

**TOWN OF CHAPEL HILL**

**STORMWATER  
MANAGEMENT  
COMMITTEE**

**Final Report - November 1994**

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### Executive Summary

In 1992 the Town Council appointed this Committee to determine what stormwater management services the Town should be providing to the citizens of Chapel Hill. New State and Federal regulations regarding the quality of urban runoff as well as continuing concerns about flooding were the nucleus for establishing this Committee.

In the two years since its inception, the Stormwater Management Committee has achieved many of its initial objectives. The most noteworthy of these accomplishments are:

1. Completed a basic inventory of the Town's Stormdrainage System, following both the natural and man-made elements of the system.
2. Established a Chemical, Physical, and Biological Stream Water Quality Monitoring Program in coordination with Carrboro and U.N.C.
3. Initiated a coordinated citizen volunteer stream monitoring effort.
4. Established a baseline inventory of stream bottom organisms (benthic monitoring) as an initial indicator of stream health.
5. Established and will provide on-going support and assistance to a Citizen Stream Cleanup Program.
6. Established a basic Public Education Program.
7. Established a Stormdrain Stenciling Program aimed at heightening public awareness of the consequences of introducing pollutants into the stormdrain system.
8. Created Geographic Information System (GIS) applications and coverages for both natural and engineered drainage systems.
9. Through testing, observation, and analysis, determined the health of our streams to be relatively good, and not posing chronic or significant public health hazards.

In addition to these completed objectives and established programs, the Committee recommends that the Town continue to improve its stormwater management policies and practices to mitigate detrimental impacts on both water quantity and quality. The Committee's findings are briefly outlined in the following statements recommending that:

- I. *The Town continue to require use of a standard, accepted method for estimating runoff, such as the "HYDROS" model currently in use, and that the Town investigate updating the "HYDROS" model to be compatible with the Town's GIS (Geographic Information System).*
- II. *The Town adopt and implement the Committee's proposed Policy on Drainage Easements.*
- III. *The Town adopt and implement the Committee's proposed Policy on Drainage Assistance Program.*
- IV. *The approval process for new development include approval of a Stormwater Impact Statement.*
- V. *The protection currently afforded by the Town's Resource Conservation District Ordinance not be weakened.*
- VI. *The Town continue to monitor the streams within Chapel Hill to assess the water quality and health of our streams, and that the Town adopt the Committee's proposed Policy on Water Quality Inventory to be funded annually through the Town's operating budget as an on-going program.*

- VII. *The current detention policy be expanded to include developments or subdivisions which create four (4) or more single family or duplex structures, whether such structures are created at one time or over an extended period of time.*
- VIII. *The Town investigate the use of regional stormwater lakes, in addition to on-site detention, as possible mitigation measures for water quantity and quality concerns, and that funds be included in the Town's 1995-96 budget to undertake a comprehensive regional lake feasibility study.*
- IX. *The Town encourage reductions in impervious and built-upon areas when considering approval for new developments.*
- X. *A stormdrainage infrastructure inventory be maintained and improved, and that the Town adopt the Committee's proposed Policy on Stormdrainage Infrastructure Inventory.*
- XI. *As-built drawings be required for stormwater systems and/or drainage infrastructure modifications included in each new project and/or development built within the Town's planning jurisdiction.*
- XII. *The Town adopt the Committee's proposed Policy on Public Maintenance of Stormdrainage System.*
- XIII. *The Town maintain and support the established volunteer network presently monitoring our streams and continue to develop, train, and equip new volunteers to monitor streams.*

The attached report provides more detailed and comprehensive discussion of these recommendations.

The Stormwater Management Committee is grateful for the opportunity to have served the Town Council and the citizens of Chapel Hill. The Committee's efforts are herewith completed, and we hope that our achievements and recommendations will properly serve the community in dealing with the important issues of stormwater quantity and quality.

### Introduction

This Committee was formed by the Town Council in 1992 to investigate and make recommendations regarding stormwater management practices and policies in Chapel Hill. The creation of this Committee was the result of concerns about flooding in Chapel Hill and changing State and Federal regulations regarding local stormwater management programs, particularly focusing on stormwater pollution and related water quality issues.

### Background and Discussion

Stormwater problems in Chapel Hill are most evident in areas where development has occurred. The resulting changes in land use have had an impact on both the quantity and quality of stormwater runoff. The increase in built-upon areas and impervious surfaces has resulted in an increased amount of stormwater runoff as well as more severe and frequent flooding. These developed areas also contribute additional pollutants into stormwater runoff such as nitrogen and phosphorus from lawn fertilizers, and oil and grease from streets and parking areas. These and other pollutants end up in our streams and lakes.

Because of Chapel Hill's location downstream from Carrboro and Orange County, the Committee recognizes that urbanization in these jurisdictions affects stormwater quantity and quality in Chapel Hill. As urbanization occurs, the effects on stormwater quantity and quality may become more pronounced. Additionally, the University of North Carolina impacts the quantity and quality of Chapel Hill's stormwater.

We believe, therefore, that stormwater management is a regional issue and should be considered as such. Coordination and cooperation among Chapel Hill, Carrboro, U.N.C., and Orange County are essential in developing an effective and comprehensive

Stormwater Management Program. This committee focused on Chapel Hill and its zoning districts, but realizes that coordination with neighboring governments and UNC will be important if the Council adopts any or all of the Committee's recommendations. This coordination and cooperation has already begun on a staff level, and should be expanded to include the administrative and political elements of each organization.

### **STORMWATER QUANTITY ISSUES**

Citizens' concerns with flooding and drainage issues was one of the primary reasons for the formation of the Stormwater Management Committee. The Committee's attention to stormwater quantity issues was therefore directed toward mitigating existing drainage problems and preventing future problems.

#### **Computer Modeling**

In 1986 the Town began utilizing sophisticated tools and procedures for predicting and controlling stormwater runoff. A computer model called "HYDROS" was developed for Chapel Hill. The "HYDROS" computer model estimates hydrographs for undeveloped and developed areas based on the Soil Conservation Service (SCS) hydrologic method. The Model is also capable of routing flows through channels, reservoirs, and systems. This allows for the modeling of complex and multiple basins.

*The Committee recommends that the Town continue to require use of a standard, accepted method for estimating runoff, such as the "HYDROS" model currently in use.*

*The Committee further recommends that the Town staff investigate updating the "HYDROS" model to be compatible with the Town's GIS (Geographic Information System).*

### Drainage Easements

Expanded urbanization of Chapel Hill has resulted in changes to the natural hydrology. Increased impervious surfaces result in an increase in the rate of runoff and stream flow after a rainfall. As runoff from new development enters and passes through existing developments, the higher and more rapid peak discharge of runoff can overload the capacity of the existing drainage infrastructure and streams. Also, existing developments can experience problems due to site plan changes such as increased impervious surface or channelization which modify existing stormwater runoff quantity and/or characteristics.

