

## CHAPTER 7: ENVIRONMENT

### Introduction

The vision of Annapolis as a “Green” City is one of this Plan’s three central tenets. The “greening” of Annapolis refers to a policy stance and a variety of actions to protect the community’s natural resources – shorelines, forested areas, creeks, and other natural areas. It refers to an embrace of new patterns and habits of building and living that seek to reduce our carbon emissions and energy use.



**Volunteers participate in annual Greenscape Projects**

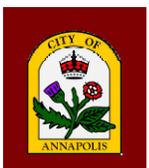
Other aspects of the “greening” of Annapolis are addressed in other sections of the Plan. These include the maintenance of a healthy living environment for Annapolis residents: boosting parks, recreational offerings and cultural offerings; expanding options to walk, bike or take transit instead of driving; enabling people to live and work in the city; and having a variety of economic services in proximity to neighborhoods.

### Primary Challenges

The Chesapeake Bay and the creeks of Annapolis are fundamental to the City’s identity, sense of place, and beauty. However, the Bay is threatened by polluted runoff that degrades its ecological health. While the Chesapeake Bay’s watershed spans parts of six states and 64,000 square miles, attention to all possible local improvements is warranted. Remedies to improve runoff water quality in fully developed areas such as Annapolis can be costly and require a degree of technical sophistication, as remedies often involve retro-fitting existing buildings and infrastructure.

Annapolis will accommodate growth and new development in the years to come as part of the City’s ongoing need to regenerate. Preserving the community’s natural resources as part of that growth is important.

Globally, we face the prospect of climate change and must commit to reducing our carbon emissions through systemic and individual actions.



## **Policies**

To respond to the primary challenges, the City embraces five main Policies; further details are in the Policy Recommendation section:

- ▶ Reduce the polluting effects of storm water runoff into the Chesapeake Bay and its tributaries.
- ▶ Protect and restore environmentally sensitive areas and other natural resources within the city.
- ▶ Shrink the city's Carbon Footprint and become a community of Green buildings to combat climate change.
- ▶ Improve community environmental stewardship and education.
- ▶ Minimize noise and light pollution.

## **Summary of Existing Conditions**

In the decade since the last Comprehensive Plan was completed, the City has made significant strides on a variety of environmental preservation efforts and has earned a reputation as a model for a city of its size. Portraying the range of activities and accomplishments in summary fashion is challenging, as these have encompassed such a wide variety of actions. The next section focuses on the legislative and regulatory context, also programs and partnerships with other jurisdictions and organizations. It is followed by a section summarizing the condition of natural resources in the city.

## **The nature of planning for sensitive environmental resources**

- ▶ This chapter addresses state planning requirements related to sensitive areas in accordance with Article 66B, Land Use, Section 3.05(4)(ix). It also works in coordination with Chapter 9 - *Water Resources*, to address requirements of Section 3.05(4)(vi) related to water and stormwater. In Annapolis' context, the State identifies sensitive environmental areas as: streams, wetlands and their buffers; 100-year flood plains; habitats of threatened and endangered species; and steep slopes.
- ▶ Approximately 40 percent of the city lies within the State-designated Chesapeake Bay Critical Area, which is land within 1,000 feet of wetlands and mean high water of the Chesapeake Bay (shown in Figure 7.4). Land within the Critical Area is protected through the City's Critical Area Overlay. As directed by the State criteria, the City's Critical Area Program designated three categories of land development within the Critical Area – Intensely Developed Area (IDA), Limited Development Area (LDA), and Resource Conservation Area (RCA). Grading, building, impervious lot coverage, buffering, and land use must follow the Critical Area criteria specific to that designation.

