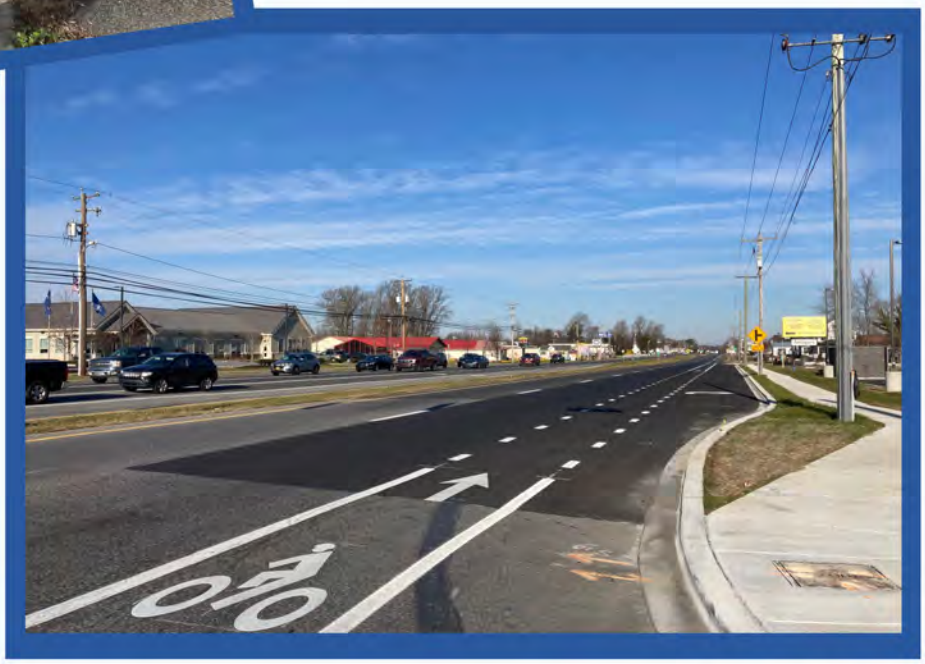
CHESWOLD US13 PEDESTRIAN SAFETY AND CONNECTIVITY STUDY



April 2024 DRAFT

DOVER/KENT COUNTY MPO
METROPOLITAN PLANNING ORGANIZATION

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TOWN OF CHESWOLD
FOUNDED 1856

The report reflects the views of the authors, who are responsible for the facts and accuracy of the research. The contents do not necessarily reflect the official view of FHWA, FTA, or DelDOT.

The preparation of this document was financed in part with funds provided by the Federal Government, including the Federal Transit Administration, through the Joint Funding Simplification Program, and the Federal Highway Administration of the United States Department of Transportation.

Dover Kent County MPO is committed to Title VI compliance. Title VI states "No person in the United States shall, on the ground of race, color, or national origin, be excluded from participation in, be denied the benefits of, or be subjected to discrimination under any program or activity receiving Federal financial assistance."

The MPO has produced a Title VI Plan to guide the assessment of projects for racial and related discrimination. The study will include a written assessment on whether the area of the project is considered an area covered by the Title VI Plan and whether the project will have a negative impact, a positive impact, or no impact.

Preface

Dover Kent MPO is pleased to provide this publication, *Cheswold US13 Pedestrian Safety and Connectivity Study*. Funded by FHWA, FTA, DelDOT, and the Town of Cheswold, this resource is intended to identify the areas along US13 in Cheswold, Delaware that lack adequate pedestrian amenities such as sidewalks, walking paths, and crosswalks. By creating this inventory and recommending changes based on the most important findings, changes to the infrastructure in the Cheswold area can then be implemented.

Dover Kent MPO is responsible to ensure existing and future transportation projects are continuing, cooperative, and comprehensive and as such, appreciates continued support from FHWA, FTA, DelDOT, and our local MPO partners in order to ensure transportation policy information is shared. We are pleased to acknowledge the following collaborators on this project:

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Introduction

The Town of Cheswold, Delaware is interested in studying the viability of new pedestrian amenities along US13 (North Dupont Highway). This would encourage and allow pedestrians and bicyclists to safely reach destinations on either the eastern side of the busy road (such as the Walmart Supercenter), or the western side, and it would facilitate movement from north to south. To address this topic, Dover Kent MPO has completed a study that explores some of the potential options for safety enhancement.

The study includes an inventory of existing conditions such as current sidewalks and crosswalks, popular destinations in the area, the flow of pedestrian traffic, and the distribution of vehicle and pedestrian crashes. Following these conditions is a list of recommendations to improve pedestrian safety in the area. The feasibility of adding ADA-compliant sidewalks and crosswalks is examined, but additional amenities such as bicycle paths are also listed in an effort to expand the overall pedestrian and bicycle network. This study is not focused on the engineering and geological specifics of new pedestrian amenities, and further analysis would be needed before extensive changes could be implemented.

The primary study area will be the stretch of US13 located within and to the south of the Town of Cheswold, no further north than Grigsby Drive and no further south than Rose Bowl Road. This corridor is about a mile in length. Adjacent streets may be referenced in terms of wider connectivity, but the most important purpose of this study is to improve US13 itself.

Existing Conditions

History

The Town of Cheswold is located in central Kent County, about five miles to the north of Dover. The major roads within and around the town are US13 (N Dupont Highway), DE42 (Main Street), and Commerce Street/Moortown Road. The Delmarva Central Railroad runs from north to south through the town, immediately to the east to Commerce Street. According to the American Community Survey from the US Census Bureau, Cheswold's total population in 2021 was 1,705. Students living in Cheswold attend Capital School District schools.

Originally known by the name Leipsic Station, the town served as a railroad stop for the Delaware Railroad and became an important hub for the shipping of grains and fruit. Over time the town has changed in character but has also kept many of its historic aspects; for example, while the Delmarva Central Railroad now passes through the town rather than stopping, the tracks still run parallel to Commerce Street, just as they did in the 19th century. In addition, the land within the town limits has primarily been changed from agricultural to residential use over the years, but much of the surrounding land is still used to produce crops. The intersection of

Main Street/Seven Hickories Road and Commerce Street/Moortown Road, known as "Old Town," is the oldest part of the community. The intersection of US13 and Main Street/Fast Landing Road is known as "Bishops Corner."

Figure 1 (l): The former railroad station in Cheswold, circa 1920. Source: Delaware Public Archives (link).

Figure 2 (r): US13 at the intersection with DE42 (Main Street), 1979. Source: Delaware Public Archives (link).

While Cheswold itself was founded in 1856, the land has been inhabited by the Lenape people for thousands of years before the arrival of Europeans. The descendants of these people are a part of the Cheswold community to this day, and the Lenape Indian Tribe of Delaware is officially recognized by the State of Delaware. The mission of the Tribe's constitutional government is "to protect the cultural identity of the Lenape people of Delaware through educational, social and cultural programs and to promote the physical and economic health of our citizens through specialized health and economic development programs tailored to our needs."[1]

Destinations

Along US13 to the south of Cheswold are various destinations, mainly consisting of vehicle repair and washing services, self-storage facilities, and several churches. The primary destination in this area is the Walmart Supercenter, which is located on the eastern side of US13 and outside of the Cheswold town limits. On Jerome Drive next to the Walmart is the McGinnis Green Shopping Mall, which includes a Domino's Pizza, an AT&T store, and other retail businesses. (This area was annexed by the town in March of 2015.) According to town officials, some people are seen walking as far south as the Redner's Warehouse Markets grocery store.

To the north of Bishops Corner, there are a few more businesses, but far fewer than to the south of the intersection. Businesses in this direction include a Royal Farms convenience store, vehicle repair services, and self-storage facilities. The majority of destinations on US13 within the study

[1] "The Lenape Indian Tribe of Delaware." Lenape Indian Tribe of Delaware. http://www.lenapeindiantribeofdelaware.com/home.html.

area are only accessible by motor vehicle, though this does not stop pedestrians and bicyclists from attempting to walk or bike along the road. This will be discussed in greater detail later in the study.

Most of the destinations in and around Cheswold are concentrated along DE42 (Main Street). These include a Valero convenience store, a Family Dollar store, restaurants such as Momma G's Soul Food & Jamaican Restaurant and Poliseno's Pizzeria, Immanuel Union United Methodist Church, the U.S. Postal Service, and municipal buildings such as Cheswold Town Hall, the Cheswold Police Department, and the Cheswold Volunteer Fire Company. Delaware Airpark is located on Seven Hickories Road about a mile to the west of Bishops Corner; it is used by civilian aviators and by Delaware State University for its Aviation Program. Many of the destinations close to US13 are currently accessible by walking as well as driving, though pedestrian improvements would still be beneficial in certain locations.

There are several residential neighborhoods that may serve as a point of origin for somebody walking to or from a nearby destination. Some of the larger residential neighborhoods in the immediate vicinity of the study area include the neighborhoods of Parkers Run, Fox Pointe, and the Pinewood Acres mobile home park. Smaller residential areas are also present within and adjacent to the Town of Cheswold, such as the homes found on Main Street, Commerce Street, Fulton Street, Katherine Drive, and Karl Drive.

Finally, there is a small public park on School Lane (to the west of Commerce Street) that is referred to as School Lane Park on maps. This area includes a basketball hoop and open space for recreational activities. The park is accessible from School Lane via Commerce Street, and also from Fox Point Drive via Seven Hickories Road.

Pedestrian and Bicycle Infrastructure

US13 (North Dupont Highway)

On the eastern side of US13, there is an existing section of sidewalk directly in front of the Walmart property. However, it only extends as far south as Carlsons Way and as far north as Jerome Drive. This network of sidewalks and crosswalks runs for about 1,000 feet. To continue north from Walmart, a pedestrian must cross US13 at Jerome Drive and use the sidewalk on the western side of the road, which runs northward from this location for about 570 feet. Other than these two sidewalk networks, which are separated by US13, there are no pedestrian amenities along the road. Therefore, the gap between the intersection with Main Street and the Clearview Car Wash property is the most critical within the study area, as the conditions for pedestrians are very hazardous.

Figure 3 (l): The existing sidewalk network in front of the Walmart property, facing southward.

Figure 4 (r): The sidewalk and DART transit shelter in front of the Walmart property, facing northward.

Within the study area, there are two crosswalks that connect the eastern and western sides of US13. These are located at the intersection with Main Street/Fast Landing Road and the intersection with Jerome Drive. Both crosswalks are at signalized intersections with pedestrian signals already present. The two crossings are about 2,400 feet apart, which means a pedestrian starting in the middle of this section must either walk north or south to one of the crosswalks (mostly without available sidewalks), or cross without the use of a crosswalk and risk being struck by a motor vehicle.

In the fall of 2023, a painted bicycle lane was added to the northbound side of US13 between Jerome Drive and Sweet Memories Antiques. However, it does not extend any further than this location, and even with this addition, US13 is still hazardous to bicyclists. Although the road's shoulders are wide, the posted vehicle speed (55 mph) and high traffic volume make the road too high stress for most bicyclists. Furthermore, the existing sidewalks are not built for multi-modal purposes and are only suitable for use by pedestrians. This means bicyclists must use either the new bicycle lane or the shoulder, both of which are in close proximity to vehicle traffic and offer no protection. The Level of Traffic Stress, or LTS, is measured between 3 and 4 in this area, which means the majority of bicyclists are not prepared to deal with the hazardous conditions.[2]

[2] "Bicycle Level of Traffic Stress (LTS)." Delaware FirstMap. https://de-firstmap-delaware.hub.arcgis.com/datasets/delaware::bicycle-level-of-traffic-stress-lts/explore.

Figure 5 (l): Vehicles blocking the pedestrian crossing at the intersection of US13 and Main Street.

Figure 6 (r): The signalized intersection of US13 and Main Street, which is frequently used by pedestrians and bicyclists.

Other Locations

Perpendicular to US13 is DE42 (Main Street), which runs east to west through the Town of Cheswold. Sidewalks are present for some portions of the road, especially on the northern side. However, there are no pedestrian crossings between the northern and southern sides of the road; this is a safety concern that is highlighted in the town's Comprehensive Plan. Bicycle lanes are present in both the eastbound and westbound lanes, though they do not extend very far and do not continue to Fast Landing Road on the other side of US13.

To the west of US13 is Commerce Street, which runs north to south. Sidewalks are present for a small section of the road but do not continue for more than 1,300 feet. The intersection of Main Street/Seven Hickories Road and Commerce Street/Moortown Road is not safe for pedestrians, as there are no crosswalks at this location, and it is close to an active railroad track.

Some of the residential neighborhoods in the area, such as Parkers Run, currently contain a strong network of sidewalks. Traffic stress in these neighborhoods is generally low, which is why these areas are less of a concern for improving conditions for pedestrians.

