

# City of Huntsville, Alabama

# Flood Mitigation Plan



1973



1999



2001

Prepared by

Flood Mitigation Planning Committee

June 1, 2001

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# Executive Summary



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## **Mitigation Plan Highlights**

This Plan was prepared by the Flood Mitigation Planning Committee of the City of Huntsville. Chapter 2 summarizes the flooding hazard faced by the City and the 6,000 improved properties in the floodplain. Chapters 4 – 9 review the various ways the City and its residents can protect life and health and reduce flood damage.

Chapter 10 is the Action Plan. There are 16 individual action items to be implemented by 13 offices and agencies. Together they recommend:

- New floodplain maps and models as the basis for regulations and watershed plans
- Acquiring and clearing the floodway and expanding parks and greenways
- Reviewing and upgrading regulatory standards and procedures for new development
- Changes in stream maintenance
- Improved flood preparedness
- More information and assistance to the public
- A new stormwater utility to finance needed projects
- Follow through mechanisms to ensure the plan is implemented

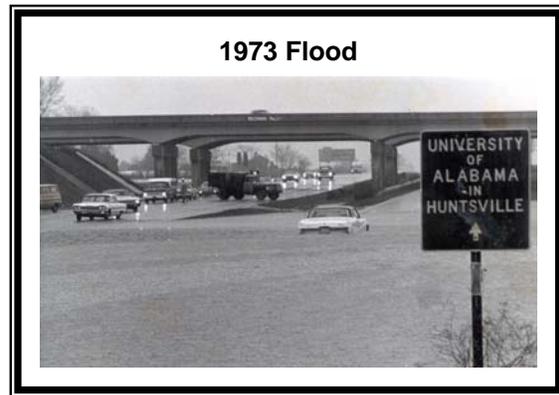
# Flood Mitigation Plan

## Executive Summary

This Executive Summary is a synopsis of the City of Huntsville's *Flood Mitigation Plan*. The sections in this summary correspond to the chapters in the full *Plan*. The full *Plan* can be viewed at the Library, at City Hall, and on the City's web site, [www.ci.huntsville.al.us](http://www.ci.huntsville.al.us).

### 1. Introduction

The City of Huntsville has extensive areas of floodplains that affect over 6,000 properties. These areas have always flooded. More recent damaging floods occurred in 1949, 1963, 1973, 1988, 1990, and 1999. Following floods in 1963 and 1973, many of the existing streams and channels that experienced flooding were straightened, widened, and concreted ("slope paved") to increase the capacity of the channel and reduce the potential for flooding.



Today, the City continues to focus on improving its drainage infrastructure to eliminate flooding problems and reduce flood potential. Huntsville has also implemented other strategies besides structural projects to reduce the likelihood of flooding and protect people from financial losses due to floods. These include joining the National Flood Insurance Program and adopting regulatory requirements for stormwater management and floodplain construction.

All the City's efforts to improve drainage facilities and implement better plans to manage development have helped, but they have not eliminated all potential flooding. This can be seen by the flood damage that resulted from a severe rainfall and flood event in June 1999 along Aldridge Creek and its tributaries.

**The *Plan*:** Because there is a variety of other possible flood protection measures, the City of Huntsville opted to prepare a formal *Flood Mitigation Plan*. The objective of the plan is to guide flood protection activities for the next 5 – 10 years and ensure that the City implements flood related activities that are most effective and appropriate for its flooding situation.

The *Flood Mitigation Plan* was developed under the guidance of a Flood Mitigation Planning Committee. Half of the members represent the general public and interest groups and half are City staff. The committee met monthly since September 2000 and has encouraged public involvement in its work.

## 2. Problem Description

**Watersheds:** Floodwaters come from the watershed. The condition of the watershed affects what happens to the rain. For example, more rain will run off if the terrain is steep, if the ground is already saturated from previous rains, or if the watershed is covered with lots of pavements and parking lots.

For this Flood Mitigation Plan, Huntsville was divided into its 15 major watersheds. These are shown on the map on the next page. Some watersheds are large, but have few buildings exposed to flooding. Using the City’s Geographic Information System (GIS), the planners collected the data on the City’s watersheds as shown in the table below.

