both the rest of the County and the State as a whole.



**Figure 5. Mean Commute Time to Work in Minutes**

<sup>10</sup> 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<sup>11</sup>

Chowan County has 7,266 housing units, 70 percent of which are single-family homes, 11 percent multi-family units, and 19 percent manufactured housing.

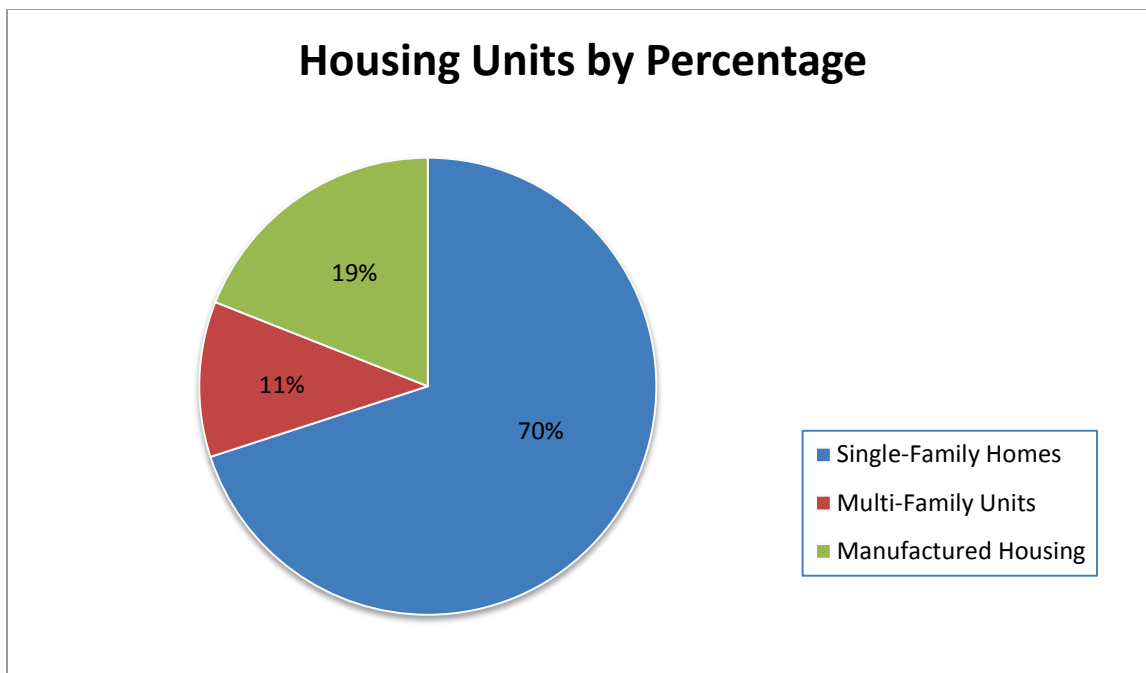


Figure 6. Housing Units by Percentage

In Chowan County 18 percent of housing units are vacant, which is slightly higher than North Carolina as a whole at 14.5 percent. Within Edenton, 23 percent of the 2,500 housing units are vacant.

Of the occupied housing units in Chowan County, 67 percent are owner-occupied compared to 65 percent in North Carolina; 33 percent are renter-occupied compared to 35 percent in North Carolina.

The median housing value in Chowan County is \$135,900. In comparison, the median housing value in North Carolina is \$140,000. Edenton has a median housing value of \$116,800.

According to the National Housing Preservation Database, Chowan County has 565 affordable housing units. The town of Edenton has 12 affordable housing units.

<sup>11</sup> 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.

## Economic/Business Profile

Chowan County has a broad array of employment types across several sectors.<sup>12</sup> According to the US Census Bureau's Longitudinal-Employer Household Dynamics Program, the largest concentrations of jobs within Chowan County are in Edenton with smaller concentrations along NC 32.<sup>13</sup>

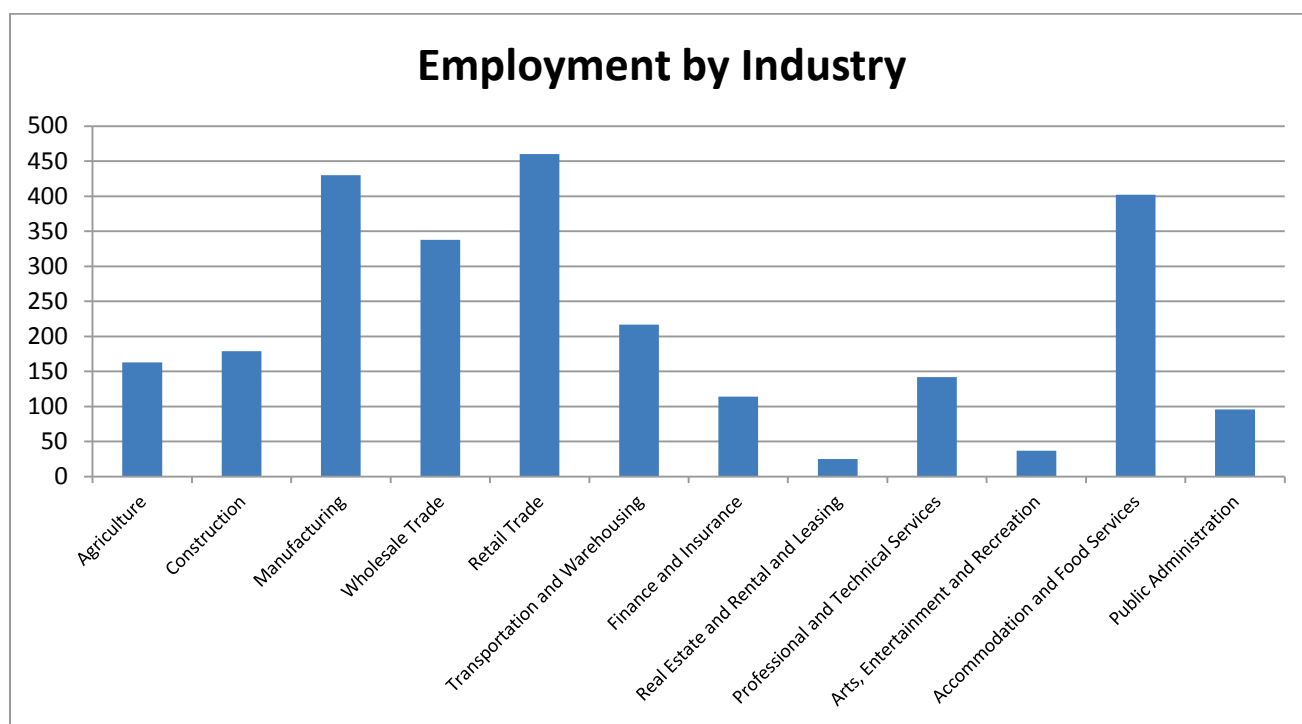


Figure 7. Employment by Industry

## 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 Chowan County is 5,648.<sup>14</sup> Within Chowan County, Edenton has the 54.3 percent of the population 16 years or over in the labor force.<sup>15</sup>

The civilian unemployment rate in Chowan County is 6.4 percent. In comparison, the North Carolina civilian unemployment rate is 5.1 percent.<sup>14</sup> Edenton has an unemployment rate of 18.6 percent.<sup>15</sup>

<sup>12</sup> Source: AccessNC – North Carolina Department of Commerce, April 2017:  
<http://accessnc.nccommerce.com/DemoGraphicsReports/pdfs/countyProfile/NC/37041.pdf>

<sup>13</sup> Source: US Census Bureau Longitudinal-Employer Household Dynamics Program

<sup>14</sup> 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>

<sup>15</sup> Source: US Census Bureau, American Community Survey 5-year Estimates (2011-2015), Table B23025, "Employment Status For The Population 16 Years And Over

## Major Employers

The top ten employers in Chowan County<sup>16</sup> represent the education, health service, manufacturing and public administration sectors, and are listed in order of total employees.

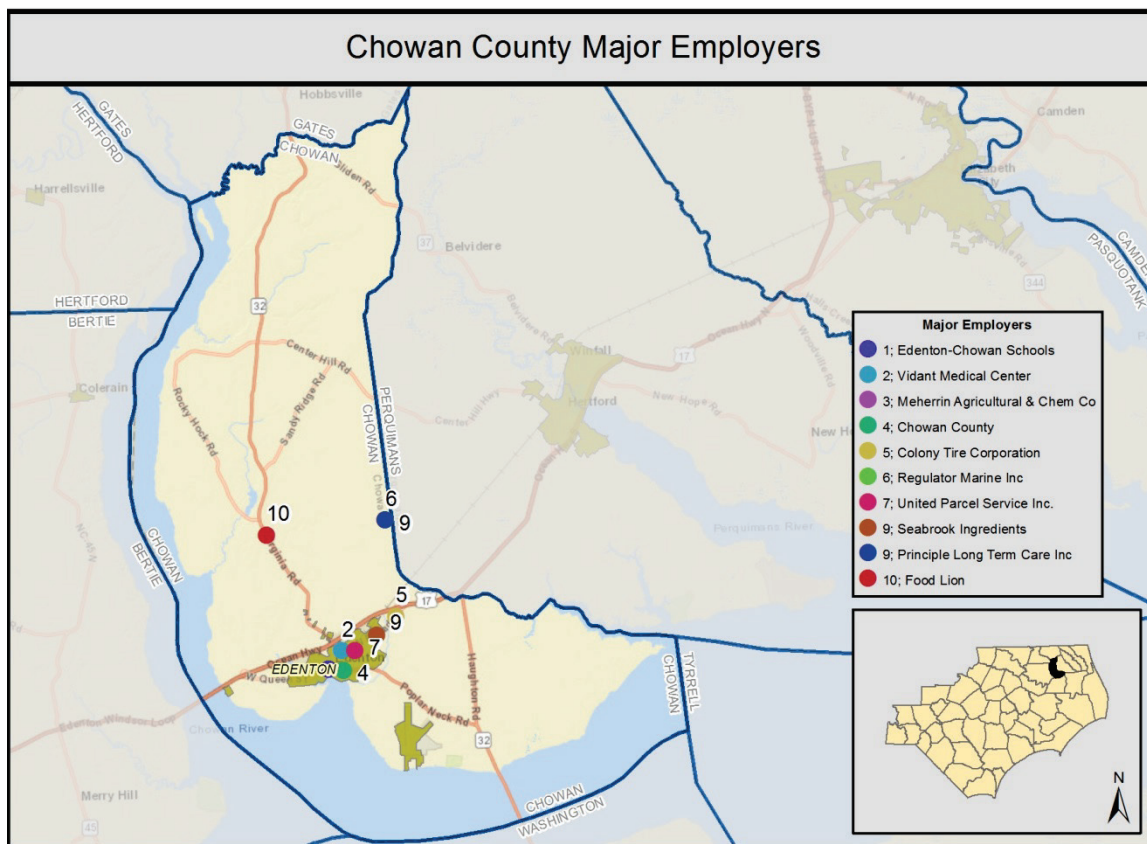


Figure 8. Major Employers by Number of Employees

## Economic Development<sup>17</sup>

Economic development activities in the County are coordinated through the Chowan County Managers office, and the Edenton-Chowan Chamber of Commerce. The Edenton-Chowan Chamber of Commerce is a private, not for profit 501 (c) (6) organization. The Chamber of Commerce “unites hundreds of companies, professionals, organizations, groups and educational institutions who are committed to build a better community in Edenton and Chowan County”.