Driveway Hazards

The following is a tally of driveway hazards that appear in each section of the US13 corridor within the study area. These primarily include paved entrances to commercial properties, but also residential driveways (both paved and unpaved) and intersections with other roads. Note that some entrances are not marked; these can be very dangerous to pedestrians, as vehicles have no set path, and it is difficult to predict their movement to and from the property.

Table 1: The number of driveway hazards along US13 in Cheswold.

Driveway Hazards	Western Side of Road (Southbound)	Eastern Side of Road (Northbound)
Between Jerome Drive and Grigsby Drive	11	14
Between Rose Bowl Road and Jerome Drive	8	7

Traffic Volume and Crash Data

According to traffic data collected by DelDOT in 2022, the portion of US13 between Main Street in Cheswold and West Denneys Road has an average annual daily traffic (AADT) of 32,986.[3] This is a significantly higher AADT than most of the surrounding roads, aside from SR1 to the east. Although these findings refer to vehicle traffic rather than pedestrian traffic, they are still meaningful in that they highlight the regional importance of US13, both as a major thruway and a commercial hub.

Crash data used in this study was collected between January of 2017 and December of 2022. During this timeframe, the most dangerous location in terms of crashes is the intersection of US13 and Main Street/Fast Landing Road, which experienced 95 crashes. This is by far the highest number of incidents in the six-year period. By contrast, the intersection of Main Street/Seven Hickories Road and Commerce Street/Moortown Road experienced 17 crashes, and the entrance to Jerome Drive experienced 20 crashes. There were seven pedestrian-related crashes during the timeframe, and while they were mostly spread across the study area, the single pedestrian fatality took place on US13 in front of the Royal Farms property. Several pedestrian- and bicycle-related crashes happened in front of Walmart, and some of these took place at night, which suggest better illumination is needed in the area.

Figure 7: A map depicting the existing conditions within the study area, including recent crashes. The intersection of US13 and Main Street experienced the most crashes of any area. The full map is available in Appendix A.

[3] "Traffic Counts." Delaware Department of Transportation (DelDOT). https://deldot.maps.arcgis.com/apps/webappviewer/index.html?id=4f76a1fa5b5c493cb3e1fad44a50dad1/

DART Bus Stops

Several DART bus stops are present along both sides of US13. On the eastern side of the road, the bus stops are located in front of the Walmart Supercenter and in front of the Royal Farms. On the western side, the bus stops are located across from the entrance to Jerome Drive and next to Momma G's Soul Food & Jamaican Restaurant. Bus routes 120 and 302 service this area. Note that the routes are only applicable at the time of this study's completion, and they are likely to change after the recommendations proposed in the DART Reimagined study are implemented.

The average daily ridership for the four DART bus stops within the study area was provided by the Delaware Transit Corporation (DTC). On an average weekday, the bus stop in front of Momma G's Soul Food receives 16 riders (in terms of both getting on and off the vehicle at this location), and the stop in front of Royal Farms receives 13 riders. The stop in front of Walmart receives an average of 18 riders during a weekday, and the stop across from Jerome Drive receives 11 riders. Although the ridership of the Cheswold bus stops is not as high as other locations, these four stops still need adequate pedestrian amenities. This is especially the case for the stop at the southwest corner of US13 and Main Street, as it is currently difficult to access due to the lack of sidewalks.

Environmental Factors

Based on MPO analysis of the study area (primarily through fieldwork and GIS mapping), very few environmental constraints are present in the places most in need of new pedestrian amenities. The most notable body of water, Alston Branch, runs to the north of Main Street and crosses underneath US13 to the north of Grigsby Drive. Alston Branch is a tributary of the Leipsic River which drains into Delaware Bay. There are also patches of wetlands within and outside of the town limits, the largest being located behind the Walmart Supercenter. These are unlikely to significantly impact the changes proposed through this study.

Before making changes in the area, it should be confirmed that the construction will not lead to negative consequences for the surrounding environment. This includes changes in residential units, roadway infrastructure, and pedestrian and bicycle amenities, all of which could have harmful impacts if not properly addressed. Wetlands are regulated under Delaware's Wetlands Act (Delaware Code Title 7, Chapter 66), and before construction is carried out within a tidal wetland, a permit must be obtained.[4] For further information, please refer to the Delaware Code.[5]

[4] "Wetlands: What's Regulated?" Delaware Department of Natural Resources and Environmental Control (DNREC). https://dnrec.delaware.gov/water/wetlands/whats-regulated/.
[5] "Title 7, Chapter 66." The Delaware Code Online. https://delcode.delaware.gov/title7/c066/index.html.

Equity Analysis

In order to understand the locations of vulnerable populations in Kent County, the MPO used two different tools. The first was census data from the US Census Bureau, which was included in the MPO's 2023 *Title VI / Environmental Justice Report*. The data features topics such as racial demographics, aging populations, poverty status, disability status, Limited English Proficiency (LEP), and personal vehicle access. It was collected at the census block group level.[6] The second tool was DelDOT's Equity Analysis Tool, which was released in 2023. With a unique methodology, this tool determines Equity Focus Areas in Delaware based on how the demographics of a particular area compare to the state average.[7] Using these tools in tandem with one another provides the MPO with a more complete picture of vulnerable populations in Kent County.

One of the topics that stands out the most among the census data is the poverty status of the Cheswold area. According to the 2021 American Community Survey, in the census block group to the west of US13, about 37.4% of the population has income below the federal poverty level. This is similar to the status of the census block groups in Dover to the south. It is also consistent with the findings of DelDOT's Equity Analysis Tool, which lists Cheswold as an Equity Focus Area due to high poverty percentage (nearly twice as much as the state average). Low-income communities often have lower vehicle ownership rates, which means residents may be more dependent on public transportation. Therefore, the accessibility of DART bus stops should be a factor in the bicycle and pedestrian improvements of US13.

Another relevant topic is the age demographics of the community. In the census block group to the east of US13, about 35.3% of the population is over the age of 65, which is considerably higher than the surrounding areas. These results are comparable to the findings of DelDOT's Equity Analysis Tool, which lists the area on the east side of US13 as having a high percentage of residents over the age of 65. A community with an older population typically has a greater need for accessible sidewalks, crosswalks, and other pedestrian infrastructure, as well as accessible public transit. This means future changes to the US13 corridor in and around Cheswold should consider the unique needs of this population.

Finally, the racial data from the US Census Bureau reveals additional demographics from the community. The Town of Cheswold is home to people of a variety of backgrounds, and as noted in its Comprehensive Plan, it is more racially diverse than Kent County as a whole. For example, the census block group to the west US13 has a relatively high concentration of Black or African American individuals (32.9%), as well as Hispanic or Latino individuals (11.2%). Most notably, in the census block group to the west of Commerce Street/McKee Road, about 3.7% of the population identifies as American Indian and Alaska Native. This is the highest concentration of

[6] "Title VI / Environmental Justice Report." Dover/Kent County MPO. https://doverkentmpo.delaware.gov/files/2023/11/EJ-Report-2023-final-version.pdf.
[7] "Equity Focus Areas." Delaware Department of Transportation (DelDOT). https://deldot.maps.arcgis.com/apps/webappviewer/index.html?id=e051d6e4313142dfb8b03205e511f661.

American Indian and Alaska Native individuals in Kent County by a wide margin. DelDOT's Equity Analysis Tool lists Cheswold as an Equity Focus Area due to the high percentage of American Indian residents (more than three times the state average). Given the history of racial disparities that often resulted from transportation planning in the United States, it is important to be aware of racial demographics of the study area, so that historically underserved communities can benefit from the changes taking place rather than being harmed by them.

Upcoming Changes

McGinnis Green and Cheswold Village

Several commercial properties are being developed in the McGinnis Green Shopping Mall on Jerome Drive. The first of these is a Taco Bell restaurant, which is located at the corner of US13 and Jerome Drive. Construction was completed in late 2023, and the restaurant opened shortly thereafter. In addition, there are two adjacent pad sites that are not yet being built on. An auto-service shop and a bank are proposed for the properties, but this is not guaranteed to be the outcome. These new businesses are likely to increase the number of pedestrians in the area, which heightens the need for sidewalks along US13 between Main Street and Jerome Drive.

Figure 8: The proposed plan for McGinnis Green and Cheswold Village. Source: Segall Group (link).

Behind the Walmart building are parcels of land that have been annexed by the Town of Cheswold. A new residential neighborhood, referred to as Cheswold Village, is proposed for these parcels. According to the project's brochure, about 102 single-family units will be added to the neighborhood. If this project is completed, there will certainly be more pedestrian traffic in the area as residents walk between their homes and the nearby businesses, which would be another reason to create safe bicycle and pedestrian connections. However, at the time of the study's completion, no changes are taking place on the property behind Walmart.[8]

[8] "Cheswold Village." Segall Group. https://www.segallgroup.com/properties/cheswold-village/.

Other Residential Developments

A residential neighborhood on the western side of US13, known as Stonington, is currently being developed. The development will consist largely of single-family homes. It is separated from Parkers Run by Alston Branch, which means a connection directly between the two neighborhoods is unlikely. Another single-family residential project, known as Lynnbury Woods, is located to the north of Lynnbury Woods Road. It recently underwent the Preliminary Land Use Service (PLUS) process.

Although these developments lie to the north of the study area, they have the potential to significantly add to the volume of pedestrian traffic in Cheswold, especially if residents want to access the businesses along US13. This is another reason the pedestrian infrastructure of the area should be examined.

Central Delaware Business Park

The industrial park to the west of US13, known as Central Delaware Business Park, is worth mentioning in terms of considering the potential for future uses. It is currently zoned as I-1 Light Industrial, I-2 Heavy Industrial, and C-2 Highway Commercial. Current uses for the area include concrete manufacturing, building-supplies distribution, self-storage, and others. A commercial center with a liquor store, a laundromat, and other retail businesses is located on the north side of the industrial park. Entrances are located on Twin Oaks Drive via US13, and on Holly Oak Lane via Main Street.

Several parcels in the industrial park are currently vacant, which means future uses could attract an influx of traffic. Temporary truck parking has been considered for the vacant parcels to alleviate the truck parking shortage in Delaware, but this has not yet been determined. It is also worth noting that some of these parcels are adjacent to the Delmarva Central Railroad tracks. Regardless of what the land is used for in the future, it is important that the area maintains adequate pedestrian networks, so that employees in the industrial park can safely walk to nearby businesses.

School Lane Park and Town Hall

The Town of Cheswold plans to improve School Lane Park in the near future. Proposed amenities include an indoor recreation center, walking trails, a playground, a small stage for performances, and a rain garden to alleviate runoff. Surveys distributed to residents helped determine which amenities should be included in the improvements. In addition, a new Town Hall building is expected to be built near the park. These changes, once completed, are likely to draw an increased amount of pedestrian and bicycle traffic into the area.

Transportation Alternatives Program (TAP)

The Town of Cheswold is currently the site of a proposed project under the Transportation Alternatives Program (TAP). The proposal involves three ADA-compliant midblock crossings that connect the two sides of Main Street to one another. This is an important change to the pedestrian amenities in the community, as the current conditions are not safe for pedestrians looking to cross the street. The concept crossings are located in front of the Town Hall/Police Department building, in front of the Cheswold Volunteer Fire Company building, and in front of the U.S. Postal Service building. The proposal was presented to the Cheswold Town Council in September of 2022.

Main Street Railroad Crossing

The railroad crossing at Main Street, to the east of Commerce Street/Moortown Road, has been studied by DelDOT for its safety concerns and potential improvements. Two crashes involving trains have taken place at this location since 1989, and several other crashes not involving trains have also occurred. The crossing was recently given signing and marking upgrades. More changes are likely to occur in the future, as DelDOT has identified other potential improvements, and Dover Kent MPO has been asked to study the safety and accessibility of the crossing for vehicles and pedestrians during 2024-2025.

Research Process

Mapping and Fieldwork

In order to analyze the study area from a spatial standpoint, Dover Kent MPO used mapping tools and created maps that were informed by the research process. Mapping was completed using ArcGIS Pro, and maps included in the study display the existing conditions around Cheswold and the recommended changes. To view these maps, please refer to Appendix A.

Fieldwork was conducted at different times between the fall of 2023 and the winter of 2024. General activities included making observations of pedestrian activity and taking photographs of existing infrastructure. Some of these photographs are included throughout the study.

Literature Review

The MPO reviewed existing literature that relates to the study area and to pedestrian safety in Delaware. The most notable examples of existing literature are the Town of Cheswold's Comprehensive Plan and DelDOT's Pedestrian Accessibility Standards Manual, though other sources were used as well. Footnotes list these additional sources.

