The Town of Henderson Maryland

Henderson Comprehensive Plan 2009

CERTIFICATE OF RECOMMENDED ADOPTION

This Comprehensive Plan has been designed to guide the physical development of the Town of Henderson pursuant to the provisions of Article 66B of the Maryland Annotated Code.

By majority vote of the Henderson Planning Commission on September 7, 2009, after an advertised informational meeting on August 3, 2009 and a duly advertised public hearing on September 8, 2009, this Plan was recommended to the Town Council of the Town of Henderson for adoption.

Henderson Planning Commission

Attested:

Cheryl Lewis, Town Manager

TOWN OF HENDERSON
RESOLUTION 09-02

COMPREHENSIVE PLAN FOR THE TOWN OF HENDERSON

WHEREAS, pursuant to Article 66B § 3.05(b) of the Annotated Code of Maryland, the Trappe Planning Commission determined that the Comprehensive Plan for the Town of Henderson should be updated and amended; and

WHEREAS, pursuant to Article 66B, as amended by House Bill 1141, 2006, the Town of Henderson is required to incorporate two new elements, a Municipal Growth Element and a Water Resource Element prior to October 1, 2009; and

WHEREAS, the Town of Henderson Planning Commission has researched issues regarding community needs and has assessed the positive and negative factors relative to growth; and

WHEREAS, the Town of Henderson Planning Commission has written a Comprehensive Plan which sets forth a framework that encourages growth while protecting attributes of the existing community; and

WHEREAS, on August 3, 2009 the Henderson Town Council held a duly advertised public hearing on the proposed draft of the Henderson Comprehensive Plan to solicit comments and a discussion of citizen concerns; and

WHEREAS, on September 8, 2009 the Henderson Town Commission and Henderson Planning Commission held a joint duly advertised public hearing on the proposed adoption of the Henderson Comprehensive Plan to solicit further comments and a discussion of citizen concerns; and

WHEREAS, the Town of Henderson Planning Commission has recommended to the Henderson Town Commission that the Plan as described above be adopted;

NOW, THEREFORE, BE IT RESOLVED by the Town Council of Henderson, Maryland, that the attached Comprehensive Plan for Henderson, Maryland, dated September 8, 2009 is hereby adopted as the Henderson Comprehensive Plan;

AND BE IT FURTHER RESOLVED that this Resolution be affixed to and be made a part of the Henderson Comprehensive Plan.

ADOPTED this 8th day of September, 2009.

Sandy Cook, Mayor

Jesse Cook, Treasurer

Robert Bell, Commissioner

Lynn Russell, Commissioner

Attest:

Cheryl Lewis, Town Manager

Contents

Chapter 1 Introduction

Why does government plan for the future? Understanding the past and preparing for the future is important for initiating actions in the present. From a broad perspective, the primary reason why government plans and creates laws is to protect the public health, safety, and welfare. In Maryland, planning is especially important due to the tremendous population growth in the State. Growth management assists in the preservation of land and resources against rapid and inappropriate development, which endangers our sensitive environment and creates billion dollar deficits in infrastructure costs that the public is ultimately required to pay for through higher taxes and other fees.

Article 66B -Maryland's Planning and Zoning Enabling Act

As the State's basic planning, zoning, and growth management law, Article 66B of the Annotated Code of Maryland, Land Use (Planning and Zoning Act) requires that local jurisdictions prepare comprehensive plans if they want to regulate land development through zoning and subdivision control. These ordinances and regulations must be consistent with the Comprehensive Plan and its eight guiding policies or "Visions."

The eight "Visions" of the Planning and Zoning Act include:

1. Development is concentrated in suitable areas;
2. Sensitive areas are protected;
3. In rural areas, growth is directed to existing population centers and resources are protected;
4. Stewardship of the Chesapeake Bay and the land is a universal ethic;
5. Conservation of resources, including a reduction in resource consumption is practiced;
6. Economic growth is encouraged and regulatory mechanisms are streamlined;
7. Adequate public facilities and infrastructure under the control of the county or municipal corporation are available or planned in areas where growth is to occur; and
8. Funding mechanisms are addressed to achieve these "Visions."

House Bill 1141

In 2006, House Bill 1141 amended Article 66B to require two new Elements in every municipal comprehensive plan. The new elements are a Municipal Growth Element (MGE) and a Water Resources Element (WRE). The Municipal Growth Element intended to focus the jurisdiction's vision regarding growth by relating the size of municipal growth areas to an analysis of projected population growth, an analysis of existing development opportunities within town, and locating logical and reasonable new growth areas that may be needed in the future (including areas identified for annexation). The Water Resources Element is intended to determine the capacity of drinking water supplies available to support the projected growth as well as the wastewater disposal capacity that will be needed. Potential infrastructure capacity shortfalls that may be identified must then be addressed in order that adequate public facilities exist, or are provided, in areas planned for growth.

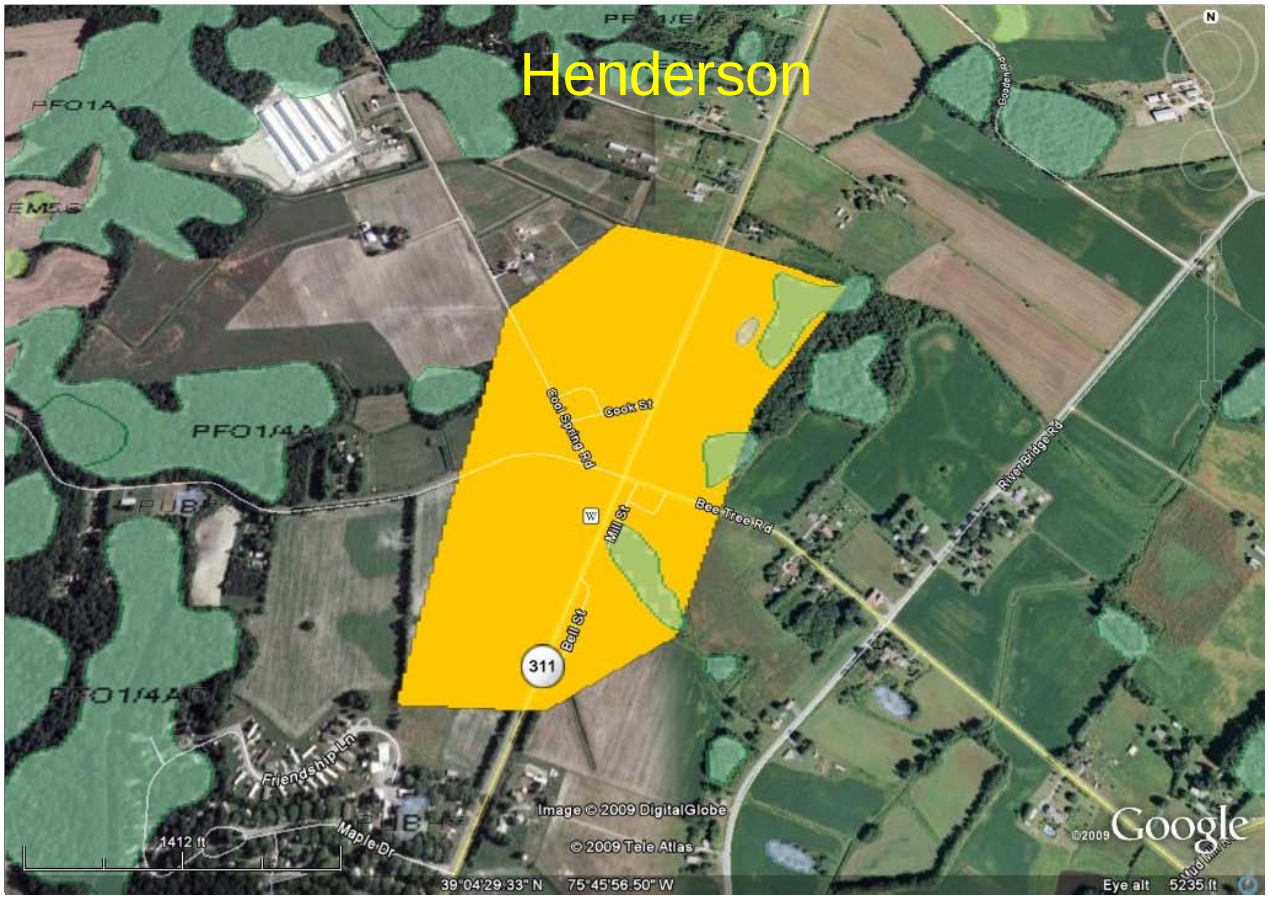
Neighborhood Conservation and Smart Growth Areas Act of 1997.

In 1997, the Maryland General Assembly enacted the Neighborhood Conservation and Smart Growth Areas Act (Smart Growth). The intent of that legislation is to marshal the State's financial resources to support growth in Maryland's communities and limit development in agricultural and other resource conservation areas. At the heart of the Smart Growth concept are the "Priority Funding Areas" (PFA's), which represent local growth areas for targeted State funding. PFA's include municipalities, existing rural villages, planned communities/growth areas, and industrial areas to be served by public water and sewer. The 7th and 8th "Visions" of the Planning and Zoning Act creates consistency with Smart Growth laws by linking provision of adequate public infrastructure in growth areas with State funding assistance limited to certified priority funding areas.

The following graphic identifies designated PFA's in northern Caroline County. Isolated County parcels augment the municipal designations. The graphic also locates the non-tidal wetlands identified by the National Fish and Wildlife Service of the Department of the Interior.

Non-tidal wetlands are under Federal jurisdiction and require a minimum 25 foot setback, or limit of disturbance, back from the edge of the wetland. The 25 foot setback is also required by the State in accordance with the Maryland Nontidal Wetlands Protection Act. This creates an initial set of development constraints that are recognized and incorporated into this Plan. Wetlands, poorly drained soils, and "perched" seasonally high water tables comprise many of the underlying environmental issues that plague residents of northern Caroline County. Henderson has been working cooperatively with its neighboring communities and the County to address health issues associated with failing septic systems and contaminated wells for many years.

Affordability has and continues to be the primary issue that hinders the Town's ability to solve these problems.



graphic 1

Lands may be designated within locally defined growth areas that are sized to accommodate the long-term vision of the jurisdiction and certified as PFA's to the Maryland Department of Planning. In addition to inclusion in Henderson's Municipal Growth Element, growth areas must be zoned for a density of at least 3.5 dwelling units per acre (or receive appropriate non-residential zoning as an "employment area" to qualify for State financial assistance. Additionally, the area must have or be planned for public sewer service (as specified in the Caroline County Water and Sewer Plan).

In terms of adequate public facilities and services, community objectives at the county and municipal levels are critical to direct growth to appropriate areas. That is an important factor in the preparation and adoption of this Comprehensive Plan.

Plans must show designated growth areas including areas planned for annexation by municipalities. Lands within local growth boundaries may be designated as a PFA provided sewer service is planned in a 10-Year Water and Sewerage Plan and provided such designation is a long-term and planned development policy that promotes efficient land use and public infrastructure.

This Comprehensive Plan is based on the 2003 North County Comprehensive Plan that established planning and growth areas for the 1st Election District (and the Town of Henderson). However, a number of important policy concerns and specific recommendations of that Plan have been repudiated by the towns. Specifically, the Town of Henderson has pursued the establishment of its own independent planning and zoning program, including the creation of a three member Planning Commission, and Board of Appeals, and the preparation and adoption of a Comprehensive Plan and Zoning and Subdivision controls.

The Town of Henderson will continue to cooperate with the other municipalities of Caroline County as well as the planning and zoning programs administered by the Caroline County Planning and Codes Department.

The purpose for growth boundaries in North County Towns is to identify and reflect community goals and policies concerning growth and public facility needs consistent with the long-term vision of each Town. Growth areas were carefully considered and coordinated with County planning staff with precisely drawn boundaries sized to meet population growth and land demands. Growth boundaries were shaped to create compact and efficient use of land, while minimizing impacts to resources. They were also sized to reflect the economics necessary to support the provision of public water and sewer services throughout the north county area.

These concerns have been studied and discussed for many years, and considerable interjurisdictional cooperation has resulted in a formal agreement that specifies the strategy for moving forward. Part of the strategy includes the ability to utilize State financial assistance opportunities, and as described above, that necessitates Henderson's ability to manage its status as a priority funding area.

Coordination between private and public entities was critical during the planning process for growth boundaries. In addition, natural factors, such as size, shape, location, soil type, slope, and land cover were calculated in determining growth boundaries. Man-made factors also were considered, such as future sewer lines and roads. Good inter-jurisdictional relationships, between State, County and municipalities, have been crucial to date and will be important for the overall success of growth areas in northern Caroline County.

Many forces shape Henderson's growth boundaries. These forces include projections for population growth, housing demands, economic viability, public infrastructure needs, densities for new development, resource preservation and conservation, and the availability of land for residential, commercial, or industrial uses.

Greenbelts serve as growth boundaries for North County Towns and provide a distinct rural edge, indicating a transition from higher density areas to lower density rural areas. The Greenbelts also serve as critical gateways to municipal areas. As depicted and described in this Comprehensive Plan, greenbelts are compact and contiguous. They are also consistent with Caroline County's plans and priorities. Successful protection, preservation, and implementation of the Greenbelt concept will depend on appropriate County zoning and restrictions on potential development.

The factors used for drawing growth boundaries for the towns and surrounding areas of Henderson include:

• Purpose: Growth boundaries establish demarcation lines (size, shape, and location) between planned growth areas and areas planned for resource/rural protection. Growth boundaries guide the creation and extension of public infrastructure.

• Planning: The planning period expresses the number of years in which growth will be accommodated. Growth boundaries guide infrastructure and utility plans, such as water and sewer extension and annexation, and employ an approximate 20 year time-frame for guiding detailed planning, system design, feasibility, and construction.

• Land Characteristics: Land characteristics include the following: existing development, areas suitable for in-fill and redevelopment, natural constraints such as topography or slope, existing or planned infrastructure improvements, highway access, environmentally sensitive areas, political and physical boundaries, agricultural and forested lands, and the location of mineral-resource areas.

Municipalities and Adequate Public Facilities (APF) Laws

Adequate public facilities (APF) laws for North County municipalities can include water and sewerage, schools, roads, emergency services and parks and are related to community growth objectives. In 1978, the Maryland General Assembly passed Article 66B, Section 10.01, enabling municipalities and non-charter counties to adopt adequate public facilities ordinances (APFO's).

Authority to enact adequate public facilities ordinances is based upon the general authority to sustain and promote the public health, safety and welfare of Maryland's citizens. APF laws were designed to curb development in areas where public facilities are inadequate and to delay development in planned growth areas until adequate public services can be obtained and assured. APF laws are growth management tools for growing counties and municipalities and are consistent with the Planning and Zoning Act.

APF laws require clearly defined standards. Henderson will consider the necessity and feasibility of a formal adequate public facility ordinance after a final strategy for public water and sewer service has been formally agreed to and adopted by the Authority. It may be that an APFO will not be needed in view of the relatively small amount of growth that is anticipated and the capacity allocation distributions incorporated into the agreement establishing the Authority.

Design Standards

Design standards for municipalities control the size, shape, and physical characteristics of new development in existing communities. Design standards supply written documentation and graphic representation for developers that expresses additional detail regarding a community's vision for its future. For example, design standards can propose that developers take into account the historic and cultural features of a municipality during development. They also can provide for connectivity to major and minor road systems to ensure adequate circulation for travelers. Visual factors, such as streetscapes, sidewalks, trails, parks, and open spaces add

aesthetic appeal to community stability and increase the desirability of an area for economic and community development.

Chapter 2 Background and Regional Setting

Caroline County

Caroline County is located on the Delmarva Peninsula in the State of Maryland. It is part of the Upper Eastern Shore Region. The Upper Eastern Shore comprises five counties; Caroline, Cecil, Kent, Queen Anne's, and Talbot. Caroline County is bordered by Queen Anne's, Talbot, and Dorchester Counties in Maryland and Kent and Sussex Counties in the State of Delaware.

Caroline County was formed in 1774 from portions of Dorchester and Queen Anne's Counties by Maryland's last colonial governor, Robert Eden. The County was named after Caroline Calvert, wife to Robert Eden and the sister of Frederick Calvert, the last Lord Baltimore. Caroline is a "Home Rule" county, as established by the State of Maryland, with three elected County Commissioners who serve a four year term.

There are ten incorporated municipalities in Caroline County, including; Denton (the County Seat), Federalsburg, Goldsboro, Greensboro, Henderson, Hillsboro, Marydel, Preston, Ridgely, and Templeville. According to Census 2000, the population for the Upper Eastern Shore indicates that the majority of growth is occurring in Caroline, Cecil, Queen Anne's, and Talbot Counties. As an indicator of future development, growth in the surrounding counties of Talbot and Queen Anne's will impact growth in Caroline County. The table below summarizes regional growth trends over the last thirty years.

Regional Population 1970-2000					
Eastern Shore Region	1970	1980	1990	2000	Growth (+/-)
Caroline County	**19,781**	**23,143**	**27,035**	**29,772**	**50% +**
Cecil County	53,291	60,430	71,347	85,951	60% +
Kent County	16,146	16,695	17942	19,197	15% +
Queen Anne’s County	18,422	25,508	33,953	40,563	120% +
Talbot County	23,682	25,604	30,549	33,812	43% +
Upper Shore	131,322	151,380	180,726	209,295	55% +
Dorchester County	29,405	30,623	30,236	30,674	4% +
Somerset County	18,924	19,188	23,440	24,747	30% +
Wicomico County	54,236	64,540	74,339	84,644	55% +
Worcester County	24,442	30,889	35,028	46,543	90% +
Lower Shore	127,007	145,240	163,043	186,608	45% +
Total Eastern Shore	258,329	296,620	343,769	395,903	50% +
Source: US Census 2000					

Table 1

County Demographics

Caroline County's population in 1970 was 19,781 and by Census 2000, the population was 29,772. This is a 50% increase over 30 years or an annual average of approximately 1.4%. Population by 2030 is expected to continue rising in the County over the next 30 years by an additional 54% from 29,772 people in 2000 to 46,000 in 2030. This growth of over 16,000 new residents should be primarily accommodated within designated PFA's and represents an average annual growth rate of 1.46%.

The municipalities are Caroline County's principal designated growth areas or "Priority Funding Areas" (PFA's). As shown in Table 2, recent population increases were highest in Henderson, Hillsboro, Preston, and Ridgely. Moderate growth occurred in Goldsboro, Greensboro, Federalsburg and Templeville. Low growth occurred in Denton and Marydel. Overall, a 12% increase in population was experienced for Caroline County towns from 1990 to 2000, which is the same as the County growth rate. In the past, rural growth has occurred on a larger scale than town growth with some 70% of Caroline County's residents presently living in rural residential areas.

Caroline County (and its municipalities) are moving toward an embrace of anti-sprawl "smart growth" principles. This Comprehensive Plan anticipates a range of growth between a "constant share" philosophy and an average of projections (prepared by the Maryland Department of Planning) that suggests average annual population increases for the Town of Henderson between 1.45% and 3.54%.

Population by Municipality			
Municipalities	**1990 population**	**2000 population**	**Growth (+/-)**
Denton	2977	2960	-1%
Federalsburg	2365	2620	11% +
Goldsboro	185	216	17% +
Greensboro	1441	1632	13% +
Henderson	**66**	**118**	**79% +**
Hillsboro	64	163	155% +
Marydel	143	147	3% +
Preston	437	566	30% +
Ridgely	1,034	1,352	31% +
Templeville	66	80	18% +
Total	**8,778**	**9,854**	**12% +**
Source: US Census			

Table 2

Higher growth rates in the towns are expected in the future as water and sewer capacity issues are addressed to allow for increased growth. Rural residential development will decline as lot availability decreases.

First Election District

Henderson lies within the 1st Election District which is bordered by Queen Anne's County in Maryland and Kent County in Delaware. There are four incorporated towns located in the region: Goldsboro, Henderson, Marydel, and Templeville. In addition, one designated "Rural Village" with historical importance also is located in the region, Mount Zion.

Sharing political borders with Delaware makes the region unique within the County. Many of the municipalities were formed in the mid to late 19th Century as railroad lines to Pennsylvania and Delaware were constructed. These towns were then connected to Delaware and Pennsylvania regions rather than Maryland regions, which served as the principal driving economic force in the area. Today, the area is closely linked to Dover, the State capital of Delaware.

North County Demographics

According to Census 2000 statistics, The 1st District had a regional population of 2,888 people in 1990 and 3,106 people in 2000. These figures indicate an overall population increase of7.5% within the last decade (an additional 218 people). In 1990, 460 people were located in the four incorporated towns, approximately 16% of the total population of the region. In 2000, 561 people resided in the towns.

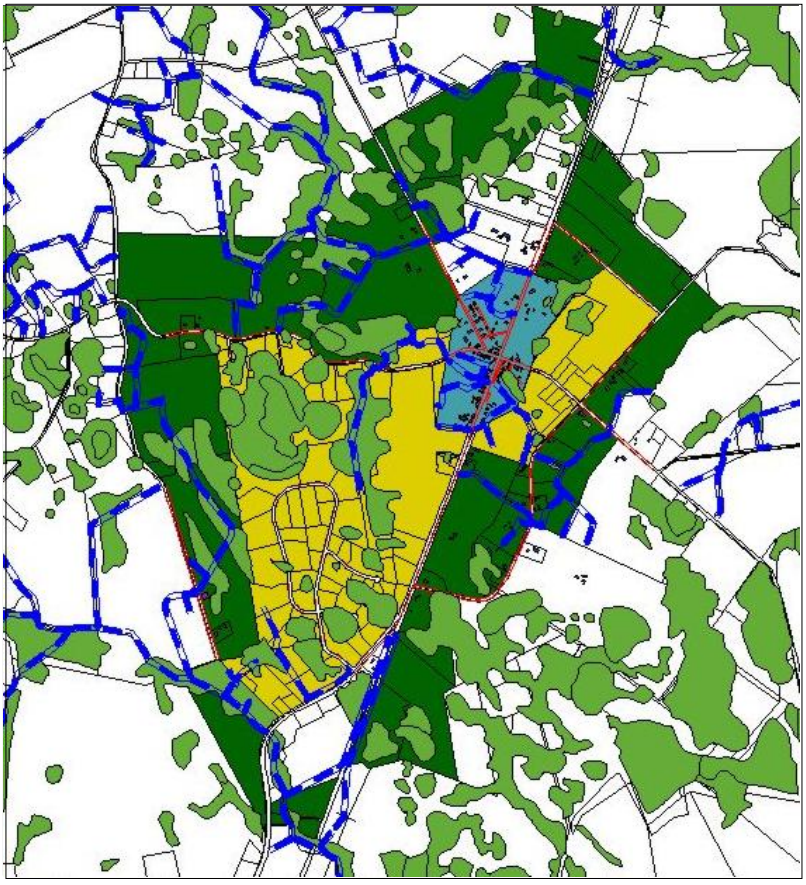
Approximately 46% of all growth in the North County region within the last decade has occurred in the incorporated towns. For North County, every town experienced growth from 1990 to 2000. Substantial growth occurred in Goldsboro, Henderson, and Templeville (see Table 2). Much of the population growth may be due to a large influx of migrant Hispanic workers. Census 2000 statistics for the region indicate that the largest portion of the County's Hispanic population is located in the North County region. Caroline County has 789 Hispanic persons, 498 of which reside in the North County region (58% of the County's Hispanic population).

North County Geography, Resources, and Industry

The 1st District has approximately 23,018 acres. The highest elevation within Caroline County (70 feet above sea level) is located in the rural village of Mount Zion. This region is located entirely with the Atlantic Coastal Plain, having a flat topography consisting of poorly drained soils marked by a high water table. Few mineral resources, aside from small deposits of sand and gravel, exist in the region. Commercially viable deposits exist primarily in and around Goldsboro.

Major North County resources include historical sites and structures, extensive forested areas, numerous non-tidal wetlands, and other environmentally sensitive areas that compose a majority of the region. Significant natural resources include Lake Bonnie and Mud Mill Pond. According to the *National Wetlands Inventory*, North County has 5,075 acres of non-tidal wetlands, comprising 22% of the entire region. North County also hosts several large areas that are designated habitat for threatened and endangered species. The major industry in the North County region is agriculture and related enterprises.

According to Agricultural Census (NASS) statistics, in 1997 $16 million was generated from agricultural related services, accounting for 19% of the County's $84 million total for agricultural industries. The region is predominately rural except for the towns and pockets of rural residential development in the countryside. The land is suitable for some crop farming, however, adequate production requires the use of drainage channels managed by Public Drainage Associations or PDA's. The Caroline County Soil Conservation District oversees the management of PDA's.



Graphic 2

The Public Drainage ditches are displayed in blue in the graphic above. The lighter green areas are mapped wetlands (that fall within Henderson, the County's designated "Henderson Growth Area" (in yellow), the darker green "Greenbelt" and other County lands (in white).

Population Projections

The preparation of population projections for very small geographic areas like the Town of Henderson are "problematic." One unanticipated development or unforeseen economic conditions could suddenly and drastically alter actual growth patterns, especially over a short-term time frame. Accordingly, the Town has opted to accept projections prepared by the Maryland Department of Planning (MDP). MDP has prepared a range of projections based on different assumptions about the distribution of growth patterns within Caroline County. The continuation of a constant share of overall growth and an average of other projections support the

policy concept that future growth should be directed to existing communities. In light of this "Smart Growth" philosophy, Henderson expects to see moderate growth once a North County Wastewater Treatment Facility is constructed and building permits can once again be issued.

Henderson Municipal Population Projections (source: Maryland Department of Planning, 2009)					
Municipalities	**2000 Pop.**	**2010 Pop.**	**2020 Pop.**	**2030 Pop.**	**AAGrowth***
Goldsboro (share)	216	247	292	334	1.46%1
Goldsboro (average)		244	289	330	1.42%
Greensboro (share)	1632	1878	2220	2534	1.46%
Greensboro (average)		1903	2287	2645	1.60%
Henderson (share)	**118**	**135**	**160**	**182**	1.45%
Henderson (average)		**160**	**236**	**335**	3.53%
Marydel (share)	147	149	199	227	1.45%
Marydel (average)		168	156	158	0.24%
Total (share)	**2113(Census)**	**2409**	**2871**	**3277**	1.47%
Total (average)		**2475**	**2968**	**3468**	1.66%

Table 3

Based on the population projections (included above – Table 3), the Maryland Department of Planning calculated housing unit projections for the Town of Henderson of 64, 97, and 144 new dwelling units for the years 2010, 2020, and 2030 respectively. The Town has reviewed those housing unit projections and concluded that there may have been housing unit undercounts for 1990 and overcounts for 1980 (or the data used contained typographical errors). It does not seem reasonable to suppose that the housing count in Henderson dropped from 72 in 1980 to 26 in 1990. Department of Assessment and Taxation data indicates that 34 of the 37 taxable residential parcels with improved assessed values above $10,000 were in existence in 1990. One of the dwelling units is an apartment building containing 4 units. Accordingly, the Census count would have enumerated three additional "dwellings" as domiciles for 4 separate households. The other three were constructed between 1990 and 2007. The remaining discrepancies could be accounted for by rectories and other tax exempt dwelling units. *Henderson estimates that 43 dwelling units are currently within Town limits.*

Based on an overall allocation cap of 234, Henderson's population growth is effectively "capped" at 1,055 persons (assuming the current 2.8 persons per household). This is well above the higher of the two projections for 2030. *The Henderson Growth Area is limited to the sewer service boundary established by mutual agreement during the creation of the North County Water and Sewer Authority.* Actual growth within the growth area will be limited by the sewer allocation cap of 234 equivalent dwelling units. Initially, Henderson is slated to receive 68 allocations in order to facilitate connection of all existing structures and to accommodate a reasonable amount of infill.

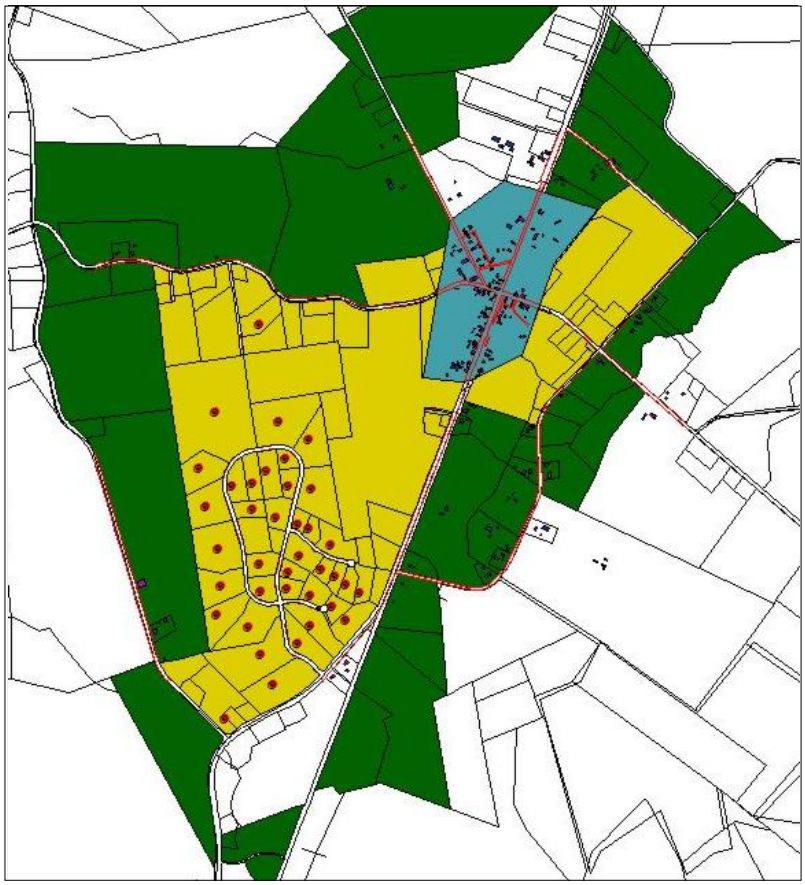
New Home Construction – Caroline County

Between 1990 and 1999, approximately 2,013 new housing units have been constructed in Caroline County. These numbers include home construction in the towns, unincorporated areas,

mobile home parks, and single/multi-family residential units. Homes that replaced older structures were subtracted to obtain a net increase of 1,802 houses. Results indicate that 72% of new housing units are being located in unincorporated areas and 28% in the towns. An additional 1,711 homes were constructed in the years between 1999 and 2007.

According to Census 2000, Caroline County's population was 29,772, with the population of unincorporated areas increasing by 1,661 (19,918 persons) and the towns by 1,076 (9,854 persons). Rural residential growth in the County can be reduced by municipal expansion, infrastructure improvements, targeted conservation, and the allocation of new lands for residential housing. Housing issues will increasingly include the debate over "affordability" in surrounding areas and related implications for a new surge of in-migration by households that will find themselves priced out of higher valued markets in adjacent counties.

In the North County region (1st District), 203 dwelling units were constructed between 1990 and 2007. Of the 255 parcels in the combined municipal growth area boundaries of the four North County towns, 56 reported new dwelling units constructed between 1990 and 2007. For the Henderson growth area only, 38 new homes were constructed during the same period. All of these dwellings are located in the Heritage Hills development south of Town.



Graphic 3

Transportation

Major highway access routes near or within Caroline County include US Route 301, US Route 50, US Route 13, and MD Route 404. MD Routes 313 and 287 in Henderson are designated scenic rural highways on the Underground Railroad Tour. Every major city within the Mid-Atlantic region is located no less than 300 miles from the County.

The closest regional cities include Dover and Wilmington, Delaware; Annapolis and Baltimore in Maryland; and Washington D.C., all located within 2 hours driving time of the County. In addition, Henderson contains a railroad line, which connects the area to Delaware and Pennsylvania, though rail traffic is dormant.

Geography, Resources, and Industry

Caroline County is approximately 321 square miles or 205,383 acres. The County average elevation is 40 to 70 feet above sea level and is located entirely with the Atlantic Coastal Plain, a geographical area extending along the East Coast seaboard below New York and Pennsylvania.

The topography of the region is relatively flat, which has created an environment suitable for crop farming due to quality well-drained soils. Large mineral deposits of sand and gravel exist in the middle and southern portions of the County.

Caroline County contains numerous natural resource areas, including large forested areas that serve as wildlife habitat, a number of rivers and streams that serve as spawning and nursery areas for several Chesapeake Bay fish species, and large areas of wetlands. Major water resources include the Choptank and Tuckahoe Rivers and Marshyhope Creek. The County is served by several large fresh water aquifers. Two major parks are located in Caroline County, including Tuckahoe and Martinak State Parks. As a hunting and fishing area, Caroline is ideal for the sportsman. The Idylwild Wildlife Management Area, north of Federalsburg, has over 3,000 acres. The homes and farms within the region provide an ideal rural setting for the County, which is historically, known as the "Green Garden County" for its vegetable production.

Caroline County has been blessed with productive farmland and is a major agricultural producer for Maryland. As an important cultural legacy, the County is one of only four or five counties in the country, where agriculture has been the dominant industry for over 300 years.

According to statistics prepared by the National Agricultural Statistics Service (NASS), in 1997, the County generated $84 million from agricultural industries (more than any other industry sector), which accounted for 28% of the County's gross domestic product. In addition, Caroline County is ranked 2nd in the State for total acreage preserved in agricultural land preservation programs.

Chapter 3 Regional Plan

Vision Statement

The Vision for Henderson is to direct growth to existing population centers and conserve resource lands for their inherent values as part of a region-wide rural agricultural conservation area that protects farm land and natural resources. The Town of Henderson continues to support this regional vision by looking to a future that includes public sewer and other public facilities needed to support sustainable long-term growth and infill development. Henderson's Vision is to become a more self-sufficient community that includes commercial services for a growing population and a self-sustaining municipal revenue structure that will ensure an economically stable community that becomes an increasingly desirable place for families and households of all income levels.

The land use and growth management goal of the Henderson Comprehensive Plan is to concentrate future development in planned growth areas and preserve the predominantly rural character of the North County region. The County's overall land use and growth management objectives to achieve this goal include the following:

- Encouraging future development to locate in designated growth areas where adequate public facilities and services exist or are planned;
- Providing adequate planning and regulatory mechanisms for growth and growth management;
- Maintaining the agricultural land-base to support the County's agricultural economy;
- Preserving valuable natural and manmade resources;
- Promoting economic development, expansion, and employment in suitable areas;
- Discouraging low-density nonagricultural development from locating outside of designated growth areas; and
- Providing appropriate county level facilities and services for North County to support existing and future populations.

Goals and Objectives

Goal

Concentrate growth in suitable areas as defined by the Municipal Growth Element including locations for infill and redevelopment within current Town limits.

Objectives

Encourage future development in areas where adequate public facilities exist or are planned.

Provide adequate planning and regulatory mechanisms for growth and growth management.

Maintain the agricultural land-base to support the County's agricultural economy.

Preserve valuable natural and man-made resources

Promote economic development, expansion, and employment in suitable areas.

Discourage low-density non-agricultural development from locating outside of designated growth areas.

Work with Caroline County to provide appropriate county level services and facilities for Henderson and nearby North County residents to be located within town limits.

Summary

Historically, population and housing growth has not been an issue in Henderson. Estimates indicate that the 1st Election District grew from 2,888 people in 1900 to 3,106 people in 2000, a 7.5% increase. Most of the new housing has been within mobile home parks and scattered rural development close to Henderson and Marydel.

By 2000, about 18% of the North County population was located within the incorporated towns. Taking mobile home parks into account, due to location and capacity, 50% of the North County's population resides in the immediate vicinity of the towns. Therefore some 68% of the North County's population resides in or near municipal areas.

If current plans for developing regional public water and sewer facilities are implemented, this trend likely would be reinforced. The location and type of new growth in North County has been consistent with the County's past growth management objective of preserving rural agriculture while concentrating growth in municipal areas (1986 *Caroline 2000: A Comprehensive Development Plan for Caroline County, Maryland*, including amendments 1991, 1996, 1998, and 2002).

Part 1: North County - Existing Land Use Summary

As shown in Table 4 and on Map 1-1, the existing land use in North County is predominantly agricultural. Of the total land in the agricultural category, approximately 40% is forested. Some 5,075 acres or about 23% of North County is classified as non-tidal wetlands according to the *National Wetlands Inventory.* Much of the land in the region is of an environmentally sensitive nature.

