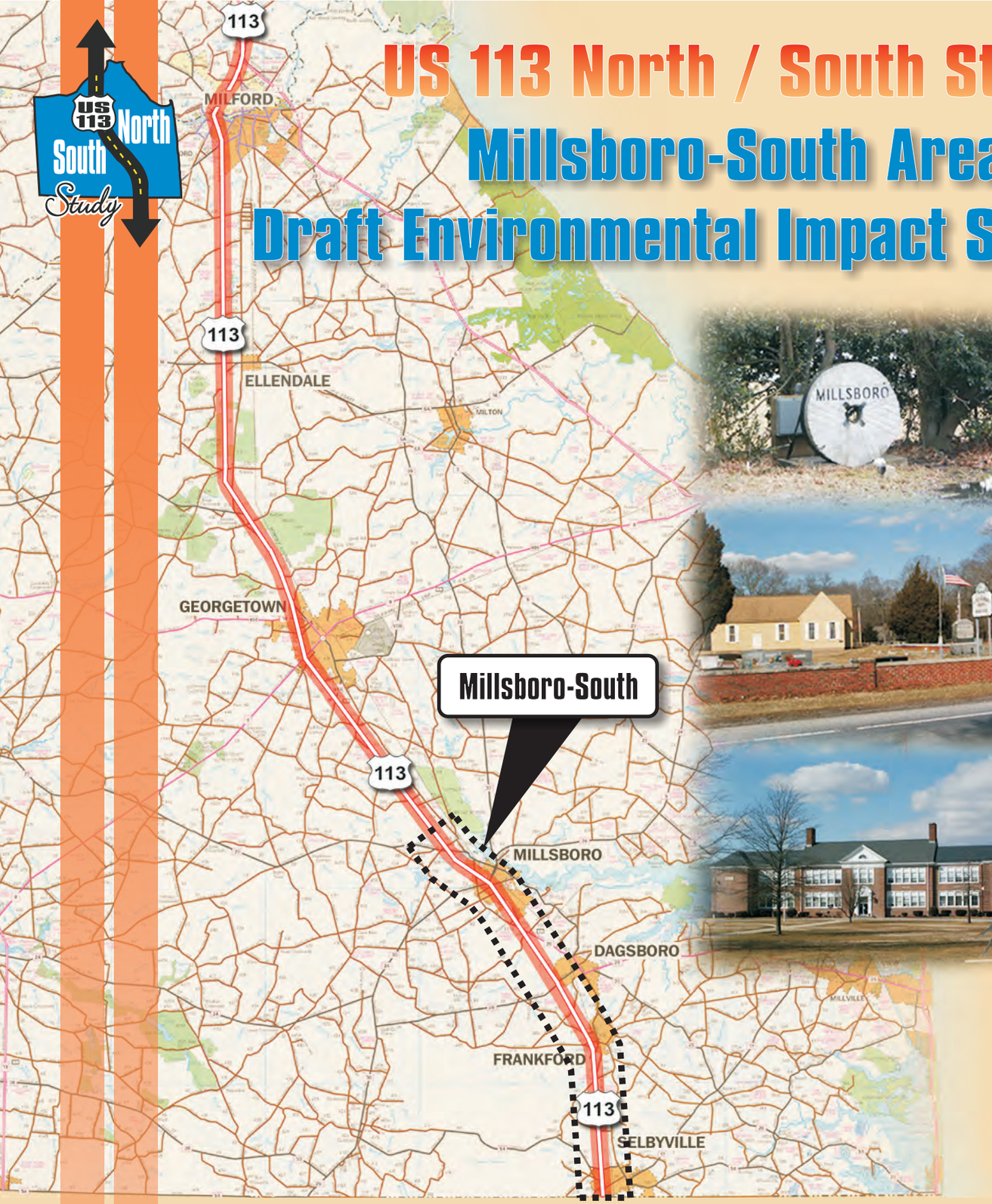
US 113 North / South Study

Millsboro-South Area

Draft Environmental Impact Statement



Federal Highway Administration

Delaware Department of Transportation

Sussex County Delaware

July 2013

FHWA ID No. E8–23669

US 113 North/South Study

From South of the Intersection of US 113 and Avenue of Honor to South of the MD State Line,
Sussex County, Delaware

MILLSBORO-SOUTH AREA
DRAFT ENVIRONMENTAL IMPACT STATEMENT (DEIS)

SUBMITTED PURSUANT TO
42 USC 4332(2)(C) and CEQ Regulations (40 CFR 1500 (et. seq.))

by the

United States Department of Transportation
Federal Highway Administration

and the

Delaware Department of Transportation

In cooperation with:

United States Army Corps of Engineers
United States Environmental Protection Agency
United States Fish and Wildlife Service

8/1/2013
Date of Approval

Mary Ridgeway
Mary Ridgeway, P.E.
Division Administrator
Federal Highway Administration

8/2/2013
Date of Approval

Natalie Barnhart
Natalie Barnhart, P.E.
Chief Engineer
Delaware Department of Transportation

The purpose of this project is to establish the southern link in a continuous limited access facility from the Maryland/Delaware state line to SR 1 near Dover Air Force Base. Specific needs to be addressed by the proposed US 113 Millsboro-South project include: meeting the growing traffic demand created by existing and future development in the area; considering safety issues; preserving a transportation corridor; considering modal interrelationships; and maintaining consistency with federal, state, and local plans for transportation systems. The project area in Sussex County, Delaware, is centered on US 113. It extends approximately four miles west of Dagsboro; approximately two miles east of Dagsboro; approximately one mile south of the Maryland/Delaware state line; and approximately two miles north of Betts Pond. Evaluated alternatives include the No-Build and five build alternatives (Green, Purple, Yellow, Red, and Blue). Each build alternative consists of a four-lane, limited access highway facility. This document describes and summarizes the environmental impacts and costs associated with each of the alternatives. The Blue alternative is recommended by the Delaware Department of Transportation as the Preferred Alternative for the project.

Information on the date, time, and location of the public hearing will be published in local newspapers. Comments on the DEIS are due by October 4, 2013 and may be submitted to either of the addresses below or made orally at the public hearing.

Additional project information, including an electronic version of this document, is available on the project website, http://deldot.gov/information/projects/us113/. The following persons may be contacted for additional information concerning this document:

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TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

APPENDICES

EXECUTIVE SUMMARY

A. Administrative Action

(x) Draft Environmental Impact Statement
(x) Section 4(f) Evaluation - project is anticipated to be processed as *de minimis* (23CFR774)
(_) Final Environmental Impact Statement
(_) Record of Decision

B. Informational Contacts

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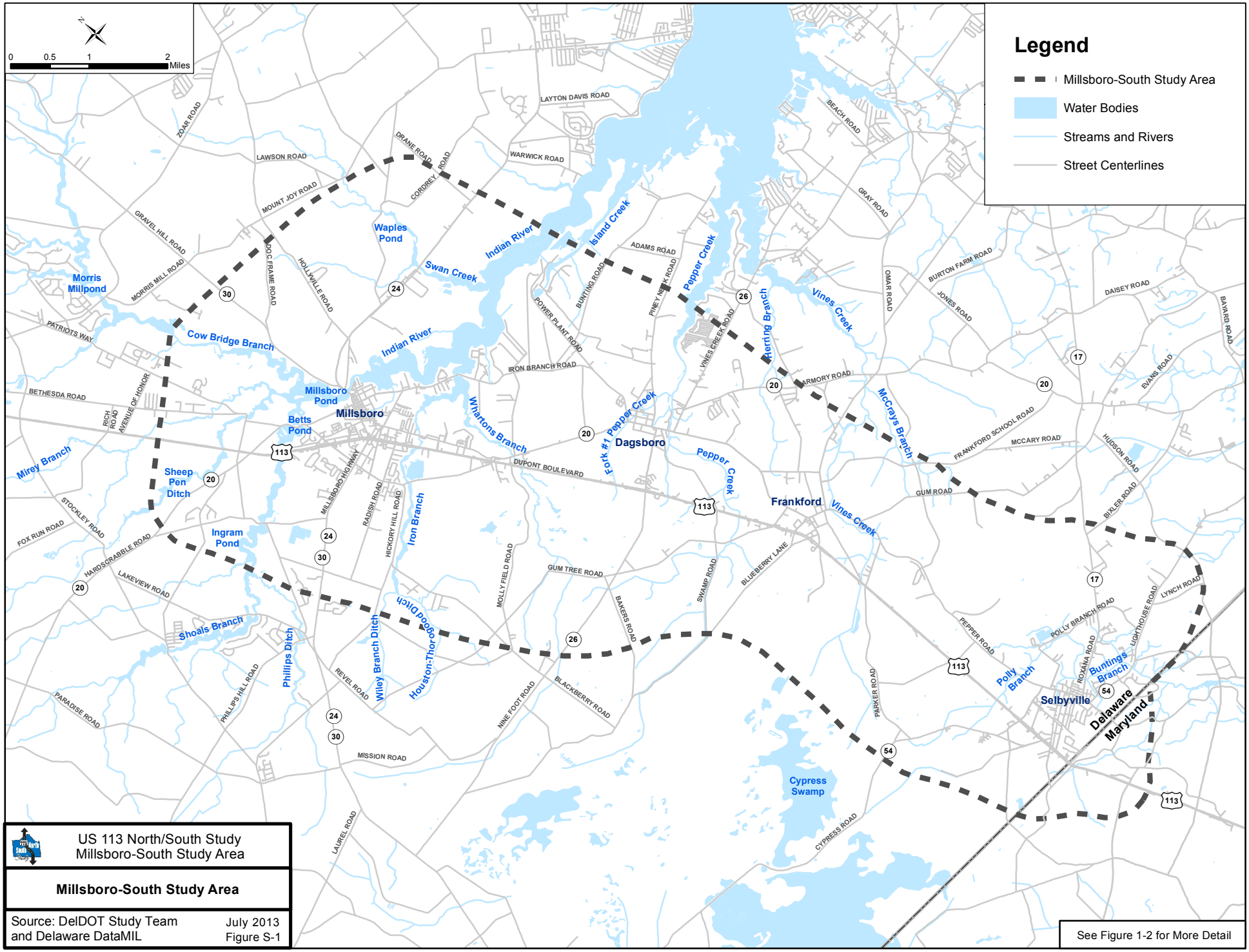
C. Summary Table of Contents

D. Description of Proposed Action/Purpose and Need

The Millsboro-South Study is a portion of the larger US 113 North/South Study, whose objective is to preserve a corridor for future expansion of US 113 from Milford, Delaware, to just south of the Maryland/Delaware line. The study area, shown on **Figure S-1**, is focused on the towns of Selbyville, Frankford, Dagsboro, and Millsboro, Delaware, and is approximately 14.3 miles long. Originally, the Millsboro-South study area was a component of the larger Georgetown-South study area, shown on **Figure S-2**, which extended further north along US 113, ending near Ellendale. After preliminary studies and extensive outreach to the resource agencies and general public, the Federal Highway Administration determined it was appropriate to separate the Georgetown area from the remaining portion of the previous Georgetown-South area. Improvements to US 113 in the Georgetown area were evaluated in an Environmental Assessment, and the remaining study area was renamed Millsboro-South. See **Chapter 1** for more details.

The current study area extends from 1.1 miles south of the Maryland/Delaware line near Selbyville to 0.5 miles south of the intersection of US 113 and Avenue of Honor (Road 86), in Sussex County. At its widest, the study area spans approximately 5.6 miles, extending east of US 113 to an area near the intersection of Cordrey Road (Road 308) and Drane Road (Road 309), northeast of Waples Pond, just west of Ingram Pond, and west of US 113.

Regionally, US 113 extends approximately 73 miles from US 13 in Pocomoke City, Maryland, to Delaware Route 1 (SR 1) in Milford. US 13 begins just north of Fayetteville, North Carolina, and extends approximately 526 miles to US 1 near Morrisville, Pennsylvania. The US 113/US 13 corridor in the Mid-Atlantic Region is depicted on **Figure S-3**. In addition to being an arterial connection for agricultural and industrial interests on the Eastern Shore of Virginia, Maryland and Delaware, this corridor functions as an alternative to the heavily traveled I-95 between the Richmond, Washington, Baltimore, and Wilmington metropolitan areas. It also receives heavy use for trips between the Norfolk area in Virginia and the Wilmington/Philadelphia region.

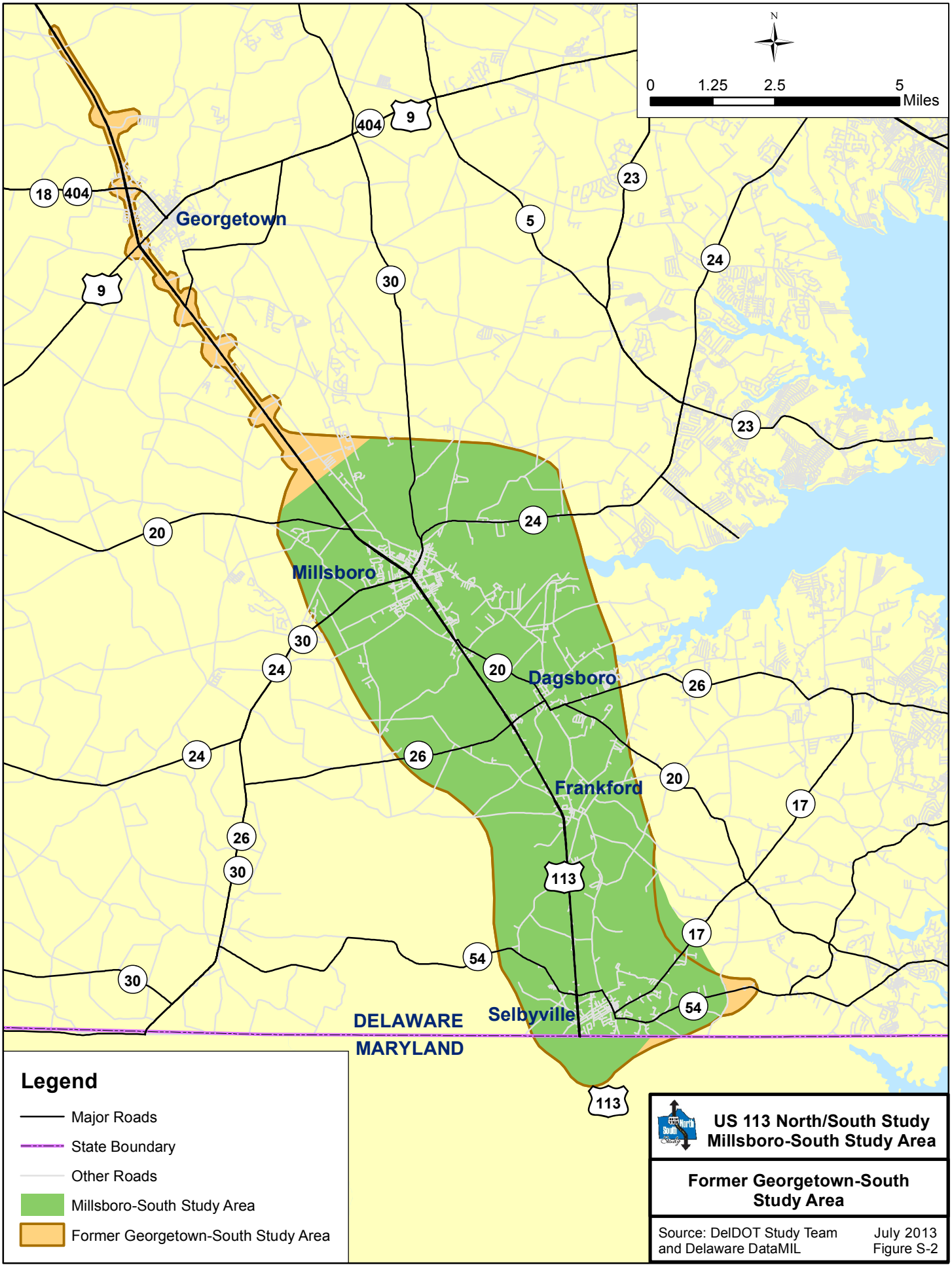


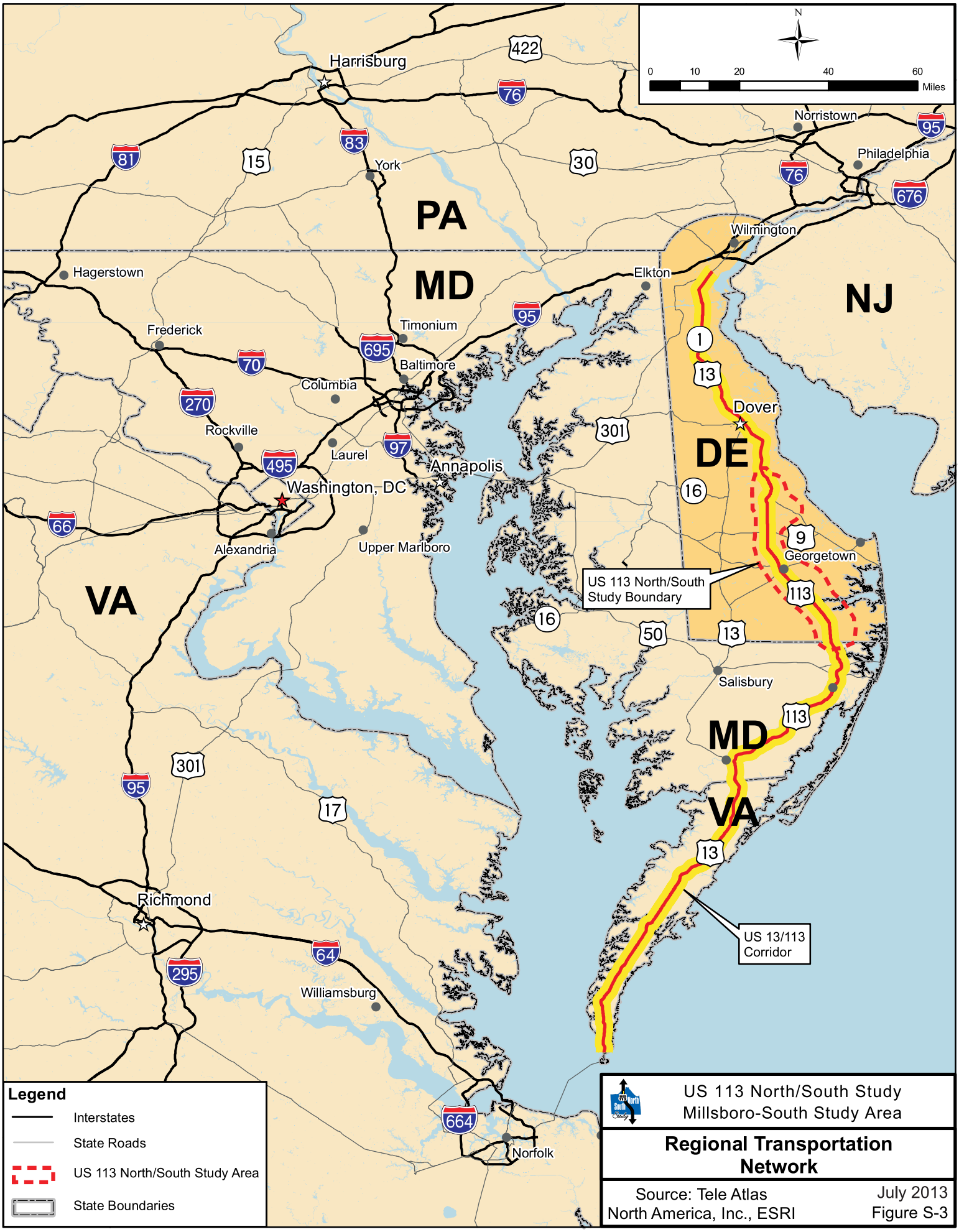
US 113 North/South Study
Millsboro-South Study Area

Millsboro-South Study Area

Source: DelDOT Study Team and Delaware DataMIL

July 2013
Figure S-1


N
0
1.25
2.5
5
Miles
Georgetown
Millsboro
Dagsboro
Frankford
Selbyville
DELAWARE
MARYLAND
18
404
9
30
5
23
24
20
26
113
17
54
Legend
Major Roads
State Boundary
Other Roads
Millsboro-South Study Area
Former Georgetown-South Study Area
US 113 North/South Study
Millsboro-South Study Area
Former Georgetown-South Study Area
Source: DelDOT Study Team and Delaware DataMIL
July 2013
Figure S-2


N
0 10 20 40 60
Miles
Harrisburg
422
76
83
81
15
York
30
Norristown
95
Philadelphia
76
676
PA
Wilmington
Hagerstown
MD
Elkton
NJ
Frederick
Timonium
95
695
70
Baltimore
Columbia
270
Rockville
Laurel
97
301
Dover
DE
495
Annapolis
Washington, DC
16
66
Alexandria
Upper Marlboro
9
Georgetown
US 113 North/South
Study Boundary
VA
113
16
50
13
Salisbury
MD
113
301
95
17
VA
13
Richmond
64
295
US 13/113
Corridor
Williamsburg
664
Norfolk
Legend
Interstates
State Roads
US 113 North/South Study Area
State Boundaries
US 113 North/South Study
Millsboro-South Study Area
Regional Transportation Network
Source: Tele Atlas North America, Inc., ESRI
July 2013
Figure S-3

In the late 1990s Delaware experienced unprecedented growth, faster than at any other time in history. Due to the nationwide economic downturn, growth began to slow in 2005. Despite this slowdown, new residential, commercial, and industrial projects are replacing farm fields and are expected to increase Sussex County's population and employment by 60 percent over the next 30 years. Continued development in the study area would require additional access points and traffic signals along US 113, resulting in greater conflicts, reduced safety, and increased traveler delay. The purpose and need for the US 113 North/South Study, including the Millsboro-South portion, are summarized below.

- US 113 is a regionally important east coast route that follows a 73-mile corridor beginning near Pocomoke City, Maryland and ending just north of Milford in Kent County, Delaware. It is a designated emergency evacuation route and one of two major north/south highways on the Delmarva Peninsula that provide a connection from Dover, Delaware to southern Maryland and the Eastern Shore of Virginia. Maintaining adequate traffic capacity along emergency evacuation routes is critical to the safety of local and seasonal residents. Roadway improvements along US 113 within the Millsboro-South Project Area would help ensure that regional evacuation routes are accessible and efficient.

- Due to the expected future land development and economic growth in Sussex County and the increased use of the resort area in southeastern Sussex County (both in the summer and year round), regional traffic traveling through the Delmarva Peninsula is expected to increase substantially during the next 25 years. Together these factors result in the need to identify and protect a corridor to preserve mobility for the study area's residents and businesses while providing highway improvements that would accommodate the anticipated growth in local, seasonal, and regional traffic.

- Improvements that would limit access are planned on US 113 south of Selbyville and north of Milford. Creating a limited access connection through the Millsboro-South study area would maintain system compatibility and continuity, and would allow US 113 to more efficiently serve future transportation needs. Subsequent to DelDOT's announcement of the Recommended Preferred Alternative in the Milford area, the General Assembly passed Senate Bill 155, the Fiscal Year 2008 Bond Bill. The epilogue language of the bill states that DelDOT "shall be prohibited from proceeding with the US 113 South/North Improvements Project in the Lincoln and Milford area as proposed in the Department's Capital Transportation Program." Although there are no current plans to continue the NEPA process for the Milford Area, there is a transportation benefit to the proposed improvements in the Millsboro-South Area.

- The Millsboro-South study area has a density of traffic signals and driveways on US 113 that is inconsistent with its function as a rural principal arterial and part of the National Highway System (NHS). NHS highways are designed to carry long distance traffic safely at relatively high speeds. Although relatively unlimited access to US 113 has enhanced the ability of the study area to compete economically, the lack of access control is inconsistent with the goals of the NHS.

- As Selbyville, Frankford, Dagsboro, and Millsboro annex new areas, as discussed by each town's most recent comprehensive plan, pressure to provide more access and traffic signals along US 113 in the study area is likely to increase. The consequences of accommodating growth, in the absence of a plan to proactively manage highway access (or of an alternative facility to serve through traffic growth), would result in the continued degradation in traffic service along US 113.

- Many of the vehicle trips on US 113 are the result of travel to nearby beaches, especially during peak tourist season, when average daily traffic increases by 60 percent. With peak season traffic predicted to increase at a steady rate, congestion in the beach area would remain at or exceed current levels, even with planned improvements. Traffic diversions from SR 1 to US 113 are likely to increase as travelers become aware of the time savings, until travel times on the two routes become similar.

- Critical ratios are used to determine whether or not a roadway segment has a higher crash rate than similar roadways. In the study area, 37 percent of US 113 exceeds the statewide crash standard for roadways of its type. Average response times for emergency vehicles are less than seven minutes, but during periods of heavy congestion and the peak tourist season, response times increase to 14 - 20 minutes.

- Eight state and local programs and plans have stated a need to accommodate future development without degrading the capacity of US 113 in the Millsboro-South study area. Local comprehensive plans, in particular, are interested in separating local and through traffic. Delaware's *Transportation Management Plan for Evacuation* discusses the importance of US 113 and the roads that cross it in the study area in terms of the state's emergency evacuation plan.

- Emergency evacuation is a concern in Sussex County due to the threat of coastal storms and flooding. This issue has become more apparent in recent years due to the impact of major storms and the flooding susceptibility of SR 1. US 113 is a designated north-south evacuation route from Kent County in the north to the Maryland state line in the south. Additionally, SR 20, SR 24, SR 54, and US 9, all of which cross US 113, are designated as east-west emergency evacuation routes. Maintaining adequate traffic capacity along evacuation routes is critical to the safety of Sussex County residents. Roadway improvements from this portion of the US 113 project, coupled with the proposed improvements along adjacent segments of US 113 in Delaware, would help ensure that regional evacuation routes are accessible and efficient.

E. Alternatives Considered

Four broad-ranged concepts were initially considered in the project development process: No-build, Transportation Systems Management (TSM), Mass Transit, and build alternatives. The

latter consisted of several build alternatives, utilizing both on-alignment (existing US 113) and new locations (eastern and western bypasses).

Only the build alternatives meet the project's purpose and need. However, the No-build Alternative does provide a baseline condition with which to compare other alternatives and their consequences, so it is retained for evaluation purposes. Since neither the Mass Transit Alternative nor the TSM Alternative individually meet the purpose and need, they have been dropped from consideration. The build alternatives are being carried forward for a comparison of their impacts.

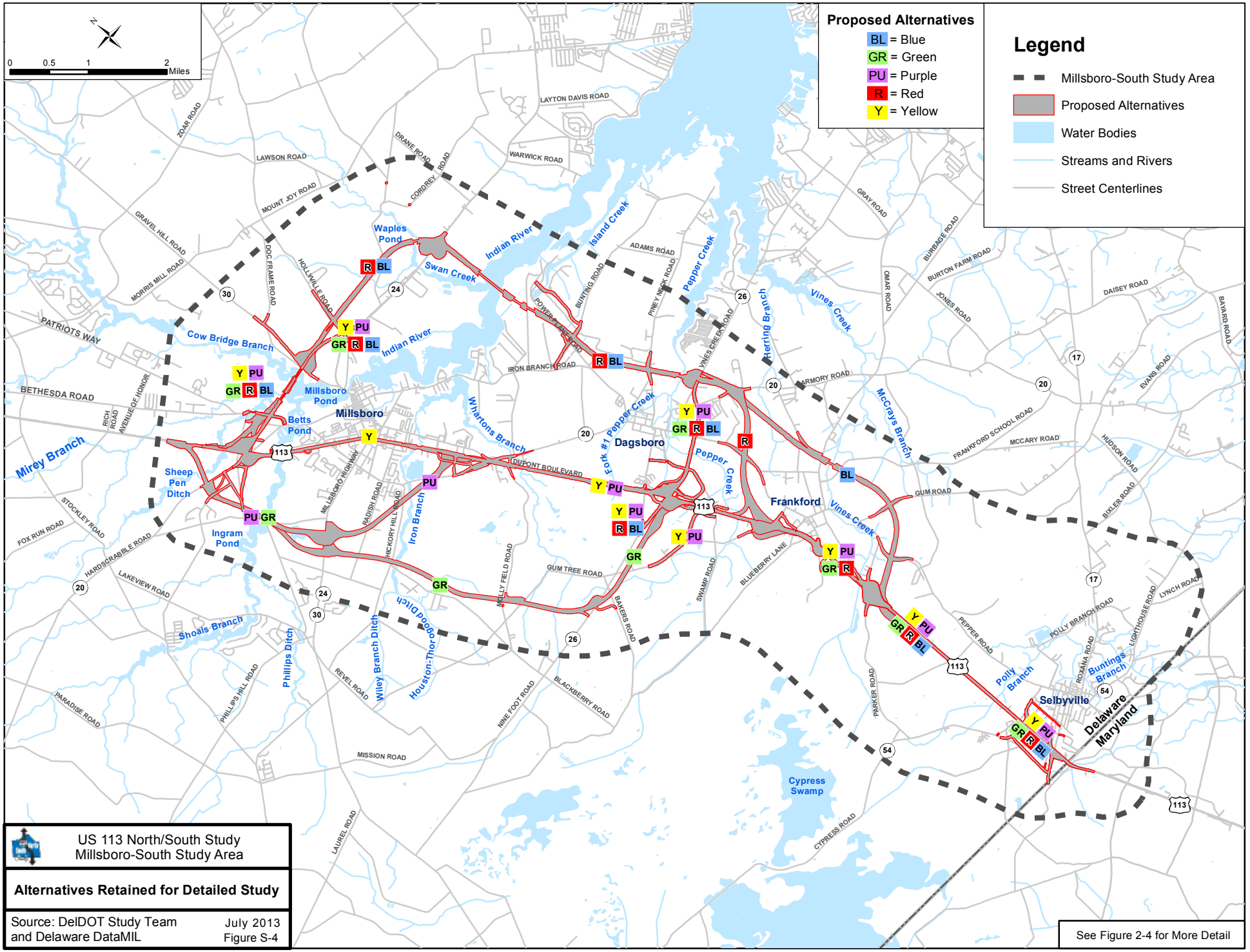
Initially, 20 individual segments were combined to create bypass alternatives and an on-alignment alternative. Based on evaluations of the environmental impacts of the build alternatives and on their ability to meet project purpose and need, as well as engineering considerations, resource agency consultation and coordination, and public input, numerous segments and alternatives were eliminated from consideration. One on-alignment and four bypass alternatives, along with the No-Build Alternative, were retained for further study.

The build alternatives retained for detailed study were given the names of colors. The No-build Alternative did not receive a name. The on-alignment alternative was named Yellow, the western bypasses were named Green and Purple, and the eastern bypasses were named Red and Blue. At this time, these are the proposed build alternatives under consideration in this document. They are shown on **Figure S-4**.

All of the build alternatives would provide a four-lane, limited-access highway from north of the Town of Selbyville to 0.5 miles south of the intersection of US 113 and Avenue of Honor. Based on discussions with Selbyville, all of the build alternatives would follow the existing US 113 alignment through town and provide controlled access with all east/west cross traffic navigating across overpasses. All of the build alternatives would also include east/west connector roads at SR 24 and SR 26. The intent of the connector roads is to provide a more direct east-west route with full access to US 113 at grade separated intersections. Details of the build alternatives are summarized below and described in more detail in **Section 2.6** of the *Draft Environmental Impact Statement*.

No-build Alternative
The No-build Alternative includes the existing network of roads plus the currently programmed, committed, and funded roadway projects, with the exception of the US 113 North/South Study, as listed in DelDOT's *2030 Constrained Long Range Plan*. The build alternatives are compared to the No-build Alternative with respect to impacts to the natural and built environment.

Green Alternative
The Green Alternative is 14.5 miles long and would begin on US 113, just south of the Maryland/ Delaware state line. It would follow existing US 113 for approximately 6.4 miles before diverging to the west near SR 26. It shifts back to the east near Hardscrabble Road, and


Proposed Alternatives
BL = Blue
GR = Green
PU = Purple
R = Red
Y = Yellow
Legend
Millsboro-South Study Area
Proposed Alternatives
Water Bodies
Streams and Rivers
Street Centerlines
0 0.5 1 2 Miles
Millsboro
Dagsboro
Frankford
Selbyville
Delaware
Maryland
Millsboro Pond
Betts Pond
Ingram Pond
Waples Pond
Swan Creek
Indian River
Island Creek
Pepper Creek
Herring Branch
Vines Creek
McCrays Branch
Cow Bridge Branch
Whartons Branch
Fork #1 Pepper Creek
Iron Branch
Mirey Branch
Sheep Pen Ditch
Shoals Branch
Phillips Ditch
Wiley Branch Ditch
Houston-Thorogood Ditch
Polly Branch
Buntings Branch
Cypress Swamp
LAYTON DAVIS ROAD
WARWICK ROAD
LAWSON ROAD
MOUNT JOY ROAD
GRAVEL HILL ROAD
MORRIS MILL ROAD
PATRIOTS WAY
BETHESDA ROAD
DRAKE ROAD
CORDREY ROAD
ZOAR ROAD
DOC FRAME ROAD
HOLLYVILLE ROAD
IRON BRANCH ROAD
POWERFIELD ROAD
BUNTING ROAD
PINEY NECK ROAD
ADAMS ROAD
VINES CREEK ROAD
ARMORY ROAD
GRAY ROAD
BUREAGE ROAD
BURTON FARM ROAD
JONES ROAD
OMAR ROAD
DAISEY ROAD
BAYARD ROAD
EVANS ROAD
HUDSON ROAD
BIXLER ROAD
LYNCH ROAD
FRANKFORD SCHOOL ROAD
MCCARY ROAD
GUM ROAD
DUPONT BOULEVARD
MILLSBORO HIGHWAY
RADISH ROAD
HICKORY HILL ROAD
MOLLY FIELD ROAD
GUM TREE ROAD
BAKERS ROAD
SWAMP ROAD
BLUEBERRY LANE
POLLY BRANCH ROAD
PEPPER ROAD
ROXANA ROAD
LIGHTHOUSE ROAD
PARKER ROAD
NINE FOOT ROAD
BLACKBERRY ROAD
REVEL ROAD
MISSION ROAD
PHILLIPS HILL ROAD
PARADISE ROAD
LAUREL ROAD
CYPRESS ROAD
FOX RUN ROAD
STOCKLEY ROAD
HARDSCRABBLE ROAD
LAKEVIEW ROAD
RICH ROAD
AVENUE OF HONOR
US 113 North/South Study
Millsboro-South Study Area
Alternatives Retained for Detailed Study
Source: DelDOT Study Team and Delaware DataMIL
July 2013
Figure S-4
See Figure 2-4 for More Detail

rejoins US 113 with a partial interchange approximately half-way between Patriots Way and Avenue of Honor. It would include six full interchanges, three partial interchanges, eight new overpasses, and three surface water crossings (Pepper Creek, Iron Branch, and Cow Bridge Branch).

Purple Alternative
The Purple Alternative would span 14.0 miles, beginning on US 113 just south of the Maryland/ Delaware state line. It would follow US 113 north for approximately 9.3 miles to the outskirts of Millsboro, before shifting to the west near City Road in Millsboro. The alternative shifts back to the east near Hardscrabble Road and rejoins US 113 with a partial interchange approximately half-way between Patriots Way and Avenue of Honor. It would include seven full interchanges, two partial interchanges, six new overpasses, and three surface water crossings (Pepper Creek, Iron Branch, and Cow Bridge Branch).

Yellow Alternative
The Yellow Alternative would begin on US 113, just south of the Maryland/Delaware state line. It would continue for 13.2 miles, following US 113 north to a partial interchange at Hardscrabble Road/Thompsonville Road. It would include eight full interchanges, two partial interchanges, three new overpasses, and two surface water crossings (Pepper Creek and Cow Bridge Branch).

Red Alternative
The Red Alternative would extend 16.3 miles, beginning on US 113 just south of the Maryland/ Delaware state line. It would diverge from US 113 approximately 5.4 miles north of its southern terminus, between Frankford and Dagsboro, and head east to SR 20 (Armory Rd.). It would then head north, cross SR 24, and head back west between Longwood Pond and Waples Pond. This alternative would end with a new interchange on existing US 113, between Patriots Way and Sheep Pen Ditch. It would include eight full interchanges, one partial interchange, five overpasses, and four surface water crossings (Pepper Creek, Indian River, Swan Creek, and Cow Bridge Branch).

Blue Alternative
The Blue Alternative is 16.5 miles long, and would begin on US 113 just south of the Maryland/ Delaware state line. Approximately 3.8 miles north on US 113, slightly south of Parker Road, it would shift to the east, and then head north after crossing Gum Road. After crossing the Indian River near Swan Creek, it would head back to the west near Longwood Pond and Waples Pond. It would then head north, cross SR 24, and head back west between Longwood Pond and Waples Pond. This alternative would rejoin US 113 with a new interchange between Patriots Way and Sheep Pen Ditch, and would end just after crossing Sheep Pen Ditch. It would include six full interchanges, nine overpasses, and five surface water crossings (Vines Creek, Pepper Creek, Indian River, Swan Creek, and Cow Bridge Branch).

Selection of a Recommended Preferred Alternative

Based on an evaluation of all of the impacts identified in this document, along with input from the resource and regulatory agencies and the public, DelDOT has recommended Blue as the Recommended Preferred Alternative for the Millsboro-South project. Among the considerations for this recommendation are impacts to communities (property acquisition, potential relocation issues, and community facilities); natural resources (wetlands and other Waters of the US, endangered species habitat, and forests); historic resources (physical, visual, and noise effects); and engineering design (ability to meet project purpose and need, design complexity, construction costs, constructability of an On-alignment vs. a Bypass alternative). Another consideration is the potential for the Blue Alternative to function as an effective emergency evacuation route. The Blue Alternative provides the longest continuous segment of limited access highway among the build alternatives. The increase in traffic capacity, direct connections to major east/west routes, and the proximity to the beach resort areas are all important factors in providing safe and efficient emergency evacuation. DelDOT would finalize the selection of a Preferred Alternative prior to issuance of the Final Environmental Impact Statement (FEIS).

F. Summary of Potential Impacts

The impacts of each of the build alternatives are compared to the No-build Alternative. The results of the evaluation are summarized in **Table S-1** and the following paragraphs. These impacts are calculated based on the limits of disturbance as determined by the current level of design, and may change as the design becomes more refined. Highlights of the table are detailed below.

Neither the No-build nor any of the build alternatives would cause the area to exceed the National Ambient Air Quality Standards for carbon monoxide. None of the proposed alternatives would have disproportionately high and adverse impacts to populations in poverty or minority populations (environmental justice) and none would impact State Nature Preserves, Wild or Scenic Rivers, State Forest Lands, properties purchased with Land and Water Conservation Fund monies, or publicly-owned wildlife refuges. All of the build alternatives would impact Millsboro Pond, a publicly-owned recreational resource subject to Section 4(f) requirements under 23 CFR 774.

Comparing the impacts of each build alternative, the table shows that Green (Western Bypass) would have the fewest impacts to schools. It would require the fewest relocations of families. However, it impacts more acres of Agricultural Preservation Easements than the other build alternatives resulting in the highest agricultural relocations, and would have the greatest impacts to Waters of the United States (WOUS) and tax ditches.

The Purple Alternative (Western Bypass) has the lowest anticipated cost, and it would not disproportionately impact minority populations. However, it would impact more wetlands and cemeteries than the other build alternatives and would require the most residential and business

Table S-1: Impact Summary[1]

	Alternative					
	No-build	**Green**	**Purple**	**Yellow**	**Red**	**Blue**
Length: miles	13.2	14.5	14.0	13.2	16.3	16.5
Preliminary Cost: millions of dollars	0	$629-$769	$562-$686	$607-$742	$671-$820	$687-$839
Wetlands: acres	0	24.9	31.3	20.1	26.5	30.8
Waters of the US: linear feet	0	22,453	15,034	14,376	16,653	19,246
Subaqueous Lands: linear feet	0	17,250	13,808	13,000	17,894	20,851
Tax Ditches: linear feet	0	26,772	18,544	18,544	19,772	14,842
Rare, Threatened and Endangered Species Habitat: acres	0	246	287	199	502	485
Prime Farmland Impacts: acres	0	54.1	46.0	40.7	45.6	64.9
Cultural Resources Impacts						
# NRHP Listed/Eligible Sites in the Limits of Disturbance	0	19	20	21	19	14
# Known Archaeological Sites in the Limits of Disturbance	0	1	0	0	1	1
Properties Potentially Subject to Section 4(f)						
# Publicly-owned Parks and Recreation Areas	0	1	1	1	1	1
# Cultural Resources	0	1	2	2	2	2
# Publicly-owned Wildlife and Waterfowl Refuges	0	0	0	0	0	0
Section 6(f) Property Impacts						
Properties Purchased with Land and Water Conservation Fund	0	0	0	0	0	0
Acreage Purchased with Land and Water Conservation Fund	0	0	0	0	0	0
Natural Area Impacts						
State Natural Areas (acres)	0	12.2	12.2	12.2	23.0	23.0
State Nature Preserves	0	0	0	0	0	0
Environmental Justice (Disproportionate Impacts)						
Populations in Poverty	No	No	No	No	No	No
Minority Populations	No	No	No	No	No	No

Table S-1: Impact Summary[1]

	Alternative					
	No-build	**Green**	**Purple**	**Yellow**	**Red**	**Blue**
Community Facilities Impacts						
Schools	0	0	1	1	2	1
Churches	0	1	2	4	1	1
Cemeteries	0	3	5	4	4	2
Parks and Recreational Facilities	0	1	2	2	1	1
Relocations						
# of Residential Properties	0	43	72	68	67	52
# of Commercial Properties	0	24	36	33	23	10
# of Agricultural Properties	0	11	9	4	9	9
# of Other Properties	0	0	2	2	0	0
Total	0	78	119	107	99	71
Other Considerations						
Agricultural District Impacts (number/acres)	0/0	1/1.9	1/1.9	1/1.9	1/5.3	1/5.3
Agricultural Preservation Easement Impacts (number/acres)	0/0	1/18.6	0	0	0	3/11.6
Forested Land Impacts: 2007 Land Use (acres)	0	70	62	42	131	162
State Forest Land Impacts	0	0	0	0	0	0
Air Quality (Number of sites that Exceed NAAQS for CO)	0	0	0	0	0	0
Noise Impacts (Residences)	0	97	174	190	89	100

[1]*Note: The data in this table are from a variety of sources and from different dates.*

relocations and most relocations overall. Along with Yellow, it would impact the most park and recreation areas.

The Yellow Alternative (On-alignment) is the shortest and has the fewest impacts to wetlands, WOUS, subaqueous lands, prime farmland, forestland, agricultural properties, and to habitat for rare, threatened, and endangered species. It would not impact any known archaeological sites or Agricultural Preservation Easements. However, it impacts more churches than the other build alternatives and would create noise impacts to the greatest number of residences. Along with Purple, it would impact the most park and recreation areas.

The Red Alternative (Eastern Bypass) would impact the most schools and prime farmland. It would create the fewest residential noise impacts. It would have the greatest impacts to habitat for rare, threatened, and endangered species. Along with Blue, it would impact the most acres of Agricultural Districts and State Natural Areas.

The Blue Alternative (Eastern Bypass) is the longest of the proposed build alternatives and has the highest estimated cost. It would have the greatest impacts to subaqueous lands, prime farmland, and forestland. Along with Red, it would impact the most acres of Agricultural Districts, and State Natural Areas. However, it would have the fewest impacts to tax ditches, properties eligible for or listed on the National Register of Historic Places, and cemeteries. It would lead to the fewest business relocations and fewest relocations overall.

Information about specific resources is provided in the following paragraphs. Many of these resources are not quantified in **Table S-1**, but details are found in **Chapter 3** of this **Draft EIS** and in the following documentation completed for this Study.

- Air Quality
- Historic Properties (Archaeology/Architectural)
- Natural Resources
- Noise
- Secondary and Cumulative Effects Analysis
- Socioeconomic
- Traffic

1. Socioeconomic Resources

Socioeconomic resources are discussed in detail in the *Socioeconomic Technical Report*, and in lesser detail in **Section 3.1**. The alternatives would each impact between 353 and 480 properties; of those, between 71 and 119 are total relocations. The most total relocations would occur with the Purple Alternative; Blue would have the fewest acquisitions. None of the alternatives would lead to disproportionate impacts to low-income or minority populations.

Land use changes, as discussed in **Section 3.2**, would include the conversion of between 591 (Yellow Alternative) and 1,084 (Blue Alternative) acres from existing uses to transportation use. The greatest land use change is for agricultural lands; however, much of this land is already proposed for urban development.

Active farming in the project area includes primarily cropland and poultry enterprises. Thirteen farms are designated as agricultural preservation areas, as either permanent Agricultural Preservation Easements or temporary Agricultural Districts. Nearly the entire project area is overlain by soils designated as prime farmland or soils of statewide importance to farming. The build alternatives would impact between 41 (Yellow) and 65 (Blue) acres of prime farmland. Each build alternative would impact one Agricultural District. Only the Green (one) and Blue (three) alternatives would impact Agricultural Preservation Easements.

There are many neighborhoods in the study area, ranging from older homes in the historic areas to new subdivisions. The Yellow Alternative would impact the Town of Millsboro as it bisects the town, affects local access and cross-town connectivity, and impacts many existing businesses (102) and residences (249) that currently front existing US 113. The Purple Alternative has the most residential property impacts (257). The remaining build alternatives would cause lesser impacts to existing communities.

As detailed in **Sections 3.3.3** to **3.3.8**, each build alternative would impact at least one community facility. Impacted schools include Lighthouse Christian School (Purple and Yellow Alternatives), John M. Clayton Elementary School (Red), and Indian River High School (Red and Blue).

Impacted religious institutions include Dagsboro Gospel Fellowship (all build alternatives), Dagsboro Church of God (Yellow), Dickerson Chapel AME Church (Purple and Yellow), and Life Church (Yellow). Each build alternative would impact between two and five cemeteries, and each would impact Millsboro Pond. None of the alternatives would impact libraries or emergency services facilities, including hospitals.

As discussed in **Section 3.4** there are potential aesthetic and visual impacts to communities and individual properties within the viewshed of each of the proposed alternatives. The proposed new roadway would be visible from numerous homes in the project area whose existing views are of farm fields and a rural landscape.

2. Cultural Resources

The evaluation of cultural resources (both standing structures and potential archaeological sites) within the Area of Potential Effect (APE) for the build alternatives was conducted in accordance with 36 CFR 800, the implementing regulations of Section 106 of the National Historic Preservation Act of 1966, as amended. The evaluation is detailed in **Section 3.5**. Twenty-four standing structures and four historic districts that are listed or eligible for listing on the National Register of Historic Places were identified within the APE. Only the Selbyville Historic District (which contains individually eligible properties) would be directly impacted by each of the proposed build alternatives, a resource potentially subject to Section 4(f) requirements. All of the build alternatives would require placement of an access road through the District. However, none of the contributing elements of the Selbyville Historic District would be impacted. Additional standing structures would be subject to potential noise and visual effects due to the build alternatives. Consultation with the State Historic Preservation Office will continue as the Criteria of Adverse Effect is applied to all historic properties affected by the Recommended

Preferred Alternative after it is selected. Appropriate minimization and mitigation of adverse effects will be determined. The results will be detailed in the FEIS.

One known archaeological site has been identified within the limits of disturbance of the Green, Red, and Blue alternatives. Further investigation for archaeological resources will be completed, as detailed in a Section 106 Memorandum of Agreement to be included in the FEIS, prior to commencement of any construction activities.

3. Section 4(f) Resources
Millsboro Pond, which is owned by the Town of Millsboro, is the only resource in the study area that involves a potential Section 4(f) use, based on the Recommended Preferred Alternative. FHWA and DelDOT have initiated *de minimis* coordination with Town of Millsboro officials. While the Town has given oral concurrence of the *de minimis* finding, to date this concurrence has not been received in writing. Subsequent to the circulation of the DEIS for public comment, FHWA and DelDOT will meet with Millsboro leaders to get their final opinion for the project and obtain written concurrence with the *de minimis* finding. Section 4(f) resources are discussed further in **Chapter 4.**

4. Air Quality
The air quality analysis results are presented in **Section 3.7**. The project would not cause any violations of applicable National Ambient Air Quality Standards.

5. Noise
Between 89 (Red Alternative) and 190 (Yellow) individual residential noise impacts were identified for the build alternatives. When the noise abatement criteria were applied to the impacted noise sensitive areas, neither noise barriers nor berms were considered both feasible and cost effective for any of the impacted areas. A summary of predicted noise levels, potential impacts, and mitigation feasibility can be found in **Section 3.8**. Details are provided in the *Noise Technical Report*.

6. Hazardous Materials Sites
A review of the Environmental Protection Agency and Delaware Department of Natural Resources and Environmental Control (DNREC) databases identified sites within the project area that currently have or previously had hazardous materials. Of 124 sites identified, 21 are potentially within the proposed right of way of one or more of the alternatives. **Section 3.9** includes details of the investigation.

7. Natural Resources
The following is a summary of the natural environmental effects of the project, which are discussed in depth in the *Natural Resources Technical Report*, and in lesser detail in **Section 3.10**.

Aquifers that provide potable water within geologic formations that underlie the US 113 project area would be subject to only minor impacts. Ground surface areas that have been characterized as recharge zones for the aquifers may also allow for introduction of pollutants into the groundwater through permeation during construction. The Red and Blue Alternatives have the

most acres of potential roadway located on excellent recharge zones, while the Green and Purple Alternatives have no impact to excellent recharge zones.

The build alternatives would affect prime farmland soils and hydric soils within the study area. The Red Alternative would have the smallest impact on prime farmland soils (72.4 acres), while Blue would have the largest impact (101.2 acres). The Blue Alternative would have the smallest impact to hydric soils (47.2 acres), and Purple would have the largest impact (62.6 acres). These impacts may not fully correlate with the wetland impacts (discussed below) since soils with hydric inclusions were not classified as hydric, and hydric soils are only one of the three criteria necessary for classifying an area as a wetland.

Impacts to surface water quality, such as altered stream flow rates and temperature, and increased nutrient levels and sedimentation, may result from each of the build alternatives. The Yellow Alternative would impact the fewest linear feet of surface waters, and the Green Alternative would impact the most. Properly designed and constructed stormwater management facilities would control runoff entering surface water features and reduce the potential for sedimentation impacts to receiving waters. During construction, the implementation of best management practices and proper erosion and sediment controls would reduce potential negative effects on surface waters (streams) and subsurface water (wells).

Impacts to floodplains have not been fully evaluated due to the lack of available floodplain data. A detailed survey of floodplain limits will be conducted during the design phase of the project. A preliminary evaluation of floodplains mapped from FEMA Flood Insurance Rate Maps has been completed. Each of the build alternatives would require some encroachment into these floodplains, but bridges are proposed to reduce or eliminate impacts.

Each of the build alternatives would adversely affect WOUS, including wetlands, by displacing or filling these systems. Impacts also include interruption to wetland or stream hydrology. The Purple Alternative would affect the most wetlands (31.3 acres). The Blue Alternative would impact the most linear feet (lf) of subaqueous lands (20,851 lf). The Yellow Alternative would have the smallest impact to wetlands (20.1 acres) and impacts to subaqueous lands (13,000 lf). Stream impacts would be greatest with Green (22,453 lf) and least with Yellow (14,376 lf). In accordance with federal and state regulations, avoidance and minimization measures to reduce impacts to wetlands and waters would continue to be implemented for all phases of the project.

Impacts to terrestrial habitat would result from the addition of paved road surfaces. Greater impacts to habitat and wildlife would occur from the off-alignment alternatives, since they would have higher amounts of habitat reduction and/or fragmentation. The Blue Alternative would impact the most forest (162 acres), and the Yellow Alternative would affect the least amount of forest (42 acres). Habitat fragmentation would result from traversing habitat and forming a roadway barrier to wildlife travel. Impacts to aquatic biota would also result from each of the build alternatives. The extent of impacts from construction activities related to this project would depend on the type of construction activity and individual tolerance and pollution sensitivity of fish, macroinvertebrates, and other aquatic life.

The US Fish and Wildlife Service provided documentation that two federally-threatened species, Bald Eagles (*Haliaeetus leucocephalus*) and swamp pink (*Helonias bullata*), may be located within the project area. Since receipt of the USFWS letter, the Bald Eagle has been removed from the Endangered Species list. However, it is still protected by the *Bald and Golden Eagle Protection Act* and the *Migratory Bird Treaty Act*. Only the Red and Blue alternatives would potentially impact the Bald Eagle, while all of the build alternatives cross suitable habitat for swamp pink. Numerous state-listed species may be impacted, but measures would be taken to lessen any impacts.

The Green, Purple and Yellow alternatives would impact 12.2 acres of the Doe Bridge Natural Area, while the Red and Blue alternatives would impact 23 acres. The Blue Alternative also crosses the Vines Creek Natural Area, but impacts to the resource have been minimized.

8. Climate Change and Sea Level Rise

Impacts to temperature, precipitation, and sea level due to greenhouse gases (GHG) and climate change could modify the region's hydrology, ecology, and agricultural production. Because sea level rise is impossible to precisely predict, DNREC developed three scenarios that predict levels of inundation by the year 2100. According to DNREC's data, between zero and 14.4 acres of the proposed build alternatives would be subject to inundation by the year 2100, depending on the scenario.

There are currently no federal or state requirements to analyze greenhouse gas emissions for individual transportation projects. The Council on Environmental Quality (CEQ) provided draft guidance in February 2010; however, that guidance stresses the difficulty in accurately predicting climate change effects. Climate change is a global issue that is more appropriately addressed at the regional level or even more appropriately at the state or national level by assessing the impact of transportation systems as opposed to individual projects. Further, climate change does not readily lend itself to an analysis at the local level, and national air quality standards for GHG have not been established. By comparing the anticipated traffic volumes and speeds along the project corridor for both the build and no-build conditions, it can be concluded that, relative to the scope of global climate change, any change in GHG levels as a result of the project are likely to be insignificant. Because there is no regional or national framework for considering the implications of project-level GHG analysis, conducting such an analysis would not benefit decision making for the project, and would add to the administrative burden.

9. Secondary and Cumulative Effects Analysis

The geographic boundary (**Figure 3-16**) for the secondary and cumulative effects analysis (SCEA) is based on a composite overlay analysis that includes the extent of the project's influence on regional traffic. The time frame used to fully understand regional changes and the potential future changes within the geographic boundary is from 1970 to 2030.

The No-build Alternative would not directly impact resources in the project area; therefore, it would not lead to secondary or cumulative effects. Based on the analysis of potential secondary and cumulative effects, the construction of any of the build alternatives may induce secondary impacts and would add to the cumulative effects of other projects (past and future) on the natural

and human environment within the SCEA boundary. Appropriate measures would be taken to minimize these effects. The SCEA Analysis is detailed in **Section 3.17**.

G. Permits Required

Federal and state laws require that various environmental permits be secured prior to the commencement of project-related construction activities. The following environmental permits would be required:

- Section 404 (Clean Water Act) individual permit from the US Army Corps of Engineers
- DNREC Tidal Wetlands Permit
- DNREC Subaqueous Lands Permit
- DNREC Water Quality Certification under Section 401 of the Clean Water Act
- DNREC Coastal Zone Management Program Federal Consistency Determination
- USCG Bridge Permit (Red and Blue alternatives only for bridging over the Indian River)
- New Castle County 100 year Floodplain Approval
- FEMA Conditional Letter of Map Revision
- US EPA National Pollution Discharge Elimination System Permit
- DNREC Erosion and Sediment Certification (DelDOT is designated agency)

H. Public Involvement Program

The Public Involvement Program for the US 113 North/South Study has included extensive interaction with members of the public. Components include: a Listening Tour; 17 meetings of a Working Group comprised of 25 citizens, business leaders, and government officials; public workshops; local meetings; and outreach through mailings, announcements, a project video, and a project website. The project team also maintained close communications with elected officials throughout the project. During the Listening Tour and Community Meetings, members of the project team met with individuals, business owners, and various community organizations to discuss project issues. The Working Group met 17 times between February 2004 and June 2007. Eleven Public Workshops and one open house were held between 2003 and 2010 to provide the community an opportunity to view displays, hear presentations, and offer comments about the project's purpose and need, alternatives, and impacts. The project mailing list, initially developed from zip code listings, was updated as the project progressed. The project website contains updated information about all facets of the project, as well as a link to provide comments directly to DelDOT. Additional information is included in **Chapter 5**.

I. Areas of Controversy

The US 113 North/South Study has included an extensive public involvement effort. In addition, ongoing coordination with local, state, and federal regulatory agencies and elected officials has addressed some of the controversial issues associated with the project. Where necessary, DelDOT has clarified facts regarding the project and discussed issues with interested parties. Development of alternative options, modifications to alignments, and other adjustments to the project have been made to address new issues as they were raised.

Some of the areas of controversy that have been identified during the project include: preserving a corridor and its impacts on individual property rights; acquisition of residences, businesses, and agricultural operations; origins and destinations of traffic; and funding. DelDOT continues to address these issues through coordination with the agencies and the public.

Following the May 2010 Public Workshops, DelDOT received two petitions expressing opposition to the project. One petition, signed by 542 people, opposed the Blue Alternative in the Millsboro-South Area and recommended several alternatives to address traffic issues. A second petition, signed by 137 people, opposed any roadway improvements in the Frankford/ Selbyville area.

A series of December 2010 newspaper articles about the US 113 project led Governor Jack Markell to order an investigation into the project. Specifically he asked "Did DelDOT have the authorization and direction to expend significant dollars and/or resources on developing a major new highway in Sussex County?" He also asked, "Has DelDOT, in moving forward with the early land acquisition component of this project, demonstrated the necessary competence, judgment, and diligence, particularly relating to the utilization and negotiation of reservation agreements?" In a January 2011 report to the Governor, his Chief of Staff concluded that DelDOT was authorized to conduct the US 113 North-South study under the direction of the General Assembly. The report further concludes that there were issues with DelDOT's land acquisition process. The report went on to detail the reasons for the two conclusions and to suggest improvements to the process.

Although the project was initiated in 2000 at the direction of elected officials in Sussex County, and had almost universal support from Sussex County legislators, some of those same legislators began to oppose the project in late 2010. Governor Markell and then-Secretary of Transportation Carolann Wicks met with Sussex County legislators on January 26, 2011. The Governor concluded "…there is no consensus among current elected officials in Sussex County as it relates to this project. This project was estimated to bring approximately $850 million of capital investment in Sussex County, create hundreds of jobs, and relieve gridlock. However, this Administration is not prepared to move forward and make that investment given the current lack of consensus from Sussex County elected officials." Due to this lack of support by the General Assembly, Governor Markell and Secretary Wicks suspended the US 113 North/South Study later that day.

Despite this suspension, discussions regarding the future of the US 113 project in southern Delaware continued between DelDOT and local legislators. On September 14, 2011, Transportation Secretary Shailen Bhatt announced that DelDOT would "complete the DEIS for the Millsboro-South segment (which is located south of Georgetown to the Maryland state line), with the understanding that the entire project would be phased, with the portion south of Millsboro not expected to be designed for 15 to 20 years. The DEIS would then be submitted to the FHWA for review and comment, with the approved draft presented to the public for comment."

J. Next Steps

FHWA's DelMar Division is in agreement with DelDOT's approach to identify, preserve, and protect a Selected Alternative for the US 113 Corridor. This corridor would meet the identified goals of the US 113 North/South Study and the identified Project Purpose and Need for US 113 in the Millsboro South Study Area.

It is anticipated that the proposed design and construction of the Preferred Alternative would be completed in segments. Each segment would be phased or prioritized only when needed and as funding becomes available. DelDOT would monitor development and traffic growth, and establish a triggering mechanism to ensure that segments are constructed only as conditions dictate. DelDOT recognizes that fiscal constraints may delay the availability of construction funding, but an established plan will help identify funding needs for the six-year Capital Transportation Program. DelDOT will commit the required funding when it becomes available.

Upon completion, this document would be made available for agency and public comment for a minimum of 30 days. DelDOT would then hold a public hearing and offer attendees an opportunity to provide comments. There would be a 15-day comment period following the public hearing. All comments received would be considered in the development of the FEIS and would become part of the public record. The NEPA process cannot be completed until DelDOT has provided a funding mechanism to advance the project. Once funding is committed, as part of the FEIS, FHWA would issue a Record of Decision, thus completing the NEPA process.

CHAPTER 1 – PURPOSE AND NEED

1.1 INTRODUCTION

1.1.1 Background

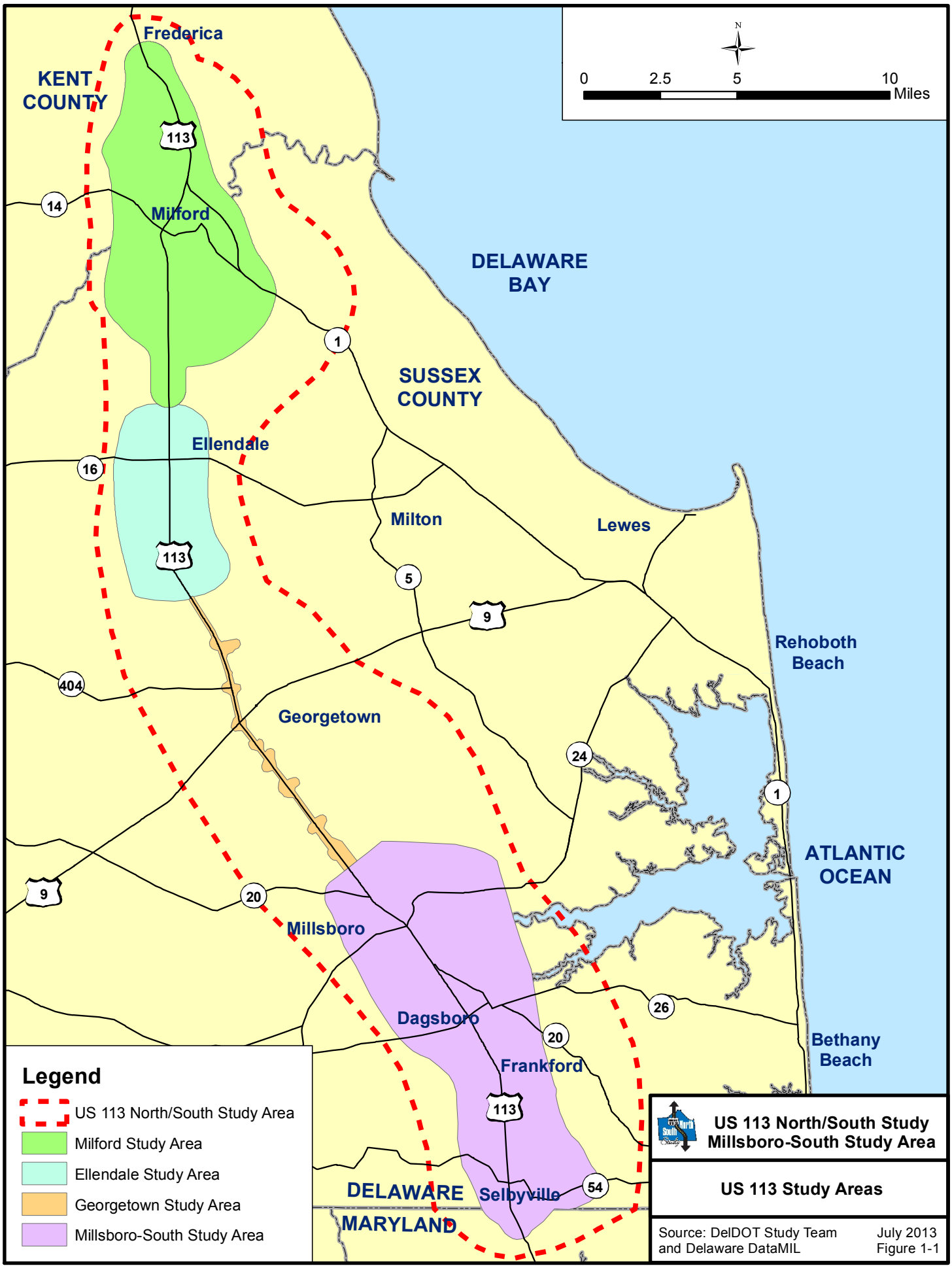
In 1996, the General Assembly passed *Section 145 of Title 17 of the Delaware Code* enabling the Department of Transportation to develop a program to protect roadway corridors serving predominantly statewide and/or regional travel in the State. The law established a roadway nomination process and called for nominations of new corridors every three years through the Department's *Statewide Long Range Transportation Plan*. The portion of US 113 from the Milford City limits to the Maryland state line (33 miles) was proposed for inclusion in the original program, which was formally adopted in February 1997.

In 2000, the State Senate adopted *Senate Resolution No. 20*, "calling upon the Delaware Department of Transportation (DelDOT) to undertake the planning process for a new north-south limited access highway as an alternative to present routes US 13 and US 113 through Sussex County." As a result, DelDOT completed the *Sussex County North-South Transportation Feasibility Study* in 2001. The study confirmed the feasibility of a north/south limited access highway through Sussex County and recommended that the US 113 corridor be studied for this purpose. It also expressed a preference for converting the existing alignment of US 113 to limited access wherever practical, and only constructing limited access bypasses in those areas where impacts along the existing alignment are determined to be too severe.

Under its *Corridor Capacity Preservation Program* (CCPP), DelDOT is continuing with the project development phase of converting US 113 to limited access between Dover Air Force Base and the SR 1/US 113 split in Milford. Subsequent to initiation the CCPP program, the segment of US 113 north of Milford was renamed SR 1. The conversion of SR 1 would continue to the south, from Milford to Nassau. North of Dover Air Force Base, SR 1 already has full access control. The portion of US 113 between Selbyville and Milford was added to the CCPP in 1996. This proposed project serves as the CCPP plan for US 113 south of Milford.

As shown on **Figure 1-1**, the US 113 study area encompasses the area adjacent to US 113, from 1.1 miles south of the Maryland/Delaware state line, north to Kent County near Frederica. Initially, three documents were proposed for this study: an Environmental Impact Statement (EIS) for the area from the state line north to Georgetown (referred to as Georgetown-South), an Environmental Assessment (EA) for the Ellendale area, and an EIS for the Milford area. A *Notice of Intent* was placed in the *Federal Register* on June 5, 2005, announcing that an EIS would be prepared for the Georgetown-South area.

The Georgetown-South document looked at numerous alternatives that bypassed each of the five towns (Selbyville, Frankford, Dagsboro, Millsboro, and Georgetown) in the proposed project area, as well as an on-alignment alternative. Initially, there were a total of 15 bypass alternatives and three on-alignment alternatives in what is now the Georgetown Study Area. Following the


Frederica
KENT COUNTY
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14
Milford
DELAWARE BAY
1
SUSSEX COUNTY
Ellendale
16
113
Milton
Lewes
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9
Rehoboth Beach
404
Georgetown
24
1
ATLANTIC OCEAN
9
20
Millsboro
26
Dagsboro
20
Bethany Beach
Frankford
113
DELAWARE
Selbyville
54
MARYLAND
0
2.5
5
10
Miles
N
Legend
US 113 North/South Study Area
Milford Study Area
Ellendale Study Area
Georgetown Study Area
Millsboro-South Study Area
US 113 North/South Study
Millsboro-South Study Area
US 113 Study Areas
Source: DelDOT Study Team and Delaware DataMIL
July 2013
Figure 1-1

procedure described in **Section 2.2**, these were narrowed down to five western bypass alternatives, one eastern bypass alternative, and two on-alignment alternatives.

In 1999, State and Federal transportation, resource, and regulatory agencies from the Mid-Atlantic Region (Maryland, Delaware, Pennsylvania, West Virginia, and Virginia) convened an Executive Summit to discuss the feasibility of streamlining the environmental review process for transportation project development. The Summit resulted in the agencies signing the *Cooperative Agreement on Environmental Streamlining and Interagency Cooperation on Environmental and Transportation Issues*. The agreement provides the foundation for the goals set forth at the Executive Summit and supports the provisions of the *Transportation Equity Act for the 21st Century (TEA-21)*. The goal was to develop a streamlined process to encourage timely, cost-effective, and environmentally sound transportation project development, and to develop a foundation for interagency coordination and cooperation on environmental and transportation issues.

Additionally, the Summit resulted in the formation of the Mid-Atlantic Transportation and Environment (MATE) Task Force. The major product of the MATE Task Force was the integration of additional permitting and environmental review processes with the 1992 *Integrated NEPA/404 process*. The MATE process is used as a tool for improving communication among environmental and transportation agencies, increasing the efficiency of the transportation project development process through concurrent environmental reviews, and as a mechanism for avoiding or resolving interagency disputes. DelDOT and the agencies are utilizing the MATE process with the US 113 North/South Study.

After preliminary studies, which included traffic analysis; summarizing NEPA-related impacts to social, economic, and natural resources; assessing property impacts; and conducting extensive public outreach, the working group, general public, and resource agencies provided strong support for a modified on-alignment alternative in the Georgetown area. As a result, all of the proposed bypass alternatives around Georgetown were eliminated from further consideration. With a proposed modification of the existing alignment as the only remaining alternative, the Federal Highway Administration (FHWA) determined it was appropriate to separate the Georgetown area from the remaining portion of the previous Georgetown-South area. The remaining area was called Millsboro-South. A detailed view of the new study area may be found on the alignment sheets in **Appendix A**.

The *Logical Termini* document (see **Appendix B**) provided the basis for conducting four separate evaluations within the US 113 North/South Study Area. The four study areas are Millsboro-South, Georgetown, Ellendale, and Milford. Each area has distinct transportation needs. Based on *23 CFR 771*, FHWA determined that an EIS was the appropriate level of documentation for the Millsboro-South and Milford areas. An EA was prepared and a Finding of No Significant Impact was issued on September 28, 2010 for the Ellendale Area of the US 113 North/South Study. An EA for the Georgetown Area was prepared and was made available for Public Notice on March 27, 2012 with the public comment period ending on April 26, 2012. The request of Finding of No Significant Impact is currently pending. An update to the *Notice of Intent*, announcing the changed study areas and levels of documentation, appeared in the October

8, 2008 *Federal Register*. This EIS addresses the Millsboro-South portion of the US 113 corridor, shaded in lavender on **Figure 1-1**.

This chapter builds upon the *Purpose and Need Study for US 113 in the Georgetown-South Area,* a document that was developed for the original Georgetown-South study area. It has been updated to reflect the new Millsboro-South study area, and it includes updated information that has been obtained since the original document was completed in August 2005.

1.1.2 Study Area

The study area addressed in this Draft EIS (DEIS) is centered along US 113 in Sussex County (see **Figure 1-2**). It includes the towns of Selbyville, Frankford, Dagsboro, and Millsboro. The study area is approximately 14.3 miles long and extends from 1.1 miles south of the Maryland/ Delaware line near Selbyville to 0.5 miles south of the intersection of US 113 and Avenue of Honor (Road 86). At its widest, the study area spans approximately 5.6 miles, extending east of US 113 to an area near the intersection of Cordrey Road (Road 308) and Drane Road (Road 309), northeast of Waples Pond. At that point, it extends slightly further west than Ingram Pond. Near Morris Mill Pond the study area follows a straight line towards the west until it crosses Sheep Pen Ditch.

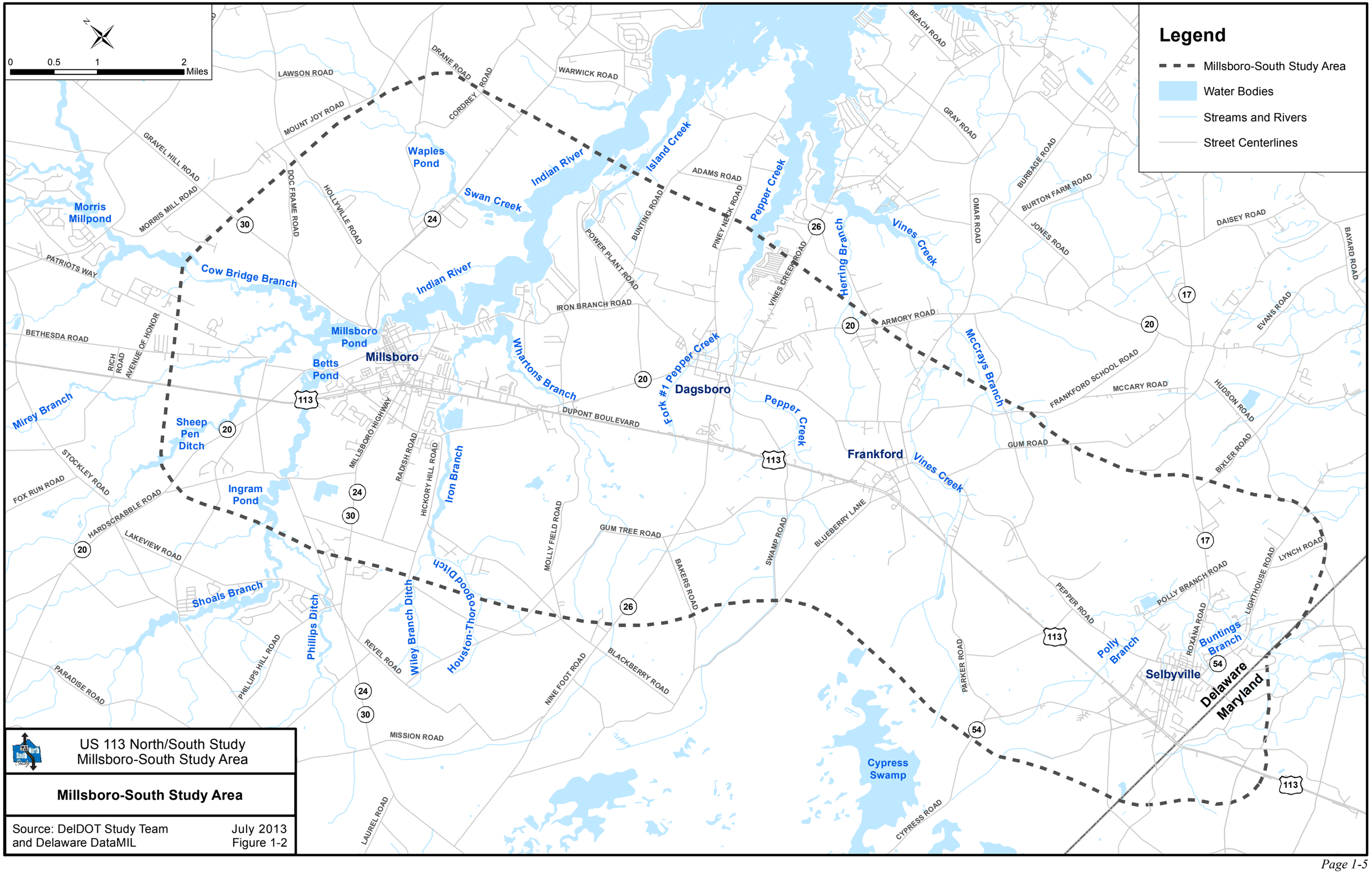
The study area limits have been set to encompass an area at least 0.5 miles outside the limit of disturbance for any of the proposed build alternatives. This provides a buffer around existing and forecasted transportation concerns and encompasses natural and socioeconomic resources that could be affected by the proposed alternatives. The study area for cultural resources is more focused, including only those tax parcels within 600 feet of the centerlines of each of the retained alternatives. See **Section 3.5**.

1.2 PROJECT PURPOSE

The purpose of the US 113 North/South Study is to establish a continuous limited access facility from the Maryland/Delaware state line northward through Sussex County to SR 1 near Dover Air Force Base, thereby completing a limited access corridor throughout the state of Delaware. The Millsboro-South study would identify corridors and typical sections that allow traffic to flow freely through the study area. Because beach-bound traffic causes severe congestion in the Millsboro area, all concepts include a bypass of Millsboro and a direct connection to SR 24 and SR 26.

1.3 PROJECT NEED

The need for the US 113 North/South Study is a result of expected future land development and economic growth in Sussex County and its municipalities, the increased use of the resort area in southeastern Sussex County (both in the summer and year round), and the projected increase in regional traffic traveling through the Delmarva Peninsula over the next 25 years. Together these



US 113 North/South Study
Millsboro-South Study Area

Millsboro-South Study Area

Source: DelDOT Study Team and Delaware DataMIL

July 2013
Figure 1-2

factors result in the need to identify and protect a corridor to accommodate additional highway capacity.

DelDOT has completed SR 1 from I-95 in New Castle County to south of the Dover Air Force Base, in Kent County, as a limited access highway. Planning is underway to convert the existing SR 1 corridor to limited access from the termination of the limited access portion of SR 1 in Kent County, to Five Points near Lewes, in Sussex County. The Maryland State Highway Administration is also pursuing efforts to convert the existing US 113 Corridor to limited access from the state line at Selbyville to US 13 in Pocomoke City, Maryland. The construction of the northern-most portion of US 113 in Maryland (from the Delaware state line to Berlin) was completed in 2005. The southern-most portion of US 113 in Maryland has been broken into five construction phases. Phase I was completed in 2006. Phase II-A is currently under construction with Phase II-B in final design. Phases III, IV, and V are at varying phases of design, and construction would occur as funding becomes available in Maryland.

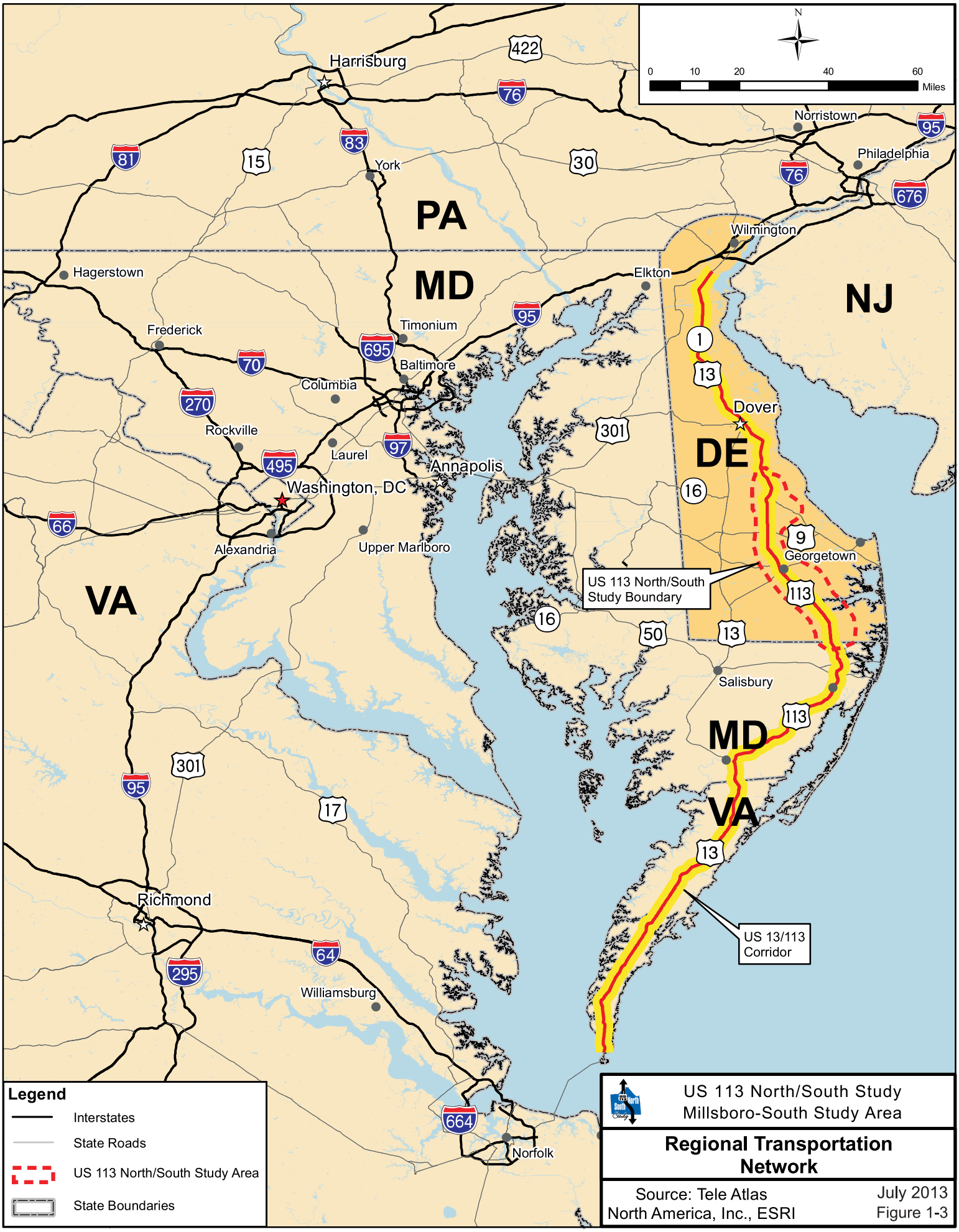
With the completion of the US 113 North/South Study in Delaware, and the designation and FHWA approval of a limited access corridor from SR 1 in Milford to the state line in Selbyville, a limited access highway running north/south through three quarters of the Delmarva Peninsula would become feasible. The corridor would begin in Pocomoke City, Maryland (near the Virginia state line), and end approximately 130 miles north at I-95 in New Castle County, Delaware (see **Figure 1-3**).

Five specific needs would be addressed by the proposed US 113 Millsboro-South project: meeting the growing traffic demand created by existing and future development in the area; considering safety issues; preserving a transportation corridor; considering modal interrelationships; and maintaining consistency with state and local plans for transportation systems. Following a discussion of the roadway system and its characteristics, the five needs are described in the following sections.

1.3.1 Roadway System

US 113 and US 13 are generally parallel routes that run north-south through the Delmarva Peninsula. Each is a principal arterial highway and a component of the National Highway System (NHS). US 13 is between eight and ten miles west of US 113 and connects North Carolina, Virginia, Maryland, Delaware, and Pennsylvania. In Delaware, US 13 extends from the Maryland state line at Delmar, to the Pennsylvania state line, northeast of Wilmington.

Between I-95 and Dover, limited-access SR 1 has supplanted the role of US 13 as part of the NHS. US 113 separates from US 13 in Dover, extends into Maryland at Selbyville, and rejoins US 13 at Pocomoke City, Maryland. Together, US 113 and US 13 function as alternatives to the heavily traveled I-95 corridor, which serves the Richmond, Washington, and Baltimore metropolitan areas. This is particularly true for regional trips between eastern South and North Carolina, Norfolk, Virginia, and the Wilmington/Philadelphia area. **Figure 1-3** depicts the regional roadway system.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0 10 20 40 60
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York
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Philadelphia
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676
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Wilmington
Hagerstown
MD
Elkton
NJ
Frederick
Timonium
95
695
70
Baltimore
Columbia
270
Rockville
Laurel
97
301
Dover
DE
495
Annapolis
Washington, DC
16
66
Alexandria
Upper Marlboro
9
Georgetown
US 113 North/South
Study Boundary
VA
113
16
50
13
Salisbury
MD
113
301
95
17
VA
13
Richmond
64
295
US 13/113
Corridor
Williamsburg
664
Norfolk
Legend
Interstates
State Roads
US 113 North/South Study Area
State Boundaries
US 113 North/South Study
Millsboro-South Study Area
Regional Transportation Network
Source: Tele Atlas North America, Inc., ESRI
July 2013
Figure 1-3

Maryland is in the process of converting US 113 into a limited-access divided highway along its length within the eastern shore, thus enhancing the capacity of the roadway to carry through traffic. The dualization from US 50 to the state line is complete. Final design is complete and right-of-way acquisition has started for the section between Snow Hill and Berlin. Part of this section of US 113 is constructed. Another portion is under construction. The rest is in various stages of design, and construction would occur as funding becomes available in Maryland.

Figure 1-4 depicts the five primary east-west routes that intersect US 113 in the study area. They are:

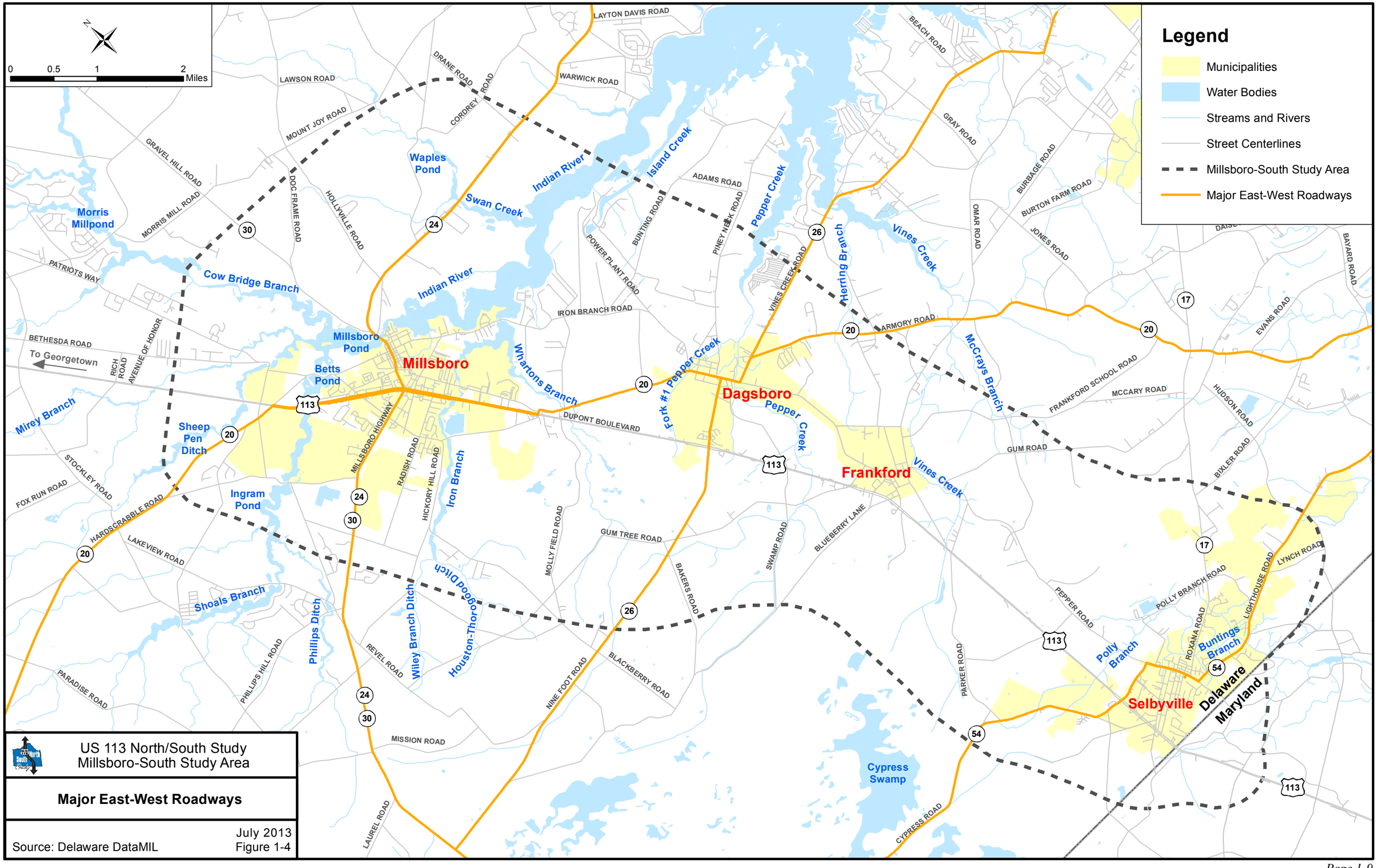
- SR 54 in Selbyville, which connects Gumboro to the west with Fenwick Island to the east.
- SR 26 in Dagsboro, which connects Gumboro to the west with Bethany Beach to the east.
- SR 20 (east) between Millsboro and Dagsboro, which extends east through Dagsboro to SR 54 near Fenwick Island.
- SR 24/30 in Millsboro. The road is signed as both SR 24 and SR 30 as it crosses US 113. SR 24 connects Laurel to the west with Long Neck and the Lewes/Rehoboth Beach area to the east. SR 30 connects Gumboro to the south with Milton and Milford to the north.
- SR 20 (west) in Millsboro, which extends west to Seaford.

US 113 is an important link in the NHS on the Delmarva Peninsula. With access-limitation improvements already built, under construction, or planned on US 113 north of Milford and south of Selbyville, creating a limited-access connection through the study area would establish system compatibility and continuity and permit US 113 to more effectively serve future transportation needs.

1.3.2 Existing Roadway Characteristics

Throughout most of the study area, US 113 is a four-lane divided highway with a typical median width of 33 feet. Within the four towns in the study area, the median width varies between 33 and 92 feet. Property access is provided via numerous unsignalized and signalized intersections, median crossovers, and private driveways.

In the majority of the study area, the roadway retains a fairly rural character. Commercial development, where present, typically consists of small businesses with single driveways onto US 113. Residential areas consist almost entirely of single-family homes, typically with individual driveways on the highway. Unsignalized crossovers are present for U-turn access and, in some cases, direct left-turn access to and from the highway. Within Millsboro and Selbyville, the roadway character is somewhat different. Although the roadway's cross-sectional elements are the same, the level of development is markedly higher. The predominant land uses along US 113 in Millsboro are retail, while Selbyville's frontage contains a mix of retail and industrial uses.


N
0
0.5
1
2
Miles
Legend
Municipalities
Water Bodies
Streams and Rivers
Street Centerlines
Millsboro-South Study Area
Major East-West Roadways
LAYTON DAVIS ROAD
BEACH ROAD
LAWSON ROAD
DRANE ROAD
CORDREY ROAD
WARWICK ROAD
GRAY ROAD
MOUNT JOY ROAD
GRAVEL HILL ROAD
MORRIS MILL ROAD
DOC FRAME ROAD
HOLLYVILLE ROAD
Waples Pond
Indian River
Swan Creek
Island Creek
ADAMS ROAD
BUNTING ROAD
PINEY NECK ROAD
Pepper Creek
BURBAGE ROAD
BURTON FARM ROAD
JONES ROAD
OMAR ROAD
Morris Millpond
PATRIOTS WAY
Cow Bridge Branch
POWER PLANT ROAD
VINES CREEK ROAD
Herring Branch
Vines Creek
BAYARD ROAD
EVANS ROAD
IRON BRANCH ROAD
ARMORY ROAD
BETHESDA ROAD
To Georgetown
RICH ROAD
AVENUE OF HONOR
Millsboro Pond
Betts Pond
Millsboro
Whartons Branch
McCrays Branch
FRANKFORD SCHOOL ROAD
MCCARY ROAD
HUDSON ROAD
Mirey Branch
Sheep Pen Ditch
DUPONT BOULEVARD
Fork #1 Pepper Creek
Dagsboro
Pepper Creek
GUM ROAD
BIXLER ROAD
STOCKLEY ROAD
FOX RUN ROAD
HARDSCRABBLE ROAD
MILLSBORO HIGHWAY
RADISH ROAD
HICKORY HILL ROAD
Iron Branch
Ingram Pond
Frankford
Vines Creek
LAKEVIEW ROAD
MOLLY FIELD ROAD
GUM TREE ROAD
SWAMP ROAD
BLUEBERRY LANE
LYNCH ROAD
LIGHTHOUSE ROAD
PEPPER ROAD
POLLY BRANCH ROAD
ROXANA ROAD
Shoals Branch
Phillips Ditch
Wiley Branch Ditch
Houston-Thorogood Ditch
BAKERS ROAD
PARKER ROAD
Polly Branch
Buntings Branch
Selbyville
Delaware
Maryland
PHILLIPS HILL ROAD
REVEL ROAD
NINE FOOT ROAD
BLACKBERRY ROAD
PARADISE ROAD
MISSION ROAD
LAUREL ROAD
Cypress Swamp
CYPRESS ROAD
US 113 North/South Study
Millsboro-South Study Area
Major East-West Roadways
July 2013
Source: Delaware DataMIL
Figure 1-4

1.3.3 Existing Traffic

Two important measures of how well a road serves its users are accessibility and mobility. Accessibility is measured by the frequency of driveways and access points along the road. More frequent access usually results in a shorter travel distance between a road user's origin and destination. Accessibility is more important for local traffic than through traffic. Mobility is determined by the capacity of a road to move vehicles and the speed at which the vehicles travel. Both measures are important to emergency responders, whose special needs are addressed in **Section 1.3.4**.