*The Committee recommends adoption of the attached Policy on Drainage Easements.*

This policy would help to ensure that areas are reserved along and adjacent to natural and/or man-made drainage facilities to promote and protect the conveyance capability and maintenance of those facilities to accommodate stormwater runoff.



*Flooding may increase with new development and expanded urbanization.*

### Drainage Assistance Program

The Committee believes that some flooding and drainage problems which affect existing private property result from expanded urbanization. The Town should consider making resources available on a cost-share basis to qualified private property owners who are directly affected by flooding problems which arise from circumstances beyond their control. This assistance would vary in scope from providing technical assistance and advice, to complete project design, construction, and maintenance, depending on the nature and extent of the impact.

The Town Manager and staff should develop criteria and standards for evaluating and prioritizing requests for drainage assistance from citizens residing and/or owning property in Chapel Hill. Funding for this program should be primarily through the Town's yearly Capital Improvements Program (C.I.P.). Each year the Town Manager should identify candidate projects for funding within the annual budget development process.

*The Committee recommends adoption of the attached Policy on Drainage Assistance Program.*

### Stormwater Impact Statement

Preventing future drainage problems is another important stormwater quantity issue. The Committee reviewed the current efforts to mitigate the impact of new development on the quantity of stormwater runoff. Current Town Policy requires that all new development use a standard method for estimating runoff, which is the "HYDROS" computer model. All developments other than single and duplex residential are also required to detain any increase in stormwater runoff between pre-development and post-development conditions.

*The Committee recommends that the approval process for new development include approval of a Stormwater Impact Statement.*

This Stormwater Impact Statement should extend upstream and downstream a reasonable distance to examine the impact of the proposed development on the quality and quantity of stormwater runoff. Requiring an impact statement during the planning stage of a project will better enable Town staff to determine what improvements might be necessary to mitigate the expected changes to the natural hydrology and hydraulics of the drainage system. The Town staff would work with each development to determine the limits and scope of the drainage impact statement necessary to adequately assess expected impacts upstream and/or downstream. The stormwater impact statement would include the following:

- limits and scope of area
- "HYDROS" model calculations
- watershed protection impact
- pollutant loading calculations
- erosion control measures
- mitigation and improvement measures
- maintenance and operation plan

The Stormwater Impact Statement should analyze the pollutant loading expected to be generated by the new development and the ability of the proposed and/or existing drainage infrastructure to handle runoff from the proposed development. The Town Manager should develop standards and procedures for the Stormwater Impact Statement, and the analysis should be performed only by competent professionals.

## STORMWATER QUALITY ISSUES

Every citizen of Chapel Hill, to some degree, deposits pollutants on the land. Construction activity results in sediment; lawn fertilization contributes nutrients; bacteria are introduced from leaking sewers and pet wastes; oil and grease are contributed from automobiles and service stations; and toxic chemical inputs can result from pesticide application. When it rains, these pollutants are picked up by stormwater runoff and end up in our streams and lakes.

The cumulative effects of pollution may include sediment that clogs waterways, fills lakes, and/or dirties water; trash and debris that affect the aesthetics and capacity of drainage facilities; impaired recreational uses; threats to the public health by contamination of drinking water; and/or degradation of aquatic life.



*Citizen volunteers remove trash and debris from stream channels during Chapel Hill's Stream Clean-up Day.*

In 1985, the Town Council adopted the Resource Conservation District (RCD) Ordinance which helps protect water quality in Chapel Hill. This ordinance creates buffer areas along perennial streams and restricts development in those designated areas. The Committee believes that the current RCD provisions have provided excellent protection of water quality and overall stream health, in addition to mitigating the quantity of runoff that would otherwise have resulted from development adjacent to our streams.

*The Committee recommends that the protection currently afforded by the Town's Resource Conservation District Ordinance not be weakened.*

In February and April of 1993, a benthic monitoring program was initiated by North Carolina's Division of Environmental Management (DEM). This testing was conducted as part of a cooperative effort between the Town of Chapel Hill and DEM to assess local background water quality conditions. The Town then initiated a stormwater monitoring program in November, 1993. This program has been collecting monthly data for both chemical and physical parameters at eight sampling sites within Chapel Hill. These sampling data are expected to provide an indication of the possible types, sources, and magnitude of pollution inputs as well as establishing a water quality baseline.

The Clean Water Act is the basic foundation for all Federal and State water quality programs. As part of this statute, the Environmental Protection Agency finalized a rule in 1990 requiring "National Pollutant Discharge Elimination System" (NPDES) permits for stormwater discharges. Currently only local governments with populations over 100,000 are required to apply for the NPDES permits. However, the Committee believes that Chapel Hill should design its water quality monitoring program with consideration for the NPDES requirements which may be placed on smaller communities such as ours in the future.

### The University of North Carolina Water Quality

The State Department of Environment, Health and Natural Resources, Division of Environmental Management (DEM) conducted benthic monitoring in February and April, 1993 on Chapel Hill's streams. Results of this study indicate that Meeting of the Waters Creek, which drains much of the UNC campus and flows into Morgan Creek, had a greatly reduced benthic population. DEM reported that bank erosion was severe. They also noted that macroinvertebrate abundance was extremely low and categorized the stream with a bioclassification of "poor".

This was an initial indication that the water quality and stream health of Meeting of the Waters Creek was degraded. Physical and chemical monitoring was performed on the creek as a supplement to the benthic studies. This monitoring was conducted by the Town of Chapel Hill and sampling to date supports the poor water quality rating indicated by DEM's benthic results. Parameters such as total solids, total phosphorus, and conductivity were analyzed and found to be abnormal.

The University of North Carolina at Chapel Hill and a UNC graduate student in the Department of Environmental Sciences and Engineering are currently conducting research that will further evaluate the stream health on Meeting of the Waters Creek. This research is expected to complete the following objectives:

- determine the water quality of Meeting of the Waters Creek
- determine whether water quality or habitat destruction is degrading the stream's biological health
- determine the source(s) of pollution

- provide a list of alternatives for controlling water quality inputs including remediation strategies, structural control, or best management practices (BMPs)

#### **Water Quality Monitoring Program**

*The Committee recommends that the Town continue to monitor the streams within Chapel Hill to assess the water quality and health of our streams, and that the Town adopt the attached Policy on Water Quality Inventory to be funded annually through the Town's operating budget as an on-going program.*

By continuing this basic water quality sampling and monitoring program, the Town should be prepared to promptly and efficiently respond to potential NPDES requirements. In the interim, the data will be useful in determining the water quality and general health of our local streams and waterways which are increasingly used for recreational purposes by our citizens.

Stream samples should be taken and a certified laboratory should conduct chemical analysis on this water to provide an indication of the types, sources, and magnitude of pollution inputs.

