

Lancaster County Council Public Safety Committee Regular Meeting Agenda

Monday, June 26, 2017

County Council Conference Room
County Administration Building
101 N. Main Street
Lancaster, SC 29720

1. **Call to Order – Committee Chair Brian Carnes** 4:00 p.m.
2. **Approval of the agenda** *[deletions and additions of non-substantive matters]*
3. **Citizens Comments**
4. **Approval of Minutes from the May 9, 2017 Public Safety Committee meeting – pgs. 3-6**
5. **Discussion / Action Items**
 - a. Fire Study Report – *Steve Willis – pg. 7*
 - b. Renewal of Kershaw Fire Protection agreement – *Darren Player – pgs. 8-10*
 - c. State Emergency Management annual grant – *Darren Player – pgs. 11-13*
 - d. **Resolution 0964-R2017 regarding the Hazard Mitigation Plan**
Resolution Title: A Resolution Adopting The Lancaster County Multi-Jurisdictional Hazard Mitigation Plan As Approved By The Federal Emergency Management Agency.
– *Darren Player – pgs. 14-194*
 - e. Warehouse space for Fire Commission and Fire Rescue staff – *Darren Player – pgs. 195-200*
 - f. STAR team – *Larry Honeycutt*
 - g. Review of Development Agreement funds that are still outstanding – *John Weaver – pgs. 201-212*
6. **Executive Session**
 - a. *Discussion incident to a proposed contractual matter. SC Code 30-4-70(2).*
 - b. *Discussion incident to a proposed contractual matter. SC Code 30-4-70(2).*

7. Adjournment

Anyone requiring special services to attend this meeting should contact 285-1565 at least 24 hours in advance of this meeting.

Lancaster County Council Public Safety Committee agendas are posted at the Lancaster County Administration Building and are available on the Website: www.mylancastercsc.org



Members of Lancaster County Council
Public Safety Committee

Brian Carnes, District 7, Chairman
Larry Honeycutt, District 4
Billy Mosteller, District 3

Minutes of the Lancaster County Council Public Safety Committee Meeting

101 N. Main Street, Lancaster, SC 29720

Tuesday, May 9, 2017

Council Members present were Brian Carnes, Larry Honeycutt, Billy Mosteller, Terry Graham and Charlene McGriff. Also present were John Weaver, Steve Willis, Steve Knight of Fitch and Associates, Kimberly Hill, Sherrie Simpson and various Department Heads. A quorum of the Lancaster County Public Safety Committee was present for the meeting.

The following press were notified of the meeting by e-mail or by fax in accordance with the Freedom of Information Act: *Lancaster News*, *Kershaw News Era*, *The Rock Hill Herald*, *Fort Mill Times*, Cable News 2, Channel 9 and the local Government Channel. The agenda was also posted in the lobby of the County Administration Building and on the county website for the required length of time.

Call to Order

Chairman Brian Carnes called the meeting to order at 4:00 p.m.

Approval of the agenda

Billy Mosteller moved to approve the agenda. Seconded by Larry Honeycutt. Passed by unanimous vote of 3-0.

Citizens Comments

There were no citizens that came forward for comments.

Approval of Minutes

Larry Honeycutt moved to approve the minutes of the April 10, 2017 Public Safety Committee meeting. Seconded by Billy Mosteller. Passed by unanimous vote of 3-0.

Discussion / Action Items

Lancaster County Fire Study.

Steve Knight of Fitch and Associates explained that he had met with the major stakeholders for Fire Services over the past 2 days. He stated that Lancaster County is currently providing quality services. He discussed the two challenges for the County: (1) recruitment and retention for volunteer fire departments, which is a trend across the Southeast; and (2) the growth in Lancaster County. He explained that the County will need to invest in fire services in order to meet that growth. He stated that the variables are changing for the County, but the County is using the same model for its fire services.

He stated that the County would benefit from a Fire Service Needs Assessment. This study would produce a long term plan for the County for the next 5-10 years regarding fire services. He stated that the study could also include an objective risk based analysis for each area of fire service. He noted that different areas have different risks and, therefore, need different resources.

John Weaver asked if the County wanted to move forward with this Needs Assessment study. Larry Honeycutt moved that the request for a Fire Service Needs Assessment study be moved to full Council with a favorable recommendation. However, Brian Carnes stated that a proposal is needed before the recommendation can be moved to full Council. Steve Knight will provide a proposal for the Committee to review.

Potential acquisition of automated message board with radar speed indications and automated license plate reader capability.

Major Shaw of the Sheriff's Department reviewed the capabilities of the Road Warrior VMS. These units would be used in the panhandle/Indian Land area in high traffic areas. The license plate readers would help identify vehicles located in the area where a crime has been committed.

Solicitation in neighborhoods.

Steve Willis reviewed the solicitation ordinance used in Berkley County. Larry Honeycutt stated that he did not want schools, PTA's, churches, etc. to be hurt by such an ordinance. Brian Carnes explained that, apparently, the people in the Indian Land area that are soliciting know they cannot be stopped by the existing ordinance and, therefore, they will not leave the neighborhoods when asked. Steve Willis will discuss a possible solicitation ordinance with the Sheriff and the Solicitor.

STAR team.

Larry Honeycutt stated that the STAR team needs to be in order so that people can be helped in an emergency. He stated that the STAR team needs to be available at all times and needs to be a top priority. Darren Player explained that the County is already working on re-activating the STAR team. Larry Honeycutt noted that the team is needed due to the growth in the County and due to Haile Gold mine. He stated that a time line is needed for the STAR team to be completely re-activated, fully operational and a notification system in place. Steve Willis stated that the members of NAC (Needs Assessment Committee) will determine the time line and then they will report back to the Committee.

Review of Development Agreement funds received and expended and Plan for remainder of Development Agreement fund.

Kimberly Hill reviewed the revenues and expenditures for the Development Agreement funds and the current fund balance. Steve Willis reviewed the potential expenditures that the Committee has been discussing, as well as the projects that the Committee has already committed to funding.

Brian Carnes asked if any other revenues will be coming into the fund. John Weaver stated that there will be additional monies coming into the fund. He will provide an updated list to the Committee.

Larry Honeycutt moved that the Sheriff's Department receive funding for 2 Road Warrior VMS units and that it be moved to full Council with a favorable recommendation. Seconded by Billy Mosteller. Passed by unanimous vote of 3-0.

Larry Honeycutt also moved that the funding for the pumper tanker equipment for Indian Land and Pleasant Valley Fire Departments and the 2 automated message boards for the

Sheriff's Department be included in the FY 2017-2018 budget ordinance. Seconded by Billy Mosteller. Passed by unanimous vote of 3-0.

Adjournment

Larry Honeycutt moved to adjourn the Public Safety Committee meeting. Seconded by Billy Mosteller. Passed by unanimous vote of 3-0. The Public Safety Committee meeting adjourned at 4:43 p.m.

Respectfully Submitted:

Approved by the Public Safety Committee

Sherrie Simpson
Clerk to Council

Brian Carnes, Chairman

Agenda Item Summary

Ordinance # / Resolution#:	Discussion Item
Contact Person / Sponsor:	Steve Willis
Department:	Administration
Date Requested to be on Agenda:	June Public Safety Committee Meeting

Issue for Consideration:

Proposal for fire service study by Fitch and Associates.

Points to Consider:

The consultant noted that a fire service study would be beneficial in three generalized areas:

1. Challenges with volunteer firefighter recruitment and retention.
2. Growth in the Panhandle.
3. Equitable and sustainable funding for the future.

Mr. Knight noted that a major component of the study would be recognizing that we are at a critical juncture to meet changes in community profiles, volunteerism, and growth. He further notes that we have to keep in mind the diversity that exists between our rural departments and our urban departments in evaluating risks and determining funding strategies.

This is a personal observation and not anything from Mr. Knight but at the most recent Fire Commission meeting I stated that while I feel equal funding of departments across the board could not be justified we had to remain cognizant that all departments had certain needs simply to operate a fire rescue service.

If the Committee wants to recommend proceeding we will need to discuss if the three points are sufficient or if the Council desires additions to a scope of work.

Funding and Liability Factors:

This is not within the current FY 17-18 budget; however, Mr. Knight has indicated they can proceed within the parameters of our Procurement Code for engaging consultants. Council will need to identify the funding source to move forward.

Council Options:

Proceed or hold until a future time proceeding with a scope of work as recommended by the Public Safety Committee.

Staff Recommendation:

Prepare a scope of work for consideration so Council can make a decision.

Committee Recommendation:

To be determined.

Agenda Item Summary

Ordinance # / Resolution#:	Discussion/ Action Item
Contact Person / Sponsor:	Darren Player
Department:	Fire Rescue
Date Requested to be on Agenda:	June Public Safety Committee

Issue for Consideration:

Renewal of Kershaw Fire Protection agreement.

Points to Consider:

This is the updated annual agreement.

There were no substantive changes.

Funding and Liability Factors:

No net cost to the County General Fund. This is a reimbursement agreement with the Town of Kershaw.

Council Options:

Approve or reject the agreement.

Staff Recommendation:

Approve the agreement. At Council we would request a motion authorizing staff to execute the agreement on behalf of Lancaster County.

Committee Recommendation:

To be determined.

STATE OF SOUTH CAROLINA)

) **INTERGOVERNMENTAL FIRE RESCUE SERVICE CONTRACT**

COUNTY OF LANCASTER)

This contract is entered into this _____ day of _____, 2017, by and between Lancaster County, hereinafter referred to as the "County", and the Town of Kershaw, hereinafter referred to as the "Town".

1. The parties intend that an independent contractor relationship will be created by this contract. The County Fire Rescue Service personnel working within the Town's corporate limits are not to be considered agents or employees of the Town and the personnel are not entitled to any benefits that the Town provides for Town employees.
2. The County agrees to provide **two** firefighters for general fire protection services to the Town and the Town agrees to contract with the County through its Fire Rescue Service to provide services in accordance with and subject to the terms of this contract. The County will also provide, if funds and personnel are available, one part-time firefighter for Saturday and Sunday from the hours of 8:00 am to 5:00 pm.
3. The County will, through the County Fire Service, provide general fire protection services within the corporate limits of the Town. The County Fire Service will assign **two** firefighters to the Town for service Monday through Friday during the hours of 8:00 am to 5:00 pm. These two firefighters job responsibilities will be as follows:
 - a) will respond to all fire incident calls in the entire Kershaw Fire District
 - b) perform fire and life safety building inspections within the corporate limits of the Town
 - c) perform general fire station upkeep
 - d) perform test and maintenance on fire apparatus and equipment
 - e) test hydrants within the corporate limits of the Town
 - f) perform other duties as assigned by the County Fire Service Director or his designee
4. The County Fire Service employees will respond as needed pursuant to existing automatic mutual aid and mutual aid agreements previously established by the County and Town.
5. The planning, organization, scheduling, direction, and supervision of the Fire Rescue Service employees and all other matters incident to the delivery of general fire protection by the employees shall be determined by the County Fire Rescue Director in cooperation with the Kershaw Fire Chief. The County Fire Rescue Director shall retain exclusive authority over the activities of his employees under the authority structure of the County. If an emergency or other event requiring additional fire protection services shall occur in the Town, then the Fire Service Director would use appropriate discretion to allocate his manpower to the Town for the extent of the emergency or other event. Standard aid agreements will continue to be in effect and are in no way compromised by this agreement.
6. The County shall assume liability for, and defend against, and secure the Town from all costs or damages of the Fire Rescue personnel in providing or failing to provide general fire protection services to the Town provided the liability is not the result of Town policy. The County will carry liability insurance and worker comprehensive coverage in (1) an amount not less than the statutory limit for automobile and (2) an amount equal to One Million (\$1,000,000.00) Dollars for general liability.

7. The Fire Rescue Director shall give prompt consideration to all requests of the Town regarding the delivery of general fire protection services. The point of contact between the Fire Rescue Service and the Town will ordinarily occur between the Fire Rescue Director and / or his designee, and the Town Administrator and / or the Mayor.
8. The Town shall pay the County, not to exceed the total sum, of one hundred forty-eight thousand, nine hundred twenty-two dollars (\$148,922.00) annually for two fire rescue employees during the work week and one part-time fire rescue employee per day on the weekend. This amount is for general fire protection and rescue services delivered during the term of this contract. **The Town shall not be required to pay for any general fire protection and rescue services beyond those services provided pursuant to this contract.**
9. The County may request in writing any adjustments to the total sum in accordance with changes to personnel assigned to the Town for the above-mentioned fire and rescue service.
10. The County shall bill the Town within ten (10) days after the beginning of each calendar year month for the cost of the above mentioned fire services provided during the past month fire and rescue services delivered to the Town. If the Town does not make payment within thirty (30) days after the due date, the County may terminate this contract. The Town shall be liable for general fire protection services rendered to the time of termination.
11. This contract shall take effect on the **first day of July, 2017**, and shall continue through **June 30, 2018**. This contract **will not** be automatically renewed for successive terms. The Town and County shall negotiate a new contract on or before June 15, 2018.
12. **This contract may be terminated by either party, without cause, upon one hundred eighty (180) days written notice to the other parties.**

This contract contains all matters considered by the parties. There have been no oral agreements made and this document shall reflect the entire contract. This contract may be amended with approval of all parties.

IT IS SO AGREED.

TOWN OF KERSHAW

COUNTY OF LANCASTER

Mark Dorman, Mayor
Town of Kershaw

Steve Willis, Administrator
Lancaster County Council

Mitch Lucas
Town Administrator

Darren Player, Director
Lancaster County Fire Service

Agenda Item Summary

Ordinance # / Resolution#:	Information Item
Contact Person / Sponsor:	Darren Player
Department:	Fire Rescue/ Emergency Management
Date Requested to be on Agenda:	June Public Safety Committee
	July County Council

Issue for Consideration:

Information on 100% grant.

Points to Consider:

There is no local cash match for this grant. The match is in-kind with county staff.

This is an annual grant from State Emergency Management.

Funding and Liability Factors:

\$60,010 which includes \$35,000 for Emergency Management special projects.

There is no local cash match.

Council Options:

No action is required as this is an annual 100% grant. This is for information only.

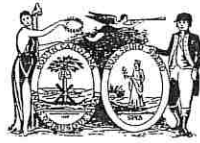
Staff Recommendation:

N/A

Committee Recommendation:

N/A

The State of South Carolina
Military Department



OFFICE OF THE ADJUTANT GENERAL

ROBERT E. LIVINGSTON, Jr.
MAJOR GENERAL
THE ADJUTANT GENERAL

June 5, 2017

Darren Player, Director
Lancaster County Emergency Management
P.O. Box 1809
Lancaster, SC 29721

REF: 2017 LEMPG Allocations

Dear Mr. Player:

This is the 2017 Local Emergency Management Performance Grant (LEMPG) application requirements notification. All required information to apply for the county grant is found at

A copy of this letter has been sent to your county administrator/manager for information. Your county's **estimated** annual award is \$61,010 which includes \$35,000 for EM Special Project funding. Your completed grant application is due to EMD by Friday June 30, 2017. Please note that this is not an award letter, but an application request to receive the grant funds. An actual award letter will be forwarded following SCEMD's award from the federal government.

The county will be reimbursed upon receipt of quarterly reports with supporting documentation of allowable expenditures. Each county will be responsible for providing the match for the grant award. **If your county has elected to participate in WebEOC software, the yearly charge becomes part of the grant award and must be matched.** Please note that the period of performance for the 2017 LEMPG is July 1, 2017 to June 30, 2018.

Of special note are the requirements outlined below:

1. Planning: LEMPG program participants must ensure EOPs are Comprehensive Preparedness Guidance (CPG) 101 v.2 compliant.
2. Exercises: LEMPG program funded personnel, to include personnel used as match, must participate in no less than three exercises in a 12-month period.
3. Training: LEMPG program funded personnel, to include personnel used as match, must complete the following training requirements: IS-100.b, IS-200.b, IS-700.a, IS-800.b, IS-120 or IS-139, IS-230.d, IS-235.b, IS-240.a, IS-241.a, IS-242.a, and IS-244.b.
4. The CERT program is now funded with LEMPG funds that must be matched by the county. Counties that want to participate must request the additional CERT funds up to a maximum of \$9,000.00, add to their budget submission and include as a scope of work item.
5. The Department of Homeland Security adopted 2 C.F.R. Part 200. The provision of 2 C.F.R. Part 200 will apply to all sub-recipient grant awards.

A 2017 LEMPG checklist has been added in the FTP site to assist in preparing the application.

Emergency Management Division
2779 Fish Hatchery Road
West Columbia, South Carolina 29172
(803) 737-8500 • (803) 737-8570

Finance and Administration

June 5, 2017

Page Two

If you have any questions or if we can assist you in any way, please contact Morgan Denny, (803) 737-8559, Deborah Dawson, (803) 737-8598, or your Regional Emergency Manager.

Sincerely,

A handwritten signature in black ink, appearing to read "K. Stenson", with a horizontal line extending to the right.

Kim Stenson
Director

KS/dd

CC: County Administrators

Agenda Item Summary

Ordinance # / Resolution#: 0964 - R2017

Contact Person / Sponsor: Darren Player, Emergency Management Director

Department: Emergency Management

Date Requested to be on Agenda: June 26, 2017 Public Safety Committee and June 26, 2017 County Council Agendas

Issue for Consideration: Resolution adopting the 2017 Version of the FEMA approved Lancaster County, SC, Multi-jurisdictional Hazard Mitigation Plan.

Points to Consider: A properly adopted, currently FEMA approved Hazard Mitigation Plan must be in place in order for public agencies to apply for disaster assistance should a Presidential Declaration of Disaster be issued for the jurisdiction or any of its included parts. Failure to adopt deletes the county and its included municipalities from any funding considerations in Disaster Declarations.

Funding and Liability Factors: There are no funding needs to adopt the plan. Liability would initiate from the inability to apply for disaster funding under the FEMA programs enacted for those purposes.

Council Options: Council may choose to pass a Resolution of Adoption or choose not to pass a Resolution of Adoption.

Recommendation: Emergency Management staff recommends the FEMA approved plan be adopted by Resolution and the plan will then be forwarded to the municipalities for their concurring adoption resolutions.

U.S. Department of Homeland Security
FEMA Region IV
3003 Chamblee Tucker Road
Atlanta, GA 30341



FEMA

June 14, 2017

Mr. Allen Fountain
State Hazard Mitigation Officer
South Carolina Emergency Management Division
2779 Fish Hatchery Road
West Columbia, South Carolina 29172

Reference: Multi-jurisdictional Hazard Mitigation Plan: Lancaster County, SC

Dear Mr. Fountain:

This is to confirm that we have completed a Federal review of the draft Lancaster County Multi-jurisdictional Hazard Mitigation Plan for compliance with the Federal Hazard Mitigation Planning requirements contained in 44 CFR 201.6(b)-(d). Based on our review and comments, we have determined that the Lancaster County Hazard Mitigation Planning Committee developed and submitted all the necessary revisions for an updated plan. Our staff has reviewed and approved these revisions.

We have determined that the Lancaster County Multi-jurisdictional Hazard Mitigation Plan is now compliant with Federal requirements, subject to formal community adoption.

In order for our office to issue formal approval of the plan, Lancaster County must submit adoption documentation and document that the final public meeting occurred. Upon submittal of these items to our office, we will issue formal approval of the Lancaster County Hazard Mitigation Plan Update.

Please have Lancaster County submit a final copy of their Plan, without draft notations and track changes.

For further information, please do not hesitate to contact Carl Mickalonis of the Hazard Mitigation Assistance Branch, at (770) 220-5628, Jean Neptune of the Hazard Mitigation Assistance Branch, at (770) 220-5474, or Darlene Booker, of my staff, at (770) 220-5404.

Sincerely,

A handwritten signature in black ink, reading "Kristen Martinenza".

Kristen M. Martinenza, P.E., CFM
Acting Branch Chief
Risk Analysis
FEMA Region IV

STATE OF SOUTH CAROLINA)
)
COUNTY OF LANCASTER)

RESOLUTION NO. 0964-R2017

A RESOLUTION

**ADOPTING THE LANCASTER COUNTY MULTI-JURISDICTIONAL HAZARD
MITIGATION PLAN AS APPROVED BY THE FEDERAL EMERGENCY
MANAGEMENT AGENCY.**

Be it resolved by the Council of Lancaster County, South Carolina:

Section 1. Approval of Multi-Jurisdictional Hazard Mitigation Plan.

Lancaster County was notified by letter dated June 14, 2017 from the Federal Emergency Management Agency – US Department of Homeland Security that the Lancaster County Multi-Jurisdictional Hazard Mitigation Plan was in compliance with the Federal Hazard Mitigation Planning requirements as promulgated in 44 CFR 201.6(b) – (d). The letter noted that the Lancaster County plan was compliant with federal requirements subject to formal adoption.

Section 2. Adoption by County Council.

By way of Resolution Number 0964-R2017 the Lancaster County Council hereby adopts the Lancaster County Multi-Jurisdictional Hazard Mitigation Plan.

Section 3. Further acts.

The Council Chair, Council Secretary, Clerk to Council, County Administrator, County Attorney, Fire Rescue and Emergency Management Director and all other appropriate officials of the County are each authorized and directed to do any and all things necessary to effect the implementation of the Multi-Jurisdictional Hazard Mitigation Plan.

Section 4. Effective date.

This Resolution is effective upon its adoption.

AND IT IS SO RESOLVED this _____ day of _____, 2017.

LANCASTER COUNTY, SOUTH CAROLINA

(SEAL)

Steve Harper, Chair, County Council

Larry Honeycutt, Secretary, County Council

ATTEST:

Sherrie Simpson, Clerk to Council

LANCASTER COUNTY HAZARD MITIGATION PLAN

LANCASTER COUNTY EMERGENCY MANAGEMENT

Hazard Mitigation Plan

6/14/2017

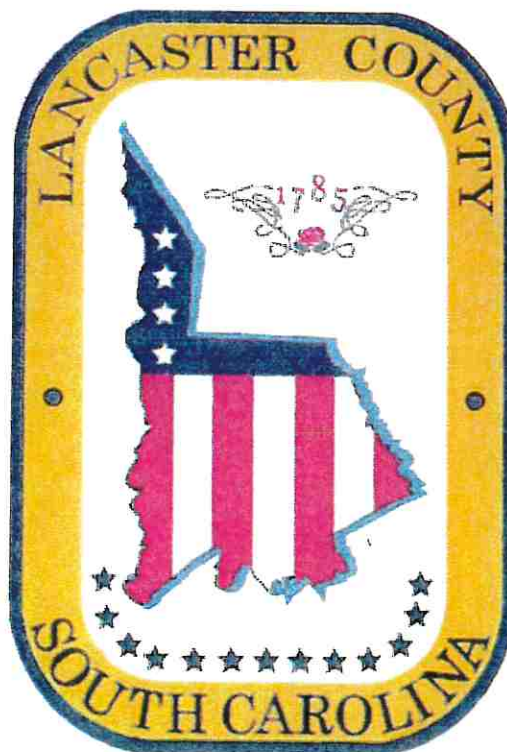


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EXECUTIVE SUMMARY

Background

The Disaster Mitigation Act of 2000, an amendment of the Robert T. Stafford Disaster Relief and Emergency Assistance Act (Public Law 93-288) of 1988, set forth the mission to establish a national disaster hazard mitigation program to:

- (1) Reduce the loss of life and property, human suffering, economic disruption, and disaster assistance costs resulting from natural, manmade and technological disasters.
- (2) Provide a source of pre-disaster hazard mitigation funding that will assist states and local governments (including Indian tribes) in implementing effective hazard mitigation measures that are designed to ensure the continued functionality of critical services and facilities after a natural disaster.

This Act also outlines the mandate for states and local communities to have an approved mitigation plan in order to receive pre- and post-disaster hazard mitigation funding.

Mission/Purpose

The mission of the plan is to minimize the loss of life, injury and damage to property and the environment from natural, manmade and technological hazards related to hazard mitigation in Lancaster County. The plan will establish methods to develop, maintain and utilize hazard information during events of significance while ensuring the continuity of government, education and notification of the public and responders. The purpose of this mission is also to identify structural and infrastructure projects that will reduce vulnerability and to construct or fortify critical infrastructure while promoting resiliency in Lancaster County.

Hazard Identification

Lancaster County is vulnerable to many natural, manmade, and technological hazards. Large hazard events such as hurricanes and earthquakes can have devastating consequences, but they do not happen as frequently as severe thunderstorms, lightning, hail, and wildfires. Hazards that occur regularly and have the potential to cause a great amount of damage are the hazards for which the county spends the most time planning and preparing. The following is a list of potential hazards that may impact our citizenry:

- Heavy Precipitation
- Hurricanes, Tropical Events
- Dam Failure
- Extreme Temperatures
- Flash Flooding
- Technological and Manmade Hazards
- High Wind
- Thunderstorm
- Drought
- Winter Storms
- Wildfire

EXECUTIVE SUMMARY

Geographically, Lancaster County is long and narrow and as such, the hazards differ greatly by region. The largest losses for our county historically are weather related. Lancaster County regularly experiences heavy precipitation, thunderstorms, hail and flash flooding. On occasion, we experience ice and snow. These storms typically produce power failure, some minor economic loss due to business closure and mitigation actions, with minor threat to life. The greatest threat to Lancaster County, though infrequent, is impact from hurricane and tropical events. Hurricane Hugo dealt a catastrophic blow to Lancaster County leaving behind substantial damage and power outages for up to several weeks.

Our greatest population density is along the state line in the northern end of the county. This exposes several developing potential hazards related to technological and manmade causes. High population density increases the impact of infrastructure failure and other damage caused by these hazards. While these are not isolated to the north end, there is an increase in potential due to system demands and density.

Wildfires are another hazard that regularly affect our county. Data collection methods have improved and in the last three years, Lancaster County has seen an increase in dollar loss due to wildfire, despite a downward trend in wildfire incidence. Our urban interface has grown significantly as the population and resulting development has increased.

Lancaster County has developed an array of hazard-specific disaster plans that address the protection of life and safety of its citizens, ensure continued delivery of critical and essential functions and services, and reduce loss and damage to its facilities and infrastructure systems. All hazard or functional plans work in concert with the Lancaster County Emergency Operations Plan. This base plan establishes a framework for an effective system of comprehensive emergency management for addressing the various types of emergencies that are likely to occur, from local emergencies with minor impact to major or catastrophic disasters.

Goals and Objectives

Based on the findings in our Hazard Identification and Vulnerability Assessment, Lancaster County Emergency Management worked with key county stakeholders to establish a list of Goals and Objectives. Goals and Objectives provide a framework for achieving the intent of the plan. The Goals and Objectives for this revision are as listed:

1. Minimize loss of life and injury, damage to property, the economy, and the environment from natural, manmade and technological hazards at all times relating to hazard mitigation.
2. Lancaster County will have the capability to develop, maintain and utilize hazard information during events of significance.
3. The continuity of county government operations will not be significantly disrupted during any event or disaster due to the lack of notification or a prioritized contact list.

EXECUTIVE SUMMARY

4. Enhance the hazards education, notification, and public information programs during this mitigation period.
5. Identify structural and infrastructure projects that will reduce vulnerability and impact to the citizens of Lancaster County, while promoting resiliency during this mitigation period.

Mitigation

In this revision there have been some changes in our Mitigation Capabilities. Lancaster County increased the utilization of social media and web-based notification to provide educational information and emergency notification. During the development of the hazard mitigation plan the stakeholders and county agencies shared in collaborative efforts to enhance current programs and help to develop in areas in which the county was deficient in previous revisions. Efforts also focused on identifying areas for improvement in this mitigation period.

Emergency Management and the identified key stakeholders developed goals that were attainable and provided a road map to providing life safety through early and pertinent notification and education, hazard mitigation through technical plan development, responder notification and education, and property conservation through code revision and public education. Attached to each goal in the Goals and Objectives Workbook include the mitigation action, hazards addressed, committee identified priority level, estimated cost and an identified target for implementation. These goals help to focus the direction of the plan.

Interagency Coordination and Initiatives

Lancaster County Emergency Management is supported by state and federal agencies in the administration of grant funding to provide for mitigation efforts to protect the citizens of Lancaster County and its townships. Several of the agencies that are key in the hazard mitigation process are South Carolina Emergency Management Division (SCEMD), South Carolina Department of Natural Resources (SCDNR), and South Carolina Department of Health and Environmental Control (SCDHEC). We also have several FEMA partnerships that are facilitated through SCEMD.

SCEMD is responsible for the application, award, grant management, and closeout of two mitigation grants: the Pre-Disaster Mitigation (PDM) grant program and the Hazard Mitigation Grant Program (HMGP). Both grants offer federal mitigation assistance through the Federal Emergency Management Agency (FEMA) to complete plans and projects to protect against all natural hazards. SCEMD is also the lead agency on all-hazard risk assessment and mitigation planning at the state level and assists in post-disaster mitigation activities.

The South Carolina Department of Natural Resources is responsible for the application, award, grant management, and closeout of the Flood Mitigation Assistance grant program. This grant program offers federal mitigation assistance through the FEMA to

EXECUTIVE SUMMARY

update the flood mitigation portion of hazard mitigation plans and projects to protect against flooding. SCDNR is also the lead agency responsible for the provision of updates and maintenance to the statewide Digital Flood Insurance Rate Maps.

SCDHEC conducts mitigation planning and activities by ensuring that facilities, businesses and water and air quality agencies meet the minimum standards as established in state regulation. Specifically, the dam infrastructure is monitored by SCDHEC staff and dam safety is an area of mitigation concern. The agency also implements surveillance measures to monitor, advise, and protect the public and healthcare providers in the case of bioterrorism or disease outbreaks. Lancaster County's greatest need is related to dam inspection. Lancaster County has a greater number of high hazard dams than any other county in the state.

Conclusion

Lancaster County Emergency Management has reviewed and updated the 2014 revision of the Hazard Mitigation Plan. This plan includes an improved risk assessment, revised mitigation goals and objectives, updated mitigation actions, and provides a new organizational format. The complete document is based on previous historical events, a correlation of data, and expertise from internal and external stakeholders, as well as from those versed in emergency management and emergency response, code enforcement, hazard-specific disciplines, and infrastructure development and support.

In light of recent events that have impacted our county and our state, the goals developed reflect realistic projects that are attainable given the resources to do so. The greatest priority toward mitigation focuses on protecting the lives of our citizens followed by providing education and notification for our responders and community, reducing loss during and after an event, increasing sustainability of infrastructure, and providing a format to reduce the regional economic impact due to events identified in the plan.

County Hazard Mitigation efforts are supported by many federal, state and local agencies. These agencies provide assistance to Lancaster County Emergency Management in fulfilling effective hazard mitigation at the county level. As required by the Disaster Mitigation Act of 2000, this plan, after local review, will be submitted to SCEMD for state approval, followed by approval through FEMA. The final step will be the adoption by the Kershaw and Heath Springs Town Councils, Lancaster City Council, and Lancaster County Council. Once adopted, this plan will be in place for five years.

SECTION - 1

INTRODUCTION

I. Introduction

Lancaster County, South Carolina and its incorporated communities prepared this Hazard Mitigation Plan to assess the communities' vulnerabilities to both natural and man-made hazards and prepare a long term strategy to address these hazards and prevent future damage and loss of life. This plan was created through participation from county and municipality officials, residents, and business owners and represents the community's consensus.

II. Background

Lancaster County is situated along the northern central border of South Carolina with North Carolina (as shown in Figure 1-1) and has an area of 555 square miles (1,437 km²). It is bound on the west by the Catawba River and Sugar Creek and on the east by the Lynches River. Lancaster County lies in the Piedmont region of the Carolinas and is comprised largely of relatively low, rolling hills with heights above sea level between 200 feet (50 m) and 800 feet to almost 1,000 feet (250 m to 300 m) with numerous rock formations of different materials and ages intermingled with one another. The soils are generally clay-like and moderately fertile, though some southeastern portions of the county are sandy as the Piedmont transitions into the Sand Hills region. The Sand Hills is a region in the interior of the state comprised of a strip of ancient beach dunes which generally divides the Piedmont from the Coastal Plain of South Carolina.

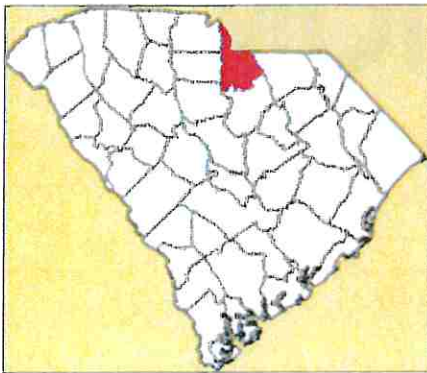


Figure 1-1.

Lancaster County has a humid subtropical climate, characterized by hot, humid summers and cool winters. Precipitation does not vary greatly between seasons. July is the hottest month, with an average high temperature of 91 °F (33 °C) and an average low temperature of 68 °F (20 °C). The coldest month of the year is January, when the average high temperature is only 53 °F (12 °C) and the average low temperature bottoms out at 30 °F (-1 °C). The record high temperature of 107 °F (42 °C) was recorded in July 1926 and a record low of -4 °F (-20 °C) was recorded January of 1985. The maximum average monthly precipitation occurs in July at 5.05 inches. The average annual rainfall is approximately 44.44 inches with most precipitation occurring from June through October.

Based on U.S. Census data estimates from 2015, Lancaster County is the state's fourth fastest growing county (by population percentage increase) in 2010 through 2015 with an estimated population increase of 9,190. The 2010 population was 76,652 and the 2015 estimate is 85,842 (U.S. Census) which represents a 12.0% increase from the 2010 population. Where there is population growth, there is usually also significant development; according to the Catawba Council of Governments from 2010 through 2014 there were 4,681 building permits for dwelling units issued, 229 mobile home permits issued, and 242 commercial and industrial building permits issued.

There are three incorporated communities within the county: the City of Lancaster, the Town of Heath Springs and the Town of Kershaw. The City of Lancaster is the County Seat. A map of the county showing the locations of the incorporated communities is provided as Figure 1-2.

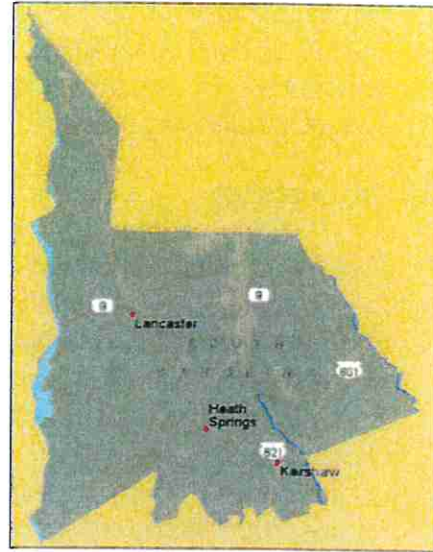


Figure 1-2.

Lancaster County is vulnerable to both natural (hurricanes/tropical storm) and technological (hazardous material incidents) hazards. Hurricane/tropical storms produce the greatest monetary damage; however, the recurrence interval is 22.8 years, making it a relatively rare event. Hail, wind, wildfires, winter storms, tornadoes, and certain man-made or technological incidents are some of the prominent hazards that regularly affect the county, based on past occurrences. Furthermore, its proximity to York County and Charlotte, North Carolina, increases the vulnerability to technological and terrorist hazards. The county's susceptibility to these and several other natural hazards were considered as part of this plan.

III. Planning Process

In order to conduct hazard mitigation planning, a committee was formed consisting of officials from the County, utilities, historical society, school district, higher education, business and economic development, regional government and representatives from each of the participating municipalities. To maximize participation, ensure equal levels of communication, and reduce time lost to travel, all Hazard Mitigation Planning Committee communications, requests for information, sharing of information, and collaboration was completed via electronic means. The most prevalent of these was via e-mail, followed by telephone. Participation in the planning process was defined as reading of e-mails, proof of which is read receipts generated by the opening of emails, and response to information requests contained in said e-mails. Through several mass emails and the return of requested materials and documentation, this Hazard Mitigation Planning Committee developed a countywide Hazard Mitigation Plan.

The committee reviewed the county's vulnerabilities to natural, manmade, and technological hazards and considered a wide variety of ways to reduce and prevent potential damage from these hazards. The committee then worked together to select the most appropriate and feasible mitigation measures.

Because residents are important to the solution, they were involved in the hazard mitigation planning process via a public review process. The plan was made available for two weeks in the lobby of the County Administration Building; notifications of this were made on the front page of the County's website and also through the Lancaster County Fire Rescue/Emergency Management Twitter and Facebook pages. The plan was also

made available as part of a free civics course provided to citizens of the County who wished to learn more about the governmental functions of the County. Residents were encouraged to ask any questions and provide any input they wished to bring into the mitigation planning process. Following is a description of the planning process.

IV. Organization

The first step of the hazard mitigation planning process was a comprehensive review of the former hazard mitigation plan. Lists were prepared to verify all represented, discounted, omitted, or otherwise incorrect data. This included a review of the make-up of the existing Hazard Mitigation Planning Committee (HMPC). Additionally, the Local Emergency Planning Committee (LEPC) was briefed and asked for input during a public meeting held on February 2, 2016. Members of the LEPC were asked to consider serving on the HMPC. Many members of the LEPC are also members of the HMPC, including utilities, municipality representatives, higher education, and county officials.

The second step of the hazard mitigation planning process was for Lancaster County to organize our resources to complete the planning process and form a new hazard mitigation committee to include local stakeholders needed to complete an accurate and inclusive plan. . As part of this process resolutions or letters of intent were collected from the municipalities in Lancaster County indicating their approval to allow the county to develop an all hazards plan to include their communities. (Appendices 1-4) We deemed it imperative that we have representation from County and incorporated community agencies such as emergency services departments, public works departments, and building code inspection. Additionally, utilities, the school district, higher education, economic development, local business, and regional government entities were contacted and requested to serve on the HMPC.

A new HMPC was formed in October of 2016 to work together to develop the hazard mitigation plan and to conduct a hazard mitigation planning process compliant with Disaster Mitigation Act of 2000 (DMA), Flood Mitigation Assistance (FMA), and Community Rating System (CRS) planning requirements.

The HMPC consists of the following representatives from Lancaster County, the City of Lancaster, the Town of Heath Springs, Town of Kershaw and various other public and private entities such as utility companies and historical preservation societies:

Lancaster County Officials

Darren Player – Director, Lancaster County Fire Rescue/Emergency Management
Keith Wilson – Deputy Director, Lancaster County Fire Rescue/Emergency Management
Stuart Barfield – EM Planner, Lancaster County Emergency Management
Stephen Blackwelder – Fire Marshal, Lancaster County Fire Rescue
Clay Catoe – Director, Lancaster County EMS
Jeff Catoe – Director, Lancaster County Public Works
Kenneth Cauthen - Director, Lancaster County Zoning
Steve Yeargin – Certified Building Official, Lancaster County Building Department
Penelope Karagounis – Director, Lancaster County Planning Department

City of Lancaster Officials

Steven "Flip" Hutfles – Administrator, City of Lancaster
Justin McLellan – Fire Chief, City of Lancaster Fire/Rescue
Jerry Crockett – Director, City of Lancaster Public Works
Lewis Streater – Building Official, City of Lancaster Building and Zoning

Town of Heath Springs

Tony Starnes – Administrator, Town of Heath Springs

Town of Kershaw

Mitch Lucas – Town Administrator, Town of Kershaw

School District and Higher Education

David Small – Director of Facilities, Lancaster County School District
Dr. John Rutledge – Director of Law Enforcement and Security and Instructor of Criminal Justice, University of South Carolina – Lancaster

Utility Representatives

Rick Jiran - District Manager, Duke Energy, Government and Community Relations
Stephen White - District Manager, Lancaster County Water and Sewer District
Phil Monroe – Vice President of Engineering and Operations, Lynches River Electric Co-Op
Tim Thornton – General Manager, Lancaster County Natural Gas Authority
Tim Hallman – Residential Services Manager, Comporium Communications

Business and Economic Development

Jamie Gilbert – Director, Lancaster County Economic Development
Dean Faile – President, Lancaster County Chamber of Commerce

V. Data Collection

Development of the mitigation plan began with data collection. With the last version of this plan, exhaustive research was conducted by community, county, state, and federal agencies to compile data on previous natural and man-made hazardous events, projected frequencies of future occurrences/the anticipated risk where available, and asset (structure, utility, and transportation systems) inventory information. For this 2017 update, many of the same data sources and some newly discovered ones were used to add in new event occurrences. Historical information and data from the previous plan revision were carried over into this update to maintain sufficient background for the plan.

Policy and regulatory information from each of the communities and the county was collected. This included comprehensive plans, zoning ordinances, development ordinances, and building code requirements as well as the current approved Hazard Mitigation Plan. Information was collected from the Lancaster County Building and Zoning, GIS Department, and Lancaster County and City of Lancaster Public Works. Several state agencies were contacted including the South Carolina Emergency Management Division, the Department of Natural Resources, the Department of Health and Environmental

Control, the Forestry Commission, and the Geologic Survey. The University of South Carolina Hazards Research Lab was also determined to be a valuable source of information.

VI. Hazards and Vulnerabilities Assessment

The HMPC worked to complete a hazard identification and vulnerability assessment for the entire county. This process allowed the committee to analyze the county's greatest hazard threats and to determine its most significant vulnerabilities. The Hazard Identification and Vulnerability Assessment were performed in large part using GIS data as well as federal and state sources.

At the February 2, 2016 LEPC meeting, a discussion was held to determine what parameters should be placed on the planning process for the HMPC. It was determined that the HMPC should focus on natural hazards as well as adding, for the 2017 rewrite, a new section that defines the categories of the following manmade hazards: dam failures, hazardous material releases, train derailments, infrastructure failures, water/sewer system disruption and power system failures. A corresponding disaster threats approach was used in this process. (Appendix 5) Increased population and industry growth in Lancaster County necessitated the inclusion of these hazards, as their risks to the population and property in the county are just as tangible and real as risks associated with natural hazards previously mentioned in the plan.

Another HMPC meeting was held in November of 2016 with principal members of the committee for an overview of the planning and hazards and vulnerabilities assessment process to be presented. At this meeting, a detailed set of questions for each entity involved was developed and forwarded to all members of the committee for their response. The information gathered from the response to this questionnaire was used to identify areas where the existing plan could be improved or where data or policy had changed.

VII. Mitigation Plan Development

A Capability Assessment was performed whereby the existing programs and policies addressing natural, manmade and technological hazards were reviewed. A thorough analysis of the adequacy of existing measures was performed and potential changes and improvements were identified. Lancaster County Emergency Management (LCEM) worked with the response from the questionnaires as well as follow-up telephone calls and emails with various committee members to establish an overall Capability Assessment.

By January of 2016, LCEM had worked through the Capability Assessment and Hazard and Vulnerability Assessment to identify goals and objectives for countywide mitigation efforts. During the month of February, LCEM worked to identify and develop mitigation action plans. In November of 2016, these goals were presented to the HMPC via email for review, comment, revision, if necessary, and prioritization. These goals represent the county and communities' vision for disaster resistance.

Everything that could affect hazard event-related damage in the county was considered by the HMPC. Every effort was made to ensure not only that relevant activities were considered, but also that the process was not limited to just a few alternatives. After much discussion, HMPC drafted an "action plan" that specifies recommended projects, who is responsible for implementing them, and when they are to be completed.

This plan recommends mitigation measures that should be pursued. Implementation of these recommendations depends on adoption of this plan by the County Council and each of the municipalities and the cooperation and support of the offices and contacts designated as being responsible for each action item.

VIII. Plan Review and Maintenance

Lancaster County Emergency Management serves as the lead agency for the HMPC and will work with the HMPC to monitor the implementation the plan and as part of the HMPC, will perform annual reviews of this plan. As representatives of the various jurisdictions covered in this plan, it is the responsibility of members of the HMPC to report the implementation of projects or activities related to Hazard Mitigation to the committee.

The annual evaluation will assess current hazards and vulnerabilities, goals and objectives of the current plan, implementation problems with the current plan, progress and outcomes of projects, and participation of the members of the HMPC. The results of these annual evaluations will serve as the basis for a complete update of this plan every five years. The HMPC will hold annual public meetings to review the plan and solicit citizen comment.

IX. Funding Sources for Mitigation

The committee had to become familiar with potential funding sources for each project identified during the planning process. Several federal and state funding sources were identified by the committee. The previous plan identified the Severe Repetitive Loss (SRL) and the Repetitive Flood Claims (RFC) programs; these programs have since been retired by FEMA. The following is a summary of the potential funding sources identified.

- Hazard Mitigation Grant Program (HMGP)
- Pre-Disaster Mitigation (PDM)
- Flood Mitigation Assistance (FMA)
- Department of Housing and Urban Development's Community Development Block Grants (HUD CDBG)

Hazard Mitigation Grant Program (HMGP) is authorized by Section 404 of the Robert T. Stafford Disaster Relief and Emergency Assistance Act, as amended (the Stafford Act), Title 42, United States Code (U.S.C.) 5170c. The key purpose of HMGP is to ensure that the opportunity to take critical mitigation measures to reduce the risk of

loss of life and property from future disasters is not lost during the reconstruction process following a disaster. HMGP is available, when authorized under a Presidential major disaster declaration, in the areas of the State requested by the Governor. The amount of HMGP funding available to the Applicant is based upon the estimated total Federal assistance to be provided by FEMA for disaster recovery under the Presidential major disaster declaration.

The Pre-Disaster Mitigation (PDM) program is authorized by Section 203 of the Stafford Act, 42 U.S.C. 5133. The PDM program is designed to assist States, Territories, Indian Tribal governments, and local communities to implement a sustained pre-disaster natural hazard mitigation program to reduce overall risk to the population and structures from future hazard events, while also reducing reliance on Federal funding from future disasters.

The Flood Mitigation Assistance (FMA) program is authorized by Section 1366 of the National Flood Insurance Act of 1968, as amended (NFIA), 42 U.S.C. 4104c, with the goal of reducing or eliminating claims under the National Flood Insurance Program (NFIP). The National Flood Insurance Fund provides funding for FMA. Both PDM and FMA programs are subject to the availability of appropriation funding, as well as any program specific directive or restriction made with respect to such funds.

The Hazard Mitigation Grant Program (HMGP) may provide funds to States, Territories, Indian Tribal governments, local governments, and eligible private non-profits following a Presidential major disaster declaration. The Pre-Disaster Mitigation (PDM) and Flood Mitigation Assistance (FMA) programs may provide funds annually to States, Territories, Indian Tribal governments, and local governments. While the statutory origins of the programs differ, all share the common goal of reducing the risk of loss of life and property due to natural hazards.

The Hazard Mitigation Grant Program (HMGP) provides grants to States and local governments to implement long-term hazard mitigation measures after a major disaster declaration. Authorized under Section 404 of the Stafford Act and administered by FEMA, HMGP was created to reduce the loss of life and property due to natural disasters. The program enables mitigation measures to be implemented during the immediate recovery from a disaster.

Hazard Mitigation Grant Program funding is only available to applicants that reside within a presidentially declared disaster area. Eligible applicants are

- State and local governments
- Indian tribes or other tribal organizations
- Certain non-profit organizations

Individual homeowners and businesses may not apply directly to the program; however a community may apply on their behalf.

HMGP funds may be used to fund projects that will reduce or eliminate the losses from future disasters. Projects must provide a long-term solution to a problem, for example, elevation of a home to reduce the risk of flood damages as opposed to buying sandbags and pumps to fight the flood. In addition, a project's potential savings must be more than the cost of implementing the project. Funds may be used to protect either public or private property or to purchase property that has been subjected to, or is in danger of, repetitive damage. Examples of projects include, but are not limited to:

- Acquisition of real property from willing sellers and demolition or relocation of buildings to convert the property to open space use
- Retrofitting structures and facilities to minimize damages from high winds, earthquake, flood, wildfire, or other natural hazards
- Elevation of flood prone structures
- Development and initial implementation of vegetative management programs
- Minor flood control projects that do not duplicate the flood prevention activities of other Federal agencies
- Localized flood control projects, such as certain ring levees and floodwall systems, that are designed specifically to protect critical facilities
- Post-disaster building code related activities that support building code officials during the reconstruction process

The amount of funding available for the HMGP under a particular disaster declaration is limited. The program may provide a State with up to 15 percent of the first \$2 billion of estimated aggregate amounts of disaster assistance, up to 10 percent for amounts between \$2 billion and \$10 billion, and up to 7.5 percent for amounts between \$10 billion and \$35.333 billion of funds released to states by FEMA. States that meet higher mitigation planning criteria may qualify for a higher percentage under the Disaster Mitigation Act of 2000.

FEMA can fund up to 75% of the eligible costs of each project. The State or grantee must provide a 25% match, which can be fashioned from a combination of cash and in-kind sources. Funding from other Federal sources cannot be used for the 25% share with one exception. Funding provided to States under the Community Development Block Grant program from the Department of Housing and Urban Development can be used to meet the non-federal share requirement.

According to the FEMA website, there are five issues you must consider when determining the eligibility of a proposed project.

- Does your project conform to your State's Hazard Mitigation Plan?
- Does your project provide a beneficial impact on the disaster area, i.e. the State?
- Does your application meet the environmental requirements?
- Does your project solve a problem independently?
- Is your project cost-effective?

HMGP funding is allocated using a "sliding scale" formula based on a percentage of the estimated total Federal assistance under the Stafford Act, excluding administrative costs for each Presidential major disaster declaration. Applicants with a FEMA-approved State or Tribal Standard Hazard Mitigation Plan may receive:

- Up to 15 percent of the first \$2 Billion of the estimated aggregate amount of disaster assistance;
- Up to 10 percent for the next portion of the estimated aggregate amount more than \$2 Billion and up to \$10 Billion; and
- 7.5 percent for the next portion of the estimated aggregate amount more than \$10 Billion and up to \$35.333 Billion

Applicants with a FEMA-approved State or Tribal Enhanced Hazard Mitigation Plan are eligible for HMGP funding not to exceed 20 percent of the estimated total Federal assistance under the Stafford Act, up to \$35.333 Billion of such assistance, excluding administrative costs authorized for the disaster.

