MD 22 Corridor Study

Final Report

September 2012

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Executive Summary

MD 22 is a major east-west corridor linking the towns of Bel Air and Aberdeen, numerous residential communities, agricultural uses, educational and minor commercial facilities, and provides a major commuter route. Capacity studies along the MD 22 corridor date back to the early 1980's and has included widening for additional lanes, individual intersection improvements, and bypass considerations. Currently, the Baltimore Metropolitan Council's (BMC) travel demand forecasts projects the MD 22 corridor to operate under congested conditions through the horizon year of 2035. **Harford County desires to have a multi-modal transportation plan that serves existing and future travel demand while blending with the character of the communities it serves, improving air quality and offsetting congestion. The purpose of this study is to provide feasible and cost efficient improvements that provide better complete streets, encourages better multi-modal cohesion and connectivity, provides mobility choices, and ensures positive results to the surrounding communities.**

To meet the many demands and goals for the corridor, a balanced and complete street approach is required. The National Coalition for Complete Streets states that "**Complete Streets are streets for everyone**. They are designed and operated to enable safe access for all users. Pedestrians, bicyclists, motorists and transit riders of all ages and abilities must be able to safely move along and across a complete street. Complete Streets make it easy to cross the street, walk to shops, and bicycle to work. They allow buses to run on time and make it safe for people to walk to and from train stations."

The "Complete Street" balances the demands and goals of the various transportation demands of automobiles, transit, pedestrians, and bicyclists, while being context sensitive to the surrounding communities and uses.

This study, ***The MD 22 Corridor Study***, was developed as a project by Harford County as a means to identify short, medium and long term solutions for the MD 22 Corridor from the intersection with MD 543 to Aberdeen Proving Ground (APG), providing for Complete Street solutions that emphasized the potential to allow users other means of transportation beyond the automobile.

One of the major premises of this study was to provide higher-level transit service that provided patrons to access APG from Bel Air and vice versa. High level transit ridership is dependent on higher density land uses and the strong "point-to-point" trip demands. When reviewing these two assumptions for creating this as a multi-modal corridor, the land use did not allow for the density to support the transit without major changes in land use policy throughout the corridor. An origin-destination study completed for the project corridor showed that the second assumption regarding a high level of users commuting to and from APG to Bel Air was not accurate. The data collected during the early stages of the project illustrated that the study corridor functioned in sections. The origin-destination study identified three sections which have been titled within this report as:

- Churchville Section: the western-most section from MD 543 to approximately MD 155 having congestion throughout due to the various destination generators within this section including Harford Community College. It was also found that some commuters from this section utilized another route to I-95, via MD 155 instead of remaining on MD 22.
- Aberdeen Section: the eastern-most section of the study corridor from I-95 to APG functions with its own congestion throughout due to the commercial and residential neighborhoods and the commuting to APG.
- Central Section: this section connecting the western and eastern section is primarily agricultural and operates primarily with good transportation and minimal congestion.

Understanding these three sections and how they function provided the guidance for developing the various alternatives and options for each section for the short term (2015), medium term (2025), and long term (2035). These improvements cover the full range of strategies to allow for the MD 22 Corridor to truly become a "Complete Street" and meet the various goals and objectives.

With the completion of a list of alternatives throughout each section and for each time period, potential issues were identified and feasibility level cost estimates were developed. The feasibility level cost estimates provide an order of magnitude for each of the improvements as well as an overall understanding of the total capital cost projected for each term of improvements. All feasibility level cost estimates include engineering, utility contingency, and construction in 2012 dollars. Right-of-way costs are NOT included at this time. The total cost range is:

- Short Term (2015): $2 - $3 million plus SHA Intersection Improvement Projects
- Medium Term (2025): $110 - $185 million plus r-o-w costs
- Long Term (2035): $85 - $125 million plus r-o-w costs

Implementation of these alternatives will require extensive coordination within Harford County Government and with the State Highway Administration (SHA) as the owner of this roadway. Additionally, key stakeholders such as APG, Harford Community College, MTA, commercial centers, and the community must participate in the implementation.

Each of the improvements provided in the summary table will require additional planning and design. For Harford County to successfully work towards having these projects implemented, it is imperative that the MD 22 Corridor be listed as a high priority to the SHA to ensure that the projects requiring capital investment funds remain competitive with the other needs throughout the state.

In addition, there are numerous other funds available that the County can request the State to pursue based on project type for the various alternatives developed for this corridor. These funds include items such as the ADA Retrofit, Access to Transit, and Sidewalk Retrofit. A more in-depth discussion regarding implementation strategies is provided in Section VI of this report.

Summary of the MD 22 Corridor Study Improvements

Proposed Improvement	Timeframe and Feasibility Cost*			Alternative Type				
	Short	Medium	Long	Maintenance	Pedestrian	Bicycle	Transit	Roadway
TDM / Transit Improvements	X	X	**X**	X	X	X	X	
Intersection: MD 543	**	$7.0 - $12.0		X	X	X	X	X
Corridor: MD 543 to MD 156	$1.2 - $1.7	$1.7 - $2.2	$41.0 - $54.0	X	X	X	X	X
Intersection: Prospect Mill Road	**	**	$25.0 - $40.0	X	X	X		X
Intersection: Thomas Run Road	Funded by SHA	$4 - $5 / $25 - $30	(costs included with Prospect Mill Road)		X	X		X
Intersection: HCC Entrance / Exit	**				X	X		
Intersection: Campus Hills Shopping Center		**			X	X		
Intersection: MD 136	**	$25.0 - $70.0			X	X		X
Intersection: MD 155		(costs included with MD 136)			X	X		X
Corridor: MD 156 to Long Drive / Technology Drive	$0.07 - $0.08	$10.0 - $15.0		X	X	X	X	X
Intersection: MD 156	**	$3.0 - $5.0			X	X		X
Corridor: Long Dr. / Technology Dr. to N. Post Road	$0.3 - $0.4	$34.0 - $43.0		X	X	X	X	X
Intersection: Long Drive / Technology Drive	**				X	X		
Intersection: Beards Hill Road	Funded by SHA	$1.5 - $2.0			X	X		X
Intersection: Middleton Road	**	$0.5 - $1.0			X	X		X
Intersection: MD 462	Funded by SHA				X	X		X
Intersection: Mt. Royal Avenue	**	**			X	X		X
Intersection: US 40 Interchange	**		$5.0 - $10.0		X	X		X
Intersection: N. Post Road	Funded by SHA				X	X		X
Corridor: N. Post Road to APG	$0.3 - $0.5		$15.0 - $20.0	X	X	X	X	X
Total Cost Per Term	**$2 - $3**	**$110 - $185**	**$85 - $125**					

***Feasibility cost is in millions and does NOT include right-of-way estimates.**
****** Costs for improvements at this location included as part of the Corridor upgrades.**

I. Introduction & Project Vision

MD 22 is a major east-west corridor linking the towns of Bel Air and Aberdeen, numerous residential communities, agricultural uses, educational and minor commercial facilities, and provides a major commuter route. Capacity studies along the MD 22 corridor date back to the early 1980's and has included widening for additional lanes, individual intersection improvements, and bypass considerations. Currently, the Baltimore Metropolitan Council's (BMC) travel demand forecasts projects the MD 22 corridor to operate under congested conditions through the horizon year of 2035. **Harford County desires to have a multi-modal transportation plan that serves existing and future travel demand while blending with the character of the communities it serves, improving air quality and offsetting congestion. The purpose of this study is to provide feasible and cost efficient improvements that provide better complete streets, encourages better multi-modal cohesion and connectivity, provides mobility choices, and ensures positive results to the surrounding communities.**

To meet the many demands and goals for the corridor, a balanced and complete street approach is required. The National Coalition for Complete Streets states that "**Complete Streets are streets for everyone**. They are designed and operated to enable safe access for all users. Pedestrians, bicyclists, motorists and transit riders of all ages and abilities must be able to safely move along and across a complete street. Complete Streets make it easy to cross the street, walk to shops, and bicycle to work. They allow buses to run on time and make it safe for people to walk to and from train stations."

The "Complete Street" balances the demands and goals of the various transportation demands of automobiles, transit, pedestrians, and bicyclists, while being context sensitive to the surrounding communities and uses. While all of these transportation needs are present along the corridor, the current roadway predominately addresses automobiles. Pedestrians and bicyclists find an incomplete and sporadic system that is missing many of the connections which in turn deters many users. This also impacts transit riders as transit riders all either begin or end as a pedestrian/bicyclists.

High-level transit ridership is also dependent upon strong "point-to point" demands and/or higher density land uses to be sustainable. The Federal Transit Administration provides the general thresholds based upon the number of dwelling units per acre in considering transit options:

- 0 - 3.0 does not support bus or rail
- 3.01 – 7.0 may support bus, does not support rail
- 7.01 – 9.0 supports bus, may support rail
- 9.01 – up supports bus and rail

The corridor is currently at approximately 1 dwelling unit per acre and is not forecasted to change significantly.

This study, ***The MD 22 Corridor Study***, was developed as a project by Harford County as a means to identify short, medium and long term solutions for the for the MD 22 corridor from the intersection with MD 543 to Aberdeen Proving Ground (APG), a length of 10.9 miles. While the corridor has continued to see growth and demands, the results of the Base Relocation and Closure (BRAC) Act bringing more direct and indirect jobs to APG has accelerated the needs. The assumed necessary long term solution was a corridor widening project with intersection upgrades which would be very expensive and impactive to the adjacent properties. The primary focus of this study was to better understand short and medium term projects to be incorporated that would provide more immediate relief and focus on a "Complete Street" concepts, ensuring that transit, pedestrians and bicycles were accommodated in a meaningful manner and not simply as an after-thought to vehicular congestion relief.

One of the original premises of this study was to consider a higher level transit corridor based on the assumed commute and congestion from the Bel Air region to the west and connecting to Aberdeen Proving Ground (APG) to the east. Transit was considered to be the viable option to provide for more near-term relief in a sustainable manner prior to, and potentially eliminating the need for, a total corridor widening. One of the initial evaluations of ***The MD 22 Corridor Study*** was to determine manners in which either a dedicated high-speed transit system such as Bus Rapid Transit (BRT) or a dedicated transit corridor could be accommodated throughout the study area.

The initial project step was to evaluate the existing transportation conditions including understanding transit, pedestrian, bicycle and vehicular volumes and desires. An origin - destination study was completed for vehicles traveling along the MD 22 corridor in both the AM and PM peak hours. In completing the origin-destination study, the original assumption for the corridor was disproved. The data collected during the early stages of the project did not support a "point-to-point" commute from Bel Air to APG. Rather, the data collected illustrated that the study corridor functioned in sections. The origin-destination study identified three sections which have been titled within this report as:

- Churchville Section: the western-most section from MD 543 to approximately MD 155 having congestion throughout due to the various destination generators within this section including Harford Community College. It was also found that some commuters from this section utilized another route to I-95, via MD 155 instead of remaining on MD 22.
- Aberdeen Section: the eastern-most section of the study corridor from I-95 to APG functions with its own congestion throughout due to the commercial and residential neighborhoods and the commuting to APG.
- Central Section: this section connecting the western and eastern section is primarily agricultural and operates primarily with good transportation and minimal congestion.

Based on these observations and understanding that without a large point-to-point commute and/or increased land use density throughout the corridor, higher-level and dedicated transit lanes

would not be sustainable within this corridor, the original approach to the project was adjusted.

With the existing conditions understood, the project approach was to first identify meaningful Transportation Demand Management options that could provide not simply congestion relief, but the beginning phases of altering behavior for individuals using this corridor and truly present other mode options such as transit, walking and biking, as a viable means of transportation. Capital improvements were developed for the approximate years of 2015, 2025, and 2035.

A. Understanding the Project Corridor

The MD 22 Corridor Study evaluated the three distinct geographic sections: the Churchville Section, the Central Section and the Aberdeen Section. Following is a description of each of the sections:

Churchville Section

The Churchville section extends along MD 22 from the western limits of the project corridor at MD 543 to just east of the MD 155 intersection. The roadway through this area provides access to various commercial properties as well as Harford Community College. The typical roadway section from MD 543 to Prospect Mill road is two travel lanes (one lane in each direction). From Prospect Mill Road to just west of Bramble Lane, the roadway widens to three lanes with some additional turn lanes. From Bramble Lane to just west of MD 136, the roadway reverts to a two lane section. From MD 136 to MD 155, a four lane section is available to motorists.

Shoulders are provided throughout most of this section of the project corridor. They vary in width from a full shoulder (± 10') in the two lane section to minimal or no shoulders at access points. This is especially true between Prospect Mill Road and Thomas Run Road and between MD 136 and MD 155. There are no access controls through this section resulting in many driveways for commercial or residential properties directly accessing MD 22.

There are six signalized intersections throughout this section:

- Prospect Mill Road
- Thomas Run Road / Schucks Road
- Harford Community College Entrance
- Campus Hills Shopping Center
- MD 136
- MD 155

The posted speed limit in this section varies between 40 and 45 mph. MD 22 is classified as an Other Principal Arterial in this section. Figure I-1 provides an aerial map of the Churchville section.

Central Section

The Central section extends from just east of the Maryland 155 intersection to just west of the Long Drive / Technology Drive intersection along MD 22. The typical roadway section through this area is two travel lanes (one lane in each direction) with turn lanes/bypass lanes at selected intersections. Shoulders are provided throughout this section. Access from driveways directly onto MD 22 occurs throughout this section.

There are no signalized intersections throughout this section. The most significant unsignalized intersecting roadways are:

- MD 156
- Grafton Lane
- North Stepney Road
- Carsins Run Road
- Aldino Stepney Road

The posted speed limit is 50 mph. MD 22 is classified as an Other Principal Arterial in this section. Figure I-2 provides an aerial map of the Central section.

Aberdeen Section

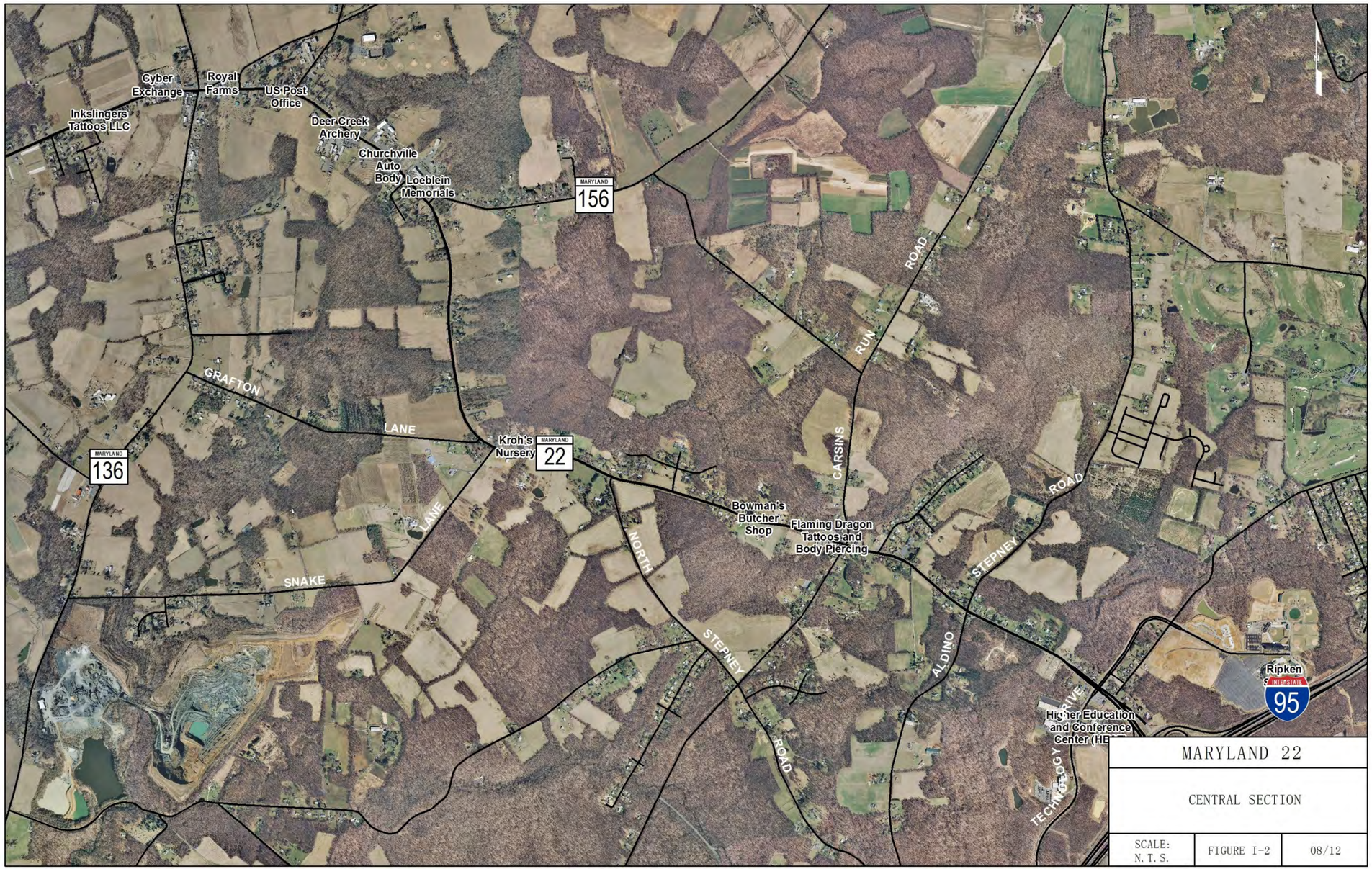
The Aberdeen section extends along MD 22 from just west of the Long Drive / Technology Drive intersection to the Aberdeen Proving Ground (APG) gates at the eastern end of the project corridor. The typical roadway section in this section is four travel lanes (two lanes in each direction) with additional turning lanes. Access is limited to intersections with the exception of the north side of the road just west of MD 462. Parking is permitted along the shoulder in this area only.

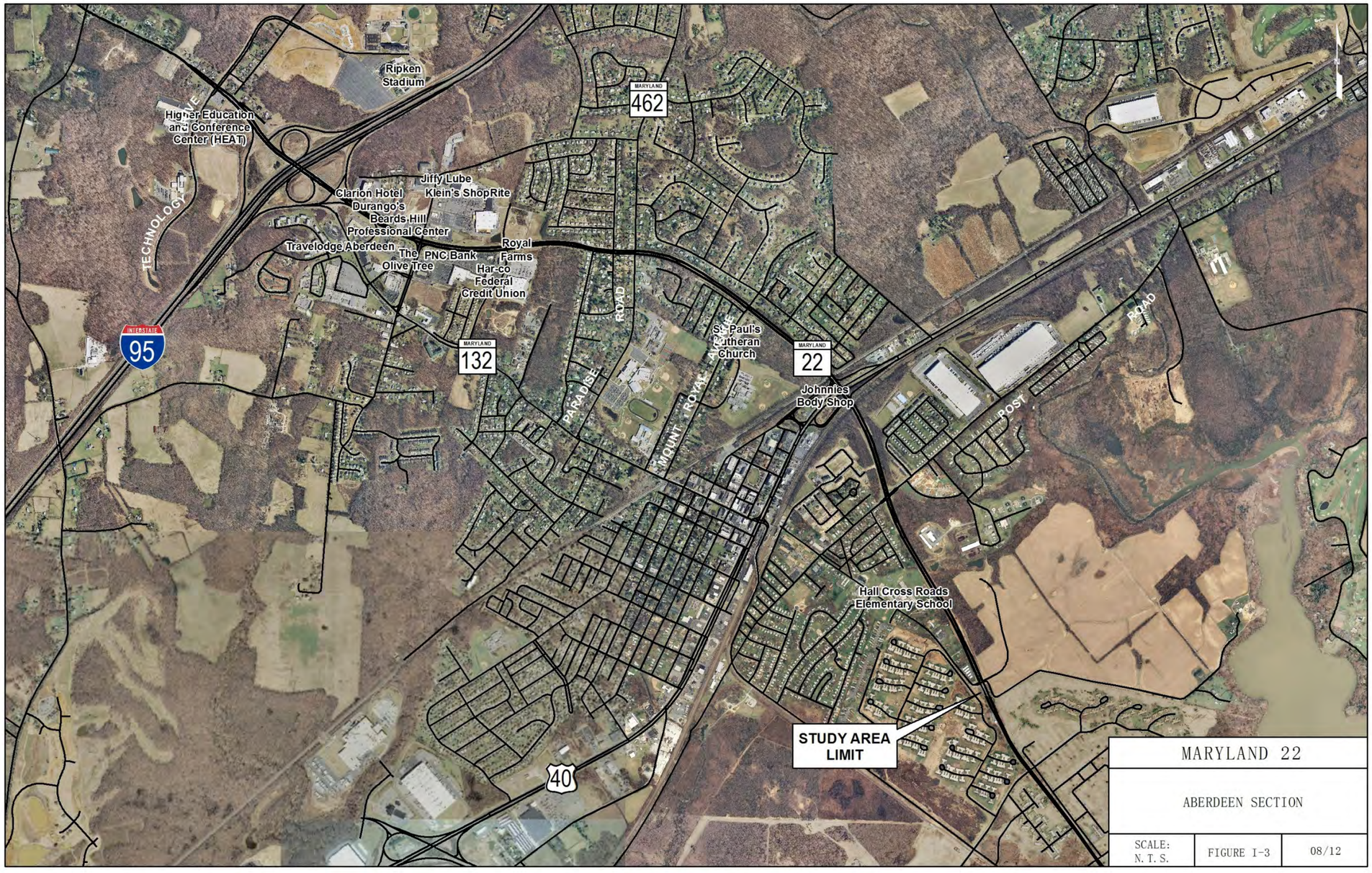
This section includes two interchanges and a total of nine signalized intersections:

- Technology Drive / Long Drive
- I-95 Northbound Off-Ramp
- I-95 Southbound Off-Ramp
- MD 132
- Middleton Road
- MD 462
- Mount Royal Avenue
- US 40 Ramps
- North Post Road

The posted speed limit in this section is 40 mph west of MD 462 and 50 mph east of MD 462. MD 22 is classified as an Urban Freeway/Expressway through the I-95 interchange area and as an Other Principle Arterial from I-95 to the APG gates. Figure I-3 provides an aerial map of the Aberdeen section.


THOMAS RUN ROAD
PRIESTFORD ROAD
LEVEL ROAD
PROSPECT
MILL ROAD
HCC ENTRANCE
BRAMBLE LANE
TUDOR LANE
ASBURY ROAD
SHUCKS ROAD
CAVALRY ROAD
MARYLAND 155
MARYLAND 22
MARYLAND 136
MARYLAND 543
Harford Vocational and Technical High School
John Archer School
Oak Grove Church
C&C Customs II Inc.
Arena Club
Flagship Cinemas
Wawa
Drake Petroleum
Campus Liquors
Bruce Bitner Cafe & Grill
Campus Hills Dentistry
Harman's Farm Market
Monarch Montessori School Kindergarten
Cyber Exchange
Inkslingers Tattoos LLC
Royal Farms
US Post Office
Deer Creek Archery
Churchville Auto Body
St. Margaret's Mission and Middle School
F&L First Jewelers
Church-Christ Scientist
Mt. Zion United Methodist Church
Rite Aid
Royal Farms
Wawa
STUDY AREA LIMIT
MARYLAND 22
CHURCHVILLE SECTION
SCALE: N. T. S.
FIGURE I-1
08/12


Cyber Exchange
Royal Farms
US Post Office
Inkslingers Tattoos, LLC
Deer Creek Archery
Churchville Auto Body
Loeblein Memorials
MARYLAND 156
GRAFTON LANE
MARYLAND 136
Kroh's Nursery
MARYLAND 22
SNAKE LANE
NORTH
Bowman's Butcher Shop
Flaming Dragon Tattoos and Body Piercing
CARSINS RUN ROAD
STEPNEY ROAD
ALDINO
TECHNOLOGY DRIVE
Higher Education and Conference Center (HE
Ripken
INTERSTATE 95
MARYLAND 22
CENTRAL SECTION
SCALE: N.T.S.
FIGURE I-2
08/12


Ripken Stadium
MARYLAND 462
Higher Education and Conference Center (HEAT)
TECHNOLOGY DRIVE
Jiffy Lube
Klein's ShopRite
Clarion Hotel
Durango's
Beards Hill Professional Center
Travelodge Aberdeen
The Olive Tree
PNC Bank
Royal Farms
Har-co Federal Credit Union
INTERSTATE 95
MARYLAND 132
PARADISE ROAD
MOUNT ROYAL AVENUE
St. Paul's Lutheran Church
MARYLAND 22
Johnnies Body Shop
POST ROAD
Hall Cross Roads Elementary School
STUDY AREA LIMIT
US 40
MARYLAND 22
ABERDEEN SECTION
SCALE: N. T. S.
FIGURE I-3
08/12

II. Existing Conditions

The full Existing Conditions Report for the MD 22 Corridor Study was completed in November, 2011 and submitted to Harford County and appears under a separate cover. Following is a summary of the existing conditions.

A. Land Use

Existing land use data (2012) was provided by the Harford County GIS department. The corridor has a diverse mixture of land uses throughout the various sections. The existing land uses are shown in Figures II-1 to II-3. Existing densities were evaluated using U.S. Census Summary File 1 (2010) data at the block group level for the census block groups adjacent to the MD 22 corridor. Density for this study is reported by dwelling units per acre (du/ac) in order to determine transit supportiveness of the land uses.

In the Churchville section between Thomas Run Road and Tudor Lane, existing land use is mostly agricultural, low density residential, and open space/unimproved land. Large areas of institutional and commercial lands are found near the MD 22 and Schucks Road intersection which include Harford Community College and Campus Hills Shopping Center. Densities in this section are primarily under 1du/ac with slightly higher densities near the intersection of MD 22 and MD 543.

The Central section of the corridor is bordered by land uses that are primarily low density residential, agricultural and open space/unimproved land. There are pockets of commercial land use near the intersections with MD 156 and Carsins Run Road. Densities for the census block groups in this section are all under 1 du/ac.

The Aberdeen section includes the most diverse mix of land uses along the project corridor. There are commercial uses including the HEAT Center located to the west of the I-95 and MD 22 Interchange along Technology Drive. From I-95 to US 40, there is a mix of commercial and residential land uses, with densities higher here than is seen elsewhere along the project corridor. The Aberdeen Marketplace, Target, and Beards Hill Plaza Shopping Center are located in this section. Between US 40 and Aberdeen Proving Ground (APG) there is a mixture of residential, institutional, and open space/unimproved land uses along the MD 22 corridor. The US 40 corridor has primarily commercial land use near its interchange with MD 22. Densities for this section are the highest along the MD 22 corridor with several census blocks having densities just above 1 du/ac. There are census blocks with densities as high as 3.2 du/ac south of the MD 22 study corridor near the intersection of MD 132 and US 40.

B. Transit Operations

Transit operations along the corridor are provided by multiple agencies including Harford County, Maryland Transit Administration, AMTRAK, and Aberdeen Proving Ground. The systems typically are supporting different users and do include transfer locations.

i. Harford Transit LINK

Harford Transit is a fixed route public transit system that operates nine routes on weekdays with no service on Saturdays. Of these routes, five travel along, or within close proximity to, the MD 22 corridor. In addition to the designated stop locations for each route, the service also operates as a flag stop system. These routes are show in Figures II-4 to II-6 and discussed below.

Route 1/1A (Green Lines) provides service from Harford Memorial Hospital to Harford Mall running along MD 22 through the Churchville and Central sections of the study corridor and then turning onto MD 132 and Post Road within Aberdeen. Stops along the project corridor include Harford Community College, Campus Hills Shopping Center, Technology Drive and Beards Hill Shopping Center.

Ridership information for Routes 1/1A indicates that the Aberdeen AMTRAK/MARC station has the greatest number of estimated boardings and alightings per day among stops along the MD 22 project corridor with 110 passengers. There are an estimated 90 boardings and alightings per day for the Harford Community College stop and 48 per day for the Beards Hill Plaza stop.

Route 4 (Yellow Line), also known as the Aberdeen Doodlebug, operates as a circular shuttle service within Aberdeen with stops at the Aberdeen AMTRAK/MARC station and the major shopping centers along the MD 22 corridor.

Route 6/6A (Purple Lines) operates along US40 between Aberdeen and Edgewood. The stop nearest to the project corridor is at the Aberdeen AMTRAK/MARC station.

Route 7 (Teal Line) operates from the Aberdeen MARC station to Havre de Grace and then onward to destinations in Cecil County by way of US 40. The stop at the Aberdeen MARC station is the only stop along this line with in the project corridor.

The Aberdeen AMTRAK/MARC station serves as a transfer point between the various Harford County Transit lines as well as AMTRAK and MARC rail, MTA commuter bus and Aberdeen Proving Ground Shuttle services.

ii. Maryland Transit Administration

The Maryland Transit Administration (MTA) operates two commuter bus routes (Routes 410 and 420) as well as commuter rail (MARC Penn Line) service within the project corridor.

MTA operates commuter bus Route 410, providing express service from Churchville / Bel Air to Baltimore on weekdays. The route has one stop located along the MD 22 corridor at the Campus Hills Shopping Center. Southbound service to Baltimore is offered in the morning and return service northbound is offered in the afternoon/evening. Morning service extends from 6:00AM to 8:48AM with four daily trips. Afternoon service runs from 3:55PM to 6:52PM with four daily trips.

Commuter bus Route 420 provides express bus service from Havre de Grace to Baltimore on weekdays. Southbound service to Baltimore is offered in the morning from 5:25AM to 8:30AM with four daily trips. Return service northbound is offered in the afternoon/evening from 12:50PM to 6:28PM with five daily trips.

This route stops at the Aberdeen AMTRAK/MARC station and at the intersection of US 40 and Plater Street which are near the MD 22 study corridor.

The MARC Penn Line commuter rail service operates from the Aberdeen AMTRAK/MARC station located on US 40, south of MD 22. It provides service on weekdays northbound to Perryville and southbound to Baltimore and Washington, DC.

iii. AMTRAK

AMTRAK provides regional and national rail service from the Aberdeen AMTRAK/MARC station. The Northeast Regional Line offers daily service northbound towards Springfield/Boston and southbound towards Newport News/Lynchburg.

iv. Aberdeen Proving Ground Shuttle

The Aberdeen Proving Ground (APG) provides a shuttle service for employees from the Aberdeen AMTRAK/MARC station to select locations on APG. The morning shuttle departs the train station at 7:42AM, delivering employees to their work locations by 8:14AM. In the evening there are shuttles to the train station at 5:08PM and 6:18PM.

C. Bicycle and Pedestrian Facilities

Existing bicycle facilities throughout the corridor are typically not formalized and consist of "Share the Road" signage in the vicinity of MD22 and MD136 roadway intersection both eastbound and westbound. There is a small section of formalized bicycle lane located adjacent to the Wawa Gas Station near the Harford Community College, most likely, installed in conjunction with the construction of the gas station.

Bicyclists using the MD 22 corridor share the road with vehicular traffic, however, throughout the corridor the existing roadway shoulders do offer a suitable riding area. The roadway shoulders are approximately eight (8) to ten (10) feet in width and are in acceptable condition to allow bicycle use. Shoulders exist for the entire length of the study area, but disappear into right turn lanes at major roadway intersections.

At select roadways that currently experience high volumes of left turning vehicles, the roadway shoulders disappear to provide left turn lanes for those vehicles while maintaining continuous traffic flow along MD 22. These points of conflict between vehicles and bicycles are not ideal and require all users of the roadway to be wary of one another.

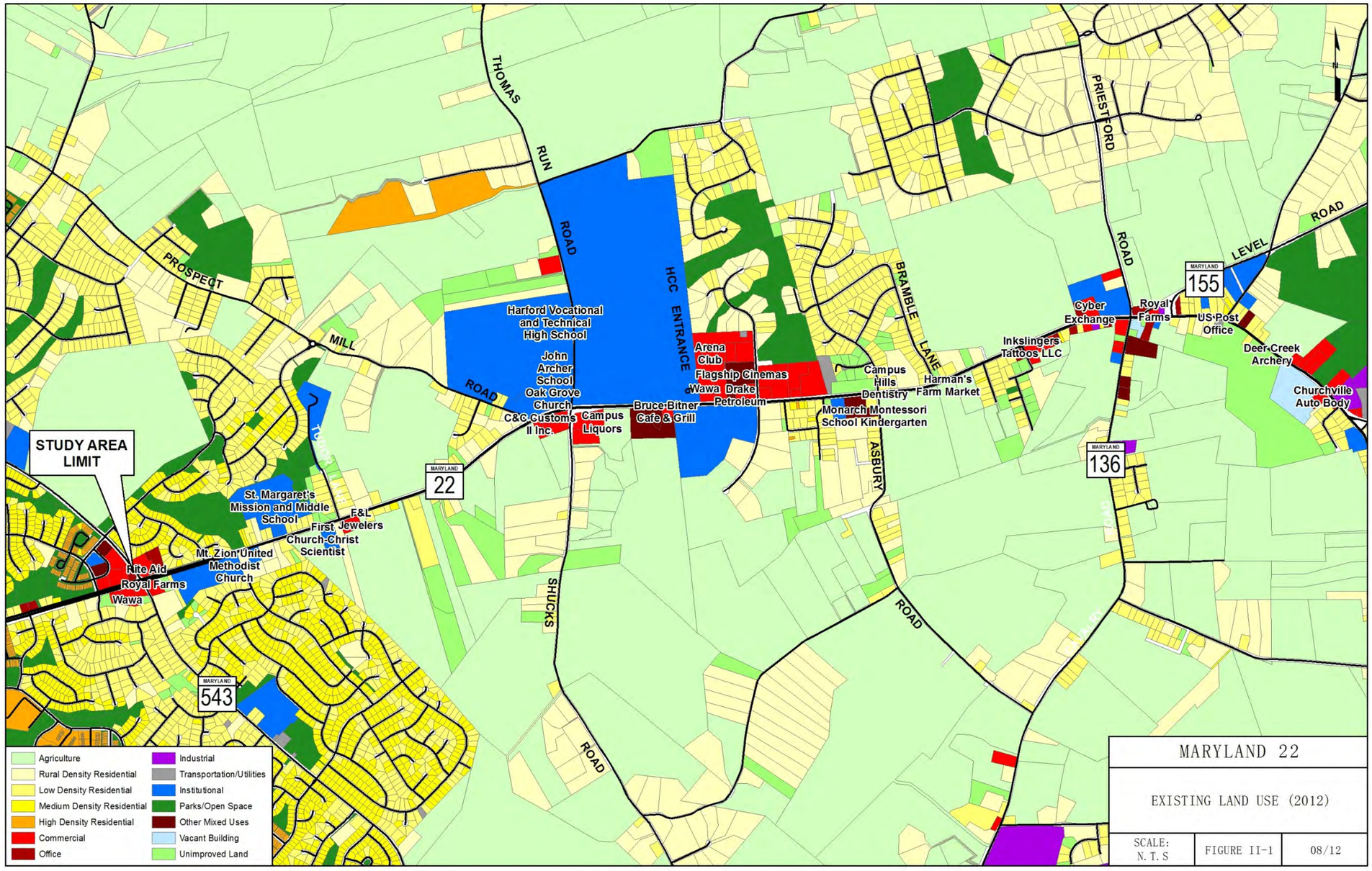
There is a limited existing pedestrian network along MD 22 within the study area. Within the Churchville portion of the study area, there are sidewalks along the northern side of the roadway from just west of the intersection with MD 136 to the intersection with MD 155. Beyond this section of sidewalk, approximately 1,000 feet in length, facilities are limited to paved roadway shoulders that terminate at turn lanes throughout this section.

