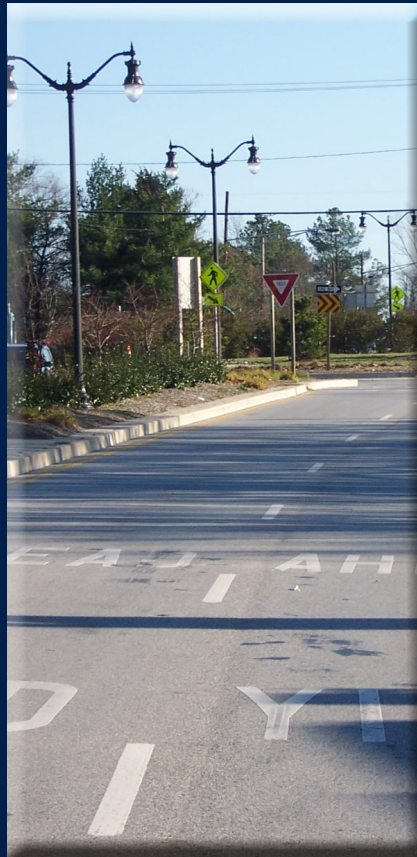


MD 175 (Annapolis Road) Phase II Feasibility Study

From MD 170 (Telegraph Road) to School Lane

Findings Summary



January 2010

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EXECUTIVE SUMMARY

Introduction

The Anne Arundel County Department of Public Works and Department of Planning and Zoning have completed the Feasibility Study for MD 175 (Annapolis Road) Phase II, from MD 170 (Telegraph Road) to School Lane, a distance of 1.36 miles. This Feasibility Study was initiated to develop a preliminary Draft Purpose and Need Statement that could be used by the Maryland State Highway Administration (SHA), should this project become funded for Project Planning in the future. In addition, the results of this study provide an initial understanding of the alternatives to be considered, including preliminary impacts based on safety improvements and future traffic needs for this corridor.

Because future development activity along this section of MD 175 is intended to create an urban town center, this study identifies right-of-way needs associated with a roadway typical section of this nature. This information can be used to preserve the required right-of-way as the corridor develops.

Purpose and Need

The purpose of this project is to improve travel safety and connectivity between Odenton and Fort George G. Meade (FGGM) for all motorists (including pedestrians and bicyclists), improve management of access along MD 175 between the Phase II project limits, contribute to the revitalization of the North Odenton commercial district by enhancing the study area's aesthetic character, and accommodate future (2030) traffic volumes caused by planned development and Base Realignment and Closure (BRAC) activity in the Odenton area.

Improvements along MD 175 between MD 170 and School Lane are needed to address the following factors:

- Vehicular, bicyclist, and pedestrian safety (pedestrian refuge and separation of opposing traffic)
- Accommodating multi-modal transportation access and improved pedestrian access

- Compatibility with the proposed streetscape of the Odenton Town Center and other sections of MD 175
- Access management and consolidation opportunities
- Preserving and promoting the viability of the commercial district (economic development)
- Forecasted congestion resulting from future growth and development in the area.

Alternatives Development

Initially, three concepts were developed for the MD 175 Phase II Feasibility Study. Concept 1 was developed by applying a four-lane typical section to the existing centerline of MD 175 throughout the entire corridor. Concept 2 was developed by applying a five-lane typical section to the existing centerline of MD 175 throughout the entire corridor. No shifts to the alignment were considered under Concepts 1 and 2. Concept 3 was developed to identify access management measures along the corridor that consolidated and closed some of the numerous unsignalized access points that exist along MD 175. Based on feedback received from the study team, a single Proposed Alternative that combined aspects of Concepts 1, 2, and 3 was developed along the existing centerline. The Proposed Alternative assumes total reconstruction through the study area and is shown in the *Alternatives Development* section, in **Figures 8A-C**.

Impacts and Costs

Based on the Proposed Alternative, the Study Team identified the preliminary impacts to the socioeconomic, cultural, and natural resources based on readily available information. Resources such as businesses, parking areas, and environmental and engineering features are identified on the mapping for the Proposed Alternative. A summary of impacts associated with the Proposed Alternative is shown in **Table ES-1**.

**Table ES-1
Proposed Alternative Impacts Summary Table**

Impact Type	Impact
Commercial Displacements	2
Residential Displacements	0
Properties Affected	93
Right-of-Way	36.72 acres *
Wetlands	0.02 acres
Forest	4.39 acres
Stream	718.3 linear feet
Floodplain	0 acres
Specimen Trees (DBH > 24")	11
Parkland	0 acres
Odenton Historic District	0.31 acres
Parking Spaces (Total)	223
High Tension Power Line Towers	2
Light/Signal/Utility Poles	64

* 2.14 acres of right-of-way is associated with stormwater management needs

Preliminary cost estimates were developed for the Proposed Alternative using the SHA Highway Cost Estimate System and are shown in **Table ES-2**. These costs are based on the assumption of total reconstruction of the segment of MD 175 under study. Preliminary engineering costs were estimated as 25 percent of the construction costs, based on SHA’s recent recommendations. Right-of-way costs were reviewed by SHA’s District 5 real estate professionals. The right-of-way land cost attributed to stormwater management needs is approximately \$1.4 million.

**Table ES-2
Proposed Alternative Cost Estimate Summary**

Category	Cost Estimate
Preliminary Engineering	\$11,500,000
Right-of-Way	\$11,700,000
Construction	\$45,900,000
Total	\$69,100,000

PURPOSE AND NEED

Project Location

The study area is located in Odenton, Maryland, in northwestern Anne Arundel County, just south of Baltimore-Washington International (BWI) Thurgood Marshall Airport, and approximately 20 miles south of Baltimore and 30 miles north of Washington, DC. In this area, MD 175 is a major east-west corridor serving the Fort George G. Meade (FGGM) Military Reservation and the Odenton Town Center. This roadway serves several different types of travelers, including commuters and military personnel, along with commercial and residential traffic.

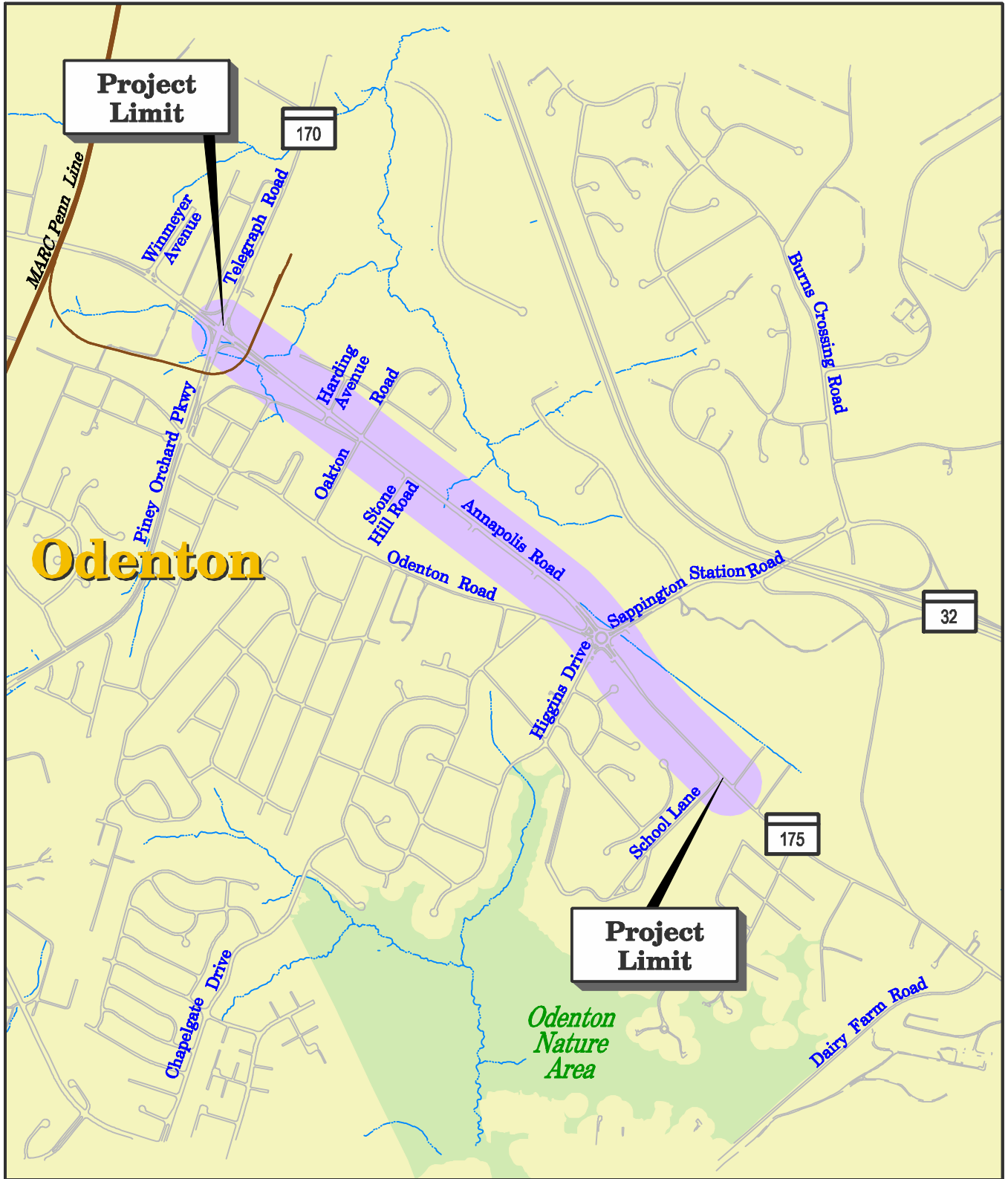
The limits of the segment of MD 175 (Annapolis Road) designated as Phase II extend from MD 170 (Telegraph Road) to School Lane. The study area limits are shown on the Project Location Map (**Figure 1**). This section of MD 175 is approximately 1.36 miles long and is functionally classified as an Urban Minor Arterial under both the State and Federal Functional Classification Systems.

Project Background

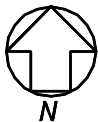
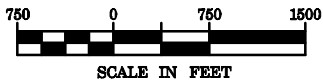
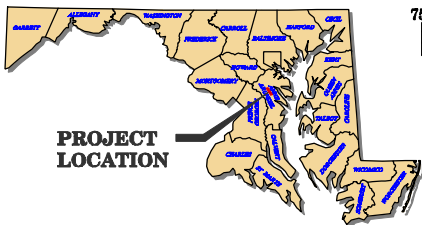
At the request of FGGM, the County initially considered a study of MD 175 between MD 295 (Baltimore-Washington Parkway) and School Lane. The County determined that segmenting this study into two phases would be more efficient and allow the study of the portion of MD 175 most directly impacted by the growth at FGGM to proceed more quickly. The limits of the MD 175 Phase I study are MD 295 to MD 170 and the limits of the MD 175 Phase II study are MD 170 to School Lane. The MD 175 Phase I Feasibility Study was completed by Anne Arundel County in 2006 and its results were forwarded to the Maryland State Highway Administration (SHA) for its formal Project Planning Study, which is ongoing and expected to be completed in 2009. The Phase I study and SHA's subsequent Draft Environmental Assessment have resulted in an initial understanding of the alternatives that may be feasible between MD 295 and MD 170. Five MD 175 mainline build alternatives, five MD 175/MD 295 interchange options, and four FGGM access options are being examined by SHA.

Purpose of the Project

The purpose of the proposed action is to improve travel safety and connectivity between Odenton and FGGM for all motorists (including pedestrians and bicyclists), improve



Odenton



MD 175 (Annapolis Road) Phase II
 From MD 170 to School Lane
 Anne Arundel County



Project Location Map

DATE:
July 2009
 SCALE:
1" = 1500'



FIGURE:
1

MD 175 Phase II Feasibility Study

Findings Summary

management of access along MD 175 between the Phase II project limits, contribute to the revitalization of the North Odenton commercial district by enhancing the study area's aesthetic character, and accommodate future (2030) traffic volumes caused by planned development and Base Realignment and Closure (BRAC) activity in the Odenton area.

Need for the Project

The Odenton Town Center Master Plan (November 2003) seeks to create an urban core along with the adjacent residential areas of Odenton, with multi-modal transportation access and improved pedestrian access encouraged, in order to preserve and promote economic development in the area. The study area should be compatible with the proposed streetscape of the Odenton Town Center and other sections of MD 175.

Crash history indicates that the accident rates for locations in the study corridor are higher than the statewide average for similar state roadways. A total of 62 unsignalized access points (commercial entrances, residential driveways, and side streets) exist along MD 175 within the study area, and although pedestrians and bicyclists share the corridor with vehicular traffic, formal sidewalks and bike paths are not present (except through the Sappington Station Road roundabout). An improvement such as adding a median to the roadway typical section would address these issues – providing pedestrian refuge, separating opposing traffic, and promoting access management.

Additionally, the MD 175 Phase II study area is expected to experience an increase in population, housing, and jobs, which will result in accompanying vehicular traffic growth. Congestion will increase by 2030 as a result of background development and BRAC, with some locations forecasted to experience unacceptable levels of service, although traffic analysis reveals that a 4-lane section (with some improvements) will be sufficient to accommodate the projected demand.

In summary, improvements along MD 175 between MD 170 and School Lane are needed to address the following factors:

- Vehicular, bicyclist, and pedestrian safety (pedestrian refuge and separation of opposing traffic)
- Accommodating multi-modal transportation access and improved pedestrian access
- Compatibility with the proposed streetscape of the Odenton Town Center and other sections of MD 175
- Access management and consolidation opportunities

MD 175 Phase II Feasibility Study

Findings Summary

- Preserving and promoting the viability of the commercial district (economic development)
- Forecasted congestion resulting from future growth and development in the area.

Growth and Development

The Maryland Department of Planning Land Use/Land Cover map (2002) shown in **Figure 2** shows that the study area consists primarily of commercial development. In addition, medium and low density residential areas, forested areas, and institutional properties are located within the study area. The primary changes in land uses in the study area are expected to result from BRAC and the Odenton Town Center, which, along with other planned development areas, are described below.