- ▶ The city has more than 120 acres of land preserved in conservation easements and monitored by the Annapolis Conservancy Board (shown in Figure 7.5). The Conservancy Board is the only municipal land trust in Maryland. It seeks donations of property, typically through the development review process, to further the goals of preserving open space, to provide recreational opportunities, and to improve the water quality of the Chesapeake Bay and its tributaries. Most of the easements are owned and maintained by the home owner association. The Conservancy Board inspects the easements annually, monitors them for compliance with the conservation deed, and provides public education.
- ▶ In 2003, the City began a Green Procurement Program to improve the energy efficiency of its overall operations and to provide an example for residents and local businesses. Under this program, the City switched to environmentally friendly and energy efficient products, such as recycled-content paper products, biodegradable cleaning supplies, and energy-efficient business machines and appliances. Energy-saving light-emitting diodes are being installed in traffic signals, crosswalk signs, streetlights, and building fixtures.
- ▶ In 2005, the City made a pledge to the World Wildlife Fund’s Power Switch Program to purchase a minimum of 15 percent of municipal electrical needs from renewable energy resources by 2020.
- ▶ In 2006, the City adopted its Energy Policy, codified in Resolution 38-06, to reduce energy costs, energy consumption, and reliance upon petroleum. The City’s Energy Policy addresses municipal energy use, energy performance contracting, distributed energy resources, green building standards, green purchasing standards, incentives, education, transportation, recycling, and the urban forest.
- ▶ In 2006, the Maryland Department of Natural Resources determined that approximately 41 percent of the City of Annapolis is covered by the urban tree canopy. The City committed to increasing the tree canopy cover to 50 percent by 2036. To work toward that goal, the City began a program to give away 500 native trees to city residents annually, stipulating that those trees be planted inside Annapolis City limits. The City now meets an annual goal of planting 1,000 trees a year. As a result, Annapolis has repeatedly won an Arbor Day Award as one of America’s finest “Tree Cities.”
- ▶ In 2007, the City adopted new stormwater management standards in response to new State legislation. These include Best Management Practices (BMPs) for reducing stormwater runoff, such as green roofs and rain gardens, requiring environmentally sensitive acreage on a development site to be deeded into a permanent conservation easement, and a more comprehensive silt-fence standard. Updated State regulations are expected to be issued in 2009, which will update the City’s Ordinance by reference.



**Tree Planting**

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- ▶ In 2008, the City adopted Green Building standards for all public buildings, buildings with more than 7,500 square feet of gross floor area, single family homes larger than 3,250 square feet, and all buildings (regardless of size) in any subdivision of five or more units. These standards become effective in 2009.
- ▶ Annapolis became a member of the International Cities for Local Environmental Initiatives (ICLEI) in 2003 and is participating in its Cities for Climate Protection Program, along with 350 other local governments. In 2006, the City completed an Energy Inventory of municipal facilities and operations. In 2008, the City completed a Community-wide Energy Inventory. Using the Community Energy Inventory as a 2006 baseline, the City developed and adopted a climate action plan in 2009 – the *Sustainable Annapolis Community Action Plan (CAP)*. The CAP included a set of emission reduction targets.
- ▶ The City is assessing its watersheds with a Watershed Restoration Plan. This study will develop a plan of action that will result in design and construction of stabilization, retrofits, and mitigation measures that will prevent further degradation of City waters and improve the City’s water quality while enhancing recreational opportunities. Watersheds are also addressed in Ch. 9 – *Water Resources*.
- ▶ Four organizations dedicated to protecting, preserving, and improving Annapolis’ four creeks have been formed in the last decade: the Spa Creek, Back Creek and Weems Creek Conservancies, and the Friends of College Creek.
- ▶ In an effort to engage citizens in beneficial environmental activities, publicly and privately, the City also actively participates in developing educational outreach, including expos, brochures, signage, school programs, awards, promotions, and a variety of other activities in English and Spanish, when possible.
- ▶ To ensure children’s awareness of the environment, the City created a groundbreaking clean air program called “Take a Deep Breath” that was taught to every 4th grade student in Anne Arundel County in 2005. More than 7,000 children learned simple ways to reduce air pollution, such as by planting trees or by driving ten miles fewer each week.



**Beautification Programs by Children**

## Existing Conditions

- ▶ Poor water quality is a persistent environmental problem for the Chesapeake Bay, stemming from the agricultural runoff and urban stormwater that flows into the Bay.