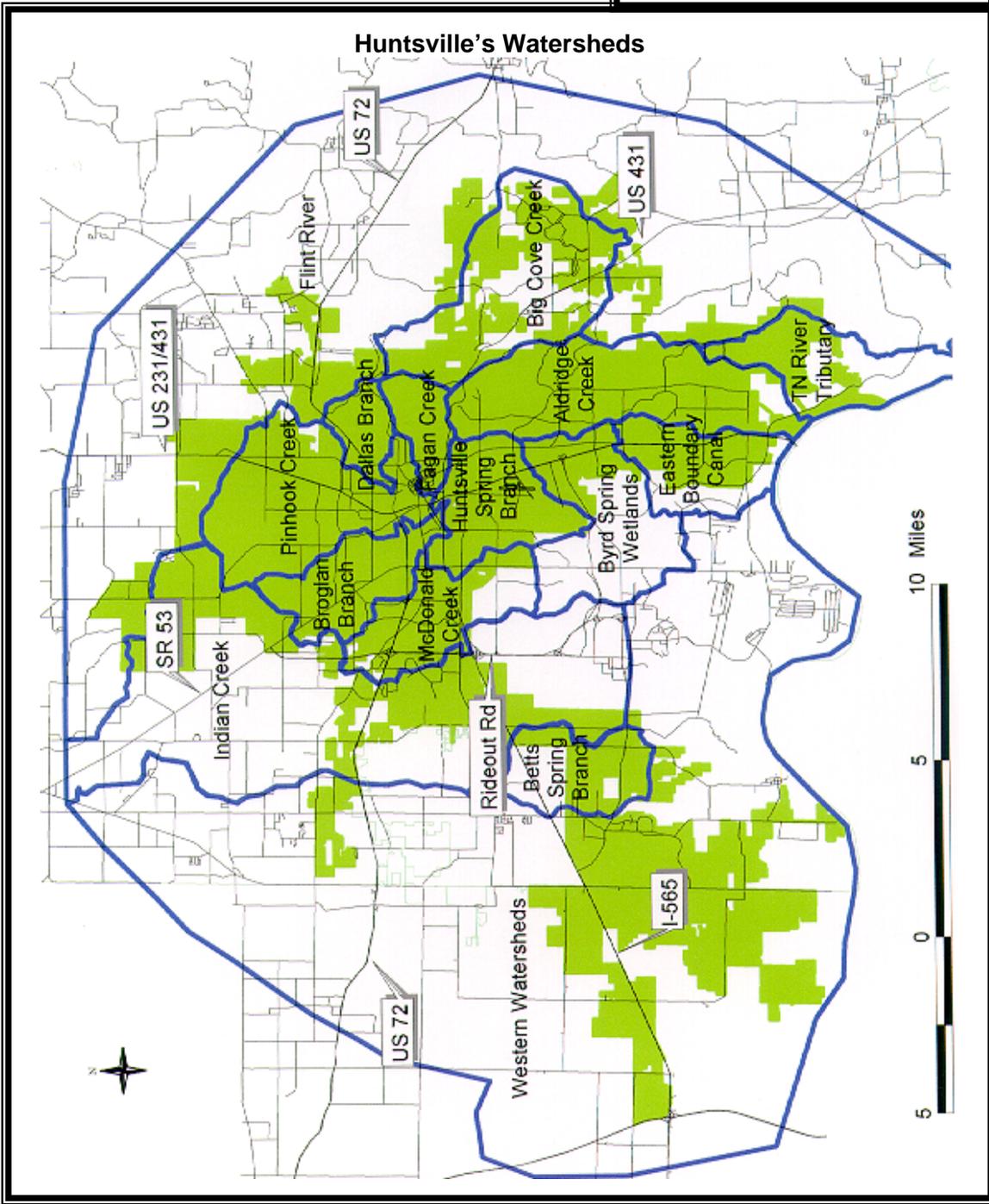
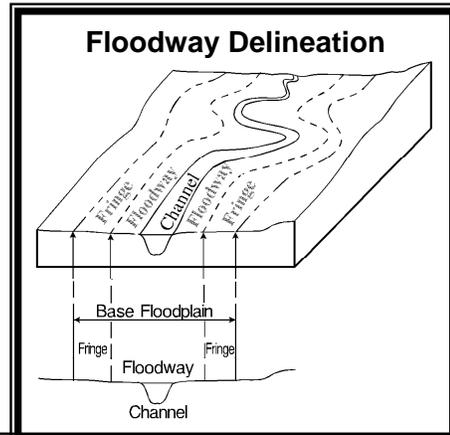
**Floodplains:** Flood studies and mitigation plans are based on the *risk* of future flooding. Flood studies determine the potential that storms and floods of certain magnitude will recur. Such events are measured by their “recurrence interval,” i.e., a 10-year storm or a 100-year flood.

