III. Affected Environment

The purpose of this chapter is to provide the baseline conditions and setting of the study area in order to assess the location and anticipated effects of the SHA Selected Alternative (See Figure S-1 for map of study area).

A. Social, Economic, and Land Use

The social, economic and land use conditions for Howard County and the MD 32 study area, as discussed below, are based on various sources of information including the US Census Bureau, County planning data, and local conditions.

1. Social Environment

a. Demographics

Statistical data regarding population demographics for the study area was gathered from the 2000 US Census Bureau, the Baltimore Metropolitan Council (BMC), and the Howard County Department of Planning and Zoning.

At the time of the 2000 US Census, Howard County had a population of 247,842, an increase of 32.2 percent as compared to the 1990 Census data (population of 187,300). Howard County's population is projected to grow to 297,900, an increase of 16.8 percent by the year 2030 (Howard County Department of Planning, 2004). Residential population growth is expected to be driven by a continued increase in employment relocated from the Baltimore and Washington, DC areas and by new residents who may commute to jobs outside of the County. The recent population growth has predominantly occurred in the eastern portion of the County in the vicinity of Columbia. Past and projected population growth rates for the County are identified in **Table III-1**.

Table III-1: Howard County Population Trends from 1940 to 2030

Decade	Past Growth Trends1						Projected Growth Trends[2]		
	1940-50	1950-60	1960-70	1970-80	1980-1990	1990-00	2000-10	2010-20	2020-30
Population	23,100	36,200	62,400	118,600	187,300	250,700	274,150	294,600	297,900
% of Increase	-	36.0%	42.0%	47.3%	36.7%	34.4%	9.6%	6.9%	1.1%

Sources: 1 US Census Bureau, 2000 US Census of Population and Housing
2 Howard County Department of Planning and Zoning

The boundaries for Census tracts cover large geographic areas. The US Census Bureau divides these tracts into smaller geographic areas, called block groups. The study area for this project lies within two Census tracts: Census Tract 6030, Block Groups 2, 3, and 4, and Census tract 6051.01, Block Groups 2 and 3. The geographic boundaries for these block groups are shown on **Figure III-1**. The data for these block groups, as shown on **Table III-2**, has been compared to the Census tracts within which they are located, as well as to Countywide and Statewide data to create a comprehensive understanding of the socio-economic conditions in the study area.

Table III-2: Regional and Local Population Between 1990 and 2000

Geographic Area	1990 Population	2000 Population	Annual % Change
Maryland	4,781,468	5,296,486	1.0%
Howard County	187,328	247,842	3.2%
Census Tract 6030	7,469	10,645	4.2%
Block Group 6030.2	1,533	1,797	1.7%
Block Group 6030.3	698	1,323	8.9%
Block Group 6030.4	1,939	2,193	1.3%
Census Tract 6051.01	6,239	8,318	3.3%
Block Group 6051.012	986	2,085	11.1%
Block Group 6051.013	3,817	2,007	-4.7%
Study Area Total [1]	8,973	9,405	0.5%

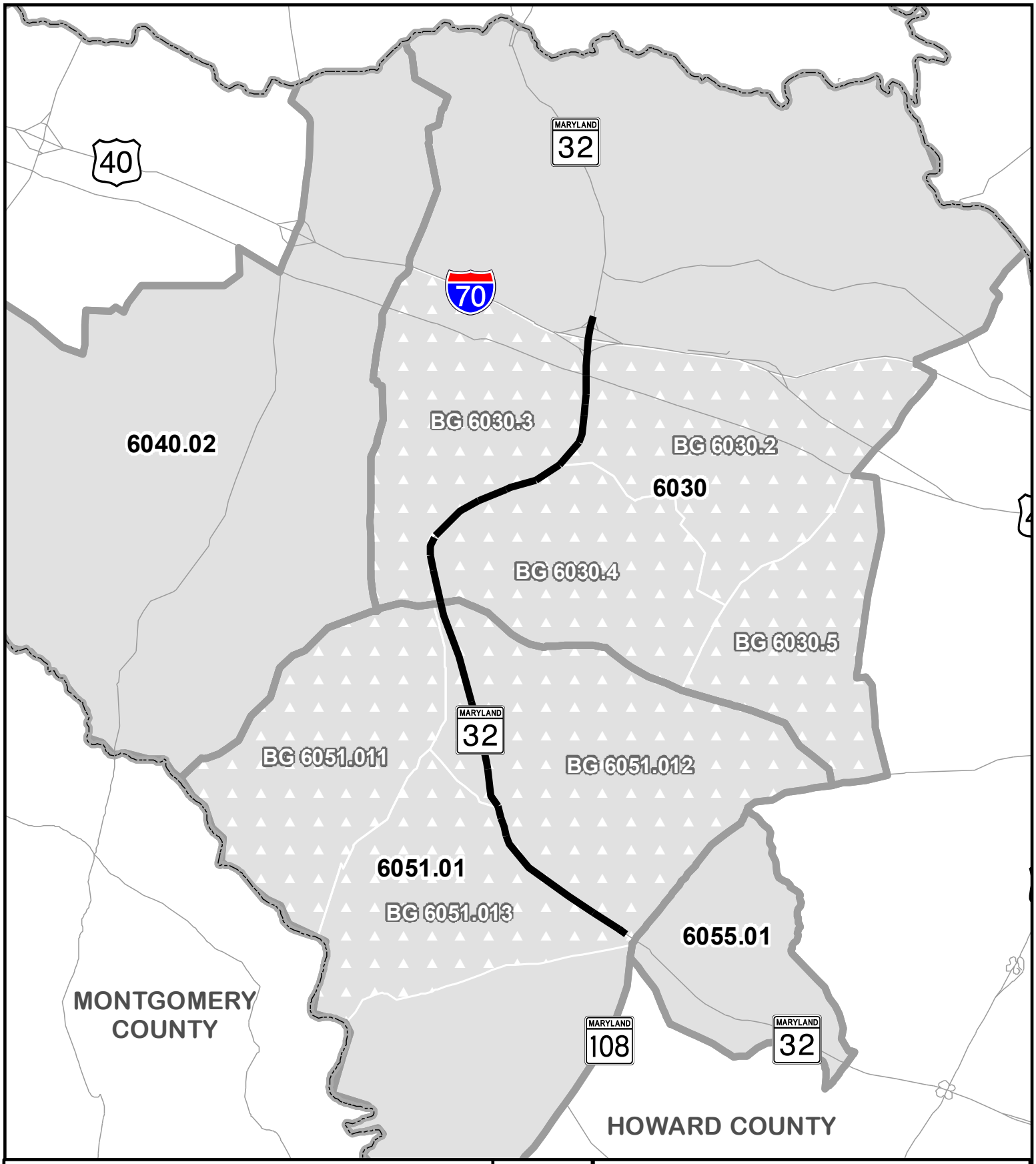
Note: [1] Study Area Total is the sum of the block groups that encompass the study area
Sources: US Census Bureau, 1990 and 2000 US Census of Population and Housing
Maryland Department of Planning, 2004

Age Distribution

Overall, the State of Maryland has a younger population than the US as a whole and Howard County has a younger population than the State. According to the 2000 US Census, 64.5 percent (159,831) of Howard County residents are between the ages of 18 and 64. Approximately 7.5 percent of the County residents are over the age of 65. Although Howard County currently has one of the smallest percentages of older residents in the State, it is poised to have one of the most rapidly aging populations in the future as more of the workforce population retires. The *Howard County General Plan 2000*[1] has recognized this dramatic shift in population and has several policies to ensure adequate housing and services to accommodate future needs for aging County residents (Howard County Department of Planning and Zoning, 2004).

Age distributions for the study area by Census boundary are presented in **Table III-3**. According to the 2000 US Census, the study area block groups have between 56 and 64 percent of their populations in the work force age group (18 to 64 years of age).

[1] Howard County Department of Planning and Zoning. 2000. *The General Plan 2000…A Six Point Plan for the Future*. Howard County Department of Planning and Zoning: Ellicott City, Maryland.



LEGEND

- MD 32 Study Area
- 52 2000 Census Block Groups
- 25 Census Tracts

1 inch = 1.5 miles

MD 32 PLANNING STUDY
MD 108 TO I-70

2000 U.S. Census Tracts

Maryland State Highway Administration

September 2005

Figure III-1

Table III-3: Age Distribution

Location		Age Distribution			
		≤ 17	**18-64**	**65 + over**	**Total**
State of Maryland	Population	1,356,172	3,341,007	599,307	5,296,486
	Percent	*25.6*	*63.1*	*11.3*	*100*
Howard County	Population	69,543	159,831	18,468	247,842
	Percent	*28.1*	*64.5*	*7.5*	*100*
Census Tract 6030	Population	3,046	6,580	1,019	10,645
	Percent	*28.6*	*61.8*	*9.6*	*100*
Block Group 6030.2	Population	491	1,125	181	1,797
	Percent	*27.3*	*62.6*	*10.1*	*100*
Block Group 6030.3	Population	473	747	103	1,323
	Percent	*37.8*	*56.5*	*7.8*	*100*
Block Group 6030.4	Population	599	1,408	186	2,193
	Percent	*27.3*	*64.2*	*8.5*	*100*
Census Tract 6051.01	Population	2,534	5,073	711	8,318
	Percent	*30.5*	*61.0*	*8.5*	*100*
Block Group 6051.012	Population	689	1,257	139	2,085
	Percent	*33.0*	*60.3*	*6.7*	*100*
Block Group 6051.013	*Population*	*584*	*1,245*	*178*	*2,007*
	Percent	*29.1*	*62.0*	*8.9*	*100*
Study Area Total [1]	Population	2,836	5,782	787	9,405
	Percent	*30.2*	*61.5*	*8.3*	*100*

Note: [1] Study Area Total is the sum of the block groups that encompass the study area
Source: US Census Bureau, 2000 US Census of Population and Housing

Racial Characteristics

The Census data indicates that the predominant racial groups within the State and Howard County are Caucasians and African-Americans. The African-American population, 35,730, as of the 2000 US Census, is distributed throughout the County and does not constitute a majority in any Census tract. According to the 2000 US Census, the racial breakdown for Howard County was 74.3 percent Caucasian and 14.4 percent African-American, with other racial groups constituting 11.3 percent of the County population. Census tracts in the study area have a smaller percentage of minority residents than found in the County as a whole (**Table III-4**).

Three percent of the 2000 Howard County population is identified as Hispanic as compared to 4.3 percent of the population of Maryland. The US Census does not categorize Hispanic as a race, rather, it is identified as an independent characteristic and this population is not counted within the races shown in **Table III-4**. The Hispanic population is shown in **Table III-5**. The total Hispanic population for the study area was 151 persons (1.6 percent).

According to the 2000 US Census data for the block groups that make up the study area, 8,308 persons (88.3 percent) were Caucasian, 473 persons (5.0 percent) were African American, 458 persons (4.9 percent) were Asians, and seventeen persons (0.2 percent) were American Indians, Eskimos, or Aleutians. The remainder of the study area population consisted of 47 persons (0.5 percent) of other races not defined and 102 persons (1.1 percent) of two or more races. The aggregate of all minorities in the study area (including Hispanics) is 13 percent, compared to 28 percent for Howard County. Block Group 6051.012 had the largest minority population at 15.9 percent.

Table III-4: Racial Characteristic Comparison

Geographic Area	Caucasian		African-American		American Indian, Eskimo or Aleutian		Asian		Pacific Islander		Other race[1] alone		Two or more races	
Maryland	3,391,308	64.0%	1,477,411	27.9%	15,423	0.3%	210,929	4.0%	2,303	0.04%	95,525	1.8%	103,587	2.0%
Howard County	184,215	74.3%	35,730	14.4%	583	0.2%	19,037	7.7%	87	0.04%	2,755	1.1%	5,435	2.2%
Census Tract 6030	9,538	89.6%	466	4.4%	14	0.1%	454	4.3%	3	0.03%	50	0.5%	120	1.1%
Block Group 6030.2	1,655	92.1%	58	3.2%	1	0.06%	42	2.3%	0	0%	18	1.0%	23	1.3%
Block Group 6030.3	1,195	90.3%	78	6.0%	1	0.08%	36	2.7%	0	0%	5	0.4%	8	0.6%
Block Group 6030.4	1,949	88.9%	143	6.5%	6	0.3%	68	3.1%	0	0%	6	0.3%	21	1.0%
Census Tract 6051.01	7,398	89.0%	309	3.7%	17	0.2%	462	5.6%	1	0.01%	30	0.4%	101	1.2%
Block Group 6051.012	1,753	84.1%	100	4.8%	6	0.3%	188	9.0%	0	0%	9	0.4%	29	1.4%
Block Group 6051.013	1,756	87.5%	94	4.7%	3	0.2%	124	6.2%	0	0%	9	0.4%	21	1.0%
Study Area Total [2]	8,308	88.3%	473	5.0%	17	0.1%	458	4.9%	0	0%	47	0.5%	102	1.1%

Note: [1] Other races are not defined.
[2] Study Area Total is the sum of the block groups that encompass the study area
Source: US Census Bureau, 2000 US Census of Population and Housing

Table III-5: Hispanic Population

Geographic Area	Hispanic Population	Percent Hispanic
Maryland	227,916	4.3%
Howard County	7,490	3.0%
Census Tract 6030	132	1.2%
Block Group 6030.2	25	1.4%
Block Group 6030.3	24	1.8%
Block Group 6030.4	35	1.6%
Census Tract 6051.01	131	1.6%
Block Group 6051.012	35	1.7%
Block Group 6051.013	32	1.6%
Study Area Total [1]	151	1.6%

Note: [1] Study Area Total is the sum of the block groups that encompass the study area
Source: US Census Bureau, 2000 US Census of Population and Housing

Income

According to Howard County, low, middle, and high income households are intermingled throughout the County, and there is no singular concentration of low-income households. According to 2000 US Census data, the median household income for the State of Maryland was $52,868. In Howard County, the median household income was $74,167, while the median for the block groups in the study area it was $109,847. The median household income for each block group is shown in **Table III-6**. Block Group 6030.3 had the lowest median household income ($91,578) in the study area, but is well above the poverty level standard for a household in the US of $19,350 for a family of four.

Table III-6 also shows the percentage of persons under the US Department of Health and Human Services poverty level standard. According to 2000 US Census data, Howard County's rate of persons below poverty (3.9 percent) was below the State's rate (8.5 percent). None of the Census tracts in the study area had a rate higher than the State. Only one of the block groups in the study area (6030.3) had a higher poverty rate (4.3 percent) than the Howard County average rate.

Table III-6: 2000 Regional and Local Income Information

Geographic Area	Population	Median Household Income	Persons Under Poverty Level [1]	% Persons Under Poverty Level
Maryland	5,296,486	$52,868	438,676	8.5 %
Howard County	247,842	$74,167	9,491	3.9 %
Census Tract 6030	10,645	$97,850	281	2.6%
Block Group 6030.2	1,797	$98,581	32	1.7 %
Block Group 6030.3	1,323	$91,578	59	4.3 %
Block Group 6030.4	2,193	$102,021	23	1.1 %
Census Tract 6051.01	8,318	$117,101	111	1.3%
Block Group 6051.012	2,085	$133,697	5	0.23 %
Block Group 6051.013	2,007	$123,362	8	0.39%
Study Area Total [2]	9,405	$109, 847	140	1.4%

Note: [1] Poverty data based on the US Department of Health and Human Services annual poverty income standard. ($19,350/year for a family of four)
[2] Study Area Total is the sum of the block groups that encompass the study area
Source: US Census Bureau, 2000 US Census of Population and Housing

b. Environmental Justice

Executive Order (EO) 12898 "Federal Actions to Identify and Address Environmental Justice on Minority and Low-Income Populations" was signed on February 11, 1994 (commonly referred to as environmental justice). The EO requires the assessment of disproportionately high and adverse human health or environmental effects of its programs, policies, and activities on minority and low income populations resulting from proposed Federal actions. The EO reaffirms the provisions of Title VI of the Civil Rights Act of 1964 and related statues. Title VI requires federal agencies to ensure that their programs, policies and activities do not have the effect of excluding populations from the benefits of the project, or subjecting persons or populations to discrimination based on race, color, or national origin. EO 12898 adds low-income to the list of populations that should be investigated to ensure that they are not excluded from the benefits of the project or subject to discrimination caused by federal programs, policies, and activities. Environmental justice requires that minority populations and low-income populations are specifically included in public participation and outreach programs.

In compliance with federal guidelines on environmental justice, an inventory of the study area was performed to identify the proportion of low-income and minority persons that live within geographic proximity of the project alternatives. Identification of low-income and minority populations was based on existing census demographics, field research, and correspondence with local planning officials and social service organizations.

Block group 6051.012 has the highest percentage of minority residents within the study area (15.9 percent); however, this percentage is still lower than the minority population of Howard

County of 25.7 percent (as shown in **Table III-4**). During the field review, minority families were identified in the study area; however, no minority communities (defined by Census as all people, male and female, child and adult, living in a given geographic area) were identified in the study area. Additionally none of the minority families identified were low-income families.

A public outreach effort to supplement the Census 2000 data information was conducted. Correspondence was sent to the local chapter of the National Association for the Advancement of Colored People (NAACP) requesting their assistance to inform their members of the project and to help identify concentrations of minority and low income populations in the study area. The NAACP did not identify any minority or low income communities and stated that all of the groups and individuals NAACP contacted were aware of the proposed project. The notification included an offer to give a presentation on the MD 32 project, thereby providing an opportunity to readily access public information and comment on the project.

Public Outreach

Throughout the MD 32 Planning Study, coordination with environmental resource agencies, elected officials, community organizations/associations, including low-income and minority representatives, and the public has been an important part of the process.

On March 18, 1999, a Public Hearing was held which provided citizens the opportunity to present oral or written testimony on the DEIS and the project. A Public Hearing record was prepared and contains remarks from 46 citizens. A summary of the Public Hearing testimony, written comments received, and responses are presented in **Sections V.B., V.C., and V.D.**

The MD 32 project has been developed in accordance with the Maryland Streamlined Environmental and Regulatory Process including coordination with Federal and State resource agencies. This involved agency concurrence on the Alternatives Retained for Detailed Study Package (ARDS), a 45-day comment period on the DEIS, and agency concurrence on the SHA Selected Alternative and Conceptual Mitigation Package (SACM). Government agencies and non-profit organizations had the opportunity to comment on the DEIS during a 45-day comment period between March of 1999 and May of 1999. A summary of the agency comments can be found in **Section V.A**.

On April 28, 2005 a draft of the SACM package was distributed to agencies for review with SHA's Selected Alternative presented at the May 2005 Interagency Review Meeting (IAR). Agency concurrence was received on May 27, 2005.

The purpose of the community and public meetings was to update the public on the status of the MD 32 study, to present the results of studies completed since the last meetings, and to receive public comments on the recommended alternatives and interchange options. The most recent community and public meetings are listed below:

Community Meetings Held:

- A Community Meeting was held on April 13, 2004 with residents near MD 32 Burntwoods Road Interchange.
- A Community Meeting with residents near MD 32/MD 144 was held on July 29, 2004.

- A Community Meeting with residents near MD 32/Rosemary Lane Interchange was held August 4, 2004 and October 25, 2004.
- A meeting was held on October 26, 2004 with the Gossage Family.
- A Town Hall Meeting was sponsored by Senator Kittleman on January 19, 2005 to provide a forum for the residents supporting "A Better Plan for 32" website.
- A meeting with residents along Wellworth Way was held on March 16, 2005.
- A follow-up meeting to the January 19, 2005 Town Hall Meeting on March 29, 2005.

Public Meeting Held:

- A Public Meeting was held on September 8, 2004 at the Folly Quarter Middle School in Ellicott City, Maryland.

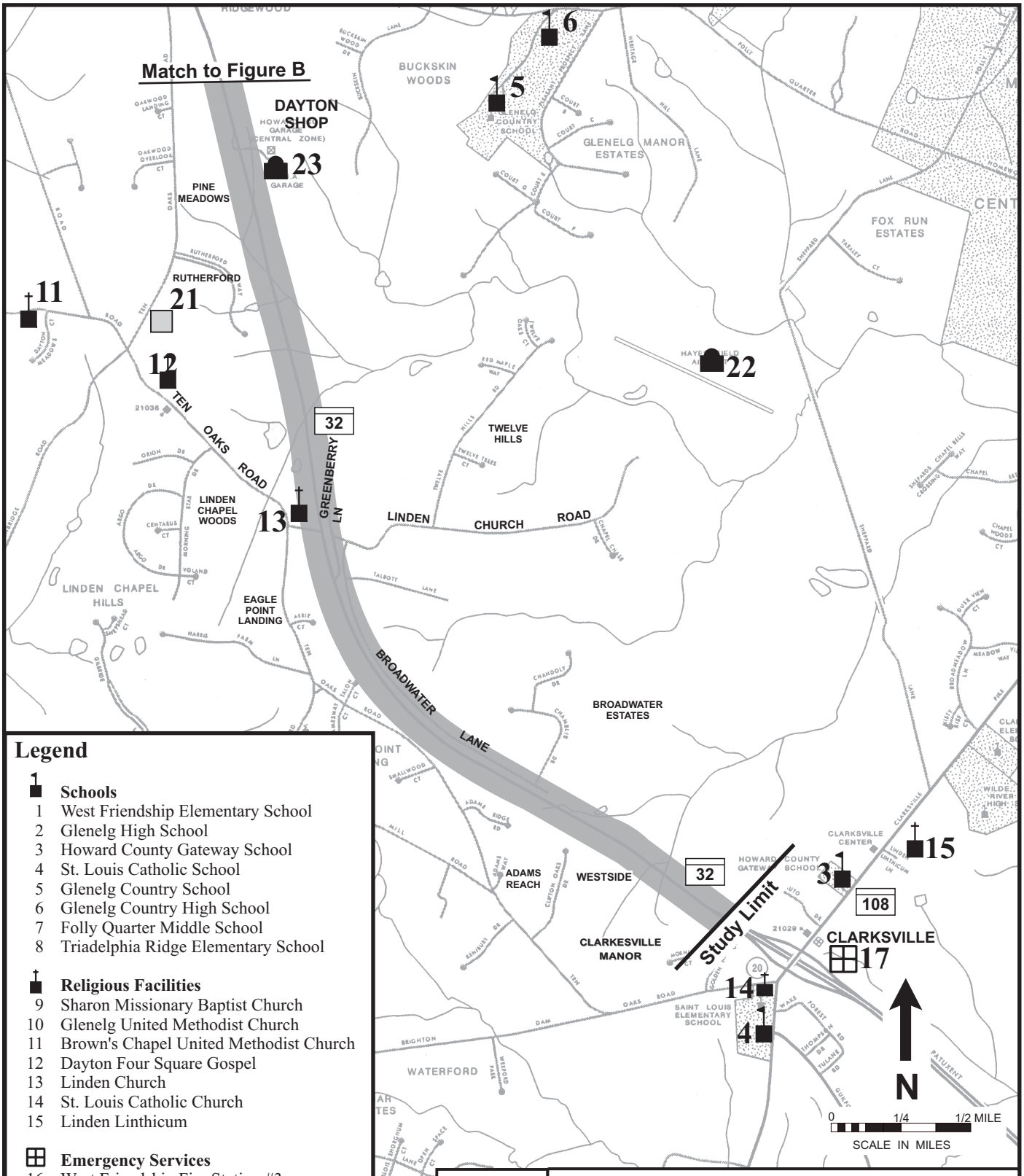
Additional information on Community and Public Meetings is available in **Section V** of this FEIS.

c. Communities and Neighborhoods

Through coordination with the Howard County Department of Planning and Zoning and review of County mapping, residential neighborhoods were identified within the study area. Community centers within the MD 32 study area include Clarksville, Dayton, Glenelg, and West Friendship. There are 20 residential neighborhoods located along the MD 32 study area. Those directly adjacent to MD 32 include Clarksville Manor, Westside, Adams Reach, Broadwater Estates, Eagle Point Landing, Linden Chapel Woods, Rutherford, Quartz Paddocks Development, Paddocks East Development, Fox Valley Estates, King's Grant, Rosemary Estates, Fox Chase Estates, Friendship Manor, and Buttercup Estates. Some of the most recently developed residential neighborhoods in the MD 32 study area include Oakwood Overlook, Lakeview at Buckskin Ridge, Foxtail Run Development, and Twin Pines Development. Some of these residential neighborhoods have been constructed or are underway since the DEIS. Single family, large lot dwellings (average lot size of three acres) are the dominant housing types in these communities. The locations of these community neighborhoods are shown on **Figure III-2A** and **2B** and on the mapping in **Appendix A**.

d. Community Facilities and Services

Educational, religious, and health care facilities as well as libraries and emergency services are found throughout the study area. Field visits to the study area and reviews of Howard County mapping were conducted to identify these facilities and services in the study area. Those directly adjacent to MD 32 are listed as follows from north to south: the West Friendship Neighborhood Shopping Center, West Friendship Elementary, Fire District 3, Triadelphia Ridge Elementary School, Western Middle School, the County Highway Maintenance Building, the State Highway Administration Maintenance Facility, the Glenelg Methodist Church, Linden Church, Fire District 5, the Clarksville Shopping Center, St. Louis Catholic Elementary and St. Louis Catholic Church. Community facilities and services located in the study area are shown on **Figure III-2A** and **2B**.



Legend

Schools
1 West Friendship Elementary School
2 Glenelg High School
3 Howard County Gateway School
4 St. Louis Catholic School
5 Glenelg Country School
6 Glenelg Country High School
7 Folly Quarter Middle School
8 Triadelphia Ridge Elementary School

Religious Facilities
9 Sharon Missionary Baptist Church
10 Glenelg United Methodist Church
11 Brown's Chapel United Methodist Church
12 Dayton Four Square Gospel
13 Linden Church
14 St. Louis Catholic Church
15 Linden Linthicum

Emergency Services
16 West Friendship Fire Station #3
17 Clarksville Fire Station #5

Parks and Recreation
18 West Friendship Park
19 Howard County Fairgrounds
20 Willow Springs Golf Course
21 Western Community Park (site)

Other Facilities
22 Hayes Field Airport
23 State Highway Administration Facilities

KEY MAP

B
A

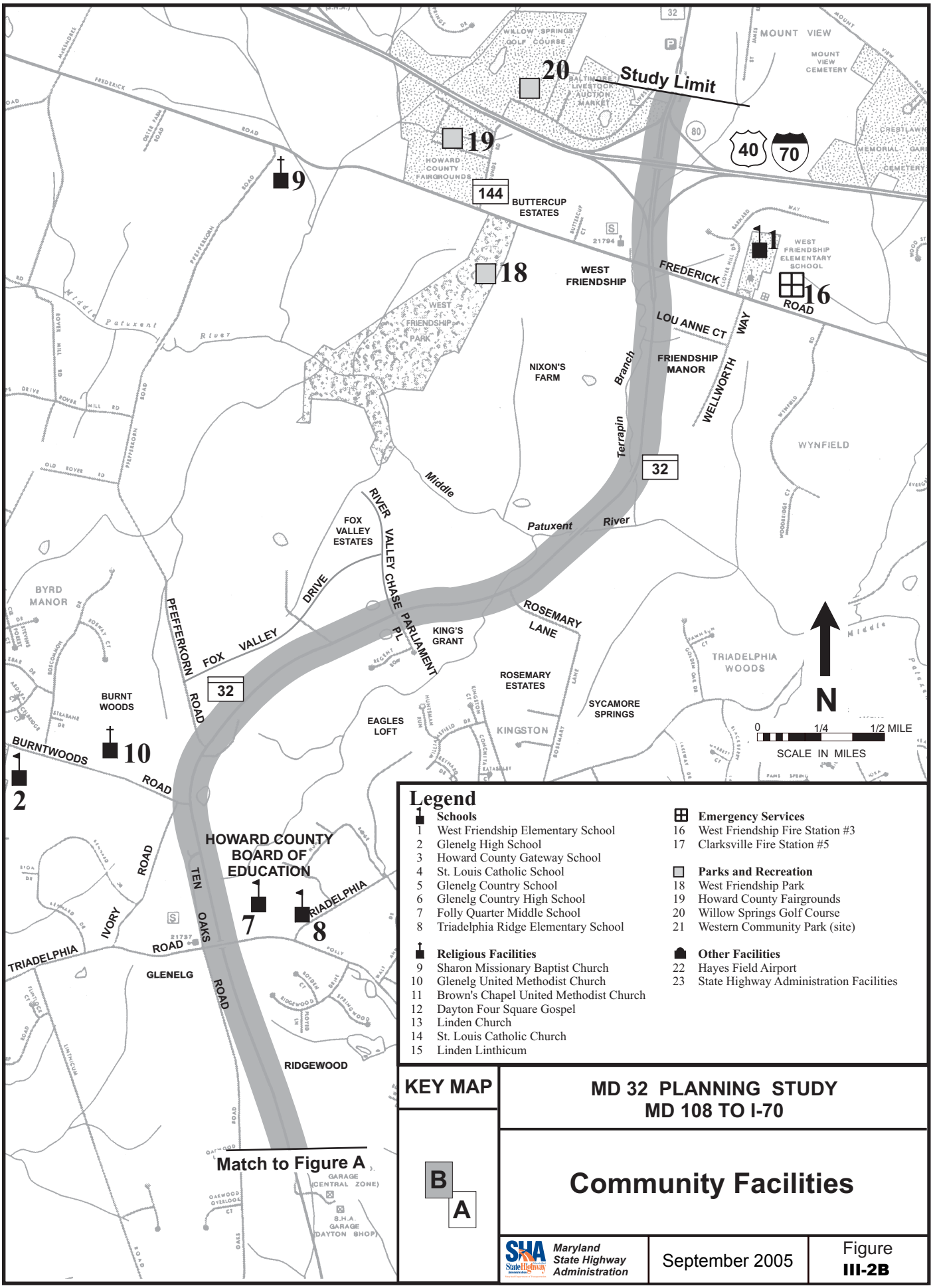
MD 32 PLANNING STUDY
MD 108 TO I-70

Community Facilities

Maryland State Highway Administration

September 2005

Figure **III-2A**



Legend

Schools
1 West Friendship Elementary School
2 Glenelg High School
3 Howard County Gateway School
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5 Glenelg Country School
6 Glenelg Country High School
7 Folly Quarter Middle School
8 Triadelphia Ridge Elementary School

Religious Facilities
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13 Linden Church
14 St. Louis Catholic Church
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Emergency Services
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Parks and Recreation
18 West Friendship Park
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21 Western Community Park (site)

Other Facilities
22 Hayes Field Airport
23 State Highway Administration Facilities

KEY MAP

MD 32 PLANNING STUDY
MD 108 TO I-70

Community Facilities

Maryland State Highway Administration

September 2005

Figure III-2B

Educational Facilities

Howard County Board of Education operates several public schools within the study area. Those directly adjacent to the MD 32 study area are Triadelphia Ridge Elementary, Folly Quarter Middle School and West Friendship Elementary. St. Louis Elementary School, a parochial school, is located on MD 108 just southeast of the MD 32/MD 108 interchange. Howard County Gateway School is an alternative school for middle and high school level students located on MD 108 north of the existing MD 32/MD 108 interchange. Clarksville Elementary School, Pointers Run Elementary School, Howard County Gateway School, Clarksville Middle School, and River Hill High School are public schools located in Clarksville. One private school, the Glenelg Country School offers a pre-kindergarten through 12th grade curriculum, and is located on Maryvale Court at Folly Quarter Road. Triadelphia Ridge Elementary School and Folly Quarter Middle School are both located at Triadelphia Road and east of MD 32. West Friendship Elementary School is located on MD 144 east of the existing MD 32/MD 144 intersection.

Religious Facilities

There are many religious facilities near the study area. In Clarksville, there are two churches: St. Louis Catholic Church and Linden Linthicum Methodist Church. St. Louis Catholic Church is located south of the study area adjacent to the St. Louis Elementary School on MD 108. Linden Linthicum Methodist Church is located north of the study area on MD 108. Linden Church is located east of MD 32 on Linden Church Road. Located in Dayton are Brown's Chapel United Methodist and Dayton Four-Square Chapel. The Glenelg United Methodist Church is located along Burntwoods Road in the community of Glenelg west of the study area. The Sharon Missionary Baptist Church is located west of the study area along MD 144.

Health Care Facilities

There are no health care facilities located within the study area. The closest medical facility is the Howard County General Hospital, the County's only hospital, which is located in Columbia. The County government operates health clinics at various locations primarily to serve individuals without health insurance. There are many health agencies, walk-in clinics, Health Maintenance Organizations, preferred provider organizations, and numerous private providers that serve residents in the County and study area.

In addition, many housing options for senior citizens exist in the County, all offering various levels of support and services: two nursing homes with approximately 543 beds, over 500 beds in congregate assisted living, approximately 550 beds in about 80 licensed group homes, seven congregate independent living apartment communities, one continuing care retirement community, and two retirement communities (*Howard County General Plan 2000*).

Vantage Place, a 65-bed alternative living facility in Columbia provides services to individuals with psychiatric disabilities and brain injuries. Seventy beds are provided for mentally disabled citizens through the Howard County Association of Retarded Citizens Community Choice program. In addition, the County provides alcohol and drug abuse treatment and shelter centers for emotionally and mentally disturbed individuals.

The Howard County Health Department provides many clinical services to its residents. Services include addiction programs for the Howard County Detention Center and a rehabilitation program for the chronically mentally ill. The Hospice Services of Howard County serve the terminally ill and their families.

Parks and Recreational Areas

While there are numerous public recreational facilities located throughout Howard County, none are directly adjacent to MD 32. However, in the vicinity of the study area there are three public facilities: West Friendship Park, Western Community Park, and the Howard County Fairgrounds.

All nine County public schools in the study area have outdoor recreational facilities, such as playgrounds and ball fields, which are open to the public.

The Howard County Fairgrounds is located west of MD 32 between MD 144 and I-70. Access to the fairgrounds is provided via the MD 32/I-70 interchange and MD 144.

There are two private recreational facilities in the vicinity of the study area: Nixon's Farm and Willow Springs Golf Course. Nixon's Farm is immediately adjacent to MD 32 on the west side just south of the existing MD 32/MD 144 intersection. Nixon's Farm offers rental facilities for weddings, corporate picnics, and other events. Willow Springs is an 18-hole, mid-length links style golf course located north on MD 32, just off Livestock Road.

Law Enforcement

Public safety is provided by the Waterloo Barrack of the Maryland State Police, located on Washington Boulevard in Jessup. In addition, the Howard County Police Department has two stations, one in Ellicott City and another in Laurel at the intersection of US 29 and MD 216, southeast of Clarksville. These law enforcement agencies are responsible for patrolling all unincorporated areas of the County. No communities in the study area have their own police departments.

Fire and Rescue

The Howard County Department of Fire and Rescue is a combination career and volunteer fire department. The County is divided into six fire districts with 11 fire stations. Fire Districts 3 and 5 are adjacent to the MD 32 study area. The West Friendship Fire Station (District 3, Station 3) is located on MD 144 east of MD 32, next to the West Friendship Elementary School. The five District Volunteer Fire Department, Inc. (District 5, Station 5) is located on MD 108 at MD 32. Both fire and emergency medical services are provided from these stations.