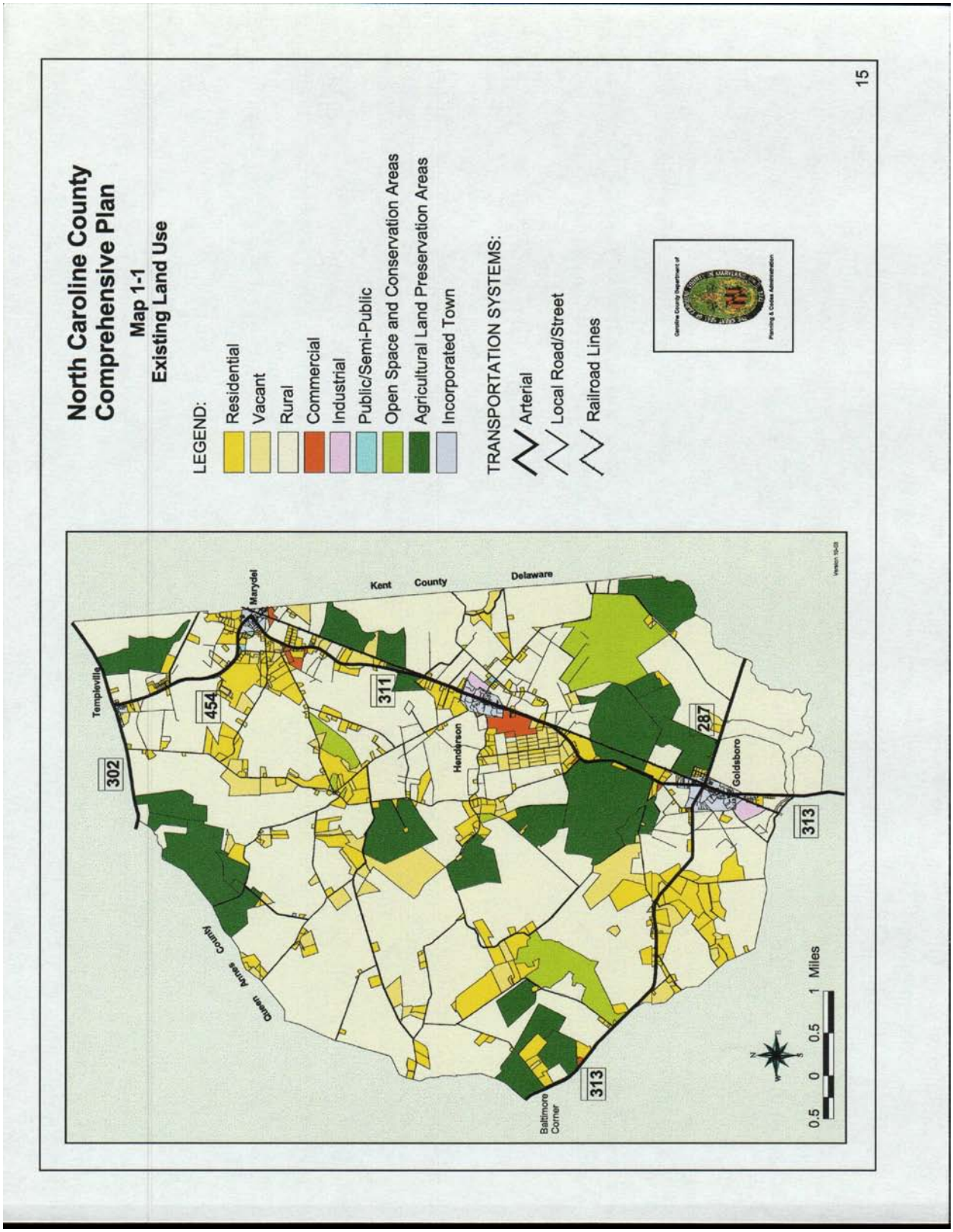
The four incorporated towns of North County comprise approximately 940 acres or 4% of the total land area in the region. Much of the residential, commercial, and industrial land uses in the

region are located in or near the towns. Some low-density residential land uses exist in scattered rural areas away from the towns. Development in the incorporated towns of the North County region can be characterized as predominantly low-density residential settlement at crossroads locations. Goldsboro (the largest town), Henderson, Marydel, and Templeville include some convenience commercial and/or business service uses that cater to the surrounding communities.

These uses are primarily located along the arterial routes, which serve as "main streets" for these communities. There is substantial vacant land (approximately 50 acres) within Goldsboro, Henderson, and Marydel, which may provide opportunities for infill development in the future. It should be noted that the towns have grown little over the last several decades. This is due to natural soil limitations in and around these communities (high water table and slow percolation rates) which preclude the approval of on-site sewage disposal systems and the lack of public water and sewer facilities.

Municipal Land Use in Acres - 2007								
	Residential	Commercial	Industrial	Vacant	Ag	Exempt	Total	R Density units/acre
Goldsboro	44	22	2	608			676	2.02
Henderson	25	22	6	24	7.5	5	65.5	1.93
Marydel	20	23	0	6			49	2.6
Source: Maryland PropertyView 2007 (approximate acreages)								

Table 4


North Caroline County
Comprehensive Plan
Map 1-1
Existing Land Use
LEGEND:
Residential
Vacant
Rural
Commercial
Industrial
Public/Semi-Public
Open Space and Conservation Areas
Agricultural Land Preservation Areas
Incorporated Town
TRANSPORTATION SYSTEMS:
Arterial
Local Road/Street
Railroad Lines
Templeville
Marydel
Kent County
Delaware
Henderson
Goldsboro
Queen Annes County
Baltimore Corner
302
454
311
287
313
313
0.5 0 0.5 1 Miles
15

Part 2: North County - Future Land Use

As shown on Map 1-2, the Regional Land Use Plan continues the growth management policies of former plans, namely concentrating population in the existing town centers and conserving agricultural and natural resources. The Land Use Plan has been refined to reflect proactive policies for preserving the agricultural areas of the North County region. It identifies portions of North County that will be priority areas for coordinated Federal, State and local programs to preserve agricultural land and support a healthy agricultural economy.

Agriculture will remain an important and preferred land use throughout the rural region. However, the Land Use Plan recognizes existing rural settlement patterns, identifying rural enclaves, villages, and crossroad communities that are part of the region's unique character. In addition, the Land Use Plan makes provisions for the stability of the existing towns of Goldsboro, Henderson, Marydel, and Templeville. It gives priority to the incorporated towns as centers for future population growth, major capital investment and provides for their reasonable expansion. The Land Use Plan depicted includes consideration for employment and designated growth areas or future Priority Funding Areas as noted in Maryland's "Smart Growth" legislation. The following describes the land use districts of the North County Land Use Plan:

Rural Agricultural Conservation

Rural Agricultural Conservation encompasses active agricultural areas, existing agricultural land preservation districts, and land in private conservation easements. The area captures most of the known significant wildlife habitat areas in the 1st Election District and closely coincides with the Maryland Green Infrastructure area, as developed by the Maryland Department of Natural Resources (DNR) under the Green Print program. The area is characterized as rural and scenic countryside consisting of farm fields, large forested areas, extensive natural resources, and scattered historic and cultural sites and structures.

The growth management emphasis for the Rural Agricultural Conservation area is to preserve the agricultural land base and protect the natural resources located in the region. It should be the priority area for programs designed to permanently preserve agricultural land, help maintain a viable agricultural industry, and protect natural resources. Low-density rural residential and related land uses should be minimized to avoid conflicts with legitimate agricultural uses and reduce demand for capital investment in infrastructure, such as county roads. The existing scenic, cultural, and historic resources that define the character of the area also should be protected through appropriate programs and regulations.

Designating key growth areas in and near the towns is an important parallel growth management objective. If the towns are desirable places to live, it will help lessen development pressure in rural areas. For the Towns to assume the role as growth centers, basic community quality and infrastructure issues will need to be addressed. A key infrastructure issue is the provision of public water and sewer services. A second key issue is the lack of planning and implementation to improve community quality, including housing stock, investment in community infrastructure, and visual aesthetics.

Rural Residential

Rural Residential areas consist of existing low-density residential uses located within the Rural Agricultural Conservation area. These areas are the result of historic development patterns, including more recently, the creation of minor subdivision lots along State and County roads. Any additional rural residential development in the region should be confined to these areas although strict access controls and roadside buffering should be required to protect and enhance the overall scenic rural character.

Where possible and where necessary, steps should be taken to enhance the rural and scenic character of these areas through the strict application of property maintenance codes.

Rural Commercial

The Rural Commercial district includes small, isolated commercial or business uses that generally serve the surrounding area, functioning as a modem mini-mart or convenience store in more remote rural locations. These uses are often associated with the historic character of the area and fulfill basic service needs for local residents. Rural Commercial areas also may include existing service facilities, such as automotive repair shops, trucking transport services, agricultural support uses, and more intense home-based businesses. In some cases, these businesses have located to service the needs of the agricultural community. New intense commercial uses in rural areas, with the possible exception of those that directly support local agriculture, should be restricted to areas planned for commercial and/or business uses.

Rural Village

The Rural Village district encompasses the historic village of Mount Zion (Melville Crossroads). Mount Zion is a unique traditional crossroad village that includes a historic church and cemetery, a small semipublic park and campground, and two meeting halls. The setting for Mount Zion is very appropriate, being surrounded by a scenic rural landscape. The approaches to the village are framed by views of open fields, forested areas, and the Louis Antal House, an early 19th Century Federal estate.

Special areas, like Mount Zion, need to be protected by appropriate programs for local historic, cultural, and scenic preservation. In addition to insuring the setting for this community, resources should be applied that will encourage the rehabilitation and restoration of structures within the village and improve overall aesthetic character.

Greenbelt Area

Greenbelt areas are "green" transitional land use areas located at the edge of the growth area boundaries of the municipalities. These areas include a mix of low density residential and agricultural land uses. The emphasis in this area is on maintaining a distinct rural edge for the designated growth areas characterized by open space, natural resources, and low density residential uses. Coordinated County/Town policies for these areas should address the protection

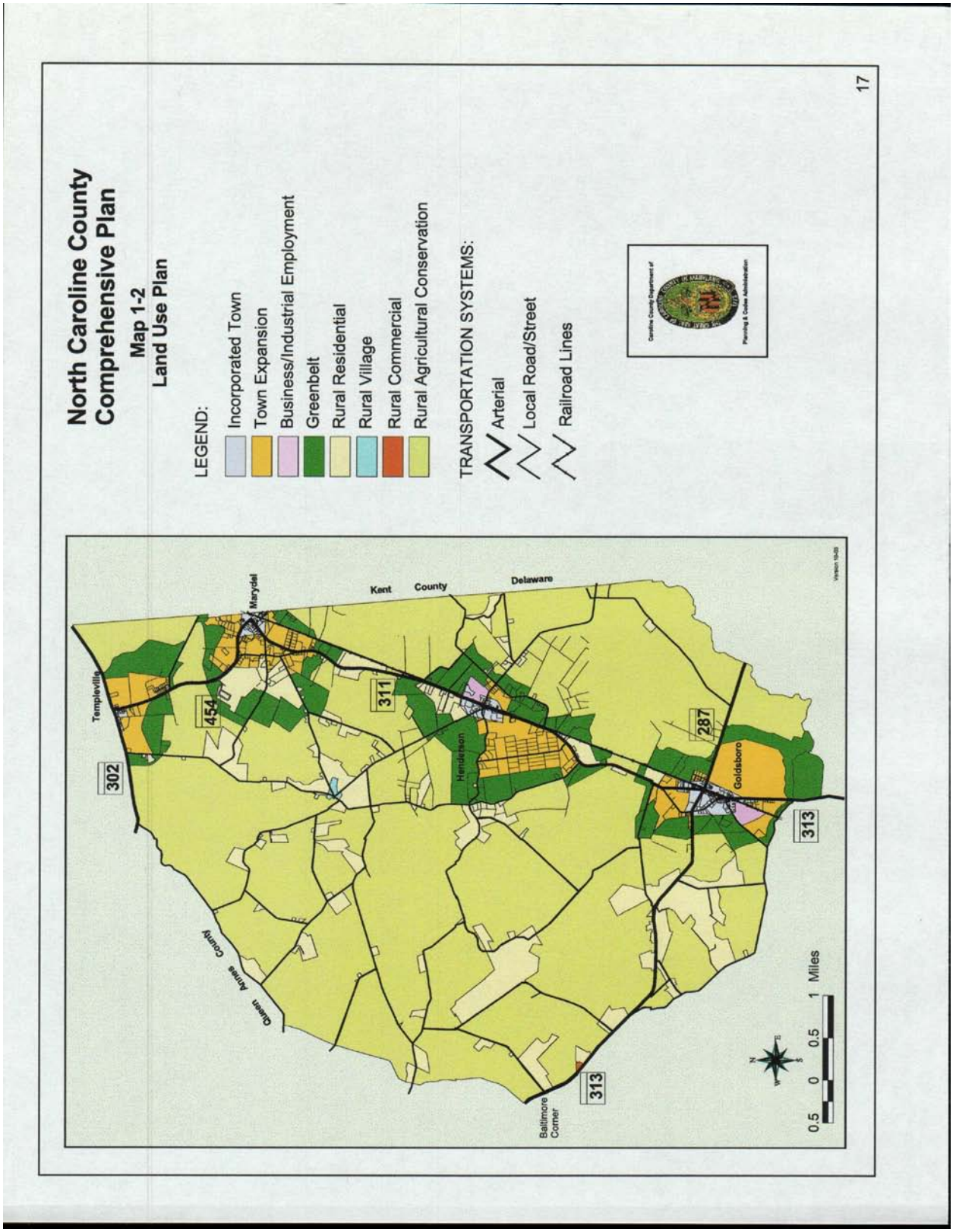
of key visual corridors and gateways to the towns, maintaining appropriate natural buffers, and protecting rural character.

Town Expansion Areas

Town Expansion Areas include the incorporated towns of Goldsboro, Henderson, Marydel, and Templeville, which constitute the region's current PFA's under the State's 1997 Smart Growth Areas Act. Town Expansion Areas also include existing developed areas adjacent to the towns, including residential, commercial, and industrial, as well as the Maryland Environmental Service (MES) proposed Water and Sewer Service District and proposed municipal expansion areas outside present corporate boundaries. The incorporated towns and the MES Water and Sewer Service District include areas currently planned for major capital improvements and will constitute the future PFA's for the region in compliance with State laws.

The emphasis for PFA's is to invest in key public infrastructure, increase economic activity, and revitalize existing neighborhoods. Overall emphasis is on insuring the orderly expansion of the Town and its infrastructure, coordinated County and Town land use policies, and promoting high quality development.

The Town Expansion Areas define a planned, long-range build-out limit for the municipalities. Potential build-out scenarios include lands within current corporate boundaries and lands designated as growth areas (vacant or undeveloped/unimproved lands, infill, and town expansion areas).


North Caroline County
Comprehensive Plan
Map 1-2
Land Use Plan
LEGEND:
Incorporated Town
Town Expansion
Business/Industrial Employment
Greenbelt
Rural Residential
Rural Village
Rural Commercial
Rural Agricultural Conservation
TRANSPORTATION SYSTEMS:
Arterial
Local Road/Street
Railroad Lines
Templeville
Marydel
Kent County
Delaware
Queen Annes County
Henderson
Goldsboro
Baltimore Corner
302
454
311
287
313
313
0.5 0 0.5 1 Miles
17

Each North County town has significant infill re-development opportunities. In addition, each town has ample growth areas. Some towns, such as Marydel, are more intensely developed; however, each town has a substantial amount of land available for growth.

The municipalities play an important role in the County's growth management strategies, thus coordinated County/Town land use policies are necessary. As designated growth centers, the towns are the preferred location for future population growth and economic activity in the region. Assisting the Towns to achieve their respective community development and redevelopment objectives is a key implementation strategy.

The Towns have embarked on a joint planning program with Caroline County to begin to address local growth management issues. Continued cooperation between the County and Towns is required to build the community resources necessary to effectively implement growth management and revitalization strategies.

Business and Industrial Employment

Business and Industrial Employment includes land extending from Goldsboro and Henderson into the Town Expansion Area. The Land Use Plan identifies these areas as potential sites for development of employment uses in a business – industrial park setting. The objective of this district is to set aside areas for employment uses that will bolster local economies and provide for jobs in close proximity to housing and in locations consistent with the overall growth management plan for Henderson.

Chapter 4: Henderson Land Use Element

Henderson's land use districts include:

Town Center

The Town Center district is made up of a mix of land uses, including residential, institutional, commercial, and public. Historic structures are located in the Town Center. Zoning for these areas should recognize the existing mix of land uses and permit their continuation. Infill and redevelopment of vacant and under-utilized sites should be encouraged, consistent with design standards and guidelines developed to insure compatibility with adjacent land uses and consistency with the existing small crossroads character of the towns. Adaptive reuse of existing historic structures also should be encouraged.

Neighborhood Conservation

The Neighborhood Conservation district encompasses existing low-density residential neighborhoods, primarily in detached single-family dwellings with some multi-family dwellings. This district may include some vacant or larger properties that could be candidate sites for infill or redevelopment projects. Historic properties located in these districts may be appropriate for adaptive reuse strategies. Zoning for these areas should address the need to protect existing residential areas from incompatible uses and activities. Design guidelines for appropriate infill projects would be applicable.

Neighborhood Business

The Neighborhood Business District (applicable only in Goldsboro) includes scattered business and commercial sites located outside of the Town Center. The purpose of this district is to recognize existing land use and/or zoning decisions. In the future these areas should not be allowed to expand and new business and commercial activities should be encouraged to locate in the Town Center District or be part of a planned development.

Town Growth

The Town Growth district encompasses large vacant tracts within the corporate limits currently in agricultural use. It also includes individual sites that lend themselves to infill and redevelopment. This area totals approximately 30 acres and includes important sites for new development, especially if a regional water and sewer system is constructed. The future land use for these areas varies and is discussed in more detail below. Important development considerations for these areas include:

- Insuring the appropriate extension of existing streets, pedestrian circulation systems, and public utilities;

- Protecting adjacent developed areas from incompatible development;

- Protecting and enhancing community gateways; and

- Insuring the quality of new development complements the existing "small town" character of the Town.

Town Expansion Areas

The County Land Use Plan identifies the Town Growth Area, which includes land around Henderson that is planned for future growth. The same development considerations that apply to growth areas within the towns can apply to these areas. Orderly development should be accomplished through the annexation process, whereby, they become part of the Town. Community quality objectives for the growth area should be clearly stated at the time of annexation and be based on the following design principles:

- New neighborhoods should accommodate a mix of uses;

- New neighborhoods should be compact and identifiable with visually discernible boundaries;

- New neighborhoods streets should extend existing street patterns to enhance views and landmarks;

- Street blocks should be consistent with existing block patterns and help describe component neighborhoods, suggesting the role of the street as a channel for social interaction;

- All parking should be accommodated through a mix of on-street and unobtrusive off-street strategies, avoiding large-scale parking lots;

- New neighborhoods should be visually coherent and establish community character through consistent rules of organization and architecture;

- Streets in new neighborhoods should be visually bounded with street trees, sidewalks, and front-yard design elements to create visual layers and contribute to the intimacy of streetscape;

- Most important, new neighborhoods and their settings should make a positive contribution to the existing town character.

Business and Employment Growth Areas

The North County Land Use Plan identifies Business and Employment Growth Areas. This land use classification encompasses adjoining county and town areas located in and around Henderson that have appropriate size, location, and access characteristics for development of business and/or light industrial uses.

Greenbelt

The North County Land Use Plan identifies a Greenbelt area adjacent to town. The greenbelt concept is a transitional land use area located at the edge of the growth area boundary intended for very low-density residential and agricultural uses. The greenbelt will help create a distinct rural edge for the designated growth area characterized by open space, natural resources, and low density residential uses.

The Henderson Land Use Plan

The land use and growth management goal for the Town of Henderson is to improve the overall quality of the Town. Henderson's land use and growth management objectives are as follows:

- Establish a Town comprehensive planning program;

- Expand the tax base of the Town by encouraging appropriate infill and redevelopment of vacant and underutilized properties;

- Improve existing property values and the climate for new investment and reinvestment in the Town by addressing key infrastructure issues;

- Stabilize property values through adoption of appropriate building and property maintenance codes;

- Insure new development is consistent with the overall growth objectives of the Town by adopting appropriate development codes and standards;

- Improve coordination between the Town and County;

- Support the utility corridor concept along the railroad right-of-way; and

- Protect sensitive environmental areas.

The primary transportation route serving Henderson is MD Route 311, a State arterial route that provides links to major highways including US Route 13 and MD Route 404. Minor routes serving the Town include Bee Tree Road, a rural route that exhibits scenic characteristics. The Town is situated along the Chesapeake railroad right-of-way, which presents an opportunity for development of a pedestrian and recreation corridor.

There are no known habitats of threatened and endangered species in or near Henderson. There are some small scattered areas of non-tidal wetlands and two stream tributaries of Tidy Island Creek, which are located in or adjacent to the Town. Portions of Henderson are located within the 100 year floodplain.

Community facilities include the Henderson Community Park, a Town Hall, and a local Post Office. The Henderson public water system serves town residents. Private water and sewerage

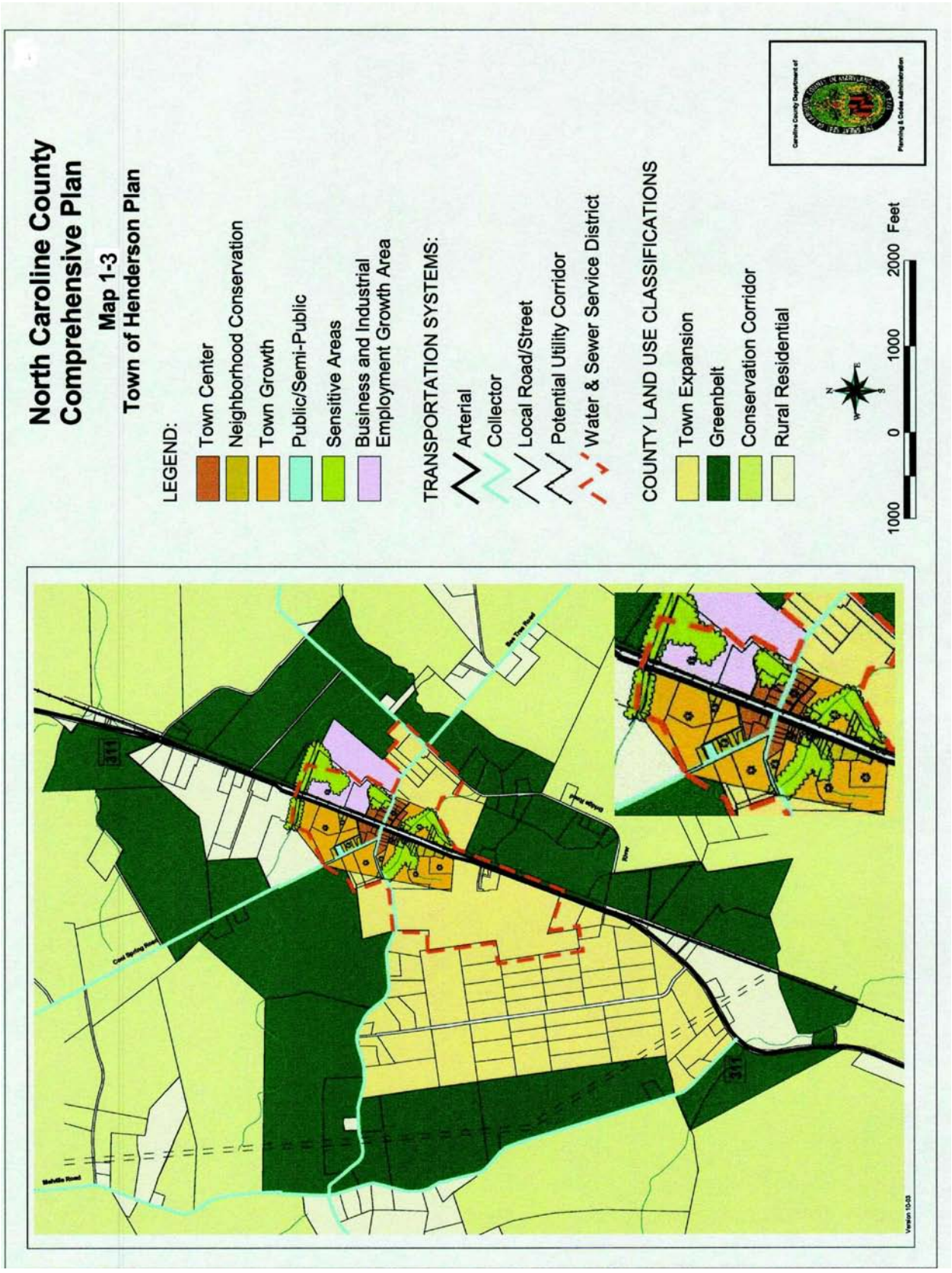
facilities are provided at Caroline Acres Mobile Home Park, located adjacent to the Town. The proposed regional *North County Five-Year Water and Sewerage Plan* will incorporate the Henderson public water system into an overall regional water system.

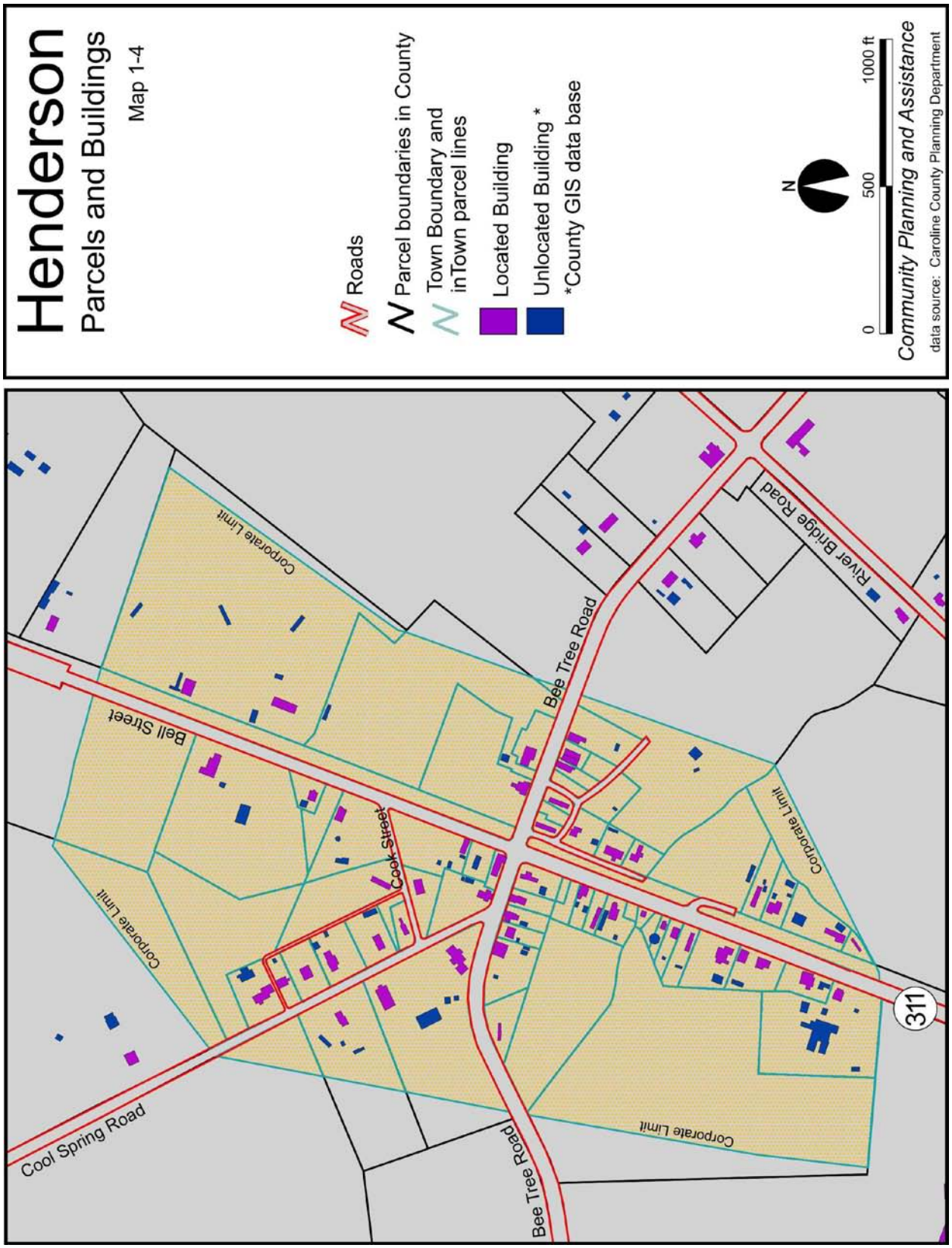
Henderson Land Uses

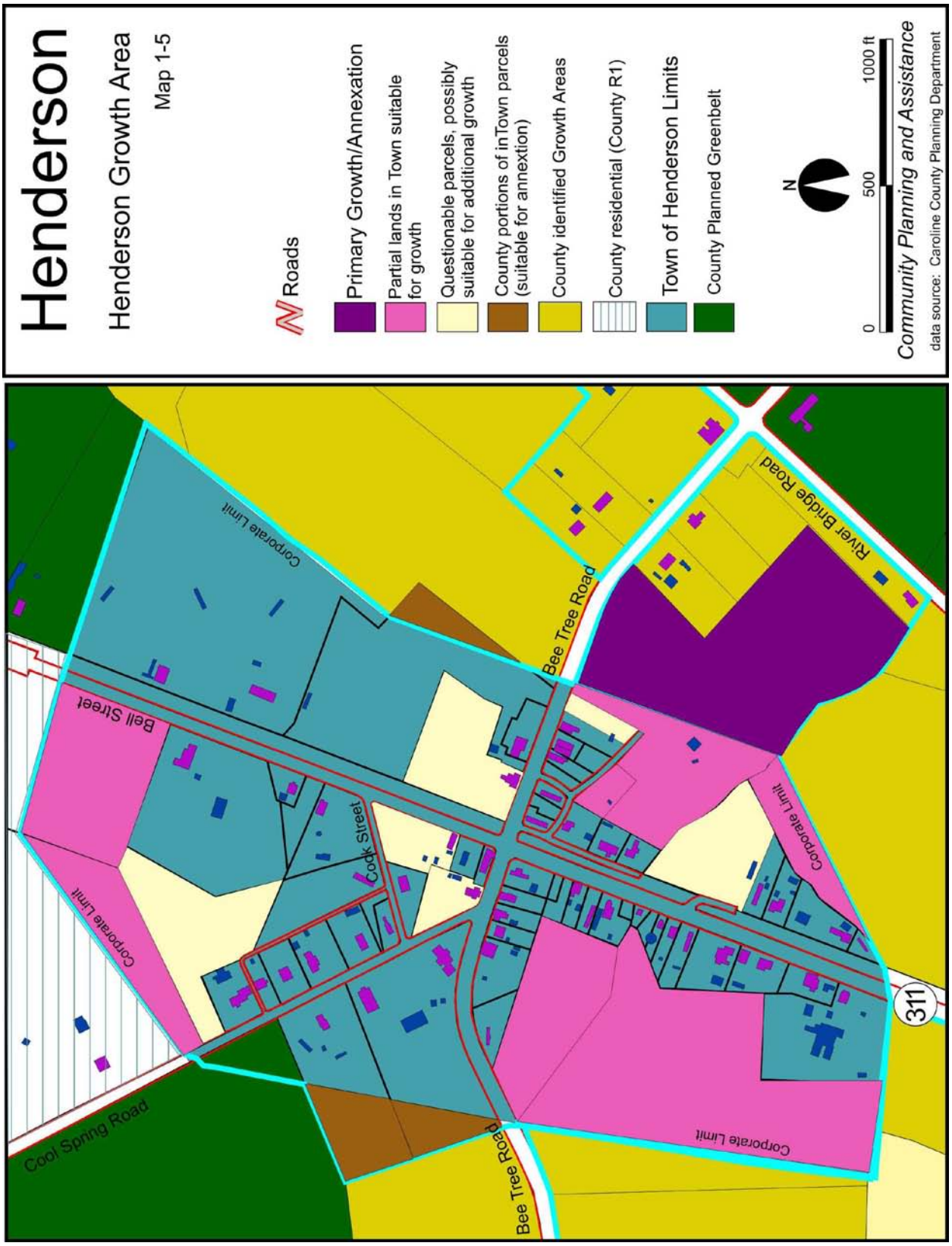
The future land use plan for Henderson is summarized on Map 1-3. Added detail is available on Map 1-4, found in the Municipal Growth Element. In addition to the land use categories described earlier, the Henderson Land Use Plan identifies approximately 22 acres of land located within the Town zoned for commercial uses. This Plan does not envision changing any of the development options available to those parcels. However, a two acre site on the north east corner of Bee Tree Road and Henderson Road (MD 311) is considered an appropriate location for extending the current commercial district to permit business activity.

The purpose of the Business/Industrial Employment Growth Area classification is to set aside land for employment development that will benefit the community in the future as well as reinforce opportunities to utilize the railroad right-of-way. The land uses depicted on the Henderson Land Use Plan Map should be used as the basis for locating new zoning districts to implement this Plan.

Henderson should consider any opportunity that may arise to improve municipal efficiency by annexing the portions of parcels that are currently outside Town limits. Future Town boundaries should follow property lines, wherever possible in order to reduce confusion regarding whether municipal or County rules and regulations apply to a particular portion of a parcel. Similarly, taxing and revenue policies can be thereby clarified and simplified.


North Caroline County
Comprehensive Plan
Map 1-3
Town of Henderson Plan
LEGEND:
Town Center
Neighborhood Conservation
Town Growth
Public/Semi-Public
Sensitive Areas
Business and Industrial
Employment Growth Area
TRANSPORTATION SYSTEMS:
Arterial
Collector
Local Road/Street
Potential Utility Corridor
Water & Sewer Service District
COUNTY LAND USE CLASSIFICATIONS
Town Expansion
Greenbelt
Conservation Corridor
Rural Residential
1000 0 1000 2000 Feet


Henderson
Parcels and Buildings
Map 1-4
Roads
Parcel boundaries in County
Town Boundary and inTown parcel lines
Located Building
Unlocated Building *
*County GIS data base
N
0
500
1000 ft
Community Planning and Assistance
data source: Caroline County Planning Department
Bell Street
Cook Street
Bee Tree Road
River Bridge Road
Cool Spring Road
Corporate Limit
311


Henderson
Henderson Growth Area
Map 1-5
Roads
Primary Growth/Annexation
Partial lands in Town suitable for growth
Questionable parcels, possibly suitable for additional growth
County portions of inTown parcels (suitable for annextion)
County identified Growth Areas
County residential (County R1)
Town of Henderson Limits
County Planned Greenbelt
N
0
500
1000 ft
Community Planning and Assistance
data source: Caroline County Planning Department
Corporate Limit
Bell Street
Cook Street
Bee Tree Road
River Bridge Road
Cool Spring Road
311

Chapter 5: Municipal Growth Element

Henderson Buildout and Capacity Analysis

This analysis was prepared as part of the background studies that evaluated options for and feasibility of extending public sewer service into the defined area of Northern Caroline County. That area has been plagued for many years with the multiple problems of failing septic systems, contaminated wells, and low household incomes. Although several years old, conditions have not materially changed in the study area. Accordingly, the findings prepared by Peter Johnson & Associates for the MES North County Wastewater needs study are considered still valid for planning purposes and are incorporated into this Comprehensive Plan at the direction of the Henderson Commissioners.

Study Area

The study area includes all properties located in the proposed North County Water and Sewer Service Area as delineated by the Maryland Environmental Service (MES). The MES Water and Sewer Service Area encompasses the entire corporate limits of Goldsboro (not including the East Star property), Marydel (not including Marydel, Delaware), Henderson, and Templeville (including the Queen Anne's County portion of Templeville) as well as land in Caroline County located in the vicinity of each of the municipalities.

The Henderson study area is shown on figure 1.

Definition of Terms and Abbreviations

Equivalent Dwelling Unit (EDU) –. A measure of water and sewer demand based on average water usage for a single family dwelling. Conforming to Maryland Department of the Environment Waste Water Guidelines, an EDU is assumed to be 250 gallons per day (gpd).
Floor Area Ratio – The ratio of the enclosed floor area of a building on a given lot to the total land area of the lot. Floor area ratio is most often employed as an intensity measure for non-residential uses.
Infill - The development of vacant, abandoned, passed over lots of record within built-up areas located in the MES service area.
GPD – Gallons per day (used in the context of this report to describe water and/or sewer allocations associated with growth policy alternatives).
North County/MES Water and Sewer Service Area – Planned water and sewer service area delineated by the Maryland Environmental Service in the report entitled, *Five Year Plan for the Establishment and Management of a North County Water and Sewer Service District to include the Towns of Goldsboro, Henderson, Marydel, Templeville,* May 23, 2002.
Redevelopment – Construction in previously developed areas of the MES water and sewer service area. Projects tend to be somewhat larger and more complex than infill projects and includes underutilized properties.
Underutilized Property -Parcels or tracts of land that have not been developed to a level at or near the full potential permitted under development regulations in effect or enabled by existing

or planned infrastructure and taking into consideration site constraints. For purposes of this analysis, "underutilized" means residential parcels with an improved value less than $10,000.

