

# 3

## Natural and Environmental Resources

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## Vision Statement

Hendersonville will be known for its success in protecting valuable open spaces and reducing its ecological footprint, maintaining the resources that first attracted residents to this community and supported its prosperity. Preservation of environmentally sensitive areas will protect citizens from natural hazards, improve water and habitat quality and contribute to an interconnected network of recreational open space. Local agriculture will continue to promote locally-grown food and will remain a strong cultural and economic component of the community. Low-impact development will promote clean air and water through energy efficiency, stormwater management and reduced waste. These ecological successes will maintain a healthy, attractive community for current and future generations.

### Section 3.1. Purpose

The Natural and Environmental Resources element creates a framework for preservation of sensitive natural areas, working lands and ecological systems in concert with future development. Preserving these features will help to sustain air and water resources and contribute to the health and quality of life of Hendersonville residents. Additionally, the concepts presented in this element will preserve the natural character that defines Hendersonville's identity.

Primary components of this element include:

1. An inventory of natural resources including wetlands, topography, streams and associated floodplains and land used for agriculture
2. A vision, goals and strategies aimed at the preservation and restoration of natural areas as Hendersonville continues to grow
3. Recommendations for establishing a "green infrastructure" network in Hendersonville

Strategies recommended in this element relate to several other elements of the Comprehensive Plan, including Population and Housing, Recreation and Open Space, Public Facilities and Services, Economic Development, Transportation and Circulation, and Land Use and Development.

### Section 3.2. Issues and Opportunities

Hendersonville's natural resources provide beautiful scenery, clean air and water, locally-produced food, recreational opportunities, and wildlife habitat. They also present challenges to development and the potential for natural hazards such as flooding and landslides. Below is a summary of issues and opportunities learned during the planning process that provide a basis for the Natural and Environmental Resources Vision, Goals and Strategies.

#### Steep Slopes

- Hendersonville's mountainous terrain is a unique asset that defines the City's scenic character and attracts residents and visitors.
- Steep slopes (generally 30% slope or greater for the purpose of this Plan) hinder development, particularly in the western reaches of the City (see Map 3.2a). Beyond increasing development costs, development on or



Blue Ridge Mountains

near steep slopes is vulnerable to the damaging effects of landslides.

- In addition to the physical challenges and environmental impacts associated with steep slope development, the State of North Carolina places restrictions on development on Protected Ridges, two of which are located adjacent to Hendersonville (see Map 3.2a).

### Waterways and Floodplains

- Mud Creek drains all other waterways in the City and ETJ (see Map 3.2a). Significant tributaries to Mud Creek within Hendersonville include Clear Creek, King Creek, Bat Fork, Johnson's Drainage Ditch, Britton Creek and Devils Fork. Several smaller tributaries empty into each of these waterways. The Mud Creek flows north and empties into the French Broad River near Asheville.
- Past farming practices created several man-made drainage ditches, such as Johnson's Drainage Ditch.
- Floodplains and wetlands associated with the City's numerous creeks restrict development in a substantial portion of Hendersonville (see Map 3.2a).
- Although most floodplain areas in the City remain undeveloped, intense development has occurred within the floodplain near Downtown and some older neighborhoods. An example is the intersection of Greenville Highway, Spartanburg Highway and South Main Street, where periodic flooding hinders emergency access and damages private property.
- Several potential wetlands are found along the Mud Creek and Bat Fork. The City is currently working with a biologist to improve the natural habitat of wetlands along the Oklawaha Greenway.
- Development of floodplains and wetlands increases the potential for flood damage and erosion and



Mud Creek flowing under South Main Street – an area prone to flooding



Example of a wetland

reduces stormwater quality and areas for floodwater storage.