**Rain garden at Hillman Parking Garage**

- ▶ Approximately 42 percent of Annapolis land area is covered with impervious surface, an estimate generated by a Strategic Urban Forestry Assessment (SUFA) in 2006.
- ▶ As much as 80 percent of Annapolis' stormwater infrastructure was built prior to 1983, based on the engineering principle of removing water as quickly and directly from a site as possible. Since 1983, State standards are focused on slowing stormwater infiltration and reducing the polluting effects of stormwater for new construction projects. Retrofitting stormwater infrastructure to meet today's standards is expensive. A dedicated revenue source, the Stormwater Utility Fee, has been established to help fund the repair, replacement, and construction of the City's stormwater facilities. The City utilizes this fund to replace storm drains, curb inlets, and drainage outfall pipes.
- ▶ Together, Annapolis' public and private sectors have developed more than 60 bioretention areas, which are called rain gardens when the source of the runoff is rain. These gardens are planted with native flowers, shrubs, and trees atop an engineered gravel and rock substrata. Rain gardens are maintained at Truxtun Park, Newman Park, Amos Garrett Park, and numerous street-end parks.
- ▶ No threatened or endangered species have been documented in the city.
- ▶ Steep slopes (slopes greater than 15 percent) occur mostly in the upper reaches of Spa and Weems creeks and, as such, lie in the Critical Area and are subject to its protections (shown in Figure 7.6).
- ▶ Sea level has risen approximately one foot along Maryland's coastline in the last century. A general prediction estimates a rise of 1 meter by the end of this century (shown in Figure 7.7). Areas extremely critical to the overall character of Annapolis and most susceptible to flooding include the downtown City Dock area, portions of Eastport, and the Naval Academy. As proven in the aftermath of the flooding caused by Hurricane Isabelle in 2003, these areas are already susceptible to significant damage related to flooding as a result of storm surges.
- ▶ As of 2008, four buildings in the city have "green roofs," a building roof that is partially or completely covered with plants. One roof is on the Osprey Nature Center at Back Creek Park, another is on the Annapolis Police Department, a third is on the Severn Savings Bank building on Westgate Circle, and the fourth is on the back portion of the garage at 608 Melvin Avenue. The new Recreation Center will be the fourth building to install a green roof.

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- ▶ With the help of volunteers, the City has constructed approximately 3,000 feet of natural shoreline around many City-owned parks. Such Living Shorelines control shoreline erosion, while restoring and preserving the characteristics of the estuarine marshes, tidal wetlands, and upland buffers.
- ▶ Annapolis is a part of a Nitrogen Oxide Air Quality Non-Attainment area that spans a number of states. A portion of the air quality problem is attributable to major out-of-state sources, but local emissions and travel patterns also contribute.



**Green Roof on Severn Savings Bank**  
**Courtesy of: O'Doherty Group Landscape**  
**Architecture**

## **Policy Recommendations**

### **Policy 1. Reduce the polluting effects of stormwater runoff into the Chesapeake Bay and its tributaries.**

**1.1** The City should seek to reduce pollutant loading from stormwater runoff to levels equivalent to a 10 percent reduction in the impervious surface, currently estimated to be 42 percent of the City’s land area. In other words, the City seeks to reduce pollutant loading as if the City’s impervious cover were 32 percent. Acknowledging that water quality of waterways is severely impacted once the impervious cover in the watershed exceeds 25 percent, the City’s long-term vision is to achieve pollutant loading rates as if the city were no more than 25 percent impervious. Actions that support this policy can be applied to new development, redevelopment, and other site and building improvements, and include:

- Green roofs on buildings.
- Use of rain barrels and rain gardens.
- Low Impact Development (LID) or Leadership in Energy & Environmental Design (LEED) or equivalent site design practices.
- Use of pervious materials in parking lots, driveways, and sidewalks.
- Reducing the amount of paving by changing parking lot dimensions and road width standards.
- Eliminating curbs where ever practical to allow flow into swales.
- Diverting stormwater flow to bioretention areas.
- Increasing the tree canopy.

The baseline of this goal is the 2006 measurement of 42 percent impervious coverage. To meet this goal, the City will develop a coherent and comprehensive set of measurements to track progress. The City may adopt guidelines, consider revising current ordinances, or initiate programs to achieve this goal.



**Figure 7-1 Sample commercial property stormwater improvements**

The commercial property shown above utilized several techniques to reduce pollutant loading from stormwater runoff. These include, and are keyed to the image:

1. Permeable paving in the walkways
2. Green Roof
3. Bioswales between parking rows and along the site perimeter
4. Rain Garden
5. Native and adapted plantings

- 1.2 Retrofit older stormwater infrastructure (storm drains, curb inlets, drainage outfall pipes) with the objective of improving storm water quality and reducing the velocity and flow. Divert storm water away from or out of pipes where ever possible.
- 1.3 Shoreline erosion control efforts should utilize natural or green techniques, such as living walls and shorelines where possible. Hard erosion control devices should be reserved for areas with high energy wave activity.
- 1.4 Increase the City’s urban tree canopy to 50 percent of its land area by 2036. In addition to meeting the primary objective of improving water quality of the Chesapeake Bay, increasing the urban tree canopy achieves other environmental objectives of reducing the urban heat island effect, reducing air pollution, and providing wildlife habitat.



**Educational Storm Drain Markers**

Actions that support this policy include:

- Tree planting, tree maintenance, and tree protection programs and activities.
- Strengthening the City’s tree removal requirements currently codified in City Code Ch. 17.09.
- Providing for rooting space under paving such that each tree is provided with sufficient soil to attain a mature canopy size.
- Minimizing soil disturbance during grading and avoiding or repairing soil compaction to improve water infiltration and support tree health.
- Adding canopy trees to rain gardens.