Assumptions and Methodology

The following assumptions were used in the preparation of the alternative build-out scenarios:

- Site constraints considered include nontidal wetlands, poor soils, 100 year floodplain.
- Liberal land set aside for stormwater management was provided where site and area drainage conditions seemed to warrant.
- EDUs equal 250 gallons per day (gpd) per dwelling unit and mobile home as per Maryland Department of the Environment Waste Water Guidelines.
- Small commercial, business and institutional properties were assigned one EDU per property. Large commercial, business, or industrial properties were assigned EDUs in accordance with the maximum potential floor area in Policy options 3 and 4.

Methodology

Existing Development Patterns

Existing development patterns were derived by first creating a data set of properties classified by the Department of Assessment and Taxation (2005 records) as "residential," with residential improvements described, and valued equal to or greater than $10,000. Average lot size was determined from this data set. In addition, a frequency distribution was calculated to determine the most prevalent lot size. This analysis was conducted for the 1st Election District and for each municipality as a precursor to developing waste water capacity allocations for the North County Water and Sewer Authority.

Two data sources were used in the analysis of existing improved residential units for the towns. At the County's request, the MES land use data was used for the most accurate count of the number of existing residential units in the defined MES service area. In addition, tax assessment data was used to determine historic lot size patterns which do not always coincide with current zoning standards. The pattern of lot sizes was a consideration in determining the lot characteristics for the scenarios. The combination of these two data sources seemed to lend the most accuracy in the analysis.

Build-Out Scenarios

Build-out scenarios are based on development concept sketches prepared for each infill or redevelopment property, taking into account existing site constraints as derived from best available information. Variations are based on alternative lot sizes reflecting current municipal development patterns or minimum lot standards required under municipal zoning and codes.

Commercial and Industrial Water and Sewer and Demand

Vacant and underutilized commercial and industrial properties were assigned a maximum floor area ratio (FAR) of 0.10 (4,356 square feet per acre). A FAR of 0.10 was derived from an analysis of current average floor area ratios in the towns of Denton and Easton. Average water and sewer demand was calculated at the rate of 200 gallons per day per 1,000 square feet of floor area.

Henderson Zoning

The Henderson Zoning Ordinance requires a minimum of 7,500 square feet per residential lot in the R-1 and R-2 districts and limits gross density to 6 dwelling units per acre. The Henderson Zoning Ordinance includes a Mobile Home Park (MH) district that permits a maximum of 8 units per acre. The Henderson Zoning Ordinance provides that, "mobile homes are excluded from all districts except in the "MH" district unless the structure provides at least 980 square feet of living space and is located on a lot that was previously occupied by a mobile home."

Henderson and Vicinity:

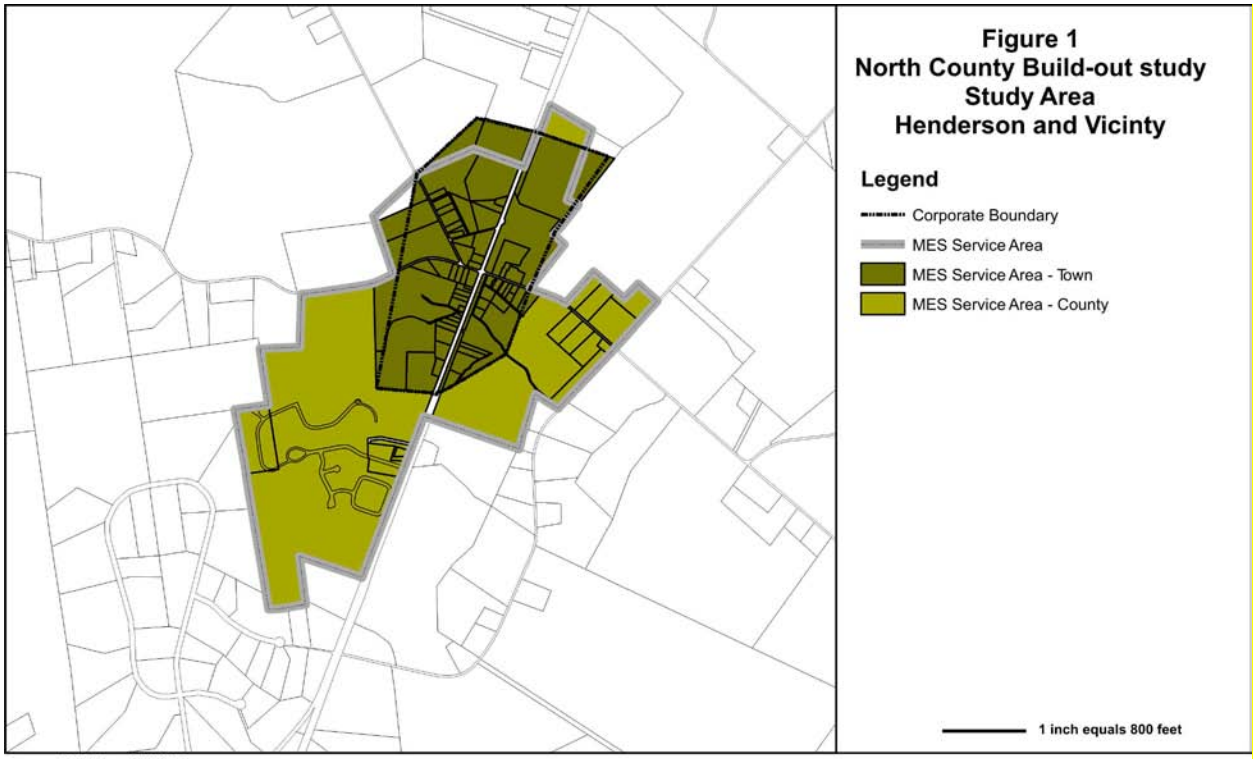
According to 2005 Maryland Department of Assessment and Taxation records, there were 47 properties classified as "residential" with improvements valued equal to or greater than $10,000 located in the Town of Henderson. The average lot size for these properties was about 0.50 acres or an average density of about 2 dwelling units per acre. Nearly 60 percent of the lots were a third of an acre or less.

The MES study reported 53 improved properties in Henderson and 137 mobile home units in Caroline Acres. This study estimates that there are an additional 38 improved properties in the County portion of the MES service area in the vicinity of Henderson. Including the existing mobile home park, the Henderson area has approximately 143 acres of land that can be considered potential infill or redevelopment sites.

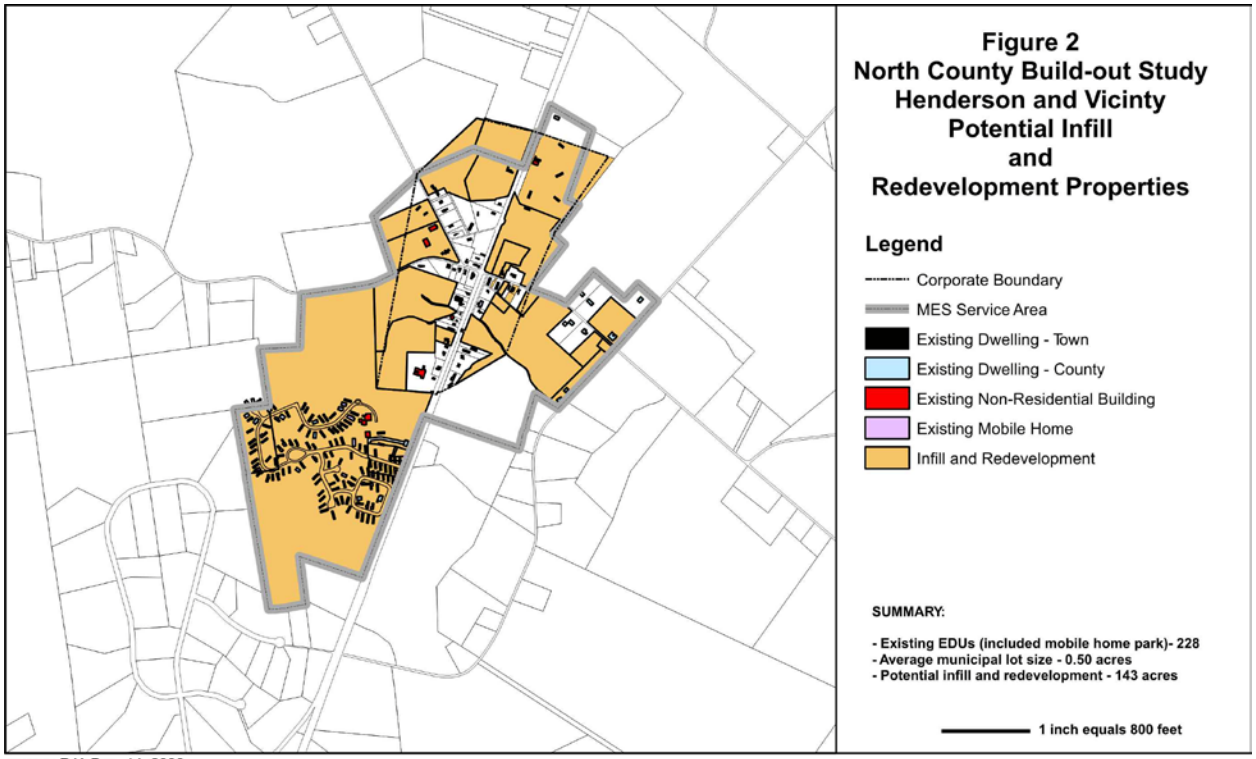
Department of Assessment and Taxation records indicate there are 9 improved properties in the Henderson vicinity that are classified as commercial, industrial, or institutional (exempt). Each of these properties was allocated one EDU for purposes of computing policy alternative 01 and 02.

Policy alternatives 03 and 04 assumed more intense use of vacant or underutilized commercial or industrial sites. Henderson and vicinity has approximately 12 acres of vacant or underutilized commercial or industrial land. Developed to the maximum extent, these properties could support approximately 51,270 square feet of floor area. Water and sewer demand is estimated to be approximately 10,254 gallons per day.

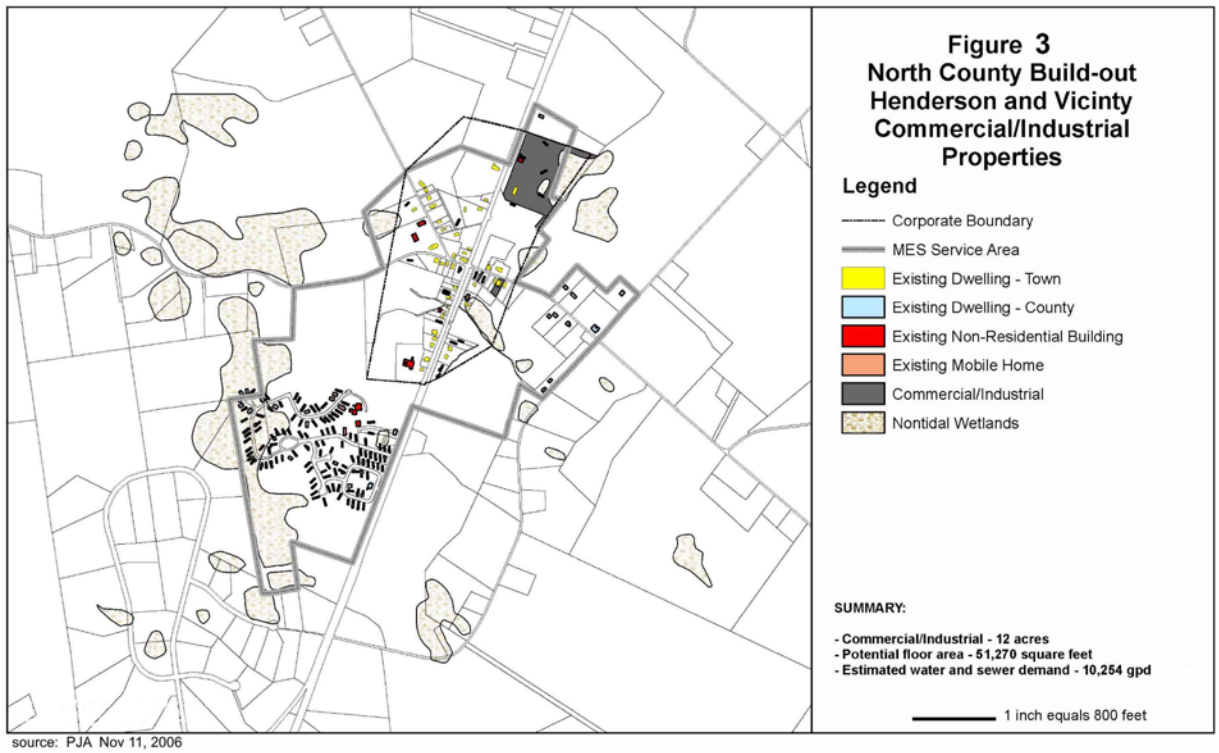
Figures 1 through 8 that follow below provide a graphic description of the various development policy options that were studied to evaluate growth options and the need for sewer allocations.



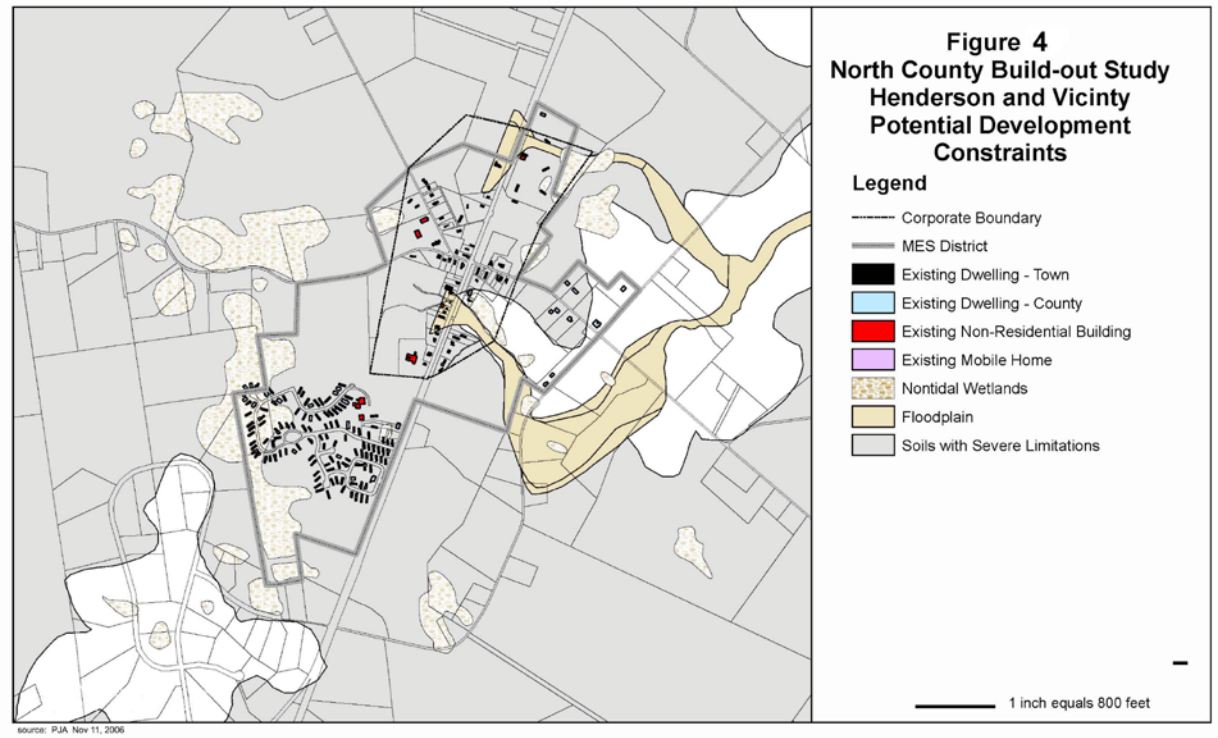
source: PJA Dec. 14, 2006



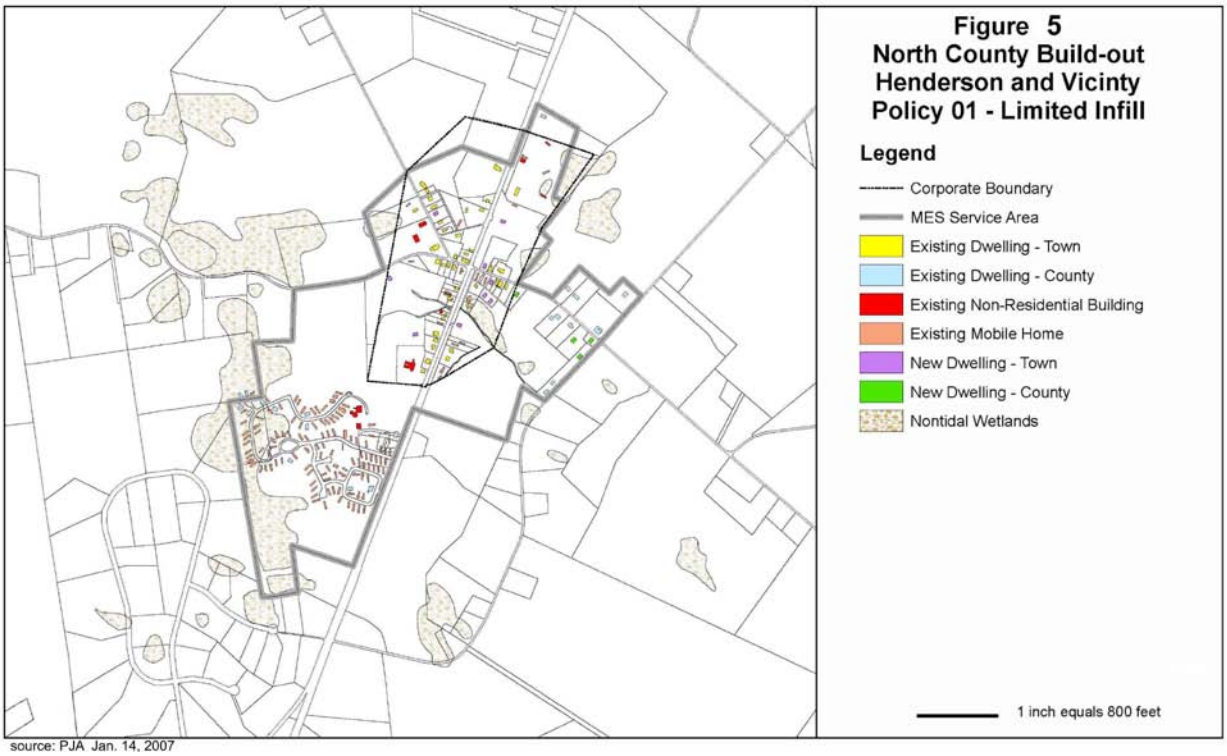
source: PJA Dec. 14, 2006



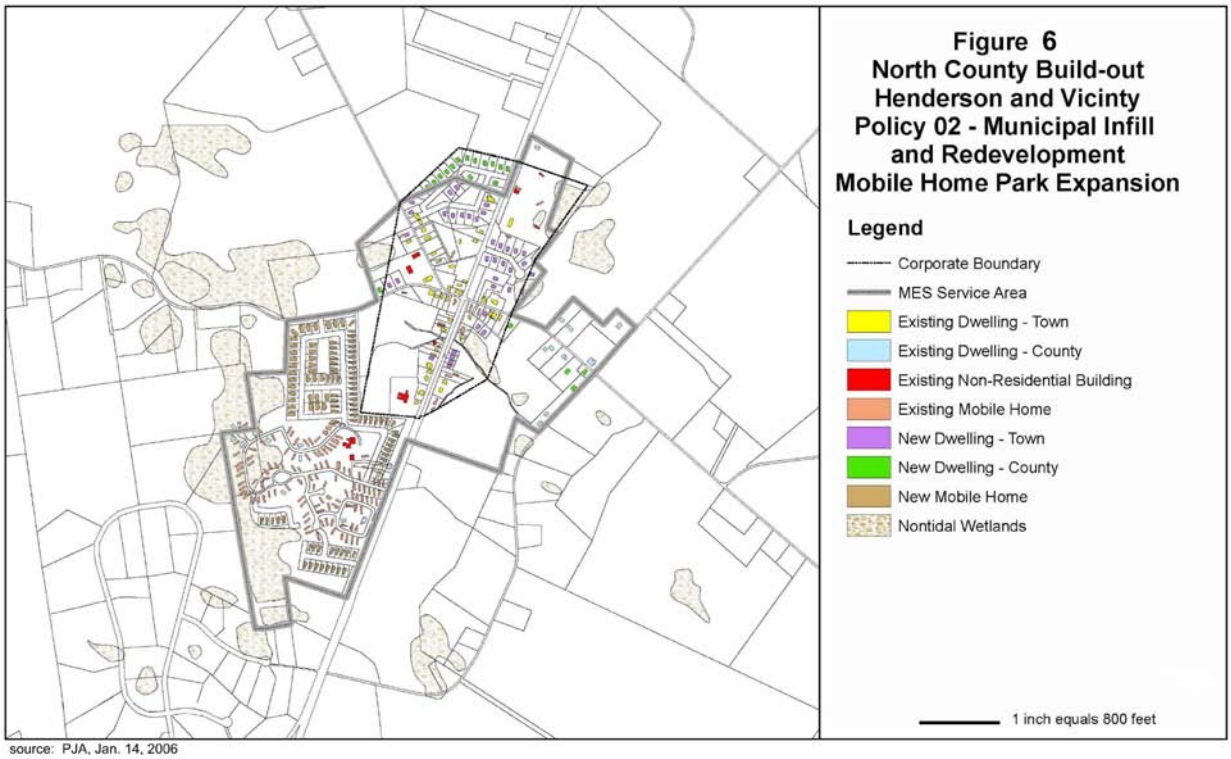
source: PJA Nov 11, 2006



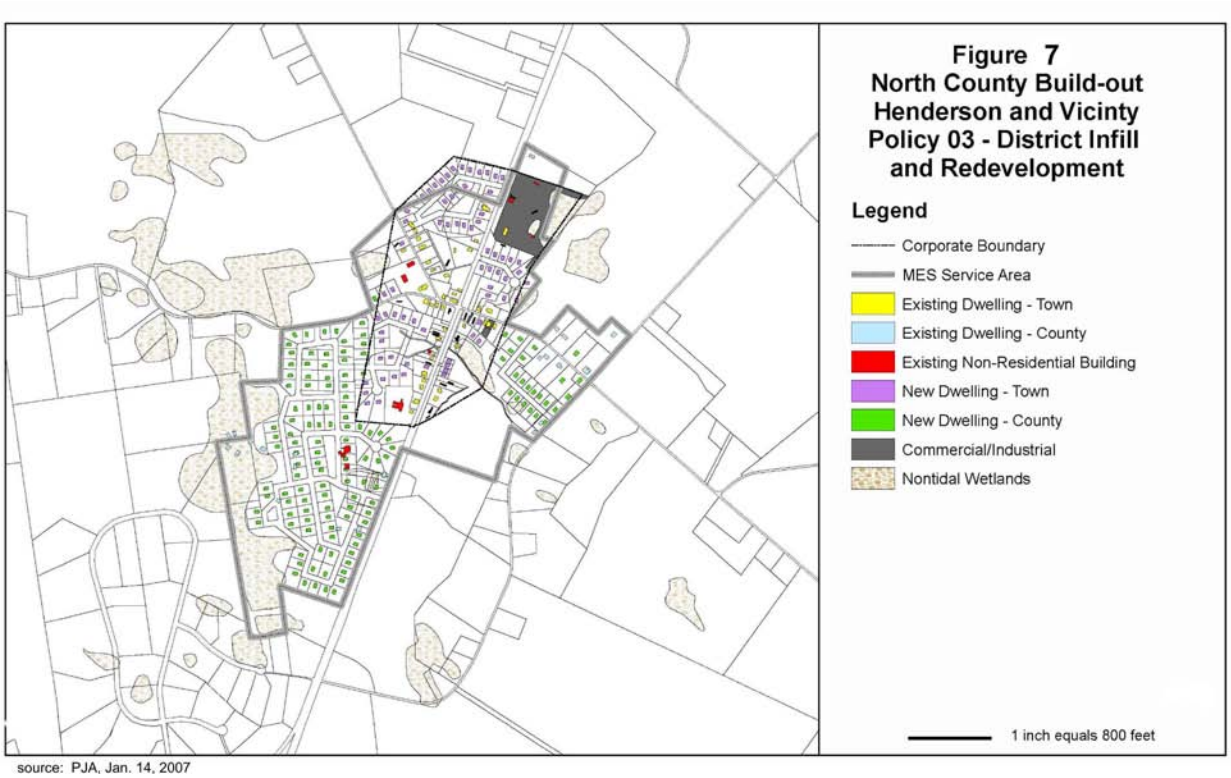
source: PJA Nov 11, 2006



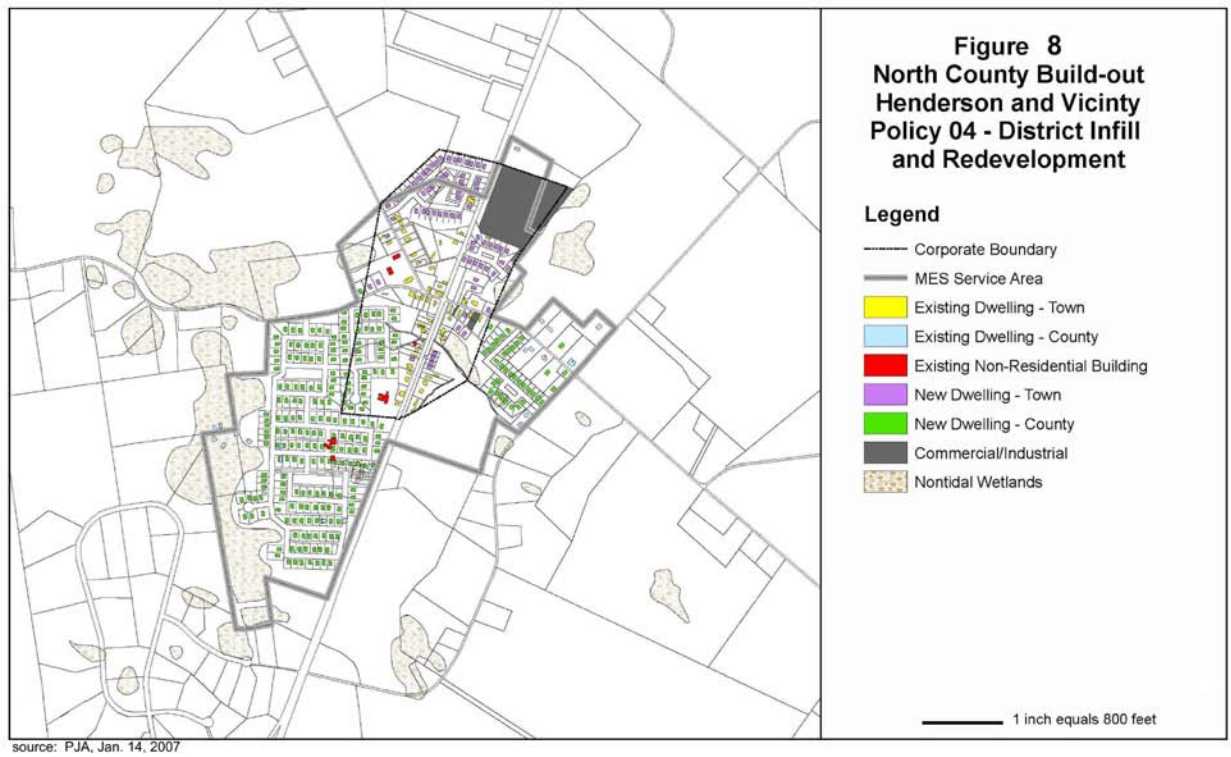
source: PJA Jan. 14, 2007



source: PJA, Jan. 14, 2006



source: PJA, Jan. 14, 2007



source: PJA, Jan. 14, 2007

Estimated Water and Sewer Demand for Alternative Policies Based Build-out Scenarios North County Water and Sewer Service Area

	EXISTING LAND USE (EDUs)			
	COUNTY		TOWN	
	SFD	MHP	SFD	TOTAL
POLICY 01				
Henderson	38	137	53	228
POLICY 02				
Henderson	38	137	53	228
POLICY 03				
Henderson	38	0	44	82
POLICY 04				
Henderson	38	0	44	82

Table 5

	GROWTH AREA NEW DEVELOPMENT (EDUs)								
	COUNTY			TOWN					
	INFILL	REDEV	MHP	INFILL	REDEV.	COMM INDUST	TOTAL	GRAND TOTAL	EST. GPD
POLICY 01									
Henderson	4	0	0	15	0	0	19	247	61,750
POLICY 02									
Henderson	4	15	102	15	25	0	161	389	97,250
POLICY 03									
Henderson	4	128	0	15	58	41	246	328	82,000
POLICY 04									
Henderson	4	238	0	15	60	41	358	440	110,000

Table 6

Policy alternative 01 describes a scenario wherein the Towns and County would provide water and sewer capacity to serve existing uses and allow some limited infill development. It assumes adequate water and sewer capacity to address existing or potential public health issues by providing water and sewer service to existing uses within the MES service area (County and Town). In addition it assumes limited infill on lots of record located in the MES service area. In summary, for purposes of calculating the minimum capacity required for this policy, it was assumed that the County and municipalities would provide water and sewer capacity adequate to meet the estimated demand from:

- existing residential, commercial, business and institutional uses in the MES area at the rate of 250 gpd per EDU;
- existing mobile home units in the mobile home parks at the rate of 250 gpd per unit; and
- infill development at the rate of one EDU per lot of record in the MES service area.

Policy alternative 02 examines a limited growth scenario. It assumes adequate water and sewer capacity to address existing or potential public health issues by providing water and sewer

service to existing uses within the MES service area (County and Town). In addition policy alternative 02 assumes infill on lots of record located in the MES service area, subdivision of larger parcels (redevelopment) within the municipalities and expansion of the mobile home parks.

Like policy alternative 01, this policy does not include allocation of water and sewer capacity for extensive Commercial or industrial development. To summarize, for purposes of calculating the minimum capacity required for this policy it was assumed that the County and municipalities would provide water and sewer capacity adequate to meet the estimated demand for:
• existing residential units in the MES area at the rate of 250 gpd per unit;
• infill and redevelopment within the municipalities;
• infill development (expansion) of the existing mobile home parks in compliance with current County standards; and
• existing commercial, business and institutional uses at the rate of one EDU per property.

Policy alternative 03 represents a more aggressive growth scenario within the MES service area. It assumes that all properties (County and municipal) with development potential will be developed in some way to the maximum extent possible, including new development on the East Star property in Goldsboro (500 EDUs). Residential properties outside of the municipalities will develop at low densities (average lot size of 15,000 square feet) and commercial and industrial properties will develop to the maximum extent possible (assumed FAR of 0.10). In the policy alternative, commercial and industrial properties that were allocated one EDU per lot of record in Policy options 01 and 02 were included in the separate allocation for commercial and industrial development, consequently the number of existing EDUs was reduced to account for this shift. This policy alternative assumes the existing mobile home parks will be converted to residential subdivisions, developed in a manner similar to other residential developments.

In order to enable this policy, it was assumed that the County and municipalities will provide water and sewer capacity adequate to meet the estimated demand associated with the following:
• existing residential units in the MES area at the rate of 250 gpd per unit;
• infill, redevelopment and new development within the municipalities;
• infill and redevelopment in the balance of the MES area based on an average lots size of 15,000 square feet per dwelling unit outside of the municipalities;
• redevelopment of the existing mobile home park properties as residential subdivisions;
• existing commercial, business and institutional uses as follows:
- large properties: 200 gallons per 1,000 square feet of potential floor area;
- small properties: one EDU per property, and
• potential new development on the East Star property in Goldsboro: 500 EDUs.

Policy alternative 04 represents the most aggressive growth scenario. It assumes that all properties (County and municipal) with development potential will be developed in some way to maximum extent possible, including new development on the East Star property in Goldsboro (500 EDUs). All residential properties will be developed at moderate densities (average lot size of 7,000 square feet) in accordance with municipal standards.
Commercial and industrial properties will develop to the maximum extent possible (assumed FAR of 0.10). This policy alternative assumes the existing mobile home parks will be converted

to residential subdivisions and developed in a manner similar to other residential developments. This policy alternative also includes an allocation of 55 EDUs for Marydel, Delaware. In order to enable this policy, it was assumed that the County and municipalities will provide water and sewer capacity adequate to meet the estimated demand associated with the following:

• existing residential units in the MES area at the rate of 250 gpd per unit;
• infill and redevelopment within the municipalities;
• infill and redevelopment in the balance of the MES area based on an average lots size of 7,000 square feet per dwelling unit;
• redevelopment of the existing mobile home park properties as residential subdivisions;
• existing commercial, business and institutional uses as follows:
- large properties: 200 gallons per 1,000 square feet of potential floor area;
- small properties: one EDU per property,
• potential new development on the East Star property in Goldsboro: 500 EDUs: and
• 55 EDUs for Marydel, Delaware.

Summary

The analysis of build-out based on the four policy alternatives described earlier resulted in estimates of water and sewer demand ranging from slightly less than 186,000 gpd to nearly 652,000 gpd. The four development scenarios suggest a potential population range that could be accommodated within Henderson of between 27 and 210 persons based on 2.8 persons per EDU.

Discussion

The following discussions points have been prepared to provide a point of departure for discussing the study results. They are intended to highlight variables that could be used to construct new policy alternatives or modify the policies presented in this Plan.

• Maryland Department of the Environment has indicated a willingness to permit a point discharge of up 270,000 gallons per day. This amount is barely adequate to meet the demand associated with Policy Alternatives 01 and 02, neither of which include capacity allocations for Marydel, Delaware or the East Star property.

• Because policy alternatives 01 and 02 include limited growth (i.e., limited new construction and population growth), they likely represent scenarios with the largest disparity between water and sewer construction and operation costs, the value of land and improvements, and the ability of users to pay based on income.

• Substantial public (Federal and State grants) and/or private funding will likely be required to make these policy options financially feasible.

• The policy alternatives reviewed focus on potential demand and various allocation strategies. Financial feasibility is a critical consideration not addressed in this report. How the construction and operation of public water and sewer facilities will be accomplished, including potential public and/or private funding sources is critical to the consideration of any final policy strategy.

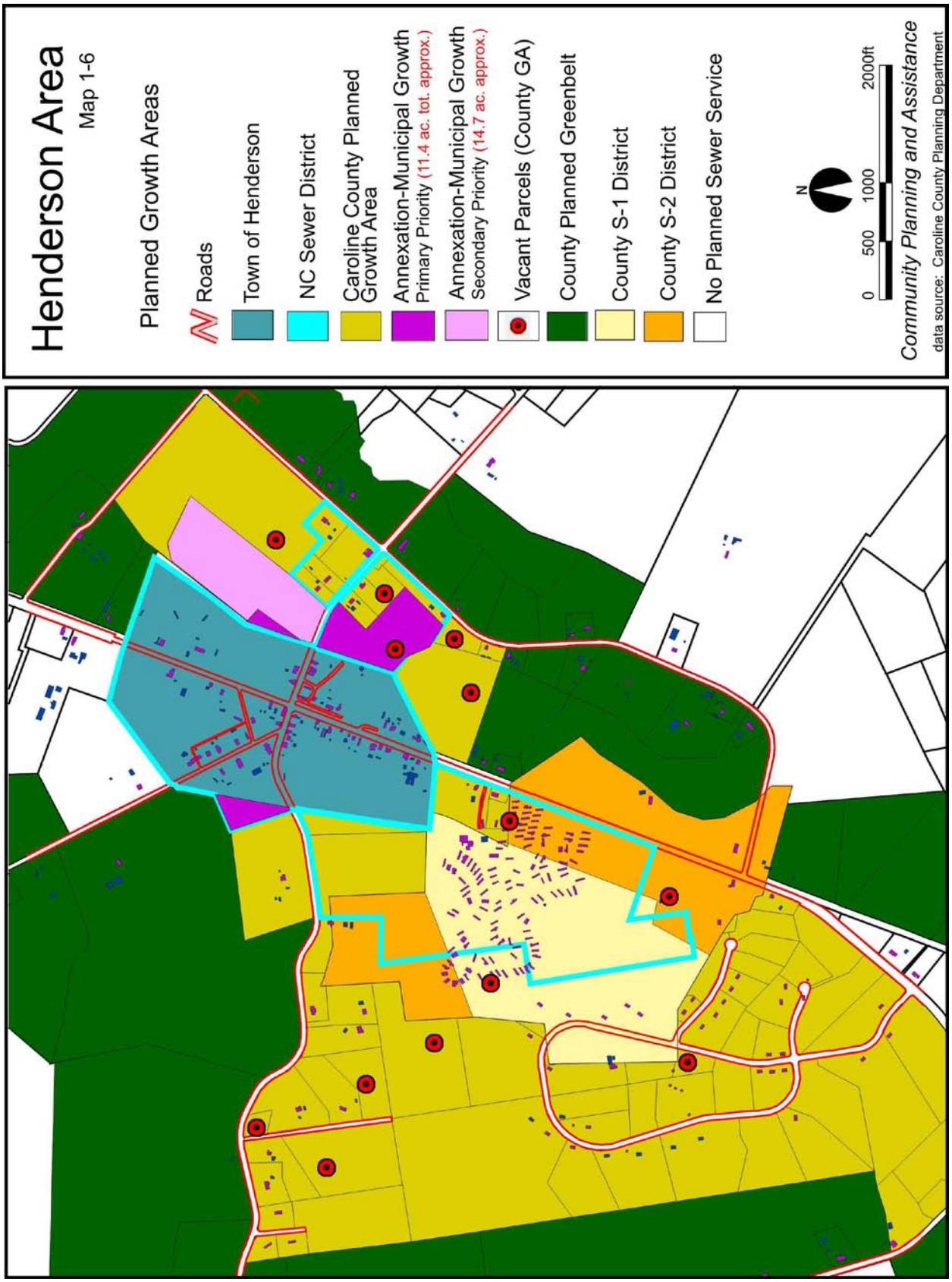
• "Town expansion" or growth areas for the municipalities shown in the North County Comprehensive Plan and the Goldsboro Comprehensive Plan are equal to or exceed the MES service area. Policy alternatives 03 and 04, and the water and sewer demand associated with them, best reflect the long range growth plans of the municipalities. The implications are that in order for the municipalities to realize their long range growth plans, water and sewer capacity in excess of 660,000 gpd will be needed.

