DRAFT FINAL REPORT FOR

PUBLIC REVIEW AND COMMENT

Comment Period June 27 to July 29, 2024

Please email comments to eastelktontraffic@wallacemontgomery.com

EAST ELKTON

Traffic Circulation and Safety Plan

DRAFT Final Report

June 2024

www.wilmapco.org

WILMAPCO

Wilmington Area Planning Council

TABLE OF CONTENTS

Figures

Tables

Appendices

Acronyms

Planning and Environmental Linkages (PEL)

National Environmental Policy Act (NEPA)

Wilmington Area Planning Council (WILMAPCO)

Metropolitan Planning Organization (MPO)

Maryland Historical Trust (MHT)

Maryland Department of the Environment (MDE)

Long Range Plan (LRP)

Annual Average Daily Traffic (AADT)

Level of Traffic Stress (LTS)

American Association of State Highway and Transportation Officials (AASHTO)

Executive Summary

Decisions made today can have a big impact on the future. Accordingly, we must use thoughtful and strategic foresight to meet the needs of tomorrow. The East Elkton Traffic Circulation and Safety Plan analyzes existing and forecasted traffic patterns, identifies potential safety hazards, and proposes solutions to enhance traffic flow and safety for a developing suburban area in Elkton, Maryland. A Planning and Environmental Linkages Study is guiding the plan.[1] This comprehensive study addresses the concerns of residents and stakeholders regarding traffic congestion and safety issues within the community using a multi-faceted approach: combining traffic data analysis, field observations, public visioning and input, and stakeholder consultations to gain a comprehensive understanding of the existing and potential future conditions to evaluate concepts and prioritize recommendations. Traffic flow patterns, crash data, pedestrian and cyclist movements, road geometries, and existing infrastructure were evaluated using a Planning and Environmental Linkages (PEL) study approach.

Who conducted the Plan?

This planning effort was led by Wilmington Area Planning Council (WILMAPCO), the federally designated Metropolitan Planning Organization (MPO) for the region. WILMAPCO is charged with planning and coordinating those transportation investments based on federal policy, local input, technical analysis, and best practices. WILMAPCO support for the Plan was requested by the Town of Elkton and Cecil County. Organizations that participated and directed the plan as part of a steering committee included the Town of Elkton, Cecil County, Maryland Department of Transportation, Maryland State Highway Administration (SHA), Cecil Transit, Amtrak, Cecil County Public Schools, Cecil County Chamber of Commerce and East Coast Greenway Alliance.

What was the Study Area?

The study area encompasses the eastern limits of Elkton, MD and its surrounding environs, including key transportation corridors, natural habitats, and residential/commercial zones with an emphasis on three key corridors: Belle Hill Road, from MD 316 (Appleton Road) to Muddy Lane; Muddy Lane, from Belle Hill Road to MD 281 (Red Hill Road); and MD 781 (Delancy Road), from MD 281 to US 40 (Pulaski Highway). See Figure ES-1 for a visual depiction of the study area.

[1] A PEL Study is a high-level planning approach to transportation decision-making that considers the environment, community, and economic goals. A PEL Study promotes a collaborative and integrated process to establish a long-term vision and strategic plan for future transportation improvements. The process and outcomes support an efficient transition to National Environmental Policy Act (NEPA) processes, final design, and construction once funding is identified.

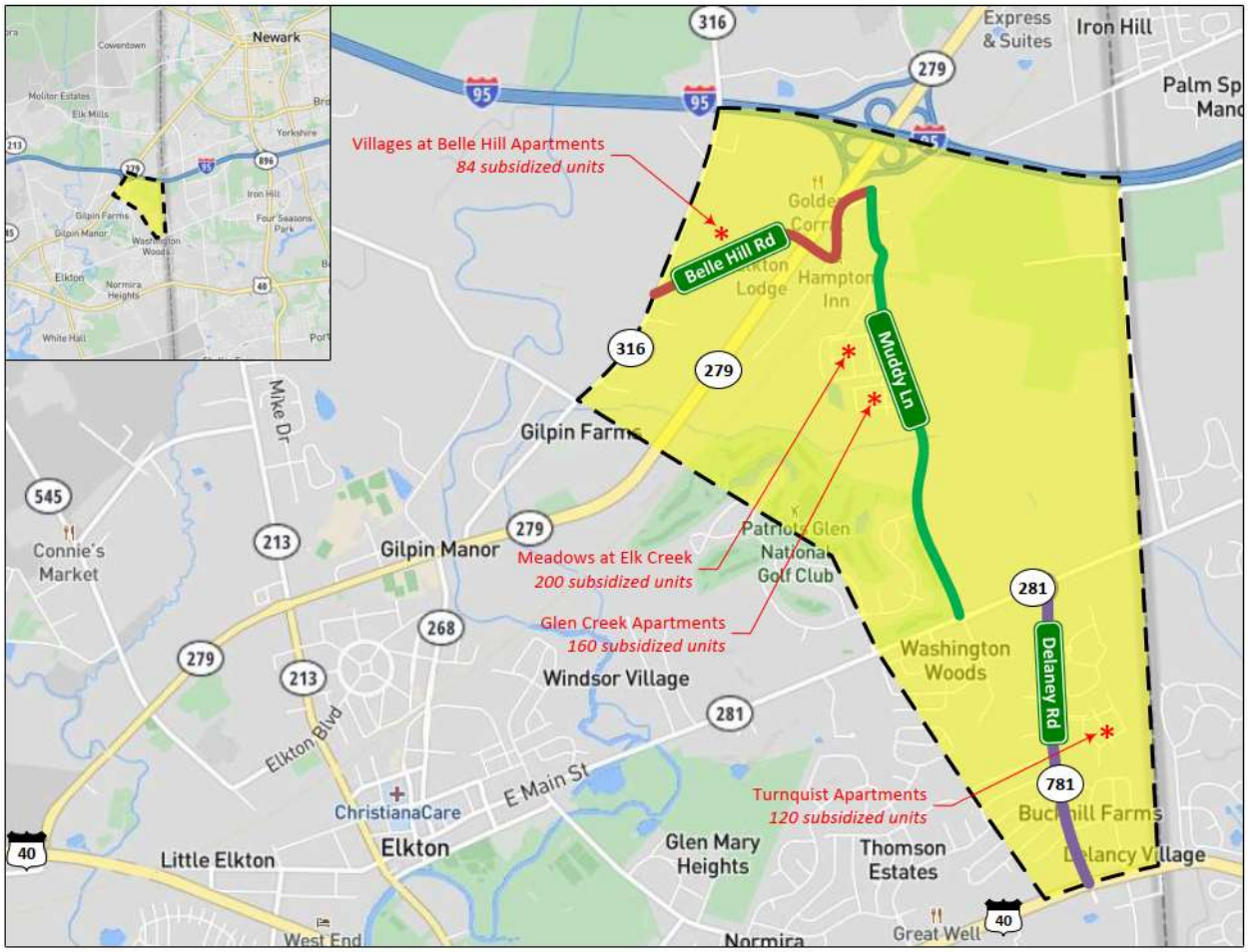


Figure ES-1: A map outlining the study area and three main corridors of interest for the project.

What was the Plan's Scope of Work?

The scope included a review of the existing conditions, transportation facilities, natural and cultural resources and developing concepts to address transportation network deficiencies and safety concerns. Transportation analyses evaluated the existing conditions of road networks, traffic patterns, crash patterns and modal choices and identified congestion points and safety concerns. These analyses involved analytical studies of available data and conditions as well as public meetings and surveys to obtain the knowledge of the public.

The natural resource assessment included a desktop inventory of sensitive ecosystems, water bodies, and wildlife habitats; identification of areas with high ecological significance; and evaluation of potential impacts from transportation projects on natural resources. The cultural resource assessment included documentation of historical sites, archaeological assets, and cultural landmarks and assessment of the potential for adverse impacts on cultural resources.

Public and stakeholder input was obtained to determine the necessities for both transportation upgrades and environmental conservation. From there, the desired mixture of transportation planning and environmental conservation was identified. To determine accurate predictions for future transportation needs, future conditions were evaluated including:

- Proposed developments in the immediate area and forecasted transportation needs associated with those developments.
- Anticipated population growth and its impact on transportation demand.
- Potential changes in land use and their implications on mobility.

How was the Public Engaged?

Public and stakeholder engagement took many forms throughout the course of the Plan including:

- Project website used to disseminate findings, recommendations, meeting presentations, meeting records and notes to provide transparency and accountability.
- Three public meetings
    - October 26, 2023: Project visioning phase and discussion of goals and concerns
    - March 27, 2024: Concept development phase and discussion of concept designs
    - June 27 2024: Public survey results, preferred alternatives and report recommendations.
- Two general public and two youth surveys to gather input.
- Direct mailings to underserved area neighborhoods and the building of an electronic mailing list to promote participation.
- Engagement with community representatives, local agencies, and advocacy groups through a steering committee. This committee met 7 times throughout the planning process.
    - September 26, 2023
    - November 13, 2023
    - December 14, 2023
    - February 13, 2024
    - March 14, 2024
    - May 22, 2024
    - June 10, 2024
- Public officials' presentations.

What were the Key Findings and Recommendations?

Key Findings

1. **Pedestrian and Cyclist Accessibility:** Pedestrian and cyclist infrastructure in the study area was found to be insufficient, with inadequate sidewalks, crosswalks, and no bicycle facilities. This lack of infrastructure poses significant safety risks and hinders walking and cycling options within the community.
2. **Safety Concerns:** Analysis of crash data revealed specific locations with a high incidence of crashes, highlighting safety hazards for motorists, pedestrians, and cyclists alike. Factors such as inadequate signage, poor visibility, traffic signal timing, inconsistent lane configurations and conflicting traffic movements were identified as contributing factors. These findings are detailed in Chapter 4 of this report.
3. **Toll Avoidance.** Drivers on I-95 must pay a toll to cross the Maryland-Delaware border in both directions but can avoid the toll by using the non-interstate routes. Approximately 60 percent of local drivers and 2-4 percent of regional drivers use local roads to avoid the toll. Improving the transportation network and removing the existing

vertical clearance limitation on Muddy Lane could exacerbate toll diversion, particularly for heavy truck traffic.

4. **Traffic Congestion Hotspots:** Several intersections within the study area were identified as congestion hotspots, particularly during peak hours. Traffic flow at these intersections is frequently impeded by vehicles "blocking the box" or by traffic queuing beyond the available storage length for the movement contributing to driver frustration. Specifically at Belle Hill Road at MD 279 (Elkton Road), MD 781 (Delancy Road) at MD 281 (Red Hill Road), and MD 781 (Delancy Road) at US 40.
5. **Land Use and Zoning:** There are locations within the study area where commercial, warehouse and distribution and residential uses abut, such as along Belle Hill Road, with no existing buffers to support the transition of uses and protect residents from the impacts of heavy truck traffic and commercial use. Additionally, the wetland and forested area on the eastern side of Muddy Lane is zoned for High Density Residential despite being a Tier 1 biodiversity conservation and targeted ecological area.[2]

Recommendations

Specific recommendations for short, mid and long-term improvements, including conceptual plans, planning level cost estimates and implementation strategies are included in chapters 4 and 5 of the report, but can be summarized as follows:

1. **Pedestrian and Cyclist Infrastructure:** Develop a well-connected pedestrian and cyclist network, including sidewalks, crosswalks, bike lanes, and shared-use paths, to promote active transportation and improve safety for vulnerable road users.
2. **Safety Enhancements:** Improve safety along the corridors by roadway reclassification, redesign, and reconstruction and by providing continuously accessible pedestrian facilities and proper bicycle facilities along the corridors and between key destinations. Implement traffic calming measures and safety countermeasures such as pedestrian refuge islands to reduce vehicle speeds and enhance safety for pedestrians and cyclists. Reduce the frequency and severity of crashes along the corridors, at major intersections and at the Royal Farms driveway on MD 781 (Delancy Road) by reducing conflicts and managing vehicle speeds.
3. **Connectivity:** Provide transportation network connections through roadway realignments that increase options for routes of travel and facilitate walking and bicycling. Continue to advance the different options for the railroad crossing at Muddy Lane without inducing additional vehicles to avoid the I-95 toll at the Maryland/Delaware border.
4. I**ntersection Improvements:** Implement signal timing adjustments, geometry improvements, provide dedicated turning lanes or roundabouts at key intersections to improve safety, traffic flow and reduce congestion.
5. **Land Use Planning:** Update the Cecil County and Town of Elkton Comprehensive Plans with an analysis of the existing Designated Growth Areas and zoning districts to determine if the transportation improvements detailed in this study meet the current vision and anticipated growth in the region. Specifically, the areas south of Belle Hill Road, west of MD 316 (Appleton Road) and the wetland and forested area on the eastern side of Muddy Lane.

[2] An area that is critically significant for biodiversity and ecological conservation.

The following are three summary tables describing the short-term, mid-term, and long-term recommendations that are being made for the study.

ID Number	Location	Report Reference	Description	Purpose	Planning Level Budget Estimate
S1	Intersection of Belle Hill Road and Elkton Road	Chapter 4, Page 38	Pavement Markings	Pavement markings at the intersection are faded and should be refreshed. Consideration should be given to high visibility crosswalks given the history of crashes involving pedestrians at this intersection.	$2,700
S2	Intersection of Belle Hill Road and Elkton Road	Chapter 4, Page 38	Trim Vegetation	The crosswalk is obscured by vegetation for vehicles turning right from southbound Elkton Road to Belle Hill Road (toward the McDonalds). Vegetation on the northwest quadrant of the intersection should be trimmed to maintain proper sight distance triangles.	$300
S3	Intersection of Belle Hill Road and Elkton Road	Chapter 4, Page 38	Crash Analysis and Traffic Signal Timing/Intersection Evaluation	The traffic signal lacks adequate pedestrian crossing time. Revise the traffic signal timing for the proper pedestrian clearance times. Complete a full crash analysis to determine the causes of the crashes and screen the intersection for the applicability of using any of the FHWA proven safety countermeasures, such as backplates with retroreflective borders, leading pedestrian intervals and adequately timed yellow change intervals. Evaluate the feasibility of installing a metering traffic signal at the truck stop driveway to manage the number of trucks entering the intersection and force trucks to queue along the service plaza driveway instead of blocking Belle Hill Road movements. **UPDATE: Pedestrian clearance time to cross Elkton Road was increased on June 26, 2024.**	$30,200

S4	Belle Hill Road	Chapter 4, Page 33	Roadway Classification - Administrative	Have the functional roadway classification changed from local road to collector road given the current and expected function of the road so that the proper design criteria are utilized in future capital projects and in the determination of federal aid eligibility.	N/A
S5	Belle Hill Road	Chapter 4, Page 34	Bicycle LTS - Administrative	Contact SHA to revise the Bicycle Level of Stress to LTS 4 based upon the number of lanes, effective ADT and prevailing speeds.	N/A
S6	Muddy Lane	Chapter 4, Page 33	Roadway Classification - Administrative	Have the functional roadway classification changed from local road to collector road given the current and expected function of the road so that the proper design criteria are utilized in future capital projects and in the determination of federal aid eligibility.	N/A
S7	Muddy Lane	Chapter 4, Page 34	Bicycle LTS - Administrative	Contact SHA to revise the Bicycle Level of Stress to LTS 4 based upon the number of lanes, effective ADT and prevailing speeds.	N/A
S8	Muddy Lane	Appendix C, Figure 10	Overhead Clearance Signage	Install additional overhead clearance signage along Muddy Lane north of the existing railroad underpass to prevent tractor trailers from attempting to travel south on Muddy Lane from Belle Hill Road.	$1,900
S9	Muddy Lane	Chapter 4, Page 41	Speed Limit Signage	Add additional speed limit signage to Muddy Lane, consider speed feedback signs and incorporate speed enforcement as part of a comprehensive community traffic calming plan.	$3,000

S10	Intersection of Delancy Road and US-40	Chapter 4, Page 40	Crash Analysis and Traffic Signal Timing/Intersection Evaluation	Complete a full crash analysis to determine the causes of the crashes and screen the intersection for the applicability of using any of the FHWA proven safety countermeasures, such as backplates with retroreflective borders, leading pedestrian intervals and adequately timed yellow change intervals. Evaluate the crashes and near misses associated with the overlapping movements between the U-turns from eastbound US-40 and right turns from southbound Delancy Road and the feasibility of the signal retiming to place these movements in different phases or to change the priority of the movements. Evaluate the feasibility of restricting the Royal Farms driveway on Delancy Road near the intersection to right-in right-out.	$30,200
S11	Delancy Road	Chapter 4, Page 33	Roadway Classification - Administrative	Have the functional roadway classification changed from Major Collector to Minor Arterial given the current and expected function of the road so that the proper design criteria are utilized in future capital projects and in the determination of federal aid eligibility.	N/A
S12	Delancy Road	Chapter 4, Page 34	Bicycle LTS - Administrative	Contact SHA to revise the Bicycle Level of Stress to LTS 4 based upon the number of lanes, effective ADT and prevailing speeds.	N/A
S13	Project Area and Nearby Neighborhoods	Chapter 3, Page 30 and Appendix D	Study pathway connectivity between neighborhoods/ other neighborhoods and destinations	Determine locations within the network that lack sufficient connectivity	N/A

ID Number	Location	Report Reference	Description	Purpose	Planning Level Budget Estimate
M1	North of Belle Hill Road	Chapter 4, Page 53	Land Use, Zoning and Comprehensive Planning	Examine ways to space truck-generating uses with residential along Belle Hill Road either through buffering or rezoning.	N/A
M2	South of Belle Hill Road	Chapter 4, Page 52	Land Use, Zoning and Comprehensive Planning	Evaluate the zoning designation for the areas south of Belle Hill Road which has a mix of zoning. Consider a zone of buffers where commercial and residential uses abut.	N/A
M3	Wetland and forested area on the eastern side of Muddy Lane	Chapter 4, Page 52	Land Use, Zoning and Comprehensive Planning	Evaluate the zoning designation for the wetland and forested area on the eastern side of Muddy Lane, which is zoned for High Density Residential despite being a Tier 1 biodiversity conservation and targeted ecological area.	N/A
M4	Intersection of Delancy Road and Royal Farms Driveway	Chapter 4, Page 49, Appendix C, Figure 8, Concepts D-2D and D-1F	Restrict Turning Movements at Royal Farms Driveway onto Delancy to Right-In/Right-Out. New Connection to Royal Farms, and Playground improvements	Reduce conflicts and crashes at Royal Farms driveway	$749,000
M5	Designated Growth Areas	Chapter 4, Page 53 and Appendix D	Land Use, Zoning and Comprehensive Planning	Analysis of Designated Growth Areas including an evaluation of anticipate growth and connectivity analysis of future connector roads and paths	N/A

ID Number	Location	Report Reference	Description	Purpose	Next Steps for Implementation	Planning Level Budget Estimate
L1	Intersection of Belle Hill Road and Elkton Road	Chapter 4, Page 39, Appendix C, Figure 2, Concept BH-2D	Intersection Realignment and Median Extension	Potential driveway and intersection alterations to improve queuing capacity at intersection	Program project on long range transportation plan. Scope and evaluate options including realignment of the intersection, realignment of the driveway and consideration of the feasibility study (mid-term recommendation) regarding a metering traffic signal at the truck stop driveway.	$740,000
L2	Intersection of Belle Hill Road and Appleton Road	Chapter 4, Page 40, Appendix C, Figure 2, Concept BH-2A	Realignment of intersection of Belle Hill Road at Appleton Road	Improve traffic flow and safety at skewed intersection	Program project on long range transportation plan.	$330,000
L3	Belle Hill Road	Chapter 4, Page 35, Appendix C, Figure 1, Concept BH-1B and BH-1C	Shared Use Path along Belle Hill Road	Improve bike and pedestrian mobility along the corridor. Achieve speed reduction through lane narrowing and deter trucks from traveling west along Belle Hill Road	Roadway reclassification (short term recommendation). Program project on long range transportation plan.	$1,590,000
L4	Bridge: Muddy Lane over Railroad or Underpass: Muddy Lane under Railroad	Chapter 4, Page 44, Appendix C, Figures 3 and 4, Concepts M-1B, M-2B, and M-2D	Replace Muddy Lane Railroad Crossing	Improve safety for all users with continuous accessible pedestrian facilities and increase options for routes of travel without inducing additional vehicles to avoid the I-95 toll at the	Program project on long range transportation plan. Scope and perform alignment studies (including NEPA evaluations) of the two Muddy Lane railroad crossing options (bridge over and new underpass alignment).	$8,280,000 to $23,990,000

				Maryland/Delaware border.		
L5	Muddy Lane	Chapter 4, Page 41, Appendix C, Figure 5, Concept M-4A	Shared Use Path with a Landscape Bioretention Area	Improve bike and pedestrian mobility along corridor while adding vegetative buffer between roadway and shared use path	Program project on long range transportation plan.	$2,850,000
L6	Muddy Lane at Powerline Easement	Chapter 4, Page 44, Appendix C, Figure 5, Concept M-4B	Truck Turnaround and Trail Parking	Design, permit and construct an interim truck turnaround within powerline easement to provide trucks last chance to turnaround to avoid underpass		$260,000
L7	Red Hill Road between Intersection of Muddy Lane and Delancyl Road	Appendix C, Figure 9	Shared use path along Red Hill Road between Muddy Lane and Delancy and Pedestrian Crossing at Muddy Lane and Red Hill Road	Improve safety for all users with continuous accessible pedestrian facilities and increase options for routes of travel.	Program project on long range transportation plan.	$750,000
L8	From Intersection of Muddy Lane and Red Hill Road and Delancy Road	Chapter 4, Page 48, Appendix C, Figures 7 or 9, Concept D-1D or D-2C	Proposed 10 ' Shared Use Path or Road along Kemp Lane	Improve connectivity by establishing a new shared use path or road between the intersection of Muddy Lane and Red Hill Road and Delancy Road	Scoping and Preliminary Design	$1,730,000

L9	Intersection of Delancy Road and Red Hill Road	Chapter 4, Page 48, Appendix C, Figures 7 or 9, Concept D-1A or D-2A	Perform Intersection Control Evaluation to determine preferred alternative - roundabout vs. improved signalized Intersection (dedicated Right Turn Lane) with pedestrian improvements	Improve safety and mobility at the intersection	Perform Intersection Control Evaluation to determine preferred alternative - roundabout vs. improved signalized Intersection (dedicated Right Turn Lane) with pedestrian improvements	$90,000
L10	Delancy Road	Chapter 4, Page 48, Appendix C, Figures 6-9, Concepts D-2B and D-1C	Reconfigure Delancy Road with Shared Use Paths on both sides, Two-Way left turn lane and pedestrian refuge islands	Improve bike and pedestrian mobility along corridor, reduce conflicts and provide safety improvements at uncontrolled crosswalks	Program project on long range transportation plan.	$6,180,000
L11	MD-279	Appendix D	East Coast Greenway Path Extension along MD-279	Provide off road multimodal facilities and connections along MD-279 between study area and key destinations	Program project on long range transportation plan. Scoping and preliminary design.	N/A

Conclusion

The East Elkton Traffic Circulation and Safety Study provides actionable recommendations to address existing and future traffic congestion and safety challenges. By implementing the proposed strategies, Elkton will have a safer, more efficient transportation network that accommodates the needs of all road users and supports sustainable future development. Integrating transportation planning with environmental considerations while promoting alternative transportation modes such as cycling, walking, and public transit allows the study to foster a resilient and inclusive community for current and future generations.