Outreach

Cheswold Heritage Day

The Town of Cheswold hosted its Heritage Day event on September 30, 2023. The event was held across from the Cheswold Volunteer Fire Company building. It served as an opportunity to introduce the study to the public and gather initial thoughts from interested community members. Dover Kent MPO displayed existing conditions in the town (including bicycle and pedestrian amenities) using a map on a posterboard. The MPO also gathered survey information from event attendees; these results were primarily collected via an interactive survey made from "sticky notes." Further information was collected from attendees using paper surveys.

The first question in the "sticky note" survey asked whether people currently bike or walk around Cheswold; of the 17 respondents, 7 (41%) said they do and 10 (59%) said they do not. The second question asked whether people feel safe biking or walking around town; of the 17 respondents, 15 (88%) said they do and 2 (12%) said they do not. The third question asked whether people would bike or walk more often if new bicycle and pedestrian amenities were created; of the 15 respondents, 15 (100%) said they would.

Figure 9 (l): The MPO's booth and posters at Cheswold Heritage Day.

Figure 10 (r): Event attendees filling out the interactive survey.

Redner's North Dover

Dover Kent MPO gathered feedback on recommended improvements at the North Dover Redner's location on February 5, 2024. Recommendations were displayed on posterboards, and feedback was collected as verbal comments. Based on these findings, most of the respondents were interested in a shared use path on US13, as it would help in removing bicycle and pedestrian traffic from the path of motor vehicles. Another major takeaway is that the Pinewood Acres entrance is unsafe for both motorists and pedestrians; several respondents had witnessed crashes at this location.

For the full results of the outreach efforts at Redner's, please refer to Appendix F.

Pedestrian Counts

On December 13, 2023, MPO staff, with the help of staff from Whitman, Requardt and Associates (WRA), carried out pedestrian counts in the Town of Cheswold. Staff were positioned at various locations on US13 within the study area. Counts were taken at three different times throughout the day. The observations collected by staff included the mode of transportation, the direction of travel, the use of intersections or crosswalks, and any

Figure 11: The table and posterboards at the North Dover Redner's location.

obstacles to the pedestrian's movement, as well as other factors. These observations were then used to inform the study's recommendations.

According to the quantitative results of the counts, the intersection of US13 and Main Street/Fast Landing Road saw a total of 16 pedestrians during peak hours throughout the day. Of these, 8 (50%) were headed either eastward or westward across the intersection. (Royal Farms and Valero were shown to be popular destinations for pedestrians.) The intersection of US13 and Jerome Drive saw a total of 19 pedestrians within the same timeframe. Of these, 14 (74%) were headed either northward or southward along existing pathways.

While these two intersections experienced the most traffic, other locations were used sporadically throughout the day. These include the sidewalks in front of Royal Farms, Sharp Energy, and Walmart. Pedestrians also walked in places where there were no sidewalks. Note that because pedestrian counts were conducted in December, the volume of pedestrians is likely not as high as it would be in warmer months.

Qualitative observations were also an important part of this process. At the intersection of US13 and Main Street, pedestrians were seen carrying out a variety of daily tasks. Both DART buses and Capital School District buses picked up passengers throughout the day. Many pedestrians walked to Royal Farms for coffee, or to Family Dollar for groceries. Bicyclists occasionally used the intersection, either turning southward towards Walmart or northward towards Smyrna. As there are no sidewalks except at the intersection's northwest corner, pedestrians and bicyclists frequently used the parking lots to avoid vehicle traffic.

Jaywalking was a common sight, particularly in between the US13-Main Street intersection and the entrance to Twin Oaks Drive. It is likely that pedestrians take this hazardous route across US13 because it is more convenient than walking up to the crosswalk at the intersection. This is a very dangerous thing to do, as the posted speed limit is 55 mph, and as there are no designated crossings, motorists will not be looking for pedestrians. Additional crosswalk locations should be considered for the corridor so that pedestrians have a safe place to cross US13.

It was observed that vehicles turning right into the southbound lane of US13 tend to stop in the pedestrian crossing, which gives drivers better visibility and allows them to turn safely into the acceleration lane. This, however, can entirely block the crosswalk, which presents a hazard to pedestrians. The acceleration lane is also short in length, which means it can be unsafe for motorists trying to merge into southbound traffic. Crosswalks on Main Street to the west of the intersection could help alleviate the hazard for pedestrians, as it would give them a place to cross away from the merging vehicles.

For the complete findings from the pedestrian counts, please refer to Appendix C of the study.

Recommendations

The following is a list of recommendations for improving pedestrian and bicycle safety along US13 in Cheswold. Note that many of the recommendations in this study refer to locations outside of the Town of Cheswold, and some are located within the right-of-way of various businesses. This means collaboration between the Town of Cheswold, Kent County, DelDOT, businesses, and other relevant stakeholders will be necessary when addressing pedestrian safety in the area.

US13 Between Rose Bowl Road and Jerome Drive

The southern extent of the study area is an important corridor leading to the Redner's grocery store. However, only small segments of this part of US13 contain existing sidewalks. Heading southward from Walmart, the sidewalk on the eastern side of the road only extends as far as Carlsons Way. There is also a segment of sidewalk on the western side of US13, in front of New Garden Early Care & Education Center. This part of US13 is largely lacking in pedestrian infrastructure, which is why the major gaps should be filled.

On the western side of the road, the five-foot sidewalk in front of New Garden Early Care & Education Center should be extended northward as far as Jerome Drive, so that it may be connected to the alternatives discussed later in the study. This sidewalk should also be extended southward as far as Redner's. There are multiple businesses with driveway entrances on both the eastern and western sides of the road, which could be a safety concern for pedestrians. Crossings at each of the driveways should be properly marked with paint and other indicators, and refuge islands may offer a buffer to pedestrians. Driveways should also be improved so that vehicles have a clearer path.

Figure 12 (l): The end of the sidewalk heading southward from Walmart.

Figure 13 (r): The end of the sidewalk heading southward from Sharp Energy.

Note that a ten-foot shared use path would be the ideal improvement, as this is the standard used by DelDOT in various parts of US13 in Dover. Doing so would also offer bicyclists a safe north-south route rather than putting them onto US13, which, despite the new bicycle lane, still has a high LTS and a high speed limit. However, if this cannot be achieved, then at a minimum the existing five-foot sidewalks should be extended. The examples below show both options. Please refer to the DelDOT Pedestrian Accessibility Standards Manual for more information.[9]

There are no existing crosswalks on this part of US13 until the intersection with Jerome Drive. The most logical places for a new crosswalk would be in front of the southern entrance to Walmart, or at the entrance to Pinewood Acres. In order to do this, though, the intersections would need to be signalized so that vehicle traffic would come to a stop.

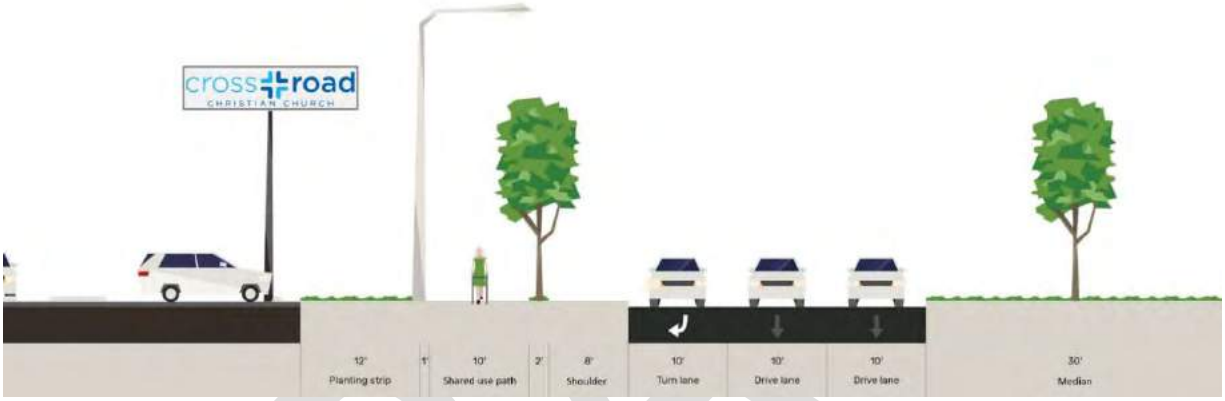

Figure 14: The southbound lane of US13 in front of Walmart, facing northward. This design includes a ten-foot shared use path and planted trees (used to represent various plantings). Created using Streetmix.

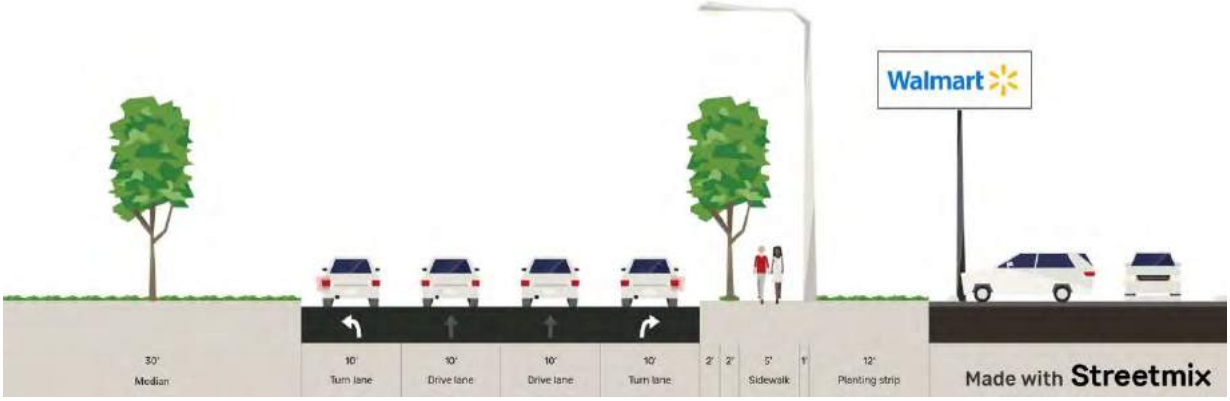

Figure 15: The northbound lane of US13 in front of Walmart, facing northward. This design includes a five-foot sidewalk (a continuation of the existing sidewalk) and planted trees (used to represent various plantings). Created using Streetmix.

[9] Pedestrian Accessibility Standards Manual. DelDOT, 2021. https://deldot.gov/Publications/manuals/pedestrianAccessibility/pdfs/2021/Pedestrian-Accessibility-Standards-for-Facilities-in-the-Public-Right-of-Way-2021-Edition.pdf.

US13 Between Jerome Drive and Grigsby Drive

The only existing sidewalk north of Jerome Drive is located on the western side of the road, in front of Sharp Energy. This five-foot sidewalk could be continued northward as far as Main Street; this, combined with additional sidewalks to the south, would provide a nearly complete north-south connection through the study area. The eastern side of the road could also be feasible for the placement of sidewalks, especially now that there is a new sidewalk in front of Taco Bell. With these segments completed, a pedestrian could move safely from Main Street to Redner's, stopping at Walmart and other businesses along the way. It would also be easier to reach the DART bus stops on US13.

The northern extent of the study area has a similar challenge as the southern extent. Given the high concentration of businesses located along US13, the existing driveways will likely be safety concerns for pedestrians if new sidewalks are added. However, this can be addressed by using painted crossings and other indicators to warn motorists of the presence of pedestrians. These changes are especially needed at adjacent roadways and driveway entrances, such as at the intersection with Simms Woods Road. Additional engineering such as pedestrian refuge islands may be necessary in some of the larger driveways; the southern entrance to Walmart is an example of this type of pedestrian amenity.

Figure 16 (l): A driveway crossing on the southbound side of US13. The existing sidewalk ends shortly to the north of this location.

Figure 17 (r): The newly installed bicycle lane on the northbound side of US13.

Three crosswalks are currently located at the intersection with Main Street/Fast Landing Road and the intersection with Jerome Drive. Observations during fieldwork indicate that pedestrians frequently use the existing crosswalks and pedestrian signals. A fourth crosswalk at this location would allow pedestrians to cross from the southern side of the intersection. Other crossings would not make sense on US13 in between Main Street and Jerome Drive, as there are no other

signalized intersections available. A fourth crosswalk would be a long-term solution that could happen along with other changes to the intersection. Further study and additional pedestrian counts by DelDOT would be needed before proceeding.