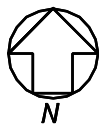
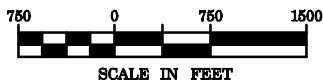
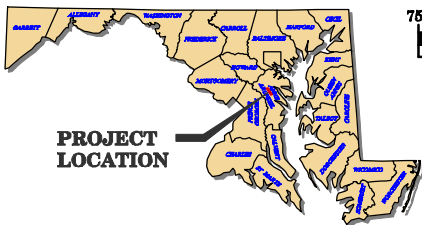
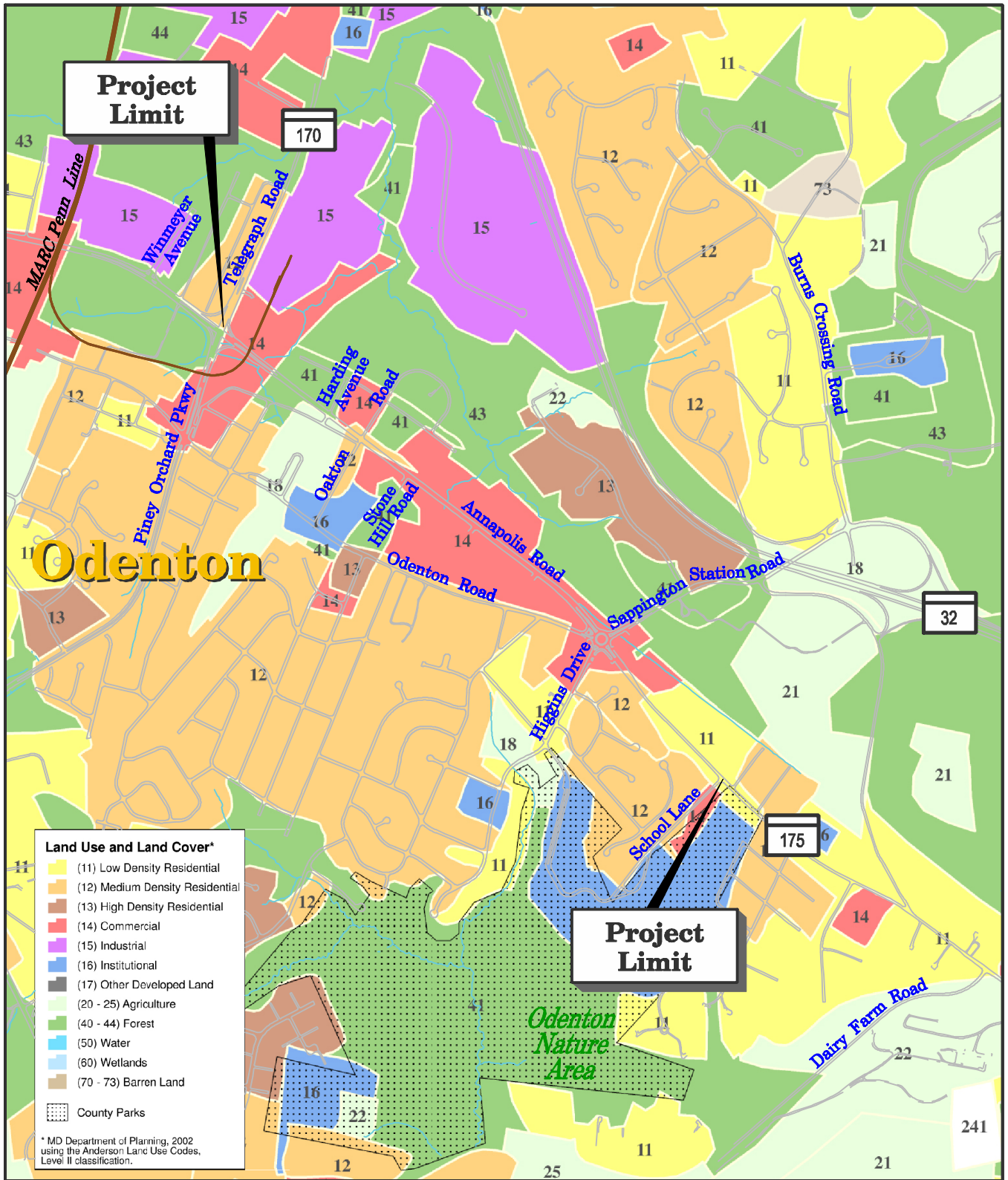
Base Realignment and Closure (BRAC)

Originally a training and deployment center, FGGM is currently transitioning to an information and administrative center and has experienced recent employment growth as a result of the new Environmental Protection Agency (EPA) and Library of Congress buildings located on-base. The area is expecting a large increase in employment and development as a result of the 2005 BRAC, and Enhanced Use Leasing (EUL) processes.

Although most of the impact will be focused on the area of MD 175 between MD 295 and MD 170 studied in Phase I by Anne Arundel County and SHA, the BRAC program will have significant effects on the entire MD 175 corridor. For FGGM, 7,500 additional on-base BRAC-related jobs and 10,000 EUL-related jobs are expected by 2011. In addition, the National Security Agency (NSA) is expected to add approximately 4,000 jobs at FGGM.

While not directly a BRAC-related action, FGGM has also embarked on an EUL program to lease out significant portions of federal land for private developments. The EUL program helps to improve utilization of Department of Defense-owned property and reduces base operating costs while stimulating the local job market and fostering cooperation between the military services and the private sector. Because significant impacts on the transportation system could result if the form, placement and sequencing of new development are not well-coordinated with transportation investments, BRAC, EUL, and NSA effects were considered during the course of this study.

The total number of additional jobs at FGGM, including BRAC and full EUL build out, is estimated at 18,000. Concurrent with BRAC, the NSA is anticipated to expand by



MD 175 (Annapolis Road) Phase II
From MD 170 to School Lane
Anne Arundel County

Land Use Map



DATE:
July 2009
SCALE:
1" = 1500'



FIGURE:
2

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approximately 1,500 positions annually over a three to five year period. Projected population statistics estimate that over 22,000 military personnel, dependents, civilian personnel, and contractors will be added. The additional traffic generated by the influx of new employees will be concentrated at specific locations, including MD 175 leading to FGGM.

Odenton Town Center

The study area, previously shown in **Figure 1**, is located on the east side of the proposed Odenton Town Center (OTC). The OTC is regionally designated as the Odenton Growth Management Area (OGMA), an area where growth and revitalization is directed because of existing water and sewer infrastructure. The OGMA was established in 1990 and, in conjunction with the MD 175 commercial revitalization district, will be one of Anne Arundel County's primary growth areas. The OGMA is a 1,600-acre area encompassing major commercial and industrial zoned portions of Odenton. It contains four sub-areas, including the Odenton Industrial sub-areas along MD 170 north of MD 175, the East Odenton Commercial area along MD 175 between Sappington Station Road and MD 170, the OTC sub-areas between MD 170 and MD 32, and the Odenton North sub-areas along MD 175 north of MD 32 to Reece Road.

Other Planned Developments

There are several mixed-use (residential/commercial) developments planned for areas to the west of the project limits, including two large developments at the intersection of MD 175 and MD 295. There are also plans to expand the parking capacity and services provided for the MARC train station at Odenton. A mixed-use Town Center and a large parking garage are also planned around the MARC station. While these development plans are not located directly within the Phase II project limits, some associated traffic growth is likely to affect the study area.

Traffic and Safety Analysis

Transportation needs associated with the growth and development discussed above is expected to increase over the next 25 years. To better understand the need for future capacity and safety improvements, and to aid in the conceptual design of study alternatives, the Study Team analyzed existing (2005) conditions and developed travel demand forecasts for the No-Build condition for 2030, the design year for this project. This section provides a description of the existing transportation facility and an analysis of traffic capacity and safety conditions in the study area.

MD 175 Phase II Feasibility Study

Findings Summary

Existing Transportation Facility

The lane configurations along MD 175 vary between the project limits. From MD 170 (Telegraph Road)/Piney Orchard Parkway to the Sappington Station Road/Odenton Road/Higgins Road roundabout, MD 175 is a four-lane roadway with a speed limit of 40 mph. This segment begins as a divided roadway with a landscaped median and transitions into an undivided roadway approximately 800 feet east of the MD 170 intersection. It widens briefly to five lanes immediately west of the roundabout to accommodate a westbound left turn lane.

The Sappington Station Road/Odenton Road/Higgins Road roundabout contains two lanes and consists of five legs. The speed limit in the roundabout is 15 mph.

From the Sappington Station Road/Odenton Road/Higgins Road roundabout to School Lane, MD 175 is primarily a two-lane, undivided roadway. For approximately 300 feet east of the roundabout, MD 175 is a four-lane divided roadway with a landscaped median. At this point, MD 175 transitions to a two-lane, undivided roadway, which extends to the eastern study limit, School Lane. The speed limit of this section is 40 mph.

A total of 62 unsignalized access points (commercial entrances, residential driveways, and side streets) exist along MD 175 within the study area, and although pedestrians and bicyclists share the corridor with vehicular traffic, formal sidewalks and bike paths are not present (except through the Sappington Station Road roundabout).

Traffic Operations

The adequacy of roadway capacity is determined using a measure called the volume-to-capacity (v/c) ratio. The v/c ratio is the ratio of the peak hour volume carried by a roadway or intersection and its hourly capacity expressed in vehicles per hour. Roadways may have traffic volumes that exceed or are forecasted to exceed capacity. This would result in a v/c ratio that exceeds 1.00 and indicates the need for capacity improvements.

Level of service (LOS) is a scale measuring the freedom of mobility or severity of congestion experienced by drivers. The LOS scale ranges from A to F. LOS A represents free flow movement of traffic with little or no congestion. LOS F represents failure with stop-and-go conditions and long queues of traffic. LOS D occurs near a critical boundary where traffic flows become unstable. This level is generally considered acceptable during peak hours of traffic flow on streets and highways in urban and suburban areas. At LOS E, the roadway is operating near capacity with unpredictable daily delays. LOS is

normally determined for the peak hours of a typical weekday. These levels have been determined through traffic research and are related to measurable traffic characteristics such as delay, speed, traffic density, and v/c ratio.

Travel Demand Forecasts for Future (2030) No-Build Conditions

The travel demand forecasts for this project were developed using Sub Area Model 2 for West County (SAM2) and forecasted traffic volumes for both Build and No-Build conditions represent unconstrained demand. The SAM2 is based on the Baltimore Metropolitan Council's (BMC) regional travel demand forecasting model that covers much of central Maryland, including Anne Arundel County. Over time, Anne Arundel County has worked to develop a specialized version of the BMC model, known as SAM2, which incorporates local refinements that are relevant to County projects. These local refinements include traffic analysis zone (TAZ) splits, to provide a more detailed roadway network in the Anne Arundel County portion of SAM2, as well as travel time and trip table refinements, that produce more locally accurate existing conditions traffic volumes on individual roadways than may be acquired from the larger-scale BMC model. For this study, Round 7A demographic data was used for Anne Arundel County, and Round 7 demographic data was used for the other counties included in SAM2.

A number of refinements have been made to SAM2 in the vicinity of MD 175 for this project and other nearby projects. These refinements include division of local TAZs, including those for FGGM and the Odenton Town Center as well as a number of other large parcels in which multiple independent developments are planned, and validation of existing conditions traffic volumes along MD 175 and its intersecting roadways from west of MD 295 (Baltimore-Washington Parkway) to MD 3.

Following completion of the refinements to SAM2, the model was run, and the outputs were post-processed using methods defined in NCHRP 255, then balanced throughout the study area network. For this assignment, BRAC gate volume data provided by FGGM was used in the post-processing of volumes along MD 175 to the west of the study area

Existing (2005) and Future (2030) Conditions Analyses

Traffic analyses have been conducted for the MD 175 Phase II corridor from MD 170 (Telegraph Road)/Piney Orchard Parkway to School Lane. Traffic data for 2005 was designated as the "existing" condition because it matches the most recent data used for the approved regional traffic model, which is updated every five years. If carried forward as a Project Planning Study, existing traffic data should be updated accordingly and

MD 175 Phase II Feasibility Study

Findings Summary

future traffic analysis should include approved 2035 forecasts. Intersection traffic counts were provided by Anne Arundel County, with the exception of MD 175 at MD 170. For consistency with the Phase I Study, the same data for MD 175 at MD 170 was used for both projects.

The forecasted volumes for this study area were developed using methods described in NCHRP 255. The first step is to use the existing count, existing model, and future model link ADTs to develop future forecasted ADTs for each link. The next step is to use the existing turning movement counts, existing ADTs, and forecasted ADTs to develop forecasted peak hour approach and departure volumes for each link, then to balance the forecasted turning movement volumes, using the existing turning movement volume distribution as a starting point, until the forecasted link approach and departure volumes are as closely matched as possible. As a result, the link volumes are determined before the turning movement volumes.

At the Sappington Station Road roundabout, the counts provided by Anne Arundel County do not correspond with observed conditions - namely the southbound Sappington Station Road to eastbound MD 175 movement. As a result, the forecasted turning movement volume from southbound Sappington Station Road to eastbound MD 175 appears higher than observed conditions indicate. If carried forward as a Project Planning Study, this data should be re-evaluated based on new counts of the roundabout traffic. The following intersections were analyzed for this study:

1. MD 175 at MD 170 (Telegraph Road)/Piney Orchard Parkway (signalized)
2. MD 175 at Harding Avenue
3. MD 175 at Oakton Road
4. MD 175 at Stone Hill Road
5. MD 175 at Odenton Shopping Center Entrance I (signalized)
6. MD 175 at Odenton Shopping Center Entrance II
7. MD 175 at Sappington Station Road/Odenton Road/Higgins Road roundabout
8. MD 175 at School Lane

Although the intersection of MD 175 and MD 170 was included in the analysis, it will not be included with the recommended improvements, as it is included within the limits of the MD 175 Project Planning Study being conducted by SHA. Improvements to this intersection resulting from SHA's study will be coordinated with the MD 175 Phase II study.

Within the study area, the highest existing ADT volume occurs between MD 170 and the Sappington Station Road/Odenton Road/Higgins Road roundabout. For this roadway segment, projected 2030 volumes represent a 2.4% annual growth increase from the existing ADT volumes. The 2030 ADT volume east of the roundabout is projected to increase 3.2% annually from existing ADT volumes. Existing and Projected 2030 ADT volumes are provided in **Table 1**. This table shows that ADT volumes on the Phase I portion of MD 175 are much larger than in the Phase II study area.

Table 1
Existing (2005) and Projected 2030 Average Daily Traffic Volumes

Segment of MD 175	2005 ADT (Vehicles Per Day)	2030 ADT (Vehicles Per Day)	Percent Increase
West of MD 170	35,300	82,100	133
MD 170 to the roundabout	21,800	39,300	80
Roundabout to School Lane	10,100	22,300	121

Intersections within the study area were analyzed using Critical Lane Analysis (CLA) and Synchro/SimTraffic, except for the roundabout, where SIDRA INTERSECTION Version 3.2 was used for the analysis. The current operations range from LOS A to LOS E and 2030 No-Build operations range from LOS A to LOS F at the study area intersections. **Table 2** summarizes the results of the analysis of roadway capacity and LOS conducted for intersections in the study area under both existing and 2030 No-Build conditions. This analysis is shown in **Figure 3**.