• New sewer treatment facilities with planned capacity in excess of 0.5 million gpd are required to achieve biological nutrient removal (BNR) standards which may affect cost and treatment strategies.

• Policy alternatives 03 and 04 (growth scenarios) have major infrastructure implications in addition to water and sewer capacity, e.g., streets, parks, government buildings and services that must be considered.

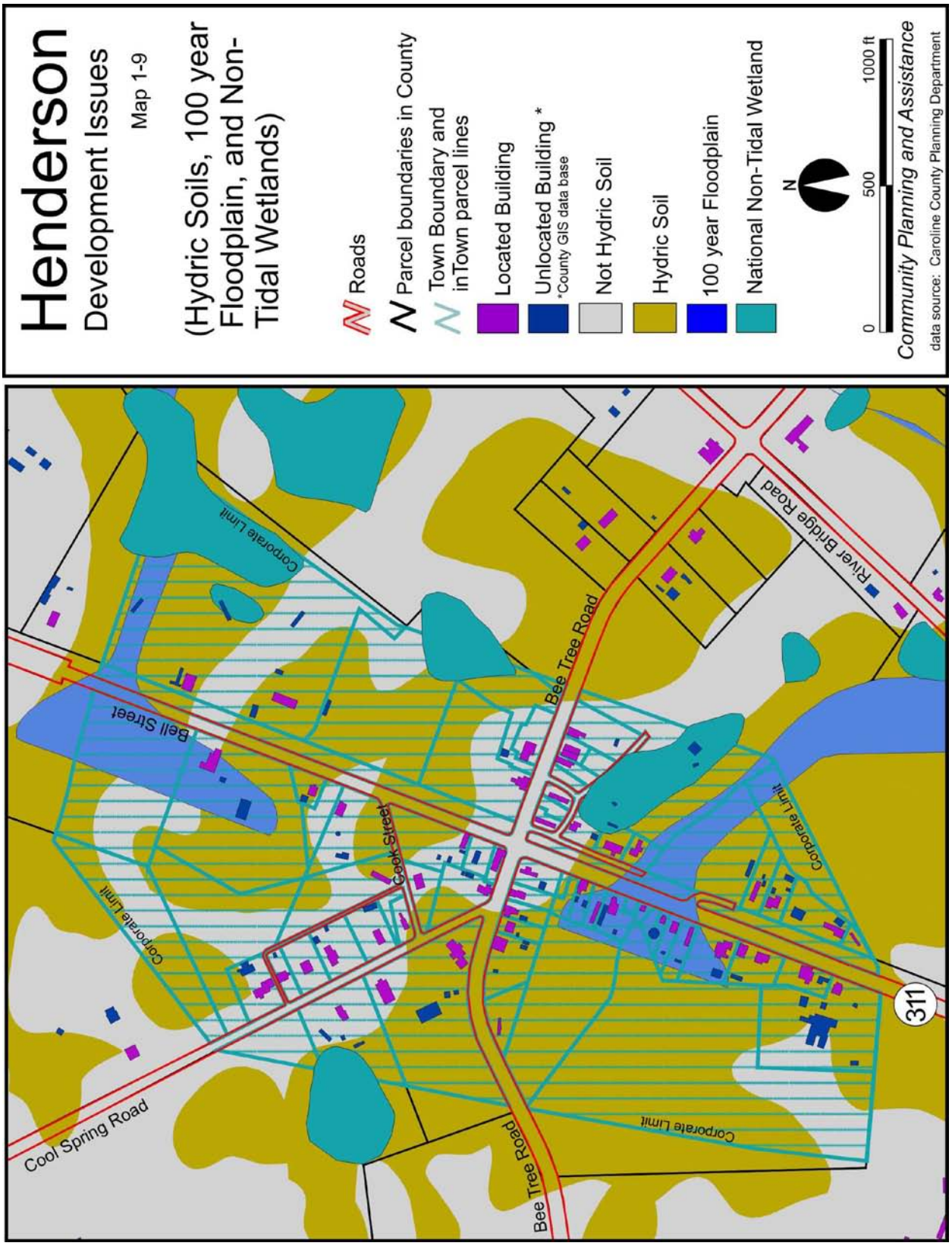
Potential Site Development Constraints

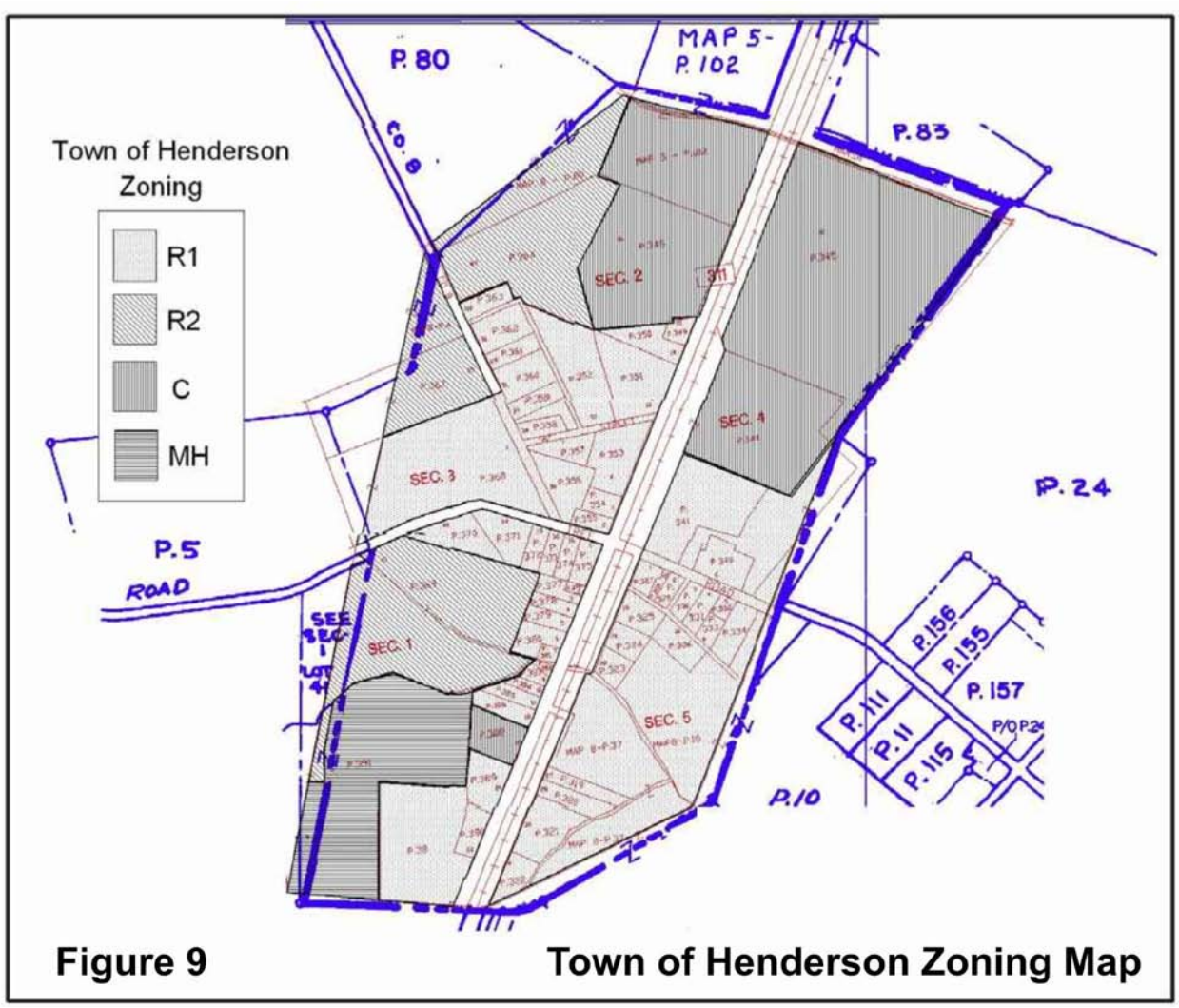
The primary site constraints noted in the analysis are nontidal wetlands, 100 year floodplain and soils with severe limitations. No other sensitive environmental features were noted. Nontidal wetlands were considered a significant constraint. The 100 year floodplain and soils with severe limitation were considered a factor affecting site development (e.g., drainage and stormwater management) and building construction (e.g., flood proof construction) but not factors that precluded development. The location of these factors is shown in maps 1-6 through 1-9, below.


Henderson Area
Map 1-6
Planned Growth Areas
Roads
Town of Henderson
NC Sewer District
Caroline County Planned Growth Area
Annexation-Municipal Growth
Primary Priority (11.4 ac. tot. approx.)
Annexation-Municipal Growth
Secondary Priority (14.7 ac. approx.)
Vacant Parcels (County GA)
County Planned Greenbelt
County S-1 District
County S-2 District
No Planned Sewer Service
N
0 500 1000 2000ft
Community Planning and Assistance
data source: Caroline County Planning Department

Henderson
Development Issues
Map 1-7
Fail Septic Areas
(2006 County Data)
Roads
Failing Septic Areas
2006 Caroline County Health Department
An exact count of failing septic systems within the Town of Henderson is not yet available. The Caroline County Health Department has been requested to provide information, as available. Anecdotal information suggest that numerous failures are present within Town limits.
N
0
500
1000 ft
Community Planning and Assistance
data source: Caroline County Planning Department
Bell Street
Corporate Limit
Cool Spring Road
Bee Tree Road
River Bridge Road
311

Henderson
Development Issues
Map 1-8
Soil Drainage, Streams and Public Ditches
Roads
Intermittent Streams
Public Drainage Association Ditch Lines
Excessively Drained Soil
Moderately Drained Soil
*County GIS data base
Poorly Drained Soil
Very Poorly Drained Soil
Well Drained Soil
N
0
500
1000 ft
Community Planning and Assistance
data source: Caroline County Planning Department
Cool Spring Road
Bee Tree Road
Bell Street
River Bridge Road
Corporate Limit
311


Henderson
Development Issues
Map 1-9
(Hydric Soils, 100 year Floodplain, and Non-Tidal Wetlands)
Roads
Parcel boundaries in County
Town Boundary and inTown parcel lines
Located Building
Unlocated Building *
*County GIS data base
Not Hydric Soil
Hydric Soil
100 year Floodplain
National Non-Tidal Wetland
N
0
500
1000 ft
Community Planning and Assistance
data source: Caroline County Planning Department
Corporate Limit
Bell Street
Cook Street
Bee Tree Road
River Bridge Road
Cool Spring Road
311



Current Henderson Zoning Districts (subject to revision based on this Plan)

North County Allocation Agreement

Sewer capacity allocations (among the participating jurisdictions) for the anticipated North County sewer system are stated in two distinct categories and a total amount. The "Minimum Allocation" category is necessary to specify agreed allocations for each jurisdiction sufficient to address the actual failing septic system parcels and associated infill areas, in the event that the final established system capacity is less than presently anticipated. The "Additional Allocation" is the increment above the Minimum Allocation for each jurisdiction, in contemplation of the currently anticipated capacity, to allow for additional growth. The parties recognize that distinguishing between the two categories also may be necessary for determining grant funding and related matters.

Capacity Allocations are as follows:

North County Sewer Allocations			
Jurisdiction	Minimum Allocation	Additional Allocation	Total
Goldsboro	131	475	606
Henderson	68	166	234
Marydel	86	69	155
Templeville	47	7	54
Caroline County	414	69	483
Totals	746	768	1532

Table 7

In the event that the final system capacity allowed by the State is less than the Total Capacity Allocations stated in the table above, but greater than the total Minimum Allocations, each jurisdiction shall have its Additional Allocations reduced pro rata by the amount determined by multiplying the calculated difference between expected total capacity and the allowed total capacity by each jurisdiction's Additional Allocation over the total of the Additional Allocations. In other words, actual final Additional Allocations for each jurisdiction will maintain their current ratio of relative system capacity.

In the event that the final system capacity allowed by the State is less than the total Minimum Allocations, Minimum Allocations pertaining to infill parcels shall be reduced pro rata by (x) the ratio of each jurisdiction's infill parcels over total infill parcels times (y) the difference between the total Minimum Allocations and the allowed total capacity.

In the event that the final system capacity allowed by the State prior to the development of the North County Sewer System is more than the total Capacity Allocations, such additional capacity shall be allocated by a reasonable method developed by the Workgroup taking into consideration all relevant factors including, but not limited to, Total Capacity Allocations, cost and cost sharing/responsibility, designated or directed capacity assignment from the State or relevant State agency, jurisdictional development projections, jurisdictional comprehensive plans, build-out histories and projections, and technology and system design changes and improvements.

Additional capacity allocations shall be determined by a *3/5* vote of the five parties to this Agreement; provided, however that no jurisdiction shall suffer or incur a cost, contribution, or financial responsibility or guarantee increase without such jurisdiction's express written consent, approved in accordance with applicable law. If no decision can be reached by the parties on such allocation, the parties agree to seek the assistance of the Maryland Mediation and Conflict Resolution Office to develop a mediated resolution.

Capacity Allocation "Ownership"

To the extent Capacity Allocations have been determined for a jurisdiction pursuant the Allocation Agreement, such Capacity Allocations are within the sole control of each individual jurisdiction for purposes of allocation, assignment, or permitting within the jurisdictional boundaries of such jurisdiction as the jurisdiction may presently be constituted (Nov. 2007).

Population and household projections notwithstanding, the pending consent order drafted by MDE and a concomitant moratorium on septic system approvals in Henderson by the Caroline County Department of Environmental Health make future municipal growth dependent upon the construction of the North County Wastewater Treatment System. Similarly, the allocations identified above serve as a defacto growth cap until such time as the Maryland Department of Environment approves a larger capacity plant. Also, potential growth in County-designated growth areas in the vicinity of Henderson outside the identified service area are limited to lots that can support individual on-site disposal systems. The Town of Henderson suggests that such potential new septic systems be limited to modern denitrification systems (due to the widespread soil limitations in the region).

Chapter 6: Water Resources Element

In 1985, the General Assembly passed Senate Joint Resolution No. 25 mandating the development of a Comprehensive Ground Water Protection Strategy for the State of Maryland. The General Assembly charged the Department of the Environment (MDE), the Department of Agriculture (MDA) and the Department of Natural Resources (DNR) with responsibility for ground water protection in Maryland. MDE was designated as the lead agency for ground water protection. The three agencies formed a steering committee and produced Maryland's Comprehensive Ground Water Protection Strategy in 1986. The Strategy described the State's existing ground water protection programs, established ground water protection goals and made recommendations for improving ground water protection efforts.

Geologic conditions vary widely across the State, and produce significant variations in the quantity and quality of ground water. Aquifers in Maryland fall into two major types – unconsolidated Coastal Plain aquifers found east of the Fall Line (a geologic divide that generally coincides with the Interstate 95 corridor), and hard rock aquifers found in the western part of the State. Coastal Plain aquifers, composed primarily of sand and gravel with layers of silt and clay, are productive and generally of good quality. Hard rock aquifers are composed of consolidated sedimentary and crystalline rock, and water availability is low to moderate.

Ground water levels in unconfined aquifers undergo seasonal fluctuation and are principally recharged by precipitation during the fall and winter months. Confined aquifers are found in Southern Maryland and the Eastern Shore, and are the primary source of drinking water in those areas.

The Aquia aquifer in Queen Anne's County show long-term steady declines. Increased water demands from a growing population place new and additional stresses on the State's aquifers, and additional analysis of the State's ground water resources is still needed in order to assess the long-term viability of many of the State's aquifers in the face of increasing demands.

The unconfined Coastal Plain aquifers are vulnerable to nonpoint source contamination. Nonpoint sources include livestock waste, onsite sewage disposal, application of fertilizers and pesticides, infiltration of urban runoff and road salt application. Nonpoint sources usually do not cause excessive contamination at specific well locations but often represent the largest loadings of pollutants to ground water over large areas. Because ground water contributes a significant percentage of water to surface water flow, delivery and reduction of nutrients via ground water is a significant issue for Maryland and has a major impact on water quality in the Chesapeake Bay.

Various aquifers also contain naturally occurring substances that affect the quality of water supplies, independently of quantity issues. The Magothy and Potomac Group aquifers in the Coastal Plain (primarily in Anne Arundel County) are subject to high levels of radium. Levels of naturally-occurring arsenic above the federal drinking water standard are not uncommon in the Aquia and Piney Point aquifers in Southern Maryland and the central Eastern Shore. This issue has been noted in wells supplying the Town of Centreville.

Declining water level trends in some areas of Southern Maryland have raised questions about the long-term sustainability of ground water withdrawals. On the Eastern Shore, increases in agricultural irrigation and the growth of towns and residential areas are expected to place greater demands on ground water supplies. The uncertain degree to which ground water moves between different aquifers in the Coastal Plain is a major obstacle to reliable modeling of their sustained yields in both Southern Maryland and the Eastern Shore.

In some areas, water quality concerns can limit the quantity of water available for withdrawal. For example, the threat of brackish water intrusion into the Aquia aquifer beneath Kent Island has precluded its full development as a water source; in other instances, ground water contamination due to human activity has affected water withdrawals on a more localized scale at numerous sites. Overall, estimating the sustainable yield of the State's aquifers will be the single most important step in assessing the risks to the adequacy of Maryland's ground water.

Need for Better Information

The 2003 Advisory Committee on the Management and Protection of the State's Water Resources identified the need for a comprehensive assessment of ground water resources in the Maryland Coastal Plain, where population is expected to grow by 44 percent between the years 2002 and 2030. Withdrawals from the confined aquifers of the Coastal Plain in Southern Maryland and the Eastern Shore have caused water levels in some aquifers to decline by tens to hundreds of feet from their original levels, and the rate of decline is expected to increase as the population in these areas grows. A more comprehensive understanding of the confined aquifer systems and how much water is available in these systems is needed in order to make sound management decisions and appropriately evaluate water withdrawal requests. The first phase of a three-phase Regional Coastal Plain Assessment began in 2006.

In 2007, the U.S. Geological Survey (USGS), Maryland Geological Survey (MGS), and MDE continued their Phase I work (2006-2008) on the Regional Coastal Plain Assessment of the Maryland Coastal Plain. Activities included developing a "beta" version of an aquifer information system (a prototype of which was delivered to the Maryland Department of the Environment) and documenting the hydrogeologic characteristics of the aquifer system. Future assessment activities will include conducting detailed studies of the regional ground water flow system and water budget, improving documentation of patterns of water quality in the aquifers, enhancing ground water level, streamflow, and water quality monitoring networks, and developing tools to facilitate scientifically sound management of the ground water resources in the Maryland Coastal Plain. Phase I activities are being jointly supported by funds and services from MDE, MGS, and USGS. Phases II and III will require significant additional investment from current and new funding partners from 2008 to 2013.

Phase I work continued on the Regional Coastal Plain Assessment of the Maryland Coastal Plain. Activities included developing a "beta" version of an aquifer information system (a prototype of which was delivered to the Maryland Department of the Environment) and documenting the hydrogeologic characteristics of the aquifer system. The study is expected to be completed in 2013, and will facilitate scientifically sound management of the ground water resources in the Maryland Coastal Plain

The Town of Henderson has a public water system that consists of a deep well, chlorine injection system, and 75,000 gallon elevated storage tank with 4,050 linear feet of 8" main, 1,400 linear feet of 6" main, 2,515 linear feet of 4" main, and 10 fire hydrants.

Water appropriation permit #C091G045(01) provides for withdrawals in excess of 10,000 gallons per day. At 200 gallons per day per EDU, the current system can support about 50 EDU's or a population of about 140 (2.8 persons/EDU). The population projection suggests that population may be reached in the near future. However, without a sewer system, there will be zero growth (due to septic failures and soil conditions). Based on current population and EDU estimates for Henderson, the Town could accommodate about seven or eight new homes. Accordingly, the Town will begin to evaluate options for expanding its water capacity in the near future. Funding is likely to be the largest stumbling block due to very limited financial capacity. However, until public sewer service is provided, the Town will experience no new growth.

Septic Systems

Estimates of nutrient loads from septic fields vary greatly, and should be viewed as "ballpark" estimates. The amount of the total nitrogen removed within the septic tank, in the drain field, and in the soil buffer is site specific. Other questions include how much nitrogen is removed by plant uptake, or is transported to deeper aquifers. There are some estimates as much as 30% of the nitrogen in Maryland groundwater in coastal zones comes from On Site Disposal Systems (OSDS), others have tended to minimize septic fields as a major source within the basin. For example, the Chesapeake Bay Program, using census data and standardized estimates of nutrient loading, estimates that 7.7 million pounds of nitrogen enter the Chesapeake Bay from OSDS each year. This represented about 6% of Maryland's nitrogen load in 1996.

According to these estimates, OSDS loadings in Maryland's tributary basins range from 3% in the Choptank and Lower Eastern Shore to 19% in the Lower Western Shore. Failing OSDS pose an additional set of threats to water quality. The average life of a septic system is 12 to 20 years, and many older systems are no longer functioning properly. Lack of maintenance and improper installation often contribute to early septic system failure. When OSDS become clogged, they block the flow of discharge to the drain field. Raw sewage backs up onto the surface of a yard or into a home, posing a direct threat to public health, as well as to surface and groundwater. In Maryland there are nearly 30,000 households with acknowledged failing OSDS. This does not include the many older OSDS that while not hydraulically failing, do not provide adequate nutrient reduction treatment.

The rate of growth in conventional OSDS is also a concern. The Maryland Office of Planning has stated that current trends will mean an additional 100,000 new OSDS in place by the year 2020. Conventional OSDS are associated with low density, sprawl development because they require large lots to accommodate the drain field and a future replacement field. According to the Maryland Office of Planning, in 1990, residential parcels served by OSDS accounted for only 19% of all households in Maryland but more than 65% of residential land. This low density development increases the need for new roads and other public services, increases vehicle miles traveled, and speeds the loss of natural areas and valuable cropland.

MDE is developing a program to label certain areas as "Areas of Special Concern." MDE will need to provide guidance to and work with local jurisdictions for identifying and designating Areas of Special Concern through the water and sewer planning process, and provide a time line to ensure that these are designated in a timely manner. MDE will also need to identify how it will assure that these important areas are protected consistently throughout the state. MDE guidance should include narrative guidelines and specific numeric criteria for local jurisdictions to use in designating these areas. The narrative guidelines would require the protection of specific, previously identified categories for protection while the numeric criteria (e.g. groundwater with measured concentrations greater than 10 mg/l nitrate -- the maximum contaminant level for drinking water in Maryland) would provide "triggers" for local jurisdictions to use during the designation process.

Henderson is anxious to work with MDE and MES to resolve the environmental and public health threats associated with widespread septic system failure and related needs that require immediate attention. Henderson stipulates that septic failures have created a public health and an environmental threat and that local OSDS have been identified as significant contributors of nutrients and other pollutants to groundwater and drinking water aquifers.

The four small towns of Goldsboro, Henderson, Marydel and Templeville are separated from each other by two to three miles but have much in common when it comes to failing OSDS, polluted wells and wet soils. These unsanitary conditions frustrate even the modest community development and economic activity appropriate to a rural village. Over the years, studies to solve the wastewater problems of one town or another were done, but the projects were too expensive to build or maintain. It is especially important to have a system with economical long-term operation and maintenance (O&M) costs as this is a low income area. Grants and loans may be available to help build a system, but there is no funding to support O&M costs.

The Consulting firm: Rummel, Klepper, and Kahl (RKK) in partnership with Green Stone Engineering are currently revising a feasibility study previously prepared for MES that looked at alternatives for providing public sewer service to the North County Water and Sewer Service Area. As time passes, costs continue to rise. Preliminary indications for the most cost effective solution among the numerous combinations of options evaluated now hover around $18 million. The longer the State postpones provision of design and construction monies the higher the cost will continue to escalate.

Tables 5,6, and 7 in the Municipal Growth Element provide a generalized basis for estimating water and sewer demands. Those numbers were used to create the future sewer allocations that have been adopted by Henderson [in its membership role in the North County Water and Sewer Authority]. The allocation agreement is a binding interjurisdictional agreement that identifies and limits future growth. Until such time as design is commenced and future construction funding can be identified, there will be no growth in Henderson. At this time, planning for water system expansion is not warranted. If circumstances change, the Town will update this element, as appropriate, and seek an amendment to the Caroline County Water and Sewer Plan. All former private wells in Henderson have been capped and disconnected. Public water serves the entire Town. The Town will seek to ensure that chemical spills, if any, are corrected as soon as they become known in order to help protect ground water supplies. However, the Town has no

capacity to address wider issues of aquifer protection and will rely on Caroline County and MDE to provide such assistance as may be appropriate. The Town anticipates that Caroline County will address source water protection in the County Water and Sewer Plan. The County is preparing the needed service area timing categories and service policies for amendment into the Water and Sewer Plan to address the limits and restrictions within the service areas of North County

Public Sewer Alternatives

RKK evaluated the following options for a wastewater treatment plant pursuant to MDE and County input:

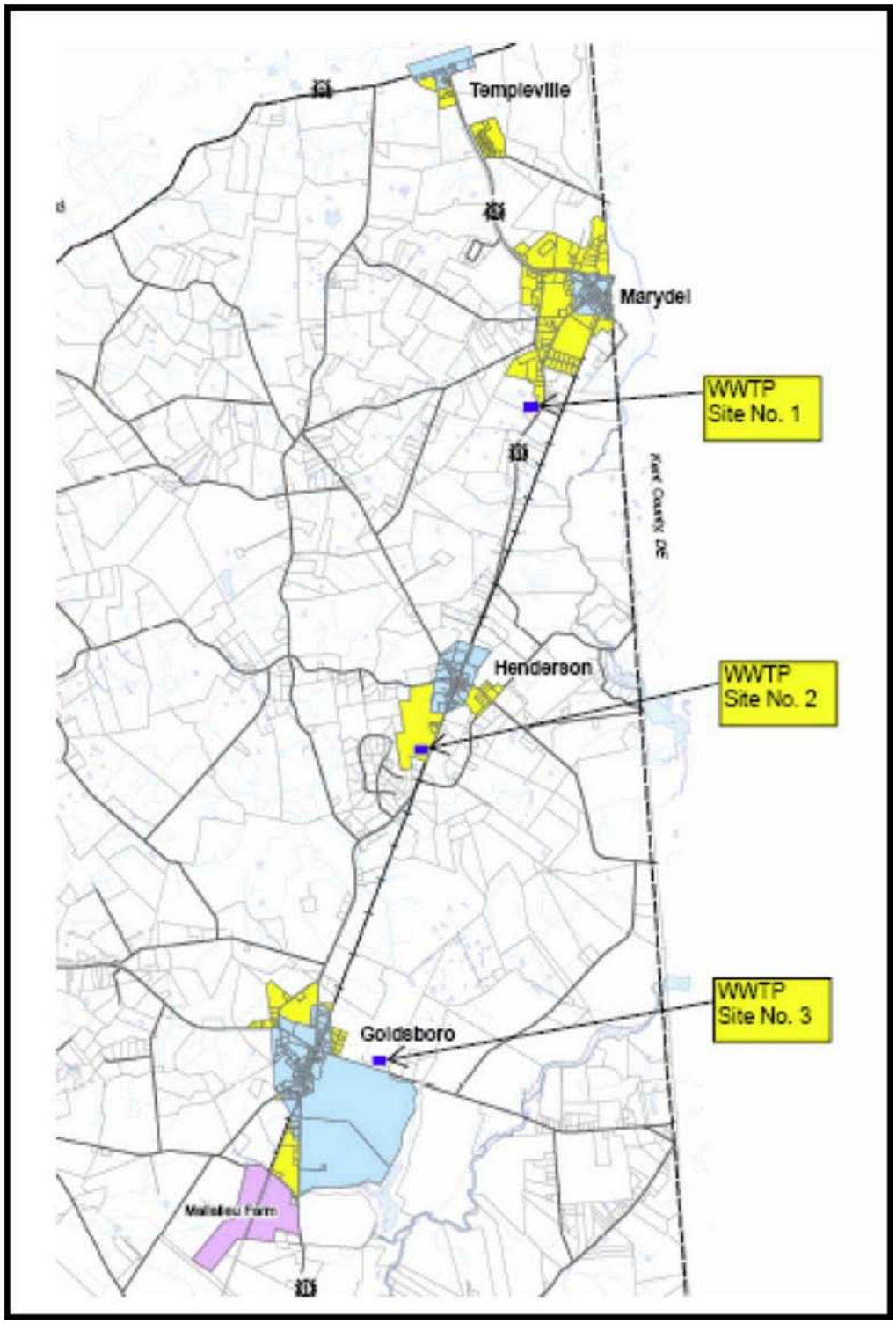
Location Options for New WWTPs
 Location 1
 Near Marydel and Cedar MHP
 Reuse Cedar MHP WWTP outfall

 Location 2
 At or adjacent to existing Caroline Acres WWTP
 Reuse existing lagoons
 Convey to spray and surface discharge sites

 Location 3
 Near Goldsboro
 Surface water discharge possibly to Choptank River
 Potential land application sites nearby

The following graphic provides geographic context for these locations:

Location Options
Waste Water Treatment Plant



Graphic 4

The alternatives included: Four Single Plant Options; One Two Plant Option; and One Four Plant Option. Land applications alternatives considered five site size scenarios:

Alt. #1: 97,000 GPD – North or South Min Allocation
(Target 32 Acres Sprayable)
Alt. #2: 133,250 GPD – North Max Allocation
(Target 43 Acres Sprayable)
Alt. #3: 186,500 GPD – Total Min Allocation
(Target 60 Acres Sprayable)
Alt. #4: 250,000 GPD – South Max Allocation
(Target 81 Acres Sprayable)
Alt. #5: 383,000 GPD – Total Max Allocation
(Target 124 Acres Sprayable

These scenarios were based on soil evaluations that identified the best probable locations.

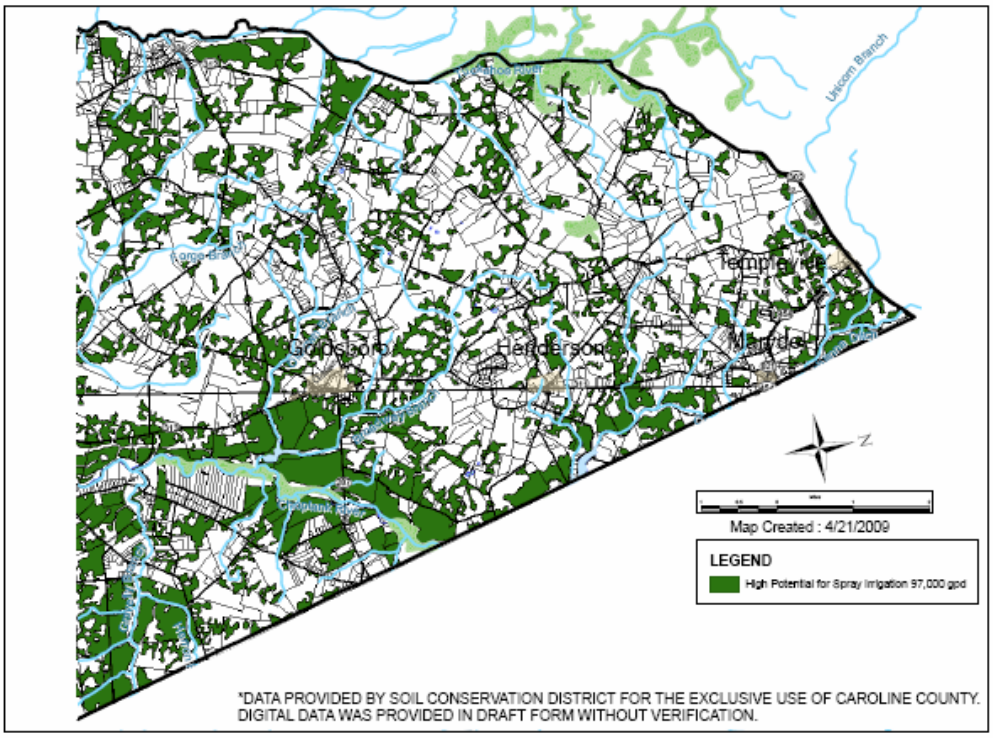
MDE has been requested to provide surface water discharge limits for a new WWTP in one of the configurations described below

Anticipated **Surface Water** Discharge Effluent Limits depend on # of Septics taken off-line
Total Nitrogen = 3.9-4.3 mg/l
Total Phosphorus = 0.17-0.4 mg/l

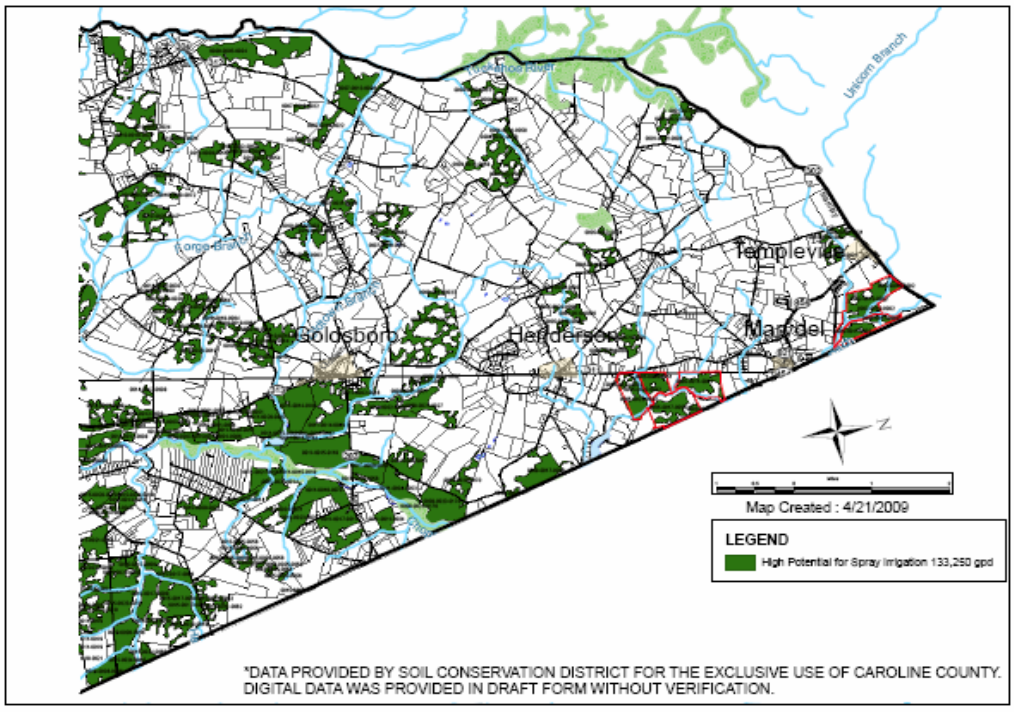
Anticipated **Spray Irrigation** Discharge Effluent Limits (Class II)
Total Nitrogen = 6-8 mg/l
Total Phosphorus = n/a
Fecal Coliform = 3 MPN/100 ml

In general, the following formula has been used to assess the potential improvement in pollutant loadings by eliminating septic systems in the Town of Henderson: total pounds of nitrogen removed equal the average household size multiplied by 9.5 lbs of nitrogen per person and the product then multiplied by the transfer absorption factor of 0.4 (which accounts for nitrogen up take by plants and soil particle binding). In Henderson's case, this improvement equals approximately 726 pounds per year.