Roanoke Chowan Community College, located in Ahoskie, offers employment, training, and job placement services through the Workforce Innovation and Opportunity Act.

Visit North Carolina, a unit of the public-private organization contracted to lead North Carolina's marketing programs, estimates that in 2015, Chowan County had \$20 million in tourism expenditures, resulting in \$1.26 million in local tax receipts. This amount has increased over the last 5 years—by 16 percent from 2011 to 2015.

<sup>16</sup> Source: NC Department of Commerce

<sup>17</sup> Sources: Chowan County Economic Development; Edenton-Chowan Chamber of Commerce; Roanoke Chowan Community College; and Visit North Carolina



## Infrastructure Profile

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

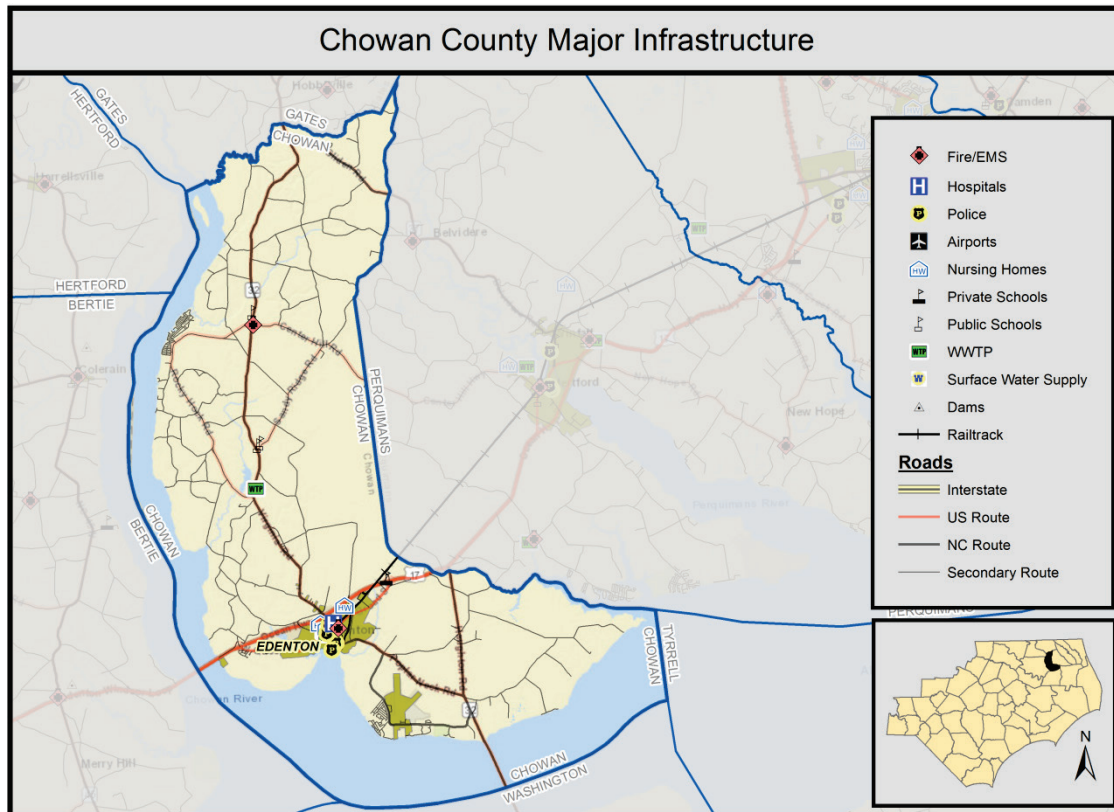


Figure 9. Chowan County Major Infrastructure

## Transportation

Chowan County is connected to the region by US 17 which runs east-west through the southern part of the County. US 17 is a major north-south highway that provides Chowan County with access to Norfolk, Virginia to the north, and New Bern and Wilmington to the south. NC 32 is a north-south route that connects Edenton and the County to US Highway 158 to the north and US Highway 64 to the south. Chowan County is also served by rail from Norfolk Southern. The Northeast Regional Airport has a 6,000 foot runway and caters mostly to privately owned aircraft.

## Health

Vidant Chowan Hospital is the only hospital located in Chowan County. It is part of a regional network of hospitals serving eastern North Carolina.

## Education<sup>18</sup>

Edenton-Chowan County Public Schools administers two elementary, one middle, and one high school. Roanoke Chowan Community College is a regional community college located in Ahoskie (in Hertford County). Roanoke Chowan Community College is a member of the North Carolina Community College System.

18 Sources: Chowan County Public Schools and Roanoke Chowan Community College



## Water

The Chowan County Water Department operates the Valhalla Water Treatment Plant, which provides drinking water to Chowan County. Its permitted capacity is 2.31 million gallons per day. The Town of Edenton operates two water treatment plants, the Beaver Hill Water Treatment Plant and the Freemason Water Treatment Plant. Together, these plants have a permitted capacity of 2.075 million gallons per day. The Town of Edenton operates a wastewater treatment plant on Macedonia Road. Chowan County does not have a wastewater treatment system and relies on private systems and septic tanks.<sup>19</sup>

## Power

O2 emc is a private energy provider currently developing Edenton Solar, a 20 megawatt solar farm in Edenton.<sup>20</sup>

## Environmental Profile

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

### Water Resources

Chowan County is located adjacent to the Chowan River, and on the northern shore of the Albemarle Sound. The most common wetland type in Chowan County is freshwater forested/shrub wetland.<sup>21</sup>

### Natural and Managed Areas

According to the NC Natural Heritage Program, the Chowan River and the land immediately adjacent to it is considered very high quality natural areas in the northern part of the County, and high quality natural areas along the eastern boundary of the county. There are several managed areas under state ownership within Chowan 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 in Chowan County include: the Gallberry Pocosin and the Rocky Hock Swamp Forest Preserve both of which are near the shores of the Chowan River. The US Fish and Wildlife Service also operates the Edenton National Fish Hatchery in Edenton.<sup>21</sup>

### 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 Chowan River and its tributaries. These areas rank between a 7 and 10, with 10 being the highest possible score. Other areas of the county are ranked between two and six. Most of the county is unrated.<sup>21</sup>

### Parks and Recreation

The Edenton-Chowan County Recreation Department maintains several parks and facilities in Chowan County. Several parks and recreation facilities are associated with the Chowan River and the Albemarle Sound including the J. Robert Hendrix Park and Cannon's Ferry Heritage Riverwalk, the Cape Colony Park and the Chowan River Fishing Pier. The recreation department also offers several neighborhood parks, a community center, and ball fields.<sup>22</sup>

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<sup>19</sup> Sources: NC Division of Water Resources, Local Water Supply Plans

<sup>20</sup> Source: US Department of Energy, US Energy Mapping System

<sup>21</sup> Source: NC Natural Heritage Program

<sup>22</sup> Source: Edenton-Chowan County Recreation Department

## Administrative Profile

The administrative capabilities of Chowan County and Edenton are discussed in great detail within Section 6 of the Albemarle Regional Hazard Mitigation Plan 2015. The assessment evaluates the capabilities of the County and Edenton to implement mitigation actions across the areas of administrative and technical capabilities, planning and regulatory capabilities, financial capabilities, educational and outreach capabilities and legal and political capabilities. Many more details about the capabilities of Chowan County and Edenton can be found in that document.

Chowan County has Emergency Services 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, and Subdivision Regulations. These plans, policies and procedures help ensure that new development in the County will be done in a responsible manner and in non-hazardous areas.

The Town of Edenton has a Planning department that would likely be able to assist with implementing the strategies in this plan as well. In terms of administrative capabilities Edenton has more administrative and fiscal capability than Chowan County, as well as more of the necessary plans, policies and procedures in place that are able to implement recommendations made in this plan.

As part of the plan, Chowan County and the Town of Edenton were asked to rate their ability to implement hazard mitigation activities given any barriers to implementation. Both Chowan County and Edenton rated their ability to implement hazard mitigation activities as “high”.



An aerial photograph showing a residential neighborhood severely impacted by flooding. The water is a murky, brownish-yellow color, covering large areas of the landscape. Numerous houses with grey roofs are visible, some partially submerged. A network of roads crisscrosses the area, with some sections completely underwater. Large green trees are scattered throughout, many of which are isolated in the floodwater. The overall scene depicts significant storm damage and inundation.

# **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 3-8 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 Chowan County is highlighted graphically in the figure below.

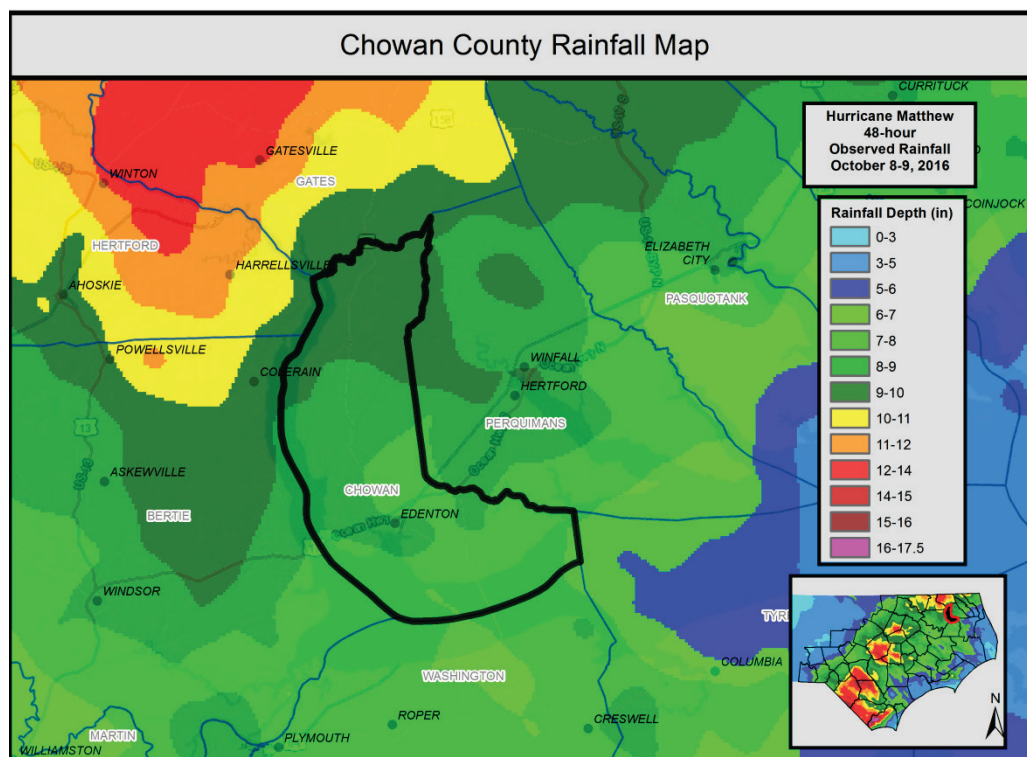


Figure 10. 48-hour Observed Rainfall Depth (October 8-9, 2016)

#### Housing

According to Individual Assistance claims as of March 2017, there were 205 impacted houses in Chowan 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.