## **Policy 2. Protect and restore environmentally sensitive areas and other natural resources within the City**

**2.1** Steep slopes that are located near water bodies should be protected by conservation easements when possible. When conservation easements are not possible, the City should enforce the preservation of all vegetation and trees along these slopes in order to prevent damage to the shoreline.



**Kayakers on Spa Creek**

**2.2** Every effort should be made to protect open space contiguous to existing natural areas to establish and protect wildlife corridors.

**2.3** Naturalized yards are encouraged over traditional landscaping. Naturalized yards favor plantings that include trees, shrubs, and groundcover plants that tolerate the natural rainfall patterns of the city and urban soils.

**2.4** Through the Annapolis Conservancy Board, the City should obtain conservation easements to meet the objective of protecting the city's natural resources generally and environmentally sensitive areas specifically. Conservation easements should connect open space where possible. The City should consider limiting rear-lot easements, establishing incentives for developers to remove invasive species during the initial grading process, and acquiring fee simple dedications for small areas in minor subdivisions.

**2.5** To help achieve the City's environmental goals and ensure high quality development, the City will create a Site Design Manual that will replace the 1986 *Parking and Landscaping Manual*. The Site Design Manual will provide guidance on design of the landscape on public and private development sites. This will include planting with a preference for water conserving plants and plants tolerant of urban soils, rainwater management, tree preservation, and soil management. Best management practices for handling the impacts of development, use of pervious and impervious paving materials, design of parking areas, lighting, internal circulation, and other matters related to site development should also be addressed in the Manual.

The Site Design Manual will aim to make the site design process more predictable. The Manual will be coordinated with the City's Green Building standards and other sections of the City Code governing trees and other planting, grading, critical areas, and rainwater.

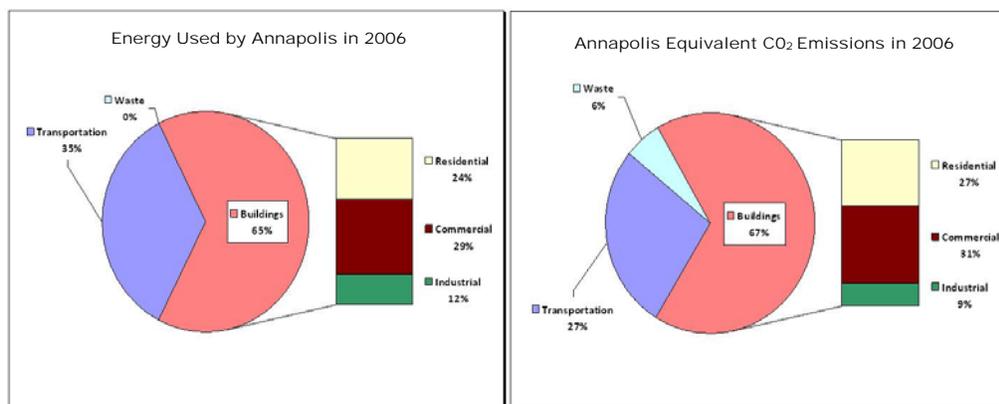
**Policy 3. Shrink the City’s Carbon Footprint and become a community of Green buildings to combat climate change**



**3.1** The City’s Energy Policy meets the objectives of reducing energy costs, energy consumption, and reliance upon petroleum. The full text of this policy is codified in R-38-06. It includes:

- A commitment to a ten (10) percent reduction in energy use in all City-owned or leased facilities five years from establishing the baseline (completed in 2007) and a fifteen (15) percent reduction by 2020, using 2006 data as a baseline;
- On-site energy generation wherever practical;
- Adoption of Green Building standards;
- A commitment to a more fuel-efficient public vehicle fleet;
- Purchase twenty (20) percent of the City’s total energy needs from renewable sources by 2020;
- Increase recycling rates in City operations and in residential and commercial communities;
- Increase the urban tree canopy (see Environment Policy 1.4);
- Energy Performance Contracting; and
- Green purchasing standards for all City Departments.

**3.2** Achieve the carbon reduction goals in the *Sustainable Annapolis - Community Action Plan* (CAP). The CAP is part of the City’s commitment to the Cities for Climate Protection Program, a program of the International Cities for Local Environmental Initiatives (ICLEI). Using the City’s *Greenhouse Gas Emissions & Energy Consumption Inventory of 2006* as a baseline, the CAP addresses how to meet the city-wide emissions reduction targets. The emission reduction targets are 50 percent reduction of government emissions (2006 levels) by 2012, 75 percent reduction by 2025, and carbon neutrality by 2050. The reduction targets for the entire Annapolis community are a 25 percent reduction (2006 levels) by 2012, 50 percent reduction by 2025, and carbon neutrality by 2050.



