Town of Chapel Hill

Hazard Mitigation Plan 2004

November 22, 2004

A partnership with

State of North Carolina

Division of Emergency Management

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Appendices

1. Introduction

Summary and Objectives

The Federal Emergency Management Agency (FEMA) defines hazard mitigation as "any sustained action taken to reduce long-term risk to human life and property from natural hazards." In the short term, hazard mitigation makes communities safer places to live. Haphazard, poorly planned development or a lack of disaster recovery resources can exacerbate a community's susceptibility to natural hazards. In the long term, hazard mitigation is an essential part of creating a sustainable community, a place that meets the needs of the present without compromising the ability of future generations to meet their own needs. By having a hazard mitigation plan in place, we can save lives and properties, reduce our vulnerability to future hazards, speed recovery after events, and demonstrate our commitment to improving community health and safety (Keeping Natural Hazards form Becoming Natural Disasters, 1998).

Having a hazard mitigation plan in place is a prerequisite to receiving both state and federal disaster funding for our community. North Carolina requires local governments to have hazard mitigation plans. Senate Bill 300, passed by the North Carolina General Assembly in June 2001, requires that local governments have an approved hazard mitigation plan in place by August 1, 2002 in order to receive state disaster assistance funds. The Town of Chapel Hill prepared and adopted a state-approved plan on June 10, 2002. The federal Disaster Mitigation Act of 2000 established additional criteria that local governments must incorporate in their hazard mitigation plans. Plans developed with these criteria must be approved by FEMA on November 1, 2004 in order to receive federal hazard mitigation funding. This document is a revision of the Hazard Mitigation Plan adopted by Town Council on June 10, 2002 intended to meet these additional criteria.

This hazard mitigation plan is intended to meet the requirements of both the state and federal legislation. Creation of this plan was important not only to meet the minimum criteria, but to create effective strategies that will work toward reducing our vulnerability to natural and man-made hazards and ensuring speedy and efficient recovery. Implementation of mitigation strategies delineated in this plan is dependent upon securing funding. Strategies are listed as suggestions so that we will be able to prioritize and be aware of our needs when funding

opportunities become available. This plan will be revisited and reassessed as further hazard identification data becomes available.

General recommendations to town governments for the creation of hazard mitigation plans are made in two North Carolina Division of Emergency Management publications: "Local Hazard Mitigation Planning Manual" (1988) and "Keeping Natural Hazards from Becoming Natural Disasters" (1998). These documents describe a five-step process for hazard mitigation planning as follows:

1. **Identify and analyze each of the hazards possibly affecting the area.** This includes assessing the frequency of occurrence, extent of area impacted, and potential of exposure to hazards. Each hazard is then assigned a rating based on its frequency, community impact, and exposure.
2. **Perform a vulnerability assessment.** During this phase the areas vulnerable to each kind of disaster are examined. An inventory of these areas is taken including number of residents, number and cost of residential buildings, number and cost of commercial buildings, number and cost of critical facilities[1], etc. Future development is estimated and the same assessment is completed. Vulnerable areas and critical structures are then mapped.
3. **Assess the community capability to manage and mitigate hazards.** This includes examining policies, programs, and ordinances that may affect vulnerability. Policies or programs that affect hazard mitigation are evaluated for their effectiveness.
4. **Research goals relevant to mitigation.** These can include community goals, state and federal mandates, and previously adopted local policies.
5. **Create a mitigation strategy.** This should include recommendations for new policies or changes to previously existing policies, how these proposals relate to the goals identified, and who has responsibility for carrying out each of these policies.

The following Hazard Mitigation Plan for the Town of Chapel Hill follows this format. Further guidance for the plan came from the Stafford Act, which requires the plan to include a "method of implementing, monitoring, evaluating and updating the mitigation plan."

[1] Critical facilities are defined as those facilities critical to the response and recovery of the community during and after a natural hazard. These include police stations, fire stations, and emergency shelters.

The Town of Chapel Hill has many hazard response programs and policies currently in place. These programs help the Town respond quickly and effectively to natural hazards. Hazard response is not mitigation; however these programs do help to reduce the impact of natural hazards on the community. One such policy is the Major Emergency Disaster Operations Plan, approved in May 1997 (Appendix F), which is updated periodically. This plan maps out the Town's response to hazards ranging from severe storms to earthquakes. A system of emergency management command and control that is compatible with that of Orange County Emergency Management and the State of North Carolina is established in this Plan. The Town Public Works department has response plans for snow, ice, and debris removal that are flexible and can be easily adjusted to respond quickly and effectively to a snow, wind, or other storm event of any intensity or duration. There is no simple solution to mitigate these types of hazards, but these response plans help lessen their negative effects on the community.

The Town participates in the National Flood Insurance Program (NFIP). Local floodplain maps indicate to residents and business owners of their proximity to floodways and floodplains with 100 and 500 year recurrence intervals. However, these maps are twenty-five years old and are in need of being updated. A floodplain remapping project has begun and we anticipate limited data will be available by January 2005.

Hazard mitigation projects that specifically address repetitive loss property acquisition in the floodway have been successfully completed in Chapel Hill and additional projects are pending further FEMA approval. Other flood mitigation projects involving Town participation include 1721 East Franklin Street and Eastgate Shopping Center drainage improvements.

This hazard mitigation plan includes comprehensive strategies from acquiring and removing repetitive loss structures from the floodway to providing helpful information and educational materials to citizens and businesses. Other hazards such as wind damage and winter storms are addressed with strategies to reduce substantial damages and speed up the recovery effort.

In 2000, the Town of Chapel Hill was active with Research Triangle Project Impact, a Triangle J Council of Governments cooperative based on three principles: 1) preventive actions must be decided at the local level, 2) private sector participation is vital, and 3) long-term efforts and investments in prevention measures are essential. Although FEMA ended Project Impact, the Town remains committed to these guiding principles. There remain opportunities for

collaboration and cooperation among local units of government for more effective hazard mitigation programming.

The objectives of the Town of Chapel Hill's Hazard Mitigation Plan are as follows:

- Reduce the risk to public health and safety from natural hazards.
- Meet State and Federal mandates in order to be eligible for disaster relief funds.
- Identify vulnerabilities to natural disasters.
- Review appropriate existing policies and regulations and suggest possible actions and changes that could be made to enhance mitigation capabilities.
- Identify existing community capabilities and goals relevant to mitigation.
- Suggest new mitigation strategies to incorporate as financial resources become available.

General Community Description

Chapel Hill is located in the Piedmont of North Carolina, and is part of the larger Research Triangle Park metropolitan area. It lies between the Town of Carrboro to the west and the City of Durham to the east, and spans the Orange County – Durham County line (see Figure 1.1). It is a growing town of 52,440 people (2002 state estimate), averaging 2.1% over the last decade, estimated to grow to 73,355 by 2025 (Chapel Hill Data Book, 2003). The Town's growth is constrained by a no-annexation policy to maintain a rural buffer around the town and to encourage infill.

Chapel Hill is a diverse, vibrant, and prosperous community, anchored by the University of North Carolina at Chapel Hill, which contributes to these qualities. As of 2003, racial composition is 78% white, 11% black, and 1% Asian and Hispanic. The Hispanic population in Orange County has increased 400% from 1990 to 2000, a trend which continues. Population estimates include UNC students that live in dorms or off-campus in Town. Thus, the age distribution is dominated by the 15-29 year age group, accounting for nearly 50 percent of the Town's population. The over-65 year age group is increasing by the greatest amount relative to other age groups at 8%.

The local economy is dominated by the University and UNC Hospitals. In 2002 the University employed 10,115 and UNC Hospitals employed 5,473. The total number of jobs in Town in 2000 was 24,455. The largest employment sectors in 2000 were educational, health,

and social services (44%), 12% for professional and administrative services, and 5% for manufacturing. Much of the high-wage employment of residents is located in the Research Triangle Park, outside of town. Median family income for Chapel Hill in 2002 was $90,140. The average price of homes sold in Chapel Hill was approximately $299,000 in 2002 (Chapel Hill Data Book 2003).

Chapel Hill residents generally enjoy mild, variable weather. Average temperatures range from 88ºF in summer to 25ºF in winter. Annual rainfall averages 46" providing drinking water and flowing creeks, and providing for wooded neighborhoods and expansive green spaces. Though residents generally appreciate the variable climate, extremes in these weather patterns can create natural disasters.

Chapel Hill is located at the western edge of a Triassic Basin that crosses through the Research Triangle Park area. The Town is divided by Morgan Creek, Bolin Creek, and Booker Creek, all of which drain to Jordan Lake. Upland areas between the streams have steep slopes and erodible but well-drained soils. Stream valleys in this upland area have narrow flood zones and are more prone to flash flooding. The Triassic Basin lowland has poorly-draining soils. Areas of Town in the Triassic Basin have elevations close to the pool elevation of Jordan Lake, contributing to slower drainage in this area.

Natural hazards that threaten the Chapel Hill area include hurricanes, severe winter storms, severe thunderstorms, tornadoes, drought, fire, and flooding. These events can cause loss of life, property damage, and tremendous economic disruption and inconvenience for Chapel Hill residents, businesses, and government services. Most natural hazard events in Chapel Hill result in flood damage or wind damage. These effects are the main focus of this hazard mitigation plan.

Public Involvement and Process

The Town of Chapel Hill's Engineering Department staff, in partnership with the NC Division of Emergency Management, developed the Stafford Act compliant Hazard Mitigation Plan over approximately a six-month period from January- June, 2002. The plan was initially developed by Town Engineering Department staff , other Town staff and regional stakeholders (planning group), and in partnership with the N.C. Division of Emergency Management,

Mitigation Planning Branch. The final plan was adopted by Town Council and approved by the N.C. Division of Emergency Management on June 10, 2002.

With the subsequent FEMA hazard mitigation plan criterion, including the "Green Book" and "Crosswalk" guidelines, the Town immediately began working on this revised document in Spring, 2003. The Engineering Department, Stormwater Division, took the primary responsibility of developing these revisions. Staff involved in the preparation of this document can be contacted here:

Town of Chapel Hill
Stormwater Management Division
209 N. Columbia St.
Chapel Hill, NC 27516
(919) 969-RAIN (7246)

The Stafford Act-compliant Hazard Mitigation Plan development included review and comment from the planning group. The planning group consisted of Engineering Department staff with the following other Town staff and local and regional agencies:

Town of Chapel Hill

Fire Department: Fire Chief, Fire Marshall
Planning Department: Director
Inspections Department: Director
Public Works Department: Director
Transportation Department: Director
Police Department: Police Chief
Manager's & Attorney's Office

UNC at Chapel Hill

Department of Environment, Health & Safety
Energy Services/Facilities Department
UNC Hospitals

Other

NC Division of Emergency Management
Triangle J Council of Governments
Chapel Hill/Carrboro Chamber of Commerce
Orange Water and Sewer Authority
Duke Power Company
Progress Energy Company
Public Service Company of North Carolina
Chapel Hill/Carrboro School District
Orange County Emergency Management

This revised plan was prepared using the same approach as the June 10, 2002 adopted plan. Upon consultation with the NC Division of Emergency Management, Planning Branch, department staff revised all key sections and solicited comments from all members of the same planning group and added other tax-exempt organizations to the group, including the local Chamber of Commerce, the local chapter of the Sierra Club and the American Red Cross. These solicitations included telephone calls and e-mails. The draft plan was placed on the website at least 2 weeks prior to the scheduled second Public Hearing on November 22, 2004, with instructions of how to submit comments on the revised plan.

The planning group provided input into the plan via a completed Hazard Mitigation Survey document or were provided the opportunity to provide input by direct submittal of comments either prior to or during the Public Hearing. For the June 10, 2002 adopted plan, no further comments were received at the Public Hearing from the planning group or any other organizations. The NC Division of Emergency Management provided comments and the plan was revised to their satisfaction. A sample of a completed Hazard Mitigation Survey is in Appendix E.

Two (2) Public Hearings

In addition to the planning group comment process, the Town held a Public Hearing on May 13, 2002 pursuant to NC General Statutes. This public hearing was advertised in local newspapers (no actual copies are provided) and was attended by all interested citizens. A

presentation was given by staff and the opportunity for comments and questions from the public as made available. No further comments were received at this public hearing.

The minutes and cover memorandum for the May 13, 2002 Public Hearing are in Appendix D. For this revised plan, a second Public Hearing is scheduled for November 22, 2004. It is anticipated that this Public Hearing will be held and this revised plan will be adopted by Town Council on this date.

Two Opportunities for Draft and Final Comments From the Public

At least 2 weeks prior to the advertised second public hearing, planning group members, in addition to other tax-exempt organizations, were provided the opportunity to make comments on the revised draft plan. The November 22, 2004 Public Hearing and Adoption offered a final opportunity for public comment. All received final revised draft comments are noted in Appendix D and have been addressed in the final draft plan for adoption.

Two (2) Plan Adoptions

On June 10, 2002, Town Council formally adopted the Stafford Act compliant Hazard Mitigation Plan. The minutes, cover memorandum and resolution for this adoption are in Appendix D. On November 22, 2004, Town Council will adopt the Disaster Mitigation Act 2000 compliant Hazard Mitigation Plan. The minutes, cover memorandum and resolution for this Public Hearing and Adoption are in Appendix D.

North Carolina Division of Emergency Management Plan Approval

On May 29, 2002, the N.C. Division of Emergency Management provided a letter to the Town of Chapel Hill stating that the adopted plan is in full compliance with the state's minimum criteria for hazard mitigation plans. It also states that additional criteria required by FEMA may be necessary and notification will be provided. A copy of this letter is in Appendix E.

This revised plan is a result of these additional FEMA requirements pursuant to the Disaster Mitigation Act 2000. All revised plan comments from NC Division of Emergency Management are included in Appendix E.

2. Goals, Priorities, and Selection Criteria

Community Goals

Goal statements were developed from existing community plans and ordinances:

Goal 1: Establish effective regional cooperation that promotes sustainable growth patterns, recognizing that economic development, land use, transportation, environmental, natural area linkages, and other planning issues transcend the boundaries of Chapel Hill.

Source: Comprehensive Plan, Section 5.2

Goal Category: Natural Resource Protection, Future Development

Objectives:

Support multi-jurisdictional planning initiatives to address regional issues. Maintain the Rural Buffer's role in providing open space and rural character, limiting sprawl, and reinforcing Chapel Hill's special community character.

Proposed strategies:

Seek opportunities for formal and informal communication with other Triangle Area jurisdictions on regional planning issues.

Develop a network of greenways with regional connections.

Manage watersheds, stormwater, and water quality.

Develop an area-wide map of potential conservation lands.

Consider creative zoning options.

Use Purchase Development Rights, and explore Transfer of Development Rights.

Encourage landowner compacts.

Hazard Threat Addressed:

hazards related to flooding, including hurricanes and thunderstorms

Goal 2: Promote orderly development and redevelopment to achieve appropriate and compatible use of land.

Source: Comprehensive Plan, Section 8.3

Goal Category: Future Development, Redevelopment

Objectives:

Establish a plan for future land use and incentives for the Town's Urban Services Area that provides for land use patterns, types, and densities that contribute to the goals of the Comprehensive Plan.

Implement coordinated land use policies, regulations, and capital improvements that provide for development to occur concurrently with the provision of adequate public services and facilities.

Proposed Strategies:

Encourage development of selected "opportunity areas" to achieve Comprehensive Plan objectives.

Encourage mixed-use development forms.

Preserve open space in residential developments through the application of conservation development principles.

Establish a growth management protocol to maintain sufficient infrastructure capacity.

Prepare and adopt small area plans to implement Comprehensive Plan concepts.

Improve the Development Review process.

Hazard Threat Addressed:

hazards related to flooding, including hurricanes and thunderstorms

Goal 3: Identify, protect, and preserve open spaces and critical natural areas and enhance the community's air quality and water resources.

Source: Comprehensive Plan, Section 9.2

Goal Category: natural resource protection

Objectives:

Implement regulations, policies, incentives and programs to conserve valuable natural resources, including trees, woodlands, and habitat areas; stream corridors and floodplains; sensitive soils and steep slopes; and air and water quality.

Implement an open space network designed to protect the natural environment, provide opportunities for active and passive recreation, separate incompatible uses, protect scenic views, and provide continuous linkages among neighborhoods.

Proposed strategies:

Preserve land with environmental value as open space.

Encourage public and private partnerships to restore and maintain the Town's environmental resources.

Encourage low-impact development for addressing stormwater quality and quantity concerns.

Encourage the creation of a stormwater utility to manage these problems.

Hazard Threat Addressed:

hazards related to flooding, including hurricanes and thunderstorms

Goal 4: Provide community facilities and services that meet the physical, social, and cultural needs of Chapel Hill's population.

Source: Comprehensive Plan, Section 11.A

Goal Category: future development

Objectives:

Plan for facility development and equipment acquisition needed to meet future community needs for fire and police protection.

Proposed Strategies:

Creation of a Community Facilities Plan that would outline plans for providing police, fire, waste services, etc. to areas where growth is expected to occur.

Hazard Threat Addressed: fire, rioting

Goal 5: Priorities for the Town's developing Stormwater Management Program were developed by a citizen's committee. While these were never specifically formulated as goals, these priorities support the overall (and unstated) goal of better stormwater management:

1. Develop and implement a comprehensive Stormwater Program Master Plan that supports all of the stormwater program priorities.

A Stormwater Master Plan will be developed based on the Mission and Program Priorities for the stormwater management program. It will set out the activites to be undertaken in line with the priorities and a time schedule and resources needed to accomplish the various elements of the stormwater management program. The Stormwater Master Plan will help guide the implementation of the stormwater management program over the long-term.

2. Address stormwater quantity (flooding) as an integral component within the program.

   The stormwater management program will be enhanced to include comprehensive long-range management efforts to minimize flood risks and the many effects of flooding. These efforts include prioritizing and addressing stormwater infrastructure needs such as maintenance, repair, replacement, upgrades and capital improvements.

3. Address stormwater quality as an integral function within the program.

   The stormwater management program will continue to address stormwater ***quality.*** This applies to water quality regulatory demands, as well as to erosion and sediment controls and to stream and aquatic system health. The stormwater management program will recognize and move toward the goals of the Town's Year 2000 Comprehensive Plan.

4. Protect and restore natural stream corridors.

   The health of the aquatic ecosystem is dependent on both quality and quantity management. The Town's stormwater management program will address both infrastructure concerns and aquatic habitat health.

5. Develop a formal public education and involvement program.

   Stormwater education efforts will identify key stakeholders, including institutions, development and business communities, and the general public. Education efforts will focus on both causes and solutions for stormwater problems, including possible regulatory remedies. The goal will be to establish a clear understanding that stormwater and surface water systems are a public resource to be protected and managed in the public interest.

6. Define the level of service and performance standards for the Town's Stormwater Program.

The stormwater management program will plan, prioritize, design and construct system improvements at a pre-determined level-of-service that is considered to be appropriate for public and private drainage systems. Defining the level and extent of service and performance for the Town's drainage system provides valuable guidance about how and where stormwater management is to be delivered and enforced.

7. Ensure compliance with Federal and State regulatory mandates.

   The stormwater management program will implement reasonable regulatory programs that comply with stormwater quality mandates from Federal and State agencies, and will address floodplain management requirements.

8. Establish clear stormwater program leadership that the public recognizes.

   The stormwater management program will clearly identify point(s) of contact responsible for system planning, regulatory compliance and enforcement, system design, construction and maintenance, and addressing stormwater concerns from the public.

9. Integrate programs to utilize resources efficiently.

   The stormwater management program will minimize duplication and inefficiencies in the management and implementation of the various stormwater elements in order to improve the overall cost-effectiveness of the program and to optimize the use of already scarce resources. It will promote integrated programs and inter-jurisdictional cooperation aimed at ensuring a positive public reception to the program.

10. Establish an understanding of the stormwater system as a "utility".

    The stormwater management program will be funded, at least in part, by the creation of a utility, providing a stable, dedicated funding source like those already in place for other services (i.e. water, sewer, gas, electricity).

Mitigation Goals

Mitigation goals have been compiled from a large number and variety of plans and ordinances to create some guiding principles for hazard mitigation that, in general, protect property, health and well-being, and quality of life:

1. Protect existing buildings and infrastructure by reducing vulnerability or susceptibility to hazards.
2. Prevent damage to future development by limiting development in hazardous locations.
3. Protect human health and well-being by reducing exposure to hazards or offering mitigating/protective services.
4. Discourage development that increases incidence or exposure of property or people to hazards.
5. Conserve and preserve sensitive and outstanding natural areas and resources.
6. Preserve and enhance the Town's interaction with the University of North Carolina at Chapel Hill.

Prioritization of Hazard Types and Locations

Thus far, the Town has been treated as a single Geographic Planning Area because of its small size. Therefore, sections of Town will not be singled out for prioritization. Priority hazard types to address can be based on the Hazard Identification and Profile table:

<u>High Priority:</u>

Flash floods/high water

Severe winter storms

Hurricanes

<u>Moderate Priority:</u>

Thunderstorms

Tornadoes

Windstorms

Primary hazards can also be prioritized based on citizen complaints:

1. flooding/water damage
2. icy conditions
3. high winds

All of these hazards have the primary effect of property damage, secondary effects to safety and health. Recovery from these hazards affects quality of life.

Selection Criteria for Mitigation Strategies

Mitigation strategies as shown in Table 3.1 were drawn from a wide variety of sources and through brainstorming with the stakeholder group. Criteria for selecting mitigation strategies and policies are based on the above goals, objectives and priority hazards. Table 3.2 describes the "high" priorities based on the indicated hazard. Section 3 also describes how the Town has taken these high priority mitigation actions and the implementation process required to implement these actions. Use or modification of existing policies is preferable to creating new policies. It will be assumed that analyzed strategies do at least partially solve the problem it is intended to. Further selection criteria to be used in the identification and analysis of mitigation strategies:

1. Does the strategy address multiple hazards?
2. Does the strategy meet at least one community mitigation goal?
3. Will the strategy achieve other community objectives?
4. Are there existing policies which implement this strategy?
5. Does this strategy work better in tandem with others?
6. Does this strategy complement or support other local, state and federal regulations?
7. Will there be a beneficial or neutral impact on the environment?
8. Will the benefits outweigh the costs?
9. Is funding available or potentially available?
10. Is there sufficient staff expertise and resources to implement and administer the resulting program?
11. Is this strategy technically feasible?

Mitigation strategy types are defined thus for evaluating strategies:

Prevention – activities which prevent, reduce the occurrence, or reduce the severity of hazardous events, or prevent new exposure of property or people.

Property Protection – activities which reduce or prevent damage to property from a hazard event.

Natural Resource Protection – activities that preserve natural ecologic functions that serve to mitigate hazards.

Human Protection – activities which reduce human exposure to hazards or offer mitigating or protective services directly to people.

Structural Projects – activities that reduce impacts by physically changing the course of a hazard event.

Public Information – activities that educate or advise residents and property owners about hazards, hazardous areas, and things they can do to mitigate hazard impacts.

3. Mitigation Strategies and Policies

Identification and Analysis of Mitigation Measures

This section introduces the Town of Chapel Hill's mitigation strategies and policies that promote the current goals and objectives of hazard mitigation and the reduction of risk to the community at-large. Table 3.1: Identification and Analysis of Mitigation Measures lists these strategies and links each strategy with the type of mitigation and hazard, the goal(s) the strategy addresses, the existing policy or program that addresses the strategy, complementary policies, the relative environmental impact, the funding and resource availability, the technical feasibility and the relative benefit/cost test.

Evaluation of Mitigation Measures for Each Identified Hazard

Town mitigation goals that address the various high priority hazards (based on the Local Hazard Index) are described in Table 3.2: Mitigation Implementation Strategies for High Index Hazards. Listed for these goals are actions required, relevant policy status, strategy type, funding sources, responsible organization, target date of completion, and monitoring steps. Only the hazards that scored as a "high" priority using the Local Hazard Index were tabulated and analyzed in this plan due to the low likelihood of the hazard such as landslides or nor'easter. All other medium and low priority hazards are listed in Table A.1: Hazard Profiles, Analysis and Rankings.

Cost-Benefit Review for High Priority Mitigation Measures

Table 3.2 describes high priority hazards that the Town is addressing with new or continuing policies. Because they are all high priority, they carry equal weight in terms of prioritized actions. The actions taken by the Town will vary, based on the process needed to take the action. For example, the action of adopting the new digital floodplain maps are subject to the schedule of delivery from the North Carolina Division of Emergency Management and the review period to review and comment on the maps; the action of identifying and prioritizing the repetitive loss structures in a database will occur as soon as the new Stormwater Management Division staff resources are made available to perform this task, or; the task of up-dating the

Town website for weather-related warnings and notices has occurred and will continue to occur. Each of these actions already or will occur, because of the high priority and the certain benefit/cost results. All other mitigation actions, including those with medium priority hazards, also will be reviewed based on their relative cost-benefit and resources required to take the action. This area of plan review will be a key element of the annual plan review to be certain that the Town is taking into consideration all feasible and relevant actions deemed necessary to reduce risks associated with hazards.

Formulation and Implementation of Mitigation Policies

Some hazard mitigation strategies for the Town of Chapel Hill have been formulated and are currently ongoing, such as for the high priority hazard of flooding. For mitigating the flood hazard, the Town has riverine (or floodplain) and general stormwater management mitigation policies. As an example for floodplain mitigation, the Town has successfully completed a Flood Mitigation Assistance (FMA) grant project for the acquisition of three repetitive loss structures on Dickerson Court and has pending additional FMA grant applications for additional repetitive loss structure acquisition. The Town also has non-structural mitigation such as direct education, the Resource Conservation District Ordinance (see RCD in Table 3.1), National Flood Insurance Program and flood map modernization activities. The Town is planning to participate in the Community Rating System (CRS) program as soon as resources are made available to administer the program. For stormwater management (see Table 3.1), the Town has a new utility funded Capital Improvements Program, storm sewer inventory program, Drainage Assistance Program and other programs intended to mitigate stormwater hazards. Tables 3.1 and 3.2 provide an identification and analysis and summarizes the high priority mitigation measures for the Town. Thus, this plan makes recommendations for expanding and strengthening the Town's resilience to natural hazards.

As a part of this plan, a database of granting sources, applications, and implementation programs will be actively maintained. This will facilitate applications for hazard mitigation funding and ensure that any monies received are used in the most efficient manner. North Carolina Emergency Management website has a list of these that will be useful for this purpose: http://www.ncem.org/Mitigation/additional_funding.htm. Selected funding sources that may be useful are as follows (numbers refer to the NCEM list):

- 10.902-Soil and Water Conservation
- 10.904-Watershed Protection and Flood Prevention
- 10.906-River Basin Surveys and Investigations
- 10.911-Watershed Surveys and Planning
- 15.921-Rivers, Trails, and Conservation Assistance
- 66.604-Environmental Justice-Small Community
- 83.505-State Disaster Preparedness Grants
- 15.919-Urban Park and Recreation Recovery Program
- 15.808-USGS Research and Data Acquisition
- 66.600-Environmental Protection Consolidated Grants
- 708-Pollution Prevention Grants Program
- Flood Mitigation Assistance Grants

The Town Council has adopted a stormwater utility ordinance to support a comprehensive stormwater management program. This program is now administered by the Stormwater Management Division, Engineering Department. This division will be responsible for all flood-related and water quality mitigation activities in Chapel Hill. All other hazard mitigation activities will be the responsibility of other applicable departments such as the Public Works Department for maintenance and all other public right-of-way issues, the Planning Department for planning and permitting/regulatory activities and the Police and Fire Departments for emergency response and public health and safety activities.

Policy and Ordinance Summary

As is described throughout this plan, the Town of Chapel Hill has existing, progressive policies and development regulations with the intended goals to mitigate hazards (especially riverine flood hazards), protect the health and safety of the public, and protect the environment.

The Resource Conservation District Ordinance (RCD), as discussed above, was enacted in 1984 to ensure the protection of natural riparian buffers of perennial streams and to protect structures from developing in locations with a higher potential for flooding. This policy and ordinance has been enhanced with the enactment of the Land Use Management Ordinance in January, 2003. The rules for new development now extend the buffer width to 150' from each

stream bank for perennial streams and 50' from intermittent stream banks and includes an elevation rule that is 3' above the base flood elevation. These regulations exceed the State of North Carolina's Neuse River Buffer Rules or similar state basin rules for horizontal distance from streams and exceed the National Flood Insurance Program (NFIP 44CFR) regulations for vertical (elevation) requirements.

For stormwater management and related non-riverine flood risks, the Town has adopted a Stormwater Management Utility Ordinance (as discussed above) for the purpose of reducing flood damages, providing for water quality improvements and restoring streams and enhancing environmental protection. This new ordinance will provide a Stormwater Master Plan that will be used as a guide for the program over the long-term. The program will include watershed plans, floodplain management and stormwater management measures with the purpose of mitigating flood losses related to stormwater runoff and development within riverine floodplains and improving water quality. The program will administer the RCD, NFIP, NPDES Phase II water quality permit and stormwater management regulations for the Town.

The Town has a right-of-way drainage maintenance program staffed solely for this purpose. There exist many miles of public rights-of-way and drainage easements that require continuous attention for maintenance. This program is funded by the stormwater management utility fund and it is anticipated that enhancements to this maintenance program will take place as a part of the master planning process. The enhancements may include equipment, staff and related maintenance policies.

In addition to the RCD and Stormwater Management Articles, the Land Use Management Ordinance (LUMO) includes all regulations and procedures required for orderly and controlled development to occur in Chapel Hill. It includes many regulations that limits a development's size, intensity, impervious surface area, buffers, etc. These rules play a key role in the mitigation of potential hazards based on the spatial restrictions required of development in the LUMO.

4. Plan Maintenance

Monitoring the Hazard Mitigation Plan is an ongoing process. Because many of the Town activities that implement the Plan are within the purview of multiple departments, primarily including the Planning (comprehensive plan, zoning, permitting), Engineering (structural mitigation implementation, design standards), Public Works (public right-of-way maintenance) Departments; it should be the responsibility of each department for ensuring that its activities are consistent with the Hazard Mitigation Plan and monitoring their progress of each action. Each of these departments should also assist other departments with their responsibilities as described in the Mitigation Strategies and Policies. All plan progress monitoring and reporting will be the responsibility of each department for inclusion into the annual plan review and report to the Manager as described below.

Effective hazard mitigation plans are dynamic, evolving in response to changing community conditions and needs. Because this plan is intended to reduce community vulnerability to hazards, the Hazard Mitigation Plan should be referred to in applicable day-to-day activities, such as in the zoning compliance permit process where identified hazards apply as well as being a part of the larger community decision making or planning process such as the Comprehensive Plan, capital improvements or public right-of-way maintenance. Although implementation and monitoring of the hazard mitigation plan will be ongoing, it is important to periodically pause and assess the direction the Hazard Mitigation Plan is setting for the community.

Annual Review of the Hazard Mitigation Plan

A review of progress and a review of the plan will take place annually, beginning two months prior to the annual budget review so as to be completed in time to inform the budgeting process. The Town Manager will designate a department to coordinate the review. Heads of relevant departments then review and submit comments on the plan to the department coordinating the review. Steps in the review process are as follows:

1. Hazard history is updated.
2. Community vulnerability is assessed using benchmarks, such as:
    a. property value located in the 100-year floodplain
    b. number of stream crossings
    c. new mobile homes
    d. evacuation routes
    e. number of flood insurance policies in effect
3. Changes in community capability are noted.
4. Progress on all strategies is noted.
5. Gaps in implementation are identified.

The coordinating department should evaluate and incorporate this feedback, as well as any public comments that have been received, into a brief report that summarizes needs and recommends Plan revisions. The coordinating department will communicate its findings to the Town Council and the public. The report can be included as a Plan Addendum if there is no need to revise the Hazard Mitigation Plan. If the Plan is revised (not just appended), it should be adopted by the Town Council. Adoption resolutions should always be included in the Plan.

Major changes in the community circumstances should trigger a plan **update**, particularly following a major disaster. The Town Manager will use his or her discretion to determine the level of revision needed. FEMA requires that the Plan be updated at least every five years.

Plan Updates

At least every five years, the Town Manager will convene a hazard mitigation steering committee to undertake a review and update of the Chapel Hill Hazard Mitigation Plan. A revision of the Town Comprehensive Plan or the Emergency Response Plan might present a good opportunity for a Hazard Mitigation Plan update. Additional hazard mitigation planning committee members should be sought from the University, environmental and social justice groups, Orange County (e.g., Planning, Emergency Management, Public Works), neighboring communities, and the general public. If the process is facilitated through a consultant, an active and diverse planning committee is essential for broad community representation and involvement.

Before starting to update the Hazard Mitigation Plan, the committee should first contact North Carolina Emergency Management and FEMA to obtain the most current requirements for hazard mitigation plans. Then the planning process should begin again, including public involvement, and all sections should be revisited. Any deficiencies noted by reviewers or users of the last version should be addressed in the update.

