



COMPREHENSIVE
Plan

City of
CRISFIELD, MARYLAND



2007

WITH 2010 AMENDMENTS

JAKUBIAK & ASSOCIATES
INCORPORATED

Town Planning





Planning Commission Approved

Comprehensive Plan

City of Crisfield, Maryland

Themes of the Comprehensive Plan

Redevelopment and Ecological Restoration

Redevelopment Consistent With Community Character

Development in Balance with Community Facilities and Services

Planning in Concert with Regional Priorities

The People of Crisfield: Reinvigorating Neighborhoods

Crisfield Planning and Zoning Commission

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Bobby Goldsborough, Member
Sam Ward, Member
Becky Daugherty, Member
Tracy Wigglesworth, Member
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SECTION 1 – INTRODUCTION

1.1 PURPOSE OF THE COMPREHENSIVE PLAN

A comprehensive plan sets forth policies governing growth, development, and conservation. It is long-range, general, and comprehensive.

Long range:	The plan is forward-looking. It provides for future needs.
General:	The plan does not focus on matters of detail which can distract from important policies and proposals.
Comprehensive:	The plan uncovers relationships between local and regional factors that impact development. It addresses major elements of the natural and built environment.

A comprehensive plan expresses basic community goals regarding future development. It does not predict future events nor list activities or projects. As a guide, a comprehensive plan allows a community to make day-to-day development decisions on the basis of reasoned and adopted policies, rather than on the individual merits of particular proposals.

1.2 PLANNING PROCESS

The City Planning and Zoning Commission prepared this Comprehensive Plan as called for by Article 66B of the Annotated Code of Maryland. Public participation was accomplished through a series of city meetings held through open work sessions sponsored by the Planning and Zoning Commission during 2005. The Planning and Zoning Commission documented residents' concerns and issues through the minutes of its meetings.

1.3 LOCATION

The location of Crisfield may be defined at a several levels (see the Crisfield Location Map).

- The Delmarva Peninsula: Agricultural and fishing activities dominated the region's economy in the past. The low population density is changing somewhat as new residents buy second homes, retire to the area, or establish primary residences to commute to the region's job centers.
- Somerset County: Led by an in-migration of retirees and second-home buyers, the County has shown steady population growth in recent years.
- Proximity to the Chesapeake Bay: Crisfield is one of only a handful of Maryland municipalities located on the Chesapeake Bay or one of its major tributaries.

1.4 REPORT ORGANIZATION

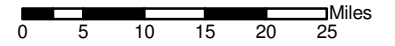
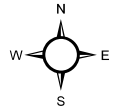
This Comprehensive Plan is organized into four main sections. Each section is a vital part of the overall Comprehensive Plan. Section 2 presents important background information on recent development activity, the City's population, and the various interrelated physical elements of Crisfield: sensitive natural areas, land use, transportation, and community facilities. It provides the baseline for a shared understanding of the opportunities and constraints facing the City as it looks to the future. Section 3 provides a projection of future growth through 2020. Section 4 presents the principles, objectives and recommended policies and actions of the Comprehensive Plan. It is organized under five major themes:

- Redevelopment and Ecological Restoration
- Redevelopment Consistent With Community Character
- Development in Balance with Community Facilities and Services
- Planning in Concert with Regional Priorities
- The People of Crisfield: Reinvigorating Neighborhoods



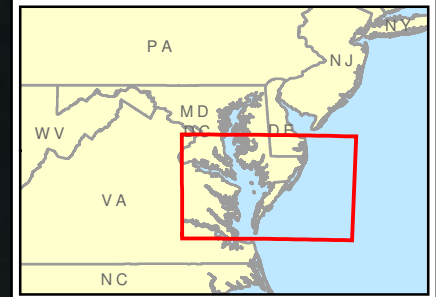
Natural Area Location Map

Date: February 27, 2007
Projection: NAD 1983 StatePlane
Maryland FIPS 1900 (Meters)



Jakubiak & Associates, Inc.
Town Planning

Map Prepared By:



SECTION 2 - EXISTING CONDITIONS

The Planning and Zoning Commission reviewed and concurred on existing conditions to understand existing community character, create a baseline for anticipating how change will impact our resources, and to inform choices about the future. An overview is provided below.

2.1 ONGOING PLANS AND PROJECTS

The City is taking steps to improve the water quality of the outflow from the wastewater treatment plant. The private sector is meeting demand in the housing and tourism real estate markets; site plans totaling about 540 dwelling units have been approved in recent years.

2.2 DEMOGRAPHICS AND ECONOMICS

The population level has declined over the past few decades. Slightly less than half of dwelling units are owner-occupied and about 60 percent are families. Children and seniors make up over one-third of the population. Local businesses are generally small and are concentrated in the retail trade, automotive, and hospitality business sectors.

2.3 NATURAL ENVIRONMENT

The Chesapeake Bay, the Little Annemessex River, and associated tidal marshes are major natural features. With the exception of several relatively high points of elevation, the City lies within the 100-year floodplain. Flooding is a regular occurrence. The remaining marshlands and low-lying areas are vital buffers helping to dissipate the energy of storm surge and store floodwaters. Much of the marina and downtown maritime areas are built on fill. Chesapeake Bay Critical Area regulations cover a significant area of the City.

2.4 LAND USE

Land use in the City consists of commercial districts along MD Route 413 and the central business district along Main Street, residential neighborhoods, and water-dependent and water related uses in the marina and downtown maritime areas. Much of the shoreline has been devoted to commercial and industrial uses directly related to or in support of the fishing industry; including the Little Boat Harbor. This is beginning to change as multi-family condominium buildings are replacing traditional maritime activities.

2.5 TRANSPORTATION AND CIRCULATION

MD Route 413 is the primary access route for the City. Sidewalks capitalize on the traditional street network, which is generally conducive to walking. The existence of a street grid in much of the City allows for a dispersed traffic pattern throughout residential neighborhoods. Much of the City's collector street system is prone to flooding.

2.6 COMMUNITY FACILITIES

With the exception of parkland, the main public facilities are adequately sized for Crisfield's current situation. A growth in population, however, would necessitate an expansion of capacity of public sewer service. Significant rehabilitation of old sanitary sewer infrastructure is needed. Local schools and a branch of the County library system provide educational resources.

2.1 ONGOING PLANS AND PROJECTS

Ongoing public and private projects and plans help define baseline conditions. They also say much about public and private sector expectations about future growth and development.

The list below summarizes major public works projects. Some have firm funding commitments. Others, especially long-range highway projects, are less certain. Listing of a project does not denote a recommendation, only that the project is in some stage of planning and/or implementation.

Most public works projects require cooperation among various levels and agencies of government and to some extent, the private sector. This being said, the City's continued leadership will be necessary for implementation. Where it is clear that projects are solely the responsibility of the State of Maryland, it is so designated below. Among private development projects, only those major projects that have received at least preliminary concept approval from the City Planning and Zoning Commission are listed.

Public Works Projects

Short-Term: 1-3 years

- Bio Nutrient Removal and Enhance Nutrient Removal upgrades at the City's wastewater treatment plant
- West Main, Fourth and Pine Street sewer main rehabilitation and upgrade project

Intermediate-Term 3-10 years

- Additional holding capacity at the existing City wastewater treatment plant
- Conduct street beautification program
- Establish a waterfront recreation park
- Partner with County to replace passenger terminal, build taxiways and new hangers, and lengthen runway at the Crisfield-Somerset County Airport with grants and other agencies

Long-Term: 10-20 years and Beyond

- Widen the entire length of MD 413 to four lanes (State)
- Construct a wastewater treatment plant with a larger capacity on a new site

Major Private Development Projects

Under Construction in 2005-2006

Captains Quarters: four-story multi-family: 16 units

Waters Edge: townhouses: 68 units

Captains Galley: six-story multi-family: 23 units

Harbour Lights: two five story and two six-story buildings: 127 units

Tangier Sound Condominiums at 1089 Somers Road (Jersey Island): eleven four-story buildings: 234 units

Locust Street Development¹: 6 units

Ball Park Subdivision (in City Limits): 11 units

¹ The developer of this project is Homes of America.

Conclusions

Currently, Crisfield is focusing on:

- Accommodating the public service needs of projects that have been recently approved and are expected to be approved
- Improving the waste water treatment plant
- Exploring methods of expanding public amenities without significant taxpayer expenditures

Crisfield is currently engaged in an era of expansion and change. Land use decisions made at this time will chart the direction of the City for years to come and impact the quality of life of all residents.

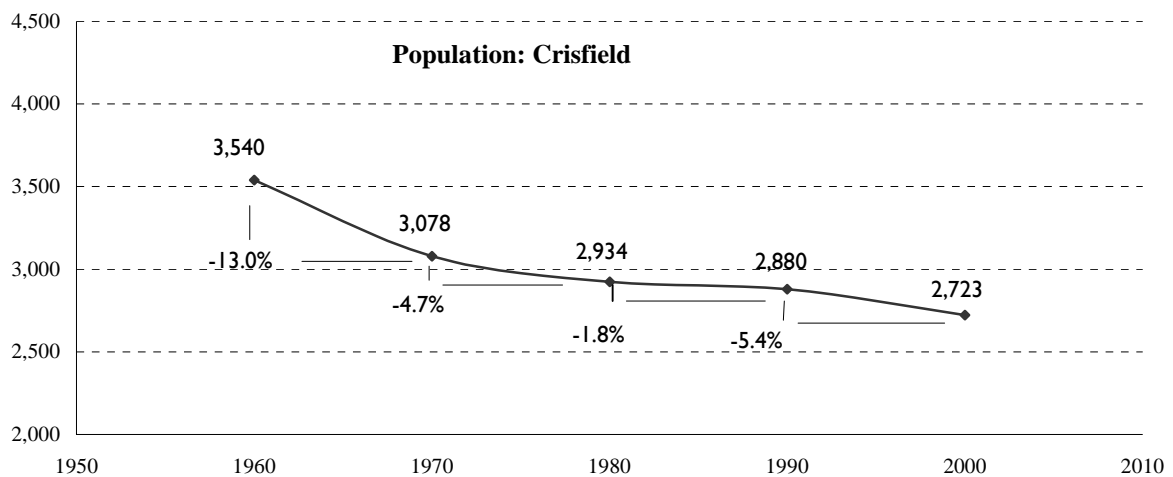
2.2 DEMOGRAPHICS AND ECONOMICS

This overview compares the City's population and housing to Somerset County, and where relevant, to the surrounding lower Eastern Shore area. In so doing, it provides a point of reference so local statistics are seen in a meaningful and broader context.

Population²

Between 1960 and 2000, the City population decreased by 817 residents, or by 23 percent from 3,540 to 2,723, as shown in the graph below. Factors contributing to population decrease in Crisfield since 1960 have included:

- The decline of the Chesapeake Bay fishing industry
- Decline in other industrial and manufacturing employment
- A decrease in the average household size.



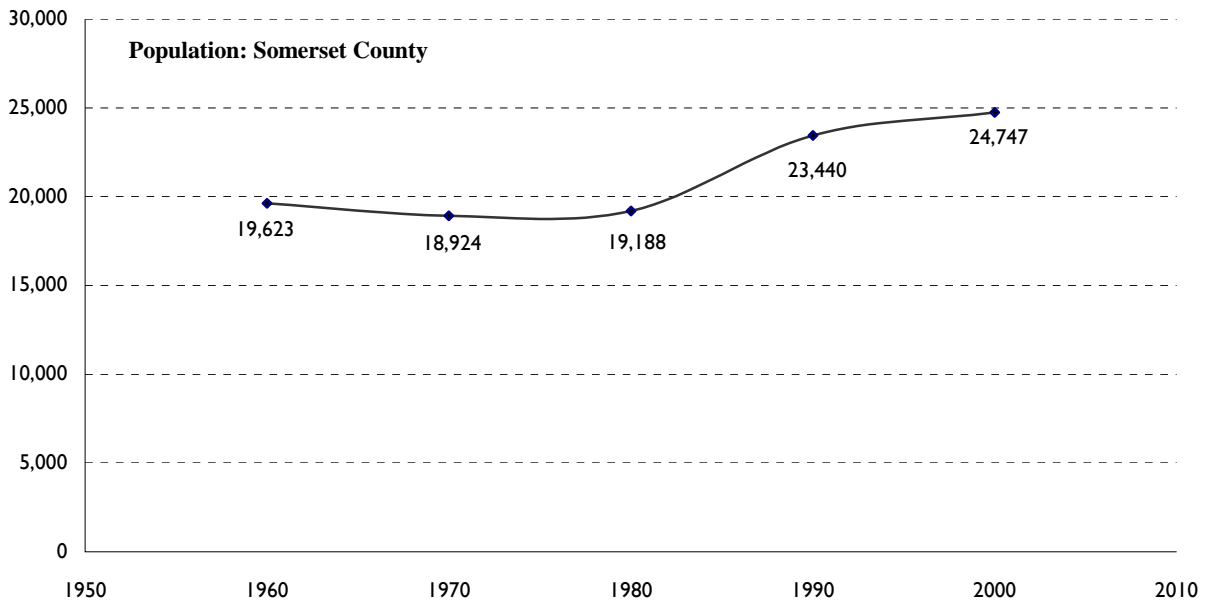
The population has declined each decade since 1960, with the greatest rate of decrease from 1960 to 1970. Overall, the decrease has been less than 1 percent per year over the last 40 years. The population of Somerset County also decreased during the 1960's, but has since grown at a modest rate as shown below.

² The source of population, age, and housing data in this report is the U.S. Census with analysis, summary, and presentation by Jakubiak & Associates, Inc.

The City's population has comprised between 11 and 18 percent of Somerset County's population over the last four decades.

Population Growth by Decade: Crisfield and Somerset County

	1960-1970	1970-1980	1980-1990	1990-2000	1960-2000
Crisfield					
Percent Change	-13.0	-4.7	-1.8	-5.4	-23.1
Percent Rate of Growth	-1.39	-0.51	-0.15	-0.56	-0.65
Somerset County					
Percent Change	-3.6	1.4	22.2	5.6	26.1
Percent Rate of Growth	-0.36	0.14	2.02	0.54	0.58



Age

The composition of population by age is an important indication of community character. In 2000, the median age of City residents nearly equaled that of the County's median age: 36.5 years. As shown below, the City has a greater percentage of children and residents over 65 years of age. Children and senior citizens comprised about 39 percent of the City population in 2000; compared to nearly 27 percent countywide.

Population by Age Group: 2000

Years of Age	Crisfield	Somerset County
Under 18	27.8%	18.5%
Over 65	11.3%	8.1%

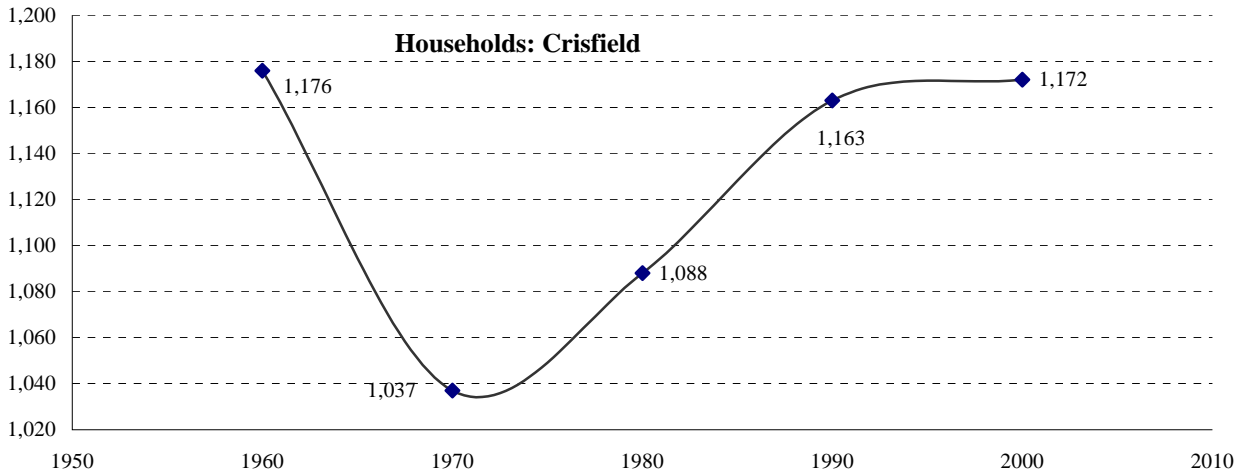
The table below compares the age structure in 2000 with that of 1990. As shown both in absolute numbers and as a percent of the total, the population under 10 years has grown. The number of children under 10 years of age increased nearly 16 percent between 1990 and 2000.

Population By Age Cohorts: 2000 and 1990

Age	2000		1990	
	#	%	#	%
Under 5 years	222	8.2	197	6.8
5 to 9 years	236	8.7	198	6.9
10 to 14 years	175	6.4	194	6.7
15 to 19 years	189	6.9	218	7.6
20 to 24 years	163	6.0	161	5.6
25 to 34 years	323	11.9	414	14.4
35 to 44 years	343	12.6	321	11.1
45 to 54 years	308	11.3	258	9.0
55 to 59 years	149	5.5	129	4.5
60 to 64 years	121	4.4	159	5.5
65 to 74 years	248	9.1	330	11.5
75 to 84 years	193	7.1	222	7.7
85 years and over	53	1.9	79	2.7
	2,723	100.0	2,880	100.0

Households

The data presented in this section concern households, or occupied housing units. After declining in the 1960's, the number of households has steadily grown. The 2000 Census showed that the number of households had essentially reached the 1960 level.



The most significant household growth occurred during the 1980's when households were added at an average annual rate of .67 percent per year, increasing over that decade by nearly 7 percent. The table below compares average annual percentage changes in each decade with the 40-year annual average (-0.01 percent). While long-term growth in households has been stagnant in the City, the number of households in the County grew by 44 percent between 1960 and 2000.

Household Growth by Decade: Crisfield and Somerset County

	1960-1970	1970-1980	1980-1990	1990-2000	1960-2000
Crisfield					
Percent Change	-11.8	4.9	6.9	0.8	-0.3
Percent Rate of Growth	-1.25	0.48	0.67	0.08	-0.01
Somerset County					
Percent Change	2.6	13.6	18.2	4.8	44.3
Percent Rate of Growth	0.26	1.28	1.68	0.47	0.92

The slight decline in the number of households in the past four decades corresponded with a greater decrease in the number of City residents. Between 1960 and 2000, average household size in Crisfield fell from 3.0 to 2.3 persons per household.

Like population and age, the make up of households is an important indication of community character³. As shown below, 723 households, or about 62 percent of all households, were family-households in 2000—that is, they were composed of persons related to the householder by birth, marriage, or adoption. Children were found to be part of 412 households or 35 percent of all households. About 62 percent of the households with children were single-parent households.

³ Thirty-three Crisfield residents lived in group quarters in 2000, including 16 who lived in a nursing home situation.

Households in Crisfield: 2000

Households	Children in Household		Sum	% of Total Households
	Yes	No		
Family Households				
Married Couple Families	154	232	386	32.9
Male Householder, no wife	23	16	39	3.3
Female Householder, no husband	231	67	298	25.4
subtotal	408	315	723	61.7
Non-Family Households	4	445	449	38.3
Total households	412	760	1,172	100.0

Other relevant findings regarding households include:

- About 49 percent of households had one or more persons 65 years of age or older;
- About 36 percent of households were one-person households; and
- About 46 percent of households were owner-occupied and 54 percent renter-occupied.

Economic Structure⁴

A basic analysis of the economic structure can help illuminate land development patterns, such as the composition and character of the commercial land use base. The zip code area encompassing Crisfield (21817) contains 134 private business establishments or 34 percent of the total establishments countywide.

Crisfield's economic structure is similar to the County's. Relative to the County, zip code 21817 does have modestly noticeable concentrations of establishments in the Retail Trade, Accommodation and Food Services⁵, Other Services (except public administration)⁶, and the Wholesale Trade⁷ sectors. And a noticeably smaller grouping of establishments in two industry sectors: the Construction and Professional, scientific and technical services sectors. Percentage of business establishments by size is shown in the table below. Overall, Crisfield's business pattern is dominated by very small businesses, much like the countywide pattern. In fact, 60 percent of all establishments in Crisfield have fewer than five employees.

⁴ The sources of economic data provided herein are the U.S. Bureau of Economic Analysis, U.S. Census and in particular, the County Business Patterns. Analysis, summary, and presentation: Jakubiak & Associates, Inc.

⁵ Eleven of the 14 business establishments of this type are full service or limited service restaurants.

⁶ In Crisfield, these establishments primarily provide automotive services.

⁷ Almost half of these establishments were fish and seafood wholesale businesses.

Business Establishments by Sector: Crisfield and Somerset County, 2002

Industry Sector	Number of Establishments			
	Crisfield		Somerset County	
	#	% of Total	#	% of Total
Total Establishments	134	100.0	392	100.0
Forestry, fishing, hunting, and agriculture support	0	0.0	9	2.3
Mining	0	0.0	1	0.3
Utilities	0	0.0	2	0.5
Construction	12	9.0	54	13.8
Manufacturing	10	7.5	22	5.6
Wholesale trade	9	6.7	15	3.8
Retail trade	27	20.1	69	17.6
Transportation & warehousing	7	5.2	22	5.6
Information	4	3.0	6	1.5
Finance & insurance	5	3.7	18	4.6
Real estate & rental & leasing	4	3.0	12	3.1
Professional, scientific & technical services	4	3.0	23	5.9
Management of companies & enterprises	1	0.7	2	0.5
Admin, support, waste mgt., remediation services	1	0.7	9	2.3
Educational services	1	0.7	2	0.5
Health care and social assistance	13	9.7	39	9.9
Arts, entertainment & recreation	2	1.5	7	1.8
Accommodation & food services	14	10.4	30	7.7
Other services (except public administration)	20	14.9	45	11.5
Unclassified establishments	0	0.0	5	1.3

Employment, Earnings, and Income

A broader view of economic character and change is discerned at the county and regional level. Between 1970 and 2002, the number of jobs in Somerset County grew by less than 1,000 from 2,774 to 3,712, an increase of almost 34 percent. Roughly during the same time, the County population grew by over 5,800 people. Currently, over 38 percent of Somerset County residents commute outside the County for employment.

The broad structure of the County and regional economy has change in fundamental ways since 1970. The share of jobs and earnings in Fishing, Construction, Manufacturing, and Wholesale Trade have declined while jobs have increased in the Retail and Service sectors. In terms of earnings from employment, the largest County industry sectors in 2002 were Health Care and Social Assistance, Accommodations and Food Services, Construction, and Finance and Insurance.

County median household income (in inflation adjusted dollars) dipped almost 5% between 1989 and 1999. In 1999, the median household income in Somerset County was \$29,903 as shown in the table below.

Median Household Income By Area: 1999, 2003

County	1999 (Census)	2003 (est.)	% Increase
Somerset	\$29,903	\$32,250	7.8
Dorchester	\$34,100	\$36,750	7.8
Wicomico	\$39,050	\$41,050	5.1
Worcester	\$40,650	\$45,200	11.2

The 2003 estimates of median household income provide a more current picture of area income. The median household income in Somerset County increased by almost eight percent between 1999 and 2003. In inflation-adjusted dollars, however, the County's household income decreased by two percent between 1999 and 2003.

According to the Census, Crisfield residents have a considerably lower median household income—\$17,979, than nearby municipalities. Thirty-four percent of households are at or below the poverty rate as defined by the U.S. Census Bureau. This City has a labor force participation rate of 53%; meaning that 53% percent of those persons at or over 16 years of age are employed. The median household income for Crisfield and similar municipalities in the lower Eastern Shore for the year of 1999 is shown in the table below.

Median Household Income By Municipality: 1999

Area	Annual Income (\$)
Crisfield	\$17,979
Pocomoke City	\$28,938
Cambridge	\$25,967
Princess Anne	\$20,066
Salisbury	\$29,191
Snow Hill	\$29,730

2.3 NATURAL FEATURES

Crisfield is a Chesapeake Bay coastal community. It is located at the end of a peninsula, with the Big Annessex River on the north and Pocomoke Sound to the south. The City fronts directly onto the Little Annessex River and is buffered from the Bay by extensive marsh and wetland systems comprising James Island State Park to the north and west and by equally large marshlands to the south. The natural topography of the region is low-lying with little variation in elevation within the City itself. The area is prone to flooding and soils are predominantly poorly draining unconsolidated silts. The Chesapeake Bay, the area floodplain, and its tidal marshes form the dominant natural systems in Crisfield.

The maps presented in this section help define the limits of development potential. The maps also help show the important roles local natural resources play in support of the existing community.

Topography

The Crisfield Area Elevations Map illustrates the low-lying nature of the area topography. It designates land areas as one of four categories of elevation: 0 - 1 foot above mean sea level, 1.1 to 2 feet, 2.1 to 3 feet, and over 3 feet. Areas that are at or within 1 foot above sea level are located along the tidal wetlands areas and are interspersed throughout the City south of the central business district. Here they function as drainage channels and wetlands holding floodwaters to some extent and conveying stormwater.

As shown on the Crisfield Area Elevations Map, many streets in the City are within one to two feet above sea level. These streets may be expected to flood in moderate storm conditions and be impassable under serious storm and flooding events.

- Somerset Avenue from Cove Street to Norris Harbor Drive
- Cove Street from Somerset Avenue to Fourth Street
- Fourth Street from Cove Street to about Main Street
- Chesapeake Avenue from MD Route 413 to N. Third Street
- Broadway from Fourth Street to Ninth Street

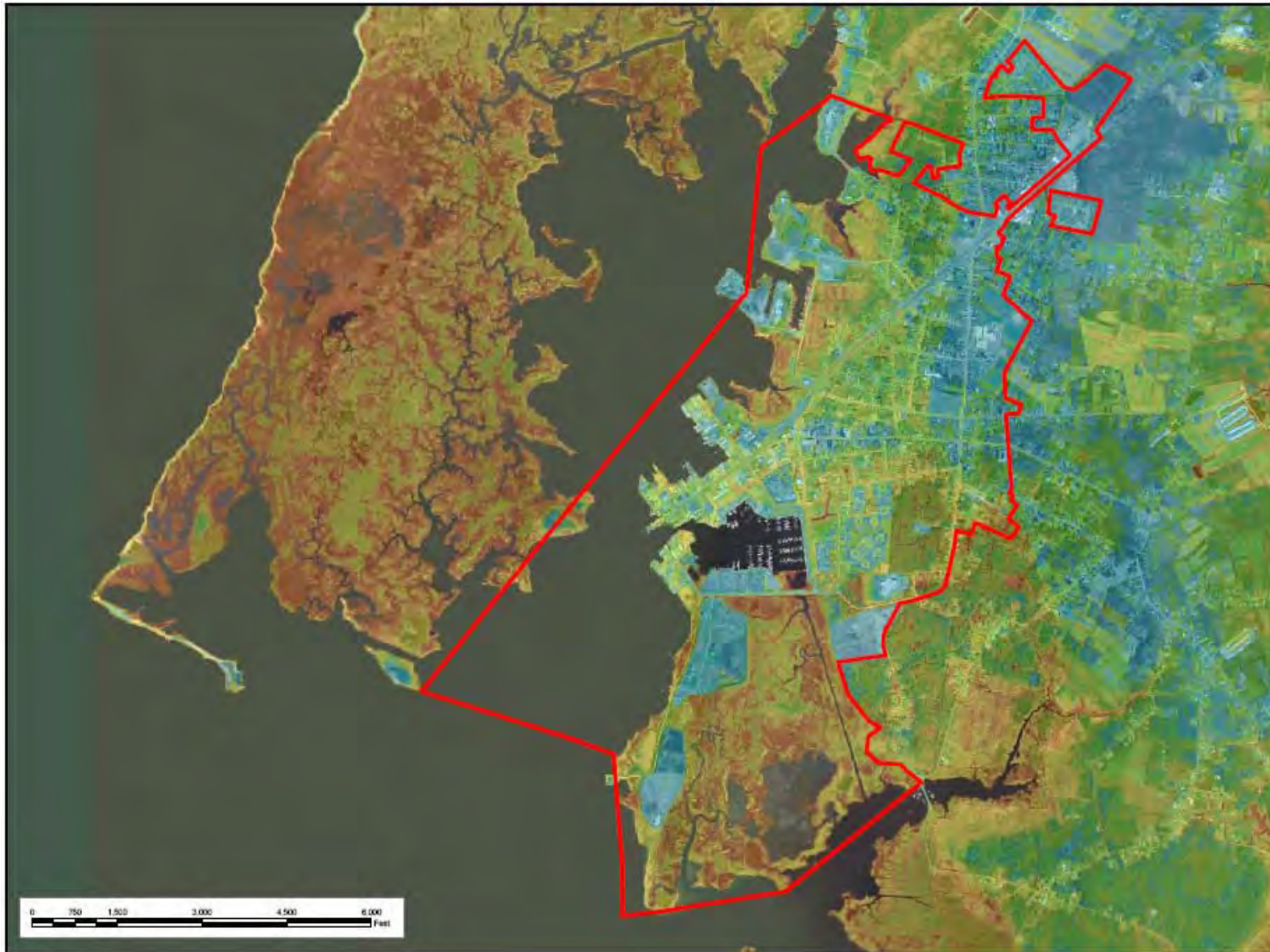
Elevations of greater than three feet above sea level are located along Somerset Avenue and the ridge northeast of the City. Elsewhere lands rising above three-foot elevation are the result of filling to support development activities or are dredge disposal sites.

Generally, the City's major institutions--schools, city hall, hospital, fire, rescue squad, and police departments, are located at or over three feet above sea level¹. The roads accessing these facilities however are in many cases below three feet elevation. MD Route 460, which accesses the hospital, is elevated only two to three feet above sea level. The section of MD 413 between Columbia and Chesapeake Avenues is elevated only two to three feet above sea level. The section of MD 413 from Sixth Street to the water is elevated only two to three feet above sea level.

With the exception of a few parcels, which are above three feet, the area known as downtown Crisfield is at an elevation of between two and three feet above sea level, though there are many very low lying areas there as well. Downtown, historically characterized by its maritime industrial and seafood-processing activities is now the location of several high-density multi-family housing projects.

¹ It is important to note that they are still located within the FEMA 100-year floodplain, though in the case of the hospital the building site may be elevated above the floodplain.

Crisfield Area Elevations



The imagery (1:2,400scale) was flown in 2004. The elevation data was produced from data collected 2003.



Legend

-  0 - 1 foot
-  1.1 - 2 feet
-  2.1 - 3 feet
-  3.1 feet and over
-  Town Boundary

Robert L. Ehrlich, Jr.
Governor

Michael S. Steele
Lt. Governor

C. Ronald Franks
Secretary



Maryland Department of Natural Resources
Watershed Information Services Division
Geographic Information Services Section
580 Taylor Ave. E-2 Annapolis, MD 21401
410-260-8751 or 1-877-620-8DNR x8751
www.dnr.maryland.gov
DNR September 2005

Soils

As shown on the Soils Map, the dominant underlying soil in Crisfield is Othello, which is a poorly drained wetland associated (hydric) soil. Seasonal high water tables and poor drainage are among the factors that limit development and prevent on-site septic systems on Othello soils (OhA, Os, Om Oo). In Crisfield, areas with this soil are also prone to tidal flooding. The other main “soil type” is classified as “made soil” (Ma). This designation represents the extent of fill activities that have occurred in Crisfield. Much of the area known as “downtown” located roughly from Seventh Street west to the water’s edge is oyster shell fill. In its natural condition, this area was marsh and surface water.

Other substantial fill areas include the City of Crisfield Public Housing Authority property. In its natural condition, much of this expansive area was tidal marsh (Tm) and forested wetlands associated with large tidal marshes that border the southern edge of the City. Remnants of this natural condition exist today as shown in the Wetlands Map. A large isolated forested wetland to the east of the housing authority property remains, as do smaller tidal wetlands closer to the marina. Prior to the development of this area, the wetlands and marsh served as a protective buffer against regular flooding and storm surges. The area also provided a natural riparian environment that supported wildlife and improved the quality of water by trapping sediments and pollutants from urban land areas.

Wetlands and Shoreline Condition

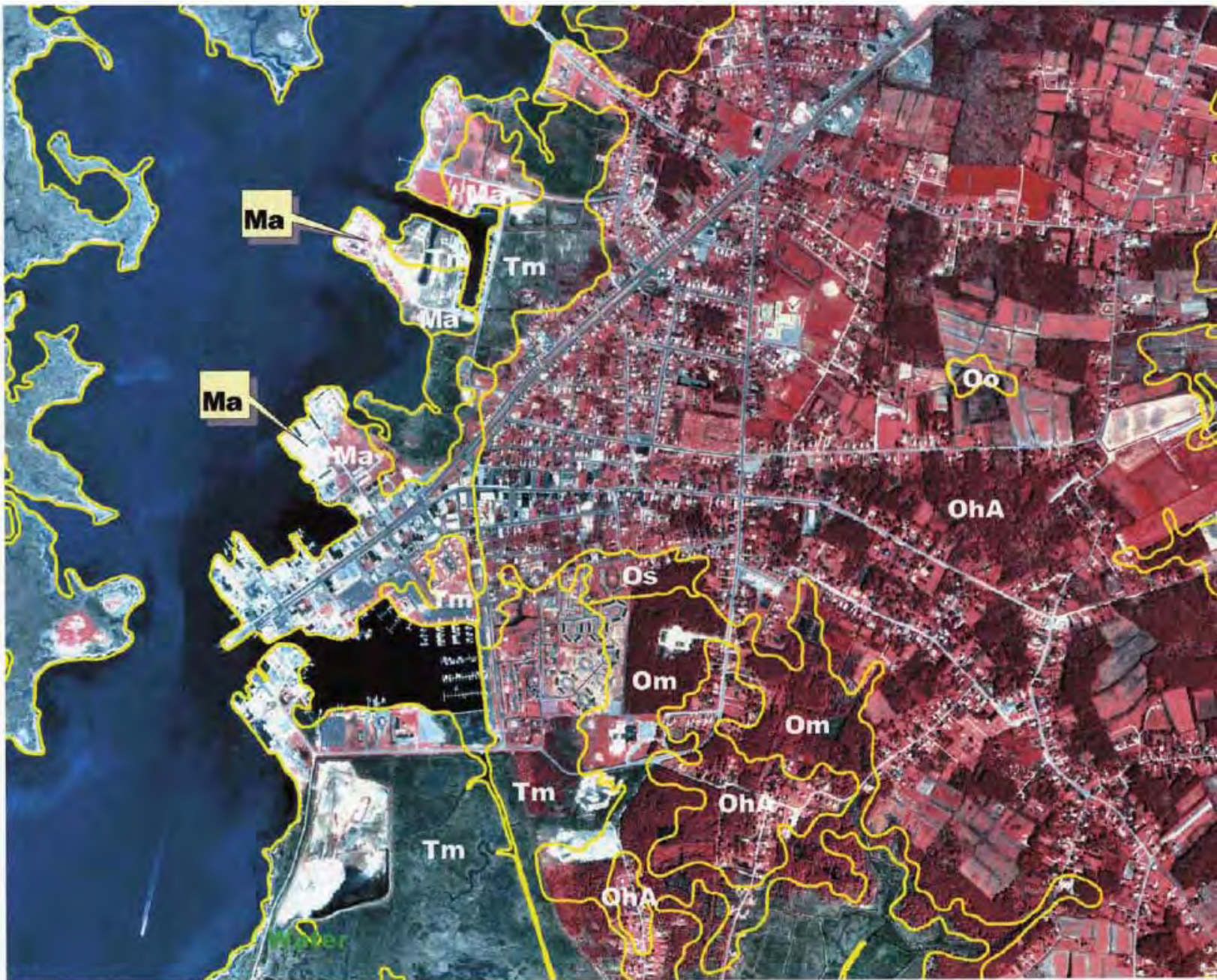
Major estuarine or tidal wetlands remain in Crisfield as shown on the Wetlands Map. Estuarine wetlands are tidally flooded marshes located at the edge of Bay and its tributary rivers. These wetlands are essential to the protection of developed areas in and around Crisfield. They help dissipate the energy from storm surge and tidal action. They also filter chemical contaminants out of stormwater runoff and are critical habitat for birds, fish, crabs, and other animals.

The Wetlands Map also shows the Palustrine or Non-Tidal wetlands. These are freshwater areas, situated within the floodplain. They cover isolated depressions and cover broad flat areas at or near sea level. These wetlands temporarily store floodwaters and thus provide localized protection from flooding. Because Crisfield is a low-lying area, these wetlands are vitally important. They will be even more important should development or redevelopment occur since such activities typically increase the rate and volume of stormwater runoff. Past filling and clearing activities have diminished the environmental benefits provided by these resources.

The Shoreline Structural Status Map also shows the type of shoreline throughout Crisfield. Note that natural vegetative shoreline corresponds with the location of the remaining intact tidal wetlands. Bulk heading is the most common structural type along the waterfront in Crisfield and corresponds with commercial/industrial land use. Behind the bulk heading, the land area is largely devoid of natural vegetation and does not support natural riparian environments.

Coastal Hazard

The City is highly susceptible to coastal hazard, predominantly to coastal flooding and storm surge. The 100-Year Floodplain Map shows that with the exception of several elevated locations, the City is located within the 100-year floodplain. Also, as noted above, almost the entirety of the City is located less than three feet above mean sea level. Coastal flooding is caused by intense winds and heavy rains and is often induced by Nor’easters, tropical storms, and hurricanes, as well as steady on-shore wind events and elevated tidal levels.



0 1000 2000 Feet

Crisfield Soils Map

Wetlands In Crisfield

Wetlands In Crisfield

(562 Acres)

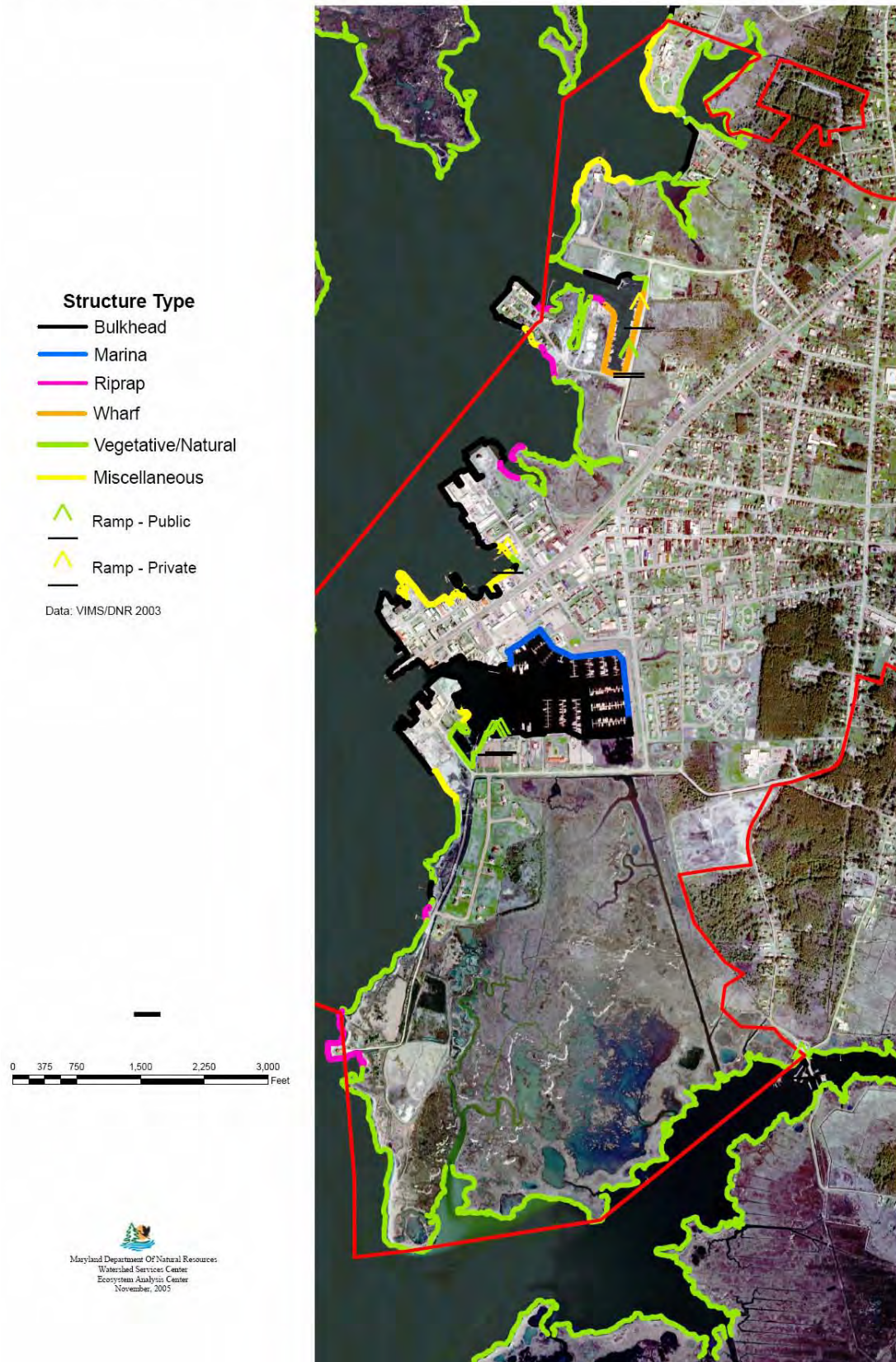
-  Tidal
-  Non-Tidal

0 500 1,000 1,500 2,000 Feet

Wetlands data presented here is generalized for statewide use. It is suitable for general reference only. Contact MDE regarding permit issues.






Shoreline Structural Status in the Crisfield Area



100-Year Floodplain In Crisfield

DRAFT

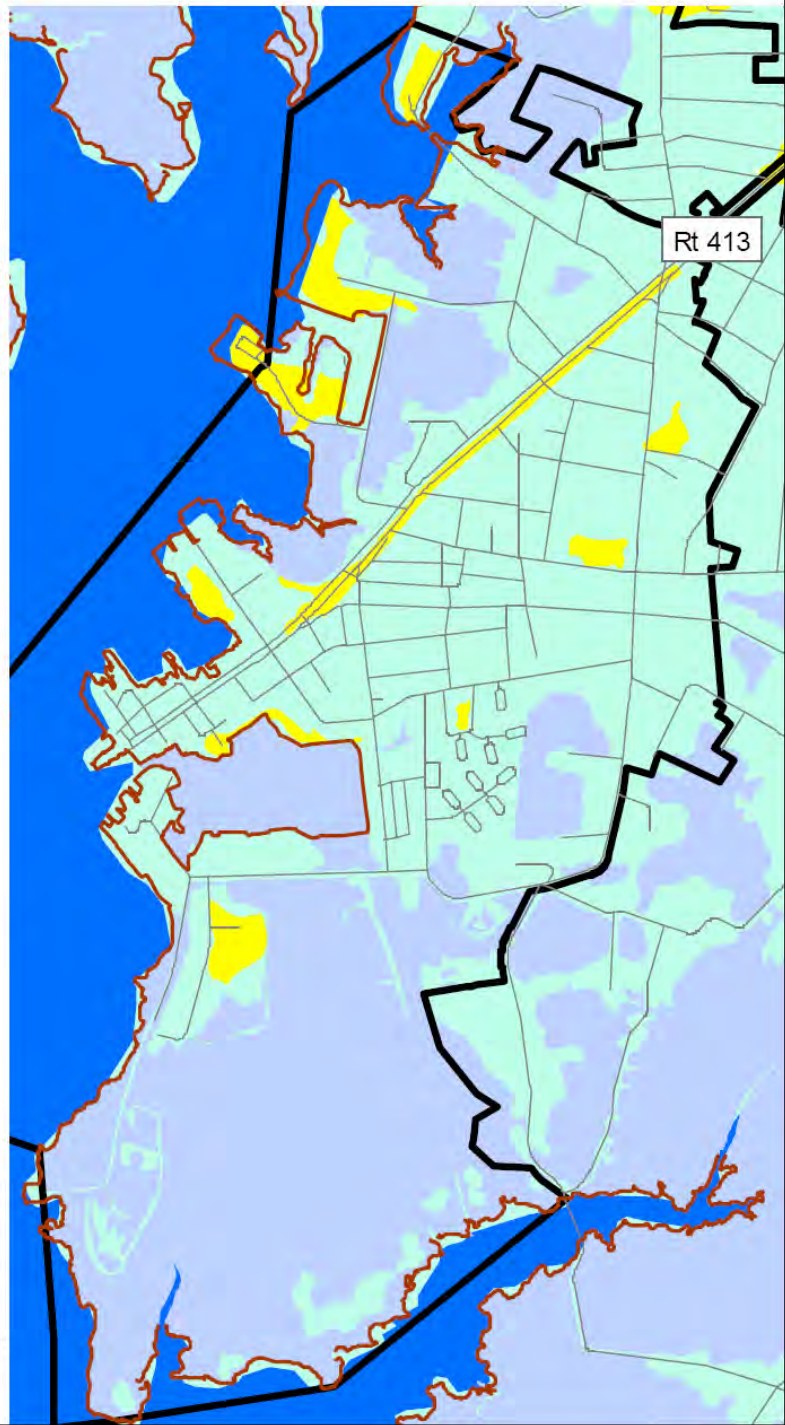
-  Open Water
-  Wetlands / Water
-  100-Year Floodplain
-  Other Land

-  Town of Crisfield
-  Shoreline
-  Roads

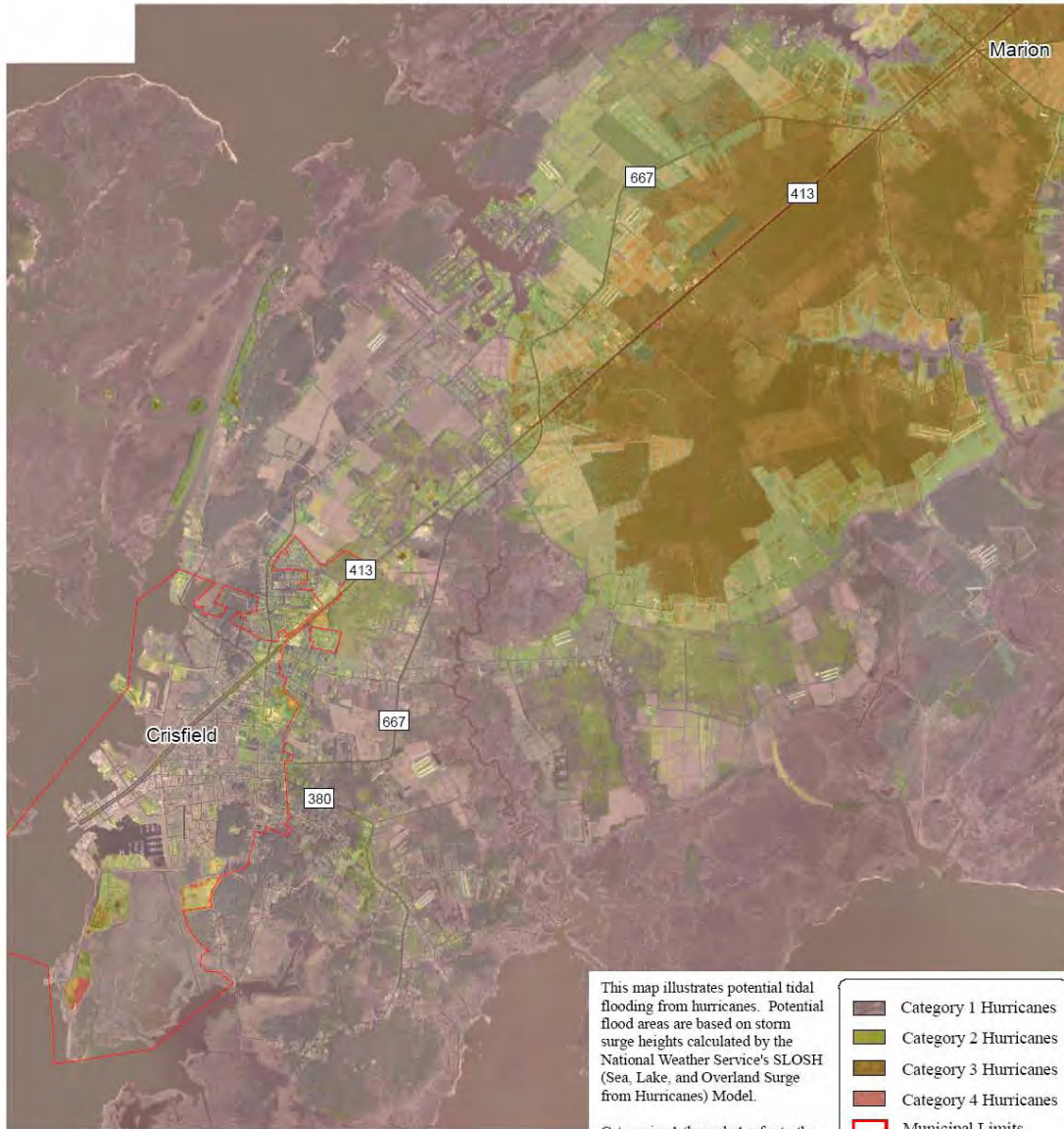
0 0.25 0.5
Miles
1:20,000



Maryland Department
Of Natural Resources
GIS: Watershed Services
LWAD June 2005
Floodplain Data: FEMA
Shoreline Data: VIMS 2003
Wetlands Data: DNR



Draft Storm Surge Threat Crisfield to Marion



This map illustrates potential tidal flooding from hurricanes. Potential flood areas are based on storm surge heights calculated by the National Weather Service's SLOSH (Sea, Lake, and Overland Surge from Hurricanes) Model.