Under the HMA programs, the total cost to implement approved mitigation activities is generally funded by a combination of Federal and non-Federal sources. The non-Federal share must be an eligible cost used in direct support of the approved activities under the grant award. Contributions of cash, in-kind services or materials, or any combination thereof, may be accepted as part of the non-Federal cost share. For FMA, not more than one half of the non-Federal contribution may be provided from in-kind contributions.

Eligible applicants must apply for the HMGP and PDM through the South Carolina Emergency Management Division – Recovery and Mitigation Group.

FEMA's Flood Mitigation Assistance Program (FMA) provides grants to states and communities for planning assistance and mitigation projects that reduce the risk of flood damage to structures covered by flood insurance. The types of grants available include planning and project assistance. FMA monies are available to eligible applicants when a Flood Mitigation Plan has been developed and FEMA has approved it.

FEMA may contribute up to 75 percent of the total eligible costs. At least 25 percent of the total eligible costs must be provided by a nonfederal source. Of this 25 percent, no more than half can be provided as in-kind contributions from third parties. There are limits on the frequency of grants and the amount of funding that can be allocated to a State or community in any 5-year period. The South Carolina Department of Natural Resources (SCDNR) serves as the administrator of the planning and projects portions of the grant. The State's FMA Coordinator is within the Land, Water and Conservation Division of SCDNR. The agency's web page is www.dnr.state.sc.us.

HUD Community Development Block Grants

Department of Housing and Urban Development's (HUD) Community Development Block Grant (CDBG) - Disaster Recovery Initiative (DRI) program provides flexible grants to help cities, counties, and States recover from Presidentially-declared disasters, especially in low-income areas. Since it can fund a broader range of recovery activities than most other programs, the DRI helps communities and neighborhoods that otherwise might not recover due to limited resources.

In response to disasters, Congress may appropriate additional funding for the CDBG and HOME programs as Disaster Recovery grants to rebuild the affected areas and provide crucial seed money to start the recovery process. Last year, South Carolina received \$157 million dollars for flood relief in the Columbia region. Disaster Recovery grants often supplement disaster programs of the Federal Emergency Management Agency, the Small Business Administration, and the U.S. Army Corps of Engineers. In addition, HOME Disaster Recovery grants can provide an important resource for providing affordable housing to disaster victims.

CDBG Disaster Recovery funds are made available to States, units of general local governments, Indian tribes, and insular areas designated by the President of the United States as disaster areas. These communities must have significant unmet recovery needs and the capacity to carry out a disaster recovery program (usually these are governments that already receive HOME or Community Development Block Grant allocations).

CDBG Disaster Recovery grants primarily benefit low-income residents in and around communities that have experienced a natural disaster. Generally, grantees must use at least half of Disaster Recovery funds for activities that principally benefit low- and moderate-income persons. These can be either activities in which all or the majority of people who benefit have low or moderate incomes or activities that benefit an area or service group in which at least 51 percent of the populous are of low- and moderate-income.

Grant recipients may use CDBG Disaster Recovery funds for recovery efforts involving housing, economic development, infrastructure and prevention of further damage to affected areas, if such use does not duplicate funding available from the Federal Emergency Management Agency, the Small Business Administration, and the US Army Corps of Engineers. Examples of these activities include:

- buying damaged properties in a flood plain and relocating residents to safer areas
- relocation payments for people and businesses displaced by the disaster
- debris removal not covered by FEMA
- rehabilitation of homes and buildings damaged by the disaster
- buying, constructing, or rehabilitating public facilities such as streets, neighborhood centers, and water, sewer and drainage systems
- code enforcement

- homeownership activities such as down payment assistance, interest rate subsidies and loan guarantees for disaster victims
- foreclosure loan assistance
- public services (generally limited to no more than 15 percent of the grant)
- helping businesses retain or create jobs in disaster impacted areas
- planning and administration costs (limited to no more than 20 percent of the grant)

HUD notifies eligible governments, which must then develop and submit an Action Plan for Disaster Recovery before receiving DRI grants. The Action Plan must describe the needs, strategies, and projected uses of the Disaster Recovery funds.

Certified Local Government (CLG) Grants are available for historic preservation through the State Historic Preservation Office (SHPO) which is part of the South Carolina Department of Archives and History (SCDAH). Although the funding for this program is administered by state, the funding is allocated by the U.S. Department of the Interior. Ten percent of the total federal appropriation to the State Historic Preservation Office is awarded annually to Certified Local Governments (CLGs). At this time, neither Lancaster County nor any municipalities within Lancaster County are CLGs. Only Certified Local Governments are eligible for this funding source. The grants can be used for projects related to historic structures and preservation, and requires matching funds (50/50 share) with awards generally ranging from \$1,500 to \$25,000. Historic Preservation projects often overlap with hazard mitigation efforts and include Identifying, Recording and Recognizing Historic Properties; Planning for Historic Districts and Multiple Historic Properties; Building Stabilization Projects; Planning for Individual Historic Properties; Preservation Education; and Strengthening Local Government Historic Preservation Programs.

The SHPO also administers the State Development ("Bricks and Mortar") Grants which can be used for stabilizing historic buildings and structures, or protecting historic buildings and structures from the adverse effects of the weather. Eligible applicants include local governments and nonprofit organizations applying for the grants for buildings or structures that are listed in the National Register of Historic Places or eligible for the National Register and have a planned or current public use. The grants are reimbursable, have a 50/50 cost match requirement and generally range from \$5,000 to \$20,000. The SHPO's website is located at <http://scdah.sc.gov/>.

SECTION - 2

HAZARD

IDENTIFICATION

I. Hazard Identification - Introduction

Lancaster County performed a Hazard Identification Analysis to determine the hazards the County faces. To perform this process, existing sources of hazard frequency data were researched including South Carolina Emergency Management Division's State of South Carolina Hazards Assessment, University of South Carolina's 2013 Hazard Assessment Profile, South Carolina Department of Natural Resources - South Carolina State Climatology Office, State Climate Office of North Carolina, Flood Insurance Rate Maps (FIRMs), FEMA publications, Department of Agriculture Forest Service wildfire risk maps, USGS earthquake and landslide risk maps, State of South Carolina erosion information, data from the South Carolina Forestry Commission (SCFA), the National Oceanographic and Atmospheric Administration (NOAA), and wind and climatic data. Additionally, historical hazard events were researched through news publications as well as state and federal agency information provided on the internet to determine their effects on the County and their probability of recurrence. Finally, flood insurance policy information was obtained from the state. The Hazard Identification process was used to identify those hazards that pose the greatest risk to the County and warrant further analysis through the vulnerability assessment.

In addition to natural hazards, this Hazard Identification also includes an overview of the man-made hazards that Lancaster County faces from day to day. Technological hazards, such as dam failures, water/sewer system disruption, hazardous material releases, power system failures, train derailments, or infrastructure failures are not always weather-related, but they can all pose similar and significant risks to the population of the county. It is also not uncommon for natural weather-related events to interfere with the operation of man-made equipment or facilities and cause a hazardous incident to occur. When combined in this manner, these two categories of hazardous events can place great stress on the agencies and individuals involved in their mitigation.

Climate Change

Despite debate about the cause, evidence shows that Earth is undergoing a climate change. For millions of years, the planet has been subject to regular naturally occurring cycles of temperature fluctuation, but in the past 250 years, a great deal of consensus exists that humans may have exacerbated the effects of these cycles. Human practices may not be solely responsible for climate change, its effects on society, the environment and life on the planet as we know it, but greater scrutiny is placed on them as these changes continue to occur.

Milankovitch Cycles are natural cycles that describe Earth's tilt in relation to the sun and, as a result, the warmth of the planet. The closer a part of the planet is to the sun, the warmer it becomes; the farther away from the sun it is, the cooler it becomes. Milankovitch Cycles also take into account the shape of the planet's orbit; the more elliptical the orbit, the less time spent close to the sun, decreasing surface temperatures. The sun also goes through eleven year solar radiation cycles due to

changes in the number of sunspots present on its surface. Greater solar radiation from more sunspots leads to higher temperatures and interference with weather patterns.

In addition to these natural cycles, industrial and societal expansion has been artificially increasing naturally occurring greenhouse gases such as methane, carbon dioxide, and nitrous oxide since the mid-eighteenth century. If the rising global temperatures were brought about because of increased solar radiation alone, the upper levels of the atmosphere would be warmed before the lower levels, unlike the case today. According to NASA, since 1980, temperatures in the upper atmosphere have actually decreased in response to a decreased number of sunspots. In the lower atmosphere however, temperatures are rising in relation to increased greenhouse gases.

In Lancaster County, severe weather events have been increasing since 1950. Using records from 1854 onward including NOAA data to group weather events by decade, it was found that the frequency of flooding, hail storm, ice storm, thunderstorm, and winter storm events has increased, coinciding with increasing average temperatures across the country. Interestingly, in the decade of 2000-2009, there were 95 total severe weather events. From 2010 to July 2015, there have been 75 severe weather events. Only halfway through the current decade, the number of events is nearly 80% that of the whole previous decade.

Increasing temperatures, the driving force behind changing weather patterns, have coincided with increased reported severe weather events. If this trend continues, the county will face more severe weather in the future. These conclusions have been made with the understanding that unreported severe weather events in the past could artificially intensify the positive correlation between temperature and severe weather. Still, industry, population, and thru-county traffic continue to grow and the effects of more severe weather bring greater risk to life, property, and economy in Lancaster County.

II. Heavy Precipitation

Precipitation is an ordinary natural event, however; precipitation falling at a rate of .30 inches or greater per hour or greater than 2 inches in 24 hours is considered excessive or heavy precipitation. Heavy precipitation may be a result of a winter storm, severe thunderstorms, hurricanes, tropical storms, tropical depressions, and nor'easters.

Excessive rainfall can produce a flash flooding hazard, which can quickly endanger both life and property. Flooding may also result from the accumulation of heavy rainfall over an extended period of time. The possibility for flash flooding is particularly hazardous in the piedmont region as it consists of rolling hills and valleys where rapid runoff can occur from the steep slopes. Urban areas are also at risk for local flooding, as hard, impermeable surfaces like concrete do not allow rainwater to be absorbed into the ground.

Hurricanes, tropical storms, tropical depressions, and nor'easters by definition bring heavy rainfalls which can cause significant damage. While Lancaster County is not susceptible to the storm surge as coastal counties may be, we are absolutely at risk for long durations of heavy precipitation. In the northern panhandle of the county especially, rapid and expansive residential development has urbanized the geography and altered natural runoff patterns. This change potentially brings increased flooding risk to a greater area. For the purpose of simplifying this plan, we will make the assumption that all severe thunderstorms, hurricanes, tropical storms, tropical depressions, and nor'easters will all be accompanied by heavy precipitation and it will not be further analyzed in this plan.

III. High Wind

High Winds are sustained wind speeds of 40 mph or greater lasting for 1 hour or longer, or winds of 58 mph or greater for any duration. **A high wind watch** is issued when high wind conditions are expected to develop in the next 12 to 36 hours. Sometimes it will be issued late in the first forecast period - 6 to 12 hours - if the potential for high wind exists but there is some uncertainty. High wind advisories in South Carolina are normally included as part of some other watch or warning such as severe thunderstorm, nor'easters, tropical storm, or tropical depressions.

A microburst is a localized column of sinking air, producing damaging divergent and straight-line winds at the surface that are similar to, but distinguishable from, tornadoes, which generally have convergent damage. A microburst will typically have an affected outflow area of less than 2½ miles wide and peak winds lasting less than 5 minutes. A microburst may induce dangerous horizontal/vertical wind shears, which can adversely affect aircraft performance and cause property damage.

A distinction can be made between a wet microburst which consists of precipitation and a dry microburst which consists of virga, or wisps of precipitation falling from a cloud but evaporating before reaching the ground. They generally are formed by precipitation-cooled air rushing to the surface, but could also be powered from the high speed winds of the jet stream deflected to the surface in a thunderstorm. Microbursts are recognized as capable of generating wind speeds higher than 168 mph.

Macrobursts are also possible in certain storm systems. A macroburst is a convective downdraft with an affected outflow area of at least 2½ miles wide and peak winds lasting between 5 and 20 minutes. Intense macrobursts may cause tornado-force damage of up to F3 intensity.

Hurricanes, tropical storms, tropical depressions, and nor'easters by definition bring high winds which can cause significant damage. These systems, with winds from 39 miles per hour and exceeding 155 miles per hour, should all include the hazard of high winds when considering their potential destructive power.

IV. Tropical Cyclones

Hurricanes, tropical storms and tropical depressions are all tropical cyclones which are defined by the National Weather Service's National Hurricane Center (NHC) as warm-core non-frontal synoptic-scale cyclones, originating over tropical or subtropical waters, with organized deep convection and a closed surface wind circulation about a well-defined center. According to the NHC, once they have formed, tropical cyclones maintain themselves by extracting heat energy from the ocean at high temperatures and releasing heat at the low temperatures of the upper troposphere. Hurricanes and tropical storms bring heavy rainfalls, storm surge, and high winds, all of which can cause significant damage. These storms can last for several days, and therefore have the potential to cause sustained flooding, high wind, and erosion conditions. These types of storms are classified by the National Weather Service using the Saffir-Simpson Hurricane Scale, which uses wind speed and barometric pressure data to predict potential property damage and flood levels. Table 2-1 illustrates the Saffir-Simpson scale.

CATEGORY	SUSTAINED WIND SPEED (MPH)	SURGE (FT)	PRESSURE (Mb)	TYPICAL DAMAGE
Tropical Depression	<39	-	-	
Tropical Storm	39-73	-	-	
Hurricane 1	74-95	4-5	> 980	Minimal
Hurricane 2	96-110	6-8	965-980	Moderate
Hurricane 3	111-130	9-12	945-965	Extensive Damage
Hurricane 4	131-155	13-18	920-945	Extreme Damage
Hurricane 5	> 155	> 18	< 920	Catastrophic Damage

Minimal	Moderate	Extensive Damage	Extreme Damage	Catastrophic Damage
Damage is done primarily to shrubbery and trees, unanchored manufactured homes are damaged, some signs are damaged, no real damage is done to structures on permanent foundations.	Some trees are toppled, some roof coverings are damaged, and major damage is done to manufactured homes.	Large trees are toppled, some structural damage is done to roofs, manufactured homes are destroyed, and structural damage is done to small homes and utility buildings.	Extensive damage is done to roofs, windows, and doors; roof systems on small buildings completely fail some curtain walls fail.	Roof damage is considerable and widespread, window and door damage is severe, there are extensive glass failures, some buildings fail completely.

Table 2-1. Saffir-Simpson Scale and Typical Damages

Nor'easters are extratropical storms occurring during the period from late fall to early spring that affect the east coast of the U.S. Low pressure systems develop off the east coast that lead to storms that bring strong northeast winds and heavy rains/precipitation. Although nor'easters' winds might be less intense than that of hurricanes, nor'easters can hover for several days over a given area. This kind of long duration storm allows larger accumulations of precipitation as well as more damage to structures as they are exposed to wind and flooding for long periods of time. These types of storms are so massive they affect all jurisdictions within the entire county equally.

A. Past Occurrences of Tropical Cyclones

A search of historical records show Lancaster County has been affected by at least 39 hurricanes, tropical storms, tropical depressions, and/or sub-tropical storms since 1854. Table 2-2 shows the number and types of storms that passed directly over Lancaster County from 1850 through 2016. Local newspapers archives, Monthly Weather Review archives, Stormpulse.com, National Hurricane Center, and other sources were drawn on to complete this record.

Hurricanes that pass in relatively close proximity to Lancaster County can also have an impact upon Lancaster County. Therefore, an analysis of storms passing through or within 50 miles of the County was also performed. These storms are listed in Table 2-3.

Tropical Cyclones Passing Directly over Lancaster County Since 1854	
1	Hurricanes
6	Tropical Storms
3	Tropical Depressions
Table 2-2	

Tropical Cyclones within 50 Miles of Lancaster County	
3	Hurricanes
23	Tropical Storms
Table 2-3	

The following storm events are those that affected Lancaster County and could be verified by at least two sources.

Storm Name	Date	Classification
Number 2	9/9/1854	Hurricane/T.S.
Number 5	9/16/1859	Hurricane/T.S.
	10/4/1877	Tropical Storm
	9/12/1878	Tropical Storm
	9/10/1882	Hurricane/T.S.
Number 2	9/11/1882	Hurricane/T.S.
	10/12/1885	Tropical Storm
	6/22/1886	Tropical Storm
	7/1/1886	Tropical Storm
	10/20/1887	Tropical Storm
	9/10/1888	Tropical Storm
Number 6	9/24/1889	Hurricane/T.S.
Number 6	8/28/1893	Hurricane
	10/4/1893	Tropical Storm
	9/29/1896	Hurricane
Number 1	6/15/1902 - 6/16/1902	Tropical Storm
	9/14/1904	Tropical Storm
	10/23/1908	Tropical Storm
	8/30/1911	Tropical Storm
	6/14/1912	Tropical Storm
Number 1	8/3/1915	Tropical Storm
	10/3/1927	Tropical Storm
	8/11/1928	Tropical Storm
	10/22/1929	Tropical Storm
	9/5/1935	Tropical Storm
Number 5	10/8/1946 - 10/9/1946	Tropical Storm
Able	8/31/1952	Hurricane
Gracie	9/30/1959	Hurricane
Cleo	8/30/1964	Hurricane/T.S.
Alma	5/26/1970	Hurricane/T.D.
Babe	9/8/1977	Hurricane/T.D.
David	9/5/1979	Hurricane
Bob	7/25/1985	Hurricane
Chris	8/28/1988	Tropical Storm
Hugo	9/22/1989	Hurricane
Marco	10/12/1990	Tropical Storm
Danny	7/19/1997 - 7/20/1997	Hurricane
Alberto	6/14/2006	Tropical Storm
Fay	8/21/2008 - 8/26/2008	Tropical Storm

Hurricane Hugo – September 22, 1989

Hugo had a lasting and devastating effect on Lancaster County. Thousands of citizens were without power, many for weeks after the storm. Schools and businesses were shut down and commodities such as canned foods, gasoline, batteries, and ice were in short supply. Damage to tree crops, electrical utilities, and structures was extensive as this was the most intense storm of recent memory.

Hurricane Hugo formed over the eastern Atlantic near the Cape Verde Islands on September 9, 1989. Hugo moved thousands of miles across the Atlantic, rapidly strengthening to briefly attain category 5 hurricane strength. It later crossed over Guadeloupe and St. Croix on September 17 as a category 4 hurricane. Weakening slightly more, Hurricane Hugo passed over Puerto Rico as a strong category 3 hurricane. Further weakening occurred several hours after re-emerging into the Atlantic, becoming downgraded to a category 2 hurricane. Hurricane Hugo re-strengthened into a category 4 hurricane before making landfall in South Carolina on September 22.

In Lancaster County, Hugo wreaked havoc on both the manmade and natural environments. Data from the National Hurricane Center and the National Weather Service indicates that winds in Lancaster County reached an estimated speed of over 80 miles per hour. According to a New York Times article from November 12, 1989, over 8,000 homes were damaged in the county. USDA Forest Service data shows that Lancaster County lost 35% of its softwood timber inventory, over double that of the 14% loss over the entire state of South Carolina. Crop and property losses in Lancaster County exceeded \$100 million.

B. Future Probabilities of Hurricanes, Tropical Storms, and Tropical Depressions

In order to estimate the frequency of occurrence, the number of hurricanes is compared to the length of the period of record which is from 1850-2015. The recurrence interval is defined from this information and is a rough estimate of the amount of time, on average, during which one occurrence of a given storm will take place. It is important to note that in reality, a storm can occur multiple times during one recurrence interval, and that the recurrence interval is only an estimated average time period. Recurrence intervals for hurricanes and tropical storms within and in the vicinity of Lancaster County are presented in Table 2-4.

STORM TYPE	NUMBER OF OCCURRENCES WITH CENTER OF STORM TRACK WITHIN 50 MILES OF LANCASTER COUNTY	RECURRENT INTERVAL (years)	Chance per Year of Recurrence	NUMBER OF OCCURRENCES WITH CENTER OF STORM TRACK IN LANCASTER COUNTY	RECURRENT INTERVAL (years)	Chance per Year of Recurrence
HURRICANE	3	55	1.8%	1	165	.6%
TROPICAL STORM	23	7	14%	6	28	4%
TROPICAL DEPRESSION	2	82	1%	1	165	.6%

Table 2-4

The average number of tropical cyclones, including hurricanes, has been following a slight decreasing trend since the beginning of the records used for this document. While the decade between 1880 and 1889 saw a large number of tropical events, the trend is still decreasing if data from this decade is excluded. Figure 2-1 shows this trend with data from all years included.

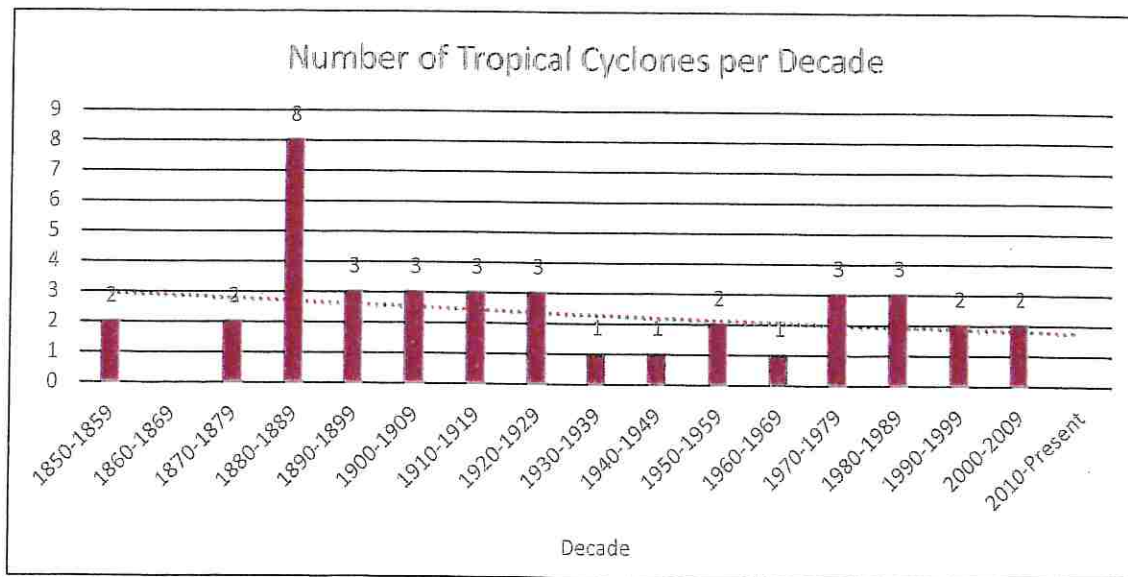


Figure 2-1

V. Severe Thunderstorms

Severe thunderstorms are defined by the National Weather Service as storms that have wind speeds of 58 miles per hour or higher, produce hail at least one inch in diameter, or produce tornadoes. In order to form, thunderstorms simply require moisture to form clouds and rain, coupled with an unstable mass of warm air that can rise rapidly.

Thunderstorms affect relatively small areas when compared with hurricanes and winter storms, as the average storm is 15 miles in diameter and lasts an average of 30 minutes. Nearly 1,800 thunderstorms are occurring at any moment around the world, however, of the estimated 100,000 thunderstorms that occur year in the United States only about 10 percent are classified as severe.

Thunderstorms are most likely to happen in the spring and summer months and during the afternoon and evening hours, but can occur year-round and at all hours. Despite their small size, all thunderstorms are dangerous and capable of threatening life and property in localized areas. Every thunderstorm produces lightning, which results from the buildup and discharge of electrical energy between positively and negatively charged areas. Each year, lightning is responsible for an average of 93 deaths (more than tornadoes), 300 injuries, and several hundred million dollars in damage to property and forests.

A. Past Occurrences of Severe Thunderstorms

Thunderstorms are fairly common in South Carolina, and severe storms bring increased risk to property and life. According to National Oceanic and Atmospheric Administration's (NOAA) National Environmental Satellite Data and Information Service's (NESDIS) National Climatic Data Center (NCDC), there have been 138 severe thunderstorm events reported in Lancaster County between January 1, 1950 and May 2, 2016. These storms resulted in \$2,351,500 in property damages, \$150,000 of crop damages, and 12 injuries and no deaths. The average hail size for these events was 1.17" and the maximum hail size was 2.75" in May 2014. The average wind speed for these storms was 43.7 mph with a maximum of 90 mph in June 2008.

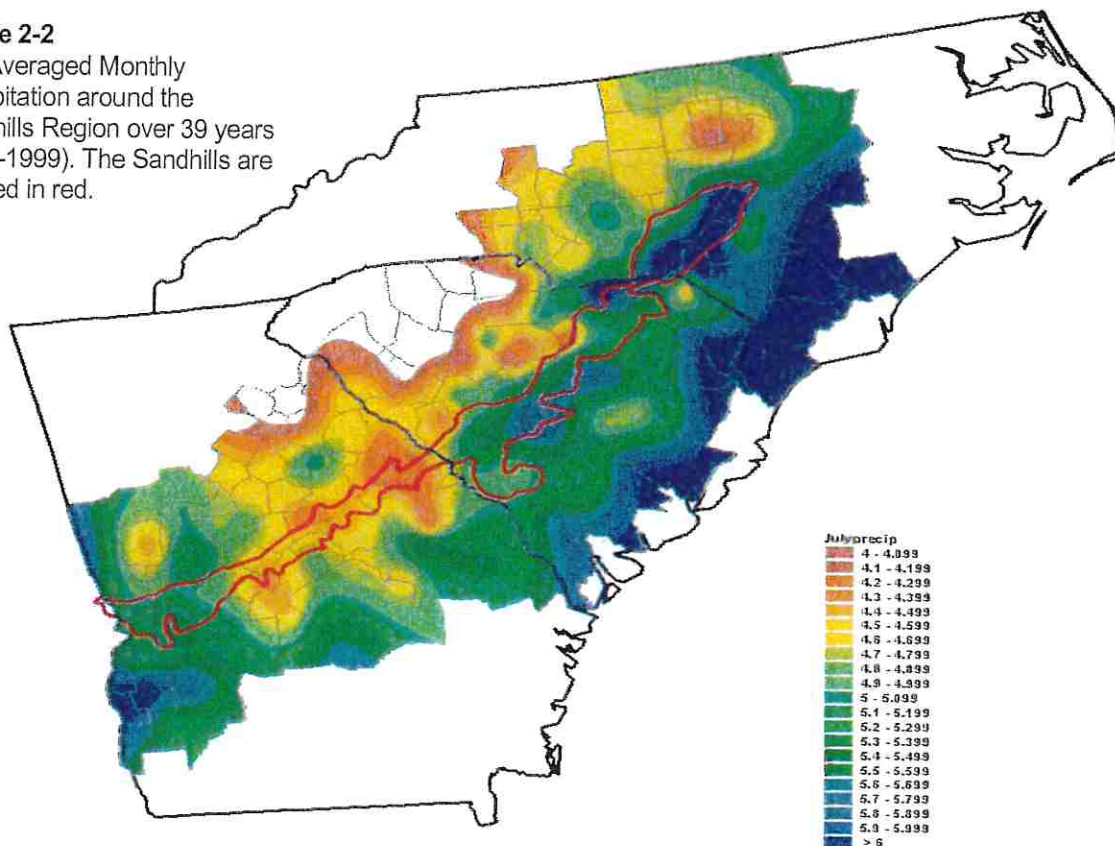
While this is the most comprehensive list of storm events used for this plan, there may be some inaccuracy based on a lack of adequate reporting in earlier years. For example, from 1950 to 1990, there were only 22 severe thunderstorms reported. There were no severe thunderstorms reported from 1950 to 1960. Despite a general increase in the number of severe weather events the past few decades, these low numbers in earlier years can most likely be attributed to poor reporting techniques at the time or a lack of historic record from which to draw data. Over the past five years, however, there have been an average of nine severe thunderstorms per year, nearly all of which caused thousands of dollars in damage.

B. Future Probabilities of Severe Thunderstorms

According to the State Climate Office of North Carolina thunderstorms occur more frequently in the Sandhills Region of North and South Carolina. The Carolina and Georgia Sandhills region of the Southeast is an elongated area of sandy soil that is located adjacent to regions of varying soil type. (See Figure 2-2) The Piedmont area to the northeast has soils that are mainly loam and clay-loam, while a variety of soil types exists in the Coastal Plain to the southeast. It is the differences in these soil types that create differential heating of the ground surface. The sandy soil regions allow an easier release of moisture into the air and, since the sandy soil absorbs less heat than the loamy or clay soils, solar heat energy heats the ground itself more than it evaporates the moisture from the ground. In short, given the same amount of energy, sandy soil would increase in temperature more than the loam or clay soils.

Figure 2-2

July Averaged Monthly Precipitation around the Sandhills Region over 39 years (1960-1999). The Sandhills are outlined in red.



These differential surface heating patterns create mesoscale circulations, causing clouds to form. Eventually, if conditions are right, thunderstorms will also form along the boundaries of these areas. By examining climatological precipitation in this and surrounding areas, the effects of the Sandhills region topography can be investigated. A period of 40 years was used to average the precipitation for 120 stations located within 50 miles of the Sandhills. Because surface heating is greatest during the summer months, these months are of most interest. Rainfall during the summer in the

Carolinas and Georgia is mainly the result of thunderstorm activity, so any increase in activity would be more clearly seen during this season. Lancaster County's southern and eastern borders are along the area defined as the Sandhills.

Climate change is also affecting surface heating in that, due to a generally warmer atmosphere, there is less heating required at the ground level to reach temperatures required for thunderstorm formation. As global temperatures continue to rise, it can be expected that the number of thunderstorms each year will rise in correlation.

Based on the frequency of past events, the occurrence of future events can be predicted. In order to estimate the frequency of occurrence, the number of severe thunderstorms is compared to the length of record which is from 1950-2016. The recurrence interval is derived from this information and is a rough estimate of the amount of time, on average, during which one occurrence of a given storm will take place. It is important to note that in reality, a storm can occur multiple times during one recurrence interval, and that the recurrence interval is only an estimated average time period. Recurrence intervals for severe thunderstorms within and in the vicinity of Lancaster County are presented in Table 2-5.

THUNDERSTORMS			
NUMBER OF EVENTS	YEARS IN HISTORY	Recurrence Interval (Years)	Hazard Frequency (Percent Chance per Year)
138	66	.48	209%
<i>Percentages greater than 100% indicate hazard can be expected to occur more than once per year. Data collected from January 1950-June 30, 2016.</i>			
Table 2-5			

Since the last update of this plan in 2015, there have been an additional 5 severe thunderstorms reported, bringing the total number of storms up to 138 from January 1950 to June 30, 2016. Since 1960, there have also been 60 hail-producing events that include some of these thunderstorms. These storms resulted in 12 injuries and \$2,351,500 in property damage and \$150,000 in crop damage, a total of \$2,501,500 of economic loss in Lancaster County over the course of 66 years due to severe thunderstorms.

Figures 2-3 and 2-4 show the distribution of when in the year and during the day past severe thunderstorms have occurred. Severe thunderstorms can and do occur throughout all of Lancaster County including all jurisdictions and municipalities and therefore should be expected to continue occurring in all areas of the county in the future.

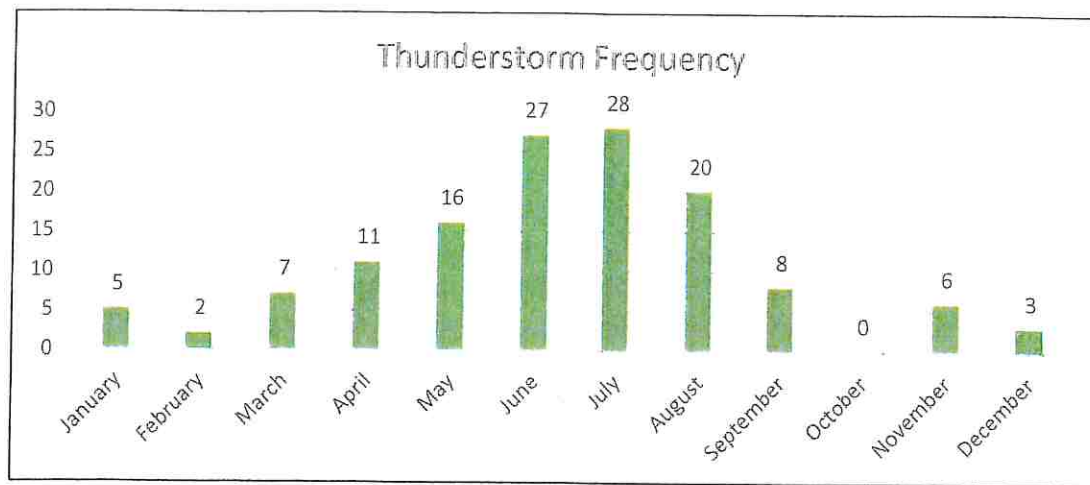


Figure 2-3

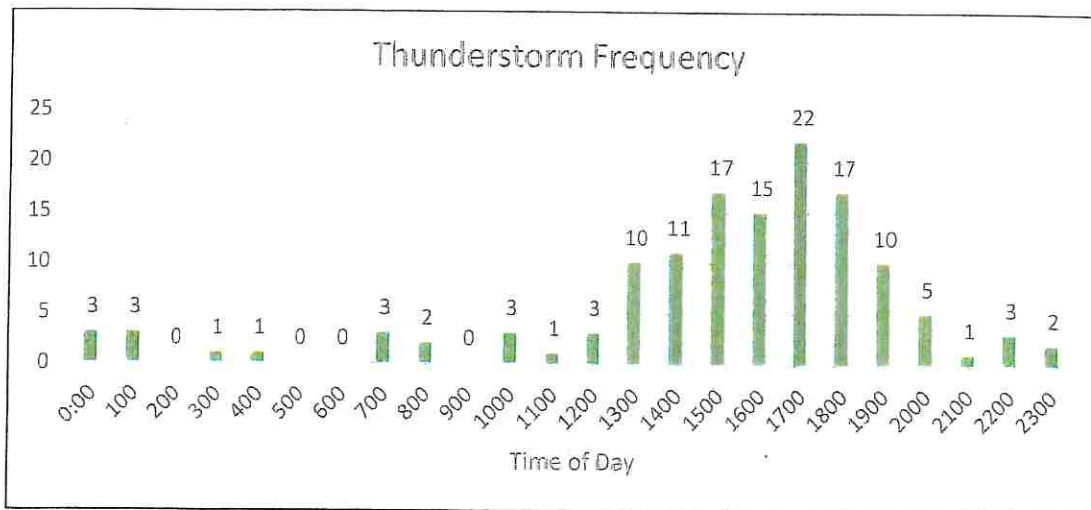


Figure 2-4

VI. Tornadoes

A tornado is a violent windstorm characterized by a twisting, funnel-shaped cloud extending to the ground. It is most often generated by a thunderstorm (but sometimes result from hurricanes) and produced when cool, dry air intersects and overrides a layer of warm, moist air forcing the warm air to rise rapidly. The damage from a tornado is a result of the high wind velocity and wind-blown debris, although they are commonly accompanied by large hail as well. The most violent tornadoes have rotating winds of 250 miles per hour or more and are capable of causing extreme destruction.

Most tornadoes are just a few dozen yards wide and touch down only briefly, but highly destructive tornadoes may carve out a path over a mile wide and several miles long. The destruction caused by tornadoes may range from light to inconceivable depending on the intensity, size and duration of the storm. Typically, tornadoes cause the

greatest damage to structures of light construction, such as residential homes, and are quite localized in impact.

Tornadoes have touched down in South Carolina during every month of the year; however, the most likely months are in the spring, March through May, and later in the fall during September. During spring, tornadoes result from active cold fronts and pre-frontal squall lines. During November and December, it is not uncommon to have active cold fronts and tornadic activity. Tornado frequency reaches a minimum in October and January; only 3% of the totals are experienced during these two months. South Carolina Department of Natural Resources keeps track of tornado statistics for the state the following graphs are from the DNR website using this data. For monthly tornado distribution see figure 2-5.

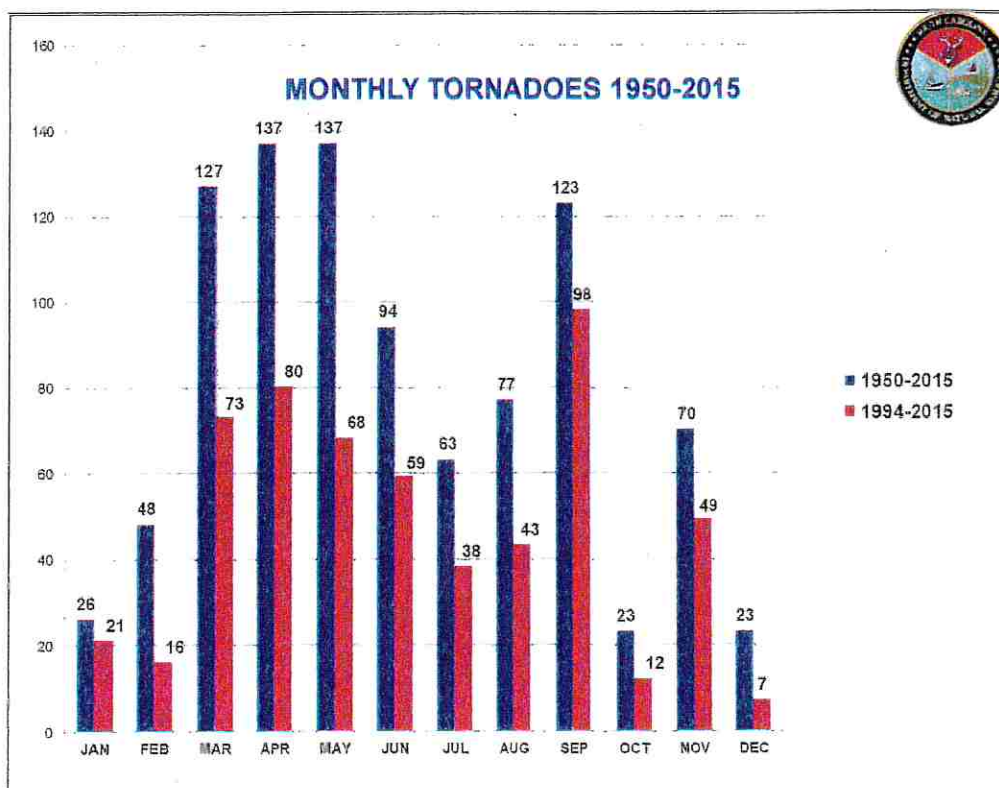


Figure 2-5

Tornadoes in South Carolina can also touch down at any time during the day or night. Figure 2-6 shows tornadoes are more likely to touchdown during the afternoon and early evening; but, tornadoes can also touch down late at night and during the early morning hours. These tornadoes in particular are more dangerous because most people are likely asleep and not able to hear television or radio warnings; and, even if awake, would not be able to see the tornadoes in the darkness.

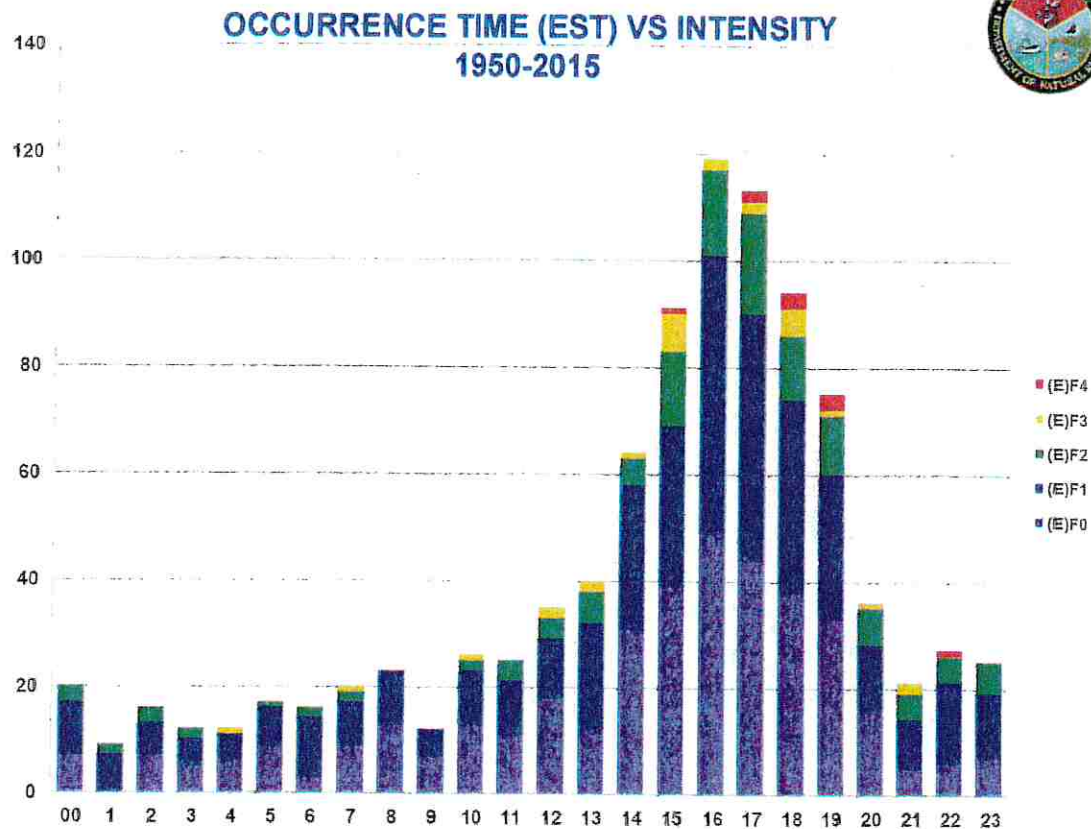


Figure 2-6

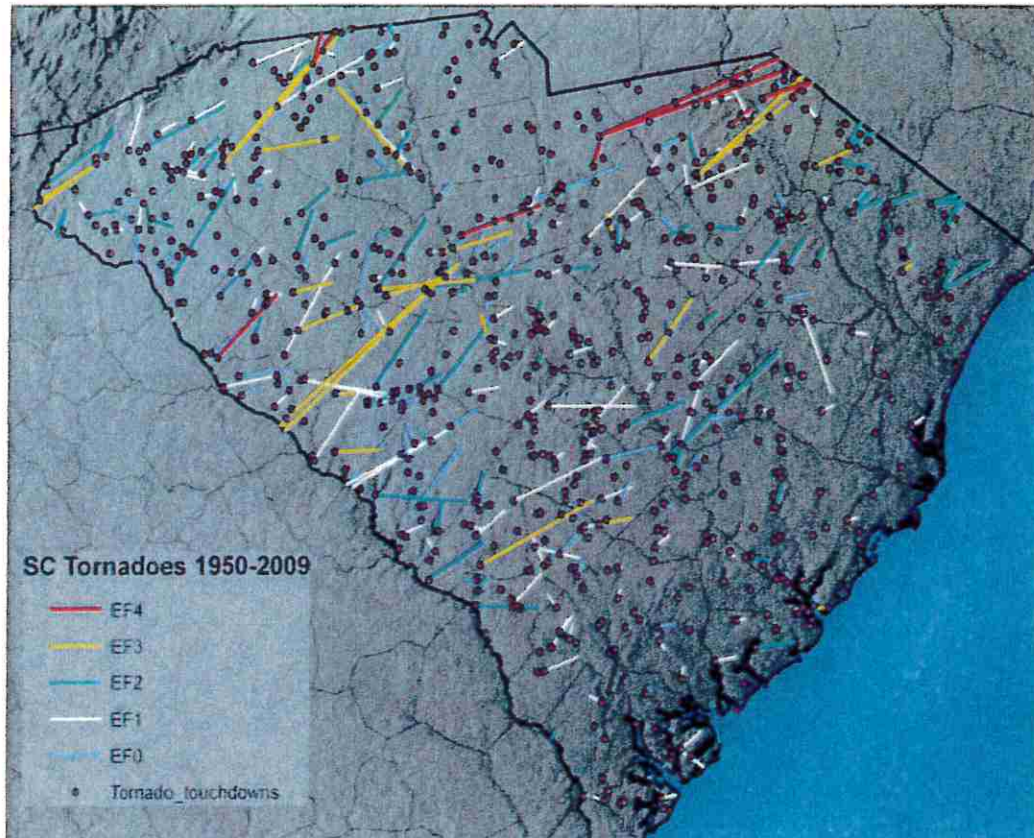
Tornado spotting and reporting methods have changed a lot over the last several decades. Plus, official tornado records only date back to 1950, therefore we do not know the actual average number of tornadoes that occur each year. It is estimated about 1,000 tornadoes hit the U.S. annually.

The largest and most devastating tornado outbreak to affect South Carolina during the last century occurred on March 28, 1984. The outbreak produced 22 tornadoes that killed 57 people, 42 in North Carolina and 15 in South Carolina, and injured another 1,248. The first tornado to strike produced F4 damage as it moved northeast into Scotland County, NC from Marlboro County, SC. around 6:15 p.m. Seven people were killed in Marlboro County, SC. Roughly a third of the victims were in mobile homes. The damage reached \$200 million. (Data from www.weather.com)

A. Historical Occurrences

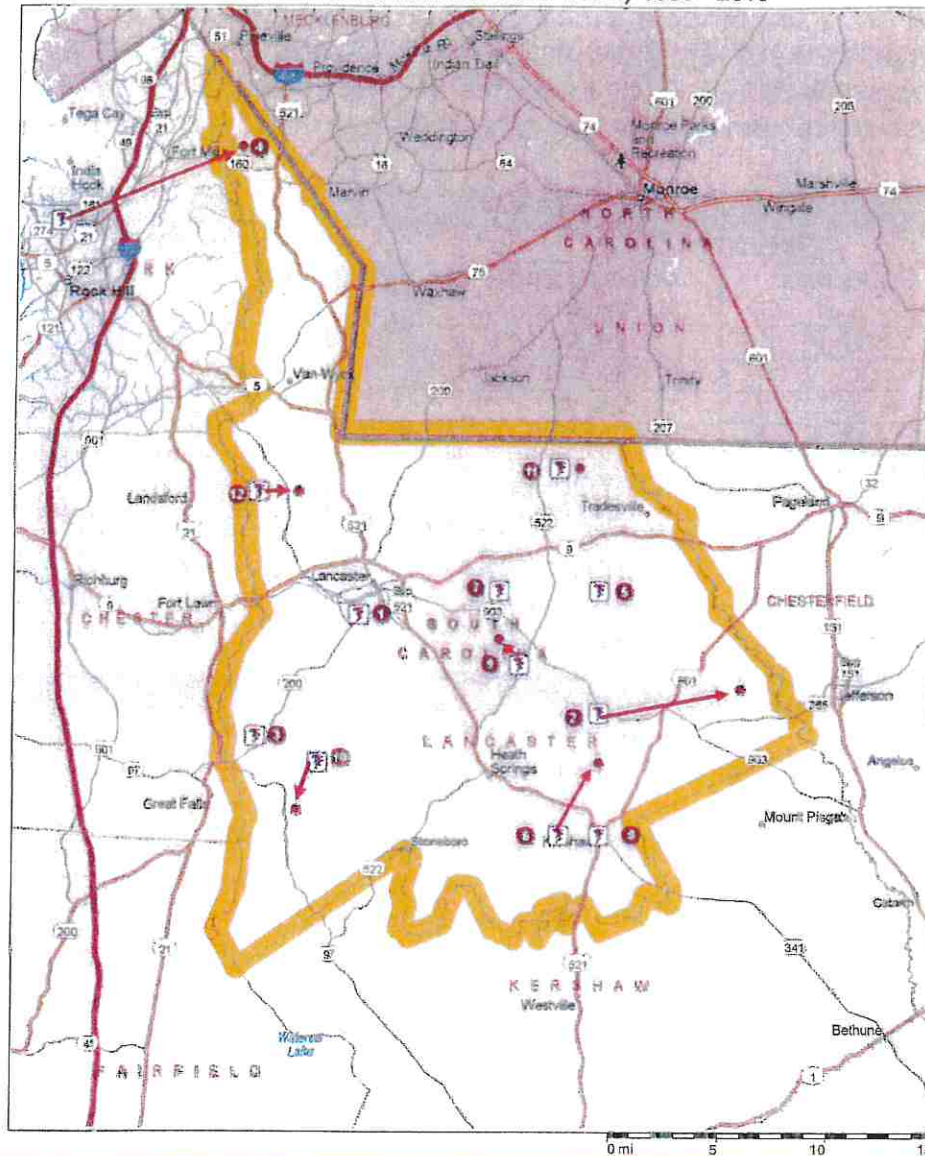
There were 670 confirmed tornado touchdown events in South Carolina between 1950 and 2001 according to the USC Hazards Lab that resulted in 72 deaths and 1,842 injuries. Typically, South Carolina tornadoes are less severe than in other parts of the country.

According to information gathered from the National Climatic Data Center and other sources, Lancaster County has been subject to 12 tornadoes between January 1, 1950 and August 20, 2010. These events have caused 7 injuries and over \$28,101,000 in property damage. The following map indicates the location of touchdowns. The red arrows indicate the direction of travel if known and the red dots indicate the end of travel if known. The accompanying chart shows 12 historic Lancaster County tornado incidents ranging from EF0 to F4 in intensity.



The following map shows that tornadoes can and do occur in all areas of Lancaster County. No municipality or jurisdiction is immune to the potential destruction of a tornado. The map shows tornadoes listed under both the Fujita and the Enhanced Fujita scales. The magnitude of all tornado occurrences prior to 2007 is recorded using the original Fujita Tornado Damage Scale. Table 2-6 describes the Enhanced Fujita (EF) Scale used today.