Public Transportation/Other Community Facilities/Services

Howard County operates senior citizens' nutrition centers at the Glenelg United Methodist Church and the Clarksville Fire Station, both of which are shown on **Figure III-2A** and **2B**.

In 2000, Howard County Library's newest branch, the Glenwood Multi-Service Center opened, replacing the Lisbon Community Library on Woodbine Road just north of I-70. It serves the Glenelg and West Friendship area. The Central Branch Library, located in West Columbia, serves the entire County. (*Howard County General Plan 2000*). Within the study area, there are three US Post Office locations: Clarksville, Glenelg, and West Friendship. The study area is not served by public water or sewer.

Howard County is served by the Maryland Transit Administration rail and commuter bus services. The Marc Camden Line includes four stations in Howard County: Jessup, Savage, Laurel Racetrack, and Laurel. The Camden Line runs along the border between Howard and Anne Arundel Counties with service into both Baltimore and Washington, DC. Commuter Bus service is provided between Columbia and Washington, DC on routes 915, 929, and 995. Service is provided between Columbia and Baltimore on bus routes 310 and 311, and between Laurel and Baltimore on route 320. None of these routes directly serve the study area. Howard Transit provides fixed route service in Columbia, Ellicott City, Clarksville, Annapolis Junction, North Laurel, Savage, and Elkridge. Corridor Transportation provides bus service between Laurel and Columbia. None of these routes directly serve the study area. Howard County also provides paratransit service for the disabled and senior citizens. A park and ride lot is located near the study area at MD 32 just north of the I-70 interchange.

2. Economic Characteristics

a. Regional Employment Characteristics

The largest sectors of employment in Howard County are educational, health and social services (21.7 percent); professional, scientific, management, administrative, waste management services (16.2 percent); and public administration (10.6 percent). The major employers in the County are Howard County Public Schools (6,694 employees), Johns Hopkins Applied Physics Lab (3,300 employees), Howard County Government (2,035 employees), Giant Food, Inc. (1,450 employees), and the Columbia Association (1,300 employees) (Howard County Economic Development Authority, 2004).

The agricultural economy is also influential in western Howard County. According to the 2002 Agricultural Profile for Howard County, agricultural sales exceeded $100 million annually, ranking agriculture among the top five industries in the County. Between 1997 and 2002, the market value of production, including crop and livestock sales increased ten percent. The *Howard County General Plan 2000* notes that farming in Howard County has shifted from grain and livestock to a varied industry of horticultural and horse farms.

As of June 2003, Howard County's unemployment rate was 3.0 percent. The State unemployment rate was 3.9 percent as compared to the national unemployment rate of 5.5 percent (US Department of Labor, Bureau of Labor Statistics, 2004).

Employment growth in Howard County is projected to be 44.9 percent between 2000 and 2030 (Maryland Department of Planning, 2004). The employment sectors with the largest projected growth are Services (23.7 percent); Finance, Insurance and Real Estate (F.I.R.E.) (15.4 percent); and Retail Trade (13.7 percent) (Maryland Department of Planning, 1995).

The County's location between the Baltimore and Washington, DC metropolitan areas and the development of Columbia were the primary reasons for the County's economic growth in the recent past. Both new industry and the expansion of the established economic base are preferred by the County. Planned economic growth and development are dependent upon efficient transportation systems.

MD 32 including the study area is part of both Maryland's primary highway system and the National Highway System. In Maryland, I-95, I-70, and US 29 serve as primary arterials for the transportation of goods and MD 32 serves as the major connector in Howard County to these primary arterials (*Howard County General Plan 2000*). These networks are intended to support interregional transportation of goods and services, as well as intrastate and interstate movement of goods. There are no industrial land uses along the MD 32 corridor.

b. Local Employment Characteristics

Within the MD 32 study area, the largest sectors of employment are educational, health and social services (20.3 percent); professional, scientific, management, administrative, and waste management services (15.0 percent); and retail trade (10.3 percent). Since most of the MD 32 study area is residential there are few industries besides retail and agriculture in the study area.

According to Census 2000 data for study area block groups, 99.1 percent (3,864) of the labor force is employed while 1.1 percent (43) is unemployed. The majority of employed residents within the study area (93.1 percent) work in the Washington DC and Baltimore metropolitan areas. Of the employed study area residents, 45 percent (1,692) work within Howard County. The average commuting time for study area residents is 30-34 minutes.

Throughout the study area the most common means of transportation to work is "driving alone." Over 83 percent of residents in the study area drive to work alone, with carpooling being the second most utilized means of transportation (8.6 percent). Additionally, 9.1 percent of study area residents work from home.

c. Tax Base

Howard County's budget is made up of over 100 different revenues, two of which (property tax and income tax) currently make up more than 85 percent of total revenue. Other local taxes include the recordation tax; admissions and amusement tax; the hotel/motel tax; and mobile home tax. The tax rates for Howard County are identified below.

- $1.044 per $100 of assessed value of real property - 7.5 percent amusement tax.
- Local income tax at 3.2 percent.
- One percent county property transfer tax.

3. Land Use

a. Existing Land Use

Howard County has seen a significant amount of development in the past several decades. As residential and commercial land uses have increased, agricultural and forested lands have decreased. **Table III-7** illustrates the changes in land use from 1994 to 2002. As the County approaches build out of available land, balancing growth becomes an important focus for future land use. The *Howard County General Plan 2000* identifies a planned growth boundary which divides the eastern and western portions of the County, as shown in **Figure III-3** Howard County Zoning Plan. The western portion of the County, including the MD 32 study area, is located outside the planned service area for water and sewer and is an area of more sparse development. The eastern portion of the County makes up the planned service area and is intended for higher density development.

Table III-7: Howard County Land Use Change Between 1994 and 2002

Land Use (acres)	1994	1997	% Change 94-97	2000	%Change 97-00	2002	%Change 00-02
Agriculture	53,949	51,008	-5.5%	49,875	-2.2%	45,893	-8%
Bare Ground	1,008	328	-67.5%	213	-35.1%	484	127.2%
Commercial	4,756	3,822	-18.4%	3,707	-3%	3,734	0.7%
Forest	55,521	52,128	-6.1%	51,913	-0.4%	49,519	-4.6%
Industrial	1,977	4,341	119.6%	4,431	2.1%	4,533	2.3%
Institutional	2,221	2,973	33.9%	3,100	4.3%	2,948	-4.9%
Open Urban Land	1,627	2,247	38.1%	1,761	-21.6%	2,444	38.8%
Residential	39,692	43,865	10.5%	45,667	4.1%	51,144	12%
Waters/Wetlands	1,427	1,464	2.6%	1,510	3.1%	1,478	-2.1%

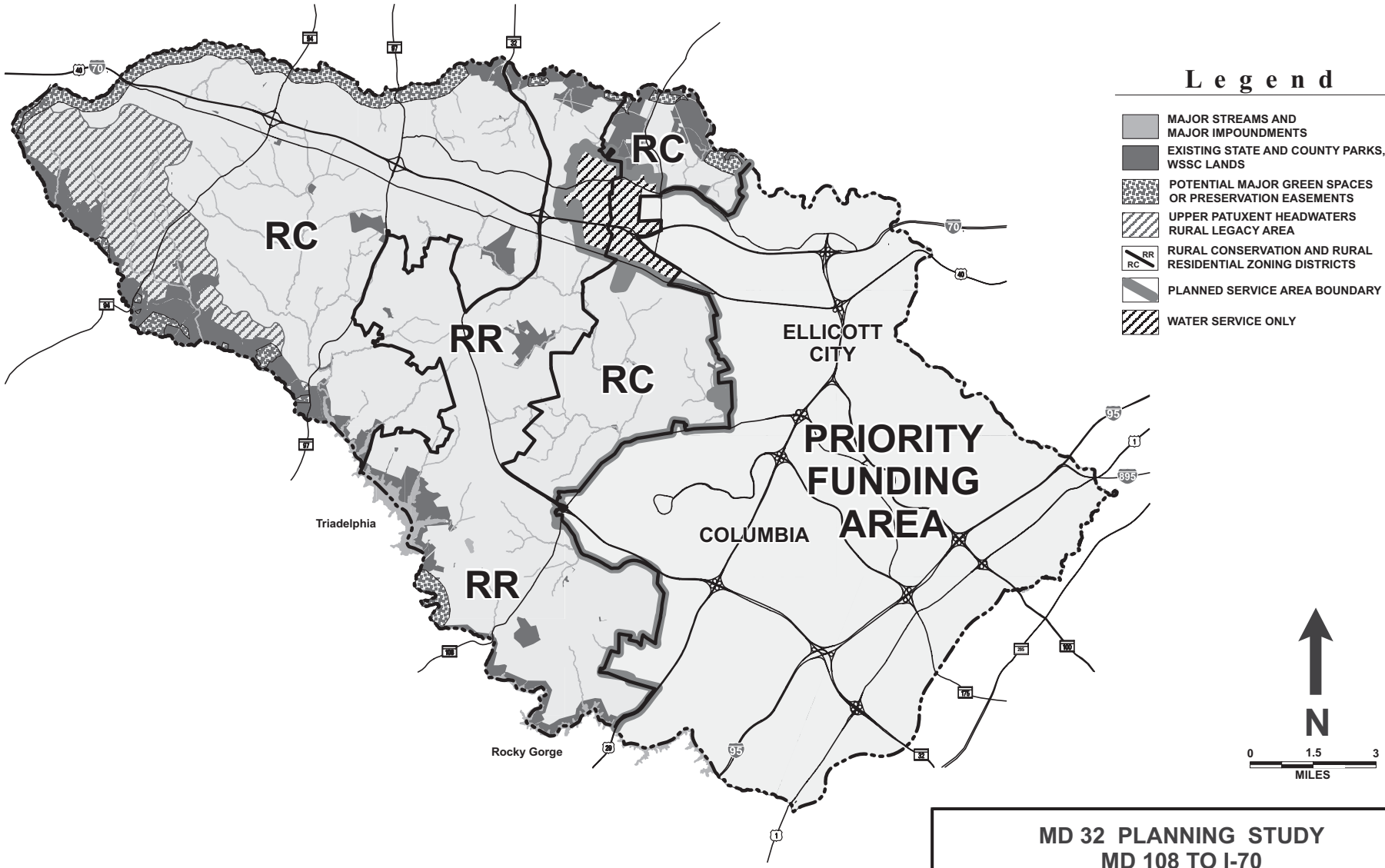
Source: Howard County Department of Planning and Zoning

The MD 32 study area falls in the Rural West planning area, which contains roughly 94,900 acres of land; 71,600 acres have already been committed to either development or preservation. Of this committed land, 48 percent is residential, 8 percent commercial/industrial or institutional, 31 percent preserved easements, and 13 percent parks and green space (Howard County General Plan 2000).

The majority of land use in the study area is divided evenly between residential and agricultural land. Forested land makes up the next largest portion of land in the study area. Scattered commercial, institutional, and industrial land uses occupy the smallest portions of the area. Refer to **Figure III-4A** and **4B** for the Existing Land Use Map.

Residential Land Use

Residential development in the Rural West Planning Area has experienced rapid growth during the decade MD 32 has been under study (mid 1990s to mid 2000s). There was an annual average of 324 residential permits issued in the Rural West planning area between 1991 and 2002. (Howard County Department of Planning and Zoning, Research Report, Issue 10, May 2003). **Figure III-5** illustrates the number of building permits that have been issued in the Rural West planning area of the County between 1991 and 2004.



Source: Howard County DPZ Land Use, July 1999
& Howard County General Plan 2000.

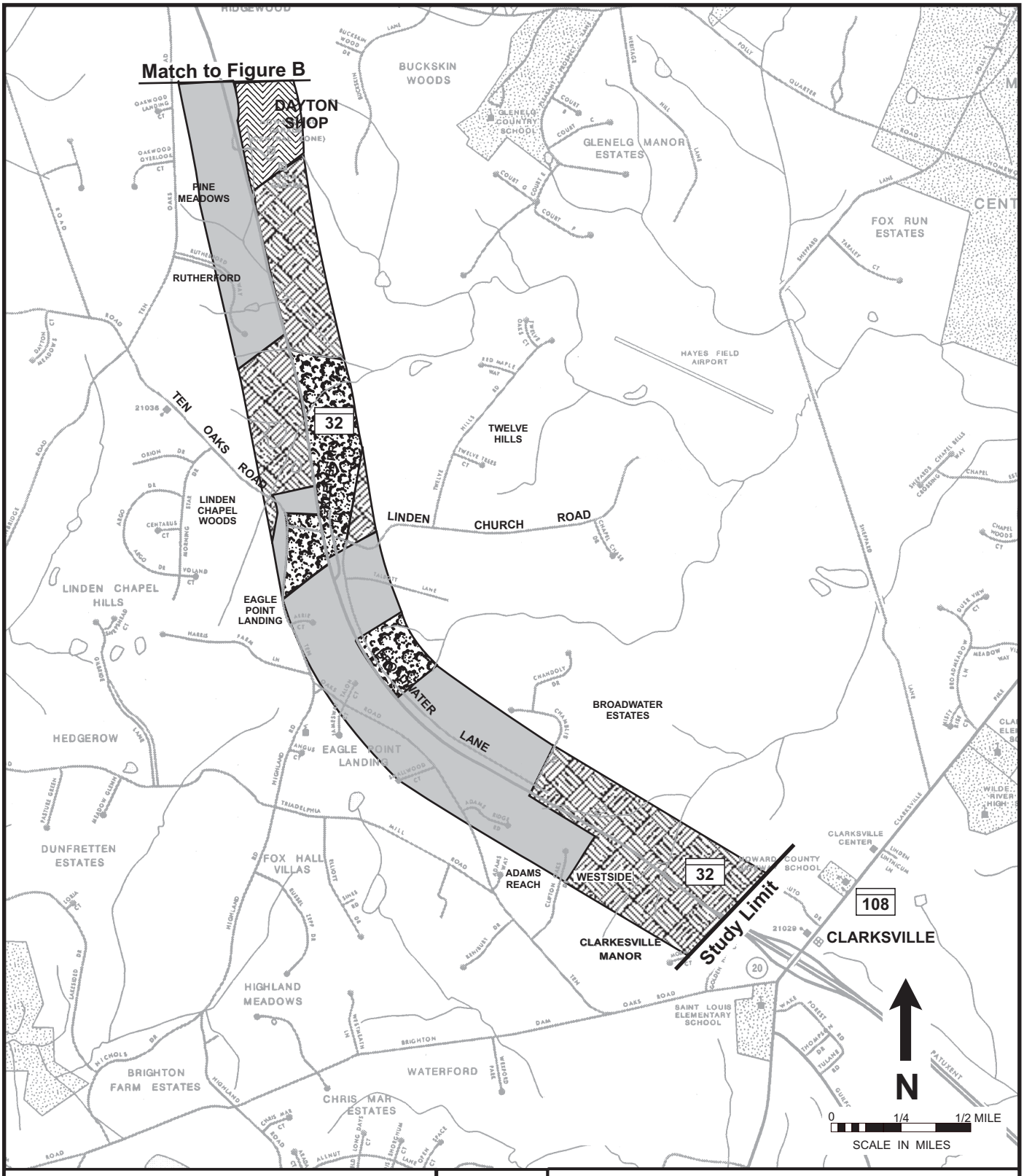
MD 32 PLANNING STUDY
MD 108 TO I-70

Howard County Zoning Plan

SHA State Highway Administration — *Maryland State Highway Administration*

September 2005

Figure **III-3**



LEGEND

- Commercial
- Forest Lands
- Agriculture
- Residential
- Institutional

Source: Maryland Department of Planning 2002

KEY MAP

B
A

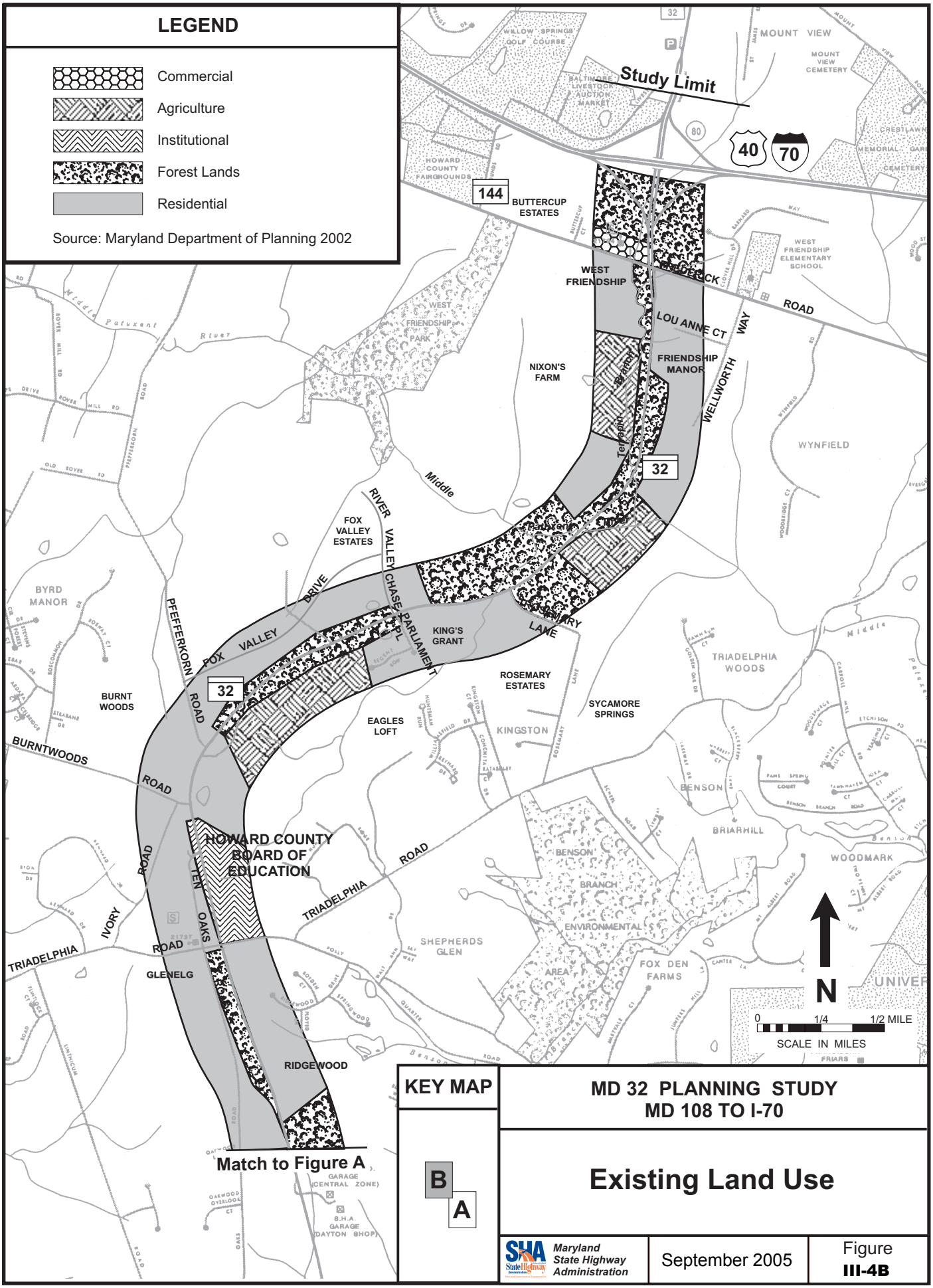
MD 32 PLANNING STUDY
MD 108 TO I-70

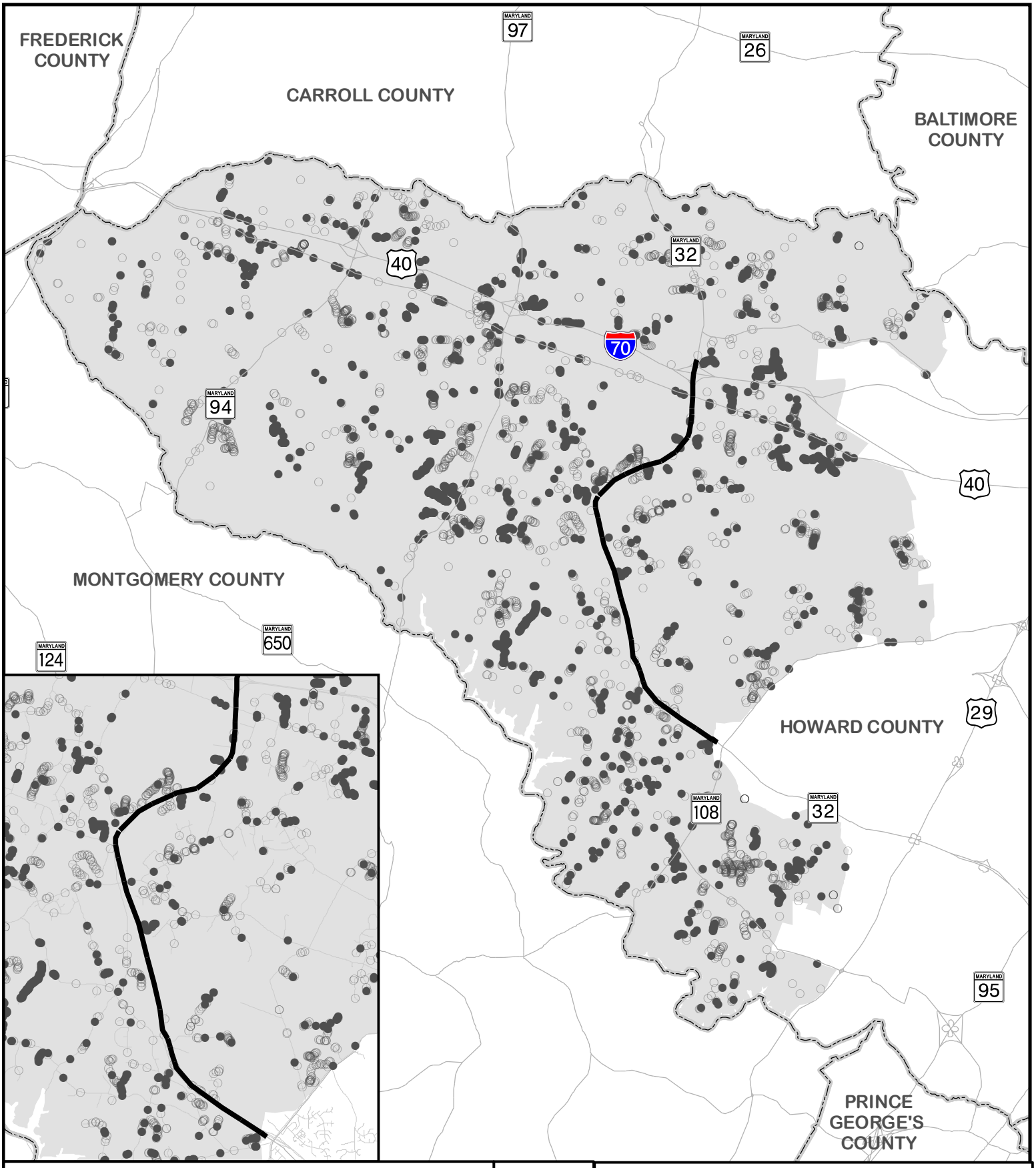
Existing Land Use

Maryland State Highway Administration

September 2005

Figure **III-4A**


LEGEND
Commercial
Agriculture
Institutional
Forest Lands
Residential
Source: Maryland Department of Planning 2002
Study Limit
MOUNT VIEW
MOUNT VIEW CEMETERY
WILLOW SPRINGS GOLF COURSE
BALTIMORE LIVESTOCK AUCTION MARKET
HOWARD COUNTY FAIRGROUNDS
CRESTLAWN MEMORIAL GARDENS CEMETERY
40
70
80
144
BUTTERCUP ESTATES
WEST FRIENDSHIP
WEST FRIENDSHIP ELEMENTARY SCHOOL
LOU ANNE CT
FRIENDSHIP MANOR
NIXON'S FARM
WELLWORTH WAY
WYNFIELD
WEST FRIENDSHIP PARK
Middle Patuxent River
Tributary
32
FOX VALLEY ESTATES
RIVER VALLEY DRIVE
PFEFFERKORN ROAD
FOX CHASE CIRCLE
PARLIAMENT LANE
KING'S GRANT
ROSEMARY ESTATES
SYCAMORE SPRINGS
TRIADELPHIA WOODS
BYRD MANOR
BURNT WOODS
BURNTWOODS ROAD
EAGLES LOFT
KINGSTON
BENSON
BRIARHILL
WOODMARK
HOWARD COUNTY BOARD OF EDUCATION
TEN OAKS ROAD
IVORY ROAD
TRIADELPHIA ROAD
GLENELG
SHEPHERDS GLEN
BENSON BRANCH ENVIRONMENTAL AREA
FOX DEN FARMS
RIDGEWOOD
Match to Figure A
GARAGE (CENTRAL ZONE)
B.H.A. GARAGE (DAYTON SHOP)
N
0 1/4 1/2 MILE
SCALE IN MILES
KEY MAP
B
A
MD 32 PLANNING STUDY
MD 108 TO I-70
Existing Land Use
Maryland State Highway Administration
September 2005
Figure III-4B



LEGEND

MD 32 Project Area

Building Permits

1991 - 1999

2000 - October 2004

Rural West

Howard County Rural West Building Permits Issued:

1991 - 1999: 2,813

2000 - October 2004: 1,701

1 inch equals approximately 2.5 miles

MD 32 PLANNING STUDY
MD 108 TO I-70

Howard County: Rural West County Issued Building Permits

Maryland State Highway Administration

September 2005

Figure III-5

In an effort to slow residential growth, the *Howard County General Plan 2000* calls for a cap on residential development in the Rural west planning area to 250 dwelling units a year. To achieve this cap in residential development in the Rural West Planning Area, Howard County formalized zoning requirements in the *Howard County General Plan 2000* and amended the zoning regulations in 2002. Two zoning districts were established for residential land outside the public water and sewer service area in western Howard County: Rural Conservation (RC) and Rural Residential (RR) (**Figure III-3A** and **3B**). The RC district established requirements for cluster residential development on large acre parcels. While in the RR district, cluster and non-cluster subdivisions are permitted, but require lot sizes to be three acres for non-cluster development and 1.2 acre lot sizes for cluster development or 4.25 acre gross subdivision. The purpose for the zoning districts is to preserve the remaining land on residential lots as a preservation parcel.

Zoning mechanisms, as described in the *Howard County General Plan 2000* and in the *Guidelines for the Agricultural Preservation Program, Rural Cluster Development Density/ Cluster Exchange Option, June 2000,* were established to ensure preservation parcels are reserved within the zoning districts. The zoning mechanisms are cluster zoning and density/cluster exchange option and are defined below (from the Agricultural Preservation Program, Rural Cluster Development Density/ Cluster Exchange Option).

> ***Cluster zoning*** *replaced the large lot development (three acre or greater lots) back in 1992. A rural cluster development consists of residential subdivision lots grouped together on a portion of a property being subdivided with the remaining area placed into a permanent preservation parcel. The rural cluster development provisions were established to accommodate low density residential development within the rural environment at a density of one dwelling unit per every 4.25 gross subdivision acres. Generally, cluster subdivision lots with individual private septic systems must range in size between 0.92 and 1.20 acres (40,000 and 50,000 square feet), and cluster lot subdivisions which use a shared community septic system must have a minimum lot size of 0.76 acres (33,000 square feet).*
>
> ***Density Exchange Option (DEO)/ Cluster Exchange Option (CEO)*** *are overlay districts established to provide land owners in the RC or RR zones the opportunity and incentive to preserve significant areas of farmland in the rural area of the County. This process is also intended to encourage the clustering of residential development in areas where development will not have an adverse impact on farm operations.*

Much of the residential development in the Rural West area has occurred near MD 32. According to the *Howard County General Plan 2000,* the land surrounding MD 32 is projected to have a steady increase in the number of households through 2020. The Baltimore Metropolitan Council also projects the number of households to increase through 2025. **Table III-8** shows the projected number of households by Transportation Analysis Zone (TAZ) for the Area of Traffic Influence, as shown in **Figure I-2**.

Table III-8 Households and Percent Change by Transportation Analysis Zone for MD 32 Study Area

TAZ[1]	Households		% change
	2000	2025	
1009	440	740	68.2%
1010	380	650	71.1%
1011	750	1160	54.7%
1015	343	442	28.9%
1016	207	418	101.9%
1017	750	910	21.3%
1052	440	710	61.4%
1053	430	650	51.2%
1054	587	772	31.5%
1055	883	1298	47.0%
1056	170	330	94.1%
1099	432	900	108.3%
1101	622	745	19.8%

Note: [1] Refer to Figure I-2 for a map of the TAZs in the study area.

The pressure for residential development in the western part of the County is due to several factors. The area is very attractive to commuters who work in the eastern portion of Howard County, Montgomery County, or the Washington metropolitan area because of access to State highways. Other characteristics that draw residential development are the County's public school system and the rural, scenic quality of the area. The majority of the homes sold along this corridor are to buyers who are second or third time homeowners from Columbia, Baltimore, and other points east. The remainder of the buyers' market consists of individuals from the Washington DC metropolitan area and newcomers to the region.

As stated earlier, Clarksville Manor, Westside, Adams Reach, Broadwater Estates, Eagle Point Landing, Linden Chapel Woods, Rutherford, Oakwood Overlook, proposed Lakeview at Buckskin Ridge, Quartz Paddocks Development, proposed Foxtail Run Development, Paddocks East Development, Fox Valley Estates, King's Grant, Twin Pines Development, Rosemary Estates, Fox Chase Estates, Friendship Manor, Fox Valley Estates, and Buttercup Estates, are residential neighborhoods located along the study area portion of the MD 32 corridor. One and two-story single family detached houses are the dominant housing types in these communities. For the locations of above mentioned neighborhoods, refer to **Appendix A.**

As available land is rapidly diminishing, there is an urgency to achieve land preservation goals. According to the Rural West Acreage Land Use Summary for 1999[2], only 23,300 uncommitted acres remain in this portion of the County. Much of this non-committed residentially zoned land is still being farmed. Competition for land arises between farmers and developers due to the fact that the best farmlands also have soils suitable for septic systems and are the ideal location for

[2] Source: Howard County Department of Planning and Zoning, 1999 and shown as Figure 3-1 in the *Howard County General Plan 2000,* page 38.

cluster lots. A possible solution the County is implementing is through the use of shared septic system drainfields.

> *"The use of shared septic systems, specifically common drain fields, allows homes to be placed in areas that are marginally or poorly suited for septic systems, but are otherwise attractive residential settings. The common drainfield is then placed on optimum soils so that the groundwater is best protected. The total amount of land used for drain fields remains the same, leaving good agricultural land, which would other wise become a home site, free to continue being farmed." (Howard County General Plan 2000)*

In order to preserve agricultural land and minimize the impacts of development on groundwater, a shared septic system design is used which allows more flexibility in a clustering site design.

Agricultural Land Use

Farming previously dominated the land use in areas where there is now a large amount of subdivided residential development. Back in 1978, the County developed the Agricultural Land Preservation Program which was designed to protect the land base needed for farming. Through this voluntary program, a farmer, whose land meets size and soil criteria, could offer to sell perpetual easement to the County, while holding fee simple title to the land and continuing to farm. The farm may be sold, but the perpetual easement restricts the development of the property, which remains with the land and binds all future owners. Two sources fund the program, a County tax on real estate transfers and the Maryland Agricultural Transfer Tax.

In 2003, improvements were made to the Agricultural Preservation Program that adjusted eligibility criteria making it available to more property owners and increasing the price paid per acre. The initial goal of the program was to preserve 20,000 acres of farmland for agricultural activities. As a result of the success of the program, the *Howard County General Plan 2000* raised the preservation target to 25,000 acres in agricultural easements. As of June 30, 2004, a total of 19,205 acres on 213 properties have been preserved in Howard County through State and County agricultural preservation programs. (Howard County Department Planning and Zoning. 2004. *Howard County Recertification Report, FY 2004 Agricultural Land Preservation Program*).

The County's Agricultural Land Preservation Program not only protects agricultural land, but also preserves environmental lands and recreation/green space parcels. Environmental preservation parcels have been designated to protect environmentally sensitive areas or natural resources (i.e., wetlands, floodplains, streams and forested areas) on the property. According to the *Howard County General Plan 2000*, in the Rural West Planning Area, over 3,600 acres of land are protected under environmental easements.

The recreation/green space parcels under the Agricultural Land Preservation Program are preserved green space in cluster developments. While this protects the land from being developed for residential use, the County recognized the need for preserving large contiguous parcels of green space. The *Howard County General Plan 2000* recommends a County

greenway along the Middle Patuxent River, crossing MD 32 between MD 144 and Nixon's Farm. However, there are numerous challenges the County faces in achieving their green space goals, including private ownership, the demand for land, and the cost of land in western Howard County.

Commercial Land Use

As described above, agricultural and residential are the dominant land uses in the western part of the County, but some scattered commercial development can be found in the study area. The commercial uses are concentrated along MD 108, Ten Oaks Road, and MD 144. The 1990 General Plan projected that there was a need for intense commercial development along I-70. However, the County no longer foresees a need for this type of development. Much of the land that could have been used for commercial development, especially in the West Friendship area, has already been used for residential development. One of the few available, uncommitted parcels identified in Howard County for new development was in the northwest quadrant of the I-70/MD 32 interchange. However, instead of new development the *Howard County General Plan 2000* recommends redevelopment and revitalization of existing community centers and properties to allow for only agribusiness uses outside of rural commercial centers.

b. Smart Growth

The intent of Maryland's Smart Growth Areas Act of 1997 is to direct State funding for growth-related projects to areas designated by local jurisdictions as Priority Funding Areas (PFAs). PFAs are existing communities and other locally designated areas as determined by local jurisdictions in accordance with Smart Growth Guidelines. According to the *Howard County General Plan 2000*, the PFAs are located in the eastern 40 percent of the County in the Planned Service Area for public water and sewer. Smart Growth is intended to direct development to existing towns, neighborhoods, and business areas by directing State infrastructure improvements to these places. In July 2004, the Board of Public Works determined that extraordinary circumstances exist and approved an exception to the Smart Growth PFA Act; thereby authorizing the Maryland Department of Transportation to provide funding for the MD 32 project.

B. Traffic and Transportation Network

MD 32 is on Maryland's primary highway system and is functionally classified by the State of Maryland as a Principle Arterial with a federal classification as a Rural-Other Principal Arterial. This segment of MD 32 through Howard County is a two-lane roadway extending from MD 108 in the village/commercial center of Clarksville to I-70 in the West Friendship community area. Through this nine-mile section, MD 32 traverses rolling terrain and passes through low density residential and agricultural areas. This segment, however, is also part of a high volume transportation corridor that provides an efficient connection for people and goods between the Eastern Shore and Western Maryland. If this section of MD 32 is dualized, it would complete the "Patuxent Freeway" system that stretches from Annapolis, the Maryland State capital, to I-70 and points west, a total distance of 40 miles. This section also connects I-70 with I-95 and points south while bypassing I-695, the Baltimore Beltway.