- Category 1 Hurricanes
- Category 2 Hurricanes
- Category 3 Hurricanes
- Category 4 Hurricanes
- Municipal Limits

Categories 1 through 4 refer to the Saffir-Simpson scale of hurricane intensity. Storm surge elevations represent "worst case" combinations of direction, forward speed, landfall point and astronomical tide for each category, but do not include wave heights that may accompany storm surge.

This map was produced using interim data provided by the Army Corps of Engineers, Philadelphia District. The data is subject to additional quality assurance and other modifications.

The model uses elevation data acquired in Spring, 2003.

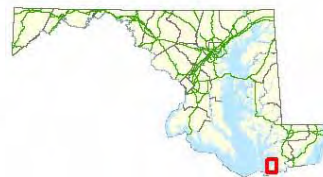


Maryland Department of Natural Resources
Watershed Information Center
580 Taylor Ave. E-2 Annapolis, MD 21401
410-260-8751 or 1-877-620-8DNR x8751
dnr.maryland.gov
DNR September 2005

Robert L. Ehrlich, Jr.
Governor

Michael S. Steele
Lt. Governor

C. Ronald Franks
Secretary



The Storm Surge Map shows the potential tidal flooding in the area from Crisfield to Marion from hurricanes of various magnitudes--Categories 1 through 4¹. With the exception of isolated pockets of higher elevation, a worst-case storm surge associated with a Category 1 hurricane would inundate the City to a height of roughly four feet. The Category 1 storm surge would extend as far inland as the intersection of MD 413 and MD 667 making about 2,400 housing units vulnerable. It would make the hospital and the Crisfield airport inaccessible by street or highway.

Sea level rise is a significant factor to consider with regard to the region's vulnerability to coastal flooding. Tide gauge records for the last 100 years show that the historical rate of sea level rise in Maryland has been between 3-4 mm per year or about one foot per century; a rate nearly twice the global average. Current scientific research, however, indicates that sea level rise rates are accelerating and may result in as much as two to three feet of rise along Maryland's shores by the year 2100. Sea level rise can influence and exacerbate coastal flood events. As sea level rises even in very small increments, storm surges heighten and extend further inland. In low-lying coastal areas, like Crisfield, a one-foot rise in sea level could translate into a one foot rise in flood level, intensifying the impact of flooding and storm surge to homes, businesses, institutions, and roadways.

Chesapeake Bay Critical Area

Chesapeake Bay Critical Area law regulates development within designated areas in 16 Maryland counties, including Somerset County and the City of Crisfield. The Critical Area is a ribbon of land, 1,000 feet wide, extending from the head of tide of Chesapeake Bay shorelines, wetlands, and tidal tributaries. In Crisfield, the Critical Area covers about 72 percent of the City's land area.

The City has the responsibility under State law to enforce the Critical Area protection program². It has incorporated the basic provisions of the 1984 law into its zoning ordinance. The law requires local jurisdictions to designate Critical Area lands one of three land use management overlay zones. These zones are shown on the official Critical Area Map, which is kept in City Hall. The zones are summarized below.

- Intensely Developed Area (IDA): Land developed with high-density residential or other high intensity uses including commercial and industrial. The intensity of development is established by the City's underlying zoning code.
- Limited Development Area (LDA): Land developed in low or moderate intensity uses and containing areas of natural plant and wildlife habitat.
- Resource Conservation Area (RCA): Land dominated by features such as wetlands, forests, and farmland. Residential density may not exceed 1 unit per 20 acres.

Critical Area law places restrictions on land development within each zone. The uses and intensity of development permitted in each zone generally reflect the designation criteria.

¹ The Map was produced by the Maryland Department of Natural Resources using interim data provided by the Army Corps of Engineers, Philadelphia District. Storm surge elevations represent the worst-case combination of direction, forward speed landfall point, and astronomical tide. The data do not include wave heights that may accompany storm surge.

² An area of the City is excluded from Critical Area requirements. This exclusion area was delineated upon the City's adoption of the program in the 1980's; at the time the City had envisioned a seafood processing industrial park for the area. The exclusion area extends along the north side of MD 413, roughly from Seventh Street to Lorie Quinn Street. Because of this exclusion, the ongoing development of the 68-unit Water's Edge townhouse project has occurred unregulated by critical area development law.

2.4 LAND USE

Surrounding Area Land Use

The area land use pattern is evident on the aforementioned Crisfield Location Map (see Section 1 of this report) and Storm Surge Map. Three observations are most relevant:

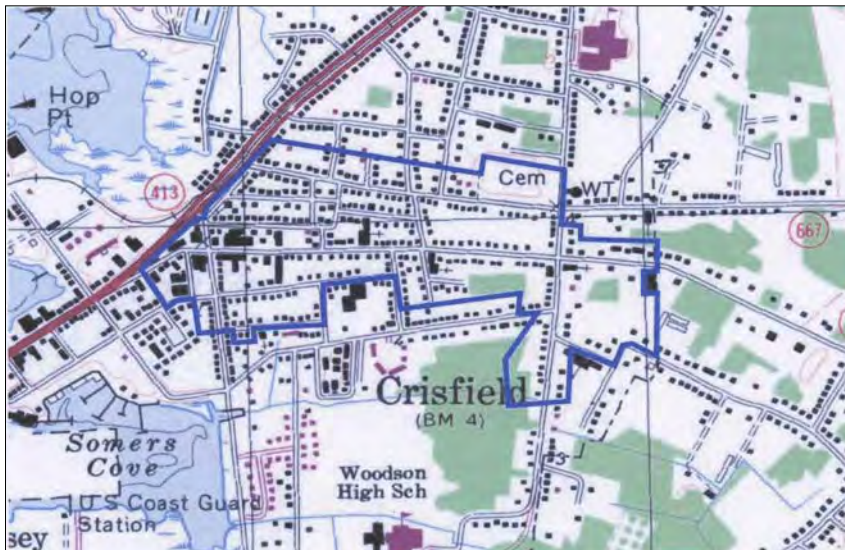
1. The Little Annessex River and Jersey Island lie to the west and south of Crisfield, permanently curbing development in those directions beyond existing City boundaries. Environmental features, such as water bodies and wetlands, restrict development throughout the region.
2. Except for small isolated concentrations, urban development is largely confined to existing centers such as Crisfield.
3. The vast majority of land outside of the City is either developed in a very low-density pattern accessible by a network of rural roads or in agricultural or open space use.

City Land Use

With regard to the City's the land use pattern, four observations are most relevant:

1. Environmental features provide a natural boundary for much of the City. Development has focused on proximity to the Bay and along the main traffic artery (MD 413).
2. Due to the fishing industry's historic dominance in the local economy, much of the developed shoreline in the past has been occupied by fishing-related uses. In recent years, however, many of the buildings that formerly housed processing plants have become vacant. Several sites have been redeveloped into multi-family residential projects.
3. The central business district is located along Main Street. The other commercial concentrations are located at the intersection of Somerset Avenue and MD 413 and in the "downtown" area along MD 413.
4. Somers Cove Marina is the prominent feature of the waterfront. Excluding the surface water, the marina comprises almost 50 acres of land area.

The Crisfield Historic District Map shows the boundaries of the historic district of the City.



2.5 HOUSING

Comparative housing statistics are shown the table below. In most categories shown, housing in Crisfield is generally similar to housing in area municipalities. There are some differences. In 2000, Crisfield had a much lower median value of owner-occupied units, at \$67,000.

The number of dwelling units-in-structure differs somewhat in Crisfield. Among area municipalities, Crisfield has the greatest percentage of housing in structures with two to four units, because this is the dominant structure type of the Crisfield Housing Authority. The Housing Authority manages 330 units, which represents 24 percent of all housing units and 28 percent of all occupied housing units.

Comparative Housing Statistics: Crisfield and Nearby Municipalities, 2000

Category	Crisfield	Pocomoke City	Princess Anne	Salisbury	Snow Hill	Somerset County
Median Home Value of Owner Occupied Units	\$67,000	\$78,000	\$77,500	\$81,200	\$81,200	\$76,500
% Vacant	13.6	10.8	10.3	5.9	12.5	20.7
Structures:						
% 1-unit detached	57.2	69.0	49.3	51.4	73.8	67.8
% 1-unit attached	6.8	28.0	8.2	8.4	1.4	2.2
% 2-units	14.0	5.9	5.4	6.8	5.6	2.7
% 3 or 4 units	10.7	5.1	12.0	6.3	1.8	3.5
% 5 to 9 units	7.0	5.6	5.1	10.9	6.5	2.5
% 10 to 19 units	1.3	3.4	12.3	10.7	2.9	2.3
% 20 or more units	2.1	8.3	5.3	4.9	5.9	1.5
% Mobile home	0.9	-	1.8	0.5	2.1	17.1
% Boat, RV, van, etc.	-	-	0.5	-	-	0.3
Median number of rooms	5.3	5.5	5.0	5.1	5.7	5.6
Median year structure built	1961	1958	1975	1967	1948	1971

2.6 TRANSPORTATION AND CIRCULATION

This overview considers current highway, street, and transit facilities throughout Crisfield. The major routes by functional classification are shown on the Street Classification Map.

Regional Highway Access

MD Route 413 (Crisfield Highway) provides primary traffic movement in and out of Crisfield. Once within city limits, the highway is known as Maryland Avenue, Richardson Avenue and as West Main Street west of its intersection with Main Street. Outside of Crisfield, MD Route 413 is a two-lane undivided rural highway, which intersects with MD Route 13.

The Maryland State Highway Administration's (SHA) Highway Needs Inventory calls for reconstruction of MD Route 413 from the City limits to MD Route 13. It also calls for an access management project at the intersection of the two highways.¹

The other State highways serving Crisfield include MD Route 380 and MD Route 667 (Old State Road). These roads form parallel streets within the City limits and then diverge outside of the City. MD Route 380 veers southward and connects to the community of Lawsonia. MD Route 667 veers northward after leaving the City and connects with MD Route 413 about two miles east of Crisfield near Hopewell. MD Route 358 (Jacksonville Road) intersects with MD Route 413 across from Somerset Avenue and travels northeastward before connecting again with MD 413 near Hopewell.

As shown below, SHA counts indicate traffic has increased by about 48 percent on MD Route 413 at its intersection with Somerset Avenue between the years 1980 and 2003. At its main intersection in the community of Marion, traffic has grown by 36 percent since 1980.

Average Vehicles per Day

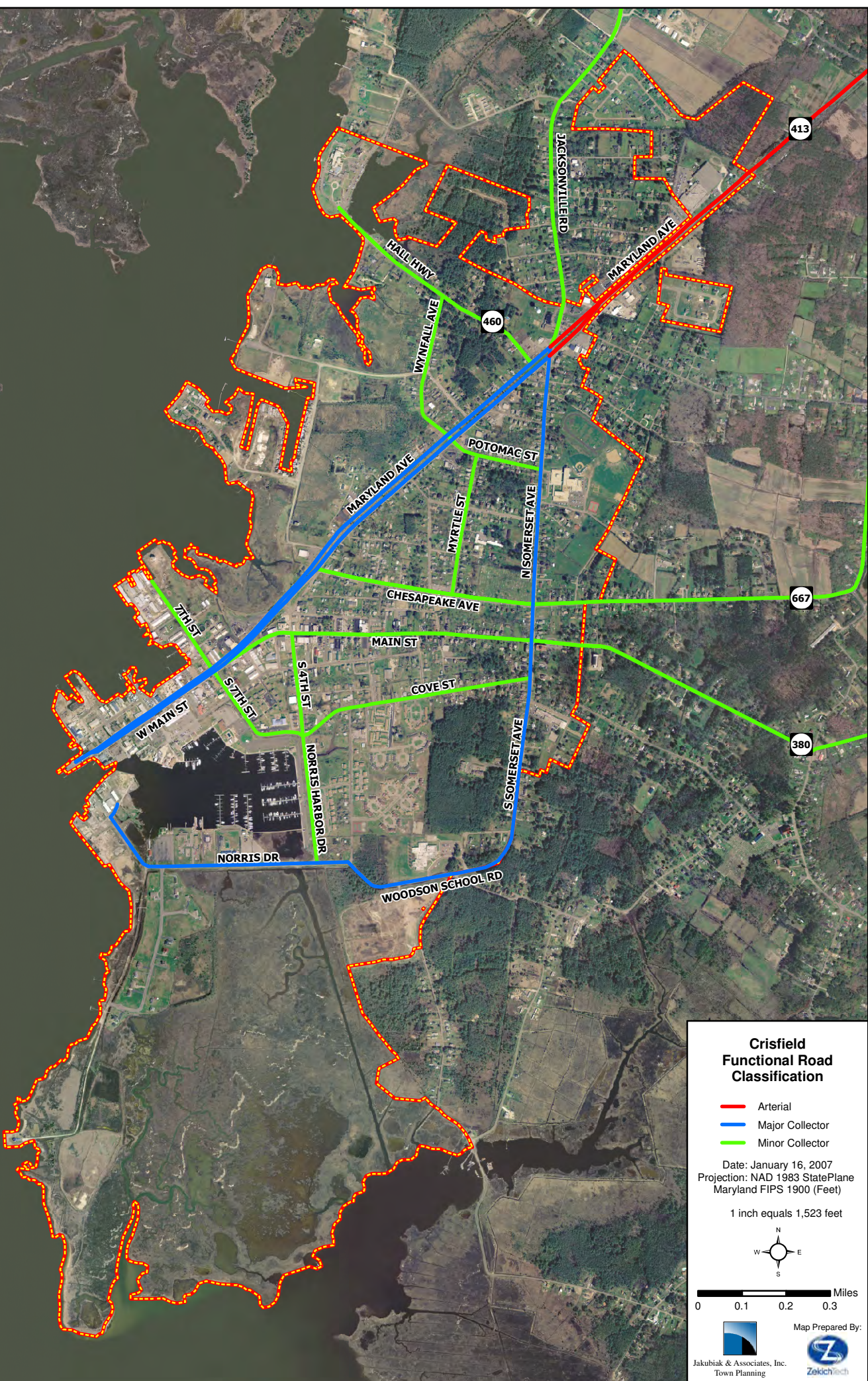
Section of Highway	1980	2003	Change	
			Percent Change	Annual Ave. Rate of Growth
MD 413 @ Somerset Ave.	8,950	13,275	48.3	1.73
MD 413 @ Charles Cannon Rd. (Marion)	4,455	6,075	36.4	1.36

Regional and County Transit Access

Shore Transit provides scheduled bus service between Crisfield and Salisbury with stops en route in Princess Anne and Westover. In Princess Anne, a transfer station connects with many other Somerset County destinations. Also, a heritage trolley/commuter route runs between Jane's Island State Park and the Somerset County Municipal Airport. The Crisfield-Somerset County Municipal Airport is available for private air transportation.

During the summer and early fall months, ferries connect Crisfield to Smith Island for non-vehicular passenger traffic. The ferry is primarily for visitors to the area.

¹ The Highway Needs Inventory is SHA's long-range planning tool, with no timeline or funding commitments.

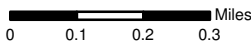


**Crisfield
Functional Road
Classification**

- Arterial
- Major Collector
- Minor Collector

Date: January 16, 2007
 Projection: NAD 1983 StatePlane
 Maryland FIPS 1900 (Feet)

1 inch equals 1,523 feet



Map Prepared By:
 Jakubiak & Associates, Inc.
 Town Planning  ZekichTech

Local Circulation

The City street network is shown on the Street Classification Map¹. MD Route 413 (Richardson Avenue and West Main Street) is the City's main axis. It extends to the downtown, maritime section, of the City, to the very tip of the peninsula. A grid is evident in this location though it is modified to conform to the shoreline. The primary east-west streets in the City are Main Street (MD Route 380) and Chesapeake Avenue (MD Route 667). These parallel collector streets facilitate movements to and from the City.

The Comprehensive Plan classifies MD Route 413, within the City, as major collector street. Somerset Avenue is the other major collector in the City and provides access for the developing residential communities and the Somers Cover Marina to MD Route 413. Other collector streets, while not as vital to traffic movements, are shown in green on the map and labeled minor collectors. These include: Hall Highway (MD 460), which provides access to the hospital, Potomac Street and Wyntall Avenues, Myrtle Street, Chesapeake Avenue, Main Street, Fourth Street, Cove Street / Seventh Street.

Street connectivity is most pronounced in the triangular area of the City bounded by Richardson Avenue, Somerset Avenue, and Cove Street. In these neighborhoods, a modified grid system of local access streets provides direct access to a mix of land use activities and helps dispersed traffic throughout residential neighborhoods.

Earlier in Section 2 of this report, the condition of several streets during flood events was reported. Major portions of the collector street network are within one to two feet above sea level and flood in moderate storm conditions and can be impassable under serious storm and flooding events. These include

- Somerset Avenue from Cove Street to Norris Harbor Drive
- Cove Street from Somerset Avenue to Fourth Street
- Fourth Street from Cove Street to about Main Street
- Chesapeake Avenue from MD Route 413 to N. Third Street

2.7 COMMUNITY FACILITIES AND SERVICES

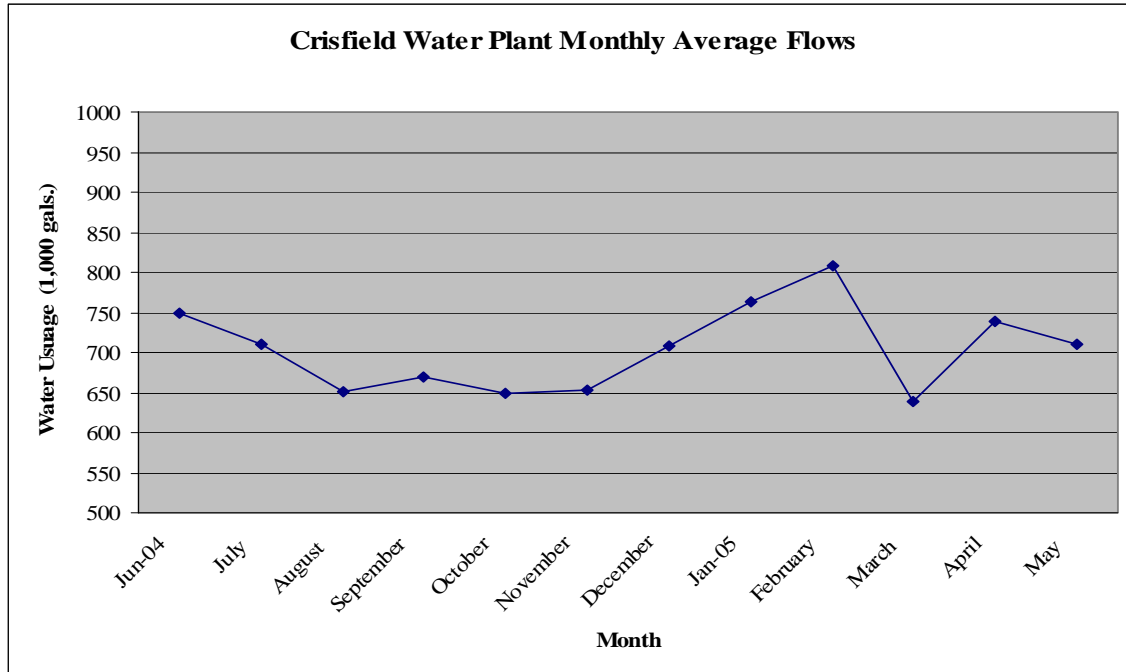
Community facilities and services described here include those elements of infrastructure, which are most impacted by growth and development.² Community facilities and services sustain and strengthen the City as population grows; provided, that is, that their capacity, quality, and accessibility are monitored. Many jurisdictions and agencies, both public and quasi-public, provide the community facilities that serve Crisfield. Section 3 of this report contains an assessment of supply and demand for municipal water and sanitary sewer services and assesses the impact of projected growth on these services.

Public Water Supply

The City of Crisfield's public water is provided by five wells with a combined capacity of about 1,200,000 gallons per day (gpd). The City recently constructed a 500,000-gallon water tower as an improvement to the system. The system now has two water towers. The monthly average flows from June 2004 to April 2005 are shown in the following graph.

¹ The classification of streets differs somewhat from the functional classification of streets and highways adopted by the Maryland State Highway Administration. This is because the City's functional classification recognizes the role that City streets play in collecting and distributing urban traffic such that some streets that do not appear on the State's rural system mapping for the Crisfield area are recognized by the City for their role in local circulation.

² With the exception of transportation facilities, which are discussed under the heading, Transportation and Circulation.



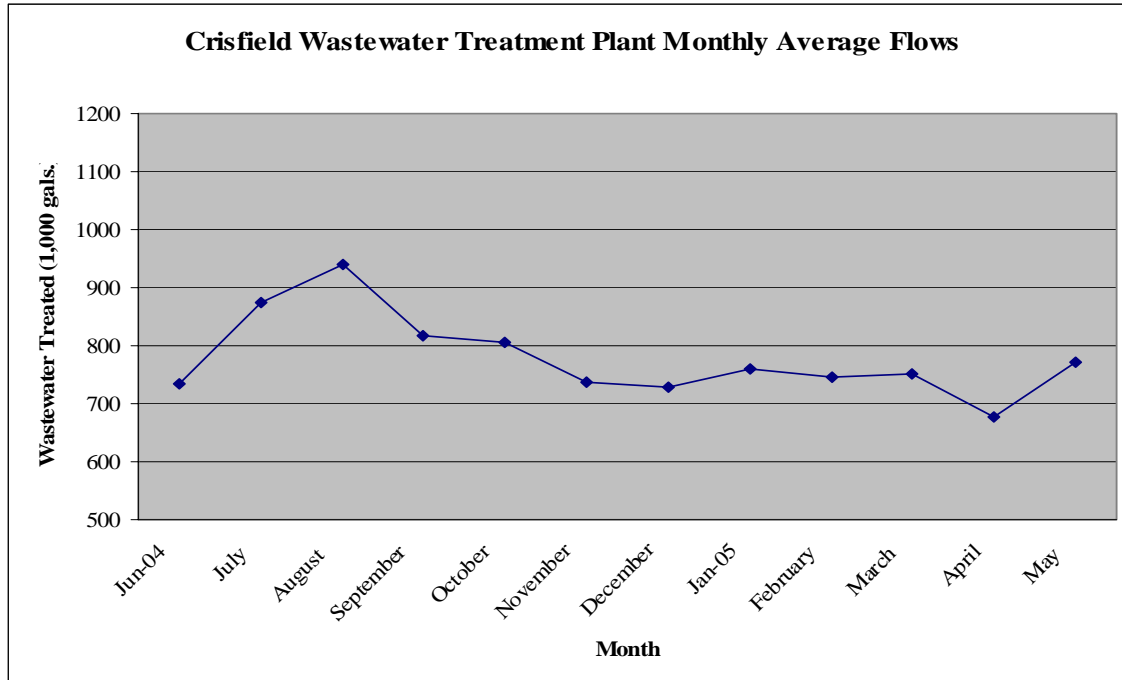
Public Sanitary Sewer Service

Crisfield’s wastewater treatment plant has a stated and permitted capacity of 1,000,000 gpd. In June 2006, the plant will undergo biological nutrient removal (BNR) and environmental nutrient removal (ENR) upgrades. The construction is expected to take 18 months to complete at a cost of \$9,500,000. The funding from this project will come from local sources, Somerset County, Maryland Department of the Environment, and the federal Environmental Protection Agency.

The current upgrade of the sewer treatment plant will not increase the capacity of the facility. The public works department is collaborating with the County on a long-range plan to provide water and sewer service to the City and to County residents on the periphery of the City that the sewer plant currently serves. A large expansion of the City sewer treatment plant will most likely involve a new site, as the current facility does not possess adequate land to significantly expand.

The public works department has recently completed a smoke test to gauge the level of inflow and infiltration into the sewer system. Infiltration was identified at private connections to the public lines. There is also assumed inflow and infiltration issues with the Main Street sewer. There are forthcoming plans to replace the sewer main along West Main, Fourth and Pine Streets. The current cast iron line was installed in 1936. Resolving this problem would free up capacity in the treatment plant, though the extent of this is unknown.

Remaining capacity in the wastewater treatment plant is limited and as is discussed in Section 3, much of the remaining capacity has been committed to approved development projects. The monthly average flows for June 2004 through April 2005 are shown in the following graph.



Schools³

The Somerset County Board of Education operates the school system. Under current school districting, the four schools shown below serve Crisfield residents. The County plans to build a new intermediate school (grades 6 and 7) in 2006. With State funds awarded in 2005, the Board of Education is expected to renovate Crisfield's Carter G. Woodson Middle School into an elementary school in time for the 2006-2007 school year. As part of a system-wide consolidation plan, the Board will close H.D. Whittington, relocate those students to Crisfield Academy, and allow Crisfield High to remain open. There is adequate capacity in the school system to accommodate more students.

School Enrollment and Capacity: Spring 2005

School	Enrollment	Capacity	% of Capacity
Marion Sarah Peyton Elementary	267	305	87.5
H. D. Whittington Primary	301	304	99.0
Somerset Intermediate	506	520	97.3
Crisfield High/Crisfield Academy	381	710	53.7

³ Source of school capacity and enrollment data: Somerset County Board of Education.

Public Library

Somerset County operates the Corbin Memorial Library in Crisfield. It is located on West Main Street. The Somerset County library system includes a central library, located in Princess Anne and two branch libraries: Corbin Memorial in Crisfield and the Ewell Branch on Smith Island.

The Somerset County Library System is part of the Shore 4, a consortium of three southern Eastern Shore Counties and the Eastern Regional Library that allows interlibrary loans of materials. This enables Crisfield residents to have access to a much larger collection of videos, books, and other materials.

Park and Recreation Facilities

There are currently no public parks or recreation areas in the City. Although the City is surrounded by water, public water access is limited to several boat ramps and the beach the City leases from the local VFW post. Some of the recreational needs of Crisfield residents may be met through the canoeing, picnicking, and camping facilities at the nearby 2,900-acre Janes Island State Park.

Fire and Police Protection

The Crisfield Volunteer Fire Department provides fire protection in the City. The fire department is located at a city-owned lot on MD Route 413. The company's service area encompasses the City. The Department has a permanent staff of ten line officers and firefighters. In response to recent construction of taller structures and more proposed development, the Department purchased a tower truck to enable firefighters to adequately respond to emergencies in taller buildings.

The Crisfield Police Department provides police service in Crisfield. There are currently twelve sworn officers, six support staff, and one K-9 dog ("Bach") on the force. Specialized roles in the department include a part-time criminal investigator, one school resource officer, a DARE officer, and a certified firearms instructor. The Department possesses 13 squad cars, many equipped with mobile data terminals, to respond to emergencies. The police station is located on West Main Street.

City Hall

The main administrative offices and offices of the City's elected officers are located in City Hall on West Main Street. City Hall contains the offices of the City manager, City treasurer/clerk, the City zoning inspector, the City public works foreman, and support staff. The Mayor and City Council chambers are also located at City Hall.

Hospital and Emergency Facilities

The primary medical care facility available to City residents is the McCready Memorial Hospital located on Hall Highway. The facility is a full service community hospital with 24-hour emergency facilities and 20 "acute-care" hospital beds. The facility is supplemented by the 69-bed Alice Byrd Tawes Nursing Home, the Peyton Center (a 19-bed psychogeriatric hospital) and an outpatient services center. The hospital's primary service area encompasses the City and the nearby communities on Smith, Tangier, Jane, and Deale Islands. The hospital provides emergency, surgical, and diagnostic services, respiratory and ancillary services for patients.

SECTION 3 - DEVELOPMENT OPPORTUNITIES AND CONSTRAINTS

A comprehensive plan must acknowledge the opportunities for sound development and the factors that constrain development. This is not a list of strengths and weaknesses. It is a list of physical factors that provide form to the City. The following list is drawn from this and the foregoing sections of this report.

3.1 OPPORTUNITIES

Compact Nature of the City

The compact nature of Crisfield can promote accessibility, convenience, and community cohesiveness. Most commercial and institutional activities are within walking distance of most residents. Compactness is a prerequisite for a healthy and vibrant city. Neighborhoods are in place.

Infill Potential

While large unused parcels are rare in Crisfield, many smaller parcels throughout the neighborhoods are unused or underutilized. Many commercial buildings are underutilized in the central business district. It is possible for the City to accommodate commercial growth within its core as well as more dense residential development in places.

Marina Development

Development in and around the Somers Cove Marina and Basin should be limited. Space exists for a sizable increase in the intensity of marina, related tourism-oriented development, and public recreational use. Through good urban and environmental design, additional development may become an attractive asset around Somers Cove.

Connecting Neighborhoods

Great opportunities exist for connecting the neighborhoods of Crisfield together and for connecting the neighborhoods to the center of the City. A grid system is largely in place except for the Crisfield Housing Authority property. The public housing community appears to be physically detached from the City at large.

Tidal Wetlands

Tidal wetlands on both the north and south of the City are important resources that protect the City against storm surge and excessive flooding. These lands are very close to the City center and their preservation helps protect water quality, wildlife habitat, and the overall environmental health for City residents.

Sensitive Natural Areas Throughout the City

Opportunities exist for preserving natural resource lands and sensitive sites for the benefit of future generations. The City abounds in natural and sensitive environmental resources. As mentioned above, they provide opportunities for recreation and help protect life and property. Also very importantly, these features will sustain Crisfield as it continues to grow from within. This is especially the case with respect to the large tidal and non-tidal wetlands, which help attenuate flooding, purify water, and support wildlife. As density increases, the importance of these natural features will grow.

Where wetland and open areas in the City have been compromised by poor development planning, they will need to be restored to the extent practicable. Opportunities exist to help restore the important functions of natural resources as new development occurs.

3.2 CONSTRAINTS

Sensitive Natural Areas

Marshlands, floodlands, and poor soils limit the location of future development. The City has not always successfully conformed itself to these features as it has developed over time and will need to recognize these constraints in the future.

Coastal Flooding

The low-lying natural of the City combined with its coastal location means that severe flooding is a fact of life. As shown in Chapter 2, much of the main collector road network becomes impassible during flooding events. Low-lying communities and residential development in the “downtown” section of the City are threatened by severe flooding.

Limited Developable Land

Most developable lands within the City are in some form of developed use already. The lack of developable lands may give rise to an increasing number of development disputes, as potentially conflicting land uses are pressed closer together. In future years, demand for new development will need to be accommodated through thoughtful and well-designed infill.

Public Open Space

The City lacks public open space. Public water access is limited to a privately held beach, which is leased to the City. No citywide parks and open space vision exists, though parks and open space are essential elements of good city form and function.

Wastewater Treatment Capacity

As documented in this report, until capacity is increased, development beyond that already approved is limited.

3.3 SUMMARY

In summary, Crisfield may expect more residential development between 2000 and 2010 than it experienced during any previous decade in recent history. Between 2000 and 2010, the City may be expected to add about 540 new housing units. Over the next five years, nearly 100 units per year may be expected.

Growth through 2010 will use up nearly all effective remaining wastewater treatment capacity, assuming a modest reserve capacity is established. The City will need to expand its wastewater treatment capacity and public water system to serve development that may occur beyond 2010. The extent of that development will be better understood upon the City’s completion and adoption of more detailed planning which is expected to be undertaken over the next couple of years.

This section also reviewed key development opportunities and constraints in Crisfield. These have factored heavily into the design of the new Comprehensive Plan, which is presented in the next section of this report.

SECTION 4 –THE COMPREHENSIVE PLAN RECOMMENDATIONS

This Comprehensive Plan focuses development and conservation policy on the issues facing Crisfield through the foreseeable future. The principles, objectives, and polices, to the extent possible, relate directly to the built and natural environments. This is very important. Future generations will judge the lasting worth of our vision by observing the City and the physical changes that will have occurred under guidance of this Plan.

The Plan is long-range and comprehensive. It provides the organizing framework for more detailed planning and design work. The Plan is a guide for the City and its residents. It is a guide for land developers. It is a guide for outside agencies and units of government. The Plan is a compilation of what is most important to Crisfield as it contemplates growth and change. It is a compelling image of the future. The Plan envisions capable city planning and engineering, a citizen population engaged in formulating and implementing growth and development polices, and consistent outreach to agencies of government with the resources and expertise to advance the interests the City shares with others.

The Plan implements the “visions” set forth in Article 66B of the Maryland Annotated Code.

1. Quality of Life and Sustainability: A high quality of life is achieved through universal stewardship of the land, water, and air resulting in sustainable communities and protection of the environment.
2. Public Participation: Citizens are active partners in the planning and implementation of community initiatives and are sensitive to their responsibilities in achieving community goals.
3. Growth Areas: Growth is concentrated in existing population and business centers, growth areas are adjacent to these centers, or strategically selected new centers.
4. Community Design: Compact, mixed-use, walkable design consistent with existing community character and located near available or planned transit options is encouraged to ensure efficient use of land and transportation resources and preservation and enhancement of natural systems, open spaces, recreational areas, and historical, cultural, and archeological resources.
5. Infrastructure: Growth Areas have the water resources and infrastructure to accommodate population and business expansion in an orderly efficient, and environmentally sustainable manner.
6. Transportation: A well-maintained, multi-modal transportation system facilitates the safe, convenient, affordable, and efficient movement of people, goods, and services within and between population and business centers.
7. Housing: A range of housing densities, types, and sizes provides residential options for citizens of all ages and incomes.
8. Economic Development: Economic development and natural resource-based businesses that promote employment opportunities for all income levels within the capacity of the State’s natural resources, public services, and public facilities are encouraged.
9. Environmental Protection: Land and water resources, including the Chesapeake and Coastal Bays, are carefully managed to restore and maintain healthy air and water, natural systems, and living resources.
10. Resource Conservation: Waterways, forests, agricultural areas, open space, natural systems, and scenic areas are conserved.

11. Stewardship: Government, business entities, and residents are responsible for the creation of sustainable communities by collaborating to balance efficient growth with resource protection.
12. Implementation: Strategies, policies, programs, and funding for growth and development, resource conservation, infrastructure, and transportation are integrated across the local, regional, state, and interstate levels to achieve these visions.

The objectives and policies set forth below are drawn from the research and analyses presented in Sections 1 through 3 of this report and public input provided throughout 2005 at multiple Planning Commission workshops. The Comprehensive Plan integrates the elements required by State planning law under five main themes.

- Redevelopment and Ecological Restoration
- Redevelopment Consistent With Community Character
- Development in Balance with Community Facilities and Services
- Planning in Concert with Regional Priorities
- The People of Crisfield: Reinvigorating Neighborhoods

Each theme is organized in the following way:

Statement of theme- including a brief description of the benefit to Crisfield.

Background – a summary of the main findings from the baseline studies provided in Sections 2 and 3.

Guiding Principles –fundamental tenets adopted by the City from which flow the Plan’s polices. These principles, while universal, address the basic physical planning issues present in Crisfield.

Objectives – goal statement pertaining to the theme phrased in an affirmative way.

Policies – the recommended courses of action to be pursued by Crisfield in achievement of the goals.

Actions – specific tasks to be undertaken to implement the policies.

The Planning Commission prepared this Comprehensive Plan as called for by Article 66B of the Annotated Code of Maryland, combining the elements required of comprehensive plans into a coherent set of policies. Article 66B requires that a comprehensive plan contain the following: a statement of goals, a land use element, a transportation element, a community facilities element, an element that contains the Commission’s recommendations for land development regulations to implement the plan, a sensitive areas element and a mineral resources element. The later element, mineral resources, has been determined through the study to be not applicable to the Crisfield Comprehensive Plan, though a soils evaluation is presented in Section 2.

4.1 REDEVELOPMENT AND ECOLOGICAL RESTORATION

As development or redevelopment occurs, the people of Crisfield will benefit from acknowledging the presence of natural resources and systematically promoting their re-emergence.

Background

Crisfield is a coastal community. It is built in a floodplain. Much of its land is less than three feet above sea level. Apart from the ridge that runs along Somerset Avenue, land rising above three feet in elevation is fill or made land. Flooding is a normal occurrence in Crisfield. Severe flooding and strong storm surge occur. Sea levels in the Chesapeake Bay region are rising. The frequency and severity of today’s flooding events will be surpassed by those of future decades.

Historically, the City has been built on lands not well suited to development. Tidal marshes have been filled and wetlands and their natural drainage channels have been disconnected from the water. Oyster shells and other fill material have been used to establish new lands for building. Recent development projects have placed high-density residential development on lands historically suited to maritime uses.

The remaining marshlands and low-lying areas are vital buffers protecting neighborhoods from flooding. They are important now, but will be even more so in decades to come. The projected increases in sea levels will worsen the effect of storm surge and regular flooding events. Regulations and procedures regarding natural resources and sensitive areas are embodied in the City's adopted Chesapeake Bay Critical Area Ordinance.

Guiding Principles

- Sensitive natural areas play significant roles in the quality and health of Crisfield. Marshlands and wetlands help attenuate flooding, dissipate the energy of storm surges, prevent shoreline erosion, improve water quality, and provide protective habitat for native plants and wildlife. Wetlands help convey and store floodwaters and provide habitat for fish, birds, and other wildlife.
- Natural areas provide form to urban development. They define the edges of intensely developed areas and they provide wide, open spaces. Together these resources add to scenic beauty. Natural areas can connect various parts of a City and in so doing can become useful elements in City planning; they become environmental corridors--natural areas for stormwater management, flood control, and recreation.
- The underlying qualities of the land help determine which uses are viable. To the extent possible, the natural capability and characteristics of the land should guide land use development. Certain uses are incompatible with underlying natural conditions. Development in sensitive areas can cause irreparable harm for future generations. As an example, the historic pattern of filling and building on tidal marshes has worsened the effects of flooding in Crisfield. Development on very low-lying lands has exposed residents to both regular flooding and severe storm surge events.
- When an historic settlement pattern prevents certain underlying sensitive areas from fulfilling their natural functions, it is often preferable to continue that development pattern while seeking to restore some degree of those natural functions. Several conditions should be met before redeveloping in naturally sensitive areas: public health and safety should be ensured; adverse impacts to other resource areas should be minimized; the proper stormwater, flood control, and shoreline protection measures and infrastructure should be in place, and other important public needs or objectives should be met. Over the long-term, redevelopment in those sensitive areas already impacted by development should enhance the underlying natural areas.
- Sea levels are rising in the Chesapeake Bay region as described in Section 3 of this report. In areas prone to severe flooding, today's capital facility planning and development must recognize the need to locate investments where they will be secure from flooding decades into the future.
- Flooding impacts the lives and living standards of people. Flooding prevents people from getting to work on time or from attending religious services, for example. Regular flooding reduces the imperative to invest in property upkeep and affects business investment. Flooding and poor drainage cause structural damage to buildings. Dampness in the walls and foundations of buildings create unhealthy living conditions.

- Combining redevelopment and ecological restoration means rebuilding upon the City’s historic settlement pattern while repairing past resource damage and improving the functions of the underlying natural systems.

Objectives

- The remaining natural environmental features and sensitive areas, and the key roles each play in sustaining life and property in and around Crisfield, are protected from development and its impacts.
- A community of landscaped and natural spaces is developed over time, which knits together Crisfield as it grows.
- Gradually, key natural functions of the floodplain reemerge as land is thoughtfully redeveloped.
- Overall time, the total amount of impervious surface area within the existing borders of Crisfield is reduced.
- Through thoughtful redevelopment and an improvement in flooding conditions, an overall improvement in living standards is attained.

Policies

1. The Comprehensive Land Use Map and the Land Use / Natural Area Compatibility Chart will guide land use decision-making. The land use categories shown on the map are summarized in the table below and described in more detail in policy no. 2.

Summary of Land Use Plan Categories: Crisfield Comprehensive Plan

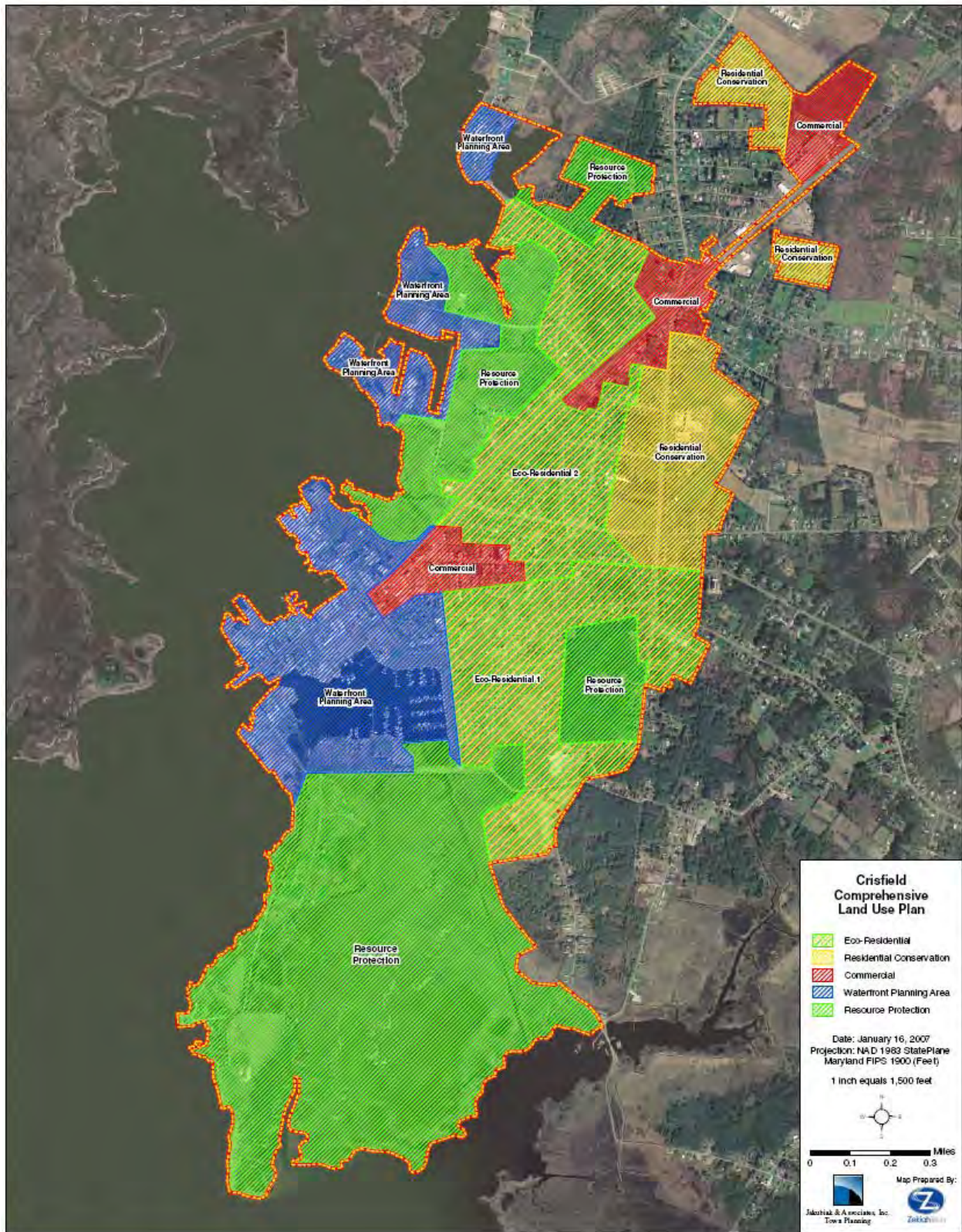
Resource Protection		
<u>Primary Emphasis</u>	<u>Character and Purpose</u>	<u>Primary Example Uses</u>
Environmental protection and conservation	Protect natural resources, promote recreational opportunities	Nature preserve, parkland, trails recreational trails, institutions, open space.
Eco-Residential Neighborhood 1		
<u>Primary Emphasis</u>	<u>Character and Purpose</u>	<u>Primary Example Uses</u>
Equal emphasis on residential rehabilitation and environmental restoration	Promote and safeguard residential setting protected from environment hazard while promoting reemergence of natural resource functions. No net increase in development density.	Multiple housing types, institutions, recreation, nature preserve, open space.
Eco-Residential 2		
<u>Primary Emphasis</u>	<u>Character and Purpose</u>	<u>Primary Example Uses</u>
Residential rehabilitation, infill, and environmental restoration, neighborhood commercial acceptable	Promote and safeguard residential setting. Promote Infill on vacant lots. No net increase in density (except through single-family infill).	Single-family housing, institutions, low impact commercial uses, open space.
Residential Conservation		
<u>Primary Emphasis</u>	<u>Character and Purpose</u>	<u>Primary Example Uses</u>
Residential conservation and infill.	Promote residential and institutional setting. Infill on vacant lots.	Predominately single-family residential types, institutions.

Commercial and Employment

<u>Primary Emphasis</u>	<u>Character and Purpose</u>	<u>Primary Example Uses</u>
Shopping, working.	Development and/or revitalization of commercial and employment uses.	Retail, office, light industrial, residential above commercial

Waterfront Planning Area

<u>Primary Emphasis</u>	<u>Character and Purpose</u>	<u>Primary Example Uses</u>
Working, recreation, tourism related.	Economic development, revitalization, economic restructuring.	Water-dependent uses, water-related uses, public recreation, resource preservation.



Land Use / Natural Area Compatibility

Land Use	Primary Sensitive Area					
	See Crisfield Elevation Map			Remaining Natural Shoreline	Tidal Marsh / Non-Tidal Wetlands	Remaining Intact Woodlands
	0-2 feet above sea level	2.1 to 3 feet above sea level	3.1+ feet above sea level			
Waterfront Planning Area						
Conservation of Existing Development						
Water-dependent uses	●	●	●	-		-
Non-water dependent uses	○	◐	●	-	○	-
New Development / Redevelopment						
Water-dependent uses	●	●	●	○	○	-
Non-water dependent uses	○	○	◐	○	○	-
Recreation						
Active (involves some land development)	◐	●	●	○	○	-
Passive	●	●	●	●	●	-
Resource Conservation	●	●	●	●	●	-
Outside of Waterfront Planning Area						
Conservation of Existing Development						
Neighborhood Conservation	○	◐	●	-	-	-
Neighborhood Infill (Limited to Vacant Lots)	○	◐	●	-	-	-
Commercial Revitalization	○	○	●	-	-	-
New Development / Redevelopment						
Residential, Neighborhood Redevelopment	○	◐	●	○	○	○
New Urban Development (non-residential)	○	◐	●	○	○	○
Recreation						
Active (involves some land development)	◐	●	●	○	○	○
Passive	●	●	●	◐	◐	●
Resource Conservation	●	●	●	●	●	●
<p>Key</p> <p>○ Incompatible</p> <p>◐ Limited Compatibility</p> <p>● Full Compatibility</p>						

2. The basis purpose of each land use designation on the Comprehensive Plan Use Plan Map is described below.

Resource Preservation

Lands designated as resource preservation should be off-limits to development and protected from development impacts.

Eco Residential-1

The Eco Residential-1 category encompasses parts of the City prone to severe and regular flooding. The designation recognizes that these land areas are vulnerable to regular flooding and the storm surge associated with major storm events, that the natural condition of this area was tidal marsh, that the underlying soils and hydrological conditions are not well suited to intense urban uses, that wetlands and drainage channels are present but artificially isolated from surrounding tidal marshland, and that streets which could serve as evacuation or rescue routes are inundated by flood waters during storm events.

Redevelopment for residential use in the Eco Residential-1 areas is acceptable but only if it restores natural functions and open spaces, links isolated wetlands and natural areas together to provide flood protection and aesthetic benefits, improves infrastructure to benefit living conditions; and provides a broad mix of housing across the affordability range. Redevelopment should not increase overall development density or the footprint of development.

Eco Residential-2

The area designated Eco Residential-2 is also vulnerable to both major storm events and regular flooding. Infill, increased housing/zoning code enforcement, and rehabilitation of houses are preferred means of redevelopment.

A similar focus on environmental management is warranted and both natural and structural improvements to mitigate flooding should be identified and implemented. Again, because of the area is vulnerable to flooding, no net increase in development density should occur, except through infill on vacant single-family residential parcels.

Residential Conservation

Land areas with the Residential Conservation designation are located at relatively higher elevations above sea level primarily on the ridge that runs along Somerset Avenue (see the Crisfield Elevation Map in Section 2). While the bulk of this area is also in the 100-year flood plain, because of its higher elevation and position in-land, it is more apt to be protected by severe storm surges (see Storm Surge Threat Map in Section 2). The area is developed largely in a low-density pattern with ample open space and institutional uses.

Commercial/Employment

Lands designated Commercial / Employment include both the central business district and the commercial area located near the intersection of Somerset Avenue and MD Route 413. Modest expansion of land devoted to commercial use near the intersection of MD Route 413 and Somerset Avenue is acceptable. Both areas should allow for a mix of residential and commercial uses.

Waterfront Planning Area

This designation recognizes that this area is a unique resource to Crisfield, that the land use changes that have occurred and are occurring present challenges to compatibility in land use, architectural design and resource conservation. The waterfront planning area should be the subject of detailed planning and urban and environmental design.

3. The following are the recommended elements of the waterfront plan:
 - A. A land use component showing the land use category for each parcel.
 - B. Recreational element that provides for broad public access to and public parklands along the waterfront, including a public walkway plan.
 - C. A cohesive set of architectural design standards for new buildings.
 - D. The identification and preservation of scenic vistas.
 - E. Design of standards for stormwater management, shoreline erosion, and flood control.
 - F. A plan for linking the marina into the central business district and heart of the downtown area.
 - G. A plan for the marina area, which should contain recommendations for broad public access to and throughout the site.