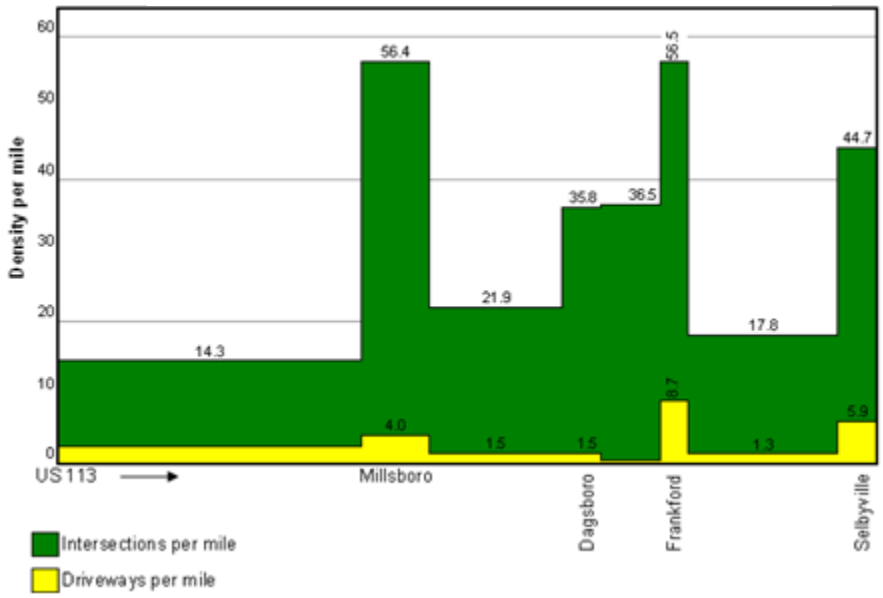
1.3.3.1 Accessibility

According to the American Association of State Highway and Transportation Officials' (AASHTO's) *A Policy on Geometric Design of Highways and Streets*, "As access density increases, there is a corresponding increase in crashes and travel times." In support of this statement, AASHTO provides the following data:

- As the number of businesses and access points increase along a roadway, there is a corresponding increase in crash rates.
- A study on congestion by the Texas Transportation Institute has reported a 2- to 3-mph speed reduction for every added signal per mile.

As illustrated on **Figure 1-5**, accessibility to and from US 113 varies within the study area. The number of intersections per mile of roadway varies from 0.7 between Frankford and Dagsboro to 8.7 in Frankford itself, with higher densities typically occurring in the towns. Similarly, higher driveway densities are most commonly found in towns, ranging from over 56 per mile in Frankford and Millsboro, to less than 15 per mile north of Millsboro.

Figure 1-5: Intersection and Driveway Density



DelDOT currently reviews requests for access along US 113 through its Subdivision Section. Based on 2010 development proposals, there are six potential developments with proposed access to US 113. Predicted/future access requests are not available. Pressure to increase the number of driveways and traffic signals along US 113 in the study area is likely to grow in the future, as the towns in the corridor expand outward. The consequence of accommodating growth in the absence of a plan, such as the CCPP, to proactively manage highway access (or of an alternative facility to serve through traffic growth), would be a degradation in traffic service along US 113.

1.3.3.2 Mobility

Mobility along US 113 is a function of travel demand (the volume of traffic that wants to use the system) and intersection capacity (the ability of US 113 to accommodate the travel demand).

Travel Demand (Daily): Daily traffic is one measure of travel demand. Along US 113, as in much of Sussex County, the presence of the beach resorts results in large seasonal fluctuations in travel demand. In 2007, average annual daily traffic (AADT) along US 113 in the study area was between 13,660 and 21,037 vehicles. Due to the seasonal traffic fluctuations, peak average daily traffic (PADT) is about 60 percent higher than the AADT in the study area.

Travel Demand (Hourly) versus Route Capacity: Mobility is more affected by peak hour volumes than daily volumes because congestion occurs when hourly demand nears or exceeds a route's hourly capacity. In the less-developed portions of the study area, the *Highway Capacity Manual* (HCM) indicates a theoretical capacity of 6,840 passenger cars per hour (level of service [LOS] D, less than one signal every two miles, free-flow speed of 50 mph). In central Millsboro, the HCM estimates a capacity of 3,400 passenger cars per hour, (LOS D, one to five signals per mile, 40-mph free-flow speed). This indicates that in Millsboro US 113 is carrying more traffic than it is designed to accommodate, as demonstrated by failing levels of service at some signalized intersections in the study area.

Travel Times: Because it provides a viable alternative for motorists using SR 1 for beach travel, peak period travel demand on US 113 is, and will continue to be, highly dependent on operating conditions along SR 1. **Table 1-1** shows the 2003 peak season travel times on US 113 and SR 1 for trips between the Kent County line and three destinations on SR 1.

Table 1-1 shows that travel times to Rehoboth Beach are currently faster on US 113 and SR 404 than on SR 1, even though the distance is longer. For the return trip, which is generally not as congested, SR 1 is almost 20 minutes faster than US 113/SR 404. As the southern endpoint moves south of Rehoboth Beach, the time savings for southbound travelers using US 113 and adjacent east-west routes become greater. Based on a summer 2003 origin-destination survey, approximately 30 percent of traffic using SR 1 in the peak season is destined for points south of the Indian River Inlet. For those travelers, US 113, in conjunction with State Routes 20, 26, and 54, serves as a reasonable alternative when the Lewes/Rehoboth Beach area is congested.

Table 1-1: Existing Travel Times between Kent County Line and Various Destinations

Destination	Direction	Travel Route	Travel Distance (miles)	Peak Period Trip Time[1]
Rehoboth Beach (SR 1 at SR 1A)	Southbound	SR 1	24.6	**1:37**
		US 113/SR 404/SR 1	35.1	**1:21**
	Northbound	SR 1	24.6	**0:39**
		SR 1/SR 404/US 113	35.1	**0:58**
Bethany Beach (SR 1 at SR 26)	Southbound	SR 1	35.3	**1:54**
		US 113/SR 20/SR 26	40.4	**1:03**
	Northbound	SR 1	35.3	**0:56**
		SR 26/SR 20/US 113	40.4	**1:42**
Fenwick Island (SR 1 at SR 54)	Southbound	SR 1	43.0	**2:11**
		US 113/SR 20/SR 54	42.6	**0:58**
		US 113/SR 54	45.9	**1:01**
	Northbound	SR 1	43.0	**1:13**
		SR 54/SR 20/US 113	42.6	**1:10**
		SR 54/US 113	45.9	**1:06**

[1] *2003 calculated conditions were obtained by applying growth rates to the year 2000 calculations. The year 2000 calculations were calibrated to be within ten percent of the observed field conditions conducted for the Sussex County Transportation Operations Management Plan.*

This does not mean that there are free-flow conditions along US 113 and adjacent east-west routes during peak periods. The use of US 113 to access Delaware's resort areas has resulted in congested conditions in towns along the highway, where through traffic passes through densely-developed downtowns. **Table 1-2** shows year 2000 travel time and speed on these routes through Millsboro, Dagsboro, and Selbyville. Travel speeds on the east-west routes are highly restricted, and are wholly inconsistent with the designation of these routes as arterial highways. As inconvenient as this congestion is for beach-bound travelers, it is even more disruptive for local residents and business owners, who often depend on these east-west routes for local travel.

Table 1-2: 2000 Travel Times and Speeds on East-West Routes

Location	Direction	Travel distance (miles)	Observed Peak Period Trip Time, 2000 (minutes)	Observed Travel Speed, 2000 (mph)
Millsboro (SR 24/30, US 113 to State Street)	Eastbound	0.5	**2.7**	**11**
	Westbound	0.5	**4.1**	**7**
Dagsboro (SR 20, US 113 to Armory Road)	Eastbound	2.8	**5.4**	**31**
	Westbound	2.8	**7.4**	**23**
Dagsboro (SR 26, US 113 to Armory Road)	Eastbound	1.3	**3.6**	**21**
	Westbound	1.3	**5.5**	**14**
Selbyville (SR 54, US 113 to Church Street	Eastbound	0.9	**2.8**	**19**
	Westbound	0.9	**3.2**	**17**

With peak season traffic predicted to grow at a steady rate, congestion in the beach area would remain at or exceed current levels, even with planned improvements. Therefore, traffic

diversions to US 113 are likely to increase until travel times on the two routes are similar. Projected travel times are provided in the Future Traffic section (**Section 1.3.7**) of this chapter.

Intersection Capacity: Intersection operations, as indicated by LOS, were evaluated using capacity analysis methods outlined in the HCM. LOS is a qualitative measure of intersection operations that ranges from A (best operating conditions) to F (worst operating conditions). It is affected by factors such as traffic volume, traffic control, lane width, and grade.

Each signalized intersection in the study area was evaluated to determine whether or not it operated acceptably (LOS A through D and traffic demand less than 95 percent of the intersection capacity). **Table 1-3** shows Base Year peak season LOS for the intersections. The US 113 intersection at SR 24/SR 30 operates unacceptably today. See the Future Traffic section for anticipated levels of service in 2030.

Table 1-3: Study Area Intersection Operations – Base Year Conditions

Intersection	2003 Peak Season Level of Service	Acceptable?
US 113 @ SR 54	C	Yes
US 113 @ SR 26	C	Yes
US 113 @ SR 20 east	D[1]	Yes
US 113 @ SR 24/SR 30	F[2]	No
US 113 @ SR 20 west	D	Yes

[1] *There is a proposed project, which was identified through the Highway Safety Improvement Program, that would include the addition of a second southbound US 113 left turn lane to improve intersection capacity.*

[2] *A short-term improvement project was completed in 2006 to improve intersection capacity to LOS E.*

1.3.4 Safety

1.3.4.1 Emergency Services Response

Sussex County Emergency Management is responsible for providing emergency services along the US 113 corridor in the study area. Fire, ambulance, and paramedic assistance are provided by the Selbyville, Frankford, Dagsboro, and Millsboro fire departments.

Emergency personnel responded to 290 calls along US 113 in 2007, the last year for which data are available. The average response time was less than seven minutes from unit assignment to unit arrival. The majority (178) of the incidents occurred in Millsboro; 54 occurred in Dagsboro, 34 occurred in Frankford, and 24 occurred in Selbyville. Although Selbyville, Dagsboro, and Millsboro have some medical facilities, the closest emergency facilities are in Milford, Lewes, and Seaford, Delaware, and Berlin, Maryland, which are as much as 21 miles away from a given point on US 113. Thus, it is essential for those who require emergency care that local highways do not experience congestion problems that can delay this care. During high congestion periods and in the summer tourist season, drivers may not be able to readily clear a path for emergency vehicles to pass. Typical response times can increase to 14 to 20 minutes, potentially resulting in the inability to provide care when it is urgently needed.

Emergency service responders in Selbyville, Dagsboro, and Millsboro are located on or adjacent to congested east-west routes between US 113 and Delaware's resort areas. This makes emergency calls doubly problematic: congestion delays emergency response and pre-emption of signals by emergency vehicles interrupts signal progression. Even one pre-empted cycle could result in up to 15 minutes of additional congestion as the signal system returns to equilibrium.

1.3.4.2 Critical Ratios

Average Accident Rates (AAR) are an indicator of the relative safety of a section of roadway. AARs are determined by comparing the number of crashes to the volume of traffic using a roadway. By comparing the AAR for a roadway segment with a threshold rate for similar roadways in the state, known as the Critical Accident Rate, the relative safety of the road segment can be determined. The ratio of these two values is called the Critical Ratio (CR). A CR greater than one indicates that a roadway segment has a higher crash rate than similar roadways. As shown in **Table 1-4**, seven sections of US 113 within the study area were identified as having CRs greater than one, based on 2005 to 2007 crash data. Thirty-seven percent of US 113 in the study area exceeds the statewide crash standard for roadways of its type.

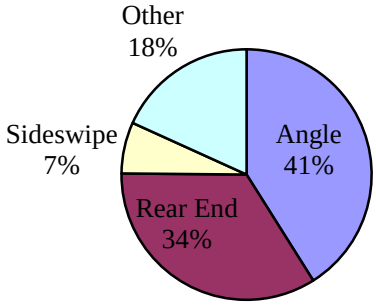
Table 1-4: US 113 Sections with Critical Ratios Greater Than 1.0 [1]

Segment Description	Length (miles)	Critical Ratio Range [2]
From Maryland State Line to 0.35-mile north of SR 54/Cemetery Road (Rd 377)	1.2	1.02 - 2.38
From 0.35-mile south of Lazy Lagoon Road/Parker Road to 0.14-mile north of Delaware Street	0.6	1.02 - 1.86
From 0.28-mile south of SR 26. to 0.21-mile north of SR 26	0.5	1.94 - 2.27
From 0.21-mile south of Cricket Street./Molly Field Road to 0.05-mile south of Dickerson Road	0.7	1.5 - 5.38
From 0.32-mile south of Radish Road to 0.2-mile north of Delaware Avenue	1.4	0.79 - 9.08
From 0.33-mile south of Hardscrabble Road to 0.14-mile north of Bark Pond Road/Sheep Pen Road	0.6	1.11 - 4.33
From 0.28-mile south of Gov. Stockley Road to 0.11-mile north of Gov. Stockley Road	0.4	1.23 - 1.47
Total	**5.4**	**1.02 – 9.08**

[1] *CRs based on 2005 to 2007 crash data*
[2] *Range of CRs for 0.30-mile sections of roadway within the segment*

Reviewing the characteristics of all highway crashes is important in assessing patterns and determining which can be corrected through highway and traffic engineering improvements. A total of 1,223 crashes were reported along US 113 in the study area between January 1997 and December 2007. **Figure 1-6** summarizes the crashes by type.

Figure 1-6: US 113 Crash Types (January 1997 - December 2007)



Angle crashes typically occur at unsignalized intersections, median crossovers, and private driveways. Rear end crashes are most common on the approaches to signalized intersections. The prevalence of both of these crash types in the study area corresponds to the number and frequency of access points along the US 113 corridor.

Thirty percent of all crashes occurred at or adjacent to signalized intersections within the study limits. The following is a summary of the intersections (both signalized and unsignalized) with the highest number of crashes (20 or more) from January 1998 through December 2007:

Signalized

- SR 24/SR 30 (Road 24) – 134 crashes
- SR 20/Hardscrabble Road (Road 20) – 108 crashes
- SR 20/Dagsboro Road/Handy Road (Road 334/Road 337) – 79 crashes

Unsignalized

- Old Landing Road (Road 339) – 68 crashes
- Delaware Avenue (Road 82) – 64 crashes

Anticipated growth in the study area would likely increase the number of access points and traffic signals along US 113. Since a substantial percentage of the crashes on US 113 occur at traffic signals, it is likely that the number of such crashes would increase as new signals are installed. These trends indicate that safety on US 113 is likely to deteriorate in the absence of either a plan to proactively manage highway access or an alternative facility to serve through traffic.

1.3.5 Modal Interrelationships

Selbyville, Frankford, Dagsboro, and Millsboro are Community Areas, as defined in the Delaware Office of State Planning Coordination's (OSPC) *Shaping Delaware's Future: Managing Growth in 21st Century Delaware*. One of the Strategies for Nurturing Communities reads "… decisions about investments and policies should be based in these principles:

> **Transportation** – In Communities, the state would provide the greatest number of transportation options with an emphasis on public transportation, walking, and bicycling. Typical transportation projects would include new or expanded facilities and services for all modes of transportation, including public transportation facilities and service when favorable development patterns and densities exist."

Therefore, a number of modes of transportation must be considered in the Millsboro-South area.

Bicycle and Pedestrian: There has been little investment in bicycle and pedestrian facilities along and across US 113 in the study area. The only sidewalk along US 113 in the study area spans the front of the Millsboro Town Square Shopping Center and adjacent businesses. Bicyclists are afforded wide shoulders in good condition along US 113 itself, although high motor vehicle speeds and volumes may make this route impractical for less experienced cyclists. No bicycle lanes or separate bicycle facilities are signed or marked along US 113 or any of the roads crossing it in the study area.

Transit: Public bus service in the state is provided by the Delaware Transit Corporation (DTC), but there are no bus routes in the Millsboro-South study area. The nearest routes are in Georgetown. However, there are on-demand paratransit services and senior citizen services provided by DTC within the study area.

Rail: Norfolk Southern provides freight service on two parallel lines in Sussex County. One of these lines passes through the study area. The Indian River Secondary Line generally parallels US 113 from north of Georgetown until its connection with the Maryland and Delaware Railroad in Frankford. Sussex County's rail lines carry light freight volumes (less than five million tons per year). An increase in freight could necessitate improvements to grade crossings in the County, but no increase is currently planned. There are no at-grade rail crossings of US 113 in the study area.

Passenger rail service in Sussex County ended in 1965. A survey conducted for the *2001 Sussex County Long Range Transportation Plan* indicates that there is interest among Sussex County residents in introducing passenger rail service in the County. However, there are currently no DelDOT or DTC studies to examine potential passenger service.

Air: There are no commercial airports within the study area. According to DelDOT, most commercial airline passengers use Philadelphia International Airport or Baltimore/Washington Thurgood Marshall International Airport. The closest public airport is Sussex County Airport in Georgetown. This facility had 44,400 flights in 2005, and is predicted to have 57,200 flights in 2015. To meet this projected increase in flights, the Sussex County Airport plans to expand its runway from 5,000 feet to 6,000 feet. A 500-foot expansion is planned in 2013, and a second 500-foot expansion is planned for 2020. The June 2008 *Sussex County Comprehensive Plan* update indicates that the County is proposing several improvements to the Sussex County Industrial Airpark. Among them is the realignment of Park Avenue to connect to Arrow Safety Road. This will provide the area necessary to complete the proposed runway extensions and allow for better access to the airpark. The connection to Arrow Safety Road will also provide direct access to the proposed interchange at US 113.

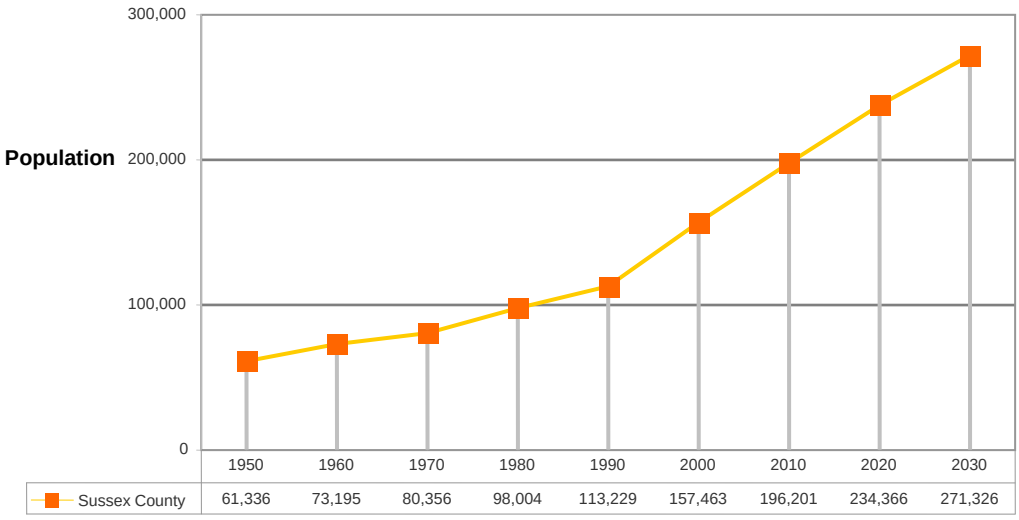
Other than the connection of Park Ave to US 113, improvements to US 113 will have little impact on the proposed runway extension projects. However, US 113 provides easy access to the Georgetown area, which is important for users of the airport.

1.3.6 Preservation of a Transportation Corridor

1.3.6.1 Population and Housing Trends

Between 1970 and 2000, the permanent population of Sussex County increased by 96 percent (see **Figure 1-7**). According to 2009 data from the Delaware Population Consortium (DPC), by 2030, the population is expected to increase another 72 percent to over 270,000 permanent residents. The number of seasonal residents of the county is also growing. According to the University of Delaware, approximately 125,000 seasonal residents are expected by 2030, an increase of 31 percent over the 2000 level. With the increase in population comes an expected increase in the number of permanent households. DPC data from 2009 indicate that between 2000 and 2030, the number of households in Sussex County is expected to increase by 88 percent, to over 118,000. While there has been a recent economic downturn nationwide, the DPC makes long-term population projections, and it expects the overall trend be continued increases in populations. In 2010, the University of Delaware confirmed that despite the economic downturn, the population of Sussex County has continued to grow by approximately 3,500 annually.

Figure 1-7: Population Trends for Sussex County



While the recent economic downturn has slowed growth throughout the country, the eastern part of Sussex County is expected to remain a popular location for retirees, second homes, etc. Continued development is anticipated in and around the study area. Improvements to US 113 and access to connecting east-west corridors would help accommodate new and planned nearby developments, thus make for an efficient limited access transportation corridor that would link burgeoning development throughout the County.

1.3.6.2 Economic Development

US 113 is an important contributor to economic development in Sussex County and the region. Its importance would continue, making it vital to preserve capacity in this transportation corridor.

According to the 2008 *Sussex County Comprehensive Plan Update*, agriculture is the County's primary industry, and tourism is rapidly growing. Forty-four percent of Sussex County's land is devoted to agriculture, and the County intends to promote businesses that are related to or compatible with agriculture. The County recognizes the unique transportation needs of the agriculture industry and has established policies to protect and address those needs.

The Delmarva Poultry Industry reports that US 113 is very important to Delaware's chicken industry. The Census Bureau ranks Sussex County first among America's counties in broiler chicken production. This industry employs approximately 7,000 persons in Kent and Sussex Counties and contributes 70 percent of Delaware's cash farm income. Approximately 1,000 farms raise chickens in Sussex and Kent Counties, and there are poultry facilities in Virginia and Maryland that send products north by truck via US 113. Additionally, mature chickens are transported to the processing plants via trucks along US 113.

Ninety-eight percent of all consumer goods in Sussex County are delivered by truck. Truck traffic on US 113 and US 13 is nearly double the five to ten percent typical on most public roads. Trucks affect and are affected by roadway performance.

Selbyville's economy is based on farming. Mountaire of Delmarva, a poultry processor, employs 1,500 people and is located on Hoosier Street within the town limits. There are 130 small companies in Selbyville, some of which are located in the Selbyville Industrial Park just off US 113. About 15 percent of the Town's land is vacant and developable.

Frankford is mainly residential and does not have a large commercial center. The Mountaire Farms plant is the town's only light industry. However, there is a large amount of vacant land available for development. The 2008 *Comprehensive Plan* recommends working with the state and county to identify sites for increased commercial and light industrial activity. The town has a strategy to annex land along US 113 and target it for commercial development.

There are no large employers in Dagsboro. However, there are over 400 acres of developable land in the town limits, most of which is designated for residential uses. Vacant and annexed land along US 113 is designated for highway commercial uses.

Millsboro functions as a regional service provider for shopping, medical, and other service needs. Within the town's boundaries, Intervet employs 500 people at its plant on Iron Branch Road south of downtown. The M&T Bank Financial Center, located just south of Millsboro on Mitchell Street, employs 600 people. Pinnacle Foods employs 250 people and is located immediately southeast of the town limits. The Indian River Power Plant, located approximately two miles southeast of the town, employs 140 people. According to the Town's 2009 *Comprehensive Plan Update*, the Town's location "in close proximity to and along major

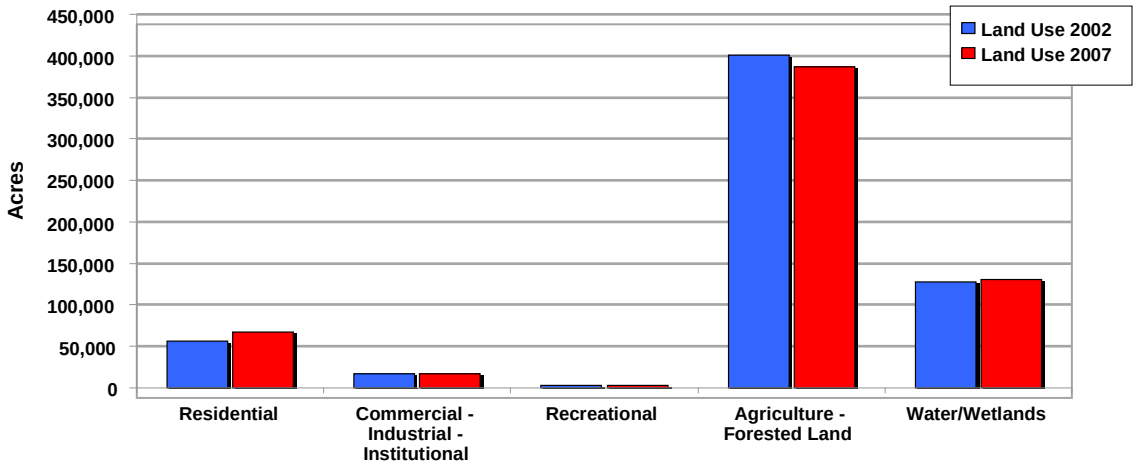
transportation corridors leading to the beach resorts" makes it a prime location to capitalize on tourist-related economic development.

1.3.6.3 Land Use Change

Sussex County land use changes between 2002 and 2007 are summarized on **Figure 1-8**, which illustrates the decreasing area of agriculture, forests and wetlands, and the increasing area of residential, recreational, and commercial/industrial/institutional land use.

From 2003 through 2006, Sussex County issued permits for the construction of over 13,700 new housing units. As of 2006, there were 26,233 residential lots recorded but not yet developed in Sussex County. Many of these new dwellings are located east of US 113, closer to the beaches of Sussex County. However, escalating land costs and scarce availability of land in the resort areas are pushing development west towards the US 113 corridor. In demonstration of this trend, nearly 7,000 new dwelling units are planned within the municipal boundaries of Millsboro, Dagsboro, and Georgetown in the next ten years.

Figure 1-8: Sussex County Land Use, 2002-2007



Source: Office of State Planning Coordination, 2002 and 2007.

1.3.6.4 Land Use Planning

Municipal and county comprehensive plans have been developed, and they help define the future of the US 113 corridor in the study area.

The Selbyville area had the fourth largest number of building permits in the County between 2003 and 2006. According to its *2007 Comprehensive Plan*, the town plans to annex the area west of US 113 and north of the existing town along US 113, which is a departure from the secondary developing areas adopted in the *Strategies for State Polices and Spending*. Selbyville has commercial uses concentrated along US 113 and the rail line.

The 2008 *Town of Frankford Comprehensive Plan* acknowledges DelDOT's intent to restrict access along US 113 and recommends annexation of land along US 113 to allow for commercial development.

The 2008 *Town of Dagsboro Comprehensive Plan* recommends highway commercial uses along US 113. The Plan identifies the area on the north side of town between SR 20 and US 113 for annexation for residential uses and also discusses annexation of land west of US 113.

The 2009 update to the 2004 *Millsboro Comprehensive Plan* recommends offices, small businesses, and restaurants in the downtown business district along US 113, from Delaware Avenue to Laurel Road. Larger commercial activities are recommended for areas south of Laurel Road.

The 2008 *Sussex County Comprehensive Plan Update* identifies a need to accommodate significant through and regional traffic while preserving mobility for local residents and access to local businesses. The largest growth in traffic between 2005 and 2030 is expected to occur around US 113. The US 113 Rail Freight Lines would continue to operate and the county plans to enhance and increase the bicycle and pedestrian routes in this corridor. The plan favors directing development to areas where the infrastructure exists. Many large developments are proposed in the central parts of the County.

State and local plans propose to address the changes in land use, but clearly indicate a need to address the through- and local-traffic needs. The Selbyville and Dagsboro plans have specifically identified the need to separate through and local traffic and recognize the need to limit access to US 113.

1.3.7 Future Traffic

Increases in population, housing, and employment are the foundation for an expected increase in average daily traffic, peak season traffic, and diminished LOS on US 113. DelDOT's peninsula-wide travel demand model was used to determine projected traffic along US 113 in 2030, the target year for this study.

Travel Demand (Daily): The large seasonal fluctuations in travel demand experienced recently are expected to continue. The model estimates that AADT along US 113 in the study area would be between 17,500 and 32,300 vehicles in 2030. If peak season traffic continues to be about 60 percent higher than AADT, the PADT would vary from 28,000 to 51,600 vehicles per day. In other words, it is expected that the volumes that occur during the summer season today would become the daily norm by 2030, and summer volumes would increase as much as 35 percent.

Travel Demand (Hourly) versus Route Capacity: Hourly demand is expected to increase as well. In the study area, US 113 is expected to carry up to 5,190 vehicles in the peak hour in 2030, as compared to 3,860 today. As noted in the Existing Traffic section, the theoretical capacity of the more rural portions of US 113 is 6,840 passenger cars per hour at level of service D. Anticipated volumes in most areas would remain below that threshold. However, in the center of Millsboro,

the anticipated average daily traffic of 5,190 vehicles would substantially exceed the roadway's theoretical capacity of 3,400 passenger cars per hour.

Travel Times: As noted in the Existing Traffic section, in 2030 US 113 is likely to function even more as an alternate route for SR 1 users who are traveling to and from beaches in Delaware and Maryland. **Table 1-5** shows the peak season travel times on US 113 and SR 1 for trips between the Kent County line and three destinations on SR 1. Both existing (2003) and projected (2030) travel times are provided. The advantages of using US 113 for beach-related traffic will likely increase by year 2030 due to increasing congestion in the SR 1 corridor, particularly in the southbound direction.

Table 1-5: Future Travel Times between Kent County Line and Various Destinations

Destination	Direction	Travel Route	Travel Distance (miles)	Peak Period Trip Time, 2003 [1]	Projected peak Period Trip Time, 2025 [1,2]
Rehoboth Beach (SR 1 at SR 1A)	Southbound	SR 1	24.6	1:37	2:18
		US 113/SR 404/SR 1	35.1	1:21	2:12
	Northbound	SR 1	24.6	0:39	1:47
		SR 1/SR 404/US 113	35.1	0:58	1:47
Bethany Beach (SR 1 at SR 26)	Southbound	SR 1	35.3	1:54	3:29
		US 113/SR 20/SR 26	40.4	1:03	2:00
	Northbound	SR 1	35.3	0:56	2:40
		SR 26/SR 20/US 113	40.4	1:42	2:31
Fenwick Island (SR 1 at SR 54)	Southbound	SR 1	43.0	2:11	4:14
		US 113/SR 20/SR 54	42.6	0:58	1:25
		US 113/SR 54	45.9	1:01	1:16
	Northbound	SR 1	43.0	1:13	3:23
		SR 54/SR 20/US 113	42.6	1:10	2:11
		SR 54/US 113	45.9	1:06	1:59

[1] *2003 and 2030 calculated conditions were obtained by applying growth rates to the year 2000 calculations. The year 2000 calculations were calibrated to be within ten percent of the observed field conditions conducted for the Sussex County Transportation Operations Management Plan.*

[2] *The projected 2030 travel times represent the average results of two different forecasting methods.*

Table 1-6 illustrates peak season travel times and corresponding travel speeds for the east-west routes described in **Section 1.3.3**, Existing Traffic. On SR 24, SR 26, and SR 54, travel speeds remain below 20 mph; SR 24 through Millsboro in particular is expected to exhibit travel speeds more characteristic of pedestrians than motor vehicles. Travel times along SR 20 are also expected to increase substantially.

Table 1-6: Future Travel Times and Speeds on East-West Routes

Location	Direction	Travel Distance (miles)	Observed Peak Period Trip Time, 2000 (minutes)	Observed Travel Speed, 2000 (mph)	Calculated Peak Period Trip Time, 2030 (minutes)	Calculated Travel Speed, 2030 (mph) [1]
Millsboro (SR 24/30, US 113 to State Street)	Eastbound	0.5	2.7	11	3.6	8
	Westbound	0.5	4.1	7	9.9	3
Dagsboro [3] (SR 20, US 113 to Armory Road)	Eastbound	2.8	5.4	31	7.3 [2]	23 [2]
	Westbound	2.8	7.4	23	9.7 [2]	17 [2]
Dagsboro [3] (SR 26, US 113 to Armory Road)	Eastbound	1.3	3.6	21	4.7 [2]	17 [2]
	Westbound	1.3	5.5	14	5.5 [2]	14 [2]
Selbyville (SR 54, US 113 to Church Street)	Eastbound	0.9	2.8	19	3.1	17
	Westbound	0.9	3.2	17	3.2	17

[1] *For segments having calculated speeds less than 10 mph, 10 mph was assumed as the minimum congested travel speed, except where observations show otherwise.*

[2] *Several segments along this route began at the 10 mph minimum for year 2000 travel times, therefore minimal calculated changes are shown in the 2030 travel times. However existing travel times are expected to increase with an increase in volume.*

[3] *A crash during the data collection period resulted in invalid data from 11 AM to 2 PM. Therefore, calculations are based on 10 AM and 3 PM data, which may vary slightly from actual peak hour data.*

A trip between the Sussex/Kent County line and points south would take longer as the roadways become more congested. During the off-peak season, the travel times may approximate current peak-season times due to the increase in year-round traffic volumes.

Intersection Capacity: Future intersection operations were evaluated using HCM methods. **Table 1-7** shows the projected 2030 LOS for the five signalized intersections evaluated within the study area as compared to the existing LOS. Four of the five signalized intersections (80%) would operate unacceptably in 2030.

Table 1-7: Study Area Intersection Operations – Projected Future Conditions

Intersection	2003 Peak Season Level of Service	Projected 2030 Peak Season Level of Service	Acceptable?
US 113 @ SR 54	C	D	Yes
US 113 @ SR 26	C	F	No
US 113 @ SR 20 east	D [1]	F	No
US 113 @ SR 24/SR 30	F [2]	F	No
US 113 @ SR 20 west	D	F	No

[1] *There is a proposed project, which was identified through the Highway Safety Improvement Program, that would include the addition of a second southbound US 113 left turn lane to improve intersection capacity.*

[2] *A short-term improvement project was completed in 2006 to improve intersection capacity to LOS E.*

In order to maintain reasonable intersection operations, a greater share of the time at traffic signals would have to be allotted to through traffic, and the required signal cycle length would

increase. Both of these accommodations to through traffic would decrease mobility for local users. This would be most obvious as wait times increase on the local roads and driveways entering US 113.

1.3.8 Federal, State, and Local Initiatives

Multiple state and local programs and plans, discussed below, have stated a need to accommodate future development without degrading the capacity of US 113 in the study area. Local plans have identified the need to separate through traffic from local traffic. However, the *National Environmental Policy Act* (NEPA) mandates that a reasonable range of both on- and off-alignment alternatives be considered and that no preference be given one type of alternative over another.

1.3.8.1 Federal Initiative

In June of 2009, the Environmental Protection Agency (EPA), US Department of Housing and Urban Development (HUD), and US Department of Transportation (USDOT) created the Partnership for Sustainable Communities. This initiative focused on increasing access to affordable housing, providing more transportation options, and lowering transportation costs while protecting the environment. The Partnership created a list of six livability principles, which are detailed below. Where applicable, information on how this project addresses these principles is also provided.

- **Provide more transportation choices** to decrease household transportation costs, reduce our dependence on oil, improve air quality, and promote public health. *Increasing capacity with the addition of a northbound/southbound through lane and grade separated intersections will improve the safety and efficiency of all travel on US 113 from Millsboro to Selbyville. The reduction in peak hour travel time delays and volume of idling vehicles at signalized intersections will help reduce road user costs and improve air quality. The final design of the proposed improvements will include provisions to accommodate multi-modal traffic in accordance with DelDOT's Complete Streets policy.*
- **Expand location- and energy-efficient housing choices** for people of all ages, incomes, races, and ethnicities to increase mobility and lower the combined cost of housing and transportation. *Providing grade separated intersections will improve mobility throughout the Millsboro, Dagsboro, Frankford, and Selbyville areas. Local east/west travel along roads crossing US 113 will be safer and more efficient.*
- **Improve economic competitiveness of neighborhoods** by giving people reliable access to employment centers, educational opportunities, services and other basic needs. *The proposed US 113 project will provide improved access among towns in Sussex County and elsewhere in Delaware and reduce time-to-market for commercial establishments.*
- **Target federal funding toward existing communities** – through transit-oriented, mixed-use development and land recycling – to revitalize communities, reduce public works costs, and safeguard rural landscapes. *The proposed project seeks to improve the existing US 113, rather than create a bypass on currently undeveloped land.*
- **Align federal policies and funding** to remove barriers to collaboration, leverage funding and increase the effectiveness of programs to plan for future growth.

- **Enhance the unique characteristics of all communities** by investing in healthy, safe, and walkable neighborhoods, whether rural, urban, or suburban.

1.3.8.2 State Initiatives

The 2002 *Statewide Long Range Transportation Plan* (LRTP) is DelDOT's strategic long-range planning tool. The plan identifies principles, policies, and actions to address statewide needs and priorities. The principles and policies are intended to guide long-range efforts (20 years into the future). The actions are defined as the necessary activities to be undertaken. The Millsboro-South area study is supported by several LRTP policies:

- The LRTP establishes a policy for DelDOT to conduct corridor and area studies. These studies support effective planning and management and identify the most effective transportation facilities.
- The LRTP identifies the continued implementation of DelDOT's CCPP for US 113 from the Maryland state line north to Milford.

The CCPP includes the section of US 113 from the Maryland state line to an area south of the Milford city limits. The purpose of this program is to protect corridors serving predominantly statewide and/or regional travel in the state. The goals of the CCPP are to:

- Maintain a road's ability to handle traffic safely and efficiently
- Minimize the impacts of increased economic growth
- Preserve the ability to make future improvements
- Prevent the need to build an entirely new road
- Separate local and through traffic

The overall US 113 North/South Study, of which the Millsboro-South Area Study is a component, would either support the goals of the CCPP in the US 113 corridor or replace the CCPP with another strategy.

The *Strategies for State Policies and Spending* were adopted in 1999. The State uses the strategies to make decisions such as the allocation of new state funding for farmland preservation, road construction, open-space preservation, transportation investments, state-supported housing development, and water and wastewater financing.

Transportation Management Plan for Evacuation: Emergency evacuation is a concern in Sussex County due to the threat of coastal storms and flooding. Approximately 48 percent of Sussex County's housing units are potentially subject to some tidal inundation in a Category 4 hurricane. Safe and efficient evacuation routes have been identified in the *Transportation Management Plan for Evacuation* prepared as part of the *Delaware Emergency Operations Plan* by the Evacuation Committee. US 113 is a designated north-south evacuation route from Kent County in the north to the Maryland border in the south. SR 20, SR 24, SR 54, and US 9, all of which cross US 113, are designated as emergency east-west evacuation routes. Maintaining adequate traffic capacity along evacuation routes is critical to the safety of Sussex County residents. See **Section 1.3.9**.

1.3.8.3 Local Initiatives

Sussex County
The *2007 Sussex County Delaware Comprehensive Plan Update* recommends implementation of improvements designed to preserve and increase capacity on US 113. The Plan also cites the following needs for those improvements:

- To accommodate significant through and regional traffic while preserving mobility for local residents and access to local businesses;
- To assure the viability of agriculture as a vital element of the county's economy, and to accommodate its special transportation requirements; and
- To improve the function of US 113 as an emergency evacuation route.

Town of Selbyville
Selbyville's *2007 Comprehensive Plan* calls for orderly, managed growth that balances residential and business uses. Objectives of the Plan include preserving farmland, protecting the environment, and maintain Selbyville's small town way of life.

The Town is divided on a north-south axis by US 113. The widening of US 113 in Maryland to four lanes is nearly complete. SR 54 is the main east-west roadway in the Town. Commercial land uses exist along US 113 in Selbyville, and there is a desire to annex land north of the Town boundary along US 113 to allow for further commercial and industrial growth. The Plan indicates that the busiest traffic route in Selbyville is Church Street, which connects US 113 and SR 54. Hoosier Street, between US 113 and SR 54, is a designated truck route. The Plan recommends coordination with DelDOT on land use and transportation issues.

Town of Frankford
The primary goal of the *2008 Town of Frankford Comprehensive Plan* is to preserve Frankford's small town atmosphere. Although Sussex County has undergone major growth in the last decade, Frankford is just beginning to experience development pressure. The main transportation concerns identified in the Plan include increasing through traffic and truck traffic. The Plan recommends annexation of land along both sides of US 113 to provide opportunities for future commercial development. The Plan further recognizes DelDOT's intent to restrict access along US 113 and the need for the Town to remain involved in the US 113 North/South Study.

Town of Dagsboro
The *2008 Dagsboro Comprehensive Plan Update* identifies traffic congestion as the most pressing transportation issue in the Town. The Plan indicates that beach traffic along SR 26 in Dagsboro is overwhelming. SR 26 intersects US 113 in Dagsboro and the huge increase in traffic volume during the beach season is identified as a critical issue for the Town. The Plan indicates that summer weekend traffic volumes are between 110 and 130 percent higher than fall weekday traffic levels at key intersections in Dagsboro.

There are concerns about traffic congestion and pedestrian safety on Main Street. The Plan recommends working with DelDOT on the study of a SR 26 bypass to reroute beach traffic away from Town to minimize the impact of beach traffic on Dagsboro residents.

Town of Millsboro
The transportation goal of the *2009 Millsboro Comprehensive Plan Update* is to maintain and improve the existing transportation and circulation pattern within the Town. The Plan indicates that this should be done by preserving and enhancing the internal transportation network and connections to the regional transportation network, connect new development with existing street patterns, connect land use and transportation decisions to preserve the capacity of existing and future developments, and providing access to alternative modes of transportation.

The Plan recommends protecting the capacity of US 113 and State Routes 24, 20, and 30. Other recommendations in the Plan include working with the Sussex County Association of Towns, Sussex County government, and DelDOT in implementing the county and statewide long-range plans.

1.3.9 Emergency Evacuation

Emergency evacuation is a concern in Sussex County due to the threat of coastal storms and flooding. Safe and efficient evacuation routes have been identified in the Transportation Management Plan for Evacuation prepared as part of the Delaware Emergency Operations Plan by the Evacuation Committee. US 113 is a designated north-south evacuation route from Kent County in the north to the Maryland border in the south. SR 54, SR 24, and SR 20, all of which cross US 113 in the study area, are designated as emergency east-west evacuation routes. The long-term benefit of the proposed improvements to traffic capacity would lead to safer and more efficient emergency evacuations.

CHAPTER 2 – ALTERNATIVES

2.1 INTRODUCTION

This chapter describes the development of proposed alternatives and the reasons for their elimination or retention for further evaluation. Information on the final build alternatives is also provided. The identification of a Preferred Alternative is discussed in **Chapter 5**. This DEIS is being prepared by DelDOT for FHWA. While DelDOT has recommended a Preferred Alternative, the final selection will not be made until the impacts of all of the proposed alternatives, and comments on the DEIS and from the public hearing, have been fully evaluated and FHWA has issued a Record of Decision (ROD). All alternatives described in this document are proposed; none has been fully engineered.

2.2 ALTERNATIVES DEVELOPMENT

The development and evaluation of proposed alternatives for US 113 in the Millsboro-South study area has been an iterative process. First, broad-ranged concepts were considered and reviewed against the proposed project's purpose and need. Next, a wide range of preliminary build alternatives was developed. Finally, through an extended process of communication with the public and coordination with the resource agencies, the alternatives were evaluated and narrowed to create a list of Alternatives Retained for Detailed Study (ARDS).

Originally, the Millsboro-South study area was part of the larger Georgetown-South study area. This chapter builds upon the *Report on Alternatives Retained for Detailed Study for US 113 in the Georgetown-South Area,* which was prepared in July 2007. It contains updated information to reflect the smaller study area.

The initial broad range of proposed alternatives included the No-build Alternative, the Transportation Systems Management (TSM) Alternative, the Mass Transit Alternative, and the build alternative. The build alternative consisted of a number of possible alignments, as discussed in **Section 2.2.4**.

2.2.1 No-build Alternative

The No-build Alternative includes the existing network of roads plus the currently programmed, committed, and funded roadway and transit projects in the study area, with the exception of the US 113 North/South Study. There are no major improvements planned to facilities within the Millsboro-South study area. Minor improvements for SR 24 and SR 26 are listed in the Statewide Transportation Improvement Program included in the *FY 2013-FY 2018 Capital Transportation Program* as of the date of this report. These planned improvements are both east of the study area. These proposed changes, such as providing turn lanes and shoulders, do not result in noteworthy capacity changes along the US 113 corridor. Evaluation of the No-build Alternative assumes no construction other than routine maintenance and repair.

The No-build Alternative does not meet the purpose of and need for this proposed project. However, it does provide a baseline condition with which to compare the other proposed alternatives and their consequences. As such, the No-build Alternative is retained for evaluation purposes. It is important to note that improvements associated with the No-build would have environmental effects that have not been evaluated as part of this study. This DEIS is for a proposed project that does not yet have a specific construction time frame; rather it is for future highway improvements. In the interim, on-going highway improvements along the existing roadway will be addressed by DelDOT as local projects independent of this long term planning initiative. As independent projects, they will be evaluated for their respective merits and impacts.

Appendix A (*Alignment Sheets*) provides aerial mapping showing conditions in the Millsboro-South study area. The baseline conditions for the No-build Alternative are found in **Section 1** of the **Appendix**.

2.2.2 Transportation System Management Alternative

TSM activities typically include those that maximize the efficiency of the present system, such as fringe parking, ride sharing, traffic signal optimization, Intelligent Transportation Systems, or High Occupancy Vehicle lanes on existing facilities. For the US 113 corridor, a TSM Alternative does not provide for access limitation and, therefore, does not meet the purpose of and need for this proposed project. It has been eliminated from further consideration.

2.2.3 Mass Transit Alternative

For US 113 a Mass Transit Alternative would consist of major investments to DART First State, Delaware Transit Corporation (DTC), such that adding additional roadway capacity to the project area would not be required. As of 2009, the DTC serves 39 Park and Ride and 15 Park and Pool lots, with approximately 4,300 parking spaces and 2,800 bus stops. In 2009, buses ran on 70 different routes in the state and carried over 9.1 million passengers, a 6 percent increase from 2008. Currently, there are no Park and Ride or Park and Pool lots in the study area. However, a new Park and Ride lot is planned as part of the Del Pointe Racino development in Millsboro. The closest bus route to the study area is in Georgetown. Expansion into the study area is included in DART's 2001-2016 business plan, but the timing of the expansion is dependent on funding.

Even though the DTC continues to invest in all elements of mass transit throughout the region, the Mass Transit Alternative by itself cannot sufficiently alleviate single occupancy vehicle travel demand such that adding capacity to the roadway network is not required. In addition, this proposed alternative does not meet other project needs, including a need for improved system linkages. The Mass Transit Alternative has therefore been eliminated from further consideration.

2.2.4 Build Alternative

The build alternative entails either changing the access of the existing facility and constructing appropriate ancillary service roads, or construction of a new roadway facility on new alignment. The build alternative is the only broad-ranged concept that meets the purpose of and need for this proposed project.

For the US 113 North/South Study, the build alternative is categorized into three concepts: on-alignment, and east and west new alignment concepts to bypass populated areas along US 113. The bypass concepts are comprised of a combination of segments, which were developed as described below.

2.3 BUILD ALTERNATIVES DEVELOPMENT

Prior to the establishment of complete alternatives, candidate segments were developed with specific purposes, such as logical interchange locations or avoidance of known socio-economic, natural, or cultural resource constraints. These segments are shown on **Figure 2-1**. Preliminary impact matrices were developed to help evaluate each segment with respect to environmental, engineering, transportation, economic development, and right-of-way considerations. These evaluations were based on available planning information collected from state and local (Sussex County, Selbyville, Frankford, Dagsboro, and Millsboro) agencies, site visits, and field reviews of the project area. In addition to the information evaluated in the matrices, citizen input was sought through the project's public involvement program.

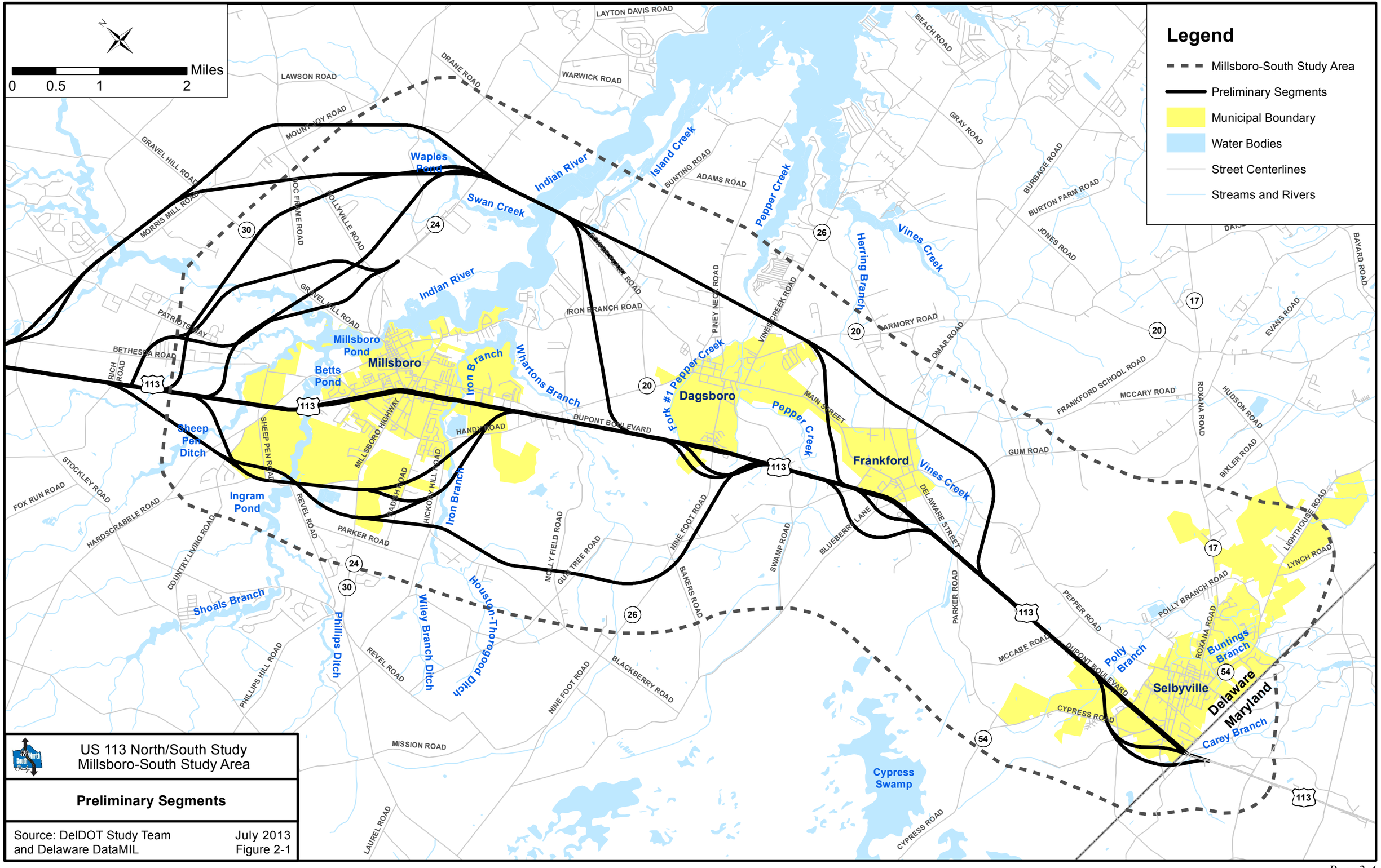
Proposed alternatives were comprised of combinations of the segments. Some alternatives were comprised of only one segment, while others were comprised of several. These segment combinations were reviewed for their ability to meet the project's purpose and need and for their comparative impacts. Those that had disproportionately high impacts or that didn't meet the project's purpose and need were not evaluated any further. The retained alternatives were given the names of colors, and they represent the ARDS throughout the remainder of this DEIS.

2.3.1 Existing Alignment

Three proposed alternatives were considered to upgrade the existing alignment of US 113 through the study area, from Selbyville north to Millsboro.

Option 1 would include upgrading existing US 113 to fully controlled access throughout the study area.

In Selbyville, new northbound limited-access lanes would be built in the existing wide median. The existing southbound lanes would remain, but access to them would be denied. The existing northbound lanes would be converted to a two-way frontage road to allow full access to properties on the eastern side of US 113. Some small access roads would provide access to properties on the western side of the highway and a new overpass would provide grade separation for Hosier Street over US 113.



US 113 North/South Study
Millsboro-South Study Area

Preliminary Segments

Source: DelDOT Study Team and Delaware DataMIL

July 2013
Figure 2-1

To better accommodate east-west travel in Selbyville, this option also included construction of a two-lane roadway to replace the existing segment of SR 54 through the town. The proposed alignment would intersect US 113 with a grade separated interchange about 0.75 miles north of existing SR 54 (Cemetery Road). The proposed roadway would connect to existing SR 54 approximately one mile west of US 113 and extend about 2.3 miles east of US 113 where it would form the fourth leg of the intersection at SR 17 and Bixler Road. The location and configuration of the new SR 54 interchange at US 113 as well as the roadway alignment were refined throughout the concept development stage in response to cultural resource impacts, proposed development, and public comment. Once the Town of Selbyville and local residents demonstrated strong support for the on-alignment alternative it was determined that the SR 54 bypass would be associated with all build alternatives. During more recent discussions with the Town of Selbyville following the public workshops in May 2010, there were concerns about the need for the SR 54 bypass and the resulting property impacts. As a result, the SR 54 bypass was removed from all build alternatives with the understanding that changes to the status of future development could trigger the need for additional east/west traffic capacity along SR 54.

From just north of Selbyville to Frankford, the existing lanes of US 113 would remain and be converted to limited access. In selected locations, a new frontage road would be provided along the western side of the highway. A full interchange would be constructed at Parker Road/Lazy Lagoon Road.

In the Frankford area, new southbound limited-access lanes would be built in the existing wide median. The existing northbound lanes would remain, but access to them would be denied. The existing southbound lanes would be converted to a two-way frontage road to allow full access to properties on the western side of US 113. Northbound and southbound on- and off-ramps would be provided at Frankford Avenue/Cat Mans Road and Gum Tree Road. A grade separation would carry Gum Tree Road over US 113.

Between Frankford and Dagsboro, the existing lanes of US 113 would be converted to full access control, with a new frontage road constructed on the southbound side to allow access to properties on the western side of the highway.

To better accommodate east-west travel in Dagsboro, this option would include construction of a two-lane replacement of SR 26, passing to the south of Dagsboro. There would be a full interchange between this SR 26 connector and US 113. From SR 20 east to the vicinity of SR 26, new southbound limited-access lanes would be built on the western side of US 113, adjacent to the existing southbound lanes. The existing southbound lanes would remain, but they would be converted to northbound operation and access to them would be denied. The existing northbound lanes would be converted to a two-way frontage road to allow full access to properties on the eastern side of US 113. In the Dagsboro vicinity, a new frontage road would be constructed on the western side.

South of Millsboro, the existing lanes of US 113 would remain and be converted to limited access, with a new frontage road system along the western side of the highway. A new connector would be provided between Handy Road and Mitchell Street at the current site of

M&T Boulevard, bridging over US 113. Access in this area would be provided by on- and off-ramps in both directions at Suburban Propane, south of M&T Boulevard. This system of ramps, with the new grade separation, would provide access to SR 20 east (Dagsboro Road).

In central Millsboro, from south of Radish Road to south of Betts Pond, new southbound limited-access lanes would be built in the existing wide median. The existing northbound lanes would remain, but access to them would be denied. The existing southbound lanes would be converted to a two-way frontage road to allow full access to properties on the western side of US 113. Generally, access to the properties on the eastern side of US 113 would be by means of existing roadways, with a limited number of new access roads. Access to and from controlled-access US 113 in this area would be limited to northbound on- and off-ramps at Houston Avenue and corresponding southbound movements at Old Landing Road. These ramps would tie to SR 24/SR 30 using surface streets, and SR 24/SR 30 would be elevated over US 113.

From south of Betts Pond to the northern end of the study area, the existing lanes of US 113 would be converted to full access control. On- and off-ramps would be provided in each direction in the vicinity of Oak Avenue, and a partial cloverleaf interchange would be provided at SR 20 west (Hardscrabble Road).

Option 2 would also include upgrading existing US 113 to fully controlled access throughout the study area. South of SR 20 east (Dagsboro Road), Options 1 and 2 are identical. See the description of Option 1 for details.

South of Millsboro, the existing lanes of US 113 would remain and be converted to limited access, with a new frontage road system along the western side of the highway. A new connector would be provided between Handy Road and SR 20 (east), bridging over US 113. Access in this area would be provided by on- and off-ramps southbound at Suburban Propane and northbound just north of Sussex Lumber and at M&T Boulevard. This system of ramps, with the new grade separation, would provide access to SR 20 east (Dagsboro Road).

In central Millsboro, from south of Radish Road to south of Betts Pond, new southbound limited-access lanes would be built in the existing wide median. The existing northbound lanes would remain, but access to them would be denied. The existing southbound lanes would be converted to a two-way frontage road to allow full access to properties on the western side of US 113. Generally, access to the properties on the eastern side of US 113 would be by means of existing roadways, with a limited number of new access roads. Access to and from controlled-access US 113 in this area would be more frequent than in Option 1. Grade separations would be provided at Radish Road and on a new alignment connecting Delaware Avenue on the west with Monroe Street on the east, the latter serving as a relocation of SR 24/SR 30 through town. Southbound ramps would be provided near Delaware Avenue and just north of SR 24/SR 30, with corresponding northbound movements at the Acme shopping center, at Old Landing Road, near Wharton Street, and at Monroe Street. Extensive access roads would be provided to tie these access points and grade separations to each other and to the existing street system in Millsboro.

From south of Betts Pond to the northern end of the study area, the existing lanes of US 113 would be converted to full access control. On- and off-ramps would be provided in each direction in the vicinity of Oak Avenue, and a full diamond interchange would be provided at SR 20 west (Hardscrabble Road).

Option 3 would entail providing one additional lane in each direction on US 113 throughout the Millsboro-South study area. From south of Radish Road to south of Betts Pond, the median of existing US 113 widens to 90 feet. In this area, Option 3 would include a new four-lane "express lane" cross section in place of the existing median. The express lanes would be elevated over the SR 24/SR 30 intersection, which would remain to allow local movements. US 113 traffic to and from Millsboro would enter and exit at either end of the express lanes. Other than the express lane section, all existing signals would be retained.

2.3.2 Western Bypass Segments

Western bypasses were developed for each of the towns in the study area. The bypasses (see **Figure 2-1**) consist of combinations of 15 segments that were developed. Each proposed alternative would include upgrading existing US 113 to fully controlled access from the southern limit of the study area to the point where each of the new alignments diverges from US 113.

Segment 6 would connect segment I with US 113 south of Selbyville. This alignment would minimize impacts to developed properties in Selbyville by extending south of the state line into Maryland.

Segment 7 would connect segment I with US 113 south of Selbyville. This alignment would minimize impacts south of the state line in Maryland, but impacts developed residential and commercial properties in Selbyville.

Segment I would form the northern half of the western bypass of Selbyville. It would begin approximately 0.75 miles north of SR 54. The alignment would pass west of developed properties in Selbyville and an existing cemetery on SR 54, and minimize impacts to a floodplain of Polly Branch.

Segment G would be a short western bypass of Frankford, beginning north of Delaware Street and ending north of Gum Tree Road. It would cross Blueberry Lane about 0.5 miles west of US 113. The alignment was developed to avoid wetland impacts at either end while allowing a bypass as far west as possible to minimize impacts to existing residences on Blueberry Lane.

Segment H would be another short western bypass of Frankford, beginning south of Cat Mans Road and ending near Gum Tree Road. The alignment would cross Blueberry Lane less than 1000 feet west of US 113. The alignment was developed to be as short as possible while minimizing impacts to existing commercial establishments along US 113 and residences on Blueberry Lane.

Segment 9, which would diverge from existing US 113 just south of Dagsboro, parallels SR 26 until it crosses Bakers Road, then turns northwest. It continues east of and roughly parallel to Hickory Hill Road, then crosses SR 24 just east of Parker Road. It turns east just south of Ingram Pond and passes along the western side of the proposed Plantation Lakes development.

Segment F would be a short western bypass of the intersection of US 113 and SR 26. It was developed to reduce potential impacts to the Dagsboro Church of God property along the western side of US 113 north of SR 26.

Segment E would be a short western bypass of the intersection of US 113 and SR 26, developed to minimize impacts to developed properties along SR 26. It would be slightly longer than Segment F and go farther west.

Segment 5 was developed to minimize impacts to existing residences in the Radish Road and Indiantown Road areas. It would entail crossing Iron Branch at an angle. The alignment would diverge from existing US 113 just north of SR 20. The segment would cross SR 24 just east of Parker Road, turning west just south of Ingram Pond and passing along the western side of the proposed Plantation Lakes development.

Segment 8 was developed to minimize impacts to Iron Branch and its associated wetlands. It would diverge from existing US 113 just north of SR 20 and would cross SR 24 just west of Godwin School Road. It would then pass along the western side of the proposed Plantation Lakes development.

Segment 4 was developed to minimize impacts to existing residences in the Radish Road and Indiantown Road areas, requiring a crossing of Iron Branch at a skew. The alignment splits from existing US 113 just north of SR 20. It would cross SR 24 just west of existing Godwin School Road, then pass along the western side of the proposed Plantation Lakes development.

Segment D would include one of two connectors to SR 24 east of Millsboro (24N and 24S, described later in this section). The alignment would start with a crossing of SR 20 just east of the existing Meadow Brook development. It would rejoin US 113 between Patriots Way and Avenue of Honor, south of Woodlawn Memorial Park.

Segment C would include one of two connectors to SR 24 east of Millsboro (24N and 24S, described below). The alignment would cross SR 20 just east of the existing Meadow Brook development and has its northern terminus on US 113 near Avenue of Honor, passing west of Woodlawn Memorial Park.

Segment 24S would be associated with all western bypasses of Millsboro. This segment would be either a two-lane or three-lane connector beginning at SR 24 just east of Hollyville Road. It would continue west, crossing SR 30 and avoiding an agricultural district. The alignment would cross Cow Bridge Branch at a narrow point in its floodplain and associated wetlands just above Millsboro Pond, then parallel Mirey Branch before passing southwest of Stockley Veterans

Cemetery. It would end at the existing intersection of US 113 and Avenue of Honor and extend to the east.

Segment 24N would be the northern option for a connector to SR 24, and is associated with all western bypasses of Millsboro. This segment would be either a two-lane or three-lane connector beginning at SR 24 just east of Hollyville Road. It would continue west, crossing SR 30. The segment would cross Cow Bridge Branch at a narrow point in its floodplain and associated wetlands, then passes to the north of Stockley Veterans Cemetery. It would end at the existing intersection of US 113 and Avenue of Honor.

2.3.3 Eastern Bypass Segments

Initially, five segments were developed to bypass Millsboro to the east (see **Figure 2-1**). One of these also bypassed Frankford and another bypassed Dagsboro. Each of the eastern bypass combinations would cross the Indian River at the same location. Segments B3, B2, and B1 meet Segments B4 and B5 at the proposed bridge over the Indian River. After considering agency comments, Segment B6 was developed in April 2005 to avoid impacts to the Doe Bridge Nature Preserve and Stockley Center.

Eastern bypass segments were not developed for Selbyville because of the potential impact to the town. A majority of the town area is located east of US 113. Due to its proximity to the Maryland/Delaware state line and the required geometric design standards, it would not be possible to avoid major impacts to the town.

In addition to the bypass segments, two options for a SR 24 Connector were developed to bypass Millsboro to the north and connect US 113 to SR 24. SR 24 South Connector and SR 24 North Connector are shown on **Figure 2-1**.

Segment B3 was developed as a part of the off-alignment alternative around the southern side of Frankford. The alignment would split from existing US 113 just south of the town of Frankford, approximately 200 feet south of the intersection of US 113 and Parker Road. It would swing northeast to cross Pepper Road and Gum Road. The alignment would then continue north and cross over Frankford School Road and Omar Road, then interchange with SR 26 approximately one mile east of Main Street in Dagsboro. It would continue north to cross Piney Neck Road and Power Plant Road, tying into alignments B4 and B5 north of the Indian River.

Segment B2 was developed as a part of the off-alignment alternative around the southern side of Dagsboro. The alignment would split from existing US 113 between Frankford and Dagsboro. It would swing northeast to cross Clayton Avenue and interchange with SR 26 approximately one mile east of Main Street in Dagsboro. It would continue north to cross Piney Neck Road and Power Plant Road, tying into alignments B4, B5, and B6 north of the Indian River.

Segment B1 would split from existing US 113 between Dagsboro and Millsboro, approximately one mile from the intersection of US 113 and SR 20 east. Segment B1 swings northeast to cross Dagsboro Road, the Norfolk Southern rail line, and Iron Branch Road. It turns north between the

Indian River and Power Plant Road, tying into alignments B4, B5, and B6 north of the Indian River.

Segment B4 would cross the Indian River near the mouth of Swan Creek, and then interchange with SR 24. North of SR 24, the alignment would cross Swan Creek between Waples Pond and Longwood Pond. It would continue to the northwest, crossing Maryland Camp Road and Hollyville Road. After an interchange with Gravel Hill Road it would rejoin US 113 just south of the Stockley Center.

Segment B5 would be very similar to Segment B4 except that it would be located a few hundred feet farther from Millsboro than Segment B4. It would cross the Indian River near the mouth of Swan Creek, and then interchange with SR 24. North of SR 24, the alignment would cross Swan Creek between Waples Pond and Longwood Pond. It would continue to the northwest, crossing Maryland Camp Road and Hollyville Road. After it interchanges with Gravel Hill Road it would rejoin US 113 just south of the Stockley Center.

Segment B6 would be similar in its location to Segment B5 until it crosses Swan Creek. At that point, it would continue in a more northerly direction, crossing Mount Joy Road. It would then turn to the west to parallel Mount Joy Road and cross SR 30 just north of its intersection with Mount Joy Road. B6 would continue to the northwest, crossing Morris Mill Road just south of the intersection of Morris Mill Road with Zoar Road. It would cross Colony Road just south of the existing Colony Road/Zoar Road intersection and intersect US 113 about 0.75 miles north of the US 113 intersection with Governor Stockley Road.

2.4 SEGMENT/OPTION ELIMINATION

Through evaluation of an impact matrix and segment combinations, eight of the 21 original segments and two of the three proposed on-alignment options were identified for elimination. The resource agencies actively participated in the evaluations, providing their input on potential adverse and beneficial impacts of the segments. Evaluations were partially based on the criteria contained in the **Impact Matrix** in **Chapter 3**. Two of the dropped segments were also opposed by the public. Consequently, the number of build alternatives was reduced. All eastern bypass segments were retained. Reasons for segment and/or alternative elimination are listed below.

2.4.1 On-alignment Options

On-alignment, Options 1 and 2: Although these concepts would provide full access control, they would result in substantial business and residential impacts in downtown Millsboro. As a result, there was strong public opposition to both of these options. However, both appear viable from south of Millsboro to the Maryland state line. As such, they would be considered in conjunction with Option 3 described below as a hybrid alternative, Option 4.

On-alignment, Option 3: This concept would not provide for full access control of the facility; therefore it does not meet the purpose of and need for the project. However, the limited-access

portion of this option in downtown Millsboro received some public support, and would be considered along with other On-alignment improvements as a hybrid alternative, Option 4.

2.4.2 Western Bypass Segments

Segment 7 was one of two western bypass alternatives through the Town of Selbyville. Segments 6 and 7 were essentially equal length; however, Segment 7 was closer to US 113 and consequently would have impacted 20 additional properties. Included among the property impacts were about 25 residential relocations and five commercial relocations. Segment 7 also had a slightly higher impact to existing wetlands. Segment 6 had the same traffic benefits with fewer impacts; therefore, Segment 7 was dropped.

Segments E and F were both short western bypasses of the Town of Dagsboro. Both segments were about 1.5 miles long and would have diverted a majority of the US 113 traffic. The resulting impacts included between three and four acres of forested wetlands, about 30 properties, and approximately 60 acres of prime farmland. The town and the working group expressed concerns about the diversion of traffic and the effect on existing businesses along US 113. There were also questions about the benefit of the interchange at Nine Foot Road (SR 26) in such close proximity to the existing signalized intersection at Clayton Street. Many residents and town officials expressed concern about the fact that the SR 26 connection would not address the traffic problems through town. Therefore, Segments E and F were dropped.

Segments G and H were both short western bypasses of the Town of Frankford. Similar to the western bypasses of Dagsboro, each segment would have diverted approximately 90 percent of the projected 2030 traffic volumes. Segment G was about 0.1 mile longer than Segment H, but Town officials expressed concern about both segments diverting too much traffic away from businesses along US 113. Neither segment would have had any wetland impacts, but both would have resulted in prime farmland impacts (Segment H over 45 acres, and Segment G over 82 acres). When considering the property impacts, which were primarily to farmland, and the lack of perceived benefit by the working group, both Segments were dropped.

Segments 4 and 5 were two of the shorter Millsboro western bypass segments. They were similar in length and followed a similar alignment, except for the segment between SR 24 and just south of Parker Road. Compared to the other western bypasses, these two segments would have had the highest wetland impacts (between 23 and 24 acres). A majority of these impacts were associated with the crossing of Iron Branch, which includes high quality forested wetlands. These segments also would have impacted between 10 and 20 more properties than Segment 8. Segments 4 and 5 were dropped because their natural resource impacts were greater than those of the other Millsboro western bypass segments.

Segment C was located at the north end of the western bypass options. It was the northernmost connection to US 113, and included an additional off-alignment crossing of Narrow Drain Branch. As a result, there would have been an additional four to five acres of wetland impacts and approximately 20 acres of additional forestland impacts. There also would have been

additional residential impacts along Country Living Road. Segment C was dropped due to relatively high residential and natural resources impacts.

2.4.3 Remaining Alternatives

The initial evaluation of proposed preliminary alternatives, completed in April 2005, resulted in the following 11 alternatives being considered for detailed study. As shown on **Figure 2-2**, each proposed build alternative was identified with a color.

- No-build Alternative (no color assigned)
- On-alignment Alternative A, Option 4, which was a hybrid of Options 1, 2, and 3 (Yellow)
- Eastern bypass alternatives B4-1 (Orange), B4-2 (Red), B4-3 (Blue), B5-1 (Brown), B5-2 (Pink), and B5-3 (Aqua)
- Western bypass alternatives D8 (Purple) and D9 (Green), both with either connector 24N or 24S
- Western bypass alternative I-6 (Gold)

2.5 ADDITIONAL EVALUATION OF ALTERNATIVES

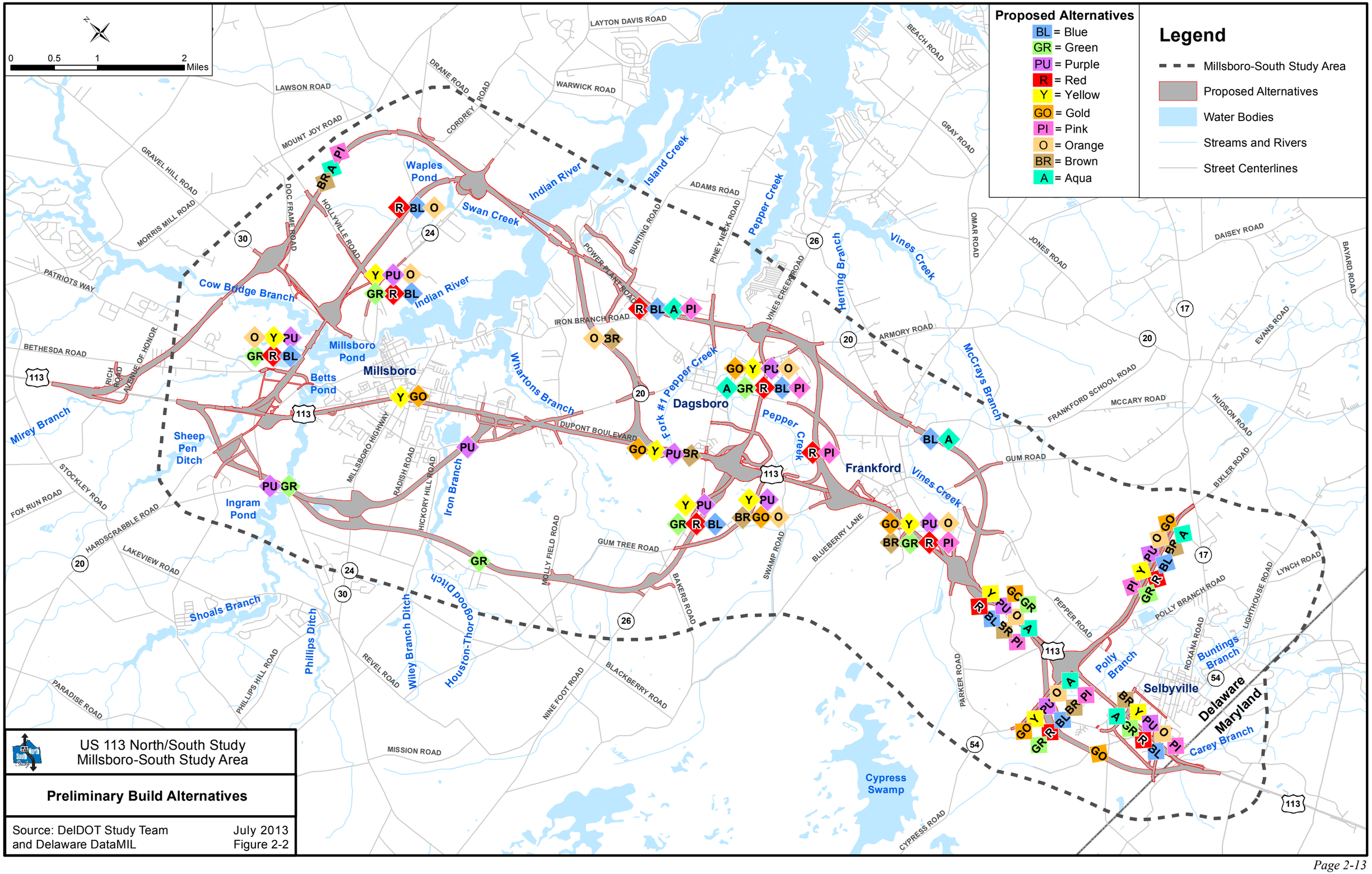
2.5.1 Evaluation of Impacts

From fall 2005 through spring 2007, DelDOT's project team conducted a detailed evaluation of natural, cultural, and socio-economic resources impacts of the remaining alternatives, as listed in **Section 2.4.3**. Specifically, the following activities were undertaken:

- Extensive consultation was conducted with FHWA and the resource agencies, including the US Army Corps of Engineers (USACE), Environmental Protection Agency (EPA), US Fish and Wildlife Service (USFWS), Delaware Department of Natural Resources and Environmental Control (DNREC) and the Delaware State Historic Preservation Office (SHPO). The project team and agency representatives participated in many joint meetings and field views to gain a full understanding of natural resources issues, including habitat quality.

- The project team prepared initial evaluations of all properties in the study area which are potentially eligible for the *National Register of Historic Places* (NRHP). As of the date of this DEIS, review and consultation with the SHPO continues. This includes consultation regarding *Section 106* of the *National Historic Preservation Act* (NHPA).

- The project team coordinated with USFWS and DNREC regarding federally rare, threatened, and endangered species (RTEs). Extensive studies were conducted to determine potential impacts to swamp pink (*Helonias bullata*), a Federally-listed plant.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Proposed Alternatives
BL = Blue
GR = Green
PU = Purple
R = Red
Y = Yellow
GO = Gold
PI = Pink
O = Orange
BR = Brown
A = Aqua
Legend
Millsboro-South Study Area
Proposed Alternatives
Water Bodies
Streams and Rivers
Street Centerlines
LAYTON DAVIS ROAD
BEACH ROAD
DRANE ROAD
CORDREY ROAD
WARWICK ROAD
LAWSON ROAD
MOUNT JOY ROAD
GRAVEL HILL ROAD
MORRIS MILL ROAD
DOC FRAME ROAD
HOLLYVILLE ROAD
Waples Pond
Swan Creek
Indian River
Island Creek
ADAMS ROAD
BUNTING ROAD
PINEY NECK ROAD
Pepper Creek
GRAY ROAD
OMAR ROAD
JONES ROAD
DAISEY ROAD
BAYARD ROAD
Herring Branch
Vines Creek
VINES CREEK ROAD
POWER PLANT ROAD
IRON BRANCH ROAD
ARMORY ROAD
EVANS ROAD
McCrays Branch
FRANKFORD SCHOOL ROAD
MCCARY ROAD
HUDSON ROAD
PATRIOTS WAY
Cow Bridge Branch
BETHESDA ROAD
RICH ROAD
AVENUE OF HONOR
Millsboro Pond
Millsboro
Betts Pond
Wharton Branch
Fork #1 Pepper Creek
Dagsboro
Pepper Creek
DUPONT BOULEVARD
Mirey Branch
Sheep Pen Ditch
MILLSBORO HIGHWAY
RADISH ROAD
HICKORY HILL ROAD
Iron Branch
Frankford
GUM ROAD
BIXLER ROAD
STOCKLEY ROAD
FOX RUN ROAD
HARDSCRABBLE ROAD
LAKEVIEW ROAD
Ingram Pond
MOLLY FIELD ROAD
GUM TREE ROAD
BAKERS ROAD
SWAMP ROAD
BLUEBERRY LANE
PEPPER ROAD
POLLY BRANCH ROAD
ROXANA ROAD
LIGHTHOUSE ROAD
LYNCH ROAD
Buntings Branch
Polly Branch
Selbyville
Delaware
Maryland
Carey Branch
Shoals Branch
Phillips Ditch
Wiley Branch Ditch
Houston-Thorogood Ditch
PHILLIPS HILL ROAD
REVEL ROAD
NINE FOOT ROAD
BLACKBERRY ROAD
PARKER ROAD
PARADISE ROAD
MISSION ROAD
Cypress Swamp
CYPRESS ROAD
30
24
26
20
17
54
113
US 113 North/South Study
Millsboro-South Study Area
Preliminary Build Alternatives
Source: DelDOT Study Team and Delaware DataMIL
July 2013
Figure 2-2

- The project team obtained mapping of known Bald Eagle (*Haliaeetus leucocephalus*) nests from DNREC and found no impacts to the nests or to the primary zones surrounding the nests.

- In 2006, DelDOT updated its travel demand model to more accurately forecast future traffic volumes. The project team used these new forecasts to evaluate how the alternatives meet the purpose of and need for the proposed project, as well as to calculate traffic-dependent impacts such as noise and air quality.

- Property and economic impacts were updated, and economic impacts to agriculture were calculated.

- DNREC approved and published new *State Natural Area* maps in fall 2006. The project team incorporated that mapping into the US 113 environmental inventory database, evaluated impacts to those areas associated with the proposed alternatives, and made adjustments to minimize impacts.

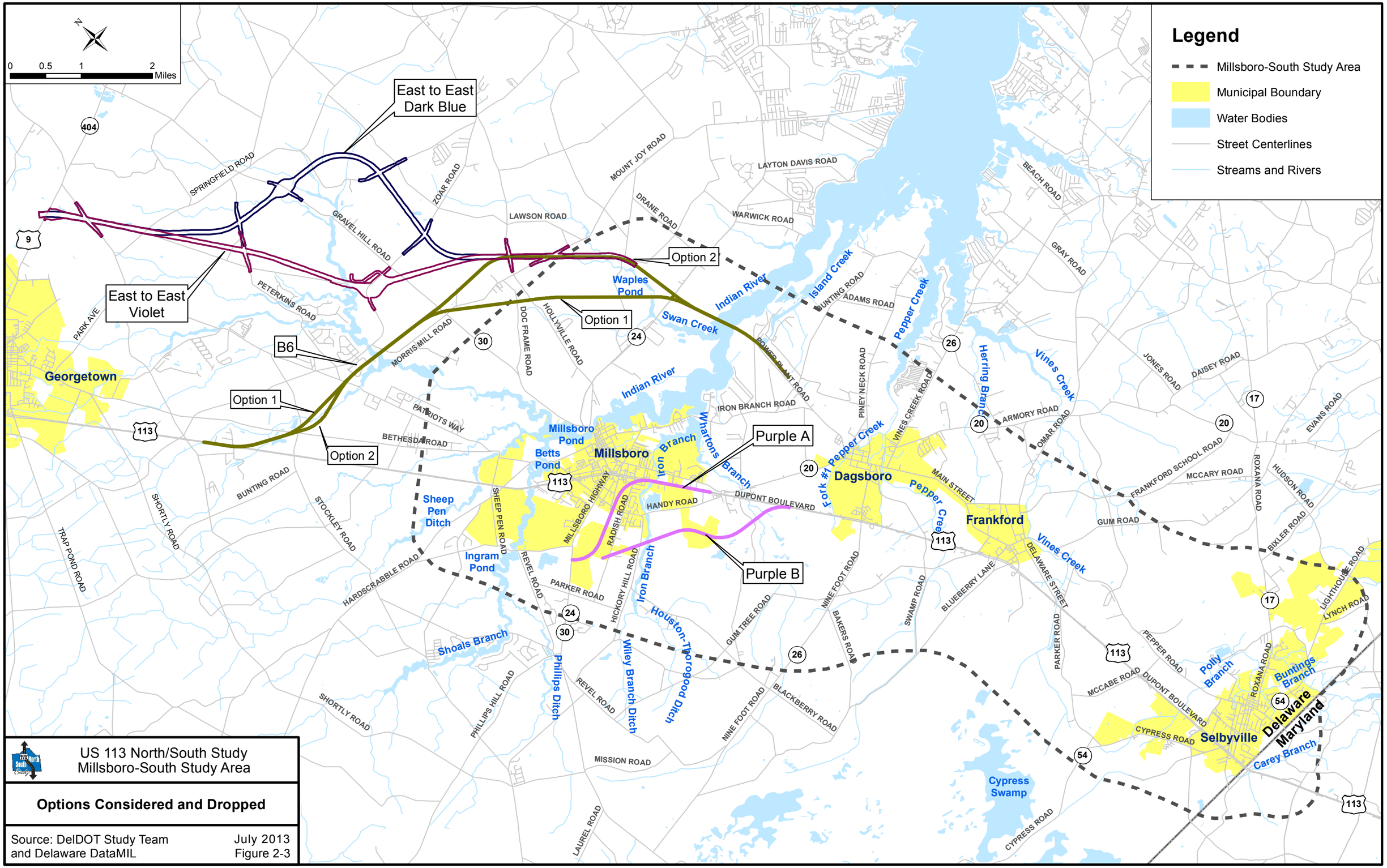
2.5.2 Evaluation of East-to-East Alternatives

In May 2006, the project team considered two potential alternatives that would connect the then-proposed eastern bypasses of Georgetown with the eastern bypass alternatives in the Millsboro-South area. These proposed "East-to-East" alternatives (see **Figure 2-3)** were considered for several reasons. First, they would eliminate impacts to the environmentally sensitive Cow Bridge Branch along the eastern side of the Stockley Center. Second, they would result in a shorter end-to-end length than separate eastern bypasses of Georgetown and Millsboro, improving traffic diversion and reducing costs. The East-to-East alternatives would also avoid impacts to Georgetown's wastewater spray irrigation facilities and to two existing developments: Golf Village and the Woods at Walls Creek.

There was a potential disadvantage of the proposed East-to-East alternatives as well. Their introduction relatively late in the study process required involving landowners and other stakeholders that were not previously impacted by any of the alternatives under consideration.

2.5.3 Evaluation of Connector Roads

Evaluation of the build alternatives included three proposed Connector Roads (see **Figure 2-3**) that would provide access to major east-west roadways in the Millsboro-South area. Under existing conditions, the three roadways, SR 54, SR 26, and SR 24, are highly congested two-lane facilities that follow circuitous routes through densely developed areas of Selbyville, Dagsboro, and Millsboro, respectively. The intent of the Connector Roads is to provide a more direct east-west route with full access to US 113 at grade separated intersections. As a result, the Connector Roads would reduce east-west traffic congestion through the towns, especially during peak seasonal traffic periods.



US 113 North/South Study
Millsboro-South Study Area

Options Considered and Dropped

Source: DelDOT Study Team and Delaware DataMIL

July 2013
Figure 2-3

At the request of the regulatory and resource agencies, DelDOT evaluated the possibility of constructing only the Connector Roads (SR 54, SR 26, and SR 24) as an avoidance and minimization alternative. These would be two-way roads, with one lane in each direction. Future widening would be possible.

Potential cumulative impacts for completion of all of the Connector Roads (and assuming no other improvements) were compared to those for completion of any of the proposed build alternatives. It is important to note that the SR 24 connector is not a separate alignment for the proposed eastern bypass alternatives because it follows the alignment of the mainline bypass. The potential impacts of the Connector Roads did not include construction of any stormwater management facilities. The evaluation indicated that the wetlands, Waters of the US, and subaqueous lands impacts of the Connector Roads represent more than half of the total impacts for most of the proposed build alternatives.

After discussions at the September 24, 2009, resource agency meeting, it was decided that construction of only the Connector Roads did not reduce natural resources impacts sufficiently to justify moving ahead with this approach. The Connector Roads would remain a component of each of the proposed build alternatives. If the need arises in the future to build any or all of the Connector Roads as stand-alone projects in advance of the US113 improvements based on independent utility, the east-west projects would need to be processed in accordance with *23CFR771* to satisfy *NEPA* requirements. The cultural resources *Memorandum of Agreement* (see **Section 3.5** for details) could be developed to address the possibility of breakout projects for any of the east-west connectors.

2.5.4 Evaluation of Purple Option A and Purple Option B

In 2008, construction began on the Peninsula Crossing Shopping Center, located on a 63 acre parcel along the west side of US 113 just north of Handy Road. The development includes multiple parcels with up to 600,000 square feet of commercial/retail space. The original Purple Alternative would necessitate relocation of this large shopping center, which includes a Lowe's and a BJ's Wholesale Club that were constructed in late 2008. Therefore, the study team created two possible alternatives to the Purple Alternative: Purple Option A and Purple Option B, both depicted on **Figure 2-3**.

A comparison of impacts for Purple, Purple Option A, and Purple Option B were presented and discussed at the September 24, 2009 resource agency meeting. Purple Option A was dismissed due to the additional anticipated property impacts (176) and residential/commercial relocations (146), compared to those from Purple (140 and 105, respectively). Purple Option B was dropped due to its impacts to natural resources, which includes wetlands (76.1 acres, vs. 50.6 for Purple) and forestland (154 acres vs. 135 for Purple).

2.5.5 Evaluation of Segment B6

Segment B6 was developed in response to agency requests to avoid impacts to the Stockley Center and Doe Bridge Nature Preserve. After its development, the initial concerns about this

segment were related to its length, with the assumption being the greater the length, the greater the impacts. Generally, this proved to be the case.

In an effort to minimize the natural resources impacts, two alignment options were developed for Segment B6. The differences between the two options focused on the area between Hollyville Road and Maryland Camp Road, which is where the alignments cross Swan Creek. Either crossing would have impacted high quality forested wetlands. The two options demonstrated that despite the alignment shifts, Segment B6 would still have had greater wetland, subaqueous lands, open water, and forestland impacts than Segment B4. The alternatives that contain B6 would have also cost more, impacted more properties, and required more relocations than B4. However, B6 would have resulted in lesser floodplain, State Resource Area, and State Natural Area impacts.

2.5.6 Public Input

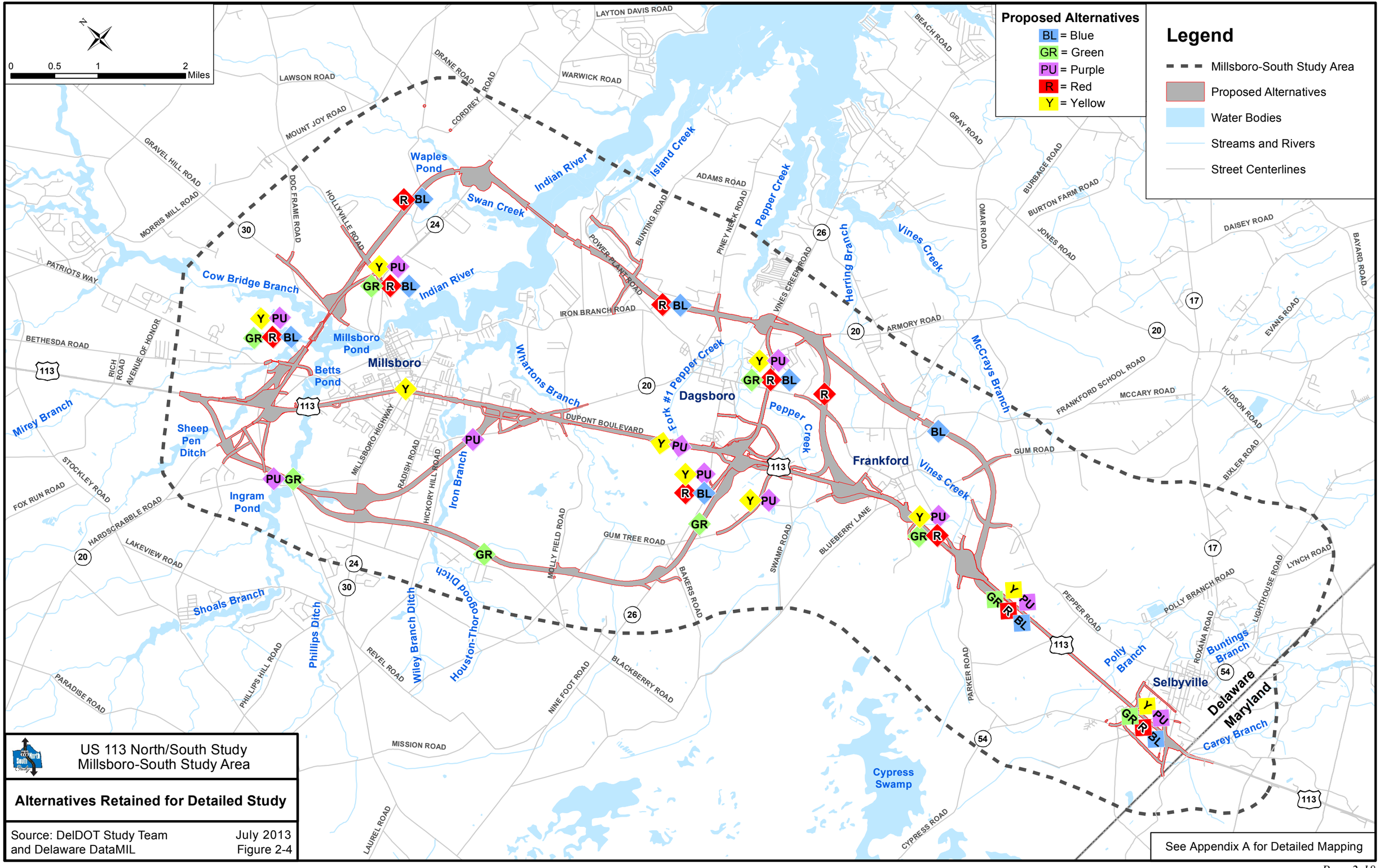
The potential East-to-East alternatives and the detailed evaluation of environmental impacts for all proposed Millsboro-South alternatives were presented at a public workshop in Millsboro on March 12, 2007. Over 400 people attended. There was substantial opposition to the East-to-East alternatives. As a result, DelDOT decided not to retain these alternatives for detailed study; this decision was announced at the April 19, 2007 working group meeting.