Tornado Touchdowns in Lancaster County 1950 - 2010



Tornado	Date	Time	Magnitude	Injuries	Damage
1	4/5/1957	8:30 PM EST	F1	0	\$250K
2	4/8/1957	5:00 PM EST	F4	0	\$250K
3	10/1/1969	11:45 PM EST	F0	0	0
4	3/24/1975	12:15 PM EST	F1	1	Unknown
5	3/4/1977	12:20 PM EST	F1	0	\$25K
6	3/28/1984	6:25 PM EST	F4	5	\$25.0M
7	6/16/1989	5:15 PM EST	F1	1	\$2.5M
8	9/22/1989	12:45 AM EST	F1	0	\$3K
9	9/7/2004	9:40 AM EST	F1	0	0
10	3/4/2008	4:42 PM EST	EF0	0	0
11	7/12/2010	1:57 PM EST	EF0	0	\$65K
12	7/12/2010	3:12 PM EST	EF0	0	\$8K

Dr. T. Theodore Fujita developed a damage scale (Fujita 1971, Fujita and Pearson 1973) for winds, including tornadoes, which was supposed to relate the degree of damage to the intensity of the wind. As of 2007 the original F-scale was abandoned and was replaced by an enhanced version. The Enhanced F-scale is a much more precise and robust way to assess tornado damage than the original F-scale.

ENHANCED FUJITA SCALE			
DERIVED EF SCALE		OPERATIONAL EF SCALE	
EF Number	3 Second Gust (mph)	EF Number	3 Second Gust (mph)
0	65-85	0	65-85
1	86-109	1	86-110
2	110-137	2	111-135
3	138-167	3	136-165
4	168-199	4	166-200
5	200-234	5	Over 200
*** IMPORTANT NOTE ABOUT ENHANCED F-SCALE WINDS: <i>The Enhanced F-scale still is a set of wind estimates (not measurements) based on damage. These estimates vary with height and exposure. Important: The 3 second gust is not the same wind as in standard surface observations. Standard measurements are taken by weather stations in open exposures, using a directly measured, "one minute mile" speed.</i>			

Table 2-6

B. Future Probabilities of Tornadoes

Based on the frequency of past events, the occurrence of future events can be predicted. In order to estimate the frequency of occurrence, the number of tornadoes is compared to the length of the period of record which is from 1950-2015. The recurrence interval is defined from this information and is a rough estimate of the amount of time, on average, during which one occurrence of a given storm will take place. It is important to note that in reality, a storm can occur multiple times during one recurrence interval, and that the recurrence interval is only an estimated average time period. Recurrence intervals for tornadoes within and in the vicinity of Lancaster County are presented in Table 2-7. There have been no tornadoes in the county since 2010. No tornadoes have occurred in Lancaster County over the last 5 years.

TORNADOES			
NUMBER OF EVENTS	YEARS IN HISTORY	Recurrence Interval (Years)	Hazard Frequency (Percent Chance per Year)
12	65	5.42	18.5%
Percentages greater than 100% indicate hazard can be expected to occur more than once per year.			

Table 2-7

VII. Flooding and Flash Floods

Lancaster County is susceptible to both riverine and flash floods. According to information gathered from the National Climate Data Center (NCDC) there is a 75% chance of a flood occurring annually. The NCDC only records 14 flood events for Lancaster County beginning in 2003 through present day. However, Lancaster County has a long history of dealing with flooding. Proof of this can be found in historical data. The newspaper Lancaster Ledger reported "*a great freshet*" or sudden flood and described creeks too high to cross and flooded crops in the September 28, 1859 edition. Also, in 2012, WSOC News reported that over a foot of water flooded SC Highway 522 in Lancaster County.

As with the dangers of rising floodwaters in the event of a dam failure, flash flooding due to heavy precipitation can prove fatal to those caught unprepared or simply in the wrong place in the event of a flood. One of the biggest causes of injury and death during flooding is the actions of pedestrians, motorists, or others when they ignore early warnings, barricading efforts, and evacuation mandates. Even though evacuation and total avoidance of flood waters are the safest course of action, some people do not take heed to these measures and place themselves in great danger, in turn placing emergency responders at great risk when rescues and recoveries have to be performed.

In the interest of alleviating the flooding problems, the U.S. Department of Agriculture's Soil Conservation Service suggested the construction of five reservoir lakes throughout the county to control excess rain runoff. Lancaster County heeded this advice and the flooding became less severe after the lakes were constructed. As the population of the county grew, however, flooding again became a growing issue due to increasing litter and manmade debris entering the system of creeks and streams in the county. This new waste mixed with already present natural debris and clogged waterways caused inundation of floodplains during heavy precipitation once again. Despite numerous cleanup efforts over the years, the litter and debris problem returns and remains a countywide problem. The need for an extensive cleanup effort becomes ever more apparent with each passing heavy precipitation event. The following are examples of heavy precipitation events that cause flooding problems.

1. Past Occurrences

In October of 2015, South Carolina experienced a "thousand year flood" as a result of a unique weather pattern that devastated South Carolina. Over a year later, recovery efforts are still under way. This weather event was preceded by almost five inches of rainfall in the North Carolina Mountains in weeks prior. While much of the mountains were experiencing severe drought, the rainfall filled rivers and basins to capacity. The power companies released water from upstream impoundments to balance the water levels in their locality. This compounded the South Carolina flooding problem.

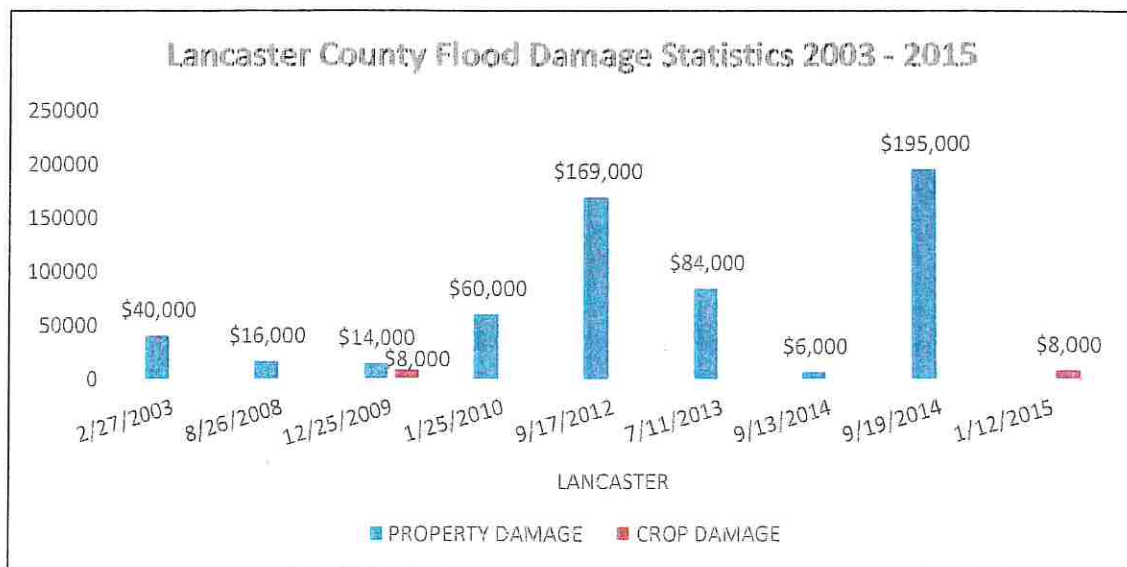
At least sixteen dams breached or failed in the Columbia area, leading to major flooding in a very short amount of time in one of the most heavily populated areas of the state. As a result, many people in the area did not recognize the depth, speed and force of the water. There were 19 deaths as a result of flooding in Columbia, two of

which happened when motorists drove around a barricade and the roadway gave way washing the vehicle away. Locally, there have been witnessed instances of people moving barricades, going around barricades and crossing roadways covered with water. These heighten the relevance of failure to heed the warnings in place to deter traffic. There are documented cases of death due to vehicles attempting to cross washed out roadways prior to barricade placement at both the local and state levels.

Infrastructure failure as a result of flooding presents economic impact and threatens public safety. During the October 2015 flooding, approximately 70 miles of Interstate 95 closed due to flooding according to the SCDOT. The total monetary impact is complex and difficult to compute. Another aspect of economic impact caused by infrastructure failure are those impacts to the adjoining businesses along the routes, which depress local economy. Locally, the greatest hazard caused by infrastructure failure is the impact to public safety response. Roadway closure increases emergency response times and in some cases isolates whole communities.

In conjunction with the significant flooding events in central South Carolina in October 2015, Lancaster County experienced an anomalous increase in rainfall in the fall of 2015. Sustained rainfall events have been occurring in greater frequency and in shorter intervals. This increases the risk for flooding that can damage roads and other infrastructure. Also, when water is added to already full reservoirs, the risk for dam failure increases. During a flood event on September 13, 2014, 1-2 feet of water was reported on several roads in the northern portion of the county.

Historical loss data is indicated in the following chart that plots the losses county-wide due to rainfall.



2. Repetitive Losses

According to NFIP information gathered from FEMA, the unincorporated area of Lancaster County has had seven (7) National Flood Insurance Program (NFIP) claims closed since 1978. These claims total \$170,849.76. The City of Lancaster has had four (4) claims closed during the same time period, totaling \$21,663.68.

Currently, there are 127 flood insurance policies in effect in the unincorporated areas of Lancaster County. The insurance in force in Lancaster County exceeds \$35,000,000.00. There are also 31 flood insurance policies in effect in the City of Lancaster. The total insurance in force within the City limits is in excess of \$9,000,000.

From Lancaster County Floodplain Manager data, the only property listed as a repetitive loss property in either the County or the City is a commercial property that lies in the unincorporated area of Lancaster County. This commercial structure is located in Zone B, C, or X which are areas either outside of the 100-year flood plain, areas of 100-year sheet flow flooding where average depths are less than 1 foot, areas of 100-year stream flooding where the contributing drainage area is less than 1 square mile, or areas protected from the 100-year flood by levees. The flooding was due to a culvert pipe being blocked by storm debris. There were also two residential properties located in unincorporated areas that were subject to flooding, but were not classified as repetitive loss structures. The structures on these residential properties were removed and building future structures on those properties has been prohibited.

3. Future Probabilities

When taking into consideration the possibility of flooding with any heavy precipitation event, it is possible that flooding may occur with any severe thunderstorm or tropical storm. Since the official record for flooding only encompasses 16 years, it may presumably be inconsistent and therefore may not be reliable. With all aspects considered, a safe assumption would seem to be the possibility of a flood event occurring annually would be at least 75%.

The Base Flood is the standard used by most Federal and state agencies, and is used by the National Flood Insurance Program (NFIP) as the standard for floodplain management and to determine the need for flood insurance. The Base Flood Elevation is the height of the base flood, usually in feet, in relation to the National Geodetic Vertical Datum. The 1% annual chance flood (100-year flood), also known as the base flood, is the flood that has a 1% chance of being equaled or exceeded in any given year. The Special Flood Hazard Area is the area subject to flooding by the 1% annual chance flood (See Section 7 Appendix 5 in the 2014 Plan for Flood Insurance Rate Maps [FIRM_{EP11}]). The annual chance of any 100-year flood is 1% while the chance for a 500-year flood is 0.2% for any given year.

VIII. Dam Failure

Dam means any artificial barrier, together with appurtenant works, including but not limited to dams, levees, dikes or floodwalls for the impoundment or diversion of water or other fluids where failure may cause danger to life or property.

Dam failure, in Lancaster County as in other places with dam and reservoir systems, could mean potential disaster for homeowners, land owners, and motorists in close proximity to and downstream of the ruptured dam. Major flooding could wreak havoc on infrastructure in the county and hamper emergency response efforts.

The height of a dam is established with respect to maximum water storage elevation measured from the natural bed of the stream or water course at the downstream toe of the barrier, or if it is not across a stream or water course, the height from the lowest elevation of the outside limit of the barrier, to the maximum water storage elevation.

South Carolina Code of Laws Title 49 Chapter 11 details laws regarding dams and includes the Dams and Reservoirs Safety Act. Dams within the state of South Carolina are regulated by South Carolina Department of Health and Environmental Control (DHEC). The law specifically gives DHEC the power to review plans to construct, repair, alter or remove any dam under its jurisdiction. Additionally, DHEC has the authority to make inspections, call for remedial work, issue permits, cite non-compliance and invoke judicial action. DHEC may take over a dam in the event of an emergency and may make rules and regulations for proper administration of the law.

State law specifically exempts dams that are:

- Less than twenty-five feet in height from the natural bed of the stream or watercourse measured at the downstream toe of the dam, or less than twenty-five feet from the lowest elevation of the outside limit of the dam, if it is not across a stream channel or watercourse, to the maximum water storage elevation and has an impounding capacity at maximum water storage elevation of less than fifty-acre feet unless a situation exists where the hazard potential as determined by DHEC is such that dam failure or improper reservoir operation may cause loss of human life;
- Owned or operated by a department or an agency of the federal government;
- Owned or licensed by the Federal Energy Regulatory Commission, the South Carolina Public Service Authority, the Nuclear Regulatory Commission, the United States Corps of Engineers, or other responsible federal licensing agencies considered appropriate by the department;
- Upon which the Department of Transportation or county or municipal governments have accepted maintenance responsibility for a road or highway where that road or highway is the only danger to life or property with respect to failure of the dam.

The purpose of this law is to provide for the certification and inspection of certain dams in South Carolina in the interest of public health, safety, and welfare in order to reduce the risk of failure of the dams, prevent injuries to persons and damage to property, and confer upon South Carolina Department of Health and Environmental Control the regulatory authority to accomplish the purposes.

In Lancaster County, a vast majority of all the dams are privately owned, including those used to produce hydroelectric power. Easements are in place along downstream waters to allow access for maintenance and inspection duties. All of the dams in the county fall under the jurisdiction of two public watershed boards. Under the guidance of these boards, the Natural Resources Conservation Service, a branch of the U.S. Department of Agriculture, inspects and assesses these dams and makes recommendations for maintenance or repair activities. Specific maintenance and repair activities are the responsibility of the two watershed boards through the property owners.

Dams are classified by size and hazard potential. (Appendix 6) See Table 2-8 Hazard Classification and Table 2-9 Size Classification.

Hazard Classification	
Class	Hazard Potential
I – High Hazard	Dams located where failure will likely cause loss of life or serious damage.
II – Significant Hazard	Dams located where failure will not likely cause loss of life but may damage property.
III – Low Hazard	Dams located where failure may cause minimal property damage.

Table 2-8

Size Classification		
Category	Storage (ac-ft.)	Height (ft.)
Very Small	< 50	< 25
Small	≥ 50 And < 1,000	≥ 25 And < 40
Intermediate	≥ 1,000 And < 50,000	≥ 40 And < 100
Large	≥ 50,000	≥ 100

Table 2-9

A. High Hazard Dams In Lancaster County

In the mid-20th century, Lancaster County built five reservoir lakes under the guidance of the U.S. Department of Agriculture's Soil Conservation Service in response to a growing problem with flooding in the Lancaster City and Kershaw areas. The county then formed the Cane Creek Watershed Board and the Little Lynches Watershed Board to keep the dams of these lakes properly maintained and the public informed about the lakes. In partnership with the Natural Resources Conservation Service and SCDHEC, the two Boards evaluate and maintain the privately owned dams in the systems of the five reservoirs.

	Built	Latitude	Longitude	Elevation
Ghent Dam	1971-1972	34.7717	-80.6692	591 ft.
Parker Reservoir	1972-1973	34.6935	-80.7031	584 ft.
Gill's Creek	1977-1978	34.7359	-80.7126	541 ft.
Little Lynches	1978-1979	34.5523	-80.6079	486 ft.
Bear Creek	1980-1984	34.6827	-80.6881	552 ft.

Table 2-10

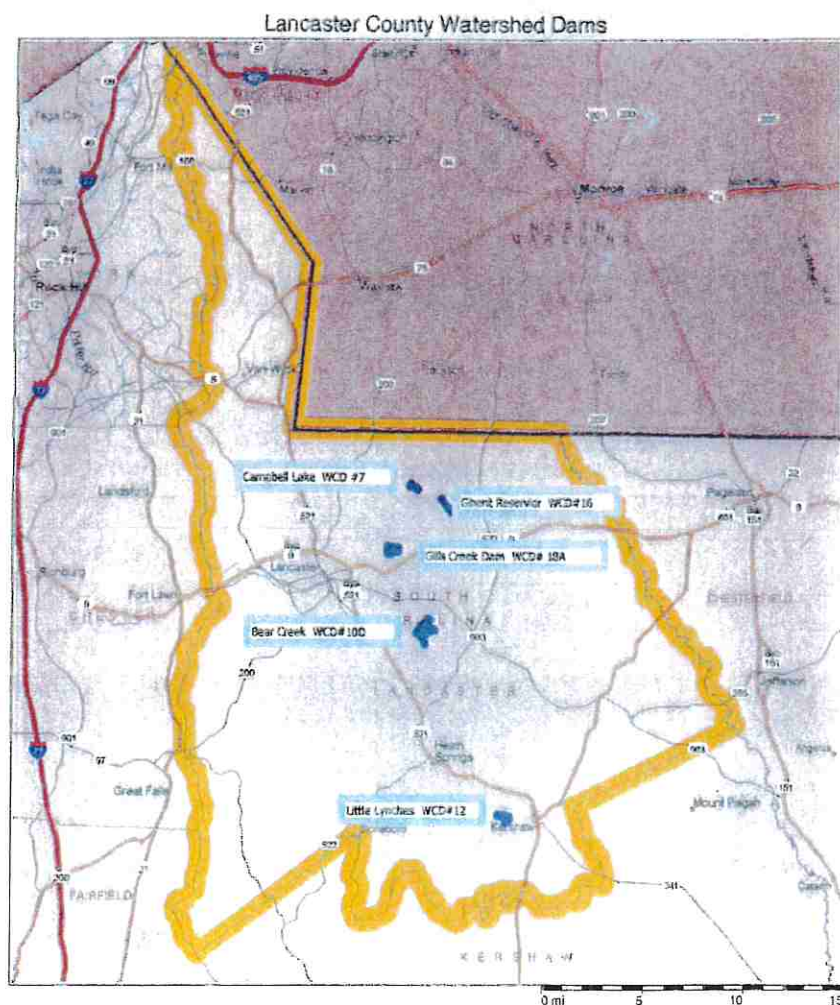


Figure 2-7

B. Cane Creek Watershed

Cane Creek Watershed is located in Lancaster County and consists primarily of Cane Creek and its tributaries. The watershed occupies 90,086 acres of the Piedmont region of South Carolina. Land use/land cover in the watershed includes: 69.6% forested land, 16.9% agricultural land, 9.3% urban land, 3.1% scrub/shrub land, 0.6% water, and 0.5 barren land.

Cane Creek originates in North Carolina and accepts drainage from Simpson Branch, Unity Branch, Flag Pond Branch, McAteer Branch, Sandy Branch, Cedar Pines Lake, and Camp Creek (North Prong, South Prong). Further downstream, the Bear Creek drainage enters Cane Creek.

Bear Creek accepts drainage from Caney Branch and Dry Branch before flowing through the Lancaster Reservoir. Lancaster Reservoir (75 acres) is used for municipal and recreational purposes for the Town of Lancaster. Turkey Quarter Creek (Little Turkey Creek) flows into Bear Creek at the reservoir and further downstream Gills Creek (Hannah's Creek) enters near the Town of Lancaster. Rum Creek drains into Cane Creek near the Town of Fort Lawn. There are a total of 236.4 stream miles and 371.5 acres of lake waters in this watershed.

Lakes & Reservoirs Within the Cane Creek Watershed			
Lake/Reservoir	Normal Pool Acres	Flood Pool Acres	Drainage Area Acres
Campbell Lake / Parker Reservoir	31	181	5,210
Gills Creek	74	327	8,185
Bear Creek	548.5	558	7,807
Joe Ghent	29	82.9	1,883

Table 2-11 a

C. Little Lynches Watershed

The Little Lynches Watershed is located in Lancaster and Kershaw Counties and consists primarily of the Little Lynches River and its tributaries from its origin to Mill Creek. Baskins Creek (Lyles Branch, Falls Branch, and Bend Creek) is joined by Blackmon Branch to form the headwaters of the Little Lynches River. The Little Lynches River accepts drainage from Horton Creek (Little Lynches Creek, Sunrise Lake, Beckham Branch, and Mobley Branch), Mill Creek, Camp Branch, Todd's Branch, Haile Gold Mine Creek (Ledbetter Reservoir), and Ned's Creek. Hanging Rock Creek (Lick Creek) flows past the Town of Kershaw to join the Little Lynches River downstream of Ned's Creek, followed by Gates Ford Branch and Shirley Creek. The watershed occupies 86,935 acres of the Piedmont and Sandhills regions of South Carolina. Little Lynches Watershed is located in south-central Lancaster County and northeastern Kershaw County.

The estimated population of the watershed is 9,600. The towns of Kershaw and Heath Springs are located in this watershed. Land use/land cover in the watershed includes: 58% forested land, 14% cultivated land, 23% pasture and idle land, 5% miscellaneous use land. This watershed is served by U.S. Highway 521, and U.S. Highway 601 as well as South Carolina Highways 903, 157, and 341. The L&C railroad also serves this watershed as it connects the towns of Kershaw, Heath Springs and the City of Lancaster.

Lakes & Reservoirs Within the Little Lynches Watershed			
Lake/Reservoir	Normal Pool Acres	Flood Pool Acres	Drainage Area Acres
Little Lynches	40.5	78.3	2,016

Table 2-11 b

D. Hydro-Electric Dams

There are five hydro-electric dams operated by Duke Energy that would have a direct negative impact on Lancaster County should a failure occur.

1. Mountain Island Hydro-Station is located on the Catawba River approximately three miles north of Mt. Holly, North Carolina. Located 28 miles downstream of Mountain Island is the Wylie Hydro Station which forms Lake Wylie.
2. Wylie Hydro Station is located on the Catawba River approximately six miles north of Rock Hill, South Carolina. Located 39 miles downstream of Wylie is Fishing Creek Hydro Station which forms the Fishing Creek Reservoir.
3. Fishing Creek Hydro Station is located on the Catawba River approximately two miles north of Great Falls, South Carolina. Located two miles downstream of Fishing Creek is the Great Falls/Dearborn Hydro Station which forms the Great Falls Reservoir.
4. Great Falls/Dearborn Hydro Station is located on the Catawba River in Great Falls, South Carolina. Located one mile downstream of the Great Falls/Dearborn Hydro Station is the Rocky Creek/Cedar Creek Hydro Station which forms the Cedar Creek Reservoir. The tailrace of Great Falls/Dearborn Hydro Station is actually part of the Rocky Creek/Cedar Creek Hydro Station headwaters.
5. Rocky Creek/Cedar Creek Hydro Station is located on the Catawba River approximately one mile south of Great Falls, South Carolina. Located twenty two miles downstream of Rocky Creek/Cedar Creek Hydro Station is Wateree Hydro Station which forms Lake Wateree. The tailrace of Rocky Creek/Cedar Creek Hydro Station is actually part of Lake Wateree's headwaters.

Inundation maps and profiles for each listed hydro-electric dam as well as additional information about hydro-electric dams that may affect Lancaster County can be found in the Duke Energy Emergency Action Plan Hydro-Electric Plants. A copy of this plan is on file with the Emergency Management Planner at Lancaster County Emergency Operations Center.

E. Inundation Profiles and Maps

Inundation maps and profiles for the five hydro-electric dams that would affect Lancaster County are located in the 2014 version of this plan and to date have not been updated. Duke Energy, owner of the five dams performed an analysis of each potential dam failure to produce these maps and profiles. These were conducted using a computer-simulated dam failure that may or may not describe conditions during an actual dam failure. These simulations used both a summer Probable Maximum Flood (PMF) event and a fire weather of sunny day event.

Inundation maps for the Cane Creek Watershed are on file with Lancaster County Emergency Management. Dam assessments are being done by the Natural Resources Conservation Service through the United States Department of Agriculture and information from these assessments is also being made available to Emergency Management. Inundation maps for the Little Lynches River Watershed will be made available when that assessment is complete in the spring of 2017.

F. Past Occurrences of Dam Failures in Lancaster County

There are no known documented failures of any High Hazard or Significant Hazard dams in Lancaster County. However, dams in Lancaster County, in addition to roads, have historically been prone to damage due to rising waters from heavy rains.

IX. Temperature Extremes

Temperature extremes can adversely affect people, crops, animals, utilities, historical items, and even structures. Coupled with varying humidity levels, temperature extremes can have a plethora of effects on living beings as well as inanimate objects. No municipality or jurisdiction is immune to temperature extremes.

A. Extreme Heat

Temperatures that hover 10 degrees or more above the average high temperature for the region and last for several weeks are defined as extreme heat. Humid or muggy conditions, which add to the discomfort of high temperatures, occur when a "dome" of high atmospheric pressure traps hazy, damp air near the ground. Excessively dry and hot conditions can provoke dust storms and low visibility. Droughts occur when a long

period passes without substantial rainfall. A heat wave combined with a drought is a very dangerous situation.

In addition to heat-related dangers to the human body such as heat stress and hyperthermia, extreme heat can bring problems to critical infrastructure and processes essential to the normal function of society. Extreme heat can adversely affect the transmission of electricity, the growth of crops, the structural integrity of paved surfaces, the operation of machinery, and the health of livestock.

No area in Lancaster County is immune to the possibility of extreme heat. According to globalchange.gov's National Climate Assessment, Lancaster County lies in the southeastern region of the US that has been nicknamed the "warming hole" because of its incongruity with the warming average temperatures of the rest of the country. Despite this, the topography and environmental features of the county are conducive to high temperatures in the summer months. The mix of sandy soils in the south of the county that reflect solar heat back into the ground-level atmosphere and the clay soils in the north that can soak in rainwater and release heated water vapor under summer sun contribute to both air temperature and heat index values.

B. Extreme Cold

What constitutes extreme cold and its effect varies across different areas of the United States. In areas unaccustomed to winter weather, near freezing temperatures are considered "extreme cold." Freezing temperatures can cause severe damage to citrus fruit crops and other vegetation. Pipes may freeze and burst in buildings that are poorly insulated or without heat.

Like extreme heat, there are distinct dangers associated with extreme cold that put both individuals and communities as a whole at risk. Extended periods of extremely low temperatures pose the greatest threats when compared to more temporary "cold snaps" because the longer the human body is exposed to these conditions, the more susceptible one becomes to the symptoms of hypothermia and frostbite. Especially at risk are the very young and the elderly, whose bodies have a harder time compensating for the lack of heat. Also at risk are those without access to heated shelter and as such, cannot readily maintain a suitable body temperature.

There are a variety of transportation impacts due to cold weather. Diesel engines are stressed and, often fuel gels in extreme cold weather impacting trucking and rail traffic. Cold temperatures take their toll on vehicle batteries. Sheer cold temperatures stress metal bridge structures.

Cold temperature impacts on agriculture are frequently discussed in terms of frost and freeze impacts early or late in growing seasons. Absolute temperature and duration of extreme cold can have devastating effects on trees and winter crops as well. Prolonged cold snaps can impact livestock not protected from the frigid temperatures.

Energy consumption rises significantly during extreme cold weather. With the increased cost of energy, the cost of staying warm has also increased. Some lower income families cannot afford the increased cost of utilities and may be subject to having their power or gas shut off. There have been instances of elderly persons freezing to death after having their utilities shut off after not being able to afford to pay their bill. This has led some communities and states to enact laws to prevent the disconnection of utility services when winter weather is expected to be dangerously cold.

Expansion and contraction of the ground due to freezing, thawing, and re-freezing can cause buried water pipes to burst leading to massive ice problems and loss of water pressure in metropolitan areas. This poses a variety of public health and public safety problems.

With the onset of cold weather and extreme cold temperatures comes an increased risk of fire due to individuals using unsafe heating equipment and practices. The use of space heaters increases as does the use of fireplaces. Improper maintenance and, in the case of space heaters, improper placement can lead to devastating fires.

C. Average and Extreme Temperatures

Lancaster County's climate is warm during summer when temperatures average between the 70's and 80's across day and night and cool in the winters when temperatures average between the 40's and 50's across day and night. (See Figure 2-8)

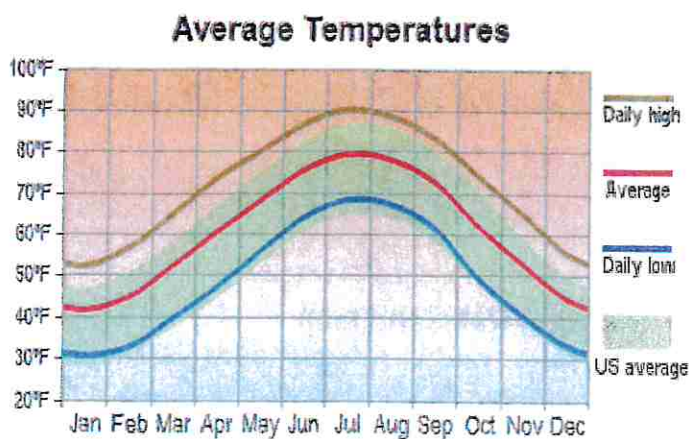


Figure 2-8

with an average difference of 25 degrees Fahrenheit.

The warmest month of the year is July, with an average maximum temperature of 90.7 degrees Fahrenheit, while the coldest month of the year is January with an average minimum temperature of 29.7 degrees Fahrenheit. Temperature variations between night and day tend to be moderate during summer with a difference that can reach 23 degrees Fahrenheit, and also moderate during winter

During the summer months of May through September the average high temperature is 86° F. Any temperature exceeding 96° F is considered extreme heat. The average low temperature during the winter months of November through February is 36° F. Any temperature below 26°F is considered extreme cold. (See Table 2-12)

Average High & Low Temperatures By Month												
Average Daily	Jan	Feb	March	April	May	June	July	Aug	Sept	Oct	Nov	Dec
Low	33	33	38	48	58	68	68	68	63	48	43	33
High	53	58	73	75	83	88	90	88	83	73	65	53

Table 2-12

The highest temperature on record is 107 degrees Fahrenheit as measured on July 27, 1926. The lowest temperature on record is -4 degrees Fahrenheit as measured on January 21, 1985.

D. Future Probabilities of Temperature Extremes

According to the U.S. Environmental Protection Agency's (EPA) summarization of the Intergovernmental Panel on Climate Change Fourth Assessment Report (IPCC, 2007) since 1950, the number of heat waves has increased and widespread increases have occurred in the numbers of warm nights. The extent of regions affected by droughts has also increased as precipitation over land has marginally decreased while evaporation has increased due to warmer conditions. Generally, numbers of heavy daily precipitation events that lead to flooding have increased, but not everywhere. Tropical storm and hurricane frequencies vary considerably from year to year, but evidence suggests substantial increases in intensity and duration since the 1970s. In the extra-tropics, variations in tracks and intensity of storms reflect variations in major features of the atmospheric circulation, such as the North Atlantic Oscillation.

Assuming the position of the IPCC, 2007 is correct; the citizens of Lancaster County should expect future high temperature extremes and fewer chances of lower temperature extremes.

X. Winter Storms (Snow, Sleet, Freezing Rain, and Ice)

Widespread accumulating snow or freezing rain across central South Carolina is an unusual event. This region is generally unaccustomed to snow, ice, and freezing temperatures. These occurrences cause substantial disruption by impacting transportation systems and commerce. Once in a while, cold air penetrates south and mixes with moist air from the Gulf of Mexico. Temperatures fall below freezing killing tender vegetation, such as flowering plants and fruit crops. Wet snow and ice rapidly accumulate on trees with leaves, causing the branches to snap under the load. Some trees fall on power lines causing power outages, likewise ice accumulation of over a quarter inch on power lines can cause them to snap under the weight. Local motorists are generally unaccustomed to driving on slick roads and traffic accidents increase.

Some buildings are poorly insulated or lack heat altogether. Heavy snow can lead to the collapse of weak roofs or unstable structures. Frequently, the loss of electric power means loss of heat for residents, which poses a significant threat to human life, particularly the elderly.

Due to the relatively rare occurrence of severe winter weather in South Carolina coupled with the expensive costs to acquire and maintain the necessary resources to combat their effects, many communities are not prepared for such events. Local municipalities may not have adequate snow removal equipment or treatments available, such as sand or salt, for icy roads.

Accurate and timely precipitation type forecasts for these events are essential to minimize the impact on local communities not accustomed to winter storms. Everyone is potentially at risk during winter storms. The actual threat to individuals depends on their specific situation.

A. Past Occurrences of Winter Storms

Records from the National Climactic Data Center, the South Carolina State Climatology Office, the National Weather Service, the American Meteorological Society and various newspapers were used to compile a list of past winter storms. Because the older events had inconsistencies across records, this report only includes events that happened from 1958 onward. Table 2-13 below lists these past events.

Table 2-13

Date	Precipitation Type	Accumulation
12/11/1958-12/12/1958	Snow	12"
1/26/1961	Sleet	
1/25/1966-1/26/1966	Snow	3"
1/29/1966	Snow	3"
1/10/1968	Ice	
1/12/1968	Ice	
2/15/1969-2/16/1969	Snow, Ice	6"
1/8/1971-1/9/1971	Freezing Rain, Ice	
3/25/1971	Snow	4-6"
12/3/1971	Snow, Sleet	8"
1/7/1973	Snow, Ice	2.6"
2/10/1973-2/11/1973	Snow	7"
1/3/1977	Snow	2"
1/3/1988	Ice	
1/7/1988	Snow	10-12"
12/22/1989-12/24/1989	Snow	2-4"
2/10/1994-2/11/1994	Ice	
1/7/1996-1/8/1996	Snow, Ice	2"
1/11/1996-1/12/1996	Sleet, Freezing Rain, Snow	2"
3/9/1999-3/10/1999	Freezing Rain	2-3"
1/24/2000-1/25/2000	Snow	11"
1/2/2002-1/3/2002	Snow	8"
12/4/2002-12/5/2002	Ice	1"
1/23/2003	Snow	4-7"
2/16/2003-2/17/2003	Ice	3/4"
1/25/2004-1/27/2004	Ice/Sleet	2 3/4"
2/26/2004-2/27/2004	Snow	3-12"
1/29/2005-1/30/2005	Ice	1/4-1/2"
1/18/2007	Ice	1/4"
2/1/2007	Snow	2-5"
1/16/2008	Snow, Sleet	2"
1/20/2009	Snow, Ice	
3/1/2009	Snow, Ice	2-3"
1/30/2010	Snow, Ice	3-4"
2/12/2010-2/13/2010	Snow	3-5"
3/2/2010	Snow	1-2 1/2"
12/26/2010	Snow	2-5"
1/10/2011	Snow, Ice	5-8" Snow, 1/4" Ice
2/16/2013	Snow	1-3"
1/28/2014-1/29/2014	Snow, Sleet	1-3"
2/12/2014-2/13/2014	Snow, Ice	4-8" Snow, 1/4-1/2" Ice
2/17/2015	Ice	1/2-3/4"
2/25/2015	Snow	2"
1/22/2016	Sleet, Freezing Rain	1/4"

December 22 - 24, 1989

A winter storm event began on Friday, December 22, 1989 and continued through Sunday, December 24. This storm has been used for a study of the impact of significant east coast winter storms and upper and lower level wind anomalies resulting in slow moving storm with extended periods of enhanced precipitation by NOAA and NWS. This storm left 12"-18" of snow in many places across the Carolinas that normally receive less than 6" per year. (See figures 2-9 and 2-10)

Lancaster County experienced 2" to 4" of snow. Since it was Christmas holiday, schools were already closed. However, due to the holiday travel season, 60 automobile collisions were reported in the Lancaster News. There was no record of deaths, injuries, or other property damage found related to this event. . (Source: *Lancaster News* December 27, 1989 edition, *National Oceanic and Atmospheric Administration (NOAA)* study by Neil A. Stuart NOAA/NWS Albany, NY located at: [http://cstar.cesm.albany.edu/nrow/nrow8/stuartanomalies.ppt#256,1,Evaluating Potential Impact of Significant East Coast Winter Storms by Analysis of Upper and Low-Level Wind Anomalies, and South Carolina Department of Natural Resources](http://cstar.cesm.albany.edu/nrow/nrow8/stuartanomalies.ppt#256,1,Evaluating%20Potential%20Impact%20of%20Significant%20East%20Coast%20Winter%20Storms%20by%20Analysis%20of%20Upper%20and%20Low-Level%20Wind%20Anomalies,%20and%20South%20Carolina%20Department%20of%20Natural%20Resources) – South Carolina State Climatology Office http://www.dnr.sc.gov/climate/sco/ClimateData/cli_sc_climate.php)

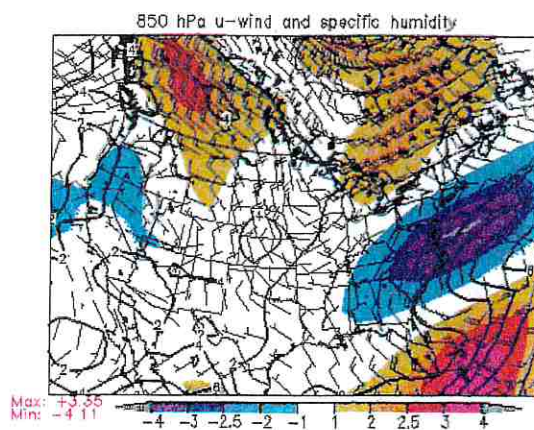


Figure 2-9

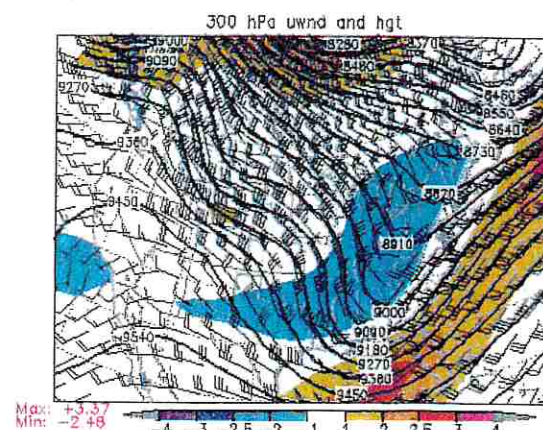


Figure 2-10

There have been at least 121 injuries and one death attributed to winter weather in Lancaster County from December 1958 to January 2016, according to the records used for this plan.

B. Future Probabilities of Winter Storms

Since 1958 we have documented 44 winter storm events. Based on the frequency of past events, the occurrence of future events can be predicted. In order to estimate the frequency of occurrence, the number of winter storms is compared to the length of the 58 year period of record from 1958-2016. The recurrence interval is defined from this information and is a rough estimate of the amount of time, on average, during

which one occurrence of a given storm will take place. It is important to note that in reality, a storm can occur multiple times during one recurrence interval, and that the recurrence interval is only an estimated average time period. See Table 2-14.

HAZARD	Number of Events	Years In Record	Recurrence Interval (Years)	% Chance Per Year	Average Accumulation (Inches)
Any Winter Storm	44	58	1.32	75.86%	3.32"
Snow Only Event	18	58	3.22	31.03%	5.22"
Ice Only Event	12	58	4.83	20.69%	.88"
Wintry Mix	14	58	4.14	24.14%	2.66"

Table 2-14

Due to the complex nature of winter weather and the components that must be in place to produce precipitation, winter storms can be difficult to predict with pinpoint accuracy. Meteorologists face the challenge of determining an exact time that the proper mix of moisture, temperature, and wind speed and direction will cause precipitation to fall on a given area- a nearly impossible feat. Unlike tornadoes and thunderstorms, which generally tend to occur during the mid to late afternoon hours, winter storms in Lancaster County historically have no discernible tendency when it comes to time of occurrence during the day.

From a mitigation standpoint, this complicates efforts made to minimize the impact of winter storms on the population. In the past, winter storms have been forecast to begin at a certain time, only for conditions to change and cause the storm to either dissipate or begin at a different time. This situation can cause schools to cancel class for storms that never arrive or not cancel in time before students arrive because a storm forms sooner than expected. The same goes for businesses and the population in general; it is not uncommon to get caught in a winter storm that develops differently than earlier forecasts predicted or to prepare for a storm that ends up posing little to no threat. Often, it is not certain until the first precipitation begins as to when exactly the storm will arrive and how severe or mild it will be. Figure 2-11 shows the times that past winter storms have occurred during the day.

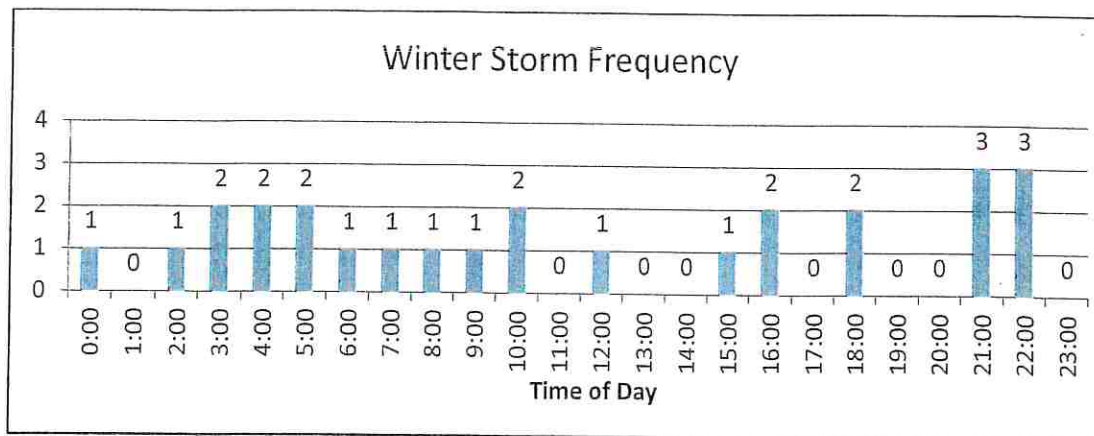


Figure 2-11

Despite the rising average temperatures due to climate change, the number of severe winter weather events is increasing. Winter storms and ice storms put great stress on Lancaster County and are more complicated for emergency agencies to respond to than other weather events. As more of these events happen in the future, the effects will be felt by a greater number of people due to projected population growth and county development. Figure 2-12a and 2-12b show the rising trend of winter storm and ice storm occurrences.

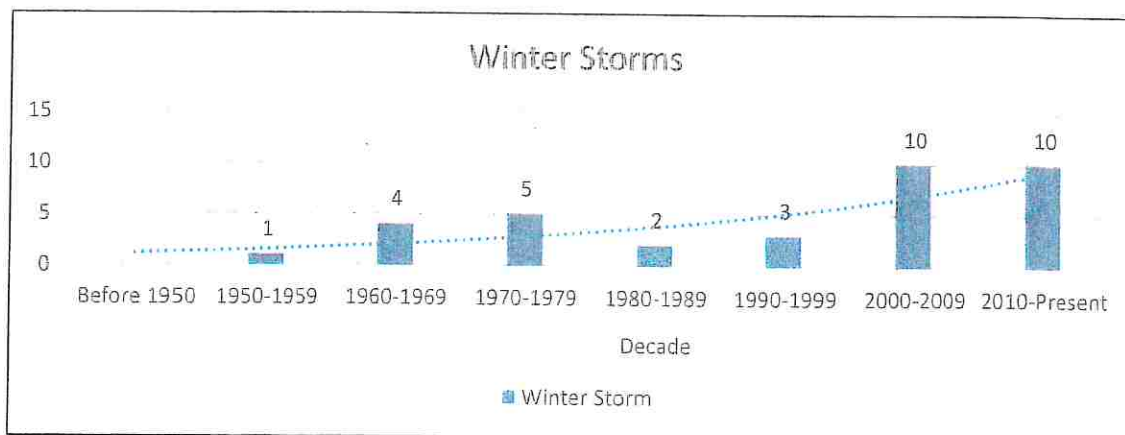


Figure 2-12a

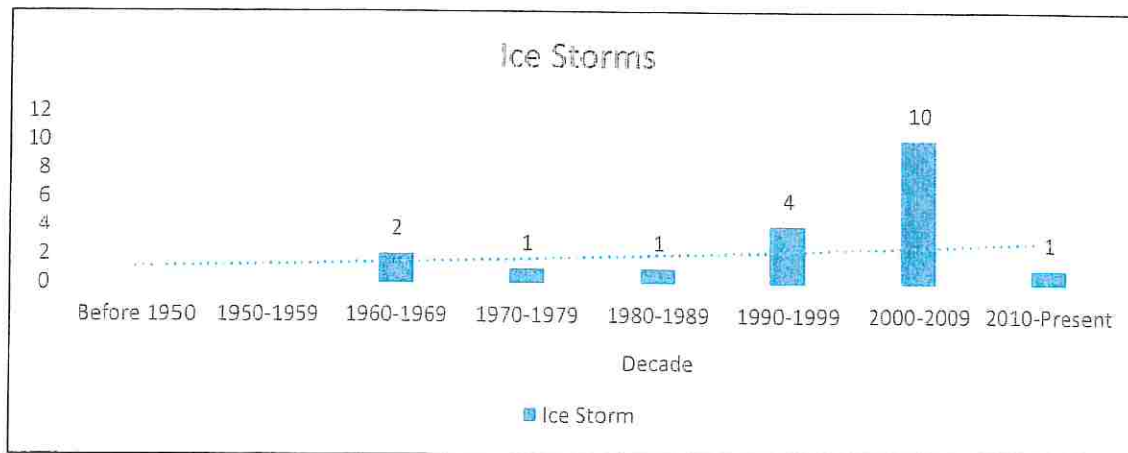


Figure 2-12b

C. Severity of Winter Storms

Winter storms affect all jurisdictions and municipalities within Lancaster County equally. (See Table 2-15)

Winter Events Affecting All Jurisdictions Within Lancaster County					
Type of Winter Event	Schools & Local Government Offices	Roads	Bridges & Overpasses	Electrical Utilities	Severity
< 2" of Snow < ¼" of Ice Above 32° F	Possible Delay or Early Dismissal	Generally Passable with Caution	Generally Passable with Caution	Outages Typically < 500	MILD
< 2" of Snow < ¼" of Ice Below 32° F	Likely Delay or Early Dismissal	Generally Passable with Few Minor Incidents. Caution Urged When Driving.	If Treated: Generally Passable with Few Minor Incidents	Outages Typically < 500	
2" – 4" of Snow or ¼" – ½" of Ice Below 32° F	Likely Closed	Passable with Some Minor Incidents. Necessary Travel Only	If Treated: Passable with Caution. Minor Incidents Likely	Outages 500 to 2,000 Likely	MODERATE
Over 4" of Snow or Over ½" of Ice Below 32° F	Closed	Most Secondary Roads Not Passable. Travel Not Advised	Dangerous. Travel Not Advised	Outages Over 2,000 Likely	SEVERE

Table 2-15

XI. Drought

Drought is a normal, recurrent feature of climate, although many mistakenly consider it a rare and random event. It occurs in virtually all climatic zones, but its characteristics vary significantly from one region to another. Drought is a temporary deviation from normal levels of rainfall over an extended period of time, usually a season or more. This deficiency results in a water shortage for some activity, group, or environmental sector.

Drought should not be viewed as only a physical or natural event. Its impacts on society result from the relationship between a natural event and the demand people place on water supply. Human beings often exacerbate the impact of drought. Recent droughts have resulted in negative economic and environmental impacts and personal hardships have underscored the vulnerability of societies to this "natural" hazard. Adverse impacts to people and economy were made especially clear during the droughts of 1998-2002 and 2007-2008. These droughts affected agriculture, forestry, tourism, power generation, public water supply, and fisheries.

No single operational definition of drought works in all circumstances, and this is a big part of why policy makers, resource planners, and others have more trouble recognizing and planning for drought than they do for other natural disasters. In fact, most drought planners now rely on mathematic indices to decide when to start implementing water conservation or drought response measures.

South Carolina began to examine the impacts and occurrences of drought in 1978 while most of the United States was experiencing severe drought conditions. South Carolina recognized the need to formalize a drought plan by passing the South Carolina Drought Response Act in 1985. This act was amended in 2000 to implement guidelines set forth in the 1998 State Water Plan. Several plans and laws have been established to monitor, manage, and conserve the state's water resources during drought periods in the best interest of all South Carolinians.

To better understand droughts, it can be useful to sub-classify them into the following groups:

- Agricultural Drought: defined by soil moisture deficiencies that affect crop performance
- Hydrological Drought: defined by declining surface and groundwater supplies due to a lack of precipitation
- Meteorological Drought: defined by a lack of precipitation relative to average precipitation for a given region
- Hydrological Drought & Land Use: defined by a meteorological drought in one area that has hydrological drought impact in another area due to manmade alterations to natural geography
- Socioeconomic Drought: defined as drought that impacts supply and demand of some economic activity

The Palmer Drought Severity Index is used to measure long-term drought impacts and uses rainfall and temperature data to rate the severity of drought conditions from 0 (no drought) to -4 (extreme drought). In the case of excess rain, a region can be placed under positive ratings such as +2 (moderate rainfall) or +4 (heavy rainfall). The Palmer Index is used to retroactively measure drought conditions over an extended time period such as months in the past as opposed to weeks or days in the past. Using the Palmer Index, the South Carolina Emergency Management Division has put Lancaster County at a medium-high risk for drought occurrence and in the medium category for social and place vulnerability for drought events.