Decisions regarding the appropriate land use and redevelopment of the waterfront area could impede the progress of a waterfront plan. Therefore, this Comprehensive Plan sets forth the City's principal policies regarding the Waterfront Planning Area:

- A. The shoreline is a public resource and it should be managed to benefit the greatest number of people in the best way possible. Extensive and coordinated physical and visual access to the water's edge for the public should be attained.
- B. The Waterfront Planning Area has long been a working waterfront and is now also recognized as a catalyst for economic development and urban revitalization in Crisfield.
- C. The plan should establish a comprehensive shoreline access strategy to coordinate physical and visual public access.
- D. Water dependent uses—uses that could not exist except on the water--such as commercial fishing, some seafood processing, boat yards, ferry terminals, marinas, tug and barge companies, etc.--should be given the highest priority in locating and expanding. This recognizes that competition from other land uses has the effect of inflating land values to a point where such essential water dependent uses can become obsolete. These uses should be given full potential to capitalize on waterfront locations and should be protected from incompatible non-water-related uses, such as housing. By allowing non-water dependent uses on waterfront sites, the City loses the potential for uses that require a water access.
- E. Water related uses--those uses that benefit from a waterfront location, but are not dependent on it such as--resorts, restaurants, certain seafood processing and warehousing, should be permitted, but not necessarily directly on the shoreline.
- F. Suitable sites for developing non-water related uses, including housing, should be identified as part of the plan.
- G. No new residential development should be approved in the Waterfront Planning Area until the City adopts a waterfront plan. Upon completing the waterfront plan, the City should adopt specific zoning and design standards for the waterfront area.

4. In addition to any specific site planning, subdivision, and zoning requirements, the City Planning Commission should evaluate all redevelopment projects against the following ecological restoration criteria as part of its review:
 - Has an acceptable floodwater impact study been conducted to measure the extent of flooding under pre and post-development conditions?
 - Does the project advance best management principles in the non-structural management of stormwater, as a first priority before the use of structural improvements.
 - How does the project respond to the underlying natural resource base and its functions? Does the project provide for the reemergence of natural flood attenuation areas, for example?
 - To what extent does the project reduce impervious surface area over pre-existing conditions and include the planting of native vegetation.
 - Is the project accessible by at least one evacuation route in the event of major flooding (see Section 4.3 Action 1)? Are all structures built to the highest standards of flood protection?
 - To what extent does the project contribute to citywide infrastructure and ecological restoration improvements aimed at mitigating flooding. Does the project contribute funding to offset the impact of development in the floodplain?
 - Does the project conform to the Land Use / Natural Area Compatibility Chart and Generalized Land Use Plan Map.
5. Every development or redevelopment project within the floodplain should reduce impervious surface area over pre-existing conditions.
6. All remaining natural shorelines will be protected from the impacts of development.
7. The City will follow a policy of ecological restoration through redevelopment. All new development will contribute funds to offset their impact and hence protect the community from flooding. Projects will include: marshland and wetland restoration, improved floodgates, shoreline repair, and the design, construction and planting of wetland mitigation and flood conveyance corridors.
8. Future development will occur primarily through the expansion of the City northeastward. Lands shown to be inundated by the storm surge of a Category 1 hurricane (see Storm Surge Threat Map in Section 2) should not be put to an urban use. Instead, they should be used only for very low density uses, agriculture, or resource conservation.

Actions

1. Use the Town Zoning Ordinance and Subdivision Regulations to ensure that, where possible, development and its impacts avoid sensitive areas, including the submerged aquatic vegetation.
2. Review site plans for proposed development projects to ensure that all reasonable measures are taken to protect sensitive areas both during and after development.
3. In redeveloping waterfront areas, to the extent possible, establish buffer areas between the water's edge and buildings or parking. Plant the buffer areas in native vegetation to improve water quality and scenic beauty.

4. Seek land conservation and protection easements over tidal marshes and natural areas located roughly between Seventh Street and Lori Quinn Drive.
5. On lands planned for residential development, cluster new home sites on the least environmentally sensitive areas. When clustering, rely on the overall dwelling unit density rather than rigid minimum lot sizes to determine the number of homes that may be built. It is possible under this approach to reduce individual lots sizes and thereby avoid unnecessary impacts to natural resource areas. This flexibility should be used in preserving woodland areas, flood prone areas, drainage ways, scenic vistas, etc.
6. Institute a native species-planting program aimed at substantially increasing land area with vegetative cover. Use the State's forest conservation fee-in-lieu funds to meet planting goals.
7. Establish a per-capita public green open space goal and seek to achieve the goal through land acquisition, developer contributions, and cooperation with state agencies of government.
8. Consider creating a shoreline protection district wherein those properties that would directly benefit from creating and maintaining shoreline erosion and flood control improvements would contribute to the cost of those improvements.
9. Eliminate the R-4 zoning district from the Zoning Ordinance and bring the zoning map and ordinance into compliance with the Comprehensive Generalized Land Use Map.

4.2 REDEVELOPMENT CONSISTENT WITH COMMUNITY CHARACTER

As redevelopment occurs, Crisfield will benefit from pursuing thoughtful infill and revitalization strategies that respect community character: the traditional layout of neighborhoods and streets, scenic vistas, local building styles, and regional vernacular architecture.

Background

The Zoning Ordinance permits a level of land use and architectural incompatibility that is changing the character of historic maritime areas. In the waterfront area, high-density residential uses, which are now permitted, by special exception, in the Tourist Maritime district are incompatible with a working waterfront. The size, scale and positioning of the buildings has reduced visual access to the water, the potential for public physical access along the water, and defined a new skyline for the City. A strong demand for vacation homes or second homes in the region may continue to make Crisfield a center of development. Much of this development will take the form of redevelopment or infill—that is, the use or reuse of vacant or underutilized parcels of land.

Guiding Principles

- Infill development and/or redevelopment can occur in a manner that respects the size, scale, and use of existing and historic development patterns. Successful infill maintains and/or restores spatial continuity to streetscapes; strengthens neighborhoods; respects historic preservation, existing vistas, and natural resources; and introduces compatible uses that complement existing community attributes and needs.
- Growing in balance with community character for Crisfield means accommodating new development opportunities in a way that reinforces the small town maritime character.

Objectives

- High standards of design and aesthetics guide property development and redevelopment within Crisfield.
- The major vistas remain open and available for future generations to enjoy.

- The remaining waterfront industries are protected from the impacts of new development.

Policies

1. Insist on excellence in site design and architecture throughout Crisfield. Minimize automobile oriented site planning in commercial areas, which includes expansive parking lots, drive-through service windows, and large setbacks.
2. Keep the architecture of new buildings generally consistent in style, materials, size, and scale with neighboring properties; departing from this policy only when guided by an adopted plan that sets forth new architectural design standards. The height of new buildings in the Waterfront Planning Area should be determined in a coordinated way as part of the waterfront plan. For instance, the permissible height of new buildings might vary depending on location on the waterfront and the presence of the most vital view sheds.
3. Insist on strict enforcement of current appearance and building codes to uphold and improve, as needed, the appearance and quality of existing development and buildings.
4. The small boat harbor is a vital element of community character supporting both the economic and cultural heritage of Crisfield. It should remain in its present location and be protected from incompatible land use activities.
5. Promote a “Main Street” commercial and entertainment area for the central business district. Standards for parking, signage, and streetscape should promote theater, music, lodging, restaurant, and shopping opportunities. Illustrations in the Zoning Ordinance should set standards to facilitate the construction of streetscape infrastructure, pedestrian safety and accessibility improvements, a cohesive signage plan, and civic gathering spaces.

Actions

1. Protect the remaining public vistas of the water. The Town should protect public vistas with zoning and development plan review. In cases where waterfront development or redevelopment is planned, the project should provide for public vistas from points outside of the projects.
2. Treat landscaping as an integral part of site planning and design to accentuate public and private spaces, contribute to community identity, prevent visual blight, buffer incompatible land uses, and improve the function of the natural environment.
3. In reviewing development site plans, ensure that measures are taken to protect adjacent or nearby waterfront industries.
4. Create a downtown historic/entertainment district: Permit mixed use: allow commercial, office/employment, live/work, civic, and residential uses in close horizontal proximity to each other and vertically-integrated within the same building. Allow mixed-use (residential/commercial) redevelopment to encourage a downtown residential population, while maintaining ground floor space exclusively for commercial use.
5. Promote compatible and historically sensitive commercial buildings and residential units. The Zoning Ordinance should include illustrations that show and set standards for minimum percentage of glass frontage of commercial buildings; the size and placement of storefront awnings over sidewalks; building configuration, building placement on the lot and building function; the concealment of flat roofs and rooftop mechanical equipment; minimum and maximum build-to-lines; allowable public frontages; minimum lot frontage build out; the vertical orientation of windows and their placement on all exterior

walls of buildings; minimum and maximum lot widths; exterior building material; the minimum and maximum pitch of roofs, and, where applicable, the minimum and maximum base densities of residential units; general handicap accessibility standards for selected housing types; landscaping and screening; and the encroachment of stoops and porches into the depth of setbacks.

4.3 DEVELOPMENT IN BALANCE WITH COMMUNITY FACILITIES AND SERVICES

As new development or redevelopment occurs, Crisfield will benefit from programming the expansion of community facilities and services to correspond to demand and ability to pay and will locate those facilities with the City's environmental constraints and opportunities in mind.

Background

The number of households in City may be expected to grow from 1,172 in 2000 to nearly 1,500 by 2030. Many of the community facilities and services on which residents and business rely may need to be expanded to accommodate this growth. Some of the most vital community facilities, such as the hospital, fire station, and wastewater treatment plant are in areas prone to flooding and/or are on streets that are inaccessible during major flood events. The City has no network of open spaces and no public parks.

Guiding Principles

- Community facilities and services sustain and strengthen cities as population grows, provided their capacity, quality, and accessibility are looked after.
- Community and civic facilities are best when they are highly accessible to the resident populations they are intended to serve and expanded as warranted by demand.
- The programming of capital facilities through a Capital Improvement Program provides both public and private development sectors the intelligence needed to make sound real estate investments.
- Parks, open space, biking, and walking trails are vital elements of a healthy city.
- Growing in balance with community facilities and services for Crisfield means recognizing capacity constraints where they exist and ensuring that adequate and accessible services are provided in a cost effective manner.

Objectives

- Water and sewer services are expanded as needed to serve planned development.
- A sense of community identity throughout Crisfield is enhanced through the quality and accessibility of community facilities and services.
- Existing facilities and services are maintained, improved, and optimized as the City grows.
- A citywide park and open space network is established that serves the recreational needs of residents and tourists.

Policies

1. Wastewater treatment plant capacity will be expanded. Plan to locate a new wastewater treatment facility beyond the current borders of the City on lands not prone to flooding. Plan for the eventual de-commissioning of the existing plant.

2. The City will work to ensure that emergency and general hospital services remain accessible to City residents during times of severe flooding. Cooperate with the McCready Memorial Hospital and all relevant local, State, and Federal agencies to ensure a high level of disaster planning to protect the essential functions of the hospital and the safety of residents, patients, and staff in the event of major storm events.
3. Ensure that major capacity investments in new buildings and facilities are located and designed to withstand major flooding events and are assessable by roadway during times of flooding.
4. Locate new and/or redeveloped civic buildings, along pedestrian ways and future transit routes so that they are broadly accessible to the public. Renovate and/or expand the City Hall.
5. Use the street and highway functional classification map (See Section 2) to organize traffic planning and the routing of transit vehicles.

Actions

1. Conduct an engineering study to determine the improvements to streets and highways needed to ensure evacuation routes in times of severe flooding. Elevate sections of the arterial and collector road systems that currently flood. Consider elevating the sections of MD 413 that act as a levy against storm surges or otherwise design measures to hold and safely convey floodwaters.
2. Develop a signing program that directs pedestrians and motorists to the civic uses in the City.
3. Expand and improve public water supply and wastewater treatment capacity and infrastructure to serve anticipated development as warranted by demand.
4. Continue to monitor growth and development and work cooperatively with police and fire agencies to ensure that the current good levels of service are maintained over time.
5. Cooperate with the County on school issues to ensure that the schools attended by the City's children retain their quality and accessibility.
6. Prepare a park and open space plan and actively acquire and improve land for recreational use. Build a network of walkway and bike trails that connect natural areas and developed sections of the City and provide access to the water's edge. Seek to ensure public access to the water's edge through the development review process.

4.4 DEVELOPMENT IN BALANCE WITH REGIONAL PLANNING POLICIES

As new development or redevelopment occurs, Crisfield will benefit from cooperation with State agencies of government, Somerset County and other concerned levels and units of government

Background

In general County and State growth management polices seek to direct new residential and commercial development to planned and designated growth areas. These areas, which have become known as priority funding areas, include Crisfield. There is a need for long-term cooperation on the part of the State, County, and City.

The schools in the Crisfield are operated by the Somerset County Board of Education and the Corbin Memorial Library in Crisfield is operated by Somerset County. The Crisfield-Somerset County Municipal Airport is located

outside of the City. A working understanding between the City and Somerset County allows the City to extend sewer service beyond its boundaries without annexation. Shore Transit operates transit service over a three-county area providing connections between Crisfield and Salisbury as well as the Crisfield loop bus route that provides service to main points of interest within the City. The Somerset County Economic Development Commission seeks local industrial investment that will benefit City residents. The Somerset County Department of Emergency Services prepares and periodically updates the emergency operations plan covering Crisfield in cooperation with the Maryland Emergency Management Agency and with FEMA.

The main access routes into Crisfield are State-owned. The Maryland Departments of the Environment and Natural Resources, including the Critical Area Commission, figure heavily in regulations concerning land conservation and development in the City. The Maryland Department of Natural Resources owns and operates the Somers Cove Marina. The State Departments of Planning, Transportation, Natural Resources, Business and Economic Development, and Housing and Community Development administer grant programs intended to benefit towns and cities.

Guiding Principles

- Implementation of a municipality’s priorities and plans can be advanced when a city coordinates the planning of local projects with the broader policy goals of other jurisdictions and agencies of government.
- Cooperation among jurisdictions is important for long-term plan implementation because it:
 - Clarifies varying development goals and the roles of the actors in community development.
 - Recognizes the sources and directs the uses of political and technical input and support.
 - Helps define priorities and guide the allocation of resources by eliminating conflicts and linking previously un-related efforts.
 - Helps to yield structures and response systems, which can link the City with non-local public and private resources.

Objectives

- Coordination with neighboring jurisdictions and other governmental units and agencies contributes to sound and responsible growth and development policies.

Policies

1. The City will work cooperatively with county, state, and federal agencies to advance the important interests the City shares in responsible planning, economic development, and the improvement of essential services.
2. The City will work cooperatively with the County to identify areas that are suitable for future urban development beyond the current municipal limits.

Actions

1. Work with the State to improve drainage and flood mitigation measures along MD Route 413 and to maintain the efficiency of state owned highways in the City and achieve other projects that meet shared objectives.
2. Work with the Maryland State Highway Administration and Somerset County to improve the safety and capacity of MD Route 413 and specifically to advance the proposed reconstruction of MD 413 to implementation.¹

¹ The Maryland State Highway Administration’s (SHA) Highway Needs Inventory calls for reconstruction of MD Route 413 from the City limits to MD Route 13. It also calls for an access management project at the intersection of the two highways. The

3. Accessible transit service is vital to economic development. Cooperate with Shore Transit to ensure that public transit services are expanded as needed to serve City residents.
4. Continue to work with the County and State economic development officials to promote employment development, the reuse of industrial properties, and the revitalization of commercial space in the central business district.
5. Continue to work with Somerset County in the planning of sanitary sewer treatment to ensure that capacity is expanded to accommodate growth and development.
6. Work with the State to ensure that any ownership and operational plan for the Somers Cove Marina substantially advances the City's interests in how the marina should be used, operated, managed, and developed.
7. Continue to work with the Somerset County Economic Development Commission to help attract employment opportunities that will benefit local residents, including entry-level jobs in the hospitality industry for young workers.
8. Continue to work with the Somerset County Department of Emergency Services to ensure that the emergency operations plan remains consistent with the needs of City residents.
9. Work with the State Highway Administration and Somerset County to develop an access control management strategy along MD Route 413 from Marion to Crisfield City limits. The primary goal would be to promote and protect the safety, efficiency, and natural beauty of the highway corridor as it approaches the City limits, as development may occur.

4.5 THE PEOPLE OF CRISFIELD - REINVIGORATING NEIGHBORHOODS

The benefits of development and redevelopment will contribute to all residents of the City.

Background

There is a profound human dimension to planning, to development, to growth and change in a city. Major decisions about development have a direct bearing on the quality of life and indeed, the living standards of residents.

With the decline in traditional fishing and manufacturing industries, there are challenges to maintaining the quality of neighborhoods. One half of the City's housing units were built before 1950 and 14 percent of all units are vacant. The wage-earning potential of many residents to support owner-financed revitalization is limited: only half of residents over 16 years of age are part of the labor force; 34 percent of residents are below the poverty level; the median household income for owner-occupied households is \$31,000 and the median income for renter households (which comprise slightly more than half of all households) is \$11,600. An aging housing stock combined with low renter income (which reduces the incentive to invest in property upkeep) contributes to diminishing housing quality.

Reinvigorating Crisfield as a city of neighborhoods means directing new planning, development and investment initiatives into arrangements that strengthen the City's people and the City's small town character. Eleven percent of the City's residents are over 65 years of age. Twenty-eight percent of the City's residents are under the age of 18. A single parent heads two-thirds of those households with children. About 46% of families with children under five

project should have recognition and support by Somerset County as a "priority project" for inclusion in SHA's Consolidated Transportation Program (CTP) before funding is committed to the project.

years of age have incomes below the poverty line. Accessible recreational opportunities and the institutions that nurture young people are limited and uncoordinated.

Guiding Principles

- A profound human dimension and quality takes precedent over the built environment. A community and its aspirations and the individual and his or her aspirations, whether attained or unrealized, are always present. Changes in the built environment affect people's lives. Environmental protection and thoughtful development decisions have a direct bearing on the living standards and the quality of life of a city's residents. Thoughtful planning and development can raise the quality of life for an entire community.
- A healthy city integrates its young people into the fabric of community life; provides safe places, opportunities, and experiences for the all residents to interact. Institutions that nurture the young and pass on the unique cultural heritage are encouraged.
- A city's waterfront is a public resource, a good held in common. Its use should benefit as many people as possible. A maritime community, like Crisfield, has a stake in its waterfront.
- Places for city residents to gather are important; these are civic places; places for the discussion of matters of public purpose and places for community-wide celebrations.
- The cost of living and housing affordability are essential factors to consider and address as redevelopment occurs in a city, to ensure that existing residents are not priced out of the housing market.

Objectives

- The energy and resources of development and redevelopment are harnessed to provide meaningful improvements in the neighborhoods of Crisfield.
- The City and its institutions focus in a concerted manner on improving opportunities for the City's children, young adults, and young families. Institutions that support and nurture children are energized and focused. Crisfield is a community that actively seeks to retain its young people. Entry-level employment opportunities are encouraged.
- An affinity for the maritime economy and its potential is widely shared. That experience and knowledge is passed on to the young in Crisfield in ways that point to economic opportunity.
- Ecological restoration is viewed as a participatory learning process joining professionals and experts working for the City with people living in Crisfield.
- Those traditional maritime industries that are not required to be located on the waterfront will have a place in the community to continue and expand their operations.
- The collective efforts of concerned citizens, organizations, businesses, and governmental agencies are harnessed to promote sustained economic growth.

Policies

1. To promote the re-invigoration of existing neighborhoods, the City will consider how best to direct an increment of tax revenues from new development to actual improvements in existing neighborhoods.

Improvements that have the dual benefits of improving the quality of life and promoting private capital investment include: improved code enforcement, removing blighted structures, infrastructure repair, flood control, stormwater management, tree planting, and beautification. Revolving loan funds to assist existing homeowners to rehabilitate properties may also be funded through new tax revenues or through negotiated annexation agreements.

2. The Somers Cover Marina and its associated lands are a vast area of open space, permitting access to the water for citizens, boat owners, visitors, and the like. This area should remain Open Space without any new development since there are many local established businesses such as restaurants, confectionaries, repair facilities, hardware, and marine related stores within walking distance in the downtown business district.
3. Development or redevelopment projects will cover the costs of the impacts to the community. For example: if a development project is found to impact the quality of a road, approval of that project will be conditioned on the developer resolving that impact. If a development project is found to impact flooding, approval of the project will be conditioned on the developer resolving that impact.
4. The City will seek to assist maritime industries is remaining in the community including those maritime industries that are not required to have a waterfront location.
5. In future housing planning, the Crisfield Housing Authority, the City, and developers will seek to avoid concentrations of poverty by mixing housing units together across the spectrum of affordability.
6. The City will seek contributions by developers and cooperation with other agencies of government, including the Somerset County Park Commission, existing groups, and citizen volunteers to create a park and recreational system. Recreational opportunities should be available for people of all ages and abilities. The system should contain large open spaces, biking and walking trails, and a center for dance, music, art, and related activities.
7. The City will insist on strict enforcement of current appearance and building codes to uphold and improve, as needed, the appearance and quality of existing buildings and lots. Dilapidated, blighted, and unsafe houses will be condemned and razed.
8. All development projects will have sidewalks and will provide direct and safe pedestrian access to the City's existing network of sidewalks.
9. The City's historic structures will be preserved and rehabilitated where necessary. The integrity of the historic district will be protected. Incentivize the adaptive reuse of historic buildings throughout the City and especially in the City's Historic District: assisted by City staff, property owners may be offered tax incentives to rehabilitate and redevelop historic downtown properties.
10. The City will pursue economic development initiatives designed to increase the number of jobs in high paying and growing sectors of the economy and retain current employment opportunities.

Actions

1. Document and publicly interpret the City's natural resources and their functions. Create a program that describes these resources. It may include interpretive signs, boardwalks, and trails. Coordinate this with a citywide recreational trail system.
2. Work with the County Department of Emergency Services to widely disseminate and seek input on community wide emergency management and operations plans.

3. In the development review process, the Planning Commission should require that developers mitigate the impacts of properties and projects to community infrastructure and natural resources upon which the City depends.
4. Obtain the services of professional town planners and municipal engineers in the review and approval of all development projects.
5. Expand City Hall, most notably the city council chambers.
6. Improve the enforcement of zoning and building codes.

4.6 IMPLEMENTATION

Implementation brings people together so that their interactions produce successful outcomes. A concerted effort at implementing the Comprehensive Plan in Crisfield would:

- Clarify varying development goals and the roles of the actors in community development.
- Recognize the sources and direct the uses of political and technical input and support.
- Help define priorities and guide the allocation of resources by eliminating conflicts and linking previously un-related efforts.
- Help yield structures and response systems, which can link the City with non-local public and private resources.

Cooperation on implementation can occur between the City and other agencies of government, its citizen volunteers and citizen groups and with private developers. Citizen involvement and leadership can be an important element of plan implementation.

Funding Mechanisms

Public sanitary sewer service and water supply are provided through an enterprise fund meaning that expansions of capacity are financed by new system users and should not be funded through the general fund of City government. This should remain so and connection fees should be set at a level that allows for the timely expansion of the systems.

The City should produce and maintain a five-year Capital Improvement Program (CIP). A CIP is a financial planning tool allowing the City to schedule infrastructure priorities with available and projected revenues. It identifies capital projects and revenue sources, which in any given year may include general obligation bonds, general fund balances, county, state, and federal grants, impact fees, etc.

The City should work with the funding programs administered by Somerset County and State agencies to implement key priorities. The City should cooperate with State agencies of government to obtain grants and other funding for planning and projects that benefit the City and its residents.

The City should place its impact fee revenues in separate accounts set aside to fund the cost of specific capital expansions. The City should periodically assess its impact fees and set the fee at a level that covers the City's cost of making improvements needed by new development.

Where it is found that a development project will have off-site impacts, the Planning Commission should require, as a condition of development approval, that the developer finance, at his/her expense, studies to quantify those impacts. The developer should cover the cost of resolving impacts created.

Regulatory Mechanisms

Zoning regulates the use of land and the intensity and character of development and redevelopment. It is perhaps the most effect tool in guiding a City's physical development. Changes will need to be made to the Zoning Ordinance and Map so that they conform to the Comprehensive Pan.

Subdivision Regulations establish the requirements and standards for the subdivision of land and the construction of infrastructure to serve new development. In addition, they establish the requirements and standards for ensuring that adequate public facilities such as street capacity and public water and sewer services are maintained. Developers of all significant projects should be required to submit studies of their impacts on the City and its public facilities and services.

The City should enforce its Chesapeake Bay Critical Area Protection Program and update it as required by law and/or changing conditions.

Continued Planning Program - Building Capability to Manage the Planning Process

City planning is a continuous process. The monitoring and review of public and private development projects is an essential task. This Comprehensive Plan provides a guide to the City as it considers new projects and programs. The City should formally re-evaluate, and update as necessary, this Comprehensive Plan six years from adoption. This is required by Article 66B of the Annotated Code of Maryland.

The City Planning Commission should conduct a yearly assessment of growth and development in conjunction with their Annual Report responsibilities per Article 66B. The annual report should be made available to City residents, neighboring jurisdictions, and the Maryland Department of Planning.

All proposed capital projects in Crisfield that affect physical growth and development should be referred to the Planning Commission for its review per Article 66B of the Annotated Code of Maryland.

The City should hire a professional planner or obtain ongoing consulting town planning and municipal engineering services. Services can be funded in part through plan review fees recently adopted.

4.7 CONCLUSION

The Crisfield Comprehensive Plan highlights the challenges and assets of Crisfield. It presents a compelling image for the future. It sets forth policies that will help shape the future in the public's interest. A public forum was created in the act of preparing this plan. In this forum discussions about the vital aspects of city development took place—the presence of natural resources and their functions, the impact of past development decisions on the lives of both neighborhoods and individuals, aspirations for the waterfront and the marina, concerns about the location, amount and impact of recent waterfront redevelopment, fears about changes in community character, the limited capacity to handle more growth and the uses of remaining sewer capacity, the need to protect and strengthen the maritime heritage, the need to ensure that development's benefits are broadly shared.

In its preparation, the plan has succeeded in bringing to light important ecological relationships, the natural assets of Crisfield—and its scenic beauty--and the character and ingenuity of its people. By itself and from this point onward, however, the document does nothing. People who live and know a place must work toward a plan's vision. Crisfield will determine whether the ideas in this Plan will thrive and become a legacy to succeeding generations. The truth is that implementing the Plan will require much work. The Plan's systematic approach to restoring natural resources through physical and economic redevelopment, for example, will require ongoing effort, coordination, and commitment.

The preservation and restoration of ecological resource within the City, the revitalization of neighborhoods and the central business district, the responsible development of the waterfront, the achievement of broadly shared and sustainable economic growth; these things are all related and are all long term endeavors, extending generations into the future. They are endeavors, which recognize that unique and vital relationships exist in Crisfield. Realizing these ideas will reveal the unshakable belief citizens have in the vitality of Crisfield and their pride in developing and nurturing its unique assets.

SECTION 5: MUNICIPAL GROWTH

5.1 INTRODUCTION

Newly adopted amendments to Article 66B require that municipalities must:

- include a Municipal Growth element in the Comprehensive Plan that specifies where the municipality intends to grow outside its existing corporate limits;
- complete an analysis of land capacity available for development, including infill and redevelopment and an analysis of the land area needed to satisfy demand for development at densities consistent with its master plan; and
- share with other planning agencies an annexation plan that is consistent with its growth element in the comprehensive master plan.

The Crisfield Municipal Growth element was added to the 2007 Crisfield Comprehensive Plan in 2009. The purpose of the Municipal Growth element is to examine the interrelationships among land use, population and housing growth, and the related impacts on public facilities and services. The findings provide City officials with a more informed basis for setting land use and growth management policies in the future through a better understanding of the multi-dimensional implications of change.

The Municipal Growth element is based on projections and assumptions about the City's future (e.g., population projections, average household size, school age students per household, etc.) which may not prove out in the future. The City recognizes this possibility. When new or significant trends or events are counter to basic assumptions underlying the conclusions of the Municipal Growth Element the City will revise the Comprehensive Plan as necessary and appropriate.

5.2 POPULATION AND DWELLING UNIT PROJECTIONS

Projecting demand for land in the planning period is complicated by a number of factors. Although there has been substantial building since 2003, much of the construction activity involves condo units primarily for seasonal or part-time use. These developments (existing and planned) include the following:

- Captains Quarters: four-story multi-family: 16 units
- Waters Edge: townhouses: 68 units
- Captains Galley: six-story multi-family: 23 units
- Harbour Lights: two five story and two six-story buildings: 127 units
- Tangier Sound Condominiums at 1089 Somers Road (Jersey Island): eleven four-story buildings: 234 units
- Locust Street Development1: 6 units
- Ball Park Subdivision (in City Limits): 11 units

170 of the 485 planned condo units have been built. While these projects will impact water and sewer use, they will not necessarily affect population projections if occupants are not counted as permanent residents of the City.

Recent economic trends suggest that basing population projections on building activity may substantially overstate expected gains (at least in the short term). One need only consider the recent trend in new residential construction (as indicated by building permits issued) to see how the downturn in the nation's economy has affected projected City growth (see Table 5-1).

Table 5-1
Residential Building Permit Activity
1997 – 2009

Year	Building Permits
1997	7
1998	6
1999	12
2000	12
2001	9
2002	7
2003	71
2004	68
2005	105
2006	9
2007	4
2008	2
2009*	0

According to a recent MDP white paper:

“Population growth continued to slow throughout most of Maryland in the July 1, 2007 to July 1, 2008 period, according to recently released population estimates from the U.S. Census Bureau. This slowdown can be attributed to the deterioration of the economy and the collapse of the housing bubble, both of which influenced the size and direction of domestic migration flows.

Particularly affected by the slowdown were formerly fast-growing, suburbanizing rural jurisdictions, like Cecil and Washington counties, that had their smallest population gains since 1983 and 1999 respectively. Additionally, long-term fast growing outer suburban counties like Frederick, Charles and Calvert, also experienced their slowest growth in decades. The slowdown in growth in these and other counties was manifested primarily in smaller gains from domestic migration. In all, two thirds of Maryland’s jurisdictions (16 out of 24), experienced net domestic out migration in the 2007/2008 period. Five of these jurisdictions – Baltimore City and Baltimore, Prince George’s, Somerset and Allegany counties – did not have other sources of population growth (such as births or international migration) sufficient enough to overcome these domestic outflows and thus experienced population declines.”²

Declining population is not new to the City. In the period 1960 to 2000 the City population declined by 23 percent or a little over 0.6 percent per year (see Table 5-2). More recently the Bureau of Census estimates the City population increased to 3,749 by July 2008.³

² White Paper, *Statewide Slowdown in Growth Affects Most Jurisdictions Net domestic outmigration experienced in 16 of 24 jurisdictions*, Maryland Department of Planning, http://www.mdp.state.md.us/msdc/Pop_estimate/Estimate_08/county/dw_popest_cnty08.htm

³ U.S. Census Bureau, Population Division. Release date: July 1, 2009

**Table 5-2
Population Trends – Crisfield and Somerset County
1960 - 2000**

	1960	1970	1980	1990	2000	Change 1960 - 2000	Percent Change	Annual Rate
City of Crisfield	3,540	3,078	2,934	2,880	2,723	-817	-23.08%	-0.65%
Somerset	19,623	18,924	19,188	23,440	24,747	5,124	26.11%	0.65%
% of County	18.04%	16.27%	15.29%	12.29%	11.00%			

Source: Crisfield Comprehensive Plan

Factors contributing to Crisfield’s population decrease since 1960 included:

- The decline of the Chesapeake Bay fishing industry;
- Decline in other industrial and manufacturing employment; and
- A decrease in the average household size.

There are few indications any of these factors has changed. The Chesapeake Bay fishing industry continues to decline. Shrinking industrial and manufacturing employment is an unabated nationwide trend. If the City’s average household size follows that of the County it is expected to be slightly more than 2 persons per household by 2030 (see Table 5-3) and average about 2.19 persons per household through the planning period.

**Table 5-3
Projected Average Household Size
Somerset County and City of Crisfield
2010 - 2030**

	2010	2015	2020	2025	2030
Somerset County*	2.25	2.21	2.19	2.17	2.13
City of Crisfield**	2.30	2.26	2.24	2.22	2.18

*Source: Somerset County – MDP

**City of Crisfield – Peter Johnston & Associates

With the preceding factors in mind, the population projections used in this Municipal Growth element (see Table 5-4) are based on the following assumptions:

1. The City’s population will grow at an average annual rate of 0.75 percent over the planning period.
3. The population in group quarters will remain constant at 33 through the planning period.
4. The vacancy rate will remain at about 14 percent.

**Table 5-4
Population Projections
2010-2030
Somerset County and City of Crisfield**

	2010	2015	2020	2025	2030	Change 2010 - 2030	Percent Change	Annual Rate
Crisfield	2,790	2,897	3,007	3,121	3,240	450	16.12%	0.75%
Somerset	26,550	27,500	28,300	28,950	29,350	2,800	10.55%	0.50%
	10.28%	9.85%	9.94%	10.11%	10.48%			

Source: Peter Johnston & Associates

Evaluating development capacity (land, water, sewer, etc.) is based on an estimate of new residents, dwelling units, and nonresidential (commercial and industrial) growth the City may experience in the planning period. These estimates provide a basis for assessing the City’s ability to accommodate growth.

A key unit of measure for assessing potential impacts is the number of new occupied dwelling units (see Table 5-5). Also noted, the median year built for owner occupied housing in 2000 was 1949. By the end of the planning period nearly 70 percent of the occupied dwelling units will be 60 years old and over half will be 80 years old.

**Table 5-5
Projected Dwelling Units
City of Crisfield**

	2010	2015	2020	2025	2030	Change 2010 - 2030
Population	2,790	2,897	3,007	3,121	3,240	450
Ave HHLD Size	2.25	2.21	2.19	2.17	2.13	
Total Dwelling Units	1,458	1,514	1,572	1,620	1,695	238
Occupied Dwelling Units	1,259	1,307	1,358	1,410	1,464	205
Vacant Dwelling Units	199	206	214	210	231	32

5.3 DEVELOPMENT CAPACITY

Residential Infill and Redevelopment Capacity

Residential infill potential examines theoretical development capacity associated with development on vacant and underutilized land in the City (see Map 5-1). Among other things this exercise allows City officials to quantify land development capacity within the existing corporate limits to determine if capacity is adequate to accommodate projected population and economic growth. In the case of population growth City officials evaluated land capacity in terms of land required for approximately 200 additional occupied dwelling units by 2030 and 450 new residents.

Infill capacity is based on the number of vacant or underutilized properties in the City that could be developed. “Vacant” land is undeveloped properties of a suitable acreage for development. “Underutilized” means those properties that exhibit significant “underdeveloped” traits such as large land acreages with one existing dwelling unit located in the City. While large unused parcels are rare in Crisfield, many smaller parcels throughout the neighborhoods are vacant or underutilized. These properties were identified using Maryland Property View (MPV) data, verified from recent aerial photography. Table 5-6 summarizes the acres of vacant and underutilized land in the City.

**Table 5-6
Vacant and Underutilized Land
City of Crisfield**

Description	Acres
Vacant Land	134
Underutilized Land	11
Total	146

Table 5-7 summarizes Crisfield’s residential development capacity. The results of the development capacity analysis

demonstrate that the City has adequate land capacity to accommodate its projected population growth.

Residential development capacity, as summarized in Table 5-7, reflects current land use patterns and zoning policies. In the *2008 Crisfield Strategic Revitalization* (SRP) included a master redevelopment plan for portions of the City, including 330 residential units owned by the Crisfield Housing Authority. The SRP master plan presents a concept for redevelopment of vacant and underutilized properties with a combination of more intense horizontal and vertical mixed use development than is implied under the current zoning classifications. As shown in Table 5-7 full implementation of the SRP master plan could result over 1,700 new residential units.

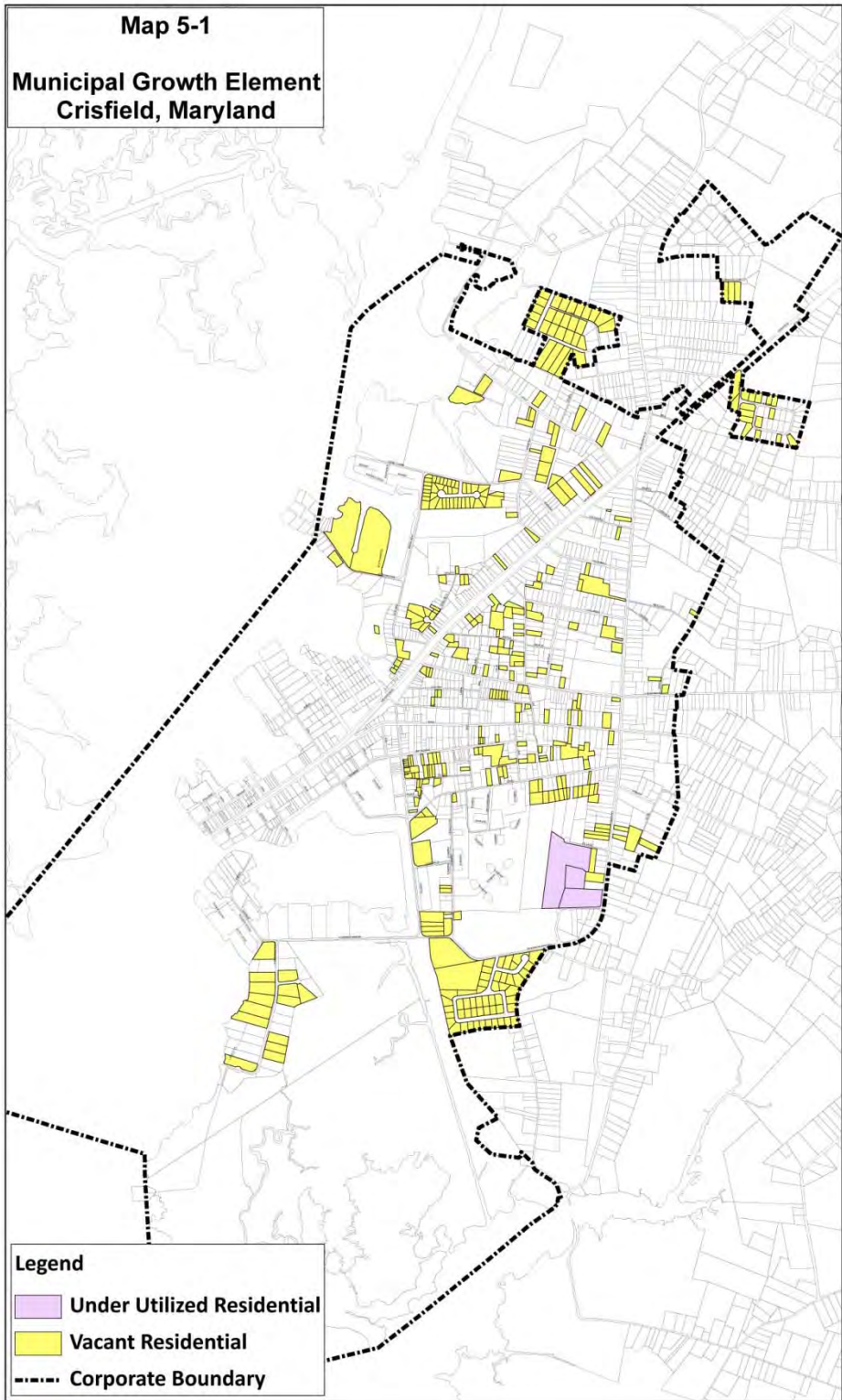
**Table 5-7
Residential Infill Development Capacity
City of Crisfield**

Unit Type	Capacity	
	Units	Population
Detached Single Family Residential	343	751
Attached Single Family*	131	287
Multi-Family*	409	896
Total	883	1,934
Added - SRP Master Plan	893	1,956
Total - with SRP Master Plan	1,776	3,889

* Concept plans approved

Non-Residential Infill and Redevelopment Capacity

Analysis of vacant commercial and industrial property (see Map 5-2) indicates that the City has sufficient land capacity to support approximately 100,000 square feet of additional commercial building and an additional 100,000 square feet of industrial building within the corporate limits. Calculation of non-residential uses (Gross Floor Area or GFA) utilizes a 0.32 “Floor Area Ratio” (FAR) factor for commercial uses and 0.17 FAR for industrial uses. Projected commercial and industrial land use was based on an assessment of commercial and industrial floor area to population ratios in the City and elsewhere in the county. The values used were 50 square feet of commercial floor area per capita and about 19 square feet of industrial floor area per capita.



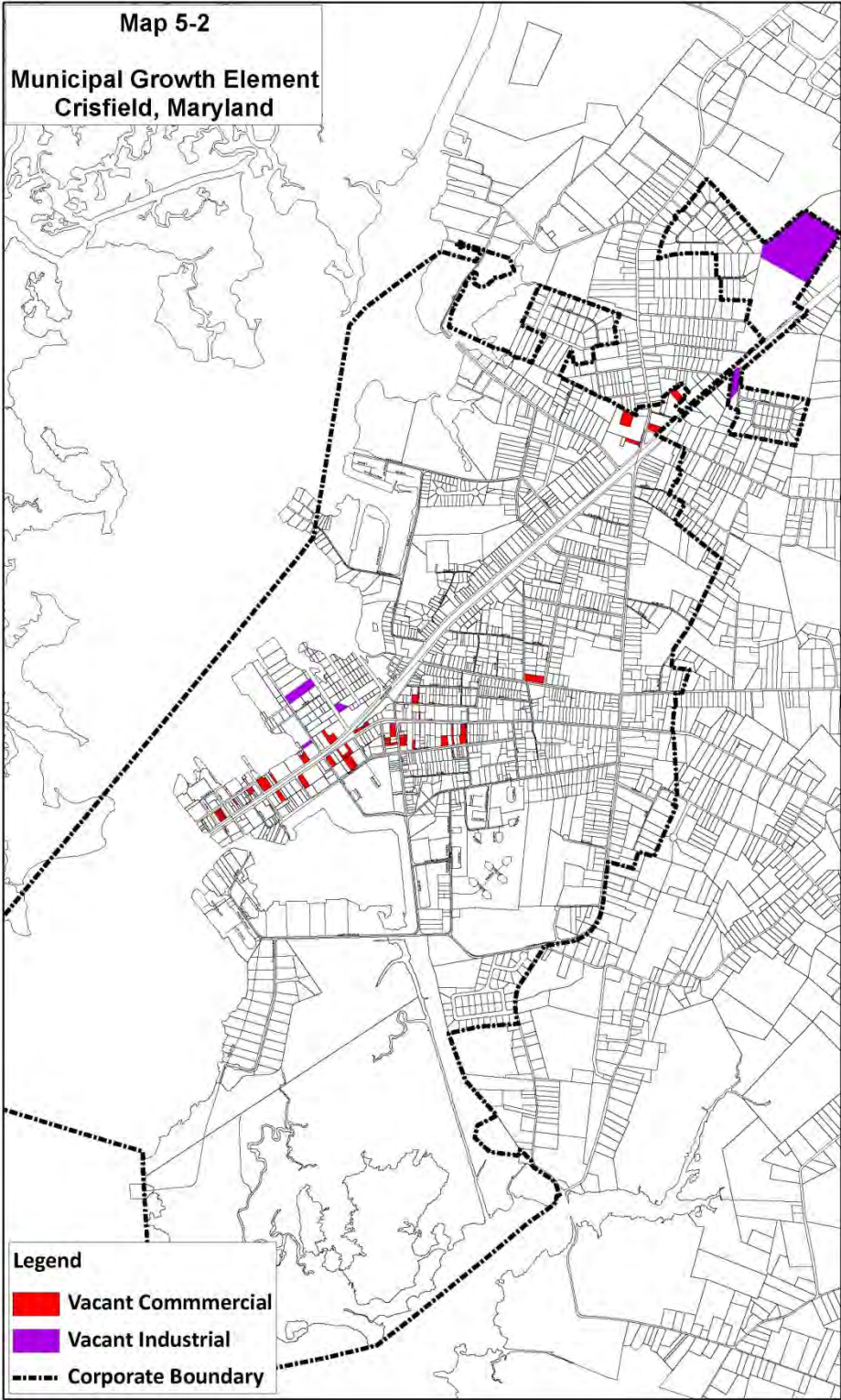


Figure 5-1



5.4 IMPACTS OF GROWTH

2030 Growth

Population, housing and economic growth will impact public services and facilities provided by Crisfield and Somerset County. Table 5-8 summarizes the potential impacts on public facilities and services (City and County) of growth resulting from infill and redevelopment and based on the City’s projected population growth through 2030. “Impact” is derived by multiplying the “service measure” by the “service unit”, i.e., either new households or new population. Households and occupied dwelling units are used interchangeably in the analysis. In some cases the multiplier represents a generation rate, e.g., the average number of students in a household or the average number of gallons of sewer that flows from a dwelling unit. In other cases, the “service measure” may represent the current level of service provided by the City, e.g., the City employs 0.43 police officers per 1,000 new residents.

**Table 5-8
Municipal Growth Impact Estimates 2010-2030
City of Crisfield**

FACILITY/SERVICE	IMPACT	SERVICE MEASURE	SERVICE UNIT
SCHOOL (new students)	98	0.476	Per household
- High School	32	0.154	Per household
- Middle School	22	0.107	Per household
- Elementary School	44	0.215	Per household
TOWN ADMIN./MEETING (GFA)	153	0.34	SF Per capita
PUBLIC WORKS (GFA)	1,502	3.3	SF Per Capita
LIBRARY (GFA)	348	0.77	SF Per Capita
RECREATION LAND (acres)	13	30	Acres per 1000 pop.
POLICE			
- Officers	0.19	0.43	Per 1,000 population
- Support Staff	0.10	0.22	Per 1,000 population
- Squad Cars	0.21	0.47	Per 1,000 population
FIRE & RESCUE			
- Personnel	2	3.58	Per 1,000 pop
- Facilities (GFA)	1,019	2,265	Sq. ft. per 1,000 pop

In calculating impacts associated with Crisfield’s growth in the planning period the City utilized the following sources and assumptions:

- Future population and dwelling unit projections from 2010 to 2030, as described in this section;
- Multipliers for school enrollment derived from St. Mary’s Educational Facilities Plan, Maryland Department of Planning Models and Guidelines publication 25, entitled, *Writing the Municipal Growth Element to the Comprehensive Plan*;
- The current City level of service for Municipal Administrative space (current space per thousand people provided by the City);
- American Library Association (library facility square footage multiplier); and
- Police and fire level of service measures (LOS) are based on the level of service currently provided by the City

Public Schools: If Crisfield reaches the projected 2030 population growth, 98 new students will be enrolled in local schools. Due to decreasing enrollment trends Somerset County public schools are expected to have adequate

capacity through 2030 (see Table 5-9). “Although three individual schools have experienced enrollment increases since 1998-99, the overall enrollment for Somerset County Public Schools has declined by 4.27 percent for the five-year period. Projections for the next six years indicate a continuation of this trend.”⁴

Table 5-9
Somerset County Public
Analysis of Building Capacity and Enrollment Schools
2002-03 and Projected 2007-2008 School Years

SCHOOLS	State Rated Capacity	2008 Actual Enrollment	% of State Rated Capacity
Crisfield High School	679	423	62%
Woodson Elementary	636	592	93.08

Source: Maryland Department of Planning

Municipal Administration and Meeting Space: The existing City Hall houses the City’s administrative offices/functions and provides meeting space for City officials and the public. The current level of service is about 340 square feet per 1,000 residents. If the City is to maintain this service level an additional 153 square feet will be required by 2030.

Public Works Space: Crisfield’s public works functions include operation of the City’s water and sewer systems, street maintenance and trash collection. Public works are housed in two buildings with a combined total of approximately 3.3 square feet per capita (based on 2000 City population).

Library: Somerset County currently provides library facilities at the Corbin Memorial Library located 4 East Main Street. The building provides approximately 0.77 square feet of floor are per capita based on the City’s 2000 population. The Somerset County Library Board is planning a new 15,000 square feet library facility to serve the City and surrounding areas. This new facility will adequately address the impacts associated with the City’s projected population growth through 2030.

Police: The Crisfield Police Department provides police service in the City. There are currently twelve sworn officers, six support staff, and one K-9 dog (“Bach”) on the force. The Department has 13 squad cars, many equipped with mobile data terminals, to respond to emergencies. Based on current level of service measure the City’s projected population growth will not require adding personnel or equipment to what is currently provided.

Recreation Land: Applying the Maryland Department of Planning’s planning factor of 30 acres per every 1,000 people, approximately 10 acres of additional recreation land will be required to serve City residents by 2030 and achieve this level of service.

Fire and Rescue: The Crisfield Volunteer Fire Department provides fire protection in the City. The fire department is housed in a 9,320 square foot building on a City-owned lot located on MD Route 413. The company’s service area encompasses the City. The Department has a permanent staff of ten line officers and firefighters. Projected impacts on fire service are minimal and should not require major expenditures for addition building space and personnel.

Water and Sewer Facilities: See Chapter 6, Water Resources for a discussion of growth impacts on water and sewer facilities.

⁴ An Evaluation of the Effect of Increased State Aid to Local School Systems Through the Bridge to Excellence Act, A Final Report by MGT for the Maryland State Department of Education, 2008

Build-Out

The build-out analysis assesses the impacts on community facilities and services provided by the City, County and other community organizations should the maximum development potential (residential, commercial and industrial) of the City be realized. "Maximum potential" was derived from the development capacity analysis the results of which are summarized in Table 5-7. Figures 5-2 and 5-3 illustrate the changes in the City's building pattern from 2009 to build-out.

These impacts are anticipated at some unspecified time beyond the planning period (after 2030). Estimated impacts on community facilities and service associated with build-out of the City of Crisfield are summarized in Table 5-10.