Ideally, the committee will be able to identify several projects from the Mitigation Strategies and Policies section that have either progressed or been completed. The plan update should note achievements resulting from plan implementation in the sections on Vulnerability Assessment and Community Capability. New strategies, which may build on past successes, should be described.

The Plan should be submitted to NCEM for a compliance review before Chapel Hill officially adopts the updated Hazard Mitigation Plan. At minimum, a copy of the updated Plan must be submitted to NCEM and FEMA after adoption.

One reason to undertake detailed reviews and updates is because FEMA may use progress on mitigation strategies as an eligibility consideration for grants and other types of funding. Awards could be influenced by whether the project for which funding is requested is included as a recommendation in the plan (indicating that it resulted from a comprehensive planning process). Furthermore, an annual evaluation report can be credited under the Community Rating System (CRS) program, which Chapel Hill is considering joining as a strategy in this plan.

Continued Public Involvement

In addition to soliciting public input during the plan update process, the Town will always ensure that the public has access to the Plan and a means of giving feedback on the Plan. The Town and the mitigation planning committee should pay special attention to communicate with any populations having unique needs, such as the elderly, non-English speaking people, and people with mobility impairments. By learning from past planning processes, each planning committee should strive to engage the public in increasingly creative ways. For example, communication with Latino populations might be improved by holding a work session in Spanish.

The plan and a summary will be posted on the web pages for the Town's Stormwater Division, Planning and Public Works Departments. A hardcopy of the plan, complete with maps, will also be available at Town Hall and at the Chapel Hill Public Library for viewing. Regardless of the format, appropriate contact information for a Town official will be provided for public feedback.

Table 3.1: Identification and Analysis of Mitigation Measures

Mitigation Strategy	Mitigation Type	Intended Hazard(s)	Comprehensive Plan mitigation goal(s) addressed	Existing Policy or Program	Complements Other Policy/Strategy	Environmental Impact	Available Funding	Available Expertise or Resources	Technically Feasible	benefit / cost > 1
moving/ acquisition of properties in floodzone	property protection	flooding, hurricanes, thunderstorms	Goal 2	NFIP	RCD Ordinance	beneficial	limited	yes	yes	yes
Elevation of buildings in floodzone	property protection	flooding, hurricanes, thunderstorms	Goal 2	NFIP	RCD Ordinance	neutral	no	yes	yes	yes
Floodproofing of buildings in floodzone	property protection	flooding, hurricanes, thunderstorms	Goal 2	NFIP	RCD Ordinance	neutral	no	yes	yes	no
No new building in floodzone	prevention	flooding, hurricanes, thunderstorms	Goal 2, 3	RCD Ordinance	RCD Ordinance	neutral	yes	yes	yes	yes
Berms and protective landscaping	structural projects	flooding, hurricanes, thunderstorms	Goal 2,3	Drainage Assistance Program	RCD Ordinance	beneficial	limited	yes	yes	yes
Floodplain redelineation	prevention	flooding, hurricanes, thunderstorms	Goal 2,3	NFIP/CTP	RCD Ordinance	neutral	no	yes	yes	yes
Insurance	property protection	fire, high winds, flooding, hurricanes, tornados, thunderstorms	Goal 2,3	NFIP	RCD Ordinance	neutral	N/A	yes	yes	yes
Real estate disclosure for flooded land	public information	flooding, hurricanes, thunderstorms	Goal 2,3	RCD Ordinance	RCD Ordinance	beneficial	N/A	yes	yes	yes
manditory buyer notification for flooded buildings	public information	flooding, hurricanes, thunderstorms	Goal 2,3	N/A	N/A	neutral	N/A	yes	yes	yes
Protective buffer around perennial streams	natural resource protection	flooding, hurricanes, thunderstorms, erosion	Goal 2,3	RCD Ordinance	NPDES Phase 2	beneficial	N/A	yes	yes	yes
Incentives to create green space along waterbodies	natural resource protection	flooding, hurricanes, thunderstorms	Goal 2,3	Greenways / OpenspacePlan	NPDES Phase 2	beneficial	N/A	yes	yes	no
Open space preservation	prevention	flooding, hurricanes, thunderstorms, erosion	Goal 2,3	Greenways / Open Space Plan	NPDES Phase 2	beneficial	N/A	yes	yes	yes
Preservation of high quality streams	prevention	flooding, hurricanes, thunderstorms	Goal 2,3, 5	RCD Ordinance / Stormwater Management	NPDES Phase 2	beneficial	N/A	yes	yes	yes
hydrologic modelling of watersheds and stormwater infrastructure	prevention, property protection	flooding, hurricanes, thunderstorms	Goal 5	RCD Ordinance / Stormwater Management	NPDES Phase 2	beneficial	yes	yes	yes	yes
Designing infrastructure for larger storms	prevention	flooding, hurricanes, thunderstorms, erosion	Goal 5	RCD Ordinance / Stormwater Management	yes: Design Manual	beneficial	N/A	yes	yes	yes
Urban stream retrofits	structural projects	flooding, hurricanes, thunderstorms, erosion	Goal 5	RCD Ordinance / Stormwater Management	NPDES Phase 2	beneficial	limited	yes	yes	unknown

Table 3.1: Identification and Analysis of Mitigation Measures

Mitigation Strategy	Mitigation Type	Intended Hazard(s)	Comprehensive Plan mitigation goal(s) addressed	Existing Policy or Program	Complements Other Policy/Strategy	Environmental Impact	Available Funding	Available Expertise or Resources	Technically Feasible	benefit / cost > 1
Replacement of infrastructure	property protection	flooding, hurricanes, thunderstorms, erosion	Goal 5	Stormwater Management	Drainage Assistance Program	neutral	limited	yes	yes	yes
Upkeep of stormwater retention ponds	property protection	flooding, hurricanes, thunderstorms	Goal 5	Stormwater Management	NPDES Phase 2	beneficial	limited	yes	yes	unknown
Stream restoration projects	property protection	flooding, hurricanes, thunderstorms, erosion	Goal 5	Stormwater Management	NPDES Phase 2	beneficial	no	yes	yes	unknown
Slope stabilization	property protection	flooding, hurricanes, thunderstorms, landslides, erosion, snow avalanches	Goal 5	Steep Slope Ordinance	steep slope protection	beneficial	N/A	yes	yes	unknown
Regular drainage maintenance	prevention	flooding, hurricanes, thunderstorms, erosion	Goal 5	Stormwater Management	NPDES Phase 2	neutral	no	yes	yes	yes
Low Impact Development (less paved area, etc.)	prevention	flooding, hurricanes, thunderstorms	Goal 5	Stormwater Management	NPDES Phase 2	beneficial	N/A	yes	yes	unknown
Tree root zone protection, other protection	property protection	high winds, tornadoes, hurricanes, thunderstorms, erosion	Goal 2,3	Tree Protection Ordinance	other urban forestry	beneficial	N/A	yes	yes	unknown
preference for urban-hardy tree species	property protection	high winds, tornadoes, hurricanes, thunderstorms, erosion, nor'easters	Goal 2,3	Tree Protection Ordinance	other urban forestry	beneficial	N/A	yes	yes	unknown
Adequate planting/survival conditions for urban trees	property protection	high winds, tornadoes, hurricanes, thunderstorms, erosion, nor'easters	Goal 2,3	Tree Protection Ordinance	other urban forestry	beneficial	N/A	yes	yes	unknown
Adequate care for urban trees	property protection	high winds, tornadoes, hurricanes, thunderstorms, erosion, nor'easters	Goal 2,3	Tree Protection Ordinance	other urban forestry	beneficial	N/A	yes	yes	unknown
Hurricane straps and other wind stabilizers	property protection	high winds, hurricanes, tornados, thunderstorms, nor'easters	other	State Building Code/County Wind Zone Category	N/A	neutral	N/A	yes	yes	unknown
Utility fee assistance for low income	human protection	heatwave, severe winter storm, drought	N/A	N/A	N/A	neutral	no	no	yes	unknown
Putting utilities underground (instead of on poles)	property protection	high winds, tornadoes, hurricanes, thunderstorms, nor'easters	other	LUMO 5.12.2 Other Utilities	N/A	beneficial	N/A	yes	yes	yes
No ground disturbance on steep slopes	prevention	landslides, erosion	other	LUMO 5.3.2 Steep Slopes	steep slope protection	beneficial	N/A	yes	yes	yes
cut & fill slopes <= 3:1	prevention	landslides, erosion	other	Stormwater Management	Design Manual	beneficial	N/A	yes	yes	yes

Table 3.1: Identification and Analysis of Mitigation Measures

Mitigation Strategy	Mitigation Type	Intended Hazard(s)	Comprehensive Plan mitigation goal(s) addressed	Existing Policy or Program	Complements Other Policy/Strategy	Environmental Impact	Available Funding	Available Expertise or Resources	Technically Feasible	benefit / cost > 1
street-salting and plowing		severe winter storms	other	Code of Ordinances 21.24	no	possibly negative (salt)	yes	yes	yes	unknown
Regular dam inspection	prevention	dam failure, flooding	N/A	N.C. Dam Safety	no	neutral	N/A	yes	yes	unknown
Water conservation policies	natural resource protection	drought	N/A	Code of Ordinances 10/OWASA policy	no	beneficial	N/A	yes	yes	yes
crowd control	human protection	rioting	N/A	event dependent	N/A	neutral	N/A	yes	yes	unknown
No open burning	prevention	fire	N/A	Code of Ordinances 7.7	N/A	beneficial	N/A	yes	yes	unknown
Sprinklers in high-occupancy buildings	human protection	fire	N/A	Code of Ordinances 7.6,38,41,50,56	fire-related	neutral	N/A	yes	yes	yes
Fire-resistant building materials	prevention	fire, lightning	N/A	NC Building and Fire Code	fire-related	neutral	N/A	yes	yes	yes
Adequate fire escapes in high occupancy or high-rise buildings	human protection	fire	N/A	NC Building and Fire Code	fire-related	neutral	N/A	yes	yes	unknown
Frequent fire inspection of popular establishments	prevention	fire	N/A	NC Building and Fire Code	fire-related	neutral	N/A	yes	yes	yes
More lightning rods around town	property protection	lightning, fire	N/A	N/A	fire-related	neutral	no	yes	yes	unknown
smoke detectors required	property, human protection	fire	N/A	NC Building and Fire Code/Code of Ordinances 9.69	fire-related	neutral	yes	yes	yes	yes
permitting of hazardous materials storage	property protection	fire	N/A	Code of Ordinances 7.5	NFIP	neutral	yes	yes	yes	unknown
Direct notification of vulnerable areas or populations	public information	flooding, high wind, hurricanes, thunderstorms, tornados, heatwave	N/A	Fire Department Standard Operating Procedures: Flooding Conditions	Emergency Response Plan	neutral	N/A	yes	yes	unknown
Panel stabilization for wood-frame buildings	property protection	earthquake	N/A	NC Building Code	N/A	neutral	N/A	yes	yes	unknown
Ready supply of potassium iodide pills for public distribution	human protection	nuclear accident	N/A	no	Emergency Response Plan	neutral	no	no	yes	unknown
better coordination with NWS or storm spotters	public information	thunderstorms, hurricanes, tornados, hailstorms	Goal 5	Emergency Response	N/A	neutral	no	yes	yes	unknown

Table 3.1: Identification and Analysis of Mitigation Measures

Mitigation Strategy	Mitigation Type	Intended Hazard(s)	Comprehensive Plan mitigation goal(s) addressed	Existing Policy or Program	Complements Other Policy/Strategy	Environmental Impact	Available Funding	Available Expertise or Resources	Technically Feasible	benefit / cost > 1
Building of new fire/police stations as population/area increases	prevention	fire, rioting	N/A	Emergency Response	no	neutral	yes	limited	yes	yes
Stormwater Management Plan Requirements for development	prevention	flooding, hurricanes, thunderstorms, erosion	Goals 4,5	Stormwater Management Ordinance	RCD/NFIP	beneficial	yes	limited	yes	yes
Generators for critical facilities		all hazards	N/A	N/A	N/A	neutral	limited	yes	yes	yes
Disaster recovery funds/grants	public information	all hazards	Goals 4,5	NFIP/grant applications	RCD/NFIP	neutral	limited	limited	yes	yes
Regular coordination of multiple jurisdictions	public information	all hazards	Goal 1	CTP	N/A	neutral	no	limited	yes	unknown
technical assistance	public information	all hazards	Goals 4,5	Drainage Assistance	Stormwater Management	beneficial	limited	limited	yes	yes
better/more design and plan review	prevention	all hazards	Goals 4,5	LUMO Design Standards	Stormwater Management	beneficial	limited	limited	yes	yes
Pre-designated shelters	human protection	all hazards	N/A	N/A	Emergency Response Plan	neutral	no	no	yes	unknown
Post-disaster reconstruction plans or regulations	prevention	all hazards	N/A	none	N/A	neutral	no	no	yes	unknown
Public education and outreach	public information	all hazards	Goals 4,5	stormwater management	other education and warning efforts	beneficial	yes	yes	yes	yes
Hazard Mitigation Plan readily available to public	public information	all hazards	N/A	stormwater management	other education and warning efforts	neutral	limited	limited	yes	unknown
Direct education for vulnerable populations	public information	all hazards	N/A	no	other education and warning efforts	neutral	no	no	yes	unknown
Emergency response staff Spanish-fluent	public information	all hazards	N/A	no	other education and warning efforts	neutral	no	no	yes	unknown
Hazard Ed staff Spanish-fluent	public information	all hazards	N/A	no	other education and warning efforts	neutral	no	no	yes	unknown
Yearly seasonal outreach via website, radio, newspaper	public information	all hazards	N/A	Town Information Officer	other education and warning efforts	beneficial	yes	yes	yes	yes
Hotline for easy reporting of problem drainage areas or other damage	public information	all hazards	Goals 4,5	stormwater management	public right-of-way maintenance	neutral	limited	limited	yes	yes

Table 3.2: Mitigation Implementation Strategies for High Index Hazards

Type of Hazard Addressed	Goal/Objective	Action Item	New Policy, Continuation or Change	Strategy Type	Funding Sources	Responsible Organization	Target Completion Date	Monitoring/Evaluation Indicators	Priority (Local Hazard Index)
Flash floods/High Water	Reduce flood exposure/risk to public health, existing buildings and infrastructure	Formally identify and prioritize repetative flood loss structures for mitigation	New	Preventative	Internal and Grant	Stormwater Management Division	Ongoing	Verify that a data base and GIS map coverage is developed	High
Flash floods/High Water	Reduce flood exposure/risk to public health, existing buildings and infrastructure	Receive, review and adopt revised NFIP flood maps	New	Preventative	Federal and State	Stormwater Management Division	Ongoing	Adopt new effective maps and enforce	High
Flash floods/High Water	Reduce flood exposure/risk to public health, existing buildings and infrastructure	Initiate actions pursuant to the existing Cooperationg Technical Partnership (CTP) between Town, State and FEMA	Continuation	Preventative	Internal, State and Federal	Stormwater Management Division	Within 5 years of agreement	Verify that the agreement is initiated	High
Flash floods/High Water	Reduce flood exposure/risk to public health, existing buildings and infrastructure	Initiate actions to bring the Town into the NFIP Community Rating System (CRS)	New	Preventative/ Public Education	Internal, State and Federal	Stormwater Management Division	Within 2 years of agreement	Verify that the agreement is initiated	High
Flash floods/High Water	Reduce flood exposure/risk to public health, existing buildings and infrastructure	Submit federal grant applications (HMGP, FMA, etc.) for flood hazard mitigation activities	Continuation	Preventative/ Public Education	Internal, State and Federal	Stormwater Management Division	Ongoing	Verify that grant applications have been submitted	High
Flash floods/High Water	Reduce flood exposure/risk to public health, existing buildings and infrastructure	Develop and map a townwide stormsewer inventory and develop capital improvements plan (CIP)	Continuation	Up-grade outdated infrastructure	Internal	Stormwater Management Division	Within 2 years of agreement	Verify that improvements are being made according to the CIP	High
Severe Winter Storms/Freezes	Educate public about pending winter storms	Post winter storm warnings on the website	Continuation	Preventative	Internal	Town Web Administrator	Ongoing	Verify that storm warnings are posted on the web site	High
Severe Winter Storms/Freezes	Reduce impacts to power lines, structures and streets	Monitor trees or limbs adjacent to power lines and public rights-of-way	Continuation	Preventative	Internal, Private and State	Public Works Department, Power Company and NCDOT	Ongoing	Determine if trees or limbs pose a threat and if so, they are removed	High
Severe Winter Storms/Freezes	Reduce impacts to power lines, structures and streets	Require burial of power lines to new development	Continuation	Preventative	Internal	Planning Department	Ongoing	Verify that underground power is installed in new developments	High
Severe Winter Storms/Freezes	Speed winter storm recovery process	Establish post-disaster clean up procedures	Continuation	Preventative	Internal	Public Works Department	Ongoing	Verify that post-disaster clean up plan was prepared	High
Hurricanes/Tropical Systems/Tornadoes	Educate public about pending weather	Post National Weather Service warnings on the website and include local information helpful for citizen preparedness and recovery	Continuation	Preventative	Internal	Town Web Administrator	Ongoing	Verify that storm warnings are posted on the web site	High
All Hazards Response	Coordinate a disaster response strategy	Develop a Disaster Response Plan	Continuation	Preventative	Internal	Town Manager	Ongoing	Verify that a Disaster Response Plan is adopted and is up-dated as needed	High

Table A.1: Hazard Profiles, Analysis, and Rankings

Type of hazard and associated elements	rank	Extent	rank	Likelihood of occurrence	Potential Impact						Score	Local Hazard Index
					rank	Critical Facilities Shutdown	rank	Injuries or Deaths	rank	Property Damage		
Windstorms	2	Town-wide	4	Likely	1	Negligible	2	Limited	2	Limited	**22**	**Moderate**
Flash Floods/High Water	1	Local	5	Highly Likely	2	Limited	3	Critical	2	Limited	**36**	**High**
Severe Winter Storms	2	Town-wide	5	Highly Likely	2	Limited	3	Critical	2	Limited	**37**	**High**
Lightning	1	Local	5	Highly Likely	1	Negligible	1	Negligible	1	Negligible	**16**	**Low**
Hailstorms	1	Local	5	Highly Likely	1	Negligible	1	Negligible	1	Negligible	**16**	**Low**
Snow avalanches	1	Local	0	Unlikely	2	Limited	3	Critical	2	Limited	**1**	**Very Low**
Wildfire/Urban fire	1	Local	3	Possible	1	Negligible	2	Limited	1	Negligible	**13**	**Low**
Heatwave	3	Regional	4	Likely	0	None	2	Limited	1	Negligible	**15**	**Low**
Storm Surges	1	Local	0	Unlikely	1	Negligible	2	Limited	2	Limited	**1**	**Very Low**
Landslides	1	Local	3	Possible	0	None	1	Negligible	2	Limited	**10**	**Low**
Sinkholes/Land Subsidence	1	Local	1	Very Unlikely	0	None	1	Negligible	2	Limited	**4**	**Very Low**
Gullying/Erosion	1	Local	5	Highly Likely	0	None	1	Negligible	1	Negligible	**11**	**Low**
Volcanic Eruption	3	Regional	0	Unlikely	4	Catastrophic	4	Catastrophic	4	Catastrophic	**3**	**Very Low**
Tsunami	3	Regional	0	Unlikely	4	Catastrophic	4	Catastrophic	4	Catastrophic	**3**	**Very Low**
Hazardous Material Spills	1	Local	3	Possible	1	Negligible	2	Limited	2	Limited	**16**	**Low**
Nuclear Accidents	3	Regional	1	Very Unlikely	4	Catastrophic	4	Catastrophic	4	Catastrophic	**15**	**Low**
Rioting	1	Local	3	Possible	0	None	2	Limited	2	Limited	**13**	**Low**
bombs/explosives	1	Local	2	Unlikely	2	Limited	4	Catastrophic	2	Limited	**17**	**Low**
Bioterrorism	3	Regional	2	Unlikely	4	Catastrophic	4	Catastrophic	1	Negligible	**21**	**Low**
Thunderstorms	2	Town-wide	5	Highly Likely	1	Negligible	2	Limited	2	Limited	**27**	**Moderate**
Tornadoes	1	Local	4	Likely	1	Negligible	2	Limited	2	Limited	**21**	**Moderate**
Hurricanes	3	Regional	4	Likely	3	Critical	3	Critical	3	Critical	**39**	**High**
Nor-easters	3	Regional	2	Unlikely	1	Negligible	1	Negligible	1	Negligible	**9**	**Very Low**
Droughts	3	Regional	4	Likely	1	Negligible	1	Negligible	1	Negligible	**15**	**Low**
Earthquakes	3	Regional	2	Unlikely	2	Limited	2	Limited	2	Limited	**15**	**Low**
Dam/Levee Failure	1	Local	3	Possible	1	Negligible	3	Critical	2	Limited	**19**	**Low**

Hazard Index = (sum of impacts) * likelihood + extent

Table A.2: Hazard Extent Ranking

Rank	Extent	Description
1	Local	Affects an area within the town limits
2	Town-wide	Affects most of the town
3	Regional	Affects a large portion of the state and possibly surrounding states

Table A.3: Hazard Probability Ranking

Rank	Likelihood of Occurrence	Description
5	Highly likely	Near 100% probability in the next year
4	Likely	Between 10 and 100% probability in the next year, or at least one chance in the next 10 years
3	Possible	Between 1 and 10% probability in the next year, or at least one chance in the next 100 years
2	Unlikely	Less than 1% probability in the next year, or less than one chance in the next 100 years
1	Very Unlikely	Less than 0.01% probability in the next year, or less than one chance in the next 10,000 years
0	Extremely Unlikely	Conditions for this hazard occur on the order of several thousand to several million years

Table A.4: Hazard Potential Impact Ranking

Rank	Potential Impact	Description	Area Affected
4	Catastrophic	Multiple deaths; complete shutdown of facilities for 30 days or more; more than 50% of property is severely damaged.	> 50%
3	Critical	shutdown of critical facilities for at least 2 weeks; more than 25% of property is severely damaged.	25-50%
2	Limited	Some injuries; complete shutdown of critical facilities for more than 1 week; more than 10% of property is severely damaged.	10-25%
1	Negligible	Minor injuries; minimal quality-of-life impacts; shutdown of critical facilities and services for 24 hours or less; less than 10% of property is severely damaged.	< 10%
0	None	No injuries, shutdown of critical facilities or area damaged	0%

Table B.1: Vulnerability Assessment for Town of Chapel Hill Zoning Limits

	CURRENT CONDITIONS			POTENTIAL FUTURE CONDITIONS		
Type of development	**Number of Buildings or Structures**	**Approximate Current Value**	**Approximate Number of People**	**Projected Number of Buildings or Structures**	**Projected Value**	**Projected Number of People**
Single-family residential	22244	$5,605,488,000	48715	23790	$5,995,083,000	53,353
Multi-family residential	144 (3484 units)	N/A	7630		N/A	8393
Commercial	2224	N/A	N/A	3214	N/A	N/A
Sewage treatment plant	1	N/A	N/A	N/A	N/A	N/A
Drinking Water treatment plant	(1 in Carrboro)	N/A	N/A	N/A	N/A	N/A
stations	8	N/A	N/A	N/A	N/A	N/A
Sewage pump stations	21	N/A	N/A	N/A	N/A	N/A
Water Tanks	4 (+ 1 in Carrboro)	N/A	N/A	N/A	N/A	N/A
Hospital	1	N/A	N/A	N/A	N/A	N/A
School	13	N/A	N/A	N/A	N/A	N/A
Police Station	1	N/A	N/A	N/A	N/A	N/A
Fire Station	5	N/A	N/A	N/A	N/A	N/A
Hazardous Materials Facility (incl. Gas stations)	11 + UNC	N/A	N/A	N/A	N/A	N/A
Government offices	3	N/A	N/A	N/A	N/A	N/A
Emergency Shelter	1	N/A	N/A	N/A	N/A	N/A
UNC properties	458	$1,964,327,071	N/A	N/A	N/A	N/A
public libraries	1	N/A	N/A	N/A	N/A	N/A
Bridges & Overpasses	120	N/A	N/A	N/A	N/A	N/A
Substations	10	N/A	N/A	N/A	N/A	N/A
Post Offices	3	N/A	N/A	N/A	N/A	N/A
Airport	1	N/A	N/A	0 (being decommissioned)	N/A	N/A
Community Centers	3	N/A	N/A	N/A	N/A	N/A

Table C.1: Local Departments, Agencies, and Organizations

Department, Agency, or Organization	Affiliation, Jurisdiction, or private NGO	Delegated Hazard Control or Mitigation Activities	Other Activities Affecting Hazards
Mayor	Town of Chapel Hill	Shall determine the need to establish a state of emergency	
Town Manager	Town of Chapel Hill	Shall determine the need to activate the Disaster Plan	
		Establish & direct the Command Team	
		Liaison to the Mayor & Council	
		Release of information during & following disaster operations	
Engineering	Town of Chapel Hill	Assess damage and safety of roads, bridges, and dams.	Stormwater Management
		NFIP administration / Floodway regulation	Public Education Program
		Public infrastructure inspection / Annual bridge inspection / Agreement with NCDOT	Routine inspection of structures
		Provide maps to emergency response teams	
		Develop estimated financial cost of hazard impact to roads, dams, and bridges	Capital Improvements Program
Inspections	Town of Chapel Hill	Assess damage and safety for Town facilities, evacuation shelters, public buildings, commercial buildings, and residences	
		Condemn buildings or properties assessed as a hazard	
		Develop list of damaged properties	
		Develop estimated financial loss of structures due to hazards	
Information Technology	Town of Chapel Hill	Maintain Town web site and internal communications for the benefit of the disaster response teams and public notifications	
		Liaison to franchised utilities	
Fire	Town of Chapel Hill	Fire suppression and rescue response	Fire safety education

Table C.1: Local Departments, Agencies, and Organizations

Department, Agency, or Organization	Affiliation, Jurisdiction, or private NGO	Delegated Hazard Control or Mitigation Activities	Other Activities Affecting Hazards
		First Responder emergency medical care.	Fire safety inspections
		Extrication & coordination with Emergency Medical Services	
		Assist with emergency evacuation	
		Coordinate and maintain mutual aid agreements with other emergency agencies	
		Identify and maintain staging areas to primary approaches to the Town	
		Update the Town's emergency notification lists	
		Develop a list of citizens requiring special assistance and provide the list to appropriate agencies for action	
		Hazard identification & isolation of unsafe areas	
		Lead search and rescue	
Police	Town of Chapel Hill	Traffic & crowd control	Public education programs
		Establish & maintain emergency evacuation routes	
		Transportation of key Town officials	
		Implement emergency evacuations	
		Maintain mutual aid agreements with other law enforcement agencies	
		Assist with search & rescue	
		Develop photo & written records of disaster sites	
		Provide security at disaster areas	
		Assignment of Crisis Intervention Team to shelters	
Planning	Town of Chapel Hill	During disaster provide clerical support for Fire, Public Works & Police Departments	Zoning and land use administration
		Administration of Land Use Management Ordinance	Comprehensive Plan

Table C.1: Local Departments, Agencies, and Organizations

Department, Agency, or Organization	Affiliation, Jurisdiction, or private NGO	Delegated Hazard Control or Mitigation Activities	Other Activities Affecting Hazards
Finance	Town of Chapel Hill	Provide & coordinate emergency procurement & purchasing during & after disasters	
		Maintain tracking & accountability	
Parks & Recreation	Town of Chapel Hill	Maintain & manage emergency sheltering for Town employees involved in disaster assistance	Greenway Master Plan
Public Works	Town of Chapel Hill	Maintain and/or restore access for primary streets	Public Right-of-way maintenance
		Provide traffic control devices	
		Coordinate with primary utilities & maintain priority list for restoration of services	
		Assist in extrication & rescue operations that require the use of heavy equipment	
		Assist with citizen evacuations	
		Coordinate cleanup, debris removal & disposal	
		Maintain a list of contractors to assist with cleanup operations	
		Maintain Town's fleet of vehicles	
		Implement backup fueling plan for vehicles	
Transportation	Town of Chapel Hill	Provide transportation & support to evacuation and sheltering	
		Provide transportation for employees to & from staging and operational areas	
		Assist in maintenance of Town's fleet of vehicles	
		Provide buses as on-site sheltering for Town employees	
Human Resources		Prepare employee I.D. disaster tag system	
Orange Water & Sewer Authority	Southern Orange Co.	Maintain & operate potable water system	Implement voluntary water conservation

Table C.1: Local Departments, Agencies, and Organizations

Department, Agency, or Organization	Affiliation, Jurisdiction, or private NGO	Delegated Hazard Control or Mitigation Activities	Other Activities Affecting Hazards
		Maintain & operate sewer system	
		Monitor reservoir levels	
		Implement mandatory water conservation practices	
		Identify auxiliary water sources	
Duke Energy	Public Utility	Maintain & implement electrical restoration plan	Right-of-way maintenance programs
		Maintain & implement mutual aid agreements with other utilities	Public education programs
Bell South	Public Utility	Maintain & implement phone restoration plan	
PSNC Engergy	Public Utility	Maintain & implement natural gas restoration plan	
Orange County	County Government	Maintain & implement emergency management	Public education programs
		Health Department will maintain communication regarding biological & disease hazards	
UNC	State Government	Hospital	
		University Facilities Planning	
NCEM	State Government	Hazard Mitigation administration and grants	
Carrboro		Adjacent jurisdiction/municipality	

Table C.2: Existing Town Policies and Programs

Policy or Program	Document Reference	Effectiveness for Mitigation and Rationale	Description	Text Citation
Town of Chapel Hill 2000 Comprehensive Plan	Long-Range Comprehensive Plan	Medium - Sets general community goals for new development and growth management.	The Plan spells out goals to minimize disturbance of natural areas, infiltrate stormwater on-site, enhance erosion and sedimentation cotrol standards, and create a Stormwater Utility.	Strategy 9F of Chapel Hill's Comprehensive Plan, pp. 86-88
Town Stormwater Management Program, Utility and Advisory Board	An Ordinance establishing a stormwater management utility and a stormwater management utility advisory board (See Appendix A)	**High** - Provides funds and programs to manage stormwater and floodplains through regulations, policy and programs, including hazard mitigation.	The stormwater management program provides a majority of the Town stormwater management programs and Laud Use Management Ordinance administration for stormwater management, Resource Conservation District and National Flood Insurance Program and hazard mitigation activities. A Master Plan will be developed to include a comprehensive and holistic approach.	Article 1. Stormwater Management Utility Ordinance, Section 23-2. Purpose. An identified fiscal and accounting fund for the purpose of comprehensively addressing the stormwater management needs of the Town through programs designed to protect and manage water quality and quantity by controlling the level of pollutants in stormwater runoff, and the quantity and rate of stormwater received and conveyed by structural and natural and drainage systems of all types. It sets forth a schedule of charges and defines the control, collection, and disbursal of funds including penalties, appeals, exemptions and credits.
Resource Conservation District (RCD)	Chapel Hill Land Use Management Ordinance (Article 3.6.3)	**High** - Prevents development in areas subject from flooding.	The RCD is established as a district that overlays other zoning districts established in Article 3.6.3 of the Land Use Management Ordinance and is primarily intended to reduce flood damage and maintain riparian buffers.	(Entire document is useful for mitigation) Article 3.6.3 -- Intent: The Land Use Management Ordinance states that a purpose of the RCD is to minimize danger to lives and properties from flooding in and near the watercourses to preserve the water-carrying capacity of the watercourses Article 3.6.3 (b) & (c) -- Establishment of Resource Conservation District: The RCD is defined to be the elevation three (3) feet above the 100-year floodplain elevation with a buffer zone 150 feet from the banks of perennial streams and 75 feet from banks of intermittent streams. Article 3.6.3 (e-i) -- Permitted Uses, Dimensional Regulations, Standards, Procedures and Development. Article 3.6.3 (j) Variances in the RCD are allowed as authorized by this Article and approved by the Board of Adjustment.
University of North Carolina at Chapel Hill Stormwater Management Master Plan	UNC Development Plan	**Medium** - could be strengthened by more cooperation between the Town and University	Individual zoning districts set varying standards for individual tracts of land owned by the University. However, the University has committed itself to responsible stormwater management.	For each location where stormwater discharges from the campus property, the standards of no net increase in stormwater volume, runoff rate, or pollutant load will be applied at that location. Stormwater Management Techniques Porous paving systems, rain storage systems, vegetated roofing Stream Monitoring Three types of stream monitoring will be conducted on streams that may be impacted by main campus post-construction stormwater runoff. 1. Hourly monitoring of Meeting of the Waters Creek 2. Quarterly visual monitoring at a Morgan Creek tributary 3. Quantitative benthic invertebrate sampling along various points along Meeting of the Waters Creek