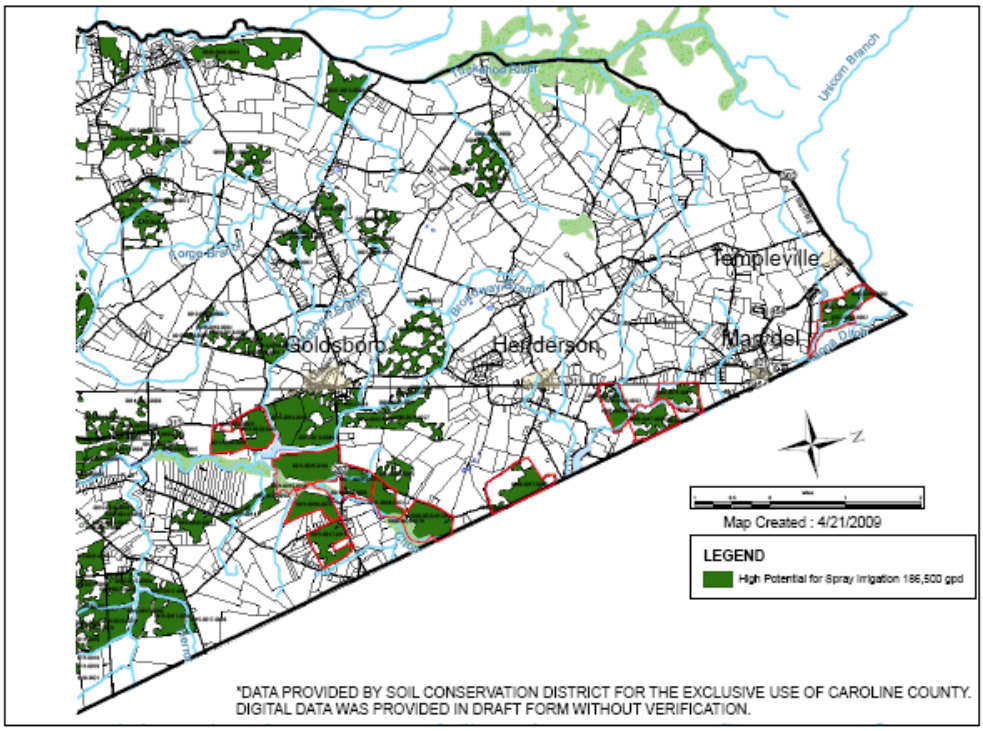
SPRAY ALTERNATIVE #1 - 97,000 gpd
Min Allocation North & South (>31.26 acres)



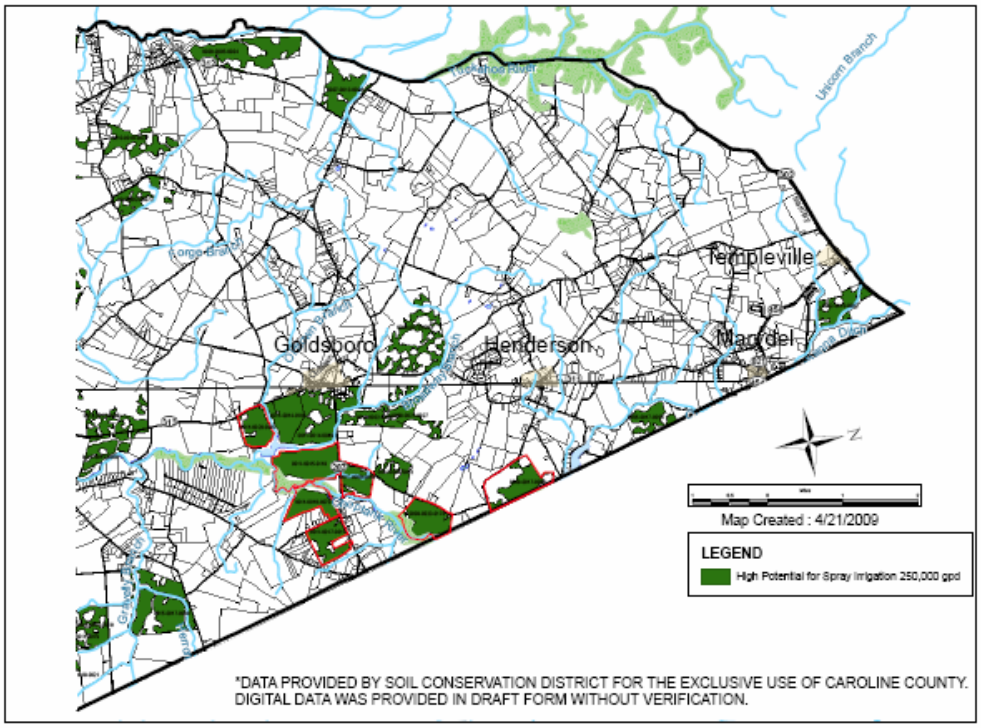
SPRAY ALTERNATIVE #2 - 133,250 gpd
Max North Allocation (>42.94 acres)

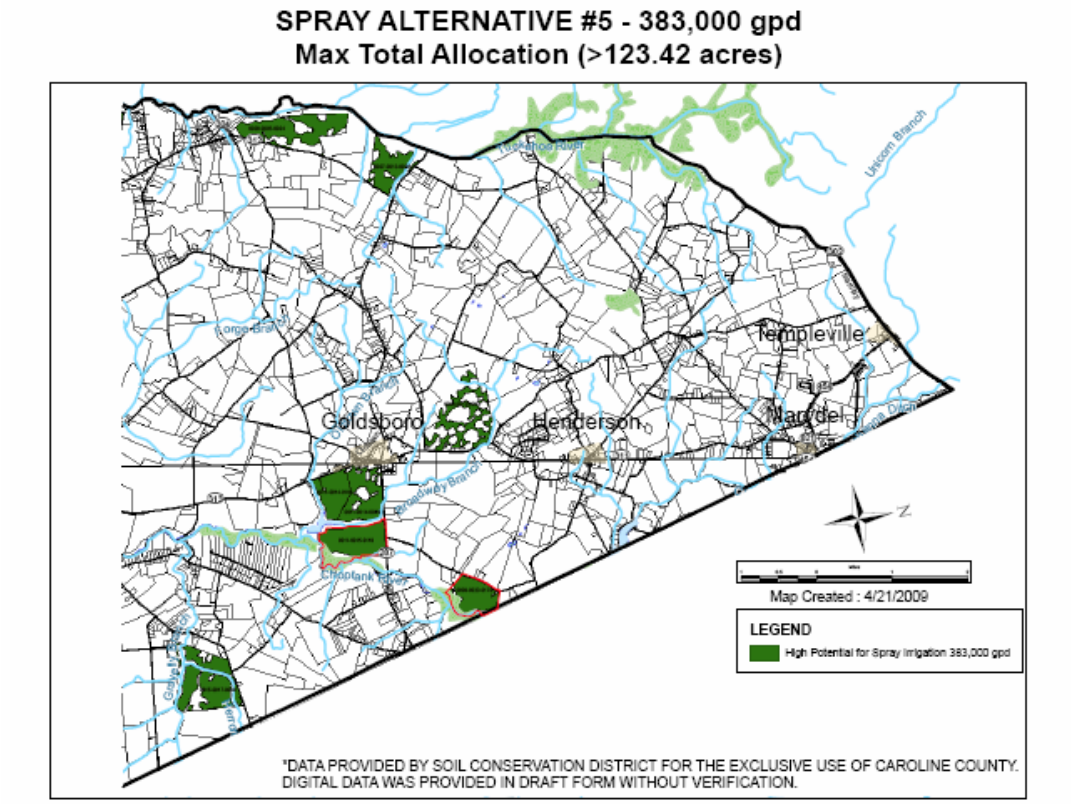


SPRAY ALTERNATIVE #3 - 186,500 gpd
Min Total Allocation (>60.10 acres)



SPRAY ALTERNATIVE #4 - 250,000 gpd
Max South Allocation (>80.56 acres)





Costs were evaluated for the following options:

One Plant -
 Oxidation Ditch
 Biolac
 SBR

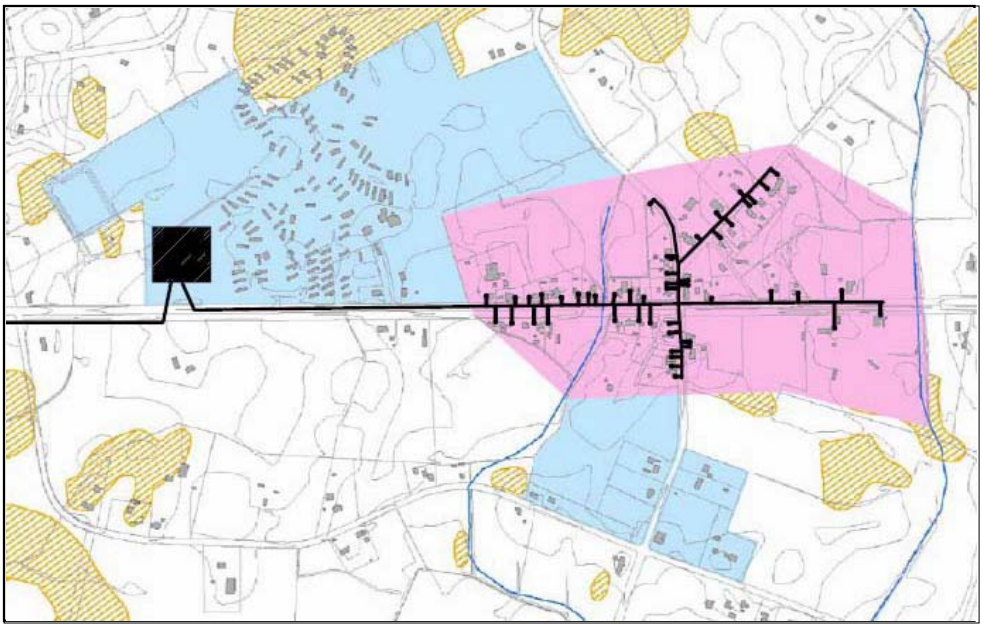
 Two Plants –
 SBR
 Biolac
 MBR

 Four Plants –
 SBR
 MBR
 Filters for surface discharge plants/Storage lagoons for hybrid and spray discharge facilities

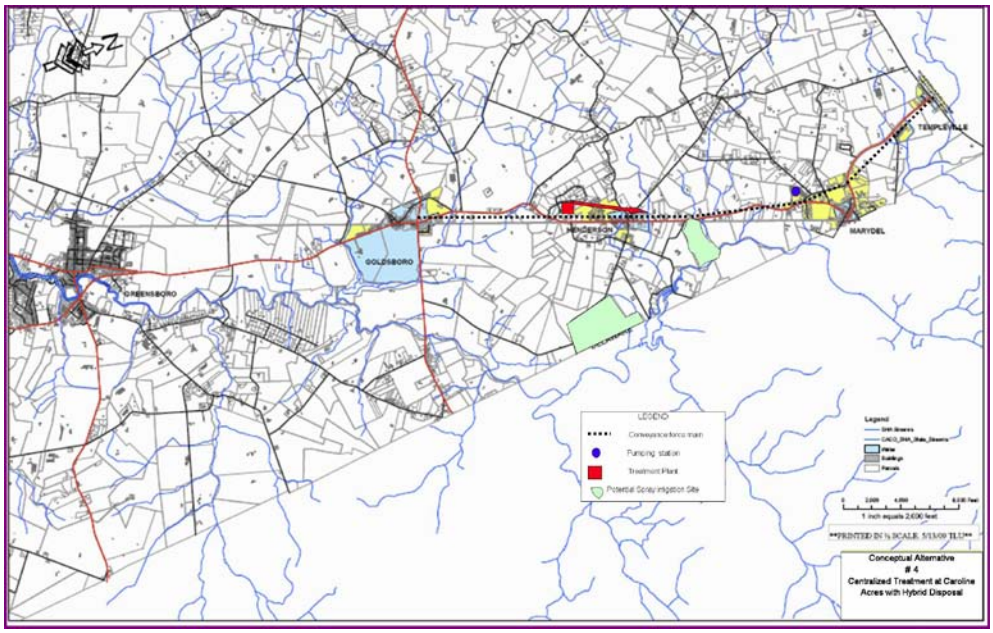
One Plant Alternatives
 Alt. 1 – Surface Discharge/Future Hybrid - $7.8-9.8 M Initially; $1.3 M Future
 Alt. 2 – Spray Discharge - $9.9-12.0 M
 Alt. 3 – Hybrid Discharge - $7.2-9.3 M
 Alt. 4 – Hybrid Discharge @ Caroline Acres – $6.6 – 8.7 M
 Two Plant Alternative
 One Surface/One Spray - $12.0–16.1 M

Gravity, Vacuum, and Low Pressure collection systems were considered, and a one or two plant SBR wwtp with low pressure (grinder pump) collection has been recommended by the consultant team.

The collection system would be composed of 1.25" to 4" diameter pressure sewers with one grinder (pump station) for each house. It would become the Authority's responsibility to maintain the pumps. Confirmation of existing individual dwelling unit electrical system adequacy remains to be completed and the possible need for additional primary pumping stations is dependent upon the eventual WWTP location. (Pumping from Templeville and Marydel to a Goldsboro location would require a supplemental pumping station.
The following graphic suggests a preliminary alignment for the Henderson collection system:



A final recommendation is pending additional cost comparisons. However, the following alternative favors a Henderson location and is included to aid further planning and discussion.



RKK has provided the anticipated initial and future flows for the various subareas of the North County Water and Sewer Service Area:

Area	EDU's in Initial Area Served	Future EDU's	Total EDU's	Initial Average Flows (gpd)	Future Average Flows (gpd)
Goldsboro & County Area	168	475	643	42,000	160,750
Henderson &County Area	77	166	243	19,250	60,750
Marydel &County Area	187	138	325	46,750	81,250
Templeville &County Area	78	7	85	19,500	21,250
Total for new Collection Systems	510	786	1,296	127,500	324,000
Caroline AcresMobile Homes	113	0	113	28,250	28,250
CedarMobile Homes	123	0	123	30,750	30,750
Total for new Treatment Systems	746	786	1,532	186,500	383,000

Table 8

Collection Systems - Preliminary Comparative Costs

	New Collection and Conveyance System in Public R/W Does not include costs on private property					Private Property Improvements		
	Templeville	Marydel	Henderson	Goldsboro	Total	New Laterals @$3,000 ea.	Electric Serv. Upgr. @1,500 ea.	Total Costs Public + Private
INITIAL								
EDU	78	187	77	168	510	510	510	
Construction cost								
Vacuum	$1,812,000	$1,920,000	$1,740,000	$3,312,000	$8,784,000	$1,530,000	$0	$10,314,000
Gravity	$2,436,000	$2,112,000	$1,944,000	$4,116,000	$10,608,000	$1,530,000	$0	$12,138,000
Low Pressure	See Note 1	$2,940,000	$852,000	$1,632,000	$5,424,000	$1,530,000	$765,000	$7,719,000
FUTURE								
EDU - Additional	7	138	166	0	311	311	311	
Future Construction Cost								
Vacuum	$456,000	$1,668,000	$948,000	See Note 2	$3,072,000	$933,000	$0	$4,005,000
Gravity	$96,000	$3,648,000	$780,000	See Note 2	$4,524,000	$933,000	$0	$5,457,000
Low Pressure	See Note 1	$1,092,000	$1,380,000	See Note 2	$2,472,000	$933,000	$466,500	$3,871,500
TOTAL								
EDU	85	325	243	168	821	821	821	
Construction Cost								
Vacuum	$2,268,000	$3,588,000	$2,688,000	$3,312,000	$11,856,000	$2,463,000	$0	$14,319,000
Gravity	$2,532,000	$5,760,000	$2,724,000	$4,116,000	$15,132,000	$2,463,000	$0	$17,595,000
Low Pressure	See Note 1	$4,032,000	$2,232,000	$1,632,000	$7,896,000	$2,463,000	$1,231,500	$11,590,500
O&M - Annual								
Vacuum								
Manhours	428	525	428	507	1888			
Total cost	$16,200	$25,900	$20,000	$33,600	$95,700			
Gravity								
Manhours	80	160	80	160	480			
Total cost	$15,000	$30,000	$15,000	$30,000	$90,000			
Low Pressure								
Manhours								
Total cost	See Note 1	$20,500	$12,150	$32,150	$64,800			
PS & FM								
Manhours								
Total cost								

Notes
(1) Templeville costs included with Marydel. Includes costs for conveyance to WWTP at Marydel
(2) Costs to be borne by developer

Table 9

Stormwater Management and Non-point Runoff

MDE developed the model **Maryland Stormwater Design Manual** (Manual) to address three goals:
(1) Protect the waters of the State from the adverse impacts urban stormwater;
(2) Provide design guidance on effective structural and nonstructural best management practices (BMPs) for new development sites; and
(3) Improve the quality of BMPs that are constructed in Maryland.

The Manual recognizes an evolving, more comprehensive approach to stormwater management. Included in this approach is better guidance and incentives for environmentally sustainable or "green" development techniques. The projected outcome of this new approach will be site designs that more closely mimic natural processes and reduce reliance on the use of structural management techniques. It is difficult to accommodate the full spectrum of water resource protection principles into each project. However, the importance of these principles should be recognized and their use encouraged during project planning. This supplement provides options that can be used in local stormwater management ordinances to shift focus from the structural

management of runoff to mimicking natural processes as part of total site design. Henderson will continue to coordinate with Caroline County in the regional management of stormwater and stormwater control measures that may be required as a condition of large scale development. Henderson does not independently review, regulate or approve stormwater plans.

The following nonstructural stormwater management practices shall be applied according to the Design Manual to minimize increases in new development runoff:
(a) Natural area conservation;
(b) Disconnection of rooftop runoff;
(c) Disconnection of non-rooftop runoff;
(d) Sheet flow to buffers;
(e) Grass channels; and
(f) Environmentally sensitive development.

The following structural stormwater management practices shall be designed according to the Design Manual:
(a) Stormwater management ponds;
(b) Stormwater management wetlands;
(c) Stormwater management infiltration;
(d) Stormwater management filtering systems; and
(e) Stormwater management open channel systems.

The performance criteria specified in the Design Manual with regard to general feasibility, conveyance, pretreatment, treatment and geometry, environment and landscaping, and maintenance shall be considered when selecting structural stormwater management practices. Structural stormwater management practices shall be selected to accommodate the unique hydrologic or geologic regions of the Henderson area.

Public Ditches Task Force Report

The total acres involved in land drainage on the Eastern Shore is substantial. In addition to the 821 miles of channelized streams administered by the more than 100 public drainage associations established by law for agricultural purposes, there are hundreds of miles of roadside ditches to facilitate transportation. Beyond public land drainage systems is a myriad of farm ditches on private land. Finally, there are new drainage systems built by commercial developers for the purpose of stormwater management. All of these systems functionally overlap and interact in a bewildering network with one ultimate purpose, *i.e.,* to move water quickly from the land.

County	PDAs/PWAs	Total Miles	Total Acres
Caroline	68	368	70,137
Somerset	4	42	13,258
Wicomico	13	176	38,903
Worcester	18	235	60,707

Summary of Public Drainage Associations (PDAs) and Public Watershed Associations (PWAs) on the MD Eastern Shore

History of Land Drainage

Land drainage has been closely associated with agricultural use of the landscape. The Task Force learned that identifying the land affected by agricultural drainage would highlight most of Delmarva's arable land. Drainage systems for transportation, housing and municipal development, and stormwater management have been connected to or superimposed upon the original agricultural network and purpose on Delmarva. As cropland accounts for approximately 50% of the land use on the Delmarva Peninsula, many of these ditch networks continue to support activities for which they were originally constructed.

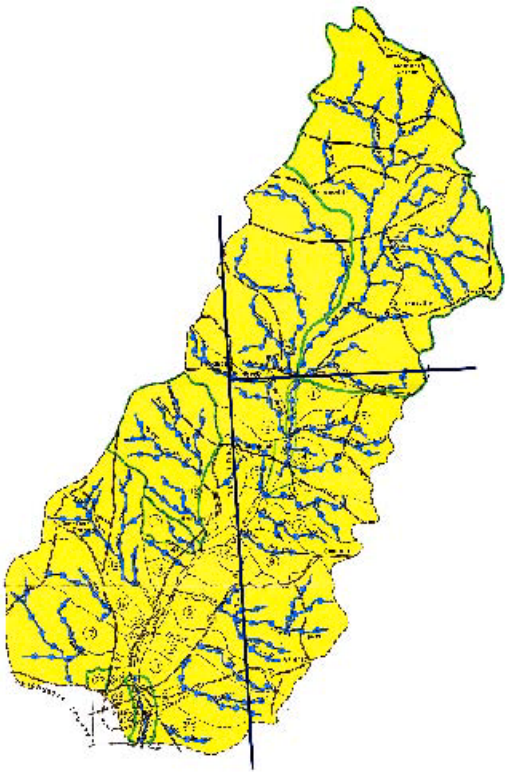
The Depression[1] is a benchmark of sorts for agriculture on the Delmarva Peninsula. Much of the land clearing was completed prior to this period, and extensive efforts to drain this land were undertaken shortly thereafter. With no recourse to replanting or alternative crops, and already living under near-poverty conditions, Eastern Shore farmers faced financial ruin if a year's crop were lost to flooding after heavy rain. Urgent need coupled with available engineering and labor through the Works Progress Administration (Civilian Conservation Corps, CCC) resulted in the re-engineering of many older ditch networks that were no longer functioning.

Figure 10. Public drainage in Caroline County, MD, and neighboring Delaware.

Above: The Long Marsh project, authorized in 1789, is the-oldest on record. Original ditch was dug by slaves using hand tools. The photo shows the main ditch as it exists today as part of the Longmarsh Public Drainage Association. Dotted blue lines on the "locator graphic" show the channelized streams, totaling 260 miles and draining 104,798 acres (from Fincher, 1977).

1 Approximately spanning the years 1929 to 1939.

Graphic 5



Although certain provisions can be traced back through earlier legislation, the law that currently regulates Public Drainage Associations (PDAs) was established in 1957 under Article 25, sections 52-95 of the Annotated Code of Maryland. The statute was last amended in 1994. Public Watershed Associations (PWA) were authorized by broadening MD drainage law in 1958 to include watershed development for a variety of purposes: ". . . constructing, operating, maintaining and carrying out works of improvement for watershed protection, flood prevention, recreation, soil conservation, drainage and/or the conservation, development, storage, utilization and disposal of water for all beneficial purposes in watershed or subwatershed areas . . . ." (Article 25, section 169). As a result of amendments made in 1994, the PDA and PWA laws closely resemble one another. There are 101 active PDAs and 4 active PWAs on the MD Eastern Shore.

Article 25 establishes PDAs as political entities with authority ". . . to locate and establish ditches, drains, or canals, and to cause to be constructed, straightened, widened or deepened any ditch, drain, or watercourse for the purpose of establishing and maintaining watershed drainage systems..." (Article 25, section 52). They may levy taxes on landowners whose property borders a PDA ditch or is located on a PWA watershed for the purpose of construction and maintenance. Further, they shall "…have and possess such rights-of-way and easements as are necessary for the construction and maintenance of the drainage improvements and for the disposition of excavated material…" (Article 25, section 88). PDA/PWAs administer drainage ditches on lands acquired by easement from the original landowners. These ditches function as water conveyance outlets for the farm ditches constructed by landowners on their private holdings.

Funding for ditch construction and maintenance was initially provided by taxing the beneficiaries, hence the widespread name “tax ditches.” After 1951, some financial support was provided by local county governments, especially when county road and PDA drainage needs interfaced. A major resource was created under Public Law 566, the federal Watershed Protection and Flood Prevention Act of 1954. This statute authorized the Soil Conservation Service (SCS, now the Natural Resource Conservation Service) to assist Soil Conservation Districts in planning and carrying out a wide variety of watershed projects. Through the SCS, the federal government provided approximately 75% cost-share funding for PDA construction; coupled with an additional 12.5% from MD and county funds, government support could cover as much as 87.5% of project costs.

This resource was largely responsible for a nationwide spate of new projects and CCC project upgrades during the 1950's and 1960's, underwriting 40 of the 103 currently active PDAs on the Eastern Shore. West Henderson PDA, completed in 1985, was the last to be constructed with Federal Public Law (PL) 566 funds.

PL 566, now called the Small Watershed Program administered by the federal government, still assists local governments in dealing with natural resource and related economic problems on specific watersheds smaller than 250,000 acres in size. But because the U.S. Army Corps of Engineers is no longer issuing permits for new ditch construction, establishment of new PDAs through the Small Watershed Program would now be highly improbable.

Under MD law, only the Maryland Department of Agriculture has the authority to provide cost-share funding for maintenance of PDA/PWA drainage (Article 8, Section 602). Cost-share began in 1978 and ended with budget reductions in 1995. It has not been reinstated for routine ditch maintenance, leaving PDA/PWAs dependent on tax assessments and county funds for this activity.

Ditch Maintenance

PDA/PWA easements have a minimum 20-ft. right of way to provide for maintenance of ditch function. I n these systems the process itself begins in the fall or winter with a walking inventory conducted by PDA managers, MDA personnel, landowners, and maintenance contractors. A report describing any problems is prepared with copies to the PDA Chair and MDA; the problems are discussed at the PDA Coordinator’s annual meeting with managers. The result is a 1- or 2-year Operation and Maintenance Plan.

The Plan is sent to MDA which forwards copies to MDE, DNR, and if operations require permitting, to the U.S. Army Corps of Engineers. After a 60-day comment period the MDA Secretary notifies the PDA Coordinator and managers of plan approval/denial. The loss of state (MDA) matching support after 1995 has seriously restricted maintenance efforts. For the most part, revenues provided through ditch taxes and county support are largely exhausted through routine practices that target woody growth (less than 4" diameter) removal by mowing and spraying with herbicides. These practices occur on approximately 2- to 5-year intervals. The routine of cleaning out a ditch prism through mechanical removal of sediments and debris – “dipping” – takes place at much longer intervals, at least 15 to 20 years.

Benefits and Beneficiaries of Land Drainage

Article 25 of the Annotated Code of Maryland begins by stating, ". . . It is hereby declared that [land] drainage shall be considered a public benefit and conducive to public health, convenience, and welfare." That drainage constitutes a "public benefit" has been reaffirmed by subsequent legislative findings. However, the functional benefits of land drainage have evolved with changing land use. For example, the original intention of lowering water table levels to make rich bottomland soils accessible as farmland has been supplanted in this day of chemical fertilizers and excess animal manure. Drainage today increases the predictability of agriculture (*e.g.*, more timely application of fertilizer and cropping at time of maximum yield) and increases the likelihood that there will in fact be a harvest each year.

The beneficiaries of "public benefit" change, directly or indirectly, as drainage extends beyond its original agricultural domain. Drainage allows for expanded residential and commercial development. A lower water table enhances the function of private septic systems while the original ditching network is often incorporated into a municipality's stormwater management system. As transportation needs of Eastern Shore residents and, especially, the several hundred thousand visitors who would reach the coastal resorts, have increased, so has the network of drainage ditches dug to make county and state roads passable and safe. Although flood control is considered a benefit of ditching, with few exceptions it is in fact incidental to the 1 inch per day design of good agricultural drainage. Also somewhat incidentally, farmland abandonment followed by ecological succession has turned former farmland ditches into woodland ditches and increased the yield of loblolly pine harvests and other forest industry products.

The evolving uses of land drainage on the Eastern Shore largely have been superimposed on the original agricultural design. When developers build private homes as well as fences and outbuildings next to former agricultural ditches, access for maintenance is often lost. Brush, sediments, and trash accumulate. At best, this creates an eyesore that can reduce the enjoyment and value of property.

At worst, stormwater backs up and floods property upstream with similar consequences. Developers do not view the improvement of drainage at downstream locations away from their holdings as their responsibility. Municipalities are forced to perform what maintenance they can where ditches and public roads intersect. The economic benefits of land drainage are difficult to assess. Benefits are viewed as considerable by farmers, forest products industries, and residents who view drainage as "the bread and butter of the Eastern Shore". Against these benefits must be weighed costs ranging from taxes levied on the adjacent and/or benefitted properties for maintenance by PDA/PWAs to a share of the multi-million dollar annual expenses being imposed to reduce nutrient and sediment loads into Chesapeake Bay (USEPA 1999). The inability to maintain adequate drainage for effective stormwater management, for example, results in more frequent flooding that lowers land values. When formerly drained lands are allowed to become wet once again they can lose a portion of their enhanced economic value. If this is done deliberately through, *e.g.*, a wetland creation project, the affected landowners can expect financial compensation.

Environmental Considerations for Best Management Practices

Agricultural ditches have been constructed according to the "C-curve" engineering guideline designed to move a maximum of 1.5 inches per day of rainfall off the land. To the extent that

land drainage strictly adheres to this guideline, it is viewed as functioning counter to MD's commitment to nutrient and sediment load reductions, wetland protection, and watershed management made under the Chesapeake Bay and Coastal Bays Programs and reaffirmed in *Chesapeake 2000*

The research literature on land drainage is both diverse and sparse, especially with reference to the Delmarva Peninsula. Ditch behavior relative to nutrient and sediment transport is heavily dependent not only on the landscape itself but on the underlying hydrology. As many Delmarva ditches are at least 70 years old and have a history of re-engineering as well as periodic maintenance, each functions at least in part as a unique system.

Increased nutrient loads are not a consequence of land drainage, but are derived from activities on the land that are permitted by drainage.

The perspective that ditches are conduits between land and receiving coastal waters would have no consequence if the land were not enriched with nutrients. In the case of agriculture, there has been a major increase in the use of chemical fertilizers and animal manure on drained landscapes. To the extent that applications exceed crop needs, ditches become a means of conveying the excesses to receiving waters. Even so, internal processing can significantly reduce the amounts of nutrients reaching the receiving waters relative to inputs at the field edge. In addition to controlling nutrient loads at the source, BMPs need to be implemented that promote "internal processing" as much as possible.

Sediment loads are low and episodic in properly constructed drainage.

Sediment loads increase dramatically during the 10-20 years following ditch construction. But in established ditches, 90% of the sediment loss is restricted to a few significant rainfall events per year. While these loads are not inconsequential for receiving waters, most drainage systems are not engineered to accommodate such episodic events on the landscape. BMPs should reduce the vulnerability of ditches to erosion and increase their ability to retain sediments as much as possible within the system following episodic rainfall events.

Surficial (shallow) aquifers beneath agricultural land are enriched in nitrogen relative to background concentrations in deeper aquifers, and this enrichment finds its way into drainage ditches.

Drainage may promote the movement of water and dissolved chemicals into surficial groundwater because it increases percolation through the soil and reduces surface runoff. Drainage is also put in place to rapidly remove excess surface flow water where infiltration rates are slow. In the Chesapeake Bay coastal plain where topography is flat and percolation increased, groundwater contributes 60-70% of the total annual stream. Although this groundwater has a residence time of 6-12 years, most drainage projects have been around long enough to have their ditches enriched with nitrogen compounds.

Graphic 6

This ditch on private land near Denton, MD, partially reconstructed in Feb. 2000, demonstrates what can happen when rigorous Operation and Maintenance procedures are not part of the process. In this specific case, a 1:1 ditch bank slope *(upper left)* proves inappropriate for the local soil profile. A 2" 24-hr rainfall event in March 2000 was sufficient to cause significant bank erosion *(upper right)*. The increased sediment loads under these conditions *(lower left)* renders bottom habitat unsuitable for indigenous aquatic life. Although there can be undercutting at times of high flow, vegetated banks remaining after a proper dip-out only a few hundred yards downstream on the same system demonstrate one best management practice that can significantly reduce bank erosion problems *(lower right)*. Established Operations and Maintenance procedures provide an important means of benefitting from past experiences and current knowledge for land drainage. These benefits are readily available to the PDAs and PWAs, but land drainage on the Eastern Shore involves a much wider scope of players. Private landowners are especially important. They need to have better access to the most current information and professional assistance if they are to maximize their benefits from land drainage.

Effective BMPs are needed to address both the source of nitrogen and the internal processing necessary to reduce its load to receiving waters.

Public Drainage Ditch Best Management Practices

Engineering Changes

In-Channel Sediment Traps - Structures that expand dimensional characteristics of a channel, for the purpose of slowing current velocities and providing storage for transported matter including, but not limited to, clay, silt, sand, and detritus.

Stage-Width Channels - Channels that are constructed to stimulate flood plain functions by using a series of widened terraces at various elevations. The terraces provide expanded areas and increased conveyance for selected flood discharges.

Weir Installation - Construction of dams within channels that partially or fully block outlet delivery and force elevated water release. Design may cause out of bank flow for wetland enhancement or retention of water for assimilation and treatment within watershed.

Water Control and Water Diversion Structures - Structures that force or divert water from one area to other areas for use, treatment or safe removal. Weirs, channels, dams, and valves may function in this way individually or in various combinations.

Irrigation Design Modifications - A planned system in which all necessary water control structures are installed for the efficient distribution of water derived from precipitation, reservoirs, wells, groundwater, etc.

Watercourse Habitat Enhancement

Tolerance of Bottom Roughness and Meandering - Maximize levels of bottom roughness and channel meandering while still achieving acceptable drainage efficiency. Increased channel roughness and sinuousity produce lower channel flows and provide variations in flow velocities that promote in-stream habitat diversity.

Strategic Placement of Logs, Rocks, Brush - Specifically designed habitat conditions achieved through installation of logs, rocks, brush, pools, runs, rapids, riffle, and ripple areas, cover, sand bars, organic deposits, and silt or mud zones.

Shaded Riffles and Pools - Vegetation including trees, shrubs, and herbaceous plants along with topographic variations in bank heights may provide shade source, lowering temperatures and favorably altering flora and fauna communities.

Bank and Contiguous Habitat Enhancement

Woody Growth for Bank Stabilization - Trees, shrubs, and some grasses and herbaceous plants are persistent due to hard fibrous structure, i.e. wood. Usually woody growth has more substantial habitat value for cover, and provides niches for greater species diversity.

1-Sided Ditch Maintenance - Allow one side of the channel to go through natural succession processes while performing maintenance practices from the other side. Maintenance practices include mowing, herbicide application, tree cutting, and excavation.

Weed-Wiper Bar Technology - Herbicide application can be directed at specific plant types or communities based upon height or location. Extended bar has wick or other contact applicator.

Forest Buffers - An area of predominantly trees and/or shrubs located to interrupt the movement of water, nutrients, pesticides, and dust and mitigate the effects of odors, noise and undesirable flow water where infiltration rates are slow.

Excess phosphorus in agricultural soils of the Eastern Shore contributes to elevated phosphorus concentrations in drainage ditches.

Because phosphorous tends to bind to soil particles under oxidizing conditions, leaching of phosphorous into shallow groundwater is minimal and phosphorous movement from fields occurs predominantly in surface runoff (Staver and Brinsfield, 1994). Repeated fertilization with phosphorous-enriched animal manure has increased soil phosphorous to levels well in excess of those needed for maximum crop production in many regions of the Maryland Coastal Plain. This increases the potential for export of soluable phosphorous into the drainage system. Because it may take decades to eliminate excess soil phosphorus, and because there are additional sources of phosphorus from groundwater sources (Sims *et al.*, 1998), BMPs are needed to promote internal retention of this compound within the drainage network.

There are fundamental differences in nutrient movement between drainage systems that handle surface runoff and those designed to lower the water table.

Systems that have been constructed simply to move water off the land include farm ditches, road ditches, and stormwater management conveyances. They do not interact directly with the underlying surficial aquifer and are instead most strongly influenced by seasonal and episodic rainfall events. Systems engineered to drain the land, such as the Pocomoke drainage network actually lower the water table and therefore directly interact with the underlying aquifer. Nutrient loads in these systems are most strongly governed by base flow. They exhibit less seasonal pattern and may be responsible for as much as 50-70% of nutrient loads to receiving waters, especially in winter when soils are recharging and there is less surface runoff. This base flow will be extremely difficult to address through BMPs; at best, perhaps a 50% reduction in nutrient loads could be realistically expected. This still exceeds the 40% load reduction committed under the Chesapeake Bay Program and is sufficient to expect measurable improvement in the quality of receiving waters.

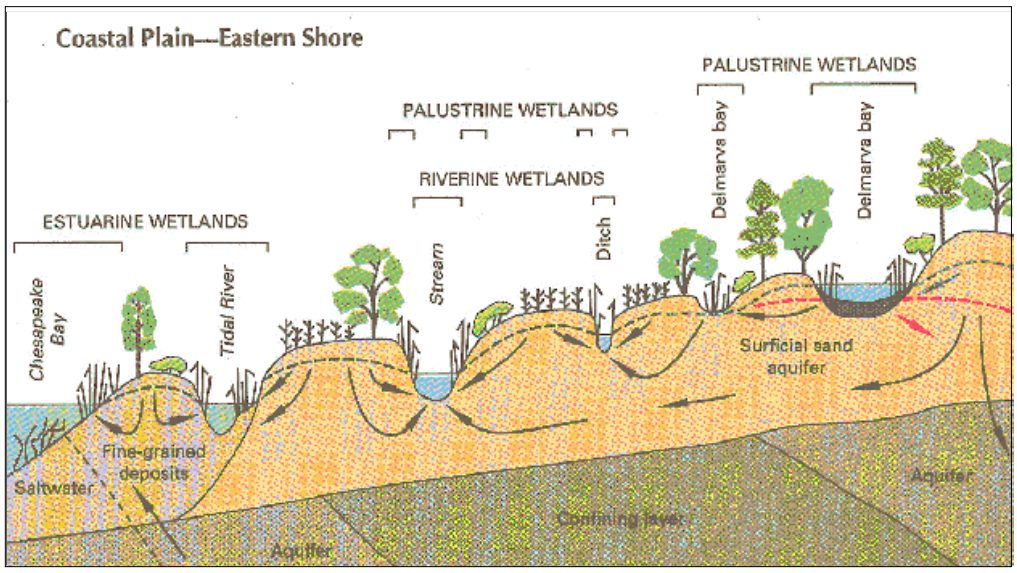


Figure 11

Practices designed to slow the transport of water across a drained watershed will allow natural processes to take effect that can reduce nutrient and sediment loadings to the receiving waters.