Segment B6 was introduced to the public relatively late in the process, and had little public exposure. Although only one of the B6 alignment options was presented to the public, the feedback received was not favorable. Based on the comments received, much of the public opposition originated from the perception that the northern limits of Segment B6 encroached on the Georgetown project area. The working group and general public opposed all bypass alternatives in the Georgetown area and included Segment B6 in that discussion. Due to public opposition and the greater environmental and property impacts, Segment B6 was dropped in September 2007.

2.6 ALTERNATIVES RETAINED FOR DETAILED STUDY

After the elimination of segments, as described in **Section 2.4**, ten proposed build alternatives remained for review. They are located on **Figure 2-2**. Upon further evaluation, five of these ten alternatives were dropped from consideration. Details on these five alternatives and the reasons for dropping them are discussed in **Section 2.6.1**.

The five remaining build alternatives (shown on **Figure 2-4)**, and the No-build Alternative, were carried forward and were evaluated in **Chapter 3** of this DEIS. Information on these final build alternatives is provided beginning in **Section 2.6.2.**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Proposed Alternatives
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Legend
Millsboro-South Study Area
Proposed Alternatives
Water Bodies
Streams and Rivers
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Millsboro
Dagsboro
Frankford
Selbyville
Delaware
Maryland
Waples Pond
Millsboro Pond
Betts Pond
Ingram Pond
Indian River
Swan Creek
Island Creek
Pepper Creek
Herring Branch
Vines Creek
McCrays Branch
Cow Bridge Branch
Mirey Branch
Sheep Pen Ditch
Whartons Branch
Fork #1 Pepper Creek
Iron Branch
Shoals Branch
Phillips Ditch
Wiley Branch Ditch
Houston-Thoroughgood Ditch
Polly Branch
Buntings Branch
Carey Branch
Cypress Swamp
LAYTON DAVIS ROAD
BEACH ROAD
WARWICK ROAD
DRANE ROAD
CORDREY ROAD
LAWSON ROAD
MOUNT JOY ROAD
GRAVEL HILL ROAD
MORRIS MILL ROAD
DOC FRAME ROAD
HOLLYVILLE ROAD
ADAMS ROAD
BUNTING ROAD
PINEY NECK ROAD
GRAY ROAD
BURBAGE ROAD
BURTON FARM ROAD
JONES ROAD
OMAR ROAD
DAISEY ROAD
BAYARD ROAD
EVANS ROAD
PATRIOTS WAY
BETHESDA ROAD
AVENUE OF HONOR
RICH ROAD
POWER PLANT ROAD
IRON BRANCH ROAD
VINES CREEK ROAD
ARMORY ROAD
FRANKFORD SCHOOL ROAD
MCCARY ROAD
HUDSON ROAD
DUPONT BOULEVARD
MILLSBORO HIGHWAY
RADISH ROAD
HICKORY HILL ROAD
MOLLY FIELD ROAD
GUM TREE ROAD
SWAMP ROAD
BLUEBERRY LANE
GUM ROAD
BIXLER ROAD
STOCKLEY ROAD
FOX RUN ROAD
HARDSCRABBLE ROAD
LAKEVIEW ROAD
PHILLIPS HILL ROAD
REVEL ROAD
NINE FOOT ROAD
BLACKBERRY ROAD
BAKERS ROAD
PARADISE ROAD
MISSION ROAD
LAUREL ROAD
CYPRESS ROAD
PARKER ROAD
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LIGHTHOUSE ROAD
LYNCH ROAD
113
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54
US 113 North/South Study
Millsboro-South Study Area
Alternatives Retained for Detailed Study
Source: DelDOT Study Team and Delaware DataMIL
July 2013
Figure 2-4
See Appendix A for Detailed Mapping

2.6.1 Dropped Build Alternatives

Gold
This western bypass alternative would have begun at existing US 113, just south of the Maryland state line, and ended north of Millsboro, at the intersection of US 113 and SR 20 (Hardscrabble Road/Thompsonville Road). It was 15.1 miles long. The Gold Alternative would have included five full interchanges, two partial interchanges, 18 overpasses, and two new water crossings (Pepper Creek and Cow Bridge Branch).

The Gold Alternative was dropped because it would not divert enough traffic from US 113 to meet the Purpose and Need for the proposed project. There was also strong opposition from the Town of Selbyville, partially due to impacts to the proposed Selbyville Town Center.

Orange
The 18.1 mile long Orange Alternative was evaluated as an eastern bypass. It would have begun at the Maryland/Delaware state line, and ended north of Avenue of Honor, just south of the Stockley Center. This alternative would have included six full interchanges, one partial interchange, 22 overpasses, and four new water crossings (Pepper Creek, Indian River, Swan Creek, and Cow Bridge Branch).

The Orange Alternative was dropped because it would not divert enough traffic from US 113 to meet the Purpose and Need for the proposed project.

Brown
Brown was evaluated as an 18.2 mile long eastern bypass alternative. It would have begun at the Maryland/Delaware state line, and ended at the intersection of Rich Road/Piney Grove Road. This alternative would have included six full interchanges, one partial interchange, 24 overpasses, and four new water crossings (Pepper Creek, Indian River, Swan Creek, and Cow Bridge Branch). Maryland Camp Road would have been closed at the proposed US 113 crossing.

The Brown Alternative was dropped because it would not divert enough traffic from US 113 to meet the Purpose and Need for the proposed project.

Pink/Aqua
Both of these east bypass alternatives were 18.0 miles long and followed a similar alignment for a majority of the alternative. The primary difference is that the Aqua Alternative, which included the longest off-alignment segment of 14.8 miles, diverged from existing US 113 approximately 3.2 miles north of the Maryland state line. The Pink Alternative followed the on-alignment segment for an additional 1.6 miles before it diverged from US 113 just north of Frankford. The two alignments met about 1.5 miles east of US 113, just south of SR 26. They continued north along the same alignment until they rejoined existing US 113 at a grade separated interchange near Rich Road/Piney Grove Road. The Pink Alternative would have included eight full interchanges, one partial interchange, 27 overpasses, and four new water crossings (Pepper Creek, Indian River, Swan Creek, and Cow Bridge Branch). The Aqua

Alternative would have included six full interchanges, 24 overpasses, and five new water crossings (Vines Creek, Pepper Creek, Indian River, Swan Creek, and Cow Bridge Branch). Maryland Camp Road would have been closed at the proposed US 113 crossing for both alternatives.

The Pink and Aqua alternatives were eliminated because they would have bisected the Doe Bridge Nature Preserve, which shelters the headwaters of the Indian River and includes about 315 acres of protected lands northwest of Millsboro. It is one of 23 state nature preserves and considered among the most protected state lands. Only the combined intervention of the Governor, Natural Areas Advisory Council, and General Assembly can affect the protection. No such intervention has been attempted during the 30-year history of the state preserve system. Throughout the concept development process, the environmental resource agencies expressed strong opposition to any alternative that impacted the nature preserve. The Red and Blue east bypass alternatives are similar to Pink and Aqua, but do not impact to the Doe Bridge Nature Preserve and result in fewer impacts to natural resources. The Pink and Aqua alternatives would have impacted high quality wetlands in the middle of the nature preserve and the alignments would have bisected a large, contiguous, forested area. These proposed alternatives were also immediately adjacent to the location where a federally-endangered Delmarva fox squirrel (*Sciurus niger cinereus)* sighting was reported. See **Section 3.10.8** for details on the squirrel.

2.6.2 Retained Alternatives

Engineering information about the five remaining build alternatives is listed in **Table 2-1** and described in detail in the subsequent section.

Table 2-1: Engineering Details for the Retained Build Alternatives

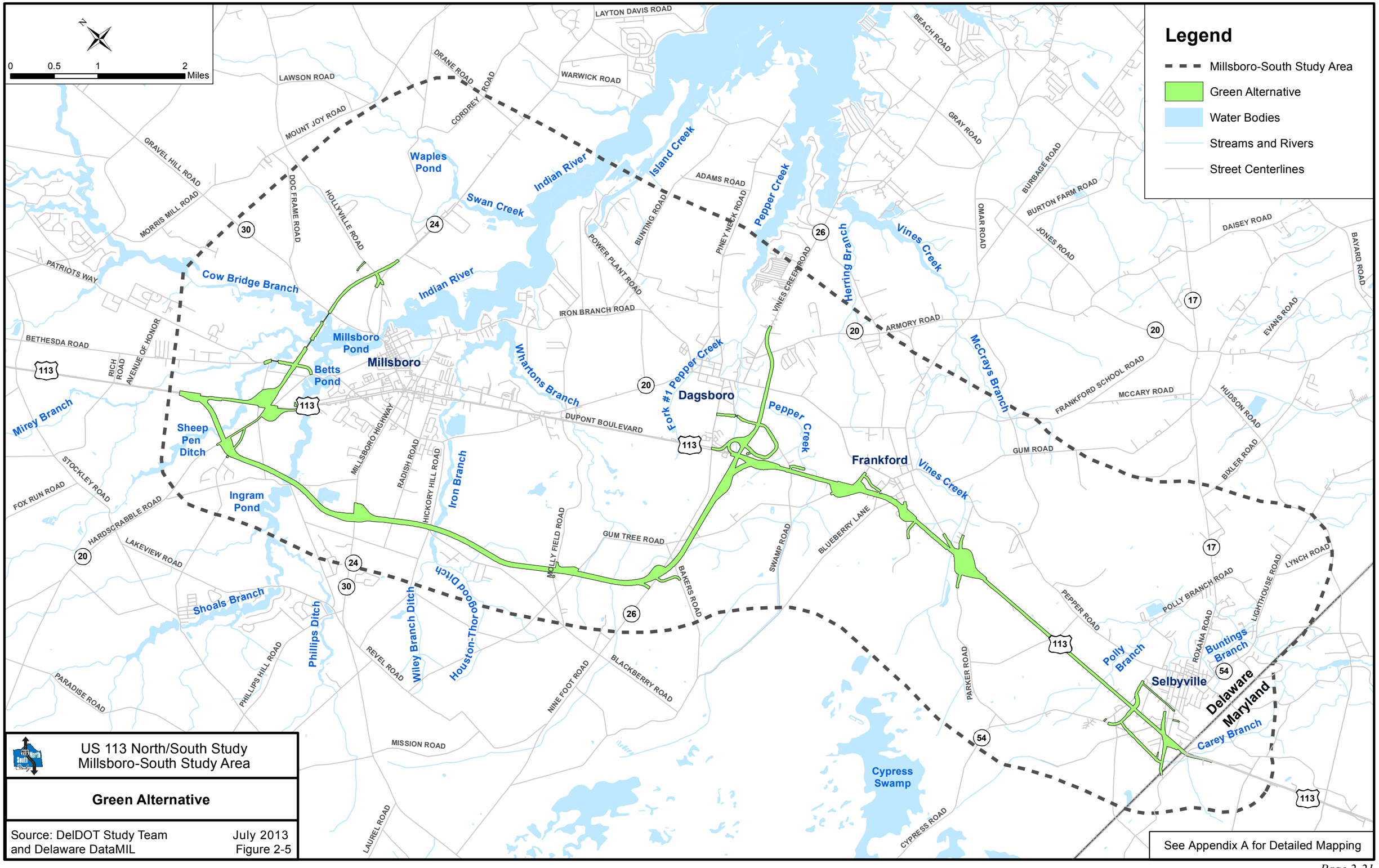
Engineering Criteria	Proposed Alternative				
	Green	Purple	Yellow	Red	Blue
Preliminary cost range (millions)[1]	$629-$769	$562-$686	$607-$742	$671-$820	$687-$839
Existing US 113/SR 1 length (miles)	6.4	9.3	13.2	5.4	3.8
Proposed off-alignment length (miles)	8.1	4.7	0	10.9	12.7
Total alternative length (miles)	14.5	14.0	13.2	16.3	16.5

[1] *Includes construction and right of way*

2.6.2.1 Western Bypass Alternatives

Green with SR 24 Connector

The Green Alternative, shown on **Figure 2-5**, would be 14.5 miles long. It would run concurrently with the Yellow Alternative until it diverges from existing US 113 with a new interchange just south of Clayton Street (SR 26) near Dagsboro. This interchange would also include a direct connection to the realigned SR 26, which provides an east-west two-lane connector around Dagsboro. SR 26 would be realigned to the south to bypass Dagsboro and would include a new crossing of Pepper Creek, east of US 113. From the new interchange with US 113 and SR 26, the alternative would head west and there would be a partial interchange and overpass at SR 26 (Nine Foot Road), where the alignment would curve to the east and continue with an overpass at Gum Tree Road.



US 113 North/South Study
Millsboro-South Study Area

Green Alternative

Source: DelDOT Study Team and Delaware DataMIL

July 2013
Figure 2-5

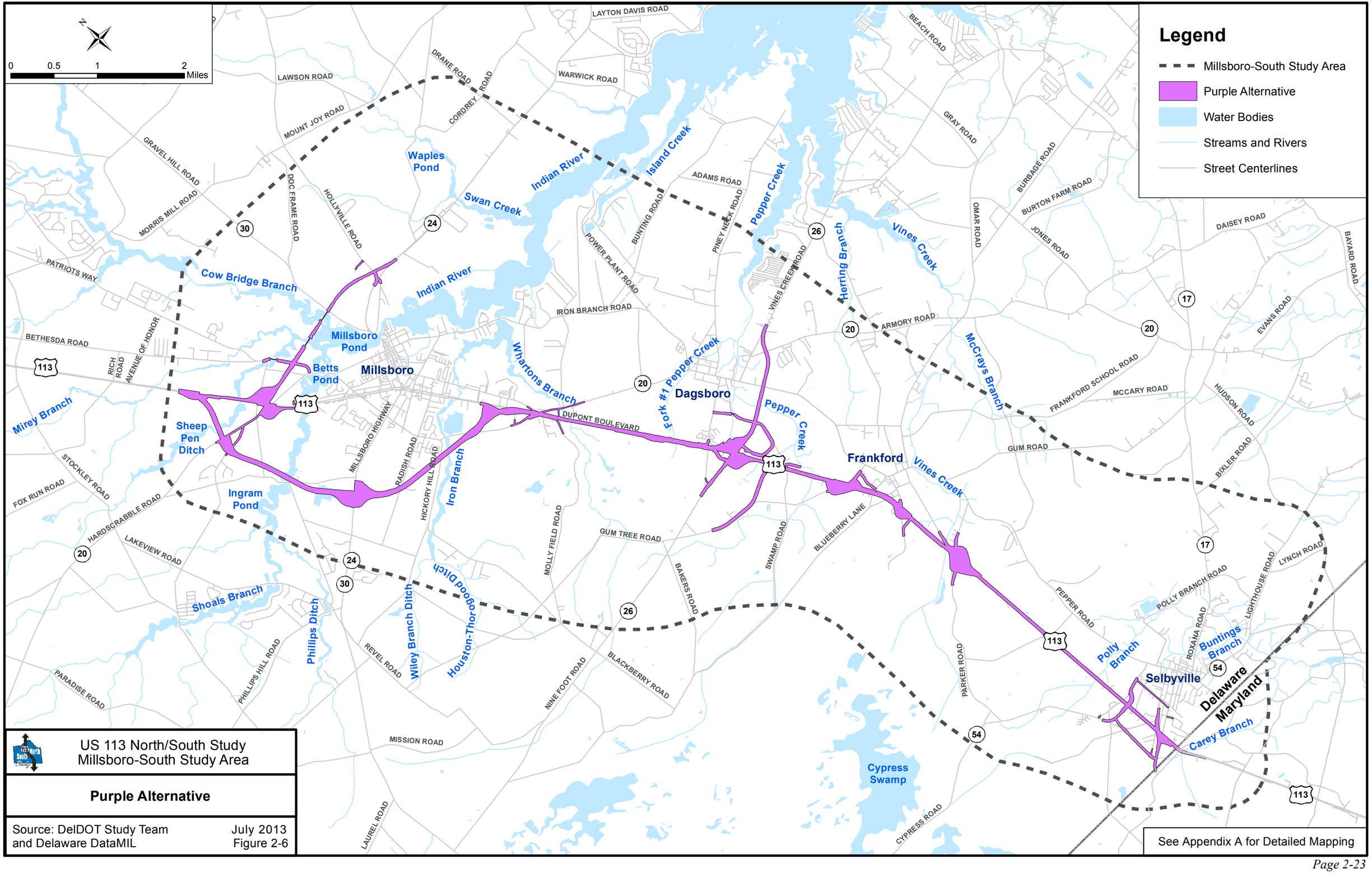
See Appendix A for Detailed Mapping

Fox Run would be realigned to connect to SR 26 (Nine Foot Road) and Molly Field Road would be realigned to connect to Gum Tree Road. As a result, there would be a US 113 overpass at SR 26 and Gum Tree Road. There would be another overpass at Hickory Hill Road and a bridge crossing of Iron Branch. The alignment would continue north with an interchange at SR 24, but there would be no access to Radish Road or Godwin School Road. From this point the alignment would continue in a northeasterly direction through the west side of the Plantation Lakes development. It would rejoin US 113 with an overpass and partial interchange at SR 20 (Hardscrabble Road), providing access to the SR 24 Connector (see below). The Green alternative is shown in detail in **Section 1** of **Appendix A**.

The SR 24 connector is associated with the Yellow Alternative and both western bypasses of Millsboro. The segment would be a new two-lane east-west connector providing access to SR 24 east of Millsboro. The connector would begin on SR 20 (Hardscrabble Road) west of US 113, and then turn to the northeast with a new grade-separated interchange south of Sheep Pen Road/ Patriots Way. The interchange would provide full access to US 113 and the SR 24 connector. Continuing east, the connector would cross Fox Run Drive, eliminating through access, and would include an overpass at Bethesda Road. Bethesda Road would be extended south to West State Street, parallel to the Norfolk-Southern Railroad. The SR 24 Connector would continue south of Sweetwater Pointe with a new crossing of Cow Bridge Branch. East of this location, an intersection would be constructed at SR 30 before the roadway shifts southeast and ties into SR 24 just east of Hollyville Road.

Purple with SR 24 Connector

The proposed Purple Alternative (see **Figure 2-6**) would span 14.0 miles. It would run concurrently with the Yellow Alternative until it diverges from existing US 113 with a new interchange at SR 20 (Dagsboro Rd.). From there, the alignment would head in a northwesterly direction with a new overpass at Handy Road and a new crossing of Iron Branch. The alignment would turn to the northwest with an overpass at Hickory Hill Road, and then cross Radish Road, eliminating through access. There would be an interchange at SR 24, and Godwin School Road would be closed at the US 113 crossing. The alternative would then continue west of the Plantation Lakes development and rejoin US 113 with an overpass and partial interchange at SR 20 (Hardscrabble Road), providing access to the SR 24 connector. The SR 24 Connector is described beginning on page 2-20. Details of the Purple Alternative appear on the mapping in **Section 2** of **Appendix A**.



US 113 North/South Study
Millsboro-South Study Area

Purple Alternative

Source: DelDOT Study Team and Delaware DataMIL

July 2013
Figure 2-6

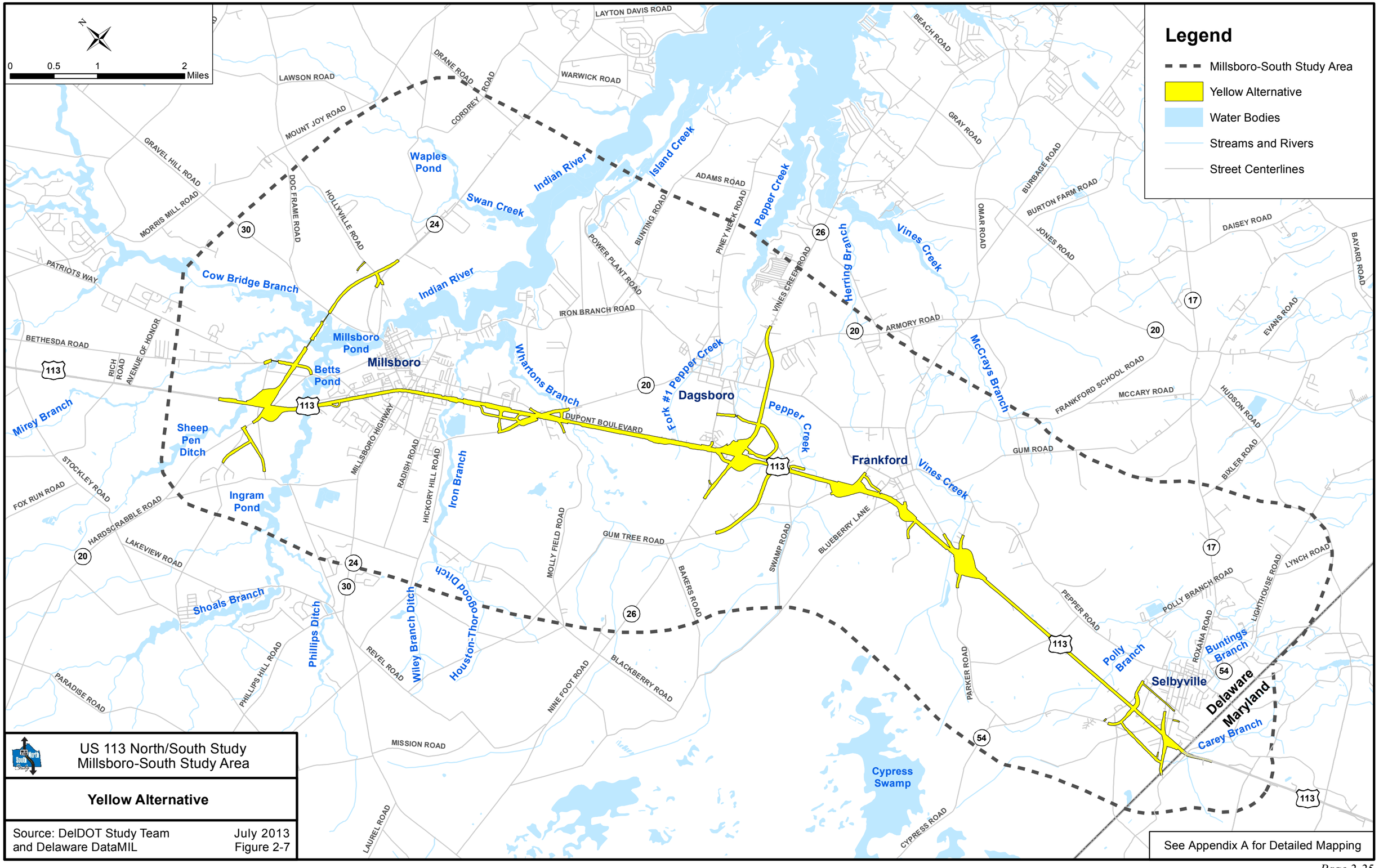
2.6.2.2 On-alignment Alternative

Yellow
The proposed Yellow Alternative (see **Figure 2-7**) would be 13.2 miles long. From the Maryland/Delaware state line to McCabe Road, the existing US 113 northbound and southbound lanes would provide controlled access, only allowing right-in and right-out movements to the properties along US 113. Grade separations would be proposed at Cemetery Road and Hosier Street by realigning them slightly to the south to accommodate all the left turn and U-turn movements. These grade separations would be connected by two roads, parallel to either side of existing US 113, to accommodate the east-west local traffic in the Selbyville area. North of McCabe Road to Parker Road, the existing US 113 northbound and southbound lanes would be converted to limited access. There would be a full, grade-separated interchange at Parker Road and a partial interchange at Frankford Avenue. From Parker Road north through Frankford, the northbound US 113 lanes would be converted to limited access, new southbound US 113 travel lanes would be constructed in the median, and the existing southbound US 113 would be converted to a two-way local access road. An interchange at Gum Tree Road would include a new overpass at US 113 to provide a local east-west connection into Frankford. From Gum Tree Road to Dagsboro, the existing US 113 lanes would be converted to limited access. Just south of Dagsboro, SR 26 would be realigned to the south to bypass Dagsboro and provide a full interchange at US 113. The SR 26 connector road would include a new crossing of Pepper Creek east of US 113.

From this point to Molly Field Road, the existing US 113 northbound lanes would become a two-lane local access road, the existing US 113 southbound lanes would become the new limited access northbound lanes and new southbound lanes would be constructed to the west. Handy Road/Dagsboro Road (SR 20) would be slightly realigned to the north, over US 113 with a partial interchange. From here to an area near the crossing of Betts Pond, the proposed improvements would include a new four-lane, elevated limited access roadway constructed in the existing grass median through the town of Millsboro. There would be overpasses at Delaware Avenue and SR 24, with parallel local access provided along the exiting northbound and southbound US 113 lanes. Access to the elevated express lanes would only be provided to the north and south of Millsboro via slip ramps from Business US 113. This alternative would end north of Millsboro at the intersection of US 113 and SR 20 (Hardscrabble Road/Thompsonville Road). West of US 113, SR 20 would be realigned to the north where there is a proposed grade separated interchange that provides access to the proposed SR 24 connector road. The SR 24 connector road would be a new two-lane roadway that provides a direct link for east-west traffic to SR 24 east of Millsboro (see page 2-22). It would require a new bridge crossing of Cow Bridge Branch. This proposed alternative is shown in detail on the maps in **Appendix A, Section 2.**

2.6.2.3 Eastern Bypass Alternatives

Red
This 16.3 mile long alternative is shown on **Figure 2-8**. It runs concurrently with the Yellow Alternative until it diverges from existing US 113 with a new interchange north of Frankford. It



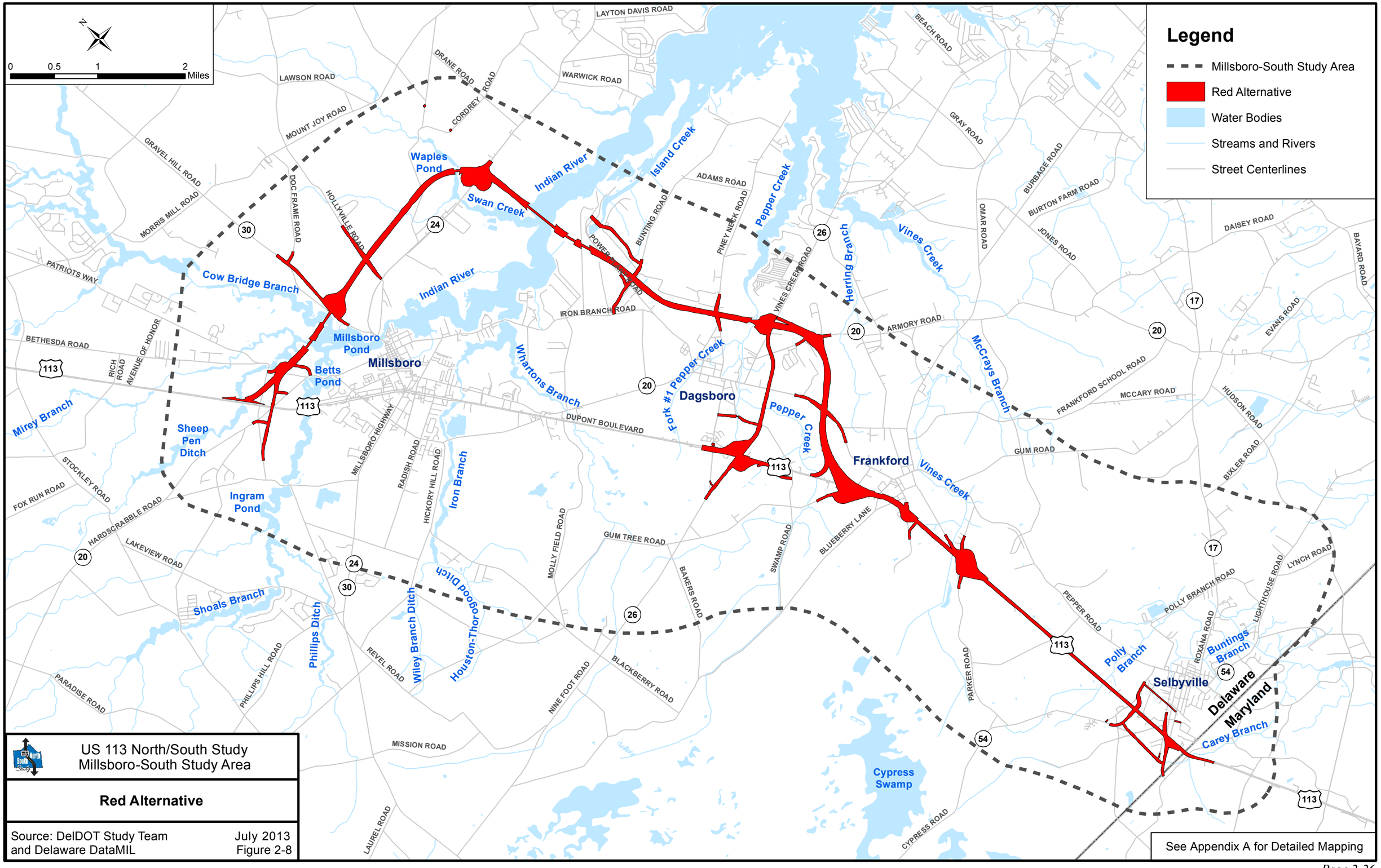
US 113 North/South Study
Millsboro-South Study Area

Yellow Alternative

Source: DelDOT Study Team and Delaware DataMIL

July 2013
Figure 2-7

See Appendix A for Detailed Mapping



US 113 North/South Study
Millsboro-South Study Area

Red Alternative

Source: DelDOT Study Team and Delaware DataMIL

July 2013
Figure 2-8

See Appendix A for Detailed Mapping

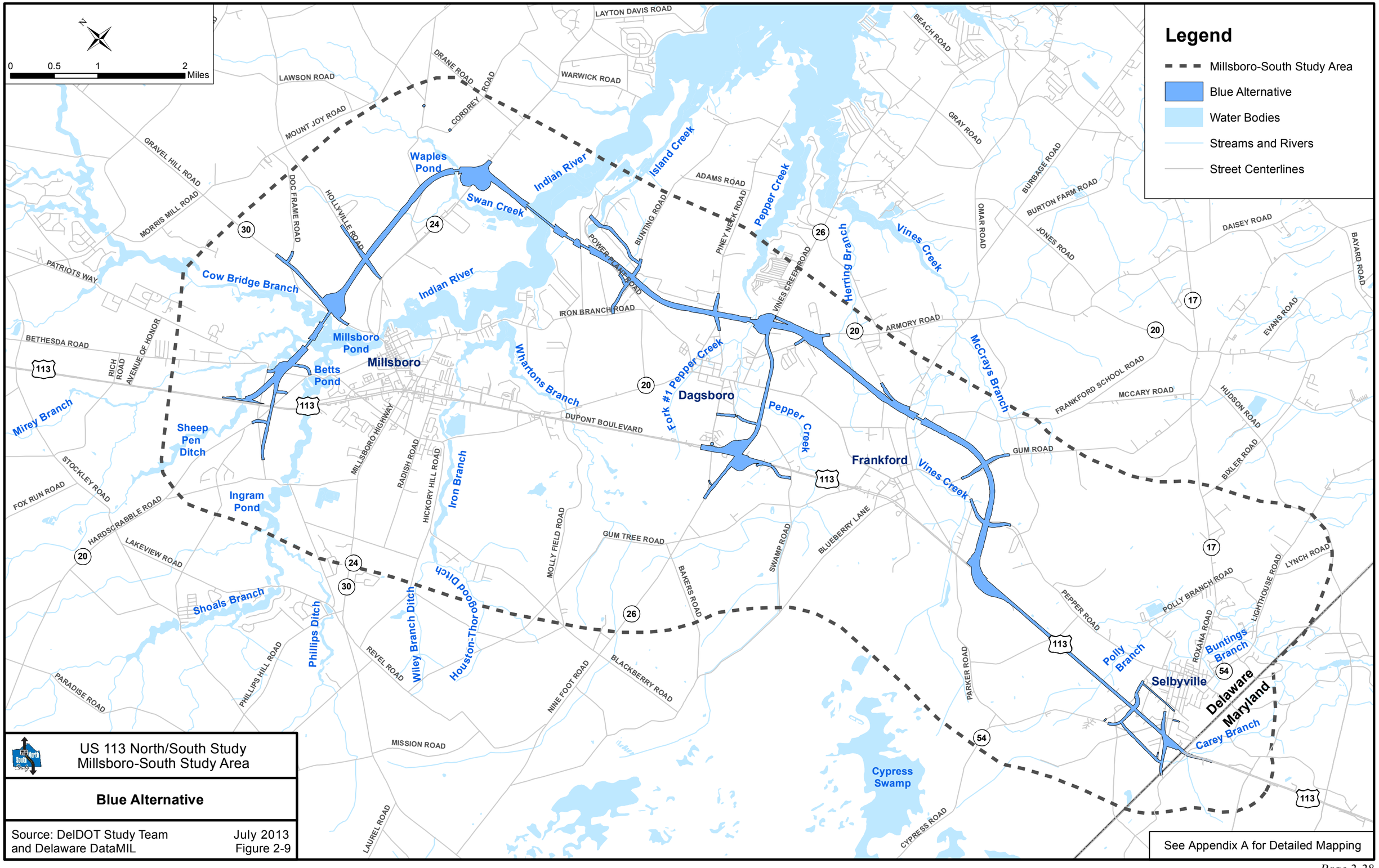
would then veer east to an interchange at SR 20/SR 26. The bypass alignment would then continue with grade separated interchanges with SR 26 and SR 20, approximately one mile east of Main Street in Dagsboro, and a new bridge crossing of Pepper Creek. Included with this alternative would be a SR 26 connector, which shifts the roadway south of Dagsboro, and provides a new east-west connection to the proposed US 113 alignment approximately 1.5 miles east of existing US 113. Piney Neck Road would be shifted to the south to provide an overpass of US 113. This alternative would continue north with an overpass at Bunting Road and crossing of Power Plant Road, eliminating through access, and crosses the Indian River near the mouth of Swan Creek.

North of SR 24, after a grade separated interchange, the proposed alignment would turn northwest and there would be a new bridge crossing at Swan Creek between Waples Pond and Longwood Pond. There would be no access to Maryland Camp Road at the proposed US 113 crossing. The alignment would continue to the west, approaching the realigned Hollyville Road, where there would be an overpass of the proposed US 113 alignment. The proposed alignment would continue in a west-southwest direction with a grade separated interchange at SR 30 (Gravel Hill Road), a bridge crossing of Cow Bridge Branch, and a single overpass of Patriots Way, the Norfolk-Southern railroad, and Bethesda Road. This alternative would end just north of Patriots Way. This proposed alternative appears on the mapping in **Section 5 of Appendix A**.

Blue

At 16.5 miles, the proposed Blue Alternative would be the longest of the retained build alternatives. As shown on **Figure 2-9**, it would run concurrently with the Yellow Alternative until it diverges from existing US 113 with a new interchange south of Parker Road. From this interchange, the alternative would head east, crossing over the Norfolk-Southern rail line and under the realigned Pepper Road. South of Vines Creek, Gum Road would be shifted to the north with an overpass at US 113. The bypass would continue in a north-northwesterly direction, where a bridge crossing would be added to Vines Creek between overpasses at Frankford School Road and Omar Road. The alignment would continue with grade separated interchanges at SR 26 and SR 20, approximately one mile east of Main Street in Dagsboro, and a new bridge crossing of Pepper Creek. Included with this alternative is a SR 26 connector, which would shift the roadway south of Dagsboro, and provide a new east-west connection to the proposed US 113 alignment approximately 1.5 miles east of existing US 113. Piney Neck Road would be shifted to the north to provide an overpass of US 113. This alternative would continue north with an overpass at Bunting Road and Power Plant Road, and would then cross the Indian River near the mouth of Swan Creek.

North of SR 24, after a grade separated interchange, the proposed alignment would turn northwest and there would be a new bridge crossing at Swan Creek between Waples Pond and Longwood Pond. There would be no access to Maryland Camp Road at the proposed US 113 crossing. The alignment would continue to the northwest, approaching the realigned Hollyville Road, where there would be an overpass of the proposed US 113 alignment. The alignment would continue in a west-southwesterly direction with a grade separated interchange at SR 30 (Gravel Hill Road), a bridge crossing of Cow Bridge Branch, and a single overpass of Patriots



US 113 North/South Study
Millsboro-South Study Area

Blue Alternative

Source: DelDOT Study Team and Delaware DataMIL

July 2013
Figure 2-9

See Appendix A for Detailed Mapping

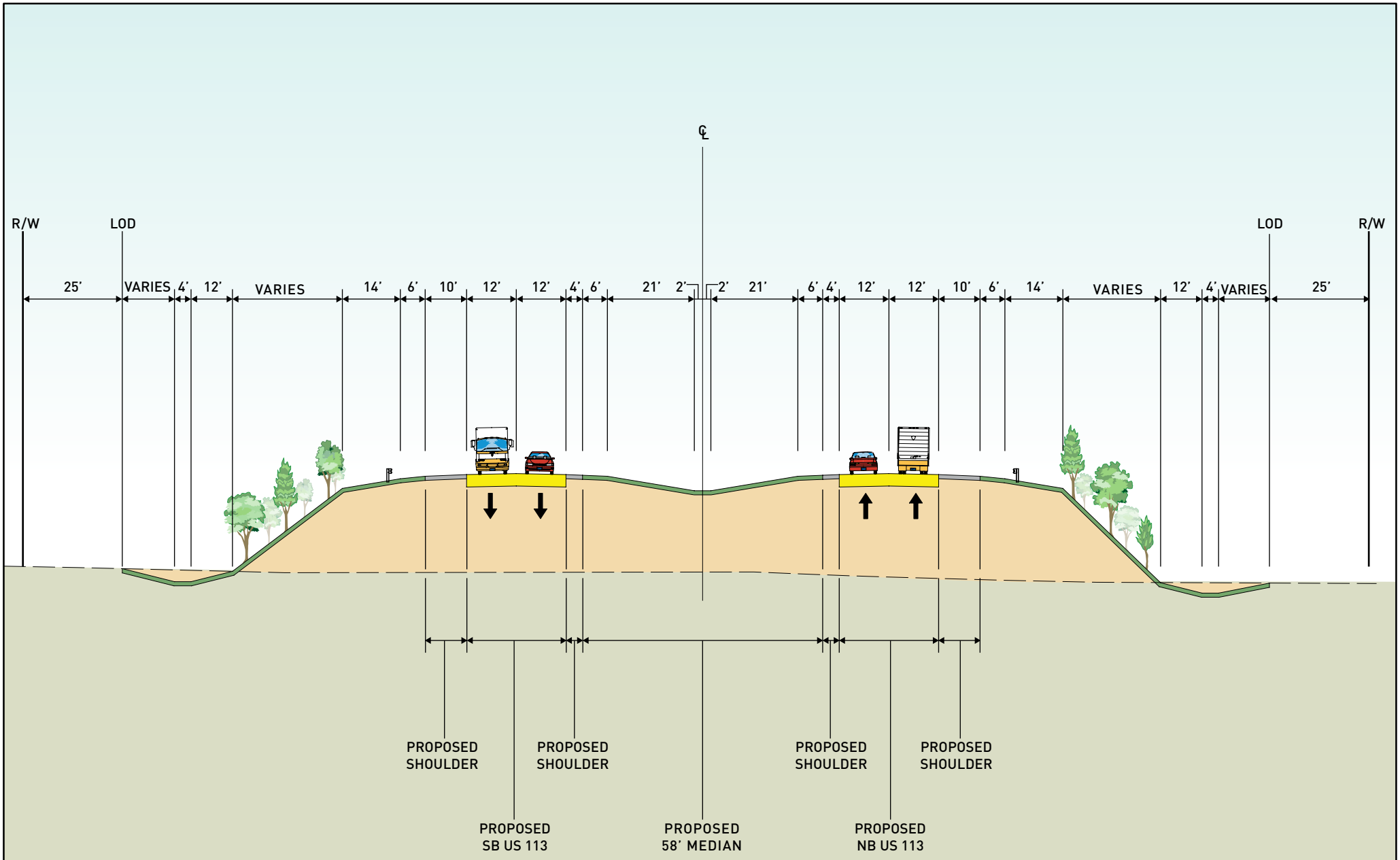
Way, the Norfolk-Southern railroad, and Bethesda Road. This alternative ends just north of Patriots Way. This proposed alternative is shown in detail on **Appendix A, Section 6.**

2.7 TYPICAL SECTIONS

The typical sections described below do not include structural (bridge) crossings over major streams or waterways. With bridges, the standard median widths could be minimized to further reduce the corridor disturbance. However, as with other DelDOT projects, details regarding structures would be considered and addressed when design and construction are initiated.

The proposed typical section for alternatives in the project area varies as explained below. Each of the proposed bypass alternatives would contain four 12-foot travel lanes, separated by a 58-foot grass median. There would be a 4-foot paved inside shoulder and a 10-foot paved outside shoulder. See **Figure 2-10** for more details.

The On-alignment Alternative from the southern terminus through Millsboro would have a varying typical section. From the Maryland state line north to Parker Road, it would consist primarily of four 12-foot travel lanes with a grass median (24-foot minimum), a 4-foot inside shoulder, and a 10-foot outside shoulder. **Figure 2-11** shows this typical section. From Parker Road to south of Millsboro, the typical section would consist primarily of four 12-foot travel lanes with a grass median (24-foot minimum), a 4-foot inside shoulder, and a 10-foot outside shoulder. In addition, there would be a two-way local access road with two 11-foot travel lanes and 8-foot shoulders. See **Figure 2-12** for details. Through the Town of Millsboro there would be four 12-foot travel lanes with a 2-foot median barrier, a 4-foot inside shoulder and 10-foot outside shoulder. These express lanes would be elevated in the existing median and the existing northbound and southbound US 113 travel lanes would remain for local access. See **Figure 2-13** for more details.



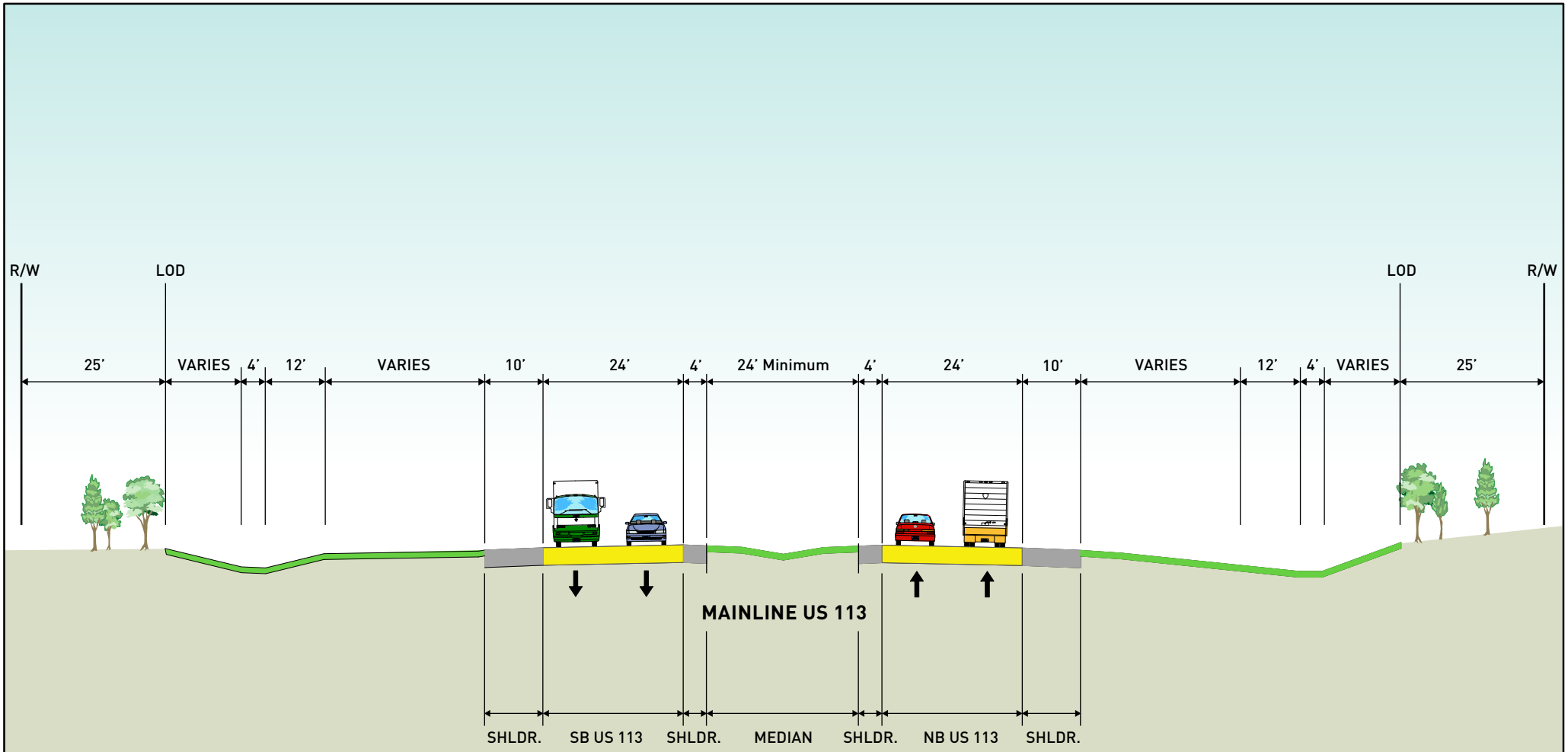
PROPOSED US 113

Horizontal and vertical dimensions are exaggerated. Not to scale

US113North/SouthStudy
Millsboro-South Study Area

Typical Section for Bypasses

July 2013 Figure 2-10



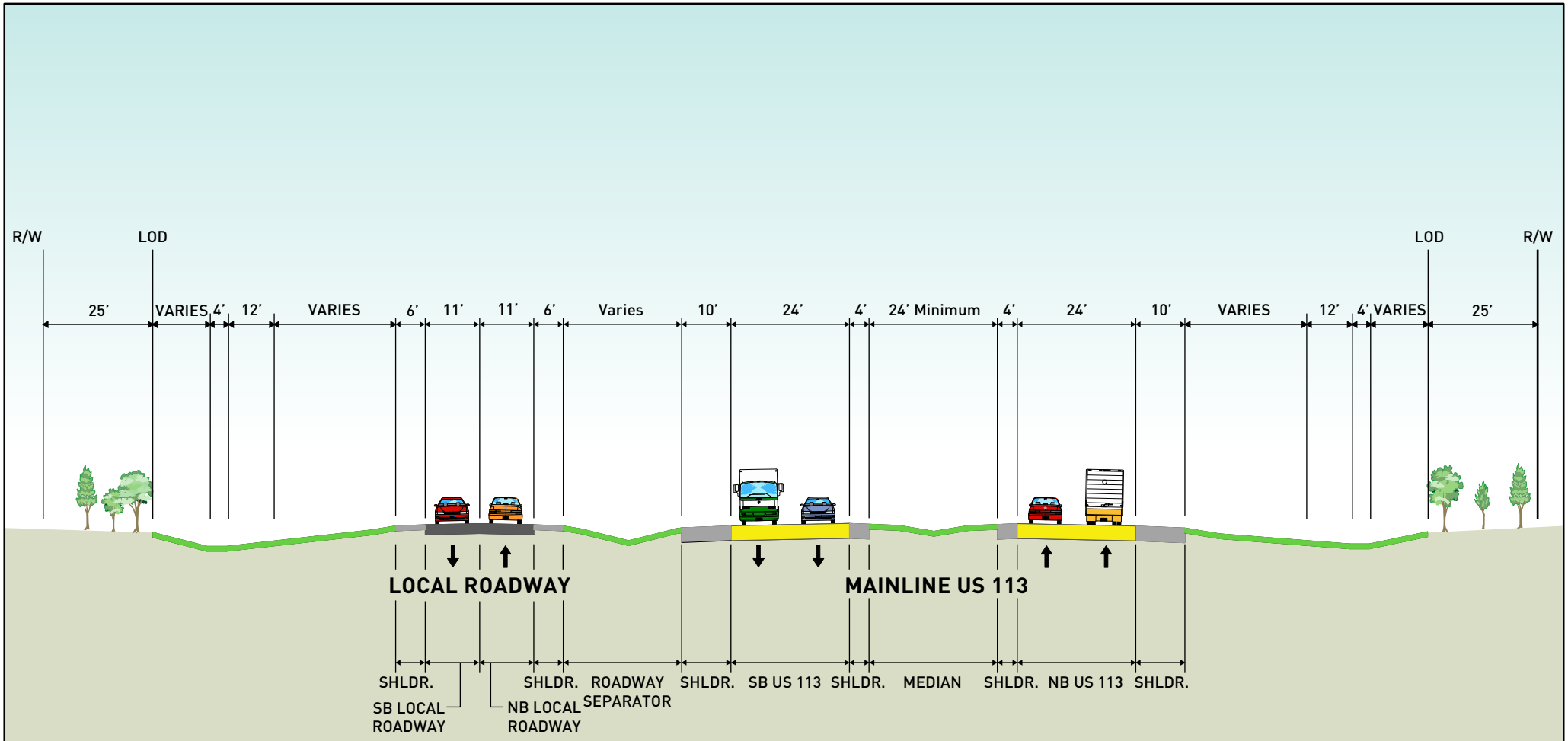
PROPOSED US 113: PARKER ROAD TO THE MARYLAND STATE LINE

Horizontal and vertical dimensions are exaggerated. Not to scale

US113North/SouthStudy
Millsboro-South Study Area

Typical Section, On-alignment

July 2013 Figure 2-11



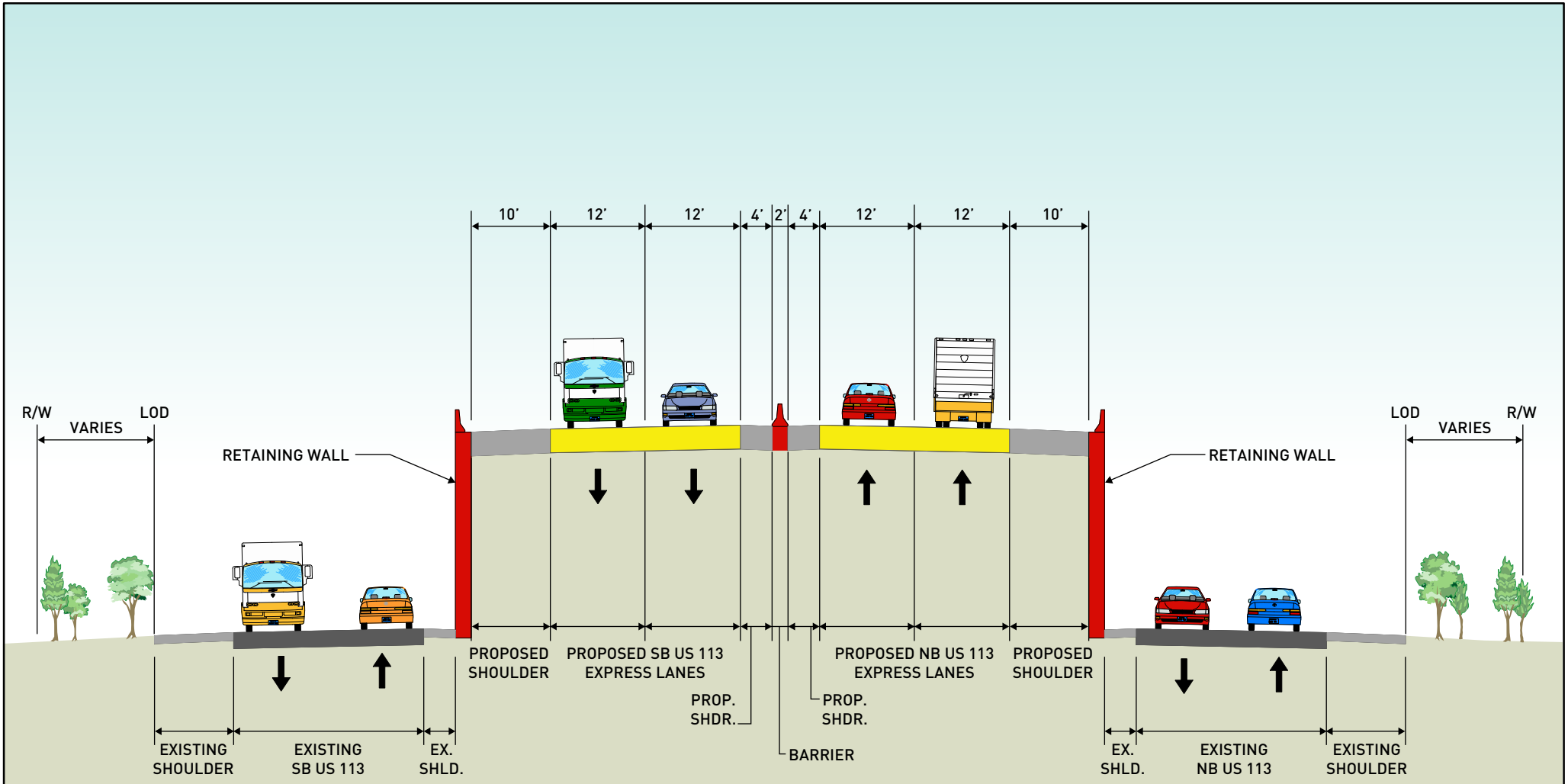
US 113 AND ADJACENT FRONTAGE ROAD
SOUTH OF IRON BRANCH TO PARKER ROAD

Horizontal and vertical dimensions are exaggerated. Not to scale

US113North/SouthStudy
Millsboro-South Study Area

Typical Section, On-alignment

July 2013 Figure 2-12



US 113 LOCAL AND EXPRESS LANES
SOUTH OF BETTS POND TO NORTH OF IRON BRANCH

Horizontal and vertical dimensions are exaggerated. Not to scale

US113North/SouthStudy
Millsboro-South Study Area

Typical Section, On-alignment

July 2013 Figure 2-13

CHAPTER 3 – AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES

This chapter discusses environmental and community resources present in the study area, and the potential beneficial and adverse social, economic, and environmental effects of the five proposed build alternatives considered in detail for the Millsboro-South portion of the US 113 North/South Study. See **Chapter 2** for details on the alternatives and their development; detailed mapping of each alternative is included in **Appendix A**. The two western bypass alternatives are identified as Green and Purple. The On-alignment Alternative appears as Yellow on each of the graphics and in each table in this chapter. The two eastern bypasses are referred to as Red and Blue. This chapter also describes the proposed mitigation measures for adverse impacts. Unless otherwise specified, the impacts described are for a 300-foot corridor.

Impacts for the proposed No-build Alternative are based on the assumption that all of the currently programmed, committed, and funded roadway and transit projects in the study area, except the US 113 North/South Study, would be implemented. The No-build Alternative is included as a baseline for comparison with the build alternatives. The comparisons in this chapter are based on the best available information. Details are provided in the summary of impacts in **Table 3-1**.

It is reasonable to assume that minor effects to environmental resources would occur during implementation of the programmed improvements associated with the No-build Alternative. Impacts for those independent projects would be addressed with their respective NEPA studies; this chapter focuses primarily on impacts of the build alternatives.

3.1 SOCIOECONOMIC CONDITIONS

Detailed information on socioeconomic conditions in the study area is provided in the *Socioeconomic Technical Report* (SETR). The following section summarizes the socioeconomic information.

3.1.1 Population and Housing

Affected Environment

The proposed project study area encompasses the region surrounding the five build alternatives in Sussex County, Delaware, and Worcester County, Maryland. Some assumptions were made when using geographic boundaries to obtain census data. Less than one percent of Worcester County is within the study area. Therefore, in an effort to not skew the data, numbers for the County as a whole are not provided in this document. The smallest geographical area for which census data are available is Blocks. According to the 2010 Census, there are over 1,000 Blocks in the study area; including all of them in the tables and on the figures for this document would

Table 3-1: Summary of Impacts

IMPACT MATRIX

US 113 North/South Study Alternatives Evaluation
MILLSBORO-SOUTH AREA

	No-Build	Green	Purple	Yellow	Red	Blue
Wetlands and Waters of the US						
Wetlands (total acres) / (acres bridged)	0	24.9/(4.8)	31.3/(5.4)	20.1/(0.3)	26.5/(6.8)	30.8/(8.1)
High Quality (bridged)	0	23.7/(4.8)	29.3/(5.4)	17.7/(0.3)	22.1/(5.0)	24.9/(6.3)
Medium Quality (bridged)	0	1.2/(0.0)	2.0/(0.0)	2.4/(0.0)	4.4/(1.8)	5.4/(1.8)
Low Quality (bridged)	0	0/(0.0)	0.0/(0.0)	0.0/(0.0)	0/(0.0)	0.5/(0.0)
Waters of the US (linear feet)	0	22,453	15,034	14,376	16,653	19,246
Subaqueous Lands, Tidal Wetlands, and Tax Ditches						
Subaqueous Lands						
Rivers and Lakes (acres) [1]	0	3.1	10.0	1.7	9.0	9.0
Linear Features (linear feet)	0	17,250	13,808	13,000	17,894	20,851
DNREC Jurisdictional Tidal Wetlands (acres)	0	0.0	0.0	0.0	1.3	1.3
Tax Ditches (linear feet)	0	26,772	18,544	18,544	19,772	14,842
Historic Resources						
Number of Historic Properties within Study Area [2]	0	19	20	21	19	14
Number of Cemeteries [3]	0	3	5	4	4	2
Cemeteries within 50 feet of LOD (additional to above)	0	3	2	2	0	0
Archaeological Resources						
Number of Known Archaeological Sites in the Limit of Disturbance [4]	0	1	0	0	1	1
Prehistoric Sensitivity in the Limit of Disturbance [5]						
High Sensitivity Area (acres / %)	0	38 (3.7%)	38 (3.5%)	19 (2.0%)	32(2.6%)	29(2.7%)
Moderate Sensitivity Area (acres / %)	0	71 (6.9%)	75 (7.0%)	52 (5.6%)	74 (6.1%)	70(6.4%)
Low Sensitivity Area (acres / %)	0	253 (24.5%)	286 (26.6%)	263 (27.7%)	289(23.7%)	259(23.7%)
Slight Sensitivity Area (acres / %)	0	671 (64.9%)	677 (62.9%)	614 (64.7%)	827(67.6%)	737(67.2%)
Early Historic-Period Sensitivity in the Limit of Disturbance [6]						
High Sensitivity Area (acres / %) [7]	0	77 (7.5%)	93 (8.6%)	35 (3.7%)	35(2.8%)	32(2.9%)
Moderate Sensitivity Area (acres / %) [7]	0	10 (1.0%)	12 (1.1%)	12 (1.2%)	21(1.7%)	20(1.8%)
Low and Slight Sensitivity Area (acres / %)	0	6 (0.6%)	6 (0.6%)	6 (0.7%)	8 (0.7%)	6(0.6%)
Low and Slight Sensitivity Area (acres / %)	0	940 (90.9%)	965 (89.7%)	895 (94.4%)	1,158(94.8%)	1,037(94.7%)
Later Historic-Period Sensitivity in the Limit of Disturbance [8]						
Extant Locations [9]	0	175	230	272	184	134
High Sensitivity Locations	0	56	58	45	69	64
Moderate Sensitivity Locations	0	91	96	100	92	86
Low Sensitivity Locations	0	17	21	23	19	15
Noise Impacts						
Total Number of Residences Affected	0	97	174	190	89	100
Rare, Threatened and Endangered Species						
Potential Rare, Threatened and Endangered Species (acres) [12]	0	246	287	199	502	485
Number of RTE Species Impacted	0	15	16	18	18	18
RTE Species / Area Impact (acres)	0	618	697	498	888	871
Other Considerations						
Agricultural Districts (Ten-Year) (number of properties)	0	1	1	1	1	1
(acres within properties)	0.0	1.9	1.9	1.9	5.3	5.3
Agricultural Preservation Easements (Permanent) (number of properties)	0	1	0	0	0	3
(acres within properties)	0	18.6	0	0	0	11.6
Prime Farmland (acres)	0	54.1	46	41	46	64.9
Natural Areas (acres)	0	12.2	12.2	12.2	23.0	23.0
Forestland: 2007 Land Use (acres)	0	70	62	42	131	162
Property Impacts						
Properties affected (number)	0	359	480	478	416	353
Properties affected (total acres)	0	920	918	591	770	1,084
Access Rights						
Relocations	0	78	119	107	99	71
Residential	0	43	72	68	67	52
Agricultural	0	11	9	4	9	9
Commercial	0	24	36	33	23	10
Other (non-profit, institutional, etc.)	0	0	2	2	0	0
Partial Acquisition / Modified Access (numbers of affected properties)	*0*	*250*	*311*	*334*	*263*	*238*
Residential	0	115	158	161	117	97
Agricultural	0	73	72	71	81	85
Commercial	0	40	47	68	28	22
Other	0	22	34	34	37	34

1 Represents large bodies of water (i.e., Indian River, Millsboro Pond, etc.).
2 Historic properties are individual resources and districts listed on or determined eligible for the National Register of Historic Places; eligibility status is based on consultant recommendations, reviewed by DelDOT and SHPO staff; consensus has been reached on all recommendations. Study area encompasses all properties on tax parcels within 600' of the centerline of the alternative.
3 Includes only those cemeteries directly impacted by an alternative.
4 Archaeological sites on file with SHPO; most have not yet been evaluated for National Register eligibility; note that the limit of disturbance (here and in subsequent rows) does not include future stormwater management and other needs such as wetland mitigation.
5 GIS inductive model based on known sites and environmental parameters, intended as a planning tool for estimating the relative likelihood for sites to be present in the limit of disturbance; note that potential archaeological significance has not been assessed; current as of January 2012.
6 GIS model based on environmental parameters and current theory regarding early historic settlement, intended as a planning tool for estimating the relative likelihood for sites to be present in the limit of disturbance; note that potential archaeological significance has not been assessed; current as of January 2012.
7 Includes estimated acreage of each alternative within hypothesized footprint of Askekesky Indian Reservation, which was not factored into the GIS sensitivity model.
8 Point locations for properties derived from historical maps and documents and assessed for likelihood of survival based on subsequent disturbances; note that potential archaeological significance has not been assessed; includes a 300-foot buffer around each point to account for mapping inaccuracies; current as of January 2012.
9 Standing historic-period structures.
10 The possible number of properties directly impacted by an alternative; includes public recreation areas, archeological sites, historic districts, and standing structures; properties evaluated for direct impacts include any property within the limit of disturbance for the alternative and also include situations where demolition of all or some of the contributing components of the resource is proposed.
11 State Resource Area as identified on 2006 maps are void. Impacts are included here as a representation of lands considered to have significant ecological value by DNREC.
12 Anticipated impacts to rare, threatened and endangered (RTE) species based on coordination to date with DNREC. Detailed evaluation and coordination with DNREC and US Fish and Wildlife Service is continuing. The data in the potential RTE species areas row are not exhaustive. These data represent known occurrences of RTE species, not habitat for RTE species.

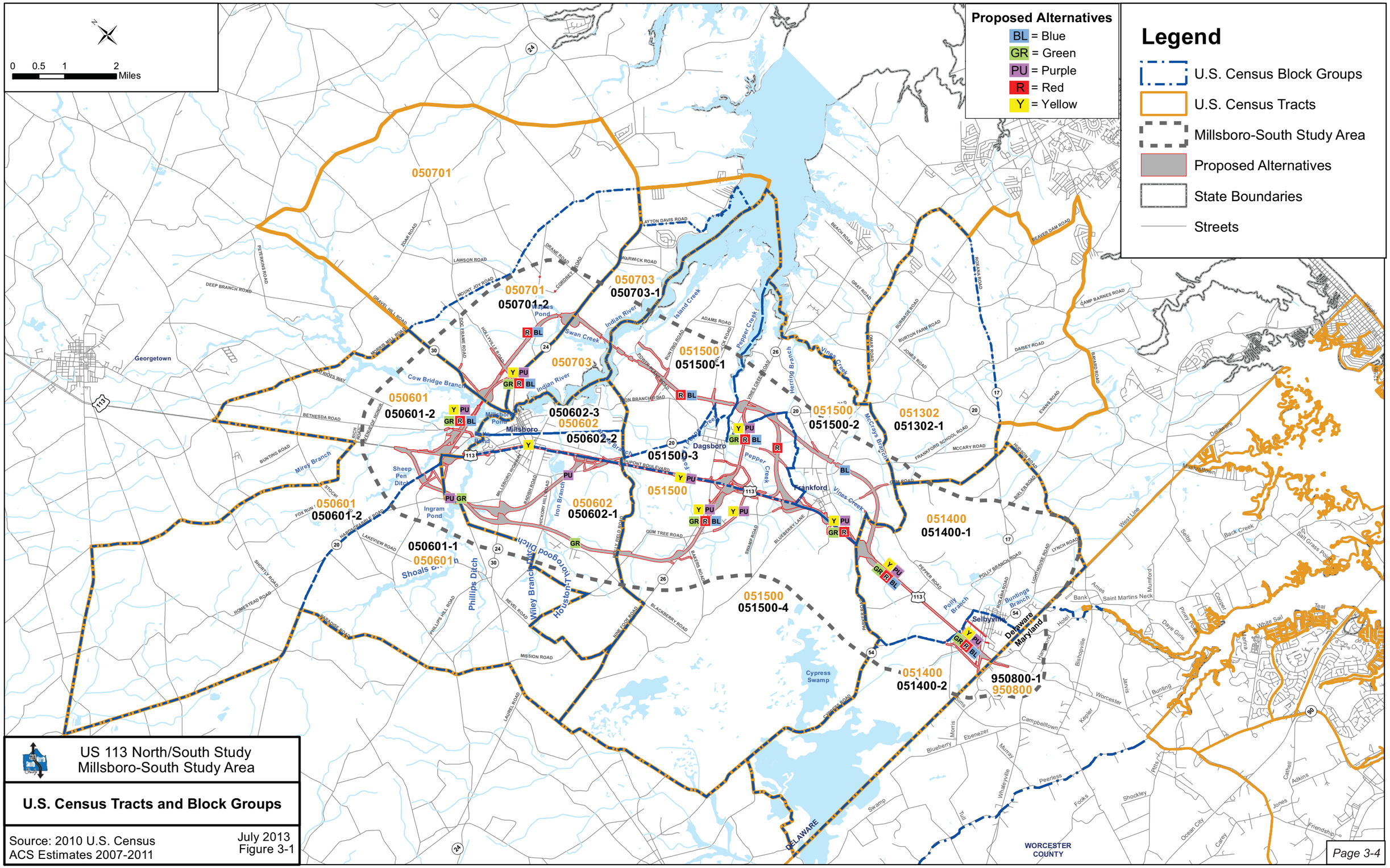
be unwieldy. Therefore, next-largest geographical unit, Block Groups, was considered. Study area Block Groups were used to evaluate the demographics, such as total populations, age distribution, disabled populations, and race. The majority of the data provided herein has been gathered at the Block Group level from the 2010 Census. Two crucial data sets, employment and income / populations in poverty, are not available from the US Census at the Block Group level. Therefore, in order to provide the most recent readily available data, this information was gathered at the Tract level from the American Community Survey (ACS). The ACS is an ongoing statistical survey that samples a small percentage of the population every year.

The 15 US Census Block Groups and the eight US Census Tracts included in the study area are shown on **Figure 3-1** and listed in **Table 3-2**. Any Block Groups or Tracts that are wholly or partially within the established study area are included. The US Census Block Groups in the study area range in size from approximately 700 to 15,500 acres. The US Census Tracts in the study area range in size from approximately 4,200 to 53,200 acres. Fourteen of the 15 Block Groups are in Sussex County and the remaining Block Group is in Worchester County. Similarly, seven of the eight Tracts are in Sussex County, with the remaining Tract in Worcester County.

Table 3-2: US Census Boundaries in the Study Area

Geographic Area	Block Groups		Tracts
Sussex County	050601-1	051302-1	050601
	050601-2	051400-1	050602
	050602-1	051400-2	050701
	050602-2	051500-1	050702
	050602-3	051500-2	051302
	050701-2	051500-3	051400
	050703-1	051500-4	051500
Worcester County	950800-1		950800

Table 3-3 summarizes the population and housing in Delaware, Sussex County, and the study area. According to the US Census data, there are 24,232 persons residing in the study area. Block Group 050601-1 has the largest population: 2,719 people. Block Group 051500-4 has the lowest population: 757 people. There are 10,730 housing units (a house, apartment, mobile home, group of rooms, or single room occupied, or intended for occupancy, as separate living quarters) within the study area.



US 113 North/South Study
Millsboro-South Study Area

U.S. Census Tracts and Block Groups

Source: 2010 U.S. Census
ACS Estimates 2007-2011

July 2013
Figure 3-1

Table 3-3: Population and Housing in the Study Area

Geographic Area/Block Group	Population	Percent of Study Area Population	Number of Housing Units	Average Household Size
Delaware	897,934	N/A	405,885	2.6
Sussex County	197,871	N/A	123,036	2.5
050601-1	2,719	11.2%	1,035	2.8
050601-2	2,338	9.6%	907	2.7
050602-1	2,063	8.5%	959	2.4
050602-2	1,662	6.9%	806	2.3
050602-3	1,832	7.6%	851	2.6
050701-2	1,258	5.2%	579	2.4
050703-1	988	4.1%	677	2.2
051302-1	1,433	5.9%	777	2.4
051400-1	2,191	9.0%	881	2.8
051400-2	1,387	5.7%	573	2.7
051500-1	1,260	5.2%	545	2.6
051500-2	2,097	8.7%	861	2.7
051500-3	978	4.0%	446	2.5
051500-4	757	3.1%	308	2.7
950800-1	1,269	5.2%	525	2.7
Total within Study Area	**24,232**	**100%**	**10,730**	**AVG - 2.6**

Source: US Census, 2010

Sussex County's population is projected to grow nearly 73 percent between 2000 and 2030, reaching a total population of over 271,000. The population of Worcester County is predicted to increase by approximately 25 percent between 2005 and 2025, reaching a total population of 64,543.

Selbyville anticipates a growth rate between 23 percent and 38 percent from 2000 to 2020, depending on which method is used to calculate growth. Frankford predicts a population of 1,150 in 2030, a 61 percent increase over 2000 levels. The population of Dagsboro is expected to increase by almost 28 percent between 2000 and 2020. Millsboro's population is expected to grow by 245 percent between 2000 and 2030. Millsboro's projected population growth is the result of annexations.

Most of the population increase would be the result of continued positive net migration to the job opportunities in the area. Another source of population expansion in the study area would be the influx of retirees and second-home buyers looking for upscale housing at more attractive pricing than that available in the Sussex and Worcester County beach communities.

Environmental Consequences and Mitigation

Table 3-4 shows property impacts in the study area. A complete acquisition refers to a property that would be purchased in its entirety based on impacts from the proposed roadway improvements. A partial acquisition refers to a property where only a portion would be purchased due to impacts from the proposed roadway improvements. A relocation occurs when

a structure, such as a home or business, exists on a parcel that would be subject to complete acquisition. Relocations include total acquisitions, but also partial acquisitions if a building is located on a large parcel of land. In these cases the whole parcel may not have to be taken, but a building on the property does. Additional compensation is provided for relocations. Relocations listed in **Table 3-4** are included in the number of complete acquisitions.

Table 3-4: Properties Affected by Alternative

Zoning Classification[1]	Proposed Alternative				
	Green	Purple	Yellow	Red	Blue
Residential	**173**	**257**	**249**	**212**	**173**
Total	15	27	20	28	24
Partial	115	158	161	117	97
Relocations	43	72	68	67	52
Business[2]	**65**	**89**	**102**	**53**	**34**
Total	1	6	1	2	2
Partial	40	47	68	28	22
Relocations	24	36	33	23	10
Agriculture	**89**	**84**	**79**	**100**	**100**
Total	5	3	4	10	6
Partial	73	72	71	81	85
Relocations	11	9	4	9	9
Non-Profits	**0**	**1**	**2**	**1**	**1**
Total	0	0	0	0	0
Partial	0	0	1	1	1
Relocations	0	1	1	0	0
Other[3]	**32**	**49**	**46**	**50**	**45**
Total	10	14	12	14	12
Partial	22	34	33	36	33
Relocations	0	1	1	0	0
Total Acquisitions	**31**	**50**	**37**	**54**	**44**
Partial Acquisitions	**250**	**311**	**334**	**263**	**238**
Total Relocations	**78**	**119**	**107**	**99**	**71**
Total Affected Properties	**359**	**480**	**478**	**416**	**353**

Notes:
Properties that require total acquisition but have no dwelling are not considered residential.

1 *Zoning classifications for Sussex and Worcester Counties; if zoning is not known, property is included in Other category.*
2 *Business includes General Business, Business Park, Commercial, Industrial, and Manufacturing classifications.*
3 *Other includes State and Local Government, Mixed Use, Institutional Development, Woodland Areas, Utility, and Miscellaneous.*

The Purple Alternative would affect the most properties overall (480) and would result in the most relocated properties (119). The Blue Alternative would have the fewest overall property impacts (353) and the fewest relocated properties (71).

Impacted property owners would be contacted regarding potential acquisitions, and they would be fairly compensated for the required acreage and improvements on the parcels. Compensation would also be provided for any farmland that may be unsuitable or inaccessible for farming as a result of the roadway improvements. For relocations, owners would be provided assistance in

accordance with the *Uniform Relocation Assistance and Real Property Acquisition Policies Act*, as amended, and DelDOT's policies. The project's Relocation Plan will be available for review in project administrative files maintained by DelDOT.

In terms of acreage, the Yellow Alternative would impact the fewest acres and the Blue Alternative would impact the most. **Table 3-5** details the total acreage impacted by each alternative, by zoning classification. Under each alternative, impacts would be greatest to land zoned as agriculture.

Table 3-5: Total Acreage Impacted by Alternative

Zoning Classification[1]	Proposed Alternative				
	Green	Purple	Yellow	Red	Blue
Residential	155	223	172	198	211
Business[2]	95	165	121	87	60
Agriculture	655	489	279	420	721
Other[3]	15	41	19	65	92
Total (acres)	**920**	**918**	**591**	**770**	**1,084**

Notes:
1 *Zoning classifications for Sussex and Worcester Counties; if zoning is not known, property is included in Other category.*
2 *Business includes General Business, Business Park, Commercial, Industrial, and Manufacturing classifications.*
3 *Other includes State and Local Government, Mixed Use, Institutional Development, Woodland Areas, Utility, and Miscellaneous.*

3.1.2 Employment Trends

Affected Environment

The most recent, readily-available employment data from the ACS Estimates (2007-2011) were used to gather information on employment and industries in the study area. The SETR provides more information on how employment industries are divided in the State of Delaware, Sussex County, and the study area. In the study area, the largest industries are educational services (16 percent), retail (14 percent), construction (12 percent), and arts/entertainment/recreation/ accommodation and food services (12 percent). The SETR also provides details on the largest employers in each town in the study area.

Environmental Consequences and Mitigation

The No-build Alternative would continue to perpetuate congestion, affecting travel times and access, thus decreasing efficiency for businesses. A new on-alignment roadway would improve mobility in the area by increasing connectivity and decreasing congestion, thereby improving the local economy. A new bypass alignment would affect the local economy by providing new areas for economic development and expansion. Further, a bypass would provide increased relief from congestion.

Each of the proposed build alternatives would impact a number of existing businesses and commercial properties along the alignment, requiring some to relocate. This may result in loss of income to the owners and loss of employment for workers in these locations. However, most businesses would likely relocate elsewhere within the study area. Relocation assistance would be provided to all businesses affected by the implementation of a build alternative. The build alternatives may also impact planned businesses (commercial, retail, and industrial) in the study area, thus altering the projected number of jobs available in the future or altering the locations of these proposed future employment opportunities.

As shown in **Table 3-4**, the Yellow Alternative would impact the most businesses in the study area (102). The Purple Alternatives would result in the greatest number of business relocations (36). The Blue Alternative would result in the fewest overall business impacts (34), and would require the fewest business relocations (10).

Each of the build alternatives would also require modified access for businesses in the study area. The Yellow Alternative would have the greatest impact to existing businesses during construction since it would interfere with access to every business along US 113 from Millsboro to the State line during construction.

Impacted business owners would be contacted regarding potential acquisitions, and they would be fairly compensated for the impacts to their businesses. For relocations, owners would be provided assistance in accordance with the federal *Uniform Relocation Assistance and Real Property Acquisition Policies Act*, as amended, and DelDOT's policies.

3.1.3 Environmental Justice

Executive Order 12898, *"Federal Actions to Address Environmental Justice in Minority and Low-Income Populations"* was signed by President Clinton in February of 1994. The Executive Order requires each Federal agency to identify and address any disproportionately high and adverse effects of Federal projects on the health or environment of minority and low-income populations to the greatest extent practicable and permitted by law. Further, the project is required to provide an opportunity for participation in the public involvement process.

3.1.3.1 Low-Income Populations/Poverty Levels

Affected Environment

The US Department of Health and Human Services (HHS) identifies families and persons as living in poverty if their total family income or unrelated individual income is less than the poverty threshold specified for the family size, age of householder, and the number of related children under 18 present. According to *FHWA Order 6640.23*, low income is defined as "a person whose household income is at or below the Department of Health and Human Services poverty guidelines." However, the HHS poverty website states that the Census Bureau, and not

HHS, compiles statistics on poverty. Therefore, Census Bureau data were used to provide poverty percentages in this document.

The ACS is an ongoing statistical survey that samples a small percentage of the population each year. The most recent available data from the 2007-2011 ACS five - Year Selected Population tables were used for median household income and percent in poverty.

Table 3-6 shows the ACS estimates for median household income and percentage of the population in poverty for Delaware, Sussex County, and the study area. According to the most recent available data, approximately 11 percent of the population of Delaware and 12 percent of the population of Sussex County was in poverty. The average percent in poverty in the study area was 11 percent.

Table 3-6: Median Income and Percentage in Poverty

Geographic Area/ Tract	Median Household Income (in dollars)	Population in Poverty (in percent)
Delaware	$59,317	11%
Sussex County	$53,215	12%
050601	$53,942	6%
050602	$49,094	13%
050701	$50,868	10%
050703	$52,176	6%
051302	$43,288	12%
051400	$52,019	15%
051500	$45,625	16%
950800	$67,852	6%
Study Area Average	**$51,858**	**11%**

Source: ACS 2007-2011

Using the most recent available data, none of the Tracts in the study area meet the EJ threshold for low-income, containing a population in poverty greater than 10 percent over the study area average (11 percent).

Environmental Consequences and Mitigation

There are no Census Tracts in the study area that contain low-income populations that are greater than 10 percent over the study area average; therefore, no disproportionately high adverse impacts to populations in poverty are anticipated.

The proposed project would enhance access to and from residential and business areas along the US 113 corridor or proposed bypass location and would increase travel options, reduce congestion and improve area travel times. Communities in the project area are expected to benefit from increased access to jobs and other destinations.

Throughout preliminary design, alignment shifts have occurred in an attempt to reduce impacts to properties along the proposed alternatives. The number of potential impacts may be further reduced during the final design phase.

3.1.3.2 Minority Populations

Affected Environment

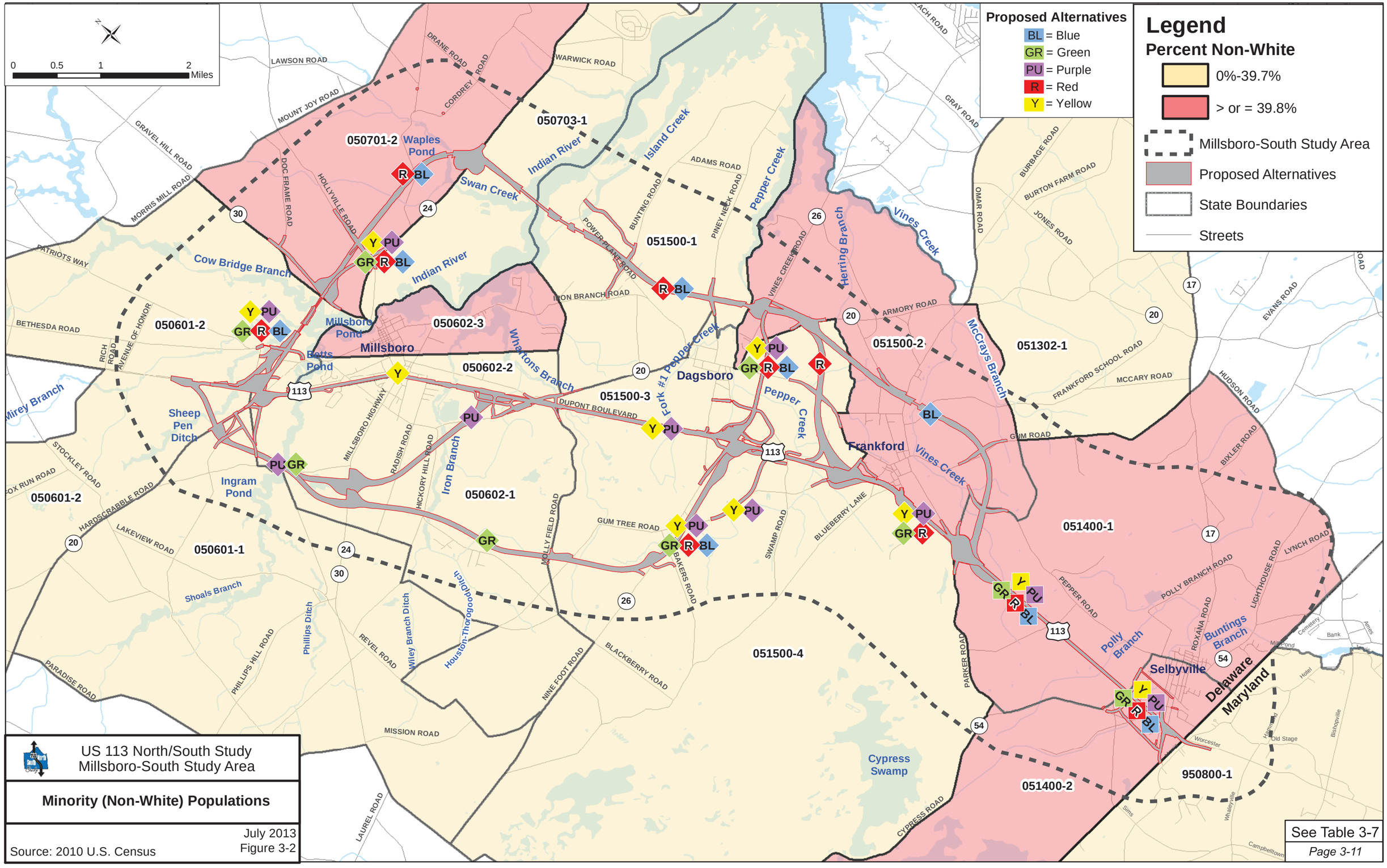
Racial distribution varies greatly throughout the study area. The State of Delaware is 27.5 percent minority (non-white) as defined by the US Census Bureau. Hispanic/Latino is a separate category; in Delaware, 4.8 percent of the population claims Hispanic or Latino heritage. The Census Bureau allows respondents to claim more than one race or ethnicity.

As shown in **Table 3-7**, the average non-white population in the study area is 29.8 percent. The threshold for EJ non-white populations was established as ten percent greater than the study area average (39.8 percent or greater). There are five Block Groups that meet the threshold for EJ non-white populations (050602-1, 050701-2, 051400-1, 051400-1, and 051500-2). Block Group 050701-2 has the highest non-white population (56 percent). **Figure 3-1** depicts the Block Groups in the study area. **Figure 3-2** shows the distribution of minority, non-white populations.

Table 3-7: Race and Ethnicity by US Census Block Group

Geographic Area/ Block Group	Total Population	White	Non-White or More than One Race	Percent Minority	Hispanic or Latino	Percent Hispanic or Latino Minority
Delaware	897,934	586,752	311,182	34.7%	73,221	8.2%
Sussex County	197,871	149,025	48,846	24.7%	16,954	8.6%
050601-1	2,719	2,191	528	19.4%	274	10.1%
050601-2	2,338	1,737	601	25.7%	208	8.9%
050602-1	2,063	1,716	347	16.8%	88	4.2%
050602-2	1,662	1,097	565	34.0%	106	6.4%
050602-3	1,832	982	850	46.4%	244	13.3%
050701-2	1,258	622	636	50.6%	170	13.5%
050703-1	988	709	279	28.2%	28	2.8%
051302-1	1,433	1,196	237	16.5%	74	5.2%
051400-1	2,191	1,309	882	40.3%	474	21.6%
051400-2	1,387	683	704	50.8%	420	30.3%
051500-1	1,260	946	314	24.9%	66	5.2%
051500-2	2,097	1,134	963	45.9%	428	20.4%
051500-3	978	807	171	17.5%	64	6.5%
051500-4	757	561	196	25.9%	46	6.1%
950800-1	1,269	1,219	50	3.9%	1	<0.1%
Study Area Total	**18,622**	**13,480**	**5,174**	**AVG- 29.8%**	**1,050**	**AVG- 10.3%**

Source: US Census, 2010
Note: The US Census allowed people to claim more than one racial or ethnic group.
Shaded areas indicate Block Groups that meet the thresholds for minority populations.



US 113 North/South Study
Millsboro-South Study Area

Minority (Non-White) Populations

July 2013
Figure 3-2

Source: 2010 U.S. Census

See Table 3-7
Page 3-11

The average Hispanic or Latino population within the study area is 10.3 percent. The threshold for EJ Hispanic or Latino populations was established as ten percent greater than the study area average (20.3 percent or greater). Three Block Groups meet the threshold for EJ Hispanic or Latino populations (BG 051400-1, BG 051400-2, and BG 051500-2). **Figure 3-3** shows the distribution of minority, Hispanic or Latino, populations.

Environmental Consequences and Mitigation

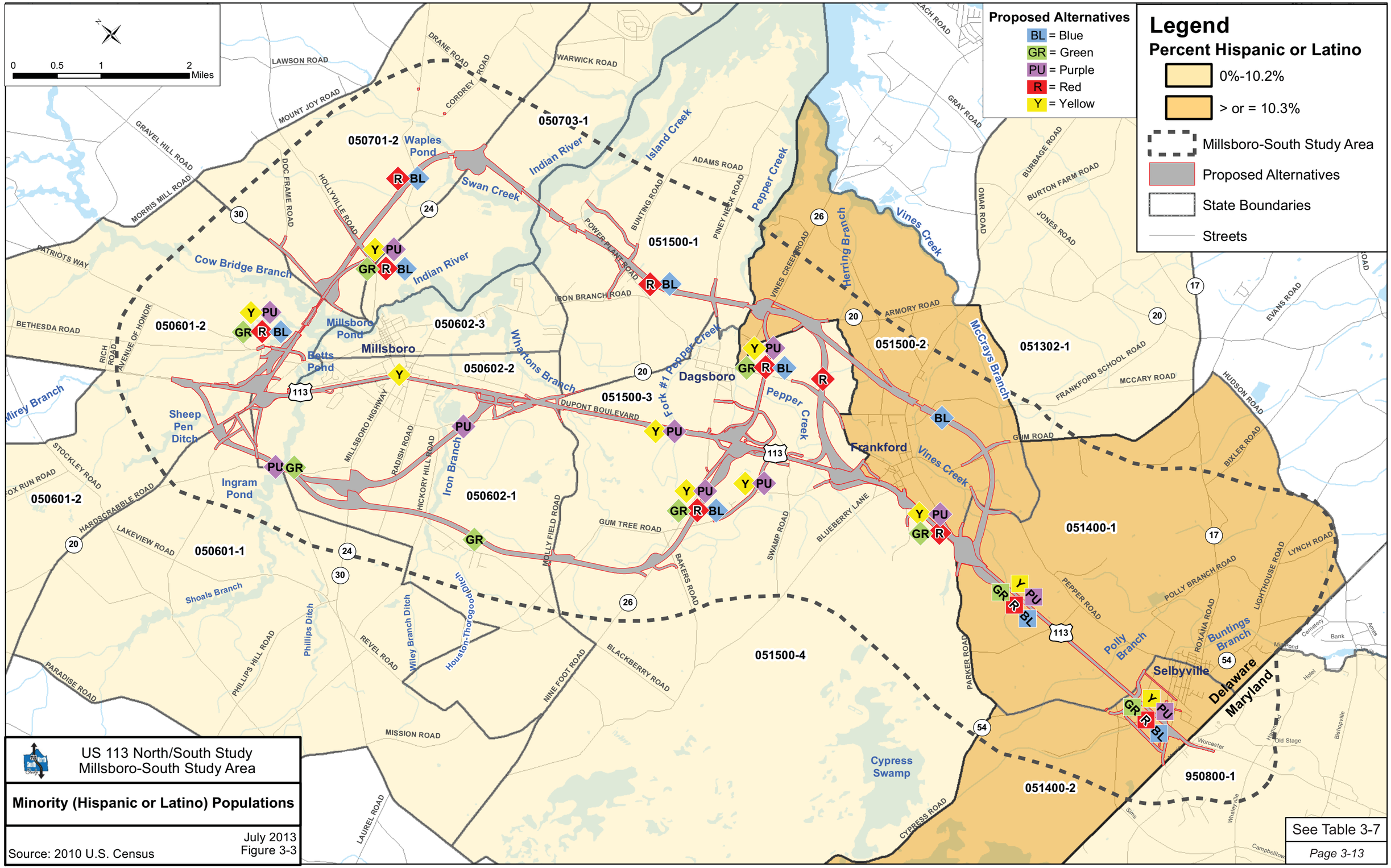
These affected areas of EJ populations were compared to areas of no-impact or less impact to determine if the environmental effects could be considered "disproportionately high and adverse" on minority populations. The potential benefits of the project are expected to be equally borne by all communities and areas of the project. Benefits include decreased congestion on existing US 113 and surrounding roadways upon completion of the project and into the future to accommodate the anticipated increases in area population, employment and development. The construction of a US 113 build alternative would improve regional accessibility and connectivity providing better access to area employment and communities.

The potential effects on land use, community facilities, air, and noise generally occur equally throughout the project corridor. Impacts in EJ areas were reviewed with regard to property impacts, relocations and access. As per FHWA Order 6640.23, a disproportionately high and adverse effect on a minority or low income population means the adverse effect is predominantly borne by such population or is appreciably more severe or greater in magnitude on the minority or low-income population than the adverse effect suffered by the non-minority or non-low-income population.

When analyzed at the Block Group level, the data indicated that for several alternatives the project impacts were disproportionately located within Block Groups that meet the threshold for EJ minority populations. However, the BGs cover large geographical areas, some containing hundreds of parcels spanning a variety of communities and neighborhoods (see **Figure 3-1**) and this level of analysis does allow for the precise location of minority areas.

Therefore, further analysis was conducted in an attempt to more precisely locate the EJ minority populations. Data from the 2010 US Census on race was collected at the Block level, the smallest geographic area for which racial data is available. The Block data was overlaid with the five proposed build alternatives and property parcels.

Table 3-8 lists the property impacts by alternative broken down by those that fall within the Blocks that meet the threshold for EJ populations and those Blocks that do not meet the threshold for EJ populations (EJ and Non EJ Blocks are shown on **Figure 3-4)**. As indicated in the table, the impacts for each alternative are not disproportionately located in EJ areas.