A. Past and Future Occurrences of Drought

The earliest records of drought indicate that some streams in South Carolina went dry in 1818, and fish in smaller streams died from lack of water in 1848. Other droughts were recorded in the years of 1890, 1925, and 1933 while the most damaging droughts in recent history occurred in 1954, 1986, 1998-2002, and 2007-2008. Droughts have occurred at roughly 30 year intervals with some exceptions, since the early 1800's. Using NOAA's Storm Events Database with a record from 1950-2016, there have been 9 years in which Lancaster County was listed in drought status. The most recent drought, which occurred in 2008, was considered a severe drought, with a Palmer Severity Index of -3. The entire County has an equal chance of occurrence of drought. See Table 2-16. (For additional information see Section 7 Appendix 6.)

B. Future Probabilities of Drought

DROUGHT			
NUMBER OF EVENTS	YEARS IN HISTORY	Recurrence Interval (Years)	Hazard Frequency (Percent Chance per Year)
9	66	7.3	13.7
<i>Percentages greater than 100% indicate hazard can be expected to occur more than once per year.</i>			
Table 2-16			

XII. Wildland Fire

Lancaster County Fire Rescue averages response to more than 33 wildland fires each year. This equates to an 11.2% chance of a wildland fire occurring each day. Therefore, these types of fires, also known as brushfires, woods fires, or forest fires, are considered common occurrences in Lancaster County. As common occurrences, Lancaster County Fire Rescue and the volunteer stations that make up our firefighting forces are adept at handling most of these of fires without assistance. If Lancaster County firefighting resources cannot make access to the fire area or if the fire exceeds the capabilities of county resources, the South Carolina Forestry Commission (SCFC) must be called in to assist. While Lancaster County and the municipalities within Lancaster County have ordinances in place with regards to outdoor burning, it is generally left to South Carolina Forestry Commission to enforce their laws.

A. Causes of Wildland Fire

Debris burning causes over 50% of the total wildfires and represents the most common cause in Lancaster County. By S.C. State Law and Lancaster County Ordinance # 921, anyone burning a yard debris fire is required to make notification by calling (800) 705-8610 prior to starting the fire. Lancaster County averages over 4,500 of these debris fire notifications annually.

Table 2-17 lists wildland fires by cause, in Lancaster County, in which SCFC responded for the fiscal years of 2011 through 2015. The major causes of fire are listed as Lightning, Campfire, Debris Burning, Incendiary, Railroad, Children and Miscellaneous.

Debris fires are any planned fire that escapes or leaves its desired area. Incendiary fires set to burn someone else's property without the owner's consent account for 6% of all wildland fires.

S.C. Forestry Commission Response to Lancaster County 2011 - 2015										
CAUSE	2011		2012		2013		2014		2015	
	Number of Responses	Acres	Number of Responses	Acres	Number of Responses	Acres	Number of Responses	Acres	Number of Responses	Acres
Debris Fire	5	11.3	7	4.2	12	24.1	15	58.6	11	15.9
Miscellaneous	3	40.4	3	1.0	2	1.4	6	14.9	4	5.7
Lightning	0	0	2	24	0	0	0	0	1	4
Incendiary	2	1.2	4	7.5	2	8	8	22.1	3	0.9
Equipment	2	1.1	2	2.5	3	16.1	6	11.2	0	0
Children	1	0.2	0	0	2	1.4	0	0	0	0
Smoking	0	0	2	3	0	0	0	0	0	0
Railroad	1	0.2	0	0	0	0	0	0	1	1.0
Campfire	1	3.0	0	0	2	1.1	0	0	1	2.5
Totals	15	57.4	20	42.2	23	52.1	35	106.8	21	30

Table 2-17

B. Wildland-Urban Interface

The number of homes lost nationally due to wildland fires has been increasing at an alarming number. These losses are found primarily in the wildland urban interface area, or the immediate boundary between undeveloped natural land and developed residential or commercial property. In recent years, an influx of new residents have moved into Lancaster County and residential building has expanded drastically into previously untouched woodlands. As development increases, lives and property will be threatened as never before and a greater demand will be placed on services such as fire protection, law enforcement, and emergency medical services.

C. Future Probabilities of Wildland Fires

Some of the information contained in this document relating to wildland fire in Lancaster County was derived from the South Carolina Forestry Commission's Annual Reports from 1996 through 2015. These can be found at <http://www.state.sc.us/forest/ar.htm>. Additional information came from Lancaster County Fire Rescue Fire Incident Reports. Based on the frequency of past events, the occurrence of future events can be predicted. According to records obtained from SCFC (Table 2-18), there were greater than 3,200 responses to wildland fires in Lancaster County in the past 69 years. If trends continue, it is predicted that the 10 year average number of responses to Lancaster County by SCFC will be 34 per year with 133.5 acres involved annually.

South Carolina Forestry Commission Wildland Fire Response to Lancaster County							
Years In Record	Total Responses	Total Acres Involved	Average Calls Per Year	Average Acres Involved Per Call	10 Year Average Number of Responses	10 Year Average Acres Involved	Chance of Occurrence (Daily)
69	3,293	17,233	47.7	5.44	34	133.5	23%

Table 2-18

Lancaster County Fire Rescue Wildland Fire Response			
Years In Record	Total Responses	Average Calls Per Year	Chance of Occurrence (Daily)
10	311	31.1	11.7%

Table 2-19

Lancaster County Fire Rescue responds to an average of 31.1 calls per year for wildland fires. (See Table 2-19) Accurate records are only available for the past eleven years. A review of a decade of data from Lancaster County Fire Rescue indicates that wildfires have decreased. (Figure 2.13a and 2.13b) Earlier notification due to communication improvements as well as public education campaigns contributed to the decrease we have seen. Urban Interface remains an area of concern for Lancaster County Fire Rescue as new developments are constructed and sprawl reaches into areas that were previously open land. This change from rural to suburban has driven the cost of fire upward. Our losses grew from the thousand dollar range to tens of thousands over a ten year period. This variance may also be attributed to enhanced reporting methods. Our trend data shows incremental increases over the last three reporting years. The Fire Commission enacted a burn ordinance that will continue to address this, however, an increase in population equates to an increase in response.

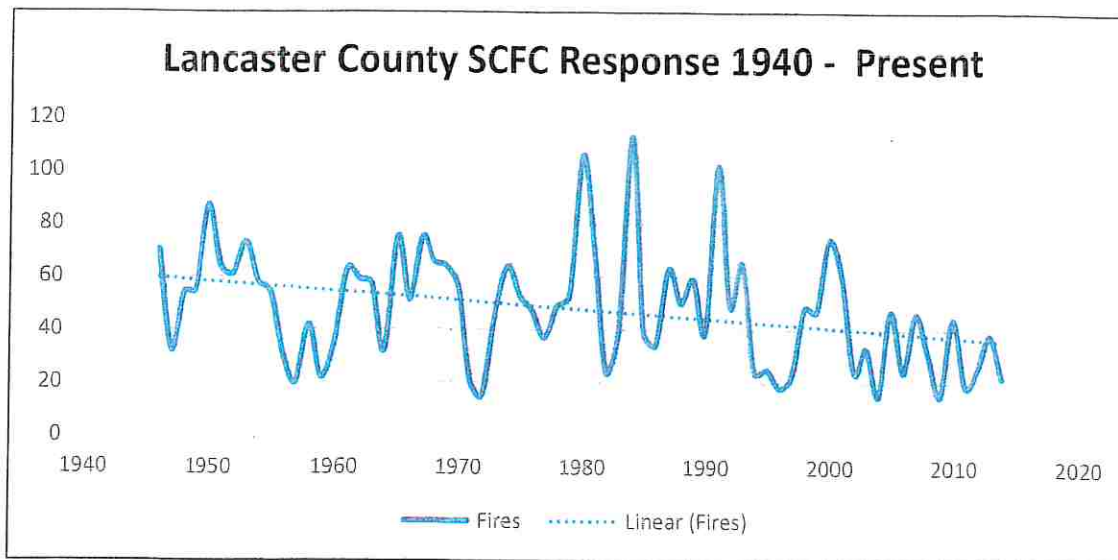


Figure 2-13a

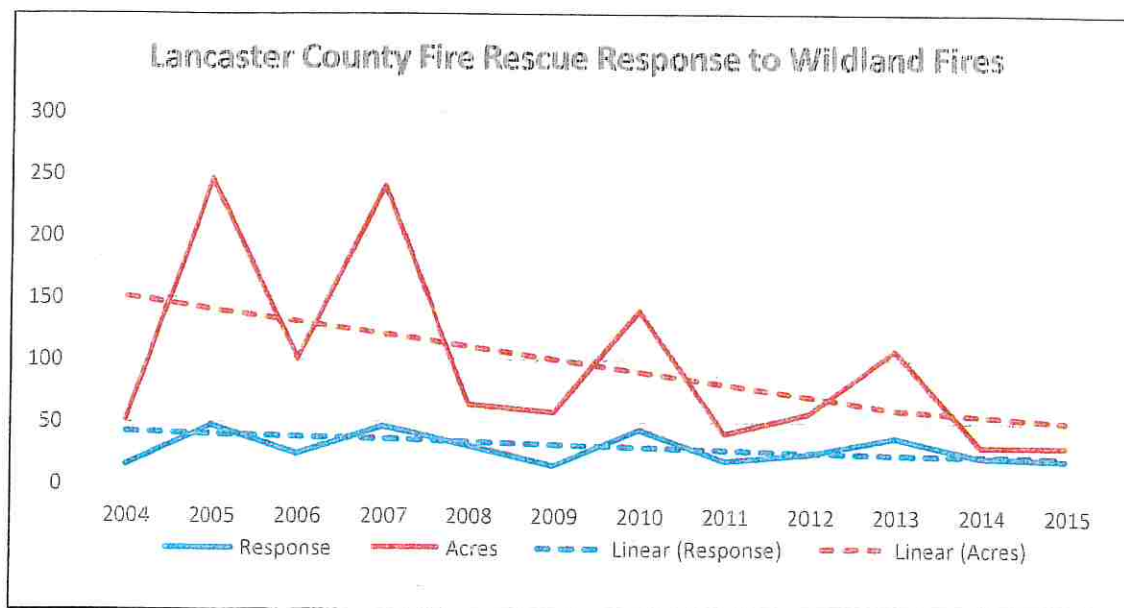


Figure 2-13b

D. Jurisdictions Affected by Wildland Fire

Wildland fires typically occur outside of heavily developed areas and not in municipal localities. Lancaster, Kershaw and Heath Springs have railroads that cross through them. The associated 75' railroad right-of-ways through the municipalities are often accompanied by tracts of undeveloped land subject to wildland type fires, however as referenced previously in Table 2-5 Lancaster County doesn't see this trend. (Appendix 7)

SCFC provided map data in Figure 2-14 which shows fire by size, class and location. The map below indicates that SCFC responds to more rural areas and less to the more populous regions. (Appendix 8) In contrast, Lancaster County

Fire Rescue has seen an influx in population and now deals with more of an urban interface style fire situation to which our fire departments are equipped to mitigate. Our fire problem changed and our staff met those challenges with diversified equipment.

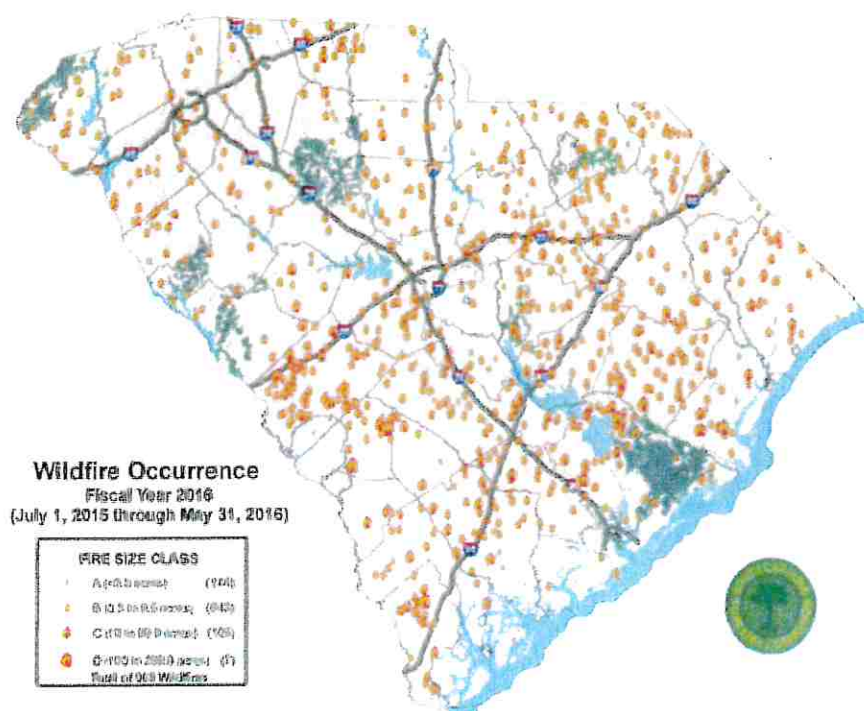


Figure 2-14

Figure 2-15 shows wildland fires that occurred from January 1, 2014 through December 31, 2015 in Lancaster County. (Appendix 10) These results were obtained from Lancaster County Fire Rescue and include all outside fires not involving structures, vehicles, or other equipment. This illustrates a correlation between population density and the occurrence of wildfires. The three fire districts with the greatest population density in the county, Gooches, Indian Land and Pleasant Valley, have the highest incidence rates of wildfires, while the less dense districts of the county have fewer wildfires.

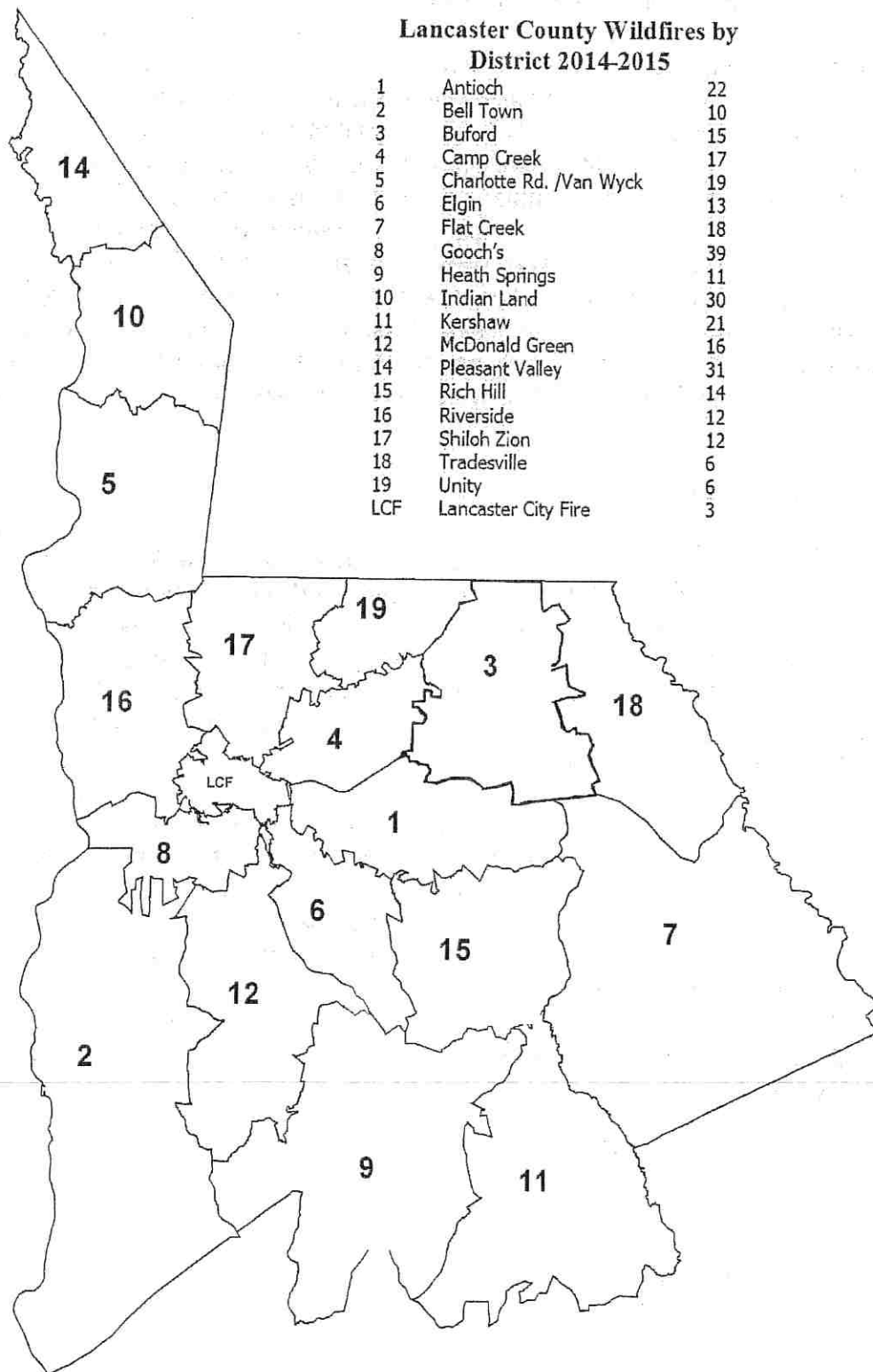


Figure 2-15

XIII. Technological and Man-Made Hazards

Lancaster County is undergoing constant residential, commercial, and industrial expansion due to its proximity to the Charlotte metropolitan area, the presence of the L&C Railroad, and the major state and U.S. highways that traverse the county. Because of the growth in residential population, daily thru-county traffic, and increases in transport and on-site storage of hazardous materials, there is also a constant growth of the risks associated with incidents involving hazardous materials or critical infrastructure. While there are concerns and problems specific to each individual man-made and natural hazard, there are unique complications that can arise when these two hazard classes are combined in single incidents. The major classes of man-made or technological hazards that are present in Lancaster County are dam failures, hazardous material releases, train derailments, infrastructure failures, water/sewer system disruption and power system failures.

A. Hazardous Materials

Lancaster County has multiple facilities that use hazardous materials in daily processes. There are others that create, store and ship hazardous materials. Through hazard planning, Emergency Management identified six high risk, four moderate risk and nineteen low risk facilities in the county. The risk is identified by analysis of material on site and its potential to impact the public or environment. This data is compiled under the cover of the Lancaster County Hazardous Materials Response Plan. (Appendix 9)

Identification and classification for these facilities is developed using E-Plan which is a Hazard and Emergency Management tool that utilizes federal Tier II reporting regulations. On a normal day when all process and containment works as it is designed, there are no risks. When things go wrong and a failure occurs, whether it be technological or anthropogenic, there becomes a hazard to humans, the environment, infrastructure and property.

The hazards identified by Lancaster County Emergency Management related to hazardous materials are:

- Accidental Release
- Fire
- Severe Weather
- Equipment Failure
- Transportation
- Infrastructure Compromise

Some of these hazards may be interrelated (such as equipment failure causing a fire or severe weather causing infrastructure compromise). Also, some hazards consist of hazardous elements which relate to one of the six above.

1. Accidental Release

An accidental release can happen as a result of multiple interrelated hazards. These accidental releases require some intervention either by facility staff or response agencies to mitigate the incident. Lancaster County Emergency Management, Fire Rescue and the Hazardous Materials Response Team have responded before to incidents of accidental release of hazardous materials into the environment. It is recognized that industry mitigates many small-scale non-reportable incidents without activating the 911 system. Facility location in the community plays a major role in consideration of what chemicals may be released and the measures necessary to control the leak and numbers of people that must be evacuated.

2. Fire

Nearly all of the hazardous materials present in Lancaster County are adversely affected when exposed to extreme heat or open flame. As such, fires in or around facilities handling these materials can prove to be dangerous to any surrounding people or property. Lancaster County and City Fire Services are equipped to mitigate fire incidents involving hazardous materials, but, depending on the properties and amount of chemical involved, the duration and severity of such an event can vary greatly.

3. Severe Weather

As with Lancaster County in general, facilities that handle hazardous materials are subject to distinct risks from severe weather events such as those addressed in this plan. Hurricanes and Tornadoes in particular can bring damaging lightning, rain, flooding, hail, and heavy winds. Risk to the population from a hazardous material release caused by these conditions would only be compounded by resulting damage to critical facilities and infrastructure. Response times for repair and containment personnel could be lengthened, increasing the duration of an environment hazardous to both on-site workers and the general public. In the event that neither the facility itself nor containment structures are compromised, most of these facilities still rely on regular delivery of supplies necessary to daily operations. Any interruption of normal function for these facilities caused by severe weather could be disastrous under the right circumstances.

4. Equipment Failure

Unforeseen failure of any aspect of operations at a facility handling hazardous materials could easily result in a release of product. Unlike an accidental release, the ability to contain the released material may be compromised by the failure of equipment crucial to normal operation. Like damage caused by

severe weather, time will need to be taken to return failed equipment to working order, possibly causing greater release in ensuing downtime.

5. Transportation

Transportation is perhaps the greatest threat present in Lancaster County when it comes to hazardous materials. A majority of the facilities that use or store hazardous materials in the county do not produce the materials on site and must have them shipped by road or railway to them. Because of the major state and U.S. highways and rail line that traverse the county, there is a significant risk of transport accidents involving hazardous materials and daily commuters or the general population of the county. As with equipment failure, the unpredictable nature of events such as these can cause variation in the severity of the events.

6. Infrastructure Compromise

As do homes and other businesses, the facilities that handle hazardous materials in the county rely heavily on existing infrastructure such as roads, bridges, water and sewer, and electrical utilities for normal day-to-day operations. The loss of any number of these resources could mean an interruption in operation, an inability to move or contain materials, or an uncontrolled release of a dangerous substance into the environment.

As shown above, many of the risks associated with hazardous materials in Lancaster County are interrelated. One event could propagate a series of failures that lead to the release of a dangerous substance, potentially affecting hundreds or thousands of people. It is not the position of this plan to push for businesses and industries in Lancaster County to avoid the use, sale, or storage of hazardous materials. When used and managed properly, it is safe and can be beneficial to use hazardous materials for industrial or commercial processes. The purpose of this plan is to recognize and address the situations which would place the population of Lancaster County at risk in the event of a release of hazardous materials.

B. Train Derailment

The Lancaster and Chester Railroad services more than sixty miles of track, thirty of which lies in Lancaster County and is headquartered in the City of Lancaster. As natural and technological disasters intersect, there are instances of infrastructure failure that impact railroads in the United States. Incidents such as derailments, bridge and rail failures, human error and hazardous materials spills plague the railroads. Local, regional and national incidents assist in the design of this Hazard Mitigation Plan.

In Lancaster County, a majority of the material transported by rail is soybean grain and other soybean products. Recently, however, railcars filled with propane have begun

to populate the rail line. In addition to the dangers presented by trains crossing major highways and other roads, the new danger of a collision or derailment involving a railcar filled with highly flammable propane has surfaced.

Past Occurrences

In Lancaster County, we have experienced many technological failures leading to notable rail incidents. Lancaster and Chester Railroad, formerly Cheraw and Chester Railway Company, opened in 1873 and by 1896 was sold due to financial struggles. Colonel Leroy Springs purchased the railroad to move his textile products from mill to mill within the Lancaster County area. According to Lancaster and Chester Railroad, "in April 1899 the wooden trestle over the Catawba River burned" and "within a month the depot at Lancaster was destroyed by fire." All were rebuilt and on June 30, 1913 the railroad experienced the "worst wreck in the railroad's history." This was a derailment where the freight and several passenger cars left the track and 'plunged to the bottom of the creek" which led to the collapse of Hooper's Creek Trestle. Five people lost their lives in the wreck. "A train also derailed and crashed into the Buy-Rite Discount Beverage in downtown Lancaster in February 2007. Two people were inside the store when the cars came crashing through, one of those people was airlifted to the hospital. Railroad officials say the train's engineers accidentally shoved the train's cars about 30 feet off the track while trying to add a rail car to the line. The store was demolished." Also, in 2010 and 2011, trains derailed in the city, blocking traffic for hours (WBTV News).

C. Infrastructure Failure

While there is not a history of major road and bridge failures in Lancaster County unrelated to weather events such as heavy flooding, there is a large number of old bridges and roads that require regular maintenance and repair. Many of these roads and bridges have been scheduled for evaluation and repair by SCDOT, but with the heavy damage in the Columbia area from the October flooding, some of these projects have been postponed due to a reallocation of resources to other parts of the state. The danger is ever-present during heavy rain events or other incidents that put these structures under greater stress than they normally experience.

D. Water/Sewer System and Power System Failures

As with other county infrastructure, there has been no recent history of major water/sewer and power system failure due to malfunction or error alone, however they are both subject to the same dangers from certain weather events that can adversely affect their normal operation or create dangerous situations. In recent years, though, there has been an increased risk nationwide of domestic or foreign terrorism that could target critical systems such as these. While this plan does not address terrorism specifically due to its complex and far-reaching nature, a mitigation plan is contingent upon exploring all sources of hazards to certain systems and structures.

SECTION - 3

VULNERABILITY

ASSESSMENT

I. Vulnerability Assessment

As a result of the Hazard Identification process, some of the hazards identified necessitate a Vulnerability Assessment. This assessment is performed to establish the impact these hazards will have on the manmade environment and how our citizens' safety may be affected. With the data collected from the hazard identification, it was determined that a vulnerability assessment focusing on specific hazards should be conducted. The requirement for the vulnerability assessment was to target natural, technological and manmade hazards which have caused major damage in the county or that have a relatively short frequency of occurrence. Therefore, the vulnerability assessment considered flooding, severe thunderstorms, tropical cyclones, winter storms, technological, and manmade hazards affecting Lancaster County.

A. Development Trends

An assessment of development trends was necessary to understand the vulnerability of the built environment within each community. The assessment directs us to consider the types and locations of future development within Lancaster County and accordingly, to conclude how to best strengthen it to be hazard resistant. As noted in Section 1, Lancaster County is South Carolina's fourth fastest growing county by percentage of population change, with an overall population increase of 12% from the 2010 population. This brings significant development of residential structures as well as commercial structures and infrastructure to keep up with the resulting demands.

1. Lancaster County

Unincorporated Lancaster County continues to grow with considerable residential and commercial development occurring in areas close to the North Carolina state line along the Highway 521 corridor in the community of Indian Land. The community of Buford also has seen some significant growth over the past decade as well. Despite this growth, 17.1% of family households and 21% of individual households are below the U.S. poverty line. Based on U.S. Census data, it is estimated that the overall population growth in the unincorporated county was 12 percent from 2010 - 2015 with a 7.8 percent increase in the number of housing units from 2010. The U.S. Census population estimate for 2015 is 85,842.

2. City of Lancaster

According to U.S. Census data, the City of Lancaster's population increased by 5.1 percent between 2010 and 2014, and the number of housing units in the City increased by 6 percent in this time period. Population density of the city is low at 1,541 people per square mile. The City of Lancaster is experiencing growth in both residential and commercial development despite the loss of over 1000 jobs in textile and accessory industries during the mid-2000s. In addition,

the family household poverty rate is 27.4% and the individual household poverty rate is 31.5%. The median age in the City is 40.6. The population of the city increases by 68 percent with commuters to a total workday population of approximately 15,700. The city's land area is relatively small, 5.81 square miles, and will thus serve as a limit to growth in the future.

3. Town of Kershaw

According to U.S. Census data, the Town of Kershaw's population increased by 19.5 percent to 1,965 between 2000 and 2009 but there were no new homes built during the same period. Population density of the town is low at 1,061 people per square mile. Kershaw's population has a median age of 41.5 years with 35.3% of family households and 38.8% of individual households having an income at or below the poverty level, based on 2014 estimates. The Town of Kershaw was founded in 1888 near the Hail Gold Mine where gold was discovered in 1825 and grew further with the textile industry boom of the last century. In the mid 1990's a 9 acre textile plant closed followed by mining operations leaving hundreds without jobs. Over the past decade additional gold deposits have been discovered and the once closed gold mine has been bought and reopened. New mining and processing facilities have been built and full-scale mining will begin in early 2017, employing 300 people. Kershaw is also home to three public schools, Kershaw Elementary, Andrew Jackson Middle School, and Andrew Jackson High School. The town's land area is relatively small, 1.85 square miles, and will thus serve as a limit to growth in the future.

4. Town of Heath Springs

According to U.S. Census data, the Town of Heath Springs' population increased by 23.1 percent to 1,064 between 2000 and 2009 but there were only 2 new homes built during the same period. Population density of the town is low at 822 people per square mile. Heath Springs' population has a median age of 41.9 years with 36.9% of family households and 42.1% of individual households having an income at or below the poverty level, based on 2014 estimates. Heath Springs Elementary School is located in the town and has a total enrollment of 409 students from kindergarten through fifth grade which is a 30 percent increase in enrollment since 2001. The town of Heath Springs has increased in size as it annexed .10 of a square mile into the town limits in 2006. This annexation brought land into the town that has become an industrial park and business has moved into the park. The town's land area is relatively small, 1.30 square miles, and will thus serve as a limit to growth in the future.

Increased development, especially in the northern panhandle region of the county, is reducing the amount of permeable ground surface available to absorb precipitation. As a result, runoff during large precipitation events is a growing concern. The close proximity of this region with the Catawba River, which forms

the western boundary of the County, allows for most of this runoff to be directed towards the river and does not always pose a threat to citizens. Certain precipitation conditions either upstream or downstream of Lancaster County, however, may limit the ability of dam operators to release water in the right times to avoid flooding some normally dry areas. As property development continues and previously rural areas become urbanized, the natural paths for runoff and absorption will change and new, man-made runoff management systems will need to adequately prevent flooding in these heavily populated areas.

B. Inventory Information

In order to assess the vulnerability of the community, particularly to natural hazards, an inventory of the county's structures and critical facilities was performed.

Critical facilities are those facilities that warrant special attention in preparing for a disaster and/or facilities that are of vital importance to maintaining citizen life and health safety, and community order during and/or directly after a disaster event. Lancaster County has prepared an inventory of critical facilities that includes emergency response facilities such as police stations, fire departments, emergency medical services stations (EMS) and medical centers/hospitals; public facilities including schools and local government buildings; and important transportation facilities including airports. Hazard Mitigation Planning Committee Members reviewed and updated the county's list during the planning process. A count of the types of facilities in each community is provided in Table 3-1.

Table 3-1 CRITICAL FACILITY INVENTORY				
FACILITY TYPE	City of Lancaster	Town of Kershaw	Town of Heath Springs	Unincorporated County
Airport	-	-	-	5
Public Facilities	4	1	2	3
Judicial Facilities	2	-	-	1
Electrical Utility Facilities	2	1	-	11
Schools	8	1	1	13
Emergency Services (Fire Stations, EMS Stations, Sheriff, and Police Stations)	6	2	3	21
Communication Facilities	5	-	-	4
Water & Sewer Facilities	13	3	2	49

Lancaster County Airport, also known as McWhirter Field, is a county-owned, public-use airport located four miles (7 km) west of the central business district of Lancaster, in Lancaster County, South Carolina. Coordinates for this airport are 34°43'22.45"N / 80°51'16.52"W. (See figure 3-1)

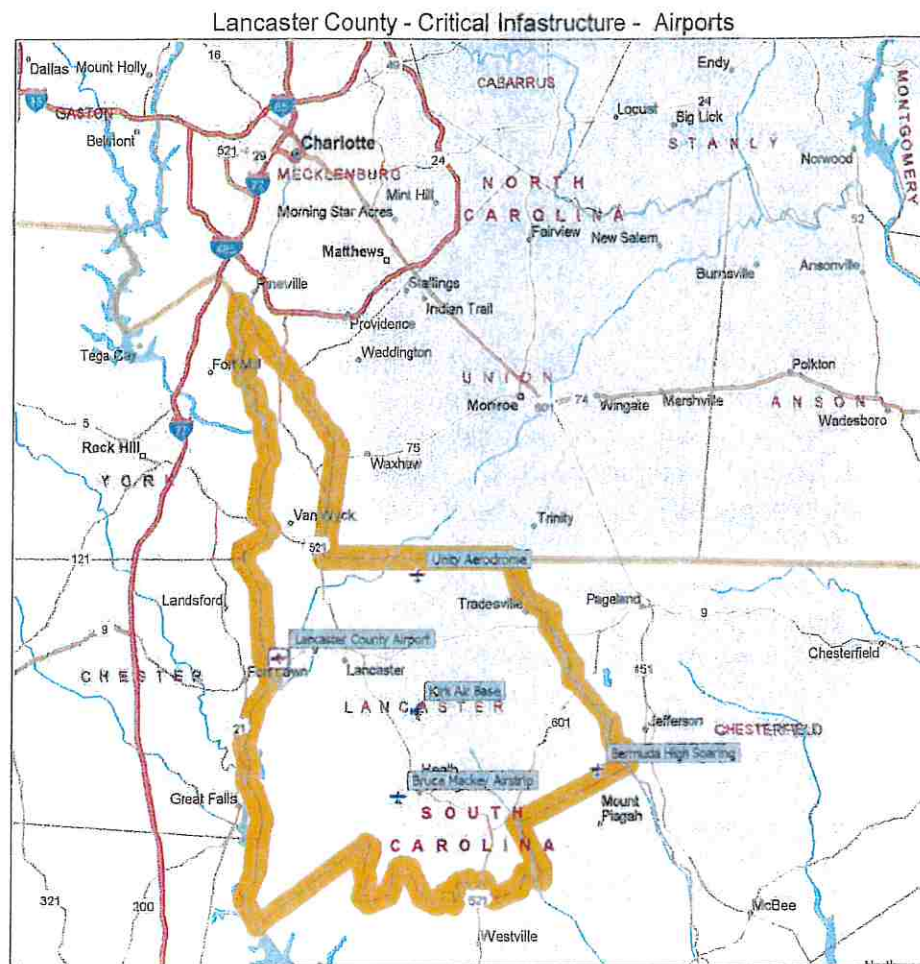


Figure 3-1

Kirk Air base is a privately owned, public use airport located five miles southeast of the central business district of Lancaster, in Lancaster County, South Carolina. Coordinates for this airport are 34°40'27.54"N / 80°40'56.25"W. Unity Aerodrome is a privately owned, private use airport located nine miles east of the central business district of Lancaster, in Lancaster County, South Carolina. Coordinates for this airport are 34°48'9.54"N / 80°40'48.24"W. Bruce Mackey Airstrip is a privately owned, private use airstrip located ten miles south southeast of the central business district of Lancaster, in Lancaster County, South Carolina. Coordinates for this airstrip are 34.58553°N 80.70231°W. Bermuda High Soaring is a privately owned glider-port located nineteen miles southeast of the central business district of Lancaster, in Lancaster County, South Carolina. Coordinates for this airstrip are 34.61233°N 80.45056°W.

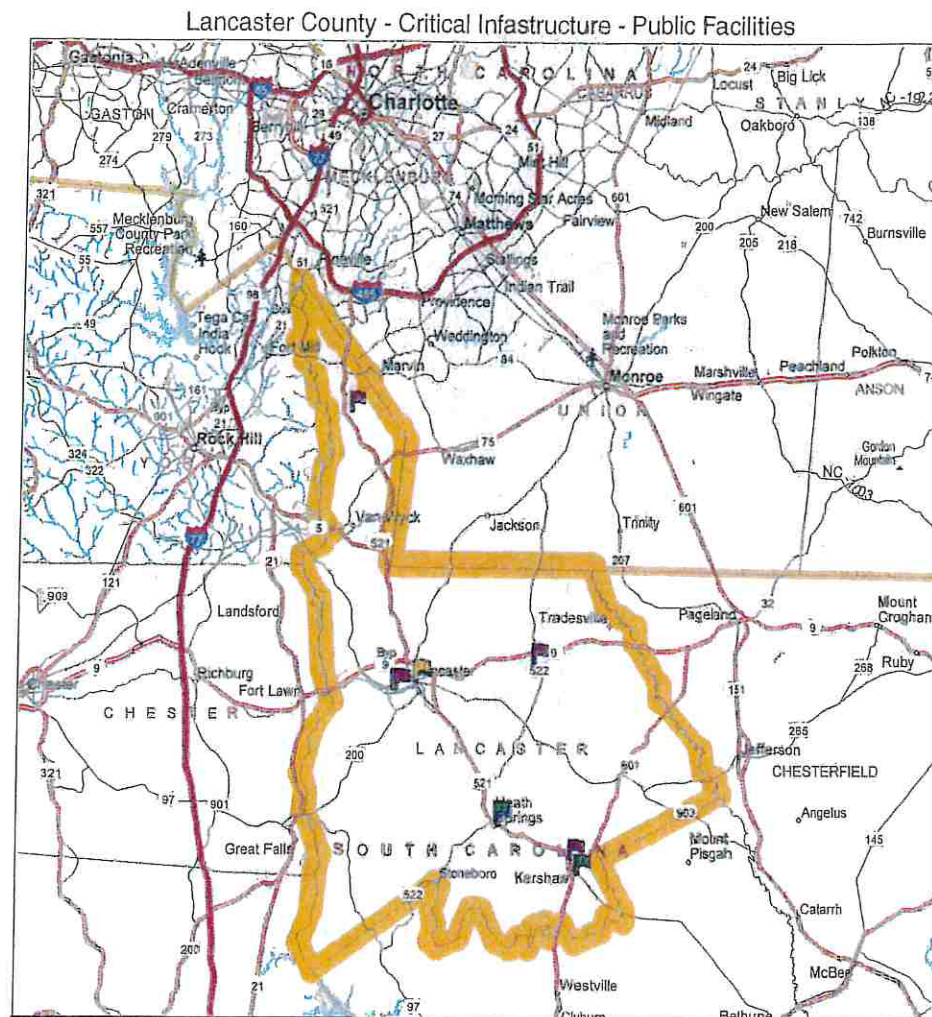


Figure 3-2

Public facilities in Lancaster County include Department of Parks and Recreation buildings located in the Indian Land Community, Town of Kershaw, Buford Community, and City of Lancaster. These sites have been identified for use as Disaster Recovery Centers. Additionally this list includes properties used by the Lancaster County Council on Aging. These are located in Heath Springs, Lancaster, and the Indian Land communities. (See figure 3-2).

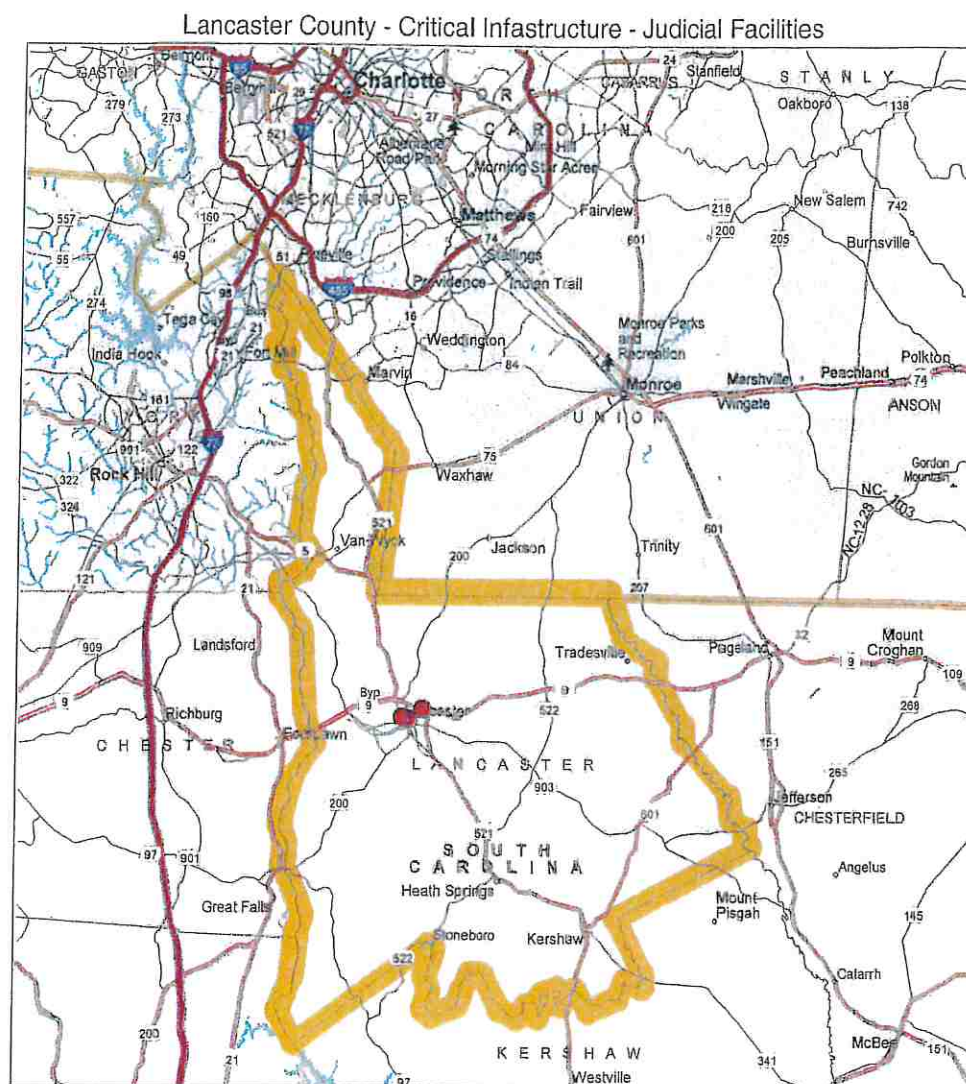


Figure 3-3

Judicial Facilities, namely courthouses are accounted for in our inventory of critical infrastructure. There are three such facilities in Lancaster County. Of these, two are located in the City of Lancaster and the remaining one is located in unincorporated Lancaster County. (See figure 3-3).

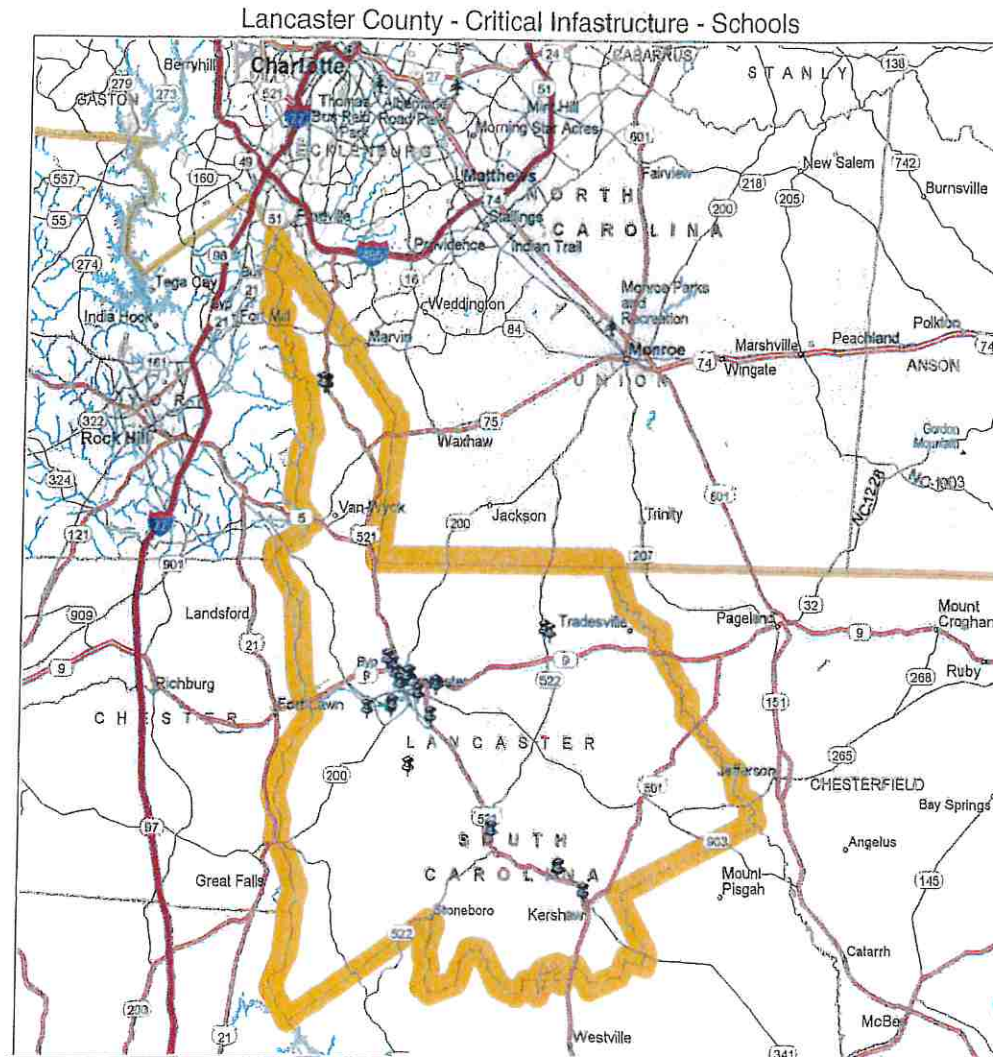


Figure 3-4

Lancaster County is home to 25 schools. These include 23 public schools belonging to Lancaster County School District, one privately owned Christian school and University of South Carolina at Lancaster. These facilities represent a product of considerable investment and many serve integral roles in our response and recovery plans. (See figure 3-4).

Lancaster County - Critical Infrastructure - Emergency Services

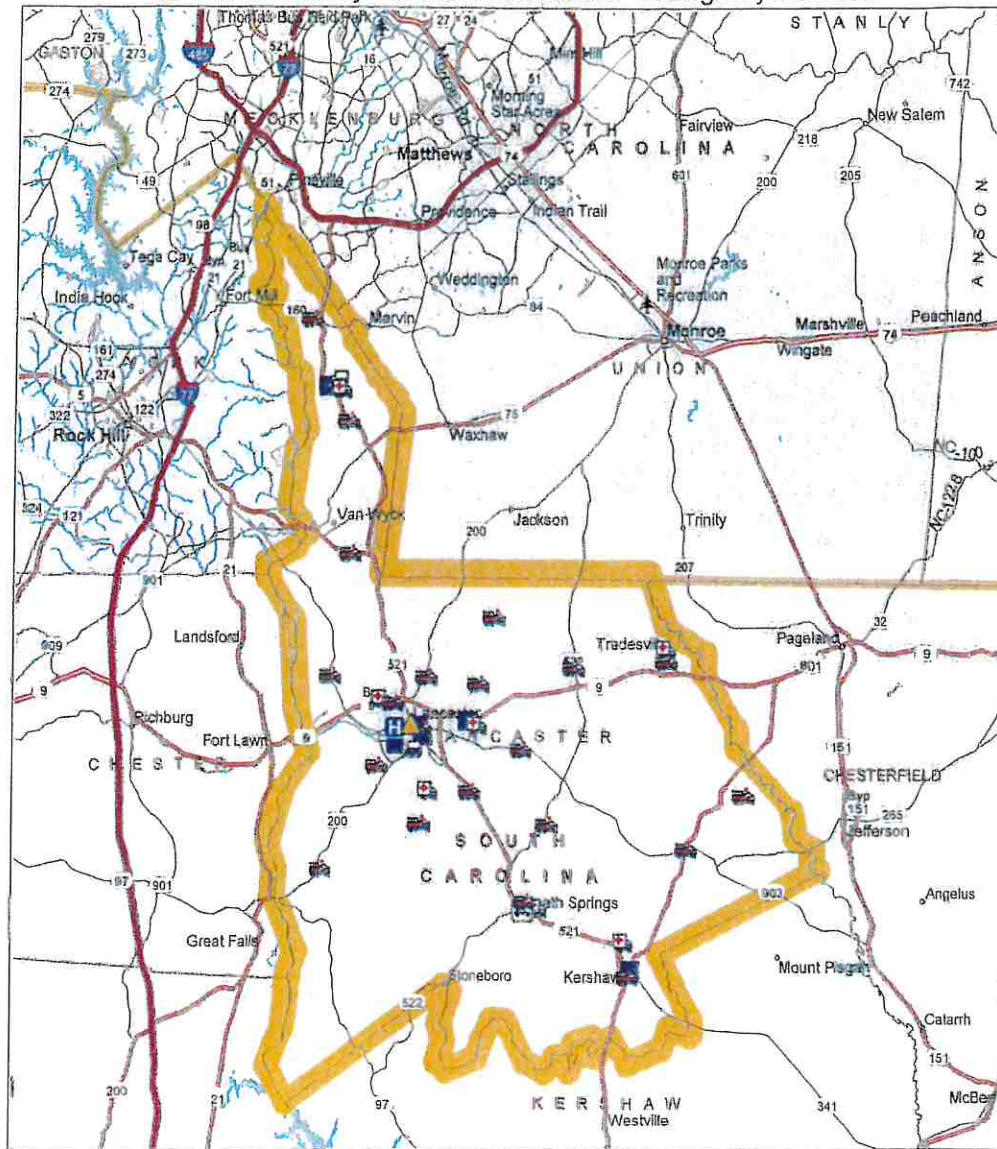
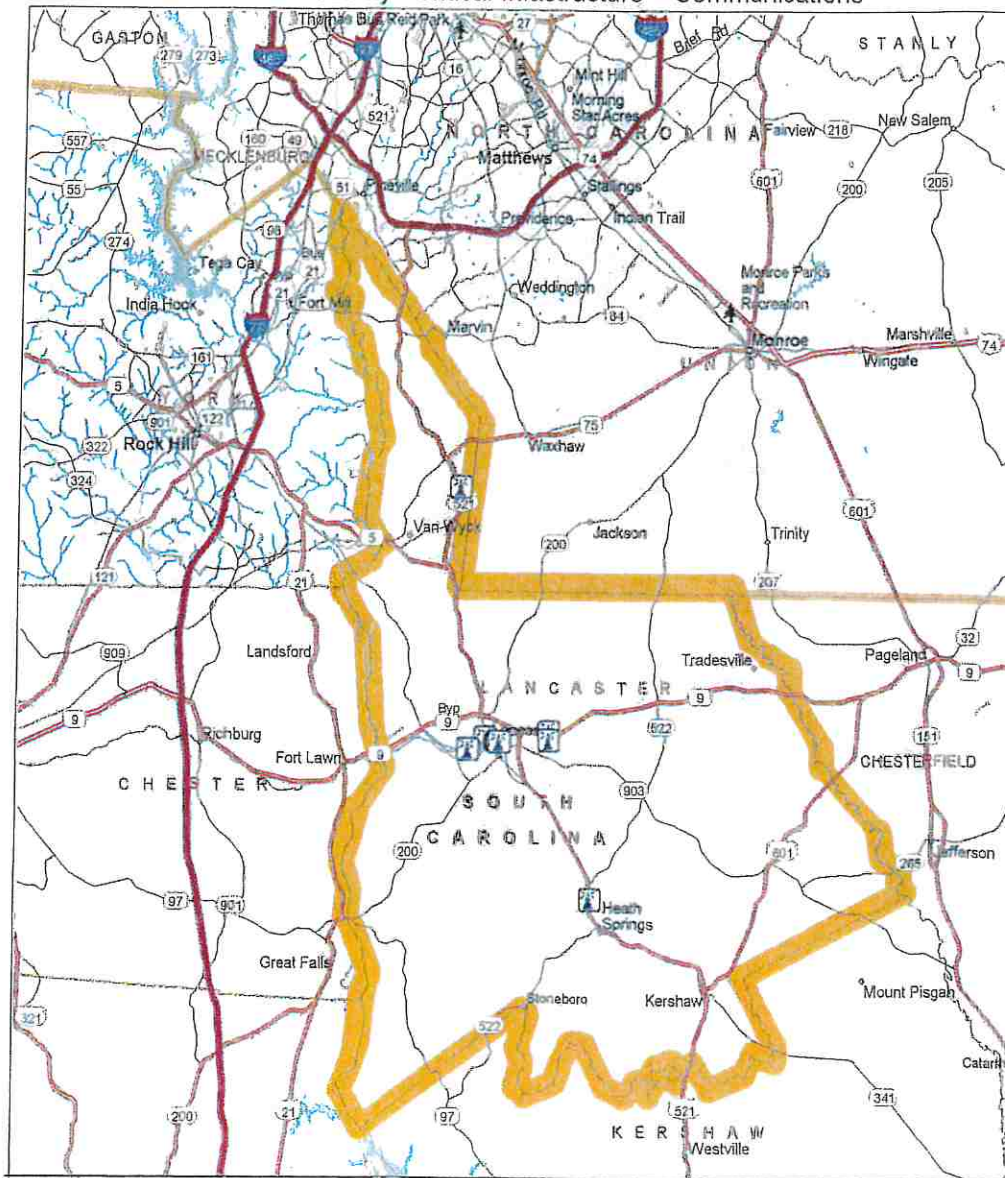


Figure 3-5

Emergency service facilities include fire stations, EMS stations, rescue squad stations, hospital, Emergency Operations Center, police departments, Sheriff's Department and law enforcement substations. These facilities are some of the most important facilities in the county with regard to emergency response to disasters. These facilities house personnel and indispensable equipment. (See figure 3-5).