Table 2
Traffic Operational Analysis for Study Area Intersections

Intersection with MD 175	2005 Existing		2030 No-Build	
	AM Peak LOS (V/C)	PM Peak LOS (V/C)	AM Peak LOS (V/C)	PM Peak LOS (V/C)
MD 170 *	C (0.77)	E (0.97)	F (1.59)	F (2.23)
Harding Avenue	A (0.23)	A (0.33)	A (0.50)	C (0.72)
Oakton Road	A (0.25)	A (0.36)	A (0.52)	C (0.78)
Stone Hill Road	A (0.23)	A (0.34)	A (0.48)	C (0.73)
Odenton Shopping Center Entrance I *	A (0.23)	A (0.44)	A (0.50)	E (0.94)
Odenton Shopping Center Entrance II	A (0.24)	A (0.36)	A (0.53)	E (0.96)
Sappington Station Road/Odenton Road/Higgins Road roundabout	B (0.63)	B (0.57)	F (1.70)	F (1.89)
School Lane	A (0.52)	A (0.55)	E (0.96)	F (1.05)

* Signalized intersections

Based on the traffic analysis, none of the intersections within the study area operate at a LOS F under existing (2005) traffic conditions during the AM or PM peak hours. Only one intersection, MD 175 at MD 170 (Telegraph Road)/Piney Orchard Parkway, is operating at LOS E (during the PM peak hour). Under 2030 No-Build traffic conditions, the MD 175 intersections with MD 170 and School Lane, as well as the roundabout, are expected to operate at LOS F during the AM or PM peak hours. Two other intersections are forecasted to operate at LOS E during either the AM or PM peak hour in 2030: MD 175 at Odenton Shopping Center Entrance I and MD 175 at Odenton Shopping Center Entrance II.

It should be noted that the intersection of MD 175 and MD 170 was evaluated with its existing configuration and not with the configurations being studied in the SHA Project Planning Study. This intersection is included for analysis purposes only and any improvements to this intersection will be included in SHA's MD 175 Project Planning Study.

In addition to the analyses performed using the CLA method, which assesses each intersection individually, analyses were performed on the signalized and unsignalized intersections within the study area using the Synchro/SimTraffic software package. Aerial backgrounds of the study area were used to develop proper geometric conditions and distance between intersections in the Synchro files. Existing signal timing data was

MD 175 @ MD 170		
	AM	PM
	LOS (VC)	LOS (VC)
Existing	C (0.77)	E (0.97)
2030 No-Build	F (1.59)	F (2.23)

MD 175 @ Oakton Road		
	AM	PM
	LOS (VC)	LOS (VC)
Existing	A (0.26)	A (0.36)
2030 No-Build	A (0.52)	C (0.78)

MD 175 @ Stone Hill Rd		
	AM	PM
	LOS (VC)	LOS (VC)
Existing	A (0.23)	A (0.34)
2030 No-Build	A (0.48)	C (0.73)

MD 175 @ Sappington Station Rd/Odenton Rd/Higgins Rd roundabout		
	AM	PM
	LOS (VC)	LOS (VC)
Existing	B (0.63)	B (0.57)
2030 No-Build	F (1.70)	F (1.89)

MD 175 @ School Lane		
	AM	PM
	LOS (VC)	LOS (VC)
Existing	A (0.52)	A (0.55)
2030 No-Build	E (0.96)	F (1.05)

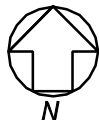
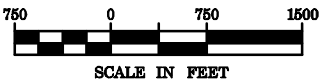
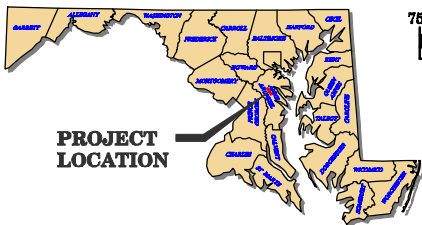
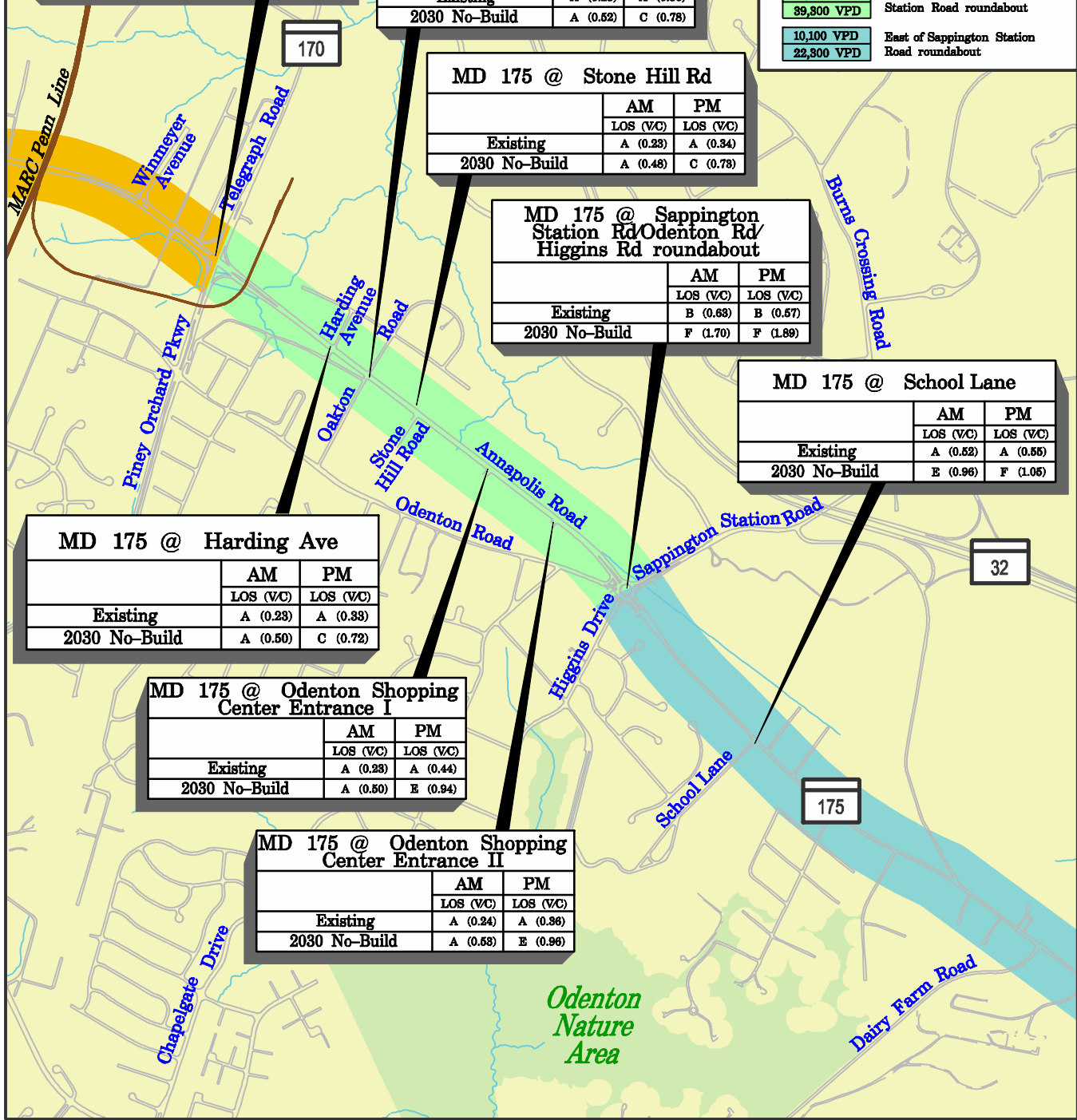
MD 175 @ Harding Ave		
	AM	PM
	LOS (VC)	LOS (VC)
Existing	A (0.23)	A (0.33)
2030 No-Build	A (0.50)	C (0.72)

MD 175 @ Odenton Shopping Center Entrance I		
	AM	PM
	LOS (VC)	LOS (VC)
Existing	A (0.23)	A (0.44)
2030 No-Build	A (0.50)	E (0.94)

MD 175 @ Odenton Shopping Center Entrance II		
	AM	PM
	LOS (VC)	LOS (VC)
Existing	A (0.24)	A (0.36)
2030 No-Build	A (0.53)	E (0.96)

Legend

Existing	Average Daily Traffic Volumes
2030 No-Build	
85,300 VPD	West of the MD 175 / MD 170 intersection
82,100 VPD	
21,900 VPD	From MD 170 to Sappington Station Road roundabout
39,300 VPD	
10,100 VPD	East of Sappington Station Road roundabout
22,300 VPD	



MD 175 (Annapolis Road) Phase II
 From MD 170 to School Lane
 Anne Arundel County

Traffic Operational Analysis Based on Critical Lane Analysis



DATE: July 2009
 SCALE: 1" = 1500'



FIGURE: **3**

obtained from the SHA Office of Traffic and Safety for the two signalized intersections within the study area, and was incorporated into the Synchro network for both AM and PM peak hour conditions. The existing conditions Synchro/SimTraffic model was then calibrated to match travel time runs, which were performed for the entire length of the study corridor on an average weekday during both the AM and PM peak periods. Once the existing conditions networks were modeled, the 2030 No-Build volumes were added to the network and the timings of the signalized intersections were optimized. For the roundabout, SIDRA INTERSECTION Version 3.2 was used for the analysis. **Table 3** summarizes the results of the Synchro/SimTraffic analysis under both existing and 2030 No-Build conditions.

Traffic analysis for the Existing and 2030 No-Build condition are provided in **Appendices A and B**, respectively, which can be found on the CD at the back of this report.

Using the method of analyzing roadway segments between intersections provided in the Highway Capacity Manual 2000 (HCM 2000), link analyses were completed using peak hourly flows for both Existing and 2030 No-Build scenarios. The resulting LOS values are provided in **Table 4**.

Based on these link analyses, the existing four-lane typical section should be sufficient to accommodate the projected traffic volume increases between MD 170 and School Lane. Capacity improvements are shown to be needed west of the intersection of MD 175 and MD 170, where link analysis shows LOS F values are obtained. The improvement will be addressed in SHA's MD 175 Project Planning Study.

Table 3
Synchro/SimTraffic Operational Analysis for Study Area Intersections

Intersection with MD 175	2005 Existing		2030 No-Build	
	AM Peak LOS (Delay in seconds)	PM Peak LOS (Delay in seconds)	AM Peak LOS (Delay in seconds)	PM Peak LOS (Delay in seconds)
MD 170 *	D (50.3)	F (127.7)	F (253.5)	F (558.3)
Harding Avenue:				
MD 175 – Eastbound Approach	A (0.3)	A (0.2)	A (1.0)	A (1.8)
MD 175 – Westbound Approach	A (0.2)	A (0.2)	A (0.6)	A (2.4)
Harding Avenue – Northbound Approach	C (18.1)	D (31.6)	F (116.7)	F (--)
Harding Avenue – Southbound Approach	C (19.2)	D (34.1)	F (184.5)	F (--)
Oakton Road:				
MD 175 – Eastbound Approach	A (0.3)	A (0.4)	A (1.0)	A (2.4)
MD 175 – Westbound Approach	A (0.4)	A (1.1)	A (0.7)	A (7.6)
Oakton Road – Northbound Approach	C (17.4)	D (33.4)	F (212.7)	F (--)
Oakton Road – Southbound Approach	C (18.9)	E (38.7)	F (343.7)	F (--)
Stone Hill Road:				
MD 175 – Eastbound Approach	A (0.0)	A (0.0)	A (0.0)	A (0.0)
MD 175 – Westbound Approach	A (0.5)	A (0.3)	A (0.8)	A (2.1)
Stone Hill Road – Northbound Approach	B (13.4)	D (30.8)	E (41.8)	F (--)
Odenton Shopping Center Entrance I *	A (4.4)	B (13.8)	A (6.3)	D (53.1)
Odenton Shopping Center Entrance II:				
MD 175 – Eastbound Approach	A (0.0)	A (0.0)	A (0.0)	A (0.0)
MD 175 – Westbound Approach	A (2.3)	A (6.2)	A (3.7)	F (75.3)
Odenton SCE II – Northbound Left	C (18.4)	F (51.0)	F (136.1)	F (--)
Odenton SCE II – Northbound Right	A (9.6)	B (11.6)	B (11.2)	C (22.5)
Sappington Station Road/Odenton Road/Higgins Road roundabout	B (11.4)	B (11.5)	F (124.5)	F (189.1)
School Lane:				
MD 175 – Eastbound Approach	A (0.0)	A (0.0)	A (0.0)	A (0.0)
MD 175 – Westbound Left	A (9.4)	A (9.8)	C (15.3)	C (16.5)
MD 175 – Westbound Thru/Right	A (0.0)	A (0.0)	A (0.0)	A (0.0)
School Lane – Northbound Left	F (138.5)	E (79.2)	F (--)	F (--)
School Lane – Northbound Right	B (12.3)	C (16.6)	C (23.6)	F (129.6)

* Signalized intersections

Table 4
Existing and 2030 No-Build Link Analyses

MD 175 Link	Existing AM (PM) LOS Westbound	Existing AM (PM) LOS Eastbound	2030 No-Build AM (PM) LOS Westbound	2030 No-Build AM (PM) LOS Eastbound
West of MD 170	C (B)	A (D)	F (D)	C (F)
MD 170 – Harding Avenue	A (A)	A (B)	B (C)	A (C)
Harding Avenue – Oakton Road	A (A)	A (B)	B (C)	A (C)
Oakton Road – Stone Hill Road	A (A)	A (B)	B (C)	A (C)
Stone Hill Road – Odenton Shopping Center Entrance I	A (A)	A (B)	B (C)	A (C)
Odenton Shopping Center Entrance I – Odenton Shopping Center Entrance II	A (A)	A (A)	B (B)	A (C)
Odenton Shopping Center Entrance II – Sappington Station Road roundabout	A (A)	A (A)	B (C)	A (C)
Sappington Station Road roundabout – School Lane	A (A)	A (A)	B (C)	B (C)
East of School Lane	A (A)	A (A)	B (C)	B (C)

Crash History Analysis

A crash history analysis was completed for the MD 175 Phase II project area for a three-year period from January 1, 2004 through December 31, 2006. According to the data provided by the SHA’s Office of Traffic and Safety (OOTS) Traffic Development and Support Division, a total of 120 police-reported crashes occurred during that time period. The total number of crashes in the study area, along with many of the crash types, are significantly higher than the statewide average rate for similar roadways. Of these crashes, none resulted in fatalities, 91 resulted in property damage only (76 percent), and

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29 resulted in injuries (24 percent). The most common crash types were fixed object (47 percent), rear end (21 percent), and angle crashes (13 percent). Approximately 77 percent of the crashes reported within the corridor were intersection-related crashes. Crash data for the entire corridor is summarized in **Table 5** for the years 2004 through 2006.