This *Plan* uses the 100-year flood and the 100-year floodplain mapped by the Federal Emergency Management Agency as the basis for planning and setting flood protection levels. The floodplain is divided into the floodway and the flood fringe.

| Watershed and Floodplain Data |           |         |            |                     |          |
|-------------------------------|-----------|---------|------------|---------------------|----------|
| Watershed                     | Watershed |         | Floodplain | Billing Addresses * |          |
|                               | Area      | In City | Area       | Floodplain          | Floodway |
| Aldridge Creek                | 21        | 98%     | 3.2        | 1,164               | 45       |
| Betts Spring Branch           | 9         | 61%     | 1.9        | 177                 | 1        |
| Big Cove Creek                | 22        | 56%     | 2.7        | 156                 | 4        |
| Broglan Branch                | 9         | 99%     | 1.0        | 923                 | 57       |
| Byrd Spring Wetlands          | 15        | 28%     | 0.8        | 77                  | 0        |
| Dallas Branch                 | 4         | 100%    | 0.6        | 72                  | 42       |
| Eastern Boundary Canal        | 10        | 62%     | 1.9        | 280                 | 0        |
| Fagan Creek                   | 4         | 100%    | 0.4        | 220                 | 1        |
| Flint River                   | 470       | 5%      | 1.8        | 93                  | 1        |
| Huntsville Spring Branch      | 11        | 97%     | 2.8        | 1,239               | 404      |
| Indian Creek                  | 49        | 29%     | 1.4        | 47                  | 3        |
| McDonald Creek                | 11        | 77%     | 1.1        | 385                 | 26       |
| Pinhook Creek                 | 23        | 100%    | 1.4        | 1,196               | 164      |
| Tennessee River tributary     | 15        | 36%     | 0.9        | 4                   | 1        |
| Western Watersheds            | 214       | 17%     | 7.2        | 33                  | 0        |
| Total                         | 887       |         | 29.1       | 6,066               | 749      |

Areas are in square miles. Floodplain areas are all in the City.  
 \* A “billing address” is an improved property that receives a utility bill. The number of billing addresses is an approximation of the number of buildings exposed to flooding.

**Floodways:** The central part of the floodplain is called the “floodway.” The floodway is the stream channel and that portion of the adjacent floodplain which must remain open to permit passage of the base flood. Floodwaters generally are deepest and swiftest in the floodway, and anything in this area is in the greatest danger during a flood. The remainder of the floodplain is called the “fringe,” where water may be shallower and slower. 5.8 square miles (20%) of Huntsville’s floodplains are in mapped floodways.



## Summary of the problem:

→ There are 29 square miles and 6,066 developed properties in the base or 100-year floodplain. These numbers mean that 17% of the City's land area and 6.7% of the City's developed property are subject to overbank flooding.

→ There are 749 improved properties in the floodway, the area of deepest and swiftest flooding.

→ While recent floods did not affect all the City's watersheds, they did cause considerable property damage where they did occur.

→ Floods also present hazards to safety, health and mental health. One person was killed in the June 1999 flood.

→ Construction of channel improvements and storage basins has lowered, but not eliminated, the flood threat on some streams.

→ Historically, flood protection work has produced channels that are not visually appealing and have little water quality, habitat or recreational benefit.

→ Floodplains provide natural and beneficial functions and improve the recreational opportunities for City residents.

→ Without appropriate regulatory constraints, future development will increase flood heights, reduce water quality and damage habitat.



## 3. Goals

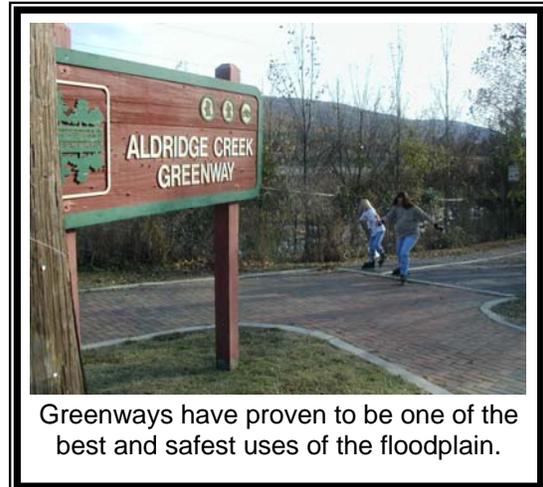
The Planning Committee set five goals for the *Mitigation Plan*:

1. Protect human life and health from flooding.
2. Mitigate the effects of flooding on existing development.
3. Protect new development from damage by the base flood.
4. Improve the quality of life in the City
5. Secure the resources needed to implement the *Flood Mitigation Plan*.