Chapter 1. Introduction

Background

The East Elkton Traffic Circulation and Safety Plan examined transportation improvements to three corridors within and nearby the Town of Elkton: Delancy Road (MD 781), Muddy Lane, and Belle Hill Road. The project was initiated from two separate requests from both the Town of Elkton and Cecil County to the Wilmington Area Planning Council (WILMAPCO). Wallace Montgomery was selected as a lead consultant to execute the work. They were guided by a Steering Committee comprised of the following members:

Randy Alexander, Cecil County Public Schools	**Rich Baker, MDOT SHA District 2**
Michael Bayer, Wallace Montgomery	**John Borkowski, KCI Technologies, Inc.**
Chris Bradley, Singerly Fire Department	**Dr. Keisha Brinkley, Elkton Middle School**
Alicia Calhoun, Elkton Alliance	**Brenda Darr, Cecil Transit**
Jonathan DeVries, AMTRAK	**Henry Dierker, MDOT SHA District 2**
Ken Fender, MDOT SHA District 2	**Scott Flanigan, Cecil County Public Works**
Thomas Fruehstorfer, KCI Technologies, Inc.	**William Goldman, Cecil County Planning and Zoning**
Aaron Harding, Cecil County Planning and Zoning	**James Leitgeb, Elkton High School**
Wayne Martin, Wallace Montgomery	**Megan McRay, Cecil County Chamber of Commerce**
Jeanne Minner, Town of Elkton Planning Director	**Stephen O'Connor, Cecil County Land Use & Development Services**
Daniel Paschall, East Coast Greenway Alliance	**Robert Rager, MDOT SHA District 2**
Derrick Sexton, MDOT SHA	**Michael Steimer, Wallace Montgomery**
Bill Swiatek, WILMAPCO	**Jake Thompson, WILMAPCO**
Wayne Tome, Sr., Cecil County Emergency Services	**Nichole Wiley, Wallace Montgomery**
Tigist Zegeye, WILMAPCO	

The Steering Committee met several times to review items such as potential concepts, public meeting materials, public survey responses and project issues and concerns. (*Note the meeting schedule in Appendix B*.)

Project Limits

The study area encompasses the eastern limits of Elkton, MD and its surrounding environs, including key transportation corridors, natural habitats, and residential/commercial zones with an emphasis on three key corridors: Belle Hill Road, Muddy Lane and MD 781 (Delancy Road). See Figure 1-1 for a visual depiction of the study area.

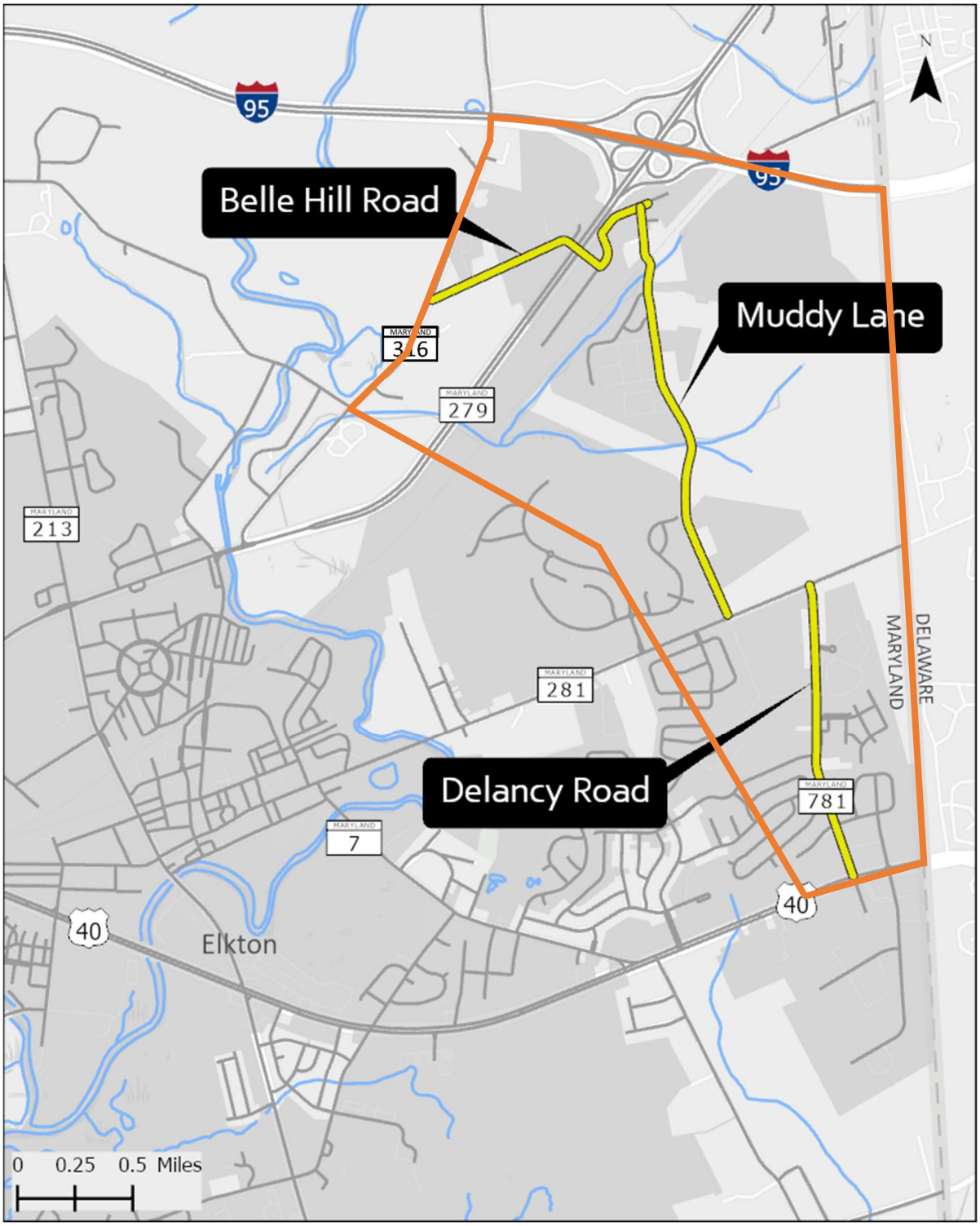
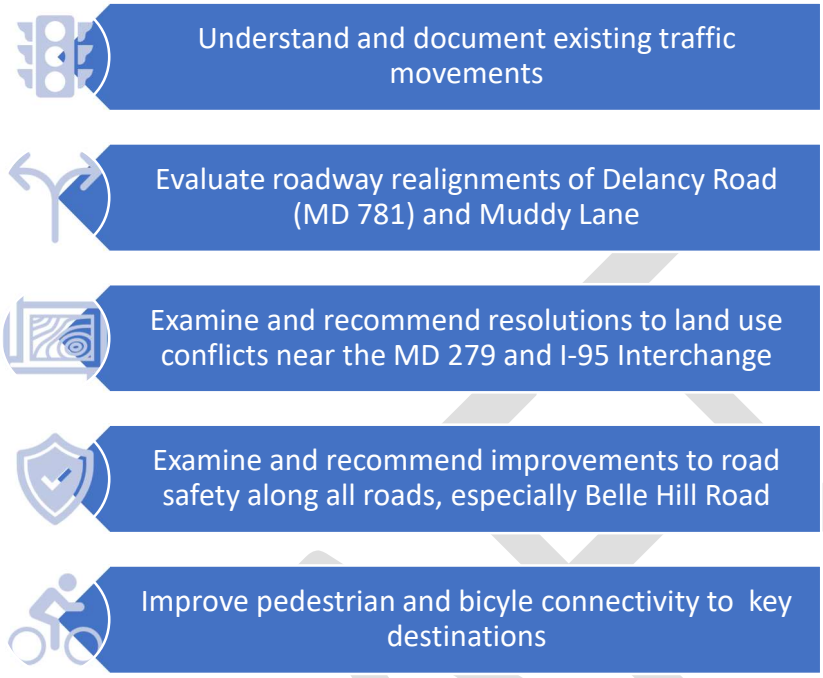


Figure 1-1: A map of the project limits and three corridors of focus.

Plan Purpose

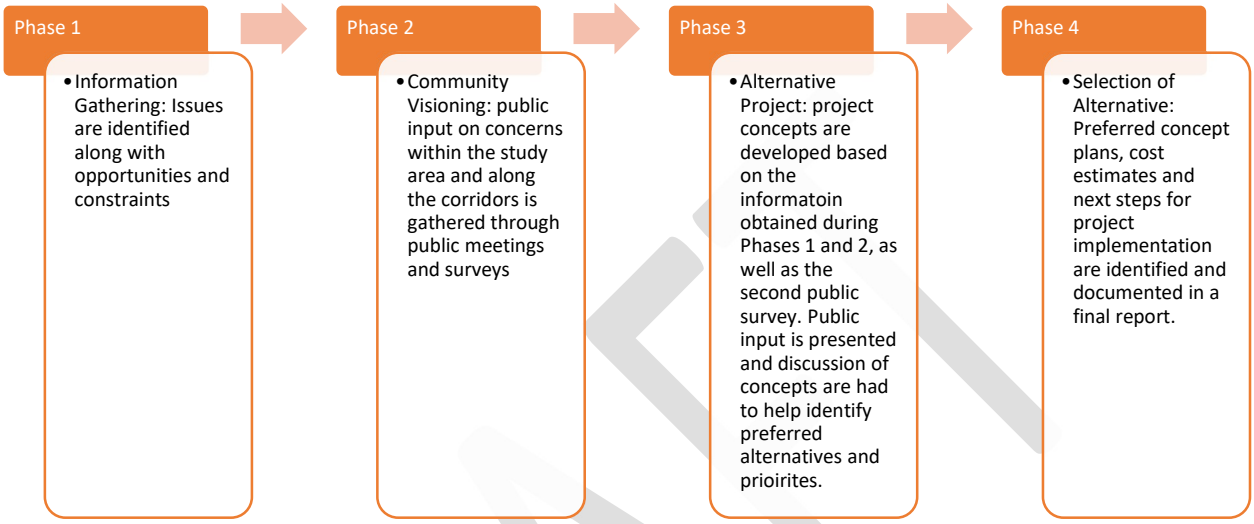
The purpose of the plan was to examine transportation improvements needed along the three corridors identified in East Elkton. The five goals of this plan were to:



Through a series of public surveys, meetings with the Steering Committee, and public outreach meetings, issues and concerns were identified and used in the preparation of several concept designs. Some of the concerns included lack of safe walking and cycling access, lack of lighting, traffic congestion, heavy truck traffic, a need for improved roadways, and overall poor connectivity. Using this information, preliminary concepts (found in **Chapter 5 – Preliminary Concepts**) were designed for presentation to the public for input. Preferred concepts were selected based on public preferences and discussion among stakeholders (**found in Chapter 7 – Outreach**).

Planned Development Phases

The plan was developed in four phases, as outlined below:



Phase 1 was completed in September 2023 and is documented in the Task 1 Report.[3] Phase 2 was completed on February 27, 2024. Phase 3 was completed in June 2024 with the closing of the final public survey. Phase 4 will culminate with the adoption of this Final Report.

[3] Available at http://www.wilmapco.org/east-elkton/

Chapter 2. Existing Conditions

Project Corridors

The existing conditions of the project study area are detailed in the Task 1 Report and summarized below. The study area has four separate affordable housing developments. According to recent census data, 75% of workers drive alone to work, 12% carpool, and 9% work from home, with less than 4% combined taking transit, walking, or biking. 5% of households do not have access to a motorized vehicle. About 12% of the population has a disability. More detailed information about the existing transportation needs can be found in **Chapter 3** of this report.

Belle Hill Road

Belle Hill Road from Appleton Road to Muddy Lane is classified by the Maryland Department of Transportation State Highway Administration as a Local Road. There are two lanes of travel with a posted speed limit of 35 mph. There are no consistent shoulders, bicycle, or pedestrian facilities. Major intersections along this portion of Belle Hill Road include MD 316 and MD 279.

Figure 2-1: Belle Hill Road

Muddy Lane

Muddy Lane from Belle Hill Road to Red Hill Road is also classified by the Maryland Department of Transportation State Highway Administration as a Local Road with a posted speed limit of 35 mph on the southern end and dropping to 25 mph at approximately Elkwood Road for the northern end with advisory speed postings of 15 mph around the sharp curves near the railroad underpass. There are no consistent shoulders, and no bicycle facilities. Some sidewalks are found by the Glen Creek Circle neighborhood but are absent elsewhere. Major intersections along Muddy Lane include Belle Hill Road and MD 281 (the roundabout).

Figure 2-2: Muddy Lane

Delancy Road

Delancy Road (MD-781) from Red Hill Road to US 40 is classified as a Major Collector. There are two lanes of travel with a posted speed limit of 35 mph. There are no consistent shoulders, and no bicycle facilities. Some sidewalk facilities are located near newer neighborhoods and businesses. Major intersections along Delancy Road include MD 281 and US 40, both of which are signalized.

Figure 2-3: Delancy Road

Natural Resources

Protecting the area's natural resources while working to improve pedestrian and vehicular safety is of the utmost importance to both Cecil County and the Town of Elkton. The Town strives to protect the quality of its ponds and creeks, as well as the Elk River.

There are wetlands within the study area along Muddy Lane, along with a targeted ecological area. Future improvements to the roadway must aim to protect any natural resources.

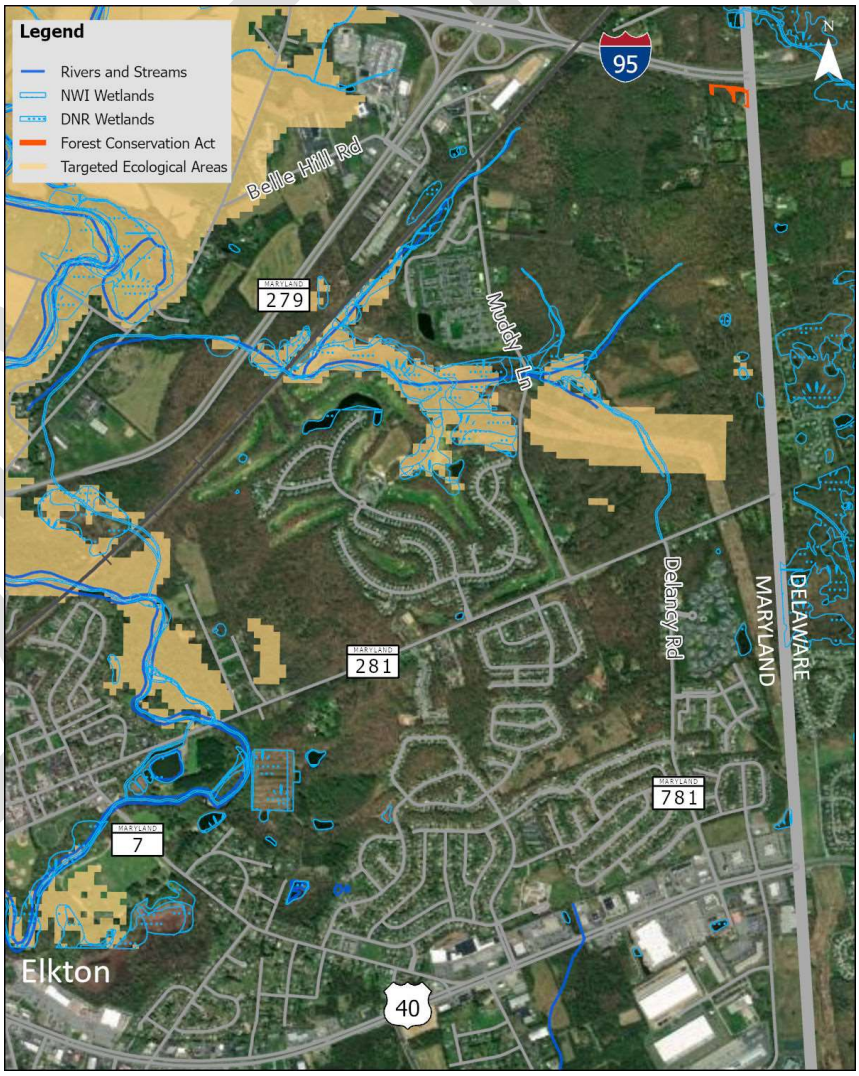


Figure 2-4: Natural Resource Areas in and Around the Project Limits

Cultural Resources

Federal laws mandate the consideration of historic sites in the planning of a federal undertaking including transportation projects utilizing federal funding.

Within the study area, adjacent to Interstate 95 and the railroad is a large Maryland Historical Trust (MHT) Easement. This is highlighted in green on the map and represents the Iron Hill Jasper Quarry Archeological site.

Within all three corridors, there is only one historic property listed – Gray's Hill (Thomas-Kemp House, Graymount, Boulden House, Hill Farm). It is located along Kemp Lane, which is between Muddy Lane and MD 781 (Delancy Road), highlighted in brown on the map to the right. Gray's Hill is said to have hosted the British Army as they camped there during the invasion of 1777.