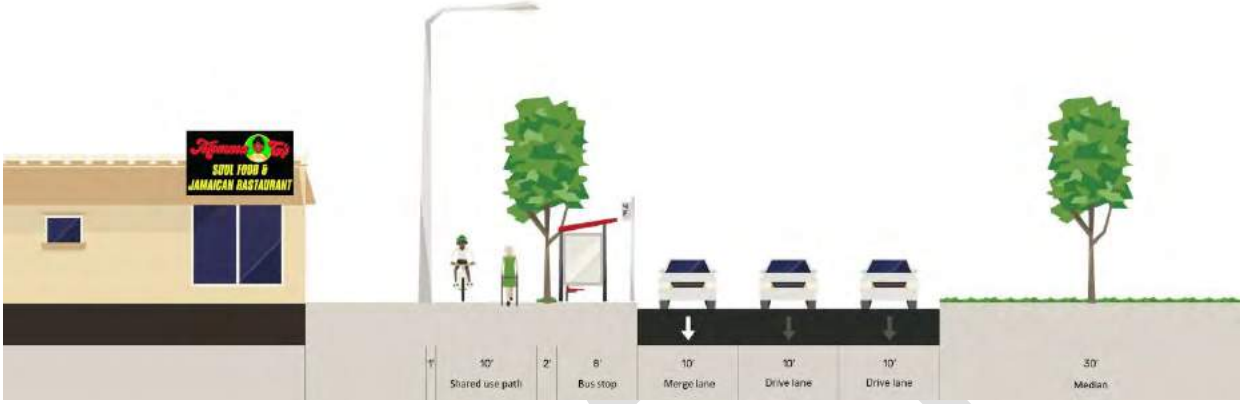

Figure 18: The southbound lane of US13 in Cheswold, facing northward. This design includes a ten-foot shared use path, planted trees (used to represent various plantings), and a covered bus stop. Created using Streetmix.

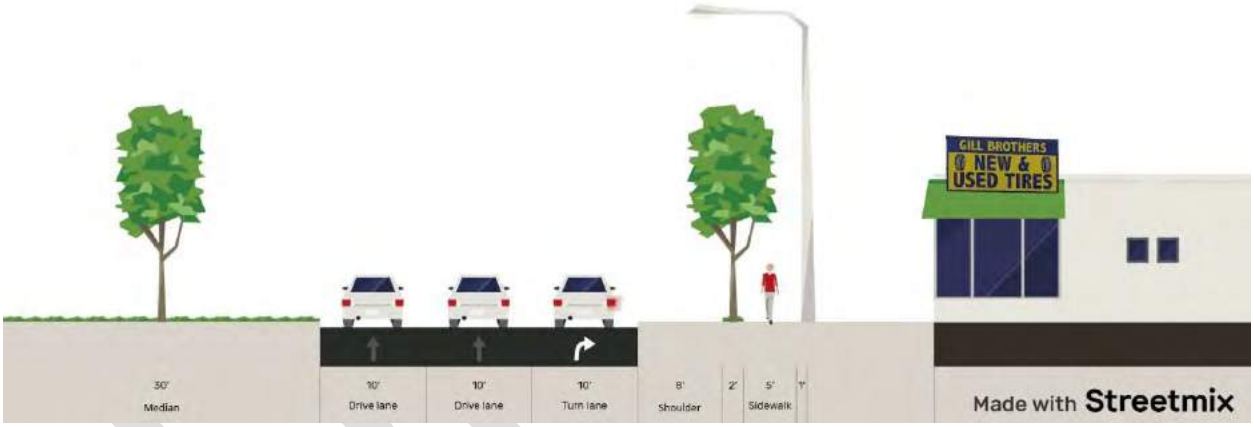

Figure 19: The northbound lane of US13 in Cheswold, facing northward. This design includes a five-foot sidewalk and planted trees (used to represent various plantings). Created using Streetmix.

To address some of the other concerns at this intersection, the acceleration lane used to turn right onto US13 could be removed and replaced with a shared use path. Righthand turns could then be signalized in a way that does not impede traffic flow. This would not only give pedestrians and bicyclists a safe route, but it would also protect pedestrians using the nearby crosswalk, as vehicles would no longer be waiting in the crosswalk area in order to make a righthand turn. Another positive change would be a potential reduction in vehicle crashes. These would be long-term changes, and signage and other small changes may be needed in the interim. A concept for these improvements, provided by Whitman, Requardt and Associates, can be found in Appendix D of the study.

Pinewood Acres

During the outreach process, it was brought to the MPO's attention that the entrance to Pinewood Acres is a particularly dangerous location for motorists, pedestrians, and bicyclists. This is for several reasons. First, there is considerable pedestrian traffic between Pinewood Acres and Walmart, though there are no sidewalks or safe crossings in this area. Second, vehicles turning left out of the neighborhood are forced to accelerate across southbound traffic, making this maneuver difficult when traffic is heavy.

Figure 20: The existing Pinewood Acres intersection, which does not have a traffic signal.

Crash data reinforces the need for safety improvements at this location. Between January of 2018 and March of 2024, there were 28 crashes at the intersection. Of these, 15 crashes were found to be preventable if a traffic signal were present. Of the total, 15 (54%) involved personal injury. The time of day with the most crashes was between 6 PM and 9 PM, which suggests lighting is another factor that needs addressing. The full data is available in Appendix D of the study.

To alleviate safety concerns, the entrance to Pinewood Acres could become a fully signalized intersection with traffic lights and crosswalks. By doing so, traffic would be slowed as it approaches the entrance, and pedestrians would have a safe crossing available. This would also benefit Redner's and the other businesses to the south, as it was indicated that the entrance to these businesses is another unsafe location, and slowed traffic would reduce the likelihood of a crash.

A fully signalized intersection would be more practical than a Rectangular Rapid Flashing Beacon (RRFB) or a High-Intensity Activated Crosswalk (HAWK), both of which do not require motorists to slow their vehicle and depend heavily on motorist attentiveness. By adding stoplights to this location, motorists will be forced to stop their vehicle, allowing pedestrians a safe path across US13. It is important that new signals at Pinewood Acres coordinate with existing signals so that northbound and southbound traffic on US13 is not given excessive delays, while still maintaining safe conditions for pedestrians.

Additional Recommendations

Along much of US13, including in Cheswold, DART bus stops are little more than a paved space marked with a sign. Improving these spaces would benefit passengers in a number of ways. For one, covering bus stops with a roof and walls creates a shelter against adverse weather, and it makes the wait for an approaching bus more bearable to passengers. Providing a place to sit is

also important. These steps, when combined with proper pedestrian infrastructure leading to the bus stop, could incentivize more people to ride the bus rather than relying on a personal vehicle. Other amenities such as bicycle racks may be included at the upgraded bus stops, and lighting should be used so that conditions are safe in the surrounding area even during the night. The existing bus stops close to Main Street lack these amenities, but the stops in front of Walmart are good examples of a covered waiting area.

Figure 21: The median at the intersection of US13 and Canwit Drive in Smyrna.

Calming traffic at the intersection of US13 and Main Street/Fast Landing Road would lead to safer conditions for pedestrians. This could be achieved by changing the speed limit from 55 mph (the current limit on this stretch of US13) to a lower value. For comparison, the speed limit of US13 is slowed to 35 mph on the approach towards Smyrna's downtown area. According to Delaware's Manual on Uniform Traffic Control Devices (MUTCD), speed limits are established through an engineering study that analyzes the current speed of vehicles, the rate of pedestrian and vehicle traffic, and the precise needs of the location. This means a proper study would need to be carried out, and frequent use by pedestrians and bicyclists would need to be confirmed (in addition to this study's findings), before changes of this sort could be implemented.

As another strategy to calming traffic as it approaches the intersection with Main Street, shrubs or other low-maintenance plants could be planted in the existing median of US13. An example of this improvement can be found in Smyrna at the intersection of US13 and Canwit Drive (the entrance to the Simon's Corner shopping plaza). Some studies have found that the presence of trees on roadways can reduce the speed of motorists, which can make the conditions safer for both motorists and pedestrians.[10] Note that large trees or other high-maintenance plantings would not be ideal for the median of US13, as the people maintaining them would be at risk from vehicle traffic. It is also important that plantings do not reduce the visibility of vehicles in the roadway. Finally, any plantings, no matter how small, would

Figure 22: An example of a sign used to indicate to a motorist that they are entering the Town of Cheswold.

[10] The Street Tree Effect and Driver Safety. Rosenblatt Naderi, Jody, et al. Institute of Transportation Engineers, 2008. https://www.researchgate.net/publication/292767085_The_street_tree_effect_and_driver_safety.

likely require a maintenance agreement with DelDOT. This would be important for preventing the shrubs from becoming overgrown. Although planted features would not be appropriate across the entirety of the corridor, it would make sense to naturally calm traffic close to busy intersections where crashes regularly take place.

The Town of Cheswold could also utilize signs that indicate motorists are entering the town's municipal boundaries. This would remind motorists to reduce their speed as they approach the intersection with Main Street, where pedestrian traffic is likely. A simple "Welcome to Cheswold" sign on both the northbound and southbound sides of US13 would achieve this. Like with plantings in the median, a maintenance agreement with DelDOT would likely be needed for signage constructed in the right-of-way.

Lighting is a concern along this corridor during the evening hours. This is especially the case for pedestrians, who may not be seen by motorists due to the limited visibility. Pedestrians may also feel unsafe walking from residential areas such as Pinewood Acres if adequate lighting is not present. If north-south pathways are constructed, new streetlights should be added to the right-of-way to make the walking route safer.

Finally, as previously discussed, vehicles turning from Main Street onto US13 often block the pedestrian crossing at the intersection of the two roads. To improve the safety of crossing Main Street, additional crosswalks should be added to the west of the intersection. This would reduce the frequency of jaywalking and also give pedestrians another option for crossing the street. Although this improvement would take place on Main Street, it would be beneficial to safety throughout the corridor. It is also consistent with the goals listed in the Town of Cheswold's Comprehensive Plan. The midblock crossings being constructed on Main Street through the Transportation Alternatives Program (TAP) should help alleviate this safety concern.

Solutions Excluded from Analysis

Pedestrian Bridge

The Town of Cheswold's Comprehensive Plan lists the addition of an "overhead walkway" (another name for a pedestrian bridge) over US13 as one of its transportation goals. This study initially took the goal into account when examining potential solutions to pedestrian safety in Cheswold. However, it was quickly determined that this solution is not as practical as it may sound, due to several key factors.

One of the most concerning drawbacks is the fact that pedestrian bridges do not serve all types of users as well as other street crossings. In order to meet ADA requirements, a ramp must not exceed a slope of 1:12, or 12 inches of run for every inch in rise.[11] In addition, according to FHWA design standards, arterials such as US13 must have a vertical clearance of 14 to 16 feet.[12] These two requirements mean a ramp must be at least 168 feet long to reach the necessary height of the bridge crossing an arterial. Ramps would need to be present on both sides of the roads, which creates a much further travel distance than necessary and can seriously hinder the progress of some pedestrians (such as those who use wheelchairs).

Another drawback to a pedestrian bridge is the cost: bridges are found to be among the most expensive solutions to the issue of pedestrian safety, due to both the construction costs and ongoing maintenance. The structure would need to be elevated to a minimum height and set back considerably on either side, so that it could accommodate the height of large vehicles such as freight trucks. This increases the land footprint required for the project and increases the amount of materials needed.[13]

Figure 23: A pedestrian bridge over a busy road. Source: Dan Burden, Pedestrian and Bicycle Information Center (link).

Finally, pedestrian bridges do not truly calm traffic, but rather, they encourage motorists to speed through the area without considering the presence of pedestrians. The effectiveness of such an improvement is also questionable, as pedestrians will often use the fastest crossing available (e.g., the street-level crossing), even if there is a grade-separated crossing nearby. If the structure is not being used, the conditions become less safe than they would be without a bridge in place.

There are situations that call for the use of a pedestrian bridge, such as when moving pedestrians over a major

[11] "ADA Ramp." ADA Compliance." https://www.ada-compliance.com/ada-compliance/ada-ramp.
[12] "Vertical Clearance." Federal Highway Administration (FHWA). https://safety.fhwa.dot.gov/geometric/pubs/mitigationstrategies/chapter3/3_verticalclearance.cfm.
[13] "Pedestrian Bridges: Connecting People with Communities." UNC School of Government, 2016. https://ced.sog.unc.edu/2016/01/pedestrian-bridges-connecting-people-with-communities/.

highway with high vehicle speed. In the case of US13 in Cheswold, given that vehicles stop intermittently at traffic lights, and that there are safer and less costly traffic-calming solutions available, a pedestrian bridge is not a practical solution to the problem.

Rectangular Rapid Flashing Beacon (RRFB)

One option initially discussed for the Cheswold area is a Rectangular Rapid Flashing Beacon (RRFB), which is a type of pedestrian-activated signal.[14] This feature allows pedestrians to cross a road without the use of a fully signalized intersection. Examples of an RRFB crossing can be found in Rehoboth Beach and Dewey Beach, both of which experience high numbers of pedestrians during the warmer months.

Figure 24: A Rapid Flashing Beacon (RRFB) and pedestrian refuge island in Dewey Beach.