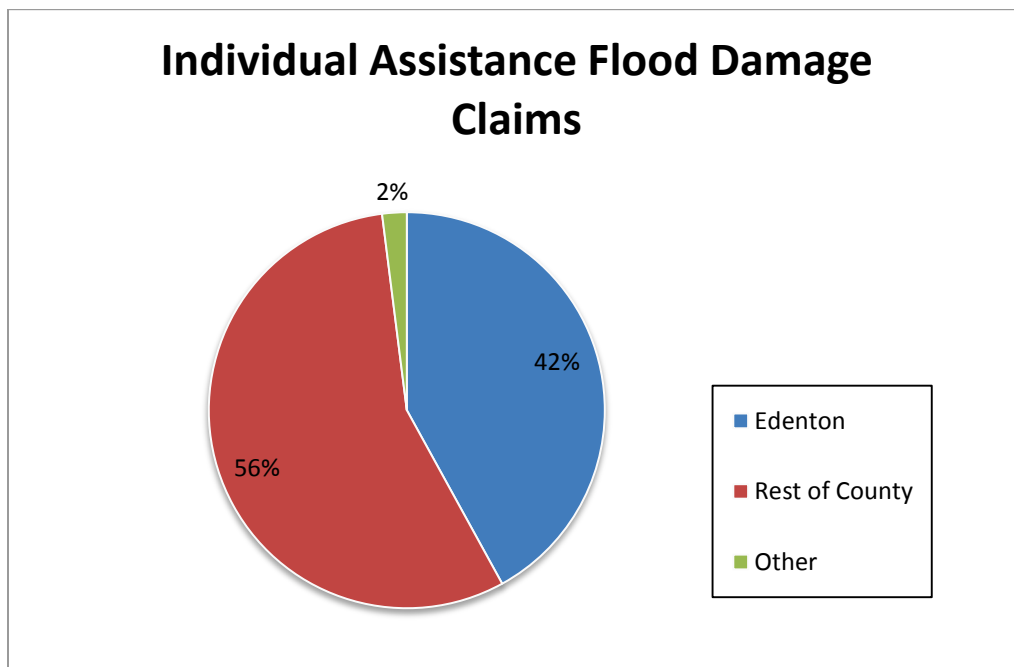


Figure 11: IA Flood Claims by Area

Housing was certainly impacted in Chowan County as a result of Hurricane Matthew as there were several homes damaged, especially in the Cape Colony neighborhood near the airport. 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:** Downtown Edenton and the Cape Colony neighborhood just west of the airport experienced flooding because of Hurricane Matthew. Additionally, county officials noted that some homes along Haughton Road (NC 37) experienced varying levels of flooding. Based on historic flooding information, these communities include a significant amount of repetitive loss properties.
- **Homes At-Risk of Future Flooding:** Homes along Pinebrook Circle have experienced flooding during past storms, however no Matthew related flooding took place. Pembroke Circle is located adjacent to where Filberts Creek drains into the Chowan River.

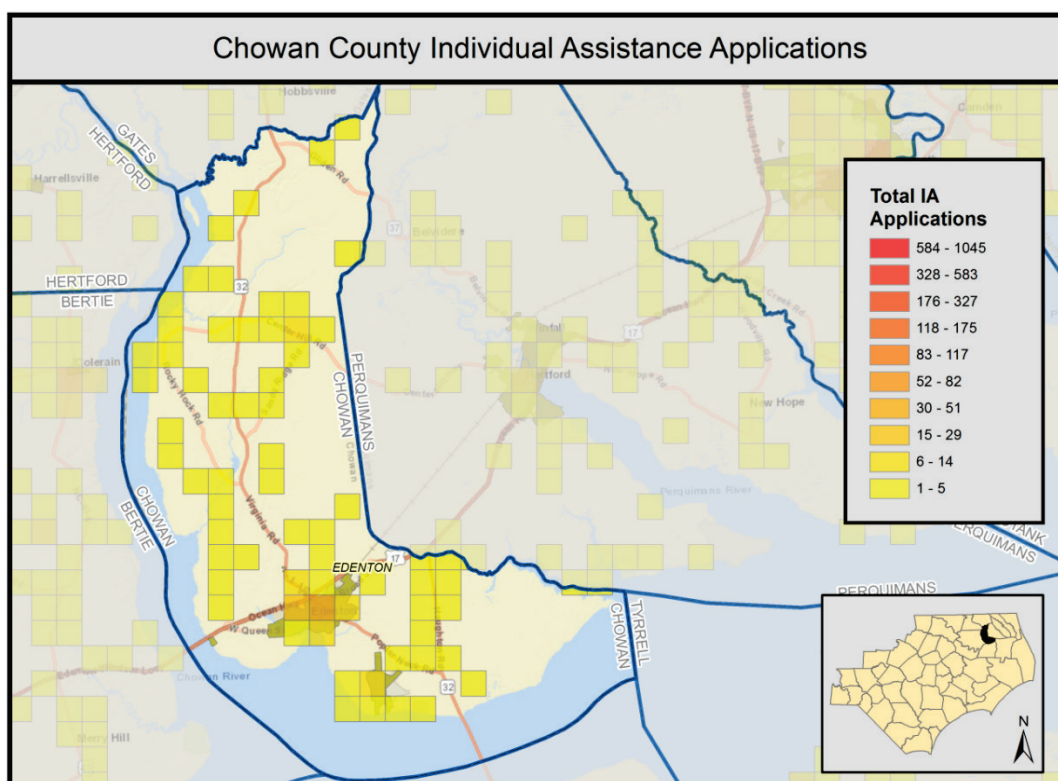


Figure 12. Chowan County IA Applications by Area

### Economics / Business / Jobs

While there were few instances of impacts to businesses in Chowan County, several of the County's major employers incurred flood damage because of Matthew and closed for several days. The bullets below summarize some of the impacts to the businesses and jobs that were identified by local officials from the event.

- **Jimbo's Jumbos:** Jimbo's Jumbos has a peanut shelling and production facility on Peanut Drive in Edenton. During Matthew the facility flooded and was closed for several days following the storm. Officials cited a undersized culvert under the railroad tracks behind the facility as the cause of the flooding.
- **Green Leaf Plant Farm:** A dam on Rocky Hock Creek that forms the Bennett Mill Pond was over-topped during Hurricane Matthew and resulted in flooding at the Green Leaf Plant Farm, a commercial greenhouse. Green Leaf Plant Farm was closed for several days and lost inventory.
- **Marina's Along Pembroke Creek:** Two marinas experienced flooding during Hurricane Matthew, both of which are along Pembroke Creek. The Bayside Marina and Edenton Marina were able to maintain operations, however local officials noted that the Edenton Marina and surrounding businesses have experienced repetitive flooding.
- **Downtown Edenton:** Downtown Edenton had several structures, including both commercial and residential, damaged as a result of Hurricane Matthew. Many streets flooded during Hurricane Matthew and frequently flood during other heavy rainfall events, often due to overwhelmed storm drainage. Local officials noted that the area in downtown experienced flooding from Freemason Street south to the waterfront because of the storm. The flooding was attributed to the amount of rainfall, and the lack

of stormwater facilities in the Town. There are gutters on the streets south of Freemason Street but no stormwater system. Instead, stormwater is conveyed over the surface of the street to drain into surrounding creeks and the Albemarle Sound. This stormwater drainage process was overwhelmed during Matthew and caused flooding in the area.

## Infrastructure

According to Public Assistance claims, which are often closely tied to infrastructure, as of 2017 there was \$35,996 of claims in Chowan County resulting from Hurricane Matthew, the entirety of which came from the Town of Edenton. It should be noted that additional claims from Hurricane Matthew might still be pending, so this number may not reflect the final claims data from the event.

Infrastructure within the Town of Edenton was one of the greatest areas of concern in the wake of Hurricane Matthew 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.

- **Dam Issues:** Officials identified two dams in Chowan County that are in need of maintenance. During Hurricane Matthew, one of these dams which is located on Rockyhock Creek was over-topped and resulted in flooding at the Green Leaf Plant Farm. The dam forms the Bennett Mill Pond and is currently covered in trees and foliage, and officials are concerned about its ability to withstand future heavy rain events. Similarly, county officials are concerned about the stability of the dam on Indian Creek that forms Dillard's Mill Pond.
- **Culvert Failure:** Several culverts were overwhelmed and resulted in flooding and road closure. Specifically, officials noted that two culverts on Filbert Creek could not handle the volume of water and resulted in flooding. Flooding at these culverts, one on NC 32/Virginia Road and one on W. Hicks Street, resulted in damage to surrounding homes and businesses and temporarily cut off partial access to the hospital.

Much of the culvert failure can be attributed to debris in the stream in the form of limbs, tree trunks, and other natural and manufactured items. Chowan County provides funding for clearing and snagging major drainage channels, but has insufficient funds for regular maintenance of all creeks, streams, culverts and ditches.

- **Road/Bridge Flooding:** Road and bridge overtopping happens regularly in Chowan County and affected several 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. Affected roads were:
  - Yellow Hammer Road was flooded and closed for four months when a pipe that channeled water underneath it washed out.
  - A culvert under Tynch Town Road washed out and resulted in mobility issues to neighborhoods and damage to a neighboring farm.
  - Chambers Ferry Road washed out and remained closed for several months after the storm.
  - NC 32 was washed out.
  - Macedonia Rd-Mexico Rd (SR-1200) was closed due to flooding.
  - Rocky Hock Creek Rd-Cowpen N (SR-1207) was closed as the pavement washed out.
  - Wildcat Rd (SR- 1208) was closed due to flooding.

- Wingfield Rd (SR-1228) had significant shoulder loss and pavement failure.
- Happy Home Rd-Sandy Ridge Rd (SR-1303) also had shoulder loss and pavement failure.
- N Broad Extd (SR-1328) was impassable near Butternut Lane due to flooding.

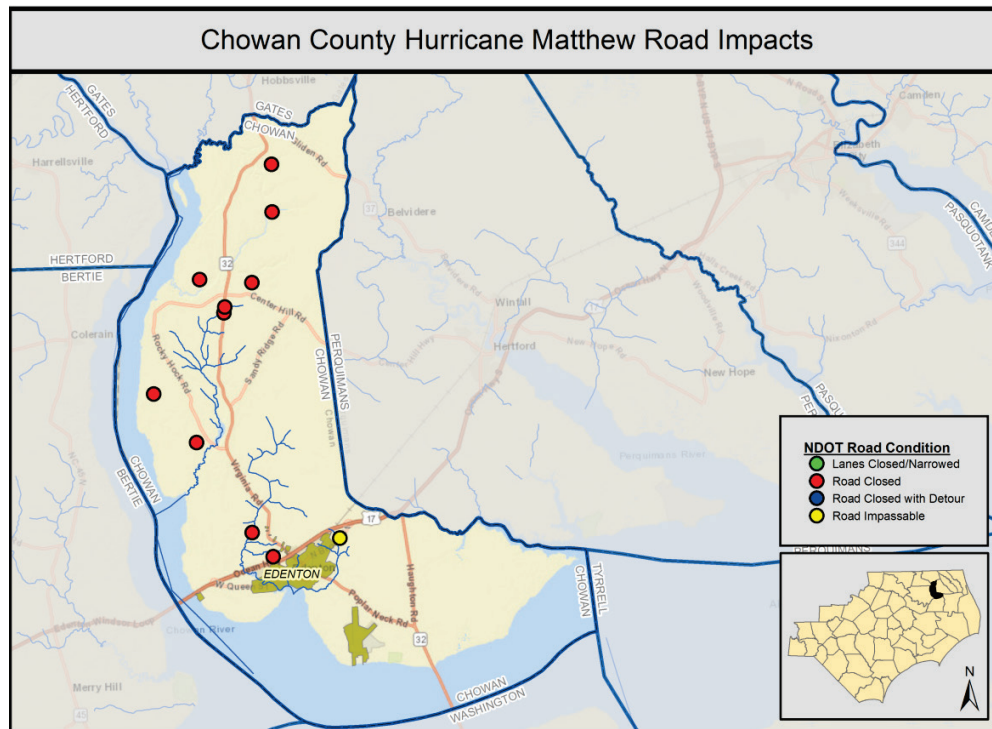


Figure 13. Impacted NCDOT Structures in Chowan County

- **Water/Wastewater Infrastructure:** Water and wastewater infrastructure is critical to maintaining health and well-being of the public in the wake of a storm event. Often this infrastructure is threatened due to the necessity of placing it near water bodies, which naturally causes the risk to flooding.