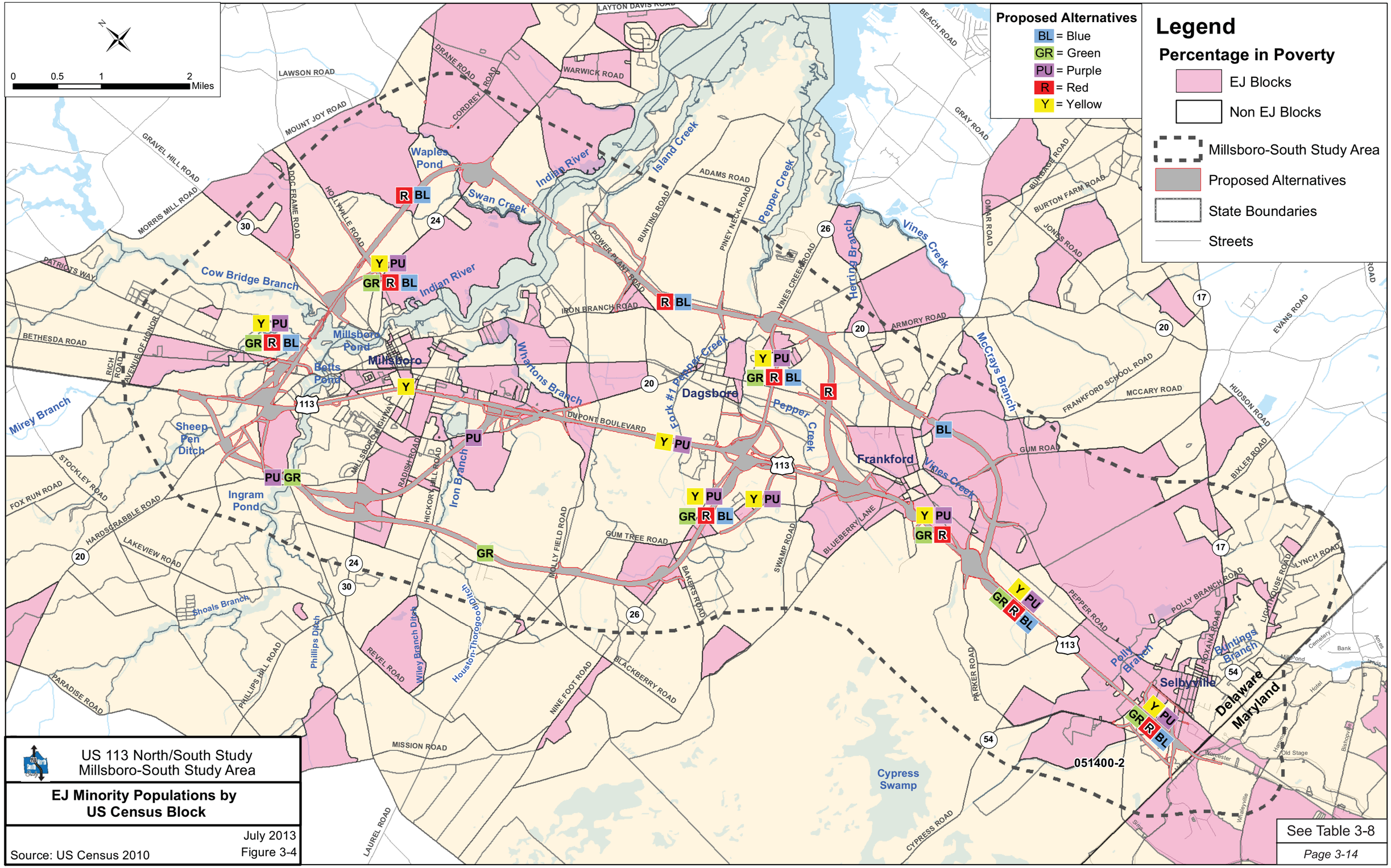
US 113 North/South Study
Millsboro-South Study Area

Minority (Hispanic or Latino) Populations

Source: 2010 U.S. Census

July 2013
Figure 3-3

See Table 3-7
Page 3-13



US 113 North/South Study
Millsboro-South Study Area

EJ Minority Populations by US Census Block

July 2013
Figure 3-4

Source: US Census 2010

See Table 3-8
Page 3-14

Table 3-8: EJ Property Impacts by Census Block

Geographic Area	Number of Property Impacts by Alternative				
	Green	Purple	Yellow	Red	Blue
EJ Census Blocks	132 (36.8%)	173 (36%)	174 (36.4%)	131 (31.5%)	105 (29.7%)
Non-EJ Census Blocks	227 (63.2%)	307 (64%)	304 (63.6%)	285 (68.5%)	248 (70.3%)
Total	**359**	**480**	**478**	**416**	**353**

Based on the above discussion and analysis, none of the build alternatives would cause disproportionately high and adverse effects on any minority or low-income populations, in accordance with the provisions of E.O. 12898 and FHWA Order 6640.23. No further EJ analysis is required.

Throughout preliminary design, alignment shifts have occurred in an attempt to reduce impacts to properties along the proposed alternatives. The number of potential impacts may be further reduced during final design phase.

3.1.3.3 Environmental Justice Outreach

Coordination with environmental agencies, elected officials, community organizations and associations, and the public has been ongoing since the initiation of the project. All impacted persons, regardless of ethnicity or income, would be fairly compensated for property impacts that occur as a result of implementation of a build alternative and would be assisted in relocation, where applicable. Efforts to avoid or minimize these and other property impacts would continue through final design. As shown in the SETR, development in the project area is active, so comparable replacement housing is projected to be available for any displaced person. Unavoidable property acquisitions and relocations of any individuals, families, or businesses will be conducted in accordance with the *Uniform Relocation Assistance and Real Property Acquisition Act* of 1970 and Amendments, and with DelDOT's policies.

The proposed project would enhance access to and from residential and business developments along the US 113 corridor or proposed new location and would increase travel options, reduce congestion, and improve area travel times. Communities in the project area are expected to benefit from increased access to jobs and other destinations.

Eleven Public Workshops and an Open House were held in the Millsboro-South Area to provide the general public with opportunities to view displays, hear presentations and offer comments (see **Chapter 5** for more detailed information). Several of the meetings were located in Selbyville, one of the areas with the highest concentration of minority populations. In order to reach the local Hispanic or Latino populations, several of the workshops were advertised in *Hoy en Delaware*, a Spanish-language newspaper. Additionally, the Millsboro/Georgetown workshops included a Spanish-speaking interpreter.

More than 50 meetings were held with individual property owners, business associations, and community groups. The Project Team met with owners of historic properties, businesses,

churches and farms located along the build alternatives. The purpose of these meetings was to keep the community informed and obtain their views and feedback on the proposed design as the study progressed. Detailed mapping showing aerial images overlaid with the proposed alternatives were provided and project staff was on hand to answer questions about proposed property impacts and access changes.

The project team held interviews and met with the Nanticoke Tribe as part of the community outreach. Members of the Nanticoke Tribe were part of the Millsboro-South Working Group. Correspondence with the tribes is ongoing.

3.1.4 Elderly and Disabled Populations

While elderly and disabled individuals are not considered part of the EJ population, they are important socioeconomic factors to consider for this project and are discussed below.

Affected Environment

The population is classified by age, in order to identify those persons who are considered elderly (age 65 and over). Persons age 65 and over constitute 14.4 percent of the total population of Delaware, 20.8 percent in Sussex County, and 18.1 percent in the study area. Population by age is summarized in **Table 3-9**. The Block Group with the largest elderly population is 050703-1 (33.4 percent). **Figure 3-1** shows the study area Block Groups.

Table 3-9: Population Age Distribution

Geographic Area/Block Group	Population	Age Distribution				
		Under 25 (%)	25-44 (%)	45-64 (%)	65 and over (%)	Median Age
Delaware	897,934	33.0%	25.3%	27.2%	14.4%	38.8
Sussex County	197,145	27.7%	21.7%	29.7%	20.8%	45.4
050601-1	2,719	33.2%	25.7%	27.8%	13.3%	39.2
050601-2	2,338	30.7%	24.6%	31.3%	13.5%	41.7
050602-1	2,063	27.2%	24.4%	30.3%	18.0%	43.2
050602-2	1,662	32.0%	23.1%	21.5%	23.4%	39.9
050602-3	1,832	36.3%	25.1%	22.8%	15.8%	35.0
050701-2	1,258	27.7%	21.6%	29.9%	20.8%	47.8
050703-1	988	18.3%	15.9%	32.4%	33.4%	55.4
051302-1	1,433	23.2%	22.4%	33.4%	21.0%	47.6
051400-1	2,191	31.2%	24.7%	27.4%	16.7%	40.6
051400-2	1,387	37.2%	24.7%	24.3%	13.8%	34.2
051500-1	1,260	29.3%	22.5%	29.3%	19.0%	44.0
051500-2	2,097	30.6%	23.2%	28.5%	17.7%	41.8
051500-3	978	30.6%	23.1%	28.9%	17.4%	42.2
051500-4	757	32.8%	25.0%	29.3%	12.9%	39.8
950800-1	1269	30.0%	20.5%	35.2%	14.3%	44.8
Study Area Total/Average	**24,232**	**30.0%**	**23.1%**	**28.8%**	**18.1%**	**42.5**

Source: US Census, 2010

People with mental, physical, or sensory limitations are classified as disabled. The proportion of the population that is disabled in Delaware, Sussex County, and the study area is 16.8, 20.6, and 18.8 percent respectively. The most recent available data on disabled populations is from the 2000 US Census. The study area average is not significantly greater than the statewide or countywide average. Disabled populations in the study area are summarized in **Table 3-10**.

Table 3-10: Disabled Population (percent)

Geographic Area/ Block Group	Disabled Population
Delaware	16.8%
Sussex County	20.6%
Study Area	18.8%

Source: US Census, 2000

Environmental Consequences and Mitigation

None of the study area Census Tracts contain significantly larger elderly population than the study area average. Therefore, no disproportionate impacts to elderly populations are anticipated.

Disabled data is not available from either the ACS 2007-2011 or the 2010 Decennial Census. According to the 2000 Census, the study area contained an average disabled population similar to that of Delaware and Sussex County. Disproportionate impacts to disabled populations are not anticipated.

3.1.5 Livability Principles and Sustainability

Affected Environment

As part of its Every Day Counts initiative, FHWA has established six principles of livability. Departments of Transportation are encouraged to be mindful of the following principles during project planning.

- **Provide more transportation choices** to decrease household transportation costs, reduce our dependence on oil, improve air quality, and promote public health.
- **Expand location- and energy-efficient housing choices** for people of all ages, incomes, races, and ethnicities to increase mobility and lower the combined cost of housing and transportation.
- **Improve economic competitiveness of neighborhoods** by giving people reliable access to employment centers, educational opportunities, services and other basic needs.
- **Target federal funding toward existing communities** – through transit-oriented, mixed-use development and land recycling – to revitalize communities, reduce public works costs, and safeguard rural landscapes.

- **Align federal policies and funding** to remove barriers to collaboration, leverage funding and increase the effectiveness of programs to plan for future growth.
- **Enhance the unique characteristics of all communities** by investing in healthy, safe, and walkable neighborhoods, whether rural, urban, or suburban.

In early 2009, an intermodal working group was formed to start shaping the US Department of Transportation's (USDOT) vision of Livability. Initial steps included the identification of all existing programs and authorities within the Department that already supported Livability and drafting possible changes to these programs that would allow the Department to make Livability a priority and make real improvements in the lives of American citizens.

In June 2009, the U.S. Department of Housing and Urban Development, USDOT, and the EPA united to form the Partnership for Sustainable Communities, an unprecedented agreement to coordinate federal housing, transportation, and environmental investments, protect public health and the environment, promote equitable development, and help address the challenges of climate change. The three agencies are working together to coordinate federal policies, programs, and resources to help urban, suburban, and rural areas and regions build more sustainable communities and make those communities the leading style of development in the United States. The agencies are identifying opportunities to build more sustainable communities and to remove policy or other barriers that have kept Americans from doing so.

Environmental Consequences

The US 113 North-South Study has maintained as one of its central themes the principle of economic competitiveness of neighborhoods by giving people reliable access to employment centers, educational opportunities and goods and services. DelDOT has worked extensively with the Office of State Planning Coordination, Sussex County, and each of the localities in the study area to address local and regional transportation needs with respect to the development trends and setting of the communities. These efforts have been specifically addressed to ensure that the project is being developed in concert with the respective comprehensive plans and growth elements of each of the comprehensive plans.

There is no official Future Land Use map in the *2008 Sussex County Comprehensive Plan Update*. However, the county has utilized federal monies, specifically the U. S. Department of Agriculture, Rural Utilities Grants, to address the State's Pollution Control Strategy. The goal of the Strategy is to replace as many septic tanks as possible through the design and construction of new sanitary sewer systems. The priority for implementation of sanitary sewer districts is toward the east of the project area, near the water. This prioritization, developed with the goal of reducing nutrients reaching the Inland Bays, may also direct future growth in Sussex County. As such, some of the US 113 build alternatives meet the anticipated future land use trends better than others. Specifically, the Red and Blue alternatives are located in the areas targeted for sewer upgrades, while Green, Purple, and Yellow are not. Consequently, the Red and Blue alternatives better align with the federal expenditures.

The rural, low density setting and the development trends in the project area make the realization of some of these principals challenging. The desires for transit-oriented development and alternate modes of travel cannot be supported by current population densities and development patterns. In addition, this roadway facility would be controlled access and designed for high speeds which do not make for walkable neighborhoods. Therefore, none of the alternatives would meet the tenets of sustainability.

3.2 LAND USE

3.2.1 Existing Land Use

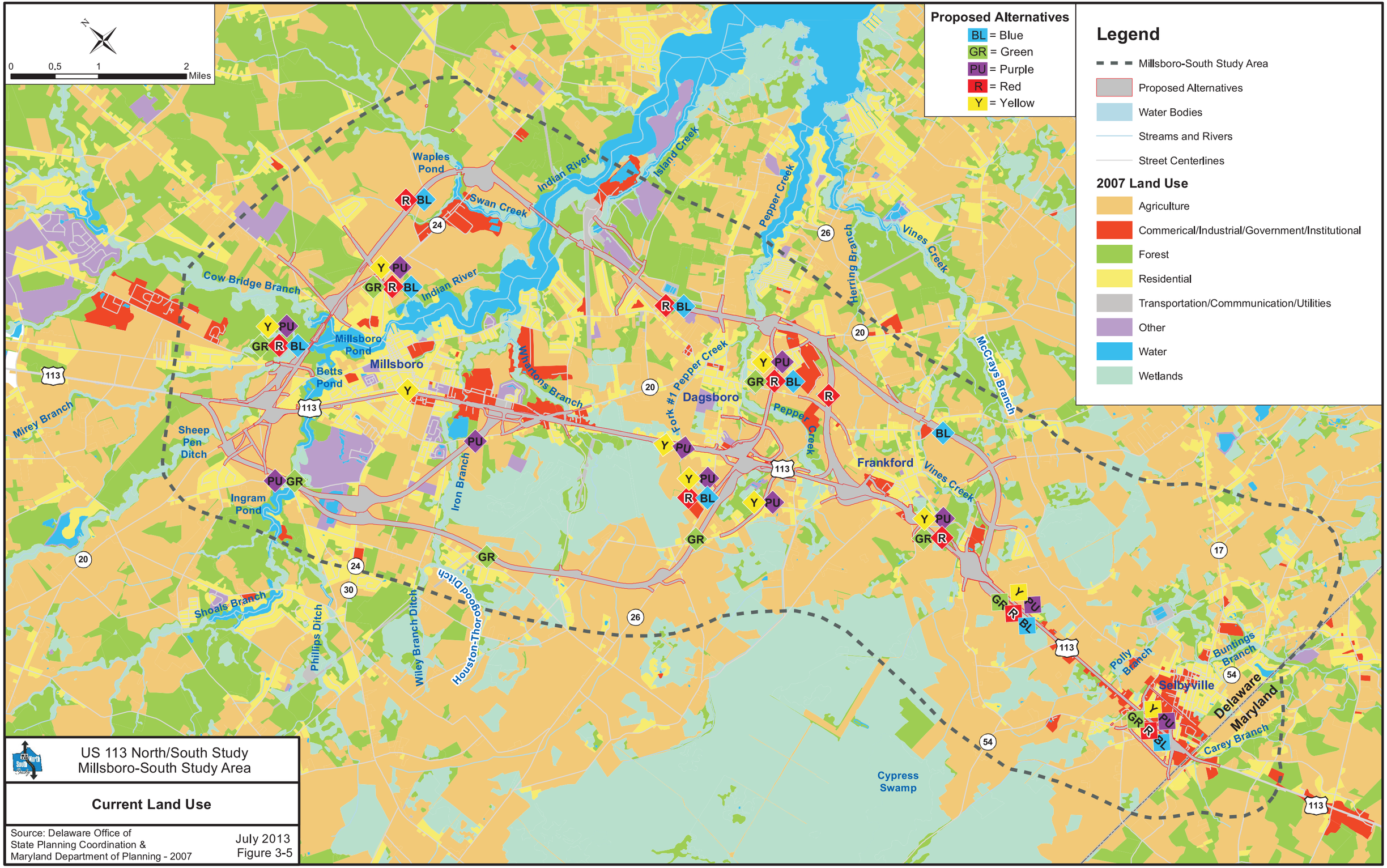
Affected Environment

Land in the study area is predominantly agricultural and forested. Agricultural land is distributed throughout the study area, primarily outside of the municipalities, where the existing land uses are predominantly residential, commercial, and urban/built up. The composition of land uses in the study area is similar to that of the remainder of Sussex County. Additional information regarding land use in Sussex County and the study area is located in the SETR. Waters and wetlands are concentrated mainly around Millsboro (along the Indian River), southwest of US 113 (in the vicinity of Molly Field Road), and between Frankford and Selbyville (Jay Patch). **Figure 3-5** shows the current land use in the study area.

Environmental Consequences and Mitigation

The No-build Alternative would have no direct impacts on the existing land use. Implementation of any of the build alternatives would result in the conversion of acres from their present land uses to transportation land use. Existing land uses that would be converted include residential, retail sales/wholesale/professional services, industrial, roads/transportation, agriculture, water and wetlands, forest, and other. Other includes land designated for recreation, institutional/ governmental, utilities, salvage yards, and other urban land as shown on **Figure 3-5**. A substantial amount of the agricultural land in the study area is designated for future development.

The conversion of land from present uses to transportation uses is shown in **Table 3-11**. The Yellow Alternative would have the least impact of the build alternatives to existing land use. It covers the fewest acres and has the greatest percentage of its land already used for transportation purposes. It would predominantly affect land along or adjacent to the existing roadway, although some additional areas would be used for access roads and intersections.



US 113 North/South Study
Millsboro-South Study Area

Current Land Use

Source: Delaware Office of State Planning Coordination & Maryland Department of Planning - 2007

July 2013
Figure 3-5

Table 3-11: Land to be Converted from Current Uses

2007 Land Use Category	Alternative				
	Green	Purple	Yellow	Red	Blue
Agricultural	66%	60%	57%	59%	61%
Commercial, Industrial	6%	8%	12%	8%	4%
Forest	9%	10%	7%	16%	20%
Residential, Urban	8%	12%	18%	9%	5%
Transportation, Government, and Utility	0%	0%	1%	0%	2%
Water	1%	1%	1%	0%	0%
Wetlands	8%	8%	4%	6%	4%
Other	2%	1%	0%	2%	4%
Total Acres Converted	**920**	**918**	**591**	**770**	**1,084**

Source: Delaware Office of State Planning Coordination, 2007 & Maryland Office of Planning, 2007

The alternatives impact between 591 acres (On Alignment) and 1,084 acres (Blue Alternative). The Green, Purple, Red, and Blue alternatives are on new alignment; they would all impact primarily agricultural, forested, and urban land. Impacts to various land uses and potential mitigation measures are discussed separately in other sections of this document, including the Secondary and Cumulative Effects Analysis (SCEA) in **Section 3.17**.

3.2.2 Future Land Use

Affected Environment

According to the Delaware Population Consortium, the population of Sussex County is predicted to increase by approximately 73 percent between 2000 and 2030. The number of households is also expected to increase during that period, by approximately 74 percent. The *Sussex County Comprehensive Plan* contains a Future Land Use Plan to help guide the location of development needed for the projected increases in population and respective housing needs. As stated in the *Comprehensive Plan*, the Future Land Use Plan divides Sussex County into Growth Areas and Rural Areas and seeks to direct the County's most concentrated forms of new development to Growth Areas. The location of Growth Areas influences Delaware state policy on: a) where the State hopes to apply certain growth management strategies; and b) how the state allocates its infrastructure spending.

The top three guidelines listed to determine where Growth Areas should be located are:

- Proximity to an incorporated municipality or a municipal annexation area.
- Presence of existing public sewer and public water service nearby.
- Plans by the County to provide public sewage service within five years.

3.2.2.1 Municipal Annexation Areas

Selbyville, Frankford, Dagsboro, and Millsboro all anticipate annexations. See the SETR for details of each municipality's planned expansion.

3.2.2.2 Existing and Planned Public Sewerage

The Sussex County Engineering Department oversees wastewater planning, has divided the county into sewer planning areas, and has completed detailed sewer treatment plans for several of these areas. As shown on **Figure 3-6,** there are four levels of sewer service planning areas:

Existing Sewer Districts – Areas where service is provided through the statutory authority granted to Sussex County through *Delaware Administrative Code 7403*, which may include serving specific users through contractual agreements. Private wastewater service providers are regulated in these areas.

Primary Service Areas – Areas where the County has conducted planning activities to eliminate septic systems and/or serve future development and growth. Primary service areas are areas with immediate needs and are designated as either developing areas or areas that have a considerable amount of existing development with wastewater needs. These areas are considered to be near-term service areas, which will receive wastewater service within 5 years. Private wastewater service providers are regulated in Primary Service Areas.

Secondary Service Areas – Areas where septic systems shall be reduced, growth is expected and special environmental needs may exist, but service is not expected within the next 5 years. The County may have conducted planning activities in these areas to eliminate septic systems and/or serve future development and growth. Private wastewater service providers may be permitted to operate in Secondary Service Areas on an interim basis, until County service is provided.

Unclassified Service Areas – Areas where County facilities are not currently planned. Private wastewater providers may be permitted to operate in these areas.

A review of the *Sussex County Comprehensive Plan's* County Wastewater Service Areas depicted on **Figure 3-6** shows that the county has focused much of its funding towards wastewater infrastructure in and around Rehoboth Bay, Indian River Bay, and Little Assawoman Bay, collectively known as the Inland Bays. Development data presented in the *Comprehensive Plan* reflect that new development proposals are highest around the Inland Bays. Furthermore, the focus of wastewater capital improvement dollars helps address the *State Pollution Control Strategy for the Inland Bays* through the elimination of the myriad of existing septic systems.

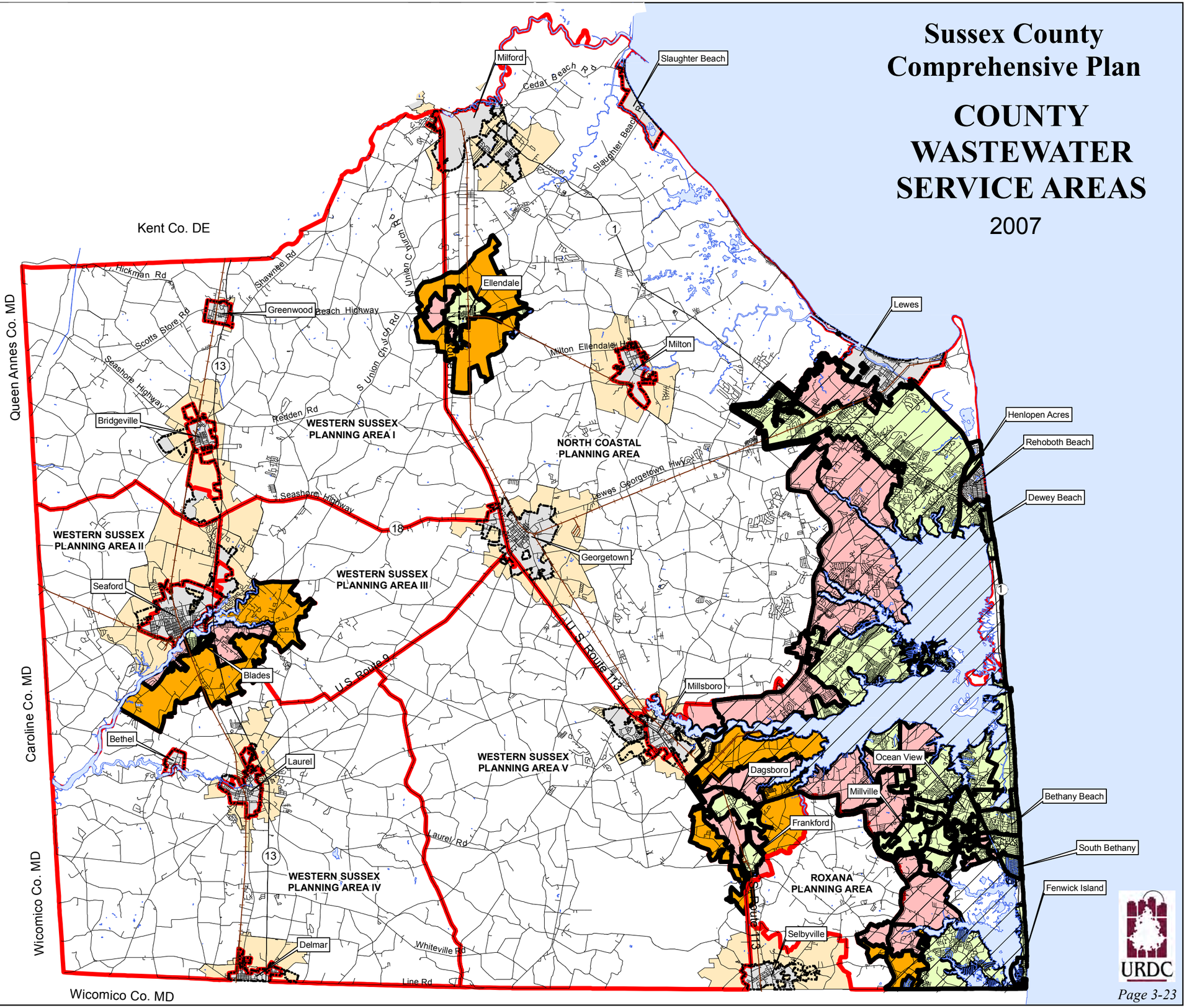
3.2.2.3 Project Conformity with Local Comprehensive Plans

Sussex County
The Mobility Element of the *2008 Sussex County Comprehensive Plan Update* discusses a continuing need to accommodate through and regional traffic while preserving mobility for local residents and access to local businesses. Further, north-south mobility should be through the preservation and increased capacity on existing major north-south routes while pursuing plans for a north-south limited access highway on existing or new alignments. The Plan further identifies as an action item to continue working with DelDOT on the recommended

Sussex County Comprehensive Plan

COUNTY WASTEWATER SERVICE AREAS

2007



- Environmentally Sensitive Development Area (ESDA)
- Roads
- Boundaries of Sewer Planning Areas
- Existing County Sewer Districts
- Primary County Service Areas
- Secondary County Service Areas
- Unclassified Service Areas
- Town/City Potential Annexation Areas (intended to be eventually served by Town/City in most cases.)
- Municipal Boundaries

Please see text for planning area and service area definitions.

0 9,000 18,000 36,000 Feet

1 inch equals 18,000 feet

N W E S

Base Map Provided By: Sussex County Mapping Deptartment

Sources: Sussex County Engineering Department

US 113 North/South Study
Millsboro-South Study Area

Sussex County Wastewater Service Areas

Source: Sussex 2008 CompPlan

July 2013
Figure 3-6

URDC

improvements to US 113 identified in the *US 113 North/South Study* from north of Milford through Selbyville to the Maryland line.

Selbyville
The *2007 Selbyville Comprehensive Plan* discusses the *US 113 North/South Study*. The Town of Selbyville recognizes the need for improvements to US 113. The Town states that there is a desire for the new roadway to bypass Selbyville and to terminate south of the Town or elsewhere outside of the municipality in order to best alleviate the traffic issues in the area.

Frankford
The *2008 Frankford Comprehensive Plan* discusses the *US 113 North/South Study*. The study has the potential to dramatically affect the Town of Frankford. The comprehensive plan discusses managing institutional, commercial, and industrial development opportunities on both sides of US 113. The Town plans to continue participating in selecting the new alignment.

Dagsboro
The *2008 Dagsboro Comprehensive Plan Update* does not directly discuss the *US 113 North/South Study*. However, the Plan does state community goals in regards to transportation planning. The Plan states that traffic congestion and pedestrian safety are the most pressing transportation related issues in the area.

Millsboro
The *2009 Millsboro Comprehensive Plan Update* discusses the *US 113 North/South Study*. It states that a *Transportation Feasibility Study* was conducted in 2001 to examine the local and regional transportation needs for the US 113 corridor and concluded that a major north/south upgrade was feasible from an engineering standpoint. The Feasibility Study led to a more detailed planning project which began in 2003. The Comprehensive Plan states that the area should have adequate crossings along the US 113 corridor and mobility should be maintained.

Environmental Consequences

This proposed project would not adversely affect the annexation plans of any of the communities within the study area. DelDOT would work with each community to ensure the project is compatible with the individual comprehensive plans.

All of the proposed build alternatives would meet the Mobility Element statements of the *Sussex County Comprehensive Plan*. However, not all of the proposed build alternatives equally meet the tenets of the Future Land Use elements of the comprehensive plan. The Green and Blue alternatives would provide a new transportation corridor west of the areas that Sussex County has identified as its growth areas or where they have focused their wastewater service areas. The Yellow Alternative meets the first guideline of focusing growth near the municipalities and their proposed annexation areas. The Red and Blue alternatives provide new north-south capacity to areas proposed as growth areas.

3.2.3 Planned Development

Affected Environment

There is a large amount of development approved, pending, or under construction within the study area. A 2013 search conducted with assistance from municipal, county, and state planners/ officials resulted in a list and map of development projects. They were categorized as either approved, in the approval process, under construction, or potential development projects.

Environmental Consequences

Completion of the build alternatives would directly impact some planned developments in the study area. **Table 3-12** lists the planned developments in the study area that would receive direct impacts from one or more of the alternatives.

Table 3-12: Direct Impacts to Planned Development by Alternative

Planned Development	Alternatives				
	Green	Purple	Yellow	Red	Blue
Selbyville Town Center	X	X	X	X	X
Frankford 1	X	X	X	X	
Frankford 2	X	X	X	X	
Chapel Crossing	X	X	X	X	X
Dagsboro 2				X	X
Dagsboro Church of God		X	X		
DGS Properties	X	X	X	X	X
Moorings at Pepper Creek				X	X
Pepper Creek Crossing				X	
Commons at Radish Farm		X			
Del Pointe	X	X	X	X	X
Dove Point		X			
Dukes Property	X	X			
Ferry Cove				X	X
Indian Meadows				X	X
Peninsula Crossing		X	X		
Plantation Lakes	X	X	X	X	X
Sommerton Chase		X			
Sweetwater Pointe	X	X	X	X	X
White's Farm	X	X	X		
Vines Creek Village	X	X	X	X	X
Pepper Creek Crossing	X	X	X	X	X
Woodlands of Pepper Creek		X	X	X	X
Total Impacted	**12**	**18**	**14**	**16**	**13**

The Purple Alternative would cause direct impacts to the most (18) proposed developments; the Green Alternative would impact the fewest (12). The remaining alternatives would impact between 13 and 16 proposed developments.

Several planned developments would be situated near one or more of the build alternatives. Impacts may include audible or visual impacts caused by the proposed project upon construction and completion of both the land use and transportation network. The planned developments located within 600 feet of the centerline of each of the build alternatives are listed in **Table 3-13**. The Yellow Alternative would potentially cause a visual or audible impact to the most proposed developments (7). The Blue Alternative has the fewest (0) potential impacts to proposed developments. The remaining alternatives would have potential impacts to proposed developments that range between one and three.

Table 3-13: Potential Impacts to Planned Development by Alternative

Planned Development	Alternatives				
	Green	Purple	Yellow	Red	Blue
Frankford 3	X	X	X	X	
Dagsboro 2	X	X	X		
Burton's Crossing			X		
Homestead			X		
Millwood		X	X		
Monroe Square			X		
Retreat at Millstone			X		
Total Impacted	**2**	**3**	**7**	**1**	**0**

DelDOT has consulted and will continue to consult with the owners/developers of these and other affected planned development areas to provide appropriate compensation for property acquisitions. Further information on property acquisitions is found in **Section 3.1.1**.

3.2.4 Farmland

Affected Environment

Historically, agriculture has been the dominant land use in both Delaware and Sussex County. In 1997, there were 2,671 farms in Delaware, covering 589,107 acres. By 2007, the total number of farms statewide decreased by almost 18 percent, to 2,200 covering 515,000 acres. In 1997, agriculture made up approximately 47 percent (282,000 acres) of Sussex County's land use. Despite a recent rise in residential growth in the county, approximately 277,000 acres (46 percent) are still used for agriculture.

Agriculture and agricultural production are vital to both the Delaware and Sussex County economies. Broiler chickens are the most valuable agricultural product in Delaware. In 2006, over 269 million birds were produced, accounting for 74 percent (over $739 million) of the total agricultural revenue (over $995 million). Nationally, Delaware ranks ninth in the number of broiler chickens produced. In terms of acreage, Delaware's row crop production is dominated by corn (*Zea mays*) and soybeans (*Glycine max*). The crops that produce the most revenue for the state are grains and soybeans ($126.8 million), followed by greenhouse and nursery products ($34.6 million), then by vegetables and fruits ($26.6 million).

The study area is dominated by agricultural production and related services, and there are several businesses vital to or supporting the many area farms. They include feed production and delivery services, livestock and poultry processing, and companies that supply and service farm equipment. The Mountaire Poultry Processing Plants in Millsboro and Selbyville employ nearly 1,600 people and over 1,650 people, respectively.

3.2.4.1 Agricultural Land Preservation

Delaware enacted the *Agricultural Lands Preservation Program* in 1991. Under the Act, Agricultural Districts provide a temporary agreement between the property owner and the state or county to continue using the land for agricultural purposes for a ten-year period (renewable). Agricultural Easements are farms that are permanently dedicated to agricultural purposes. This permanent dedication is recorded as a deed restriction and is carried forward to all future property owners. See the SETR for details on eligibility for the program.

Of the 156,785 acres of Delaware farmland that are permanently protected through the *Agricultural Lands Preservation Program*, 36.4 percent (57,111 acres) are located in Sussex County. There are 100.4 acres designated as Agricultural Districts and 795.2 acres of permanent Agricultural Easements in the study area.

3.2.4.2 Prime Farmland

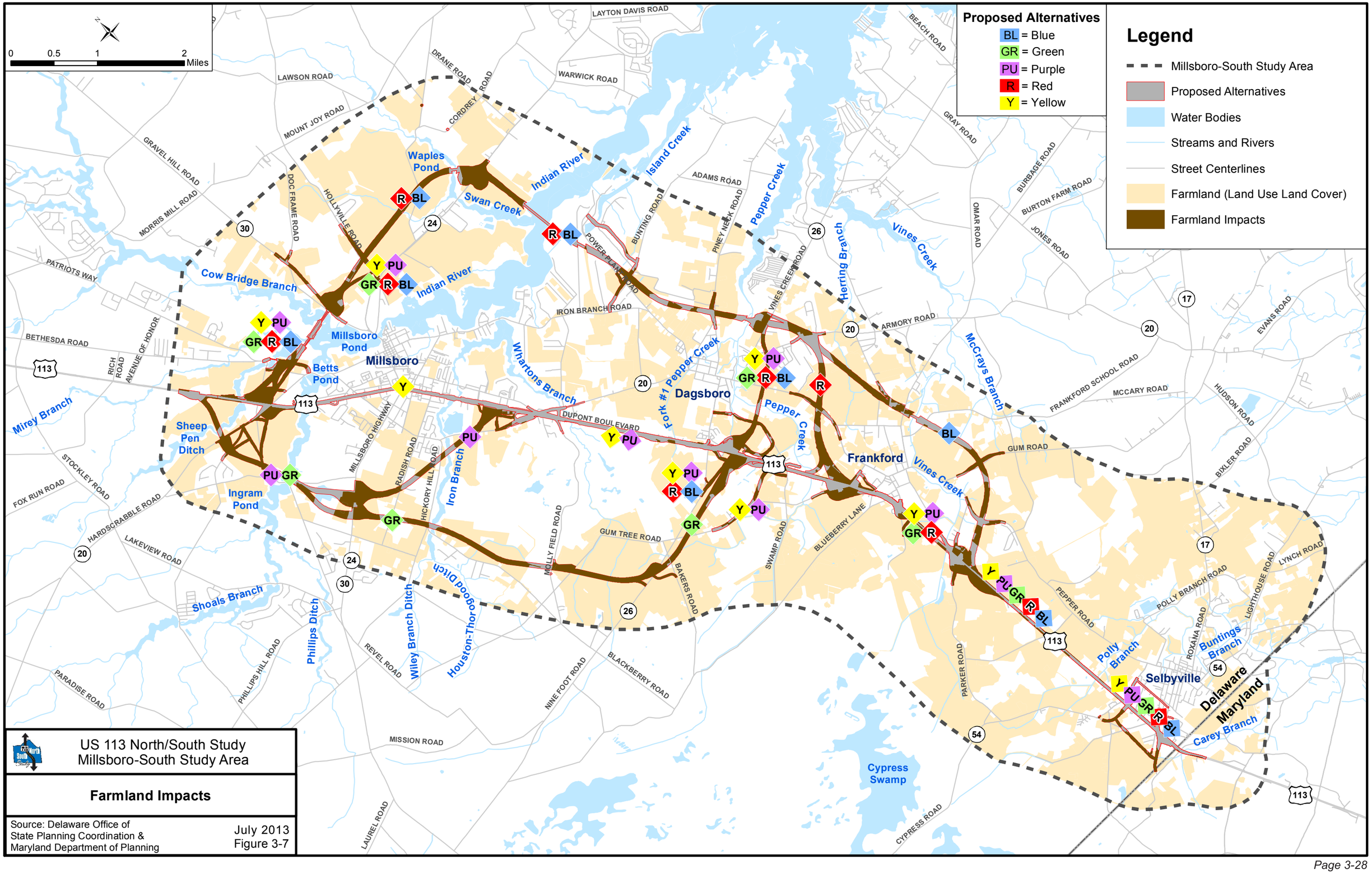
According to the Natural Resources Conservation Service (NRCS), prime farmland soils are those that have the best combination of physical and chemical characteristics for producing food, feed, forage, fiber, and oilseed crops. To be considered prime farmland, these soils must also be available for agricultural uses. Soils of statewide importance are those that are nearly prime farmland soils, and that economically produce high yields of crops when treated and managed according to acceptable farming methods.

Prime farmland soils cover 2,277 acres scattered throughout the study area. Soils of statewide importance are more common in the study area, occupying 6,115 acres. Prime farmland covers 1,374 acres in the study area and makes up a portion of the proposed right-of-way for each alternative.

Environmental Consequences and Mitigation

Although development would continue to occur, there would be no impacts to farmland from the No-build Alternative. Each of the proposed build alternatives would impact farmland in the study area, and some total acquisitions would be required by each (see **Table 3-3** and **Figure 3-7**). However, a substantial amount of the agricultural land that would be impacted by the project is already proposed for development.

Table 3-14 contains farmland impact data. The Red Alternative would directly impact the most agricultural parcels (30) and the greatest acreage (683.7) of agricultural land. Green and Purple


0 0.5 1 2 Miles
Proposed Alternatives
BL = Blue
GR = Green
PU = Purple
R = Red
Y = Yellow
Legend
Millsboro-South Study Area
Proposed Alternatives
Water Bodies
Streams and Rivers
Street Centerlines
Farmland (Land Use Land Cover)
Farmland Impacts
LAYTON DAVIS ROAD
BEACH ROAD
DRANE ROAD
CORDREY ROAD
WARWICK ROAD
LAWSON ROAD
MOUNT JOY ROAD
GRAVEL HILL ROAD
MORRIS MILL ROAD
DOC FRAME ROAD
HOLLYVILLE ROAD
Waples Pond
Indian River
Island Creek
Swan Creek
ADAMS ROAD
BUNTING ROAD
PINEY NECK ROAD
Pepper Creek
GRAY ROAD
BURBAGE ROAD
BURTON FARM ROAD
JONES ROAD
OMAR ROAD
Vines Creek
Herring Branch
VINES CREEK ROAD
POWER PLANT ROAD
PATRIOTS WAY
Cow Bridge Branch
IRON BRANCH ROAD
ARMORY ROAD
EVANS ROAD
BETHESDA ROAD
RICH ROAD
AVENUE OF HONOR
Millsboro Pond
Betts Pond
Millsboro
Whartons Branch
McCrays Branch
FRANKFORD SCHOOL ROAD
MCCARY ROAD
HUDSON ROAD
Mirey Branch
Sheep Pen Ditch
DUPONT BOULEVARD
Fork #1 Pepper Creek
Dagsboro
Pepper Creek
MILLSBORO HIGHWAY
RADISH ROAD
HICKORY HILL ROAD
Iron Branch
GUM ROAD
BIXLER ROAD
STOCKLEY ROAD
FOX RUN ROAD
HARDSCRABBLE ROAD
Ingram Pond
Frankford
Vines Creek
LAKEVIEW ROAD
MOLLY FIELD ROAD
GUM TREE ROAD
SWAMP ROAD
BLUEBERRY LANE
LYNCH ROAD
LIGHTHOUSE ROAD
POLLY BRANCH ROAD
PEPPER ROAD
Shoals Branch
Phillips Ditch
Wiley Branch Ditch
Houston-Thoroughgood Ditch
BAKERS ROAD
PARKER ROAD
ROXANA ROAD
Buntings Branch
Polly Branch
Selbyville
Delaware
Maryland
Carey Branch
PHILLIPS HILL ROAD
REVEL ROAD
NINE FOOT ROAD
BLACKBERRY ROAD
PARADISE ROAD
MISSION ROAD
LAUREL ROAD
CYPRESS ROAD
Cypress Swamp
US 113 North/South Study
Millsboro-South Study Area
Farmland Impacts
Source: Delaware Office of State Planning Coordination & Maryland Department of Planning
July 2013
Figure 3-7

would impact the fewest parcels (12 each), and Yellow would impact the fewest acres (438.1) of agricultural land. Yellow would impact 17 parcels, while Blue would impact 22. Purple, Green, and Blue would each impact between 581 and 658 acres. Each build alternative would also create indirect impacts to farmland, such as elimination of access or making remaining portions of fields too small to farm.

Table 3-14: Farmland Impacts

Farmland Category	Proposed Alternative				
	Green	Purple	Yellow	Red	Blue
# Direct Impacts to Farm parcels (acres)	12 (536.8)	12 (457.2)	17 (324.0)	30 (631.3)	22 (607.4)
# Indirect Impacts to Farm parcels (acres)	37 (117.5)	42 (121.4)	29 (62.7)	50 (228.5)	46 (207.2)
Prime Farmland Soils (acres)[1]	99.3	86.3	81.0	72.4	101.2
Prime Farmland (acres)	54.1	46.0	40.7	45.6	64.9
# Agricultural Districts Impacted (acres)	1 (1.9)	1 (1.9)	1 (1.9)	1 (5.3)	1 (5.3)
# Agricultural Easements Impacted (acres)	1 (18.6)	0	0	0	3 (11.6)

[1] *This impact information includes prime farmland soils already impacted or proposed for development*

As land once used for agriculture is converted into subdivisions and other types of development, including the selected build alternative, farming and the agricultural businesses that support it could gradually become less sustainable. Agribusinesses would not be directly affected by the build alternatives. However, they would be affected by the cumulative decrease in farmland in the area, primarily due to increasing development. Cumulative effects of the project are discussed in **Section 3.17.**

One means of evaluating the conversion of prime farmland to highway use is through the *Farmland Conversion Impact Rating* (FCIR) form developed under the *Farmland Protection Policy Act*. The FCIR form compares impacts of the proposed alternatives to prime farmland within a mile-wide corridor (1/2-mile from either side of the centerlines). This form will be completed and included with the Final EIS (FEIS).

All of the build alternatives would impact prime farmland. The Blue Alternative would impact the most prime farmland (64.9 acres), and the Yellow Alternative would impact the least (40.7 acres). The other build alternatives would impact between 45.6 and 54.1 acres each.

Impacts to agricultural districts and easements are listed in **Table 3-14**. There are three agricultural districts in the study area, but only one would be impacted by any of the proposed build alternatives. The district is between Washington Street, Hollyville Road, Doc Frame Road, and Gravel Hill Road, north of Millsboro. Impacts range from 1.9 acres to 5.3 acres, depending on the alternative selected.

There are ten permanent agricultural preservation easements scattered throughout the study area, but only four of them would be impacted by any of the proposed build alternatives. The first is

located on both sides of Molly Field Road, and would be impacted by the Green Alternative. Another is located between Selbyville and Frankford, on both sides of Pepper Road, adjacent to Jay Patch Road and McCabe Road. It would be impacted by all of the alternatives. The other two easements abut one another and are between Pepper Road, Shockley Town Road, and Gum Road. The Blue Alternative would impact these two easements.

Each of the build alternatives would impact farm parcels that are eligible for the *Agricultural Lands Preservation Program* based on their LESA score. The Blue Alternative would impact the most parcels eligible for this program (120), while the Yellow Alternative would impact the fewest (96). The other build alternatives will impact either 99 or 117 parcels eligible for the program. Although these parcels are eligible, that does not imply that the owners are interested in the program.

3.2.4.3 Compensation

Property owners would be contacted regarding potential acquisitions, and they would be fairly compensated for the required acreage. In the case of agricultural preservation lands, compensation would be determined based on the "highest and best development use of the property with no consideration given to the restrictions and limitations" of the preservation agreement (*3 Delaware Code, Chapter 9, Subchapter IV, Section 922*). Compensation would also be provided for any farmland that may be unsuitable or inaccessible for farming purposes as a result of the roadway improvements. For those farm operations that are subject to relocation, owners would be provided relocation assistance in accordance with the *Uniform Relocation Assistance and Real Property Acquisition Act of 1970*, as amended in 1987.

3.3 COMMUNITY FACILITIES AND SERVICES

3.3.1 Traffic and Transportation

Affected Environment

3.3.1.1 Roadway Network

US 113 is the only major road providing north-south access within the study area. The nearest north-south routes outside the study area are US 13 to the west and SR 1 to the east. US 113 passes just west of Selbyville, Frankford, and Dagsboro and generally bisects Millsboro. Other major roadways in the area include SR 54, SR 17, SR 26, SR 24, SR 30, and SR 20. Most of these are east-west routes that serve to connect the four towns included in this study to the coastal areas.

3.3.1.2 Mass Transit

DART First State, Delaware Transit Corporation's (DTC) statewide operating division, carries over 8.3 million riders annually. Buses run on 70 different routes statewide, but the closest bus route to the study area is in Georgetown. Expansion into the study area is included in DART's 6-year business plan for 2011-2016, but the timing of the expansion is dependent on budgets. Sussex County has two Park and Ride and four Park and Pool lots, but none are in the study area. However, a new Park and Ride lot is planned as part of the Del Pointe Racino development in Millsboro.

3.3.1.3 Pedestrian, Bicycle and Motorist Paths

The Southern Delaware Heritage Trail was conceived approximately ten years ago. It is primarily used by recreational bicyclists, but is also an attraction for motorists. Its 130 miles of biking trails and 70 miles of motorist trails are all parts of existing roadways, with signs to indicate the routes. The Trail connects the towns of Lewes, Millsboro, Milton, Greenwood, Bridgeville, Seaford, Laurel, and Delmar. There are 8.3 miles of Scenic Bicycle Routes associated with the Heritage Trail within the study area.

Sussex County has two existing Scenic and Historic Byways, located in Lewes and western Sussex County, respectively. Neither is in the study area. See the SETR for more information.

Along US 113, bicyclists may use the wide outside shoulders along both sides of the roadway. The shoulders are in good condition, but high motor vehicle speeds and volumes make this route impractical for less experienced cyclists. No bicycle lanes or separate bicycle facilities are signed or marked along US 113 or any of the roads crossing US 113 in the study area.

3.3.1.4 Travel Characteristics

The US Census gathers commuting characteristics for communities at the Block Group level for workers age 16 and over. **Figure 3-1** depicts the study area Block Groups. According to the 2000 US Census, the majority of the workers in the study area drive alone to work (93.2 percent). Less than one percent use public transportation, 2.8 percent walk, bike, or use other means, and 3.75 work from home. The majority of the commuters in the study area travel less than 30 minutes to work. See the SETR for additional details on commuting characteristics of the study area. Data from the 2010 Census will be provided when it becomes available.

Environmental Consequences and Mitigation

The proposed No-build Alternative would affect future travel patterns. Traffic volumes on existing US 113 are projected to increase by 2030, resulting in increased congestion and decreased safety along this route. This congestion is likely to encourage drivers to seek alternate routes around the congested areas, resulting in increased traffic on other routes.

All of the proposed build proposed alternatives would result in changes in travel patterns within the study area. Population growth is expected in the area, with a predicted increase of 40 percent in Sussex County between 2000 and 2030. Anticipated congestion from growth would be alleviated by this project. The build alternatives would alleviate congestion by accommodating increased traffic from seasonal travelers using US 113 as a thoroughfare to the coast. Traffic Level of Service (LOS) analysis is discussed in **Chapters 1 and 2**.

Less than 1 percent of the population in the Millsboro-South study area uses public transportation to commute to work. DART bus routes are connected to coastal areas and the western part of Sussex County and do not enter the Millsboro-South study area. There is no mass transit system in the study area, so there would be no impacts from the US 113 project.

The Lewes Scenic and Historic Byway is approximately 7.2 miles from the study area, and the proposed Western Sussex Byway is approximately 10.9 miles from the study area. Since both resources are well outside the study area, neither would be impacted by this proposed project.

All of the proposed alternatives would affect travel patterns. Under the No-build Alternative, it is anticipated that as traffic volumes on US 113 increase, local users of the road would divert to local roads to avoid the congestion. Each of the build alternatives would decrease traffic in the area and reduce congestion. All of the off-alignment alternatives would increase connectivity, linking various parts of the study area that were previously less accessible.

3.3.2 Neighborhoods

Affected Environment

Neighborhoods within the study area range from older single family detached houses, predominantly located in the historic districts and downtown areas, to newer subdivisions located closer to the town limits and between municipalities. There are dozens of newly constructed neighborhoods, mainly located outside of the municipalities.

Planned neighborhoods and residential developments may be affected by the proposed project and are discussed in **Section 3.2.3.**

Environmental Consequences and Mitigation

The proposed No-build Alternative would not directly impact neighborhoods. However, the increased traffic congestion along existing US 113 and adjacent streets that would result from the No-build Alternative would make it more difficult to travel between neighborhoods and may create difficulty traveling between residences and businesses. In addition, congestion on arterial routes could result in increased cut-through traffic in some neighborhoods. See **Section 3.16** for further details.

The proposed build alternatives may affect neighborhood cohesion because the new limited-access roadways may separate facilities (shopping centers, schools, churches, etc.) from the neighborhoods and communities they serve. The build alternatives would improve neighborhood cohesion, however, by increasing connectivity in the area and allowing travelers to reach their destinations more quickly and safely.

The Yellow Alternative would place a limited-access roadway through Millsboro, bisecting the town. Most of the existing networks would continue to be operational due to bridging and grade separations, ensuring accessibility to roads that are bisected by US 113. The Red and Blue bypass alternatives around Frankford, Dagsboro, and Millsboro would have little impact on cohesion within the towns because each alternative bypasses the municipalities completely. However, these alternatives would place a limited-access roadway in the rural areas surrounding the towns, potentially separating them from the surrounding farms and rural residences. Access would still be maintained across US 113 at major roadways.

3.3.3 Schools

Affected Environment

The Indian River School District in Sussex County serves all four towns in the study area. The district consists of seven elementary schools, three middle schools, two high schools, two specialty schools, an art magnet school, and an outdoor education center. The district serves nearly 8,400 students and employs over 1,000 individuals, including approximately 600 teachers. In the 2007-2008 school year, 509 students in the district were enrolled in private schools. Public and private schools in the study area are listed in **Table 3-15** and shown on **Figure 3-8**.

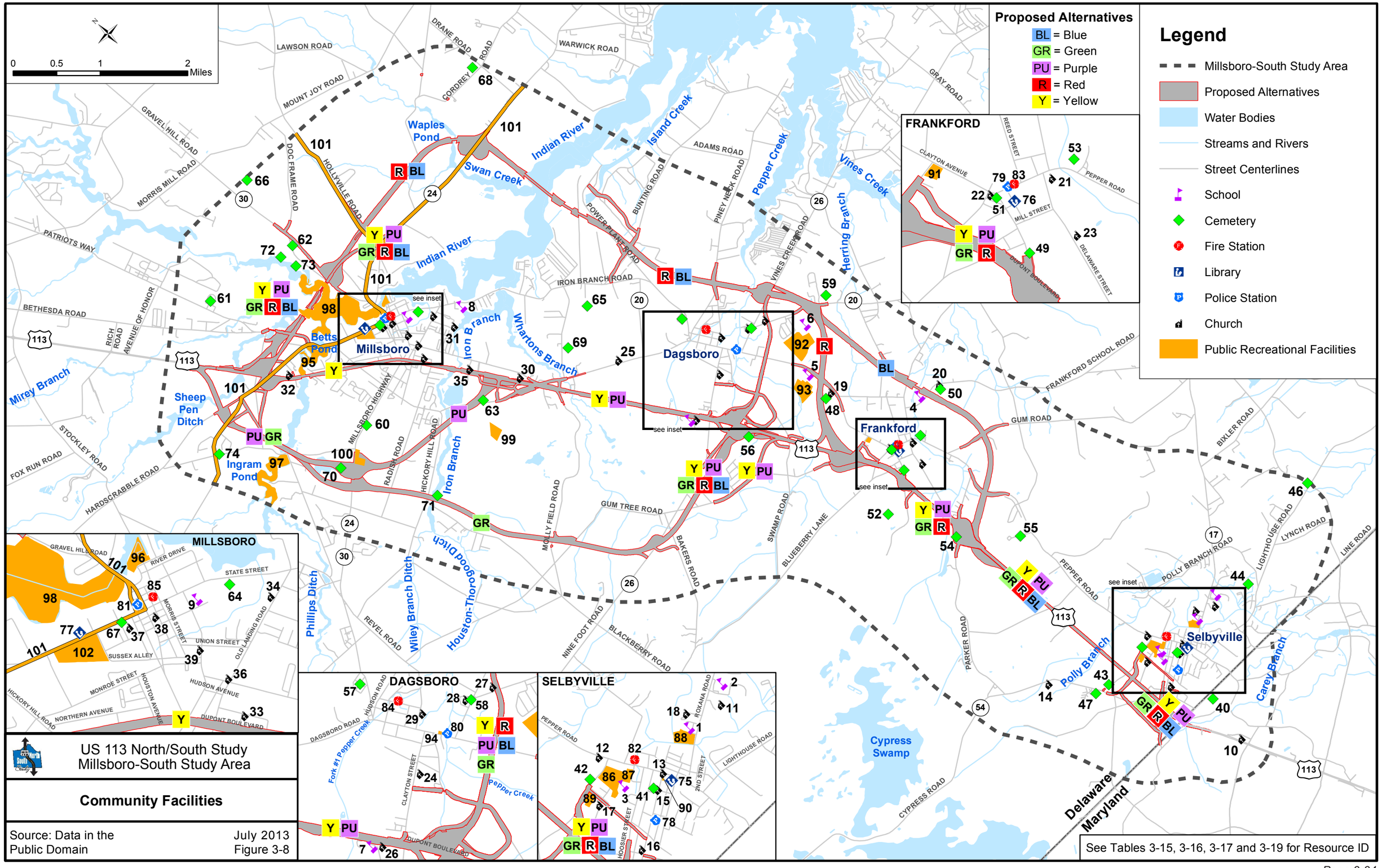
Table 3-15: Schools in the Study Area

Figure 3-8 ID	Name	Address	City
1	Phillip C. Showell Elementary School	41 Bethany Rd.	Selbyville
2	Selbyville Middle School	80 Bethany Rd.	Selbyville
3	Southern DE School of the Arts (Magnet)	27 Hosier St.	Selbyville
4	G. W. Carver Educational Center	30207 Frankford School Rd.	Frankford
5	John M. Clayton Elementary School	252 Clayton Ave.	Frankford
6	Indian River High School	29772 Armory Rd.	Dagsboro
7	Lighthouse Christian School (Private)	32224 Dupont Blvd	Dagsboro
8	East Millsboro Elementary School	29346 Iron Branch Rd.	Millsboro
9	Millsboro Middle School	302 East State St.	Millsboro

Source: Delaware Department of Education

Environmental Consequences and Mitigation

Three study area schools would be impacted by the proposed build alternatives. Lighthouse Christian School, affiliated with Dagsboro Church of God, would require relocation under the Purple Alternative and would require access modification under the Yellow Alternative. Access modification may be required for John M. Clayton Elementary School under the Red Alternative.


0 0.5 1 2 Miles
Proposed Alternatives
BL = Blue
GR = Green
PU = Purple
R = Red
Y = Yellow
Legend
Millsboro-South Study Area
Proposed Alternatives
Water Bodies
Streams and Rivers
Street Centerlines
School
Cemetery
Fire Station
Library
Police Station
Church
Public Recreational Facilities
FRANKFORD
MILLSBORO
DAGSBORO
SELBYVILLE
Millsboro
Dagsboro
Frankford
Selbyville
see inset
Waples Pond
Swan Creek
Indian River
Island Creek
Pepper Creek
Vines Creek
Herring Branch
Betts Pond
Iron Branch
Wharton Branch
Mirey Branch
Sheep Pen Ditch
Ingram Pond
Phillips Ditch
Wiley Branch Ditch
Houston-Thorogood Ditch
Fork #1 Pepper Creek
Polly Branch
Carey Branch
Cypress Swamp
Delaware
Maryland
LAWSON ROAD
MOUNT JOY ROAD
GRAVEL HILL ROAD
MORRIS MILL ROAD
DRANE ROAD
CORDREY ROAD
WARWICK ROAD
GRAY ROAD
DOC FRAME ROAD
HOLLYVILLE ROAD
ADAMS ROAD
BUNTING ROAD
PINEY NECK ROAD
POWER PLANT ROAD
VINES CREEK ROAD
IRON BRANCH ROAD
PATRIOTS WAY
BETHESDA ROAD
RICH ROAD
AVENUE OF HONOR
FRANKFORD SCHOOL ROAD
GUM ROAD
BIXLER ROAD
LIGHTHOUSE ROAD
LYNCH ROAD
LINE ROAD
POLLY BRANCH ROAD
PEPPER ROAD
PARKER ROAD
CYPRESS ROAD
SWAMP ROAD
BLUEBERRY LANE
BAKERS ROAD
BLACKBERRY ROAD
NINE FOOT ROAD
REVEL ROAD
MOLLY FIELD ROAD
GUM TREE ROAD
RADISH ROAD
HICKORY HILL ROAD
MILLSBORO HIGHWAY
STOCKLEY ROAD
FOX RUN ROAD
HARDSCRABBLE ROAD
CLAYTON AVENUE
REED STREET
PEPPER ROAD
MILL STREET
DUPONT BOULEVARD
DELAWARE STREET
GRAVEL HILL ROAD
RIVER DRIVE
STATE STREET
MORRIS STREET
OLD LANDING ROAD
UNION STREET
SUSSEX ALLEY
MONROE STREET
HOUSTON AVENUE
HUDSON AVENUE
NORTHERN AVENUE
HICKORY HILL ROAD
DUPONT BOULEVARD
HUDSON ROAD
DAGSBORO ROAD
CLAYTON STREET
PEPPER ROAD
ROXANA ROAD
2ND STREET
HOOSIER STREET
LIGHTHOUSE ROAD
CYPRESS ROAD
POLLY BRANCH ROAD
PEPPER ROAD
LIGHTHOUSE ROAD
LYNCH ROAD
LINE ROAD
BIXLER ROAD
GUM ROAD
FRANKFORD SCHOOL ROAD
BETHESDA ROAD
PATRIOTS WAY
IRON BRANCH ROAD
POWER PLANT ROAD
BUNTING ROAD
PINEY NECK ROAD
ADAMS ROAD
GRAY ROAD
WARWICK ROAD
DRANE ROAD
CORDREY ROAD
MOUNT JOY ROAD
LAWSON ROAD
GRAVEL HILL ROAD
MORRIS MILL ROAD
DOC FRAME ROAD
HOLLYVILLE ROAD
VINES CREEK ROAD
MILLSBORO HIGHWAY
RADISH ROAD
HICKORY HILL ROAD
MOLLY FIELD ROAD
GUM TREE ROAD
SWAMP ROAD
BLUEBERRY LANE
BAKERS ROAD
BLACKBERRY ROAD
NINE FOOT ROAD
REVEL ROAD
PARKER ROAD
CYPRESS ROAD
STOCKLEY ROAD
FOX RUN ROAD
HARDSCRABBLE ROAD
US 113 North/South Study
Millsboro-South Study Area
Community Facilities
Source: Data in the Public Domain
July 2013
Figure 3-8
See Tables 3-15, 3-16, 3-17 and 3-19 for Resource ID

The Indian River High School grounds would be impacted under the Red and Blue Alternatives. Where necessary, relocation assistance would be provided.

Local school bus routes may be affected by the proposed project. Under the No-build Alternative, congestion would increase along school bus routes. The build alternatives would primarily affect school bus routes by improving safety and travel times on US 113 compared to the No-build Alternative, resulting in safer, more reliable service.

Road closures that result from this project would affect school bus routes. Permanent closures would be minimal, and DelDOT would coordinate with the Indian River School District to allow for the rerouting of school buses. Similarly, temporary closures during construction would be coordinated with the school district to assure that the affected students get to school.

3.3.4 Religious Institutions

Affected Environment

There are 29 known places of worship in the Millsboro-South study area. They serve as religious, social, and cultural centers for the community. Religious institutions in the study area are shown on **Figure 3-8** and listed in **Table 3-16**.

Table 3-16: Religious Institutions in the Study Area

Figure 3-8 ID	Name	Location	Town
10	St. Mathew Baptist Church	13204 Worcester Hwy.	Bishopville, MD
11	Apostolic Church of Jesus	74 State Highway 17	Selbyville
12	Assembly of God Church	36360 Pepper Rd.	Selbyville
13	Gospel of the Kingdom of God	5 State Highway 17	Selbyville
14	Peninsula Community Church	28574 Cypress Rd.	Selbyville
15	Salem United Methodist Church	29 State Highway 17	Selbyville
16	St. Martins Episcopal Church	75 W. Church St.	Selbyville
17	Thessalonia Pentecostal Church	17 Clendaniel Ave	Selbyville
18	Zoar United Methodist Church	11 Church Ln.	Selbyville
19	Antioch AME Church	194 Clayton Ave.	Frankford
20	Frankford Church of Christ	30354 Frankford School Rd.	Frankford
21	Frankford Presbyterian Church	corner of Main St. & Delaware Rd.	Frankford
22	Frankford United Methodist Church	12 Clayton Ave.	Frankford
23	Trinity Holiness Church	Delaware Ave.	Frankford
24	Bethel United Methodist Church	107 Clayton St.	Dagsboro
25	Dagsboro Church of Christ	28001 Dagsboro Rd.	Dagsboro
26	Dagsboro Church of God	32224 Dupont Blvd.	Dagsboro
27	Dagsboro Gospel Fellowship	corner of Armory and Vines Creek Roads	Dagsboro
28	Prince George's Chapel	corner of Vines Creek Rd. and Chapel Ln.	Dagsboro
29	Spirit-Excellence Ministry	29118 Piney Neck Rd	Dagsboro
30	Dickerson Chapel AME Church	589 W. Dupont Hwy.	Millsboro
31	Emmanuel's House	29393 White St.	Millsboro
32	Harvest Ministry	28253 Dupont Blvd.	Millsboro
33	Holy Trinity Church of God and Christ	corner of First St. and Division Ave.	Millsboro

Table 3-16: Religious Institutions in the Study Area

Figure 3-8 ID	Name	Location	Town
34	Jesus New Pentecostal Prayer Room	26580 Old Landing Rd.	Millsboro
35	Life Church	W. Dupont Hwy. between Dickerson & Radish Roads	Millsboro
36	Living Word Christian Center	corner of Old Landing and Mitchell Roads	Millsboro
37	St. Mark's Episcopal Church	corner of W. State & Ellis Streets	Millsboro
38	United Faith Church of Deliverance	214 Main St.	Millsboro
39	Wesleyan Church of Millsboro	255 Wilson Hwy.	Millsboro

Source: Sussex County GIS, internet searches, field reconnaissance

Environmental Consequences and Mitigation

Four churches would be impacted by at least one of the proposed build alternatives. All of the alternatives would impact access to Dagsboro Gospel Fellowship, but new access would be provided. The Yellow Alternative would require a modification of access to Dagsboro Church of God. The Purple Alternative would require relocation of Dickerson Chapel AME Church; the Yellow Alternative would require modified access. If the Yellow Alternative is built, Life Church would require modified access. Any church that requires relocation would receive assistance as described in **Section 3.1.1**.

3.3.5 Cemeteries

Affected Environment

Table 3-17 lists the 35 known cemeteries in the study area. They are shown on **Figure 3-8**.

Table 3-17: Cemeteries in the Study Area

Figure 3-8 ID	Cemetery Name	Location	Town
40	Golden Acres Cemetery	Hotel Rd.	Worcester Co.
41	Salem United Methodist Church Cemetery	29 State Highway 17 (W. Church St.)	Selbyville
42	Selbyville Redman Memorial Cemetery	near intersection of Cemetery Rd. and Railroad Ave.	Selbyville
43	unnamed cemetery	Cemetery Rd, between Cypress Rd. & Blueberry Farm Rd.	Selbyville
44	unnamed cemetery	Polly Branch Rd , near Lighthouse Rd.	Selbyville
45	unnamed cemetery	east side of Hudson Rd., south of Deer Run Rd.	Selbyville
46	unnamed cemetery	Hudson Rd and Lighthouse Rd.	Selbyville
47	unnamed cemetery	near intersection of Cypress Rd. & Cemetery Rd.	Selbyville
48	Antioch Church Cemetery	194 Clayton Ave	Frankford
49	Carey Cemetery	southeast corner of Dupont Blvd. & Frankford Ave.	Frankford
50	Frankford Church of Christ Cemetery	30354 Frankford School Rd.	Frankford
51	Frankford United Methodist Church Cemetery	12 Clayton Ave.	Frankford

Table 3-17: Cemeteries in the Study Area

Figure 3-8 ID	Cemetery Name	Location	Town
52	Long Cemetery	Catmans Rd., ~ 0.25 miles west of US 1132	Frankford
53	Short Family burials – Hickman-Cress Farm	east side of Pepper Rd., between Memory Ln. and Thatcher St.	Frankford
54	unnamed cemetery	Parker Road, ~ 0.15 miles west of US 113	Frankford
55	unnamed cemetery	Feather Ln., ~ 0.1 mile west of Pepper Rd.	Frankford
56	Adkins Family Cemetery	wooded area on west side of US 113, south of Quarter Mile Dr.	Dagsboro
57	Dagsboro Redman Memorial Cemetery	corner of Iron Branch & Cemetery Roads	Dagsboro
58	Prince George's Chapel Cemetery	corner of Vines Creek Rd. & Chapel Ln.	Dagsboro
59	unnamed cemetery	north of Armory Rd., between Parsons Rd. & Herring Wood Dr.	Dagsboro
60	Adkins/Old Field Cemetery	Millsboro Highway, between Godwin School Rd. & Kendall St.	Millsboro
61	DE Veteran's Memorial Cemetery	26669 Patriot's Way	Millsboro
62	Frame Family Cemetery	west of Gravel Hill Rd., ~ 0.1 mile south of Doc Frame Rd.	Millsboro
63	Marvel Family Cemetery	east side of Handy Rd., ~ 0.5 miles south of Hickory Hill Rd.	Millsboro
64	Millsboro Cemetery	State St. (next to middle school)	Millsboro
65	Mumford Family Cemetery	south of Iron Branch Rd., in wooded area next to power line adjacent to Secluded Ln.	Millsboro
66	Pauper Cemetery	west of Gravel Hill Rd., between Doc Frame & Mt. Joy Roads	Millsboro
67	St. Mark's Episcopal Church Cemetery	W. State & Ellis Streets	Millsboro
68	Thoroughgood Cemetery	near intersection of Cordrey & Drane Roads	Millsboro
69	unnamed cemetery	agricultural field at the corner of Thorogoods Road and the railroad tracks	Millsboro
70	unnamed cemetery	between the quarry on Dutton Ln. & Millsboro Hwy.	Millsboro
71	unnamed cemetery	near intersection of Injun Town & Hickory Hill Roads.	Millsboro
72	unnamed cemetery	west of Gravel Hill Rd., near Cow Bridge Branch	Millsboro
73	unnamed cemetery	west of Gravel Hill Rd., near Cow Bridge Branch	Millsboro
74	unnamed cemetery	north side of Godwin School Rd., ~ .06 miles west of Country Living Road	Millsboro

Source: Sussex County GIS, John Milner Associates, internet searches, field reconnaissance

Environmental Consequences and Mitigation

Up to seven cemeteries are located within the limit of disturbance (depending on which alternative is selected); however, in all cases, direct impacts to them can be avoided. **Table 3-18** contains a summary of cemeteries within the limit of disturbance for each proposed alternative, with notes regarding property acquisitions. Cemeteries that are located within 50 feet of the project's limit-of-disturbance are indicated by an "N" in the table; these are included to account for the possibility that there could be outlying graves. An "A" in the table refers to an acquisition of the entire parcel. Even with full acquisition of the property, graves would not be impacted and access would be maintained. An "E" indicates that a temporary construction

easement would be required for the property on which the cemetery is located, and an "R" means that there would be right-of-way acquisition.

Table 3-18: Potential Impacts to Cemeteries

Figure 3-8 ID	Cemetery	Proposed Alternative				
		Green	Purple	Yellow	Red	Blue
41	Selbyville Redman Memorial Cemetery	E[1]	E	E	E	E
48	Carey Cemetery	R[2]	R	R	R	
53	unnamed cemetery	R	R	R	R	
55	Adkins Family Cemetery	N[3]	A[4]	A	A	A
61	Frame Family Cemetery	N	N	N		
62	Marvel Family Cemetery		N	N		
69	unnamed cemetery		A			
70	unnamed cemetery	N				

[1] *E: Temporary construction easement*
[2] *R: Right-of-way acquisition*
[3] *N: Nearby (within 50' of limit-of-disturbance)*
[4] *A: Acquisition of parcel*

Where possible, alignment shifts were made to avoid known cemeteries. No known graves would be impacted by the proposed alternatives, and every effort would be made to avoid any graves that are discovered during construction.

Impacts to cemeteries are considered direct impacts. Three of the cemeteries in **Table 3-18** are outside the proposed project's limit of disturbance, but are included because they are within 50 feet of it. There is no reason to assume that they would be impacted, and they are included only to consider any outlying graves. The proposed Purple Alternative has most cemeteries (seven) within or near the limit of disturbance, while the proposed Blue Alternative has the fewest (two). Compensation would be provided for any property impacts. Any graves encountered would be treated in accordance with *7 Del. Code, Chapter 54*. See **Section F,** *Cemeteries and Human Remains,* of the Draft Memorandum of Agreement for cultural resources (**Appendix C**).

3.3.6 Libraries

Affected Environment

Selbyville, Frankford, and Millsboro each have a public library. The libraries provide internet access as well as access to a variety of information and materials that help to fulfill the educational, informational, recreational, and cultural needs of their patrons. The public libraries are shown on **Figure 3-8**.

Environmental Consequences and Mitigation

The closest library to any of the build alternatives is in Frankford. However, it is located approximately 0.2 miles from the nearest proposed alternatives (Green, Purple, Yellow, and

Red). Therefore, none of the libraries in the study area would be impacted by any of the alternatives, and no mitigation is required.

3.3.7 Emergency Services and Health Care

Affected Environment

3.3.7.1 Emergency Services

Emergency service facilities are shown on **Figure 3-8**.

Police
The Selbyville Police Department's six officers and its Chief of Police patrol the Town and surrounding areas, servicing approximately 7.5 square miles. The Police Station is located at 68 West Church Street in downtown Selbyville.

The Town of Frankford initiated its Police Department by hiring its first officer in November of 2007. The Station is located at 11 Frankford Ave.

There is one full-time Police Chief and one full-time sergeant employed by the Town of Dagsboro. The police headquarters are located at 33134 Main Street. If no Dagsboro officer is on duty, the Delaware State Police provide service in case of an emergency.

The Millsboro Police Department serves the Town and surrounding area. The Police Department employs one chief, nine officers, and an administrative assistant. The Department headquarters are located at 307 Main Street.

Fire
Selbyville Volunteer Fire Company # 88 currently has over 50 active firefighters and is one of the only companies in the area with its own full time EMT ambulance driver. The Selbyville Fire Company is located on Main Street.

Frankford Volunteer Fire Company #76 has approximately 50 members and is located on Main Street in Frankford. It operates a total of twelve trucks and rescue vehicles.

There is a volunteer fire department and ambulance service in Dagsboro. Dagsboro Fire Company #73, on Waples Street, has 23 officers (EMS and Administrative) and over 60 active members.

Millsboro Fire Company Station 83 serves the Town of Millsboro and its surrounding district. It has almost 50 active members. The fire company is located at 109 East State Street.

3.3.7.2 Medical/Health Care Services

There are no hospitals located within the Millsboro-South study area. Nearby facilities include Milford Memorial Hospital in Milford, Kent General Hospital in Dover, Stockley Center in Millsboro, Nanticoke Memorial Hospital in Seaford, and Beebe Medical Center in Lewes.

Environmental Consequences and Mitigation

There are no police or fire stations closer than 0.1 mile to any of the build alternatives, and there are no hospitals in the Millsboro-South study area. Therefore, no emergency services or health care facilities would be directly impacted by any of the proposed alternatives, and no mitigation is proposed. As discussed in **Section 1.3.4**, delays may occur in emergency response times.

3.3.8 Parks and Recreation Facilities

Affected Environment

3.3.8.1 Public Parks and Recreation Areas

The municipal parks and public recreational facilities in the study area are summarized by locality in **Table 3-19** and shown on **Figure 3-8**.

Table 3-19: Public Parks and Recreation Facilities

Figure 3-8 ID	Park or Facility/ Owner	Location	Area	Amenities	Section 6(f) or DTF[1] Protection
SELBYVILLE					
86	DE School of the Arts/IRSD[2]	27 Hosier St.	9.4 acres	Baseball diamond, soccer field, open space	DLWCTF
87	Lower Sussex Pop Warner Football Complex and Selbyville Park/ Selbyville	Park St.	4.0 acres	Pop Warner football field, track, playground equipment	DLWCTF
88	Phillip C. Showell Elementary School/ IRSD	41 Bethany Rd.	6.4 acres	Playground equipment and open space	DLWCTF
89	Unnamed/ Selbyville	Cemetery and Railroad Sts.	3.1 acres	Trails, educational signage	DLWCTF
90	Unnamed/ Selbyville	Church St. between Rodgers Ave. and Main St.	0.1 acres	Benches and landscaped area	
FRANKFORD					
91	Frankford Town Park/Frankford	Clayton Ave. and Hickory St.	2.0 acres	Two picnic pavilions, playground equipment, soccer field, benches, trails, open space, and accessible restrooms	DLWCTF

Table 3-19: Public Parks and Recreation Facilities

Figure 3-8 ID	Park or Facility/ Owner	Location	Area	Amenities	Section 6(f) or DTF[1] Protection
DAGSBORO					
92	Indian River High School/ IRSD	29772 Armory Road	41.5 acres	Baseball diamond, football field, and track	
93	Indian River High School (former)/ IRSD	252 Clayton Ave.	22.6 acres	Track, baseball diamonds, tennis courts, soccer field	6(f)
94	Katie Helm Park/ Dagsboro	Between Canal St. and Swamp Rd.	0.4 acres	Playground, picnic table, gazebo, walking paths, benches, bike racks	DLWCTF
MILLSBORO					
95	Betts Pond/ Millsboro	Betts Pond Rd.	18 acres	Fishing	
96	Cupola Park/ Millsboro	Morris St. and Indian River	4.1 acres	Two boat ramps, 24 boat slips for rent, playground, picnic area	
97	Ingram Pond/ Millsboro	Godwin School Rd.	52.2 acres	Boat ramp and fishing	6(f)
98	Millsboro Pond/ Millsboro	SR 24	101 acres	Boat ramp and fishing	
99	new park #1/ Millsboro	Handy Road	10.8 acres	to be determined	
100	new park #2/ Millsboro	Millsboro Highway	8.7 acres	to be determined	
101	Southern Delaware Heritage Trail/ Sussex County	Sussex County	70 motorist/ 130 cyclist miles (8.3 cyclist miles in study area)	Automobile and biking routes	
102	W. B. Atkins Memorial Park/ Millsboro	State St.	10.7 acres	Little League baseball fields	DLWCTF, 6(f)

Source: Sussex County GIS, internet searches, field reconnaissance
Notes: [1] *Delaware Land and Water Conservation Trust Fund*
[2] *Indian River School District*

3.3.8.2 Section 6(f) Resources

Section 6(f) of the 1965 *Land and Water Conservation Fund Act* applies to all projects that impact recreational lands purchased or improved with land and water conservation funds. The maps generated when each project receives funding indicate the portion of the facility that receives Section 6(f) protection. The *Act* stipulates that the Secretary of the Interior must approve the conversion of any such property to uses other than public, outdoor recreation. When a conversion is approved, in kind mitigation is typically required.

Five resources in the study area have received Section 6(f) land and water conservation funds: Ingram Pond; the Stockley Center; Selbyville Recreation Park; W. B. Adkins Memorial Park; and the Indian River School District facilities at Indian River High School, Sussex Central Junior High (now Millsboro Middle School), and Selbyville Middle School. Selbyville Recreation Park

formerly housed a public swimming pool, but the pool has been filled in. The parcel currently does not have active recreational facilities, but it is still protected by Section 6(f). The tennis courts constructed with Section 6(f) funds at Sussex Central Junior High School have been removed, but the land is still protected.

3.3.8.3 Delaware Land and Water Conservation Trust Fund Resources

Established in 1986, the Delaware Land and Water Conservation Trust Fund provides a funding source for the acquisition of open space, the development of greenways, and for outdoor recreation projects. The grant program is administered by the DNREC Division of Parks and Recreation. Property acquired or improved through the trust fund is intended to remain in public outdoor recreation and conservation use in perpetuity. It may not be converted to other uses without an act of the General Assembly. Protections for facilities funded by the trust fund are similar to those for facilities receiving Section 6(f) funds.

Six properties in the study area were purchased or improved using the trust fund. They are the Lower Sussex Pop Warner Football Complex, the Delaware School of the Arts, Phillip C. Showell Elementary School, an unnamed recreation area at Cemetery and Railroad Streets, Frankford Town Park, and Katie Helm Park.

Environmental Consequences and Mitigation

Depending on the alternative chosen, either one or two recreational facilities would be impacted by the project. All of the alternatives would impact Millsboro Pond. In addition, New Park #2 in Millsboro would be acquired under the Purple Alternative, and the Yellow Alternative would cross Betts Pond. Mitigation for impacts to Betts Pond and New Park #2 are unknown at this time, but DelDOT is committed to working with the Town of Millsboro to determine appropriate mitigation. The LOD was modified to avoid impacts to the Cemetery and Railroad Street facility. Millsboro Pond and the Cemetery and Railroad Street facility are discussed below.

Although Millsboro Pond would be bridged, each of the proposed alternatives includes piers that would directly impact the pond. The impact would be greater for the Red and Blue alternatives, which would have two lanes with full shoulders in each direction as opposed to a single lane in each direction with full shoulder designation for the Green, Purple, and Yellow alternatives. Boating restrictions on the pond prohibit boats with motors greater than five horsepower; therefore impact of the new structure on boat traffic should be minimal. Minor changes in boat traffic patterns may be necessary.

The only Section 6(f) resource located near any of the proposed alternatives is Ingram Pond. Shifts were made to the Green and Purple alignments early in the preliminary design phase in order to avoid this resource. No impacts are anticipated and therefore no mitigation is required.

No facilities that received funding from the Delaware Land and Water Conservation Trust Fund that would be impacted by this project. The Cemetery and Railroad Streets property is near all of the alternatives, but DelDOT has shifted the alignment to avoid this resource.

3.3.9 Utilities

Affected Environment

3.3.9.1 Water

Public water systems serve the study area. Water storage consists of wells, elevated storage tanks, and a ground level tank. The wells utilize both the Columbia Formation and Manokin Aquifer. The towns of Selbyville and Frankford both have water treatment plants. Dagsboro purchases its water from Millsboro.

3.3.9.2 Wastewater

Wastewater treatment facilities are present in the study area. The Selbyville, Piney Neck, and Millsboro wastewater facilities serve both residence and businesses. There are four pump stations in Selbyville. The Piney Neck Wastewater Facility is collected via gravity sewers. A force main ultimately sends the waste to the wastewater facility. The Millsboro sanitary sewer system consists of both primary and secondary treatment facilities. The facility was upgraded to tertiary treatment systems, including the addition of phosphorous removal and ultraviolet (UV) disinfection facilities.

3.3.9.3 Electric Service

NRG (formerly Connectiv) and the Delaware Electric Cooperative provides electrical power to the study area. NRG provides electric service to Selbyville, Frankford, and Dagsboro. The provision of electric service in Millsboro is shared by NRG and the Delaware Electric Cooperative.

Environmental Consequences and Mitigation

Utility impacts resulting from each of the proposed alternatives would require relocations. These relocations would involve aerial and underground utilities and include existing water, sewer, electric, gas, cable, and fiber optic communications. DelDOT would coordinate with the appropriate service providers for any required movements of utility lines. It is anticipated that the utility impacts would be more severe along the Yellow Alternative and with the on-alignment segments of the bypass alternatives due to the density of existing facilities along US 113. Proposed construction would be phased to minimize service interruptions.

3.4 AESTHETICS AND VISUAL QUALITY

Affected Environment

Within the Millsboro-South study area, the visual landscape can be separated into distinct types. To the east, towards the coastal areas, the landscape is dominated by vacation homes and rental properties, along with community facilities and shopping centers geared towards the needs of tourists. The coastal area is more densely populated than the inland areas, which are mostly rural and rustic. Much of the area surrounding the towns is dominated by agriculture. Poultry production is prevalent in the area; long, low-roofed chicken houses dot the landscape.

The aesthetics of each town in the study area are similar. They were all founded between 1747 and 1860 under similar conditions and all began to grow under the same thriving industry. Small historic areas are located in the downtown portions of each town. The towns' landscapes still retain the small, rural town feel, although the landscape is continually changing with the addition of new residences, businesses, and small-scale commercial areas. In some cases large developments are occurring subsequent to annexations.

There is a new visual aspect and feeling in the Millsboro-South study area, associated with the many newer housing developments that proliferate. Mostly single-family homes on modest-sized lots, these developments have contributed new elements to the rural farm country that dominates the area.

3.4.1 Western Bypasses

The Green and Purple alternatives are also located in areas dominated by farmlands (largely cropland and chicken farms), interspersed wooded areas, farm buildings, and scattered homes and businesses along two-lane roads. The western bypasses go through or near several properties slated for development, mostly near Dagsboro and Millsboro. The development is primarily residential and consists of single-family homes on approximately ¼-acre lots. In the southern portion of the study area, there are several stream and wetland systems that may be visible from some of the bypass alternatives.

3.4.2 On-Alignment

The Yellow Alternative passes through both rural and more urbanized areas. Beginning just north of Millsboro near the Indian River and its tributaries, the alternative then continues through the municipality of Millsboro where homes, small businesses, and larger commercial business centers predominate. In general, the aesthetics along US 113 in the Millsboro-South area become more rural as the alternative moves south. The existing US 113 alignment passes just to the west of Frankford and Dagsboro, avoiding much of the more urbanized areas. It passes through the western portion of Selbyville, avoiding much of the developed area in the Town. The southern portion of the Yellow Alternative passes through many wooded and open areas.

3.4.3 Eastern Bypasses

The Red and Blue alternatives are located in mostly rural areas dominated by agriculture, forest land and scattered residences. There are several stream and wetland systems near the eastern bypasses in the Millsboro-South study area, primarily near Dagsboro and Millsboro.

Environmental Consequences and Mitigation

The No-build Alternative would have no effect on the visual or aesthetic quality of the study area. Except for the effects of increasing congestion on the roadways, the landscape would continue to evolve with increasing development in the urban areas and increasing suburban development in the rural areas, without the influence of a new US 113 roadway.

All of the proposed build alternatives would change the aesthetic view of the landscape and viewsheds that surround them. The construction of a four-lane limited access highway within the rural and suburban landscape would affect the visual quality of the view from properties immediately surrounding the new roadway. Because the topography in the area is flat, areas that are somewhat distant would have views of the new roadway as well. Existing natural land cover, farmlands, forests, and open spaces would change in character. In many places, the view of farm fields would be replaced by concrete roadway and traffic, and the new roadway would be visible from numerous homes, some of which are historic.

Due to the scattered nature of the housing in the study area, mitigation for visual impacts is not feasible.

3.5 CULTURAL RESOURCES

This section is intended to fulfill requirements of Section 106 of the National Historic Preservation Act (NHPA) of 1966, as amended, for documenting findings of effect in accordance with the regulations of the Advisory Council for Historic Preservation (ACHP) (36 CFR Part 800). Written documentation elements are referenced.

Using authority delegated by FHWA, DelDOT notified the State Historic Preservation Office (SHPO) and the ACHP (in a letter dated July 20, 2010) that the agency intended to use the NEPA process to satisfy the requirements for Section 106 (per 36 CFR 800.8(c)) for the proposed undertaking. Project initiation and consultation with federally recognized Native American tribes in Delaware has also taken place. On February 11, 2013 FHWA initiated nation to nation consultation with the Delaware Nation, Stockbridge-Munsee Community, and Delaware Tribe of Indians. On February 19th, 2013, the Delaware Tribe of Indians requested to remain a consulting party, but without signature to the Memorandum of Agreement (MOA) (**Appendix C**). On June 21st, 2013, the Stockbridge-Munsee Community indicated to FHWA that they were not claiming Delaware an area of interest. Copies of correspondence are included

in **Appendix D**. As such and until such time may be warranted, the Stockbridge-Munsee Community is no longer part of the nation to nation consultation regarding this project and undertaking. As this project moves forward with its Section 106 administration and consultation under an MOA (**Appendix C**), FHWA and when applicable DelDOT on behalf of FHWA will continue its consultation on a nation to nation basis with the two federally recognized tribes (Delaware Nation and Delaware Tribe of Indians). DelDOT will also initiate and continue any consultation with the two state (non-federally) recognized tribes (Nanticoke Indian Tribe, and the Lenape Indian Tribe of Delaware). No other consulting parties or persons of interest have been identified.

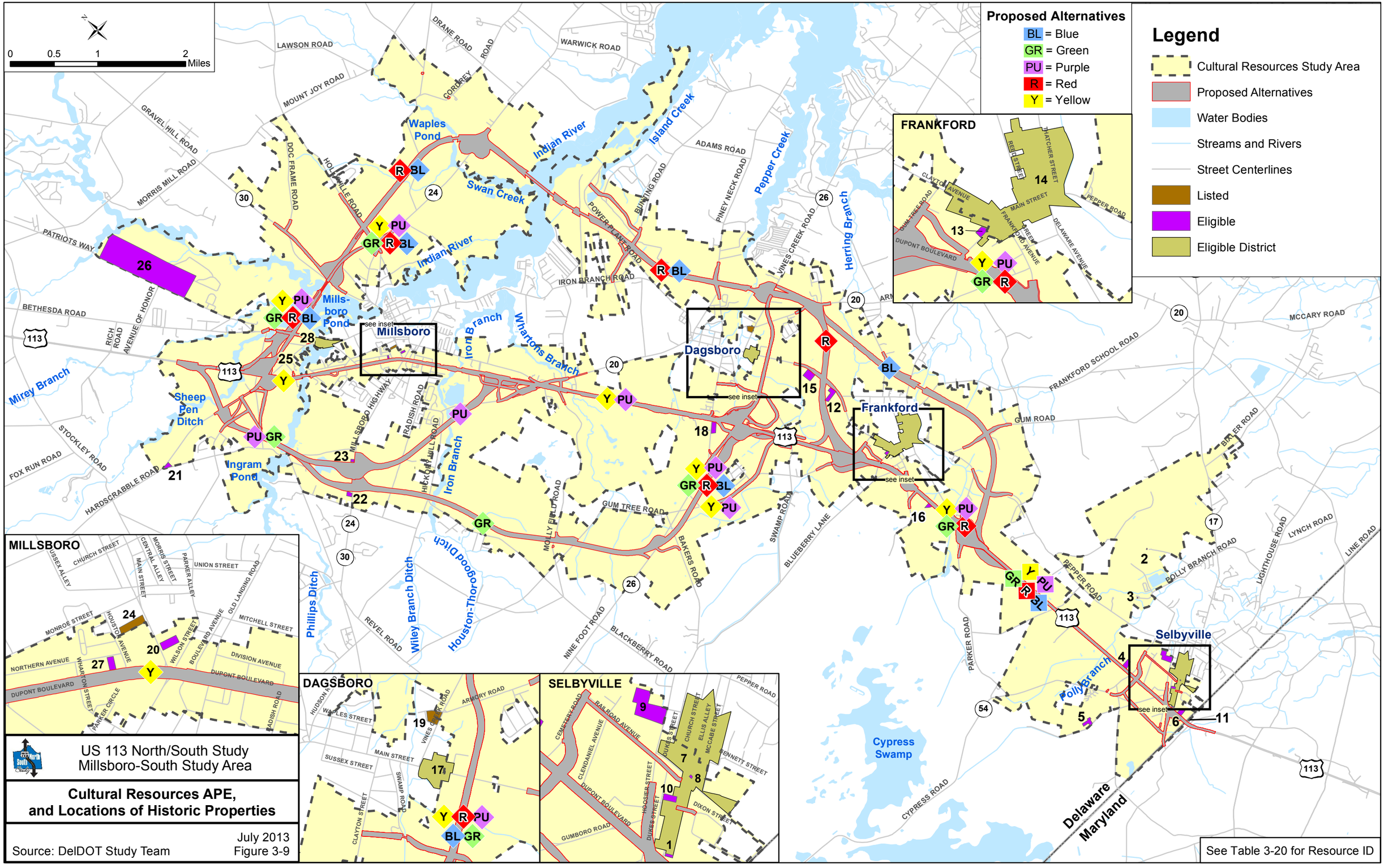
All historic architectural properties that are listed in or are eligible for listing in the National Register of Historic Places (National Register) have been identified within the Area of Potential Effects (APE) illustrated in **Figure 3-9**. Throughout the NEPA process, environmental analysis, agency coordination, and preparation of the DEIS, DelDOT has consulted with the SHPO and the Sussex County Preservation Planner about the project's potential effect on historic properties. The public, including impacted or involved historic property owners, have been consulted with throughout the planning process (see **Chapter 5**). Proposed measures to avoid, minimize, or mitigate the undertaking's effects on historic properties are discussed in this section and are further memorialized in the MOA. The MOA has been developed to formalize Section 106 consultation, resolve adverse effects, and present a mitigation plan for all adversely affected historic properties, including a plan to identify and evaluate archaeological sites.

3.5.1 Background, Including the Area of Potential Effects

A description of the project undertaking with illustrations consistent under 36 CFR Part 800.11(e)(1) is provided in **Chapter 1** and **Chapter 2**.