Given the average vehicle speed on US13, an RRFB crossing would not be practical for getting from one side of US13 to the other, as it would be dangerous for pedestrians. However, an RRFB would be an ideal type of crossing on Main Street, where vehicle speeds and traffic volume are significantly lower. This solution is being pursued through the Transportation Alternatives Program (TAP).

In place of an RRFB, a fully signalized intersection would likely be the most effective solution on US13 in the Cheswold area. The entrance to Pinewood Acres is a possible location for this improvement. Note that signalization is more expensive to implement than an RRFB, though it will have a more positive outcome on pedestrian safety.

[14] "Rectangular Rapid Flashing Beacons." Delaware Strategic Highway Safety Plan. https://deldot.gov/Programs/DSHSP/index.shtml?dc=project-rapid-flashing-beacons.

Next Steps

To complete a north-south connection of pedestrian paths on US13, the Town of Cheswold should work with DelDOT on filling in the missing gaps. The recommendations included in this study will be submitted to DelDOT for inclusion in the Capital Transportation Program (CTP), as well as Dover Kent MPO's Metropolitan Transportation Plan (MTP) and Transportation Improvement Program (TIP). Specific segments of the corridor may be eligible for funding under DelDOT's Bike/Ped Pool Statewide Project Prioritization or other programs.

Further counts of vehicle and pedestrian traffic will be needed before certain long-term solutions can be pursued, such as adding a signal to an intersection or reducing speed limits through the town. This is an opportunity for continued collaboration between the Town of Cheswold, DelDOT, and Dover Kent MPO. Doing so will allow the relevant stakeholders to obtain a greater understanding of the corridor's needs, and it will determine whether the changes are warranted. Pedestrian counts in particular should take place in the warmer months, as this is when the highest volume of people will be present.

A maintenance agreement with DelDOT will be necessary for changes to the right-of-way such as plantings and signage. The Town of Smyrna is an example of a municipality that has low-maintenance shrubs in the median of US13. It may be useful for Cheswold to follow a similar direction to Smyrna or other municipalities who have pursued these solutions.

In 2024-2025, Dover Kent MPO will be studying the railroad crossing at Main Street. At the same time, the Town of Cheswold will be seeing the completion of new midblock crossings through DelDOT's Transportation Alternatives Program (TAP). Continued coordination between these stakeholders will be necessary to avoid conflicting outcomes in the projects.

Conclusion

Although US13 provides a direct north-south connection for motorists, the high volume of traffic it experiences can also lead to hazardous conditions for pedestrians and bicyclists. The Town of Cheswold is an example of this. At this time the pedestrian pathways are heavily fragmented, which requires walking through parking lots or in the road's shoulder. In addition, ADA-compliant pathways are not present in most of the right-of-way, which severely limits the route's overall accessibility. There are many businesses along US13 that provide necessary services, and new residential developments are being built in the area, which heightens the importance of proper infrastructure.

By making changes to the corridor in strategic locations, pedestrians and bicyclists will have a much easier time reaching their destinations. The most important change is a shared use path or sidewalk that runs from north to south, which would remove pedestrians from the path of vehicle traffic. Other changes to improve safety could include a signalized intersection, a new crosswalk, and streetscape features such as plantings and signage. The resources provided in this study should help in pursuing individual improvements and in researching particular topics.

The ultimate goal of the study's recommendations is to improve safety for all roadway users in Cheswold. This includes pedestrians, bicyclists, and motorists, and it relates to both residents and employees of the US13 corridor. There may also be additional benefits such as a greater sense of community and more opportunities for recreation. By taking the necessary steps to prevent crashes and enhance connectivity, the Town of Cheswold will move closer towards its goal of creating safer conditions on US13.

Appendix A - Study Area Maps

The following maps provide different details of the Town of Cheswold's pedestrian network. The first map highlights the existing conditions within the area; it also uses clusters (symbolized using circular icons) to depict the concentrations of crashes on roadways between 2017 and 2022. The second map shows the locations that are most in need of improvement based on analysis of the area. These recommendations are also listed in Appendix B.

Town of Cheswold Pedestrian Crossing Study

Royal Farms

Town Hall

Cheswold Fire Station - Company 43

Walmart

Average Annual Daily Traffic (AADT) Count: 32,986 Updated: 4/10/2023 - U.S. Rt. 13

TOWN OF CHESWOLD FOUNDED 1856

Project Sponsor

Crash Data (January 1, 2017 - December 31, 2022)

Point Count
- Low
- High

Pedestrian and/or Bike Crashes (10)
- Bike - Personal Injury (2)
- Pedestrian - Personal Injury (7)
- Pedestrian - Fatality (1)

- Crosswalk
- Curb / Island
- Sidewalk

Cheswold Zoning
- A-1 - Agricultural
- C-1 - Neighborhood Business
- C-2 - Highway Commercial
- I-1 - Light Industrial
- I-2 - Heavy Industrial
- M-1 - Industrial District (Defunct)
- R-1 - Old Town Residential
- R-2 - One & Two Family Residential
- R-3 - Family Residential & Townhome
- R-4 - Manufactured Homes
- R-5 - Age Defined Community

N

CREDITS:
Delaware Department of Transportation - Crash Data, AADT
Cheswold: Zoning (Comprehensive Plan)

DOVER/KENT COUNTY MPO
METROPOLITAN PLANNING ORGANIZATION

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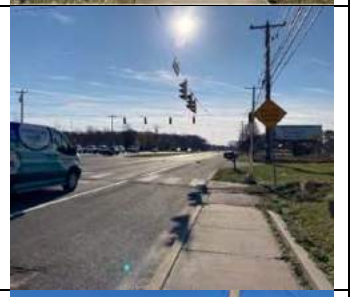
Appendix B - List of Recommendations

The following table corresponds with the recommended pedestrian amenities listed in the study. Information provided includes the type of improvement, the status of construction, the benefits to the community, the roadway jurisdiction, the approximate length of path needed, and the estimated cost. Further information on each item may be found in the study's body. Note that the facts provided are accurate at the time of the study's completion, though at a later date the conditions at each of these locations may have been changed.

Roadway jurisdiction (in other words, responsibility for adding pedestrian amenities) was determined using the Road Maintenance Responsibility map from DelDOT, which shows the roads that are state- and town-maintained. All of US13 around Cheswold is under state maintenance. However, given the current municipal boundaries and the ownership of parcels along the corridor, it is necessary to facilitate collaboration between officials from the state, county, and town, as well as private landowners, when making improvements.

Location	Type of Improvement	Status	Benefit	Jurisdiction	Approximate Path Length	Cost Estimate	Image
A. US13 between Main Street and Jerome Drive (western side of US13)	Shared use path (10 ft), driveway crossings	Partially complete	Safer conditions for bicyclists and pedestrians, north-south connectivity	DelDOT (roads), Town of Cheswold and Kent County (boundaries)	2,400 ft total (1,800 ft incomplete)		
B. US13 between Jerome Drive and Rose Bowl Road (western side of US13)	Shared use path (10 ft), driveway crossings	Partially complete	Safer conditions for bicyclists and pedestrians, north-south connectivity	DelDOT (roads), Kent County (boundaries)	2,250 ft total (1,950 ft incomplete)		
C. US13 between Main Street and Jerome Drive (eastern side of US13)	Shared use path (10 ft), driveway crossings	Partially complete	Safer conditions for bicyclists and pedestrians, north-south connectivity	DelDOT (roads), Town of Cheswold and Kent County (boundaries)	2,400 ft total (1,900 ft incomplete)		
D. US13 between Jerome Drive and Rose Bowl Road (eastern side of US13)	Shared use path (10 ft), driveway crossings	Partially complete	Safer conditions for bicyclists and pedestrians, north-south connectivity	DelDOT (roads), Kent County (boundaries)	2,250 ft total (1,350 ft incomplete)		

Location	Type of Improvement	Status	Benefit	Jurisdiction	Approximate Path Length	Cost Estimate	Image
E. Intersection of US13, Main Street, and Fast Landing Road (DE42)	Additional crosswalk with pedes-trian signal	Not complete	Safer conditions for all users, connectivity across US13	DelDOT (roads), Kent County (boundaries)	130 ft (crosswalk)		
F. Intersection of US13, Main Street, and Fast Landing Road (DE42)	Improved righthand turn (eastbound on Main Street)	Not complete	Safer conditions for all users	DelDOT (roads), Kent County (boundaries)	N/A		
G. Intersection of US13 and Pinewood Acres Ave	Signalized intersection, crosswalk with pedes-trian signal	Not complete	Safer conditions for all users, connectivity across US13	DelDOT (roads), Kent County (boundaries)	120 ft (crosswalk)		
H. Main Street between US13 and Commerce Street	Midblock crossings (x3), ADA curb ramps	Scheduled under TAP	Safer conditions for bicyclists and pedestrians, connectivity across Main Street	DelDOT (roads), Town of Cheswold (boundaries)	60 ft (crosswalk)		

Location	Type of Improvement	Status	Benefit	Jurisdiction	Approximate Path Length	Cost Estimate	Image
I. Intersection of US13, Main Street, and Fast Landing Road (DE42)	Bus stop improvements (x2), including shelter and pad	Not complete	Improved experience for DART riders	DelDOT (roads), Kent County (boundaries)	N/A		
J. Intersection of US13, Main Street, and Fast Landing Road (DE42)	Small, low-maintenance shrubs in US13 median	Not complete	Traffic calming	DelDOT (roads), Kent County (boundaries); requires DelDOT maintenance agreement	N/A		
K. Intersection of US13, Main Street, and Fast Landing Road (DE42)	"Welcome to Cheswold" signage	Not complete	Traffic calming	DelDOT (roads), Kent County (boundaries); requires DelDOT maintenance agreement	N/A		
L. US13 between Main Street and Rose Bowl Road	Improved lighting on side of road	Partially complete (very few existing lights)	Improved visibility and overall safety	DelDOT (roads), Town of Cheswold and Kent County (boundaries), property owners (land)	N/A		

Appendix C - Results of Pedestrian Counts

The following maps show the results of pedestrian counts carried out by Dover Kent MPO and Whitman, Requardt and Associates on December 13, 2023. Green symbols depict the total volume of pedestrians during peak hours throughout the day, and blue symbols depict the total volume of bicycles within the same timeframe. Arrows are used to indicate the direction pedestrians and bicyclists were headed. The maps also show observed DART ridership, the concentration of prior pedestrian- and bicycle-related crashes, and the locations of existing lighting. Findings from the pedestrian counts were used to inform the study's recommendations.

December 2023

Existing Conditions

US 13

Cheswold DE:
North of Main St
to Rose Bowl Rd

- Traffic Signal
- Existing Luminaire
- Bus Stop
- Daily Bus Board/Alight
- Total Ped Volume (6 hours, AM/MID/PM Peaks)
- Total Bicycle Volume (6 hours, AM/MID/PM Peaks)
- Bicycle Non-Injury Crash
- Pedestrian Injury Crash
- Pedestrian Fatal Crash
- Pedestrian Non-Injury Crash
- Bicycle Fatal Crash
- Bicycle Injury Crash
- Dark — Nighttime Crash

Crash study period - January 2014 through December 2023

Feet
0 50 100 200

Figure 1

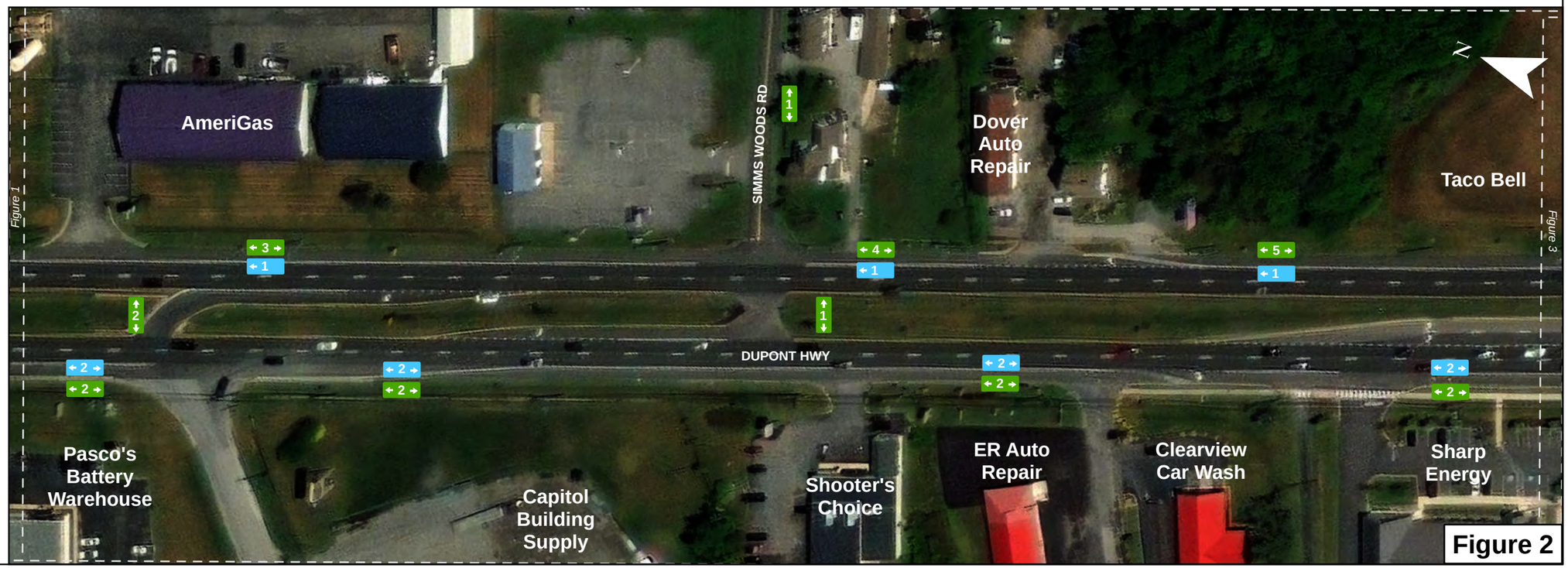


Figure 2

December 2023

Existing Conditions

US 13

Cheswold DE:
North of Main St
to Rose Bowl Rd

- Traffic Signal
- Existing Luminaire
- Bus Stop
- Daily Bus Board/Alight
- Total Ped Volume Peak Hours
- Total Bicycle Volume Peak Hours
- Bicycle Non-Injury Crash
- Pedestrian Injury Crash
- Pedestrian Fatal Crash
- Pedestrian Non-Injury Crash
- Bicycle Fatal Crash
- Bicycle Injury Crash
- Dark — Nighttime Crash

