South Central Kent County Circulation & Sufficiency Study

April 2025

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Project Description and Purpose

The goal of the South Central Kent County Circulation & Sufficiency Study is to evaluate the area roadways to develop recommendations for short-term (1-5 years) and medium-term (6-10 years) circulation improvements. The study assesses the potential need for multimodal enhancements, including:

1. Roadway improvements, such as turn lanes, lengthened turn lanes, partial or full shoulders/bypass lanes, upgrades to signalized and unsignalized intersections.
2. Transit improvements, such as new stop locations, upgrades to stops, etc.
3. Bike/pedestrian system improvements, including potential for integration with roadway improvements (above).

This study will focus on identifying projects and recommendations that can be implemented in the next 3-5 years, with some supplemental projects that can be implemented in 5-10 years or may require further study. This plan will aid local officials and decision makers in guiding future projects in such a way to safely accommodate all modes of transportation and land uses to promote Kent County's goals to support economic growth and enhance quality of life for all residents.

Study Area

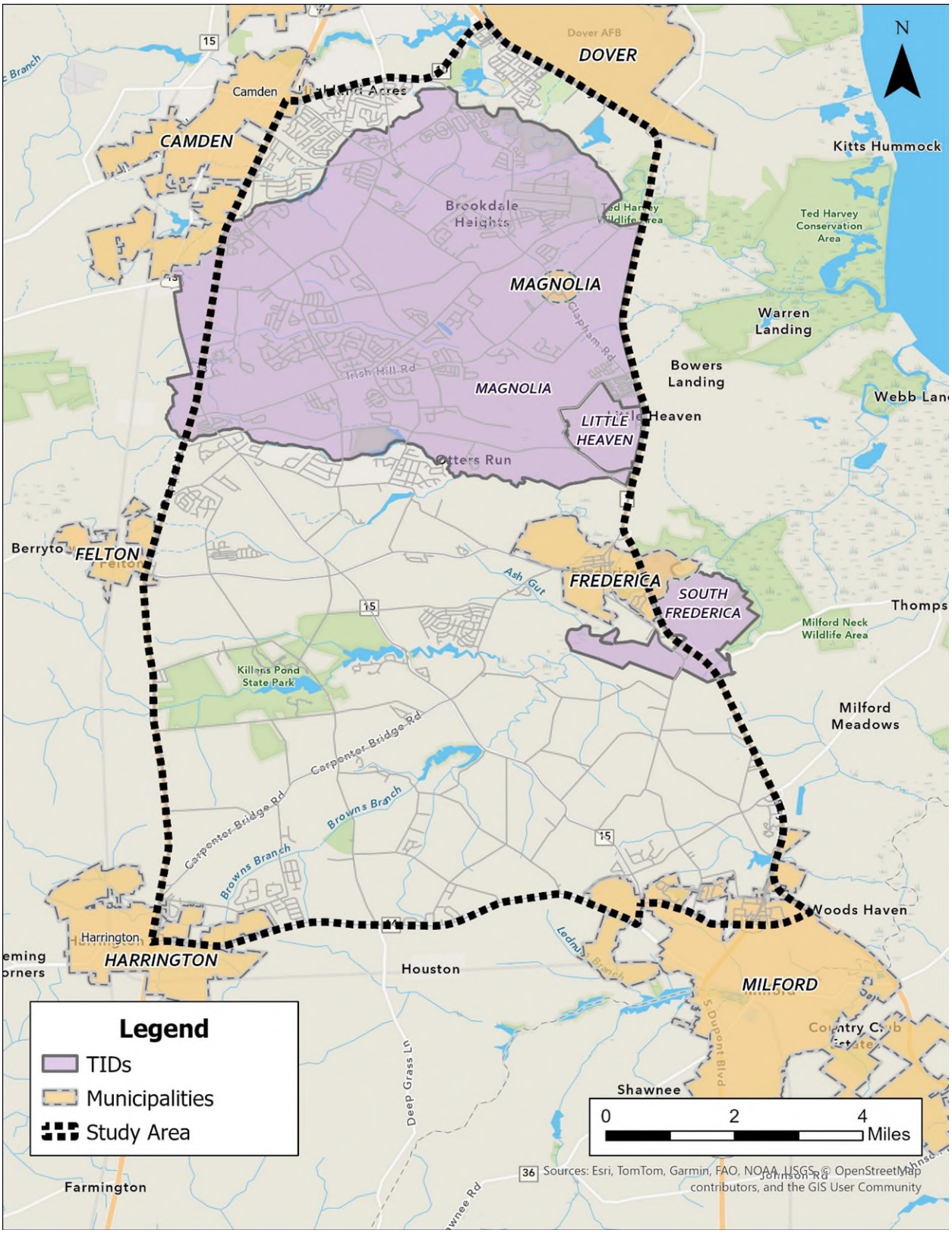
The Study Area is roughly bounded by SR 10 to the north; SR 1 to the east; SR 14, Airport Road, and Tenth Street to the south; and US 13 to the west (**Figure 1**). It spans approximately 49,822 acres (approximately 77.8 square miles), encompassing portions of the Town of Camden, Town of Felton, Town of Frederica, City of Harrington, City of Milford, and the entire Town of Magnolia. Most of the study area is in the Kent County Growth Zone and was identified because it has experienced significant residential development pressure. The development patterns within the study area support an auto-dependent transportation system. Small portions of the study area are served by transit, and bicycle and pedestrian facilities within the study area are sparse and largely disconnected. Kent County is still considered a rural county and actively works to preserve that character. Rural communities face their own set of transportation challenges. Rural America faces significant safety and mobility challenges, such as high motor vehicle fatalities rates and poor transportation infrastructure condition and maintenance. Rural residents have limited transportation options; only 36% have the choice between airline, rail, and bus transportation services. However, the demand for regionally focused, connected, and accessible public transit solutions is rising.[1]

"From 2017 to 2021, over 83,000 people died on rural roadways; this accounts for 43% of all roadway deaths despite only 20% of the U.S. population residing in these areas and only 31% of vehicle miles traveled occurring in rural areas."

-FHWA, Proven Safety Countermeasures in Rural Communities

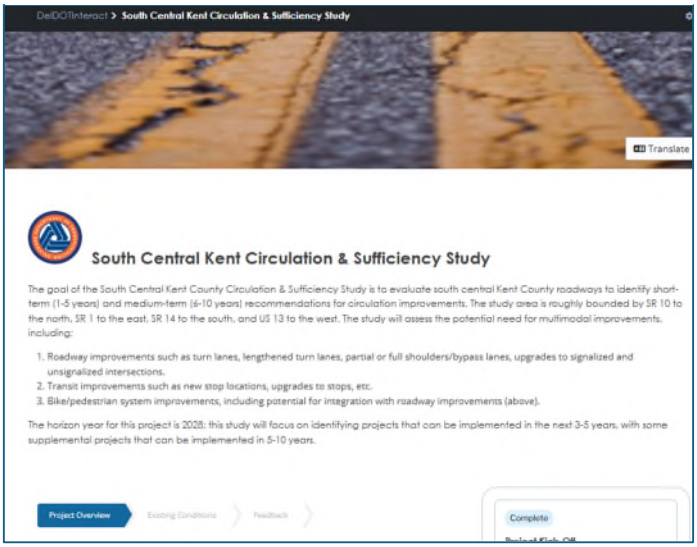
[1] US DOT, The Critical Role of Rural Communities in the U.S. Transportation System, https://www.transportation.gov/rural/grant-toolkit/critical-role-rural-communities#:~:text=Rural%20residents%20have%20limited%20transportation,public%20transit%20solutions%20is%20rising.

Figure 1: Study Area with Municipal and TID boundaries



Outreach Activities

Figure 2: Online Project Page (https://publicinput.com/southcentralkent)



Since the study focuses on identifying short-term circulation improvements, traditional public workshops were not included in this project. However, the project team still afforded the public opportunities to provide feedback. DelDOT hosted a project page on their platform, PublicInput (https://publicinput.com/southcentralkent), and the project team worked with the Dover/Kent County MPO to encourage input on social media. Existing conditions maps and data were posted to the website for review along with an open comment box to identify any areas of concern within the study area. The project team received two comments:

1. *We need some form of rapid transit from Dover to Milford. I advocate for a light rail system to transport passengers.*
2. *I know that Kent has a bike plan and there have been studies. I also know that it is still not safe to ride a bike for any distance in Kent County. More effort need[s] to be made to ensure this form of transportation is safe and attractive to everyone. This will encourage more physical fitness and reduce obesity – a chronic health issue in Delaware.*

Placeholders for PAC, TAC and MPO Council

The public will also have an opportunity to provide feedback when the report and recommendations are presented at MPO Council, PAC and TAC meetings with DelDOT and Kent County staff in attendance.

Existing Conditions

Existing Roadway Conditions

Roadway Functional Classification

Roadways within the study area are classified as either major collectors, minor collectors, minor arterials, principal arterials, or local roadways. The functional classification of each roadway is based on the type of service the road provides to the public and the designation is used for planning purposes and design standards. Local roads emphasize immediate access to land, while Arterials emphasize a high level of mobility for through movement. Collectors is the medium and offers a compromise between both functions. **Figure 3** shows the variety of roadway functional classes within the study area.

Both major and minor collector roads gather traffic from local roads and funnel them into arterial networks. Major collectors are often longer and have higher speed limits and annual average traffic volumes than their minor collector counterparts. The following roadways within the study area are classified as **major collectors** for either their entire length or just sections:

- Sorghum Mill Road
- Rising Sun Road
- Voshells Mill/Star Hill Road (from Lochmeath Way to Walnut Shade Road)
- Lochmeath Way
- Peachtree Run Road
- Walnut Shade Road
- Woodlytown Road
- Irish Hill Road
- Barkers Landing Road
- Trap Shooters Road
- Barratts Chapel Road
- Frederica Road
- Thomsponville Road
- North Walnut Street

Minor collectors serve the same function as major collectors, but on a smaller scale, thereby having lower speed limits and annual average traffic volumes and travelling less distance. There are just a handful of **minor collectors** in the study area including the following:

- Voshells Mill/Star Hill Road (from Peachtree Run to Lochmeath Way)
- Andrews Lake Road
- Killens Pond Road
- Airport Road
- Tenth Street

Minor arterials provide service for trips of moderate length, linking the higher arterial network. In a rural context, they are generally characterized by higher speed limits with minimal interference to through traffic. The following roadways within the study area are classified as **minor arterials**:

- Lebanon Road (SR 10)
- South State Street
- Canterbury Road (SR 15)
- Midstate Road (SR 12)
- Frederica Road
- Carpenter Bridge Road
- Milford-Harrington Highway (SR 14)

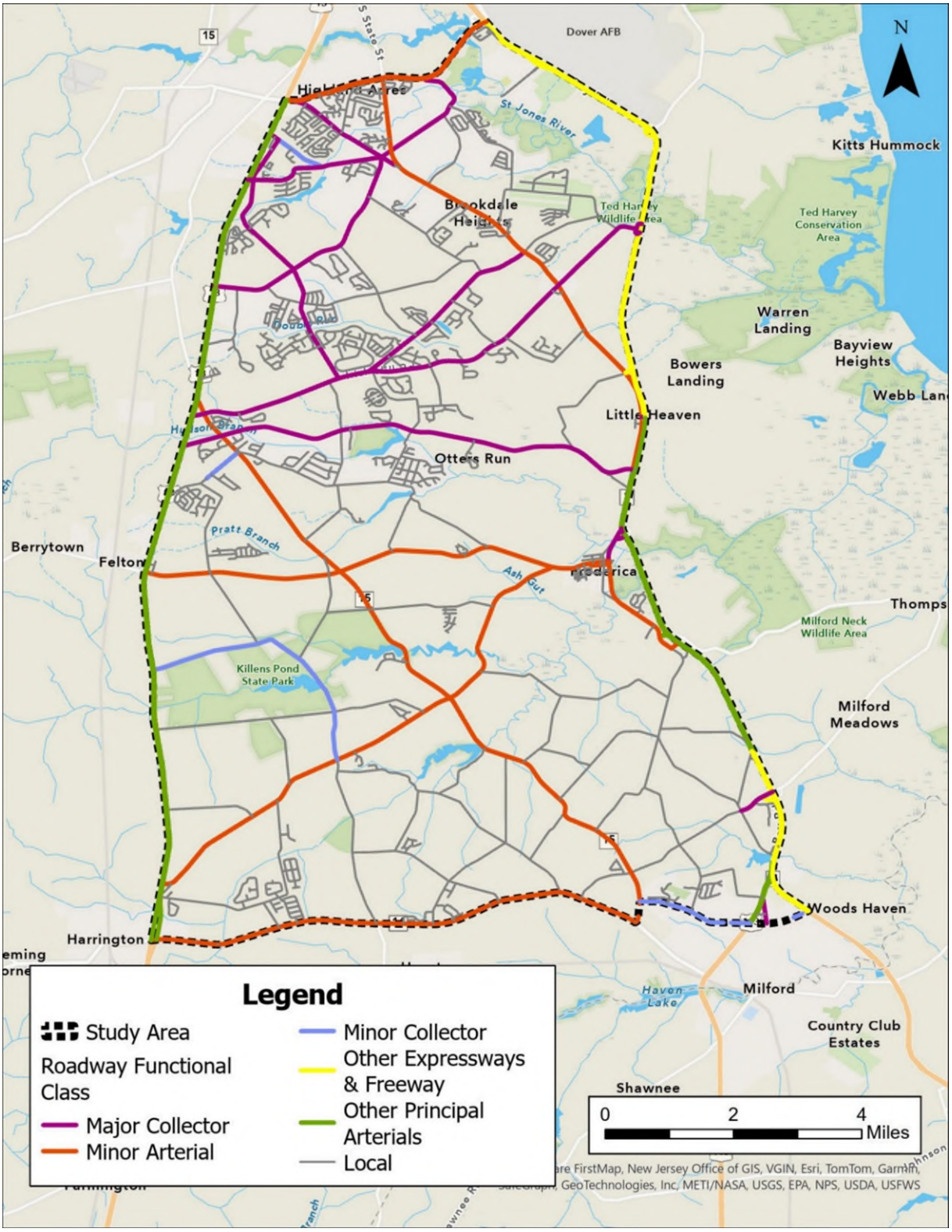
SR 1 is classified as other expressway and freeway and serves as the eastern boundary of the study area. It is not being evaluated as part of this study.

Other principal arterials provide a high degree of mobility for metropolitan areas and through rural areas and can directly serve the abutting land uses. They can be accessed via at-grade intersections. With few exceptions, these roadways are also not being evaluated in this study. These **other principal arterials** within the study area include:

- SR 1 (from Bowers Beach Road to Spring Hill Drive)
- US 113
- US 13

The remainder of the roads within the study area are classified as local. Local roadways are not intended for long-distance travel and are generally designed to discourage thru traffic.

Figure 3: Study Roadway Functional Classification



Signalized Intersections

Most of the signalized intersections within the study area are located along the borders, with the highest density along US 13 and SR 10. Within the study area, South State Street has the highest number of signalized intersections. **Figure 4** identifies all signalized intersections in the study area.

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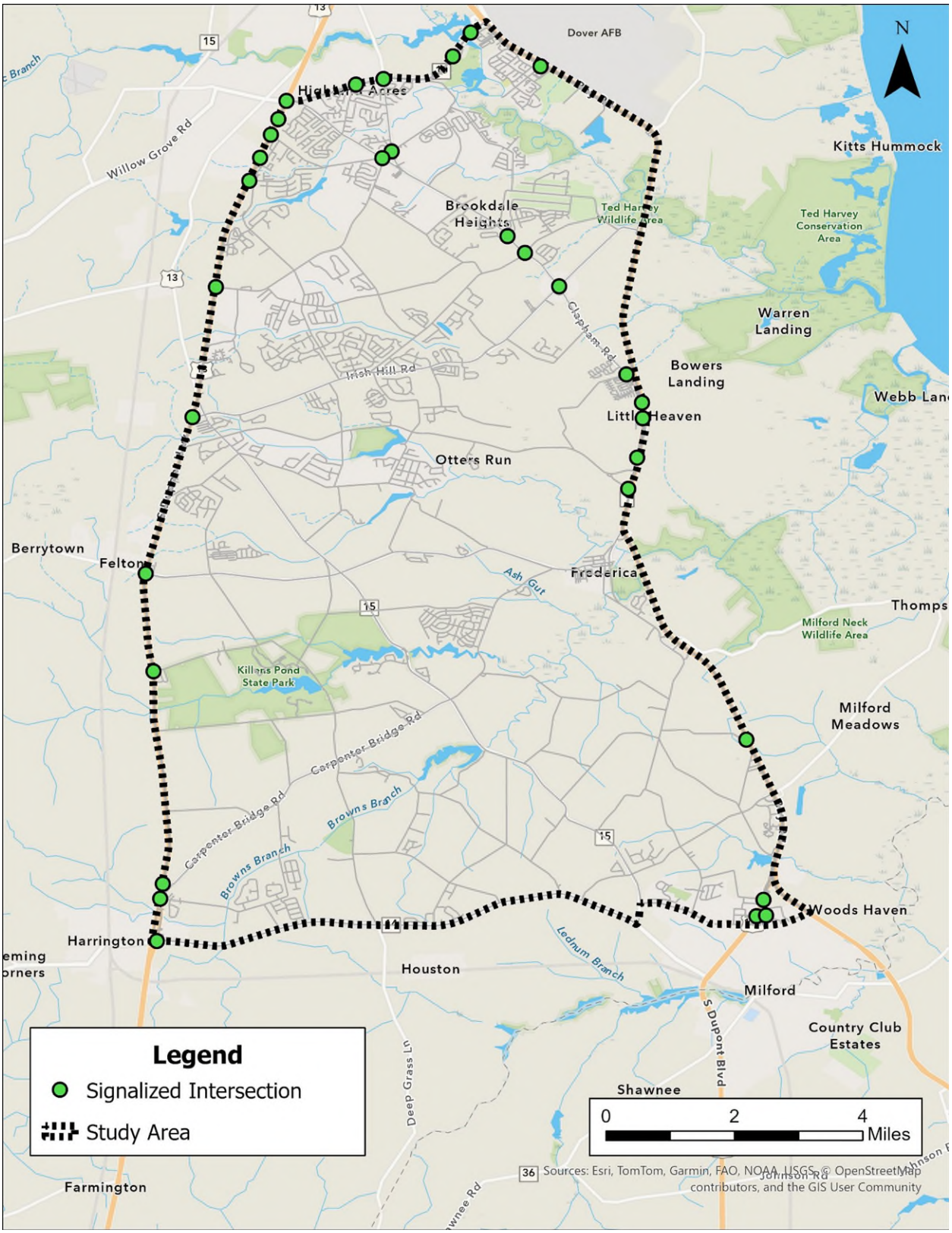
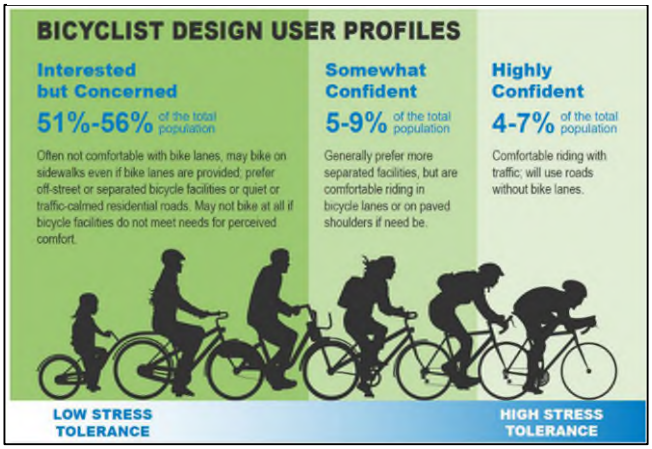
Figure 4: Signalized Intersections within the Study Area



Bicycle and Pedestrian Mobility

Transportation in the study area is largely auto-dependent. While many residential developments include internal sidewalk networks, these networks typically do not connect to larger networks of sidewalks or shared-use paths.

Figure 5: Bicyclist Design User Profile (FHWA Bikeway Selection Guide)

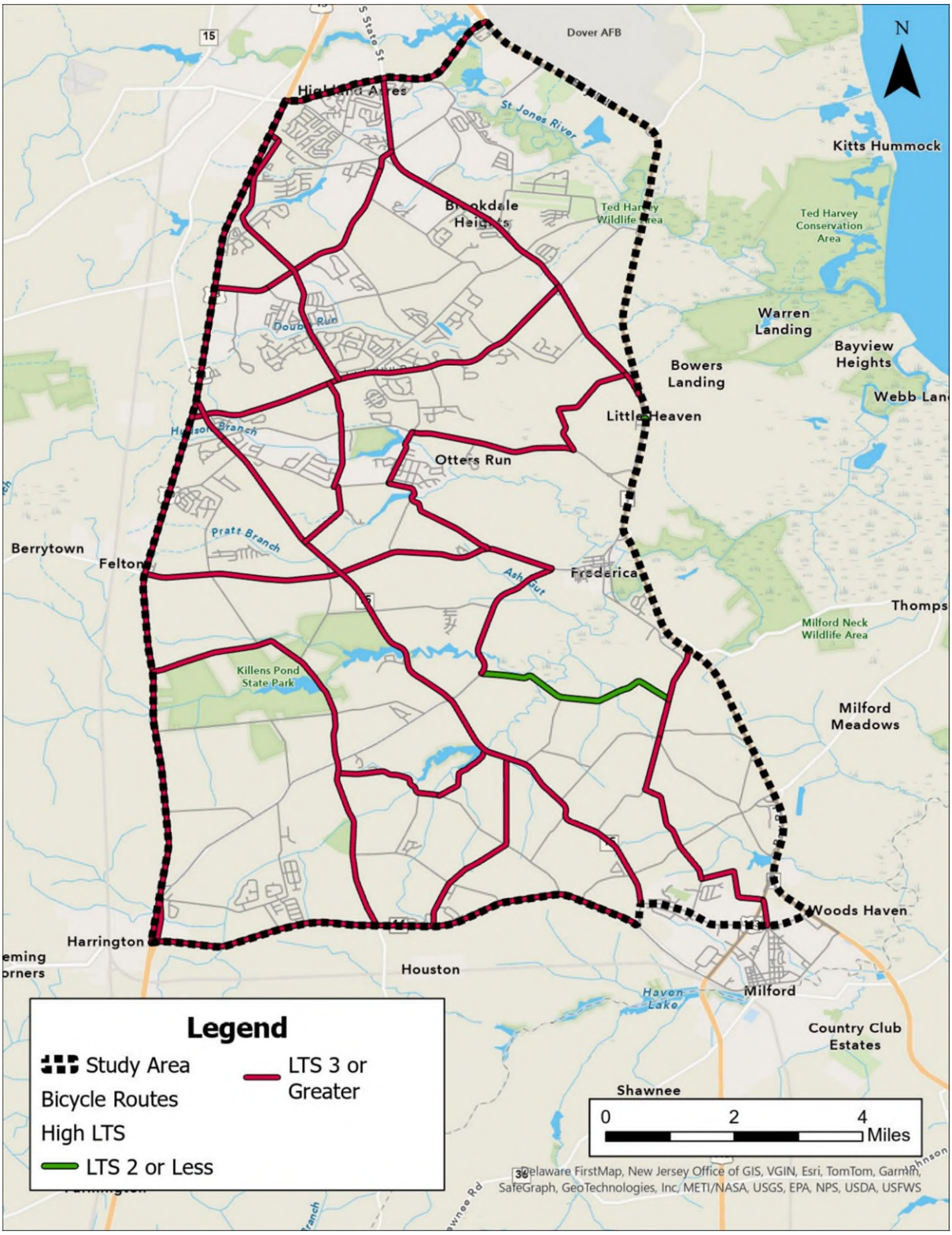


A bicycle network is an interconnected system of bikeways. Each bicycle network is unique to the surrounding community's geography and needs. For south central Kent County, the network provides an alternative means of travel between employment centers, neighborhoods and community amenities such as schools, parks, shopping centers, and restaurants. While there are different types of network users (**Figure 5**), including highly confident cyclists, this network aims to meet the comfort levels of those considered 'interested but concerned'. Based on that goal and utilizing DelDOT's *Bicycle Network Model - Level of Traffic Stress (LTS)*, preferred low-stress routes have been identified in the network map. "Level of Traffic Stress (LTS) is an objective, data-driven approach to understanding perceptions of bicyclist comfort and a willingness to travel based on bicycle facility characteristics" (*Benchmarking Bike Networks*, The League of American Cyclists, 2022). LTS is broken down into four (4) scores, identified in **Table 1**, and calculated based on factors like vehicle speeds, on-street parking presence, bikeway design, road user separation, intersection approach and control, bicycle facility obstructions, and bike network gaps. **Figure 6** identifies which state designated bicycle routes are scored 2 or lower (green) and 3 or higher (red). Nearly all the routes within the study area are scored LTS levels 3 and 4, which indicate that they are conducive to the most experienced cyclists.