Lancaster County - Critical Infrastructure - Communications



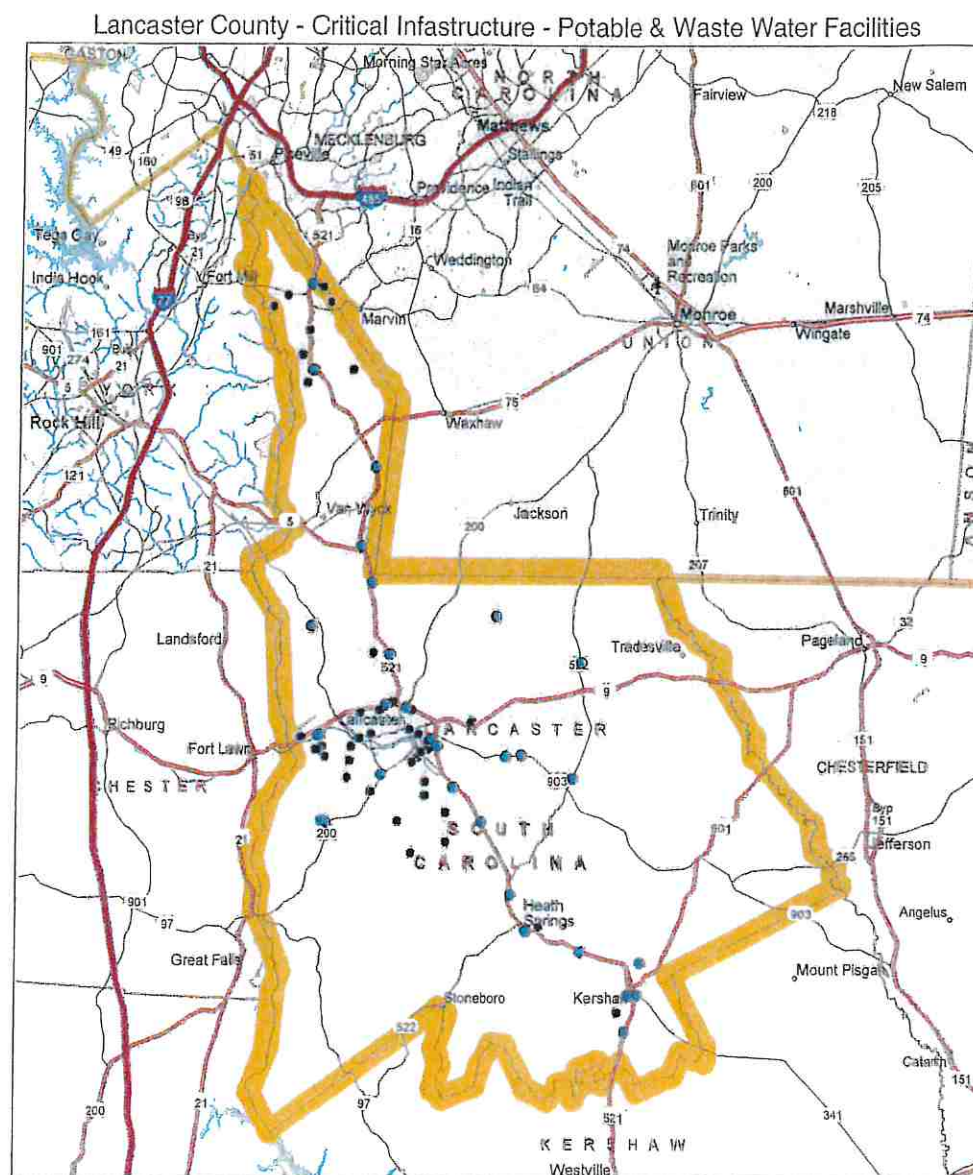


Figure 3-7

Other facilities that are essential to the health and safety of our citizens are water and sewer facilities. We have identified 67 installation points crucial to the effective operation of water and sewer systems operating within Lancaster County. (See Figure 3-7).

1. Lancaster County

Lancaster County owns and/or operates facilities across the county that are critical to the response of emergency services and recovery of its citizens to disaster. Many of these locations are shown on the maps located in this section of the plan (figures 3-1 through 3-7).

Lancaster County Owned/Operated Properties	
Indian Land Recreation Center 8286 Charlotte Highway	\$1,708,200
Springdale Recreation Center 260 South Plantation Road	\$872,100
Buford Recreation Center 4073 Hurley Walters Road	\$849,600
Andrew Jackson Recreation Center 6354 N. Matson Street	\$640,300
Lancaster County Council On Aging South Plantation Rd	\$1,004,800
Lancaster County Library (Indian Land) 7669 Charlotte Hwy	\$2,145,400
Indian Land Rescue Squad 8286 Charlotte Highway	\$834,500
Lancaster County Council on Aging 212 Spring Street, Heath Springs	\$382,500
Lancaster County Rescue Squad 3958 Great Falls Hwy	\$8900
Lancaster County Courthouse 128 N. Main St.	\$32,131,900
County Magistrates Office 761 Lancaster Bypass East	\$640,300
Lancaster County Sheriff's Office 1941 Pageland Hwy.	\$2,785,100
County Administration Building 101 N. Main Street	\$7,432,300
Lancaster County Airport	\$2,599,600
Old County Jail 208 W. Gay St.	\$287,100
Lancaster County Public Health /Dept. of Social Services 1833 Pageland Hwy.	\$3,025,900
Lancaster County Coroner's Office	\$225,800
Lancaster County Emergency Management 111 Covenant Place	831,300
Lancaster County Public Library 313 South White Street	\$1,062,000
Lancaster County Economic Development 210 W. Gay St.	\$696,900
Lancaster County Family Court 100 N. Catawba St.	\$335,200
Kershaw Branch Library 3855 Fork Hill Rd. Kershaw	\$1,458,700
Southside Early Childhood Center 500 Hampton Road, Lancaster	\$214,400
Brooklyn Springs Elementary 1637 Billings Drive, Lancaster	\$4,016,800

Lancaster County Owned/Operated Properties Continued	
Buford Elementary 1906 N. Rocky River Road	\$1,037,600
Clinton Elementary 110 Clinton School Road	\$469,000
Discovery School/GT 302 W. Dunlap Street	\$958,000
Erwin Elementary 1477 Locustwood Avenue	\$3,504,900
Heath Springs Elementary 158 Solar Road, Heath Springs	\$972,600
Indian Land Elementary 4137 Doby's Bridge Road, Indian Land	\$9,182,700
Kershaw Elementary 108 N. Rollins Drive, Kershaw	\$4,012,500
McDonald Green Elementary 2763 Lynwood Drive, Lancaster	\$772,000
North Elementary 1100 Roddey Drive, Lancaster	\$4,546,700
A. R. Rucker Middle 422 Old Dixie Road, Lancaster	\$1,516,000
Andrew Jackson Middle 6865 Kershaw-Camden Highway, Kershaw	\$3,947,835
Buford Middle 1890 N. Rocky River Road, Lancaster	\$1,037,600
Indian Land Middle 8361 Charlotte Highway, Indian Land	\$7,170,400
South Middle 1551 Billings Drive, Lancaster	\$4,016,800
Andrew Jackson High 6925 Kershaw-Camden Highway, Kershaw	\$6,363,665
Buford High 4290 Tabernacle Road, Lancaster	\$9,727,400
Indian Land High 8063 River Road, Indian Land	\$4,193,800
Lancaster High 617 Normandy Road, Lancaster	\$15,459,200
EMS Station 1, County Jail, Public Works Campus 2006 Pageland Hwy, Lancaster	\$5,086,000
EMS Station 2 1101 Crestfield Avenue, Lancaster	\$140,500
EMS Station 3 1301 Melvain Road, Lancaster	\$105,900
EMS Station 4 & 8 8290 Charlotte Hwy, Indian Land	\$343,700
EMS 365 Rocky River Rd.	\$197,300
EMS Station 6 3855 Fork Hill Road, Kershaw	See Kershaw Library
EMS Station 7 309 Hart Street, Heath Springs	\$14,000
Antioch Fire Dept. 3015 Taxahaw Rd., Lancaster	\$211,800
Bell Town Fire Dept. 4600 Great Falls Hwy., Lancaster	\$84,400

Lancaster County Owned/Operated Properties Continued	
Buford Fire Dept. 1893 N. Rocky River Rd., Lancaster	\$194,400
Camp Creek Fire Dept. 2386 Camp Creek Rd., Lancaster	\$22,400
Elgin Fire Dept. 114 Tram Rd.	\$143,000
Charlotte Road Van Wyck Fire Dept. 4455 Old Hickory Rd.	\$121,900
Flat Creek Fire Dept. 7663 Flat Creek Rd., Kershaw	\$196,900
Gooch's Fire Dept. 1594 Grace Ave., Lancaster	\$33,800
Indian Land Fire Dept. 185 Six Mile Creek Road, Indian Land	\$655,500
McDonald Greene Fire Dept. 2787 Lynwood Dr.	\$103,000
Pleasant Valley Fire Dept. 315 Fort Mill Hwy., Indian Land	\$2,465,300
Rich Hill Fire Dept. 3089 Rocky River Rd., Heath Springs	\$226,400
Riverside Fire Dept. 1875 Riverside Rd., Lancaster	\$144,100
Shiloh Zion Fire Dept. 703 Monroe Hwy.	\$134,300
Tradesville Fire Dept. 2145 Old Camden Monroe Hwy., Lancaster	\$131,400
Unity Fire Dept. 2495 Shiloh Unity Rd., Lancaster	\$87,400

Of social, economic, cultural, and public service importance during the recovery phase of a county wide disaster are the recreation centers. These locations are identified as Disaster Recovery Centers and discussed in the South Carolina Recovery Plan which is Appendix 6 of the South Carolina Emergency operations Plan. Additionally, of the schools listed, (4) four are emergency shelters (Andrew Jackson, Buford, Indian Land, and Lancaster High Schools).

Critical infrastructure and facilities comprise all public and private facilities deemed essential for the delivery of vital services, protection of special populations, and the provision of other services of importance for that community. This plan concentrates on a group of facilities that are crucial for protecting the health and safety of the population: health care, educational, and emergency response facilities. (Appendix 10)

2. City Of Lancaster

The City of Lancaster provided a list of structures and facilities that were critical to the City's infrastructure and to the citizens of the City.

City of Lancaster Properties	
Lancaster County Council of Arts Building (201 West Gay Street)	\$1,259,442
City Services Building (916 15 th Street)	\$14,127,138
City Hall (216 S. Catawba Street)	\$2,847,669
Municipal Justice Center (405 East Arch Street)	\$5,138,771
Fire Station #1 (401 East Arch Street)	\$1,267,856
Fire Station #2 (818 Hubbard Drive)	\$1,576,488
Fire Office, Training and Storage Building	\$119,103
Building at Police Dept. Firing Range (1451 Reservoir Road)	\$16,585
Building & Grounds Dept. (120 West Arch Street)	\$178,723
Public Works Complex (139 Lynwood Drive)	\$2,458,032
WWTP Properties Site 12 (1150 Lockwood Lane)	23,893,393
WWTP Properties Lift Stations	\$1,950,176
Hubbard Drive Water Tank and Facilities	\$1,423,444
Chesterfield Ave. Water Tank and Facilities	\$1,423,444
Vehicle Maintenance Building	\$936,787
Water Plant Pumping Station Building (2475 DHEC Road)	\$1,479,043

As the County Seat, the City of Lancaster has the greatest population density and is home to most of the vital structures in the county. In addition to those properties owned and maintained by the City there are numerous other facilities, including some critical infrastructure within the City Limits of Lancaster.

Of utmost importance to public health is the hospital. Springs Memorial Hospital (SMH) is located at 800 West Meeting Street in the City of Lancaster. SMH is a 200 bed hospital and a Level 2 Trauma Center. SMH is the only hospital in Lancaster County.

Of social, economic, cultural, and public service importance are the Lancaster County Administration Building, Lancaster County Economic Development, Lancaster County Chamber of Commerce, Lancaster County School District Administration Building, and University of South Carolina at Lancaster Campus. These are just a few of the facilities located within the City of Lancaster that are not City owned properties. Central to the operation of City Government is the City Hall. It houses administration, building, planning, and zoning, City Council Chambers, and city finance departments.

Other social, cultural, and historic sites within the City of Lancaster include:

- Lancaster County Courthouse designed by Robert Mills and built in 1828. The structure is listed on the National Historic Landmark Register.
- Kimbrell Building built in 1875 and located on the corner of Main and Dunlap Street. Until 1930 it was used as a hospital.
- 114 South Main Street was constructed 1888-1889 and housed the first Bank of Lancaster, L&C Railroad and Leroy Springs Cotton Company offices.
- First Methodist Church, organized in 1839, was the first church in the town of Lancaster.
- Old Lancaster County Jail was designed by Robert Mills and built in 1823. It is listed as a National Historic Landmark.
- Former A.M.E. Zion Church located on West Gay St. was the first A.M.E. church in Lancaster and was organized in 1870.
- Old Presbyterian Church and Cemetery was built in 1862 and was the first brick church in the county. It is listed on the National Register of Historic Places and owned by the Society for Historic Preservation.
- Springs House, built 1820-1830 the building served as the Lancaster City Hall from 1957 to 2000. It is listed on the National Register of Historic Places.
- Moore Building, Northeast corner of Main and East Gay. This is perhaps the oldest commercial building located in downtown Lancaster. Possibly built in the late 1860's or early 1870's, it is two stories high and is built of red flemish bond brick. This block was known as the McKenna Block. William McKenna was the largest landowner in downtown Lancaster in the 1830's and 1840's.

The Waste Water Treatment Plant and lift stations are of course a necessity for public health and a public service offered by the Town, as are the potable water system and the solid waste collection. (Appendix 11)

3. Town of Kershaw

The Town of Kershaw provided a list of structures and facilities that were critical to the Town's infrastructure and to the citizens of the Town.

Town of Kershaw Properties	
Town Hall	\$1,400,000
Floyd Street Water Tank	\$402,000
Hwy 601 Elevated Tank	\$685,800
Waste Water Lift Station at Prison	\$290,000
South Hart Street Lift Station	\$100,000
Waste Water Treatment Plant	\$7,268,500
Fire Station	\$705,000
113 S. Hampton St. Maintenance Shop	\$126,000
113 S. Hampton St. Equipment Shelter	\$59,000

Town of Kershaw Properties Continued	
N. Ashe St. Lift Station	\$26,000
E. 2 nd St. Lift Station	\$67,000
Little Dude Ave. Lift Station	\$50,000
E. Marion St. Community Health Building	\$307,000
Hwy. 601 Water Booster	\$71,000

One of the most important structures in the Town of Kershaw is the Town Hall. This building houses the Mayor's Office, Town Administrator's Office, Town Clerks Office, Sheriff's Sub-Station, and Council Chambers. This structure is the center for public services, public safety, and economic, cultural and social activities. It was constructed in 2009 to meet or exceed current building codes. The building is equipped with a sprinkler system as well as an alarm system. It is well above flood plains and is most susceptible to damage from a tornado strike or possibly high winds from a severe thunderstorm due to its shingled roof.

Another important structure in the Town of Kershaw is the Fire Station. It was built in 1979. The station has a wood truss gambrel style asphalt shingled roof with masonry load bearing walls. The roof is prone to wind damage due to its style of construction.

The Waste Water Treatment Plant and lift stations are of course a necessity for public health and a public service offered by the Town. As is the potable water system which includes the Floyd Street and Hwy 601 elevated water tanks. (Appendix 12)

4. Town of Heath Springs

The Town of Heath Springs provided a list of structures and facilities that were critical to the Town's infrastructure and to the citizens of the Town.

Town of Heath Springs Properties	
Town Hall/Fire Station	\$2,551,634
Train Depot	\$186,433
Waste Water Treatment Plant	\$2,254,434
WWTP Lab Building	\$11,560
WWTP Storage Building	\$61,545
WWTP Chemical Building	\$21,429
Lift Stations #1-7	\$590,439
Water Tank	\$626,021
WWTP Sodium Hypochlorite Building	\$34,465
Cauthen St. Building	\$64,753

The single most important structure in the Town of Heath Springs is the Town Hall/Fire Station. The original building was built in the late 1970's but it has been twice remodeled and added on to with the last addition and renovation completed in 1987 when the Fire Station portion of the building was expanded and a public works garage added. This building houses the Mayor's Office, Town Clerks Office, Sheriff's Sub-Station, Town Hall, Fire Station, and Public Works. This structure is the center for public services, public safety, and economic, cultural and social activities.

There are current plans to expand the building once again. The building in its existing configuration is designed to for 40-50 MPH Wind Loads. According to the 2006 International Building Code, the basic wind design for buildings in this zone should be 100 MPH. As this structure is considered critical infrastructure, the newest portions of the structure will be designed to withstand 120 MPH wind loads and the existing portions upgraded to withstand at least the 100 MPH loads the 2006 IBC requires.

The most historically important structure in the Town of Heath Springs is the Train Depot. The Depot was originally built in 1882 but it was destroyed by fire in December 1899. A replacement Depot was completed in April of 1900. Once again the Depot was destroyed by fire July 25, 1903. This was a historic fire in that it spread to and destroyed the better part of the business district of the Town of Heath Springs. In fact, this fire was the very reason Town Council passed an ordinance forbidding building of wood frame buildings on the burned block. Once again the Depot was rebuilt in December 1903. On January 14, 1909 the Depot was robbed and set on fire to cover the robbery. The current structure was rebuilt in 1910 and still stands today.

The Depot is a social and cultural center point of the Town as it is the site of annual Fourth of July celebration. It is used as a meeting place by the Town of Heath Springs and as a class room by the Heath Springs Fire Department and rented out for special occasions to private citizens and groups.

The Waste Water Treatment Plant and lift stations are of course a necessity for public health and a public service offered by the Town. (Appendix 13)

II. Flooding

Having investigated the different flooding issues of concern in Lancaster County, a series of analyses designed to assess current, relative vulnerability of structures in the county to flood events was performed. Less than .025% of all NFIP payments in the state of South Carolina over the last 32 years have gone to covered properties in Lancaster County (see table 3-2). Generally, flooding issues with homes and businesses are not the bulk of the problems faced by Lancaster residents, rather flooded and washed out roads and bridges account for our largest number of losses. Some of these "wash outs" can affect entire neighborhoods causing them to have to be evacuated because the only road in or out of their neighborhood may be partially or totally washed away.

National Flood Insurance Program Loss Statistics Jan. 1, 1978 Through July 31, 2016					
	Total Losses	Closed Losses	Open Losses	CWOP Losses	Total Payments
South Carolina	33,858	22,794	157	10,907	\$ 581,435,379.44
Lancaster County	9	7	0	2	\$ 149,186.08
Lancaster City	8	4	0	4	\$ 21,663.68

Closed Without Payment - CWOP

Table 3-2

Thunderstorms and tropical cyclones bring torrential rains. These rains, most in excess of (1) one inch per hour, cause riverine flooding as well as occasional overbank flooding depending on the timing and duration of the rain event.

Flooding problems resulting from runoff of surface water generally increase as areas become more urbanized such as in the City of Lancaster. Greater population density generally increases the amount of impervious area, e.g., pavement and buildings. This reduction in the amount of natural ground that can absorb rainfall results in an increase in the amount of surface runoff generated. Uncontrolled, this runoff may be channeled to areas that cause flooding of structures and roadways. This is especially true where the predevelopment land surface has a gently sloping surface with no defined channels. Such areas are subject to shallow sheet flooding during storms, but urbanization and other development speeds the accumulation of floodwater.

The damages caused by flash floods can be more severe than ordinary riverine floods because of the speed with which flooding occurs (possibly hindering evacuation or protection of property), the high velocity of water, and the debris load. Channel velocities of 9 feet per second, typically realized in flash floods, can move a 90 pound rock. The density of water enables it to pack a destructive punch. Water moving at 10 miles per hour exerts the same pressure on a structure as wind gusts at 270 miles per hour.

"During the 20th century, floods were the number one natural disaster in the United States in terms of the number of lives lost and property damage".

"March 2000, U.S. Geological Survey"

Sudden destruction of structures and washout of roads can result in loss of life. A high percentage of flood-related deaths result from motorists underestimating the depth and velocity of flood waters and attempting to cross swollen streams.

1. Lancaster County

Lancaster County Building and Zoning submitted a report to the HMPC dated November 2, 2010 (See Section 7 Appendix 6 Exhibit #2 under the previous cover). The report details new flood maps that will become effective after the completion of this document. Additionally, the report list zoning ordinances and regulations adopted by the county including an updated Flood Damage Prevention

Ordinance found in the Lancaster County Municode Chapter 8.1.7a Flood Damage Prevention.

The report detailed some homes that have been or may be subject to flooding. These include three apartment buildings, two mobile homes and five stick built homes on 8th Street which is in a low lying area along Bear Creek. See figures 3-8 and 3-9.



Fig. 3-8



Fig. 3-9

Additionally the report lists a mobile home at the end of East Park Drive which is situated along Hannah's Creek (See figure 3-10). Finally a home located along Rum Creek at 2265 Country Club Drive (See figure 3-11).



Fig. 3-10



Fig. 3-11

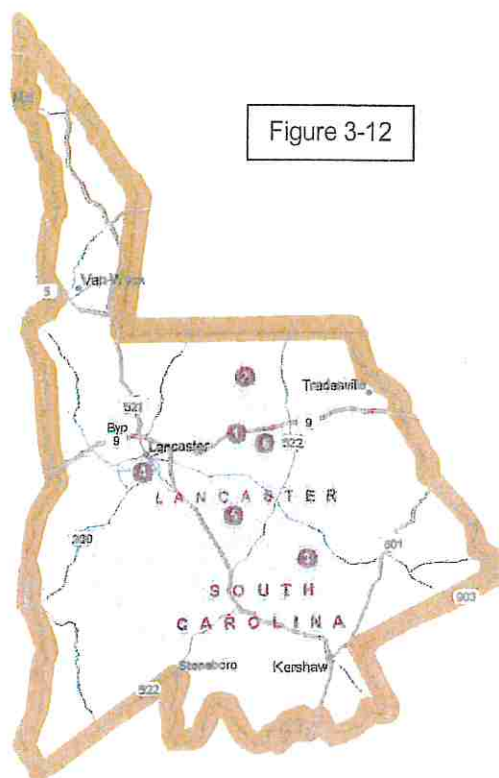


Figure 3-12

History has shown there are many creek crossings throughout the County that experience problems with flooding. With rainfall of as little as one inch per hour, several of these creek crossings overflow their banks, washing away the roads that cross them. These washouts pose a real danger to anyone foolish enough to attempt to cross them. But again, history has shown there are citizens that fail to realize the dangers of crossing water covered roads despite warnings. Creek crossings such as these identified in figure 3-12 and listed below not only are costly to maintain and repair but also pose a hazard to those that attempt to cross them when flooded and the emergency workers that risk their lives to rescue them. (Appendix 14)

Figure 3-12 shows the following roads that have creek crossings that are problematic: (1) Doster Road, (2) Daystar Road, (3) Fish Hatchery Road, (4) Old Farm Road, (5) Kirk Air Base Road, and (6) Langley Road. As an example of these hazards Figures 3-13, 3-14, 3-15, and 3-16 are presented here to underscore the assessment of these crossings.



Fig. 3-13

Doster Road September 2012 (South Branch Wildcat Creek) exhibiting significant road wash due to flooding exposing infrastructure and minimizing the roadway to one lane of travel.

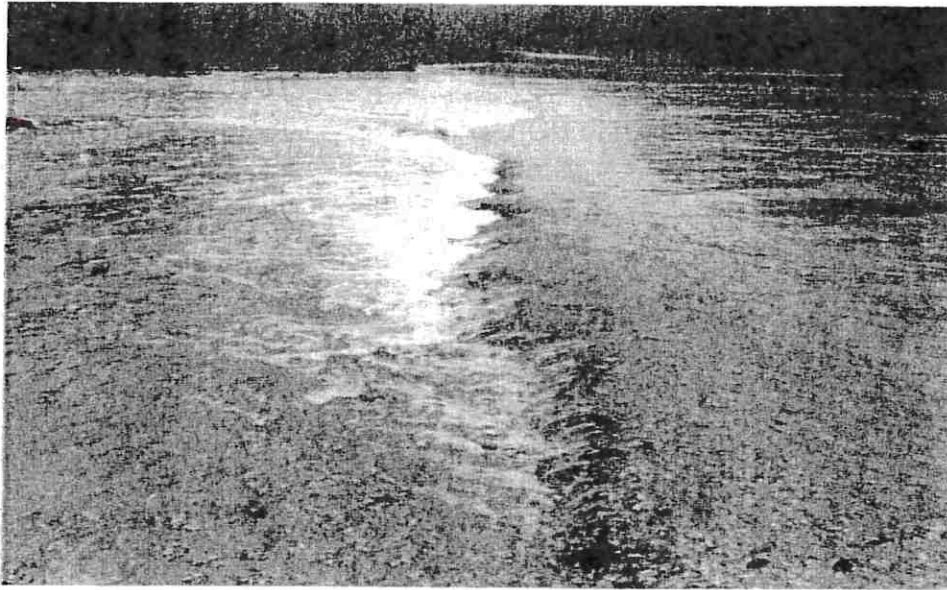


Fig. 3-14

Daystar Road November 2015 (Camp Creek Crossing)

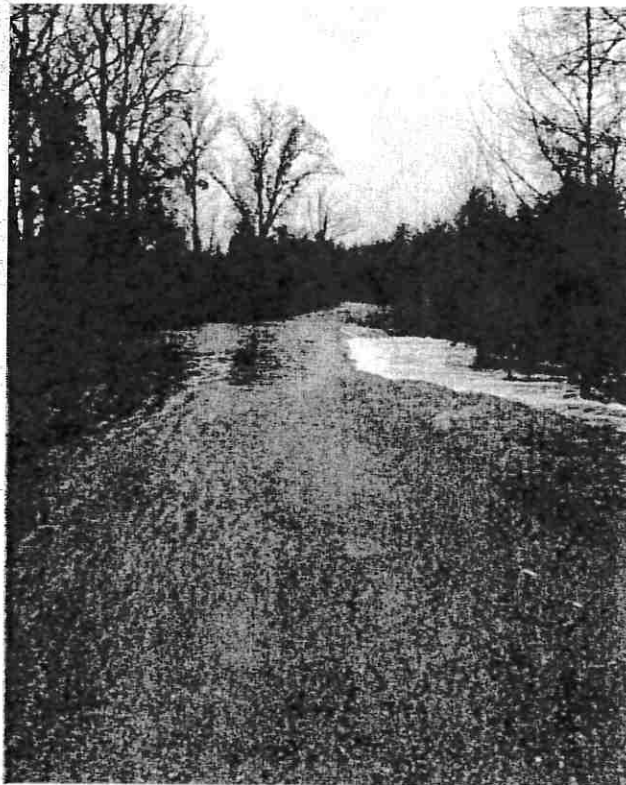


Fig. 3 -15

Old Farm Rd. November 2015 (Camp Creek Crossing)

In 3-14 and 3-15 you see examples of roadways in Lancaster County that are completely inundated with water. These present hazards to and threaten the lives of our residents, while placing our rescuers in perilous positions as they are faced with rescue situations. According to NOAA, it takes less than one foot of water to float most vehicles. Incidents such as those listed above as well as 3-16 below isolate neighborhoods and pose evacuation and response challenges.



Fig. 3 -16 Fish Hatchery Road November 2015 (Hanging Rock Creek) Road failure due to extreme wash downstream from an earthen dam.

2. City Of Lancaster

The City of Lancaster Building and Zoning Department submitted to the committee information pertaining to storm water management regulations. The City of Lancaster has adopted Article XII. "Flood, Drainage, Storm-water, Sediment, And Erosion Controls" as part of their City Code. The purpose of this ordinance is to protect the safety and welfare of the citizen of Lancaster while restricting or prohibiting land uses that may increase erosion, increase flood heights or velocities. This ordinance also ensures that uses of land vulnerable to floods, including facilities which serve such uses be protected against flood damage at the time of initial

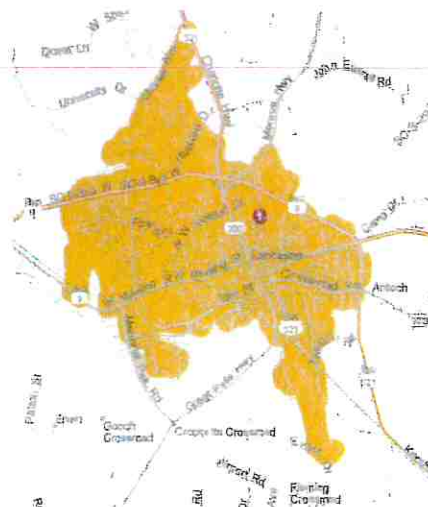
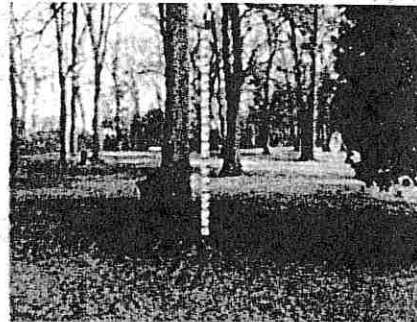


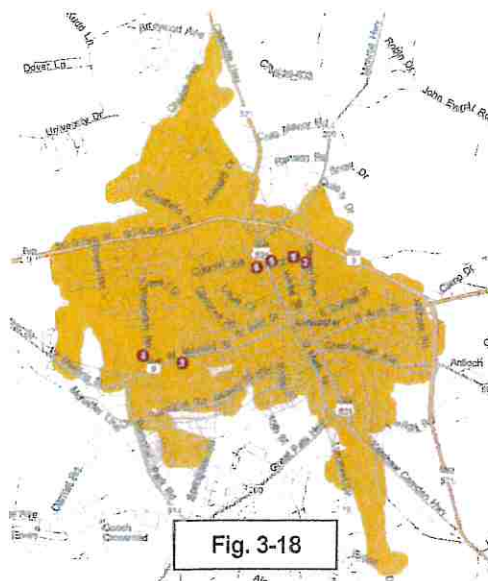
Fig. 3-17

construction and it establishes control of the alteration of natural floodplains, stream channels and natural protective barriers which are involved in the accommodation of floodwaters. Additionally, the ordinance prevents or regulates the construction of flood barriers which will unnaturally divert floodwaters or which may increase flood hazards to other lands.

According to information obtained from the Director of Public Works for the City of Lancaster, flooding and drainage problems are a rare problem for the City. The one exception is indicated in figure 3-17 by the number 1. This area, the intersection of Clinton Street Extension and Almetta Street, is frequently flooded by rains in excess of 1 inch per hour. These streets must be watched for flooding and, once flooded, barricaded to prevent motorists from driving through the waters. There are also four homes in the immediate area of this intersection that threatened when heavy precipitation falls. On average the public works department spends about \$500.00 per year in overtime dealing with floods.

Lancaster City Fire Department has placed six flood gauges around the city due to flooding. These gauges are used to monitor the depth and speed of rising flood waters. These gauges were installed and maintained by the fire department so their swift water rescue teams will have information required to determine rescue tactics. Some of these gauges are placed in locations where flash flooding has been known to occur and where swift water rescues have had to be performed. Figure 3-18 indicates the location of these flood gauges as follows; 1) Woodland Drive mounted on metal power transmission tower, 2) Clinton Avenue just past 448 Clinton Avenue on the west side of the road, 3) Melvin Steele Soccer Field at the intersection of Meeting Street and Woodlawn Dr. 4) On the west side of Plantation Road approximately 1000 feet north of the Meeting Street and Plantation Road intersection, 5) East of Woodland Drive and North Main Street along the creek bank in Constitution Park, 6) Near the Roddey Drive entrance to Constitution Park.





Hannah's Creek unites with Gills Creek in the City of Lancaster just before Gills Creek intersects Clinton Avenue near Almetta Street. Gills Creek then runs across the City of Lancaster from east to west roughly paralleling Woodland Drive before emptying into Cane Creek and on to the Catawba River. Heavy downpours across the City and to the west of the City can cause flash floods as these creeks come together. Often after heavy downpours the rush of water is slowed as Gills Creek and other smaller tributaries merge into Cane Creek causing flooding of areas along the creeks on the west side of the City of Lancaster. This flooding often results in the Melvin Steele Soccer Fields as well as the ball fields at the Lancaster County Parks and Recreation Complex on Plantation Drive to become completely submerged.

3. Town of Kershaw

The Town of Kershaw has adopted an ordinance for flood control. The Flood, Drainage, Storm-water, Sediment, And Erosion Controls ordinance was enacted to protect human life and health, minimize expenditure of public money for costly flood control projects, to minimize the need for rescue and relief efforts associated with flooding and generally undertaken at the expense of the general public; to minimize prolonged business interruptions, to minimize damage to public facilities and utilities; to help maintain a stable tax base by providing for sound use and development of flood-prone areas in such manner as to minimize future flood blight areas; and to insure that potential home buyers are notified that property is in a flood area.

To achieve the aforementioned goals this ordinance prohibits uses which are dangerous to health, safety and property due to water or erosion hazards, or which result in damaging increases in erosion or in flood heights or velocities; prevent alteration of natural floodplains, stream channels and natural protective barriers which are involved in the accommodation of floodwaters; and prevent the construction of flood barriers which will unnaturally divert floodwaters or which may increase flood hazards to other lands.

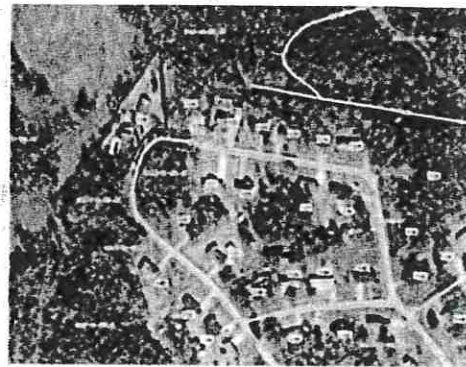
Zoning matters in the Town of Kershaw are administered through a collaborative process where Lancaster County Planning Commission holds public hearings meetings on behalf of the Town of Kershaw. The findings and recommendations are then presented to Kershaw Town Council in open public hearings. Kershaw Town Council may adopt or decline to adopt the recommendations of the county Planning Commission.

The Town of Kershaw has relatively few problems with flooding. The one exception is an area located on the west side of town, on Blackmon Circle (see figure 3-19 and 3-20).

Fig. 3-19



Fig. 3-20



A house located at 138 Blackmon Circle is regularly threatened by flood waters from Lick Creek that runs along the boundary of the property. Rain events that exceed a rate of (1) one inch per hour can cause the creek to overflow its banks and endanger the property.

4. Town of Heath Springs

The Town of Heath Springs has adopted an ordinance for flood control. The Flood, Drainage, Storm-water, Sediment, And Erosion Controls ordinance was enacted to protect human life and health, minimize expenditure of public money for costly flood control projects, to minimize the need for rescue and relief efforts associated with flooding and generally undertaken at the expense of the general public; to minimize prolonged business interruptions, to minimize damage to public facilities and utilities; to help maintain a stable tax base by providing for sound use and development of flood-prone areas in such manner as to minimize future flood blight areas; and to insure that potential home buyers are notified that property is in a flood area.

To achieve the aforementioned goals this ordinance prohibit uses which are dangerous to health, safety and property due to water or erosion hazards, or which result in damaging increases in erosion or in flood heights or velocities; prevent alteration of natural floodplains, stream channels and natural protective barriers which are involved in the accommodation of floodwaters; and prevent the construction of flood barriers which will unnaturally divert floodwaters or which may increase flood hazards to other lands.

Zoning matters in the Town of Heath Springs are administered through a collaborative process where Lancaster County Planning Commission holds public hearings meetings on behalf of the Town of Heath Springs. The findings and recommendations are then presented to Heath Springs Town Council in open public hearings. Heath Springs Town Council may adopt or decline to adopt the recommendations of the county Planning Commission.

As the Town of Heath Springs has an average elevation of over 490 feet above sea level there are relatively few flooding issues in the Town of Heath Springs.

III. Severe Thunderstorms

- A. Having investigated the different wind hazard issues of concern in Lancaster County, a series of analyses designed to assess current, relative vulnerability of structures in the County to Severe Thunderstorms and their accompanying high wind hazards was performed.

A thunderstorm is defined as a storm that contains lightning and thunder which is caused by unstable atmospheric conditions. When the upper air which is cold sinks and the warm moist air rises, storm clouds or 'thunderheads' develop resulting in thunderstorms. This can occur singularly, in clusters or in lines. Severe thunderstorms can bring in heavy rains which can cause flash floods, strong winds, lightening, hail and tornadoes.

Having previously addressed flooding problems, our attention turns to another aspect of these storms that causes the greatest amount of damage; strong or high winds. High Winds are sustained wind speeds of 40 mph or greater lasting for 1 hour or longer, or winds of 58 mph or greater for any duration. High wind advisories in South Carolina are normally included as part of some other watch or warning such as a severe thunderstorm.

Experts agree that structures built to meet or exceed current building code high-wind provisions have a much better chance of surviving violent windstorms. A roof's ability to withstand wind forces is critical in determining how well it can serve its primary function of dramatically increasing property losses due to the accompanying water-related damage.

Damage to the roof is extremely significant in the estimation of losses. Even small damage can be a significant contributor to the total damage of a structure because of the entrance of rain into the building. According to statistics from the National Weather Service, thunderstorm wind events alone caused more than \$267 million worth of property damages in 2015.

In the early 1970's there was increasing interest among building designers to incorporate wind loads into model building codes. The problem, however, was that existing standards from the Washington, D.C.- based American National Standards

Institute were based on testing high-rise buildings. Low-rise buildings, frequently constructed of metal reacted differently to wind based on boundary layer flow and the action of turbulence.

During the 1980's the Standard Building Code adopted low-rise building standards, and in the 1990s the American Society of Civil Engineers, Reston, VA incorporated the standards in its standard, ASCE 7, "Minimum Design Loads for Buildings and Other Structures." The new International Building Code, which combines the regionally focused National Building Code, Standard Building Code and Uniform Building Code, recognizes the ASCE wind-design loads.

Building codes generally require metal roofs to resist design wind-load pressures without any damage to roof systems. The 2000 IBC, for example is very explicit in requiring that metal-roofed buildings adequately address wind uplift. The code addresses issues of roof design and product testing.

Many factors influence the magnitude of wind velocity across a roof deck and the resulting uplift pressures. Wind gusts for the building location, the shape of the roof deck, edge configuration and the surrounding structures all influence a roof's wind resistance. Spacing and physical properties of supporting structural members such as gauge, yield strength and grade influence design and can affect fastener attachments.

Furthermore, wind resistance is influenced by secondary supports, such as beams, purlins and joists, as well as their connections to main structural members and construction details along edges and near openings like skylights.

1. Lancaster County

Lancaster County first began enforcing building codes in the 1990's. Structures constructed prior to the 1990's may not meet minimum construction standards. Throughout Lancaster County, emergency service facilities and some recreational facilities were built prior to the enforcement of building codes. Many of the structures that house our emergency services may be subject to the very disasters for which they will be called to respond to.

Eighteen out of our twenty-two fire stations and sub-stations were built by volunteer firefighters with funds raised by their respective communities. These structures, for the most part, were built for as little money as possible and constructed anywhere from the 1950's through today. Several are pole barns adapted for use as a fire station without any understanding or consideration of the term "critical infrastructure" or NFPA Standards.

Likewise, our Emergency Medical Service headquarters is in a house built in 1937. Some of the county offices have been moved into new government buildings that are up to current building codes and specifications. Most of those remaining buildings had

facelifts or were modernized in the late 1970's and early 1980's. Some of emergency service and public service buildings are mobile homes. Some of the essential services in the county are not in buildings built specifically for the purpose for which they are being used.

Many of these structures are subject to wind and hail damage. Most were not designed to address the pressures and uplift of high winds. It is doubtful that they were designed with shear forces or snow loads in mind.



Fork Hill Road July 2015



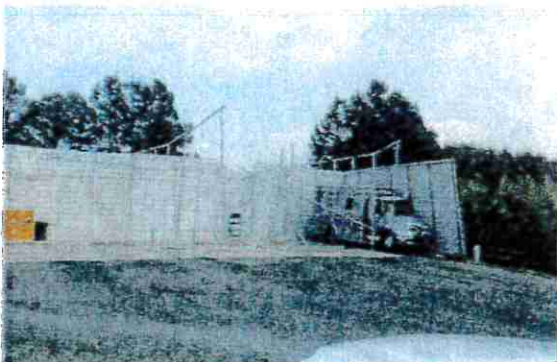
Rocky River Road July 2015



Flat Creek Road July 2015



Windsor Drive July 2015



EMS 1 Wind Damage September 2015

The photographs above are indicative of the types of wind damage associated with severe thunderstorms in Lancaster County. These photographs were taken in Lancaster County to document damage associated with severe thunderstorms. In the storm affecting the Fork Hill Road area, there were substantial straight line winds gusting to greater than 20 mph according to local weather stations. This pattern led to overturned outbuildings, downed trees and powerlines as well as roof damage to several structures.

The damage seen in a late day thunderstorm in September 2015 lifted the roof from a garage structure that houses EMS Response Units at Lancaster County Emergency Medical Service on Pageland Highway. The wind gusts reached greater than 30 mph during the storm.

2. City Of Lancaster

The City of Lancaster has identified 34 structures or facilities which they have determined to be susceptible to identified hazards in that the hazard could either cause damage to or otherwise interfere with operations. Many of these structures were constructed and inspected to meet standard building codes.

The City of Lancaster's Building and Zoning department has been enforcing building codes since 1969 and the Fire Department's code enforcement program dates back to the 1950's. These preventative measures have helped to mitigate many problems before they could arise.

Most of the City's critical infrastructure was built to withstand the average extremes of our naturally occurring environment. All emergency services structures are located well away from areas prone to flooding and are constructed substantially well. Of course with severe thunderstorms comes the risk of strong winds, flooding, and lightning. Very few public structures can completely resist the strongest severe thunderstorms we may anticipate.

At greatest risk are the historical structures. Many are wood framed balloon construction with asphalt shingled roofs. While some may have had slate roofs, many of those have been covered with asphalt shingles due to the excessive cost of using slate. These are subject to wind and hail damage which often accompanies severe thunderstorms.

3. Towns of Kershaw and Heath Springs

The Town of Kershaw has identified six structures or facilities which they have determined to be susceptible to identified hazards in that the hazard could either cause damage to or otherwise interfere with operations. Additionally, an assessment was made of how the loss of the structure or facility would affect the Social, Cultural, Economic, Environmental, Public Health, Public Safety, and Public Services. Table 3-3 shows the susceptibility for each structure or facility

as determined by the Town of Kershaw. Table 3-4 shows the impact loss of the facility or structure would have on Social, Cultural, Economic, Environmental, Public Health, Public Safety, and Public Service sectors of the community as determined by the Town of Kershaw.

To determine susceptibility to thunderstorms, a commonsense approach was used taking into account the conditions present during average thunderstorms and the condition of the structure being considered. Age and structural condition were considered as well as the maximum intensity of past thunderstorms. The results of this study may be subjective but past performance is the only objective proof available for comparison.

Town of Kershaw Susceptibility to Thunderstorm				
Structure or Facility Name	HIGH	MEDIUM	LOW	NONE
Waste Water Treatment Plant			X	
Town Hall			X	
Floyd Street Water Tower			X	
Hwy 601 Water Tower			X	
Prison Waste Water Lift Station		X		
South Street Waste Water Lift Station			X	

Table 3-3

Additionally, the same subjective commonsense approach was used to make an assessment of how the loss of the structure or facility would affect the Social, Cultural, Economic, Environmental, Public Health, Public Safety, and Public Services. This approach made judgments based on the premise that the structure or facility was destroyed and the local governmental body would have to replace it without insurance or outside help. Also the assessment looked at the service(s) these structures or facilities provide and considered what impact there would be if these services no longer were available.

Town of Kershaw Impact Loss							
Structure or Facility	Social	Cultural	Economic	Environmental	Public Health	Public Safety	Public Service
Waste Water Treatment Plant	High	High	High	High	High	Low	High
Town Hall	Medium	Medium	High	None	Low	Medium	High
Floyd Street Water Tower	Low	Low	High	Medium	Medium	Low	Medium
Hwy 601 Water Tower	Low	Low	High	Medium	Medium	Low	Medium
Prison Waste Water Lift Station	None	None	Medium	High	High	Low	Low
South Street Waste Water Lift Station	None	None	Medium	High	High	Low	Low

Table 3-4

The Town of Kershaw demolished its former Town Hall which was built in 1955 and replaced it with a new structure in 2010. The new building was built to meet and, in many instances, exceed current building codes. The new structure was built to easily resist the normally occurring weather elements as well as withstand our hazardous weather extremes.

Additionally, the building is equipped with a fire suppression sprinkler system and fire alarms. The roof of the structure is covered with conventional asphalt shingles which could lift during an extreme wind event, but the overall design and construction of the new building by far surpasses that of the previous Town Hall.

The Severe Thunderstorm vulnerability of the structures in both Kershaw and Heath Springs is dependent on several factors including:

- Ability of structures to withstand wind loads commensurate with the level of design attention (a measure of the level of engineering design for the structure)
- Quality of materials and construction
- Beneficial or adverse effects of nearby trees and structures
- Age and condition
- Emergency backup power generators
- Obscured access to personnel needed to operate and maintain facility

An example of a possible problem with this site could be: The 2006 Edition of the International Building Code requires structures should be designed to withstand a 100 mile per hour wind gust for 3 seconds. The Waste Water Lift Station near the State Prison on Hwy 601 was designed and built over 15 years ago, prior to a uniform inspection practices and mandated adherence to building codes. Its ability to withstand a Severe Thunderstorm with accompanying high wind event and lightning is suspect.

Another possible problem could be: The soil in this area is extremely sandy which is problematic when it comes to adequate grounding to disperse lightning adequately. This in turn increases the chance that stray voltage from lightning strikes could leave this Lift Station inoperable.

The Town of Heath Springs has identified thirteen structures or facilities which they have determined to be susceptible to identified hazards in that the hazard could either cause damage to or otherwise interfere with operations. Table 3-5 shows the susceptibility for each structure or facility as determined by the Town of Heath Springs. Table 3-6 shows the impact that loss of the facility or structure would have as determined by the Town of Heath Springs.