The existing two-lane roadway consists of a bituminous surface with two 12-foot lanes and 10-foot shoulders. When the roadway was built in the late 1950s/early 1960s, it was intended to be the initial two lanes of a four-lane divided highway and was anticipated to be able to handle traffic demand to the year 2000. Between MD 108 and Burntwoods Road, MD 32 is a partially access-controlled roadway with a 300-foot right-of-way. Between Burntwoods Road and I-70, MD 32 has no access control and an approximate right-of-way of 150 feet.
Currently, there are traffic signals at Linden Church Road, east and west; Ten Oaks Road; Burntwoods Road, MD 144, and the I-70 ramp terminals. A new signal will be added at the entrance to the Dayton Shop in 2005. There are passing zones throughout the length of the project; however, they are generally not utilized during the peak hours because the opposing volumes are too heavy. Hazard identification beacons were installed at several different locations along MD 32 to increase driver awareness of approaching conditions. The entire corridor was recently resurfaced, and upgraded centerline pavement markings and rumble strips were added. Overhead intersection street lights are located at all public streets and special warning signs are found throughout the corridor to encourage motorists to use headlights for added visibility to other motorists. There are turn lanes at the following intersections: Linden Church Road (east and west), Dayton Shop, Ten Oaks Road, Burntwoods Road, River Valley Chase/Parliament Place, Rosemary Lane, MD 144, and the I-70 ramp terminals.

The traffic flow along MD 32 was measured by determining the level of service (LOS) for the roadway (refer to **Section I.C.3** for a description of each level of service). Each level coincides with conditions that drivers experience while traveling along the roadway during the peak travel periods. LOS designations, from A to F, are used to define traffic flow. LOS A indicates ideal conditions and LOS F indicates severe congestion with substantial delays.

1. Traffic Conditions

The current ADT (2003) along MD 32 ranges from 23,900 vehicles south of MD 144 to 26,400 vehicles south of Linden Church Road. Existing (2003) volumes are presented on **Figure IV-1**, as are the traffic projections for the year 2025 under the No-Build and the Build scenarios. Trucks, including school buses, currently make up 11 percent of the ADT volumes along MD 32.

The existing LOS along the two-lane section of MD 32 is LOS E/F in the AM/PM peak hour. The intersection LOS range from LOS D to LOS F, except for East Linden Church in the AM peak period and West Linden Church in the PM peak period, both of which operate at a LOS A.

C. Cultural Resources

Historic structures and archeological resource identification and evaluation studies have been completed for the study area. Coordination letters from the State Historic Preservation Officer (SHPO) acknowledging completion of cultural resource identification are included in **Section V.F** of this document. Cultural resource studies were undertaken in compliance with Section 106 of the National Historic Preservation Act of 1966 (NHPA), as amended.

The NHPA represents the cornerstone of federal preservation law, and was passed to address the widespread disturbance of historic properties. The law provides for identification, evaluation,

and protection of cultural resources. Section 106 of the NHPA requires federal agencies to take into account the effects of their undertakings on historic properties, and provides the Advisory Council on Historic Preservation (ACHP), an independent agency created by the NHPA, the opportunity to comment on undertakings that affect historic properties. Properties that qualify for inclusion on the National Register of Historic Places (NRHP) are considered historic for the purposes of Section 106. To qualify for the National Register, districts, sites, buildings, structures, and objects must have significance in American history, architecture, or archeology, and must possess integrity of location, design, setting, materials, workmanship, feeling, and association. Additionally, properties must meet one or more of the following criteria:

- Be associated with events that have made a significant contribution to the broad patterns of history; or
- Be associated with the lives of persons significant in our past; or
- Embody the distinctive characteristics of a type, period, or method of construction, or represent the work of a master, or possess high artistic values, or represent a significant and distinguishable entity whose components may lack individual distinction; or
- Have yielded, or be likely to yield, information important in prehistory or history.

The Section 106 review process includes steps for identification and evaluation of historic properties, assessing the effects of the agency's proposed undertaking, and, if there is a harmful (adverse) effect, consultation about ways to avoid, reduce, or mitigate that harm.

1. Historic Sites

Two historic structures that were determined to be National Register Eligible (NRE) occur within the Area of Potential Effect (APE). The locations of the structures, Westwood, M.E. Church (HO-207) and the Milton Shipley Farm Corncrib (HO 6-45) are shown on **Sheets 3 and 5** respectively, in **Appendix A**.

The SHPO has concurred that these two historic structures within the project's APE are eligible for the NRHP.

a. HO-207, Westwood Methodist Episcopal Church

The Westwood M.E. Church, located at 13554 Triadelphia Road, is a three-part complex, that is currently the location of a residence and antique shop. The original structure, a simple, Gothic Revival frame chapel, was constructed in 1858 upon the instruction of local parishioners, who had previously met in a schoolhouse. Circuit-riding ministers provided services. During the Civil War, services were held separately for the Union and Confederate supporters. In 1920, the size of the congregation had increased to the point that a second, more elaborate chapel was constructed just west of the original, complete with a square tower, shingled second level, and large stained glass window in the south principal elevation. The two sections were connected in 1956 by means of a school wing. The Methodist Church found that the property was redundant, and sold it to a private party by circa 1979. The school wing was converted to a residence, and the churches were stripped of furniture. The newer church had been retained more or less in its original condition, according to the present owner, who uses it as a furniture storeroom and

salesroom. The original frame structure has had some major alterations, however, in the form of removal of the slave galley above the front door, remodeling, building of internal walls, and the addition of a vestibule.

The Westwood M.E. Church is eligible under Criterion C for its Gothic Revival stylistic features, which illustrate the evolving tastes on the part of the architects and/or builders and their client, in this case, the Methodist Church. The NRHP boundary of the property is coterminous with the current legal boundary of the property.

b. HO 6-45, Milton Shipley Farm Corncrib

The Milton Shipley Farm Corncrib (HO 6-45) is located on the former Milton Shipley farm within an ensemble of highly altered or modern farm structures. The corncrib is eligible for the NRHP under Criterion C as a rare example of a unique design and method of construction. Maryland Historical Trust (MHT) staff is not aware of any other such structure within the state, but knows of an apparently identical example in the Midwest. The design of the corncrib is unusual for its use of perforated corrugated metal and its oval shape. It probably dates from the early twentieth century and may possibly have been obtained from a mail order catalogue. It appears to be representative of the growing use of standardized designs and mass marketed products, including small structures, on American farms in the early twentieth century, a development that paralleled the national trend toward mass consumption and standardization. The historic property boundary for the Milton Shipley Corncrib extends just outside the footprint of the building.

Previously, the Howard County Hunt Club (HO-14) was determined NRE. The Howard County Board of Education (BOE) purchased this site for the construction of two schools. The MHT together with the Public School Construction Program and the BOE entered into a Memorandum of Agreement (MOA) dated February 18, 1997, regarding the Howard County Hunt Club. This MOA stated that the BOE would demolish the Hunt Club NRE structure to undertake construction of the Western Elementary school #3. The MOA stipulated that an exhibit demonstrating the history of the Hunt Club would be prepared for display at the new school.

2. Archeological Resources

A Phase I archeological investigation of the project corridor was completed in 1998. The investigation identified seven archeological sites (18HO230, 18HO231, 18HO232, 18HO233, 18HO234, 18HO235, 18HO236). Additionally, a previously recorded site (18HO139) in the project vicinity was reinvestigated. Only prehistoric site 18HO232 was found to be potentially eligible for the NRHP. The remaining sites are not eligible for listing in the NRHP because of low information potential or prior disturbance (**Table III-9)**.

The SHA Selected Alternative includes interchange modifications, stormwater management facilities, and access roads that were not considered in the DEIS. Because of these changes, the APE was refined to include these additional areas. Supplementary Phase I archeological identification was undertaken for the refined APE in 2004/2005. Four new archeological sites were identified (18HO261, 18HO262, 18HO263, and 18HO264). Site 18HO232 and Site

18HO261 were found to be potentially eligible for listing in the NRHP. A Phase II evaluation was recommended.

a. 18HO232

Site 18HO232 is a prehistoric site with diagnostic artifacts indicative of a Late Archaic period occupation. Artifact densities on the site are moderate to high and the site is well preserved. The site may provide important information in prehistory regarding economic organization and technology in the Piedmont during the Late Archaic period. Site 18HO232 may be significant under Criterion D for its potential to yield information important in prehistory.

b. 18HO261

Site 18HO261 is an early nineteenth to early twentieth century sawmill site. The site includes the remains of the stone foundation of the mill, the wheel pit, a low retaining wall bordering the wheel race, and the mill raceway. The site appears to retain some depositional integrity in addition to the intact features. Site 18HO261 may contain sufficient information to contribute to our knowledge of the development of the milling industry in nineteenth century Howard County and, thus, it may be significant under Criterion D for its potential to yield information important in prehistory.

Table III-9: Archeological Sites

Site Number	Affiliation	NR Eligibility	Recommendations
18HO139	Prehistoric	Not Eligible	No Further Investigation
18HO230	Prehistoric	Not Eligible	No Further Investigation
18HO231	Prehistoric – Late Archaic	Not Eligible	No Further Investigation
18HO232	Prehistoric – Late Archaic	Potentially Eligible	Avoidance and temporary protective fencing
18HO233	Historic - 19th and 20th C	Not Eligible	No Further Investigation
18HO234	Historic – 19th and 20th C	Not Eligible	No Further Investigation
18HO235	Historic – 19th and 20th C	Not Eligible	No Further Investigation
18HO236	Prehistoric	Not Eligible	No Further Investigation
18HO261	Historic – Early 19th to Early 20th C	Potentially Eligible	Phase II evaluation and treatment as appropriate
18HO262	Prehistoric	Not Eligible	No Further Investigation
18HO263	Historic – 19th and 20th C	Not Eligible	No Further Investigation
18HO264	Prehistoric and Historic	Not Eligible	No Further Investigation

D. Topography, Geology, and Soils

1. Topography

Howard County is located within the Piedmont Physiographic Province except for a small zone of the Coastal Plain Province along the Anne Arundel County border. The topography of Howard County is mostly rolling and slopes from the west and north to the east and south. Surface elevations range from 875 feet above sea level in the west at Frederick County to 20 feet above sea level in the southeast near Anne Arundel County. The rolling terrain of the Piedmont Plateau of Howard County results from the folding and faulting, and the variable erosional properties of the underlying crystalline bedrock and intrusive igneous rock.

2. Geology

The MD 32 study area is located entirely within the Piedmont Physiographic Province and is underlain by crystalline bedrock of pre-Cambrian and early Paleozoic ages. Soils consist of material weathered in place from crystalline and micaeous bedrock. The study area is underlain, specifically, by the bedrock of the Liberty Complex and Wissahickon Group. The geology of the study area is shown in **Figure III-6A** and **6B**.

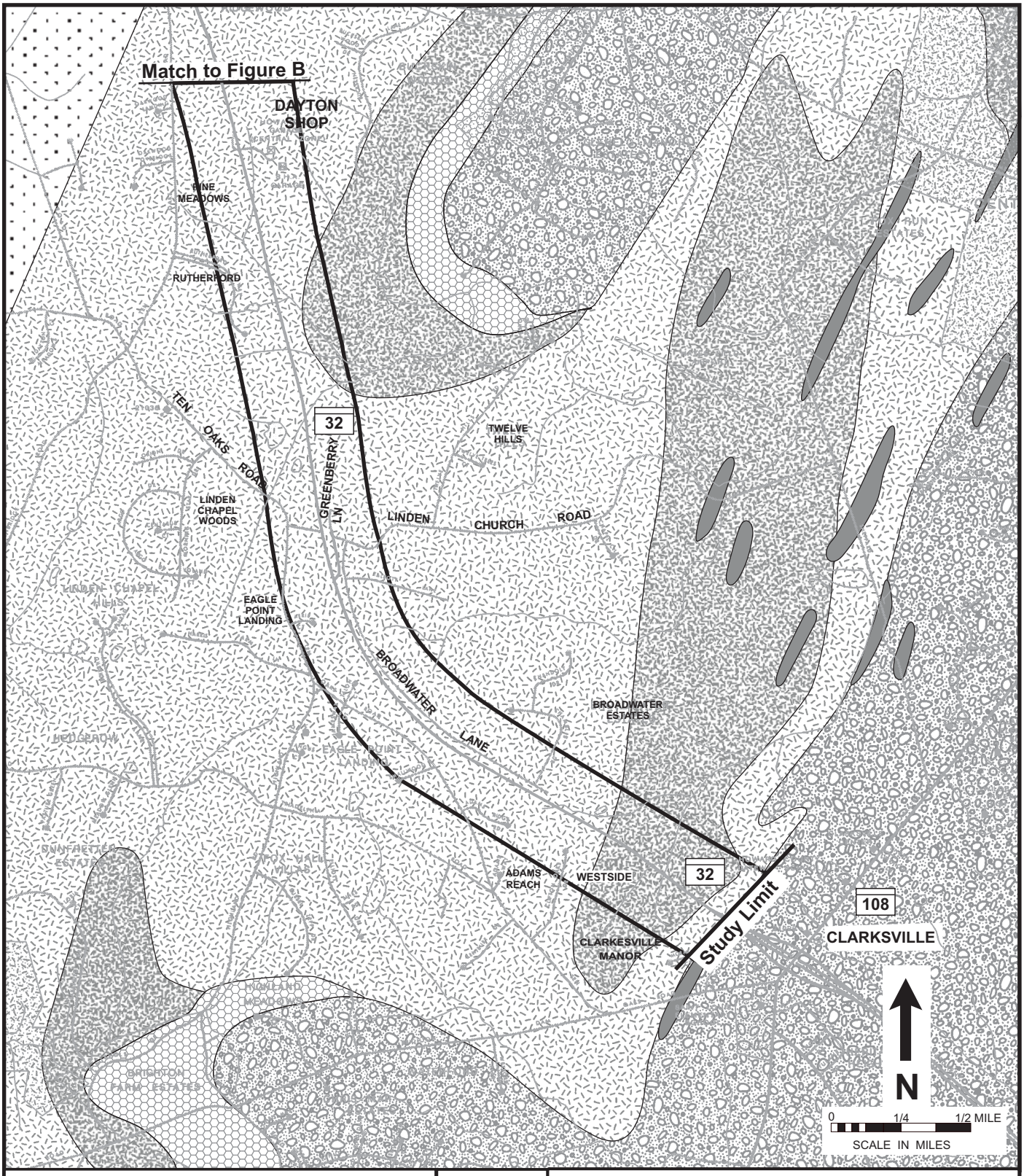
The Morgan Run Formation of the Liberty Complex consists of fine to medium grained, silvery gray to greenish gray, garnetiferous, quartz-chlorite / biotite-muscovite schist. Undifferentiated ultra mafic and mafic rock exists within the Morgan Run Formation and consists of discontinuous layers of fine to medium grained, dark green to black, chlorite-amphibolite schist.

Interlayered Loch Raven and Oella Formations underlie the majority of the study area. The Loch Raven Formation consists of medium grained, medium to dark gray, biotite-plagioclase-garnet-muscovite-quartz schist. The Oella Formation consists of medium grained, medium gray biotite-plagioclase-muscovite-quartz schist interlayered with fine grained, biotite-plagioclase-quartz gneiss.

Cockeysville Marble, Baltimore Gneiss, and Pegmatite underlie the southern end of the study area. The Cockeysville Marble consists of fine to medium grained, white to light bluish gray calcite marble with minor white to pale tan dolostone. Baltimore Gneiss is fine to coarse grained, light pink to pale tan gneiss interlayered with biotite-microcline-quartz-plagioclase gneiss. Pegmatite is intrusive igneous rock consisting of massive light gray to pinkish-gray rock composed of muscovite mica, quartz, albite, and microcline-perthite.

3. Soils

Based upon the Soil Survey for Howard County Maryland (1968), the soils within the study area consist of loam, silt loam, gravelly loam, and gravelly silt loam. These soils are formed in place from weathered crystalline and micaceous rock and are classified into soil series according to similar soil profiles as determined by the Soil Survey. Parent material for the Glenelg, Manor, Chester, Elioak, Glenville, and Baile soils is weathered soft, micaceous schist. Recently deposited alluvium formed on floodplains is the parent material for the Hatboro and Comus soils. It should be noted that the soil survey was completed in 1968 and significant change has occurred in the project area due to commercial and residential development. An updated version



LEGEND

- Sykesville Formation
- Morgan Run Formation
- Morgan Run Formation Ultramafic & Mafic Rock
- Cockeysville Marble
- Setters Formation
- Oella & Loch Raven Formation
- Pegmatite
- Baltimore Gneiss
- Thrust Fault Teeth on Upper Plate

KEY MAP

B
A

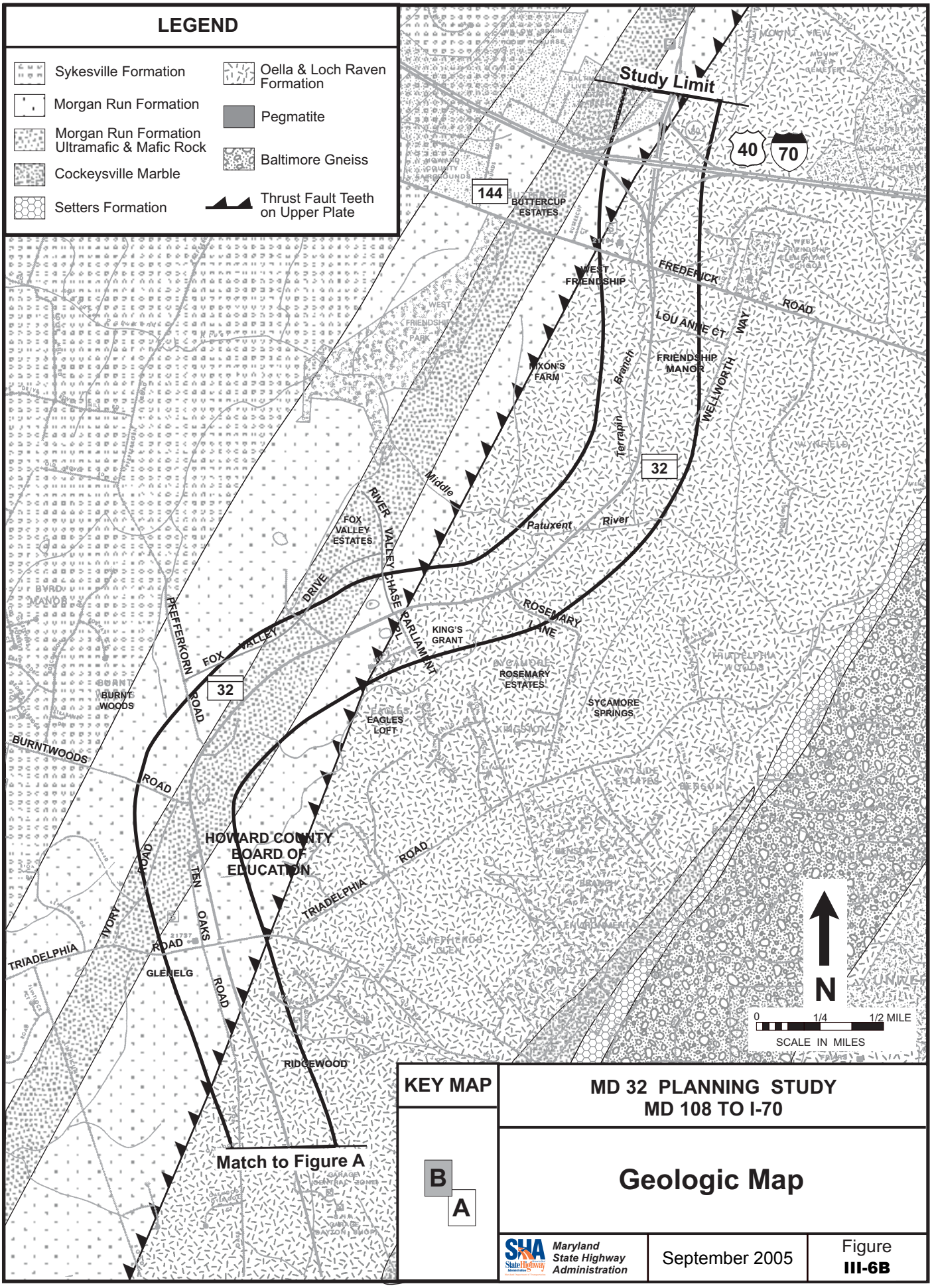
MD 32 PLANNING STUDY
MD 108 TO I-70

Geologic Map

Maryland State Highway Administration

September 2005

Figure **III-6A**


LEGEND
Sykesville Formation
Morgan Run Formation
Morgan Run Formation Ultramafic & Mafic Rock
Cockeysville Marble
Setters Formation
Oella & Loch Raven Formation
Pegmatite
Baltimore Gneiss
Thrust Fault Teeth on Upper Plate
Study Limit
40
70
144
BUTTERCUP ESTATES
WEST FRIENDSHIP
FREDERICK ROAD
LOU ANNE CT
WAY
FRIENDSHIP MANOR
WELLWORTH
MIXON'S FARM
Branch
Terrapin
32
Middle
Patuxent
River
FOX VALLEY ESTATES
RIVER VALLEY DRIVE
CHASE
PARLIAMENT
ROSEMARY LANE
KING'S GRANT
ROSEMARY ESTATES
SYCAMORE SPRINGS
PFEFFERKORN ROAD
FOX VALLEY
BURNT WOODS
BURNTWOODS ROAD
EAGLES LOFT
HOWARD COUNTY BOARD OF EDUCATION
TRIADELPHIA ROAD
IVORY ROAD
TEN OAKS ROAD
GLENELG ROAD
RIDGEWOOD
Match to Figure A
N
0 1/4 1/2 MILE
SCALE IN MILES
KEY MAP
B
A
MD 32 PLANNING STUDY
MD 108 TO I-70
Geologic Map
Maryland State Highway Administration
September 2005
Figure III-6B

of the Soil Survey for Howard County is currently underway by the Natural Resources Conservation Service (NRCS). This information is in draft form and has not yet been approved for use. The soil series within the majority of the study area are the Glenelg, Manor, and Chester series. These soils comprise approximately 85 percent of all soils along the study area.

A brief description of the soil series within the study is contained in **Table III-10**. The soil series have been grouped into soil associations based on similar soil forming processes and geographic setting. These associations are shown on **Figure III-7A** and **7B.**

The characteristics of the soils within the study area have been reviewed for the suitability of the soils for engineering purposes. The properties of soils significant for design and construction include permeability, compactibility, drainage, and shrink-swell potential of the soils.

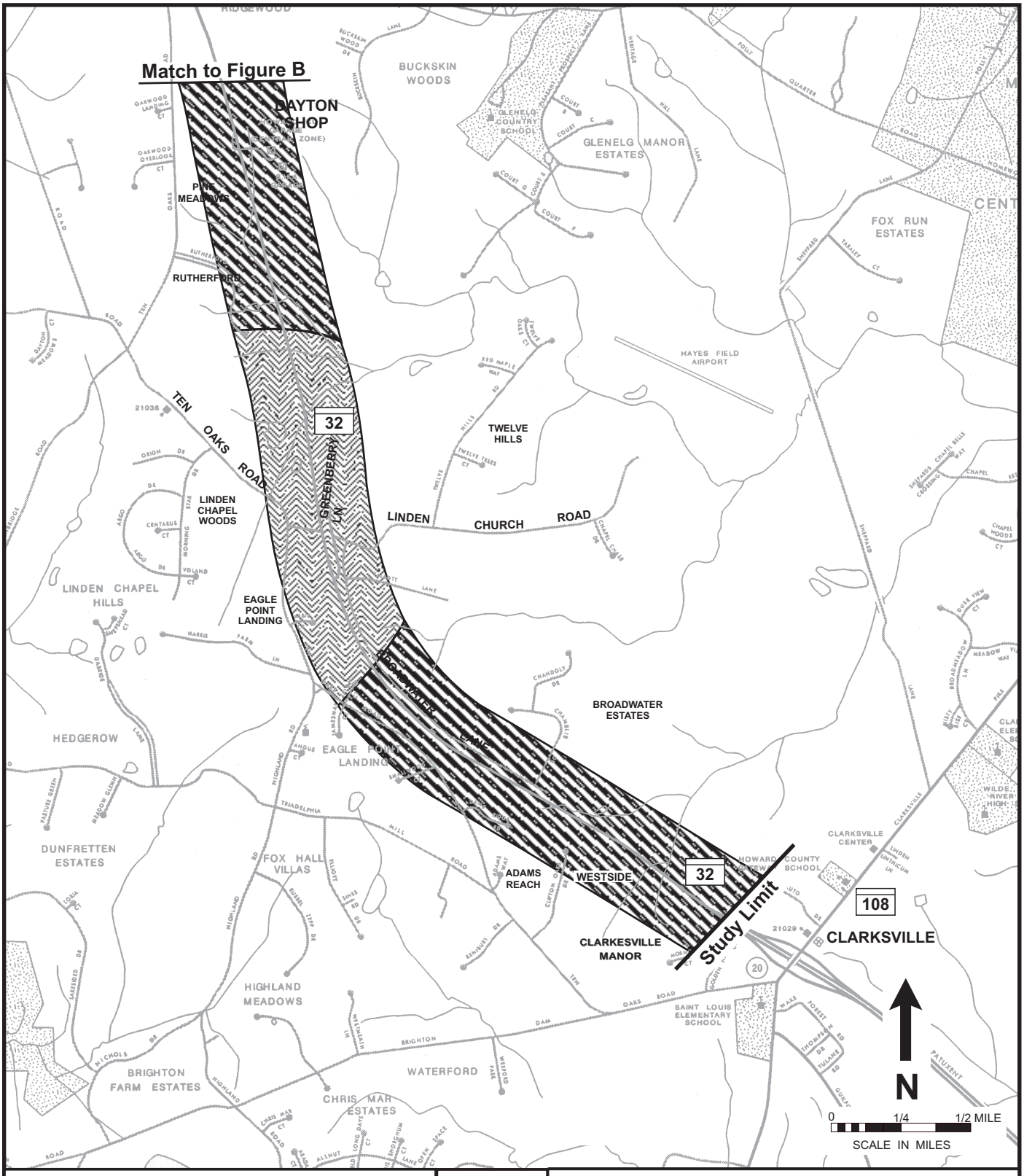
The soils in the study area classify as ML-low plasticity silt; MH-high plasticity silt; and CL-a low plasticity clay. The permeability of undisturbed samples is estimated between 0.63 and 2.0 inches per hour. These soils are generally well drained and exhibit little potential of shrink-swell with changes in moisture. The maximum dry density of these soils is estimated from 101 to 110 pounds per cubic foot with estimated average optimum moisture content of 16 percent.

Table III-10: Description of Common Soil Series in the Study Area

Soil Series	Description
Baile Series	Nearly Level, Poorly drained Silt Loam
Chester Series	Nearly Level to Steep, Well-drained Silt Loam and Gravelly Silt Loam
Comus Series	Nearly Level, Well-drained Silt Loam
Elioak Series	Nearly Level to Steep, Well-drained Silt Loam
Glenelg Series	Gently Sloping to Steep, Well-drained Loam
Glenville Series	Nearly Level to Steep, Moderately to Well-drained Silt Loam
Hatboro Series	Nearly Level, Poorly drained Silt Loam
Manor Series	Nearly Level to Steep, Well-drained Loam and Gravelly Loam

Soils located within the study area have been reviewed for constructability of pipelines, roadways, and embankments. It is estimated that depth to bedrock for the majority of the study area is four to ten feet below ground surface. Construction below these depths will likely encounter bedrock. Depth to groundwater is estimated to be greater than 20 feet below ground surface for the Glenelg, Manor, Chester, and Elioak series. In areas of the Baile, Hatboro, Comus, and Glenville series, the groundwater is estimated at approximately zero to four feet below ground surface. These soils are subject to flooding.

The Glenelg, Manor, Elioak, and Glenville soils provide fair to good stability for roadway location and embankments. The Glenelg soils are elastic and may be difficult to compact. The Baile, Hatboro, and Comus soil provide poor to very poor stability for roadway location and embankment. These soils are located in limited areas.



LEGEND

Glenelg - Manor - Chester Association

Glenelg - Chester - Manor Association

KEY MAP

B
A

MD 32 PLANNING STUDY
MD 108 TO I-70

Soil Associations

Maryland State Highway Administration

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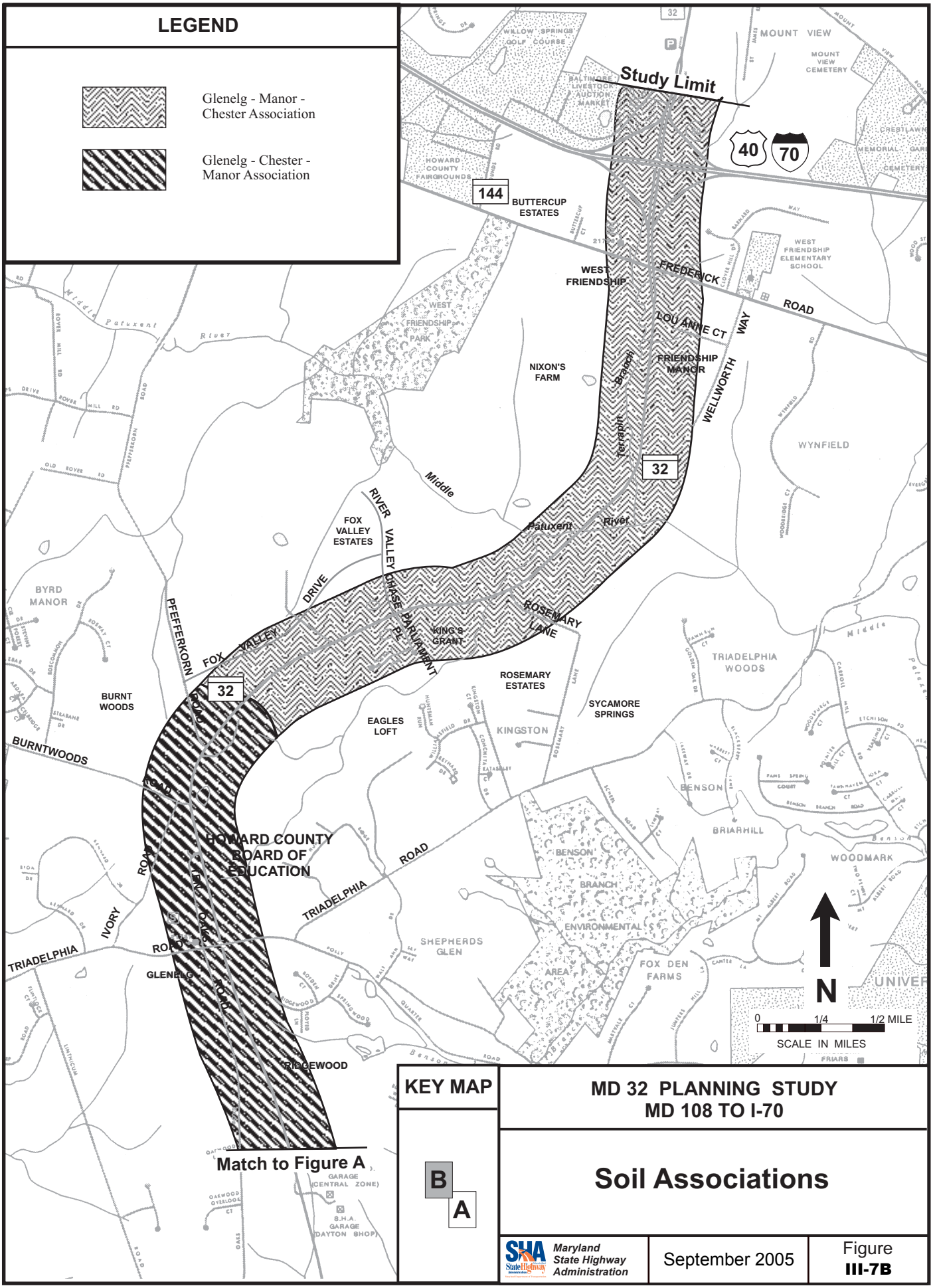
Figure **III-7A**


LEGEND
Glenelg - Manor - Chester Association
Glenelg - Chester - Manor Association
Study Limit
MOUNT VIEW
MOUNT VIEW CEMETERY
WILLOW SPRINGS GOLF COURSE
BALTIMORE LIVESTOCK AUCTION MARKET
HOWARD COUNTY FAIRGROUNDS
CRESTLAWN MEMORIAL GARDENS CEMETERY
40
70
144
BUTTERCUP ESTATES
WEST FRIENDSHIP
WEST FRIENDSHIP ELEMENTARY SCHOOL
FREDERICK ROAD
LOU ANNE CT
WAY
FRIENDSHIP MANOR
WELLWORTH
NIXON'S FARM
WEST FRIENDSHIP PARK
Middle Patuxent River
Middle Patuxent River
Terrapin Branch
32
WYNFIELD
FOX VALLEY ESTATES
RIVER VALLEY DRIVE
PFEFFERKORN ROAD
FOX VALLEY ROAD
CHASE PL
PARLIAMENT
KING'S GRANT
ROSEMARY LANE
ROSEMARY ESTATES
BYRD MANOR
BURNT WOODS
BURNTWOODS ROAD
EAGLES LOFT
KINGSTON
SYCAMORE SPRINGS
TRIADELPHIA WOODS
BENSON
BRIARHILL
WOODMARK
HOWARD COUNTY BOARD OF EDUCATION
TRIADELPHIA ROAD
IVORY ROAD
GLENELG ROAD
BENSON BRANCH ENVIRONMENTAL AREA
SHEPHERDS GLEN
FOX DEN FARMS
RIDGEWOOD
Match to Figure A
GARAGE (CENTRAL ZONE)
B.H.A. GARAGE (DAYTON SHOP)
N
0 1/4 1/2 MILE
SCALE IN MILES
KEY MAP
B
A
MD 32 PLANNING STUDY
MD 108 TO I-70
Soil Associations
Maryland State Highway Administration
September 2005
Figure III-7B

4. Farmland Soils

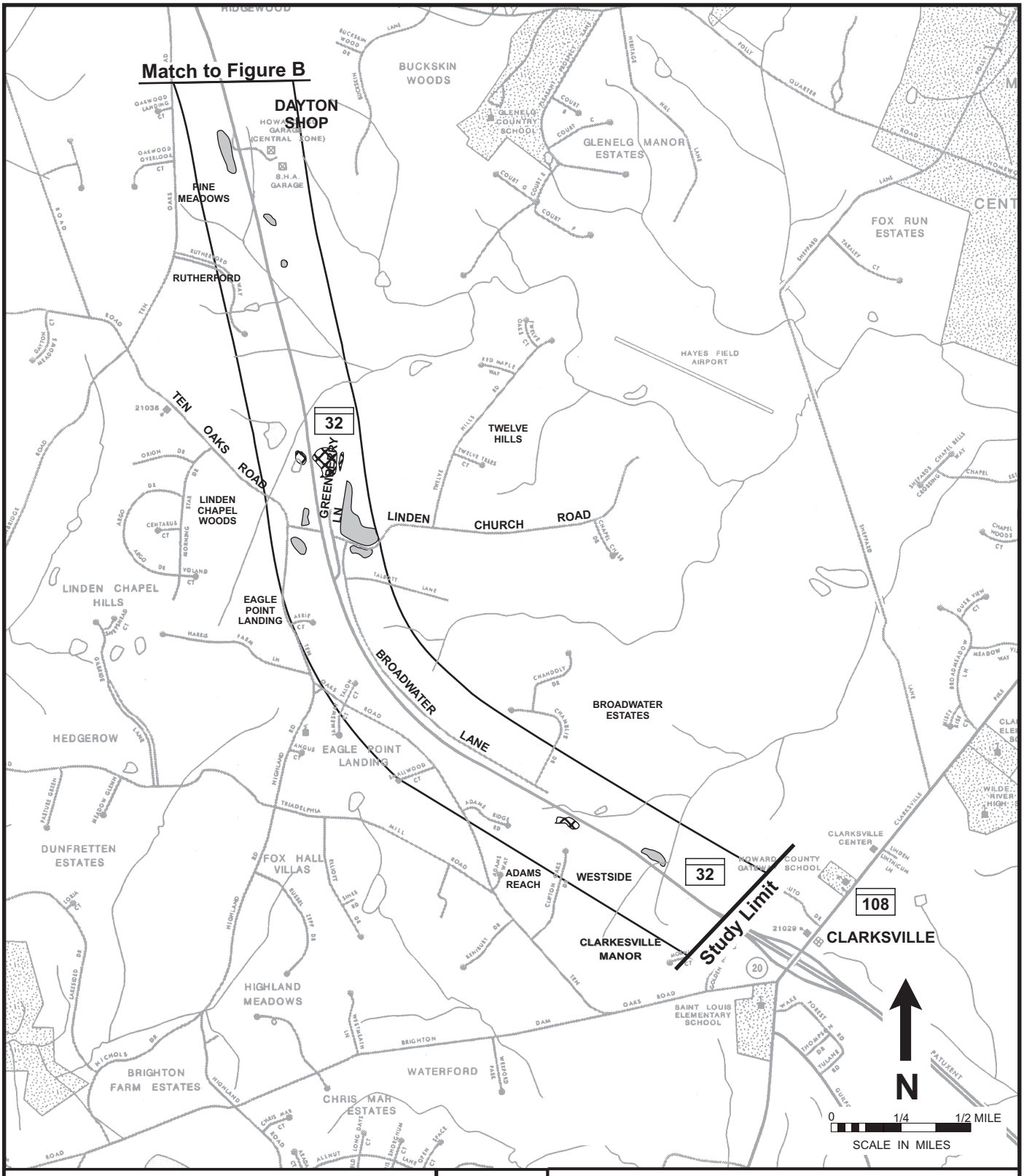
The NRCS identifies certain soils as Prime and Statewide Important farmland soils. Prime farmland soils are those whose composition is best for producing food, feed, forage, fiber, and oilseed crops and other agricultural crops. These soils require minimum inputs to fuel, fertilizer, pesticides, and labor, and do not exhibit intolerable soil erosion as determined by the US Department of Agriculture, Secretary. Prime farmland soils have adequate moisture supply, favorable temperature and growing season, and acceptable soil quality. It does not include land that is already set aside for development or water storage. Soils of statewide importance are similar to the prime farmland soils; however, these soils require treatment and management to produce as high a yield as prime farmland soils. The prime farmland and statewide important farmland soils encountered within the study area are identified in **Table III-11** and are presented in **Figure III-8A** and **8B**.