Table 1: Blueprint for Bicycle Level of Traffic Stress

Level of Traffic Stress	Description	Example
1	Safe for children to use; Usually completely separated from auto traffic	
2	Tolerated by most mainstream adult populations of cyclists; Roads with low volume and low speed auto traffic	
3	Tolerated by riders who are enthused and confident; Heavy traffic with separated bike facility	
4	Only tolerated by strong and fearless riders; cyclists must interact with high volumes or speeds of auto traffic.	

Figure 6: Bicycle Level of Traffic Stress



Public Transportation

Delaware Transit Corporation (DTC) operates DART First State, offering a statewide network of transit options. Services provided include fixed route, intercounty, seasonal bus, paratransit for people with disabilities, commuter train service contracted through SEPTA and Delaware Commute Solutions' ride matching program. The study area is served by seven (7) public bus routes: four (4) local (Routes 104, 105, 117 and 210) and three (3) intercounty (Routes 303, 305, 307). As shown in **Figure 7**, the routes primarily concentrate at the northwest and southeast corners of the study area, with services along the east and west study area boundary.

Running along the northwest corner of the study area is Route 104, a local route which provides transit to the Town of Camden and US 13. Route 105, another local route, is located east of Route 104 and serves the Dover Air Force Base with stops along SR 10 and SR 1 in the northern portion of the study area. The local route that serves the largest expanse of the study area is Route 117, which runs along US 13 from the Town of Camden to the Town of Harrington. The route provides service for nearly the entire western border of the study area apart from a segment where it travels eastward along Peachtree Run Road to Cherry Drive and then circles back to US 13 along SR 10.

All of the intercounty bus routes serve SR 1 at some point in their route. Route 305 runs along SR 1 entirely, with terminals in the City of Wilmington and City of Lewes. This is the only Beach Bus route within the study area, operating seasonally on weekends from the weekend before Memorial Day to Labor Day. Route 307 primarily travels along SR 1, which runs to and from the City of Dover and City of Lewes. This route veers from SR 1 briefly to accommodate a stop in the City of Milford. Route 303 is the only intercounty route that provides significant transit within the study area instead of along its borders. It runs along US 13, connecting the City of Dover and the Town Camden, and then travels on SR 10, State Street, and Clapham Road to eventually intersect with SR 1. Route 303 serves SR 1 until it intersects US 113 in the City of Milford which it runs along until the Town of Georgetown.

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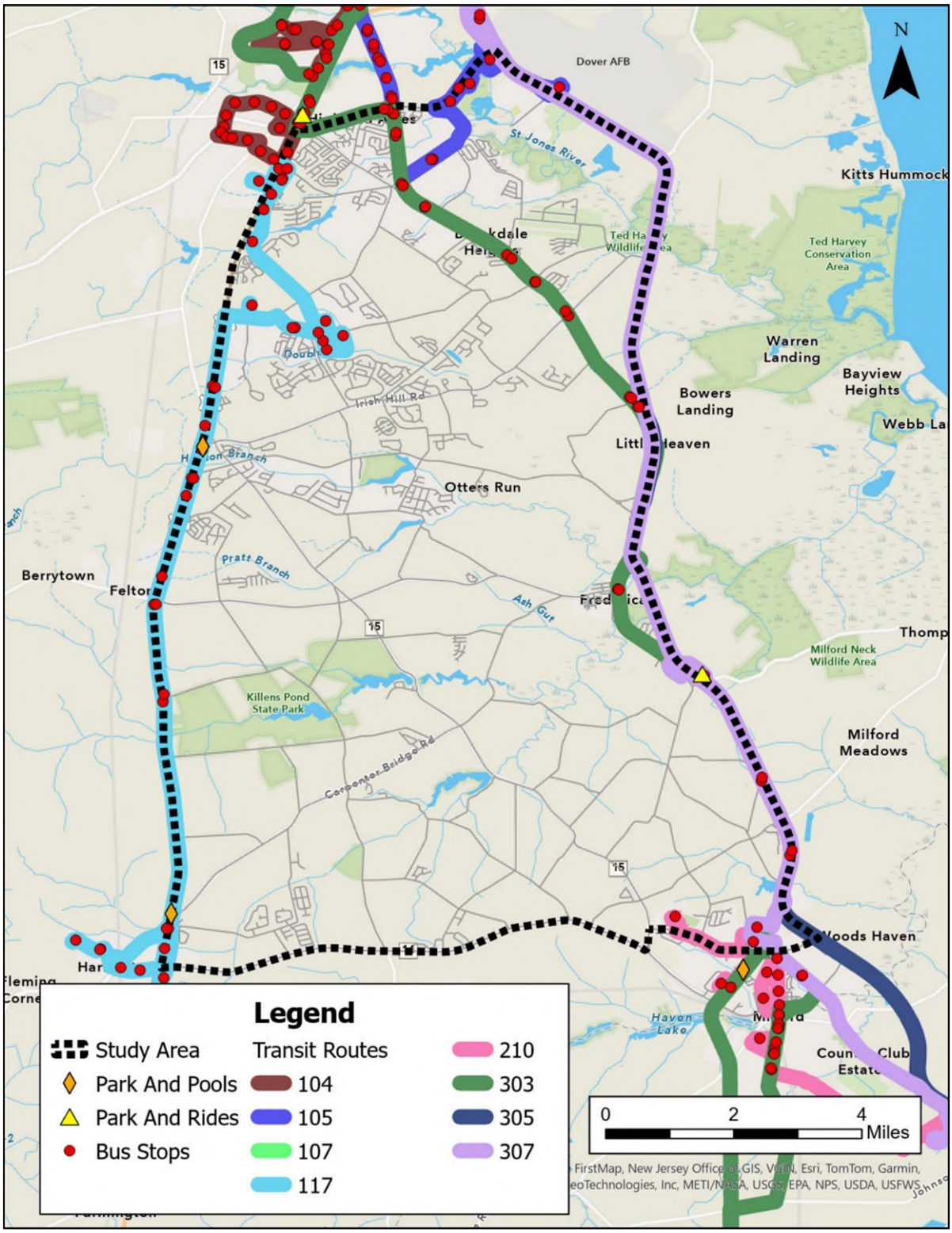
Figure 7: Public transit services within and adjacent to the Study Area

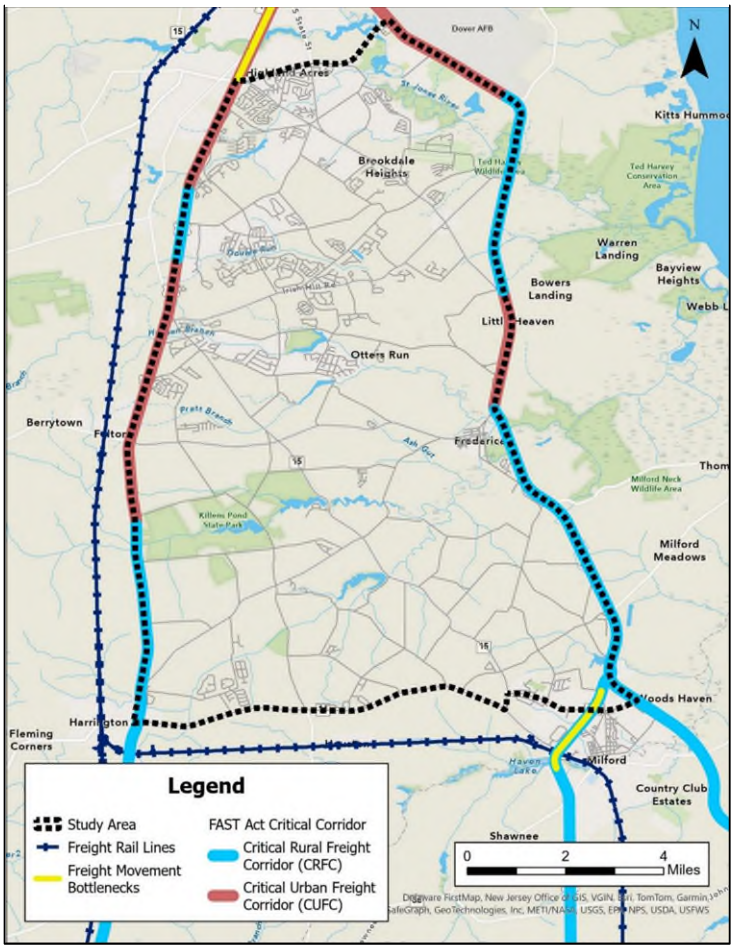


Rail and Freight

Although there are no active railroad freight lines within the study area, Norfolk Southern (NS) operates two (2) railroad freight lines just beyond the study area's boundary. A north-south route known as the Delmarva Secondary Line runs parallel to US 13, west of the study area border. The Indian River Secondary Line extends east-west along the southern study area border, just south of SR 14.

All the freight within the study area is transported by truck. US 13 and SR 1 are both designated critical urban and rural freight corridors that provide crucial connectivity to the National Highway Freight Network (NHFN) and study area with truck access. Main roads are also utilized as truck routes. **Figure 8** displays the rail and truck freight routes as well as freight movement bottlenecks[2] within and adjacent to the study area. As shown on this map, the only freight movement bottleneck in the study area is the portion of US 113 in north Milford, just south of the split from SR 1. There is also an area along US 13, just outside the northwest boundary of the study area, that experiences freight movement bottlenecks.

Figure 8: Freight network within and adjacent to the Study Area



Data Collection

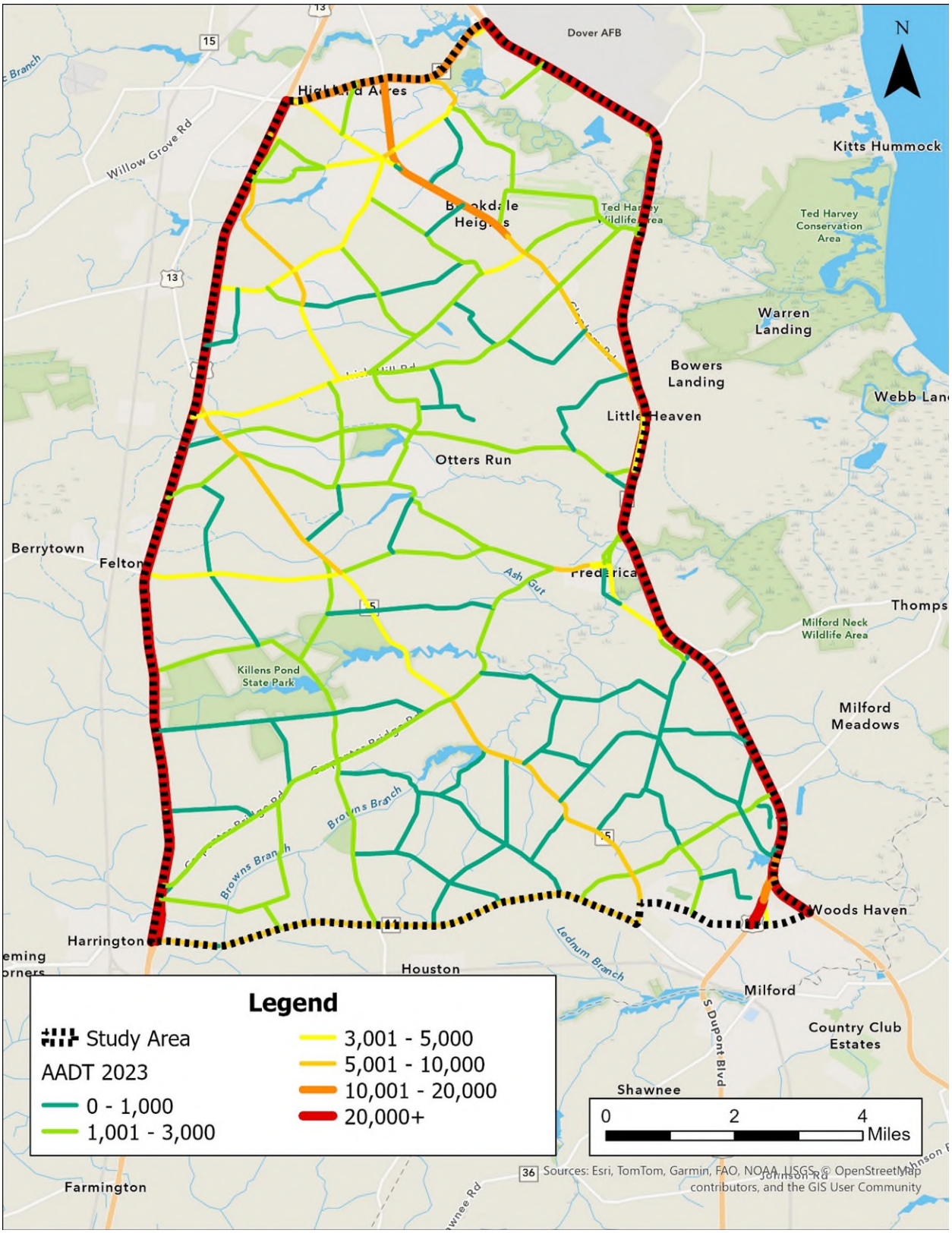
Traffic Volume

Annual Average Daily Traffic (AADT) data, publicly available through the Delaware FirstMap portal, was used to analyze traffic volumes in the study area. The most recent AADT data at the time of this analysis represents traffic volume projections in 2023. The analysis and recommendations included in this study does not include US 13, along the western side of the study area, and SR 1, along the eastern side of the study area. The highest AADT road segments were generally clustered in the southeast corner of the study area, providing connections to North Dupont Boulevard and the Milford Bypass interchange, and the northern portion of the study area, clustered around South State Street, Rising Sun Road, and Voshell Mills Star Hill Road/Sorghum Mill Road and extending along East Lebanon Road to Bay Road.

The average AADT across the roadway segments analyzed was 4,900. The maximum AADT of the study area road segments was 37,300 vpd which occurred along four road segments of Bay Road between Old Lebanon Road and Bay Road. The minimum AADT of the study area road segments was 6, which occurred at Old Barratts Chapel Road. **Figure 9** presents the AADT throughout the study area.

[2] Delaware FirstMap: Delaware Freight Movement Bottlenecks 2.0 - Overview

Figure 9: Study Area Roadway 2023 AADT



Travel Patterns

Crash History

Utilizing data downloaded from the Delaware Open Data portal, crashes that occurred during a five-year period (2019 to 2023) in the study area were analyzed. The crash data includes details about each incident, such as crash severity, involvement of pedestrians or bicyclists, and time of day.

From 2019 to 2023, there were a total of 6,920 crashes within the study area, including 33 fatal crashes. These fatality crashes are primarily located along US 13 and SR 1, which border the west and east sides of the study area. Of the roadways that cross through the study area, Irish Hill Road and Canterbury Road have the highest occurrence of fatal crashes, with three fatal crashes on each roadway during the four-year period.

Roughly 9% (63 crashes) of the total crashes in the study involved a pedestrian. These occurred primarily at intersections along US 13, Irish Hill Road, and Millchop Lane. There are notable clusters of crashes involving pedestrians at the Milford Airpark Plaza in the southeast corner of the study area, and in the southwest corner of the study area intersecting with Harrington (**Figure 10**).

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Figure 10: Crashes Involving Pedestrians and Bicyclists

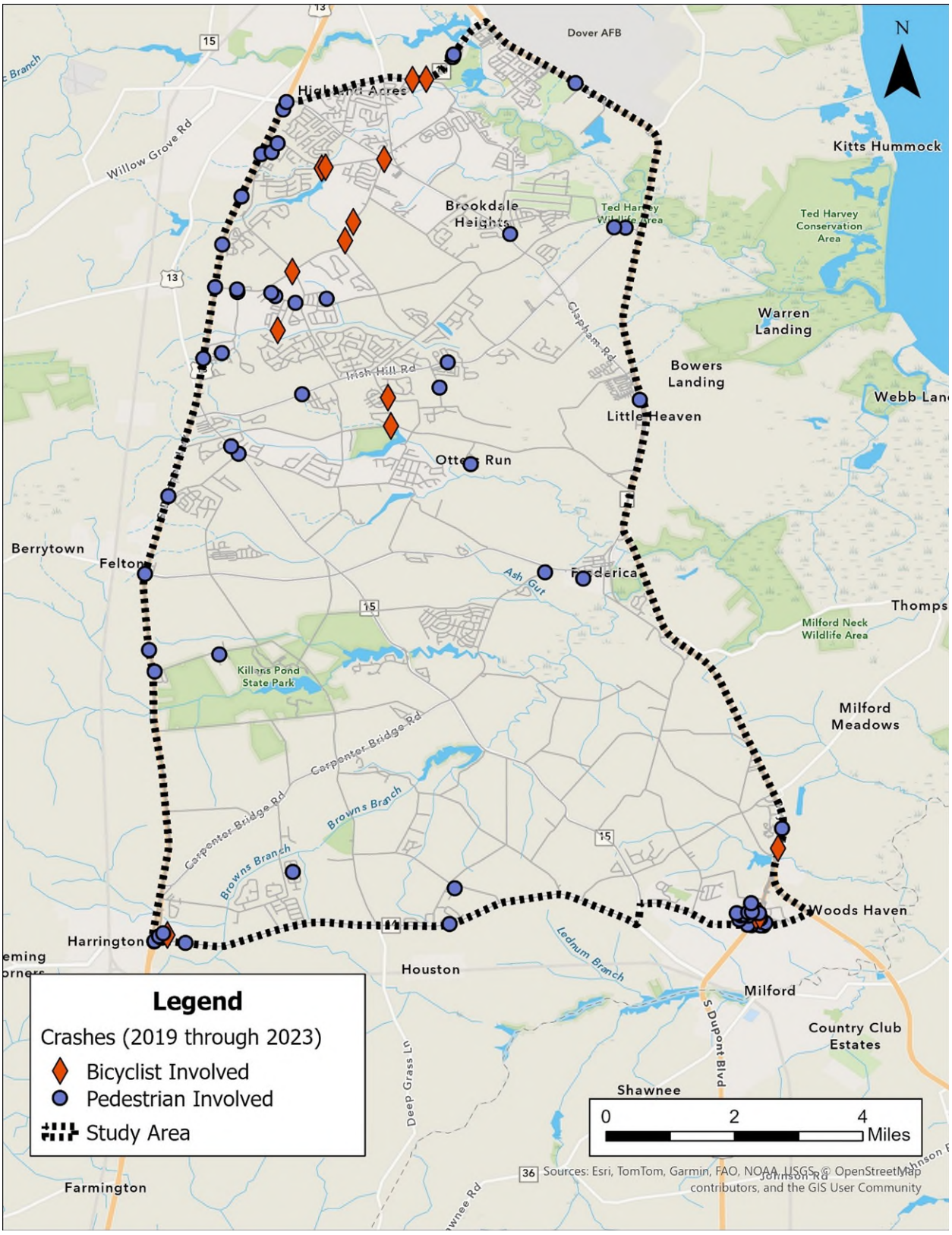
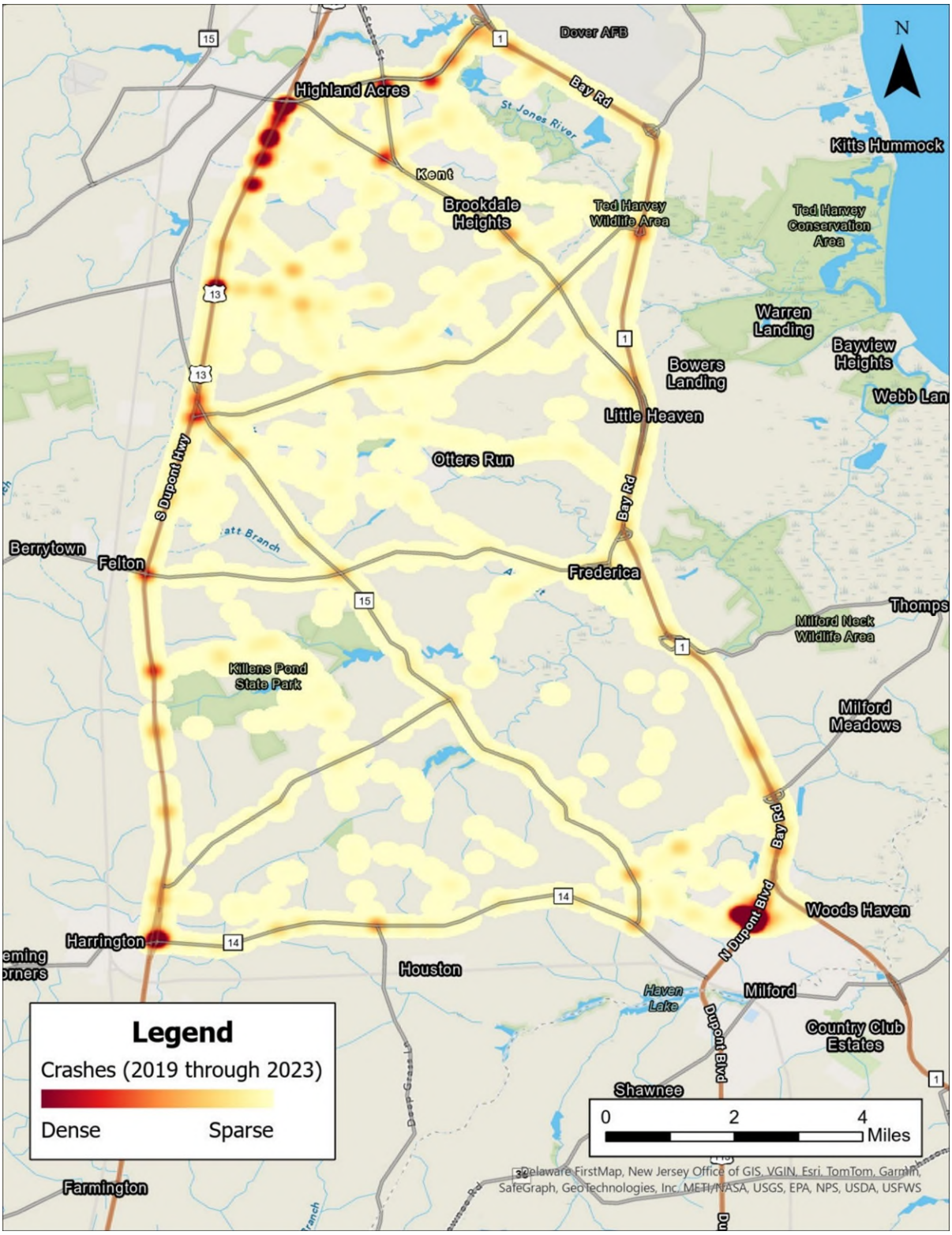


Figure 11 displays the distribution of total crashes in the study area. Crash hotspots are located at major intersections, most notably along US 13, Rising Sun Road, South State Street, SR 1, SR 113, and Canterbury Road.