Table 5
Crash Summary for MD 175 from MD 170 to School Lane
(January 1, 2004 through December 31, 2006)

Crash Type	Number of Crashes				Crash Rate per 100 MVMT	Statewide Average Rate
	2004	2005	2006	Total		
Total Crashes	46	42	32	120	718.9 *	284.1
Fatal	0	0	0	0	0.0	1.2
Injury	12	6	11	29	173.7 *	116.5
Property Damage Only	34	36	21	91	545.1 *	166.4
Opposite Direction	2	0	1	3	18.0	11.3
Rear End	11	11	3	25	149.8 *	96.5
Sideswipe	4	2	3	9	53.9 *	22.0
Left Turn	2	0	1	3	18.0 *	36.2
Angle	4	5	6	15	89.9 *	51.9
Pedestrian	1	1	0	2	12.0	8.1
Parked Vehicle	0	0	0	0	0.0	4.9
Fixed Object	19	21	16	56	335.5 *	26.4
Other	3	2	2	7	41.9 *	21.8
Truck Related	2	1	0	3	18.0	17.2
Nighttime	24	28	18	70	58% *	32%
Wet Surface	11	9	5	25	20%	28%
Snow/Ice Surface	1	4	0	5	Not provided	Not provided
Alcohol Related	9	10	9	28	23% *	8%
Intersection Related	33	32	27	92	Not provided	Not provided

* Significantly higher than the statewide rate

Accident rates per 100 million vehicle miles traveled and statewide average rates were provided by SHA Office of Traffic and Safety (OOTS). Accident rates for intersection-related crashes, as well as those occurring with conditions involving snow or ice, were not explicitly summarized, so those rates are unavailable.

Although the total crash rate is significantly higher than the statewide average, it should be noted that of the 120 crashes reported, 84 of them (70 percent) have occurred at either MD 170 (14 crashes) or at the roundabout (70 crashes). It is also worth noting that 28 crashes (23 percent) were alcohol related, which is considerably higher than the statewide average. No reported crash-related fatalities occurred during the three-year study period.

The MD 170 to Sappington Station Road roundabout segment of the study area includes intersections with MD 170, Harding Avenue, Oakton Road, and two entrances/exits to the Odenton shopping center – one is signalized and the other is not. This segment experienced a total of 46 police-reported crashes during the period 2004 through 2006. The most common crash types reported were rear end crashes (28 percent) and fixed object crashes (24 percent). Additionally, approximately 63 percent of the crashes were reported as intersection related. **Table 6** presents the crash summary for this segment.

Table 6
Crash Summary for MD 175 from
MD 170 to West of Sappington Station Road Roundabout
(January 1, 2004 through December 31, 2006)

Crash Type	Number of Crashes			
	2004	2005	2006	Total
Total Crashes	17	17	12	46
Fatal	0	0	0	0
Injury	7	3	5	15
Property Damage Only	10	14	7	31
Opposite Direction	1	0	0	1
Rear End	5	6	2	13
Sideswipe	1	2	2	5
Left Turn	2	0	1	3
Angle	1	1	3	5
Pedestrian	1	1	0	2
Parked Vehicle	0	0	0	0
Fixed Object	4	5	2	11
Other	2	2	2	6
Nighttime	6	10	4	20
Wet Surface	3	2	1	6
Snow/Ice Surface	0	1	0	1
Alcohol Related	2	3	2	7
Intersection Related	11	8	10	29

The roundabout at the intersection of MD 175 and Sappington Station Road/Odenton Road/Higgins Road was listed by OOTS as a Priority Candidate Safety Improvement Intersection in 2004, 2005, and 2006 and experienced a total of 70 police-reported crashes during the period 2004 through 2006. The most common crash types reported were fixed object crashes (61 percent), rear end crashes (14 percent), and angle crashes (14 percent). As reported by OOTS, the predominant accident pattern in the roundabout involves vehicles traveling eastbound on MD 175 striking the center of the roundabout. Additionally, observation of the roundabout operations revealed a potential operating issue at the roundabout with the movements from Sappington Station Road conflicting

with through traffic from MD 175. **Table 7** presents the crash summary for the Sappington Station Road roundabout.

Table 7
Crash Summary for MD 175 at
Sappington Station Road Roundabout
(January 1, 2004 through December 31, 2006)

Crash Type	Number of Crashes			
	2004	2005	2006	Total
Total Crashes	27	24	19	70
Fatal	0	0	0	0
Injury	5	3	6	14
Property Damage Only	22	21	13	56
Opposite Direction	1	0	1	2
Rear End	5	4	1	10
Sideswipe	3	0	1	4
Left Turn	0	0	0	0
Angle	3	4	3	10
Pedestrian	0	0	0	0
Parked Vehicle	0	0	0	0
Fixed Object	14	16	13	43
Other	1	0	0	1
Nighttime	17	17	13	47
Wet Surface	8	6	4	18
Snow/Ice Surface	1	3	0	4
Alcohol Related	6	7	7	20
Intersection Related	21	23	17	61

The Sappington Station Road roundabout to School Lane segment of the study area includes only the intersection at School Lane. This segment experienced a total of four police-reported crashes during the period 2004 through 2006, with two rear end crashes and two fixed object crashes. **Table 8** presents the crash summary for this segment.

Table 8
Crash Summary for MD 175 East of
Sappington Station Road Roundabout to School Lane
(January 1, 2004 through December 31, 2006)

Crash Type	Number of Crashes			
	2004	2005	2006	Total
Total Crashes	2	1	1	4
Fatal	0	0	0	0
Injury	0	0	0	0
Property Damage Only	2	1	1	4
Opposite Direction	0	0	0	0
Rear End	1	1	0	2
Sideswipe	0	0	0	0
Left Turn	0	0	0	0
Angle	0	0	0	0
Pedestrian	0	0	0	0
Parked Vehicle	0	0	0	0
Fixed Object	1	0	1	2
Other	0	0	0	0
Nighttime	1	1	1	3
Wet Surface	0	1	0	1
Snow/Ice Surface	0	0	0	0
Alcohol Related	1	0	0	1
Intersection Related	1	1	0	2

Access to MD 175

Safety in the MD 175 Phase II study area is affected by the large number of direct access points to MD 175. In addition to two signalized intersections, a total of 62 unsignalized access points (commercial entrances, residential driveways, and side streets) exist along MD 175 within the study area and some developments have multiple points of direct access to MD 175. Large numbers of access points correspond to an increase in potential disruptions to travel flow and conflict points. Implementing access management improvements (i.e. limiting direct access to MD 175) would reduce the probability of

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mid-block turning vehicles, which would result in better operations and reduced potential for accidents.

The safety characteristics of any highway are related to the driver's expectation of hazards and points of conflict that may arise. By reducing the number of direct access points along a roadway and otherwise managing access, the driver's expectations, and therefore attention, can be focused on navigating the roadway.

Consistency with Smart Growth, Master Plans, and Related Projects and Studies

Maryland Smart Growth Law

Subsequent to the 1992 Planning Act, Maryland established the Priority Funding Areas Act (1997) to direct State funded growth-related projects to areas designated by local jurisdictions as Priority Funding Areas (PFAs). PFAs include the land within the Baltimore and Washington beltways, established towns, cities, and rural villages, and other existing and proposed communities of sufficient residential and commercial densities. The entire MD 175 Phase II study area lies within designated PFAs.

In addition, Odenton is one of three areas designated for "town center" development in Anne Arundel County. Although just to the west of the study area, the mixed-use, transit-oriented development near the Odenton MARC station is in compliance with Maryland Smart Growth laws. Additionally, to support planned growth at the local level, the state designated Odenton as a PFA and a Designated Neighborhood in the 1997 Priority Funding Areas Act. This Act allows funding for infrastructure and business development to be used in the Odenton area.

Area Master Plans

MD 175 Phase II is located in Anne Arundel County's Odenton Small Area Planning region. In addition, there are several other master plans that include recommendations for the study area, which are described below:

- The 2003 Odenton Small Area Plan
- The 2003 Odenton Town Center Master Plan
- The 2007 Odenton Trails Schematic Plan
- The 2003 Anne Arundel County Bicycle and Pedestrian Master Plan
- The 2002 Anne Arundel County Greenways Master Plan.

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Findings Summary

Odenton Small Area Plan (September 2003): The Odenton Small Area Plan envisions Greater Odenton as a cohesive community with a balance of residential, commercial, industrial, natural, and recreational areas. Abundant pedestrian, greenway, road, and rail connections should link neighborhoods, while watersheds, wetlands, forested areas, historic sites, cultural heritage, and scenic roads are preserved. Sidewalk and streetscape improvements for MD 175 are recommended, as well as promoting the improvement, expansion, and connection of the hiker/biker trails in Odenton and West County to provide alternatives to single occupancy vehicle travel. Improvements to the limited transit services currently offered in Odenton are needed and a commuter bus system that links major employment centers with stops at the MARC rail station and major activity centers should be established. The entire project study area falls within the boundaries of the Odenton Small Area Plan.

Odenton Town Center Master Plan (November 2003): The Odenton Town Center (OTC) Master Plan includes recommendations on how to focus future growth in Odenton through the proposed OTC. The OTC will be a destination for shopping, employment, education and other services for the town center, FGGM, and the western part of Anne Arundel County. The OTC planners seek to create an urban core along with the adjacent residential areas of Odenton. MD 175 will connect the OTC with the surrounding area. In the plan, the Odenton boundary line is located at the Sappington Station Road roundabout, but for the MD 175 Phase II project, the study area extends further east to School Lane. Additionally, the core OTC location is proposed to the west of the project limits. A few of the goals of the OTC Master Plan are “creating a destination” for retail, employment, and entertainment with multi-modal transportation access and promoting transit use by residents commuting out of Odenton and workers commuting into Odenton.

Most of the study area lies within the East Odenton sub-area of the OTC Master Plan. The East Odenton area includes the commercial corridor along MD 175 between MD 170 (Telegraph Road) and the commercial businesses surrounding the roundabout at Sappington Station Road. The Master Plan supports the continued use of this area for local businesses that serve the surrounding residential communities. MD 175 is intended to remain auto-oriented with retail and service businesses. Improved pedestrian access is encouraged to support connectivity to local businesses.

Odenton Trails Schematic Plan (January 2007): The Odenton Trails Schematic Plan was completed for the Anne Arundel County Department of Recreation and Parks in 2007 with the purpose of developing a system of multi-use trail routes that connect the OTC and the MARC Station to existing and planned trails and communities in the area. In relation to this project, a pedestrian overpass across MD 175 is included as a planned trail

MD 175 Phase II Feasibility Study

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segment along the utility right-of-way located halfway between MD 170 and the roundabout at Sappington Station Road. Additionally, a future trail connection (South Shore Trail) is identified to the east of the roundabout at Sappington Station Road.

Anne Arundel County Bicycle and Pedestrian Master Plan (March 2003): The Anne Arundel County Bicycle and Pedestrian Master Plan includes recommendations for a pedestrian improvement zone involving connections from MD 175 to the Odenton MARC Station and the proposed OTC. Additionally, pedestrian-safe intersections should be created and access to off-road trails and public transportation should be increased. Shared and wider outside lanes are also recommended, as well as integrating bicycling and walking as a standard part of each new development and transportation project.

Anne Arundel County Greenways Master Plan (October 2002): The goal of the Anne Arundel County Greenways Master Plan is to protect ecologically valuable lands for present and future generations. Based on the map provided in the plan, there are no protected or proposed greenways that fall within the MD 175 Phase II project limits.

Related Projects and Studies

In addition to the studies of MD 175 between MD 295 and MD 170 discussed previously, the following projects and studies are ongoing or planned in the study area. Coordination between these project teams and the MD 175 Phase II Study Team will continue throughout this study.

SHA BRAC Priority Intersection Program: In preparation for the increase in personnel at FGGM and the surrounding area, the SHA has completed a study of short-term (based on 2011 traffic) intersection improvements for a total of 35 intersections associated with the BRAC and EUL programs at FGGM. All of the intersections along MD 175 within the SHA MD 175 Project Planning Study limits were included in the analysis and development of short-term intersection improvements. This project is now in the design phase.

SHA MD 198 Project Planning Study: Due to anticipated growth in the area and BRAC recommendations, the SHA is currently studying transportation needs on MD 198 from MD 295 to MD 32. The purpose of the project is to improve existing capacity and traffic operations, enhance access to FGGM, and increase vehicular, bicycle, and pedestrian safety along MD 198, while supporting existing and planned development in the area. Alternatives include multi-lane reconstruction of MD 198 and bridge reconstruction across the Little Patuxent River and tributaries.

FGGM BRAC Near-Term Highway Corridor Study: Anne Arundel County, in partnership with Howard County, the City of Laurel, and the SHA, is conducting the FGGM BRAC Near-Term Highway Corridor Study, funded by the Office of Economic Adjustment (OEA). The purpose of this study is to perform an investigation of spot improvements at key intersections or other conflict points along several major corridors in the vicinity of FGGM. The study will include travel demand forecasting and traffic analyses, recommendations for improvements to key failing intersections, and 30 percent design plans and estimates to forward to the SHA for programming as funding becomes available.

Odenton MARC Station: Due to anticipated growth in the area and the lack of any additional area for surface parking at the Odenton MARC Station, the Maryland Transit Administration (MTA) has funding for planning and environmental documentation for a proposed 2,500-3,000 space structured parking garage at the station.

Odenton Road: Included in the Anne Arundel County Fiscal Year 2009 Capital Budget and Program, this project provides pedestrian improvements to Odenton Road recommended in the Odenton Town Plan, including sidewalks and biking improvements, to increase pedestrian and bicycling safety in the area. Phase I is the one-mile segment from Higgins Drive to Piney Orchard Parkway and Phase II is the segment from Piney Orchard Parkway to the MARC station.

Odenton Town Center Boulevard: Included in the Anne Arundel County Fiscal Year 2009 Capital Budget and Program and recognized in the General Development Plan (GDP) and Odenton Town Center plans, this project creates a roadway and sidewalk from MD 175 through the MD 32 underpass to Town Center Boulevard in Seven Oaks. This project will provide additional roadway capacity and an entrance to the Odenton Town Center development area.

The Village at Odenton Station: A.J. Properties has begun construction of a 400,000 square foot transit-oriented development (TOD) project located across from the Odenton MARC station. Containing retail, office, and housing space, this is the first major town center project in Anne Arundel County.

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Bicyclist and Pedestrian Access

Existing Facilities

Within the MD 175 Phase II study area, there is little or no bicyclist and pedestrian access. No sidewalks are present, except alongside the Sappington Station Road roundabout, and travel lanes are not wide enough to accommodate bicycle traffic along with vehicular traffic.

Consistency with Bicycle and Pedestrian Master Plan

As previously noted, the Anne Arundel County Bicycle and Pedestrian Master Plan includes recommendations for access to off-road trails and shared and wider outside travel lanes. Any proposed improvements in this study will take these recommendations into account.

Summary of Project Purpose and Needs

The MD 175 corridor is one of the fastest growing areas in Anne Arundel County and is projected to grow rapidly over the next decade due to employment and residential expansion at FGGM, development of the Odenton Town Center, and revitalization of the MD 175 corridor. Improvements to MD 175 are recommended in various local master plans, and several projects and studies are underway to improve transportation in the surrounding areas. Specifically, the Odenton Town Center Master Plan (November 2003) seeks to create an urban core along with the adjacent residential areas of Odenton, with multi-modal transportation access and improved pedestrian access encouraged.