- Floodplains and wetlands in their natural state are opportunities for:
  - Natural stormwater filtering and conveyance
  - Continuous, regionally connected recreational greenways
- The City has adopted several measures to protect and manage water resources in order to prevent flood damage, preserve and enhance natural habitat and protect water quality. Examples include:
  - Participation in the National Flood Insurance Program since 1982
  - A Flood Damage Prevention Ordinance in Chapter 24 of the Municipal Code
  - Stormwater management requirements (Section 6-17 of the Zoning Code) and Phase II stormwater requirements (Chapter 24 of the Municipal Code)
  - A stormwater management program
  - Participation in the Western North Carolina Stormwater Partnership

- Natural Resource Protection Standards (Article 17 of the Zoning Code), which include development restrictions in the Floodway and 100-Year Floodplain and stream buffer protection standards
- A resolution of agreement with Henderson County to enforce the County-adopted Soil Erosion and Sedimentation Control Ordinance within the City's planning jurisdiction
- Acquisition of property for flood storage and stormwater treatment through the Clean Water Management Trust, including 27 acres near the intersection of Greenville Highway, Spartanburg Highway and South Main Street

### Flora and Fauna Habitat

Hendersonville residents have a history of showing concern for the natural habitat, as evidenced by

- Hendersonville received a Tree City USA Designation in 1991(see Figure 3.2a).
- The City's Tree Board (established in Section 46-146 of the Municipal Code) oversees the planting and care of trees on public property.
- The Heritage Tree ordinance (Section 46-124 of the Municipal Code) provides a procedure for designating specific trees in the community for protection, due to their size, age, or historical significance. The City currently has seven trees designated as Heritage Trees.
- The City has declared itself a sanctuary for birds and squirrels (Sections 10-1 through 10-3 of the Municipal Code). These sections generally prohibit the killing or harming of birds or squirrels within the corporate limits of Hendersonville, with a priority given to the Brevard White Squirrel.
- Hendersonville contains three areas identified by the North Carolina

### Figure 3.2a: Tree City USA

The Tree City USA program provides direction, technical assistance, public attention and national recognition for urban and community forestry programs. It is sponsored by the Arbor Day Foundation in cooperation with U.S. Department of Agriculture Forest Service. In order to qualify as a Tree City a community must have:

- A Tree Board or Department
- A Tree Care Ordinance
- A Community Forestry Program with an annual budget of at least \$2 per capita
- An Arbor Day observance and proclamation.

Department of Environment and Natural Resources as Natural Heritage Areas, which are locations of rare plant or animal habitat that warrant special consideration as land use decisions are made. These three areas include:

- Mud Creek Bridge and Eubank Swamp Remnant are located within and adjacent to King Memorial Park (park locations identified on Map 3.3a) and represent a wetland complex with diverse plant species despite past disturbances to the site.
- Jackson Park Wetlands are located at the northwest corner of Jackson Park.
- Bat Fork Bog is located adjacent to the southeast corner of Jackson Park and provides habitat for several rare plant species.

### Agricultural Preservation

- City and County residents still value agriculture as a part of the community's identity and history and for its aesthetic value as open space. Apple orchards, a significant part of the local culture, are celebrated at the annual North Carolina Apple Festival in Hendersonville. Agriculture in Hendersonville, as in many American communities, faces challenges from

development and competition from other regions and nations.

- The Appalachian Sustainable Agriculture Project (ASAP) helps to create and expand local food markets and create community-based, locally-controlled food systems. Additional information can be found at [www.asapconnections.org](http://www.asapconnections.org).
- Locally grown and raised foods, as advocated by ASAP and other organizations, can lead to:
  - Fresher and healthier foods
  - Preservation of rural economies, heritage and cultural values
  - Reduced environmental impact due to reduced shipping distances and sustainable farming practices
- Map 3.2a illustrates locations of Voluntary Agricultural Districts in and around Hendersonville. The Voluntary Agricultural District program, established by Henderson County, encourages farmers to preserve and identify their properties as farmland. The program maps and posts signs that identify participating properties as active farms. Additionally, the program requires notations on subdivisions and planned unit development plats regarding the proximity of a participating farm.

### Sustainable Development and Green Infrastructure

- Attendees of Steering Committee and general public meetings expressed a desire for sustainable development – development that preserves natural features and wildlife and maintains natural systems.
- The “green infrastructure” concept (see Figure 3.2b) views natural systems as a crucial part of a community’s infrastructure that requires the same level of attention as utilities and roadways. Green infrastructure systems help to protect and restore naturally functioning ecosystems and provide a framework

Figure 3.2b: Green Infrastructure

Green infrastructure is defined as an interconnected network of greenspace that conserves natural ecosystem values and functions and provides associated benefits to human populations...our nation’s natural life sustaining system. (SprawlWatch Clearinghouse, 2002).