Between September 2005 and June 2009, architectural properties in the Millsboro-South study area were evaluated for eligibility to be included on the National Register. The APE was defined as all tax parcels within approximately 600 feet of the centerlines of the alternatives retained for detailed study. The APE was adjusted as refinements were made to project design. Based on the locations of the ARDS, the footprint limits of disturbance in which effects to archaeological sites that could occur is also shown within the APE on **Figure 3-9.** This APE or footprint of the ARDS does not include any off-site wetland mitigation areas, additional staging or stockpile areas, full confirmation of storm water management locations, or other mitigation areas. These additional elements would be identified at a later date.

If off-site wetland mitigation sites or other project changes are identified later in time, DelDOT is committed to updating the APE, identifying any additional historic properties, and assessing the project's effect on such properties, as provided for in the MOA.


0 0.5 1 2 Miles
Proposed Alternatives
BL = Blue
GR = Green
PU = Purple
R = Red
Y = Yellow
Legend
Cultural Resources Study Area
Proposed Alternatives
Water Bodies
Streams and Rivers
Street Centerlines
Listed
Eligible
Eligible District
FRANKFORD
MILLSBORO
DAGSBORO
SELBYVILLE
Millsboro
Dagsboro
Frankford
Selbyville
see inset
Waples Pond
Swan Creek
Indian River
Island Creek
Pepper Creek
Herring Branch
Mills-boro Pond
Iron Branch
Wharton Branch
Mirey Branch
Sheep Pen Ditch
Ingram Pond
Phillips Ditch
Wiley Branch Ditch
Houston-Thorogood Ditch
Holly Branch
Cypress Swamp
Delaware
Maryland
LAWSON ROAD
MOUNT JOY ROAD
GRAVEL HILL ROAD
MORRIS MILL ROAD
PATRIOTS WAY
BETHESDA ROAD
FOX RUN ROAD
STOCKLEY ROAD
HARDSCRABBLE ROAD
DRANE ROAD
CORDREY ROAD
WARWICK ROAD
ADAMS ROAD
PINEY NECK ROAD
BUNTING ROAD
POWER PLANT ROAD
IRON BRANCH ROAD
VINES CREEK ROAD
MCCARY ROAD
FRANKFORD SCHOOL ROAD
GUM ROAD
GUM TREE ROAD
SWAMP ROAD
BAKERS ROAD
BLUEBERRY LANE
REVEL ROAD
NINE FOOT ROAD
BLACKBERRY ROAD
CYPRESS ROAD
PARKER ROAD
BOLLY BRANCH ROAD
LIGHTHOUSE ROAD
LYNCH ROAD
LINE ROAD
PEPPER ROAD
MAIN STREET
DUPONT BOULEVARD
NORTHERN AVENUE
DIVISION AVENUE
MITCHELL STREET
MONROE STREET
SUSSEX STREET
CHURCH STREET
ARMORY ROAD
WAPLES STREET
CLAYTON STREET
RAILROAD AVENUE
CHURCH STREET
ELLIS ALLEY
MCCABE STREET
DIXON STREET
GUMBORO ROAD
CLENDANIEL AVENUE
CEMETERY ROAD
THATCHER STREET
REED STREET
CLAYTON AVENUE
GUM FREE ROAD
FRANKFORD AVENUE
DELAWARE AVENUE
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113
US 113 North/South Study
Millsboro-South Study Area
Cultural Resources APE, and Locations of Historic Properties
July 2013
Figure 3-9
Source: DelDOT Study Team
See Table 3-20 for Resource ID

Affected Environment

This section is intended to help describe the steps taken to identify historic properties following 36 CFR 800.11(e)(2). If the information is known, elements of 36 CFR 800.11(e)(3) is included or referenced.

3.5.2 Architectural Resources

The identification and evaluation of architectural resources began in September 2005 with initiation of Section 106 for the undertaking. Following the development of historic context for US 113 and in confirmation of the level of effort, National Register evaluations for the Millsboro-South area architectural resources were presented in a series of draft reports beginning in October 2006. Following submission and review, comments from DelDOT and SHPO, as well as the identification of additional resources along revised alignment segments, resulted in several revised or "final-draft" reports. On October 22, 2012 a comprehensive supplemental report had been submitted to the SHPO that is deemed as the "final" architectural evaluation report.

Approximately 480 architectural properties subject to direct or indirect impacts (36 CFR 800.5(a)(1)) from the project's conceptual alternatives were initially identified and evaluated. The final report concludes that twenty four (24) individual properties and four (4) historic districts within the APE are eligible for listing or are already listed on the National Register (see **Figure 3-9)**. Of the twenty-eight (28) architectural historic properties, twenty five (25) have National Register boundaries within 600 feet of at least one of the proposed alternatives that had been retained for further study and could potentially be involved and affected by the undertaking. **Table 3-20** lists these resources, along with their National Register status (listed or eligible), and the alternative(s) that may affect them. The Yellow Alternative has the greatest number of historic resources (21) located within 600 feet of the proposed alternative. Each of the remaining alternatives (Green, Purple, Blue, and Red) passes within 600 feet of between 20 and 14 known architectural historic properties.

Beyond resource agency meetings and other individual office meetings, DelDOT, SHPO, Sussex County and FHWA staff conducted multiple field tours between October 2006 and February 2010 to review and discuss the results of the evaluation-level study of architectural resources and to validate the APE.

The results of the architectural surveys and identification efforts are presented in the final *Evaluation of National Register Eligibility for Architectural Properties in the Millsboro-South Study Area, U.S. 113 North/South Study,* dated January 2012. Results of this historic property identification effort, including information on the characteristics that qualify them for the National Register, can be found online at www.deldot.gov/archaeology/US113_Millsboro/.

Table 3-20: Architectural Historic Properties within the Cultural Resources APE

Figure 3-9 ID	Cultural Resources Survey Number	Property Name	National Register Status	National Register Boundary within 600 feet of Proposed Alternative(s)
1	S-10181	English Cottage*	Eligible	All
2	S-02114	Holliway-Carey House	Eligible	None**
3	S-11770	Joshua B. Murray House	Eligible	None**
4	S-10243	Long-Mumford House	Eligible	All
5	S-01909	McCabe Farm	Eligible	None**
6	S-10217	Pomeroy's	Eligible	All
7	S-09825	Selbyville Historic District	Eligible	All
8	S-12161	Selbyville Railroad Station*	Eligible	All
9	S-09137	Selbyville School	Eligible	All
10	S-11495	St. Martin in the Fields*	Eligible	All
11	D-101	Transpeninsular Monument 10	Listed	All
12	S-08158/ S-10759	Antioch AME Church & Camp Meeting	Eligible	Red
13	S-10659	Cannon and Messick Feed Store***	Eligible	Green, Purple, Yellow, Red
14	S-08160	Frankford Historic District	Eligible	Green, Purple, Yellow, Red
15	S-09136	Indian River High School	Eligible	Red
16	S-10655	Landes Family Poultry Plant	Eligible	Green, Purple, Yellow, Red
17	S-04910	Dagsboro South Historic District	Eligible	All
18	S-04692	Gray Farm	Eligible	All
19	S-00176	Prince George's Chapel	Listed	All
20	S-10873	Charles B. Houston House	Eligible	Yellow
21	S-04595	Godwin School	Eligible	Green, Purple, Yellow
22	S-10972	Hudson General Store	Eligible	Green, Purple
23	S-10799	Millsboro Chicken Hatchery	Eligible	Purple
24	S-05740	Perry Shockley House	Listed	Yellow
25	S-04673	R. W. Tilney House	Eligible	All
26	S-09126	Stockley Center	Eligible	All
27	S-10611	Walter McKinley Betts House	Eligible	Yellow
28	S-09147	Warren's Mill Historic District	Eligible	All

** Individually eligible properties that are within and contribute to the Selbyville Historic District; unless indicated differently, the District will be treated as one impacted resource.*
*** Properties involved in the overall historic property identification effort. Upon consultation, those properties are no longer within or near the retained or proposed alternatives.*
**** Individually eligible property that is within and contributes to the Frankford Historic District; the District will be treated as one impacted resource.*

3.5.3 Archaeological Resources

Based on existing and known information, two archaeological sites are within the anticipated Limit of Disturbance for the retained alternatives:

- **Indian River Archaeological Complex (7S-F-011, 7S-F-012, and 7S-F-013)** was listed on the National Register in December 1978. It consists of several dense concentrations

of artifacts along the north bank of Indian River east of Millsboro. Materials within the site date from the Early Middle Woodland through Late Woodland periods, but artifacts of the Middle Woodland period were predominant. A colonial period component was also present at one of the sites. This site would be involved with and impacted by both the Red and Blue alternatives.

- **Hickory Hill (7S-J-005)** has not been evaluated for National Register eligibility. It was identified through surface collection in 1971 by H. Hutchinson, one of the established members of the Sussex Archaeological Society at that time. The form on file at SHPO does not specify whether the site is prehistoric or historic, and little is known about the site other than its location. This location would be involved with the Green alternative.

Under the Green and Purple alternatives located west of Millsboro, an additional area of heightened archaeological sensitivity is the Askekesky Indian Reservation, which consisted of a 1,000-acre parcel of land established in 1711 by the Maryland Provincial government. The reservation was located at the headwaters of the Indian River, in the area between the Askakeson Branch and Indian Branch, but its exact boundaries are unknown. Map and deed information were used to determine the likely footprint of the reservation and to estimate the number of acres potentially affected by the retained alternatives. These impacted acres are included in the Early Historic Period data, as part of the High Sensitivity Area.

To complement 36 CFR 800.11(e)(2)(3) and (4)), the archaeological sensitivity model was prepared as a planning tool to assist in the development of the retained alternatives and to aid in the assessment of potential impacts on archaeologically sensitive areas. Prehistoric (pre-contact Native American history) and historic archaeological potential were both considered in the model. Environmental characteristics were compiled using available Geographic Information System (GIS) data. GIS programs were also used to evaluate the relative level of the impact of each alternative within the project area. Historic and modern ground disturbances were modeled to assess the degree of archaeological potential. The model resulted in the creation of zones characterized by their sensitivity for prehistoric and historic archaeological resources. These areas were illustrated in the January 2005 report and reviewed by DelDOT and SHPO archaeologists. For the protection of known and potential sites, maps of these areas are not provided herein. Section 304 of the *National Historic Preservation Act, 36 CFR Part 800.11 of the Advisory Council on Historic Preservation's regulations implementing Section 106 of that same Act,* and *Delaware Code Title 7, Chapter 53, § 5314* permit the restriction of access to information on the location and nature of archaeological resources.

DelDOT is committed to completing the archaeological analysis necessary to determine the National Register eligibility of archaeological resources that may be affected by ground disturbing activities. To date, a comprehensive Phase I archaeological assessment has not been completed. The MOA establishes the process for identifying archaeological resources within the APE for the Recommended Preferred Alternative and evaluating their eligibility for the National Register. Additional efforts may include a more comprehensive Phase I analysis and

consultation on the need for further investigation. To date, no testing to corroborate the *Archaeological Sensitivity Study* has occurred.

Environmental Consequences

3.5.4 Effects to Historic Properties

Potential effects, minimization, and mitigation strategies for historic properties are discussed in the following sections. The discussion and summary below provide the elements of 36 CFR 800.11(e)(4) and (5).

Section 106 of the NHPA and its regulations (*36 CFR 800*) require that, once historic properties in the undertaking's APE are identified, the potential effects shall be assessed to determine if the undertaking would adversely affect one or more historic properties. An *effect* is defined as an "alteration to the characteristics of a historic property qualifying it for inclusion in or eligibility for the National Register" (*36 CFR part 800.16[i]*). The effect is *adverse* when the alteration of a qualifying characteristic occurs "in a manner that would diminish the integrity of the property's location, design, setting, materials, workmanship, feeling, or association. Consideration shall be given to all qualifying characteristics of a historic property, including those that may be identified subsequent to the original evaluation of the property's eligibility for the National Register. Adverse effects may include reasonably foreseeable effects caused by the undertaking that may occur later in time, be farther removed in distance or be cumulative" (*36 CFR 800.5(a)(1)*). As stipulated in *36 CFR 800.5(a)(2)*, examples of adverse effects include, but are not limited to:

(i) Physical destruction of or damage to all or part of the property;
(ii) Alteration of a property that is not consistent with Secretary's Standards for the treatment of historic properties (*36 CFR part 68*) and applicable guidelines;
(iii) Removal of the property from its historic location;
(iv) Change of the character of the property's use or of physical features within the property's setting that contribute to its historic significance;
(v) Introduction of visual, atmospheric, or audible elements that diminish the integrity of the property's significant historic features;
(vi) Neglect of a property which causes its deterioration, except where such neglect and deterioration are recognized qualities of a property of religious and cultural significance to an Indian tribe or Native Hawaiian organization; and
(vii) Transfer, lease, or sale of property out of Federal ownership or control without adequate and legally enforceable restrictions or conditions to ensure long-term preservation of the property's historic significance.

Based on direct consultation with the SHPO and involvement with the Sussex County Preservation Planner, the potential effects of the undertaking on historic properties, to the degree that they can be assessed with the information available, are discussed in the following sections.

Field meetings from July 2010 through October 2012, along with follow-up discussions and correspondence, confirmed that the Criteria of Adverse Effect applied to historic properties and discussed minimization and mitigation measures for affected historic properties.

Only the Selbyville Historic District (with a number of individually-eligible properties) would be directly impacted by each of the proposed build alternatives. If affected, all of the Architectural Historic Properties listed in **Table 3-20** would only be impacted through the introduction of visual, atmospheric, or noise elements that diminish the integrity of the properties' significant historic features. **Table 3-21** lists and summarizes the effects to each historic property in accordance with the Section 106 criteria of adverse effect (listed above) and in coordination and consultation with the SHPO.

Table 3-21: Architectural Historic Properties, Section 106 Effects Assessment 36 CFR 800.5(a)(2) with Example

Cultural Resource	Effect (Criterion) by Alternative				
	Green	Purple	Yellow	Red	Blue
S-10181 English Cottage[1]	A (iv, v)	A (iv, v)	A (iv, v)	A (iv, v)	A (iv, v)
S-02114 Holliway-Carey House	NE	NE	NE	NE	NE
S-11770 Joshua B. Murray House	NE	NE	NE	NE	NE
S-10243 Long-Mumford House	NA (v)	NA (v)	NA (v)	NA (v)	NA (v)
S-01909 McCabe Farm	NE	NE	NE	NE	NE
S-10217 Pomeroy's	A (iv); access limited	A(iv); access limited	A(iv); access limited	A(iv); access limited	A(iv); access limited
S-09825 Selbyville Historic District including English Cottage (S-10181); Selbyville Railroad Station (S-12161); St. Martin in the Fields (S-11495)	A (iv, v)	A (iv, v)	A (iv, v)	A (iv, v)	A (iv, v)
S-09137 Selbyville School	NE	NE	NE	NE	NE
D-101 Transpeninsular Monument 10	NE	NE	NE	NE	NE
S-08158/S-10759 Antioch AME Church & Camp Meeting	NE	NE	NE	A (iv, v, foreseeable secondary impacts)	NE
S-08160 Frankford Historic District including Cannon and Messick Feed Store (S-10659)	NA (iv, v); some access becomes limited	NA (iv, v); some access becomes limited	NA (iv, v); some access becomes limited	NA (iv, v); some access becomes limited	NE
S-09136 Indian River High School	NE	NE	NE	A (iv, v); potential atmospheric issues with being an active school)	NE
S-10655 Landes Family Poultry Plant	NA (iv, v)	NA (iv, v)	NA (iv, v)	NA (iv, v)	NE
S-04910 Dagsboro South District	A (iv, v)	A (iv, v)	A (iv, v)	A (iv, v)	A (iv, v)

Table 3-21: Architectural Historic Properties, Section 106 Effects Assessment 36 CFR 800.5(a)(2) with Example

Cultural Resource	Effect (Criterion) by Alternative				
	Green	Purple	Yellow	Red	Blue
S-04692 Gray Farm	NA (iv, v); limited access not adverse	A (iv, v); limited access not adverse	A (iv, v); limited access not adverse	NA (iv, v); limited access not adverse	NA (iv, v); limited access not adverse
S-00176 Prince George's Chapel	NE	NE	NE	NE	NE
S-10873 Charles B. Houston House	NE	NE	A (iv, v)	NE	NE
S-04595 Godwin School	NE	NE	NE	NE	NE
S-10972 Hudson General Store	A (iv, v); cumulative impact on resource	NA (v for visual only)	NE	NE	NE
S-10799 Millsboro Chicken Hatchery	NA (v for visual only)	A (iv, v)	NE	NE	NE
S-05740 Perry-Shockley House	NE	NE	NA (v visual only)	NE	NE
S-04673 R.W. Tilney House	NE	NE	NE	NE	NE
S-09126 Stockley Center	NE	NE	NE	NE	NE
S-10611 Walter McKinley Betts House	NE	NE	A (iv, v)	NE	NE
S-09147 Warren's Mill Historic District	NA (iv, v visual only)	NA (iv, v visual only)	NA (iv, v visual only)	NA (iv, v visual only)	NA (iv, v visual only

A: Adverse
NA: Not Adverse
NE: No Effect (no historic properties affected; beyond project area)
[1] Properties within Selbyville Historic District are treated as one resource impact. However, English Cottage is adversely affected as an individual property. St. Martins in the Field and Selbyville Railroad Station will not be individually affected beyond the effects to the Selbyville H.D. as a whole.

3.5.5 Archaeological Potential

In order to evaluate the potential consequences of the proposed build alternatives, the archaeological predictive model was overlaid with the proposed limit of disturbance of each of the alternatives, thereby determining the areas of each sensitivity level affected by the alternatives. The results are shown in **Table 3-22**.

In the prehistoric and early historic sensitivity models, the majority of the land within the limit of disturbance is in either the Low or Slight Sensitivity Area (approximately 89 and 90 percent, respectively).

Table 3-22: Archaeological Potential of the Proposed Alternatives within the Limit of Disturbance

Archaeological Potential	Proposed Alternatives				
	Green	Purple	Yellow	Red	Blue
Known Archaeological Sites[1]	1	0	0	1	1
Prehistoric Archaeological Sensitivity Model (acres/%[2])					
High Sensitivity Area	38 / 3.7%	38 / 3.5%	19 / 2.0%	32 / 2.6%	29 / 2.7%
Moderate Sensitivity Area	71 / 6.9%	75 / 7.0%	52 / 5.6%	74 / 6.1%	70 / 6.4%
Low Sensitivity Area	253 / 24.5%	286 / 26.6%	263 / 27.7%	289 / 23.7%	259 / 23.7%
Slight Sensitivity Area	671 / 64.9%	677 / 62.9%	614 / 64.7%	827 / 67.6%	737 / 67.2%
Early Historic Period Archaeological Sensitivity Model (acres/%[1])					
High Sensitivity Area	77 / 7.5%	93 / 8.6%	35 / 3.7%	35 / 2.8%	32 / 2.9%
Moderate Sensitivity Area	10 / 1.0%	12 / 1.1%	12 / 1.2%	21 / 1.7%	20 / 1.8%
Low Sensitivity Area	6 / 0.6%	6 / 0.6%	6 / 0.7%	8 / 0.7%	6 / 0.6%
Slight Sensitivity Area	940 / 90.9%	965 / 89.7%	895 / 94.4%	1,158 / 94.8%	1,037 / 94.7%
Later Historic Period Archaeological Sensitivity Model					
Extant Locations	175	230	272	184	134
High Sensitivity Locations	56	58	45	69	64
Moderate Sensitivity Locations	91	96	100	92	86
Low Sensitivity Locations	17	21	23	19	15

[1] *Archaeological sites on file with SHPO; National Register status not yet determined for site on Green Alternative.*
[2] *Indicates percentage of total acres within the anticipated limit of disturbance.*

When the later historic-period sensitivity of the alternatives is compared, the number of extant locations ranges from 134 for the Blue Alternative to 272 for the Yellow Alternative. The number of extant locations for the remaining alternatives is between 175 and 230. Each alternative has the potential to impact between 45 (Yellow) and 69 (Red) locations that have a high likelihood of containing later historic-period archaeological deposits. The Green, Purple, and Blue alternatives have the potential to impact 56, 58, and 64 high sensitivity sites, respectively. Potential impacts to locations with a moderate likelihood of containing later historic-period archaeological deposits range from 86 for the Blue Alternative to 100 for the Yellow Alternative. The potential impacts to low sensitivity sites range from 15 for the Blue Alternative to 23 for the Yellow Alternative.

3.5.6 Applicable Criteria of Adverse Effect, Alternatives and Mitigation Measures

The following paragraphs provide a brief summary to further highlight elements of 36 CFR 800.11(e)(5) with respect to options to avoid or minimize known and applicable adverse effects. With respect to the SHPO and Sussex County consultation and the applicable criteria of adverse effect applied to each known historic property, the following can be analyzed.

- Green Alternative: five historic properties adversely effected; one known inventoried archaeological site; one possible Native American settlement
- Purple Alternative: six historic properties adversely effected; one possible Native American settlement

- Yellow Alternative: seven historic properties adversely effected; highest historic period archaeological impact based on the sensitivity model
- Red Alternative: seven historic properties adversely effected, including one National Register listed archaeological complex
- Blue Alternative: five historic properties adversely effected, including one National Register listed archaeological complex; lowest percentages of overall archaeological impact based on sensitivity model

In consideration of options, all build alternatives have the same level and degree of adverse effect on four architectural properties (i.e. English College, Pomeroy's, Selbyville HD, and Dagsboro HD). Numerically, the Blue Alternative is the least harmful with respect to known historic properties (**Table 3.20**). The Yellow alternative is the On-Alignment where greater man-made resources would be present and impacted. Such is the case with known historic properties and under the historic period sensitivity model for archaeology. Both the Red and Green alternative would adversely impact known resources (i.e. Antioch AME Church & Camp Meeting and Hudson General Store) to a point where those functions and defining characteristics would likely be so impaired that they would not adequately be conveyed. Because the functions and defining characteristics would not be adequately conveyed, their National Register eligibility status and function as a historic property would be jeopardized.

The only known historic property that varies to some degree between adverse or no adverse effects under all build alternatives is the Gray Farm. The Recommended Preferred Alternative (Blue) does not adversely affect this resource, whereby other alternatives (Purple, Yellow) would have adverse effects.

This overall breakdown, as well as the sensitivity model for potential archaeological impacts, has been presented to and discussed with the SHPO. The build alternatives and a no build scenario were presented, and options were discussed in preliminary design concepts to avoid or minimize adverse effects.

In terms of a preferred option, DelDOT is committed to performing the necessary archaeological analysis to determine all National Register eligibility for archaeological resources in the Millsboro-South APE. In sum, between five and seven historic properties within all the alternatives would be adversely impacted. All measures would be discussed, considered, and implemented to minimize an adverse effect upon the Recommended Preferred Alternative. This is further predicated by the MOA.

Beyond the future archaeological protocol effort, all of the known historic properties would experience an adverse effect in the form in changes in setting or use of the property, visual, or audible. Some secondary impacts are likely to occur with some of the alternatives. Physical impacts and encroachment within the Selbyville Historic District would occur, but upon non-contributing portions and properties of the district. Since adverse effects to historic properties may be unavoidable and inevitable, mitigation measures proposed with the SHPO have been memorialized in the MOA. As discussed with the SHPO and the Sussex County Preservation

Planner and included in the MOA, anticipated mitigation can include fencing, landscaping, or berming on new rights of way or adjacent to the historic property's borders. Mitigation can also range from better directional signage, voluntarily instituting better preservation and land use management administrative needs for the local level, use of modular retaining walls to minimize footprint, and/or historic marking/signs.

The MOA in **Appendix C** is considered a "DRAFT" and is prepared mainly for consideration of the Recommended Preferred Alternative. The MOA is predicated or written based on discussions in **Chapter 6,** which describes the justification for DelDOT choosing the Recommended Preferred Alternative (Blue). As necessary, the MOA will be clarified to reflect decisions related to a Recommended Preferred Alternative or modifications to the Blue Alternative at a later time including public and agency comments on the Draft EIS.

Based on continued archaeological identification efforts, if archaeological adverse effects cannot be avoided (such as in the case of the Red or Blue Alternative), traditional or alternative forms of archaeological mitigation would be utilized. These are addressed in the MOA.

3.5.7 Outreach Summary

Relevant correspondence by agencies and the public per 36 CFR 800.11(e)(6) is offered in **Chapter 5, Comments and Coordination**. To date, there has not been an expression or concern raised by the public about potential project impacts related to cultural resources. Should concerns about adverse effects and/or potential impacts be expressed, they would be included and discussed in the final EIS.

3.6 ENERGY

There would be no noticeable difference in energy consumption among any of the proposed build alternatives. Initially, the No-build Alternative would require less energy expenditure than the considerable energy consumed during construction of a build alternative. In the long term, however, the energy expended due to projected traffic congestion in the design year with the No-build Alternative is likely to exceed the energy expended with any of the build alternatives in place, and may exceed the initial energy expended for construction.

3.7 AIR QUALITY

This section describes the regulatory framework for air quality considerations, the pollutants of concern, federal and state ambient air quality standards, existing conditions in the study area, and predicted changes in air quality that may result from implementation of the proposed project. It also discusses possible mitigation efforts where adverse effects are projected.

Transportation conformity refers to the extent that highway and transit expansion projects add to or subtract from regional emission levels. These analyses typically are performed at the systems

level, meaning that the particular improvement or sets of improvements are included in a regional travel demand model from which the "total emissions" for a county are estimated. The analyses provide an estimate of the total emissions generated from highway and transit systems, and a determination of whether those estimates, at the regional level, follow mandated Federal reductions in regional emissions as reported in State Implementation Plans.

Project level emissions analyses examine the extent to which highway and transit expansion projects add to or subtract from "project area" emission levels. These studies are typically performed within the area directly adjacent to a proposed improvement, and are often within several hundred feet of those projects. These studies do not consider regional air quality, but are concerned with what affect proposed projects may have on air quality adjacent to or in the immediate vicinity of a particular area.

3.7.1 Relevant Pollutants

"Air Pollution" is a general term that refers to one or more chemical substances that degrade the quality of the atmosphere. Individual air pollutants degrade the atmosphere by reducing visibility, damaging property, reducing the productivity or vigor of crops or natural vegetation, or by adversely affecting human or animal health.

Eight air pollutants have been identified by the EPA as being of concern nationwide: carbon monoxide (CO), sulfur oxides (SO_x), hydrocarbons (HC), nitrogen oxides (NO_x), ozone (O_3), lead (Pb), particulate matter with a size of 10 microns or less (PM_{10}), and particulate matter with a size of 2.5 microns or less ($PM_{2.5}$). These pollutants, with the exception of HC, are collectively referred to as criteria pollutants.

The sources of these pollutants, their effects on human health and the nation's welfare, and their final deposition in the atmosphere vary considerably. In the study area, ambient concentrations of CO, O_3, and Pb are primarily influenced by motor vehicle activity. Emissions of sulfur oxides are associated mainly with stationary sources such as power plants and refineries. Emissions of nitrogen oxides and particulate matter come from both mobile and stationary sources.

Carbon monoxide is a colorless and odorless gas. In the urban environment, it is associated primarily with the incomplete combustion of fossil fuels in motor vehicles. CO combines with hemoglobin in the bloodstream and reduces the amount of oxygen that can be circulated through the body. High CO concentrations can lead to headaches, aggravation of cardiovascular disease, and impairment of central nervous system functions. CO concentrations can vary greatly over comparatively short distances. Relatively high concentrations are typically found near crowded intersections and along heavily used roadways carrying slow-moving traffic. Even under the most severe meteorological and traffic conditions, high concentrations of CO are limited to locations within a relatively short distance, 90 to 180 meters (300 to 600 feet) of heavily traveled roadways. Consequently, it is appropriate to evaluate concentrations of CO on a regional and on a localized or "microscale" basis. In general, CO emissions have been decreasing as a result of

the *State and Federal Motor Vehicle Control Program*, which has mandated increasingly lower emission levels for vehicles manufactured since 1973.

Sulfur oxides constitute a class of compounds of which sulfur dioxide (SO_2) and sulfur trioxide (SO_3) are of great importance. The health effects of SO_x include respiratory illness, damage to the respiratory tract, and bronchi constriction. Relatively little SO_x is emitted from motor vehicles.

Hydrocarbons include a wide variety of volatile organic compounds emitted principally from the storage, handling, and use of fossil fuels. Although HC can cause eye irritation and breathing difficulties, their principal health effects are related to their role in the formation of ozone. Hydrocarbon emissions are generally evaluated on a regional basis.

Nitrogen oxides are of concern because of their role as precursors in the formation of ozone. Most of the NOx emitted by motor vehicles or construction combustion equipment is in the form of nitric oxide (NO), which is not directly harmful to human health. Only a small percentage is emitted as nitrogen dioxide (NO_2), which can cause lung irritation and decrease lung capacity. Once emitted, NO reacts slowly in the presence of sunlight with ozone to form NO_2. Since the reactions are slow and occur as the pollutants are diffusing downwind, elevated NO_2 and ozone levels are often found many miles from their sources. For that reason, the effects of nitrogen oxide emissions are generally examined on a regional basis, and not at a localized level. Ozone is the principal component of photochemical smog. It is a major cause of lung and eye irritation in the urban environment. It is formed in the atmosphere through a series of reactions involving hydrocarbons and nitrogen oxides in the presence of sunlight. High O_3 concentrations normally occur only in the summer, when insulation is greatest and temperatures are high.

Lead is a stable compound which persists and accumulates both in the environment and in animals. In people, it affects the blood-forming system, the nervous system, and the renal system. In addition, lead has been shown to affect the normal functions of the reproductive, endocrine, hepatic, cardiovascular, immune, and gastrointestinal systems. The lead used in gasoline anti-knock additives historically represented a major source of lead emissions to the atmosphere, and lead emissions have been greatlydecreased due to the elimination of leaded gasoline and the replacement of vehicles that burn leaded gasoline with those that cannot. An analysis of lead is generally only performed for projects that emit large quantities of the pollutant (e.g., lead smelters) or are near such projects.

Particulate matter includes both liquid and solid particles of a wide range of sizes and composition. Of particular concern are those particles that are smaller than or equal to 10 microns or 2.5 microns in size (PM_{10} and $PM_{2.5}$, respectively). The data collected through several nationwide studies indicates that most PM_{10} is the product of fugitive dust, wind erosion, and agricultural and forestry sources, while a small portion is the product of fuel combustion. In the case of $PM_{2.5}$, the combustion of fossil fuels accounts for a large percentage of this pollutant. The main health effects of air-borne particulate matter are on the respiratory system.

In conclusion, of the seven criteria pollutants identified by the EPA as being of nationwide concern, CO is the only one whose localized affects currently require a detailed, microscale mobile source impact evaluation for roadway projects at the EIS level.

3.7.2 National and State Ambient Air Quality Standards

As required by the *Clean Air Act* (CAA) Amendments of 1970 (*P.L. 91-064, December 31, 1970*) and the CAA Amendment of 1977 (*P.L. 95-95, August 7, 1977*), the EPA has established *National Ambient Air Quality Standards* (NAAQS) for the following air pollutants: O_3, CO, NO_2, SO_x, PM_{10}, $PM_{2.5}$, and Pb. Delaware has also promulgated ambient air quality standards for the same pollutants. However, the state standards are identical to the federal standards.

The pollutants chosen for the NAAQS meet the following criteria:

- Emissions cause or contribute to air pollution that may reasonably be expected to endanger public health or welfare; and
- Presence in the ambient air results from numerous or diverse mobile or stationary sources.

The "primary" standards were established to protect public health, including the health of "sensitive" populations such as asthmatics, children, and the elderly, with an adequate margin of safety. The "secondary" standards are intended to protect the nation's welfare and account for air-pollutant effects on soil, water, visibility, vegetation, buildings, and other aspects of the general welfare. The applicable state and federal standards are shown in **Table 3-23**. Units of measure for the standards are parts per million (ppm) by volume, milligrams per cubic meter of air (mg/m^3), and micrograms per cubic meter of air ($\mu g/m^3$).

Table 3-23: National and State Ambient Air Quality Standards

Pollutant	Averaging Period	National and State Standards	
		Primary	Secondary
Ozone (O_3)	1 Hour [1]	0.12 ppm (235 µg/m3)	Same as Primary Standard
	8 Hour [2]	0.08 ppm (157 µg/m3)	
Carbon Monoxide (CO)	1 Hour [3]	35 ppm (40 mg/m3)	---
	8 Hour [3]	9 ppm (10 mg/m3)	---
Nitrogen Dioxide (NO_2)	Annual Average	0.053 ppm (100 µg/m3)	Same as Primary Standard
Sulfur Dioxide (SO_2)	Annual Average	0.03 ppm (80 µg/m3)	---
	24 Hour [3]	0.14 ppm (365 µg/m3)	---
	3 Hour [3]	---	0.5 ppm (1300 µg/m3)
Coarse Particulate Matter (PM_{10})	Annual Arithmetic Mean [4]	Revoked	---
	24 Hour [5]	150 µg/m3	Same as Primary Standard
Fine Particulate Matter ($PM_{2.5}$)	Annual Arithmetic Mean [6]	15 µg/m3	Same as Primary Standard
	24 Hour [7]	65 µg/m3	Same as Primary Standard
Lead (Pb)	Calendar Quarter	1.5 µg/m3	Same as Primary Standard

Sources: EPA Office of Air Quality Planning and Standards; Delaware Air Quality Management Section, "Ambient Air Quality Standards (Regulation 3.)"

Notes: ppm: parts per million; µg/m3: micrograms per cubic meter; mg/m3: milligrams per cubic meter

1 *The standard is attained when the expected number of days per calendar year with maximum hourly average concentrations above 0.12 ppm is ≤ 1. As of June 15, 2005 EPA revoked the 1-hour ozone standard in all areas except the fourteen 8-hour ozone nonattainment Early Action Compact Areas*

2 *To attain this standard, the 3-year average of the fourth-highest daily maximum 8-hour average ozone concentrations measured at each monitor within an area over each year must not exceed 0.08 ppm*

3 *Not to be exceeded more than once per year*

4 *Due to a lack of evidence linking health problems to long-term exposure to coarse particle pollution, the agency revoked the annual PM_{10} standard in 2006 (effective December 17, 2006)*

5 *Not to be exceeded more than once per year on average over 3 years*

6 *To attain this standard, the 3-year average of the weighted annual mean $PM_{2.5}$ concentrations from single or multiple community-oriented monitors must not exceed 15.0 µg/m^3*

7 *To attain this standard, the 3-year average of the 98th percentile of 24-hour concentrations at each population-oriented monitor within an area must not exceed 35 µg/m^3 (effective December 17, 2006)*

3.7.3 Mobile Source Air Toxics

In addition to the criteria air pollutants for which there are NAAQS, the EPA also regulates air toxics. The EPA has designated seven prioritized Mobile Source Air Toxics (MSAT), which are known or probable carcinogens or can cause chronic respiratory effects. The prioritized MSATs are: acrolein, benzene, 1.3-butidiene, diesel particulate matter plus diesel exhaust organic gases (diesel PM), formaldehyde, naphthalene, and polycyclic organic matter.

In December of 2012, FHWA issued an interim guidance update titled "*Guidance on Air Toxic Analysis in NEPA Documents"*, which requires analysis of MSAT under specific conditions. The update reflects the recent implementation of the EPA MOVES emission model for estimating MSAT emissions from mobile sources along with updates of scientific research in the MSAT arena.

Consistent with this recent guidance, U.S. 113 is a project with "low potential MSAT effects" because design year traffic is projected to be less than the 140,000 to 150,000 annual average

daily traffic (AADT) thresholds identified in FHWA's guidance. A qualitative MSAT analysis concluded that, for the design year build scenarios on the roadway network in the project area, regional MSAT emissions are expected to be significantly lower than those emitted today, even when taking into account the projected increase in vehicle miles traveled. Additionally, the implementation of EPA's vehicle and fuel regulations will result in significantly lower MSAT levels for the area in the future than exist today.

Affected Environment

The project area is in Sussex County, Delaware. The EPA has designated the entire state of Delaware as being a non-attainment area for ozone. Sussex County has not been designated by EPA as being in non-attainment for carbon monoxide, nitrogen dioxide, sulfur dioxide, lead, fine particulate matter, or coarse particulate matter.

Metropolitan Planning Organizations (MPO) are federally funded transportation policy-making groups charged with, among other things, protecting air quality by ensuring that transportation plans, programs, and projects conform to the state's air quality plan, known as the "state implementation plan". Following the 2010 census, the Salisbury-Wicomico (MD) MPO expanded to include portions of Sussex County, but the MPO does not contain any segment or portion of US Route 113; therefore, the organization's Transportation Improvement Program does not contain or allocate funding for the project.

A detailed microscale air quality analysis was performed in 2008 to determine the local CO impact of the proposed project. The analysis considered the impact of the No-build Alternative and all build alternatives at 16 air quality receptors located throughout the study area and at seven signalized intersections, analyzed by a matrix of between 14 to 24 receptors. Locations of the air quality receptors used in the analysis are shown on **Figure 3-10** and listed in **Table 3-24**.

Table 3-24: Air Quality Receptor Locations

Receptor	Address/Location
R-1	26200 Dupont Blvd.
R-2	26203 Dupont Blvd.
R-3	2464 Sheep Pen Rd.
R-4	26536 Gravel Hill Rd.
R-5	26903 Gravel Hill Rd.
R-6	28066 Chrisandria Ct.
R-7	Dickerson Chapel AME
R-8	31037 Dupont Blvd.
R-9	32581 Dupont Blvd.
R-10	33208 Dupont Blvd.
R-11	36390 Dupont Blvd.
R-12	29562 Vines Creek Rd.
R-13	33062 Bakers Rd.
R-14	300040 Millsboro Hwy.
R-15	29792 Millsboro Hwy.
R-16	37095 Dupont Blvd.
INT 113 / DE 20N	Matrix of 20 receptors at US 113 / DE 20 North intersection

Table 3-24: Air Quality Receptor Locations

Receptor	Address/Location
INT 113 / DE 24/30	Matrix of 20 receptors at US 113 / DE 24/30 intersection
INT 113 / DE 20S	Matrix of 14 receptors at US 113 / DE 20 South intersection
INT 113 / DE 26	Matrix of 20 receptors at US 113 / DE 26 intersection
DE 24 / Thompson	Matrix of 24 receptors at DE 24/30 / Thompson intersection in Millsboro
DE 26 / 20N	Matrix of 15 receptors at DE 26/20 intersection in Dagsboro
DE 26 / 20S	Matrix of 15 receptors at DE 26/20 intersection south of Dagsboro
US 113 / DE 54	Matrix of 20 receptors at US 113 / DE 54 intersection in Selbyville

Environmental Consequences

The air quality analysis indicates that carbon monoxide impacts resulting from the implementation of any of the proposed build alternatives would not result in a violation of the *State/National Ambient Air Quality Standards* (S/NAAQS) 1-hour concentration or the 8-hour concentration, at any air quality receptor location, in any analysis year. The air quality analysis also indicates that the carbon monoxide impact from the proposed No-build Alternative also results in no violations of the 1-hour concentration or the 8-hour concentration in any analysis year. The S/NAAQS for the 1-hour concentration is 35.0 ppm and the S/NAAQS for the 8-hour concentration in 9.0 ppm. The results of these analyses are presented in **Table 3-25**.

A comparison of the proposed No-build Alternative to the proposed build alternatives shows that CO concentrations generally remain the same. There are slight increases or decreases in CO concentrations that can be attributed to shifts in the roadway alignments and altered traffic patterns on existing and proposed roadways. Increases are typically seen at receptors that are located near a proposed alignment but were previously situated in a more remote location. Increases in CO concentration at receptors range from 0.1 to 1.5 ppm. Reductions in CO concentration are typically seen at receptors adjacent to existing roadways that are projected to facilitate less traffic volume when the proposed alignment is constructed. Reductions typically range from 0.1 to 0.7 ppm.

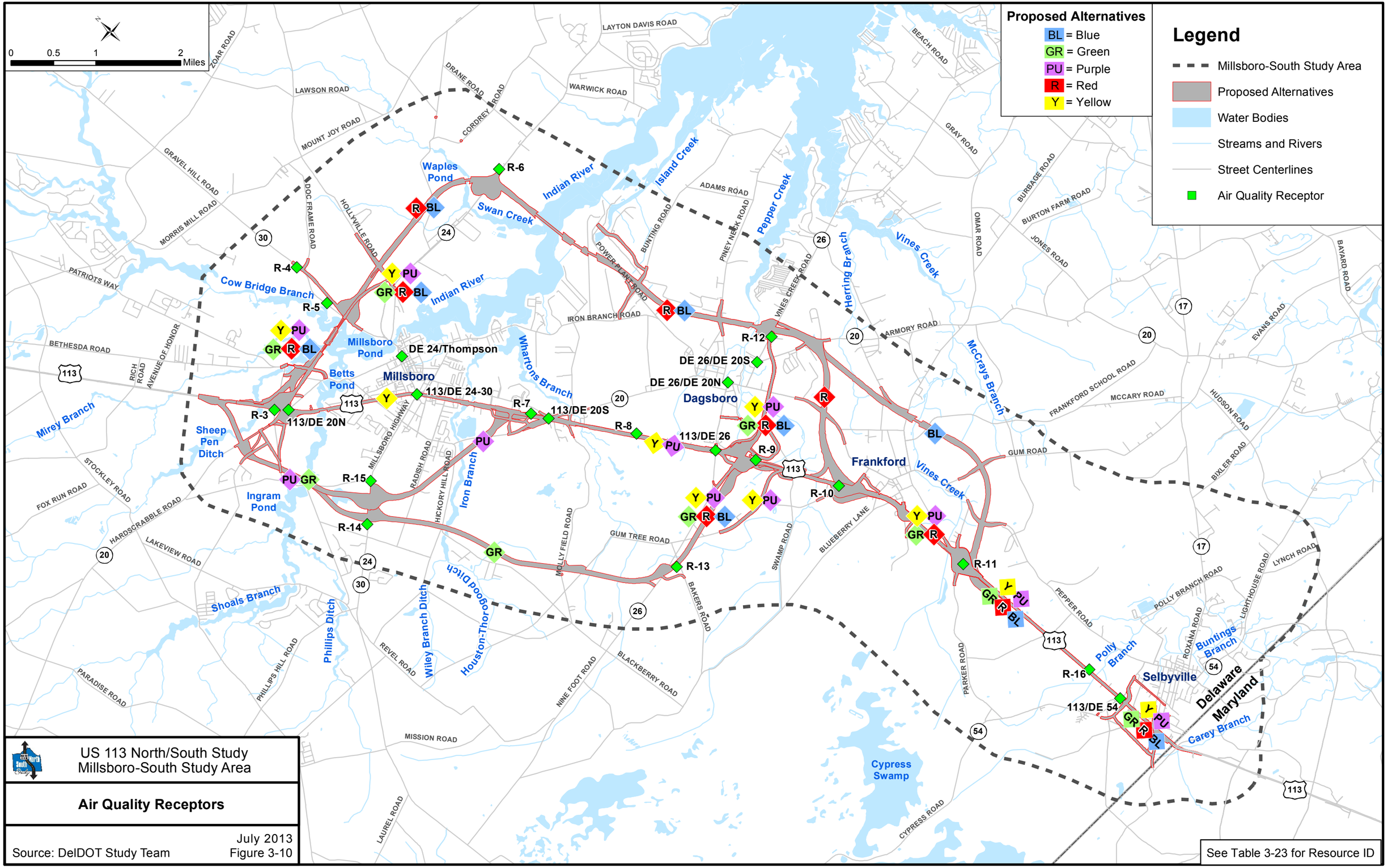

0 0.5 1 2 Miles
Proposed Alternatives
BL = Blue
GR = Green
PU = Purple
R = Red
Y = Yellow
Legend
Millsboro-South Study Area
Proposed Alternatives
Water Bodies
Streams and Rivers
Street Centerlines
Air Quality Receptor
R-3
R-4
R-5
R-6
R-7
R-8
R-9
R-10
R-11
R-12
R-13
R-14
R-15
R-16
113/DE 20N
113/DE 24-30
113/DE 20S
113/DE 26
DE 24/Thompson
DE 26/DE 20S
DE 26/DE 20N
113/DE 54
Millsboro
Dagsboro
Frankford
Selbyville
Millsboro Pond
Betts Pond
Ingram Pond
Waples Pond
Indian River
Island Creek
Swan Creek
Cow Bridge Branch
Pepper Creek
Herring Branch
Vines Creek
McCrays Branch
Wharton Branch
Iron Branch
Mirey Branch
Sheep Pen Ditch
Shoals Branch
Phillips Ditch
Wiley Branch Ditch
Houston-Thorogood Ditch
Polly Branch
Buntings Branch
Carey Branch
Cypress Swamp
Delaware
Maryland
LAYTON DAVIS ROAD
WARWICK ROAD
BEACH ROAD
GRAY ROAD
LAWSON ROAD
MOUNT JOY ROAD
GRAVEL HILL ROAD
MORRIS MILL ROAD
DRANE ROAD
CORDREY ROAD
ZOAR ROAD
DOG FRAME ROAD
HOLLYVILLE ROAD
ADAMS ROAD
BUNTING ROAD
PINEY NECK ROAD
POWER PLANT ROAD
VINES CREEK ROAD
OMAR ROAD
BURBAGE ROAD
BURTON FARM ROAD
JONES ROAD
BAYARD ROAD
EVANS ROAD
PATRIOTS WAY
BETHESDA ROAD
RICH ROAD
AVENUE OF HONOR
IRON BRANCH ROAD
ARMORY ROAD
FRANKFORD SCHOOL ROAD
MCCARY ROAD
HUDSON ROAD
BIXLER ROAD
GUM ROAD
MILLSBORO HIGHWAY
RADISH HILL ROAD
HICKORY HILL ROAD
MOLLY FIELD ROAD
GUM TREE ROAD
SWAMP ROAD
BLUEBERRY LANE
BAKERS ROAD
PEPPER ROAD
POLLY BRANCH ROAD
LIGHTHOUSE ROAD
LYNCH ROAD
ROXANA ROAD
PARKER ROAD
CYPRESS ROAD
NINE FOOT ROAD
BLACKBERRY ROAD
REVEL ROAD
PHILLIPS HILL ROAD
PARADISE ROAD
LAUREL ROAD
MISSION ROAD
FOX RUN ROAD
STOCKLEY ROAD
HARDSCRABBLE ROAD
LAKEVIEW ROAD
113
20
24
30
26
54
17
US 113 North/South Study
Millsboro-South Study Area
Air Quality Receptors
July 2013
Figure 3-10
Source: DelDOT Study Team
See Table 3-23 for Resource ID

Table 3-25: 2030 CO Concentrations (ppm)

Receptor	No- build		Green		Purple		Yellow		Red		Blue	
	1-hr.	8-hr.	1-hr.	8-hr.	1-hr.	8-hr.	1-hr.	8-hr.	1-hr.	8-hr.	1-hr.	8-hr.
26200 Dupont Blvd.	1.9	1.5	2.0	1.7	2.0	1.6	2.0	1.7	2.1	1.7	2.1	1.7
26203 Dupont Blvd.	2.3	1.9	2.6	2.1	2.4	2.0	2.6	2.3	2.6	2.1	2.5	2.1
2464 Sheep Pen Rd.	2.1	1.8	1.9	1.6	2.0	1.6	2.4	2.1	1.8	1.5	1.9	1.5
26536 Gravel Hill Rd.	1.6	1.3	1.6	1.3	1.6	1.3	-	-	1.6	1.4	1.6	1.3
26903 Gravel Hill Rd.	1.7	1.3	1.7	1.3	1.7	1.4	-	-	1.7	1.3	1.7	1.3
28066 Chrisandria Ct.	1.9	1.6	1.9	1.6	2.0	1.7	-	-	2.0	1.7	2.0	1.7
Dickerson Chapel AME	2.4	2.0	2.5	2.1	-	-	2.4	2.1	-	-	-	-
31037 Dupont Blvd.	2.1	1.7	2.1	1.8	1.9	1.6	2.1	1.8	-	-	-	-
32581 Dupont Blvd.	2.2	1.9	2.6	2.3	2.6	2.3	2.8	2.5	-	-	-	-
33208 Dupont Blvd.	2.0	1.6	2.2	1.8	2.3	2.0	2.4	2.1	-	-	1.9	1.6
36390 Dupont Blvd.	2.0	1.6	2.0	1.7	2.2	1.8	2.2	1.9	1.7	1.4	2.2	1.8
29562 Vines Creek Rd.	1.8	1.4	2.1	1.7	1.8	1.4	-	-	1.8	1.5	1.8	1.5
33062 Bakers Rd.	1.4	1.1	1.4	1.1	-	-	-	-	-	-	-	-
30 40 Millsboro Hwy.	1.9	1.5	2.7	2.3	-	-	-	-	-	-	-	-
29792 Millsboro Hwy	2.0	1.6	2.0	1.7	-	-	-	-	-	-	-	-
37095 Dupont Blvd.	2.0	1.7	-	-	-	-	2.4	2.1	-	-	-	-
US 113 / DE 20 N	3.3	2.9	2.8	2.4	3.0	2.6	-	-	2.9	2.6	3.0	2.7
US 113 / DE 24/30	2.9	1.4	3.2	2.9	-	-	3.4	3.1	-	-	-	-
US 113 / DE 20 S	3.5	1.5	-	-	-	-	-	-	-	-	-	-
US 113 / DE 26	2.5	2.1	-	-	-	-	-	-	-	-	-	-
DE 24 / Thompson	3.1	2.2	3.0	2.6	2.9	2.6	3.0	2.7	2.7	2.4	2.7	2.4
DE 26 / 20 N	2.8	2.4	2.5	2.2	2.6	2.2	2.3	2.0	2.3	2.0	2.4	2.1
DE 26 / 20 S	2.7	2.3	-	-	-	-	-	-	2.7	2.4	2.7	2.4
US 113 / DE 54	3.3	2.9	-	-	-	-	-	-	-	-	-	-

S/NAAQS for the 1-hour concentration is 35.0 ppm
S/NAAQS for the 8-hour concentration in 9.0 ppm.

Monitored Air Quality

Air pollutant levels throughout Delaware are monitored by a network of sampling stations operated under the supervision of the DNREC's Division of Air and Waste Management. The closest monitoring stations to the project corridor are located in Sussex and Kent Counties at the Seaford (O_3, $PM_{2.5}$), Lewes (O_3), Felton (O_3, $PM_{2.5}$), and Dover ($PM_{2.5}$) Monitoring Sites. The monitoring of $PM_{2.5}$ began in 1999 at the Seaford, Felton, and Dover Monitoring Sites.

Prior to the 2010 Census there was no Federally-designated MPO for Sussex County. According to Federal regulations DelDOT was the agency required by Federal law to show transportation projects *conform* to applicable Federal air quality planning requirements.

DelDOT completed required transportation conformity analyses and determinations for the Sussex County nonattainment area in May, 2005 and most recently in March, 2010. The US 113 Project was not included in those determinations, as the project was not a "trigger" for such analysis to occur.

EPA issued a final rule designating nonattainment areas for the 2008 ozone NAAQS that became effective July 20, 2012. Through this process Sussex County was designated as a *"marginal*

nonattainment" area. According to FHWA and EPA regulations nonattainment counties and areas have a "one-year grace period" in which to conduct a quantitative conformity analysis and make a conformity determination. That one-year grace period for Sussex County ended July 20, 2013. DelDOT submitted an updated conformity analysis and determination and, on July 19, 2013, FHWA and FTA approved that submission. The US 113 Project was not included in this determination, as the project status in the CTP was not a "trigger" for such analysis to occur.

Following the 2010 Census, the designated urbanized area for the Salisbury-Wicomico MPO was expanded to include additional portions of Sussex County, primarily along the US 13 corridor from Delmar to north of Seaford. This means that a portion of Sussex County is contained within the planning area of the Salisbury-Wicomico MPO and because of that, the MPO's TIP and long range transportation plan must include a transportation conformity analysis for the urbanized portion of the Sussex County. However, Sussex County presents a somewhat unique situation in which the expansion of the Salisbury-Wicomico urbanized area into Sussex County (following the 2010 Census) resulted in a bi-state urbanized area.

The non-urbanized (Census-designated rural) portions of Sussex County are considered donut areas due to the county-wide nonattainment status and must also be included in any conformity determination done by an MPO or State DOT. As of June, 2013 the Delaware and Maryland DOTs are in the early stages of coordination to identify any new and/or changed agency responsibilities to account for the expanded Delaware portion of the Salisbury, MD-DE urbanized area following the 2010 Census. It is likely that an update of the 2004 MOU outlining agency roles within the Salisbury-Wicomico MPO will be needed, potentially affecting subsequent transportation conformity determinations that may occur in the future.

The highest levels reported for the Lewes, Seaford, Felton, and Dover stations in 2005 are shown in **Table 3-26**. The levels do not exceed the S/NAAQS for any of the pollutants monitored, with the exception of O_3. There are no data for the monitoring of lead in Delaware.

Table 3-26: Delaware Air Quality Monitoring Sites Highest Recorded Levels, 2005-2007

Polluant	Seaford	Lewes	Felton	Dover
Particulate Matter < 2.5 micrometers ($PM_{2.5}$)				
3-year Average of 98th Percentiles	34 µg/m	N/A	32 µg/m^3	31 µg/m^3
Average > 35 µg/m^3	No	N/A	No	No
3-year Average of Annual Averages	13.3 µg/m	N/A	12.3 µg/m^3	12.3 µg/m^3
Average > 15 µg/m^3	No	N/A	No	No
Ozone (O_3)				
8-Hour Maximum	0.083 ppm	0.081 ppm	N/A	0.078 ppm
Concentrations > 0.085 ppm	0	0	N/A	0
3-Year Average of 4th Daily Maximum Eight-Hour Average	0.082 ppm	0.082 ppm	N/A	0.080 ppm

Air Quality Regulations and Status of the Project Area
Air quality is regulated at the federal level under the *Clean Air Act* and *EPA's Final Conformity Rule (40 CFR Parts 51 and 93).* Section 107 of the 1977 CAA Amendment requires the EPA to publish a list of all geographic areas in compliance with the NAAQS, as well as those not attaining the NAAQS. Areas not in compliance with NAAQS are deemed non-attainment areas. Areas which were previously deemed non-attainment areas, but which recently achieved compliance with the NAAQS, are deemed maintenance areas. The designation of an area is based on the data collected by the state-monitoring network on a pollutant-by-pollutant basis. The proposed project corridor is classified as a non-attainment area for O_3.

3.7.4 Mitigation

This proposed project would not result in impacts to air-quality that exceed the NAAQS; therefore mitigation would not be required.

3.8 NOISE

This section discusses the evaluation of potential noise impacts that would result from implementation of the Millsboro-South component of the US 113 North/South Study. An overview of noise/activity relationships is provided. This section summarizes the existing noise conditions and projected noise levels that may result from the construction of a build alternative. Impacts to noise sensitive receptors are identified and potential mitigation for impacts is discussed. Please refer to the *Noise Technical Report* (NTR) for more information.

FHWA has issued guidelines for noise evaluation as established in Title 23 CFR Part 772, *Procedures for Abatement of Highway Traffic Noise and Construction Noise*. Highway traffic noise studies, noise abatement procedures, coordination requirements, and design noise levels in CFR Part 772 constitute the noise standards mandated by 23 U.S.C. 109(i). Design noise levels for various types of activity (land use) categories are summarized in the following section.

3.8.1 Criteria for Determining Noise Impacts

To describe noise environments and to assess impact on noise sensitive areas, a frequency weighing measure that simulates human subjective response to noise is typically used. A-weighted ratings of noise sources, which reflect the human ear's reduced sensitivity to low frequencies, have been found to positively correlate with human perceptions of the annoying aspects of noise, particularly from traffic noise sources. A-weighted noise levels, described in decibels-A (dBA), are the values cited by FHWA in its Noise Abatement Criteria (NAC).

DelDOT revised its Noise Policy, which was approved by the FHWA and became effective on July 13, 2011. The new DelDOT policy states that a traffic noise analysis must be completed for each category of land use shown in the current 23 CFR Part 772 Noise Abatement Criteria,

included herein as **Table 3-27**. Category F is an exception, with no impact criteria and no required noise analysis for this land use. Category D would be initiated only after completion of an analysis for outdoor activity areas or determination that exterior abatement is not feasible or reasonable. No Category D impacts are anticipated for the US 113 Millsboro-South area. Mitigation is not required for Category G under 23 CFR 772; however, predicted highway traffic noise levels must be documented and provided to local officials under the revised policy.

Table 3-27: Noise Abatement Criteria

Activity Category	Activity Criteria		Evaluation Location	Activity Description
	Leq(h)	L10(h)		
A	57	60	Exterior	Lands on which serenity and quiet are of extraordinary significance and serve an important public need and where the preservation of those qualities is essential if the area is to continue to serve its intended purpose.
B	67	70	Exterior	Residential.
C	67	70	Exterior	Active sport areas, amphitheaters, auditoriums, campgrounds, cemeteries, day care centers, hospitals, libraries, medical facilities, parks, picnic areas, places of worship, playgrounds, public meeting rooms, public or nonprofit institutional structures, radio studios, recording studios, recreation areas, Section 4(f) sites, schools , television studios, trails, and trail crossings.
D	52	55	Interior	Auditoriums, day care centers, hospitals, libraries, medical facilities, places of worship, public meeting rooms, public or nonprofit institutional structures, radio studios, recording studios, schools, and television studios.
E	72	75	Exterior	Hotels, motels, offices, restaurants/bars, and other developed lands, properties or activities not included in A-D or F.
F	-	-	-	Agriculture, airports, bus yards, emergency services, industrial, logging, maintenance facilities, manufacturing, mining, rail yards, retail facilities, shipyards, utilities (water resources, water treatment, electrical), and warehousing.
G	-	-	-	Undeveloped lands that are not permitted.

Source: 23 CFR Part 772 Noise Abatement Criteria

The design noise levels in **Table 3-27** were used to determine highway traffic noise impacts and the need for considering abatement measures. For the US 113 Millsboro-South project, noise-sensitive land uses potentially affected by the proposed improvements are primarily in activity categories B and C, for which the following NAC is applicable: equivalent sound level ($L_{eq)}$ equals 67 dBA (exterior) for residential areas, hospitals, libraries, sports areas, playgrounds, etc. where outdoor activity is present. See the NTR for more details. When the predicted design-year build alternative noise levels in the project area approach or exceed the NAC, a noise impact occurs and requires the consideration of mitigation to reduce traffic noise.

In December 1993, the FHWA issued a memorandum to provide guidance on interpreting the word "approach" in section 772.5(g) of 23 CFR. The FHWA defined noise levels, which "approach" the noise abatement criteria, to be 1 dBA less than the NAC level.

Criteria adopted by DelDOT for the determination of an impacted receptor under the State Noise Abatement Policy are summarized as follows:

- Loudest hour Leq A-weighted noise levels.
- Design year noise levels approach or exceed the NAC levels.
- Design year noise levels substantially exceed existing noise levels (12 dBA or more).

3.8.2 Analysis Procedures and Methodology

This analysis was conducted in accordance with standard FHWA guidelines and current DelDOT procedures and policies. The analysis began with the determination of existing noise levels along the project corridor in order to assess the traffic noise contributions on the neighboring noise sensitive areas. Future proposed design year 2030 alternatives noise calculations and predictions were performed using FHWA-approved methods. See the NTR for more details.

3.8.3 Measured and Predicted Existing Noise Levels

Affected Environment

A Noise Sensitive Area (NSA) represents a community of properties (receptors) that could be impacted by traffic noise resulting from the proposed roadway alignments. The NSA could consist of residences, historic properties, schools, churches and other facilities with common outdoor use areas (refer to **Table 3-27**, Activity Category B).

Noise monitors were placed throughout the study area for a specific period of time, including peak and non-peak periods, in order to establish an accurate representation of the noise environment. Subsequently, many additional noise receptors were added after the noise model was calibrated using ambient measurement receptors so that noise levels could be predicted for other land uses.

Ten ambient measurement receptors currently exceed the NAC under existing conditions. They are located in NSAs 1, 8, 9, 10, 11, 13, 14, 17, and 28 (see the NTR for more detail).

Environmental Consequences and Mitigation

3.8.3.1 Predicted Future Noise Levels

FHWA requires noise to be analyzed in the "loudest noise hour" of the day. As noted previously, ambient measurements may not reflect the loudest hour of the day. The loudest-noise hour traffic condition represents a combination of vehicle volume, classification mix, and speed to produce the worst traffic noise condition that would be experienced along the project corridor. For existing conditions within the project area, the loudest noise hour typically occurs during the highest traffic volume conditions along existing US 113.

Future noise levels were predicted at receptor locations within influence of traffic noise for each retained alternative. Peak traffic volumes for the alternatives were predicted for the design year 2030. See the NTR for more details on the analysis.

An impact occurs if a receptor meets or exceeds the impact criteria for a given land use or if a receptor experiences an increase of 12 dBA or greater over existing noise levels. For example, a receptor with an existing noise level of 47 dBA that would experience a design-year predicted noise level of 59 dB or greater and would be considered impacted.

The NTR provides a table displaying the predicted future noise levels and the impacted receptors. **Table 3-28** contains a summary of the model results.

Table 3-28: Summary of Noise Modeling Results

Impact Criterion	Existing	Design Year 2030					
		No-build	Green	Purple	Yellow	Red	Blue
Number of Receptors at 66 dBA or Higher	10	18	8	8	10	10	10
Number of Receptors Experiencing a 12 dBA or Greater Increase	0	0	4	5	0	2	2
Number of Impacted Properties	**N/A**	**N/A**	**97**	**174**	**190**	**89**	**100**

Sixteen of the NSAs would have at least one impacted receptor. Total impacts for each proposed alternative, as shown in **Table 3-28**, are not determined by the number of impacted receptors at ambient measurement locations, but rather by the total number of impacted properties represented by those receptors plus others that were added to the noise model. Mitigation is discussed below.

3.8.4 Impact Assessment/Abatement

Each of the proposed build alternatives would cause noise impacts. Yellow would impact the most properties (190), followed by Purple (174), Blue (100), Green (97), and Red (89). All impacts in the study area would fall under NAC Categories B and C, with most resulting from noise levels exceeding 66 dBA in the design year; some result from 12-dBA or greater increases over existing noise levels.

3.8.4.1 Noise Abatement Criteria

Traffic noise impacts were assessed, and the potential for introducing mitigating measures, such as a noise walls or berms, was evaluated. Consideration for mitigation is based on the size of the impacted area, the predominant activity within the area, visual impact, construction practicality, and feasibility and reasonableness. The factors considered when determining whether the mitigation would be considered, as detailed in DelDOT's Transportation Noise Policy, are outlined as follows:

- A reasonable and feasible noise mitigation method is available. DelDOT will identify and evaluate impacts that noise abatement measures will have on the social, economic, and natural environments when determining the feasibility and reasonableness of a noise barrier project.
- At least three impacted receptors exist in a common noise environment.
- Noise mitigation will achieve a noise reduction of at least 5 dBA. This reduction is referred to as Insertion Loss.
- Noise mitigation is cost-effective, not to exceed $25,000 per benefited residence.
- A benefited residence is an impacted receptor that would receive an insertion loss of at least 9 dB from the installation of noise mitigation.
- Non-impacted and benefited receptors may be incorporated at 25 percent weighting if the original cost-effectiveness calculation using only impacted and benefited receptors fails to meet the criteria.
- Noise mitigation is acceptable to the majority of people affected.

Unit costs of $25.00 per square foot of noise wall and $10.00 per cubic yard of fill material for berms are assumed for this project. Cost figures are based upon recent experience and are intended to reasonably reflect the cost of constructing an earth berm or ground mounted noise wall system. Berm geometry assumes 2.5:1 side slopes and 4-foot wide top.

3.8.4.2 Undeveloped Land

Undeveloped land falls under activity Category G in 23 CFR Part 772 Noise Abatement Criteria. This category applies to all lands that are undeveloped and do not have any development plans that have been issued bona-fide building permits prior to the effective date of public knowledge of the project. No mitigation will be considered for this land use category, but predicted noise levels, conveyed as distances from the edge of roadway for noise levels to reach impact criteria for various land use categories, would be provided to local planning officials for their consideration when permitting future development.

3.8.4.3 Impacts and Mitigation Feasibility

Impacts associated with the proposed alternatives and the feasibility of mitigation are discussed in detail in the NTR. Typical mitigation is in the form of a noise barrier wall or berm. Barrier and berm mitigation are both discussed in the NTR. Tables are also provided.
Barrier mitigation of projected noise impacts with the Green alternative is feasible for NSAs 2, 3, 5, 9 and 10 but not reasonable due to cost per residence exceeding $25,000 or mitigation not achieving 9 dBA insertion loss. Mitigation is not feasible for NSAs 7, 12, 13, 18, 29 and 31 due to either access requirements or isolated receptors.

Berm mitigation of projected noise impacts with the Green alternative is feasible for NSAs 2, 3 and 5 but not reasonable due to cost per residence exceeding $25,000 or mitigation not achieving

9 dBA insertion loss. Mitigation is not feasible for NSAs 7, 9, 10, 12, 13, 18, 29 and 31 due to either access requirements, isolated receptors or space constraints.

Barrier mitigation of projected noise impacts with the Purple alternative is feasible for NSAs 2, 3, 4, 5, 9, 10 and 22 but not reasonable due to cost per residence exceeding $25,000 or mitigation not achieving 9 dBA insertion loss. Mitigation is not feasible for NSAs 8, 12, 13, 18, 19, 23, 29 and 31 due to either access requirements or isolated receptors.

Berm mitigation of projected noise impacts with the Purple alternative is feasible for NSAs 2, 3 and 4 but not reasonable due to cost per residence exceeding $25,000 or mitigation not achieving 9 dBA insertion loss. Mitigation is not feasible for NSAs 8, 9, 10, 12, 13, 18, 19, 22, 23, 29 and 31 due to either access requirements or space constraints.

Barrier mitigation of projected impacts with the Yellow Alternative is feasible for NSAs 9, 10, 19, 20, 21, 22, 26 and 27 but not reasonable due to cost per residence exceeding $25,000 or mitigation not achieving 9 dBA insertion loss. Mitigation is not feasible for NSAs 8, 12, 13, 18, 23, 24, 25, 28, 29 and 31 due to either access requirements or isolated receptors.

Berm mitigation of projected impacts with the Yellow Alternative is not feasible for NSAs 8, 9, 10, 12, 13, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, and 31 due to right-of-way constraints, lack of space between US 113 and associated service road, and access requirements. Receptors are also too isolated to consider mitigation for NSAs 18, 24 and 25.

Barrier mitigation of projected noise impacts with the Red alternative is feasible for NSAs 9, 10 and 16 but not reasonable due to cost per residence exceeding $25,000 or mitigation not achieving 9 dBA insertion loss. Mitigation is not feasible for NSAs 12, 13, 14, 15, 17, 18, 28, 29 and 31 due to either access requirements or isolated receptors.

Berm mitigation of projected noise impacts with the Red alternative is feasible for NSA 16 but not reasonable due to cost per residence exceeding $25,000. Mitigation is not feasible for NSAs 9, 10, 12, 13, 14, 15, 17, 18, 28, 29 and 31due to either access requirements, isolated receptors or space constraints.

Barrier mitigation of projected noise impacts with the Blue alternative is feasible for NSAs 11and 16 but not reasonable due to cost per residence exceeding $25,000 or mitigation not achieving 9 dBA insertion loss. Mitigation is not feasible for NSAs 9, 12, 13, 14, 15, 17, 18, 28, 29 and 31 due to either access requirements or isolated receptors.
Berm mitigation of projected noise impacts with the Blue Alternative is feasible for NSA 16, but not reasonable due to the cost per residence exceeding $25,000. Mitigation is not feasible for NSAs 9, 12, 13, 14, 15, 17, 18, 28, 29 and 31 due to either access requirements, isolated receptors or space constraints.

3.8.4.4 Impact Assessment/Abatement Conclusions

Based on the July 2011 *DelDOT Noise Policy*, no noise mitigation measure was found to meet DelDOT's criteria for both feasibility and cost-effectiveness for any noise sensitive area. All mitigation analyzed is either not feasible due to access requirements, space constraints or isolated receptors, or not reasonable due to costs exceeding $25,000 per benefited receptor or the inability to achieve a minimum 9 dBA insertion loss at impacted receptors.

3.8.5 Construction Noise

Temporary noise impacts may occur from construction activity. Areas around the construction zone would experience varied periods and degrees of noise that differ from that of surrounding ambient community noise levels. Noise and vibration impacts result from two sources: construction noise and increases over existing noise from additional traffic generated by construction activity. The contractor's operations would be performed in such a manner that noise levels would not substantially impact nearby noise sensitive activities. Land uses that are sensitive to traffic noise are also sensitive to construction noise.

Generally, increased noise and vibration are limited to areas within 300 feet of the source. To limit the effects, construction activities would typically be limited to weekday daylight hours, in accordance with local ordinances. Should the contractor need to deviate from normal work hours, DelDOT has mechanisms in place to work with the affected community to minimize impacts from the change in hours.

Some potential mitigation measures that may be employed include adjustments to equipment, provision of temporary noise barriers, distribution of noise events, good communication with the public, and financial incentives to contractors. Temporary construction noise impacts are discussed in **Section 3.14**.

3.9 HAZARDOUS MATERIALS

Searches of both the *EPA's Envirofacts* database and the *DNREC Environmental Navigator* database were conducted in August of 2009 and November of 2110 to determine the existence of regulated facilities in the study area. The following components of the *Envirofacts* database were searched:

- ICIS – Integrated Compliance Information System: A database that, when complete, would contain integrated Enforcement and Compliance information across most of EPA's programs.
- NPDES – National Pollutant Discharge Elimination System: A provision of the Clean Water Act, which prohibits discharge of pollutants into waters of the US unless a special permit is issued by the EPA or a state or tribal government.

- AIRS/AFS – Aerometric Information Retrieval System/AIRS Facility Subsystem: A computer-based repository for information about air pollution in the US. This information comes from source reports by various stationary sources of air pollution and provides information about the air pollutants they produce.
- NEI – National Emissions Inventory: A database containing information about sources that emit criteria air pollutants and their precursors and hazardous air pollutants.
- RCRAInfo – Resource Conservation and Recovery Act Information: Facilities which generate, transport, treat, store, and/or dispose of hazardous waste are required to provide information on their activities to state environmental agencies, which in turn provide it to the EPA. Information on accident clean up or other activities that result in a release of hazardous materials to the water, air or land must also be reported through RCRAInfo.
- SQG – Small Quantity Generator: An enterprise that produces 220 to 2,200 pounds per month of hazardous waste. SQG's include automotive shops, dry cleaners, photographic developers, and many other small businesses. These facilities are exempt from RCRA.
- CESQG – Conditionally Exempt SQG: An enterprise that produces fewer than 220 pounds of hazardous waste per month. These facilities are exempt from most regulations.
- LQG – Large Quantity Generator: A facility generating more than 2,200 pounds of hazardous waste per month. Such generators produce about 90 percent of the nation's hazardous waste and are subject to all RCRA requirements.
- CERCLIS – Comprehensive Environmental Response, Compensation, and Liability Information System. These are Superfund sites.
- TRI – Toxics Release Inventory: This inventory contains information about more than 650 toxic chemicals that are used, manufactured, treated, transported, or released into the environment. Manufacturers of these chemicals are required to report the locations and quantities of chemicals stored on-site to state and local governments who in turn report them to the EPA.
- NCDB – National Compliance Data Base: This database tracks regional compliance and enforcement activity and manages the Pesticides and Toxic Substances Compliance and Enforcement program at a national level. The system tracks all compliance monitoring and enforcement activities from the time an inspector conducts an inspection until the time the inspector closes the case or settles the enforcement action.

According to the *Envirofacts database*, the only known CERCLIS (Superfund) site in the study area is the NCR Corp. plant on Mitchell St. in Millsboro. There are no registered LQGs in the study area, and there are no facilities in the study area that are listed in the NCDB. **Table 3-29** lists the EPA or DNREC-regulated facilities located in the Millsboro-South study area. They are shown on **Figure 3-11.**

Table 3-29: EPA or DNREC Regulated Facilities

Facility	Address	Regulated Activity	Environmental Interest and (Data Source)	Figure 3-11 ID
402 Main St. property	402 Main St.	▪ UST	▪ DNREC Environmental Navigator	1
Arogona, Carol	30269 Dupont	▪ UST	▪ DNREC Environmental Navigator	2

Table 3-29: EPA or DNREC Regulated Facilities

Facility	Address	Regulated Activity	Environmental Interest and (Data Source)	Figure 3-11 ID
	Blvd.			
B&S Ye Old Country Store	Rt. 26 & US 113 (Dagsboro)	▪ UST	▪ DNREC Environmental Navigator	3
Bill Cannons Garage, Inc.	36389 Dupont Blvd.	▪ Hazardous Waste Generator	▪ DNREC Environmental Navigator	4
Bodies Dairy Market #1	222 Railroad Ave.	▪ UST	▪ DNREC Environmental Navigator	5
Bodies Dairy Market #6	912 Main St.	▪ UST	▪ DNREC Environmental Navigator	6
Bodies Dairy Market, Inc.	78 Church St.	▪ UST	▪ DNREC Environmental Navigator	7
Brasure Property	712 Dupont Blvd.	▪ UST	▪ DNREC Environmental Navigator	8
Buntings Auto Repair	115 Clayton Ave.	▪ UST	▪ DNREC Environmental Navigator	9
Buntings Nursery	Duke St. & Railroad Ave. (Selbyville)	▪ UST	▪ DNREC Environmental Navigator	10
C&E TV	10 N. Dupont Blvd.	▪ UST	▪ DNREC Environmental Navigator	11
Clark property	29284 Berry Rd.	▪ UST	▪ DNREC Environmental Navigator	12
Corner Dairy Market	306 Main St.	▪ UST	▪ DNREC Environmental Navigator	13
Coulbourn Property	116 W. Dupont Blvd.	▪ UST	▪ DNREC Environmental Navigator	14
Dagsboro Fire Station	31818 Waples St.	▪ UST	▪ DNREC Environmental Navigator	15
Dagsboro Foodrite	Main St.	▪ UST	▪ DNREC Environmental Navigator	16
Dagsboro Gulf	SR 26 & Main St.	▪ UST	▪ DNREC Environmental Navigator	17
Dagsboro State OMS 5 Armory	Omar Rd.	▪ Hazardous Waste Generator ▪ UST	▪ DNREC Environmental Navigator	18
Dagsboro Town Hall	504 Main St.	▪ UST	▪ DNREC Environmental Navigator	19
DE Veterans Memorial Cemetery	26669 Patriots Way	▪ UST	▪ DNREC Environmental Navigator	20
DelDOT Dagsboro Yard	Rd. 334	▪ UST	▪ DNREC Environmental Navigator	21
Delmarva Power and Light	Railroad Ave. (Dagsboro)	▪ UST	▪ DNREC Environmental Navigator	22

Table 3-29: EPA or DNREC Regulated Facilities

Facility	Address	Regulated Activity	Environmental Interest and (Data Source)	Figure 3-11 ID
Delmarva Power Indian River Power Plant	Powerplant Rd. (Dagsboro)	▪ Reported Air Release ▪ Hazardous Waste Handler ▪ Reported Toxic Release ▪ Discharges to Water ▪ UST ▪ AST	▪ Air, minor (AIRS/AFS) ▪ National Emissions Inventory (NEI) ▪ SQG (RCRA notification) ▪ Biennial Reporter (RCRA notification) ▪ TRI Reporter (TRI Reporting Form) ▪ Enforcement/Compliance (ICIS) ▪ NPDES, major (NPDES permit) ▪ DNREC Environmental Navigator	23
Delmarva Power, Millsboro Ops	700 E. Dupont Blvd.	▪ Hazardous Waste Handler ▪ UST	▪ CESQG (RCRA notification)	24
Dollar General Store # 387	Church and Main Sts. (Millsboro)	▪ UST	▪ DNREC Environmental Navigator	25
East Millsboro Elementary School	500 E. State St.	▪ Air Emissions ▪ UST ▪ AST	▪ DNREC Environmental Navigator	26
Eatons Market	712 Dupont Blvd.	▪ UST	▪ DNREC Environmental Navigator	27
Estate of Ethel Dukes	SR 311, Dagsboro	▪ UST	▪ DNREC Environmental Navigator	28
First Omni Bank	499 Mitchell St.	▪ UST	▪ DNREC Environmental Navigator	29
Fox Company	Railroad Tracks (Selbyville)	▪ UST	▪ DNREC Environmental Navigator	30
Frank Smith Nursery	200 Delaware Ave.	▪ UST	▪ DNREC Environmental Navigator	31
Frankford Elementary School	30207 Frankford School Rd.	▪ Discharges to Water ▪ Air Emissions ▪ UST ▪ AST	▪ (NPDES)DNREC Environmental Navigator ▪ DNREC Environmental Navigator	32
Frankford Fire Station	Main St.	▪ UST	▪ DNREC Environmental Navigator	33
General Plumbing Supply	118 E. Dupont Blvd.	▪ UST	▪ DNREC Environmental Navigator	34
Generic Brand Petroleum	Dupont Blvd. (Selbyville)	▪ UST	▪ DNREC Environmental Navigator	35
Getty Service Station	Main St. & Pine St. (Dagsboro)	▪ UST	▪ DNREC Environmental Navigator	36
Gray's Mobil	34114 Dupont Boulevard	▪ UST	▪ DNREC Environmental Navigator	37
Green Valley Terrace	231 S. Washington St.	▪ UST	▪ DNREC Environmental Navigator	38
Greenhill Treasurers	SR 24 W (Millsboro)	▪ UST	▪ DNREC Environmental Navigator	39
Gulabs Tire Center	101 W. Dupont Blvd.	▪ UST	▪ DNREC Environmental Navigator	40
Harold Mumford	Millsboro Hwy. (Millsboro)	▪ UST	▪ DNREC Environmental Navigator	41
Hickman & Willey	62 Ellis Alley	▪ UST	▪ DNREC Environmental Navigator	42

Table 3-29: EPA or DNREC Regulated Facilities

Facility	Address	Regulated Activity	Environmental Interest and (Data Source)	Figure 3-11 ID
Hitchens Auto	327 N. Main St.	▪ UST	▪ DNREC Environmental Navigator	43
Hitchens Brothers	Cemetery Rd. (Selbyville)	▪ UST	▪ DNREC Environmental Navigator	44
Hobans Service Center	19 N. Main St.	▪ UST	▪ DNREC Environmental Navigator	45
Hudson property	13 Bethany Rd.	▪ UST	▪ DNREC Environmental Navigator	46
Indian River Auto Sales	635 W. Dupont Blvd.	▪ Hazardous Waste Handler	▪ SQG (RCRA notification)	47
Indian River Educational Complex	31 W. Hosier St.	▪ UST	▪ DNREC Environmental Navigator	48
Intervet, Inc.	29160 Intervet Ln.	▪ Reported Toxic Release	▪ TRI Reporter (TRI Reporting Form)	49
Jay's Market	34051 Dupont Boulevard	▪ UST	▪ DNREC Environmental Navigator	50
John Williams property	Railroad Ave. and Wilson St. (Millsboro)	▪ UST	▪ DNREC Environmental Navigator	51
K&J's Enterprises	US 113 (Frankford)	▪ UST	▪ DNREC Environmental Navigator	52
Larry Mitchell Farm	34165 Swamp Rd.	▪ UST	▪ DNREC Environmental Navigator	53
Lathbury, Walter	SR 333 (Dagsboro)	▪ UST	▪ DNREC Environmental Navigator	54
Main Street Selbyville	26 South Main Street	▪ UST	▪ DNREC Environmental Navigator	55
Melson Funeral Services	41 Thatcher St.	▪ Air Emissions	▪ DNREC Environmental Navigator	56
Metro Building Supply	18 N. Dupont Blvd.	▪ UST	▪ DNREC Environmental Navigator	57
Mid-Atlantic Delaware	SR 332 (Dagsboro)	▪ UST	▪ DNREC Environmental Navigator	58
Mid-Sussex Medical Center	214 E. Dupont Blvd.	▪ Hazardous Waste Generator	▪ DNREC Environmental Navigator	59
Milford Fertilizer	Hickory St. (Frankford)	▪ UST	▪ DNREC Environmental Navigator	60
Millsboro BP #2461	28194 East Dupont Boulevard	▪ UST	▪ DNREC Environmental Navigator	61
Millsboro Dump Site	near E. State St.	▪ Unpermitted Dump	▪ DNREC Environmental Navigator	62
Millsboro Ford	338 W. Dupont Blvd.	▪ Hazardous Waste Handler ▪ UST	▪ SQG (RCRA notification) ▪ DNREC Environmental Navigator	63
Millsboro Furniture Co.	225 Main St.	▪ UST	▪ DNREC Environmental Navigator	64
Millsboro Mobil	US 113 & SR 24	▪ UST	▪ DNREC Environmental Navigator	65
Millsboro Sewage Treatment Plant	State St.	▪ Discharges to Water	▪ NPDES, non-major (NPDES permit)	66
Millsboro Shell #480	102 W. Dupont Blvd.	▪ UST	▪ DNREC Environmental Navigator	67
Millsboro TCE	225 N. Dupont	▪ Reported Toxic Release	▪ DNREC Environmental Navigator	68

Table 3-29: EPA or DNREC Regulated Facilities

Facility	Address	Regulated Activity	Environmental Interest and (Data Source)	Figure 3-11 ID
Site	Hwy.			
Millsboro Texaco	US 113 & SR 24	▪ UST	▪ DNREC Environmental Navigator	69
Mountaire Farms	Hosier St. (Selbyville)	▪ UST	▪ DNREC Environmental Navigator	70
Mountaire Farms Franklin Feed Mill	11 Daisy St.	▪ Reported Toxic Release ▪ Reported Air Release	▪ TRI Reporter (TRI Reporting Form) ▪ Air, minor (AIRS/AFS) ▪ National Emissions Inventory (NEI)	71
Mountaire Farms of DE, Inc.	29106 John J. Williams Hwy.	▪ Reported Air Release ▪ Hazardous Waste Handler ▪ Reported Toxic Release ▪ UST	▪ Air, minor (AIRS/AFS) ▪ National Emissions Inventory (NEI) ▪ SQG (RCRA notification) ▪ TRI Reporter (TRI Reporting Form) ▪ Enforcement/Compliance (ICIS) ▪ DNREC Environmental Navigator	72
Mountaire Farms of Delmarva	Railroad Ave. & Hosier St. (Selbyville)	▪ Discharges to Water ▪ Air Emissions ▪ UST ▪ AST ▪ Hazardous Waste Handler	▪ (NPDES) DNREC Environmental Navigator ▪ DNREC Environmental Navigator ▪ CESQG (RCRA notification)	73
Mumford Sheet Metal	101 Cemetery Rd.	▪ UST	▪ DNREC Environmental Navigator	74
Murray Motors	SR 26 (Dagsboro)	▪ UST	▪ DNREC Environmental Navigator	75
Navar Studio	SR 24 E, Millsboro	▪ UST	▪ DNREC Environmental Navigator	76
NCR Corp., Millsboro Plant	499 Mitchell St.	▪ Superfund Site ▪ Hazardous Waste Handler	▪ CERCLIS ▪ unknown (RCRA notification)	77
Parker Block Co.	30234 Millsboro Hwy.	▪ Air Emissions ▪ Hazardous Waste Generator ▪ UST	▪ DNREC Environmental Navigator	78
Parker, Cliff	SR 380 (Frankford)	▪ UST	▪ DNREC Environmental Navigator	79
Peninsula Nurseries	Hosier Ave. (Selbyville)	▪ UST	▪ DNREC Environmental Navigator	80
Pep Up #10	US 113 (Dagsboro)	▪ UST	▪ DNREC Environmental Navigator	81
Pep Up #18	107 East Dupont Hwy.	▪ UST	▪ DNREC Environmental Navigator	82
Phillip C Showell Elementary School	41 Bethany Rd.	▪ UST	▪ DNREC Environmental Navigator	83
PRMC Family Medicine	US 113 & SR 26 (Dagsboro)	▪ UST	▪ DNREC Environmental Navigator	84
Racetrack Auto Body	84 Church St.	▪ Hazardous Waste Handler	▪ SQG (RCRA notification)	85
Rich's Auto Body	SR 1 (Dagsboro)	▪ Hazardous Waste Handler	▪ SQG (RCRA notification)	86
Rosies Place	US 113 (Frankford)	▪ UST	▪ DNREC Environmental Navigator	87
Royal Farms Store #116	28359 Clayton Ave.	▪ UST	▪ DNREC Environmental Navigator	88

Table 3-29: EPA or DNREC Regulated Facilities

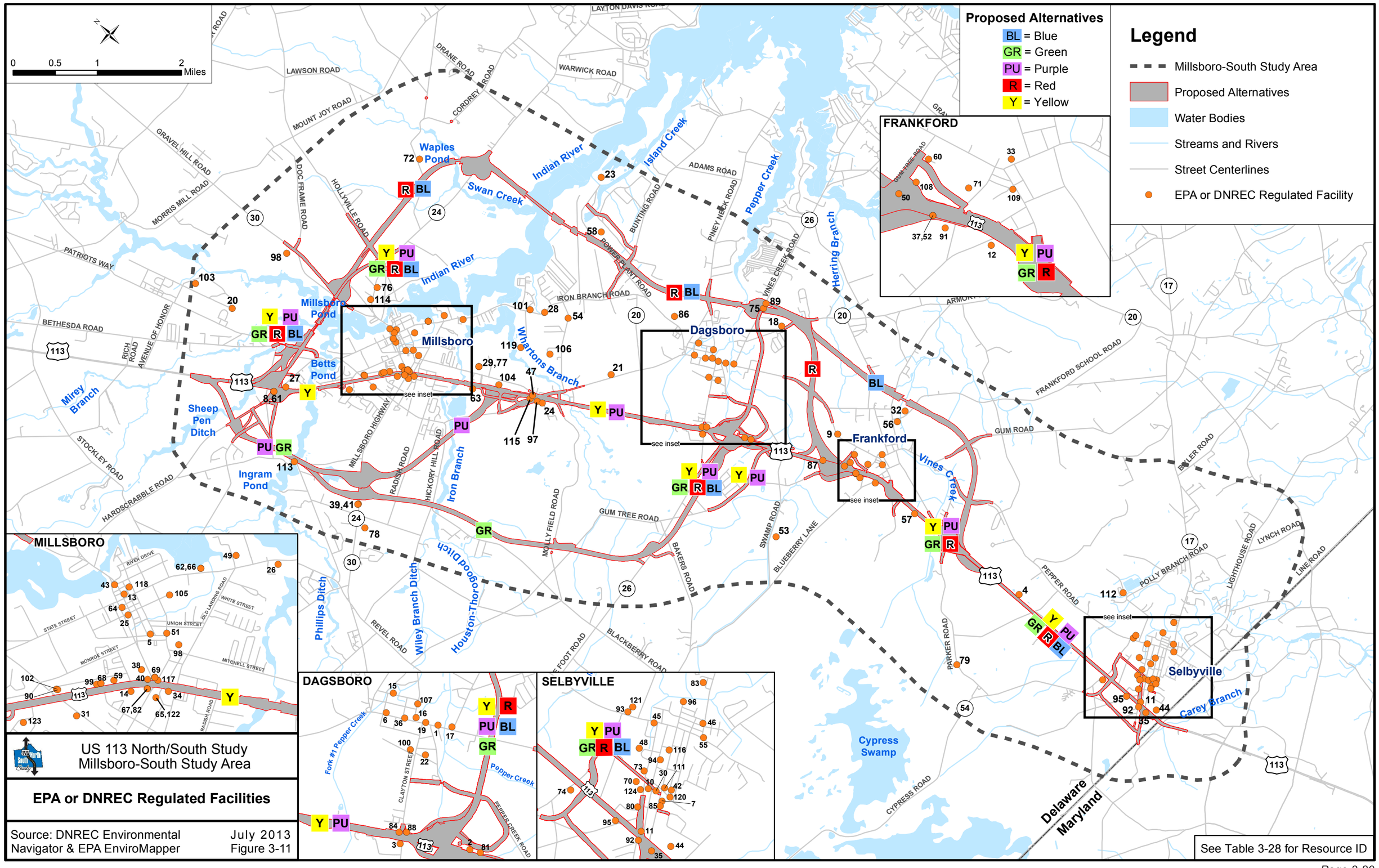
Facility	Address	Regulated Activity	Environmental Interest and (Data Source)	Figure 3-11 ID
Rusts Motor Service	SR 2 (Dagsboro)	▪ UST	▪ DNREC Environmental Navigator	89
Schering Plough Animal Health	369 W. Dupont Blvd.	▪ Hazardous Waste Handler ▪ Air Emissions	▪ SQG (RCRA notification) ▪ DNREC Environmental Navigator	90
Seaside Chevrolet	US 113 (Frankford)	▪ UST	▪ DNREC Environmental Navigator	91
Selbyville Arby's	9 S. Dupont Blvd.	▪ UST	▪ DNREC Environmental Navigator	92
Selbyville Foodrite	48 N. Main St.	▪ UST	▪ DNREC Environmental Navigator	93
Selbyville Residence	34 Dukes St.	▪ UST	▪ DNREC Environmental Navigator	94
Selbyville Shell	US Route 113 & Gumboro Rd	▪ UST	▪ DNREC Environmental Navigator	95
Selbyville Wastewater Plant	Church St.	▪ UST	▪ DNREC Environmental Navigator	96
Shore Stop	US 113 & Rt. 337 (Millsboro)	▪ Air Emissions	▪ DNREC Environmental Navigator	97
Shorts Marine	32415 Long Neck Rd.	▪ Hazardous Waste Handler	▪ SQG (RCRA notification)	98
Simmons Cable TV	305 W. Dupont Blvd.	▪ UST	▪ DNREC Environmental Navigator	99
Southern States Cooperative	302 Clayton St.	▪ UST	▪ DNREC Environmental Navigator	100
State St. Garage	721 E. State St.	▪ UST	▪ DNREC Environmental Navigator	101
Sterwin Laboratories	US 113 (Millsboro)	▪ UST	▪ DNREC Environmental Navigator	102
Stockley Center for the Mentally Retarded	26351 Patriots Way	▪ Air Emissions	▪ DNREC Environmental Navigator	103
Suburban Propane	525 Dupont Blvd.	▪ UST	▪ DNREC Environmental Navigator	104
Sussex Central Junior High School	302 E. State St.	▪ Air Emissions ▪ UST	▪ DNREC Environmental Navigator	105
Thorogood Concrete	Thorogoods Rd. (Millsboro)	▪ UST	▪ DNREC Environmental Navigator	106
Timmons Marine Engineering	565 Piney Neck Rd.	▪ UST	▪ DNREC Environmental Navigator	107
Total Performance Center	Hickory St. (Frankford)	▪ Hazardous Waste Generator	▪ DNREC Environmental Navigator	108
Town of Frankford	Frankford Ave.	▪ UST	▪ DNREC Environmental Navigator	109
Town of Millsboro	322 Wilson Hwy.	▪ UST	▪ DNREC Environmental Navigator	110
Town of Selbyville	68 W. Church St.	▪ UST	▪ DNREC Environmental Navigator	111
Town of	106 Polly	▪ Discharges to Water	▪ NPDES, non-major (NPDES	112

Table 3-29: EPA or DNREC Regulated Facilities

Facility	Address	Regulated Activity	Environmental Interest and (Data Source)	Figure 3-11 ID
Selbyville WWTP	Branch Rd.	▪ UST	permit) ▪ DNREC Environmental Navigator	
Townsend-Ingram Pond	SR 410 & 328A (Millsboro)	▪ Unpermitted Dump	▪ DNREC Environmental Navigator	113
Townsend Marketing	SR 24 E (Millsboro)	▪ UST	▪ DNREC Environmental Navigator	114
Uncle Ted's Trading Post	661 E. Dupont Blvd.	▪ UST	▪ DNREC Environmental Navigator	115
United States Postal Service	23 W. Church St.	▪ UST	▪ DNREC Environmental Navigator	116
US 113 Fuel Stop	US 113 (Dagsboro)	▪ AST	▪ DNREC Environmental Navigator	117
VFW Ambulance Service	Railroad Ave. (Millsboro)	▪ UST	▪ DNREC Environmental Navigator	118
Vlasic Foods, Inc.	SR 331 S (Millsboro)	▪ Discharges to Water ▪ Hazardous Waste Handler ▪ Reported Air Release ▪ Reported Toxic Release ▪ UST	▪ NPDES, major (NPDES permit) ▪ CESQG (RCRA notification) ▪ Air, minor (AIRS/AFS) ▪ National Emissions Inventory (NEI) ▪ TRI Reporter (TRI Reporting Form) ▪ DNREC Environmental Navigator	119
Warehouse	Railroad R-O-W (Selbyville)	▪ UST	▪ DNREC Environmental Navigator	120
Watson Vault	5 Polly Branch Rd.	▪ UST	▪ DNREC Environmental Navigator	121
Wawa #837	102 E. Dupont Blvd.	▪ Hazardous Waste Handler ▪ UST	▪ SQG (RCRA notification) ▪ DNREC Environmental Navigator	122
Whaley property	2 Oak Dr.	▪ UST	▪ DNREC Environmental Navigator	123
Wilgus Cleaners	65 Hosier St.	▪ Reported Air Release ▪ Hazardous Waste Generator	▪ Air, minor (AIRS/AFS) ▪ DNREC Environmental Navigator	124

Sources: EPA Envirofacts Data Warehouse and DNREC Environmental Navigator
Notes: [1] *Underground Storage Tank*
[2] *Above Ground Storage Tank*

The facilities with the most noteworthy EPA-regulated activities are Delmarva Power Indian River, Vlasic Foods, Inc., and the four Mountaire Corporation facilities in the area. Delmarva Power Indian River is a coal-powered 784 megawatt electric generation facility located on the Indian River. It has reported air releases, toxic releases, discharges to water, and is a hazardous waste handler. In addition, it has been subjected to enforcement compliance. Vlasic Foods produces pickles, peppers, and relish at its plant on SR 331 South in Millsboro. The plant has reported air releases, toxic releases, discharges to water, and is a hazardous waste handler. In addition, there is an underground storage tank on site. Mountaire Corporation's facilities in the study area are used for feed mill and hatchery operations, and for poultry processing. The Millsboro facility consists of almost 2,000 acres. Mountaire's facilities have reported air releases, toxic releases, and discharges to water. They also have underground and above ground storage tanks, and are hazardous waste handlers.