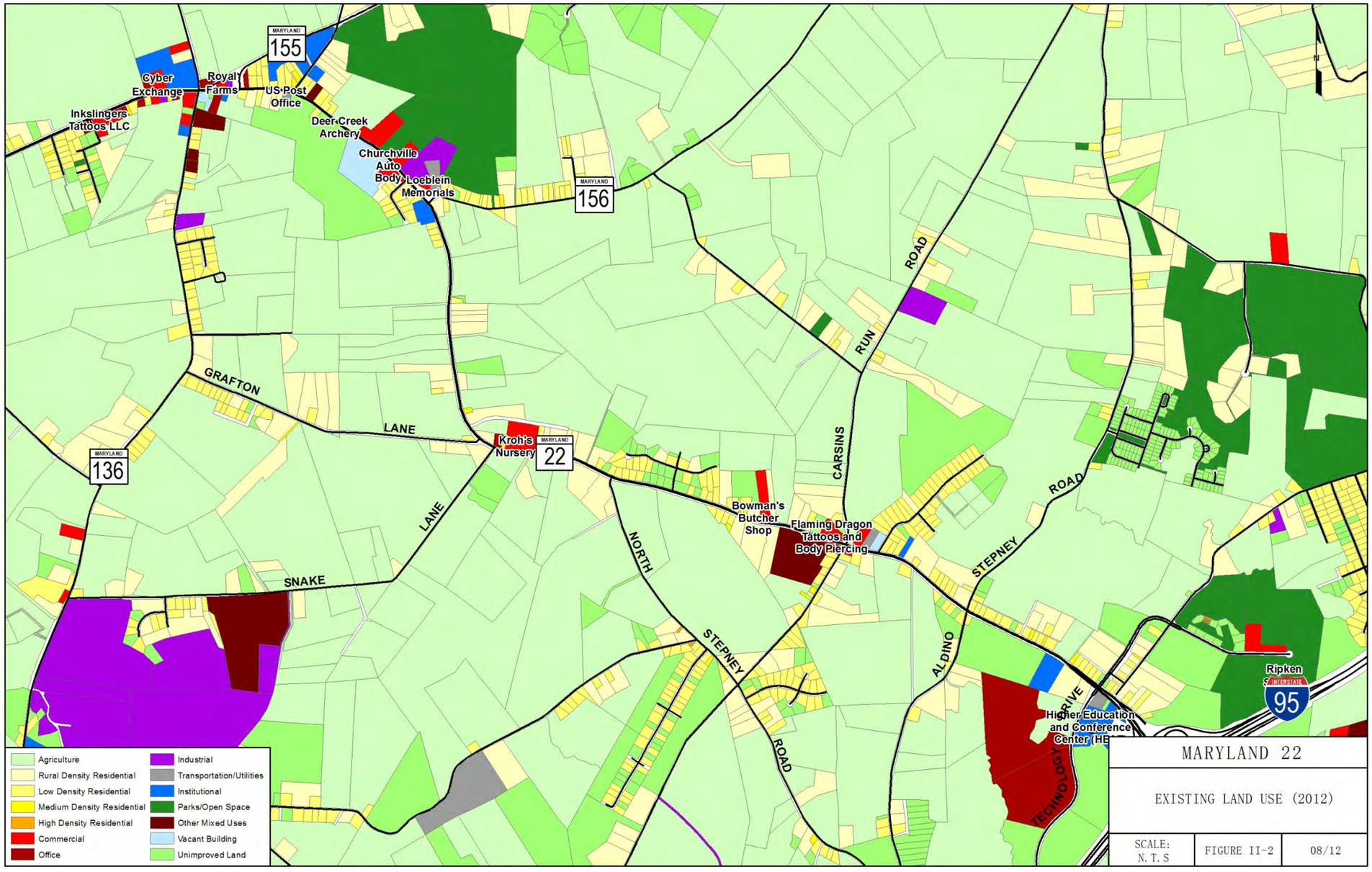
Following the intersection with MD 155/Level Road, pedestrian facilities in the Central portion of the study area are limited to paved shoulders that terminate at turn lanes throughout the section. At the eastern end of this section, there are pedestrian facilities including sidewalks, crosswalks, pedestrian signals, ramps and a refuge island at the intersection with Technology Drive.

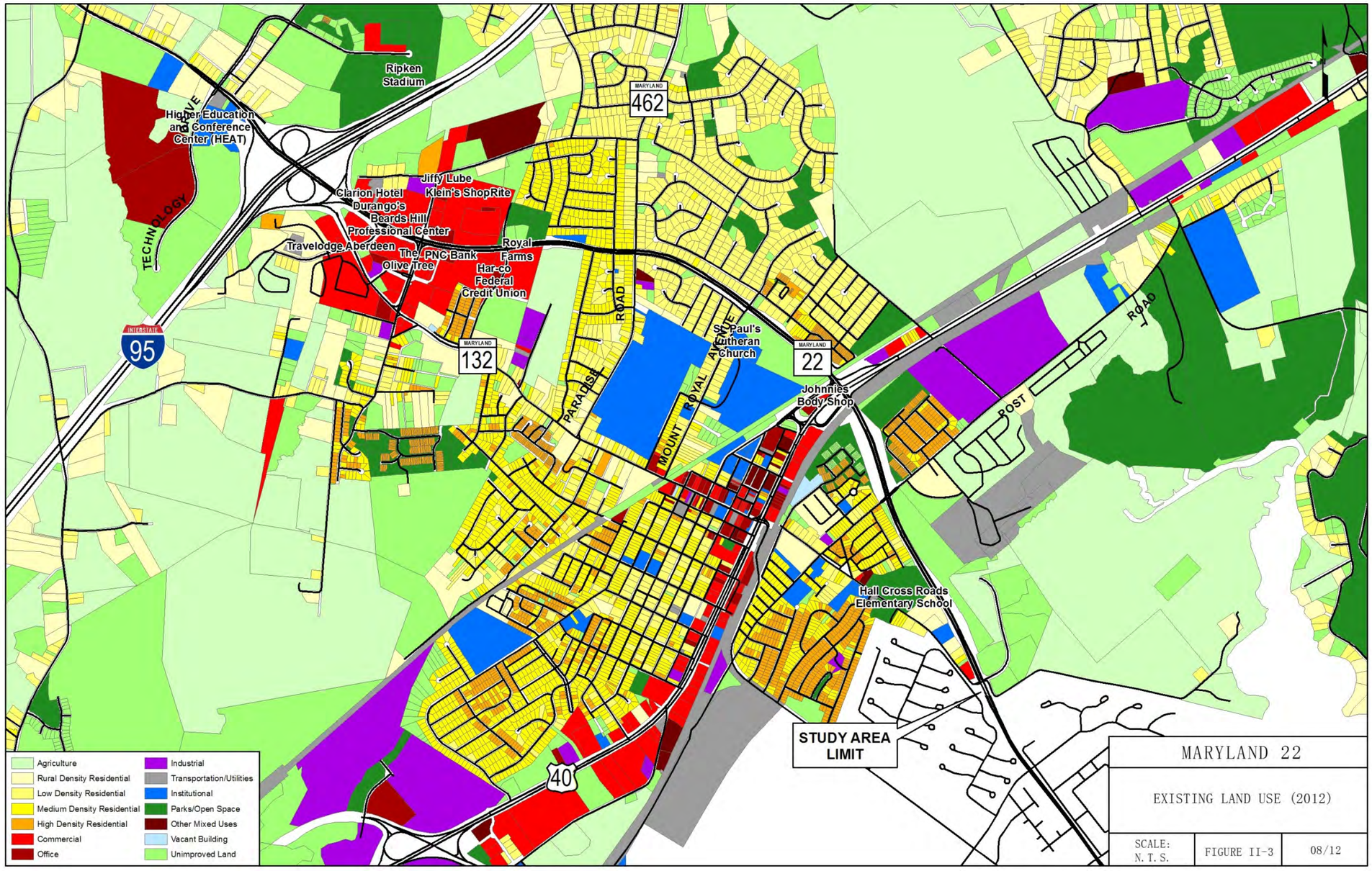
The Aberdeen section of the corridor contains the most facilities for pedestrians. The facilities at the Technology Drive intersection extend along both sides of MD 22 approaching the I-95 interchange, continue along the structure over I-95 and then terminate just east of the interchange. Shoulders in this area vary in width according to turn lane configurations. There are sidewalks which extend to the south side of MD 22 along Middleton Road which provide access to the shopping center, but do not extend along MD 22. Shoulder facilities continue along both sides of the roadway until sidewalks resume in a residential section near the intersection with Graceford Drive. Sidewalks continue eastward, terminating just east of the intersection with MD 462/Paradise Road. The MD 462/Paradise Road intersection features sidewalks, crosswalks, pedestrian ramps and signals.

Following MD 462/Paradise Road, pedestrian facilities are limited to a paved roadway shoulder until the intersection with Mount Royal Avenue which features crosswalks and sidewalks for the western side of the crossing. Paved shoulders continue to MD 132/Post Road which features crosswalks and limited sidewalk facilities. From this intersection to the eastern study area limit, pedestrian facilities are limited to a paved roadway shoulder.

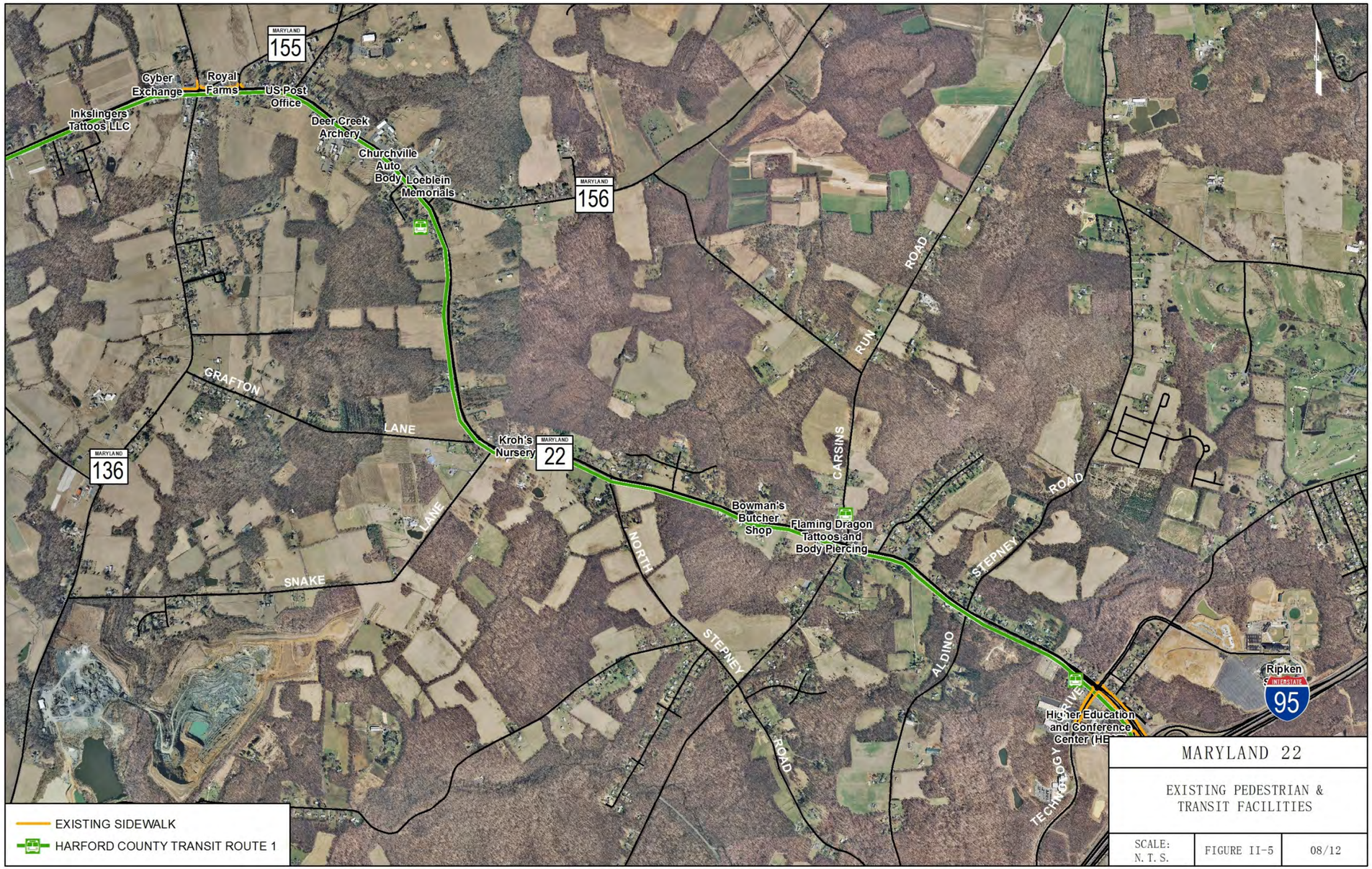
A majority of the pedestrian facilities along the corridor are not compliant with the current ADA requirements.

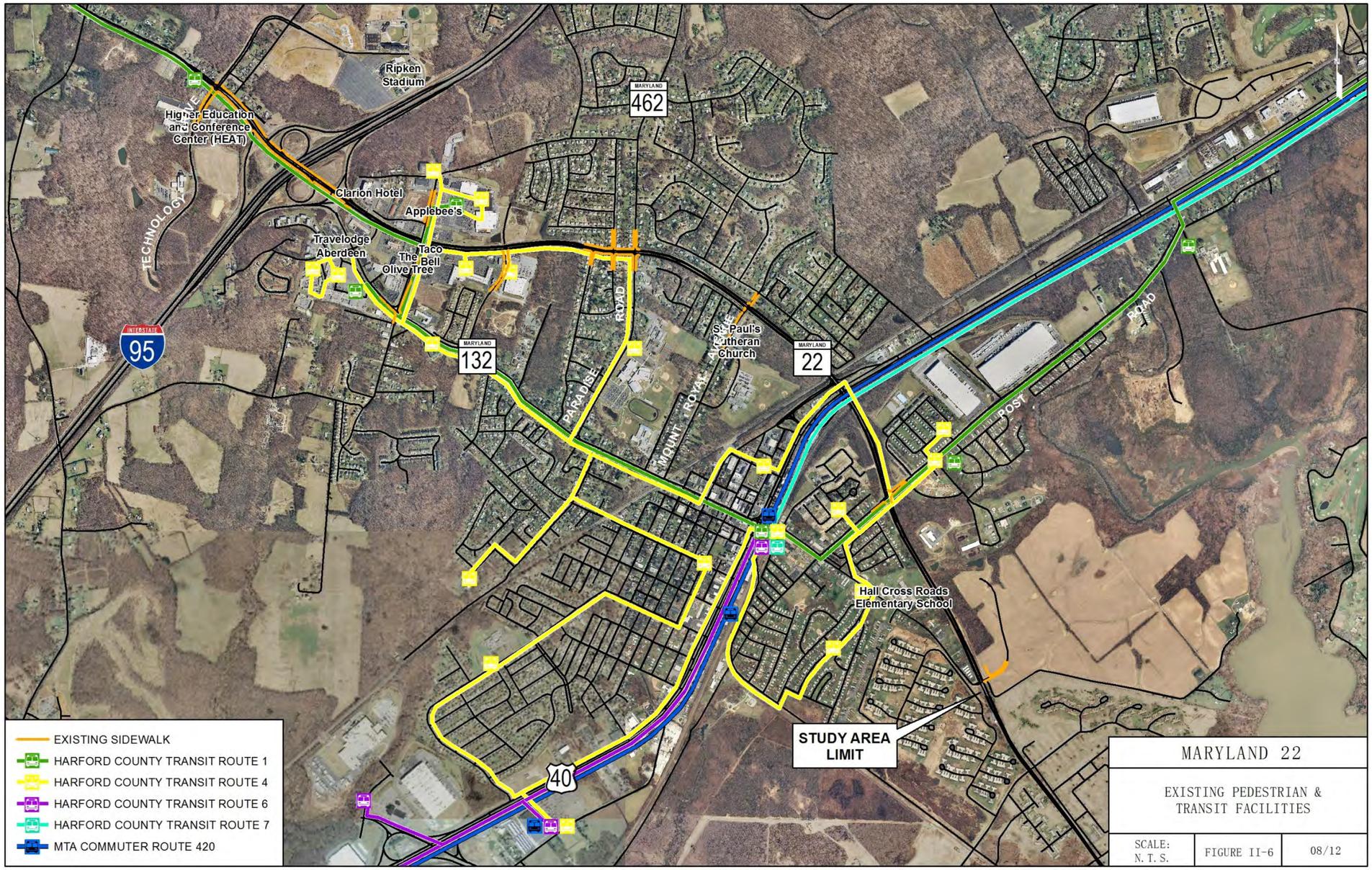

THOMAS RUN ROAD
PROSPECT
MILL ROAD
HCC ENTRANCE
PRIESTFORD ROAD
BRAMBLE LANE
LEVEL ROAD
ASBURY ROAD
SHUCKS ROAD
STUDY AREA LIMIT
Harford Vocational and Technical High School
John Archer School
Oak Grove Church
Arena Club
Flagship Cinemas
Wawa
Drake Petroleum
Bruce Bitner
Cafe & Grill
C&C Customs II Inc.
Campus Liquors
Campus Hills Dentistry
Monarch Montessori School Kindergarten
Harman's Farm Market
Inkslingers Tattoos LLC
Cyber Exchange
Royal Farms
US Post Office
Deer Creek Archery
Churchville Auto Body
St. Margaret's Mission and Middle School
F&L
First Jewelers
Church-Christ Scientist
Mt. Zion United Methodist Church
Rite Aid
Royal Farms
Wawa
MARYLAND 155
MARYLAND 22
MARYLAND 136
MARYLAND 543
Agriculture
Rural Density Residential
Low Density Residential
Medium Density Residential
High Density Residential
Commercial
Office
Industrial
Transportation/Utilities
Institutional
Parks/Open Space
Other Mixed Uses
Vacant Building
Unimproved Land
MARYLAND 22
EXISTING LAND USE (2012)
SCALE: N.T.S
FIGURE II-1
08/12


MARYLAND 155
MARYLAND 156
MARYLAND 136
MARYLAND 22
Cyber Exchange
Royal Farms
US Post Office
Inkslingers Tattoos LLC
Deer Creek Archery
Churchville Auto Body
Loeblein Memorials
Kroh's Nursery
Bowman's Butcher Shop
Flaming Dragon Tattoos and Body Piercing
Higher Education and Conference Center (HE
Ripken
INTERSTATE 95
GRAFTON
LANE
SNAKE
NORTH
STEPNEY
ROAD
CARSINS
RUN
ALDINO
DRIVE
TECHNOLOGY
Agriculture
Rural Density Residential
Low Density Residential
Medium Density Residential
High Density Residential
Commercial
Office
Industrial
Transportation/Utilities
Institutional
Parks/Open Space
Other Mixed Uses
Vacant Building
Unimproved Land
MARYLAND 22
EXISTING LAND USE (2012)
SCALE: N.T.S
FIGURE II-2
08/12


Ripken Stadium
Higher Education and Conference Center (HEAT)
TECHNOLOGY DRIVE
Jiffy Lube
Klein's ShopRite
Clarion Hotel
Durango's
Beards Hill Professional Center
Travelodge Aberdeen
The Olive Tree
PNC Bank
Royal Farms
Har-co Federal Credit Union
INTERSTATE 95
MARYLAND 132
MARYLAND 462
PARADISE ROAD
MOUNT ROYAL AVENUE
St. Paul's Lutheran Church
MARYLAND 22
Johnnies Body Shop
POST ROAD
Hall Cross Roads Elementary School
40
STUDY AREA LIMIT
Agriculture
Rural Density Residential
Low Density Residential
Medium Density Residential
High Density Residential
Commercial
Office
Industrial
Transportation/Utilities
Institutional
Parks/Open Space
Other Mixed Uses
Vacant Building
Unimproved Land
MARYLAND 22
EXISTING LAND USE (2012)
SCALE: N. T. S.
FIGURE II-3
08/12


THOMAS RUN ROAD
PROSPECT MILL ROAD
HCC ENTRANCE
BRAMBLE LANE
PRIESTFORD ROAD
LEVEL ROAD
TUDOR LANE
SHUCKS ROAD
ASBURY ROAD
CAVALRY ROAD
MARYLAND 155
MARYLAND 22
MARYLAND 136
MARYLAND 543
Harford Vocational and Technical High School
John Archer School
Oak Grove Church
Arena Club
Flagship Cinemas
Wawa
Drake Petroleum
Bruce Bitner Cafe & Grill
Campus Liquors
C&C Customs Inc.
Campus Hills Dentistry
Harman's Farm Market
Monarch Montessori School Kindergarten
Cyber Exchange
Royal Farms
US Post Office
Inkslingers Tattoos LLC
Deer Creek Archery
Churchville Auto Body
St. Margaret's Mission and Middle School
F&L
First Jewelers
Church Christ Scientist
Mt. Zion United Methodist Church
Rite Aid
Royal Farms
Wawa
STUDY AREA LIMIT
EXISTING SIDEWALK
HARFORD COUNTY TRANSIT ROUTE 1
MTA COMMUTER ROUTE 410
MD 6 Inch Imagery
MARYLAND 22
EXISTING PEDESTRIAN & TRANSIT FACILITIES
SCALE: N. T. S.
FIGURE II-4
08/12


MARYLAND 155
MARYLAND 156
MARYLAND 136
MARYLAND 22
Cyber Exchange
Royal Farms
US Post Office
Inkslingers Tattoos LLC
Deer Creek Archery
Churchville Auto Body
Loeblein Memorials
Kroh's Nursery
Bowman's Butcher Shop
Flaming Dragon Tattoos and Body Piercing
Higher Education and Conference Center (HE
Ripken
INTERSTATE 95
GRAFTON LANE
SNAKE LANE
NORTH STEPNEY ROAD
STEPNEY ROAD
CARSINS RUN ROAD
ALDINO DRIVE
TECHNOLOGY
EXISTING SIDEWALK
HARFORD COUNTY TRANSIT ROUTE 1
MARYLAND 22
EXISTING PEDESTRIAN & TRANSIT FACILITIES
SCALE: N. T. S.
FIGURE II-5
08/12


Ripken Stadium
Higher Education and Conference Center (HEAT)
TECHNOLOGY DRIVE
Clarion Hotel
Applebee's
Travelodge Aberdeen
Taco Bell
The Olive Tree
MARYLAND 462
INTERSTATE 95
MARYLAND 132
PARADISE ROAD
MOUNT ROYAL AVENUE
St. Paul's Lutheran Church
MARYLAND 22
POST ROAD
Hall Cross Roads Elementary School
MARYLAND 40
STUDY AREA LIMIT
EXISTING SIDEWALK
HARFORD COUNTY TRANSIT ROUTE 1
HARFORD COUNTY TRANSIT ROUTE 4
HARFORD COUNTY TRANSIT ROUTE 6
HARFORD COUNTY TRANSIT ROUTE 7
MTA COMMUTER ROUTE 420
MARYLAND 22
EXISTING PEDESTRIAN & TRANSIT FACILITIES
SCALE: N. T. S.
FIGURE II-6
08/12

D. Traffic Operations

The analysis of existing traffic operations investigated several factors including: field observations, origin-destination study, crash analysis, traffic volumes, and traffic analysis.

i. Field Observations

Field observations were performed along the MD 22 corridor in both the AM and PM peak periods. These observations evaluated travel speed, queuing, signal operations and overall congestion within the corridor.

During the AM peak period, there are two areas of severe congestion that take place. These areas are near the Prospect Mill Road/Thomas Run Road intersection and approaching the Aberdeen Proving Ground (APG) gate. There are other areas such as the MD 136 and MD 155 intersections, Beards Hill Road and MD 462 that also have high turning queues.

On MD 22 eastbound, queues extend over 130 vehicles from the Prospect Mill Road intersection signal. This causes motorists to wait multiple signal cycles to clear the intersection. Motorists typically waited over eight minutes from the time they were queued to pass through the intersection on MD 22 eastbound. The delay is similar for the southbound Prospect Mill Road traffic. In this direction, motorists typically waited close to seven minutes to clear the intersection with queues extending for 65 vehicles. Once motorists clear this intersection, traffic flows at a more moderate speed.

The second major traffic operation issue is traffic entering APG. Personnel must be checked before entering the base. Despite the fact that four of the five gates were provided to review credentials, the stoppage still causes traffic to queue back approximately 0.8 miles to North Post Road. Queuing extends beyond the North Post Road intersection and in the worst case condition back through the US 40 interchange. In general the queues usually extend between US 40 and North Post Road.

The other locations where motorists were forced to wait multiple signal cycles include MD 136 southbound. Queues of greater than 30 vehicles can form on this approach. The Beards Hill Road northbound left turn will queue to the MD 132 intersection. This forces motorists to experience long delays. The final location is MD 462 southbound where motorists destined to APG are queued to make a left turn to MD 22. These queues range from 10 to 20 vehicles.

The remaining sections operate with only minor delays due to signal operations or operate free flow speed. This is the case in the center section between MD 155 and Technology Drive/Long Drive with speed dictated mostly by the running speed of the lead vehicle along the section of roadway.

The PM peak for the most part presents a separate set of issues. The one common operational problem is with the northbound left turn from Beards Hill Road. In the PM peak, substantial queues occur that forces motorists to wait two cycles to clear the intersection. Traffic exiting from APG causes long queues to occur on MD 22 westbound at the North Post Road signal. These queues extend to the newly constructed acceleration lane from Research Boulevard. Once through the North Post Road signal, traffic flows at a moderate rate. A high volume of traffic is reduced at the exit ramp to US 40 eastbound. Motorists making the left turn from the US 40 ramp to MD 22 will queue to near Rogers Street but generally will make it through the signal. Occasionally at the Beards Hill Road signal traffic queues almost to the signal at Middleton Road. Once traffic passes through the I-95 signals, speeds increase to 50 plus miles per hour until the MD 155 area.

The Churchville section is especially congested westbound between approximately Asbury Road and the Thomas Run Road intersection. Stop and go traffic is common through this area to traverse through the three signalized intersections.

The other area that experiences congestion is the section between MD 136 and MD 155 both eastbound and westbound with westbound being the slightly lower operations. The proximity of the two intersections with the turning movements especially on to MD 155 along the mainline plus the commercial access points causes slow traffic operations. This also influenced Maryland 22 westbound traffic at the MD 155 signal with queues of 25 vehicles forming.

ii. Origin-Destination Study

To better define travel patterns in the MD 22 corridor, origin/destination studies were performed. The major emphasis of these studies was to determine the number of motorists utilizing MD 22 from the Churchville area to access Aberdeen Proving Ground (APG) in the morning; and exiting APG in the evening to return to the Churchville area. **A general opinion prior to completing this study by the general public was that there is a high percentage of traffic making a point to point trip from Bel Air to APG. By completing the origin-destination study, this was found not to be true.**

An origin/destination survey was conducted along MD 22 eastbound from west of Prospect Mill Road to APG. This survey was performed to determine the destinations of motorists in the Churchville area during the AM peak period, specifically the percentage of persons destined to APG. A license plate matching survey was performed by recording license plate numbers at three locations in the corridor: along Prospect Mill Road, on MD 22 west of Prospect Mill Road, and on MD 22 at North Post Road. Additional surveys were performed to determine the volume of motorists utilizing Prospect Mill Road southbound to Thomas Run Road northbound and the interaction between the MD 155 and MD 136 movements. These surveys were utilized in conjunction with the traffic count data to determine the trip patterns in the entire corridor for motorists entering the network at the Prospect Mill intersection.

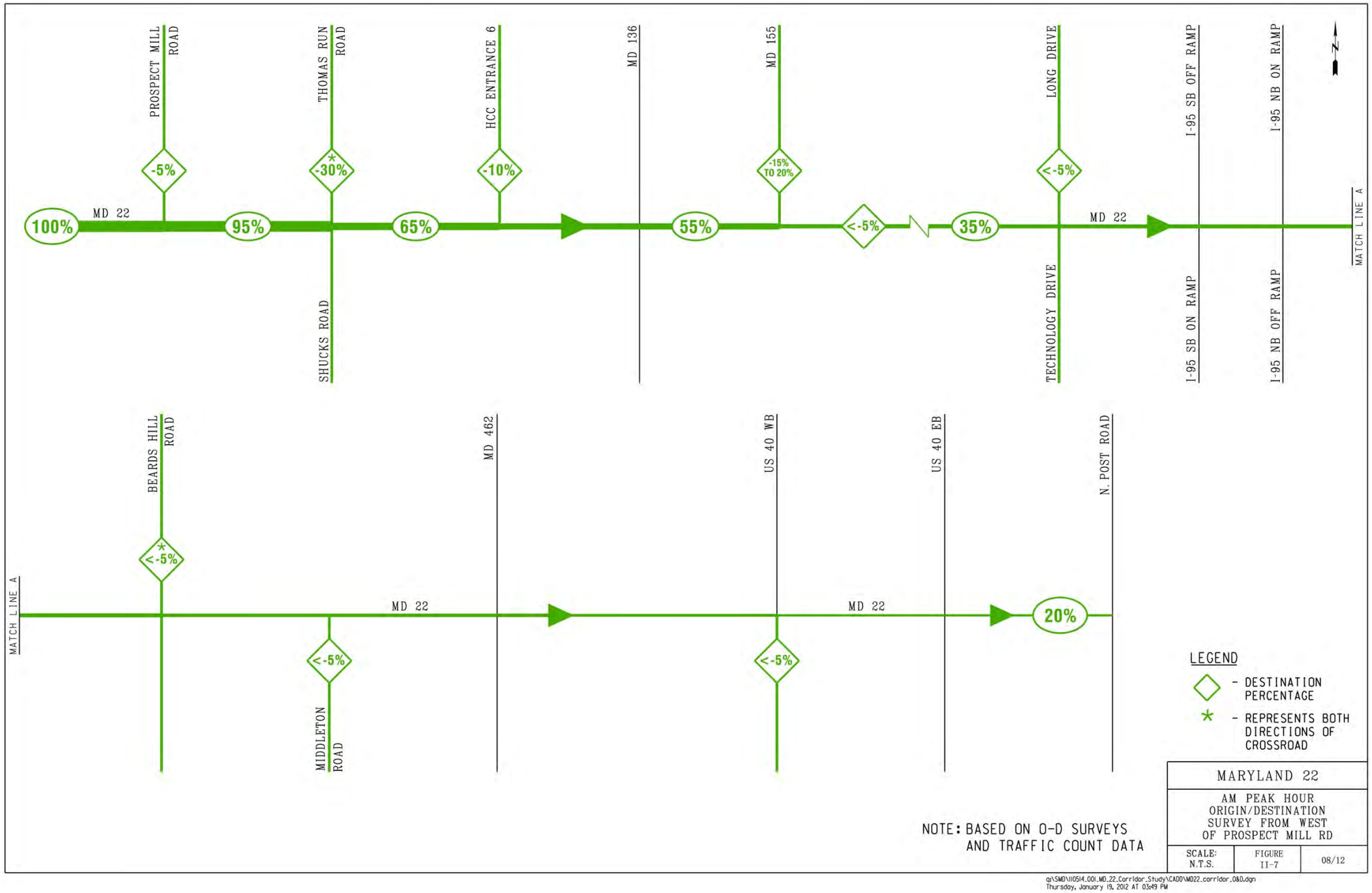
In the PM peak period, origin destination surveys were performed along MD 22 westbound from APG to US 40. This data, along with analysis of turning movements at each of the intersections, was the basis to develop the trip patterns of motorists leaving APG.

The survey results showed during the AM peak period, 20 percent to 25 percent of motorists along MD 22, west of Prospect Mill Road traverse MD 22 to access APG. In the PM peak period, the survey showed about 10 percent of commuters leaving APG traveled

westbound along MD 22 with a destination west of Prospect Mill Road. Diagrams illustrating the findings of this survey during the AM and PM peak periods are located in Figures II-7 to II-8 respectively.

iii. Aberdeen Proving Ground

Aberdeen Proving Ground (APG) is presently conducting a Gate Study to evaluate their operations at all access points. Recommendations for modifications to the gates will be completed in the near future. It would be preferred if APG would provide zip code data on the location of the people working at their facility. In order to supplement that data or to further define travel patterns, origin-destination studies should be performed along MD 543 and MD 155. Over the long term, patterns in the model should be confirmed along MD 22 due to the changes in origins of workers at APG.


PROSPECT MILL ROAD
THOMAS RUN ROAD
HCC ENTRANCE 6
MD 136
MD 155
LONG DRIVE
I-95 SB OFF RAMP
I-95 NB ON RAMP
MATCH LINE A
-5%
*
-30%
-10%
-15% TO 20%
<-5%
100%
MD 22
95%
65%
55%
<-5%
35%
<-5%
MD 22
SHUCKS ROAD
TECHNOLOGY DRIVE
I-95 SB ON RAMP
I-95 NB OFF RAMP
BEARDS HILL ROAD
MD 462
US 40 WB
US 40 EB
N. POST ROAD
MATCH LINE A
*
<-5%
MD 22
MD 22
20%
<-5%
MIDDLETON ROAD
LEGEND
- DESTINATION PERCENTAGE
* - REPRESENTS BOTH DIRECTIONS OF CROSSROAD
NOTE: BASED ON O-D SURVEYS AND TRAFFIC COUNT DATA
MARYLAND 22
AM PEAK HOUR ORIGIN/DESTINATION SURVEY FROM WEST OF PROSPECT MILL RD
SCALE: N.T.S.
FIGURE II-7
08/12
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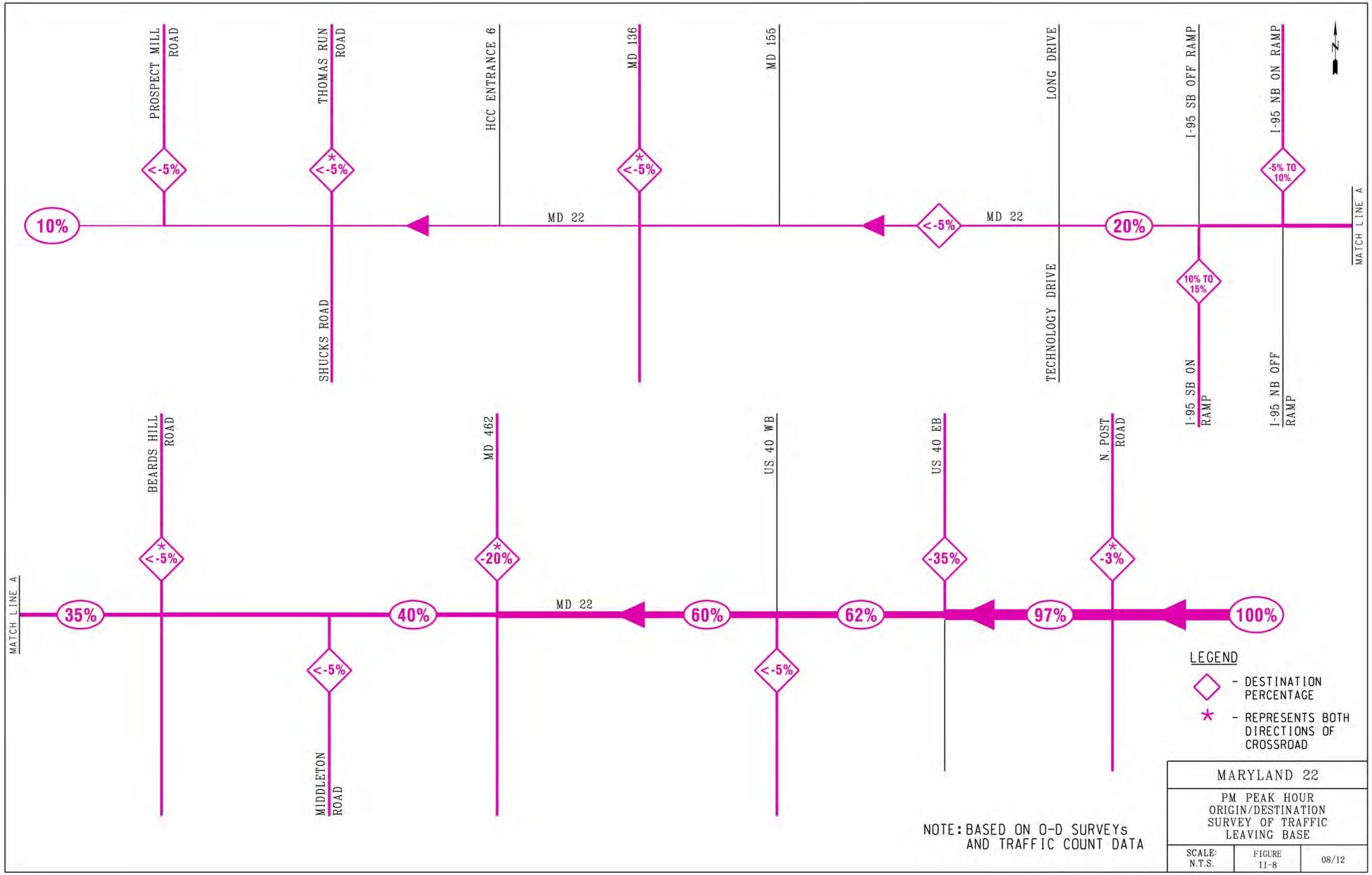
PROSPECT MILL ROAD
THOMAS RUN ROAD
HCC ENTRANCE 6
MD 136
MD 155
LONG DRIVE
I-95 SB OFF RAMP
I-95 NB ON RAMP
10%
<-5%
*
<-5%
MD 22
*
<-5%
<-5%
MD 22
20%
-5% TO 10%
MATCH LINE A
SHUCKS ROAD
TECHNOLOGY DRIVE
10% TO 15%
I-95 SB ON RAMP
I-95 NB OFF RAMP
BEARDS HILL ROAD
MD 462
US 40 WB
US 40 EB
N. POST ROAD
MATCH LINE A
35%
*
<-5%
40%
*
-20%
MD 22
60%
62%
-35%
97%
*
-3%
100%
<-5%
MIDDLETON ROAD
LEGEND
- DESTINATION PERCENTAGE
* - REPRESENTS BOTH DIRECTIONS OF CROSSROAD
NOTE: BASED ON O-D SURVEYS AND TRAFFIC COUNT DATA
MARYLAND 22
PM PEAK HOUR ORIGIN/DESTINATION SURVEY OF TRAFFIC LEAVING BASE
SCALE: N.T.S.
FIGURE II-8
08/12
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Thursday, January 19, 2012 AT 03:49 PM

III. Roadway Safety Audit

A road safety audit was performed along the MD 22 corridor. A road safety audit is considered by the Federal Highway Administration (FHWA) as being one of the nine proven safety countermeasures for reducing highway fatalities and serious injuries. The road safety audit involves a multi-disciplinary team to evaluate safety aspects along a roadway. This team involves mostly people independent of the study team and takes into account all potential users of the facility and not just automobile drivers.

In general, the improvements are centered towards low cost items that can be implemented in the short term. Typical types of improvements include adjustments to signing, pavement markings and removal of obstacles.

The MD 22 road safety audit was conducted in December, 2011. The team consisted of persons from the Maryland State Highway Administration (MDSHA) and Johnson, Mirmiran and Thompson. This included representatives from traffic engineering, planning, landscape architecture, pedestrian/bicycle specialists and highway design. Crash data was reviewed by the participants both before and during the audit. These representatives both walked and drove the corridor evaluating various safety issues for motorists, pedestrians and bicyclists as it related to the crashes and in general.