Town of Heath Springs Susceptibility to Severe Thunderstorm				
Structure or Facility Name	HIGH	MEDIUM	LOW	NONE
Town Hall/Fire Station			X	
Train Depot		X		
Waste Water Treatment Plant			X	
WWTP Lab Building		X		
WWTP Storage Building		X		
WWTP Chemical Building		X		
WWTP Equipment Building		X		
Lift Station #1			X	
Lift Station #2			X	
Lift Station #3			X	
Lift Station #4			X	
Lift Station #5			X	
Lift Station #6			X	

Table 3-5

Town of Heath Springs Impact Loss							
Structure or Facility	Social	Cultural	Economic	Environmental	Public Health	Public Safety	Public Service
Town Hall/Fire Station	High	High	High	High	High	High	High
Train Depot	High	High	Medium	None	None	None	Low
Waste Water Treatment Plant	Medium	Low	High	Medium	Medium	Low	Medium
WWTP Lab Building	Medium	Low	High	Medium	Medium	Low	Medium
WWTP Storage Building	None	None	Medium	Medium	Medium	Low	Low
WWTP Chemical Building	None	None	Medium	High	Medium	Low	Low
WWTP Equipment Building	None	None	Medium	Medium	Medium	Low	Low
Lift Station #1	Low	None	Medium	Medium	Medium	Low	Low
Lift Station #2	Low	None	Medium	Medium	Medium	Low	Low
Lift Station #3	Low	None	Medium	Medium	Medium	Low	Low
Lift Station #4	Low	None	Medium	Medium	Medium	Low	Low
Lift Station #5	Low	None	Medium	Medium	Medium	Low	Low
Lift Station #6	Low	None	Medium	Medium	Medium	Low	Low

Table 3-6

The Heath Springs Fire Department and Town Hall underwent a structural upgrade and addition during 2010 and 2011 to strengthen the structure against the effects of severe thunderstorms and tropical cyclones. Shear walls were added, massive four foot wide and four foot deep footings were poured to resist wind lift. The exterior metal façade, which included a steel and sheet metal three to four foot overhang and parapet, was removed and reworked to include hardy board and

brick which will better resist wind and the deteriorating effects of rain. Some structural changes were made to strengthen the roof against and prevent excessive snow loads. This structure was originally built prior to a code enforcement program being in place. After a review by a structural engineer it was determined to have been constructed with a wind load rating of approximately 40 miles per hour. The renovated structure was built to bring this load rating up to approximately 130 miles per hour.

As with the City of Lancaster, at greatest risk are the historical structures in Kershaw and Heath Springs. Many are wood framed balloon construction with asphalt shingled roofs. While some may have had slate roofs, many of those have been covered with asphalt shingles due to the excessive cost of using slate. These are subject to wind and hail damage which often accompanies these types of storms.

The vulnerability of Town owned structures was determined, for the purposes of this document by persons not licensed to perform such analysis and therefore may have overlooked engineering flaws not readily apparent to laymen.

IV. Tropical Cyclones

- A. Having investigated the different wind hazard issues of concern in Lancaster County, a series of analyses designed to assess current, relative vulnerability of structures in the County to high wind hazards was performed. Tropical cyclones are one of the events considered most probable to have a widespread effect on the County.

A tropical cyclone is a storm system characterized by a large low-pressure center and numerous thunderstorms that produce strong winds and heavy rain. They strengthen when water evaporated from the ocean is released as the saturated air rises, resulting in condensation of water vapor contained in the moist air. They are fueled by a different heat mechanism than other cyclonic windstorms such as nor'easters and polar lows.

The term "tropical" refers to both the geographic origin of these systems, which form almost exclusively in tropical regions of the globe, and their formation in maritime tropical air masses. The term "cyclone" refers to such storms' cyclonic nature, with counterclockwise rotation in the Northern Hemisphere. The category of tropical cyclones includes tropical depressions, tropical storms, and hurricanes.

Tropical cyclones can produce extremely powerful winds, torrential rain, and they are also able to spawn tornadoes. They develop over large bodies of warm water, and lose their strength when they move over land due to increased surface friction and loss of the warm ocean as an energy source.

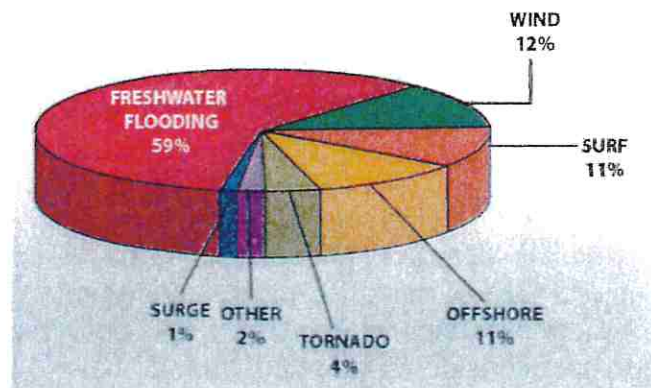
For Lancaster County, tropical cyclones present a combination of flooding, high winds, and severe thunderstorms. There is a chance of these storms spawning

tornadoes, yet alone, tropical cyclones are made up of sustained winds of 39 to 74-plus miles per hour. The greatest danger to Lancaster County, however, is the torrential rain.

It is recorded in a brochure produced in 2005 by National Oceanic and Atmospheric Administration, National Weather Service titled "Tropical Cyclone Flooding a Deadly Inland Danger" - that "Since the 1970s inland flooding has been responsible for more than half of all deaths associated with tropical cyclones in the United States."

Copied from National Oceanic and Atmospheric Administration, National Weather Service titled "Tropical Cyclone Flooding A Deadly Inland Danger"

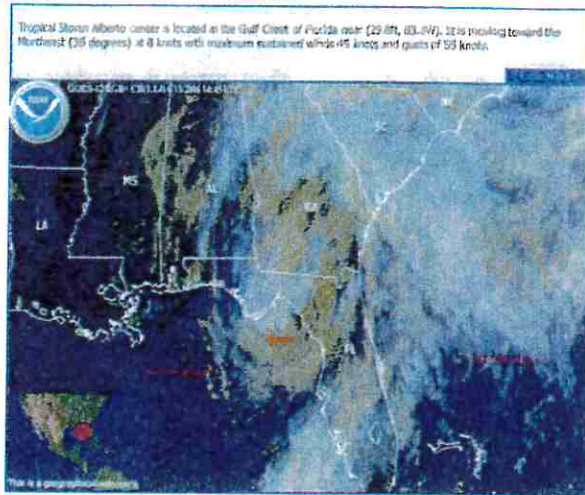
Deaths caused by the effects of tropical cyclones in the U.S. since 1970



1. Lancaster County

Lancaster County has seen the torrential rains that tropical cyclones can bring. According to National Weather Service at Columbia South Carolina Between the hours of 4:04 am Tuesday June 13, 2006 and 10:24 am Wednesday June 14, 2006 2.5"-3" of rain fell across Lancaster County as Tropical Storm Alberto made its way across Lancaster County. Alberto began its progression across the state in the early morning hours of that Wednesday with 40 mile per hour winds and a northeastern forward progression of 15 to 25 miles per hour dissecting the state of South Carolina diagonally from Barnwell County to Marlboro County.

During its track past Lancaster County, Alberto caused the closings of at least 36 roads in the county. Four of these were closed due to trees blown down from the 22 miles per hour winds coupled with saturated grounds while the others were closed for flooding. Nine creeks overflowed their banks and crossed roads. 5 roads suffered significant damage. Additionally 4 to 7 homes were reported flooded and damaged along Country Club Road. In the City of Lancaster five roads remained closed due to being submerged as of the morning of the 15th. Ten other roads throughout the county remained closed through the 15th of June with two not being opened again until after June 16th and 19th. There were no reported deaths due to this storm but the City of Lancaster Fire Department conducted at least two separate swift water rescues during the event.



From this single event it can be shown that within Lancaster County there are at least five roads that are subject to severe damage due to the torrential rains associated with tropical cyclones. Additionally, there are nine creeks that flooded out of their banks and rushed across roads. Our major vulnerability in this area is the loss of roads due to torrential flooding rains associated with this type of storm.

As mentioned in an earlier section of this document, many structures built prior to the 1990's may be subject to wind damage due to possible sub-par building practices conducted prior to code enforcement. Additionally, buildings with asphalt shingled roofs as well as some built up roofs may have difficulty withstanding the constant torrent of 20 to 39 mile per hour wind driven rains of a slow moving storm.

It is estimated that as many as 18 of the 22 county fire stations/substations and 6 of the 8 EMS stations may be vulnerable to damage caused by tropical cyclones. The vulnerability of county owned structures was determined, for the purposes of this document by persons not licensed to perform such analysis and therefore may have overlooked engineering flaws not readily apparent to laymen.

Additionally, the problems associated with debris management must be considered. Lancaster County is limited in its ability by both manpower and equipment to contend with any large debris producing event without outside assistance from private contractors.

2. City of Lancaster

The City of Lancaster, like Lancaster County has many of the same vulnerabilities to flooding. The torrential rains associated with these storms can quickly overwhelm the storm water drainage systems causing flooding of city streets.

Additionally, the confluence of Gills Creek and Hanna's Creek as well as that of Gills Creek and Cane Creek makes the low lying areas around these creeks in the City of Lancaster susceptible to flooding.

Many structures built prior to building inspection services may be subject to wind damage due to possible sub-par building practices conducted prior to code enforcement. Additionally, buildings with asphalt shingled roofs as well as some built up roofs may have difficulty withstanding the constant torrent of 20 to 39 mile per hour wind driven rains of a slow moving storm.

Most of the City's critical infrastructure was built to withstand the average extremes of our naturally occurring environment. All emergency services structures are located well away from areas prone to flooding and are constructed relatively well. Of course with tropical cyclones comes the risk of strong winds, flooding, lightening, and hail. Very few public structures can completely resist the strongest tropical cyclones we may anticipate.

At greatest risk are the historical structures. Many are wood framed balloon construction with asphalt shingled roofs. While some may have had slate roofs, many of those have been covered with asphalt shingles due to the excessive cost of using slate. These are subject to wind and hail damage which often accompanies these types of storms.

The vulnerability of city owned structures was determined, for the purposes of this document by persons not licensed to perform such analysis and therefore may have overlooked engineering flaws not readily apparent to laymen.

3. Towns of Kershaw and Heath Springs

The Town of Kershaw has identified six structures or facilities which they have determined to be susceptible to identified hazards in that the hazard could either cause damage to or otherwise interfere with operations. Additionally, an assessment of how the loss of the structure or facility would affect the Social, Cultural, Economic, Environmental, Public Health, Public Safety, and Public Services. Table 3-7 shows the susceptibility for each structure or facility as determined by the Town of Kershaw. Table 3-8 shows the impact loss of the facility or structure would have on Social, Cultural, Economic, Environmental, Public Health, Public Safety, and Public Service sectors of the community as determined by the Town of Kershaw.

To determine susceptibility to tropical cyclones, the same commonsense approach was used as with the method used for the susceptibility measurements for severe thunderstorms previously in this plan.

Additionally, the same subjective commonsense approach was used to make an assessment of how the loss of the structure or facility would affect the Social, Cultural, Economic, Environmental, Public Health, Public Safety, and Public Services. This approach made judgments based on the premise that the structure or facility was destroyed and the local governmental body would have to replace it without insurance or outside help. Also the assessment looked at the service(s) these structures or facilities provide and considered what impact there would be if these services no longer were available.

Town of Kershaw Susceptibility to Tropical Cyclones				
Structure or Facility Name	HIGH	MEDIUM	LOW	NONE
Waste Water Treatment Plant	X			
Town Hall			X	
Floyd Street Water Tower		X		
Hwy 601 Water Tower		X		
Prison Waste Water Lift Station			X	
South Street Waste Water Lift Station			X	

Table 3-7

Town of Kershaw Impact Loss							
Structure or Facility	Social	Cultural	Economic	Environmental	Public Health	Public Safety	Public Service
Waste Water Treatment Plant	High	High	High	High	High	Low	High
Town Hall	Medium	Medium	High	None	Low	Medium	High
Floyd Street Water Tower	Low	Low	High	Medium	Medium	Low	Medium
Hwy 601 Water Tower	Low	Low	High	Medium	Medium	Low	Medium
Prison Waste Water Lift Station	None	None	Medium	High	High	Low	Low
South Street Waste Water Lift Station	None	None	Medium	High	High	Low	Low

Table 3-8

The Town of Kershaw demolished its former Town Hall which was built in 1955 and replaced it with a new structure in 2010. The new building was built to meet and, in many instances, exceed current building codes. The new structure was built to easily resist the normally occurring weather elements as well as withstand our hazardous weather extremes.

Additionally, the building is equipped with a fire suppression sprinkler system and fire alarms. The roof of the structure is covered with conventional asphalt shingles which could lift during an extreme wind event, but the overall design and construction of the new building by far surpasses that of the previous Town Hall.

The Town of Heath Springs has identified thirteen structures or facilities which they have determined to be susceptible to identified hazards in that the hazard could either cause damage to or otherwise interfere with operations. Table 3-9 shows the susceptibility for each structure or facility as determined by the Town of Heath Springs. Table 3-10 shows the impact loss of the facility or structure would have on the community as determined by the Town of Heath Springs.

Town of Heath Springs Susceptibility to Tropical Cyclones				
Structure or Facility Name	HIGH	MEDIUM	LOW	NONE
Town Hall/Fire Station			X	
Train Depot	X			
Waste Water Treatment Plant		X		
WWTP Lab Building	X			
WWTP Storage Building	X			
WWTP Chemical Building	X			
WWTP Equipment Building	X			
Lift Station #1			X	
Lift Station #2			X	
Lift Station #3			X	
Lift Station #4			X	
Lift Station #5			X	
Lift Station #6			X	

Table 3-9

Town of Heath Springs Impact Loss							
Structure or Facility	Social	Cultural	Economic	Environmental	Public Health	Public Safety	Public Service
Town Hall/Fire Station	High	High	High	High	High	High	High
Train Depot	High	High	Medium	None	None	None	Low
Waste Water Treatment Plant	Medium	Low	High	Medium	Medium	Low	Medium
WWTP Lab Building	Medium	Low	High	Medium	Medium	Low	Medium
WWTP Storage Building	None	None	Medium	Medium	Medium	Low	Low
WWTP Chemical Building	None	None	Medium	High	Medium	Low	Low
WWTP Equipment Building	None	None	Medium	Medium	Medium	Low	Low
Lift Station #1	Low	None	Medium	Medium	Medium	Low	Low
Lift Station #2	Low	None	Medium	Medium	Medium	Low	Low
Lift Station #3	Low	None	Medium	Medium	Medium	Low	Low
Lift Station #4	Low	None	Medium	Medium	Medium	Low	Low
Lift Station #5	Low	None	Medium	Medium	Medium	Low	Low
Lift Station #6	Low	None	Medium	Medium	Medium	Low	Low

Table 3-10

The tropical cyclone vulnerability of these structures is dependent on several factors including:

- Ability of structures to withstand wind loads due to the level of design attention (a measure of the level of engineering design for the structure)
- quality of materials and construction
- beneficial or adverse effects of nearby trees and structures
- age and condition
- Insulation and heating factors
- Emergency backup power generators
- Process and functions in non-climate controlled areas
- Obscured access to personnel needed to operate and maintain facility

The Heath Springs Fire Department and Town Hall underwent a structural upgrade and addition during 2010 and 2011 to strengthen the structure against the effects of severe thunderstorms and tropical cyclones. Shear walls were added, massive four foot wide and four foot deep footings were poured to resist wind lift. The exterior metal façade, which included a steel and sheet metal

three to four foot overhang and parapet, was removed and reworked to include hardy board and brick which will better resist wind and the deteriorating effects of rain. Some structural changes were made to strengthen the roof against and prevent excessive snow loads. This structure was originally built prior to a code enforcement program being in place. After a review by a structural engineer it was determined to have been constructed with a wind load rating of approximately 40 miles per hour. The renovated structure was built to bring this load rating up to approximately 130 miles per hour.

Many structures built prior to building inspection services may be subject to wind damage due to possible sub-par building practices conducted prior to code enforcement. Additionally, buildings with asphalt shingled roofs as well as some built up roofs may have difficulty withstanding the constant torrent of 20 to 39 mile per hour wind driven rains of a slow moving storm.

Again, at greatest risk are the historical structures. Many are wood framed balloon construction with asphalt shingled roofs. While some may have had slate roofs, many of those have been covered with asphalt shingles due to the excessive cost of using slate. These are subject to wind and hail damage which often accompanies these types of storms.

The vulnerability of town owned structures was determined, for the purposes of this document by persons not licensed to perform such analysis and therefore may have overlooked engineering flaws not readily apparent to laymen.

V. Winter Storms

- A.** Having investigated the different Winter Storm issues of concern in Lancaster County, a series of analyses designed to assess current, relative vulnerabilities of structures in the County to Winter Storm hazards was performed. Winter storms are one of the types of events considered most probable to have a wide spread effect on the County.

1. Lancaster County

The vulnerability to these storms is directly linked to the size of the winter storm. Any storm with less than 1/8 of an inch of ice or less than 2 inches of snow and of short duration can be weathered quite easily. However, any storm producing more than 1/8 of an inch of ice or more than 2 inches of snow or a combination of the two is of great concern. (See Table 13a)

Winter Events Affecting All Jurisdictions Within Lancaster County					
Type of Winter Event	Schools & Local Government Offices	Roads	Bridges & Overpasses	Electrical Utilities	Severity
< 2" of Snow < ¼" of Ice Above 32° F	Possible Delay or Early Dismissal	Generally Passable with Caution	Generally Passable with Caution	Outages Typically < 500	MILD
< 2" of Snow < ¼" of Ice Below 32° F	Likely Delay or Early Dismissal	Generally Passable with Few Minor Incidents. Caution Urged When Driving.	If Treated: Generally Passable with Few Minor Incidents	Outages Typically < 500	
2" – 4" of Snow or ¼" – ½" of Ice Below 32° F	Likely Closed	Passable with Some Minor Incidents. Necessary Travel Only.	If Treated: Passable with Caution. Minor Incidents Likely.	Outages 500 to 2,000 Likely	MODERATE
Over 4" of Snow or Over ½" of Ice Below 32° F	Closed	Most Secondary Roads Not Passable. Travel Not Advised.	Dangerous. Travel Not Advised	Outages >2,000 Likely	SEVERE

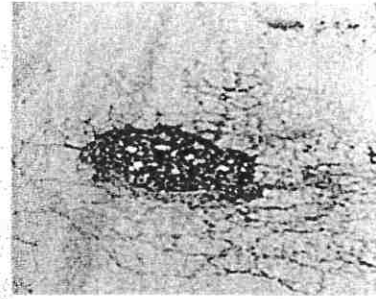
Table 3-11 a

At the first mention of a possible winter storm, Emergency Management begins monitoring the threat and reviewing emergency plans. Other agencies are notified of the possible threat and warnings are issued. If the threat develops into an actuality, personnel are sent into the field to monitor conditions and assist any citizens that may be stranded in the storm. Once it is determined that the road conditions are hazardous schools are closed and all nonessential County offices are closed. If there is a chance for wide spread power outages, the Red Cross is notified to prepare to open shelters as needed.

Lancaster County emergency services (Fire, EMS, & Sheriff) have limited access to vehicles capable of all-weather operation. During winter storms travel by emergency services is limited to only emergency response. Response with lights and siren is suspended. County Fire Service and EMS four wheel drive vehicles are dispatched with ambulances to access road conditions assist stuck ambulances, and in some cases transport patients from their homes to the ambulances for transport to the hospital.

When a winter storm hits Lancaster County almost everything shuts down. Authorities recommend that travel be limited to only what is absolutely necessary and for the most part citizens comply. Lancaster County does not own any dedicated snow removal equipment, but uses motor graders to scrape county roads. Fire trucks and ambulances are not equipped with chains or all-wheel drive. For the most part everyone is asked to simply stay home and wait out the storm.

Most vulnerable to the effects of winter storms are roofs and roads throughout the county. Winter storms that end with prolonged periods of thawing and refreezing cause the most damage. Evidence of this can be found with the after effects of the winter storms of 2011.



As a result of the thawing and refreezing action that immediately followed the 2011 storms, the LCEMS training building had ice build under the shingles of the roof. As ice thawed and refroze it lifted the shingles and pushed water into the building. This cycle continued over a week with each cycle causing additional damage. Eventually water damaged extended from the roof to the floor.

Secondary roads throughout the county did not fare much better during the thaw and refreeze cycle. Water from the thaw penetrated deeper into the cracks in the asphalt during the day where it then froze and expanded overnight. In many cases this caused large sections of some roads to heave upward and crumble apart. As a result many secondary roads across Lancaster County are pot hole filled and terrible to travel on. Lancaster County spent over \$14,300 in material, equipment and labor in addition to inmate labor used to repair roads damaged by this winter storm.

2. City of Lancaster

The City of Lancaster is susceptible to winter storms. The vulnerability to these storms is directly linked to the size of the winter storm. Any storm with less than 1/8 of an inch of ice or less than 2 inches of snow and of short duration can be weathered quite easily. However, any storm producing more than 1/8 of an inch of ice or more than 2 inches of snow or a combination of the two is of some concern.

In the event of an ice related winter storm the City of Lancaster Public Works responds to clear any storm debris that would prohibit or interfere with streets, storm drains, and right of ways. The City reportedly has all equipment necessary to complete their assigned mission including chainsaws, vacuum trucks, knuckle boom trucks and backhoes.

3. Towns of Kershaw and Heath Springs

The six structures or facilities previously mentioned for the town of Kershaw vulnerable to severe weather have also been examined in relation to winter storms. Table 3-11b shows the susceptibility for each structure or facility as determined by the Town of Kershaw. Table 3-12 shows the impact that loss of the facility or structure would have on the community as determined by the

Town of Kershaw. The results of this study may be subjective but past performance is the only objective proof available for comparison.

Town of Kershaw Susceptibility to Winter Storms							
Structure or Facility	Social	Cultural	Economic	Environmental	Public Health	Public Safety	Public Service
Waste Water Treatment Plant	High	High	High	High	High	Low	High
Town Hall	Medium	Medium	High	None	Low	Medium	High
Floyd Street Water Tower	Low	Low	High	Medium	Medium	Low	Medium
Hwy 601 Water Tower	Low	Low	High	Medium	Medium	Low	Medium
Prison Waste Water Lift Station	None	None	Medium	High	High	Low	Low
South Street Waste Water Lift Station	None	None	Medium	High	High	Low	Low

Table 3-11b

Town of Kershaw Impact Loss				
Structure or Facility Name	HIGH	MEDIUM	LOW	NONE
Waste Water Treatment Plant		X		
Town Hall			X	
Floyd Street Water Tower				X
Hwy 601 Water Tower				X
Prison Waste Water Lift Station				X
South Street Waste Water Lift Station			X	

Table 3-12

The six structures or facilities previously mentioned for the town of Heath Springs vulnerable to severe weather have also been examined in relation to winter storms. Table 3-13 shows the susceptibility for each structure or facility as determined by the Town of Heath Springs. Table 3-14 shows the impact that loss of the facility or structure would have on the community as determined by the Town of Heath Springs.

Town of Heath Springs Susceptibility to Winter Storms				
Structure or Facility Name	HIGH	MEDIUM	LOW	NONE
Town Hall/Fire Station			X	
Train Depot			X	
Waste Water Treatment Plant		X		
WWTP Lab Building		X		
WWTP Storage Building		X		
WWTP Chemical Building		X		
WWTP Equipment Building		X		
Lift Station #1			X	
Lift Station #2			X	
Lift Station #3			X	
Lift Station #4			X	
Lift Station #5			X	
Lift Station #6			X	

Table 3-13

Town of Heath Springs Impact Loss							
Structure or Facility	Social	Cultural	Economic	Environmental	Public Health	Public Safety	Public Service
Town Hall/Fire Station	High	High	High	High	High	High	High
Train Depot	High	High	Medium	None	None	None	Low
Waste Water Treatment Plant	Medium	Low	High	Medium	Medium	Low	Medium
WWTP Lab Building	Medium	Low	High	Medium	Medium	Low	Medium
WWTP Storage Building	None	None	Medium	Medium	Medium	Low	Low
WWTP Chemical Building	None	None	Medium	High	Medium	Low	Low
WWTP Equipment Building	None	None	Medium	Medium	Medium	Low	Low
Lift Station #1	Low	None	Medium	Medium	Medium	Low	Low
Lift Station #2	Low	None	Medium	Medium	Medium	Low	Low
Lift Station #3	Low	None	Medium	Medium	Medium	Low	Low
Lift Station #4	Low	None	Medium	Medium	Medium	Low	Low
Lift Station #5	Low	None	Medium	Medium	Medium	Low	Low
Lift Station #6	Low	None	Medium	Medium	Medium	Low	Low

Table 3-14

The winter storm vulnerability of these structures is dependent on several factors including:

- Ability of structures to withstand snow loads due to the level of design attention (a measure of the level of engineering design for the structure)
- quality of materials and construction
- beneficial or adverse effects of nearby trees and structures
- age and condition
- Insulation and heating factors
- Emergency backup power generators
- Process and functions in non-climate controlled areas
- Obscured access to personnel needed to operate and maintain facility

The Town of Kershaw does not own any snow removal equipment or pretreatment equipment. Kershaw is dependent upon South Carolina Department of Transportation to clear state owned roads throughout Town. Kershaw's Public Works department is very limited in staff and resources. The department lacks the equipment and manpower to adequately respond to any winter storm or major debris causing event such as an ice producing winter storm.

The waste water treatment plant is somewhat vulnerable to the effects of a winter storm. Should icing and/or fallen trees cause a power interruption, the facility has a generator to temporarily restore power. The most critical component to the operation of the plant could be the lack of personnel to operate it should ice and snow prevent travel to the site. Additionally, there is a possibility of damage due to icing should there be a prolonged power outage.

An example of a possible problem with this site could be: The 2006 Edition of the International Building Code requires structures in the Kershaw area to be designed with a 10 pound per square foot snow load as a minimum. Certain structures in both Kershaw and Heath Springs were designed and built over 50 years ago, prior to a uniform inspection practices and mandated adherence to building codes. Its ability to withstand a major winter storm event is suspect.

Another possible problem could be: Winter Storm travel to and from facilities may be difficult at best. Some facilities that require personnel to attend to them may be neglected for days due to weather conditions. During these periods of time damages may go unnoticed and may compound without immediate intervention.

The Heath Springs Fire Department and Town Hall underwent a structural upgrade and addition in 2011 to strengthen the structure against the effects of severe weather events. The exterior metal façade, which included a steel and sheet metal three to four foot overhang and parapet, will be removed and reworked to better resist wind and the deteriorating effects of rain. Some structural changes will be made to strengthen the roof against overloading by snow. This structure was originally built prior to a code enforcement program being in place. After a review by a structural engineer it was determined to have been constructed with a wind load rating of approximately 40 miles per hour. The renovated structure was built to bring this load rating up to approximately 130 miles per hour.

VI. Technological and Manmade Hazards

Technological hazards related to manmade structures and certain business and industrial activity pose a potential threat to our citizenry, economy and our environment. The purpose of this plan is to address where natural disasters affect or contribute to technological or manmade hazards. The hazards identified as posing the most significant threat in Lancaster County are dam failure, hazardous materials release, train derailment and infrastructure failures.

A. Dams

South Carolina Department of Health and Environmental Control Geologists and Hydrologists with the Bureau of Water, responsible for surface water monitoring and dam safety, have identified fifty dams in Lancaster County. Of the fifty, six are considered to be high hazard, four significant hazard and forty low hazard dams. Recent South Carolina events have drawn attention to the potential threat associated with inundation and dam failure.

The high hazard dams contain range of 219,900,000 to 3,258,500,000 gallons of water at full pond. Four of the six dams that are considered high hazard dams are of earthen construction with an earthen core. Two of these that create an impoundment for the city water supply are of a soil and rock construction. A dam failure at these locations would create substantial flooding for down-stream residents and potentially compromise transportation routes.

B. Hazardous Materials

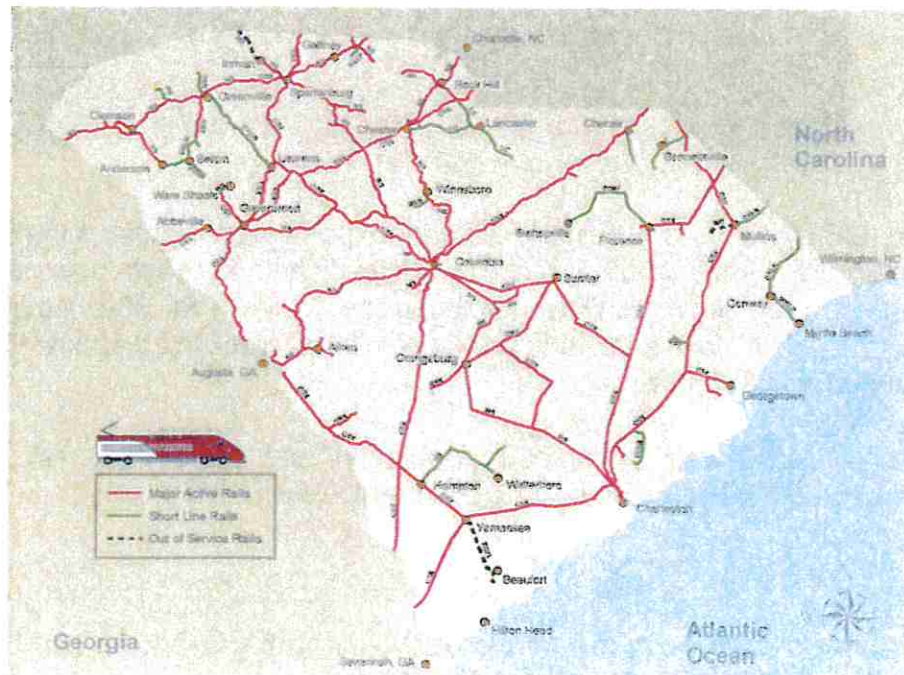
No community in our county is immune to the potential release of hazardous materials whether from a facility, pipeline or transportation routes. Lancaster County Emergency Management developed a Hazard Materials Response Plan in 2016 that identifies the risks from greatest to least hazardous.

The production, transportation, and misuse of hazardous materials pose a threat to our community, as do process failures at facilities. Proximity is the most

significant vulnerability associated with hazardous material release or containment failures. Currently, there are no provisions for separating residential development, churches and schools from facilities or pipelines that manufacture, store, transport or use hazardous materials.

C. Train Derailment

Lancaster County is situated on the South Carolina and North Carolina state line and has two rail lines running through the county. The CSX rail line runs east to west across the northern end of the county running parallel to Highway 75. The CSX rail line has seen three derailments from 2010 – 2016 in a 5.8 mile stretch splitting the state line. Fortunately for the communities surrounding the tracks, there were no hazardous materials in the involved cars. The most significant loss was \$1.6 million dollars according to the National Transportation Safety Board.





CSX Derailment May 2011 at the NC/SC State Line.

The Lancaster and Chester Railroad experienced similar situations with two derailments since 2007. The most significant of these was when the train destroyed the Buy Rite Discount Beverage on Main St. after leaving the tracks. The L & C Railroad represents the most miles of track in Lancaster County with 60 miles of primary track.

With more industry, increased population and more trips, rail incidents are recognized as a vulnerability in Lancaster County.

D. Infrastructure Failure

Infrastructure failure is the failure of critical public or private utility infrastructure resulting in the temporary loss of essential functions or services. According to the latest census data, Lancaster County is the twenty-sixth fastest growing county in the nation. With the vast network of water and sewer lines, treatment facilities, the electrical grid, communication and transportation, failures can occur anywhere.

Incidents of failure frequently involve widespread areas and are not concentrated in one neighborhood. Citizens and businesses are dependent on utility infrastructure to provide essential services such as power, gas, sewer disposal and treatment and communications.

When the water or wastewater treatment systems in a community are inoperable due to a system failure, serious public health concerns arise that must be addressed immediately to prevent outbreaks of disease. Typically, it is the most vulnerable members of society that are the most heavily impacted. If the failure involves more

than one system, or is large enough in scope and magnitude, whole communities can be severely impacted.

Lancaster County has had few incidents of failure related to infrastructure unrelated to outside influence such as severe weather. Our primary failures impact transportation and safety and are directly related to natural events such as flooding that undermines streets or removes the surface from the roadway cutting off access.

VII. Assessment Summary

A. Assessment

Having investigated the different hazards to Lancaster County and the municipalities of Lancaster, Kershaw, and Heath Springs and determined the level of susceptibility of each jurisdiction we can determine the vulnerability of the county as a whole to these hazards.

1. Lancaster County

Lancaster County and its municipalities are at risk in the following ways:

- Severe Thunderstorms
 - ~ 190% Annual chance of severe thunderstorm
 - ~ Typically Low losses as the localized nature of the storms generally affect less than 50% of the population at any one time.
- Flash Floods and Flooding
 - ~ 75% annual chance of a flooding event, 1% Chance of 100-year flood and .2% Chance of 500-year flood event.
 - ~ Typically Low losses as the localized nature of the flood zones generally affect less than 10% of the population at any one time.
- Winter Storms
 - ~ 71.2% Annual chance of winter storm event
 - ~ Typically Low to Medium losses as the widespread nature of these storms generally affects 100% of the population at any one time, however actual damages are not usually significant unless the storm is a heavy ice producer.
- Tropical cyclones
 - ~ 18% Annual chance of being affected by a tropical system.
 - ~ Typically Medium to High losses as the widespread nature of these storms generally affects 100% of the population at any one time, however actual damages depend significantly on the size, duration, speed, and strength of the storm. Producers of significant heavy precipitation and high wind are a rare event.
- Technological and Manmade Hazards
 - ~ Present a potential threat to our citizenry, economy and our environment.
 - ~ Represent the potential collision between natural disasters and technological or manmade hazards.

- ~ *Those identified as posing the most significant threat in Lancaster County are:*
 - *Dam failure*
 - *Hazardous materials release*
 - *Train derailment*
 - *Infrastructure failures.*
- ~ *Increased demands, aging equipment and structures coupled with slow inadequate funding options to repair, replace or enhance current infrastructure present as a vulnerability.*

SECTION - 4

MITIGATION

CAPABILITY

ASSESSMENT

I. Mitigation Capability Assessment Introduction

The planning process has identified the natural, manmade, and technological hazards posing a threat to Lancaster County and described and quantified the vulnerability of the County and communities to these risks. The next step, prior to forming goals and objectives for improving each jurisdiction's ability to reduce the impacts of these risks, is to assess what loss prevention mechanisms are already in place. Doing so provides the County's "net vulnerability" to natural, manmade, and technological disasters and more accurately focuses the goals, objectives and proposed actions of this plan. This part of the planning process is referred to as the Mitigation Capability Assessment.

The HMPC took two approaches in conducting this assessment. First, an inventory of existing policies, regulations and plans was made. These policy and planning documents were collected and reviewed to determine if they contributed to reducing hazard related losses, or if they inadvertently contributed to increasing such losses. Second, an inventory of other mitigation activities was made through the use of a matrix. The purpose for this effort was to identify activities and actions beyond policies, regulations and plans that were either in place, needed improvement, or could be undertaken, if deemed appropriate.

The HMPC collected and analyzed the documents presented in Table 4-1.

Table 4-1. Document Used for Capability Assessment

Lancaster County	City of Lancaster	Town of Kershaw	Town of Heath Springs
Lancaster County Emergency Operations Plan January 2009	Signatory	Signatory	Signatory
Flood Damage Management Ordinance of Lancaster County, Municode Chapter 9 Ordinance 1095 August 23, 2016	Ordinance #008-16 Flood, Drainage, Storm-water, Sediment, & Erosion Controls July 8, 2008	Follows County	Follows County
Ordinance #847 Building and Construction Standard Codes Adopted Sept. 10, 2007	Ordinance #008-12 Technical Codes Adopted June, 24, 2008	Follows County	Follows County
Hazard Mitigation Plan January 28, 2012	Signatory	Signatory	Signatory
Section 108, Unsafe Structures, International Property Maintenance Code, 2012	Ordinance #008-12 Technical Codes Adopted June, 24, 2008	Follows County	Follows County
Ordinance #309, Unified Development Ordinance Sept. 28, 1998	Code of Ordinances Section 31-267 Development permit and certification requirements.	Ordinance #60 Unified Development Ordinance	Follows County
Lancaster County Debris Management Plan March 23, 2010	Ordinance #006-02 Bulk Collection March 28, 2006	Follows County	Follows County
Ordinance #921 Fire Prevention Code June 2, 2008	Ordinance #002-04 Fire Prevention Code May 14, 2002	Follows County	Ordinance #15A Fire Prevention Ordinance June 24, 1986
Lancaster County Hazardous Materials Response Plan 2015	Signatory	Signatory	Signatory

The following is a bulleted summary of how each of these documents contributes to an overall Hazard Mitigation framework. Each point identifies where and how mitigation concepts, principles and measures are integrated into the normal day-to-day activities of the local governments.

- **Lancaster County Emergency Operations Plan**

Section 2 of the Lancaster County Emergency Operations Plan (EOP) contains a description of Emergency Support Function (ESF) 14 – Long-Term Recovery and Mitigation. The purpose of this ESF is to seek out, promote and build mitigation opportunities into the recovery process.

In Support Annex 2 of the Lancaster County EOP is the Emergency Recovery Plan. This plan seeks to return county infrastructure to equal to or better than pre-incident condition through use of mitigation practices.

Additionally, there is Support Annex 5 of the Lancaster County EOP titled Mitigation. This portion of the plan specifically states that Lancaster County agencies and emergency departments with responsibilities included in the EOP will develop standard operating procedures based on Hazard Mitigation.

- **Lancaster County Ordinance 1095, Municode Chapter 9 Flood Damage Management Ordinance – “Storm Water Management Ordinance”**

The objective of this ordinance is to protect human life and health, to help maintain a stable tax base by providing for the sound use and development of flood-prone areas in such a manner as to minimize flood blight areas, and to insure that potential home buyers are notified that property is in a flood area. The provisions of the article are intended to minimize damage to public facilities and utilities such as water and gas mains, electric, telephone, and sewer lines, streets and bridges located in the floodplain, and prolonged business interruptions. Also, an important floodplain management objective of this article is to minimize expenditure of public money for costly flood control projects and rescue and relief efforts associated with flooding.

- **City of Lancaster Ordinance # O08-16**

The objective of this ordinance is to protect human life and health; to minimize expenditure of public money for costly flood control projects; to minimize the need for rescue and relief efforts associated with flooding and generally undertaken at the expense of the general public; to minimize prolonged business interruptions, to minimize damage to public facilities and utilities; to help maintain a stable tax base by providing for sound use and development of flood-prone areas in such manner as to minimize future flood blight areas; and to insure that potential home buyers are notified that property is in a flood area.

- **Lancaster County Ordinance # 847, Chapter 7 Buildings and Construction**

The objective of this ordinance is to adopt the latest model building codes and standards so that Lancaster County Building and Zoning can insure the built environment will meet or exceed the latest minimum standards for safety.

- **City of Lancaster Ordinance # O08-12**

The objective of this ordinance is to adopt the latest model building codes and standards so that City of Lancaster Building and Zoning can insure the built environment will meet or exceed the latest minimum standards for safety.

- **Lancaster County Hazard Mitigation Plan**

FEMA requires state, tribal, and local governments to develop and adopt hazard mitigation plans as a condition for receiving certain types of non-emergency disaster assistance, including funding for mitigation projects. Jurisdictions must update their hazard mitigation plans and re-submit them for FEMA approval every five years to maintain eligibility. Through the Hazard Mitigation Assistance (HMA) grant programs (Hazard Mitigation Grant Program, Pre-Disaster Mitigation, and Flood Mitigation Assistance), FEMA offers planning grants that support state, tribal, and local governments in developing and updating mitigation plans.

- **International Property Maintenance Code, Section 108**

Descriptive code that outlines code use and authority to declare a structure unsafe in the event of damage due to a natural or manmade disaster and compromise.

- **Lancaster County Ordinance # 309**

The Unified Development Ordinance establishes zoning districts, setbacks from streams and designated floodplains, erosion control, storm water management, conditional uses, administrative procedures, flood damage prevention, and other rules regarding the use of land in Lancaster County.

- **City of Lancaster Code of Ordinances Section 31-267**

The City of Lancaster adopted a Unified Development Ordinance to establish zoning districts, set setbacks from streams and designated floodplains, erosion control, storm water management, conditional uses, administrative procedures, flood damage prevention, and other rules regarding the use of land in the City of Lancaster.

- **Town of Kershaw Ordinance # 60**

The Town of Kershaw adopted a Unified Development Ordinance to establish zoning districts, set setbacks from streams and designated floodplains, erosion control, storm water management, conditional uses, administrative procedures, flood damage prevention, and other rules regarding the use of land in the Town of Kershaw.

- **Lancaster County Debris Management Plan**

This plan is designed to identify agencies and activities that are involved in debris operations to ensure a coordinated response which achieves removal, storage, and final disposition of debris deposited along or immediately adjacent to public right-of-way in the unincorporated areas of the County.

- **City of Lancaster Ordinance # 006-02**

This ordinance establishes policy for the collection of yard debris, white goods, and solid waste collection by the City of Lancaster.

- **Lancaster County Ordinance # 921**

This ordinance is intended to prescribe regulations consistent with nationally recognized practices for the reasonable protection of life and property from the hazards of fire and explosion due to the storage, use or handling of hazardous materials, substances and devices, and from conditions hazardous to life or property in the use or occupancy of buildings or premises.

- **City of Lancaster Ordinance # 002-04**

This ordinance is intended to prescribe regulations consistent with nationally recognized practices for the reasonable protection of life and property from the hazards of fire and explosion due to the storage, use or handling of hazardous materials, substances and devices, and from conditions hazardous to life or property in the use or occupancy of buildings or premises.

- **Town of Heath Springs Ordinance # 15A**

This ordinance regulates the burning of materials outdoors within the Town Limits of Heath Springs. This ordinance is intended to prescribe regulations consistent with nationally recognized practices for the reasonable protection of life and property from the hazards of fire.

- **Lancaster County Hazardous Materials Response Plan**

This plan was written to identify and establish an ordered list, reporting those materials that may pose a hazard to the citizens of Lancaster County. The plan also identifies recommended best practices for response and mitigation based on the DOT Emergency Response Guidebook. The inventory of materials is based on the most up to date Tier II data available.

II. Local Government Capability Matrix

In addition to the assessment of community policies, regulations and plans, the Hazard Mitigation Planning Committee also created a matrix (see table 4-2) as a way of taking inventory of additional mitigation capabilities in each community. The intent of this effort was to see if there were any similarities or gaps in community programs and tools that might indicate where some improvements could be made.

The matrix and the key to the matrix labels are located on the following pages. There are boxes that are shaded yellow, and others that are red. The yellow boxes highlight an opportunity to make an improvement, such as:

- Giving consideration to incorporating Hazard Mitigation principles throughout the various elements of a community's planning efforts or as a separate element itself.

The red boxes highlight issues that should generate a higher level of concern, and thus warrant further investigation. For example, the red highlighted boxes indicate:

- That no incorporated municipality has undertaken any special efforts to protect their critical facilities from wind damages. This could easily be a mitigation priority.

Table 4-2 Capability Matrix

	Lancaster County	City Of Lancaster	Town of Kershaw	Town of Heath Springs
Comp Plan	YES	COUNTY PLAN	COUNTY PLAN	COUNTY PLAN
Is HM included	YES	COUNTY PLAN	COUNTY PLAN	COUNTY PLAN
Land Use Plan	YES	YES	COUNTY	COUNTY
Subdivision Ordinance	YES	YES	NO	NO
Zoning Ordinances	YES	YES	YES	YES
Hazard Mitigation Plan	YES	COUNTY PLAN	COUNTY PLAN	COUNTY PLAN
FPM Ordinance	YES	YES	YES	YES
Administrator	YES	YES	YES	COUNTY PLAN
Sub. Damage	YES	YES	YES	YES
No. of FP Bldgs **	1	75 31 Mobile Homes 5 Apartment Bldgs 39 Other Bldgs	0	0
No. of policies	60	25	0	0
No. of RLs	2	4	0	0
CRS Rating	NONE	NONE	NONE	NONE
Storm-water Program	YES	YES	YES	YES
Building Official	YES	YES	COUNTY SERVICE	COUNTY SERVICE
Inspections	YES	YES	COUNTY SERVICE	COUNTY SERVICE
Local EOP	YES	COUNTY PLAN	COUNTY PLAN	COUNTY PLAN
Warning-sirens	NO	NO	NO	NO
Reverse 911	YES	NO	COUNTY	COUNTY
ReachSC	YES	COUNTY PLAN	COUNTY PLAN	COUNTY PLAN
Cable Override	NO	NO	NO	NO
NOAA Radio	YES	NO	NO	NO
Structural Protection Projects	YES 5 RESERVOIRS	YES	YES	NO
Property Protection Projects	NO	NO	NO	NO
Critical Facility Protection	SOME	SOME	NO	NO
Natural And Cultural Inventory	NO	NO	NO	NO
Erosion Control	YES	YES	YES	YES
Sediment Control	YES	YES	YES	YES
Pub. Info Prgm	SOME	NO	NO	NO
Env. Ed Prgm	NO	NO	NO	NO

** Based on best available information.

EXPLANATION OF CAPABILITY ASSESSMENT MATRIX

Comp Plan: Does the community have a Comprehensive Long-Term Community Growth Plan?

Land Use Plan: Does the community have a plan that designates type of Land Use desired/required?

Subdivision Ordinance: Does the community have an ordinance that dictates lot sizes, density, setbacks, construction type, etc?

Zoning Ordinance: Does the community have an ordinance that dictates type of Use and Occupancy in certain areas?

HM Plan: Does the community have an existing stand-alone Hazard Mitigation Plan?

FPM Ord: Does the community have a Floodplain Management Ordinance: Directs development in identified Flood Hazard Areas.

Sub. Damage: Does the FPM Ordinance contain language on Substantial Damage/Improvements?

Administrator: Does the community have a Floodplain Administrator (someone responsible for enforcing the ordinance)?

Of FP Bldgs.: How many buildings are in the floodplain in the community?

Of policies? How many buildings in the floodplain are insured against flood through the NFIP?

Of RL's: How many NFIP Repetitive Losses are in the community? (Paid > \$1,000, twice in the past 10 years)

CRS Rating: Is the community in the Community Rating System of the NFIP, and if so, what's the rating?

Storm-water Program: Does the community have a Storm-water Management program?

Building Official: Does the community have a Building Official?

Inspections: Does the community conduct building inspections during and after completion of the development process?

LEOP: Does the community have a Local Emergency Operations Plan (a disaster RESPONSE plan)?

Warning: Do you have any type of system, such as: Sirens? NOAA Weather Radio reception? Cable (TV) Override? "Reverse 911"?

Structural Protection Projects: (levees, drainage facilities, detention/retention basins)

Property Protection Projects: (buy-outs, elevation of structures, flood proofing, small "residential" levees or berms/floodwalls)

Critical Facility Protection: (for example, protection of power substations, sewage lift stations, water-supply sources, the EOC, police/fire stations, medical facilities ... that are at risk ... e.g., in the floodplain)

Natural And Cultural Inventory: Does the community have an inventory of resources, maps, or special regulations within the community? (Wetlands and historic structures/districts, etc.)

Erosion or Sediment Control: Does the community have any projects or regulations in place?

Public Information and/or Environmental Education Program: Does the community have an ongoing program even if its primary focus is not hazards? Examples would be regular flyers included in city utility billings, a website, or an environmental education program for kids in conjunction with Parks & Recreation.

SECTION - 5

GOALS AND

OBJECTIVES

I. Introduction

The Lancaster County Hazard Mitigation Planning Committee worked together to develop goals and objectives for addressing hazard mitigation. The process for writing these goals and objectives aimed to make them **Specific, Measurable, Achievable, Relevant and Timely**. In order to begin the discussion of goals, the committee first had to review the hazard identification and vulnerability assessment to determine the most significant threats to the county and communities. It is important that every mitigation project have the potential to reduce the effects of a future disaster or event.

II. Planning

The committee was presented with a review of existing policies, procedures and regulations for dealing with various hazards and threats posed by them. This is Section 4 of the plan, the Capability Assessment. The committee focused on communities' existing policies and practices towards protecting lives and property from its various threats. After discussing the results of the capability assessment and determining needs for addressing identified hazards, a set of goals was drafted. There are several pieces of the planning process that must be explained:

Goals: represent broad statements that are achieved through the implementation of more specific, action-oriented policies or projects. Goals establish the framework for mitigation projects.

Proposed Hazard Mitigation Policies: Policies are defined as an ongoing course of action agreed to by members of the Planning Team.

Proposed Hazard Mitigation Projects: Projects are defined as actions taken to address defined vulnerabilities to existing systems.

Mitigation Action Plan: a prioritized list of actions, each of which includes a categorization of the mitigation technique, the hazards addressed, the individual or organization responsible for implementation, an estimated timeline for completion, and series of funding sources.

III. Mitigation Goals

The following are a compilation of goals identified, currently underway, or needed to reduce the impacts of natural, man-made, or technological events. The purpose of this section is to describe general goals and objectives for Lancaster County and the municipalities included in its boundaries as they relate to the mitigation program.

- **Goal #1:** Minimize loss of life, injury, damage to property, the economy, and the environment from natural, man-made and technological hazards at all times through hazard mitigation.

- **Goal #2:** Lancaster County will have the capability to develop, maintain, and utilize hazard information during events of significance.
- **Goal #3:** The continuity of county government operations will not be significantly disrupted during any disaster due to lack of notification or a prioritized contact list.
- **Goal #4:** Enhance the Hazards Education, Notification, and Public Information Programs during this mitigation period.
- **Goal #5:** Identify structural and infrastructure projects that will reduce vulnerability and impact to the citizens of Lancaster County, while promoting resiliency during this mitigation period.

IV. Identification and Analysis of Mitigation Measures

FEDERAL REQUIREMENTS FOR LOCAL MITIGATION PLANS 44 CFR 201.6. The local mitigation plan is the representation of the jurisdiction's commitment to reduce risks from natural hazards, serving as a guide for decision makers as they commit resources to reducing the effects of natural hazards. Local plans will also serve as the basis for the State to provide technical assistance and to prioritize project funding.