Table C.2: Existing Town Policies and Programs

Policy or Program	Document Reference	Effectiveness for Mitigation and Rationale	Description	Text Citation
Capital Improvements Drainage and Open Space Bond Projects	Capital Improvements Program (CIP) (2001-2016)	**Medium** - Inconsistent funding	The CIP identifies capital needs and identifies funding sources for capital projects.	Infrastructure 4. Replacement of Lakeshore Drive bridge over Booker Creek Available funds (1996 Streets Bond) --- $270,000 over 2001-2003 7. Improvements to public drainage infrastructure Available funds (1996 Streets Bond) --- $200,000 over 2001-2003 Parks and Other Public Use Facilities 13. Open space acquisition promoting non-automobile connectivity and/or preserving entrance way corridors, scenic vistas, environmentally sensitive Resource Conservation, community open space, and neighborhood open space. Projects are ongoing. 24. Replacement of Bolinwood Drive bridge over Bolin Creek, a part of the bridge replacement program. Available funds --- limited to $40,000 per year. 29. Drainage assistance funding for projects which may be cost-shared with property owners. Available funds -- $50,000. Parks and Other Public Use Facilities 45. Completion of various greenway projects based on the 1998 Greenways Master Plan following priorities set by the Council Available funds --- $1,778,000 over 15 years
Tree Protection	Chapel Hill Land Use Management Ordinance (Article 5.7)	**Medium** - assists with stormwater runoff (quality and quantity), could cause conflict with wind and ice hazard mitigation	The Town recognizes trees are a contributing element of economic and environmental value and provide a mechanism to control flooding and places strict regulations on tree removal at construction sites. Abundance of trees in Town contributes to debris removal after ice or wind storms.	Article 5.7.1 (b) (3)-- Finding Trees and other landscape elements help to naturally control flooding and erosion. (c) -- Purpose Regulate the protection and long-term management of trees, shrubs, and soils in Chapel Hill. Article 5.7.2 -- Permits Required It is unlawful to plant, prune, remove, apply chemicals or disturb any tree within the critical root zone. (Does not apply to single-family or two-family dwellings on individual lots less than 5 acres unless the trees are registered by the owner.) Additionally, clearing vegetation or removing soil on public land or easements owned or maintained by the Town of Chapel Hill is not permitted without approval from the Town Manager.
Zoning Districts, Uses, and Dimensional Standards	Chapel Hill Land Use Management Ordinance (Article 3)	**Medium** - Creates zones that may be useful for more efficient mitigation measures	The zoning district section recognizes the RCD and WPD (see below) as overlay districts. Land use intensity restrictions are established for each zone in Article 3.5.	Section 3.1 -- Establishment of Zoning Districts The planning jurisdiction is divided into zoning districts. The use regulations and intensity regulations are laid out in Articles 3.5. Sections 3.3.1-3.3.11 1. Town Center Districts, 2. Community Commercial District, 3. Neighborhood Commercial District, 4. Office/Institutional District 3, 5. Office/Institutional District 2, 6. Office/Institutional District 7. Industrial District, 8. Residential Districts, 9. Rural Transition Districts 10. Overlaying Districts, 11. Conditional Use Districts

Table C.2: Existing Town Policies and Programs

Policy or Program	Document Reference	Effectiveness for Mitigation and Rationale	Description	Text Citation
Watershed Protection District (WPD)	Chapel Hill Land Use Management Ordinance (Article 3.6.4)	**Medium** - Focus is water quality, however water quality facilities inherently serve to reduce peak discharges	The WPD is established as a district that overlays other zoning districts established in Article 3.6. The WPD is primarily intended to preserve water quality, pursuant to North Carolina General Statues, Chapter 143, Article 21.	Article 3.6.4 (a) -- Intent: Intended to apply a part of the New Hope Watershed draining to Jordan Lake. Article 3.6.4 (b) -- Establishment of Watershed Protection District: The WPD is established for certain lands within the New Hope Watershed as a zoning overlay district. All development within the watershed will comply with Article 3.6.4. Article 3.6.4 (e) Intensity Regulations: In order to prevent excessive stormwater runoff from damaging water quality of reservoirs, it is desirable that as much runoff from hard surfaces as possible be absorbed into penetrable land areas. Low and high density development will comply with this article.
National Flood Insurance Program (NFIP)	National Flood Insurance Act 1969	**High** - NFIP recognizes and financially rewards actively mitigating communities.	The NFIP makes Federally-backed flood insurance available in communities that agree to adopt and enforce floodplain management ordinances to reduce future flood damage. Further, buildings constructed in compliance with NFIP building standards suffer 77% less damage annually than those not built in compliance. And, every $3 paid in flood insurance claims saves $1 in disaster assistance payments.	44 CFR Parts 59-78, Revised as of October 1, 1998, final NFIP rules that became effective between October 1, 1998 and June 1, 1999.
Design Manual and Standard Details	Chapel Hill Land Use Management Ordinance (Article 5.4.3)	**High** - Design Manual and Standard Details provides engineering means and methods acceptable to meet the standards of the LUMO	Design manual and standard details provide guidelines for overall design performance and safety. Stormwater management and other requirements are components of the manual that serve to mitigate natural and manmade	LUMO Article 5.4.3 Includes means, methods and information for the purpose of describing how development may occur to meet the minimum criteria of the LUMO.
Design and Development Standards	Chapel Hill Land Use Management Ordinance (Article 5)	**High** - Establishes the criteria for designing a lot, a development, or a site.	The design criteria includes environmental protections, steep slope protections, street systems, buildings and structures, lighting and signage and construction activities.	Article 5.1.1: Intent: This article provides general performance standards to ensure development within Chapel Hill planning jurisdiction will be constructed in a safe, orderly, energy-efficient and visually harmonious fashion. Article 5.2.1: General Site Arrangement: Structures shall be placed and arranged so as not to affect adjacent property. These effects include, the removal of lateral support, the creation of hazard, nuisance, danger, inconvenience, loss of light, air, solar access, privacy or views. Article 5.3.2 Steep Slopes minimizes disturbance and intensity on steep slopes, Article 5.4 Stormwater Management regulates peak discharges, volume and pollutant loading from development. Article 5.5 Parks and Open Space provides a means to purchase open space.

Table C.2: Existing Town Policies and Programs

Policy or Program	Document Reference	Effectiveness for Mitigation and Rationale	Description	Text Citation
Hazard Mitigation Grant Assistance Program/ Flood Mitigation Assistance Program	NFIP- Stafford Act- Disaster Mitigation Act 2000	**High** - Grants are essential to the Town's mitigation strategy and success.	The Town has received a Flood Mitigation Assistance grant to remove three houses from the Bolin Creek floodway. Additional projects such as this can prevent property damage and injury from predictable natural hazards. The Town currently has applications submitted to FEMA for further grants for the purpose of acquisition and demolition of repetititve loss structures located in the regulatory floodway.	44 CFR Parts 59-78, Revised as of October 1, 1998, final NFIP rules that became effective between October 1, 1998 and June 1, 1999.
Cooperative Technical Partnership (CTP) between Chapel Hill, Carrboro NCDEM and FEMA (Appendix D)	Agreement between the Town's of Chapel Hill and Carrboro, the State of North Carolina and FEMA dated, November 11, 2002	**Medium** - Further develop cooperative efforts between FEMA and the Town of Chapel Hill and other local units of government including Triangle J Council of Governments, the Town of Carrboro, UNC-Chapel Hill, and Orange County in floodplain mapping and mitigation	Provides a mechanism for cooperative approaches to flood hazard mitigation.	Agreement executed on September 19, 2002 between the Town's of Chapel Hill and Carrboro, the State of North Carolina and FEMA.
Flood Damage Prevention Ordinance	Article IV Chapel Hill Code	**High** - prevents further development in the floodplain and any changes to existing structures must protect from flooding	Restricts or prohibits uses which are dangerous to health, safety, and property due to water or erosion or flood heights or velocities. Requires that uses vulnerable to floods to be protected against flood construction at the initial time of construction. Controls the alteration of natural floodplains, stream channels, And natural protective barriers, which are involved in the accommodation of Flood waters. Controls filling, grading, dredging, and other development which may increase erosion or flood damage. Prevents or regulates the construction of obstructions which will unnaturally divert flood waters or which may increase flood hazards to other lands.	Statement of Purpose - Section 5-51: It is the purpose of this article to promote the public health, safety and general welfare, to minimize public and private losses due to flood conditions in specific areas and to further environmental goals by provisions designed to: (1) Restrict or prohibit uses which are dangerous to health, safety and property due to water or erosion or flood heights or velocities. (2) Require that uses vulnerable to floods, including facilities which serve such uses, be protected against flood damage at the time of initial construction. (3) Control the alteration of natural floodplains, stream channels and natural protective barriers, which are involved in the accommodation of flood waters. (4) Control filling, grading, dredging and other development which may increase erosion or flood damage. (5) Prevent or regulate the construction of obstructions which will unnaturally divert flood waters or which may increase flood hazards to other lands.
Water Conservation Ordinance	Article X. Chapel Hill Code	**High** - Draught management causes less risk to public health and safety.	Mandatory conservation is required (and enforced by OWASA) during Stage 1 and 2 Water Shortages and Water Supply Emergencies.	Article X. Chapel Hill Code of Ordinances

Table C.2: Existing Town Policies and Programs

Policy or Program	Document Reference	Effectiveness for Mitigation and Rationale	Description	Text Citation
Soil Erosion and Sedimentation Control Division	Article 5 of Chapter 5 of the Town Code of Ordinances	**High** - has positive mitigating effects on several hazards	This division has the purpose of regulating the clearing, grading, excavating, filling, and manipulation of the earth and the moving and storing of waters in order to: control and prevent accelerated soil erosion and sedimentation, prevent the pollution of water, prevent damage to property, maintain the balance of nature, prevent the obstruction of natural and artificial drainageways, and inhibit flooding and reduce the undermining of roads and other transportation features.	Article 5 of Chapter 5 of the Town Code of Ordinances
Amendment of official maps and profiles Ordinance	Article 5-57: Town Code of Ordinances	**High** - Map modernization and otherwise accurate floodplain maps helps the Town regulate the NFIP rules as well as the RCD rules.	Any base flood elevation or location of special flood hazard may be amended when a flood control project has altered the flood hazard, or subsequent data indicates that the elevations or locations are no longer correct, or plans are submitted for a channel improvement or relocation that would alter the elevation or location.	Article 5-57: Town Code of Ordinances
International Fire Code	Code of Ordinances, Sections 5.1, 5.2, 7.5, 7.6, 7.7, etc.	**High**	Has special fire districts in dense areas, storage of hazardous materials, automatic sprinkler systems, open burning of brush, fire exits, smoke detectors, etc.	Code of Ordinances, Sections 5.1, 5.2, 7.5, 7.6, 7.7, etc.
Steep slopes	LUMO Section 5.3.2	**High**	The purpose of this section is to minimize the grading and site disturbance of steep slopes by restricting impervious surfaces and land disturbance in such areas, and by requiring special construction techniques in steeply sloped area in order to: • Protect water bodies (streams and lakes) and wetlands from the effects of erosion on water quality and water body integrity, • Protect the plant and animal habitat of steep slopes from the effects of land disturbance, and • Preserve the natural beauty and economic value of the town's wooded hillsides.	Article 5.3.2(d):Construction activities on slopes greater than fifteen (15) per cent shall comply with the following: (1) Exposed soil that is not under continuous construction shall be revegetated with temporary or permanent vegetation so that the soil is not left exposed following issuance of a certificate of occupancy, vegetation shall be reestablished. If irrigation is not provided, then the exposed soil shall be planted with species which can survive without irrigation. Vegetative cover or any alternative cover (rock, masonry, etc.) shall be maintained in perpetuity. (2) All cut and fill slopes shall not exceed a three (3) (horizontal) to one (1) (vertical) by the town manager upon certification, by a qualified soils engineer or geologist, that the slope will remain stable under foreseeable conditions. The certification must delineate any specific stabilization measures deemed necessary by the soils engineer or geologist.

Table C.2: Existing Town Policies and Programs

Policy or Program	Document Reference	Effectiveness for Mitigation and Rationale	Description	Text Citation
Burying utility lines	LUMO Section 5.12.2	**Medium** - If mitigation funds were made available, it would be beneficial to relocate these utilities underground since the Town has experienced lengthy power outages during ice storms or major storm events such as Hurricane Fran. Retrofitting above ground utilities by placing them underground is beyond the financial means of the Town, but could be accomplished with resources from state or federal	The Town of Chapel Hill requires new developments to install electric, cable, and telephone wires underground. In older neighborhoods, utilities are overhead and services fail when trees or limbs fall and break the lines.	LUMO Article 5.12.2 Other Utilities. All utility lines other than lines used only to transmit electricity between generating stations or substations shall be placed underground, and all surface disruptions required for installation shall be rehabilitated to the original or an improved condition.
Open Space and Greenways		**Medium** - Acquiring and demolishing repetitively flooded structures could increase Town open space and enhance these programs.	The Town's Open Space and Greenways Programs target tracts of open lands for acquisition to maintain the property as open space. Much of this land is located within the special flood hazard area. FEMA funded acquistion projects have occurred and applications have been submitted to FEMA for further similar projects.	44 CFR Parts 59-78, Revised as of October 1, 1998, final NFIP rules that became effective between October 1, 1998 and June 1, 1999.
Stormwater Structures Inventory		**Medium** - not completed due to the lack of sufficient resources. The inventory should be further utilized to carry out an effective storm sewer maintenance program, and should be updated periodically.	The developing Storm Sewer Inventory, which includes inlet and outlet locations, elevations and conditions and network of sewers, should be adequately completed and properly managed through a Geographic Information Systems (GIS) format.	On-going program.
Stormwater Modeling and Maintenance database		**Medium** - This modeling and database should be further developed and maintained with a ranking system to quickly and effectively prioritize capital improvements and drainage assistance projects to be completed as funding becomes available. Enhance the existing right-of-way drainage maintenance and drainage assistance programs with sufficient resources to plan and implement improvement activities on public and private property.	The Town currently has a "Stormwater Maintenance Program" database underway that lists stormwater/flood problem areas in Chapel Hill. Further planning, modeling and ranking needs to be performed.	Program will be further developed under the Stormwater Management Utility Master Plan.

Figure 1.1: Local Jurisdictions

Legend

- Secondary Roads
- Primary Roads
- County Boundaries
- Streams
- Other Water Features
- Chapel Hill Town Limits
- Carrboro Town Limits
- Carrboro Planning Limits
- Chapel Hill Urban Services Area
- Chapel Hill Planning Limits