A study of crash history was conducted to examine the safety characteristics of the study area. Although the total crash rate for the three year period (2004 through 2006) is significantly higher than the statewide average, the majority of the crashes occurred at either the MD 170 intersection (14 crashes) and at the roundabout (70 crashes), with fewer crashes reported at the other intersections along MD 175.

Within the study area limits on MD 175 between MD 170 (Telegraph Road)/Piney Orchard Parkway and School Lane, there are no access limitations. In addition to two signalized intersections, a total of 62 unsignalized access points (commercial entrances, residential driveways, and side streets) exist along MD 175 within the study area, and although pedestrians and bicyclists share the corridor with vehicular traffic, formal

sidewalks and bike paths are not present (except through the Sappington Station Road roundabout). A lack of access management is associated with disruptions to travel flow; and consolidating access may be a way to improve safety and mobility in the study area. An improvement such as adding a median to the roadway typical section would address these issues – providing pedestrian refuge, separating opposing traffic, and promoting access management.

A review of existing and projected traffic data shows that none of the intersections within the study area operate at a LOS F under existing (2005) traffic conditions during the AM or PM peak hours. Only one intersection, MD 175 at MD 170 (Telegraph Road)/Piney Orchard Parkway, is operating at LOS E (during the PM peak hour). Under 2030 No-Build traffic conditions, the MD 175 intersections with MD 170 and School Lane, as well as the roundabout, are expected to operate at LOS F during the AM or PM peak hours. Two other intersections are forecasted to operate at LOS E during either the AM or PM peak hour in 2030: MD 175 at Odenton Shopping Center Entrance I and MD 175 at Odenton Shopping Center Entrance II.

In summary, improvements are needed to increase travel safety and connectivity between Odenton and FGGM for all motorists (including pedestrians and bicyclists), accommodate multi-modal transportation access and improved pedestrian access, increase compatibility with the proposed streetscape of the Odenton Town Center and other sections of MD 175, improve management of access along MD 175, contribute to the revitalization of the North Odenton commercial district by enhancing the study area's aesthetic character, and accommodate future (2030) traffic volumes caused by planned development and BRAC activity in the Odenton area.

ENVIRONMENTAL INVENTORY AND ANALYSIS

Development of Project Base Mapping and Environmental Inventory

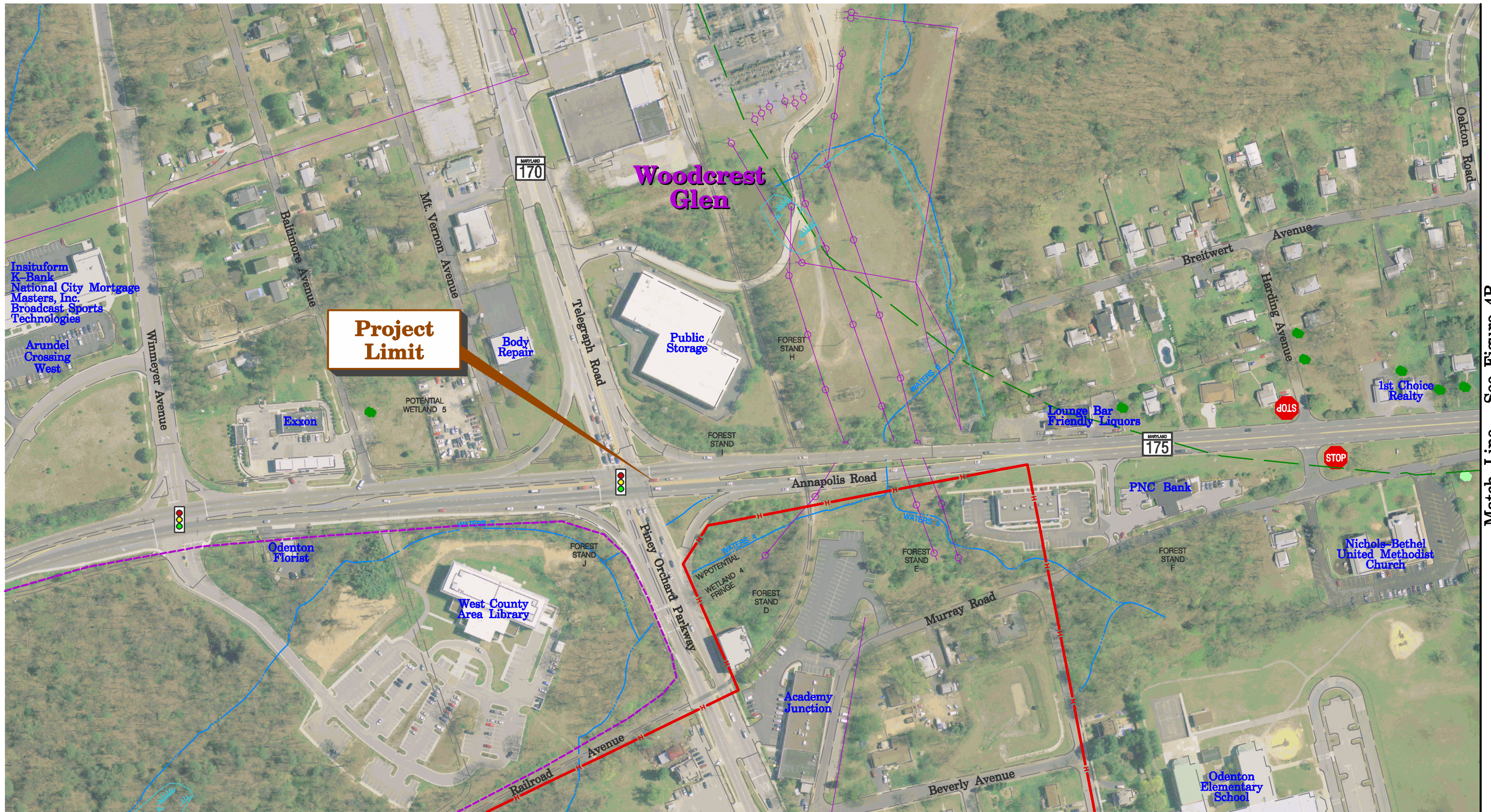
The Study Team worked with Anne Arundel County and SHA to gather various data from many sources for the MD 175 Phase II study area. The list of data sources includes recent studies in the area, accident and safety data, recent traffic impact studies, right-of-way plats, County Master Plans, and proposed development within the study corridor. Anne Arundel County and SHA provided electronic copies of the necessary layers and files of GIS mapping, including aerial photography and topographic mapping with two-foot contours.

In order to gather a baseline environmental inventory of the project area, the Study Team surveyed in-house/office resources, existing available GIS environmental inventory data, including historic resource data, and visited the site to visually confirm the location and extent of these resources. No detailed fieldwork, such as wetland delineations, was completed for this study. Sources of information included the use of existing SHA and Anne Arundel County GIS databases, the Maryland Department of the Environment (MDE) toolbox, Federal Emergency Management Agency (FEMA) floodplain maps, National Wetland Inventory (NWI) wetland maps, and other readily available information. All relevant environmental information was also included on the project base mapping. A summary of the environmental features in the study area is included below. All resources are shown on **Figures 4A-C**.

Land Use

Land use in the study area consists of commercial and residential uses with several wooded areas interspersed. On the south side of MD 175 between MD 170 and Sappington Station Road, there are two large shopping areas, the Academy Junction Plaza and the Odenton Shopping Center. Several additional commercial and office establishments such as fast food restaurants, banks, insurance companies, and gas stations are located within the study area, with direct access from MD 175. Two health care facilities and two institutional facilities are also located within the study area: Odenton Medical Center, Johns Hopkins Medicine of Odenton, Arundel High School, and the West County Area Library. Odenton Elementary School is located adjacent to the study area on Odenton Road, with access from Oakton Road and MD 175. There is one church located along the south side of MD 175, the Nichols Bethel United Methodist Church. An assisted living facility is located on the north side of MD 175, east of Sappington Station

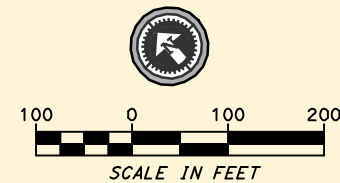
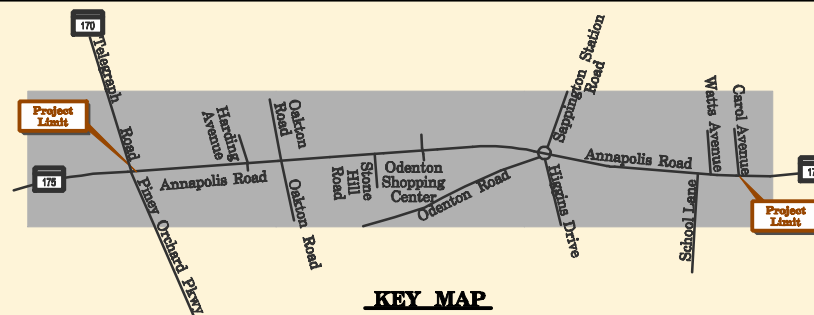
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Match Line - See Figure 4B

Legend

- Potential Specimen Tree
- Tree with DBH > 24 inches
- Forest Stand
- Business Name
- Electric Overhead Cables
- MD Inventory of Historic Properties
- National Wetlands Inventory Stream
- Streams
- Drainage / Swale
- Archaeological Site
- Historic District
- Sensitive Species Project Review Area
- Special Treatment Area
- Existing Traffic Signal



MD 175 (Annapolis Road) Phase II
 From MD 170 to School Lane



Environmental Resources

DATE: July 2009
 SCALE: As noted



FIGURE:
4A

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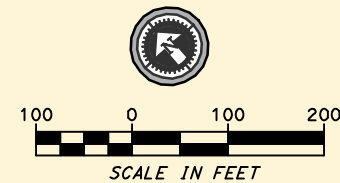
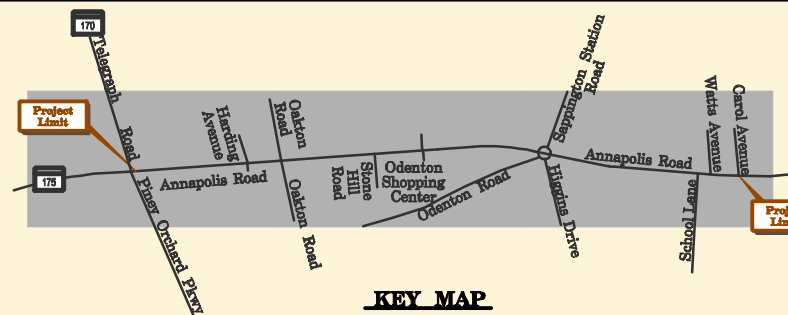
Match Line - See Figure 4A



Match Line - See Figure 4C

Legend

- Potential Specimen Tree
- Tree with DBH > 24 inches
- Forest Stand
- Business Name
- Electric Overhead Cables
- MD Inventory of Historic Properties
- ▨ National Wetlands Inventory
- National Wetlands Inventory Stream
- Streams
- Drainage / Swale
- ▭ Archaeological Site
- ▭ Historic District
- ▭ Sensitive Species Project Review Area
- ▭ Special Treatment Area
- ⬡ Existing Traffic Signal



MD 175 (Annapolis Road) Phase II
 From MD 170 to School Lane



Environmental Resources

DATE:
July 2009
 SCALE:
As noted

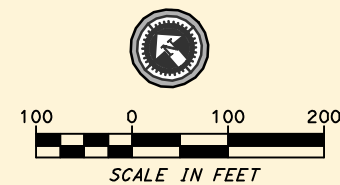
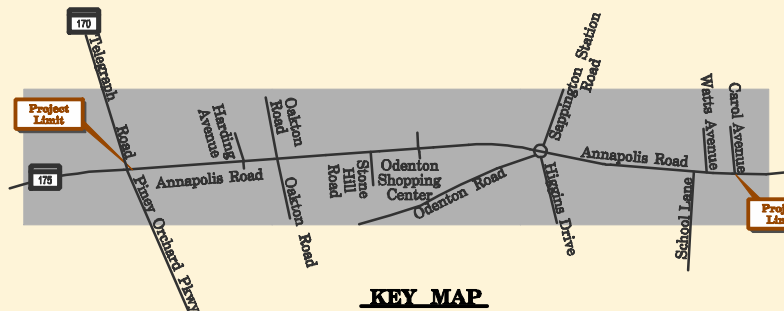


FIGURE:
4B

Match Line - See Figure 4B



- Potential Specimen Tree
- Tree with DBH > 24 inches
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- MD Inventory of Historic Properties
- National Wetlands Inventory
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- Streams
- Drainage / Swale
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- Sensitive Species Project Review Area
- Special Treatment Area
- Existing Traffic Signal



MD 175 (Annapolis Road) Phase II
 From MD 170 to School Lane



Environmental Resources

DATE:
July 2009
SCALE:
As noted



FIGURE:
4C

Road. The only residential areas located immediately adjacent to MD 175 are located between Sappington Station Road and School Lane.

Large mature trees between the roadway and homes provide screening, shade and aesthetic qualities. Land uses and land cover types mapped by the Maryland Department of Planning (MDP) in 2002 were shown in **Figure 2** (Land Use Map).

Due to the many commercial properties adjacent to MD 175, there may be several facilities that generate, handle, or store hazardous materials. Potential hazardous waste sites within the study area include two gas stations, car maintenance shops, and dry cleaners. Another potential hazardous waste site is a former gas station (currently closed) located on the corner of MD 175 and Odenton Road, west of the Sappington Station roundabout.

Cultural Resources

According to the Maryland Historical Trust (MHT) database, there are no National Register of Historic Property (NRHP) sites located within the project study area. A small portion of the Odenton Historic District exists within the study area, on the southeast side of the MD 175 and MD 170 intersection. Two properties listed in the Maryland Inventory of Historic Properties (MIHP) are located along MD 175, east of the Sappington Station roundabout, outside any potential impact area for the project. Site AA-1019 is a residential structure that is accessed from but not visible from MD 175. Site AA-876 is located on the north side of MD 175, east of School Lane. Additional coordination with the MHT will be needed to determine the status of these sites on the MIHP and whether any new determinations have been made in study area.

The Odenton Town Center Master Plan, Archeological Resources Map (page 53) of known sites and potential sites shows there are no archeological resources known to exist within the project study area. Further coordination with the MHT to identify potentially significant cultural resources will be conducted concurrent with the Project Planning Study.

Natural Environmental Resources

Sensitive Species Project Review Area

An investigation of readily available information identified a portion of the study area within a broad area identified by the Maryland Department of Natural Resources (DNR)

MD 175 Phase II Feasibility Study

Findings Summary

as a Sensitive Species Project Review Area (SSPRA). Coordination with DNR would be necessary during any future planning study in order to determine what plant, animal, or aquatic species are present within this area and what precautions are necessary.