The road safety audit listed various items which have been included in the short, medium and long term improvements. Some of these improvements were analyzed to determine their benefit based on the Highway Safety Manual as to the reduction in crashes that could be anticipated based on crash modification factors (CMFs). These are depicted as follows:

- MD 22 @ MD 543; Extension of eastbound Maryland 22 through lane.

  This would improve lane distribution on MD 22 eastbound at the MD 543 intersection. Presently it is approximately a 2/3, 1/3 distribution over the lanes and has the potential to reduce one sideswipe crash over a three year period

- MD 22 between Schucks Road and Harford Community College; Reduce Crest Vertical Curve.

  The anticipated number of crashes that could be reduced by this improvement from one every two years to one every nine years depending upon the detailed nature of the crashes

- MD 22 between the Harford Community College Entrance and Campus Hills Drive; Eliminate Access points along North side of Roadway.

  This would provide a reduction of .5 to 1 crash per year based on the Highway Safety Manual.

- MD 22 @ MD 156; Realign Intersection.

  By eliminating the skew, it would be projected to reduce about one crash at this location every 8 years

- MD 22 between Mount Royal Avenue and US 40; Review the need for guardrail through this section.

  There has been three single vehicle crashes through this section. There are no crash modification factors for this improvement so an estimated reduction in collisions cannot be determined although it would be anticipated that this would have a positive benefit.

These improvements are included within the Short Term Improvement diagrams.

IV. Crash Analysis

Crash data was obtained from the Maryland State Highway Administration (MDSHA) for the study area along the MD 22 corridor. The data was collected during a three year period (2008 – 2010). Within the three year study period, a total of 388 reported crashes occurred from Maryland 543 to North Post Road.

Corridor wide, the most common type of incident that occurred along the MD 22 corridor during the three year period was rear-end crashes, with 161 reported. The next most frequent type to occur along the corridor was left turn crashes, with 65 reported. There were 53 angle crashes, 45 collisions that involved hitting a fixed object, 27 were considered as other undefined crashes, 16 sideswipes, 13 opposite direction, 6 were pedestrian related and 2 involved parked vehicles.

Three out of the six pedestrian crashes occurred at intersections. These were at MD 462, North Post Road and Rhineforte Drive / Asbury Road. Out of the three non-intersection related pedestrian crashes, one occurred at the Campus Hill Shopping Center. The other two pedestrian crashes occurred just west of Middleton Road and just west of Mount Royal Avenue.

Out of all crashes reported:

- 21% occurred at night
- 16% occurred on a wet surface
- 5% were alcohol related

There was one fatality in the corridor. The fatality related crash occurred between the intersections of MD 136 and MD 155 along eastbound MD 22.

During the completion of this study, there has been two fatalities near the intersections of MD 22 and Beards Hill Road and at Middleton Road.

V. Traffic Volumes

Traffic counts were conducted throughout the study corridor in addition to count data which was gathered from the Maryland State Highway Administration's website. This included turning movement counts at intersections and portable tube counts placed along the roadways. Turning movement counts were performed or obtained from the state website and the Maryland Transportation Authority.

In addition, JMT conducted spot counts at the Middleton Road and Technology Drive/Long Drive intersections. This was completed to determine relative changes in traffic volumes along MD 22 at these locations. There were no available counts in several years at those locations. Besides these two intersections, count data was not available at Campus Hills Shopping Center and Mount Royal Avenue. These were not included in the study. The following

portable counts were taken at the I-95 Ramps in September, 2010 and October, 2010:

- MD 22 eastbound to I-95 southbound, on ramp
- MD 22 westbound to I-95 southbound, on ramp
- MD 22 eastbound to I-95 northbound, on ramp
- MD 22 westbound to I-95 northbound, on ramp
- I-95 northbound to MD 22, off ramp
- I-95 southbound to MD 22, Off Ramp

In addition other portable count data on Maryland State Highway Administration website was reviewed to supplement the turning movement counts.

The Average Daily Traffic (ADT) was calculated along MD 22 and intersecting roadways. This was based on converting the 13 hour counts to average daily traffic by using the Maryland SHA Traffic Trends guidebook and utilizing the portable traffic count data. Traffic volumes along MD 22 range from approximately 17,000 to 33,000 vehicles per day. The highest volume area along the MD 22 corridor is from the I-95 ramps to the US 40 ramps with at least 29,000 vehicles per day in each section. The lowest volumes are between MD 155 and Technology Drive/Long Drive. In the Churchville section, the two highest volume areas are between Prospect Mill Road and Thomas Run Road and between MD 136 and MD 155. The volume on both of these sections is greater than 26,000 vehicles per day. The highest volume cross street is Beards Hill Road to the north of MD 22 with approximately 17,000 vehicles per day. The other cross roads with over 10,000 vehicles per day include Thomas Run Road, Beards Hill Road south of MD 22 and MD 462 north of MD 22. The average daily traffic for each section is shown in Figures II-9 to II-11. Appendix E contains the detailed average daily traffic diagrams.

The directionality of AM peak hour volumes vary greatly based on the section of the study area. In the Churchville area, eastbound and westbound traffic is directionally split almost 50% eastbound and 50% westbound between Thomas Run Road and Maryland 136. Peak hour volumes are about 800 to 1,000 vehicles both directions. West of Thomas Run Road eastbound is the predominant movement with the highest volume being close to 1,300 vehicles in the peak hour. On Maryland 22 east of Maryland 155, through the central section eastbound is the peak direction. The directional distribution is approximately 70/30 through this section with approximately 800 to 900 vehicles in the peak direction. The major direction of traffic flow in the Aberdeen section is eastbound. Traffic volumes in the eastbound direction range from 1,700 to 2,100 vehicles per hour. Westbound volume from Aberdeen Proving Ground to Beards Hill Road increases from 100 to 700 vehicles per hour as motorists traverse westbound. The AM peak hour volumes are depicted in Figures II-12 to II-14 with detailed turning movements shown in Appendix E.

The PM peak hour direction of traffic along the entire Maryland 22 section is westbound. In the Churchville section, the directional distribution ranges from 52% to 58%. Traffic volumes are from 1,000 to 1,400 vehicles per hour in the westbound direction with the highest volumes between Maryland 136 and Maryland 155. The central section has about 1,000 vehicles per hour in the westbound direction and 600 vehicles per hour eastbound. The Aberdeen section is the most directionally oriented area. Near Aberdeen Proving Ground more than 90% of the traffic is headed out of the Base. The percentage lowers as motorists traverse further west but at a minimum approximately two-thirds of the traffic is travelling westbound. This amounts to approximately 1,800 to 2,300 vehicles per hour with the highest volume being between U.S. 40 and Old Post Road. The eastbound volumes are from approximately 100 to 1,000 vehicles per hour. The PM peak hour volumes are shown in Figures II-15 to II-17.

VI. Traffic Analysis

Traffic analysis was conducted for the MD 22 corridor using the existing traffic volumes. The analysis was based on performing traffic simulation modeling of the corridor. This was performed using the SYNCHRO software to analyze how well the roadway network and intersections operate. The models were obtained from the Maryland State Highway Administration (MDSHA). The models were updated to include the volumes developed as part of this study. The results were then reviewed versus the field observations. Adjustments were made to the model such as taking into account the impacts of the gates had on traffic flow. The Highway Capacity Manual (HCM) outputs were used to determine the level of service (LOS) for the signalized intersections that were included as part of this study. The results of the analysis for the existing traffic volumes and existing roadway geometry during the AM and PM peak hours are shown in Table II-I on the next page.

Table II-1

Churchville Section		
Intersection	**Peak Hour**	**2010 LOS**
MD 543	AM	D
	PM	D
Prospect Mill Road	AM	D
	PM	C
Thomas Run Road	AM	C
	PM	**E**
HCC Entrance/Exit	AM	B
	PM	B
Campus Hills Shopping Center	AM	A
	PM	B
MD 136	AM	C
	PM	D
MD 155	AM	B
	PM	C

Table II-1 (Continued)

Aberdeen Section		
Intersection	**Peak Hour**	**2010 LOS**
Long Drive/Technology Drive	AM	B
	PM	B
I-95 Southbound Ramp	AM	B
	PM	A
I-95 Northbound Ramp	AM	A
	PM	A
Beards Hill Road	AM	B
	PM	C
Middleton Road	AM	A
	PM	B
MD 462	AM	C
	PM	C
Mt Royal Avenue	AM	B
	PM	C
US 40 Ramp	AM	A
	PM	C
N. Post Road	AM	D
	PM	D

The results of the analysis show that two of the thirteen signalized intersections operate at a LOS "D" which is the lowest LOS observed during the AM peak hour. These intersections are Prospect Mill Road and North Post Road. The remaining signalized intersections along MD 22 operate at a LOS "C" or better during the AM peak hour.

The intersection of Thomas Run Road operates with a LOS "E" which is the worst out the thirteen signalized intersections along MD 22 during the PM peak hour. The MD 543, MD 136, and N. Post Road intersections operate with a LOS "D" during the PM peak hour with the remaining intersections operating with a LOS "C" or better

In addition, average travel speeds along MD 22 were determined based on the Sim-Traffic travel speeds from the model and compared with the existing travel speeds in the corridor

The lowest travel speed (under10 mph) through the Churchville section of MD 22 in the AM peak hour is west of Prospect Mill Road in the eastbound direction and east of Thomas Run Road/Shucks Road in the westbound direction. Speeds increase (30-40 mph) east of Thomas Run Road/Shucks Road in the eastbound direction to MD 155 during the AM peak hour. The travel speed in the westbound direction during the AM peak hour is approximately 35 mph from MD 136 to the Harford Community College Entrance. The lowest speed (under 10 mph) in the PM peak hour is in the westbound direction between the Harford Community College Entrance and Thomas Run Road. East of the Harford Community College Entrance, speeds are higher in the westbound direction during the PM peak hour and vary from around 20 mph to 30 mph. The same is for west of the Harford Community College Entrance in the eastbound direction, speeds vary from around 25 mph to 35 mph in the PM peak hour.

The travel speed through the central section in the eastbound and westbound direction is approximately 46 mph during the AM and PM peak hours.

Through the Aberdeen section of the study corridor, the lowest traveled speed (6-15 mph) during the AM peak hour was east of North Post Road in the eastbound direction towards the APG. MD 22 west of North Post Road also experiences low speeds (16-25 mph) in the eastbound direction during the AM peak hour. The remainder of the MD 22 from Technology Drive/Long Drive to US 40 in both the eastbound and westbound directions runs at varied speeds from approximately 26 mph to greater than 45 mph during the AM peak hour.


PROSPECT
MILL
RD
RUN
THOMAS
ROAD
HCC ENTRANCE 6
LAKES
DR
RHINEFORTE
DR
BRAMBLE
LN
MARYLAND 22
MARYLAND 136
MARYLAND 155
TUDOR LN
SHUCKS
ROAD
CAMPUS
ASBURY
ROAD
N
AVERAGE DAILY TRAFFIC
- 0 - 2,000
- 2,000 - 8,000
- 8,000 - 15,000
- 15,000 - 20,000
- 20,000 - 25,000
- 25,000 - 30,000
> 30,000
MARYLAND 22
AVERAGE DAILY TRAFFIC
SCALE: N. T. S.
FIGURE II-9
08/12
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MARYLAND 22
MARYLAND 156
MARYLAND 22
GRAFTON LN
SNAKE LN
MARYLAND 22
N STEPNEY RD
CARSINS RUN RD
LYNN LEE DR
STEPNEY RD
MARYLAND 22
ALDINO
AVERAGE DAILY TRAFFIC
- 0 - 2,000
- 2,000 - 8,000
- 8,000 - 15,000
- 15,000 - 20,000
- 20,000 - 25,000
- 25,000 - 30,000
> 30,000
MARYLAND 22
AVERAGE DAILY TRAFFIC
SCALE: N. T. S.
FIGURE II-10
08/12
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LONG DR
MARYLAND 22
95
TECHNOLOGY DR
BEARDS HILL RD
MIDDLETON RD
BUSH CHAPEL RD
MARYLAND 132
GRACEFORD RD
PARADISE RD
RB
MARYLAND 462
MT ROYAL AVE
40
N POST RD
CHURCH GREEN RD
AVERAGE DAILY TRAFFIC
- 0 - 2,000
- 2,000 - 8,000
- 8,000 - 15,000
- 15,000 - 20,000
- 20,000 - 25,000
- 25,000 - 30,000
> 30,000
MARYLAND 22
AVERAGE DAILY TRAFFIC
SCALE: N. T. S.
FIGURE II-11
08/12
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Monday, November 28, 2011 AT 03:21 PM


PROSPECT
MILL
RD
TUDOR LN
RUN
RD
THOMAS
SHUCKS
ROAD
HCC ENTRANCE 6
DR
LAKES
PHINEFORTE
DR
BRAMBLE
LN
CAMPUS
ROAD
ASBURY
ROAD
MARYLAND 22
MARYLAND 136
MARYLAND 155
N
PEAK HOUR VOLUME
- < 200
- 200 - 600
- 600 - 1,000
- 1,000 - 1,500
- 1,500 - 2,000
> 2,000
MARYLAND 22
AM PEAK HOUR
TRAFFIC VOLUMES
SCALE: N. T. S
FIGURE II-12
08/12
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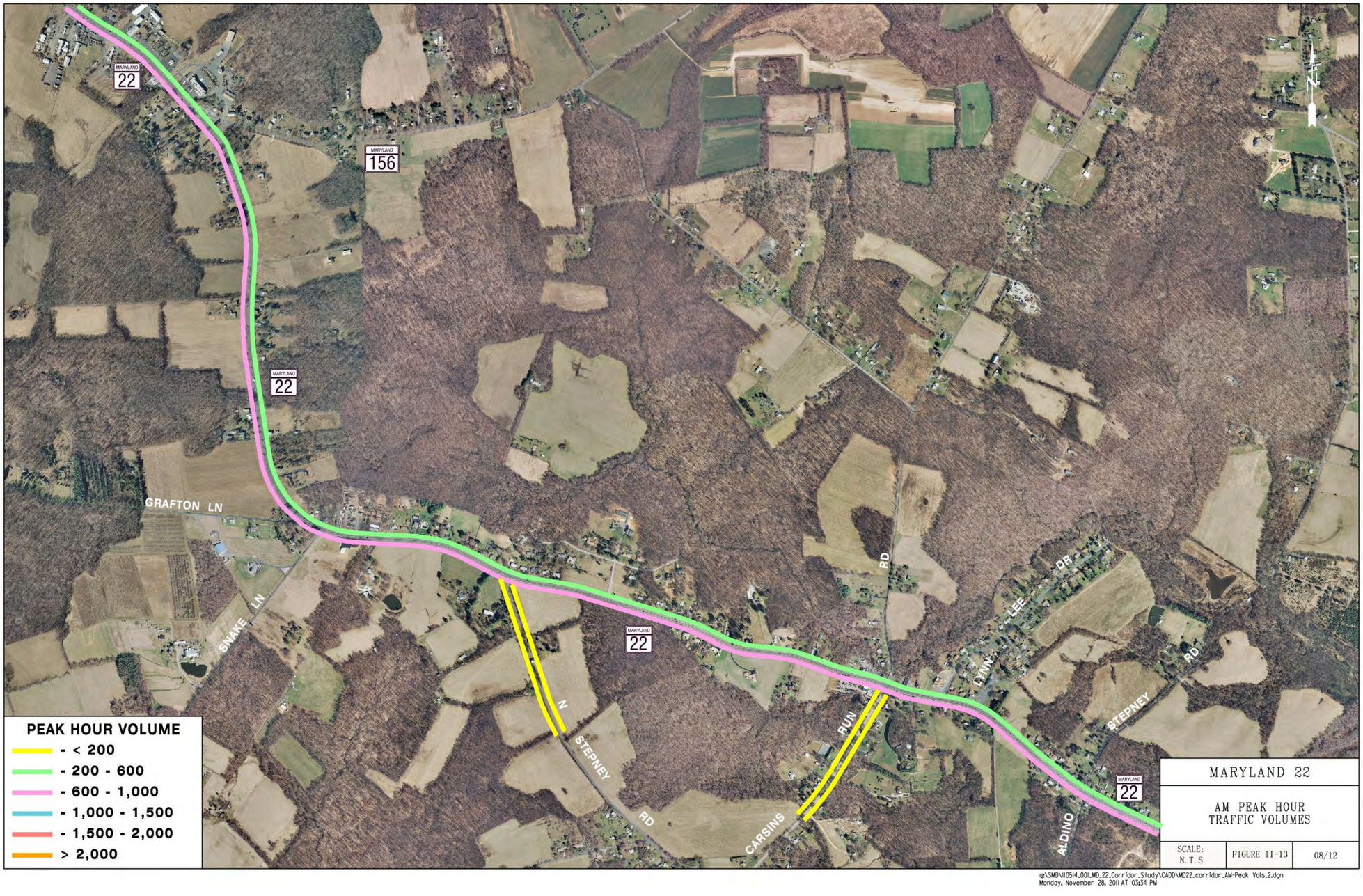
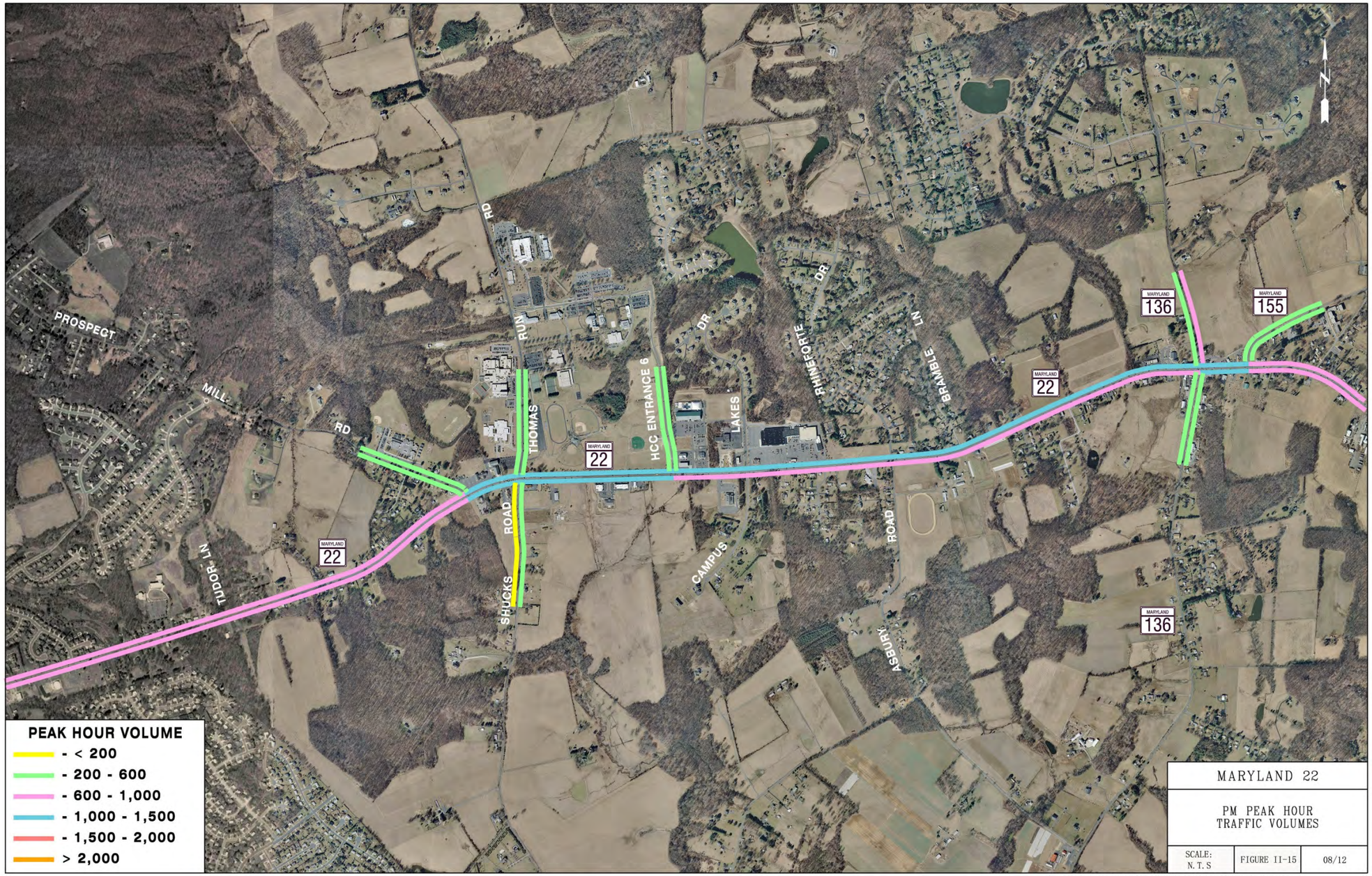

MARYLAND 22
MARYLAND 156
MARYLAND 22
GRAFTON LN
SNAKE LN
MARYLAND 22
N STEPNEY RD
CARSINS RUN RD
LYNN LEE DR
STEPNEY RD
MARYLAND 22
ALDINO
PEAK HOUR VOLUME
- < 200
- 200 - 600
- 600 - 1,000
- 1,000 - 1,500
- 1,500 - 2,000
> 2,000
MARYLAND 22
AM PEAK HOUR
TRAFFIC VOLUMES
SCALE: N. T. S
FIGURE II-13
08/12
q:\SMD\110514.001_MD.22_Corridor_Study\CADD\MD22_corridor_AM-Peak Vols.2.dgn
Monday, November 28, 2011 AT 03:34 PM


LONG DR
MARYLAND 22
INTERSTATE 95
TECHNOLOGY DR
BEARDS HILL RD
PARADISE RD
GRACEFORD RD
MIDDLETOWN RD
BUSH CHAPEL RD
MARYLAND 132
MARYLAND 462
MT ROYAL AVE
N POST RD
CHURCH GREEN RD
US 40
PEAK HOUR VOLUME
- < 200
- 200 - 600
- 600 - 1,000
- 1,000 - 1,500
- 1,500 - 2,000
> 2,000
MARYLAND 22
AM PEAK HOUR TRAFFIC VOLUMES
SCALE: N.T.S
FIGURE II-14
08/12
q:\SMD\110514_001_MD_22_Corridor_Study\CADD\MD22_corridor_AM-Peak Vols_3.dgn
Monday, November 28, 2011 AT 03:36 PM


PROSPECT
MILL
RD
TUDOR LN
MARYLAND 22
THOMAS
RUN
RD
SHUCKS
ROAD
HCC ENTRANCE 6
LAKES
CAMPUS
DR
WHINEFORTE
DR
BRAMBLE
LN
ASBURY
ROAD
MARYLAND 136
MARYLAND 155
N
PEAK HOUR VOLUME
- < 200
- 200 - 600
- 600 - 1,000
- 1,000 - 1,500
- 1,500 - 2,000
> 2,000
MARYLAND 22
PM PEAK HOUR
TRAFFIC VOLUMES
SCALE: N. T. S
FIGURE II-15
08/12
q:\SMD\II05I4_001_MD_22_Corridor_Study\CADD\MD22_corridor_PM-Peak Vols.I.dgn
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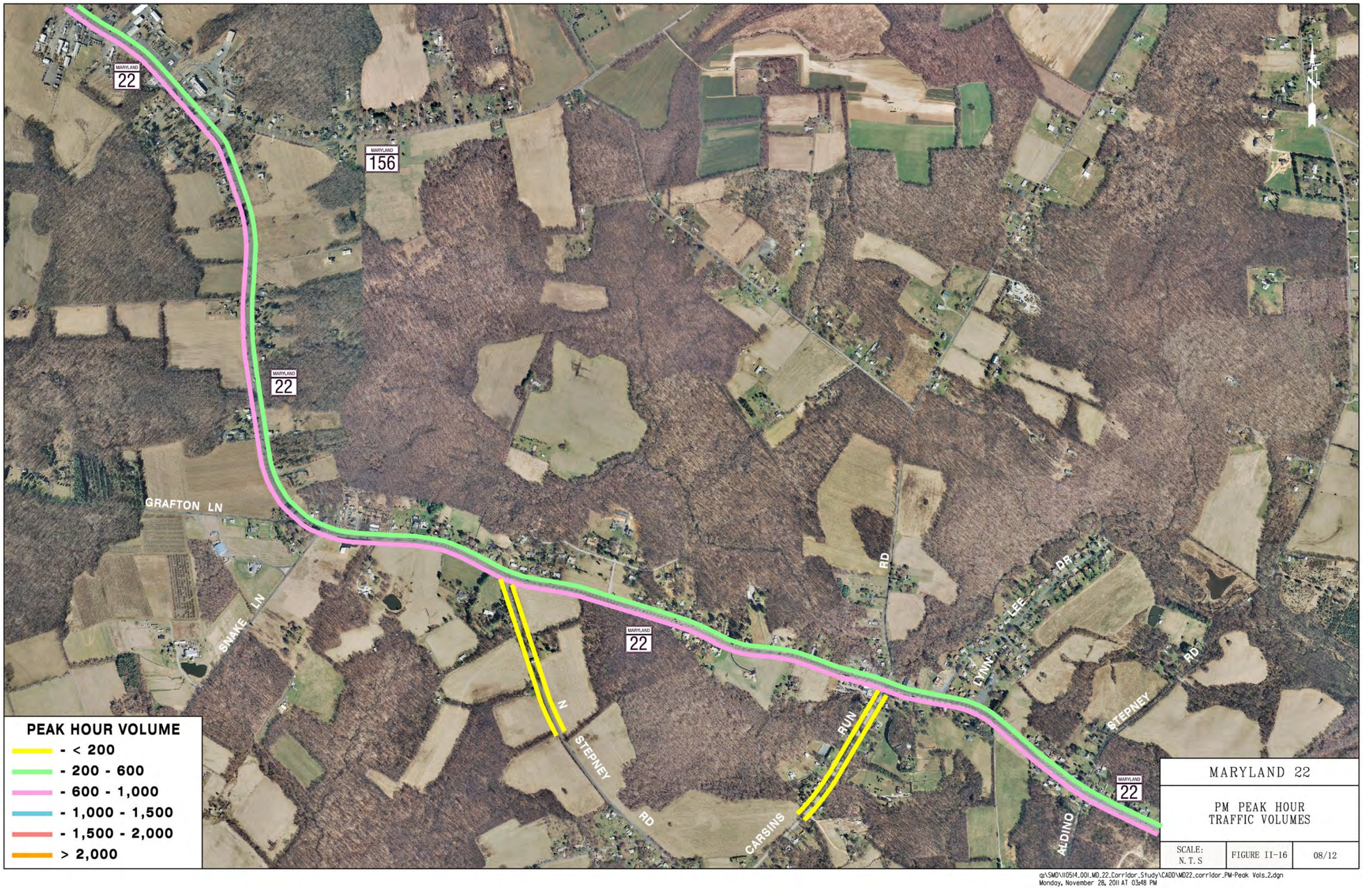
MARYLAND 22
MARYLAND 156
MARYLAND 22
GRAFTON LN
SNAKE LN
MARYLAND 22
N STEPNEY RD
CARSINS RUN RD
LYNN LEE DR
STEPNEY RD
MARYLAND 22
ALDINO
PEAK HOUR VOLUME
- < 200
- 200 - 600
- 600 - 1,000
- 1,000 - 1,500
- 1,500 - 2,000
> 2,000
MARYLAND 22
PM PEAK HOUR
TRAFFIC VOLUMES
SCALE: N. T. S
FIGURE II-16
08/12
q:\SMD\110514.001_MD.22_Corridor_Study\CADD\MD22_corridor_PM-Peak Vols.2.dgn
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LONG DR
MARYLAND 22
INTERSTATE 95
TECHNOLOGY DR
BEARDS HILL RD
PARADISE RD
GRACEFORD RD
MIDDLETOWN RD
MARYLAND 132
BUSH CHAPEL RD
MARYLAND 462
MT ROYAL AVE
40
N POST RD
CHURCH GREEN RD
PEAK HOUR VOLUME
- < 200
- 200 - 600
- 600 - 1,000
- 1,000 - 1,500
- 1,500 - 2,000
> 2,000
MARYLAND 22
PM PEAK HOUR
TRAFFIC VOLUMES
SCALE: N.T.S
FIGURE II-17
08/12
q:\SMD\110514.001.MD.22_Corridor_Study\CADD\MD22_corridor_PM-Peak Vols.3.dgn
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III. Area Master Plans & Planning Studies

There have been several other plans and studies previously completed (within the last 10 years) that are within the project area. These plans were reviewed and evaluated in preparation of this study.

A. Maryland Department of Transportation Twenty Year Bicycle and Pedestrian Access Master Plan (October 2002)

The Maryland Department of Transportation's (MDOT) Twenty Year Bicycle & Pedestrian Access Master Plan, October 2002, provides a framework for meeting the future demand for increased facilities. It includes, among many other specific initiatives, including the following:

- Bicycle and Pedestrian Safety Curriculum for Maryland schools
- Safe Routes to Schools programs
- Maryland Bicycle Retrofit Program
- Pedestrian countdown signals
- Safe Bicycling in Maryland Guide
- Guidelines to safer bus stop locations for pedestrians
- Bicycle on busses – throughout the State
- Updated statewide bicycle map
- Best practices guide for bicycle and pedestrian facility design and operation
- Pedestrian- friendly transit-oriented developments throughout the State
- Transportation surveys to aid in identification of bicycle and pedestrian usage and travel patterns
- Studies aimed at new methods to increase the visibility of bicyclists and pedestrians on roadways

The Maryland Department of Transportation (MDOT) reviewed bicycle facility needs inventories as prepared by local jurisdictions in order to develop two tiers of needs for further review. Roadways in Tier 1 are those which demonstrate the greatest need for bicycle and pedestrian accommodation, whereas roadways in Tier 2 show less need.

There are no Tier 1 locations within the project corridor for the MD 22 study; however, the following portions of MD 22 with the study area were identified as Tier 2 locations for bicycle facility improvements ***[listed in brackets are the existing bicycle levels of comfort]***:

- From Level Road (MD 155) to Aldino Road [B]
- From Aldino Road to North Stepney Road [C]
- From North Stepney Road to Carsins Run Road [B]
- From Carsins Run Road to I-95 [B]
- From I-95 to Beards Hill Road [A]
- From Beards Hill Road to Paradise Road (MD 462) [B]
- From Paradise Road (MD 462) to Pulaski Highway (US 40) [D]
- From North Post Road to Aberdeen Proving Ground [C]

The study also lists areas identified by local jurisdictions as in need of pedestrian facilities. Included within this list is the need for completing missing sidewalk sections along MD 22 throughout the study area.

It should be noted that this master plan was completed prior to the BRAC relocations to APG.

B. Transportation Outlook 2035: Creating a Blueprint for the Baltimore Region's Future, Baltimore Regional Long Range Transportation Plan (2007)

Transportation Outlook 2035: (Outlook 2035) was prepared by the Baltimore Regional Transportation Board, the federally designated metropolitan planning organization (MPO) for the Baltimore region, as a financially constrained long-range transportation plan for the Baltimore region. The plan is reviewed every four years to create a framework for guiding investment in transportation projects in the Baltimore region.

Outlook 2035 provides a list of Preferred Alternative Projects which are the result of a multi-faceted planning process including public review and comment. These projects include multiple modes of transportation (highways, pedestrians and bicycles, transit) as well as various demand management programs.

Within the highway preferred alternative projects is the widening of MD 22 from two to four lands from MD 543 to I-95 (complete by 2020), and from four to six lanes from I-95 to the Aberdeen Proving Ground (APG) gate (complete by 2030).

The Aberdeen Area Bikeway is identified as a bicycle preferred alternative project to connect Ripken Stadium to the Aberdeen MARC Station by 2015.

C. Harford County Transportation Development Plan (2008)

The Harford County Transportation Development Plan includes an inventory and assessment of transportation services in Harford County. Existing demographics and land uses were evaluated to determine the location of the most transit dependent populations and the transit origins and destinations within the county. Those in the transit dependent population were based upon the following

demographic indicators: autoless household, below poverty line, persons with a disability, elderly and youth. A map depicting Relative Transit Need based on the combination of categories indicated high transit need at the western limit of the MD 22 Study corridor and in the Aberdeen section of the Study corridor.

The MD 22 Study corridor includes an extensive number of major trip generators which include: Aberdeen Proving Ground, HEAT Center, Harford Community College, Aberdeen Marketplace, Campus Hills Shopping Center, Ripken Stadium and the Aberdeen train station. In addition to these specific locations there are a number of educational facilities, apartment complexes and industrial business parks.

The evaluation of the existing Harford Transit system identifies a number of key issues to operation such as connectivity between routes, circuitous routing, service to MARC/AMTRAK, dependability and marketing.

A five-year Conceptual Service Plan is provided with system improvement needs, alternatives and estimated operating costs. The plan includes realigning bus routes, expanding hours and developing marketing materials and system maps. Along the MD 22 Study corridor, the Plan recommends that Harford County establish stops on their bus routes to serve pedestrian access points to APG, as bus access to the base is restricted.

D. Traffic and Intersection Studies for Base Realignment and Closure – Aberdeen Proving Ground (2008)

The Traffic and Intersection Studies for Base Realignment and Closure (BRAC) at Aberdeen Proving Ground (APG) developed short-term intersection concepts based on traffic studies conducted at 47 locations near APG. Costs and impacts were developed for each concept and priority short-term improvements were identified for inclusion in the Maryland Department of Transportation Consolidated Transportation Program (CTP). Of the 47 intersections examined, the study recommends improvements at 31 locations due to projected 2015 operations at a level of service (LOS) F during one of the peak periods. The following short-term improvement locations fall along the MD 22 Study Corridor and are included in the Priority 1 (greatest need) level:

- MD 22 / MD 132A (Beards Hill Road)
- MD 22 / MD 462 (Paradise Road)
- MD 22 / US 40 On/Off Ramps
- MD 22 / MD 132B (North Post Road)

Long-term needs for corridors and intersections were identified for the 2030 horizon. According to the long-term study, MD 22 from north of I-95 to MD 132A is expected to operate at LOS E or F by 2030 under BRAC conditions. MD 22 from MD 132A to the APG gate is also projected to operate at LOS E or worse by 2030 and would benefit from additional through lanes at closely spaced intersections. A sketch-level cost estimate for corridor improvements along a three mile stretch of MD 22 from 132A to the APG gate was estimated at $40-$45 million (2008 dollars).

E. Harford Community College Facilities Master Plan (2009)

The Harford Community College Facilities Master Plan sites traffic congestion on MD 22 and Thomas Run Road as a significant safety concern. Enrollment is expected to continue at a high rate.

The Master Plan identifies the potential intersection modification at MD 22 and Thomas Run Road to include two left-turn lanes from eastbound MD 22 to northbound Thomas Run Road that would likely reduce backups on MD 22, but could cause additional problems on Thomas Run Road.

The consultant team recommended widening Thomas Run Road from two to three lanes to create a boulevard with a center lane for left turns. Another recommendation is the conversion of “Entrance 3”, the most heavily travelled entrance to the college, to be a roundabout. This entrance is on Thomas Run Road.

A recent property acquisition of 121-acres to the west of the existing campus creates the possibility for access to the college from Prospect Mill Road in the long term.

The plan also includes a number of recommendations for parking and pedestrian improvements which are within the campus limits.

F. Harford County Bicycle Survey Report (2010)

The Harford County Bicycle Survey Report findings identified two portions of the MD 22 study corridor as locations for potential bike routes. These sections are from Thomas Run Road to Level Road (MD 155) and from Technology Drive to the Aberdeen Proving Ground (APG) gates.

Among survey respondents, 82% indicated that they currently drive alone to work; of those, 42% indicated they would consider cycling to work. The primary reason for riding bicycles was for recreation and exercise according to 95% of respondents. Survey respondents also indicated that building more bikeways would encourage more cycling countywide (90% of respondents). If adequate facilities existed, 60% of respondents would allow their children to walk or bike to school.

The MD 22 corridor received comfort scores ranging from 2.57 to 3.30 (1 being the best and 5 being the worst) from commuters. Positive features of the bicycling experience along MD 22 included convenience, easy riding, usable shoulder, good conditions and aesthetics. The negative features included motorist behavior, traffic volume, shoulder issue and safety.

G. Harford County Transportation Element Plan (2010)

The Harford County Transportation Element Plan describes how the County intends to address its transportation needs while meeting Federal and State legislative requirements. The strategies and recommendations are based on meeting existing and future travel demands as well as projected population and employment growth including the Base Realignment and Closure (BRAC) impact on the area. The Plan considers the integration of transportation and land use and considers multiple modes of transportation.

The Plan identifies MD 22 as a priority highway improvement. From MD 543 to I-95, the recommendation is widening from two to four lanes with an estimated construction cost of $67.4 million. From I-95 to Aberdeen Proving Ground (APG) the recommendation is widening from four to six lanes with an estimated construction cost of $45.9 million. The priority for each improvement is classified as "high".

The Plan also identifies three intersections for BRAC intersection improvements: MD 22 / MD 132B (Old Post Road), MD 22 / MD 462 (Paradise Road), MD 22 / MD 132A (Beards Hill Road). Each of these projects is classified as a capacity improvement with a priority of "high".

The Plan also identifies the MD 22 Study corridor as part of several bicycle facility projects. The MD 22 corridor is considered part of the "Bike to Work Day" Route. The Proposed East Coast Greenway Trail will travel along the MD 22 corridor from just west of MD 136 to MD 155. There is also a potential bicycle linkage on MD 22 from Glenville Road to Thomas Run Road and from Thomas Run Road to MD 924.