1 inch equals 6,000 feet

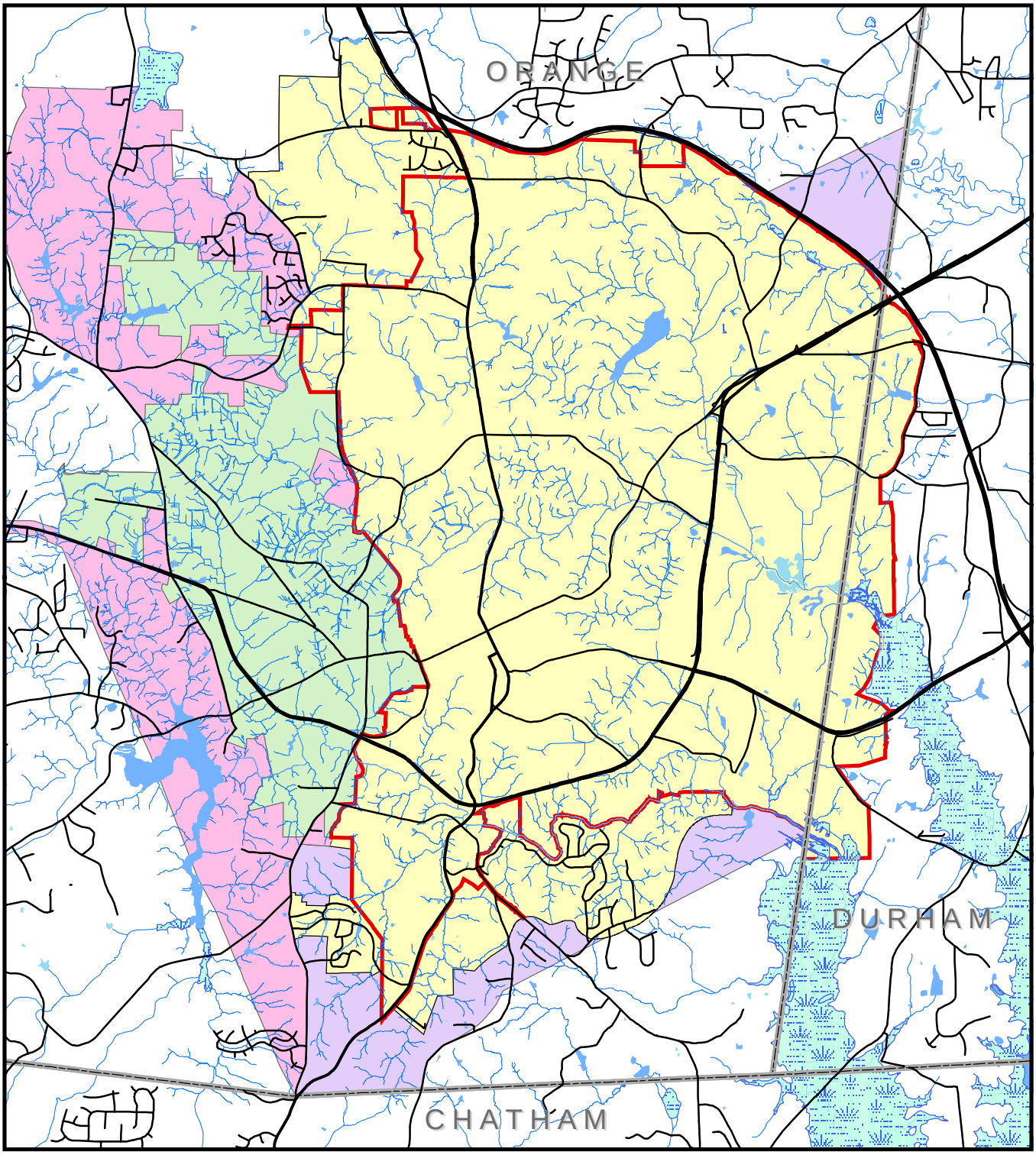


Figure A.1: Steep Slopes and Areas Prone to Flash Flooding in Chapel Hill

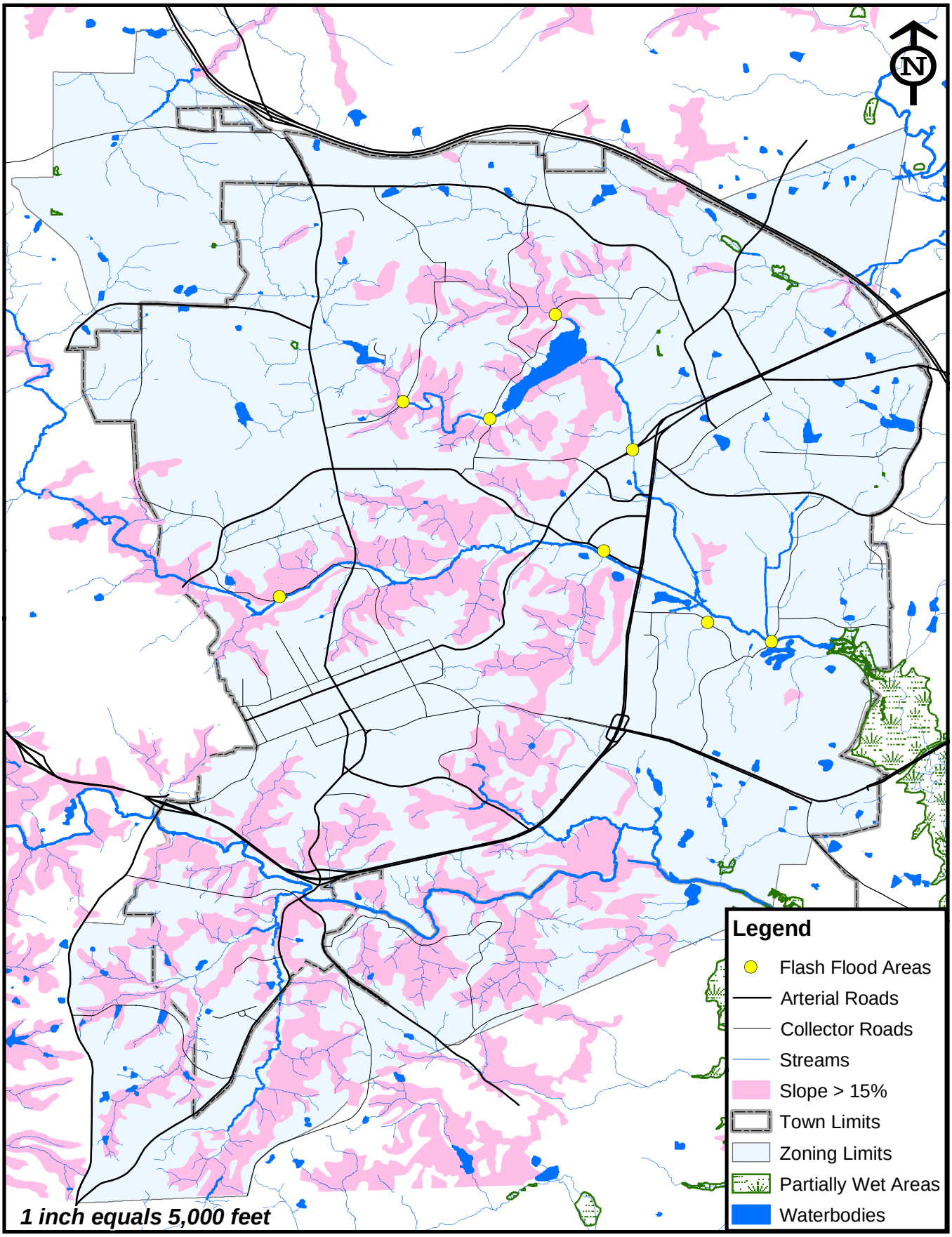


Figure A.2: National Flood Insurance Program Flood Zones in Chapel Hill

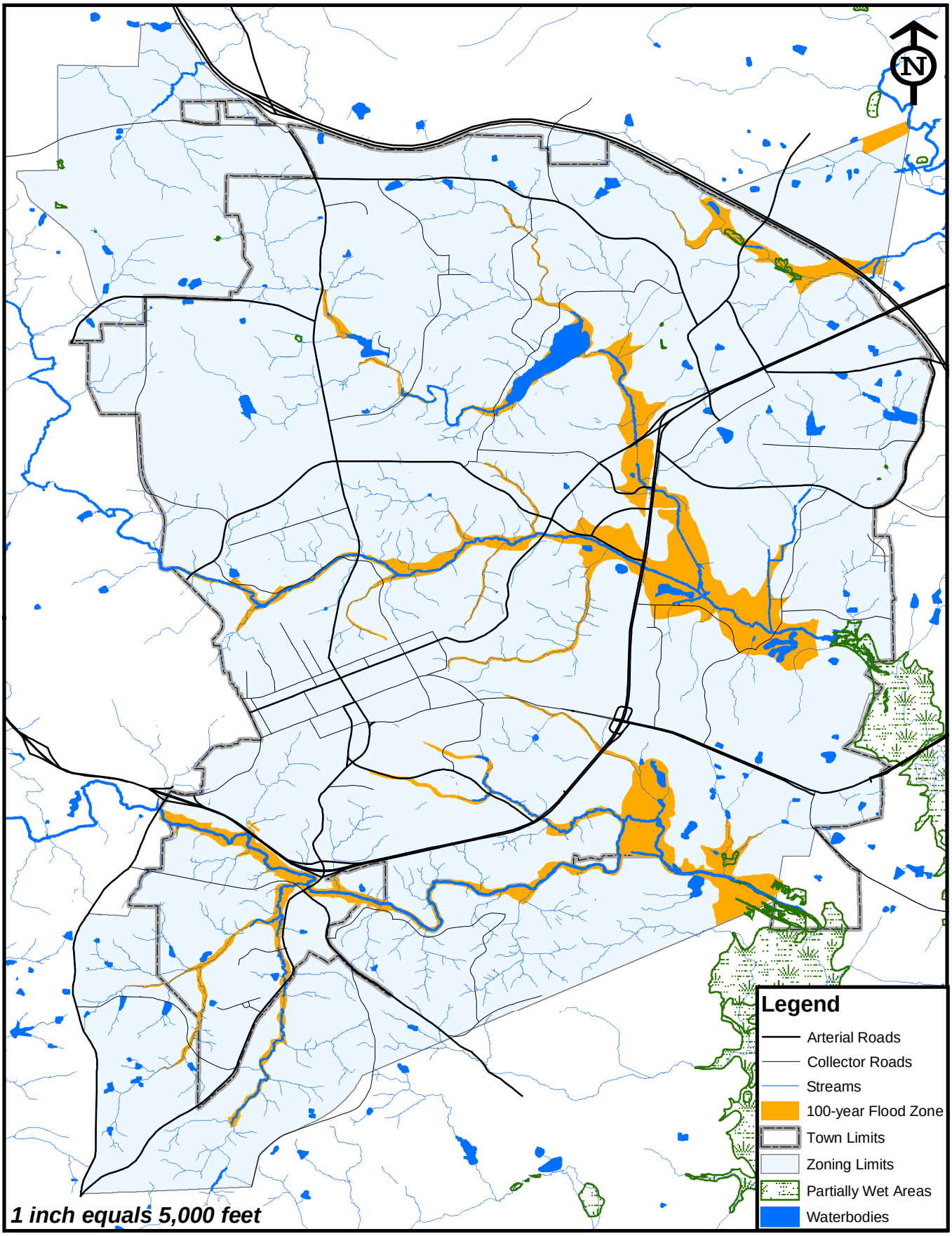


Figure A.3: Shearon Harris Emergency Planning Zones in the Chapel Hill Area

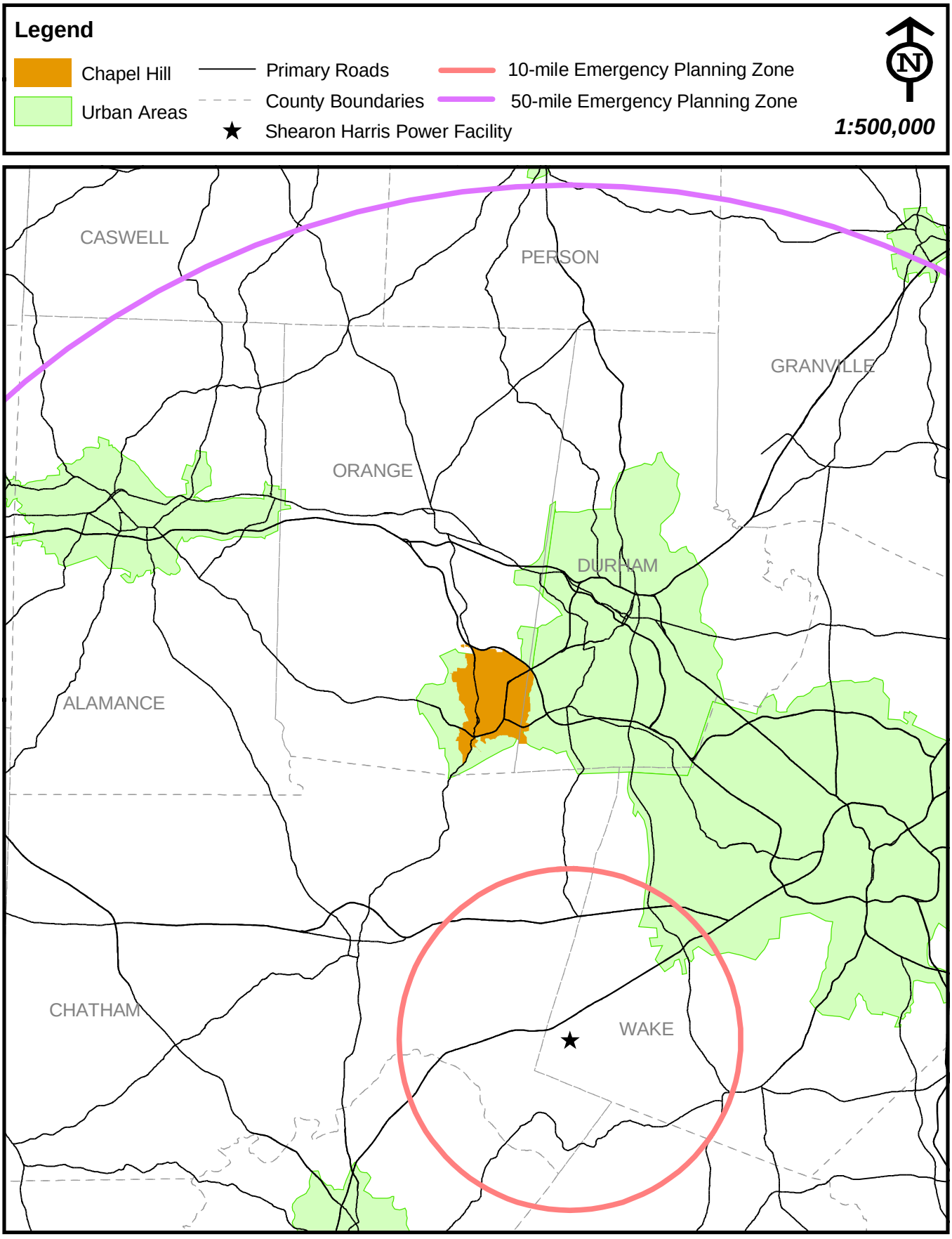


Figure A.4: Hurricane and Tropical Storm Tracks in the Piedmont Area

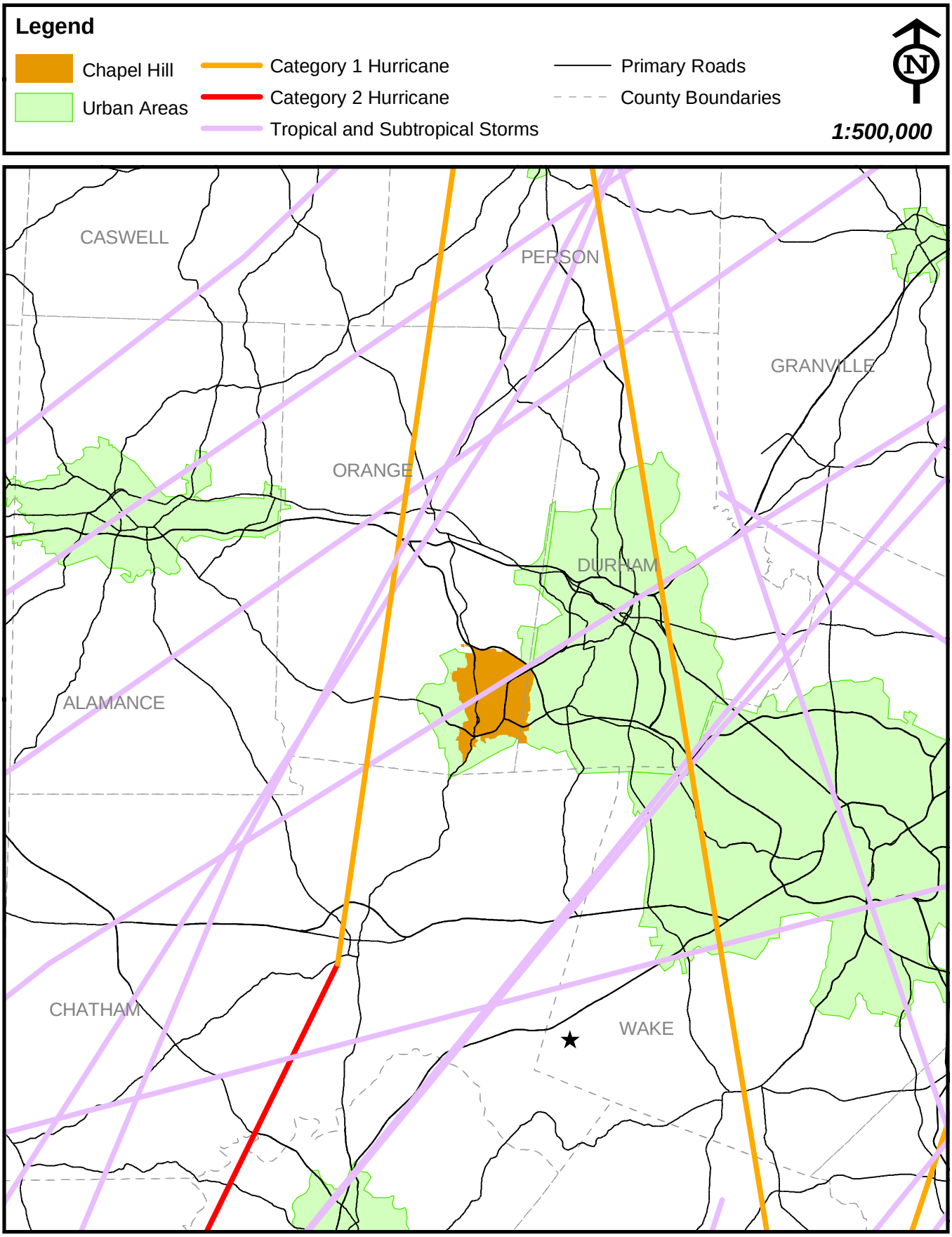


Figure A.5: High - Risk Dams Around Chapel Hill

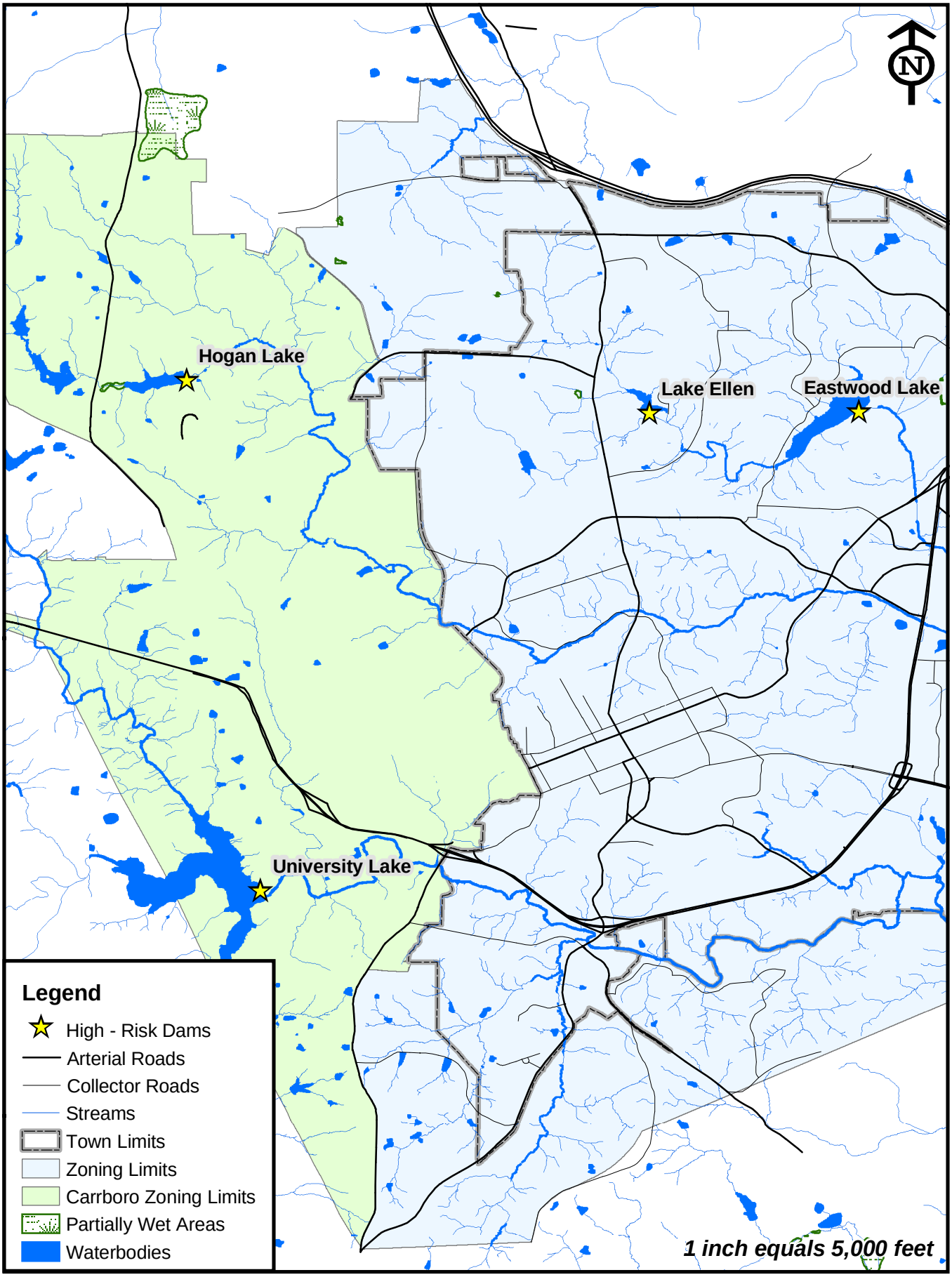


Figure A.6: Composite Hazard Exposure

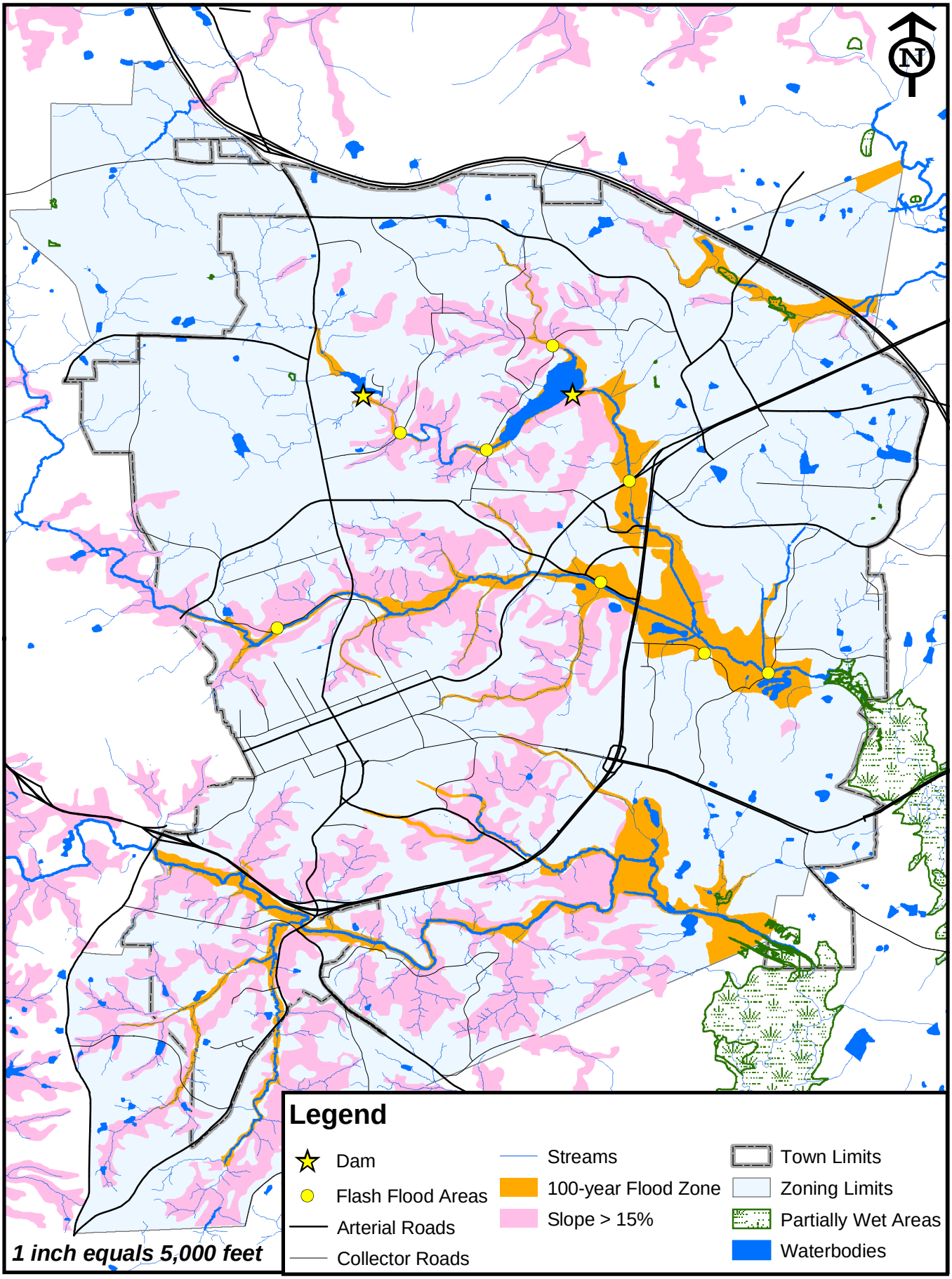


Figure B.1: Existing Land Use in Chapel Hill, May, 2002

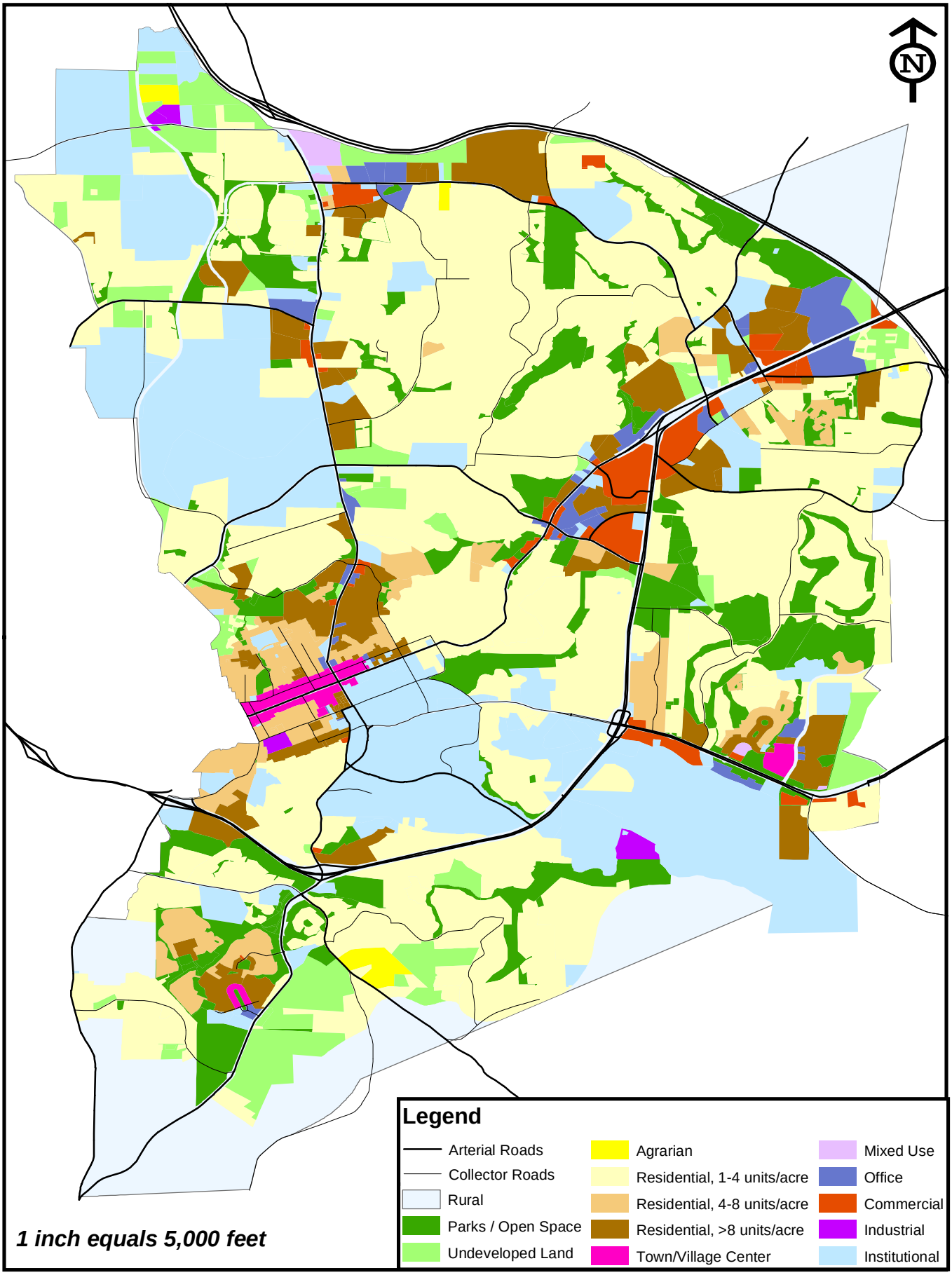


Figure B.2: Zoning, Underdeveloped Areas, and Overlay Districts

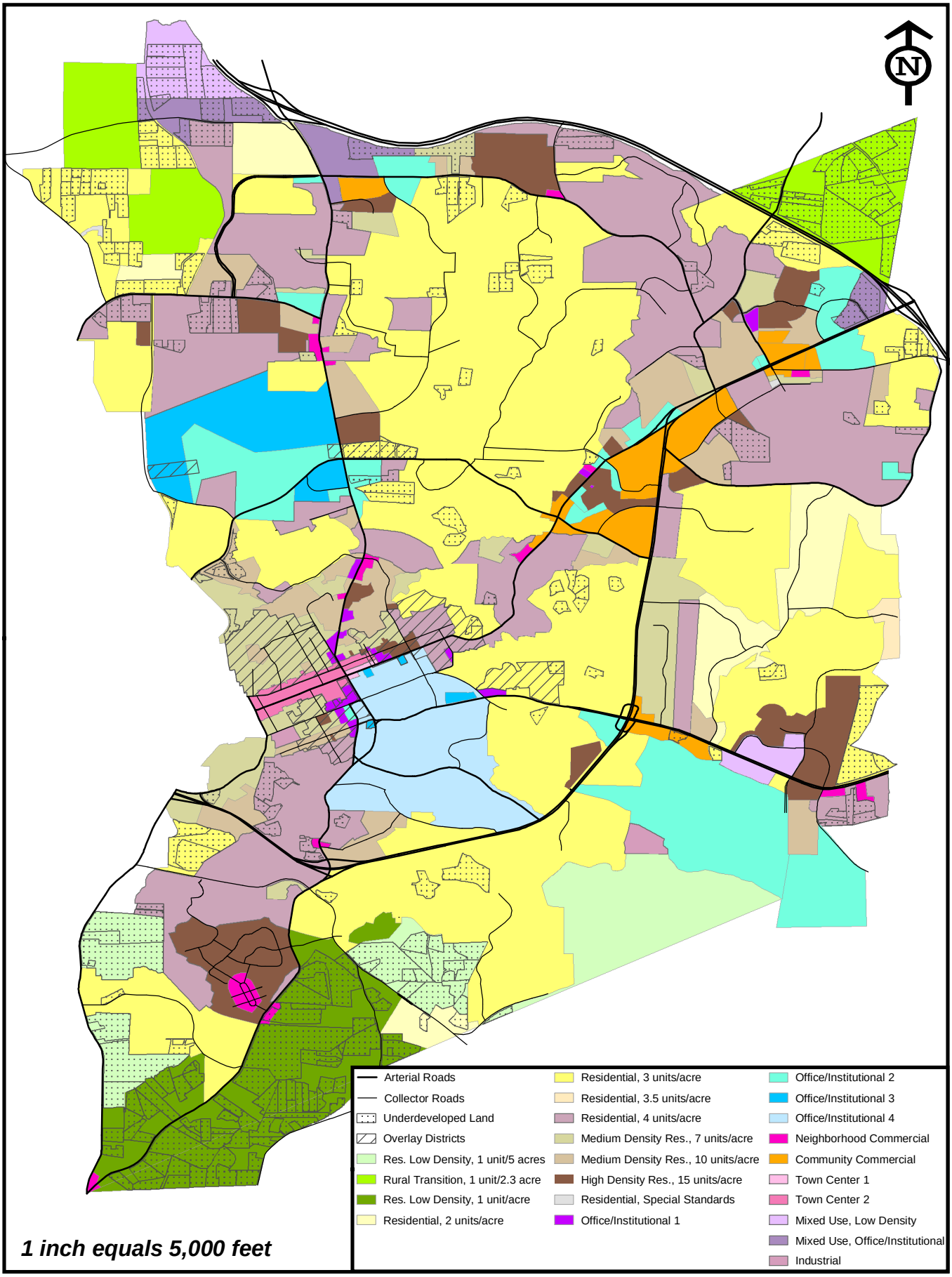


Figure B.3: Comprehensive Land Use Plan

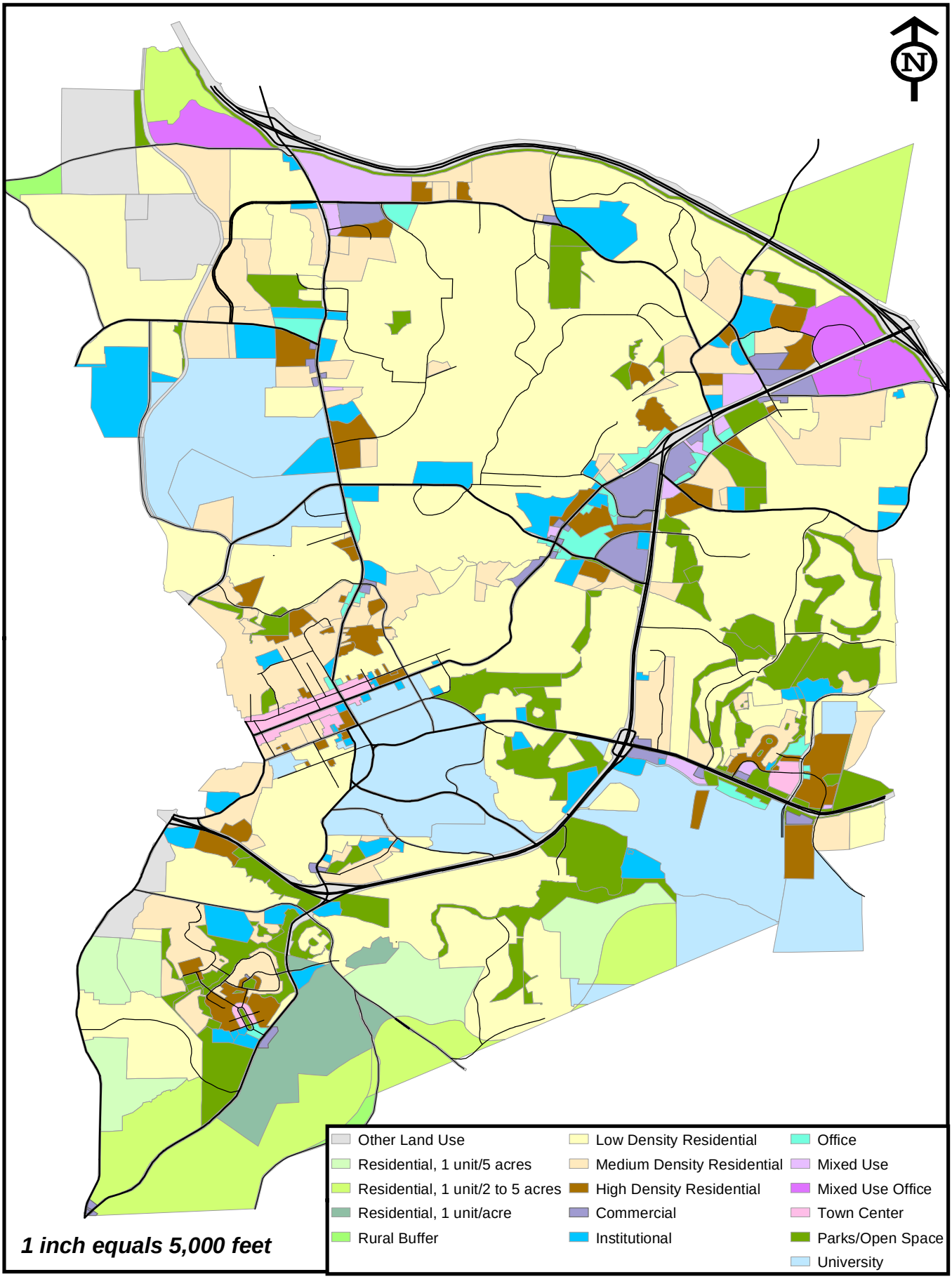


Figure B.4: Critical Facilities in Chapel Hill

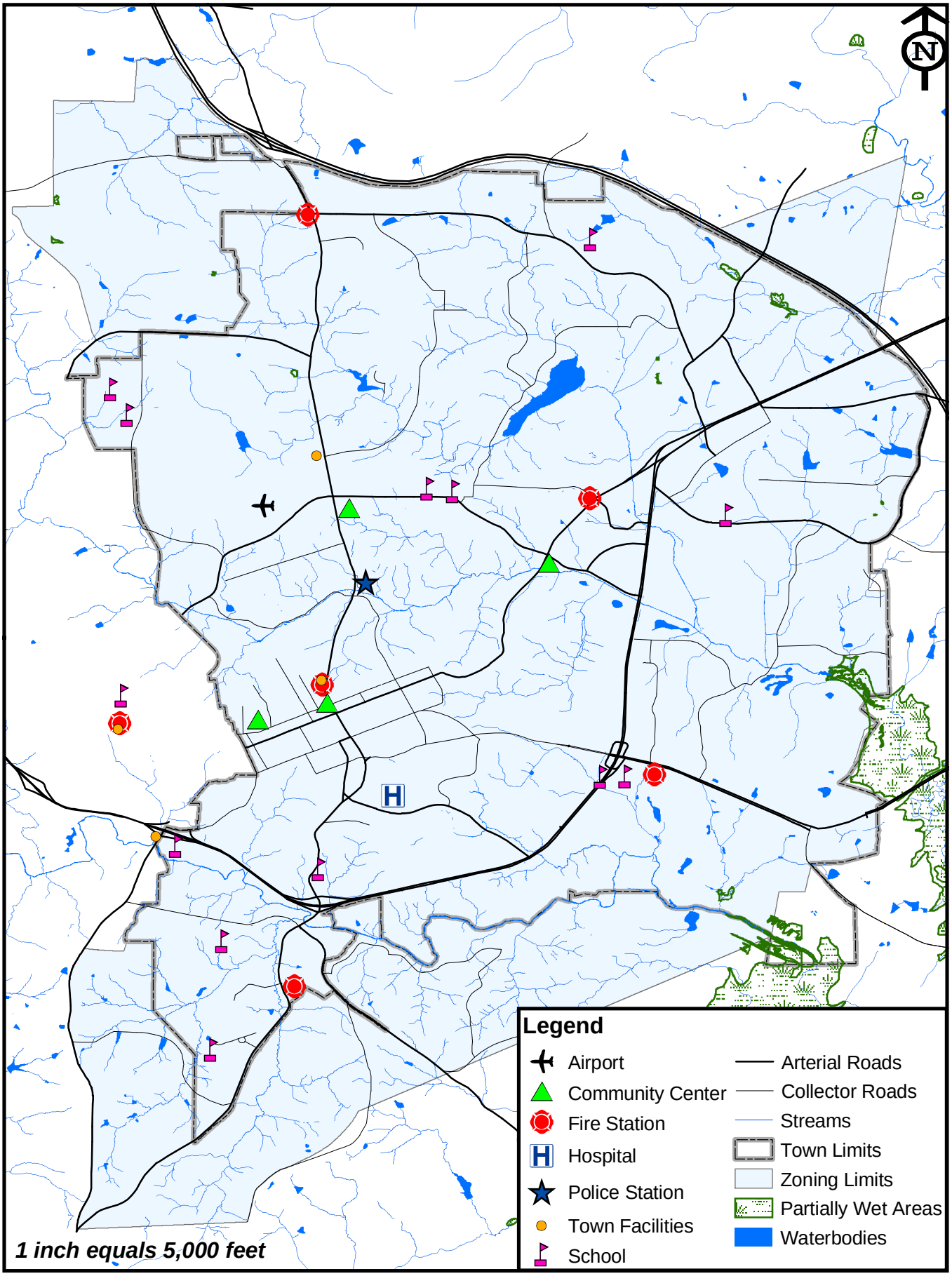


Figure B.5: Critical Infrastructure in Chapel Hill

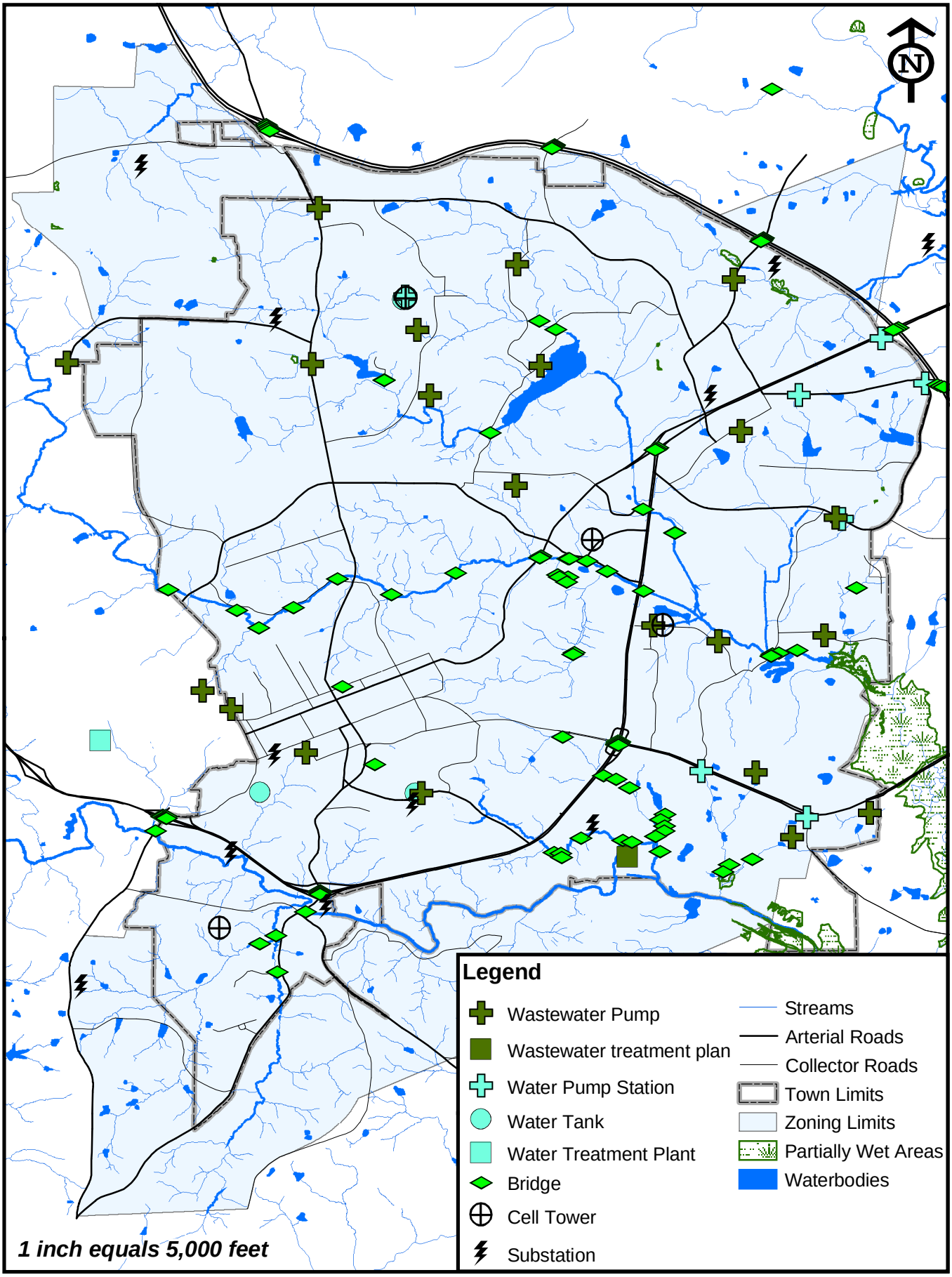


Figure B.6: Hazardous Facilities, Repetitive Loss, and Vulnerable Structures in Chapel Hill

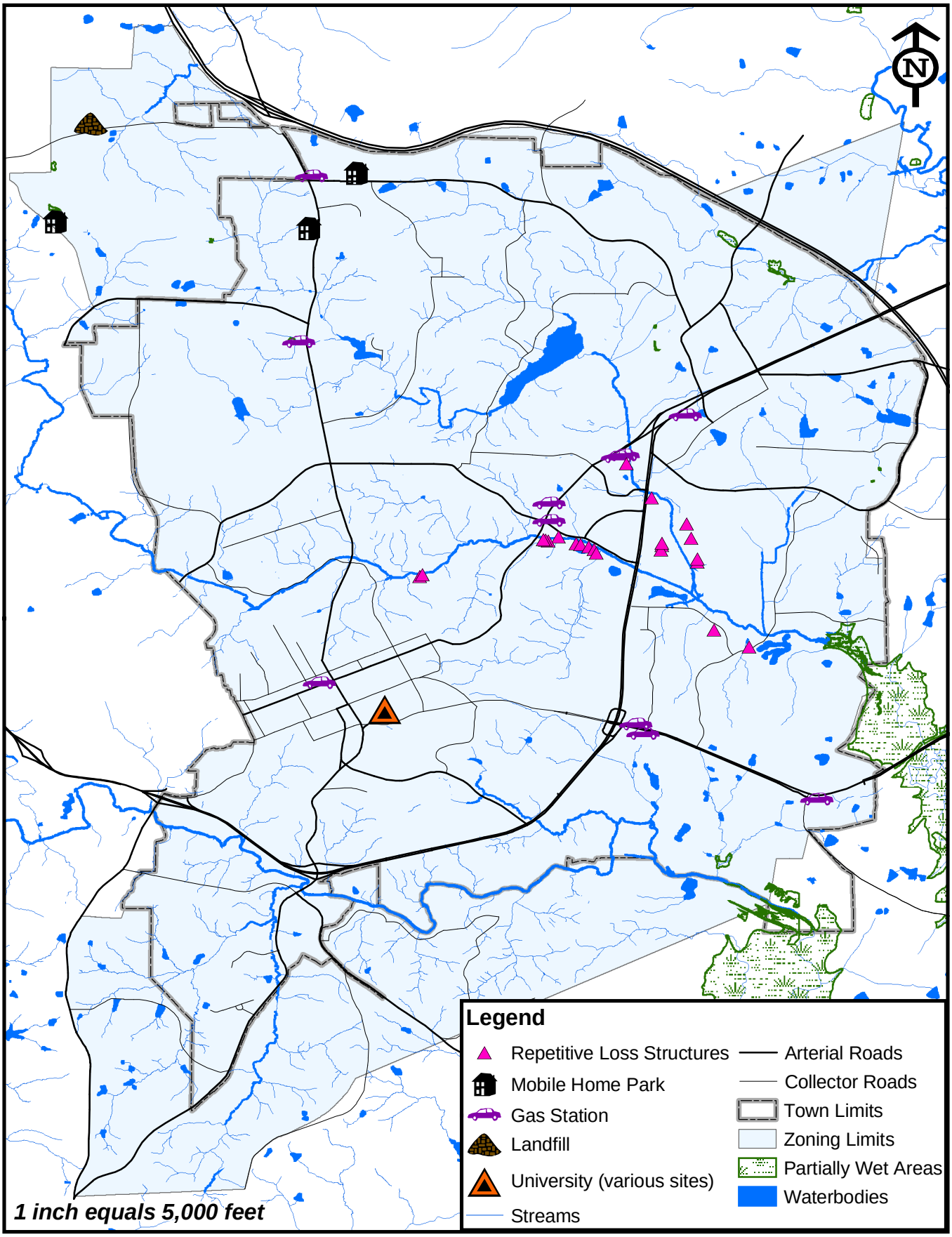


Figure B.7: Critical Facilities and Infrastructure, Vulnerable, Hazardous, and Repetitive Loss Structures with All Hazards