Crash study period - January 2014 through December 2023

Feet
0 50 100 200

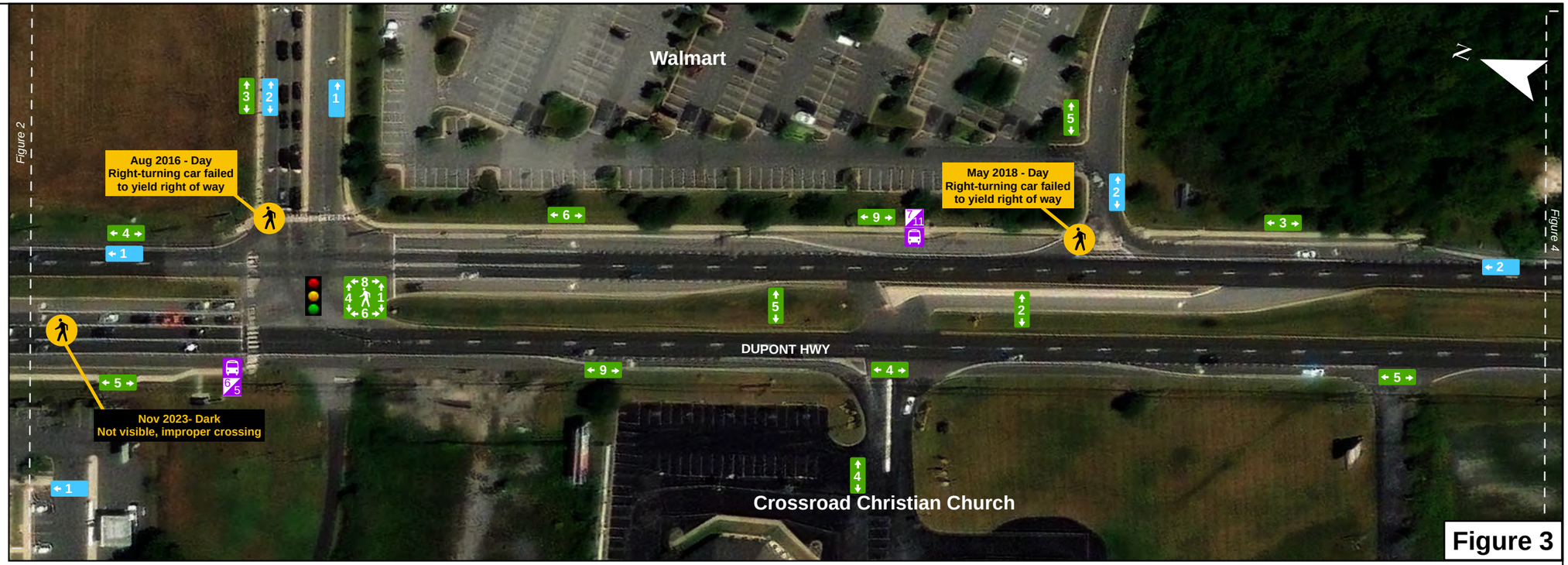


Figure 3

Figure 4

Appendix D - Detailed Analysis

The following analysis was produced for this study by Whitman, Requardt and Associates. The analysis was ultimately used to inform the study's recommendations and provide evidence for why safety improvements are necessary along the US13 corridor in and around Cheswold. A key part of the analysis is crash data collected between January of 2018 and March of 2024, which includes the type of crash and additional conditions such as time of day. Also included are quantitative and qualitative observations that came from the pedestrian counts taken in December of 2023.

Most of the treatments in the analysis focus on the entrance to Pinewood Acres and the intersection of US13 and Main Street, two of the most concerning locations in the study area. These correspond with the recommendations included in this study. Potential treatments include a signalized intersection at Pinewood Acres and a reconfiguration of the righthand turn lane on Main Street. Signage may be a viable short-term solution.

US 13 (N Dupont Highway) at Pinewood Acres Avenue Intersection Safety Evaluation

March 2024

US 13 at Pinewood Acres Avenue Intersection Safety Evaluation

Overview

- Cheswold Pedestrian Study summary provided to Dover/Kent MPO in Feb 2024
- South of Jerome Drive, there is a lack of pedestrian connections and crossings along US 13; pedestrians were observed crossing midblock
  - Recommendation to consider crossing alternatives near the Church/Walmart/bus stop
- During public outreach, citizens noted that the intersection of Pinewood Acres Avenue is dangerous for vehicles, and pedestrians regularly walk to/from the neighborhood

US 13 at Pinewood Acres Avenue
Intersection Safety Evaluation
Existing Conditions

- US 13 (N Dupont Highway) is a four-lane divided highway with no signalized intersections or marked pedestrian crossings between Jerome Drive (1,700 ft north) and Dyke Branch Road (3,000 ft south)
- Stop-controlled on EB Pinewood Acres Avenue approach
  - Stop line not present
  - Pinewood Acres Avenue is a private roadway
- No pedestrian connections present
  - East side sidewalk ends 750 ft north of Pinewood Acres Avenue
- Single luminaire present on southwest corner of intersection
- Pinewood Acres Avenue provides access to Pinewood Acres Mobile Home Park
  - No other network connections through neighborhood (no outlet)
- Intersection and neighborhood are outside the Town of Cheswold municipal boundary
- No turning movement count available

DelDOT WRA

US 13 at Pinewood Acres Avenue
Intersection Safety Evaluation
Existing Conditions

- US 13 has a 42-foot median
- The median opening at Pinewood Acres Avenue provides yield-control for NB lefts, SB u-turns, and EB lefts completing the secondary part of the turn after crossing SB US 13
- No markings are present in the median and the correct point to yield, proper turning path to take, and right-of-way between multiple turning movements are not clear

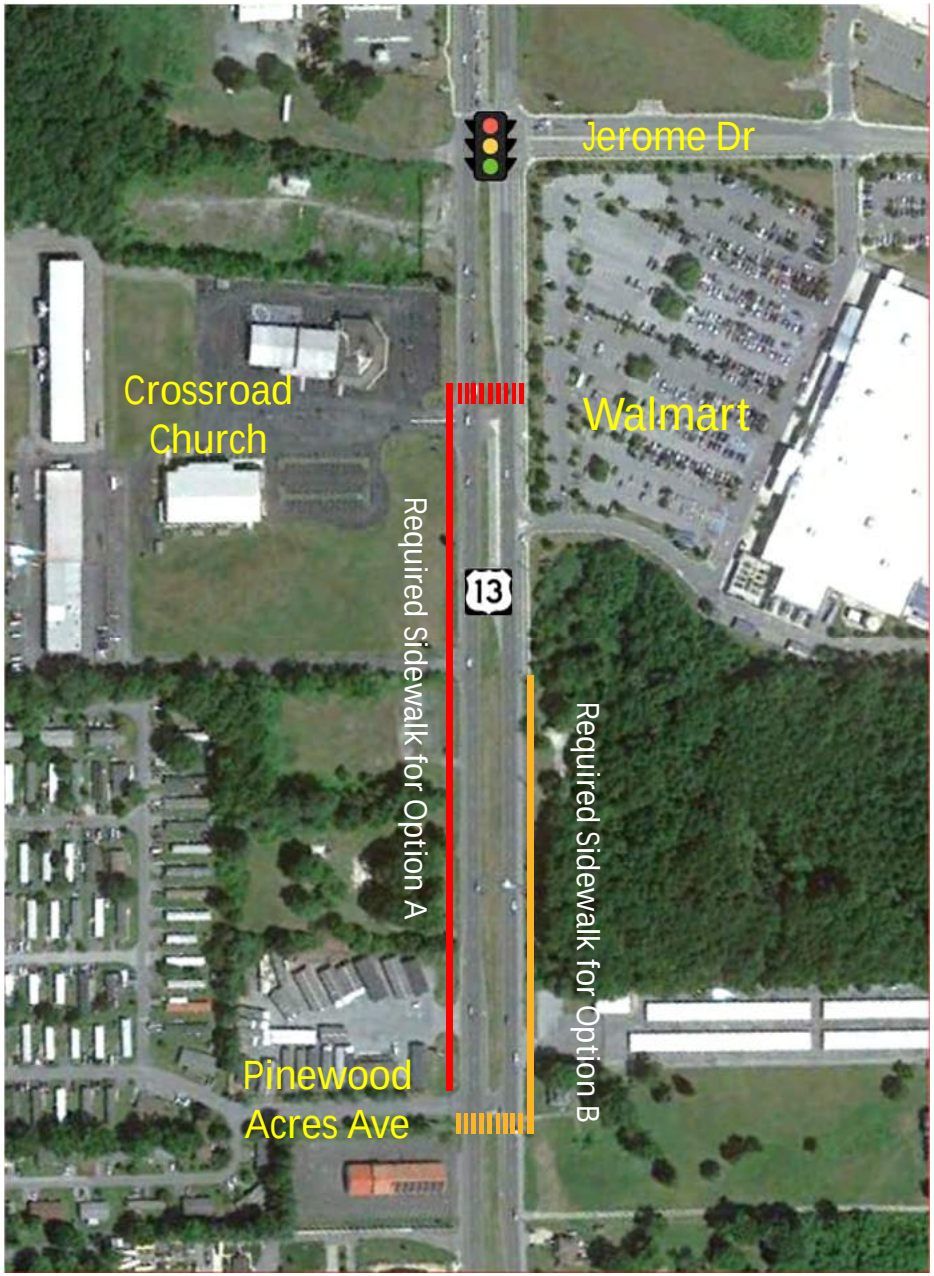
DelDOT WRA

US 13 at Walmart/Pinewood Acres Avenue

Pedestrian Crossing Analysis

Potential Crossing Locations

- A: Crossroad Church
  - Close to bus stop
  - Improved access for church
  - Pedestrians observed crossing here during study
- B: Pinewood Acres Ave
  - Direct access from neighborhood
  - Improvements have potential to provide more vehicular benefits
  - Can connect to existing sidewalk on east side of US 13 at Walmart property (less additional sidewalk required)
  - Intersection is less geometrically "complicated" (e.g., channelized left turn at Crossroad Church)
  - Farther from Jerome Drive signal