The downtown sewer lift station located behind the Chamber of Commerce and a stormwater pump station is located on East Water Street near Hayes Farm Road. During Matthew and other heavy rain events, these facilities become overwhelmed. The stormwater backups associated with these lift stations causes flooding in different parts of the town.

## Ecosystems / Environment

Overall, environmental impacts in Chowan County as a result of Hurricane Matthew were relatively minimal. However, there were some noteworthy incidents that may not have explicitly impacted the environment and ecosystems, but which brought to light some underlying issues related to overall water quality.

- **Riparian Buffering:** In much of Chowan County, the riparian forests have been clear-cut or are not wide enough to be effective. Riparian forests are critical for providing storage for and filtering stormwater, and for providing key habitat for fish and wildlife. There is significant pressure to harvest riparian forests in the state for wood pellets and other wood products. Many farms will plant crops up to the edge of the stream leaving too few trees left in the riparian buffers. Many of these remaining trees are weakened due to edge exposure and then fall into creeks and rivers during storm events, compounding the efforts to keep waterways unobstructed. During Hurricane Matthew and other heavy rain events, there is insufficient riparian buffering of streams to filter nutrients and sediments from agricultural



operations and urban development that can degrade water quality and could potentially be a contributor to recent blue-green algae blooms seen in the Chowan River.

- **Natural Debris Buildup Causing Flooding:** Several low-water bridges across the county experienced a significant amount of debris buildup in streams. This debris is frequently in the form of downed trees and beaver dams that are constructed and then washed out during heavy rainfall/flooding events. This debris is then caught underneath bridges and in culverts, causing a jam which backs up water upstream and results in flooding.

An aerial photograph showing a residential neighborhood partially submerged in floodwater. The water is a murky, brownish-yellow color, covering large areas of the landscape, including lawns and some trees. Several houses with light-colored siding and dark roofs are visible, some with water reaching their windows. A network of streets is visible, with some sections completely underwater. The background is filled with dense green trees, some of which are also partially submerged. The overall scene depicts the impact of flooding on a community.

# **4. Strategies for Resilient Redevelopment**



## 4. Strategies for Resilient Redevelopment

This section provides details about the resilience and revitalization strategies and actions identified in Chowan 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	3
Economic Development	2
Infrastructure	6
Environment	1
<b>Grand Total</b>	<b>12</b>

**Table 3. Chowan County Summary of Projects by Pillar**

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

Pillar	Action Name	Priority	Overall Ranking
Infrastructure	Chowan County Infrastructure Action 3: Millpond dam and associated facilities repairs and upgrade (Bennett Millpond and Dillard Millpond)	High	1
Infrastructure	Chowan County Infrastructure Action 5: Pump Station Capacity Increase	High	2
Infrastructure	Chowan County Infrastructure Action 6: Construct stormwater infrastructure improvements	High	3
Infrastructure	Chowan County Infrastructure Action 2: Filberts Creek culvert replacement	High	4
Infrastructure	Chowan County Infrastructure Action 1: Downtown Edenton Hydrologic and Hydraulic Studies	High	5
Infrastructure	Chowan County Infrastructure Action 4: Chowan County Drainage Clearing and Snagging	High	6
Economic Development	Chowan County Economic Development Action 2: Increase the capacity of broadband internet	High	7
Environment	Chowan County Environment Action 1: Stormwater Culvert and Wetland Construction	Medium	8
Economic Development	Chowan County Economic Development Action 1: Provide business assistance to protect critical equipment and inventory	Medium	9

Pillar	Action Name	Priority	Overall Ranking
Housing	Chowan County Housing Action 3: Downtown Edenton Home Elevation	Low	10
Housing	Chowan County Housing Action 1: Cape Colony Neighborhood Home Elevation	Low	11
Housing	Chowan County Housing Action 2: Haughton Road Home Elevation	Low	12

**Table 4. Projects by 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

Chowan County did not prioritize any of the housing strategies developed during the planning process as high or medium priority. Instead, the county focused its priorities on the infrastructure and economic development pillars. The following projects represent the housing strategies that Chowan County indicated are of a lower priority to address.

### Low Priority Housing Strategies

Pillar	Action Name	Priority	Overall Ranking
Housing	Chowan County Housing Action 3: Downtown Edenton Home Elevation	Low	10
Housing	Chowan County Housing Action 1: Cape Colony Neighborhood Home Elevation	Low	11
Housing	Chowan County Housing Action 2: Haughton Road Home Elevation	Low	12

**Table 5. Chowan High Priority Housing Summary**

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

- **Acquisition/Elevation of Damaged Homes:** Develop a program to assess and identify solutions for widespread repetitive flooding of homes and continual flood risk in the Cape Colony (Action 1) and Haughton Road (Action 2) residential communities and downtown Edenton (Action 3). The county would like to include the options of elevation, reconstruction, and/or acquisition as a part of this study.



Figure 14. Housing Action 1: Cape Colony Neighborhood Home Elevation

## Housing Action 1: Cape Colony neighborhood elevations and buyouts

**County:** Chowan

**Priority Grouping:** Low Priority

**Priority Ranking:** 11

**Project Timeframe:** This project could be implemented immediately upon being funded.

**Location:** Cape Colony Neighborhood

**Project Summary:** Elevations and buyouts as appropriate of low to moderate income houses flooded during Matthew.

Question	Response	Disposition
Articulate how this project addresses an unmet need that has been created by damage from Hurricane Matthew.	The houses in this neighborhood are outside of the Special Flood Hazard Areas and are not required to purchase flood insurance.	N/A
Consistent with existing plans (describe points of intersection/departure)	Yes	Agree
Does this project comply with existing Local and State authority (codes, plan and ordinance)?	Yes	Agree
Does this project meet the intents and goals for the Hurricane Matthew Recovery Act?	Yes	Agree
Explain any benefits or impacts to the economy of the county from this project.		Agree
For how long will this solution be effective?	Between 11 and 30 years	Agree
How effective is the risk reduction?	Unknown	Agree
How many public facilities are involved in this project (buildings and infrastructure)?	0	Agree
Is coordination with other communities/counties needed to complete this project?	No	Agree
Is this project consistent with Federal Laws	Yes	Agree
To what degree does this project adversely impact local floodplain/coastal zone management?	No Impact	Agree
To what degree will it be possible to positively quantify the environmental benefits and ROI of this project?	Minimal to low confidence	N/A
What impact will this action have on the local economy/tax base?	No Impact	Agree
What impacts to the environment of the county will result from this project?		N/A
What is the capability of the local government to administer this project?	Low	Agree
What is the financial range of this project?	\$501K - \$1M	Agree
What is the level of public support for this project?	Medium	Agree
What is the technical feasibility of this project?	Higher than 75%	Agree
Who will administer this project?	County	Agree

- **Haughton Road Elevations and/or Buyouts:** Elevations and buyouts as appropriate of low to moderate income houses flooded during Matthew.

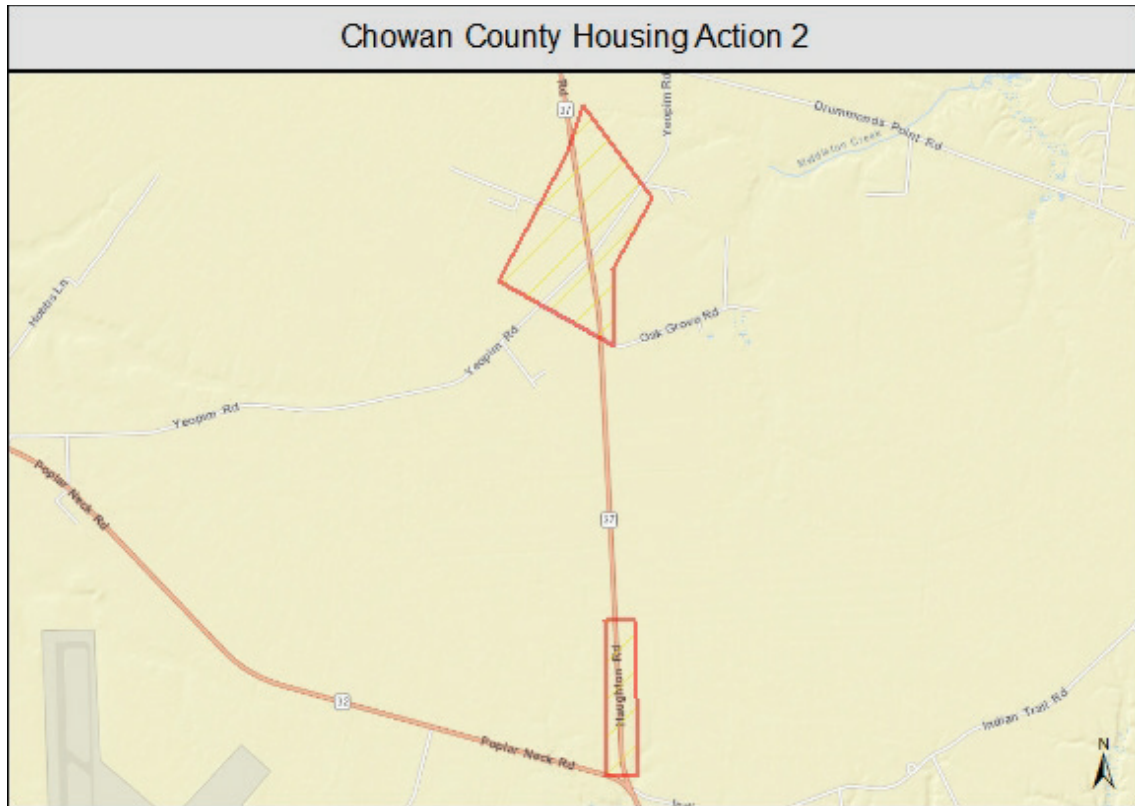


Figure 15. Housing Action 2: Haughton Road (NC32) Elevations and Buyouts

## Housing Action 2: Haughton Road (NC 32) elevations and buyouts

**County:** Chowan

**Priority Grouping:** Low Priority

**Priority Ranking:** 12

**Project Timeframe:** This project could be implemented immediately upon being funded.

**Location:** Homes along Haughton Road (NC 32) north of Indian Trail Road and in the vicinity of the intersection of Yeopim Road

**Project Summary:** Elevations and buyouts as appropriate of low to moderate income houses flooded during Matthew.

Question	Response	Disposition
Articulate how this project addresses an unmet need that has been created by damage from Hurricane Matthew.	The houses in this neighborhood are outside of the Special Flood Hazard Areas and are not required to purchase flood insurance.	N/A
Consistent with existing plans (describe points of intersection/departure)	Elevation and buyouts of homes prone to flooding are not discussed in any location plans.	Agree
Does this project comply with existing Local and State authority (codes, plan and ordinance)?	Yes	Agree
Does this project meet the intents and goals for the Hurricane Matthew Recovery Act?	Yes	Agree
Explain any benefits or impacts to the economy of the county from this project.		Agree
For how long will this solution be effective?	Between 11 and 30 years	Agree
How effective is the risk reduction?	Unknown	Agree
How many public facilities are involved in this project (buildings and infrastructure)?	0	Agree
Is coordination with other communities/counties needed to complete this project?	No	Agree
Is this project consistent with Federal Laws	Yes	Agree
To what degree does this project adversely impact local floodplain/coastal zone management?	No Impact	Agree
To what degree will it be possible to positively quantify the environmental benefits and ROI of this project?	Minimal to low confidence	N/A
What impact will this action have on the local economy/tax base?	Unknown	Agree
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?	Low	Agree
What is the financial range of this project?	\$501K - \$1M	Agree
What is the level of public support for this project?	Medium	Agree
What is the technical feasibility of this project?	Unknown	Agree
Who will administer this project?	County	Agree



- **Downtown Edenton Elevations and/or Buyouts:** Elevations and buyouts as appropriate of houses that flooded during Hurricane Matthew that are in repetitive flood areas.