Special Treatment Area

As shown in the Odenton Town Center Master Plan (2003), two Special Treatment Areas exist within or adjacent to the study area. The purpose of this designation is to identify areas that contain natural features that could be damaged by development activities. One Special Treatment Area exists along the eastern perimeter of the West County Area Library and includes a stream with a forested buffer. It also includes a forested wetland; however the wetland is located west of the library parking lot, outside of the study area. A second Special Treatment Area is located between the Bonaventure Community, the Winmark office complex and the Lions Gate community, and terminates on the north side of MD 175. The specific area identified is a tributary to the Picture Spring Branch, which contains significant floodplain, wetlands, and steep slopes. Picture Spring Branch flows to the Severn Run Environmental Area and the Severn River.

Wetlands and Waters of the U.S.

The study area is located within the Severn River watershed, with tributaries draining to Severn Run and Jabez Branch. Streams within the study area are classified as Use I-P waters (Protection of fish and aquatic life and contact recreation, including drinking water). Generally, no work is permitted in these streams during the period of March 1 through June 15 during any year.

A review of historical mapping of tributaries to the Severn Run was conducted prior to a field investigation to identify potential wetlands and other Waters of the U.S. that may be present in the study area. Comparison of historical mapping, recent photography, and County base mapping suggests that some tributaries have been relocated, culverted, and straightened as part of past land use changes. In addition, existing stormwater management facilities along MD 175 may have altered hydrology to wetlands shown on National Wetland Inventory (NWI) maps (1981-1982). Two tributaries to the Severn Run, the Picture Stream Branch and the Jabez Branch lie within the study area.

Seven stream segments were identified within the study area. One stream (Waters 1) is a headwater stream feeding into Jabez Branch to the east. This stream has been channelized through the study area, parallel to and north of MD 175, from just west of Sappington Station Road to beyond the eastern limits of the project. The remaining stream channels

MD 175 Phase II Feasibility Study

Findings Summary

appear to drain to Severn Run. Refer to the Proposed Alternative maps for the location of these waters. According to the Federal Emergency Management Agency floodplain mapping the 100-year floodplain does not extend south to these study area streams.

NWI mapping identifies one palustrine forested (PFO) wetland (Wetland 3) located on the north side of MD 175, across from the Odenton Shopping Center. Field verification of this wetland area shows the wetland still exists, however it is not as large as illustrated on the NWI, but has migrated closer to the stream channel.

Four additional potential wetland areas are located within the study area. Wetland 1 is located in the northwest corner of the MD 175/Sappington Station Road roundabout. It is a palustrine emergent/palustrine scrub/shrub wetland (PEM/PSS) surrounding the Waters 1 tributary. Waters 1 connects by culvert beneath MD 175 to a small drainage area adjacent to a closed gas station on the south side of MD 175. This area has been identified as potential Wetland 2. It is a man-made feature, however due to the hydrologic connection, hydrophytic vegetation has been established. Areas of this drainage feature have been lined with rip-rap and/or streambed netting.

Potential Wetland 4 is a small PEM/PFO wetland fringe along Waters 4, located within the southeast quadrant of the MD 175/MD 170 intersection and is flanked by railroad tracks to the east. The final potential wetland area (Wetland 5) is located on the north side of MD 175, west of MD 170, between Mt Vernon Avenue and Baltimore Avenue. The area appears to be a wet meadow with scattered broadleaf cattail and horsetail species and a magnolia tree. Soils in the area exhibited hydrologic indicators. This area is described in the *MD 175 Feasibility Study from MD 295 (Baltimore-Washington Parkway) to MD 170 (Telegraph Road)* (2006).

Forest

During the site reconnaissance, there were 10 forest stands identified within the study area which are labeled as Stands A through J on the Proposed Alternative maps. The forested areas identified are mostly early successional stands and many are significantly influenced by invasive plant species. Historical documentation was reviewed to ascertain what natural forest stand species exist within the study area. The *Vegetation Map of Maryland, The Existing Natural Forests* (Brush, 1976) shows the majority of Odenton at that time was forested. The forest association encompassing the majority of this MD 175 study area is the Chestnut Oak, Post Oak, Blackjack Oak Association. This community commonly contains red maple (*Acer rubrum*), black gum (*Nyssa sylvatica*), white oak (*Quercus alba*), sassafras (*Sassafras albidium*), American holly (*Ilex opaca*), Virginia

MD 175 Phase II Feasibility Study

Findings Summary

pine (*Pinus virginiana*), black oak (*Quercus velutina*), American beech (*Fagus grandifolia*), flowering dogwood (*Cornus florida*), sweet gum (*Liquidambar styraciflua*), scarlet oak (*Quercus coccinea*), Spanish oak (*Quercus falcata*), mockernut hickory (*Carya tomentosa*), black cherry (*Prunus serotina*), and sweet pignut hickory trees (*Carya glabra*). Understory species consist of greenbriers (*Smilax spp.*), Japanese honeysuckle (*Lonicera japonica*), Virginia creeper (*Parthenocissus quinquefolia*), dwarf huckleberry (*Gaylussacia dumosa*), mountain laurel (*Kalmia latifolia*), southern arrowwood (*Viburnum dentatum*), and tall deerberry (*Vaccinium stamineum*).

Many of these natural species listed above were identified during the site reconnaissance as existing within the 10 forest stands. The tree species most commonly observed in the forest stands were black cherry, red maple, and sweetgum. Several other edge species and invasive species such as black locust (*Robinia pseudoacacia*), tree-of-heaven (*Ailanthus altissima*), multiflora rose (*Rosa multiflora*), fragrant honeysuckle (*Lonicera fragrantissima*), and poison ivy (*Toxicodendron radicans*) are also existent throughout the study area.

Population Characteristics

The MD 175 study area has experienced rapid population growth in the past and is anticipated to experience additional growth as a planned growth area and as nearby Fort George G. Meade expands to support the result of the 2005 Base Realignment and Closure (BRAC) process.

Between 1970 and 2000, the County's population has increased by 64.3%, growing from 298,042 to 489,656. The County's population is expected to continue to increase by 15.4% between 2000 and 2030.

Population and Demographics

The U.S. Census identifies Odenton as a census designated place (CDP). Population change between 1990 and 2000 and demographic data for year 2000 was determined for the Odenton CDP. The population for the Odenton CDP was 12,833 in 1990 and 20,534 in 2000, an increase of 61 percent.

Using Census 2000 data, the racial distribution within the Odenton CDP shows that the percent minority is 20 percent, slightly higher than that of the County average of 19 percent. There are fewer individuals living below the poverty level (1999) in the Odenton CDP than the County as a whole, 2.5 and 5.1 percent respectively. The median incomes

for the Odenton CDP and the County are \$61,768 and \$65,563, respectively. **Table 9** compares minority populations, persons living below the poverty level, and median incomes for the Odenton CDP and Anne Arundel County.

Table 9
Demographic Distribution in the 2000 Census

Category	Odenton CDP		Anne Arundel County	
	Total	Percent	Total	Percent
Total Population	20,636	100	489,656	100
White	16,453	79.7	397,893	81.3
Black or African American	2,605	12.6	65,280	13.3
American Indian and Alaskan Native	78	0.4	1,533	0.3
Asian	736	3.6	1,1380	2.3
Native Hawaiian and Other Pacific Islander	0	0	252	0.1
Some other race alone	108	0.5	4,007	0.8
Two or more races	656	3.2	9,311	1.9
Minority	4,183	20.3	91,763	18.7
Persons at or Below Poverty (1999), with total population in parentheses	507 (20,582)	2.5	24,335 (473,849)	5.1
Median Income	61,768	-	65,563	-

Projected Population, Households, and Employment in Odenton

The most recent population, household, and employment projections from Anne Arundel County’s Subarea Model 2 (SAM2) for West County, which represents a local refinement

of the Baltimore Metropolitan Council’s (BMC) Round 7A data, were used for this study to show anticipated growth between 2005 and the project design year, 2030. These projections are based on land use and build out zoning (in 2030) provided in this area. As shown in **Table 10** below, total population, households and employment were tallied for the Traffic Analysis zone (TAZ) splits developed for the MD 175 study. These TAZ splits are numbered 335, 336, 337, 342, 343, 1193, 1195, 1196, 1256, and 1260.

Table 10
Population, Households and Employment
for the Study Area Traffic Analysis Zones

Category	2005	2030	Percent Change
Population	6,503	10,683	64.3%
Households	2,597	4,805	85.0%
Employment	4,328	15,062	248.0%

Source: Anne Arundel County Subarea Model 2 for West County

As shown in **Table 10**, the County anticipates the number of households within the study area will increase from 2,597 to 4,805, a change of 85 percent. Employment within the study area, which includes the Odenton Town Center, is expected to increase from 4,328 in 2005 to 15,062 in 2030, an increase of 248 percent. For comparison purposes, the following table (**Table 11**) shows the total population, households and employment for the County as a whole, using data for all regions in the Subarea 2 model. **Table 11** shows countywide changes are less pronounced than inside Odenton, a designated growth area within the County.

Table 11
Population, Households and Employment
for Anne Arundel County

Category	2005	2030	Percent Change
Population	515,830	580,940	12.6%
Households	193,263	233,390	20.8%
Employment	326,156	456,645	40.0%

Source: Anne Arundel County Subarea Model 2 for West County

ALTERNATIVES DEVELOPMENT

The Proposed Alternative for the MD 175 Phase II corridor was developed to address the project needs described in the Purpose and Need Statement and to consider the many resources in the study area. The Proposed Alternative includes segments of three-, four-, and five-lane typical sections, horizontal and vertical alignments, intersection improvements, and bicycle and pedestrian accommodations. This alternative assumes total reconstruction through the study area, which is reflected in the cost estimate discussed later in the report.

Initially, three concepts were developed for the MD 175 Phase II Feasibility Study. Concept 1 was developed by applying a four-lane typical section to the existing centerline of MD 175 throughout the entire corridor. Concept 2 was developed by applying a five-lane typical section to the existing centerline of MD 175 throughout the entire corridor. No shifts to the alignment were considered under Concepts 1 and 2. Concept 3 was developed to identify access management measures along the corridor that consolidated and closed some of the numerous unsignalized access points that exist along MD 175. Based on feedback received from the study team, a single alternative that combined aspects of Concepts 1, 2, and 3 was developed along the existing centerline.

Design Criteria

Horizontal and vertical geometry was based on SHA design standards, the American Association of State Highway and Transportation Officials (AASHTO) “Green Book,” and supporting guidance manuals.

The project design criteria consists of the following:

- Design speed: 45 mph minimum (existing conditions matched)
- Design vehicle: WB-67
- Typical Section (Closed Section with median)
 - Standard pavement cross slope: 2%
 - Lane widths: 11-foot inside lane, 16-foot outside lane including a 5-foot bicycle lane
 - Sidewalk widths: 5-foot sidewalk and 10-foot hiker/biker trail
 - Clear zone widths: Minimum 1.5-foot lateral offset; 4-foot – 6-foot lateral offset desirable
 - Grading Slopes: 2:1 max tie-in slope used with 1-foot backing for fixed and variable grading sections

MD 175 Phase II Feasibility Study

Findings Summary

- Horizontal Alignment
 - Minimum radius or degree of curvature: 730 feet
 - Maximum super elevation: 4%
 - Minimum tangent between curves: 133 feet
- Vertical Alignment
 - Minimum grade: 0.5%
 - Maximum grade: 6%
 - Stopping sight distance: 360 feet
 - K value (sag curve): 79
 - K value (crest curve): 84
 - Roadway overpass minimum vertical clearance: N/A

Typical Sections

Typical sections developed for the MD 175 Phase II Feasibility Study Concepts 1 and 2 are shown in **Figures 5, 6, and 7.**

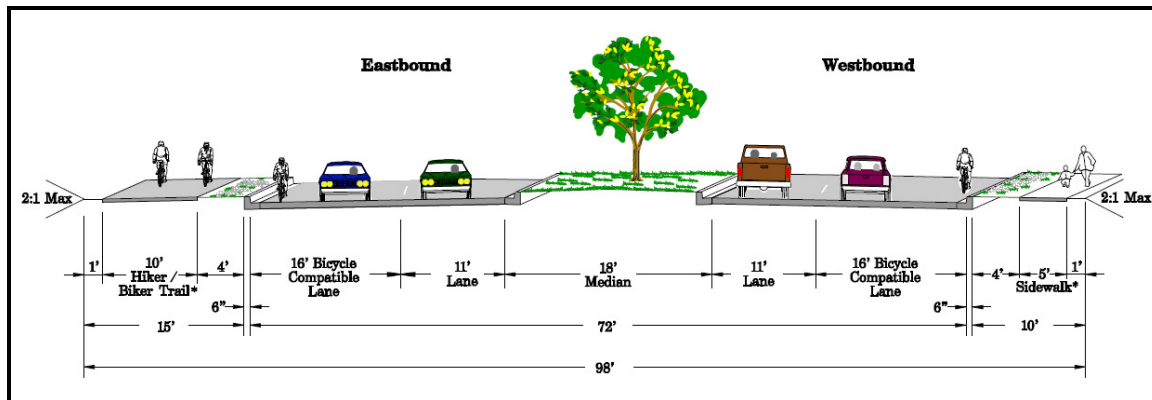


Figure 5: Four-Lane Typical Section from MD 170 to the Sappington Station Road Roundabout

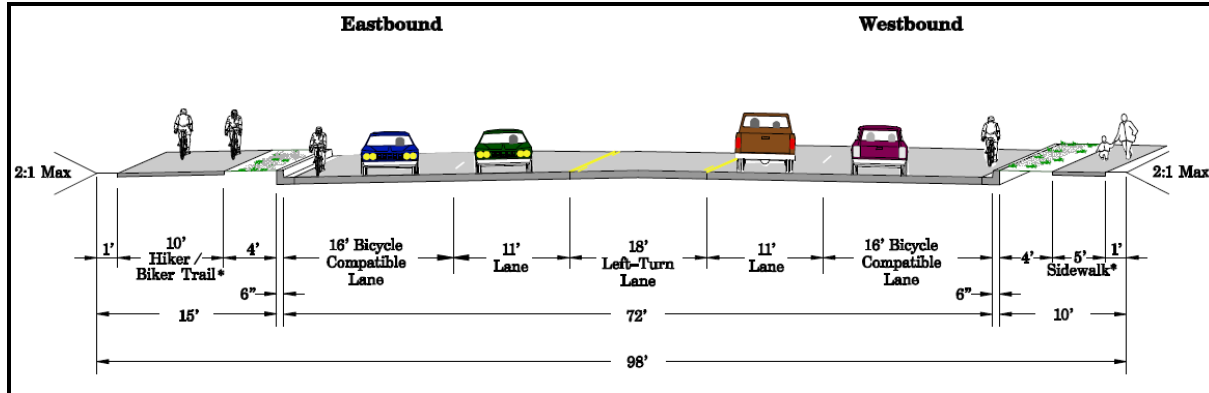


Figure 6: Five-Lane Typical Section from MD 170 to the Sappington Station Road Roundabout

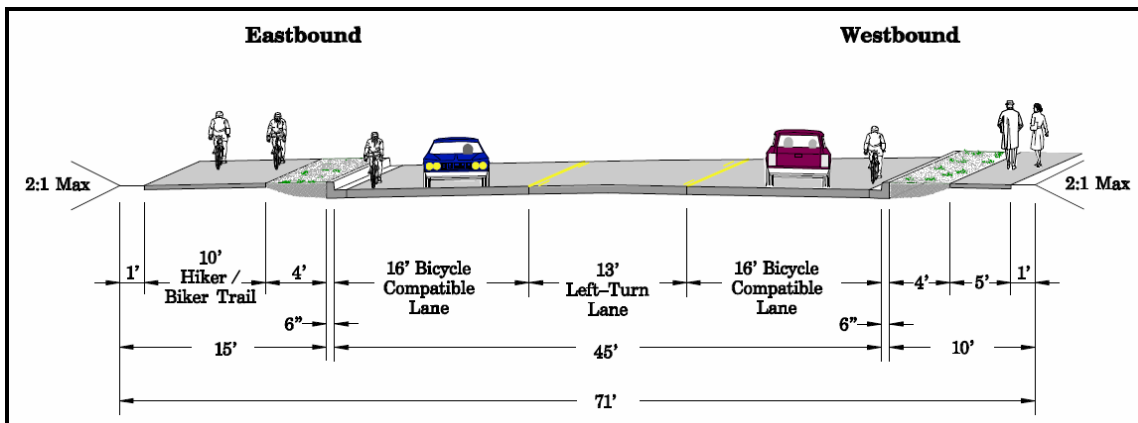


Figure 7: Three-Lane Typical Section from the Sappington Station Road Roundabout to School Lane

Concept 1 was developed by applying a four-lane typical section to the existing centerline of MD 175 throughout the entire corridor. Concept 2 was developed by applying a five-lane typical section to the existing centerline of MD 175 throughout the entire corridor. Based on feedback received from the Study Team, a single alternative that combined aspects of Concepts 1, 2, and 3 was developed along the existing centerline. This alternative assumes total reconstruction through the study area.