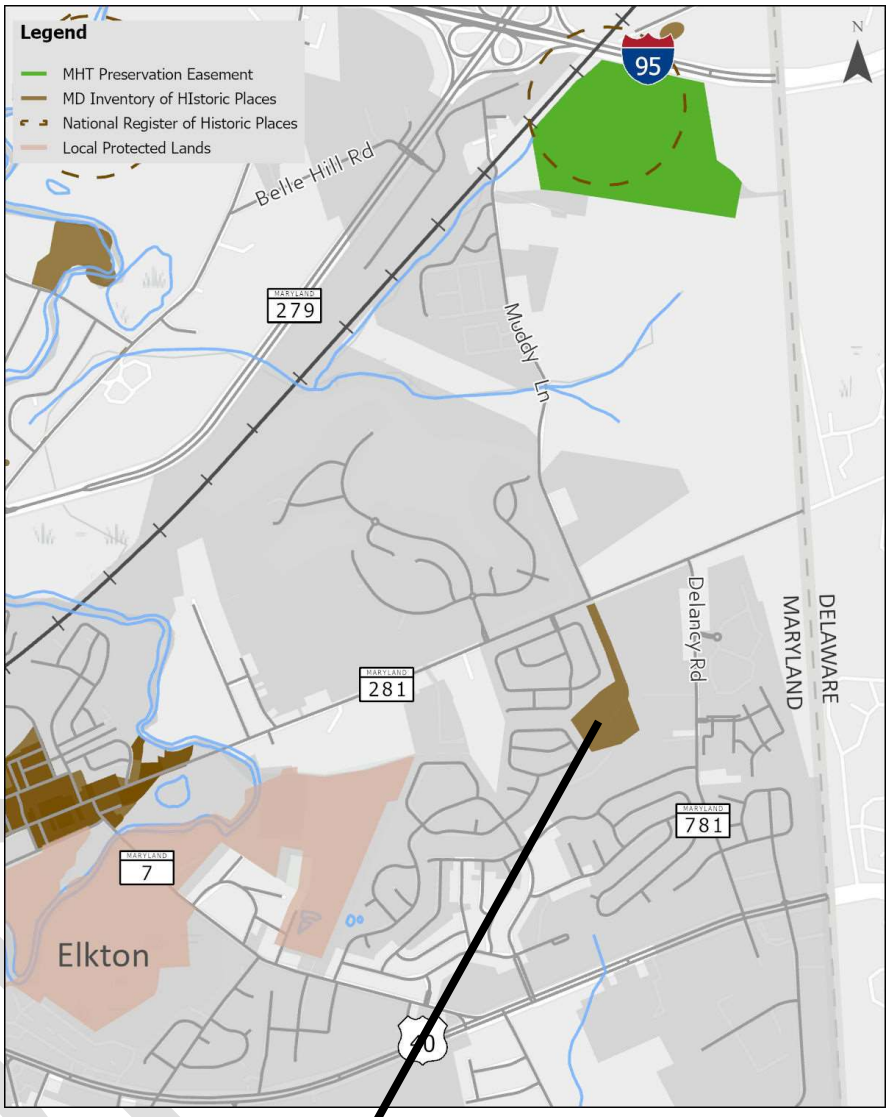


Figure 2-5: The location of the historic property within the project limits

Land Use

This study originated in part from recommendations contained in the Comprehensive Plans for Cecil County (2010) and the Town of Elkton (2010). Both plans include language emphasizing the need for better connectivity between the MD-279 corridor and central Elkton.

The context for these recommendations in 2010 was twofold: to improve connections between Interstate 95 and existing developed areas of the Town, especially central and downtown Elkton, and to enable better transportation connectivity as Elkton grows, especially to the north and northwest, where three of the Town's four Future Growth Areas were designated in 2010 and have not changed.

The Land Use pattern, and corresponding zoning, for the Study Area, are rooted in the Comprehensive Plans for both jurisdictions. **Cecil County and Elkton are both expected to update their Comprehensive Plans within the next few years. The recommendations in this Study can provide guidance to the County and Town as they prepare these plans and plan other changes to improve the built environment in this area, in addition to guiding the implementation of any of this study's concepts.**

It should be noted that the language in the existing Comprehensive Plans focuses on the "bigger picture" of Elkton and the Study Area, both in land area and timeframe, more than the parameters of this study. The intent here is to provide context on the Study Area's Land Use and Zoning that Cecil County and the Town of Elkton can consider as they implement the study and plan for further infrastructure investments and improvements in the future. Also, the study area is within MDP Priority Funding Areas.

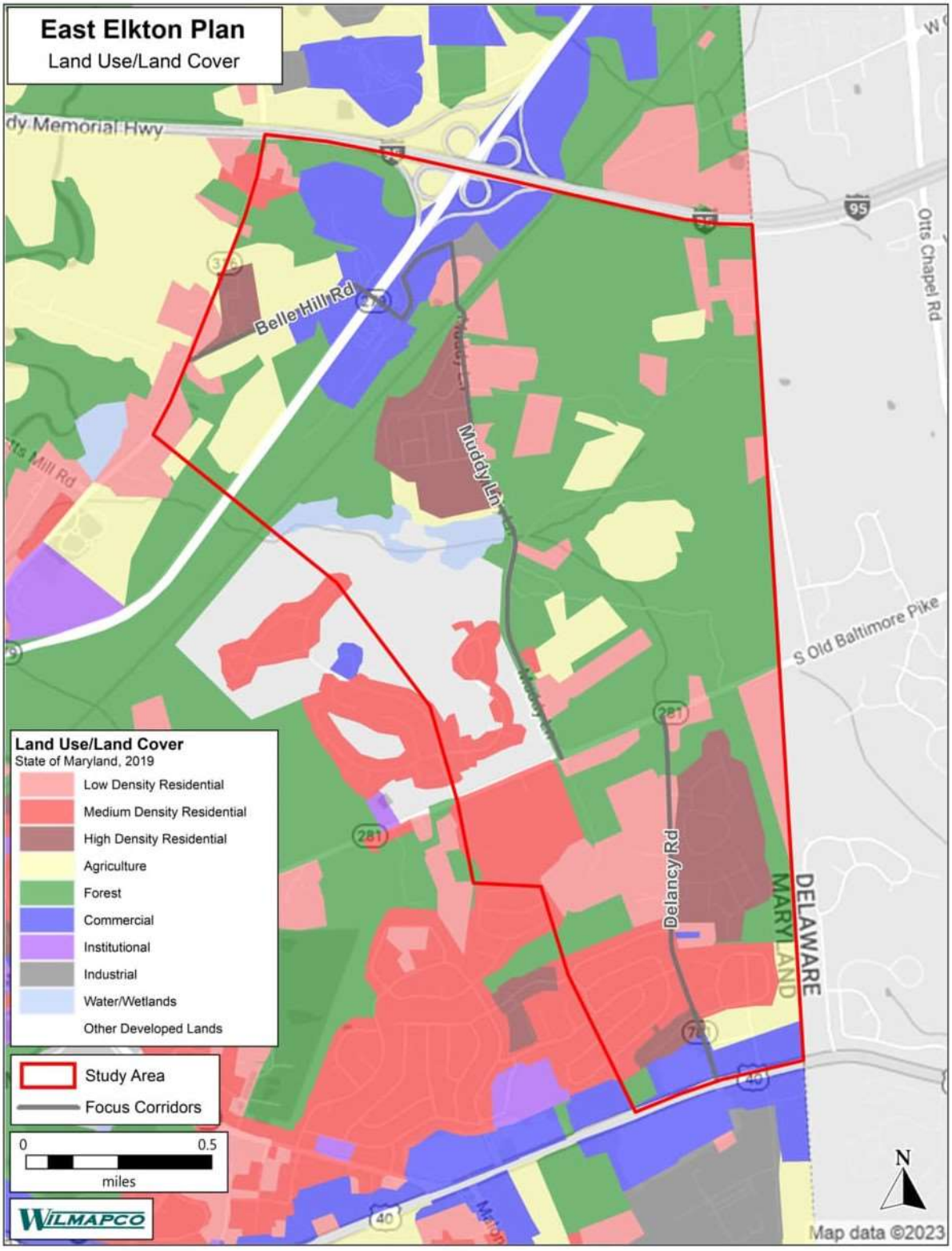


Figure 2-6: Existing Land Use – Task 1 Report

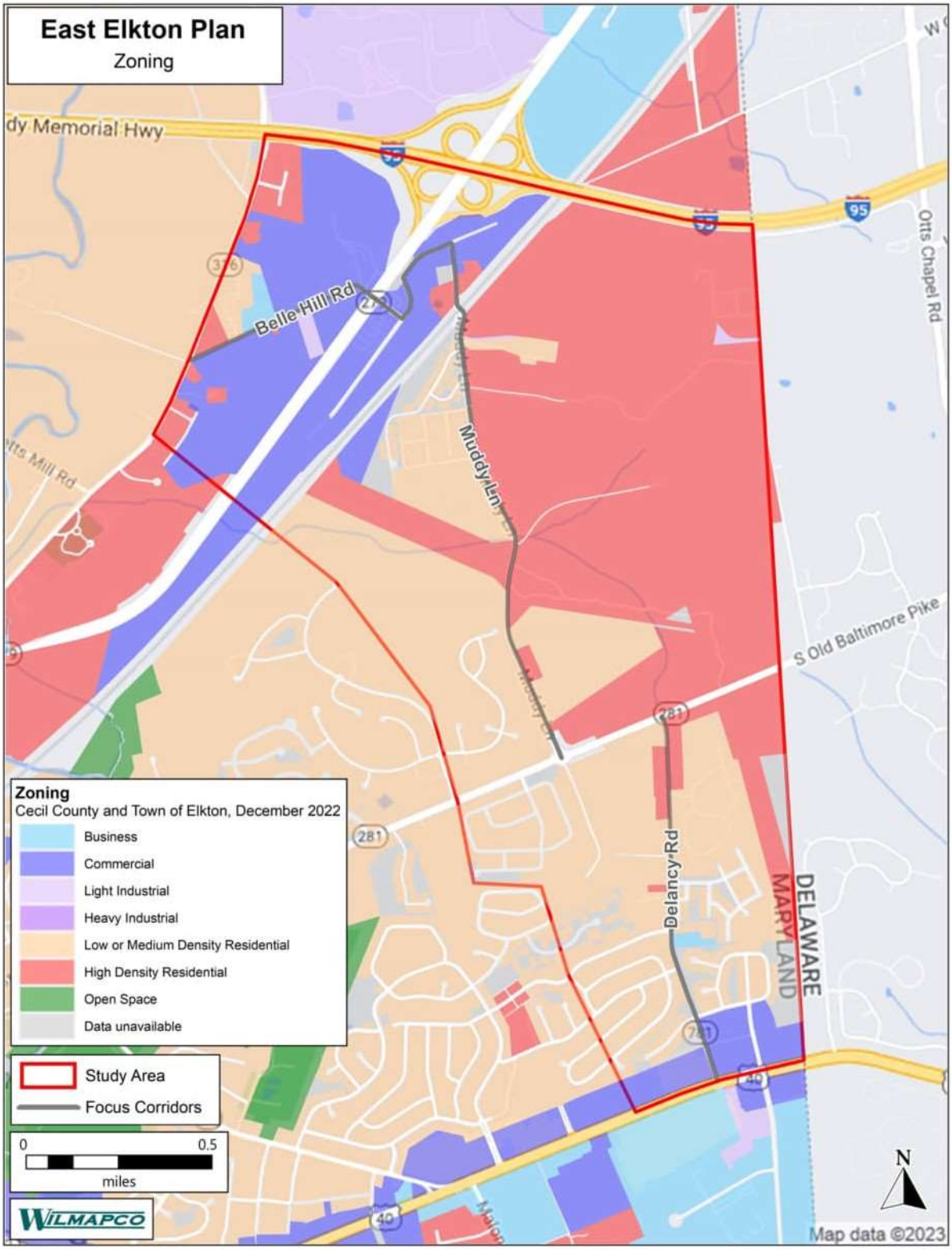


Figure 2-7: Existing Zoning - Task 1 Report

Planning Context

Although each prior comprehensive plan was developed separately, the County and Town employed the same consultant to draft them, in parallel processes that ran between 2008 and 2010. In addition, the Maryland Department of the Environment (MDE) engaged the University of Maryland's Center for Environmental Science to facilitate discussions between the County and Town about the allocation of water resources and how these resources could serve the area's future growth and development.

Growth was a central issue of both plans, as robust growth was forecast for the region at the time, providing an opportunity to shape Elkton's future. To this end, in its 2010 Comprehensive Plan, Elkton designated four Future Growth Areas, including two that overlap with this plan's Study Area. All four are relevant to this Study.

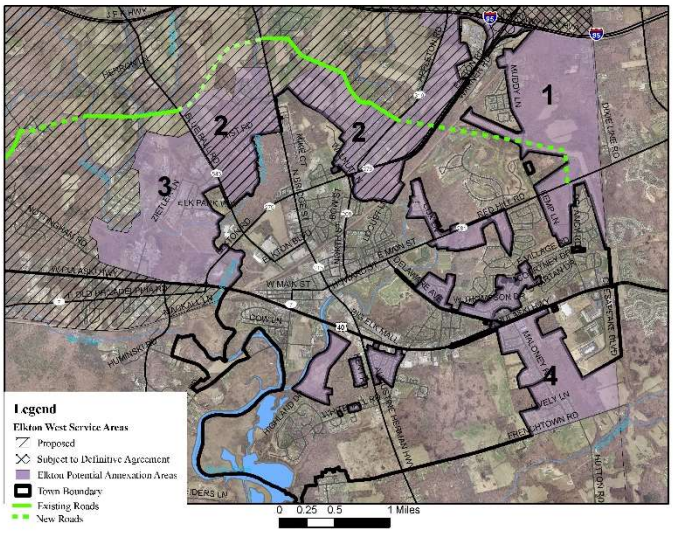


Figure 2-8: Elkton's Designated Growth Areas (2010)

Growth Area 1 includes undeveloped land identified as potential annexation areas east of Muddy Lane and south of Interstate 95. Growth Area 2, the Town's largest, includes unincorporated areas north of the Town boundary west of MD-279 and north of the Town to I-95. Growth Area 3 is north of US-40 and west of Blue Ball Road on western edge of Elkton; while Growth Area 4 is south of US-40 and includes the Southfields development.

Reconciling these areas with the County's plans, especially for infrastructure (transportation, as well as water and sewer), was seen as critical to Elkton's future, in 2010 and beyond, to ensure that the Future Growth Areas could be weaved into the Town's existing neighborhoods as they were built out. Even though the rate of future growth has not met the projections of 2008-10, planning for future growth in the Elkton area remains an important consideration for the Town and County.

To achieve this, both plans supported the development of a Loop Road, to connect Muddy Lane and East Elkton to the Designated Growth Areas. The individual segments of loop road that fall within the study area were considered during this study, one segment was determined to be infeasible or undesirable due to elevation constraints at the existing railroad and stream crossing (see segment 4 below) and one segment was determined to be undesirable due to the disturbance of environmentally sensitive land (see segment 1 below). This study considers a variety of other alignments for east-west connector roads within the Study Area and recommends further evaluation and advancing the following concepts illustrated in Appendix C of this report: Concepts BH-1D, M2-B D-1B, D-2B.

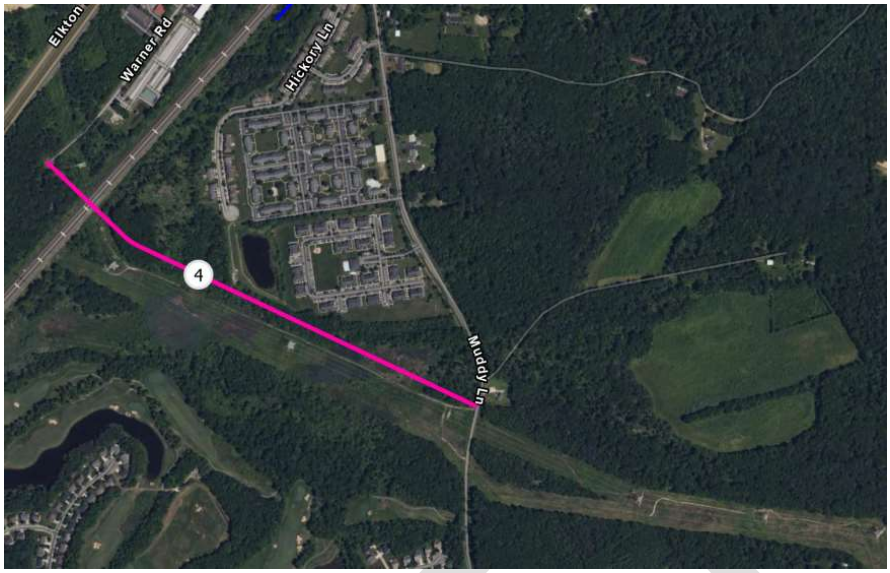


Figure 2-9: Connector Road between Muddy Lane and Warner Road along powerlines

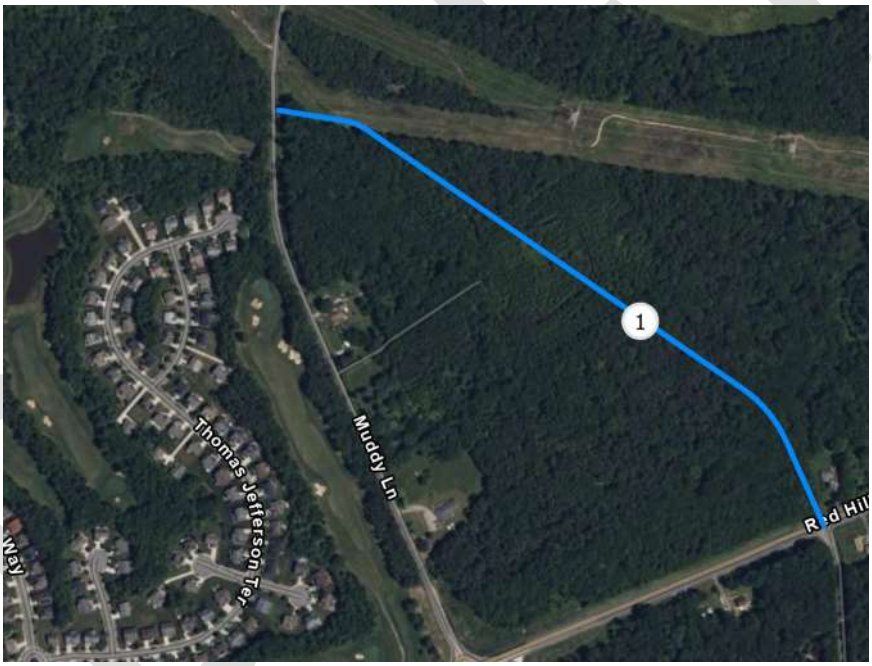


Figure 2-10: Connector Road between Red Hill Road and Muddy Lane

Proposed Elkton Loop Road

When the current Cecil County Comprehensive Plan was approved in 2010, the existing Roadway Improvement Strategic Plan recommended the development of a new northern loop road around Elkton. The intent of this loop road was to increase overall connectivity in the area north of Elkton and Elkton West and provide access to I-95 that does not require travel through central Elkton.

Cecil County's 2010 Comprehensive Plan carried forward the Strategic Plan's recommendation, with a suggested alignment modification in the vicinity of Muddy Lane and Belle Hill Road.

However, there was some concern that implementation of such a loop road could lead to increased traffic congestion on US 40, MD 279, and MD 281 east of Elkton.

The Plan recognized, as this study does, that most local traffic and some regional traffic will use the eastern portion of this loop (between MD 279 and US 40) to bypass the Delaware toll plaza on I-95. The portion of the road east of MD 279 could be costly as it would require an upgrade of the Amtrak railroad crossing at Muddy Lane. The Plan suggested that the pros and cons of this proposed road be carefully studied to ensure that its implementation helps to achieve the County's transportation goals.

To assess the demands of future traffic on the transportation system, MDOT's travel model was run for 2030, using the projected socioeconomic forecasts of population, households, and employment developed by WILMAPCO in 2009, and including 40 miles of planned road improvements from the adopted Long Range Plan (LRP) that were scheduled for completion by 2030.

The Plan also identified some of the key transportation issues that Elkton would need to address with the State and County to connect the Growth Areas to existing developed areas:

- Improving north-south connections between US 40 and I-95. For the US 40 corridor to continue to flourish, preserving and enhancing access to I-95 will be important.
- Improving east-west connections in growth areas. Elkton has several north-south connections that provide good access into and out of the Town, especially to the north. Travel model data shows that the east-west roads (MD 279, MD 281 and US 40) will experience increasing congestion as the Town and region grow.
- Preserving US 40 as a "free flowing" highway through Elkton. If US 40 is to continue to function as the center of commercial activity, not only in Elkton, but for the County as a whole, travel along the road must be efficient and destinations accessible.
- Increasing internal street networks and connectivity so that motorists have options and traffic is not channeled onto a few roads.
- Increasing transit options, especially rail and bus, to reduce automobile trips.
- Increasing and improving options for walking and bicycling.

As approved, the Town's Comprehensive Plan matched the general recommendations in the County Plan. From the Town's perspective, the travel modeling completed in 2010 highlighted the need for new road connections, including a loop road, to implement the Town's land use goals and meet the demands of a growing community. This loop road, as envisioned then, would track north from the end of MD 781 (Delancy Road), connect to Muddy Lane, cross or tunnel under the AMTRAK line near the existing underpass, then cross MD-279 through the Town's future growth areas to existing Marley Road.

The Town Plan suggested that the intersections of this loop road with major north-south roads such as Appleton Road (MD 316), Singerly Road (MD 213) and Blue Ball Road (MD 545) could serve as mixed use "nodes" supporting transit and pedestrian-oriented development, in keeping with the Plan's Land Use element. Cecil County's Roadway Improvement Strategic Plan identified a general alignment for this road in 2007.