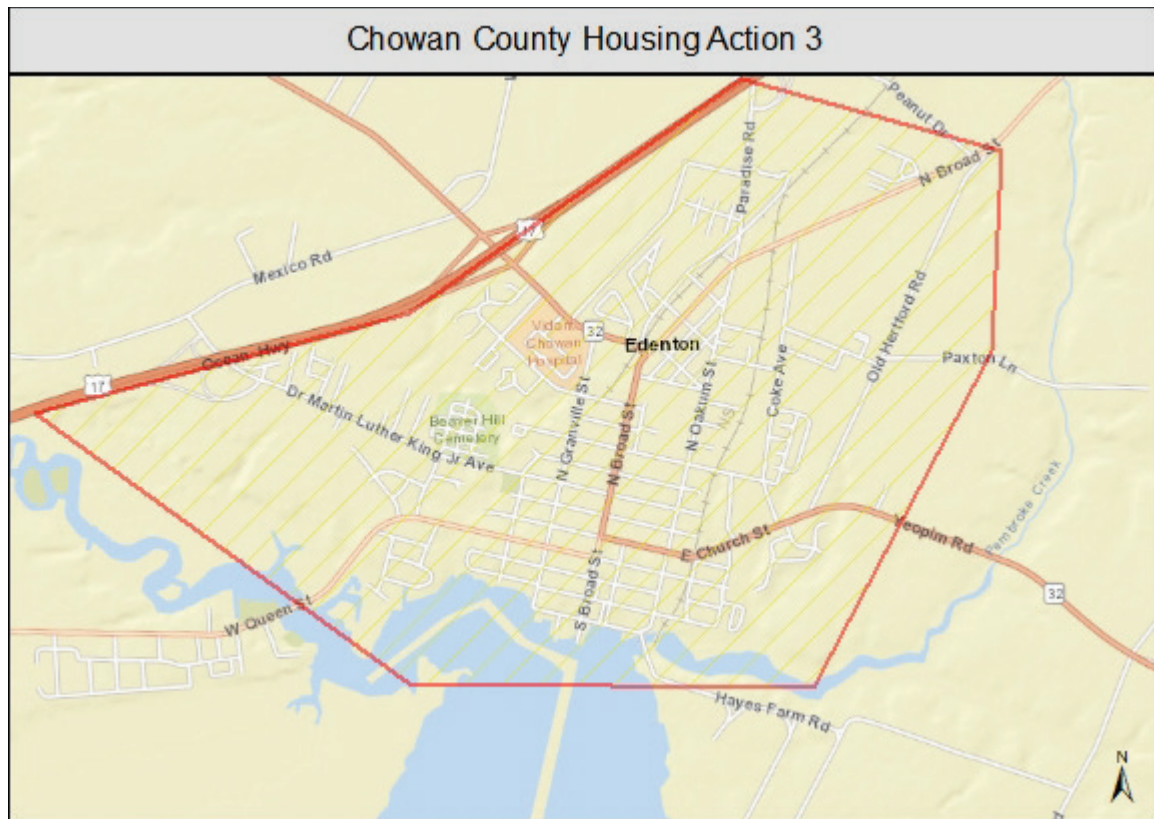


Figure 16. Housing Action 3: Downtown Edenton Home Elevation

## Housing Action 3: Downtown Edenton elevations and buyouts

**County:** Chowan

**Priority Grouping:** Low Priority

**Priority Ranking:** 10

**Project Timeframe:** This project could be implemented immediately upon being funded.

**Location:** Downtown Edenton

**Project Summary:** Elevations and buyouts as appropriate of houses flooded during Matthew that are in repetitive flood areas.

Question	Response	Disposition
Articulate how this project addresses an unmet need that has been created by damage from Hurricane Matthew.	Hurricane Matthew was historic in terms of rain levels and flooding was experienced by homes that are not in a flood plain including houses in downtown Edenton.	N/A
Consistent with existing plans (describe points of intersection/departure)	There are no plans associated with Chowan County or the Town of Edenton that discuss housing elevation or buyouts.	Agree
Does this project comply with existing Local and State authority (codes, plan and ordinance)?	Yes	Agree
Does this project meet the intents and goals for the Hurricane Matthew Recovery Act?	Yes	Agree
Explain any benefits or impacts to the economy of the county from this project.		Agree
For how long will this solution be effective?	Between 11 and 30 years	Agree
How effective is the risk reduction?	Unknown	Agree
How many public facilities are involved in this project (buildings and infrastructure)?	0	Agree
Is coordination with other communities/counties needed to complete this project?	No	Agree
Is this project consistent with Federal Laws	Yes	Agree
To what degree does this project adversely impact local floodplain/coastal zone management?	No Impact	Agree
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?	No Impact	Agree
What impacts to the environment of the county will result from this project?		N/A
What is the capability of the local government to administer this project?	Medium	Agree
What is the financial range of this project?	\$501K - \$1M	Agree
What is the level of public support for this project?	Medium	Agree
What is the technical feasibility of this project?	Less than 25%	Agree
Who will administer this project?	Local	Agree

## Economic Development Strategies

### High Priority Economic Development Strategies

Pillar	Action Name	Priority	Overall Ranking
Economic Development	Chowan County Economic Development Action 2: Increase the capacity of broadband internet	High	7

**Table 6. Chowan County High Priority Economic Development Summary**

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

- **Increase the capacity of broadband internet:** County officials noted that increasing the capacity of and creating redundancies in the broadband internet network would allow businesses to be more resilient after future storms. Tech related industries in the County were hampered after the storm because of lost internet access. Increasing the capacity and creating redundancies would protect those businesses, as well as create an economic development incentive for the County. An additional benefit of this strategy is it would make the Chowan County school system more able to meet the requirements of House Bill 44 passed by the North Carolina General Assembly in 2013 requires that public schools transition from textbooks to digital learning by the 2017-2018 school year. This change will require a robust high-speed internet network. This project would ensure that businesses in the county have access to high speed internet, and would ensure that students can maintain access to schools.
- **This is a county-wide project, so no project area map has been included.**

## Economic Development Action 2: Increase the capacity of broadband internet

**County:** Chowan

**Priority Grouping:** High Priority

**Priority Ranking:** 7

**Project Timeframe:** This project could be implemented immediately upon being funded.

**Location:** County-wide

**Project Summary:** Increase the capacity of broadband internet, and provide redundancies to protect residents from extended outages.

Question	Response	Disposition
Articulate how this project addresses an unmet need that has been created by damage from Hurricane Matthew.	The county experienced a loss of internet service after Hurricane Matthew. In the future a loss of internet access will mean that students will not have access to school work. This project would increase both the resiliency of businesses and the school system	N/A
Consistent with existing plans (describe points of intersection/departure)	Yes	Agree
Does this project comply with existing Local and State authority (codes, plan and ordinance)?	Yes	Agree
Does this project meet the intents and goals for the Hurricane Matthew Recovery Act?	Yes	Agree
Explain any benefits or impacts to the economy of the county from this project.	An increase in broadband availability could act as an incentive for businesses that the county and town could use to attract businesses to the area.	Agree
For how long will this solution be effective?	Between 31 and 50 years	Agree
How effective is the risk reduction?	Unknown	Agree
How many public facilities are involved in this project (buildings and infrastructure)?	>6	Agree
Is coordination with other communities/counties needed to complete this project?	No	Agree
Is this project consistent with Federal Laws	Yes	Agree
To what degree does this project adversely impact local floodplain/coastal zone management?	No Impact	Agree
To what degree will it be possible to positively quantify the environmental benefits and ROI of this project?	Low to moderate confidence	N/A
What impact will this action have on the local economy/tax base?	Between 51 and 75%	Agree
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?	High	Agree
What is the financial range of this project?	\$251K - \$500K	Agree
What is the level of public support for this project?	High	Agree
What is the technical feasibility of this project?	Higher than 75%	Agree
Who will administer this project?	Regional	Agree

### Medium Priority Economic Development Strategies

Pillar	Action Name	Priority	Overall Ranking
Economic Development	Chowan County Economic Development Action 1: Provide business assistance to protect critical equipment and inventory	Medium	9

**Table 7. Chowan Medium Priority Economic Development Summary**

This project represents the economic development strategy that Chowan County indicated is of a medium priority to address. Additional detail on the project can be found below:

- **Provide Critical Equipment Assistance:** This project would provide funding for recovery assistance to businesses that did not qualify for Small Business Association (SBA) loans or other recovery programs for non-residential uses. There are many small businesses in Chowan County, and because of the lower-income profile of households, many of these businesses do not have the excess capital to bear the impacts of the storm. Impacts to small businesses included damaged infrastructure, damaged capital investments—both real and other property, lost inventory, lost revenues from both displaced customers and business disruption, payments to employees who were not able to work, and disrupted operations from employees being unable to get to work.
- **This is a county-wide project, so no project area map has been included.**



## Economic Development Action 1: Provide business assistance

**County:** Chowan

**Priority Grouping:** Medium Priority

**Priority Ranking:** 9

**Project Timeframe:** This project could be implemented immediately upon being funded.

**Location:** County-wide

**Project Summary:** Provide business assistance to protect critical equipment and inventory by providing financial assistance for elevating or relocating critical equipment during hurricane events.