0 0.5 1 2 Miles
Proposed Alternatives
BL = Blue
GR = Green
PU = Purple
R = Red
Y = Yellow
Legend
Millsboro-South Study Area
Proposed Alternatives
Water Bodies
Streams and Rivers
Street Centerlines
EPA or DNREC Regulated Facility
FRANKFORD
MILLSBORO
DAGSBORO
SELBYVILLE
see inset
Waples Pond
Millsboro Pond
Betts Pond
Ingram Pond
Sheep Pen Ditch
Mirey Branch
Swan Creek
Indian River
Island Creek
Pepper Creek
Herring Branch
Wharton Branch
Iron Branch
Phillips Ditch
Wiley Branch Ditch
Houston-Thoroughgood Ditch
Fork #1 Pepper Creek
Vines Creek
Carey Branch
Cypress Swamp
Millsboro
Dagsboro
Frankford
Selbyville
Delaware
Maryland
LAWSON ROAD
MOUNT JOY ROAD
GRAVEL HILL ROAD
MORRIS MILL ROAD
DOC FRAME ROAD
HOLLYVILLE ROAD
DRANE ROAD
CORDREY ROAD
WARWICK ROAD
LAYTON DAVIS ROAD
ADAMS ROAD
BUNTING ROAD
PINEY NECK ROAD
POWERPLANT ROAD
VINES CREEK ROAD
IRON BRANCH ROAD
PATRIOTS WAY
BETHESDA ROAD
RICH ROAD
AVENUE OF HONOR
STOCKLEY ROAD
HARDSCRABBLE ROAD
MILLSBORO HIGHWAY
RADISH ROAD
HICKORY HILL ROAD
MOLLY FIELD ROAD
GUM TREE ROAD
SWAMP ROAD
BLUEBERRY LANE
BAKERS ROAD
REVEL ROAD
BLACKBERRY ROAD
CLAYTON STREET
PEPPER CREEK ROAD
CYPRESS ROAD
PARKER ROAD
PEPPER ROAD
POLLY BRANCH ROAD
LIGHTHOUSE ROAD
LYNCH ROAD
LINE ROAD
FRANKFORD SCHOOL ROAD
GUM ROAD
BYLER ROAD
ARMORY ROAD
RIVER DRIVE
OLD LANDING ROAD
WHITE STREET
STATE STREET
UNION STREET
MONROE STREET
MITCHELL STREET
US 113 North/South Study
Millsboro-South Study Area
EPA or DNREC Regulated Facilities
Source: DNREC Environmental Navigator & EPA EnviroMapper
July 2013
Figure 3-11
See Table 3-28 for Resource ID

Based upon the available information, there is no evidence of environmental contamination that would render this area unsuitable for development. Because this is a planning-level study, extensive investigations of individual contamination sites are not practical. As the project progresses through the design process, further investigations will occur. Trained DelDOT personnel will be onsite during construction, and any hazardous materials sites directly impacted by the project will be tested.

Environmental Consequences

Small portions of new right-of-way may be required for those programmed improvements or projects associated with the proposed No-build Alternative. Hazardous materials impacts for those independent projects would be addressed with their respective NEPA studies.

As shown in **Table 3-30**, each of the proposed build alternatives would impact at least one hazardous materials facility. The Blue Alternative impacts the fewest (8) hazardous materials sites, followed by the Green (10), Red (11), Purple (12), and Yellow (14) alternatives.

Table 3-30: Hazardous Materials Impacts

Facility	Address	Impacted by
Bill Cannon's Garage	36389 Dupont Blvd.	All
Brasure Property	712 Dupont Blvd.	Yellow
C & E TV	10 N. Dupont Blvd.	All
Fox Company	Railroad Tracks (Selbyville)	All
Generic Brand Petroleum	Dupont Blvd. (Selbyville)	All
Gray's Mobil	34114 Dupont Boulevard	Green, Purple, Yellow, Red
Jay's Market	34051 Dupont Boulevard	Green, Purple, Yellow, Red
K & J's Enterprises	Dupont Blvd. (Frankford)	Red
Metro Building Supply	18 N. Dupont Blvd.	Green, Purple, Yellow, Red
Millsboro BP #2461	28194 East Dupont Boulevard	All
Milford Fertilizer	Hickory St. (Frankford)	Green, Purple, Yellow
Millsboro TCE Site	225 N. Dupont Hwy.	Yellow
Mountaire Farms Franklin Feed Mill	11 Daisy St.	Green, Purple, Yellow
Mountaire Farms of DE, Inc.	29106 John J. Williams Hwy.	Yellow, Red, Blue
Murray Motors	SR 26 (Dagsboro)	Red, Blue
PRMC Family Medicine	Dupont Blvd. & SR 26	Purple, Yellow
Rosie's Place	US 113 (Frankford)	Green, Purple, Yellow, Red
Rusts Motor Service	SR 2 (Dagsboro)	Red, Blue
Selbyville Arby's	9 S. Dupont Blvd.	All
Total Performance Center	Hickory St. (Frankford)	Green, Purple, Yellow
Uncle Ted's Trading Post	661 E. Dupont Blvd.	Purple, Yellow

It is beyond the scope of this study to assess the potential impacts the alternatives would have on small generators of hazardous waste located within the study area. A more detailed investigation (Phase I and/or Phase II Environment Site Assessment) may be necessary during the design phase of the proposed project. Phase I Assessments use research and visual inspections to identify potential problems from the use of hazardous materials sites, while a Phase II Assessment involves collection and analysis of samples of potentially hazardous materials. Any

hazardous waste sites encountered during the design phase would require mitigation in accordance with federal and state standards and regulations.

Although severe contamination is not anticipated, the proposed construction will need to accommodate appropriate management and disposal of contaminated soil or groundwater that may be encountered during construction. Additional site investigation efforts may be warranted at the 21 sites listed in **Table 3-30** prior to property acquisition. The level of investigation may range from review of regulatory documents to formal Phase I Environmental Site Assessments or Phase II Site Investigations, depending on site conditions and the likelihood of property purchase.

3.10 NATURAL ENVIRONMENT

3.10.1 Topography, Geology, and Groundwater

Affected Environment

3.10.1.1 Topography

Topographic data were obtained through *Delaware DataMIL.com*, which provides interactive maps based upon United States Geological Survey (USGS) topographic mapping. The DataMIL website also provides information on elevation above mean sea level (MSL).

The proposed project is located entirely within the Atlantic Coastal Plain. Elevations range from sea level at the Indian River to approximately 39 feet above MSL near Frankford. Selbyville, Frankford, and Dagsboro are each approximately 30 feet above MSL, and Millsboro is 25 feet above MSL. The landscape throughout the study area is generally flat, with a few low, wide ridges and narrow, steep-sided stream valleys.

3.10.1.2 Geology

Geological data were obtained through maps from the *Delaware Geological Survey* (DGS) and the University of Delaware. Information obtained includes geologic formations exposed at ground surface and encountered in representative well logs throughout Sussex County.

The study area lies entirely within the Delmarva Coastal Plain physiographic province. The Coastal Plain is typified by sedimentary deposits that dip gently and increase in thickness toward the southeast. The geologic formation that occurs at the ground surface across most of the study area is the Pleistocene-age Columbia group (Columbia, Omar, and Beaverdam formations). This formation consists primarily of sands and gravels originating from glacial outwash and extends to depths of ten to over 100 feet below ground surface. This relatively recent formation covers the eroded surfaces of the older, dipping, Coastal Plain strata. See the *Natural Resources Technical Report* (NRTR) for further details.

The coarse material deposits of the Columbia group are a useful source of exploitable sand and gravel, which are important natural resources in southern Delaware. Greensand (glauconite), which is found in the St. Mary's Formation, has been used as fertilizer because it is a source of potash.

3.10.1.3 Groundwater

Groundwater is an important resource and commodity for the State of Delaware, especially in the Millsboro-South region, where public surface water supply systems are absent and groundwater is used for both domestic supply and farm irrigation. Wetland-dependent wildlife relies on groundwater to create wetland seep habitat. On average, Delaware receives 40 to 44 inches of rainfall per year, but not all of this water is available for use. From this yearly rainfall supply, approximately 20 inches evaporates, three inches is transpired by plants, and four to five inches is lost to surface runoff. The remaining 12 to 17 inches makes its way into the ground where it is stored in a system of groundwater aquifers that underlie most of the state.

Groundwater recharge is the infiltration of surface water into aquifers. In areas with excellent groundwater recharge potential, the first 20 feet below the surface is primarily composed of sand deposits. The DGS estimates that excellent recharge areas allow two to three times more water through the soils compared to fair or poor recharge areas. Infiltration rate is important for land use planning as it relates to water protection, particularly in areas (such as the study area) that obtain all of their drinking water from groundwater resources. Impervious surfaces such as new roadways preclude or severely limit infiltration of groundwater and can concentrate contaminants.

Groundwater recharge potential in the study area varies from poor to excellent, with the majority being fair. Groundwater recharge potential near Selbyville is fair to poor. It is poor near Frankford and generally fair to good in the Dagsboro and Millsboro vicinities, with only a few areas that are either poor or excellent.

The source water where contaminants are likely to move toward and reach the water supply in groundwater systems is called the wellhead protection area. DNREC guidelines indicate that wells in confined aquifers should have a fixed radius wellhead protection area of 150 feet. Those in unconfined aquifers vary, based on computer modeling. Sussex County enacted regulations "to ensure that land use activities are conducted in such a way as to minimize the impact on and reduce the risk of contamination of excellent groundwater recharge areas and wellhead protection areas which are the source of public drinking water throughout the county…." in June of 2008.

Environmental Consequences and Mitigation

Table 3-31 lists the acreage of new impervious surface in previously undisturbed areas, by recharge potential category, for each of the proposed alternatives. For all proposed alternatives, the majority of the new impervious surface would be in areas with fair or poor groundwater recharge potential. The Red and Blue Alternatives have the highest acreage of new impervious

surface within excellent groundwater recharge potential areas. Green, Purple, and Yellow impact far fewer acres with excellent groundwater recharge potential. Regardless of which alternative is chosen, Best Management Practices (BMPs) would be utilized to minimize the impacts of new impervious surfaces.

Table 3-31: Impacts to Groundwater Recharge Potential (acres)

Recharge Potential	Green	Purple	Yellow	Red	Blue
Excellent	0	0	5.2	136.8	136.8
Good	60.2	115.5	91	171.9	171.9
Fair	545.4	523.3	462.9	447.9	448
Poor	285.1	271.3	241.9	315.4	252.7

The Red and Blue alternatives would impact a large wellhead protection area on Power Plant Road. The Green, Purple, Yellow, and Red alternatives would affect a wellhead protection area just east of existing US 113, near Daisey Avenue in Frankford. All of the build alternatives would impact a wellhead protection area on both sides of existing US 113 near Hosier Street and Baker Road in Selbyville. Regardless of which alternative is chosen, impacts to wellhead protection areas would be minimized through implementation of appropriate BMPs.

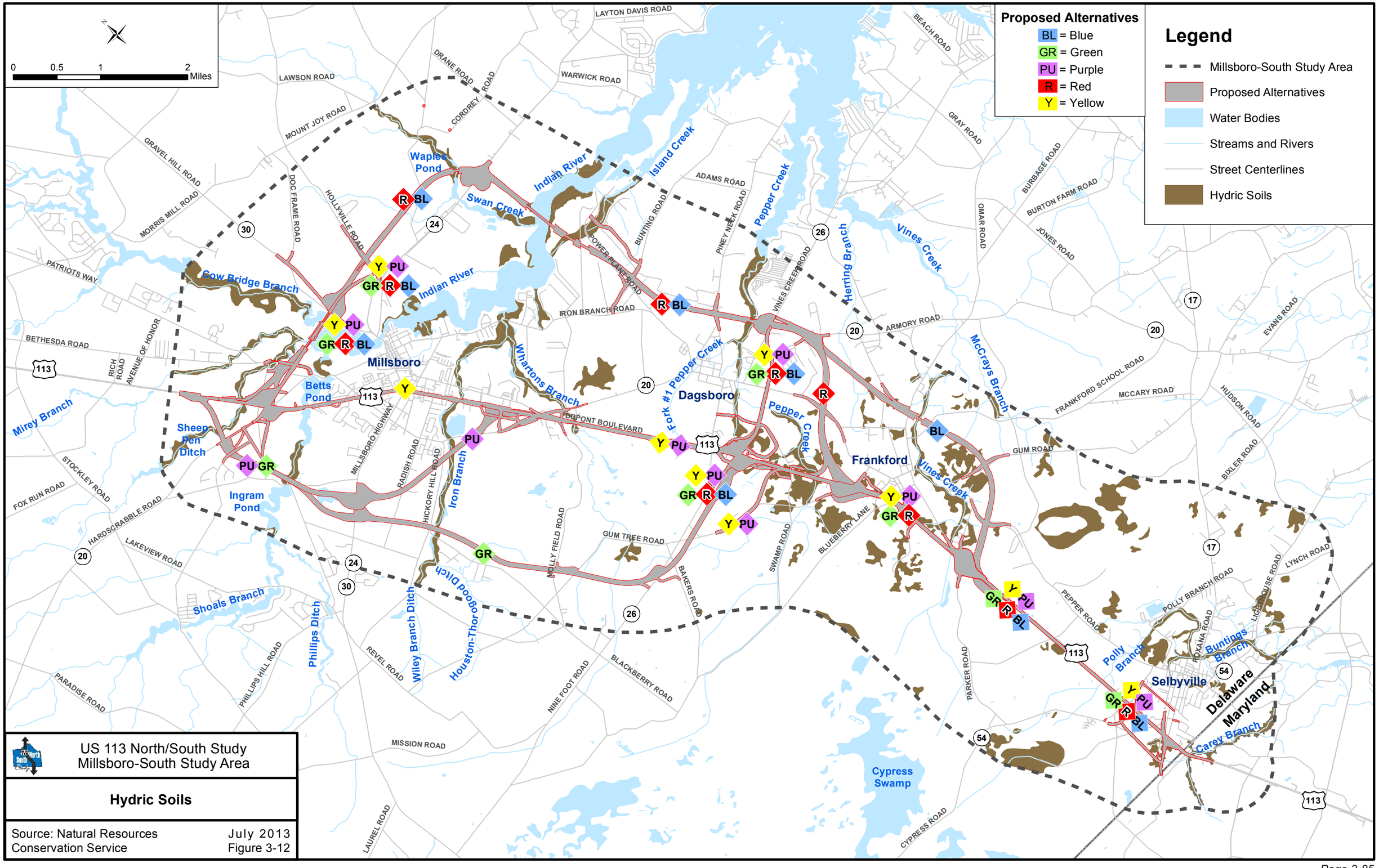
3.10.2 Soils

Affected Environment

Information on soils in the proposed project area was obtained from NRCS, the soil survey for Sussex County, and GIS soil layers. Soils in the study area consist primarily of sandy loams and loamy sands, indicating that there is little silt or clay. The soil survey supplies information on soil series and units in the project area. **Table 3** of the NRTR lists the mapped soils in the study area.

Hydric soils are those that formed under conditions of saturation, flooding, or ponding of sufficient duration during the growing season to develop anaerobic conditions in the upper part. Soils with hydric inclusions are those where more than 50% of the soil group is hydric, but the entire group is not. **Figure 3-12** shows hydric soils in the study area. The hydric soils shown do not reflect the full extent of the wetlands in the study area.

Since hydric soils are one of the three criteria that, by definition, must be present in classifying an area as a wetland, identifying them is important for land-use planning, conservation planning, and assessment of potential wildlife habitat. Hydric soils were identified using the *NRCS Web Soil Survey* for Sussex County. As shown in **Table 3** of the NRTR, there are seven mapped hydric soils in the study area. An additional seventeen soils are partially hydric.


0 0.5 1 2 Miles
Proposed Alternatives
BL = Blue
GR = Green
PU = Purple
R = Red
Y = Yellow
Legend
Millsboro-South Study Area
Proposed Alternatives
Water Bodies
Streams and Rivers
Street Centerlines
Hydric Soils
LAYTON DAVIS ROAD
BEACH ROAD
LAWSON ROAD
DRANE ROAD
CORDREY ROAD
WARWICK ROAD
GRAY ROAD
MOUNT JOY ROAD
GRAVEL HILL ROAD
MORRIS MILL ROAD
DOC FRAME ROAD
HOLLYVILLE ROAD
Waples Pond
Indian River
Swan Creek
Island Creek
ADAMS ROAD
PINEY NECK ROAD
Pepper Creek
BURBAGE ROAD
BURTON FARM ROAD
JONES ROAD
OMAR ROAD
BUNTING ROAD
POWER PLANT ROAD
Vines Creek
Herring Branch
VINES CREEK ROAD
PATRIOTS WAY
Cow Bridge Branch
Indian River
IRON BRANCH ROAD
ARMORY ROAD
EVANS ROAD
BETHESDA ROAD
RICH ROAD
AVENUE OF HONOR
Millsboro
Whartons Branch
Fork #1 Pepper Creek
Dagsboro
McCrays Branch
FRANKFORD SCHOOL ROAD
MCCARY ROAD
HUDSON ROAD
Mirey Branch
Betts Pond
DUPONT BOULEVARD
Sheep Pen Ditch
MILLSBORO HIGHWAY
RADISH ROAD
HICKORY HILL ROAD
Iron Branch
Pepper Creek
Frankford
Vines Creek
GUM ROAD
BIXLER ROAD
STOCKLEY ROAD
FOX RUN ROAD
HARDSCRABBLE ROAD
LAKEVIEW ROAD
Ingram Pond
MOLLY FIELD ROAD
GUM TREE ROAD
SWAMP ROAD
BLUEBERRY LANE
BAKERS ROAD
LIGHTHOUSE ROAD
LYNCH ROAD
POLLY BRANCH ROAD
PEPPER ROAD
ROXANA ROAD
Buntings Branch
Polly Branch
Selbyville
Delaware
Maryland
Carey Branch
PARKER ROAD
Shoals Branch
Phillips Ditch
Wiley Branch Ditch
Houston-Thoroughgood Ditch
PHILLIPS HILL ROAD
REVEL ROAD
NINE FOOT ROAD
BLACKBERRY ROAD
PARADISE ROAD
MISSION ROAD
LAUREL ROAD
Cypress Swamp
CYPRESS ROAD
US 113 North/South Study
Millsboro-South Study Area
Hydric Soils
Source: Natural Resources Conservation Service
July 2013
Figure 3-12

Prime farmland soils and soils of statewide importance were defined in **Section 3.2.4**, and mapped in the NRTR. Please refer to NRTR for additional information. Another nine soils may be classified as prime farmland soils if they are either drained or irrigated, as appropriate. Some soils of statewide importance may produce yields as high as those of prime farmland soils if conditions are favorable. There are nine mapped statewide important soils in the study area.

Environmental Consequences and Mitigation

Each proposed alternative would impact both hydric and prime farmland soils. **Figure 3-12** shows that hydric soils in the study area are generally limited to the areas adjacent to wetlands, creeks, and floodplains. Since all streams crossed during construction would be bridged, hydric soil impacts are likely to be minimal. Hydric and prime farmland soil impacts by alternative are shown in **Table 3-32**. The Blue Alternative would have 12.7 miles of new roadway construction and eliminate 101 acres of prime farmland soil from production. The Red Alternative would impact the fewest (72) acres of prime farmland soil. The Green, Purple, and Yellow alternatives will impact similar quantities of prime farmland soils (99, 86, and 81 acres, respectively). Impacts to prime farmland soil would be minimized to the extent practicable, but unavoidable impacts are an irreversible and irretrievable commitment of resources. There is no mitigation for impacts to prime farmland soils.

Table 3-32: Impacts to Hydric and Prime Farmland Soils

Soil Type	Green	Purple	Yellow	Red	Blue
Hydric Soils Impacted (acres)	60.5	62.6	55.0	59.1	47.2
Prime Farmland Soils Impacted (acres)[1]	99.3	86.3	81.0	72.4	101.2

Note: [1] Includes prime farmland already impacted or proposed for development

3.10.3 Surface Waters and Water Quality

In 1972, growing public awareness of water pollution and concerns about controlling it led to the enactment of the *Federal Water Pollution Control Act*. Amended in 1977, this law became known as the *Clean Water Act* (CWA). The CWA established the basic structure for regulating discharges of pollutants into the waters of the U.S.

Affected Environment

3.10.3.1 Drainage Basin and Watersheds

A hydrologic unit code (HUC) is a sequence of numbers or letters that identify a hydrological feature like a drainage basin or watershed. The fewer the digits in the HUC, the larger and less specific the area it describes.

The study area is located within the Chincoteague Drainage Basin (HUC-8). This basin is in the southeastern portion of the state, from the Maryland/Delaware state line to Lewes. It covers

approximately 203,000 acres, and drains to the Atlantic Ocean. The dominant land uses in the basin are agriculture, forests, and water.

Two sub-basins (HUC-10) of the Chincoteague Basin are located within the study area: the Indian River Bay and Inland Bays. There are eight watersheds (HUC-12) in these sub-basins. The study area's sub-basins and watersheds are listed in **Table 3-33**. **Figure 3-13** shows the study area watersheds.

Table 3-33: Sub-basins and Watersheds in the Study Area

Sub-basin (HUC-10)	Watershed (HUC-12)
Inland Bays	St. Martin River
	Assawoman Bay
	Little Assawoman Bay
Indian River Bay	Vines Creek-Indian River
	Swan Creek-Indian River
	Indian River Bay-Indian River Inlet
	Long Drain Ditch-Betts Pond
	Cow Bridge Branch-Indian River

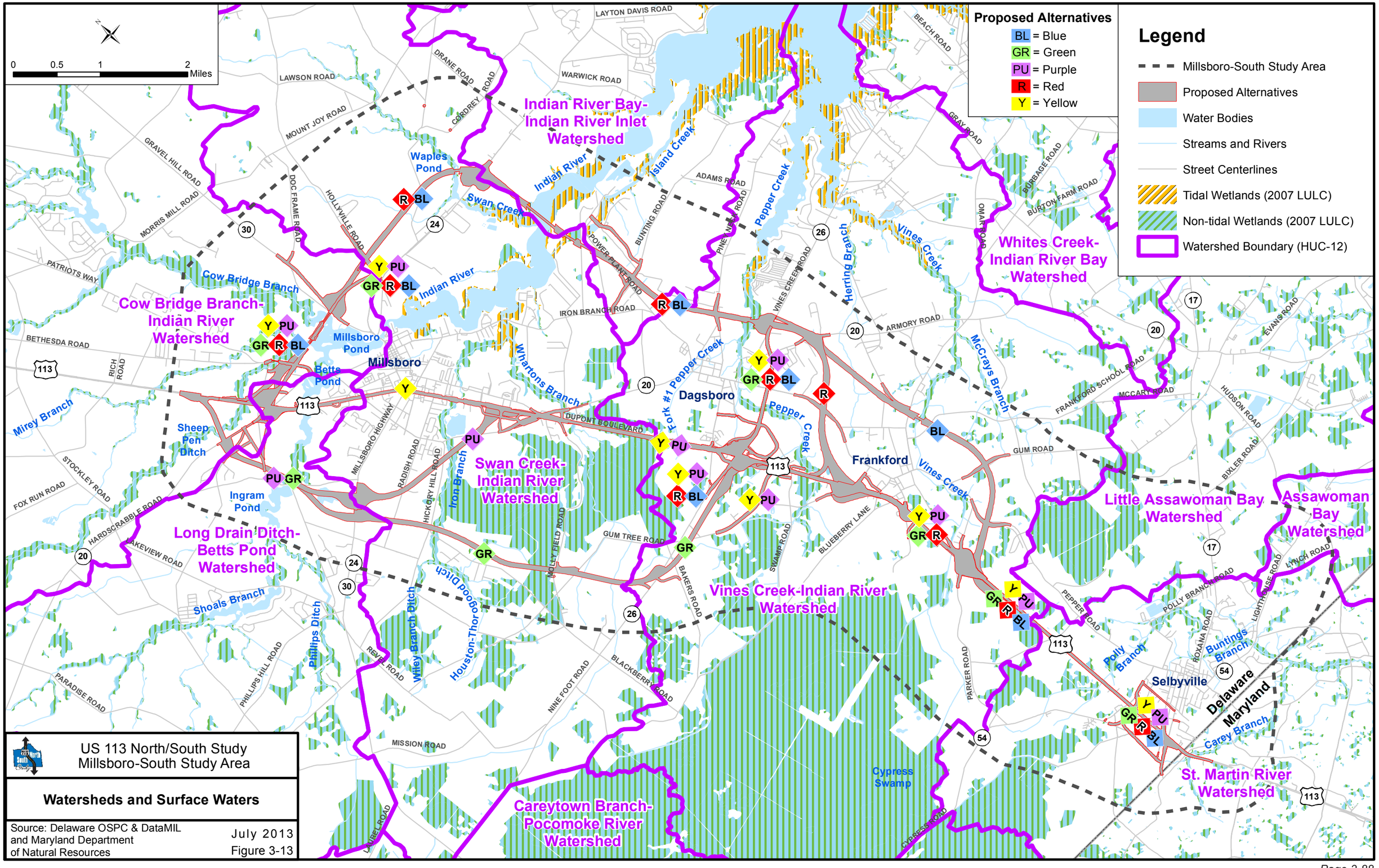
Land uses within the Inland Bays and Indian River Bay sub-basins include agriculture, brushland/forest, wetland, urban/residential, confined feeding operations, and barren. Between 1992 and 2002, the amount of land in agriculture and forests decreased rapidly, while urban land increased dramatically. According to DNREC, the primary watershed concerns are the presence of pathogens, nutrient loading, physical habitat condition, and protection of water supply. Further information on water quality standards can be found in the NRTR. Information on each watershed can also be found in the NRTR.

3.10.3.2 Water Quality

DNREC has obtained water quality data for ten of the surface water features in the study area. These water bodies are routinely monitored for typical water quality parameters: pH, temperature, DO, nitrogen levels, and phosphorus levels. See the NRTR for more details. In all cases where data were available, minimum pH levels in the study area were below the accepted standard. Maximum pH levels were acceptable in all cases. Temperatures were in the acceptable range in all water bodies. Minimum DO levels were below the acceptable range in 4 of the seven water bodies (57 percent) where they were measured. Total nitrogen levels exceeded the standard 70 percent of the time, but phosphorus levels were acceptable in all water bodies.

Environmental Consequences and Mitigation

Both drainage basins and most watersheds in the study area would be crossed by at least one alternative. Only the Assawoman Bay and Little Assawoman Bay watersheds would not be



US 113 North/South Study
Millsboro-South Study Area

Watersheds and Surface Waters

Source: Delaware OSPC & DataMIL and Maryland Department of Natural Resources

July 2013
Figure 3-13

crossed by an alternative. See **Section 3.10.5** for details on the anticipated impacts of each alternative.

Roadway projects can result in nonpoint source pollution. Typical pollutants from roadways include heavy metals, asbestos, and engine oils. Another chronic nonpoint pollutant is deicing salt that is transported into surface and groundwater. Delaware's Sediment and Stormwater Regulations are intended to minimize the amount of nonpoint source pollution that reaches waterways by utilizing BMPs and other acceptable stormwater management techniques as determined at the design stage. Some of these techniques include installing sediment basins, ponds, or filter systems to filter runoff prior to its entering the water system. While these guidelines would be complied with during all phases of the proposed project, and BMPs would be left in place following construction, nonpoint highway pollutants would still be transported into surface and ground water throughout the life of this project.

3.10.4 Floodplains

Affected Environment

In accordance with Executive Order 11988 – *Floodplain Management*, FHPM 6-7-3-2 *Location and Hydraulic Design for Encroachments on Floodplains*, and 23 CFR Part 650 Subpart A – *Location and Hydraulics Study*, the study area was evaluated for potential impacts to floodplains and floodways. The estimated 100-year floodplains in the study area were identified using Federal Emergency Management Agency (FEMA) Digital Flood Insurance Rate Maps. Regulatory floodways are areas that must be kept clear of any encroachments in order to accommodate a 100-year flood without any increases in the 100-year flood elevation.

The largest river within the study area is the Indian River, which drains into Indian River Bay. The Indian River has a large 100-year floodplain associated with it and many of its tributaries. These tributaries include Whartons Branch, Iron Branch, Island Creek, Swan Creek, an unnamed tributary to Swan Creek, Houston Thorogood Ditch, Wiley Branch Ditch, Phillips Ditch, Shoals Branch, Ingram Pond, Betts Pond, Millsboro Pond, Sheep Pen Ditch, Cow Bridge Branch, and Mirey Branch.

Pepper Creek and Vines Creek are two other large water bodies that drain into Indian River Bay. Both have large 100-year floodplains. Herring Branch, which drains into Vines Creek, also has a 100-year floodplain. Pepper Creek tributaries with 100-year floodplains include Fork Number 1 of Pepper Creek and an unnamed tributary. There is also a 100-year floodplain associated with Polly Branch, Buntings Branch, and an unnamed tributary to Buntings Branch.

The floodways in the study area are affiliated with Bunting Branch, Vines Creek, Pepper Creek, Fork Number 1 of Pepper Creek, an unnamed tributary to Pepper Creek, Whartons Branch, Iron Branch, Indian River, Betts Pond, Millsboro Pond, Sheep Pen Ditch, and Mirey Branch. The largest floodway, which ranges from approximately 120 to 1,950 feet wide, is along the Indian River.

Environmental Consequences and Mitigation

The No-build Alternative would not result in floodplain impacts. All floodways in the study area would be bridged, regardless of which build alternative is chosen. Although each of the proposed build alternatives crosses designated floodplains, bridges are proposed so that impacts to floodplains are either eliminated or reduced. Final bridge lengths would be determined following consultation with the resource agencies. Potential impacts to floodplains include displacement due to filling, alteration of drainage patterns, water quality degradation, reduction in flood storage capacity, and effects on floral and faunal communities. Executive Order 11988, *Floodplain Management,* prohibits federal support of incompatible floodplain development unless there is no practicable alternative. Since each of the alternatives would cross floodplains, there are no practicable alternatives that would allow total avoidance. None of the alternatives would support incompatible floodplain development.

Mitigation of impacts to floodplains would be accomplished by following the general guidelines for the design and construction of culverts and bridges listed in the National Flood Insurance Program. Additionally, the incorporation of stormwater management ponds during construction of the proposed project would meet the standards designed to reduce stormwater flows as required by the *Delaware Sediment and Stormwater Law* and the *Delaware Sediment and Stormwater Regulations.*

3.10.5 Waters of the United States, including Wetlands

Section 404 of the *Clean Water Act* regulates the discharge of dredged or fill material into waters of the United States (WOUS). WOUS include tidal and non-tidal wetlands, rivers, ponds, streams and some ditches. Most activities in WOUS, including infrastructure development (such as highways and airports) are regulated under this program. Section 404 requires a permit before dredged or fill material may be discharged into WOUS, unless the activity is exempt from Section 404. In addition the CWA requires federal permit applicants conducting any activity that may result in a discharge into navigable waters to provide the US Army Corps of Engineers (USACE) with a Section 401 certification. The certification, made by the state in which the discharge originates, declares that the discharge would comply with applicable provisions of the Act, including water quality standards requirements. Section 404 of the CWA is the primary vehicle for federal regulation of wetlands whereas Section 401 (Certification) specifies additional requirements for permit review, particularly at the state level. DelDOT would submit a Water Quality Certification application to the Wetlands and Subaqueous Lands Section, completed in accordance with Section 5.10, the Application Procedure, of the "Regulation Governing the Control of Water Pollution" (amended May, 2003), or the then-current revision.

3.10.5.1 Streams

Streams are moving bodies of water, confined within a bed and stream banks. They are important components of the water cycle, instruments in groundwater recharge, and corridors for fish and wildlife migration. Streams play an important role in connecting fragmented habitats,

and thus in conserving biodiversity. At the federal level, streams are regulated under the Section 404 of the CWA. Navigable waters are regulated under Section 10 of the *Rivers and Harbors Act*. DNREC regulates streams under Section 401 of the CWA and as subaqueous lands. Streams are one type of open water resource.

3.10.5.2 Subaqueous Lands

DNREC regulates Delaware's subaqueous lands, which consist of submerged lands and tidelands. Submerged lands are those "lying below the line of mean low tide in the beds of all tidal water within the boundaries of the State and the lands lying below the plane of the ordinary high water mark of non-tidal rivers, streams, lakes, ponds, bays and inlets within the boundaries of the State as established by law and specific manmade lakes or ponds as designated by the Secretary." Tidelands are lands lying between the mean high water and mean low water lines. According to the *Subaqueous Lands Act* (7 Del. Code §7202) "No person shall deposit material upon or remove or extract materials from, or construct, modify, repair or reconstruct, or occupy any structure or facility upon submerged lands or tidelands without first having obtained a permit, lease or letter of approval from the Department."

3.10.5.3 Tax Ditches

The Delaware General Assembly enacted the *Drainage Law* in 1951 to facilitate drainage and prevent flooding. The Law created a means to establish, finance, and maintain drainage organizations (tax ditches), which are governmental subdivisions of the State. Some tax ditches are regulated as subaqueous lands. See the NRTR for more details.

It should be noted that the boundaries of federally-regulated WOUS often overlap those of tax ditches and DNREC-regulated subaqueous lands and wetlands. As such, impacts for WOUS, tax ditches, subaqueous lands, and wetlands are not cumulative.

3.10.5.4 Non-tidal Wetlands

Under the CWA, wetlands are defined as "those areas that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions." Wetlands are protected at the federal level under the CWA and by DNREC under Section 401 of the CWA.

3.10.5.5 Tidal Wetlands

DNREC regulates Delaware's tidal wetlands under the state's *Wetlands Act*. State-regulated wetlands are defined as "those lands lying at or below two feet above local mean high water which support or are capable of supporting" certain plant species that are listed in the law and regulations. The locations of these State-regulated wetlands are shown on a set of official State Wetland Maps that were adopted as part of these Regulations.

Affected Environment

There are multiple large open water resources in the study area. The Indian River runs generally east to west through the northern portion of the study area. Millsboro Pond and Betts Pond are mill ponds located near Millsboro. Ingram Pond is another mill pond, located at the intersection of Godwin School Road and Revel Road. Waples Pond and Longwood Pond are the final large open water resources in the study area. These mill ponds are located along John J. Williams Highway, near Maryland Camp Road. They are connected through a breached dam.

There are numerous small named and unnamed streams/open water resources in the study area. Some of the named WOUS are Carey Branch, Iron Branch, Island Creek, Long Drain Ditch, Pepper Creek, Polly Branch, Sandy Branch, Sheep Pen Ditch, Swan Creek, Vines Creek, and Whartons Branch. Boundaries of large and small open water resources were identified using blue line streams and other bodies of water shown on the USGS 7.5 Minute Series topographic maps for the study area. All of the named streams in the study area have subaqueous lands associated with them.

The study area contains 19 tax ditches. All are associated with either streams or subaqueous lands.

Study area wetlands were originally identified off-site using *2002 Land Use/Land Cover* (LULC) data in association with *DNREC's Official Delaware Tidal Wetland Delineation Maps*, and the *Sussex County Soil Survey*. There are three large LULC wetland complexes in the study area: south of US 113 between SR 26 (Nine Foot Road) and Hickory Hill Road; along the southwestern boundary of the study area, between SR 54 and SR 26; and the Jay Patch wetland along Jay Patch and Pepper Roads between Selbyville and Frankford. The remaining wetlands in the study area occur primarily in association with, or in close proximity to, streams and waterways. There are tidally influenced wetlands associated with Pepper Creek, Island Creek, Whartons Branch, Iron Branch, the Indian River, and Swan Creek. These tidal wetlands extend approximately as far west as the town limits of Dagsboro and Millsboro.

The mapped wetland areas were field verified beginning in 2005. The boundaries were refined following periodic field visits with federal and state agency representatives between 2006 and 2009. Field determinations of wetland areas utilized methods described in the *1987 US Army Corps of Engineers' Wetlands Delineation Manual*. These determinations involved a review of existing conditions, including an inventory of the dominant vegetative species, an assessment of the hydrologic influences, and review of the soil profile. These field investigations were conducted in conjunction with the Corps of Engineers for an added measure of accuracy.

Results of the field determinations provided assurances that in the Millsboro-South study area, the GIS layer from the LULC database was sufficient in its mapping accuracy to allow a comparison of the proposed alternatives. Representatives from the USACE agreed that this effort was sufficient to preclude flagging the extent of each wetland system affected by the

alternatives. A detailed wetland survey would be conducted the time of final design and permitting.

Except for the tidal wetlands mentioned above, all wetlands in the Millsboro-South study area are palustrine. A palustrine wetland is any non-tidal wetland dominated by trees, shrubs, or emergent plants, mosses, or lichens. Tidal wetlands with levels of ocean-derived salts of less than 0.5 parts per thousand, and open water areas of less than 20 acres, are also considered palustrine systems. Most wetlands in the study area are forested (PFO), but scrub-shrub (PSS), emergent (PEM), and unconsolidated bottom (PUB) wetlands were also found. Descriptions of the wetland types are provided in the NRTR. Open water sites are those deepest areas in the Palustrine System (greater than 6 feet deep at low water) and therefore, are technically not wetlands. They may or may not be vegetated.

Wetlands in the study area were classified as high, medium, or low quality. High quality wetlands consist of mature, relatively undisturbed forests. Tidal wetlands that are relatively intact and not dominated by invasive species are also classified as high-quality. Medium quality systems are those with disturbed forests, such as those in power lines or with recent logging operations. Tidal wetlands dominated by invasive species still provide valuable wetland functions and are thus classified as medium quality. Low quality wetlands are those that are either isolated forests or non-forested. Several wetland systems have both high and medium quality components. Both the Vines Creek and Whartons Branch wetlands have high, medium, and low quality portions.

Figure 3-13 shows the location of wetlands and other WOUS resources within the Millsboro-South study area.

Environmental Consequences and Mitigation

The extent of the impacts of highway construction on surface waters is related to the number and nature of the surface water crossings.

Impacts to Open Waters
Two large open water resources would be impacted by the project if a build alternative is selected. Millsboro Pond would be impacted regardless of which build alternative is chosen. All of the alternatives would cross the pond in the same location, but the Red and Blue alternatives require more extensive bridging. They would each impact 4.0 acres of the pond, while the remaining build alternatives would each impact 1.1 acres. Only the Red and Blue alternatives would impact the Indian River. The two alignments run concurrently at a crossing of the river near the mouth of Swan Creek. They would each impact 4.5 acres of open water in the river. Green and Purple would impact a large unnamed borrow pit, and the other alternatives would each cross smaller, unnamed open waters.

Impacts to Linear Features

Table 3-34 shows the proposed alternatives and the named surface waters that they cross. As shown in the table, a number of unnamed surface waters are also crossed by each alternative. Impacts to streams, linear subaqueous lands, and tax ditches are often to the same resource, and therefore should not be summed to get a total impact figure. The impacts reflect the project's anticipated Limits of Disturbance near the stream crossings. Subaqueous land impacts are based on an estimate of the State's jurisdictional subaqueous lands in the study area. To date, no jurisdictional determination (JD) has been completed. During permitting for the project, a JD would be prepared.

Table 3-34: Surface Water Crossings by Proposed Alternative

Proposed Alternative	Linear Feet of Stream Impacts	Linear Feet of Subaqueous Land Impacts	Linear Feet of Tax Ditch Impacts	Water Course Name
Green	1,135	1,135	0	Carey Branch
	316	316	0	Iron Branch
	329	329	0	Long Drain Ditch
	937	937	0	Millsboro Pond[1]
	1,583	1,231	1,966	Pepper Creek
	79	189	112	Polly Branch
	194	430	484	Sandy Branch
	574	574	0	Sheep Pen Ditch
	16,655[2]	11,458[2]	23,903[2]	unnamed waters
	344	344	0	Vines Creek
	307	307	307	Whartons Ditch
	22,453	**17,250**	**26,772**	**TOTAL**
Purple	1,135	1,135	0	Carey Branch
	452	452	0	Iron Branch
	331	331	0	Long Drain Ditch
	937	937	0	Millsboro Pond[1]
	346	463	713	Pepper Creek
	133	133	235	Pepper Creek, Fork No. 1
	79	189	112	Polly Branch
	194	430	484	Sandy Branch
	574	574	0	Sheep Pen Ditch
	10,333[2]	8,644[2]	17,000[2]	unnamed waters
	344	344	0	Vines Creek
	176	176	0	Whartons Branch
	15,034	**13,808**	**18,544**	**TOTAL**
Yellow	1,135	1,135	0	Carey Branch
	313	313	0	Iron Branch
	937	937	0	Millsboro Pond[1]
	346	463	713	Pepper Creek
	133	133	235	Pepper Creek, Fork No. 1
	79	189	112	Polly Branch
	194	430	484	Sandy Branch
	120	120	0	Sheep Pen Ditch

Table 3-34: Surface Water Crossings by Proposed Alternative

Proposed Alternative	Linear Feet of Stream Impacts	Linear Feet of Subaqueous Land Impacts	Linear Feet of Tax Ditch Impacts	Water Course Name
	10,562[2]	8,723[2]	17,000[2]	unnamed waters
	344	344	0	Vines Creek
	213	213	0	Whartons Branch
	14,376	**13,000**	**18,544**	**TOTAL**
Red	1,135	1,135	0	Carey Branch
	1,436	1,436	0	Indian River[1]
	30	30	0	Island Creek
	934	934	0	Millsboro Pond[1]
	493	493	496	Pepper Creek
	79	189	112	Polly Branch
	194	430	484	Sandy Branch
	145	145	0	Sheep Pen Ditch
	141	141	0	Swan Creek
	11,643[2]	12,538[2]	18,680[2]	unnamed waters
	423	423	0	Vines Creek
	16,653	**17,894**	**19,772**	**TOTAL**
Blue	1,135	1,135	0	Carey Branch
	333	332	389	Herring Branch
	1,436	1,436	0	Indian River[1]
	30	30	0	Island Creek
	934	934	0	Millsboro Pond[1]
	218	218	0	Pepper Creek
	79	189	112	Polly Branch
	194	430	484	Sandy Branch
	145	145	0	Sheep Pen Ditch
	141	141	0	Swan Creek
	14,290[2]	15,550[2]	13,857[2]	unnamed waters
	311	311	0	Vines Creek
	19,246	**20,851**	**14,842**	**TOTAL**

[1] *The Indian River and Millsboro Pond also have impacted acreage. See the* ***Impact Matrix*** *for details.*
[2] *total linear feet of unnamed waters*

Table 3-35 summarizes the linear feet of impacts to surface waters by each alternative. The impact data shown in **Tables 3-34** and **3-35** reflect the new impervious surface in or near surface water crossings. The No-build Alternative would not have any direct impacts on surface waters. The Green Alternative would have the highest linear feet of stream impacts, followed by Blue, Red, Purple, and Yellow. The Blue Alternative would impact the most linear feet of subaqueous lands, followed by Red, Green, Purple, and Yellow. The Green Alternative would impact the most linear feet of tax ditches, followed by Red, Purple, Yellow, and Blue.

Table 3-35: Total Linear Feet of Impacts to Surface Waters by Alternative

Aquatic Resource Type	Alternatives				
	Green	Purple	Yellow	Red	Blue
Streams	22,453	15,034	14,376	16,653	19,246
Subaqueous Lands	17,250	13,808	13,000	17,894	20,851
Tax Ditches	26,772	18,544	18,544	19,772	14,842

Direct impacts to open waters would be reduced through a variety of means. Bridging is the most effective means of reducing impacts, and all streams crossed for this proposed project would be reviewed during final design for the opportunity for bridging. One potential concern with water crossings is fragmentation of fish habitat. Each crossing would be examined to ensure that the most appropriate method is used to maintain fish passage. Countersinking and bottomless culverts are two options for addressing this impact. Other design measures, such as reducing the width of the roadway and median, could reduce surface water impacts and would be identified later during the permitting and final design processes.

Unavoidable impacts to the streams and subaqueous lands would be mitigated for based on quality and function, principally through relocation of channels and restoration of existing channels using natural stream design and riparian buffer enhancement. Preservation and/or restoration may be employed at selected sites. Regardless of which alternative is chosen, DelDOT is committed to maintaining the continuity and flow of the tax ditches, and would ensure that maintenance activities are still possible. See the NRTR for details on compensatory mitigation.

Impacts to Wetlands

A total of 36 wetlands would be impacted by one or more of the proposed alternatives. These wetlands were numbered south to north, west to east. Where possible, the wetlands were given names, based on the water body with which they are associated. However, many of the impacted wetlands are not associated with a named surface water. Wetland impacts are shown by alternative in the NRTR. A description of the affected wetlands and their dominant vegetation can also be found in the NRTR.

A summary of total wetland impacts is provided in **Table 3-36**. The Purple Alternative would create the greatest impacts to wetlands (31.3 acres), followed by Blue (30.8 acres), Red (26.5 acres), Green (24.9 acres), and Yellow (20.1 acres). There would be no wetlands impacted in the St. Martin River, Assawoman Bay, or Little Assawoman Bay watersheds (see **Figure 3-13**.) Regardless of the alternative chosen, most impacts would be to high-quality wetlands. There would be only minimal impacts to low-quality wetlands.

Table 3-36: Total Wetland Impacts by Alternative (acres)

	Green	Purple	Yellow	Red	Blue
High Quality	23.7	29.3	17.7	22.1	24.9
Medium Quality	1.2	2.0	2.4	4.4	5.4
Low Quality	0.0	0.0	0.0	0.0	0.5
TOTAL	**24.9**	**31.3**	**20.1**	**26.5**	**30.8**

Table 3-37 provides a breakdown of impacts to each wetland system by alternative and wetland quality. The break down confirms that the majority of the wetlands are considered high quality systems.

Table 3-37: Impacts to Wetland Systems by Alternative

Proposed Alternative	Wetland Name	Impacts* (acres)			Wetland Type
		High Quality	Medium Quality	Low Quality	
Green	Iron Branch	8.1			PFO
	Long Drain Ditch	5.5			PFO
	Pepper Creek	5.4			PFO
	Polly Branch	0.7			PFO
	Sheep Pen Ditch	3.4	<0.1		PFO
	Vines Creek	0.6	1.1		PFO
Purple	Iron Branch	4.1			PFO
	Long Drain Ditch	5.5			PFO
	Pepper Creek	2.7			PFO
	Fork No. 1, Pepper Creek	12.3	0.7		PFO
	Polly Branch	0.7			PFO
	Sheep Pen Ditch	3.4	<0.1		PFO
	Vines Creek	0.6	1.1		PFO
	Whartons Branch		0.1		PFO
Yellow	Iron Branch	0.3			PFO
	Pepper Creek	2.7			PFO
	Fork No. 1, Pepper Creek	12.3	0.7		PFO
	Polly Branch	0.7			PFO
	Sheep Pen Ditch	0.9	<0.1		PFO
	Vines Creek	0.6	1.1		PFO
	Whartons Branch	0.2	0.5		PFO
Red	Indian River	0.7			Tidal Emergent
	Island Creek		0.6		Tidal Emergent
	Pepper Creek	13.1			PFO
	Polly Branch	0.7			PFO
	Sheep Pen Ditch	2.4			PFO
	Swan Creek	1.2			PFO
	Vines Creek	0.7	1.1		PFO
Blue	Indian River	0.7			Tidal Emergent
	Island Creek		0.6		Tidal Emergent
	McCrays Branch	< 0.1			PFO
	Pepper Creek	9.7			PFO
	Polly Branch	0.7			PFO
	Sheep Pen Ditch	2.4			PFO
	Swan Creek	1.2			PFO
	Vines Creek	7.0	2.2	0.5	PFO

**Wetland impacts shown have been reduced due to the inclusion of bridging in the design.*

Wetland impact estimates were calculated based on the proposed project's limit of disturbance and preliminary design for interchanges. They have been reduced due to the inclusion of bridging in the design. It was assumed that all wetland areas within the limits of disturbance would be directly displaced, even though it is anticipated that impacts would be reduced through further design refinements and minimizing the limits of construction within the project footprint. Further minimization will be presented in the FEIS, when more refined engineering and design are available.

In addition to the direct wetland impacts which result from the clearing and filling of wetland areas within the project's right-of-way, there are also indirect impacts that may occur to those wetland areas that are adjacent to and/or potentially affected by the construction of the proposed project. These impacts may include increased levels of sediment-, nutrient-, or pollutant-laden stormwater runoff and/or the alteration of floodwaters and wetland hydrology (i.e., water table) which may in turn result in changes to wetland communities. In general, the potential for indirect impacts is higher for those alternatives that have the most direct impacts and are adjacent and parallel to large tracts of wetlands. Another indirect impact would be shading from bridges. Indirect impacts would be minimized through the implementation of appropriate erosion and sediment control measures, as well as through the proper sizing, design, and alignment of drainage structures, and design measures to minimize bridge footprints.

Impact Minimization

In accordance with Executive Order 11990, *Protection of Wetlands*, wetlands and open waters were given special consideration in developing and evaluating alternatives, and have been avoided where practical. Anticipated impacts to wetlands and other WOUS are based on the limits of disturbance and have been reduced through inclusion of bridges in the project design to span sensitive wetland areas and streams. For the mainline of the road facility, the limit of disturbance includes the toe of the fill slope or head of the cut slope. Bridges have a smaller out-to-out footprint than a roadbed with a fill slope, and have less permanent fill in areas such as wetlands and water crossings. Wetlands or open waters under a bridge experience limited direct impacts due to the placement of footers, piers or pilings, shading, or temporary construction measures. In addition, the area under bridges is precluded from reverting to a mature forested state, and installing a bridge through a forested wetland is considered a conversion impact. However, the areas under the structures would be allowed to revegetate, thereby maintaining the hydrological and habitat connectivity of the affected wetland systems they cross. The acreage of reduced impacts depends on the bridge design and construction methods that are selected.

Direct impacts may also be reduced through design measures that reduce the width of the roadway and median. These measures, such as using 2:1 slopes or retaining walls, would be identified during the permitting and final design process. Indirect impacts to wetlands and open waters may also occur due to construction activities, traffic operation, and maintenance. Restricting the location of staging areas and temporary construction causeways in wetlands would reduce indirect impacts. Implementation of strict erosion and sediment control measures during construction would minimize temporary impacts to WOUS. Additionally, various control measures would be incorporated into the roadway design and maintenance plans to reduce

impacts to wetland hydrology and water quality. These include the use of stormwater basins and other BMPs as a means of mitigating expected impacts to water quality. Where possible, stormwater basins would be installed in areas that have previously been developed but that are currently abandoned, such as old strip malls, rather than into undeveloped land.

Stream Compensation
Unavoidable impacts to the streams and subaqueous lands would be compensated for based on quality and function, principally through relocation of channels and restoration of existing channels using natural stream design and riparian buffer enhancement. Preservation and/or restoration may be employed at selected sites. Currently, mitigation banks for stream impacts do not exist in Delaware, and DNREC has not agreed to subaqueous lands impact compensation through mitigation banking. Therefore only permittee-responsible mitigation has been explored. See the NRTR for details on compensatory mitigation.

Wetland Compensation
The mitigation strategy for this proposed project is currently being developed, and would ensure that there is full replacement of the acreage of the wetlands that would be impacted. In general, the current approach would be to develop a permittee-responsible comprehensive mitigation plan to meet recommended replacement ratios. Current replacement ratios are forested at 2:1, scrub-shrub at 1.5:1, and emergent at 1:1. These ratios are the same for both estuarine and palustrine systems. Preference shall be given to mitigation opportunities within the same watershed as the impacts. Generally, restoration of wetlands is more feasible and sustainable than creation of wetlands. Opportunities for wetland restoration as a means of compensation would be fully evaluated. However, DNREC currently requires tidal wetland creation to compensate for tidal wetland impacts.

While current policies indicate mitigation banking is preferred over permittee-responsible compensatory mitigation, the USACE District Engineer has broad discretion in determining appropriate compensatory mitigation. The conceptual mitigation strategies described in the NRTR were developed with the USACE and are considered appropriate compensation for unavoidable impacts. It is important to note that the existing policies with respect to compensation ratios and mitigation methods may change prior to actual project design, permitting, and construction. If so, the then-current replacement ratios and policies would be followed. See the NRTR for more details on proposed mitigation.

3.10.6 Wild and Scenic Rivers and Natural Landmarks

Affected Environment

The *National Wild and Scenic Rivers Act* of 1968 resulted from recommendations of the Outdoor Recreation Resources Review Commission. The Commission recommended that the nation protect wild rivers and scenic rivers from development that would substantially change their wild or scenic nature. A river or river segment may be designated by either Congress or the Secretary of the Interior, due to its remarkable scenic, recreational, geologic, fish and wildlife, historic,

cultural, or other similar values. Designated rivers or sections of rivers are preserved in their free-flowing condition and are not dammed or otherwise altered.

According to the National Park Service, Wild and Scenic Rivers internet site, there are no National Wild and Scenic Rivers located within the study area. According to the National Park Service, National Natural Landmark internet site, of the 600 designated National Natural Landmarks, none are located within the study area.

Environmental Consequences and Mitigation

There would be no impacts to National Wild and Scenic Rivers or National Natural Landmarks as a result of this proposed project. Therefore, no mitigation is necessary.

3.10.7 Vegetation and Wildlife

Affected Environment

All of Sussex County, except the marshlands and beaches, was once covered with hardwoods. Terrestrial habitat types were characterized based on aerial mapping and field observations. Several different habitat types occur throughout the study area. An overview of each habitat type, as well as the general type of wildlife and vegetation that each supports, is included in the following sections. Lists of the species most likely to occur in each habitat are provided in the NRTR.

Agricultural Land
The most abundant habitat found in the study area is agricultural land, which consists of cropland, feedlots, farmsteads, rangeland, and pasture. Large areas of agricultural land are often separated by narrow tree rows, roadways, stream valleys, or residential or commercial areas. Wildlife which typically dwells or feeds on agricultural land includes white-tailed deer (*Odocoileus virginianus*), red fox (*Vulpes vulpes*), raccoon (*Procyon lotor*), various rodent species, and upland game birds.

Developed Habitat
Developed land is the second most abundant habitat in the study area and includes commercial, residential, industrial, and park areas. Wildlife found in developed habitat includes species adapted to the "edge habitats" created when developed areas are adjacent to agricultural land or forests. Vegetation in developed habitats includes both native and non-native plants. Some of the non-native plants become invasive. Landscape plantings are also common in this habitat.

Meadow Habitat
Meadow habitat is mostly comprised of former agricultural land that has been abandoned for several years. These areas are classified as early successional upland habitat or herbaceous upland habitat. Vegetation in these areas consists of pioneering grasses and forbs, including many of the species found in developed habitats. Wildlife species found in meadow habitat

include small mammals, white-tailed deer, and multiple bird species. Reptiles may also inhabit meadows.

Forest Habitat
Forest habitat is scattered throughout the study area. The majority of the forest land is privately owned for timber production. As a result, forests in the study area are rarely mature or enduring. Large tracts of forest are located near the Indian River, Cow Bridge Branch, and along Bunting Road. Forests in the study area are generally characterized as early- to mid-successional. Oaks or loblolly pines are dominant, depending on the forest successional stage, on the better drained soils. Forest cover in the study area is shown on **Figure 3-14**.

State Natural Areas and Nature Preserves
Delaware established the Natural Areas Preservation System (7 Del. Code, Chapter 73) in 1978 to create a statewide inventory of natural areas and a system of nature preserves. A natural area, as defined by the law, is an "area of land or water, or of both land and water, whether in public or private ownership, which either retains or has reestablished its natural character (although it need not be undisturbed), or has unusual flora or fauna, or has biotic, geological, scenic or archaeological features of scientific or educational value." As of July 2009, there were 68 natural areas identified in the state.

"Nature Preserves" are natural areas that have been formally "dedicated," or estate, interest or rights transferred, to DNREC for and on behalf of the State. As of July 2009, there were 27 dedicated nature preserves in the state.

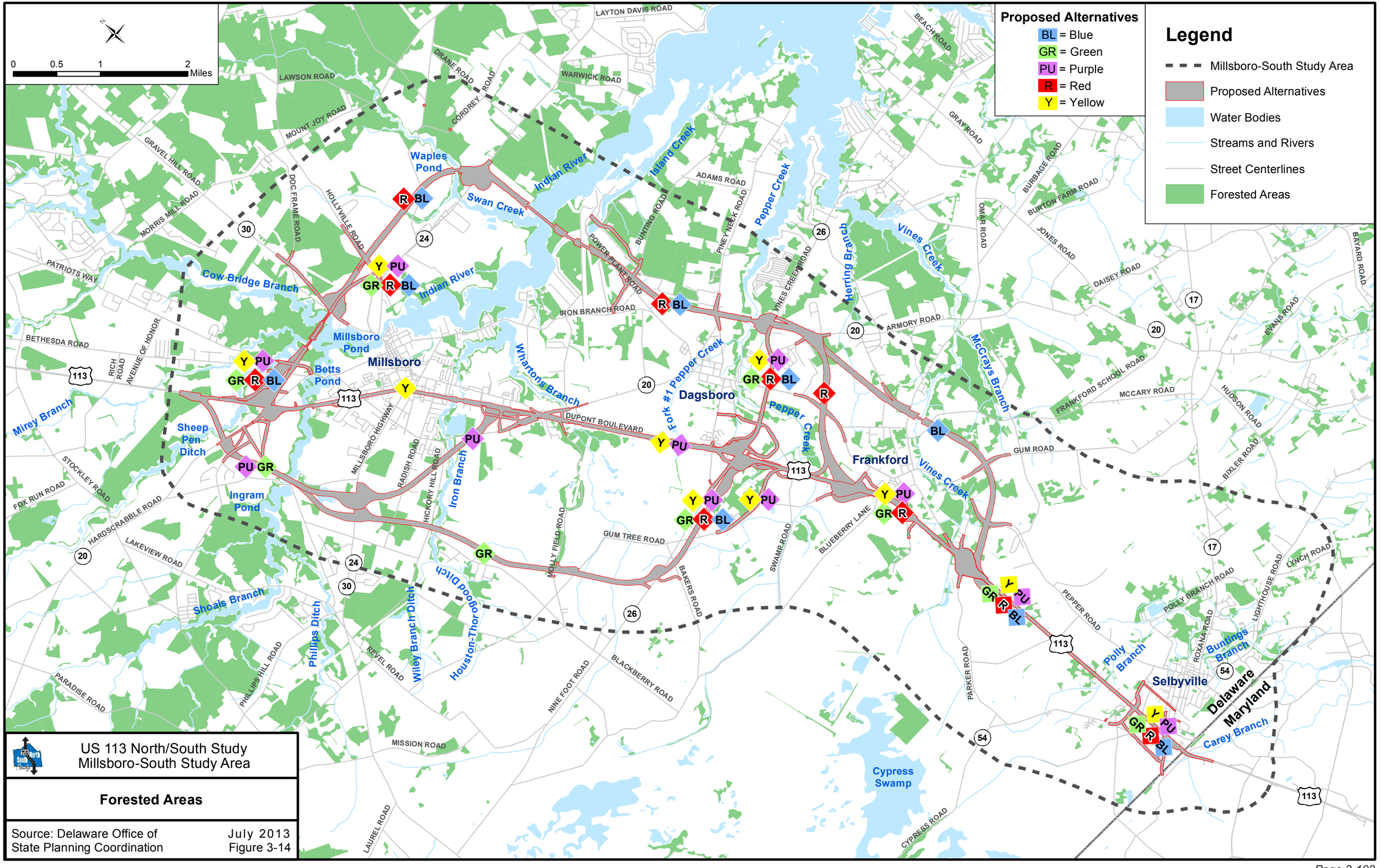
There are four State Natural Areas in the study area. They are the Doe Bridge Natural Area, the Vines Creek Natural Area, the Omar Formation Natural Area, and the Great Cypress Swamp Natural Area. The only nature preserve in the study area is Doe Bridge, an ecologically-unique resource near Millsboro Pond. State natural areas in the study area and the Doe Bridge nature preserve are depicted on **Figure 3-15**.

Environmental Consequences and Mitigation

Any impacts of the No-build Alternative's projects would be determined with those individual project's NEPA studies. The proposed build alternatives would each impact upland habitat, as summarized in **Table 3-38**. Given the predominance of forests and agricultural land in the study area, those were the only types of upland habitats that were considered.

Table 3-38: Impacts to Forests and Agricultural Land

Proposed Alternative	Total Undeveloped Uplands (acres)	Agricultural Land (acres)	Upland Forest (acres)
Green	607	537	70
Purple	519	457	62
Yellow	366	324	42
Red	762	631	131
Blue	769	607	162

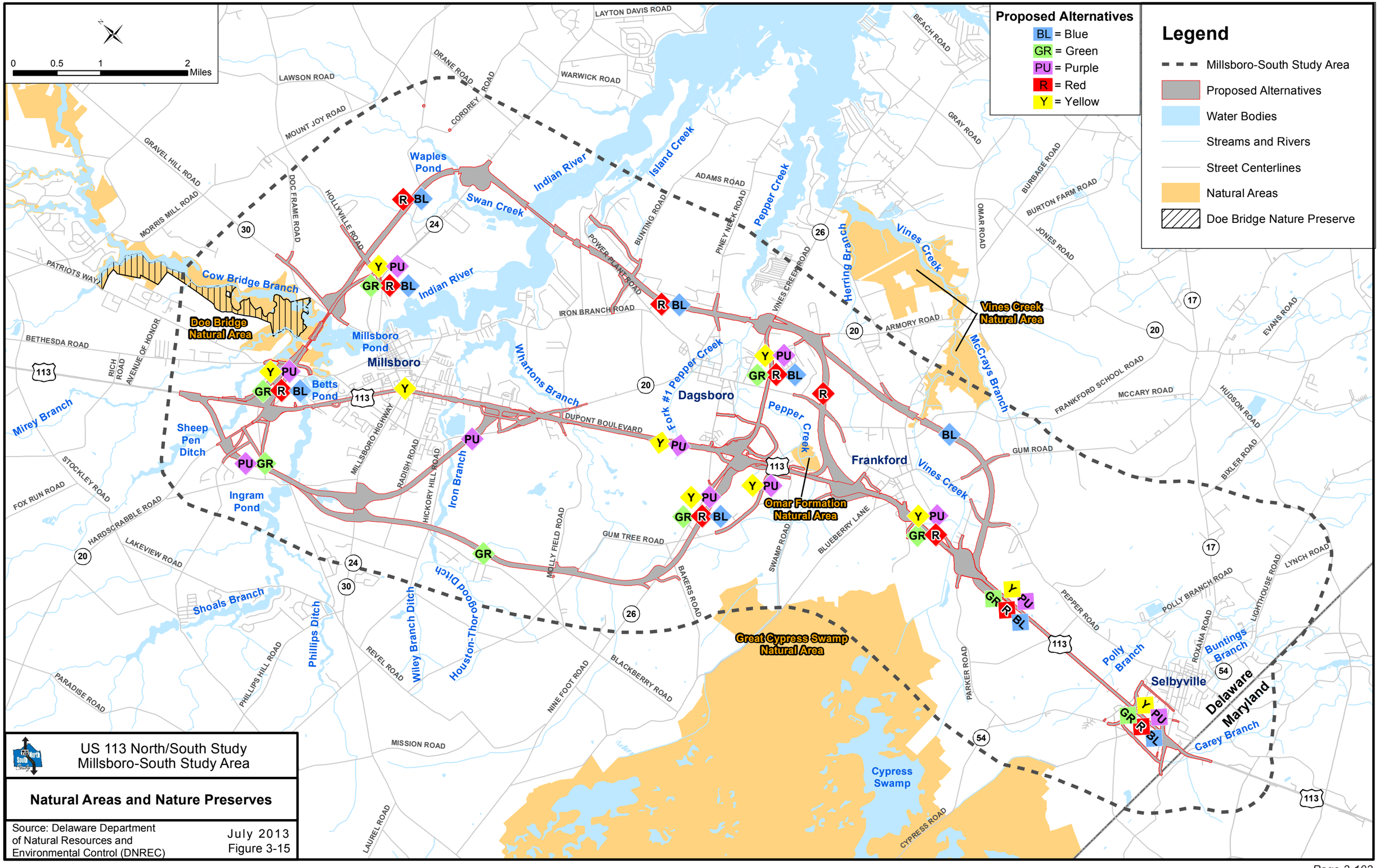


US 113 North/South Study
Millsboro-South Study Area

Forested Areas

Source: Delaware Office of State Planning Coordination

July 2013
Figure 3-14



US 113 North/South Study
Millsboro-South Study Area

Natural Areas and Nature Preserves

Source: Delaware Department of Natural Resources and Environmental Control (DNREC)

July 2013
Figure 3-15

Agricultural Land
The greatest impacts to agricultural land would occur with the Red Alternative (631 acres), while the Yellow Alternative would produce the fewest impacts (324 acres). The Green, Purple, and Blue alternatives impact between 457 and 607 acres of agricultural land. Impacts may occur due to fragmentation of farmland, making it more difficult to reach some fields or requiring additional effort by farmers to conduct their operations. Compensation for impacted farmland would be provided as discussed in **Section 3.2.4**.

Forest Habitat
Direct forestland impacts are greatest for the Blue Alternative at 162 acres, and least for the Yellow Alternative at 42 acres. The remaining alternatives cause direct impacts to between 62 and 162 acres of forestland. Additional impacts to forestlands include fragmentation and the subsequent increased likelihood of invasive species becoming established in forested areas. Because they pass through some areas with relatively large tracts of contiguous forest, implementing either the Red or Blue alternative would result in the most secondary impacts to forested land. However, no quantitative assessment has been conducted to determine the amount of fragmentation that would occur with any of the alternatives.

Forestland impacts would be minimized to the maximum extent practicable, and compensation would be provided for unavoidable impacts. In keeping with the requirements of Delaware's *Landscaping and Reforestation Act*, mitigation would be performed in accordance with Appendix A of DelDOT's *Road Design Manual*. See the NRTR for more details.

State Natural Areas and Nature Preserves
Potential impacts to these resources include habitat loss, forest fragmentation, wetland filling, noise pollution, air pollution, and the addition of new impervious surfaces. Modifications were made to each of the proposed alternatives to avoid direct impacts to Doe Bridge Nature Preserve. Based on current alignments, the nearest proposed limit of disturbance is 850 feet from this ecological resource. Although the proposed alternatives would not cross the Preserve, their proximity to it may impact the variety of floral and faunal resources currently identified at the nature preserve. DelDOT is committed to on-going coordination with DNREC to determine ways of minimizing the impacts to this ecologically important area.

Each of the alternatives would impact the Doe Bridge Natural Area near Cow Bridge Branch and Millsboro Pond, immediately adjacent to the Doe Bridge Nature Preserve. Impacts range from 12.2 acres for the Green, Purple, and Yellow alternatives to 23.0 acres for the Red and Blue alternatives. The entire natural area consists of 2,377 acres, therefore in the worst case scenario, less than one percent of the natural area would be subject to direct impacts. DelDOT is committed to on-going coordination with DNREC to determine ways of minimizing the impacts to this resource.

The Vines Creek Natural Area, adjacent to Vines Creek, would be crossed by the Blue Alternative. However, DelDOT was able to develop a viable alignment in and adjacent to an existing utility corridor, thus minimizing impacts to intact vegetation. Various methods are

being investigated to minimize impacts to natural areas, including minimization of pavement, minimization of corridor clearing, and bridging wetlands.

Wildlife
The primary impact of the proposed build alternatives on wildlife would be the elimination of habitat and the loss of smaller less mobile wildlife species located within the corridor. A four-lane roadway can sever or bisect populations of less mobile species such as reptiles, amphibians, and small mammals, resulting in isolation of certain populations and a possible reduction in the species' genetic integrity. Further impacts are likely in the form of road-kills, as animals migrate or wander across the roadway in search of food, cover, and breeding grounds. Reptiles increase their risk of being road-killed when they use the road surface for basking.

Additional impacts would occur in the form of forested ecosystem fragmentation. Because stream corridors generally represent the last vestiges of forested area, the stream corridors are also important wildlife corridors. Fragmentation, in the form of new roadway impediments, would further reduce the habitat value of the area for species that require large contiguous forested tracts. Impacts to species sensitive to human disturbance could also occur. While this fragmentation may have beneficial impacts to species adapted to edge habitat types, populations of these species are generally not in decline.

The proposed project's expected impacts to wildlife can be reduced through design measures, such as bridging and countersinking of culverts to allow for wildlife crossings, installing fencing at key crossings to keep wildlife off the roadway, using wildlife-friendly erosion control netting, and reducing the roadway footprint and median width. In addition, temporary impacts can be reduced by minimizing staging areas and construction access roads in valuable habitats.

3.10.8 Rare, Threatened, and Endangered Species

The Endangered Species Act (ESA) of 1973 was enacted to protect both species and their critical habitat. It protects plants, invertebrates, and vertebrates. The ESA prohibits federal agencies from authorizing, funding or carrying out actions which may jeopardize endangered species (Section 7(a)(2)). At the ecosystem level, the ESA requires that endangered species be granted "critical habitats" which encompass all areas necessary for their recovery (Section 3(5)(A)). Federal agencies are forbidden from authorizing, funding, or carrying out any action which "destroys or adversely modifies" a critical habitat area (Section 7(a)(2)).

Affected Environment

Federal Species
Correspondence from the US Fish and Wildlife Service (USFWS), dated 28 November 2006, indicated that two federally listed species, Bald Eagle (*Haliaeetus leucocephalus*) and swamp pink (*Helonias bullata*), may be located within the project area. Biological information on these species is available in the NRTR. Since receipt of the USFWS letter, the Bald Eagle has been

removed from the Endangered Species list. However, it is still protected by the *Bald and Golden Eagle Protection Act* and the *Migratory Bird Treaty Act*.

In the fall of 2007, a DNREC zoologist sighted a federally-endangered Delmarva fox squirrel at the Doe Bridge Nature Preserve. Two seasons of intensive photo monitoring provided no additional evidence of Delmarva fox squirrels in the Nature Preserve. Therefore, the USFWS has determined that the squirrel sighted in 2007 was a transient individual and no Section 7 consultation is necessary at this time. DelDOT would continue coordination with the USFWS as the project advances. Should Delmarva fox squirrels be sighted in the future, formal Section 7 consultation must be initiated.

The perennial swamp pink is federally-threatened. The plant is found in saturated, usually organic soils or black mucks which are mostly covered in moss (sphagnous). This habitat is prevalent throughout the stream valleys in the study area. Swamp pink has been located in some of the stream valleys in the study area. As described in the NRTR, two biologists conducted field searches for swamp pink at every build alternative stream/wetland crossing in the study area. If a build alternative is selected, more complete searches would be performed along each stream and wetland crossing prior to construction.

State Species

DNREC's Natural Heritage Program maintains a database of rare plant and animal species and natural communities in Delaware. This inventory contains information from a variety of sources, including publications, museum and herbarium collections, and field work. The database is updated as new data are obtained. **Appendix A** of the NRTR lists those species and natural communities that, according to data provided by DNREC, are likely to occur within the study area and that are considered very rare or extremely rare. It contains one non-vascular plant, 39 vascular plants, 14 invertebrates, 16 vertebrates, and ten natural communities. **Table 3-39** is derived from **Appendix A** of the NRTR. It contains those species which could be impacted by one or more of the proposed alternatives.

Table 3-39: Delaware Species of Conservation Concern Potentially Impacted

Common Name	Scientific Name	Taxon	State Rank	Impacted by
baldcypress	*Taxodium distichum*	Vascular Plant	extremely rare	Yellow
Bald Eagle	*Haliaeetus leucocephalus*	Vertebrate Animal	very rare (breeding)	All
Barred Owl	*Strix varia*	Vertebrate Animal	very rare	All
bayonet rush	*Juncus militaris*	Vascular Plant	rare to very rare	All
Black Vulture	*Coragyps atratus*	Vertebrate Animal	very rare (breeding)	Red, Blue
blackbanded sunfish	*Enneacanthus chaetodon*	Vertebrate Animal	very rare	All
cutleaf water-milfoil	*Myriophyllum pinnatum*	Vascular Plant	rare to very rare	All
Delmarva fox squirrel	*Sciurus niger cinereus*	Vertebrate Animal	extremely rare	All
Elliott's goldenrod	*Solidago latissimifolia*	Vascular Plant	rare to extremely rare	Red, Blue

a firefly	*Photuris frontalis*	Invertebrate Animal	extremely rare	All
gray-banded zale	*Zale squamularis*	Invertebrate Animal	extremely rare	All
ironcolor shiner	*Notropis chalybaeus*	Vertebrate Animal	very rare	All
mud sunfish	*Acantharchus pomotis*	Vertebrate Animal	very rare	Yellow, Red, Blue
Red-headed Woodpecker	*Melanerpes erythrocephalus*	Vertebrate Animal	extremely rare	All
Red-shouldered Hawk	*Buteo lineatus*	Vertebrate Animal	very rare	All
swamp pink	*Helonias bullata*	Vascular Plant	very rare	All
Torrey's beak-rush	*Rhynchospora torreyana*	Vascular Plant	rare to very rare	Purple, Yellow
an underwing moth	*Catocala ulalume*	Invertebrate Animal	extremely rare	All
water bulrush	*Schoenoplectus subterminalis*	Vascular Plant	rare to very rare	All
Yellow-throated Warbler	*Dendroica dominica*	Vertebrate Animal	very rare (breeding)	All

In addition to the species listed in **Table 3-39**, DNREC has indicated that two unique natural communities are likely to be impacted by the proposed project. Inland dune ridge woodlands may be impacted by all of the alternatives. Baldcypress-red maple-tupelo swamps may be impacted by the Yellow Alternative.

Many of the state-listed species are associated with wetlands and other waters of the US, which are protected under Section 404 of the Clean Water Act. Impacts to WOUS would be avoided and minimized, in turn minimizing the impact to state listed species. DelDOT would continue to coordinate with DNREC to minimize impacts to state-listed species to the greatest extent practical.

Environmental Consequences and Mitigation

The USFWS's National Bald Eagle Management Guidelines recommend a 600 foot vegetated buffer be maintained around a nest tree during roadway construction to promote acceptable conditions for eagles. Activities that would cause temporary impacts, such as the use of loud machinery, should be conducted outside the breeding season. In addition, mature trees should be maintained within ½ mile of permanent waters to provide potential nesting and roosting sites. There are three Bald Eagle nests in the study area. The closest nest is one recently discovered on Swan Creek; it is less than 50 feet from the Red and Blue alternatives. The Bald Eagle nest in Millsboro Pond is approximately 275 feet from the Red and Blue alternatives. All of the alternatives are farther from the nest at the confluence of Indian River, Whartons Branch, and Iron Branch. Should the proposed Red or Blue alternative be selected as the Preferred Alternative, consultation with the USFWS and DNREC would be required.

No new element occurrences of swamp pink were found during the field searches, but this does not prove that there are no new populations in the area. Suitable habitat exists around Cow Bridge Branch, Stockley Branch, Mirey Branch, Sheep Pen Ditch, and tributaries to Ingram Pond, Betts Pond, and Millsboro Pond. Iron Branch, Whartons Branch, Island Creek, Pepper Creek, Herring Branch, Polly Branch, Buntings Branch, and Vines Creek, along with a tributary

to it, also provide habitat. The wetlands associated with Jay Patch and Cypress Swamp also provide suitable habitat. Prior to applying for permits, a more detailed survey would be conducted with DNREC to verify the presence or absence of the species along the stream corridor. Should a new element occurrence be found, Section 7 consultation with the USFWS would be initiated.

To protect swamp pink, the project was designed to minimize impacts of hydrologic changes, siltation, and runoff (both quantity and quality) in the watershed. This would be accomplished via the use of bridging and stormwater management facilities, to reduce sedimentation.

Mitigation measures to reduce potential impacts to threatened or endangered species would be similar to those mentioned in **Section 3.10.8**. They include the use of design measures such as bridging, countersinking of culverts, and reducing the roadway footprint and median width. In addition, temporary impacts can be reduced by minimizing staging areas and construction access roads in valuable habitats. After the construction footprint has been determined, and prior to construction of the proposed action, DelDOT would conduct additional coordination with DNREC's Division of Fish and Wildlife to further refine mitigation measures. They may include the use of time of year restrictions on construction, contractor training in recognizing and avoiding threatened and endangered species and their habitats, and on-site restoration of habitat.

3.11 CLIMATE CHANGE

Greenhouse gases (GHG) are those that trap heat in the earth's atmosphere, potentially contributing to climate change. Naturally-occurring greenhouse gases include water vapor, carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O), and ozone. Human activities create additional greenhouse gases, such as chlorofluorocarbons, hydrofluorocarbons (HFCs), and perfluorocarbons. The primary greenhouse gases that enter the atmosphere due to human activities are CO_2, CH_4, N_2O, and fluorinated gases.

Transportation is a major source of GHG. For example, transportation accounted for approximately 28 percent of the total greenhouse gas emissions in the United States in 2006. DNREC reports that transportation is responsible for 24 percent of GHG in Delaware. Any combustion of gasoline or diesel fuel releases CO_2 into the air. CH_4 and N_2O are also byproducts of fuel combustion; HFC emissions are produced by vehicle air conditioners and refrigerated transport.

Greenhouse gas emissions from both the transportation and electric power industry have increased at an average rate of two percent annually since 1990. Emissions from the agricultural and industrial sectors each increased at a rate of approximately 0.8 percent annually during the same period. Emissions from commercial and residential sources decreased slightly during this period.

Changes in temperature, precipitation, and sea level from climate change could impact the region's hydrology, leading to reduced stream and river flow, lower aquifer recharge rates, and

reduced water supply. These changes would negatively impact the ecology of Delaware's forests, wetlands, and estuarine habitat. They could also alter agricultural production. The Northeast Climate Impacts Assessment discusses a number of ways climate change is projected to affect the water resources in the Northeast. For example, climate change will likely bring increased precipitation during the winter and spring, increasing stream flow and groundwater supply during these months, while also increasing the risk of winter flooding. The increased winter precipitation is expected to fall mostly as rain, and warmer winter temperatures will shorten the snow season and reduce snowpack in many northern states. Rising temperatures and the increased incidence of short-term droughts could cause extended low-flow periods in the summer, increasing the risk of water supply shortage problems during the summer and fall months.

While drought conditions may become more frequent during the hotter months of the year, heavy rain events have the potential to increase surface runoff. More stormwater runoff will increase the risk that surface water supplies in lakes, rivers, ponds, and reservoirs could be contaminated by sewage, agriculture, and industrial pollutants. According to the EPA, many of Delaware's shallow aquifers are already contaminated by industrial pollutants. Increased precipitation could exacerbate groundwater contamination by increasing the inflow of contaminants into the state's aquifers.

In February 2010, the CEQ issued draft guidance on the ways Federal agencies can consider the effects of GHG and climate change in the evaluation of proposed Federal actions under NEPA. As this guidance is still in draft form and potentially subject to change, it does not yet have any direct implications for developing transportation projects.

It is not useful or informative at this time to consider greenhouse gases as part of the US 113 North/South study. The sources of greenhouse gas emissions are global, and climate change does not easily lend itself to analysis at a local level. In addition, NEPA dos not explicitly require an analysis of GHG at the project level and no national standards have been established. Given the global scale of emissions, it is also not useful to make greenhouse gas emissions comparisons among the ARDS for this study. By comparing the anticipated traffic volumes and speeds along the project corridor for both the build and no-build conditions, it can be concluded that, relative to the scope of global climate change, any change in GHG levels as a result of the project are likely to be insignificant.

The NEPA process was designed to concentrate on analyzing issues that can be meaningful in the consideration of project alternatives, not to amass data that is not relevant when evaluating alternatives. Because there is no regional or national framework for considering the implications of project-level GHG analysis, conducting such an analysis would not benefit decision making for the project, and would add to the administrative burden.

3.12 SEA LEVEL RISE

Changes to and losses of the State's coastal resources are anticipated as a result of sea level rise. Sea level rise causes shore line erosion, inundation of wetlands and uplands, changes to habitat, and damage to public infrastructure. Coastal and coastal-adjacent areas are under increased threat of saltwater contamination from sea level rise. Saltwater intrusion occurs when excessive pumping from coastal aquifers decreases the pressure gradient between underground freshwater and ocean saltwater. As freshwater is pumped from the underground aquifers to the surface, saltwater is drawn into the aquifers, leading to contamination.

Coastal areas along the Northeast, including southeastern New England, Massachusetts' Cape Cod area, and New Jersey, are already experiencing saltwater intrusion. The Intergovernmental Panel on Climate Change's projections of a 7-23 inch sea level rise by the end of the century, depending on future emission scenarios, indicate that Delaware's shallow groundwater supplies may be at risk from saltwater intrusion. Delaware's 381 miles of shoreline also make it susceptible to saltwater intrusion.

Because it is not possible to precisely predict future rates of sea level rise, DNREC supports using a range of scenarios that represent low, medium, and high estimates of future global warming. The recommended scenarios are: 1.6 feet, 3.3 feet, and 4.9 feet. These scenarios are based on historical data for local sea level rise and incorporate the predictions of national and international experts. The three scenarios can be used as a planning tool to assess potential sea level rise impacts between now and the year 2100.

Considering both local and global factors, anticipated sea level rise in Delaware is between 1.6 and 4.9 feet between 2012 and the year 2100. As shown in **Table 3-40**, the majority of the projected sea level rise in the study area in the next 100 years would be approximately 3.3 feet. The greatest impact from all levels of sea level rise would occur within the Red Alternative (4.7, 12.1, and 14.4 acres, respectively).

Table 3-40: Area of Alignment Exposed to Sea Level Rise by the Year 2100 (acres)

Proposed Alternative	Anticipated Sea Level Rise		
	1.6 Feet	3.3 Feet	4.9 Feet
Green	0	1.5	1.7
Purple	0	1.5	1.7
Yellow	0	2.4	2.7
Red	4.7	12.1	14.4
Blue	0	6.0	9.5

Source: DNREC, 2012

Another risk of sea level rise is impacts to infrastructure. With this project, the crossings of Millsboro Pond, Swan Creek, the Indian River, and Pepper Creek would be the most vulnerable. To address this, the proposed roadway profile will be elevated throughout a majority of the alignment, including overpasses and waterway crossings. For the purpose of concept design, the

profile grade of the new roadway will be elevated a minimum of five feet above the existing 100-year floodplain. The profile grade will continue to be refined through final design to identify and adjust the roadway elevation to minimize the effects of the sea level rise.

3.13 PERMITS

3.13.1 Permit Application

A "Wetlands and Subaqueous Lands Section Basic Application Form" must be submitted to the DNREC Division of Water Resources in order to receive permits for work in State jurisdictional Subaqueous Lands including streams and open water, State jurisdictional Tidal Wetlands as shown on the 1988 Tidal Wetlands Mapping. Such work may include construction, dredging, filling, or excavation.. The Basic Application Form will also requests a "Water Quality Certification" under Section 401 of the Clean Water Act from DNREC. An "Application for a Department of the Army Permit" must be submitted in order to receive a individual permit from the Philadelphia District Army Corps of Engineers for work in Federally jurisdictional Wetland and Other Waters of the U.S (streams and open waters). See the NRTR for a list of federal and state regulations protecting wetlands.

The USACE and DNREC would each issue a public notice of this proposed project, solicit public comments, and conduct a public interest review that includes those comments. Compensatory mitigation would be required for impacts to each jurisdictional resource. See the NRTR for the proposed mitigation package. The mitigation strategy will be further defined when permit applications are submitted.

If the Red or Blue alternative is selected as the preferred alternative, a permit from the United States Coast Guard (USCG) would be required for the bridge over the Indian River. DelDOT has begun coordination with the USCG District in Norfolk, Virginia, to develop a conceptual height and clearance for the bridging of the Indian River. An application consistent with the USCG Bridge Permit Application Guide, would be submitted if the Red or Blue alternative is selected.

3.13.2 Federal Consistency

Effective December 19, 2006, the National Oceanic and Atmospheric Administration (NOAA) revised the regulations implementing the federal consistency provisions of the *Coastal Zone Management Act* (CZMA) of 1972. Federal consistency is one of the most important tools available to states for managing development activities within their coastal zones. In Delaware, oversight is provided by the *Delaware Coastal Management Program*. Pursuant to CZMA (15 CFR Part 923), the DCMP was approved by NOAA in 1979. To comply with this regulation, federal activities which are reasonably likely to affect any land or water use, or natural resources, in the state's designated coastal resources management area must be consistent with the

enforceable policies of the DCMP. As such, DCMP will be review the project to determine if it is consistent with Delaware's coastal zone management policies.

Because no portion of the State is more than eight miles from tidal waters, Delaware's Coastal Management Area, as defined by the *Del. Code Ann. Title 7 Chapter 70 Section 7001-7013*, includes the entire State. The DCMP has an approved set of policies, including pre-existing State laws, regulations, and executive orders, for reviewing projects for Federal Consistency.

Because federal funding would be used and federal permits would be required for wetland impacts a consistency determination from the DCMP is required. DCMP currently prefers to issue the Federal Consistency Statement at the conclusion of the NEPA process, however under certain circumstances, the Statement would be issued immediately prior to the USACE permit .

Applicants for federal consistency submit a statement of "consistency", along with a complete project description and analysis of impacts, to DCMP. The statement of consistency indicates that the applicant has reviewed the Coastal Management Program policies and believes that the project adheres to them. DCMP reviews are typically complete within 90 days, but more complex projects may take up to six months to review.

Federal consistency reviews are conducted by DCMP staff, often with input from other state and federal agencies. Following a review, the applicant receives either a "consistency concurrence" or "denial of consistency concurrence." The former indicates that the Coastal Management Program agrees that the proposed project is in keeping with its policies, and that the project may proceed. The latter means that the proposed project may not proceed until it is modified to adhere to the Coastal Management Policies.

All agencies with enforceable regulatory programs of the DCMP have been given the opportunity to review and comment on this document. The proposed project would be conducted with all pertinent federal and state permits and other authorizations including the applicable enforceable regulatory policies of the DCMP.

3.13.3 Other Permits, Approvals and Certifications

Any construction or fill within the FEMA 100 year floodplain, or any non-delineated 100 year floodplain would require approval by New Castle County. In addition any increase in the FEMA 100 year floodplain requires a letter of authorization from FEMA. A New Castle County floodplain permit would be requested through the submission of and Application for Plan Review (SLD-1 Form) and supporting hydraulic information for each crossing of the FEMA 100 year floodplain or non-delineated 100 year floodplain. If necessary as the result of an increase in the FEMA 100 year floodplain, a Conditional Letter of Map Revision (CLOMR) would be requested from FEMA through the submission of an MT-2 Application and supporting hydraulic information.

The National Pollutant Discharge Elimination System (NPDES) regulates the discharge of pollutants into Waters of the U.S. including runoff during construction. The DNREC General NPDES Permit covers discharges during construction activities following the submission of a Notice of Intent form to DNREC. In addition, Delaware's Sediment and Stormwater Program requires construction projects to have approved erosion and sediment control and stormwater management plans. DNREC has delegated the authority to administer and enforce the Sediment and Stormwater Program to DelDOT on DelDOT projects. Therefore, erosion and sediment control and stormwater management plan approval will granted by DelDOT with the approval of the final plans for construction.

3.14 CONSTRUCTION IMPACTS

Several environmental impacts can occur during construction of the roadway, but they can be controlled, minimized, or mitigated through careful attention to prudent construction practices and methods. Potential construction impacts and preventative practices are summarized below.

Water quality
Project construction would likely result in short-term impacts to nearby water resources from sedimentation. Strict adherence to both temporary and permanent erosion and sedimentation controls, as outlined in the current version of the *Delaware Erosion and Sedimentation Control Handbook*, would minimize these impacts. Construction activities would be staged so that exposure of cleared areas and erodible earth are minimized to the extent possible. Wherever feasible, erosion control measures would be retained as permanent features in the roadway design. Construction impacts would also be mitigated by performing work adjacent to waterways during periods of low flow. Extreme caution would be exercised to prevent spilling of materials, fuels, and lubricants into waterways during construction. In the event any contractor dumps, discharges or spills any contaminant that may affect water quality, he would immediately notify all appropriate local, state, and federal agencies and would take immediate action to contain and remove the contaminant.

Borrow and Disposal Sites
Construction of this project would create borrow and disposal sites. However, impacts from these sites cannot be fully addressed until further details are available in the final planning and design process. Borrow and disposal sites would be kept out of wetlands and other environmentally-sensitive sites.

Detours, Traffic Maintenance and Control
Temporary detours and delays to local traffic would occur during construction, particularly at locations of crossroad bridges and interchange construction. An increase in truck traffic would occur during the construction period and access to construction areas may require temporary access roadways to staging/storage areas and the construction site. This can be mitigated by defining designated truck routes and parking areas as part of the construction traffic plan. Maintenance of the current flow of traffic on the existing roadway network would be planned and scheduled to minimize traffic delay throughout the proposed project. In construction areas,

traffic control measures using the standard practices, as defined in DelDOT's *Traffic Controls for Street and Highway Construction and Maintenance Operations*, would be used. In addition to following these standards, DelDOT would prepare news releases and schedules of construction activities and make them available to the public.