Chapter 3. Transportation Needs

Traffic Volume

Annual Average Daily Traffic (AADT) is a measurement of the total volume of daily vehicle travel. The table below shows 2022's AADT ranges in the study area.[4]

Table 3-1: Existing Traffic Volumes and Functional Classifications

	AADT (2022)	Existing Functional Classification
Belle Hill Road	3,000 – 7,000	Local Road
Muddy Lane	5,000 – 6,000	Local Road
MD 781 (Delancy Road)	~ 14,000	Major Collector

Truck Volume

Truck volumes came from 2021 Streetlight data and only included heavy trucks that were at least Class 7 and weighed a minimum of 26,000 pounds.[1] The study area is adjacent to the Critical Urban Freight Corridor on MD 279 north of Interstate 95.[5] The data showed that the most truck traffic was near the intersection of MD 279 and Belle Hill Road. On Elkton Road, heavy trucks comprised 3-4% of all traffic west of this intersection and 5-17% east of the intersection near the I-95 interchange. On Belle Hill Road, heavy trucks comprised about 1% of traffic, but up to 26% of traffic at the intersection with Elkton Road given the presence of the commercial truck facilities there.

Future Volumes

A conservative estimate of the growth rate of the average vehicle miles traveled per year in Cecil County can be used to predict future traffic volumes. These predicted values can then be utilized to ensure proposed solutions would be viable in the future under larger traffic volumes within the system. The base year for the traffic volume projections was 2022 and the volumes were projected to the design year of 2045. The estimated growth rate was determined based on growth rates approved in multiple traffic impact studies for the Town. The figure below uses a compounding growth rate of 1.5 percent per year and assumes that the planned developments both in and around Elkton would be built as expected. The figure below does not consider any modal shifts should these study recommendations be implemented and a comprehensive pedestrian and cyclist network be developed along with additional transit connections and improved transit services.

Table 3-2: Projected Traffic Volumes and Functional Classifications

	AADT (2045)	Existing Functional Classification
Belle Hill Road	4,225 – 9,589	Minor Collector
Muddy Lane	7,042 – 8,450	Minor Collector
MD 781 (Delancy Road)	~ 19,700	Minor Arterial

[4] Streetlight data accessed by WILMAPCO. Referenced from WILMAPCO, *East Elkton Traffic Circulation and Safety Plan - Task 1 Report*, 2023.

[5] Freight Corridors (maryland.gov)

Crash Data

Crash data were compiled from all enforcement agencies by the Maryland State Police.[6] Between June 1, 2022 and June 1, 2023, a total of 79 vehicle crashes were reported along the three study corridors. The most crash prone intersection was MD 781 (Delancy Road) and US 40 with a total of 25 crashes, none of which were fatal. The second most crash prone intersection was Belle Hill Road and Elkton Road with 13 crashes. The table below shows the crash data for the three corridors.

Table 3-3: Crash Data

Crash Clusters/Intersections	Total Crashes	Fatalities	Injuries	Property Damage Only
Belle Hill Road and Elkton Road	13	0	6	7
Muddy Lane and Red Hill Road	3	0	1	2
MD 781 (Delancy Road) and US 40	25	0	9	16
Corridors	**Total Crashes**	**Fatalities**	**Injuries**	**Property Damage Only**
Belle Hill Road west of MD 279	7	0	3	4
Belle Hill Road east of MD 279	4	0	2	2
Muddy Lane	9	0	0	9
MD 781 (Delancy Road)	18	0	5	13

Multi-Modal Transportation

A strong multi-modal transportation network provides safe and efficient alternatives to vehicular travel. Not only does it reduce traffic and congestion, but it also improves connectivity and community health while reducing environmental pollution. All available forms of multi-modal transportation within the study area are shown in **Figure 3-1**.

[6] Source Maryland State Police
https://mdsp.maryland.gov/Pages/Dashboards/CrashDataDownload.aspx

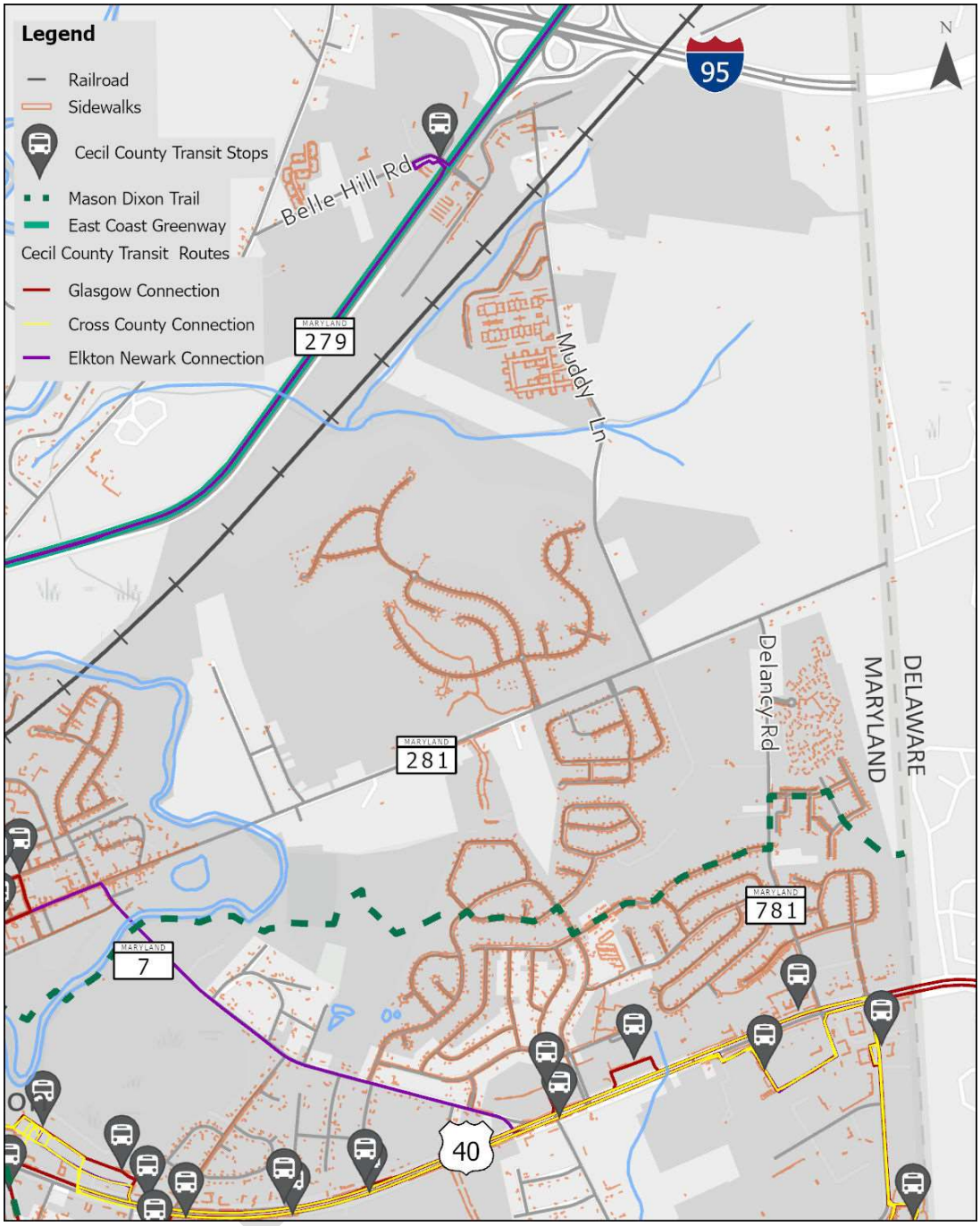


Figure 3-1: Forms of Multi-Modal Transportation Within the Study Area

Transit

The study area is served by three Cecil Transit bus routes: the Elkton-Newark Connection, the Glasgow Connection, and the Cross-County Connection. The Elkton-Newark Connection line travels along Elkton Road (MD 279) and has one stop at the intersection of Belle Hill Road. This connection links Elkton,

Maryland to Newark, Delaware. The other two bus services travel along the southern end of the study area along US 40, connecting Elkton to the rest of Cecil County.

There is an existing park-and-ride facility that is connected to the northbound bus stop at the intersection of Elkton Road (MD 279) and Belle Hill Road available for transit riders. The facility has a total of 25 parking spaces and is located at 291 Belle Hill Road. However, the facility is underutilized with approximately 28 users a year.[7] It is only accessible from Belle Hill Road, lacks appropriate wayfinding signage, lacks adequate lighting, lacks ADA parking spaces, lacks ADA compliant access paths and lacks any desired park-and-ride amenities such as covered or enclosed waiting areas, benches, bus schedule information, bike racks, bus lockers, EV charging facilities, vending machines, or restrooms. It appears to be nothing more than an empty parking lot with a single sign identifying it as a commuter facility.

Figure 3-2: I-95 at MD 279 Park and Ride Facility

Pedestrian Facilities

Pedestrian facilities include sidewalks and trail/shared use path connections. Sidewalks are inconsistent throughout these corridors. As seen in **Figure 3-1**, some sidewalks are provided along short segments of Muddy Lane and MD 781 (Delancy Road) but not enough to connect pedestrians to local points of interest. Most full sidewalk connections are provided in the surrounding neighborhoods, but formal internal connections between neighborhoods are largely absent.

Bicycle Facilities

There are no designated bicycle facilities within the study area. However, Elkton Road (MD 279) is included in the Maryland State Highway Administration (SHA) Bike Spine. The Bike Spine includes

[7] Source Maryland MDOT SHA Park and Ride Facilities GIS Mapping https://data.imap.maryland.gov/datasets/maryland-mdot-sha-park-and-ride-facilities-mdot-sha-park-and-ride-facilities/explore?location=39.657782%2C-75.831583%2C10.74

roadways and trails throughout the state of Maryland that are officially designated as routes meeting specific safety criteria to accommodate bicycles. The East Coast Greenway[8] is a partially developed biking and walking trail stretching from Maine to Florida. As discussed in the 2018 Elkton Pedestrian Plan[9] a previous feasibility study identified a feasible portion of the route through Cecil County. The proposed path extension will consist of an off-road shared use path that is suitable for trail users of all ages and abilities along Elkton Road.

Belle Hill Road, Muddy Lane, and MD 781 (Delancy Road) have no bicycle facilities and no consistent shoulders for cyclists. The Mason Dixon Trail is part of the Elk Neck State Park. A section of the trail passes through Elkton over MD 781 (Delancy Road) and connects into Delaware.

Transportation Needs

To identify and prioritize improvements to the transportation network and provide alternative modes of travel, this study evaluated the existing use of the network and assessed various concepts to improve connectivity, safety and accessibility. Concepts took into consideration the local character, traffic, existing and future land use while following federal and state design guidelines. The various concepts considered include:

- Roadway widening and lane reconfigurations.
- Roadway realignments and connector roads.
- Roadway shoulders and lane widths.
- Intersection control.
    - Traffic signals.
    - Roundabouts.
    - Stop control.
    - Intersection realignments.
    - Additional turn lanes.
- Roadway traffic calming.
    - Medians (permanent and temporary).
    - Channelization.
    - Chicanes.

In addition to the roadway, the following pedestrian and bicycle improvements were also considered:

- Designated bike lanes.
- Shared-Use Paths.
- Sharrows.
- Sidewalk and shared-use path connections.
- Pedestrian crossing improvements including pedestrian refuge islands, high visibility crosswalks, rectangular rapid flashing beacons, and traffic signal retiming.
- General traffic calming.

[8] https://greenway.org/states/maryland

[9] Elkton Pedestrian Plan (wilmapco.org)

Detailed information on the proposed improvements and concepts can be found in **Chapter 4 - Recommended Improvements**.

Chapter 4. Recommended Improvements

A total of 26 concepts (Tables 4.2, 4.3 and 4.4) to improve transportation circulation and safety were developed based upon the public feedback, traffic and crash data, land use, environmental issues, opportunities, and constraints.

Functional Classification

A roadway's functional classification defines the primary purpose the roadway is intended to serve. Functional Classification is an important consideration in determining federal funding eligibility and in making design decisions such as driveway access, lane width, shoulder width, design speed, etc. It is driven by Annual Average Daily Traffic (AADT). Furthermore, there is flexibility in determining functional classification because of overlapping range of values in the guidelines. Arterial highways are intended to accommodate long distance trips with appropriately high limits on access control to allow higher speed limits. Local roads are the opposite in that they are oriented to land access and lower speed limits. Collector roads serve the dual purpose of providing direct land access and conveying traffic between the arterials and local roads. The differences between major and minor collectors are subtle. Minor collectors often are shorter in length, operate at lower speeds, and have greater connecting driveway access.

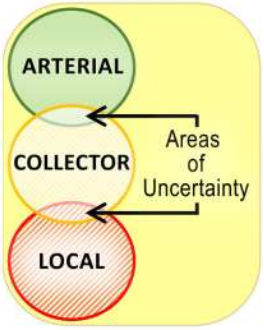


Figure 4-1: Roadway Classifications

Belle Hille Road and Muddy Lane are currently classified by MDOT SHA as local roads. MD 781 (Delancy Road) is currently classified as a major collector. Recent guidance from the Federal Highway Administration[10] provides typical characteristics for the following road classifications:

Table 4-1: Characteristics of Different Roadway Classifications

Typical Characteristics	Minor Arterial	Major Collector	Minor Collector	Local
Lane Width	10-12 feet	10-12 feet	10-11 feet	8-10 feet
Shoulder Width	4-8 feet	1-6 feet	1-4 feet	0-2 feet
AADT (Rural)	1,500 – 6,000	300-2,600	150-1,100	15-400
AADT (Urban)	3,000-14,000	1,100-6,300	1,100-6,300	80-700

[10] FHWA, "Highway Functional Classification Concepts, Criteria and Procedures 2023 Edition" Table 3-6. Available at https://www.fhwa.dot.gov/planning/processes/statewide/related/hwy-functional-classification-2023.pdf

On an average day in 2022, Belle Hill Road carried approximately 3,000 to 7,000 vehicles per day (vpd) while Muddy Lane carried approximately 5,000 to 6,000 vpd and these volumes are expected to increase with the proposed developments along the corridors. Essentially, these local roads are currently functioning and are expected to continue to function as major collector roads.

Meanwhile, MD 781 (Delancy Road) carries about 14,000 vpd and, based upon these volumes, is currently functioning as an urban minor arterial. Preliminary concepts were developed based upon the current function of the roads. **Recommendation: Belle Hill Road and Muddy Lane should be reclassified as urban minor collectors and MD 781 (Delancy Road) as an urban minor arterial.**

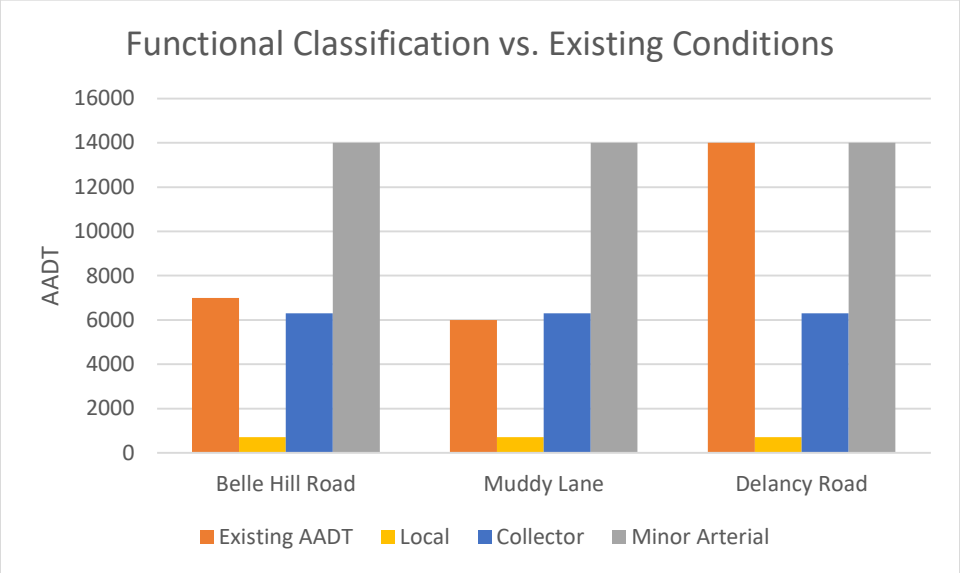


Figure 4-2: Functional Classifications versus Existing Conditions Bar Chart

Bicycle Level of Traffic Stress

MDOT's Bicycle Level of Traffic Stress (LTS) Data sets were reviewed to help understand existing bicycling conditions. The MDOT LTS methodology evaluates the impact of the street characteristics on a bicyclist's experience and classifies streets into one of five "stress levels" for bicycling:

- LTS 1 – Tolerated by all, including children
- LTS 2 – Tolerated by most adults
- LTS 3 – Tolerated by confident cyclists
- LTS 4 – Tolerated by only the "strong and fearless" cyclists
- LTS 5 – Bicycle access prohibited

However, a closer look at the data used to develop the LTS for the study corridors reveals some problems with the assumptions made in the analysis. Belle Hill Road and Muddy Lane have a current MDOT Bicycle Level of Traffic Stress (LTS) of 1 and 2[11].

[11] See Maryland Bicycle Level of Traffic Stress (LTS) Web Application (arcgis.com)

These assessments are based upon a roadway's functional status as a local road having an assumed speed limit of 25 mph. Meanwhile, the posted speed limit on Belle Hill Road is 35 mph and most of Muddy Lane is posted 35 mph, switching to 25 mph north of Elkwood Road. The prevailing speeds (85th percentile speeds) are 45 mph for Muddy Lane and 32-39 mph for Belle Hill Road. Both these corridors lack consistent shoulders. Using the MDOT LTS methodology, the proper LTS for these corridors is 4 (see figure 5-1 below), which is only appropriate for the strong and fearless riders. The MDOT LTS values for MD 781 (Delancy Road) are 3 and 4, which are more consistent with the existing conditions of the roadway. However, the entire corridor should arguably be classified as an LTS 4 due to the lack of consistent shoulder, the traffic volumes and the actual vehicle speeds ranging from 37 mph to 47 mph. In summary, the existing corridors are tolerated only by strong and fearless bicyclists and appropriate facilities are needed on all three corridors to allow bicyclists to comfortably access more destinations. **Recommendation: MDOT should modify its Bike LTS map to reflect LTS 4 conditions on Belle Hill Road, Muddy Lane, and MD 781 (Delancy Road).**

Mixed Traffic Criteria

Number of Lanes	Effective ADT	Prevailing Speed						
		<20mph	25mph	30mph	35mph	40mph	45mph	50+mph
Unlaned 2-way street (No centerline)	0-750	1	1	2	2	3	3	3
	751-1500	1	1	2	3	3	3	4
	1501-3000	2	2	2	3	4	4	4
	3000+	2	3	3	3	4	4	4
1 thru lane per direction (1-way, 1 lane street or 2-way street with centerline	0-750	1	1	2	2	3	3	3
	751-1500	2	2	2	3	3	3	4
	1501-3000	2	3	3	3	4	4	4
	3000+	3	3	3	4	4	4	4
2 thru lanes per direction	0-8000	3	3	3	3	4	4	4
	8001+	3	3	4	4	4	4	4
3+ thru lanes per direction	Any	3	3	4	4	4	4	4

Effective ADT = ADT for two-way roads. Effective ADT – 1.5' ADT for one-way roads

Figure 4-3 MDOT's LTS Methodology[12]

Bicycle Facilities

None of the three corridors in the study area have bikeways. Over 65% of public survey respondents and 69% of the youth surveyed indicated that adding bicycle lanes and paths was a "very important improvement" need.[13] To develop the preliminary concepts, current available guidance[14] was reviewed to determine the recommended type of bicycle facilities for each of the corridors. Based upon the 2022 traffic volumes and 85th percentile speeds the preferred bicycle facilities are either a separated bike lane or shared use path for each corridor. Typical sections prepared for each corridor are included in Appendix C of this report illustrating the various bicycle facilities.