#### **GENERAL STORMWATER MANAGEMENT PROVISIONS**

Many stormwater management issues involve both water quality and water quantity to varying degrees. The Committee discussed these general stormwater management areas of concern and prepared recommendations for consideration.

#### **Regional Stormwater Control Lakes**

The concept of regional lakes is to combine into a single lake the detention and control needs for multiple properties. Regional

The concept of regional lakes is to combine into a single lake the detention and control needs for multiple properties. Regional lakes or ponds control stormwater runoff within a watershed and could produce water quality and quantity benefits.

Under the Town's current policy, every property which is developed, other than single family or duplex-residential, is required to have on-site detention. This approach of "single site, single basin" is a widely used and accepted method for controlling and managing stormwater quantity runoff. The principal beneficiary of single site management is the property immediately downstream of the lake or structure controlling the release of the runoff after a storm. There is also a degree of equality in requiring each development to handle "its water" on "its site".

The Committee believes that although these current efforts are reasonable methods for managing stormwater, policy improvements should be considered.

*The Committee recommends that our current detention policy be expanded to include developments or subdivisions which create four (4) or more single family or duplex structures, whether such structures are created at one time or over an extended period of time.*

The Committee believes that the Town should provide all downstream properties with the same degree of protection from stormwater runoff.

*The Committee recommends that the Town investigate the use of regional stormwater lakes, in addition to on-site detention, as possible mitigation measures for water quantity and quality concerns, and that funds be included in the Town's 1995-96 budget to undertake a comprehensive regional lake feasibility study.*

flood protection further downstream than the single site basins. There appear to be other benefits to the regional lake approach, including:

1. Stormwater coming from Carrboro and the County that passes through Chapel Hill could be mitigated and controlled by regional lakes located upstream and in undeveloped areas. These lakes could intercept runoff before it adversely affects property within Chapel Hill.
2. The Town could own and operate the regional lakes, thus ensuring proper maintenance and inspection.
3. A system of ponds could provide an opportunity for coordinated operations to compound benefits.
4. Regional lakes may be large enough, wherever practical, to act as recreational facilities with both passive and active uses.
5. Regional lakes may provide an opportunity for educational uses. Schools may be able to use the lakes for field trips to study the environment and lake ecology.

The Committee recognizes that there are several issues concerning regional lakes about which neither they nor the Town staff have the expertise to make informed recommendations. Therefore, the Committee recommends that a consulting firm with expertise in engineering, planning, and the environment be retained. The consultant's job would be to provide answers and recommendations to the following:

1. Are regional lakes a feasible solution to control runoff generated within Chapel Hill and coming from adjacent communities?

2. Are regional lakes a feasible solution for water quality standards of the drinking water watershed protection requirements?
3. Where within our watersheds are the optimum places to locate regional facilities and is land available to do so?
4. How would regional facilities affect and be affected by existing and proposed land uses?
5. What are the estimated costs and time schedules for implementing a regional lake construction program? What are possible funding sources?
6. If found to be feasible what are the costs and benefits for regional detention scenarios appropriate for Chapel Hill?

#### **Reduction in Built Upon and Impervious Surface Areas**

The Committee recognizes the direct adverse effect that impervious surfaces and built upon-areas have on stormwater runoff.

*The Committee recommends that the Town encourage reductions in impervious and built-upon areas when considering approval for new developments.*

Ways to reduce impervious surfaces might include:

1. increase allowable building height and reduce building footprint;
2. grant a floor area density bonus (that does not increase footprint) for projects with multi-level parking decks.

In addition the Town could charge a fee for every square foot of impervious surface created. (Fee could be used to fund stormwater improvements, maintenance, and operations.)

### Stormdrainage Infrastructure Inventory

An up to date Stormwater Infrastructure System Inventory is necessary to comprehensively determine the extent and condition of the Town's drainage system. The Town Council authorized this Committee to undertake a basic inventory of the Town's man-made infrastructure. This inventory has been incorporated into the Town's GIS data base along with data on perennial streams and Resource Conservation Districts.

*The Committee recommends that this stormdrainage system inventory be maintained and improved upon by the Town staff, and that the Town adopt the attached Policy on Stormdrainage Infrastructure Inventory.*

The purpose of maintaining this inventory is to:

1. Identify inadequate facilities;
2. Provide information for computer modeling and analysis;
3. Identify unusual features of the system;
4. Provide information which can identify opportunities for system-wide approaches, downstream impacts, etc.;
5. Provide a basis for identifying problem areas and potential solutions;

6. Identify existing easements, access points, ownership, etc. as related to the drainage system;
7. Provide a data base for monitoring compliance with the National Pollutant Discharge Elimination System (NPDES) regulations;
8. Provide information to property owners, developers, and other agencies;
9. Provide a basis for evaluation of the adequacy of our standards/specifications for drainage infrastructure.

*The Committee recommends that as-built drawings be required for stormwater systems and/or drainage infrastructure modifications included in each new project and/or development built within the Town's planning jurisdiction.*

The as-built drawings would be used to update the base inventory as new developments are built. The inventory should reside and be maintained on the Town's GIS.

#### **Public Maintenance of Stormdrainage System**

The Committee realizes that achieving the objectives of identifying and mapping various elements of the Town's drainage system are only part of the larger picture of system operation and maintenance.

*The Committee recommends adoption of the attached Policy on Public Maintenance of Stormdrainage System.*

By adopting this policy, the Town could determine through careful analysis those portions of the stormdrainage system which should be publicly maintained.

### Citizen Volunteer Assistance Program

*The Committee recommends that the Town maintain and support the established volunteer network presently monitoring our streams and continue to develop, train, and equip new volunteers to monitor streams.*

These networks are used by the Town to help identify areas of streams which may need more comprehensive monitoring. Currently citizen volunteers collect data on nearly all of the Town's major streams.

Changing citizen behavior and attitudes is the key to successfully preventing pollution from reaching our streams. The Town should continue educating employees and the public about stormwater problems. Educational tools which have been shown to work are: storm drain stenciling, public service announcements on local radio and T.V., talking to science clubs within the school system, and speaking to civic groups about stormwater management.



*Culbreth Middle School students help initiate the Stormdrain Stenciling Program.*



*Frank Porter Graham students learn how to collect water quality data.*

### Conclusion

Since 1992 this Committee has been investigating stormwater management issues as they relate to Chapel Hill. The Committee determined that there are two key stormwater issues in Chapel Hill: water quality and water quantity.

Until recently, the water quantity issue has received the greatest amount of attention from the Town. Concern about flooding and/or the potential for flooding was a major reason this Committee was created by the Council. The focus of the Town's past efforts have primarily involved regulations designed to prevent or mitigate the impact of new developments on the quantity of stormwater runoff. After becoming familiar with the Town's current regulations and policies aimed at mitigating potential flooding problems, the Committee determined that they are generally adequate for Chapel Hill.