Table 5-11 summarizes an alternative scenario - build-out impacts with full implementation of the Crisfield SRP. Since many of the residential units would only be used seasonal the impacts associated with implementation of the SRP would probably be less pronounced than Table 5-11 would indicate.

Nearly all facilities and services provided by the City and County will be noticeably impacted by the build-out of the City. Chief among County impacts is to the elementary schools. Somewhat less significant are impacts to police and fire services at the City level.

Table 5-10
Municipal Growth Impact Estimates at Build-Out
City of Crisfield

FACILITY/SERVICE	IMPACT	SERVICE MEASURE	SERVICE UNIT
SCHOOL (new students)	420	0.476	Per household
- High School	136	0.154	Per household
- Middle School	94	0.107	Per household
- Elementary School	190	0.215	Per household
TOWN ADMIN./MEETING (GFA)	657	0.34	SF Per capita
PUBLIC WORKS (GFA)	6,459	3.3	SF Per Capita
LIBRARY (GFA)	1,497	0.77	SF Per Capita
RECREATION LAND (acres)	58	30	Acres per 1000 pop.
POLICE			
- Officers	0.83	0.43	Per 1,000 population
- Support Staff	0.42	0.22	Per 1,000 population
- Squad Cars	0.90	0.47	Per 1,000 population
FIRE & RESCUE			
- Personnel	7	3.58	Per 1,000 pop
- Facilities (GFA)	4,380	2,265	Sq. ft. per 1,000 pop

Figure 5-2
Municipal Growth Element
Crisfield, Maryland

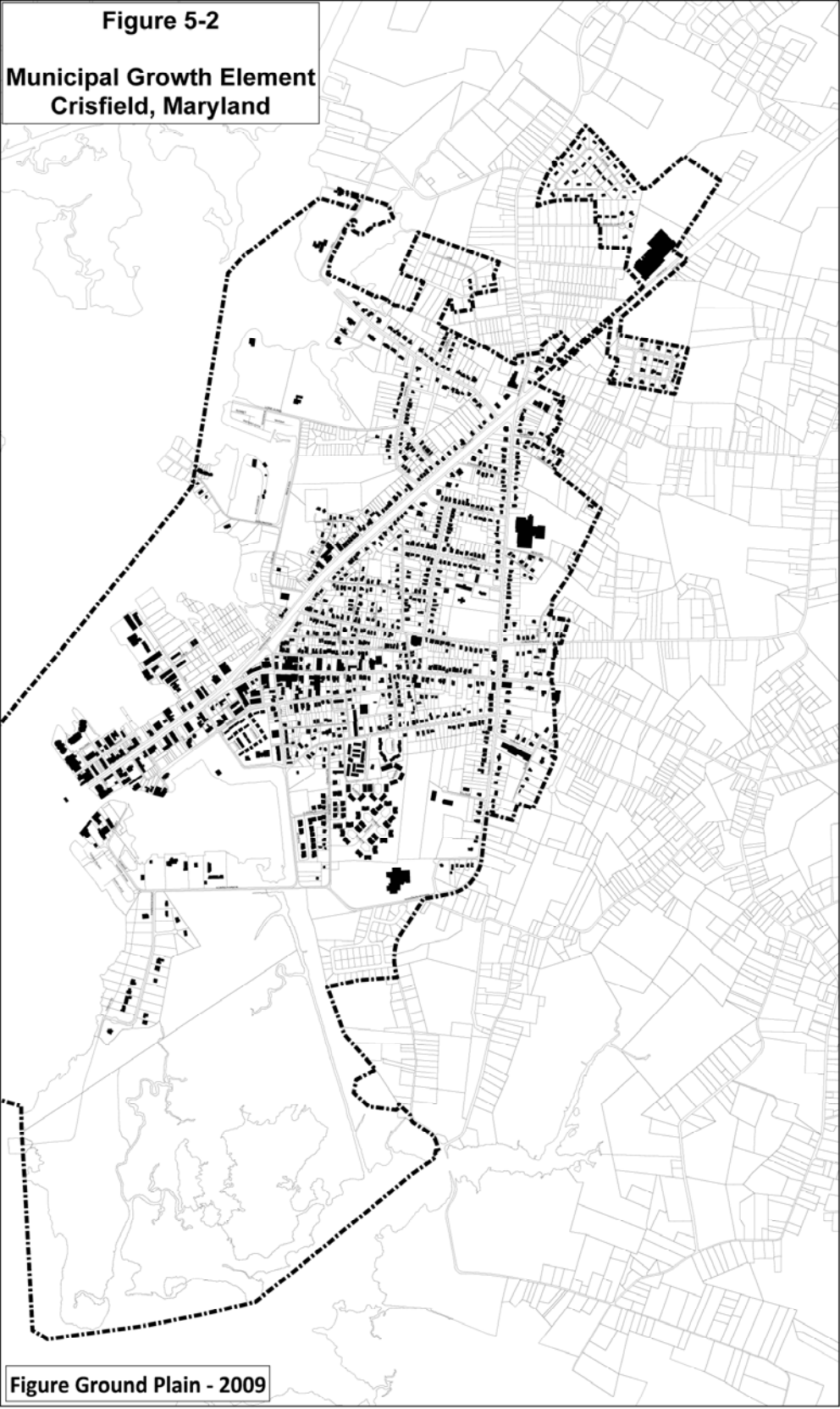
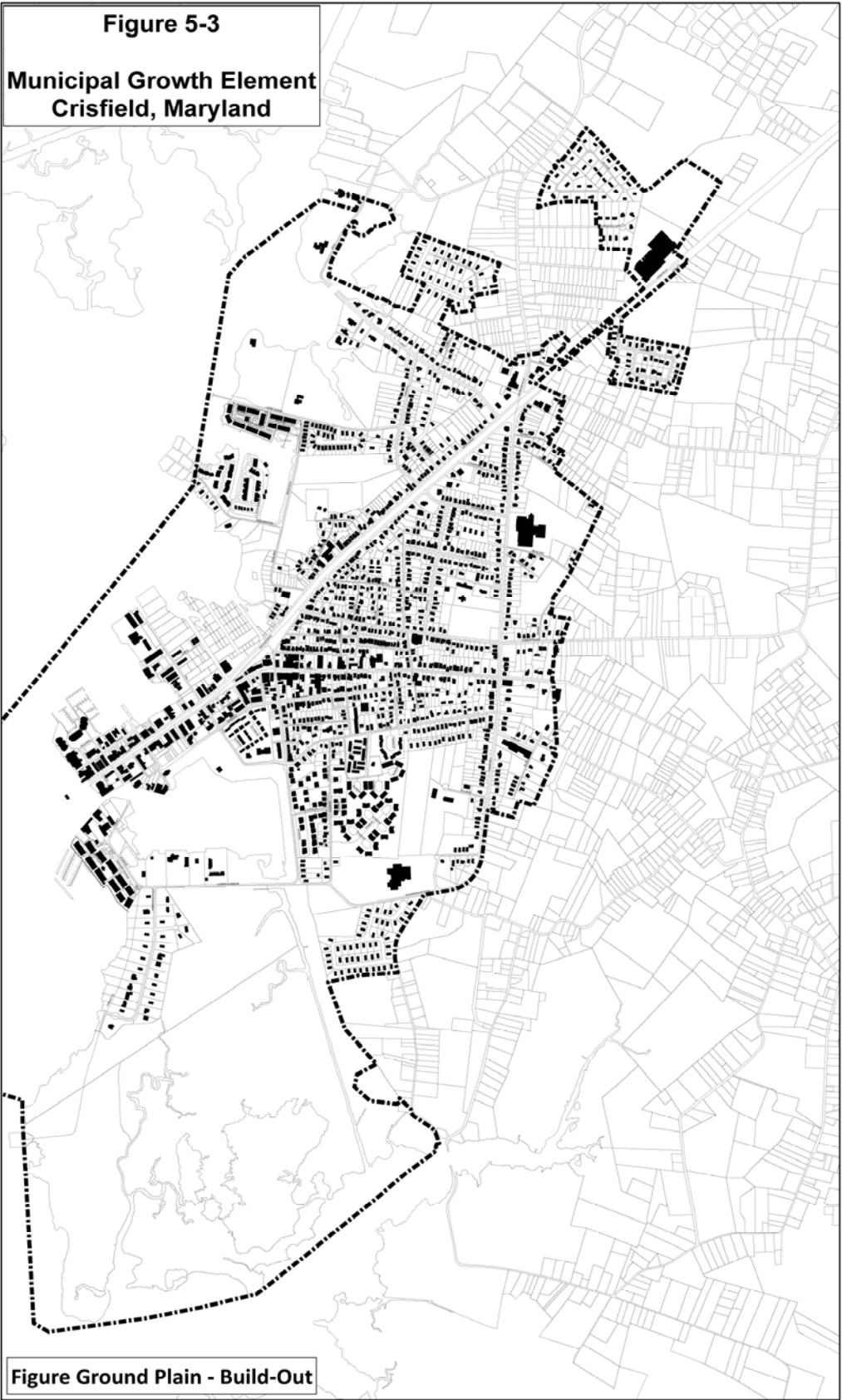


Figure Ground Plain - 2009



Funding Strategies

Population growth will require the City and County fund the public facilities and services necessary to serve new residents and businesses. In all likelihood, current sources of revenue alone, e.g., property tax, user fees, will not be sufficient to meet expenditures. In some instances, State and/or Federal grants and loans may be available to assist local governments. Other forms of revenue to address growth impacts also may need to be considered (see Table 5-12 for examples). Funding mechanisms the City may want to consider include:

Adequate Public Facilities Ordinance (APFO) – The City could adopt an APFO. An APFO ties development approvals to the existing and planned capacity of infrastructure based on quantifiable levels of service for public facilities and services. APFO level of service standards also could be used when negotiating an annexation agreement or development of a Developers Rights and Responsibility Agreement (DRRA). It would be prudent of the City to consider funding strategies like the APFO before current systems are at or above 75 percent of capacity.

**Table 5-11
Municipal Growth Impact Estimates at Build-Out
With Full Implementation of the SRP Master Plan
City of Crisfield**

FACILITY/SERVICE	IMPACT	SERVICE MEASURE	SERVICE UNIT
SCHOOL (new students)	845	0.476	Per household
- High School	274	0.154	Per household
- Middle School	190	0.107	Per household
- Elementary School	382	0.215	Per household
TOWN ADMIN./MEETING (GFA)	1,322	0.34	SF Per capita
PUBLIC WORKS (GFA)	13,224	3.4	SF Per Capita
LIBRARY (GFA)	3,073	0.79	SF Per Capita
RECREATION LAND (acres)	117	30	Acres per 1000 pop.
POLICE			
- Officers	1.71	0.44	Per 1,000 population
- Support Staff	0.86	0.22	Per 1,000 population
- Squad Cars	1.86	0.48	Per 1,000 population
FIRE & RESCUE			
- Personnel	14	3.67	Per 1,000 pop
- Facilities (GFA)	992	255	Sq. ft. per 1,000 pop

Developers Rights and Responsibility Agreement (DRRA) - The City should adopt legislation regulating DRRA's and require a DRRA that addresses financing of infrastructure improvements be executed prior to approval of any major development. This legislation should be put into place immediately.

Fiscal Impacts/Impact Fees - Major development projects should be required to identify and address fiscal impacts to the City. These impacts could be addressed in a DRRA executed prior to development approval. As an alternative, the City can adopt an impact fee ordinance. Impact fees, also known as

exactions, extractions, contributions, and proffers, are the financial responsibilities which a municipality places upon a developer to provide some or all of the physical improvements (from sewers and streets to parks and schools) necessitated by development and its impacts. Impact fees are levied as a condition for the approval of plats or building plans and subsequent permission to proceed with development. They are direct contributions by developers and may include dedication of land, construction of facilities, or payment of fees in lieu of these facilities. They can be levied through written provisions in ordinances or through negotiations.⁵ For example, a fee could be levied to offset the cost of additional City administration and meeting space, land can be dedicated for parks or schools and trails can be constructed to satisfy recreation land requirements.

The County is the appropriate level of government to adopt some of these funding mechanisms, e.g., school impact fees or excise tax, could be considered.

Municipal Priority Funding Area - The City should ensure that annexation areas are included within its municipal Priority Funding Area (PFA) (see Map 6-4, Chapter 6, Water Resources). In order to satisfy the requirements of “certification” annexed area (for residential development) must be zoned to permit an average density of at least 3.5 dwelling units per acre and the area must be served by a public or community sewer. In addition the Somerset County Master Water and Sewerage Plan should be amended to reflect any proposed new service areas.

**Table 5-12
Potential Funding Source to Address
Municipal Growth Impacts**

Facility/Service	Potential Funding Sources
School Facilities	Property tax, Excise Tax, Impact Fee, Federal/State School Construction Funds
City Administration	
- Facilities	Property Tax, DRRA, Impact fee, grants and loans
- Personnel	Property tax, Service fees (e.g., zoning certificate fee, inspection fees), grants
City Public Works	
- Facilities	DRRA, Impact fee, Connection fees, User fees, Public works agreement, grants, loans
- Personnel	Property tax, service fees (e.g., water and sewer charges)
Library Facilities	Property tax, excise tax, impact fee, Grants and loans
City Police	
- Facilities	Property tax, DRRA, Impact fee
- Personnel	Property tax, fines and fees
Recreation Land	DRRA, Land dedication, State Program Open Space (POS)
Fire and Rescue - Nonprofit	
- Facilities	DRRA, grant, public and private contributions

⁵ (Miles, Mike E., Emil E. Malizia, Marc A. Weiss, Gayle L. Berens, and Ginger Travis. 1991, Real Estate Development: Principles and Process. Washington, D.C.: Urban Land Institute).

Facility/Service	Potential Funding Sources
<u>County-Provided Fire and Rescue</u>	
- Facilities	Property tax, excise tax, impact fee, special tax (e.g., fire districts tax), grants
- Personnel	Property tax, special tax (e.g., fire district tax)
Water and Sewer Facilities	DRRA, Public Works Agreements, connection fees, user charges

5.5 ANNEXATION PLAN

House Bill 1141 (Land Use – Local Government Planning) requires the City to include in the comprehensive plan a growth element that specifies where the municipality intends to grow outside its existing corporate limits. The City must discuss how it intends to address service, infrastructure, and environmental protection needs for identified growth areas and surrounding environs.

Crisfield’s development capacity analysis indicates that the City has sufficient land to support future commercial and light industrial development and maintain the current floor area to population ratios. Although the City currently has no specific annexation plans it will consider annexing additional land for economic development purposes. All annexation will be done consistent with the City’s annexation policies. These annexation policies are intended to ensure the extension of corporate boundaries permits the most efficient use of public utilities and services and that costs associated with capacity expansion are fairly allocated among those benefitting. The City’s annexation policies are as follows:

- Annexed areas must be contiguous to the corporate limits and create a natural extension of the City’s boundaries.
- Proposed annexation areas will be economically self-sufficient and will not result in larger municipal expenditures than anticipated revenues, which could indirectly burden existing City residents with the costs of services or facilities to support the area annexed.
- The costs of providing roads, utilities, parks, other community services will be borne by those people gaining the most value from such facilities through income, profits, or participation.
- Specific conditions of annexation will be made legally binding in an executed annexation agreement. Such agreements will address, among other things, consistency with the goals, objectives and recommendations of this Plan, City zoning and landowner and City development expectations, responsibility for appropriate studies, and preliminary agreements concerning responsibilities for the cost of facilities and services provided by the City. These preliminary agreements may be further revised in a Developers Rights and Responsibility Agreement (DRRA).
- For annexations involving larger parcels of land, the City may require appropriate impact studies, including a fiscal impact study and an environmental impact assessment that addresses the potential impact of the proposed annexation on the environment of the site and surrounding area.
- If necessary, applicants for annexation underwrite the cost of completing all studies related to expanding capacity in existing public facilities and/or services.

Prior to annexing any land area not included in the current growth plan, the City will first consider appropriate amendments to this Comprehensive Plan and will follow the procedural requirements for Comprehensive Plan updates and annexation established in State law, including those of House Bill 1141. This will ensure that the proposed annexation is consistent with the goals and objectives of the Plan and Somerset County’s comprehensive

plan, that appropriate consideration has been given to the adequacy of public facilities and services, and that the County and State agencies are afforded an opportunity to comment on the proceedings.

Depending on the size of the proposed annexation (and as appropriate) the City may require the applicant to complete studies addressing the potential impacts of development on such things as City staffing and finances, traffic, and the provision of County facilities and services. In addition, applicants proposing annexation will be required to prepare an environmental impact assessment that includes a discussion of proposed strategies to address the environmental protection needs for the growth area and surrounding environs. All terms of annexations will be recorded in an annexation agreement, and if appropriate reflected in a Developer Rights and Responsibility Agreement (DRRA) at the time of final development approval. If deemed necessary by the City, the County may be included as a party in annexation negotiations.

5.6 INTERJURISDICTIONAL COORDINATION

The Economic Development, Planning and Resource Protection Act of 1992 encourages local governments and the State to coordinate their planning and development efforts to achieve the “Eight Visions.” Under the Act, local governments must adopt comprehensive plans which include the Visions. Zoning and other planning implementation mechanisms must be consistent with these plans. Under the Planning Act, local comprehensive plans must include recommendations for improving planning and development processes to encourage economic expansion, and to direct future growth to appropriate areas. Such development and economic growth often have interjurisdictional impacts on transportation, infrastructure, environment, and other areas of concern. For this reason, it is necessary for planning, growth strategies, and policies to promote and encourage cooperation among adjacent jurisdictions.

The *Crisfield Comprehensive Plan* also includes a water resources element that identifies strategies for addressing drinking water and other water resources to meet current and future needs and identifies suitable areas to receive stormwater and wastewater derived from development. Preparation of the growth element included a complete analysis of land capacity available for development, including infill and redevelopment and an analysis of the land area needed to satisfy demand for development at densities consistent with the *Crisfield Comprehensive Plan*.

House Bill 1141 requires the City to consult with Somerset County concerning its municipal growth element. Prior to approving the growth element, the City must provide a copy to the County, accept comments from the County, meet and confer with the County regarding the growth element, and on request of either party engage in mediation to facilitate agreement on a growth element. The bill encourages municipalities and counties to participate in joint planning processes and agreements. Coordination with County officials is important to ensure that newly annexed territory qualifies for State assistance as a Priority Funding Area if annexed after September 30, 2006.

It is important that the City coordinate its planning and development activities with the County. Managing future growth will depend on sound strategies to address such issues as water quality and quantity, school capacity, demand on emergency services, public infrastructure, and transportation facilities. As is the case with public infrastructure, water quality and quantity issues cannot be addressed by the City alone. Going forward, effective management of potential sources of pollution must be based on watershed-wide land use strategies and coordinated administration and enforcement of sediment and erosion control and stormwater management regulations. Protection of vulnerable drinking water supplies requires the participation of all jurisdictions affected.

On-going and effective mechanisms for City/County dialogue, coordination, and agreement are needed. Acceptable coordinated strategies should be formalized in ways that bind each participant to a policy process. Forums for on-going coordination and cooperation include a Council of Governments (COG), joint committees (for example for watershed planning initiatives), and others. Examples of potential formal mechanisms for recording joint policies include Memorandums of Understanding (MOU) and/or an Inter-Governmental Agreement (IGA).

SECTION 6: WATER RESOURCES

6.1 INTRODUCTION

The Crisfield Water Resources element was added to the 2007 Crisfield Comprehensive Plan in 2009. The Water Resources element (WRE) satisfies a basic planning requirement mandated by Maryland House Bill 1141 (HB 1141) that jurisdictions assess water resource capacity to meet current and future needs. Specifically, the statutory requirements include the following tasks:

- Identify drinking water and other water resources that will be adequate for the needs of existing and future development proposed in the land use element of the plan, considering available data provided by the Maryland Department of the Environment (MDE).
- 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.
- Adopt a WRE in the comprehensive plan on or before October 1, 2009, unless extension(s) are granted by Maryland Department of Planning (MDP), pursuant to law.

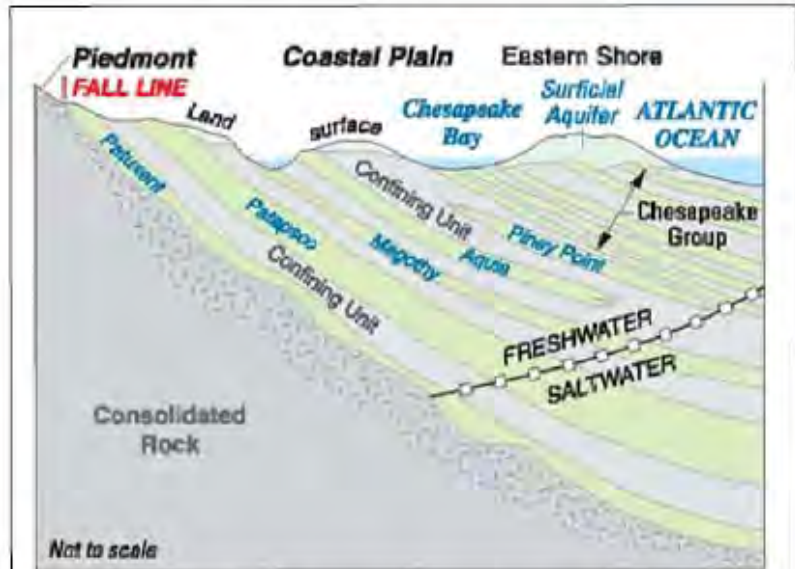


Figure 6-1 The North Atlantic Coastal Plain Aquifer System
Source: The Science Plan for Comprehensive Regional Assessment of the Atlantic Coastal Plain Aquifer Systems in Maryland, US Department of Interior and USGS

The zoning classifications of a property may not be changed after October 1, 2009 if a jurisdiction has not adopted a WRE in its comprehensive plan.

The WRE addresses three critical water resources, including drinking water (both supply and quality) and the capacity of receiving waters to assimilate wastewater and stormwater management stormwater discharge. Among other things, preparation of the WRE is intended to test water resource capacity limits, determine the potential implications of water resource issues for future growth, and facilitate the development of management strategies.

6.2 HYDROGEOLOGIC SETTING

The City of Crisfield is part of the Northern Atlantic Coastal Plain Aquifer System (NACP). The NACP encompasses approximately 50,000 square miles that extends from the North Carolina and South Carolina border to Long Island, New York. This aquifer system is bounded in the west by the Fall Line (Figure 6-1) which separates

the Piedmont from the Coastal Plain physiographic province in Maryland. It is bounded in the east by the Atlantic Ocean. 6

The Atlantic Coastal Plain Aquifer System in Maryland consists of an alternating series of aquifers and confining units that descend and widen, as they extend toward the Atlantic Ocean. The major aquifers in the Maryland portion of the NACP are the Patuxent, Patapsco, Magothy, Aquia and Piney Point Formations, and the Chesapeake Group. The City of Crisfield draws its water from the aquifers located in the Chesapeake Group. “The aquifers in the Chesapeake Group are used mostly east of the Chesapeake Bay. These include the Cheswold, Federalsburg, and Frederica aquifers, which are used from Dorchester to Queen Anne’s Counties, and the Manokin, Ocean City, and Pocomoke aquifers, which are used in Somerset, Worcester, and Wicomico Counties.”7

In 2002, total ground water use in Maryland exceeded 214 million gallons per day.⁸ The urban areas of Baltimore and Washington, D.C. make up the largest percentage of the State’s water usage, and their water supply is primarily derived from surface water sources. In Maryland’s Coastal Plain counties, which include southern Maryland and the Eastern Shore, ground water comprises 86% of the total water use.⁹

Groundwater in the Coastal Plain is drawn from unconfined (natural water table) and confined (artesian) aquifers. Unconfined aquifers are recharged by rainfall and snow melt and depleted by drought, resulting in fluctuating water levels. Artesian aquifers receive recharge from areas where water-bearing formations crop out, leakage through confining beds, and lateral movement of water from adjacent aquifers. Artesian aquifers are much less vulnerable to drought conditions.¹⁰

The natural water quality of Coastal Plain ground water is generally good and ranges from very soft to very hard with the average in the moderately soft range (Vokes and Edwards, 1974). Most Coastal Plain aquifers contain both fresh and salt water. Water directly below recharge areas is fresh; salt levels increase with aquifer depth and proximity to the ocean. The location of the freshwater-salt water boundary (zone of diffusion) depends on the volume of fresh water entering the aquifer from recharge or leakage.

One of the most common problems in Coastal Plain aquifers is salt water intrusion. Some parts of the confined aquifers in the system have been affected by intrusion of brackish or saline water, notably in more heavily populated areas along the coastlines of the Bay (Annapolis, Kent Island) and the Atlantic Ocean (Ocean City), where water usage is greater.¹¹

In 2007, the U.S. Department of the Interior and U.S. Geological Survey (USGS) reported that “decades of increasing pumpage have caused ground-water levels in parts of the Maryland Coastal Plain to decline by as much as 2 feet per year in some areas of southern Maryland. Continued declines at this rate could affect the long-term sustainability of ground-water resources in Maryland’s heavily populated Coastal Plain communities and the agricultural industry of the Eastern Shore.”¹²

The 2004 report of the Maryland Advisory Committee on the “Management and Protection of the State’s Water Resources” recommended a comprehensive study of the sustainability of the entire Atlantic Coastal Plain aquifer system in Maryland. Such a study is currently being undertaken by the U.S. Department of the Interior and USGS,

⁶ *A Science Plan for a Comprehensive Regional Assessment of the Atlantic Coastal Plain Aquifer System in Maryland* (Open-File Report 2007–1205), by Robert J. Shedlock, David W. Bolton, Emery T. Cleaves, James M. Gerhart, and Mark R. Nardi, U.S. Department of the Interior and U.S. Geological Survey, prepared in cooperation with the Maryland Geological Survey, the Maryland Department of Natural Resources and the Maryland Department of the Environment.

⁷ <http://md.water.usgs.gov/publications/wsp-2275/md-dc-html.html>

⁸ *An Overview of Wetlands and Water Resources of Maryland*, by Denise Clearwater, Paryse Turgeon, Christi Noble, and Julie Labranche. Prepared for Maryland Wetland Conservation Plan Work Group, January 2000

⁹ Ibid.

¹⁰ Ibid.

¹¹ Ibid.

¹² Open File Report 2007 – 1205, *A Science Plan For A Comprehensive Regional Assessment Of The Atlantic Coastal Plain Aquifer System In Maryland*, by Robert J. Shedlock, David W. Bolton, Emery T. Cleaves, James M. Gerhart, and Mark R. Nardi, U.S. Department of the Interior, U.S. Geological Survey, 2007.

in cooperation with the Maryland Geological Survey and Maryland Department of the Environment. The assessment will be conducted in three phases and is expected to take 7 to 8 years to complete. Currently, the project is in Phase I, which began in 2006. A key component of the assessment will be the development of an aquifer information system designed to serve the needs of both water managers and scientific investigators. When fully developed, the system will serve as a web-based tool and will facilitate the use of ground-water management models for evaluation of a variety of water-management strategies.

6.3 LAND USE SCENARIOS

Crisfield’s analysis of water resource takes into account two distinct land use development scenarios. Scenario one depicts 2030 growth and build-out of the City based on current entitlements under existing zoning. This scenario reflects infill and redevelopment trends and land ownership patterns, including recent waterfront development (see Map 5-1 and 5-2, Chapter 5, Municipal Growth). Due to the considerable investment required to assemble land as would be the case in the alternative scenario, this scenario represents the most realistic future land use development concept the City can expect.

The second alternative reflects implementation development schemes similar to the recommended Master Development Plan (Master Plan) depicted in the *City of Crisfield Strategic Revitalization Plan (SRP)*. The Master Plan is shown on Figure 5-1 in the Chapter 5, Municipal Growth. The SRP Master Plan displays a mixed use redevelopment concept for properties at selected waterfront locations as well as extensive redevelopment of the Crisfield Housing Authority properties (see Table 6-1 for residential capacity comparison). The location and extent of land use conversion in this scenario is very similar to that analyzed in the prior described scenario. Impervious surface change will be about the same, however residential densities are much higher. This scenario also assumes that non-residential development capacity at build-out will increase from approximately 750,000 square feet of gross floor areas to over 1.44 million square feet gross floor area.

**Table 6-1
Residential Infill Development Capacity
City of Crisfield**

Unit Type	Capacity	
	Units	Population
Detached Single Family Residential	343	751
Attached Single Family*	131	287
Multi-Family*	409	896
Total	883	1,934
Added - SRP Master Plan	893	1,956
Total - with SRP Master Plan	1,776	3,889

* Concept plans approved

6.4 WATER

Source Water

The City of Crisfield draws its water from the Piney Point, Paleocene Series and Potomac Group aquifers. The City’s State Water Appropriation Permits (SWAP) summarized below permit withdrawal of up to 1.35 million gallons per day (MGD). This level of withdrawal is more than is currently used which may be the result of having once served a thriving seafood processing industry that was much larger part of the local economy.

State Water Appropriation Permit No. S072G006 (05): The withdrawal granted by this permit is limited to a daily average of 600,000 gallons on a yearly basis and a daily average of 700,000 gallons for the month of maximum use. The water is taken from wells nos. 3, 6, 7 and 9, all screened in the aquifers of the Potomac Group.

State Water Appropriation Permit No. S072G106(02): The withdrawal granted by this permit is limited to a daily average of 150,000 gallons on a yearly basis and a daily average of 200,000 gallons for the month of maximum use. The water is taken from well no. 4, screened in the Piney Point, Paleocene Series, and Potomac Group Aquifers.

State Water Appropriation Permit No. S072G206(02): The withdrawal granted by this permit is limited to a daily average of 550,000 gallons on a yearly basis and a daily average of 600,000 gallons for the month of maximum use. The water is taken from wells nos. 5 & 8 screened in the aquifers of the Paleocene Series and Potomac Group.

Water System

Crisfield’s water system consists of five active wells (wells 2 and 4 are inactive). The flow from each of the active wells is summarized in Table 6-2 below. There are no known private wells operational in the City.

**Table 6-2
Maximum Flow Capacity
Source Wells
Crisfield, Maryland**

Active Well	Gallons Per Minute (gpm)	Gallons Per Hour (gph)
Broadway Well	390	23,400
Jersey Well	175	10,500
Park Well	340	20,400
Maryland Avenue Well	400	24,000
Jacksonville Well	850	51,000
Total Capacity	2,155	129,300

Source: City of Crisfield Public Utilities Department

The water system includes 3 water storage tanks with a combined capacity of 825,000 gallons (see Table 6-3). Water from the wells is chlorinated before distribution. According to the City of Crisfield’s Annual Water Quality Report¹³ the City’s drinking water, “is safe and meets federal and state requirements.”

¹³ Annual Water Quality Report, The City of Crisfield, Maryland/2008, PWSID# 0190001

Table 6-3
Water Storage Capacity
Crisfield, Maryland
Storage Capacity

Well	(Gallons)
Well 6	250,000
Well 8	500,000
Tower	75,000
Total	825,000

The City’s water system includes approximately 28 miles of lines that currently serve 1,800 residential and non-residential hookups within the City and 800 customers outside of the City through an arrangement with the Somerset County Sanitary Commission (see Map 6-1) executed in 1977. Some customers in the County get water service only. Average daily flows range from 750,000 to 800,000 gallons per day (GPD). Overall, current water usage, expressed in terms of equivalent Dwelling Unit (EDU’s), averages between 350 to 380 GPD. Water EDUs are approximately 25 percent higher than sewer flows. This may be due in part to high water-use commercial seafood establishments that do not contribute waste water into the sewer systems.

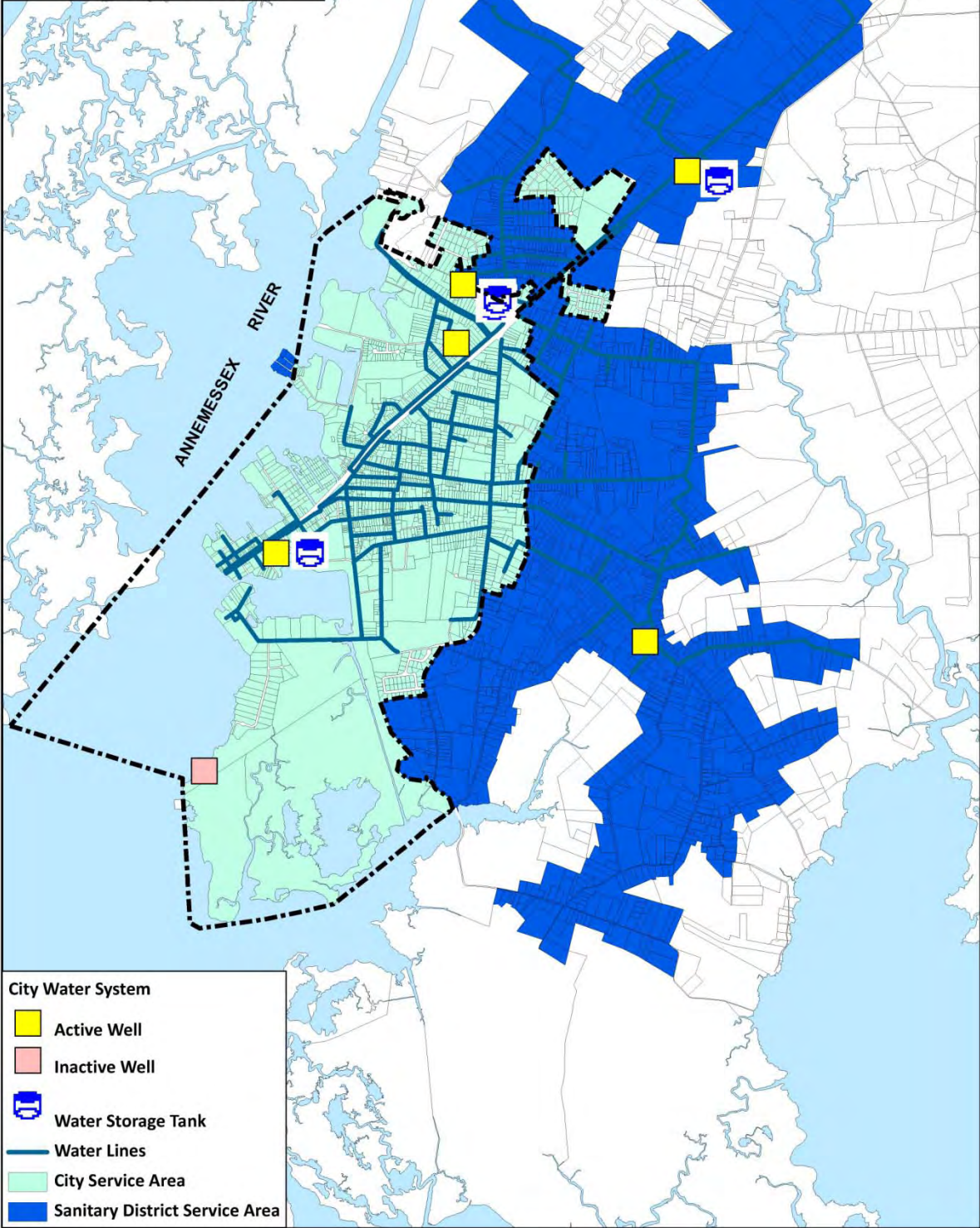
Projected Water Demand

Table 6-4 summarizes projected water demand through 2030. Water demand in Table 6-4 is based on 205 projected new occupied dwelling units by 2030 (see Section 5, Municipal Growth, Table 5-5). Commercial and industrial demand was based on the assumption that the City would maintain a ratio of approximately 50 square feet of commercial and 19 square feet of industrial floor area per 1,000 population. The City currently has capacity totaling 1.35 million gallons per day (MGD) which is adequate to meet projected demand through 2030.

Table 6-4
Projected Water Demand – 2030
Crisfield, Maryland

	2010	2015	2020	2025	2030
WATER DEMAND (MGD)	0.80	0.81	0.83	0.84	0.86
CAPACITY (MGD)	1.35	1.35	1.35	1.35	1.35
PERCENT OF CAPACITY	59.26%	60.27%	61.31%	62.40%	63.52%

Map 6-1
Water Resources Element
Crisfield, Maryland



6.5 WASTEWATER

Sewer System

The Crisfield wastewater treatment plant (WWTP) utilizes activated sludge treatment technology. The WWTP is permitted for a maximum capacity of 1 MGD. Currently, the WWTP has average daily flows of around 0.68 MGD. Recently completed replacement of the 1936 sewer lines along Maryland Avenue (MD 413) reduced peak flows by approximately 0.1 MGD. The remaining 1936 sewer lines are planned for replacement over the next several years to further reduce inflow and infiltration.

The Crisfield sewer system serves the City and surrounding County areas. About 1,586 EDU's are used in the City and an additional 218 EDUs are committed to development projects (some of which have not yet been constructed). Through an agreement with the Somerset County Sanitary District, the City services 848 sewer accounts in adjacent County areas (see Map 6-2). Based on current flow versus hookup the City calculates each sewer EDU at 277 GPD. There are no known private septic systems operational in the City.

The City is has completed upgrades to the WWTP that will enable Enhanced Nutrient Removal (ENR) standards for nitrogen and phosphorous. The City's National Pollution Discharge Elimination Permit (NPDES Permit MD002001), effective July 1, 2005, allows the City to discharge up to 1.0 MGD into the Annessex River. With the upgrade to the WWTP the City is to "make a best effort to achieve annual concentrations goals of 3 mg/l for nitrogen and 0.3 mg/l for phosphorus" ... and "maintain loads at or below 12,182 lbs/year for nitrogen and 914 lbs/year for phosphorus."¹⁴.

Projected Sewer Flow – 2030

Based on population and household projections (see Section 5 Municipal Growth Element) it is estimated that sewer flow could exceed 0.74 MGD by 2030 (see Table 6-5) which is nearly 75 percent of the existing capacity of the WWTP.

¹⁴ Maryland Department of the Environment Discharge Permit, 04-DP-0688, NPDES Permit MD002001, City of Crisfield, Maryland,

Table 6-5
Projected Sewer Flow – 2030
Crisfield, Maryland

	2010	2015	2020	2025	2030
SEWER FLOW (MGD)	0.68	0.69	0.71	0.72	0.74
CAPACITY (MGD)	1.00	1.00	1.00	1.00	1.00
PERCENT OF CAPACITY	68.00%	69.36%	70.77%	72.23%	73.75%

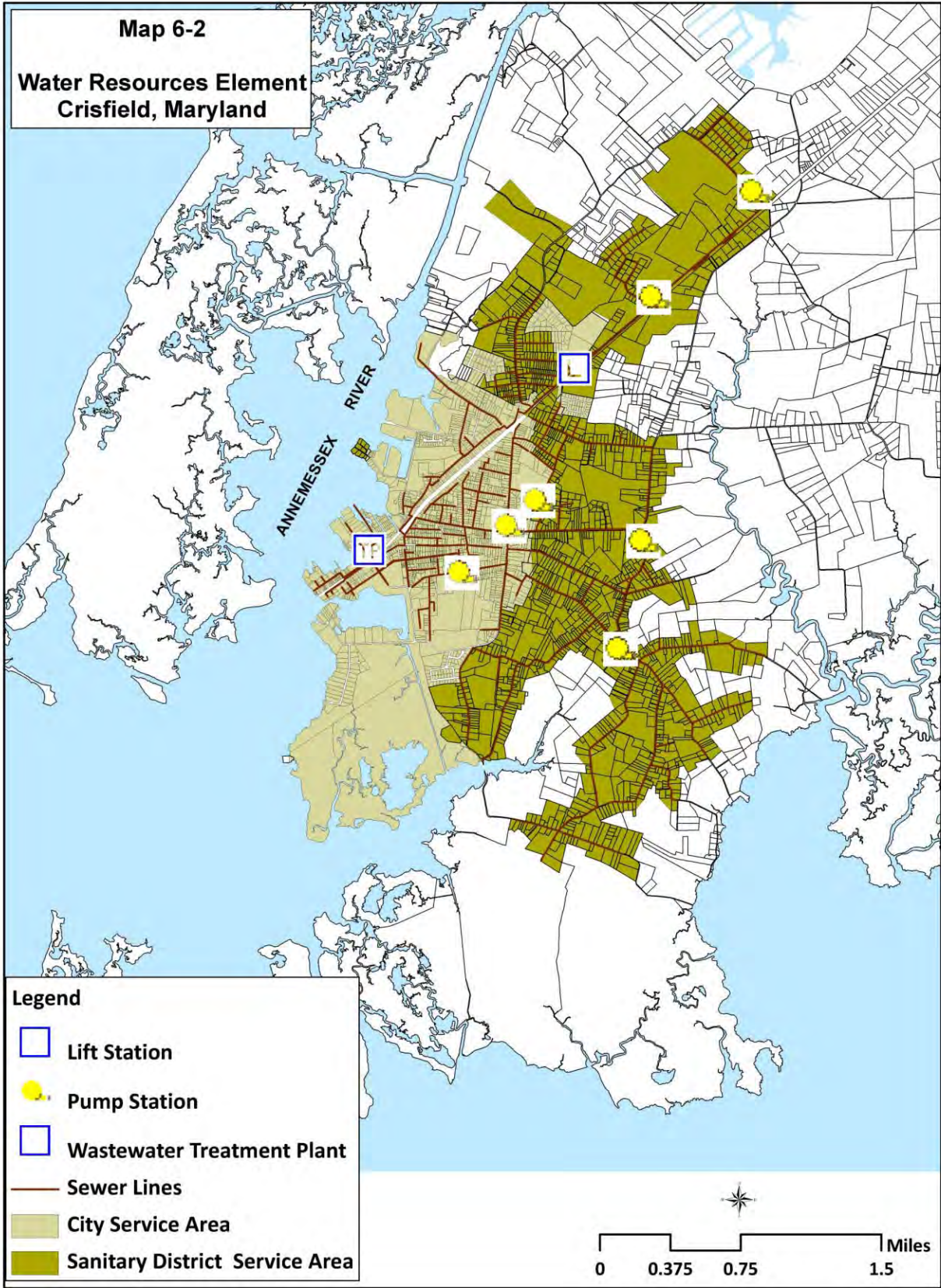
6.6 Build-Out

As the City approaches its full build-out potential (see Section 5, Municipal Growth Table 5-7 for development capacity analysis) issues associated with water and sewer capacity become more pronounced. Water demand will be nearly 80 percent of allowable groundwater withdrawal (see Table 6.6) and sewer flow (Table 6-7) will nearly exceed the current capacity of the WWTP (1.0 MGD). If the recommendations of the SRP are implemented water and sewer demand would be even greater, at or exceeding the City’s current water and sewer capacity (see Table 6-8 and Table 6-9).

Capacity issues are even more pronounced if development occurs as recommended in the SRP Master Plan. Under this scenario, most of the remaining water supply capacity would be used and sewer flows would exceed existing capacity.

It is apparent from this analysis that the City should consider sewer capacity limits before increasing service to areas outside the existing corporate area if it intends to fully utilize its existing development capacity. It also demonstrates that implementation of the SRP Master Plan will require additional sewer treatment capacity beyond that which can be achieved under the limits of the current NPDES permit. Implementation of the SRP Master Plan may also require added water supply.

Map 6-2
Water Resources Element
Crisfield, Maryland



- Legend**
- Lift Station
 - Pump Station
 - Wastewater Treatment Plant
 - Sewer Lines
 - City Service Area
 - Sanitary District Service Area

**Table 6-6
Water Demand at Build-out
Crisfield, Maryland**

WATER DEMAND	IMPACT	SERVICE MEASURE	SERVICE UNIT
Residential	220,750	250	GPD per dwelling unit
Commercial	19,338	96,689	200 GPD per 1,000 sf gfa
Industrial	7,348	36,742	200 GPD per 1,000 sf gfa
Total Added Demand	247,436		GPD
2009 Average Daily Demand	800,000		GPD
Total Demand	1,047,436		GPD
Capacity	1,350,000		GPD
Remaining Capacity	302,564		GPD

**Table 6-7
Sewer Flow at Build-out
Crisfield, Maryland**

SEWER FLOW	TOTAL	SERVICE MEASURE	SERVICE UNIT
Residential	220,750	250	GPD per dwelling unit
Commercial	19,338	96,689	200 GPD per 1,000 sf gfa
Industrial	7,348	36,742	200 GPD per 1,000 sf gfa
Total Additional Capacity	247,436		GPD
2009 Average Daily Flow	680,000		GPD
Total Demand	927,436		GPD
Capacity	1,000,000		GPD

**Table 6-8
Water Demand at Build-out (SRP Master Plan)
Crisfield, Maryland**

WATER DEMAND	IMPACT	SERVICE MEASURE	SERVICE UNIT
Residential	444,000	250	GPD per dwelling unit
Commercial	38,894	194,472	200 GPD per 1,000 sf gfa
Industrial	14,780	73,899	200 GPD per 1,000 sf gfa
Total Additional Capacity	497,674		GPD
2009 Average Daily Flow	800,000		GPD
Total Demand	1,297,674		GPD
Capacity	1,350,000		GPD

Table 6-9
Sewer Flow at Build-out (SRP Master Plan)
Crisfield, Maryland

SEWER FLOW	IMPACT	SERVICE UNIT	SERVICE MEASURE
Residential	444,000	250	GPD per dwelling unit
Commercial	38,894	194,472	200 GPD per 1,000 sf gfa
Industrial	14,780	73,899	200 GPD per 1,000 sf gfa
Total Added Flow	497,674		GPD
2009 Average Daily Flow	680,000		GPD
Total Flow	1,177,674		GPD
WWTP Capacity	1,000,000		GPD

6.7 PROGRAMMING WATER AND SEWER FACILITIES

Programming for water and sewer facilities is reflected in the 2008 Somerset County Master Water and Sewerage Plan and the City and County’s Priority Funding Areas (PFA). May 6-3 shows the PFA for Pocomoke City and surrounding areas. PFAs are areas eligible for State assistance with water and/or sewer system improvements.

Proposed improvements must appear in the appropriate service area category in the County’s Master Water Sewer Plan before MDE will consider issuing construction permits. The City should periodically review their planned service area boundaries to insure they reflect current policy and request appropriate amendments as necessary. In addition the City should obtain the service area boundaries maps that apply to the City when available in a digital format.

Water and sewer service areas as shown in the *Somerset 2008 County Master Water and Sewerage Plan* are broken down based on when service is planned (See Figures 6-2 and 6-3). Table 6-10 summarizes the delineation criteria required by State law.

“Plans for expanding Crisfield’s water system include the area between Maryland Route 413, along Old State Road. Long range projections indicate expansion of the water service to the area north of Maryland Route 413, extending to the Daughtery Road area and properties along the Jones Creek area.”¹⁵ Planned sewer projects include replacement sewer mains on 4th Street and Pine Street.