H. City of Aberdeen Comprehensive Plan (2011)

The City of Aberdeen Comprehensive Plan was completed in 2011. The Transportation Plan was completed in 2009 as part of the overall update of the Comprehensive Plan. The Plan includes recommendations related to roadway, transit, pedestrian and bicycle facilities.

One such recommendation is to change the functional classification of MD 22 from I-95 to the Aberdeen Proving Ground (APG) gate from "Freeway/Expressway" to "Principal Arterial" in order to reflect a roadway which accommodates multiple modes of transportation. In coordination with the change in functional classification, there is also a recommended street typology classification system, in which MD 22 would be classified as a "Regional Connector".

A number of recommendations for transit are also identified in the Plan including additional bus routes to APG, pedestrian improvements at bus stops, a multimodal transit center and a park-and-ride facility. In the short-term, the City wishes to promote the existing train station as a multimodal hub with expanded parking for MTA commuters and bike racks at the station.

The Plan identifies a shuttle to APG from the train station or a park-and-ride lot as a means to reduce traffic on MD 22 and reduce the need for widening.

Regarding pedestrian facilities, the plan identifies MD 22 as a barrier to pedestrian mobility due to a limited sidewalk network and limited intersections with safe crossing facilities. Recommended pedestrian facilities are identified along the MD 22 study corridor at MD 22 and Beards Hill Road. The plan identifies MD 22 as an existing designated bike route and sites future corridor studies to include provision for safe on-street facilities for bicyclists along MD 22 in Aberdeen.

The Plan's prioritization of transportation improvements includes the following locations along the MD 22 study corridor within short-term improvements:

- MD 22 / MD 132A (Beards Hill Road) SHA Intersection Improvement
- MD 22 / MD 462 (Paradise Road) SHA Intersection Improvement
- MD 22 / MD 132B (Old Post Road) SHA Intersection Improvement
- MD 22 Widening Study

Within medium term improvements, the Plan lists the interchange of MD 22 and US 40.

I. Harford County Master Plan and Land Use Element Plan (2011)

The Harford County Master Plan and Land Use Element plan is the update to the 2004 plan and will become effective as of May 14, 2012.

The Plan includes a description of the County's designated growth areas as defined by the Development Envelope. Along the MD 22 study corridor, the western portion of the Churchville section (west of Prospect Mill Road) and the Aberdeen section are within the Development Envelope. The entirety of the Central Section is outside of the Development Envelope. One of the implementation strategies for maintaining quality of life in the County is to enhance the character of the rural areas of the County through sustainable measures.

Supporting the mission of Aberdeen Proving Ground (APG) would be accomplished by improving access to the site including roadway upgrades, MARC service and facility upgrades and the establishment of a transit-oriented development centered on the Aberdeen train station.

An additional action item related to quality of life in the County is the provision of connections between neighborhoods and employment, shopping, recreation and education through a combination of streets, sidewalks, pathways and bikeways. For the transportation enhancements, the Plan defers to the 2010 Transportation Element Plan which addresses the County's policies and priorities for developing a safe, efficient, multimodal transportation system.

J. Maryland State Highway Administration Intersection Improvement Projects (Current)

The Maryland State Highway Administration (MDSHA) is actively involved with various projects in the MD 22 corridor. This was both related to the Base Realignment and Closure (BRAC) activities in the area and also as a result of separate studies recognizing the need for modifications to improve operations. Among the projects which are in various phases of planning or design include:

i. MD 22 / Prospect Mill Road and Thomas Run Road

These improvements include an additional eastbound and westbound lane along MD 22 from west of Prospect Mill Road to east of Thomas Run Road.
(design phase)

ii. MD 22 / MD 136 and MD 155

These improvements include intersection enhancements to improve traffic capacity. These improvements are in the conceptual study phase and have not been finalized.

iii. MD 22 / Beards Hill Road

These improvements include an additional eastbound and westbound lane along MD 22 and additional turn lanes on Beards Hill Road.
(design phase)

iv. MD 22 / Paradise Road

These improvements include an additional eastbound and westbound lane along MD 22 and additional turn lanes on Paradise Road.
(design phase)

v. MD 22 / Old Post Road

These improvements include an additional eastbound and westbound lane along MD 22 and additional turn lanes on Old Post Road.
(design phase)

These improvements are included within the Short Term Alternatives of this study (2015 planning horizon). The 2010 traffic analysis showed that these intersections were operating at or close to unacceptable level-of-services. With continued BRAC relocation and growth in the area, these intersections are anticipated to continue to deteriorate. SHA is in the process of engineering design on these improvements. It is important that Harford County continue to stress the importance of these improvements to SHA and request that funding for construction be obtained in the short-term.

IV. Forecasted Conditions

A. Land Use

The Harford County Master Plan and Land Use Element Plan which takes effect on May 14, 2012 includes proposed land use changes along the MD 22 Study corridor as well as general recommendations to manage growth. The preservation of rural and agricultural land continues to be a goal of the County in alignment with the Priority Preservation Area Program. Forecasted density along the corridor was measured by the projected population density using data from the Harford County Demographic Data & Growth Trends (December 2011)

The Churchville section of the study corridor features one of the land use changes from the 2012 Plan update. The change involves the extension of the boundary of the Harford Community College to match the future expansion plans of the college. Construction is expected to begin in Spring 2012 on the new "West Campus" across from Entrance 5 (Thomas Run Road). This expansion is projected for completion in Spring 2014. Population density within the census tracts bordering the Churchville section is expected to increase from approximately 380 persons per square mile in 2010 to 450 persons per square mile in 2035, an increase of 19%.

The Central section of the study corridor is expected to maintain its existing land uses due to the County's efforts to maintain the rural character of existing undeveloped areas and agricultural land. Population density within the census tracts bordering the Central section is expected to increase from approximately 260 persons per square mile in 2010 to 295 persons per square mile in 2035, an increase of 13%.

The Aberdeen section includes the second change from the 2012 Land Use Element Plan update. The land use change is from agricultural to low intensity residential for the remaining agricultural land south of I-95 and MD 155, just east of MD 462 (Paradise Road).

Another sizeable planned development along the MD 22 Study corridor in the Aberdeen section is the expansion of the North Gate Business Park located at the eastern end of the corridor along Research Boulevard. The complex is designed to include 800,000 square feet of office space with plans for food service, convenience store and banking service on site. Population density within the census tracts bordering the Aberdeen section is expected to increase from approximately 1,910 persons per square mile in 2010 to 2,060 persons per square mile in 2035, an increase of 9%.

B. Transit Operations

Currently there are no plans for expansion of services within the corridor by any of the transit agencies.

C. Bicycle and Pedestrian Facilities

The on-going development of Harford County's Bicycle and Pedestrian Master Plan will provide officials with a guide to completing the County's pedestrian and bicycle facilities network. Input from citizens and advocacy groups is helping to shape the master plan and to provide valuable insight to perceived deficiencies in the network. Harford County initiatives, such as Bike to Work Day, serve to promote bicycling as a viable and healthy form of commuting and/or recreation for its residents.

Future development will occur and it will be important for the County to have a plan and the policies to implement the plan. Harford Community College (HCC) is continually growing and is a major trip destination along the corridor. By providing sufficient bicycle and pedestrian facilities in and around the campus, a reduction in the numbers of vehicles on the roads may be realized. The local businesses adjacent to the campus may also benefit as students are more likely to walk or bicycle to them if they are provided with the facilities to do so, safely.

To the south of HCC along Schucks Road, is the site for the future Schucks Road Regional Sports Complex. The County's Master Plan also discusses the construction of a new elementary school adjacent to the proposed park. These elements will greatly increase the need for improved bicycle and pedestrian facilities in the area.

Parcels of property through the relatively rural section of the MD22 corridor between Churchville and I-95 have the potential to become housing subdivisions in the future. It will be important to provide the necessary bicycle and pedestrian facilities as part of any future housing developments if a truly complete bicycle and pedestrian facilities network is to be realized for the MD22 corridor.

D. Traffic Operations

Travel demand forecasts were developed for the MD 22 corridor study. The forecasts were developed for the short (2015), medium (2025) and long term (2035). The forecasts were analyzed to determine traffic operations for the base and build alternative conditions.

The origin-destination results found for the existing conditions are generally expected to continue with the forecasted traffic. As traffic volumes continue to increase, crashes are expected to increase as congestion becomes worse.

i. 2015 Travel Demand Forecasts

Travel demand forecasts were developed for the year 2015 along the MD 22 corridor. The 2015 forecasts were based on proposed developments in the study area from Churchville to Aberdeen plus a regional growth for the roadway network. A key assumption associated with the 2015 forecasts was the level of growth which would occur in the next three years for some of the larger scale developments. For example the Northgate Business Park located west of the Aberdeen Proving Ground is ultimately slated to be 870,000 square feet of office space. It was assumed that the presently built office buildings at the site would be fully occupied by the year 2015, but no additional buildings would be constructed. This would mean 270,000 square feet of office space by 2015 would be occupied. Other key assumptions used for the forecasts:

- The Aberdeen Corporate Park located east of Middleton Road. The Aberdeen Corporate Park building which is presently under construction was assumed to be built and occupied, totaling 253,900 SF of office and 12,000 SF of retail.
- The Commons at Fieldside Village/Stadium Town Center located on Long Drive. The Commons at Fieldside Village/Stadium Town Center ultimately consists of 500,000 SF of office and 108,000 SF of commercial. By 2015 it was estimated to include 120,000 SF of office and 108,000 SF of shopping center.
- The expansion of Harford Community College. The expansion of Harford Community College was proposed in various phases. Phase I was assumed to be complete by 2015. This included one (1) building with a student capacity of 500.

The relocation of employees to Aberdeen Proving Ground was reflected in the existing traffic volumes. In addition to these developments a regional increase of approximately 2% per year was included. This was used to develop the 2015 average daily traffic and AM/PM peak hour volumes. The average daily traffic volumes and the AM and PM peak hour volumes are included in Appendix E.

ii. 2025 Travel Demand Forecasts

Travel demand forecasts were developed for the medium term period which is defined as 2025. The basis for the forecasts was the Baltimore Metropolitan Council (BMC) regional travel demand model. The model was run with approved regional socio-economic data as defined in Round 7C. BMC is presently developing a new zone structure for Harford County with revised socio-economic data to reflect the 2010 census. This data is not yet available and therefore, the socio-economic data for round 7C shown in Table IV-1 reflects the changes to the number of households and employment utilized for this study.

Table IV-1

TAZ	HOUSEHOLDS		EMPLOYMENT	
	2010	2025	2010	2025
897	640	809	552	666
898	607	728	2,358	3,123
899	258	300	262	347
926	1,111	1,277	749	883
927	164	177	268	315
928	203	224	55	63
932	714	1577	222	1,506
933	93	103	381	439
941	665	1,565	420	498
945	496	567	745	1,073
946	238	246	1,494	2,072
947	491	1,016	88	105
948	261	274	1,390	1,909
949	163	173	336	472
950	1,608	2,120	498	688
951	376	457	773	887
952	573	595	517	593
953	48	83	2	2,003
954	426	440	1,765	2,025
955	628	653	751	862
1002	759	567	10,997	17,997

The major developments that were partially included in the 2015 travel demand forecasts were expanded by the year 2025. This assumed the remaining 600,000 SF of office at the Northgate Business Park, the 380,000 SF of office at The Commons of Fieldside Village and the completion of Phase 2 and 3 at Harford Community College.

The 2025 base average daily traffic volumes are shown in the Appendix E. The AM/PM peak hour volumes are included as part of the Appendix.

The various build options were developed for the Maryland 22 corridor. These build options included improvements to the existing intersections plus modifications to the roadway network which would require adjustments to the no build traffic volumes. This would include the following locations:

- Prospect Mill Road/ Thomas Run Road/ Schucks Road
- Maryland 136/ Maryland 155
- Middleton Road to Beards Hill Road
- Mt. Royal Ave.
- US 40
- N Post Road to Aberdeen Proving Ground Gate

At these locations traffic volumes were reassigned based on the alternatives. The traffic reassignment for the Prospect Mill Road/ Thomas Run Road/ Schucks Road intersection, at the Maryland 136/ Maryland 155 intersection and for the area between Middleton Road and Beards Hill Road were developed based on performing origin destination surveys at those locations. The percentages from that study were applied to the 2025 traffic volumes. The volumes for the Mt. Royal Ave. and US 40 alternatives were reassigned to the new location for the particular movements. The final location is associated with the proposed reverse HOV lane on Maryland 22 traversing toward Aberdeen Proving Ground (APG) in the AM peak period. This lane would provide for multi-occupant vehicles, buses and motorists destined to the Northgate Business Park. The lane volume was calculated by first taking out the volumes who would be utilizing the Northgate office complex. A vehicle occupancy count was performed for the existing movement into APG to determine the number of vehicles that would qualify for HOV usage. The Synchro model was utilized to determine the travel time advantage and therefore modify the number of HOV users. Various iterations were performed to evaluate the travel time advantage versus the switching to a multi-occupant vehicle. The model assumed one gate for HOV users and the remaining three gates for general purpose users. Any additional gates for the general purpose motorists will decrease the effectiveness of motorists switching to HOV usage.

The projected volumes for the Prospect Mill Road/ Thomas Run Road/ Schucks Road intersections, Maryland 136/ Maryland 155, the area between Middleton Road and Beards Hill Road the

Maryland 22/ Mt. Royal Ave. intersection and the relocations of ramps at the US 40/ Maryland 22 interchange are included in the Appendix E. The Appendix also contains the projected volumes for the HOV lane toward the APG gate.

iii. 2035 Travel Demand Forecasts

The Maryland 22 corridor study included the development of travel demand forecasts for the long term period which is defined as the year 2035. The forecasts were developed for the base and build alternatives. The 2035 forecasts utilized the Baltimore Metropolitan regional model. This included the approved socio-economic data for Round 7C for the corridor. The socio-economic data and transportation analysis zones are being revised by BMC at this time which will later be incorporated into the regional model. Presently the projected changes in the households and employment for 2035 are shown in Table IV-2

Table IV-2

TAZ	HOUSEHOLDS		EMPLOYMENT	
	2010	2035	2010	2035
897	640	897	552	694
898	607	783	2,358	3,252
899	258	320	262	361
926	1,111	1,320	749	919
927	164	182	268	328
928	203	228	55	66
932	714	2,116	222	266
933	93	107	381	458
941	665	1,888	420	518
945	496	601	745	1,117
946	238	246	1,494	2,151
947	491	1,306	88	110
948	261	278	1,390	1,988
949	163	176	336	491
950	1,608	2,427	498	716
951	376	485	773	923
952	573	595	517	618
953	48	103	2	3
954	426	440	1,765	2,109
955	628	656	751	897
1002	759	477	10,997	18,997

The roadway and transit network were held consistent with the approved long range plan.

The base volumes were developed for the mainline of Maryland 22 and the cross roads. These average daily traffic volumes and the AM/PM peak hour volumes are depicted in various diagrams in Appendix E.

The traffic volumes for the build alternatives were developed in a similar manner to the 2025 build forecasts. These same alternatives applied to both years with the additional growth between 2025 and 2035 taken into account. The only additional alternative was for the Churchville Bypass Volumes were developed for this alternative by analyzing the travel patterns and through the regional model. The alternatives for the build options are shown in Appendix E.

Table IV-3 provides the No-Build LOS analysis for 2010, 2015, 2025, and 2035.

Table IV-3

Churchville Section					
Intersection	**Peak Hour**	**2010 LOS**	**2015 NO BUILD LOS**	**2025 NO BUILD LOS**	**2035 NO BUILD LOS**
MD 543	AM	D	D	**E**	**F**
	PM	D	**E**	**F**	**F**
Prospect Mill Road	AM	D	**E**	D	D
	PM	C	D	C	D
Thomas Run Road	AM	C	**E**	D	**E**
	PM	**E**	**F**	**E**	**F**
HCC Entrance/Exit	AM	B	C	D	**E**
	PM	B	C	**E**	**F**
Campus Hills Shopping Center	AM	A	A	B	C
	PM	B	C	**E**	**F**
MD 136	AM	C	**E**	**F**	**F**
	PM	D	**E**	**F**	**F**
MD 155	AM	B	B	C	D
	PM	C	C	D	D

Aberdeen Section					
Intersection	**Peak Hour**	**2010 LOS**	**2015 NO BUILD LOS**	**2025 NO BUILD LOS**	**2035 NO BUILD LOS**
Long Drive / Technology Drive	AM	B	C	C	D
	PM	B	C	D	**E**
I-95 Southbound Ramp	AM	B	B	B	B
	PM	A	A	A	B
I-95 Northbound Ramp	AM	A	A	B	B
	PM	A	A	B	B
Beards Hill Road	AM	B	D	D	D
	PM	C	D	D	D
Middleton Road	AM	A	B	D	**F**
	PM	B	C	**E**	**E**
MD 462	AM	C	**E**	C	C
	PM	C	C	C	C
Mt Royal Avenue	AM	B	D	**F**	**F**
	PM	C	D	D	**F**
US 40 Ramp	AM	A	A	**E**	**F**
	PM	C	C	C	C
N. Post Road	AM	D	**F**	C	C
	PM	D	**F**	C	D

V. Alternatives

Alternatives were developed for this Study based on the evaluation of the existing conditions, understanding of the origin-destination study results and all traffic analysis results. All alternatives and options were considered that worked to address the existing and proposed deficiencies while working towards creating the MD 22 Corridor as a Complete Street within the project limits.

Once the alternatives as presented below were evaluated for reasonableness and feasibility, planning level cost estimates were developed, as included in the charts throughout this section. These cost estimates were developed utilizing the SHA format for this level of study. All estimates made assumptions off of the aerial and County GIS mapping for major category quantities and utilized a percent contingency for items such as drainage, utilities, planning and preliminary engineering. At this time **no** right-of-way costs have been developed associated with these improvements.

A. Short Term (2015)

Short term improvements are defined as opportunities to implement improvements to the corridor that improve the movement and safety for transit, pedestrians, bicycles and motorists by approximately the year 2015 to provide better "Complete Streets". Capital projects that are already in design, such as the State Highway Administration Intersection Improvement Projects along the corridor, were considered as short term improvements, otherwise all other major capital projects were considered medium or long term. Likewise potential short term type improvements requiring right-of-way or significant environmental/utility impacts, determined that these projects were identified as either medium or long term. The short-term improvements for the entire MD 22 study corridor are provided in figures V-1 through V-8. Levels of Service for the short-term improvements are included in Table V-1.

i. Transportation Demand Management Solutions

Transportation Demand Management (TDM) Solutions are concepts that utilize and optimize the existing transportation systems without any capacity and/or construction activities. This is done by reducing the travel demand on the existing facilities during the heaviest traffic times. In other portions of Maryland some of the techniques that have been implemented include: employee transit pass subsidy, parking cashout, reduced SOV (single occupancy vehicle) parking spaces, shuttle services, create rideshare boards at employment centers, create parking charges, increased transit information, and electronic bulletin board by zip code for ridesharing.

TDM solutions are also being utilized to promote a change in behavior for the manner in which individuals think about transportation. For example, including a bicycle lane or sidewalk facility in an area may not immediately draw people to use these resources, the inclusion of these facilities with the promotion of wellness education, bike-to-work days, and other outreach efforts can encourage people to change their behavior and begin to use these resources over the next generation.

For the MD 22 corridor, the following TDM solutions would provide overall benefits to mobility:

1. Flexible Work Schedules / Tele-commute Workers

Harford County should promote flexible work schedules as well as encourage appropriate businesses along the corridor and just off of the corridor to utilize tele-commuting as a viable option for their employees to utilize even one – two days per week.

Flexible work hours should also be promoted to APG not just as a solution for the MD 22 Corridor but also as a viable component to proposed solutions as a part of the Gate Study currently underway.

These aspects would require coordination between the County and the major employment centers in the area prior to implementation. For further information, it is recommended that the County encourage employers along the corridor to coordinate with other employers in the area who have successfully implemented these programs. For example, flexible work hours and tele-commuting have been proven effective in companies such as CareFirst BlueCross BlueShield in Baltimore and McCormick & Co. in Hunt Valley.

2. Harford Community College Scheduling

Discussions should continue between Harford County and Harford Community College in regards to scheduling of classes, the goal being to schedule all large classes (such as introductory and other core classes) to not begin or end near the AM peak travel demand hour of 7:00 to 8:00 in the morning.

This would provide the benefit of reducing traffic volumes in the AM peak period, and would especially assist in reducing the left turn volume from MD 22 eastbound to Thomas Run Road northbound. For every 200 students that can be reduced from the peak hour, approximately 45 trips through the intersection would be eliminated. Although this would not eliminate the need for improvements at this intersection, it would extend the time frame by which the improvements are needed. This could also reduce the number of required lanes, depending upon the number of student trips removed from the network.

Enrollment data for the 2010 – 2012 fall semesters was provided to the project team by Dr. Deborah Cruise, Vice President of Student Development and Institutional Effectiveness at Harford Community College (p: 410-412-2233, dcruise@harford.edu). This data reflects the current class scheduling pattern at the college, and represents the number of students enrolled in credited on-campus classes. On an average day, approximately forty percent of students arrive on campus for classes that start within the AM peak period for MD 22 (7:00 – 10:00 am), while eight percent arrive within the PM peak period (3:00 – 6:00 pm).

Based on this data, it would be reasonable to conclude that a restructuring of the current class scheduling pattern could aid in the

reduction of traffic on MD 22 at the Thomas Run Road intersection for the AM peak period. Harford Community College has expressed concerns about the feasibility of implementing this recommendation, as it could negatively affect their ability to accommodate their enrollment.

This strategy will require continued coordination between Harford County Director of Planning and Zoning with Harford Community College to discuss the importance of the MD 22 corridor and request that any class with 40 or more attendees be scheduled outside of the AM peak hour for the MD 22 corridor.

3. High School Student Parking

There are several high schools along the corridor in which the students drive themselves to school. The schools could limit the parking and provide parking privileges to students either as an earned benefit based on academic achievement, or as a need-based system for students with after school responsibilities such as athletics or employment. Implementation of a fee for obtaining a parking pass could further limit the number of students driving themselves to school.

4. Media Promotion

With any effort that is undertaken by Harford County, including encouraging flexible schedules, tax incentives for employers promoting transit, tele-commuting, etc. a media promotion utilizing the existing Harford County website as well as any social media outlets and working with local Chambers of Commerce to promote the initiatives should be completed. Media promotions of existing programs can also be completed throughout the year to continue to keep these programs in the forefront for employers and employees.

It is recommended that Harford County develop a request for proposal (RFP) for a media-based firm to develop a proposal to meet the media promotion desired. This RFP should include items to address concerns such as how TDM measures can be successfully implemented through a media promotion.

ii. Corridor-Wide

1. Transit Improvements

Shifting commuters from their automobile to transit requires that the commuter feels comfortable and can easily negotiate the transition. A key element of this transition is the availability of information. The primary source for transit information is the agency website. An improved website will provide a level of comfort to the new and/or occasional transit rider. Harford Transit is currently in the process of upgrading their website and means to promote the website through a transit based grant. Elements anticipated to be provided both in the near term as well as those to be incorporated as the "next steps" for online marketing include the following listed below. It is also recommended that new website incorporate responsive design.

- Real-time data for bus routes and stop locations
  Harford Transit is currently in the process of geo-coding the various bus routes to be able to link back to Google map services. Once this is completed, the user will have the capability to see the location of the bus vehicle en route as well as follow their progress. Currently the Maryland Transit Administration utilizes this technology as well as the City of Baltimore for the Charm City Circulator.

- Incorporation of Quick Response (QR) codes
  QR codes can be incorporated into the bus stop signage as well as other key locations and transit brochures to provide a link to the Harford Transit website, the location of the bus (for bus stop signs) or other useful information based on the location of the QR code.

- Social Media
  With the completion of the website with the new branding and incorporating the real-time data, Harford Transit can look to provide further information through Social Media sites to predominantly target the Millennial generation that currently utilizes sites such as Facebook, Twitter, and YouTube as a means of communication. Social media can be and is currently being used in the transit industry to provide real-time service updates, build relationships with users, and promote employment with the agency. The importance of utilizing social media sites should not be underestimated as these sites can encourage a new generation in the workforce to establish transit as their primary option for transportation that is convenient, cost-effective, and can reduce their individual carbon footprint.

  It is recommended that within the previously mentioned RFP for media promotion, a large component should be included for social media promotion and practice. Additionally, with the launch of social media sites, the responsibility of providing status updates and tweets should be specifically assigned to ensure an updated and frequent online presence.

With the completion a fully functional and branded online presence, it is recommended that Harford Transit and Harford County work with large employment centers throughout the region (beyond the MD 22 Corridor), as well as APG, to incorporate a link to Harford Transit's site to promote transit as a viable option for their employees.

When the transit rider is looking for their stop, it is important that they can easily find the location. This requires increased visibility for the transit signage. The current Harford Transit branding includes orange on blue, as seen below. For better visibility, it has been discussed with Harford Transit that reversing the color scheme would make their transit signage more visible. The improved transit

signage would also be a prime indicator to automobile traffic along the corridor. The improved visibility of the signage may attract new patrons and would also indicate to the auto drivers to be more aware.

While there are no bus stops within the study limits that have ridership levels warranting a bus shelter, it is recommended that bus shelters for the higher usage stops throughout the Harford Transit system, such as Harford Mall and the Harford County Government building, be installed. Additionally, extending service hours to include Saturday on Bus Routes that service shopping centers and other commercial areas could promote greater ridership numbers. Overall improvements to the system such as more visible signage, shelters, benches, and other amenities, even when outside of the study area corridor, provide a benefit to the entire system through rider comfort. Because transit is largely based on ease and comfort of its riders, anything done to promote this anywhere in the system will benefit the entire system.

iii. Churchville Section

1. Intersection of MD 22 / MD 543

Pedestrian facilities at this intersection would be improved by the upgrade of pedestrian ramps to be completely compliant with current Americans with Disabilities Act (ADA) standards. Federal requirements for ADA accessibility have been incorporated into SHA standards and include specific guidelines for elements such as sidewalks, ramps, and crosswalks. The cross slopes of the existing landing areas appear to be noncompliant. New sidewalk should be installed along northbound MD 543 from the Rite Aid to connect MD 22 with the neighborhood to the north. Improved pedestrian accessibility along the corridor provides for increased mobility as well as being a component of the Complete Streets initiative.

Bicycle facilities in this area in the short-term would be addressed with Share the Road signing eastbound and westbound beginning at Hillside Drive, approximately 350 feet west of the Wawa gas station and continuing through the MD 543 intersection. Share the Road would continue along the westbound side of MD 22 for approximately 2,000 feet while bicycle lanes utilize the shoulder on the eastbound side of the roadway.

Additional safety improvements at this intersection in the short term include tree trimming along the southbound lanes of MD 543 south of MD 22 to improve signal head visibility. A “Lane Ends / Merge Left” sign would be added on the mast arm for eastbound MD 22.

2. Along MD 22 from MD 543 to Andreas Lane

For bicycle facilities, Share the Road signage would be extended from MD 543 to approximately Andreas Drive along both sides of MD 22.

There are no recommendations for pedestrian or roadway safety improvements in this area for the short-term.

3. Along MD 22 from Andreas lane to Tudor Lane

Share the Road signage would continue along the westbound side of MD 22 until just prior to Tudor Lane. Along the eastbound lanes in this area, bicycle facilities along MD 22 would be provided by remarking existing shoulders for a bike lane.

There are no recommendations for pedestrian or roadway safety improvements in this area for the short-term.

4. Along MD 22 from Tudor Lane to Prospect Mill Road

In this section, short-term improvements would include bicycle lanes on the shoulder along the eastbound and westbound sides of MD 22.

There are no recommendations for pedestrian or roadway safety improvements in this area for the short-term.

5. Intersection of MD 22 / Prospect Mill Road and Thomas Run Road / Schucks Road

This area of the MD 22 study corridor includes one of the Maryland State Highway Administration (MDSHA) intersection improvements discussed in Section III. Detailed enlargements of the proposed MDSHA improvements are illustrated in Appendix A.

Due to the proximity to the Harford Community College there are a number of pedestrian improvements included for the short-term. New sidewalk would be installed from Prospect Mill Road to Thomas Run Road/Schucks Road. Crosswalk pavement markings would be installed at the intersection of Prospect Mill Road and MD 22.

Bicycle facilities in this area would be Share the Road signage between Prospect Mill Road and Thomas Run Road/Schucks Road.

The MDSHA intersection improvements in this area include proposed widening to accommodate an additional eastbound thru lane and an additional westbound thru-right turn travel lane from Prospect Mill Road to Thomas Run Road/Schucks Road.

An additional safety improvement in this area would be to trim the tree on eastbound MD 22 which are currently blocking the pedestrian crossing sign east of Prospect Mill Road.

6. Along MD 22 from Thomas Run Road/Schucks Road to Harford Community College Entrance (Wawa)

The pedestrian improvements in this area include the extension of the sidewalk facilities introduced in the MDSHA improvement project at Prospect Mill Road and Thomas Run Road/Schucks Road. New sidewalk would extend from beyond the MDSHA improvements at Thomas Run Road/Schucks Road to the Harford Community College Entrance.

Bicycle facilities would be incorporated in the short-term along MD 22 in this area through a combination of "Share the Road" signage and remarking existing shoulders for bike lanes.

Several additional short term roadway safety improvements were identified for this area. Advanced signing would be installed identifying the Harford Community College Entrance. The guiderail just west of the intersection with the Harford Community College Entrance should be repaired or replaced. At the intersection with the Harford Community College entrance the stop bar or signal design would be modified to ensure minimum distance to the signal head requirements are met.

7. Along MD 22 from Harford Community College Entrance (Wawa) to Rhineforte Drive / Asbury Road

Pedestrian facility improvements in this area for the short term include the extension of a sidewalk network along westbound MD 22 from the Harford Community College Entrance to the eastern side of the Campus Hills Shopping Center.

Bicycle facilities would be included through a combination of "Share the Road" signage and remarking existing shoulders for bike lanes.

There are no additional roadway safety improvements for this area during the short term.

8. From Rhineforte Drive / Asbury Road to MD 136

The short term improvements for this area of the MD 22 corridor are limited to bicycle facility improvements. Bicycle facilities would be implemented by remarking the existing shoulders for bike lanes from Rhineforte Drive/Asbury Road to just west of MD 136.

There are no additional pedestrian or roadway safety improvements for this area during the short term.

9. Intersection of MD 22 / MD 136 / MD 155

The short-term pedestrian facility improvements in this area include the installation of new sidewalk along westbound MD 22 to connect the existing sidewalk network at the historic Churchville Presbyterian Church to the commercial establishments just west along MD 22. All pedestrian ramps at the MD 136 and MD 155 intersections should be upgraded to be ADA compliant. The lack of detectable warning strips makes the existing ramps noncompliant. Crosswalk pavement striping would be upgraded at both the MD 136 and MD 155 intersections with MD 22. Additionally, pedestrian signals would be added at both the MD 136 and MD 155 intersections with MD 22.

It is recommended that the County pursue funding for these and other pedestrian facility improvements through the SHA Sidewalk Retrofit Program, which makes grant funds available for sidewalk improvements on state highways. Additional information about this program can be found through coordination with SHA.

Bicycle facilities along MD 22 through these intersections would be provided through "Share the Road" signage in the short term. "Share the Road" signs would be installed along both sides of MD22 from approximately 1,000 feet west of the MD136 intersection to approximately 1,500 feet east of the MD136 intersection.

There are additional roadway safety improvements in this area for the short term. The existing "Lane Ends" sign along MD 22 just west of MD 136 should be relocated or the trees obstructing its view should be trimmed. The "No Parking" signs between MD 136 and MD 155 along MD 22 should be eliminated.

10. Along MD 22 from MD 155 to MD 156

The short-term improvements along the MD 22 corridor between MD 155 and MD 156 are limited to bicycle facility improvements. Bicycle facilities would be incorporated along MD 22 in this area through a combination of "Share the Road" signage (from MD 155 to Glenville Road) and remarking existing shoulders for bike lanes.

There are no additional pedestrian or roadway safety improvements for this area during the short term.

11. Intersection of MD 22 / MD 156

There are no recommended short term improvements for this intersection. Turn bypass traffic lanes are currently striped at this intersection. The available pavement does not allow for bike facilities to be indicated within the short term. Advance signage to identify to bicyclists and automobiles of no bike lane ahead should be installed.

iv. Central Section

1. Along MD 22 from MD 156 to Grafton Lane

The short-term improvements along this portion of the MD 22 study corridor are limited to bicycle facility upgrades. Bike lanes would be provided by remarking the existing shoulders along MD 22. "Share the Road" signage would be used to accommodate bicycles through at intersection with Grafton Lane.

There are no additional pedestrian or roadway safety improvements for this area during the short term. Forecasted traffic volumes will be accommodated by the existing infrastructure and there are not pedestrian destinations throughout this stretch of roadway to require the need for an expanded sidewalk network in the short term.

2. Intersection of MD 22 / Grafton Lane

Short term improvements at the intersection of MD 22 and Grafton Lane are limited to bicycle facility upgrades. In this area, bicycle facilities would be included with "Share the Road" signage.

There are no additional roadway safety improvements for this area during the short term. Forecasted traffic volumes will be accommodated by the existing infrastructure and there are not pedestrian destinations throughout this stretch of roadway to require the need for an expanded sidewalk network in the short term.

3. Along MD 22 from Grafton Lane to Long Drive / Technology Drive

There are no short-term improvements for pedestrian facilities in this portion of the study corridor due to a lack of existing pedestrian destinations.

Bicycle facilities along MD 22 in this portion of the MD 22 study corridor would be implemented through a combination of "Share the Road" signage and remarking existing shoulders for bike lanes. Bike lines would be provided where the shoulder width is available, with the exception of intersections where the shoulder width is reduced due to the addition of bypass and turn lanes. In these areas, "Share the Road" signage would be implemented.

There are two roadway safety improvements in this portion of the study corridor near the intersection of MD 22 with Aldino Stepney Road. To improve the visibility of the stop sign along the northbound approach of Aldino Stepney road, the vegetation would be trimmed. The existing "Stop Ahead" sign just prior to this intersection would be replaced.

v. Aberdeen Section

1. Intersection of MD 22 / Technology Drive / Long Drive

There are several pedestrian facility upgrades at the intersection of MD 22 with Technology Drive/Long Drive. The existing pedestrian ramps would be upgraded to current ADA compliance. The cross slopes of the existing landing areas appear to be noncompliant. In addition there are no detectable warning strips on any of the ramps. Portions of the existing sidewalk would be reconstructed to provide access to the existing pedestrian signal push button which is currently outside of the maximum distance permitted for ADA compliance.

Bicycle facility upgrades in the short term include "Share the Road" signage at this intersection. The signage would begin approximately 650 feet before the intersection and extend eastward towards the MD 22/I-95 interchange. This intersection marks the beginning of a very congested area with vehicular traffic and should therefore be heavily signed to make drivers aware of the potential presence of bicyclists in the area.

There are no additional roadway safety improvements for this intersection in the short term.

2. Along MD 22 from Technology Drive / Long Drive to Beards Hill Road

The recommendations for short-term pedestrian facility improvements include the installation of median fencing from east of the I-95 bridge to the intersection with Beards Hill Road to prohibit mid-block pedestrian crossings through this heavily travelled roadway section. Field observations indicated a number of pedestrians crossing midblock in this area resulting in a recent fatality. By adding decorative fencing and enhanced landscaping plantings between existing trees, this will deter pedestrians from attempting to cross midblock and will direct them toward the adjacent signalized intersections.

Bicycle facilities through this portion of the study corridor include the installation of "Share the Road" signage from Technology Drive/Long Drive to Beards Hill Road along MD 22. This area should be heavily signed to make drivers aware of the potential presence of bicyclists as this area is highly a highly travelled vehicular corridor including several interstate interchange ramps. The existing roadway shoulder would be marked for a bike lane along westbound MD 22 from just east of the I-95 interchange to Beards Hill Road.

The roadway safety improvements for this portion of the study corridor include the removal of the plantings along westbound MD 22 prior to the I-95 on-ramp that are obstructing the eastbound ramp speed sign. The sign could also be relocated.

3. Intersection of MD 22 / Beards Hill Road

This intersection is included within the MDSHA Intersection Improvement projects underway discussed in Section III. The MDSHA intersection improvement project includes improvements to pedestrian and roadway facilities. A detailed enlargement of these improvements is included in Appendix A.

New sidewalk would be installed along Beards Hill Road to the north and south of MD 22 as part of the MDSHA Intersection Improvements. These proposed sections of sidewalk would complete the sidewalk network along the east side of Beards Hill Road and provide a continuous pedestrian connection between the shopping center on the north side of MD 22 with the apartment buildings to the south of MD 22.

Bicycle facilities would be accommodated through this intersection through a combination of "Share the Road" signage and remarking existing shoulders for bike lanes.

The roadway improvements of the MDSHA Intersection Improvement Project include widening of MD 22 to provide additional thru lanes in each direction. The project also widens the northern leg of the intersection to allow for a southbound free flow

right turn lane onto MD 22 westbound. Dualized left turn lanes would be provided along Beards Hill Road. Roadway widening would extend east from the intersection to the intersection of MD 22 with Paradise Road.

In addition to the MDSHA Intersection Improvements at this intersection, there are a number of other minor roadway safety improvements. The existing lane drop arrow on westbound MD 22 just west of Beards Hill Road would be removed as it does not accurately reflect the existing roadway configuration. The old guiderail along westbound MD 22 in front of the McDonald's should be removed. "No Stopping" signs would be added along MD 22 in front of the McDonald's to prohibit patron parking along this section of the roadway shoulder. The existing red light camera pole located in the northeast quadrant of the intersection would be removed and the exposed wires would be repaired.