EMAP STANDARD 4.4.5: The mitigation plan shall be based on the natural and human-caused hazards identified by the Emergency Management Program and the risk and consequences of those hazards. The mitigation plan for the jurisdiction is developed through formal planning processes involving Emergency Management Program stakeholders and shall establish interim and long-term strategies, goals, objectives, and actions to reduce risk to the hazards identified. The Emergency Management Program implements a process and documents project ranking based upon the greatest opportunity for loss reduction and documents how specific mitigation actions contribute to overall risk reduction.

All activities chosen by the committee and those who are internal and external stakeholders fall into one of the broad mitigation techniques listed below:

A. Prevention (Goal #1)

Prevention activities are designed to limit vulnerabilities that the community faces during a disaster or event. Prevention activities include:

1. Resource identification and capability assessment
2. Hazard mapping
3. Building code revision
4. Floodplain regulation
5. Storm water management
6. Drainage system maintenance
7. Hazardous materials identification and location
8. Pipeline and rail line mapping
9. Capital improvement planning for infrastructure
10. Historic site identification

B. Property Protection (Goal #5)

Property protection measures are designed to help facilities survive the event while minimizing damage and loss. Property Protection mitigation activities include:

1. Acquisition of at-risk structures
2. Critical facilities protection
3. Retrofitting (wind or flood-proofing)
4. Incorporating hazard mitigation into Public Works
 - a. Identification
 - b. Notification
 - c. Mitigation
 - d. Reporting
5. Historic site protection and preservation

C. Natural Resource Protection (Goal #1)

Natural resource protection reduces the environmental impact of an event while protecting life, property, and the resources that impact us. Natural Resource Protection Activities include:

1. Floodplain protection
2. Erosion and sediment control
3. Wetland preservation and restoration
4. Habitat preservation
5. Runoff control
6. Water monitoring
7. Wildfire fuel breaks

D. Structural or Infrastructure Projects (Goal #5)

Structural or Infrastructure mitigation projects are projects to minimize the impact of a disaster or event with structural modifications or new construction, including:

1. Acquisition of structures in flood prone areas
2. Utility improvements
3. Structural retrofit to accommodate growth and system demands.
4. Floodwalls and retaining walls
5. Detention and retention structures
6. Culverts
7. Develop measures to protect at-risk vulnerable critical facilities
8. Shelter enhancement to include but not limited to back-up power

E. Emergency Response and Support Services (Goals #3 and #2)

Emergency response can significantly reduce the impact of a disaster or event if given the appropriate resources and training. Some associated enhancements include:

1. Warning, alerting and communication systems for response agencies and stakeholders.
 - a. Continuity of government operations
 - b. Identification of key players.
2. Data and information management during emergencies
3. Search and rescue priority planning
4. Evacuation planning and management
5. Flood "fighting" techniques
6. Hazardous materials planning

F. Public Information and Awareness (Goal #4)

Public Information and awareness activities are used to provide education, information, notification and direction. The utilization of numerous information dissemination mediums is important to reach the desired audience. Examples of activities that support mitigation include:

1. Warning, alerting and communication systems
2. Outreach and education
3. Demonstrations and events
4. Training
5. Event information and direction

After a review the hazard identification and vulnerability assessment, the committee of technical experts in their respective fields worked to identify the greatest threats that have the ability to impact the welfare of the county. The purpose of the Goals and Objectives Section is to provide a framework of ambitions set for the provision of the safety and resiliency of our community, the economy of the county and the environment.

SECTION - 6

MITIGATION

PROJECTS /

ACTION PLAN

Mitigation projects were developed based on the goals and objectives outlined in Section 5. The HMPC worked to develop projects to meet the mitigation needs of the County and all municipalities for each specific hazard faced. Some projects cover multiple hazards and multiple jurisdictions. Projects from the previous mitigation cycle that have not been fully completed have been carried over into this current mitigation cycle to continue efforts to complete them.

I. Guidelines to Evaluation and Prioritization of Goals and Mitigation Actions

To ensure that the mitigation strategies and actions associated with the projects listed meet the outlined goals, the HMPC will provide a prioritized project list based on potential losses. Prioritization of projects will also be influenced by available funding and relevancy to the goals of Lancaster County government. As such, mitigation funding is limited and as projects are created, each one will identify the goal referenced, actions entailed, and a potential funding source.

Guiding principles to assist with project identification and prioritization:

1. The project must be in conformance with the hazard mitigation plan.
2. The project must solve a problem independently or constitute a functional portion of a solution to ensure project completion.
3. The project should first reduce the impact of a disaster on the citizens of Lancaster County and meet several professional benchmarks such as cost effectiveness, reducing future risk or repetition, and inclusion of the provision for environmental sensitivity.
4. Review the historical data to gauge the effectiveness of a project. Is this a single occurrence or repetitive in nature?
5. Consider the available funding options for project completion.
6. Population density and development in potential project areas.

II. Potential Projects Identified By Lancaster County Emergency Management

The projects listed here are those that have been identified as a result of information obtained from outside agencies, internal sources, and previous plans. Projects listed here are included in this version of the plan in addition to those projects from previous plan submissions that have yet to be completed.

Since the 2014 Hazard Mitigation Plan Annual Review, seven of the nineteen projects in the 2014 revision have been completed. The remainder of the projects have been carried over into the latest update.

A. Flood Mitigation of County Roads

B. Channel and Basin Debris Removal*

1. Map Storm-Water Run-Off Channels.

2. Institute Waterway Inspection Program.
3. Remove Debris Blocking Storm-Water Channels.

C. Historic Site Identification and Preservation*

1. Develop and adopt a historic preservation ordinance including Board of Architectural Review.
2. Become a participant in the Certified Local Government Program.
3. Preservation of National Landmark "Old County Jail" built in 1823.

D. Enhance the Hazards Education/Public Information Program*

1. Continued training of public officials and employees.
2. Incorporating hazard mitigation into Public Works projects.
3. Promote public awareness about mitigation and emergency preparedness by working with social media, local newspapers and television stations.

E. Improved Protection of Critical Facilities*

1. Identify at-risk facilities.
2. Develop measures to address the risk to vulnerable critical facilities to prevent future damages.

F. Identification of Hazardous Materials Facilities, Products and Processes

1. Using Tier II data update and enhance the Hazardous Materials Response Plan to identify risk.
2. Using Tier II data and plans to educate responders on potential needs to reduce impact and potential loss of life to the public and responders.
3. Identify and Map pipeline and rail lines in anticipation of an event or compromise.

G. Life Safety Protective Measures

1. Install generators at Red Cross approved shelter sites which are used as temporary shelters and Disaster Recovery Centers
2. Pre-wire for emergency shelters for mobile generator connection
3. Lease/Purchase mobile generators for use with emergency shelters.
4. Price and prioritize the need for a permanent generator solution possibility for shelter locations.

Due to the necessity of buy-in from county and school administrations, this project priority is high while feasibility is low due to ongoing projects, lack of man hours and funding to facilitate the process. Lancaster County Emergency Management worked with South Carolina Emergency Management on possible grant funding possibilities; however, the grant cycle was too close to complete. Continued pursuit of information and possible funding sources are in process.

Because of a lack of feasibility and funding, the projects consisting of a licensed inspection of Public Works and EMS and fire stations have been removed from this plan.

III. Scope of Goals and Objectives Project Workbook

Lancaster County, South Carolina continues to grow at a rate faster than Richland, York, Greenville, and Charleston Counties in South Carolina, just to name a few. The latest revision of our Hazard Mitigation Plan addresses several challenges associated with this growth and incorporates identified natural, manmade, and technological threats based on historical data while using forecast models and charts to predict possible future occurrences of events.

The goals and objectives for this mitigation cycle involve countywide projects. These projects are designed to protect life, reduce injury, lessen impact to infrastructure, safeguard the economy, and eliminate potential environmental demise.

In planning for this mitigation cycle, the process led to the development of a Goals and Objectives project workbook. The workbook is divided into sections which correlate to the goals and objectives identified in the plan. The workbook, at a glance, will identify the hazard addressed, mitigation actions, committee-based identification of priority, and projected cost for the action.

Included in the workbook are some historical goals that have recently been completed. Projects highlighted in **yellow** are new projects for this mitigation cycle. Projects highlighted in **green** are projects that are approved, funded, and/or completed. Projects that are not highlighted are active projects from the previous mitigation cycle that are awaiting funding and/or approval. These projects have been carried over from the previous mitigation to reflect ongoing efforts to complete them.

Goal #1: Minimize loss of life, injury, damage to property, the economy and the environment from natural, manmade and technological hazards at all times relating to hazard mitigation.

Mitigation Action	Hazards Addressed	Priority	Category	Associated Goal	Estimated Cost	Funding Source	Lead Agency	Implementation Schedule	Status	Milestones Achieved
Flood Mitigation of County Roads	Flood, Dam Failure, Storm Inundation	High	Prevention Activity	1	\$0	Local Gov't. Budget	Public Works	Immediate/ Continuing	In Progress	17 of 30 projects completed
Channel and Basin Cleanout	Flood, Dam Failure, Storm Inundation	High	Prevention Activity	1	\$0	USDA Grant Funding	Zoning Department	Immediate/ Continuing		
Building Code Revision	Flooding	High	Property Protection	1	\$0	Local Gov't. Funded	County Building Dept.	Complete - County UDO Update Nov. 2016	Complete	UDO Revision Nov. 2016
Addition of FEMA Floodplain Managers	Flooding, Construction Methods/ Protective Measures	High	Prevention Activity	1	\$0	Local Gov't. Funded	County Building Dept.	Proposed per Code Official	Pending	2 Employees obtained training however not cert. yet.

Goal #2: Lancaster County will have the capability to develop, maintain and utilize hazard information during events of significance.

Mitigation Action	Hazards Addressed	Priority	Category	Associated Goal	Estimated Cost	Funding Source	Lead Agency	Implementation Schedule	Status	Milestones Achieved
Inspection of Storm Water Drainage System	Flooding, Dam Failure, Storm Inundation	High	Natural Resource Protection	2	\$0	Local Gov't Budget	County Public Works/DHEC	Annual	Proposed	Drainage Construction Plans Submitted
Hazardous Materials Planning	All	High	Emergency Response and Support Services	2	\$3,304	Emergency Mgmt. Hazard Mitigation Grant	Emergency Mgmt.	Immediate/Continuing	Complete	HAZMAT Response Plan Completed

Goal #3: The continuity of county government operations will not be significantly disrupted during any disaster due to lack of notification or a prioritized list.

Mitigation Action	Hazards Addressed	Priority	Category	Associated Goal	Estimated Cost	Funding Source	Lead Agency	Implementation Schedule	Status	Milestones Achieved
Warning, Alerting, & Communications for Emergency Responders	All	High	Emerg. Response & Support	3	\$2,772.48	Local Gov't Budget	Lancaster County Emergency Mgmt. and 911 Comms.	Immediate/Annually	Pending	Notification Process in Progress
Data & Information Sharing During Emergencies	All	High	Emerg. Response & Support	3	\$0	UASI Grant Funding	Emergency Mgmt.	Immediate/Annually	Underway	Plans & Tier II Data Complete

Goal #4: Enhance the Hazards Education, Notification and Public Information Programs during this mitigation period.

Mitigation Action	Hazards Addressed	Priority	Category	Associated Goal	Estimated Cost	Funding Source	Lead Agency	Implementation Schedule	Status	Milestones Achieved
Continuing Mitigation Training for Building Officials	All	High	Property Protection	4	\$0.00	Local Gov't Budget	County Building & Zoning	Annual	Ongoing	Pertinent training classes identified
Mitigation Training for Public Works Officials	All	High	Prevention Activity	4	\$0.00	Local Gov't Budget	Lancaster County and City Public Works	Annual	Ongoing	Pertinent training classes identified
Outreach and Education for Hazard Mitigation and Emergency Preparedness	All	Medium	Public Information and Awareness	4	\$6,352.00	Local Gov't Budget	Lancaster County Emergency Mgmt.	Quarterly	Proposed	Multiple-Media Ad. Pricing Acquired
Warning, Alerting, and Communications for the Public	All	High	Public Information and Awareness	4	\$0.00	Local Gov't Funded	Lancaster County Emergency Mgmt.	Constant - As Needed & Pertinent	Underway	Social Media and Web-based Comms. Established

Goal #5: Identify Structural and Infrastructure Projects that will reduce vulnerability and impact of the citizens of Lancaster County while promoting resiliency during this mitigation period.

Mitigation Action	Hazards Addressed	Priority	Category	Associated Goal	Estimated Cost	Funding Source	Lead Agency	Implementation Schedule	Status	Milestones Achieved
Critical Facilities Fortification	Tornado T.storm Hurricane		Structural or Inf.structure	5	\$1,950,000	USDA/Local Gov't.	County Fire Rescue/ Emergency Mgmt.	Underway	Ongoing	Two projects funded. Several unfunded.
Retrofitting, Floodproofing, Removal or Relocation of Residential and Business Properties	High Wind, Flooding, Dam Failure, & Storm Inundation	High	Property Protection	5	\$0	NFIP & Local Gov't Budget	County Building & Zoning	Complete	Ongoing - As Needed	UDO revision as protection measure. 11/2016
Historic Site protection/ preservation	All	High	Property Protection	5	\$500,000	Local Gov't Budget	Historical Society	2017-2018 Budget year.	Pending	Old county jail repairs pending.
Emergency Shelter Retrofit for Emergency Backup Power	All	High	Structural or Inf.structure	5	\$678,000	PDM Grant	Lancaster County Emergency Mgmt.	Pending Outside Concurrence		Costs Acquired

Prevention Activity	Project Name	Jurisdiction	Priority	Status	Projected Cost	Actual Cost	Difference
Flood Mitigation of County Roads (Goal #1)	Greystone Dr.	County		Complete 2010			\$0.00
	Thornwell Rd.	County		Complete 2010			\$0.00
	Harris Hill Rd.	County		Complete 2010			\$0.00
	Greystone Dr. - Entrance	County		Complete 2011			\$0.00
	Langley Rd.	County		Complete 2014			\$0.00
	Kirk Air Base Rd. - Small Crossing	County	High	Approved			\$0.00
	Kirk Air Base Rd. - Large Crossing	County		Complete 2014			\$0.00
	Barbarosa Dr.	County		Complete 2012			\$0.00
	Daystar Rd.	County		Complete 2011			\$0.00
	Leadoff Rd.	County		Complete 2011			\$0.00
	Gills Creek Dr.	County		Start July 2017			\$0.00
	Carnes Wilson Rd.	County		Complete 2012			\$0.00
	Honeycutt Rd.	County	High	Pending-No Funding			\$0.00
	Bob Ormand Rd.	County	High	Pending			\$0.00
	Plyer Mill Rd.	County	High	Pending			\$0.00
Waxhaw Village Rd.	Stamp Mill Rd. - Big and Little Double Branch	County	High	Approved			\$0.00
	Happy Trail	County		Complete 2014			\$0.00
	Grain Bin Rd.	County		Complete			\$0.00
		County	High	Pending - Endangered Species			\$0.00
		County		Complete 2012			\$0.00
	Walker Rd. - Large Crossing	County		Complete 2012			\$0.00
	Walker Rd. - Small Crossing	County		Complete 2012			\$0.00
	Logging Rd.	County		Complete 2012			\$0.00
		County					
		County					

Prevention Activity	Project Name	Jurisdiction	Priority	Status	Projected Cost	Actual Cost	Difference
Flood Mitigation of County Roads (Goal #1)	Fernwood Rd.	County	High	Pending			\$0.00
	Feather Run Rd.	County	High	Pending			\$0.00
	Decree Rd.	County	High	Pending			\$0.00
	Walnut Rd.	County	High	Pending			\$0.00
	Stewart Place Rd.	County	High	Approved			\$0.00
	Henderson Rd.	County	High	Under Review			\$0.00
	Pursuit Ln.	County	High	Approved			\$0.00
	Ander Vincent Rd.	County	High	Pending 2016			\$0.00
	Total				\$0.00	\$0.00	\$0.00
Channel and Basin Cleanup (Goal #1)	Storm Water Drainage System Mapping	Lancaster County	Medium	Approved	Funded through Lancaster County Operations Budget		
	Debris removal from storm water runoff channels	Lancaster County	High	Pending	\$0.00		\$0.00
	Total				\$0.00	\$0.00	\$0.00
Addition of FEMA Floodplain Managers (Goal #1)	Floodplain Management Training	Lancaster County	Medium	Approved & Pending	Funded through Lancaster County Operations Budget		
Mitigation Training for Public Works Officials (Goal #4)	Incorporate Hazard Mitigation into Public Works Training	Lancaster County	Medium	Proposed	Funded through Lancaster County Operations Budget		

Property Protection	Project Name	Jurisdiction	Priority	Status	Projected Cost	Actual Cost	Difference
Historic Site Protection and Preservation (Goal #5)	Develop Historic Preservation Ordinance	Lancaster County	Low	Proposed	Supported by the Historic Commission by South Carolina General Assembly by Act #48		
	Become a Certified Local Government (CLG)	Lancaster County	Medium	Proposed	Funded through Lancaster County Operations Budget		
	Preservation of Historic Old Jail	Lancaster County	High	Funded	\$500,000.00		
	Total				\$500,000.00	\$0.00	\$0.00

Building Code Revision (Goal #1)	Create Code Changes for Flood Consideration	City of Lancaster, Towns of Kershaw and Heath Springs, Unincorporated Lancaster County	High	Complete - County UDO Update Nov. 2016	Funded through Lancaster County Operations Budget		
Training Building Code Officials (Goal #4)	Including Hazard Mitigation Training into Curriculum of Building Official Training	Lancaster County	High	Approved	Funded through Lancaster County Operations Budget		
Retrofitting, Floodproofing, Removal or Relocation of Residential and Business Properties (Goal #5)	Utilize Grant Funding to Fortify, Remove or Relocate Vulnerable Private Structures	Lancaster County	High	NFIP - Removed 2 residential structures due to repetitive loss	\$0	\$0.00	\$0.00
	Total				\$0.00	\$0.00	\$0.00

Natural Resource Protection	Project Name	Jurisdiction	Priority	Status	Projected Cost	Actual Cost	Difference
Inspection of Storm Water Drainage System (Goal #2)	Institute Waterway Inspection Program	Lancaster County	High	In Progress	Funded through Lancaster County Operations Budget		

Structural or Infrastructure Projects	Project Name	Jurisdiction	Priority	Status	Projected Cost	Actual Cost	Difference
Critical Facility Fortification (Goal #5)	New Station Construction for EMS 7	Town of Heath Springs	High	No Funding	\$800,000.00		\$0.00
	EMS 3 Fortification	Unincorporated Lancaster County	Low	No Funding	\$0.00	\$0.00	\$0.00
	EMS 8 Retaining Wall	Unincorporated Lancaster County	High	Funded & Pending	\$350,000.00		
	Antioch Fire Station Fortification	Unincorporated Lancaster County	Low	No Funding	\$0.00	\$0.00	\$0.00
	Bell Town Fire Station Fortification	Unincorporated Lancaster County	Low	No Funding	\$0.00	\$0.00	\$0.00
	Charlotte Rd./Van Wyck Fire Station Fortification	Unincorporated Lancaster County	Medium	New station design underway	\$800,000.00		\$0.00
	Elgin Fire Station Fortification	Unincorporated Lancaster County	Low	No Funding	\$0.00	\$0.00	\$0.00
	Riverside Fire Station Fortification	Unincorporated Lancaster County	Low	No Funding	\$0.00	\$0.00	\$0.00
	Total				\$1,950,000.00	\$0.00	\$0.00

Structural or Infrastructure Projects	Project Name	Jurisdiction	Priority	Status	Projected Cost	Actual Cost	Difference
Shelter Retrofit to Facilitate Emergency Power (Goal #5)	Pre-wire shelters for mobile generator connection	Unincorporated Lancaster County	Low	Proposed			\$0.00
	Purchase mobile generators for use with shelters	Unincorporated Lancaster County	Low	Proposed	\$378,000.00		\$378,000.00
	Fixed Site Generators for use with shelters	Unincorporated Lancaster County	High	Proposed	\$300,000.00		\$300,000.00
	Total				\$678,000.00	\$0.00	\$678,000.00

Emergency Response and Support Services	Project Name	Jurisdiction	Priority	Status	Projected Cost	Actual Cost	Difference
Warning, Alerting, and Communication Systems for Response Agencies and Stakeholders (Goal #3)	Expansion of Active 911 System	Lancaster County	High	Pending EOP Update 2017	\$2,376.00	\$0.00	\$0.00
	Everbridge Notification Group Enhancements	Lancaster County	High		\$396.48	\$0.00	\$0.00
	Total				\$2,772.48	\$0.00	\$0.00

Data and Information Management During Emergencies (Goal #3)	Use existing plans and Tier II Data to educate responders	Lancaster County	Medium	Proposed	Funded through Lancaster County Operations Budget		
	Continuity of Government Operations Plan Maintenance	Lancaster County	High	Ongoing	Funded through County Operational Budget - To be updated in 2017 EOP Update		

Hazardous Materials Planning (Goal #2)	Hazardous Materials Response Guide	Lancaster County	Medium	Completed & Approved	\$3,304.00	\$0.00	\$3,304.00
	Identify and Map Pipe and Rail Lines	Unincorporated Lancaster County	Medium	Complete SCDOT & NPMIS	\$0.00	\$0.00	\$0.00
	Total				\$3,304.00	\$0.00	\$0.00

Public Information and Awareness	Project Name	Jurisdiction	Priority	Status	Projected Cost	Actual Cost	Difference
Warning, Alerting and Communications (Goal #4)	Everbridge Program Expansion (Reverse 911)	Lancaster County	High	Pending	Funded through County Operations Budget		
	Enhanced 911 Usage Expansion	Lancaster County	Medium	Ongoing			
	Enhanced Public Notification utilizing Social Media and Web Applications	Lancaster County	High	Ongoing	Funded through County Operations Budget		

Outreach and Education (Goal #4)	Public Awareness Media Outreach	Lancaster County	High	Approved	\$0.00		
	Print Media - Lancaster News 4 x's 1/4 Page	Lancaster County	Medium	Proposed	\$2,300.00		
	Print Media - Carolina Gateway 4 x's 1/4 Page	Northern Lancaster County	Medium	Proposed	\$2,000.00		
	Discover Magazine	Lancaster County	Medium	Proposed	\$1,297.00		
	Welcome to Indian Land Magazine	Lancaster County	Medium	Proposed	\$755.00		
	County Website	Lancaster County	Low	In Progress	Funded through County Operations Budget		
Total					\$6,352.00	\$0.00	

RESOLUTION R16-02

**A RESOLUTION ALLOWING LANCASTER COUNTY TO ACT ON BEHALF OF THE
CITY OF LANCASTER IN THE ANALYSIS AND DEVELOPMENT OF A HAZARD
MITIGATION PLAN**

WHEREAS, The City of Lancaster has limited capability to undertake extensive participation in the preparation of a hazard mitigation plan; and

WHEREAS, Lancaster County is able to act on behalf of The City of Lancaster in the analysis and development of a hazard mitigation plan; and

WHEREAS, Lancaster County shall prepare a hazard mitigation plan in accordance with 44 FEMA requirements at 44 C.F.R. 201.6; and

WHEREAS, Lancaster County shall deliver a draft copy of the Plan for public comment as well as the Governing Body's comment during the planning process and prior to adoption.

NOW THEREFORE BE IT RESOLVED, that Lancaster County is hereby authorized on behalf of the City of Lancaster to prepare the Lancaster County Multi-Hazard Mitigation Plan, which shall be reviewed and considered for adoption by the Lancaster City Council upon completion.

DONE IN MEETING ASSEMBLED on the 9th day of February, 2016 and to become effective February 9, 2016

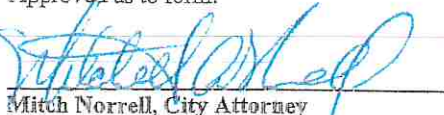
Requested by:

Yeas 6 Nays 0

Lancaster County Emergency Management


John Howard, Mayor Pro Tempore

Approved as to form:


Mitch Norrell, City Attorney


Tracy Rabon, Municipal Clerk



Post Office Box 100
Heath Springs, SC 29058
(803) 273-2066
Fax: 803-273-3478

February 15, 2016

Mr. Patrick Helms
Emergency Management Planner
Lancaster County Emergency Management
PO Box 1809
Lancaster, SC 29721

Dear Patrick,

The Town of Heath Springs would like once again to be included in the Lancaster County Hazard Mitigation Plan.

Town Administrator

Tony Stames

TOWN OF KERSHAW

*Continued Progress,
A Goal*



*Community Pride,
A Reality*

February 4, 2016

Patrick Helms
Emergency Management Planner
Lancaster County Emergency Management
PO Box 1809
Lancaster, SC 29721

RE: Hazard Mitigation Plan

Dear Mr. Helms:

The Town of Kershaw intends to be included in the county's Hazard Mitigation Plan pending formal resolution by the Kershaw Town Council. As we discussed, I will present the resolution to the Council for adoption at the meeting scheduled for February 15, 2016.

Sincerely,

Joe Boyes
Town Administrator

STATE OF SOUTH CAROLINA
COUNTY OF LANCASTER
TOWN OF KERSHAW

)
)
)

RESOLUTION

RESOLUTION TO ALLOW LANCASTER COUNTY TO ACT ON BEHALF OF
THE TOWN OF KERSHAW IN THE ANALYSIS AND DEVELOPMENT OF A
HAZARD MITIGATION PLAN

WHEREAS, The Town of Kershaw has limited capability to undertake extensive participation in the preparation of a hazard mitigation plan; and

WHEREAS, Lancaster County is able to act on behalf of The Town of Kershaw in the analysis and development of a hazard mitigation plan; and

WHEREAS, Lancaster County shall prepare a hazard mitigation plan in accordance with 44 FEMA requirements at 44 C.F.R. 201.6, and

WHEREAS, Lancaster County shall deliver a draft copy of the Plan for public comment as well as the governing body's comment during the planning process and prior to adoption.

NOW THEREFORE, Kershaw Town Council authorizes Lancaster County on behalf of Town of Kershaw to prepare the Lancaster County Multi-Hazard Mitigation Plan, which shall be reviewed and considered for adoption by Town Council upon completion.

ADOPTED this 21 day of March, 2016 at the meeting
of the Town Council.

Mark Decker
(Mayor)

Corresponding Disaster Threats

Natural

Flood

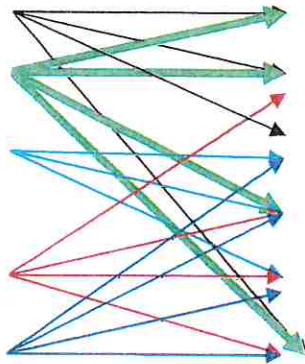
Hurricane

Tornado

Drought

Winter Storm

Wind



Technological

Dam Failure

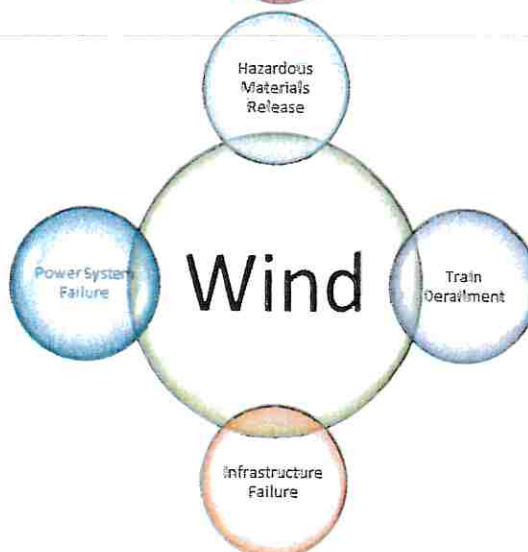
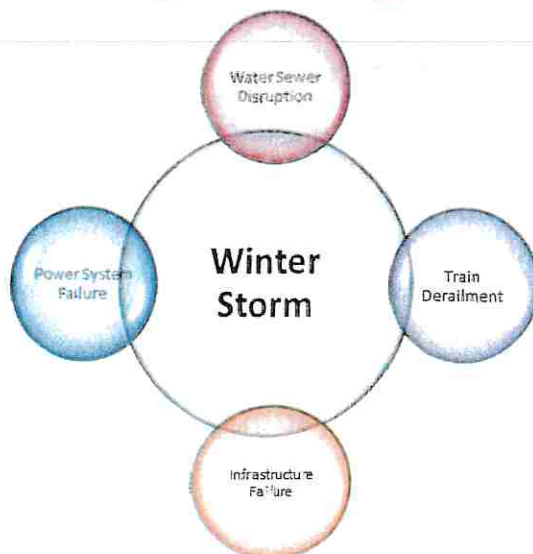
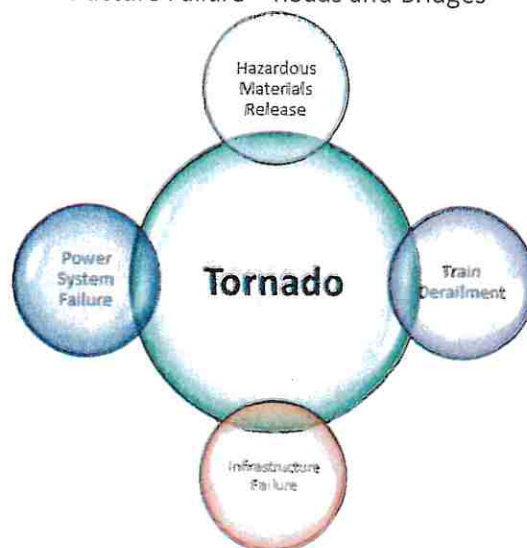
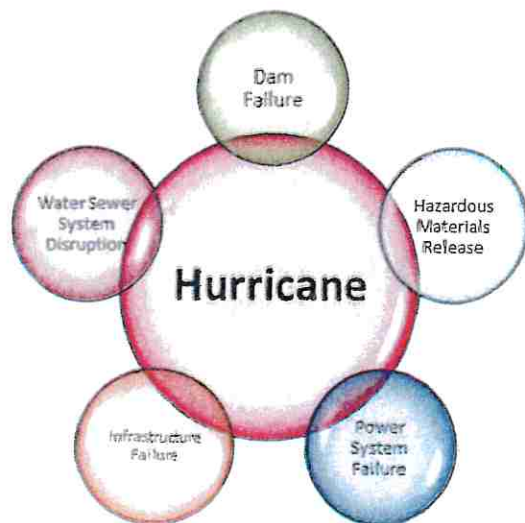
Water/Sewer System Disruption

Haz Mat Release

Power System Failure

Train Derailment

Infrastructure Failure – Roads and Bridges



When natural disasters and technological disasters collide it presents a significant problem to mitigation, response, planning and recovery efforts. In October of 2015, South Carolina experienced a "thousand year flood" as a result of a weather pattern that devastated South Carolina. Two months later, recovery efforts are still under way. Weather, rainfall and storms are natural disasters which lead to a technological disaster such as a dam, bridge, road, infrastructure failures.

South Carolina has over 50,000 dams throughout the state, including 34 federally regulated dams and over 2,317 state regulated dams. At any time, one or more of these dams may be threatened by upstream flash floods, earthquakes, neglect or any combination of the above, which potentially leads to personal injury or death, significant damage to property, infrastructure and potential dam failures downstream.

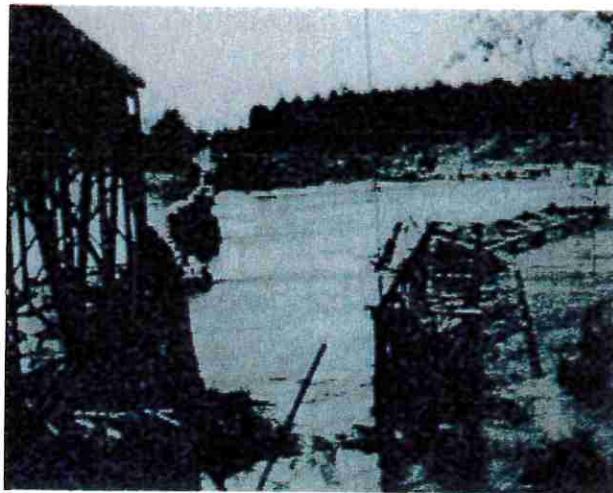
During the most recent event, according to AccuWeather Meteorologist Anthony Sagliani, "The key players included a strengthening non-tropical storm in the South, a strong area of high pressure in Canada and converging tropical moisture from Hurricane Joaquin near the equator." This produced historic rainfall, a natural disaster, which led to dam and infrastructure failures.

This perfect weather event was preceded by almost five inches of rainfall in the North Carolina Mountains in weeks prior. The significance of the rain was that the North Carolina Mountains were in a severe drought situation. This rainfall filled the rivers and basins to capacity. The power companies released water from upstream impoundments, south, to balance the water levels in their locality. This compounded the South Carolina flooding problem.

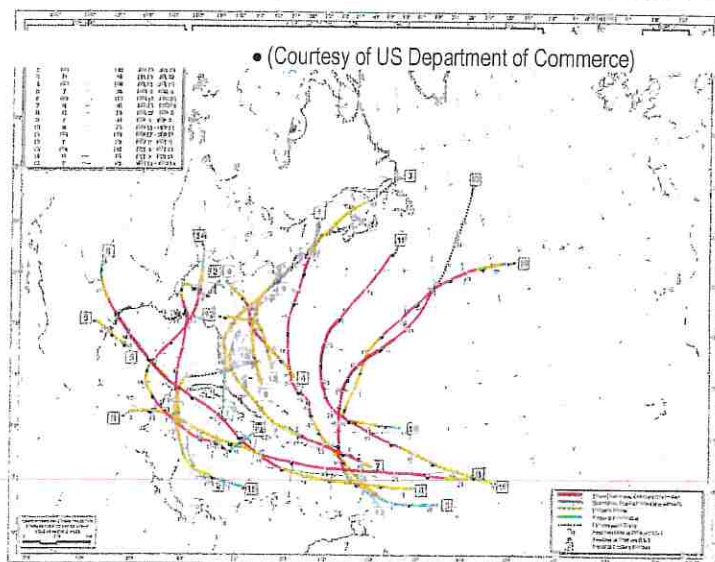


Recent events in Columbia S.C. where devastation occurred highlight the need to identify areas with a history of flooding. During the October 2015 storm, "Sixteen dams breached or failed completely as of 10:30 p.m. EDT Thursday, according to the South Carolina Department of Health and Environmental Control (DHEC)." One dam was intentionally breached to alleviate pressure." (Galimberti, 2015) The significance of this was that much of the flooding involved Gills Creek. As recent as the 1940's, according to the Richland County, there were flooding situations which led to dam failures or purposeful breaching to prevent failure in Gills Creek and associated tributaries. "Both the Forest Lake Dam and the Lake Katherine Dam failed during major floods and were rebuilt or repaired under military supervision." (Floodplain Mapping and Hazard Management) Richland County further recognized that these failures would occur in a 50 year flooding situation.

The most recent "thousand year flood" is similar to a storm system in July of 1916, which impacted Lancaster County. There were three back-to-back hurricanes that dumped unprecedented amounts of rainfall on the Blue Ridge Mountains and the Carolina Piedmont. "Between July 6 and July 17, almost forty inches of rain fell in the mountains of western North Carolina, while the foothills downstream received only slightly lesser amounts. The Catawba, Broad, French Broad, Tennessee and Yadkin Rivers were all flooded, wreaking incredible devastation as the waters surged downstream. Almost every bridge, railroad trestle, dam and textile mill along these rivers were damaged or destroyed, and in the mountains some entire towns were swept into the raging torrents of the once docile rivers." (Glendening, 2006)



This storm resulted in a failure in transportation infrastructure. The Lancaster and Chester Railroad reported that the Catawba River Bridge was washed away by flooding caused by the storm. Colonel Springs, owner of Springs Mills, subsequently purchased a ferry to transport goods across the river until repairs were complete. It was later reported by a historical document published by the L&C Railroad that Colonel Springs "purchased a two span bridge" in order to re-establish the rail line.



Lancaster County is affected by repetitive flooding problems. In a recent review of flood prone areas, there are fifty four streets that have been impacted and six that have

multiple instances of flooding over the last decade. This routine flooding leads to transportation challenges, closures and in some instances evacuations. Lancaster County flooding contributes to roadway and infrastructure failure and poses a threat to human life.

One human behavior repeated during flooding is the lack of recognition of the depth, speed and force of the water. There were 19 deaths as a result of flooding in Columbia, with two of those killed when they drove around a barricade and the roadway gave way washing the vehicle away, outside of Columbia during the October 2015 flooding. Locally, there have been witnessed instances of people moving barricades, going around barricades and crossing roadways covered with water. There have also been

documented cases of death due to vehicles attempting to cross washed out roadways prior to barricade placement at both the local and state levels.

Infrastructure failure as a result of flooding presents economic impact and threatens public safety. Approximately 70 miles of Interstate 95 closed due to flooding according to the SCDOT. The total monetary impact is complex and difficult to compute. Another aspect of economic impact caused by infrastructure failure are those impacts to the adjoining businesses along the routes, which depress local economy. Locally the greatest hazard caused by infrastructure failure is the impact to public safety response. Roadway closure increases response times and in some cases such as Langley Road isolates whole communities.

• **Lancaster County Dams**

Lancaster County has 50 dams on different sized impoundments. Dams in South Carolina fall under three classifications according to SC DHEC. Each has a different inspection cycle. They are:

- High Hazard/C1 – 2 year inspection cycle
- Significant Hazard/C2 – 3 year inspection cycle
- Low Hazard/C3 – 5 year inspection cycle

The hazard classifications are based on damages that may occur if a dam is to breach or fail. According to DHEC, a High Hazard Dam failure may cause loss of life, a Significant Hazard Dam failure may cause damage to homes, secondary roads and major infrastructure and a Low Hazard Dam failure may cause limited property damage to others property.

The South Carolina Emergency Management Division has several suggested actions related to protective actions and dam safety:

Before a Dam Failure

- Know your risk. There are more than 50,000 dams located throughout South Carolina. Do you live downstream from a dam? Is the dam a high-hazard or significant-hazard potential dam?
- Review the current Emergency Action Plan (EAP) for the dam. An EAP is a formal document required for all dams regulated by the Federal Energy Regulatory Commission (FERC), the US Army Corps of Engineers (USACE), the US Bureau of Reclamation (BOR), or designated as a "High Hazard" or "Significant Hazard" by the SC Department of Health and Environmental Control (DHEC). Dams designated as "Low Hazard" by DHEC are surveyed every three years. The Emergency Action Plans are developed and maintained by the dam owners, identify potential emergency conditions at a dam, and specify pre-planned actions to be followed to reduce property damage and loss of life. Please contact the dam owner if you have any questions concerning the EAP for a specific dam.
- Know your evacuation route should you be told to evacuate.

- Review your insurance policy. Flood coverage is not part of most homeowner, mobile home or renter's insurance policies. There is a 30-day waiting period for coverage to take effect.

During a Dam Failure

- If told to evacuate, secure your home. If you have time, bring in outdoor furniture and move essential items to an upper floor.
- Turn off utilities at the main switches or valves, if instructed to do so. Disconnect electrical appliances. Do not touch electrical equipment if you are wet or standing in water.
- Do not walk through moving water. Six inches of moving water can make you fall. If you have to walk in water, walk where the water is not moving. Use a stick to check the firmness of the ground in front of you.
- Do not drive into flooded areas. If floodwaters rise around your car, abandon the car and move to higher ground if you can do so safely. You and the vehicle can be quickly swept away.

After a Dam Failure

- After a flood, listen for news reports to learn whether the community's water supply is safe to drink.
- Avoid floodwaters; water may be contaminated by oil, gasoline, or raw sewage. Water may also be electrically charged from underground or downed power lines.
- Be aware of areas where floodwaters have receded. Even if the roadway of a bridge or elevated highway looks normal, the support structures below may be damaged.
- Stay clear of downed power lines and report them to your power company.
- Use extreme caution when entering buildings; there may be hidden damage, particularly to foundations. Stay out of any building that is surrounded by floodwaters.
- Clean and disinfect everything that got wet. Mud left from floodwater can contain sewage and other harmful chemicals.

Gov. Haley gives update

A comprehensive account of South Carolina's flood recovery efforts and a growing damage estimate came Saturday afternoon from Gov. Nikki Haley.

Haley said the death toll in the Palmetto State has now reached 19. She estimated the damage to be at least \$7 million and said that number is expected to rise.

Haley said there are no issues with pipelines, airports or ports in South Carolina. While both the Norfolk-Southern and CSX railways are dealing with damage, Haley said freight continues to move through alternate routes.

Haley's update included efforts to bring people to safety and provide emergency shelter. To date, the state Department of Natural Resources and law enforcement agencies have conducted 850 rescues, Haley said. She added that there are currently 17 emergency shelters with 495 occupants.

The number of dam breeches stands at 20, and 129 dams are currently being monitored, Haley said. Officials are also closely watching the public water systems and private wells across the state.

Haley ended her news conference with reassuring words.

"We will get through this," Haley said

Dam Inspections:

South Carolina officials have released records that show that most of the dams in Richland County that broke in this month's torrential rains had been cited repeatedly in state inspection reports for deficiencies.

Seventeen community dams have failed in Richland County since Oct. 4, including 15 regulated by the South Carolina Department of Health and Environmental Control.

(<http://www.wyff4.com/news/building-collapses-in-columbia-numerous-roads-flooded/35646664>)

- **Resources**

Emergency Road Closures SCDOT

<http://scdot.maps.arcgis.com/apps/MapTools/index.html?appid=5961fcb98cfc4c768d5ffa17b5a798e5>

- **Works Cited**

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Lancaster County Wildfires by District 2014-2015

1	Antioch	22
2	Bell Town	10
3	Buford	15
4	Camp Creek	17
5	Charlotte Rd. /Van Wyck	19
6	Elgin	13
7	Flat Creek	18
8	Gooch's	39
9	Heath Springs	11
10	Indian Land	30
11	Kershaw	21
12	McDonald Green	16
14	Pleasant Valley	31
15	Rich Hill	14
16	Riverside	12
17	Shiloh Zion	12
18	Tradesville	6
19	Unity	6
LCF	Lancaster City Fire	3

Total All Land Fires by County and Cause, Fiscal Year 2000

County	Lightning No. Acres	Campfire No. Acres	Smoking No. Acres	Debris No. Acres	Incendiary No. Acres	Equipment No. Acres	Railroad No. Acres	Children No. Acres	Miscellaneous No. Acres	Total No.	Total Acres
Abbeville County	5 44.6	2 3.0	4 4.3	22 89.7	4 28.1	16 40.9	1 0.1	3 2.6	4 2.1	61	215.4
Aiken County	16 87.6	0 0	5 35.5	86 216.7	49 175.4	12 50.2	2 11.5	20 18.0	22 113.6	212	708.5
Allendale County	2 8.0	0 0	2 2.5	7 34.8	2 10.6	1 15.0	0 0	1 10.0	1 1.0	16	81.9
Anderson County	3 23.1	1 10.0	0 0	27 66.6	5 69.5	2 2.5	0 0	1 28.0	14 43.6	63	243.3
Bamberg County	4 35.0	0 0	3 7.7	31 71.2	7 43.7	5 3.8	0 0	1 0.1	0 0	51	161.5
Bartwell County	7 29.8	0 0	1 0.2	21 95.3	4 13.5	8 90.2	0 0	1 0.5	8 21.3	50	250.8
Beaufort County	2 19.0	0 0	1 16.0	37 160.1	18 57	0 0	1 4	1 4.0	5 41.0	65	301.1
Berkeley County	6 78.1	0 0	3 33.0	133 614.2	140 870.9	13 158.2	4 45.2	11 7.5	13 40.4	323	1847.5
Calhoun County	5 2.9	0 0	4 69.2	21 69.0	4 13.1	1 14.0	0 0	0 0	3 4.3	38	172.5
Charleston County	5 36.0	0 0	0 0	54 304.6	59 512.9	4 4.6	1 0.2	4 8.6	4 6.8	131	873.7
Cherokee County	0 0	1 8.0	4 22.0	14 38.3	7 29.2	5 35.5	0 0	2 5.0	16 133	49	271
Chester County	4 60.1	0 0	0 0	17 29.5	18 177.4	3 6.2	4 77.0	2 1.1	6 6.1	54	357.4
Chesterfield County	8 17.7	0 0	15 83.6	46 64.4	25 31.4	11 35.0	4 3.2	4 2.0	11 45.4	124	282.7
Clarendon County	3 31.1	0 0	2 5.0	59 356.1	62 487.9	22 52.3	1 0.1	1 1.0	3 0.5	153	934.0
Colleton County	5 161.0	0 0	1 0.5	92 328.7	34 238.3	10 95.7	1 3.0	6 12.1	4 5.3	153	844.6
Darlington County	2 0.3	0 0	4 11.1	59 200.8	30 112.4	7 23.9	0 0	1 0.5	5 8.0	108	357.0
Dillon County	0 0	1 12.0	1 0.2	20 88.4	15 52.2	12 33.9	0 0	4 6.7	11 14.9	64	208.3
Dorchester County	2 8.0	0 0	2 16.0	56 289.3	25 226.9	2 1.5	1 2.5	6 5.4	1 4.0	95	553.6
Edgefield County	6 27.5	0 0	1 1.0	23 34.7	9 30.8	3 118	0 0	2 4.1	10 23.0	54	239.1
Fairfield County	15 266.7	1 0.5	2 1.2	15 89.2	3 5	15 68.1	4 4.1	4 5.0	10 58.4	69	498.2
Florence County	9 204.7	0 0	9 9.0	101 277.1	100 340.4	12 29.3	1 2.5	12 31.9	4 0.7	248	895.6
Georgetown County	6 15.2	0 0	1 3.1	60 425.6	39 301.6	2 182.6	2 4.5	1 10.0	3 5.6	114	948.2
Greenwood County	2 80.1	1 0.1	0 0	35 173.3	8 63.5	3 71.0	1 1.0	8 24.0	17 56.7	75	469.7
Hampton County	5 34.4	0 0	4 11.4	29 196.3	3 30.8	3 6.6	3 4.8	12 8.2	13 12.2	72	304.7
Horry County	10 71.4	0 0	3 0.6	49 115.4	36 47.4	10 7.1	1 4.0	10 8.7	5 5.0	124	259.6
Jasper County	3 97.0	0 0	2 5.0	72 425.8	65 333.1	2 27.6	1 25.6	6 21.8	11 19.0	170	954.9
Kershaw County	3 9.1	0 0	1 0.5	39 241.2	40 305.9	2 55.0	3 0.4	2 4.5	4 16.1	94	632.7
Lancaster County	16 175.4	0 0	10 27.8	46 185.2	5 3.4	13 122.2	0 0	3 0.7	15 26.9	108	541.6
Laurens County	2 5.0	2 0.6	4 7.7	18 35.0	3 2.2	4 13.5	2 1.7	9 8.6	4 13.0	47	83.3
Lee County	3 3.6	0 0	3 4.0	22 64.5	21 72.5	1 9.0	4 28.0	2 1.7	9 72.0	64	256.7
Lexington County	18 43.6	5 3.3	1 2.5	57 216.3	25 165.3	4 19.0	0 0	1 5.0	3 25.2	94	436.9
Marion County	0 0	0 0	9 4.9	127 217.8	31 45.2	11 40.9	14 39.9	59 55.4	36 90.4	310	541.4
Mathews County	1 1.0	0 0	1 0.3	18 118.2	10 54.7	2 8.1	0 0	3 2.2	3 0.3	37	183.8
McCormick County	3 68.5	4 15.2	5 4.3	30 46.0	41 194.8	2 0.6	0 0	7 21.4	2 0.2	88	268.3
Newberry County	3 46.2	0 0	1 0.6	12 25.0	2 0.6	5 1.7	3 30.3	3 1.1	5 24.1	41	167.3
Oconee County	5 32.1	2 5.0	2 3.0	34 150.0	17 50.2	0 0	0 1.0	5 8.6	12 47.9	33	107.0
Orangeburg County	7 32.2	0 0	15 49.8	121 457.7	37 124.7	24 58.0	1 0.2	26 91.8	8 78.2	239	892.6
Richkins County	3 40.7	1 1.5	3 11.5	42 152.1	4 5.7	4 8.6	1 5.0	7 10.0	16 83.0	81	318.1
Saluda County	2 25.0	0 0	2 5.0	24 89.0	32 132.1	0 0	2 5.3	12 42.0	19 252.9	93	551.3
Spartanburg County	4 62.0	0 0	1 0.3	18 36.7	7 17.3	14 37.3	0 0	2 0.2	3 7.2	49	161.0
Sumter County	2 12.0	1 1.0	4 35.0	16 74.1	2 4	7 27.0	5 25.5	6 27.5	12 53.5	55	259.6
	4 46.8	1 0.1	0 0	81 208	48 252	8 71.2	1 5.0	8 9.4	17 55.7	168	648.2

Union County	1	2.0	0	0	0	0	13	29.0	1	25	1	0.5	0	0	0	9	22.1	25	78.6	
Williamsburg County	6	276.3	0	0	10	207.4	105	442.2	101	631.5	9	17.7	2	3.2	3	2	0.3	238	1582.6	
York County	2	20.0	0	0	0	0	20	38.1	5	33.4	1	20.0	2	10.0	1	6	19.2	37	155.7	
Grand Total	221	2341.	23	60.3	147	703.5	2039	7708.5	1206	6428.5	307	1686.6	77	348.8	294	538.9	401	1582.4	4715	21399.3

LANCASTER COUNTY HAZARDOUS MATERIALS RESPONSE PLAN EXECUTIVE SUMMARY

The purpose of the Hazardous Materials Response plan is to provide guidance for emergency response as outlined in OSHA's 29 CFR 1910.120(q), for facility response and response to transportation accidents involving radioactive material or other hazardous materials incidents.