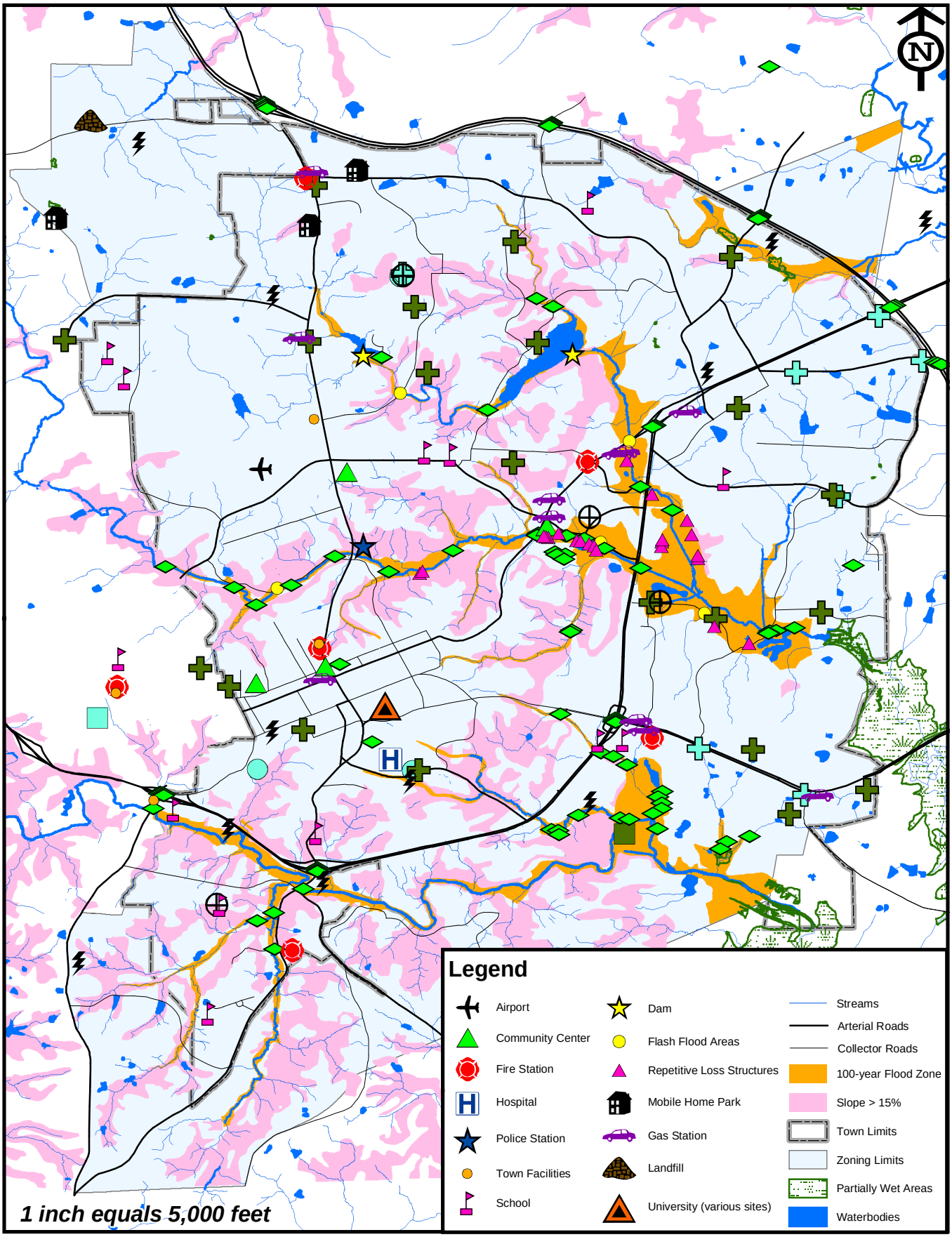
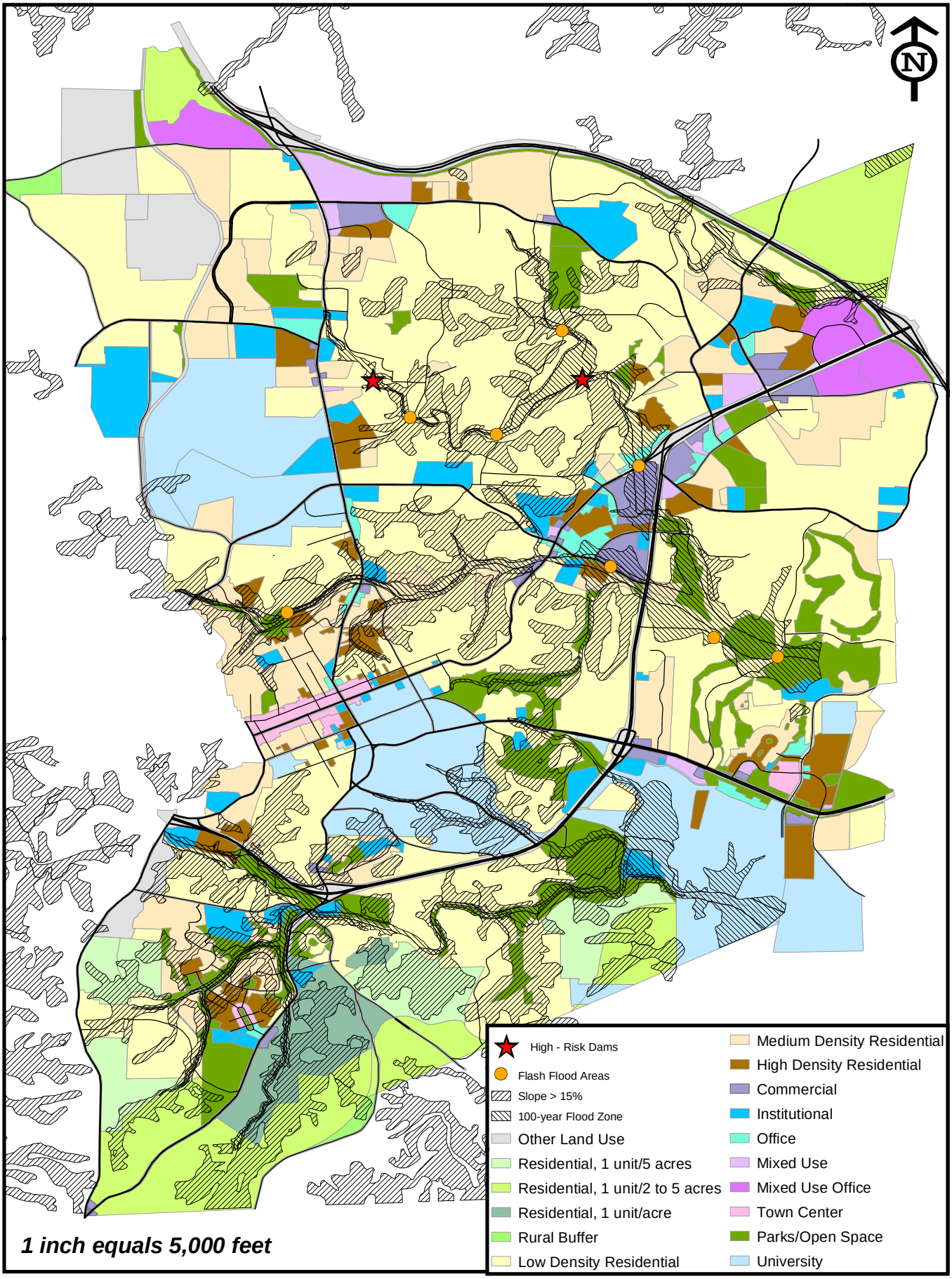


Figure B.8: Land Use Plan and All Hazards



APPENDIX A:
Hazard Identification, Profiles, and Analysis

Appendix A: Hazard Identification and Analysis

The location of North Carolina's Piedmont region in a temperate zone affected by maritime weather systems allows for a wide variety of natural hazards to occur. Most local hazards are related to storm activity of some kind, with flooding, high winds, and ice being the most common hazards.

While many hazards may be ranked as low to moderate for Chapel Hill in the larger scale of North Carolina or the Southeast, hazards profiled in this document are ranked from very low to high relative to Chapel Hill conditions and history for the purpose of planning and prioritization by the Town. See Table A.1 for a summary of hazard rankings; see Tables A.2, A.3, and A.4 for the scales used. The index was calculated by adding the rankings for the three kinds of impacts times a rank for frequency of occurrence. Rankings for each hazard are explained with that hazard.

Hazards have been separated into "primary" hazards, and "complex" hazards that result in several primary hazards of differing degree. Complex hazard events usually have several different kinds of hazards, such as flash flooding and high winds; hazard profiles for these "primary" hazards are therefore also applicable to the complex hazards that feature them in combination. Primary hazards will be profiled first.

One side-effect to note with many of these hazards is that trees may be knocked over or weakened until they fall. Downed trees may cause the most damage for several of these hazards, breaking power lines, damaging structures, blocking roads, or even causing injury or loss of life. Hazards likely to cause treefall will be noted as such. While electrical power and phone service are likely to be affected by treefall or other hazards, it is rare that gas or water/sewer services are affected.

Where no map is provided, the extent is usually regional. Some hazards, such as tornadoes, while very local in extent are not easy to predict in location. Maps for hazards that have a more random pattern of location are also not mapped.

Members of Town departments were surveyed for information on past events, how the Town prepares and responds, and likelihood of future events. Specific data have been acquired through FEMA, NCEM, NWS, and other government agencies, in addition to reports in area newspapers. Additional hazards were identified by local knowledge and experiences.

Primary Hazards

Windstorms/High Winds

High winds can occur in many conditions, from thunderstorms, hurricanes, nor'easters, and tornadoes, although high winds can also occur outside of a storm event. In any case, high winds are likely to knock over trees and even structures in very high winds. The amount of damage is dependent on windspeed. Wind damage usually results in downed power lines, according to newspaper reports and the NCDC database. Small wildfires may also result.[1]

In general, the greatest wind damage has been the result of hurricane winds. Hurricanes that significantly affected Chapel Hill occurred in September of 2003, 1999, and 1996, July of 1996, June of 1957, and October of 1954.[2] Wind gusts in the Chapel Hill area caused by Hurricane Fran in 1996 were around 52 miles per hour (mph).[3]

High winds are most commonly associated with tornadoes and thunderstorms in the Piedmont of North Carolina. Five tornadoes have been reported in Orange County since 1975. 58 thunderstorms with high winds have been reported in Orange County since 1975, six of which were reported in Chapel Hill. Two storms with particularly high winds occurred in February of 1998.[4] Wind gusts were on the order of 30-35 mph, and the storm produced heavy rainfall. However, most of the economic damage to private residences resulted from flooding and not from wind.

High winds are a chronic hazard, but have historically caused limited, localized damage, few injuries and no shutdown of critical facilities by themselves. High winds associated with hurricanes, tornadoes, or thunderstorms are more damaging, and are assigned a moderate hazard index.

Flash Flooding/High Water

Floods are associated with all kinds of storms, such as hurricanes and thunderstorms, but also with extended periods of moderate rain or brief downpours. Flood events can be divided into two kinds, causing damage in different areas. In steep areas, the rapid accumulation of water can cause a flash flood with high flow velocity. This flow can scour streams, severely eroding them, and can damage (or completely remove) structures in its path such as bridges and

culverts under roads. These floods come on and subside very quickly. Figure A.1 shows steep slopes as identified from the SSURGO soil survey database (slopes more than 15%), as well as points along stream segments prone to flash flooding. Soil types identified with more than 15% slope include Goldston slaty silt loam, Louisburg sandy loam, Tatum silt loam, Wedowee sandy loam, and Wilkes gravelly loam.

Lowland areas experience lower flow velocities, though at even 1 foot of depth a moderate flow is dangerous and the main floodway of a stream or river can have great destructive force. However, these areas can be flooded extensively and for long periods of time. Figure A.2 shows flood zones as mapped by FEMA for the National Flood Insurance Program. Chapel Hill experiences both kinds of floods, having a mix of small, steep streams and larger floodplains in its jurisdiction.

Two high-wind storms occurred in February of 1998[5]. Heavy rainfall was associated with these wind events. Rising creek levels caused by the second storm flooded Camelot Village Apartments so badly that Chapel Hill police evacuated residents. Many streets were closed because of the storm.

Several flash floods have been reported in Chapel Hill since 1993.[6] On August 27, 1995, a flood closed several local roads. Damage estimates from the Department of Transportation were around $250,000. An historic mill was destroyed, and water damaged several homes. One flood occurred on March 19, 1998 as a result of a slow moving cold front that dropped heavy rains on already saturated ground[7]. The other recent flood occurred on July 23, 2000. Streets flooded, and a bridge was washed out on Piney Mountain Road. Many buildings and dwellings flooded, especially Eastgate Shopping Center in Chapel Hill. October 11, 2002, flash floods occurred across the region. Nearby Raleigh-Durham airport reported 5.33 inches of rain. On March 20-21, 2003, the town received around 2.53 inches of rain.[8]

Many county-wide flash floods have been reported in Orange County. These flood events were associated with tropical storms that swept across the state. Most recently, Hurricane Isabel dropped about 1.72 inches of rain on September 22, 2003.[9] Chapel Hill received over an inch of rain on June 15, 2001 from Tropical Storm Allison. Hurricanes Floyd and Dennis both caused widespread flooding in September of 1999. Hurricane Fran dropped more than 10 inches of rain on Chapel Hill in September of 1996.[10]

Chapel Hill has a high hazard index for flooding because of the many locations and occurrences.[11]

Severe Winter Storms

The Piedmont region usually experiences a yearly winter storm, often a mix of snow, sleet, and freezing rain. However, in an average year, Chapel Hill receives less than 8 inches of snow.[12] Maximum monthly and daily snowfall records date back 57 years. A recent study shows that Chapel Hill is at highest risk for severe snow storms when there is a strong high pressure system over Alaska and Yukon Territory.[13] If a high pressure system of about 500 mb develops in that area, Chapel Hill is more likely to receive 4 inches or more of snowfall in the next three days.

Several major heavy snow events have been reported in the region since 1994.[14] The largest snowfall recorded within a 24-hour period occurred in January of 2000 with about 18 inches of snow.[15] Maximum snow depths peaked at 20 inches that month. About 12 inches of snow blanketed Chapel Hill in the beginning of January, 2002.[16] Approximately 1.5 inches of snow fell during the large ice storm of December, 2002 (see description of ice conditions below). One and a half inches of snow fell on January 16, 2003, and another 3 inches fell on January 23. About an inch accumulated in February, 2003. A smaller storm occurred in November of 2000, when Chapel Hill received about an inch of snow.[17] Two to four inches of snow, sleet, and freezing rain accumulated on January 6-7, 1996, with another half inch falling a week later on the 12th. Two inches accumulated in February of 1996, and another winter storm was reported in February of 1994. Most of these storms featured a combination of ice and snow in some amount. Trace amounts (less than 0.25 inches) of ice and snow accumulated in early February 2001, and about half an inch of snow fell a few weeks later. Trace amounts of snow fell again in March of 2003.

Prior to 1994, Chapel Hill had several large snow events. In December of 1958 and again in March of 1969 around 9 inches fell within 24 hours.[18] In February of 1979 the area received over 10 inches in one day. The town received 11 to 12 inches of snow during a snowstorm in early March of 1980.[19] A storm in January of 1982 left 6 inches of combined sleet and snow. Chapel Hill received 1 inch in January of 1983, and 3 to 4 inches shortly afterward in March.

Six inches of snow accumulated in February of 1984. Between 2 and 5 inches of snow accumulated from two separate storm events in January of 1987. Four inches accumulated during a snow storm the following month in February of 1987. Two inches fell in Chapel Hill in March of 1993. The Blizzard of 1888, which occurred on March 11, most likely affected the Chapel Hill area.[20]

It is difficult to classify storm events exclusively into ice or snow categories. Snow and ice storms frequently occur together in Chapel Hill. The most severe ice storm to hit Chapel Hill in recent history occurred in December of 2002[21]. Sleet accumulations were greater than 1.5 inches, and freezing rain accumulations were greater than 0.75 inches.[22] This storm knocked down many power lines and trees. This storm was followed by two other winter storms in the middle and end of February of 2003 that caused regional ice accumulation of about 1.5 inches by February 17, and around 0.25 inches by February 27.[23] The most commonly reported economic damage from snow and ice storms resulted from car accidents.[24]

Four other regional ice storms have recently been reported in the vicinity[25]. These occurred in January of 1998, January and February of 1996, and February of 1994. In addition, seven winter storms have had ice accumulations from freezing rain. Five of these storms occurred in January of 2000. The other two storms occurred in January of 2002.

Chapel Hill has a high hazard index for severe winter storms.[26] Winter storms occur almost every year, affecting critical facilities for a limited amount of time and causing limited property damage, both largely due to treefall and its effects, such as blocking roads and breaking power lines, and damage from car accidents. Winter storms are ranked as critical for injuries and deaths, largely because of the unsafe driving conditions they create.

Lightning

Lightning is a common feature of thunderstorms, but also occurs in dry weather, particularly in the summer. Historically, North Carolina is ranked as one of the top five states in the country for lightning deaths, injuries, and damages.[27] State-wide, there were 629 lightning deaths or injuries between 1959 and 1994. Despite the elevated risk of lightning strikes in the state, there is no indication that Chapel Hill residents in the Piedmont region of the state have the

same unusually high risk. In addition, only one individual is usually affected by any given lightning strike, so the economic impacts of damage are expected to be small.

Three lightning events have been reported in Orange County in recent years. One of these events started three residential fires in Chapel Hill on July 2, 1998.[28] A condominium complex on Copperline Drive sustained the most damage. A woman was struck outside her apartment complex in the neighboring town of Carrboro in August of 1999, and a house caught fire in the neighboring town of Hillsborough in June of 1997.

Despite the high likelihood of lightning occurring, Chapel Hill has a low hazard index for lightning because a lightning strike does not necessarily result in damage, tends to result in few injuries and causes no shutdown of critical facilities. Lightning striking a vulnerable (i.e. less fire-resistant) structure or causing a fire during drought is much less likely and assigned a low hazard index as well, in spite of causing much greater damage.

Hailstorms

Hailstorms are an occasional feature of thunderstorms in the Piedmont, and associated more with severe thunderstorms that also tend to spawn tornadoes. Hail can cause minor damage to structures, and particularly to cars, but its greatest damage is to crops. Forty-three hailstorms have been reported in Orange County since 1956.[29] Three of these hail events have been reported in Chapel Hill since the NCDC began local reporting in 1993. No significant damage has occurred from hailstorms in Chapel Hill, based on newspaper research.[30] Chapel Hill has a low hazard index for hailstorms due to the historically limited amount and extent of damage, injuries, or shutdown of critical facilities caused by hailstorms.

Snow Avalanches

There have been no reported snow avalanches in Chapel Hill or in the surrounding Piedmont region. The town does not receive large enough amounts of snow to create avalanches nor has significantly large steep areas. Chapel Hill has a very low hazard index for snow avalanches due to the lack of necessary conditions.

Wildfire/Urban Fire

The risk of wildfires is very low in Chapel Hill, largely related to drought and lightning strikes. Since 1960, only 6 injuries have been reported state-wide.[31] None of these occurred in or near Chapel Hill. Brush fires pose a minor threat. For instance, fifteen small brush fires were put out in Orange County on March 7, 2004 as a result of a storm, but did not cause any major damage.[32]

There are five fire stations in Chapel Hill.[33] Urban fires periodically occur in Chapel Hill. Nation-wide, fraternity houses have a higher risk of having fire incidents.[34] On May 12, 1996, an accidental fire killed five people and injured three others at the Phi Gamma Delta fraternity house at the University of North Carolina in Chapel Hill. [35] Damage estimates for that fire were around $475,000. As a result of this fire, Chapel Hill has enacted a retroactive sprinkler law, and taken other measures to minimize the risk of fraternity fires.[36]

The risk of urban fire for any given area in Chapel Hill will depend on the individual building characteristics. There are several factors that make fraternity houses more susceptible to fires. Other, usually older, buildings that share these characteristics are also at higher risk for fire. Factors include: lack of automatic sprinkler protection; combustible interior wall finish materials such as pine paneling; an open central stairway that allows fire ventilation; the lack of fire-rated construction separating common areas from sleeping areas, and the lack of building-wide automatic fire detection and fire alarm systems. While fires are a possible occurrence, impacts would largely be severe injuries and possibly a death, but only a very small area of damage. Fires are given a low hazard index.[37]

Heatwave

Short heatwave events are common throughout the Piedmont, although they may be part of a larger drought season. A heat wave was reported in Orange County on July 22, 1998[38]. The maximum temperature for the month of July was only 92 degrees.[39] However, heat index values made temperatures feel much higher[40]. The summer months of 1952-1954 were some of the hottest temperatures on record. [41] Over the last 57 years, the highest daily maximum temperatures occurred in the following months: 95 degrees in April, 1980; 97 degrees in May,

1953; 104 degrees in June, 1954; 105 degrees in July, 1952; 105 degrees in August, 1988; 104 degrees in September, 1954; and 98 degrees in October, 1954. Heatwaves cause little property damage and do not shut down critical facilities, but can result in many cases of heatstroke and very occasional deaths. Heatwaves are given a low hazard index.

Storm Surges

Storm surges are a coastal phenomenon usually associated with hurricanes. Chapel Hill is not affected by storm surges due to its distance from the coast and therefore has a very low hazard index for storm surges.

Landslides

According to USDA soils maps for Orange County, North Carolina, there are three soil types that generally have up to 15% slopes, and three soil types that have 15% or greater slopes. These soil types will probably be more prone to landslides than other soils. These areas are most likely to be located near major streams in the central and western portions of Chapel Hill. Orange county lists the risk of landslides as "moderate,"[42] although there have been no recorded events of landslides. While the area of steep slopes in Chapel Hill makes small landslides possible (Figure A.1 shows steep slopes identified from soil surveys), limited amount of damage and few injuries results in a low hazard index.[43]

Sinkholes/Land Subsidence

Sinkholes and land subsidence are associated with an area's hydrology. Sinkholes result from the lack of support to the soil when subsurface limestone is dissolved by groundwater. Land subsidence often results from the drawdown of the water table in a wet area, which results in compaction of clayey soils and decomposition of organic soils. In areas where these hazards occur, these hazards may cause limited, local property damage. However, both of these hazards are very unlikely in the Piedmont region, and are assigned a very low hazard index.

Gullying/Erosion

Gullying and erosion are the result of runoff and stream velocities too high for the stability of the land surface they flow over. Dry land may lack stabilizing plants or other surface cover. A stream's hydrology may be changing to have shorter, faster flood peaks after rains. Both of these are highly likely in urbanized areas such as Chapel Hill, but these hazards cause negligible, localized property damage and few (if any) injuries in even the most severe events. While being a chronic problem, effects of these hazards accumulate over a longer period of time rather than as a single event. All thse factors give gullying and erosion a low hazard index.

Volcanoes

The eastern United States has not had any episodes of volcanism for several million years, and is extremely unlikely to experience any in the next several thousand years. Thus, volcanic eruptions have a very low hazard index.

Tsunamis

Only one tsunami has been reported in the Atlantic Basin since records were kept, associated with the 1886 earthquake in Charleston, SC.[44] Most tsunamis are a result of tectonic activity and underwater and coastal-mountain landslides. These events are not intense enough to create tsunamis large enough to reach Chapel Hill. Only an event that displaces an immense amount of water, such as an oceanic meteor impact, could create the conditions for such a large tsunami. While this would be catastrophically disastrous, tsunamis are given a very low hazard index due to the very low probability of a meteor impact.

Hazardous Material Spills

There is a state-led hazardous material cleanup site at the University of North Carolina at Chapel Hill.[45] There are no National Priority List superfund sites located in Chapel Hill or

Orange County, although an old chemical waste site is in the CERCLIS database.[46] Local transport of hazardous materials in sufficient quantity is rare in Town, but more common along Interstate 40, which skirts the northern and eastern sides of Town. One wreck and subsequent chemical spill occurred just south of Town on I-40 in 2004. Private trucking companies use private hazard materials cleanup crews. Critical facilities are unlikely to be affected by spills. Spills may result in some human exposure that requires brief hospitalization. While property damage may be minimal, materials can reach streams and the water table, making cleanup very difficult. Spills tend to be very localized, but are not unlikely, thus spills are given a low hazard index.

Nuclear Accidents

Shearon Harris nuclear power plant is located about 25 miles from Chapel Hill. The chance of a mishap at Shearon Harris is estimated at one in 869 years, which makes it less susceptible than the estimated industry average, at one in 704 years.[47] There have been no nuclear accidents at Shearon Harris that have caused economic damage to Chapel Hill. Warning systems and practices are targeted to a radius of 10 miles from the plant, called the Emergency Planning Zone (plume exposure pathway). Chapel Hill and Orange County are outside of this zone. Chapel Hill is within the 50-mile radius of a zone where foodstuffs are managed to prevent exposure through ingestion. Figure A.3 is a map of the region with the plant, the 10- and 50-mile zones, and Chapel Hill. Severe accidents could result in large-scale contamination of property and land, massive human exposure, and associated evacuation of the region. However, severe accidents are very unlikely, and most events are likely to be better contained, with much less general exposure and contamination. For this reason, nuclear accidents are given a low hazard index.

Rioting

There was one race riot in Chapel Hill in 1937 which resulted in three injuries.[48] According to newspaper archive searches and interviews with local residents, activity today is limited to minor political protests and gatherings near the University of North Carolina.[49] Most

large-scale group activity is related to post-game celebrations or Halloween festivities. Damage is limited to isolated looting and destruction of private property such as cars and windows, some injuries are expected, but would not result in a shutdown of critical facilities. Rioting is possible but not likely, and is given a low hazard index.

Terrorism- bombs/explosives

According to newspaper archive searches and interviews with local residents, there have been no major acts of terrorism or bombings in Chapel Hill. Terrorist acts involving explosives would likely damage a limited area, but have severe casualties. It is unlikely Chapel Hill will experience such an event, thus terrorism is given a low hazard index.

Bioterrorism

There have been no reported incidents or threats of bioterrorism in Chapel Hill, according to newspaper archive searches, although this issue is becoming an increasing concern in the country. Unlike terrorist acts involving explosives, bioterrorism causes little property damage, but can cause significant illness or death, which secondarily affects critical facilities. A bioterrorist act is likely to affect a larger region than just the Town. However, it is considered an unlikely occurrence and given a low hazard index.

Complex Hazards

Thunderstorms

Thunderstorms occur throughout the year in the Piedmont, though largely associated with fronts in the spring and fall, and summertime air masses (single cell). Historically, thunderstorms have been common in this area. On average, the Chapel Hill area has about 44 days of thunderstorms each year.[50] These days are distributed throughout the year, although based on 57 years of records, thunderstorms are most likely to occur in June, July and August. Fifty-eight thunderstorms were reported in Orange County since 1975.[51] In 1993 the NCDC began tracking where the thunderstorms occurred within the county. Since that time, seven significant thunderstorms have been reported in Chapel Hill. Damage reports generally describe fallen trees from high winds, though thunderstorms also can produce lightning and torrential rain that can cause flash floods or high water in low areas. Tornadoes and hailstorms are an occasional feature of severe thunderstorms.

Chapel Hill has a moderate hazard index for thunderstorms. It is almost certain that thunderstorms will occur every year, but they generally cause limited property damage and some injuries (especially associated with flooding), but rarely shut down critical facilities for more than 24 hours.

Tornadoes

Based on state-wide historical records since 1950, tornadoes are most likely to occur in March through June, although they may happen at other times of the year. [52] Tornadoes are largely associated with hurricanes and thunderstorms.[53] Five tornadoes have been reported in Orange County since reporting began in 1950.[54] These tornadoes resulted in 11 injuries in the county, and two deaths. No extensive damage was reported, just minor damage from brief touchdowns.[55] The state-wide average number of deaths from tornadoes is only two per year, so injuries are likely to be limited even in the event a tornado does hit Chapel Hill.[56] The closest F5 intensity on the Fujita scale[57] tornado hit Raleigh in 1988. Given the small area that a tornado destroys, the chance of hitting critical facilities is low, though it causes severe destruction in the

small path it takes. Chapel Hill has a moderate hazard index for tornadoes based on the increased likelihood of thunderstorms occurring in the Piedmont region of North Carolina.[58]

Hurricanes

Tropical cyclonic storms such as hurricanes primarily affect coastal North Carolina, but their effects can be experienced many miles inland. State-wide, North Carolina has been hit by 25 hurricanes between 1900 and 1996[59]. Of those hurricanes, 10 were category 3 and one was category 4. Based on past frequency, major hurricanes are most likely to occur in August, September, or October[60]. There are also indications that the likelihood of hurricanes passing through North Carolina has increased since about 1970.[61] Hurricane Audrey passed through central North Carolina in June of 1957. Hurricane Hazel struck in October of 1954.[62] Hazel was a category 4 hurricane. There were no deaths, one serious injury, and significant property damage.

The most recent hurricane to affect Chapel Hill was Hurricane Isabel, which struck in September, 2003. [63] Four other hurricanes have been reported in Orange County since 1993.[64] Hurricane Dennis struck on September 4, 1999. Chapel Hill received around 12 inches of rain from this storm. Hurricane Floyd was a category 2 hurricane that affected Chapel Hill shortly afterward on September 15, 1999.[65] Hurricane Fran was a category 3 hurricane that struck in September, 1996.[66] Winds and flooding created problems in Chapel Hill as a result of this storm.[67] Hurricane Bertha struck in July, 1996, but mainly affected the Raleigh area to the east of Chapel Hill. See Figure A.4 for a map of storm tracks close to Chapel Hill.

High winds and torrential rains cause the majority of damage inland, including direct damage to structures by wind, flash floods and high water, treefalls damaging structures, loss of power, and impassable roads. All of these conditions contribute to high risk of injury or death (especially by drowning), and can shut down critical facilities for days or weeks. Tropical storms have the potential to cause critical damage, but the town's distance from the coast greatly reduces the likelihood of very intense storms reaching the area. Chapel Hill has a high hazard index for hurricanes.[68]

Nor'easters

Nor'easters are severe coastal wintertime storms. Nor'easters are generally not a high risk in Chapel Hill because the town is not located near the coast. However, nor-easters that affect the coast may increase the risk of high winds, tornadoes, or heavy precipitation in Chapel Hill. [69] Many winter storms that hit Chapel Hill were prompted by nor'easters that affected the North Carolina coast, including storms in 1888, 1993 and 1996.[70] Chapel Hill has a very low hazard index for nor'easters based on the town's distance from the coast.[71]

Droughts

Droughts are linked to El Nino/La Nina weather patterns. Researching Chapel Hill drought damage in newspaper archives and the NCDC database did not indicate any substantial property damage or human injury caused by drought. Large-scale agriculture does not occur in Chapel Hill. The agricultural sector is most likely to be economically impacted by droughts.[72]

No data were available from newspapers to prove significant economic or physical damages from the drought specifically for Chapel Hill. The Orange Water and Sewer Authority (OWASA) did institute water restrictions in Chapel Hill during the drought.[73] OWASA will be completing a drought response survey for statewide planning purposes.[74] The survey requests economic estimates of drought damage, but the survey has not yet been published.

An extreme drought affected Chapel Hill from 1998-2002.[75] This was the worst drought to hit the area in the last 100 years, with rainfall deficits equivalent to about one year's worth of rainfall. Normal expected annual rainfall in the area is about 42 inches.[76] Annual values from NOAA's southeast regional precipitation records there have been several periods that had below average precipitation.[77] Records cover the time period between 1895 and 2002. There was a less severe drought from 1910 to 1919, another from 1950 to 1957, a four-year drought that ended around 1970. Other data for this region indicates there has been some sort of severe drought in 75 of the 100 years from 1896 to 1995.[78] However, this information is very general and covers the southeast region from Virginia south to Florida and west to Alabama. As other records show, Chapel Hill's risk of drought is much less than 75%. Droughts are not expected to affect critical facilities or cause property damage, and the only associated injuries would be secondarily if a

strong heatwave occurred. With such low impact, droughts are given a low hazard index in spite of their frequency.

Earthquakes

Tectonic activity in the Southeastern United States is not as rare as one might think with a lack of active mountain-forming or proximity to faults of tectonic plates. Earthquakes of MM intensity 5 to 6 are not uncommon in the southern Appalachians.

Earthquakes felt in Raleigh (30 miles from Chapel Hill) include:

- 1811-1812 series of severe earthquakes in New Madrid, MO
- 1886 severe earthquake in Charleston, SC
- 1897 Giles County, VA
- 1913 Union County, SC
- 1916 Asheville, NC
- 2003 near Richmond, VA[79]

Risk of an earthquake with an epicenter near Chapel Hill is small. If there were one, of an intensity average for the Southeastern United States, injuries and property damage, as well as shutdown of critical facilities, would be limited. Earthquakes elsewhere in this larger region would have negligible injuries and property damage, if any. Chapel Hill is listed by the State as having low hazard index for earthquakes[80].

Dam/Levee Failure

There are four high-risk dams in the Chapel Hill area. One dam is located two miles west of Chapel Hill at University Lake.[81] The dam structure was built in 1932, and underwent improvements in 1993. It is 811 feet long, and retains a reservoir that covers 213 acres. The reservoir's capacity is 450 million gallons. Another dam contains Hogan Lake, upstream from Chapel Hill on Bolin Creek. People and property located downstream of the dam are at risk if a dam failure should occur. Dam failures produce a flash flood similar to that from an extremely

large rain event, but can be much more extensive and affecting the larger, lower floodplains that dams tend to be built upon.

Eastwood Lake is located within the limits of Chapel Hill.[82] It covers an area of 48.1 acres. It was designed to have a minimum depth of four feet when it was built in 1937, which would give it an approximate volume of 63 million gallons.