4. Along MD 22 from Beards Hill Road to Middleton Road

Short-term pedestrian facility improvements in this portion of the MD 22 corridor include the installation of median fencing from east of Beards Hill Road to west of the intersection with Middleton Road to prohibit mid-block pedestrian crossing. Field observations indicated a number of pedestrians crossing midblock in this area. By adding decorative fencing and enhanced landscaping plantings between existing trees, this will deter pedestrians from attempting to cross midblock and will direct them toward the adjacent signalized intersections.

Bicycle facility improvements in this portion of the MD 22 corridor would be provided through the remarking existing shoulders for bike lanes.

Additional roadway safety improvements through this portion of the study corridor include roadway widening as part of the MDSHA Intersection Improvement project from Beards Hill Road to Paradise Road.

5. Intersection of MD 22 / Middleton Road

Pedestrian facility improvements for the short term include the implementation of crosswalk pavement markings and pedestrian signals for the crossing of MD 22 at Middleton Road.
Bicycle facilities through this intersection would be accommodated by the remarking of the existing shoulders for bike lanes.

Roadway safety improvements through this intersection include roadway widening as part of the MDSHA Intersection Improvement project from Beards Hill Road to Paradise Road.

Additional roadway safety improvements for this area during the short term include signing and lighting improvements. The sign located approximately 650 feet east of the MD 22 / Middleton Road intersection should be revised to read "Middleton Road". Additionally, street lighting would be installed along this portion of the corridor.

6. Along MD 22 from Middleton Road to Paradise Road (MD 462)

Short-term pedestrian facility improvements in this portion of the MD 22 corridor include the installation of median fencing from east of Middleton Road to Roberts Road, just west of Paradise Road, to prohibit mid-block pedestrian crossing. Field observations indicated a number of pedestrians crossing midblock in this area. By adding decorative fencing and enhanced landscaping plantings between existing trees, this will deter pedestrians from attempting to cross midblock and will direct them toward the adjacent signalized intersections.

Bicycle facilities through this portion of the study corridor would be accommodated by the remarking of the existing shoulders for bike lanes.

Roadway safety improvements through this section include roadway widening as part of the MDSHA Intersection Improvement project from Beards Hill Road to Paradise Road.

7. Intersection of MD 22 / Paradise Road (MD 462)

This intersection is included within the MDSHA Intersection Improvement projects underway discussed in Section III. The MDSHA Intersection Improvement Project includes roadway widening from Beards Hill Road to Paradise Road, as well as widening to provide an additional thru lane in either direction along MD 22. Paradise Road (MD 462) would be widened to provide a dedicated right turn lane northbound onto eastbound MD 22 and an additional southbound left turn lane onto eastbound MD 22. The MDSHA intersection improvement project includes improvements roadway facilities; however, pedestrian and bicycle facilities should also be included. A detailed enlargement of these improvements is included in Appendix A.

Bicycle facility improvements in this portion of the MD 22 corridor would be provided through the remarking existing shoulders for bike lanes.

In addition to the MDSHA Intersection improvements, route marker assemblies on MD 462 would also be added.

8. Along MD 22 from Paradise Road (MD 462) to Mt. Royal Avenue

Short term improvements through this portion of the MD 22 study corridor are limited to bicycle facility improvements. Bicycle facilities through this intersection would be accommodated by the remarking of the existing shoulders for bike lanes.

There are no additional pedestrian or roadway safety improvements through this area.

9. Intersection of MD 22 / Mount Royal Avenue

There are several short-term improvements for pedestrian facilities at the intersection of MD 22 and Mount Royal Avenue. The existing pedestrian ramps would be upgraded to meet current ADA guideline requirements. The crosswalks at the intersection would be remarked with new pavement striping.

Bicycle facilities through this intersection would be accommodated by the remarking of the existing shoulders for bike lanes.

Short-term roadway safety improvements at this intersection are limited to the addition of a "Do Not Enter" sign along westbound MD 22 prior to Mount Royal Avenue.

10. Along MD 22 from Mt. Royal Avenue to US 40 Interchange

There are no short-term pedestrian facility improvements in this area. There is not a need for a continuation of the sidewalk network in this area east of Mount Royal Avenue in the short term.

Bicycle facilities through this section of the study area would be accommodated by the remarking of the existing shoulders for bike lanes.

There are no additional roadway safety improvements through this portion of the study area for the short term.

11. Interchange of MD 22 / US 40

There are no pedestrian facility improvements through the interchange with MD 22 and US 40.

Through this interchange, bicycle facilities would be incorporated along MD 22 with "Share the Road" signage. The existing lane configuration and bridge width does not allow the additional shoulder width required to stripe this area for a separated bike lane facility.

There are two roadway safety improvements for this interchange in the short term. The ramp speed sign along westbound MD 22 just prior to US 40 should be relocated. In the same vicinity, the westbound deceleration lane would be remarked.

12. Along MD 22 from US 40 Interchange to North Post Road

There are no pedestrian facility improvements from the interchange with US 40 to North Post Road.

Through this portion of the MD 22 study corridor, bicycle facilities would be accommodated by the remarking of the existing shoulders for bike lanes.

There are no additional roadway safety improvements through this portion of the study area for the short term.

13. Intersection of MD 22 / North Post Road

This intersection is included within the MDSHA Intersection Improvement projects underway discussed in Section III. The roadway improvements included in the MDSHA Intersection Improvement Project includes the widening of MD 22 to provide an additional thru travel lane in each direction. The lane configuration of the northern leg of the intersection along North Post Road will be reconfigured to include an additional northbound thru lane and a southbound free flow channelized right turn onto westbound MD 22. Pedestrian facility upgrades in the short-term in accordance with the MDSHA Intersection Improvement Project include updating sidewalks, pedestrian push buttons, signing and ramps to be fully ADA compliant. A detailed enlargement of these improvements is included in Appendix A.

Short term improvements for bicycle facilities through this intersection would be incorporated by the remarking of the existing shoulders for bike lanes.

There are two additional short-term roadway safety improvements for this intersection. Standard MDSHA speed reduction signing would be installed on MD 22 eastbound. The mounting height of the signs approaching Aberdeen Proving Ground (APG) should be reviewed to meet current standards and visibility

14. Along MD 22 from North Post Road to Aberdeen Proving Ground Gates

There are no pedestrian facility improvements from North Post Road to the APG gates in the short term.

Short term improvements for bicycle facilities through this intersection would be incorporated by the remarking of the existing shoulders for bike lanes. The section of eastbound MD 22 just prior to the APG gates would include "Share the Road" signage.

Roadway improvements for this portion of the study corridor would include the provision of an eastbound "AM Peak HOV and Research Boulevard Only" lane on north side of the median (contra-flow) from North Post Road to the APG gate. In conjunction with this roadway reconfiguration, one of the in-processing gates would be dedicated to HOV-only processing. A detailed inset of these proposed operations is included in Figure V-9. An additional roadway safety improvement for this area would be the addition of "One Way" and "Do Not Enter" signs at appropriate locations near the intersection of MD 22 with Research Boulevard.

Table V-1: Short Term Improvements

Churchville Section						
Intersection	**Traffic Analysis**				**Feasibility Level Cost Estimate (Not Including ROW)**	**Remarks**
	Peak Hour	**2010 LOS**	**2015 NO BUILD LOS**	**2015 BUILD LOS**		
Corridor Length: MD 543 to MD 156					$1.2 – 1.7 million	Pedestrian and bicycle facility upgrades through entire section. No anticipated impacts to utilities or drainage. Improvements could be completed by SHA and/or County Maintenance.
MD 543	AM	D	D	D	**	Improvements could be completed by SHA and/or County Maintenance. No anticipated impacts to utilities or drainage.
	PM	D	**E**	**E**		
Prospect Mill Road	AM	D	**E**	D	**	Improvements could be completed by SHA and/or County Maintenance. No anticipated impacts to utilities or drainage.
	PM	C	D	C		
Thomas Run Road	AM	C	**E**	D	Funded by SHA	Intersection improvement project plans underway with SHA. Ensure that SHA plans account for pedestrian and bicycle facilities.
	PM	**E**	**F**	D		
HCC Entrance/Exit	AM	B	C	C	**	Improvements could be completed by SHA and/or County Maintenance. No anticipated impacts to utilities or drainage.
	PM	B	C	C		
Campus Hills Shopping Center	AM	A	A	A	*	
	PM	B	C	C		
MD 136	AM	C	**E**	**E**	****	Improvements could be completed by SHA and/or County Maintenance. No anticipated impacts to utilities or drainage.
	PM	D	**E**	**E**		
MD 155	AM	B	B	B	*	
	PM	C	C	C		

***There are no short-term costs anticipated at this intersection.**
**** Cost for improvements at this intersection included as part of the MD 543 to MD 156 pedestrian/bicycle upgrades.**

Central Section						
Intersection	**Peak Hour**	**2010 LOS**	**2015 NO BUILD LOS**	**2015 BUILD LOS**	**Feasibility Level Cost Estimate (Not Including ROW)**	**Remarks**
Corridor Length: MD 156 to Long Drive/Technology Drive					$70,000 - $80,000	Pedestrian and bicycle facility upgrades through entire section. No anticipated impacts to utilities or drainage. Improvements could be completed by SHA and/or County Maintenance.

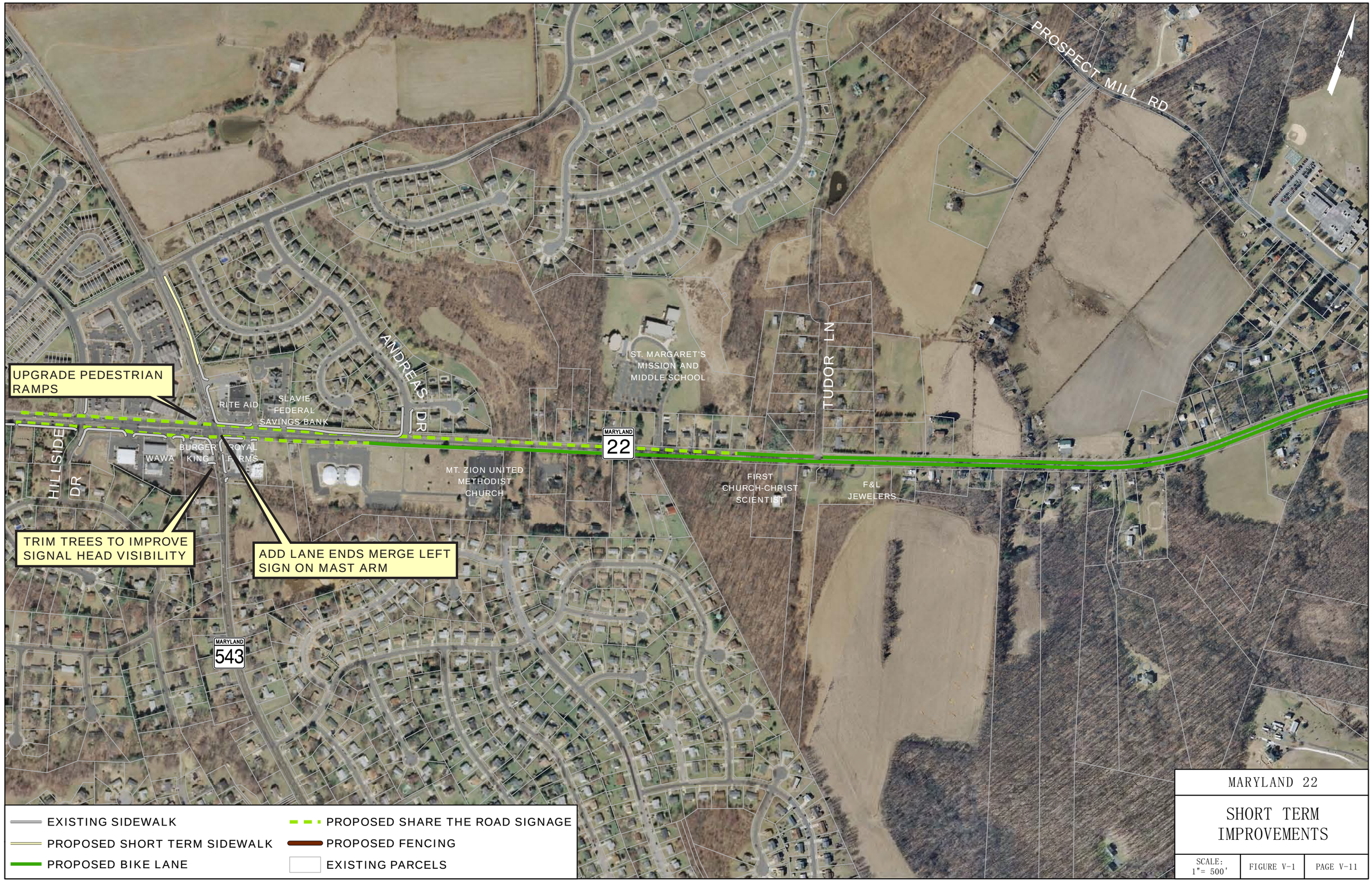
***There are no short-term costs anticipated at this intersection.**

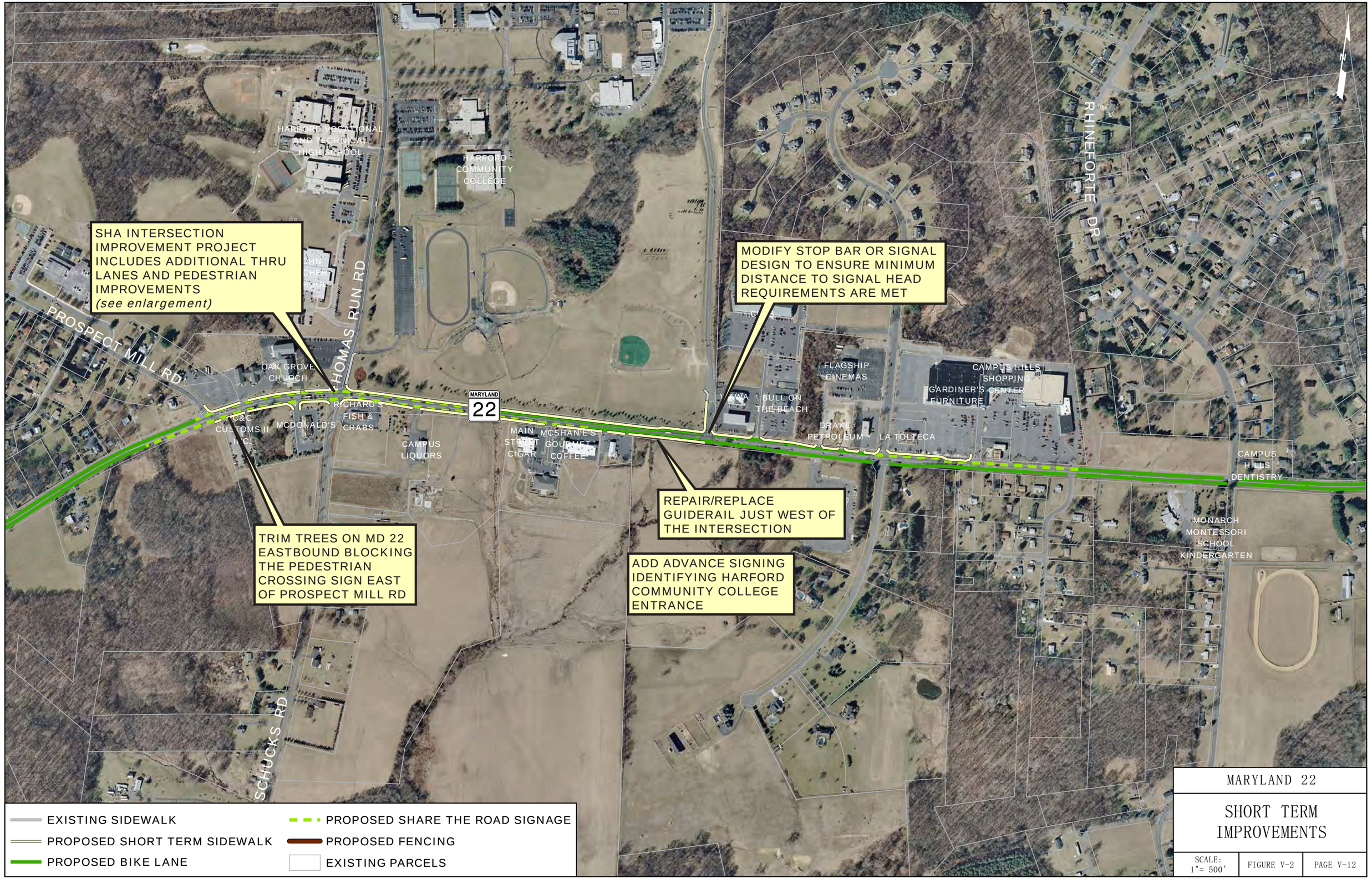
**** Cost for improvements at this intersection included as part of the MD 156 to Long Drive/Technology Drive pedestrian/bicycle upgrades.**

Aberdeen Section						
Intersection	**Peak Hour**	**2010 LOS**	**2015 NO BUILD LOS**	**2015 BUILD LOS**	**Feasibility Level Cost Estimate (Not Including ROW)**	**Remarks**
Corridor Length: Long Drive/Technology Drive to APG					$300,000 - $400,000	Pedestrian and bicycle facility upgrades through entire section. No anticipated impacts to utilities or drainage. Improvements could be completed by SHA and/or County Maintenance.
Long Drive/Technology Drive	AM	B	C	C	**	No anticipated impacts to utilities or drainage
	PM	B	C	C		
I-95 Southbound Ramp	AM	B	B	B	*	
	PM	A	A	A		
I-95 Northbound Ramp	AM	A	A	A	*	
	PM	A	A	A		
Beards Hill Road	AM	B	D	C	Funded by SHA	Intersection improvement project plans underway with SHA. Ensure that SHA plans account for pedestrian and bicycle facilities.
	PM	C	D	C		
Middleton Road	AM	A	B	B	**	Improvements could be completed by SHA and/or County Maintenance. No anticipated impacts to utilities or drainage.
	PM	B	C	C		
MD 462	AM	C	**E**	C	Funded by SHA	Intersection improvement project plans underway with SHA. Ensure that SHA plans account for pedestrian and bicycle facilities.
	PM	C	C	B		
Mt Royal Avenue	AM	B	D	D	**	Improvements could be completed by SHA and/or County Maintenance. No anticipated impacts to utilities or drainage.
	PM	C	D	D		
US 40 Ramp	AM	A	A	A	**	Improvements could be completed by SHA and/or County Maintenance. No anticipated impacts to utilities or drainage.
	PM	C	C	C		
N. Post Road	AM	D	**F**	C	Funded by SHA	Intersection improvement project plans underway with SHA. Ensure that SHA plans account for pedestrian and bicycle facilities.
	PM	D	**F**	C		
N. Post Road to APG	AM	D	**F**	C	$300,00-500,000	Potential for minor utility or drainage impacts. No anticipated displacements. Coordination required with APG.
	PM	D	**F**	C		

***There are no short-term costs anticipated at this intersection.**

**** Cost for improvements at this intersection included as part of the Long Drive/Technology Drive to APG pedestrian/bicycle upgrades.**

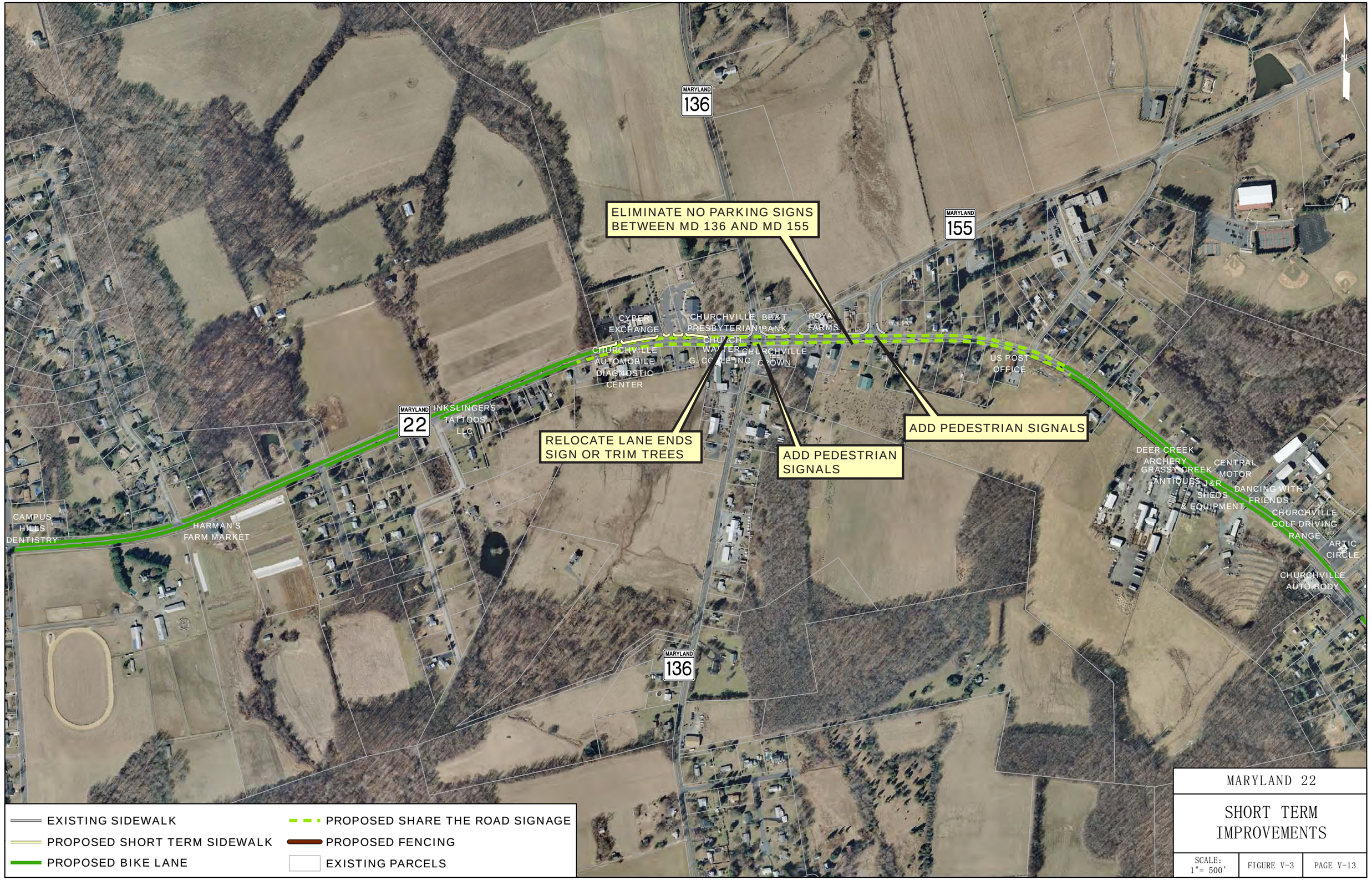

PROSPECT MILL RD
UPGRADE PEDESTRIAN RAMPS
TRIM TREES TO IMPROVE SIGNAL HEAD VISIBILITY
ADD LANE ENDS MERGE LEFT SIGN ON MAST ARM
ANDREAS DR
HILLSIDE DR
TUDOR LN
RITE AID
SLAVIE FEDERAL SAVINGS BANK
WAWA
BURGER KING
ROYAL FARMS
ST. MARGARET'S MISSION AND MIDDLE SCHOOL
MT. ZION UNITED METHODIST CHURCH
FIRST CHURCH-CHRIST SCIENTIST
F&L JEWELERS
MARYLAND 22
MARYLAND 543
EXISTING SIDEWALK
PROPOSED SHORT TERM SIDEWALK
PROPOSED BIKE LANE
PROPOSED SHARE THE ROAD SIGNAGE
PROPOSED FENCING
EXISTING PARCELS
MARYLAND 22
SHORT TERM IMPROVEMENTS
SCALE: 1"= 500'
FIGURE V-1
PAGE V-11



MARYLAND 22

SHORT TERM IMPROVEMENTS

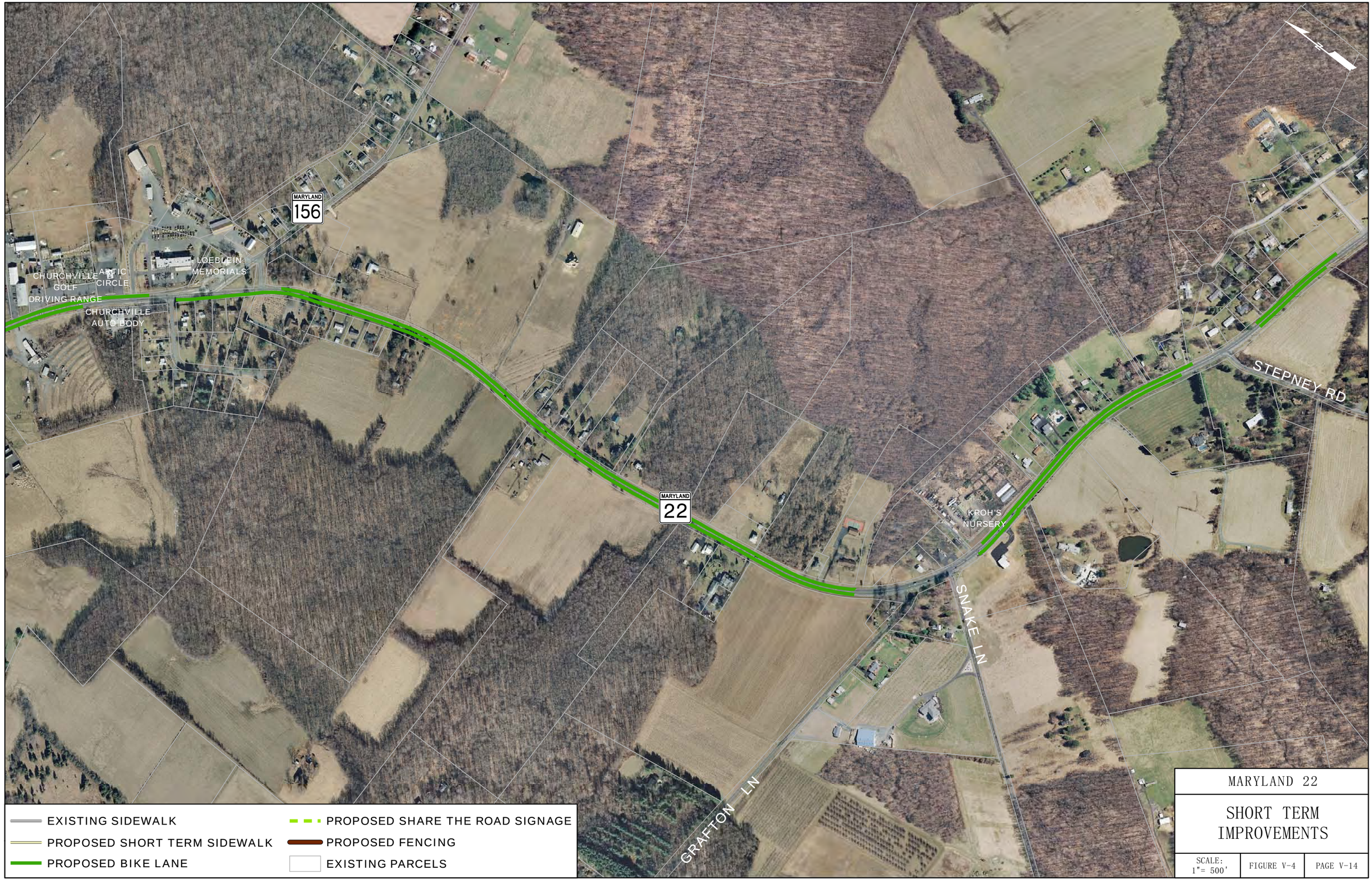
SCALE: 1"= 500'	FIGURE V-2	PAGE V-12



MARYLAND 22

SHORT TERM IMPROVEMENTS

SCALE:	FIGURE V-3	PAGE V-13
1"= 500'		



MARYLAND 22

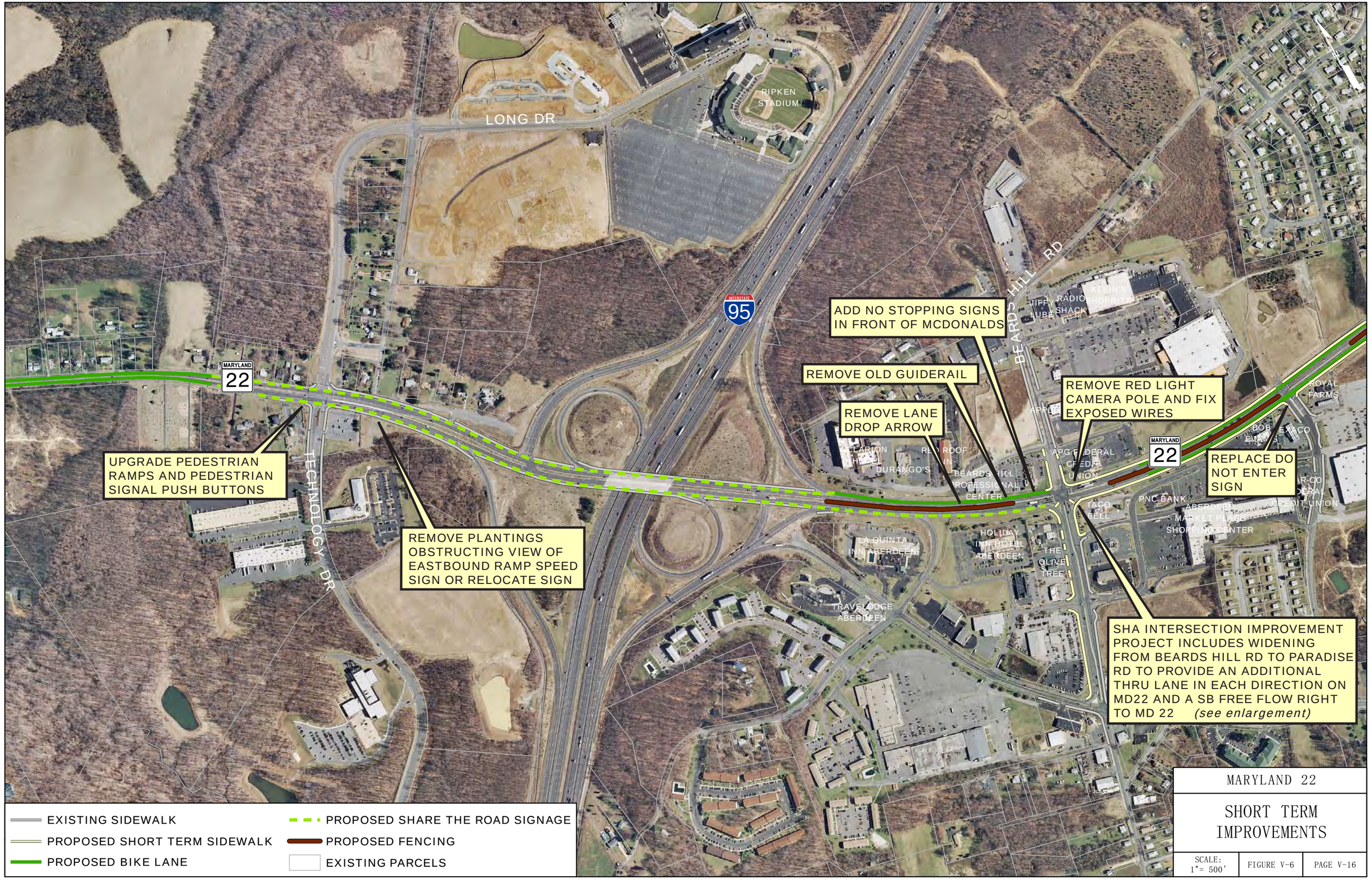
SHORT TERM IMPROVEMENTS

SCALE: 1"= 500'	FIGURE V-4	PAGE V-14

MARYLAND 22

SHORT TERM IMPROVEMENTS

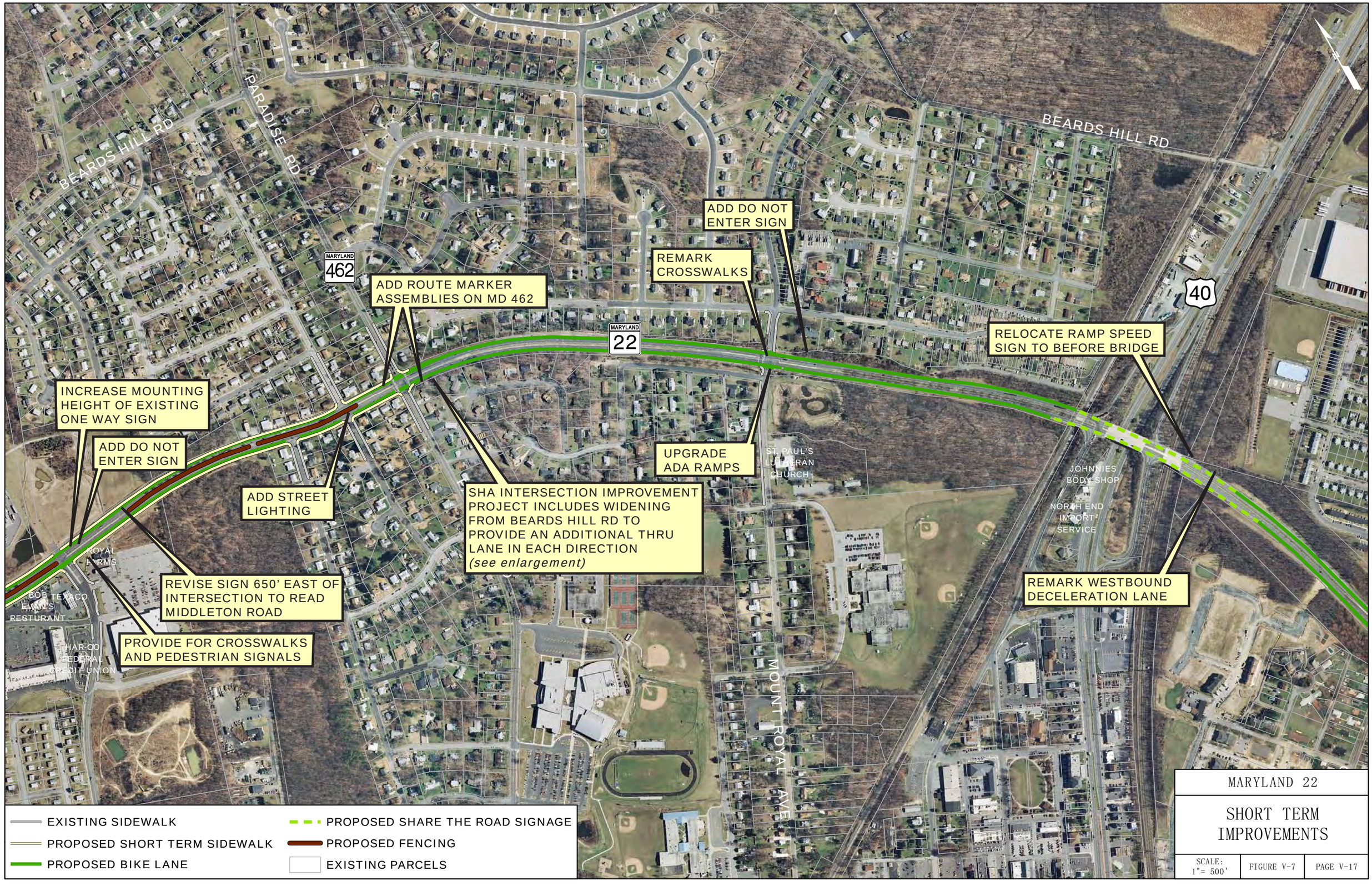
SCALE: 1"= 500'	FIGURE V-5	PAGE V-15



MARYLAND 22

SHORT TERM IMPROVEMENTS

SCALE: 1"= 500'	FIGURE V-6	PAGE V-16



MARYLAND 22

SHORT TERM IMPROVEMENTS

SCALE: 1"= 500'	FIGURE V-7	PAGE V-17

POST RD

PROPOSED EASTBOUND AM PEAK HOV LANE ON NORTH SIDE OF MEDIAN (CONTRA-FLOW) FROM POST ROAD TO APG GATE
(see enlargement)

RESEARCH BLVD

ON MD 22 EASTBOUND PROVIDE STANDARD SHA SPEED REDUCTION SIGNING

MARYLAND 22

HALL CROSS ROADS ELEMENTARY SCHOOL

POST RD

SHA INTERSECTION IMPROVEMENT PROJECT INCLUDES WIDENING TO PROVIDE AN ADD'L THRU LANE IN EACH DIRECTION, UPDATING SIDEWALKS, PEDESTRIAN SIGNING, PUSH BUTTONS, AND ADA RAMPS
(see enlargement)

REVIEW MOUNTING HEIGHT OF SIGNS APPROACHING ABERDEEN PROVING GROUNDS

ADD ONE WAY AND DO NOT ENTER SIGNS AT APPROPRIATE LOCATIONS

EXISTING SIDEWALK
PROPOSED SHORT TERM SIDEWALK
PROPOSED BIKE LANE
PROPOSED SHARE THE ROAD SIGNAGE
PROPOSED FENCING
EXISTING PARCELS

MARYLAND 22

SHORT TERM IMPROVEMENTS

SCALE: 1"= 500'	FIGURE V-8	PAGE V-18

B. Medium Term (2025)

Medium term improvements are defined as opportunities to implement improvements to the corridor that improve the movements for transit, pedestrian, bicycles and motorists by approximately the year 2025 to further provide for a "Complete Street". Capital projects to improve intersection operations as well as some widening along the corridor are also recommended as medium term. The Medium Term improvements build upon the Short Term improvements and assume that they have been completed.