Figure 11: Study Area Crash Distribution



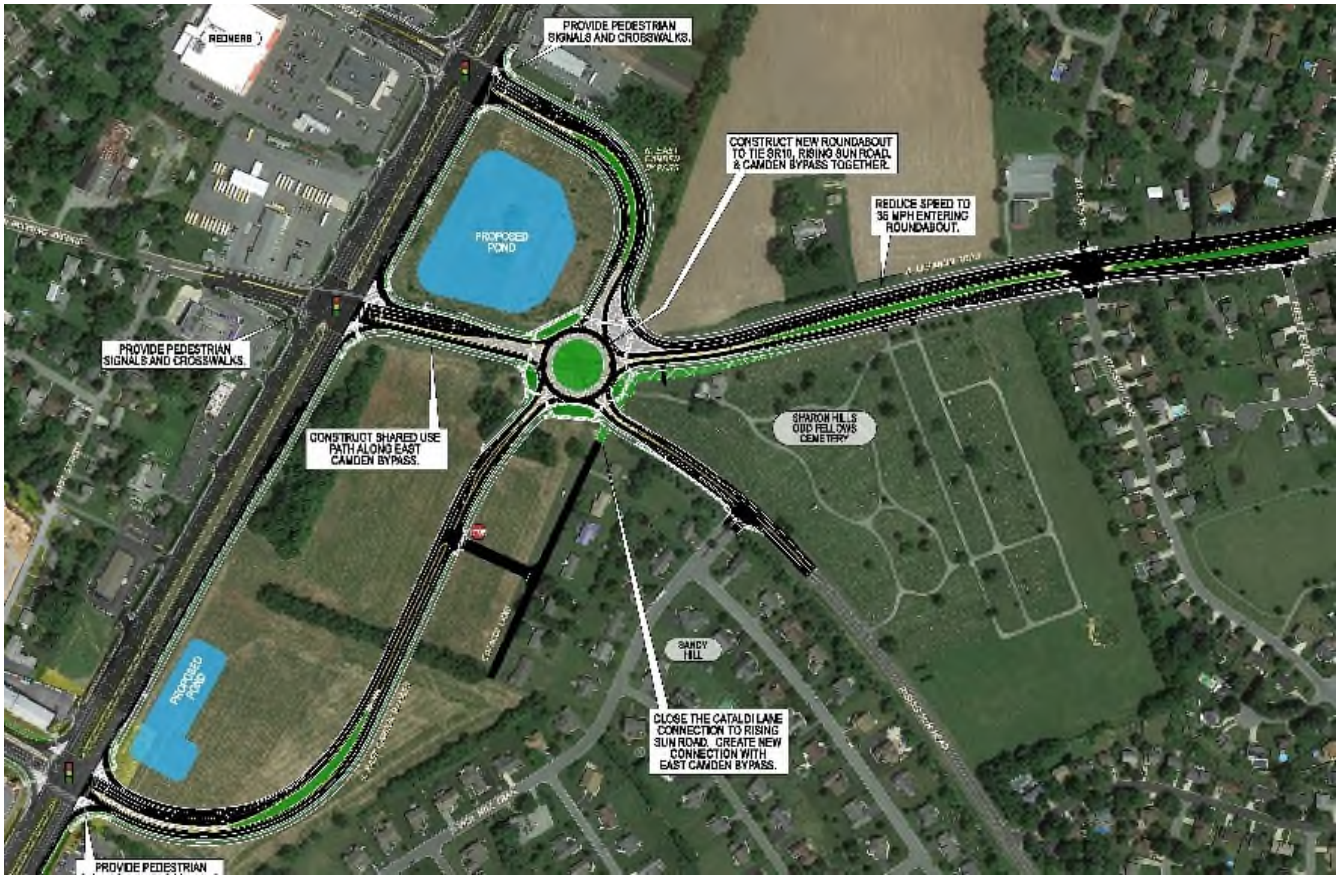
HSIP and CTP Projects

DelDOT has several Capital Projects planned for the study area based on the FY2025 to FY2030 Capital Transportation Program (CTP). Several of these projects were initiated through the Highway Safety Improvement Program (HSIP) and Hazard Elimination Program (HEP), as indicated in the project descriptions. Based on the CTP, there are nine projects in various stages in the various stages of development.

East Camden Bypass

The East Camden Bypass is in the northwest portion of the study area. As depicted in **Figure 12**, it will run from US 13 northeast on a new alignment to a roundabout at SR 10 and Rising Sun Road. The project began construction in summer 2024 and is expected to continue through FY 2026.

Figure 12: East Camden Bypass Project



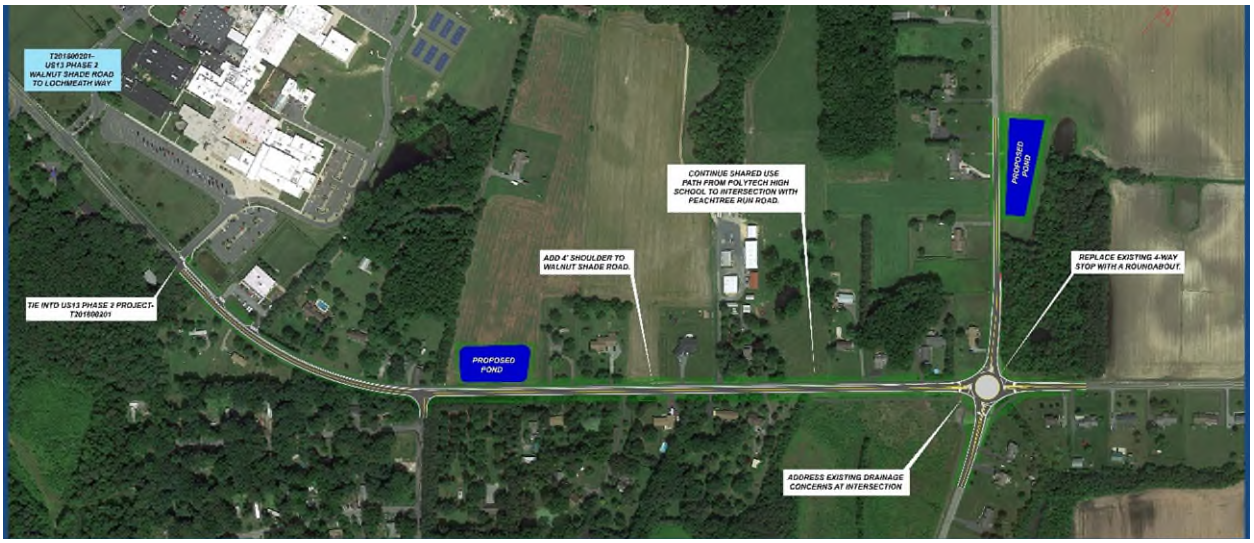
West Camden Bypass Project

West of our study area additional work will be completed on the West Camden Bypass. The West Camden Bypass project consists of constructing a new roadway, to the west of US 13. The roadway will begin on Willow Grove Road (SR10), just east of the railroad tracks, and continue east to US 13. Connections will be made at South Street, Upper King Road/S. Main Street and King Boulevard with roundabouts. The tie in at US13 will utilize the existing Wawa entrance road and will connect to the East Camden Bypass.

Walnut Shade Road, US 13 to Peachtree Run Road

This project includes the construction of a shared use path along Walnut Shade Road from US 13 to Peachtree Run Road and a roundabout at Walnut Shade Road and Peachtree Run Road. The FY2025 to FY2030 CTP indicates that his project would go to construction in FY2025, but construction has been delayed. Currently, design and right-of-way acquisition are underway. See **Figure 13** for more detail.

Figure 13: Walnut Shade Road Project



HEP, KC, US 13, Lochmeath Way to Puncheon Run Connector

This is a project to widen US 13 from the Puncheon Run Connector to Lochmeath Way, adding a third through lane in each direction. This project was identified under the Highway Safety Improvement Program (HSIP) and later under the Hazard Elimination Program (HEP). The project includes the addition of shared use paths on both sides of the roadway. Design and right-of-way acquisition are underway. Construction of the East and West Camden Bypasses need to occur prior to the start of this project construction. The FY 2025 to FY 2030 CTP shows construction occurring in FY2026 to FY2029.

HEP, KC, US 13, Walnut Shade Road to Lochmeath Way

This project extends the previous project south to Walnut Shade Road, adding a third through lane to US 13 in each direction. This project was identified under the HSIP and HEP programs. It also includes shared use paths on both sides of the roadway. Design and right-of-way acquisition are underway. Construction is scheduled to begin at the conclusion of the widening of US 13 from the Puncheon Run Connector to Lochmeath Way.

South State Street/Plaindealing Road/Woodlytown Road Intersection Improvements

This project includes plans to install a roundabout and associated improvements at the intersection of South State Street, Plaindealing Road, and Woodlytown Road. The project does not yet have a project page on the DelDOT website. According to the FY2025 to FY2030 CTP, preliminary engineering is planned for FY2025 and construction is planned for FY2028. There has been substantial community opposition to the proposed roundabout.

Irish Hill Road, Fox Chase Road to McGinnis Pond Road

This project includes the addition of shoulders, bike lanes and/or shared-use paths along Irish Hill Road from Fox Chase Road to McGinnis Pond Road. It includes realigning Woodlytown Road with McGinnis Pond Road and realigning Peachtree Run Road with Fox Chase Road. Roundabouts will be installed at the realigned intersections. According to the FY2025 to FY2030 CTP, construction is scheduled to begin in FY2026. See **Figure 14** for more detail.

Figure 14: Irish Hill Road Project

Irish Hill Road Upgrade (US 13 to Glen Forest Road)

The DelDOT FY25 to FY30 CTP identifies Irish Hill Road from Magnolia to US 13 as a need. This project will improve the portion of the roadway from US 13 to Forest Glen Road with multi-modal improvements and provide connectivity to other projects. According to the FY2025 to FY2030 CTP, this project is scheduled for preliminary engineering beginning in FY2027. No construction date is identified.

Peachtree Run Road (Voshells Mill Road to Irish Hill Road)

This project will improve intersections (turn lanes and roundabouts) for the entire length of Peachtree Run Road and add shoulders to the roadway. According to the FY2025 to FY2030 CTP, this project is scheduled for preliminary engineering beginning in FY2025. No construction date is identified.

Canterbury Road – SR 12 to US 13

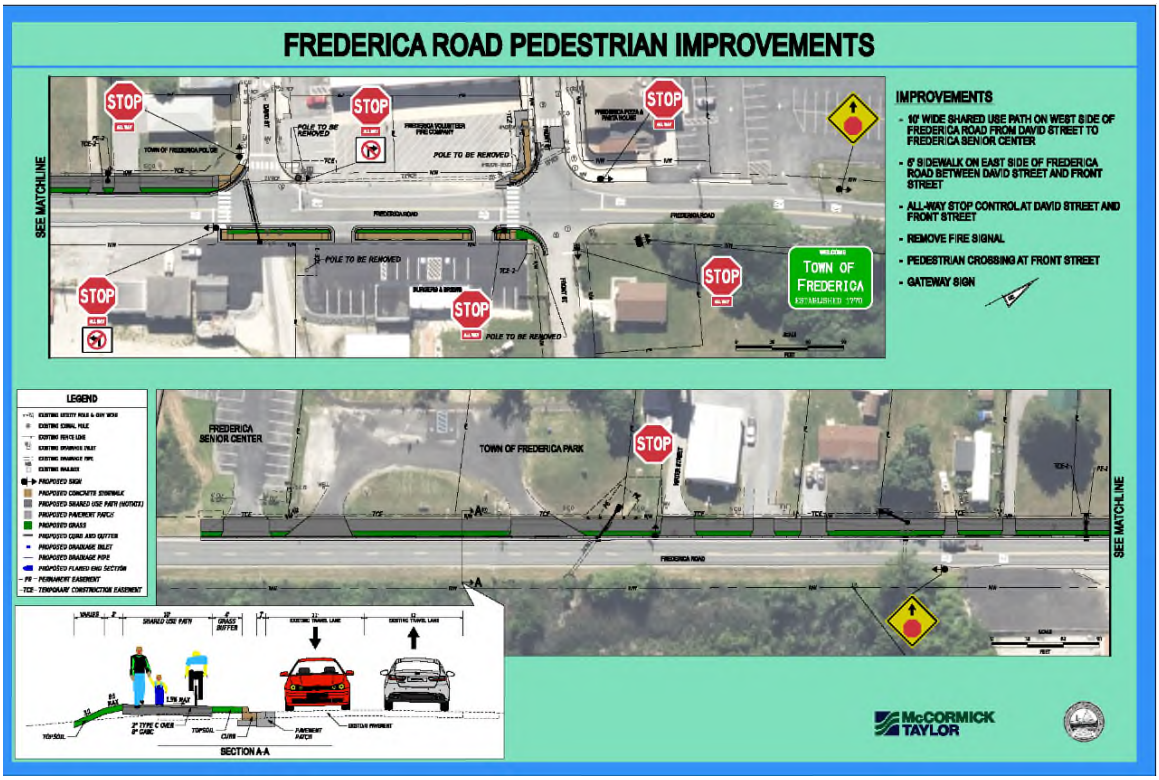
This project includes multiple roundabouts and other roadway safety improvements to Canterbury Road between SR 12 and US 13. The intersection of Canterbury Road and Irish Hill Road is currently in the alternatives review process through the HEP program. An online public workshop was held during February 2025, with the expectation that the preferred alternative will be selected in 2025. This intersection is expected to begin construction in 2027, pending available funding. Project planning and design is also underway on a roundabout at Andrews Lake Road and Canterbury Road, which was also identified through the HEP program. See **Figure 15** for more detail.

Figure 15: Canterbury Road Project

Frederica Road Pedestrian Improvements

The Active Transportation and Community Connections Section of DelDOT has developed plans for pedestrian improvements along Frederica Road in Frederica from the Frederica Senior Center north to the Town limits. The proposal includes a shared-use path on the west side of the road from the Senior Center to David Street. From there a sidewalk will be constructed on the east side of the road between David Street and Front Street. A crosswalk will be added at Front Street, and a gateway sign will be added to the north ern town boundary on Frederica Road. Construction is expected to begin in the fall of 2025 and be completed in the spring of 2026. See **Figure 16** for more detail.

Figure 16: Frederica Road Improvements



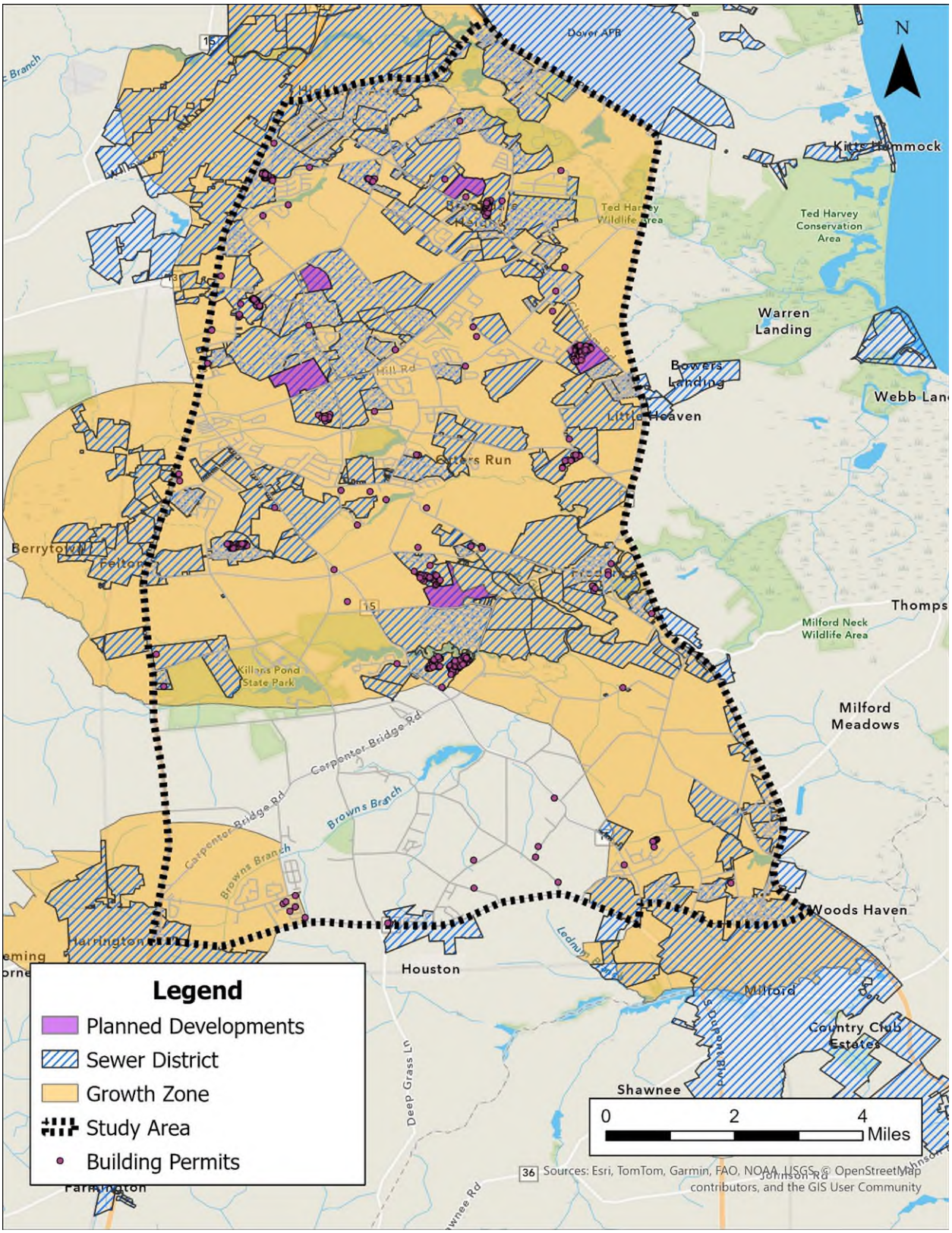
Development Activity

South central Kent County is experiencing significant development and associated pressures on the transportation network. Most of the study area is within the Kent County Growth Zone (Growth Zone), except for the southwest portion of the study area. **Figure 17** shows the Growth Zone. The Growth Zone is the area identified in the Kent County Comprehensive Plan where new development is planned. Within Growth Zone infrastructure to support development, including wastewater and transportation infrastructure, either exist or have expansions planned. There are two Growth Zone areas in the study area, one large area that encompasses the north and east portions of the study area, and another in the southwest corner near the City of Harrington. Sewer Districts are present throughout the study area, mostly within Growth Zone. The Sewer Districts are centered mostly in the Growth Zone and areas designated in the Kent County Comprehensive Plan as employment centers, commercial areas, or industrial areas. Portions of the study area are also within areas identified by municipal comprehensive plans as potential annexation areas.

Development in the study area can be identified by planned developments and permits. There are five planned developments within the study area. All of the planned developments are within a Sewer District and the Growth Zone. The planned developments are mostly within the Delaware Strategies for State Policies and Spending (State Strategies) Level 2, with some areas of Level 1 or 3 among the planned developments. The State Strategies provide policy guidance for state activities and serve as a framework for coordinating the plans and actions of local governments. Investment levels range from urban (Level 1) to rural (Level 4) areas as part of the State Strategies.

Building permits in the study area are mostly present in clusters, representing major subdivisions, with some sporadic building permits throughout. A majority of the building permits are within both Growth Zones and Sewer Districts. The building permits fall mostly within State Strategies Level 2 or 3, with clusters of building permits in Level 1 mostly in the northern study area. There are some building permits that are within State Strategy Level 4.