Table III-11: Soil Map Units and Properties within the MD 32 Study Area

Soil Survey Symbol	Soil Mapping Unit	Prime Farmland	Statewide Importance
Ba	Baile silt loam	N	N
CgB2	Chester gravelly silt loam, 3-8% slopes	Y	N
CgC2	Chester gravelly silt loam, 8-15% slopes	N	Y
ChA	Chester silt loam, 0-3% slopes	Y	N
ChB2	Chester silt loam, 3-8% slopes	Y	N
ChC2	Chester silt loam, 8-15% slopes	N	Y
ChC3	Chester silt loam, 8-15% slopes	N	Y
ChD2	Chester silt loam, 15-25% slopes	N	N
Cs	Comus silt loam	Y	N
EkA	Elioak silt loam, 0-3% slopes	Y	N
EkB2	Elioak silt loam, 3-8% slopes	Y	N
EkC2	Elioak silt loam, 8-15% slopes	N	Y
EkD2	Elioak, silt loam, 15-25% slopes	N	N
G1A	Glenelg loam, 0-3% slopes	Y	N
G1B2	Glenelg loam, 3-8% slopes	Y	N
G1C2	Glenelg loam, 8-15% slopes	N	Y
G1C3	Glenelg loam, 8-15% slopes	N	Y
G1D2	Glenelg loam, 15-25% slopes	N	N
GnA	Glenville silt loam, 0-3% slopes	Y	N

Soil Survey Symbol	Soil Mapping Unit	Prime Farmland	Statewide Importance
GnB2	Glenville silt loam, 3-8% slopes	Y	N
Ha	Hatboro silt loam	N	Y
M1A	Manor loam, 0-3% slopes	Y	N
M1B2	Manor loam, 3-8% slopes	Y	N
M1C2	Manor loam, 8-15% slopes	N	Y
M1C3	Manor loam, 8-15% slopes	N	Y
M1D2	Manor loam, 15-25% slopes	N	N
M1D3	Manor loam, 15-25% slopes	N	N
M1E	Manor loam, 25-45% slopes	N	N
MgB2	Manor gravelly loam, 3-8% slopes	Y	N
MgC2	Manor gravelly loam, 8-15% slopes	N	Y
MgC3	Manor gravelly loam, 8-15% slopes	N	N
MnD	Manor very stony loam, 3-25% slopes	N	N

Source: *USDA Soil Survey, Howard County, Maryland (1968)*



LEGEND

Prime Farmland Soils

Statewide Important Farmland Soils

KEY MAP

B
A

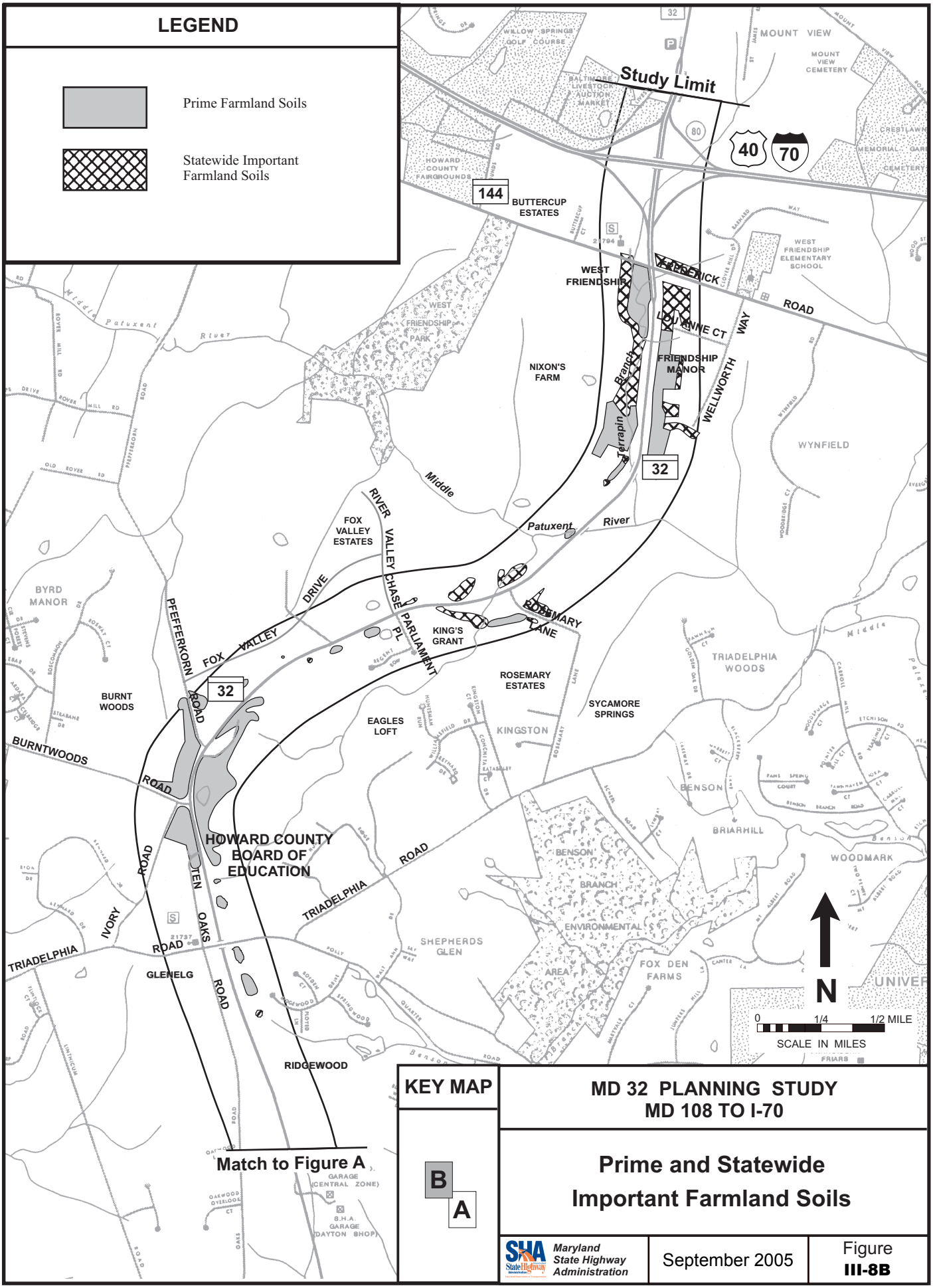
MD 32 PLANNING STUDY
MD 108 TO I-70

Prime and Statewide Important Farmland Soils

Maryland State Highway Administration

September 2005

Figure **III-8A**


LEGEND
Prime Farmland Soils
Statewide Important Farmland Soils
Study Limit
MOUNT VIEW
MOUNT VIEW CEMETERY
WILLOW SPRINGS GOLF COURSE
BALTIMORE LIVESTOCK AUCTION MARKET
HOWARD COUNTY FAIRGROUNDS
CRESTLAWN MEMORIAL GARDENS CEMETERY
40
70
144
BUTTERCUP ESTATES
WEST FRIENDSHIP
WEST FRIENDSHIP ELEMENTARY SCHOOL
FREDERICK ROAD
LOUVANNE CT
WAY
FRIENDSHIP MANOR
WELLWORTH
NIXON'S FARM
Branch
Terrapin
WEST FRIENDSHIP PARK
Middle Patuxent River
WYNFIELD
32
FOX VALLEY ESTATES
RIVER VALLEY CHASE
DRIVE
PFEFFERKORN ROAD
FOX VALLEY
PL
PARLIAMENT
KING'S GRANT
ROSEMARY LANE
ROSEMARY ESTATES
SYCAMORE SPRINGS
BYRD MANOR
BURNT WOODS
BURNTWOODS ROAD
EAGLES LOFT
KINGSTON
TRIADELPHIA WOODS
BENSON
BRIARHILL
WOODMARK
HOWARD COUNTY BOARD OF EDUCATION
TRIADELPHIA ROAD
IVORY ROAD
OAKS ROAD
GLENELG ROAD
SHEPHERDS GLEN
BENSON BRANCH
ENVIRONMENTAL AREA
FOX DEN FARMS
RIDGEWOOD
Match to Figure A
GARAGE (CENTRAL ZONE)
B.H.A. GARAGE (DAYTON SHOP)
N
0 1/4 1/2 MILE
SCALE IN MILES
KEY MAP
B
A
MD 32 PLANNING STUDY
MD 108 TO I-70
Prime and Statewide Important Farmland Soils
Maryland State Highway Administration
September 2005
Figure III-8B

E. Water Quality

1. Surface Water Resources

Waters of the US and Water of the State within the study area include ponds, streams, rivers, and wetlands, and are listed in **Table III-12**. Wetlands are discussed in detail in **Section III.G.** The study area lies entirely within the Middle Patuxent River watershed, near the drainage divides (which delineate sub-watersheds) with South Branch Patapsco River and Little Patuxent River to the north and the drainage divide with Patuxent River (Triadelphia Reservoir) to the west. The location of these surface water features and the drainage divides are shown on **Figure III-9A** and **9B**. Drainage divides were delineated based on United States Geological Survey (USGS) topographic quadrangles for Clarksville and Sykesville, Maryland (1971 and 1979).

Table III-12: Waters of the United States

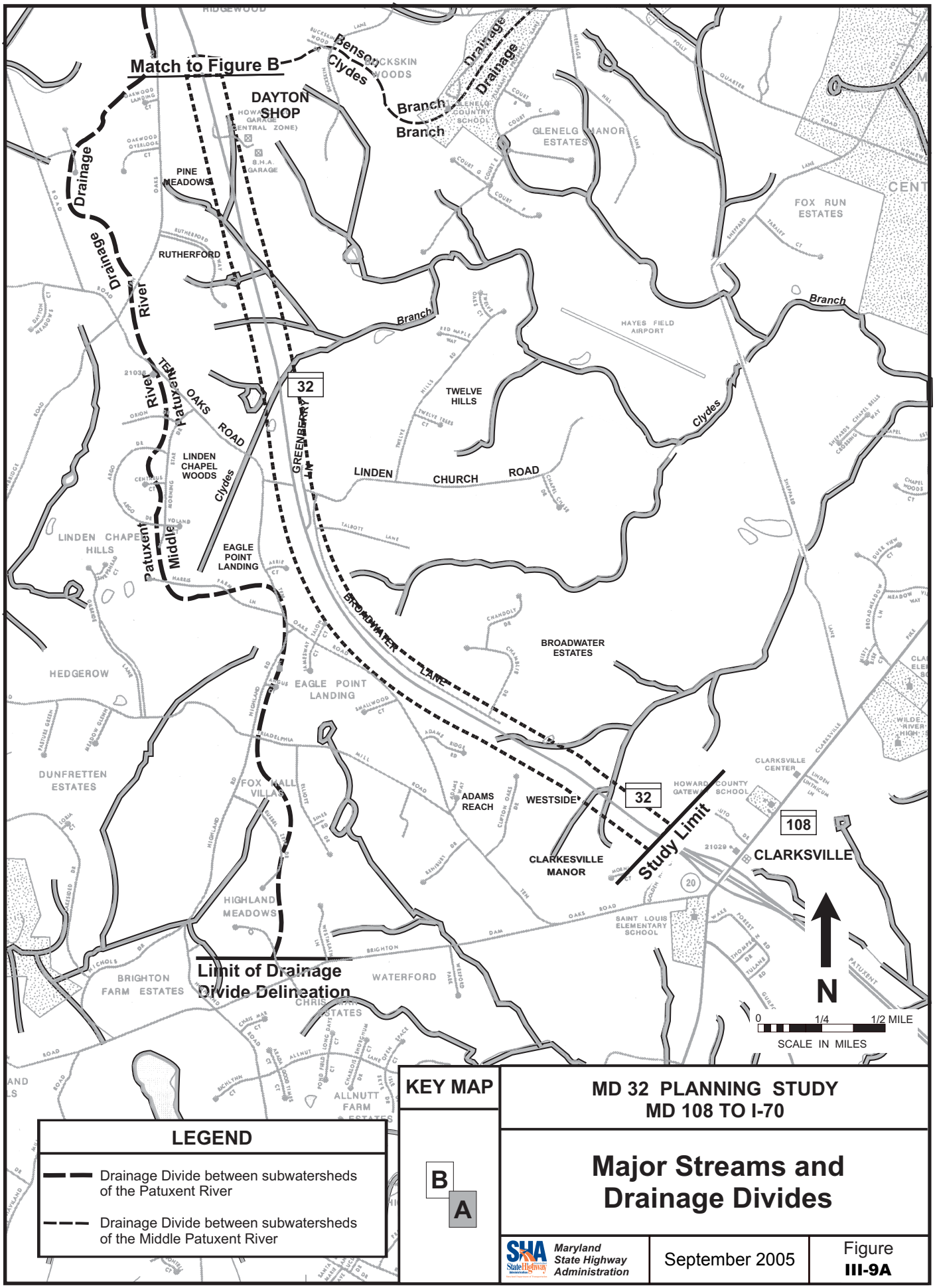
Name of Stream	Stream Location	DNR 12-Digit Watershed	Stream Type
WUS 1	109+60 lt.	021311060961	perennial/intermittent
WUS 2	128+00 to129+00 lt.	021311060961	perennial/intermittent
WUS 4A	135+25 to 140+16 lt.	021311060961	perennial/intermittent
WUS 4B	135+00 lt.	021311060961	perennial/intermittent
WUS 5	139+00 to 139+30 lt.	021311060961	perennial/intermittent
WUS 6	170 + 00 lt.	021311060962	perennial/intermittent
WUS 7	183+00 to 184+00 lt.	021311060962	ephemeral
WUS 8	191 + 00 rt.	021311060962	ephemeral
WUS 9	214 + 00 rt.	021311060962	perennial/intermittent
WUS 10	211+00 to 214+00 rt.	021311060962	perennial/intermittent
WUS 11	215+00 to 216+00 lt.	021311060962	perennial/intermittent
WUS 12	226+00 to 227+00 lt.	021311060962	perennial/intermittent
WUS 13	227+00 to 239+00 lt.	021311060962	perennial/intermittent
WUS 14	250+00 lt.	021311060962	perennial/intermittent
WUS 15	255 +00 lt.	021311060962	perennial/intermittent
WUS 16	269+00 lt.	021311060962	perennial/intermittent
WUS 17A	270+00 to 271+00 lt.	021311060962	perennial/intermittent
WUS 17B	269+00 to 275+00 lt.	021311060962	perennial/intermittent
WUS 18A	270+00 to 278+00 rt.	021311060962	ephemeral
WUS 18B	279+00 to 281+00 rt.	021311060962	ephemeral
WUS 19	318+00 to 321+00 rt.	021311060961	perennial/intermittent
WUS 20	335+00 to 337+00 rt.	021311060963	ephemeral
WUS 21A	348+00 rt.	021311060963	perennial/intermittent
WUS 21B	348+00 lt.	021311060963	perennial/intermittent
WUS 22	355+00 rt.	021311060963	perennial/intermittent
WUS 23	359+00 to 362+00 lt.	021311060963	perennial/intermittent
WUS 24A	358+00 to 360+00 rt.	021311060963	perennial/intermittent
WUS 24B	360+00 to 365+00 rt.	021311060963	ephemeral
WUS 25A	377+00 to 386+50 rt.	021311060963	ephemeral
WUS 25B	386+00 to 388+00 rt.	021311060963	perennial/intermittent
WUS 26	382+00 to 387+00 lt.	021311060963	ephemeral
WUS 30	413+25 rt.	021311060963	perennial/intermittent
WUS 31	416+50 to 423+00 lt.	021311060963	ephemeral
WUS 32	421+00 to 422+00 rt.	021311060963	ephemeral
WUS 33	439+00 to 441+00 lt.	021311060963	ephemeral
WUS 34	439+00 to 445+00 rt.	021311060963	perennial/intermittent
WUS 36	447+00 to 449+00 rt.	021311060963	perennial/intermittent

Name of Stream	Stream Location	DNR 12-Digit Watershed	Stream Type
WUS 37	449+00 to 451+50 lt.	021311060963	perennial/intermittent
WUS 38	455+00 lt.	021311060963	perennial/intermittent
WUS 39	468+00 lt.	021311060963	perennial/intermittent
WUS 39	468+00 lt.	021311060963	perennial/intermittent
WUS 41	480+00 rt.	021311060963	ephemeral
WUS 42A	486+50 lt. and rt.	021311060963	perennial/intermittent
WUS 42B	495+00 to 496+00 lt.	021311060963	perennial/intermittent
WUS 42B	515+00 to 520+00 lt.	021311060963	perennial/intermittent
WUS 42B	515+00 to 520+00 lt.	021311060963	perennial/intermittent
WUS 42C	504+00 to 505+00 lt.	021311060963	perennial/intermittent
WUS 42C	503+00 to 504+00 and 505+00 to 506+00 lt.	021311060963	perennial/intermittent
WUS 42D	529+00 to 531+00 lt.	021311060963	perennial/intermittent
WUS 42E	546+00 to 549+00 lt.	021311060963	perennial/intermittent
WUS 42F	555+00 to 558+00 lt.	021311060963	perennial/intermittent
WUS 43A	486+50 to 487+50 rt.	021311060963	perennial/intermittent
WUS 43B	487+50 to 490+00 rt.	021311060963	ephemeral
WUS 44	502+00 along access road	021311060963	perennial/intermittent
WUS 45A	502+00 rt. and lt.	021311060963	perennial/intermittent
WUS 45B	508+00 rt. and lt.	021311060963	ephemeral
WUS 45C	505+50 along access road	021311060963	perennial/intermittent
WUS 46	514+00 rt.	021311060963	perennial/intermittent
WUS 47	521+00 along access road	021311060963	perennial/intermittent
WUS 48	526+00 to 530+00, lt. and rt.	021311060963	perennial/intermittent
WUS 49	529+00 lt.	021311060963	perennial/intermittent
WUS 50A	547+00 lt.	021311060963	perennial/intermittent
WUS 50B	547+00 rt.	021311060963	perennial/intermittent
WUS 51	489+00 to 493+00 rt.	021311060963	perennial/intermittent
WUS 52	483+00 to 485+00 rt.	021311060963	ephemeral

All of the streams and rivers within the study area are classified by the Maryland Department of the Environment (MDE) as Use I-P. Uses of these streams include Water Contact Recreation, Protection of Aquatic Life, and Public Water Supply. In-stream construction within these streams is restricted between March 1 and June 15, inclusive of any year. The study area contains part of the Middle Patuxent River mainstem and its tributaries, including Terrapin Branch, the upper reaches of Benson Branch, the upper reaches of Clydes Branch, their tributaries, and other unnamed tributaries of the Middle Patuxent River.

The Middle Patuxent River is listed on MDE's 303(d) list of impaired waters. The 303(d) list includes a report of Maryland's impaired water surfaces. Impairments are identified when water quality monitoring data suggest that a waterbody does not meet or is not expected to meet water quality standards. The Middle Patuxent River is listed on Maryland's 1998 303(d) list because of the presence of nutrients, suspended sediments and zinc.

The streams throughout the study area vary in width from approximately two feet to 20 feet and in depth from approximately two inches to greater than three feet. Review of USGS maps indicates that most tributaries are probably generated by groundwater discharge and surface water run-off from surrounding upland areas. The majority of the streams and river channels are unvegetated.



LEGEND

- Drainage Divide between subwatersheds of the Patuxent River
- Drainage Divide between subwatersheds of the Middle Patuxent River

KEY MAP

B
A

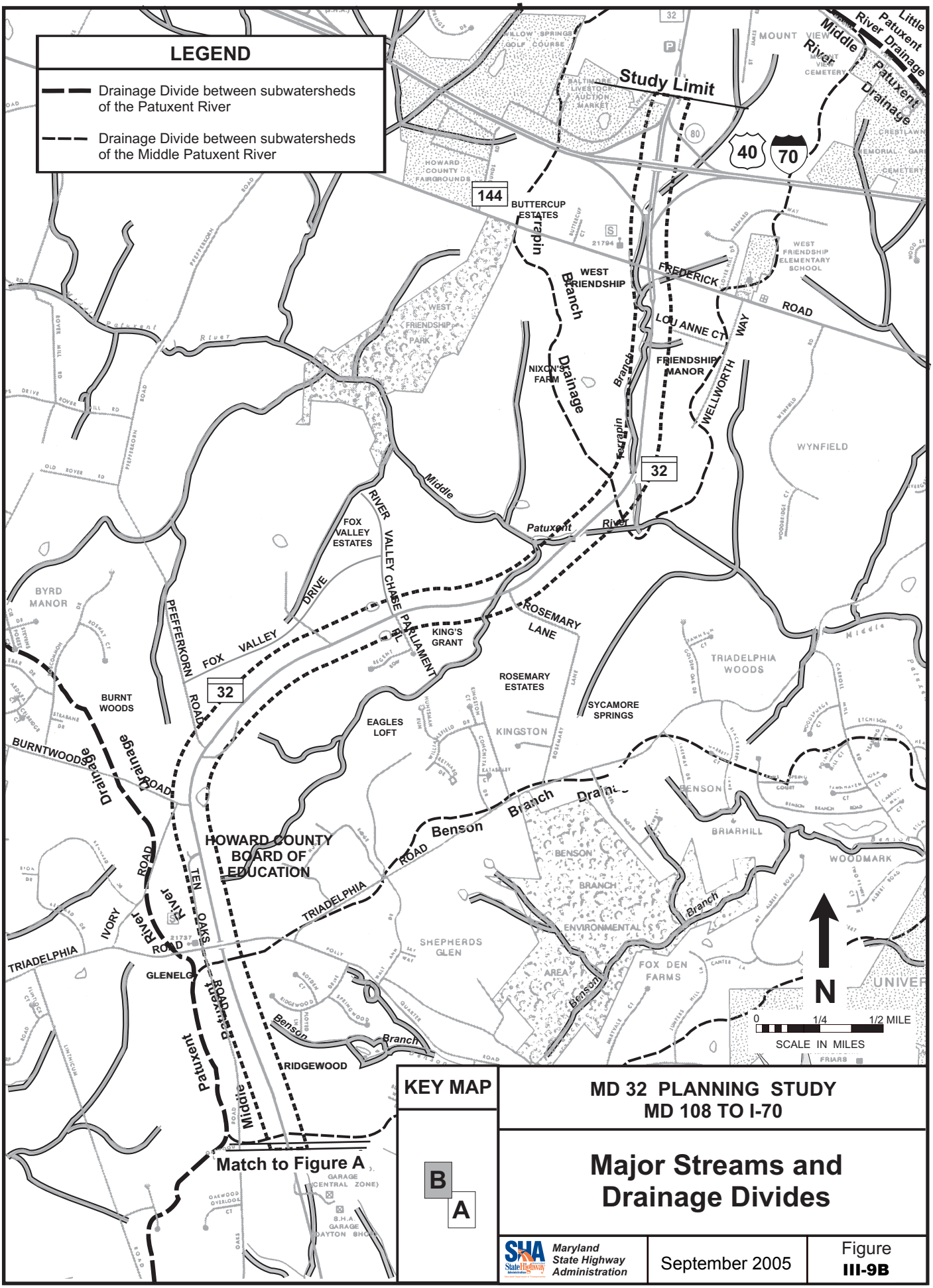
MD 32 PLANNING STUDY
MD 108 TO I-70

Major Streams and Drainage Divides

Maryland State Highway Administration

September 2005

Figure **III-9A**


LEGEND
Drainage Divide between subwatersheds of the Patuxent River
Drainage Divide between subwatersheds of the Middle Patuxent River
Study Limit
Little Patuxent River Drainage
Middle Patuxent River Drainage
144
BUTTERCUP ESTATES
Trapin Branch Drainage
WEST FRIENDSHIP
FREDERICK ROAD
LOU ANNE CT
WAY
FRIENDSHIP MANOR
WELLWORTH
NIXON'S FARM
WEST FRIENDSHIP PARK
WEST FRIENDSHIP ELEMENTARY SCHOOL
WYNFIELD
32
Middle Patuxent River
FOX VALLEY ESTATES
RIVER VALLEY DRIVE
CHASE PARLIAMENT
KING'S GRANT
ROSEMARY LANE
ROSEMARY ESTATES
SYCAMORE SPRINGS
TRIADELPHIA WOODS
BYRD MANOR
PFEFFERKORN ROAD
FOX VALLEY
BURNT WOODS
EAGLES LOFT
KINGSTON
BURNTWOODS ROAD
Drainage
HOWARD COUNTY BOARD OF EDUCATION
Benson Branch Drainage
BENSON
BRIARHILL
WOODMARK
TRIADELPHIA ROAD
IVORY ROAD
TEN OAKS ROAD
RIVER
SHEPHERDS GLEN
ENVIRONMENTAL AREA
FOX DEN FARMS
GLENELG
Patuxent ROAD
Middle Patuxent
RIDGEWOOD
Benson Branch
Match to Figure A
GARAGE (CENTRAL ZONE)
B.H.A. GARAGE (DAYTON BHC)
N
0 1/4 1/2 MILE
SCALE IN MILES
KEY MAP
B
A
MD 32 PLANNING STUDY
MD 108 TO I-70
Major Streams and Drainage Divides
Maryland State Highway Administration
September 2005
Figure III-9B

Tributaries, along with ponds, provide aquatic habitat and drinking water for both mammal and bird species. The freshwater tributaries also provide some spawning environments for fish species indigenous to the Middle Patuxent. In addition to aquatic habitat, the functions provided by these streams and rivers include production export and nutrient removal/transformation. A discussion of the aquatic and wetland habitat features within the study area is included in **Section III.G**.

Approximately three acres of ponds are located within the MD 32 study area. The ponds primarily serve as stormwater management facilities and farm ponds (possibly spring-fed), varying in depth from approximately two feet to greater than three feet. Many of these ponds are bordered with fringe wetlands, areas of vegetation tolerant of frequent soil saturation or continued inundation. These water resources serve as habitats for aquatic plant and animal species and as a water source for terrestrial animals, which may frequent the adjacent woodland and old field habitats. No lakes are located within the study area.

Water Quality

An assessment of basic water quality and other conditions was conducted for streams within the study area. Information on water quality was gathered from Federal, State and local sources. Published data from DNR and Howard County Department of Natural Resources were reviewed to obtain information on stream channel conditions and surface water quality within and adjacent to the project area. Because existing water quality data was sparse, new field sampling was conducted for this study in selected streams within the study area. All sampling was conducted in accordance with SHA's Stream Monitoring Protocol (April 2001), which is largely based on the DNR Biological Stream Survey's (MBSS) protocols. In addition, physical (geomorphic) stream data were collected and sampling for benthic macroinvertebrates was completed. The results of the water quality assessment are discussed in more detail below and in the MD 32 Natural Environmental Technical Report (NETR).

The assessments were conducted on representative portions of Terrapin Branch, Middle Patuxent main channel, its unnamed tributary, and tributaries to Clydes Branch. Data was collected at a total of seven sampling stations for dissolved oxygen, pH, conductivity, turbidity, and temperature. In addition, macroinvertebrates were collected from the streambeds based on EPA Rapid Bioassessment Protocols and Save Our Streams methods, in order to supplement the water quality data and to assess the habitat suitability of the streams. The sampling station locations are listed in **Table III-13**.

Table III-13: Water Quality Sampling Site Locations

Site Number	Water Quality Sampling Site Location
1	Terrapin Branch, 600 feet upstream of MD 144 bridge crossing
2	Terrapin Branch, 350 feet downstream of MD 32 culvert
3	Middle Patuxent, 980 feet downstream of MD 32 bridge crossing
4	Middle Patuxent, 1,200 feet upstream of MD 32 bridge crossing
5	Unnamed tributary to Middle Patuxent, 560 ft downstream of MD 32
6	Unnamed tributary to Clydes Branch, 800 feet upstream of MD 32 culvert, which is located 2,400 feet south of the existing Dayton Shop entrance
7	Same tributary as No. 6, but 320 feet downstream of MD 32 culvert

All of the water quality parameters tested fell within normal ranges for healthy streams and were within acceptable standards for Maryland streams (see COMAR, November 1993). High dissolved oxygen levels are important to aquatic life in streams and concentrations for the sites sampled were at maximums for the observed temperatures. Turbidity levels were low and pH was close to neutral, which is ideal for aquatic life. Conductivity levels were relatively low, but might be a function of low water temperatures and/or geological conditions. The results of the initial sampling efforts are presented in **Table III-14**.

Table III-14: Averaged Water Quality Measurements at Selected Stream Sites

Site Number	pH	Conductivity microsiemens/cm	Temperature ^{o}C	Turbidity NTUs	Dissolved Oxygen mg/l
1	6.5	0.36	9	7	13.0
2	6.7	0.37	7	5	11.7
3	6.7	0.10	7	6	12.4
4	7.0	0.12	7	5	12.4
5	6.8	0.09	7	4	12.2
6	6.8	0.09	8	7	11.4
7	6.9	0.15	8	6	11.8

Over 1,500 macroinvertebrate specimens were collected at the seven sampling stations, representing 22 different taxonomic families. **Table III-15** shows the results of the data analysis for six metrics. Based on the types of organisms found, standard sensitivity values for each taxa and weighting values allocated to metric values, a total biosurvey score was calculated for each sample site. Biosurvey scores were evaluated relative to standard habitat suitability categories and rated as good, fair, or poor. Only sample Site 7 was rated in the good category, five sites, Sites 2 through 6, were rated as fair, and Site 1 was rated as poor. While the water quality parameters tested might lead one to expect higher biosurvey scores for these sites, there may be limiting factors, including seasonal factors (sampling was done in fall) and the presence of untested pollutants. The results obtained from these investigations will provide baseline information to compare future conditions during and following project construction.

Table III-15: Metric Values From Macroinvertebrate Sampling Site

Primary Metric	Weighted Biosurvey Scores By Site Number						
	1	**2**	**3**	**4**	**5**	**6**	**7**
Number of Taxa	0	3	3	3	3	3	3
Number of EPT Taxa[1]	0	3	3	3	3	3	3
Percent Dominance[2]	0	0	0	3	3	3	6
Sensitive Taxa Index[3]	6	6	6	6	6	6	6
Percent Abundance of Scrapers[4]	3	0	0	0	0	6	3
Percent Abundance of Shredders[5]	0	0	0	0	6	0	6
Overall Site Score	9	12	12	15	21	21	27
Site Condition Value	*Poor*	*Poor-Fair*	*Poor-Fair*	*Fair*	*Fair*	*Fair*	*Good*

Notes: [1] Number of taxa in the generally pollution-sensitive orders: Ephemeroptera, Plecoptera and Trichoptera (a high diversity or variety indicates more suitable conditions)

[2] Percent composition of the most abundant family at a site (high values indicate less suitable conditions)

[3] Modified Hilsenhoff index calculated based on standard tolerance values for each taxon (high values

indicate less suitable conditions)
[4] Scrapers consume algae from rocks (high values indicate good habitat conditions)
[5] Shredders break down leaf litter and debris (high values indicate good habitat conditions)

Geomorphic data was also collected on Terrapin Branch and the unnamed tributary to Middle Patuxent in order to classify the streams and evaluate relative stability. These streams were selected based on their relatively extensive lengths within the project corridor and potentially greater disturbance from future activities deriving from this project. In addition to classifying the streams, significant portions of these and other channels within the study area were walked and qualitatively evaluated for bank erosion, down-cutting and deposition of bed material.

The stream classification investigation was based on the Rosgen methodology (Rosgen, 1996) for three representative reaches for the selected streams. The Rosgen Stream Classification System identifies seven major stream types based on geomorphology, labeled A through G. Each category is further refined into six sub-classes from one (bedrock) to six (silt/clay) based on particle size distribution. The locations of channel cross-sections for this effort are listed in **Table III-16**.