However, the Committee recommends expanding the current on-site detention policy to include developments which create four (4) or more single family structures . The intent of this would be to

provide the same degree of protection to all downstream property owners with regard to increased stormwater runoff resulting from new development. Where possible, a single facility should be used to manage multiple sites.

Additionally, the Committee recommends that the Town require a Stormwater Management Impact Statement as a component of the development application process. This impact statement would be used to determine what improvements and/or infrastructure are necessary to prevent or mitigate stormwater problems that may be caused by that development.

One key component to preventing future drainage problems is the reservation of lands for conveyance of stormwater. This reservation is typically by way of a drainage easement. The Committee recommends adoption of a Policy on Drainage Easements to reserve areas on, along, and/or adjacent to natural and/or man-made drainage facilities to promote and protect the conveyance capability and maintenance of drainage facilities.

Another important aspect of the water quantity issue is correcting existing flooding problems. As a growing community, the increase in impervious surfaces and built-upon areas has impacted the existing drainage system. If private property is affected by flooding or other water quantity issues resulting from new development, then the Town should provide assistance in mitigating those impacts. The Committee recommends adoption of a Policy on Drainage Assistance Program to provide technical and/or financial assistance to citizens with localized drainage problems on private property.

The water quality issue of stormwater management has gained interest and momentum as a result of State and Federal regulations mandating local stormwater programs to control pollution in stormwater runoff. The Committee established a water quality

monitoring program to assess the health of our streams and to establish current water quality data for our waterways. This initial monitoring program has since evolved into a formal chemical and physical properties water quality monitoring program.

The Committee recommends adoption of a Policy on Water Quality Inventory to establish continued monitoring of the water quality in our streams and to establish and maintain an inventory of data concerning the biological, chemical, and physical properties of streams and other conveyances.

While the Committee stops short of recommending that the Town undertake a major change in its role in the maintenance of the community drainage system, the Committee does recommend adoption of a Policy on Public Maintenance of Stormdrainage System which would signify the Town's commitment to a reasonable level of public maintenance of stormwater infrastructure.

With the submittal of this report, the Town's Stormwater Management Committee has completed its work. We wish to thank the Town Council of Chapel Hill for the opportunity to serve the citizens on this important issue and we hope that our recommendations will assist the Council in improving the safety, health, and welfare of the entire community.

**APPENDIX "A"****TABLE OF CONTENTS**

- 1.0 POLICY ON DRAINAGE EASEMENTS
- 2.0 POLICY ON DRAINAGE ASSISTANCE PROGRAM
- 3.0 POLICY ON WATER QUALITY INVENTORY
- 4.0 POLICY ON STORMDRAINAGE INFRASTRUCTURE INVENTORY
- 5.0 POLICY ON PUBLIC MAINTENANCE OF STORMDRAINAGE SYSTEM

## 1.0 POLICY ON DRAINAGE EASEMENTS

### 1.1 Policy

To reserve areas on, along, and/or adjacent to natural and/or man-made drainage facilities by dedication, land reservation, grants, and/or acquisition.

### 1.2 Purpose

To promote and protect the efficient, effective and environmentally sensitive conveyance of stormwater and to provide for on-going maintenance of drainage facilities.

### 1.3 Easement Identification

Storm Drainageways which are not dedicated for Town maintenance as Public Storm Drainage Easements shall be identified on Plats and Deeds as "Reserved Storm Drainageway", and shall be reserved from any development which would obstruct or constrict the effective conveyance and control of stormwater from or across the property.

### 1.4 Requirements For Different Kinds of Easements.

#### 1.4.1 Easements Along Man-Made Drainage Infrastructure

Easements shall be required along all existing, proposed, renovated, altered or reconstructed ditches, pipes, culverts, channels, ponds, lakes and similar infrastructure which are related to and/or necessary for the conveyance and/or control of stormwater.

#### 1.4.2 Easements Along Natural Drainageways

Easements shall be required along natural drainageways, lakes, and/or ponds which are determined to be necessary for conveyance and/or control of stormwater to benefit and protect the community.

#### 1.4.3 Easements Along Regulatory Floodplains And Resource Conservation Districts.

Unless required by sections 4.1 or 4.2, storm drainage easements generally will not be required along Regulatory Floodplains and Resource Conservation Districts. (Note: Land within these areas is typically reserved as open space or parks and recreation land.)

**1.5 Access To Stormdrainage Easements And Facilities**

Direct, reasonable, and convenient access shall be provided to all public stormdrainage easements and/or facilities to be maintained by the Town.

**1.6 Easement Size and Locations**

The size and location of drainage easements shall be determined by the Town Manager, as necessary, on a case by case basis.

**1.7 Retroactive Stormdrainage Easement Acquisition**

Through grants, gifts and capital improvement programs, the Town may acquire stormdrainage easements along existing manmade/natural drainage conveyances and/or facilities, where such conveyances and/or facilities are deemed necessary to promote the health, safety and/or welfare of the community.

## 2.0 POLICY ON DRAINAGE ASSISTANCE PROGRAM

### 2.1 Policy

To provide technical and/or financial assistance to citizens residing and/or owning property in Chapel Hill with localized drainage problems on private property.

### 2.2 Purpose

To make Town resources available to private property owners on a cost sharing basis to implement drainage repairs on or directly affecting the owner's property.

### 2.3 Drainage Assistance Program

The Town of Chapel Hill may assist citizens in solving localized drainage problems to the extent that funds and resources are available.

The scope of Town involvement in any drainage assistance project may vary from technical advice to design, construction, and maintenance of drainage improvements.

Participation in the program is voluntary. Citizens desiring to participate in the program must submit a written request to the Town asking for the project to be considered as a candidate for the Drainage Assistance Program (DAP). Upon receipt and review of a written request, the Town Manager will determine the scope of Town involvement (if any) and the project priority as related to other drainage improvement needs Townwide.

Approved program participants must provide written agreement to pay for their share, and must execute a right-of-entry form allowing Town forces to enter their property and holding the Town harmless from liability for the improvements and/or related construction activity.

The Town may, at its discretion, accept all or part of the improved drainage facility for maintenance, subject to provision by the property owner(s) of all necessary drainage, access, and maintenance easements or rights-of-way.

#### 2.4 Prioritizing Projects

The priority for participation, in the Drainage Assistance Program will be based on the following criteria:

- \* Likelihood of physical injury or loss of life.
- \* Likelihood of public property damage.
- \* Likelihood of private property damage.
- \* Likelihood of impeded public/private access.
- \* Likelihood of loss of property value.
- \* Likelihood of nuisance flooding which does not significantly threaten safety or property.

Priority will be given to mitigating those drainage problems resulting in the more severe occurrence criteria listed.