Figure 17: Development Activity in the Study Area

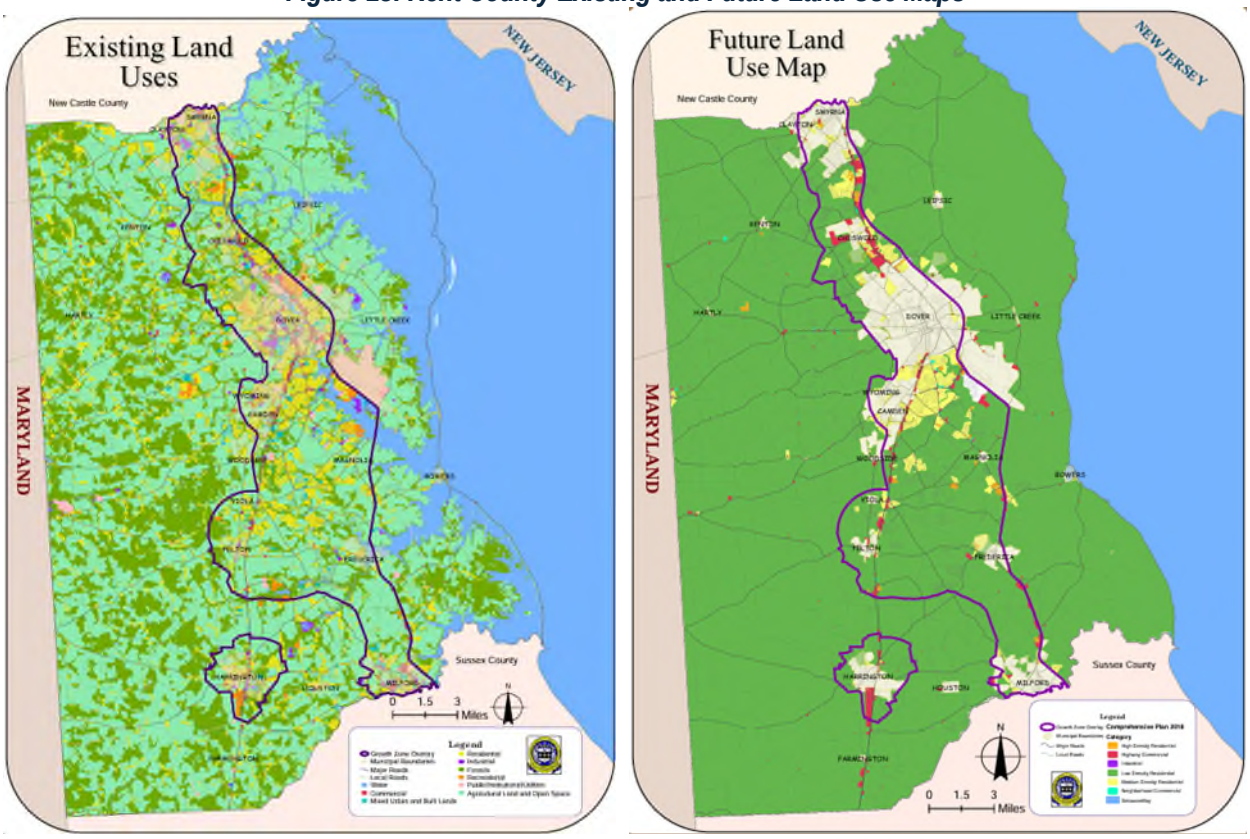


Local and Regional Planning

Current and Future Land Use

Current land use was identified by the 2018 Kent County Comprehensive Plan. Within the study area land is primarily agricultural and open space interwoven with forests. Residential land use is distributed primarily along major roadways and occurs most densely in the northern half of the study area. Patches of commercial land use are concentrated along US 13 in addition to scattered pockets lining South State Street and East Lebanon Road. Mixed urban and built lands are intermittently present alongside residential and commercial land uses throughout the study. Nearly the entire study area is within Kent County's Growth Zone apart from an area that roughly extends south from Paradise Alley Road to the Town of Harrington and west from Canterbury Road. **Figure 18** displays Kent County's existing land use.

Figure 18: Kent County Existing and Future Land Use Maps



Source: 2018 Kent County Comprehensive Plan

According to the 2018 Kent County Comprehensive Plan, future land use in the study area is primarily low density residential. Future land use designated as medium density residential comprises the northwest corner of the study area and occurs in isolated pockets along major roadways, including US 13, SR 1, South State Street, Irish Hill Road, and Millchop Lane. High density residential future land use is less common in the study area and mostly occurs in small patches near medium density residential designated lands. Highway commercial future land use clusters primarily along US 13 and SR 1, with some scattered patches lining South State Street and East Lebanon Road. The extent of the overlay zone remains. Future land use is also depicted in **Figure 18Error! Reference source not found.**.

Relevant Plans and Studies

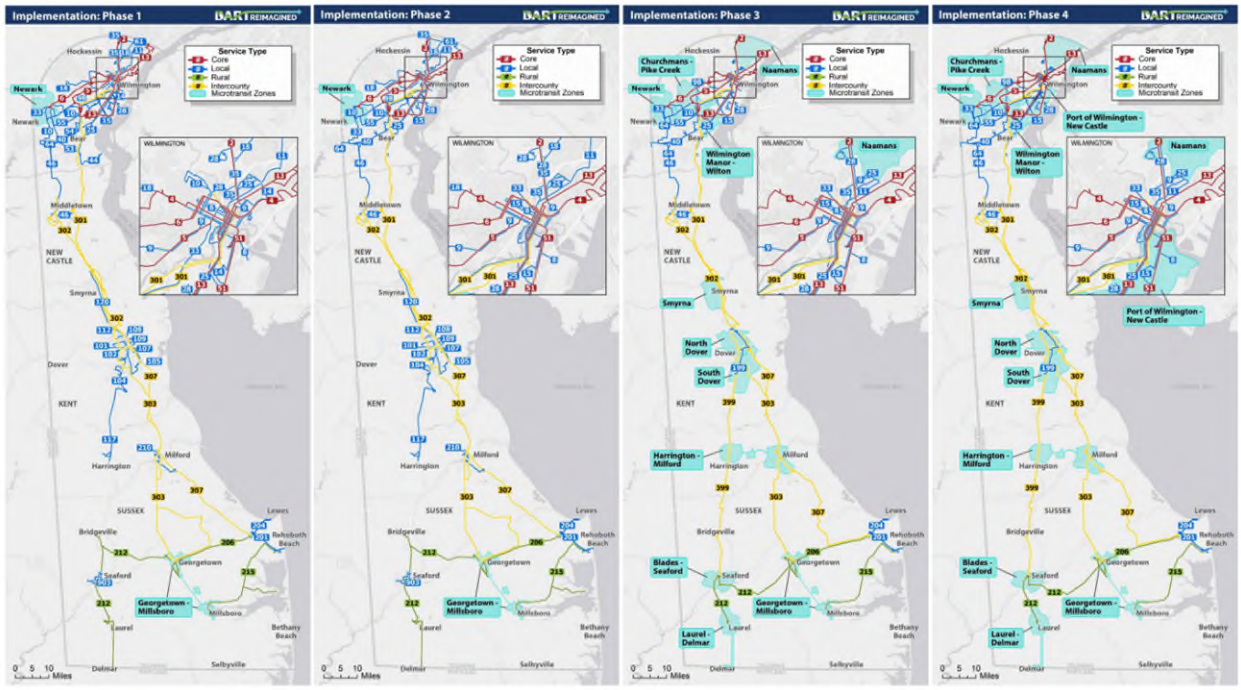
DART Reimagined

The DART Reimagined Final Report, published in 2024, came out of a year-long statewide transit study led by the Delaware Transit Corporation intended to identify opportunities to reconfigure the bus network and future service plan to provide a more sustainable and equitable statewide transit system. The study involved a comprehensive service review, which identified rider needs and challenges, as well as collaboration with riders, members of the public and representatives from municipalities, businesses, county governments, and state agencies. The DART Reimagined Final Report provides policy recommendations and implementation strategies for an improved transit system and service plan for Delawareans.

The DART Reimagined Implementation Plan includes four phases detailed in **Figure 19.** Phase 3 is expected to begin in 2027. This phase is expected to affect the project area as DART Connect introduces eight (8) new on-demand microtransit services intended to replace existing fixed routes. Dover was identified as one of several recommended microtransit zones wherein community circulation and connections to employment, retail, services, and transit hubs would be provided 5 days a week along major arterials, collector roads, and on local streets. In implementation Phase 3, DART Connect South Dover is expected to launch, replacing existing bus routes 105 and 117, which currently serve communities located within the study area. The majority of this study area will not be served by microtransit or fixed route service.

DART Reimagined also recommended a series of intercounty routes spanning from Wilmington to Seaford, Georgetown, and the Delaware Beaches. Intercounty routes will be offered on weekdays to provide long-distance commuter services with stops at park-and-ride lots, transfer hubs, and employment centers via major arterials and freeways. Within the study area, this includes intercounty route 303, which starts in south Dover, runs from US 13 to SR 10 to State Street Extended and down State Street to SR 1, passes through Harrington and Bridgeville, and ends in Seaford with connections to rural routes in Sussex County.

Figure 19: DART Reimagined Implementation Phases



Transportation Improvement Districts

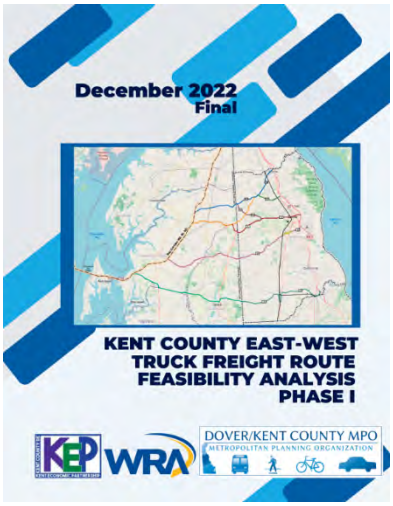
Three Transportation Improvement Districts (TID) lie either entirely or partially within the study area: Little Heaven, Magnolia, and South Frederica. A TID is an area where transportation infrastructure and land use planning are coordinated, and the transportation improvements needed to support the development are planned for the entire area ahead of the new development taking place. The cost of the transportation improvements is estimated and allocated between the development community and the State. Instead of completing a traffic impact study for a project, the developer pays a fee based on the number of residential units or floor area associated with the nonresidential use.

The improvements planned for Little Heaven include an internal road system and an SR 1 interchange. Improvements planned for South Frederica include a series of access roads, improvements to Tub Mill Pond Road and Frederica Road, traffic signals, and roundabouts. Improvements for Magnolia are still being developed but will include addition of a second turn lane from US 13 southbound to Irish Hill Road.

As of April 2, 2025 none of the aforementioned TIDs have become fully operational.

Dover/Kent MPO Studies

Kent County East-West Truck Freight Route Feasibility Analysis



The December 2022 Kent County East-West Truck Freight Route Feasibility Analysis Phase I examines the existing conditions of east-west routes in Kent County, Delaware, and identifies the most beneficial and effective improvements to east-west freight routes. The study also offers alternatives to the existing conditions so that municipalities may consider changes in local infrastructure that will benefit both truck drivers and the community.

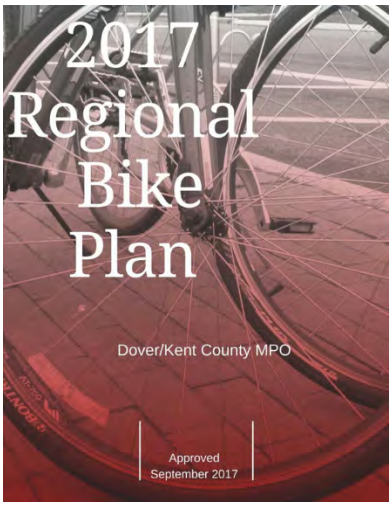
This study is one of two phases, consisting of the feasibility aspects of east-west freight in Kent County, and proposing both short-term and mid-term solutions that alleviate some of the challenges associated with truck movement in Kent County. It also proposes a viable east-west route that trucks will be able to use in the coming years, and in doing so, bypass downtown areas. The second phase is currently underway. Phase II is underway and will include the required engineering analysis. The only area within the study area, outside of US 13 and SR 1, is an area of SR 14 in the Milford area.

Town of Magnolia Traffic Study (2020)

The Town of Magnolia worked with the Dover/Kent County MPO to conduct a Traffic Study of the Main Street and Walnut Street intersection in Magnolia. Town officials expressed concerns related to safety, speeding, trucks, and congestion associated with the local post office and school. After a thorough analysis of the area, the report recommended that the intersection of Main Street, Walnut Street and Irish Hill Road should remain under traffic signal control. A roundabout is not feasible. Levels of service at the intersection with existing travel lanes and signal operation are good today (level of service B) and are expected to remain good in the future with anticipated development. Physical changes to the intersection are not recommended at this time.

The following recommendations are suggested to address elements of need described above.

- Request that DelDOT move the stop line on Walnut Street ten feet back and post a “Stop Here on Red” sign to make it easier for school buses and fire trucks to make the left turn into Walnut Street.
- Work with DelDOT to evaluate a “Rest on Red” operation at the traffic signal to discourage speeding.
- Replace the missing radar “Your Speed” sign for southbound traffic on North Main Street. Funding for these signs comes from the legislature’s Community Transportation Fund (CTF).
- Implement improved circulation measures at the post office and at McIlvaine Early Learning Center described in this report. These measures involve construction on private property.



2017 Regional Bike Plan

The 2017 Regional Bike Plan serves as an update to the prior 2011 plan. The purpose of this update is to highlight progress made and establish goals and objectives for improving the safety and effectiveness of the bicycle system. The Plan Update identifies and prioritizes recommended projects and makes recommendations for policies, ordinances, and other actions that should be taken at either the State, County or Local government level. The Plan Update uses a 20–year planning timeframe with the plan being updated for accomplishments and changes every 5 years. This timeframe for this Plan Update is 2017-2037.

The Plan includes one recommended project affecting the study area in Camden and Wyoming. Along Peachtree Run, shoulders and/or bike lanes are recommended to provide continuous bicycle access along the four-mile length of the road, from Voshells Mill/Star Hill Road to Irish Hill Road. Additionally, the plan recommends installation of shoulders or bike lanes along the segment of Voshells Mill/Star Hill Road, from Peachtree Run to US 13 to allow continuous access to bicyclists.

DelDOT Kent County Transportation Operations Management Plan (TOMP)

The Kent County Transportation Operations Management Plan (TOMP) April 2021 Report applies DelDOT's extensive traffic data to identify congested areas in Kent County and recommend solutions. Analysis of traffic data revealed the "hotspots" in Dover, Camden, and Northern Milford. In these areas, congestion slows Kent County travelers, especially during peak hours. The improvements recommended to reduce congestion and improve travel times include adding monitoring devices to provide more robust data regarding the incidence and causes of congestion, improving intersection and corridor operations through signing, striping, and geometric modifications, and engaging in transportation planning in conjunction with urban development plans to address the effects of population growth and sprawl.

Local Government Comprehensive Plans

A thorough review of comprehensive plans for jurisdictions within the study area was conducted. This included a review of comprehensive plans for Kent County, the Town of Camden, Town of Magnolia, Town of Felton, Town of Frederica, City of Harrington, and City of Milford. Only the Towns of Frederica and Magnolia are entirely within the study area. This review sought to identify transportation concerns and challenges faced by communities within the study area. The review also sought to identify recommendations and planned projects affecting the study area. Not every community noted major concerns or challenges, and only a few comprehensive plans included recommendations and planned projects within the study area. The relevant findings from the local government comprehensive plan review are included below.

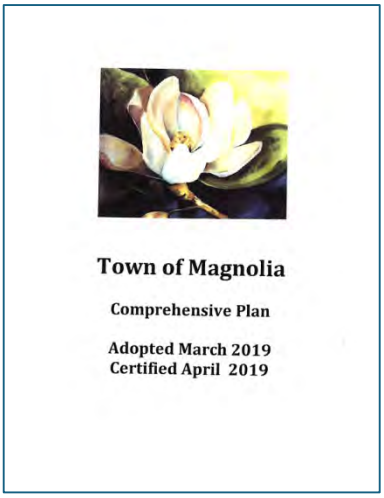
Kent County Comprehensive Plan

The most recent Kent County Comprehensive Plan, adopted in 2018, included a number of recommendations within the study area. The plan notes that Kent County is working with the Dover/Kent MPO to establish an improvement schedule for roads within the Growth Zone Overlay District that fail to meet existing design standards. The Plan recommends coordinating with DelDOT to pursue corridor studies along South State Street. Five roads within the study area were identified for priority improvements:

- State Street Extended: Sorghum Mill to Magnolia
- Canterbury Road: Andrews Lake to US 13
- Walnut Shade: Peachtree Run Road to Woodside
- Irish Hill Road: US 13 to South State Street Extended
- Intersection of Irish Hill Road and Woodlytown Road

Magnolia Comprehensive Plan

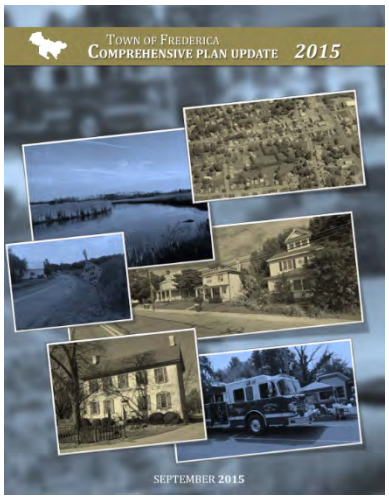
The Town of Magnolia Comprehensive Plan, adopted in March 2019, noted that traffic congestion and bicycle and pedestrian facility impediments have posed challenges.



Traffic congestion is particularly troublesome at the intersection of South State Street and Clapham Road, which is the single stop light and intersection in Town. Traffic congestion is also a concern along Main Street in the northern half of town, where traffic is mostly one and a half times greater than it is towards the south end of town.

In terms of bicycle and pedestrian facilities, there are sidewalk gaps along East Walnut Street and North Main Street that impede pedestrian travel, and narrow roadways along Main Street and County Road 31 that hinder bicycling.

The Comprehensive Plan recommended generating improved traffic count data at the Main Street traffic light intersection and working to mitigate traffic impacts, such as trucks causing damage to roadways. That data was collected and analyzed in the Magnolia Traffic Study.



Frederica Comprehensive Plan

The Town of Frederica Comprehensive Plan Update of 2015 noted issues with non-storm related roadway flooding on Market Street north of Coleman Avenue and on Frederica Road on each approach of the Murderkill River bridge crossing. The Town recommended conducting Drainage/Hydraulic studies to determine the extent of the flooding problem.

The plan noted pedestrian infrastructure challenges as sidewalks become scarce outside of the town center. For example, there are no sidewalks along Frederica Road and there are incomplete sidewalks South of St. Agnes Street and in the two blocks north of Front Street. To address this, the plan reommended that the sidewalk network be maintained and expanded to ensure ADA compliance and to encompass areas close to the town center that are not currently serviced by sidewalks.

Additional transportation related recommendations for the Town included:

- Integrating Complete Streets infrastructure and improving bicycle and pedestrian connectivity and safety;
- Implementing streetscape revitalization and traffic calming in the town center along Frederica Road between David Street and Front Street;
- Considering connections and streetscape improvements along Coleman Street and Lowber Street;
- Exploring the possibility of adding additional DART routes from Frederica to employment centers;
- Establishing a Capital Improvements Program to ensure timely maintenance of streets and sidewalks;
- Conducting an inventory to determine where street maintenance is a problem; and
- Exploring the possibility of creating a TID for the northwest growth area.

Analysis

Roadways within the study area were identified for improvements using a prioritization model. The prioritization model was developed in collaboration with the Dover/Kent County MPO, DelDOT, and Kent County and drew guidance from the project prioritization criteria used in DelDOT's Capital Transportation Program (CTP). The final model used 20 variables grouped into five (5) categories that were weighted and combined to provide a quantitative value for prioritizing individual road segments. Variables, categories, and their respective scores are shown in **Table 20**, and the following sections detail how each variable was processed and scored. The limit of a road segment correlates with DelDOT Annual Average Daily Traffic (AADT) segments. Prioritization scores were calculated and applied to each road segment using GIS and can be seen in **Figure 29** with a detailed table of road segments' scores available in **Appendix A**.

Table 20: Prioritization Factors and Scoring

Factor	Layer	Layer Score	Factor Score
Safety	Crash Index	15.0%	**25.0%**
	HSIP Locations	10.0%	
System Operating	V/C Ratio	10.0%	**20.0%**
	AADT >= 10,000	10.0%	
Development	PLUS Level	5.0%	**20.0%**
	Permits by Block Group	2.5%	
	Planned Developments by Block group	2.5%	
	Within a Growth Zone	5.0%	
	Within a TID	5.0%	
Multimodal/Destinations	Bicycle LTS	5.0%	**17.5%**
	Pedestrian Network	5.0%	
	Transit Walksheds	5.0%	
	Freight Corridor	2.5%	
Equity/EJ	Low Income	2.5%	**17.5%**
	Disabilities	2.5%	
	L.E.P.	2.0%	
	Seniors	2.0%	
	Zero Car Households	5.0%	
	Minority	2.0%	
	Flood Risk	1.5%	
Total			**100%**

Safety

The Safety factor is made up of two variables, described in more detail in the following sections: Crash Index and Highway Safety Improvement Program (HSIP) locations. Safety makes up 25% of the overall score for a road segment, with Crash Index contributing 15% and HSIP Location 10%.

Crash Index

The Crash Index is a composite score derived from publicly available crash data. Crashes were represented by points on the map where the crash is reported to have occurred. All crashes along a given road segment were combined and weighted by severity so that more severe crashes received greater consideration than less severe ones. The specific crash severity weighting used is shown in this equation. Crash Index = (Number of Fatal Crashes * 40) + (Number of Injury Crashes * 4.5) + (Number of Property Damage Only Crashes *1). The crash index score was then normalized to the 15% allotted to the variable, with the highest scoring road segments receiving all 15% available and the rest scaled respectively.

HSIP

HSIP is a federal-aid program focused on reducing fatalities and serious injuries on all public roads using comprehensive transportation safety planning. HSIP locations are being investigated as potential locations for implementing HSIP spot and systematic safety improvements. The HSIP requires a data-driven, strategic approach to improving highway safety on all public roads with a focus on performance. Road segments within HSIP Locations received all the possible 10% score for this variable, while road segments not within HSIP Locations received zero points.

System Operating

The System Operating factor is made up of two variables, described in more detail in the following sections: Volume/Capacity (V/C) Ratio and Average Annual Daily Traffic (AADT). This factor assesses the roadway system's ability to handle projected traffic volumes. System Operating makes up 20% of the overall score of a road segment, with AADT and VC Ratio both receiving 10%.

VC Ratio

VC Ratio is a composite score representing a road segment's volume of traffic and capacity for that traffic. The statewide VC Ratio currently supplied by DelDOT was not appropriate for the level of analysis in this study, thus VC Ratios were established using a separate methodology.

Volume is the product of a road segment's AADT and K-factor. K-factor[3] is the proportion of AADT on a road segment (based on functional classification) during the hour in which the 30th highest hourly traffic flow of the year takes place.

Capacity is calculated by reducing the "ideal conditions" of a road segment's capacity (1800 veh/hr/lane) by the product of a road segment's Free Flow Speed (FFS), roadway shoulder presence, and Friction Factor. FFS classifies a road segment by speed limit and Functional Class, where the FFS is 5 MPH above the posted speed limit for arterial roads and the same as the posted speed limit for collector roads. The FFS then determines the adjustment to the capacity of a road segment, as seen in **Table 21** below. Roadway shoulder presence was used to reduce the capacity value by 20% if a road segment's shoulder was less than 6 feet wide. The Friction Factor represents "conflicts" along road segments, such as driveways, non-signalized intersections, or signalized intersections. For this analysis, all road segments were considered to have a low Friction Factor, resulting in 10% reduction to capacity, except for Voshells Mill Star Hill Road, Rising Sun Road, and South State Street from Locust Grove Road to East Lebanon Road, which were all considered to have a moderate Friction Factor resulting a 20% reduction to capacity.