BMPs that slow the transport of water *(Fig. 12)* can reduce the volume of water discharged as a result of evaporation and uptake and transpiration by plants. Sediments tend to settle out as water movement slows. During the growing season plants take up and absorb nutrients; rotting vegetation in the sediments consumes dissolved oxygen and creates conditions favorable for nitrogen loss to the atmosphere through denitrification.

Retention of sediments will also tend to retain particle-bound phosphorus. Even the vegetation present in the ditch prism can slow water movement, retain nutrients, and reduce sediment loss during the warm months.

While adoption of BMPs can reduce nutrient and sediment loads delivered by land drainage, far greater reductions will be realized by practices that keep nutrients and sediments from entering the ditches in the first place.

Exclusive focus on routine maintenance by mowing, spraying, and woody growth removal prevents the recovery of stream habitats on drained lands.

Examples of best management practices are shown on the following page. Lack of dipping permits luxurious growth of vegetation in ditch itself, which slows water transport and allows additional time for sedimentation and internal nutrient processing. Example *(upper left)* is the Aydelotte PDA main . Salisbury, MD, has used public lands *(upper right)* to construct retention ponds that expand to hold more water during heavy rainfall as part of improved stormwater

management. On Birch Branch PDA *(middle right,)* a series of weirs were constructed to reestablish grade and slow water movement. Delaware has purchased innovative weed-wiper bar equipment *(lower left, right)* that selectively applies herbicides to control woody plant growth without broadly disturbing other bank-protecting plants. Another BMP practice, 1-sided ditch maintenance, is illustrated in the top photographs of *Fig. 12*.

Figure 12

A watershed perspective is absolutely necessary.

Local "C-curve" drainage need not apply at the scale of the entire watershed. It may be possible to slow transport through parts of the system by diverting water or allowing it to spread out without significantly affecting necessary drainage upstream (Sims *et al.,* 1998). At the present time, limited funding contributes to this lack of perspective and encourages the installation of isolated BMP structures.

These may have local significance, but studies on the German Branch watershed indicate they are generally ineffective because their contribution is generally overwhelmed by problems with the larger system. BMPs that adopt this perspective can use water control structures not only for water table management but also to divert runoff into existing or restored non-tidal wetlands.

All have required substantial infusion of additional funding through the creative use of available State and Federal resources and agriculture cost-share programs such as the Conservation Reserve Enhancement Program (CREP) and Environmental Quality Improvement Program (EQIP). The Public Drainage Task Force concluded that a watershed perspective ultimately will resolve the perceived contradiction between land drainage and water quality that presently exists.

Concluding Observations

Drainage has been and continues to be closely associated with land use. On the Delmarva Peninsula, that use has been primarily, but not exclusively, for agriculture. The relationship is such that changes in the extent of drainage can be expected to cause or reflect changes in land use. As an example, Denmark, where approximately half of the country's 39,000 miles have been channelized since at least 1800, has embarked on a massive program of stream restoration. But agriculture now employs less than 5% of the Danish workforce. Efforts to preserve farming as a way of life on the Eastern Shore must recognize the significance of land drainage o this policy.

Outside of the agricultural community, few citizens actually understand the origins, purpose, and significance of land drainage.

The environmental consequences of drainage, plus the overtaking of agricultural ditches by development and stormwater management, argue that land drainage can no longer be considered the responsibility of a single state agency.

Recommendations

Recommendation #1.

Policy makers should acknowledge the need to protect the economic well-being of people who depend on effective land drainage while at the same time protecting and enhancing the environment that is affected by public ditches. The objectives to be balanced are efficient drainage of land for farming, forestry, development use, and public transportation, while also as much as possible reducing nutrient and sediment export and enhancing stream and riparian habitat for living resources.

Recommendation #2.

The "on-the-ground" balance of objectives should reflect site-specific conditions as well as overall watershed management goals. Site-specific conditions involve physical, biological, and economic factors. There is need to identify, site-by-site, opportunities for slowing the rate of water flow and improving habitat in and near public drainage ditches without creating uncompensated costs for landowners who depend on public drainage.

The guiding principle is, where possible, to reduce "C-curve" drainage by retaining water on the landscape for longer periods of time overall. This promotes nutrient transformation and retention through chemical and biological processes, sediment deposition as opposed to transport, and increased water loss to the atmosphere through evapotranspiration. There is potential for using water control structures, not just for water table management, but also for the diversion of water from ditches into neighboring habitat to create, restore, or expand existing wetlands. This is a form of drainage water remediation that can remove excess P by chemical precipitation, promote denitrification and N uptake by plants, and reduce water volume by transpiration and increased groundwater recharge. Engineering changes such as these can help reduce nutrient loadings from ditched landscapes as called for by commitments made under the Chesapeake Bay and Maryland Coastal Bays Programs. Watercourse and bank and contiguous habitat actions also support the state's Green Infrastructure initiative in which critical habitat hubs are connected by bio-corridors that can be comprised, in part, by ditch rights-of-way. Such watershed scale endeavors require an inventory of ditching relative to habitat infrastructure, a task best carried out through GIS analysis. In most cases, landowners would have to sacrifice some productive land for the sake of habitat improvement. No such endeavors must be undertaken without appropriate cost-sharing or other form of compensation.

Recommendation #3.

Implementation of the recommended objectives should involve the application of best management practices (BMPs) that are based on the most recent results of scientific research. Continual research on drainage design and maintenance methods is essential to further management improvement of public drainage. Therefore, such research and technical assistance to apply research results should receive active support from the State of Maryland. BMPs should incorporate the best achievable methods to reduce nutrient export and increase habitat quality.

Recommendation #4.

The State should create an interagency public drainage coordinating group, to be chaired by a designee of the Secretary of the Department of Agriculture with representatives from Public Drainage Associations (PDAs) and Public Watershed Associations (PWAs) and from each of the Governor's Chesapeake Bay Cabinet agencies. The mission of this group will be to promote and encourage the following:

a) Review existing state guidelines and practices to ensure consistency with recommendations made by the Public Drainage Task Force;

b) Identify needed research, development, demonstration, funding, and technical assistance

related to the general implementation of BMPs for public drainage;

c) Establish guidelines which incorporate BMPs for use in the redesign and maintenance of public drainage systems;

d) Cooperate with federal agencies to support State of Maryland objectives; and

e) Coordinate, across State of Maryland and federal agencies, the effective and timely review of permits for drainage redesign and maintenance efforts.

Recommendation #5.

In recognition of the potential public benefits of reliable maintenance efforts that are based on BMPs, State and federal funds should be provided to augment local revenue for maintenance for Public Drainage Association (PDA) and Public Watershed Association (PWA) ditches, to incorporate into their maintenance and redesign efforts progressive outcomes such as reducing nutrient transport, reducing flow, and habitat improvement.

Recommendation #6.

In keeping with the State of Maryland vision for Smart Growth and in compliance with existing laws and regulations, the State should place the burden of costs required for altering public drainage, such as increased costs of maintenance, on to the developers of property to be drained. Alterations would include up-stream and downstream stormwater features (structural and non-structural) to accommodate development, and mitigate expenses.

Although the implementation of practices in accordance with Maryland's new *Stormwater Manual* will increase local water retention times and promote groundwater recharge as opposed to surface runoff, the fact remains that the cumulative effects of development on a given watershed have the capacity to overload a pre-existing system originally designed for agricultural drainage. The "Design" subgroup strongly recommended that developers be held financially accountable for the implementation of downstream BMPs (*e.g.,* multi-stage channel design modifications) necessary to accommodate any increased stormwater discharge rates. It is most desirable, of course, to ensure that a new development project with plans to discharge into a public drainage system adopt stormwater management that retains the original (pre-development) discharge rates. If either of these requirements cannot be met, the development should not be permitted to go forward..

Recommendation #7.

Watershed management goals must be consistent with the goals of non-point source nutrient load reduction efforts. The State of Maryland should maintain, and, as feasible, enhance and expand current efforts to control nutrient losses from source areas, both public and private lands, before the nutrients reach public drainage ditches.

The citizens of Henderson understand the importance of healthy buffer in slowing down water, taking up nutrients, and holding sediment, we also recognize the need for proper drainage of our land to ensure that farms and roads remain drained and septic systems work properly.

Water Supply

Eight major aquifers are used for water supply in Queen Anne's, Talbot and Caroline Counties:

- The Columbia aquifer is a surficial aquifer that extends over most of the region. The Columbia aquifer supplies some older homes and farms, and is used for irrigation, but because it is shallow, it is vulnerable to contamination from surface sources, and to going dry during droughts.
- The Miocene aquifers underlie the Columbia aquifer, and are used for domestic, commercial, and irrigation supplies in that area.
- The Piney Point aquifer underlies the Miocene sediments and is a poor aquifer in some parts of the region. It is used for domestic and commercial supplies where it is present, and for municipal supplies in Caroline and Dorchester Counties. This is the aquifer that supplies Henderson.

  Henderson is the only town in Northern Caroline County that has a public water system. The Town well taps into the Piney Point aquifer, and the system is permitted to withdraw 15,000 gallons per day. A storage tank provides 75,000 gallons of capacity. Assuming usage of 225 gallons per day and 53 EDU's, there exists approximate capacity for an additional 13 EDU's. More growth will probably require an expansion to the water system.

- The Aquia aquifer underlies the Piney Point and Columbia aquifers, and is used extensively throughout the area, except for the southeastern part of Talbot County. Brackish water is present in the Aquia aquifer in a narrow strip along the Chesapeake Bay shoreline of Kent Island. Water levels in the Aquia aquifer have declined at a rate of about one-half foot per year since 1980, and may continue to decline as the region's population increases, and demand for irrigation water increases. The Aquia is extensive used in Goldsboro and the North Caroline area. The best available data on its status has been included. This section will be updated in the future when the Coastal Plain Aquifer Study, currently underway by State agencies, is completed and made available.
- The Matawan aquifer underlies the Aquia aquifer in western Queen Anne's County and northern Caroline. It is used for small domestic supplies in parts of Kent Island where it provides an alternative water source to the Aquia aquifer and deeper Cretaceous aquifers that have severe iron problems.
- The Magothy aquifer underlies the Matawan aquifer and may be hydraulically connected to it in places. It supplies water for domestic and commercial uses on Kent Island but water from the Magothy is very high in iron, and must be treated before use. The Magothy aquifer is also used for much of the municipal water supply at Easton, where iron concentrations do not pose a problem.
- The Upper Patapsco aquifer underlies the Magothy aquifer and supplies water for domestic, commercial, and municipal uses on Kent Island and eastward to Grasonville. Water from the Upper Patapsco aquifer also has a severe iron problem in the Kent Island area but becomes less severe to the east and south. The Upper Patapsco aquifer is also used for the municipal supply at Easton where iron concentrations do not pose a treatment problem. These deeper aquifers may need to be investigated for potential

municipal use if shallower sources become contaminated or dropping water levels become more severe as regional population increases in the years toward 2030.

- The Lower Patapsco aquifer underlies the Upper Patapsco aquifer on Kent Island, and has been used for part of the public supply system on Kent Island since late 1999, but nowhere else on the Eastern Shore south of Cecil County. Although water from the Lower Patapsco aquifer requires treatment for iron, concentrations are much lower than in the Magothy and Upper Patapsco aquifers. Aquifer tests have shown that the Lower Patapsco aquifer is very productive, and provides an excellent alternative to shallower aquifers, in spite of its great depth (1,445 feet below sea level at Stevensville).

  The Middle Patapsco and Patuxent aquifers are potential ground-water sources, but are not currently used for water supply in Queen Anne's and Talbot Counties, and have not been tested thoroughly.

  Bedrock underlying the Coastal Plain sediments is not considered a potential water supply.

Projected and hypothetical pumpage scenarios by the Maryland Geological Survey simulated with a ground-water flow model indicate water levels will decline in the Aquia aquifer as population and irrigation requirements increase.

A 2002 study by MGS of the Aquia yields and usage in Anne Arundel County suggests that, as defined by the present management guideline, the Aquia aquifer has reached its maximum allowable yield. So, for Henderson (and other Caroline County water users) it is clear that it will become increasingly important to understand the inter-regional relationships that affect local water supplies and to remain engaged with growth management issues not just in northern Caroline County but on the mid-Shore generally and also on the Western Shore.

Water Quality

Henderson is located in the Upper Choptank Watershed. The watershed is cited by the State for four impairments: biological, bacteriafecal coliform, nutrients and sediments. A watershed restoration action plan was prepared for the Upper Choptank in 2003 that recommended a number of strategies such as a cover crop program, improved maintenance and buffer programs for public drainage ditches, better enforcement of local sensitive areas, flood protection and stormwater management ordinances and creation of Geographic Information Systems (GIS) data for better long-term study of trends and conditions. The plan is scheduled for update. If any policies are found to be specifically relevant to Henderson then they will be incorporated into the next cycle of Plan updates. However, the impact of management techniques by the Town will of necessity be nearly unmeasurable given the relative size of Henderson to the 118,000 acre watershed. Non-point loading rates for the Upper Choptank are included in the following table:

Upper Choptank Watershed Non-Point Source Loading Rates			
Land Use	Nitrogen (lbs/ac)	Phosphorous (lbs/ac)	Sediment (tons/acre
Urban	7.5	0.7	0.09
Crops	17.11	1.21	0.74
Pasture	8.40	1.15	0.30
Forest	1.42	0.00	0.03

From these coefficients, one may infer that Henderson generates 435 lbs of Nitrogen per year, 40.6 lbs of Phosphorous, and just over 5 tons of sediment. The agricultural land within Town contributes another 128 lbs of Nitrogen, 9 lbs of phosphorous, and perhaps 5.5 tons of sediment. In light of the general environmental conditions at Henderson, it is probable that much of this pollution is captured by the local ditching network. The greatest "return on investment" is likely to result from a focus on Best Management Practices for agricultural land and preservation of existing forested areas.

Upper Choptank River Watershed

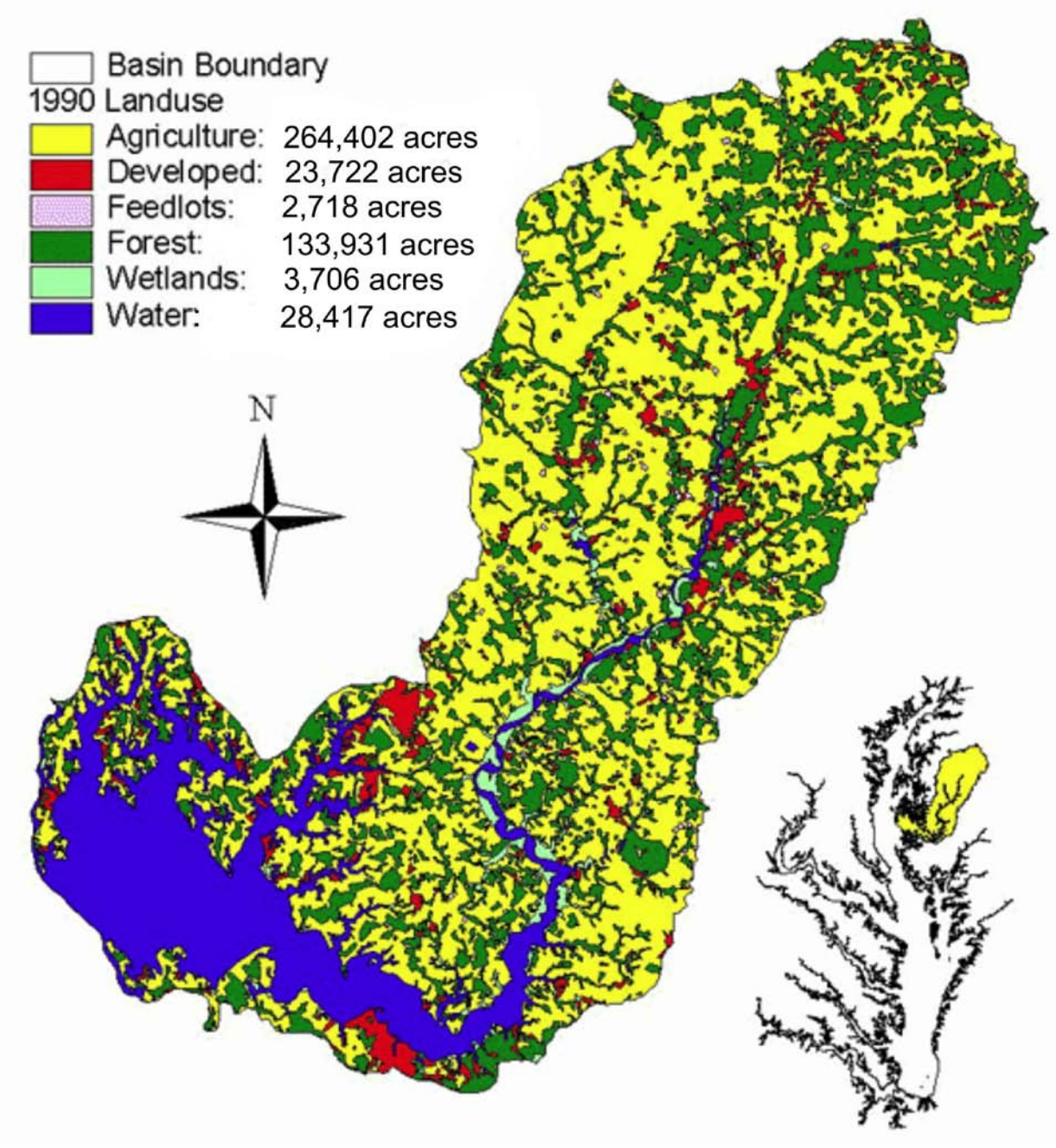
In January of 2002, Talbot and Caroline Counties jointly submitted a Watershed Restoration Action Strategy or WRAS proposal for the Upper Choptank River Watershed. Partners include the Maryland Department of Natural Resources, Department of Agriculture (MDA), the Caroline County Soil Conservation District (SCD), the Choptank River Tributary Strategy Team, and the University of Maryland Center for Environmental Studies (UMCES).

The WRAS process consists of phased plan elements that identify the most important causes of water pollution and resource degradation on a localized watershed-by-watershed basis. They also detail implementation measures needed to address water quality problems and establish a process by which to measure performance.

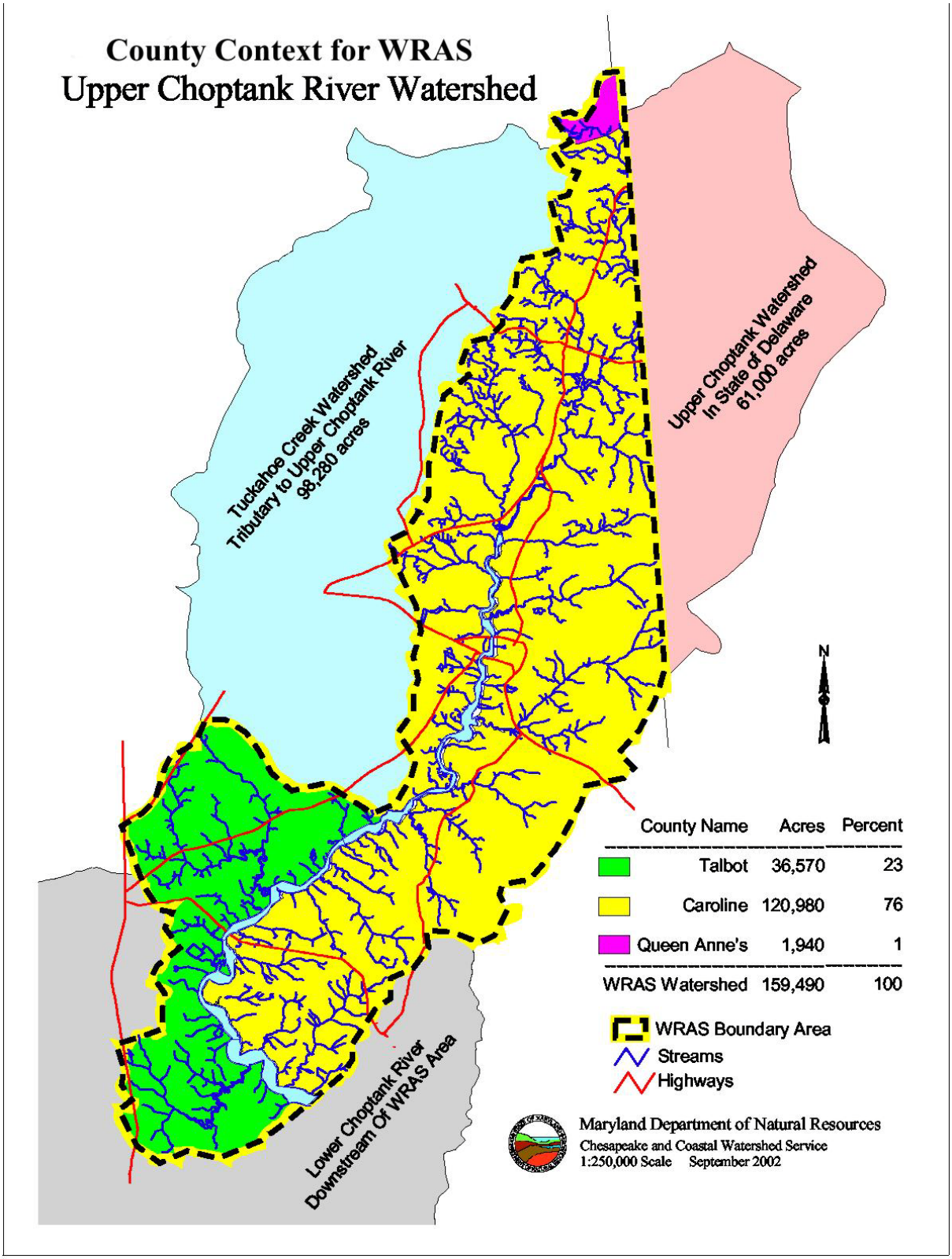
Working with public and private agencies and entities, Caroline County has completed the first phase of the WRAS program and produced the *Upper Choptank River Watershed Restoration Action Plan.* The *Upper Chop tank River Watershed Restoration Action Plan* for Caroline and Talbot Counties highlights the following action strategies to address pollution:

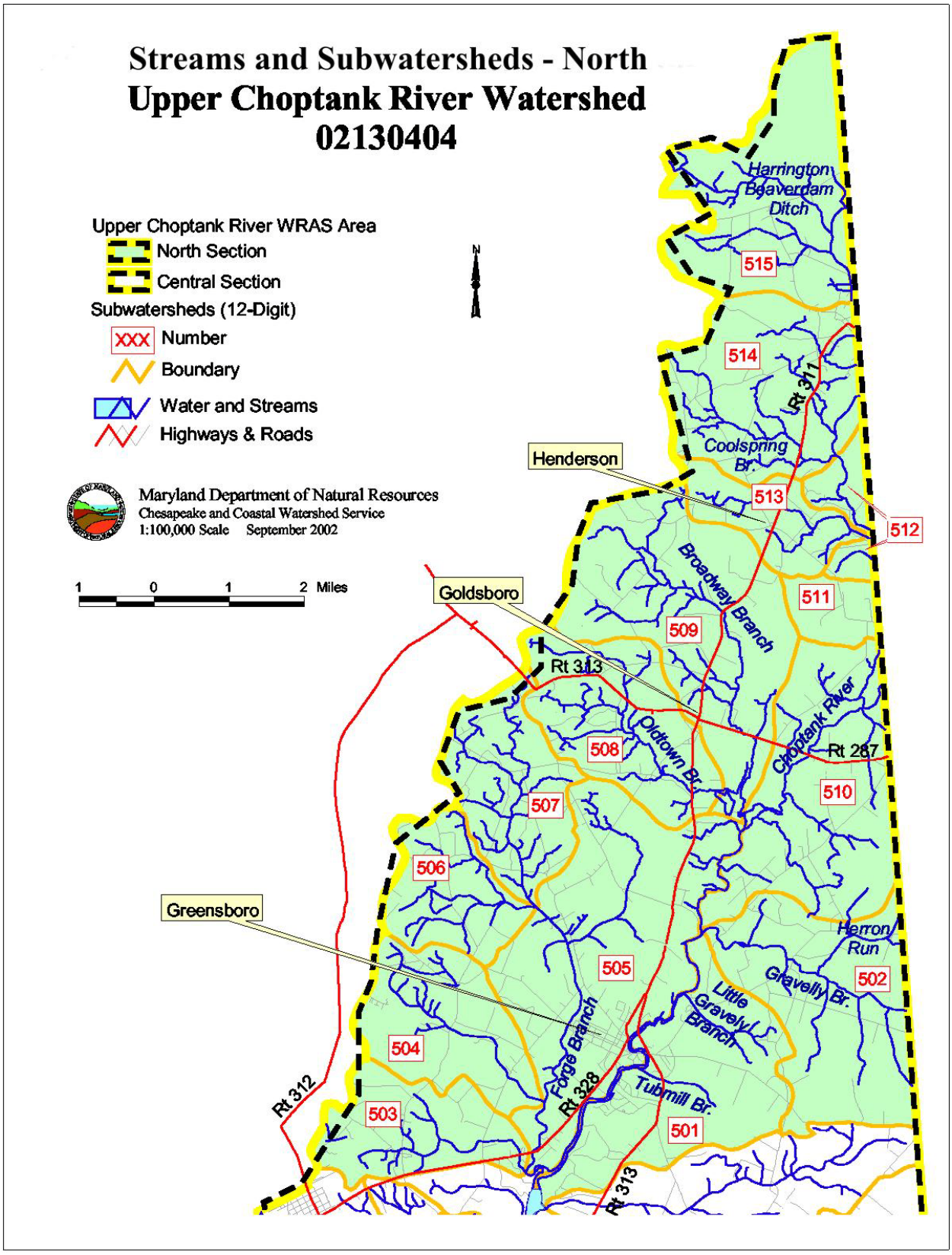
- Cover Crops;
- Public Drainage Associations (PDA's);
- Wetlands, Buffers, & Forests;
- Updated Soil Surveys;
- On-Site Sewage Disposal Systems and Groundwater Protection;
- Targeted Preservation Areas; and the Choptank Marina.

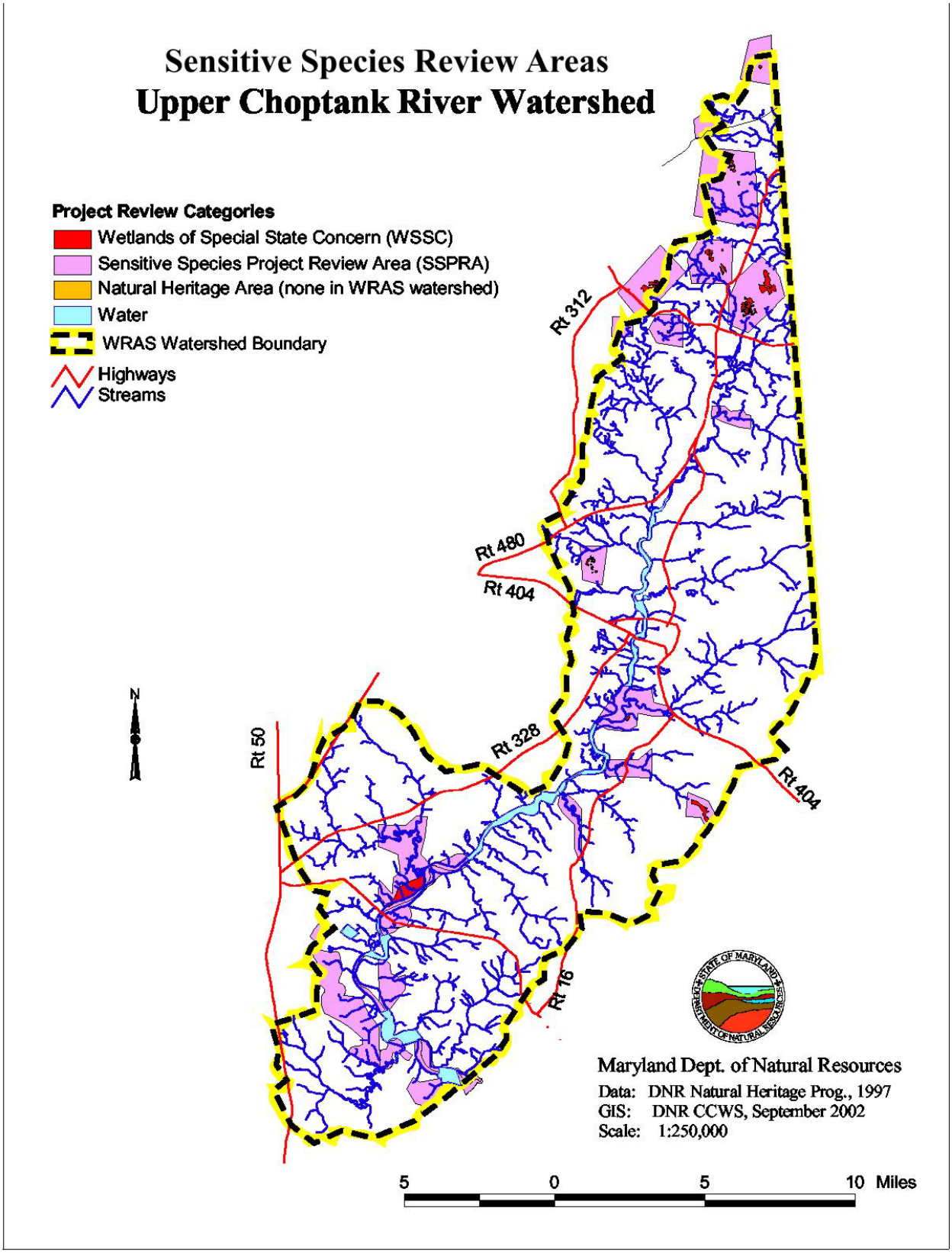
Choptank Watershed Land Use



Source: USDA-Agricultural Research Service (CEAP) 2007


County Context for WRAS
Upper Choptank River Watershed
Tuckahoe Creek Watershed
Tributary to Upper Choptank River
98,280 acres
Upper Choptank Watershed
In State of Delaware
61,000 acres
Lower Choptank River
Downstream Of WRAS Area
N
County Name Acres Percent
Talbot 36,570 23
Caroline 120,980 76
Queen Anne's 1,940 1
WRAS Watershed 159,490 100
WRAS Boundary Area
Streams
Highways
Maryland Department of Natural Resources
Chesapeake and Coastal Watershed Service
1:250,000 Scale September 2002


Streams and Subwatersheds - North
Upper Choptank River Watershed
02130404
Upper Choptank River WRAS Area
North Section
Central Section
Subwatersheds (12-Digit)
XXX Number
Boundary
Water and Streams
Highways & Roads
Maryland Department of Natural Resources
Chesapeake and Coastal Watershed Service
1:100,000 Scale September 2002
1 0 1 2 Miles
N
Harrington Beaverdam Ditch
515
514
Rt 311
Coolspring Br.
Henderson
513
512
Broadway Branch
511
509
Goldsboro
Rt 313
Choptank River
Rt 287
508
Oldtown Br.
510
507
506
Greensboro
Herron Run
505
502
Gravelly Br.
Little Gravelly Branch
Forge Branch
504
Rt 328
Tubmill Br.
Rt 312
503
501
Rt 313


Sensitive Species Review Areas
Upper Choptank River Watershed
Project Review Categories
Wetlands of Special State Concern (WSSC)
Sensitive Species Project Review Area (SSPRA)
Natural Heritage Area (none in WRAS watershed)
Water
WRAS Watershed Boundary
Highways
Streams
N
Rt 312
Rt 480
Rt 404
Rt 328
Rt 50
Rt 404
Rt 16
Maryland Dept. of Natural Resources
Data: DNR Natural Heritage Prog., 1997
GIS: DNR CCWS, September 2002
Scale: 1:250,000
5 0 5 10 Miles

Chapter 7: Sensitive Areas Element

Caroline County has an abundance of natural resources that include rivers, streams, wetlands, forested areas, and wildlife. These resources have aesthetic and environmental qualities that define the essential character of Henderson.

A primary environmental goal of the *Henderson Comprehensive Plan* is to protect the natural resources in immediate environs of the town and the 1st Election District. Objectives for protecting natural resources include:

- Enacting appropriate protection measures for environmentally sensitive areas;
- Conserving forest resources, recognizing that these are renewable resources;
- Improving surface water quality; and
- Conserving groundwater resources.

Summary

Article 66B of the Annotated Code of Maryland requires that every Comprehensive Plan to recommend policies to address the protection of environmentally sensitive areas, including:

- Streams and Stream Buffers;
- Steep Slopes;
- 100-Year Floodplains;
- Habitats of Threatened and Endangered Species;
- Agricultural and Forested Areas Planned for Protection or Conservation; and
- Wetlands.

Section I: Streams and Stream Buffers

Water resources in the Henderson region include primarily the Choptank River. Public Drainage Associations provide for land drainage and improved agricultural production but are not classified as "streams" and only carry off rainfall runoff. The Upper Choptank Watershed extends through several Maryland Counties including Caroline, Dorchester, Queen Anne's, and Talbot as well as parts of the State of Delaware.

Section II: Steep Slopes

Slopes provide an environment that facilitates the movement of soil and pollutants when land disturbances occur. The control of erosion is achieved through the regulation of development on steep slopes because such areas represent the greatest opportunity for accelerated soil loss that carries sedimentation and pollution to streams. Caroline County is approximately 321 square miles with an average elevation of only 40 to 70 feet above sea level. Steep slopes are rare in the

County with only 1 % of soils having been identified as having a slope greater than 15%. Most steep slopes occur along rivers and streams adjacent to or near tidal areas and are protected by the *Caroline County Chesapeake Bay Critical Area Program* regulations.

Section IV: 1OO-Year Floodplain

Some areas of Caroline County are subject to periodic flooding, which poses risks to the public health and safety, as well as potential loss of property. Flood-related losses may result from:

• Structures, which are inappropriately located, inadequately elevated, or otherwise unprotected and vulnerable to floods; or
• Development, which increases flood damage to other lands.

While the protection of life and property provided the initial basis for the protection of floodplains, there has been a growing recognition in recent years that limiting disturbances within floodplains can serve a variety of additional public health benefits.

Floodplains moderate and store floodwaters absorb wave energies, and reduce erosion and sedimentation. Wetlands found within floodplains help maintain water quality, recharge surface water supplies, protect fisheries, and provide habitat and natural corridors for wildlife.

Section V: Habitat of Threatened and Endangered Species Habitat

Destruction and degradation currently is estimated to threaten some 400 native Maryland species with extinction. There are numerous State and Federal laws that protect threatened and endangered species. As stated in the "1991 Update" to the Caroline County Comprehensive Plan, the County's role in the protection of threatened and endangered species should be to provide information on the location of such species and habitats to the property owners.

Due to the County's large forested areas, problems have arisen between property owners and government officials because Federal wildlife maps have cited much of Caroline, Talbot, and Dorchester Counties as potential habitat for the Delmarva Fox Squirrel. As a result, private land use and agricultural land management practices have been impacted due to these habitat designations.

Enhancing public awareness is important to raising appreciation for important wildlife habitat present in Caroline County. At the same time, State and Federal agencies responsible for guiding efforts to manage these habitat resources should not rely on a "shot gun" approach to habitat protection and management. For example, over 35% of the 1st Election District is designated by the Maryland Department of Natural Resources as a "sensitive species project review area" (see Sensitive Species Review Areas Map - above).

This means that any proposed development activity within these areas, including the installation of best management practices for agriculture, may be subject to lengthy review processes. Such review procedures can delay projects and increase costs. Smart Growth policies promote streamlined project reviews in areas designated for growth. For this reason, sound information concerning the presence of actual species habitat and defined protection areas are critical to

insure appropriate levels of management and avoid conflicts. Caroline County and local landowners are willing to work with appropriate State and Federal agencies in efforts that lead to improved management programs based on more accurate data.

Section VI: Agricultural and Forested Areas Planned for Protection or Conservation

There are no specific agricultural or forested areas in Henderson or in the Henderson Growth Area that are planned for protection of conservation.

Section VII: Wetlands

Wetlands are areas continuously or intermittently inundated with water. Tidal wetlands are found along tidal rivers and streams and are subject to the rise and fall of tides. Non-tidal wetlands are sometimes influenced solely by groundwater. Both types of wetlands host a myriad of plants that contribute to the natural food chain and also act as a filter for pollution from land sources.