## 4. Preventive Measures

The Committee looked at measures that are designed to keep the problem from occurring or getting worse by preserving areas from development and by setting construction standards for new development. The Committee concluded:

- The Greenway Plan, zoning ordinance and subdivision regulations are Huntsville's primary tools used to manage development in the floodplain. Other potential tools, such as an open space plan, are not currently used.
- In areas where development is allowed in the floodplain, the city's program meets the minimum national requirements. Because minimum national standards do not cover all of Huntsville's needs, the City requires new buildings to be protected one foot higher than the national requirement.

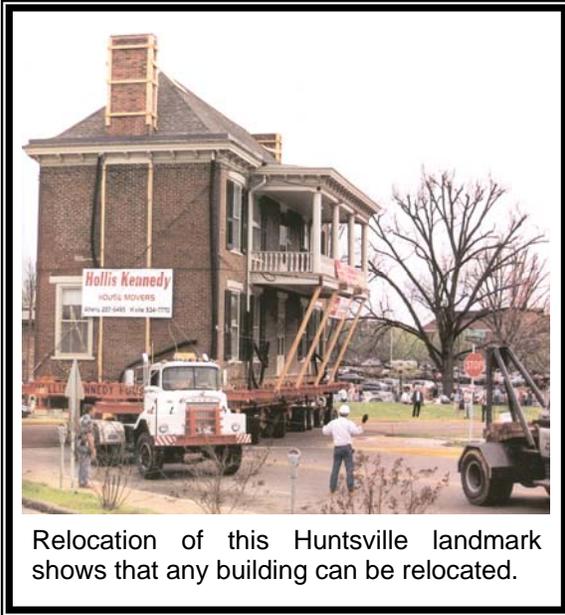


- The City's standards for stormwater detention cannot be considered effective in managing runoff from greater than the 10-year storm. The 10-year storm is an appropriate standard for the minor drainage system, but the first floor of buildings should be protected from larger floods through proper design of the major drainage system and detention
- The City's procedures for administering regulations on floodplain construction should be streamlined with clear lines of responsibility between the Engineering and Inspection Divisions to be sure all requirements are met.
- The most effective approaches to managing stormwater runoff in any particular location are best determined by a stormwater management master plan. The City is initiating such plans.

## 5. Property Protection

Property protection measures are used to modify buildings subject to flood damage rather than to keep floodwaters away. These can be inexpensive measures which often are implemented by or cost-shared with property owners. They include relocation, acquisition, local barriers, floodproofing and insurance. The Committee found:

- A program to reduce damage to existing properties should focus on the floodway, where there are 749 improved properties in this area of deepest and swiftest flooding. The floodway should be the initial focus for acquisition projects where the acquired land can be converted to open space and greenways.

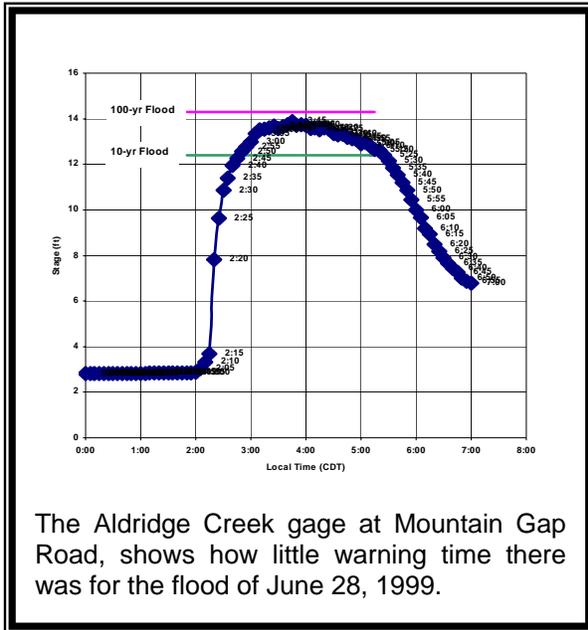


- Property owners can implement some property protection measures at little cost, especially for sites in areas of low flood hazard.
- Many people are not aware of the various ways they can protect their own property.
- There is a low level of awareness of the availability and coverage provided by flood insurance.
- The City can promote and support property protection measures through a variety of activities.

## 6. Emergency Services

Emergency services measures protect people during and after a flood. Locally, these measures are coordinated by the Huntsville-Madison County Emergency Management Agency. The Agency's main guidance for implementing population protection measures is the *Emergency Operations Plan* which was just updated in 2000.