The information in this document was provided in accordance with the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA), commonly known as Superfund. A free-standing law, the Emergency Planning and Community Right-to-Know Act of 1986 (EPCRA), commonly known as **SARA Title III**, was enacted by Congress and provides information related to hazardous material production, transportation, use, disposal and clean-up. The Environmental Protection Agency (EPA) was appointed, by Congress, as the enforcement agency for ensuring reporting, storage, use, monitoring release and clean-up of hazardous materials by producers, users, carriers or handlers.

The Hazardous Materials Response Plan identifies facilities that develop, manufacture or utilize chemicals in processes that are considered hazardous to life, health or the environment according to the EPA's E-Plan Tier II data. It lists the reported chemicals and average quantities on site for facilities in Lancaster County. The information in this document is not all-inclusive and was designed as a reference guide for responders to plan for, mitigate and recover from an event at a facility or location in which an emergency has occurred.

This plan provides resources for tracking personnel, developing incident management organizational documents as they relate to hazardous materials incidents and the suggested roles associated with those. It defines suggested plans of action for administrative, support and operational personnel in relation to emergency notification, response and recovery. It defines suggested methods for public alerting, minimum evacuation distances as established by the Department of Transportation's Emergency Response Guidebook and the potential of creating an area of refuge for evacuees.

The Plan describes suggested practices for response, safety and training guidelines for responders. It also identifies the facility by type hazard; low, moderate and high risk facilities. This information is based on quantity on hand, nature of the materials on site, suggested evacuation distances and potential life safety hazard.

The Plan was designed as a reference to support all agencies involved in a hazardous materials incident, not to dictate methods of preparation, planning, mitigation or recovery from any incident. It is the responsibility of all agencies to identify, coordinate and manage resources to provide for the safety of responders, the public and the environment.

Table 3-1

CRITICAL FACILITY INVENTORY

FACILITY TYPE	City of Lancaster	Town of Kershaw	Town of Heath Springs	Unincorporated County
Airport	-	-	-	5
Public Facilities	4	1	2	3
Judicial Facilities	3	-	-	2
Electrical Utility Facilities	2	1	-	11
Schools	8	1	1	13
Emergency Services (Fire Stations, EMS Stations, Sheriff, and Police Stations)	6	2	3	21
Communication Facilities	5	-	-	4
Water & Sewer Facilities	13	3	2	49

Lancaster City Critical Infrastructure List

Property Description and Address	Estimated Value 2012	Estimated Value 2016
Lancaster County Council of Arts Building (201 West Gay Street)	\$1,435,017	
City Services Building (916 15th Street)	\$11,839,000	
City Hall (216 South Catawba Street)	\$2,900,000	
Municipal Justice Center (405 East Arch Street)	\$3,280,000	
Fire Station #1 (401 East Arch Street)	\$871,960	
Fire Station #2 (818 Hubbard Drive)	\$944,311	
Building at the Police Firing Range (1451 Reservoir Road)	\$13,693	
Building and Grounds Department (120 W. Arch St.	\$114,905	
Public Works Complex (Offices) (139 Lynwood Drive)	\$949,819	
Public Works Garage/Warehouse (1320 Lynwood Drive)	\$931,579	
Public Works Storage Building (1309 Lynwood Drive)	\$809,443	
Public Works Pole Building (1309 Lynwood Drive)	\$50,900	
Solid Waste Transfer Building (1309 Lynwood Drive)	\$138,660	
Solid Waste Transfer Station (1309 Lynwood Drive)	\$96,000	
WWTP Digester (1150 Lockwood Lane)	\$1,957,546	
WWTP Clarifier #1 (1150 Lockwood Lane)	\$930,783	
WWTP Clarifier #2 (1150 Lockwood Lane)	\$930,783	
WWTP Clarifier #3 (1150 Lockwood Lane)	\$1,254,436	

Lancaster City Critical Infrastructure List

Property Description and Address	Estimated Value 2012	Estimated Value 2016
WWTP Solids Holding Tank (1150 Lockwood Lane)	\$1,207,000	
WWTP Oxidation Ditch #1 (1150 Lockwood Lane)	\$3,816,482	
WWTP Oxidation Ditch #2 (1150 Lockwood Lane)	\$3,816,483	
WWTP Blower Building (1150 Lockwood Lane)	\$346,351	
WWTP Chlorine Building (1150 Lockwood Lane)	\$16,747	
WWTP Maintenance Shop (1150 Lockwood Lane)	\$47,990	
WWTP Motor Control Center Building (1150 Lockwood Lane)	\$139,282	
WWTP Backflow-Prevent/Electronic Read Meter Building (1150 Lockwood Lane)	\$130,000	
WWTP Control Building (1150 Lockwood Lane)	\$576,402	
WWTP Old Pump House (Lancaster)	\$49,272	
Hubbard Drive Water Tank (Hubbard Drive, Lancaster)	\$922,340	
Chesterfield Avenue Water Tank (Chesterfield Avenue, Lancaster)	\$922,340	
Chesterfield Avenue Water Tank Building (Chesterfield Avenue, Lancaster)	\$1,925	
Water Plant Pumping Station (2475 DHEC Road)	\$264,060	
Clearwell Tank Building and Equipment (2475 DHEC Road)	\$26,104	
Press Building and Holding Area (1150 Lockwood Lane)	\$720,666	

**Town of Kershaw
Critical Infrastructure List**

Property Description and Address	Estimated Value 2012	Estimated Value 2016
Town Hall	\$1,100,000	\$1,100,000
Floyd Street Water Tank	\$300,000	\$300,000
Highway 601 Elevated Water Tank	\$350,000	\$350,000
Waste Water Lift Station at the Prison	\$150,000	\$150,000
South Street Lift Station	\$80,000	\$80,000
Waste Water Treatment Plant	\$3,000,000	\$3,000,000
Fire Station	\$750,000	\$750,000

The Town of Heath Springs provided a list of structures and facilities that were critical to the Town's infrastructure and to the citizens of the Town.

Town of Heath Springs Properties	
Town Hall/Fire Station	\$2,551,634
Train Depot	\$186,433
Waste Water Treatment Plant	\$2,254,434
WWTP Lab Building	\$11,560
WWTP Storage Building	\$61,545
WWTP Chemical Building	\$21,429
Lift Station #1	\$88,732
Lift Station #2	\$58,805
Lift Station #3	\$116,166
Lift Station #4	\$87,169
Lift Station #5	\$98,479
Lift Station #6	\$78,411
Lift Station #7	\$62,677
Water Tank	\$626,021
WWTP Sodium Hypochlorite Building	\$34,465
Cauthen St. Building	\$64,753

APPENDICES

ROADWAY FLOOD DAMAGE 2012-2015

Date	Road Name	Damage Type
9/17/2012	Gills Creek Dr.	Washout
9/17/2012	Hough Rd.	Over wash
9/17/2012	Lee Ormand Rd.	Over wash
9/18/2012	Carnes Wilson Rd.	Washout/Road Degradation/Infrastructure Damage
9/18/2012	Doster Rd	Washout
9/19/2014	Ander Vincent Rd.	Wash/Road Damage
8/18/2015	Stewart Place Rd.	Washout
10/1/2015	Harold Faulkenberry Rd.	Washout
10/1/2015	Henderson Rd.	Washout/Minor Culvert Damage
10/1/2015	Pursuite Ln.	Over wash/Minor Culvert Damage
11/2/2015	Ander Vincent Rd.	Wash - Grader work
11/2/2015	Old Bailes Rd.	Wash - Guardrail Work needed
11/2/2015	Belt Ln.	Cross Line work needed
11/2/2015	Millstone Branch Ln.	Cross Line work needed - trash removal
11/2/2015	Harris Hill Rd.	Water over road
11/2/2015	Harper Keefe Rd	Needs ditching and grading
11/2/2015	Pursuite Ln.	Crossline work needed
11/2/2015	Lamplight Rd.	Crossline clearing
11/2/2015	Robinson Rd.	Ditches and Pipes need clearing
11/2/2015	Clayton Rd.	Ditches and Pipes need clearing
11/2/2015	Activity Ln.	Washout Repair
11/3/2015	Bayou Ln.	Washout Repair
11/9/2015	Greystone Ln.	Pipe and ditch cleanout
11/10/2015	Baulkum Rd.	Washout/Sink Hole
11/10/2015	Henderson Rd.	Washout Repair
11/11/2015	Harris Hill Rd.	Washout Repair
11/18/2015	Daystar Rd.	Over wash
11/18/2015	Fish Hatchery Rd.	Complete Washout/Road Failure
11/18/2015	Langley Rd.	Over wash
11/18/2015	Old Farm Rd.	Over wash
11/18/2015	Plyler Mill Rd.	Over wash
11/18/2015	Stewart Place Rd.	Over wash
12/30/2015	Mt. Carmel Rd.	Washout/Road Degradation

APPENDICES**ROADWAY FLOOD DAMAGE 2012-2015**

12/30/2015	Walnut Rd.	Washout/Road Degradation
12/30/2015	Willie Usher Rd.	Washout/Road Degradation
12/30/2015	Banner Rd.	Washout
12/30/2015	Bevel Ln.	Washout
12/30/2015	Battlement Rd.	Washout
12/30/2015	Hershel Plyler Rd.	Washout

ABOUT US

GOVERNMENT

EMPLOYEE INFORMATION

SITE MAP



Emergency Notifications

[Tweets by @LCFR911](#)


Welcome to Lancaster County

OUR VISION:

The vision for Lancaster County is to be a great place to live, learn, work, worship, play and raise a family.

OUR MISSION:

Lancaster County facilitates its vision by being a safe community with responsible growth and economic opportunity. The mission of Lancaster County government is to continuously strive to provide progressive quality public services in a timely fashion and in a cost effective manner.

News & Announcements

[Hazard Mitigation Summary Online for Public Review](#)
[2017 Meeting and Holiday Schedule](#)
[Daylight Savings Convenience Site / Recycling Center hours](#)
[FREE NACD prescription drug discount card for family and pets](#)
[Lancaster County Comprehensive Plan 2014-2024](#)
[Lancaster County Adopted Unified Development Ordinance \(November 29, 2016\)](#)
[Fair Housing Statement and Survey](#)
[Passport Information](#)

Emergency Notifications

[Tweets by @LCFR911](#)

Social Media

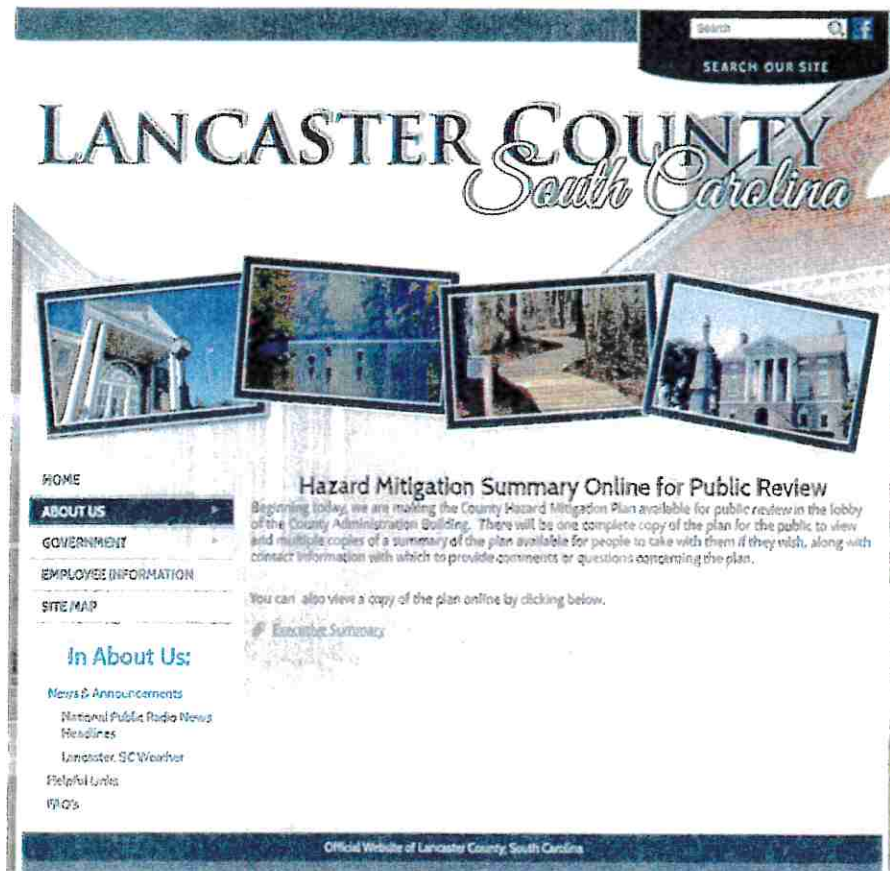
[Tweets by @LCFR911](#)

Community Calendar


March 2017						
S	M	T	W	Th	F	S
				1	2	3
4	5	6	7	8	9	10
11	12	13	14	15	16	17
18	19	20	21	22	23	24
25	26	27	28	29	30	31
< Feb Read All Apr >						

Official Website of Lancaster County, South Carolina

[Home](#) [About Us](#) [Government](#) [Employee Information](#) [Site Map](#)



Home Alerts Notifications Messages Search Twitter



L_C_F_R_
@LCFR011


Visit the Lancaster County Emergency Management website by clicking here: bit.ly/2meHJd0

Lancaster, SC
joiner.org
Joined January 2016

32 Photos and videos

Tweets Tweets & replies Media

L_C_F_R_ @LCFR011 15m
The County Hazard Mitigation Plan is available in the lobby of the County Admin. Building. Please review it and let us know what you think!



You Retweeted
@SCEMD Mar 7
Here's how you can participate in tomorrow's statewide tornado drill at 8 a.m. #scstatewide #scem #emergencyprep


Statewide Practice what you would do if a tornado

Lancaster County Fire Rescue

Page Messages Notifications Insights Publishing Tools Settings Help

Lancaster County Fire Rescue
@LCFR011

Lancaster County's Hazard Mitigation Plan is available for public review in the lobby of the County Administration Building at 401 N. Main St. in downtown Lancaster. Please have a look at it and let Lancaster County Emergency Management know if you have any questions or comments about the plan. Contact information for LCSEM and copies of the document summary of the plan will be available with the plan.



Do you want to make a difference in your community? Do you have the courage to make decisions that will save someone's life? Become a volunteer firefighter.

337 likes
Lancaster Fire-Rescue

Wanting to be a firefighter?

Photo of a person in a firefighter uniform standing next to a fire truck.

Practice your fire safety skills with the Fire Safety Quiz. Free up to 100% correct!

Pinpoint Local Businesses

1st Lancaster Fire
Lancaster, SC 29701
(803) 295-0000

2nd Lancaster Fire
Lancaster, SC 29701
Messages Now

Pinpoint Local Businesses

Hazard Mitigation Plan Public Review Sign-In

Name	Address
Christine Kraly	2046 Vermont Way Ft Mill.
Joe Lucenere	"
Jean Lenke	2050 Vermont Way, Fox Mill 29707
Alton Washburn	16106 Commodore Dr LANCASTER
Doreen Payer	728 E. Arch Street LANCASTER SC 29707
Wally Poole	2007 Vermont Way IL SC
Irene Simpson	2333 Morris Rd. Leno. SC 29708
Linda Ottil	2331 Oxford Circle
Henri Simpson	553 Briarwood Lane
Chelsea Gardner	2216 Fall Lane
BaBarra Taylor	26533 Sandpiper Ct, Fort Mill SC
James Wimmer	" "
Stephen Blackwelder	
Nate Wall	
Trevor Miller	2869 CB Reeves
Doreen Payer	4060 Hoke Rd Heath, SC
Stunt Butfield	405 N. Nolan St. Kershaw, SC 29067
KEITH WILSON	8507 VANCE BAKER RD IL SC

Agenda Item Summary

Ordinance # / Resolution#:

Contact Person / Sponsor: Darren Player, Director

Department: Lancaster County Fire Rescue

Date Requested to be on Agenda: June 26, 2017 Public Safety Committee Meeting Agenda

Issue for Consideration: Land and buildings are available for purchase from LCI located at 1212 Kershaw Camden Hwy. The Fire Commission and Fire Rescue staff have need of warehouse space as well as land area to set up a driver testing track, work area for fire apparatus as well as possible classroom space. This property is located within the city limits of Lancaster behind the Porter Belk Lumber Co property with a common drive accessing the city of Lancaster Public works and trash transfer site. Attached is a folio with property information provided by the Agent.

Points to Consider: Property consists of 6.91+- Acres with a 5544 Square foot garage type building with office area included. It is properly zoned to be both a warehouse and training facility. The price per square foot is much cheaper than new construction.

No funding mechanism is present for the acquisition of this property and the Commission questioned whether or not Development funds could be used since this benefits all Fire Departments in the county.

Purchase price listed by the Agent in Charge is \$395,000.00.

Funding and Liability Factors: No funding mechanism is in place at this time, this is a planning item and a question from the Fire Commission and Fire Rescue for assistance and advice on this project.

Council Options: Council could choose to explore the possibility of purchase or instruct the Fire Commission and Fire Rescue this is not a project Council is willing to consider.

Recommendation: Staff recommends this project be explored and if possible, using Development Funds or some other funding mechanism, purchase the property with the idea it will provide a variety of uses for the Fire Rescue program.



COMMERCIAL REAL ESTATE SERVICES



INDUSTRIAL PROPERTY FOR SALE

1212 Kershaw Hwy, Lancaster, SC 29720

1212 KERSHAW HWY

Presented By:

JAN RINGELING

704.490.3872

jan@moodyre.com

**MOODY GROUP
COMMERCIAL SERVICES**

6201 Fairview Rd.
Charlotte, NC 28210

980.21 196
MoodyRe.com

INDUSTRIAL PROPERTY FOR SALE

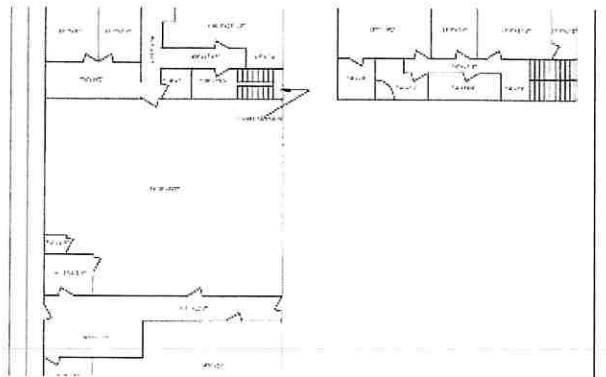
1212 Kershaw Hwy, Lancaster, SC 29720

EXECUTIVE SUMMARY



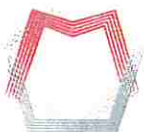
OFFERING SUMMARY

Sale Price:	\$395,000
Lot Size:	6.91 Acres
Year Built:	1997
Building Size:	5,544
Zoning:	LCT
Market:	Lancaster, SC 29720
Price / SF:	\$71.25



PROPERTY OVERVIEW

Currently an industrial truck repair / shop area, storage/parts inventory



JAN RINGELING

704.490.3872

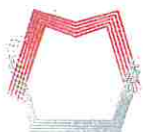
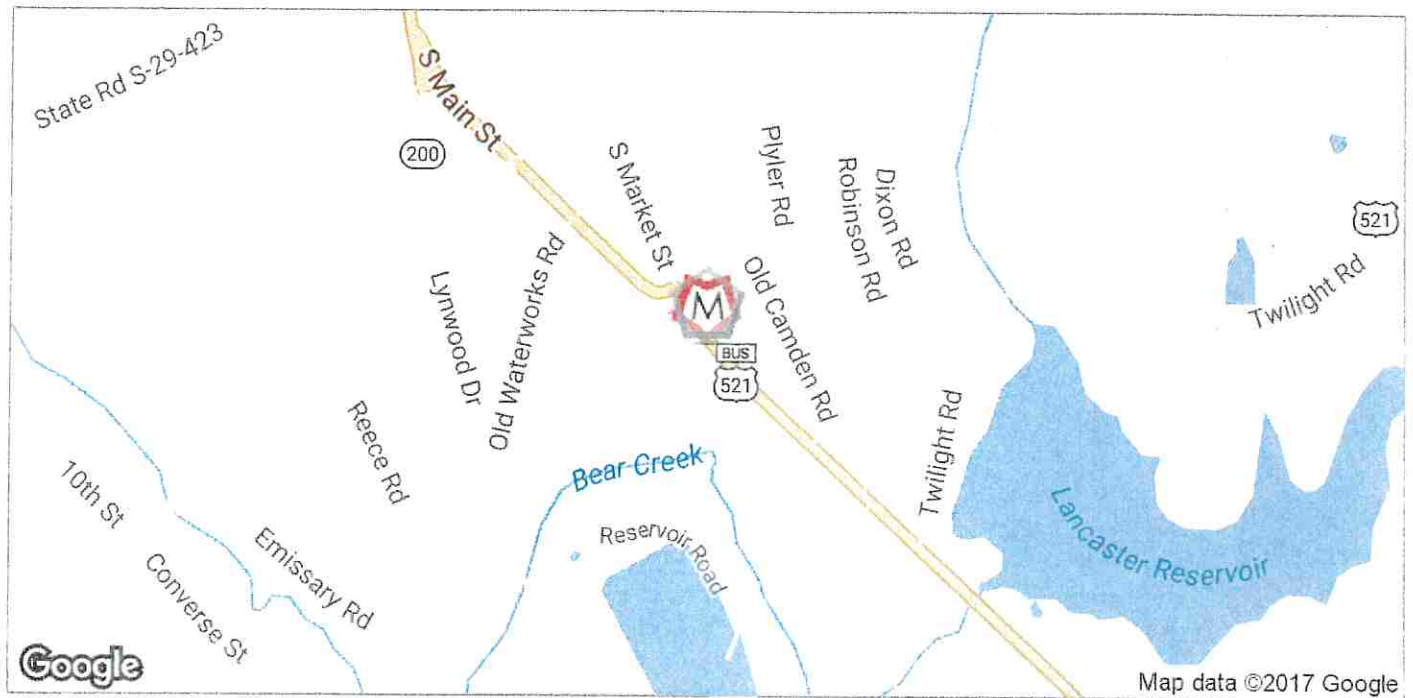
jan@moodyre.com

MOODY GROUP COMMERCIAL SERVICES • 6201 Fairview Rd. • Charlotte, NC 28210 • 980.215.8448 • MoodyRe.com

INDUSTRIAL PROPERTY FOR SALE

1212 Kershaw Hwy, Lancaster, SC 29720

LOCATION MAPS



JAN RINGELING

704.490.3872

jan@moodyre.com

MOODY GROUP COMMERCIAL SERVICES • 6201 Fairview Rd. • Charlotte, NC 28210 • 980.215.8448 • MoodyRe.com

INDUSTRIAL PROPERTY FOR SALE

1212 Kershaw Hwy, Lancaster, SC 29720

PROPERTY DESCRIPTION



PROPERTY OVERVIEW

Currently the home of Lineberger Construction Company

Business is relocating to anchor a 110 acre industrial park currently being developed next door.

Offices on main level and upper

Fenced yard with truck repair / shop area, storage/parts inventory

LOCATION OVERVIEW

Located half mile from downtown Lancaster and adjacent to our new KCH Industrial Park, rail accessed.



JAN RINGELING

704.490.3872

jan@moodyre.com

MOODY GROUP COMMERCIAL SERVICES • 6201 Fairview Rd. • Charlotte, NC 28210 • 980.215.8448 • MoodyRe.com

INDUSTRIAL PROPERTY FOR SALE

1212 Kershaw Hwy, Lancaster, SC 29720

PROPERTY DETAILS

SALE PRICE

\$395,000

LOCATION INFORMATION

Building Name	1212 Kershaw Hwy
Street Address	1212 Kershaw Hwy
City, State, Zip	Lancaster, SC 29720
County/Township	Lancaster
Market	Lancaster, SC 29720
Cross Streets	

BUILDING INFORMATION

Building Size	5,544 SF
Tenancy	Single
Office Space	2000
Year Built	1997
Load Factor	No
Free Standing	No

PROPERTY DETAILS

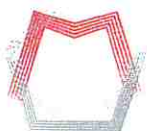
Property Type	Light Industrial
Property Subtype	Manufacturing
Zoning	LCT
Lot Size	6.91 Acres
APN#	0081-00-021.01 - 301,000 SF
Corner Property	No
Waterfront	No

PARKING & TRANSPORTATION

Street Parking	No
Rail Access	N/A

UTILITIES & AMENITIES

Security Guard	No
Handicap Access	No
Freight Elevator	No
Centrix Equipped	No
Leed Certified	No
Restrooms	
Power	Yes



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**AS RECOMMENDED FOR APPROVAL
BY THE
INFRASTRUCTURE AND REGULATION AGREEMENT COMMITTEE
For Third Reading Consideration at the July 27, 2015 Council Meeting**

STATE OF SOUTH CAROLINA)

COUNTY OF LANCASTER)

ORDINANCE NO. 2015-1360

AN ORDINANCE

TO APPROVE A DEVELOPMENT AGREEMENT BETWEEN SINACORI BUILDERS, LLC, AND THE COUNTY OF LANCASTER RELATING TO THE COVINGTON DEVELOPMENT; TO AUTHORIZE CERTAIN COUNTY OFFICIALS TO EXECUTE AND DELIVER THE DEVELOPMENT AGREEMENT; AND TO PROVIDE FOR OTHER MATTERS RELATED THERETO.

FILED
OFFICE OF CLERK
OF COURT
LANCASTER, SC
JUL 28 2 25 PM

Be it ordained by the Council of Lancaster County, South Carolina:

Section 1. Findings and Determinations.

The Council finds and determines that:

(a) Lancaster County is authorized by the South Carolina Local Government Development Agreement Act, codified as Sections 6-31-10 to -160, Code of Laws of South Carolina 1976, as amended (the "Act"), and by the Development Agreement Ordinance for Lancaster County, South Carolina, Ordinance No. 663 (the "Ordinance"), to enter into development agreements with developers;

(b) Sinacori Builders, LLC, seeks to enter into a development agreement with Lancaster County relating to the Covington development; and

(c) the Act and Ordinance require a development agreement to be approved by the county governing body by the adoption of an ordinance.

Section 2. Approval of Agreement; Authorization to Act.

A. The Council Chair and Council Secretary are each authorized, empowered and directed to execute, acknowledge and deliver a Development Agreement between Sinacori Builders, LLC, and the County of Lancaster relating to the Covington development (the "Development Agreement") in the name and on behalf of the County of Lancaster. The form of the Development Agreement is attached hereto as Exhibit A and all terms, provisions and conditions of the Development Agreement are incorporated herein by reference as if the Development Agreement were set out in this ordinance in its entirety. By adoption of this ordinance, the Lancaster County Council approves the Development Agreement and all of its terms, provisions and conditions. The Development Agreement is to be in substantially the form as

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STATE OF SOUTH CAROLINA)
)
COUNTY OF LANCASTER) **COVINGTON DEVELOPMENT**

This **DEVELOPMENT AGREEMENT** (the "Agreement") is made and entered into as of the ____ day of _____, 2015 ("Agreement Date"), by and among **SINACORI BUILDERS, LLC** ("Developer"), a North Carolina limited liability company, and the **COUNTY OF LANCASTER** (the "County"), a body politic and corporate, a political subdivision of the State of South Carolina.

RECITALS

WHEREAS, Developer has obtained the right to acquire certain real property consisting of approximately 165 acres, more or less, located in the County and known as the Covington development.

WHEREAS, Developer has submitted an application to the County requesting that the Covington development property be rezoned to R-15P, Moderate Density Residential / Agriculture Panhandle District, with a Cluster Subdivision Overlay District.

WHEREAS, Developer and County have determined that it is in the best interests of the County and Developer to enter into this Agreement to set forth the terms and conditions of the development in order to more fully protect the Developer's development rights, thereby providing certainty and predictability to the Developer of those rights and providing certainty and predictability to the County on the scope and terms of the development.

WHEREAS, the Developer desires to obtain from the County in connection with the development, and the County is willing to provide, assurances: (1) that the property will be appropriately zoned for the duration of this Agreement; (2) that upon receipt of its development and construction permits it may proceed with the planned development and construction; and (3) that the development rights will be vested for the duration of this Agreement.

of the entity's officers and owners. Any Developer acquiring Development Rights is required to file with the County an acknowledgment of this Agreement and the transfer of Development Rights is effective only when the County receives a commitment from the acquiring Developer to be bound by it. This provision does not apply to the purchaser or other successor in title to the Developer who is the owner or lessee of a completed residence and is the end user and not the developer thereof or who is the owner or lessee of an individual lot, who is not a developer and who intends to build a residence on the lot for the owner or lessee to occupy.

ARTICLE IV

DEDICATIONS AND FEES AND RELATED AGREEMENTS

Section 4.01. Purpose of Article. The Parties understand and agree that Development of the Property imposes certain burdens and costs on the County, including those for certain services and infrastructure improvements. Eventually, *ad valorem* taxes collected from the property may meet or exceed the burdens and costs placed upon the County, but certain initial costs and capital expenditures are now required that are not to be funded by any increase in taxes paid by existing residents of the County. The purpose of this article is to identify the matters agreed upon to be provided by the Developer to mitigate such burdens and costs.

Section 4.01A. School Payments. Developer agrees to pay to the County for the benefit of the Lancaster County School District One Hundred Sixty-Five Thousand and No/100 dollars (\$165,000.00) upon the earlier of either December 1, 2016 or the closing on the sale of any portion of the Covington development to an individual or entity other than a Sinacori Related Entity (the "School Payment"). Developer acknowledges and agrees that County is responsible only for the remittance of the School Payment to the Lancaster County School District and that the County has no other obligation or responsibility for the School Payment. As used in this section, "Developer" means Sinacori Builders, LLC, a North Carolina limited liability company, and does not include its successors or assigns but does include a Sinacori Related Entity that holds title to the Property.

Section 4.01B. Fire and EMS Station. Developer agrees to donate to County, by the time of final plat approval for the first phase of the Covington development, approximately two (2) acres of land to be identified by mutual agreement of the parties on Exhibit F (the "Substation Property"), attached hereto and incorporated herein by reference as if the exhibit were set out in this Agreement in its entirety. Developer will convey fee simple title to the Substation Property to County by general warranty deed. The deed will include appropriate restrictions on the Substation Property to ensure that the Substation Property will continue to be used for either fire or public safety related uses, or both uses, for at least ten (10) years from the date of transfer. Title to the Substation Property shall be insurable. Developer is responsible for the costs and expenses of transferring title to the Substation Property, except County is responsible for any title insurance premiums if County chooses to purchase title insurance. County agrees, and County shall cause the Pleasant Valley Fire Protection District to agree, that the new Substation built on the Substation Property shall be of a design that is compatible with and will not detract from the Covington development; the parties anticipate that such Substation design will be

similar in exterior appearance to the sketch shown on Exhibit F-1, or substantially similar thereto with Developer's approval, which approval shall not be unreasonably withheld.

Section 4.01C. Funds for Public Safety. Developer agrees to pay County Three Hundred Thirty Thousand and No/100 dollars (\$330,000.00) upon the earlier of either December 1, 2016, or the closing on the sale of any portion of the Covington development to an individual or entity other than a Sinacori Related Entity (the "Public Safety Payment"). Upon receipt of the Public Safety Payment, the monies must be accounted for separate and distinct from other monies of the County. The Public Safety Payment must be used for non-recurring purposes for law enforcement, fire and emergency medical service in the panhandle area of the County. The determination of the specific uses for the Public Safety Payment is at the discretion of the County Council. As used in this section, "Developer" means Sinacori Builders, LLC, a North Carolina limited liability company, and does not include its successors or assigns but does include a Sinacori Related Entity that holds title to the Property.

Section 4.02. Payment of Costs. Upon submission of appropriate documentation of the expenditure, Developer agrees to reimburse the County, not later than December 31, 2015, for the County's reasonable unreimbursed actual costs related to this Agreement. The foregoing cost reimbursement is capped at ten thousand dollars (\$10,000.00) and is limited to County payments to third-party vendors and service providers that have not been otherwise reimbursed from the fee paid by Developer pursuant to Section 10 of Ordinance No. 663.

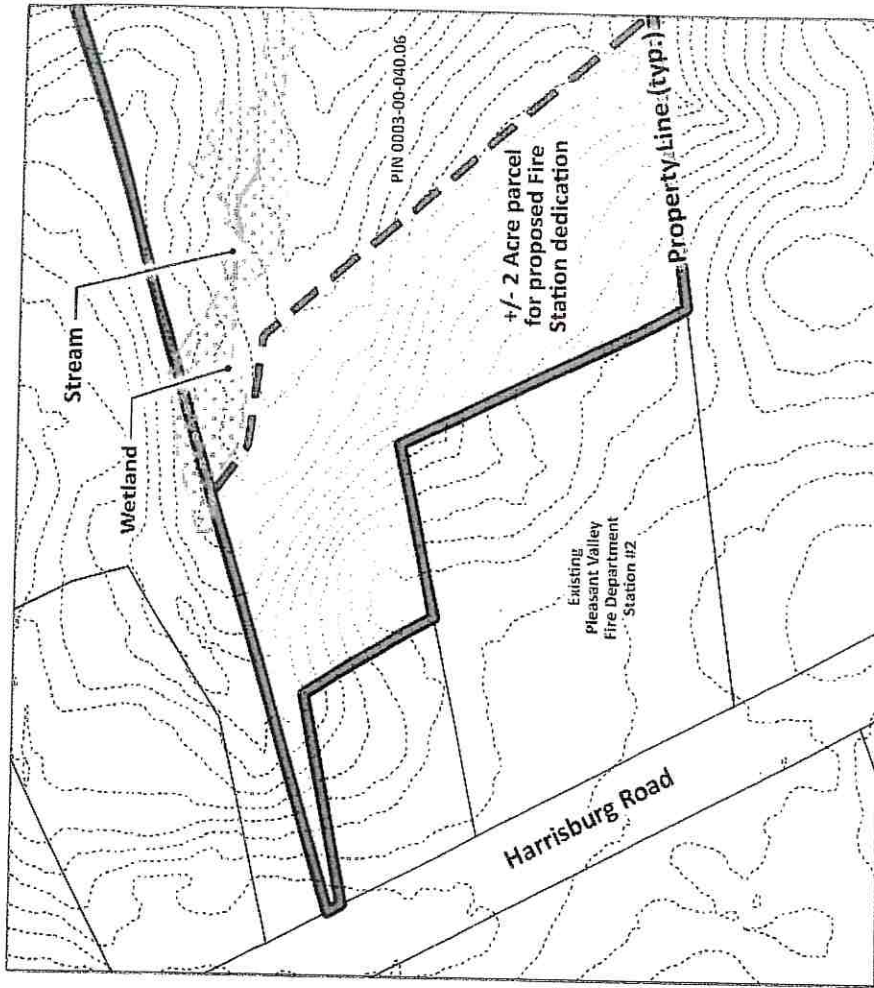
Section 4.03. Other Charges or Fees. (A) Nothing in this Agreement shall be construed as relieving Developer from the payment of any fees or charges in effect at the time of collection as may be assessed by entities other than the County.

(B) Developer is subject to the payment of any and all present or future fees enacted by the County that are of County-wide application and that relate to the County's costs of processing applications, issuing development permits, reviewing plans, conducting inspections or similar type processing costs.

Section 4.04. Infrastructure and Services. The Parties recognize that the majority of the direct costs associated with the Development of the Property will be borne by Developer, and many necessary infrastructure improvements and services will be provided by Developer or other governmental or quasi-governmental entities, and not by the County. For clarification, the Parties make specific note of and acknowledge the following:

(A) Roads. (1)(a) Developer is responsible for the construction and costs of all roads, whether for public or private use, within the Property including but not limited to any necessary entrance and intersection improvements as required by the South Carolina Department of Transportation related to the development of the Property. All roads must be constructed in accordance with the County's road standards. The road improvements are expected to be implemented on a schedule consistent with the development of the Property as contained in the development schedule and as necessary to serve the development.

(b) Developer shall cause to be prepared a traffic impact analysis conducted and sealed by a licensed South Carolina professional engineer. Any road improvements, which are determined to be necessary, based on the results of the traffic impact analysis, shall be



DRAFT

DO NOT RELY ON THIS DOCUMENT

ESP
tables

ESP Associates, P.A.
P.O. Box 7030 3475 Lakewood Blvd.
Charlotte, NC 28241 704.584.2978
NC - 704.584.4949 SC - 803.682.2440
www.ESP Associates.com



Covington Conceptual Fire Station Exhibit

July 10, 2015

GRAPHIC SCALE



1 INCH = 100 FT.



P.O. Box 471785, Charlotte NC 28247

EXHIBIT
205

F

FILED
OFFICE OF CLERK
OF COURT
2015 DEC -1 AM 11:13
CLERK OF COURT
LANCASTER, SC

STATE OF SOUTH CAROLINA)

COUNTY OF LANCASTER)

ORDINANCE NO. 2015-1378

AN ORDINANCE

TO APPROVE A DEVELOPMENT AGREEMENT BETWEEN FORESTAR (USA) REAL ESTATE GROUP INC. AND THE COUNTY OF LANCASTER RELATING TO A PORTION OF THE ANSLEY PARK (PDD-21) DEVELOPMENT; TO AUTHORIZE CERTAIN COUNTY OFFICIALS TO EXECUTE AND DELIVER THE DEVELOPMENT AGREEMENT; AND TO PROVIDE FOR OTHER MATTERS RELATED THERETO.

Be it ordained by the Council of Lancaster County, South Carolina:

Section 1. Findings and Determinations.

The Council finds and determines that:

(a) Lancaster County is authorized by the South Carolina Local Government Development Agreement Act, codified as Sections 6-31-10 to -160, Code of Laws of South Carolina 1976, as amended (the "Act"), and by the Development Agreement Ordinance for Lancaster County, South Carolina, Ordinance No. 663 (the "Ordinance"), to enter into development agreements with developers;

(b) Forestar (USA) Real Estate Group Inc. seeks to enter into a development agreement with Lancaster County relating to a portion of the Ansley Park (PDD-21) development; and

(c) the Act and Ordinance require a development agreement to be approved by the county governing body by the adoption of an ordinance.

Section 2. Approval of Agreement; Authorization to Act.

A. The Council Chair and Council Secretary are each authorized, empowered and directed to execute, acknowledge and deliver a Development Agreement between Forestar (USA) Real Estate Group Inc. and the County of Lancaster relating to a portion of the Ansley Park (PDD-21) development (the "Development Agreement") in the name and on behalf of the County of Lancaster. The form of the Development Agreement is attached hereto as Exhibit A and all terms, provisions and conditions of the Development Agreement are incorporated herein by reference as if the Development Agreement were set out in this ordinance in its entirety. By adoption of this ordinance, the Lancaster County Council

2015018844

DEED NO CHARGE
RECORDING FEES

\$0.00

PRESENTED & RECORDED:

12-09-2015 03:46 PM

JOHN LANE

REGISTER OF DEEDS

LANCASTER COUNTY, SC

By: CANDICE PHILLIPS DEPUTY

BK: DEED 932

PG: 106-128

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STATE OF SOUTH CAROLINA)

DEVELOPMENT AGREEMENT

COUNTY OF LANCASTER)

PORTION OF

ANSLEY PARK DEVELOPMENT

This **DEVELOPMENT AGREEMENT** (the "Agreement") is made and entered into as of the 23rd day of November, 2015 ("Agreement Date"), by and between **FORESTAR (USA) REAL ESTATE GROUP INC.** ("Developer"), a Delaware corporation, and the **COUNTY OF LANCASTER** (the "County"), a body politic and corporate, a political subdivision of the State of South Carolina.

RECITALS

WHEREAS, Developer has obtained the right to acquire certain real property consisting of approximately 157 acres, more or less, located in the County and known as a portion of the Ansley Park development.

WHEREAS, the Property is currently zoned planned development district pursuant to Ordinance No. 650, PDD-21, Ansley Park Planned Development District-21 approved January 31, 2005 and amended by Ordinance No. 796 dated January 28, 2007.

WHEREAS, Developer and County have determined that it is in the best interests of the County and Developer to enter into this Agreement to set forth the terms and conditions of the development in order to more fully protect the Developer's development rights, thereby providing certainty and predictability to the Developer of those rights and providing certainty and predictability to the County on the scope and terms of the development.

WHEREAS, the Developer desires to obtain from the County in connection with the development, and the County is willing to provide, assurances: (1) that the property will be appropriately zoned for the duration of this Agreement; (2) that upon receipt of its development and construction permits it may proceed with the planned development and construction; and (3) that the development rights will be vested for the duration of this Agreement.

ARTICLE IV

DEDICATIONS AND FEES AND RELATED AGREEMENTS

Section 4.01. Purpose of Article. The Parties understand and agree that Development of the Property imposes certain burdens and costs on the County, including those for certain services and infrastructure improvements. Eventually, *ad valorem* taxes collected from the property may meet or exceed the burdens and costs placed upon the County, but certain initial costs and capital expenditures are now required that are not to be funded by any increase in taxes paid by existing residents of the County. The purpose of this article is to identify the matters agreed upon to be provided by the Developer to mitigate such burdens and costs.

Section 4.01A. Funds for Public Safety. Developer agrees to pay County THREE HUNDRED TEN THOUSAND AND NO/100 DOLLARS (\$310,000.00) upon the earlier of either June 30, 2017, or the closing on the sale of any portion of the Ansley Park development by the Developer to an individual or entity other than a Forestar Related Entity (the "Public Safety Payment"). Upon receipt of the Public Safety Payment, the monies must be accounted for separate and distinct from other monies of the County. The Public Safety Payment must be used for non-recurring purposes for law enforcement, fire and emergency medical service in the panhandle area of the County. The determination of the specific uses for the Public Safety Payment is at the discretion of the County Council. As used in this section, "Developer" means Forestar (USA) Real Estate Group Inc., a Delaware corporation, and does not include its successors or assigns but does include a Forestar Related Entity that holds title to the Property.

Section 4.01B. School Payments. Developer agrees to pay to the County for the benefit of the Lancaster County School District ONE HUNDRED FIFTY-FIVE THOUSAND AND NO/100 DOLLARS (\$155,000.00) upon the earlier of either June 30, 2017 or the closing on the sale of any portion of the Ansley Park development to an individual or entity other than a Forestar Related Entity (the "School Payment"). Developer acknowledges and agrees that County is responsible only for the remittance of the School Payment to the Lancaster County School District and that the County has no other obligation or responsibility for the School Payment. As used in this section, "Developer" means Forestar (USA) Real Estate Group Inc., a Delaware corporation, and does not include its successors or assigns but does include a Forestar Related Entity that holds title to the Property.

Section 4.02. Payment of Costs. Upon submission of appropriate documentation of the expenditure, Developer agrees to reimburse the County, not later than December 31, 2015, for the County's reasonable unreimbursed actual costs related to this Agreement. The foregoing cost reimbursement is capped at ten thousand dollars (\$10,000.00) and is limited to County payments to third-party vendors and service providers that have not been otherwise reimbursed from the fee paid by Developer pursuant to Section 10 of Ordinance No. 663.

FILED
OFFICE OF CLERK
OF COURT
2016 OCT 28 AM 11:59
CLERK OF COURT
LANCASTER, SC

STATE OF SOUTH CAROLINA)

COUNTY OF LANCASTER)

ORDINANCE NO. 2016-1418

AN ORDINANCE

TO APPROVE A FIRST AMENDMENT TO THE DEVELOPMENT AGREEMENT FOR BRETAGNE PHASES 1, 2 AND 3; TO AUTHORIZE CERTAIN COUNTY OFFICIALS TO EXECUTE AND DELIVER THE FIRST AMENDMENT TO THE DEVELOPMENT AGREEMENT FOR BRETAGNE PHASES 1, 2 AND 3; AND TO PROVIDE FOR OTHER MATTERS RELATED THERETO.

Be it ordained by the Council of Lancaster County, South Carolina:

Section 1. Findings and Determinations; Purpose.

A. The Council finds and determines that:

(a) Lancaster County is authorized by the South Carolina Local Government Development Agreement Act, codified as Sections 6-31-10 to -160, Code of Laws of South Carolina 1976, as amended (the "Act"), and by the Development Agreement Ordinance for Lancaster County, South Carolina, Ordinance No. 663 (the "Ordinance"), to enter into development agreements with developers;

(b) Council approved a development agreement for the Bretagne development and that development agreement, dated June 4, 2007, is recorded in the records of the Lancaster County Register of Deeds in Deed Book 403, Pages 100-135 (the "Development Agreement"); and

(c) the property owners association for the lot owners in Phases 1, 2 and 3 of the Bretagne development and the successor developer of Phases 1, 2 and 3 of the Bretagne development have requested Council to approve amendments to the Development Agreement as it relates to Phases 1, 2 and 3 so as to allow completion of development of those phases.

B. It is the purpose of this ordinance to approve an amendment to the Development Agreement.

Section 2. Approval of First Amendment; Authorization to Act.

A. The Council Chair and Council Secretary are each authorized, empowered and directed to execute, acknowledge and deliver a First Amendment to the Development Agreement for Bretagne

2016016480

DEED NO CHARGE
RECORDING FEES

\$0.00

PRESENTED & RECORDED:

11-07-2016 10:53 AM

JOHN LANE

REGISTER OF DEEDS
LANCASTER COUNTY, SC

By: CANDICE PHILLIPS DEPUTY

BK: DEED 1009

PG: 212-245

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STATE OF SOUTH CAROLINA) AMENDED DEVELOPMENT AGREEMENT
COUNTY OF LANCASTER) FOR
BRETAGNE PHASES 1, 2 AND 3

This AMENDED DEVELOPMENT AGREEMENT FOR BRETAGNE PHASES 1, 2 and 3 (the "Agreement"), is made and entered into as of the 3 day of NOV, 2016, by and between BRETAGNE HOLDINGS, LLC ("Developer"), a South Carolina limited liability company, and the COUNTY OF LANCASTER (the "County"), a political subdivision of the State of South Carolina.

RECITALS

WHEREAS, the Development Agreement dated June 4, 2007 is hereby amended for development of Phases 1, 2 and 3 by Developer; and

WHEREAS, Developer is developing certain real property, consisting of one hundred fifty-three and one-half (153.50) acres, more or less, located in the County and known as Phases 1, 2 and 3 of the Bretagne development and presently zoned R-15 Moderate Density Residential/Agricultural District;

WHEREAS, Developer and County have determined that it is in the best interests of the County and Developer to enter into this Agreement to set forth the terms and conditions of the development in order to more fully protect the Developer's development rights, thereby providing certainty and predictability to the Developer of those rights and providing certainty and predictability to the County on the scope and terms of the development;

WHEREAS, the Developer desires to obtain from the County in connection with the development, and the County is willing to provide, assurances: (1) that the property will be appropriately zoned for the duration of this Agreement; (2) that upon receipt of its development and construction permits it may proceed with the planned development and construction; and (3) that the development rights will be vested for the duration of this Agreement.

WHEREAS, in connection with the proposed development, Developer and County recognize that the scope and term of the planned development under this Agreement accomplish the statutory aims of comprehensive, orderly planning and development within the County, thus providing benefits to the citizens of the County and providing public benefits through, among other things, the donation of funds or financing of those public facilities and services described and identified in this Agreement.

Section 4.02. Payment to Lancaster County. (A) Developer agrees to pay to the County for the benefit of the Lancaster County School District FIVE HUNDRED AND NO/100 DOLLARS (\$500.00) at the time an application for a building permit is made for each residential dwelling unit authorized in Section 1.06 (the "School Payment"). Developer acknowledges and agrees that County is responsible only for the remittance of the School Payment to the Lancaster County School District and that the County has no other obligation or responsibility for the School Payment.

(B) Developer agrees to pay to the County ONE THOUSAND AND NO/100 DOLLARS (\$1,000.00) at the time an application for a building permit is made for each residential dwelling unit authorized in Section 1.06 (the "Public Safety Payment"). Upon receipt of the Public Safety Payment, the monies must be accounted for separate and distinct from other monies of the County. The Public Safety Payment must be used for non-recurring purposes for law enforcement, fire and emergency medical service in the panhandle area of the County. The determination of the specific uses for the Public Safety Payment is at the discretion of the County Council.

Section 4.03. Payment of Costs. Not Applicable.

Section 4.04. Other Charges or Fees. (A) Nothing in this Agreement shall be construed as relieving Developer from the payment of any fees or charges in effect at the time of collection as may be assessed by entities other than the County.

(B) Developer is subject to the payment of any and all present or future fees enacted by the County that are of County-wide application and that relate to the County's costs of processing applications, issuing development permits, issuing building permits, reviewing plans, conducting inspections or similar type processing costs.

Section 4.05. Infrastructure and Services. The Parties recognize that the majority of the direct costs associated with the Development of the Property will be borne by Developer, and many necessary infrastructure improvements and services will be provided by Developer or other governmental or quasi-governmental entities, and not by the County. For clarification, the Parties make specific note of and acknowledge the following:

(A) Roads. (1) Developer is responsible for the construction and costs of all roads, both public and private, within the Property including but not limited to any necessary entrance and intersection improvements as required by the South Carolina Department of Transportation to Tillman Steen Road and Barberville Road related to the development of the Property. The public road improvements are expected to be implemented on a schedule consistent with the development of the Property as contained in the development schedule and as necessary to serve the development. One or more roads within the development of the Property may be one way.

(2) County acknowledges that the Bretagne development is a restricted access community. Construction and maintenance of all roads within this restricted access community is the responsibility of the Developer. Developer may transfer its maintenance obligation to a homeowners' association established for the Bretagne development, provided, that the transfer is for perpetual maintenance.

Exhibit C
Development Schedule

<u>Calendar Year</u> <u>Beginning January 1</u>		<u>Units Commenced/Completed</u> <u>Single Family Units</u>
2017	2018	25
2018	2019	50
2019	2020	25
2020	2021	25
2021	2022	24

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