Solid Waste Disposal
Any solid waste impacts created during construction would be temporary. All material resulting from clearing and grubbing, demolition, or other construction operations resulting in solid waste material, would be removed from the project area, ground up for mulch, or otherwise disposed of by the contractor. Other construction debris, such as used forms, maintenance waste, and general trash, would be collected and disposed of at local landfills.

Air Quality
Air quality impacts from construction would be temporary and consist primarily of emissions from diesel powered construction equipment and fugitive dust. To minimize the potential adverse impacts to air quality, construction activities would be performed in accordance with DelDOT's 2004 *Road Design Manual*. Measures would be taken to minimize exposed earth by stabilizing with grass, mulch, pavement, or other cover as early as possible, applying water as a stabilizing agent to working or haulage areas, covering, shielding, or stabilizing of stockpiled materials as necessary, and the use of covered trucks.

Noise and Vibration
The construction of the proposed project would result in temporary noise and vibration increases along the corridor. Noise and vibration impacts result from two sources: construction noise and increases over existing noise from additional traffic generated by construction activity. The contractor's operations would be performed in such a manner that noise levels would not substantially impact nearby noise sensitive activities. Land uses that are sensitive to traffic noise are also sensitive to construction noise.

Generally, increased noise and vibration are limited to areas within 300 feet of the source. To limit the effects, construction activities would typically be limited to weekday daylight hours, in accordance with local ordinances. Should the contractor need to deviate from normal work hours, DelDOT has mechanisms in place to work with the affected community to minimize impacts from the change in hours.

Some potential mitigation measures that may be employed include adjustments to equipment, provision of temporary noise barriers, distribution of noise events, good communication with the public, and financial incentives to contractors.

Utilities
The proposed project would require some adjustment, relocation, or modification to existing public utilities. The degree of modification, limited to temporary interruption of service during construction, varies between the alternatives. The Yellow Alternative would have the greatest

impacts. The disruption in utility service during construction can be minimized by phased adjustments to the utility in conjunction with roadway construction operations.

Health and Safety
All contractors would be required to comply with federal, state, and local laws governing safety, health, and sanitation during the course of construction. Employees are bound by the safety guidelines and outlined in Section D 3.00 of the DelDOT *Construction Manual*. All reasonable safety considerations and safeguards necessary to protect the safety of the public, and to protect property in connection with roadway construction, would be taken.

Constructability of the Yellow Alternative
Each of the proposed build alternatives runs concurrently with the Yellow alterative for at least a portion of its length. Because of the need to maintain traffic under the Yellow Alternative and maintain reasonable access to the numerous homes and businesses existing along the US 113 corridor, the time to construct the improvements will be longer than a bypass alternative. The contractor constructing the improvements will have to allocate time toward maintaining reasonable access, taking time away from constructing the improvements, and adding time to the overall project. The timeframe is also compounded by the numerous utilities and drainage systems along the existing corridor, which also must be maintained. Energy and communication outages of any appreciable extent will not be tolerated by the citizens impacted by those outages. Similarly, potential drainage impacts associated with the reconstruction of the existing drainage system must be eliminated. To minimize these potential impacts, additional time must be allotted in the construction contracts to address this issue.

Addressing drainage issues would entail ensuring that there is an adequate stormwater management system and that the existing stormwater system is maintained during construction. Initially, traffic would be diverted so that a new storm system could be constructed along the existing roadway to avoid future interference with structures constructed as part of the project. The opportunities for installation of stormwater management systems may be limited due to the heavily developed nature of the area.
Traffic concerns consist of detours, acceleration/deceleration lanes for the detours, driveway aprons that would be in the detours, and ensuring that the limits of construction, including tapers, would not interfere with existing bridge widths. Detours would be necessary for the Hickory Hill Road intersection, Houston Street, Wharton Street, Old Landing Road, Radish Road, Oak Avenue, etc. Due to curbing and drainage requirements, temporary acceleration/deceleration lanes may not be practical at the other detour routes. Furthermore, depending on the design, intersection closures may be required. Driveway aprons along US 113 directly abut shoulders that may be required for thru-traffic during construction. This would be a traffic safety issue; warning signs for driveways would be important and speed limit on US 113 would have to be reduced.

Signalization issues include development and installation of temporary signals at various intersections throughout the construction period. Several existing aerial and underground utility facilities would need to be relocated throughout the project area.

Many of the constructability issues would be addressed using phased construction. The focus of the first phase of construction would include installing erosion and sediment control along with stormwater management for the remaining phases. It would also require installing temporary traffic signal control, temporary pavement widening, removal of existing medians/islands, installing the detours; and erecting signage and barricades to prevent crossing US 113; and, shifting traffic to existing shoulders. Due to limited existing pavement width, temporary concrete barriers would be used to separate northbound and southbound traffic in some areas.

The second phase of construction would be divided into several stages, and would include utility relocations, new roadway and bridge construction, placement of permanent drainage structures, and installation of median barriers, permanent traffic signals, and lighting.

The last phase would require installing the final pavement course, placing final signing and lane markings, and removal of all temporary traffic control devices. Stormwater management ponds would be graded to the final configuration and all disturbed areas would be stabilized with permanent erosion and sediment control measures.

At this conceptual stage, and with uncertainty regarding the availability of funding and when improvements would be needed, it is difficult to determine the breakdown of contracts or the timeframes for construction. However, given the fact that the Yellow Alternative must maintain traffic flow while reconstructing the existing US 113 corridor, the time required for its construction will be longer than that for any of the bypass alternatives. The bypasses have to maintain access to properties in the existing corridor only where they intersect the corridor or use existing US 113 to complete their alignment. In addition, the longer the bypass alternative, the greater the difference between the time required to construct the Yellow Alternative versus a bypass. As an example, the Purple Alternative returns to the existing US 113 corridor just south of Millsboro and uses the Yellow Alternative from that point to the state line. This alternative would require more time to construct than the Blue Alternative, because Blue does not use the Yellow Alternative as part of the alignment until south of Frankford.
Having to break the improvements into contracts that recognize funding and need, the Yellow Alternative will result in the existing US 113 corridor from Millsboro to the state line being under construction for a protracted period of time. In contrast, building a bypass alternative would minimize any impact to the existing US 113 corridor except where the bypass intersects the existing corridor or uses it to complete the bypass alternative.

Constructability of the Bypass Alternatives
While the bypass alternatives have issues similar to the Yellow Alternative, the ability to address those issues and minimize the impacts is easier with a bypass. Access to properties will also have to be maintained, but there will be fewer access points. In addition, most of those accesses will be for residential rather than business uses, and will not require the level of maintenance that a business access requires. Many of the accesses are associated with secondary roads that will be intersected by the bypass alternative. Many of these can be addressed by advanced contracts that will result in construction of the secondary road crossings. Several secondary roads are proposed

to go over the bypass alignment, thereby eliminating the issue of maintaining access from construction of the bypass itself. Additionally, this approach minimizes the number of accesses that have to be maintained to those along the cross road. After the secondary road projects are completed, those properties are not affected when the bypass itself is constructed.

With the Blue Alternative, for example, Hollyville Road is proposed to cross over the bypass alignment. A contract would be developed to build the Hollyville Road overpass as a separate project or as an early phase in construction of that portion of the Blue Alternative. The proposal for Hollyville Road calls for the overpass to be built east of existing Hollyville Road. This will allow for maintenance of traffic for both the vehicles using Hollyville Road and the six to eight properties that access Hollyville Road within the limits of the proposed overpass during construction of the overpass. When the overpass is complete, traffic will be shifted to the overpass and the portion of existing Hollyville Road that was abandoned. When the bypass itself is constructed, the traffic on reconstructed Hollyville Road and the properties accessing it will not be affected by the bypass construction.

Utility issues will also be associated with the secondary roads that are intersected by the bypass alternatives. The utility issues would also be addressed in the advanced contracts and eliminated from concern during the construction of the bypass alignment. Through the use of advanced contracts, the issue of extended periods of construction can be reduced to a selected few locations. These include the major state road crossings (24, 26, 20 and 30), where interchanges would be constructed, as well as at the tie-in points to existing US 113, rather than the entire corridor, as would be the case with the Yellow Alternative.

Finally, since the bypass alternatives are on new alignment, the construction will include a new drainage system. This will be advantageous compared to having to maintain an existing drainage system while expanding that system to drain additional improvements, as in the case with the Yellow Alternative.

With a reduced need to maintain traffic during construction, and advanced contracts to eliminate additional conflict points, the time required to build a bypass alternative can be reduced, even when built in sections because of funding constraints, when compared to the Yellow Alternative.

3.15 RELATIONSHIP OF LOCAL SHORT TERM USES VERSUS LONG TERM PRODUCTIVITY

The extent to which the proposed action of constructing the proposed project would result in long-term gains at the expense of short-term impacts is summarized in this section. Generally, although the degree of impact may vary, all of the alternatives would have similar short-term impacts to long-term productivity.

Short-term impacts are primarily experienced during the construction period, which is also the time of greatest environmental disruption. Construction impacts, as described in **Section 3.11**, and other short-term impacts are, for the most part, offset by gains in long-term productivity.

3.15.1 Detours and Accessibility

The inconvenience of detours, traffic delays, and increased truck traffic due to project construction are short-term sacrifices that in the long-term would improve travel times, reduce local street traffic congestion, improve safety, and improve local and regional accessibility.

3.15.2 Water Quality

Negative impacts might occur to area water systems through temporary increases in turbidity, erosion, and siltation, and from contamination due to fuel or lubricant spills during construction. Prudent construction methods, including the implementation of an approved erosion and sediment control plan and proper stormwater management techniques, would be utilized to mitigate potential impacts. During construction, appropriate BMPs to meet then-current standards and regulations would be implemented where feasible. These protections would remain in place and be maintained after construction is completed. Consideration would be given to vegetated swales, treatment systems, and other stormwater management controls as methods for maintaining water quality.

Increased impervious surfaces can alter stream flow regimes, resulting in lower base flows and higher peak flows. Altered flow regimes would also affect the geomorphology of receiving waterways through stream channel aggradation or degradation, resulting in reduced in-stream habitat quality and/or increased bank erosion and sedimentation. These effects would be minimized by properly designing each crossing. The new crossings would enhance treatment of some of the existing impervious surfaces in the study area.

3.15.3 Air Quality

Emissions from construction equipment and trucks, dust, and any burning from construction activity (tree tops and stumps) would reduce the quality of air during the construction period. However, with the completed project in use, average speeds in the corridor would increase, thereby reducing carbon monoxide and hydrocarbon emissions.

3.15.4 Noise

The impact of acoustic noise is directly proportional to proximity to the project right-of-way. Long-term noise can be reduced for nearby residents by utilizing noise abatement measures. Noise complaints during construction would be evaluated and controls would be implemented as appropriate for excessive noise levels in the vicinity of noise sensitive receptors.

3.15.5 Safety

While construction activity would temporarily increase the potential for construction-related and motor vehicle accidents, the improved travel service provided by the facility upon its completion would reduce the potential for future motor vehicle accidents in the corridor.

3.15.6 Employment

During construction, jobs would be created for those building the road. However, there would be a loss in employment from commercial establishments that are required to relocate. As these facilities reopen and new commercial development is induced by the new road, employment would increase over the long-term. The proposed build alternatives serve current and upcoming traffic needs that result from present and future land use development planning by local, regional, and State officials. Thus, the local short-term impacts and use of resources by the proposed action are consistent with the maintenance and enhancement of long-term productivity for the local area, State, and region.

3.15.7 Emergency Evacuation

Emergency evacuation is a concern in Sussex County due to the threat of coastal storms and flooding. Safe and efficient evacuation routes have been identified in the *Transportation Management Plan for Evacuation* prepared as part of the *Delaware Emergency Operations Plan* by the Evacuation Committee. US 113 is a designated north-south evacuation route from Kent County in the north to the Maryland border in the south. SR 54, SR 24, SR 9, and SR 20, all of which cross US 113 in the study area, are designated as emergency east-west evacuation routes. Slowdowns in evacuations that result from detours, traffic delays, and increased truck traffic during construction are short-term impacts that will be minimized to the greatest extent possible. The long-term benefit of the proposed improvements to traffic capacity would lead to safer and more efficient emergency evacuations.

3.15.8 Constructability

Constructability issues would arise regardless of whether the On-alignment or a Bypass alternative is selected. However, the magnitude of the issues would be greater with the On-alignment alternative. Major constructability issues include construction delays, difficulties in maintaining access to homes and businesses for both local traffic and emergency vehicles, traffic diversions for the installation of a new storm drainage system, maintenance of traffic, and the use of temporary signals. While the impacts would be greater with the On-alignment Alternative, they can be partially mitigated through the use of phased construction. Any inconveniences brought about during construction would be temporary and would be offset in the long term by decreased travel times and reduced congestion when the project is finished.

3.16 IRREVERSIBLE AND IRRETRIEVABLE COMMITMENT OF RESOURCES

Implementation of the proposed action involves a commitment of a range of natural, physical, human, and fiscal resources. Land used in the construction of the proposed facility is considered an irreversible commitment during the time period that the land is used for a highway facility. However, if a greater need arises for use of the land or if the highway facility is no longer needed, the land can be converted to another use. At present, there is no reason to believe such a conversion would ever be necessary or desirable. Although the quantity of resources used may vary among the proposed alternatives, each alternative would require a similar commitment of resources.

Considerable amounts of fossil fuels, labor, and highway construction materials such as cement, aggregate, and bituminous material would be expended. Additionally, large amounts of labor and natural resources are used in the fabrication and preparation of construction materials. These materials are generally not retrievable. However, they are not in short supply and their use would not have an adverse effect upon continued availability of these resources. Any construction would also require a one-time expenditure of both State and Federal funds, which are not retrievable.

The commitment of these resources is based on the concept that residents in the immediate area, state, and region would benefit from the improved quality of the transportation system. These benefits would consist of improved accessibility and safety, savings in time, and greater availability of quality services which are anticipated to outweigh the commitment of these resources.

3.17 SECONDARY AND CUMULATIVE EFFECTS ANALYSIS

Secondary (or indirect) impacts are described in the Council on Environmental Quality (CEQ) regulation (*40 CFR § 1508.8(b)*) as those effects that are *"…caused by the action and are later in time or farther removed in distance, but are still reasonably foreseeable.*"

The CEQ regulations define cumulative effects as "*…the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such actions"* (*40 CFR 1508.7*).

A secondary and cumulative effects analysis (SCEA) was conducted to evaluate the effects on the environment which may result from the US 113 project and other past, present and reasonably foreseeable actions. The full analysis may be found in the *SCEA Technical Report*.

3.17.1 SCEA Scoping

The SCEA analyzes the potential for secondary and cumulative effects to land use and examines how those effects may impact socioeconomic, cultural, and natural resources. Scoping for the secondary and cumulative effects analysis consists of identifying the geographic area and the time frame within which the analysis is to be conducted. The scoping also includes the identification of resources to be included in the SCEA and identification of the methods used for analysis. The SCEA scoping process is summarized herein. For detailed information, see the *SCEA Technical Report*.

3.17.1.1 SCEA Boundary

The SCEA boundary consists of two parts: the geographic and the temporal boundary. The geographic boundary for the SCEA is a synthesis of the resource boundaries determined by overlaying a series of mapped data of various resources from which data about the area are readily available.

US Census Block Groups
The demographic and socioeconomic information in the SCEA are based on the ACS Estimates 2007-2011, where available. The 76 Census Block Groups within the SCEA boundary span both Sussex County and Worcester County. They represent the extent of the socioeconomic and cultural resources potentially affected by the Millsboro-South project.

Watersheds
The SCEA boundary encompasses six watersheds: Indian River, Iron Branch, Indian River Bay, Little Assawoman, Assawoman, and Buntings Branch. These watershed boundaries represent the areas where there are natural environmental resources potentially affected by the proposed project.

Area of Traffic Influence
The area of traffic influence (ATI) was developed by including all of the TAZs that encompass the preliminary build alternatives and expanding the area to include one TAZ beyond the preliminary alternatives (TAZ+1).

Overall Geographical SCEA Boundary
The SCEA boundary is a synthesis of 2010 US Census Block Groups, watershed boundaries, and ATI, as shown on **Figure 3-16**. The boundary is determined by the outermost edge of each of the areas that is directly impacted by one or more of the original Millsboro-South alternatives. The SCEA boundary encompasses 242,098 acres (378.3 square miles) and includes the entire US 113 project area as well as much of Sussex County, Delaware, and a small portion of northern Worcester County, Maryland. A detailed description is included in the SCEA Tech Report.

The temporal boundary for the SCEA was developed with consideration of past, present, and reasonably foreseeable future actions (40 CFR 1508.7). A review of historic population,

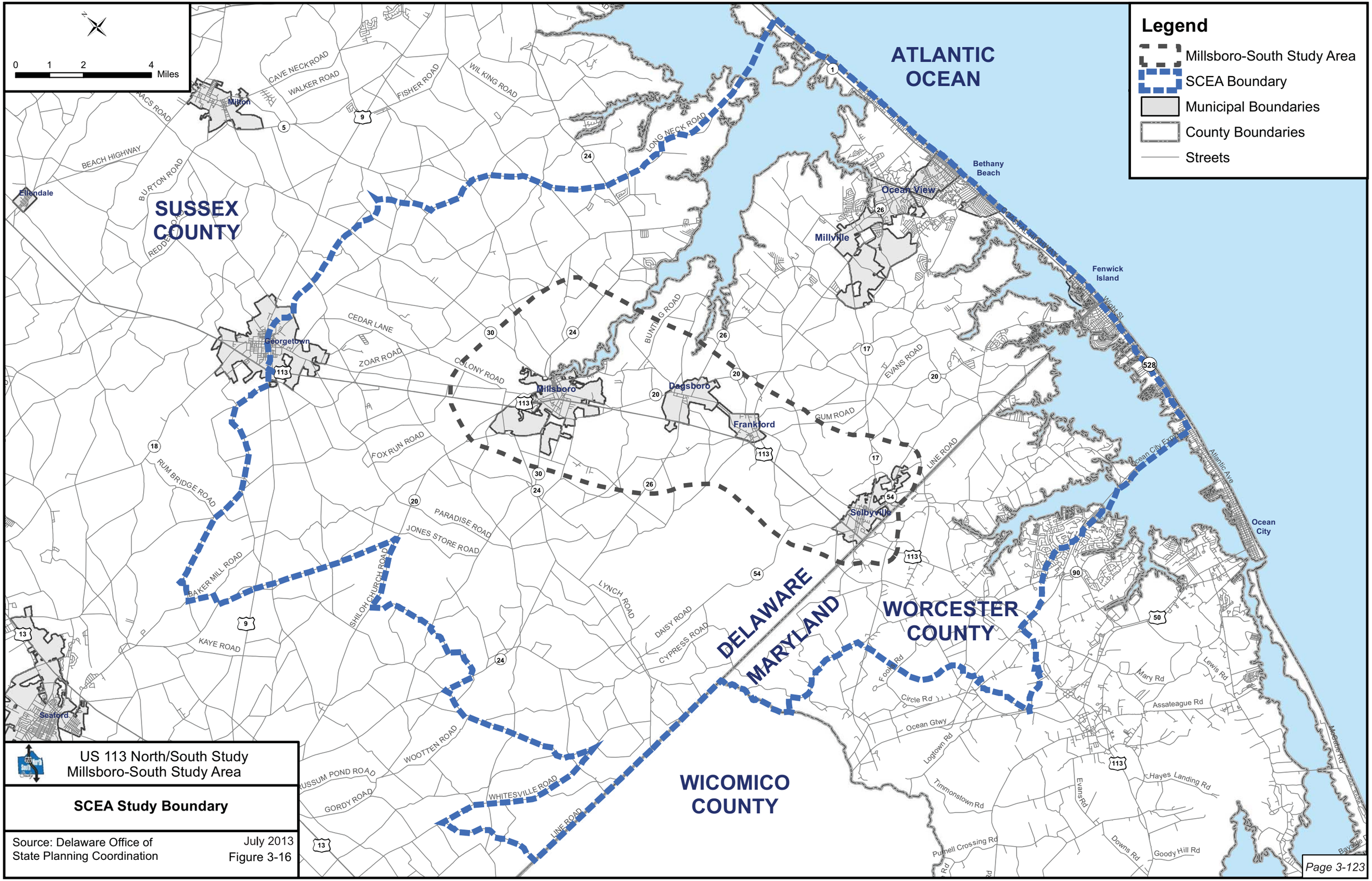
employment, and land use trends was undertaken to define the temporal boundary of the SCEA. The time frame for the SCEA analysis is from 1970 to 2030, a period of 60 years (see SCEA Technical Report for more detail).

3.17.1.2 Resources to be Analyzed

The SCEA analyzes those socioeconomic, cultural, and natural resources upon which the proposed project would have a direct or secondary effect. **Table 3-41** lists the resources evaluated for this SCEA, along with the rationale for their inclusion in the analysis.

Table 3-41: Resources Studied in the SCEA

Resource/Issue	Include in SCEA	Rationale	Representative Sub-Boundary
Community (cohesion, linkages, services)	Yes	Direct Impacts	U.S. Census Block Groups, Area of Traffic Influence
Economic Conditions	Yes	Direct and Secondary Impacts	U.S. Census Block Groups
Public Parks and Recreational Facilities	Yes	Direct and Secondary Impacts	U.S. Census Block Groups, Area of Traffic Influence
Farmland	Yes	Direct Impacts	U.S. Census Block Groups, Area of Traffic Influence
Historic Properties	Yes	Direct Impacts	U.S. Census Block Groups
Archaeological Sites	Yes	Potential Direct Effects	U.S. Census Block Groups
Surface Waters (Streams) and Wetlands	Yes	Direct Impacts	Watersheds
Floodplains	Yes	Direct Impacts	Watersheds
Groundwater	Yes	Direst Impacts	Watersheds
RTE Species	Yes	Direct Impacts	Watersheds
Forests	Yes	Direct Impacts	Watersheds



US 113 North/South Study
Millsboro-South Study Area

SCEA Study Boundary

Source: Delaware Office of State Planning Coordination

July 2013
Figure 3-16

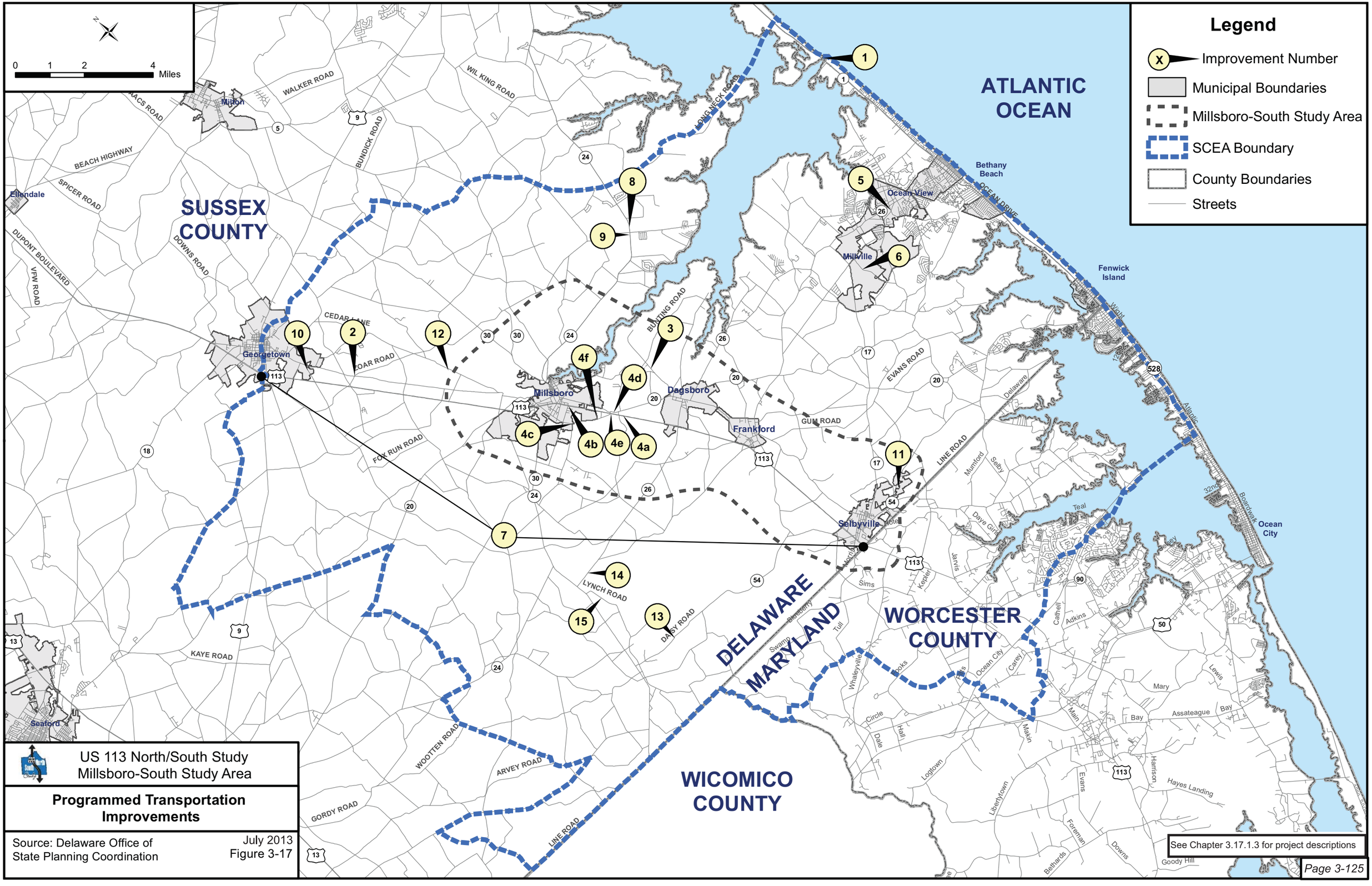
3.17.1.3 Other Projects within the SCEA Boundary

Other projects and "reasonably foreseeable future actions" that could have an influence on the resources within the SCEA boundary have been identified in order to assess the potential for secondary (indirect) or cumulative effects.

Programmed Transportation Improvements
Planned roadway and other transportation improvements within and adjacent to the study area are included in the No-build Alternative and would be completed whether or not a US 113 build alternative is selected. Additional projects that are programmed within the SCEA boundary are identified in Delaware's *Capital Transportation Program* for FY 2013-2018 as of the date of this report. The projects in the area are detailed below and their locations are shown on **Figure 3-17**.

Delaware Capital Transportation Program

1. **Indian River Inlet Bridge and Area Improvements** - This project includes: temporary realignment of the SR 1 travel lanes; reconstruction of access roads; construction of the north and south approach embankments; construction of an additional 10-foot wide pedestrian/bicycle walkway; relocation of electric, water and sewer utilities; construction of wetland mitigation sites and new terrapin habitat; completion of miscellaneous temporary and permanent park improvements; and roadway tie-in work to be performed once the new bridge has been completed.
2. **Alternate SR 24 (Phase II) Zoar Road, Speedway Road, and Bethesda Road Intersection Improvements** - This project would identify and address safety and operational issues at the intersection of Zoar Road, Speedway Road, and Bethesda Road.
3. **Iron Branch Road/State Street** - This project entails pavement resurfacing, curb and sidewalk reconstruction, and relocating some utility poles to eliminate or reduce the number of fixed objects in the pavement along State Street/Iron Branch Road in Millsboro.
4. **US 113 Intersection Improvements** - The proposed intersection improvements include, but are not limited to, median channelization and/or median closures to restrict certain movements at the following locations:
    - 4a. US 113 at Cricket Street/Molly Field Road
    - 4b. US 113 at Radish Road/Second Street
    - 4c. US 113 at Delaware Avenue/Hickory Hill Road
    - 4d. US 113 at SR 20/Dagsboro Road/Handy Road
    - 4e. US 113 at SR 20/Thompsonville Road
    - 4f. US 113 at Sheep Pen Road/Bark Pond Road
5. **Atlantic Avenue from Clarksville to Assawoman Canal** - This project includes improvements to intersections and the addition of five-foot shoulders along the SR 26 corridor from Clarksville to the Assawoman Canal. Sidewalks will be constructed from Windmill Road (S362) to the Assawoman Canal. The intersection of SR 26 and Central Avenue will be realigned, and turn lanes will be added in each direction.


0 1 2 4 Miles
Legend
Improvement Number
Municipal Boundaries
Millsboro-South Study Area
SCEA Boundary
County Boundaries
Streets
ATLANTIC OCEAN
SUSSEX COUNTY
DELAWARE
MARYLAND
WORCESTER COUNTY
WICOMICO COUNTY
Milton
Ellendale
Georgetown
Millsboro
Dagsboro
Frankford
Selbyville
Milville
Bethany Beach
Ocean View
Fenwick Island
Ocean City
Seaford
WALKER ROAD
WIL KING ROAD
LONG NECK ROAD
BUNDICK ROAD
BEACH HIGHWAY
SPICER ROAD
DUPONT BOULEVARD
VFW ROAD
DOWNS ROAD
CEDAR LANE
FOX RUN ROAD
BUNTING ROAD
EVANS ROAD
GUM ROAD
LINE ROAD
LYNCH ROAD
DAISY ROAD
KAYE ROAD
WOOTTEN ROAD
ARVEY ROAD
GORDY ROAD
OCEAN DRIVE
Boardwalk
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US 113 North/South Study
Millsboro-South Study Area
Programmed Transportation Improvements
Source: Delaware Office of State Planning Coordination
July 2013
Figure 3-17
See Chapter 3.17.1.3 for project descriptions

6. **SR 26 Detour Routes** - The proposed improvements include construction of 11-foot lanes, two five-foot shoulders, and turn lanes at intersections with a 14-foot clear zone through a series of roadways including S353, Burbage Road, S352, Windmill Road, S 84, Central Avenue, and S368, Beaver Dam Road. Minor realignment along Beaver Dam Road on to the Village of Bear Trap Dunes would also be included.
7. **US 113 North/South Improvements** - This project study would continue to work on viable alternatives for a limited access highway throughout Sussex County to address existing and future transportation needs along US 113 while preserving environmental and historic resources and accommodating planned economic growth.
8. **SR 24/Mount Joy Road and SR 24/Bay Farm Road Intersection Improvements** - This project includes widening lanes/approaches and extending turn lanes to meet storage requirements.
9. **SR 24 at SR 5 / SR 23 Intersection Improvements** - This project would implement access management strategies at the Shell Gas Staion driveway along SR 5 with operational improvements on SR 24.
10. **Park Avenue Relocation** - This project begins at the intersection of South Bedford Street and Arrow Safety Road relocating Park Avenue approximately 2,400 feet to the east of the current Park Avenue and South Bedford Street intersection. The segment of Arrow Safety Road between US 113 and South Bedford Street would be upgraded and signed as US Route 9 Truck Bypass Route. The intersection of Arrow Safety Road and South Bedford Street will be reconstructed to provide appropriate turn lanes and signalized.
11. **SR 54 Mainline Improvements** - This project would improve SR 54/Lighthouse Road from SR 20/Zion Church Road to S58C/Keenwick.
12. **Patriots Way, Avenue of Honor to Stockley Branch** - This project would construct turn lanes at the entrance of Sussex Central High School and add shoulders along this portion of Patriots Way. Improvements are needed for the additional bicycle, pedestrian and bus traffic at the new Sussex Central High School.
13. **SR 417 Daisey Road over Pocomoke River** - This project involves the replacement of existing pipe arches with concrete box beams and minor reconstruction of the approach, installation of guardrail and riprap in stream.
14. **SR 26 over Whartons Branch** - This project involves the replacement of the existing corrugated metal pipe arches with a precast concrete three-sided frame. Additional work includes minor reconstruction of the approach roadway, installation of guardrail as needed, and placement of riprap in the stream to prevent scour. The work would be performed under a full road closure with detour.
15. **SR 26/30 over Gum Branch** - This project involves the replacement of the existing corrugated metal pipes with a precast concrete three-sided frame. Additional work includes minor reconstruction of the approach roadway, installation of guardrail as needed, and placement of riprap in the stream to prevent scour.

Proposed Development Projects

Planned development projects within the SCEA boundary have been evaluated for their secondary and cumulative effects on resources. The effects of these proposed projects on the

natural and built environment may contribute to the cumulative effects of the proposed US 113 project; however, most of the impacts resulting from these projects have not yet been identified. **Table 3-42** presents a summary of the proposed development projects within the SCEA boundary.

Table 3-42: Summary of Development Projects within the SCEA Boundary

Location	Residential Development	Non-Residential Development
SCEA Boundary	5,200 acres	3,000 acres

There are approximately 100 planned development projects within the SCEA boundary. The majority (roughly 75 percent) of the proposals are residential projects, most of which are located closer to the coastline and which total over 5,000 acres. Approximately 20 percent of the proposed development involves commercial uses, either exclusively or as part of mixed use development. **Figure 3-18** shows the planned development projects in the SCEA boundary. Details on each proposed project are included in the *SCEA Technical Report*.

Approximately 25 percent of the proposed development projects are located directly adjacent to US 113. However, none of these projects are dependent upon the completion of a build alternative.

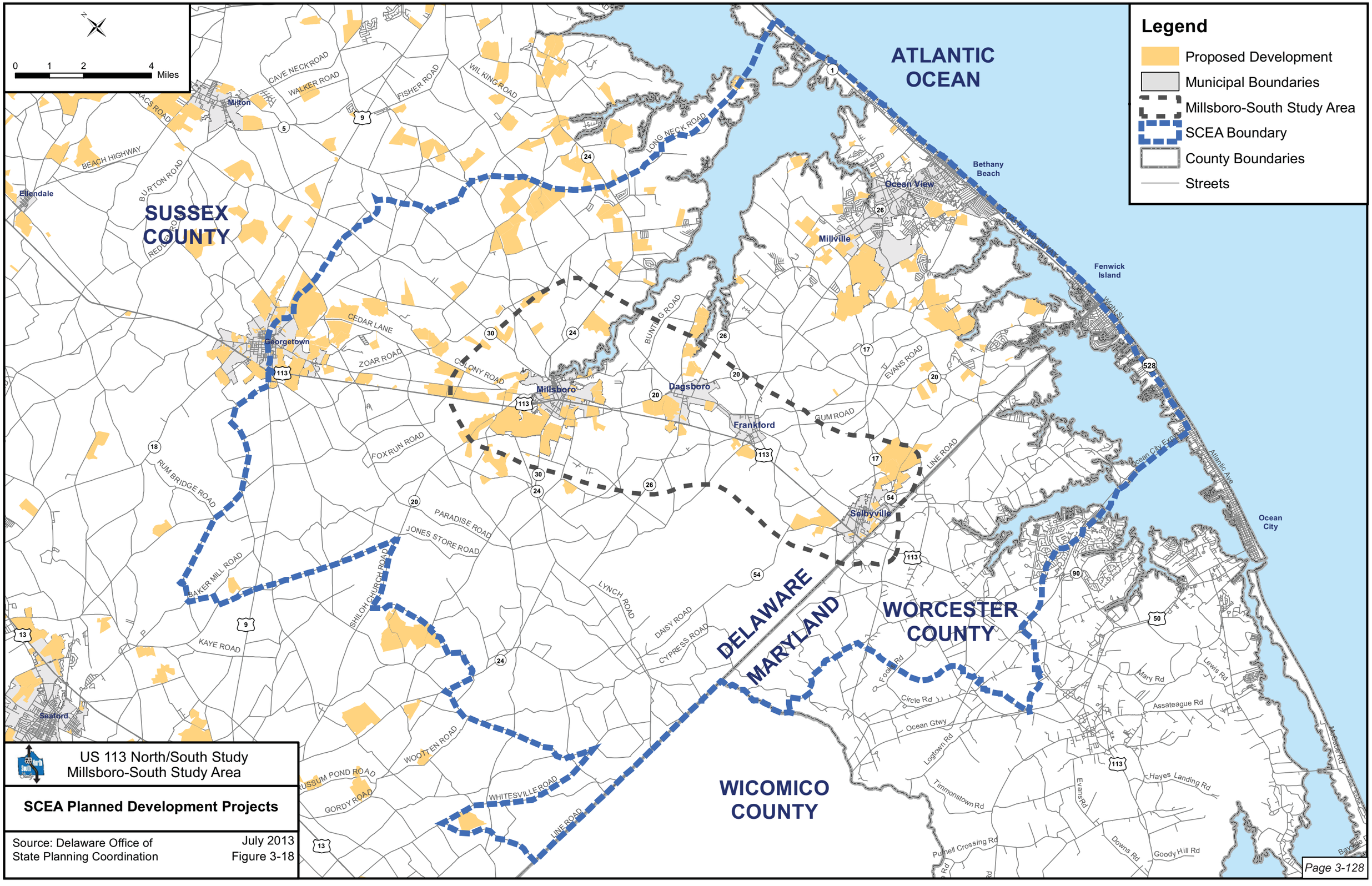
3.17.2 Past, Present, and Future Land Use

Large-scale changes in land use since 1980 were reviewed in the local comprehensive plans. Documents comparing aerial photographic records of Delaware's land use in 1984, 1992, and 2002 were instrumental in reviewing past land uses and changes that have occurred. Present land use was evaluated using data from 2007. Future land use projections were calculated using Comprehensive Plans for Sussex County and the municipalities in the SCEA boundary.

3.17.2.1 Past Land Use – Historic Changes and Trends

Past land use data show that Delaware's historical land use within the SCEA boundary was predominantly agriculture, and that agricultural and forested lands have decreased as developed uses (residential, urban, commercial, industrial, transportation, government, and utility) have increased. **Figure 3-19** depicts the development trends within the SCEA boundary.

Sussex County
Agriculture has historically been the largest land use in Sussex County (49 percent in 1984 and 46.1 percent in 1992). In 2002, agricultural land use comprised 44.9 percent of the area in Sussex County. There was a loss of over 25,000 acres of agricultural land between 1984 and 2002. Forested land has also declined in Sussex County. Between 1984 and 2002, 102,209 acres (over 47 percent) of forest was converted to other uses.

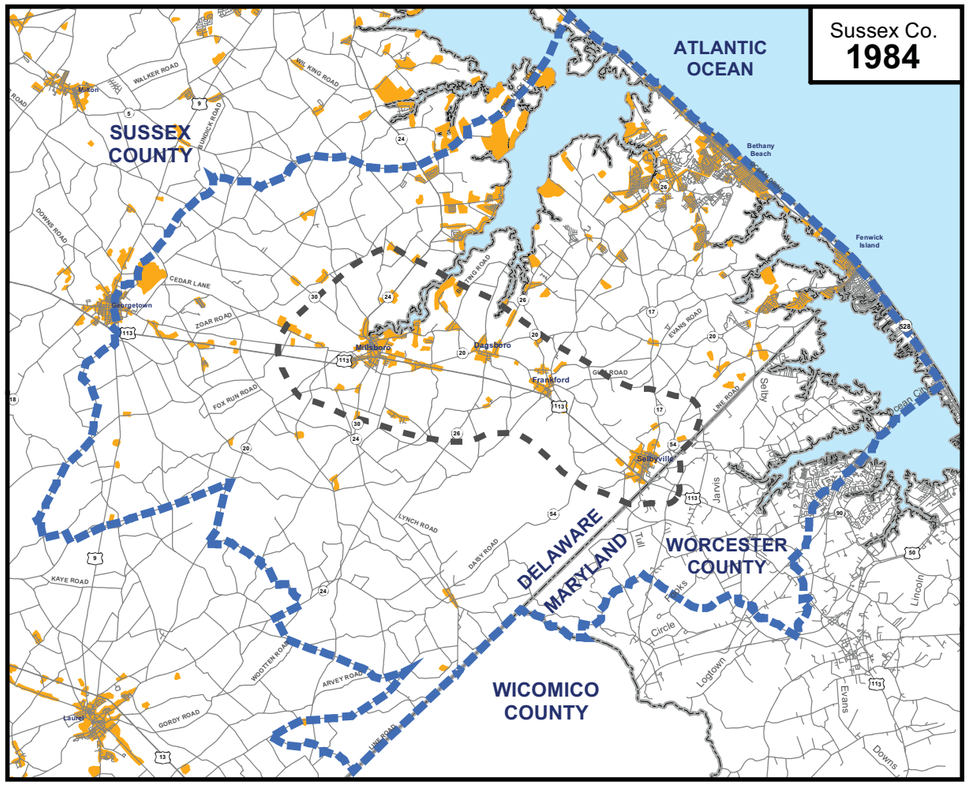


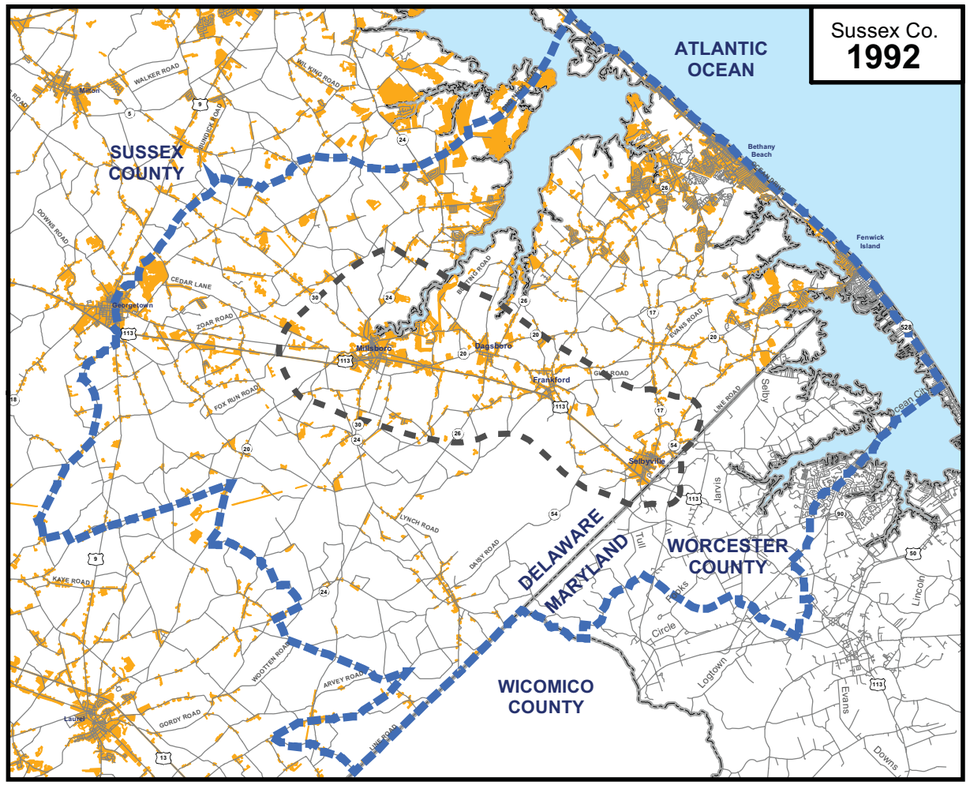
US 113 North/South Study
Millsboro-South Study Area

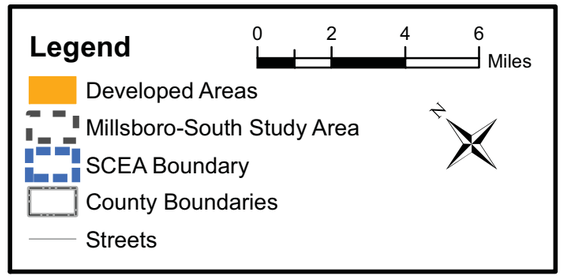
SCEA Planned Development Projects

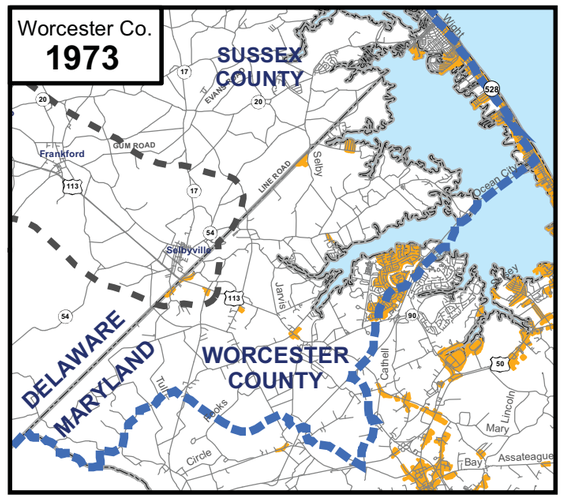
Source: Delaware Office of State Planning Coordination

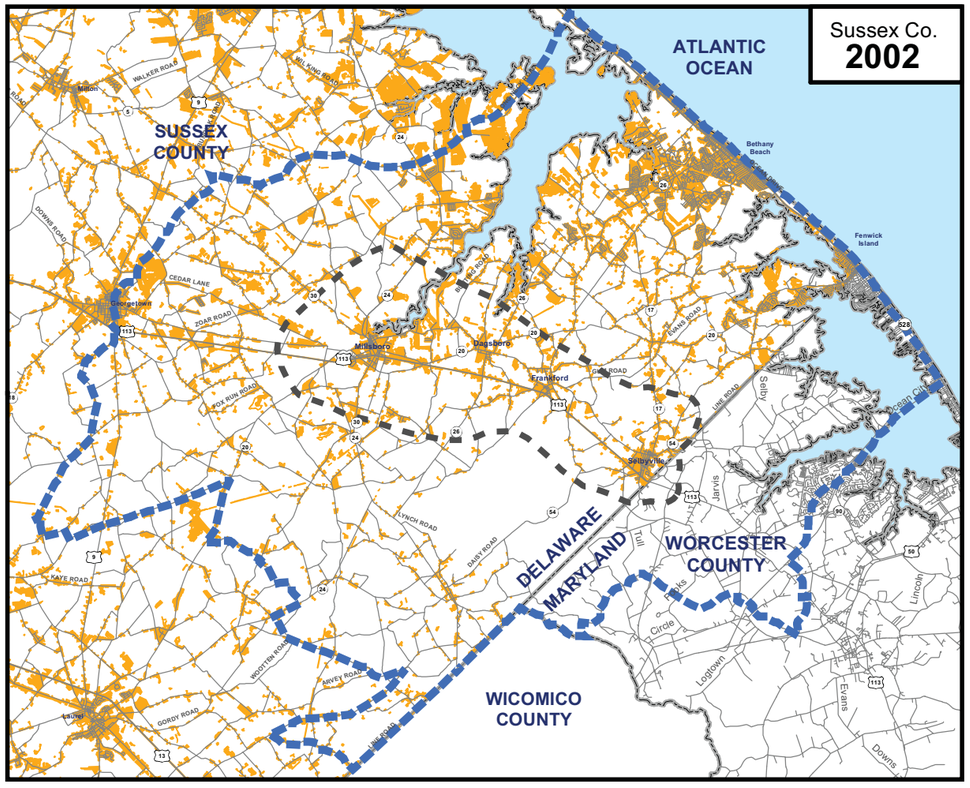
July 2013
Figure 3-18

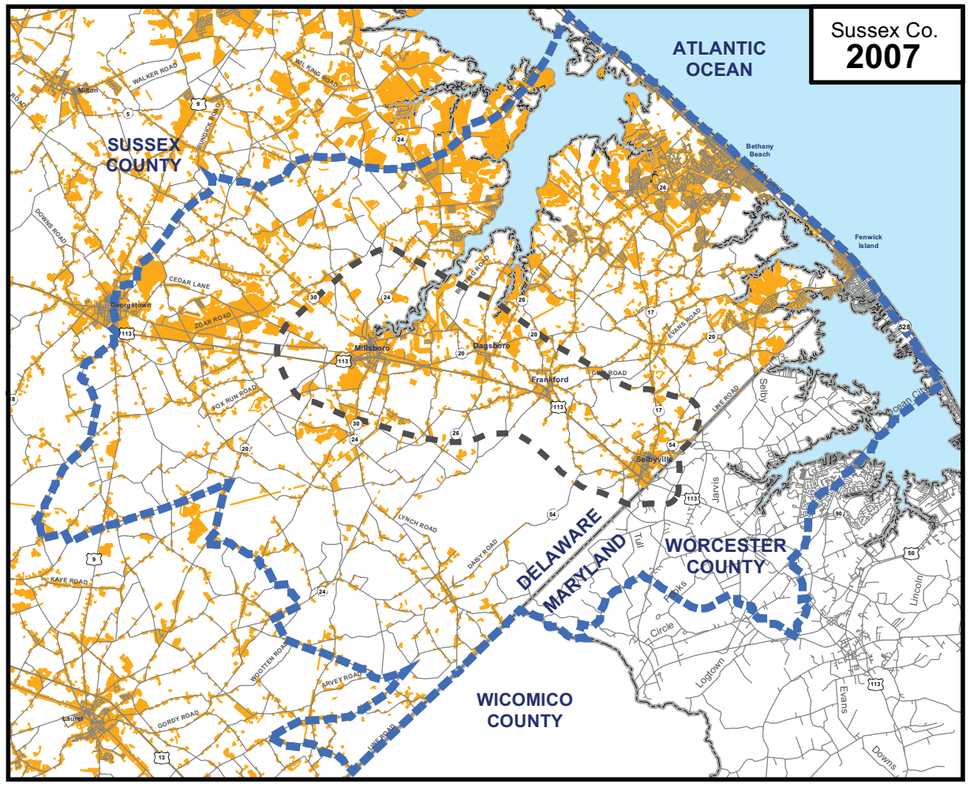


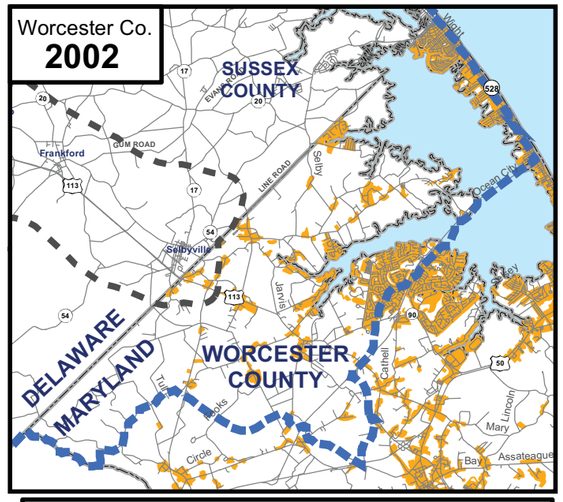












US 113 North/South Study
Millsboro-South Study Area

SCEA Development Trends

Source: Delaware Office of State Planning Coordination & Maryland Dept. of Natural Resources

July 2013

Figure 3-19

Between 1984 and 2002, acreage in residential/urban land use increased by nearly 39,000 acres. Commercial/industrial uses also grew during the same time period, increasing by about 22 percent. Many of Sussex County's traditional communities are densely occupied with residential and commercial districts that are in close proximity to each other. However, Sussex County is experiencing sprawl-style development where the urban centers are expanding into the rural areas outside the municipalities. The Atlantic coastal and inland bay areas have experienced the largest growth. **Table 3-43** summarizes the historical land use trends for Sussex County from 1984 to 2002.

Worcester County
Past land use data for Worcester County are available dating from 1973 and are summarized in **Table 3-44**. In both 1973 and 2002 the predominant land uses in the county were forest, agriculture, and wetlands. Between 1973 and 2002, residential/urban areas doubled in size within the county, increasing from just over 8,000 acres to over 16,000 acres. Commercial areas increased by about 50 percent. Agricultural areas remained about the same. Forested areas decreased by 5 percent.

SCEA Boundary
Within the SCEA boundary urban, residential, and commercial areas are mostly concentrated around the town centers and along the coastal areas. Agricultural areas are dispersed throughout the SCEA area. There is a particularly high concentration of forested areas in the SCEA area in the western portion of Worcester County and east of US 113 between US 113 and SR 30. Wetlands are concentrated along the coast east of Georgetown and north of Lewes, along US 113 north of Georgetown, and north of the state line just west of Dagsboro and Selbyville.

Land use within the SCEA boundary has changed in a similar manner to land use in Sussex and Worcester Counties. **Table 3-43** summarizes the land use changes within the Sussex County portion of the SCEA boundary from 1984 to 2002. **Table 3-44** summarizes the land use changes within the Worcester County portion of the SCEA boundary from 1973 to 2002.

3.17.2.2 Existing Land Use in the SCEA Boundary

Existing land uses, for purposes of this analysis, can be described by identifying the land use and determining the amounts of committed acreage, protected acreage, and available land within the SCEA boundary in 2007. Understanding the existing land use patterns in relation to past land use is crucial for determining what resources may be affected by secondary and cumulative effects and where those effects might occur.

Table 3-43: Sussex County Past Land Use

Land Use	1984		1992		2002		Net Change (Percent)		
	Acres	%	Acres	%	Acres	%	1984-1992	1992-2002	1984- 2002
Residential/Urban	22,851	3.8%	44,430	7.4%	61,369	10.2%	95%	38%	169%
Commercial	4,315	0.7%	4,235	0.7%	5,256	0.9%	-2%	24%	22%
Industrial	1,565	0.3%	1,317	0.2%	1,462	0.2%	-16%	11%	-7%
Recreation	1,565	0.3%	1,787	0.3%	3,106	0.5%	14%	74%	98.4%
Transportation, Utilities, Communication	849	0.1%	2,792	0.5%	3,700	0.6%	229%	33%	336%
Institutional, Government	0	0%	1,247	0.2%	1,623	0.3%	--	30%	--
Agriculture	296,349	49.0%	278,335	46.1%	271,057	44.9%	-6%	-3%	-9%
Rangeland/Brushland	26,950	4.5%	4,605	0.8%	18,736	3.1%	-83%	307%	-31%
Forest (incl. clear cut)	213,563	35.3%	133,386	22.1%	111,354	18.4%	-38%	-17%	-48%
Water	2,784	0.5%	6,480	1.1%	9,003	1.5%	133%	39%	223%
Wetlands	29,760	4.9%	114,557	19.0%	112,080	18.6%	285%	-2%	277%
Other	3,640	0.6%	11,020	1.8%	5,445	0.9%	203%	-51%	50%
Total	**604,191**	**100%**	**604,189**	**100%**	**604,191**	**100%**	**N/A**	**N/A**	**N/A**

Notes: -- The category is not included in the data set. The "other" category may include transitional/filled/graded areas, extraction areas, beach, riverbanks, or inland sandy areas.
Source: Delaware Office of State Planning Coordination, 2007

Table 3-44: Worcester County Past Land Use

Land Use	1973		2002		Net Change (Percent) 1973-2002
	Acres	%	Acres	%	
Residential/Urban	8,177	2.7%	16,603	5.5%	103%
Commercial	1,655	0.5%	3,379	1.1%	104%
Industrial	303	0.1%	377	0.1%	24%
Institutional	237	0.1%	1,131	0.4%	377%
Agriculture	98,913	32.6%	98,824	32.6%	-0.1%
Brushland	12,743	4.2%	10,245	3.4%	-20%
Forest (incl. clear cut)	157,729	52.0%	149,746	49.3%	-5%
Water	1,850	0.6%	1,944	0.6%	5%
Wetlands	19,729	6.5%	18,858	6.2%	-4%
Beach/Barren Land	2,160	0.7%	2,425	0.8%	12%
Other	105	<0.1%	68	<0.1%	-35%
Total	**303,601**	**100%**	**303,601**	**100%**	**N/A**

Notes: "Other" may include transitional/ filled/graded areas, extraction areas, beach, riverbanks, or inland sandy areas
Source: Maryland Dept. of Planning, 2003

Table 3-45: Land Use Change within the Sussex County Portion of the SCEA Boundary

Land Use	1984		1992		2002		Net Change		
	Acres	%	Acres	%	Acres	%	1984-1992	1992-2002	1984-2002
Residential/Urban	8,521	4.5%	14,878	7.9%	20,054	10.6%	75%	35%	135%
Commercial	1,374	0.7%	1,044	0.6%	1,278	0.7%	-24%	22%	-7%
Industrial	580	0.3%	381	0.2%	494	0.3%	-34%	30%	-15%
Recreation	710	0.4%	631	0.3%	1,179	0.6%	-11%	87%	66%
Transportation, Communication, Utilities	518	0.3%	1,314	0.7%	1,585	0.8%	154%	21%	206%
Institutional/ Governmental	0	0.0%	449	0.2%	605	0.3%	--	35%	--
Agriculture	86,869	45.9%	81,337	43.0%	79,390	41.9%	-6%	-2%	-9%
Brushland	10,546	5.6%	1,398	0.7%	5,379	2.8%	-87%	285%	-49%
Forest (incl. clear cut)	72,290	38.2%	42,823	22.6%	35,990	19.0%	-41%	-16%	-50%
Water	450	0.2%	2,385	1.3%	2,837	1.5%	431%	19%	531%
Wetlands	6,191	3.3%	39,562	20.9%	38,796	20.5%	539%	-2%	527%
Other	1,293	0.7%	3,139	1.7%	1,755	0.9%	143%	-44%	36%
Total	**189,342**	**100%**	**189,342**	**100%**	**189,342**	**100%**	**N/A**	**N/A**	**N/A**

Notes: -- The category is not included in the data set.
"Other" may include transitional/filled/graded areas, extraction areas, beach, riverbanks, or inland sandy areas.
Sources: Delaware Office of State Planning Coordination, 2007; Earth Data International for the State of Delaware, 1984 and 1992

Table 3-46: Land Use Change within the Worcester County Portion of the SCEA Boundary

Land Use	1973		2002		Net Change, in Percent
	Acres	%	Acres	%	1973-2002
Residential/Urban	2,112	5.3%	4,231	10.6%	100%
Commercial	53	0.1%	567	1.4%	963%
Industrial	0	0.0%	80	0.2%	N/A
Institutional, Governmental	0	0.0%	127	0.3%	N/A
Agriculture	14,552	36.4%	12,935	32.3%	-11%
Brushland	1,298	3.2%	959	2.4%	-26%
Forest (incl. clear cut)	11,508	28.8%	10,965	27.4%	-5%
Water	8,211	20.5%	8,128	20.3%	-1%
Wetlands	2,141	5.3%	1,974	4.9%	-8%
Other	139	0.3%	48	0.1%	-65%
Total	**40,014**	**100%**	**40,014**	**100%**	**N/A**

Notes: "Other" may include transitional/filled/graded areas, extraction areas, beach, riverbanks, or inland sandy areas
Source: Maryland Department of Planning, 2003

The cities and towns within the SCEA boundary include Selbyville, Fenwick Island, Frankford, Bethany Beach, Dagsboro, Millsboro, and Georgetown. Most cities and towns have recently completed a comprehensive plan. The major themes of the plans include the preservation of small-town character, enhancement of agriculture and open space, preservation of natural resources, and accommodation of growth while providing services for citizens.

The most recent data indicate that the predominant land use in the SCEA boundary remains agricultural (39 percent). Forested land covers the next largest portion of the SCEA area (20 percent). Wetlands are also prevalent within the SCEA boundary, comprising 18 percent of the land use. Residential and urban land covers 12 percent of the area within the SCEA boundary. **Table 3-47** summarizes the current land use within the SCEA boundary.

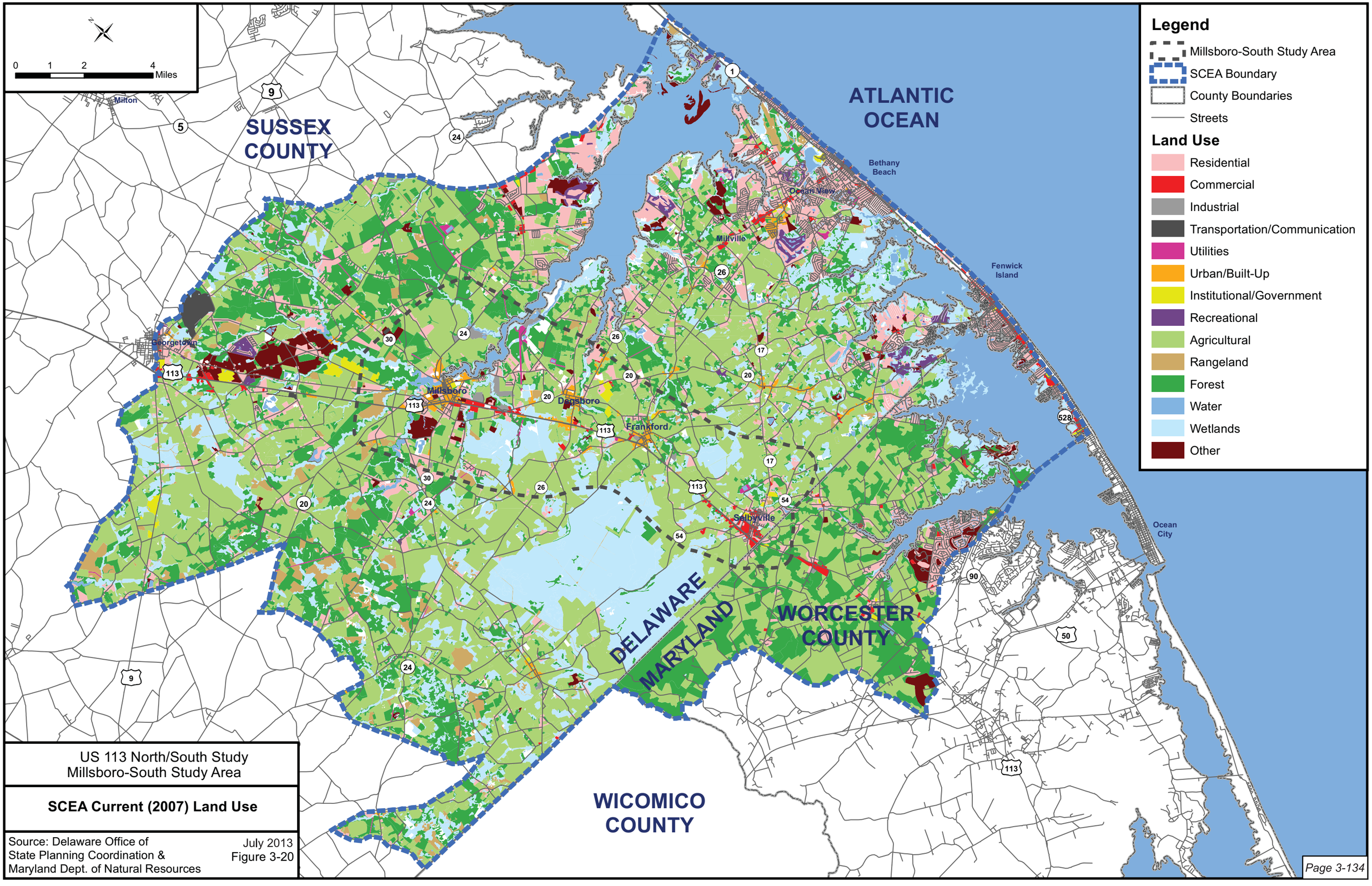
Table 3-47: Current Land Use within the SCEA Boundary

Land Use	SCEA Acres within Sussex County (2007)	SCEA Acres within Worcester County (2007)	Total Acres	Percent of Total Area
Agriculture	74,095	12,818	86,913	38.3%
Forest (incl. clear cut)	35,412	9,977	45,389	19.9%
Wetlands	37,822	1,906	39,728	17.5%
Residential/Urban	23,938	3,932	27,870	12.3%
Water	2,289	7,753	10,042	4.4%
Brushland/Rangeland	5,250	180	5,430	2.4%
Other	0	0	0	0.0%
Commercial	1,446	500	1,946	0.9%
Recreation	1,395	0	1,395	0.6%
Transportation/Communication/Utilities	1,643	169	1,812	0.8%
Government, Institutional	785	272	1,057	0.5%
Industrial	537	185	722	0.3%
Beach/ Barren Land	4,729	31	4,760	2.1%
Total	**189,341**	**37,723**	**227,064**	**100%**

Recently, the land use within the SCEA boundary has shifted. As the residential and urban areas increase, mostly surrounding municipal areas and near the coast, the agricultural and forested areas decrease. **Figure 3-20** shows the 2007 land use in the SCEA area.

Sussex County Land Use

Land in Sussex County within the SCEA boundary is predominantly agricultural. Agricultural land is distributed throughout the SCEA area. Forested land is also distributed throughout the SCEA area, particularly east of Georgetown. Residential and urban areas are primarily located along the coast surrounding Bethany Beach and Fenwick Island, as well as inland near Selbyville, Frankford, Dagsboro, Millville, Millsboro, and Georgetown. There are also several large residential areas along the coast of the Indian River Bay. Wetlands are located primarily along the Atlantic and Delaware Bay coastlines, but there is a large contiguous wetland system (Cypress Swamp) south and west of US 113.



US 113 North/South Study
Millsboro-South Study Area

SCEA Current (2007) Land Use

Source: Delaware Office of State Planning Coordination & Maryland Dept. of Natural Resources

July 2013
Figure 3-20

Current Worcester County Land Use within the SCEA Boundary
Agricultural land is scattered throughout the Worcester County portion of the SCEA area; it is the predominant land use. The second most common land use in the county within the SCEA boundary is forest. Forested land is particularly prevalent in the northern and western portions, bordering Wicomico and Somerset Counties. The urban and residential areas are concentrated primarily around Ocean City and Berlin. Wetlands in Worcester County are located along the coastal areas that border the Atlantic Ocean, Assawoman Bay, and the Isle of Wight. A large portion within the SCEA area, west of US 113 and south of SR 26 is zoned as wetland area.

Current Zoning within the SCEA Boundary
Zoning within the SCEA area is shown on **Figure 3-21**. Land within the SCEA boundary is primarily zoned for agricultural and forest purposes. Near the coast and surrounding the urban town centers land is zoned residential uses. Agricultural districts and easements throughout the SCEA study area should remain conducive to agricultural use in the future.

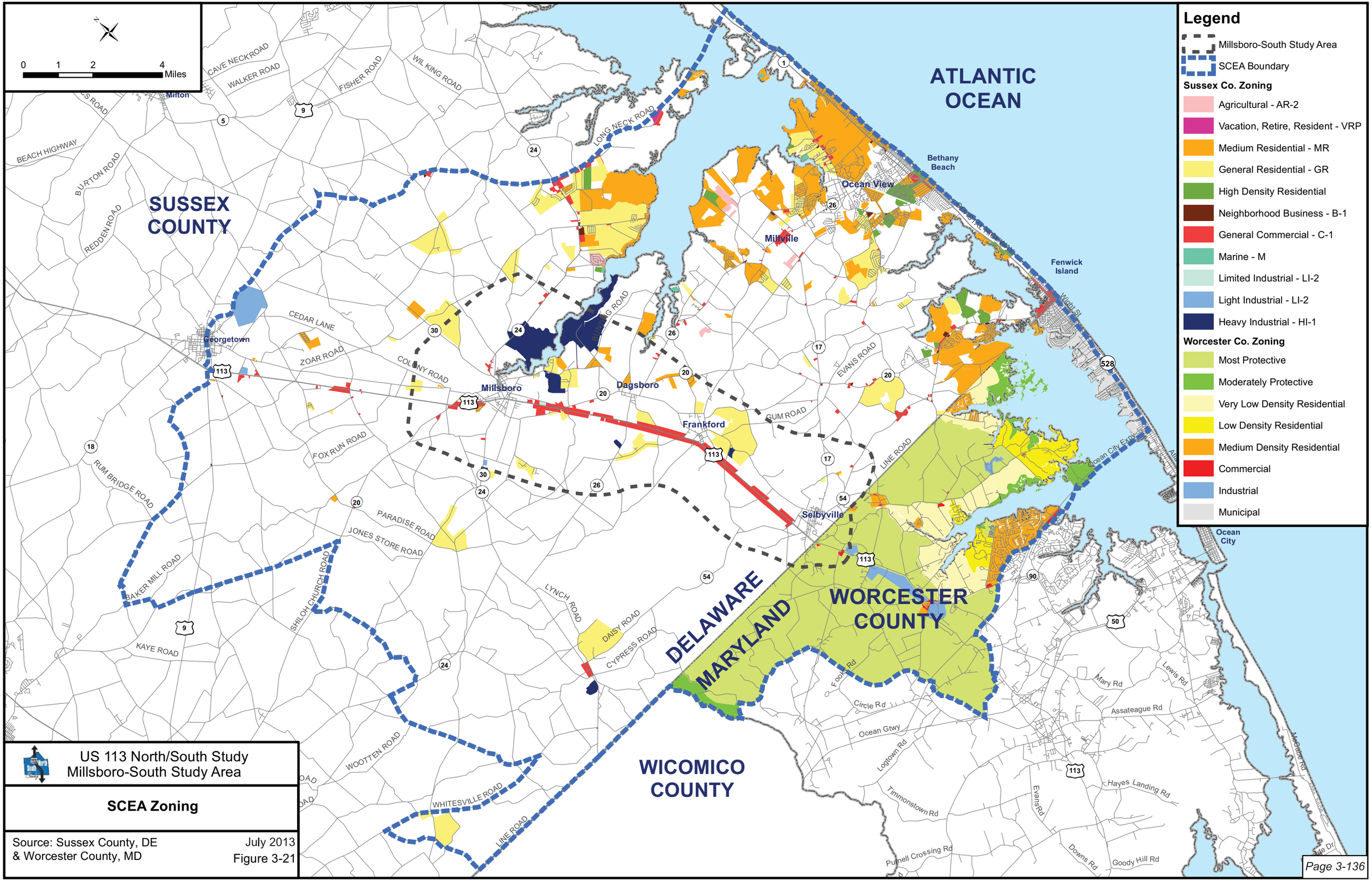
In Maryland areas of priority funding target subsidies toward existing communities and places where local governments desire growth. Growth-related projects include most State programs that encourage or support growth and development, such as highways, sewer and water construction, economic development assistance, and State leases or construction of new office facilities.

3.17.2.3 Future Land Use

Future land use within the SCEA boundary would be primarily influenced by the recommendations of the current comprehensive plans, land use plans, and zoning, and by state planning initiatives. The comprehensive plans within the SCEA boundary for Sussex County, Worcester County, Selbyville, Dagsboro, Frankford, Millsboro, Georgetown, and other small towns along the US 113 corridor include recommendations for growth and zoning for future development.

Sussex County
Current development trends show that future growth patterns would be concentrated south of Georgetown, east of US 113 between Georgetown and Millsboro, north and west of Millsboro, east and west of Dagsboro, east of Frankford, and to the northeast and northwest of Selbyville. These trends are consistent with the Sussex County Comprehensive Plan.

Worcester County
The 2006 *Worcester County Comprehensive Plan* seeks to maintain the County's rural and coastal character, protect its environment and natural resources, and locate planned development in designated growth areas. Areas should be annexed into the town prior to or at the time of development, and limitations shall be established on the development. The County also strives to undertake land preservation and other methods to preserve existing land and establish new open space and "greenways" to ensure habitat diversity and corridors in the County.



US 113 North/South Study
Millsboro-South Study Area

SCEA Zoning

Source: Sussex County, DE & Worcester County, MD

July 2013
Figure 3-21

3.17.2.4 Land Use Conclusions

Most of the planned or zoned growth is focused in and around the larger cities and towns; small town plans also focus growth within town boundaries or in adjacent areas where development could be supported. Extensive growth has occurred within the SCEA area and it would proceed based on the strengths of the state and county land use controls and protection programs.

3.17.3 Analysis of Secondary and Cumulative Effects

Although the No-build Alternative would have no secondary or cumulative effects as a result of improvements to US 113, the No-build Alternative would result in changes in travel patterns as traffic conditions continue to worsen. Increasing traffic and congestion along US 113 may lead to further congestion on local roads.

Secondary or indirect effects include those that would not occur without the completion of the proposed project. Generally, secondary or indirect effects include changes in land use, zoning, or population as a result of, but not directly because of, the implementation of a build alternative. Coordination with Sussex and Worcester County planning agencies has determined that there are no transportation, residential, or commercial development projects dependent upon the completion of a US 113 build alternative.

The extent, rate, and location of development within the SCEA boundary would primarily be influenced by state, county, and local land use regulations. Growth is expected to occur regardless of the alternative (build or No-build) selected for the proposed project. Therefore, the US 113 project would not induce secondary development from dependent projects, land use changes, or zoning changes. Development is already planned in the area and would occur with or without the US 113 project. However, some of the proposed build alternatives may directly facilitate development as access is improved and mobility is expanded.

Construction of a US 113 build alternative would facilitate land use change at some locations, particularly at proposed interchanges, and thus is likely to influence the location of future, reasonably foreseeable development. Development is more likely to occur in areas near and adjacent to the new roadway and associated interchanges as accessibility and mobility would be improved. The interchange locations for each alternative are summarized in **Table 3-48**.

Table 3-48: Proposed Interchange Locations

Proposed Alternative	Interchange Location
Green	SR 54, Parker Rd./Lazy Lagoon Rd., Catmans Rd., Gum Tree Rd., SR 26 Bypass, Nine Foot Rd. (SR 26 west of US 113), SR 24/SR 30, SR 20
Purple	SR 54, Parker Rd./Lazy Lagoon Rd., Catmans Rd., Gum Tree Rd., SR 26 Bypass, Handy Rd., SR 24/SR 30, SR 20
Yellow	SR 54, Parker Rd./Lazy Lagoon Rd., Catmans Rd., Gum Tree Rd., SR 26 Bypass, Handy Rd., SR 24
Red	SR 54, Parker Rd./Lazy Lagoon Rd., Catmans Rd., directional interchange at existing US 113, split diamond interchange at SR 26 and SR 20, SR 26 bypass interchange with existing US 113, SR 24, SR 30, interchange with existing US 113

Blue	SR 54, directional interchange at existing US 113, split diamond interchange at SR 26 and SR 20, SR 26 bypass interchange with existing US 113, SR 24, SR 30, interchange with existing US 113

The build alternatives could also potentially influence the rate of completion of approved and proposed development within the SCEA boundary, within both the existing and proposed pattern of land use and at interchange areas. This would occur because less congestion and ease of travel would encourage people and businesses to move to growth areas within the study area. Thus the US 113 project could stimulate secondary effects caused by changes to the rate of development.

Since the bypass alternatives propose the introduction of a new controlled-access transportation facility on new alignment in an area experiencing growth, the Transportation Research Board states that substantial land use conversion may be induced adjacent to the facility, primarily along interchanges and major arterials leading to interchanges. Because the proposed project would not be built until approximately 2030, the specific configurations of the interchanges are not finalized in this Draft EIS.

In general, secondary effects caused by a change in the location and rate of development are expected to have the following characteristics:

- The build alternatives would affect the specific location and rate of development within the land use framework established by state and local planning authorities.
- Development is occurring and would continue to occur regardless of the alternative chosen for the US 113 project (No-build or build). Given the broad pattern of development which is occurring within the SCEA boundary, the alternatives would have no impact on the extent and amount of development. Rather, the build alternatives would be constructed in response to the extent of development.
- Improvements to US 113 would not provide access to areas otherwise inaccessible to development, and therefore would not influence the extent of development.
- There are no known public or private development projects dependent upon improvements to US 113.
- The size of the developable area would be similar among all of the alternatives (No-build or build).
- Secondary effects to natural, socioeconomic, and cultural resources may be avoided, minimized, and mitigated by individual developers through applicable regulations.

Another type of secondary or indirect effect could be caused by a change in travel patterns and traffic volumes on the regional roadway network, such as those that might result from increases in gasoline prices and the greater usage of alternative fuels for vehicles. These changes could result in indirect effects to communities and historic resources even though there would be no physical impact to those resources. Examples could include deterioration of local roadways due to traffic diversions or structural stresses to historic buildings caused by additional traffic vibrations.

Cumulative effects include impacts on environmental resources which would result from incremental impacts of the construction of a US 113 alternative when added with other past, present, and reasonably foreseeable future actions. Cumulative impacts would result from any public or private development that may or may not be associated with the US 113 project. If the proposed US 113 project directly or secondarily affects the resource, then cumulative effects could occur if another development or project affects the same resource.

The resources directly or secondarily affected by the implementation of any of the proposed build alternatives are summarized in **Table 3-41** in **Section 3.17.1.2**. A brief discussion of the potential secondary and cumulative effects follows.

3.17.3.1 Socioeconomic Resources

The proposed No-build Alternative would not impact the socioeconomic resources in the SCEA boundary. However, under the No-build Alternative, roadways in the project area would continue to experience increased congestion as development and population increases. This could cause new development to not reach its full build-out potential due to lack of access to major roadways and congestion on local roads. Local road congestion would eventually hinder access to local businesses and thereby discourage economic development, and it would slow the transport of goods and services. The No-build Alternative may also result in some businesses relocating to areas with better regional access as travel conditions worsen.

Within the SCEA boundary, secondary and cumulative effects, such as changes in accessibility and changes in the greater community structure (cohesion, interactivity, and changes in locations of some businesses) resulting from the implementation of a proposed build alternative would occur near the areas of direct impacts. Most of the impacts would be located at interchanges where development could occur, depending upon the alternative selected. The Yellow Alternative would have the most secondary and cumulative impacts to businesses due to its location along the existing roadway. It would also have the greatest impact to community cohesion because it would bisect Millsboro with a limited-access road. This alternative would create a physical barrier that could inhibit or alter traffic patterns for east/west travel.

The build alternatives would also result in changes to the layout of proposed subdivisions. These impacts are generally considered direct impacts on proposed development. DelDOT consultation with affected developers could result in changes to development plans to accommodate a build alternative.

Within the SCEA boundary, cumulative effects to businesses and the economic environment could include changes in community structure or additional stresses on community infrastructure (water, sewer, etc.) and facilities (schools, emergency response capability, etc.).

Business Effects
The implementation of a build alternative would result in direct impacts to business properties. As a result, there may be permanent loss of some businesses that are directly affected and do not choose to relocate within the study area. However, these impacts may be offset by the

facilitation of proposed business development and access that would occur with completion of a build alternative. Changes in the intensity of development or the timing of proposed development could also occur as a secondary impact, due to changes in access and traffic patterns that would occur with the construction and use of a build alternative.

Based on the Dun and Bradstreet *US 113 North/South Study Business Survey*, there would be a potential for businesses that rely on pass-by and seasonal traffic to either close or relocate to more highly-traveled roadways along the bypass routes or outside of the US 113 study area. This secondary impact may result from any of the proposed bypass alternatives. This could also result in a cumulative loss of business income and tax-based income from local businesses. Replacement opportunities would likely be available and could negate this effect.

Community Effects
The implementation of a build alternative would result in direct impacts to private properties. The number of impacts would vary depending upon the alternative chosen. Cumulative effects could add to the number of residential displacements, when added to other projects, from existing housing within the SCEA boundary. The implementation of a proposed build alternative may also change the existing travel patterns for some additional properties for which access may change.

3.17.3.2 Public Parks and Recreation Areas

The proposed No-build Alternative would not impact the public parks and recreation areas in the SCEA boundary.

All of the build alternatives would impact Millsboro Pond. Although Millsboro Pond would be bridged, each of the proposed alternatives includes piers that would directly impact the pond. The Purple and Yellow Alternative would cross Betts Pond and impact New Park #2. Use of the recreational areas will not be impacted.

Construction of a build alternative for this project may cause secondary effects to parkland as a result of changes in the rate of development particularly in the areas around proposed interchanges.

Cumulative effects to parkland resulting from Federally-funded transportation projects would be regulated through existing laws, including Section 4(f) of the US Department of Transportation Act of 1966, which prohibits the use of park and recreational facilities for transportation uses unless there is no feasible and prudent alternative, or the use is determined to de minimis impact.

3.17.3.3 Farmland and Farming

The proposed No-build Alternative would not impact farmland or farming. Within the SCEA boundary, the loss of prime farmland has occurred with residential and non-residential construction. Development trends, especially in Sussex County, have contributed to this loss and would continue to contribute to the conversion of prime farmland to other uses.

One secondary effect to farmland and farming resulting from the build alternatives is the loss of farmland to increased development within the SCEA boundary, particularly in the areas around proposed interchanges. The rate of conversion of these farmlands to urban development would also increase because of easier regional access.

Construction of a build alternative for this project would result in the addition of an incremental amount of farmland loss due to the cumulative decreasing amounts of prime farmland available for farming and decreased farm production within the SCEA boundary.

Implementation of any of the build alternatives would result in direct impacts to agricultural land and Agricultural Preservation Easements which could potentially affect agricultural production, resulting in the cessation of active farming on lands from which right-of-way is taken, and the subsequent development of those parcels. Reduced access to farmable lands as a result of the implementation of a build alternative may also produce secondary impacts, such as cessation of farming on those parcels from which access is removed. These changes could subsequently decrease the cumulative agricultural productivity in the region.

As indicated in **Table 3-45**, there was a net loss of 7,479 acres of agricultural land in the Sussex County portion of the SCEA boundary between 1984 and 1997. **Table 3-46** shows that in the Worcester County portion of the SCEA boundary, there was a loss of 1,618 acres of agricultural land between 1973 and 2002. Although both Sussex and Worcester Counties have agricultural preservation programs in place, the loss of farmland is anticipated to continue in the future regardless of the alternative selected.

The direct acquisition of agricultural land for use in the construction of a build alternative would contribute incrementally to the cumulative decrease in the amount of farmlands within the SCEA area. Cumulative decreases in the amount of available farmlands could eventually result in complete cessation of active farming on many farms in the SCEA boundary.

3.17.3.4 Cultural Resources (Historic Properties and Archaeological Sites)

The No-build Alternative would not directly or secondarily impact any cultural resources in the area. Architectural historic properties in the proposed project area have been evaluated for direct impacts by the alternatives. Each of the build alternatives would have direct physical impacts to historical resources. Between six and nine historic properties may be adversely affected by visual impacts from the proposed alternatives.

Based on the archaeological predictive model, there may be direct impacts to archaeological sites as a result of the implementation of a build alternative. Consideration of direct impacts to archaeological sites would be determined in a Memorandum of Agreement that would be included in the Final EIS.

Because the area within the SCEA boundary has not been thoroughly surveyed for archaeological resources, there may be additional archaeological resources that have not been

identified. As the population within the SCEA boundary increases and commercial and residential development pressures rise, there may be effects to these unrecorded resources. Prehistoric archaeological resources are often found within undisturbed areas, frequently near streams, that may be affected by future development.

Since there are no development projects dependent on the US 113 project, there would be no secondary effect to any archaeological resources or historic structures caused by land use changes. However, the proposed build alternatives may cause secondary effects to cultural resources by increasing the rate at which potential areas are developed and changing the location of the development. Known and unknown cultural resources in areas that are not currently designated for growth would not incur secondary effects under any alternative.

Cumulative effects to cultural resources caused by development within the SCEA boundary are as likely under the No-build Alternative as under any of the build alternatives. There is potential for cumulative effects on archaeological resources from the US 113 project along with additional unrelated development within the SCEA boundary.

Cumulative effects that occur to any known or unknown cultural resources would be regulated through existing laws that facilitate the protection of cultural resources. Section 4(f) of the 1966 *Department of Transportation Act* prohibits the use of cultural resources listed in or eligible for listing in the National Register of Historic Places, including some archaeological resources, for federal transportation projects unless there is a thorough analysis to avoid and minimize harm, and there is no prudent and feasible avoidance alternative (see **Chapter 4)**.

Section 106 of the *National Historic Preservation Act* provides for the protection of those historic properties that are listed on or eligible for listing on the *National Register of Historic Places*. Under Section 106 consultation, which applies to Federal agencies, appropriate minimization and mitigation of any adverse effect must be considered in order to prevent the destruction (direct) or degradation (through neglect) of those resources.

3.17.3.5 Streams and Wetlands

The proposed No-build Alternative would not directly, secondarily, or cumulatively impact any of the streams or wetlands within the SCEA boundary.

The SCEA boundary encompasses six watersheds. According to the United States Geological Survey topographic maps and field surveys, streams are scattered throughout the SCEA boundary, generally flowing west to east. Direct impacts to streams would result from the construction of bridges or culvert crossings.

According to the *National Wetland Inventory* mapping, approximately 18 percent of the area within the SCEA boundary is comprised of wetlands (39,000 acres). The proposed build alternatives would directly impact between 34.5 acres (Green) and 50.6 acres (Purple) of mapped wetlands, depending on which alternative is selected.

Potential development is independent of the US 113 project and would occur regardless of whether the US 113 project is constructed; therefore secondary impacts from land use changes are not anticipated. Any future projects would be subject to federal and state wetland protection legislation and programs, with required reviews from the US Army Corps of Engineers and DNREC. Permits requiring avoidance, minimization, and/or mitigation would help offset most wetland losses caused by cumulative effects. As a result of regulations that protect wetlands, it is anticipated that the proposed improvements to US 113 would have minimal cumulative effects on wetlands.

Efforts to minimize direct impacts to wetlands and streams would occur throughout the planning stages. Impacts that cannot be avoided or minimized would be mitigated in accordance with the Clean Water Act and Delaware's Subaqueous Lands Act and Wetlands Act to ensure no net loss of wetlands and streams. Mitigation efforts or costs would be identified during the final design stages of the proposed project. Implementation of the CWA helps to protect against the cumulative loss of wetlands and streams over time. Although the quantity may be regulated, it is difficult to measure the pollutants entering these systems and their degradation over time. With the additional development potentially resulting from this project near interchanges and along new roadway, the quality of aquatic resources may decline.

3.17.3.6 Floodplains

The No-build Alternative would not directly, secondarily, or cumulatively impact floodplains in the SCEA study area. Currently, FEMA regulations restrict development within floodplains, and any proposed encroachment in a floodplain must be permitted by the local jurisdiction. The direct impacts to floodplains from the proposed project range from 39.8 acres for the Yellow Alternative to 50.5 acres for the Purple Alternative.

There are no secondary impacts anticipated as a result of the implementation of the US 113 project. Stormwater management ponds and linear runoff retention areas would minimize the effects of storm events on the holding capacity of the floodplain.

Programs are in place to prevent cumulative effects from floodplain encroachment. These include federal, state, and local regulations that govern fill and construction in floodplains. These regulations include *Federal Executive Order 11988, US Department of Transportation Order 5650.2, and the National Flood Insurance Act of 1968*. Development would not occur in floodplains as they are usually unsuitable and unsafe for building.

3.17.3.7 Water Quality and Aquatic Habitats

The No-build Alternative would not directly, secondarily, or cumulatively impact water quality or aquatic habitats in the SCEA study area.

As a result of this proposed project, the conversion of open space and farmed or forested areas to impervious areas or manicured landscapes is anticipated to increase, resulting in increased

surface runoff and peak storm flow and the potential for the introduction of pollutants and sediment into waterways. These direct effects would be mitigated by the required compliance with the CWA, the *National Pollutant Discharge Elimination System* program, and stormwater management practices administered by DNREC.

Secondary impacts anticipated as a result of the implementation of the Millsboro-South project include changes in the location of development and the rate of development within the SCEA boundary, with development concentrated near interchanges. Stormwater management ponds

and linear runoff retention areas would minimize the effects of storm events in these locations, largely preventing degradation of water quality.

Cumulative effects to water quality and aquatic habitats include incremental impacts caused by additional development and a proportional increase in the amount of impervious surface within area watersheds.

3.17.3.8 Rare, Threatened, and Endangered Species

The *Endangered Species Act of 1973* (ESA) requires consideration and avoidance of known occurrences of listed species and their critical habitat, thus slowing the loss of biodiversity. The proposed No-build Alternative would not directly, secondarily, or cumulatively impact RTE species in the project area.

Secondary effects of a build alternative could include the alteration of habitat in future years. Secondary effects could also include displacement if a protected species is found within the alignment. The location and rate of development in the area, particularly around interchanges, may also increase as a result of one of the proposed build alternatives. This increase would affect habitat for swamp pink, a federally-listed species known to occur in the study area.

Cumulative effects may include a loss of habitat or continued disturbance over time as a result of increased development. Cumulative effects could also include the increased pressure on habitat or in areas that support other RTE species, including those state-listed species that may be present within the SCEA boundary. The ESA requires consideration and avoidance of known occurrences of listed species, thus lessening the recent cumulative effects. Loss of habitat and continued disturbance may encourage or increase exotic/invasive species colonization that would further degrade the habitat.

3.17.3.9 Forests and State Natural Areas

The No-build Alternative would not directly, secondarily, or cumulatively impact forests or state natural areas.

Forested lands account for approximately 46,477 acres, or 20 percent, of the land area within the SCEA boundary. Direct effects of the proposed project would include the conversion of forests and state natural areas to transportation uses. The build alternatives would impact between 79

(Yellow Alternative) and 189 acres (Blue Alternative) of forested land. In accordance with the guidelines for forest replacement outlined by the *Delaware Forest Conservation Act*, forest lands would be replaced on a 1:1 or 2:1 tree replacement ratio, or on an acre per acre basis, depending on the number of trees removed. Therefore, upon completion of the required mitigation, there is anticipated to be no net loss of forested lands as a direct result of the project. Between 12 acres (Green, Purple, and Yellow alternatives) and 25 acres (Blue Alternative) of natural areas would be impacted by the build alternatives.

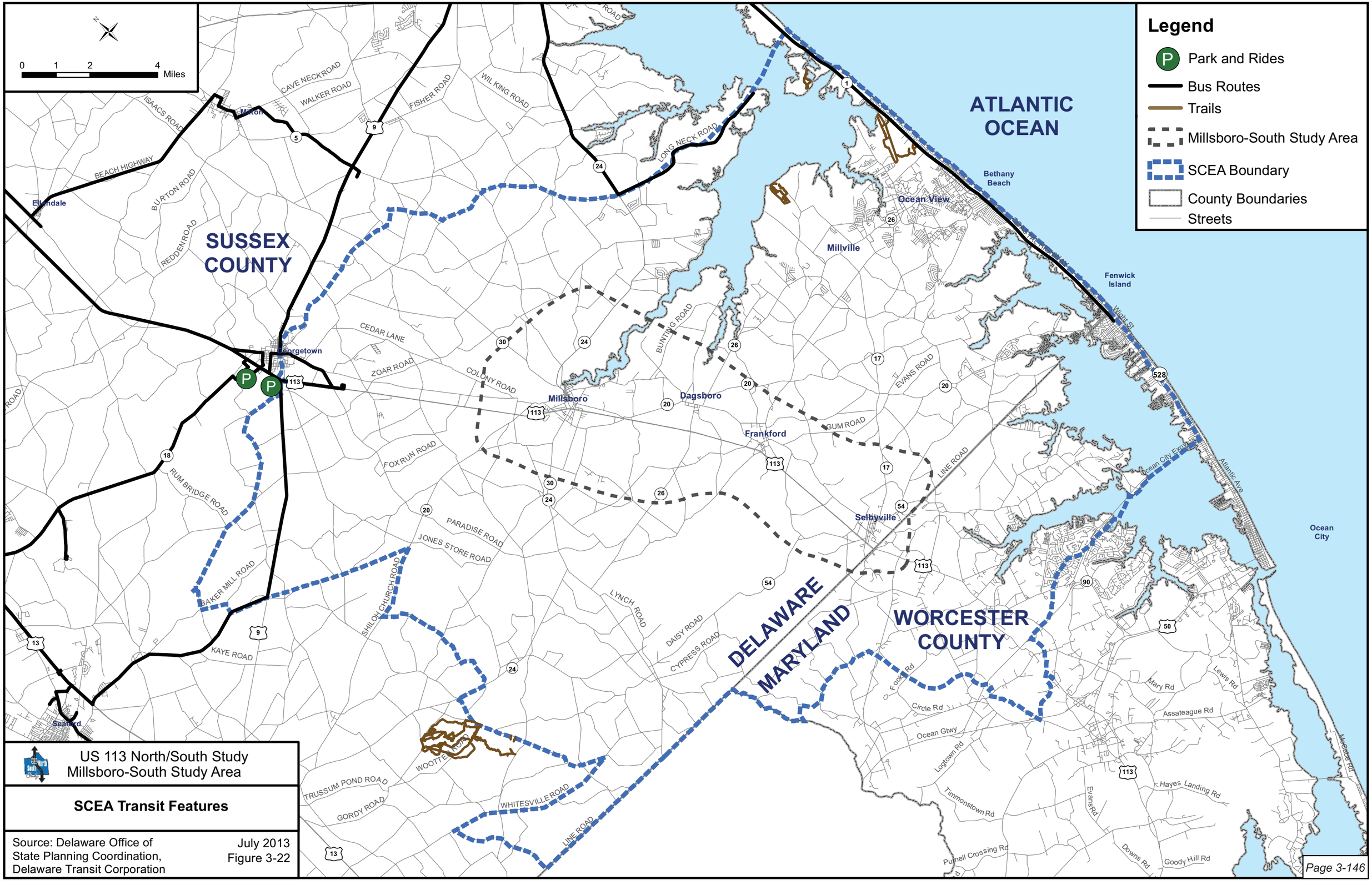
Present and future development and transportation projects were compared with the land use plans to determine the potential secondary and cumulative effects to forests and state natural areas. Secondary effects to these resources could occur as a result of the proposed build alternatives. Because there are no development projects dependent upon the US 113 project, secondary effects to forested land would not occur as a result of a change to the land use pattern. However, compared to the proposed No-build Alternative, the rate of development for areas zoned for residential use could increase as a result of improved roadway capacity on US 113. This could result in a faster conversion of forests and state natural areas to land designated for residential and commercial uses, especially near interchanges. An increase in the rate of development would adversely affect woodland species by decreasing the availability of habitat for wildlife populations. The maturity of forested areas would change as established forest lands are cleared and new forests are planted.