[3] DelDOT Traffic Count Manual, K and D Factor Descriptions
https://deldot.gov/Publications/manuals/traffic_counts/pdfs/2003/k_and_d_factors.pdf

Table 21: Free Flow Speed Capacity Reductions

Free Flow Speed (Arterials)	Speed Limit (Collectors)	Capacity Adjustment
>= 55 MPH	>= 55 MPH	No Reduction
40 - 54 MPH	40 - 54 MPH	10% Reduction
25 - 39 MPH	25 - 39 MPH	20% Reduction
10 - 24 MPH	10 - 24 MPH	30% Reduction
< 10 MPH	< 10 MPH	40% Reduction

Volume was then divided by Capacity to provide a ratio for each roadway. The V/C Ratio was scaled proportionally so that the road segment with the highest V/C Ratio received all of the available 10% score and lower V/C Ratios received a respectively lower percentage of the 10% possible.

AADT

AADT is a measure of traffic volume on a given road segment. Road segments with an AADT greater than or equal to 10,000 received all available 10% while road segments with an AADT less than 10,000 received zero points.

Development

The Development factor is made up of five variables, described in more detail in the following sections: State Strategies, Permits, Planned Developments, Within a Growth Zone, and Within a TID. Development makes up 20% of the overall score of a road segment, with State Strategies Level, Growth Zone designation, and TID designation each contributing 5%, with Permits by Block Group and Planned Developments by Block Group each contributing 2.5%.

Strategies for State Policies and Spending

The Strategies for State Policies and Spending (State Strategies) are developed by the Delaware Office of State Planning Coordination (OSPC) and the Cabinet Committee on State Planning Issues to identify areas for State investments that support growth and land conservation. Investment Levels correlate with the State's goals for growth and preservation. Levels 1 and 2 represent areas with established communities and developed land. These are typically urban areas and older suburbs. Level 3 areas represent areas that are experiencing growth and where growth is planned in local comprehensive plans. Level 3 can also indicate the presence of natural features that warrant some protection. Level 4 represents the areas where the State's priority is for land preservation and conservation. These are the rural areas of the State. Some areas are considered "Out of Play" because they are not available for private development. Level 1 areas have established infrastructure and development. Level 2 areas are urbanized areas with some existing infrastructure and development and more already planned. Level 3 areas are developing but less established, these areas are early on in their long-term planning processes. Level 4 areas are rural and often do not offer the same infrastructure and public services that the other Levels do; Level 4 areas are not intended for future development.

Road segments in State Strategies Levels 1 or 2 areas received all the available 5%, while segments in Level 3 areas received 2.5%, while Level 4 and Out of Play areas received zero points. When a road segment falls within multiple different State Strategies Levels, it was given the lower levels score, equating to the higher level of development.

Permits

The Permits variable represents building permits issued between 2023 and 2024 within the study area. These permits

were represented by points that were counted along each road segment, where any permit within 250 feet of the road segment contributed to that count. The permit count associated with a road segment was then normalized to the 2.5% allotted to the variable, with the highest permit counts along the road segments receiving all available 2.5% and the rest scaled respectively.

Planned Developments

Planned Developments are multi-unit residential developments planned to be built within the study area and represent locations of concentrated future traffic demands. In GIS, planned developments were represented by polygons that enclosed all the lots expected to be developed. Road segments within 250 feet of a planned development received all the possible 2.5% score for this variable, while road segments not within 250 feet of a planned development received zero points.

Growth Zones

Growth Zones are areas identified within comprehensive plans to support growth. These areas are made up of the Kent County Growth Zone and the annexation areas designated in municipal comprehensive plans. Growth Zones represent areas where local and State governments have planned for development, and often the infrastructure to support development, while areas outside of Growth Zones are expected to experience less future development. Road segments within 100 feet of a Growth Zone received all the possible 5% score for this variable, while road segments not within 100 feet of a planned development received zero points.

TIDs

Transportation Improvement Districts (TIDs) are areas prioritized for transportation improvements based on expected development identified in local Comprehensive Plans. TIDs represent areas already identified as a priority for investment in transportation infrastructure and thus bolster the prioritization criteria already used in this model. Road segments within 100 feet of a TID received all the possible 5% score for this variable, while road segments not within 100 feet of a TID received zero points.

Multimodal Connectivity & Destinations

The Multimodal Connectivity & Destinations category is made up of four variables, described in more detail in the following sections: Level of Stress (LTS), Pedestrian Network, Transit Walksheds, and Freight Corridor. Multimodal Connectivity & Destinations makes up 17.5% of the overall score of a road segment, with LTS, Pedestrian Network, and Transit Walksheds each receiving 5%, and Freight Corridor receiving 2.5%.

Bicycle LTS

Bicycle Level of Stress (LTS) refers to a composite score representing a bicyclist's perceived comfort riding on a given road. Road qualities like geometry and traffic volume are quantified to create an LTS score ranging from 1 to 4. LTS scores of 1 represent roads that are suitable for everyone including new riders and children while an LTS score of 4 represents roads that are only suitable for the most confident bicyclists. Roads with higher LTS scores were considered higher priority for this analysis as they present opportunities to improve safety and the multimodal options available.

Road segments with LTS scores 4 received all of the available 5%, LTS 3 road segments received 2.5%, LTS 2 road segments received 1.25%, and road segments with an LTS 1 or a bike path present received zero points.

Pedestrian Network

A pedestrian network within the study area was identified by combining available sidewalk, crosswalk, trails and pathway data. Road segments were scored relative to the distance to the pedestrian network: road segments within 100 feet of the pedestrian network received all of the available 5%, road segments within half a mile received 2.5%, and road segments further than a half of a mile from the pedestrian network received zero points.

Transit Walksheds

Pedestrian accessibility to transit was analyzed along the existing pedestrian network within the study area. Using ArcGIS Network Analysis, locations were identified along the pedestrian network for both existing DART bus stops and proposed bus stops for 2028. This analysis estimates that existing bus stops are accessible to pedestrians within at most 1 mile and on average 0.22 miles of a stop. While the number of individual bus stops is proposed to be reduced in 2028, accessibility will be supplemented with DART Connect on-demand microtransit zones. This analysis estimates that proposed bus stops will be accessible to pedestrians within at most 0.67 miles and on average 0.18 miles of a stop, but the addition of DART Connect service areas will provide accessibility for any pedestrian within the service area. Road segments were scored relative to the distance to a transit walkshed: road segments that intersect a transit walkshed received all of the available 5%, road segments within quarter of a mile of a transit walkshed received 2.5%, road segments within a half mile of a transit walkshed received 1.25%, and road segments further than a half a mile from a transit walkshed received zero points.

Freight Corridor

While no freight corridors travel through the study area, if a road segment touched a freight corridor, it received 2.5% for prioritization purposes.

Equity Analysis

Socioeconomic characteristics were analyzed based on the census block group-level data available through the American Community Survey (ACS) 2018-2022 5-year estimates. When available, mapping capabilities of the Delaware Environmental Justice (EJ) Screening[4] GIS tool were utilized. This service displays a range of socioeconomic factors at the block group level which are also based on ASC 2018-2022 5-year estimates. Twenty-eight (28) block groups were identified as within or intersecting with the study area. The following sections offer a breakdown of socioeconomic characteristics within the study area.

All socioeconomic characteristics were scored using the same methodology in which census blocks groups with the highest rates of a given characteristic received the most points. Census block groups were grouped into quantiles (or quarters) based on the amount of people with respective characteristics, meaning the 4th quartile is the quarter of block groups that have the most amount of people associated with that characteristic. The 4th quartile block groups received all the available points, the 3rd quartile received half of the available points, the 2nd quartile received a quarter of the available points, and the 1st quantile received zero points. The specific scoring available to each category is shown in **Table 22** below.

[4] Delaware EJScreen Mapping Service: DE EJScreen | DE FirstMap

Table 22: Socioeconomic Characteristics Scoring Scheme

Socioeconomic Characteristic	Percent of Overall Score	Percent Score per Quantile	
Low Income Census Block Groups	2.50%	4th Quantile	2.50%
		3rd Quantile	1.25%
		2nd Quantile	0.63%
		1st Quantile	0.00%
Disabilities Census Block Groups	2.50%	4th Quantile	2.50%
		3rd Quantile	1.25%
		2nd Quantile	0.63%
		1st Quantile	0.00%
L.E.P. Census Block Groups	2.00%	4th Quantile	2.00%
		3rd Quantile	1.00%
		2nd Quantile	0.50%
		1st Quantile	0.00%
Seniors Census Block Groups	2.00%	4th Quantile	2.00%
		3rd Quantile	1.00%
		2nd Quantile	0.50%
		1st Quantile	0.00%
Zero Car Census Block Groups	5.00%	4th Quantile	5.00%
		3rd Quantile	2.50%
		2nd Quantile	1.25%
		1st Quantile	0.00%
Minority Census Block Groups	2.00%	4th Quantile	2.00%
		3rd Quantile	1.00%
		2nd Quantile	0.50%
		1st Quantile	0.00%

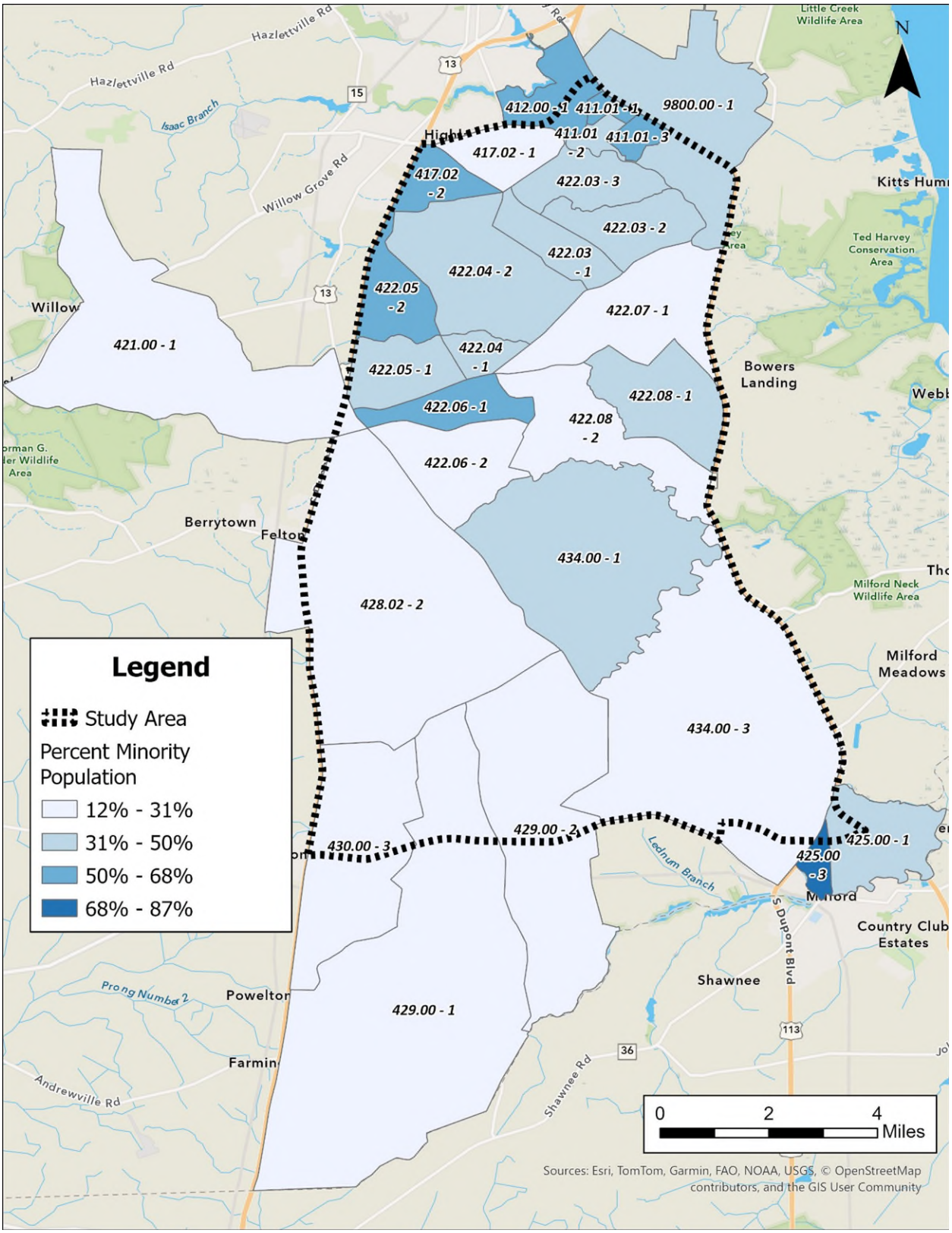
Minority Populations

The U.S. Census Bureau classifies race based on individuals' self-identification with one or more of the following groups: white, black or African American, Asian, Native Hawaiian or other Pacific Islander. Ethnicity is defined as whether an individual is of Hispanic origin or not. For this analysis, a person of color was defined as an individual who lists their racial status as a race other than white and/or lists their ethnicity as Hispanic or Latino.

According to the *Environmental Justice: Council on Environmental Quality (CEQ) Environmental Guidance Under NEPA* (1997) a minority population should be identified where either the minority population of the affected area exceeds 50% or the minority population of the affected area is meaningfully greater than the minority population percentage in the general population or other appropriate unit of geographic analysis.

The presence of minority populations was determined using the Delaware EJScreen which provides the percentage of the population identifying as a person of color at the block group level. Of the 28 block groups within the study area, seven (7) have racial or ethnic minority populations over 50%. **Figure 23** displays which block groups contain minority populations.

Figure 23: Percent minority populations within or intersecting with the Study Area



Low-Income Populations

Low-income populations were determined by utilizing the Delaware EJScreen Tool, which defines low income as a household whose income is less than or equal to twice the poverty threshold[5]. This threshold is updated annually and varies by family size. Since the poverty threshold is a national number and the same across all geographic regions, this approach seeks to capture low-income households in areas with a higher cost of living. There are two (2) block groups where over 52% of the households are considered low income. The percentage of low-income households within each block group is presented in **Figure 24**.

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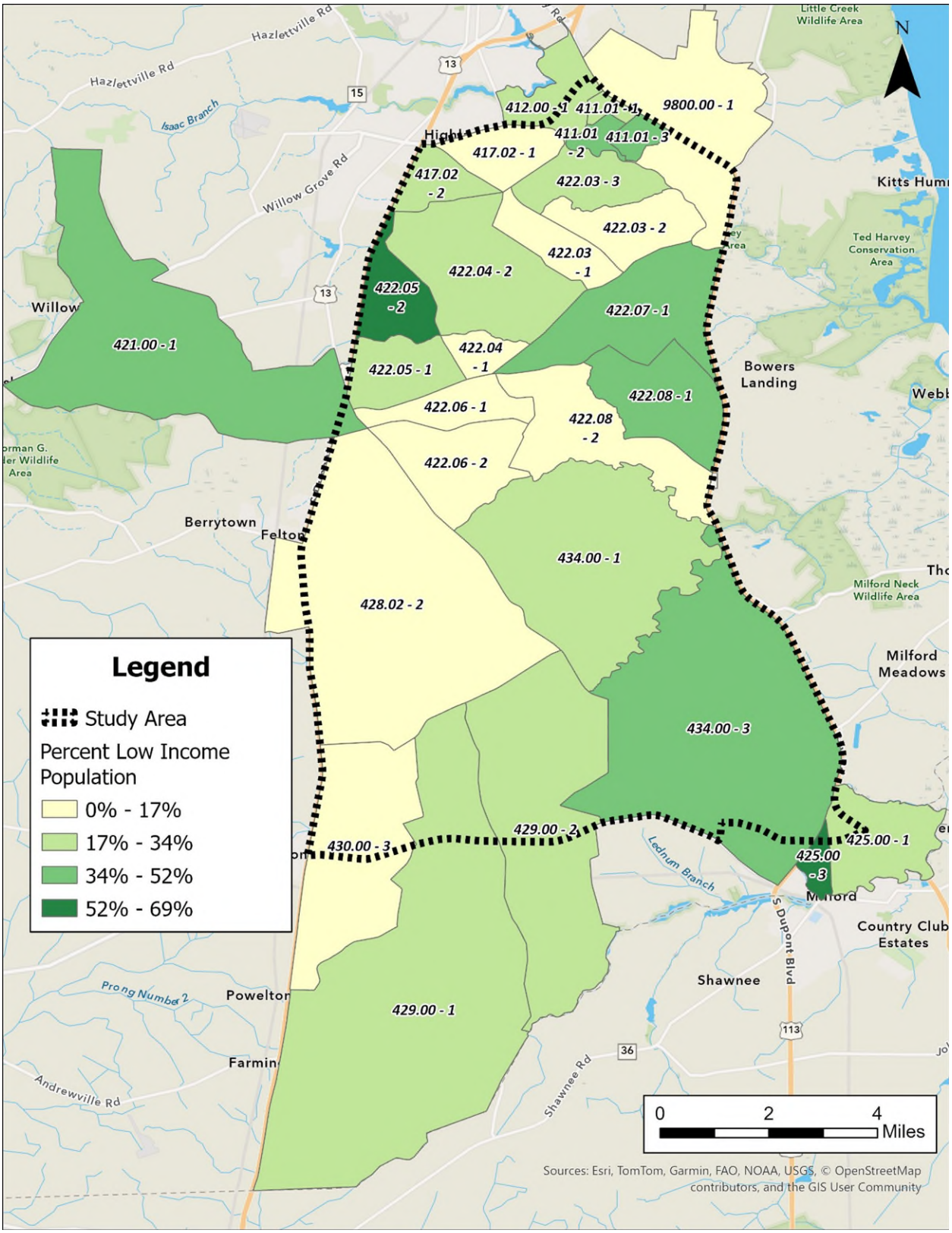
[5] U.S. Census Bureau Poverty Thresholds

Figure 24: Percent low-income populations within or intersecting with the Study Area



Populations with Disabilities

Individuals with disabilities are considered traditionally underserved; therefore, their residence within the study area was reviewed for this equity analysis. Delaware EJScreen Tool contains block group-level data detailing the percentage of households with one (1) or more individuals with disabilities. As displayed in **Figure 25**, there are five (5) block groups with a comparatively higher percentage of households with one (1) or more individuals with disabilities.

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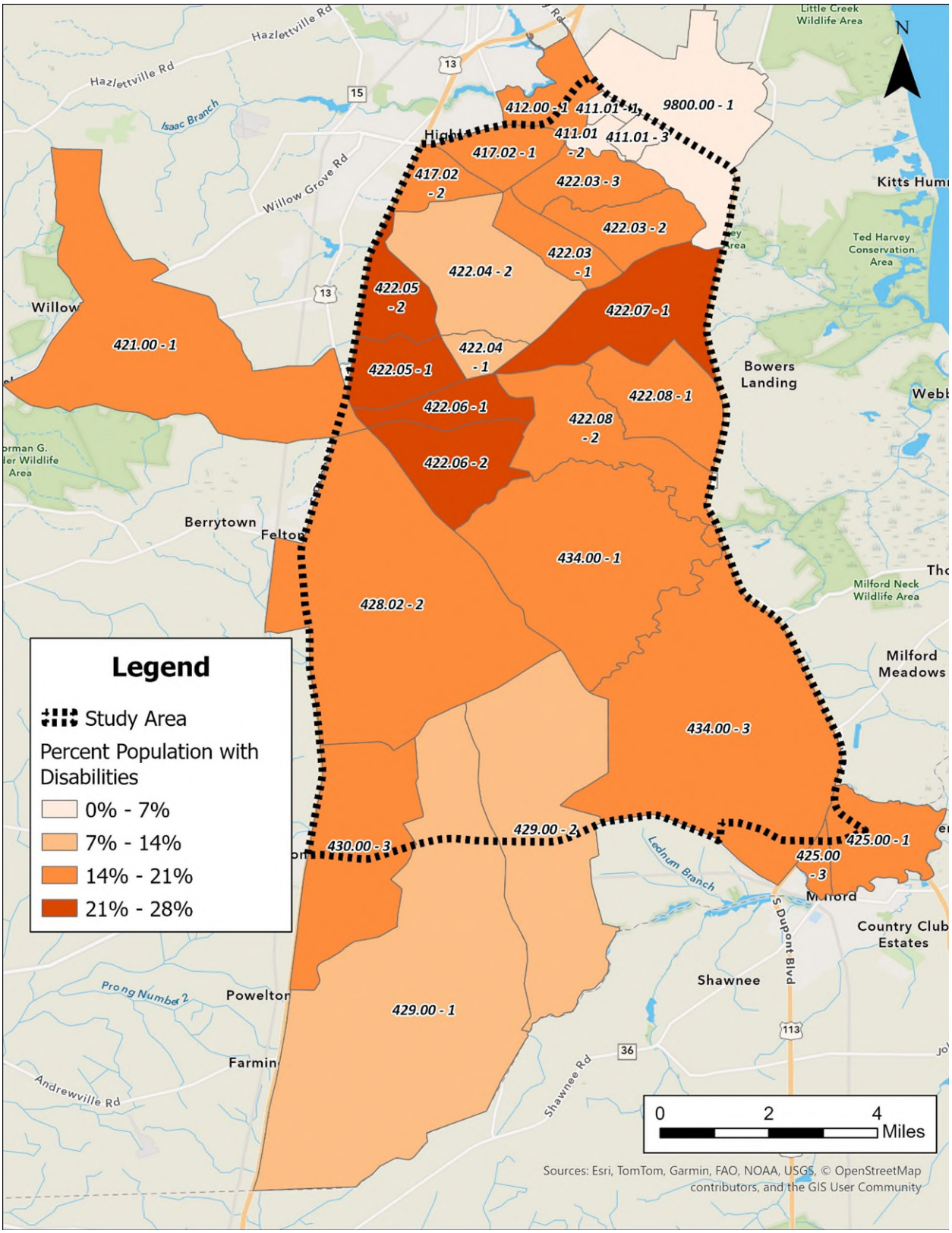
Figure 25: Percent of population with disabilities within or intersecting with the Study Area



Senior Populations

The population of senior citizens was considered for this equity analysis. Senior citizens are defined as individuals aged 65 and over. The percentage of senior citizens in each block group was provided by the Delaware EJScreen Tool and is displayed in **Figure 26**. Seven (7) block groups have a higher percentage of senior populations relative to others in the study area.