Table III-16: Channel Cross-section Sampling Site Locations

Site Number	Channel Cross-section Sampling Site Location
CS 1	Terrapin Branch, 1,250 feet downstream of MD 144 bridge crossing
CS 2	Terrapin Branch, same location as Water Quality Site Number 2
CS 3	Unnamed tributary to Middle Patuxent, 1,200 feet upstream of MD 32 crossing (same tributary as Water Quality Site Number 5)

The results of these assessments are presented in **Table III-17**. Based on the cross-sections selected, all three reaches of these streams have been classified as F4 channels in the Rosgen Stream Classification System, which represent an unstable form. F4 channels are characterized by large width to depth ratios at bankfull elevations, high entrenchment, moderate sinuosity, low slope, and gravel bed material. Thus, these streams tend to have a broad channel with shallow water levels. During "bankfull" flows, (i.e., the most dominant channel-forming flows approximating the 1.5 year storm), water does not typically overflow the banks, but is confined within the existing channel. Without a significant floodplain to spread out the flow and dissipate energy, increased stress on the stream banks has resulted in significant bank erosion along many reaches of these streams. Consequently, the eroded bank material is transported downstream. However, due to the shallow water depths, velocity is relatively low and this eroded bank material has become deposited in mid-channel and side-channel bars in numerous locations along these streams.

Table III-17: Rosgen Stream Classification and Delineative Criteria

Delineative Criteria	Station CS-1	Station CS-2	Station CS-3
Bankfull Width (Feet) Width of channel at bankfull stage elevation in a cross-over reach	14.3	22.50	13.4
Mean Depth (Feet) Average depth of channel cross-section at bankfull elevation	0.47	1.67	0.55
Bankfull Channel Cross-section Area (Square Feet) Area of the stream channel cross-section at bankfull elevation	9.87	37.50	0.74
Width/Depth Ratio Bankfull width divided by bankfull mean depth in a riffle section	44.60	21.09	24.36
Maximum Depth (Feet) Maximum depth of the bankful channel cross-section	0.85	1.50	0.75
Width of Flood-Prone Area (Feet) Distance across channel at twice maximum depth	21.30	36.00	14.40
Entrenchment Ratio An index of channel flow confinement during bankfull discharges	1.49[1]	1.60[1]	1.07
Dominant Streambed Particle Type Represents the mean diameter of channel bed materials	Coarse Gravel	Medium Gravel	Fine Gravel
Water Surface Slope (Feet per Foot) Gradient change over a reach of 20 -30 bankfull channel widths	0.005	0.009	0.007
Channel Sinuosity An index of channel meander pattern from stream length/valley length	1.35	1.11[1]	1.36
Stream Class	**F4**	**F4**	**F4**

Note: [1] "F" class channels typically have an entrenchment ratio less than 1.4 and sinuosity greater than 1.2; however, under Rosgen's classification system, values of entrenchment and sinuosity ratios can vary by $\pm$ 0.2 units and meet the criteria for "F" channels.

Due to existing conditions in their watersheds, bank erosion, and other problems will likely continue for presently disturbed streams, such as Terrapin Branch and the unnamed tributary to the Middle Patuxent. As a result, channels will become wider and less capable of effectively transporting bed material downstream. Further deposition will likely restrict flows to the point where downcutting of the channels will occur as the stream seeks to restore equilibrium. According to fluvial geomorphology principles and Rosgen's evolutionary stages of channel adjustment, if current hydrological conditions in the watersheds remain, these F4 channels will likely evolve toward a more stable "C" channel configuration. This is already evident in some sections of these streams where a "C" channel has already begun to form within the existing wide "F" channel. The rate of this transformation is dependent on factors such as land use activities within the watershed and long-term climatic changes. Typically, as a watershed becomes more developed and paved with impervious materials, peak flows become more frequent and velocities increased, which causes more stress on stream banks and increased erosion. Proper sediment and erosion control practices and channel restoration efforts can often reduce such problems and bring a stream back into physical, chemical, and biological balance.

Additional Stream Assessment – June 2004

In addition to the above stream assessments, on June 3, 2004, a stream assessment was conducted on an unnamed tributary located approximately two miles south of the MD 32/I-70 intersections to the Middle Patuxent River. The purpose of the assessment was to determine the

local fish community composition of the stream and the effects of the culvert on fish habitat. The sampling sites, MPAX-UT-US and MPAX-UT-DS, were located directly 15 meters upstream and ten meters downstream of a double box culvert under MD 32. Methodology included a review of existing water quality data, along with the identification of four MBSS sampling stations, which provided a good overview of stream conditions in this portion of the Middle Patuxent watershed as a whole.

MPAX-UT-US, the upstream sampling site, was rated as Fair by the Physical Habitat Index (PHI). Large amounts of sedimentation due to aggradation upstream of the culvert have reduced optimal riffle habitat. The poor habitat score at this site is also due to a low number of instream woody debris, which is heavily weighted in the PHI due to its importance in providing fish and macroinvertebrate niches. MPAX-UT-DS, downstream of MD 32, was rated as poor by the PHI. Low numbers of instream woody debris, a low aesthetics score, and low sub-optimal scores in several other habitat categories contributes to a lower PHI score at the downstream site compared to the upstream site.

Water quality measurements were taken at both upstream and downstream sampling sites as shown in **Table III-18**. All water quality measurements were within State standards.

Table III-18: Water Quality Data – Unnamed Tributary to Middle Patuxent

Site Number	pH	Conductivity microsiemens/cm	Temperature ^{o}C	Turbidity NTUs	Dissolved Oxygen mg/l
Upstream Site	7.16	0.23	16.7	10.9	8.30
Downstream Site	7.06	0.23	15.8	11.0	8.16

Sampling of the macroinvertebrate community is an effective way to assess localized water quality conditions. The upstream sampling site was rated Fair (3.7) using Maryland Biological Stream Survey (MBSS) and Benthic macroinvertebrate Index of Biotic Integrity (BIBI) protocols, due to the dominance of *Chironomidae* and the genera *Hydropsyche* sp. The downstream sampling site was also rated as Fair (3.9) by the BIBI. Thirty-two taxa were collected at the two sites sampled. Thirty-seven percent of the macroinvertebrates collected were considered intolerant while only nine percent were considered very tolerant. A lack of optimal habitat as well as upstream agricultural activity contributes to the impairment of the upstream site. At the downstream site road runoff from MD 32 may contribute to the slight impairment of this site.

Fish community assessments are generally conducted as part of a larger water quality study to obtain a well-rounded picture of the entire aquatic community. Nine species of fish were collected at the upstream site as follows:

- Blacknose dace
- Creek chub
- Fallfish
- Longnose dace
- Rosyside dace
- White sucker
- Bluegill
- Smallmouth bass
- Tessellated darter

The fish community at the upstream site was rated as Fair by the MBSS FIBI with a score of 3.67 (see Table III-20). Biomass at the upstream site was 1,440 grams. Twelve species of fish were collected at the downstream site as follows:

- American eel
- Blacknose dace
- Common shiner
- Creek chub
- Cutlips minnow
- Longnose dace
- Rosyside dace
- Swallowtail shiner
- Northern hogsucker
- White sucker
- Pumpkinseed
- Tessellated darter

The fish community at the downstream site was rated as Fair (3.22) by the MBSS FIBI, with biomass of 3,250 grams.

In addition to the standard MBSS fish sampling protocols conducted for the unnamed tributary, presence/absence electrofishing surveys were conducted in the mainstem of the Middle Patuxent River, downstream of the confluence of the sampled unnamed tributary and upstream of MD 32. Within the mainstem of the Middle Patuxent River where fish sampling was conducted, three species were shown that were not found within the tributary: Margined madtom, river chub, and spotfin shiner. All three of these species are considered intolerant to pollution. Species identified in the Middle Patuxent River site were identical to those at the downstream site, and three additional species were observed: margined madtom, river chub, and spotfin shiner.

Based on the findings of the 2004 stream assessment, it is believed that the MD 32 culvert, in its current condition with the fish blockage, could be having a negative effect on the habitat and biological communities in the stream as shown in **Table III-19**. Macroinvertebrate and fish community sampling conducted for this study indicate that the biological parameters measured are slightly more impaired upstream of the MD 32 culvert than downstream. However, the habitat assessment indicates a slightly better habitat upstream, mainly due to the lack of instream woody debris and rootwads in the downstream segments. It is likely that the sediment aggradation and straightening from the old roadway abutment are the limiting factors for the macroinvertebrate community upstream, and these factors, along with the fish blockages at the culvert, limit fish communities in the upstream segment. The fish community displays the greatest level of disparity between segments, with biomass below the culvert being over twice that of the upstream segment. Downstream of MD 32, greater species diversity was also noted.

Table III-19: Summary of Additional Survey Results – Unnamed Tributary to Middle Patuxent

Parameter	Upstream Site MPAX-UT-US	Downstream Site MPAX-UT-DS
Physical Habitat Index	44.24 (Fair)	38.29 (Poor)
Water Quality	All within State standards	All within State standards
Macroinvertebrate IBI	3.7 (Fair)	3.9 (Fair)
Fish IBI	3.67 (Fair)	3.22 (Fair)
Fish Biomass	1,440 grams	3,250 grams

2. Groundwater Resources

Groundwater in Howard County is derived entirely from precipitation. Precipitation flows as surface runoff into streams, evaporates to the atmosphere or percolates into the ground. The amount of precipitation that enters the ground depends upon the permeability of the soil and bedrock, the topography of the land and the duration and intensity of the precipitation. Most of the precipitation that percolates into the ground never reaches the groundwater reservoirs because it is lost by seepage into springs and streams, and by evaporation and transpiration.

Groundwater is found in the openings of joints and fractures within the igneous and metamorphic rocks underlying Howard County. Water is also contained in the pores, between the particles of rock within the weathered zone of bedrock. Groundwater occurs typically in a water table condition where precipitation is able to percolate into the unconfined aquifer and is not restricted by an impervious rock layer. Artesian conditions may occur in localized areas.

Water is supplied by reservoirs for most of the eastern portion of the County, while the western portion, including the study area, relies upon wells for water supply. These wells are fed by the Maryland Piedmont Aquifer, which EPA has designated as a Sole Source Aquifer (meaning that it supplies 50 percent or more of the drinking water for a given area). The remaining water was supplied by Baltimore City and Washington Suburban Sanitary Commission (WSSC) systems from sources outside the County.

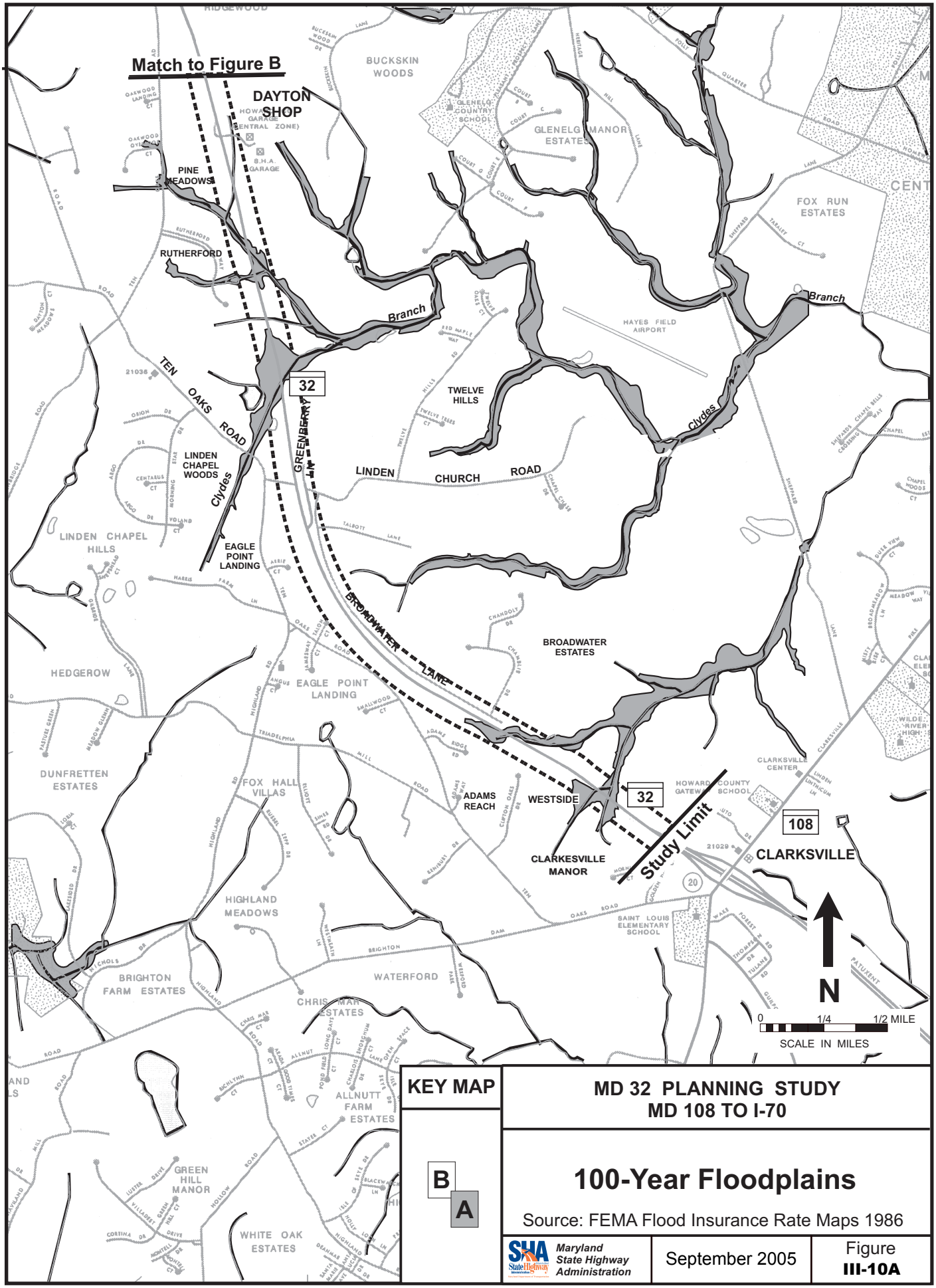
The stormwater management requirements for the project are discussed in **Section IV.E.**

F. Floodplains

The 100-year floodplain limits (1986) have been identified and delineated based on the Federal Emergency Management Agency (FEMA) mapping. Within the study area, 100-year floodplains are associated with the Middle Patuxent River, Benson Branch, Clydes Branch and some tributaries of Clydes Branch. The river, streams and their associated floodplains are shown on **Figure III-10A** and **10B**.

The 100-year floodplains associated with the Middle Patuxent River and Clydes Branch and its upper tributaries consist of farm fields, wooded areas, wetlands and some improved properties. Woodland area covers the 100-year floodplain of Benson Branch within the study area.

The Middle Patuxent River 100-year floodplain intersects a few driveways, but no structures within the study area. The 100-year floodplain of Clydes Branch and its tributary that cross MD 32 between Linden Church Road and the Dayton Shop entrance contains six structures and a few driveways east of the study area. The 100-year floodplains of Benson Branch and the Clydes Branch tributaries that cross MD 32 between MD 108 and Chamblis Drive do not include structures in or near the study area.



KEY MAP

B
A

MD 32 PLANNING STUDY
MD 108 TO I-70

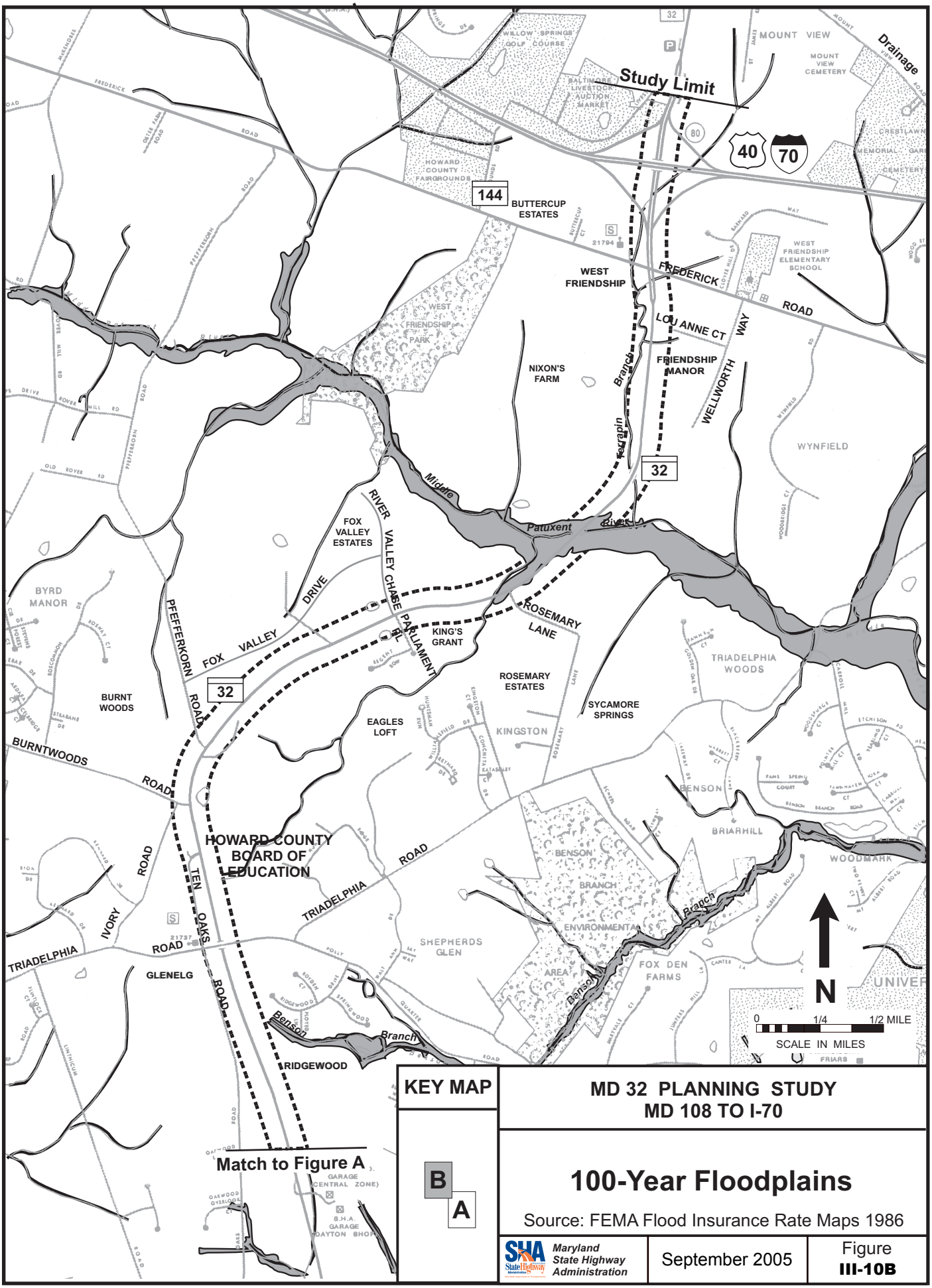
100-Year Floodplains

Source: FEMA Flood Insurance Rate Maps 1986

Maryland State Highway Administration

September 2005

Figure **III-10A**



KEY MAP

MD 32 PLANNING STUDY
MD 108 TO I-70

100-Year Floodplains

Source: FEMA Flood Insurance Rate Maps 1986

Maryland State Highway Administration

September 2005

Figure **III-10B**

G. Wetlands

1. Methodology

The Clean Water Act forbids the discharge of any pollutant into navigable water unless permitted by the US Army Corps of Engineers (USACE). Section 404 of the Act requires potential dischargers of dredged or fill materials into Waters of the United States to secure a permit from USACE. As presently applied, a Section 404 permit is required for most activities proposed to take place in wetlands and surface waters.

A wetland delineation of water features with the study area was conducted in accordance with the US Army Corps of Engineers Wetlands Delineation Manual (1987). The Routine on Site Determination Method was used to identify characteristics of the study area wetlands. Wetlands were classified in accordance with the United States Fish and Wildlife Service's (USF&WS) "Classification of Wetlands and Deepwater Habitats of the United States" (Cowardin et al., 1979).

Wetland soils were identified using field indicators and the "Soil Survey of Howard County, Maryland". Soil color was determined using "Munsell Soil Color Charts" (Kollmorgen Corp., 1975). Soil profiles were sampled using a hand auger. Plant species were identified using "Flora of West Virginia" (Strausbaugh and Cole, 1974), "Newcomb's Wildflower Guide" (Newcomb, 1977), the "Shrub Identification Book" (Symonds, 1963), and "Trees of the Eastern United States and Canada" (Harlow, 1957). Wetland indicator status of observed vegetation was determined using the "National List of Plant Species that Occur in Wetlands: 1988 National Summary" (USF&WS Biological Report 88 (24), 1988).

Wetland hydrology was determined based on soil pit evaluations and observations noted in the field. National Wetland Inventory (NWI) mapping was obtained for preliminary identification of wetland areas.

All wetlands within the study area were assigned a qualitative value according to the importance of functions performed for the surrounding environment. The manual "A Method for Wetland Functional Value Assessment" (US DOT Federal Highway Administration, 1983) was used as a guide to evaluate relative functional values for wetlands. A determination of functions and values was based on observations during field investigations. In 1997, SHA requested that significant wetlands (defined as wetlands within the study area that equal or exceed 0.5 acre) be evaluated using the more detailed function/value assessment technique of the USACE, New England Division, Method for Wetland Function and Value Assessment. Wetlands F, H, J/K, L, S, W, EE/FF, RR, TT and HHH were evaluated using this technique.

2. Identification and Delineation of Waters of the US including Wetlands

The initial field investigation of wetlands was conducted in July of 1995 (Wetlands A through JJ). Additional studies were conducted for an expanded study area in 1997 and 1998 (Wetlands KK through UU) and 2004 (WET-1, WET-3, WET-4, WUS-51, and WUS-52). Soil borings were taken at each wetland and a detailed account of vegetation and hydrologic conditions was prepared. **Figure III-11** and the alternatives mapping in **Appendix A** identify wetland locations in the study area. A relative value was assigned for each wetland based on combining scores for

all functions to obtain an overall rating. The methodology is presented in the Wetland Identification and Delineation Report (July 1997) for this project.

The USACE completed the jurisdictional determination of Wetlands A through PP in November 1997. A jurisdictional determination of Wetlands QQ through UU was completed in 1998 and concurrence was received in April 1998. There was also a jurisdictional determination extension granted in 2003 and valid for five years until 2008.

On May 10, 2004, an agency field review was conducted in the study area to discuss the options of the proposed improvements with regards to avoidance and minimization of environmental impacts and mitigation objectives. During this meeting the USACE noted that ephemeral channels not previously recognized as jurisdictional would now be considered jurisdictional. Several ephemeral channels were identified during this field review. In addition it was recommended that a re-evaluation of the wetlands and waters within the project area be conducted due to some discrepancies between the DEIS and the current study being conducted.

On May 17, 2004, an agency field review was conducted in the study area to discuss in greater detail the environmental impacts and mitigation objectives. Several Waters of the US, including ephemeral channels were identified during this field review. In addition Wetland M was identified as 70 percent woodland and 30 percent emergent during the field review.

On February 18, 2005, an agency jurisdictional field review was conducted to review all of the Waters of the US, including ephemeral channels and perennial and intermittent streams within the project limits, in order to determine the mitigation requirements associated with the project. During the field review, four potentially jurisdictional wetlands and/or stream systems were identified as requiring more detailed study.

A wetland delineation was conducted on March 4, 2005 and March 10, 2005 as part of the MD 32 Planning Study to verify the mapped wetlands and Waters of the US and to conduct a wetland delineation, as recommended by the agencies during the February 18, 2005 field review, for previously flagged areas that have changed since the initial delineation. In addition, the widths of all streams were measured as part of this field review.

During the March 2005 site reviews, seven additional wetland systems were identified and flagged in the field (BBB, DDD, EEE, GGG, HHH, WUS-23, WUS-45B), and the existing mapping was updated based on current conditions. Prior to field investigation, possible wetland areas were located using USFWS National Wetland Inventory and the United States Geological Survey Maps for the Clarksville and Sykesville quads and the Natural Resources Conservation Service (NRCS) Soil Survey Report for Howard County. Wetland boundaries were marked in the field with pink wetland delineation survey ribbon and their locations were surveyed using a Trimble GPS receiver.

On March 24, 2005 an agency office/field meeting was conducted to discuss wetland and Waters of the US impacts and the proposed mitigation. Mapping of the study area was reviewed and changes from the recent delineations were noted and discussed. The agencies were given an opportunity to review any areas that needed further clarification. Field reviews were conducted at three wetlands and/or Waters of US to confirm the findings (Wetlands 4 and F and WUS-43).

During this review, MDE and USACE also verified the locations of systems identified during the March 4, 2005 and March 10, 2005 wetland delineation.

a. Palustrine Wetlands

The following is a description of all the wetlands that were identified during the various field reviews that have been conducted throughout the course of the MD 32 project.

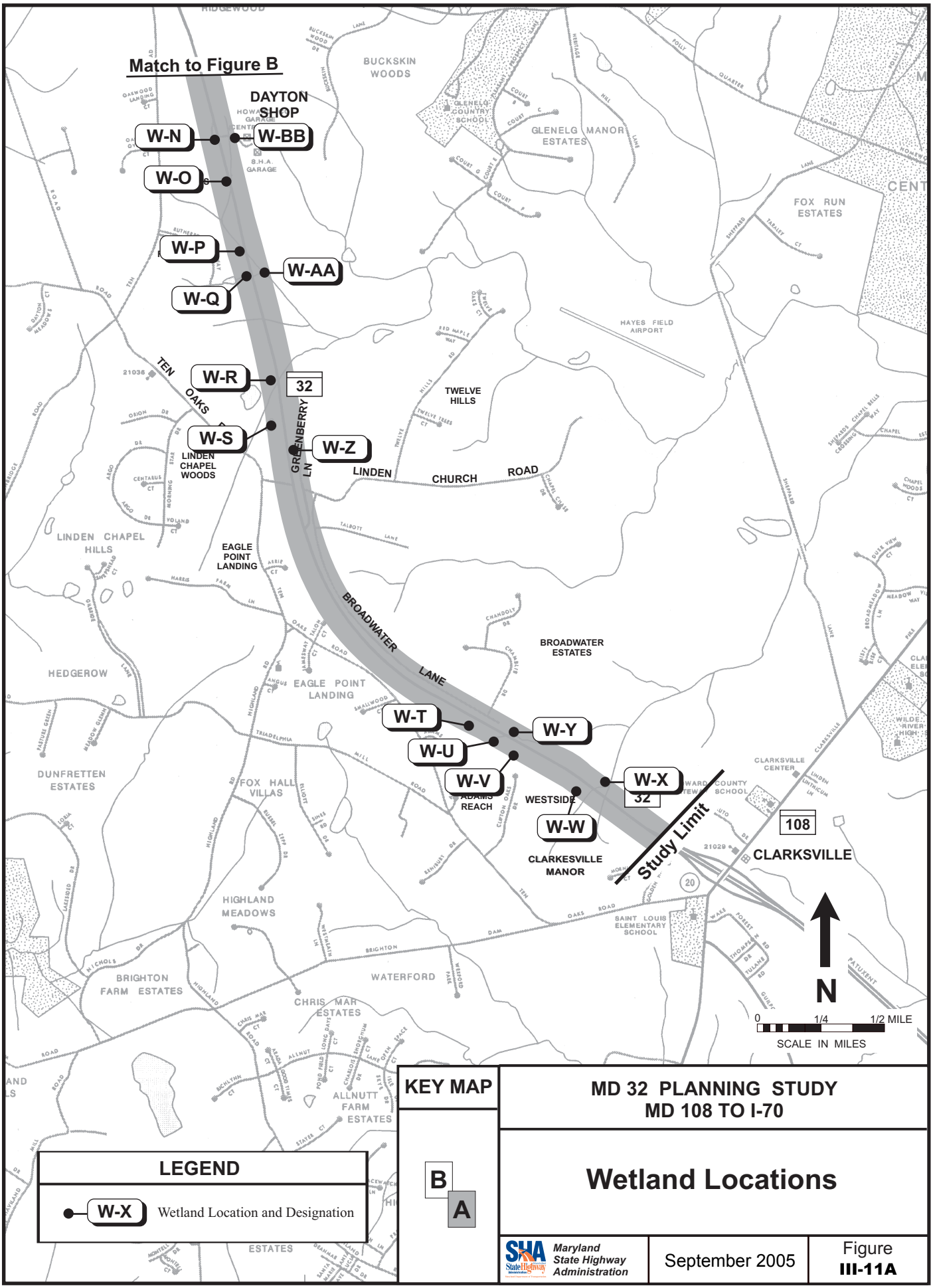
Wetland A, approximately 0.04 acre, is a palustrine, emergent, persistent (PEM1) wetland, see **Figure III-11B** and **Appendix A, Sheet 5**. It is located on the west side of existing MD 32, south of MD 144. The wetland was flagged in the field, numbered sequentially from A1-5. This wetland was not shown on the NWI mapping. The most significant function provided by Wetland A is habitat for wildlife. Because of the small size and proximity to area roadways, the wetland was determined to have a low value.

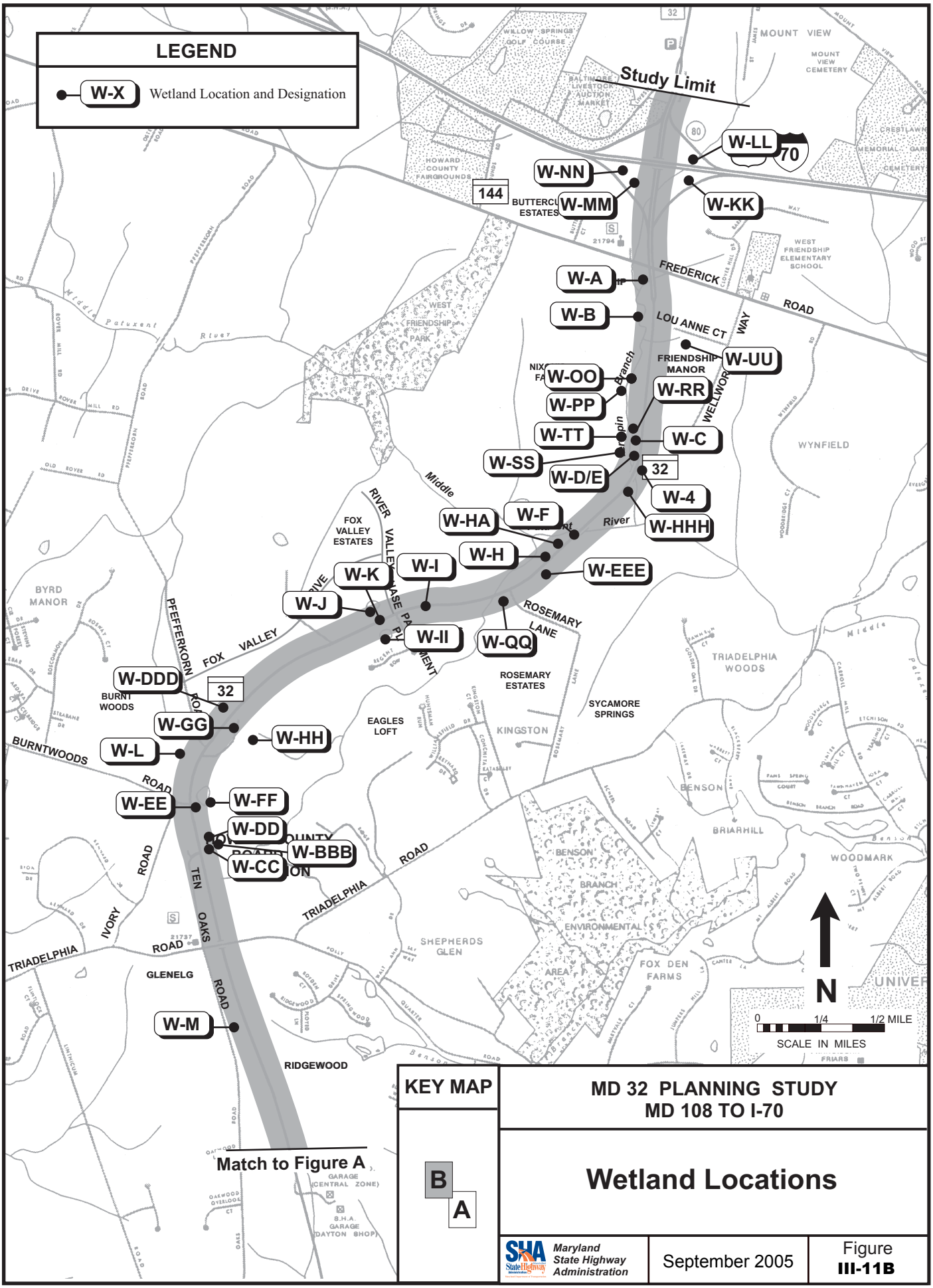
Wetland B, approximately 0.16 acre, is a palustrine, emergent, persistent (PEM1) and a palustrine, scrub/shrub, broad-leaved deciduous (PSS1) wetland, see **Figure III-11B** and **Appendix A, Sheets 5 and 5A**. The wetland was flagged in the field, numbered sequentially from B1-9. This wetland was not shown on the NWI mapping. The most significant functions provided by Wetland B include habitat for wildlife and active recreation (residential trail). Because of the small size, the wetland was determined to have a low value.

Wetland C, approximately 0.15 acre, is a palustrine, emergent, persistent (PEM1) wetland, see **Figure III-11B** and **Appendix A, Sheet 5**. It is located on the west side of existing MD 32, north of Nixon's Farm Lane. The wetland was partially flagged in the field, numbered sequentially from C1-7. A portion of the wetland was in active pasture and therefore was not flagged. This wetland was not shown on the NWI mapping. The most significant function provided by Wetland C is groundwater discharge. Because of the small size and the existing disturbance, active pasture, the wetland was determined to have a low value.

Wetland D/E, approximately 0.27 acre, is a palustrine, scrub/shrub, persistent (PSS) wetland, see **Figure III-11B** and **Appendix A, Sheet 5**. It is located on the west side of existing MD 32, south of Nixon's Farm Lane. The wetland was flagged in the field, numbered sequentially from DE1-13. This wetland was not shown on the NWI mapping. The most significant functions provided by Wetland D/E are short-term sediment trapping/stabilization and habitat for wildlife. Because most of the area is periodically maintained by mowing, and there is limited cover for wildlife, the wetland was determined to have a low value.

Wetland F, approximately 0.60 acre, is a palustrine, forested, broad-leaved deciduous (PFO1) wetland, see **Figure III-11B** and **Appendix A, Sheet 4**. It is located on the west side of existing MD 32, north of Rosemary Lane. The wetland was flagged in the field, numbered sequentially from F1-25. The wetland appeared to have been modified in the past by ditch excavation and may have been a pasture (old barbed wire fence). Several very large (30" DBH) pin oak trees were found within this wetland. This wetland was not shown on the NWI mapping. The most significant functions provided by Wetland F include passive recreation, habitat for wildlife, short-term sediment trapping/stabilization, and flood desynchronization. Because of the large size of the forested wetland, the wetland was determined to have a high value.