A green infrastructure network consists of:

- “Hubs” that anchor the network and provide origins or destinations for wildlife and ecological processes. Examples include large national or state parks or wildlife refuges, managed native landscapes, working lands, regional parks and preserves, and community parks and natural areas. The picture below illustrates a portion of the 100-Year Floodplain, an example of a green infrastructure “hub”.



- “Links” that connect the system together and provide continuity in wildlife habitat and ecological systems. Examples include linkages between parks or preserves (see Oklawaha Greenway below and on the following page), river and stream corridors, greenbelts, and wooded buffer areas between urban and rural land uses.



- for future development. Examples of green infrastructure may include:
- Natural areas such as waterways, wetlands, woodlands, and wildlife habitats
  - Recreational areas such as greenways and parks
  - Working lands such as farms, ranches and forests
  - Benefits of green infrastructure include:
    - Enriched habitat and biodiversity
    - Cleaner air and water
    - Increased recreational opportunities
    - Improved health
    - Increases in property values
    - Reduced public infrastructure and service costs, including stormwater management and water treatment
    - Better connection to nature and sense of place
  - The Land-of-Sky Regional Council is a regional planning and development organization that represents Madison, Buncombe, Henderson and Transylvania Counties. The Council is working with local communities on the Linking Lands and Communities project, which aims to develop a regional conservation and development network. This network will:
    - Identify the region's green infrastructure.
    - Identify areas most suited for future growth and development.
    - Illustrate the importance of interconnectivity.
    - Provide a resource for decision-makers and developers.



Oklawaha Greenway boardwalk

## Section 3.3. Goals and Strategies

### Goal NR-1.

***Preserve environmentally sensitive areas in order to protect life and property from natural hazards, protect water resources, and preserve natural habitat.***

### Strategy NR-1.1.

**Discourage and reduce development of structures and impervious surfaces within the FEMA Floodway and 100-Year Floodplain (see Map 3.3a).**

Preserving and restoring the floodway and floodplain in an undisturbed, vegetated state preserves flood storage capacity, controls the quality and quantity of stormwater, and preserves flora and fauna habitat.

#### Action NR-1.1.1

Maintain and enforce the provisions of the City's Flood Protection Standards as development and redevelopment occur.

#### Action NR-1.1.2

Encourage the reduction of existing impervious surfaces located in the floodway and 100-year floodplain when redeveloping.

#### Action NR-1.1.3

Pursue grants to acquire properties in floodprone areas for the purpose of flood storage and stormwater treatment.