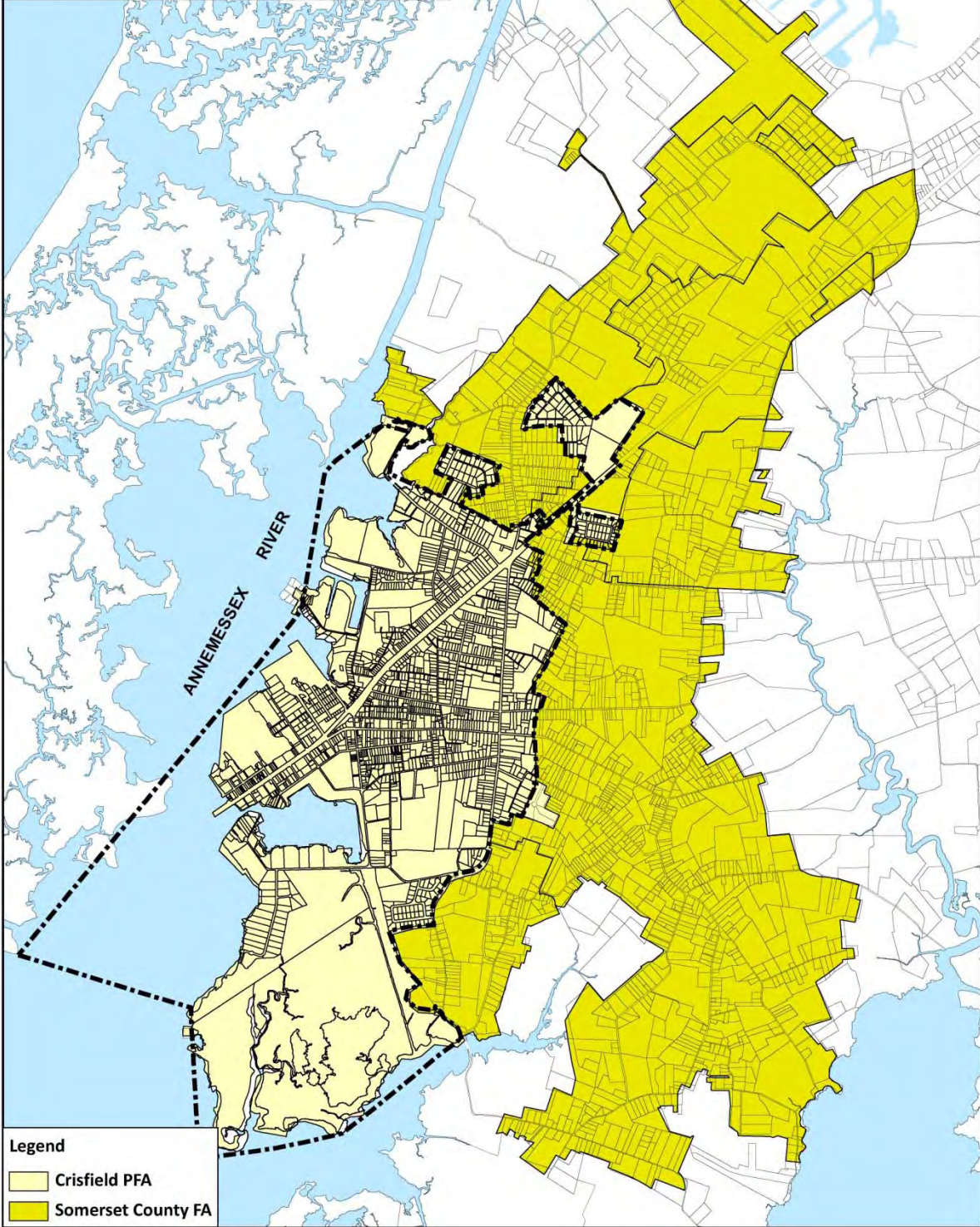
¹⁵Pg 51, 2008 Somerset County Master Water and Sewerage Plan, Somerset County Department of Technical and Community Services, August 2008

Table 6-10
Service Area Categories
Master Water and Sewerage Plan

Delineation	Description
W-1 and S-1	Areas served by community and multi-use water and sewerage systems which are either existing or are under construction
W-2 and S-2	Areas to be served by extensions of existing community and multi-use water supply and sewerage systems which are in the final planning stages
W-3 and S-3	Areas where improvements to, or construction of, new community and multi-use water supply and sewerage systems will be given immediate priority
W-4 and S-4	Areas where improvements to, or construction of, new community and multi-use water supply and sewerage systems will be programmed for the 3 to 5/6 year period
W-5 and S-5	Areas where improvements to, or construction of, new community and multi-use water supply and sewerage systems are programmed for inclusion within the 6/7 through 10-year period
W-6 and S-6	Areas where there is no planned service

Map 6-3

**City of Crisfield & Somerset County
Priority Funding Areas (PFA)**



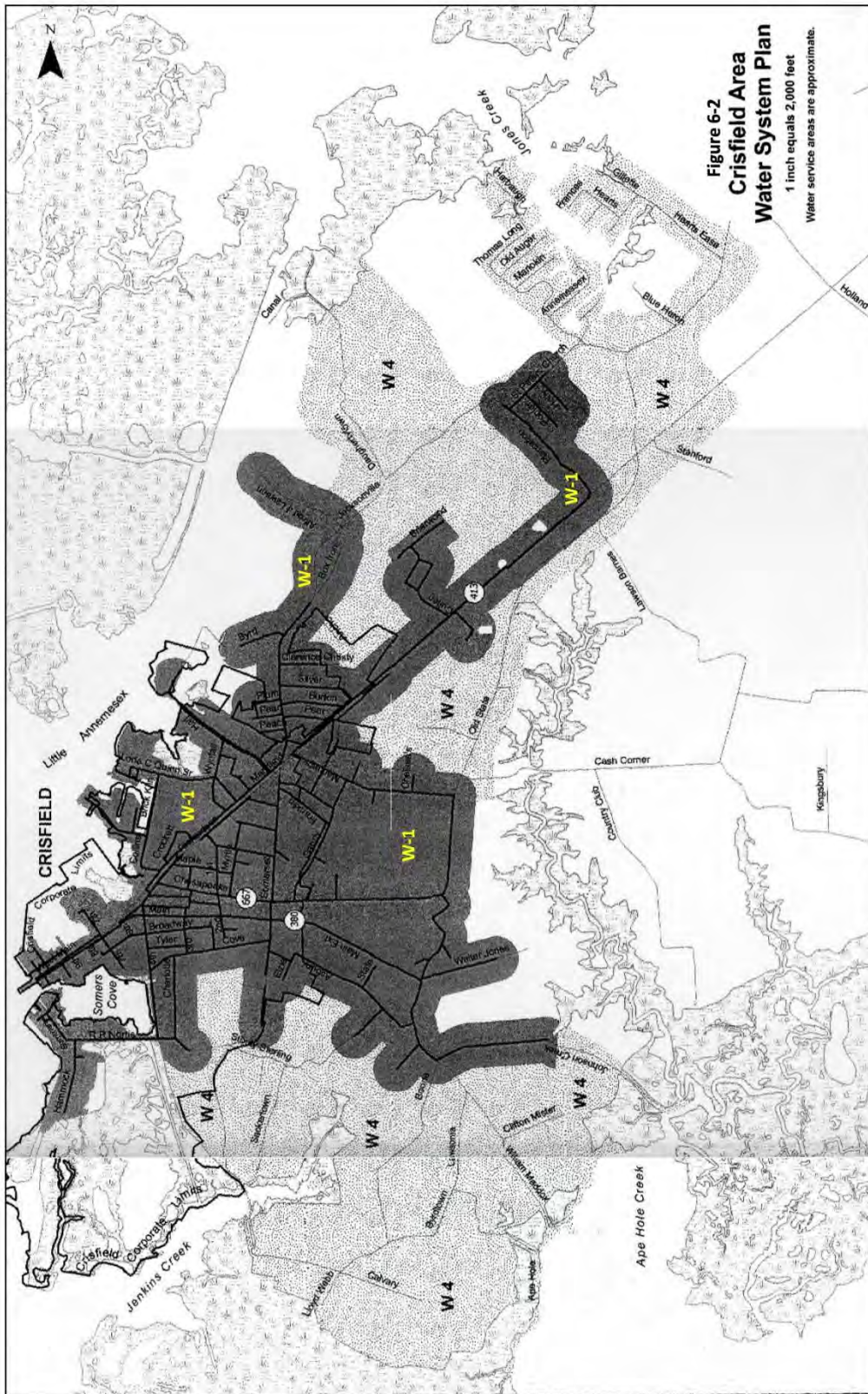
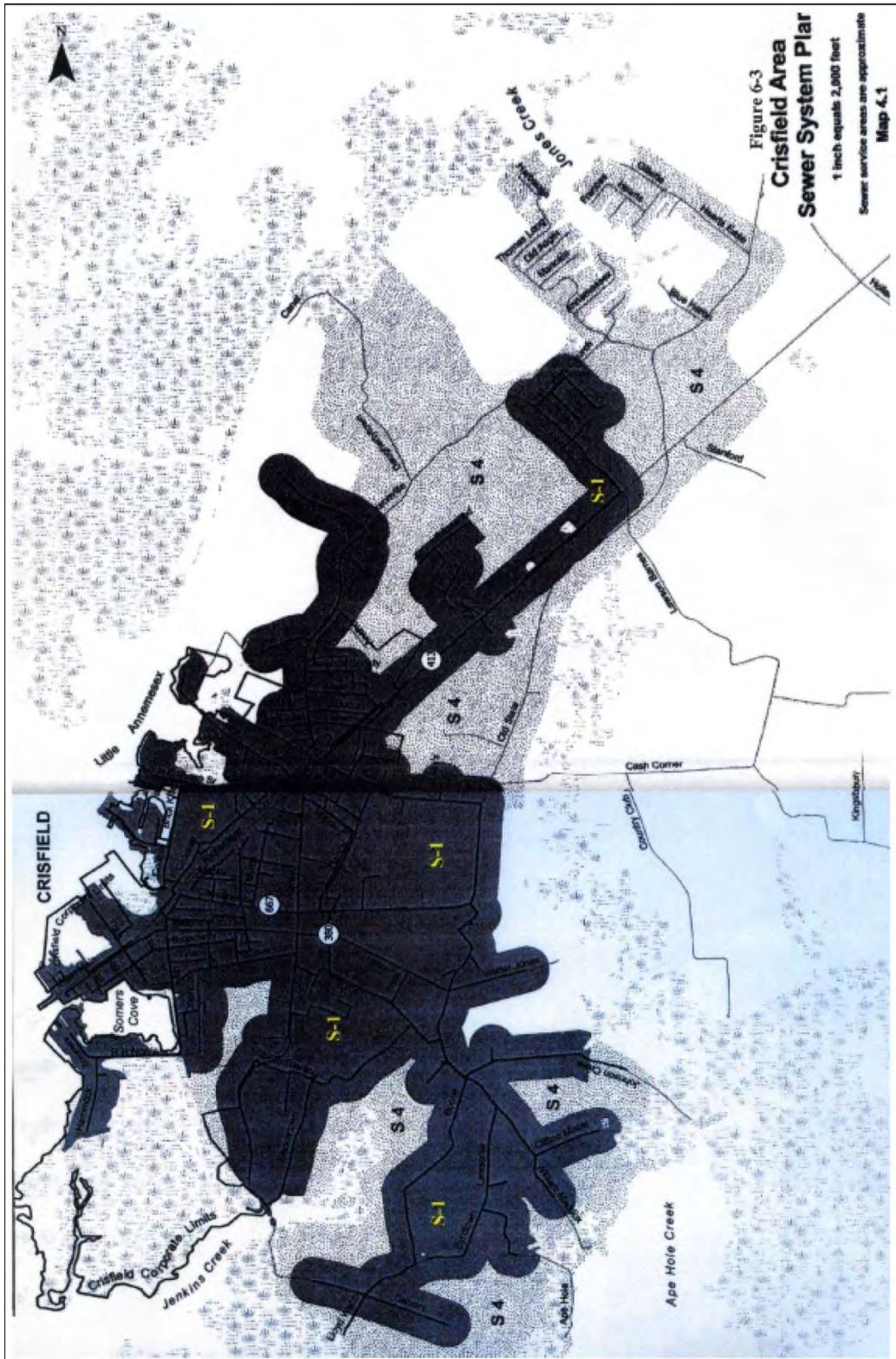


Figure 6-2
Crisfield Area
Water System Plan
 1 inch equals 2,000 feet
 Water service areas are approximate.



6.8 WATERSHED CHARACTERISTICS

The City of Crisfield is located in the Tangier Sound watershed (Maryland 8-Digit Watershed Code: 02130206) and is part of the Lower Eastern Shore Tributary Basin (see Map 6-3). The watershed encompasses approximately 45,193 acres (excluding water and wetlands) and has a total area of over 159,401 acres. Water areas and wetlands dominate the watershed (see Table 6-11). In 2002, “Urban” constituted a small percent of the land use in the watershed. This remains true today. Approximately 700 acres or about 13 percent of the 5,468 acres of the “Urban” land use category are located in the City of Crisfield.

Table 6-11
Land Use/Land Cover – 2002
Tangier Sound Watershed

Land Use/Land Cover	Acres	Percent of Total
Urban	5,468	3.43%
Agriculture	15,193	9.53%
Forest	24,443	15.33%
Wetland	26,430	16.58%
Barren	66	0.04%
Water	87,801	55.08%
Total	159,401	100.00%

Source: 2002 Land Use Land Cover, Maryland Department of Planning

Water Quality Issues

Current data indicates that water quality trends in the Tangier Sound watershed are deteriorating and should strongly influence City policy concerning environmental protection. Indicators of current water quality issues (and management strategies) are reported in several publications addressing water quality trends in the watershed. Tangier Sound is included in Maryland 303(d) list of impaired waters for sediment, bacteria, nutrients and biological impairments.¹⁶ It was first listed in 1996 as being impaired by nutrients and sediments. Further impairments were noted by the Maryland Department of the Environment (MDE) in 2004, including fecal coliform and evidence of biological impacts in tidal portions. Development of TMDLs for nutrients, sediments and biological (non-tidal) is pending.

In 2006, the Maryland Department of the Environment submitted a Total Maximum Daily Load (TMDL) to the United States Environmental Protection Agency (EPA). The TMDL is for fecal coliform for a Restricted Shellfish Harvesting Area in the Tangier Sound Basin (Somerset County, Maryland). The report cites excessive bacteria concentrations in the restricted shellfish area. MDE will perform a bacterial source tracking (BST) study in the watershed.¹⁷

According to the EPA’s response to MDE’s TMDL submittal, “a TMDL must comply with Federal requirements including 1) be designed to attain and maintain applicable water quality standards; 2) include total allowable loading and as appropriate, wasteload allocations for point sources and load allocations for non-point sources; 3) consider impacts of background pollutant contributions; 4) take critical stream conditions into account (the conditions when water quality is most likely to be violated); 5) consider seasonal variations; 6) include a margin of safety (which

¹⁶ *The 2008 Integrated Report of Surface Water Quality in Maryland, Submitted in Accordance with Sections 303(d), 305(b) and 314 of the Clean Water Act*, Maryland Department of the Environment, Maryland Department of Natural Resources, 2008

¹⁷ *Decision Rationale – Total Maximum Daily Loads of Fecal Coliform for the Restricted Shellfish Harvesting Area in the Laws Thorofare and Upper Thorofare of the Tangier Sound Basin in Somerset County, Maryland*; United State Environmental Protection Agency – EPA; August 2, 2006.

accounts for uncertainties in the relationship between loads and in-stream water quality; 7) consider reasonable assurance that the TMDL can be met; and 8) be subject to public participation.”¹⁸

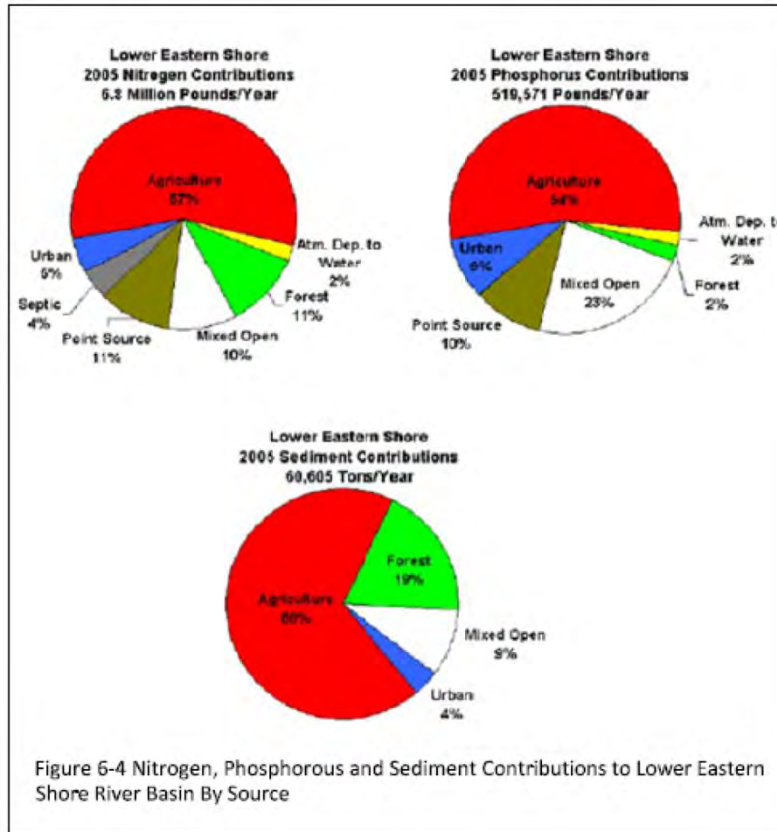
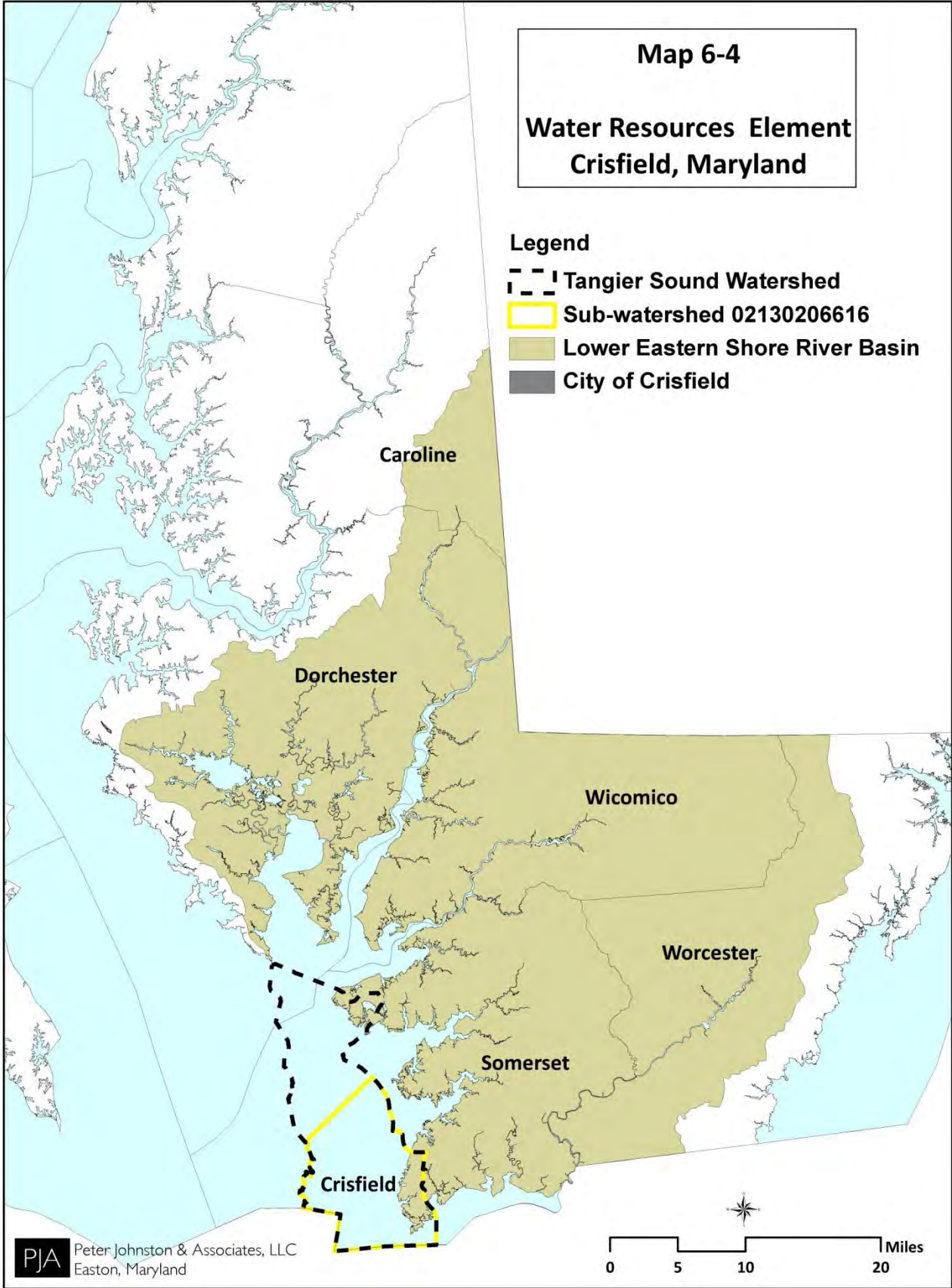


Figure 6-4 Nitrogen, Phosphorous and Sediment Contributions to Lower Eastern Shore River Basin By Source

¹⁸ Ibid.



Other indicators of water quality trends are discussed in the Department of Natural Resources (DNR) Watershed Restoration Actions Strategies (WRAS). A WRAS is part of a continuing process of assessing problems and causes, identifying opportunities for intervention, implementing corrective actions, and evaluating how well environmental goals for watersheds are being achieved. The WRAS for the Lower Eastern Shore included these observations concerning the Tangier Sound watershed:

“Only scattered improving trends in water quality are seen in the Lower Eastern Shore, and many areas remain in poor condition, especially with respect to suspended solids and water clarity...Although dissolved oxygen is fair to good, it is worsening in the upper Nanticoke, Manokin and North Tangier Sound.”

“... high sediment loads can reduce the amount of organic matter that is produced and available to the benthos; low biomass relative to reference conditions is a problem in the Manokin River and Tangier Sound (Llansó *et al.* 2005).”¹⁹

A shown in Figure 6-4, urban sources represent a small portion of nutrient and sediment contributions in the Lower Eastern Shore Tributary Basin.²⁰ However “urban” is a much higher percentage of the land use in the sub-watershed (12 percent) than is general case of the Tributary Basin. This fact and other indicators imply that the City has a role to play in reducing nutrient and sediment loading in the watershed.

6.9 RECEIVING WATER CAPACITY

Point Source Loadings

A primary purpose for assessing water resources is to consider the potential impacts of future growth on the water quality in the watershed. The water resources assessment evaluates two major sources of potential pollutants entering the receiving waters, point and non-point. Point sources are identifiable inputs of waste that are discharged via pipes or drains primarily from industrial facilities and municipal treatments plants into streams, rivers, lakes, or oceans.

The assessment of point sources and their impact on water quality in the Tangier Sound Watershed examined nutrient loadings in the base year (2002) based on Maryland Department of Planning 2002 Land Use/Land Cover data and 1996 point source nutrient loadings for Crisfield from the Chesapeake Bay Program (CBP) Watershed Model (Phase 4.3) for the Eastern Shore.²¹ The assumed nutrient caps are those outlined in the City’s NPDES permit and the Tributary Strategy Implementation Plan (Table 6-12).²² The 2030 land use assessment was based on projected land use changes in the City, full implementation of ENR upgrades to the City’s WWTP, and completion of planned improvements to address inflow and infiltration problems. The assessment of 2030 impacts of projected City growth indicates a reduction in total contribution of nutrient point source loading in the watershed over 2002 levels (see Table 6-13).

¹⁹ Lower Eastern Shore Conservation and Restoration Action Strategy Phase I: Program Description And Atlas Of Environmental Indicators, Maryland Department Of Natural Resources, Chesapeake And Coastal Watershed Service, March, 2000

²⁰ Maryland Tributary Strategy Lower Eastern Shore Basin Summary Report for 1985-2005 Data, Maryland Department of Natural Resources, August 2007

²¹ Chesapeake Bay Watershed Model Application and Calculation Of Nutrient and Sediment Loadings, Appendix F: Point Source Loadings A Report Of The Chesapeake Bay Program Nutrient Subcommittee, August 1998

²² Maryland’s Chesapeake Bay Tributary Strategy Statewide Implementation Plan, January 2008

Table 6-12
Tributary Strategy Implementation Plan
Total Load Caps
City of Crisfield, Maryland

Jurisdictions	Total Nitrogen TN (lbs/yr)	Total Phosphorous TP (lbs/yr)
City of Crisfield	12,182	914

It is significant to note that the point source nutrient reduction Tributary Strategy for the watershed caps the City's output of TN and TP. These caps represent potential limits to the how much the City can expect to grow unless improved treatment levels of discharge can be achieved. If the City's ENR treatment is able to achieve outputs of 3 mg/l of TN and 0.3 mg/l TP the City's contributions will be less than the Tributary Strategy caps and may allow for more growth than otherwise could be predicted. However, within these limits the City barely has adequate treatment capacity to accommodate their projected growth through 2030.

Table 6-13
Point Source Nutrient Loading Analysis Spreadsheet - Summary Results
City of Crisfield - 2002 Land Use & 2030 Land Use

Land Use/Land Cover	City of Crisfield		
	2002 Land Use	2002 Land Use	2030
	2002 BMPs	Tributary Strategy BMPs	Land Use
	(Acres)	(Acres)	(Acres)
Development	564	564	653
Agriculture	18	18	0
Forest	476	476	429
Water	597	597	597
Other	181	181	156
Total Area	1,836	1,836	1,836
Nitrogen Loading	31,981	31,981	12,182
Phosphorus Loading	2,811	2,811	914

Non-point Sources Loading

Non-point source pollution occurs when rainfall, snowmelt, or irrigation runs over land or through the ground and gathers pollutants. Pollutants are then deposited into streams, rivers, lakes, and coastal waters or introduced into ground water. Stormwater runoff is a significant contributor to non-point source loading.

Stormwater runoff is part of the natural hydrologic process. Human activities such as urbanization and agriculture can alter natural drainage patterns and add pollutants to rivers, lakes, and streams as well as coastal bays and estuaries. Urban runoff can be a significant source of water pollution, including flows discharged from urban land uses into stormwater conveyance systems and receiving waters. In the past, efforts to control the discharge of stormwater focused on quantity (e.g. drainage, flood control etc.) and only to a limited extent on quality (e.g. sediment and erosion control). More recently, officials are stressing the importance of controlling the quality as well as quantity of stormwater runoff in order to achieve the State's water quality objectives for the Chesapeake Bay.

Crisfield's non-point source contributions to the watershed were evaluated using two measures of potential impact associated with the City's projected growth in the planning period. The first of these is changes in non-point source nutrient loading contributions to the watershed. This evaluation addresses the requirement that the City identify

suitable receiving waters and land areas to meet the stormwater management disposal needs of existing and future development proposed in the land use element of the plan.

Changes in loadings of potential sources of pollution commonly associated with urban development, i.e., total nitrogen (TN) and total phosphorus (TP) were evaluated as indicators of future impacts. Even though Tangier Sound is not under TMDL limits for these potential sources of impairment, deteriorating conditions and trends indicate that they are of concern. Consequently assessing impacts and devising strategies to reduce TN and TP loadings should be compelling to City officials. In addition to TN and TP, sediment loadings also should be a source of concern in the watershed. The Tributary Strategy is a 40 percent reduction in nutrients.²³

Potential changes in TN and TP loadings associated with projected land use changes in Crisfield were evaluated using land use unit loading rates for Somerset County provided in a spreadsheet format by the Maryland Department of the Environment (MDE). The results of the evaluation (see Tables 6-14 and 6-15) indicate that with application of best management practices the City's TN and TP loadings will increase somewhat over 2002 levels with application of the Tributary Strategy Best Management Practices (BMPs) when considering the City alone and remain essentially unchanged when measured in the context of the Tangier Sound watershed. This suggests that in order to achieve the Tributary Strategy nutrient reduction goals additional management strategies affecting land use in the entire watershed will be required.

Table 6-14
Non-point Source Loading Analysis Spreadsheet – Summary Results
City of Crisfield
2002 Land Use & 2030 Land Use

Land Use/Land Cover	2002 Land Use/ Land Cover*	2030 Land Use/ Land Cover*
	(Acres)	(Acres)
Development	564	653
Agriculture	18	0
Forest	476	429
Water	597	597
Other	181	156
Total Area	1,836	1,836
	Non-point Loading	
	(Lbs/Yr)	(Lbs/Yr)
Total Nitrogen Loading	5,322	5,470
Total Phosphorus Loading	320	333

* Assumes Tributary Strategy BMPs

²³ Maryland's Chesapeake Bay Tributary Strategy Statewide Implementation Plan, January 2008

Table 6-15
Nutrient Point and Loading Analysis Spreadsheet - Summary Results
Tangier Sound Watershed
2002 Land Use & 2030 Land Use with Crisfield Growth

Land Use/Land Cover	2002 Land Use/ Land Cover*	2030 Land Use/ Land Cover*
	(Acres)	(Acres)
Development	4,910	4,999
Agriculture	15,193	15,176
Forest	50,850	50,803
Water	87,801	87,801
Other	647	622
Total Area	159,401	159,401
Residential Septic (EDUs)	2,774	2,774
Non-Residential Septic (EDUs)	563	563
	Non-point Loading	
	(Lbs/Yr)	(Lbs/Yr)
Nitrogen Loading	263,763	262,066
Phosphorus Loading	17,366	17,387

* Assumes Tributary Strategy BMPs

Considered in the context of the sub-watershed (DNR 02130206) the total Crisfield's projected point source (PS) and non-point point source (NPS) loading (see Table 6-16) decreases (See Maps 6-4 for watershed boundaries).

Achieving sediment reduction goals has proven more difficult. The projected land use changes associated with growth in Crisfield will undoubtedly increase the City's contribution to sediment loadings in the watershed. According to the Chesapeake Bay Program,

“The rapid rate of population growth and related residential and commercial development coupled with the ongoing issues associated with accounting for the existing practices has made this pollution source sector [sediment] the only one in the Bay watershed which continues to still be growing, and thus showing the overall ‘progress’ as negative. About one-quarter of the nutrient reductions called for in the jurisdictions' cleanup strategies are expected to come from efforts to reduce, treat or prevent pollution from urban/suburban lands and septic systems. While improvements have been made in landscape design and stormwater management practices, significant challenges still exist in accounting for existing on-the-ground control practices. That aside, to date, it is estimated that the pollution increases associated with land development (e.g. converting farms and forests to urban/suburban developments) have surpassed the gains achieved from improved landscape design and stormwater management practices.”²⁴

Special attention to stormwater management practices, including the application of environmental site design techniques and long term maintenance of facilities will be critical to achieving the Chesapeake Bay Tributary sediment reduction strategy.

²⁴ http://www.chesapeakebay.net/status_urbansuburban.aspx?menuitem=19694

The second measure of potential impacts from growth is the increase in total impervious cover in the watershed. According to a classification system advocated by the Center for Watershed Protection sub-watersheds with impervious cover greater than 10 percent watersheds are “likely to experience significant degradation in stream quality unless changes are made to zoning, comprehensive plans and development regulations.”²⁵ Impervious cover in the sub-watershed in which the majority of the City is located is already greater than 10 percent. In addition to placing an even greater emphasis on employing stormwater best management practices this situation indicates that the City’s growth plans should be focused on land in the adjacent sub-watershed to the north. Table 6-16 summarizes the impacts of City growth in the watershed (DNR 02130206) including impervious cover change. Compared to the overall size of the watershed, impervious cover was less the one percent of the watershed area and would remain below one percent of the area through 2030 with the projected growth in the City of Crisfield. However, over 90 percent of the sub-watershed area is water and wetlands. Compared to the upland (non-water and non-wetland) portions of the watershed the percent of impervious cover rises to over 15 percent.

Table 6-16
Nutrient Loading Analysis Spreadsheet - Summary Results
Sub-watershed 02130206
2002 Land Use & 2030 Land Use with City Growth

Land Use/Land Cover	2002 Land Use/Land Cover* (Acres)	2030 Land Use/Land Covers* (Acres)
Development	1,265	1,354
Agriculture	418	401
Forest	7,900	7,854
Water	41,800	41,800
Other	189	164
Total Area	51,572	51,572
Upland Area	2,772	2,772
Total Impervious Cover	438	480
Nutrient Loading		
-Total Nitrogen (NPS+PS)	75,535	54,417
- Total Phosphorus (NPS+PS)	3,943	2,060
Percent Impervious Cover		
Watershed Area	0.85%	0.93%
Upland Only	15.81%	17.33%

* Assumes Tributary Strategy BMPs

6.10 CONCLUSIONS AND RECOMMENDATIONS

Conclusions

Based on currently available data there appears to be an adequate and safe drinking water as well a physical system resources available to accommodate the City’s projected 2030 growth. Additional water sources as well as treatment, storage and distribution facilities may be required to support the build-out of the City if the SRP Master Plan is fully realized. Average per household water usage (expressed as Equivalent Dwelling Units or EDUs) is high as compared with other municipalities and indicates opportunities for water conservation.

The City has adequate sewer capacity to accommodate its projected 2030 growth but barely enough capacity to accommodate the full build-out of the City. There is insufficient existing capacity in the WWTP to support

²⁵ *User’s Guide to Watershed Planning in Maryland*, Center for Watershed Protection, December 2005

implementation of the SRP Master Plan. Based on projected sewer flows (See Table 6-7) planning for additional sewer treatment capacity should begin toward the end of the planning period or sooner if additional capacity is provided to the Somerset County Sanitary District.

In part, due to the types of land uses that dominate the watershed, water quality in the Tangier Sound Watershed remains relatively good but trends indicate it is threatened by increasing nutrient and sediment loadings. TN, TP and sediments have been identified as a source of impairment with TMDLs recommended but not considered a priority at this time.²⁶

Crisfield currently represents a small part of the source for potential pollutants. With application of recent ENR level treatment improvements at the City's WWTP, the City's contribution of point source nutrient loading in the watershed will decrease over current levels. With application of urban best management practices to manage non-point sources Crisfield's contributions of TN and TP will be managed at or below 2002 levels. Sediment loadings will probably increase but will remain a relatively small portion of the total sediment loading in the watershed.

Strategies indicated for protecting surface water quality in Tangier Sound include reducing loading from agriculture sources (e.g., implementing nutrient management plans, installing forested buffers along drainage ways), retrofitting existing septic systems with de-nitrification systems (approximately 2,000 estimated in 2002), limiting new septic systems and/or connecting existing uses on private septic systems to public systems, and requiring urban stormwater best management practices. The current level of impervious cover in the sub-watershed indicates that special attention is needed to protect water quality in drainageways and stream systems. The need for coordinated land use and resource protection strategies among all jurisdictions in the watershed is strongly indicated.

Suitability of receiving waters for discharge from the Crisfield's WWTP as well as stormwater runoff must consider the assimilative capacity of the Tangier Sound for nutrients, sediment and other potential pollutions sources associated with urban land uses. Current data indicates that water quality trends in Tangier Sound are deteriorating. Tangier Sound is included in Maryland 303(d) list of impaired waters for sediment, bacteria, nutrients and biological impairments.²⁷

Development of TMDLs for nutrients, sediments and biological (non-tidal) is pending. When TMDLs are established the City will have a better reference point by which to assess its management strategies. Without TMDL's or some other measure of assimilative capacity, there is no basis upon which to gauge the long term capacity of receiving water to assimilate WWTP discharge or stormwater runoff at this time. The City will continue to track MDE efforts to quantify the assimilative capacity of Tangier Sound as it considers future wastewater treatment options and will assess its 2030 Land Use Plan and/or additional pollution control measures if the pollution impacts of the City's growth plans are demonstrated to exceed the assimilative capacity of the receiving waters when defined.

Recommendations

Drinking water supply does not appear to be significant constraints for projected growth through 2030. The assimilative capacity of receiving waters is not known but water quality trends indicate the need for implementing strategies that minimize future loadings. Managing land use in a way that benefits water resources requires assessing development regulations, policies and guidelines from a new perspective for the City. Among other things, the objectives of regulations, policies and guidelines should be to:

- minimize the footprint of new development to the maximum extent possible, extensive use of water conservation measures;
- stage growth based on the availability and capacity of water resources;
- retrofit existing developed areas with improved stormwater management techniques;

²⁶ The 2008 Integrated Report of Surface Water Quality in Maryland, Submitted in Accordance with Sections 303(d), 305(b) and 314 of the Clean Water Act, Maryland Department of the Environment, Maryland Department of Natural Resources, 2008

²⁷ Ibid

- encourage best practices in the management of public drainage ditches; and
- require best management practices in all new development.

Utilizing best management practices is particularly important in watersheds with the highest percentage of impervious surfaces or that will be impacted by growth. In addition the City should consider the following strategies to reduce the impacts of future growth on water resources:

- Begin planning for additional sewer and water capacity. Should the City consider land application of wastewater as a solution to the WWTP Tributary Strategy point source cap it will first need to open preliminary discussions with MDE about the feasibility of land application²⁸. Among other things a feasibility analysis will need to address the following issues:
 - Is their sufficient acreage available to provide for capacity needs including finding willing landowners;
 - What wastewater storage will be required when land application is not possible during certain times of the year;
 - Are their opportunities to preserve properties designated for land application if the City does not yet own these properties;
- Carefully consider sewer allocation policies to avoid over commitment. Limit commitment of sewer capacity outside of the City. Avoid committing sewer allocation on a long-term basis. Consider accepting a non-refundable option or reservation fee for sewer allocations. Limit commitments to no more than two or three years.
- As part of a water conservation program, install water meters for all users (residential and nonresidential) and establish rates based on water usage. Reducing average water and sewer EDUs from 350 GPD to 250 GPD for example could add substantial capacity to the water and wastewater systems capacity. The current difference between the water usage and the wastewater treatment per EDU is significant and should to be addressed. The lack of water meters makes for unknowns that impede efficient infrastructure planning. The City and the Somerset County Sanitary District need to provide more accurate use and demand figures to adequately manage and project system needs.
- Undertake facilities planning for expansion of the WWTP when at 75 percent capacity. Considering the Tributary Strategy discharge cap of 1 million gallons per day, the City should be prepared to study alternative treatment methods and WWTP locations.
- Make education material available to residents regarding nutrient management to reduce fertilizer applications to grassed areas and lawns.
- Establish, maintain, or expand forest buffers in the form of linear wooded areas along streams to help filter nutrients, sediments and other pollutants in runoff.
- Work with developers, homeowners associations and individual homeowners to reduce the amount of impervious.
- Require new development and infill and redevelopment projects to treat stormwater using nonstructural and

²⁸ For additional information, the City should refer to MDE Guidelines for Land Application and Reuse of Municipal Waters at http://www.mde.maryland.gov/Programs/WaterPrograms/Water_Supply/Land_Ap_and_Reuse.asp

micro-scale practices to the maximum extent feasible. Techniques such as submerged gravel wetlands, rain water harvesting (cisterns and rain barrels), landscape infiltration, infiltration berms, and dry wells should become common practices. Stormwater should be filtered using such techniques as rain gardens, landscape and tree planters (e.g., linear tree pits, sidewalk planters), grass swales and bio-swales, tree-swales, grass filter strips and vegetated buffers.

- Encourage development design that maintains or enhances green infrastructure, and incorporates low impact design through stormwater management techniques for water quality and quantity management. The City also should encourage LEED (Leadership in Energy and Environmental Design) technology to promote sustainable building practices, conserve energy, and improve water and air quality.
- Work with Somerset County and the State of Maryland regarding source water protection planning to coordinate water resource related initiatives.
- Consider conducting a source water protection analysis to evaluate the need for additional source water protection measures.

-

Crisfield can achieve its water resource conservation objectives and make a positive contribution to improving water quality in the watershed by implementing urban BMPs. Through its stormwater management ordinance and programs and development standards the City should require environmental site design (ESD) techniques that optimize conservation of natural features (e.g., drainage patterns, soil, vegetation), minimize impervious surfaces (e.g., pavement, concrete channels, roofs), slow down runoff to maintain discharge timing and to increase infiltration and evapotranspiration and use other nonstructural practices or innovative technologies approved by MDE. Planning for water and wastewater facilities should reflect the need to conserve ground water resources and reduce nutrient and sediment loadings in the Tangier Sound watershed.

Future Analysis

The City is not able to recommend any refinements to the science or methodologies used to model water resource capacity and land use impacts. The conclusions and recommendations contained herein are based on a planning analysis using best available data. These conclusions and recommendations may need to be reconsidered when better data concerning ground water resources and the impacts of land use on water quality are available. For example, useful data and recommendations from the comprehensive study of the sustainability of the entire Atlantic Coastal Plain aquifer system in Maryland recommended by the Maryland Advisory Committee on the “Management and Protection of the State’s Water Resources” will be a consideration in future land use decisions. In addition, the results of improved modeling of the relationships between land use and water quality, when available, will be used to evaluate future land use decisions as well as the effectiveness of current management strategies.

SECTION 3 - DEVELOPMENT OPPORTUNITIES AND CONSTRAINTS

A comprehensive plan must acknowledge the opportunities for sound development and the factors that constrain development. This is not a list of strengths and weaknesses. It is a list of physical factors that provide form to the City. The following list is drawn from this and the foregoing sections of this report.

3.1 OPPORTUNITIES

Compact Nature of the City

The compact nature of Crisfield can promote accessibility, convenience, and community cohesiveness. Most commercial and institutional activities are within walking distance of most residents. Compactness is a prerequisite for a healthy and vibrant city. Neighborhoods are in place.

Infill Potential

While large unused parcels are rare in Crisfield, many smaller parcels throughout the neighborhoods are unused or underutilized. Many commercial buildings are underutilized in the central business district. It is possible for the City to accommodate commercial growth within its core as well as more dense residential development in places.

Marina Development

Development in and around the Somers Cove Marina and Basin should be limited. Space exists for a sizable increase in the intensity of marina, related tourism-oriented development, and public recreational use. Through good urban and environmental design, additional development may become an attractive asset around Somers Cove.

Connecting Neighborhoods

Great opportunities exist for connecting the neighborhoods of Crisfield together and for connecting the neighborhoods to the center of the City. A grid system is largely in place except for the Crisfield Housing Authority property. The public housing community appears to be physically detached from the City at large.

Tidal Wetlands

Tidal wetlands on both the north and south of the City are important resources that protect the City against storm surge and excessive flooding. These lands are very close to the City center and their preservation helps protect water quality, wildlife habitat, and the overall environmental health for City residents.

Sensitive Natural Areas Throughout the City

Opportunities exist for preserving natural resource lands and sensitive sites for the benefit of future generations. The City abounds in natural and sensitive environmental resources. As mentioned above, they provide opportunities for recreation and help protect life and property. Also very importantly, these features will sustain Crisfield as it continues to grow from within. This is especially the case with respect to the large tidal and non-tidal wetlands, which help attenuate flooding, purify water, and support wildlife. As density increases, the importance of these natural features will grow.

Where wetland and open areas in the City have been compromised by poor development planning, they will need to be restored to the extent practicable. Opportunities exist to help restore the important functions of natural resources as new development occurs.

3.2 CONSTRAINTS

Sensitive Natural Areas

Marshlands, floodlands, and poor soils limit the location of future development. The City has not always successfully conformed itself to these features as it has developed over time and will need to recognize these constraints in the future.

Coastal Flooding

The low-lying nature of the City combined with its coastal location means that severe flooding is a fact of life. As shown in Chapter 2, much of the main collector road network becomes impassible during flooding events. Low-lying communities and residential development in the “downtown” section of the City are threatened by severe flooding.

Limited Developable Land

Most developable lands within the City are in some form of developed use already. The lack of developable lands may give rise to an increasing number of development disputes, as potentially conflicting land uses are pressed closer together. In future years, demand for new development will need to be accommodated through thoughtful and well-designed infill.

Public Open Space

The City lacks public open space. Public water access is limited to a privately held beach, which is leased to the City. No citywide parks and open space vision exists, though parks and open space are essential elements of good city form and function.

Wastewater Treatment Capacity

As documented in this report, until capacity is increased, development beyond that already approved is limited.

3.3 SUMMARY

In summary, Crisfield may expect more residential development between 2000 and 2010 than it experienced during any previous decade in recent history. Between 2000 and 2010, the City may be expected to add about 540 new housing units. Over the next five years, nearly 100 units per year may be expected.

Growth through 2010 will use up nearly all effective remaining wastewater treatment capacity, assuming a modest reserve capacity is established. The City will need to expand its wastewater treatment capacity and public water system to serve development that may occur beyond 2010. The extent of that development will be better understood upon the City's completion and adoption of more detailed planning which is expected to be undertaken over the next couple of years.

This section also reviewed key development opportunities and constraints in Crisfield. These have factored heavily into the design of the new Comprehensive Plan, which is presented in the next section of this report.

SECTION 4 –THE COMPREHENSIVE PLAN RECOMMENDATIONS

This Comprehensive Plan focuses development and conservation policy on the issues facing Crisfield through the foreseeable future. The principles, objectives, and polices, to the extent possible, relate directly to the built and natural environments. This is very important. Future generations will judge the lasting worth of our vision by observing the City and the physical changes that will have occurred under guidance of this Plan.

The Plan is long-range and comprehensive. It provides the organizing framework for more detailed planning and design work. The Plan is a guide for the City and its residents. It is a guide for land developers. It is a guide for outside agencies and units of government. The Plan is a compilation of what is most important to Crisfield as it contemplates growth and change. It is a compelling image of the future. The Plan envisions capable city planning and engineering, a citizen population engaged in formulating and implementing growth and development polices, and consistent outreach to agencies of government with the resources and expertise to advance the interests the City shares with others.

The Plan implements the “visions” set forth in Article 66B of the Maryland Annotated Code.

1. Quality of Life and Sustainability: A high quality of life is achieved through universal stewardship of the land, water, and air resulting in sustainable communities and protection of the environment.

2. Public Participation: Citizens are active partners in the planning and implementation of community initiatives and are sensitive to their responsibilities in achieving community goals.
3. Growth Areas: Growth is concentrated in existing population and business centers, growth areas are adjacent to these centers, or strategically selected new centers.
4. Community Design: Compact, mixed-use, walkable design consistent with existing community character and located near available or planned transit options is encouraged to ensure efficient use of land and transportation resources and preservation and enhancement of natural systems, open spaces, recreational areas, and historical, cultural, and archeological resources.
5. Infrastructure: Growth Areas have the water resources and infrastructure to accommodate population and business expansion in an orderly efficient, and environmentally sustainable manner.
6. Transportation: A well-maintained, multi-modal transportation system facilitates the safe, convenient, affordable, and efficient movement of people, goods, and services within and between population and business centers.
7. Housing: A range of housing densities, types, and sizes provides residential options for citizens of all ages and incomes.
8. Economic Development: Economic development and natural resource-based businesses that promote employment opportunities for all income levels within the capacity of the State's natural resources, public services, and public facilities are encouraged.
9. Environmental Protection: Land and water resources, including the Chesapeake and Coastal Bays, are carefully managed to restore and maintain healthy air and water, natural systems, and living resources.
10. Resource Conservation: Waterways, forests, agricultural areas, open space, natural systems, and scenic areas are conserved.
11. Stewardship: Government, business entities, and residents are responsible for the creation of sustainable communities by collaborating to balance efficient growth with resource protection.

12. Implementation: Strategies, policies, programs, and funding for growth and development, resource conservation, infrastructure, and transportation are integrated across the local, regional, state, and interstate levels to achieve these visions.

The objectives and policies set forth below are drawn from the research and analyses presented in Sections 1 through 3 of this report and public input provided throughout 2005 at multiple Planning Commission workshops. The Comprehensive Plan integrates the elements required by State planning law under five main themes.

- Redevelopment and Ecological Restoration
- Redevelopment Consistent With Community Character
- Development in Balance with Community Facilities and Services
- Planning in Concert with Regional Priorities
- The People of Crisfield: Reinvigorating Neighborhoods

Each theme is organized in the following way:

Statement of theme- including a brief description of the benefit to Crisfield.

Background – a summary of the main findings from the baseline studies provided in Sections 2 and 3.

Guiding Principles –fundamental tenets adopted by the City from which flow the Plan’s policies. These principles, while universal, address the basic physical planning issues present in Crisfield.

Objectives – goal statement pertaining to the theme phrased in an affirmative way.

Policies – the recommended courses of action to be pursued by Crisfield in achievement of the goals.

Actions – specific tasks to be undertaken to implement the policies.

The Planning Commission prepared this Comprehensive Plan as called for by Article 66B of the Annotated Code of Maryland, combining the elements required of comprehensive plans into a coherent set of policies. Article 66B requires that a comprehensive plan contain the following: a statement of goals, a land use element, a transportation element, a community facilities element, an element that contains the Commission’s recommendations for land development regulations to implement the plan, a sensitive areas element and a mineral resources element. The later element, mineral resources, has been determined through the study to be not applicable to the Crisfield Comprehensive Plan, though a soils evaluation is presented in Section 2.

4.1 REDEVELOPMENT AND ECOLOGICAL RESTORATION

As development or redevelopment occurs, the people of Crisfield will benefit from acknowledging the presence of natural resources and systematically promoting their re-emergence.

Background

Crisfield is a coastal community. It is built in a floodplain. Much of its land is less than three feet above sea level. Apart from the ridge that runs along Somerset Avenue, land rising above three feet in elevation is fill or made land. Flooding is a normal occurrence in Crisfield. Severe flooding and strong storm surge occur. Sea levels in the Chesapeake Bay region are rising. The frequency and severity of today's flooding events will be surpassed by those of future decades.

Historically, the City has been built on lands not well suited to development. Tidal marshes have been filled and wetlands and their natural drainage channels have been disconnected from the water. Oyster shells and other fill material have been used to establish new lands for building. Recent development projects have placed high-density residential development on lands historically suited to maritime uses.

The remaining marshlands and low-lying areas are vital buffers protecting neighborhoods from flooding. They are important now, but will be even more so in decades to come. The projected increases in sea levels will worsen the effect of storm surge and regular flooding events. Regulations and procedures regarding natural resources and sensitive areas are embodied in the City's adopted Chesapeake Bay Critical Area Ordinance.

Guiding Principles

- Sensitive natural areas play significant roles in the quality and health of Crisfield. Marshlands and wetlands help attenuate flooding, dissipate the energy of storm surges, prevent shoreline erosion, improve water quality, and provide protective habitat for native plants and wildlife. Wetlands help convey and store floodwaters and provide habitat for fish, birds, and other wildlife.
- Natural areas provide form to urban development. They define the edges of intensely developed areas and they provide wide, open spaces. Together these resources add to scenic beauty. Natural areas can connect various parts of a City and in so doing can become useful elements in City planning; they become environmental corridors--natural areas for stormwater management, flood control, and recreation.
- The underlying qualities of the land help determine which uses are viable. To the extent possible, the natural capability and characteristics of the land should guide land use development. Certain uses are incompatible with underlying natural conditions. Development in sensitive areas can cause irreparable harm for future generations. As an example, the historic pattern of filling and building on tidal marshes has worsened the

effects of flooding in Crisfield. Development on very low-lying lands has exposed residents to both regular flooding and severe storm surge events.

- When an historic settlement pattern prevents certain underlying sensitive areas from fulfilling their natural functions, it is often preferable to continue that development pattern while seeking to restore some degree of those natural functions. Several conditions should be met before redeveloping in naturally sensitive areas: public health and safety should be ensured; adverse impacts to other resource areas should be minimized; the proper stormwater, flood control, and shoreline protection measures and infrastructure should be in place, and other important public needs or objectives should be met. Over the long-term, redevelopment in those sensitive areas already impacted by development should enhance the underlying natural areas.
- Sea levels are rising in the Chesapeake Bay region as described in Section 3 of this report. In areas prone to severe flooding, today's capital facility planning and development must recognize the need to locate investments where they will be secure from flooding decades into the future.
- Flooding impacts the lives and living standards of people. Flooding prevents people from getting to work on time or from attending religious services, for example. Regular flooding reduces the imperative to invest in property upkeep and affects business investment. Flooding and poor drainage cause structural damage to buildings. Dampness in the walls and foundations of buildings create unhealthy living conditions.
- Combining redevelopment and ecological restoration means rebuilding upon the City's historic settlement pattern while repairing past resource damage and improving the functions of the underlying natural systems.