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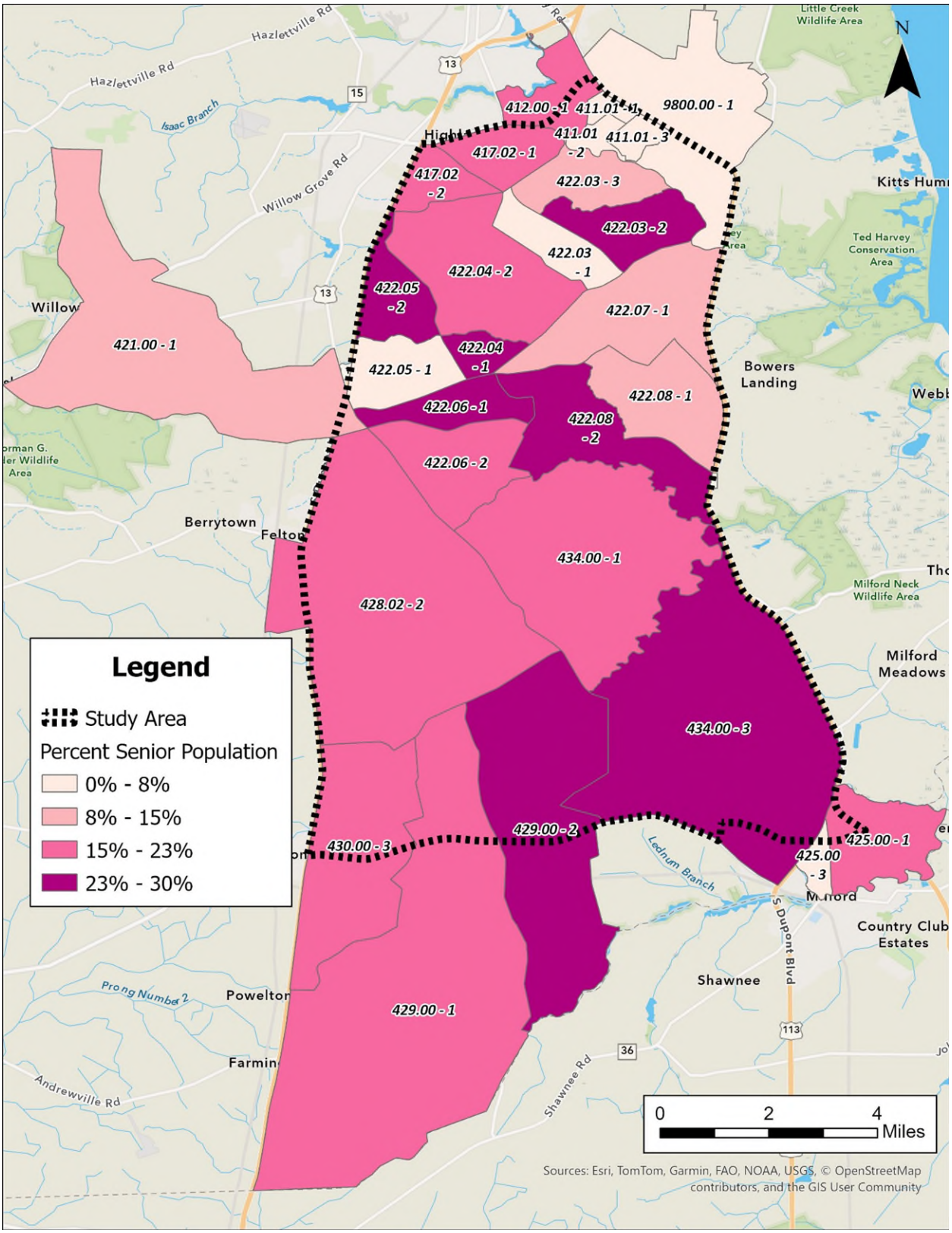
Figure 26: Percent senior population within or intersecting with the Study Area



Limited English Proficiency Populations

Traditionally underserved populations include those with Limited English Proficiency (LEP). LEP was measured based on the U.S. Census Bureau "limited English-speaking household" definition in which no one aged 14 or over speaks English at least "very well". The Delaware EJScreen Tool provides the percentage of LEP households by block group, presented in **Figure 27**. In one block group at the southeast corner of the study area, nearly a quarter of the households (approximately 24%) are considered LEP.

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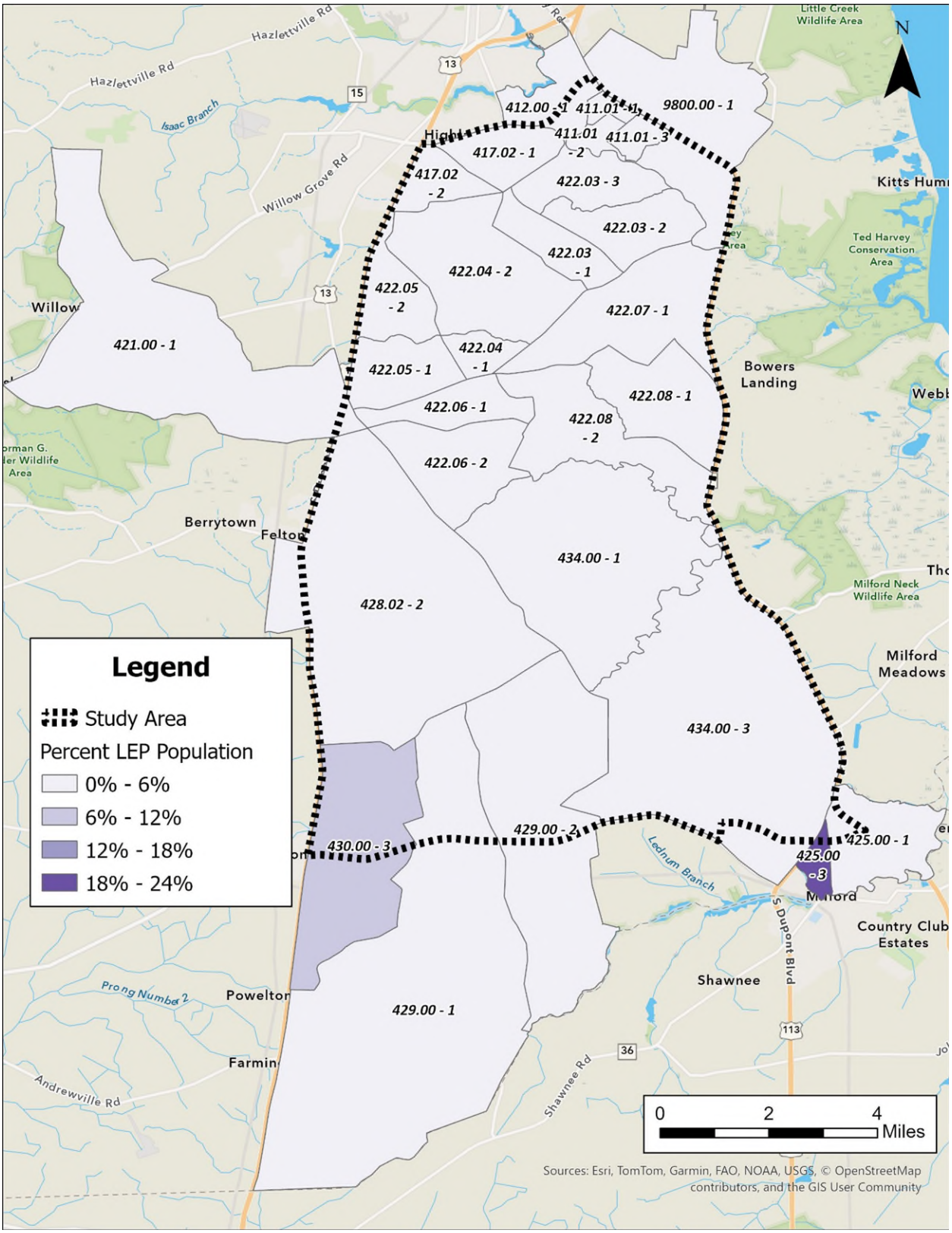
Figure 27: Percent LEP populations within or intersecting with the Study Area



Zero-Car Households

An indicator of underserved populations is the presence of zero-car households. This was the only socioeconomic feature not provided by the Delaware EJScreen Tool. ACS 2018-2022 5-year estimates[6] were available at the block group level. **Figure 28** presents the percentage of zero-car households for each block group. Two (2) block groups located in the northwest portion of the study area have an elevated presence of zero-car households compared to the rest of the study area, ranging from 12% to 16% of households without access to a vehicle.

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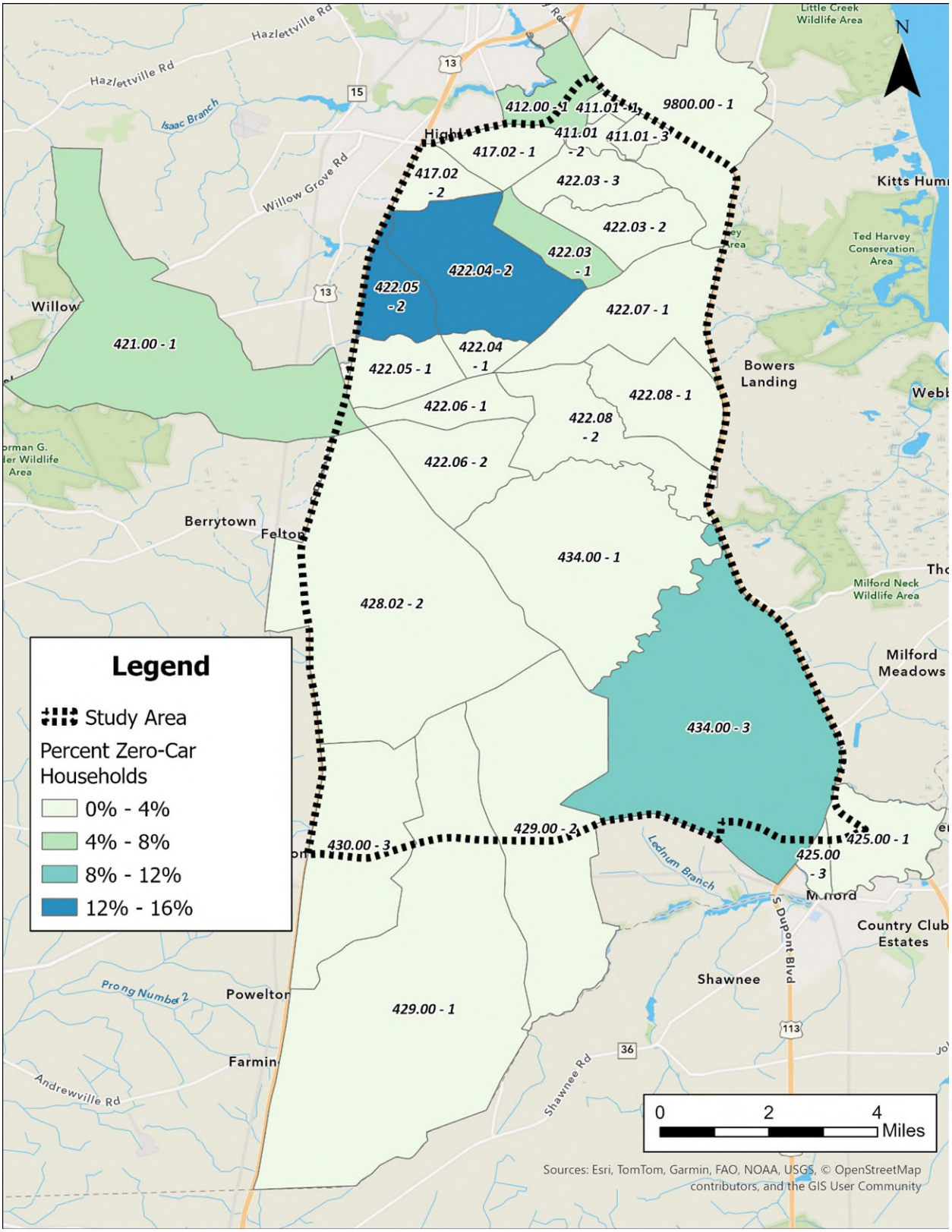
[6] ACS 5-year estimate table B25044: Tenure by Vehicle Available provided zero-car household statistics.

Figure 28: Percent of zero-car households within or intersecting with the Study Area



Flood Risk

Flood risk in the study area was identified using Federal Emergency Management Agency (FEMA) National Flood Hazard data for 100-year floodplains. Road segments within 100 feet of a floodplain received all the possible 1.5% score for this variable, while road segments not within 100 feet of floodplain received zero points.

Prioritized Roads/Results

Category scores along road segments were added together to establish a prioritization score that was used to inform where recommended improvements may be most needed. A map of all road segments symbolized by their prioritization score can be seen in **Figure 29**.

The methods described here allow for a road segment to score between zero (0) and one (1), with zero indicating the lowest priority possible and one the highest. The scores for these road segments ranged from a low of 0.025 on McCauley Pond Road (between Sandbox Road and SR 15) to a high of 0.685 on eastbound North Dupont Boulevard (between Airport Road and North Walnut Street). The average prioritization score was 0.265. Only one other road segment scored near the highest value: westbound North Dupont Boulevard between Airport Road and North Walnut Street, which scored 0.659 as a result of slightly lower in Safety and Multimodal/Destinations factors. The next highest scoring road segments scored 0.476 (North Dupont Boulevard eastbound from North Walnut Street to Tub Mill Pond Road) and 0.472 (South State Street from Rising Sun Road to Sorghum Mill Road).

The highest priority road segments were generally clustered in the northern part of the study area, around Magnolia, or in in the southeastern portion near Milford:

- S. State Street
- SR 10 / Lebanon Rd
- W. Walnut Street
- E. Walnut Street
- Peachtree Run
- N. Main Street
- S. Main Street
- SR 14 / Milford-Harrington Road
- SR 15 / Canterbury Road

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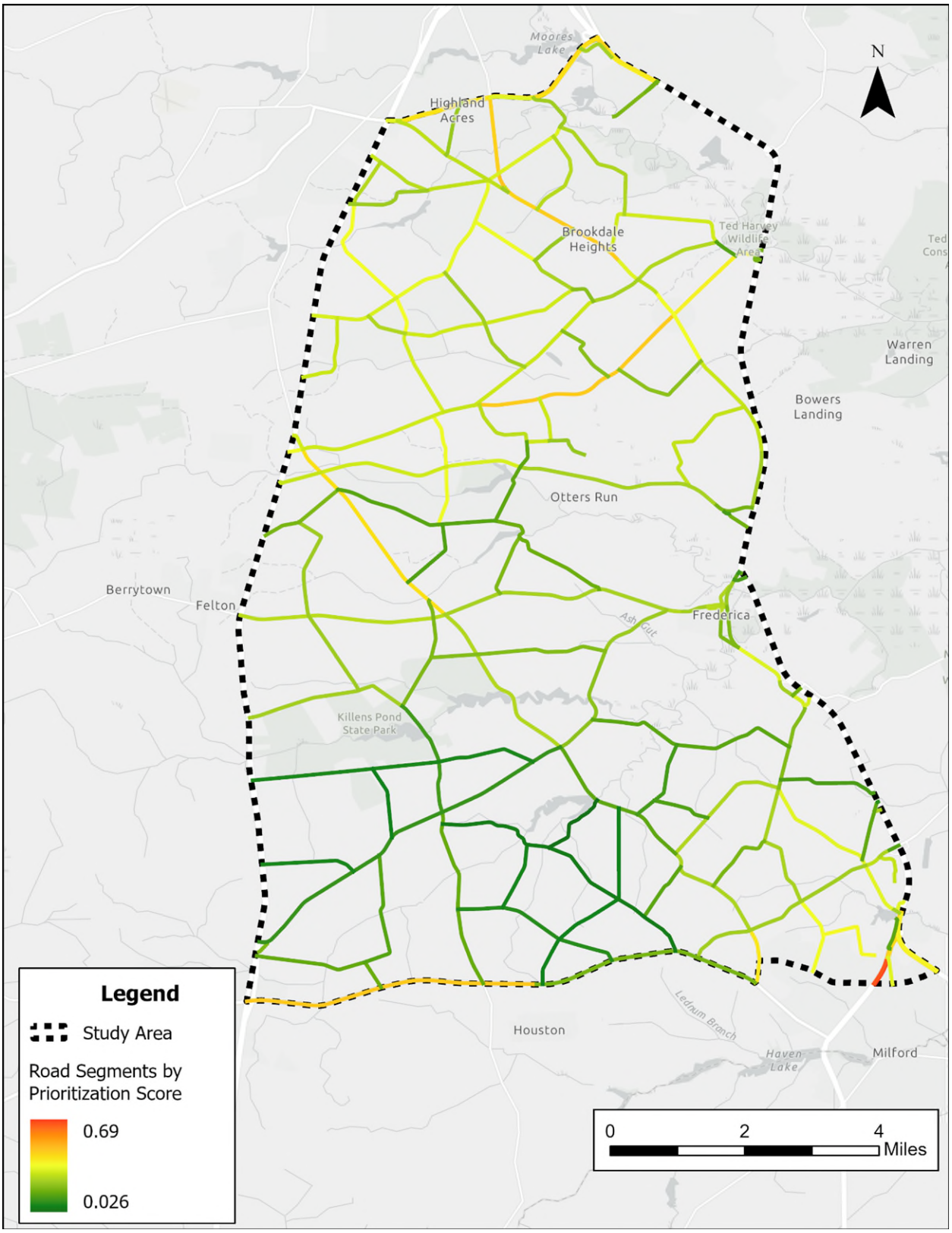
Figure 29: Road Segments by Prioritization Score



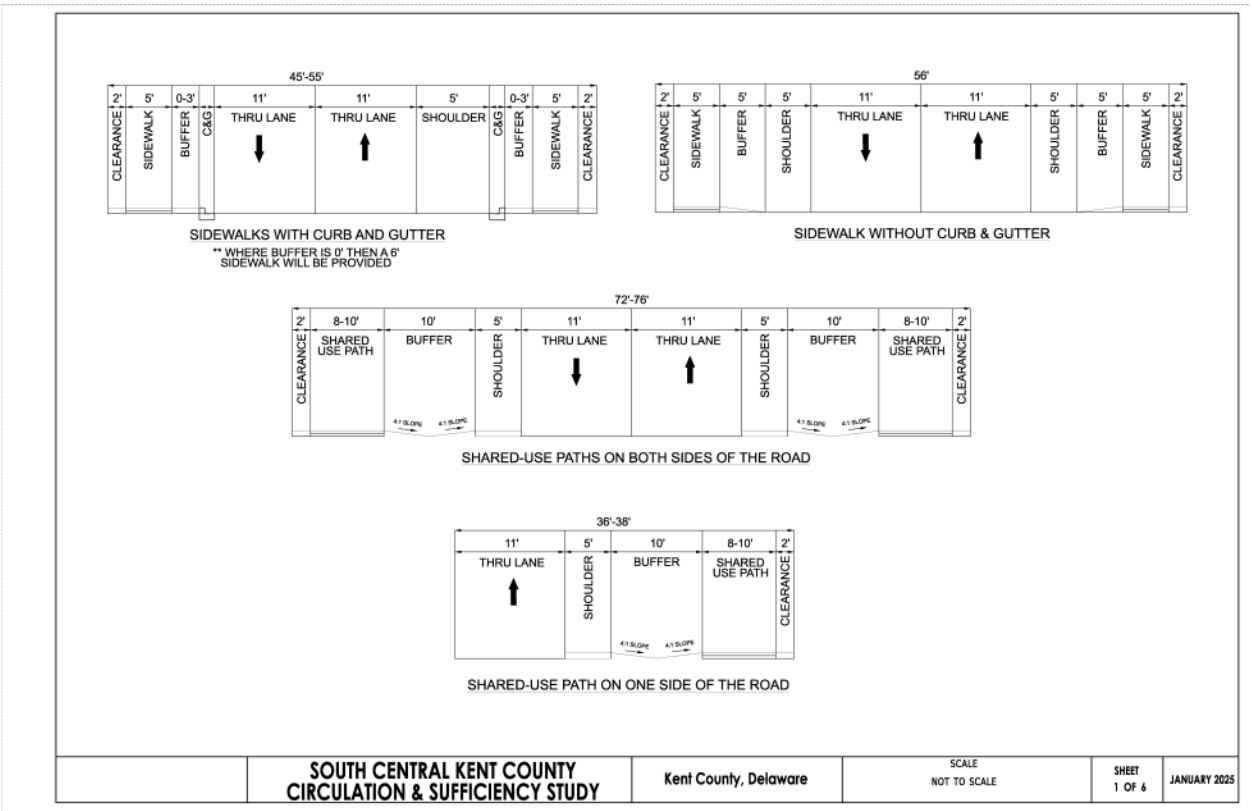
Recommendations

The following recommendations were developed in consultation with the Dover/Kent County MPO, DelDOT, and Kent County based on the results of the prioritization scoring, planned improvements, and available resources.

Typical Section

A "typical section" is a detailed cross-sectional drawing that shows the standard dimensions and features of a roadway or structure, used as a basis for construction details and information throughout the project plans. **Figure 30** includes typical sections that were developed for recommendations including bicycle and pedestrian facilities and could be applied throughout the study area as needed. Many of the roadways in the study area share characteristics and features, however, the ranges presented below reflect the variability amongst them.

Figure 30: Typical Sections for Bicycle and Pedestrian Facilities in South Central Kent County



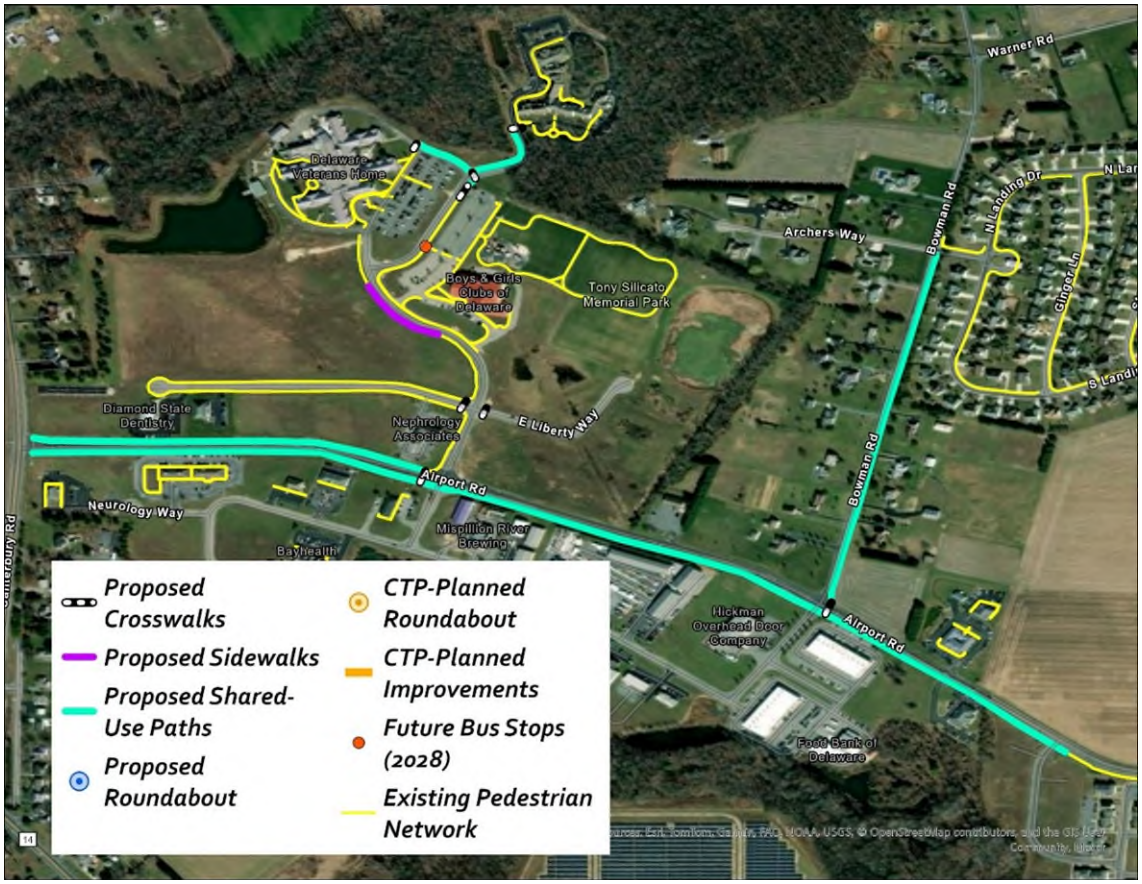
Bicycle and Pedestrian Improvements

<u>Airport Road</u>

Recommended bicycle and pedestrian improvements within the Airport Road vicinity include shared-use paths, crosswalks, and sidewalks. The installation of shared-use paths is recommended along both sides of Airport Road from Canterbury Road to Delaware Veterans Boulevard. East of Delaware Veterans Boulevard, the shared-use path would continue along the south side of Airport Road until it connects with existing pedestrian infrastructure just east of Cascades Lane. On the Canterbury Road end, this would ultimately tie into the new Milford Corporate Center. An additional recommended shared-use path would extend along Bowman Road from Landing Drive to Airport Road. A

crosswalk across Airport Road at Bowman Road is recommended to connect to the shared-use path along the south side of Airport Road. Crosswalks across East and West Liberty Lanes are also recommended along Delaware Veterans Boulevard. Sidewalk is recommended to fill in a gap along the west side of Delaware Veterans Boulevard. A shared-use path is recommended along the northeast side of the Delaware Veterans Home parking lot, where it would continue along the west side of Patriots Way until the entrance of Delaware Hospice. A series of crosswalks are suggested to connect existing sidewalks of the Delaware Veterans Home and Delaware Hospice to the recommended shared-use path. **Figure 31** depicts these improvements.