Question	Response	Disposition
Articulate how this project addresses an unmet need that has been created by damage from Hurricane Matthew.	This project would benefit Chowan County in that businesses could remain operation during heavy rain events or could re-open sooner after hurricane events there by maintaining the economic stability of the businesses. The project would benefit the county tax base by keeping the businesses viable during and after storm events.	N/A
Consistent with existing plans (describe points of intersection/departure)	This project is not discussed in any existing plans in Chowan County.	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 would benefit the county tax base by keeping the businesses viable during and after storm events.	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)?	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?	Less than 25%	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?	High	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?	Less than 25%	N/A
Who will administer this project?	County	N/A

## Infrastructure Strategies

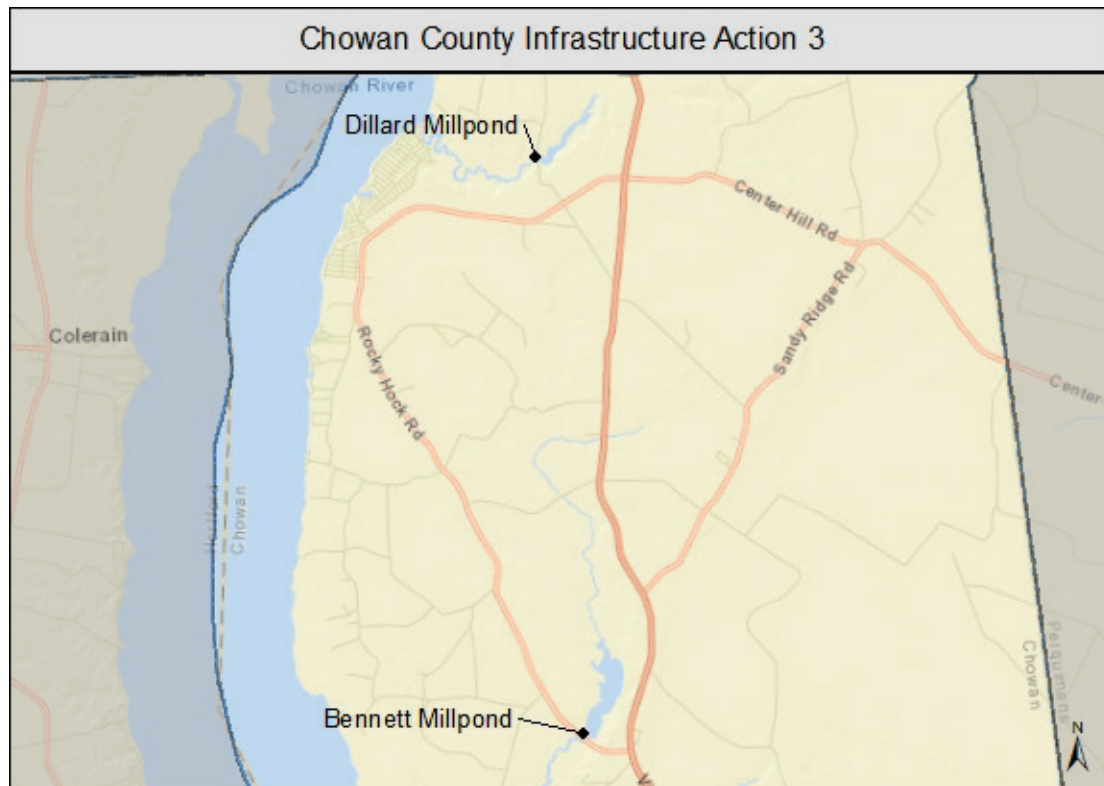
### High Priority Infrastructure Strategies

Pillar	Action Name	Priority	Overall Ranking
Infrastructure	Chowan County Infrastructure Action 3: Millpond dam and associated facilities repairs and upgrade (Bennett Millpond and Dillard Millpond)	High	1
Infrastructure	Chowan County Infrastructure Action 5: Pump Station Capacity Increase	High	2
Infrastructure	Chowan County Infrastructure Action 6: Construct stormwater infrastructure improvements	High	3
Infrastructure	Chowan County Infrastructure Action 2: Filberts Creek culvert replacement	High	4
Infrastructure	Chowan County Infrastructure Action 1: Downtown Edenton Hydrologic and Hydraulic Studies	High	5
Infrastructure	Chowan County Infrastructure Action 4: Chowan County Drainage Clearing and Snagging	High	6

**Table 8. Chowan High Priority Infrastructure Summary**

These projects represent the infrastructure strategies that Chowan County indicated are the highest priority to address. The County prioritized all of its infrastructure strategies as high priority. Detail can be found below:

- Millpond Dam and Associated Facilities Repairs and Upgrades:** The levees at Bennett Millpond and Dillard Millpond are both in need of repairs or risk failing in future heavy rain events. This project would repair and upgrade the levees themselves, as well as associated facilities such as access roads.



**Figure 18. Infrastructure Action 3: Millpond dam and associated facilities repairs and upgrade (Bennett Millpond and Dillard Millpond)**

## Infrastructure Action 3: Millpond dam repairs and upgrades

**County:** Chowan

**Priority Grouping:** High Priority

**Priority Ranking:** 1

**Project Timeframe:** The project could be implemented within 6 months of receiving funding.

**Location:** Mill pond dams at Bennett Mill Pond and Dillard Mill Pond

**Project Summary:** The dams associated with these two mill ponds over flowed during Hurricane Matthew and caused damage to businesses, agricultural operations, and recreational facilities. The dams and associated facilities are in disrepair.

Question	Response	Disposition
Articulate how this project addresses an unmet need that has been created by damage from Hurricane Matthew.	The County does not have funding to repair the damage at these mill ponds caused by Hurricane Matthew.	N/A
Consistent with existing plans (describe points of intersection/departure)	Yes	Agree
Does this project comply with existing Local and State authority (codes, plan and ordinance)?	Yes	Agree
Does this project meet the intents and goals for the Hurricane Matthew Recovery Act?	Yes	Agree
Explain any benefits or impacts to the economy of the county from this project.	The benefit of these improvements is that surrounding businesses and farms will be protected from flooding associated from these dams inability to handle rain falls associated with a Hurricane Matthew type event.	Agree
For how long will this solution be effective?	More than 50 years	Agree
How effective is the risk reduction?	50-100 year event	Agree
How many public facilities are involved in this project (buildings and infrastructure)?	1-3	Agree
Is coordination with other communities/counties needed to complete this project?	No	Agree
Is this project consistent with Federal Laws	Yes	Agree
To what degree does this project adversely impact local floodplain/coastal zone management?	Unknown	Agree
To what degree will it be possible to positively quantify the environmental benefits and ROI of this project?	Minimal to low confidence	N/A
What impact will this action have on the local economy/tax base?	Less than 25%	Agree
What impacts to the environment of the county will result from this project?	Dam repairs could positively impacts water quality in that they will allow sediment in storm water to settle in a pond rather than being conveyed to surrounding land uses.	N/A
What is the capability of the local government to administer this project?	Medium	Agree
What is the financial range of this project?	\$1M+	Agree
What is the level of public support for this project?	Medium	Agree
What is the technical feasibility of this project?	Higher than 75%	Agree
Who will administer this project?	County	Agree

- **Pump Station Capacity Increase:** The stormwater pump stations in downtown Edenton could not handle the capacity of rainwater associated with Hurricane Matthew. This project would increase the capacity of the stormwater and sanitary sewer pump stations in Edenton.

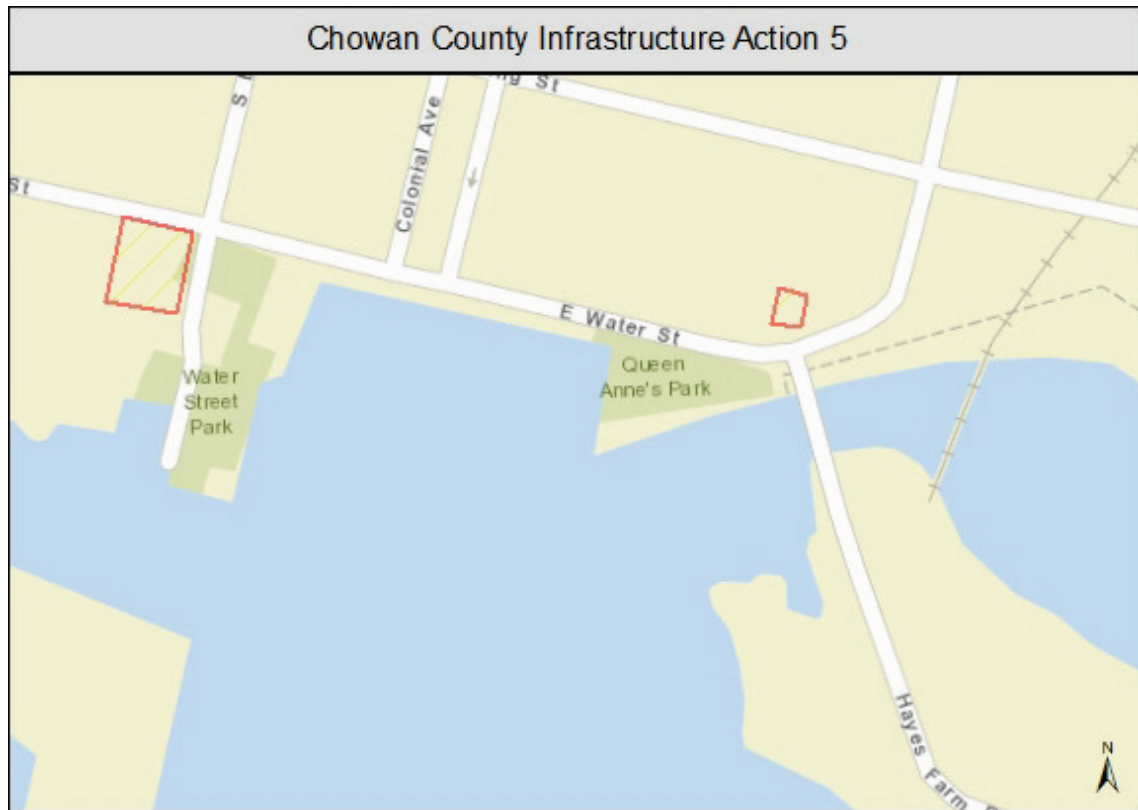


Figure 19. Chowan County Infrastructure Action 5: Pump Station Capacity Increase

## Infrastructure Action 5: Pump station capacity increase

**County:** Chowan

**Priority Grouping:** High Priority

**Priority Ranking:** 2

**Project Timeframe:** 12 months

**Location:** In Edenton, at the pump stations located behind the Chamber of Commerce and at E. Water Street/S. Oakum Street

**Project Summary:** This project would increase the capacity of these storm water and sanitary sewer pump/lift stations which were overwhelmed during Hurricane Matthew and caused flooding as a result of backups.

Question	Response	Disposition
Articulate how this project addresses an unmet need that has been created by damage from Hurricane Matthew.	County officials noted that these sewer pump/lift stations are overwhelmed during most heavy rain events but the Town of Edenton does not have the funds to improve or upgrade them.	N/A
Consistent with existing plans (describe points of intersection/departure)	The Albemarle Regional Hazard Mitigation Plan (2015) includes several strategies for the Town of Edenton to identify areas of flooding from storms and the reasons for flooding.	Agree
Does this project comply with existing Local and State authority (codes, plan and ordinance)?	Yes	Agree
Does this project meet the intents and goals for the Hurricane Matthew Recovery Act?	Yes	Agree
Explain any benefits or impacts to the economy of the county from this project.	Although there are no direct benefits to the economy associated with this project the project would indirectly benefit businesses in Edenton by reducing the amount of flooding associated with storm water back-ups.	Agree
For how long will this solution be effective?	Between 31 and 50 years	Agree
How effective is the risk reduction?	50-100 year event	Agree
How many public facilities are involved in this project (buildings and infrastructure)?	1-3	Agree
Is coordination with other communities/counties needed to complete this project?	No	Agree
Is this project consistent with Federal Laws	Yes	Agree
To what degree does this project adversely impact local floodplain/coastal zone management?	No Impact	Agree
To what degree will it be possible to positively quantify the environmental benefits and ROI of this project?	Low to moderate confidence	N/A
What impact will this action have on the local economy/tax base?	Less than 25%	Agree
What impacts to the environment of the county will result from this project?		N/A
What is the capability of the local government to administer this project?	High	Agree
What is the financial range of this project?	\$501K - \$1M	Agree
What is the level of public support for this project?	High	Agree
What is the technical feasibility of this project?	Higher than 75%	Agree
Who will administer this project?	Local	Agree



- **Stormwater Infrastructure Improvements:** Perform stormwater infrastructure improvements in the Town of Edenton that would be identified in a hydraulic study. These improvements could include upgrading existing infrastructure, and constructing a new stormwater sewer system for downtown areas that do not have stormwater sewers.
- **This is a county-wide project, so no project area map has been included.**

## Infrastructure Action 6: Construct storm water infrastructure improvements

**County:** Chowan

**Priority Grouping:** High Priority

**Priority Ranking:** 3

**Project Timeframe:** 12 months (to follow Action 1)

**Location:** Downtown Edenton from Freemason Street south and in the neighborhood north of the high school.

**Project Summary:** Construct storm water infrastructure improvements in downtown Edenton in conformance with the storm water plan developed in Infrastructure Action 1. The existing stormwater drainage facilities consist of a system of piping, catch basins, and drainage ditches and swales.