- The City's ability to provide flood warning and detailed flood response plans is limited to the Tennessee and Flint Rivers.



The Aldridge Creek gage at Mountain Gap Road, shows how little warning time there was for the flood of June 28, 1999.



- Because many other Huntsville watersheds respond to rainfall in two hours or less, early flood warning on other streams is hampered by a lack of real-time rain and stream gages and local storm forecasts.
- An improved flood response plan is dependent on early flood warning and flood stage forecast maps.
- Critical facilities that will be affected by flooding need to be identified and included in flood response planning.

## 7. Structural Projects

Structural projects have traditionally been used by cities to control flows and water surface elevations. They include reservoirs, levees, floodwalls, channel modifications, dredging, and drainage system maintenance.

→ Each of these measures has been shown to work in Huntsville, but each has its own advantages and disadvantages.

→ Watershed planning is the best way to determine the most appropriate flood damage reduction measure(s) for an area.

→ Channel modifications, including slope paving of channels, and dredging have been two of the City's more common flood protection approaches. While channel modifications are effective, these approaches are expensive and can have adverse impacts on water quality, habitat, and downstream flooding.



→ Given available resources, the City has an appropriate program for maintaining channels and basins to ensure that they keep their design flood protection levels, but many residents have voiced displeasure with the way it works.

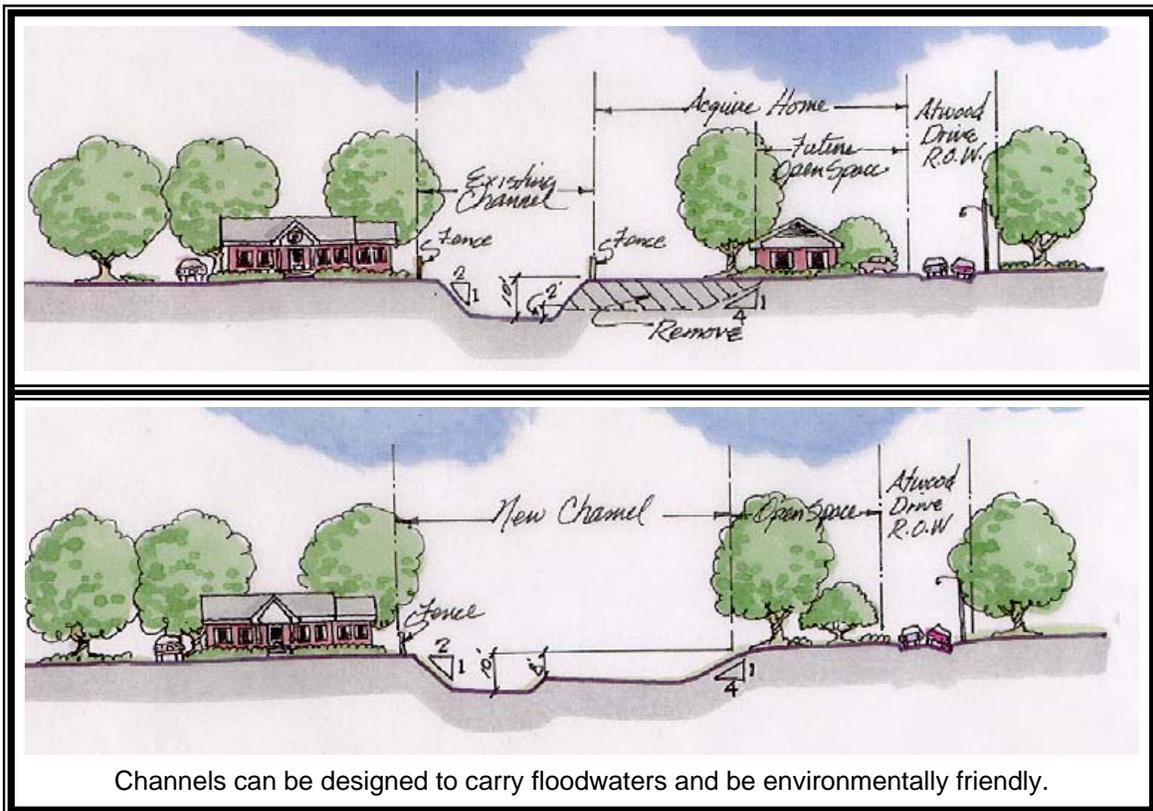
## 8. Natural Resource Protection

Natural resource protection activities are generally aimed at preserving (or in some cases restoring) natural areas. In so doing, these activities enable the naturally beneficial functions of floodplains and watersheds to be better realized. For example, protecting wetlands preserves areas that store and filter floodwaters.