The medium-term improvements for the entire MD 22 study corridor are provided in figures V-10 through V-18. Levels of Service for the medium-term improvements are included in Table V-2.

i. Churchville Section

1. Intersection of MD 22 / MD 543

There are a number of recommended pedestrian and roadway improvements at the intersection of MD 22 and MD 543 in the medium term.

There are pedestrian facility recommendations for the medium term along both MD 22 and MD 543. New sidewalk would be installed along the westbound side of MD 22 between Hillside Drive and MD543. On the eastbound side of MD 22, sidewalk would be installed connecting the existing sidewalk adjacent to the Royal Farms store to the Mt. Zion United Methodist Church. On MD 543, sidewalk would be installed along both sides of the roadway south of MD 22. The new sidewalk would connect the Burger King and Royal Farms stores with the large housing subdivision south of MD 22.

The intersection would be widened to provide an additional lane on MD 22 and MD 543 and dualized left turn lanes. This widening is illustrated in the enlargement in Appendix B.

Several lane reconfigurations and operational modifications are included in the medium-term roadway improvements. Along MD 22, west of the intersection, left turns would be relocated from the Wawa to Hillside Drive. This improvement is illustrated in Appendix B. Along MD 22 eastbound, east of the intersection, the lane drop would be extended by remarking the area from MD 22 through just west of Andreas Drive. A queue jump lane would be added on MD 22 eastbound at 543.

There are no additional bicycle facility improvements for this intersection during the medium term.

2. Along MD 22 from MD 543 to Andreas Lane

Medium-term improvements along MD 22 from MD 543 to Andreas Lane are limited to pedestrian network upgrades. The pedestrian network along MD 22 would be completed in this area by installing new sidewalk along the eastbound lanes of MD 22 from MD 543 to just east of Andreas Lane.

There are no bicycle facilities or roadway improvements included for this portion of the study corridor in the medium-term.

3. Along MD 22 from Andreas lane to Tudor Lane

There are no recommended medium term improvements for this section of the study corridor. There are no major pedestrian generators in the area. Bicycle facility improvements would be addressed in the short-term improvements and should satisfy the needs of users through 2025. Traffic demand forecasts indicate that the existing infrastructure will accommodate the volumes anticipated by 2025.

4. Along MD 22 from Tudor Lane to Prospect Mill Road

There are no recommended medium term improvements for this section of the study corridor. There are no major pedestrian generators in the area. Bicycle facility improvements would be addressed in the short-term improvements and should satisfy the needs of users through 2025. Traffic demand forecasts indicate that the existing infrastructure will accommodate the volumes anticipated by 2025.

5. Intersection of MD 22 / Prospect Mill Road and Thomas Run Road / Schucks Road

The medium term improvements for this intersection of the study corridor are limited to pedestrian facility upgrades north of the intersection. The pedestrian network along Thomas Run Road would be completed by the installation of new sidewalk to the Harford Community College Entrance.

There are no additional roadway improvements recommended for this intersection in the medium term as the MDSHA Intersection Improvements would have been completed during the short term improvements.

6. Along MD 22 from Prospect Mill Road to Harford Community College Entrance (Wawa)

The medium term improvements for this portion of the study corridor include access modifications and roadway widening. MD 22 would be widened to four travel lanes (two in each direction) from just east of Thomas Run Road, tying into the MDSHA Intersection Improvements, to east of the Campus Hills Shopping Center. The widening would include reconstructed pedestrian facilities along MD 22 and at all intersections to make the pedestrian network fully ADA compliant. A detailed enlargement of these improvements is included in Appendix B.

Bicycle facility improvements would be addressed in the short-term improvements and should satisfy the needs of users through 2025.

The additional roadway improvements in this area are related to the access management consolidation proposed at the Thomas Run Station Shopping Center which are illustrated in Appendix B. With these improvements, a review would be completed to determine if the vertical crest of the roadway can be lowered. This improvement would be implemented with the access management improvements.

7. Along MD 22 from Harford Community College Entrance (Wawa) to Rhineforte Drive / Asbury Road

The medium term improvements along this portion of the study corridor are limited to traffic signal and access management modifications near the Campus Hills Shopping Center as well as the continuation of the roadway widening improvements discussed in the previous section.

The existing traffic signal at Campus Hills Shopping Center would be relocated to Campus Hills Drive. Campus Hills Drive is a public street, (Meadow Spring Drive to the south) while the existing signal only provides access to the private Campus Hills Shopping Center. The Campus Hills Shopping Center does have access to Campus Hills Drive. The existing Campus Hills Shopping Center entrance would be converted to right-in / right-out access at the existing signal location. Three additional access points between the Harford Community College entrance and Campus Hills Drive could be converted to right–in / right-out operations. The affected restaurants, health club, and commercial establishments all have alternative access to Campus Hills Drive. The reduction in conflict points along MD 22 will improve the overall traffic operation within this area and the consolidated signalized intersection will provide for pedestrian and bicycle access.

The Maryland SHA would need to conduct a study based on the current guidelines to confirm that the existing signal is not needed at the current location. Based upon the latest traffic volumes from the shopping center, the eight hour volume warrant would not appear to be met if a new signal was being evaluated at this location. The one disadvantage of relocating the signal is this would move the signals closer together along MD 22. Coordination between Harford County director of Planning and Zoning and SHA would be required to develop an access management strategy for this location.

Pedestrian facility improvements would be included in the roadway widening project along MD 22 and at all intersections to make the network fully ADA compliant.

Bicycle facility improvements would be addressed in the short-term improvements and should satisfy the needs of users through 2025.

8. From Rhineforte Drive / Asbury Road to MD 136

There are no recommended medium term improvements for this section of the study corridor. There are no major pedestrian generators in the area. Bicycle facility improvements would be addressed in the short-term improvements and should satisfy the needs of users through 2025. Traffic demand forecasts indicate that the existing infrastructure will accommodate the volumes anticipated by 2025.

9. Intersection of MD 22 / MD 136 / MD 155

There are four different alternatives for the medium term roadway improvements at the intersection of MD 22 with MD 136 and MD 155. All of the alternatives would include pedestrian and bicycle improvements. Enlargements for these alternatives are located in Appendix B. Through the course of our study, MDSHA has also initiated a study of this intersection.

i. Alternative A: Reconfiguration of MD 155 north of MD 22

This alternative reconfigures existing MD 155 north of its intersection with MD 22. A two-lane connection would be constructed parallel to MD 22 connecting MD 155 and MD 136. Southbound traffic on MD 136 would be limited to a right turn movement only at MD 22. Users wishing to continue south on MD 136 or east on MD 22 would utilize the new connection to MD 155 and the upgraded intersection at MD 155 and MD 22. Those wishing to utilize MD 136 northbound from MD 22 would use MD 155 northbound and the new connector roadway to reach MD 136 northbound. The existing lanes of MD 136 northbound would end following the existing entrance to the bank.

A traffic signal would be installed at the intersection of the new connector roadway and existing MD 155. An additional roadway connection would be constructed extending MD 155 through the intersection with MD 22 to the south and curving to the west to connect with MD 136. The pavement of existing MD 136 south of MD 22 would be removed as this movement would be transferred to the new connector roadways. This alternative reflects a lower level of service in the AM peak hour when compared to the no-build because traffic is combined from both the MD 136 and MD 155 intersections to one location that improves the overall operations through this section by eliminating the delay at the MD 136 intersection.

Detailed lane configurations for this alternative are illustrated in Appendix B.

ii. Alternative B: Reconfiguration of MD 155 to the south of MD 22

This alternative reconfigures existing MD 155 to the south of MD 22. It involves intersection widening at MD 22 and MD 155 as well as the construction of a new roadway which extends MD 155 to the south through its intersection with MD 22 to connect with MD 136.

The existing intersection of MD 136 and MD 22 would be modified to remove the southbound thru movement, creating a t-intersection from the existing four-way intersection. The removed movement would be rerouted onto the newly constructed MD 155 south extension. A second left turn lane would be added on MD 136 south onto eastbound MD 22, and then motorists would utilize a new right turn lane to access MD 155 south. Motorists wishing to utilize MD 136 south from westbound MD 22 would also utilize the newly constructed MD 155 extension as the southbound left turn movement onto MD 136 would be removed.

Detailed lane configurations for this alternative are illustrated in Appendix B.

iii. Alternative D: Widen MD 22 to four lanes

This alternative would widen MD 22 to four lanes through the intersections. Additional turn lanes would be needed at each of the intersections.

Detailed lane configurations for this alternative are illustrated in Appendix B.

iv. Alternative E: Construct the Churchville Bypass

A Churchville Bypass would provide an alternative to vehicles that are continuing through Churchville. This would include vehicles from the Prospect Mill Road/Thomas Run Road area and I-95/APG areas. These vehicles would divert onto the bypass area. While this is not the majority of vehicles, it diverts enough vehicles from the existing roadway to improve the overall operations. Vehicles that are destined to Churchville/MD 136/MD 155 would remain on the existing roadway system.

In addition to the intersection improvement options, a capacity improvement would be implemented in the medium term to extend the through/right lane on westbound MD 22 approaching MD 155 to accommodate the forecasted 2025 volumes.

10. Along MD 22 from MD 155 to MD 156

There are no recommended medium term improvements for this section.

11. Intersection of MD 22 / MD 156

There are no recommended medium term improvements for this section.

ii. Central Section

1. Along MD 22 from MD 156 to Grafton Lane

Complete the bike lane by constructing bike lanes outside of the vehicular bypass lanes at the unsignalized intersections through this section

2. Intersection of MD 22 / Grafton Lane

Complete the bike lane by constructing bike lanes outside of the vehicular bypass lanes at this unsignalized intersection

3. Along MD 22 from Grafton Lane to Long Drive / Technology Drive

Complete the bike lane by constructing bike lanes outside of the vehicular bypass lanes at the unsignalized intersections through this section

iii. Aberdeen Section

1. Intersection of MD 22 / Long Drive / Technology Drive

There are no recommended medium term improvements for this section.

2. Along MD 22 from Long Drive / Technology Drive to Beards Hill Road

There are no recommended medium term improvements for this section.

3. Intersection of MD 22 / Beards Hill Road

Lengthen the eastbound right turn lane and provide a second access point to the shopping center. Detailed lane configurations for this alternative are illustrated in Appendix B.

4. Along MD 22 from Beards Hill Road to Middleton Road

There are no recommended medium term improvements for this section.

5. Intersection of MD 22 / Middleton Road

Provide an access to the shopping center from Middleton Road (extended). Detailed lane configurations for this alternative are illustrated in Appendix B.

6. Along MD 22 from Middleton Road to Paradise Road (MD 462)

There are no recommended medium term improvements for this section.

7. Intersection of MD 22 / Paradise Road (MD 462)

There are no recommended medium term improvements for this intersection.

8. Along MD 22 from Paradise Road (MD 462) to Mt. Royal Avenue

Widen MD 22 to six lanes. Included in this widening are complete pedestrian and bicycle network. Detailed lane configurations for this alternative are illustrated in Appendix B.

9. Intersection of MD 22 / Mt. Royal Avenue

Widen MD 22 to six lanes. Included in this widening are complete pedestrian and bicycle network. Detailed lane configurations for this alternative are illustrated in Appendix B.

10. Along MD 22 from Mt. Royal Avenue to US 40 Interchange

Widen MD 22 to six lanes. Included in this widening are complete bicycle network. Detailed lane configurations for this alternative are illustrated in Appendix B.

11. Interchange of MD 22 / US 40

There are no recommended medium term improvements for this interchange.

12. Along MD 22 from US 40 Interchange to North Post Road

There are no recommended medium term improvements for this section.

13. Intersection of MD 22 / North Post Road

There are no recommended medium term improvements for this section.

14. Along MD 22 from North Post Road to Aberdeen Proving Ground gates

There are no recommended medium term improvements for this section. If the HOV alternative is determined not to be implemented at all, then a six lane section would be required within this section.

Table V-2: Medium Term Improvements

Churchville Section								
Intersection	**Peak Hour**	**2010 LOS**	**2015 NO BUILD LOS**	**2015 BUILD LOS**	**2025 NO BUILD LOS**	**2025 BUILD LOS**	**Feasibility Level Cost Estimate (Not Including ROW)**	**Remarks**
Corridor Length: MD 543 to MD 156							$1.7 – 2.2 million	Pedestrian and bicycle facility upgrades through entire section. No anticipated impacts to utilities or drainage. Improvements could be completed by SHA and/or County Maintenance.
MD 543	AM	D	D	D	**E**	D	$7 – 12 million	Possibility for minor utility and drainage impacts. Impacts to commercial properties and entrances. Signal upgrades required.
	PM	D	**E**	**E**	**F**	D		
Prospect Mill Road	AM	D	**E**	D	D	-	**	Upgrades could be completed by SHA and/or County Maintenance.
	PM	C	D	C	C	-		
Thomas Run Road	AM	C	**E**	D	D	-	**	Upgrades could be completed by SHA and/or County Maintenance.
	PM	**E**	**F**	D	**E**	-		
Relocate Entrance Between Thomas Run Road to HCC Entrance/Exit	AM	-	-	-	-	-	$4 – 5 million	Entrance Consolidation: Impacts to commercial entrances. Possibility for utility and drainage impacts.
	PM	-	-	-	-	-		
Widening Between Thomas Run Road to HCC Entrance/Exit	AM	-	-	-	-	-	$25 – 30 million	Widening: Impacts to commercial entrances Possibility for utility and drainage impacts
	PM	-	-	-	-	-		
HCC Entrance/Exit	AM	B	C	C	D	A	*	Improvements in LOS is based on widening listed above.
	PM	B	C	C	**E**	B		
Campus Hills Shopping Center	AM	A	A	A	B	A	**	No anticipated impacts to utilities or drainage.
	PM	B	C	C	**E**	A		

***There are no additional medium-term costs anticipated at this intersection.**

**** Cost for improvements at this intersection included as part of the MD 543 to MD 156 pedestrian/bicycle upgrades.**

Churchville Section (continued)								
Intersection	**Peak Hour**	**2010 LOS**	**2015 NO BUILD LOS**	**2015 BUILD LOS**	**2025 NO BUILD LOS**	**2025 BUILD LOS**	**Feasibility Level Cost Estimate (Not Including ROW)**	**Remarks**
MD 136	AM	C	**E**	**E**	**F**			
	PM	D	**E**	**E**	**F**			
Alternative A: Reconfiguration of MD 155 North of MD 22	AM	-	-	-	-	N/A	$45-50 million	Possibility for drainage and utility impacts. Displacements and impacts to commercial and residential properties.
	PM	-	-	-	-	N/A		
Alternative B: Reconfiguration of MD 155 South of MD 22	AM	-	-	-	-	C	$25-30 million	Possibility for drainage and utility impacts. Displacements and impacts to commercial and residential properties.
	PM	-	-	-	-	B		
Alternative D: Widen MD 22 to Four Lanes	AM	-	-	-	-	D	$25-30 million	Possibility for drainage and utility impacts Possible displacements and impacts to 35 commercial, residential and institutional properties.
	PM	-	-	-	-	D		
Alternative E: Construct the Churchville Bypass	AM	-	-	-	-	-	$60-70 million	Possibility for drainage and utility impacts. Displacements and impacts to commercial and residential properties.
	PM	-	-	-	-	-		
MD 155	AM	B	B	B	C			
	PM	C	C	C	D			
Alternative A: Reconfiguration of MD 155 North of MD 22	AM	-	-	-	-	D	Included in MD 136 Alternative A	
	PM	-	-	-	-	D		
Alternative B: Reconfiguration of MD 155 South of MD 22	AM	-	-	-	-	C	Included in MD 136 Alternative B	
	PM	-	-	-	-	D		
Alternative D: Widen MD 22 to Four Lanes	AM	-	-	-	-	B	Included in MD 136 Alternative D	
	PM	-	-	-	-	C		
Alternative E: Construct the Churchville Bypass	AM	-	-	-	-	-	Included in MD 136 Alternative E	LOS for this alternative was calculated for the long term only.
	PM	-	-	-	-	-		
MD 156	AM	-	-	-	-	-	$3-5 million	Possibility for drainage and utility impacts.
	PM	-	-	-	-	-		

***There are no additional medium-term costs anticipated at this intersection.**

**** Cost for improvements at this intersection included as part of the MD 543 to MD 156 pedestrian/bicycle upgrades.**

Central Section								
Intersection	**Peak Hour**	**2010 LOS**	**2015 NO BUILD LOS**	**2015 BUILD LOS**	**2025 NO BUILD LOS**	**2025 BUILD LOS**	**Feasibility Level Cost Estimate (Not Including ROW)**	**Remarks**
Corridor Length: MD 156 to Long Drive/Technology Drive							$10 – 15 million	Pedestrian and bicycle facility upgrades through entire section. No anticipated impacts to utilities or drainage. Improvements could be completed by SHA and/or County Maintenance.

***There are no additional medium-term costs anticipated at this intersection.**

**** Cost for improvements at this intersection included as part of the MD 156 to Long Drive/Technology Drive pedestrian/bicycle upgrades.**

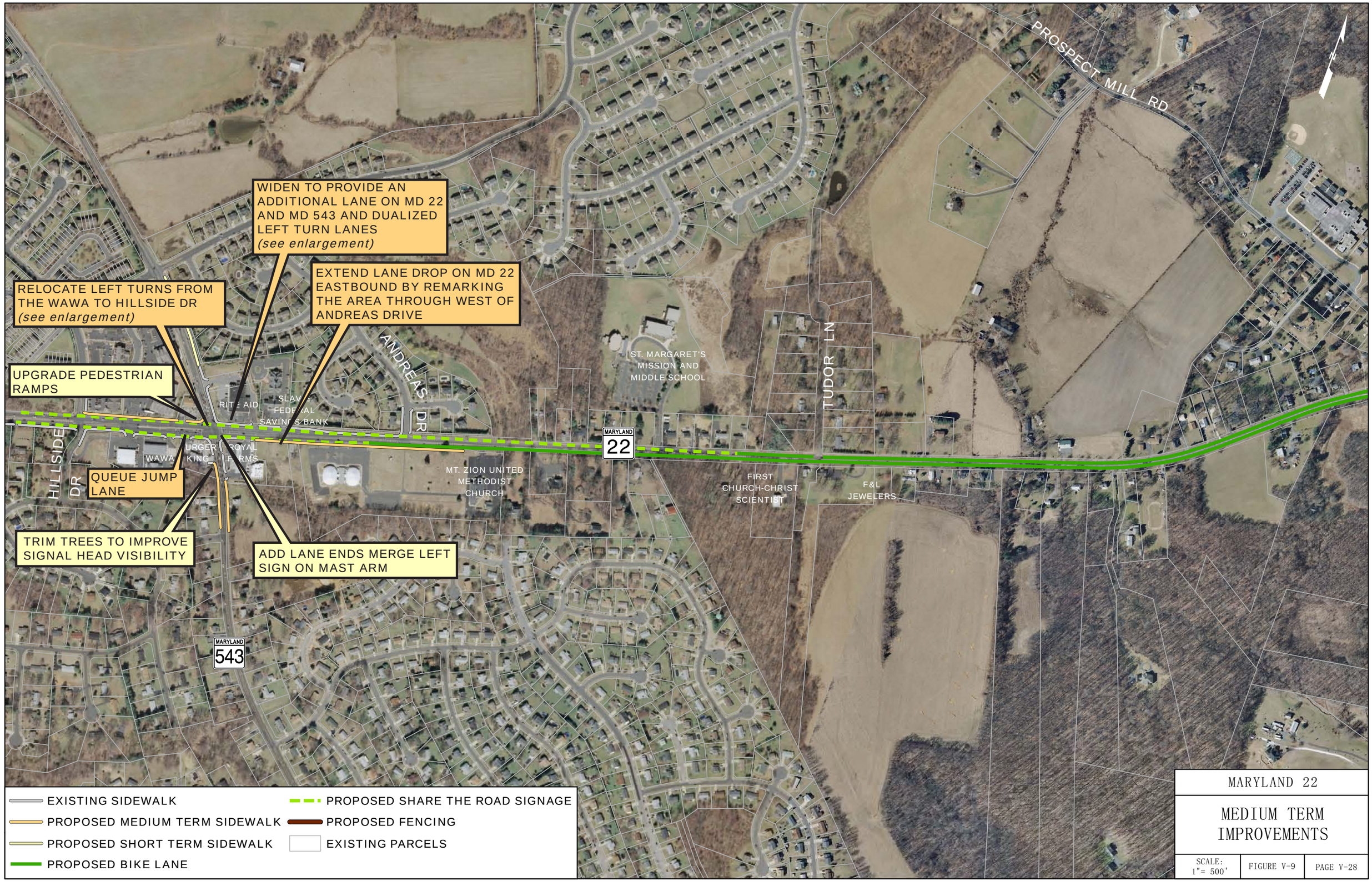
Aberdeen Section								
Intersection	**Peak Hour**	**2010 LOS**	**2015 NO BUILD LOS**	**2015 BUILD LOS**	**2025 NO BUILD LOS**	**2025 BUILD LOS**	**Feasibility Level Cost Estimate (Not Including ROW)**	**Remarks**
Corridor Length: Long Drive/Technology Drive to APG							$2 – 3 million	Pedestrian and bicycle facility upgrades through entire section. No anticipated impacts to utilities or drainage. Improvements could be completed by SHA and/or County Maintenance.
Long Drive/Technology Drive	AM	B	C	C	C	-	*	
	PM	B	C	C	D	-		
I-95 Southbound Ramp	AM	B	B	B	B	B	*	
	PM	A	A	A	A	A		
I-95 Northbound Ramp	AM	A	A	A	B	B	*	
	PM	A	A	A	B	B		
Corridor Length: Beards Hill Road to MD 462							$12 – 15 million	Widening to six lanes. Includes full pedestrian and bicycle facility upgrades. Possibility for utility and drainage impacts.
Beards Hill Road	AM	B	D	C	D	D	$1.5 – 2 million	Additional right-turn access to shopping center from MD 22. Possibility for utility and drainage impacts.
	PM	C	D	C	D	D		

***There are no additional medium-term costs anticipated at this intersection.**
**** Cost for improvements at this intersection included as part of the Long Drive/Technology Drive to APG pedestrian/bicycle upgrades.**

Aberdeen Section (continued)								
Intersection	**Peak Hour**	**2010 LOS**	**2015 NO BUILD LOS**	**2015 BUILD LOS**	**2025 NO BUILD LOS**	**2025 BUILD LOS**	**Feasibility Level Cost Estimate (Not Including ROW)**	**Remarks**
Middleton Road	AM	A	B	B	D	D	$0.5 – 1 million	Additional access to shopping center from Middleton Rd. Possibility for utility and drainage impacts.
	PM	B	C	C	**E**	C		
Corridor Length: MD 462 to US 40							$20-25 million	Widening: includes complete pedestrian and bicycle network. Possibility of drainage and utility impacts.
MD 462	AM	C	**E**	C	C	C	*	LOS reflects widening MD 22 from east of Beards Hill Road to the SHA Improvements
	PM	C	C	B	C	C		
Mt Royal Avenue	AM	B	D	D	**F**	A	**	LOS reflects widening MD 22 from east of Beards Hill Road to the SHA Improvements
	PM	C	D	D	D	B		
US 40 Ramp	AM	A	A	A	**E**	-	*	
	PM	C	C	C	C	-		
N. Post Road	AM	D	**F**	C	C	C	*	LOS reflects widening MD 22 from east of Beards Hill Road to the SHA Improvements
	PM	D	**F**	C	C	C		

***There are no additional medium-term costs anticipated at this intersection.**

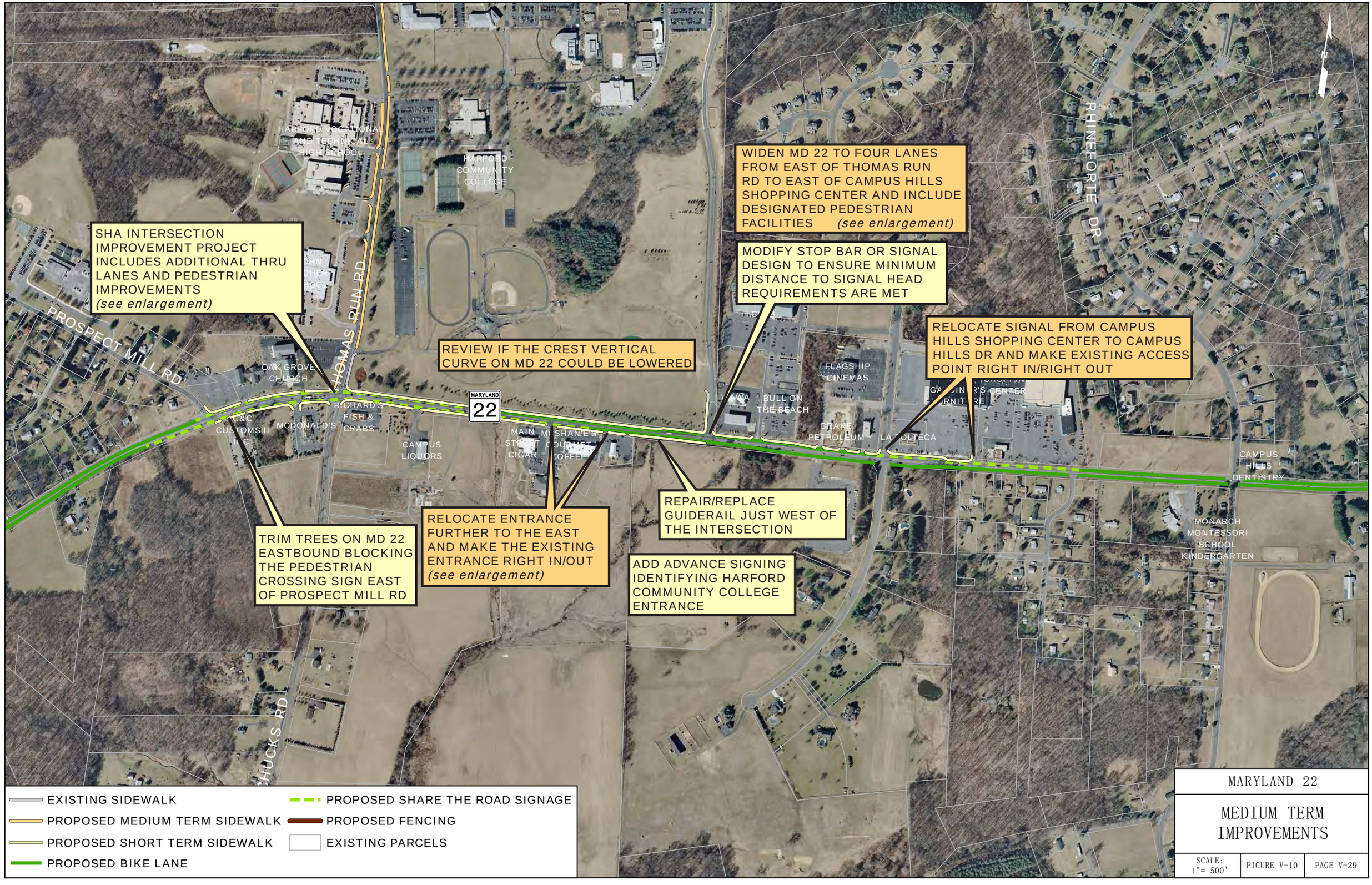
**** Cost for improvements at this intersection included as part of the Long Drive/Technology Drive to APG pedestrian/bicycle upgrades.**