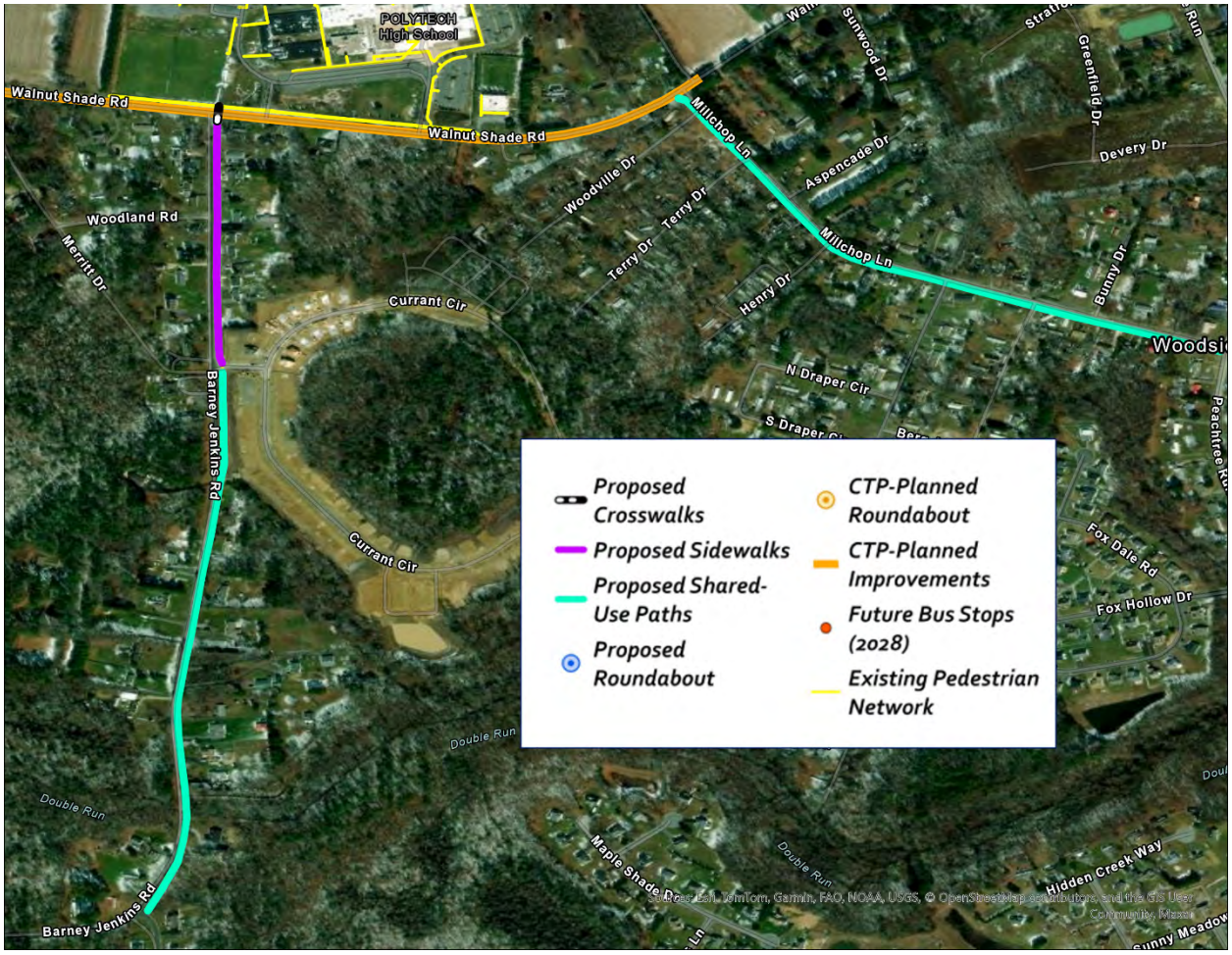
Figure 31: Airport Road Pedestrian Improvements



Barney Jenkins Road at Walnut Shade Road

A shared-use path is recommended along the east side of Barney Jenkins Road from Hunters Run to Currant Circle. Once it reaches Currant Circle the shared-use path would transition to a sidewalk, due to right-of-way constraints, and continue along the east side of Barney Jenkins Road to Walnut Shade Road. A crosswalk across Walnut Shade Road is recommended. Additionally, another shared-use path is recommended along the west/south side of Millchop Lane from Walnut Shade Road to Peachtree Run. **Figure 32** depicts these improvements.

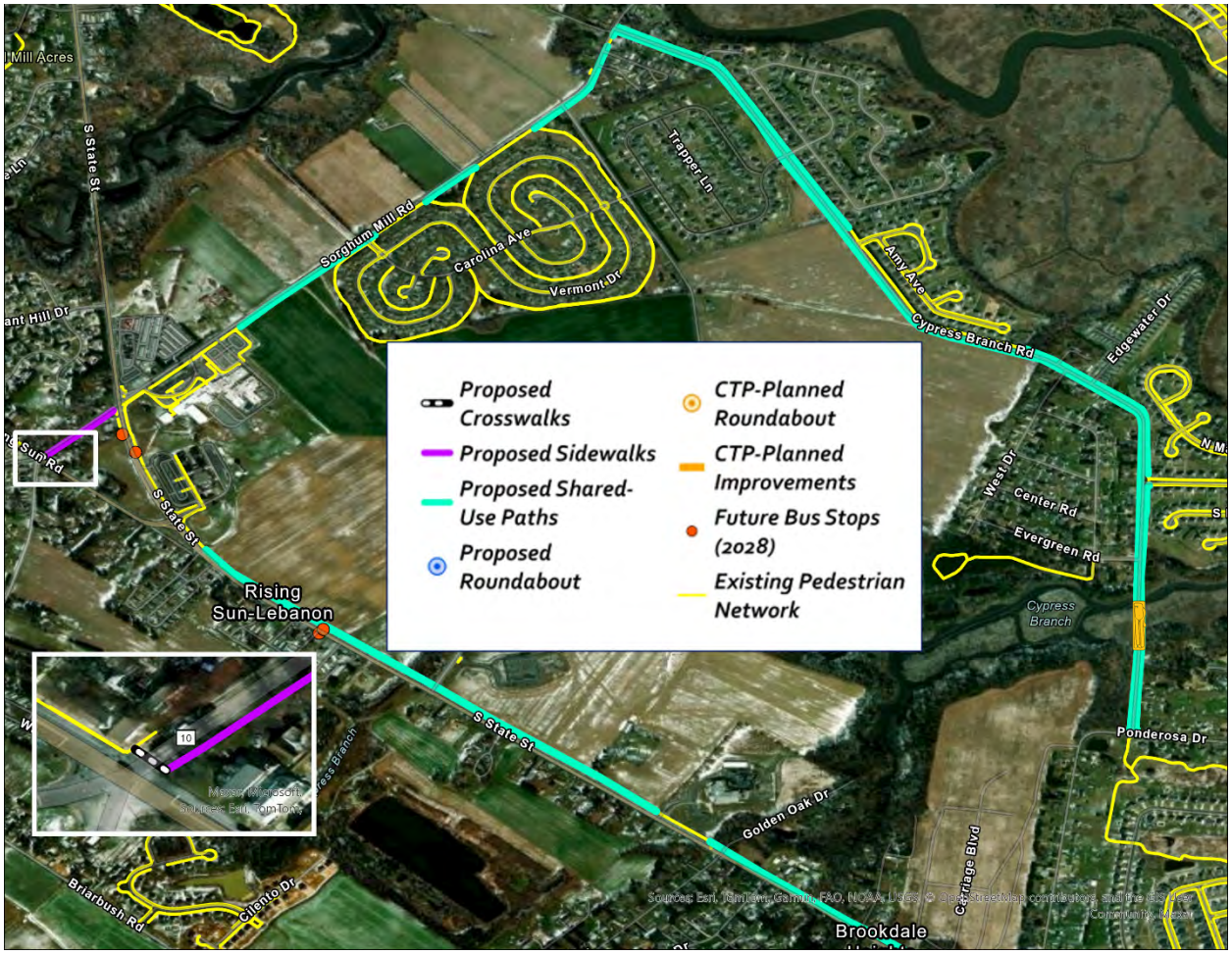
Figure 32: Barney Jenkins Road at Walnut Shade Road Pedestrian Improvements



Cypress Branch Road

A shared-use path is recommended along both sides of Cypress Branch Road from Sorghum Mill Road to Ponderosa Drive. Another shared-use path is proposed along the south side of Sorghum Mill Road starting at the southeast corner of the Cypress Branch Road and Sorghum Mill Road intersection to the existing pedestrian network associated with the John S. Charlton School. Sidewalk is also recommended along the south side of Sorghum Mill Road from the west side of South State Street to Rising Sun Road. A crosswalk is recommended across Sorghum Mill Road at its intersection with Rising Sun Road. A shared-use path is also recommended along the north/east side of South State Street from the existing sidewalk across Prairie Dog Lane to Woodlytown Road and Plaindealing Road. **Figure 33** presents most of these recommendations; however, the full extent of the shared-use path along South State Street is cut off at Brookview Avenue. **Figure 34** depicts the remainder of the recommended South State Street shared-use path.

Figure 33: Cypress Branch Road Pedestrian Improvements

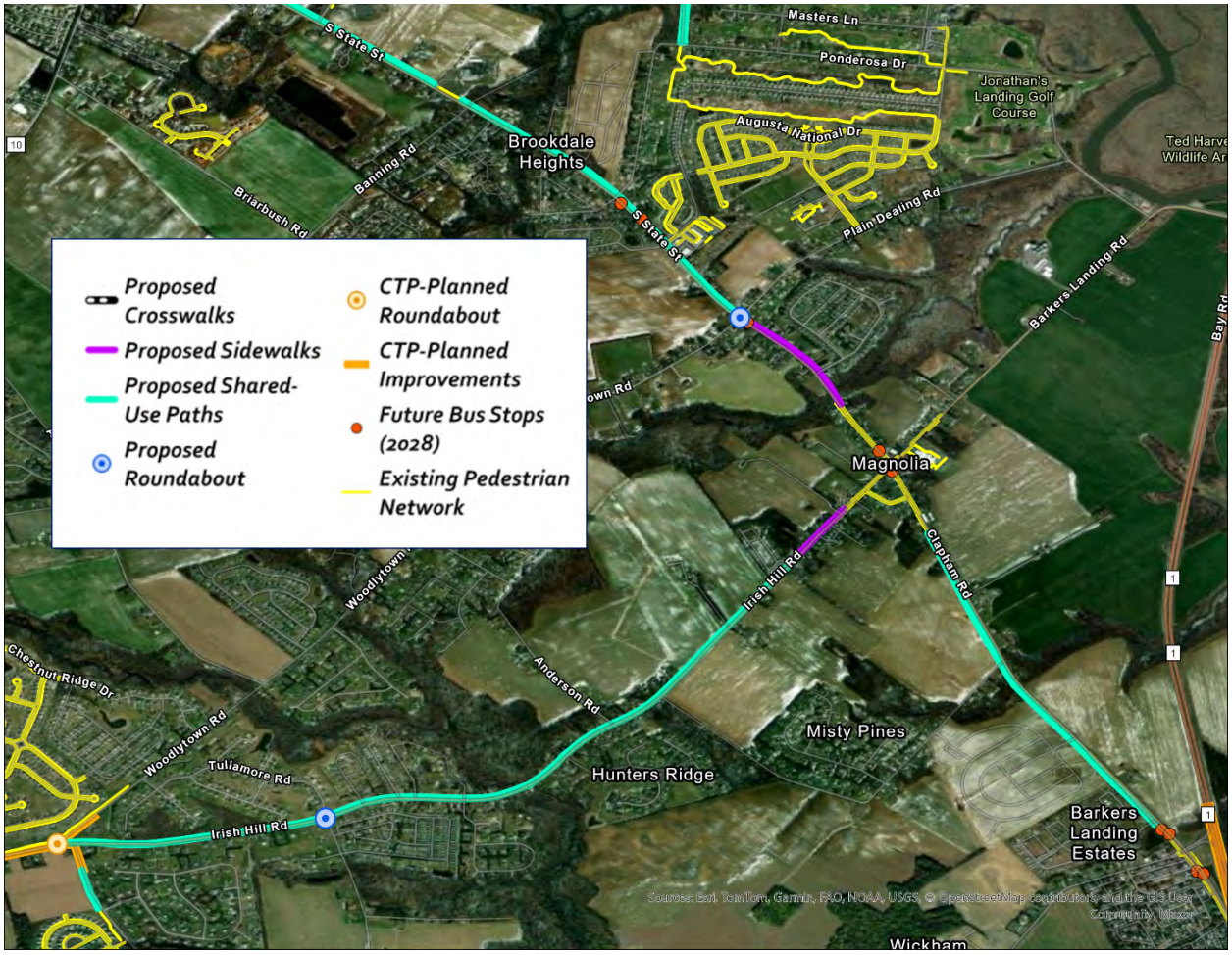


DelDOT also has a project to address frequent flooding on the southern portion of the road, just south of the bridge over Cypress Branch. The scope of the project is to raise the road by approximately 16 inches to reduce the frequency of flooding and water on the road during very high tides. Coordination with the design team will be necessary to provide at least a five-foot shoulder in the design and scope of the project. Wetland constraints will be the controlling factor in the final design plans. Construction is currently scheduled for 2026.

Irish Hill Road

As reflected in **Figure 34**, the recommended shared-use path along the north/east side of South State Street continues to the intersection of Woodlytown Road and Plaindealing Road. At this intersection, a roundabout is recommended. South of the recommended roundabout, sidewalk is recommended along the north/east side of South State Street until it meets the existing sidewalk north of Magnolia. South of Magnolia, shared-use path is recommended along the south/west side of Clapham Road until it reaches existing sidewalk just south of Jury Drive. Additionally, sidewalk is recommended along the north side of Irish Hill Road from the existing sidewalk to Skeet Road (Magnolia Crossing Mobile Home Park), where it would transition to shared-use path continuing along Irish Hill Road from Skeet Road to Woodlytown Road. An additional shared-use path is recommended along the west side of McGinnis Pond Road from the CTP-planned shared-use path to existing shared-use path across from Magnolia Meadows Parkway. Another roundabout is recommended at the Irish Hill Road and Tullamore Road.

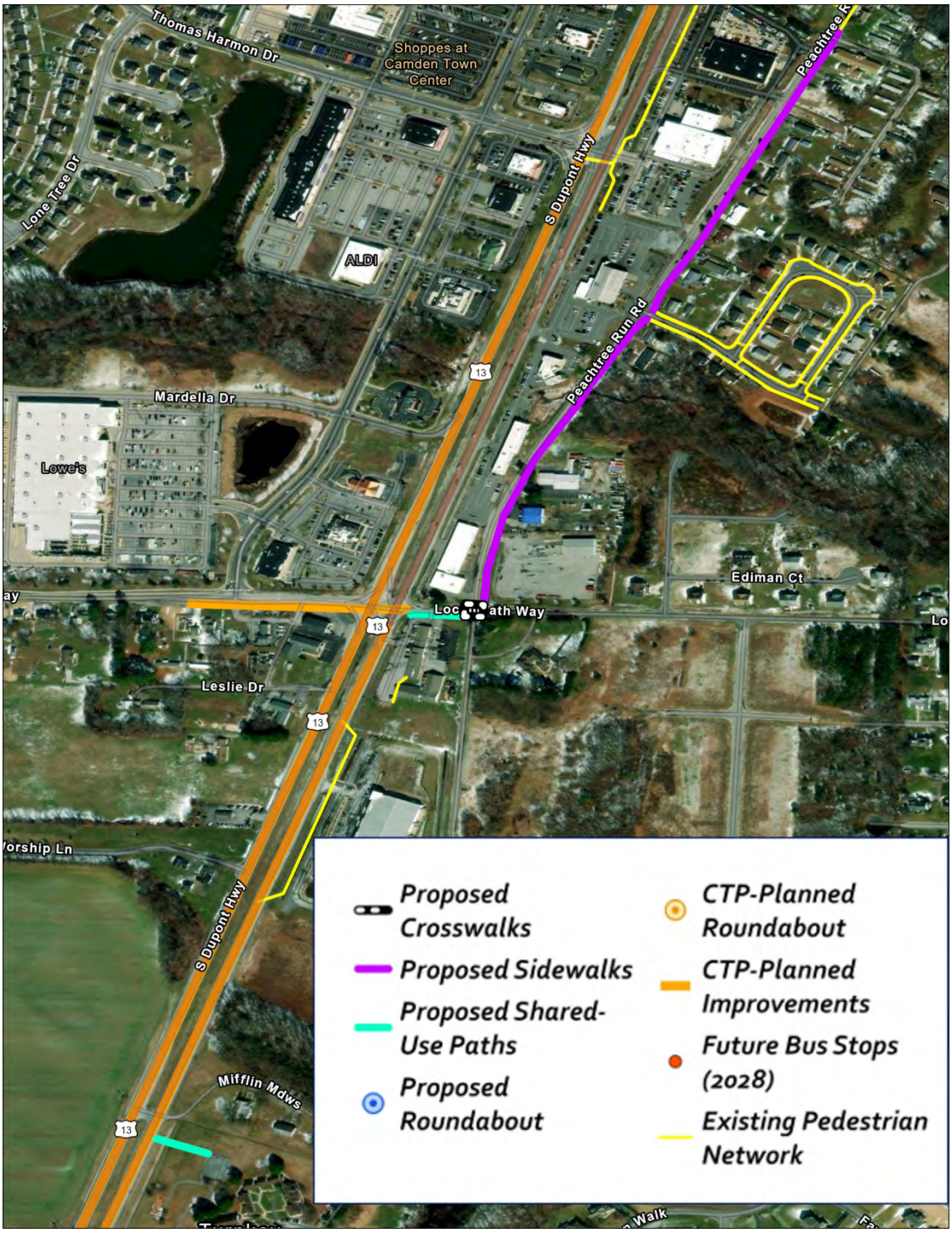
Figure 34: Irish Hill Road Pedestrian Improvements



Mifflin Meadows Drive & Peachtree Run Road

Sidewalk is recommended along the east side of Peachtree Run Road (**Figure 35**) from Vanessa Drive to Lochmeath Way. Crosswalks are recommended across all approaches of the Peachtree Run Road and Lochmeath Way intersection. A shared-use path is recommended along the south side of Lochmeath Way from US 113 to Peachtree Run Road. Another shared-use path is recommended from the basketball court south of Mifflin Meadows to US 13.

Figure 35: Mifflin Meadows Drive & Peachtree Run Road Pedestrian Improvements



Concepts

Sorghum Mill Road

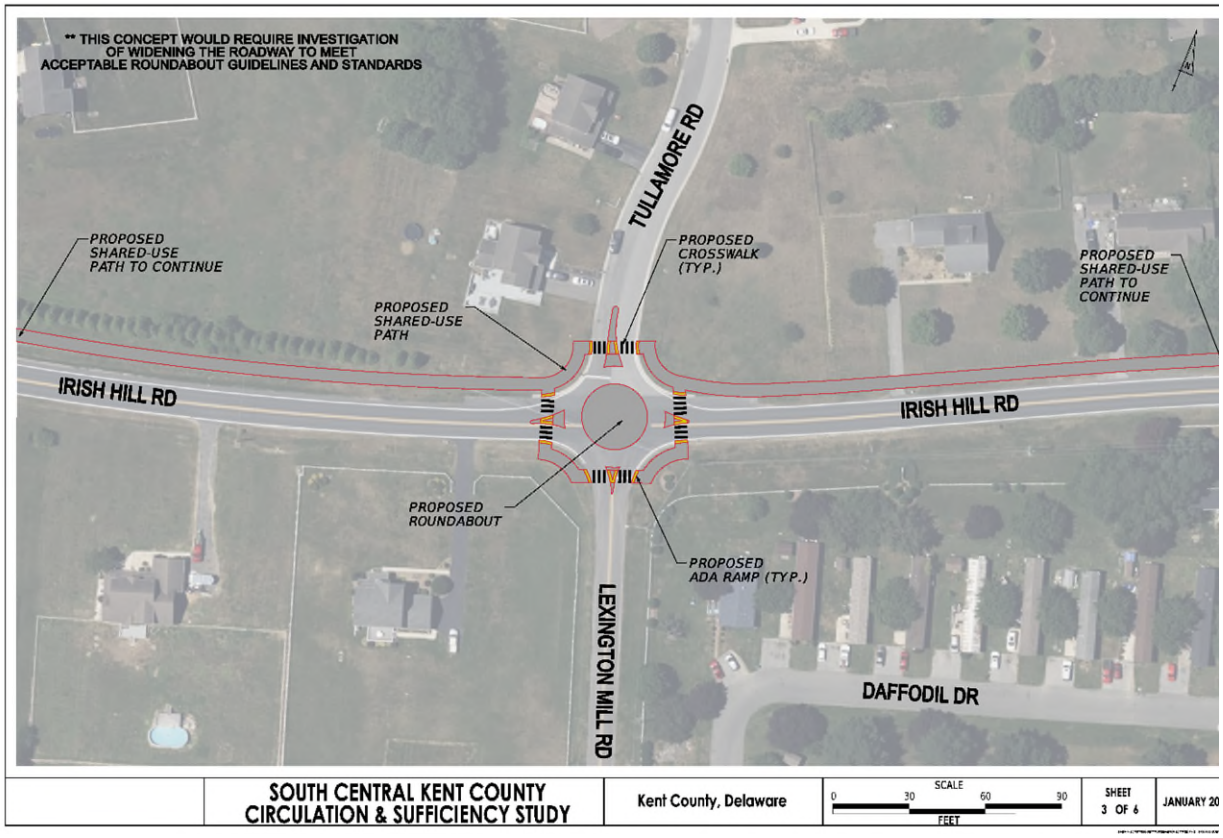
Sidewalk is proposed along the east side of Sorghum Mill Road from Rising Sun Road to South State Street. The sidewalk would tie into the existing ADA ramp at the intersection with South State Street. An ADA ramp and crosswalk would be added to the north leg of the intersection with Rising Sun Road.