North County contains numerous areas that are considered non-tidal wetlands (See Natural Resources Map). Most of North County falls into the Pocomoke/Fallsington soil association, which is characterized as poorly or very poorly drained. Presently wetlands are defined and protected by both State and Federal laws. These regulations are sufficient to protect wetlands in Caroline County. Most wetlands in the Henderson area are beyond the designated Growth Area but do provide a limiting influence of its location and extent.

Section VIII: Water Quality Initiatives

Among the many issues threatening the public health today is air, water, and soil pollution. The majority of people in the North County region and its Towns rely on private wells for water and septic systems for wastewater disposal. Presently, the four North County Towns have serious health and environmental problems associated with failing on-site septic systems and contamination of shallow groundwater supplies.

In addition, to failing septic systems, the North County region is an agricultural area, which contributes to nutrient loadings that enter the Choptank and Tuckahoe Rivers, affecting both surface and groundwater. Non-point source pollution from farming operations in North County, coupled with a lack of adequate best management practices for farming, have contributed greatly to pollution in the Upper Choptank Watershed.

Under the *Clean Water Action Plan,* the State of Maryland conducted a "Unified Watershed Assessment" for each of the State's 58 watersheds. The Tuckahoe and Choptank Rivers were cited as a "Priority One Restoration Watersheds," according to EPA standards, being impaired by *one or more pollutants, such as nutrients, sediments, toxic substances, acidity, or fecal coliform. (emphasis added)*

Section IX: Conclusions

The North County region has long been a traditional hunting and fishing area since pre-colonial times, containing many natural resources that are important to Caroline County as a whole. North

County's natural environment is an important component of the quality of life that residents enjoy.

The County's policy indicates that natural resources are a fundamental part of the character of Caroline County and a vital portion of what makes our community an attractive place to live and work. Natural resource management, whether for the purpose of protection or utilization (as in the case of forest and mineral resources), requires the use of current best management practices for planning and regulatory implementation.

At present, one potential element of environmental protection in Maryland deals with Total Maximum Daily Loads or TMDL's. TMDL's limit the amount of pollutants permitted from each potential source through an allocation system, as the sum of allowable loads of a single pollutant from all contributing point and nonpoint sources. A TMDL is a calculation of the maximum amount of a specific pollutant that can enter a waterbody and still meet water quality standards. Water quality standards identify the uses for each waterbody, for example, drinking water supply, contact recreation (swimming), and aquatic life support (fishing), and the scientific criteria to support that use. Any TMDL calculation must include a margin of safety to ensure that the waterbody can be used for the purpose that the State has designated. The Federal Clean Water Act, Section 303, establishes water quality standards and TMDL programs.

In the near future, it may be mandatory to include TMDL programs in Caroline County to address point and non-point source pollution. As pollution levels rise in the Chesapeake Bay and its tributaries, local governments may be forced to implement measures that provide protection for the Bay and its wildlife. These measures may include farming best management practices and enhanced buffer controls for non-point source pollution as well as stringent discharge requirements for wastewater facilities.

Chapter 8: Mineral Resource Conservation

The primary mineral resource in Caroline County is sand and gravel, a necessary mineral for many types of construction. Although, Henderson contains little sand and gravel, nonetheless, mineral resource conservation is important for the County's future as a whole.

A goal of the Henderson Comprehensive Plan is to conserve mineral resources in the 1st Election District.

Objectives for conserving mineral resources include:

• Identifying specific mineral resource areas to indicate appropriate areas for mineral extraction;
• Developing appropriate site development standards for mineral extraction activities

Summary

Sand and gravel comprises much of the mineral resources in Caroline County, as well as other areas of the Eastern Shore. Sand and gravel play a pivotal role in creating and sustaining our built environment, including road construction, building construction, and paving.

Tremendous quantities of this mineral are used for road surfaces. According to information developed by the Maryland Department of Planning, as an example, an estimated 400 to 600 tons are used to make one subdivision street that is a block long and 50 to 100 tons are used to build the average single-family residential home.

Sand & Gravel

Caroline County's sand and gravel is a nonrenewable resource that must be protected to ensure future use because these minerals are important to the State and the local economy. Much of the sand and gravel in western shore counties of Maryland has been mined to support the State's tremendous growth from 1950 to the present. Mineral resources in counties such as Anne Arundel, Calvert, Charles, Cecil, and Harford have been utilized, which will likely result in more pressure for mining sand and gravel deposits located in rural Eastern Shore Counties to support continued growth.

In 1975, Surface Mining Laws were enacted in Maryland, mainly for implementing environmental controls through State approved mining and reclamation plans. A two-tiered process of State and local regulations will assist in preserving mineral resources, while also allowing flexibility for the mining industry.

The North County region contains few mineral resources. Much of the region's sand and gravel is located in the southern portion in and near the Town of Goldsboro. The majority of rural areas in North County contain clay soils and numerous sensitive areas, such as wetlands and forested areas. Henderson is considered unsuitable for mineral extraction.

Chapter 9: Historic & Cultural Preservation

Over the past fifty years, Caroline County has lost many valuable historic and cultural resources to modem development. A goal of the Henderson Comprehensive Plan is to preserve the North County's historic sites, structures, and cultural heritage.

Objectives for historic preservation include:

• Encouraging the appropriate preservation of Caroline County's historical, cultural, archeological, and scenic resources;
• Improving Caroline County's inventory of historic sites and structures;
• Encouraging and supporting historic preservation through planning and regulatory mechanisms;
• Coordinating strategies and regulatory provisions between North County Towns to achieve mutual historic preservation goals;
• Encouraging industries that support historic preservation for incorporated and unincorporated areas of North County; and
• Encouraging the exploration of heritage area planning and tourism to link preservation initiatives with economic opportunities.

Summary

The North County region contains nineteen (19) inventoried historic sites and structures. The region also contains numerous archeological sites from the pre-colonial period, notably in the vicinity of Mud Mill Pond, which served as an Indian hunting and fishing ground. MD Routes 313 and 287 are part of Maryland's Underground Railroad Tour.

Section I: History of North County

Much of the historic and cultural legacy of the North County region is steeped in traditional agriculture and the railroad industry. Three of the four major towns in North County, Goldsboro, Henderson, and Marydel, have histories related to the expansion of the railroad.

Town of Henderson

The Henderson area was an Indian enclave in the days before early European settlement. An abundance of arrowheads, stone axes, and other artifacts can be found in the surrounding gardens and fields. The Town of Henderson originally developed as a crossroads village in the hinterlands of Caroline County.

At the close of the 18th Century, Edward Thawley owned a farm called "The Carrow Place," near modem day Henderson. In 1831, one of Thawley's granddaughters married Joshua Meredith. Henderson was originally called "Meredith's Crossing." The name Henderson was bestowed on Meredith's Crossing in 1868, being named after Mr. Henderson, a major

stockholder in the Delaware & Chesapeake (D&C) Railroad. Soon after, Henderson began to expand and its first school, church, and mill were erected.
In 1874, a school site was chosen. The Henderson schoolhouse grew out over the years as rooms were added for new children. Today it has been remodeled into residential apartments. In 1854, Pippin's Methodist Church, the first church to serve the Town, was constructed at Melvill's Crossroads (Mount Zion). The present-day church was constructed in 1919 and built on the foundation of the previous 19th Century church.

During much of Caroline County's early history, mills were used to grind local grain into flour. The first mill in Henderson was known as "Mud Mill". The name was later changed to the "Choptank Mill," which still exists today.

An important part of Henderson's history, the D&C railroad passed through the town. The railroad line was completed about the same time the line for the Town of Goldsboro was finished in 1867, linking the two towns economically. An old wood burning steam train made two trips a day, carrying freight and passengers. It was called the "Baltimore" after Maryland's most famous port city. The second train to be used was the "General Tilghman," named after General Tench Tilghman, an aide-decamp for George Washington and a famous Eastern Shore plantation owner. Although the Town has experienced a decline during the 20th Century, it is still a small rural crossroad village.

Section II: Historic Resource Inventory

Historic Resource inventories assist public and private entities to catalogue valuable historic sites and structures. For this plan, historic resource inventories have been categorized according to their proximity to growth centers based on information contained in the Maryland Historical Trust's (MHT) database. The inclusion of Caroline County's historical sites and structures in the County's information and mapping systems, will greatly enhance historic preservation efforts. Significant resources also include MD Routes 313 and 287, which are designated scenic rural highways on the Underground Railroad Tour.

Henderson Historical Sites

Louis Antal House (1800-1825) National Register of Historic Places - NRHP: The Louis Antal House is located south of the rural village of Mt. Zion on Melville Road near the Town of Henderson. Mt. Zion is a small crossroad village of distinct early historical importance for the County. As part of this history, the Louis Antal House is an excellent example of traditional Federal-style architecture with Flemish bond, a two-room central hall plan, gable ended chimneys, and symmetrical window placements. The house was built on a high foundation, traditional for the region.

Brick House on Steele Road (1800-1825):

The Brick House is located north of the Louis Antal House near Mt. Zion on Steele Road. As a farmhouse constructed in the first quarter of the 19th Century, the Brick House is an example of traditional Federal architecture with Flemish bonding. The principal facade is very tall with a high foundation and gable-ended chimneys.

Ervington (1800-1825):

Ervington is a private residence located northeast of the Town of Henderson. Ervington is a two story brick farmhouse with Flemish and common bonding and an addition was constructed in the late 19th Century to replace the kitchen wing. Much like most homes of this period in Upper Caroline County, Ervington has gable-ended chimneys and traditional Federal architectural features, however, it deviates from the Federal style floor plan of a central hall in favor of a hall and parlor, a mid to late Victorian architectural trademark.

Hignutt House (1800-1825,1880):

The Hignutt House is located southwest of the Town of Henderson. The house has two distinct sections constructed at different times. The original building consisted of a traditional one and a half story farm-house with two main rooms. The house still has its original comer staircase and board paneling. In the late 19th Century, a second addition was constructed on the building's south wall. The new structure was a large two story section with late Victorian gingerbread porches.

Goldsboro Railroad Station (1880):

Located just outside the Town of Henderson rather than Goldsboro, the Goldsboro Railroad Station is one of the key architectural structures in the region. Although located in a mobile home park, the Railroad House is a testament to the importance of rail transportation in early American rural history. During the time of its construction in 1880, the railroad was the dominant economic force in the region and it played a daily role in the life of pioneering Americans.

The history of the Towns of Goldsboro and Henderson coincide with the completion of the D&C railroad in 1867. At the time there were only three structures in the town of Goldsboro and about five in the Town of Henderson. The construction of the Goldsboro Railroad Station marked a turning point in the history of both towns.

The railroad station's design is typical of many small rural villages of the time. However, several distinct features are marked on the structure. The station has a large hipped roof, which slopes down and flares out on all sides to protect passengers from adverse weather. The overhang is supported by hand-carved brackets, which form a delicate and graceful design. The Railroad Station is one of Henderson's most important historical legacies.

Henderson School (1874;1891):

A small school called "Cool Spring" was founded at a very early date. The citizens of Henderson attempted to move this school to a new site in 1873 but the effort failed. In 1874, a new schoolhouse was erected by two local carpenters. By 1891, this structure was too small to accommodate the children of Henderson and various rooms were added until the school assumed its present state in the early 20th Century. The one story structure maintained a V-shape and a

gable roof. It now exists as residential apartments with only portions of the original structure still intact.

Section III: Conclusion

There are several important elements to the development of an effective program for the protection of historic resources. First is the inventory of historic sites and structures. The second element involves designating the most significant historic sites and structures for listing on a Federal, State, or County register of historic places. Educating the public on the benefits of historic preservation and forming partnerships with organizations involved in historic preservation activities is necessary. The third element involves specific regulatory actions to protect historic resources.

According to *Article 66B of the Annotated Code of Maryland* (Planning & Zoning Enabling Act), Sections 8.01 to 8.17, "Historic Area Zoning," local jurisdictions may designate "boundaries for sites, structures, or districts, which are deemed to be of historic, archeological, or architectural significance." Local historic preservation planning allows property owners in designated historic preservation districts to access significant tax credits, low-interest loans, and grants to repair and renovate important historic properties, thus preserving our valuable heritage.

The North County region has numerous sites and structures of historic, cultural, and archeological importance to Caroline County. Structures, such as Castle Hall, have tremendous importance for Maryland's colonial history. The North County Towns of Goldsboro, Henderson, and Marydel also have many sites and structures of historical importance yet to be catalogued and identified.

Although, Town sites and structures are not listed on the Maryland Historical Trust's catalogue of important places, these buildings are a testament to local history and pride. A county-wide historic preservation plan and regulations for the establishment of voluntary local historic districts can aid North County Towns in acquiring grants and loans for historic preservation, community enhancement, and overall aesthetic improvements.

Chapter 10: Transportation

The primary transportation goal of the *Henderson Comprehensive Plan* is to provide for the safe and efficient movement of people and goods.

Objectives for transportation include:

• Preserving the Clayton-Denton-Easton railroad right-of-way.
• Insuring development of appropriate vehicle and pedestrian circulation systems to serve the designated growth areas when needed;
• Minimizing the need for extensive capital investment in upgrading County roads outside of the designated growth areas and along major travel routes;
• Encouraging the location of jobs close to population centers in order to reduce vehicle miles of travel;
• Providing for alternative modes of travel within the designated growth areas, such as pedestrian and bicycle routes; and • Improving safety for motorists by controlling access along State and County roads.

Summary

Major highway access routes include MD Routes 313 and 287 (designated scenic rural highways) and MD Routes 311, and 454. The existing State highway system in North County provides easy connections to higher order roads that access metropolitan areas in Maryland and Delaware, including MD Routes 404 and 454 (Del. Route 8) as well as US Routes 50, 301, and US Route 13.

North County towns are within easy driving distance of major metropolitan centers in Delaware and on the western shore of Maryland. The closest regional cities include Dover and Wilmington, Delaware; Philadelphia, Pennsylvania; Annapolis and Baltimore, Maryland; and Washington D.C., located within 2 hours driving time. For example, it is a 25 minute drive from the Town of Goldsboro to Dover, Delaware.

The arterial system in North County is composed of State roads that serve as intracounty connectors to Queen Anne's County, Maryland and Kent County, Delaware. The arterial system operates at acceptable levels of service.

The collector system is composed of County roads and town streets that meet the vehicular travel needs of North County residents. For a predominately rural area, the collector system operates at acceptable levels of service. Travel demand and safety considerations are low enough that no major capital improvements are planned at this time.

Upper Shore Aging, Inc. (U-Star Transportation) provides limited public transit on the "Orange Line," which currently runs as a deviated line. According to the *2000 Transportation Development Plan for Caroline, Kent, and Talbot Counties*, a report prepared for U-Star, North

County demonstrated a need for transportation services to provide transportation to disadvantaged populations. That need is just as great in 2009.

Section I: System Inventory

All roads within Caroline County are classified according to intended use and potential traffic capacity requirements. The functional classification of roads is as follows:

Arterial Road: a major road carrying heavy traffic between major communities, towns, and counties.

Major Collector Road: a road providing access to properties, collecting and distributing moderate traffic between neighborhoods, major development areas, or intra-county circulation, and serving not more than 50 units in a subdivision.

Minor Collector Road: a road providing access to properties, collecting and distributing light traffic from larger capacity roads, and serving not more than 50 units in a subdivision.

Local Road: a road serving and providing access to abutting residential and agricultural properties, carrying no through traffic, and serving not more than 25 units in a subdivision.

Commercial/Industrial Road: a road providing access to and within a commercial or industrial area.

The highway system serving North County consists of approximately 110 miles of roads, with nearly 91 miles in the County system. The highway system includes approximately 19.5 miles of arterial highways maintained by the Maryland State Highway Administration (SHA). Arterial highways carry a high volume of intra-county traffic, providing access to and from higher level arterial roads. The arterial system consists of MD Routes 313, 287, 302, 311 and 454. The highway system also includes 52 miles of collector roads that serve travel needs, provide access to lower order roads, and provide direct access to properties.

The lowest order of roads consists of local streets in the Towns and approximately 39 miles of County roads. The primary function of these roads is to provide access to properties. Capacity on local roads varies according to whether or not it is paved and depending on the condition of bridge crossings. Some local road systems consist of unpaved County Roads.

Section II: Transportation Issues

Major transportation issues identified by Town officials are as follows:

- Status of improvements to paved and unpaved County roads in the Caroline County Road Improvement Program;
- Future of railroad right-of-way;
- Local highway flooding problems and the lack of maintenance of some local stormwater drainage systems, i.e. ditches;

- Access control, such as excessive curb cuts and strip development along roads;
- Lack of appropriate transportation design standards and specifications for the Towns and designated growth areas;
- Poor control of visual impacts for gateway corridors, such as inappropriate road-side buffers; and
- Lack of appropriate visual controls along scenic rural routes.

Section III: Conclusion

Concentrating growth in existing population centers supports future expansion of limited transit service, available in the region. When development occurs, road improvements will be needed within designated areas. The Towns and County will need to coordinate in order to ensure efficient expansion of local road capacity. This is an important consideration and is underscored in the findings of the *2000 Transportation Development Plan for Caroline, Kent, and Talbot Counties.* The North County region demonstrates the largest need for public transit, based on transportation disadvantaged data in the report.

Local State Highway Administration streetscape projects provide an opportunity to enhance the visual quality of the Towns, improve vehicular and pedestrian circulation, and bring much needed capital improvements. SHA has already undertaken a streetscape project in Goldsboro. Other North County Towns could benefit from similar projects. An important objective should be design for controlling vehicle speeds through the towns, a concern of local residents.

The Chesapeake Railroad right-of-way that runs from Tuckahoe State Park to the Town of Goldsboro to Marydel, presents an opportunity to create local trail segments within town limits.(Easton Clayton Rails-to-Trail). In addition, the railroad right-of-way could serve as a potential utilities corridor. The character of rural agricultural areas, historic cross roads villages, and towns are important assets in the North County region.

New development along highway corridors that detracts from the positive visual qualities of these areas should be avoided. Similar standards should apply in the County and the Towns to ensure that new development along highways is properly designed, including appropriate access controls and visual buffers.

Chapter 11: Community Facilities

Community facilities include water and wastewater facilities and services, town administration buildings, police and fire stations, as well as parks, libraries, and schools. A primary goal of the Henderson Comprehensive Plan is to provide a system of community facilities, public services, and utilities that service Town residents and are consistent with the this land use and growth management plan. Objectives for community facilities include:

• Ensuring adequate park and open space land and facilities to meet current and projected demands;
• Securing an elementary school in the north county region somewhere between Goldsboro and Marydel to provide local educational opportunities;
• Coordinating planning and programming of community facilities with the appropriate Municipal, County, and State agencies and entities;
• Coordinating community facilities planning and programming to ensure consistency with the goals and objectives of the Henderson Comprehensive Plan;
• Ensuring an adequate supply of potable water and wastewater treatment for Town residents;
• Directing growth to existing population centers to be served by existing or planned public infrastructure; and
• Requiring adequate public facilities to serve proposed new development.

Summary

The primary need in the North County region is community water supply and wastewater treatment facilities. North County Towns have serious health concerns associated with failing on-site septic systems and contamination of groundwater supplies. Failing septic systems also are contributing factors to surface water quality issues in the region. The creation of adequate municipal public infrastructure (water and sewer) will assist in the alleviation of many environmental problems. However, planning for other community facilities and services for existing and future residents is equally as important.

There are approximately 428 acres of park land in North County. Community Parks are located in Goldsboro, Henderson, and Templeville and are operated and maintained by the Towns. Christian Park is a County park located between Goldsboro and Greensboro. Several semi-public and/or private parks are located near Goldsboro and one private park is situated in the rural village of Mount Zion, near Henderson.

The Caroline County Parks and Recreation Plan concluded that the County should pursue a goal of 24.7 acres of local recreation space per thousand people, through cooperation with other recreation providers, limited land acquisition, and park development. At present, the County utilizes programs such as Program Open Space (POS), Transportation Enhancement Funds, the Agricultural Land Preservation Foundation Program, and the Rural Legacy Program to acquire land.

In addition to parks and park facilities, greenways and trail systems offer desirable amenities that are supported in the Parks & Recreation Plan. As illustrated in the 2000 edition of the *Maryland Atlas of Green ways, Water Trails, and Green Infrastructure,* published by the Maryland Greenways Commission, the State envisions several initiatives for North County, including:

• The Easton/Clayton Rails to Trail:

Promoting a rails to trail along the former Chesapeake Railroad right-of-way that runs from Tuckahoe State Park to the Town of Ridgely, from Ridgely to Greensboro, and from Greensboro through Goldsboro and Henderson to Marydel.

• Upper Choptank River Greenway:

Promoting a regional ecological and recreational greenway that would connect the County's Christian Park to the Greensboro Boat Ramp; and

• Choptank River Water Trail:

Promoting the development of a water trail route along the upper reaches of the Choptank River.

Greenways and park lands improve the attractiveness of towns and surrounding rural areas. They also improve the local quality of life by offering recreational activities and services to County residents, enhancing the local economy through the creation of attractive environments for circulation, development, eco-tourism, and heritage tourism. The designation of greenbelts in and around existing population areas can assist in creating an improved sense of community and identity.

Section I: Public Sites and Services

Meeting places have a public social, political, and economic function. Public sites and services include community meeting areas (such as town halls and community halls), fire stations, and police stations. Town and community halls are places where local government can meet with the public and make decisions regarding their communities. Fire stations and police stations offer valuable public services for the health, safety, and welfare of the region.

There are a variety of public services offered in North County Towns for both town and regional residents. This includes basic government services, such as trash collection in the Towns, a post office, and fire stations in Goldsboro and Marydel. Town halls exist in all four North County Towns for the conduct of local municipal government business. An additional community hall exists in Marydel for local Town functions, meetings, and gatherings. In addition, health services are provided in the Town of Goldsboro.

Public sites and services are critical to creating a safe environment for the North County region and its residents. Top priorities for safety include fire protection, law enforcement, and basic government services. Although the region has adequate fire protection and a County police

substation, located in Marydel, residents stated that important services are lacking. Adequate law enforcement for the region was consistently cited despite the police substation.

Section II: Educational Facilities

The Public School Construction Program is a major source of funding for Caroline County and approval requests for the planning of new school projects are submitted to the Interagency Committee for Public School Construction (IAC), who reviews requests and submits recommendations to the Maryland Board of Public Works.

To receive funding, projects must meet the IAC's "Evaluation Criteria," be included in Caroline County's Educational Facilities Master Plan, and have prior IAC planning approval (planning approval usually means that subsequent construction funds are supplied but does not guarantee funding).

In Caroline County, the Board of Education establishes priorities for its 5-Year Capital Program, which is submitted to the IAC to obtain funds from the PSCP. The first established priority in the County is the renovation of existing schools based on age of the school (the oldest receiving priority funding). Maryland's new policies for school facilities now target funds to existing structures rather than the construction of new schools.

Any new school construction is linked to Smart Growth principles, requiring schools be located in designated growth centers and are served (or planned for service) by adequate public infrastructure. According to the Educational Facilities Master Plan, the construction of new schools in Caroline County is a secondary priority to the renovation of existing schools.

From 1970 to 2000, most regions in Caroline County indicated population growth. *The highest rate of growth was in the northern area of the County. The Greensboro, Henderson, and Ridgely areas exhibited the most significant levels of increased population. (emphasis added)*

On average, the school age population is about a 25 percent of the total population. The highest percentage of school age population was indicated in the North County region. The largest numerical increase of school-age population growth was indicated for Greensboro. According to the Educational Facilities Master Plan, population growth and development in the North County region will significantly increase public school enrollment at the Greensboro Elementary School, Lockerman Middle School, and North Caroline High School.

Caroline County school enrollment projections from 2000 to 2005 indicate little or no growth. Taken as a whole, most regions show a stable or declining school enrollment population. According to these projections, school enrollment is relatively stable in many portions of the County, indicating there is little need for the construction of new schools. *However, it should be noted that a new school may be needed in the future for the North County region.*

Due to current Board of Education policies, the future construction of a school in North County is not feasible at this time because the State of Maryland will not supply funding for the construction of new school facilities when older facilities can be utilized and demand more

immediate attention. According to the precepts of the Smart Growth Act, the State also would require water and sewer services and facilities to be present prior to construction of a North County school, ensuring adequate public facilities are present.
Educational facilities were a key discussion topic at various public meetings. As a result, the Marydel Land Use Plan includes identification of a potential site for a new elementary school. This component reflects community sentiments concerning school facility locations. Residents want to see school facilities located close to the towns to reduce busing time for local children. Residents also expressed the belief that major facilities, such as a school, are important components of any community.

Location criteria for such facilities should reinforce Smart Growth principles and provide for the special needs of the growing Hispanic population in North County and those residents who are transportation disadvantaged.

Section III: Emergency Services

There are two types of emergency services in Caroline County that provide inter-related services, including Emergency Medical Services (EMS-Medical) and Emergency Management Services (EMS-Management). Each is an individual department within Caroline County's local government structure.

EMS-Management is a Caroline County department that provides emergency planning and coordination 911, police communications for the Sheriff's Department and 5 town police departments, fire and rescue communications for 8 Fire/EMS-Medical Departments, and manages the National Crimes Information Computer System for police agencies. EMS Management also oversees a comprehensive and progressive risk management program, including employee safety, workman's compensation, general liability, and property and fleet insurance.

EMS-Medical is a Caroline County department that provides emergency medical services through a combination of volunteer and career providers. The combination operates out the towns of Federalsburg, Preston, Denton, Ridgely, Greensboro, Goldsboro and Marydel. A staffed career paramedic unit is dispatched on every EMS-Medical incident. The closest volunteer ambulance also is dispatched. On some calls requiring additional resources volunteer fire and rescue equipment are dispatched. Caroline County has mutual aid agreements with all surrounding counties.

The Director of EMS-Medical is appointed by the Commissioners of Caroline County. The EMS-Medical Department is an active participant with the County Association of Fire Chiefs, EMS Association, and the County Volunteer Firemen's Association. The Basic Life Support Enhancement Committee is a County Commissioner appointed committee to oversee the billing for a services program and daytime enhancement of career personnel.

Funding for EMS-Medical is supplied through the County general fund appropriations and a fee for services program. The fee for services program bills patients and their insurance companies

according to national standards. Income from the fee for services does not offset the appropriation to totally fund EMS Medical.

The volunteer Fire Companies purchase equipment through a combination of County allotment and funds derived through various fund-raising efforts.

The public demand for EMS-Medical provided in a rapid fashion has developed over the past two decades. National and state regulations/standards define the characteristics of a quality EMS-Medical system. The future demand for EMS Medical will require substantially increased funding efforts by Caroline County to ensure adequate services for citizens and visitors.

Section IV: Water and Sewer

Among the many issues threatening public health today is air, water, and soil pollution. One major component of that pollution is the absence of public water and wastewater systems in small communities with failing individual septic systems.

The majority of the people in Northern Caroline County rely on private wells for water and in-ground septic systems for wastewater disposal. All four Towns have serious health and environmental problems associated with failing on-site septic systems and contamination of surface groundwater supplies. These problems have existed since the 1970's. The Town of Goldsboro has been cited as a failing septic system area since 1975. In August of 1996, the MDE issued a "Consent Order" to the Town to resolve the problem of failing septic systems and resulting pollution. The nearby Town of Henderson is served by a community owned water system but residents rely on private septic systems for waste disposal, many of which are failing. The Caroline County Health Department is concerned that improperly treated septic system effluent is contaminating groundwater in the area.

Water and Sewer Facilities and Services

Water and wastewater infrastructure are of tremendous importance for growth and growth management. The new 8th Vision, included in the 2000 Amendments to *Article 66B of the Annotated Code of Maryland, Land Use* (Planning & Zoning Enabling Act), states that adequate public facilities and infrastructure shall be available or planned in areas where growth is to occur. The adoption of the 8th Vision achieves consistency between the Planning & Zoning Enabling Act and the 1997 Smart Growth Areas Act, which funnels state funding to "Priority Funding Areas" (areas for major State capital improvement and investment).

To address North County water and wastewater problems, Caroline County, working with the municipalities and the Maryland Environmental Service, has developed a regional water/wastewater service area. As a State affiliated agency, MES established a Water and Sewer Service District in North County. The future water and sewer system is intended to correct all present deficiencies in the Service District, eliminating the use of septic systems and private wells. It will fill community needs for the next 20 to 40 years.

Major systems in the region include the Henderson Water System and water and wastewater systems located in two mobile home parks. The Henderson Water System is the only existing public system in the region. At present, it serves the residents of Henderson only and is owned and operated by the Town. The water system consists of a deep well, chlorine injection system, and 75,000 gallon elevated storage tank with 4,050 linear feet of 8" main, 1,400 linear feet of 6" main, 2,515 linear feet of 4" main, and 10 fire hydrants.

It is envisioned by the Town of Henderson and Caroline County that the Henderson Water System will be incorporated into a future regional water and wastewater system. Private water and sewer systems include Cedar's Mobile Home Park (formally Walker's Mobile Home Park) and Caroline Acres Mobile Home Park. The Cedar's Mobile Home Park Water/Wastewater Distribution and Collection System is located south of the Town of Marydel. It has a sewer treatment facility with a permitted flow capacity of 1,500 gallons per day.

The effluent is discharged into the Tidy Island Branch of the Choptank River. The Caroline Acres Mobile Home Park Water/Wastewater Distribution and Treatment System is located south of the Town of Henderson. It has a public water supply and sewer treatment facility with a permitted flow capacity of 24,000 gallons per day. The effluent is spray irrigated onto woodland areas.

Adequate public infrastructure is important to the healthy functioning of North County Towns. As a major goal of the *Henderson Comprehensive Plan,* improved coordination is recommended between the County and its municipalities to provide both water and sewer. The present *Caroline County Master Water and Sewerage Plan* supports the formation of the MES Service District because it addresses long-term solutions. Assisting in the formation of water and sewer for municipalities discourages County operation of such facilities. Caroline County lacks adequate funding and operation and maintenance capabilities for water and wastewater systems.

North County regional Priority Funding Area's (PFA), areas designated for capital improvements by the State in cooperation with the County and municipalities, are the four North County Towns. PFA's in North County are being amended to include the Towns plus the MES Sewer and Water Service District.

On March 2, 1999, the County Commissioners of Caroline County passed "Resolution #99-003" endorsing the regional water and wastewater system concept. In December of 2002, the Commissioners of Caroline County adopted the *North County 5-Year Water & Sewer Plan,* as prepared by MES. In 2003, the four North County Towns adopted the *North County 5-Year Water & Sewer Plan,* as prepared by MES.

The Master Water and Sewerage Plan was updated in 2004 to include the *MES Five-Year Water and Sewer Plan* for North County Towns. If, however, the MES water and sewer system cannot acquire adequate funding to construct a regional system, then alternatives should be re-evaluated, such as the feasibility of extending sewer lines to the Town of Greensboro's wastewater treatment plant or other possible scenarios.

Any planning for water and sewer service should be regional in scope and account for potential inter-regional water and sewer systems. This includes communities in Kent County, Delaware as well as service to communities with existing systems, such as Greensboro that may experience future treatment problems or have service interrupted as the result of a catastrophic event.

Due to distance and proximity to incorporated areas, the abandoned railroad line that runs through the North County Towns of Goldsboro, Henderson, and Marydel provides an ideal "utility corridor" for linking water, sewer, and other services for the region.

Section V: Conclusion

Several major issues were discussed in a series of community meetings held from late February to July 2002 in North County Towns. Though seven years “out of date,” the concerns listed then are just as valid today – and are readopted and reincorporated into the Henderson Comprehensive Plan. These meetings were held to discuss community issues, opportunities, and constraints and sought to educate Town officials regarding planning and zoning.

Several major community facilities issues emerged from the public meetings, including:
• Lack of Adequate Public Services;
• Lack of Safety and Law Enforcement (no municipal police force or State/County police station);
• Lack of adequate school facilities, located close to North County Towns; and
• Lack of Public Water and Sewer Infrastructure, improved community facilities and services in the North County region are critical to advancing the growth management, infrastructure enhancement, resource protection, and community conservation objectives of the *Henderson Comprehensive Plan.*

Chapter 12: Housing Element

A primary goal of the *Henderson Comprehensive Plan* is to provide for affordable, safe, and sound sanitary housing for the residents of North County. Objectives for housing include:
• Providing sufficient land and infrastructure to support development;
• Encouraging the re-development and reuse of existing housing stock; and
• Increasing the supply of affordable workforce housing.

Summary

North County suffers from a lack of investment in the existing housing stock, especially within the incorporated towns. Many properties have experienced deterioration in value over time, mainly due to poor conditions and environmental constraints.

In 2000, the median value of homes in North County was $77,000, as compared to the median value of Caroline County homes at $101,600, representing a $24,600 difference. The median value of homes in the State of Maryland is $143,300. The median value of homes in North County is 50% less than the Maryland average. Tax assessment records for 2000 describe the quality of over 99% of all housing in North County as being "fair" or "below average." "Fair" quality homes are defined as units meeting minimal building codes, typically mass produced and exhibiting an overall quality range from average to below average. Over a third of the housing units were described as being "low quality construction."

Section I: Housing in North County

Part of the housing problem in North County can be attributed to generally low average household incomes in the. According to Census 2000 statistics of a total 3,038 housing units, 2,100 are owner occupied and 968 are rental units. Rental properties made-up approximately 33% of the total housing stock in 2000. Deteriorating rental units have been cited as a major contributor to the local housing problem, including overcrowding and lack of maintenance.

There also is a significant concentration of mobile homes in the North County region. According to Census 2000, there were 388 units classified as mobile homes. Although livability issues exist with rental properties and mobile homes, given the low average income of residents in the region, rental housing and mobile homes address community demand.

Another part of the housing problem can be attributed to the lack of adequate water and sewer facilities to serve the incorporated towns, where most of the housing is concentrated. The critical lack of these facilities not only impedes construction of new housing, but also discourages investment in the existing housing stock.

There are no apparent public or private organizations currently addressing affordable housing issues in the North County region, such as Habitat for Humanity. The need for affordable

housing is apparent, but the lack of infrastructure that thwarts private investment in new housing also limits the ability of public and private agencies to effectively utilize existing programs to address the problem.

There is considerable infill development potential within Henderson where new housing could be developed, if adequate public facilities were available. Tax records indicate nearly 50 acres are classified as vacant or "underutilized."

Section II: Conclusion

Housing quality is an important issue in North County. Continuing deterioration of the housing stock in the growth centers creates a cycle of decreasing housing values and lack of reinvestment in existing dwelling units. This in turn, adversely impacts the overall quality of the communities and may even result in large scale property abandonment. Like so many of the issues in North County, addressing the housing problem is dependent on developing public water and sewer facilities to correct existing health problems.

Chapter 13: Implementation

The following sections outline recommended strategies for implementing the goals and objectives of the *Henderson Comprehensive Plan*. Achieving the primary goals of the County (concentrated growth and resource conservation) and the goals of the Town (revitalization and positive growth) are mutually dependent.

Coordinated planning and plan implementation between the County and Town will be necessary in order to achieve the vision of this Plan.

Section I: County Implementation Recommendations

Recommendations for Caroline County were developed from a detailed analysis of existing conditions and a series of public information meetings, as described in the individual sections of this Plan. These recommendations are designed to create consistency in the future application of Maryland laws and County and municipal policies and regulations.

Land Use and Growth Management

RECOMMENDATION #1: Amend the *Henderson Zoning Ordinance and Subdivision Regulations (as needed)* to incorporate appropriate zoning districts, zoning provisions, and development standards to implement the recommendations of the *Henderson Comprehensive Plan.*

Suggested overlay zoning districts include:

• Town Growth Area - Expansion Areas: Delineate a build-out area for town growth. Zoning provisions should provide for the continuation and consistent expansion of existing land uses, including residential, commercial, and industrial uses. Commercial uses include properly planned and designed mobile home parks.

Design standards should require that new development be consistent with the existing town fabric. For example, subdivision streets should provide for connection to the existing town street system in a logical and continuous manner. Development that detracts from the appearance of gateway corridors leading to the town centers, should not be permitted.

RECOMMENDATION #2: Revise the *Caroline County Official Zoning Map* to reflect the recommendations of the *Henderson Comprehensive Plan.*

RECOMMENDATION #3: Prepare development design guidelines to illustrate techniques to minimize the impact of new development on existing scenic and rural character. Guidelines should address landscaping and buffers, access control, signage, and development siting.

Section II: Specific Implementation Recommendations

The following recommendations refer to individual sections of this Comprehensive Plan and represent specific actions that may be taken by public and private entities to improve existing policies, programs, and regulations for land use conditions.

• Participate in the development of water quality improvement/protection programs and strategies to address point and non-point sources of pollution in Caroline County, including continued participation with Federal, State and regional organizations in the assessment of water quality issues and pollution management strategies; and

• Cooperate with the Maryland Water Resources Administration in programs to ensure the appropriate use and conservation of Caroline County's groundwater resources.