Match to Figure B
DAYTON SHOP
W-N
W-BB
W-O
W-P
W-AA
W-Q
W-R
32
W-S
W-Z
LINDEN CHAPEL WOODS
GREENBERRY LN
TEN OAKS ROAD
LINDEN CHURCH ROAD
TWELVE HILLS
HAYES FIELD AIRPORT
FOX RUN ESTATES
GLENELG MANOR ESTATES
BUCKSKIN WOODS
LINDEN CHAPEL HILLS
EAGLE POINT LANDING
BROADWATER LANE
BROADWATER ESTATES
HEDGEROW
W-T
W-U
W-V
W-Y
W-X
W-W
WESTSIDE
ADAMS REACH
CLARKSVILLE CENTER
CLARKSVILLE
CLARKSVILLE MANOR
Study Limit
108
20
DUNFRETTEN ESTATES
FOX HALL VILLAS
HIGHLAND MEADOWS
BRIGHTON FARM ESTATES
WATERFORD
CHRIS MAR ESTATES
ALLNUTT FARM ESTATES
SAINT LOUIS ELEMENTARY SCHOOL
N
0 1/4 1/2 MILE
SCALE IN MILES
LEGEND
W-X Wetland Location and Designation
KEY MAP
B
A
MD 32 PLANNING STUDY
MD 108 TO I-70
Wetland Locations
Maryland State Highway Administration
September 2005
Figure III-11A


LEGEND
W-X
Wetland Location and Designation
Study Limit
W-LL
W-NN
W-MM
W-KK
W-A
W-B
W-UU
W-OO
W-PP
W-RR
W-TT
W-C
W-SS
W-D/E
W-4
W-HHH
W-F
W-HA
W-H
W-I
W-K
W-J
W-EEE
W-II
W-QQ
W-DDD
W-GG
W-HH
W-L
W-EE
W-FF
W-DD
W-BBB
W-CC
W-M
Match to Figure A
MOUNT VIEW
MOUNT VIEW CEMETERY
WILLOW SPRINGS GOLF COURSE
BALTIMORE LIVESTOCK AUCTION MARKET
HOWARD COUNTY FAIRGROUNDS
BUTTERCUP ESTATES
WEST FRIENDSHIP ELEMENTARY SCHOOL
FREDERICK ROAD
LOU ANNE CT
WAY
FRIENDSHIP MANOR
WELLWORTH
WEST FRIENDSHIP PARK
Middle Patuxent River
WYNFIELD
FOX VALLEY ESTATES
Middle Patuxent River
BYRD MANOR
PFEFFERKORN ROAD
FOX VALLEY
ROSEMARY LANE
ROSEMARY ESTATES
SYCAMORE SPRINGS
TRIADELPHIA WOODS
BURNT WOODS
EAGLES LOFT
KINGSTON
BENSON
BRIARHILL
WOODMARK
BENSON BRANCH
ENVIRONMENTAL AREA
FOX DEN FARMS
SHEPHERDS GLEN
BURNTWOODS ROAD
TEN OAKS ROAD
IVORY ROAD
TRIADELPHIA ROAD
GLENELG
RIDGEWOOD
GARAGE (CENTRAL ZONE)
B.H.A. GARAGE (DAYTON SHOP)
N
0 1/4 1/2 MILE
SCALE IN MILES
KEY MAP
B
A
MD 32 PLANNING STUDY
MD 108 TO I-70
Wetland Locations
Maryland State Highway Administration
September 2005
Figure III-11B

Wetland G, approximately 0.04 acre, is a palustrine, emergent (PEM) wetland, see **Appendix A, Sheet 4**. It is located on the west side of existing MD 32, north of Rosemary Lane. This wetland does not appear on NWI mapping. The wetland was flagged in the field, numbered sequentially from G1-12. Wetland G was contained in an overflow channel of the Middle Patuxent River. The most significant functions provided by Wetland G include flood desynchronization. Because of the small size of the wetland, the wetland was determined to have a low value.

Wetland H, approximately 0.55 acre, is a palustrine, emergent, persistent (PEM1) and a palustrine, scrub/shrub, broad-leaved deciduous (PSS1) wetland, see **Figure III-11B** and **Appendix A, Sheet 4**. It is located on the west side of existing MD 32, north of Rosemary Lane. The wetland was flagged in the field, numbered sequentially from H1-27. The wetland appeared to have been a remnant stream channel that has become filled with organic material due to permanent saturation/inundation. Minor fill associated with household trash was found in a portion of the wetland. This wetland was not shown on the NWI mapping. The most significant functions provided by Wetland H include habitat for wildlife, nutrient retention/removal (long term), and groundwater discharge. Because of the diverse vegetation and undisturbed nature of the wetland found under a forested canopy, the wetland was determined to have a medium value.

Wetland HA, approximately 0.04 acre, is a small isolated, palustrine forested (PFO) wetland, see Figure III-11B and **Appendix A, Sheet 4**. This wetland is flagged in the field with six flags. The wetland is located north of Wetland H. This area is contained within a pocket depression. The area does not appear on NWI mapping. The most significant functions provided by Wetland HA include flood desynchronization, long-term nutrient retention/removal, and long-term sediment trapping. Because of the wetland's small size and isolated nature, the wetland was determined to have a low value.

Wetland I, approximately 0.14 acre, is a palustrine, emergent, persistent (PEM1) wetland, see **Figure III-11B** and **Appendix A, Sheet 4**. Wetland I is located on the west side of existing MD 32, north of River Valley Chase. The wetland was flagged in the field, numbered sequentially from I1-10. The wetland was surrounded by maintained lawn and roadway right-of-way. A female box turtle was observed in the wetland. This wetland was not shown on the NWI mapping. The most significant function provided by Wetland I is habitat for wildlife. Because of the isolated nature of the wetland and its small size, the wetland was determined to have a low value.

Wetland J, approximately 0.77 acre, is a palustrine, open water, excavated (POWx) wetland, see **Figure III-11B** and **Appendix A, Sheet 4**. The wetland was not flagged in the field and is contained within the pond banks. The wetland was an old farm pond, which is now found adjacent to a development. This area was shown on the NWI mapping as a POWZh wetland. The most significant functions provided by Wetland J include habitat for wildlife and active recreation (paths and adjacent development). Because of the recreational use of the wetland by area residents, the wetland was determined to have a medium value.

Wetland K, approximately 0.09 acre, is a palustrine, scrub/shrub, broad-leaved deciduous (PSS1) wetland, see **Figure III-11B** and **Appendix A, Sheet 4**. It is located on the west side of existing MD 32, south of River Valley Chase. The wetland was flagged in the field, numbered sequentially from K1-7. The wetland was found at the foot of the berm containing Wetland J. This wetland was not shown on the NWI mapping. The most significant function provided by

Wetland K is habitat for wildlife. Because of past disturbance, the wetland was determined to have a low value.

Wetland L, approximately 0.68 acre, is a palustrine, emergent, persistent (PEM1) and a palustrine, open water, excavated (POWx) wetland, see **Figure III-11B** and **Appendix A, Sheet 3**. It is located on the west side of existing MD 32, north of Burntwoods Road. The wetland was not flagged in the field because the wetland is found in active pasture. The POW portion of the wetland is contained within the pond banks, only a small portion of PEM wetland is found at the overflow swale. Regular grazing activity disturbs the PEM area. This area was shown on the NWI mapping as a POWZh wetland. The most significant functions provided by Wetland L include habitat for wildlife, flood desynchronization, and groundwater discharge. Because of active farm use, the wetland was determined to have a medium value.

Wetland M, approximately 0.29 acre, is a palustrine, emergent, persistent (PEM1) and a palustrine, forested, broad-leaved deciduous (PFO1) wetland, see **Figure III-11B** and **Appendix A, Sheet 3**. Wetland M is located on the west side of existing MD 32, south of Triadelphia Road. The wetland was flagged in the field, numbered sequentially from M1-7. The wetland consists of two wetland areas in close proximity. The one wetland was created by roadside swale excavation. This wetland was not shown on the NWI mapping. The most significant function provided by Wetland M is groundwater discharge. Because of its small size and past disturbance (swale excavation), the wetland was determined to have a low value.

Wetland N, approximately 0.10 acre, is a palustrine, emergent, persistent (PEM1) wetland, see **Figure III-11A** and **Appendix A, Sheet 2**. It is located on the west side of existing MD 32, across from the Dayton Shop. The wetland was flagged in the field, numbered sequentially from N1-10. The hydrology of the wetland was affected by roadside swale excavation in the past. This wetland was not shown on the NWI mapping. The most significant function provided by Wetland N is groundwater discharge. Because of past disturbance and its small size, the wetland was determined to have a low value.

Wetland O, approximately 0.08 acre, is a palustrine, emergent, persistent (PEM1) wetland, see **Figure III-11A** and **Appendix A, Sheet 2**. It is located on the west side of existing MD 32, south of the Dayton Shop. The wetland was flagged in the field, numbered sequentially from O1-8. The wetland was recently cleared for gas pipeline maintenance activities. This wetland was not shown on the NWI mapping. The most significant function provided by Wetland O is groundwater discharge. Because of recent disturbance and its small size, the wetland was determined to have a low value.

Wetland P, approximately 0.03 acre, is a palustrine, emergent, persistent (PEM1) and a palustrine, scrub/shrub, broad-leaved deciduous (PSS1) wetland, see **Figure III-11A** and **Appendix A, Sheet 2**. It is located on the west side of existing MD 32, south of the Dayton Shop. The wetland was flagged in the field, numbered sequentially from P1-5. The wetland was contained within the banks of a perennial stream. This area was shown on the NWI mapping as a PEM5A wetland. The most significant function provided by Wetland P is habitat for wildlife. Because of its small size, the wetland was determined to have a low value.

Wetland Q, approximately 0.13 acre, is a palustrine, emergent, persistent (PEM1) wetland, see **Figure III-11A** and **Appendix A, Sheet 2**. It is located on the west side of existing MD 32,

south of the Dayton Shop. The wetland was flagged in the field, numbered sequentially from Q1-14. The wetland bordered a perennial stream and averaged 20 feet wide. This wetland was not shown on the NWI mapping. The most significant functions provided by Wetland Q include habitat for wildlife and groundwater discharge. Because the diverse vegetation provides shading to and filters runoff entering the stream, the wetland was determined to have a medium value.

Wetland R, approximately 0.02 acre, is a palustrine, emergent, persistent (PEM1) wetland, see **Figure III-11A** and **Appendix A, Sheet 2**. It is located on the west side of existing MD 32, north of Linden Church Road. The wetland was flagged in the field, numbered sequentially from R1-2, and had an average width of five feet (1.5 meters). The wetland is a farmed wetland swale. This wetland was not shown on the NWI mapping. No significant functions were provided by Wetland R; therefore, the wetland was determined to have a low value.

Wetland S, approximately 0.50 acre, is a palustrine, open water, excavated (POWx) wetland, see **Figure III-11A** and **Appendix A, Sheet 2**. The wetland was not flagged in the field and is contained within the banks. The wetland is actively used for recreation. This area was shown on the NWI mapping as a POWZh wetland. The most significant functions provided by Wetland S include habitat for wildlife and active recreation (boat dock and recreational equipment). Because of the recreational use of the wetland by area residents, the wetland was determined to have a medium value.

Wetland T, approximately 0.14 acre, is a palustrine, scrub/shrub, broad-leaved deciduous (PSS1) wetland, see **Figure III-11A** and **Appendix A, Sheet 1**. It is located west of existing MD 32 and east of Adam's Reach. The wetland was flagged in the field, numbered sequentially from T1-18. The wetland is associated with a number of shallow intermittent stream channels within an upland woodland canopy. This wetland was not shown on the NWI mapping. The most significant functions provided by Wetland T include passive recreation and habitat for wildlife. Because of the wooded conditions surrounding the wetland, the wetland was determined to have a medium value.

Wetland U, approximately 0.28 acre, is a palustrine, forested, broad-leaved deciduous (PFO1) wetland, see **Figure III-11A** and **Appendix A, Sheet 1**. It is located west of existing MD 32 and east of Adam's Reach. The wetland consisted of two wetland areas in close proximity and with similar vegetation. An old fence found within the wooded area indicated that the area was used as pasture in the past. This wetland was not shown on the NWI mapping. The most significant functions provided by Wetland U include habitat for wildlife and groundwater discharge. Because of the relatively undisturbed nature of the wetland found within a wooded area, the wetland was determined to have a medium value.

Wetland V, approximately 0.06 acre, is a palustrine, emergent, persistent (PEM1) wetland, see **Figure III-11A** and **Appendix A, Sheet 1**. The wetland was flagged in the field, numbered sequentially from V1-7. The wetland appeared to have been an old farm pond that had been breached. This area was shown on the NWI mapping as a POWZh wetland. The most significant functions provided by Wetland V include groundwater discharge, habitat for wildlife, and long-term sediment trapping/stabilization. Because of the diverse vegetation found in the wetland, the wetland was determined to have a medium value.

Wetland W, approximately 3.54acres, is a palustrine, forested, broad-leaved deciduous (PFO1) wetland, see **Figure III-11A** and **Appendix A, Sheet 1**. It is located west of existing MD 32, just north of the MD 108 interchange. The wetland was flagged in the field, numbered sequentially from W1-33. The wetland appears to have been an area that had remained unutilized for agricultural purposes due to a high groundwater table. This wetland was not shown on the NWI mapping. The following information was collected near the transition area between wetland and upland. The wetland characteristics became stronger following down the gradual slope toward the perennial stream. The most significant functions provided by Wetland W include passive recreation, habitat for wildlife, flood desynchronization, active recreation (hunting), and groundwater discharge. Because of the large wetland area and wooded conditions, the wetland was determined to have a high value.

Wetland X, approximately 0.30 acre, is a palustrine, scrub/shrub, broad-leaved deciduous (PSS1) wetland, see **Figure III-11A** and **Appendix A, Sheet 1**. The wetland was flagged in the field, numbered sequentially from X1-10. This area was shown on the NWI mapping as a PFO1A wetland. The most significant functions provided by Wetland X include habitat for wildlife and groundwater discharge. Because of existing disturbances (active pasture) and the small size of the wetland, the wetland was determined to have a low value.

Wetland Y, approximately 0.05 acre, is a palustrine, forested, broad-leaved deciduous (PFO1) wetland, see **Figure III-11A** and **Appendix A, Sheet 1**. The wetland was flagged in the field, numbered sequentially from Y1-9. The wetland was a small seepage area adjacent to a perennial stream. This wetland was not shown on the NWI mapping. The most significant function provided by Wetland Y is habitat for wildlife. Because of its small size, the wetland was determined to have a low value.

Wetland Z, approximately 0.01 acre, is a palustrine, emergent, persistent (PEM1) wetland, see **Figure III-11A** and **Appendix A, Sheet 2**. Wetland Z is located on the east side of existing MD 32, north of Linden Church Road. The wetland was flagged in the field, numbered sequentially from Z1-4. The wetland was a small seepage area adjacent to an intermittent stream. This wetland was not shown on the NWI mapping. No significant functions are provided by Wetland Z; therefore, the wetland was determined to have a low value.

Wetland AA, approximately 0.40 acre, is a palustrine, emergent, persistent (PEM1) and a palustrine, scrub/shrub, broad-leaved deciduous (PSS1) wetland, see **Figure III-11A** and **Appendix A, Sheet 1**. The wetland was flagged in the field, numbered sequentially from AA1-20. The wetland appeared to have been partially cleared for pipeline right-of-way in the past. The wetland appeared to be suitable habitat for the Bog turtle (*Clemmys muhlenbergii*). This area was shown on the NWI mapping as a PEM5A/SS1A wetland. The most significant functions provided by Wetland AA include habitat for wildlife, groundwater discharge, and long-term sediment trapping/stabilization. Because the wetland appeared to be good turtle habitat and because of the vegetative diversity, the wetland was determined to have a medium value.

Wetland BB, approximately 0.03 acre, is a palustrine, emergent, persistent (PEM1) wetland, see **Figure III-11A** and **Appendix A, Sheet 2**. It is located on the east side of existing MD 32, at the Dayton Shop. The wetland was not flagged in the field due to regular MDSHA roadside mowing activities. The wetland was a roadside drainage swale. This wetland was not shown on the NWI mapping. The most significant function provided by Wetland BB is short-term

sediment trapping/stabilization. Because of the man-made character of the wetland, the wetland was determined to have a low value.

Wetland CC, approximately 0.08 acre, is a palustrine, forested, broad-leaved deciduous (PFO1) and a palustrine, scrub/shrub, broad-leaved deciduous (PSS1) wetland, see **Figure III-11B** and **Appendix A, Sheet 3**. The wetland was flagged in the field, numbered sequentially from CC1-7. The wetland is found adjacent to an intermittent stream channel. This area was shown on the NWI mapping as a PFO1A wetland. The most significant functions provided by Wetland CC include: active recreation (horse trails) and groundwater discharge. Because of the small size of the wetland, the wetland was determined to have a low value.

Wetland DD, approximately 0.05 acre, is a palustrine, scrub/shrub, broad-leaved deciduous (PSS1) wetland, see **Figure III-10B** and **Appendix A, Sheet 3**. The wetland was flagged in the field, numbered sequentially from DD1-15. The wetland consists of two small wetland areas in close proximity. This area was shown on the NWI mapping as a PFO1A wetland. The most significant function provided by Wetland DD is groundwater discharge. Because of the small size of the wetland, the wetland was determined to have a medium value.

Wetland EE, approximately 0.58 acre, is a palustrine, emergent, persistent (PEM1) and a palustrine, open water, excavated (POWx) wetland, see **Figure III-11B** and **Appendix A, Sheet 3**. It is located on the east side of existing MD 32, across from Burntwoods Road. The wetland was flagged in the field, numbered sequentially from EE1-5 and EE10-15. The pond is found on an active farm. This area was shown on the NWI mapping as a POWZh wetland. The most significant functions provided by Wetland EE include habitat for wildlife and groundwater discharge. Because the pond is on an active farm, the wetland was determined to have a medium value.

Wetland FF, approximately 0.41 acre, is a palustrine, emergent, persistent (PEM1) wetland, see **Figure III-10B** and **Appendix A, Sheet 3**. The wetland was flagged in the field, numbered sequentially from FF1-8. The approximately two-thirds of the wetland was maintained for horse pasture by regular mowing. This wetland was not shown on the NWI mapping. The most significant functions provided by Wetland FF include habitat for wildlife and groundwater discharge. Because of the diverse vegetation, the wetland was determined to have a medium value.

Wetland GG, approximately 0.01 acre, is a palustrine, emergent, persistent (PEM1) wetland. It is located on the east side of existing MD 32, north of Pfefferkorn Road. The wetland was flagged in the field, numbered sequentially from GG1-5, see **Figure III-11B** and **Appendix A, Sheet 3**. The wetland is a small wetland pocket adjacent to an intermittent stream. This wetland was not shown on the NWI mapping. No significant functions were provided by Wetland GG; therefore, the wetland was determined to have a low value.

Wetland HH, approximately 0.03 acre, is a palustrine, emergent, persistent (PEM1) wetland, see **Figure III-11B** and **Appendix A, Sheet 3**. The wetland was flagged in the field, numbered sequentially from HH1-8. However, approximately half of the wetland, which extends into a backyard, was not flagged. This wetland was not shown on the NWI mapping. The most significant function provided by Wetland HH is groundwater discharge. Because of the small

size, regular mowing, and past filling disturbances (trash), the wetland was determined to have a low value.

Wetland II, approximately 0.41 acre, is a palustrine, forested, broad-leaved deciduous (PFO1) wetland, see **Figure III-10B** and **Appendix A, Sheet 4**. The wetland was flagged in the field, numbered sequentially from II1-5. The wetland appeared to have been part of a former farm pond. This was shown on the NWI mapping as a POWZh wetland. Wetland II provides minor habitat for wildlife, active recreation (recreational walking bridge), and groundwater discharge. Because of past disturbance and the small size of the wetland in the study area, the wetland was determined to have an overall composite low value.

Wetland JJ, approximately 0.01 acre, is a palustrine, scrub/shrub, broad-leaved deciduous (PSS1) wetland, see Figure III-10B and Appendix A, Sheet 4. The wetland was flagged in the field, numbered sequentially from JJ1-3. The wetland is a roadside drainage swale. This wetland was not shown on the NWI mapping. A small linear channel wetland was added near Wetland JJ (not contiguous with JJ). This area was named **Wetland JJ1,** see Figure III-10B and Appendix A, Sheet 4, and was flagged with two flags. In addition, a riverine channel was added perpendicular to Wetland JJ on the west side of MD 32.Wetland JJ provides short-term sediment trapping/stabilization. However, because of its man-made character and its small size, the wetland was determined to have an overall medium value.

Wetland KK, approximately 0.4 acre, is a palustrine, forested, broad-leaved deciduous (PFO1) wetland, see **Figure III-11B** and **Appendix A, Sheet 5**. Wetland KK is located on the east side of existing MD 32, south of I-70. The wetland was flagged in the field, numbered sequentially from KK1-15. The wetland was found in a low, flat area within the southeast quadrant of the MD 32/I-70 Interchange. This wetland was not shown on the NWI mapping. The most significant function provided by Wetland KK is habitat for wildlife. The wetland was determined to have a medium value.

Wetland LL, approximately 0.1 acre, is a palustrine, forested, broad-leaved deciduous (PFO1) wetland, see **Figure III-11B** and **Appendix A, Sheets 5 and 5A**. The wetland was flagged in the field, numbered sequentially from LL1- 8. The wetland was found in a low, flat area within the northeast quadrant of the MD 32/I-70 Interchange. This wetland was not shown on the NWI mapping. The most significant function provided by Wetland LL is habitat for wildlife. The wetland was determined to have a medium value.

Wetland MM/NN, approximately 0.45 acre, is a palustrine, forested, broad-leaved deciduous (PFO1) wetland and 0.18, is a palustrine, emergent, persistent (PEM1) wetland, see **Figure III-11B** and **Appendix A, Sheet 5**. It is located in the southwest quadrant of the I-70/MD 32 interchange. The wetland was flagged in the field, numbered sequentially from MM1-9 and NN 1-10. Wetland MM and NN flagged seperately during the 1997 delineation were determined to be connected during the March 2005 delineation. The wetland was found in a gently sloping, swale area within the southwest quadrant of the MD 32/I-70 Interchange. This wetland was not shown on the NWI mapping. Relative to other functions evaluated for Wetland MM/NN, the most significant function provided by this wetland is a small amount of habitat for wildlife and sediment trapping. However, this function when combined with others resulted in an overall medium value score.

Wetland OO, approximately 0.2 acre, is a palustrine, emergent, persistent (PEM1) and a palustrine, forested, broad-leaved deciduous (PFO1) wetland, see **Figure III-11B** and **Appendix A, Sheet 5.** It is located on the west side of existing MD 32, south of West Frontage Road. The wetland was flagged in the field, numbered sequentially from OO1-15. It was located in a wooded area, along the west side of the Terrapin Branch, a tributary to the Patuxent River. This wetland was not shown on the NWI mapping. The most significant function provided by Wetland OO is habitat for wildlife. The wetland was determined to have a medium value.

Wetland PP, approximately 0.2 acre, is a palustrine, emergent, persistent (PEM1) wetland, see **Figure III-11B** and **Appendix A, Sheet 5**. It is located on the west side of MD 32, south of West Frontage Road. The wetland was found, already flagged in the field by another party (10 flags total). It was located in a field area, west of Terrapin Branch. This wetland was not shown on the NWI mapping. Due to its small size and lack of cover for wildlife, Wetland PP was determined to have an overall low value.

Wetland QQ, approximately 0.10 acre, consists of two small, non-contiguous palustrine emergent (PEM) wetlands, see **Figure III-11B** and **Appendix A, Sheet 4**. This wetland was flagged with ten flags. The wetland is located at the southeast corner of the intersection of Rosemary Lane and MD 32. This area has been significantly impacted by grading activities, and does not display hydric soils throughout. This wetland does not appear on NWI mapping. The most significant functions provided by Wetland QQ include flood desynchronization, dissipation of erosive forces, and wildlife habitat, short-term sediment trapping, and long-term nutrient retention/removal. Because of the wetland's small size and highly disturbed nature, the wetland was determined to have a low value.

Wetland RR, approximately 0.88 acre, is a palustrine emergent (PEM) wetland, see **Figure III-11B** and **Appendix A, Sheet 5**. This wetland is flagged in the field using 24 flags. This area is maintained in a pastoral condition. The wetland is located near the Nixon's Farm access drive, east of Terrapin Branch, contiguous with Wetland C. Due to the differing characters of Wetlands C and RR these wetlands are evaluated separately, but are hydrologically connected units. The Natural Resources Conservation Service has confirmed that this wetland does not qualify as "prior converted cropland". This wetland does not appear on NWI mapping. The most significant functions provided by Wetland RR include wildlife habitat, short-term sediment trapping, flood desynchronization, groundwater discharge/recharge, long-term nutrient retention/removal, and long-term sediment trapping. Because of the wetland's highly disturbed nature, however, the wetland was determined to have an overall medium value.

Wetland SS, approximately 0.12 acre, is a small isolated, palustrine emergent (PEM) wetland, see **Figure III-11B** and **Appendix A, Sheet 5**. It is located on the west side of existing MD 32, south of Nixon's Farm Lane. This wetland was flagged in the field using eight flags. Wetland SS is located south of the Nixon's Farm entrance road, west Terrapin Branch, near Wetland D/E. This area is maintained in a pastoral condition. This wetland is not contiguous with other wetlands, but maintains a perennial, piped, sub-surficial link with Terrapin Branch. The Natural Resources Conservation Service has confirmed that this wetland does not qualify as "prior converted cropland". This wetland does not appear on NWI mapping. The only significant function provided by Wetland SS includes groundwater discharge/recharge. Because of the wetland's highly disturbed nature and small size, the wetland was determined to have a low value.

Wetland TT, approximately 1.21 acres, is a palustrine emergent (PEM) wetland, see **Figure III-11B** and **Appendix A, Sheet 5**. This wetland was flagged in the field using 40 flags. This area is maintained in a pastoral condition. The wetland is located near the Nixon's Farm access drive, west of Terrapin Branch, across from Wetlands C and RR. The Natural Resources Conservation Service has confirmed that this wetland does not qualify as "prior converted cropland". This wetland does not appear on NWI mapping. The most significant functions provided by Wetland TT include groundwater discharge/recharge, and wildlife habitat, short-term sediment trapping, flood desynchronization, food chain support, long-term nutrient retention/removal, and long term sediment trapping. Because of the wetland's highly disturbed nature the wetland was determined to have an overall medium value.

Wetland UU, approximately 0.01 acre, is a small, seep, palustrine forested (PFO) wetland, see **Figure III-11B** and **Appendix A, Sheet 5**. The wetland is located at the southeast corner of the MD 32 and MD 144 intersection. This wetland is flagged with 4 flags. This area is contiguous with an unnamed tributary to Terrapin Branch. The area does not appear on NWI mapping. The most significant functions provided by Wetland UU include passive recreation, short-term sediment trapping, dissipation of erosive forces, and groundwater discharge/recharge. Because of the wetland's small size, the wetland was determined to have a low value.

Wetland BBB, approximately 0.08 acre, is a palustrine forested (PFO) wetland, see **Figure III-11B** and **Appendix A, Sheet 3**. This wetland is flagged as Wetland BBB, flags WBBB-1 through WBBB-41. Wetland BBB is located on the east side of MD 32, east of Burntwoods Road. This wetland does not appear on NWI mapping. The most significant functions provided by this wetland include sediment/toxicant retention, wildlife habitat, floodflow alteration, groundwater recharge/discharge, and sediment/shoreline stabilization. This wetland was determined to have a high value due to the several functions that it provides and the high value of the groundwater driven wooded wetlands associated with this wetland system.

Wetland DDD, approximately 0.22 acre, is a palustrine emergent (PEM) wetland with a saturated water regime, see **Figure III-11B** and **Appendix A, Sheet 3**. This wetland is flagged as DDD, flags WDDD-1 through WDDD-13. It is located on the west side of MD 32, south of Fox Valley Drive. This wetland does not appear on NWI mapping. The most significant functions associated with this wetland include groundwater recharge/discharge, sediment toxicant retention, and nutrient removal. Wetland DDD was determined to have a medium value because it is hydrologically suppored by groundwater; however, it is not as highly functioning as some of the other wetlands within the MD 32 study area.

Wetland EEE, approximately 0.12 acre, begins as a palustrine emergent (PEM – 0.08 acre) wetland but also includes a palustrine forested (PFO – 0.04 acre) wetland, see **Figure III-11B** and **Appendix A, Sheet 4**. It is located on the east side of MD 32, north of Rosemary Lane. Wetland EEE is a seasonally saturated water regime flagged as Wetland EEE. A palustrine forested (PFO) wetland with a seasonally saturated water regime flows into Wetland EEE at Station 90. This wetland does not appear on NWI mapping. The functions provided by this wetland include sediment toxicant retention and groundwater recharge/discharge. The entire wetland system was determined to have a medium value because although it includes more than one type of vegetative class and is groundwater driven the size of the wetland is small.

Wetland HHH, approximately 0.55 acre, is a palustrine emergent (PEM) wetland with a permanently flooded water regime, see **Figure III-11B** and **Appendix A, Sheet 5**. It is located on the east side of MD 32, northeast of Fox Chase Road. This wetland was flagged in the field and numbered sequentially from WHHH-1.1 to WHHH-11.1. This wetland does not appear on NWI mapping. The functions provided by this wetland include sediment toxicant retention, groundwater recharge/discharge and nutrient removal. Wetland HHH was determined to have high value because it is hydrologically supported by a natural groundwater spring that forms the headwaters of a tributary to the Middle Patuxent River.

Wetland WET-1 (2004), approximately 0.08 acres, is a palustrine emergent wetland (PEM), see **Appendix A, Sheet 5.** The wetland is located on the east side of MD 32, west of Wellworth Way. The wetland was flagged in the field as WET-1 (2004), flags 2004-1 to 2004-12. This wetland did not appear on NWI mapping. The most significant function provided by WET-1 is groundwater discharge. Because of the small size of the wetland and its proximity from other WUS, it was determined to have a low value.

Wetland WET-3 (2004), approximately 0.03 acres, is a palustrine forested wetland (PFO), see **Appendix A, Sheet 5.** The wetland is located on the east side of MD 32, west of Wellworth Way. The wetland was flagged in the field sequentially with nine flags. It does not appear on NWI mapping. The most significant function provided by WET-3 is flood control alteration, sediment toxicant retention and ground water recharge. The wetland was determined to have a medium value.

Wetland 4, approximately 0.17 acres, is a palustrine emergent (PEM) wetland, see **Figure III-11-B** and **Appendix A, Sheet 5**. Wetland 4 is located on the east side of MD 32, south of Wellworth Way. The wetland was not flagged in the field due to frequent mowing activity. This wetland does not appear on NWI mapping. The most significant function provided by Wetland 4 is groundwater recharge. Because most of the area is periodically maintained by mowing and there is limited cover for wildlife, the wetland was determined to have a low value.

A summary of each wetland can be found in **Table III-20**.