Figure 36: Sorghum Mill Road Concept

Irish Hill Road and Lexington Mill Road

A roundabout is proposed at the intersection of Irish Hill Road and Lexington Mill Road. The proposed roundabout would have ADA ramps (TYP.) and crosswalks on all four legs. A proposed shared use path would run along the west side of Irish Hill Road. This concept would require analysis to determine the feasibility to meet DelDOT roundabout guidelines and standards in the DelDOT Design Guidance Memorandum 1:26.

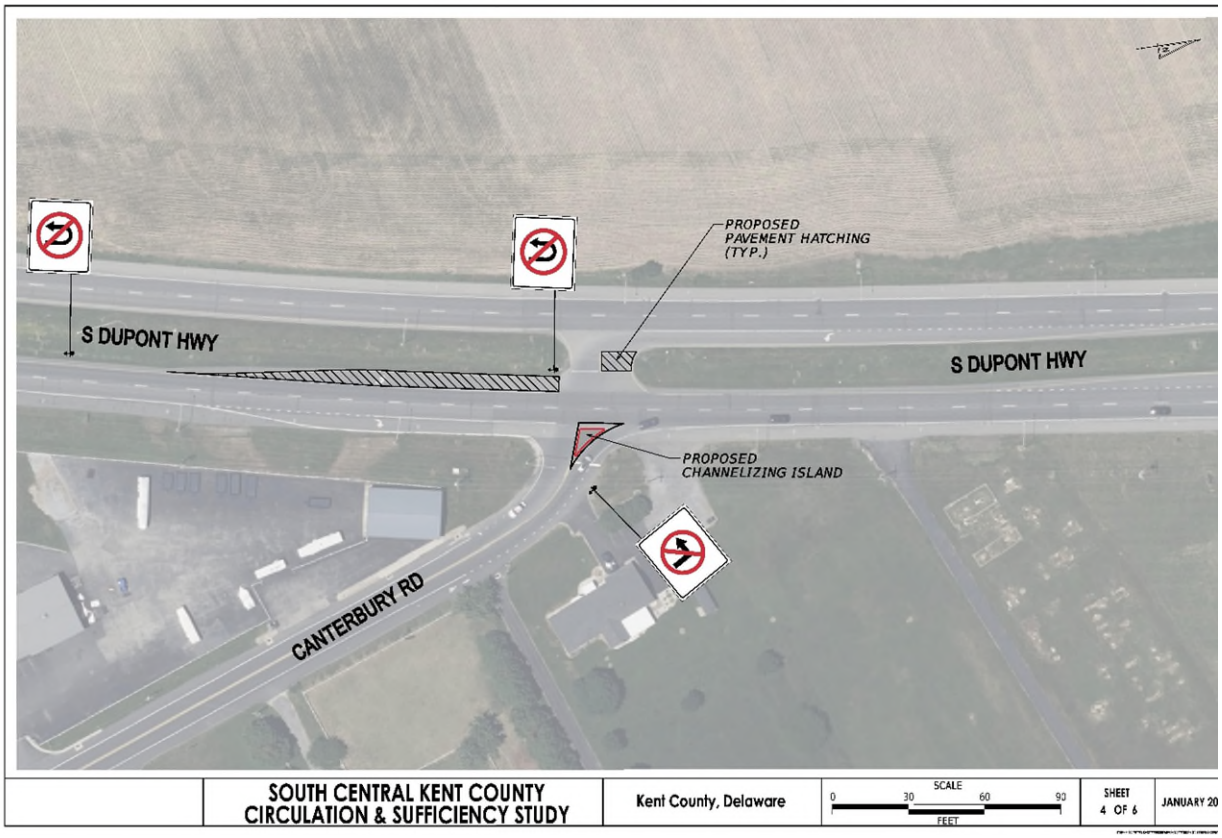
Figure 37: Irish Hill Road and Lexington Mill Road



Canterbury Road And South Dupont Highway

At the intersection of Canterbury Road and South Dupont Highway, the northbound U-turn movement and westbound left-turn would be prohibited with islands and appropriate signing and striping. The northbound U-turn lane would be removed with pavement hatching. Pavement hatching would also be used to extend the north median to create one lane for the southbound left turns to cross the median to Canterbury Road. At Canterbury Road, a channelizing island is proposed to only allow westbound cars to turn right at South Dupont Highway. The project team recognizes that modifications to this crossing are being considered as part of a capital project at Canterbury Road and Irish Hill Road. This recommendation generally aligns with Alternative 2 identified in this project's planning process.

Figure 38: Canterbury Road and South Dupont Highway Concept



McGinnis Pond Road and Barratts Chapel Road

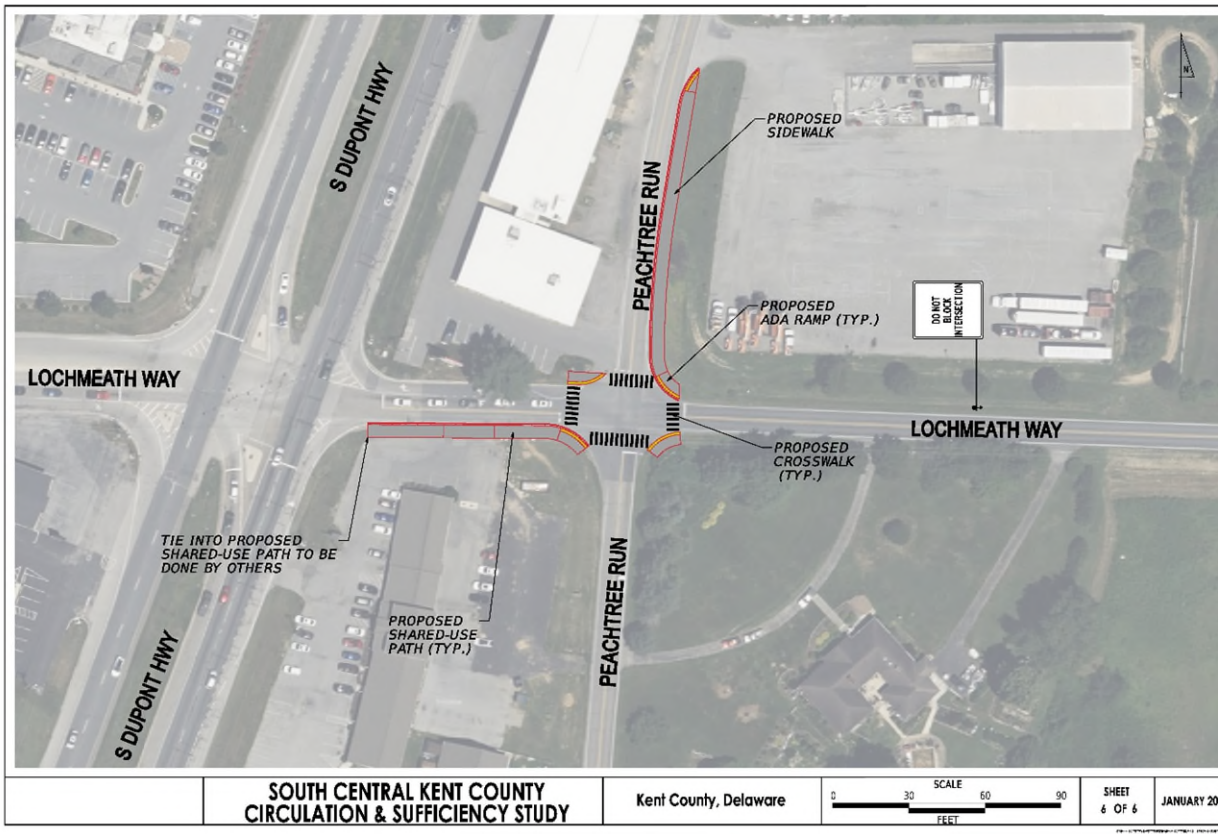
The intersection of McGinnis Pond Road and Barratts Chapel Road is proposed to be converted from two-way stop controlled along McGinnis Pond Road to an all-way stop intersection. Stop signs and stop bars would be added on Barratts Chapel Road at the intersection. Warning signs for stop sign ahead would also be added along Barratts Chapel Road approaching the intersection.

Figure 39: McGinnis Pond Road and Barratts Chapel Road Concept

Peachtree Run and Lochmeath Way

The intersection of Peachtree Run and Lochmeath Way is proposed for crosswalk improvements. Crosswalks are proposed on all four legs of the intersection, with ADA ramps proposed for each corner. Sidewalk is proposed along the east side of Peachtree Run north of the intersection. Along Lochmeath Way west of the intersection, a shared-use path is proposed that would tie into a shared-use path to be constructed by DelDOT. This concept would also include a sign instructing drivers traveling west on Lochmeath Way to not block the intersection at Peachtree Run. The project team recommends that DelDOT and the Dover/Kent MPO explore whether all or some of these improvements could be incorporated into the US 13 widening project.

Figure 40: Peach Tree Run and Lochmeath Way Concept



Other Recommendations

Safety and Traffic Recommendations

Appropriate Speed Limits for All Road Users

Appropriate speed limits for all road users are critical for improving road safety. Speed control is one of the most important methods for reducing fatalities and serious injuries. Speed limits that are consistent with and reasonable for local conditions can effectively manage travel speeds and reduce crash severity. When setting speed limits, agencies should consider non-vehicular activities, types of road users present, crash history, land use context, traffic volumes, and observed speeds, among other factors. While setting speed limits is an important component of an effective speed management program, other strategies, such as traffic calming, roadway design features, and high-visibility enforcement encourage compliance with the posted speed limit.

For areas where vehicle speeds create or contribute to unsafe conditions, evaluating the speed limit may be appropriate. This begins by conducting a speed study. Speed studies are conducted to get a sample of the speed vehicles are travelling along a roadway compared to the speed limit. These studies can determine the 85th percentile speed of vehicles, which is then used to determine the need for reduced speed limits, speed enforcement, traffic calming measures, or other strategies. Speed studies should be conducted when an issue of speed safety is noted for a location. Factors that may indicate the need for a speed study along a roadway are publicly reported speeding issues, the prevalence of crashes where speed was a factor, priority pedestrian corridors, changes in land use or zoning, and development or improvement projects that may substantially change the local conditions. This study analysis did not have data that would support studying whether speeding is an issue in the study area or not.

Based on factors to conduct speed studies, speed studies are recommended for the following locations:

- SR 10 (Lebanon Road) – after the completion of the East and West Camden bypasses
- S. State Street
- SR 15 (Canterbury Road) – after the completion of currently funded CTP projects
- Irish Hill Road – after the completion of currently funded CTP projects
- SR 12 (Midstate Road)

Dynamic Speed Feedback Signs

An effective speed management program uses additional strategies concurrent with appropriate speed limits. One strategy is dynamic speed feedback signs to enforce the speed limit. Dynamic speed feedback signs use radar or laser technology to determine the speed of an approaching vehicle and display the speed to the driver. These signs can be permanently installed below a posted speed limit sign. The signs can reduce speeding along roadways and reduce subsequent crashes. Dynamic speed feedback signs can be used where there is observed speeding, where speed limits have changed, or in speed transition zones. Dynamic speed feedback signs can also be effective in advance of horizontal curves on high-speed roads. It is recommended that if speed studies identify areas where speeding is an issue or the speed limit is changed based on a speed study, then dynamic speed feedback signs can be effective in reducing speeding in those locations.

SR 10 Median Crossovers

Median improvements are recommended at the SR 10 median across from Liberto Plaza (see **Figure 41)** to more clearly define turning movements. One short-term treatment is the addition of striping to delineate (see **Figure 42**) the proper position of vehicles as the current median has no markings and leads to confusion for drivers. Additional medians along SR 10 may benefit from the same treatment.

Figure 41: SR 10 Median Crossover across from Liberto Plaza

Figure 42: Proposed Median Striping Improvements Example

Roadway Improvements

Roadway Striping

Centerline striping defines the lanes on a roadway. Most roadways without centerline striping are minor roads, especially along residential streets. Adding centerline striping can define and reduce the perceived width of the travel

lane, improving driver attention and helping reduce speeds. Reflective pavement markers can also be utilized to improve driver attention to pavement markings. Centerline striping can be added on minor roadways to address issues with speeding and crashes. Centerline pavement markings can also be added on unmarked roads at intersections. Application of a double yellow centerline on a minor road approach that extends at least 50 to 100 feet from an intersection stop line can promote proper vehicle placement and increase driver awareness of the intersection. This is useful for signalized and unsignalized/stop-controlled intersections. Crashes at intersections could be reduced by centerline striping, as it designates the lanes to improve the positioning and paths of vehicles at intersections. This could also be used to provide adequate room for turns from the major road.

Edge line striping defines the edge of the travel lane, which improves driver awareness and perception of the travel lane. Edge line striping is also effective to narrow the lanes and/or provide additional delineation for other uses, such as shoulders or bike lanes. Lane width reduction can reduce speeding along the roadway by creating a narrower travel lane. Roadways without edge lines would benefit from edge line striping but widening edge lines on existing roadways may also create a safety benefit. Wider edge lines increase drivers' perception of the edge of the travel lane and can provide a safety benefit to all facility types in both urban and rural areas. Wider edge lines are effective in reducing crashes on rural two-lane highways, especially for single-vehicle crashes. When determining where wider edge line installation would be beneficial, roadway departure crash risk factors should be considered. Potential risk factors for two-lane rural roads include:

- Pavement and shoulder widths.
- Presence of curves.
- Traffic volumes.
- History of nighttime crashes.

New vehicle technology includes the "lane assist" function that alerts drivers when they begin to leave the travel lane. This technology relies on lane markings as discussed in this recommendation. Adding lane markings as proposed will improve the reliability of this technology as drivers travel on roads within the study area.

Adequately maintained retroreflective signs, pavement markings, and roadway lighting improve nighttime highway visibility and reduce the risk of crashes by increasing visibility for drivers and other roadway users. Because the retroreflective properties of traffic control devices deteriorate over time, these signs need to be actively maintained to ensure that they remain clearly visible at night. Adequately maintained retroreflective pavement markings improve nighttime highway visibility and reduce the risk of crashes by bouncing light from vehicle headlights off the traffic control device and back toward the vehicle and the driver's eyes. This makes markings appear brighter and easier to see and read at night. Roadway lighting is another means to increase visibility for drivers and other roadway users. Properly designed roadway lighting allows road users to quickly assess roadway conditions and creates a safer environment within the roadway vicinity.

Signal Timing Improvements

Signal timing affects the flow of traffic for all travel modes. Modifying traffic signal timing schemes, or those at one or both of nearby signalized intersections, can optimize the operational efficiency of an intersection. Signal timing should address the needs of all users including pedestrians, bicycles, and vehicles, and may even need to accommodate freight, transit, and railroad. Network configuration and traffic demand as well as context such as user mix and land use can be used to identify appropriate signal operations.

Modifying the signal timing can optimize the traffic movements at an intersection, improve capacity, and reduce delays. Signal timing optimization studies may also be done when roadway projects, developments, or land use is changed as

the traffic volumes/demand can be impacted, changing the optimal operations of an intersection. Signal timing studies may also be done if an adjacent unsignalized intersection is experiencing excessive queueing on minor roads or vehicle conflicts caused by insufficient gaps in through traffic on the major road. The entirety of a signalized corridor should be considered when analyzing signal timing optimization.

Signal Timing Optimization studies are recommended at SR 10 (Lebanon Road) & South State Street and Voshells Mill Star Hill Road/Walnut Shade Road/Sorghum Mill Road & Rising Sun Road. These intersections are recommended for study due to the high levels of congestion and safety incidents. A study at SR 10 and South State Street should be done following the completion of the East Camden Bypass.

Bike and Pedestrian System Improvements

Pedestrian Lighting

Poor lighting conditions reduce visibility along roadways and at crosswalks, which can lead to safety issues. Improved lighting at crosswalks, intersections, and along rural highways can result in a large reduction of nighttime crashes that could result in personal injury or fatality.

The goal of pedestrian lighting should be to illuminate with positive contrast to make it easier for a driver to visually identify the pedestrian. At crosswalks, this involves carefully placing the luminaires in forward locations to avoid a silhouette effect of the pedestrian. For multi-lane roadway crossings where vehicle volumes exceed 10,000 AADT, a marked crosswalk alone is typically not sufficient. Under such conditions, more substantial crossing improvements, such as crosswalk lighting, is warranted to ensure the safety for pedestrians and reduce likelihood of a crash.

Pedestrian lighting should be integrated into new facilities. Lighting audits are recommended around schools, community facilities, employment centers, and transit stops. These types of locations are pedestrian generators and often have higher volumes of pedestrians. Facilities associated with pedestrian volumes should have pedestrian lighting within the nearby pedestrian network for pedestrian safety. Audits can be conducted to determine if pedestrian lighting is present or adequate around these facilities. If there is not adequate lighting, pedestrian lighting should be installed or upgraded.

Rectangular Rapid Flashing Beacons (RRFB)

A marked crosswalk or pedestrian warning sign may not be sufficient for drivers to adequately see crossing locations and yield to pedestrians at uncontrolled locations. To enhance pedestrian visibility and increase driver awareness, pedestrian actuated Rectangular Rapid Flashing Beacon (RRFB) can be installed alongside a pedestrian warning sign. RRFBs consist of two rectangular-shaped yellow indicators, each with a light-emitting diode (LED)-array-based light source. RRFBs flash with an alternating high frequency when activated to enhance conspicuity of pedestrians at the crossing to drivers. The RRFB is applicable to many types of pedestrian crossings but is particularly effective at multi-lane crossings with speed limits less than 40 miles per hour. RRFBs should be placed in the median rather than the far-side of the roadway if there is a pedestrian refuge. Solar-powered panels in RRFBs can eliminate the need for a power source.

RRFBs are recommended at Barney Jenkins Road and Walnut Shade Road to provide a safe pedestrian midblock crossing. Locations along South State Street may also be appropriate locations for RRFBs at existing midblock crossings or where pedestrians are crossing not at an intersection. Generally, midblock crossings within the study area could be analyzed to determine if an RRFB would be appropriate to install at the crossing. It is recommended to install RRFBs at locations with significant pedestrian crossings.

Policy and Land Use

Many housing developments are being constructed in South Central Kent County, adding even more pedestrians that would need to utilize the multimodal network. Connectivity is an important aspect of the multimodal network that helps promote the use of the network by providing a continuous dedicated space for pedestrians to travel.

As part of the development review and coordination process, DelDOT and Kent County should ensure that shared use paths and sidewalks are required along all public road frontages and within developments, to provide for safe pedestrian travel. Where development occurs in an area with existing sidewalks or share use paths, upgrades or replacements to these assets should be required if they do not meet the current standards.

Transit Improvements

Microtransit

Microtransit, also referred to as on-demand transit, is a transit service that uses multi-passenger vehicles to provide transit trips at request with flexible routes or within a specific region. Microtransit is aimed at providing service within areas that are not served by fixed route transit. It can also be used to provide first-mile/last-mile connections to fixed route services or hub to hub zone-based services.

Microtransit can also be useful in rural areas, where fixed route transit is not available or is limited. Rural areas have lower population densities, larger distances between destinations, and low walkability making traditional fixed-route transit not feasible, even though a demand may still exist. Another benefit of on-demand transit is that it can readily adjust to changes in travel patterns. As development occurs in and around rural areas, creating new destinations, the on-demand flexible routes can adjust for those changes more quickly than traditional fixed routes.

DART Reimagined defines a family of services to provide a clear system of services that aligns with the land use of the area. One of the service categories being introduced is Microtransit, which provides on-demand community circulation and connections to employment, retail, medical services, and transit hubs. Microtransit is identified as appropriate for a range of land uses and in rural to core areas. DART has existing microtransit service called DART Connect that is available in Newark, Georgetown, and Millsboro. This service uses smaller vehicles to provide on-demand service to more destinations than their bus service. The rider's cost of the on-demand service is the same price as DART bus fare. DART Connect rides can be booked on DART's website, DARTTransit app or by phone.

DART Reimagined recommends creating more microtransit zones, mirroring DART Connect. This would transition some lower-performing bus routes into microtransit zones. Microtransit would increase system efficiencies by increasing the number of passenger trips per mile compared to the current fixed route services. Within the study area, DART Reimagined recommended network would create microtransit zones in South Dover and Harrington-Milford, removing majority of the local fixed-routes. Coordination with DART on the creation and boundaries of microtransit zones within the study area is recommended. It will also be important to monitor the implementation of DART Reimagined to ensure that it does not result in a reduction in transit service where fixed routes are being replaced with microtransit.

Safe Routes to School

Safe Routes to School (SRTS) programs make it safe, convenient and fun for children to walk or bicycle to school. Elementary and middle schools can receive funding through Delaware SRTS Program. Recommendations made in this report along S. State Street and Sorghum Mill Road will improve bicycle and pedestrian access to Postlewait Middle School, Allen Frear Elementary and the John S. Charlton School. SRTS funding could be utilized to pursue these improvements.

Other schools located within the study area also lack strong bicycle and pedestrian facilities linking them to surrounding residential communities. We recommend that the Dover/Kent County MPO and DelDOT reach out to J.R. McIlvaine Early Childhood Center on East Walnut Street, Star Hill Elementary School on Star Hill Road, David E. Robinson Elementary on Briarbush Road, and Magnolia Middle School to assess interest in participating in the SRTS Program to identify and implement bicycle and pedestrian safety improvements in the walk zones surrounding the schools.

Additional Resources

FHWA Proven Safety Countermeasures in Rural Communities – US DOT Federal Highway Administration (FHWA-SA-24-005)

Kent County Comprehensive Plan https://www.kentcountyde.gov/files/sharedassets/public/v/1/content-publishers/planning/planning-pdf/2018-comprehensive-plan-adopted-9-11-18-full-document-with-appendices.pdf

Low Cost Pedestrian Safety Zones: Countermeasure Selection Resource – US DOT National Highway Traffic Safety Administration (DOT-HS-813-479)

NCHRP Research Report 940: Solid-State Roadway Lighting Design Volumes I & II (https://nap.nationalacademies.org/catalog/25678/solid-state-roadway-lighting-design-guide-volume-1-guidance)

(https://nap.nationalacademies.org/catalog/25679/solid-state-roadway-lighting-design-guide-volume-2-research-overview)