Lake Ellen is the only other lake of significant size. It covers an area of less than 8 acres and a depth of less than 20 feet.[83] The dam was built in the early 1960's, and a dam engineer recently verified that the structure is in sound condition. See Figure A.5 for a map of high-risk dams in the area. Dam failures are possible but limited in extent, however, the damage in that extent can be severe, as well as produce many injuries or even deaths. Dam failures are unlikely to affect more than a few critical facilities, and thus are given a low hazard index.

Conclusions

By ranking the various effects of hazards in the Chapel Hill area, those related to storms are indexed as high (hurricanes, floods, and severe winter storms) and moderate (tornadoes, severe thunderstorms, and windstorms). These hazards have greater effect on local conditions and have a higher priority for mitigation. Composite exposure to hazards (with the exception of hurricanes and nuclear accidents, which are regional in scale) is shown in Figure A.6 (the "all-hazards map"). Areas subject to floods stand out as particularly hazardous areas.

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APPENDIX B:
Vulnerability Assessment

Appendix B: Vulnerability Assessment

Existing Conditions and Future Development

Older, denser parts of Town, as well as the University, were developed in the upland areas between Morgan and Bolin Creeks. Since the Urban Services boundary is fixed and no annexation is planned, infill is beginning to occur in other sections of Town. A section of Durham County was annexed in the mid-seventies. This area is completely within the Triassic Basin. The Town has different development and services zones that have produced the current extent and kind of development, as well as affecting future development. Densities within town limits range largely from 1 to 8 units per acre, with some denser areas. All analyses for this plan use the Town's Zoning Limits as boundaries for which the Town has some responsibility. The Town's Zoning Limits extend beyond the city limits, where the Town has created a "rural buffer". Densities in this area range from 1 unit per 5 acres to 1 unit per 2 acres. Existing land use conditions are shown in Figure B.1. Existing land use data used to create the map is based mostly on existing conditions, with the exception of government-owned properties, such as the University. Different levels of land use within these parcels were not differentiated, making the Horace Williams Tract (completely undeveloped) look the same as Central Campus (densely developed).

There are few large undeveloped tracts in Town. The most notable, and largest at around 900 acres, is the University's Horace Williams Tract at the headwaters of Crow Branch, a tributary to Booker Creek. There are countless other small, privately-owned, isolated parcels around Town, some of which are large enough to create small subdivisions. These moderately-sized, subdividable parcels (considered "underdeveloped areas") are shown on Figure B.2, which shows zoning and overlay districts which affect future development trends. Overlay districts are specialized zones that have particular requirements above and beyond the zones they overlay, and their location is dependent on the presence of other factors. Overlay zones include the Historic District, the Airport Hazard Zone, the Watershed Protection District, and the Resource Conservation District.

For several years, the Council has declared its intent to consider for future annexation all of the land between the current Town Limits and the Urban Services Area boundary. The Urban

Services Boundary of the Town has been identified in the 2000 Land Use Plan as the limits of the area to which urban services will be extended; we do not anticipate annexations beyond that line. We do anticipate that the Council will annex all of the area within the Urban Services Boundary at such time as each increment of the area meets statutory standards and there is financial capacity to provide the services required upon annexation. For purposes of vulnerability analysis, the Comprehensive Land Use Plan will be used as an idealized approximation of potential future conditions (see Figure B.3).

Critical Facilities and Infrastructure

A "critical facility" or "critical infrastructure" is defined as buildings, services, and infrastructure that are essential to a community's response to and recovery from a disaster. For purposes of this plan, this includes fire and police stations, hospitals, Town Hall and Public Works facilities, homeless shelters, schools and community centers which can be used as emergency shelters, transportation networks, and water/wastewater, electrical, and communications utilities. Figures B.4 and B.5 show the general locations of critical facilities and infrastructure around Town.

There is one police station and one hospital. In the event of damage to these facilities, some police and hospital activities and function would be reduced, and some possibly relocated. In a more destructive event, police and hospital activities would be greatly limited, and would necessitate assistance from neighboring jurisdictions.

There are five fire stations, serving different parts of town. The Town could reasonably reshuffle employees and remaining equipment in the event of damage or destruction of one station for a period of time necessary to repair or replace a station. Damage or destruction of more than one would place a considerable burden on the community, and the Town would probably request assistance from neighboring jurisdictions.

Town Hall and Public Works serve as centers for the coordination of response to disasters and the storage of equipment necessary for cleanup and recovery. Damage to either of these could be adapted to, but complete destruction of either facility would destroy large amounts of equipment, information, and resources.

For the above facilities, much of the Town's capability of response and recovery lies in the staff themselves. An event that results in significant casualties in any one facility would severely restrict disaster response and recovery.

Transportation networks, such as bridges and roads, are critical to the rapid response to and recovery from a disaster. Public Works takes primary responsibility for clearing main roads through Town, but secondary streets may have to wait a few days. Where neighborhoods have several interconnections with major roads, access is not severely limited. In the few subdivisions that have only one point of connection to a major road, residents may be completely cut off from services for several days, or until they can clear a path to the main road themselves. Fortunately, the Town encourages interconnections between and within most developments to ensure multiple points of access.

Utilities such as drinking water and sewage treatment, electricity, and gas are essential for residents at all times, although this dependence is only realized during the few times a disaster interrupts service. After the ice storms of the winter of 2002 – 2003, some areas in the Research Triangle went without heat for up to two weeks, usually if they relied on electricity. Residents in some rural areas outside of Town would attempt to obtain heat from gas grills and other heating elements not designed for indoor use. Incidences of carbon monoxide poisoning increased greatly in the days after each storm, particularly among immigrants from tropical and subtropical countries. Most residents of Chapel Hill have sufficient education and experience with winter conditions to avoid this. Sales of small generators have been high since that winter, indicating the desire of residents to be better prepared for such minor but common disasters.

Drinking water, sewage treatment, and gas utilities are rarely interrupted in disaster events, although localized flooding can contaminate water supplies in the immediate area. Electricity, and communications utilities such as phone or cable, are interrupted with much greater frequency due to the common use of aboveground lines. The Town has attempted to reduce this by requiring underground utilities in new development, but has no plan for addressing the many aboveground lines running through most of Town. Trees in urban settings are less resistant to environmental stresses as compared to more rural areas, and are the usual cause of interruption of wire-based utilities, especially in high-wind or icy events. Proper care of streetside trees may increase their resistance to falling or breakage in minor events. Extreme wind events will break lines and poles even in the absence of trees, so strengthening trees for common events provides a balance of line protection with the many benefits of street trees in southern urban settings.

Vulnerable Areas, Hazardous Facilities, and Repetitive Losses

There are three mobile home parks in Town. Residents of these developments are particularly vulnerable in high-wind events, as mobile homes do not have any safe locations to hide in high winds. Residents may in fact be safer hiding outside of their homes in such conditions. Care should be taken to provide residents with warnings and possible evacuation in high-wind events if at all possible.

There are a few facilities around Town storing hazardous materials, including gas stations and various sites around the University's campus. The fire department already tracks these locations and what is stored there for more effective fire response. These facilities may also be vulnerable to other hazards, particularly those that cause large and potentially dangerous leaks in storage tanks. Earthquakes, floods, and other events that destabilize soil (for underground tanks) or result in large debris (for aboveground tanks) can result in damage to these tanks that causes a release of hazardous material. These kinds of damages are fortunately rare.

There are 22 structures around Town identified as having suffered repetitive flood losses, mostly single-family residences and multi-family residences. Damage costs for these structures range from $2273 to $451,093. There are many other structures around Town that have had only one flooding event. Some areas, such as University Mall and Eastgate, are particularly vulnerable because of their partial location in the stream's 100-year floodplain and the channelization of Bolin Creek in that area. Damage assessments for a huge rain event in July of 2000 that flooded the malls and surrounding areas amounted to an estimated loss of $6,268,000; of that $4,593,000 was in uninsured losses. Many tenants of Eastgate had no flood insurance. The approximate locations of these three groups of structures are shown on Figure B.6.

Assessing Value and Potential Losses

Estimates of current numbers of structures in the Town and in hazardous areas were compiled to get an idea of current vulnerability, and the projected number estimated for future vulnerability. Information on public and private assets and facilities is presented in Table B.1. This was developed from a combination of sources, including the 2000 Chapel Hill Data Book, the 2000 Census, Orange County Tax Office data, and independently developed datasets. The number of people affected in residential development was based on an estimation of three people

per house. Approximate value of residential buildings was based on a median value of $252,000 (from the 2000 Data Book). Estimates of projected numbers of buildings were based on Chamber of Commerce data. Estimates of current and projected replacement value have only thus far been calculated for single-family residential development. A fuller estimation of value for all kinds of development will be done with the HAZUS modeling software, and this information incorporated in the next update of the Hazard Mitigation Plan.

To get an overview of how hazards identified affect existing critical facilities and infrastructure, they were overlaid with the all-hazards map, as well as repetitive loss, vulnerable, and hazardous structures (see Figure B.7). To get an overview of how hazards may affect potential future conditions, the "all-hazards map" was combined with the Comprehensive Land Use Plan to create Figure B.8. This map can be used to review the Town's plans for growth against the locations of hazards.

APPENDIX C:
Community Capability

Appendix C: Community Capability

Local Departments, Agencies, and Organizations

The Town of Chapel Hill has various departments and coordinates with various other local governments, private companies and agencies that has a bearing on hazard mitigation, disaster response and recovery. Refer to Table C.1, Local Departments, Agencies and Organizations for a description of these departments, agencies and organizations and their related mitigation activities.

Existing Policies, Programs, and Ordinances

Existing policies, programs, and ordinances that have an effect on community vulnerability or the Town's ability to mitigate hazards are listed in Table C.2. Effectiveness rankings are based on the adequacy of the policy or program, whether an effective policy that should be continued and supported, a policy that could do more for mitigation if enhanced or strengthened, or a policy that should be modified or rescinded.

Legal, Fiscal, and Technical Capability and Political Conditions

This capability assessment analyzes the Town's current capability to mitigate the threats hazards pose. To conduct a complete and thorough assessment of the Town's capability an examination of the Town's legal, fiscal, technical and political capability was conducted.

The Town of Chapel Hill is constantly working to provide the staff and resources necessary to accomplish the strategies necessary to mitigate the hazards in their jurisdiction. However, the Town realizes that there are a large number of diverse funding sources available to communities to assist in the fiscal responsibility required to implement local hazard mitigation plans, including both government and private programs. While federal and state programs carry out the bulk of disaster relief programs that provide funds for mitigation, local governments are encouraged to open the search field as widely as possible, and include alternative funding sources to supplement the local hazard mitigation budget.

The Town of Chapel Hill has enacted a stormwater management utility ordinance (Appendix D) to provide funding for programming and flood-related hazard mitigation projects.

This includes property acquisition, flood proofing and other improvements that implement multiple funding sources to ensure the success of such projects. In addition the Town realizes that before effective mitigation strategies can be applied, stable funding sources and effective incentives must be established on a per project basis to encourage participation by the private and public sectors.

Legal Capability

Enabling legislation, primarily (Chapter 160A, Article 8 of the North Carolina General Statutes (NCGS) and in particular NCGS 160A-174) in North Carolina delegates legal authority to local governments to implement regulatory measures. The basis for much of this authority is the police power, designed to protect public health, safety and welfare. This authority enables local officials to enact and enforce ordinances and to define and abate nuisances. As hazard mitigation is a form of protecting public health, safety and welfare, it falls under the general regulatory powers of local governments. Enabling legislation also authorizes building codes and inspections, land use regulations, acquisition of property to mitigate hazards, and floodway regulation.

Fiscal Capability

The power to levy taxes, fees and special assessments and apply these funds to all hazard mitigation measures is a component of a jurisdiction's fiscal capability. The Town's Stormwater Management Utility and Stormwater Management Advisory Board Ordinance establishes fees for the purpose of funding the Town Stormwater Management Program. This program includes the Town's flood-related disaster mitigation activities described in Section 3., Mitigation Strategies and Policies.

Technical Capability

The Town of Chapel Hill has technical capability to perform hazard mitigation activities through a variety of programs, policies and ordinances. See Table C.2 for detailed descriptions of these programs, policies, and ordinances.

Town staff in multiple departments use computer based technology such as Geographic Information System (GIS) to provide map coverage for numerous hazard mitigation purposes such as debris removal, floodways, floodplains, steep slopes and other overlay districts. Samples of this mapping capability are included in this plan.

The Town of Chapel Hill has many hazard response programs and policies currently in place. These programs help us to respond quickly and effectively to natural hazards. Hazard response is not mitigation; however these programs do help to reduce the impact of natural hazards on the community. One such policy is the Major Emergency Disaster Operations Plan, approved in May 1997, and updated periodically. This plan maps out the Town's response to hazards ranging from severe storms to earthquakes. A system of emergency management command and control that is compatible with that of Orange County Emergency Management and the State of North Carolina is established in this Plan. The Town Public Works department has response plans for snow, ice, and debris removal that are flexible and can be easily adjusted to respond quickly and effectively to a snow, wind, or other storm event of any intensity or duration. There is no simple solution to mitigate these types of hazards, but these response plans help lessen their negative effects on the community.

The Town participates in the National Flood Insurance Program (NFIP). Local floodplain maps indicate to residents and business owners of their proximity to floodways and floodplains with 100 and 500 year recurrence intervals. However, these maps are twenty-five years old and are in need of being updated. A floodplain remapping (map modernization) project is nearly completed by the NC Division of Emergency Managment and we anticipate preliminary data will be available by January 2005.

Hazard mitigation projects that specifically address flooding have been completed and additional projects are planned in Chapel Hill. Other projects have included a public Flood Mitigation Assistance (FMA) project in which three single-family homes on Dickerson Court were purchased by the Town and demolished. A fourth house was purchased and demolished as well, although it was not under the FMA grant agreement. These houses were directly in the regulatory floodway and had suffered repetitive flood losses. The area has been restored into an extension of the Bolin Creek greenway. Other FMA projects have been applied for and are pending FEMA approval. This hazard mitigation plan will address structures like these found to be at the highest risk for flooding and other hazards.

Political Capability

The Town of Chapel Hill has a history of progressive policies and programs that supports strong public health and safety and environmental stewardship. The recently enacted stormwater management utility ordinance indicates this willpower as well as other recent adoptions

including the Land Use Management Ordinance amendments and the OI-4 Development Plan adoption for the University of North Carolina at Chapel Hill.

Summary and Acceptability Assessment

Current Town policies, practices and conditions address mitigating high priority hazards in Chapel Hill, however existing resources limit the extent of how effective these mitigation policies and conditions are. With a higher priority for hazard mitigation activities in certain key areas, these limitations would be reduced or removed. For instance, if local matching funds were budgeted for structural mitigation activities with sufficient staff resources to administer these activities, more mitigation activities would occur to reduce the risk to structures and public health and safety. Non-structural mitigation activities, such as open space acquisition and participation in the Community Rating System (CRS) could occur with sufficient priority and resources.

Chapel Hill remains vulnerable to natural hazards, especially flooding, hurricanes/tropical storms and winter storm/freeze events. Each of these events poses a specific set of vulnerabilities, hazards and response activities. For flooding hazards, the Town has riverine flooding and stormwater flooding that could be more effective in mitigating at-risk conditions with sufficient prioritization of resources.

For hurricanes, tropical storms and winter storms/freeze events, the Town has a Disaster Response Plan and coordinates activities with Emergency Managers and agencies for warnings and a rapid response and clean-up as described in this plan. Additional activities such as generators at all Fire and Police Stations have added to emergency response and operations. Other added practices may include a review of the Emergency Response Plan in coordination with the Hazard Mitigation Plan to ensure mitigation consistency and efficiency.

The Town of Chapel Hill has been and remains committed to mitigating the impacts of natural hazards to the extent practicable to ensure the health, safety and welfare of its citizens. The limiting factor has been the lack of resources and the lack of a comprehensive Hazard Mitigation Plan. With this revised plan soon to be adopted and in place, the Town remains committed to reviewing and improving its mitigation practices on an annual basis or more frequently, as hazardous conditions warrant.

APPENDIX D:
Town Council Agenda Items and Resolutions

AGENDA # 2b

MEMORANDUM

TO: Mayor and Town Council

FROM: W. Calvin Horton, Town Manager

SUBJECT: Public Hearing: Hazard Mitigation Plan

DATE: May 13, 2002

Tonight's public hearing will include a presentation of the draft *Town of Chapel Hill Hazard Mitigation Plan* and will provide the Town Council with an opportunity to ask questions and to receive comments and questions from interested citizens. Attachment #1 is a copy of the draft plan.

Following tonight's hearing, we will make any necessary revisions to the plan and bring the final document to Council for adoption at its regular business meeting on June 10, 2002.

BACKGROUND

North Carolina Senate Bill 300 and the Federal Disaster Mitigation Act of 2000 require that, to remain eligible to receive relief funding as a result of a declared disaster, local governments adopt by August 1, 2002 a Hazard Mitigation Plan that is acceptable to the North Carolina Department of Emergency Management.

In addition to allowing the Town to remain eligible for disaster relief funds, a local hazard mitigation plan would provide a dynamic planning document that describes potential hazards, vulnerabilities and strategies to reduce short-term and long-term risks to life and property. Hazard mitigation planning is an essential part of creating and maintaining a sustainable community by meeting the needs of the present generation without compromising the ability of future generations to meet their needs.

DISCUSSION

The Town of Chapel Hill has a history of weather related events that have resulted in significant hazards including property damage, commerce interruptions, reductions in public services, impacts on quality of life and expenses (both public and private) for recovery efforts. These hazards in Chapel Hill result typically from high winds, heavy snow and/or ice, and intense and/or extended rainfall resulting in large volumes of runoff.

The Town has policies and procedures in place for recovery from natural disasters and/or other emergencies, but we presently have no comprehensive plan or policy for identifying and mitigating potential hazards over the long-term. Adoption of a Town of Chapel Hill Hazard Mitigation Plan is necessary for two primary reasons:

1) State law requires that local governments in North Carolina adopt an approved Hazard Mitigation Plan no later than August 1, 2002 in order to remain eligible for disaster relief funds.
2) By identifying and mitigating potential hazards, the Town could expect to reduce or eliminate some exposures and costs associated with disaster response and recovery.

The Town could use its Hazard Mitigation Plan as a tool to anticipate and plan for most disasters before they occur and to aid in preparation of detailed action plans, based on the particular type of disaster, to reduce loss of life, property, economic activity, public services and quality of life. The Town Plan is considered to be "dynamic" because it is designed to be reviewed and modified from time-to-time based on actual experiences and occurrences and/or technological advances and changes in hazard exposure.

The plan has been modeled after the North Carolina Division of Emergency Management publications: "Local Hazard Mitigation Planning Manual" and "Keeping Natural Hazards from Becoming Natural Disasters". The proposed Town plan includes the following five-step process recommended in these publications:

1) Identify and analyze each of the hazards possibly affecting the area.
2) Perform a vulnerability assessment.
3) Assess the community capability to manage and mitigate hazards.
4) Research goals relevant to mitigation.
5) Create a mitigation strategy.

The plan also includes methods for implementing, monitoring, evaluating and updating the mitigation plan as outlined in relevant federal requirements.

The plan has been developed specifically for the Town of Chapel Hill and addresses Town-specific needs in mitigation activities. Although we experience winter storms and wind damages, the plan focuses on flood damages, where disaster resultant costs have historically been the greatest. It identifies the primary watersheds, accompanying floodplains and structures located within those floodplains that are vulnerable to flooding.

The plan takes a comprehensive look at the Town's current programs, policies and regulations that are related to hazard mitigation, describes the effectiveness of that program or policy and offers additional/supplemental mitigation options for consideration. The plan suggests that mitigation efforts can be effectively improved by strengthening current programs, policies and regulations in addition to creating some new ones.

The Mitigation Strategies section of the plan describes actions the Town may wish to pursue if adequate funding opportunities become available, including disaster relief funds from the North

Carolina Department of Emergency Management (NCDEM) and the Federal Emergency Management Agency (FEMA).

CONCLUSION

The proposed hazard mitigation plan for Chapel Hill would provide a dynamic planning document that identifies hazards, vulnerabilities and mitigation activities and strategies to reduce short-term and long-term risks to human life and property. Such a plan is required by state and federal law for the Town to remain eligible to receive disaster relief funds.

MANAGER'S PRELIMINARY RECOMMENDATION

That the Council refer questions and comments received at tonight's Public Hearing to the Town Manager for review and consideration in revising the draft Town of Chapel Hill Hazard Mitigation Plan as may be necessary.

ATTACHMENTS

1. Draft Town of Chapel Hill Hazard Mitigation Plan (begin new page 1).

EXCERPT FROM MAY 13, 2002 TOWN COUNCIL BUSINESS MEETING MINUTES

2b. Public Hearing on Draft Hazard Mitigation Plan

Stormwater Engineer Fred Royal submitted a draft Town of Chapel Hill Hazard Mitigation Plan, which was required by both the state and Federal governments:

· Section 409 of the Stafford Act requires that local governments must have an approved hazard mitigation plan in place in order to receive federal disaster recovery funds.
· NC Senate Bill 300 requires that local governments have a hazard mitigation plan in place by August 1, 2002, in order to receive state disaster assistance funds.

Hazard Mitigation Plan Outline

· Identify and analyze each of the hazards possibly affecting the area
· Perform a vulnerability assessment
· Assess the community capability to manage and mitigate hazards
· Research goals relevant to mitigation
· Create a mitigation strategy

Mitigation Strategies

· Strengthen existing programs:
· Further develop and maintain the stormwater/drainage maintenance program and database
· Further develop cooperative efforts between the Town of Chapel Hill and other local units of government
· Create new Programs:
· Prioritize, plan and apply for further grants like (FMA) Flood Mitigation Assistance and others
· Modernize and enhance the Flood Insurance Rate Maps
· Develop a public watershed education program

Mr. Royal said the Town needed to have a resolution concerning this Plan in place by June 10, 2002.

COUNCIL MEMBER STROM MOVED, SECONDED BY COUNCIL MEMBER WARD, TO RECEIVE AND REFER THE PLAN TO THE MANAGER. THE MOTION WAS ADOPTED UNANIMOUSLY. (8-0).

MEMORANDUM

TO: All Department Heads

FROM: Fred Royal, Engineering Department

SUBJECT: Draft Hazard Mitigation Plan

DATE: May 17, 2002

Please find attached the Draft Hazard Mitigation Plan for your review and comment. This plan, in its final form, will be presented to Council on June 10, 2002 for their consideration and adoption.

Also find attached the report presented to Council on May 13, 2002 for your information.

Please submit your comments to me no later than May 27, 2002 in order to make any necessary revisions. The North Carolina Division of Emergency Management, Mitigation Planning Branch, is currently reviewing the document to ensure that it contains the minimum criteria for local Hazard Mitigation Plans.

Thank you.

ATTACHMENTS

1. Draft Town of Chapel Hill Hazard Mitigation Plan
2. Report to Council on May 13, 2002

AGENDA #4e

MEMORANDUM

TO: Mayor and Town Council

FROM: W. Calvin Horton, Town Manager

SUBJECT: Town of Chapel Hill Hazard Mitigation Plan Adoption

DATE: June 10, 2002

The attached resolution would adopt the Town of Chapel Hill Hazard Mitigation Plan as necessary for the Town to remain eligible for State and federal disaster relief funds.

BACKGROUND AND DISCUSSION

The draft Town of Chapel Hill Hazard Mitigation Plan was presented at a Public Hearing on May 13, 2002. There were no comments at that hearing.

A copy of the draft document was also submitted to the North Carolina Division of Emergency Management for review and comment. The only comments we received were from the North Carolina Division of Emergency Management, and these comments have been incorporated into the final document. The comments requested more detail concerning responsibility and for a scheduling of mitigation activities. These items were satisfactorily addressed as follows:

1. Comment: Identify each hazard that could potentially affect the community.

   Staff Response: "*Hail Storm" was added to Table 1, page 7.*

2. Comment: Assign local responsibility for each proposed mitigation activity initiative and establish target dates for their completion.

   Staff Response: *Section VIII., Mitigation Strategy, page 26, local responsibility has been listed at the Town Departmental level and Target Establishment Dates have been listed or addressed. The responsible departments listed under "existing programs" are those departments that are currently responsible for those programs and the target establishment dates either depend upon available resource ,are currently under Council consideration or June 2005. Listed under "new programs", the responsibility is listed at the departmental level and the target establishment date as resources become available or June 2005.*

   It is important to note that the target establishment date of June 2005 is just that, a "target", not a mandated deadline. A three year period was selected as a reasonable time-

frame to strengthen or establish programs, which also are dependant upon other factors, such as available resources.

3. Comment: Establish a regular schedule and develop the procedures to evaluate, update and enhance the Hazard Mitigation Plan.

   Staff Response: *Section IV. Plan Evaluation was added which notes that mitigation strategies should be reviewed and reassessed every 2 years or immediately following a natural disaster, whichever comes first.*

The proposed final version of the Town of Chapel Hill Hazard Mitigation Plan is presented tonight for adoption by the Town Council. The color maps provided in the draft document presented at the May 13 Public Hearing have not been changed, and only black-and-white copies of those maps are being provided tonight, because of reproduction costs.

Adoption of a Town of Chapel Hill Hazard Mitigation Plan is necessary for two primary reasons:

1) State law requires that local governments in North Carolina adopt an approved Hazard Mitigation Plan no later than August 1, 2002 in order to remain eligible for disaster relief funds.
2) By identifying and mitigating potential hazards, the Town could expect to reduce or eliminate some exposures and costs associated with disaster response and recovery.

In addition to allowing the Town to remain eligible for disaster relief funds, the proposed hazard mitigation plan would provide a planning document that describes potential hazards, vulnerabilities and mitigation activities to reduce short-term and long-term risks to life and property. Hazard mitigation planning is an essential part of creating and maintaining a sustainable community by meeting the needs of the present generation without compromising the ability of future generations to meet their needs.

As described in the May 13, 2002 report to Council, the Town of Chapel Hill has a history of weather related events that have resulted in significant hazards including property damage, commerce interruptions, reductions in public services, impacts on quality of life and expenses (both public and private) for recovery efforts.

The plan takes a comprehensive look at the Town's current programs, policies and regulations that are related to hazard mitigation, describes the effectiveness of that program or policy and offers additional/supplemental mitigation options for consideration. The plan suggests that mitigation efforts can be effectively improved by strengthening current programs, policies and regulations in addition to creating some new ones.

The Mitigation Strategies section of the plan describes actions the Town may wish to pursue if adequate funding opportunities become available, including disaster relief funds from the North Carolina Division of Emergency Management (NCDEM) and the Federal Emergency Management Agency (FEMA).

CONCLUSION

The hazard mitigation plan for Chapel Hill is required by law for the Town to remain eligible to receive State and Federal disaster relief funds and provides a dynamic planning document that identifies hazards, vulnerabilities and mitigation activities to reduce short-term and long-term risks to human life and property.

MANAGER'S RECOMMENDATION

That the Council adopt the attached resolution establishing a Town of Chapel Hill Hazard Mitigation Plan as endorsed by the North Carolina Division of Emergency Management.

ATTACHMENTS

1.) Town of Chapel Hill Hazard Mitigation Plan (begin new page 1).
2.) Letter of plan approval from the NC Division of Emergency Management (p. 41).

A RESOLUTION ESTABLISHING A TOWN OF CHAPEL HILL HAZARD MITIGATION PLAN AS REQUIRED BY STATE SENATE BILL 300 IN ORDER TO REMAIN ELIGIBLE FOR STATE AND FEDERAL DISASTER RELIEF FUNDING (2002-06-10/R-5)

WHEREAS, the Town Council desires to remain eligible for State and federal disaster relief funds in the event of a declared disaster in Chapel Hill; and

WHEREAS, the Council recognizes the value of having a plan in place for identifying, prioritizing, and mitigating potential and real hazards that could affect Chapel Hill; and

WHEREAS, the Town has prepared a Hazard Mitigation Plan and has revised the Plan as suggested by the North Carolina Division of Emergency Management following its presentation at a Public Hearing on May 13, 2002 and its submittal to the State and to Town Departments for review and comment; and

WHEREAS, the North Carolina Division of Emergency Management has endorsed the proposed Town of Chapel Hill Hazard Mitigation Plan.

NOW, THEREFORE, BE IT RESOLVED by the Council of the Town of Chapel Hill that the Council herewith adopts the Town of Chapel Hill Hazard Mitigation Plan as presented on June 10, 2002.

BE IT FURTHER RESOLVED that the Council directs the Manager to periodically review and to present for Council approval proposed revisions to the Plan as new data and information become available, as mitigation measures are achieved, and as mitigation strategies evolve.

This the 10th day of June, 2002.

EXCERPT FROM JUNE 10, 2002 TOWN COUNCIL BUSINESS MEETING MINUTES

A RESOLUTION ADOPTING VARIOUS RESOLUTIONS AND ORDINANCES (2002-06-10/R-1)

BE IT RESOLVED by the Council of the Town of Chapel Hill that the Council hereby adopts the following resolutions and ordinances as submitted by the Town Manager in regard to the following:

a. Nominations to Bicycle and Pedestrian Advisory Board, Board of Adjustment, Housing and Community Development Advisory Board, Human Services Advisory Board, Personnel Appeals Committee, and the Planning Board (R-2).

b. Donation of Property by Duke Energy Company (R-3).

c. Regulation of Newspaper Racks in the 100 Block of East Franklin Street (O-1).

e. Town of Chapel Hill Hazard Mitigation Plan (R-5).

h. Orange County HOME Consortium Agreement (R-8).

i. Tentatively Scheduling a Council Meeting on July 26, if necessary, to Adopt a Final Budget for 2002-03 (R-9).

This the 10th day of June, 2002.

A RESOLUTION ESTABLISHING A TOWN OF CHAPEL HILL HAZARD MITIGATION PLAN AS REQUIRED BY STATE SENATE BILL 300 IN ORDER TO REMAIN ELIGIBLE FOR STATE AND FEDERAL DISASTER RELIEF FUNDING (2002-06-10/R-5)

WHEREAS, the Town Council desires to remain eligible for State and federal disaster relief funds in the event of a declared disaster in Chapel Hill; and

WHEREAS, the Council recognizes the value of having a plan in place for identifying, prioritizing, and mitigating potential and real hazards that could affect Chapel Hill; and

WHEREAS, the Town has prepared a Hazard Mitigation Plan and has revised the Plan as suggested by the North Carolina Division of Emergency Management following its presentation at a Public Hearing on May 13, 2002 and its submittal to the State and to Town Departments for review and comment; and

WHEREAS, the North Carolina Division of Emergency Management has endorsed the proposed Town of Chapel Hill Hazard Mitigation Plan;

NOW, THEREFORE, BE IT RESOLVED by the Council of the Town of Chapel Hill that the Council herewith adopts the Town of Chapel Hill Hazard Mitigation Plan as presented on June 10, 2002.

BE IT FURTHER RESOLVED that the Council directs the Manager to periodically review and to present for Council approval proposed revisions to the Plan as new data and information become available, as mitigation measures are achieved, and as mitigation strategies evolve.

This the 10th day of June, 2002.

AGENDA #6c

MEMORANDUM

TO: Mayor and Town Council

FROM: W. Calvin Horton, Town Manager

SUBJECT: An Ordinance Establishing a Stormwater Management Utility and a Stormwater Management Utility Advisory Board

DATE: June 14, 2004

The attached ordinance would establish a Stormwater Management Utility, set an equivalent rate unit fee of $39 per 2,000 square feet of impervious surface area, and provide for appointment of a Stormwater Management Utility Advisory Board for the Town of Chapel Hill.

The Manager recommends enactment of the Ordinance.

BACKGROUND AND DISCUSSION

As part of its budget deliberations in past months, the Council has discussed and received public comment on the proposed establishment of a Stormwater Management Utility intended to provide the Town with a mechanism to fund and support the management of stormwater within the Town's corporate limits.

Key elements of the proposed stormwater management program are:

- Implement stormwater management activities necessary for compliance with existing and new State and federal regulations
- Develop a master plan in year one intended to identify and schedule program activities in future years
- Continue and enhance stormwater management services currently being provided by the Town
- Provide stable and sufficient funding for capital improvements and drainage assistance projects
- Provide an emergency reserve fund
- Reimburse the Town's General Fund for Utility development costs
- Identify existing General Fund costs that should be billed to the Utility
- Establish broad-based public education and information activities to maximize community involvement in managing stormwater
- Authorize minimal increases in Town staff to support the Utility program, with emphasis on using contract services
- Establish an Equivalent Rate Unit (ERU) of 2000 square feet of impervious surface area and an annual Utility fee of $39.00 per ERU
- Authorize an annual program budget of $1,760,000 in the first year.