The Proposed Alternative builds on the typical section recommendation of the 2003 Odenton Town Center Master Plan, with provisions for continuous sidewalks and a landscaped median, along with safety improvements and future traffic needs. No roadway

MD 175 Phase II Feasibility Study

Findings Summary

mainline capacity improvements between intersections were deemed necessary to accommodate future traffic conditions and four lanes are sufficient to accommodate future traffic volumes. However, some intersections will require improvements.

Although pedestrians and bicyclists share the corridor with vehicular traffic, formal sidewalks and bike paths are not currently present throughout the corridor (except through the Sappington Station Road roundabout). Increased pedestrian access with sidewalk and bicycle path connectivity matches the design from the Phase I study. The addition of a median to the roadway typical section provides pedestrian refuge and improves safety by separating opposing traffic.

Between MD 170 and the Sappington Station Road roundabout, the roadway section will predominantly consist of four lanes with a median, to enhance safety and access management through the corridor. In areas where numerous access points will remain, a center turn lane will be introduced instead of a median. East of the roundabout, a three-lane section will be introduced that incorporates a center turn lane into the typical section. With the four- and five-lane typical sections, it should be noted that the width of the sidewalk and bicycle path can be increased depending on future development needs and could be constructed to abut the front of a building, if desired.

Access Management Measures

Currently, a total of 62 unsignalized access points (commercial entrances, residential driveways, and side streets) exist along MD 175 within the study area. The addition of a median to the roadway typical section promotes access management.

In order to promote and accommodate access management, three intersection improvements were developed as part of the Proposed Alternative. These proposed intersection improvements are described below:

1. MD 175 at Harding Avenue

Although the intersection of MD 175 and Harding Avenue is not projected to operate at an undesirable level of service in 2030, the addition of a median to force right-in/right out movements between MD 175 and Harding Avenue is proposed as an access management measure.

2. MD 175 at Oakton Road

The intersection of MD 175 and Oakton Road is not projected to operate at an undesirable level of service in 2030, but the addition of a center turn lane is proposed to provide access to businesses on both sides of MD 175 and improve traffic operations at this intersection. The closure of Murray Road at Oakton Road is also proposed to enhance safety and traffic operations.

3. MD 175 at Stone Hill Road

The intersection of MD 175 and Stone Hill Road is not projected to operate at an undesirable level of service in 2030, but the addition of a median throughout this intersection is proposed to provide a left-turn lane from westbound MD 175 and improve traffic operations.

Access management measures are shown on the Proposed Alternative mapping (**Figures 8A-C**). The right-of-way offset shown on the Proposed Alternative mapping contains a 10-foot buffer that can be used for utility relocation.

Intersection Improvements

Because the intersection of MD 175 and MD 170 is included in the current SHA Project Planning Study, no improvements were recommended at this location. Improvements to this intersection resulting from SHA's study will be coordinated with the MD 175 Phase II study to tie the two projects together.

In addition to the access management intersection improvements, four other intersection improvements were developed as part of the Proposed Alternative to accommodate projected 2030 traffic volumes and achieve a LOS D or better, where possible. The proposed intersection improvements are described below and shown on the Proposed Alternative mapping (**Figures 8A-C**):

1. MD 175 at Odenton Shopping Center Entrance I

The intersection of MD 175 and the signalized entrance to the Odenton Shopping Center is projected to operate at LOS E in 2030. In order to operate at LOS D in 2030, the following intersection improvements are proposed:

- Relocate the signalized intersection to the east in order to align the entrance with that of the Winmark Center
- Add a second northbound left turn lane exiting the shopping center
- Add a median throughout the intersection and provide left-turn bays on MD 175 in both the eastbound and westbound direction.

2. MD 175 at Odenton Shopping Center Entrance II

The intersection of MD 175 and the unsignalized entrance to the Odenton Shopping Center is projected to operate at LOS E in 2030. In order to operate at LOS D or better in 2030, a median is proposed throughout the intersection, with an added left-turn lane on westbound MD 175 to improve traffic operations.

3. MD 175 at the Sappington Station Road Roundabout

At the Sappington Station Road roundabout, the traffic volume counts provided by Anne Arundel County do not correspond with observed conditions – namely the southbound Sappington Station Road to eastbound MD 175 movement. As a result, the forecasted turning movement volume from southbound Sappington Station Road to eastbound MD 175 appears to be too high. If carried forward as a Project Planning Study, this data should be re-evaluated based on new counts of the roundabout traffic.

Based on the forecasted volumes, the Sappington Station Road roundabout is projected to operate at LOS F in 2030. To avoid complete or significant reconstruction, the following improvements are proposed, although traffic operations are still projected to operate at LOS F:

- Add a slip ramp from southbound Sappington Station Road to westbound MD 175 so that vehicles travelling in this direction can avoid entering the roundabout
- Remove existing pavement striping on northbound Sappington Station Road in order to obtain two lanes in the northbound direction.

Due to the safety concerns at the Sappington Station Road roundabout, recent safety measures put in-place at the roundabout (signage, etc.) should be monitored

for effectiveness. Additionally, traffic volumes should be counted again in the future and compared to forecasted volumes from this study

4. MD 175 at School Lane

As with the traffic counts at the Sappington Station Road roundabout, if carried forward as a Project Planning Study, the data should be re-evaluated based on new counts of the roundabout traffic in the eastbound MD 175 direction. Based on available data, the intersection of MD 175 and School Lane is projected to operate at LOS F in 2030. In order to improve safety and create pedestrian refuge, a median is proposed east and west of the intersection, along with the addition of an eastbound right-turn lane. Based on the available data, these improvements improve intersection operations to LOS E in 2030.

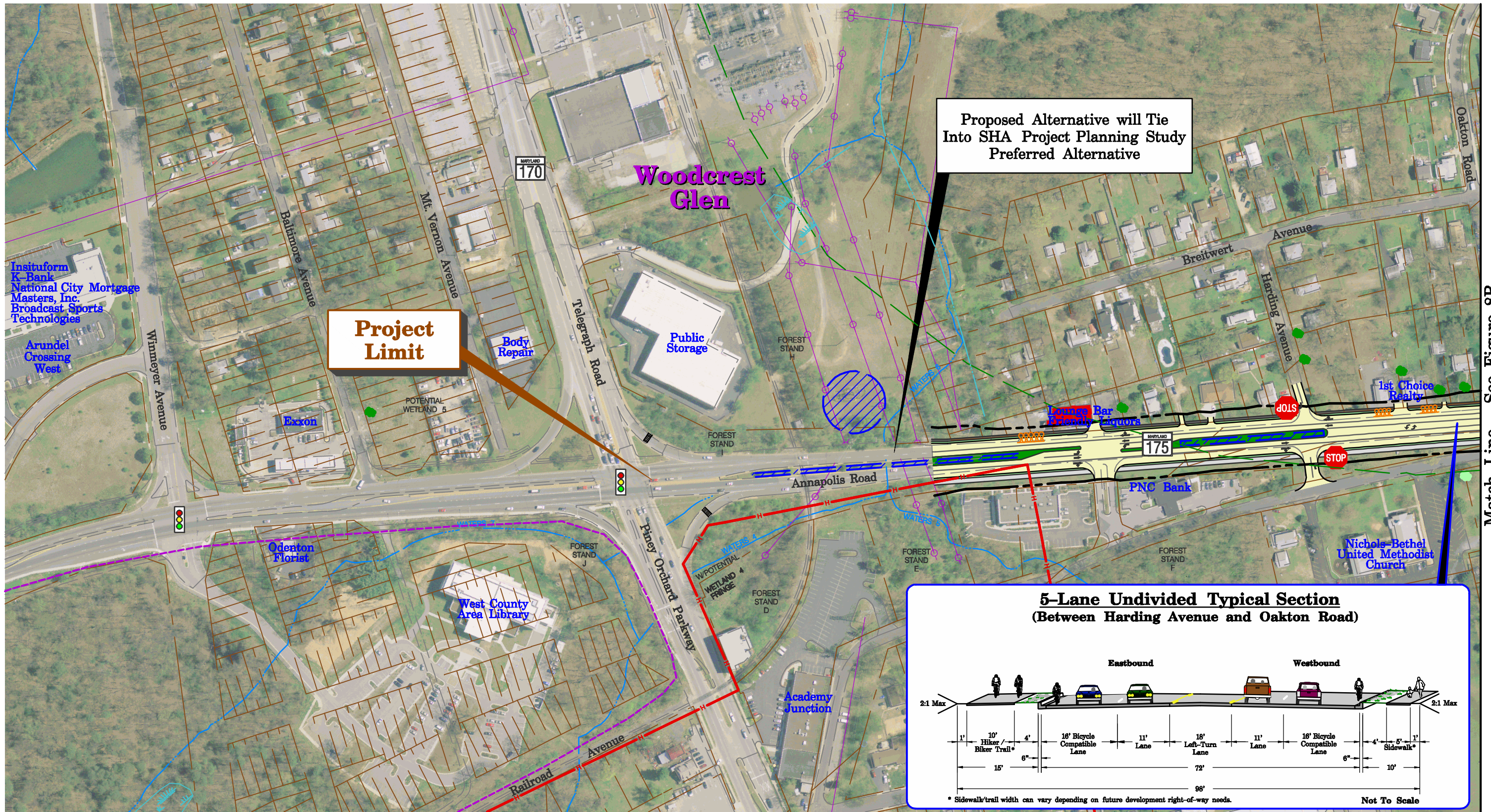
In order to determine length requirements for turn lanes at each intersection, Maryland SHA Queuing Analysis was conducted under 2030 volume conditions. This analysis produces the minimum length needed for each turn bay and the results are presented in **Table 12**.

Table 12
2030 Maryland SHA Queuing Analysis

Intersection with MD 175	Lane	Minimum Queue Length Needed (Feet)
Harding Avenue	EBL	15
	WBL	15
Oakton Road	EBL	23
	WBL	53
Stone Hill Road	WBL	18
Odenton Shopping Center Entrance I	WBL	58
Odenton Shopping Center Entrance II	WBL	306
School Lane	WBL	272

Traffic analysis for the 2030 Build condition at each intersection is available in **Appendix C**, which can be found on the CD at the back of this report.

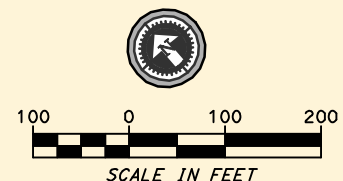
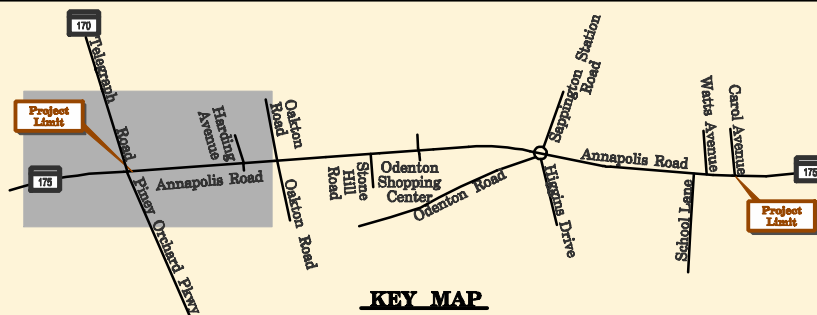
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Match Line - See Figure 8B

Legend

- Existing Property Line
- Proposed Right-of-way
- Potential Specimen Tree
- Tree with DBH > 24 inches
- Forest Stand
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- Special Treatment Area
- Potential Displacement
- Potential Stormwater Management Facility
- Access Closure
- Proposed Roadway
- Proposed Sidewalk
- Proposed Lane Lines
- Proposed Median
- Proposed Hiker-Biker Trail
- Proposed Right-of-way Line
- Existing Traffic Signal