**Figure 7-2 Energy Used by Annapolis in 2006**

**Figure 7-3 Annapolis Equivalent CO<sub>2</sub> Emissions in 2006**

**3.3** Promote alternatives to gasoline-fueled vehicles for transportation to reduce transportation-related greenhouse gas emissions. Support land use patterns that limit vehicular travel demand. Support pedestrian and bike amenities along all major roads. Refer to Ch. 4 – *Transportation*, for further treatment of this subject.

**3.4** Develop a strategy for sea level rise as part of the City’s adaptation and response to threats from climate change. This planning effort should be coordinated with the City’s *Hazard Mitigation Plan* and be prepared in coordination with State efforts, as well as the Federal government, U.S. Naval Academy, and County Government. It should delineate impacted areas, inventory potentially affected populations, assets, and resources, and develop legislative and regulatory responses. It should also address such issues as a post-disaster plan, public education on the risks of sea level rise, and coordination with other government agencies on research needs related to sea level rise. See Policy 10 in Ch. 3 – *Land Use & Economic Development* for the City’s policy regarding waterfront land use.

**Policy 4. Improve community environmental stewardship and education**

**4.1** In support of the numerous volunteer efforts, projects, and organizations dedicated to environmental preservation, advertise and popularize these efforts and their environmental benefits.

**4.2** Build and foster partnerships with other jurisdictions, the private sector, and local environmental groups to address natural resource protection and environmental education.



**Volunteer Project**

- 4.3 Implement a Business Environmental Stewardship Program. This voluntary program should award certification to businesses meeting the minimum number of points in the areas of recycling, waste management, water and energy conservation, and pollution prevention.

### **Policy 5. Minimize Noise and Light Pollution**

- 5.1 Seek to minimize noise disturbance in neighborhoods, with a particular emphasis on reducing noise at night and in the early morning hours. Efforts should be consistent with State of Maryland noise standards.
- 5.2 Develop a city-wide strategy to reduce light pollution, in coordination with BGE and the Naval Academy. Investigate utilizing minimum intensity light sources, timed lighting systems, improving light fixtures and directing them more accurately, and adjusting the types of lights used.