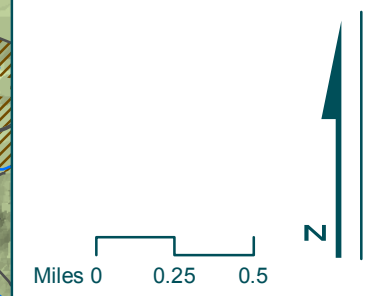
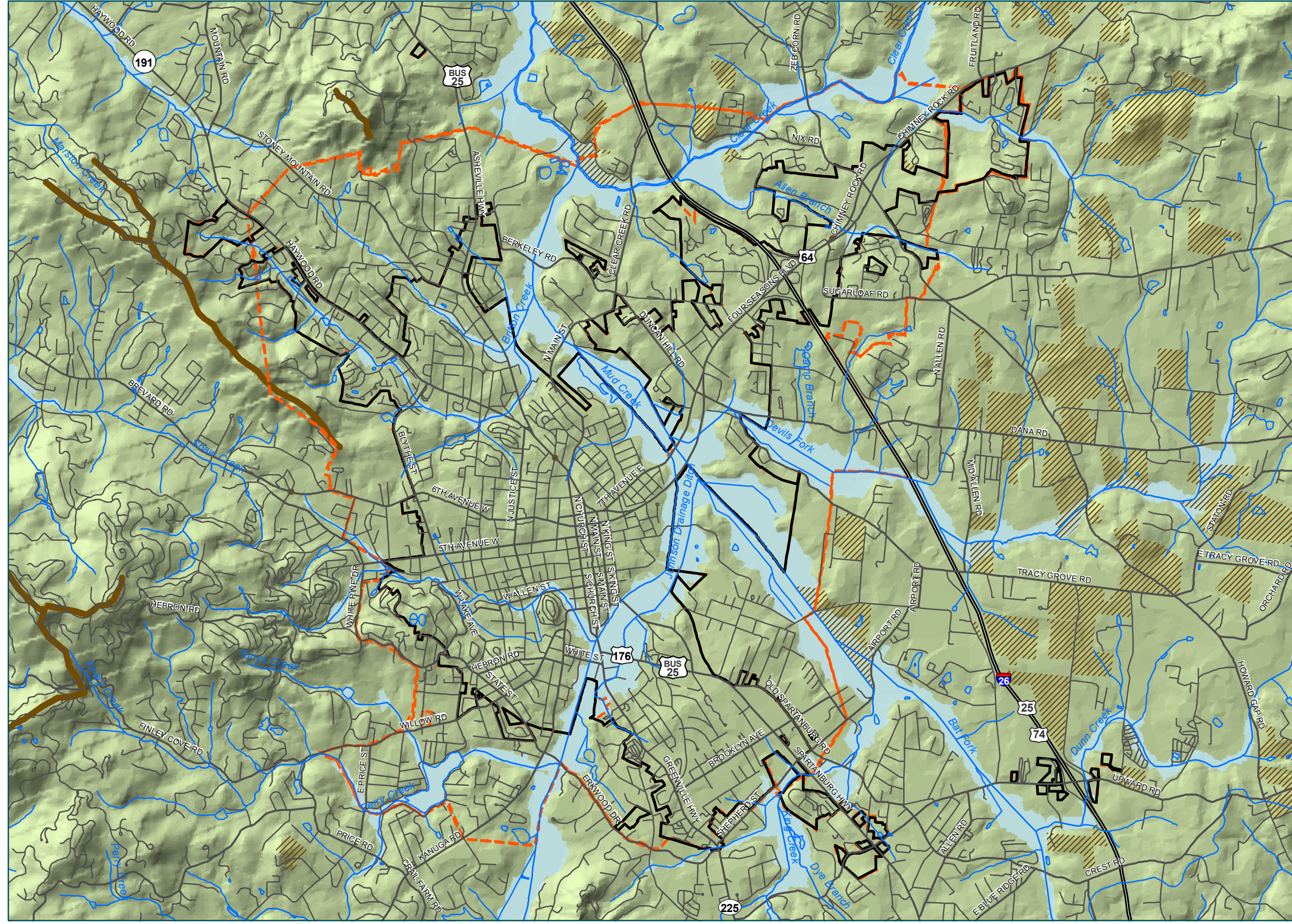
#### Action NR-1.1.4

Encourage the preservation of existing flood storage areas.

Map 3.2a:  
Natural Features

Legend















- City Limits
- Extra Territorial Jurisdiction
- Freeway
- Thoroughfare
- Local Street
- Voluntary Agricultural Districts
- State-Protected Ridges
- Stream
- 100-Year Floodplain
- Hillside Relief