[12] https://www.mdot.maryland.gov/OPCP/MDOT_LTS_Metadata_Methodology_Full.pdf
[13] Second highest need identified. Improve intersections was first at approximately 73%.
[14] FHWA, "*Bikeway Selection Guide*," GHWA-SA-18-077 Washington, DC 2019

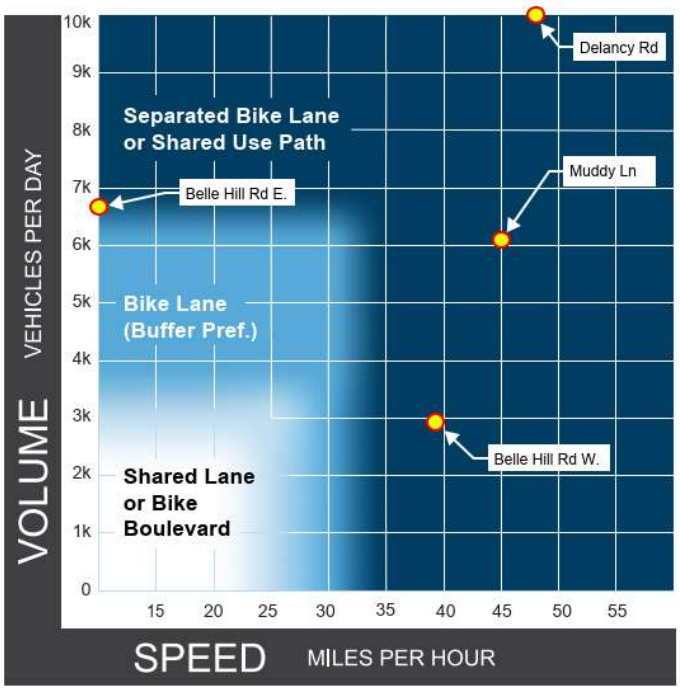


Figure 4-4: FHWA Preferred Bikeway Type for Urban, Urban Core, Suburban, and Rural Town Contexts

Pedestrian Accommodations

There are gaps in the sidewalk and pathway network throughout the study area. To increase the safety and mobility for pedestrians, the minimum improvement needed along each of the three corridors is a continuous ADA compatible pedestrian route. Accordingly, two general concepts were proposed: a concept with a five-foot-wide sidewalk and a concept with a 10-foot-wide shared use path for both bicyclists and pedestrians. For Belle Hill Road a third concept BH-2E (a sidewalk and bike lane) was presented. Most public survey respondents preferred that concept for Belle Hill Road. Meanwhile, there was a strong preference for the shared use path concepts on the other corridors. However, the shared use path concepts require less right of way and less environmental impact. The shared use path concept on Belle Hill is the preferred alternative of Elkton planning staff and provides a seamless connection to the proposed path system of the East Coast Greenway. **Recommendation: Further pursue the concept of a shared use path along all corridors.**

Belle Hill Road Concepts

Table 4-2 is a full list of the ten concepts developed for Belle Hill Road. Figure 4-5 shows the locations of these ten concepts.

Table 4-2: Belle Hill Road Concept Descriptions

Number	Description	Purpose	% Public Support
BH-1A	*Channelizing Island*	*Improve traffic flow and safety at skewed intersection of Appleton Road and Belle Hill Road*	29
BH-1B	*Shared Use Path Typical Section*	*Proposed Roadway Typical Section to improve bike and pedestrian mobility along corridor*	29
BH-1C	*Median Treatment with Horizontal Deflection*	*To achieve speed reduction through lane narrowing and deter trucks from traveling west along Belle Hill Road*	53
BH-1D	*Connector Road*	*Potential Roadway Realignment to improve connectivity between Belle Hill Road and Appleton Road for commercial vehicles*	N/A
BH-1E	*Service Plaza Driveway Circulation Improvements and Median Extension*	*Potential driveway and intersection improvements to improve queuing capacity at intersection of Belle Hill Road and Elkton Road*	32
BH-2A	*Realign Intersection*	*Improve traffic flow and safety at skewed intersection of Appleton Road and Belle Hill Road by realignment of Belle Hill Road*	45
BH-2B	*Sidewalk Typical Section*	*Proposed Roadway Typical Section to improve pedestrian mobility along corridor*	14
BH-2C	*Chicane*	*To slow traffic using curb extensions to form S-shaped curves. Also to deter trucks from traveling west along Belle Hill Road*	18
BH-2D	*Realign Intersection and Median Extension*	*Potential driveway and intersection improvements to improve queuing capacity at intersection of Belle Hill Road and Elkton Road*	53
BH-2E	*Sidewalk with Bike Lane*	*Proposed Roadway Typical Section to improve bike and pedestrian mobility along corridor*	36

Figure 4-5: Belle Hill Road Concept Locations

Belle Hill Road at Elkton Road (MD-279)

Belle Hill Road intersects both Elkton Road (MD 279) and Appleton Road (MD 316) at sharply skewed intersections where community members expressed concerns and where many crashes occurred. See Figure 4-6 below.

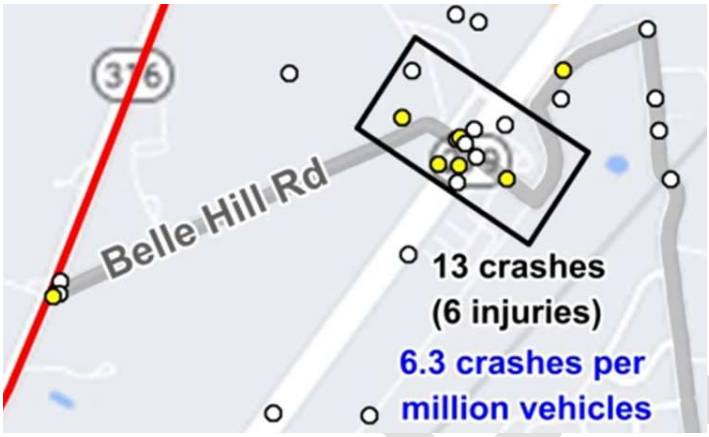


Figure 4-6: Crash Clusters along Belle Hill Road

This intersection is the second most crash prone location in the study area. There was a total of 20 crashes at the intersection between January 2020 to December 2023, 9 of which were injury-related crashes. Five (5) crashes were classified as a sideswipe, 3 were classified as a rear-end crash, and 3 crashes involved pedestrians. A full crash analysis would need to be performed to determine the root cause of the crashes. The greatest concern is the pedestrian crashes, which are all injury related.

In addition, the existing traffic signal does not give all walkers enough time to cross MD 279. To cross Elkton Road, the pedestrian signals were timed to approximately 32 seconds (5-second solid white hand crossing signal and 27-second countdown). The crossing distance is approximately 145 ft to cross Elkton Road completely (curb to curb). Using the required walking speed of 3.5 ft/s, a pedestrian would need at least 41 seconds to cross, so there is an existing shortage of crossing time. There is an existing refuge island on Elkton Road with pedestrian buttons, so it appears that the intersection may have been designed as a multistage crossing. The issue with this design is that while faster pedestrians may be able to cross in a single pass, slower pedestrians must wait at the crossing island for almost a full cycle or risk conflict. Under this design pedestrian delay can be very long and could contribute to the pedestrian related crashes at this intersection. There are signal timing techniques that can limit the delay at multi-stage crossings. One way is to change the cycle length so that the amount of time pedestrians would have to wait at the crossing island is decreased. Since half-crossing requires a shorter phase than a full crossing, it should be possible to provide the same vehicular capacity with a shorter cycle. Another technique is to have some crossings to and from the median run concurrently with a left turn phase since the pedestrian facilities crossing Elkton Road are only located on one side of the intersection.

To cross Belle Hill Road at this intersection, the pedestrian signals were timed for approximately 22 seconds (5-second solid white hand crossing signal and 17-second countdown). The curb-to-curb length is approximately 90 feet. Using the required walking speed of 3.5 ft/s, a pedestrian

would need at least 26 seconds to cross, so there is a slight shortage of time for crossing this leg of the intersection as well. **Recommendation: It is recommended that the pedestrian clearance time at this intersection be revised to accommodate a slower walking speed so that walkers can make it across the entire road safely and/or the pedestrian delay at the multi-stage crossing is limited through signal timing techniques. Consideration could also be given to a leading pedestrian interval (LPI).[15]**

Additionally, the existing crosswalk pavement markings are faded and the sight distance for vehicles turning right from SB Elton Road to Bell Hill Road (towards the McDonalds) is obscured by vegetation. **Recommendation: Pavement markings should be refreshed or replaced with high visibility pavement markings to increase motorist visibility of pedestrians. Vegetation on the northwest quadrant of the intersection should be continuously trimmed to maintain proper sight distance triangles.** Furthermore, there are two bus stops situated at this intersection and Elkton Road has a posted speed limit of 50 mph and 64 mph is the 85th percentile speed. It is believed that pedestrian conflicts are being both created and emphasized by the presence of these bus stops. Pedestrians may be illegally crossing the roadways to reach the bus stops, especially with the existing crosswalk markings fading away. Also, vehicles are quickly travelling on the roadway at speeds where drivers may not be reacting to pedestrians that are illegally in the roadways within an appropriate amount of time to properly respond to the situation. **Recommendation: There are various additional safety countermeasures that should be considered, including confirming properly timed yellow change intervals, adding backplates with retroreflective borders, confirming adequate lighting levels at the intersection, and ensuring there is proper pedestrian access to the bus stops.**

Figure 4-7: Backplate with Retroreflective Border (Source: FHWA)

[15] An LPI is an FHWA Proven Safety Countermeasure that gives pedestrians the opportunity to enter the crosswalk at an intersection 3 to 7 seconds before vehicles are given a green indication to better establish their presence in the crosswalk before vehicles turn right or left. One study concluded LPI's have a 13% reduction in pedestrian vehicle crashes at intersections[15]. Since the minor road operates in split phasing, these timing modifications may lead to a longer queue of vehicles when pedestrians are present, but it is necessary for pedestrian safety to provide pedestrians with adequate time to cross the road. It is also advisable to time two-stage crossings with acceptable pedestrian delay to prevent them from routinely crossing against the light rather than waiting unacceptably long in the median.

Figure 4-8: Intersection of Belle Hill Road and Elkton Road

A major issue at this intersection is that tractor trailers leaving the truck stop on Belle Hill Road consistently block the through movements due to lack of available space for trucks to queue at the intersection with Elkton Road. Survey respondents identified improving this intersection as the number one priority for Belle Hill Road.

Figure 4-9: Intersection of Belle Hill Road and Elkton Road (Source: Bing Maps)

Concept alternatives were prepared to improve traffic flow and safety at the intersection. See Appendix C - Concepts BH-1E (service plaza driveway circulation improvement) and BH-2D (intersection realignment). A majority of those who took the survey preferred the intersection realignment concept (52%). **Recommendation: Both concepts should be further evaluated during the preliminary design phase.** Another possibility to improve the flow of traffic and control the queue along the eastbound Belle Hill Road approach at MD 279 (Elkton Road) is to install a metering traffic signal at the truck stop driveway to manage the number of trucks entering the intersection and force trucks to queue along the service plaza driveway. The signal would need to be coordinated with the existing traffic signal with queue detection to determine the presence or severity of the queue spillback within the driveway. This approach would require programming of the traffic signal controller to adapt to the varying traffic demands and require a traffic study and model to predict feasibility and effectiveness.

Belle Hill Road at Appleton Road (MD 316)

The alignment on Belle Hill Road at its intersection with Appleton Road (MD 316) inhibits the view of motorists. Concept alternatives were prepared to improve traffic flow and safety. See Appendix C - Concepts BH-1A (a channelizing island) and BH-2A (intersection realignment). Most public survey respondents and the Elkton Town officials prefer the intersection realignment option. **Recommendation: This concept will require right-of-way acquisition but appears to be the better long-term solution for this intersection and the concept that should be advanced.**

Another concern along Belle Hill Road involves the mix of residential and truck-generating commercial land uses. To deter commercial vehicles from traveling west on Belle Hill Road, where truck through traffic is currently prohibited, two different concepts were proposed. See BH-1C (a median treatment) and BH-2C (a chicane). Both improvements, which would also act to slow speeds, would be situated near the location where the road changes ownership.

Figure 4-10: Median Treatment Example (Source: Google Maps)

Figure 4-11: Chicane Example

Most public survey respondents preferred the median treatment option. A potential two-lane connector road concept (BH-1D) was also proposed to improve the connectivity between Belle Hill Road and Appleton Road and to separate the mixing of residential and truck-generating commercial land uses. See Appendix C, Figure 1 for details. **Recommendation: Implement the median treatment option along Belle Hill Road and further pursue the concept of a connector road between Belle Hill Road and Appleton Road.**

Muddy Lane Concepts

Biodiversity Conservation

Muddy Lane's existing conditions do not conform to geometric design standards established by the American Association of State Highway and Transportation Officials (AASHTO) for roadways. Most of Muddy Lane has no shoulders and there are sharp horizontal curves and a railroad underpass with an 11-foot vertical clearance. This makes travel along Muddy Lane a safety concern for both motorized and non-motorized users, particularly with potential increased volume in the future. Muddy Lane has retained rural features such as open ditches and being heavily wooded on both sides throughout much of the corridor. However, it is situated in a Suburban Zone with various single-family houses along the corridor as well as Glen Creek Apartments and the Meadows at Elk Creek on the western side of the road. In between these apartment complexes on the western side is a forested area with wetlands. This wetland area and the forested area on the eastern side of Muddy Lane were identified as significant for biodiversity conservation, specifically Tier 1, which is considered extremely significant. This Tier 1 area is surrounded by land classified as Tier 5, which is also considered significant for biodiversity conservation.

Traffic Calming on Muddy Lane

Table 4-3 is a full list of the six (6) concepts developed for Muddy Lane. Figure 4-12 shows the locations of these six concepts. Most of the public survey respondents preferred the shared use

path with wide landscape/bioretention area concept (M-4A), which attempts to blend the corridor in with the surrounding high priority biodiversity conservation area. Tree planting in this widened area along a corridor may also reduce vehicle speeds by appearing to narrow the width of the roadway. Reducing vehicle speed is an important consideration with Muddy Lane having the highest 85th percentile speed of any of the three corridors studied (45 mph). Other speed related countermeasures should be considered such as additional speed limit signage, speed feedback signs, and lane narrowing. However, speed enforcement should also be part of a comprehensive community traffic calming plan, particularly on Muddy Lane where the average vehicle speed is nearly twice the posted speed limit. To that end, the Cecil County 2021-2025 Strategic Highway Safety Plan[16] identifies an ongoing action item for the Cecil County Sheriff's Office to lead efforts to increase enforcement of speed and aggressive driving (ENF-2).

[16] https://zerodeathsmd.gov/wp-content/uploads/2021/07/Cecil-County-Strategic-Highway-Safety-Plan-2021-2025-Final-PDF-23-Jun-21.pdf

Figure 4-12: *Muddy Lane Concept Locations*

Table 4-3: Muddy Lane Concept Descriptions

Number	Description	Purpose	% Public Support
M-1A	*Shared Use Path Typical Section*	*Proposed Roadway Typical Section to improve bike and pedestrian mobility along corridor*	34
M-1B	*Underpass Rendering*	*Alignment modification at Muddy Lane Amtrak Crossing*	61
M-2B	*Muddy Lane Realignment and Bridge Rendering*	*Alignment modification at Muddy Lane Amtrak Crossing. Proposing reuse of existing Muddy Lane alignment under railroad and existing underpass for pedestrians and bicycles*	33
M-2C	*Roundabout*	*Alternative intersection control*	N/A
M-4A	*Shared Use Path with Landscape Bioretention Area*	*Proposed Roadway Typical Section to improve bike and pedestrian mobility along corridor while adding vegetative buffer between roadway and shared use path*	36
M-4B	*Truck Turnaround and Trail Parking*	*Interim truck turnaround within powerline easement to provide trucks last chance to turnaround to avoid underpass*	79

Amtrak Bridge over Muddy Lane

In addition to the concerns over vehicle speeds and lack of pedestrian/bike accommodations, the railroad underpass was highlighted during the community vision phase of this plan. In 2015 Cecil County completed a traffic study of Muddy Lane to identify crash trends, evaluate existing conditions, and identify short-, mid- and long-term improvements along Muddy Lane at the underpass. The study recommended short term signage and pavement marking improvements, many of which have been implemented. However, despite the improved signage, residents along Muddy Lane raised concerns that trucks are still frequently traveling on Muddy Lane and having to turn around in driveways and front yards. Streetlight traffic data was reviewed and confirmed that 17 heavy trucks per day turned onto Muddy Lane from Belle Hill Road, but that Muddy Lane only averaged 10 heavy trucks and 100 medium trucks per day south of the underpass. A fair interpretation of that data is that approximately 7 heavy trucks per day are turning onto Muddy Lane and then turning around to avoid the underpass. **Recommendation: Additional signage should be added as a short-term mitigation option to prevent trucks coming from the north. Accordingly, a concept signing plan was provided to Cecil County on April 2, 2024 and it is included in Appendix C of this report.**

A mid-term option proposed during this study was an interim truck turnaround within the powerline easement south of the underpass. This would provide northbound trucks a last chance to turn around to avoid the underpass (Concept M-4B). The turnaround could be converted into a trail parking lot or could be designed to serve both functions. The inspiration for this concept came from pull-off facilities often used in national parks designed to provide both cars and large recreational vehicles trail parking and turnaround opportunities. Nearly 80 percent of survey respondents liked the concept with those opposed raising concerns over cost and general security concerns typically associated with public parking areas.

The County's 2015 Muddy Lane study assessed four different long-term alternatives to improve the railroad underpass. Two alternatives realigned Muddy Lane under the existing underpass to increase the vertical clearance and horizontal alignment. The study concluded that these options would be too costly. A third alternative involved an underpass replacement, with better horizontal alignment and vertical grade improvements. The fourth and final alternative realigned

Muddy Lane over top a new bridge above the railroad tracks and eliminated the underpass. The 2015 study recommended the bridge overpass with the secondary choice being the underpass realignment/replacement should the overpass be infeasible. The present study further developed these two alternatives, including creating renderings and gathering public feedback.

More than 61% of public survey respondents preferred the improved underpass alternative to the bridge over Amtrak option. Approximately 80% of survey respondents ranked the need to improve this crossing as very important or extremely important. Some of those opposed to the underpass alternative were residential property owners that would be potentially displaced. Preliminary review of this alternative indicates that 8 properties, totaling 2 acres, will be impacted.

Figure 4-13: Improved Underpass Rendering

The bridge over the Amtrak railroad option presented to the public proposed to maintain the existing underpass to accommodate a shared use path. This could be an important consideration given the proposed vertical slopes of the bridge approaches and the need to meet the slope restrictions of The Americans with Disabilities Act. The advantage of this alternative is the direct roadway connection between Belle Hill Road and Muddy Lane. The disadvantage of this alternative is approximately 4 acres of right-of-way will be needed with extensive earthwork and three stream crossings.

Another consideration is the toll avoidance issue detailed in the Task 1 Report. As stated, drivers on I-95 must pay a toll to cross the Maryland-Delaware border in both directions but can avoid the toll by using the non-interstate routes. The origin-destination analysis revealed that both local and regional traffic are taking these alternative routes to avoid the toll. On the average day in 2022, 60 percent of local traffic between East Elkton and I-95 in Delaware avoided paying the toll. Meanwhile, approximately 2 to 4 percent of regional drivers used local roads to avoid the toll. These proposed improvements will likely exacerbate the toll avoidance, particularly for heavy truck traffic that will no longer be restricted by vertical clearance limitations on Muddy Lane.

Figure 4-14: Bridge over Amtrak Rendering

Recommendation: Study both the improved underpass and the bridge over Amtrak alternatives further.

Delancy Road (MD-781) Concepts

Table 4-4 is a full list of the ten concepts developed for Delancy Road.