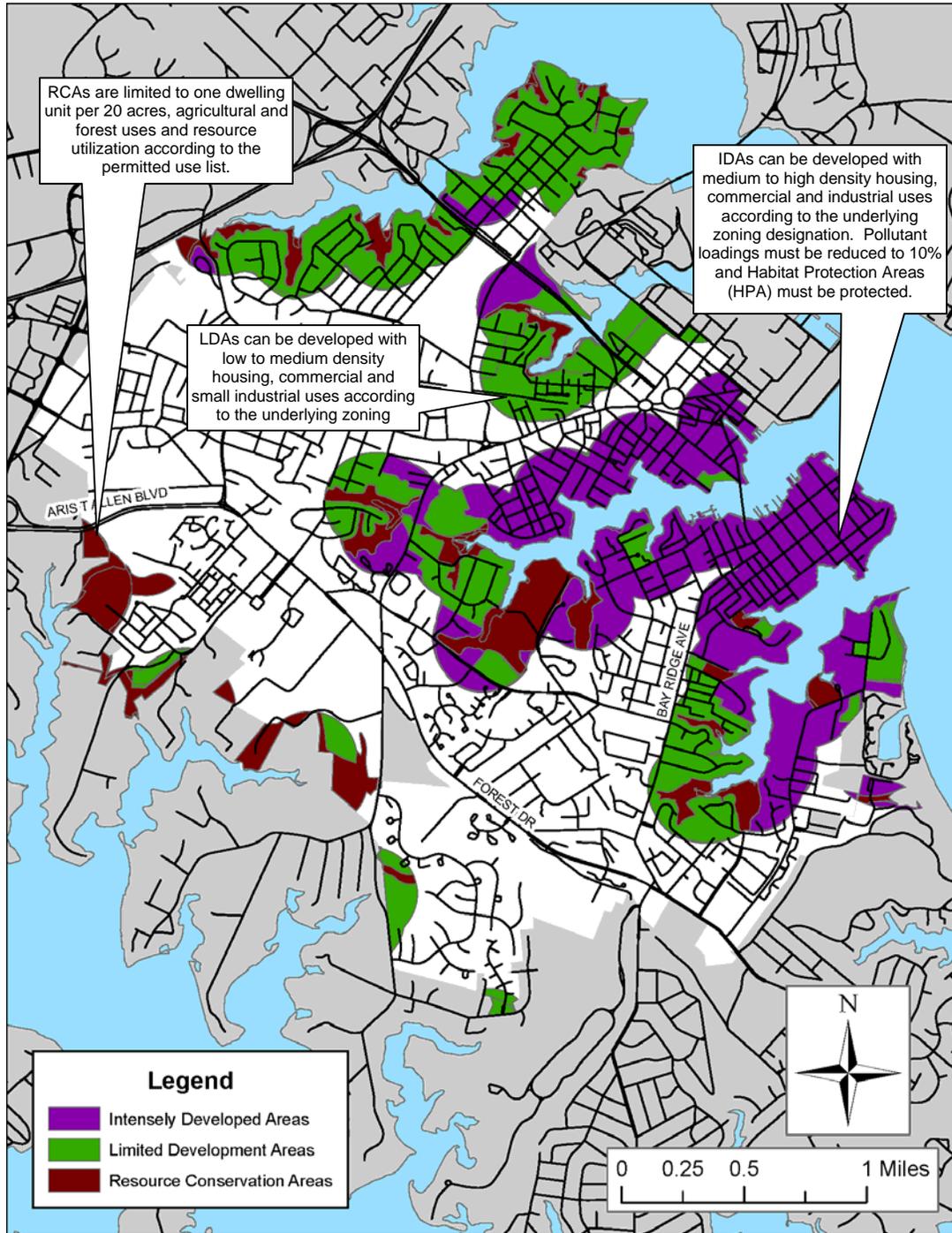


Figure 7-4 Critical Areas

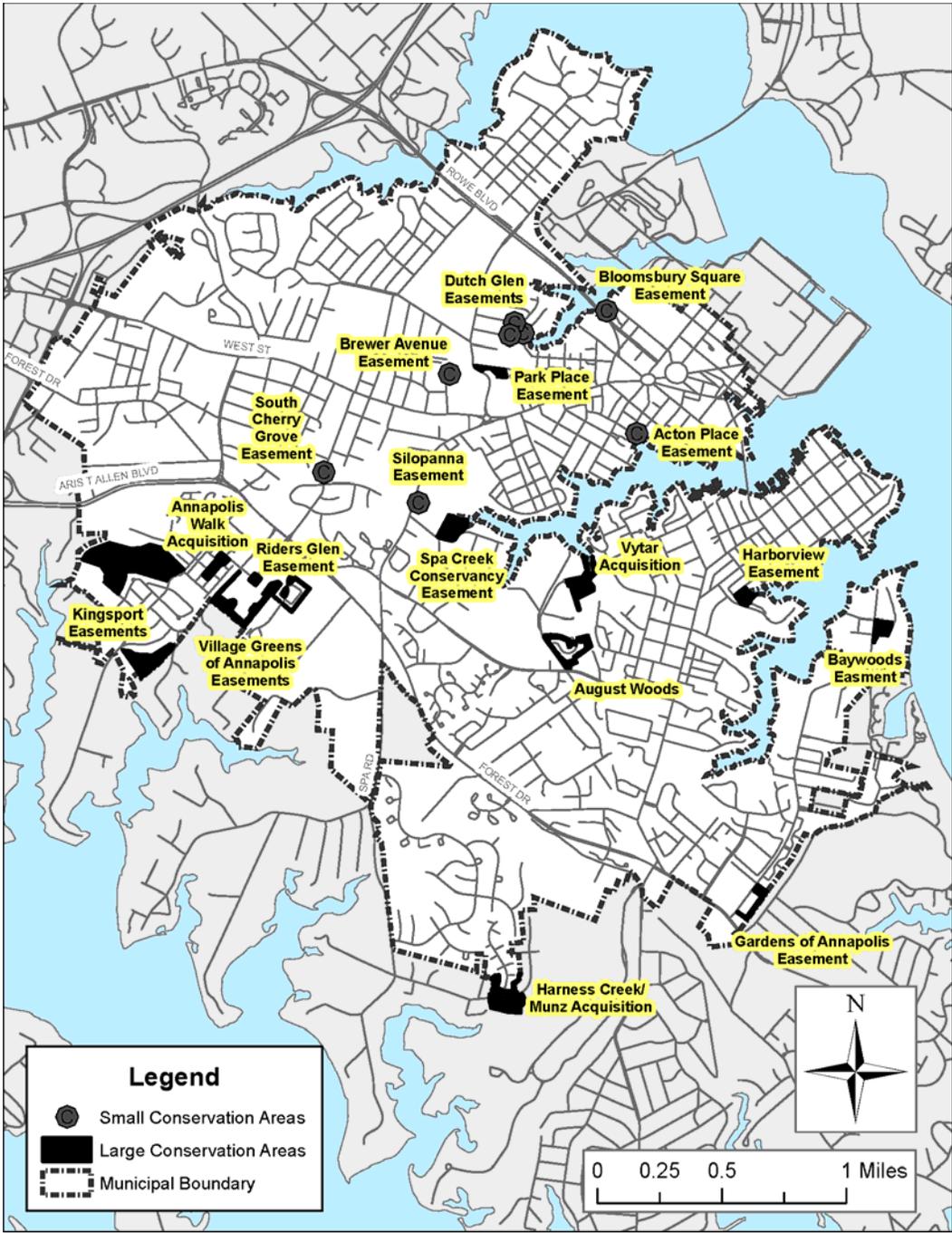


Figure 7-5 Conservation Easement Map