Source:  
City of Hendersonville  
Henderson County  
USGS  
March 2009

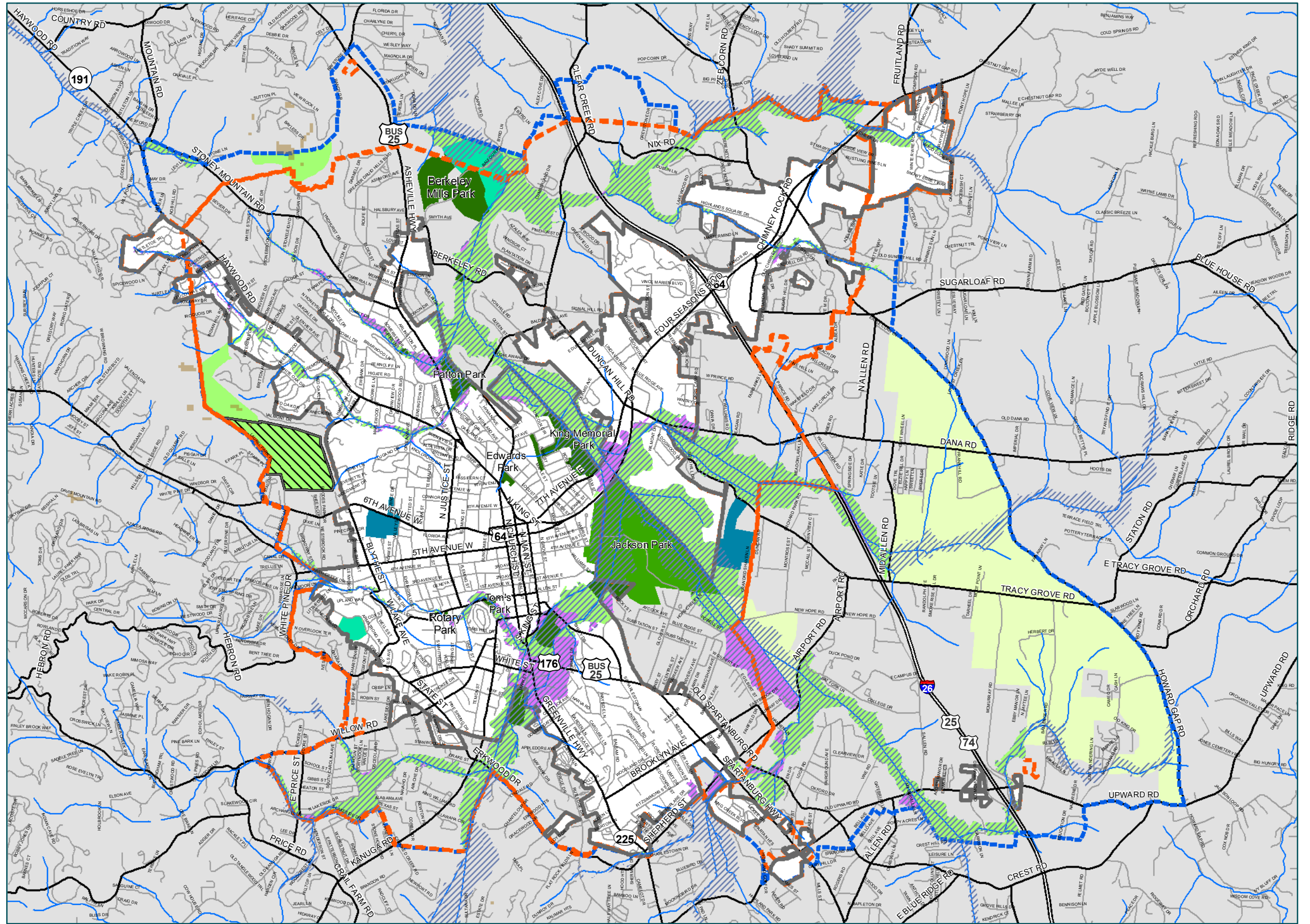
Map 3.3a:  
Green Infrastructure  
Plan

Legend

-  Slopes 30% or greater
-  100-Year Floodplain
-  Stream
-  City Limits
-  Extra Territorial Jurisdiction
-  Proposed ETJ Expansion
- Green Infrastructure**
- Environmentally Sensitive Lands**
-  City-Owned
-  County-Owned
-  Conservation Easement
-  Other Ownership
- Working Lands**
-  Agricultural Land
-  Cemetery
-  Water/Wastewater Utilities
-  Developed 100-yr. floodplain



Source:  
City of Hendersonville  
Henderson County  
March 2009







### Strategy NR-1.2.

#### Protect land adjacent to streams in order to protect water quality, reduce erosion, and protect wildlife habitat.

Streams carry stormwater through the community and provide conduits for flora and fauna, as well as attractive aesthetic and recreational elements for citizens. Streams also function as a major component of the green infrastructure (see Map 3.3a). Preserving land adjacent to streams provides opportunities for parks and greenways, as well as stormwater control and treatment measures such as rain gardens and filter buffers. Since not all streams are located in the FEMA floodplain, additional measures are needed to protect these valuable natural assets.