## 3.0 POLICY ON WATER QUALITY INVENTORY

### 3.1 Policy

To monitor the quality of stream flow and establish an inventory of the biological, chemical, and physical qualities of streams and conveyance systems.

### 3.2 Purpose

To identify pollutants and source(s) of pollution in stream flow.

### 3.3 Types Of Monitoring

3.3.1 Chemical monitoring shall be performed to determine the presence of chemical pollutants and to define the general chemical make-up of the stream flow.

3.3.2 Benthic monitoring shall be performed to determine the biological condition of streams and to indicate whether or not pollutants are present in the water.

3.3.3 Physical properties (conductivity, PH, temperature, turbidity, etc.) of stream flow and stormwater shall be monitored and measured to determine the physical condition of the water.

### 3.4 Location And Frequency Of Monitoring

The Town Manager shall determine the location and frequency of water quality testing. The Town's testing should be performed in concert with water quality testing in progress and/or planned by federal, state, or other local testing efforts.

### 3.5 Data Sharing

The Town shall share water quality data obtained through it's testing efforts.

### 3.6 Corrective Action

If significant pollution and/or stream degradation is identified, the Town Manager shall notify appropriate local, state, and federal agencies, make reasonable efforts to determine the pollution source(s), and to implement corrective measures for mitigation and clean-up of said pollution, within the legal limits of authority.

## **4.0 POLICY ON STORMDRAINAGE INFRASTRUCTURE INVENTORY**

### **4.1 Policy**

The Town shall inventory the significant components of the stormdrainage infrastructure that are essential to the community drainage system.

### **4.2 Purpose**

To identify the location, size and condition of the Town's stormdrainage infrastructure and conveyance system. The inventory should provide a basis for identifying inadequate facilities, identifying existing and/or needed easement, and access, identifying existing or potential drainage problems, identifying opportunities for regional basins and system-wide approaches, engineering modelling information, identifying unusual features, and relating to the National Pollutant Discharge Elimination System (NPDES) regulations.

### **4.3 Inventory of Infrastructure Existing Prior to 1993**

An inventory of existing infrastructure is necessary to develop a comprehensive stormwater management program. Inventories should be prioritized so that developed basins are given the highest and most detailed priority.

An inventory of the existing infrastructure should be used to develop components of the drainage system that should be publicly maintained. Significant privately owned/maintained drainage components should also be identified.

### **4.4 As Built Drawings**

All development, redevelopment, and/or subdivision should provide as-built drawings upon completion of the project which show the actual construction of all drainage components.

### **4.5 Annexation**

The Town shall inventory areas as they are annexed into the Town limits.

## **5.0 POLICY ON PUBLIC MAINTENANCE OF STORMDRAINAGE SYSTEM**

### **5.1 Policy**

To maintain stormwater infrastructure within and adjacent to public rights-of-ways, public drainage easements, on public lands, and on private lands where drainage facilities are integral parts of the community storm drainage system. The Town may assume responsibility for those portions of the drainage system that directly affect the safety and general welfare of the community-at-large.

### **5.2 Purpose**

To provide for the safe, efficient, and effective operation and maintenance of the Town stormdrainage system and to protect environmentally sensitive areas.

### **5.3 Routine Maintenance Efforts**

Town maintenance will consist of that which is required to keep the storm drainage system component(s) operational as planned and/or designed. Such maintenance may include cleaning, mowing, silt removal and similar routine maintenance operations.

Routine storm drainage system maintenance will be scheduled in accordance with a preventative maintenance plan established to ensure that all storm drainage facilities and system components accepted by the Town for maintenance will receive periodic inspections and maintenance as necessary for proper operation.

### **5.4 Emergency Maintenance And Repairs**

Emergency maintenance and repairs of non-public stormdrainage facilities may be performed by the Town when it is determined to be in the interest of the public health, safety and welfare.

## APPENDIX "B"

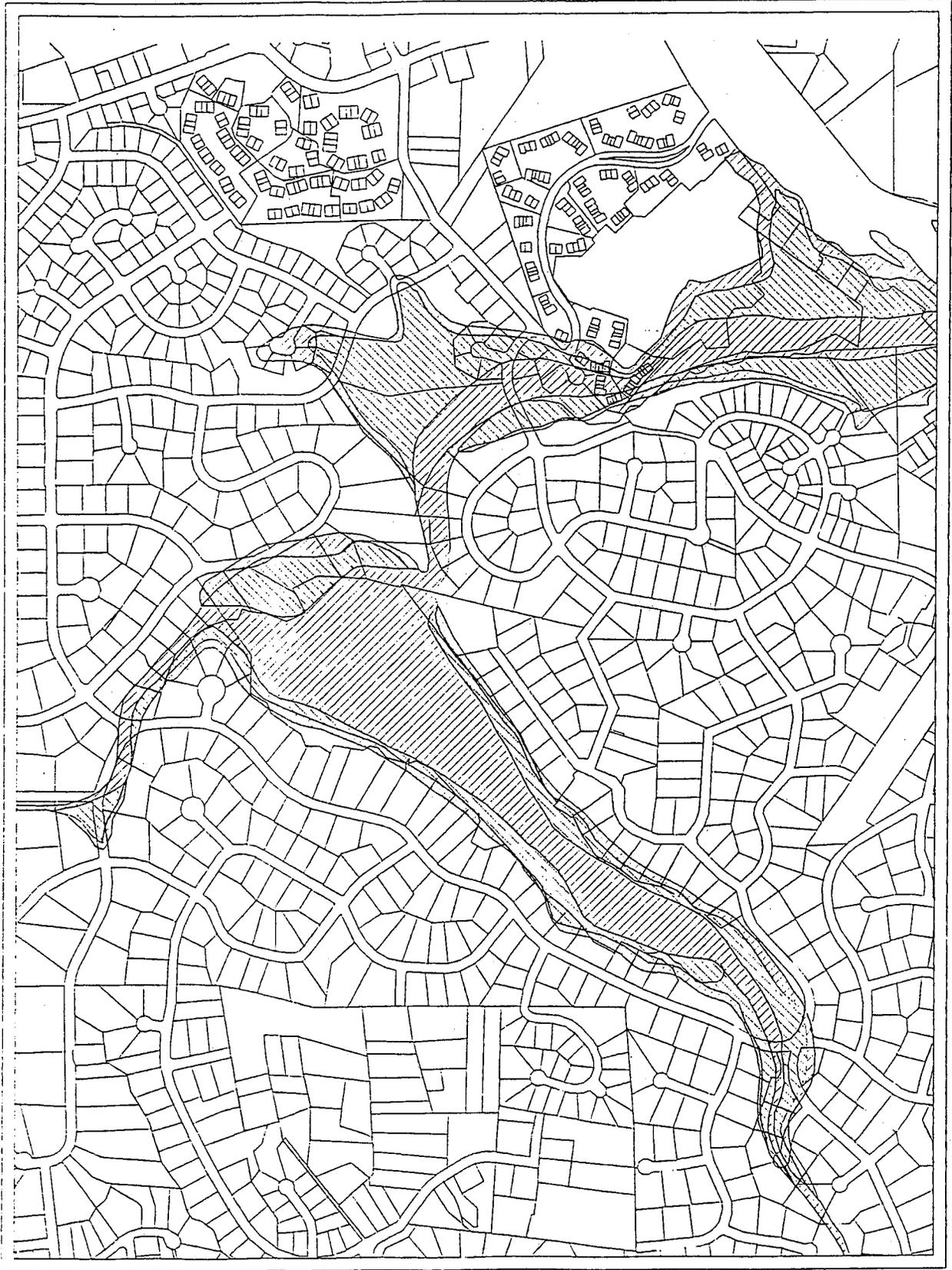
Since the Stormwater Committee was created in 1992, several accomplishments and/or goals have been realized as a direct result of its efforts. The most noteworthy of these are as follows:

- \* Completed a basic inventory of the Town's Stormdrainage System, following both the natural and man-made elements of the system.
- \* Established a Chemical, Physical, and Biological Stream Water Quality Monitoring Program in coordination with Carrboro and U.N.C.
- \* Initiated a coordinated citizen volunteer stream monitoring effort.
- \* Established a baseline inventory of stream bottom organisms (benthic monitoring) as an initial indicator of stream health.
- \* Established a Citizen Stream Clean-up Program.
- \* Established a basic Public Education Program.
- \* Established a Stormdrain Stenciling Program aimed at heightening public awareness of the consequences of introducing pollutants into the stormdrain system.
- \* Created Geographic Information System (GIS) applications and coverages for both natural and engineered drainage systems.
- \* Through testing, observation, and analysis, determined the health of our streams to be relatively good, and not posing chronic or significant public health hazards.

**APPENDIX "C"**

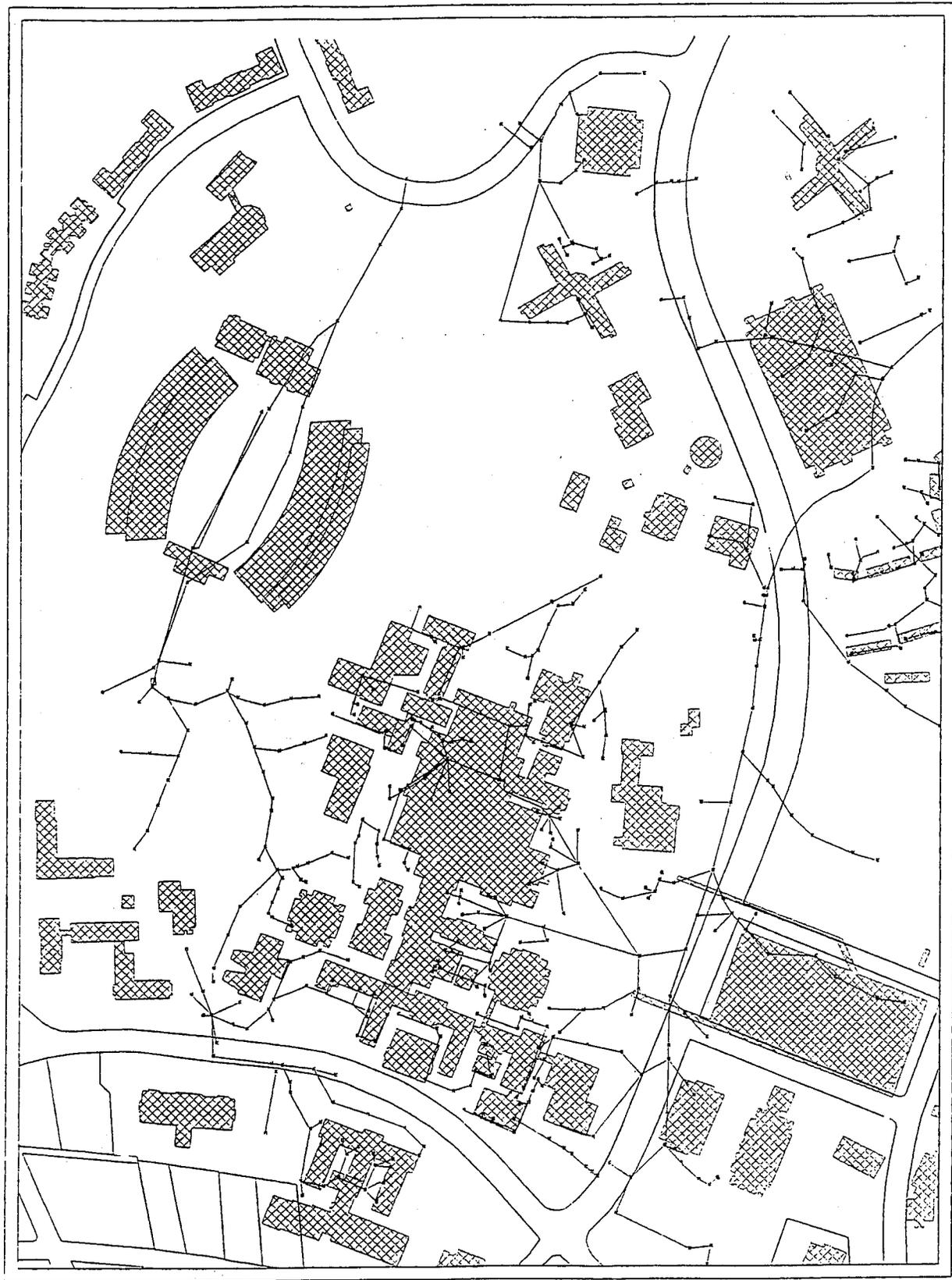
**GIS APPLICATIONS MAPS**

Floodway, 100 and 500 Year Flood Zones Map



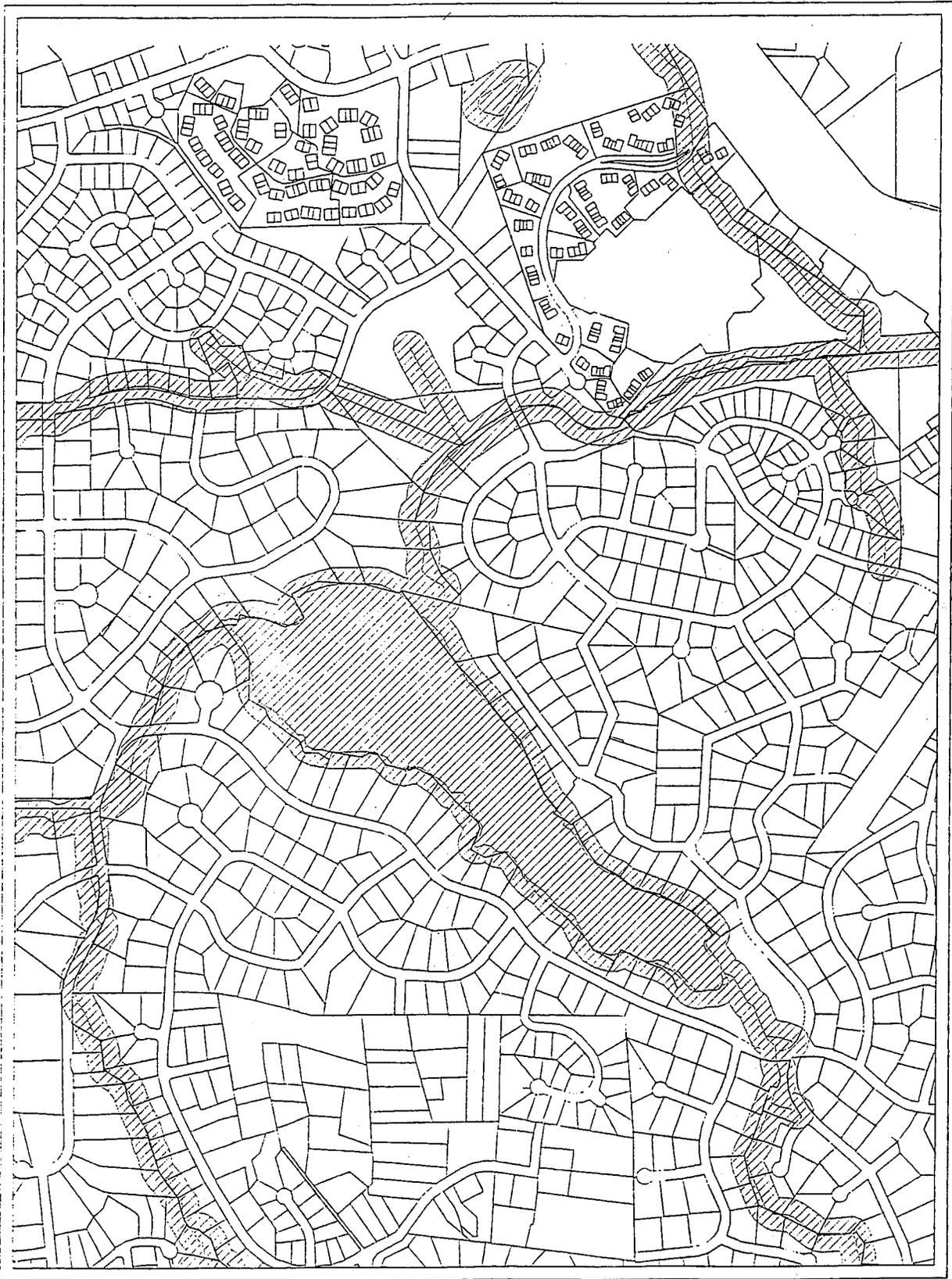
Official FEMA flood maps presented in the Town's GIS format.

# Storm Drainage Map



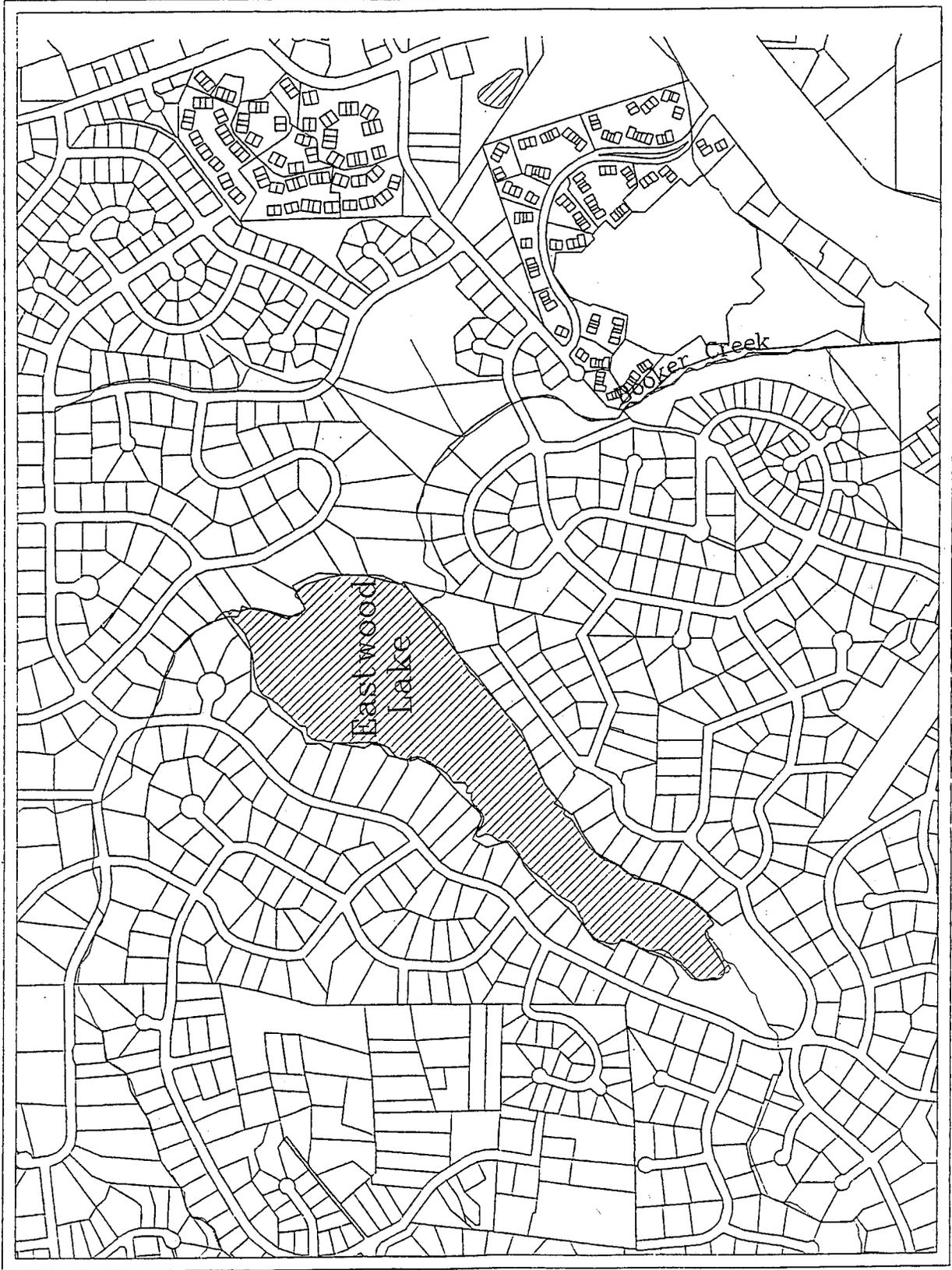
Representative GIS map of catch basins and stormwater drainage system near UNC's Kenan Stadium.