Table III-20: Wetland Summary

Wetland Number	Approx. Size	Cowardin Classification [2]	Dominant Vegetation		Soils	Hydrologic Indicators	Principal Function
A	0.04 acre	PEM1	Black willow Spotted touch-me-not Sensitive fern Japanese honeysuckle	*Salix nigra* *Impatiens capensis* *Onoclea sensibilis* *Lonicera japonica*	Cs-Comus silt loam	low topographic area in floodplain, oxidized root channels	habitat for wildlife
B	0.16 acre	PEM1 PSS1	Red maple Shallow sedge Touch-me-not Grasses Silky dogwood	*Acer rubrum* *Carex lurida* *Impatiens capensis* *Gramineae spp.* *Cornus amomum*	Cs-Comus silt loam	oxidized root channels, low topographic location, crayfish chimneys	habitat for wildlife active recreation
C	0.15 acre	PEM1	Spotted touch-me-not Soft rush Sensitive fern Arrow-leaf tearthumb	*Impatiens capensis* *Juncus effusus* *Onoclea sensibilis* *Polygonum sagittatum*	Cs-Comus silt loam	inundation and saturation	groundwater discharge
D/E	0.27 acre	PSS	Sensitive fern Shallow sedge Soft rush Green bulrush Unidentified goldenrod	*Onoclea sensibilis* *Carex lurida* *Juncus effusus* *Scirpus atrovirens* *Solidago sp.*	Ha-Hatboro silt loam	oxidized root channels, saturation, depressional topography, dominant OBL, FACW vegetation	habitat for wildlife short-term sediment trapping/stabilization
F	0.60 acre	PFO1	Red maple Spicebush Halberd-leaf tearthumb Pin oak Skunk cabbage	*Acer rubrum* *Lindera benzoin* *Polygonum arifolium* *Quercus palustris* *Symplocarpus foetidus*	Cs-Comus silt loam	water-stained leaves, scour, wetland drainage patterns, shallow tree roots	passive recreation, habitat for wildlife, short-term sediment trapping/stabilization, flood desynchronization
G	0.04 acre	PEM	Nepal microstegium Spotted touch-me-not Halberd-leaf tearthumb Arrow-leaf tearthumb	*Eulalia viminea* *Impatiens capensis* *Polygonum arifolium* *Polygonum sagittatum*	Cs-Comus silt loam	soil saturation, drift lines, hydrophytic vegetation	flood desynchronization

Table III-20: Wetland Summary

Wetland Number	Approx. Size	Cowardin Classification [2]	Dominant Vegetation		Soils	Hydrologic Indicators	Principal Function
H	0.55 acre	PEM1 PSS1	Red maple Sedge Rice cutgrass Spicebush Swamp rose Broad-leaf arrow-head Skunk cabbage	*Acer rubrum* *Carex stricta* *Leersia oryzoides* *Lindera benzoin* *Rosa palustris* *Sagittaria latifolia* *Symplocarpus foetidus*	Cs-Comus silt loam	soil saturation, water-stained leaves, wetland drainage patterns	habitat for wildlife, nutrient retention/removal (long term) groundwater discharge
HA	0.04 acre	PFO	Multiflora rose Silky dogwood Spicebush Red maple Black willow Black cherry	*Rosa multiflora* *Cornus amomum* *Lindera benzoin* *Acer rubrum* *Salix nigra* *Prunus serotina*	Ha - Hatboro silt loam	inundation, soil saturation, oxidized root channels, water stained leaves	wildlife habitat, floodflow alteration, long-term sediment trapping/stabilization
I	0.14 acre	PEM1	Grass-leaved goldenrod Soft rush Seedbox Sensitive fern Arrow-leaf tearthumb	*Euthamia graminifolia* *Juncus effusus* *Ludwigia palustris* *Onoclea sensibilis* *Polygonum sagittatum*	Cs-Comus silt loam	soil saturation, oxidized root channels	habitat for wildlife
J	0.77 acre	POWx			undetermined	inundation	habitat for wildlife active recreation
K	0.09 acre	PSS1	Spotted touch-me-not Spicebush Sensitive fern Clearweed Arrow-leaf tearthumb Black willow Elderberry	*Impatiens capensis* *Lindera benzoin* *Onoclea sensibilis* *Pilea pumila* *Polygonum sagittatum* *Salix nigra* *Sambucus canadensis*	Ba-Bale silt loam	soil saturation	habitat for wildlife
L	0.68 acre [1]	PEM1 POWx	Soft rush Path rush Virginia bugleweed	*Juncus effusus* *Juncus tenuis* *Lycopus virginicus*	Ba-Baile silt loam	inundation, topographic location	habitat for wildlife flood desynchronization groundwater discharge

Table III-20: Wetland Summary

Wetland Number	Approx. Size	Cowardin Classification [2]	Dominant Vegetation		Soils	Hydrologic Indicators	Principal Function
M	0.29 acre	PEM1 PFO1	Red maple Spotted touch-me-not Sensitive fern Arrow-leaf tearthumb Broad-leaf cattail	*Acer rubrum* *Impatiens capensis* *Onoclea sensibilis* *Polygonum sagittatum* *Typha latifolia*	ChB2-Chester silt loam, 3-8 percent	water-stained leaves, shallow tree roots, crayfish chimneys, topographic location	groundwater discharge
N	0.10 acre	PEM1	Red maple Spotted touch-me-not Soft rush Sensitive fern Broad-leaf cattail	*Acer rubrum* *Impatiens capensis* *Juncus effusus* *Onoclea sensibilis* *Typha latifolia*	Ba-Baile silt loam	soil saturation	groundwater discharge
O	0.08 acre	PEM1	Joe-pye-weed Spotted touch-me-not Soft rush Arrow-leaf tearthumb Black willow	*Eupatorium purpureum* *Impatiens capensis* *Juncus effusus* *Polygonum sagittatum* *Salix nigra*	Ba-Baile silt loam	soil saturation	groundwater discharge
P	0.03 acre	PEM1 PSS1	Nepal microstegium Spotted touch-me-not Arrow-leaf tearthumb Bulrush Black willow	*Eulalia viminea* *Impatiens capensis* *Polygonum sagittatum* *Scirpus spp.* *Salix nigra*	Cs-Comus silt loam	soil saturation, topographic location	habitat for wildlife
Q	0.13 acre	PEM1	Shallow sedge Spotted touch-me-not Soft rush Rice cutgrass Arrow-leaf tearthumb Broad-leaf Arrowhead	*Carex lurida* *Impatiens capensis* *Juncus effusus* *Leersia oryzoides* *Polygonum sagittatum* *Sagittaria latifolia*	Ha-Hatboro silt loam	soil saturation, topographic location	habitat for wildlife groundwater discharge

Table III-20: Wetland Summary

Wetland Number	Approx. Size	Cowardin Classification [2]	Dominant Vegetation		Soils	Hydrologic Indicators	Principal Function
R	0.02 acre	PEM1	Common persimmon grasses Soft rush Sensitive fern Black willow New York ironweed	*Diospyros virginiana* *Gramineae spp.* *Juncus effusus* *Onoclea sensibilis* *Salix nigra* *Vernonia noveboracensis*	Cs-Comus silt loam	low topographic location	none
S	0.50 acre	POWx	undetermined	undetermined	undetermined	inundation	habitat for wildlife active recreation
T	0.14 acre	PSS1	Spotted touch-me-not Spicebush Skunk cabbage Northern arrow-wood	*Impatiens capensis* *Lindera benzoin* *Symplocarpus foetidus* *Viburnum recognitum*	GnB2-Glenville silt loam, 3-8 percent	wetland drainage patterns	passive recreation habitat for wildlife
U	0.28 acre	PFO1	Red maple Alder Winterberry Spotted touch-me-not Spicebush Royal fern Halberd-leaf tearthumb Skunk cabbage	*Acer rubrum* *Alnus spp.* *Ilex verticillata* *Impatiens capensis* *Lindera benzoin* *Osmunda regalis* *Polygonum arifolium* *Symplocarpus foetidus*	GnB2-Glenville silt loam, 3-8 percent	soil saturation, wetland drainage patterns	habitat for wildlife, groundwater discharge
W	3.54 acres [1]	PFO1	Red maple Spicebush Japanese honeysuckle Virginia creeper Slippery elm	*Acer rubrum* *Lindera benzoin* *Lonicera japonica* *Parthenocissus quinquifolia* *Ulmus rubra*	Ba-Baile silt loam	wetland drainage patterns, water-stained leaves, site topography	passive recreation habitat for wildlife flood desynchronization active recreation groundwater discharge

Table III-20: Wetland Summary

Wetland Number	Approx. Size	Cowardin Classification [2]	Dominant Vegetation		Soils	Hydrologic Indicators	Principal Function
X	0.30 acre	PSS1	Alder Spotted touch-me-not Field mint Clearweed Broad-leaf arrow-head Black willow Nannyberry	*Alnus spp.* *Impatiens capensis* *Mentha arvensis* *Pilea pumila* *Sagittaria latifolia* *Salix nigra* *Viburnum lentago*	Ba-Baile silt loam	soil saturation, oxidized root channels	habitat for wildlife groundwater discharge
Y	0.05 acre	PFO1	Red maple Spotted touch-me-not Black willow Skunk cabbage Northern arrow-wood	*Acer rubrum* *Impatiens capensis* *Salix nigra* *Symplocarpus foetidus* *Viburnum recognitum*	GnB2-Glenville silt loam, 3-8 percent	inundation, soil saturation	habitat for wildlife
Z	0.01 acre	PEM1	Spotted touch-me-not Grasses	*Impatiens capensis* *Gramineae spp.*	GnB2-Glenville silt loam, 3-8 percent	soil saturation, water-stained leaves, wetland drainage patterns	none
AA	0.40 acre	PEM1 PSS1	Tussock sedge Spotted touch-me-not Soft rush Spicebush Arrow-head tearthumb Swamp rose Broad-leaf arrow-head Black willow Giant burreed	*Carex stricta* *Impatiens capensis* *Juncus effusus* *Lindera benzoin* *Polygonum sagittatum* *Rosa palustris* *Sagittaria latifolia* *Salix nigra* *Sparganium eurycarpum*	Ha-Hatboro silt loam	inundation soil saturation	habitat for wildlife groundwater discharge long-term sediment trapping/stabilization
BB	0.03 acre	PEM1	Umbrella sedge Grasses Rice cutgrass Sensitive fern	*Cyperus strigosus* *Gramineae spp.* *Leersia oryzoides* *Onoclea sensibilis*	Ba-Baile silt loam	soil saturation	short-term sediment trapping/stabilization

Table III-20: Wetland Summary

Wetland Number	Approx. Size	Cowardin Classification [2]	Dominant Vegetation		Soils	Hydrologic Indicators	Principal Function
CC	0.08 acre	PFO1 PSS1	Red maple Spicebush Panic grass Poison ivy Skunk cabbage Northern arrow-wood	*Acer rubrum* *Lindera benzoin* *Panicum spp.* *Toxicodendron radicans* *Symplocarpus foetidus* *Viburnum recognitum*	GnB2-Glenville silt loam	wetland drainage patterns	active recreation groundwater discharge
DD	0.05 acre	PSS1	Spicebush Skunk cabbage	*Lindera benzoin* *Symplocarpus foetidus*	GnB2-Glenville silt loam	wetland drainage patterns	groundwater discharge
EE	0.58 acre	PEM1 POWx	Water purslane Black willow Broad-leaf cattail	*Ludwigia palustris* *Salix nigra* *Typha latifolia*	GnB2-Glenville silt loam	inundation	habitat for wildlife, groundwater discharge
FF	0.41 acre	PEM1	Swamp milkweed Shallow sedge Soft rush Seedbox Panic grass Arrow-leaf tearthumb	*Asclepias incarnata* *Carex lurida* *Juncus effusus* *Ludwigia alternifolia* *Panicum spp.* *Polygonum sagittatum*	GnB2-Glenville silt loam	inundation, soil saturation, oxidized root channels	habitat for wildlife, groundwater discharge
GG	0.01 acre	PEM1	Spotted touch-me-not Sensitive fern	*Impatiens capensis* *Onoclea sensibilis*	Ba-Baile silt loam	soil saturation	none
HH	0.03 acre	PEM1	Grasses Spotted touch-me-not Spicebush	*Gramineae spp.* *Impatiens capensis* *Lindera benzoin*	CgB2-Chester gravelly silt loam, 3-8 percent	soils saturation, wetland drainage patterns	groundwater discharge
II	0.41 acre	PFO1	Red maple Spotted touch-me-not Halberd-leaf tearthumb Arrow-leaf tearthumb Black willow	*Acer rubrum* *Impatiens capensis* *Polygonum arifolium* *Polygonum sagittatum* *Salix nigra*	Ba-Baile silt loam	soils saturation, wetland drainage patterns	habitat for wildlife, active recreation, groundwater discharge

Table III-20: Wetland Summary

Wetland Number	Approx. Size	Cowardin Classification [2]	Dominant Vegetation		Soils	Hydrologic Indicators	Principal Function
JJ	0.01 acre	PSS1	Red maple Alder Spotted touch-me-not Rose Broad-leaf arrow-head New York Ironweed	*Acer rubrum* *Alnus spp.* *Impatiens capensis* *Rosa spp.* *Sagittaria latifolia* *Vernonia noveboracensis*	disturbed soils	soil saturation	short-term sediment trapping/stabilization
KK	0.4 acre	PFO1	Green ash Black willow Red maple Arrow-wood Touch-me-not Lurid sedge	*Fraxinus pennsylvanica* *Salix nigra* *Acer rubrum* *Viburnum dentatum* *Impatiens capensis* *Carex lurida*	Cs-Comus silt loam	soil saturation, oxidized root channels, water stained leaves	habitat for wildlife groundwater discharge
MM/NN	0.63 acre	PFO1	Red maple Silver maple Black willow	*Acer rubrum* *Acer saccharinum* *Salix nigra*	ChB2	drift lines, drainage patterns, oxidized root channels, water stained leaves	habitat for wildlife short term sediment trapping/stabilization
		PEM1	Touch-me-not Unidentified goldenrod	*Impatiens capensis* *Solidago sp.*	ChB2-Chester silt loam	soil saturation	habitat for wildlife short term sediment trapping/stabilization groundwater discharge long term nutrient retention/removal
OO	0.2 acre	PEM1 PFO1	Red Maple Spicebush Black willow Touch-me-not Lurid sedge Arrow-leaf tearthumb Arrow-head	*Acer Rubrum* *Linera Benzoin* *Salix nigra* *Impatiens sp.* *Carex lurida* *Polygonum sagittatum* *Sagittaria letifolia*	Cs-Comus silt loam	soil saturation	habitat for wildlife short term sediment trapping/stabilization flood desynchronization
PP	0.2 acre	PEM1	Unidentified sedge Soft rush Green bulrush Arrow-leaf tearthumb Unidentified grass	*Carex sp.* *Juncus effusus* *Scirpus atrovirens* *Polygonum sagittatum* *Gramineae sp.*	Cs-Comus silt loam	oxidized root channels	none

Table III-20: Wetland Summary

Wetland Number	Approx. Size	Cowardin Classification [2]	Dominant Vegetation		Soils	Hydrologic Indicators	Principal Function
QQ	0.10 acre	PEM	Sneezeweed Fox Sedge Soft Rush Shallow Sedge Monkey Flower Green Bulrush Jewelweed Microstegium,Nepal	*Helenium autumnale* *Carex vulpinoidea* *Juncus effusus* *Carex lurida* *Mimulus guttatus* *Scirpus atrovirens* *Impatiens capensis* *Eulalia viminea*	Cs-Comus silt loam	soil survey data, FAC-Neutral	wildlife habitat, short- term sediment trapping/stabilization
RR	0.88 acre	PEM	Soft Rush Blue Vervain Green Bulrush Indian Paintbrush	*Juncus effusus* *Verbena hastata* *Scirpus atrovirens* *Castilleja coccinea*	Cs-Comus silt loam	soil saturation, drainage patterns, oxidized root channels	wildlife habitat, short-term sediment trapping/stabilization
SS	0.12 acre	PEM	Soft Rush Willow-herb Monkey Flower	*Juncus effusus* *Epilobium hirsutum* *Mimulus guttatus*	Cs-Comus silt loam	soil saturation, drainage patterns	groundwater discharge
TT	1.21 acres	PEM	Soft Rush Monkey Flower Blue Vervain Green Bulrush Bull Thistle Red-top Panicgrass	*Juncus effusus* *Mimulus guttatus* *Verbena hastata* *Scirpus atrovirens* *Cirsium vulgare* Panicum rigidum	Cs-Comus silt loam	inundation, soil saturation, drainage patterns, oxidized root channels	groundwater discharge/recharge, and wildlife habitat, short-term sediment trapping, flood desynchronization, food chain support, long-term nutrient retention/removal, and long term sediment trapping
UU	0.01 acre	PFO	Jewelweed Willow-herb Red maple Sedge, spp. Rush, spp.	*Impatiens capensis* *Epilobium hirsutum* *Acer rubrum* *Carex spp.* *Juncus spp.*	MlD3-Manor Loam, 15-25 percent	soil saturation, drainage patterns, seep	groundwater discharge recreation
BBB	0.08 acre	PFO	Red maple Spicebush Silky dogwood Skunk cabbage	*Acer rubrum* *Lindera benzoin* *Cornus amomum* *Symplocarpus foetidus*	Glenville silt loam	inundation, soil saturation, drainage patterns, oxidized rhizospheres	sediment/toxicant retention wildlife habitat floodflow alteration groundwater recharge/discharge sediment/shoreline stabilization
DDD	0.22 acre	PEM	Soft rush False nettle Arrow-leaf tearthumb	*Juncus effusus* *Boehmeria cylindrical* *Polygonum sagittatum*	Baile silt loam	inundation, drainage patterns and oxidized rhizospheres	groundwater recharge/discharge sediment toxicant retention nutrient removal

Table III-20: Wetland Summary

Wetland Number	Approx. Size	Cowardin Classification [2]	Dominant Vegetation		Soils	Hydrologic Indicators	Principal Function
EEE	0.12 acre	PEM PFO	Soft rush Broad-leaf cattail Red Maple Arrow-leaf tearthumb	*Juncus effuses* *Typha latifolia* *Acer rubrum* *Polygonum sagittatum*	Manor loam Manor silt loam	inundated, soil saturation, drainage patterns oxidized rhizospheres and water-stained leaves	sediment toxicant retention groundwater recharge/discharge
HHH	0.55 acre	PEM	Arrow-leaf tearthumb	*Polygonum sagittatum*	Manor silt loam	inundation, soil saturation, oxidized rhizospheres and water-stained leaves	sediment toxicant retention groundwater recharge/discharge nutrient removal
1	0.08	PEM	Curly dock Umbrella sage Soft rush Sycamore Cattails Reed canary grass	*Rumex crispus* *Carex lurida* *Juncus effuses* *Nyssa sylvatica* *Typha latifolia* *Phalaris arundinacoa*	Manor loam	Saturated soil, drainage patterns, oxidized root channels	groundwater recharge
3	0.03	PFO	Black willow Virigina knotweed Multiflora rose Pokeweed	*Salix nigra* *Polygonnum virginianum* *Rosa multiflora* *Phytolacca americana*	Manor loam	Inundation, saturated soils	groundwater recharge
4	0.17 acres	PEM	Soft rush Sedge, spp.	*Juncus effuses* *Carex, spp.*	Cs-Comus silt loam	oxidized root channels	groundwater recharge

Notes:
[1]These wetlands extend beyond the area studied for the Wetland Identification and Delineation Report, July 1997.
[2]Cowardin et al. 1979. Classification of wetlands and deepwater habitats of the United States.

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3. Existing Stormwater Management Facilities

During the field studies conducted in 1995, two existing stormwater management areas were found within the study area. These sites appear to fulfill two of the three criteria (vegetation and hydrology) required for jurisdictional wetlands. However, long-term wetland hydrology could not be confirmed with the absence of hydric characteristics in the soils. The soils should gain hydric characteristics over time if wetland hydrology is maintained. One of these stormwater management areas is associated with a development, and the other is an SHA stormwater management facility at the southern limits of the study area (refer to **Appendix A, Sheet 1**).

4. Waters of the United States

As defined by Section 404 of the Clean Water Act, riverine "Waters of the US" were identified in the study area. Waters of the United States include the rivers streams and tributaries that transport surface and groundwater during the year. Waters of the US are described in Section III.E, Surface Water Resources. Waters of the US were updated on the mapping and numbered WUS-1 through WUS-50B.

H. Vegetation and Wildlife

The study area includes woodlands, wetlands, farmlands, and meadows, as well as landscaped and turfed areas associated with developed residential, commercial, recreational, and institutional land uses.

The woodland habitats vary from bottomland floodplain areas dominated by plant species tolerant of semi-saturated and prolonged saturated or inundated conditions, to sloping and level uplands consisting of vegetation tolerant of drier soil environments.

The woodland density varies, with some areas having a fairly dense overstory, subcanopy, shrub and herbaceous cover while other areas have sparse or no subcanopy trees, shrubs and herbaceous species. Past farming practices, road construction, or development have disturbed all wooded areas within the study area.

Based on vegetation, three major habitat types within the study area have been identified: terrestrial (upland), wetland, and aquatic. Many of the wildlife species found in the study area are generalists and use the variety of habitats found in the area. Some species however, have more specific habitat requirements.

1. Terrestrial Habitat and Wildlife

The upland woodlands are dominated primarily by white oak (*Quercus alba*), hickories (*Carya* sp.), tulip tree (*Liriodendron tulipifera*), red maple (*Acer rubrum*), flowering dogwood (*Cornus florida*), Japanese honeysuckle (*Lonicera japonica*), poison-ivy (*Toxicodendron radicans*), and Virginia creeper (*Parthenocissus quinquefolia*). Tree-of-heaven (*Ailanthus altissima*) commonly grows along the roadway and other disturbed woodland edges.

A few meadows/fallow fields are interspersed between the farmed areas, landscaped areas and woodlands and are dominated by various grasses as well as flowering herbs and shrubby species. Plant species occurring in the fallow field areas include meadow fescue (*Festuca pratensis*), goldenrod (*Solidago* spp.), Queen Anne's lace (*Daucus carota*), sour dock (*Rumex crispus*), chicory (*Cichorium intybus*), horse-nettle (*Solanum carolinense*), daisy fleabane (*Erigeron strigosus*), and multiflora rose (*Rosa multiflora*).

The developed areas contain a wide variety of native, naturalized, and ornamental trees, shrubs, and herbaceous plants. These include lawns and other turfed areas, hedgerows, foundation plantings, and flowerbeds.

In the developed areas, wildlife species able to adapt and coexist with humans are commonly found. Certain woodland dwelling mammal species will also occasionally venture onto developed and cropland areas in search of food. Bird species expected to commonly use the developed, cropland and meadow areas, as well as the wooded areas, include mourning dove (*Zenaida maccrouna*), American robin (*Turdus migratorius*), gray catbird (*Dumetella carolinensis*), northern mocking bird (*Mimus polyglottos*), turkey vulture (*Carthartes aura*), common grackle (*Quiscalus quiscula*), and American crow (*Corvus brachyrhynchos*). Mammal and reptile species include red fox (*Vulpes vulpes),* white-tailed deer (*Odocoileus virginianus*), woodchuck (*Marmota monox),* raccoon (*Procyon loter*), gray squirrel (*Sciurus carolinensis),* eastern chipmunk (*Tamias striatus*), Virginia opossum (*Didelphis virginiana*), eastern box turtle (*Terrapine carolina carolina*), and black rat snake (*Elaphe obsoleta obsoleta).*

Forest Interior Dwelling Species (FIDS) are an important part of Maryland's natural heritage and their habitat is monitored by the DNR Heritage and Wildlife Service. FIDS act as an "umbrella species," which is used to indicate the quality and benefits from functions and values of forest ecosystems. Based on initial correspondence with DNR, woodland areas on or adjacent to the project site contain FIDS habitat. A field review and evaluation of aerial photographs subsequently identified four areas of FIDS habitat that border the project area. The areas include: 1) the large woodland tract located north of Dayton Shop and east of MD 32; 2) woodland area east of MD 32 between Triadelphia Road and Regent's Row; 3) woodland areas on both sides of MD 32 at the Middle Patuxent River crossing; and 4) the woodland area surrounding Terrapin Branch south of MD 144 and west of MD 32.

2. Aquatic and Wetland Habitat and Wildlife

The wetland habitats within and adjacent to the study area consist of forested, scrub-shrub and emergent wetlands as well as riverine stream systems. The stream systems are identified and described in **Section III.E** and the wetland systems are discussed in **Section III.G.** The streams crossed within the study area have primarily unvegetated, sand, and gravel channel bottoms. The adjacent channel slopes typically support emergent and scrub-shrub plant species, although some reaches display eroded areas of bare soil. Palustrine deciduous forests often occur on the adjacent floodplains.

The bottomland woodlands are dominated primarily by several species that include red maple (*Acer rubrum*), box elder (*Acer negundo*), sycamore (*Platanus occidentalis*), tulip-tree

(*Liriodendron tulipifera*), spicebush (*Lindera benzoin*), Japanese honeysuckle (*Lonicera japonica*), and spotted touch-me-not (*Impatiens capensis*).
Wetlands occur within or adjacent to floodplains or other areas where a prolonged high water table or other water source sustains plant species. This enables plants to adapt and reproduce in soils which may be saturated or inundated for long periods of time. These species include the following: red maple (*Acer rubrum*), silky dogwood (*Cornus amomum*), spicebush (*Lindera benzoin*), broad-leaved cattail (*Typha latifolia*), spotted touch-me-not (*Impatiens capensis*), soft rush (*Juncus effusus*), sedges (*Carex sp.,* and skunk cabbage (*Symplocarpus foetidus).*

Bird species dependent on aquatic habitats include great blue heron (*Ardea herodias*), mallard (*Anas platyrhynchos*), wood duck (*Aix sponsa*), and red-winged black bird (*Agelaius phoeniceus*). Mammal, reptile, and amphibian species also utilizing these habitats include muskrat (*Ondatra zibethius*), northern water snake (*Nerodia sipedon*), bullfrog (*Rana catesbeiana*), pickerel frog (*Rana palustris*), green frog (*Rana clamitans melanota*), and northern two-lined salamander (*Eurycea bislineata*). Streams and ponds within and adjacent to the study area are considered to be aquatic habitats. Shallow depths in these habitats permit the dense growth of some submerged vascular plant species, which are either attached to the substrate or float freely in the water above the bottom or on the surface. These species include curly pondweed (*Potamogeton crispus*) and common waterweed (*Elodea canadensis*).

Stream systems that occur within the Middle Patuxent River watershed provide food sources and spawning environments for fish species listed in **Table III-21.**

Table III-21: Fish Species Found in the Middle Patuxent River

Common Name	Scientific Name
American Eel[1]	*Anguilla rostrata*
Blacknose Dace[1]	*Rhinichthys atratulus*
Bluegill Sunfish[1]	*Lepomis macrochirus*
Common Shiner[1]	*Luxillus cornutus* (formerly *Notropis c.*)
Creek Chub[1]	*Semotilus atromaculatus*
Cutlip Minnow[1]	*Exoglossum maxillingua*
Fallfish[1]	*Semotilus coporalis*
Golden Shiner	*Notemigonus crysoleucas*
Longnose Dace[1]	*Rhinichthys cataractae*
Margined Madtom	*Noturus insignis*
Northern Hogsucker	*Hypentelium nigricans*
Redbreast Sunfish	*Lepomis auritus*
River Chub	*Nocomis micropogon*
Rosyface Shiner	*Notropis rubellus*
Rosyside Dace[1]	*Clinostomus funduloides*
Satinfin Shiner	*Cyprinella analostana*
Shield Darter	*Percina peltata*
Smallmouth Bass	*Micropterus dolomieu*
Swallowtail Shiner	*Notropis procne*
Tesselated Darter[1]	*Etheostoma olmstedi*
White Sucker[1]	*Catostomus commersoni*

Note: [1]These species were also found in tributaries of the Middle Patuxent, such as Clydes Branch and Benson Branch (DNR: Maryland Biological Stream Survey, March 1997).

DNR's Use I-P instream work restriction period (March 1 through June 15) will protect the spawning period for the rest of the listed fish species and any other fish species likely to reside within the study area (Dintaman, Jr., 1994). Many of the upland species such as American robin, northern mockingbird, gray catbird, red fox, white-tailed deer, raccoon, Virginia opossum, eastern box turtle, and black rat snake also utilize the wetland and aquatic habitats.

3. Rare, Threatened, or Endangered Species

Coordination with the US Fish and Wildlife Service (June 15, 2004) revealed that, except for occasional transient individuals, there are no known Federally or State listed endangered or threatened species under their jurisdiction within the study area. Coordination with the Maryland DNR Fish, Heritage and Wildlife Administration (McKegg, 1994) also stated that there are no known/recorded Federal or State rare, threatened, and endangered plants or animals within the study area. Coordination with the Maryland DNR Environmental Review Program (Dintaman, Jr., 1994) indicates that C. Tsai and S.L. Golembiewski of the Center for Estuarine and Environmental Studies, University of Maryland, reported in a 1979 paper that one glassy darter (*Etheostoma vitreum*), a State endangered finfish species, was captured during fish sampling in the Middle Patuxent River at Triadelphia Road on July 1, 1966. However, DNR does not have any information to document or confirm this record. The Little Patuxent River supports one of two known populations of the endangered fish in the State. Although the Middle Patuxent River flows into the Little Patuxent near the known range of the glassy darter (the Little Patuxent from Savage to the confluence with Patuxent River), the MD 32 study area is located a significant distance upstream.

I. Existing Air Quality

The study area is located in Howard County, Maryland, which is a severe air quality non-attainment area for ozone (O_3). Howard County is not a non-attainment area for carbon monoxide (CO) and Particulate Matter (PM_{10}), Nitrogen Dioxide (NO_2), Sulfur Dioxide (SO_2), or Lead (Pb). Since the study area is in a non-attainment area for ozone, the region is subject to transportation control measures such as the Vehicle Emissions Inspection Program and the State Implementation Plan (SIP). The SIP is determined through a regional air quality analysis performed on the Transportation Improvement Plan (TIP) and transportation plan. This project conforms to the SIP as it originates from a conforming TIP and transportation plan.

A detailed microscale air quality analysis has been performed to determine the local CO impact of the proposed project. Fifty-nine air quality sensitive receptors were used for the analysis. The receptors are residences or historic sites, and were chosen to represent an area for predicting air quality impacts. The locations of air quality sensitive receptors used in the analysis are listed on **Table III-22** and shown on **Figure III-12A** and **12B**. The results are summarized in **Section IV.K.** A copy of the Air Quality Technical Analysis Report is available at the State Highway Administration, 707 North Calvert Street, Baltimore, Maryland 21202.

Table III-22: Air Monitoring Locations

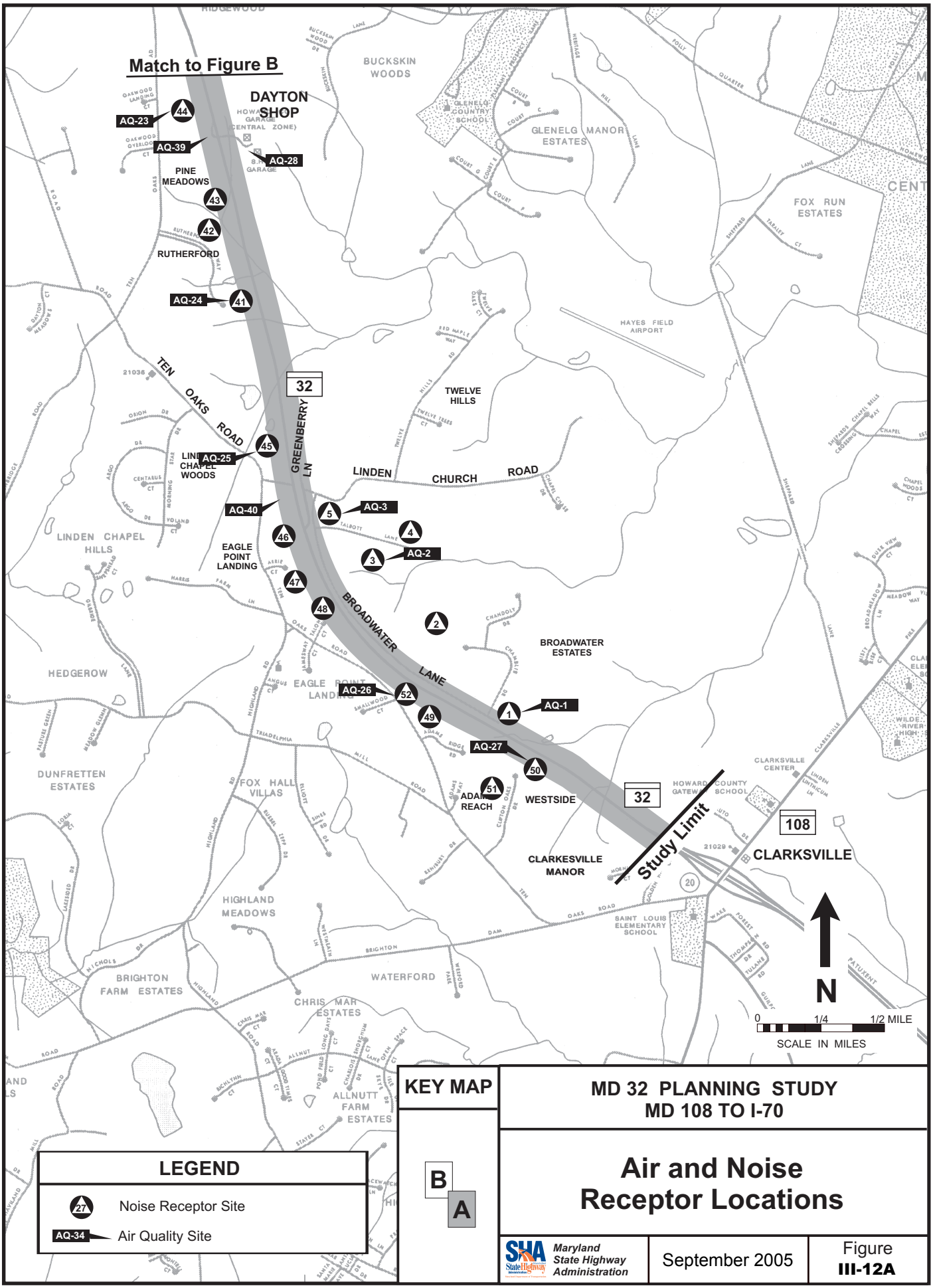
Receptor	Address / Location	Description
R1	Southeast end of Broadwater Lane	Single Family Residence
R2	5577 Broadwater Lane	Single Family Residence
R3	5385 Broadwater Lane	Single Family Residence
R4	5317 Broadwater Lane	Single Family Residence
R5	13125 Linden Church Road	Single Family Residence
R6	13554 Triadelphia Road	Historic Site (Former Westwood M. E. Church)
R7	13523 Triadelphia Road	Single Family Residence
R8	13339 Ridgewood Drive	Single Family Residence
R9	13351 Ridgewood Drive	Single Family Residence
R10	3625 Ivory Road East	Single Family Residence
R10a	3205 Route 32	Single Family Residence (Proposed)
R11	3405 Ivory Road East	Single Family Residence
R12	3220 Regents Row	Single Family Residence
R13	3213 Parliament Place Road	Single Family Residence
R14	3115 Route 32	Single Family Residence
R14a	3120 Stiles Way	Single Family Residence
R15	3262 Rosemary Lane	Single Family Residence
R16	3075 Route 32	Single Family Residence
R17	3035 Route 32	Single Family Residence
R18	2935 Route 32	Single Family Residence
R19	2666 Wellworth Way	Single Family Residence
R20	2620 Lou Anne Court	Single Family Residence
R21	12569 Frederick Road	Single Family Residence
R22	2591 Lou Anne Court	Single Family Residence
R25	12765 Frederick Road	Single Family Residence
R26	12791 Route 144	Single Family Residence
R27	12820 Route 144	Single Family Residence
R28	2740 Route 32	Single Family Residence
R28a	12913 Vista View	Single Family Residence
R29	2710 Route 32	Single Family Residence
R30	3080 Route 32	Single Family Residence
R30a	Rosemary Lane West Frontage Road	Edge of Right-of-Way Sta 321+00
R31	13124 Fox Path Lane	Single Family Residence
R31a	3124 River Valley Chase	Single Family Residence
R32	3101 Fox Path Lane	Single Family Residence
R33	3129 Fox Valley Drive	Single Family Residence
R34	3183 Fox Valley Drive	Single Family Residence
R35	3310 Fox Valley Drive	Single Family Residence
R35a	3325 Fox Valley Drive	Single Family Residence
R35b	3301 Fox Valley Drive	Single Family Residence
R36	13755 Burntwoods Road	Single Family Residence
R36a	13780 Burntwoods Road	Single Family Residence (Proposed)
R36b	13780 Burntwoods Road	Single Family Residence (Proposed)
R37	3625 Ten Oaks Road	Single Family Residence
R38	3753 Ivory Road West	Single Family Residence
R39	4109 Ten Oaks Road	Single Family Residence
R40	4195 Ten Oaks Road	Single Family Residence
R41	4537 Rutherford Way	Single Family Residence

Table III-22: Air Monitoring Locations (Continued)		
Receptor	**Address / Location**	**Description**
R42	4551 Ten Oaks Road	Single Family Residence
R43	4521 Ten Oaks Road	Single Family Residence
R44	4315 Ten Oaks Road	Single Family Residence
R45	5073 Ten Oaks Road	Single Family Residence
R46	5199 Ten Oaks Road	Single Family Residence
R47	5306 Aerie Court	Single Family Residence
R48	5427 Talon Court	Single Family Residence
R49	5508 Ten Oaks Road	Single Family Residence
R50	5936 Clifton Oaks Drive	Single Family Residence
R51	5931 Clifton Oaks Drive	Single Family Residence
R52	5505 Ten Oaks Road	Single Family Residence

J. Existing Noise Conditions

As listed in **Table III-23** and shown on **Figure III-12**, there are 58 receptor sites located within 15 Noise Sensitive Areas (NSAs) characterized by noise levels at specific locations within each NSA. The NSAs are generally residential areas, although a church is also included as a receptor site. These sites were selected to represent the existing noise environment in those areas adjacent to MD 32 involving regular human use or activities that would be susceptible to adverse noise impacts from highway generated noise. A NSA may represent several residences or an entire community. Noise receptor sites represent individual analysis sites within the NSA. Refer to **Section IV.J** for a detailed explanation of approved SHA noise criteria.