#### Action NR-1.2.1

Encourage protection of streams and wetlands and land adjacent to them.

#### Action NR-1.2.2

Continue to enforce and improve upon the City's Stream Buffer Protection Standards. Potential improvements include buffer widths that depend upon the size of the area drained by the stream and additional guidelines and provisions for low-impact building and site design.

#### Action NR-1.2.3

Encourage additional measures beyond the minimum required in the Stream Buffer Protection Standards during development reviews.

#### Action NR-1.2.4

Create and maintain a map that shows all developments that are required to follow stream buffer regulations.

#### Action NR-1.2.5

Develop a monitoring program for developments that include stream buffers to ensure that encroachment does not occur.

#### Action NR-1.2.6

Continue to require restoration of buffers that have been encroached upon.

#### Action NR-1.2.7

Provide educational materials on the importance and value of stream buffers to those property owners and developers with streams on their property.

#### Action NR-1.2.8

Provide stream restoration demonstration projects on City-owned property that includes streams.

#### Action NR-1.2.9

Coordinate with the North Carolina Cooperative Extension Service on stream preservation and restoration.

#### Action NR-1.2.10

Work with partners such as the Carolina Mountain Land Conservancy to encourage the acquisition of conservation easements in high-priority protection areas.

### Strategy NR-1.3.

**Encourage restoration of natural habitat and drainage patterns in developed areas.** Development has already occurred in several environmentally sensitive areas, resulting



Developed land near the intersection of Spartanburg Highway and Greenville Highway is subject to frequent flooding due to its location within the Mud Creek floodplain.

in developed floodplains (identified on Map 3.3a) and piped or rerouted streams. Future redevelopment in these areas should restore natural habitat and drainage patterns.

#### Action NR-1.3.1

Enforce floodplain protection regulations that require, where feasible, that redevelopment in the floodplain demonstrate an improvement in the site's functionality as a floodplain.

#### Action NR-1.3.2

Pursue grants to acquire developed floodplain properties when available and restore the sites to a natural state.

#### Action NR-1.3.3

Develop guidelines for daylighting streams and other habitat-restoring activities to encourage property owners to engage in these activities.

#### Strategy NR-1.4.

**Control development on steep slopes in order to protect life and property from erosion and landslides and preserve the natural appearance of hillsides.** Recent landslide events near Hendersonville underscore the importance of controlling development on or near steep slopes (generally 30% slope or greater; see Figure 3.3a for an explanation). Furthermore, preserving

**Figure 3.3a: Steep Slope Definition and Measurement**

The term "steep slopes" has varying definitions depending on factors such as soil types and development intensity. For the purpose of this plan, steep slopes are defined as 30% or greater.



steep hillsides in their natural state helps to protect a natural amenity that has attracted so many residents to Hendersonville. Map 3.3a illustrates a limited number of steep slope areas (30% or greater) in the Hendersonville ETJ.

#### Action NR-1.4.1

Encourage preservation of steep slopes in reviews of developments in planned development districts. Should the City consider expanding its planning jurisdiction to include large undeveloped areas with slopes greater than 30%, the City should consider adopting a steep slope development ordinance that applies to all development proposals.

#### Strategy NR-1.5.

**Continuously assess development and preservation efforts within areas planned as Natural Resources/Agricultural on the Future Land Use Map (Map 8.3b in Chapter 8) based on their conservation value.** Additional factors beyond those identified in this Plan may affect the conservation value of land. The statewide Conservation Planning Tool, described in Figure 3.3b, offers a means of assessing and prioritizing conservation efforts and coordinating them with regional and statewide efforts.

#### Action NR-1.5.1

Use Conservation Planning Tool findings and GIS data to evaluate and prioritize conservation of land within areas planned as Natural Resources/Agricultural.