Table 4-4: Delancy Road *Concept Descriptions*

Number	*Description*	*Purpose*	*% Public Support*
D-1A	*Roundabout*	*To improve safety and mobility at the intersection of Delancy Road and Red Hill Road*	37
D-1B	*Sidewalk Typical Section*	*Proposed Roadway Typical Section to improve pedestrian mobility along corridor*	29
D-1C	*Pedestrian Refuge Island*	*Possible safety improvement at proposed uncontrolled crosswalk*	76
D-1D	*Proposed 10 ' Shared Use Path*	*Proposed pedestrian and bicycle connection between intersection of Muddy Lane and Red Hill Road and Delancy Road*	17
D-1E	*Proposed crossing at Muddy Lane and Red Hill Road*	*Proposed pedestrian and bicycle connection at the intersection of Muddy Lane and Red Hill Road*	N/A
D-1F	*Proposed Playground improvements, connection to Royal Farms and Right-In/Right-Out*	*Alternative location for left hand turns into and out of Royal Farms*	63
D-2A	*Add Right Turn Lane*	*Proposed mobility improvement at the intersection of Delancy Road and Red Hill Road*	57
D-2B	*Shared Use Path Typical Section*	*Proposed Roadway Typical Section to improve bike and pedestrian mobility along corridor*	55
D-2C	*Proposed Kemp Lane*	*Proposed connection between intersection of Muddy Lane and Red Hill Road and Delancy Road*	42
D-2D	*Royal Farms Left Turn Restriction*	*Proposed improvements to restrict left hand turns into and out of Royal Farms driveway*	92

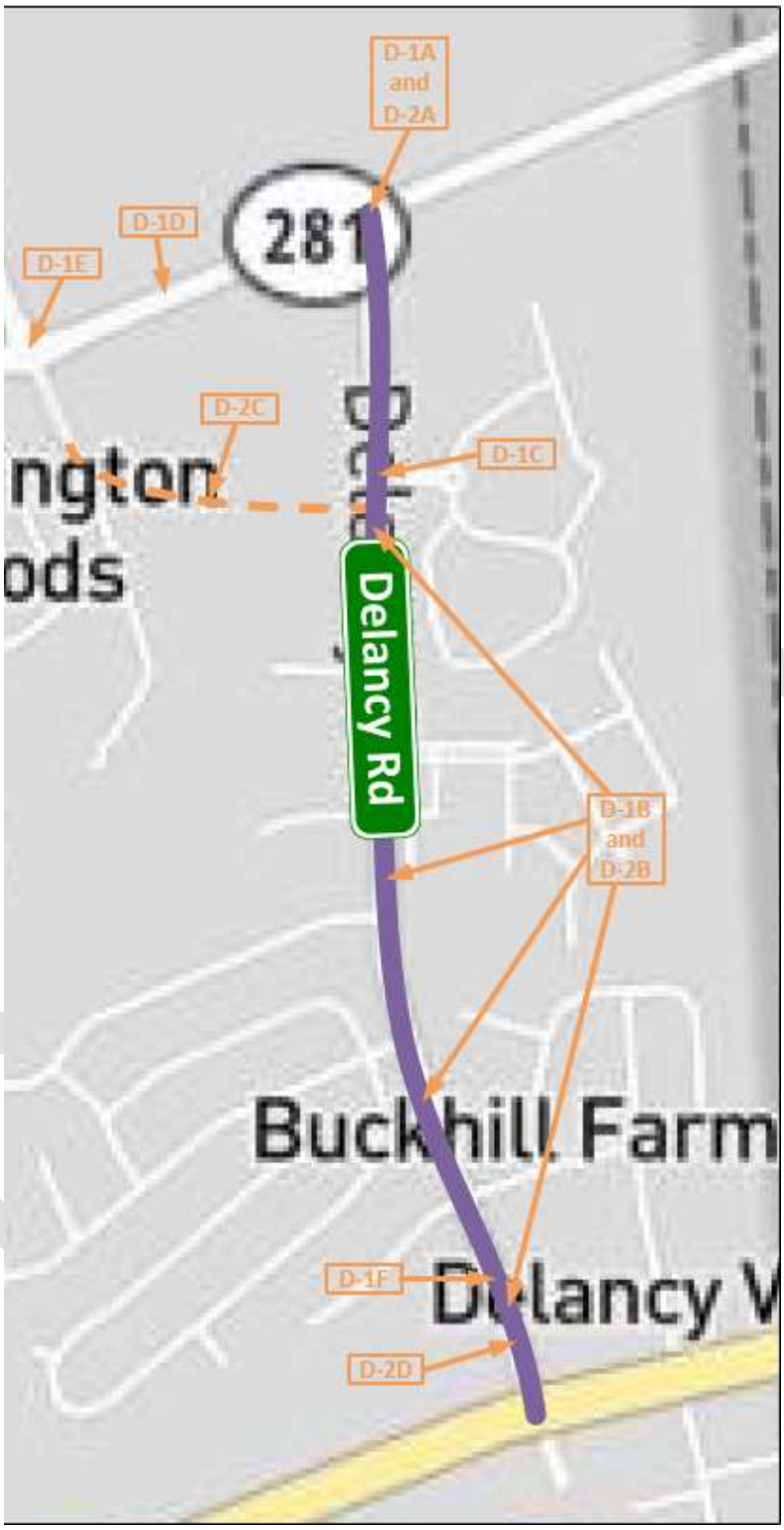


Figure 4-15: *Delancy Road Concept Locations*

Despite being only one mile in length, Delancy Road (MD 781) has a variety of roadway configurations. It transitions from two-lanes in the north to four-lanes in the south with a variety of dedicated left turn lanes, right turn acceleration lanes, right turn deceleration lanes, and

intermittent sidewalks. Due to the residential land use along Delancy Road (MD 781), with commercial destinations along both sides of the corridor, the traffic volumes (14,000 vpd) and vehicular speeds (37 mph to 47 mph), both the Steering Committee and the public recommended pedestrian amenities on both sides of Delancy Road (MD 781). The recommendation for pedestrian facilities on both sides was also made in the 2018 Elkton Pedestrian Study with a clarification that the southern half received a higher pedestrian prioritization score and should be built first. In addition to the separate pedestrian facilities, the inconsistency in the lane configuration can cause driver confusion. **Recommendation: Replacing these inconsistent lanes with two travel lanes of consistent width divided by a two-way left turn lane for the exclusive use of left turning vehicles should be considered.** This concept separates passing vehicles to minimize the risk of head on collisions, removes left turning movements from the through lanes and provides an area for pedestrian refuge islands[17]. Approximately 85 percent of survey respondents agreed with the recommendation to replace the various turn lanes with a two-way left-turn lane.

Due to the desire for pedestrian amenities on both sides safe crossings must also be provided. The Federal Highway Administration's *Guide for Improving Pedestrian Safety at Uncontrolled Crossing Locations*[18] was reviewed to select countermeasures at the various uncontrolled pedestrian crossing locations. **Recommendation: High-visibility crosswalk markings and pedestrian refuge islands were proposed (Concept D-1C). Additional countermeasures to be considered during the preliminary design phase include streetlighting, advance pedestrian signs, and pedestrian hybrid beacons.**

In addition to the proposed improvements along MD 781 (Delancy Road), a proposed connector road partially utilizing the alignment of the private drive Kemp Lane was presented as either a shared use path (Concept D-2B) or a road with a shared use path (Concept D-2C). A majority of public survey respondents preferred the connector road with shared use path concept (42 percent) over the shared use path only concept (17 percent), but approximately 25 percent of respondents were unsure and 16 percent recommended no change. **Recommendation: Given the presence of the historic property referenced in Chapter 2 of this report and the connectivity analysis referenced in Chapter 6, additional evaluation and prioritization of this proposed connection is recommended.**

Delancy Road (MD 781) at Red Hill Road (MD 281)

Based upon field observations and public feedback there are delays at the intersection of Delancy Road (MD 781) and Red Hill Road (MD 281). Concept D-1A proposed to replace the existing traffic signal with a roundabout. Roundabouts often outperform signalized intersections in both safety and mobility and are effective when combined with other roundabouts such as the existing roundabout at the intersection of Red Hill Road (MD 281) and Muddy Lane. Together these roundabouts would improve safety along Red Hill Road (MD 281) and allow full access to the proposed future development even with driveways restricted to right-in/right-out movements. Another concept presented (Concept D-2A) proposed to add a dedicated right turn lane on MD

[17] A pedestrian refuge island is a median with a refuge area that is intended to help protect pedestrians who are crossing a multilane road. This countermeasure is sometimes referred to as a crossing island, refuge island, or pedestrian island.

[18] https://www.fhwa.dot.gov/innovation/everydaycounts/edc_5/docs/STEP-guide-improving-ped-safety.pdf

781 (Delancy Road) at the intersection. Most of the public survey respondents preferred to add a right turn lane (58 percent) over a roundabout (37 percent). **Recommendation: Given the proven safety, capacity and access benefits associated with roundabouts, an intersection study should be performed to help guide the final decision.**[19]

Delancy Road (MD 781) at Pulaski Highway (US 40)

The most crash prone intersection in the study area is the intersection of Delancy Road (MD 781) and US 40.

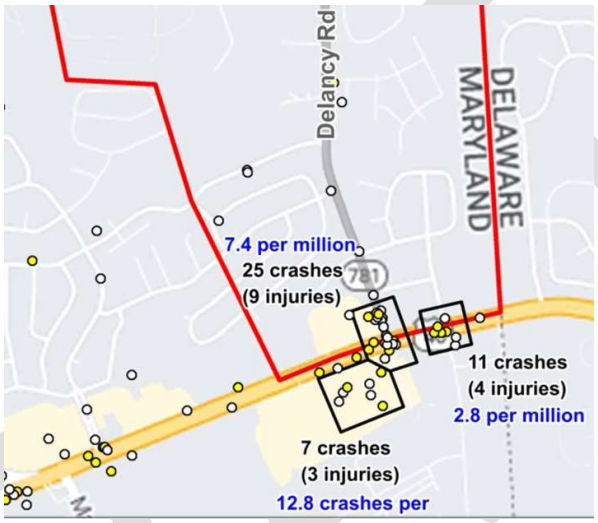


Figure 4-16: Crash Clusters at MD 781 (Delancy Road) and US-40

There were a total of 35 crashes at the intersection between January 2020 to December 2023, 11 of which were injury-related crashes. Twelve (12) of the 35 crashes were sideswipes and 10 were rear-end crashes. **Recommendation: A full crash analysis should be performed to determine patterns associated with the crashes.** Most public comments/concerns referenced conflicts with the Royal Farms driveway and that U-turns from eastbound US-40 and right turns from southbound MD 781 (Delancy Road) occur at the same time.

Royal Farms Driveway Along Delancy Road (MD 781)

During the visioning phase of this plan, out of 116 survey respondents who answered the question, “what concerns you the most?”, 10 respondents wrote comments about the Royal Farms driveway at MD 781 (Delancy Road) and the need to restrict turning movements. The youth survey received similar comments. During the concept phase of this plan, over 91% of respondents agreed that left turns should be restricted in/out of Royal Farms from/to MD 781 (Delancy Road).

[19] See 2024 NCHRP Research Report 1087: *Guide for Intersection Control Evaluation.* https://nap.nationalacademies.org/catalog/27509/guide-for-intersection-control-evaluation?utm_source=TRB+Weekly&utm_campaign=7eed613271-EMAIL_CAMPAIGN_2024_02_12_07_16&utm_medium=email&utm_term=0_c66acb9bce-7eed613271-%5BLIST_EMAIL_ID%5D#resources

Figure 4-17: Example Left Turn Restriction at Service Station Driveway using Flexible Post Delineators (Source: Google Maps)

Restricting left turns by concrete median, flexible post delineators or a combination of the two would cause traffic to detour to enter the Royal Farms. A map was prepared to show those anticipated traffic flows – see Appendix C. An additional concept was prepared (Concept D-1F) to upgrade an existing Elkton Town park to the north and provide a roadway realignment to improve access and safety at the Royal Farms intersection. Approximately 63 percent of survey respondents liked the idea of the access road coupled with a playground upgrade. There was even strong support from youth, with multiple ideas for the park also shared.
Recommendation: Create an access road to Royal Farms coupled with a playground upgrade.

Figure 4-18: Concept D-1F

U-Turn and Right Turn Conflict

Field observations noted near misses with most of the U-turning traffic going into the Royal Farms parking lot. There is a U-turn Yield to Right Turn (sign R10-16) giving the right turns the

right of way, but the signage is either being disregarded or is not being seen.
Recommendation: The R10-16 sign is recommended to be placed next to the left turn signal face per MD MUTCD 2B.53, but there appears to be inadequate space on the mast arm to place the sign in the proper location, so it was placed on the pole instead.

Figure 4-19: Delancy Road (MD 781) at Pulaski Highway (US 40) Existing Signage (Source: Google Maps)

Field observations noted more U-turns than right turns. **Recommendation: consideration should be given to changing the priority of the turning movements.** This would include (1) retiming the traffic signal to remove the overlap of the right and left turns so that the right turns from southbound MD 781 (Delancy Road) and the left turns/ U-turns from eastbound US 40 occur in separate phases; (2) removing the R10-16 sign: (3) replacing the green right turn arrow signal head with a standard 3-section signal head; and (4) installing a R10-30 (Right Turn on Red Must Yield to U-Turn) sign along southbound Delancy Road (MD 781) as shown in the image below. The analysis should also screen the intersection for the applicability of using any of the FHWA proven safety countermeasures, such as backplates with retroreflective borders and appropriately timed yellow change intervals.

Figure 4-20: Delancy Road (MD 781) at Pulaski Highway (US 40) Proposed Signage

Vehicle counts of each movement at the intersection and an examination of the crash data should be completed to confirm that the crashes are occurring during this overlap and whether the counts justify the modification. **Recommendation: An investigation into the capacity and delay of the intersection should be completed to determine whether this modification decreases the level or service below an acceptable level or causes any negative results that trigger additional intersection modifications. Another option to consider is to prevent U-turns from occurring at the intersection.** It seems that most of the U-turns are attempts to enter the Royal Farms per the public survey and field observations. If the proposed access road is installed per the East Elkton Traffic Circulation and Safety Alternative #1, then there may be less of a need to make a U-turn at US-40. Again, the crash data would have to be analyzed before any conclusions are made.

Considerations for Land Use and Zoning

Since the Cecil County and Town of Elkton Comprehensive Plans were adopted in 2010, several development projects have been approved, implemented, and proposed for the study area, but the general conditions on Land Use and Zoning remain very similar to the situation approximately 15 years ago. Several residential projects have been proposed along Muddy Lane, but some of these projects have not been able to move forward because of road access and their impact on Muddy Lane. Table 4.4 summarizes these projects within the Town of Elkton.

Recommendation: As of 2024, several of the same issues that restricted development remain. Because this study focuses on a more limited area, both the County and Town should consider in their next Comprehensive Plan updates how these recommended transportation improvements fit into the future road network and make land use changes in keeping with the Town's vision and future goals for this area.

Table 4-5: Planned and Approved Development Projects in the Study Area (Source: Town of Elkton)

Development	Location	Intended Use	Date Proposed	Units		Status
				Single	Multi	
Red Hill Apartments	Red Hill Road (MD 281)	Multi-Family Residential	2024		276	Concept
Patriot's Landing	Muddy Lane	Single-Family	2023	100		Preliminary
Buddy's Ridge	Muddy Lane	Single-Family	2023	226		Concept
Ayars Property	Belle Hill Road	Logistics	2023	N/A		Concept
189 Belle Hill Road	Belle Hill Road	2 Hotels and Convenience/Gas	2024	N/A		Concept
Graymount Commons	Graymount Circle	Townhomes	pre-1992	187		Final

In addition to these projects, the Villages at Belle Hill, an 84-unit apartment community, has been developed outside of Elkton's municipal boundary on Clear Blossom Drive, off Belle Hill Road adjacent to Appleton Road (MD-316). This project opened in August 2013.

Most of the land area in the study area is residential, except for the area around and adjacent to the I-95-/MD-279 interchange and along Belle Hill Road, which crosses MD-279 and has

commercial, warehouse and distribution and light industrial uses along it. The other concentration of commercial and industrial uses is along US-40 in the far southeastern corner of the study area.

Recommendation: In places where commercial, warehouse and distribution and residential land uses currently abut, such as along Belle Hill Road, buffers (such as open space and thick tree lines) would help to support the transition of uses and protect residents from the impacts of heavy truck traffic and commercial activity. Longer term, truck-generating uses, such as warehousing and truck stops, should be better spaced from residential uses and streets to improve safety and quality of life. Revising underlying zoning designations and by-right uses can help achieve this segregation in the long term. According to survey results, this is desired among residents of East Elkton. We found in Survey 1 that truck stops, warehouse and storage facilities, and office buildings were not desired nearby residences, while retail, restaurants, healthcare, and community facilities were desired or tolerable.

The current zoning is consistent with the residential character of most of the study area. Areas that bear further analysis in the Town's next Comprehensive Plan include the areas along the northern and southern portions of Belle Hill Road which has a mix of zoning and the wetland and forested area on the eastern side of Muddy Lane, which is zoned for High Density Residential despite being a Tier 1 biodiversity conservation and targeted ecological area.

Recommendation: As with the prior Comprehensive Plans (created in 2010), Cecil County and the Town of Elkton would benefit from a detailed analysis of the existing Designated Growth Areas, to determine if this remains the Town's current vision, and evaluate how much growth is anticipated in the region through the horizon year of the next plan.

Recommendation: Cecil County and the Town of Elkton evaluate the need to restrict or limit development in the forested area on the eastern side of Muddy Lane, which is a Tier 1 biodiversity conservation and targeted ecological area.

The transportation improvements detailed in this study provide means to improve connectivity within the study area. Consideration of future concepts, such as a loop road, to extend that connectivity west to potential future areas of growth, should be a strong focus of both the County's and Town's next comprehensive plans.

Chapter 5. Outreach

Steering Committee

This planning process was guided by a steering committee consisting of members from the Wilmington Area Planning Council, the Town of Elkton, Cecil County, Cecil County Public Schools, the Maryland Department of Transportation State Highway Administration, Amtrak, Emergency Services and East Coast Greenway Alliance. Members met monthly to review data, plan and discuss feedback from public meetings and surveys, and review concept design ideas. Notes and video recordings from each meeting are available on the project webpage.

Public Meetings and Surveys

Including robust feedback from area residents was critical and a large focus of this project. Three public meetings were held at Elkton's public library to: establish a vision, review potential alternatives, and present a draft plan. A pair of public surveys accompanied the first two workshops. These surveys were conducted to collect feedback on resident and stakeholder concerns, as well as thoughts on potential design concepts and final design concepts. The surveys were available in both online and hardcopy formats. The surveys were advertised by Steering Committee members. In particular, the surveys were advertised on both WILMAPCO's project site as well as through social media and the Town of Elkton's website.

October 26, 2023

At the first public meeting, residents discussed the goals of the study and reviewed findings from the first public survey. This survey gathered concerns and issues in the study area. Approximately 20 people attended the public meeting and provided valuable feedback for consideration. A total of 121 people responded to the first public survey.

Figures 5-1 and 5-2: First Public Meeting

March 27, 2024

In March, a second public meeting was held at the library to discuss concept designs. Approximately 40 residents attended and shared their feedback with the design team either verbally or via public survey. A total of 188 people responded to the second public survey.

Figures 5-3 and 5-4: Second Public Meeting

June 27, 2024

A final public meeting was held at the library to present the results of the Second Public Survey, to present the recommend alternatives, to introduce the project the draft final report and to solicit comments on the report recommendations.

Youth Outreach

In addition to the general public outreach meetings and surveys, two separate youth surveys were conducted. With the assistance of Dr. Keisha Brinkley, Principal of Elkton Middle School, and James Leitgeb, Principal of Elkton High School, a survey was prepared and distributed to students for completion. A total of 30 surveys were completed by 8th through 12th graders, with students citing the following issues:

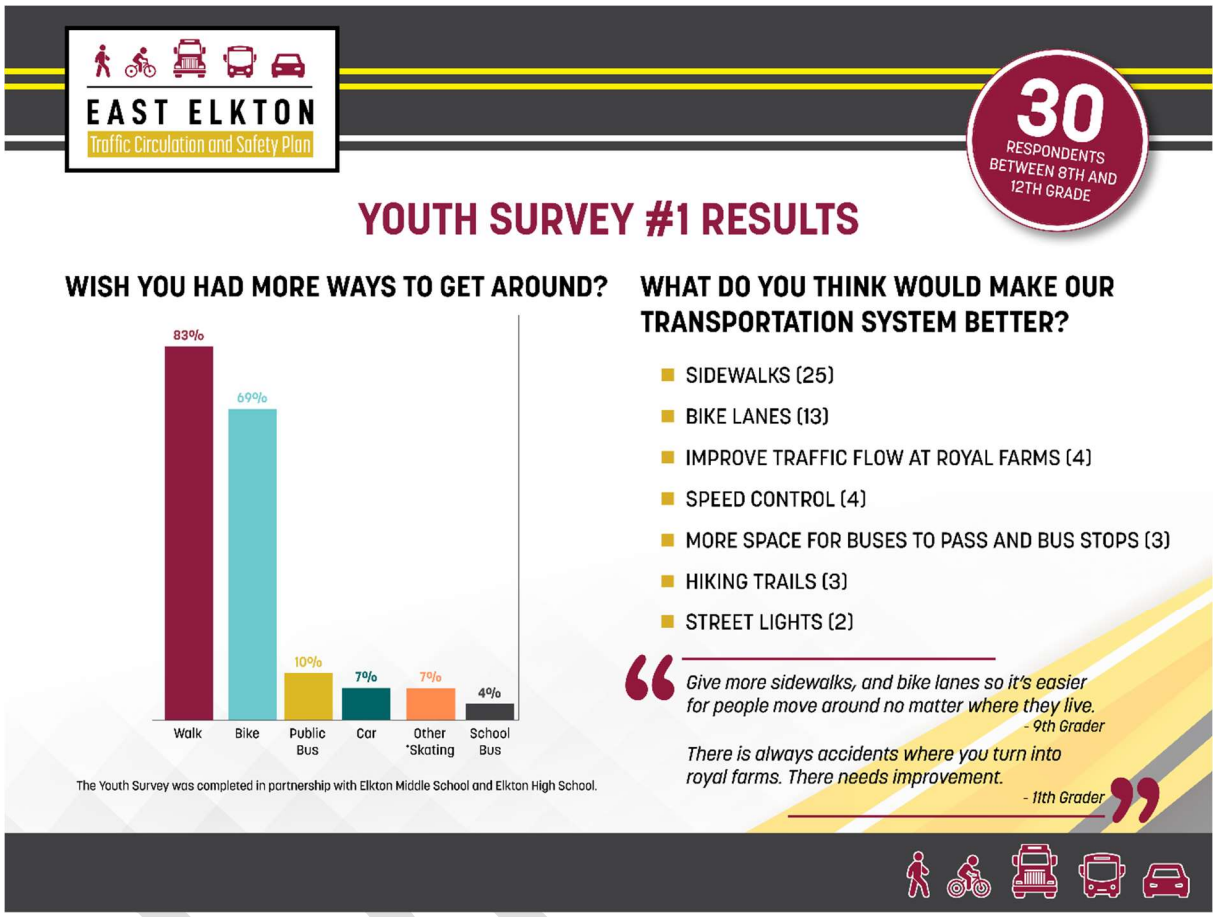


Figure 5-5: Issues Cited by Students

The emphasis Elkton's young people placed on improved walking and cycling connections helped inform the development of project recommendations, especially the connectivity appendix.