→ A flood mitigation program can take advantage of interest in protecting wetlands and natural floodplain functions and utilize natural resource protection programs to support flood protection.

→ While wetlands and other areas have been damaged in the past, the current regulations on wetland protection, erosion and sediment control and dumping have effective standards. However, there are some gaps in enforcement.

→ The move toward river restoration (see the illustration on the next page) and nonpoint source best management practices are encouraging trends, but many property owners and developers are still learning about appropriate procedures.



Channels can be designed to carry floodwaters and be environmentally friendly.

## 9. Public Information

A successful hazard mitigation program involves both the public and private sectors. Public information activities advise property owners, renters, and businesses about flood hazards and ways to protect people and property from these hazards. These activities can motivate people to take flood protection steps and protect the natural and beneficial functions of floodplains and watersheds.

- There are many ways that public information programs can be used so that people and businesses will be more aware of the hazards they face and how they can protect themselves. Many are currently being implemented.
- The residents and businesses of Huntsville have a relatively low level of knowledge about the following flood mitigation topics:
  - The various ways they can protect their own property from flooding.
  - The availability and coverage provided by flood insurance.
  - What to do when a flood warning is issued.
  - The City's channel maintenance program.
- There are opportunities for improved public information services, including:
  - Providing more information and links on the City's web site
  - Outreach projects that reach more people and cover more topics
  - Providing real estate agents with flood hazard information

## 10. Action Plan

General recommendations appear at the end of Chapters 4 – 9 for each of the six mitigation strategies. The Action Plan converts those general recommendations to specific action items. It is organized according to the office that would be responsible for them.

### Engineering Division

- 1. Floodplain mapping:** Prepare watershed models and floodplain maps for all of the City's floodprone areas. These would include hydrologic and hydraulic computer models of the surface water flows in the watershed that can be used to evaluate alternative flood protection measures and the impact of new developments on drainage and flooding and a flood stage forecast map for emergency response planning.
- 2. Watershed plans:** Prepare master flood protection plans using the models and mapping developed pursuant to the previous action item. Each plan should include an evaluation of structural and property protection measures (and combinations of those measures) that will protect existing development and a determination of the best approach to managing stormwater runoff from new development in the watershed, including locations for regional detention facilities. These plans should be coordinated with open space planning with the objective of acquiring properties in the floodway that will result in open space or greenways that will benefit the entire community.
- 3. Stormwater management regulations:** Review the Subdivision Regulations and the Stormwater Management Manual to determine appropriate standards and procedures that will ensure that post-development flows leaving a development will not cause increased damage to downstream properties.
- 4. Floodplain regulations:** Ensure that the City meets all required regulatory provisions and review the floodplain regulations and identify construction standards that are more appropriate for Huntsville's flood conditions.

### Planning Division

- 5. Zoning Ordinance:** Review the Zoning Ordinance to insure that the standards for new construction in the floodplain are appropriate.
- 6. Open Space Plan:** Prepare an open space plan with associated funding recommendations to facilitate protection of land to provide flood protection and recreation benefits. The plan should be coordinated with watershed plans (Action Item #2) with the objective of acquiring properties in the floodway that will result in open space or greenways that will benefit the entire community.

### Inspection Division

- 7. Regulatory procedures:** Review the City's procedures to ensure that all the floodplain and stormwater regulations are properly and fully enforced.

## Public Works Services

- 8. Drainage maintenance program:** Prepare new drainage system maintenance procedures. Include streamside residents and interested organizations in the preparation of the procedures and incorporate maintenance standards and procedures that will protect sensitive areas and habitat.

## Emergency Management Agency

- 9. Pilot flood response plan:** prepare a pilot flood response plan for one floodplain, using a flood stage forecast map prepared pursuant to Action Item #1 and evaluate the benefits and costs of a flood warning program.
- 10. Critical facilities plans:** Identify the critical facilities that are affected by flooding. Work with their managers to determine any special flood warning and response support they may need from the City and encourage them to prepare their own flood response plans.