MARYLAND 22

MEDIUM TERM IMPROVEMENTS

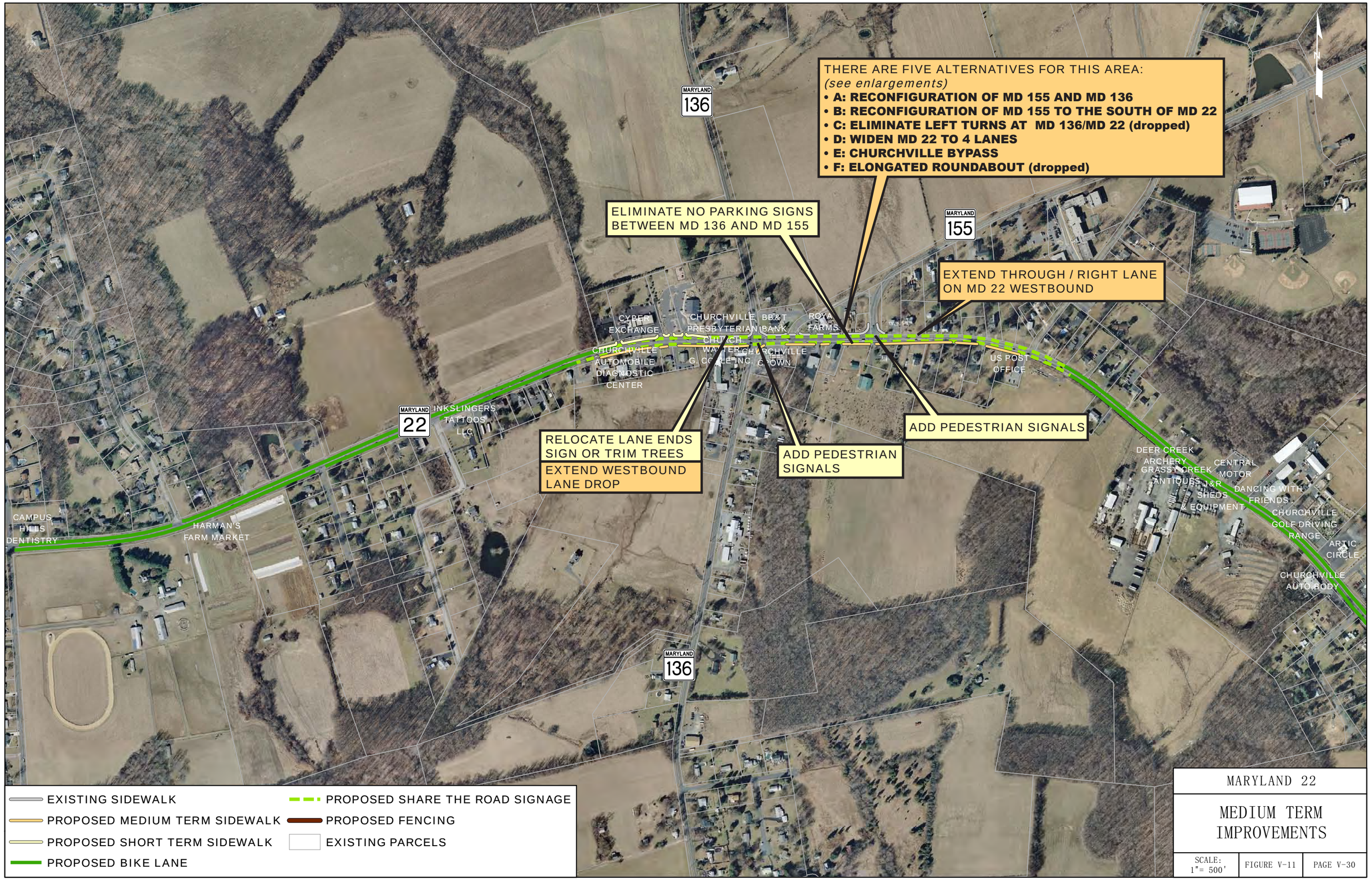
SCALE: 1"= 500'	FIGURE V-9	PAGE V-28



MARYLAND 22

MEDIUM TERM IMPROVEMENTS

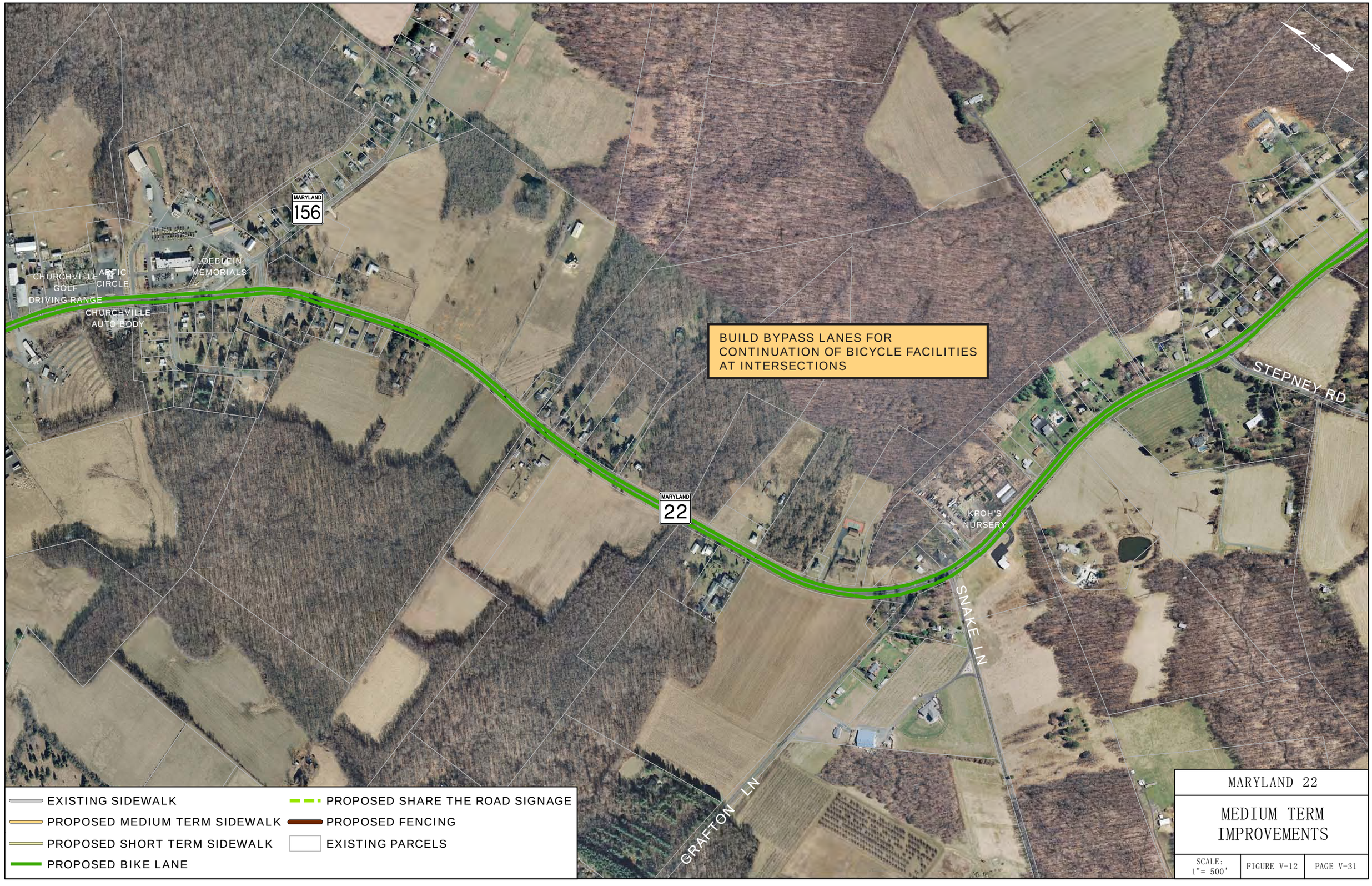
SCALE: 1"= 500'	FIGURE V-10	PAGE V-29



MARYLAND 22

MEDIUM TERM IMPROVEMENTS

SCALE: 1"= 500'	FIGURE V-11	PAGE V-30



MARYLAND 22

MEDIUM TERM IMPROVEMENTS

SCALE: 1"= 500'	FIGURE V-12	PAGE V-31

BUILD BYPASS LANES FOR CONTINUATION OF BICYCLE FACILITIES AT INTERSECTIONS

TRIM VEGETATION BLOCKING STOP SIGN

REPLACE EXISTING STOP AHEAD SIGN

BOWMAN'S BUTCHER SHOP

FLAMING DRAGON TATTOOS AND BODY PIERCING

ADAMS JEEP OF MARYLAND

FORMAL WHERE

MARYLAND 22

ALDINO STEPNEY RD

STEPNEY RD

CARSINS RUN RD

EXISTING SIDEWALK

PROPOSED MEDIUM TERM SIDEWALK

PROPOSED SHORT TERM SIDEWALK

PROPOSED BIKE LANE

PROPOSED SHARE THE ROAD SIGNAGE

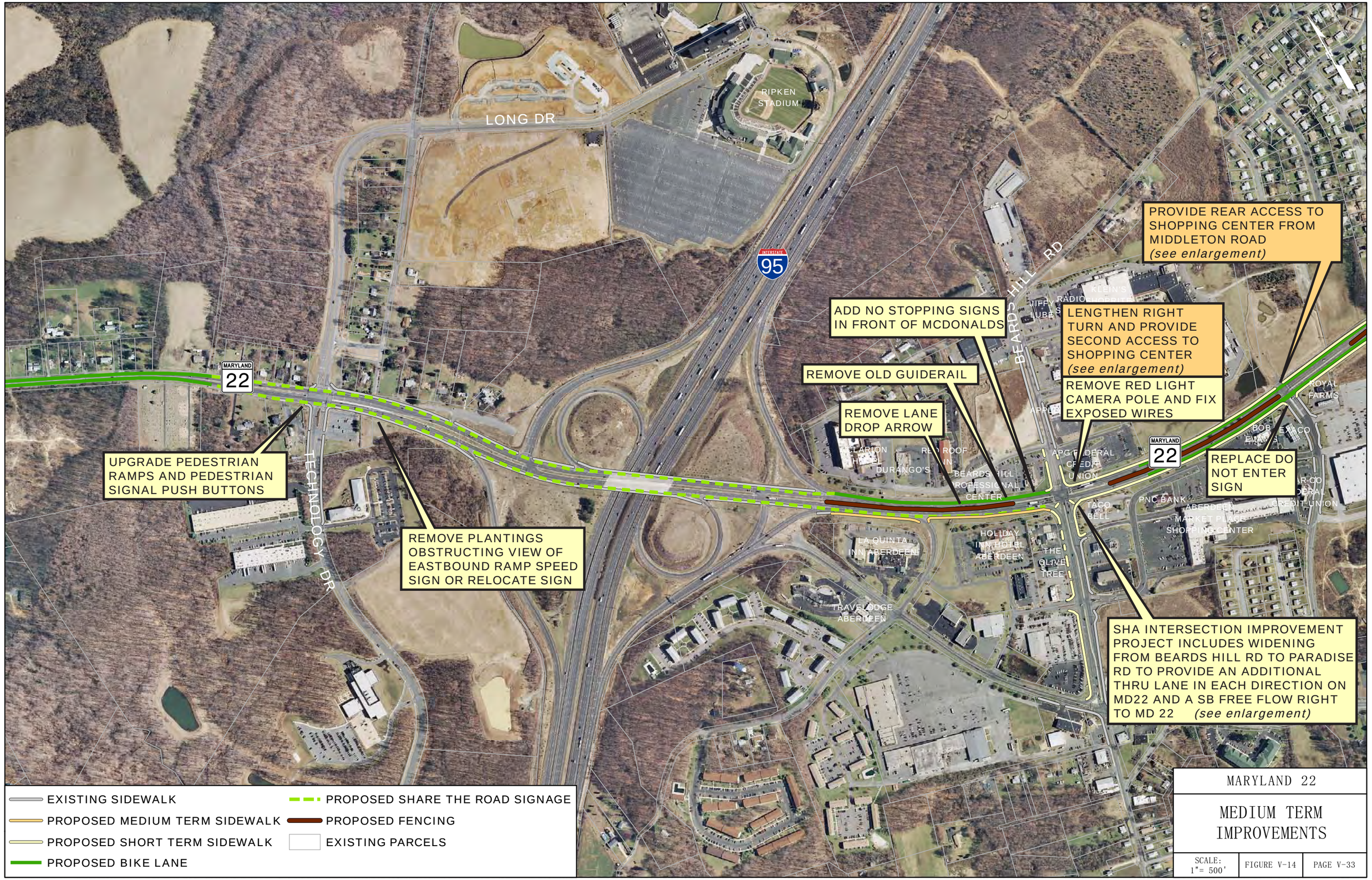
PROPOSED FENCING

EXISTING PARCELS

MARYLAND 22

MEDIUM TERM IMPROVEMENTS

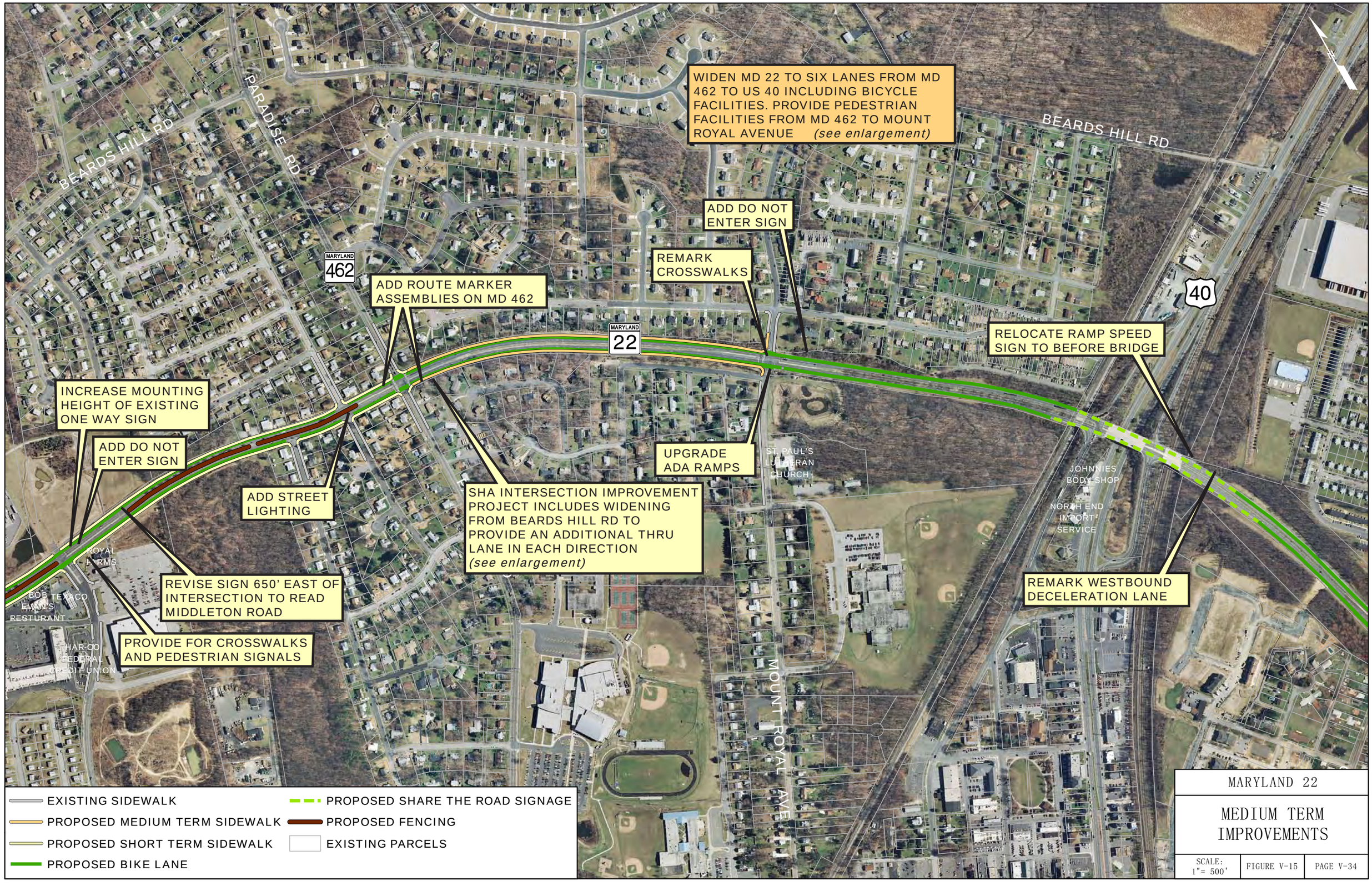
SCALE: 1"= 500'	FIGURE V-13	PAGE V-32



MARYLAND 22

MEDIUM TERM IMPROVEMENTS

SCALE: 1"= 500'	FIGURE V-14	PAGE V-33



MARYLAND 22

MEDIUM TERM IMPROVEMENTS

SCALE: 1"= 500'	FIGURE V-15	PAGE V-34

POST RD

PROPOSED EASTBOUND AM PEAK HOV LANE ON NORTH SIDE OF MEDIAN (CONTRA-FLOW) FROM POST ROAD TO APG GATE
(see enlargement)

RESEARCH BLVD

ON MD 22 EASTBOUND PROVIDE STANDARD SHA SPEED REDUCTION SIGNING

MARYLAND 22

HALL CROSS ROADS ELEMENTARY SCHOOL

POST RD

SHA INTERSECTION IMPROVEMENT PROJECT INCLUDES WIDENING TO PROVIDE AN ADD'L THRU LANE IN EACH DIRECTION, UPDATING SIDEWALKS, PEDESTRIAN SIGNING, PUSH BUTTONS, AND ADA RAMPS
(see enlargement)

REVIEW MOUNTING HEIGHT OF SIGNS APPROACHING ABERDEEN PROVING GROUNDS

ADD ONE WAY AND DO NOT ENTER SIGNS AT APPROPRIATE LOCATIONS

- EXISTING SIDEWALK
- PROPOSED MEDIUM TERM SIDEWALK
- PROPOSED SHORT TERM SIDEWALK
- PROPOSED BIKE LANE
- PROPOSED SHARE THE ROAD SIGNAGE
- PROPOSED FENCING
- EXISTING PARCELS

MARYLAND 22

MEDIUM TERM IMPROVEMENTS

SCALE: 1"= 500'	FIGURE V-16	PAGE V-35

C. Long Term (2035)

Long term improvements predominately include opportunities to widen the corridor to the "ultimate" conditions including four-lane complete street sections from MD 543 to I-95 and completion of the six-lane complete street widening from I-95 to Aberdeen Proving Ground. The roadway widening would include the incorporation of complete bike lanes and sidewalk network. These are improvements anticipated to be completed by approximately the year 2035.

i. Churchville Section

1. Intersection of MD 22 / MD 543

There are no recommended long term improvements for this intersection.

2. Along MD 22 from MD 543 to Andreas Lane

Widen MD 22 to four lanes including full pedestrian and bicycle facilities. A detailed enlargement for this alternative is located in Appendix C.

3. Along MD 22 from Andreas lane to Tudor Lane

Widen MD 22 to four lanes including full pedestrian and bicycle facilities. A detailed enlargement for this alternative is located in Appendix C.

4. Along MD 22 from Tudor Lane to Prospect Mill Road

Widen MD 22 to four lanes including full pedestrian and bicycle facilities. A detailed enlargement for this alternative is located in Appendix C.

5. Intersection of MD 22 / Prospect Mill Road and Thomas Run Road / Schucks Road

There are three different alternatives for the long term roadway improvements at the intersection of MD 22 with Prospect Mill Road and Thomas Run Road / Schucks Road. All of the alternatives would include pedestrian and bicycle improvements. Enlargements for these alternatives are located in Appendix C.

i. Prospect Mill Road / Thomas Run Road Connection

This alternative would provide a new two-lane roadway connection from Prospect Mill Road to Thomas Run Road. The new roadway would connect into Prospect Mill Road at the existing roundabout with Wagner Farm Court and proceed eastwardly and intersect Thomas Run Road opposite the Harford Community College entrance. The new roadway would be designed with an adjacent mixed-use trail system.

ii. Prospect Mill Road / Schucks Road Connection

This alternative would deny left turns from MD 22 to Thomas Run Road / Schucks Road. To accommodate these vehicular movements, a new roadway would be constructed. The new roadway would extend south of Prospect Mill Road, curve and intersect with a new traffic signal on Schucks Road, then continue eastwardly before curving north to intersection with MD 22 approximately 600' east of the current intersection with MD 22. The new roadway would be constructed with a complete pedestrian and bicycle network. The pedestrian and bicycle network along MD 22 previously provided would remain.

iii. Intersection widening at MD 22 with Thomas Run Road/Schucks Road

This alternative would widen the intersection to improve roadway capacity. MD 22 would have four through lanes and right and left turn lanes. The northbound/southbound movement along Thomas Run Road / Schucks Road would be widened to four through lanes with additional right and left turn lanes.

6. Along MD 22 from Prospect Mill Road to Harford Community College Entrance (Wawa)

There are no recommended long term improvements for this section.

7. Along MD 22 from Harford Community College Entrance (Wawa) to Rhineforte Drive / Asbury Road

Widen MD 22 to four lanes including full pedestrian and bicycle facilities from east of Campus Hills Shopping Center to Rhineforte Drive/Asbury Road.

8. From Rhineforte Drive / Asbury Road to MD 136

Widen MD 22 to four lanes including full pedestrian and bicycle facilities.

9. Intersection of MD 22 / MD 136 / MD 155

There are no recommended long term improvements for this intersection.

10. Along MD 22 from MD 155 to MD 156

There are no recommended long term improvements for this section.

11. Intersection of MD 22 / MD 156

Reconstruct the intersection with MD 156. The high speed connection from southbound MD 156 to westbound MD 22 would be removed. The newly constructed connection of MD 156 and MD

22 would be in the middle of the current two connections to MD 22. A left turn lane would be provided from southbound MD 156 to eastbound MD 22. The new intersection would require a stop sign and is not anticipated to require a new traffic signal. Detailed lane configurations for this alternative are illustrated in Appendix C.

The bike lane would be completed by constructing bike lanes outside of the vehicular bypass lanes at this unsignalized intersection.

ii. Central Section

1. Along MD 22 from MD 156 to Grafton Lane

There are no recommended long term improvements for this section. This section will need to be monitored in the future to determine the potential need for widening based on the level of development that occurs. If signals are placed along this section, widening will be needed at those locations to provide additional through capacity along MD 22.

2. Intersection of MD 22 / Grafton Lane

There are no recommended long term improvements for this intersection.

3. Along MD 22 from Grafton Lane to Long Drive / Technology Drive

There are no recommended long term improvements for this section.

iii. Aberdeen Section

1. Intersection of MD 22 / Long Drive / Technology Drive

There are no recommended long term improvements for this intersection.

2. Along MD 22 from Long Drive / Technology Drive to Beards Hill Road

There are no recommended long term improvements for this section.

3. Intersection of MD 22 / Beards Hill Road

There are no recommended long term improvements for this intersection.

4. Along MD 22 from Beards Hill Road to Middleton Road

There are no recommended long term improvements for this section.

5. Intersection of MD 22 / Middleton Road

There are no recommended long term improvements for this intersection.

6. Along MD 22 from Middleton Road to Paradise Road (MD 462)

There are no recommended long term improvements for this section.

7. Intersection of MD 22 / Paradise Road (MD 462)

There are no recommended long term improvements for this intersection.

8. Along MD 22 from Paradise Road (MD 462) to Mt. Royal Avenue

There are no recommended long term improvements for this section.

9. Intersection of MD 22 / Mt. Royal Avenue

There are no recommended long term improvements for this intersection.

10. Along MD 22 from Mt. Royal Avenue to US 40 Interchange

There are no recommended long term improvements for this section.

11. Interchange of MD 22 / US 40

Reconfigure interchange along US 40 to eliminate left turn along MD 22, thereby allowing room for designated bike lanes. A detailed enlargement for this alternative is located in Appendix C.

12. Along MD 22 from US 40 Interchange to North Post Road

There are no recommended long term improvements for this section.

13. Intersection of MD 22 / North Post Road

There are no recommended long term improvements for this intersection.

14. Along MD 22 from North Post Road to Aberdeen Proving Ground gates

Widen MD 22 to six lanes including full pedestrian and bicycle facilities. A detailed enlargement for this alternative is located in Appendix C.

Table V-3: Long Term Improvements

Churchville Section										
Intersection	**Peak Hour**	**2010 LOS**	**2015 NO BUILD LOS**	**2015 BUILD LOS**	**2025 NO BUILD LOS**	**2025 BUILD LOS**	**2035 NO BUILD LOS**	**2035 BUILD LOS**	**Feasibility Level Cost Estimate (Not Incl. ROW)**	**Remarks**
MD 543	AM	D	D	D	**E**	D	-	-	*	
	PM	D	**E**	**E**	**F**	D	-	-		
Corridor Length: MD 543 to Andreas Lane									$4-6 million	Impacts to commercial entrances. Possibility for drainage and utility impacts.
Corridor Length: Andreas Lane to Tudor Lane									$10-15 million	Possible impacts to commercial and residential properties. Possibility for drainage and utility impacts.
Corridor Length: Tudor Lane to Prospect Mill Road									$27-33 million	Possible impacts to residential properties Possibility for drainage and utility impacts.
Prospect Mill Road	AM	D	**E**	D	D		D			
	PM	C	D	C	C		D			
Alternative A: Prospect Mill Rd/Thomas Run Rd Connection	AM	-	-	-		B		B	$35-40 million	Drainage, utility, and right-of-way impacts. Requires structure for stream crossing.
	PM	-	-	-		A		A		
Alternative B: Prospect Mill Rd/Shucks Rd Connection	AM	-	-	-		C		C	$25-30 million	Possibility for drainage and utility impacts. Possible impacts to commercial and residential properties
	PM	-	-	-		B		B		
Alternative C: Intersection Widening	AM	-	-	-		B		B	$28-33 million	Possibility for drainage and utility impacts. Impacts to commercial entrances.
	PM	-	-	-		B		B		
Thomas Run Road	AM	C	**E**	D	D		**E**			
	PM	**E**	**F**	D	**E**		**F**			
Alternative A: Prospect Mill Rd/Thomas Run Rd Connection	AM	-	-	-		D		D	Included in Prospect Mill Alternative A	
	PM	-	-	-		D		**E**		
Alternative B: Prospect Mill Rd/Shucks Rd Connection	AM	-	-	-		C		C	Included in Prospect Mill Alternative B	
	PM	-	-	-		B		B		
Alternative C: Intersection Widening	AM	-	-	-		D		D	Included in Prospect Mill Alternative C	
	PM	-	-	-		D		D		

***There are no additional long-term costs anticipated at this intersection.**

Churchville Section (continued)										
Intersection	**Peak Hour**	**2010 LOS**	**2015 NO BUILD LOS**	**2015 BUILD LOS**	**2025 NO BUILD LOS**	**2025 BUILD LOS**	**2035 NO BUILD LOS**	**2035 BUILD LOS**	**Feasibility Level Cost Estimate (Not Incl. ROW)**	**Remarks**
Corridor Length: HCC Entrance to Rhineforte Drive / Asbury Road									$25-30 million	Possibility for drainage and utility impacts.
HCC Entrance/Exit	AM	B	C	C	D	A	**E**	B	*	LOS reflects widening along MD 22
	PM	B	C	C	**E**	A	**F**	B		
Campus Hills Shopping Center	AM	A	A	A	B	A	C	A	*	
	PM	B	C	C	E	A	F	A		
MD 136	AM	C	**E**	**E**	**F**		**F**		*	
	PM	D	**E**	**E**	**F**		**F**			
Alternative A: Reconfiguration of MD 155 North of MD 22	AM	-	-	-	-	N/A		N/A	*	
	PM					N/A		N/A		
Alternative B: Reconfiguration of MD 155 South of MD 22	AM	-	-	-	-	C		C	*	
	PM	-	-	-	-	B		B		
Alternative D: Widen MD 22 to Four Lanes	AM	-	-	-	-	-	-	-	*	
	PM	-	-	-	-	-	-	-		
Alternative E: Construct the Churchville Bypass	AM	-	-	-	-	D		D	*	
	PM	-	-	-	-	C		C		
MD 155	AM	B	B	B	C		D		*	
	PM	C	C	C	D		D			
Alternative A: Reconfiguration of MD 155 North of MD 22	AM	-	-	-	-	D		D	*	
	PM	-	-	-	-	D		D		
Alternative B: Reconfiguration of MD 155 South of MD 22	AM	-	-	-	-	C		C	*	
	PM	-	-	-	-	D		D		
Alternative D: Widen MD 22 to Four Lanes	AM	-	-	-	-	-	-	-	*	
	PM	-	-	-	-	-	-	-		
Alternative E: Construct the Churchville Bypass	AM	-	-	-	-	B		B	*	
	PM	-	-	-	-	C		C		

***There are no additional long-term costs anticipated at this intersection.**

Central Section										
Intersection	**Peak Hour**	**2010 LOS**	**2015 NO BUILD LOS**	**2015 BUILD LOS**	**2025 NO BUILD LOS**	**2025 BUILD LOS**	**2035 NO BUILD LOS**	**2035 BUILD LOS**	**Feasibility Level Cost Estimate (Not Incl. ROW)**	**Remarks**
Corridor Length: MD 156 to Long Drive/Technology Drive									*	

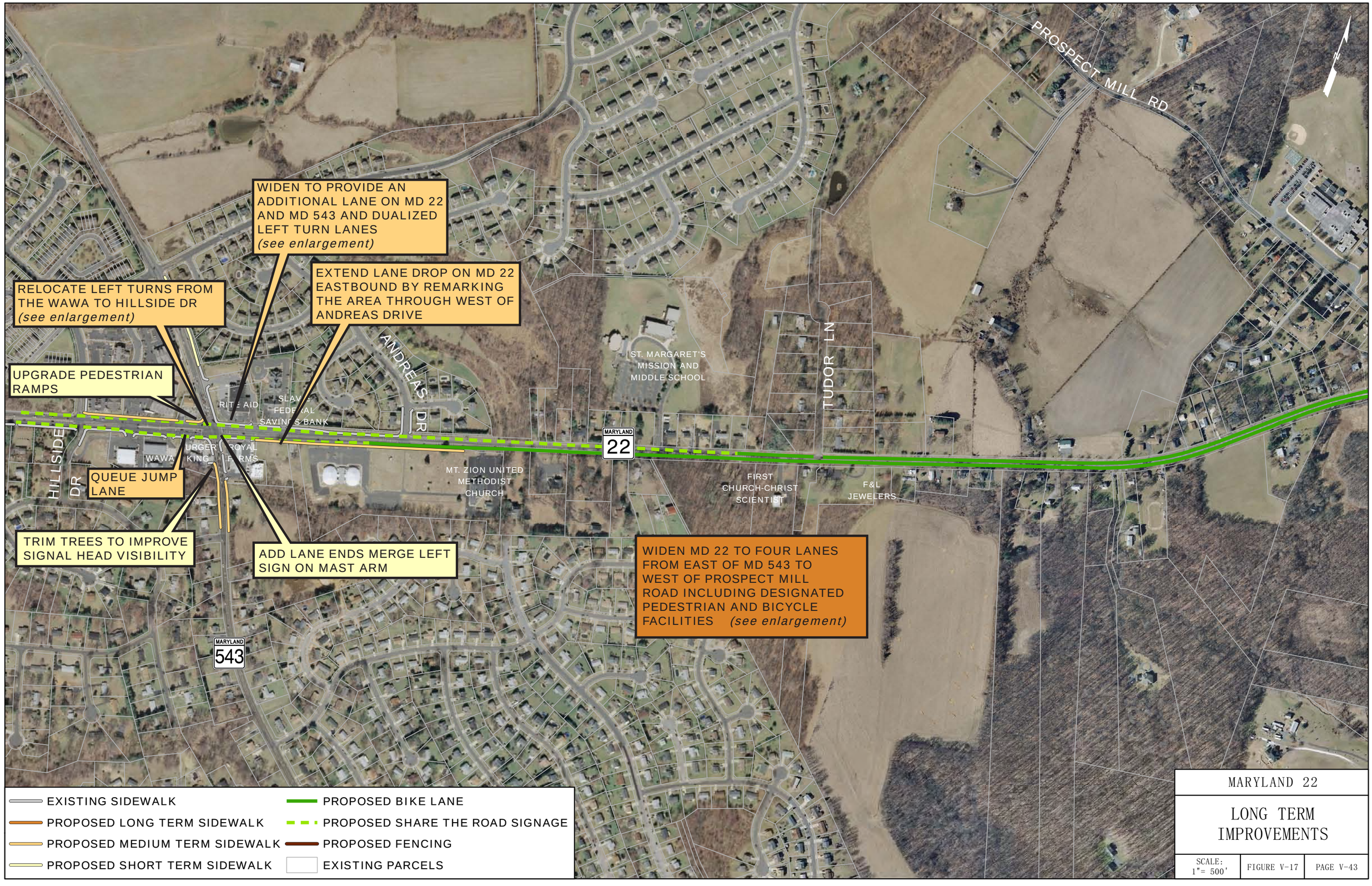
***There are no additional long-term costs anticipated at this intersection.**

Aberdeen Section										
Intersection	**Peak Hour**	**2010 LOS**	**2015 NO BUILD LOS**	**2015 BUILD LOS**	**2025 NO BUILD LOS**	**2025 BUILD LOS**	**2035 NO BUILD LOS**	**2035 BUILD LOS**	**Feasibility Level Cost Estimate (Not Incl. ROW)**	**Remarks**
Long Drive / Technology Drive	AM	B	C	C	C	C	D	C	*	Restriped southbound lanes to include double lefts and a through right. This is necessary only if the development occurs.
	PM	B	C	C	D	C	**E**	D		
I-95 Southbound Ramp	AM	B	B	B	B	B	B	B	*	
	PM	A	A	A	A	A	B	B		
I-95 Northbound Ramp	AM	A	A	A	B	B	B	B	*	
	PM	A	A	A	B	B	B	B		
Beards Hill Road	AM	B	D	C	D	D	D	D	*	
	PM	C	D	C	D	D	D	D		

***There are no additional long-term costs anticipated at this intersection.**

Aberdeen Section (continued)										
Intersection	**Peak Hour**	**2010 LOS**	**2015 NO BUILD LOS**	**2015 BUILD LOS**	**2025 NO BUILD LOS**	**2025 BUILD LOS**	**2035 NO BUILD LOS**	**2035 BUILD LOS**	**Feasibility Level Cost Estimate (Not Incl. ROW)**	**Remarks**
Middleton Road	AM	A	B	B	D		**F**	D	*	
	PM	B	C	C	**E**		**E**	D		
MD 462	AM	C	**E**	C	C	C	C	C	*	
	PM	C	C	B	C	C	C	C		
Mt Royal Avenue	AM	B	D	D	**F**	A	**F**	B	*	
	PM	C	D	D	D	B	**F**	B		
US 40 Ramp	AM	A	A	A	D		**E**			
	PM	C	C	C	C		C			
US 40 Interchange	AM	-	-	-	-	-		B	$5 – 10 million	Possibility for drainage and utility impacts. Impacts to US 40 traffic patterns. Allows for designated bike lane.
	PM	-	-	-	-	-		B		
N. Post Road	AM	D	**F**	C	C		C	C	*	
	PM	D	**F**	C	C		D	D		
Corridor Length: N. Post Road to APG gates									$15 – 20 million	Possibility for drainage and utility impacts. Complete pedestrian and bicycle network.

***There are no additional long-term costs anticipated at this intersection.**



MARYLAND 22

LONG TERM IMPROVEMENTS

SCALE: 1"= 500'	FIGURE V-17	PAGE V-43

THERE ARE THREE ALTERNATIVES FOR THIS AREA:
(see enlargements)
- **A: PROSPECT MILL RD/THOMAS RUN RD CONNECTION**
- **B: PROSPECT MILL RD/SCHUCKS RD CONNECTION**
- **C: INTERSECTION WIDENING AT MD 22/THOMAS RUN RD**

SHA INTERSECTION IMPROVEMENT PROJECT INCLUDES ADDITIONAL THRU LANES AND PEDESTRIAN IMPROVEMENTS *(see enlargement)*

WIDEN MD 22 TO FOUR LANES FROM EAST OF THOMAS RUN RD TO EAST OF CAMPUS HILLS SHOPPING CENTER AND INCLUDE DESIGNATED PEDESTRIAN FACILITIES *(see enlargement)*

MODIFY STOP BAR OR SIGNAL DESIGN TO ENSURE MINIMUM DISTANCE TO SIGNAL HEAD REQUIREMENTS ARE MET

RELOCATE SIGNAL FROM CAMPUS HILLS SHOPPING CENTER TO CAMPUS HILLS DR AND MAKE EXISTING ACCESS POINT RIGHT IN/RIGHT OUT

REVIEW IF THE CREST VERTICAL CURVE ON MD 22 COULD BE LOWERED

TRIM TREES ON MD 22 EASTBOUND BLOCKING THE PEDESTRIAN CROSSING SIGN EAST OF PROSPECT MILL RD

RELOCATE ENTRANCE FURTHER TO THE EAST AND MAKE THE EXISTING ENTRANCE RIGHT IN/OUT *(see enlargement)*

REPAIR/REPLACE GUIDERAIL JUST WEST OF THE INTERSECTION

ADD ADVANCE SIGNING IDENTIFYING HARFORD COMMUNITY COLLEGE ENTRANCE

HARFORD VOCATIONAL
HARFORD COMMUNITY COLLEGE
PROSPECT MILL RD
THOMAS RUN RD
OAK GROVE CHURCH
MARYLAND 22
RICHARD'S FISH & CRABS
MCDONALD'S
C&C CUSTOMS II LLC
CAMPUS LIQUORS
MAIN STREET CIGAR
MCSHANE'S GOURMET COFFEE
FLAGSHIP CINEMAS
BULL ON THE BEACH
DRAKE PETROLEUM
LA OLTECA
RHINEFORTE DR
CAMPUS HILLS DENTISTRY
MONARCH MONTESSORI SCHOOL KINDERGARTEN
SCHUCKS RD

EXISTING SIDEWALK
PROPOSED LONG TERM SIDEWALK
PROPOSED MEDIUM TERM SIDEWALK
PROPOSED SHORT TERM SIDEWALK
PROPOSED BIKE LANE
PROPOSED SHARE THE ROAD SIGNAGE
PROPOSED FENCING
EXISTING PARCELS

MARYLAND 22

LONG TERM IMPROVEMENTS

SCALE: 1"= 500' | FIGURE V-18 | PAGE V-44

THERE ARE FIVE ALTERNATIVES FOR THIS AREA:
(see enlargements)
- **A: RECONFIGURATION OF MD 155 AND MD 136**
- **B: RECONFIGURATION OF MD 155 TO THE SOUTH OF MD 22**
- **C: ELIMINATE LEFT TURNS AT MD 136/MD 22 (dropped)**
- **D: WIDEN MD 22 TO 4 LANES**
- **E: CHURCHVILLE BYPASS**
- **F: ELONGATED ROUNDABOUT (dropped)**

ELIMINATE NO PARKING SIGNS BETWEEN MD 136 AND MD 155

EXTEND THROUGH / RIGHT LANE ON MD 22 WESTBOUND

WIDEN MD 22 TO FOUR LANES FROM EAST OF CAMPUS HILLS SHOPPING CENTER TO WEST OF MD 136 EXCLUDING THE CHURCHVILLE BYPASS ALTERNATIVE. INCLUDE DESIGNATED PEDESTRIAN AND BICYCLE FACILITIES

RELOCATE LANE ENDS SIGN OR TRIM TREES

EXTEND WESTBOUND LANE DROP

ADD PEDESTRIAN SIGNALS

ADD PEDESTRIAN SIGNALS

MARYLAND 136

MARYLAND 155

MARYLAND 22

MARYLAND 136

CYPER EXCHANGE

CHURCHVILLE AUTOMOBILE DIAGNOSTIC CENTER

CHURCHVILLE PRESBYTERIAN CHURCH

WATTER G. CO LE INC.

BB&T BANK

ROYAL FARMS

CHURCHVILLE CROWN

US POST OFFICE

INKSLINGERS TATTOOS LLC

CAMPUS HILLS DENTISTRY

HARMAN'S FARM MARKET

DEER CREEK ARCHERY

GRASSY CREEK ANTIQUES

J&R SHEDS & EQUIPMENT

CENTRAL MOTOR

DANCING WITH FRIENDS

CHURCHVILLE GOLF DRIVING RANGE

ARTIC CIRCLE

CHURCHVILLE AUTO BODY

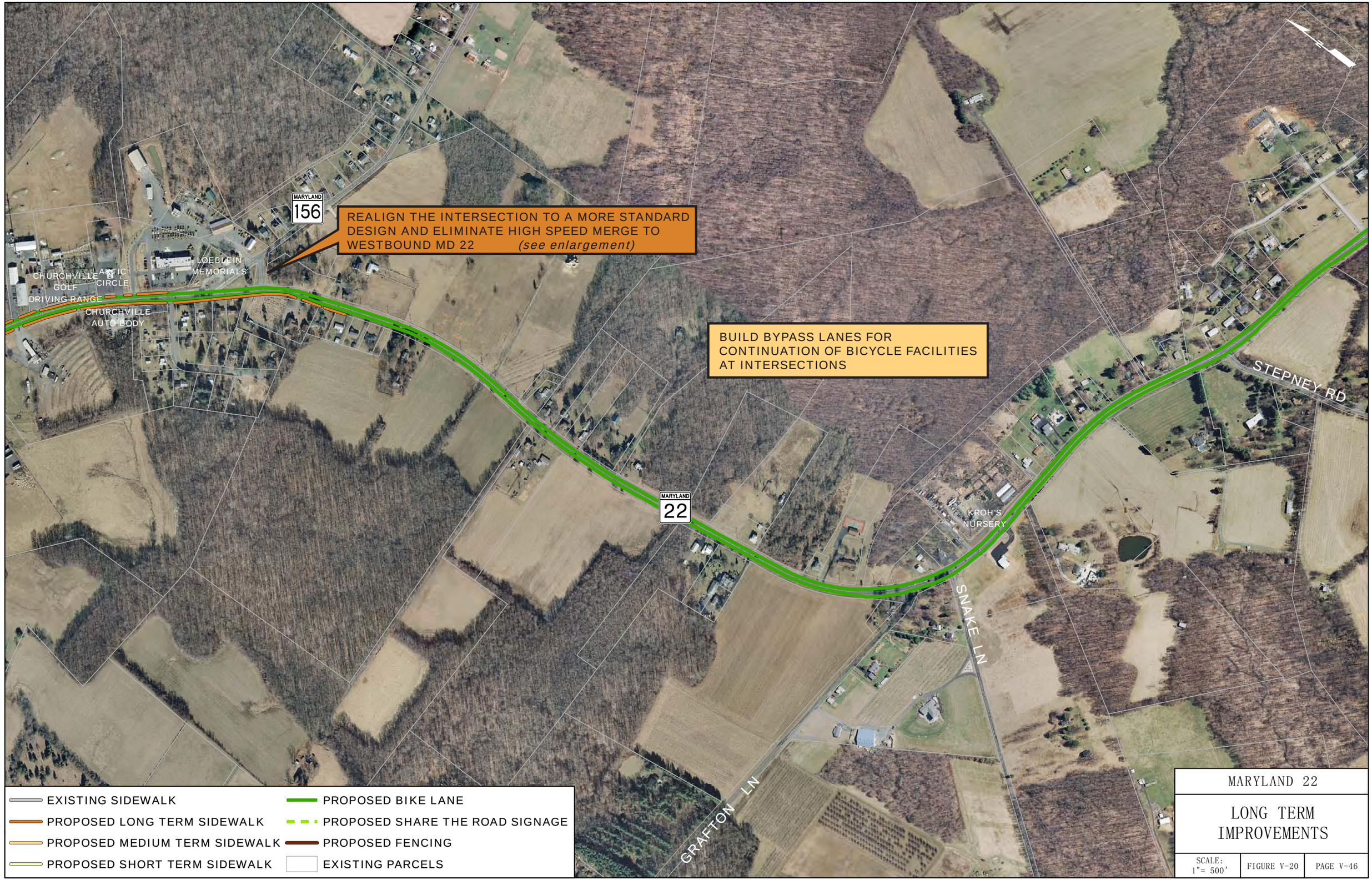
N

EXISTING SIDEWALK
PROPOSED LONG TERM SIDEWALK
PROPOSED MEDIUM TERM SIDEWALK
PROPOSED SHORT TERM SIDEWALK
PROPOSED BIKE LANE
PROPOSED SHARE THE ROAD SIGNAGE
PROPOSED FENCING
EXISTING PARCELS