Objectives

- The remaining natural environmental features and sensitive areas, and the key roles each play in sustaining life and property in and around Crisfield, are protected from development and its impacts.
- A community of landscaped and natural spaces is developed over time, which knits together Crisfield as it grows.
- Gradually, key natural functions of the floodplain reemerge as land is thoughtfully redeveloped.

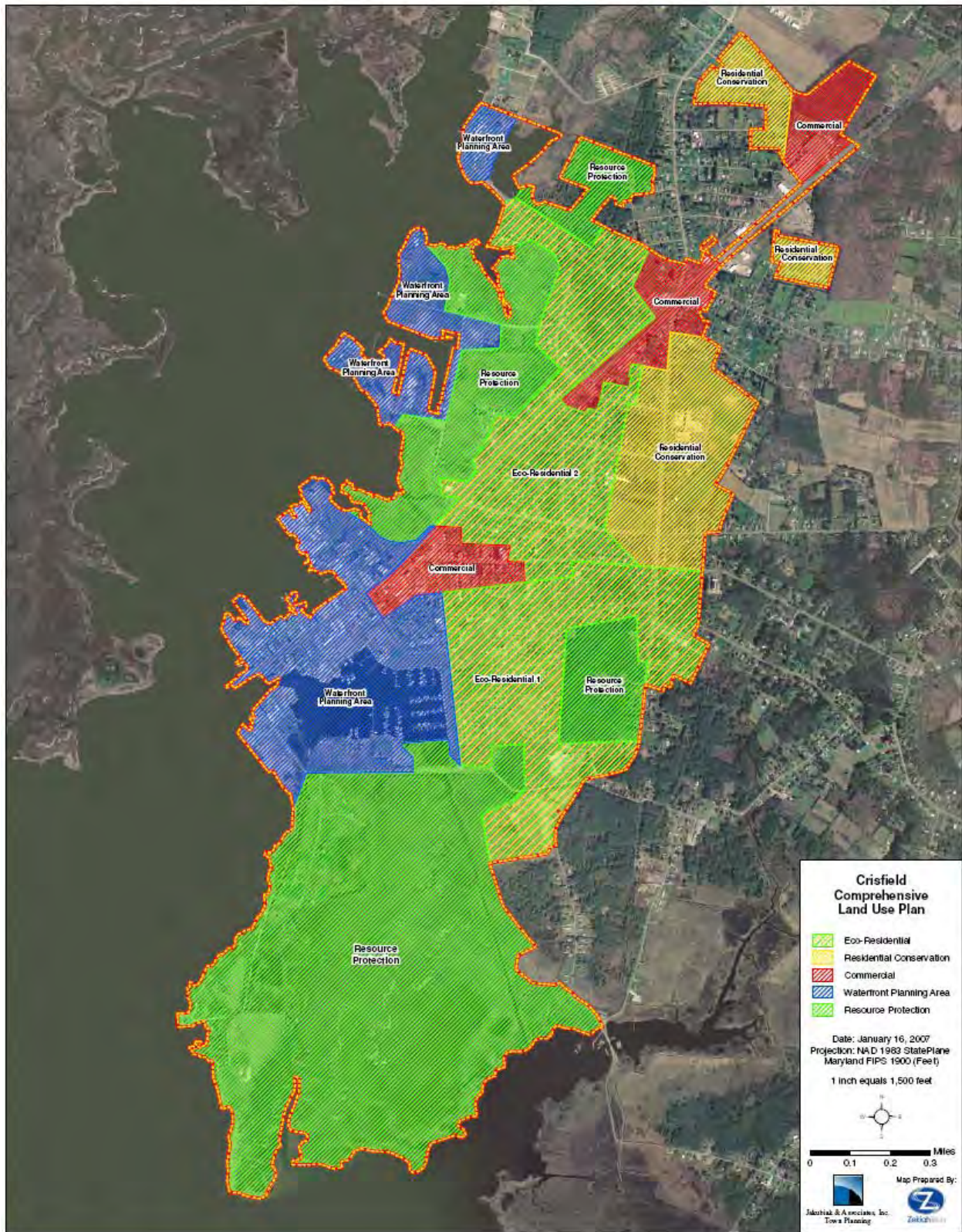
- Overall time, the total amount of impervious surface area within the existing borders of Crisfield is reduced.
- Through thoughtful redevelopment and an improvement in flooding conditions, an overall improvement in living standards is attained.

Policies

1. The Comprehensive Land Use Map and the Land Use / Natural Area Compatibility Chart will guide land use decision-making. The land use categories shown on the map are summarized in the table below and described in more detail in policy no. 2.

Summary of Land Use Plan Categories: Crisfield Comprehensive Plan

Resource Protection		
<u>Primary Emphasis</u>	<u>Character and Purpose</u>	<u>Primary Example Uses</u>
Environmental protection and conservation	Protect natural resources, promote recreational opportunities	Nature preserve, parkland, trails recreational trails, institutions, open space.
Eco-Residential Neighborhood 1		
<u>Primary Emphasis</u>	<u>Character and Purpose</u>	<u>Primary Example Uses</u>
Equal emphasis on residential rehabilitation and environmental restoration	Promote and safeguard residential setting protected from environment hazard while promoting reemergence of natural resource functions. No net increase in development density.	Multiple housing types, institutions, recreation, nature preserve, open space.
Eco-Residential 2		
<u>Primary Emphasis</u>	<u>Character and Purpose</u>	<u>Primary Example Uses</u>
Residential rehabilitation, infill, and environmental restoration, neighborhood commercial acceptable	Promote and safeguard residential setting. Promote Infill on vacant lots. No net increase in density (except through single-family infill).	Single-family housing, institutions, low impact commercial uses, open space.
Residential Conservation		
<u>Primary Emphasis</u>	<u>Character and Purpose</u>	<u>Primary Example Uses</u>
Residential conservation and infill.	Promote residential and institutional setting. Infill on vacant lots.	Predominately single-family residential types, institutions.
Commercial and Employment		
<u>Primary Emphasis</u>	<u>Character and Purpose</u>	<u>Primary Example Uses</u>
Shopping, working.	Development and/or revitalization of commercial and employment uses.	Retail, office, light industrial, residential above commercial
Waterfront Planning Area		
<u>Primary Emphasis</u>	<u>Character and Purpose</u>	<u>Primary Example Uses</u>
Working, recreation, tourism related.	Economic development, revitalization, economic restructuring.	Water-dependent uses, water-related uses, public recreation, resource preservation.



Land Use / Natural Area Compatibility

Land Use	Primary Sensitive Area					
	See Crisfield Elevation Map			Remaining Natural Shoreline	Tidal Marsh / Non-Tidal Wetlands	Remaining Intact Woodlands
	0-2 feet above sea level	2.1 to 3 feet above sea level	3.1+ feet above sea level			
Waterfront Planning Area						
Conservation of Existing Development						
Water-dependent uses	●	●	●	-		-
Non-water dependent uses	○	◐	●	-	○	-
New Development / Redevelopment						
Water-dependent uses	●	●	●	○	○	-
Non-water dependent uses	○	○	◐	○	○	-
Recreation						
Active (involves some land development)	◐	●	●	○	○	-
Passive	●	●	●	●	●	-
Resource Conservation	●	●	●	●	●	-
Outside of Waterfront Planning Area						
Conservation of Existing Development						
Neighborhood Conservation	○	◐	●	-	-	-
Neighborhood Infill (Limited to Vacant Lots)	○	◐	●	-	-	-
Commercial Revitalization	○	○	●	-	-	-
New Development / Redevelopment						
Residential, Neighborhood Redevelopment	○	◐	●	○	○	○
New Urban Development (non-residential)	○	◐	●	○	○	○
Recreation						
Active (involves some land development)	◐	●	●	○	○	○
Passive	●	●	●	◐	◐	●
Resource Conservation	●	●	●	●	●	●
<p>Key ○ Incompatible</p> <p> ◐ Limited Compatibility</p> <p> ● Full Compatibility</p>						

2. The basis purpose of each land use designation on the Comprehensive Plan Use Plan Map is described below.

Resource Preservation

Lands designated as resource preservation should be off-limits to development and protected from development impacts.

Eco Residential-1

The Eco Residential-1 category encompasses parts of the City prone to severe and regular flooding. The designation recognizes that these land areas are vulnerable to regular flooding and the storm surge associated with major storm events, that the natural condition of this area was tidal marsh, that the underlying soils and hydrological conditions are not well suited to intense urban uses, that wetlands and drainage channels are present but artificially isolated from surrounding tidal marshland, and that streets which could serve as evacuation or rescue routes are inundated by flood waters during storm events.

Redevelopment for residential use in the Eco Residential-1 areas is acceptable but only if it restores natural functions and open spaces, links isolated wetlands and natural areas together to provide flood protection and aesthetic benefits, improves infrastructure to benefit living conditions; and provides a broad mix of housing across the affordability range. Redevelopment should not increase overall development density or the footprint of development.

Eco Residential-2

The area designated Eco Residential-2 is also vulnerable to both major storm events and regular flooding. Infill, increased housing/zoning code enforcement, and rehabilitation of houses are preferred means of redevelopment.

A similar focus on environmental management is warranted and both natural and structural improvements to mitigate flooding should be identified and implemented. Again, because of the area is vulnerable to flooding, no net increase in development density should occur, except through infill on vacant single-family residential parcels.

Residential Conservation

Land areas with the Residential Conservation designation are located at relatively higher elevations above sea level primarily on the ridge that runs along Somerset Avenue (see the Crisfield Elevation Map in Section 2). While the bulk of this area is also in the 100-year flood plain, because of its higher elevation and position in-land, it is more apt to be protected by severe storm surges (see Storm Surge Threat Map in Section 2). The area is developed largely in a low-density pattern with ample open space and institutional uses.

Commercial/Employment

Lands designated Commercial / Employment include both the central business district and the commercial area located near the intersection of Somerset Avenue and MD Route 413. Modest expansion of land devoted to commercial use near the intersection of MD Route 413 and Somerset Avenue is acceptable. Both areas should allow for a mix of residential and commercial uses.

Waterfront Planning Area

This designation recognizes that this area is a unique resource to Crisfield, that the land use changes that have occurred and are occurring present challenges to compatibility in land use, architectural design and resource conservation. The waterfront planning area should be the subject of detailed planning and urban and environmental design.

3. The following are the recommended elements of the waterfront plan:
 - A. A land use component showing the land use category for each parcel.
 - B. Recreational element that provides for broad public access to and public parklands along the waterfront, including a public walkway plan.
 - C. A cohesive set of architectural design standards for new buildings.
 - D. The identification and preservation of scenic vistas.
 - E. Design of standards for stormwater management, shoreline erosion, and flood control.
 - F. A plan for linking the marina into the central business district and heart of the downtown area.
 - G. A plan for the marina area, which should contain recommendations for broad public access to and throughout the site.

Decisions regarding the appropriate land use and redevelopment of the waterfront area could impede the progress of a waterfront plan. Therefore, this Comprehensive Plan sets forth the City's principal policies regarding the Waterfront Planning Area:

- A. The shoreline is a public resource and it should be managed to benefit the greatest number of people in the best way possible. Extensive and coordinated physical and visual access to the water's edge for the public should be attained.
- B. The Waterfront Planning Area has long been a working waterfront and is now also recognized as a catalyst for economic development and urban revitalization in Crisfield.
- C. The plan should establish a comprehensive shoreline access strategy to coordinate physical and visual public access.
- D. Water dependent uses—uses that could not exist except on the water--such as commercial fishing, some seafood processing, boat yards, ferry terminals, marinas, tug and barge companies, etc.-- should be given the highest priority in locating and expanding. This recognizes that competition from other land uses has the effect of inflating land values to a point where such essential water dependent uses can become obsolete. These uses should be given full potential to capitalize on waterfront locations and should be protected from incompatible non-water-related uses, such as housing. By allowing non-water dependent uses on waterfront sites, the City loses the potential for uses that require a water access.

- E. Water related uses—those uses that benefit from a waterfront location, but are not dependent on it such as—resorts, restaurants, certain seafood processing and warehousing, should be permitted, but not necessarily directly on the shoreline.
 - F. Suitable sites for developing non-water related uses, including housing, should be identified as part of the plan.
 - G. No new residential development should be approved in the Waterfront Planning Area until the City adopts a waterfront plan. Upon completing the waterfront plan, the City should adopt specific zoning and design standards for the waterfront area.
4. In addition to any specific site planning, subdivision, and zoning requirements, the City Planning Commission should evaluate all redevelopment projects against the following ecological restoration criteria as part of its review:
- Has an acceptable floodwater impact study been conducted to measure the extent of flooding under pre and post-development conditions?
 - Does the project advance best management principles in the non-structural management of stormwater, as a first priority before the use of structural improvements.
 - How does the project respond to the underlying natural resource base and its functions? Does the project provide for the reemergence of natural flood attenuation areas, for example?
 - To what extent does the project reduce impervious surface area over pre-existing conditions and include the planting of native vegetation.
 - Is the project accessible by at least one evacuation route in the event of major flooding (see Section 4.3 Action 1)? Are all structures built to the highest standards of flood protection?
 - To what extent does the project contribute to citywide infrastructure and ecological restoration improvements aimed at mitigating flooding. Does the project contribute funding to offset the impact of development in the floodplain?
 - Does the project conform to the Land Use / Natural Area Compatibility Chart and Generalized Land Use Plan Map.
5. Every development or redevelopment project within the floodplain should reduce impervious surface area over pre-existing conditions.
6. All remaining natural shorelines will be protected from the impacts of development.

7. The City will follow a policy of ecological restoration through redevelopment. All new development will contribute funds to offset their impact and hence protect the community from flooding. Projects will include: marshland and wetland restoration, improved floodgates, shoreline repair, and the design, construction and planting of wetland mitigation and flood conveyance corridors.
8. Future development will occur primarily through the expansion of the City northeastward. Lands shown to be inundated by the storm surge of a Category 1 hurricane (see Storm Surge Threat Map in Section 2) should not be put to an urban use. Instead, they should be used only for very low density uses, agriculture, or resource conservation.

Actions

1. Use the Town Zoning Ordinance and Subdivision Regulations to ensure that, where possible, development and its impacts avoid sensitive areas, including the submerged aquatic vegetation.
2. Review site plans for proposed development projects to ensure that all reasonable measures are taken to protect sensitive areas both during and after development.
3. In redeveloping waterfront areas, to the extent possible, establish buffer areas between the water's edge and buildings or parking. Plant the buffer areas in native vegetation to improve water quality and scenic beauty.
4. Seek land conservation and protection easements over tidal marshes and natural areas located roughly between Seventh Street and Lori Quinn Drive.
5. On lands planned for residential development, cluster new home sites on the least environmentally sensitive areas. When clustering, rely on the overall dwelling unit density rather than rigid minimum lot sizes to determine the number of homes that may be built. It is possible under this approach to reduce individual lots sizes and thereby avoid unnecessary impacts to natural resource areas. This flexibility should be used in preserving woodland areas, flood prone areas, drainage ways, scenic vistas, etc.
6. Institute a native species-planting program aimed at substantially increasing land area with vegetative cover. Use the State's forest conservation fee-in-lieu funds to meet planting goals.
7. Establish a per-capita public green open space goal and seek to achieve the goal through land acquisition, developer contributions, and cooperation with state agencies of government.

8. Consider creating a shoreline protection district wherein those properties that would directly benefit from creating and maintaining shoreline erosion and flood control improvements would contribute to the cost of those improvements.
9. Eliminate the R-4 zoning district from the Zoning Ordinance and bring the zoning map and ordinance into compliance with the Comprehensive Generalized Land Use Map.

4.2 REDEVELOPMENT CONSISTENT WITH COMMUNITY CHARACTER

As redevelopment occurs, Crisfield will benefit from pursuing thoughtful infill and revitalization strategies that respect community character: the traditional layout of neighborhoods and streets, scenic vistas, local building styles, and regional vernacular architecture.

Background

The Zoning Ordinance permits a level of land use and architectural incompatibility that is changing the character of historic maritime areas. In the waterfront area, high-density residential uses, which are now permitted, by special exception, in the Tourist Maritime district are incompatible with a working waterfront. The size, scale and positioning of the buildings has reduced visual access to the water, the potential for public physical access along the water, and defined a new skyline for the City. A strong demand for vacation homes or second homes in the region may continue to make Crisfield a center of development. Much of this development will take the form of redevelopment or infill—that is, the use or reuse of vacant or underutilized parcels of land.

Guiding Principles

- Infill development and/or redevelopment can occur in a manner that respects the size, scale, and use of existing and historic development patterns. Successful infill maintains and/or restores spatial continuity to streetscapes; strengthens neighborhoods; respects historic preservation, existing vistas, and natural resources; and introduces compatible uses that complement existing community attributes and needs.
- Growing in balance with community character for Crisfield means accommodating new development opportunities in a way that reinforces the small town maritime character.

Objectives

- High standards of design and aesthetics guide property development and redevelopment within Crisfield.
- The major vistas remain open and available for future generations to enjoy.
- The remaining waterfront industries are protected from the impacts of new development.

Policies

1. Insist on excellence in site design and architecture throughout Crisfield. Minimize automobile oriented site planning in commercial areas, which includes expansive parking lots, drive-through service windows, and large setbacks.
2. Keep the architecture of new buildings generally consistent in style, materials, size, and scale with neighboring properties; departing from this policy only when guided by an adopted plan that sets forth new architectural design standards. The height of new buildings in the Waterfront Planning Area should be determined in a coordinated way as part of the waterfront plan. For instance, the permissible height of new buildings might vary depending on location on the waterfront and the presence of the most vital view sheds.
3. Insist on strict enforcement of current appearance and building codes to uphold and improve, as needed, the appearance and quality of existing development and buildings.
4. The small boat harbor is a vital element of community character supporting both the economic and cultural heritage of Crisfield. It should remain in its present location and be protected from incompatible land use activities.
5. Promote a “Main Street” commercial and entertainment area for the central business district. Standards for parking, signage, and streetscape should promote theater, music, lodging, restaurant, and shopping opportunities. Illustrations in the Zoning Ordinance should set standards to facilitate the construction of streetscape infrastructure, pedestrian safety and accessibility improvements, a cohesive signage plan, and civic gathering spaces.

Actions

1. Protect the remaining public vistas of the water. The Town should protect public vistas with zoning and development plan review. In cases where waterfront development or redevelopment is planned, the project should provide for public vistas from points outside of the projects.
2. Treat landscaping as an integral part of site planning and design to accentuate public and private spaces, contribute to community identity, prevent visual blight, buffer incompatible land uses, and improve the function of the natural environment.
3. In reviewing development site plans, ensure that measures are taken to protect adjacent or nearby waterfront industries.
4. Create a downtown historic/entertainment district: Permit mixed use: allow commercial, office/employment, live/work, civic, and residential uses in close horizontal proximity to

each other and vertically-integrated within the same building. Allow mixed-use (residential/commercial) redevelopment to encourage a downtown residential population, while maintaining ground floor space exclusively for commercial use.

5. Promote compatible and historically sensitive commercial buildings and residential units. The Zoning Ordinance should include illustrations that show and set standards for minimum percentage of glass frontage of commercial buildings; the size and placement of storefront awnings over sidewalks; building configuration, building placement on the lot and building function; the concealment of flat roofs and rooftop mechanical equipment; minimum and maximum build-to-lines; allowable public frontages; minimum lot frontage build out; the vertical orientation of windows and their placement on all exterior walls of buildings; minimum and maximum lot widths; exterior building material; the minimum and maximum pitch of roofs, and, where applicable, the minimum and maximum base densities of residential units; general handicap accessibility standards for selected housing types; landscaping and screening; and the encroachment of stoops and porches into the depth of setbacks.

4.3 DEVELOPMENT IN BALANCE WITH COMMUNITY FACILITIES AND SERVICES

As new development or redevelopment occurs, Crisfield will benefit from programming the expansion of community facilities and services to correspond to demand and ability to pay and will locate those facilities with the City's environmental constraints and opportunities in mind.

Background

The number of households in City may be expected to grow from 1,172 in 2000 to nearly 1,500 by 2030. Many of the community facilities and services on which residents and business rely may need to be expanded to accommodate this growth. Some of the most vital community facilities, such as the hospital, fire station, and wastewater treatment plant are in areas prone to flooding and/or are on streets that are inaccessible during major flood events. The City has no network of open spaces and no public parks.

Guiding Principles

- Community facilities and services sustain and strengthen cities as population grows, provided their capacity, quality, and accessibility are looked after.
- Community and civic facilities are best when they are highly accessible to the resident populations they are intended to serve and expanded as warranted by demand.
- The programming of capital facilities through a Capital Improvement Program provides both public and private development sectors the intelligence needed to make sound real estate investments.

- Parks, open space, biking, and walking trails are vital elements of a healthy city.
- Growing in balance with community facilities and services for Crisfield means recognizing capacity constraints where they exist and ensuring that adequate and accessible services are provided in a cost effective manner.

Objectives

- Water and sewer services are expanded as needed to serve planned development.
- A sense of community identity throughout Crisfield is enhanced through the quality and accessibility of community facilities and services.
- Existing facilities and services are maintained, improved, and optimized as the City grows.
- A citywide park and open space network is established that serves the recreational needs of residents and tourists.

Policies

1. Wastewater treatment plant capacity will be expanded. Plan to locate a new wastewater treatment facility beyond the current borders of the City on lands not prone to flooding. Plan for the eventual de-commissioning of the existing plant.
2. The City will work to ensure that emergency and general hospital services remain accessible to City residents during times of severe flooding. Cooperate with the McCreedy Memorial Hospital and all relevant local, State, and Federal agencies to ensure a high level of disaster planning to protect the essential functions of the hospital and the safety of residents, patients, and staff in the event of major storm events.
3. Ensure that major capacity investments in new buildings and facilities are located and designed to withstand major flooding events and are assessable by roadway during times of flooding.
4. Locate new and/or redeveloped civic buildings, along pedestrian ways and future transit routes so that they are broadly accessible to the public. Renovate and/or expand the City Hall.
5. Use the street and highway functional classification map (See Section 2) to organize traffic planning and the routing of transit vehicles.

Actions

1. Conduct an engineering study to determine the improvements to streets and highways needed to ensure evacuation routes in times of severe flooding. Elevate sections of the arterial and collector road systems that currently flood. Consider elevating the sections of MD 413 that act as a levy against storm surges or otherwise design measures to hold and safely convey floodwaters.
2. Develop a signing program that directs pedestrians and motorists to the civic uses in the City.
3. Expand and improve public water supply and wastewater treatment capacity and infrastructure to serve anticipated development as warranted by demand.
4. Continue to monitor growth and development and work cooperatively with police and fire agencies to ensure that the current good levels of service are maintained over time.
5. Cooperate with the County on school issues to ensure that the schools attended by the City's children retain their quality and accessibility.
6. Prepare a park and open space plan and actively acquire and improve land for recreational use. Build a network of walkway and bike trails that connect natural areas and developed sections of the City and provide access to the water's edge. Seek to ensure public access to the water's edge through the development review process.

4.4 DEVELOPMENT IN BALANCE WITH REGIONAL PLANNING POLICIES

As new development or redevelopment occurs, Crisfield will benefit from cooperation with State agencies of government, Somerset County and other concerned levels and units of government

Background

In general County and State growth management policies seek to direct new residential and commercial development to planned and designated growth areas. These areas, which have become known as priority funding areas, include Crisfield. There is a need for long-term cooperation on the part of the State, County, and City.

The schools in the Crisfield are operated by the Somerset County Board of Education and the Corbin Memorial Library in Crisfield is operated by Somerset County. The Crisfield-Somerset County Municipal Airport is located outside of the City. A working understanding between the City and Somerset County allows the City to extend sewer service beyond its boundaries without annexation. Shore Transit operates transit service over a three-county area providing connections between Crisfield and Salisbury as well as the Crisfield loop bus route that provides service to main points of interest within the City. The Somerset County Economic Development

Commission seeks local industrial investment that will benefit City residents. The Somerset County Department of Emergency Services prepares and periodically updates the emergency operations plan covering Crisfield in cooperation with the Maryland Emergency Management Agency and with FEMA.

The main access routes into Crisfield are State-owned. The Maryland Departments of the Environment and Natural Resources, including the Critical Area Commission, figure heavily in regulations concerning land conservation and development in the City. The Maryland Department of Natural Resources owns and operates the Somers Cove Marina. The State Departments of Planning, Transportation, Natural Resources, Business and Economic Development, and Housing and Community Development administer grant programs intended to benefit towns and cities.

Guiding Principles

- Implementation of a municipality’s priorities and plans can be advanced when a city coordinates the planning of local projects with the broader policy goals of other jurisdictions and agencies of government.
- Cooperation among jurisdictions is important for long-term plan implementation because it:
 - Clarifies varying development goals and the roles of the actors in community development.
 - Recognizes the sources and directs the uses of political and technical input and support.
 - Helps define priorities and guide the allocation of resources by eliminating conflicts and linking previously un-related efforts.
 - Helps to yield structures and response systems, which can link the City with non-local public and private resources.

Objectives

- Coordination with neighboring jurisdictions and other governmental units and agencies contributes to sound and responsible growth and development policies.

Policies

1. The City will work cooperatively with county, state, and federal agencies to advance the important interests the City shares in responsible planning, economic development, and the improvement of essential services.
2. The City will work cooperatively with the County to identify areas that are suitable for future urban development beyond the current municipal limits.

Actions

1. Work with the State to improve drainage and flood mitigation measures along MD Route 413 and to maintain the efficiency of state owned highways in the City and achieve other projects that meet shared objectives.
2. Work with the Maryland State Highway Administration and Somerset County to improve the safety and capacity of MD Route 413 and specifically to advance the proposed reconstruction of MD 413 to implementation.¹
3. Accessible transit service is vital to economic development. Cooperate with Shore Transit to ensure that public transit services are expanded as needed to serve City residents.
4. Continue to work with the County and State economic development officials to promote employment development, the reuse of industrial properties, and the revitalization of commercial space in the central business district.
5. Continue to work with Somerset County in the planning of sanitary sewer treatment to ensure that capacity is expanded to accommodate growth and development.
6. Work with the State to ensure that any ownership and operational plan for the Somers Cove Marina substantially advances the City's interests in how the marina should be used, operated, managed, and developed.
7. Continue to work with the Somerset County Economic Development Commission to help attract employment opportunities that will benefit local residents, including entry-level jobs in the hospitality industry for young workers.
8. Continue to work with the Somerset County Department of Emergency Services to ensure that the emergency operations plan remains consistent with the needs of City residents.
9. Work with the State Highway Administration and Somerset County to develop an access control management strategy along MD Route 413 from Marion to Crisfield City limits. The primary goal would be to promote and protect the safety, efficiency, and natural beauty of the highway corridor as it approaches the City limits, as development may occur.

4.5 THE PEOPLE OF CRISFIELD - REINVIGORATING NEIGHBORHOODS

¹ The Maryland State Highway Administration's (SHA) Highway Needs Inventory calls for reconstruction of MD Route 413 from the City limits to MD Route 13. It also calls for an access management project at the intersection of the two highways. The project should have recognition and support by Somerset County as a "priority project" for inclusion in SHA's Consolidated Transportation Program (CTP) before funding is committed to the project.

The benefits of development and redevelopment will contribute to all residents of the City.

Background

There is a profound human dimension to planning, to development, to growth and change in a city. Major decisions about development have a direct bearing on the quality of life and indeed, the living standards of residents.

With the decline in traditional fishing and manufacturing industries, there are challenges to maintaining the quality of neighborhoods. One half of the City's housing units were built before 1950 and 14 percent of all units are vacant. The wage-earning potential of many residents to support owner-financed revitalization is limited: only half of residents over 16 years of age are part of the labor force; 34 percent of residents are below the poverty level; the median household income for owner-occupied households is \$31,000 and the median income for renter households (which comprise slightly more than half of all households) is \$11,600. An aging housing stock combined with low renter income (which reduces the incentive to invest in property upkeep) contributes to diminishing housing quality.

Reinvigorating Crisfield as a city of neighborhoods means directing new planning, development and investment initiatives into arrangements that strengthen the City's people and the City's small town character. Eleven percent of the City's residents are over 65 years of age. Twenty-eight percent of the City's residents are under the age of 18. A single parent heads two-thirds of those households with children. About 46% of families with children under five years of age have incomes below the poverty line. Accessible recreational opportunities and the institutions that nurture young people are limited and uncoordinated.

Guiding Principles

- A profound human dimension and quality takes precedent over the built environment. A community and its aspirations and the individual and his or her aspirations, whether attained or unrealized, are always present. Changes in the built environment affect people's lives. Environmental protection and thoughtful development decisions have a direct bearing on the living standards and the quality of life of a city's residents. Thoughtful planning and development can raise the quality of life for an entire community.
- A healthy city integrates its young people into the fabric of community life; provides safe places, opportunities, and experiences for the all residents to interact. Institutions that nurture the young and pass on the unique cultural heritage are encouraged.
- A city's waterfront is a public resource, a good held in common. Its use should benefit as many people as possible. A maritime community, like Crisfield, has a stake in its waterfront.

- Places for city residents to gather are important; these are civic places; places for the discussion of matters of public purpose and places for community-wide celebrations.
- The cost of living and housing affordability are essential factors to consider and address as redevelopment occurs in a city, to ensure that existing residents are not priced out of the housing market.

Objectives

- The energy and resources of development and redevelopment are harnessed to provide meaningful improvements in the neighborhoods of Crisfield.
- The City and its institutions focus in a concerted manner on improving opportunities for the City's children, young adults, and young families. Institutions that support and nurture children are energized and focused. Crisfield is a community that actively seeks to retain its young people. Entry-level employment opportunities are encouraged.
- An affinity for the maritime economy and its potential is widely shared. That experience and knowledge is passed on to the young in Crisfield in ways that point to economic opportunity.
- Ecological restoration is viewed as a participatory learning process joining professionals and experts working for the City with people living in Crisfield.
- Those traditional maritime industries that are not required to be located on the waterfront will have a place in the community to continue and expand their operations.
- The collective efforts of concerned citizens, organizations, businesses, and governmental agencies are harnessed to promote sustained economic growth.

Policies

1. To promote the re-invigoration of existing neighborhoods, the City will consider how best to direct an increment of tax revenues from new development to actual improvements in existing neighborhoods. Improvements that have the dual benefits of improving the quality of life and promoting private capital investment include: improved code enforcement, removing blighted structures, infrastructure repair, flood control, stormwater management, tree planting, and beautification. Revolving loan funds to assist existing homeowners to rehabilitate properties may also be funded through new tax revenues or through negotiated annexation agreements.

2. The Somers Cover Marina and its associated lands are a vast area of open space, permitting access to the water for citizens, boat owners, visitors, and the like. This area should remain Open Space without any new development since there are many local established businesses such as restaurants, confectionaries, repair facilities, hardware, and marine related stores within walking distance in the downtown business district.
3. Development or redevelopment projects will cover the costs of the impacts to the community. For example: if a development project is found to impact the quality of a road, approval of that project will be conditioned on the developer resolving that impact. If a development project is found to impact flooding, approval of the project will be conditioned on the developer resolving that impact.
4. The City will seek to assist maritime industries is remaining in the community including those maritime industries that are not required to have a waterfront location.
5. In future housing planning, the Crisfield Housing Authority, the City, and developers will seek to avoid concentrations of poverty by mixing housing units together across the spectrum of affordability.
6. The City will seek contributions by developers and cooperation with other agencies of government, including the Somerset County Park Commission, existing groups, and citizen volunteers to create a park and recreational system. Recreational opportunities should be available for people of all ages and abilities. The system should contain large open spaces, biking and walking trails, and a center for dance, music, art, and related activities.
7. The City will insist on strict enforcement of current appearance and building codes to uphold and improve, as needed, the appearance and quality of existing buildings and lots. Dilapidated, blighted, and unsafe houses will be condemned and razed.
8. All development projects will have sidewalks and will provide direct and safe pedestrian access to the City's existing network of sidewalks.
9. The City's historic structures will be preserved and rehabilitated where necessary. The integrity of the historic district will be protected. Incentivize the adaptive reuse of historic buildings throughout the City and especially in the City's Historic District: assisted by City staff, property owners may be offered tax incentives to rehabilitate and redevelop historic downtown properties.
10. The City will pursue economic development initiatives designed to increase the number of jobs in high paying and growing sectors of the economy and retain current employment opportunities.

Actions

1. Document and publicly interpret the City's natural resources and their functions. Create a program that describes these resources. It may include interpretive signs, boardwalks, and trails. Coordinate this with a citywide recreational trail system.
2. Work with the County Department of Emergency Services to widely disseminate and seek input on community wide emergency management and operations plans.
3. In the development review process, the Planning Commission should require that developers mitigate the impacts of properties and projects to community infrastructure and natural resources upon which the City depends.
4. Obtain the services of professional town planners and municipal engineers in the review and approval of all development projects.
5. Expand City Hall, most notably the city council chambers.
6. Improve the enforcement of zoning and building codes.

4.6 IMPLEMENTATION

Implementation brings people together so that their interactions produce successful outcomes. A concerted effort at implementing the Comprehensive Plan in Crisfield would:

- Clarify varying development goals and the roles of the actors in community development.
- Recognize the sources and direct the uses of political and technical input and support.
- Help define priorities and guide the allocation of resources by eliminating conflicts and linking previously un-related efforts.
- Help yield structures and response systems, which can link the City with non-local public and private resources.

Cooperation on implementation can occur between the City and other agencies of government, its citizen volunteers and citizen groups and with private developers. Citizen involvement and leadership can be an important element of plan implementation.

Funding Mechanisms

Public sanitary sewer service and water supply are provided through an enterprise fund meaning that expansions of capacity are financed by new system users and should not be funded through

the general fund of City government. This should remain so and connection fees should be set at a level that allows for the timely expansion of the systems.

The City should produce and maintain a five-year Capital Improvement Program (CIP). A CIP is a financial planning tool allowing the City to schedule infrastructure priorities with available and projected revenues. It identifies capital projects and revenue sources, which in any given year may include general obligation bonds, general fund balances, county, state, and federal grants, impact fees, etc.

The City should work with the funding programs administered by Somerset County and State agencies to implement key priorities. The City should cooperate with State agencies of government to obtain grants and other funding for planning and projects that benefit the City and its residents.

The City should place its impact fee revenues in separate accounts set aside to fund the cost of specific capital expansions. The City should periodically assess its impact fees and set the fee at a level that covers the City's cost of making improvements needed by new development.

Where it is found that a development project will have off-site impacts, the Planning Commission should require, as a condition of development approval, that the developer finance, at his/her expense, studies to quantify those impacts. The developer should cover the cost of resolving impacts created.

Regulatory Mechanisms

Zoning regulates the use of land and the intensity and character of development and redevelopment. It is perhaps the most effect tool in guiding a City's physical development. Changes will need to be made to the Zoning Ordinance and Map so that they conform to the Comprehensive Pan.

Subdivision Regulations establish the requirements and standards for the subdivision of land and the construction of infrastructure to serve new development. In addition, they establish the requirements and standards for ensuring that adequate public facilities such as street capacity and public water and sewer services are maintained. Developers of all significant projects should be required to submit studies of their impacts on the City and its public facilities and services.

The City should enforce its Chesapeake Bay Critical Area Protection Program and update it as required by law and/or changing conditions.

Continued Planning Program - Building Capability to Manage the Planning Process

City planning is a continuous process. The monitoring and review of public and private development projects is an essential task. This Comprehensive Plan provides a guide to the City

as it considers new projects and programs. The City should formally re-evaluate, and update as necessary, this Comprehensive Plan six years from adoption. This is required by Article 66B of the Annotated Code of Maryland.

The City Planning Commission should conduct a yearly assessment of growth and development in conjunction with their Annual Report responsibilities per Article 66B. The annual report should be made available to City residents, neighboring jurisdictions, and the Maryland Department of Planning.

All proposed capital projects in Crisfield that affect physical growth and development should be referred to the Planning Commission for its review per Article 66B of the Annotated Code of Maryland.

The City should hire a professional planner or obtain ongoing consulting town planning and municipal engineering services. Services can be funded in part through plan review fees recently adopted.

4.7 CONCLUSION

The Crisfield Comprehensive Plan highlights the challenges and assets of Crisfield. It presents a compelling image for the future. It sets forth policies that will help shape the future in the public's interest. A public forum was created in the act of preparing this plan. In this forum discussions about the vital aspects of city development took place—the presence of natural resources and their functions, the impact of past development decisions on the lives of both neighborhoods and individuals, aspirations for the waterfront and the marina, concerns about the location, amount and impact of recent waterfront redevelopment, fears about changes in community character, the limited capacity to handle more growth and the uses of remaining sewer capacity, the need to protect and strengthen the maritime heritage, the need to ensure that development's benefits are broadly shared.

In its preparation, the plan has succeeded in bringing to light important ecological relationships, the natural assets of Crisfield—and its scenic beauty--and the character and ingenuity of its people. By itself and from this point onward, however, the document does nothing. People who live and know a place must work toward a plan's vision. Crisfield will determine whether the ideas in this Plan will thrive and become a legacy to succeeding generations. The truth is that implementing the Plan will require much work. The Plan's systematic approach to restoring natural resources through physical and economic redevelopment, for example, will require ongoing effort, coordination, and commitment.

The preservation and restoration of ecological resource within the City, the revitalization of neighborhoods and the central business district, the responsible development of the waterfront, the achievement of broadly shared and sustainable economic growth; these things are all related and are all long term endeavors, extending generations into the future. They are endeavors, which recognize that unique and vital relationships exist in Crisfield. Realizing these ideas will

reveal the unshakable belief citizens have in the vitality of Crisfield and their pride in developing and nurturing its unique assets.

SECTION 5: MUNICIPAL GROWTH

5.1 INTRODUCTION

Newly adopted amendments to Article 66B require that municipalities must:

- include a Municipal Growth element in the Comprehensive Plan that specifies where the municipality intends to grow outside its existing corporate limits;
- complete an analysis of land capacity available for development, including infill and redevelopment and an analysis of the land area needed to satisfy demand for development at densities consistent with its master plan; and
- share with other planning agencies an annexation plan that is consistent with its growth element in the comprehensive master plan.

The Crisfield Municipal Growth element was added to the 2007 Crisfield Comprehensive Plan in 2009. The purpose of the Municipal Growth element is to examine the interrelationships among land use, population and housing growth, and the related impacts on public facilities and services. The findings provide City officials with a more informed basis for setting land use and growth management policies in the future through a better understanding of the multi-dimensional implications of change.

The Municipal Growth element is based on projections and assumptions about the City's future (e.g., population projections, average household size, school age students per household, etc.) which may not prove out in the future. The City recognizes this possibility. When new or significant trends or events are counter to basic assumptions underlying the conclusions of the Municipal Growth Element the City will revise the Comprehensive Plan as necessary and appropriate.

5.2 POPULATION AND DWELLING UNIT PROJECTIONS

Projecting demand for land in the planning period is complicated by a number of factors. Although there has been substantial building since 2003, much of the construction activity involves condo units primarily for seasonal or part-time use. These developments (existing and planned) include the following:

- Captains Quarters: four-story multi-family: 16 units
- Waters Edge: townhouses: 68 units
- Captains Galley: six-story multi-family: 23 units
- Harbour Lights: two five story and two six-story buildings: 127 units
- Tangier Sound Condominiums at 1089 Somers Road (Jersey Island): eleven four-story buildings: 234 units
- Locust Street Development1: 6 units

- Ball Park Subdivision (in City Limits): 11 units

170 of the 485 planned condo units have been built. While these projects will impact water and sewer use, they will not necessarily affect population projections if occupants are not counted as permanent residents of the City.

Recent economic trends suggest that basing population projections on building activity may substantially overstate expected gains (at least in the short term). One need only consider the recent trend in new residential construction (as indicated by building permits issued) to see how the downturn in the nation’s economy has affected projected City growth (see Table 5-1).

Table 5-1
Residential Building Permit Activity
1997 – 2009

Year	Building Permits
1997	7
1998	6
1999	12
2000	12
2001	9
2002	7
2003	71
2004	68
2005	105
2006	9
2007	4
2008	2
2009*	0

According to a recent MDP white paper:

“Population growth continued to slow throughout most of Maryland in the July 1, 2007 to July 1, 2008 period, according to recently released population estimates from the U.S. Census Bureau. This slowdown can be attributed to the deterioration of the economy and the collapse of the housing bubble, both of which influenced the size and direction of domestic migration flows.

Particularly affected by the slowdown were formerly fast-growing, suburbanizing rural jurisdictions, like Cecil and Washington counties, that had their smallest population gains since 1983 and 1999 respectively. Additionally, long-term fast growing outer suburban counties like Frederick, Charles and Calvert, also experienced their slowest growth in decades. The slowdown in growth in these and other counties was manifested primarily in smaller gains from domestic migration. In all, two thirds of Maryland’s jurisdictions (16 out of 24), experienced net domestic out migration in the 2007/2008 period. Five of

these jurisdictions – Baltimore City and Baltimore, Prince George’s, Somerset and Allegany counties – did not have other sources of population growth (such as births or international migration) sufficient enough to overcome these domestic outflows and thus experienced population declines.”²

Declining population is not new to the City. In the period 1960 to 2000 the City population declined by 23 percent or a little over 0.6 percent per year (see Table 5-2). More recently the Bureau of Census estimates the City population increased to 3,749 by July 2008.³

**Table 5-2
Population Trends – Crisfield and Somerset County
1960 - 2000**

	1960	1970	1980	1990	2000	Change 1960 - 2000	Percent Change	Annual Rate
City of Crisfield	3,540	3,078	2,934	2,880	2,723	-817	23.08%	-0.65%
Somerset	19,623	18,924	19,188	23,440	24,747	5,124	26.11%	0.65%
% of County	18.04%	16.27%	15.29%	12.29%	11.00%			

Source: Crisfield Comprehensive Plan

Factors contributing to Crisfield’s population decrease since 1960 included:

- The decline of the Chesapeake Bay fishing industry;
- Decline in other industrial and manufacturing employment; and
- A decrease in the average household size.

There are few indications any of these factors has changed. The Chesapeake Bay fishing industry continues to decline. Shrinking industrial and manufacturing employment is an unabated nationwide trend. If the City’s average household size follows that of the County it is expected to be slightly more than 2 persons per household by 2030 (see Table 5-3) and average about 2.19 persons per household through the planning period.

**Table 5-3
Projected Average Household Size
Somerset County and City of Crisfield
2010 - 2030**

	2010	2015	2020	2025	2030
Somerset County*	2.25	2.21	2.19	2.17	2.13
City of Crisfield**	2.30	2.26	2.24	2.22	2.18

² White Paper, *Statewide Slowdown in Growth Affects Most Jurisdictions Net domestic outmigration experienced in 16 of 24 jurisdictions*, Maryland Department of Planning, http://www.mdp.state.md.us/msdc/Pop_estimate/Estimate_08/county/dw_popest_cnty08.htm

³ U.S. Census Bureau, Population Division. Release date: July 1, 2009

*Source: Somerset County – MDP

**City of Crisfield – Peter Johnston & Associates

With the preceding factors in mind, the population projections used in this Municipal Growth element (see Table 5-4) are based on the following assumptions:

1. The City’s population will grow at an average annual rate of 0.75 percent over the planning period.
3. The population in group quarters will remain constant at 33 through the planning period.
4. The vacancy rate will remain at about 14 percent.

**Table 5-4
Population Projections
2010-2030
Somerset County and City of Crisfield**

						Change	Percent	Annual
	2010	2015	2020	2025	2030	2010 - 2030	Change	Rate
Crisfield	2,790	2,897	3,007	3,121	3,240	450	16.12%	0.75%
Somerset	26,550	27,500	28,300	28,950	29,350	2,800	10.55%	0.50%
	10.28%	9.85%	9.94%	10.11%	10.48%			

Source: Peter Johnston & Associates

Evaluating development capacity (land, water, sewer, etc.) is based on an estimate of new residents, dwelling units, and nonresidential (commercial and industrial) growth the City may experience in the planning period. These estimates provide a basis for assessing the City’s ability to accommodate growth.

A key unit of measure for assessing potential impacts is the number of new occupied dwelling units (see Table 5-5). Also noted, the median year built for owner occupied housing in 2000 was 1949. By the end of the planning period nearly 70 percent of the occupied dwelling units will be 60 years old and over half will be 80 years old.

**Table 5-5
Projected Dwelling Units
City of Crisfield**

							Change
	2010	2015	2020	2025	2030	2010 - 2030	
Population	2,790	2,897	3,007	3,121	3,240	450	
Ave HHL D Size	2.25	2.21	2.19	2.17	2.13		
Total Dwelling Units	1,458	1,514	1,572	1,620	1,695	238	
Occupied Dwelling Units	1,259	1,307	1,358	1,410	1,464	205	

	2010	2015	2020	2025	2030	Change 2010 - 2030
Vacant Dwelling Units	199	206	214	210	231	32

5.3 DEVELOPMENT CAPACITY

Residential Infill and Redevelopment Capacity

Residential infill potential examines theoretical development capacity associated with development on vacant and underutilized land in the City (see Map 5-1). Among other things this exercise allows City officials to quantify land development capacity within the existing corporate limits to determine if capacity is adequate to accommodate projected population and economic growth. In the case of population growth City officials evaluated land capacity in terms of land required for approximately 200 additional occupied dwelling units by 2030 and 450 new residents.

Infill capacity is based on the number of vacant or underutilized properties in the City that could be developed. “Vacant” land is undeveloped properties of a suitable acreage for development. “Underutilized” means those properties that exhibit significant “underdeveloped” traits such as large land acreages with one existing dwelling unit located in the City. While large unused parcels are rare in Crisfield, many smaller parcels throughout the neighborhoods are vacant or underutilized. These properties were identified using Maryland Property View (MPV) data, verified from recent aerial photography. Table 5-6 summarizes the acres of vacant and underutilized land in the City.

Table 5-6
Vacant and Underutilized Land
City of Crisfield

Description	Acres
Vacant Land	134
Underutilized Land	11
Total	146

Table 5-7 summarizes Crisfield’s residential development capacity. The results of the development capacity analysis demonstrate that the City has adequate land capacity to accommodate its projected population growth.

Residential development capacity, as summarized in Table 5-7, reflects current land use patterns and zoning policies. In the *2008 Crisfield Strategic Revitalization (SRP)* included a master redevelopment plan for portions of the City, including 330 residential units owned by the Crisfield Housing Authority. The SRP master plan presents a concept for redevelopment of vacant and underutilized properties with a combination of more intense horizontal and vertical

mixed use development than is implied under the current zoning classifications. As shown in Table 5-7 full implementation of the SRP master plan could result over 1,700 new residential units.

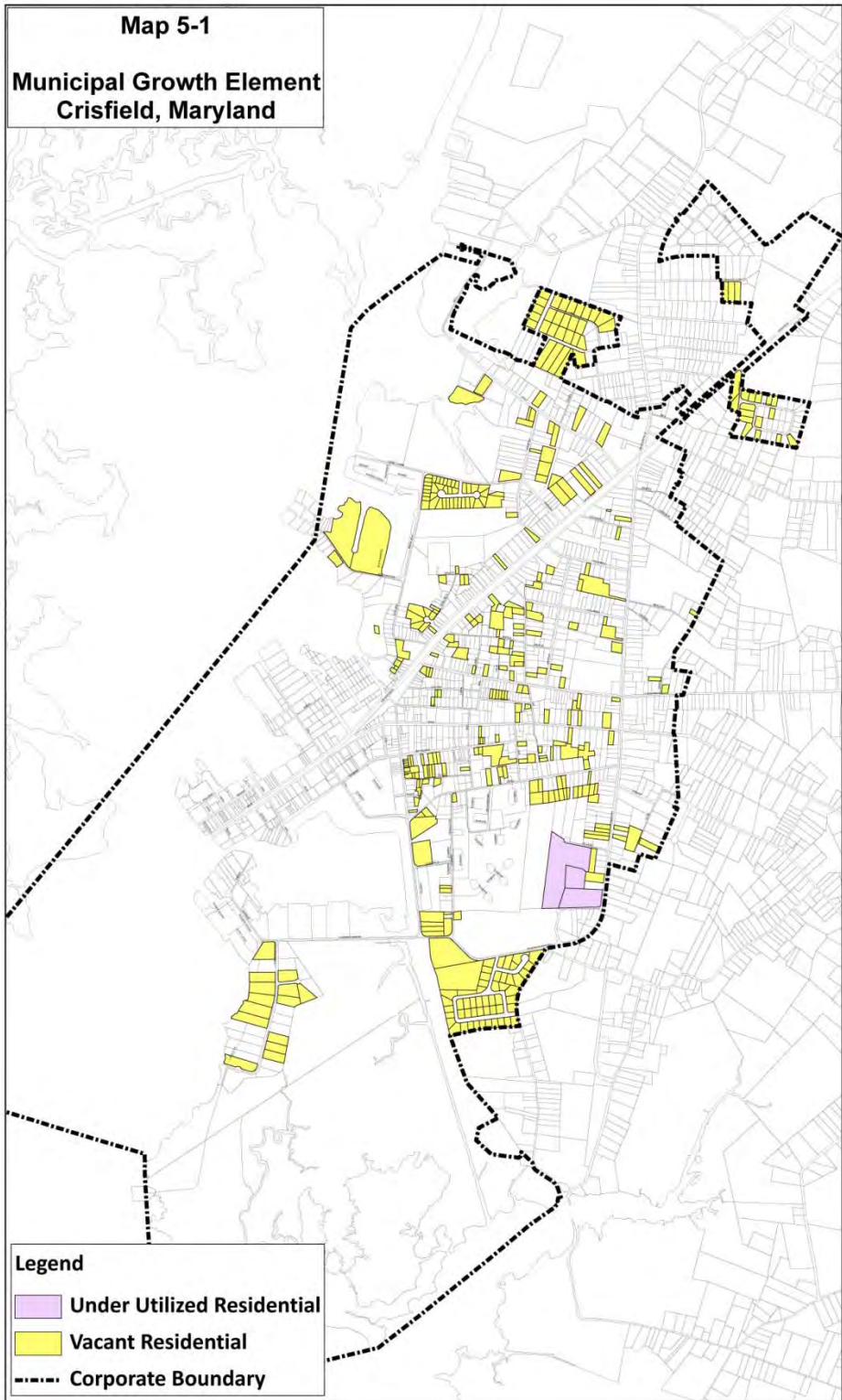
**Table 5-7
Residential Infill Development Capacity
City of Crisfield**

Unit Type	Capacity	
	Units	Population
Detached Single Family Residential	343	751
Attached Single Family*	131	287
Multi-Family*	409	896
Total	883	1,934
Added - SRP Master Plan	893	1,956
Total - with SRP Master Plan	1,776	3,889

* Concept plans approved

Non-Residential Infill and Redevelopment Capacity

Analysis of vacant commercial and industrial property (see Map 5-2) indicates that the City has sufficient land capacity to support approximately 100,000 square feet of additional commercial building and an additional 100,000 square feet of industrial building within the corporate limits. Calculation of non-residential uses (Gross Floor Area or GFA) utilizes a 0.32 “Floor Area Ratio” (FAR) factor for commercial uses and 0.17 FAR for industrial uses. Projected commercial and industrial land use was based on an assessment of commercial and industrial floor area to population ratios in the City and elsewhere in the county. The values used were 50 square feet of commercial floor area per capita and about 19 square feet of industrial floor area per capita.