The first year of the proposed program would focus on the following key elements:

- A stormwater management program master plan would be developed to identify program activities in future years, and to establish an implementation schedule including associated resource needs and costs.

- A comprehensive public education and participation plan would be developed to provide outreach services.

- Existing stormwater management services would be continued and required new services would be provided.

- A portion of the utility revenue would be reserved to establish a capital improvements project fund account (approximately $50,000 in the first year).

- A portion of the utility revenue would be used to reimburse the General Fund for all costs associated with the development and establishment of the Utility ($402,000 one time charge).

- The utility would be charged for costs incurred by the Town for providing stormwater management services (approximately $576,000 in the first year).

- A fee rate of $39.00 per Equivalent Rate Unit (ERU) per year would be implemented, based on an ERU area of 2000 square feet. The first ERU would include 200-2000 square feet of impervious surface area, and there would be no cap on the number of ERUs per property.

- The Utility rate base would not include assessment of fees for public streets and/or other public access ways owned and maintained by the Town or by the North Carolina Department of Transportation.

- Property owned by the University would not be included in making the initial estimate of total Equivalent Rate Units. It is our understanding of the law that the University would be subject to the Town's utility ordinance, including payment of applicable fees. However, the University has a different understanding of the relevant law. Therefore, the Manager recommends that the Utility proceed without including any revenue from the University in the first-year revenue estimate and that negotiations to resolve this issue be initiated.

- A stormwater management credit system would be explored during the first year of the program, and the Manager would provide recommendations for the Council's consideration regarding the issue of allowing credits.

To accomplish the above objectives, the first year of the proposed stormwater management program would involve primarily organizational, planning, and public information/participation

activities. New services would be limited to those mandated by State and federal regulations involving, for the most part, implementation of the Town's National Pollutant Discharge Elimination System, Phase Two (NPDES-II) permit requirements.

ORDINANCE CONSIDERATIONS

Under North Carolina General Statute 160A-314(a1)(1), before the Council establishes a schedule of rates, fees, charges or penalties for a stormwater management program it is required to hold an advertised Public Hearing on the matter. The Council held a Public Hearing on the proposed Stormwater Management Utility ordinance on May 12, 2004.

The proposed ordinance would establish a Town Stormwater Management Utility and a Stormwater Management Utility Advisory Board. The proposed ordinance calls for an annual stormwater management fee of $39.00 per equivalent rate unit (ERU), which is set at two thousand square feet of impervious surface area or fraction thereof. This fee would apply to all zoning lots and tracts within the corporate limits of the Town except lots and tracts with fewer than 200 square feet of impervious surface area.

The proposed ordinance also includes a penalty schedule consistent with the schedule for interest charged by Orange County and Durham County for delinquent taxes, 2% for the month of January and ¾% for each month thereafter.

MANAGER'S RECOMMENDATION

The Manager recommends enactment of the attached ordinance that would establish a Stormwater Management Utility, set an equivalent rate unit fee of $39 per 2,000 square feet of impervious surface area, and provide for appointment of a Stormwater Management Utility Advisory Board for the Town of Chapel Hill.

If the Council enacts this ordinance, the Manager would proceed with the normal process for soliciting citizens interested in serving on Town advisory boards and would present the names and qualifications of applicants to the Council for its consideration in nominating and appointing members of the Stormwater Management Utility Advisory Board described in the ordinance.

AN ORDINANCE ESTABLISHING A STORMWATER MANAGEMENT UTILITY AND A STORMWATER MANAGEMENT UTILITY ADVISORY BOARD FOR THE TOWN OF CHAPEL HILL (2004-06-14/O-9)

BE IT ORDAINED by the Council of the Town of Chapel Hill as follows:

Section 1. Chapter 23, Article I of the Town Code is hereby revised to read as follows:

"ARTICLE I. STORMWATER MANAGEMENT UTILITY

Sec. 23-1. Findings.

The Council does hereby find that:

(a) North Carolina General Statute Chapter 160A, Article 16 authorizes the Town to acquire, construct, establish, enlarge, improve, maintain, own, operate, and contract for the operation of stormwater management programs designed to protect water quality by controlling the level of pollutants in, and the quantity and flow of, stormwater and structural and natural stormwater and drainage systems of all types.

(b) The establishment, by Town ordinance, of a Stormwater Management Utility that shall be accounted for as a separate enterprise fund and will facilitate the provision of a stormwater management program.

(c) North Carolina General Statute Sec. 160A-314 authorizes the Town of Chapel Hill to establish and revise from time to time a schedule of rates and charges to fund the stormwater management program activities including both structural and natural stormwater conveyance and drainage system services provided by the Stormwater Management Utility.

Sec. 23-2. Purpose.

This ordinance establishes a Stormwater Management Utility as an identified fiscal and accounting fund for the purpose of comprehensively addressing the stormwater management needs of the Town through programs designed to protect and manage water quality and quantity by controlling the level of pollutants in stormwater runoff, and the quantity and rate of stormwater received and conveyed by structural and natural stormwater and drainage systems of all types. It sets forth a schedule of charges and defines the control, collection, and disbursal of funds including penalties, appeals, exemptions and credits.

Sec. 23-3. Definitions.

For the purpose of this Article, the following words, terms, and phrases shall have the meanings given to them in this section, except where the context clearly indicates a different meaning:

Credits shall mean ongoing reductions in the stormwater management service charge applicable to a given zoning lot or tract in recognition of on-site or off-site systems, facilities, measures, and/or actions undertaken to reduce or mitigate the stormwater quantity and/or quality impact(s) of the zoning lot or tract that would otherwise impact the public stormwater management system. Credits shall be conditioned on the continuing performance of the mitigation systems, facilities, measures, or actions in reference to standards adopted by the Stormwater Management Utility, and may be revised or rescinded for cause. In no case shall credits exceed the amount of the stormwater management service charge. The means and measures for identifying, issuing and obtaining credits will be provided in a Credit Manual approved by the Town Council.

Developed land shall mean a zoning lot or tract altered from its natural state to include impervious surface area equal to or greater than 200 square feet.

Drainage system shall mean natural and structural channels, swales, ditches, swamps, rivers, streams, creeks, wetlands, branches, reservoirs, ponds, drainage ways, inlets, catch basins, gutters, pipes, culverts, bridges, head walls, storm sewers, lakes, and other physical works, properties, and improvements that transfer, control, convey or otherwise influence the movement of stormwater runoff.

Equivalent Rate Unit (ERU) shall mean two thousand (2,000) square feet of impervious surface or fraction thereof.

Impervious surface area shall mean developed areas of land that prevent or significantly impede the infiltration of stormwater into the soil. Typical impervious surface areas include, but are not limited to: roofs, sidewalks, walkways, patios, swimming pools, private driveways, parking lots, access extensions, alleys and other paved, engineered, compacted or gravel surfaces containing materials that prevent or significantly impede the natural infiltration of stormwater into the soil.

Natural state shall describe existing undeveloped land where the soil and vegetation characteristics that have not been substantially modified or disturbed by human activities and the hydrologic function is in an unaltered or natural condition.

Service area shall mean all land within the corporate limits of the Town, including all land areas legally annexed thereto.

Service charge shall mean a stormwater management service charge, applicable to a zoning lot or tract, that generally reflects the impact on or demand for stormwater management services provided by the Town to properly control and manage stormwater runoff quantity and/or quality associated with the zoning lot or tract. The service charge will vary from one zoning lot or tract to another, based on the impervious surface area.

Stormwater shall mean the runoff from precipitation that travels over natural state or developed land surfaces and enters a drainage system.

Stormwater management program shall mean an identified set of measures and activities designed to protect, restore and/or manage stormwater quality by controlling and/or reducing pollutants and; to reduce and/or manage stormwater quantity by controlling velocity, volume, and rate.

Stormwater Management Utility shall mean an organizational structure that is responsible for funding, administering, and operating the Town's stormwater management program, and that is supported through a rate structure based on the impervious surface area found on zoning lots or tracts located within the service area.

Tract shall mean a parcel of land not previously recorded as a zoning lot.

Undeveloped land shall mean all land that is not altered from its natural state to an extent that results in 200 or more square feet of impervious surface area.

Zoning lot shall mean a legally subdivided lot (not a tract) shown on a legally recorded plat or deed, or a combination of such legally subdivided and recorded adjacent lots.

Sec. 23-4. Establishment of a Stormwater Management Utility and Stormwater Management Enterprise Fund.

(a) There is hereby established a Town Stormwater Management Utility that shall be responsible for implementing, operating, and administering the Town's stormwater management program as defined herein.

(b) There is hereby established a Town Stormwater Management Enterprise Fund for the purpose of dedicating and protecting funding applicable to the responsibilities of the Stormwater Management Utility including but not limited to, rents, rates, fees, charges, and penalties as may be established, after due notice and a public hearing by the Town Council. Funding may also include other funds transferred or allocated to the Stormwater Management Utility by the Town Council. All revenues and receipts of the Stormwater Management Utility shall be placed in the Stormwater Management Enterprise Fund and all expenses of the utility shall be paid from the Stormwater Management Enterprise Fund, except that other revenues, receipts, and resources not accounted for in the Stormwater Management Enterprise Fund may be applied to stormwater management activities as deemed appropriate by the Town Council.

Sec. 23-5. Jurisdiction.

The jurisdiction (service area) of the Stormwater Management Utility shall extend to the corporate limits of the Town, including all areas legally annexed thereto.

Sec. 23-6. Impervious Service Area and Equivalent Rate Unit.

(a) *Impervious surface area* on a given zoning lot or tract directly relates to the volume, rate and pollutant loading of stormwater runoff discharged from that zoning lot or tract to the Town's structural and natural drainage systems and facilities. Therefore, impervious surface area shall be the primary parameter for establishing a rate structure to distribute the cost of services

associated with the operation, repair, improvement and maintenance of public drainage systems and facilities through a schedule of rates, fees, charges, and penalties related to the operation of a Stormwater Management Utility and Stormwater Management Enterprise Fund as established in Section 23.4.

(b) Based on an analysis by the Town of impervious surface area on properties throughout the Town, an impervious surface area of 2,000 square feet shall be designated as one (1) *Equivalent Rate Unit (ERU)*

Sec. 23-7. Schedule of Fees and Charges.

(a) The schedule of fees and charges set out in this section is hereby adopted and shall apply to all zoning lots and tracts within the corporate limits of the Town, except as may be altered by credits or exemptions provided in this Article.

(1) All zoning lots and tracts of land within the corporate limits of the Town, shall be billed for one (1) Equivalent Rate Unit for each 2,000 square feet or fraction thereof of impervious surface area on the subject zoning lot or tract.

(2) The annual service charge per Equivalent Rate Unit shall be $39.00 per year.

(b) There will be no service charge for zoning lots or tracts with fewer than 200 square feet of impervious surface area.

Sec. 23-8 Billing and Collection

(a) *Method of billing.* Billing and collection of the Stormwater Management Utility service charges and any other rents, rates, fees, charges, and penalties for stormwater management services and facilities shall be administered by the Town Manager.

(b) *Delinquencies.* Stormwater Management Utility service charge billings or other billings for rents, rates, fees, charges, and penalties associated with the Stormwater Management Utility shall be declared delinquent if not paid on or before January 5 of the following year that billings are issued. Delinquent billings shall accumulate additional penalties at the rate of 2% for the month of January, and ¾ if 1% for each month thereafter. This penalty shall be termed a delinquent payment penalty charge.

(c) *Appeal of disputed bills and adjustments*. If any citizen wishes to dispute a stormwater utility service charge billing or any other rents, rates, fees, charges, or penalties adopted pursuant to this Article, that citizen must submit a written appeal within 60 days of receipt of the billing, stating the reasons for the appeal, and providing information pertinent to the calculation of the billed charge. A timely appeal shall stay the penalty deadlines. An appeal of a disputed bill shall be filed with the Town's stormwater manager for review and disposition. If the citizen is not satisfied with the disposition of the appeal, the citizen may further appeal the disputed charge to the Town Manager or his designee who shall make the final ruling on the validity of the appeal.

(d) *Collection of delinquencies:* The administrative remedies provided in this chapter shall be exhausted before recourse to a court of competent jurisdiction.

Sec. 23-9. Disposition of Service Charges and Fees.

Stormwater Management Utility service charge and fee revenues shall be assigned and dedicated solely to the Stormwater Management Enterprise Fund in the Town budget and accounting system, which shall be and remain separate from other funds, and shall be used only to fund identified stormwater management program activities. The services charges and fees paid to and collected by virtue of the provision of this Article shall not be used for general or other governmental or proprietary purposes of the Town, except to pay for costs incurred by the Town in rendering services associated with the Stormwater Management Utility.

Sec. 23-10. Credits and Exemptions.

(a) *Credits.* Credits against stormwater management utility service charges are an appropriate means of adjusting fees, rates, rentals, charges, fines, and penalties, under some circumstances, to account for applicable mitigation measures. Credit mechanisms may be established by the Town Council and, if established, the means and measures for identifying, issuing and obtaining credits will be provided in a Credit Manual approved by the Town Council. No exception, credit, offset, or other reduction in stormwater management service charges shall be granted based on age, race, tax status, economic status, or religion of the customer, or other condition unrelated to the demand for and cost of services provided by the Stormwater Management Utility.

(b) *Exemptions.* Except as provided in this Article, no public or private property shall be exempt from Stormwater Management Utility service charges, with the following exceptions:

(1) Public road rights-of-way that have been conveyed to and accepted for maintenance by the North Carolina Department of Transportation, and that are available for use by the general public for transportation purposes, shall be exempt from Town Stormwater Management Utility service charges.

(2) Public road rights-of-way that have been conveyed to and accepted for maintenance by the Town of Chapel Hill, and that are available for use by the general pubic for transportation purposes, shall be exempt from Town Stormwater Management Utility service charges.

(3) Railroad rights-of-way used for trackage and related appurtenances shall be exempt from Town Stormwater Management Utility service charges.

Sec. 23-11. Establishment of a Stormwater Management Utility Advisory Board.

A Town of Chapel Hill Stormwater Management Utility Advisory Board is hereby established.

Sec. 23-12. Membership Qualifications and Terms.

The Stormwater Management Utility Advisory Board shall consist of nine (9) members appointed by the Town Council. All appointees shall reside within the corporate limits of the Town of Chapel Hill during their terms of service. Board representation shall include three members who are single-family residential property owners, five members who are owners or employees of companies owning property used for multi-family, business, commercial, or non-profit purposes, and one member employed by the University of North Carolina at Chapel Hill.

The terms of board members shall be a maximum of three (3) years. The terms of the original members may be staggered so that all terms do not expire simultaneously. Vacancies shall be filled only for the remainder of the unexpired term of the vacant position. Members of the Board shall demonstrate interest in support for the efficiency, effectiveness, goals and mission of the Town's Stormwater Management Program. Board members shall serve without compensation, but may be reimbursed for actual expenses incidental to the performance of their duties within the limit of funds available to the Board and identified by the Town Council for such purposes.

Sec. 23-13. Officers.

The Board shall elect one member to serve as Chair and to preside over its meetings, and shall create and fill such offices and committees as it may deem necessary. The term of the Chair and other officers shall be one (1) year, with eligibility for re-election to a second term. The Chair or any member acting as Chair is authorized to administer oaths to witnesses coming before the Board.

Sec. 23-14. Charge and Responsibilities of the Board.

The Stormwater Management Utility Advisory Board is herewith charged with the following responsibilities:

(a) Provide recommendations regarding the identification and implementation of new stormwater management program activities.

(b) Review and provide recommendations on the Stormwater Management Program Master Plan.

(c) Provide recommendations concerning gaps or inconsistencies in Town stormwater management services, facilities, programs, policies, and regulations and recommend improvement alternatives.

(d) Provide recommendations for priorities and scheduling of watershed master planning and development of drainage basin plans.

(e) Assist Town staff in working with stakeholder groups to implement program objectives and activities.

(f) Assist Town staff with public education and outreach activities that promote the Town's Stormwater Management Program.

(g) Assist Town staff in meeting the mission and achieving the identified goals and objectives of the Town's Stormwater Management Program.

(h) Provide recommendations for internal program evaluation and reporting mechanisms, and assist Town staff in periodically reporting to the Town Council on program effectiveness.

Sec. 23-15. Meetings.

The Board shall establish a regular meeting schedule and shall meet at least quarterly.

All Board meetings shall be open to the public, and reasonable notice of the time and place thereof shall be given in accordance with Chapter 143, Article 33C of the North Carolina General Statutes.

The Board shall keep a record of its meetings, including attendance of its members, and its resolutions, findings, recommendations, and actions.

Sec. 23-16. Meeting Attendance.

Any member of the Board who misses more than three (3) consecutive meetings shall lose his or her status as a member of the Board, and shall be replaced or reappointed by the Council. Absence due to sickness, death, or other emergencies of like nature shall be recognized as excused absences, and shall not affect the member's status on the Board, except that in the event of a long illness or other such cause for prolonged absence, the member shall be replaced.

Sec. 23-17. Quorum and Voting.

A quorum and simple majority of the Board shall consist of five (5) members. The vote of a simple majority shall be necessary to take any official Board action.

Section 2. This ordinance supersedes all Town ordinances or parts of ordinances in conflict herewith.

Section 3. Any part or provision of this ordinance found by a court of competent jurisdiction to be in violation of the Constitution or laws of the United States or of the State of North Carolina is hereby deemed severable and shall not affect the validity of the remaining provisions of the ordinance.

Section 4. This ordinance shall become effective upon its enactment.

This the 14th day of June, 2004.

AGENDA #4a

MEMORANDUM

TO: Mayor and Town Council

FROM: W. Calvin Horton, Town Manager

SUBJECT: Calling a Public Hearing on November 22, 2004 Regarding the Town of Chapel Hill Hazard Mitigation Plan 2004.

DATE: November 8, 2004

The attached resolution would call a Public Hearing on November 22, 2004, regarding the Town of Chapel Hill Hazard Mitigation Plan 2004.

BACKGROUND AND DISCUSSION

North Carolina Senate Bill 300 requires that all communities in North Carolina adopt a local Hazard Mitigation Plan. In response to this legislation, the Town of Chapel Hill prepared a Hazard Mitigation Plan and presented it for review and comment at a Public Hearing on May, 13, 2002. No comments were received at Hearing. Subsequently, the Town of Chapel Hill Hazard Mitigation Plan was adopted by the Council on June 10, 2002. The Town's Plan was submitted to and accepted by the North Carolina Department of Emergency Management in accordance with the requirements of the legislation.

Since adoption of the Town's first Hazard Mitigation Plan in 2002, revisions and new requirements for local plans have been promulgated by the Federal government as part of the Disaster Mitigation Act of 2000. These requirements include more detailed mapping, expanded stakeholder participation, and new and more detailed criteria regarding hazard identification, community vulnerability, hazard mitigation means and measures, local application(s), and up-dating procedures.

Prior to Council adoption of a revised Hazard Mitigation Plan and submittal to the State for approval, the Town is required to hold a Public Hearing to receive public comment on the Plan.

If the Council adopts the attached resolution calling a Public Hearing on November 22, 2004, to receive comments on the Town of Chapel Hill Hazard Mitigation Plan 2004, Town staff would place ads in local newspapers announcing the Hearing. We would also place drafts of the proposed Plan for public review on the Town's web site at http://townhall.townofchapelhill.org/stormwater/docs/hazard_mitigation_plan_2004.pdf, in the Town Library, and in the Engineering Department and Clerk's Office at Town Hall.

NEXT STEPS

If a Public Hearing on the Town of Chapel Hill Hazard Mitigation Plan 2004 is held on November 22, 2004, we will include an action item on the regular Council meeting agenda that same night requesting that the Council adopt the Pan and directing the Manager to forward it to Federal Emergency Management Agency and to the State so that the Town can remain eligible for disaster relief funds.

MANAGER'S RECOMMENDATION

That the Council adopt the following resolution calling a Public Hearing on November 22, 2004, to receive comments on the Town of Chapel Hill Hazard Mitigation Plan 2004 and directing the Town Manager to publish the required notices and to place drafts of the Plan on the Town website, in the Town Library, and in the Engineering Department and Clerk's Office at Town Hall.

A RESOLUTION CALLING A PUBLIC HEARING ON THE TOWN OF CHAPEL HILL HAZARD MITIGATION PLAN 2004 (2004-11-08/R-3)

WHEREAS, the Council of the Town of Chapel Hill desires to remain eligible for State and Federal disaster relief and mitigation funds in the event of a declared disaster within or including the Town of Chapel Hill; and

WHEREAS, the Council recognizes the value of having a plan in place for identifying, prioritizing, and mitigating potential and real hazards that would affect Chapel Hill and its residents in the event of a disaster; and

WHEREAS, the Council adopted a Hazard Mitigation Plan in 2002 in accordance with the requirements of North Carolina Senate Bill 300; and

WHEREAS, revisions to the Town's currently adopted Hazard Mitigation Plan are necessary in response to Federally mandated requirements of the Disaster Mitigation Act of 2000; and

WHEREAS, in order to remain eligible for State and Federal disaster relief and mitigation funds, local governments must adopt a hazard mitigation plan that complies with the currently mandated requirements and the plan must be accepted by the Federal Emergency Management Agency; and

WHEREAS, prior to adoption by a local government, a Public Hearing must be held on a new or substantially revised Hazard Mitigation Plan;

NOW, THEREFORE, BE IT RESOLVED by the Council of the Town of Chapel Hill that the Council calls a Public Hearing at 7:00 p.m. on Monday, November 22, 2004, in the Council Chamber at Town Hall, 306 N. Columbia Street, Chapel Hill, North Carolina to receive public comment on the *Town of Chapel Hill Hazard Mitigation Plan 2004.*

This is the 8th day of November, 2004.

Placeholder for Report to Council: Public Hearing
for Revised Hazard Mitigation Plan
Pages 112 - 115

Placeholder for Minutes of Public Hearing for
Revised Hazard Mitigation Plan
Pages 116 - 118

APPENDIX E:
Supporting Mitigation Documents

North Carolina Department of Crime Control and Public Safety
Division of Emergency Management

Michael F. Easley., Governor | Bryan E. Beatty, Secretary

May 29, 2002

Fred Royal, Stormwater Management Engineer
Town of Chapel Hill
306 N. Columbia St
Chapel Hill, NC 27516

Re: Hazard Mitigation Plan

Dear Mr. Royal:

The Division's Mitigation Planning Branch has received a revised copy of the Town of Chapel Hill Hazard Mitigation Plan. Staff has reviewed the document and agrees that Chapel Hill's plan is within full compliance with the North Carolina Division of Emergency Management's minimum criteria for hazard mitigation plans.

Please note that when FEMA's final criteria are determined additional information may be required. As soon as we know FEMA's final interpretation of these rules we will notify you of any issues that need to be addressed.

We hope that the processes involved in preparing this mitigation plan have helped your community develop a better understanding of the unique risks your county faces, as well as enabled you to develop strategies that will help reduce the potential for future loss of life and property within your community.

Congratulations on a job well done.

Sincerely,

Jay Sikes,
Hazard Mitigation Planner
Risk Assessment and Planning Branch

FIRST

MAILING ADDRESS:
4713 Mail Service Center
Raleigh, NC 27699-4713
Telephone: (919) 733-3867

OFFICE LOCATION:
1830-B Tillery Place
Raleigh, NC 27604

FEDERAL EMERGENCY MANAGEMENT AGENCY

COOPERATING TECHNICAL PARTNERS

MEMORANDUM OF AGREEMENT

AGREEMENT is hereby made on September 19, 2002, by these parties: the Towns of Chapel Hill and Carrboro, North Carolina, *the State of North Carolina* and the Federal Emergency Management Agency (FEMA).

BECAUSE the National Flood Insurance Program (NFIP) established by the National Flood Insurance Act of 1968 has several purposes, the most significant being

- To better indemnify individuals from losses through the availability of flood insurance;
- To reduce future flood damages through community floodplain management regulations; and
- To reduce costs for disaster assistance and flood control.

BECAUSE a critical component of this program is the identification and mapping of the nation's floodplains to create a broad-based awareness of the flood hazard and to provide the data necessary for community floodplain management programs and to actuarially rate flood insurance;

BECAUSE the Federal Emergency Management Agency (FEMA) administers the National Flood Insurance Program (NFIP) and is authorized by §1360 of the National Flood Insurance Act of 1968, as amended (42 U.S.C. 4101), to establish and update flood-risk zone data in floodplain areas. Further, in the identification of flood-prone areas, FEMA is authorized to consult with, receive information from, and enter into agreements or other arrangements with the head of any State, regional, or local agency in order to identify these floodplain areas;

BECAUSE FEMA encourages strong Federal, State, regional, and local partnerships for the purposes of reducing flood losses and disaster assistance; and FEMA and its State, regional, and local partners have determined that it is advantageous to encourage and formalize greater cooperation in the flood hazard identification and mapping processes; and many communities and the agencies that serve them have developed considerable technical capabilities and resources that provide the opportunity to improve and expand the collection, development, and evaluation of flood hazard data; and

BECAUSE the Towns of Chapel Hill and Carrboro, North Carolina participate in the NFIP *(or shares flood protection and/or floodplain management responsibilities with communities that participate in the NFIP)*, the Towns of Chapel Hill and Carrboro, North Carolina have been deemed by FEMA to be in good standing in the NFIP; and

BECAUSE the Towns of Chapel Hill and Carrboro, North Carolina have expressed a desire to perform certain functions in the flood hazard identification process and has provided evidence that it has sufficient technical capability and will dedicate the resources necessary to perform those functions; and

BECAUSE the Towns of Chapel Hill and Carrboro, North Carolina are located in the State of North Carolina, which has joined the Cooperating Technical Partners Program as a Cooperating Technical State.

NOW THEREFORE, it is mutually agreed that the parties enter into this agreement to work together to create and maintain accurate, up-to-date flood hazard data for the Towns of Chapel Hill and Carrboro, North Carolina *(or communities served by* the Towns of Chapel Hill and Carrboro, North Carolina*)* subject to the terms and conditions recited below.

1. CONSULTATIONS

The Towns of Chapel Hill and Carrboro, North Carolina shall work through the State of North Carolina with FEMA to collaborate on flood hazard identification activities and all parties shall consult with each other to fully integrate each other's contributions into flood hazard identification efforts. Questions regarding the execution of the agreement will be resolved by an implementation committee consisting of a FEMA representative, a North Carolina representative and the Towns of Chapel Hill and Carrboro, North Carolina representative. If this committee is unable to resolve technical issues the resolution may be accomplished through alternative dispute resolution procedures.

2. EVALUATION AND REPORTING

The parties shall annually review the partnership created by the agreement to determine and document the activities undertaken to maintain accurate flood hazard data, and to revise the agreement as necessary.

3. RESOURCE COMMITMENT

The parties agree to commit the appropriate human, technical, and available financial resources sufficient to coordinate effectively with all entities impacted by flood hazard identification efforts to implement this agreement.

4. STANDARDS

Unless otherwise agreed to by the parties, all flood hazard identification activities will be accomplished in accordance with the standards documented in *Guidelines and Specifications for Flood Hazard Mapping Partners*, dated February 2002, and all subsequent revisions.

5. SPECIFIC INITIATIVES

Specific data sharing initiatives or projects to be performed will be attached to this agreement in the form of appendices. The parties will be obligated to perform as described in these appendices.

6. TERM

The respective duties, responsibilities and commitments of the parties in this agreement shall begin on the date this Agreement is signed by the parties and may be periodically renewed, revised, or terminated at the option of any of the parties. The parties agree that a 60-day notice shall be given prior to the termination of this agreement.

THEREFORE, each party has caused this Agreement to be executed by its duly authorized representatives on the date mentioned above.

W. Calvin Horton, Manager
Town of Chapel Hill

8/28/02
Date

Mike Nelson, Mayor
Town of Carrboro

8-28-2002
Date

A. Todd Davison, FI&M Division Director
Federal Emergency Management Agency

9/9/02
Date

John Dorman, Director
North Carolina Floodplain Mapping Program

8/29/02
Date

TOWN OF CARRBORO

NORTH CAROLINA

The following resolution was introduced by Alderman Joal Hall Broun and duly seconded by Alderman Alex Zaffron.

A RESOLUTION AUTHORIZING THE MAYOR TO EXECUTE
A MEMORANDUM OF AGREEMENT WITH
THE FEDERAL EMERGENCY MANAGEMENT AGENCY
AND THE STATE OF NORTH CAROLINA
AS A COOPERATING TECHNICAL PARTNER
Resolution No. 179/2000-01

WHEREAS, the Federal Emergency Management Agency has offered both Chapel Hill and Carrboro an opportunity to participate in the Cooperating Technical Partners program;

WHEREAS, the State of North Carolina is in the process of re-mapping flood hazard areas throughout the state;

WHEREAS, the State of North Carolina is a party to the agreement;

WHEREAS, Carrboro and its floodplain management program stands to benefit through cooperative efforts with federal, state, and local technical partnerships.

NOW, THEREFORE, BE IT RESOLVED that the Carrboro Board of Aldermen hereby authorizes the Mayor to sign the Federal Emergency Management Agency Cooperating Technical Partners Memorandum of Agreement.

The foregoing resolution having been submitted to a vote, received the following vote and was duly adopted this 26th day of June, 2001:

Ayes: Joal Hall Broun, Mark Dorosin, Jacquelyn Gist, Diana McDuffee, Michael Nelson, Allen Spalt, Alex Zaffron

Noes: None

Absent or Excused: None

I, Sarah C. Williamson, Town Clerk of the Town of Carrboro, do hereby certify that the foregoing is a true and correct copy of a resolution adopted by the Carrboro Board of Aldermen on June 26, 2001.

TOWN OF CARRBORO INCORPORATED 1911 NORTH CAROLINA

Sarah C. Williamson
Town Clerk

301 WEST MAIN STREET, CARRBORO, NC 27510 • (919) 942-8541 • FAX (919) 968-7737 • TDD (919) 968-7717
AN EQUAL OPPORTUNITY EMPLOYER

I, Joyce A. Smith, CMC, Town Clerk of the Town of Chapel Hill, North Carolina, hereby certify that the attached is a true and correct copy of Resolution 2001-07-02/R-4, adopted by the Town Council of the Town of Chapel Hill on July 2, 2001.

This the 11th day of July, 2001.

Joyce A. Smith, CMC
Town Clerk

A RESOLUTION AUTHORIZING THE MANAGER TO EXECUTE A MEMORANDUM OF AGREEMENT WITH THE FEDERAL EMERGENCY MANAGEMENT AGENCY AND THE NORTH CAROLINA DIVISION OF EMERGENCY MANAGEMENT REGARDING THE COOPERATING TECHNICAL PARTNERS PROGRAM (2001-07-02/R-4)

WHEREAS, the Federal Emergency Management Agency has prepared a Memorandum of Agreement offering the Town of Chapel Hill an opportunity to participate in the Cooperating Technical Partners Program; and

WHEREAS, the State of North Carolina is in the process of re-mapping flood hazard areas throughout the State and would be a party to said Agreement; and

WHEREAS, both the Chapel Hill Floodplain Management Program and the Federal Emergency Management Agency would benefit from a partnership between federal, State, and local regulators;

NOW, THEREFORE, BE IT RESOLVED by the Council of the Town of Chapel Hill that the Council authorizes the Manager to execute on behalf of the Town a Federal Emergency Management Agency Cooperating Technical Partners Memorandum of Agreement.

This the 2nd day of July, 2001.