MARYLAND 22

LONG TERM IMPROVEMENTS

SCALE: 1"= 500'	FIGURE V-19	PAGE V-45



MARYLAND 22

LONG TERM IMPROVEMENTS

SCALE: 1"= 500'	FIGURE V-20	PAGE V-46

BUILD BYPASS LANES FOR CONTINUATION OF BICYCLE FACILITIES AT INTERSECTIONS

TRIM VEGETATION BLOCKING STOP SIGN

REPLACE EXISTING STOP AHEAD SIGN

BOWMAN'S BUTCHER SHOP

FLAMING DRAGON TATTOOS AND BODY PIERCING

ADAMS JEEP OF MARYLAND

FORMAL WHERE

MARYLAND 22

ALDINO STEPNEY RD

STEPNEY RD

CARSINS RUN RD

ALDINO STEPNEY RD

EXISTING SIDEWALK

PROPOSED LONG TERM SIDEWALK

PROPOSED MEDIUM TERM SIDEWALK

PROPOSED SHORT TERM SIDEWALK

PROPOSED BIKE LANE

PROPOSED SHARE THE ROAD SIGNAGE

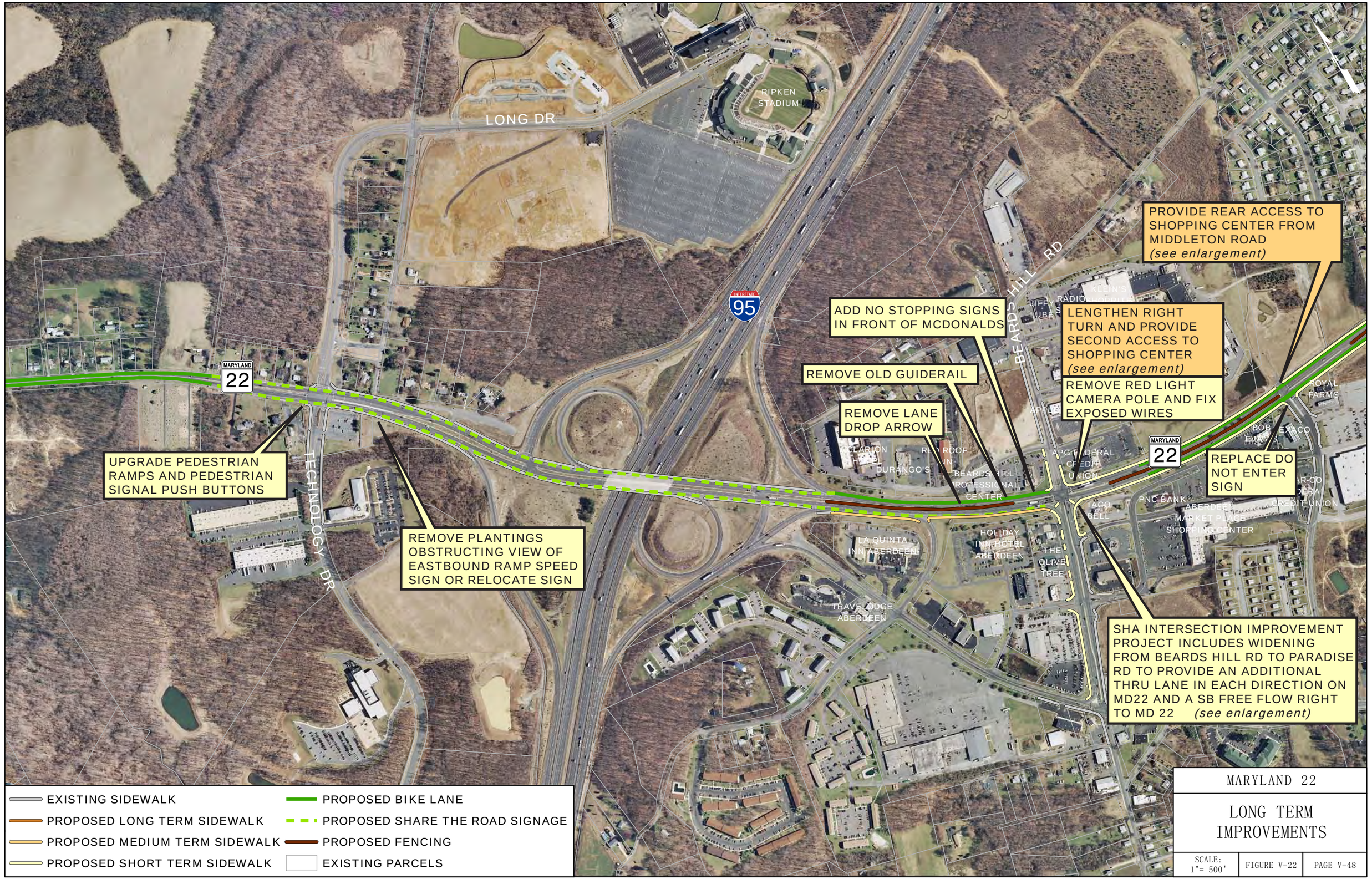
PROPOSED FENCING

EXISTING PARCELS

MARYLAND 22

LONG TERM IMPROVEMENTS

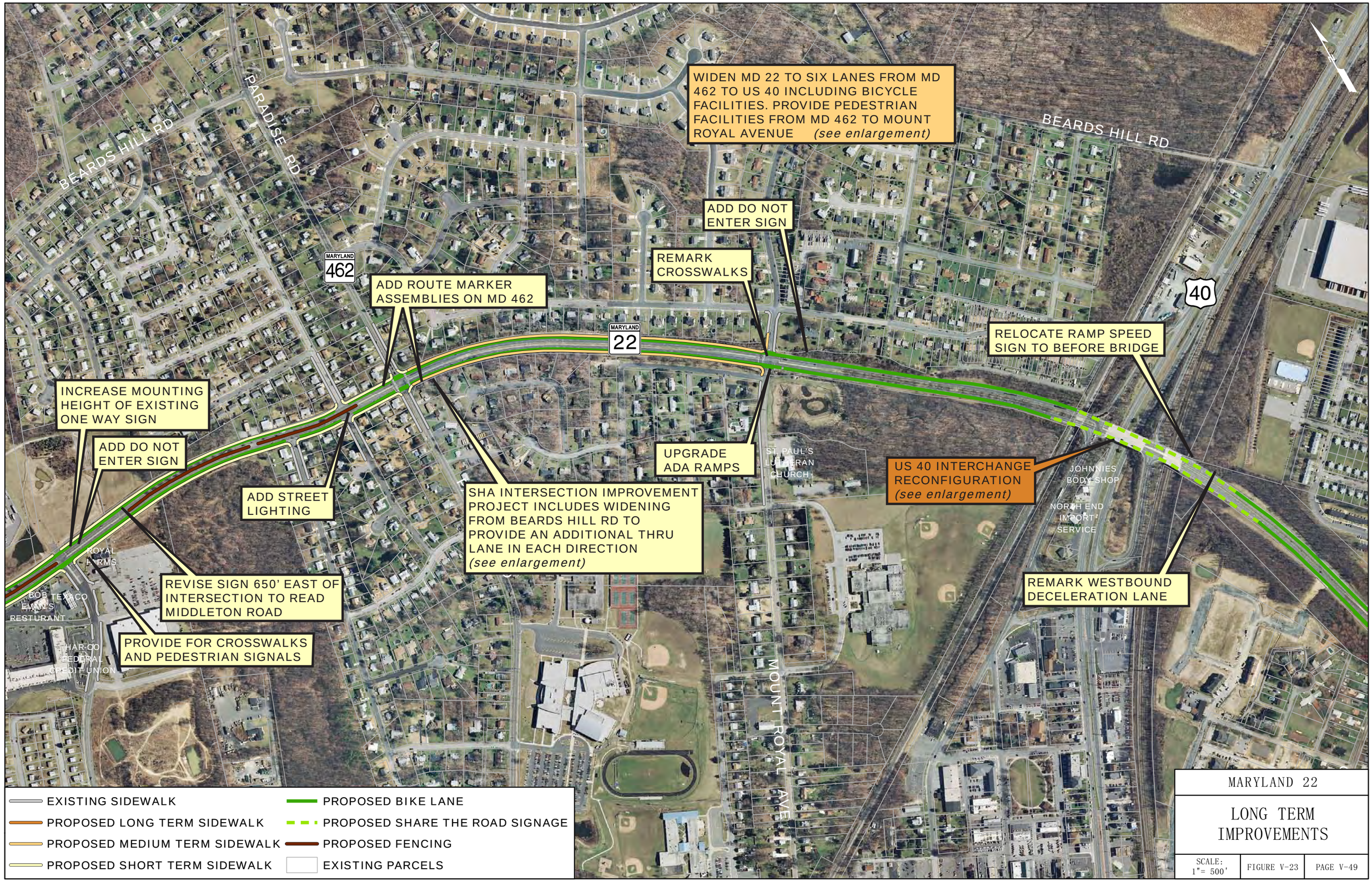
SCALE:	FIGURE	PAGE
1"= 500'	V-21	V-47



MARYLAND 22

LONG TERM IMPROVEMENTS

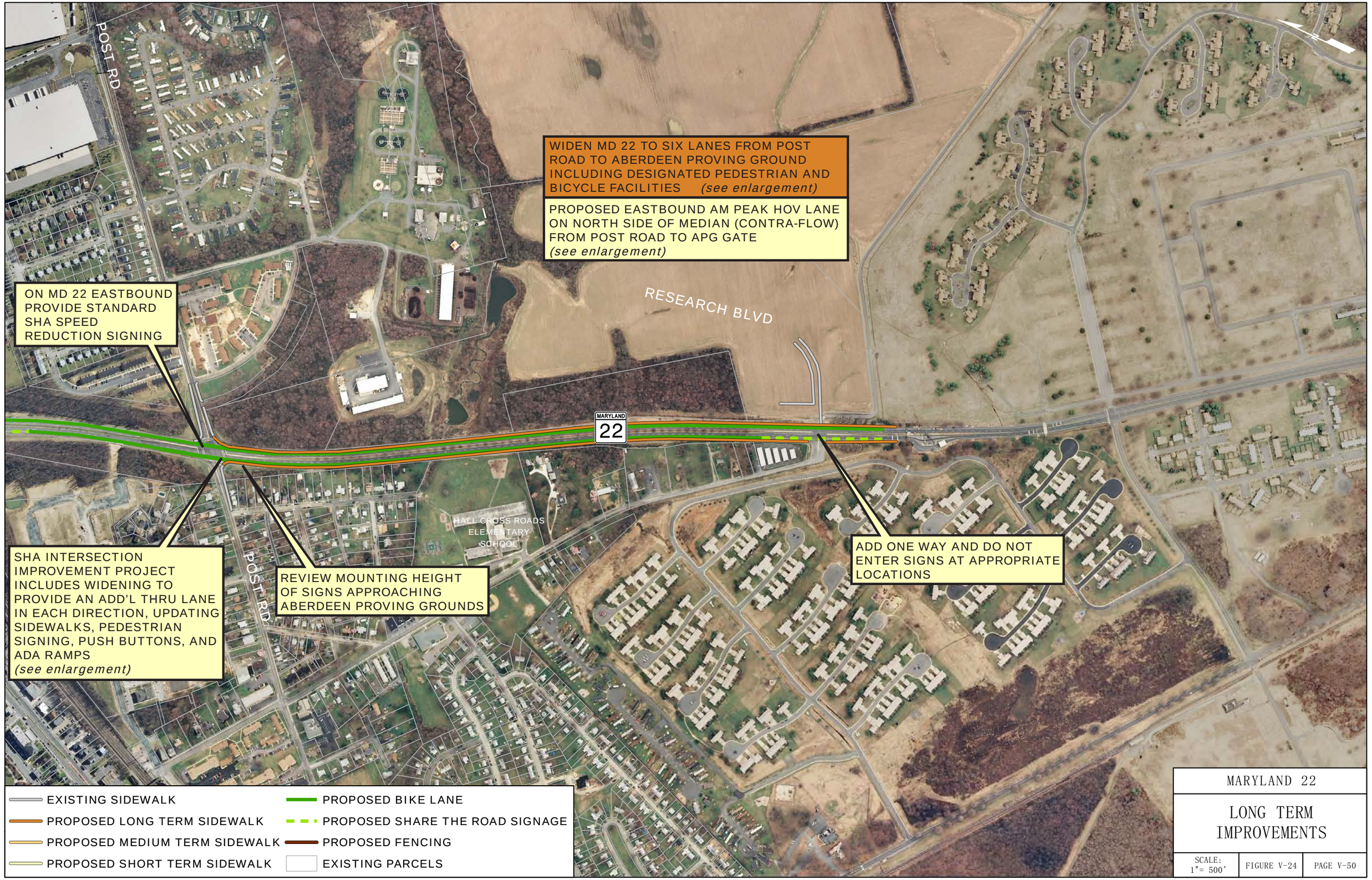
SCALE: 1"= 500'	FIGURE V-22	PAGE V-48



MARYLAND 22

LONG TERM IMPROVEMENTS

SCALE: 1"= 500'	FIGURE V-23	PAGE V-49



MARYLAND 22

LONG TERM IMPROVEMENTS

SCALE: 1"= 500'	FIGURE V-24	PAGE V-50

VI. Implementation Strategies

One of the most challenging and difficult aspects of a Corridor Study is the implementation strategy. While many agencies, residents, and key stakeholders recognize that changes must be made; they often get bogged down in the characteristics of their individual needs and impacts. Based upon past successes, several recommendations are provided to assist Harford County with implementation.

A. General

- Harford County should identify to other agencies that the County has completed and funded this study. Several potential funding sources require County participation of funding and the costs for this study may meet some of the requirements.

- Coordination and involvement with SHA is required. SHA is the owner and responsible for maintenance of the MD 22 right-of-way. It is imperative that Harford County and SHA work together to implement the recommended improvements.

- It is imperative that the County identify the MD 22 Corridor as one of their priority corridors to the State to ensure that the various projects throughout the different terms identified that require capital investment (CIP) remain competitive with the other projects throughout the state for funding.

- It is recommended that the County request the SHA establish a MD 22 Task Force that would meet quarterly and stay focused on the corridor study implementation strategies. Membership on the task force could include the SHA District Four Engineer, ADE-Project Development, ADE-Traffic, Harford County Traffic Area Engineer, Deputy Administrator for Planning & Engineering, SHA Director of Planning, SHA Engineering Access Permits Division Chair, SHA Travel Forecasting Chief, along with representatives from MTA, APG, HCC, Local Businesses, and State Elected Official(s). This above panel of experts can address discussion on the HOV concept, access consolidation and strategies for reserving and purchasing right-of-way for the ultimate improvements as well as ensuring that the corridor remain a high priority for the County.

- Coordination and involvement of several key stakeholders such as Harford Community College, Aberdeen Proving Ground, and Harford Public Schools is necessary. Harford County Director of Planning and Zoning should initiate these meetings.

- Presentations and input from the residents and businesses along the corridor should be held. This can be accomplished through community association meetings or a general public meeting. Harford County's website should be updated to include this report. The importance of the entire corridor working together must be stressed.

- Local and State elected officials should be briefed on the needs and implications of not implementing the improvements on their constituents, the local economy, and the quality of life.

- Harford County and SHA should review any new development along the corridor to ensure that they are consistent and include the recommendations of this report. Sidewalks and bicycle facilities should be required for all projects.

- Harford County should brand MD 22 as the "Harford County Education and Technology Corridor". This will allow the County to tie in economic development and roadway improvements and possibly fund through bond issuance. A marketing campaign should be developed.

- Add the ability to the Harford County Adequate Public Facilities ordinance to require minimum vehicle occupancies and a five year monitoring plan for the newly branded corridor.

- Market to existing and potential developments the tax benefits associated with the TDM strategies outlined within the report.

- Harford County should coordinate and illicit the involvement of the Harford County Chamber of Commerce to promote the corridor.

B. Short Term (2015)

- Harford County should request that SHA adopts this plan as completion of a Roadway Safety Audit. Many of the signing, marking, and maintenance improvements can be implemented mainly with County and SHA maintenance crews. Adoption of this plan will allow SHA to proceed without additional studies needing to be completed. To do this, the County should request a meeting with the District Four Engineer and key staff to begin the process for adoption.

- The County should stress the importance of completing the BRAC related SHA Intersections Improvement projects quickly to elected officials and SHA. Partial participation of funding by Harford County would signify the importance that the County places on these improvements and perhaps allow them to be completed sooner.

- In areas of new sidewalk, the County and SHA should confirm the right-of-way and utility avoidance with more detailed plans and site walks prior to implementation.

- Harford County and SHA should work with the adjacent property owners on access consolidation as shown with several of the improvements. Property owners must be educated that full access is not guaranteed to all individual properties. The County and SHA must educate the property owners that if access consolidation is not achieved, then medians may be installed resulting in only right in / right out access for all of the properties.

- Work with APG to develop a transportation demand management plan encouraging off-peak trips, carpooling, and tele-commuting including possibly creating a tele-commuting center.

- Determine the results of the APG Gate Study and receive APG's input on the HOV concept.

- Discuss with SHA the schedule for routine maintenance projects along the corridor, such as roadway resurfacing, and coordinate the improvements from this study at the same time.

- Non-traditional funding sources should be investigated such as the Transportation Enhancement for the pedestrian and bicycle improvements and BRAC programs.

- Work with SHA for possible funding of pedestrian access along MD 22 including through the Sidewalk Retrofit Program ($11.1 million statewide FY 2012-2017), the ADA Compliance Program ($61.0 million statewide FY 2012-2017), and possibly the Areawide Geometric Improvement Contract.

- Coordinate bicycle project improvements through the SHA Bicycle Retrofit Program ($6.3 million statewide FY 2012-2017).

C. Medium Term (2025) and Long Term (2035)

- Harford County should request that SHA begin detailed Project Planning Studies for the proposed improvements. Major capital improvements typically take from 10 – 15 years from initiation to implementation.

- Reserve the right-of-way for the ultimate widening and intersection improvements related to potential new developments.

- Review with SHA when the bridges on MD 22 over US 40 will require major redecking and rehabilitation and tie-in the schedule with the proposed alternatives.

- Harford County should investigate and prepare a strategy to purchase available right-of-way along the corridor if it becomes available.

D. Recommendations Matrix

In order to organize and present such a massive amount of information in a concise and manageable manner, a matrix has been developed. Recommended projects and improvements have been organized based on estimated cost and perceived overall impact on the corridor in order to determine a proposed timeframe for implementation of each.

Table VI-1: Recommendations Matrix

Matrix of Recommendations / Responsibilities Short-Term Improvements: Roadway Safety Audit											
Project	**Cost ***	**Timeframe**									**Process to Implement / Remarks**
		2012	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**	
Trim Trees / Vegetation *Trim trees Along MD 543 (southern leg)* *Trim trees on MD 22 eastbound that are blocking the pedestrian crossing sign east of Prospect Mill Road* *Trim trees on MD 22 near the intersection with MD 136 that is blocking the "Lane Ends" sign* *Trim vegetation on Aldino Stepney Road (southern leg) blocking stop sign* *Remove plantings obstructing view of eastbound ramp speed sign on eastbound MD 22 near I-95 SB on-ramp*	Maintenance	■									Coordinate with the SHA District Engineer's office to have these maintenance-type items completed.
Signing / Marking *Add "Lane ends / merge right" sign on mast arm at MD 22 / MD 543 intersection (for eastbound MD 22)* *Add advanced signage for Harford Community College Entrance* *Relocate stop bar at intersection with Harford Community College Entrance* *Remove "No Parking" signs between MD 136 and MD 155* *Replace existing "Stop Sign Ahead" sign on Aldino Stepney Road* *Remove lane drop arrow on MD 22 west of intersection with Beards Hill Road* *Add "No Parking" signs along westbound MD 22 west of Beards Hill Road, in front of McDonald's* *Replace "Do Not Enter" sign at intersection of MD 22 / Middleton Road* *Increase mounting height of existing "One Way" sign near Middleton Road* *Add "Do not Enter" sign near intersection of MD 22 / Middleton Road* *Revise sign 650' east of Middleton Road to read "Middleton Road"* *Add route marker assemblies on MD 462* *Add "Do Not Enter" signs near intersection of MD 22 / Mt. Royal Avenue* *Remark crosswalks at Mt. Royal Avenue* *Relocate ramp speed sign east of US 40 to before US 40 bridge* *Review mounting height of signs approaching APG* *Provide standard speed reduction signs on MD 22 from Post Road to APG* *Add "One Way" and "Do Not Enter" signs at appropriate locations near Research Boulevard* *Remark westbound deceleration lane for MD 22 westbound to US 40*	Maintenance	■									Coordinate with the SHA District Engineer's office to have these maintenance-type items completed.
Miscellaneous Traffic Features *Repair / Replace guardrail just west of intersection of MD 22 / Harford Community College Entrance* *Remove old guardrail in front of McDonald's near intersection with Beards Hill Road* *Remove red light camera pole and fix exposed wires at the northeast corner of the intersection of MD 22 / Beards Hill Road*	Maintenance	■									Coordinate with the SHA District Engineer's office to have these maintenance-type items completed.

* Feasibility cost is in millions and does **NOT** include right-of-way estimates.

Matrix of Recommendations / Responsibilities
Short-Term Improvements

Project	Cost *	Timeframe 2012	2013	2014	2015	2016	2017	2018	2019	2020	Process to Implement / Remarks
MD 22 Task Force *Establish task force and conduct meetings quarterly*		★	★	★	★	★	★	★	★	★	Establish the Task Force as cited in the MD 22 Corridor Study Report.
Transit Improvements *Real-time data coding*											Continue coding the routes as is currently in process.
Intersection of MD 22 / Prospect Mill Rd and Thomas Run Rd / Schucks Rd *SHA capacity improvements* *Incorporate pedestrian facilities to Campus Hills Shopping Center* *Incorporate bicycle facilities*	SHA Funded *(Approx. $3.0 Construction Cost)*		Design	ROW	Construction						Coordinate with SHA to incorporate the additional pedestrian and bicycle facilities into the design for the intersection.
Intersection of MD 22 / North Post Road *SHA capacity improvements* *Incorporate pedestrian facilities* *Incorporate bicycle facilities*	SHA Funded *(Approx. $9.2 Construction Cost)*		Design	ROW	Construction						Coordinate with SHA to incorporate the additional pedestrian and bicycle facilities into the design for the intersection.
HOV Improvements along MD 22 from North Post Road to APG	$0.3 - $0.5										Coordinate with APG to allocate a gate for the HOV and discuss responsibility for daily implementation. Coordinate with SHA's District Engineer for the median cut-through to access the HOV lane.
TDM *Flexible Work Schedule / Tele-Commute*			★			★			★		Work with the local Chamber and businesses. Re-visit this as new businesses come to the Corridor (potentially include a requirement on their site plan). Re-visit this every few years to promote continued efforts.
TDM *Harford Community College scheduling*			★								Work with Harford Community College as well as coordinate with Towson University for scheduling at their new facility.
TDM *High school student parking*			★								Work with local high schools.
Transit Improvements *Reverse signage color (orange background)*											Coordinate with Harford Transit LINK.
TDM *Media promotion*			RFP Process		Implementation						Develop and advertise the Media Campaign RFP. A media campaign is ongoing requiring constant updates.
Transit Improvements *QR Codes* *Social Media*											Include Social Media component in the Media Campaign RFP.

* Feasibility cost is in millions and does **NOT** include right-of-way estimates.
** Activities in these years overlap with the term either before or after the term shown in the table

Matrix of Recommendations / Responsibilities
Short-Term Improvements

Project	Cost *	Timeframe									Process to Implement / Remarks
		2012	2013	2014	2015	2016	2017	2018	2019	2020	
Intersection of MD 22 / Beards Hill Road *SHA capacity improvements* *Incorporate pedestrian facilities along Beards Hill Road* *Incorporate bicycle facilities*	SHA Funded *(Approx. $9.6 Construction Cost)*			Design	ROW	Construction					Coordinate with SHA to incorporate the additional pedestrian and bicycle facilities into the design for the intersection.
Transit Improvements *Bus shelters at higher usage areas* *Real-time data displays*											To be completed through Harford County. Identify and apply for appropriate FTA grants for project completion by a rural (non-urban) transit agency.
Along MD 22 from MD 543 to Long Drive / Technology Drive *ADA upgrades at intersection of MD 22 / MD 543* *Sidewalk along MD 543 (northern leg)* *"Share the Road" signage* *Restripe shoulders to accommodate bicycle lanes* *Extend pedestrian facilities from Thomas Run Road to HCC* *Extend pedestrian facilities along westbound MD 22 just west of MD 136* *Add pedestrian signal at intersections of MD 22 / MD 136 and MD 22 / MD 155*	$1.3 - $1.8			Design	Const.						Coordinate with SHA for project priority.
Intersection of MD 22 / MD 462 (Paradise Road) *SHA capacity improvements* *Incorporate pedestrian facilities* *Incorporate bicycle facilities* *Incorporate street lighting*	SHA Funded *(Approx. $10.6 Construction Cost)*				Design	ROW	Construction				Coordinate with SHA to incorporate the additional pedestrian and bicycle facilities into the design for the intersection.
Along MD 22 from Long Drive / Technology Drive to Middleton Road *ADA upgrades at intersection of MD 22 / Long Drive / Technology Drive* *"Share the Road" signage* *Restripe shoulders to accommodate bicycle lanes* *Install crosswalks and pedestrian signal at MD 22 / Middleton Road*	$0.3 - $0.4							Design	Const.		Coordinate with SHA for project priority.

* Feasibility cost is in millions and does **NOT** include right-of-way estimates.

** Activities in these years overlap with the term either before or after the term shown in the table

Matrix of Recommendations / Responsibilities
Medium-Term Improvements

Project	Cost *	Timeframe											Process to Implement / Remarks
		2020**	2021	2022	2023	2024	2025	2026	2027	2028	2029**	2030**	
MD 22 Task Force *Continue meeting quarterly to focus on implementation strategies*		★	★	★	★	★	★	★	★	★	★	★	Continue quarterly meetings of the MD 22 Corridor Task Force.
Intersection of MD 22 / MD 543 *Widen intersection to provide additional lanes along MD 22 and MD 543* *Extend lane drop on MD 22 eastbound with remarking* *Include westbound queue jump signal prioritization* *Incorporate missing pedestrian facilities near intersection*	$7.0 - $12.0	Design	ROW	Construction									Coordinate with SHA, investigate various funding resources as identified in Section VI of the MD 22 Corridor Study Report.
Intersection of MD 22 / Prospect Mill Road and Thomas Run Road / Schucks Road *Complete pedestrian network north of the intersection to the Harford Community College Entrance*	$0.6 - $0.8	Design	Const.										To be completed as a County Project.
Along MD 22 from Beards Hill Road to Paradise Road *Widen MD 22 to six lanes from west of Middleton Road to east of Paradise Road* *Incorporate and complete pedestrian facilities* *Incorporate bicycle facilities* *Evaluate a second entrance to Beards Hill Plaza*	$14.0 - $18.0			Design	ROW	Construction							Coordinate with SHA, investigate various funding resources as identified in Section VI of the MD 22 Corridor Study Report.
Along MD 22 from Thomas Run Road to Rhineforte Drive *Widen MD 22 to four lanes from Thomas Run Road to Rhineforte Drive* *Incorporate and complete pedestrian facilities* *Incorporate bicycle facilities* *Relocate traffic signal from Campus Hill Shopping Center to Campus Hills Drive and make existing access point right-in / right-out* *Relocate entrance to Thomas Run Station Shopping Center to the east and make existing entrance right-in / right-out*	$29.0 - $40.0				Design	ROW	Construction						Coordinate with SHA, investigate various funding resources as identified in Section VI of the MD 22 Corridor Study Report.
Intersection of MD 22 / MD 136 / MD 155 *Intersection capacity improvements for both intersections* *Extend westbound lane drop on MD 22* *Incorporate and complete pedestrian facilities* *Incorporate bicycle facilities*	$25.0 - $70.0					Planning		Design	ROW	Construction			Coordinate with SHA to establish this as a priority to begin planning efforts during the appropriate year.
Along MD 22 from Paradise Road to US 40 Interchange *Widen MD 22 to six lanes from Paradise Road to US 40 Interchange* *Incorporate / complete pedestrian facilities through Mt. Royal Avenue* *Incorporate bicycle facilities*	$20.0 - $25.0						Design	ROW	Construction				Coordinate with SHA, investigate various funding resources as identified in Section VI of the MD 22 Corridor Study Report.
Along MD 22 from MD 156 to Long Drive / Technology Drive *Complete the network by constructing bicycle lanes around the bypass lanes*	$10.0 - $15.0										Design	Const.	Coordinate with SHA, investigate various funding resources as identified in Section VI of the MD 22 Corridor Study Report.

* Feasibility cost is in millions and does **NOT** include right-of-way estimates.

** Activities in these years overlap with the term either before or after the term shown in the table

Matrix of Recommendations / Responsibilities
Long-Term Improvements

Project	Cost *	Timeframe												Process to Implement / Remarks
		2029**	2030**	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	
MD 22 Task Force *Continue meeting quarterly to focus on implementation strategies*		★	★	★	★	★	★	★	★	★	★	★	★	Continue quarterly meetings of the MD 22 Corridor Task Force.
Interchange of MD 22 / US 40 *Reconfigure interchange*	$5.0 - $10.0	Design		Construction										Coordinate with SHA, investigate various funding resources as identified in Section VI of the MD 22 Corridor Report.
Along MD 22 from North Post Road to APG *Widen MD 22 to six lanes* *Incorporate and complete pedestrian facilities* *Incorporate bicycle facilities*	$15.0 - 20.0			Design	ROW	Construction								Coordinate with SHA, investigate various funding resources as identified in Section VI of the MD 22 Corridor Report.
Along MD 22 from Rhineforte Drive to MD 136 *Widen MD 22 to four lanes* *Incorporate and complete pedestrian facilities* *Incorporate bicycle facilities*	$25.0 - $30.0					Design	ROW	Construction						Coordinate with SHA, investigate various funding resources as identified in Section VI of the MD 22 Corridor Report.
Along MD 22 from MD 543 to Prospect Mill Road and Intersections *Widen MD 22 to four lanes* *Intersection capacity improvements for MD 22 / Prospect Mill Road* *Intersection capacity improvements for MD 22 / Thomas Run Road / Schucks Rd* *Incorporate and complete pedestrian facilities* *Incorporate bicycle facilities*	$41.0 - $94.0					Planning		Design	ROW	Construction				Coordinate with SHA to establish this as a priority to begin planning efforts during the appropriate year.
Intersection of MD 22 / MD 156 *Reconstruct intersection for perpendicular connection* *Incorporate / complete pedestrian facilities from intersection east*	$3.0 - $5.0									Design	ROW	Construction		Coordinate with SHA, investigate various funding resources as identified in Section VI of the MD 22 Corridor Report.

* Feasibility cost is in millions and does **NOT** include right-of-way estimates.

** Activities in these years overlap with the term either before or after the term shown in the table

E. Potential State Funding Sources

Finding funding for various projects can be challenging. As mentioned above, it is imperative for the County to specify that the MD 22 Corridor is a high priority for the County to the State to ensure that the various improvements projects requiring capital investment through the CIP remain competitive with the various needs throughout the state for funding.

In addition, there are numerous other funding sources through the State that the County can consider, such as the Sidewalk Retrofit Program already mentioned in this section. Finally, any type of match program the County can do with the State will make these projects more competitive for implementation. The various funding sources are listed below:

- ADA Retrofit (Fund 33): This is a fund to retrofit existing, non-compliant sidewalks to the latest ADA standards.

- Access to Transit (Fund 78): This is a fund to provide short connections and upgrade access to transit stops (bus, light rail, and heavy rail) with sidewalks along state roadways.

- Sidewalk Retrofit (Fund 79): This is a fund to construct missing sidewalk segments to fill gaps within the pedestrian network. The missing segment must be located either in a "designated neighborhood" per Section 6-301 of the Housing and Community Development Article, or within a Priority Funding Area.

- Bicycle Retrofit (Fund 88): This is a fund to provide bicycle improvements along state roadways.

- Community Safety and Enhancement Program (Fund 84): This is a fund for "streetscape" projects to promote safety and economic development.

- Transportation Enhancement Program (TEP): This program funds a variety of transportation related projects. In relation to bikeways and trails, TEP funding can be used to construct pedestrian and bicycle trails adjacent to abandoned railroad corridors; installation of pedestrian and bicycle amenities at intermodal nodes or trailheads; and construction or rehabilitation of bicycle and pedestrian facilities for off-road trails, trailheads, bike parking, bike lane striping that is part of an off-road system, bike and pedestrian bridges, and underpasses.

VII. Alternatives Considered and Dropped

During development of this study, there have been several alternatives that were considered and dropped from further consideration. These include the following:

A. Short Term (2015)

i. Roadway Safety Audit Components

Several of the components originally identified in the Road Safety Audit were dropped from further consideration following additional review.

In the Churchville section the dropped components include:

- Consider converting the MD 22 eastbound right turn lane at MD 136 to a thru lane. This improvement would not fully meet the traffic demands at this intersection.
- Provide a double right turn lane along MD 155 southbound at MD 22. This improvement would not fully meet the traffic demands at this intersection.

In the Central section the dropped components include:

- Review the sight distance at MD 22 and Aldino Stepney Road.
- Perform a safe speed study on the curve east of Carsins Run Road.

These components were dropped since they offer little to no impact to or improvement of traffic flow through the corridor.

In the Aberdeen section the dropped components include:

- Review the need for a barrier along MD 22 between MD 462 and US 40. Cost for removal of this median is greater than the potential traffic benefits.
- Evaluate reconstructing the median between MD 462 and Roberts Way. This is addressed by the MDSHA Intersection Improvement project at MD 462.
- Extend the southbound left turn lane on MD 22 at North Post Road. All necessary upgrades to this intersection are included within the MDSHA Intersection Improvement projects.
- Evaluate minor widening to facilitate truck turns from US 40 to MD 22. A more comprehensive plan was developed for the US 40 interchange.
- Provide pedestrian facilities on ramps and across bridges at the MD 22 / US 40 interchange. There is no need for pedestrian facilities through this area.
- Mount Royal Avenue relocation of left turns (u-turns) on MD 22. This would offer little to no impact to traffic flow through the intersection.

B. Medium Term (2025)

i. Transit Service into Aberdeen Proving Ground

One recommendation that had been evaluated previously was to coordinate between Harford Transit and Aberdeen Proving Ground to allow for Harford Transit vehicles to enter APG and provide service to the installation as a continuation of a regular bus line. With this recommendation, a final stop would need to be created outside of the APG gates to permit all non-APG badged individuals to exit the vehicle.

While this accommodation has been utilized at other installations throughout the country, such as Norfolk Naval Station in Virginia, it requires a separate funding source provided by the installation for the operation of the transit vehicle within the installation perimeter. As service is denied to the general public for even a portion of the route, that vehicle then falls within the parameters of the Federal Transit Administration's regulations regarding Charter Services (CFR 49, Ch. VI) and must follow these regulations.

ii. Transit Service Connecting to Aberdeen Proving Ground

With the understanding of the regulations governing charter service and thereby funding restrictions for charter service, it was recommended that Harford Transit consider re-routing a bus line to provide service to a turn-around located off of Research Boulevard, immediately outside of the APG gates. This service would provide opportunities for ridership within the office complex located off of Research Boulevard as well as provide opportunity for individuals going to APG an opportunity to exit at this stop and walk onto APG through a pedestrian gate.

This recommendation was dropped as the buildings within the installation are not within walking distance of the gate requiring APG to operate an internal shuttle. Given the configuration of the installation it would be recommended that multiple shuttles serving different areas of the base be incorporated to ensure timely service. This recommendation would require the funding of the shuttle service to be within the APG budget in some manner. Until such time that APG can secure funds for an internal shuttle service, it is not recommended that Harford Transit create a stop at Research Boulevard.

Should APG secure additional funding for a complete internal shuttle / transit system, it would then be recommended that Harford Transit re-evaluate the extension of service to the end of MD 22 with a turn-around at Research Boulevard.

It would also be recommended that should APG secure this funding, that Harford Transit coordinate with APG to provide shared information between both APG transit and Harford Transit's websites.

iii. Prospect Mill Road / Thomas Run Road Connection

This alternative would provide a mixed-use trail connection only from Prospect Mill Road to Thomas Run Road. The new mixed use trail would connect into Prospect Mill Road at the existing roundabout with Wagner Farm Court and proceed eastwardly and

intersect Thomas Run Road opposite the Harford County Community College entrance. It was determined that this connection as mixed-use trail only connection was cost prohibitive.

iv. MD 22 / MD 136 / MD 155 Alternative C: Eliminate left turns at MD 136 / MD 155

This alternative eliminates existing left turn movements at the intersection of MD 22 and MD 136 with MD 22. The following left turn maneuvers would be removed:

- Southbound MD 136 onto eastbound MD 22
- Eastbound MD 22 onto northbound MD 136
- Westbound MD 22 onto southbound MD 136
- Northbound MD 136 onto westbound MD 22

The existing left turn movements at MD 22 and MD 136 would be accommodated by the construction of three new roundabouts. Roundabouts would be constructed on MD 136 north and south of MD 22 with enough separation to avoid queuing issues. The third roundabout would be constructed on MD 22 west of MD 136 with separate thru westbound thru lanes.

This option was dropped due to the impacts and the potential driver confusion.

v. MD 22 / MD 136 / MD 155 Alternative F: Elongated Roundabout Connecting MD 136 and MD 155 along MD 22

This alternative would look to remove the two signalized intersections at MD 22 with MD 136 and MD 155. Initially, two roundabouts were investigated. It was found that the queueing back-up on eastbound MD 22 in the AM Peak was unacceptable. To accommodate the queueing and traffic movements an elongated roundabout would be provided connecting the two roadways. Two lanes would be required for the roundabout. This option was dropped due to right-of-way impacts and no improved traffic operations compared with the other options.

C. Long Term (2035)

i. Improvements Outside of the Corridor

Options outside of the immediate MD 22 Study corridor were considered as a means to improve traffic congestion conditions in the long term. The regional roadway system was evaluated including MD 155 and MD 543 as both include access to many of the same destinations as MD 22: Bel Air/Churchville, I-95, APG. The existing rural nature of these roadways in combination with surrounding land uses does not position either as a significant relief for future traffic volumes without a significant investment in upgrading capacity. Moving forward, these roadways should be kept in consideration as it is likely that as conditions deteriorate on MD 22; these related roadways may also suffer. In the future, additional Origin-Destination studies should be considered for these nearby corridors.

ii. MD 715 Extended

In addition to looking at MD 155 and MD 543 as potential relief to MD 22, the options discussed within the MD 715 Extended Planning Study were also reviewed. The MD 715 Extended Planning Study was conducted as part of the comprehensive traffic study for the Base Realignment and Closure (BRAC) at Aberdeen Proving Ground (APG). The purpose of the study was to investigate options to extend existing MD 715, a major access route to APG in order to alleviate congestion on MD 22 and other parallel roadways. The following alignments were evaluated:

- Option 1: This option would extend MD 715 to the north and tie into existing Beards Hill Road at MD 132 just south of I-95.
- Option 2: This option would extend MD 715 to the north and tie into existing Stepney Road south of I-95. The roadway would cross I-95 (without access to it) and continue north on a new alignment and terminate at MD 22. Stepney Road would be improved with this option.
- Option 3: This option would extend MD 715 to the north and provide a new interchange with I-95 in the vicinity of existing Stepney Road before continuing north to MD 22. Stepney Road would not be improved with this option.

Following an analysis of environmental impacts and traffic benefits, the SHA and MDTA do not plan to pursue a MD 715 extended project.

iii. New Trail System

A new trail system was investigated that would provide an alternative to providing bicycle facilities along MD 22. The trail system would connect Harford Community College and the new park proposed along Schucks Road with Aberdeen and APG. It was discussed that the new trail system would not provide an alternative transportation option to MD 22 to balance the impacts and cost.

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