In this study, noise levels are presented in terms of the A-weighted equivalent sound level, abbreviated L_{eq}. L_{eq} is a single number representation of the actual fluctuating sound level that accounts for all sound energy during a given period of time. The units of L_{eq} are A-weighted decibels or dBA. The A-weighting means that the sound is measured by a method that approximates the response of the human ear, with de-emphasis of the low and very high frequencies and emphasis on the mid-frequency noise level range. In order to give a sense of perspective to the noise levels discussed, the following noise level descriptions are provided; a quiet rural night would register about 40 dBA, a quiet suburban night about 60 dBA, a noisy day about 80 dBA, a gas lawn mower at 100 feet about 70 dBA, and a diesel truck at 50 feet about 85 dBA. Under typical field conditions, noise level changes of 2 to 3 dBA are barely perceptible, while a change of 5 dBA is readily noticeable. A 10 dBA increase in noise level is judged by most people as a doubling of sound loudness.


Match to Figure B
DAYTON SHOP
AQ-23
AQ-39
AQ-28
PINE MEADOWS
RUTHERFORD
AQ-24
TEN OAKS ROAD
GREENBERRY LN
AQ-25
LINDEN CHAPEL WOODS
AQ-40
AQ-3
AQ-2
LINDEN CHURCH ROAD
TWELVE HILLS
EAGLE POINT LANDING
BROADWATER LANE
BROADWATER ESTATES
AQ-26
AQ-1
AQ-27
WESTSIDE
ADAM REACH
HOWARD COUNTY GATEWAY SCHOOL
CLARKSVILLE CENTER
CLARKSVILLE
CLARKESVILLE MANOR
Study Limit
SAINT LOUIS ELEMENTARY SCHOOL
BUCKSKIN WOODS
GLENELG COUNTRY SCHOOL
GLENELG MANOR ESTATES
FOX RUN ESTATES
HAYES FIELD AIRPORT
LINDEN CHAPEL HILLS
HEDGEROW
DUNFRETTEN ESTATES
FOX HALL VILLAS
HIGHLAND MEADOWS
BRIGHTON FARM ESTATES
WATERFORD
CHRIS MAR ESTATES
ALLNUTT FARM ESTATES
32
108
20
N
0 1/4 1/2 MILE
SCALE IN MILES
LEGEND
Noise Receptor Site
Air Quality Site
KEY MAP
B
A
MD 32 PLANNING STUDY
MD 108 TO I-70
Air and Noise Receptor Locations
Maryland State Highway Administration
September 2005
Figure III-12A

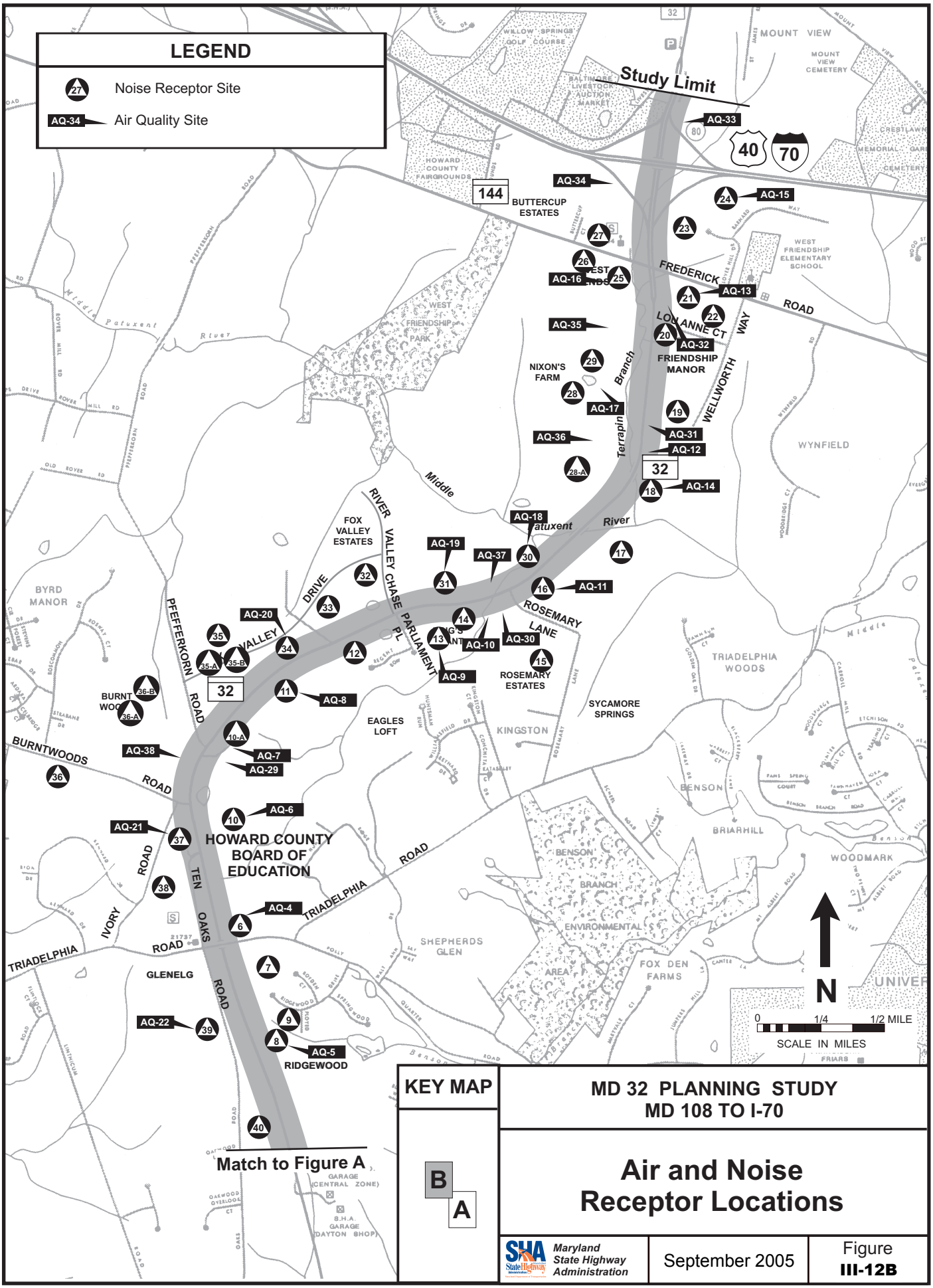

LEGEND
Noise Receptor Site
Air Quality Site
Study Limit
AQ-33
AQ-34
AQ-15
AQ-16
AQ-13
AQ-35
AQ-32
AQ-17
AQ-31
AQ-12
AQ-36
AQ-14
AQ-18
AQ-19
AQ-37
AQ-11
AQ-20
AQ-10
AQ-30
AQ-9
AQ-8
AQ-38
AQ-7
AQ-29
AQ-6
AQ-21
AQ-4
AQ-22
AQ-5
HOWARD COUNTY BOARD OF EDUCATION
BUTTERCUP ESTATES
FRIENDSHIP MANOR
NIXON'S FARM
WEST FRIENDSHIP ELEMENTARY SCHOOL
WYNFIELD
FOX VALLEY ESTATES
ROSEMARY ESTATES
SYCAMORE SPRINGS
EAGLES LOFT
KINGSTON
TRIADELPHIA WOODS
BENSON
BRIARHILL
WOODMARK
BENSON BRANCH
ENVIRONMENTAL AREA
FOX DEN FARMS
SHEPHERDS GLEN
GLENELG
RIDGEWOOD
BYRD MANOR
BURNT WOODS
FRIENDSHIP PARK
MOUNT VIEW
MOUNT VIEW CEMETERY
CRESTLAWN MEMORIAL GARDENS CEMETERY
HOWARD COUNTY FAIRGROUNDS
WILLOW SPRINGS GOLF COURSE
BALTIMORE LIVESTOCK AUCTION MARKET
FREDERICK ROAD
LORRAINE CT
WAY
WELLWORTH
Terrapin Branch
Middle Patuxent River
RIVER VALLEY CHASE PL
PARLIAMENT
ROSEMARY LANE
PFEFFERKORN ROAD
VALLEY DRIVE
BURNTWOODS ROAD
TEN OAKS ROAD
IVORY ROAD
TRIADELPHIA ROAD
Match to Figure A
GARAGE (CENTRAL ZONE)
B.H.A. GARAGE (DAYTON SHOP)
N
0 1/4 1/2 MILE
SCALE IN MILES
KEY MAP
B
A
MD 32 PLANNING STUDY
MD 108 TO I-70
Air and Noise Receptor Locations
Maryland State Highway Administration
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Figure III-12B

Table III-23: Noise Sensitive Areas (NSA)

NSA	Description	Number of Residences	Number of Receptors
A	NB MD 32: Broadwater Estates, from Chamblis Drive to Linden Church Road. (Sta. 135+00 to 200+00)	27	5
B	NB MD 32: Vicinity of Triadelphia Road (Sta. 310+00 to 340+00)	12+ Historic Property	4
C	NB MD 32: Vicinity of Ivory Road (Sta. 370+00 to 390+00)	14	3
D	NB MD 32: Parliament Place to Rosemary Lane (Sta. 415+00 to 455+00)	28	5
E	NB MD 32: Rosemary Lane to Middle Patuxent River (Sta. 455+00 to 475+00)	3	2
F	NB MD 32: Middle Patuxent River to MD144 (Sta. 500+00 to 530+00)	20	5
G	NB MD 32: At I-70 interchange (Sta. 500+00 to 550+00)	5	2
H	SB MD 32: At MD 144 intersection (Sta. 530+00)	5	3
I	SB MD 32: Vicinity of Nixon's Farm Lane (Sta. 500+00 to 510+00)	17	3
J	SB MD 32: Fox Valley Estates (Sta. 380+00 to 460+00)	50	8
K	SB MD 32: Vicinity of Burntwoods Road (Sta. 345+00 to 365+50)	9	3
K-1	SB MD 32: NW quadrant at Burnt Woods Road (Sta. 365+50 to 375+00)	27	2
L	SB MD 32: Vicinity of Ten Oaks Road (Sta. 305+00 to 325+00)	8	2
M	SB MD 32: Rutherford Community (Sta. 240+00 to 290+00)	20	4
N	SB MD 32: Eagle Point Landing & Adams Reach Communities (Sta. 120+00 to 220+00)	32	8

A field measurement program to establish ambient noise levels was conducted from April 1998 through June 1998. An acoustical analysis measurement of the ambient noise levels is required to establish the basis for impact analysis and to calibrate the Traffic Noise Model (TNM version 2.1) computer model. The ambient noise levels shown in **Table III-24**, recorded over 15-minute periods, represent a generalized view of current highway traffic noise levels. Measurements were taken between 10 a.m. and 3 p.m. on weekdays to determine what typical daytime noise levels at these sites. Traffic (autos, medium truck and heavy trucks) counts were taken at receptor sites during the noise measurement sessions. In addition to the 15-minute measurements, 24-hour measurements were taken at selected locations. The results and analysis of these measurements are in **Section IV.J**, as well as the Noise Analysis Technical Report is available at the Maryland State Highway Administration, 707 North Calvert Street, Baltimore, Maryland 21202.

Using this data, an adjusted peak ambient noise level was developed at each receptor site. This adjusted level represents the peak noise level to be expected during a 24-hour period. The traffic volumes combined with existing topographic and roadway alignment data were used in the TNM

2.1 computer model. If the computer model results were not within 3 dBA of the ambient measurement, then additional measuring and/or modeling was performed until the model was calibrated. It should be noted that, in addition to noise generated by traffic, the ambient measurements include background noise such as crickets, wind, rustling leaves and aircraft/helicopter flyovers. However, when there is significant traffic, the contribution of background noise to the ambient noise level is usually negligible. Background noise that could be considered excessive is noted at the time of measurement and results in the retaking of a measurement if the model cannot be calibrated.

Locations and descriptions of each NSA along with the receptor sites. and the results of the ambient noise monitoring program are presented in **Table III-24**. Peak ambient levels ranged from 51 to 71 dBA. As expected, the lower values were found in isolated areas, while the higher values were found near existing roads.

Table III-24: Ambient Noise Levels

NSA	Rec.	Location	Description	Peak Ambient (dBA)
A	1	South East End of Broadwater Lane	Single Family Residence	61
	2	5577 Broadwater Lane, Broadwater Estates	Single Family Residence	54
	3	5385 Broadwater Lane, Broadwater Estates	Single Family Residence	60
	4	5317 Talbot Lane	Single Family Residence	51
	5	13125 Linden Church Road	Single Family Residence	55
B	6	Westwood Church - 13554 Triadelphia Road	Church (Historic Property)	67
	7	13523 Triadelphia Road	Single Family Residence	58
	8	13339 Ridgewood Drive	Single Family Residence	66
	9	13351 Ridgewood Drive	Single Family Residence	58
C	10	3625 Ivory Road East	Single Family Residence	63
	10-A	Under Construction	Single Family Residence	57
	11	3405 Ivory Road East	Single Family Residence	70
D	12	3220 Regents Row at King's Grant Community	Single Family Residence	63
	13	3213 Parliament Place Road	Single Family Residence	55
	14	3115 NB MD 32	Single Family Residence	59
	14-A	3120 Stiles Way	Single Family Residence	63
	15	3262 Rosemary Lane	Single Family Residence	57
E	16	3075 NB MD 32	Single Family Residence	68
	17	3035 NB MD 32	Single Family Residence	57
F	18	2935 NB MD 32	Single Family Residence	71
	19	2666 Wellworth Way at Friendship Manor	Single Family Residence	55
	20	2620 Lou Anne Court at Friendship Manor	Single Family Residence	68
	21	12569 EB MD144	Single Family Residence	57
	22	2591 Lou Anne Court at Friendship Manor	Single Family Residence	52
G	23	12575 Clover Hill Drive, WB MD144	Single Family Residence	62
	24	12592 Clover Hill Drive, WB MD144	Single Family Residence	64

Table III-24: Ambient Noise Levels (Continued)

NSA	Rec.	Location	Description	Adjusted Ambient (dBA)
H	25	12765 EB MD144	Single Family Residence	60
	26	12791 EB MD144	Single Family Residence	60
	27	12790 WB MD144	Single Family Residence	60
I	28	2740 SB MD 32	Single Family Residence	56
	28-A	12913 Vista View	Single Family Residence	58
	29	2710 SB MD 32	Single Family Residence	57
J	30	3080 SB MD 32	Single Family Residence	63
	31	13124 Fox Path Lane, North at Fox Valley Estates	Single Family Residence	57
	32	3101 Fox Valley Drive at Fox Valley Estates	Single Family Residence	55
	33	3129 Fox Valley Drive at Fox Valley Estates	Single Family Residence	53
	34	3183 Fox Valley Drive at Fox Valley Estates	Single Family Residence	58
	35	3310 Fox Valley Drive at Fox Valley Estates	Single Family Residence	57
	35-A	3325 Fox Valley Drive	Single Family Residence	62
	35-B	Fox Valley Drive	Single Family Residence	63
K	36	13755 Burntwoods Road	Single Family Residence	58
	37	3625 Ten Oaks Road	Single Family Residence	62
	38	3753 Ivory Road West	Single Family Residence	57
K-1	36-A	Under Construction	Single Family Residence	60
	36-B	Under Construction	Single Family Residence	59
L	39	4109 Ten Oaks Road	Single Family Residence	61
	40	4195 Ten Oaks Road	Single Family Residence	61
M	41	4537 Rutherford Way	Single Family Residence	59
	42	4551 Ten Oaks Road	Single Family Residence	54
	43	4521 Ten Oaks Road	Single Family Residence	65
	44	4315 Ten Oaks Road	Single Family Residence	64
N	45	5073 Ten Oaks Road	Single Family Residence	62
	46	5199 Ten Oaks Road	Single Family Residence	59
	47	5306 Aerie Court - Eagle Point Landing	Single Family Residence	60
	48	5427 Talon Court	Single Family Residence	61
	49	5508 Ten Oaks Road	Single Family Residence	62
	50	5936 Clifton Oaks Drive	Single Family Residence	62
	51	5931 Clifton Oaks Drive	Single Family Residence	57
	52	5505 Ten Oaks Road	Single Family Residence	62

K. Visual Quality

Visual resources of a landscape include the visual character and elements within the study area. The visual landscape is bounded by those areas that can be seen from the study area, as well as those areas, which afford a view of the project itself. The MD 32 corridor offers views from and to properties adjacent to the roadway. No regional vista points were identified. Mobile viewers of the landscape include pleasure drivers, commuters, and truck drivers, among others. Stationary viewers of visual landscape include residents, farmers, business employees, consumers, and tourists.

1. Methodology

Viewsheds are determined by review of land use mapping and field reconnaissance throughout the study area to assist in the evaluation of the visual quality of the area. A viewshed is "the surface area visible from a given view point or series of view points; it is also the area from which that view point or series of view points may be seen" (FHWA, Visual Impact Assessment for Highway Projects, 1981). A viewshed may also be defined as, "a tool for identifying the views that a project could actually affect" (FHWA, 1981).

2. Existing Visual Environment

Farmland, open space, woodland, and single family homes in large lot subdivisions (greater than one-acre lots) dominate the visual landscape in the study area. The generally rolling topography limits low-lying views to the immediate vicinity and elevated views to the hilltops. Given the study area's relatively gentle relief, opportunities for expansive vistas are limited. Additionally, public views are limited to views from roadways, as a majority of the properties adjacent to MD 32 are privately owned. The topography of the study area is discussed in **Section III.D.1.**

Field visits were conducted during which the existing visual character of the study area was documented through photography. No expansive vistas were identified. Views of the MD 32 roadway are accessible from individual properties as well as from roadway overpasses. Views from the MD 32 roadway are of the farms, residences, rolling hills, and woodland.

L. Municipal, Industrial and Hazardous Waste Sites

1. Initial Site Assessment Methodology

An Initial Site Assessment (ISA) was conducted in 1999 to identify the potential presence of hazardous or other environmentally sensitive waste sites that could impact the study area. An updated environmental database report, dated September 27, 2004, contains detailed information about potential hazardous materials sites that may impact the study area. Copies of both reports are available for review at the State Highway Administration, 707 North Calvert Street, Baltimore, Maryland 21202.

The tasks of the ISA included the following:

- Research and review available public records to identify recognized environmental conditions in connection with the study area, including records maintained by the EPA, MDE, and Howard County.

  a) Review environmental databases including the Comprehensive Environmental Response, Compensation and Liability Information System (CERCLIS); the National Priorities List (NPL); Hazardous Waste Sites (SHWS); Solid Waste Facilities (SWF); Underground Storage Tanks (USTs); Resource Information System Treatment Storage and Disposal (RCRIS-TS); RCRIS Large Quantity Generator (RCRIS-LQG); and RCRIS Small Quantity Generator (RCRIS-SQG).

  b) Research and review available related aerial photographs (current and historical), topographic maps, land ownership/development maps, soils maps, hydrological maps, geologic maps, and Sanborn fire insurance maps.

- Perform a field reconnaissance of the study area and facilities to identify recognized environmental conditions.

- Interview key personnel to obtain information regarding the environmental conditions of the project corridor, if available.

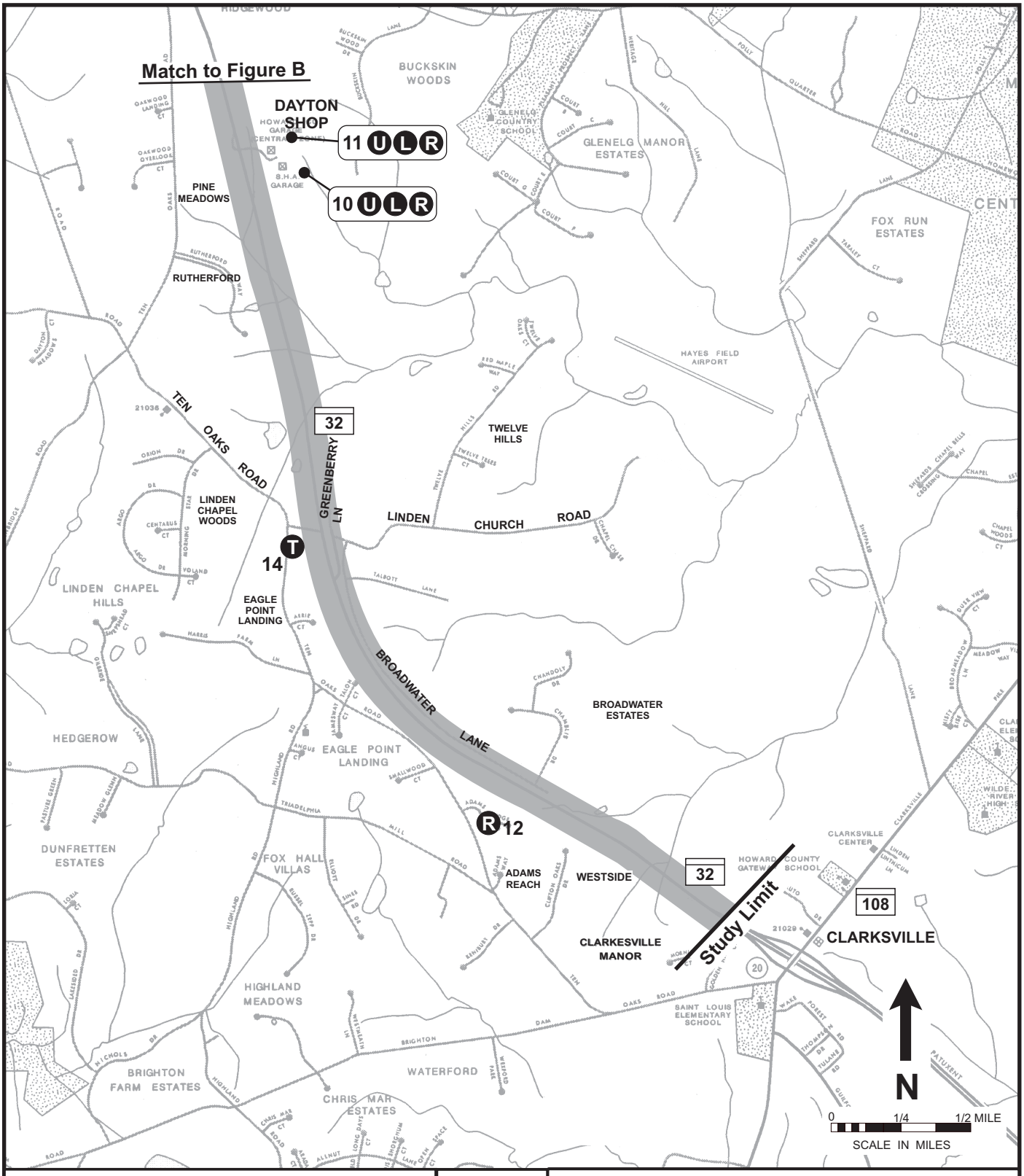
- Develop recommendations and a preliminary work plan for further investigation as part of a Phase II - Preliminary Site Investigation (PSI), if warranted.

2. Environmental Database Review

Based upon a review of the environmental database report and observations made during the field reconnaissance of the study area, the sites described below were identified as having documented or potential releases of contamination, or for maintaining operations which involve the generation of hazardous wastes. For more information on the sites of environmental concern, refer to the environmental database report which is available for review at the State Highway Administration, 707 North Calvert Street, Baltimore, Maryland 21202.

a. Resource Conservation and Recovery Act

The Resource Conservation and Recovery Act (RCRA) databases includes selected information on sites that generate, store, treat, or dispose of hazardous waste as defined by the RCRA. The source of these databases is the EPA, and they include the Resource Information System Treatment Storage and Disposal (RCRIS-TS) database; RCRIS Large Quantity Generator (RCRIS-LQG) database; and RCRIS Small Quantity Generator (RCRIS-SQG) database. These sites are listed in the Resource Conservation and Recovery Information System (RCRIS). A total of six sites within the vicinity of the study area were identified on the RCRIS database. The site numbers in **Table III-24** refer to the locations as noted on **Figure III-13A** and **13B**.



LEGEND

- U Underground Storage Tank (UST)
- L Leaking UST
- R RCRA Waste Site
- T Transformers

KEY MAP

B
A

MD 32 PLANNING STUDY
MD 108 TO I-70

Potential Hazardous Materials Locations

Maryland State Highway Administration

September 2005

Figure III-13A

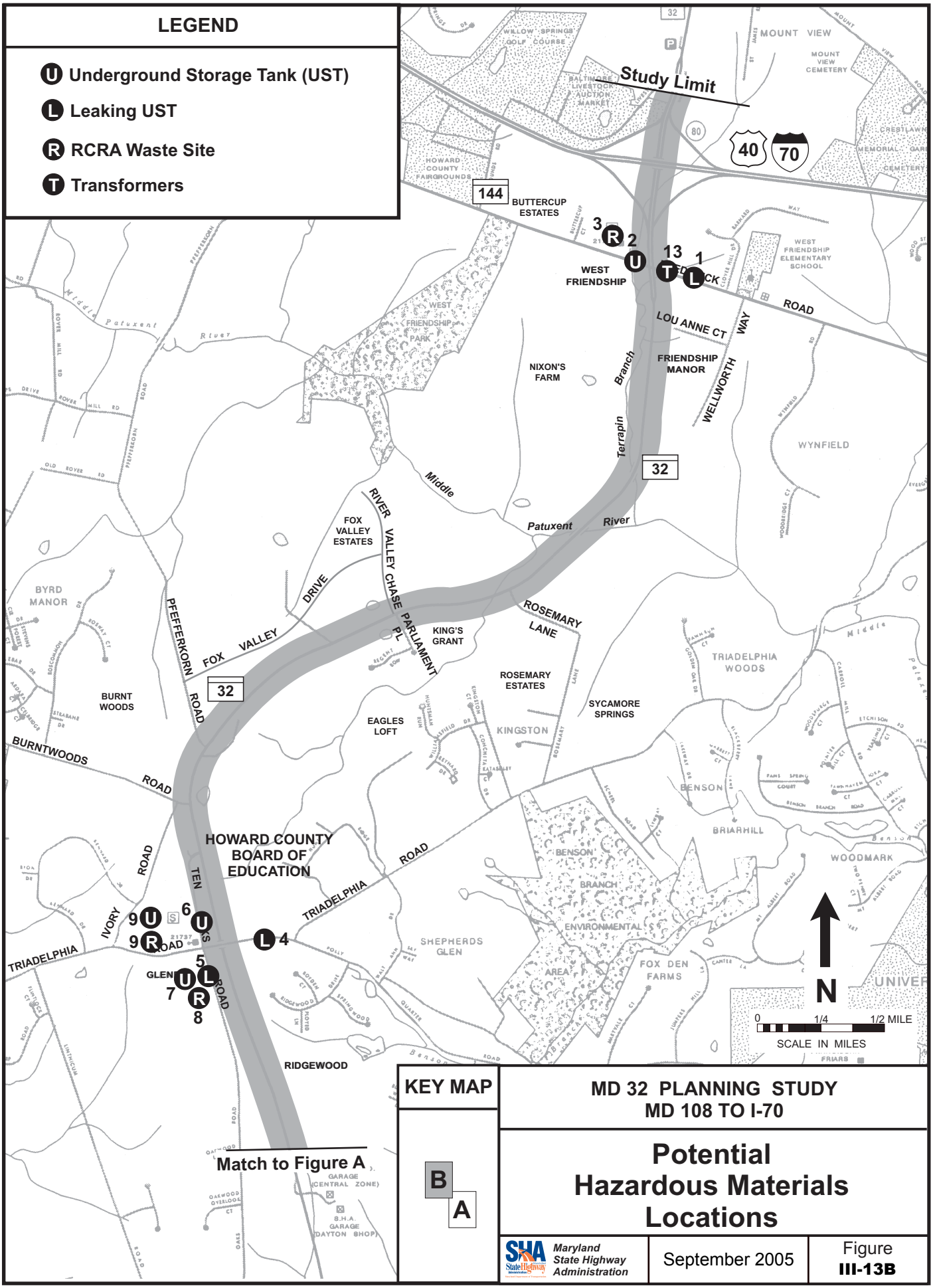

LEGEND
U Underground Storage Tank (UST)
L Leaking UST
R RCRA Waste Site
T Transformers
Study Limit
MOUNT VIEW
MOUNT VIEW CEMETERY
WILLOW SPRINGS GOLF COURSE
BALTIMORE LIVESTOCK AUCTION MARKET
HOWARD COUNTY FAIRGROUNDS
CRESTLAWN MEMORIAL GARDENS CEMETERY
40
70
144
BUTTERCUP ESTATES
WEST FRIENDSHIP
WEST FRIENDSHIP ELEMENTARY SCHOOL
LOU ANNE CT
WAY
ROAD
FRIENDSHIP PARK
NIXON'S FARM
Branch
FRIENDSHIP MANOR
WELLWORTH
Terrapin
WYNFIELD
32
Middle
Patuxent
River
FOX VALLEY ESTATES
RIVER
VALLEY CHASE
PARLIAMENT
PL
KING'S GRANT
ROSEMARY LANE
ROSEMARY ESTATES
SYCAMORE SPRINGS
TRIADELPHIA WOODS
BYRD MANOR
PFEFFERKORN
FOX
VALLEY
DRIVE
ROAD
BURNT WOODS
EAGLES LOFT
KINGSTON
BENSON
BRIARHILL
WOODMARK
BURNTWOODS
ROAD
HOWARD COUNTY BOARD OF EDUCATION
TEN
TRIADELPHIA
IVORY
SHEPHERDS GLEN
BENSON BRANCH
ENVIRONMENTAL AREA
FOX DEN FARMS
GLENWOOD
RIDGEWOOD
Match to Figure A
GARAGE (CENTRAL ZONE)
B.H.A. GARAGE (DAYTON SHOP)
N
0 1/4 1/2 MILE
SCALE IN MILES
KEY MAP
B
A
MD 32 PLANNING STUDY
MD 108 TO I-70
Potential Hazardous Materials Locations
Maryland State Highway Administration
September 2005
Figure III-13B

Table III-25: RCRIS Listed Sites

Site Number	EDR Map ID	RCRIS Description	
		Classification	Violation Status
3	**1**	Small Quantity Generator	No Violations
8	**5**	Small Quantity Generator	No Violations
9	**5**	Small Quantity Generator	No Violations
13	**7**	Small Quantity Generator	No Violations
10	*****	Small Quantity Generator	No Violations
11	*****	Small Quantity Generator	No Violations

Notes: * Orphan Site – a site that could not be mapped using the environmental database search; therefore, it was located by field reconnaissance.

b. Underground Storage Tanks

The Underground Storage Tank (UST) database contains registered USTs, which are regulated under Subtitle I of RCRA. The database is maintained by MDE and refers to all registered USTs with and without documented leaks or corrective action. A total of nine sites within the vicinity of the study area were identified on the UST database. The site numbers in **Table III-25** refer to the locations as noted on **Figure III-13A** and **13B**.

c. Leaking Underground Storage Tanks

The Leaking Underground Storage Tank (LUST) database contains UST locations currently undergoing corrective or remedial action. The source for this data is MDE. A total of three sites within the vicinity of the study area were identified on the LUST database. The site numbers in **Table III-26** refer to the locations as noted on **Figure III-13A** and **13B**.

Table III-26: Underground Storage Tanks

Site Number	EDR Map ID	UST Description		
		Quantity and Size	**Product**	**Status**
1	**1**	2–550 gallon	Heating Oil	Removed
		2–1,000 gallon	Gasoline	Permanently Out of Use
		1–550 gallon	Kerosene	Permanently Out of Use
		2–550 gallon	Gasoline	Removed
2	**1**	2–10,000 gallon	Gasoline	Currently in Use
4	**5**	2–275 gallon	Gasoline	Permanently Out of Use
6	*****	1-20,000 gallon	Gasoline	Currently in Use
7	**5**	1–10,000 gallon	Diesel Fuel	Currently in Use
		1–10,000 gallon	Gasoline	Currently in Use
		1–8,000 gallon	Gasoline	Currently in Use
9	**5**	1–1,000 gallon	Other	Permanently Out of Use
		2–10,000 gallon	Diesel	Permanently Out of Use
		1–1,000 gallon	Used Oil	Permanently Out of Use
		1–1,000 gallon	Gasoline	Permanently Out of Use
		2–1,000 gallon	Not Reported	Permanently Out of Use
10	**6**	1–10,000 gallon	Diesel	Permanently Out of Use
		1–10,000 gallon	Diesel	Currently in Use
		1–275 gallon	Heating Oil	Permanently Out of Use
		1–10,000 gallon	Gasoline	Currently in Use
		1–2,000 gallon	Heating Oil	Permanently Out of Use
		1–2,000 gallon	Gasoline	Currently in Use
		1–500 gallon	Used Oil	Permanently Out of Use
		1–3,000 gallon	Heating Oil	Permanently Out of Use
		1–1,000 gallon	Kerosene	Permanently Out of Use
		1–1,000 gallon	Gasoline	Permanently Out of Use
		2–1,000 gallon	Gasoline	Permanently Out of Use
11	**6**	2–10,000 gallon	Diesel Fuel	Currently in Use
		1–10,000 gallon	Gasoline	Currently in Use
		1–6,000 gallon	Heating Oil	Currently in Use
		1–1,000 gallon	Used Oil	Currently in Use
		1 – 2,000 gallon	Kerosene	Currently in Use
12	*****	1-2,000 gallon	Diesel	Permanently Out of Use
		1-2,000 gallon	Gasoline	Permanently Out of Use

Notes: * Orphan Site – a site that could not be mapped using the environmental database search; therefore, it was located by field reconnaissance.

Table III-27: Leaking Underground Storage Tanks

Site Number	EDR Map ID	LUST Description	
		Status	**Recovery Type**
1	**1**	Closed	Monitoring w/no active remediation.
4	**5**	Open	Monitoring w/no active remediation.
5	**5**	Open	Monitoring w/no active remediation.

3. Aerial Photography Review

Aerial photographs of Howard County from 1963, 1970, 1980, and 1993 were reviewed. The aerial photographs were reviewed for indications of potential hazardous waste locations within the vicinity of the study area; none were identified.

The 1963, 1970, and 1980 aerial photographs show that the adjoining properties to the study area consisted of a combination of agricultural and wooded land. Scattered residential development was found across the vicinity of the study area.

The 1993 aerial photograph showed the conversion of areas adjoining the study area to residential development. Commercial development was also present in areas adjacent to the study area and at the north and south terminuses of the study area.

4. Field Reconnaissance

The purpose of the field reconnaissance on October 1, 2004 and October 22, 2004 was to identify obvious environmental concerns within the study area. Also, the field reconnaissance provided an opportunity to confirm the locations and potential recognized environmental conditions associated with adjoining properties that were identified in the environmental database search or on aerial photographs, which may be impacted in the study area.

The study area is comprised mainly of a combination of residential, agricultural, and woodland properties. Commercial development is present primarily along the north and south termini of the study area and along road intersections with MD 32 including Triadelphia Road, Ten Oaks Road, and MD 144. Industrial development does not appear to be present currently or have occurred historically throughout the study area or within its general vicinity. The right-of-way consists of a combination of woodland buffer and vacant land with scattered adjoining residential and commercial properties throughout.