**Figure 3.3b:**

#### OneNC Conservation Planning Tool

The Conservation Planning Tool offers a detailed, statewide analysis of conservation value based on biodiversity, water resources and agricultural viability. It includes online mapping, downloadable GIS layers, and reports that the City can use in its efforts to evaluate decisions to develop or preserve land within areas planned as Natural Resources/Agricultural. Additional information can be found at [www.oneNCnaturally.org](http://www.oneNCnaturally.org).

**Goal NR-2.**

*Provide a variety of quality open space, distributed equitably throughout Hendersonville, that can be used for recreational opportunities and aesthetic enhancements.*

**Strategy NR-2.1.**

**Encourage clustered development that preserves open space while allowing a return on investment.** Clustering homes on smaller lots, or clustering commercial development in multi-story buildings, preserves open space without sacrificing housing units or leasable floor area. Zoning regulations can encourage such development by avoiding minimum lot area standards and promoting flexibility in design.

**Action NR-2.1.1**

Maintain density bonuses that allow additional density in return for open space preservation.

**Strategy NR-2.2.**

**Acquire or encourage acquisition of environmentally sensitive properties.** Areas such as floodplains and stream corridors provide opportunities for community recreation in addition to environmental benefits. See Goal NR-1 for specific strategies for acquiring land or easements in these areas.



Clustered development and open space

**Strategy NR-2.3.**

**Promote preservation of woodlands.** Mature trees and wooded areas are significant community-defining natural features that contribute to Hendersonville's identity. Trees provide several additional community benefits, as described in Figure 3.3c.

**Action NR-2.3.1**

Continue to encourage tree

**Figure 3.3c: Community Benefits of Trees**

**Cooling/Reduced Energy Costs**

The shading and cooling effects of trees can provide comfort in urban areas and reduce energy costs. The net cooling effect of a young, healthy tree is equivalent to room-size air conditioners operating 20 hours a day. Furthermore, trees placed properly around buildings can reduce air-conditioning needs by 30 percent and can save 20 to 50 percent in heating costs (source: U.S. Department of Agriculture).

**Increased property value**

Healthy, mature trees add an average of 10 percent to a property's value (source: USDA Forest Service).

**Improved air quality**

One acre of forest absorbs six tons of carbon dioxide and produces four tons of oxygen, which is enough to meet the annual needs of 18 people (source: U.S. Department of Agriculture).

**Stress relief**

According to research at Texas A&M University, visual exposure to settings with trees has produced significant recovery from stress within five minutes.

**Improved water quality**

Tree leaves and roots help to reduce stormwater runoff and erosion through rainwater interception, absorption and soil stabilization. Wooded areas help to prevent the transport of sediment and chemicals into streams (source: USDA Forest Service).

preservation by providing existing tree preservation credit toward landscaping requirements.

#### Action NR-2.3.2

Continue to allow the Tree Board to review and provide recommendations for tree preservation for Special Use Permit projects.

#### Action NR-2.3.3

Adopt ANSI A300 of the Accredited Standards Committee (ASC) of the American National Standards Institute for the maintenance and pruning of trees on City controlled property and rights-of-way.

#### Action NR-2.3.4

Promote right tree in the right place standards when planting new trees.

#### Action NR-2.3.5

Encourage larger developments to place structures and roadways in areas where land has been disturbed and trees have already been removed.

#### Strategy NR-2.4.

**Promote the location and design of open space areas within developments so that they contribute to and link individual homes to the City's green infrastructure network.** A continuously linked system of green infrastructure provides continuity in ecological systems, increased opportunities for stormwater management, and provides a space in which to construct pedestrian paths that link together neighborhoods and parks. Future open space areas should be viewed as an extension or component of the City's green infrastructure network, as illustrated in Map 3.3a.

#### Action NR-2.4.1

Encourage development and redevelopment projects to provide open space areas that connect to planned green infrastructure areas.

#### Goal NR-3.

**Reduce the ecological footprint of developed and developing areas in order to reduce the impact on natural resources, create a healthy, sustainable community and reduce energy costs.**

#### Strategy NR-3.1.

**Promote LEED® (Leadership in Energy and Environmental Design) certification with new development activity.** The LEED® program provides standards for low-impact and energy-efficient building and site design. See Figure 3.3c for additional information.