US 13 at Walmart/Pinewood Acres Avenue

Pedestrian Crossing Analysis

Treatment Options

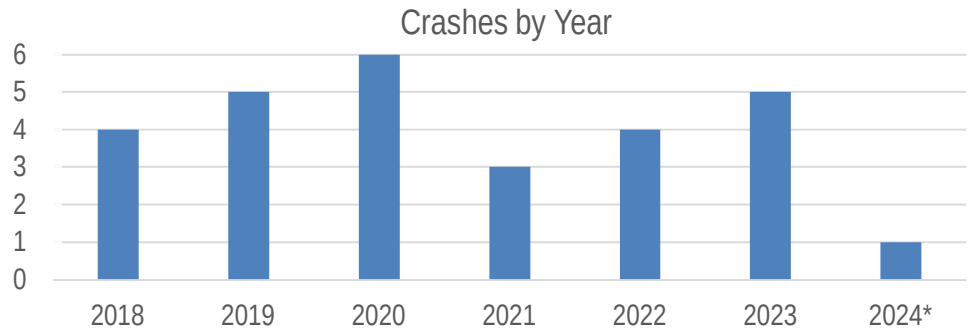
- Unsignalized Crosswalk
  - Least expensive alternative
  - Limited safety provisions for pedestrians
  - Drivers on a rural highway unlikely to yield
- RRFB
  - Less expensive than full signalization alternatives
  - Wide median allows crossing to be treated as two separate instances
  - Drivers on a rural highway unlikely to yield
  - No RRFBs have been installed on rural arterials in the state
- HAWK
  - Recommended by analysis from NCHRP Report 562 at this location
  - No longer installed at intersections by DelDOT based on recent review showing poor compliance and creation of secondary issues
- Full Signal
  - DelDOT Traffic's practice is to consider signals when NCHRP Report 562 recommends HAWKs
  - Fully protected crossing facility for pedestrians
  - Improved safety for side street traffic (mitigate angle and injury crashes)
  - Requires full stop of all US 13 traffic for pedestrians (but stops can be coordinated with adjacent signals)

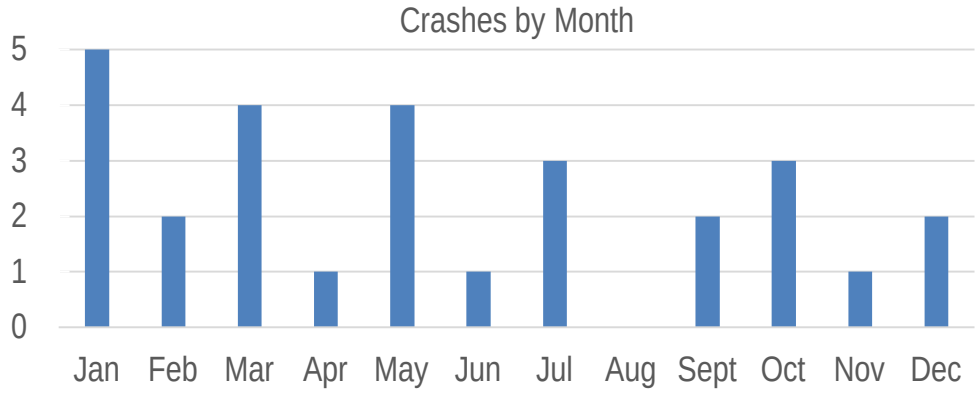
US 13 at Pinewood Acres Avenue Intersection Safety Evaluation

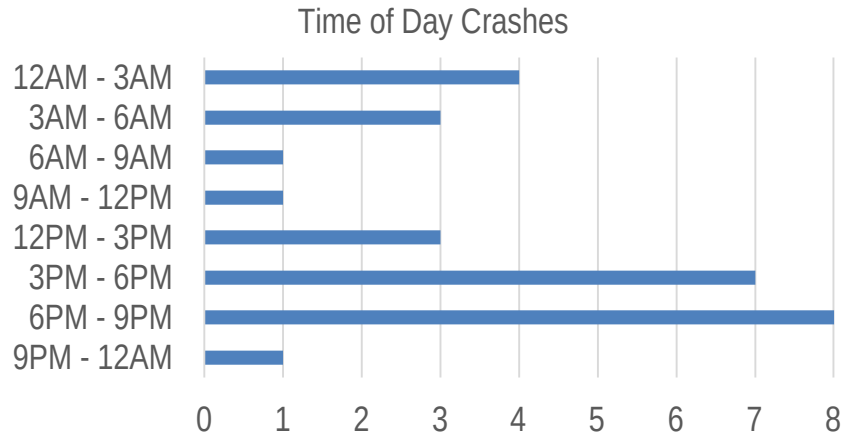
Crash Data

1/1/2018 – 3/11/2024: 28 Crashes

- 6 NBL/SBT angle crashes
  - 5 involved NBL failure to yield
  - 1 involved SBT vehicle with headlights off
- 4 EBL/SBT angle crashes
  - 3 involved EBL failure to yield
    - 1 resulted in SBT swerving to avoid the EBL and leaving the roadway
  - 1 involved SBT vehicle with headlights off
- 3 SB roadway departure crashes (1 DUI)
- 3 SB rear end crashes
- 2 EBL/NBL angle crashes in crossover
- 2 SBU/NBT angle crashes
  - 1 involved SBU failure to yield
  - 1 involved NBT vehicle with headlights off
- 2 NB roadway departure crashes (1 DUI)
- 1 SBU/NBL sideswipe crash in crossover
- 1 NBU roadway departure crash
- 1 NB sideswipe crash
- 1 SB sideswipe crash
- 1 SB deer crash
- 1 EB rear end crash







15 (54%) personal injury crashes

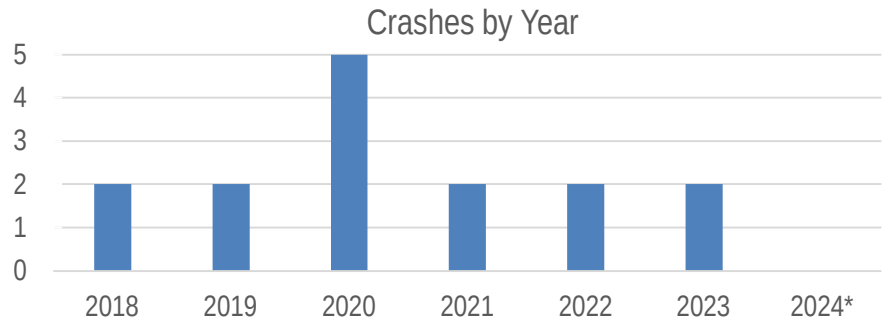
US 13 at Pinewood Acres Avenue Intersection Safety Evaluation

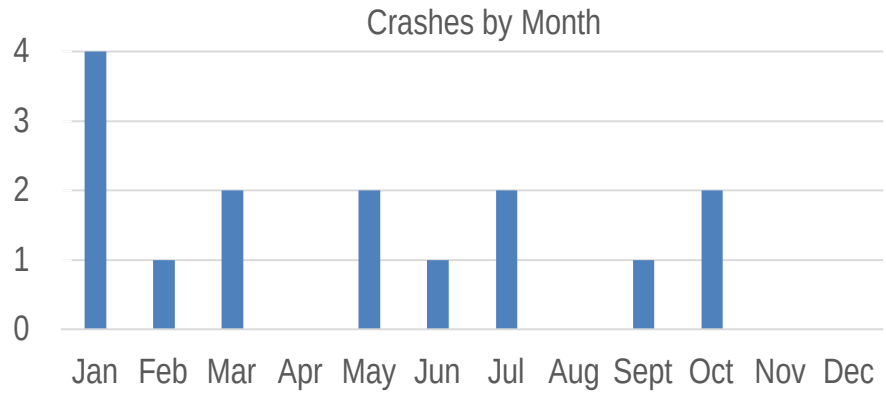
Crash Data

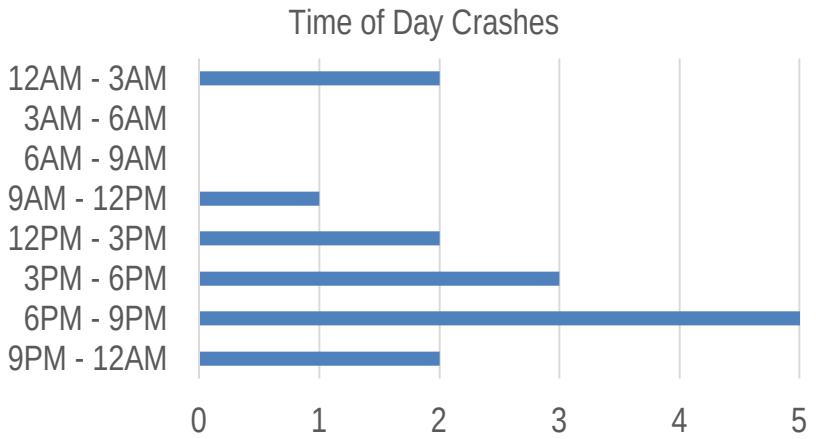
1/1/2018 – 3/11/2024:

15 crashes correctible by traffic signal

- 6 NBL/SBT angle crashes
  - Tuesday, October 22, 2019 at 2:42 PM
  - Sunday, June 28, 2020 at 12:03 AM
  - Tuesday, October 27, 2020 at 7:23 PM
  - Sunday, May 2, 2021 at 10:28 PM
  - Tuesday, September 7, 2021 at 8:25 PM
  - Thursday, January 20, 2022 at 8:41 PM
- 4 EBL/SBT angle crashes
  - Friday, July 6, 2018 at 1:37 PM
  - Friday, January 11, 2019 at 5:35 PM
  - Monday, July 20, 2020 at 11:06 PM
  - Wednesday, February 15, 2023 at 6:20 PM
- 2 EBL/NBL angle crashes in crossover
  - Wednesday, March 14, 2018 at 4:38 PM
  - Saturday, January 15, 2022 at 11:37 AM
- 2 SBU/NBT angle crashes
  - Wednesday, January 1, 2020 at 12:56 AM
  - Wednesday, May 27, 2020 at 6:08 PM
- 1 SBU/NBL sideswipe crash in crossover
  - Tuesday, March 7, 2023 at 4:56 PM







11 (73%) personal injury crashes

US 13 at Pinewood Acres Avenue
Intersection Safety Evaluation
Sight Distance Evaluation

- Intersection sight distance from the minor street approach was collected and compared to the required sight distances (AASHTO Geometric Design of Highways and Streets, 7th Edition – Tables 9-5, 9-7, 9-11, and 9-13)

Stop- or Yield-Controlled Approach	Looking	Intersection Sight Distance (ft)	
		Required	Available
Eastbound Pinewood Acres Drive	Right from W side	768’	1000’+
	Right from Median	647’	1000’+
	Left from W side	607’	475’
Northbound US 13 Left Turn	Right from Median	566’	1000’+

US 13 at Pinewood Acres Avenue Intersection Safety Evaluation

Signal Warrant Analysis

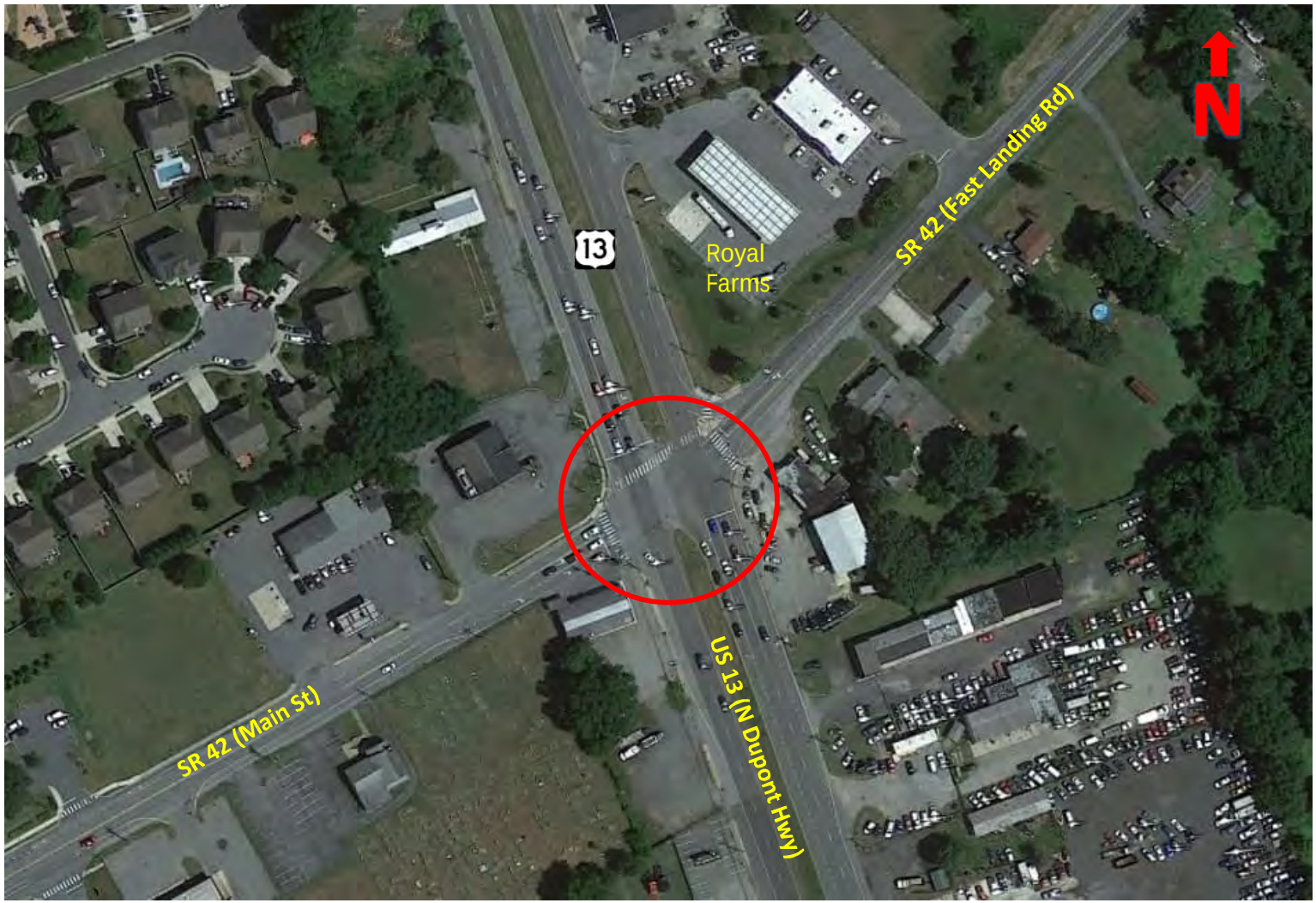
Warrant	Met / Not Met
1) 8-Hour Volume	TBD
1A) Minimum Volume	TBD
1B) Interruption of Continuous Traffic	TBD
1C) Combination of Conditions	TBD
2) 4-Hour Volume	TBD
3) Peak Hour Volume	TBD
7) Crash Warrant	Partially Met
7A) Adequate Trial of Alternatives	N/A
7B) Minimum Number of Crashes in 12-months	Yes (5 of 5 crashes)
7C) Meets 80% Volume Criteria of 1A or 1B	TBD
7B Alt) Alternative Crash Warrant (IA-19)	*Yes*
One-Year Crash Frequency	*Yes (5 of 4 total, 4 of 3 severe)*
Three-Year Crash Frequency	*Yes (10 of 5 total, 8 of 4 severe)*