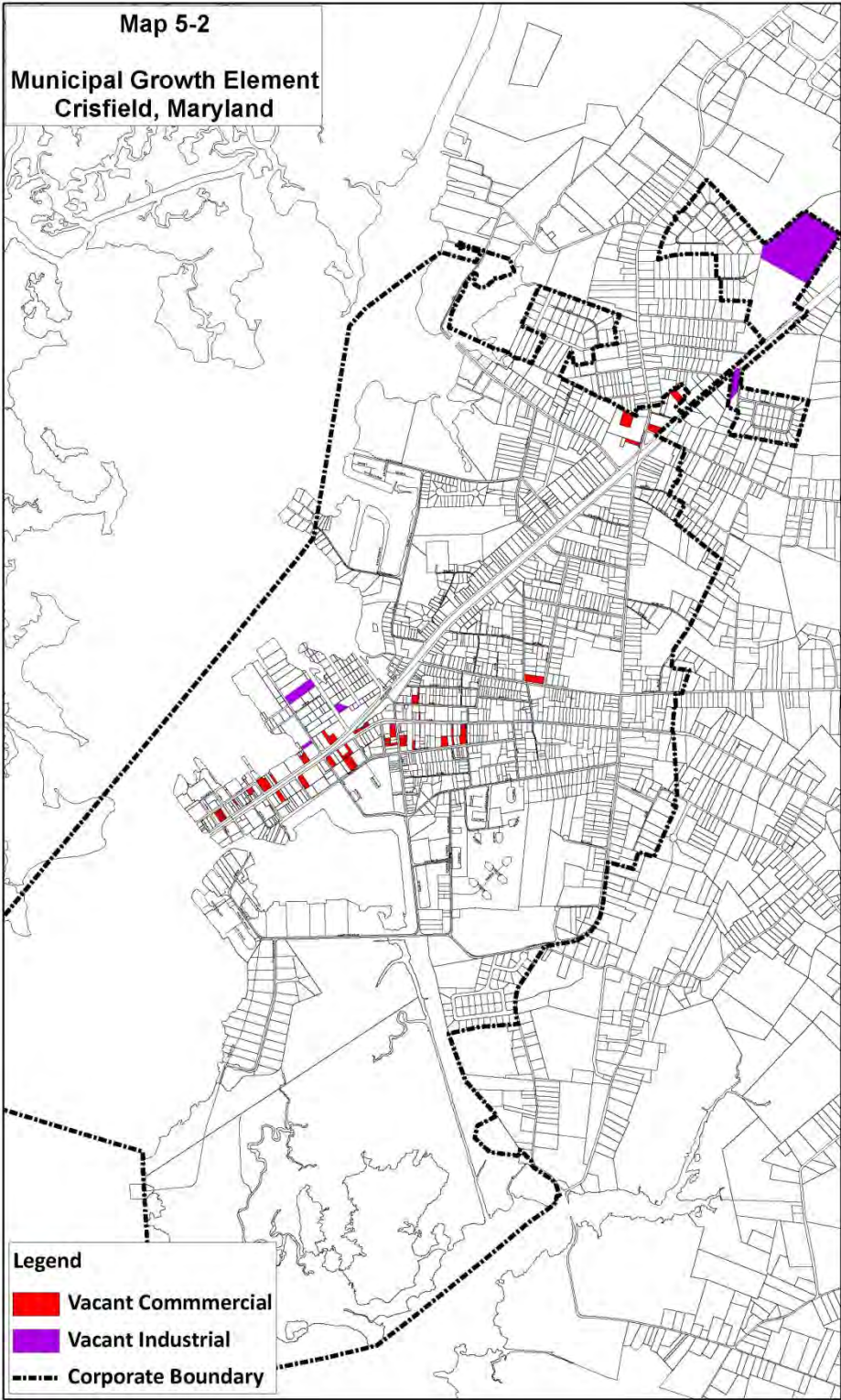


Figure 5-1



5.4 IMPACTS OF GROWTH

2030 Growth

Population, housing and economic growth will impact public services and facilities provided by Crisfield and Somerset County. Table 5-8 summarizes the potential impacts on public facilities and services (City and County) of growth resulting from infill and redevelopment and based on the City’s projected population growth through 2030. “Impact” is derived by multiplying the “service measure” by the “service unit”, i.e., either new households or new population. Households and occupied dwelling units are used interchangeably in the analysis. In some cases the multiplier represents a generation rate, e.g., the average number of students in a household or the average number of gallons of sewer that flows from a dwelling unit. In other cases, the “service measure” may represent the current level of service provided by the City, e.g., the City employs 0.43 police officers per 1,000 new residents.

**Table 5-8
Municipal Growth Impact Estimates 2010-2030
City of Crisfield**

FACILITY/SERVICE	IMPACT	SERVICE MEASURE	SERVICE UNIT
SCHOOL (new students)	98	0.476	Per household
- High School	32	0.154	Per household
- Middle School	22	0.107	Per household
- Elementary School	44	0.215	Per household
TOWN ADMIN./MEETING (GFA)	153	0.34	SF Per capita
PUBLIC WORKS (GFA)	1,502	3.3	SF Per Capita
LIBRARY (GFA)	348	0.77	SF Per Capita
RECREATION LAND (acres)	13	30	Acres per 1000 pop.
POLICE			
- Officers	0.19	0.43	Per 1,000 population
- Support Staff	0.10	0.22	Per 1,000 population
- Squad Cars	0.21	0.47	Per 1,000 population
FIRE & RESCUE			
- Personnel	2	3.58	Per 1,000 pop
- Facilities (GFA)	1,019	2,265	Sq. ft. per 1,000 pop

In calculating impacts associated with Crisfield’s growth in the planning period the City utilized the following sources and assumptions:

- Future population and dwelling unit projections from 2010 to 2030, as described in this section;
- Multipliers for school enrollment derived from St. Mary’s Educational Facilities Plan, Maryland Department of Planning Models and Guidelines publication 25, entitled, *Writing the Municipal Growth Element to the Comprehensive Plan*;

- The current City level of service for Municipal Administrative space (current space per thousand people provided by the City);
- American Library Association (library facility square footage multiplier); and
- Police and fire level of service measures (LOS) are based on the level of service currently provided by the City

Public Schools: If Crisfield reaches the projected 2030 population growth, 98 new students will be enrolled in local schools. Due to decreasing enrollment trends Somerset County public schools are expected to have adequate capacity through 2030 (see Table 5-9). “Although three individual schools have experienced enrollment increases since 1998-99, the overall enrollment for Somerset County Public Schools has declined by 4.27 percent for the five-year period. Projections for the next six years indicate a continuation of this trend.”⁴

Table 5-9
Somerset County Public
Analysis of Building Capacity and Enrollment Schools
2002-03 and Projected 2007-2008 School Years

SCHOOLS	State Rated Capacity	2008 Actual Enrollmen t	% of State Rated Capacity
Crisfield High School	679	423	62%
Woodson Elementary	636	592	93.08

Source: Maryland Department of Planning

Municipal Administration and Meeting Space: The existing City Hall houses the City’s administrative offices/functions and provides meeting space for City officials and the public. The current level of service is about 340 square feet per 1,000 residents. If the City is to maintain this service level an additional 153 square feet will be required by 2030.

Public Works Space: Crisfield’s public works functions include operation of the City’s water and sewer systems, street maintenance and trash collection. Public works are housed in two buildings with a combined total of approximately 3.3 square feet per capita (based on 2000 City population).

Library: Somerset County currently provides library facilities at the Corbin Memorial Library located 4 East Main Street. The building provides approximately 0.77 square feet of floor are per capita based on the City’s 2000 population. The Somerset County Library Board is planning

⁴ An Evaluation of the Effect of Increased State Aid to Local School Systems Through the Bridge to Excellence Act, A Final Report by MGT for the Maryland State Department of Education, 2008

a new 15,000 square feet library facility to serve the City and surrounding areas. This new facility will adequately address the impacts associated with the City's projected population growth through 2030.

Police: The Crisfield Police Department provides police service in the City. There are currently twelve sworn officers, six support staff, and one K-9 dog ("Bach") on the force. The Department has 13 squad cars, many equipped with mobile data terminals, to respond to emergencies. Based on current level of service measure the City's projected population growth will not require adding personnel or equipment to what is currently provided.

Recreation Land: Applying the Maryland Department of Planning's planning factor of 30 acres per every 1,000 people, approximately 10 acres of additional recreation land will be required to serve City residents by 2030 and achieve this level of service.

Fire and Rescue: The Crisfield Volunteer Fire Department provides fire protection in the City. The fire department is housed in a 9,320 square foot building on a City-owned lot located on MD Route 413. The company's service area encompasses the City. The Department has a permanent staff of ten line officers and firefighters. Projected impacts on fire service are minimal and should not require major expenditures for addition building space and personnel.

Water and Sewer Facilities: See Chapter 6, Water Resources for a discussion of growth impacts on water and sewer facilities.

Build-Out

The build-out analysis assesses the impacts on community facilities and services provided by the City, County and other community organizations should the maximum development potential (residential, commercial and industrial) of the City be realized. "Maximum potential" was derived from the development capacity analysis the results of which are summarized in Table 5-7. Figures 5-2 and 5-3 illustrate the changes in the City's building pattern from 2009 to build-out.

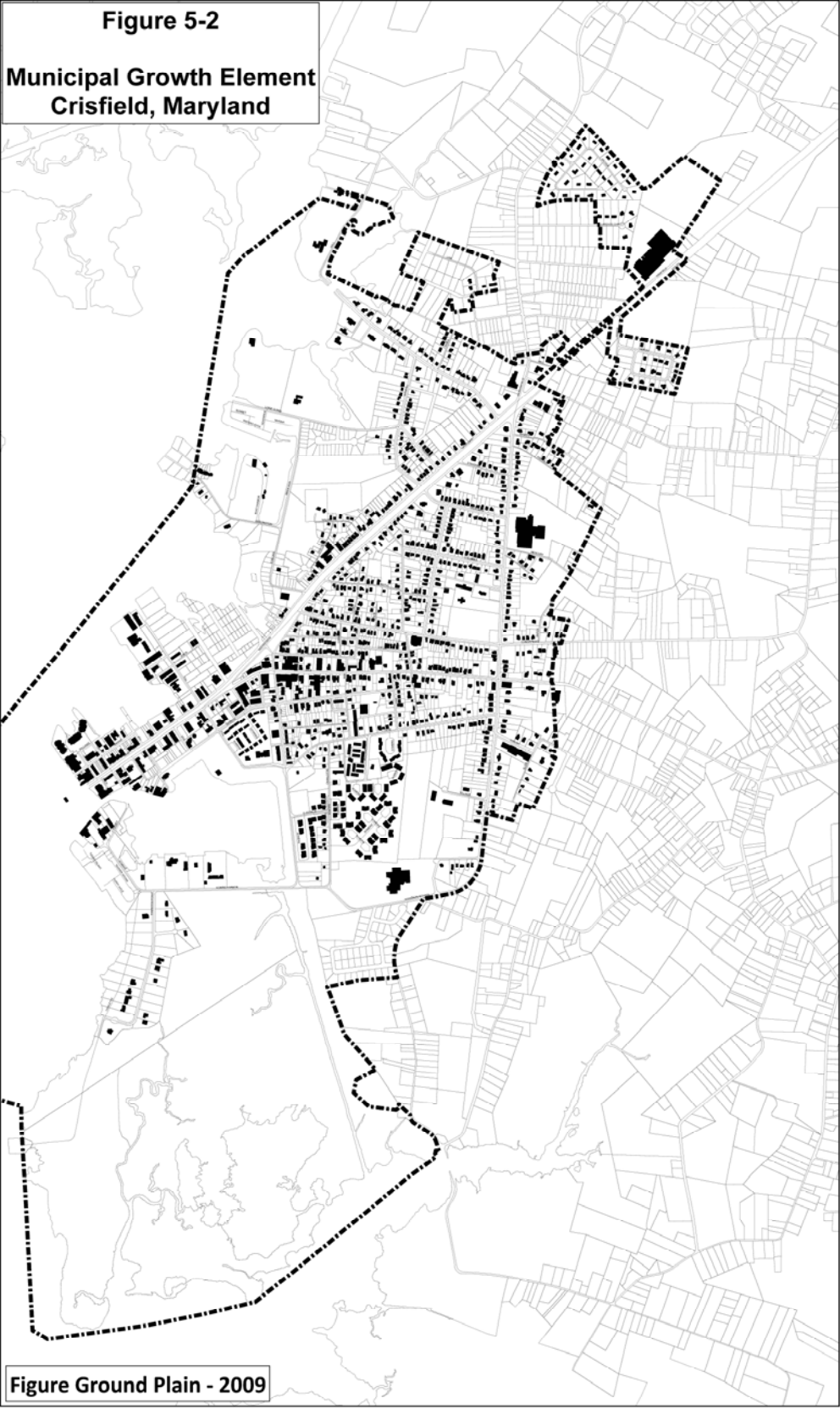
These impacts are anticipated at some unspecified time beyond the planning period (after 2030). Estimated impacts on community facilities and service associated with build-out of the City of Crisfield are summarized in Table 5-10.

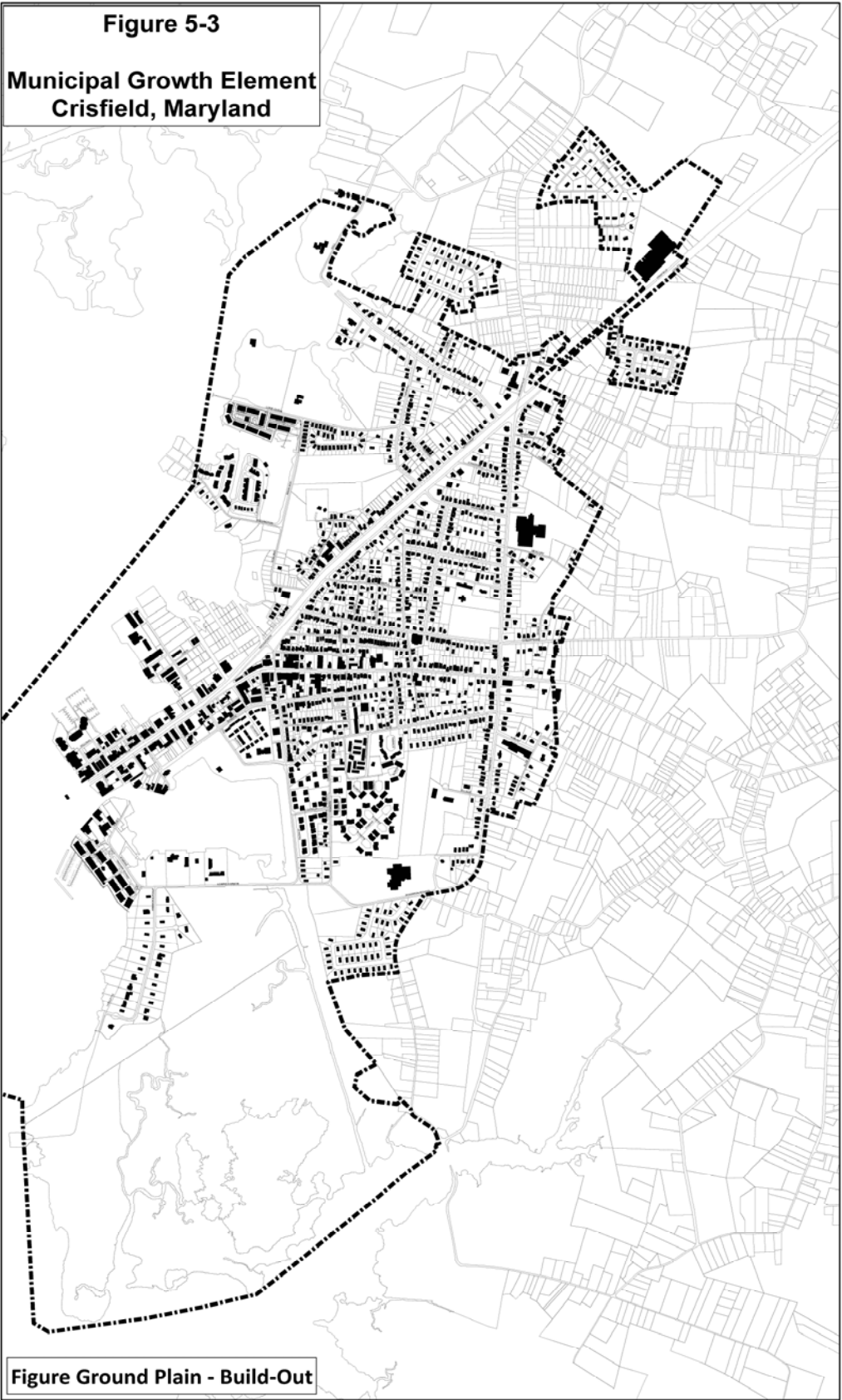
Table 5-11 summarizes an alternative scenario - build-out impacts with full implementation of the Crisfield SRP. Since many of the residential units would only be used seasonal the impacts associated with implementation of the SRP would probably be less pronounced than Table 5-11 would indicate.

Nearly all facilities and services provided by the City and County will be noticeably impacted by the build-out of the City. Chief among County impacts is to the elementary schools. Somewhat less significant are impacts to police and fire services at the City level.

Table 5-10
Municipal Growth Impact Estimates at Build-Out
City of Crisfield

FACILITY/SERVICE	IMPACT	SERVICE MEASURE	SERVICE UNIT
SCHOOL (new students)	420	0.476	Per household
- High School	136	0.154	Per household
- Middle School	94	0.107	Per household
- Elementary School	190	0.215	Per household
TOWN ADMIN./MEETING (GFA)	657	0.34	SF Per capita
PUBLIC WORKS (GFA)	6,459	3.3	SF Per Capita
LIBRARY (GFA)	1,497	0.77	SF Per Capita
RECREATION LAND (acres)	58	30	Acres per 1000 pop.
POLICE			
- Officers	0.83	0.43	Per 1,000 population
- Support Staff	0.42	0.22	Per 1,000 population
- Squad Cars	0.90	0.47	Per 1,000 population
FIRE & RESCUE			
- Personnel	7	3.58	Per 1,000 pop
- Facilities (GFA)	4,380	2,265	Sq. ft. per 1,000 pop





Funding Strategies

Population growth will require the City and County fund the public facilities and services necessary to serve new residents and businesses. In all likelihood, current sources of revenue alone, e.g., property tax, user fees, will not be sufficient to meet expenditures. In some instances, State and/or Federal grants and loans may be available to assist local governments. Other forms of revenue to address growth impacts also may need to be considered (see Table 5-12 for examples). Funding mechanisms the City may want to consider include:

Adequate Public Facilities Ordinance (APFO) – The City could adopt an APFO. An APFO ties development approvals to the existing and planned capacity of infrastructure based on quantifiable levels of service for public facilities and services. APFO level of service standards also could be used when negotiating an annexation agreement or development of a Developers Rights and Responsibility Agreement (DRRA). It would be prudent of the City to consider funding strategies like the APFO before current systems are at or above 75 percent of capacity.

Table 5-11
Municipal Growth Impact Estimates at Build-Out
With Full Implementation of the SRP Master Plan
City of Crisfield

FACILITY/SERVICE	IMPACT	SERVICE MEASURE	SERVICE UNIT
SCHOOL (new students)	845	0.476	Per household
- High School	274	0.154	Per household
- Middle School	190	0.107	Per household
- Elementary School	382	0.215	Per household
TOWN ADMIN./MEETING (GFA)	1,322	0.34	SF Per capita
PUBLIC WORKS (GFA)	13,224	3.4	SF Per Capita
LIBRARY (GFA)	3,073	0.79	SF Per Capita
RECREATION LAND (acres)	117	30	Acres per 1000 pop.
POLICE			
- Officers	1.71	0.44	Per 1,000 population
- Support Staff	0.86	0.22	Per 1,000 population
- Squad Cars	1.86	0.48	Per 1,000 population
FIRE & RESCUE			
- Personnel	14	3.67	Per 1,000 pop
- Facilities (GFA)	992	255	Sq. ft. per 1,000 pop

Developers Rights and Responsibility Agreement (DRRA) - The City should adopt legislation regulating DRRAs and require a DRRA that addresses financing of infrastructure improvements be executed prior to approval of any major development. This legislation should be put into place immediately.

Fiscal Impacts/Impact Fees - Major development projects should be required to identify and address fiscal impacts to the City. These impacts could be addressed in a DRRA executed prior to development approval. As an alternative, the City can adopt an impact fee ordinance. Impact fees, also known as exactions, extractions, contributions, and proffers, are the financial responsibilities which a municipality places upon a developer to provide some or all of the physical improvements (from sewers and streets to parks and schools) necessitated by development and its impacts. Impact fees are levied as a condition for the approval of plats or building plans and subsequent permission to proceed with development. They are direct contributions by developers and may include dedication of land, construction of facilities, or payment of fees in lieu of these facilities. They can be levied through written provisions in ordinances or through negotiations.⁵ For example, a fee could be levied to offset the cost of additional City administration and meeting space, land can be dedicated for parks or schools and trails can be constructed to satisfy recreation land requirements.

The County is the appropriate level of government to adopt some of these funding mechanisms, e.g., school impact fees or excise tax, could be considered.

Municipal Priority Funding Area - The City should ensure that annexation areas are included within its municipal Priority Funding Area (PFA) (see Map 6-4, Chapter 6, Water Resources). In order to satisfy the requirements of “certification” annexed area (for residential development) must be zoned to permit an average density of at least 3.5 dwelling units per acre and the area must be served by a public or community sewer. In addition the Somerset County Master Water and Sewerage Plan should be amended to reflect any proposed new service areas.

Table 5-12
Potential Funding Source to Address
Municipal Growth Impacts

Facility/Service	Potential Funding Sources
School Facilities	Property tax, Excise Tax, Impact Fee, Federal/State School Construction Funds
City Administration	
- Facilities	Property Tax, DRRA, Impact fee, grants and loans
- Personnel	Property tax, Service fees (e.g., zoning certificate fee, inspection

⁵ (Miles, Mike E., Emil E. Malizia, Marc A. Weiss, Gayle L. Berens, and Ginger Travis. 1991, Real Estate Development: Principles and Process. Washington, D.C.: Urban Land Institute).

Facility/Service	Potential Funding Sources
	fees), grants
City Public Works	
- Facilities	DRRA, Impact fee, Connection fees, User fees, Public works agreement, grants, loans
- Personnel	Property tax, service fees (e.g., water and sewer charges)
Library Facilities	Property tax, excise tax, impact fee, Grants and loans
City Police	
- Facilities	Property tax, DRRA, Impact fee
- Personnel	Property tax, fines and fees
Recreation Land	DRRA, Land dedication, State Program Open Space (POS)
Fire and Rescue - Nonprofit	
- Facilities	DRRA, grant, public and private contributions
County-Provided Fire and Rescue	
- Facilities	Property tax, excise tax, impact fee, special tax (e.g., fire districts tax), grants
- Personnel	Property tax, special tax (e.g., fire district tax)
Water and Sewer Facilities	DRRA, Public Works Agreements, connection fees, user charges

5.5 ANNEXATION PLAN

House Bill 1141 (Land Use – Local Government Planning) requires the City to include in the comprehensive plan a growth element that specifies where the municipality intends to grow outside its existing corporate limits. The City must discuss how it intends to address service, infrastructure, and environmental protection needs for identified growth areas and surrounding environs.

Crisfield’s development capacity analysis indicates that the City has sufficient land to support future commercial and light industrial development and maintain the current floor area to population ratios. Although the City currently has no specific annexation plans it will consider annexing additional land for economic development purposes. All annexation will be done consistent with the City’s annexation policies. These annexation policies are intended to ensure the extension of corporate boundaries permits the most efficient use of public utilities and services and that costs associated with capacity expansion are fairly allocated among those benefitting. The City’s annexation policies are as follows:

- Annexed areas must be contiguous to the corporate limits and create a natural extension

of the City's boundaries.

- Proposed annexation areas will be economically self-sufficient and will not result in larger municipal expenditures than anticipated revenues, which could indirectly burden existing City residents with the costs of services or facilities to support the area annexed.
- The costs of providing roads, utilities, parks, other community services will be borne by those people gaining the most value from such facilities through income, profits, or participation.
- Specific conditions of annexation will be made legally binding in an executed annexation agreement. Such agreements will address, among other things, consistency with the goals, objectives and recommendations of this Plan, City zoning and landowner and City development expectations, responsibility for appropriate studies, and preliminary agreements concerning responsibilities for the cost of facilities and services provided by the City. These preliminary agreements may be further revised in a Developers Rights and Responsibility Agreement (DRRA).
- For annexations involving larger parcels of land, the City may require appropriate impact studies, including a fiscal impact study and an environmental impact assessment that addresses the potential impact of the proposed annexation on the environment of the site and surrounding area.
- If necessary, applicants for annexation underwrite the cost of completing all studies related to expanding capacity in existing public facilities and/or services.

Prior to annexing any land area not included in the current growth plan, the City will first consider appropriate amendments to this Comprehensive Plan and will follow the procedural requirements for Comprehensive Plan updates and annexation established in State law, including those of House Bill 1141. This will ensure that the proposed annexation is consistent with the goals and objectives of the Plan and Somerset County's comprehensive plan, that appropriate consideration has been given to the adequacy of public facilities and services, and that the County and State agencies are afforded an opportunity to comment on the proceedings.

Depending on the size of the proposed annexation (and as appropriate) the City may require the applicant to complete studies addressing the potential impacts of development on such things as City staffing and finances, traffic, and the provision of County facilities and services. In addition, applicants proposing annexation will be required to prepare an environmental impact assessment that includes a discussion of proposed strategies to address the environmental protection needs for the growth area and surrounding environs. All terms of annexations will be recorded in an annexation agreement, and if appropriate reflected in a Developer Rights and Responsibility Agreement (DRRA) at the time of final development approval. If deemed necessary by the City, the County may be included as a party in annexation negotiations.

5.6 INTERJURISDICTIONAL COORDINATION

The Economic Development, Planning and Resource Protection Act of 1992 encourages local governments and the State to coordinate their planning and development efforts to achieve the “Eight Visions.” Under the Act, local governments must adopt comprehensive plans which include the Visions. Zoning and other planning implementation mechanisms must be consistent with these plans. Under the Planning Act, local comprehensive plans must include recommendations for improving planning and development processes to encourage economic expansion, and to direct future growth to appropriate areas. Such development and economic growth often have interjurisdictional impacts on transportation, infrastructure, environment, and other areas of concern. For this reason, it is necessary for planning, growth strategies, and policies to promote and encourage cooperation among adjacent jurisdictions.

The *Crisfield Comprehensive Plan* also includes a water resources element that identifies strategies for addressing drinking water and other water resources to meet current and future needs and identifies suitable areas to receive stormwater and wastewater derived from development. Preparation of the growth element included a complete analysis of land capacity available for development, including infill and redevelopment and an analysis of the land area needed to satisfy demand for development at densities consistent with the *Crisfield Comprehensive Plan*.

House Bill 1141 requires the City to consult with Somerset County concerning its municipal growth element. Prior to approving the growth element, the City must provide a copy to the County, accept comments from the County, meet and confer with the County regarding the growth element, and on request of either party engage in mediation to facilitate agreement on a growth element. The bill encourages municipalities and counties to participate in joint planning processes and agreements. Coordination with County officials is important to ensure that newly annexed territory qualifies for State assistance as a Priority Funding Area if annexed after September 30, 2006.

It is important that the City coordinate its planning and development activities with the County. Managing future growth will depend on sound strategies to address such issues as water quality and quantity, school capacity, demand on emergency services, public infrastructure, and transportation facilities. As is the case with public infrastructure, water quality and quantity issues cannot be addressed by the City alone. Going forward, effective management of potential sources of pollution must be based on watershed-wide land use strategies and coordinated administration and enforcement of sediment and erosion control and stormwater management regulations. Protection of vulnerable drinking water supplies requires the participation of all jurisdictions affected.

On-going and effective mechanisms for City/County dialogue, coordination, and agreement are needed. Acceptable coordinated strategies should be formalized in ways that bind each participant to a policy process. Forums for on-going coordination and cooperation include a Council of Governments (COG), joint committees (for example for watershed planning

initiatives), and others. Examples of potential formal mechanisms for recording joint policies include Memorandums of Understanding (MOU) and/or an Inter-Governmental Agreement (IGA).

SECTION 6: WATER RESOURCES

6.1 INTRODUCTION

The Crisfield Water Resources element was added to the 2007 Crisfield Comprehensive Plan in 2009. The Water Resources element (WRE) satisfies a basic planning requirement mandated by Maryland House Bill 1141 (HB 1141) that jurisdictions assess water resource capacity to meet current and future needs. Specifically, the statutory requirements include the following tasks:

- Identify drinking water and other water resources that will be adequate for the needs of existing and future development proposed in the land use element of the plan, considering available data provided by the Maryland Department of the Environment (MDE).
- 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.
- Adopt a WRE in the comprehensive plan on or before October 1, 2009, unless extension(s) are granted by Maryland Department of Planning (MDP), pursuant to law.

The zoning classifications of a property may not be changed after October 1, 2009 if a jurisdiction has not adopted a WRE in its comprehensive plan.

The WRE addresses three critical water resources, including drinking water (both supply and quality) and the capacity of receiving waters to assimilate wastewater and stormwater management stormwater discharge. Among other things, preparation of the WRE is intended to test water resource capacity limits, determine the potential implications of water resource issues for future growth, and facilitate the development of management strategies.

6.2 HYDROGEOLOGIC SETTING

The City of Crisfield is part of the Northern Atlantic Coastal Plain Aquifer System (NACP). The NACP encompasses approximately 50,000 square miles that extends from the North Carolina and South Carolina border to Long Island, New York. This aquifer system is bounded in the west by the Fall Line (Figure 6-1) which separates the Piedmont from the Coastal Plain physiographic province in Maryland. It is bounded in the east by the Atlantic Ocean. 6

⁶ *A Science Plan for a Comprehensive Regional Assessment of the Atlantic Coastal Plain Aquifer System in Maryland* (Open-File Report 2007–1205), by Robert J. Shedlock, David W. Bolton, Emery T. Cleaves, James M. Gerhart, and Mark R. Nardi, U.S. Department of the Interior and U.S. Geological Survey, prepared in cooperation with the Maryland Geological Survey, the Maryland Department of Natural Resources and the Maryland Department of the Environment.

The Atlantic Coastal Plain Aquifer System in Maryland consists of an alternating series of aquifers and confining units that descend and widen, as they extend toward the Atlantic Ocean. The major aquifers in the Maryland portion of the NACP are the Patuxent, Patapsco, Magothy, Aquia and Piney Point Formations, and the Chesapeake Group. The City of Crisfield draws its water from the aquifers located in the Chesapeake Group. “The aquifers in the Chesapeake Group are used mostly east of the Chesapeake Bay. These include the Cheswold,

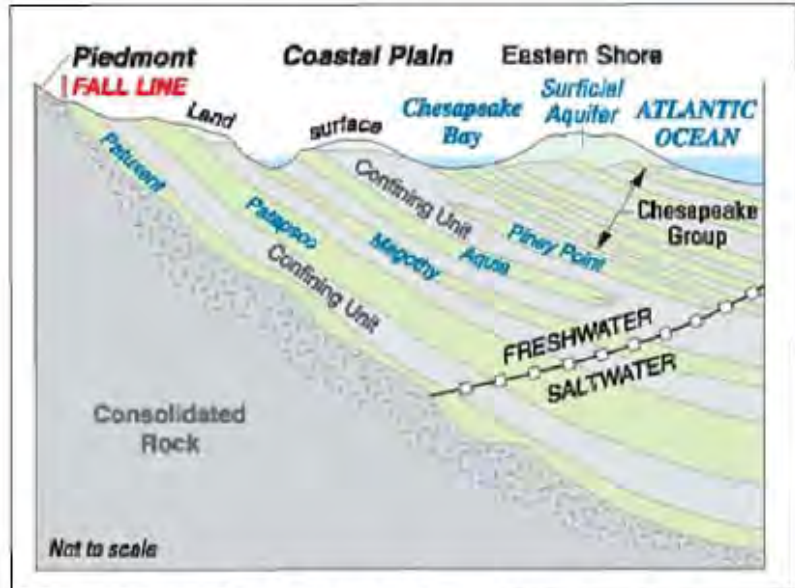


Figure 6-1 The North Atlantic Coastal Plain Aquifer System
 Source: The Science Plan for Comprehensive Regional Assessment of the Atlantic Coastal Plain Aquifer Systems in Maryland, US Department of Interior and USGS

Federalburg, and Frederica aquifers, which are used from Dorchester to Queen Anne’s Counties, and the Manokin, Ocean City, and Pocomoke aquifers, which are used in Somerset, Worcester, and Wicomico Counties.”⁷

In 2002, total ground water use in Maryland exceeded 214 million gallons per day.⁸ The urban areas of Baltimore and Washington, D.C. make up the largest percentage of the State’s water usage, and their water supply is primarily derived from surface water sources. In Maryland’s Coastal Plain counties, which include southern Maryland and the Eastern Shore, ground water comprises 86% of the total water use.⁹

Groundwater in the Coastal Plain is drawn from unconfined (natural water table) and confined (artesian) aquifers. Unconfined aquifers are recharged by rainfall and snow melt and depleted by drought, resulting in fluctuating water levels. Artesian aquifers receive recharge from areas where water-bearing formations crop out, leakage through confining beds, and lateral movement of water from adjacent aquifers. Artesian aquifers are much less vulnerable to drought conditions.¹⁰

The natural water quality of Coastal Plain ground water is generally good and ranges from very soft to very hard with the average in the moderately soft range (Vokes and Edwards, 1974). Most

⁷ <http://md.water.usgs.gov/publications/wsp-2275/md-dc.html>

⁸ *An Overview of Wetlands and Water Resources of Maryland*, by Denise Clearwater, Paryse Turgeon, Christi Noble, and Julie Labranche. Prepared for Maryland Wetland Conservation Plan Work Group, January 2000

⁹ Ibid.

¹⁰ Ibid.

Coastal Plain aquifers contain both fresh and salt water. Water directly below recharge areas is fresh; salt levels increase with aquifer depth and proximity to the ocean. The location of the freshwater-salt water boundary (zone of diffusion) depends on the volume of fresh water entering the aquifer from recharge or leakage.

One of the most common problems in Coastal Plain aquifers is salt water intrusion. Some parts of the confined aquifers in the system have been affected by intrusion of brackish or saline water, notably in more heavily populated areas along the coastlines of the Bay (Annapolis, Kent Island) and the Atlantic Ocean (Ocean City), where water usage is greater.¹¹

In 2007, the U.S. Department of the Interior and U.S. Geological Survey (USGS) reported that “decades of increasing pumpage have caused ground-water levels in parts of the Maryland Coastal Plain to decline by as much as 2 feet per year in some areas of southern Maryland. Continued declines at this rate could affect the long-term sustainability of ground-water resources in Maryland's heavily populated Coastal Plain communities and the agricultural industry of the Eastern Shore.”¹²

The 2004 report of the Maryland Advisory Committee on the “Management and Protection of the State’s Water Resources” recommended a comprehensive study of the sustainability of the entire Atlantic Coastal Plain aquifer system in Maryland. Such a study is currently being undertaken by the U.S. Department of the Interior and USGS, in cooperation with the Maryland Geological Survey and Maryland Department of the Environment. The assessment will be conducted in three phases and is expected to take 7 to 8 years to complete. Currently, the project is in Phase I, which began in 2006. A key component of the assessment will be the development of an aquifer information system designed to serve the needs of both water managers and scientific investigators. When fully developed, the system will serve as a web-based tool and will facilitate the use of ground-water management models for evaluation of a variety of water-management strategies.

6.3 LAND USE SCENARIOS

Crisfield’s analysis of water resource takes into account two distinct land use development scenarios. Scenario one depicts 2030 growth and build-out of the City based on current entitlements under existing zoning. This scenario reflects infill and redevelopment trends and land ownership patterns, including recent waterfront development (see Map 5-1 and 5-2, Chapter 5, Municipal Growth). Due to the considerable investment required to assemble land as would be the case in the alternative scenario, this scenario represents the most realistic future land use development concept the City can expect.

¹¹ Ibid.

¹² Open File Report 2007 – 1205, *A Science Plan For A Comprehensive Regional Assessment Of The Atlantic Coastal Plain Aquifer System In Maryland*, by Robert J. Shedlock, David W. Bolton, Emery T. Cleaves, James M. Gerhart, and Mark R. Nardi, U.S. Department of the Interior, U.S. Geological Survey, 2007.

The second alternative reflects implementation development schemes similar to the recommended Master Development Plan (Master Plan) depicted in the *City of Crisfield Strategic Revitalization Plan* (SRP). The Master Plan is shown on Figure 5-1 in the Chapter 5, Municipal Growth. The SRP Master Plan displays a mixed use redevelopment concept for properties at selected waterfront locations as well as extensive redevelopment of the Crisfield Housing Authority properties (see Table 6-1 for residential capacity comparison). The location and extent of land use conversion in this scenario is very similar to that analyzed in the prior described scenario. Impervious surface change will be about the same, however residential densities are much higher. This scenario also assumes that non-residential development capacity at build-out will increase from approximately 750,000 square feet of gross floor areas to over 1.44 million square feet gross floor area.

**Table 6-1
Residential Infill Development Capacity
City of Crisfield**

Unit Type	Capacity	
	Units	Population
Detached Single Family Residential	343	751
Attached Single Family*	131	287
Multi-Family*	409	896
Total	883	1,934
Added - SRP Master Plan	893	1,956
Total - with SRP Master Plan	1,776	3,889

* Concept plans approved

6.4 WATER

Source Water

The City of Crisfield draws its water from the Piney Point, Paleocene Series and Potomac Group aquifers. The City’s State Water Appropriation Permits (SWAP) summarized below permit withdrawal of up to 1.35 million gallons per day (MGD). This level of withdrawal is more than is currently used which may be the result of having once served a thriving seafood processing industry that was much larger part of the local economy.

State Water Appropriation Permit No. S072G006 (05): The withdrawal granted by this permit is limited to a daily average of 600,000 gallons on a yearly basis and a daily average of 700,000 gallons for the month of maximum use. The water is taken from wells nos. 3, 6, 7 and 9, all screened in the aquifers of the Potomac Group.

State Water Appropriation Permit No. S072G106(02): The withdrawal granted by this permit is limited to a daily average of 150,000 gallons on a yearly basis and a daily average of 200,000

gallons for the month of maximum use. The water is taken from well no. 4, screened in the Piney Point, Paleocene Series, and Potomac Group Aquifers.

State Water Appropriation Permit No. S072G206(02): The withdrawal granted by this permit is limited to a daily average of 550,000 gallons on a yearly basis and a daily average of 600,000 gallons for the month of maximum use. The water is taken from wells nos. 5 & 8 screened in the aquifers of the Paleocene Series and Potomac Group.

Water System

Crisfield’s water system consists of five active wells (wells 2 and 4 are inactive). The flow from each of the active wells is summarized in Table 6-2 below. There are no known private wells operational in the City.

**Table 6-2
Maximum Flow Capacity
Source Wells
Crisfield, Maryland**

Active Well	Gallons Per Minute (gpm)	Gallons Per Hour (gph)
Broadway Well	390	23,400
Jersey Well	175	10,500
Park Well	340	20,400
Maryland Avenue Well	400	24,000
Jacksonville Well	850	51,000
Total Capacity	2,155	129,300

Source: City of Crisfield Public Utilities Department

The water system includes 3 water storage tanks with a combined capacity of 825,000 gallons (see Table 6-3). Water from the wells in chlorinated before distribution. According to the City of Crisfield’s Annual Water Quality Report¹³ the City’s drinking water, “is safe and meets federal and state requirements.”

¹³ Annual Water Quality Report, The City of Crisfield, Maryland/2008, PWSID# 0190001

Table 6-3
Water Storage Capacity
Crisfield, Maryland
Storage Capacity

Well	(Gallons)
Well 6	250,000
Well 8	500,000
Tower	75,000
Total	825,000

The City’s water system includes approximately 28 miles of lines that currently serve 1,800 residential and non-residential hookups within the City and 800 customers outside of the City through an arrangement with the Somerset County Sanitary Commission (see Map 6-1) executed in 1977. Some customers in the County get water service only. Average daily flows range from 750,000 to 800,000 gallons per day (GPD). Overall, current water usage, expressed in terms of equivalent Dwelling Unit (EDU’s), averages between 350 to 380 GPD. Water EDUs are approximately 25 percent higher than sewer flows. This may be due in part to high water-use commercial seafood establishments that do not contribute waste water into the sewer systems.

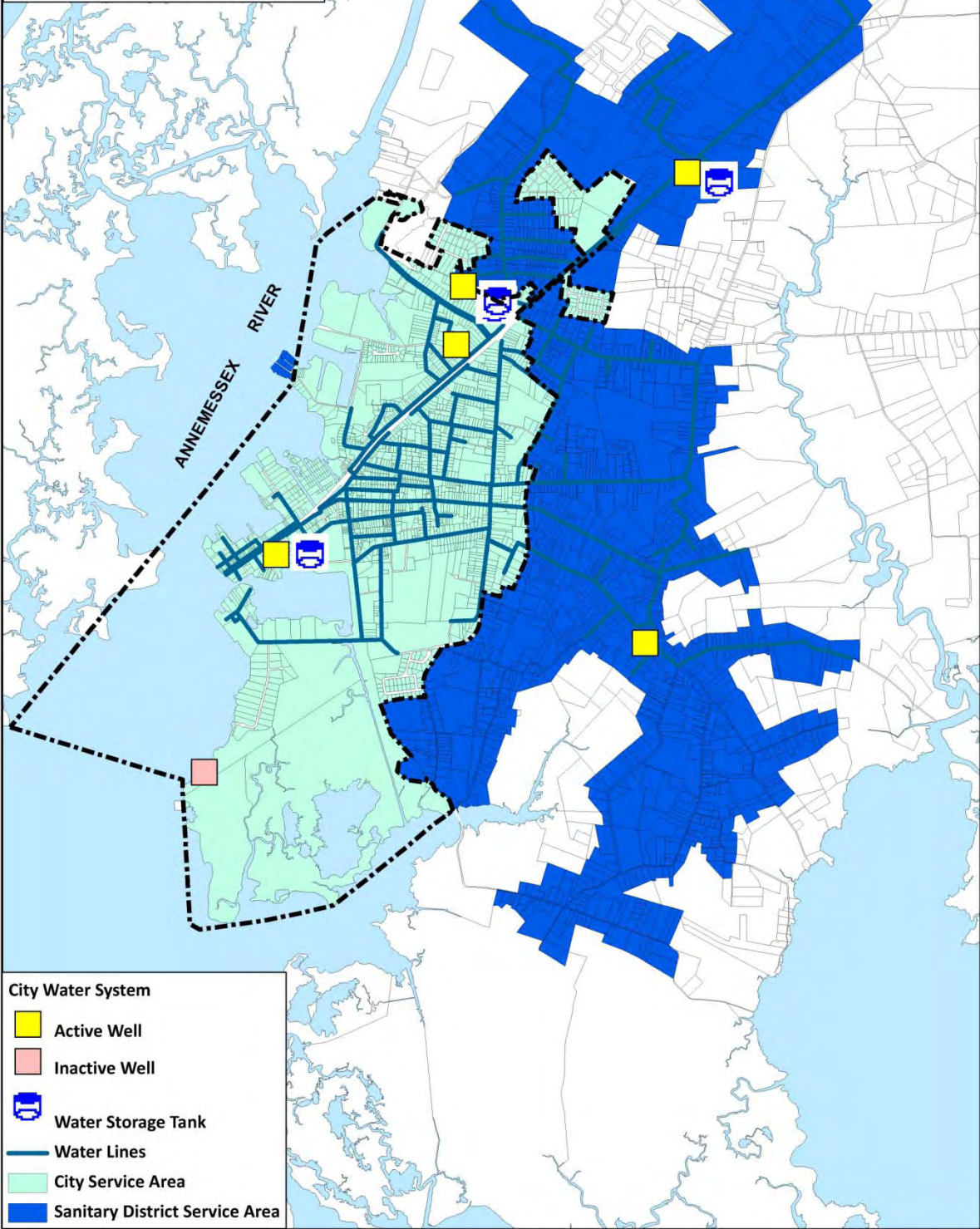
Projected Water Demand

Table 6-4 summarizes projected water demand through 2030. Water demand in Table 6-4 is based on 205 projected new occupied dwelling units by 2030 (see Section 5, Municipal Growth, Table 5-5). Commercial and industrial demand was based on the assumption that the City would maintain a ratio of approximately 50 square feet of commercial and 19 square feet of industrial floor area per 1,000 population. The City currently has capacity totaling 1.35 million gallons per day (MGD) which is adequate to meet projected demand through 2030.

Table 6-4
Projected Water Demand – 2030
Crisfield, Maryland

	2010	2015	2020	2025	2030
WATER DEMAND (MGD)	0.80	0.81	0.83	0.84	0.86
CAPACITY (MGD)	1.35	1.35	1.35	1.35	1.35
PERCENT OF CAPACITY	59.26%	60.27%	61.31%	62.40%	63.52%

Map 6-1
Water Resources Element
Crisfield, Maryland



6.5 WASTEWATER

Sewer System

The Crisfield wastewater treatment plant (WWTP) utilizes activated sludge treatment technology. The WWTP is permitted for a maximum capacity of 1 MGD. Currently, the WWTP has average daily flows of around 0.68 MGD. Recently completed replacement of the 1936 sewer lines along Maryland Avenue (MD 413) reduced peak flows by approximately 0.1 MGD. The remaining 1936 sewer lines are planned for replacement over the next several years to further reduce inflow and infiltration.

The Crisfield sewer system serves the City and surrounding County areas. About 1,586 EDU's are used in the City and an additional 218 EDUs are committed to development projects (some of which have not yet been constructed). Through an agreement with the Somerset County Sanitary District, the City services 848 sewer accounts in adjacent County areas (see Map 6-2). Based on current flow versus hookup the City calculates each sewer EDU at 277 GPD. There are no known private septic systems operational in the City.

The City is has completed upgrades to the WWTP that will enable Enhanced Nutrient Removal (ENR) standards for nitrogen and phosphorous. The City's National Pollution Discharge Elimination Permit (NPDES Permit MD002001), effective July 1, 2005, allows the City to discharge up to 1.0 MGD into the Annessex River. With the upgrade to the WWTP the City is to "make a best effort to achieve annual concentrations goals of 3 mg/l for nitrogen and 0.3 mg/l for phosphorus" ... and "maintain loads at or below 12,182 lbs/year for nitrogen and 914 lbs/year for phosphorous."¹⁴.

Projected Sewer Flow – 2030

Based on population and household projections (see Section 5 Municipal Growth Element) it is estimated that sewer flow could exceed 0.74 MGD by 2030 (see Table 6-5) which is nearly 75 percent of the existing capacity of the WWTP.