During the concept review phase, WILMAPCO held a pop-up event at Elkton High School on May 8, 2024. Over 60 students attended the lunchtime event and participated in activities.

Figures 5-6 and 5-7: Pop-up Event at Elkton High School

Students were asked to provide feedback on improvements proposed for Delancy Road (MD 781), the proposed entrance change to Royal Farms, and where they would like to see walking and cycling path connections added. Those recommendations are shown in Figure 5-8.

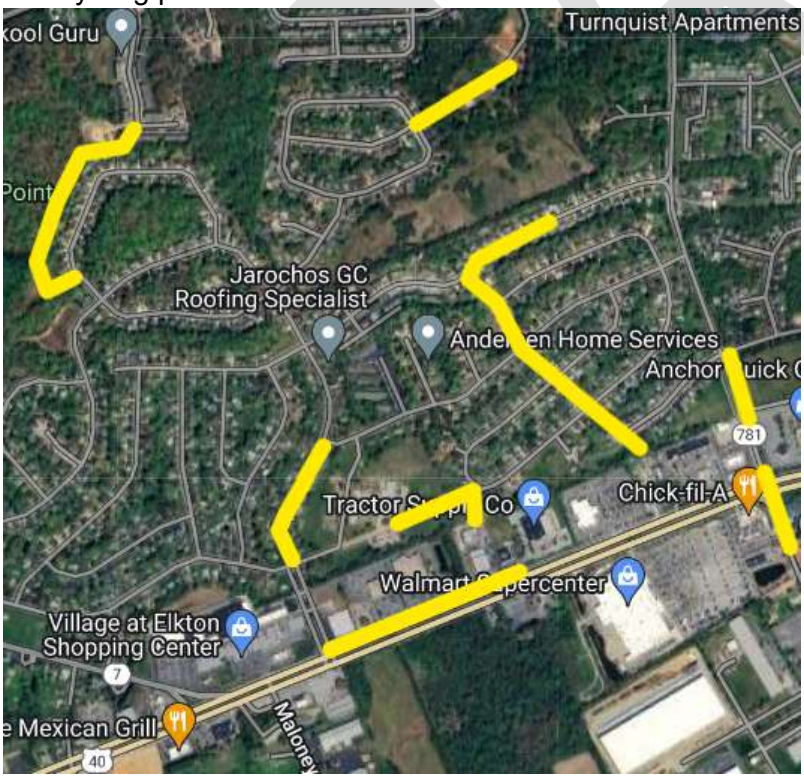


Figure 5-8: Youth Survey Suggested Pathways

Feedback gathered is summarized in the chart below:

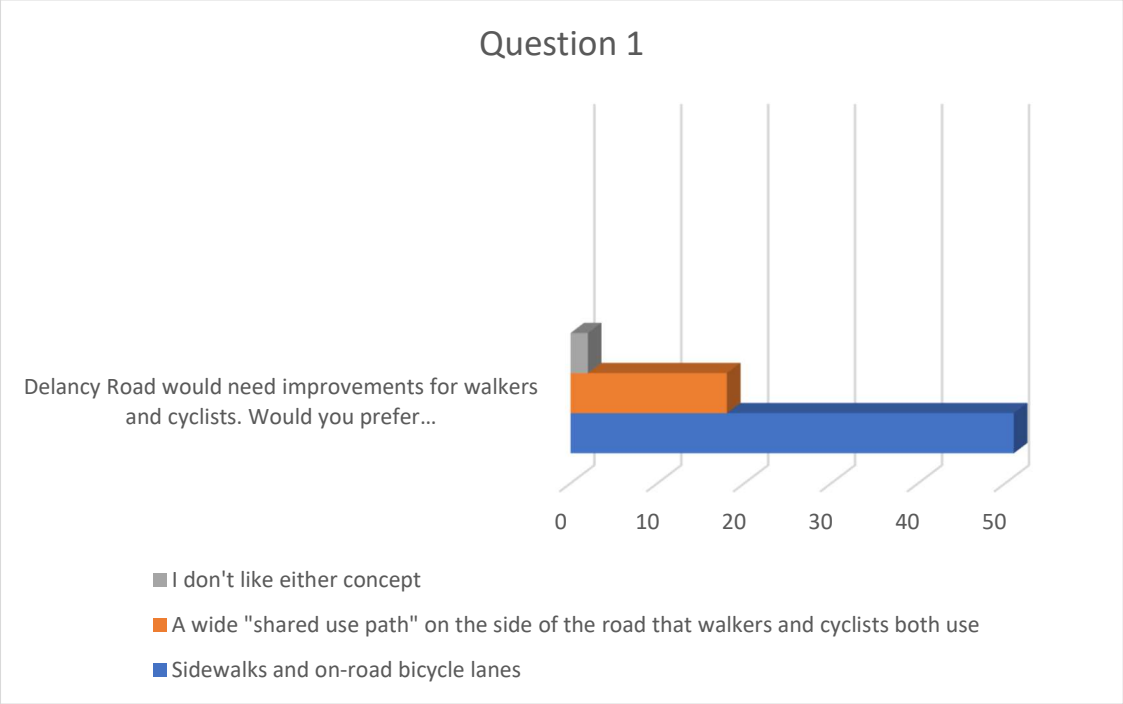


Figure 5-9: Results of Student Survey Question One

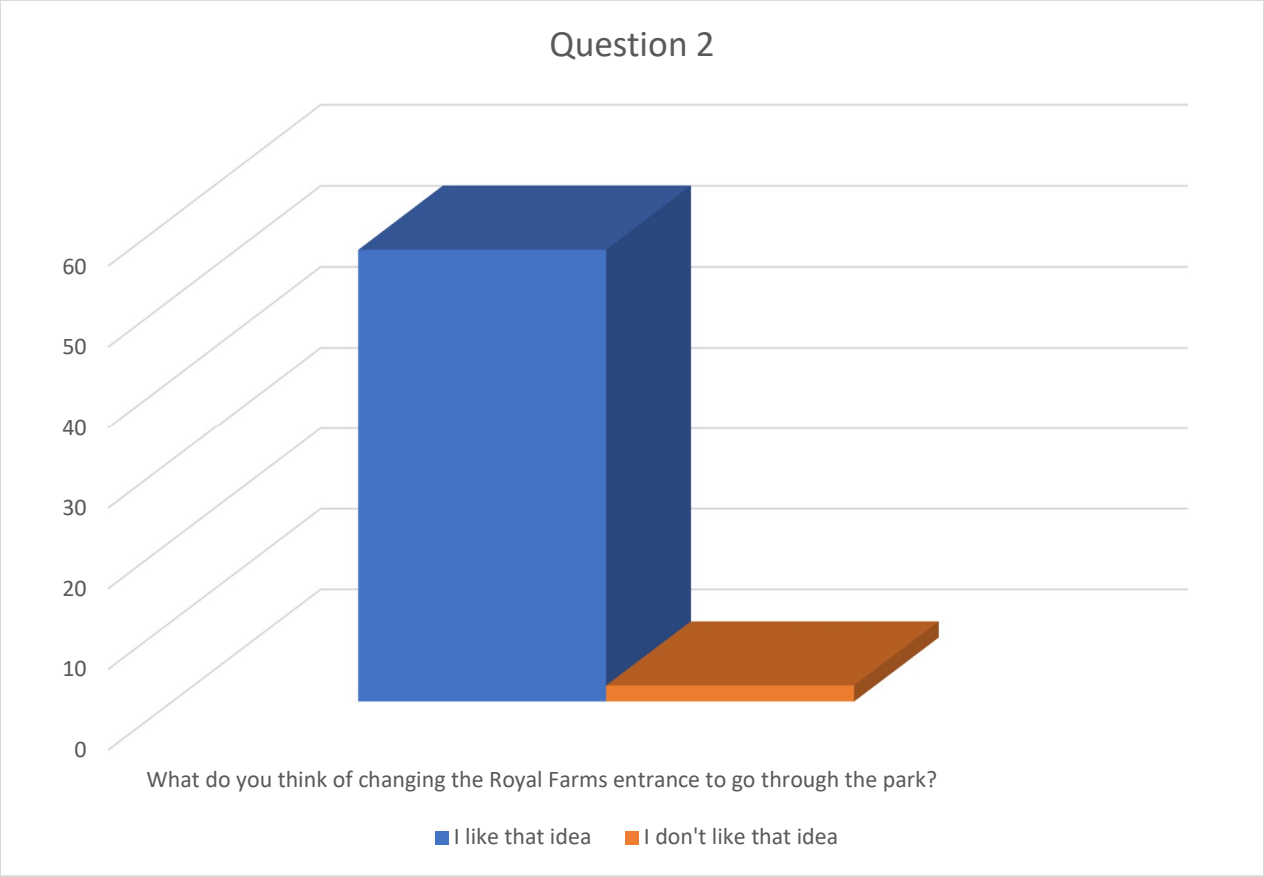


Figure 5-10: Results of Student Survey Question Two

Students also noted, in their responses to Question 2, that they'd like to see sensory equipment installed at the park by the Royal Farms, and more updated equipment overall.

Coverage

To monitor the overall coverage of community members achieved through survey responses, the location of each survey participant's home was identified and marked on a map. Figure 5-11 shows the location of the homes for the participants of survey one and Figure 5-12 shows the location of the homes for the participants of survey two.

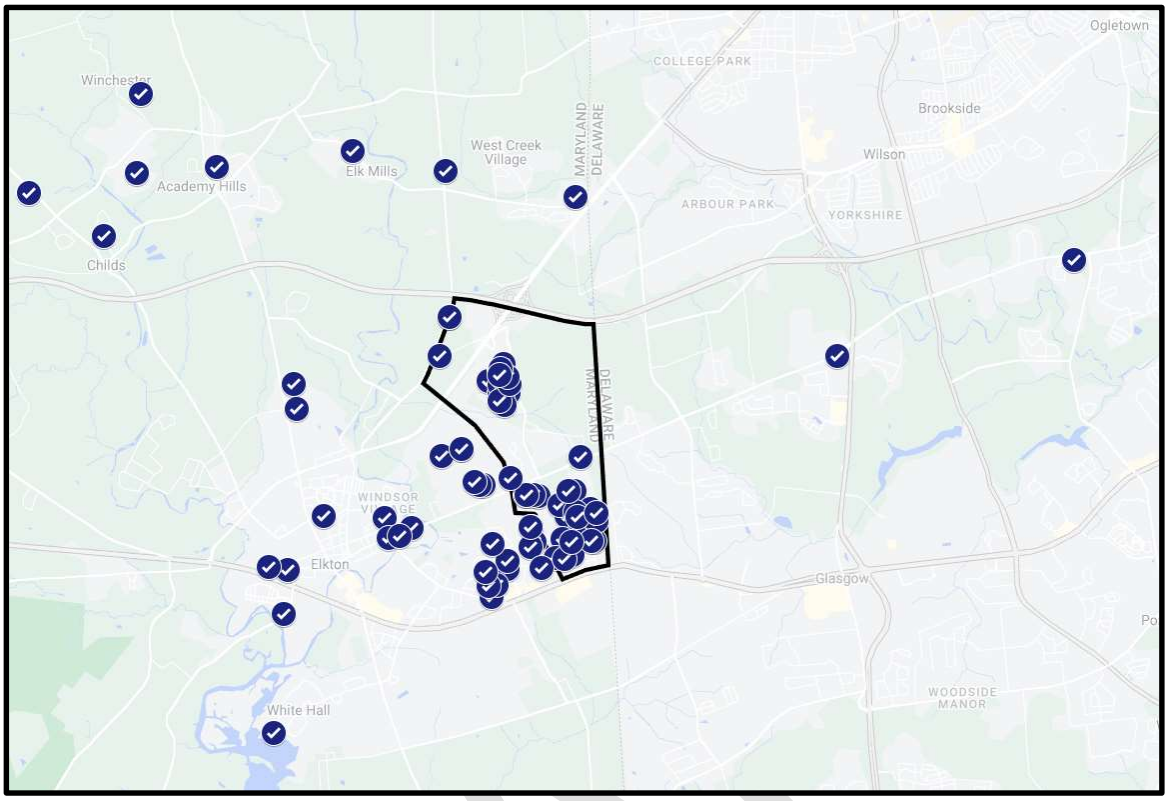


Figure 5-11: Home Locations of Survey One Participants

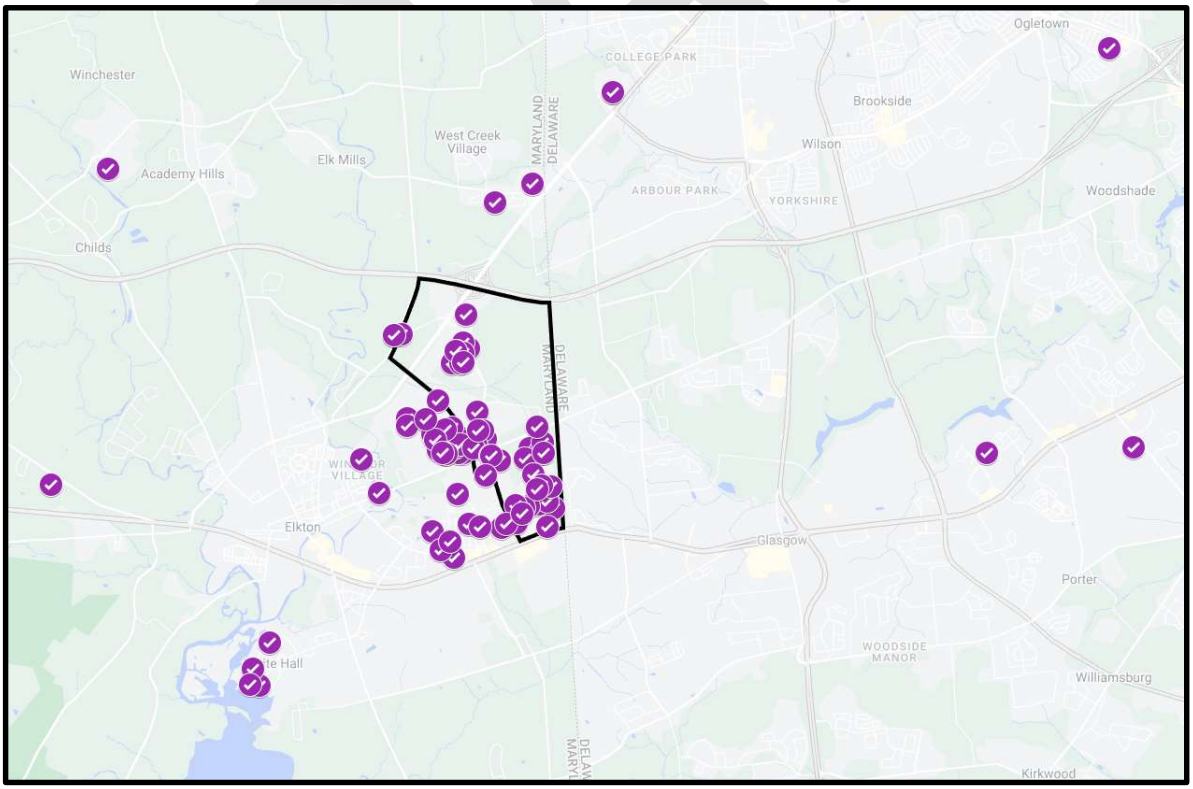


Figure 5-12: Home Locations of Survey Two Participants

Chapter 6. Implementation and Next Steps

The potential improvements were discussed and weighed as part of the second public meeting and survey. The scope of the proposed improvements is large and broken down into three manageable pieces, allowing various projects to be completed over successive years as funding, additional studies, and finals designs are completed.

Short-Term Recommendations (less than 2 years)

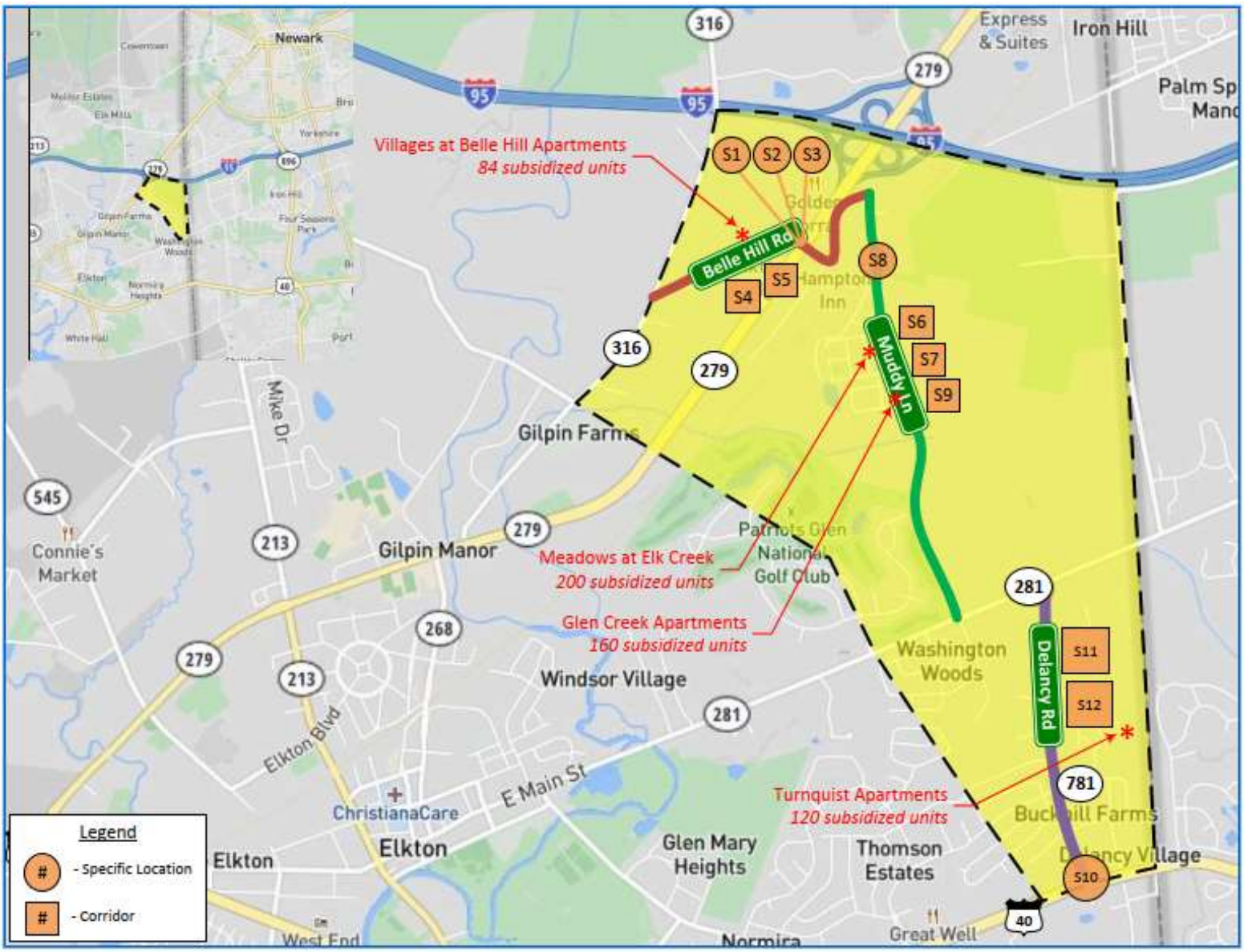


Figure 6-1: Short-Term Recommendations

Table 6-1: Short-Term Recommendations

ID Number	Location	Report Reference	Description	Purpose	Planning Level Budget Estimate[20]
S1	Intersection of Belle Hill Road and Elkton Road	Chapter 4, Page 38	Pavement Markings	Pavement markings at the intersection are faded and should be refreshed. Consideration should be given to high visibility crosswalks given the history of crashes involving pedestrians at this intersection.	$2,700
S2	Intersection of Belle Hill Road and Elkton Road	Chapter 4, Page 38	Trim Vegetation	The crosswalk is obscured by vegetation for vehicles turning right from southbound Elkton Road to Belle Hill Road (toward the McDonalds). Vegetation on the northwest quadrant of the intersection should be trimmed to maintain proper sight distance triangles.	$300
S3	Intersection of Belle Hill Road and Elkton Road	Chapter 4, Page 38	Crash Analysis and Traffic Signal Timing/Intersection Evaluation	The traffic signal lacks adequate pedestrian crossing time. Revise the traffic signal timing for the proper pedestrian clearance times. Complete a full crash analysis to determine the causes of the crashes and screen the intersection for the applicability of using any of the FHWA proven safety countermeasures, such as backplates with retroreflective borders, leading pedestrian intervals and adequately timed yellow change intervals. Evaluate the feasibility of installing a metering traffic signal at the truck stop driveway to manage the number of trucks entering the intersection and force trucks to queue along the service plaza driveway instead of blocking Belle Hill Road movements.	$30,200
S4	Belle Hill Road	Chapter 4, Page 33	Roadway Classification - Administrative	Have the functional roadway classification changed from local road to collector road given the current and expected function of the road so that the proper design criteria are utilized in future capital projects and in the determination of federal aid eligibility.	N/A

[20] All planning level budget estimates are based on the approximated let date for the project.