US 13 at Pinewood Acres Avenue
Intersection Safety Evaluation
Recommendations

- Dover/Kent MPO should obtain intersection turning movement count and complete formal signal justification study / capacity analysis
  - Coordinate with DelDOT Traffic regarding further study efforts
  - Study should also include analysis of full or partial crossover closures/modifications in comparison to full-access signalization
- A signalized crosswalk at Pinewood Acres Ave along the south leg of the intersection is the preferred pedestrian access alternative if a traffic signal is warranted
  - Full connectivity/access will also rely on filling in sidewalk gap south of Walmart property – begin necessary coordination to program that improvement

US 13 @ SR 42 (Main Street/Fast Landing Road)

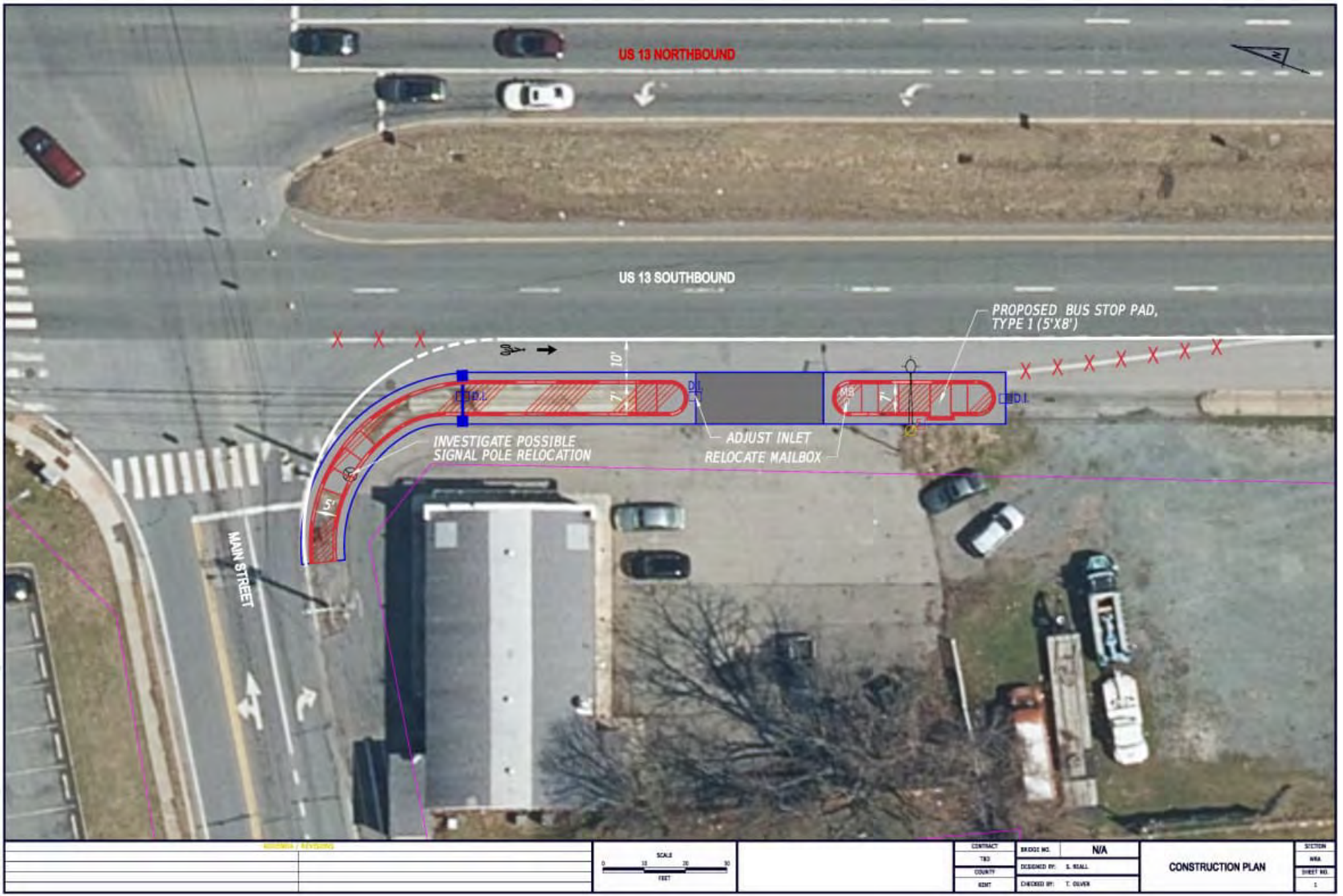
Eastbound Right Turn Considerations



March 2024

US 13 @ SR 42 (Main Street/Fast Landing Road)

Potential Southwest Corner Sidewalk/Striping Improvements



US 13 @ SR 42 (Main Street/Fast Landing Road)

Eastbound Right Turn on Red Restriction

- 2021 HEP Site S-3 noted EB right-turning vehicles frequently pull up in front of the stop line and block the west leg crosswalk
- With the proposed removal of the EB right-turn acceleration lane, alternatives to right turns on red can be considered
- Potential Options:
  - Prohibit EB right turns on red
  - Signalize the EB right-turn movement (provide green during NB left-turn and EB movements) and prohibit right turns on red otherwise

US 13 @ SR 42 (Main Street/Fast Landing Road)

Eastbound Right Turn on Red Restriction

- *Synchro* analysis was completed to assess queue lengths and vehicle delays in each scenario
- Right turn on red restriction creates failing movements
- Signalized right turn creates longer queues but no failing movements

Vehicle Delay (sec/veh)	AM Peak Hour		PM Peak Hour	
	Thru/Left Lane	Right Lane	Thru/Left Lane	Right Lane
Existing (Right Turns on Red Permitted)	73.6 sec (E)	60.1 sec (E)	73.0 sec (E)	61.5 sec (E)
No Right Turn on Red	65.6 sec (E)	82.2 sec (F)	62.3 sec (E)	82.9 sec (F)
Signalized Right Turn	69.7 sec (E)	52.0 sec (D)	65.4 sec (E)	44.1 sec (D)

50th/95th Percentile Queues (ft)	AM Peak Hour		PM Peak Hour	
	Thru/Left Lane	Right Lane	Thru/Left Lane	Right Lane
Existing (Right Turns on Red Permitted)	132 ft / 200 ft	0 ft / 67 ft	114 ft / 177 ft	0 ft / 70 ft
No Right Turn on Red	128 ft / 200 ft	156 ft / 236 ft	109 ft / 174 ft	158 ft / 242 ft
Signalized Right Turn	131 ft / 200 ft	139 ft / 199 ft	111 ft / 175 ft	131 ft / 172 ft

Red indicates failing/overcapacity movements
Assumed storage length of right-turn lane is 178’

US 13 @ SR 42 (Main Street/Fast Landing Road)

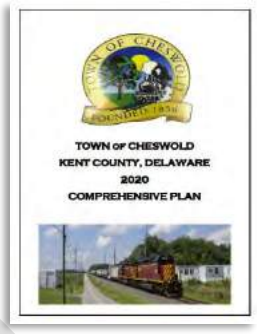
Recommendations

- Do not change signal operation or restrict right turns on red at this time
- Include enhanced signage with proposed sidewalk/ restriping project to encourage proper stop location at the stop line and improved awareness of ped crossing
- Coordinate improvements with DelDOT Traffic

Appendix E - Relevant Resources

Town of Cheswold Comprehensive Plan (2020)

https://cheswold.delaware.gov/files/2021/09/2020-Certified-Cheswold-Comprehensive-Plan.pdf



This document serves as the most recent Comprehensive Plan for the Town of Cheswold. It incorporates the input gathered during public hearings and workshops throughout 2020. It went through the Preliminary Land Use Service (PLUS) process and was ultimately certified in 2021. The most relevant information from this document is the town's various transportation goals. These include making businesses on the eastern side of US13 more accessible to pedestrians and improving Main Street with safer crossings. There is additional useful information such as local history and demographic background. Finally, maps are used to depict features such as municipal boundaries, zoning, land use, environmental factors, and investment levels from the State Strategies map.

DelDOT Pedestrian Accessibility Standards Manual (2021)

https://deldot.gov/Publications/manuals/pedestrianAccessibility/pdfs/2021/Pedestrian-Accessibility-Standards-for-Facilities-in-the-Public-Right-of-Way-2021-Edition.pdf

This 2021 manual is used by DelDOT as a thorough guide for creating accessible pedestrian facilities throughout the State of Delaware. Most relevant to this study are the required measurements for various pedestrian amenities. For example, the minimum width for a sidewalk is listed as 5 feet (or 6 feet when there is no buffer strip), and the minimum width for a shared use path is listed as 10 feet. Also included in the manual are requirements for turning areas, ramps, buffer strips, and other pedestrian facilities. Measurements such as these are useful to the *Cheswold US13 Pedestrian Safety and Connectivity Study* because they give a baseline for how much space is needed for new amenities. This has guided the Dover Kent MPO when creating recommendations based on the existing constraints.

Appendix F - Notes from Redner's North Dover (2/5/2024)

- People are always walking on US13, this is a safety concern. The route needs more safe/designated crossings.
- Look into Hatchery Road. (No specifics as to what should be done here.)
- Skeptical of usefulness of future bike paths in Cheswold; but another crosswalk at Main Street intersection is a good idea.
- Drivers need to slow down on US13.
- Contrasted conditions in Delaware to England, where there are more places to walk. Fox Pointe neighborhood has no sidewalks. (Respondent asked for speed bumps in neighborhood but the fire department does not want it.)
- A friend was killed at U-turn in study area; this should not be the case. (Respondent recommended getting rid of U-turns.)
- The entrance to Pinewood Acres is the most dangerous intersection, respondent has seen people being lifted by helicopter to hospital after a crash.
- Best to separate bikes from other traffic, make sure riders are visible.
- Add a light at Pinewood Acres?
- "'Share the road' isn't working in Delaware; modes of travel should be separated."
- Coming out of parking lots is the most dangerous. (Redner's, etc.)
- Lots of people from Pinewood Acres walking to Walmart; it needs more crosswalks and connected paths.
- Respondent question: Is it possible to have fewer lanes on US13?
- Cheswold needs to feel more like a town: slower traffic, high density, more business and a railroad station.
- Shared use path is the best option for US13: bike/pedestrian would be off the road and wheelchair accessible.
- Add either sidewalks or a bike lane along the road.
- The entrance to Walmart and the new Taco Bell entrance to the north don't make any sense.
- Too many people speeding, police need to patrol the area more.
- A bike path would be ideal except for clashing bike/pedestrian traffic (e.g., kids on bikes or skateboards); added greenery is always good.
- Ditches near the railroad are not safe, cars can go right into them.
- Need more signalized pedestrian crossings.
- Verona Woods turnoff was improved some time ago. Based on that experience, "people will get used to change eventually." May need a light at Redner's.

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DOVER/KENT COUNTY MPO

METROPOLITAN PLANNING ORGANIZATION

WRA

TOWN OF CHESWOLD

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