## Public information strategy – Engineering Division

- 11. Ongoing public information activities:** Ensure that the following ongoing information and technical assistance activities are implemented:

- Providing map and flood hazard information to inquirers
- One-on-one advice and assistance on flood protection measures
- Providing references to the library
- Issuing news releases and news articles
- Making presentations at meetings of associations and interested groups

- 12. New public information projects:** Design and initiate the following new activities:

- Publicity of property protection projects that have been constructed in Huntsville
- Incorporating a flood protection web page in the City's web site
- Providing a library of flood-related videos to the public access cable TV channel.
- Preparing a homeowner's flood protection manual
- Conducting an annual mailing to floodplain addresses
- Pursuing measures to disclose the flood hazard to house hunters
- Preparing sinkhole and landslide hazard maps and public information materials

## Administrative Action Items –Mayor and City Council

- 13. Plan adoption:** Adopt this *Flood Mitigation Plan* and create a standing Mitigation Committee.

## Mitigation Committee

- 14. Program oversight:** Monitor implementation of the Action Plan and report on progress and recommended changes to the Mayor and City Council.

**15. Financial review:** It is estimated that the City of Huntsville will need to spend in the neighborhood of \$9 million per year if it is to significantly reduce flood losses over the next 10 – 20 years. This is the estimated total of current expenditures, the cost of the *Plan's* action items (see box), and the expected cost of implementing the watershed plans.

Current sources of revenue for flood protection and stormwater management activities are stretched to their limits. There are funding sources that have not been used, but there are many policy and financial issues that need to be reviewed and settled before a recommendation can be submitted to the Mayor and City Council. At a minimum, the following should be examined:

- A stormwater user fee or utility
- Fees for reviewing new development's stormwater plans and/or flood protection measures (currently the City does not charge for this extra permit review)
- Using volunteers for activities such as stream maintenance

**Engineering Division**

**16. Community Rating System:** After sufficient action items recommended by this *Plan* are implemented, the City should submit a modification to move it to a CRS Class 7. This will produce a 15% flood insurance premium reduction and an average annual saving to Huntsville property owners of \$44 per flood insurance policy.

| Estimated Plan Costs                |                       |
|-------------------------------------|-----------------------|
| Action Item                         | Estimated Annual Cost |
| 1. Floodplain mapping               | \$1,000,000           |
| 2. Watershed plans                  | \$1,000,000           |
| 3. Stormwater mgmt regulations      | \$60,000              |
| 4. Floodplain regulations           | Staff time            |
| 5. Zoning ordinance                 | Staff time            |
| 6. Open space plan                  | Staff time            |
| 7. Regulatory procedures            | Staff time            |
| 8. Drainage maintenance program     | Staff time            |
| 9. Pilot flood response plan        | Staff time            |
| 10. Critical facilities plans       | Staff time            |
| 11. Ongoing public information      | Staff time            |
| 12. New public information projects | \$6,000               |
| 13. Plan adoption                   | Staff time            |
| 14. Program oversight               | Staff time            |
| 15. Financial review                | \$5,000               |
| 16. Community Rating System         | Staff time            |
| Total estimated annual dollar costs | \$2,071,000           |

These figures are the estimated annual costs for the recommended action items. For action items 1, 2, and 15, the estimated annual cost is the estimated total cost divided by 5 years. *Note:* These are only the costs of the recommended action items. They do not include the operations, administrative, maintenance and capital improvements costs being expended by the City for current flood and stormwater management activities. These numbers do not include the cost of implementing the recommendations of the watershed plans, which could run up to \$5 million each year.

The full *Plan* can be viewed at the Library, at City Hall, and on the City's web site, [www.ci.huntsville.al.us](http://www.ci.huntsville.al.us). Comments on the draft *Plan* were requested. They should've been presented at a public meeting to be held at [time] on June 11 at City Hall or submitted to the City's Engineering Division by that date. For more information, contact Dr. Warren Campbell at 427-5350.