S5	Belle Hill Road	Chapter 4, Page 34	Bicycle LTS - Administrative	Contact SHA to revise the Bicycle Level of Stress to LTS 4 based upon the number of lanes, effective ADT and prevailing speeds.	N/A
S6	Muddy Lane	Chapter 4, Page 33	Roadway Classification - Administrative	Have the functional roadway classification changed from local road to collector road given the current and expected function of the road so that the proper design criteria are utilized in future capital projects and in the determination of federal aid eligibility.	N/A
S7	Muddy Lane	Chapter 4, Page 34	Bicycle LTS - Administrative	Contact SHA to revise the Bicycle Level of Stress to LTS 4 based upon the number of lanes, effective ADT and prevailing speeds.	N/A
S8	Muddy Lane	Appendix C, Figure 10	Overhead Clearance Signage	Install additional overhead clearance signage along Muddy Lane north of the existing railroad underpass to prevent tractor trailers from attempting to travel south on Muddy Lane from Belle Hill Road.	$1,900
S9	Muddy Lane	Chapter 4, Page 41	Speed Limit Signage	Add additional speed limit signage to Muddy Lane, consider speed feedback signs and incorporate speed enforcement as part of a comprehensive community traffic calming plan.	$3,000
S10	Intersection of Delancy Road and US-40	Chapter 4, Page 40	Crash Analysis and Traffic Signal Timing/Intersection Evaluation	Complete a full crash analysis to determine the causes of the crashes and screen the intersection for the applicability of using any of the FHWA proven safety countermeasures, such as backplates with retroreflective borders, leading pedestrian intervals and adequately timed yellow change intervals. Evaluate the crashes and near misses associated with the overlapping movements between the U-turns from eastbound US-40 and right turns from southbound Delancy Road and the feasibility of the signal retiming to place these movements in different phases or to change the priority of the movements. Evaluate the feasibility of restricting the Royal Farms driveway on Delancy Road near the intersection to right-in right-out.	$30,200

S11	Delancy Road	Chapter 4, Page 33	Roadway Classification - Administrative	Have the functional roadway classification changed from Major Collector to Minor Arterial given the current and expected function of the road so that the proper design criteria are utilized in future capital projects and in the determination of federal aid eligibility.	N/A
S12	Delancy Road	Chapter 4, Page 34	Bicycle LTS - Administrative	Contact SHA to revise the Bicycle Level of Stress to LTS 4 based upon the number of lanes, effective ADT and prevailing speeds.	N/A
S13	Project Area and Nearby Neighborhoods	Chapter 3, Page 30 and Appendix D	Study pathway connectivity between neighborhoods/other neighborhoods and destinations	Determine locations within the network that lack sufficient connectivity	N/A

Mid-Term Recommendations (2-5 years)

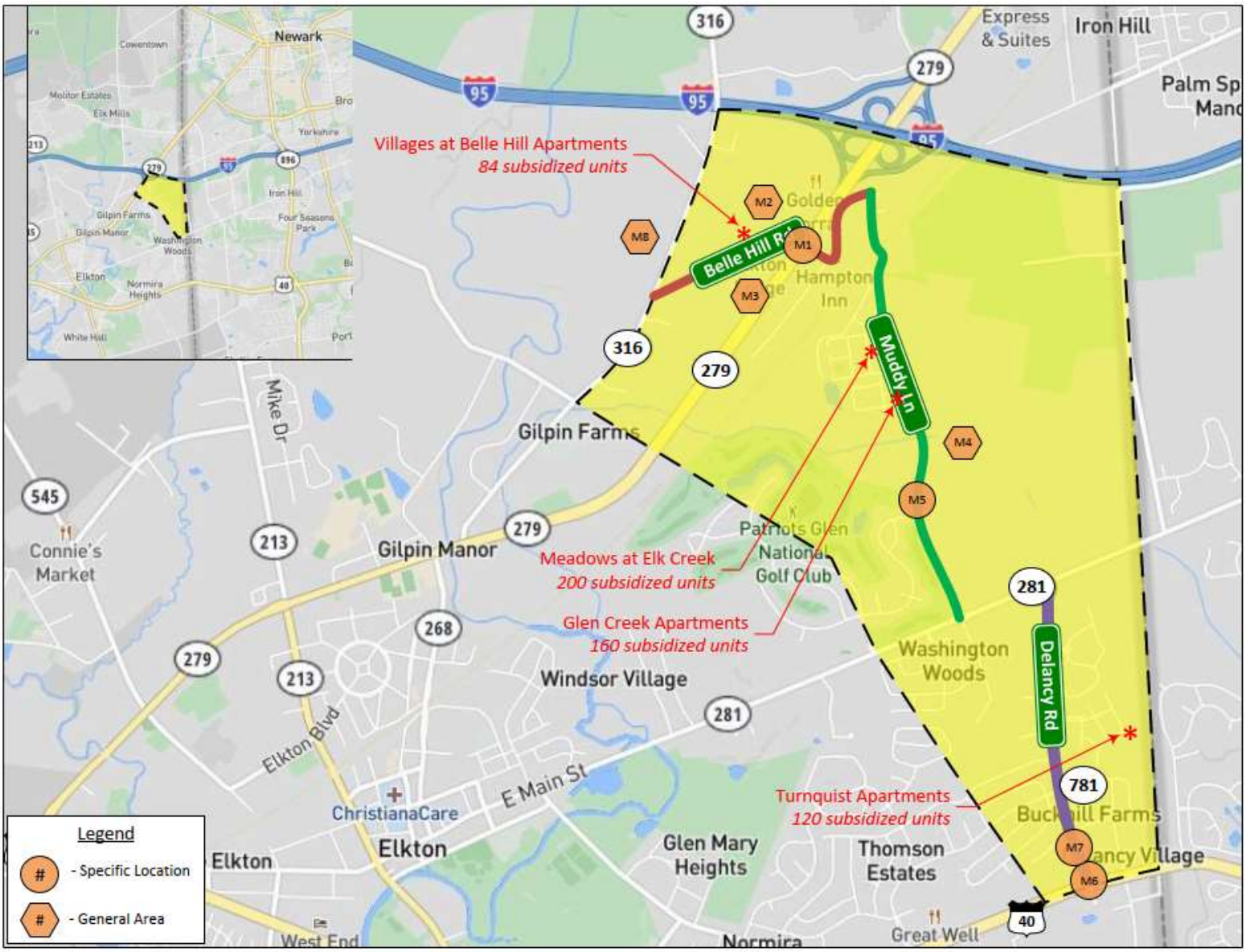


Figure 6-2: Mid-Term Recommendations

Table 6-2: Mid-Term Recommendations

ID Number	Location	Report Reference	Description	Purpose	Planning Level Budget Estimate*
M1	Northern Side of Belle Hill Road	Chapter 4, Page 53	Land Use, Zoning and Comprehensive Planning	Examine ways to space truck-generating uses with residential along Belle Hill Road either through buffering or rezoning.	N/A
M2	Southern Side of Belle Hill Road	Chapter 4, Page 52	Land Use, Zoning and Comprehensive Planning	Evaluate the zoning designation for the areas south of Belle Hill Road which has a mix of zoning. Consider a zone of buffers where commercial and residential uses abut.	N/A
M3	Wetland and forested area on the eastern side of Muddy Lane	Chapter 4, Page 52	Land Use, Zoning and Comprehensive Planning	Evaluate the zoning designation for the wetland and forested area on the eastern side of Muddy Lane, which is zoned for High Density Residential despite being a Tier 1 biodiversity conservation and targeted ecological area.	N/A
M4	Intersection of Delancy Road and Royal Farms Driveway	Chapter 4, Page 49, Appendix C, Figure 8, Concepts D-2D and D-1F	Restrict Turning Movements at Royal Farms Driveway onto Delancy to Right-In/Right-Out. New Connection to Royal Farms, and Playground improvements	Reduce conflicts and crashes at Royal Farms driveway	$749,000
M5	Designated Growth Areas	Chapter 4, Page 53 and Appendix D	Land Use, Zoning and Comprehensive Planning	Analysis of Designated Growth Areas including an evaluation of anticipate growth and connectivity analysis of future connector roads and paths	N/A

Long-Term Recommendations (over 5 years)

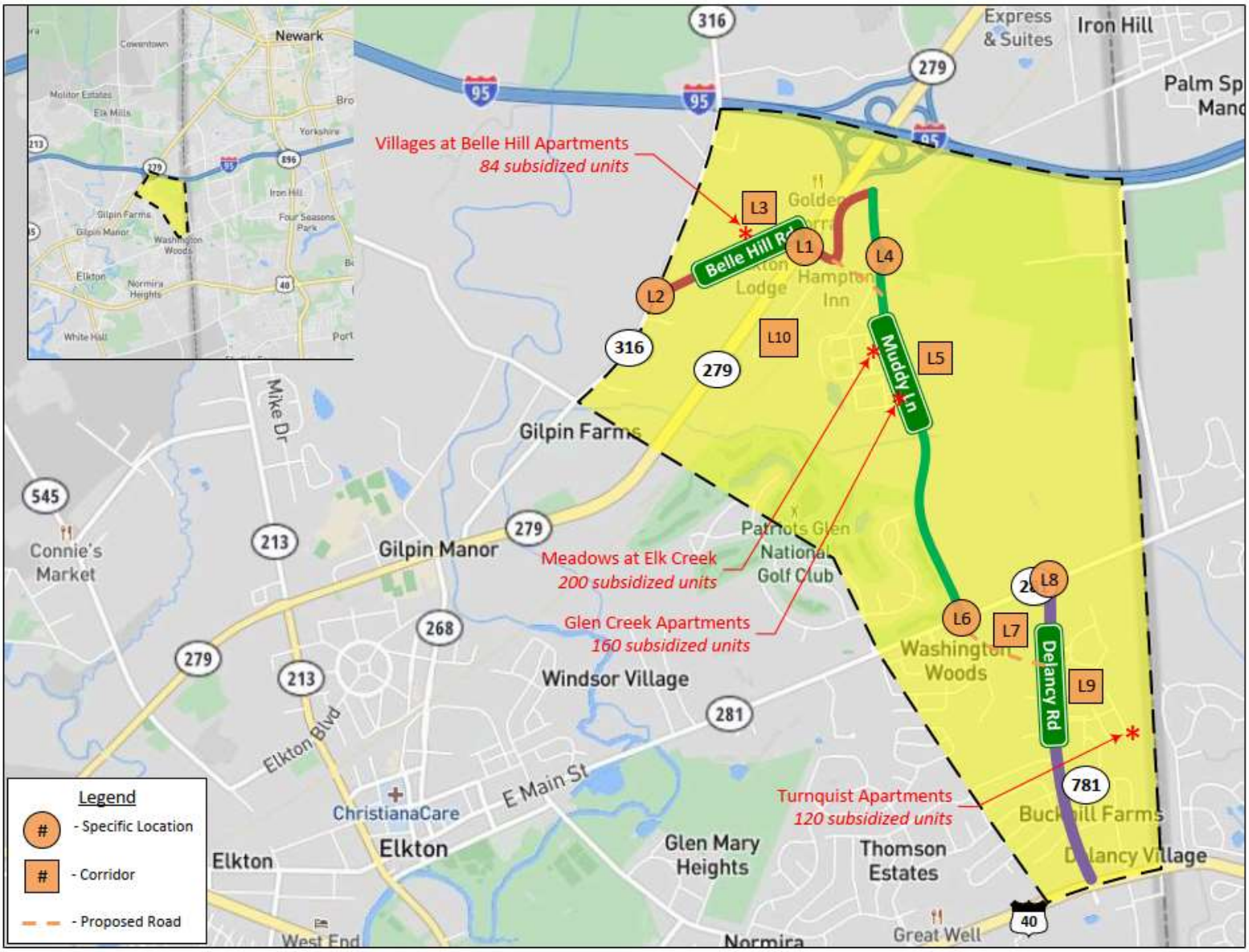


Figure 6-3: Long-Term Recommendations

Table 6-3: Long-Term Recommendations

ID Number	Location	Report Reference	Description	Purpose	Next Steps for Implementation	Planning Level Budget Estimate*
L1	Intersection of Belle Hill Road and Elkton Road	Chapter 4, Page 39, Appendix C, Figure 2, Concept BH-2D	Intersection Realignment and Median Extension	Potential driveway and intersection alterations to improve queuing capacity at intersection	Program project on long range transportation plan. Scope and evaluate options including realignment of the intersection, realignment of the driveway and consideration of the feasibility study (mid-term recommendation) regarding a metering traffic signal at the truck stop driveway.	$740,000
L2	Intersection of Belle Hill Road and Appleton Road	Chapter 4, Page 40, Appendix C, Figure 2, Concept BH-2A	Realignment of intersection of Belle Hill Road at Appleton Road	Improve traffic flow and safety at skewed intersection	Program project on long range transportation plan.	$330,000
L3	Belle Hill Road	Chapter 4, Page 35, Appendix C, Figure 1, Concept BH-1B and BH-1C	Shared Use Path along Belle Hill Road with Median Treatment with Horizontal Deflection	Improve bike and pedestrian mobility along the corridor. Achieve speed reduction through lane narrowing and deter trucks from traveling west along Belle Hill Road	Program project on long range transportation plan.	$1,590,000
L4	Bridge: Muddy Lane over Railroad or Underpass: Muddy Lane under Railroad	Chapter 4, Page 44, Appendix C, Figures 3 and 4, Concepts M-1B, M-2B, and M-2D	Replace Muddy Lane Railroad Crossing	Improve safety for all users with continuous accessible pedestrian facilities and increase options for routes of travel without inducing additional vehicles to avoid the I-95 toll at the Maryland/Delaware border.	Program project on long range transportation plan. Scope and perform alignment studies (including NEPA evaluations) of the two Muddy Lane railroad crossing options (bridge over and new underpass alignment).	$8,280,000 to $23,990,000

L5	Muddy Lane	Chapter 4, Page 41, Appendix C, Figure 5, Concept M-4A	Shared Use Path with a Landscape Bioretention Area	Improve bike and pedestrian mobility along corridor while adding vegetative buffer between roadway and shared use path	Land Use planning and zoning considerations (mid term recommendation). Program project on long range transportation plan.	$2,850,000
L6	Muddy Lane at Powerline Easement	Chapter 4, Page 44, Appendix C, Figure 5, Concept M-4B	Truck Turnaround and Trail Parking	Design, permit and construct an interim truck turnaround within powerline easement to provide trucks last chance to turnaround to avoid underpass		$260,000
L7	Red Hill Road and Intersection of Muddy Lane and Red Hill Road	Appendix C, Figure 9	Shared use path along Red Hill Road between Muddy Lane and Delancy and Pedestrian Crossing at Muddy Lane and Red Hill Road	Improve safety for all users with continuous accessible pedestrian facilities and increase options for routes of travel.	Program project on long range transportation plan.	$750,000
L8	From Intersection of Muddy Lane and Red Hill Road and Delancy Road	Chapter 4, Page 48, Appendix C, Figures 7 or 9, Concept D-1D or D-2C	Proposed 10 ' Shared Use Path or Road along Kemp Lane	Improve connectivity by establishing a new shared use path or road between the intersection of Muddy Lane and Red Hill Road and Delancy Road	Scoping and Preliminary Design	$1,730,000
L9	Intersection of Delancy Road and Red Hill Road	Chapter 4, Page 48, Appendix C, Figures 7 or 9, Concept D-1A or D-2A	Perform Intersection Control Evaluation to determine preferred alternative - roundabout vs. improved signalized Intersection (dedicated Right Turn Lane) with pedestrian improvements	Improve safety and mobility at the intersection	Perform Intersection Control Evaluation to determine preferred alternative - roundabout vs. improved signalized Intersection (dedicated Right Turn Lane) with pedestrian improvements	$90,000

L10	Delancy Road	Chapter 4, Page 48, Appendix C, Figures 6-9, Concepts D-2B and D-1C	Reconfigure Delancy Road with Shared Use Paths on both sides, Two-Way left turn lane and pedestrian refuge islands	Improve bike and pedestrian mobility along corridor, reduce conflicts and provide safety improvements at uncontrolled crosswalks	Program project on long range transportation plan.	$6,180,000
L11	MD-279	Appendix D	East Coast Greenway Path Extension along MD-279	Provide off road multimodal facilities and connections along MD-279 between study area and key destinations	Program project on long range transportation plan. Scoping and preliminary design.	N/A

Funding Opportunities

With potential projects identified, securing funding is important to ensure projects can be completed in a timely manner without a financial strain on Town and County budgets. The following funding mechanisms are currently available as opportunities for cost share and/or grants.

Roadway Infrastructure Grants:

Grants are available through the Federal Highway Administration, Federal Railroad Administration, Federal Transit Administration, as well as the US Department of Transportation. Grants available for these types of projects are:

- *Fastlane/INFRA Grants:* these grants fund planning stages, Feasibility studies, preliminary engineering, as well as construction and Implementation phases.
- *Safe Streets for All (SS4A) Grants:* these grants fund both implementation and planning stages of projects, as well as preliminary engineering, construction, and non-infrastructure projects.
- *Tiger/Build Grants:* these grants fund the planning, preliminary engineering, and final engineering stages of projects.

Bicycle and Pedestrian Facilities Grants:

Grants are available through the Maryland Department of Transportation, MDOT MVA Highway Safety, MDOT Motor Vehicle Administration, as well as MDOT State Highway Administration. Grants available for these types of projects are:

- *Community Parks and Playgrounds* – these grants fund final engineering, construction and/or implementation, and non-infrastructure projects
- *Maryland Bikeways* – these grants fund feasibility studies, preliminary engineering, final engineering, and construction and or implementation.

- *Recreation Trails* – these grants fund the planning phases, preliminary engineering, construction and/or implementation, and non-infrastructure projects.
- *Safe Routes to School* – these grants fund preliminary engineering, final engineering, construction and/or implementation, as well as non-infrastructure projects.
- *Transportation Alternatives Program* – these grants fund final engineering, construction and/or implementation, and non-infrastructure projects.

Next Steps

Following the Plan's endorsement, a Monitoring Committee comprised of Steering Committee members will periodically convene to pursue and track the Plan's implementation. This includes conducting follow up studies, identifying appropriate grant opportunities, and monitoring underlying conditions in the study area. This is a long-term process with an undefinable exact timeline that will require monitorization. The Town of Elkton's website may be used to provide updates on the project's progress. Other items to consider include:

- Evaluate if the lighting at Muddy Lane approaches at the Amtrak overpass is adequate. Were there any nighttime crashes in this section of Muddy Lane? Does underpass lighting exist?
- Should centerline rumble strips be implemented for any two-lane roadways in the study area? Perhaps this may be considered if crash data indicates any head-on collisions.
- Inventory of existing signing and pavement markings to ensure they conform to current MUTCD. Identify any missing, damaged, or inappropriate traffic control devices.
- Perform a pavement condition assessment. Determine if any of these roadways are scheduled for resurfacing/rehabilitation.
- Re-evaluate truck height and weight restrictions along routes within the study area. Is the appropriate signing in place along Belle Hill Road, Muddy Lane, Delancy Road, etc.?
- Are there any midblock or intersections that should be evaluated for marked crosswalks to improve connectivity for pedestrians and bicycles?
- At the intersection of Belle Hill Road and MD 316 (Appleton Road), have vegetation cut back along right side of northbound MD 316 approaching the intersection to improve sight lines.
- Upgrade existing the transit stops and park and ride facility for ADA accessibility and consider providing amenities including but not limited to wayfinding signage, adequate lighting, covered or enclosed waiting areas, video surveillance system, benches, bus schedule information, bike racks, bike share station, bus lockers, EV charging facilities, vending machines, or restrooms. It appears to be nothing more than an empty parking lot with a single sign identifying it as a commuter facility.
- Eliminate any gaps in the sidewalk network along these roadways.
- Implement bus stop improvements (shelters, other bus stop amenities, etc.).
- Installation of bike racks as part of the East Coast Greenway trail system.