Cultural and Historic Preservation

• Partner with the Maryland Historical Trust (MHT) to develop a Henderson historic structures preservation plan. Address the feasibility of adopting historic preservation regulations that permit the establishment of "voluntary" historic preservation districts;

• Upon completion and approval of a historic preservation plan, apply for "Certified Local Government Program (CLG)" status from the Maryland Historical Trust; and

• Participate in the Maryland Heritage Areas and Tourism Development Program as a means of expanding the County's tourism economy, increasing private historic preservation investment, and stimulating the adaptive reuse of historic structures.

Economic Development

• Encourage the enhancement of the County's digital infrastructure to serve existing businesses and industries and attract new ones;

• Encourage the set aside of land in locations consistent with the Growth Area for new commercial and industrial uses; and

• Encourage the redevelopment of underutilized commercial and industrial sites in North County Towns.

Transportation

• Require appropriate pedestrian circulation systems in new development and require new pedestrian systems to connect to existing systems;

• Work with County staff in developing transportation design guidelines, standards, and specifications appropriate to town settings;

• Insure that the cost of making major road improvements, necessitated by new development, is borne by the developer.
This should be made clear in any annexation proposal or developer agreements. The design and location of new and improved roads should provide for the efficient circulation of people, goods, and services within the designated growth area and to the extent possible channel long distance trips to the State highway system;

• When existing County roads are proposed to serve as collector streets within a town system, they should be included in the annexation process and the developer should be responsible for upgrading the road to Town standards;

• Prepare design guidelines that include the following principles:

The street lay-out should be simple and have a logical pattern to insure legibility;
The street lay-out should respect natural features and topography;
The street lay-out should present an attractive streetscape;
Proposed new streets should provide for the appropriate extension of existing streets;
Every lot should be afforded a reasonable means of ingress and egress for emergency vehicles;
No direct driveway access should be provided onto an existing or planned major collector street from a residential lot;
Vehicles should be able to enter and exit without posing any substantial danger to themselves, pedestrians, or vehicles traveling on abutting streets, or interfere with the free and convenient flow of traffic on abutting or surrounding streets;
Residential streets should be designed to manage the speed and volume of traffic in residential neighborhoods using "traffic calming" methods that encourage speeds of 25 mph or less;

Streets should be related appropriately to the topography and designed to facilitate appropriate storm water management;
Street rights-of-way should be adequate to serve all functions to carry motor vehicle, bicycle and pedestrian traffic, allow on-street parking, and serve as a link in the town's drainage system.

Community Facilities

• Work with providers to insure that the location of new public facilities and services are located and/or designed to support the growth management programs of the County and its municipalities. Designate the incorporated towns and the North County Water and Sewer District as North County "Priority Funding Areas"(PFA's);

• Update the *Caroline County Master Water and Sewerage Plan* to reflect the North County Water and Sewer Service District and other potential scenarios for water and sewer services;

• Insure that County and State capital improvements and facilities programs are consistent with County and municipal growth management strategies. The Caroline County Planning Commission should review annual capital improvement programs of key State and County agencies, such as the Maryland Department of Transportation's Annual Capital Improvements

Program, and Caroline County Department of Parks and Recreation land acquisition and development programs;

• Maintain public ownership of the existing Chesapeake Railroad right-of-way for use as a potential utilities corridor (rails-to-trails link or railroad use);

• In cooperation with the County, define projected growth areas. Revise the zoning for designated growth areas to reflect a coordinated County/Town long-term annexation policy. Prohibit urban-type community facilities in rural areas;

• Work with the County to insure appropriate stormwater management;

• Review recommendations of the County's *Land Preservation and Recreation Master Plan* to insure they are consistent with County and municipal growth management programs and "Priority Funding Area" strategies;

• Locate parks and open space facilities in areas that support the County's growth management objectives. The growth management strategies in the *Henderson Comprehensive Plan* imply that major new park and recreation facilities should be located in or near the town. Planning for new County park and recreation facilities should involve Henderson and be coordinated with this growth plan; and

Housing

• Seek examples of municipal building codes, rental housing codes, and property maintenance codes for potential application in Henderson;

• Encourage town and private sector initiatives to address housing affordability;

• Utilize appropriate State and Federal housing programs to address housing affordability issues in North County; and

Consider using the existing railroad right-of-way corridor as a local pedestrian trail facility.

Endorse the following basic design principles to be reflected in the development of codes and regulations:

• Neighborhoods are compact and identifiable, and their boundaries are visually discernible;
• Neighborhoods are linear (cross-roads or grid patterned), with variations to enhance views and landmarks;
• Neighborhoods are visually coherent and character is established through consistent rules of organization and architecture;
• Street corridors are visually bounded and intimate in feeling. Street trees, sidewalks, and front yard design elements create visual layers and contribute to the intimacy of streetscape;
• Street blocks help describe component neighborhoods, suggesting the role of the street as a

channel for neighborly interaction;
• Neighborhoods accommodate a mix of uses, even at the "hamlet" scale;
• Parking is accommodated through a mix of on-street and unobtrusive off-street strategies. Large-scale parking lots are avoided, and older lots are redesigned into smaller landscaped segments; and
• Most important, neighborhoods and their setting convey a strong "sense of place." Appropriate design of new development projects, whether development is located in "growth areas" or occurs as infill or redevelopment projects within the Towns, is critical to insuring that new neighborhoods fit well with the existing community character. Each community should establish basic design principles that set forth the communities expectations for the qualities of new development.

Strip forms of development should be discouraged and new development should be responsible for the cost of any off-site improvements to Town streets and County roads necessitated by the proposed development. This includes the cost of upgrading County roads that may become part of the Town street system.

Conclusion

Henderson is the study area for this Plan. The updated *Caroline County Comprehensive Land Use Plan* should consist of several sub-regional comprehensive plans, including this one. Subregional plans will allow the County to address State laws, assess regional needs on a more detailed basis, and develop a plan based on broader public participation and support. Sub-regional area plans also will form the basis for the updated *Caroline County Master Water and Sewerage Plan.*

This Plan will guide the County's land use and growth management policies for the Henderson Growth Area and immediate environs. .

New development should be consistent with the expansion of the town fabric.

This plan, and any ensuing regulations developed in accordance with this plan, will serve as the primary land use and growth management document for the Town of Henderson.

APPENDIX : WATER & SEWERAGE SUMMARY

Section I: Background

The *5-Year Water and Sewerage Plan for Henderson* (MES Water and Sewer Plan) was prepared by Maryland Environmental Service (MES) and was adopted in December of2002 by the Commissioners of Caroline County and the North County Towns of Goldsboro, Henderson, Marydel, and Templeville. The MES Water and Sewer Plan was incorporated into the *Caroline County Master Water & Sewerage Plan* and its production will coincide with the adoption of the *Henderson Comprehensive Plan.*

The MES Water and Sewer Plan details the history of water and wastewater problems and initiatives in the North County region. It also defines a water and sewer service district and addresses costs for a regional water/wastewater system for the four towns of Goldsboro, Henderson, Marydel, and Templeville and outlying areas. Service will be offered to the Marydel side of Delaware (Kent County, DE) but will be rendered under contractual agreement.

Section II Water & Sewer Plan Summary

MES has designated areas in Caroline and Queen Anne's Counties as the water and sewer service district, in accordance with the Maryland Environmental Service Act, Annotated Code of Maryland Natural Resources Article, Section 3-101. As a State affiliated agency, MES was created by the Maryland General Assembly to provide dependable, effective, and efficient water supply and wastewater collection and treatment services to the public and private sectors.

In response to problems caused by failing septic systems in the communities of North County, the Commissioners of Caroline County initiated a region-wide study in 1998 to determine the County level of costs to address water and sewer issues. The study was conducted by the engineering firm of George, Miles, and Buhr, Inc. (GMB). The study recommended a regional water and wastewater system to replace failing septic systems in the area. In 2000, as a response to the recommendations of the GMB Study, the County Commissioners of Caroline County passed a resolution authorizing MES to prepare a 5-Year Water and Sewerage Plan for North County to establish a MES water and sewer service district.

The MES Water and Sewer Plan outlines an effective and economical means of providing water supply and wastewater collection and treatment service. It also outlines development and construction of facilities; acquisition or improvement of facilities; potential expansion; ownership and operation of the water supply and wastewater collection and treatment facilities. Implementation of the MES Water and Sewer Plan by the MES Board of Directors is expected when funding for the project materializes.

Upon adoption and funding, the service district will be established and construction of the water and wastewater facilities will commence. Facilities include water supply and storage and distribution systems for the Towns of Goldsboro, Marydel, and Templeville and outlying area.

The existing public water system for the Town of Henderson will be integrated into the service district. A gravity sewer system to collect domestic wastewater from the Towns and outlying area will be constructed, conveying effluent to a central treatment plant at Goldsboro.*

Section III: Cost Estimates for the North County Water & Sewer System

As shown in the Water Resources Element, the estimated total cost for the construction of the proposed facilities has increased by about $3 million dollars over the last six or seven years. The annual operation and maintenance cost was estimated to be about $186,515 and will also have increased commensurately. At present, potential debt service is anticipated to be covered by charges levied against the water and sewer customers.

The monthly estimated cost per customer per month in 2002 for water and sewer services in the North County Water and Sewer Service District is $28.11 or $84.33 per quarter and $337.32 annually. Due to the expansion of the water and sewer service area during the planning stage of the MES 5-Year Water and Sewer Plan, monthly costs per customer were reduced to a more affordable level than identified in the 1998 GMB Study.

Section IV: Conclusion

The people in North County rely on private wells for water and in-ground septic systems for wastewater disposal. Serious health and environmental problems associated with failing on-site septic systems and contamination of surface groundwater supplies have been documented in the region. The Town of Goldsboro has been cited as a failing septic system area since 1975. In August of 1996, the Maryland Department of the Environment (MDE) issued a "Consent Order" to the Town to resolve the problem of failing septic systems and resulting pollution. The Caroline County Health Department is concerned that improperly treated septic system effluent is contaminating groundwater in the area. Due to environmental constraints and a high water table, groundwater contamination is suspected. The Caroline County Health Department has reported concerns that individuals are withdrawing contaminated groundwater from wells that have less than the required 100 feet separation from septic systems.

Water and wastewater infrastructure are of tremendous importance for growth and growth management. The new 8th Vision, included in the 2000 Amendments to *Article 66B of the Annotated Code of Maryland, Land Use* (Planning & Zoning Enabling Act), states that adequate public facilities and infrastructure shall be available or planned in areas where growth is to occur. The adoption of the 8th Vision achieves consistency between the Planning & Zoning Enabling Act and the 1997 Smart Growth Areas Act, which funnels state funding to "Priority Funding Areas" (areas for major State capital improvement and investment).

Adequate public infrastructure is important to the healthy functioning of Caroline County. To address water and wastewater problems specific to North County, the MES Water and Sewer Plan was developed. The future water and sewer system is intended to correct all present deficiencies in the Service District, eliminating the use of septic systems and private wells. It will fill community needs for the next 20 to 40 years. The regional water/wastewater system also will begin to address pollution problems in the Queen Anne's County portion of the Town of

Templeville, by offering services, which will improve the overall health of the Upper Choptank River Watershed.

The present *Caroline County Master Water and Sewerage Plan* supports the formation of the MES Service District because it addresses long-term solutions for the region. Assisting in the formation of water and sewer for municipalities discourages County operation of such facilities. Caroline County has stated that it lacks adequate funding to operate and maintain water and wastewater systems.

**Recent work by the consulting firm Rummel, Klepper, and Kahl has raised the possibility of a grinder pump/low pressure system as being potentially more cost efficient. Various issues remain to be investigated including multiple treatment plants and combinations of spray irrigation and surface discharge (as ultimately determined by the North County Water and Sewer Authority). Irrespective of the final solution selected, the Town of Henderson is committed to pursuing a cooperative solution to its municipal sewerage disposal needs within the umbrella of its role in the North County Water and Sewer Authority. This Comprehensive Plan is expressly consistent with providing public water and sewer service to the service areas agreed to in the North County Sewer Allocation Agreement, which has been duly adopted by the Town of Henderson.*

APPENDIX : HOUSING & COMMUNITY DEVELOPMENT

Section I: Background

During the 2002 session of the Maryland General Assembly, Senators Richard Colburn and Walter Baker introduced Senate Bills 189, 190, and 191 to grant the Towns of Goldsboro, Henderson, and Marydel the authority for urban renewal and slum clearance. These bills prohibit the taking of any land or property without just compensation, declares that any land taken shall be for public use, imposes requirements for urban renewal, and allows the Towns to issue bonds for urban renewal under certain circumstances.

Section II: Housing Programs

As federal housing and other related programs have disappeared, cities and counties have sought to aid the would-be homeowner. Maryland mounted an ambitious housing program in 1986 in response to federal cutbacks. Most of the state housing programs are administered by the State of Maryland's Community Development Administration which offers a variety of housing programs that fall under the general categories of home ownership, rental housing, special loans and housing subsidy programs. The current programs are briefly described below:

Home Ownership Programs

Maryland Mortgage Program (MMP) - The purpose of the MMP is to enable low- and moderate-income households to purchase homes by providing below-market interest rate mortgage financing through private lending institutions. The MMP, which targets first-time home buyers, is available to individuals and households with incomes at or below 85 percent of the State median income.

Maryland Home Financing Program - Home Purchase (MHFP- PIRL) - The purpose of MHFP is to provide low-interest rate mortgages for lower-income households. The MHFP, which targets first-time home buyers, is available to individuals and households with incomes at or below 55 percent of the State median income.

Maryland Home Financing Program - Reverse Equity Mortgage Program (MHFP-REMP) –The purpose of the MHFP-REMP is to enable the elderly of limited income to access part of their accumulated equity in order to pay for housing and other personal expenses to continue to occupy the home. For eligible applicants and properties, the Community Development Administration (CDA) will establish a line of credit up to a program maximum of $50,000 from which funds may be requested on a monthly basis. No repayment of loans is required until the death of the last surviving borrower, after the borrower voluntarily moves out, or after the sale or transfer of the property.

Settlement Expenses Loan Program (SELP) - SELP provides financial assistance in the form of

low interest loans to pay settlement expenses.

Rental Housing Programs

Multi-Family Bond Program (MBP) - This program is designed to increase the construction and rehabilitation of multi-family rental housing for families with limited incomes. Tax exempt bonds and notes provide below-market rate construction and permanent financing to profit and nonprofit developers. A certain percentage of units in the project must be made available to low-income persons and households.

Rental Housing Production Program (RHPP) - The purpose of the RHPP is to increase the supply of rental housing for low-income families by providing below-market rate and deferred payment loans to developers. The program is designed to be used in conjunction with tax-exempt, private, local and federal loans.

Elderly Rental Housing Program (ERHP) - The purpose of the ERHP is to increase the supply of rental housing for low-income elderly households by providing below-market rate and deferred payment loans to developers. The program is designed to be used in conjunction with tax-exempt, private, local and federal loans.

Nonprofit Rehabilitation Program (NRP) - The purpose of the NRP is to provide low-interest mortgage loans to nonprofit organizations and local governments to rehabilitate housing for low-income households.

Partnership Rental Housing Program (PRHP) - The PRHP is intended to expand the supply of affordable housing for poor families through State and local government partnerships. Eligible projects include new construction and acquisition or rehabilitation of rental housing.

Maryland Housing Rehabilitation Program - Multi-Family (MHRP-MF) - The purpose of the Multi-Family Program is to provide loans to assist owners in bringing their multi-family units up to applicable building codes and standards.

Multi-Family Home and Energy Loan Program (HELP-MF) - The purpose of the HELP is to finance rehabilitation and energy conservation of existing Multi-Family properties using the proceeds of tax-exempt bonds.

Construction Loan Program (CLP) - The CLP provides low-interest, construction financing loans to nonprofit and local governments to acquire, rehabilitate, or construct certain types of housing and for bridge loans to profit motivated developers.

Transitional Housing and Emergency Shelter Program (THESP) - The THESP provides grants to improve or create transitional housing and emergency shelters for the purpose of reducing homelessness in the State.

Special Loan Programs

Maryland Housing Rehabilitation Program - Single Family (MHRP SF) - The purpose of the program is to preserve and improve existing small residential properties by bringing the properties up to applicable codes and standards. In 1990 this program was merged with the

Livability Code Rehabilitation Program.

Accessory, Shared and Sheltered Housing Program (ACCESS) - The purpose of ACCESS is to expand low cost housing opportunities for low-income households and low-income elderly, handicapped or disabled persons by financing the creation of accessory, shared, and sheltered housing facilities.

Indoor Plumbing Program (lPP) - The purpose of the IPP is to provide indoor plumbing in residential properties. Loans are made to income eligible households in owner-occupied single family units.

Residential Lead Paint Abatement Program (RELAP) - Loans are provided through the RELAP to reduce instances of lead poisoning of children by financing the abatement of lead paint in residential buildings.

Group Home Financing Program (GHFP) - The purpose of this loan program is to assist individuals and nonprofit organizations to construct or acquire and modify existing housing to serve as group homes or temporary and emergency shelter for income-eligible persons and households with special housing needs.

Special Housing Opportunities Program (SHOP) - The purpose of the Special Housing Opportunities Program (SHOP) is to assist non-profit organizations and local development agencies construct and acquire and modify existing housing to provide shelter and service individuals with special housing needs.

Special Targeted Area Rehabilitation Program (STAR) - The purpose of the STAR program is to preserve and improve single family properties. STAR was designed to bring properties up to applicable building codes and standards or a minimum housing quality standard.

Housing Subsidy Programs

Rental Allowance Program (RAP) - This program provides grants to local governments to provide flat rent subsidies to low-income families who are homeless or have emergency housing needs. The purpose of the program is to help these families to move from temporary housing to permanent housing and self sufficiency.

Section 8 Existing CertificateNoucher Program - A U.S. Department of Housing and Urban Development Program (HUD), Section 8 Existing is a rental assistance program which subsidizes the rent of low income families through the use of federal grants. This program is administered through the Maryland Community Development Administration and the Maryland

Rural Development Corporation by the Caroline County Department of Planning and Codes Administration.

Low Income Housing Tax Credit Program

The Federal Low-Income Housing Tax Credit, created by the Tax Reform Act of 1986 and extended by the Revenue Reconciliation Act of 1989, is designed to encourage private sector investment in the construction and rehabilitation of housing for low- and moderate-income families. The law gives states annual tax credit allocation based on population. CDA is the agency which allocates the state's tax credits on a competitive basis.

Infrastructure Program

The purpose of this program is to provide an efficient and economical means of access to capital markets in order to finance infrastructure projects to local governments. This program is administered through the Maryland CDA.

Maryland Department of Planning Comments

Overview

The Maryland Department of Planning (MDP) reviewed the draft Comprehensive Plan 2009 Update for the Town of Henderson dated June 2009. The draft Plan was submitted for 60-day review in accordance with Article 66B of the Code of Maryland Regulations and was received by MDP on July 3, 2009. The 60-day review period ended on September 1, 2009. The Town has scheduled a public hearing on the draft Plan for September 8, 2009 in accordance with §3.07(b)(1) of Article 66B.

MDP also reviewed the draft Plan for adequacy of the Water Resources Element (WRE) and Municipal Growth Element (MGE) in accordance with the requirements of House Bill (BB) 1141. The following are review comments from the Maryland Department of Planning.

General Comments on the Draft Comprehensive Plan

- The Department appreciates the thorough mapping of the Town's Land Use, Potential Infill and Potential Development Constraints. It would be helpful if these analyses were summarized in a tabular format within the Municipal Growth Element section by population and housing units. *The Town is very familiar with the situation and all Town officials know what their allocation number is. No table is necessary. The "analysis" is provided as a summary and explanation of how the allocations were determined. Now that they are officially adopted by all jurisdictions, they create a "given."*

- Discussion in Chapters 1 and 2 (pages 3-12) includes pertinent information primarily focused on the County. However, the discussion presupposes that the reader is familiar with the County's previous planning activities. Incorporating additional information about the North Caroline County Comprehensive Plan, particularly as related to the Town of Henderson, would be helpful for the reader. *Henderson officials are intimately familiar with the history and ongoing effort to bring sewer service to the Town. This is the Town's Comprehensive Plan, which was prepared for the purpose of eventually qualifying for State assistance with regard to securing public sewer service.*

- The draft Plan includes discussion of four possible growth scenarios (pages 30-39). While MDP recognizes that any of these scenarios could become reality, please indicate which one is the Town's preferred growth scenario. *The preferred growth scenario is the one that results in construction of a wastewater treatment plant and the subsequent provision of service to Henderson. The amount of growth that can be accommodated is limited to the capacity allocations that have already been set aside by agreement. The preferred growth scenario would result in new growth ultimately utilizing those allocations and adding additional users to the system to help fund the improvements.*

- The Town of Henderson has new or additional water and sewer service areas that were recently created through amendment to the North Caroline County Comprehensive Plan mainly to address public health concerns due to failing septic systems. The boundaries of these service areas incorporate the Town's municipal areas and surrounding County lands. The service areas outside of the Town limits coordinate with the Town's future growth areas, however the county lands that these new service areas include are not State certified Priority Funding Areas (PF A) but do include existing community sewerage systems and known areas of failing septic systems. There is

additional County land that is vacant and not certified PFA. These areas are not eligible for water or sewer service from State funded infrastructure projects that increased capacities as of January 1, 1997. This funding restriction should be made clear in the Town's final Plan as reimbursement issues may affect local budgets. It has been discussed with the County that the County land inside of the service area limits will be designated as "receiving areas" within the County's TDR program. *These issues have been discussed on a monthly basis for the last five years by participating members in the North County Water and Sewer Authority. Henderson and Caroline County are participating members.*

- A locator map early in the document indicating the location of the Town of Henderson within Caroline County would enhance the document for readers. In addition, please include a map of the boundary of the 1st Election District which is discussed frequently in the text. *Henderson fails to see the need for these maps since 1) officials and residents already know where Henderson is located and that they are within the 1st Election District. Article 66B contains no requirements for maps of this nature.*

- The maps on pages 32-35 are small and therefore unclear to the reader. Please consider enlarging these maps in the final Plan. *Thank you for your interest. Earlier drafts included larger maps. The Town determined that they could be reduced to save space, particularly since the information was already well reviewed and because the maps were only included to document the prior analysis (which is incorporated by reference) and led directly to the creation of sewer service allocations…which now control all future planning and growth management discussions.*

- Inconsistent formatting throughout the draft Plan is distracting and interferes with the reader's ability to fully absorb the information presented. *Thank you. These issues have been addressed.*

- MDP would suggest inclusion of a glossary of all relevant terms at the beginning of the document instead of within the Municipal Growth Element chapter alone. *noted.*

- The information regarding public land drainage ditches is very informative and well-presented. *Thank you.*

- The information regarding Historic and Cultural Preservation is very informative and well-presented. *Thank you.*

Specific Comments on the Draft Comprehensive Plan

The following specific comments have all been addressed.

- Page 2, ~1: Vision should be pluralized in line 7.

  ~ 3: Not all non-tidal wetlands are under the jurisdiction of the federal government, although many are. In addition, the 25 foot setback is required by the State in accordance with the Maryland Nontidal Wetlands Protection Act.

- Page 3, ~3: The term Priority Funding Area was introduced earlier in this section and the explanation of the acronym "PF A" is duplicative.

- Page 4, ~1: Please clarify if the 2003 Comprehensive Plan discussed was prepared by the Town or County.

- Page 5, bullet 2: Please clarify whether "this Comprehensive Plan" refers to the Town or County's Comprehensive Plan.

  ~3: Please insert the acronym (APFO) following the first mention of an Adequate Public Facilities Ordinance.

  Page 6: MDP suggests that the values described in the last sentence of the first paragraph benefit both community and economic development.

- Page 7: Please revise the section title to indicate that the discussion refers to County Demographics.

- Page 8, ~5: Please clarify if Mount Zion is located within the Town limits.

- Page 13, bullets 5-6: Please add a space between the two bullets.

- Page 17, ~2: The acronym PF A appears earlier in the document and does not need to be explained again.

  ~3: Please capitalize Election District.

- Page 19, ~1: The acronym PF A appears earlier in the document and does not need to be explained again.

- Page 22, ~3: Please consider revising the "Neighborhood Business District" discussion as it does not appear to exist in Henderson.

  Bullets 2-3: Please add a space between the two bullets.

- Page 23, ~1: Please pluralize "include" in line 1.

- Page 30, ~2: Please capitalize Election District in the last line.

- Page 38, bullet 3: It appears that a bullet is missing from the Discussion section.

- Page 49, ~2: Please insert a period at the end of the sentence, and clarify whether there was additional information that is associated with the Town's water supply that should be included in this paragraph.

  Page 49, ~1: Please provide an explanation for the acronym "OSDS".

- Pages 50-52: There are a number of formatting discrepancies on these pages.

  Page 57, Table 8: Please revise to indicate that the total EDUs for Henderson is 243.

Page 58: any discussion of stormwater should also include the new 2007 Maryland Stormwater Update and a timeline for updating existing ordinances. Page 59, ~5: There is a subscript annotation in line 3 after "agricultural purposes" but no related footnote or endnote information.

Page 60, ~2: The reader might benefit from a timeframe associated with the Great Depression.

- Page 62, ~4: The acronym MDA appears earlier in the document and does not need to be explained again.
- Page 63, ~1; Please clarify what MD stands for in line 3.
- Page 69, ~4: The acronym BMP appears earlier in the document and does not need to be explained again.
- Page 74, bullet 3: Bullet 3 appears to be missing. In addition, please capitalize EDUs in lines 4 and 5.
- Page 81, ~4: The acronym PDA appears earlier in the document and does not need to be explained again.
- Page 82, ~7: Please capitalize Election District in line 4.
- Page 83, ~6: Please clarify that text is bolded for emphasis.
- Page 92, ~2: The acronym SHA appears earlier in the document and does not need to be explained again.
- Page 93, ~1: Please revise to read "Henderson Comprehensive Plan" in line 3. Also, please clarify if italicization is for emphasis in line 3 and bullet 3.

  Bullet 2 is missing.
- Page 95, ~5: Please clarify if italicization is for emphasis in lines 1-3.

  ~7: Please clarify if italicization is for emphasis in lines 4-5.
- Page 97, ~3: The acronym MDE appears earlier in the document and does not need to be explained again.

  ~5: The acronym MES appears earlier in the document and does not need to be explained again.
- Page 98, ~4: The acronym PF A appears earlier in the document and does not need to be explained again.

Comments on the Municipal Growth Element

MDP has reviewed the Town's Municipal Growth Element and determined that, although some of the requirements of HB 1141 have been sufficiently addressed, the draft Plan in its current state does not meet all of the requirements of this legislation. The following comments identify revisions that

should be considered for the final Plan in order to comply with this legislation.

- Please include a 2030 population projection for the proposed growth areas. *The growth areas are so small and the uncertainty surrounding timing of construction of a regional sewer plant is such that a population projection separate from one for the Town as a whole is meaningless.*

- Please reorganize the capacity-related data to better illustrate the linkages between land supply and demand. *This is unclear, particularly in light of the already stated realities.*

- Please clarify the source of the data used to determine infill capacity for the Town and its Annexation Areas. *Addressed: Peter Johnson & Associates (consultant on the MES needs analysis)*

- Please include a detailed discussion on how infrastructure upgrades will or may be funded. *This is premature and unknown at this time. If the MDP would like to provide realistic suggestions and assistance in securing funding, please notify the Town, and appropriate input will be added to the Plan.*

- Please discuss the Town's approach to preserving the integrity of the greenbelt as a growth management tool and also describe any future expansion of the greenbelt that could be possible. *Caroline County is responsible for land management beyond municipal limits. The town will continue to coordinate and cooperate with County efforts to provide land planning services to the residents of Northern Caroline County.*

The Henderson Area Planned Growth Areas map (page 40) indicates that Caroline County's Planned Growth Area is approximately 2-3 times the size of the Town's. This appears to contradict the Town's vision of "directing growth to existing population centers and conserv[ing] resource lands ... " Please describe how the Town will work with the County to ensure development is concentrated in appropriate areas. *See above response. Growth will be limited to public sewer allocations within planned service areas.*

Comments on the Development Capacity Analysis & Population Projections

- The Maryland Department of Planning appreciates the inclusion of population projections and a capacity analysis identifying the build-out potential in the Town.

- The analysis in the draft Plan uses a set of MDP projections for population and housing units "(average of all naive methods)," which is slightly higher than MDPs recommended set, but certainly within reason.

- Please review and clarify the figures used to derive the Town's infill capacity. The Town's 2030 population is estimated at 182, a 1.45% annual average growth rate. However, the Town's infill potential is not clear. The draft Plan lacks an estimate of the population and number of housing units that could reside within the existing Town limits. *This comment is incorrect. The information is provided in tables 6, 7, and 8. Infill potential is limited to designated allocations. Without sewer there will be no growth due to poor soils and failing septic systems.*

- Please also clarify the figures used to arrive at the Annexation Areas infill capacity. *The analysis was prepared by site specific evaluation of soils, existing development, parcel shapes and locations by Peter Johnson & Associates in discussion with Town officials. The results have been vetted.*

- It is unclear if a capacity analysis was conducted for the two proposed annexation areas. By using the housing units per acre and persons per housing unit figures, the Primary Priority Annexation Area could consist of 11.4 acres or 64 people. The Secondary Priority Annexation Area could consist of 14.7 acres or 82 people. Please clarify if the 2.8 persons per housing unit size projection used in the draft Plan is based on 2000 Census Data or a 2030 projection. MDP recommends that a 2030 population projection also be included as the number of persons per housing unit will change by the horizon year. *Household size is based on 2000 Census Data. The Town has no other reliable source for household size. Guessing what Henderson's household size will be in 2030 is dependent upon a number of variables that the Town presently has no control over. Accordingly, the town feels such an exercise to be essentially meaningless at this time. Again, the controlling factor is the already allocated sewer capacities (in an as yet unconstructed plant).*

- The Town should provide information on more detailed finance mechanisms to pay for these upgrades. If it is the Town's intent that developer(s) absorb infrastructure expenses associated with major development, what portion of the costs should developer(s) absorb? *100% of anything that is not grant funded.* Should the developer(s) donate land for a school site, pay for the update of a treatment plant, or increase capacity for pubic water? *Yes* Under what conditions should the developers provide such assistance? *All*

Comments on the Water Resources Element

- The draft WRE as submitted is incomplete; however by making the following additions or addressing the following comments, the WRE will conform to the requirements of HB 1141. Those comments in bold are most important to address. The WRE does not yet effectively address the following purposes of the law and/or State guidance, as follows: *Henderson is receptive to receiving specific MDE assistance.*

- Identify suitable receiving waters and land areas to meet the stormwater management and wastewater treatment and disposal needs of existing and future development proposed in the land use element of the plan, considering available data provided by MDE (Section 1.03(iii), Article 66B). *The discussion mentions that one of the alternatives under study is a partial discharge utilizing existing permit to the Choptank River. No selection has yet been made by the NCWSA. The extensive section on Public Drainage Associations adequately addresses all stormwater management issues that affect Henderson.*

- The WRE should, for each watershed, calculate the total forecasted nutrient load, which includes nutrient loads from current and future WWTP discharge, septic tanks, and stormwater runoff (MDP M&G 26, p. 13). *This issue will be revisited when final decisions are made regarding the size and location of the proposed wwtp. If no plant is constructed no change will result. Septic tank loading estimates have been provided. Stormwater runoff will be revisited and addressed as information becomes available.*

- The land use element should be influenced by the adequacy assessments for drinking water, wastewater, and nonpoint source pollution (MDP M&G 26, p. 17). *Nonpoint pollution is addressed through the recommendations contained in the PDA discussion. Drinking water is shown to be adequate at present and will require expansion if growth occurs (as is stated in the Plan). Wastewater is not satisfactory due to extensive failing septic systems. State grant assistance will be required to address that concern. The land use element recognizes these limitations as well as efforts spanning the last eight years to bring public sewers to Henderson.*

- Does the WRE estimate the future demand for water by reviewing population projections (MDP M&G 26, p. 27). *This issue has been addressed. Henderson has sufficient capacity to support approximately 140 residents using its current withdrawal permit. It is not know at this time whether that permit can be amended or whether an additional well would need to be drilled. That issue will only be addressed if progress is made on building a wastewater treatment plant and bringing the service to Henderson.*

- Does the WRE identify planning strategies to protect current and future water sources from pollution (MDP M&G 26, p. 27). *That issue is beyond the capacity of the Town to address. Henderson will cooperate with County and MDE efforts to address that topic.*

Overall Comments

- The population projections for 2010, 2020, and 2030 (page 10) should be used to calculate potential water and sewer demand in the near-term (versus at build-out alone) to identify when water resource constraints would likely be encountered. *This has been added to the draft. Water capacity will need to be expanded when and if the population grows to about 140 persons.*

- The demand analysis found in Tables 5, 6, and 7 (pages 36 and 45) and related discussion (pages 30, 31, 36-39) belong in the WRE or should be referenced in the WRE. The figures in tables 5 and 6 should be used to calculate potential demand for water and wastewater. *This has been accomplished.*

- Many of the water resource element requirements are located in separate sections of the plan. This information should be included in the WRE or the WRE should specifically state where the necessary information is located in the Plan. *This statement is too broad to be implemented. More specificity is required.*

Comments on the Water Demand Analysis

- Please identify and discuss if there are any private wells in the Town and any plans to serve those properties served by private wells. *None. Mentioned in draft.*

Comments on the Proposed Methods for Protecting Source Water

- There is a detailed account of the aquifer system. It is stated that the town draws from the Piney Point aquifer. Needed is a discussion of how the town plans to protect this source water or why it cannot. *Accomplished.*

- The Maryland Stormwater Design Manual, described on page 58, was revised in 2009 and also includes a chapter on environmental site design which may provide additional guidance for protection of source waters. *This comment should be directed to Caroline County (which administers the stormwater management programs in Caroline County).*

Comments on the Sewer Demand Analysis

- The final Plan should note that the Caroline County Water and Sewer Plan has not been amended appropriately to date. The County is preparing the needed service area timing categories and service policies for amendment to the County's WSP to address the limits and restrictions within the service areas *accomplished.*

- The final Plan should identify the number of septic systems in the Town and discuss any plans to connect failing septic systems to a wastewater treatment plant. *Plan states the number of existing houses (and the fact that they are on individual septic service and that they are failing).*

- If connecting all of the town's septic systems to a WWTP is planned for the future, a date for this connection needs to be stated, potential flows need to be calculated based on current and future EDUs, and loads calculated by the additional EDUs and effluent concentrations should listed. *No date is possible (as has been explained in the Plan) loadings have been calculated based on removing existing septics. RKK has estimated plant loads (in the Plan).*

Comments on Identifying Suitable Receiving Waters

- The Cedar Mobile Home WWTP load needs to be added as a point source load to the nonpoint source load to estimate total loads (current and future). If there are additional point sources within the town they need to be identified and added to this calculation. *This is addressed in the County Plan because CMH park is located in the County.*

- Include any TMDLs for the Tidy Island Branch, and associated maps. *None have been identified that Henderson is aware of. If the State is aware of any TMDL's for Northern Caroline County, Henderson would be grateful to receive that information.*

- Include designated Tier II water bodies with boundaries that include the existing and future boundaries of Henderson. *There are none in or near Henderson. Accordingly, they have not been mapped. Perhaps MDP has data that can be shared with Henderson.*

- Decreasing or remaining under point source or nonpoint source caps through strategies like connecting failing septic systems and spray irrigation should be discussed. These two issues are raised in the context of reducing pollution loads but not for staying within pollution load limits (e.g. TMDLs). *No known TMDL's have yet been established.*

- **Add a pollution forecast for future point source and nonpoint source pollution based on the land use plan scenarios. The choice of land use plan should be influenced by the forecast-the least impactful and use plan should be chosen.** *This suggests that the growth option resulting in the least amount of growth should be selected. That appears counter*

intuitive, particularly when the problem is to find users and fund sources to construct a wwtp in the first place. **Discuss the suitability of receiving waters in the context of the pollution forecast and any TMDLs. If there isn't sufficient information to discuss suitability, note that this is the case.** *That has been noted in the Plan.*

- Clarification is needed for the estimated current non-point source loads calculated on page 76. The source for the land use data should be cited. *GIS calculation based on Maryland Property View and Caroline County data sets*

Comments on the Transportation Element

- MDP strongly supports the Town to make proper access controls and positive visual qualities of new developments along highway corridors which will allow the Town to reduce the need for the expansion of roadway capacity.

- MDP recommends the Town develop a pedestrian and bicycle system including sidewalks and bicycle lanes or trails throughout the existing Town and for the planning area. *Henderson questions whether the reviewer has ever physically visited the Town. Pedestrians share existing paved surfaces with vehicles, motorized and otherwise.*

- MDP recommended that the existing and proposed streets, sidewalks and bike-lanes be linked to various residential communities, and commercial, community, and recreational centers. *The Plan documents that there are no "residential communities, and commercial, community, and recreational centers" that can be "linked." The entire town is one very small "community."*