# City of Huntsville, Alabama

## Flood Mitigation Plan

### Contents

|   |      |
|---|------|
| Chapter 1. Introduction .....                           | 1-1  |
| 1.1. Background .....                                   | 1-1  |
| 1.2. Mitigation Planning Committee .....                | 1-2  |
| 1.3. The Community Rating System .....                  | 1-5  |
| Chapter 2. Problem Description .....                    | 2-1  |
| 2.1. Sources of Flooding .....                          | 2-1  |
| 2.2. Huntsville’s Watersheds .....                      | 2-3  |
| 2.3. Historical Flooding .....                          | 2-5  |
| 2.4. Flood Data .....                                   | 2-7  |
| 2.5. Safety and Health Hazards .....                    | 2-12 |
| 2.6. Floodprone Buildings .....                         | 2-13 |
| 2.7. Critical Facilities .....                          | 2-17 |
| 2.8. Economic Impact .....                              | 2-18 |
| 2.9. Other Natural Hazards .....                        | 2-20 |
| 2.10. Natural and Beneficial Floodplain Functions ..... | 2-26 |
| 2.11. Future Development .....                          | 2-27 |
| 2.12. Conclusions .....                                 | 2-29 |
| 2.13. References .....                                  | 2-30 |
| Chapter 3. Goals .....                                  | 3-1  |
| 3.1. Findings .....                                     | 3-1  |
| 3.2. Goals .....  | 3-1  |
| Chapter 4. Preventive Measures .....                    | 4-1  |
| 4.1. Planning .....                                     | 4-1  |
| 4.2. Open Space Preservation .....                      | 4-2  |
| 4.3. Zoning .....                                       | 4-4  |
| 4.4. Subdivision Regulations .....                      | 4-5  |
| 4.5. Building Codes .....                               | 4-8  |
| 4.6. Floodplain Development Regulations .....           | 4-8  |
| 4.7. Stormwater Management .....                        | 4-13 |
| 4.8. Conclusions .....                                  | 4-16 |
| 4.9. Recommendations .....                              | 4-17 |
| 4.10. References .....                                  | 4-18 |

|  |      |
|--|------|
| Chapter 5. Property Protection.....              | 5-1  |
| 5.1. Relocation .....                            | 5-2  |
| 5.2. Acquisition.....                            | 5-3  |
| 5.3. Building Elevation .....                    | 5-4  |
| 5.4. Local Barriers.....                         | 5-6  |
| 5.5. Dry Floodproofing .....                     | 5-7  |
| 5.6. Wet Floodproofing.....                      | 5-8  |
| 5.7. Sewer Backup Protection.....                | 5-9  |
| 5.8. Insurance .....                             | 5-10 |
| 5.9. The City’s Role .....                       | 5-12 |
| 5.10. Conclusions.....                           | 5-14 |
| 5.11. Recommendations.....                       | 5-14 |
| 5.12. References.....                            | 5-15 |
| Chapter 6. Emergency Services .....              | 6-1  |
| 6.1. Flood Detection.....                        | 6-1  |
| 6.2. Flood Warning .....                         | 6-4  |
| 6.3. Flood Response.....                         | 6-6  |
| 6.4. Critical Facilities Protections.....        | 6-8  |
| 6.5. Post-Disaster Recovery and Mitigation ..... | 6-8  |
| 6.6. Conclusions.....                            | 6-10 |
| 6.7. Recommendations.....                        | 6-10 |
| 6.8. References.....                             | 6-11 |
| Chapter 7. Structural Projects .....             | 7-1  |
| 7.1. Reservoirs .....                            | 7-1  |
| 7.2. Levees and Floodwalls.....                  | 7-2  |
| 7.3. Channel Modifications.....                  | 7-3  |
| 7.4. Dredging .....                              | 7-6  |
| 7.5. Drainage System Maintenance .....           | 7-8  |
| 7.6. Conclusions.....                            | 7-12 |
| 7.7. Recommendations.....                        | 7-13 |
| 7.8. References.....                             | 7-13 |
| Chapter 8. Natural Resource Protection.....      | 8-1  |
| 8.1. Wetland Protection.....                     | 8-1  |
| 8.2. Erosion and Sedimentation Control .....     | 8-4  |
| 8.3. River Restoration .....                     | 8-6  |
| 8.4. Best Management Practices .....             | 8-8  |
| 8.5. Dumping Regulations .....                   | 8-9  |
| 8.6. Conclusions .....                           | 8-10 |
| 8.7. Recommendations .....                       | 8-10 |
| 8.8. References .....                            | 8-11 |

|  |       |
|--|-------|
| Chapter 9. Public Information.....     | 9-1   |
| 9.1. Map Information .....             | 9-1   |
| 9.2. Library and Web Sites .....       | 9-2   |
| 9.3. Outreach Projects .....           | 9-4   |
| 9.4. Technical Assistance.....         | 9-6   |
| 9.5. Real Estate Disclosure .....      | 9-7   |
| 9.6. Educational Programs .....        | 9-8   |
| 9.7. Conclusions.....                  | 9-10  |
| 9.8. Recommendations.....              | 9-11  |
| 9.9. References.....                   | 9-12  |
| Chapter 10. Action Plan.....           | 10-1  |
| 10.1. Summary of Conclusions.....      | 10-1  |
| 10.2. Program Action Items .....       | 10-4  |
| 10.3. Public information strategy..... | 10-11 |
| 10.4. Administrative Actions .....     | 10-13 |
| 10.5. Mitigation Committee.....        | 10-17 |
| 10.6. Plan Adoption Resolution.....    | 10-18 |

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