Question	Response	Disposition
Articulate how this project addresses an unmet need that has been created by damage from Hurricane Matthew.	Currently storm water is transferred over surface streets to surrounding waterways. This system was overwhelmed during Matthew and caused flooding in downtown neighborhoods and exposed the need for better storm water drainage in the downtown area.	N/A
Consistent with existing plans (describe points of intersection/departure)	Yes	Agree
Does this project comply with existing Local and State authority (codes, plan and ordinance)?	Yes	Agree
Does this project meet the intents and goals for the Hurricane Matthew Recovery Act?	Yes	Agree
Explain any benefits or impacts to the economy of the county from this project.	This project would benefit downtown businesses by limiting or possibly eliminating flooding in the downtown area allowing better access to businesses during and immediately after future hurricanes or heavy rain events.	Agree
For how long will this solution be effective?	More than 50 years	Agree
How effective is the risk reduction?	<50 year event	Agree
How many public facilities are involved in this project (buildings and infrastructure)?	1-3	Agree
Is coordination with other communities/counties needed to complete this project?	Yes	Agree
Is this project consistent with Federal Laws	Yes	Agree
To what degree does this project adversely impact local floodplain/coastal zone management?	No Impact	Agree
To what degree will it be possible to positively quantify the environmental benefits and ROI of this project?	Low to moderate confidence	N/A
What impact will this action have on the local economy/tax base?	Less than 25%	Agree
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	Agree
What is the financial range of this project?	\$501K - \$1M	Agree
What is the level of public support for this project?	High	Agree
What is the technical feasibility of this project?	Higher than 75%	Agree
Who will administer this project?	Local	Agree

- **Culvert Replacements on Filberts Creek:** Replace culverts on Filberts Creek under NC 32 (Virginia Road) and W. Hicks Street west of Granville Street with culverts sized to handle rain events equal to that of Hurricane Matthew. The culvert under W. Hicks Street is next to critical hospital-related infrastructure including high-speed internet cabling and a water pipe. Improvements to this culvert should include protective structures such as a bulkhead or riprap.

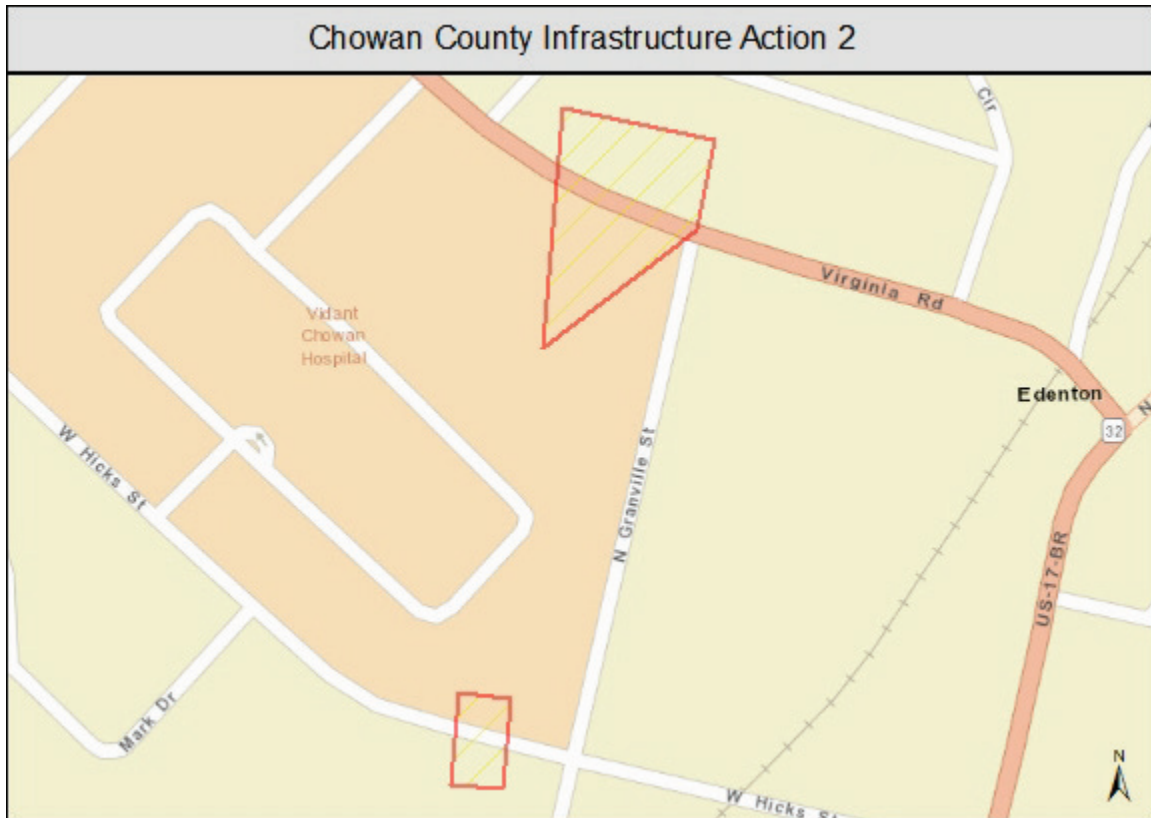


Figure 20. Infrastructure Action 2: Filberts Creek culvert replacement

## Infrastructure Action 2: Filberts Creek culvert replacement

**County:** Chowan

**Priority Grouping:** High Priority

**Priority Ranking:** 4

**Project Timeframe:** The project could be implemented within 6 months of receiving funding.

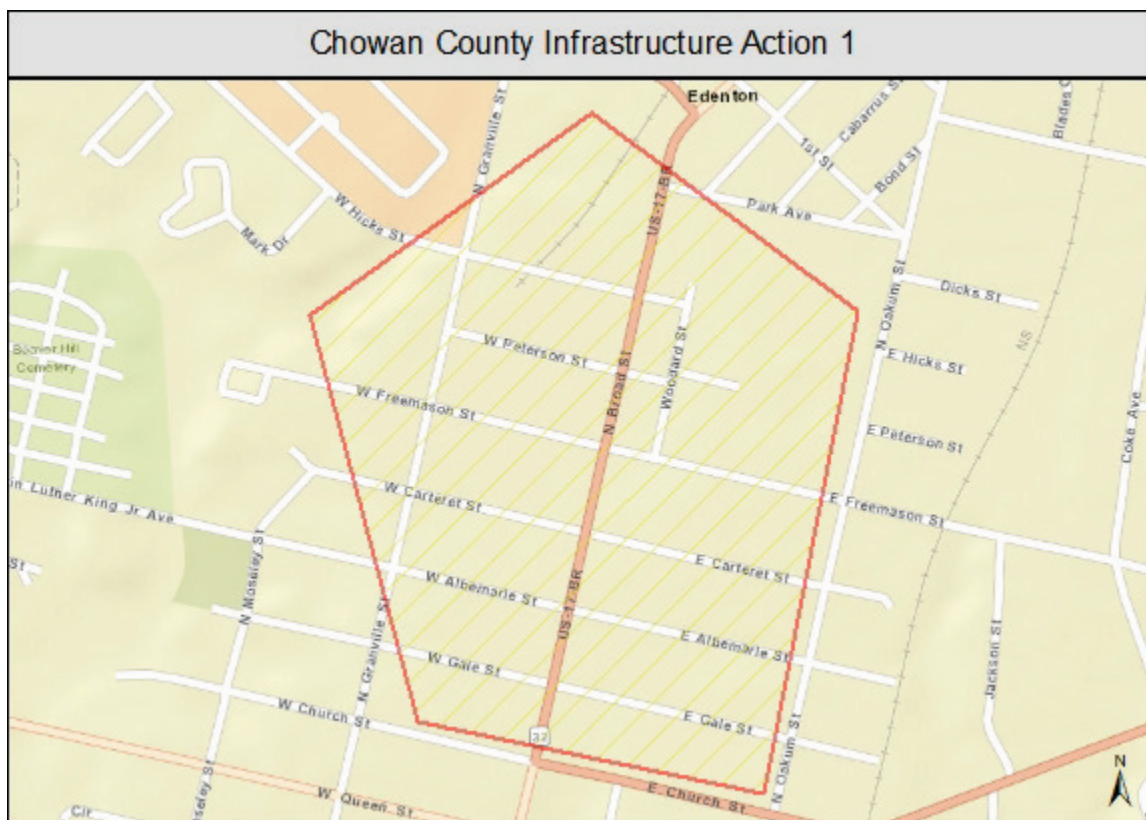
**Location:** Culverts on Filberts Creek under NC 32 (Virginia Road) and W. Hicks Street in Edenton

**Project Summary:** Replace culverts along Filberts Creek that were overwhelmed and caused flooding during Hurricane Matthew. Along with culverts designed for additional capacity, the culvert at W. Hicks Street should include additional protection of hospital-related utilities that includes a water line and high-speed internet.

Question	Response	Disposition
Articulate how this project addresses an unmet need that has been created by damage from Hurricane Matthew.	Hurricane Matthew was historic in terms of rain levels and caused flooding in areas that had never flooded before including in these areas. This project would install culverts designed to handle storm water from rain events equal to Hurricane Matthew.	N/A
Consistent with existing plans (describe points of intersection/departure)	Yes	Agree
Does this project comply with existing Local and State authority (codes, plan and ordinance)?	Yes	Agree
Does this project meet the intents and goals for the Hurricane Matthew Recovery Act?	Yes	Agree
Explain any benefits or impacts to the economy of the county from this project.	There are hospital-related utilities along this culvert including the water supply to the hospital that if damaged could potentially impact hospital operations.	Agree
For how long will this solution be effective?	More than 50 years	Agree
How effective is the risk reduction?	50-100 year event	Agree
How many public facilities are involved in this project (buildings and infrastructure)?	1-3	Agree
Is coordination with other communities/counties needed to complete this project?	Yes	Agree
Is this project consistent with Federal Laws	Yes	Agree
To what degree does this project adversely impact local floodplain/coastal zone management?	Between 26 and 50%	Agree
To what degree will it be possible to positively quantify the environmental benefits and ROI of this project?	Minimal to low confidence	N/A
What impact will this action have on the local economy/tax base?	Less than 25%	Agree
What impacts to the environment of the county will result from this project?	Positive impacts to the water quality of surrounding streams and to the Chowan River and Albemarle Sound.	N/A
What is the capability of the local government to administer this project?	Medium	Agree
What is the financial range of this project?	\$101K - \$250K	Agree
What is the level of public support for this project?	Medium	Agree
What is the technical feasibility of this project?	Higher than 75%	Agree
Who will administer this project?	State	Agree



- **Downtown Edenton Hydrologic and Hydraulic Studies:** This project recommends conducting a series of studies in downtown Edenton intended to identify locations of repetitive flooding, and the stormwater infrastructure related causes. The first study, a hydrologic study, would use rainfall data equal to the amount received during Hurricane Matthew. A subsequent hydraulic study would examine the capacity of the current stormwater infrastructure to handle the runoff equal to what was experienced during Hurricane Matthew, and identify needed improvements.