¹⁴ Maryland Department of the Environment Discharge Permit, 04-DP-0688, NPDES Permit MD002001, City of Crisfield, Maryland,

Table 6-5
Projected Sewer Flow – 2030
Crisfield, Maryland

	2010	2015	2020	2025	2030
SEWER FLOW (MGD)	0.68	0.69	0.71	0.72	0.74
CAPACITY (MGD)	1.00	1.00	1.00	1.00	1.00
PERCENT OF CAPACITY	68.00%	69.36%	70.77%	72.23%	73.75%

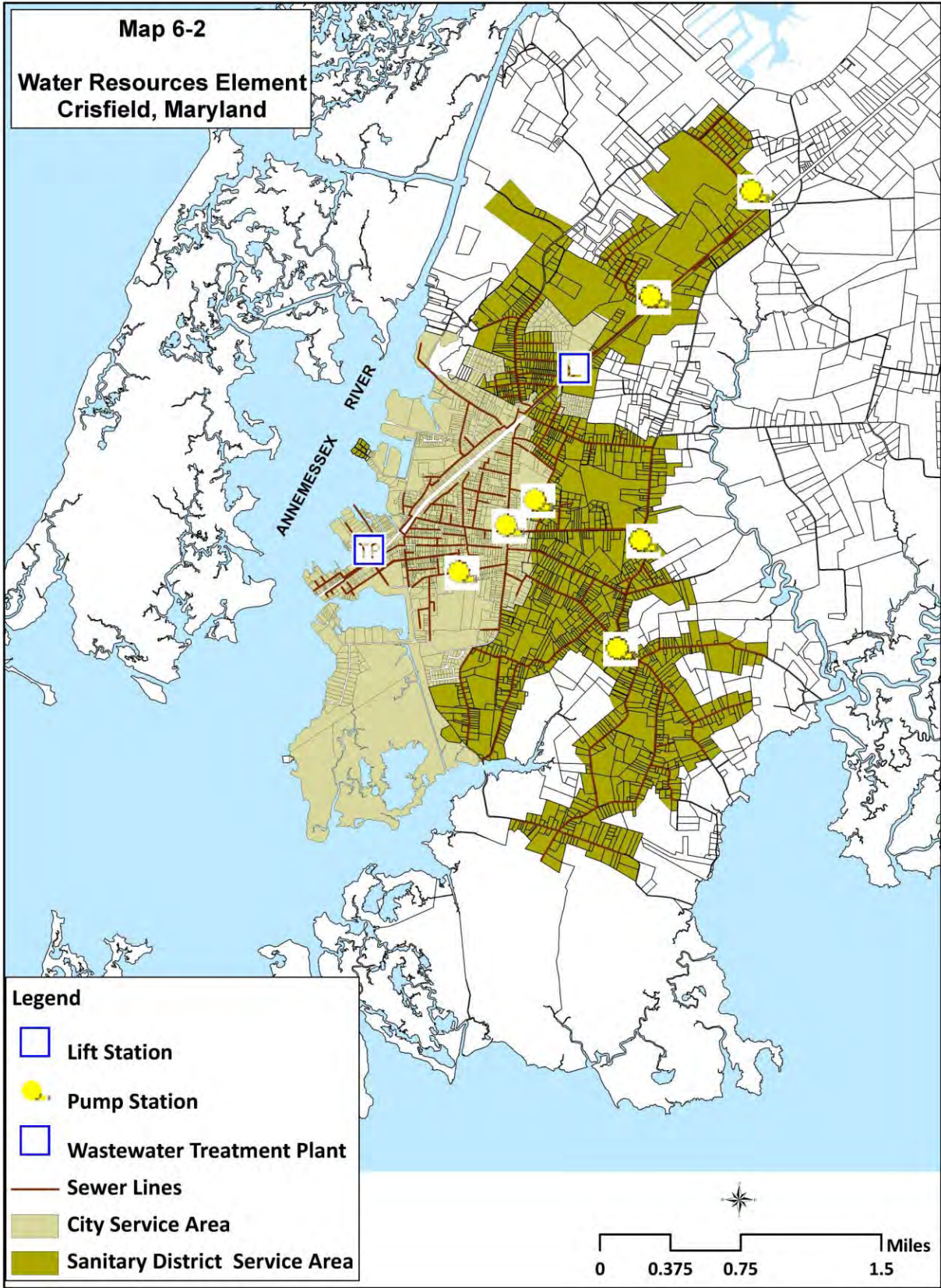
6.6 Build-Out

As the City approaches its full build-out potential (see Section 5, Municipal Growth Table 5-7 for development capacity analysis) issues associated with water and sewer capacity become more pronounced. Water demand will be nearly 80 percent of allowable groundwater withdrawal (see Table 6.6) and sewer flow (Table 6-7) will nearly exceed the current capacity of the WWTP (1.0 MGD). If the recommendations of the SRP are implemented water and sewer demand would be even greater, at or exceeding the City’s current water and sewer capacity (see Table 6-8 and Table 6-9).

Capacity issues are even more pronounced if development occurs as recommended in the SRP Master Plan. Under this scenario, most of the remaining water supply capacity would be used and sewer flows would exceed existing capacity.

It is apparent from this analysis that the City should consider sewer capacity limits before increasing service to areas outside the existing corporate area if it intends to fully utilize its existing development capacity. It also demonstrates that implementation of the SRP Master Plan will require additional sewer treatment capacity beyond that which can be achieved under the limits of the current NPDES permit. Implementation of the SRP Master Plan may also require added water supply.

Map 6-2
Water Resources Element
Crisfield, Maryland



- Legend**
-  Lift Station
 -  Pump Station
 -  Wastewater Treatment Plant
 -  Sewer Lines
 -  City Service Area
 -  Sanitary District Service Area

**Table 6-6
Water Demand at Build-out
Crisfield, Maryland**

WATER DEMAND	IMPACT	SERVICE MEASURE	SERVICE UNIT
Residential	220,750	250	GPD per dwelling unit
Commercial	19,338	96,689	200 GPD per 1,000 sf gfa
Industrial	7,348	36,742	200 GPD per 1,000 sf gfa
Total Added Demand	247,436		GPD
2009 Average Daily Demand	800,000		GPD
Total Demand	1,047,436		GPD
Capacity	1,350,000		GPD
Remaining Capacity	302,564		GPD

**Table 6-7
Sewer Flow at Build-out
Crisfield, Maryland**

SEWER FLOW	TOTAL	SERVICE MEASURE	SERVICE UNIT
Residential	220,750	250	GPD per dwelling unit
Commercial	19,338	96,689	200 GPD per 1,000 sf gfa
Industrial	7,348	36,742	200 GPD per 1,000 sf gfa
Total Additional Capacity	247,436		GPD
2009 Average Daily Flow	680,000		GPD
Total Demand	927,436		GPD
Capacity	1,000,000		GPD

**Table 6-8
Water Demand at Build-out (SRP Master Plan)
Crisfield, Maryland**

WATER DEMAND	IMPACT	SERVICE MEASURE	SERVICE UNIT
Residential	444,000	250	GPD per dwelling unit
Commercial	38,894	194,472	200 GPD per 1,000 sf gfa
Industrial	14,780	73,899	200 GPD per 1,000 sf gfa
Total Additional Capacity	497,674		GPD
2009 Average Daily Flow	800,000		GPD
Total Demand	1,297,674		GPD
Capacity	1,350,000		GPD

Table 6-9
Sewer Flow at Build-out (SRP Master Plan)
Crisfield, Maryland

SEWER FLOW	IMPACT	SERVICE UNIT	SERVICE MEASURE
Residential	444,000	250	GPD per dwelling unit
Commercial	38,894	194,472	200 GPD per 1,000 sf gfa
Industrial	14,780	73,899	200 GPD per 1,000 sf gfa
Total Added Flow	497,674		GPD
2009 Average Daily Flow	680,000		GPD
Total Flow	1,177,674		GPD
WWTP Capacity	1,000,000		GPD

6.7 PROGRAMMING WATER AND SEWER FACILITIES

Programming for water and sewer facilities is reflected in the 2008 Somerset County Master Water and Sewerage Plan and the City and County’s Priority Funding Areas (PFA). May 6-3 shows the PFA for Pocomoke City and surrounding areas. PFAs are areas eligible for State assistance with water and/or sewer system improvements.

Proposed improvements must appear in the appropriate service area category in the County’s Master Water Sewer Plan before MDE will consider issuing construction permits. The City should periodically review their planned service area boundaries to insure they reflect current policy and request appropriate amendments as necessary. In addition the City should obtain the service area boundaries maps that apply to the City when available in a digital format.

Water and sewer service areas as shown in the *Somerset 2008 County Master Water and Sewerage Plan* are broken down based on when service is planned (See Figures 6-2 and 6-3). Table 6-10 summarizes the delineation criteria required by State law.

“Plans for expanding Crisfield’s water system include the area between Maryland Route 413, along Old State Road. Long range projections indicate expansion of the water service to the area north of Maryland Route 413, extending to the Daughtery Road area and properties along the Jones Creek area.”¹⁵ Planned sewer projects include replacement sewer mains on 4th Street and Pine Street.

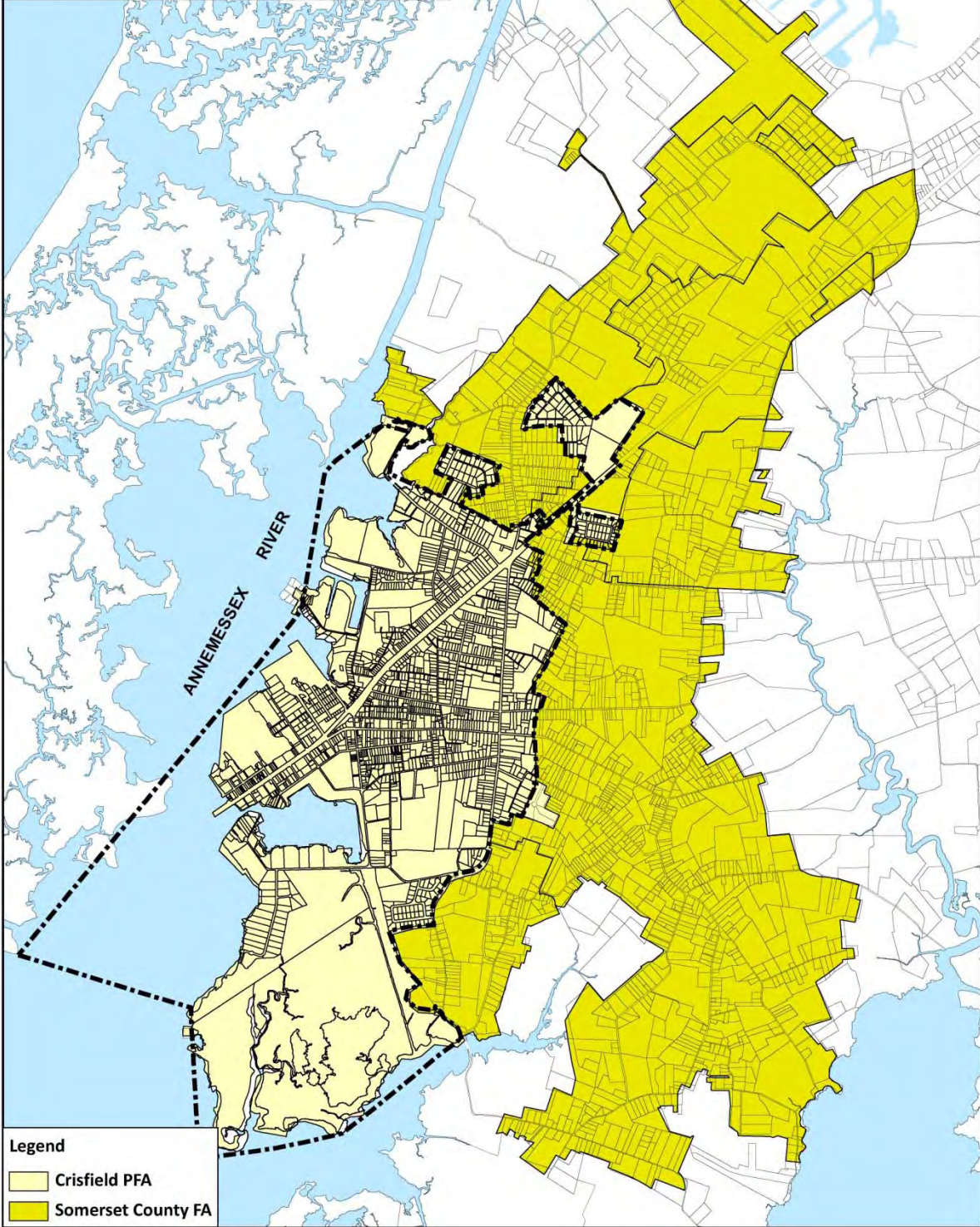
¹⁵Pg 51, 2008 Somerset County Master Water and Sewerage Plan, Somerset County Department of Technical and Community Services, August 2008

Table 6-10
Service Area Categories
Master Water and Sewerage Plan

Delineation	Description
W-1 and S-1	Areas served by community and multi-use water and sewerage systems which are either existing or are under construction
W-2 and S-2	Areas to be served by extensions of existing community and multi-use water supply and sewerage systems which are in the final planning stages
W-3 and S-3	Areas where improvements to, or construction of, new community and multi-use water supply and sewerage systems will be given immediate priority
W-4 and S-4	Areas where improvements to, or construction of, new community and multi-use water supply and sewerage systems will be programmed for the 3 to 5/6 year period
W-5 and S-5	Areas where improvements to, or construction of, new community and multi-use water supply and sewerage systems are programmed for inclusion within the 6/7 through 10-year period
W-6 and S-6	Areas where there is no planned service

Map 6-3

**City of Crisfield & Somerset County
Priority Funding Areas (PFA)**



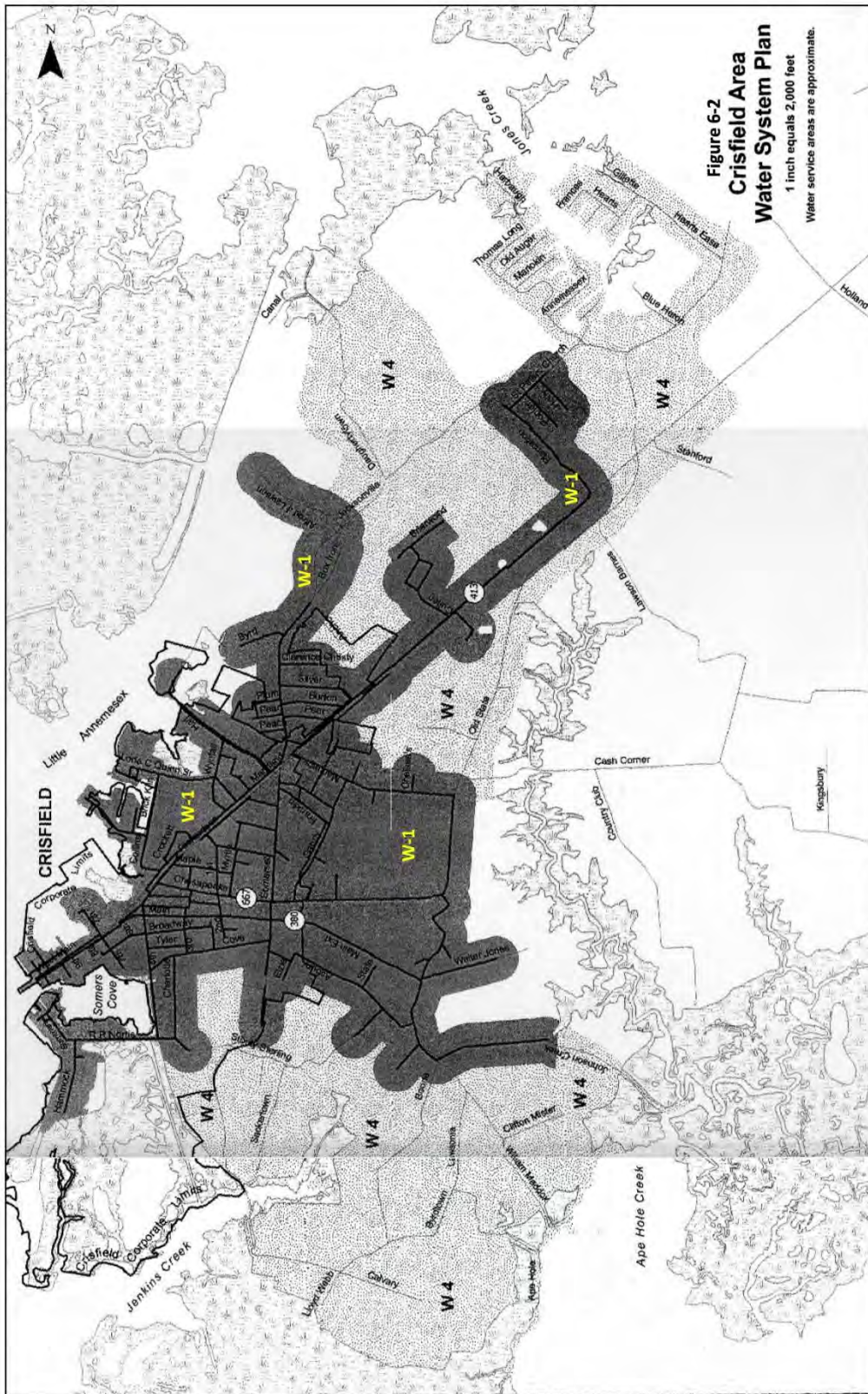
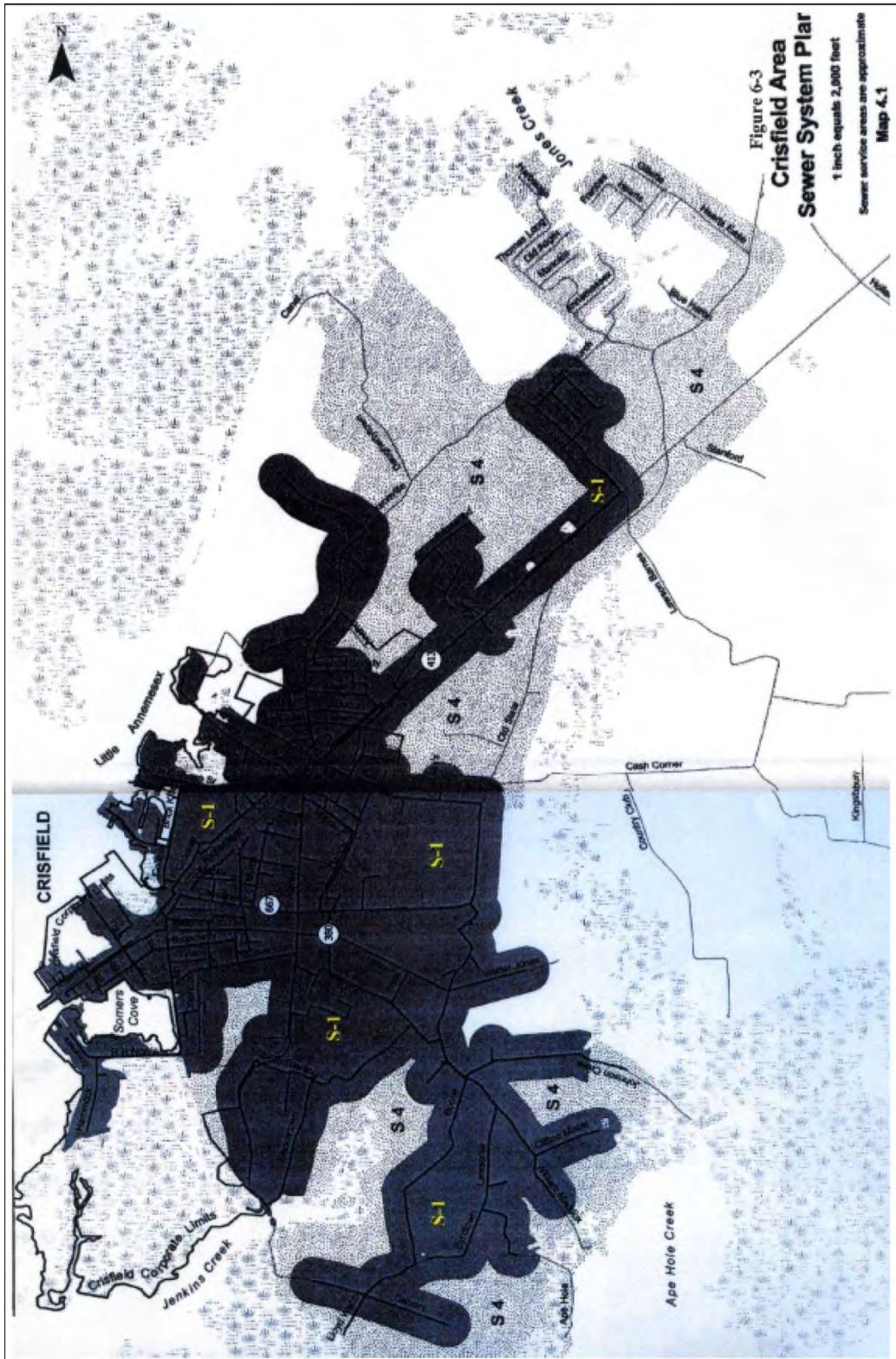


Figure 6-2
Crisfield Area
Water System Plan
 1 inch equals 2,000 feet
 Water service areas are approximate.



6.8 WATERSHED CHARACTERISTICS

The City of Crisfield is located in the Tangier Sound watershed (Maryland 8-Digit Watershed Code: 02130206) and is part of the Lower Eastern Shore Tributary Basin (see Map 6-3). The watershed encompasses approximately 45,193 acres (excluding water and wetlands) and has a total area of over 159,401 acres. Water areas and wetlands dominate the watershed (see Table 6-11). In 2002, “Urban” constituted a small percent of the land use in the watershed. This remains true today. Approximately 700 acres or about 13 percent of the 5,468 acres of the “Urban” land use category are located in the City of Crisfield.

Table 6-11
Land Use/Land Cover – 2002
Tangier Sound Watershed

Land Use/Land Cover	Acres	Percent of Total
Urban	5,468	3.43%
Agriculture	15,193	9.53%
Forest	24,443	15.33%
Wetland	26,430	16.58%
Barren	66	0.04%
Water	87,801	55.08%
Total	159,401	100.00%

Source: 2002 Land Use Land Cover, Maryland Department of Planning

Water Quality Issues

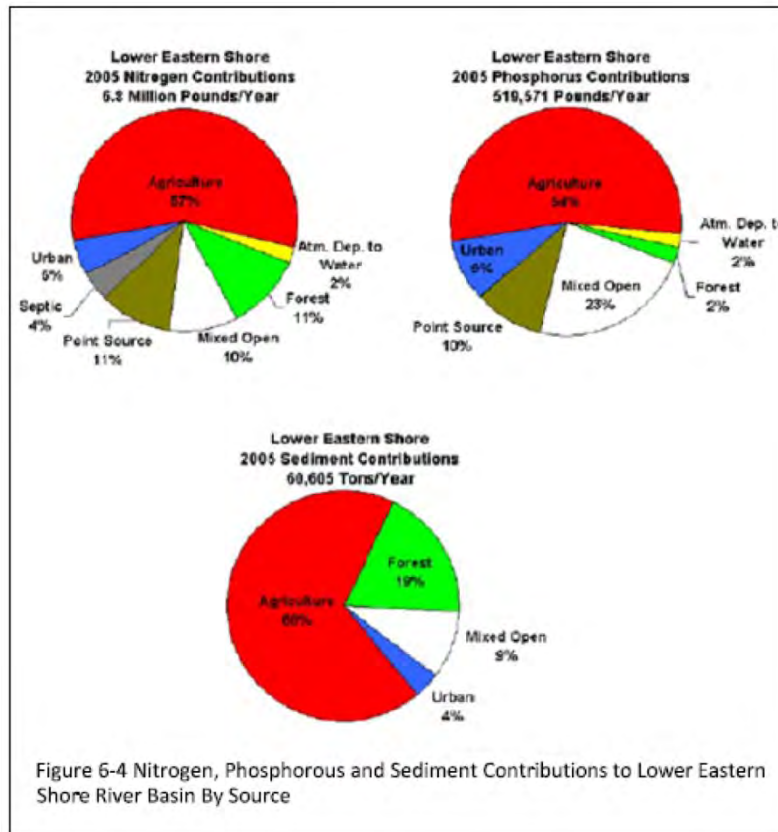
Current data indicates that water quality trends in the Tangier Sound watershed are deteriorating and should strongly influence City policy concerning environmental protection. Indicators of current water quality issues (and management strategies) are reported in several publications addressing water quality trends in the watershed. Tangier Sound is included in Maryland 303(d) list of impaired waters for sediment, bacteria, nutrients and biological impairments.¹⁶ It was first listed in 1996 as being impaired by nutrients and sediments. Further impairments were noted by the Maryland Department of the Environment (MDE) in 2004, including fecal coliform and evidence of biological impacts in tidal portions. Development of TMDLs for nutrients, sediments and biological (non-tidal) is pending.

In 2006, the Maryland Department of the Environment submitted a Total Maximum Daily Load (TMDL) to the United States Environmental Protection Agency (EPA). The TMDL is for fecal coliform for a Restricted Shellfish Harvesting Area in the Tangier Sound Basin (Somerset

¹⁶ *The 2008 Integrated Report of Surface Water Quality in Maryland, Submitted in Accordance with Sections 303(d), 305(b) and 314 of the Clean Water Act*, Maryland Department of the Environment, Maryland Department of Natural Resources, 2008

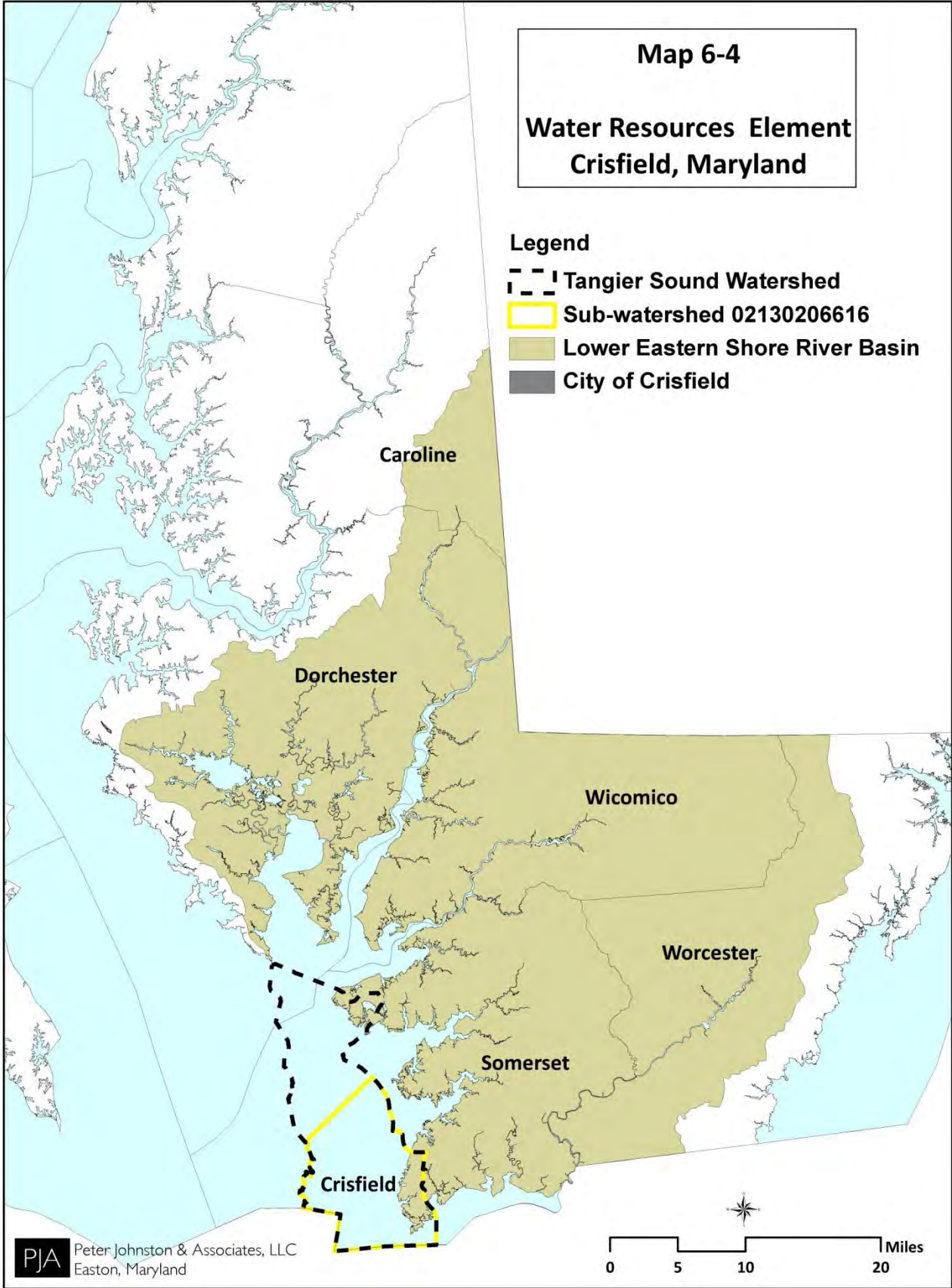
County, Maryland). The report cites excessive bacteria concentrations in the restricted shellfish area. MDE will perform a bacterial source tracking (BST) study in the watershed.¹⁷

According to the EPA’s response to MDE’s TMDL submittal, “a TMDL must comply with Federal requirements including 1) be designed to attain and maintain applicable water quality standards; 2) include total allowable loading and as appropriate, wasteload allocations for point sources and load allocations for non-point sources; 3) consider impacts of background pollutant contributions; 4) take critical stream conditions into account (the conditions when water quality is most likely to be violated); 5) consider seasonal variations; 6) include a margin of safety (which accounts for uncertainties in the relationship between loads and in-stream water quality; 7) consider reasonable assurance that the TMDL can be met; and 8) be subject to public participation.”¹⁸



¹⁷ Decision Rationale – Total Maximum Daily Loads of Fecal Coliform for the Restricted Shellfish Harvesting Area in the Laws Thorofare and Upper Thorofare of the Tangier Sound Basin in Somerset County, Maryland; United State Environmental Protection Agency – EPA; August 2, 2006.

¹⁸ Ibid.



Other indicators of water quality trends are discussed in the Department of Natural Resources (DNR) Watershed Restoration Actions Strategies (WRAS). A WRAS is part of a continuing process of assessing problems and causes, identifying opportunities for intervention, implementing corrective actions, and evaluating how well environmental goals for watersheds are being achieved. The WRAS for the Lower Eastern Shore included these observations concerning the Tangier Sound watershed:

“Only scattered improving trends in water quality are seen in the Lower Eastern Shore, and many areas remain in poor condition, especially with respect to suspended solids and water clarity...Although dissolved oxygen is fair to good, it is worsening in the upper Nanticoke, Manokin and North Tangier Sound.”

“... high sediment loads can reduce the amount of organic matter that is produced and available to the benthos; low biomass relative to reference conditions is a problem in the Manokin River and Tangier Sound (Llansó *et al.* 2005).”¹⁹

As shown in Figure 6-4, urban sources represent a small portion of nutrient and sediment contributions in the Lower Eastern Shore Tributary Basin.²⁰ However “urban” is a much higher percentage of the land use in the sub-watershed (12 percent) than is general case of the Tributary Basin. This fact and other indicators imply that the City has a role to play in reducing nutrient and sediment loading in the watershed.

6.9 RECEIVING WATER CAPACITY

Point Source Loadings

A primary purpose for assessing water resources is to consider the potential impacts of future growth on the water quality in the watershed. The water resources assessment evaluates two major sources of potential pollutants entering the receiving waters, point and non-point. Point sources are identifiable inputs of waste that are discharged via pipes or drains primarily from industrial facilities and municipal treatment plants into streams, rivers, lakes, or oceans.

The assessment of point sources and their impact on water quality in the Tangier Sound Watershed examined nutrient loadings in the base year (2002) based on Maryland Department of Planning 2002 Land Use/Land Cover data and 1996 point source nutrient loadings for Crisfield from the Chesapeake Bay Program (CBP) Watershed Model (Phase 4.3) for the Eastern Shore.²¹ The assumed nutrient caps are those outlined in the City’s NPDES permit and the Tributary Strategy Implementation Plan (Table 6-12).²² The 2030 land use assessment was based on

¹⁹ Lower Eastern Shore Conservation and Restoration Action Strategy Phase I: Program Description And Atlas Of Environmental Indicators, Maryland Department Of Natural Resources, Chesapeake And Coastal Watershed Service, March, 2000

²⁰ Maryland Tributary Strategy Lower Eastern Shore Basin Summary Report for 1985-2005 Data, Maryland Department of Natural Resources, August 2007

²¹ Chesapeake Bay Watershed Model Application and Calculation Of Nutrient and Sediment Loadings, Appendix F: Point Source Loadings A Report Of The Chesapeake Bay Program Nutrient Subcommittee, August 1998

²² Maryland’s Chesapeake Bay Tributary Strategy Statewide Implementation Plan, January 2008

projected land use changes in the City, full implementation of ENR upgrades to the City’s WWTP, and completion of planned improvements to address inflow and infiltration problems. The assessment of 2030 impacts of projected City growth indicates a reduction in total contribution of nutrient point source loading in the watershed over 2002 levels (see Table 6-13).

Table 6-12
Tributary Strategy Implementation Plan
Total Load Caps
City of Crisfield, Maryland

Jurisdictions	Total Nitrogen TN (lbs/yr)	Total Phosphorous TP (lbs/yr)
City of Crisfield	12,182	914

It is significant to note that the point source nutrient reduction Tributary Strategy for the watershed caps the City’s output of TN and TP. These caps represent potential limits to the how much the City can expect to grow unless improved treatment levels of discharge can be achieved. If the City’s ENR treatment is able to achieve outputs of 3 mg/l of TN and 0.3 mg/l TP the City’s contributions will be less than the Tributary Strategy caps and may allow for more growth than otherwise could be predicted. However, within these limits the City barely has adequate treatment capacity to accommodate their projected growth through 2030.

Table 6-13
Point Source Nutrient Loading Analysis Spreadsheet - Summary Results
City of Crisfield - 2002 Land Use & 2030 Land Use

Land Use/Land Cover	City of Crisfield		
	2002 Land Use	2002 Land Use	2030
	2002 BMPs	Tributary Strategy BMPs	Land Use
	(Acres)	(Acres)	(Acres)
Development	564	564	653
Agriculture	18	18	0
Forest	476	476	429
Water	597	597	597
Other	181	181	156
Total Area	1,836	1,836	1,836
Nitrogen Loading	31,981	31,981	12,182
Phosphorus Loading	2,811	2,811	914

Non-point Sources Loading

Non-point source pollution occurs when rainfall, snowmelt, or irrigation runs over land or through the ground and gathers pollutants. Pollutants are then deposited into streams, rivers, lakes, and coastal waters or introduced into ground water. Stormwater runoff is a significant contributor to non-point source loading.

Stormwater runoff is part of the natural hydrologic process. Human activities such as urbanization and agriculture can alter natural drainage patterns and add pollutants to rivers, lakes, and streams as well as coastal bays and estuaries. Urban runoff can be a significant source of water pollution, including flows discharged from urban land uses into stormwater conveyance systems and receiving waters. In the past, efforts to control the discharge of stormwater focused on quantity (e.g. drainage, flood control etc.) and only to a limited extent on quality (e.g. sediment and erosion control). More recently, officials are stressing the importance of controlling the quality as well as quantity of stormwater runoff in order to achieve the State's water quality objectives for the Chesapeake Bay.

Crisfield's non-point source contributions to the watershed were evaluated using two measures of potential impact associated with the City's projected growth in the planning period. The first of these is changes in non-point source nutrient loading contributions to the watershed. This evaluation addresses the requirement that the City identify suitable receiving waters and land areas to meet the stormwater management disposal needs of existing and future development proposed in the land use element of the plan.

Changes in loadings of potential sources of pollution commonly associated with urban development, i.e., total nitrogen (TN) and total phosphorus (TP) were evaluated as indicators of future impacts. Even though Tangier Sound is not under TMDL limits for these potential sources of impairment, deteriorating conditions and trends indicate that they are of concern. Consequently assessing impacts and devising strategies to reduce TN and TP loadings should be compelling to City officials. In addition to TN and TP, sediment loadings also should be a source of concern in the watershed. The Tributary Strategy is a 40 percent reduction in nutrients.²³

Potential changes in TN and TP loadings associated with projected land use changes in Crisfield were evaluated using land use unit loading rates for Somerset County provided in a spreadsheet format by the Maryland Department of the Environment (MDE). The results of the evaluation (see Tables 6-14 and 6-15) indicate that with application of best management practices the City's TN and TP loadings will increase somewhat over 2002 levels with application of the Tributary Strategy Best Management Practices (BMPs) when considering the City alone and remain essentially unchanged when measured in the context of the Tangier Sound watershed. This suggests that in order to achieve the Tributary Strategy nutrient reduction goals additional management strategies affecting land use in the entire watershed will be required.

²³ Maryland's Chesapeake Bay Tributary Strategy Statewide Implementation Plan, January 2008

Table 6-14
Non-point Source Loading Analysis Spreadsheet – Summary Results
City of Crisfield
2002 Land Use & 2030 Land Use

Land Use/Land Cover	2002 Land Use/ Land Cover*	2030 Land Use/ Land Cover*
	(Acres)	(Acres)
Development	564	653
Agriculture	18	0
Forest	476	429
Water	597	597
Other	181	156
Total Area	1,836	1,836
	Non-point Loading	
	(Lbs/Yr)	(Lbs/Yr)
Total Nitrogen Loading	5,322	5,470
Total Phosphorus Loading	320	333

* Assumes Tributary Strategy BMPs

Table 6-15
Nutrient Point and Loading Analysis Spreadsheet - Summary Results
Tangier Sound Watershed
2002 Land Use & 2030 Land Use with Crisfield Growth

Land Use/Land Cover	2002 Land Use/ Land Cover*	2030 Land Use/ Land Cover*
	(Acres)	(Acres)
Development	4,910	4,999
Agriculture	15,193	15,176
Forest	50,850	50,803
Water	87,801	87,801
Other	647	622
Total Area	159,401	159,401
Residential Septic (EDUs)	2,774	2,774
Non-Residential Septic (EDUs)	563	563
	Non-point Loading	
	(Lbs/Yr)	(Lbs/Yr)
Nitrogen Loading	263,763	262,066
Phosphorus Loading	17,366	17,387

* Assumes Tributary Strategy BMPs

Considered in the context of the sub-watershed (DNR 02130206) the total Crisfield's projected point source (PS) and non-point point source (NPS) loading (see Table 6-16) decreases (See Maps 6-4 for watershed boundaries).

Achieving sediment reduction goals has proven more difficult. The projected land use changes associated with growth in Crisfield will undoubtedly increase the City's contribution to sediment loadings in the watershed. According to the Chesapeake Bay Program,

“The rapid rate of population growth and related residential and commercial development coupled with the ongoing issues associated with accounting for the existing practices has made this pollution source sector [sediment] the only one in the Bay watershed which continues to still be growing, and thus showing the overall ‘progress’ as negative. About one-quarter of the nutrient reductions called for in the jurisdictions' cleanup strategies are expected to come from efforts to reduce, treat or prevent pollution from urban/suburban lands and septic systems. While improvements have been made in landscape design and stormwater management practices, significant challenges still exist in accounting for existing on-the-ground control practices. That aside, to date, it is estimated that the pollution increases associated with land development (e.g. converting farms and forests to urban/suburban developments) have surpassed the gains achieved from improved landscape design and stormwater management practices.”²⁴

Special attention to stormwater management practices, including the application of environmental site design techniques and long term maintenance of facilities will be critical to achieving the Chesapeake Bay Tributary sediment reduction strategy.

The second measure of potential impacts from growth is the increase in total impervious cover in the watershed. According to a classification system advocated by the Center for Watershed Protection sub-watersheds with impervious cover greater than 10 percent watersheds are “likely to experience significant degradation in stream quality unless changes are made to zoning, comprehensive plans and development regulations.”²⁵ Impervious cover in the sub-watershed in which the majority of the City is located is already greater than 10 percent. In addition to placing an even greater emphasis on employing stormwater best management practices this situation indicates that the City's growth plans should be focused on land in the adjacent sub-watershed to the north. Table 6-16 summarizes the impacts of City growth in the watershed (DNR 02130206) including impervious cover change. Compared to the overall size of the watershed, impervious cover was less the one percent of the watershed area and would remain below one percent of the area through 2030 with the projected growth in the City of Crisfield. However, over 90 percent of the sub-watershed area is water and wetlands. Compared to the upland (non-water and non-wetland) portions of the watershed the percent of impervious cover rises to over 15 percent.

²⁴ http://www.chesapeakebay.net/status_urbansuburban.aspx?menuitem=19694

²⁵ *User's Guide to Watershed Planning in Maryland*, Center for Watershed Protection, December 2005

Table 6-16
Nutrient Loading Analysis Spreadsheet - Summary Results
Sub-watershed 02130206
2002 Land Use & 2030 Land Use with City Growth

Land Use/Land Cover	2002 Land Use/Land Cover* (Acres)	2030 Land Use/Land Covers* (Acres)
Development	1,265	1,354
Agriculture	418	401
Forest	7,900	7,854
Water	41,800	41,800
Other	189	164
Total Area	51,572	51,572
Upland Area	2,772	2,772
Total Impervious Cover	438	480
Nutrient Loading		
-Total Nitrogen (NPS+PS)	75,535	54,417
- Total Phosphorus (NPS+PS)	3,943	2,060
Percent Impervious Cover		
Watershed Area	0.85%	0.93%
Upland Only	15.81%	17.33%

* Assumes Tributary Strategy BMPs

6.10 CONCLUSIONS AND RECOMMENDATIONS

Conclusions

Based on currently available data there appears to be an adequate and safe drinking water as well as a physical system resources available to accommodate the City's projected 2030 growth. Additional water sources as well as treatment, storage and distribution facilities may be required to support the build-out of the City if the SRP Master Plan is fully realized. Average per household water usage (expressed as Equivalent Dwelling Units or EDUs) is high as compared with other municipalities and indicates opportunities for water conservation.

The City has adequate sewer capacity to accommodate its projected 2030 growth but barely enough capacity to accommodate the full build-out of the City. There is insufficient existing capacity in the WWTP to support implementation of the SRP Master Plan. Based on projected sewer flows (See Table 6-7) planning for additional sewer treatment capacity should begin toward the end of the planning period or sooner if additional capacity is provided to the Somerset County Sanitary District.

In part, due to the types of land uses that dominate the watershed, water quality in the Tangier Sound Watershed remains relatively good but trends indicate it is threatened by increasing

nutrient and sediment loadings. TN, TP and sediments have been identified as a source of impairment with TMDLs recommended but not considered a priority at this time.²⁶

Crisfield currently represents a small part of the source for potential pollutants. With application of recent ENR level treatment improvements at the City's WWTP, the City's contribution of point source nutrient loading in the watershed will decrease over current levels. With application of urban best management practices to manage non-point sources Crisfield's contributions of TN and TP will be managed at or below 2002 levels. Sediment loadings will probably increase but will remain a relatively small portion of the total sediment loading in the watershed.

Strategies indicated for protecting surface water quality in Tangier Sound include reducing loading from agriculture sources (e.g., implementing nutrient management plans, installing forested buffers along drainage ways), retrofitting existing septic systems with de-nitrification systems (approximately 2,000 estimated in 2002), limiting new septic systems and/or connecting existing uses on private septic systems to public systems, and requiring urban stormwater best management practices. The current level of impervious cover in the sub-watershed indicates that special attention is needed to protect water quality in drainageways and stream systems. The need for coordinated land use and resource protection strategies among all jurisdictions in the watershed is strongly indicated.

Suitability of receiving waters for discharge from the Crisfield's WWTP as well as stormwater runoff must consider the assimilative capacity of the Tangier Sound for nutrients, sediment and other potential pollutions sources associated with urban land uses. Current data indicates that water quality trends in Tangier Sound are deteriorating. Tangier Sound is included in Maryland 303(d) list of impaired waters for sediment, bacteria, nutrients and biological impairments.²⁷

Development of TMDLs for nutrients, sediments and biological (non-tidal) is pending. When TMDLs are established the City will have a better reference point by which to assess its management strategies. Without TMDL's or some other measure of assimilative capacity, there is no basis upon which to gauge the long term capacity of receiving water to assimilate WWTP discharge or stormwater runoff at this time. The City will continue to track MDE efforts to quantify the assimilative capacity of Tangier Sound as it considers future wastewater treatment options and will assess its 2030 Land Use Plan and/or additional pollution control measures if the pollution impacts of the City's growth plans are demonstrated to exceed the assimilative capacity of the receiving waters when defined.

Recommendations

Drinking water supply does not appear to be significant constraints for projected growth through 2030. The assimilative capacity of receiving waters is not known but water quality trends indicate the need for implementing strategies that minimize future loadings. Managing land use in a way that benefits water resources requires assessing development regulations, policies and

²⁶ The 2008 Integrated Report of Surface Water Quality in Maryland, Submitted in Accordance with Sections 303(d), 305(b) and 314 of the Clean Water Act, Maryland Department of the Environment, Maryland Department of Natural Resources, 2008

²⁷ Ibid

guidelines from a new perspective for the City. Among other things, the objectives of regulations, policies and guidelines should be to:

- minimize the footprint of new development to the maximum extent possible, extensive use of water conservation measures;
- stage growth based on the availability and capacity of water resources;
- retrofit existing developed areas with improved stormwater management techniques;
- encourage best practices in the management of public drainage ditches; and
- require best management practices in all new development.

Utilizing best management practices is particularly important in watersheds with the highest percentage of impervious surfaces or that will be impacted by growth. In addition the City should consider the following strategies to reduce the impacts of future growth on water resources:

- Begin planning for additional sewer and water capacity. Should the City consider land application of wastewater as a solution to the WWTP Tributary Strategy point source cap it will first need to open preliminary discussions with MDE about the feasibility of land application²⁸. Among other things a feasibility analysis will need to address the following issues:
 - Is their sufficient acreage available to provide for capacity needs including finding willing landowners;
 - What wastewater storage will be required when land application is not possible during certain times of the year;
 - Are their opportunities to preserve properties designated for land application if the City does not yet own these properties;
- Carefully consider sewer allocation policies to avoid over commitment. Limit commitment of sewer capacity outside of the City. Avoid committing sewer allocation on a long-term basis. Consider accepting a non-refundable option or reservation fee for sewer allocations. Limit commitments to no more than two or three years.
- As part of a water conservation program, install water meters for all users (residential and nonresidential) and establish rates based on water usage. Reducing average water and sewer EDUs from 350 GPD to 250 GPD for example could add substantial capacity to the water and wastewater systems capacity. The current difference between the water usage and the wastewater treatment per EDU is significant and should to be addressed. The lack of water meters makes for unknowns that impede efficient infrastructure

²⁸ For additional information, the City should refer to MDE Guidelines for Land Application and Reuse of Municipal Waters at http://www.mde.maryland.gov/Programs/WaterPrograms/Water_Supply/Land_Ap_and_Reuse.asp

planning. The City and the Somerset County Sanitary District need to provide more accurate use and demand figures to adequately manage and project system needs.

- Undertake facilities planning for expansion of the WWTP when at 75 percent capacity. Considering the Tributary Strategy discharge cap of 1 million gallons per day, the City should be prepared to study alternative treatment methods and WWTP locations.
- Make education material available to residents regarding nutrient management to reduce fertilizer applications to grassed areas and lawns.
- Establish, maintain, or expand forest buffers in the form of linear wooded areas along streams to help filter nutrients, sediments and other pollutants in runoff.
- Work with developers, homeowners associations and individual homeowners to reduce the amount of impervious.
- Require new development and infill and redevelopment projects to treat stormwater using nonstructural and micro-scale practices to the maximum extent feasible. Techniques such as submerged gravel wetlands, rain water harvesting (cisterns and rain barrels), landscape infiltration, infiltration berms, and dry wells should become common practices. Stormwater should be filtered using such techniques as rain gardens, landscape and tree planters (e.g., linear tree pits, sidewalk planters), grass swales and bio-swales, tree-swales, grass filter strips and vegetated buffers.
- Encourage development design that maintains or enhances green infrastructure, and incorporates low impact design through stormwater management techniques for water quality and quantity management. The City also should encourage LEED (Leadership in Energy and Environmental Design) technology to promote sustainable building practices, conserve energy, and improve water and air quality.
- Work with Somerset County and the State of Maryland regarding source water protection planning to coordinate water resource related initiatives.
- Consider conducting a source water protection analysis to evaluate the need for additional source water protection measures.

Crisfield can achieve its water resource conservation objectives and make a positive contribution to improving water quality in the watershed by implementing urban BMPs. Through its stormwater management ordinance and programs and development standards the City should require environmental site design (ESD) techniques that optimize conservation of natural features (e.g., drainage patterns, soil, vegetation), minimize impervious surfaces (e.g., pavement,

concrete channels, roofs), slow down runoff to maintain discharge timing and to increase infiltration and evapotranspiration and use other nonstructural practices or innovative technologies approved by MDE. Planning for water and wastewater facilities should reflect the need to conserve ground water resources and reduce nutrient and sediment loadings in the Tangier Sound watershed.

Future Analysis

The City is not able to recommend any refinements to the science or methodologies used to model water resource capacity and land use impacts. The conclusions and recommendations contained herein are based on a planning analysis using best available data. These conclusions and recommendations may need to be reconsidered when better data concerning ground water resources and the impacts of land use on water quality are available. For example, useful data and recommendations from the comprehensive study of the sustainability of the entire Atlantic Coastal Plain aquifer system in Maryland recommended by the Maryland Advisory Committee on the “Management and Protection of the State’s Water Resources” will be a consideration in future land use decisions. In addition, the results of improved modeling of the relationships between land use and water quality, when available, will be used to evaluate future land use decisions as well as the effectiveness of current management strategies.

Crisfield Planning and Zoning Commission

Steve Marshall, Chairman
Bobby Goldsborough, Member
Sam Ward, Member
Becky Daugherty, Member
Tracy Wigglesworth, Member
Vernel Cottman, Member

Mayor and City Council

Percy J. Purnell, Jr., Mayor
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