Cumulative effects to forests and forest habitat would occur with all of the proposed build alternatives combined with other development and transportation projects. Cumulative effects would most likely occur in existing forests and state natural areas that are designated for development. Wildlife species would be impacted from continued loss or fragmentation of habitat. The impact of decreasing forested areas is compounded by the fragmentation of the remaining forests. Fragmented, isolated parcels of woodlands and natural areas are less effective as wildlife habitat and for the protection of air, water, and soil.

3.17.3.10 Transit

The No-build Alternative will not directly, secondarily, or cumulatively impact transit within the SCEA area. As of 2009, the Delaware Transit Corporation serves 39 Park and Ride and 15 Park and Pool lots, with approximately 4,300 parking spaces and 2,800 bus stops. Existing transit features including park and ride lots, bus routes, and trails are shown on **Figure 3-22**.

In 2009, buses ran on 70 different routes in the State, and carried over 9.1 million passengers, a six percent increase from 2008. Currently, there are no Park and Ride or Park and Pool lots in the study area or the SCEA area. However, a new Park and Ride lot is planned as part of the Del Pointe Racino development in Millsboro. Bus routes are located within the SCEA area in the Georgetown area and along the coast. Expansion into the study area is included in Delaware Area Rapid Transit (DART) Six-year business plans, but the timing of the expansion is dependent on budgets.



US 113 North/South Study
Millsboro-South Study Area

SCEA Transit Features

Source: Delaware Office of State Planning Coordination, Delaware Transit Corporation

July 2013
Figure 3-22

There are no secondary impacts to transit anticipated as a result of the implementation of the US 113 project. Cumulative effects could include continued strain on transit features as a result of development in the area.

3.17.3.11 Emergency Evacuation Routes

Emergency evacuation is a concern in Sussex County due to the threat of coastal storms and flooding. Approximately 48 percent of Sussex County's housing units are potentially subject to some tidal inundation in a Category 4 hurricane. Safe and efficient evacuation routes have been identified in the *Transportation Management Plan for Evacuation* prepared as part of the *Delaware Emergency Operations Plan* by the Evacuation Committee.

US 113 is a designated north-south evacuation route from Kent County in the north to the Maryland state line in the south. Additionally, SR 20, SR 24, SR 54, and US 9, all of which cross US 113, are designated as east-west emergency evacuation routes. Emergency evacuation routes within the SCEA area are shown on **Figure 3-23**. Maintaining adequate traffic capacity along evacuation routes is critical to the safety of Sussex County residents. Roadway improvements from this portion of the US 113 project, coupled with the proposed improvements along adjacent segments of US 113 in Delaware, would help ensure that regional evacuation routes are accessible and efficient.

3.17.4 Secondary and Cumulative Effects Analysis Conclusions

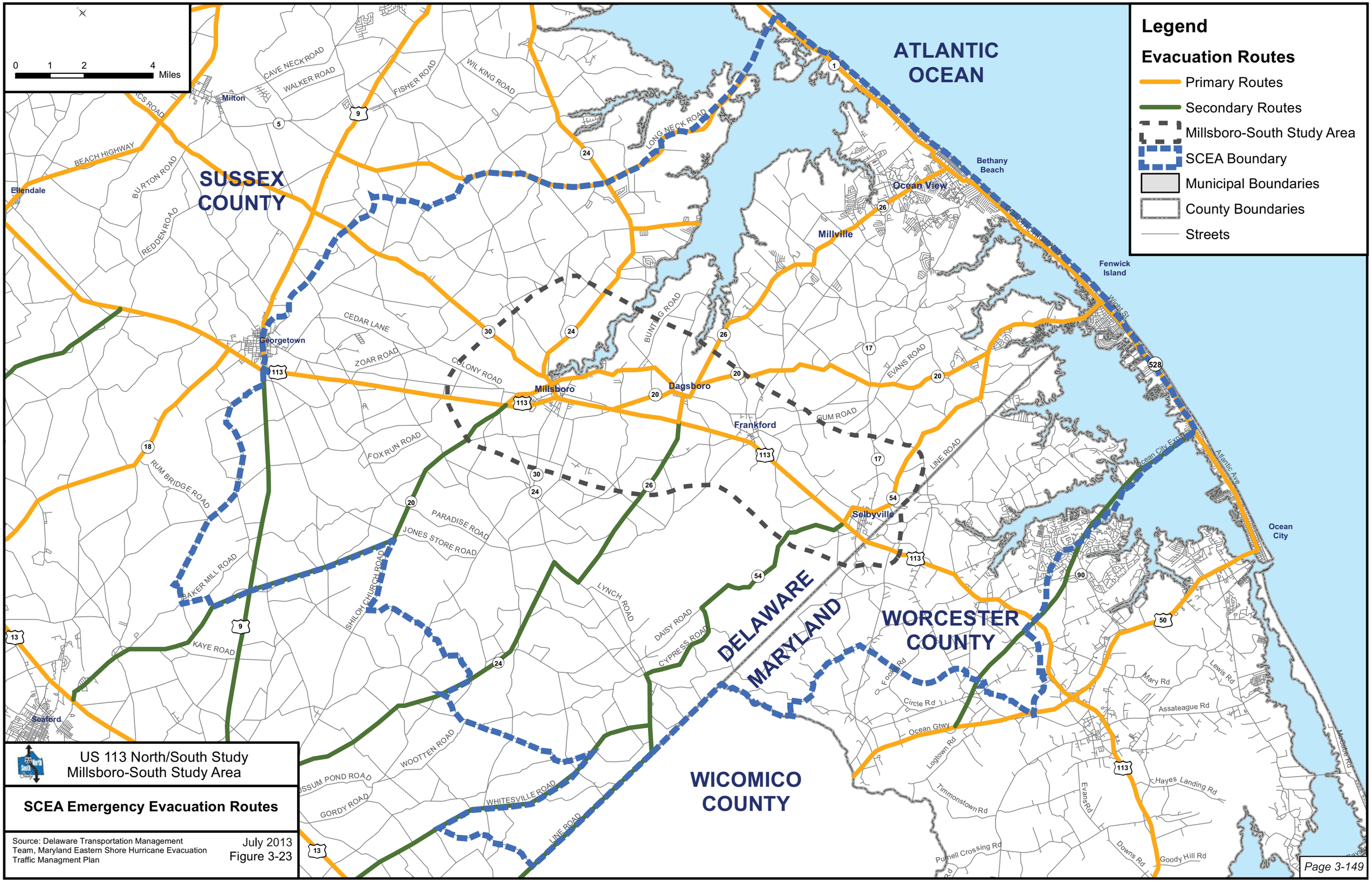
The proposed No-build Alternative would not directly impact resources in the project area; therefore, there would be no secondary and cumulative effects from the No-build Alternative.

Based on the analysis conducted regarding potential secondary and cumulative effects, the construction of any of the proposed build alternatives may induce secondary impacts and would add to the cumulative effects of other projects (past and future) on the natural and human environment within the SCEA boundary.

Secondary effects may include changes in the location and timing or rate of planned development within the SCEA boundary. The improved transportation network may result in future zoning change requests for higher density developments in areas not currently zoned for such development. Among the effects of this proposed project, therefore, is the potential for additional development that could occur as a result of the construction of a new roadway.

Potential cumulative effects include incremental additional impacts, added to the effects of other public and private development, to socioeconomic resources; farmland; cultural resources; streams and wetlands; floodplains; water quality and aquatic habitats; rare, threatened, and endangered species; forests; and individual properties. Any additional development beyond that which is already planned, and therefore not reasonably foreseeable, could add to these cumulative impacts and increase impacts to natural and socioeconomic resources within the SCEA boundary. Various federal and state laws have been enacted to protect the above

resources. While some secondary and cumulative effects would occur, these laws should serve to lessen those effects.



US 113 North/South Study
Millsboro-South Study Area

SCEA Emergency Evacuation Routes

Source: Delaware Transportation Management Team, Maryland Eastern Shore Hurricane Evacuation Traffic Managment Plan

July 2013
Figure 3-23

CHAPTER 4 – SECTION 4(f) RESOURCES

4.1 Introduction

Pursuant to Section 4(f) of the U.S. Department of Transportation Act of 1966 (49 U.S.C. § 303) and the Federal Highway Administration's (FHWA) implementing Section 4(f) regulations (23 CFR 774), publicly owned land of a public park, recreation area, or wildlife and waterfowl refuge, or land of an historic site of national, state, or local significance were identified within the US 113 North/South Study Millsboro-South Area. **Table 4-1** lists and **Figure 4-1** locates 45 potential Section 4(f) resources identified within the study area.

Section 4(f) states that the "use" of a Section 4(f) resource may not be approved unless it is determined that there is no feasible and prudent alternative to the use and all possible planning to minimize harm to the resource has been included, or the use has been determined to be "*de minimis.*" Avoidance and minimization of impacts to Section 4(f) resources were considered in the development of all build alternatives evaluated in Chapter 2 of this Draft Environmental Impact Statement (DEIS).

Based on the Section 4(f) analysis and consultations with jurisdictional officials conducted to date, the Federal Highway Administration (FHWA) is of the opinion that a *de minimis* Section 4(f) finding is applicable to the Recommended Preferred Alternative identified in this DEIS. Under the Recommended Preferred Alternative (the Blue Alternative), three properties (Millsboro Pond, Indian River Archaeological Complex, and Selbyville Historic District) were identified as having potential Section 4(f) use.

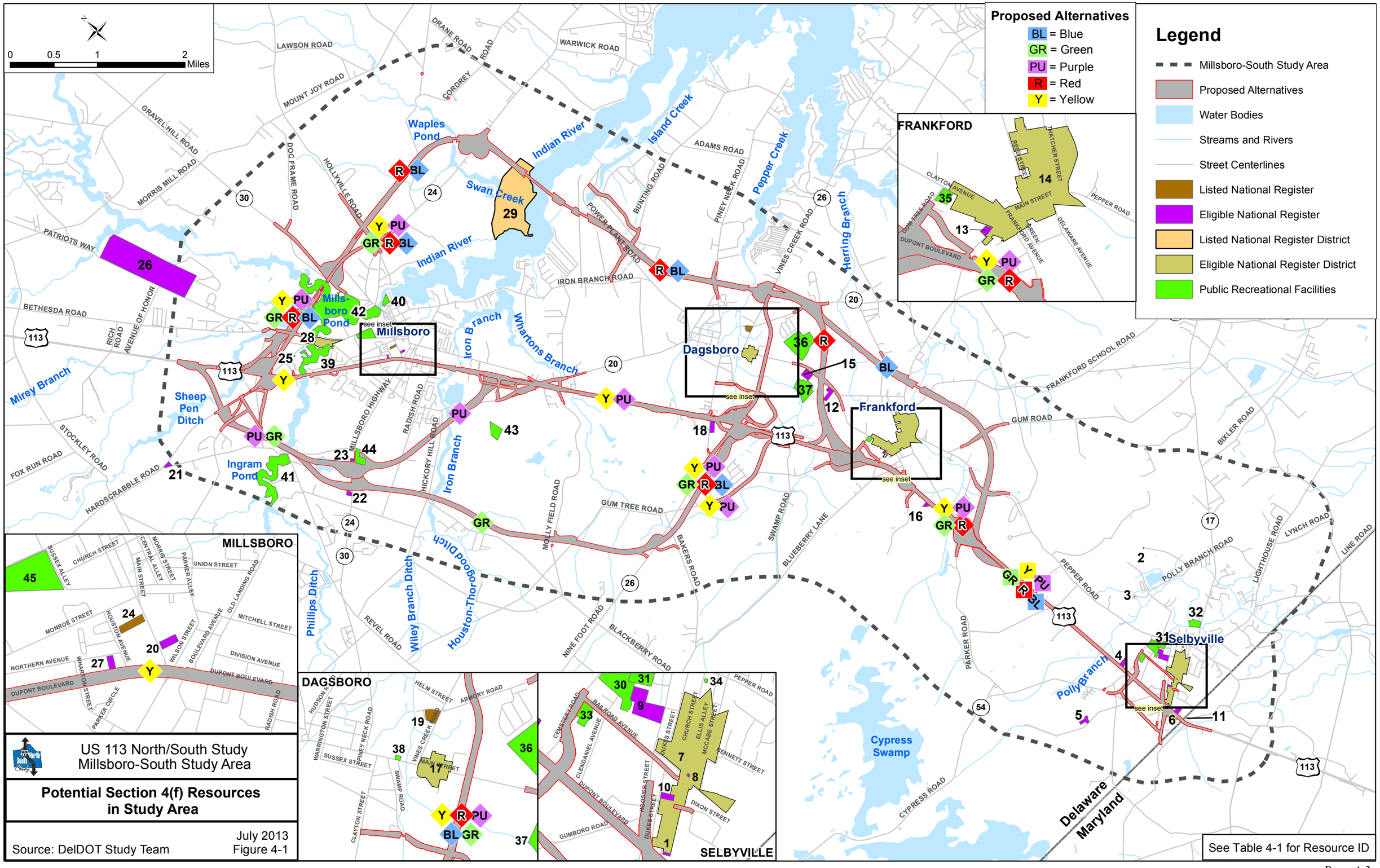
- Indian River Archaeological Complex: Section 4(f) use does not apply because preservation in place is not warranted.
- Selbyville Historic District: Section 4(f) use does not apply as the impacted contributing properties are not being used or encroached upon.
- Millsboro Pond: a Section 4(f) *de minimis* determination is being pursued.

A FHWA Section 4(f) determination will be made based on additional coordination with jurisdictional officials. This will occur subsequent to publication of the DEIS and public hearing. This will allow for the opportunity for agency comments and public input on the project and DEIS that would be shared with jurisdictional officials consistent with 23 CFR 774.5(b).

The FHWA Section 4(f) determination will be made in the project's Final Environmental Impact statement (FEIS) or FHWA Record of Decision (ROD) that will formally approve a Preferred Alternative for the US 113 North/South Study Millsboro-South Area. FHWA's Section 4(f) opinion in this DEIS is based on the information provided in the following sections.

Table 4-1: Summary of Section 4(f) Resources Within Millsboro-South Study Area

Figure 4-1 ID	Name	Type
1	English Cottage	National Register Eligible Resource
2	Holliway-Carey House	National Register Eligible Resource
3	Joshua B. Murray House	National Register Eligible Resource
4	Long-Mumford House	National Register Eligible Resource
5	McCabe Farm	National Register Eligible Resource
6	Pomeroys	National Register Eligible Resource
7	Selbyville East Commercial/Residential	National Register Eligible District
8	Selbyville Railroad Station	National Register Eligible Resource
9	Selbyville School	National Register Eligible Resource
10	St. Martin in the Fields	National Register Eligible Resource
11	Transpeninsular Monument 10	National Register Listed Resource
12	Antioch AME Church and Camp Meeting	National Register Eligible Resource
13	Cannon and Messick Feed Store	National Register Eligible Resource
14	Frankford (S-08160)	National Register Eligible District
15	Indian River High School	National Register Eligible Resource
16	Landes Family Poultry Plant	National Register Eligible Resource
17	Dagsboro South	National Register Eligible District
18	Gray Farm	National Register Eligible Resource
19	Prince George's Chapel	National Register Listed Resource
20	Charles B. Houston House	National Register Eligible Resource
21	Godwin School	National Register Eligible Resource
22	Hudson General Store	National Register Eligible Resource
23	Millsboro Chicken Hatchery	National Register Eligible Resource
24	Perry Shockley House	National Register Listed Resource
25	R.W. Tilney House	National Register Eligible Resource
26	Stockley Center	National Register Eligible Resource
27	Walter McKinley Betts House	National Register Eligible Resource
28	Warren's Mill (S-09147)	National Register Eligible District
29	Indian River Archaeological Complex	National Register Listed District
30	DE School of the Arts	Public Recreational Facility
31	Lower Sussex County Pop Warner	Public Recreational Facility
32	Phillip C. Showell Elementary School	Public Recreational Facility
33	unnamed park	Public Recreational Facility
34	unnamed park	Public Recreational Facility
35	Frankford Town Park	Public Recreational Facility
36	Indian River High School (new)	Public Recreational Facility
37	Indian River High School (old)	Public Recreational Facility
38	Katie Helm Town Park	Public Recreational Facility
39	Betts Pond	Public Recreational Facility
40	Cupola Park	Public Recreational Facility
41	Ingram Pond	Public Recreational Facility
42	Millsboro Pond	Public Recreational Facility
43	New Park 1	Public Recreational Facility
44	New Park 2	Public Recreational Facility
45	WB Atkins Memorial Park	Public Recreational Facility


0 0.5 1 2 Miles
Proposed Alternatives
BL = Blue
GR = Green
PU = Purple
R = Red
Y = Yellow
Legend
Millsboro-South Study Area
Proposed Alternatives
Water Bodies
Streams and Rivers
Street Centerlines
Listed National Register
Eligible National Register
Listed National Register District
Eligible National Register District
Public Recreational Facilities
FRANKFORD
MILLSBORO
DAGSBORO
SELBYVILLE
Millsboro
Dagsboro
Frankford
Selbyville
Millsboro Pond
Ingram Pond
Waples Pond
Swan Creek
Indian River
Island Creek
Pepper Creek
Herring Branch
Iron Branch
Whartons Branch
Mirey Branch
Sheep Pen Ditch
Phillips Ditch
Wiley Branch Ditch
Houston-Thorogood Ditch
Polly Branch
Cypress Swamp
Delaware
Maryland
LAWSON ROAD
MOUNT JOY ROAD
GRAVEL HILL ROAD
MORRIS MILL ROAD
DOC FRAME ROAD
HOLLYVILLE ROAD
DRANE ROAD
CORDREY ROAD
WARWICK ROAD
ADAMS ROAD
BUNTING ROAD
PINEY NECK ROAD
POWER PLANT ROAD
VINES CREEK ROAD
IRON BRANCH ROAD
PATRIOTS WAY
BETHESDA ROAD
RICH ROAD
AVENUE OF HONOR
FOX RUN ROAD
STOCKLEY ROAD
HARDSCRABBLE ROAD
MILLSBORO HIGHWAY
RADISH ROAD
HICKORY HILL ROAD
MOLLY FIELD ROAD
GUM TREE ROAD
SWAMP ROAD
BAKERS ROAD
BLUEBERRY LANE
REVEL ROAD
NINE FOOT ROAD
BLACKBERRY ROAD
FRANKFORD SCHOOL ROAD
GUM ROAD
BIXLER ROAD
LIGHTHOUSE ROAD
LYNCH ROAD
LINE ROAD
POLLY BRANCH ROAD
PEPPER ROAD
PARKER ROAD
CYPRESS ROAD
THATCHER STREET
REED STREET
CLAYTON AVENUE
MAIN STREET
GREEN
FRANKFORD AVENUE
DELAWARE AVENUE
PEPPER ROAD
GUM TREE ROAD
DUPONT BOULEVARD
CHURCH STREET
SUSSEX ALLEY
MORRIS STREET
CENTRAL ALLEY
PARKER ALLEY
UNION STREET
OLD LANDING ROAD
MONROE STREET
HOUSTON AVENUE
MITCHELL STREET
NORTHERN AVENUE
WILSON STREET
BOULEVARD AVENUE
DIVISION AVENUE
WHARTON STREET
PARKER CIRCLE
RADISH ROAD
HELM STREET
ARMORY ROAD
WARRINGTON STREET
WINES CREEK ROAD
SUSSEX STREET
SWAMP ROAD
CLAYTON STREET
MAIN STREET
CEMETERY ROAD
RAILROAD AVENUE
CLENDANIEL AVENUE
DUKES STREET
CHURCH STREET
ELLIS ALLEY
MCCABE STREET
PEPPER ROAD
BENNETT STREET
DUPONT BOULEVARD
HOOSIER STREET
DUKES STREET
DIXON STREET
GUMBORO ROAD
see inset
US 113 North/South Study
Millsboro-South Study Area
Potential Section 4(f) Resources in Study Area
Source: DelDOT Study Team
July 2013
Figure 4-1
See Table 4-1 for Resource ID

4.2 Section 4(f) Resources

During early stages of the US 113 North/South Study Millsboro-South Area project, potential properties within the study area that would meet Section 4(f) criteria were identified. The Blue Alternative, identified as the Recommended Preferred Alternative, is located adjacent to three Section 4(f) resources with the potential for use, as shown on **Figure 4-2**. Those properties are the Indian River Archaeological Complex, the Selbyville Historic District, and Millsboro Pond. Upon identification of these properties, the official(s) with jurisdiction were contacted to begin coordination about potential use of the Section 4(f) resource. As shown in **Table 4-2**, the three properties were evaluated for their potential Section 4(f) use.

Table 4-2: Summary of Section 4(f) Resources Along the Preferred Alternative

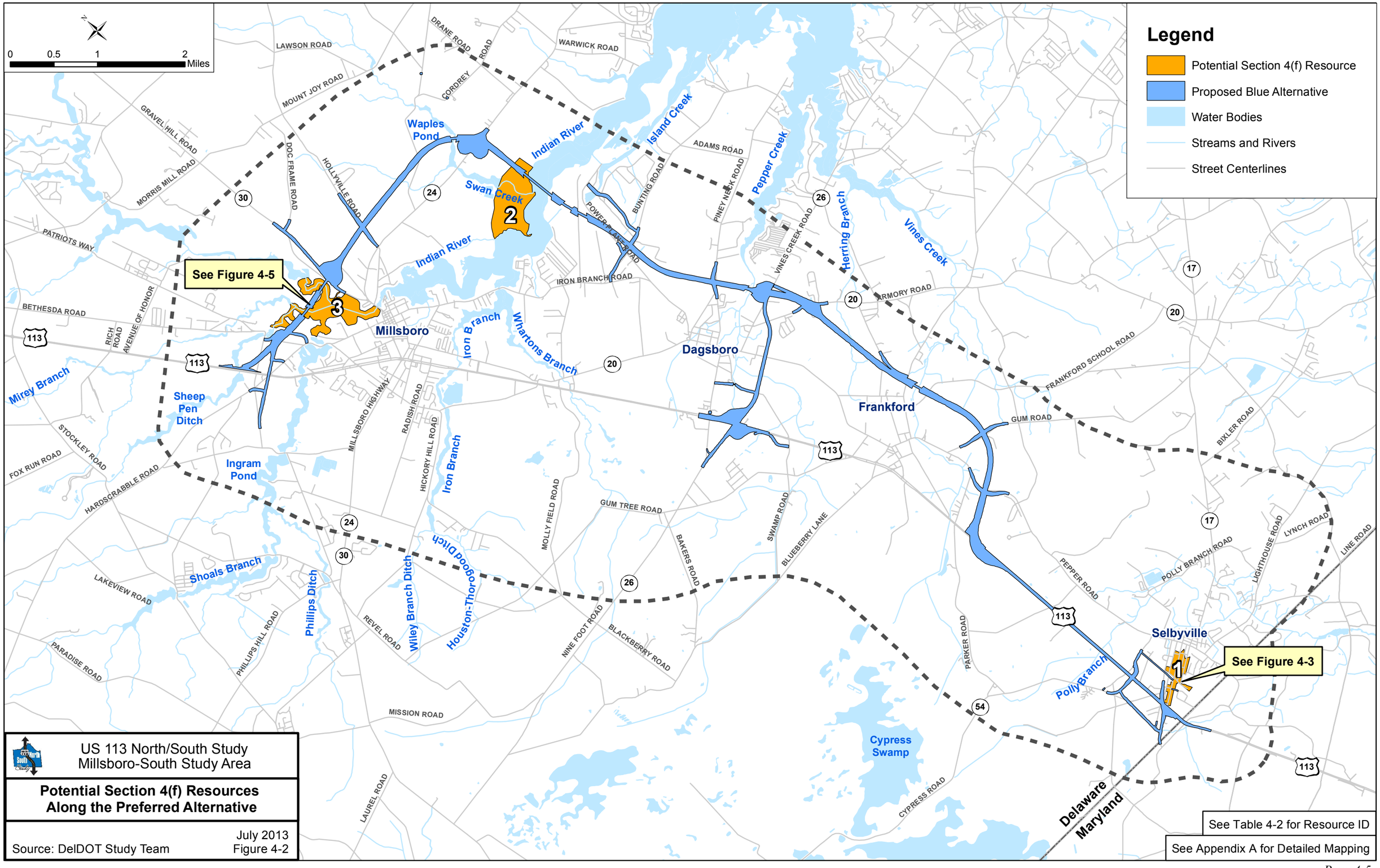
Figure 4-2 ID	Type	Site	Use
1	Historic District	Selbyville Historic District	NO
2	Archaeology	Indian River Archaeological Complex (Native American Site)	NO (based on limited information, it is eligible for its data recovery information)
3	Public Park	Millsboro Pond	YES, anticipated to be *de minimis*

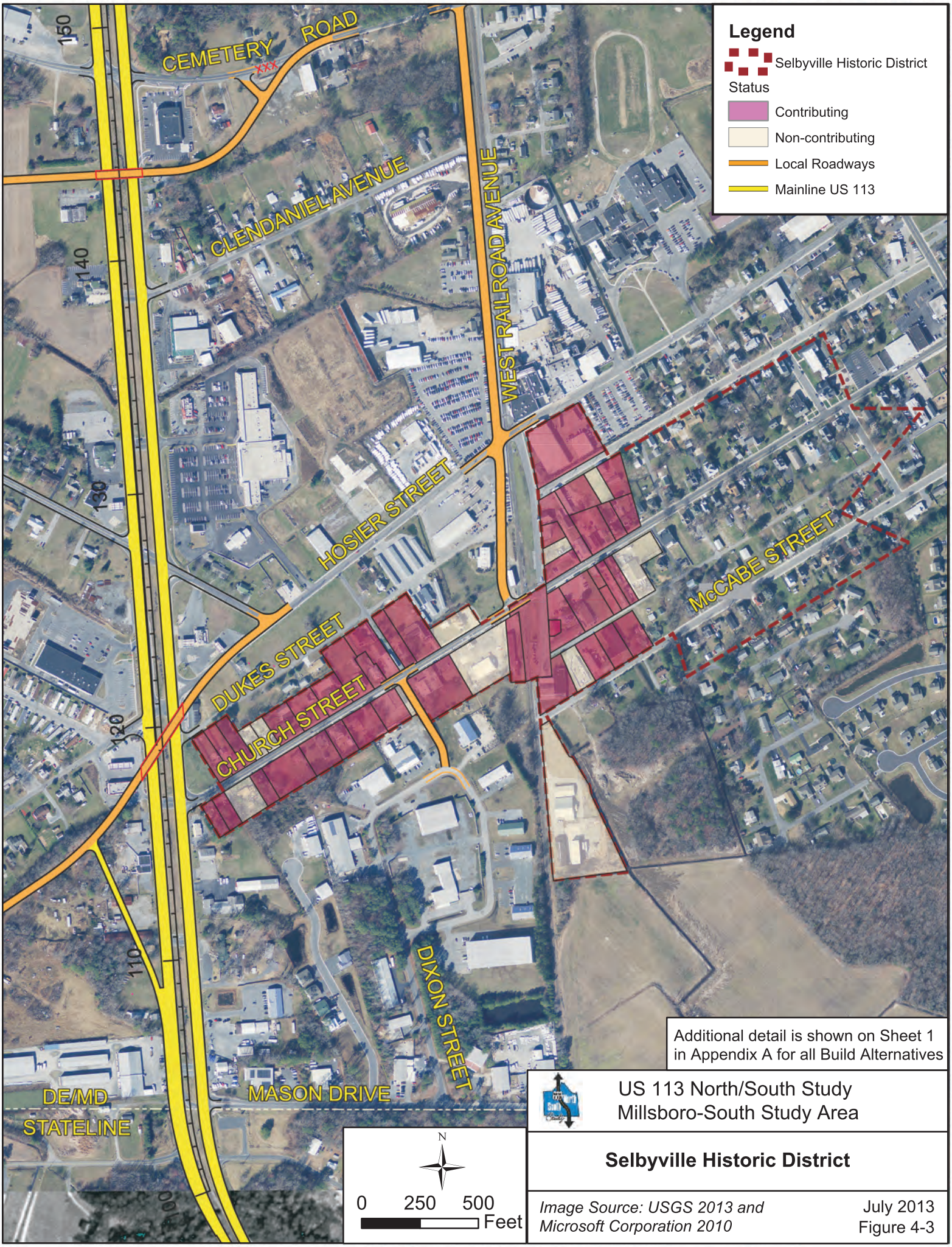
4.2.1 Selbyville Historic District

The Selbyville Historic District was determined eligible for listing on the National Register of Historic Places (NRHP) in 2010. The historic district includes both contributing and noncontributing elements. Although the historic district has been determined to be adversely affected by the Recommended Preferred Alternative under Section 106 criteria, the impact is to an undeveloped lot that has been determined to be a non-contributing element, as shown on **Figure 4-3** and **Figure 4-4**. Therefore a Section 4(f) use would not occur.

The impact is for construction of a connecting street that provides access to the Selbyville Industrial Park. This property is currently accessed only from US 113 via Mason Drive; crossovers on US 113 permit access to and from both northbound and southbound lanes. Upon construction of the Recommended Preferred Alternative, those crossovers will be eliminated and Mason Drive will not have access to or from southbound US 113. The new connecting street will allow industrial park access to and from southbound US 113, as well as direct access to and from downtown Selbyville.

For purposes of Section 106, appropriate steps are outlined in the Memorandum of Agreement (MOA) (see **Appendix C**) to minimize or mitigate impacts to properties within the historic district.


0 0.5 1 2 Miles
Legend
Potential Section 4(f) Resource
Proposed Blue Alternative
Water Bodies
Streams and Rivers
Street Centerlines
See Figure 4-5
See Figure 4-3
1
2
3
Millsboro
Dagsboro
Frankford
Selbyville
Indian River
Swan Creek
Waples Pond
Iron Branch
Whartons Branch
Mirey Branch
Sheep Pen Ditch
Ingram Pond
Shoals Branch
Phillips Ditch
Wiley Branch Ditch
Houston-Thoroughgood Ditch
Island Creek
Pepper Creek
Herring Branch
Vines Creek
Polly Branch
Cypress Swamp
Delaware
Maryland
LAWSON ROAD
DRANE ROAD
WARWICK ROAD
CORDREY ROAD
MOUNT JOY ROAD
GRAVEL HILL ROAD
MORRIS MILL ROAD
DOC FRAME ROAD
HOLLYVILLE ROAD
ADAMS ROAD
BUNTING ROAD
PINEY NECK ROAD
POWERTOWN ROAD
VINES CREEK ROAD
ARMORY ROAD
IRON BRANCH ROAD
PATRIOTS WAY
BETHESDA ROAD
RICH ROAD
AVENUE OF HONOR
MILLSBORO HIGHWAY
RADISH ROAD
HICKORY HILL ROAD
FRANKFORD SCHOOL ROAD
GUM ROAD
BIXLER ROAD
STOCKLEY ROAD
FOX RUN ROAD
HARDSCRABBLE ROAD
MOLLY FIELD ROAD
GUM TREE ROAD
BAKERS ROAD
SWAMP ROAD
BLUEBERRY LANE
PEPPER ROAD
POLLY BRANCH ROAD
LIGHTHOUSE ROAD
LYNCH ROAD
LINE ROAD
LAKEVIEW ROAD
PARADISE ROAD
PHILLIPS HILL ROAD
REVEL ROAD
NINE FOOT ROAD
BLACKBERRY ROAD
PARKER ROAD
MISSION ROAD
LAUREL ROAD
CYPRESS ROAD
30
24
26
20
17
113
54
US 113 North/South Study
Millsboro-South Study Area
Potential Section 4(f) Resources
Along the Preferred Alternative
Source: DelDOT Study Team
July 2013
Figure 4-2
See Table 4-2 for Resource ID
See Appendix A for Detailed Mapping

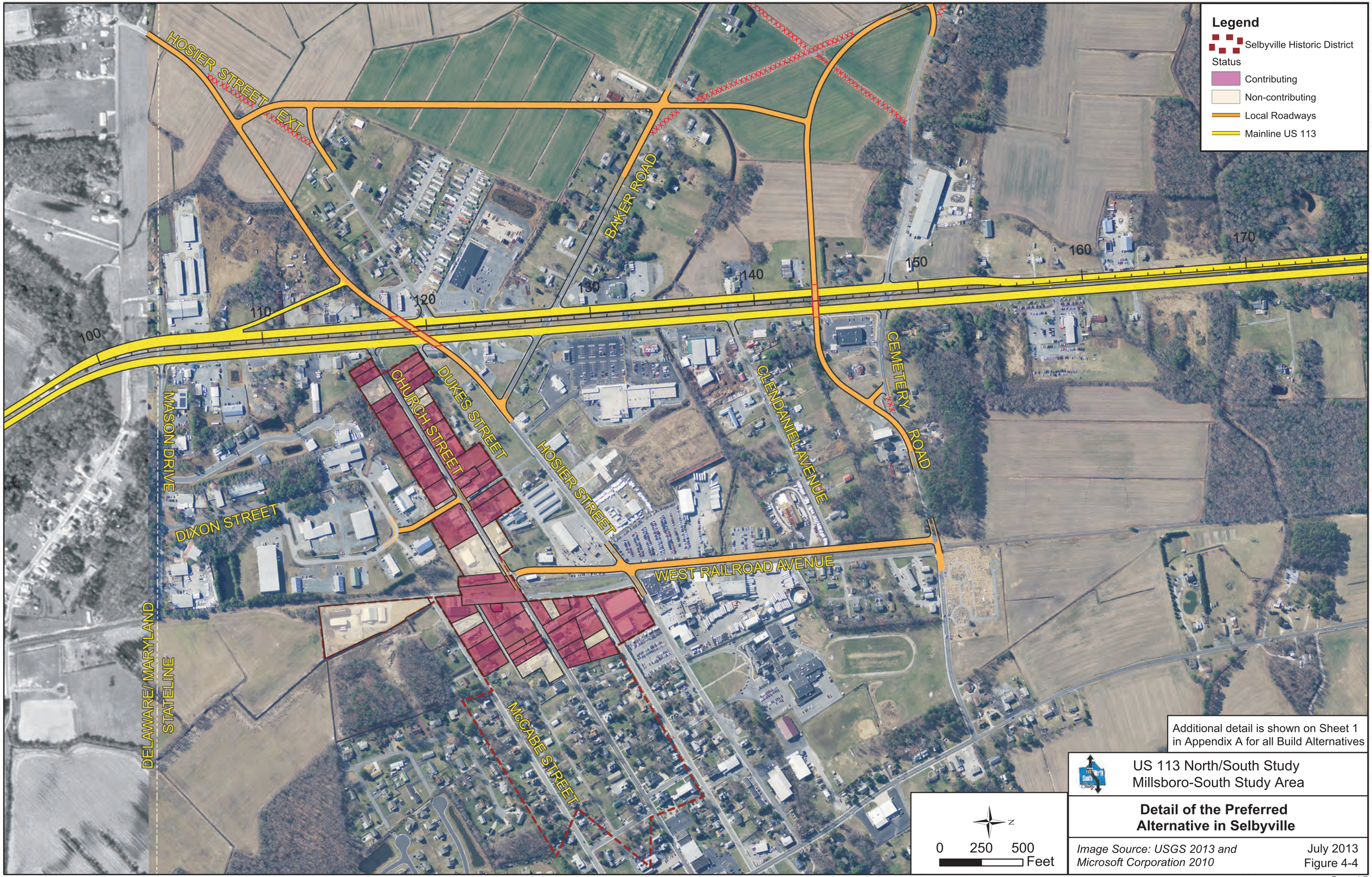


US 113 North/South Study
Millsboro-South Study Area

Selbyville Historic District

Image Source: USGS 2013 and Microsoft Corporation 2010

July 2013
Figure 4-3



Additional detail is shown on Sheet 1 in Appendix A for all Build Alternatives

US 113 North/South Study
Millsboro-South Study Area

Detail of the Preferred Alternative in Selbyville

Image Source: USGS 2013 and Microsoft Corporation 2010

July 2013
Figure 4-4

4.2.2 Indian River Archaeological Complex

Archaeological sites that are eligible for the NRHP and warrant preservation in place are considered Section 4(f) resources. Based on limited analysis, the Indian River Archaeological Complex is important chiefly for what can be learned by data recovery, and does not warrant preservation in place; therefore, Section 4(f) does not apply. A Memorandum of Agreement (MOA) has been drafted to formalize Section 106 consultation, resolve adverse effects, and present a mitigation plan for all affected historic properties, including unidentified archaeological sites to address those sites discovered (see **Appendix C**).

4.2.3 Millsboro Pond

Millsboro Pond is a publicly-owned park with public access and is a Section 4(f) resource. Key activities that occur within the 101-acre park are boating (boats with motors greater than five horsepower are prohibited) and fishing. The Recommended Preferred Alternative would result in a use of Millsboro Pond because it would require the construction of a bridge that would span the pond, requiring piers, as shown on **Figure 4-5**. However, because the impact to the property's key features would be minimal, and would only convert an estimated four acres (maximum limit of use) to a transportation use, a Section 4(f) *de minimis* determination has been discussed with Town of Millsboro officials and is anticipated. For publicly owned parks, recreation areas, and wildlife and waterfowl refuges, a *de minimis* impact is one that will not adversely affect the activities, features, or attributes of the property. If the FHWA determines that a transportation use of Section 4(f) property results in a *de minimis* impact to that property, the Section 4(f) process is complete. An analysis of avoidance alternatives is not required and a Section 4(f) evaluation is therefore not necessary.

Relationship of Resource to Corridor: Millsboro Pond is located to the east of US 113 in the Town of Millsboro (**Figure 4-2**).

Area: Millsboro Pond consists of 101 acres.

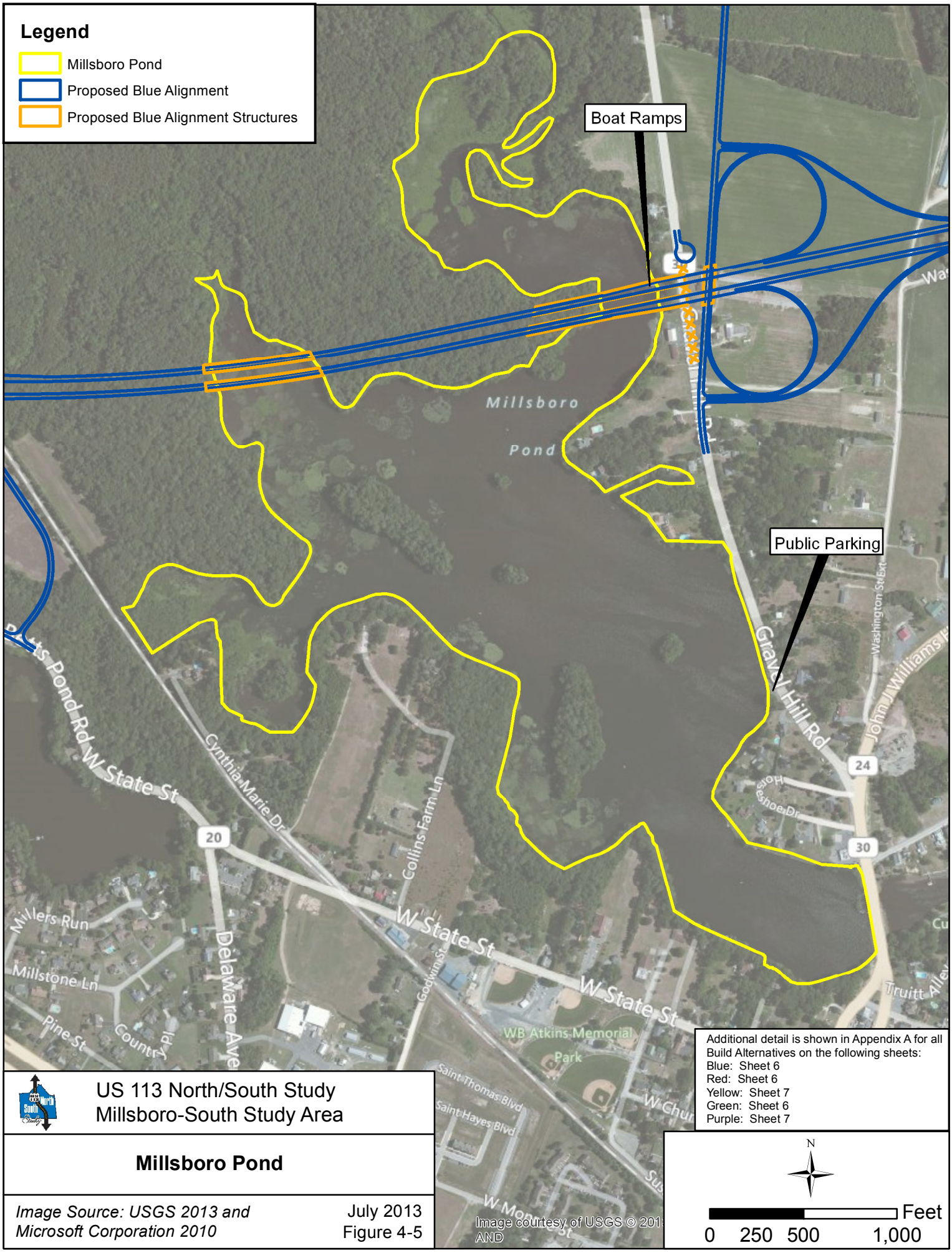
Ownership: Millsboro Pond is owned by the Town of Millsboro, with the exception of the boat ramp, which is owned and operated by the Delaware Department of Natural Resources and Environmental Control (DNREC).

Activities: Fishing and boating are allowed in the pond.

Access: Access is provided via a boat ramp built by DNREC off of SR 30. Boat motors are restricted to five horsepower.

Similarly Used Land: Nearby Betts Pond and the Indian River Bay offer a similar environment for boating and fishing.

Clauses: There are no known clauses to the use of the land.



Additional detail is shown in Appendix A for all Build Alternatives on the following sheets:
Blue: Sheet 6
Red: Sheet 6
Yellow: Sheet 7
Green: Sheet 6
Purple: Sheet 7

N

0 250 500 1,000 Feet

US 113 North/South Study
Millsboro-South Study Area

Millsboro Pond

Image Source: USGS 2013 and Microsoft Corporation 2010

July 2013
Figure 4-5

Public Coordination: Impacts to the pond were shown at the May 2010 public workshops and no objections were raised by the public.

Agency Coordination: The official with jurisdiction, the Town of Millsboro, has been consulted through written correspondence with the Town Manager. A meeting was also held on September 16, 2010. Official concurrence of the *de minimis* finding would need to be included as part of the project's FEIS or ROD after agencies and the public have had an opportunity to comment.

4.3 Conclusion

Under the DEIS Recommended Preferred Alternative, three properties were identified as having a possible Section 4(f) use, potentially requiring a Section 4(f) Evaluation. The following is a summary of the three Section 4(f) resources identified along the Recommended Preferred Alternative:

- Indian River Archaeological Complex: Section 4(f) use does not apply because preservation in place is not warranted.
- Selbyville Historic District: Section 4(f) use does not apply as the impacted contributing properties are not being used or encroached upon.
- Millsboro Pond: a Section 4(f) *de minimis* determination is being pursued.

A FHWA Section 4(f) determination will be made in the project's FEIS or ROD approving a Recommended Preferred Alternative. The *de minimis* impact determination to Millsboro Pond will include sufficient supporting documentation to demonstrate that the impacts, after avoidance, minimization, mitigation, or enhancement measures are taken into account, are *de minimis* as defined in 23 CFR 774.17; and that the coordination required by 23 CFR 774.5(b) was completed.

CHAPTER 5 – COMMENTS AND COORDINATION

Public involvement began early in the Millsboro-South portion of the US 113 North/South Study, with stakeholder interviews, the formation of a Working Group, and a program of public outreach through mailings, announcements, a video, a project website, and public workshops.

5.1 Stakeholder Listening Tour

Beginning in August 2003, interviews were conducted with elected officials, agency representatives, business and other property owners, farmers, interest groups, and community organizations. The objectives were to inform stakeholders about the project; build credibility for the project development process and Project Team; and discover issues, expectations, and suggestions at the earliest possible stage. The interviews also identified additional stakeholders and provided suggestions for how to inform and involve people in the study area.

The public has extensive, and sometimes conflicting, ideas about improvements needed to address transportation issues in the US 113 corridor. Following are some of the key thoughts expressed during the interviews:

- Rapid development and escalating land costs in the US 113 corridor make options for highway improvements fewer and more expensive with every passing month.
- There are serious congestion and safety problems on east-west routes.
- The impact of highway improvements on existing businesses must be addressed.
- If we don't act now, the US 113 corridor could end up with problems like those on SR 1 from Five Points to Rehoboth.
- Development is planned all along US 113, from north of Milford through Selbyville. Therefore, it is important to look at the entire length of US 113 in Delaware.
- Development is way ahead of our highways, and greater coordination is needed between developers and transportation officials.
- To protect natural resources and farmland, improvements should be kept as close to current US 113 as possible.
- Different solutions need to be applied in different locations.
- US 113 should serve the needs of the Delmarva Peninsula, and not become a Preferred Alternative for I-95 east coast travel.
- Any US 113 transportation plan needs to reflect a balance in treating local, through, and resort traffic.
- Solving US 113 land use and transportation issues would require concerted efforts by the study area towns, Sussex County, and DelDOT.
- A plan needs to be developed now to identify and protect needed rights-of-way.
- Once a plan for improvement of US 113 is in place, we need to stick to it and follow through in a timely manner.
- The study area towns and Sussex County are interested in working closely with DelDOT to address these issues.

5.2 Working Group

A 25-person Working Group was created to provide input to DelDOT regarding establishment of a limited access highway to meet current and future needs along the US 113 corridor. All Working Group meetings were open to the public, and most were covered by the local press. Meetings were held in the evening to encourage citizen attendance.

The group met 17 times between February 2004 and June 2007. It consisted of an individual farmer and representatives of the following agencies, organizations, businesses, or industries:

- Bennett Orchards
- Bethany/Fenwick Area Chamber of Commerce
- Delaware Center for the Inland Bays
- Delaware Small Business Development Center
- Dyer McCrea Ventures
- First State Community Action Agency
- Greater Millsboro Chamber of Commerce
- Indian River School District
- Millsboro Volunteer Fire Company
- Mountaire Farms
- Nanticoke Indian Association
- State of Delaware (State Police Troop 4; Department of Agriculture; Office of State Planning Coordination; DelDOT)
- Sussex County (Planning and Zoning; Emergency Medical Services)
- Sussex County Farm Bureau
- Thoro-Good's Concrete
- Town of Dagsboro (Mayor)
- Town of Frankford (Town Council President)
- Town of Millsboro (Town Manager and Town Councilman)
- Town of Selbyville (Town Administrator)
- Townsends

5.3 Public Events

Eleven Public Workshops and one Open House were held between October 2003 and May 2010. Over 1,400 people attended these events. The events were widely publicized in local newspapers, and over 1,000 people were individually notified about them.

A variety of techniques were used to present information, including the video, "The Time to Act is Now;" large, reader-friendly displays; Power Point presentations; and large maps with the alternatives on an aerial photograph base. Project Team members were available at all events to talk to citizens, answer their questions, and provide property-specific information. Comment forms were available at each event. All comment forms and other written communications were

summarized and entered into the project record. The information provided by the public was helpful in developing the alternatives and identifying the Recommend Preferred Alternative.

5.3.1 October 23, 2003: Public Workshop, Indian River High School

The first Public Workshop was attended by 32 people. The purposes were to inform the public about the US 113 North/South Study and to obtain information from residents regarding transportation issues and needs. The project video was shown, and displays were used to present the following information:

- Environmental agency coordination
- Project purpose and need
- Growth and land use
- Natural, agricultural, and cultural resources
- Safety and traffic conditions
- Sussex County transportation projects

Participants were asked to comment about transportation needs, suggested solutions, and the presence of environmental or historic resources in the study area.

5.3.2 June 7, 2004: Public Workshop, Millsboro Volunteer Fire Company

The second Public Workshop attracted 109 people. Display boards were used to convey information and encourage comments regarding:

- Project background
- Environmental agency coordination schedule
- Working group process
- Vision, goals, and objectives
- Population and land use
- Travel patterns
- Transit
- Improvement concepts (On-alignment option and Off-alignment bypass options)

This information was also summarized in a Power Point presentation, which was shown three times. Attendees provided verbal comments to the Project Team and used comment forms to provide written input.

5.3.3 November 15 and 16, 2004: Public Workshops, Millsboro and Selbyville Volunteer Fire Companies

The purpose of these Public Workshops, attended by 338 people, was to present the preliminary alternatives for review and comment. The November 15th workshop was held in Millsboro and the November 16th workshop was held in Selbyville, at each town's Volunteer Fire Company.

Public comments on the conceptual alternatives presented at the June 2004 Public Workshop were considered when preparing the preliminary alternatives. Display boards provided information on the following topics:

- Study process/misconceptions/next steps/schedule
- Community involvement
- Travel patterns/traffic assessments
- Limited access highway/east-west traffic
- Property acquisition process
- Sussex County transportation projects

Large maps were available for each preliminary alternative (East and West Bypass Options, and On-alignment). These maps received considerable attention as attendees assessed potential impacts to their properties and communities. Comparison matrices were available to quantify the engineering, agricultural, cultural/historic, natural resource, property, and access impacts of the alternatives. Attendees were given a handout with reduced versions of the displays and related information so they could review the materials in detail at their leisure. Comment forms were available so the public could provide input on specific preliminary alternatives.

5.3.4 May 23 and 24, 2005: Public Workshops, Millsboro and Selbyville Volunteer Fire Companies

The purpose of the fourth set of Public Workshops was to obtain input to help DelDOT determine which preliminary alternatives should be retained for detailed study and which alternatives should be eliminated from further consideration. The May 23rd public workshop was held in Millsboro and the May 24th public workshop was held in Selbyville, at each town's Volunteer Fire Company. The workshops were attended by 201 people.

Large display boards, maps of the alternatives, impact matrices, and Working Group recommendations were available for review. These materials were also available as handouts.

5.3.5 October 18, 2005: Open House, Millsboro Volunteer Fire Company

This day-long informal event was attended by 229 people. It allowed attendees to review the alternative maps without the time and crowd constraints experienced at Public Workshops. The Open House received the same publicity and notification as did the Public Workshops. The comments and information provided by attendees were used in refining the retained alternatives.

5.3.6 June 12 and 13, 2006: Public Workshops, Millsboro and Selbyville Volunteer Fire Companies

The purpose of the these workshops was to obtain input from the public to help DelDOT further refine the Alternatives Retained for Detailed Study and move forward with a Draft EIS. The focus of the workshops was refinements to the On-alignment and Bypass alternatives and key issues and impacts associated with them. A Power Point presentation was offered three times to

summarize the status of the project, review the retained alternatives, and outline the next steps in the process. The workshops were attended by 143 people. The June 12th workshop was held in Millsboro and the June 13th workshop was held in Selbyville, at each town's Volunteer Fire Company. Participants used comment forms and/or expressed their concerns verbally about the ARDS. They also suggested refinements.

5.3.7 March 12, 2007: Public Workshop, Millsboro East Elementary School

The primary focus of this workshop was to obtain input from the public regarding the advisability of including an additional alternative, called the "East-to-East" option. It would connect the eastern bypass of Georgetown to bypasses east of the Millsboro area. Large display boards and maps of the two East-to-East options were used to present information about the study and the results of the evaluations of the ARDS. The following information was available:

- Community involvement/process overview/agency coordination
- Study area/purpose and need
- Property acquisition process
- Georgetown-Millsboro East-to-East alternatives
- Next steps

A Power Point presentation, explaining the alternatives, their advantages and disadvantages, and the views of the state and federal regulatory and resource agencies, was shown three times. The maps of each alternative received considerable attention.

The comment form asked attendees to provide input regarding the desirability of adding the East-to-East alternatives to the ARDS. Over 350 people attended the Workshop. Comment forms were received from 85 people, and they showed an overwhelming lack of support for either East-to-East alternative. Based on this input and other technical factors, DelDOT decided to drop these alternatives from further consideration.

5.3.8 May 24 and 25, 2010: Public Workshops, Millsboro Fire Company and Phillip C. Showell Elementary School

These workshops were held to update the public on the progress that had been made on the project since the March 2007 Public Workshop, and to present the refinements to the Alternatives Retained for Detailed Study. Also, DelDOT presented the Blue Alternative as its preliminarily Recommended Preferred Alternative, and sought public input on this choice.

A series of displays provided information on topics such as community and resource agency coordination, the property acquisition process, details on the alternatives, reasons for selecting Blue as the preliminary Recommended Preferred Alternative, and status updates on each of the US 113 North/South study projects. Presentations, providing much of the same information, were conducted at each meeting.

A total of 467 people signed in at the workshops, and 91 comment forms were submitted either during the workshops or during the formal comment period following them. During the formal

comment period, DelDOT received two petitions expressing opposition to the project. One petition, signed by 542 people, opposed the Blue Alternative in the Millsboro-South Area and recommended adding lanes to existing US 113, additional lanes on Route 1, an elevated highway over Route 1 in bottleneck areas, and improvements to and use of existing roads to by-pass the Town of Millsboro. A second petition, signed by 137 people, was submitted opposing any plan in the Frankford/Selbyville area with the following statement, *"The Frankford/Selbyville area has no need now or in the foreseeable future of any plan that the state has proposed. Those that have pushed the proposed changes have failed to listen to the local populace. In our area your proposals will only serve to ruin our community businesses, open space, and quality of life."*

An evaluation of the petitions revealed that only 20 of the signatories of the first petition and 19 signatories of the second petition reside within the study area/would be directly impacted by the proposed project. DelDOT will continue to conduct outreach with those individuals within the study area/directly impacted by the project who signed either petition.

5.4 Local Community Meetings

More than 50 meetings were held with individual property owners, business associations, and community groups. The Project Team met with owners of historic properties, businesses, churches, and farms located along the build alternatives. DelDOT representatives met with other groups, including the Millsboro Chamber of Commerce, Dagsboro Church of God, Polly Branch Community, Ruritan Clubs, and Mountaire Farms. The purpose of these meetings was to keep the community informed and obtain their views as the study progressed.

"The Time to Act is Now," was shown at many of the local meetings. The video emphasized the rapid growth and increased traffic that Delaware, particularly Sussex County, has been experiencing and is expected to continue experiencing in the next 25 years. The video emphasized that "unless we act today," US 113 would end up resembling SR 1 from Five Points to Rehoboth. Two options were presented: do nothing and face the consequences in 20 years, or upgrade US 113 to a limited access highway. How this goal can be achieved was outlined in the video, as were opportunities for public involvement.

5.5 Project Mailing List, Public Information and Announcements

A mailing list evolved during the project, and over 1,000 residents and businesses were individually notified of the last Public Workshop. The mailing list included everyone who attended a Working Group meeting, Public Workshop, or the Open House, or who contacted DelDOT or the Project Team. People who live near the build alternative were also included.

Before each Public Workshop, an announcement was sent to people on the mailing list, notifying them of the purpose, subject matter, time, and location of the workshop. A legal Public Notice was placed in newspapers serving the study area. Additionally, an FYI was put in the papers as an attractive "reader friendly" advertisement located outside the classified sections. The FYI and Public Notice appeared in the *News Journal – Kent and Sussex Edition*, *Sussex Countian*, and *Sussex Post*.

Upcoming workshops were mentioned on the project web site and "Window Posters" were placed in popular pedestrian travel locations in the study area. The posters were also produced in Spanish to meet the needs of the Hispanic community, and a Spanish interpreter was present at the Public Workshops.

5.6 Project Web Site

An interactive project web site (http://www.deldot.gov/information/projects/us113/) has been operational since August 2003. Information available on the web site includes:

- Home Page –Most recent project highlights, status, and contact information
- Project Information – Project study area, need, goals, and objectives
- Working Group Information – Membership, purpose and role, agenda, minutes, presentation materials for each meeting
- Environmental Process – NEPA process, resource agencies, resource information
- Retained Alternatives – Interactive maps using Flash player
- Public Involvement Process – Press releases, project video, working group meetings, and public workshop information
- Public Workshops – Displays, handouts, comparison of alternatives, alternatives, public comments

Maps and key information were updated frequently. Comment forms could be obtained and submitted via the web site. While accessed throughout the study period, the web site was more active during the periods before and after Public Workshops. It was hit over 150,000 times in 2011 and has had nearly two million hits to date, including 272,000 in 2009 and 223,000 in 2010.

5.7 Elected Official Briefings/Communications

DelDOT and the Project Team were diligent about informing elected officials and seeking their input throughout the study process. These officials were part of the Stakeholder interviews. They were briefed at key milestones during the study, invited to Public Workshops and the Open House, and attended Working Group meetings and local community meetings. After the Public Workshops, a document containing 11" × 17" copies of the displays and maps and a summary of public comments was prepared and sent to each elected official.

5.7.1 Locality-Specific Coordination

Each of the study area towns worked directly with the project team in expressing its concerns and preferences for the US 113 North/South Study. Each was also represented on the Millsboro-South Area Working Group, with the opportunity to obtain information and provide input during the course of 17 meetings between February 2004 and June 2007.

Selbyville
Through coordination with the project team, the Town of Selbyville indicated that the Yellow alternative was its preference, citing the desire to support existing and future commercial development along US 113 and to preserve farmland on the west side of the Town. In meetings with the project team, the Town has worked out details of improving US 113 on its existing alignment through Selbyville and for an alignment for SR 54. Both projects are compatible with Selbyville's comprehensive plan.

Frankford
During its participation with the Millsboro-South Working Group, the Town of Frankford expressed its preference for the Blue alternative. This alternative would allow Frankford to manage its growth along existing US 113 and to the north, while reducing congestion on existing US 113 through a bypass immediately east of the Town.

Dagsboro
Through its participation on the Millsboro-South Working Group, the Town of Dagsboro expressed its preference for the Blue alternative. The Blue alternative allows Dagsboro to manage its growth around existing US 113 and to the south, and to relieve congestion on US 113 through a bypass east of the Town.

Millsboro
The Town of Millsboro also used its participation on the Millsboro-South Working Group to express its preference for the Blue alternative. Since the beginning of the Working Group process, Millsboro has opposed the Yellow alternative. Town leaders are concerned that it would divide Millsboro, creating separate communities east and west of US 113. The Town believes these impacts would be inconsistent with the goals of the Town's comprehensive plan and with Millsboro's community character.

5.8 Media Outreach

Throughout the project development process, DelDOT has actively involved the media, so that they could inform the public and urge residents to get involved. Between October 2003 and September 2011, eighteen press releases were issued. Some were accompanied by a press briefing. The releases focused on:

- Announcing that the study was beginning and outlining its purpose
- Inviting citizens to the Public Workshops and Open House
- Announcing the formation of the Working Group in February 2004
- Informing citizens that aerial and ground surveys were underway and requesting their assistance in identifying environmental and cultural resources
- Announcing that both East-to-East options had been dropped from further consideration
- Announcing the status and next steps in identification of a Recommended Preferred Alternative
- Announcing the selection of a Recommended Preferred Alternative

- Providing the results of the US 113 project study ordered by Governor Markell
- Announcing DelDOT's proposed regulations for implementing the US 113 study report recommendations
- Announcing Governor Markell's suspension of the project
- Announcing discussions between DelDOT and Sussex County legislators about the US 113 study
- Announcing the restart of NEPA documentation process for the Millsboro-South portion of the US 113 North/South Study

In addition to the press releases, DelDOT Public Affairs, the project management staff, and Project Team members communicated with the press as needed. Press stories, letters to the editor, and commentaries were compiled and reviewed so that the Project Team remained informed about public views and comments.

5.9 Agency Coordination

To facilitate project development, DelDOT and the environmental agencies held frequent Coordination Meetings. Representatives from FHWA, USACE, EPA, SHPO, USFWS, DNREC, the Delaware Department of Agriculture, and the Delaware Office of State Planning Coordination participated in these meetings. The National Marine Fisheries Service did not participate, but was provided all the project information and data given to other agencies.

5.9.1 Meetings

DelDOT and the Project Team met with the resource agencies 38 times between July 2003 and December 2012. Many of the meetings covered all four US 113 projects (Millsboro-South, Georgetown, Ellendale, and Milford). However, the following meetings, held between February 2007 and July 2012, focused primarily on the Millsboro-South and Georgetown projects.

- February 8, 2007
- February 22, 2007
- March 14, 2007
- April 5, 2007
- April 23, 2007
- May 10, 2007
- June 20, 2007
- July 17, 2007
- September 25, 2007
- October 23, 2008
- December 2, 2008
- January 13, 2009
- February 19, 2009
- March 26, 2009
- May 28, 2009
- July 7, 2009
- September 24, 2009
- November 4, 2009
- December 10, 2009
- April 13, 2010
- June 24, 2010
- August 12, 2010
- September 23, 2010
- December 2, 2010
- February 28, 2012
- July 11, 2012

Table 5-1 outlines the topics discussed with the agencies. Meeting minutes are maintained in DelDOT's project files and are available upon request.

Table 5-1: Agency Coordination Meetings

Topic	Specific Issues Discussed
Natural Resources	Inventory, wetlands, subaqueous lands, RTE species, field reviews
Engineering	Potential routes, traffic modeling, preliminary alternatives, logical termini, ARDS, alignment shifts, interchange options, updated traffic data, bridge study
Comments	• From the agencies regarding: proposed action, environmental documents, alignments • From the Working Group regarding: alignments, working group meetings • From the public regarding: Public Workshops, alignments
Cultural Resources	Section 4(f), Section 106
Impacts	By alternative
Misc.	Project action items/schedule, project goals, Corridor Capacity Preservation Program, communities and future development, public involvement, project updates, Purpose and Need concurrence, 6(f) impacts, stormwater management, input from elected officials, direction from Secretary Wicks

5.9.2 Field Reviews – USACE & DNREC

Representatives of the USACE met regularly with the field teams during the wetland delineation effort. The USACE and DelDOT committed to early planning and coordination efforts to assure that the wetland information generated would be accurate. USACE worked closely with DNREC and the Project Team to verify wetland delineations and determine the quality of each wetland surveyed. **Table 5-2** provides the dates of field views and meetings.

Table 5-2: USACE and DNREC Coordination Meetings and Field Views

Date	Agency/Topic
May 14, 2004	Field Tour
March 7 and 8, 2006	USACE Field Tour
October 17, 2006	Field Tour of Wetlands and Alternatives
December 17, 2006	DNREC Field Tour
March 28, 2007	Field Tour of Revised Brown Alternative and Indian River Power Plant Area
January 25, 2007	Resource Agency Field View
February 22, 2007	Resource Agency Field View
March 28, 2007	Resource Agency Field View
March 12, 2008	Resource Agency Field View

Information on RTE species was requested from DNREC and USFWS. USFWS indicated the potential presence of swamp pink and Bald Eagles in the project area. DNREC provided details on RTEs, Coastal Zone Consistency, forest quality, and State natural communities.

5.9.3 Field Reviews – Cultural Resources Evaluation- Section 106

Cultural resources, both architectural and archaeological, are present in the project area. Coordination with the Delaware SHPO has included seven meetings and field reviews between January 2007 and October 2012 to determine the presence of cultural resources, the potential for archaeological resources within the build alternative's limits of disturbance, and the eligibility of newly identified resources for listing on the NRHP. Coordination would continue through the development of strategies to minimize and/or mitigate adverse effects, and the completion of a Section 106 Memorandum of Agreement. A copy of the MOA will be included in the FEIS.

CHAPTER 6 – RECOMMENDED PREFERRED ALTERNATIVE

Impacts to the natural and built environment, resource and regulatory agency input, and the results of an extensive public involvement process (including coordination with the Working Group) were carefully evaluated by DelDOT in order to develop a Recommended Preferred Alternative recommendation. Based on all of the analyses completed and presented in this DEIS, DelDOT recommends the **Blue Alternative** as the Recommended Preferred Alternative for the Millsboro-South US 113 North/South Study.

Some of the issues considered in developing this recommendation include impacts to communities (property acquisitions, potential relocations, and impacts to community facilities); natural resources impacts (wetlands and other WOUS, RTE species habitat, and forests); historic resources (direct, visual, and noise impacts); Section 4(f) resources; and engineering (ability to meet project purpose and need, design complexity, and construction costs). **Table 6-1** provides information on the engineering considerations while **Table 6-2** provides details on other considerations.

Table 6-1: Engineering Details for the Retained Build Alternatives

Engineering Criteria	Proposed Alternative				
	Green	Purple	Yellow	Red	Blue
Preliminary Cost Range (millions)*	$629-$769	$562-$686	$607-$742	$671-$820	$687-$839
Existing US 113/SR 1 Length (miles)	6.4	9.3	13.2	5.4	3.8
Proposed Off-Alignment Length (miles)	8.1	4.7	0	10.9	12.7
Total Alternative Length (miles)	14.5	14.0	13.2	16.3	16.5

** Includes construction and right of way*

This DEIS recommendation is for a Preferred Alternative only. Final identification of the selected alternative cannot occur until after a Public Hearing is conducted and comments are considered, the FEIS has been publicly circulated, and the Record of Decision is issued by FHWA. DelDOT will continue to interact with members of the public and communities, and with those directly affected by the Recommended Preferred Alternative, along with the environmental resource and regulatory agencies, to refine the Recommended Preferred Alternative design and develop strategies to avoid, minimize, and mitigate impacts. These refinements would ultimately lead to the identification of a selected alternative that can be carried forward to design. This chapter describes the reasons for recommending the Blue Alternative as the Recommended Preferred Alternative.

Table 6-2: Summary of Impacts

IMPACT MATRIX

US 113 North/South Study Alternatives Evaluation
MILLSBORO-SOUTH AREA

	No-Build	Green	Purple	Yellow	Red	Blue
Wetlands and Waters of the US						
Wetlands (total acres) / (acres bridged)	0	24.9/(4.8)	31.3/(5.4)	20.1/(0.3)	26.5/(6.8)	30.8/(8.1)
High Quality (bridged)	0	23.7/(4.8)	29.3/(5.4)	17.7/(0.3)	22.1/(5.0)	24.9/(6.3)
Medium Quality (bridged)	0	1.2/(0.0)	2.0/(0.0)	2.4/(0.0)	4.4/(1.8)	5.4/(1.8)
Low Quality (bridged)	0	0/(0.0)	0.0/(0.0)	0.0/(0.0)	0/(0.0)	0.5/(0.0)
Waters of the US (linear feet)	0	22,453	15,034	14,376	16,653	19,246
Subaqueous Lands, Tidal Wetlands, and Tax Ditches						
Subaqueous Lands						
Rivers and Lakes (acres) [1]	0	3.1	10.0	1.7	9.0	9.0
Linear Features (linear feet)	0	17,250	13,808	13,000	17,894	20,851
DNREC Jurisdictional Tidal Wetlands (acres)	0	0.0	0.0	0.0	1.3	1.3
Tax Ditches (linear feet)	0	26,772	18,544	18,544	19,772	14,842
Historic Resources						
Number of Historic Properties within Study Area [2]	0	19	20	21	19	14
Number of Cemeteries [3]	0	3	5	4	4	2
Cemeteries within 50 feet of LOD (additional to above)	0	3	2	2	0	0
Archaeological Resources						
Number of Known Archaeological Sites in the Limit of Disturbance [4]	0	1	0	0	1	1
Prehistoric Sensitivity in the Limit of Disturbance [5]						
High Sensitivity Area (acres / %)	0	38 (3.7%)	38 (3.5%)	19 (2.0%)	32(2.6%)	29(2.7%)
Moderate Sensitivity Area (acres / %)	0	71 (6.9%)	75 (7.0%)	52 (5.6%)	74 (6.1%)	70(6.4%)
Low Sensitivity Area (acres / %)	0	253 (24.5%)	286 (26.6%)	263 (27.7%)	289(23.7%)	259(23.7%)
Slight Sensitivity Area (acres / %)	0	671 (64.9%)	677 (62.9%)	614 (64.7%)	827(67.6%)	737(67.2%)
Early Historic-Period Sensitivity in the Limit of Disturbance [6]						
High Sensitivity Area (acres / %) [7]	0	77 (7.5%)	93 (8.6%)	35 (3.7%)	35(2.8%)	32(2.9%)
Moderate Sensitivity Area (acres / %) [7]	0	10 (1.0%)	12 (1.1%)	12 (1.2%)	21(1.7%)	20(1.8%)
Low and Slight Sensitivity Area (acres / %)	0	6 (0.6%)	6 (0.6%)	6 (0.7%)	8 (0.7%)	6(0.6%)
Low and Slight Sensitivity Area (acres / %)	0	940 (90.9%)	965 (89.7%)	895 (94.4%)	1,158(94.8%)	1,037(94.7%)
Later Historic-Period Sensitivity in the Limit of Disturbance [8]						
Extant Locations [9]	0	175	230	272	184	134
High Sensitivity Locations	0	56	58	45	69	64
Moderate Sensitivity Locations	0	91	96	100	92	86
Low Sensitivity Locations	0	17	21	23	19	15
Section 4(f) Properties						
Total Number of Properties Potentially Subject to Section 4(f) [10]	0	2	4	4	3	3
Noise Impacts						
Total Number of Residences Affected	0	97	174	190	89	100
Rare, Threatened and Endangered Species						
Potential Rare, Threatened and Endangered Species (acres) [12]	0	246	287	199	502	485
Number of RTE Species Impacted	0	15	16	18	18	18
RTE Species / Area Impact (acres)	0	618	697	498	888	871
Other Considerations						
Agricultural Districts (Ten-Year) (number of properties)	0	1	1	1	1	1
(acres within properties)	0.0	1.9	1.9	1.9	5.3	5.3
Agricultural Preservation Easements (Permanent) (number of properties)	0	1	0	0	0	3
(acres within properties)	0	18.6	0	0	0	11.6
Prime Farmland (acres)	0	54.1	46	41	46	64.9
Natural Areas (acres)	0	12.2	12.2	12.2	23.0	23.0
Forestland: 2007 Land Use (acres)	0	70	62	42	131	162
Property Impacts						
Properties affected (number)	0	359	480	478	416	353
Properties affected (total acres)	0	920	918	591	770	1,084
Access Rights						
Relocations	0	78	119	107	99	71
Residential	0	43	72	68	67	52
Agricultural	0	11	9	4	9	9
Commercial	0	24	36	33	23	10
Other (non-profit, institutional, etc.)	0	0	2	2	0	0
Partial Acquisition / Modified Access (numbers of affected properties)	*0*	*250*	*311*	*334*	*263*	*238*
Residential	0	115	158	161	117	97
Agricultural	0	73	72	71	81	85
Commercial	0	40	47	68	28	22
Other	0	22	34	34	37	34

1 Represents large bodies of water (i.e., Indian River, Millsboro Pond, etc.).
2 Historic properties are individual resources and districts listed on or determined eligible for the National Register of Historic Places; eligibility status is based on consultant recommendations, reviewed by DelDOT and SHPO staff; consensus has been reached on all recommendations. Study area encompasses all properties on tax parcels within 600' of the centerline of the alternative.
3 Includes only those cemeteries directly impacted by an alternative.
4 Archaeological sites on file with SHPO; most have not yet been evaluated for National Register eligibility; note that the limit of disturbance (here and in subsequent rows) does not include future stormwater management and other needs such as wetland mitigation.
5 GIS inductive model based on known sites and environmental parameters, intended as a planning tool for estimating the relative likelihood for sites to be present in the limit of disturbance; note that potential archaeological significance has not been assessed; current as of January 2012.
6 GIS model based on environmental parameters and current theory regarding early historic settlement, intended as a planning tool for estimating the relative likelihood for sites to be present in the limit of disturbance; note that potential archaeological significance has not been assessed; current as of January 2012.
7 Includes estimated acreage of each alternative within hypothesized footprint of Askekesky Indian Reservation, which was not factored into the GIS sensitivity model.
8 Point locations for properties derived from historical maps and documents and assessed for likelihood of survival based on subsequent disturbances; note that potential archaeological significance has not been assessed; includes a 300-foot buffer around each point to account for mapping inaccuracies; current as of January 2012.
9 Standing historic-period structures.
10 The possible number of properties directly impacted by an alternative; includes public recreation areas, archeological sites, historic districts, and standing structures; properties evaluated for direct impacts include any property within the limit of disturbance for the alternative and also include situations where demolition of all or some of the contributing components of the resource is proposed.
11 State Resource Area as identified on 2006 maps are void. Impacts are included here as a representation of lands considered to have significant ecological value by DNREC.
12 Anticipated impacts to rare, threatened and endangered (RTE) species based on coordination to date with DNREC. Detailed evaluation and coordination with DNREC and US Fish and Wildlife Service is continuing. The data in the potential RTE species areas row are not exhaustive. These data represent known occurrences of RTE species, not habitat for RTE species.

6.1 ALTERNATIVES NOT PREFERRED

The No-build, Green, Purple, Yellow, and Red alternatives are not preferred for the Millsboro-South portion of the US 113 project. The reasons these alternatives are not preferred are summarized below.

No-build Alternative
There would be no impacts to the natural environment, community facilities, or properties in the area as a result of the No-build Alternative. However, the No-build Alternative is the only retained alternative that does not meet the project Purpose and Need. The purpose of the project is to preserve mobility for local residents and businesses while providing highway improvements that would accommodate the anticipated growth in local, seasonal, and through traffic. As development and the population increase in Sussex County, there is a need for an improved and more efficient north/south route. The safety and traffic concerns along existing US 113 and surrounding roadways would be compounded and would continue to worsen under to the No-build Alternative. In addition, US 113 was the recommended north-south corridor in the 2001 *Sussex County North-South Transportation Feasibility Study*. There is little locality, agency, or public support for the No-build Alternative.

The No-build Alternative was not selected as the Recommended Preferred Alternative because of its lack of support and because it does not provide a US 113 that accommodates planned economic growth in the Selbyville, Frankford, Dagsboro, and Millsboro areas. Therefore, it does not meet the Purpose and Need for the project.

Green Alternative
The Green Alternative would require the fewest residential (43) and other (such as vacant lots) relocations. Compared to the other build alternatives, noise impacts for the Green Alternative are moderate; 94 properties would be audibly impacted.

With regard to wetland impacts, the Green Alternative is second lowest of the build alternatives. It is in the middle in terms of impacts to high quality wetlands. Due to the nature of Sheep Pen Ditch, the wetlands associated with it are dominated by mature Atlantic white cedar/red maple forest. These high quality wetlands would be impacted by each of the build alternatives, but Green and Purple would impact the most acreage (3.4) of this system.

The Green Alternative would impact the second lowest acreage of habitat for RTE Species (246 acres). However, it would have the greatest linear feet of impacts to WOUS (22,453) and to tax ditches (26,772 linear feet).

There are 19 historic properties within the study area surrounding the Green Alternative; this is the same as Red, less than Purple and Yellow, and more than Blue. There is one known archaeological site within the limit of disturbance. These resources could be subject to both direct and indirect effects with adverse effects under Section 106 criteria of adverse effect application.

Only the Green and Blue alternatives impact Agricultural Preservation Easements; Green impacts more acres (19 vs. 12 acres). The Green Alternative has poor consistency with the initiatives of Strategies for State Policies and Spending. It falls in the middle of the Build alternatives in terms of both total length (14.5 miles) and construction cost ($629 - $769 million). The Green Alternative received little support from the public, the Working Group, or the towns in the study area. It was generally opposed by the USACE and EPA.

The Green Alternative was not selected as a Recommended Preferred Alternative due to lack of support and its lack of consistency with Strategies for State Policies and Spending and local comprehensive plans.

Purple Alternative

Purple would be the most disruptive alternative to community facilities. It is the only alternative that would require relocation of a religious institution, the Dickerson Chapel AME Church. It is also the only alternative that would require relocation of a school, the Lighthouse Christian School, associated with Dagsboro Church of God. In addition, Purple would impact more cemeteries than any of the other build alternatives.

The Purple Alternative would require the highest number of relocations overall (119), the most residential relocations (72), and a high number of access modification (311 properties). It would require (9) agricultural relocations, but the most commercial relocations (36). Noise impacts for the Purple Alternative are the second highest of the build alternatives; 171 properties would be audibly impacted.

The Purple Alternative would impact the most wetlands (31.3 acres) and the most high-quality wetlands (29.3 acres), but would be second lowest of the build alternatives in terms of WOUS impacts (15,034 linear feet) and in the middle in terms of tax ditch impacts (18,544 linear feet). Due to the nature of Sheep Pen Ditch, the wetlands associated with it are dominated by mature Atlantic white cedar/red maple forest. These high quality wetlands would be impacted by each of the build alternatives, but Green and Purple would impact the most acreage (3.4) of this system. Purple is in the middle of the build alternatives for impacts to habitat for RTE Species (287 acres), and for impacts to forest land (96 acres).

There are 20 historic properties within the study area surrounding the Purple Alternative, but no known archaeological sites within the limit of disturbance. These historic properties could be subject to indirect impacts.

The Purple Alternative would impact the second lowest amount of agricultural land of the proposed build alternatives (457 acres). It would impact 1.9 acres of a single Agricultural District and no Agricultural Preservation Easements. The Purple Alternative's consistency with the Strategies for State Policies and Spending initiative is very poor. Purple is the second shortest build alternative, and it has the second shortest length of roadway on new alignment. It would be the least expensive of the build alternatives (between $562 and $686 million).

There was little support from the public, the Working Group, or the towns in the study area for the Purple Alternative. Purple was generally opposed by the USACE and EPA.

The Purple Alternative was not selected as a Recommended Preferred Alternative due to its high number of relocations and partial acquisitions, its high impacts to wetlands and other WOUS, its potential impacts to cemeteries, and its lack of support.

Yellow Alternative
A total of 107 residential, commercial, or agricultural properties would require relocation as a result of the Yellow Alternative, and 334 properties would require modified access. Along with Purple, it requires the most business relocations. Noise impact calculations show that the Yellow Alternative would audibly impact the most properties (188).

The Yellow Alternative has relatively low impacts to wetlands, WOUS, and forestland. Of the build alternatives, Yellow has the lowest impacts to wetlands (20.1 acres), WOUS (14,376 linear feet), and subaqueous lands (13,000 linear feet). The Green, Purple, and Yellow alternatives all avoid impacts to tidal wetlands. Yellow has the fewest impacts (42 acres) to forest land. Due to the nature of Sheep Pen Ditch, the wetlands associated with it are dominated by mature Atlantic white cedar/red maple forest. These high quality wetlands would be impacted by each of the build alternatives; at 0.9 acres, Yellow would have the least impacts.

There are 21 historic properties within the study area surrounding the Yellow Alternative, the most of the build alternatives. There are no known archaeological sites within the limit of disturbance. These historic properties could be subject to indirect impacts.

The addition of access roads would increase maintenance of traffic impacts along existing US 113 and would cause the Yellow Alternative to be the most disruptive to the public during construction. Despite the addition of access roads, the Yellow Alternative would primarily be a limited access highway, creating a barrier for east-west community interaction and interfering with community cohesion in the project area.

The Yellow Alternative would impact the fewest acres (324) of agricultural land and it would be the second least expensive alternative to construct ($607 - $742 million). However, it impacts the most existing homes and businesses along US 113, and would require the longest time to construct. The Yellow Alternative has very poor consistency with the goals of Strategies for State Policies and Spending because it divides the study area towns, adversely impacts evacuation and the delivery of emergency services, and does not serve anticipated growth.

Throughout the course of this project, the Yellow Alternative has been strongly opposed by the general public, emergency services providers, and the towns of Frankford, Dagsboro, and Millsboro. Opposition was primarily due to the Yellow Alternative creating a limited-access highway that would divide the towns of Frankford, Dagsboro, and Millsboro. This would obstruct local east-west access to and from the towns.

Concern was also expressed about business disruptions and traffic delays during the lengthy construction process. See **Section 3.14** for more details on constructability.

The Yellow Alternative was not selected as the Recommended Preferred Alternative because it has high cultural, socio-economic, and engineering costs. Strong opposition by the public, emergency service providers, and the study area towns also influenced the decision to not choose Yellow as the Recommended Preferred Alternative. Finally, the Yellow Alternative also divides Frankford, Dagsboro, and Millsboro due to the introduction of a limited access roadway through the center of these municipalities.

Red Alternative

Red is in the middle of the proposed build alternatives with regards to overall property relocations (96). Along with Blue, it has the most agricultural properties requiring relocation (11). Noise impacts resulting from the Red Alternative are the lowest among the build alternatives (87).

There would be moderate impacts to the natural environment as a result of the Red Alternative. It would impact 26.5 acres of wetlands and 16,653 linear feet of WOUS. The Red and Blue alternatives would have the greatest impact to tidal wetlands under the jurisdiction of DNREC. The length the system associated with Swan Creek has created backwater wetlands dominated by mature Atlantic white cedar and red maple. Red and Blue are the only Build alternatives that would impact this high quality wetland system; their impacts would be equal. The Red Alternative would impact the second-highest amount of forested land (131 acres) and, along with Blue, the most state natural areas (23 acres).

There are 19 historic properties within the study area surrounding the Red Alternative, and one known archaeological site within the limit of disturbance. These historic properties could be subject to indirect impacts.

The Red Alternative has the highest impacts to agricultural land (631 acres) and, along with the Blue Alternative, impacts the most acres (5.3) of Agricultural Districts. The Red Alternative has poor consistency with the initiatives of Strategies for State Policies and Spending.

The Red Alternative is the second longest build alternative and would have 10.9 miles of new alignment. The total cost for the Red Alternative is the second highest (between $671 and $820 million).

Although climate change would result in an estimated sea level rise of approximately 1.6 to 4.9 feet during the next 100 years, sea level rise is not expected to have a major impact on the build alternatives for US 113. The Red Alternative would likely experience the greatest impact from the potential rise in sea level. Regardless of which alternative is selected, the proposed roadway profile will be elevated throughout a majority of the alignment, including overpasses and waterway crossings. For the purpose of concept design, the profile grade of the new roadway

will be elevated a minimum of five feet above the existing 100-year floodplain. The profile grade will continue to be refined through final design to identify and adjust the roadway elevation to minimize the effects of the sea level rise.

Public Workshops revealed that an eastern bypass was preferred, but Blue had more support than Red. This alternative was strongly opposed by Dagsboro and Frankford, and was not supported by the Millsboro-South Working Group.

The Red Alternative was not selected as the Recommended Preferred Alternative due to its high number of required relocations and lack of Working Group and Town support, and due to its impacts to RTE species habitat and forests.

6.2 RECOMMENDED PREFERRED ALTERNATIVE

The Blue Alternative is recommended as the Recommended Preferred Alternative for the US 113 project. It is summarized below.

The Blue Alternative would have the fewest overall relocations and total property impacts. It would have the second fewest residential relocations, and the fewest commercial relocations. A total of 238 properties would require access modifications. Noise impacts for the Blue Alternative are in the middle of the build alternatives, with 100 properties audibly impacted. See **Table 6-2** for details.

The Blue Alternative's impacts to natural resources are similar to those of the other build alternatives. It would impact 30.8 acres of wetlands and 19,246 linear feet of WOUS. The length the system associated with Swan Creek has created backwater wetlands dominated by mature Atlantic white cedar and red maple. Red and Blue are the only build alternatives that would impact this high quality wetland system. The Blue Alternative would impact 162 acres of forestland, the most of any of the build alternatives. It would also impact the second most habitat for RTE species.

There are 14 historic properties within the study area surrounding the Blue Alternative; this is the fewest of the build alternatives. There is one known archaeological site within the limit of disturbance. These historic properties could be subject to indirect impacts.

The Blue Alternative would be in the middle of the build alternatives in terms of impacts to farmland (607 acres). Along with the Red Alternative, it impacts the greatest acreage of Agricultural Districts (5.3 acres), and it has the second highest impacts to Agricultural Preservation Easements (11.6 acres). The Blue Alternative complies with the Strategies for State Policies and Spending.

At 16.5 miles, Blue is the longest of the build alternatives. Only 3.8 miles follows the existing roadway of US 113. Thus, the Blue Alternative would be the most expensive of the build alternatives (between $687 and $839 million).

A review of the five build alternatives for the Millsboro-South project area determined that the Blue Alternative would provide the most benefit for emergency evacuation. This assessment was based on the fact that the Blue Alternative provides the longest segment of new, limited access roadway to improve the safety and efficiency of traffic operations during an evacuation. The Blue Alternative has the additional benefit of being closer to vacation destinations where a majority of the seasonal traffic would originate during a coastal storm emergency.

Working Group meetings, Public Workshops, and discussions with the municipalities in the area revealed that the Blue Alternative had the most support among each of these sectors. The Blue Alternative is supported by the USACE and EPA.

The Blue Alternative was selected as the Recommended Preferred Alternative because it most closely conforms to the Strategies for State Policies and Spending, has the most support from the public and local towns, and would provide an effective route for emergency evacuations. It also has natural resources impacts that are similar to the other build alternatives, and has the lowest potential relocation and partial acquisition impacts. In addition, it has the lowest potential for impacts to historic properties.

6.3 PHASED IMPLEMENTATION

Due to the magnitude of this project, it is anticipated that the proposed design and construction of the Millsboro-South Preferred Alternative would be completed in segments. Each segment would be phased or prioritized only as they are needed and as funding becomes available. DelDOT would develop a plan to monitor growth in development and traffic, and establish a triggering mechanism to ensure that segments are constructed only as conditions dictate. Immediate safety and congestion concerns would be addressed first; however, it is important to identify project needs to allow adequate time to complete design work. Providing a more detailed design effort would also allow the identification and preservation of specific right-of-way needs for future segments.

Based on current needs, the northernmost section of the Recommended Preferred Alternative, which bypasses the Town of Millsboro, would likely be the first segment constructed. This segment would include approximately 4.1 miles of new alignment, beginning at the interchange with US 113 and terminating at SR 24. This project would include a four-lane limited-access roadway with grade separated interchanges at SR 30 and SR 24. There would be several bridge structures, but this segment would terminate prior to the proposed Indian River crossing.

The next segment to be constructed would likely be the proposed east-west connection from existing US 113 to SR 26, which would intersect existing US 113 at a new grade separated interchange south of Dagsboro. This project would include approximately 2.3 miles of new two-lane roadway along a proposed alignment that would end where the new US 113 east bypass intersects existing SR 26.

The remaining off-alignment segments would likely be built north to south because traffic volumes are highest in the north and traffic projections indicate that this is not likely to change. However, construction priorities would still be based on demand (as determined by traffic monitoring) and funding availability. It is anticipated that the on-alignment segment from south of Frankford (through Selbyville) to the state line would be built last. The entire project would probably be phased over 15 to 20 years, with the segments south of Millsboro in the later stages of that period.

CHAPTER 7 – LIST OF PREPARERS

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CHAPTER 10 – LIST OF ACRONYMS

AADT	Average Annual Daily Traffic
AASHTO	American Association of State Highway and Transportation Officials
AAR	Average Accident Rates
AIRS/AFS	Aerometric Information Retrieval System/AIRS Facility Subsystem
APE	Area of Potential Effect
ARDS	Alternatives Retained for Detailed Study
ATI	Area of Traffic Influence
BMP	Best Management Practice
CAA	Clean Air Act
CCPP	Corridor Capacity Preservation Program
CEQ	Council on Environmental Quality
CERCLIS	Comprehensive Environmental Response, Compensation and Liability Information System
CESQG	Conditionally Exempt Small Quantity Generator
CFR	Code of Federal Regulations
CR	Critical Ratio
CTP	Capital Transportation Program
CWA	Clean Water Act
CZMA	Coastal Zone Management Act
DART	Delaware Area Rapid Transit
dBA	Decibels A-weighted. A measure of noise that reflect the human ear's sensitivity
DCMP	Delaware Coastal Management Plan
DEIS	Draft Environmental Impact Statement
DelDOT	Delaware Department of Transportation
DGS	Delaware Geographical Survey
DNREC	Delaware Department of Natural Resources and Environmental Control
DO	Dissolved Oxygen
DTC	Delaware Transit Corporation
EA	Environmental Assessment
EIS	Environmental Impact Statement
EPA	Environmental Protection Agency
ESA	Endangered Species Act
FCIR	Farmland Conversion Impact Rating
FEIS	Final Environmental Impact Statement
FEMA	Federal Emergency Management Agency
FHWA	Federal Highway Administration

GIS	Geographic Information System
gpm	gallons per minute
gpd	gallons per day
HC	Hydrocarbon
HCM	Highway Capacity Manual
HHS	Health and Human Services
ICIS	Integrated Compliance Information System
JD	Jurisdictional Determination
L_{eq}	Equivalent Sound Level
LESA	Land Evaluation Site Assessment
LOS	Level of Service
LQG	Large Quantity Generator
LRTP	Long Range Transportation Plan
LULC	Land Use/Land Cover
mgd	million gallons per day
MOA	Memorandum of Agreement
MSAT	Mobile Source Air Toxics
MSL	Mean Sea Level
NAAQS	National Ambient Air Quality Standards
NAC	Noise Abatement Criteria
NB	Northbound
NCDB	National Compliance Data Base
NEI	National Emission Inventory
NEPA	National Environmental Policy Act of 1969
NHPA	National Historic Preservation Act
NHS	National Highway System
NOAA	National Oceanic and Atmospheric Administration
NPDES	National Pollutant Discharge Elimination System
NRCS	Natural Resources Conservation Service
NRTR	Natural Resources Technical Report
NSA	Noise Sensitive Area
OSPC	Office of State Planning Coordination
PADT	Peak Average Daily Traffic
PEM	Palustrine Emergent
PFO	Palustrine Forested
PM	Particulate Matter
PSS	Palustrine Scrub-Shrub

PUB	Palustrine Unconsolidated Bottom
RCRAInfo	Resource Conservation and Recovery Act of 1976
RTE	Rare, Threatened, and Endangered Species
S/NAAQS	State/National Ambient Air Quality Standards
SB	Southbound
SCEA	Secondary and Cumulative Effects Analysis
SEPTA	Southern Pennsylvania Transportation Authority
SHPO	State Historic Preservation Office
SQG	Small Quantity Generator
TAZ	Transportation Analysis Zones
TNM	Traffic Noise Model
TRI	Toxics Release Inventory
TSM	Transportation System Management
USACE	Unites States Army Corps of Engineers
USCG	United States Coast Guard
USFWS	United States Fish and Wildlife Service
USGS	United States Geological Survey
UV	Ultraviolet
WOUS	Waters of the United States