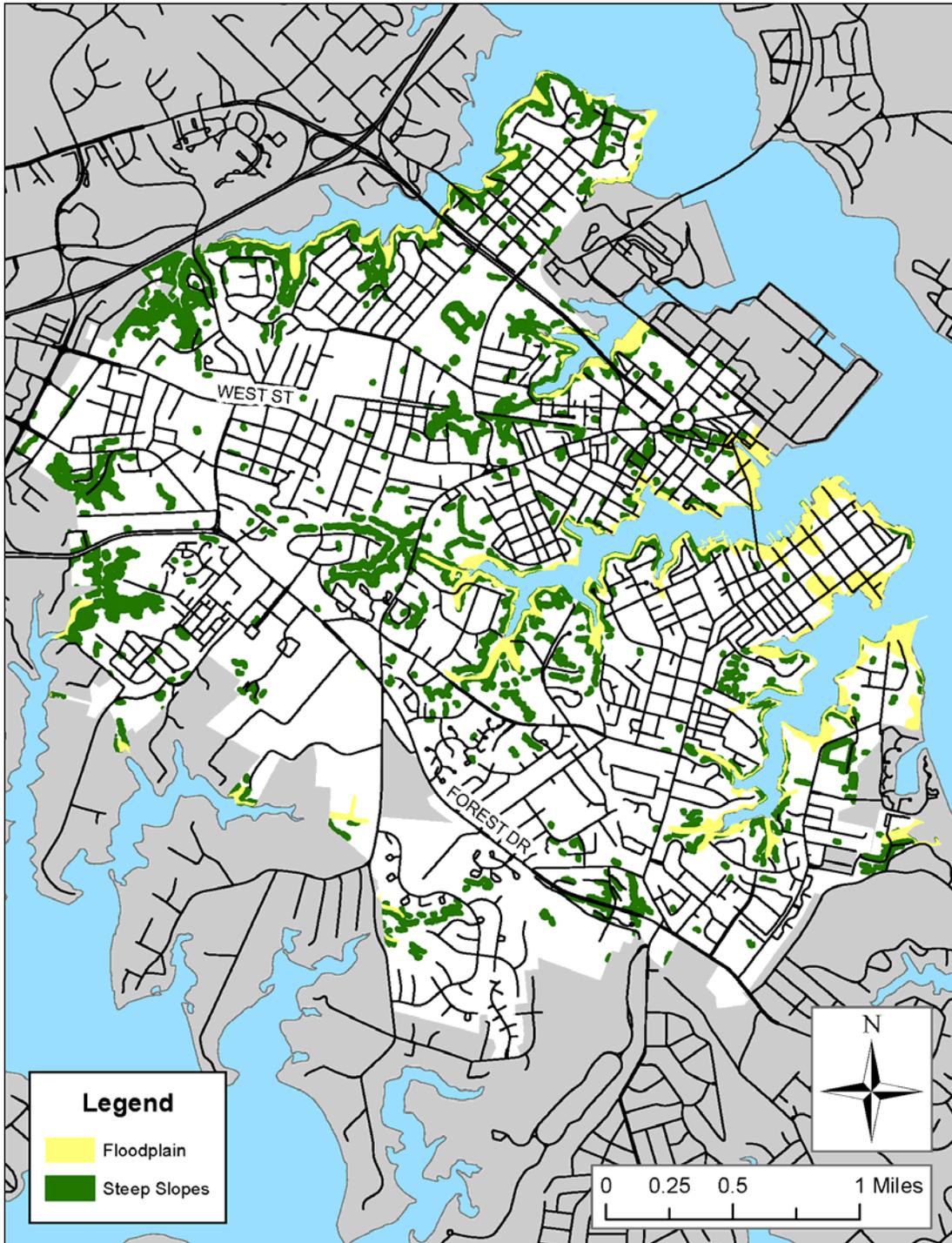


Figure 7-6 Steep Slopes and Floodplain Map

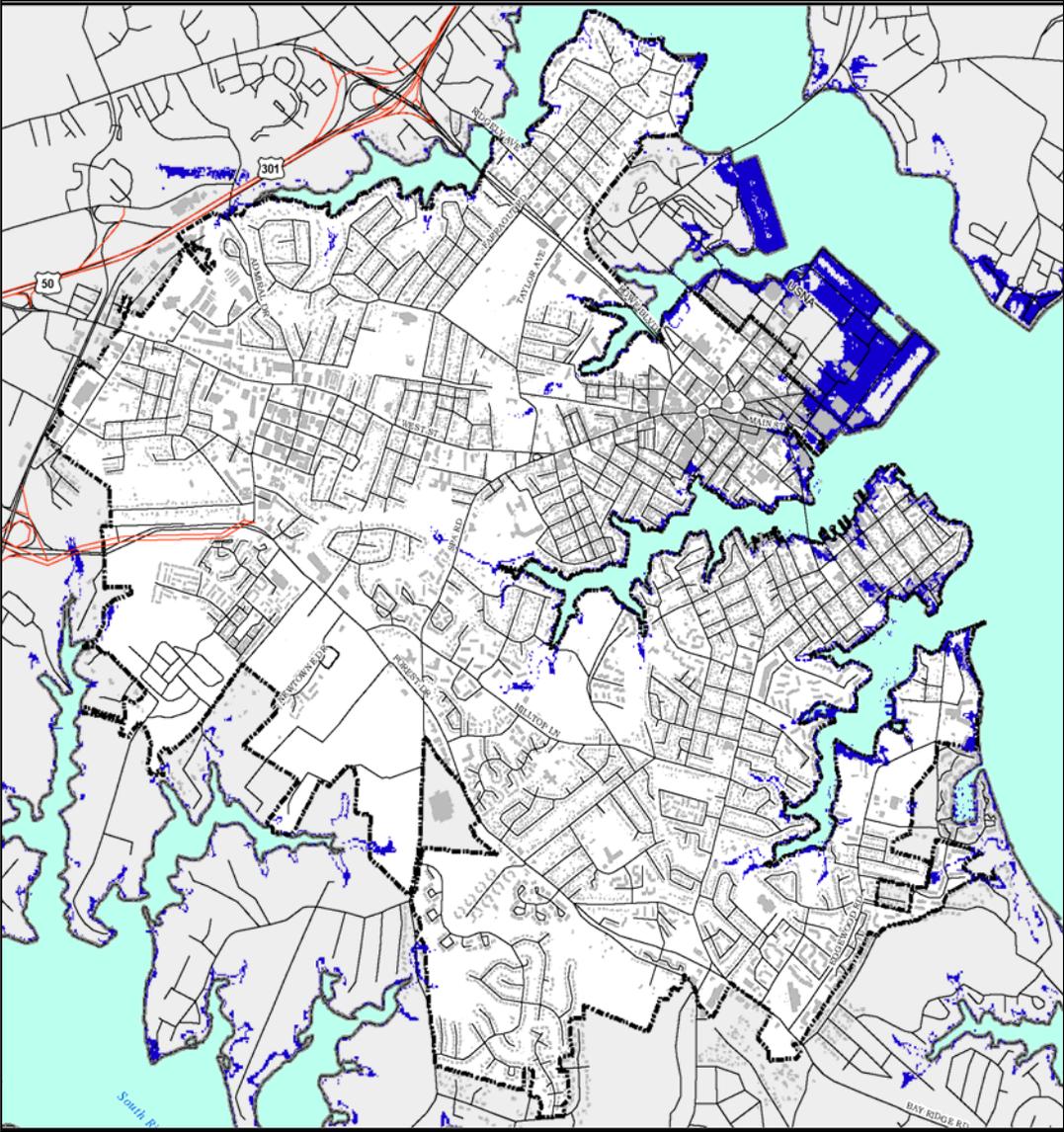


Figure 7-7 Potential 1 Meter Sea Level Rise (Shown in Blue) Map

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