#### Action NR-3.1.1

Require that all new municipal buildings be LEED® Certified in order to set an example for private development.

#### Action NR-3.1.2

Encourage the County and School District to require LEED® Certification for new facilities.

#### Action NR-3.1.3

Explore the feasibility and benefit of offering reduced permit fees as an incentive for private LEED®-Certified buildings.

#### Figure 3.3d: LEED®

Developed by the United States Green Building Council, LEED® is a detailed set of standards for sustainable site design, water and energy efficiency, mitigation of air pollution, waste reduction, and indoor air quality. LEED® certification provides independent, third-party verification that a building project is environmentally responsible, profitable, and a healthy place to live and work.

Additional information regarding the LEED® program is provided at [www.usgbc.org/leed](http://www.usgbc.org/leed).



### Strategy NR-3.2.

**Enable and encourage Low-Impact Development practices in stormwater management.** Low Impact Development (LID) is an innovative approach to stormwater management that mimics natural hydrological processes and focuses on both the quality and quantity of stormwater. See Strategy WR-2.3 in Chapter 6 for details and examples of LID practices.

### Strategy NR-3.3.

**Encourage citizens to engage in activities that reduce their ecological footprint.** Individual citizen activity can significantly influence the community's environmental impact. There is already a growing predisposition nationwide toward "green" products and activities.

#### Action NR-3.3.1

Set Citywide goals for waste reduction and recycling participation.

#### Action NR-3.3.2

Increase the practice of recycling among residents. Work with the City's recycling providers to offer such incentives as larger bins and financial incentives.

#### Case Study: RecycleBank®

The City of Montgomery, Ohio, recently launched a pilot program with its recycling provider, Rumpke, that offers financial incentives to households that recycle.

Participants in the RecycleBank program receive monetary credits that can be redeemed at participating businesses (e.g. home improvement stores, pharmacies, sporting goods stores, etc.). The amount of the credit is based on the weight of recycled materials from each household.

#### Action NR-3.3.3

Develop educational materials and programs that promote the benefits of and strategies for waste reduction, water conservation and energy efficiency.

#### Action NR-3.3.4

Purchase City vehicles that use alternative fuels or hybrid technology in order to set an example for citizens and businesses.

### Goal NR-4.

***Preserve Hendersonville's agricultural resources in order to maintain a rich heritage and promote locally-grown food. Map 3.3a identifies areas for which the Comprehensive Plan recommends preservation of agricultural uses.***

#### Strategy NR-4.1.

**Maintain the link between area agriculture and tourism and cultural activities.** Agriculture continues to be a vital piece of local tourism and cultural festivals. Maintaining this link helps to provide an economic incentive for farmers and helps to maintain Hendersonville's heritage and identity.

#### Action NR-4.1.1

Continue to support the North Carolina Apple Festival and other agriculture-related cultural events.

#### Action NR-4.1.2

Include agriculture in area tourism promotional efforts by advertising festivals, roadside stands, farmers markets, and other agricultural-related tourist draws.

**Strategy NR-4.2.**

**Maintain and expand upon downtown farmers' markets.** Farmers' markets already operate in downtown Hendersonville, including the Curb Market on Church and the Tailgate Market on King. These markets provide consumers with locally-grown produce, draw foot traffic to Downtown businesses and serve as community-building events. Efforts to expand upon Hendersonville's farmers' markets should continue to focus on downtown locations and increase frequency and offerings. When developed, future downtown parks will provide dedicated spaces for these events.

**Action NR-4.2.1**

Increase the frequency and offerings of downtown farmers' markets.

**Strategy NR-4.3.**

**Continue to support the right to farm by minimizing conflicts between farmers and non-farming neighbors.**

**Action NR-4.3.1**

Work with Henderson County on efforts to educate the public about the benefits of the County's Voluntary Farmland Preservation Program.

**Strategy NR-4.4.**

**Discourage leapfrog development patterns that fragment agricultural land.**

**Action NR-4.4.1**

Avoid support of rezonings of agricultural land to more intense uses when adequate infrastructure is not available.

**Action NR-4.4.2**

Assess the possible conflict of uses when considering rezoning of active agricultural lands.