APPLICATION FOR FEDERAL ASSISTANCE

OMB Approval No. 0348-0043

	2. DATE SUBMITTED	Applicant Identifier
1. TYPE OF SUBMISSION: Application: [x] **Construction** [ ] **Non-Construction**; Preapplication: [ ] **Construction** [ ] **Non-Construction**	**3. DATE RECEIVED BY STATE** **8/28/03**	State Application Identifier **1448-0270**
	4. DATE RECEIVED BY FEDERAL AGENCY	Federal Identifier

5. APPLICANT INFORMATION

Legal Name: **Town of Chapel Hill**	Organizational Unit: **Engineering**
Address *(give city, county, State, and zip code):* 306 North Columbia Stree, Chapel Hill, Orange County, NC 27516	Name and telephone number of person to be contacted on matters involving this application *(give area code)* **George Small, Director of Engineering** **919-968-2833**

6. EMPLOYER IDENTIFICATION NUMBER *(EIN):* 56-6001199

7. TYPE OF APPLICANT: *(enter appropriate letter in box)* [C]

A. State; B. County; C. Municipal; D. Township; E. Interstate; F. Intermunicipal; G. Special District; H. Independent School Dist.; I. State Controlled Institution of Higher Learning; J. Private University; K. Indian Tribe; L. Individual; M. Profit Organization; N. Other (Specify) _____

8. TYPE OF APPLICATION: [X] **New** [ ] **Continuation** [ ] **Revision**

If Revision, enter appropriate letter(s) in box(es) [ ] [ ]

A. Increase Award; B. Decrease Award; C. Increase Duration; D. Decrease Duration; Other *(specify):*

9. NAME OF FEDERAL AGENCY:

Federal Emergency Management Agency

10. CATALOG OF FEDERAL DOMESTIC ASSISTANCE NUMBER: 97.039

TITLE: **Hazard Mitigation Grant Program**

11. DESCRIPTIVE TITLE OF APPLICANT'S PROJECT:

Acquisition and demolition of 2 12-unit condomiums within the floodway

12. AREAS AFFECTED BY PROJECT *(Cities, Counties, States, etc.):*

Camelot Village, Chapel Hill, NC

13. PROPOSED PROJECT:		**14. CONGRESSIONAL DISTRICTS OF:**	
Start Date	Ending Date	a. Applicant	b. Project
October 2004	**October 2006**	**4th**	**4th**

15. ESTIMATED FUNDING:

a. Federal	$ 1078500 .00	
b. Applicant	$ .00	
c. State	$ 359500 .00	
d. Local	$ .00	
e. Other	$ .00	
f. Program Income	$ .00	
g. TOTAL	$ **1,438,000.00** .00	

16. IS APPLICATION SUBJECT TO REVIEW BY STATE EXECUTIVE ORDER 12372 PROCESS?

a. YES. THIS PREAPPLICATION/APPLICATION WAS MADE AVAILABLE TO THE STATE EXECUTIVE ORDER 12372 PROCESS FOR REVIEW ON:

DATE: _____

b. No. [X] PROGRAM IS NOT COVERED BY E.O. 12372
[ ] OR PROGRAM HAS NOT BEEN SELECTED BY STATE FOR REVIEW

17. IS THE APPLICANT DELINQUENT ON ANY FEDERAL DEBT?

[ ] **Yes** **If "Yes," attach an explanation.** [X] **No**

18. TO THE BEST OF MY KNOWLEDGE AND BELIEF, ALL DATA IN THIS APPLICATION/PREAPPLICATION ARE TRUE AND CORRECT, THE DOCUMENT HAS BEEN DULY AUTHORIZED BY THE GOVERNING BODY OF THE APPLICANT AND THE APPLICANT WILL COMPLY WITH THE ATTACHED ASSURANCES IF THE ASSISTANCE IS AWARDED.

a. Type Name of Authorized Representative	b. Title	c. Telephone Number
George Small	**Director of Engineering**	**919-968-2833**
d. Signature of Authorized Representative		e. Date Signed

Previous Edition Usable
Authorized for Local Reproduction

Standard Form 424 (Rev. 7-97
Prescribed by OMB Circular A-102

Hazard Mitigation Survey

Name: Bosworth Department: Fire

Please give the following possible disasters a rank of low, medium, or high impact based on your experiences in Chapel Hill:

Flooding	high, it happens all the time
Hurricane	high, but medium frequency
Thunderstorm	medium impact
Tornado	low and low frequency
Severe Winter Storm	high, when they occur

What are some examples of recent events (within the past ten years) from each of the following categories? Please include descriptions of preparation activities, damages, clean-up activities, approximate staff hours expended, approximate costs incurred by the town, and any possible ways the effects of the hazard could have been lessened.

Flood
Flooding is mostly due to rainfall. To prepare they put additional equipment on trucks. They don't staff command pot. They notify neighborhoods, particularly near the mall. Only had one remove because they needed to, mostly just convenience removals. Now they just standby in the area and make sure there are no electrical shorts or EMS calls. Money spent is usually not an issue with floods. There's not a whole lot you can do in a flood. Disaster money spent is mostly by residents. Bosworth recommends that we need to fix the problem and spend whatever money it takes.

Hurricane
They staff up and open the Emergency Operations Center (EOC). Philosophy is to make sure they don't get themselves killed doing what is unnecessary. They have to hunker down at some point. Mostly know that hurricanes are coming. Damages are flooding, tornadoes, high winds, broken water mains, broken gas mains, etc. They usually send out blazers and fire trucks. They do a lot of work cutting paths into trees to get emergency service. The town has figures for Fran. Command post runs on emergency power.

Thunderstorm
They don't staff up. They watch for flooding and microbursts (little violent windstorms).

Tornado
Nothing they can do since they come up so quickly. Only open up EOC if 911 gets swamped. Planning is all in place. They can get people here in 30 minutes.

Severe Winter Storm
Put additional people on 4 wheel drive vehicles. Damage comes to power lines, EMS service. They send crews out to see how bad the damage is. All fire trucks come with insta-chains so that the crew doesn't have to get out and put chains on the tires.

What are the current hazard mitigation policies/programs that your department has in place? Please include document reference. How effective do you think these policies are and why?
Had enough situations to practice policies, so they are pretty good. Only thing they need is a communications tool to contact all departments. There are two different frequencies and way too much traffic.

What goals does your department have in terms of hazard mitigation?
Protect life, then property. Re-establish service as quickly as possible. Don't have tangible goals like Bell-South (10% of service returned every hour).

What are your recommendations for needed hazard mitigation policies/programs?
Nothing really. Biggest problem is coordination in the field.

Hazard Mitigation Survey

Bruce Hefflin
Public Works Director

Disaster impact rank on experience in Chapel Hill.

Flooding: low
Hurricane: medium
Thunderstorm: high
Tornado: medium
Severe Winter Storm: medium

Recent Events, etc.

Flood: There have been floods throughout the 1970s and 1980s, 1995 wiped out Bolin Greenway, Umstead Park, roads and bridges

Thunderstorm: Can happen at anytime. This year minimal impact. Some trees down and some damage to buildings.

Tornado: Never had a touch-down in Chapel Hill. Although, Hillsborough and Raleigh have been hit.

Severe Winter Storm: The biggest storm was in 2000. 1995-1996 there was a severe winter storm. Some ice storms in the 1980s. A few smaller scale ice storms.

Current hmp.

Plans are generally even specific built around common structure and response. The disaster response plan involves traffic control for flooding; contractor, in-house spreader trucks for winter storms

Goals dpt. has in terms of hm

Most flooding is just nuisance flooding. Large majority of pribate property prone to structural flooding. Streets not a big deal

Recommendations

Plans must be flexible. Monetary value of thunderstorm isn't much, but the frequency of clean-up is costly.

Bill Webster
Parks and Recs. Director

Disaster impact rank on experience in Chapel Hill.

Flooding: high
Hurricane: see flooding, every year big possibility
Thunderstorm: high, big storm last July
Tornado: haven't seen one in 20 years that I've been here
Severe Winter Storm: Moderate, can happen but not very often.

Recent Events, etc.

Flood: Flood biggest damage, no specific numbers. Trail and park damage. Close facilities. Basically shut-down

Hurricane: no info

Thunderstorm: Seen floods three times. July 2000 it flooded. Massive destruction to Eastgate and a 100 ft stretch between Franklin and Bolinwood on Bolin Trail.

Tornado: Never seen one. Mt. Olive had one 10-15 years ago. Hillsborough had one 5 years ago.

Severe Winter Storm: Ice storms are common. The town comes to a halt. Buildings and facilities open if it is reasonable. Some facilities serve as shelters.

Current hmp.
Affect rest of town but not parks and rec. Just don't open. Access drive affected. Some ideas to help mitigate flooding would be to upgrade, retrofit, take into account flooding and wind. Design buildings and bridges properly.

Goals dpt. has in terms of hm

Day-to-day hazard mitigation plans. Get rid of dead trees (public works job)

Recommendations

Practical policies. Reports often have a lot of fluff. Hazards can happen at anytime.
Goals: buildings on generators, replace unsafe roofs with ones that withstand hurricanes.

Additional info

Parks: historically Umstead Park loses ***$5,000*** worth of sand from playground area. Parking lot and bridges damaged.

Bolin Creek Trail: Had to install ***$100,000*** retaining wall because of storm. Loss of asphalt. ***$15,000*** to replace asphalt trail. Greenway trails are built too close to streams. Should use concrete cross-sections designed for floods and movement rather than asphalt.

Umstead Park: Would like to totally redesign. Pull away from stream. It costs too much money to fix. Should see where water is moving fast and design accordingly. Two of the pedestrian bridges should be demolished and properly designed.

APPENDIX F:
Town of Chapel Hill Major Emergency / Disaster Operations Plan

Draft: _____

Date: _____

TOWN OF CHAPEL HILL

DISASTER OPERATIONS PLAN

Purpose:

To establish an operating guideline for the management, response, and application of Town Governmental resources to a major community emergency or disaster with the objectives of protecting the safety and welfare of it's citizens, reducing or mitigating the loss of property, initiating requests to receive additional assistance from local, state and federal agencies and assisting the Community in returning to a non-emergency status.

Philosophy:

In order to meet those objectives, the Town agencies will manage major event and disaster operations under the following philosophies:

* Those operations that are intended to stop or reduce loss of life are paramount.
* Safety of Town employees will always be of prime consideration in directing operations.
* Recognition that some incidents may exceed the scope or resources of Town agencies to effectively mitigate and therefore lines of communication and cooperation to other local, County, State, and Federal agencies will be routinely maintained.
* A system of Emergency Management, Command, and Control that is compatible with that of our Triangle Region Municipal Mutual Aid partners, Orange County Emergency Management, State of North Carolina and the federal Emergency Management Agency will be utilized.
* A return to normal operations and day to day activities as soon as possible is important for the long term health of the affected agencies and the Community at large.
* A planned, controlled, comprehensive and rapid response to a major community emergency incident or disaster is the desired standard to be met.

The initial focus and strategies for the Command Team shall be:

1. Save lives
2. Prevent life loss or further injuries
3. Protect public health
4. Open access to all areas for relief operations
5. Restore utilities
6. Provide public information
7. Prevent further property loss

8. Reduce or halt environmental damage
9. Re-open all areas to public access

Incident Type

The Town of Chapel Hill, due to its size, location, demographics and history has the potential for the occurrence of a variety of major emergencies. For the purpose of this plan, those emergencies are categorized as follows: weather related; transportation; fires; special events; and other incident types

A chart of risk potential has been developed by the planning team

Condition	Category	Isolated Widespread Community Impact	Potential Fatalities	Potential For Property Damage	Exposure H-M-L	Frequency H-M-L
Weather Related	Severe Storms	W	YES	YES	HIGH	MEDIUM
	Tornado	W	YES	YES	HIGH	LOW
	Flooding	I	YES	YES	MEDIUM	MEDIUM
	Winter Storms	W	YES	YES	MEDIUM	MEDIUM
	Hurricane	W	YES	YES	LOW	MEDIUM
Transportation	Major Vehicle Accident	I	YES	YES	HIGH	LOW
	Aircraft Crash	I	YES	YES	MEDIUM	LOW
	Bridge Collapse	I	YES	YES	MEDIUM	LOW
	Hazardous Materials	W	YES	YES	MEDIUM	MEDIUM
	Train Accident	I	YES	YES	LOW	LOW
Fires	Major	I	YES	YES	HIGH	LOW
	Gas Line Rupture	I	YES	YES	MEDIUM	LOW
	Hazardous Materials	W	YES	YES	MEDIUM	MEDIUM
Special Events	Planned Event (Festivals)	W	YES	YES	HIGH	MEDIUM
	Spontaneous Gatherings	I	YES	YES	HIGH	MEDIUM
	Venue Related (Smith Center, etc.)	I	YES	YES	HIGH	LOW
Other Incident Types	Earthquake	W	YES	YES	LOW	LOW
	Civil Disturbance	W	YES	YES	MEDIUM	LOW
	Building Collapse	I	YES	YES	LOW	LOW
	Terrorism (Hostage, Sniper)	I	YES	YES	MEDIUM	LOW
	Explosion (Bombing)	I	YES	YES	MEDIUM	LOW
	Utilities Disruption	W			MEDIUM	LOW
	Illness Related	W	YES		LOW	LOW
	Multiple Hazards	Refer to Individual Categories Listed Above				

Isolated or Widespread Community Impact: I = Isolated; W = Widespread

Implementation of Operations

Notification and Authority:

Major emergencies or disasters may be forecast in a few instances but generally occur with little or no warning. Therefore, the activation of response may come in several ways.

Prior Notice - If time permits with a potential incident (generally weather related or special events) the designated lead Town Department (see section ____) will call a planning meeting with the affected Departments and, in consultation with the Town Manager, establish an operations plan.

No Prior Notice - The on-duty field supervisor (generally Police or Fire) shall notify their Department or Division head who shall in turn notify the Town Manager and the other Town Departments who are to be initially involved. Activation of the Town Emergency Operations Center and initial plan shall be at the discretion of the Fire Chief or the Police Chief or the Public Works Director or the Town Manager.

The Town Manager shall determine the need to activate the full Disaster Plan, notify the Mayor and Council and establish a Command Team.

The Mayor shall determine the need to establish a state of Emergency as authorized by N.C. General Statues Sec. 14-288.12 and Article V, Chapter 11 of the Town Code of Ordinances.

Command Team:

The Town of Chapel Hill Command Team shall generally consist of, but not be limited to, the following or their designees;

Town Manager	Police Chief
Asst. Manager	Public Works Director
Fire Chief	Finance Director
Town Information Officer	

Support Team members to the Command Team shall generally consist of, but not be limited to, the following or their designees;

Deputy Town Managers	Transit Director	
Chief Building Inspector	Planning Director	Parks & Rec. Director
Purchasing Agent	Engineer	Police Major
Town Clerk	Deputy Fire Chief-Operations	
Orange County Radio Amateur Representative		
Orange County Rescue/EMS Representative		

Emergency Operation Center:

An Emergency Operations Center (E.O.C.) will be activated when coordination of multiple Department or Agency efforts is indicated, when requested by the on-scene field commander, or when deemed necessary by a member of the Command Team. The primary Chapel Hill E.O.C. will be Fire Headquarters, 302 N. Columbia Street. The backup E.O.C. will be Police Headquarters, 827 Airport Road.

Each E.O.C. shall have and maintain the following:

* On-site back-up power
* Multi-channel UHF and VHF radio capability
* Multiple phone lines
* Secure meeting room space
* Cooking, showering, and sleeping facilities
* Fax and copy capabilities
* Cable television
* Copy of UNC Disaster Plan
* Copy of Orange County Disaster Plan
* Two copies of Chapel Hill Disaster Plan
* Town Street Map
* Copy of Fire Department Response Grid Book

Staffing for the E.O.C. shall consist of the Command Team, designated members of the support team and appropriate communications, clerical and logistics personnel. The Incident Commander shall be designated by the lead agency per section _____ or by the Manager.

Each member of the Command Team shall bring with them to the E.O.C. the following equipment (if applicable to responsibilities)

* Portable radio (for own Department) and charger
* Cellular phone and charger
* Departmental Special Operations Plans
* Resource lists (Department Specific)
* Personal items, toiletries and change of clothes (if indicated by situation)

The Command Team shall review the list of potential problems by incident type found in Section _____ of this plan. A running log and documentation of all decisions, significant occurrences, key information, and applicable times will be kept by E.O.C. personnel.

Documentation Requirements:

For any emergency (or unusual incident), a necessary tool is an accurate and complete record of what happened and what was done. Depending on the size and scope of an emergency, each department may be assigned duties/task during an emergency operation and therefore needs to be prepared to document actions

taken, resources expended, and specific events that happen during the emergency. The following is an outline of items that should be tracked and recorded during an emergency operation. This outline is meant to address non-routine activities associated with responding to an emergency.

Cost: *It is critical after an emergency operation to be able to define the cost associated with responding to the situation. Accurate and logical records are critical for securing any reimbursement for these costs.*

a. Labor: straight time, overtime, and comp-time

b. Materials and Supplies
   1. items used form inventory
   2. items acquired specifically for the event

c. Equipment and Services Cost:
   1. use of Town owned equipment
   2. use of leased/rented or contracted equipment
   3. any emergency services needed to maintain operation.

Field Reports: *This will only be applicable to departments with staff working at the scene of the emergency. Field reports consist of information gathered from the emergency scene and forwarded to a location where decisions are made regarding the appropriate response needed (may be provided in oral or written form).*

a. Description of what is wrong: 1) could be something that needs attention; or 2) an update from previous report(s)
   1. Example: the house at 100 Elm St. is on fire
   2. Example: the Elm St. fire is under control

b. Records of reports and actions taken on report:
   1. Maintain (at least a summary) of all relevant field reports.
   2. Time stamp: it may be useful to not the date/time of each field report.
   3. Describe actions/decisions/etc. taken on field reports
   4. Note if any information was passed along to other agency/department/organization/etc.

Events and Situation: *This is a record (diary) of noteworthy occurrences during an emergency operation. The nature and scope of this record may vary between departments. Date and time stamps should also be used for these entries. The following describes examples of possible entries but is not all inclusive.*

a. Notified of emergency by Town Manager and given assignment
b. Started calling personnel back to work
c. Held staff briefing and made assignments
d. Provided status report for Town Manager]
e. Three personnel injured in accident, reassigned task, requested back-up personnel and equipment.
f. Power failure occurred, moved operation to another location.
g. Discontinued routine service on Franklin Street and reassigned

resources to emergency.

h. completed emergency operations assignments resumed normal service.

i. Damage or accidents that involve the property of others.

Collection and compilation of all reports and records pertaining to a disaster operations shall be completed by the Town Clerk's office.

All communications from the field will be routed to the E.O.C. Field Commanders or Team Leaders shall coordinate efforts through the E.O.C.

* **Field Commanders and/or Team Leaders shall be responsible for on-site operations and communicating conditions to Command.**

* **Command Team will be responsible for developing a strategic plan, communicating with County E.O.C., policy decisions, resource allocation, and media releases.**

Access to the E.O.C. shall be limited to Command Team, designated Support Team, and/or necessary staff. If necessary, a Town Liaison person will be designated and sent to the County E.O.C. to facilitate cooperation. He/she shall carry a cellular phone and a copy of the Town Disaster Plan.

The following management models shall be utilized by the Command Team (modifications may be made based on needs or conditions).

Level I Disaster Management Model:

Utilized for short term (24 hour or less), isolated scene and/or incidents mitigated locally with locally controlled resources. A field Command Post and/or the E.O.C. may be used.

Level II Disaster Management Model:

Utilized for short term widespread community incident or long term incident regardless of scope.

Each incident shall generally have a lead Department and a backup Department identified below. The lead Department will assume the Command role or if unable to do so will pass the role to the backup Department. The Manager or the Command Team may re-assign the lead if necessary.

Incident Type	Lead Dept.	Backup Dept.
Severe Storms	Fire	Public Works
Tornado	Fire	Police
Flooding	Fire	Public Works
Winter Storms	Public Works	Police
Hurricane	Fire	Police
Major Vehicle Accident	Police	Fire
Aircraft Crash	Fire	Police
Bridge Collapse	Fire	Public Works
Hazardous Materials(transport)	Fire	Police
Train Accident	Fire	Police
Major Fire	Fire	Police
Gas Line Rupture	Fire	Police
Hazardous Materials(facility)	Fire	Police
Planned Events	Police	Fire
Spontaneous Crowd Gathering	Police	Fire
Earthquake	Fire	Police

Major Building Collapse	Fire		Public Works
Terrorism Incident	Police	Fire	
Explosion		Fire	Police
Utilities Disruption	Public Works	Fire	
Illness Related	Fire	Police	
Multi-Hazard	Refer to Command Team		

As part of the overall Town Disaster Plan, each Department will develop a Departmental plan that includes the following items. Additional information may be included if necessary to the emergency preparedness of that Department. These Departmental plans will be considered annexes to the Town plan and must be updated by September 1st of each year. The plans must be reviewed by the Department designated by the Manager to update the overall plan each year.

Individual Departmental Plans:

A. Procedure for and recall list of all employees needed for emergency operations.
B. Work schedule that would maintain 24 hour operations with 1/2 of the workforce on duty (12 hour shifts) at all times for up to six days.
C. Specific plans to meet each responsibility listed for the Department under Section _____ of this plan.
D. Develop procedure for recording specific services rendered and tracking of all personnel and costs.
E. Specific list of services or responsibilities that could not be suspended for periods of time (up to six days).
F. Lists of on-hand resources needed for emergency operations of Department and/or sources of materials if resources are not on hand.
G. Line of succession, four deep, for management of the specific Department.

Task Force and/or Strike Team Formation

Under certain conditions or situations the Command Team of the Town may form and assign operational level employees to Task Forces or Strike Teams.

Strike Team:A work group made up of employees from the same department or discipline that is supervised and assigned as a team. Command will direct strike teams or assign them under particular operations directors.

Example: A fire captain and six firefighters with two pumpers or a supervisor and five Public Works personnel with a pickup truck, front end loader, and dump truck.

Task Force: A work group made up of employees from several departments or disciplines supervised by someone from the lead

department in the incident and assigned as a team. Task forces are directed by Command.

Example: Three firefighters, a police officer, and three Public Works employees assigned to a specific area to clear access and search for victims.

Conditions or circumstances that may require long term or wide spread operations may indicate the need for formation of these groups. Also large or long term pre-planned and anticipated events where teams may need multiple skills or capabilities to be effective in operations.

Examples might include:

* Multi-day cultural or social events
* Post hurricane or tropical storm recovery
* Severe winter storm operations
* Spontaneous street celebrations/takeovers
* Post Major air crash recovery
* Large or widespread wildfire
* Severe sustained flooding
* Riots or Civil Unrest situations

General Guidelines for Disaster Operations

Personnel working in emergency disaster operations should not be "on line" for more than 12 hours at a time without a corresponding 12 hour break. (This includes Command Team members)

* Personnel working in emergency disaster operations should be rotated frequently if working under high stress conditions.

* Once the Command Team and E.O.C. is functioning, field supervisors should refer media inquiries to the E.O.C. or seek clearance from the E.O.C. prior to releasing information or granting interviews.

* For community-wide long term disasters, an employee/family shelter shall be opened separately from general population shelters

* Personnel operating in moving water greater than 2 feet deep should wear a personal floatation device and use a lifeline.

* At sustained wind conditions above 35 mph all personnel operating outside should wear head protection. At sustained wind conditions above 50 mph, only life safety operations should continue and all high profile vehicles should be parked. At sustained winds above 70 mph, all personnel should remain in shelter.

* All personnel operating inside a mass casualty site shall observe bloodborne

pathogen guidelines. This includes cleanup crews after all victims have been removed.

* All personnel shall be assigned and work in a "buddy system" during hazardous emergency operations to provide for safety margins.

* Food should be provided to personnel working in emergency disaster operation at intervals no greater than six hours. Liquids for drinking must be maintained at all work sites.

* On site debriefing and follow-up critical incident stress counseling shall be provided for all personnel operating under high stress disaster conditions.

* Applicable safety work rules (lockout/tag out, confined space, etc.) shall be observed by all work teams.

* Control of utilities should be handled by the appropriate agency.

Key Responsibilities Assigned by Departments

Manager's Office:

* Participation in and/or lead of Command Team
* Liaison to Mayor and Council
* Maintain pre-worded disaster declarations for signing by Mayor or Mayor Pro-tem
* Provide record keeping support to Command Team
* Coordinate assignment of Departments or staff not working under Command Team
* Approval authority over Public Information media releases by Command Team

* Assign a Department the responsibility of updating the disaster plan on an annual basis
* Assure availability of Manager or designee at all times for disaster response.

Fire Department:

* Fire suppression and rescue response
* First Responder Emergency Medical Care
* Basic extrication and coordination with Rescue Squad
* Search and Rescue
* Maintain primary Town E.O.C.
* Emergency evacuation
* Hazard identification and isolation of unsafe areas
* Maintain mutual aid agreements with other Fire and Rescue agencies
* Field Command or Command Team lead/participation where indicated

* Maintain lists of identified staging areas to primary approaches to Town
* Perform other assigned duties
* Update Town emergency notification lists
* Maintain a list of citizens requiring special assistance

Police Department:

* Law enforcement patrol services
* Traffic control and crowd control
* Transportation of key Town officials, if indicated
* Maintain backup Town E.O.C.
* Emergency evacuations and/or field announcements to the public
* Maintain mutual aid agreements with other law enforcement agencies
* Field Command or Command Team lead/participation, where indicated
* Develop photo record of disaster site
* Assist in search and rescue
* Scene security for isolated incidents
* Perform other assigned duties

Public Works:

* Maintain and/or restore primary rights of way
* Provide barricades where indicated
* Coordinate response of utilities and maintain priority list of Town facilities for restoration of service
* Assist in heavy extrication and rescue operations
* Assist in citizen evacuations
* Coordinate cleanup, debris removal, and disposal (maintain lists of contractors to assist with this work)
* Maintain Town fleet with priority on emergency vehicles and backup fueling plan

* Maintain key Town facilities with priority on E.O.C. and backup E.O.C.
* Field Command or Command Team lead/participation, where indicated
* Perform other assigned duties

Finance:

* Maintain and coordinate emergency procurement and purchasing system

* Maintain cash or charge card availability for use as directed by the Command Team
* Maintain simple tracking and accountability system for disaster related costs

* Participate in Command Team
* Perform other assigned duties

Parks and Recreation:

* Maintain and manage emergency sheltering capability for Town employees or employee families
* Maintain backup for Red Cross in emergency sheltering of citizens
* Maintain list of shelters and alternative sheltering sites with corresponding lists of resources or needs for each
* Coordinate feeding of on-duty Town employees during emergency operations
* Provide support to Command Team
* Perform other assigned duties

Transportation:

* Provide transportation support to evacuation and sheltering operations
* Provide transportation for employees to and from staging and operational areas as indicated
* Assist in maintaining Town fleet with priority on Emergency vehicles
* Provide bus/coaches as on site sheltering for Town employees as indicated
* Provide support to Command Team
* Perform other duties as assigned

Engineering/Inspections:

* Develop a plan for two Departments to merge forces in meeting listed responsibilities
* Assess damage and safety to the following in priority order and provide to the Command Team
    1. Town E.O.C. and backup E.O.C.
    2. Roads, bridges, and dams
    3. Public Works facilities, Town Hall, and fire stations
    4. Evacuation Shelters
    5. Other Town Facilities
    6. Public or Commercial Buildings
    7. Private Residences

* Condemn buildings or properties assessed as a hazard
* Develop lists of damaged properties
* Develop assessment of damages in financial terms
* Provide maps to Command Team, as indicated
* Develop emergency rapid permit processes for demolition, emergency temporary repairs, and debris removal
* Provide support to Command Team

* Perform other duties as assigned

Planning:

* Serve as Public and Media Information Office under the Command Team and Manager
* Provide clerical support to key emergency operations departments such as Fire, Public Works, and Police
* Perform other duties as assigned

Solid Waste:

* Coordinate debris disposal
* Backup assistance to Public Works
* Perform other duties as assigned

Personnel:

* Prepare employee I.D. disaster tag system
* Backup assistance to Manager's Office
* Provide every Town employee, on an annual basis, a Red Cross Family Disaster Plan Brochure
* Perform other duties as assigned

Housing:

* Assess needs and damages to Public Housing units
* Act as coordinator for Public housing needs and communicate the same to Command Team
* Perform other duties as assigned

Library:

* Backup assistance to Parks and Recreation
* Perform other duties as assigned

Attorney:

* Consultant to the Command Team
* Perform other duties as assigned

<u>Recovery</u>

As the immediate threat to life and property is mitigated the Command Team will shift the focus to the following areas.

* Restoration of routine services

* Employee recovery and Debriefing
* Community Information and Counseling
* Debris Removal and Disposal
* Public Health and/or Decontamination Issues
* Facilitation of State and Federal Assistance Centers
* Incident Documentation and Cost Recovery

The Command Team and E.O.C. operation will be down sized or terminated as soon as operations return to normally supervised levels. A two step critique process will be initiated within 10 days of the termination of the Command Operation. The first step will be a time line critique by the key Command Team participants. This will be led by the Manager or his/her designee. The second step will be a multi-agency Command and Field Team Leaders critique of lessons learned led by a team of 2-3 comprised from the Command Team and assigned by the Manager.

If necessary, a liaison team of Town staff will be assigned by the Town Manager to coordinate recovery and follow-up with private, State, and Federal agencies.

Problem Anticipation by Incident Category

The following are lists of anticipated or potential problems identified by incident category. They are intended to alert the Command Team to specific areas to be addressed. They may also be used for training of Town staff in disaster management strategies.

Weather Related

* call back employees
* communications (volume, loss, UHF and VHF)
* sheltering (feeding employees, sanitation, citizen sleeping)
* evacuations
* morgue
* EMS and First Aid
* loss of access roads
* equipment dependability/lack of equipment.
* search and rescue
* looting and security.
* public information
* damage assessment and intelligence gathering.
* employee family (shelter, support and safety) * command team rotation.
* legal authorities (Pete to research)
* transportation (movement of people and equipment).
* staging of resources

Transportation Related

* communications (volume, loss of facilities, UHF, VHF)
* sheltering (employees, citizens, sanitation, feeding and sleeping)
* evacuations
* search and rescue
* morgue
* first aid and EMS
* access routes
* loss of utilities (power, phones)
* command team rotation
* financial
* debris removal
* intelligence gathering
* public information
* transportation (movement of people and equipment)
* restoration/infra-structure
* cross-agency interaction
* environmental impact

Fires

* cross-agency interaction
* communication (detached from OCC)
* sheltering
* evacuations
* morgue
* first aid and EMS
* access routes (loss of)
* loss of utilities (water, power, phone)
* command team rotation
* search and rescue
* looting/security/crowd control
* intelligence gathering
* public information
* staging
* transportation (movement of people/equipment)
* foam
* environmental impact
* legal authority

Special Events

* cross-agency interactions
* communications
* employee rotation/feeding
* EMS and first aid
* access routes (loss of)
* crowd control
* staging
* looting and security
* intelligence gathering
* public information
* legal authority
* transportation
* debris removal
* maintenance of routine services
* mass arrest contingency

Other Incidents

Earthquake - same as weather

Civil Unrest - same as special events

Building Collapse - same as fire

Terrorism (unique)

* security
* loss of access
* staging
* evacuations
* crowd control
* public information
* communications
* inter-agency
* EMS and first aid
* search and rescue
* command rotation
* debris removal
* sheltering
* employee support
* routine services (disruption)
* legal authority
* intelligence gathering/environmental impact

Explosion - same as fire

Utilities Disruption (unique)

* sheltering
* evacuation
* communications
* routine services
* public information
* intelligence gathering
* loss of access routes
* disruption of public access to system (911, etc.)
* transportation
* environmental impact

Illness Related (unique)

* EMS
* sheltering
* intelligence gathering
* public information
* inter-agency
* financial
* routine services
* personnel resources
* environmental impact

Gas Line Rupture - same as fire

Revisions to Disaster Plan

Each year during July and August, each Department Head will review the individual respective Department disaster plan and submit any revisions to the Department assigned by the Manager to coordinate the update. Individual Departmental plans and Town disaster plan annexes must be submitted by September 1st. The overall update must be submitted to the Manager's Office not later than November 1st.

Each annex and individual Department plan must be in brief outline or bullet format (no narratives). The following is a list of those annexes:

Annex	Item	Responsible Person
A	Communications List -emergency phones -frequencies	Fire Chief
B	Key Town Staff & Officials Emergency Contact List	Fire Chief
C	Emergency Agency Contact List	Fire Chief
D	Law Enforcement Agency Contact List	Police Chief

E	UNC Official Emergency Contact List	Manager
F	Emergency Ordinances/Statutes/State of Emergency Declarations, etc.	Town Clerk
G	Emergency Purchase Procedures	Finance
H	Emergency Shelter Plan	Parks & Recreation
I	Identification of Staging Areas	Fire Chief
J	Utilities Emergency Contact List	Public Works Dir.
K	Facilities Prioritization Restoration List	Public Works Dir.
L	Manager's Office Emergency Plan	Town Manager
M	Fire Dept. Emergency Plan	Fire Chief
N	Police Dept. Emergency Plan	Police Chief
O	Public Works Emergency Plan	Public Works Dir.
P	Finance Dept. Emergency Plan	Finance Dir.
Q	Parks & Recreation Emergency Plan	Parks & Rec. Dir.
R	Transportation Emergency Plan	Transportation Dir.
S	Engineering Emergency Plan	Town Engineer & Building Inspector
T	Planning Dept. Emergency Plan	Planning Dir.
U	Solid Waste Dept. Emergency Plan	Solid Waste Dir.
V	Personnel Emergency Plan	Personnel Dir.
W	Housing & Community Development Emergency Plan	Housing Dir.
X	Library Emergency Plan	Library Dir.
Y	Emergency Foreign Language Interpreters Contact List	Police Chief
Z	News Media Contact List	Planning Dir.
AA	Social Service Agency Support Contact List	Police Chief
BB	Department Emergency Equipment and Resource Inventory Surveys	Public Works