# 100 Foot Perennial Buffer Map



GIS map depicting the 100 foot buffer along Chapel Hill's perennial streams.

# Perennial Surface Water Map



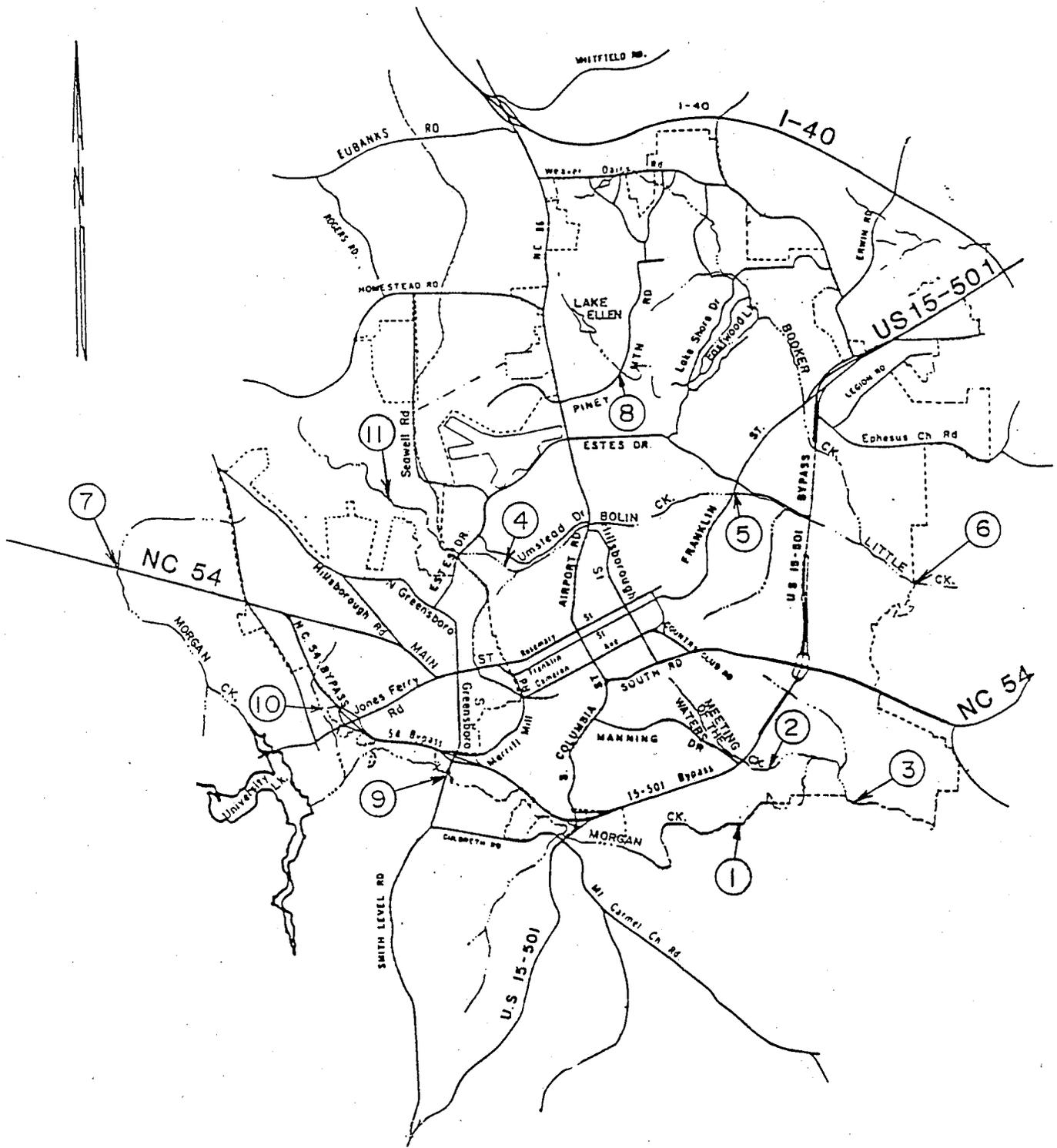
Map presents GIS capabilities of overlaying perennial stream map and Town parcel maps.

## WATER QUALITY STANDARDS FOR FRESHWATER CLASSES

<u>PARAMETERS</u>	<u>REG. STANDARD</u>	<u>HIGHER STANDARD</u>
AMMONIA (NH <sub>3</sub> )	NL (1.0mg/l summer, 2.0 mg/l winter)	
CADMIUM (Cd)	2.0 ug/l	0.4 ug/l
CHROMIUM (Cr)	50.0 ug/l	
COLIFORM, FECALS	200/100 ml*	OR 400/100 ml 20%*
DISSOLVED OXYGEN (DO)	5.0 mg/l*	
IRON (Fe)	1.0 mg/l	
LEAD (Pb)	25.0 ug/l	
NICKEL (Ni)	88.0 ug/l	25.0 ug/l
NITRATE N (NO <sub>3</sub> -)		10.0 MG/L
OIL AND GREASE	NL (>100mg/l is concern)	
Ph (units)	6.0 - 9.0	
PHENOLS		1.0 ug/l
PHOSPHORUS	NL (>0.50mg/l is concern)	
SOLIDS, TDS		500.0 mg/l
SOLIDS, TSS	NL (<30.0mg/l low, >100.0mg/l high)	
ZINC (Zn)	50.0 ug/l	

From North Carolina Division of Environmental Management  
 Administrative Code Section 15A NCAC 2B. 0200 -  
 Classifications and Water Quality Standards Applicable  
 to Surface Waters of North Carolina, February 1, 1993.

- NL = no legal limit. The standards given are recommended.  
 \* = based on five consecutive samples over a 30 day period  
 or not exceed 400cfu/100ml in more than 20% of samples  
 examined during such period.  
 \* = not less than a daily average of 5.0 mg/l.



SITES

- NO. 1 = MORGAN - ASHE
- NO. 2 = MEETING - LAUREL HILL
- NO. 3 = MORGAN - FORD
- NO. 4 = BOLIN - BOLINWOOD
- NO. 5 = BOLIN - ESTES
- NO. 6 = LITTLE - GOLF
- NO. 7 = MORGAN - CONTROL
- NO. 8 = BOOKER - PINEY MTN.
- NO. 9 = MORGAN - SMITH LEVEL (FUTURE SITE)
- NO. 10 = TOMS - CARRBORO
- NO. 11 = BOLIN - CARRBORO

**CHEMICAL/PHYSICAL  
PARAMETER  
SAMPLING SITES**

NO SCALE