**Figure 21. Infrastructure Action 1: Downtown Edenton Hydrologic and Hydraulic Studies**

## Infrastructure Action 1: Edenton Hydrologic and Hydraulic study

**County:** Chowan

**Priority Grouping:** High Priority

**Priority Ranking:** 5

**Project Timeframe:** The project could be implemented within 6 months of receiving funding.

**Location:** Downtown Edenton

**Project Summary:** Conduct a hydrologic engineering study of a rain event using rain amounts equal to what was experienced during Hurricane Matthew to determine the quantity of runoff in the area. A separate hydraulic study would identify impacts to culverts, bridges, etc., to see what restrictions were causing issues.

Question	Response	Disposition
Articulate how this project addresses an unmet need that has been created by damage from Hurricane Matthew.	Hurricane type rain events such as Hurricane Matthew have exposed the inability of the Town of Edenton's storm water system to handle this type of heavy rain. The town needs a study to identify areas that are contributing to flooding.	N/A
Consistent with existing plans (describe points of intersection/departure)		Agree
Does this project comply with existing Local and State authority (codes, plan and ordinance)?	Yes	Agree
Does this project meet the intents and goals for the Hurricane Matthew Recovery Act?	Yes	Agree
Explain any benefits or impacts to the economy of the county from this project.		Agree
For how long will this solution be effective?	Between 11 and 30 years	Agree
How effective is the risk reduction?	50-100 year event	Agree
How many public facilities are involved in this project (buildings and infrastructure)?	1-3	Agree
Is coordination with other communities/counties needed to complete this project?	No	Agree
Is this project consistent with Federal Laws	Yes	Agree
To what degree does this project adversely impact local floodplain/coastal zone management?	Less than 25%	Agree
To what degree will it be possible to positively quantify the environmental benefits and ROI of this project?	Medium to high confidence	N/A
What impact will this action have on the local economy/tax base?	Less than 25%	Agree
What impacts to the environment of the county will result from this project?		N/A
What is the capability of the local government to administer this project?	High	Agree
What is the financial range of this project?	\$51K - \$100K	Agree
What is the level of public support for this project?	High	Agree
What is the technical feasibility of this project?	Higher than 75%	Agree
Who will administer this project?	Local	Agree

- **Drainage Clearing and Snagging:** This project would provide funding for the clearing and snagging of creeks, streams, culverts, ditches and other major stormwater conveyances throughout the county.
- **This is a county-wide project, so no project area map has been included.**

## Infrastructure Action 4: Drainage clearing and snagging

**County:** Chowan

**Priority Grouping:** High Priority

**Priority Ranking:** 6

**Project Timeframe:** 0-12 months

**Location:** County-wide

**Project Summary:** Clearing and snagging creeks, streams, culverts and ditches in partnership with NCDOT and the North Carolina Department of Agriculture.

Question	Response	Disposition
Articulate how this project addresses an unmet need that has been created by damage from Hurricane Matthew.	Many of the flood events caused by Hurricane Matthew happened because of obstructed storm water conveyances. Although the County funds some clearing and snagging there are insufficient funds available for the regular annual maintenance that is needed.	N/A
Consistent with existing plans (describe points of intersection/departure)	Yes	Agree
Does this project comply with existing Local and State authority (codes, plan and ordinance)?	Yes	Agree
Does this project meet the intents and goals for the Hurricane Matthew Recovery Act?	Yes	Agree
Explain any benefits or impacts to the economy of the county from this project.	Although there are no direct benefits or impacts to the economy of the county the project would indirectly benefit business operations and interruptions to commuters by reducing flooding resulting from blocked storm water conveyances.	Agree
For how long will this solution be effective?	Between 31 and 50 years	Agree
How effective is the risk reduction?	50-100 year event	Agree
How many public facilities are involved in this project (buildings and infrastructure)?	0	Agree
Is coordination with other communities/counties needed to complete this project?	No	Agree
Is this project consistent with Federal Laws	Yes	Agree
To what degree does this project adversely impact local floodplain/coastal zone management?	Less than 25%	Agree
To what degree will it be possible to positively quantify the environmental benefits and ROI of this project?	Low to moderate confidence	N/A
What impact will this action have on the local economy/tax base?	Between 26 and 50%	Agree
What impacts to the environment of the county will result from this project?		N/A
What is the capability of the local government to administer this project?	High	Agree
What is the financial range of this project?	\$251K - \$500K	Agree
What is the level of public support for this project?	High	Agree
What is the technical feasibility of this project?	Higher than 75%	Agree
Who will administer this project?	County	Agree



## Environmental, Ecosystem and Agricultural Strategies

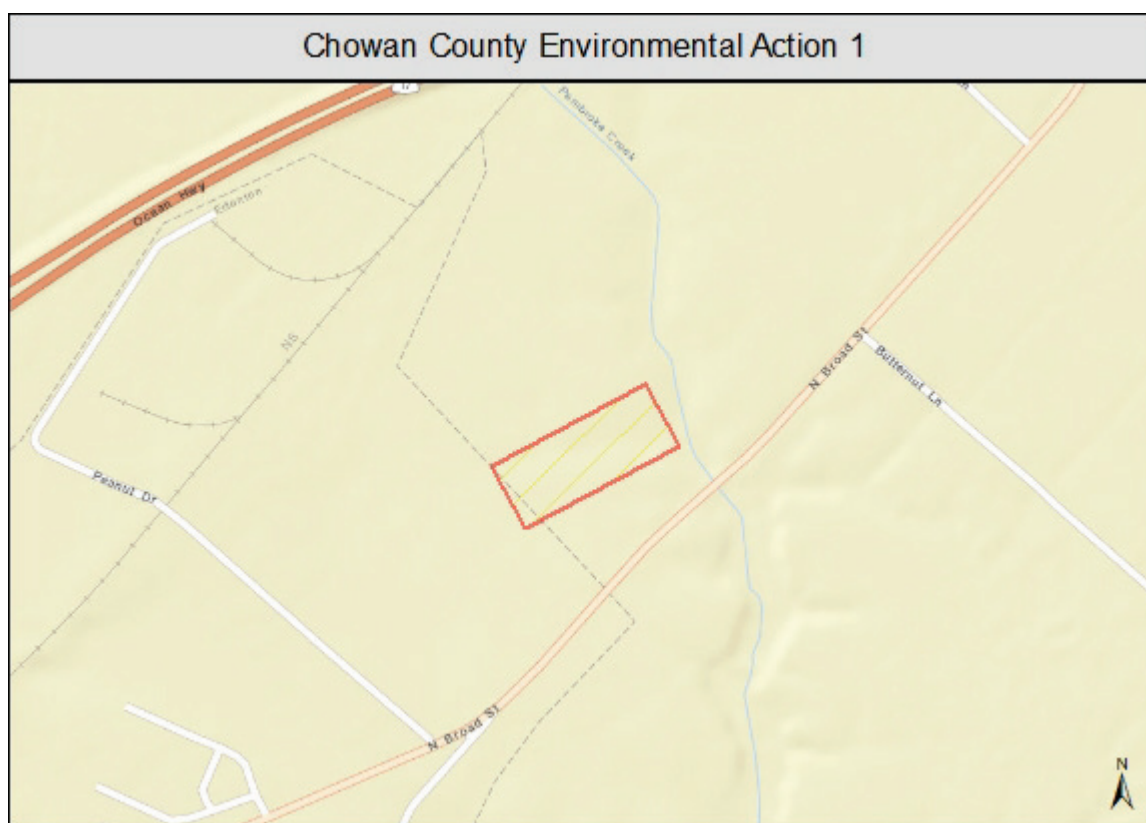
### Medium Priority Environmental Strategies

Pillar	Action Name	Priority	Overall Ranking
Environment	Chowan County Environment Action 1: Stormwater Culvert and Wetland Construction	Medium	8

**Table 9. Chowan Medium Priority Environmental Summary**

This project represents the environmental strategy that Chowan County indicated is of a medium priority to address. The County prioritized all of its environmental strategies as medium priority. Additional detail can be found below:

- Stormwater Culvert Construction:** This project would construct a culvert to divert storm water around Jimbo's Jumbos on Peanut Drive from the ditch along the eastern edge of the railway line and direct it southeast towards farming culvert. The inclusion of a wetland would help filter and clean the runoff and improve water quality in the County.



**Figure 22. Environment Action 1: Stormwater Culvert and Wetland Construction**

## Environment Action 1: Stormwater culvert and wetland construction

**County:** Chowan

**Priority Grouping:** Medium Priority

**Priority Ranking:** 8

**Project Timeframe:** Within 1 year

**Location:** The properties around Jimbo Jumbo's on Peanut Drive.

**Project Summary:** Construct a culvert to divert water from the ditch along the eastern edge of the railway line on Jimbo Jumbo's property and direct it southeast towards farming culvert which drains into Queen Anne Creek.

Question	Response	Disposition
Articulate how this project addresses an unmet need that has been created by damage from Hurricane Matthew.	Hurricane Matthew was the first hurricane to hit Chowan County since the Jimbo Jumbo's expansion took place and revealed the drainage issues in the area.	N/A
Consistent with existing plans (describe points of intersection/departure)		Agree
Does this project comply with existing Local and State authority (codes, plan and ordinance)?	Yes	Agree
Does this project meet the intents and goals for the Hurricane Matthew Recovery Act?	Yes	Agree
Explain any benefits or impacts to the economy of the county from this project.	The flooding that resulted from the lack of drainage caused Jimbos Jumbo's to close and damaged some inventory at the plant. Additional storm water drainage would help prevent further flooding in the future and allow a major employer to return to production.	Agree
For how long will this solution be effective?	Between 31 and 50 years	Agree
How effective is the risk reduction?	50-100 year event	Agree
How many public facilities are involved in this project (buildings and infrastructure)?	0	Agree
Is coordination with other communities/counties needed to complete this project?	No	Agree
Is this project consistent with Federal Laws	Yes	Agree
To what degree does this project adversely impact local floodplain/coastal zone management?	No Impact	Agree
To what degree will it be possible to positively quantify the environmental benefits and ROI of this project?	Low to moderate confidence	N/A
What impact will this action have on the local economy/tax base?	Less than 25%	Agree
What impacts to the environment of the county will result from this project?	County officials indicated that the construction of a wetland along the culvert would assist in improving water quality of the storm water runoff as it would allow sediments to be filtered naturally.	N/A
What is the capability of the local government to administer this project?	High	Agree
What is the financial range of this project?	\$101K - \$250K	Agree
What is the level of public support for this project?	High	Agree
What is the technical feasibility of this project?	Higher than 75%	Agree
Who will administer this project?	Local	Agree

## 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.