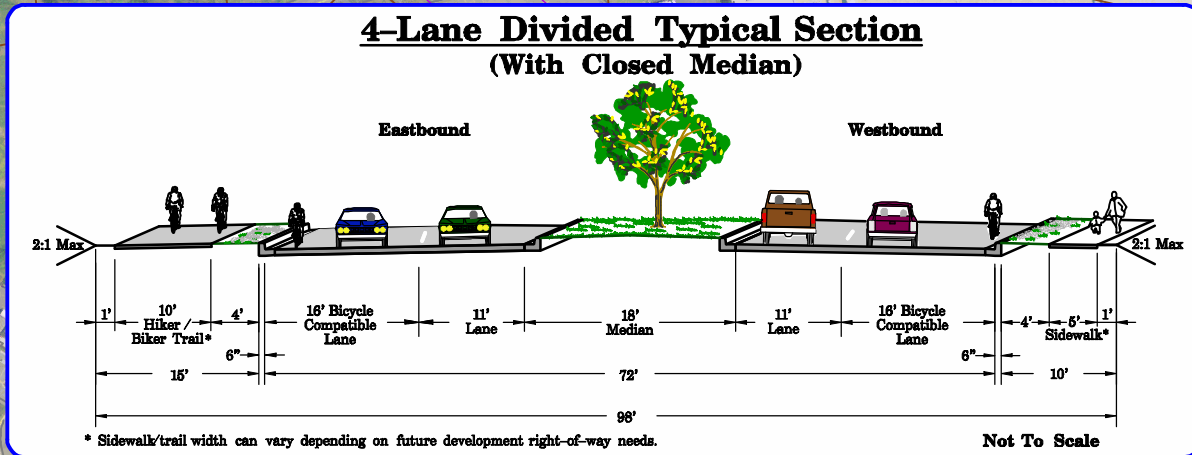
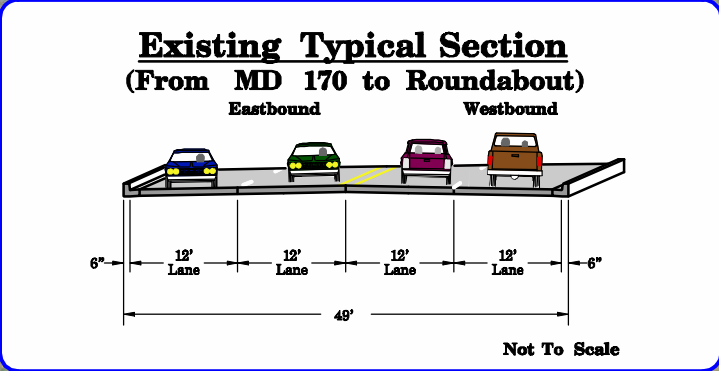
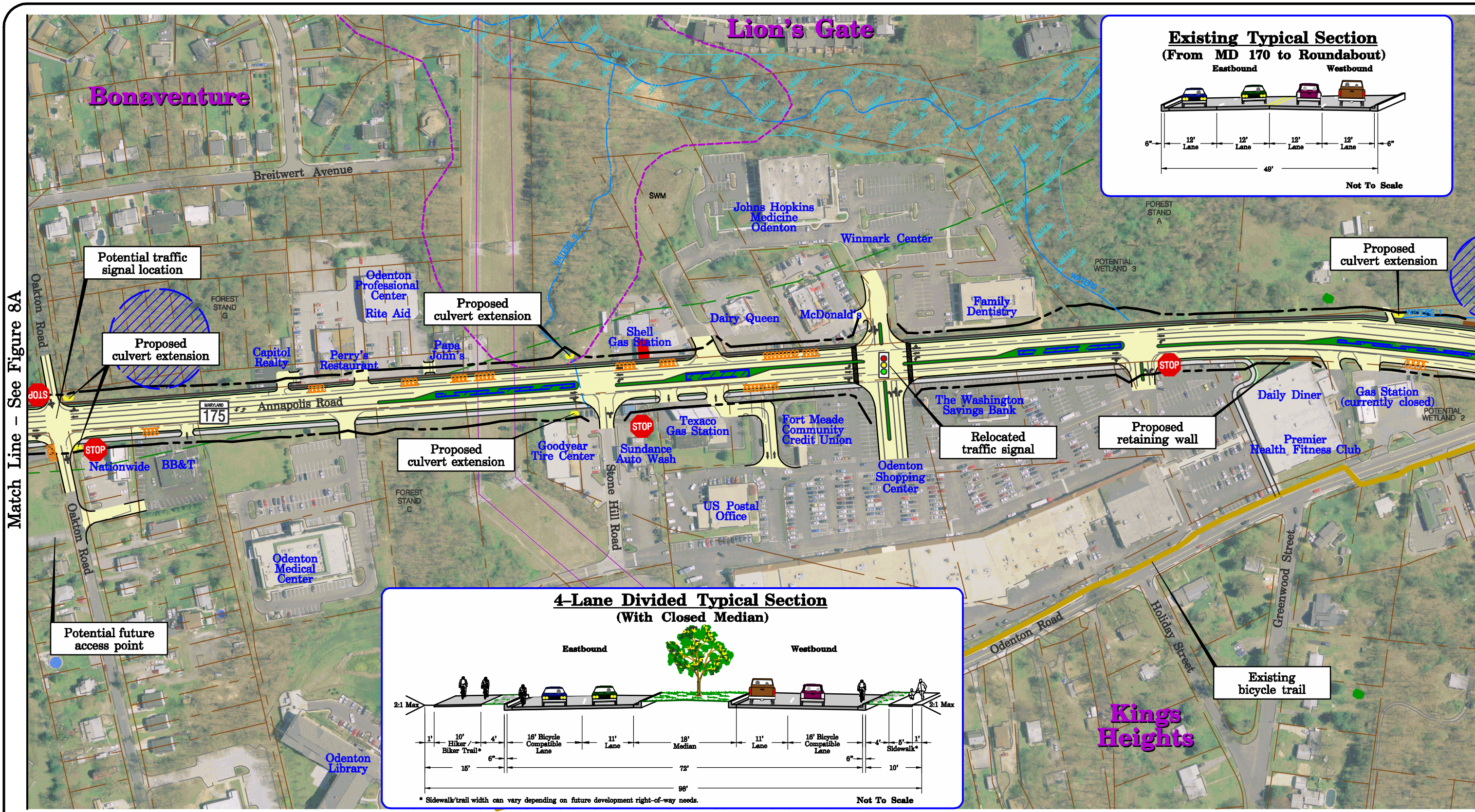


MD 175 (Annapolis Road) Phase II
 From MD 170 to School Lane

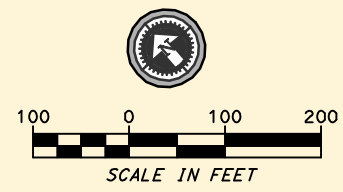
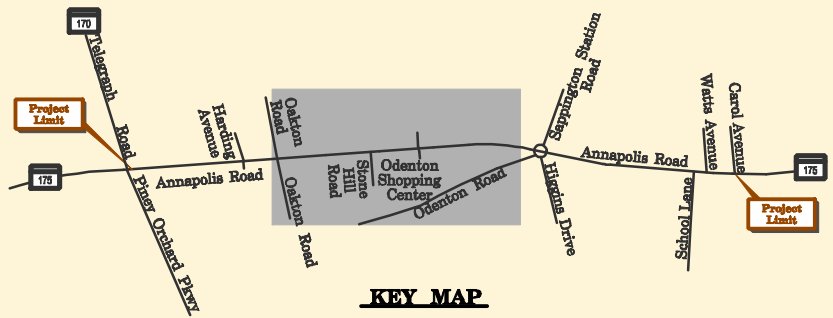
Proposed Alternative

 DATE: July 2009	 HUNT VALLEY, MARYLAND	FIGURE: 8A
SCALE: As noted		

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- #### Legend
- Existing Property Line
 - Proposed Right-of-way
 - Potential Specimen Tree
 - Forest Stand
 - Business Name
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 - National Wetlands Inventory
 - National Wetlands Inventory Stream
 - Streams
 - Drainage / Swale
 - Archaeological Site
 - Sensitive Species Project Review Area
 - Special Treatment Area
 - Potential Displacement
 - Potential Stormwater Management Facility
 - Access Closure
 - Proposed Roadway
 - Proposed Sidewalk
 - Proposed Lane Lines
 - Proposed Median
 - Proposed Hiker-Biker Trail
 - Proposed Right-of-way Line
 - Existing Traffic Signal



MD 175 (Annapolis Road) Phase II From MD 170 to School Lane

Proposed Alternative

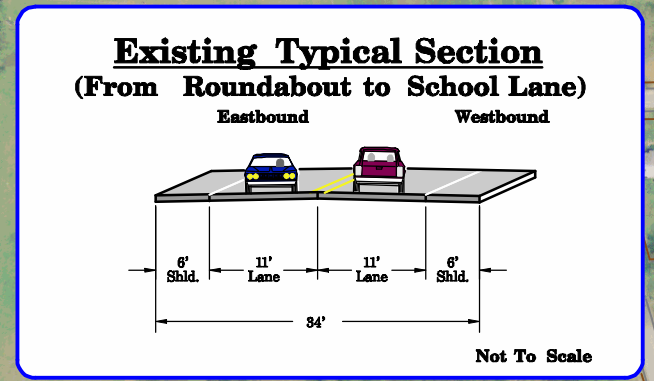
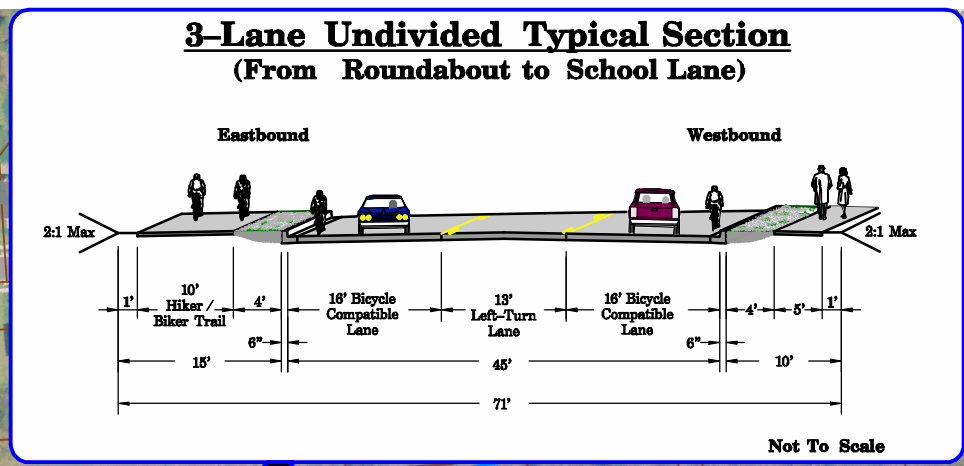
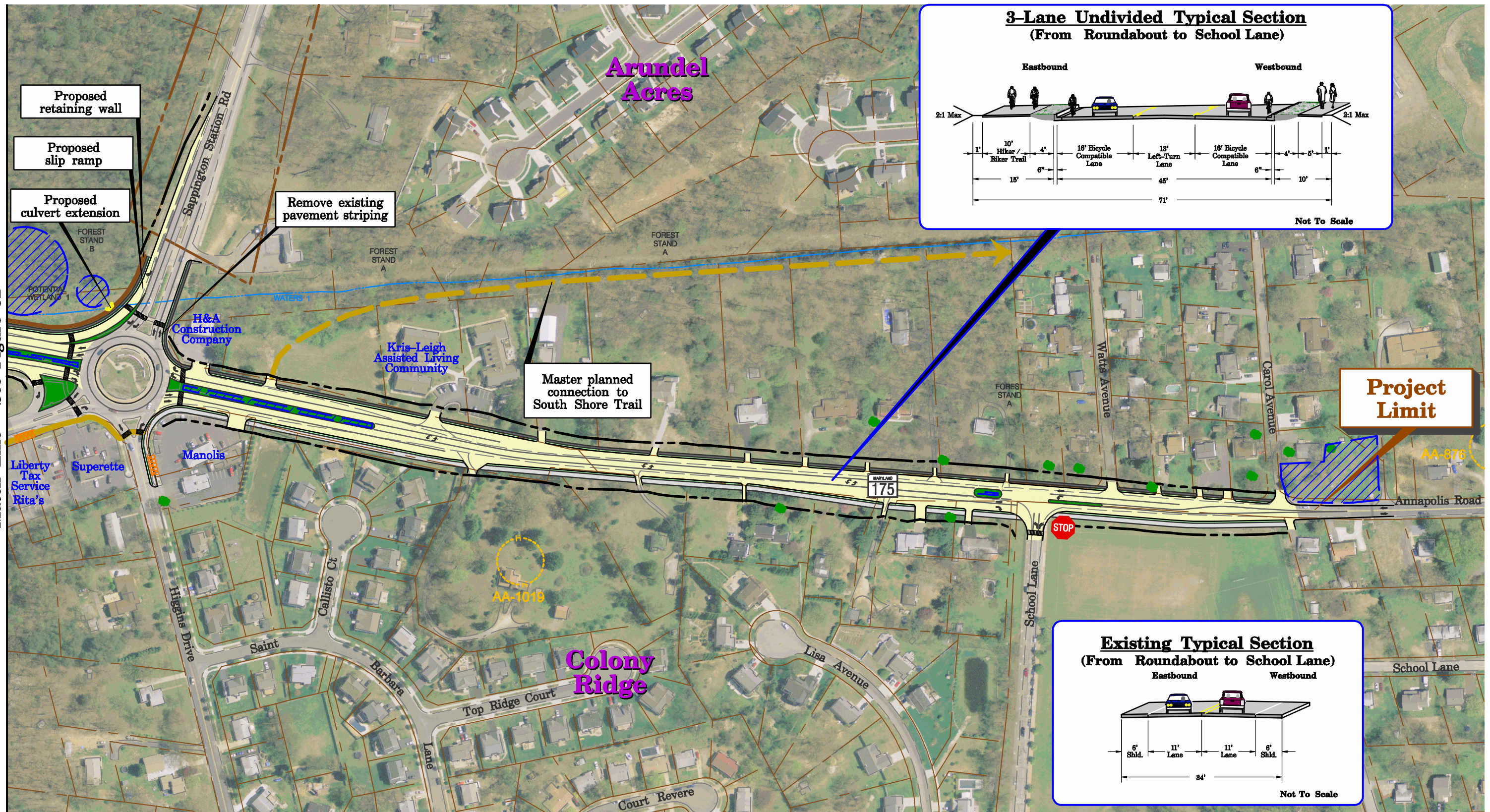
DATE: July 2009

SCALE: As noted

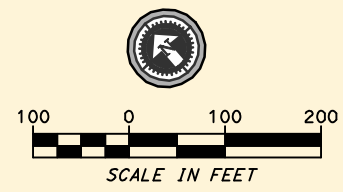
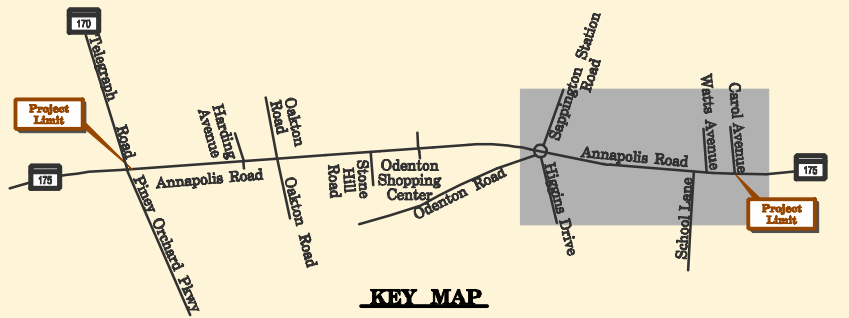
FIGURE: 8B

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Match Line - See Figure 8B



- #### Legend
- Existing Property Line
 - Proposed Right-of-way
 - Potential Specimen Tree
 - Tree with DBH > 24 inches
 - Forest Stand
 - Business Name
 - Electric Overhead Cables
 - Historic District
 - MD Inventory of Historic Properties
 - National Wetlands Inventory
 - National Wetlands Inventory Stream
 - Streams
 - Drainage / Swale
 - Archaeological Site
 - Sensitive Species Project Review Area
 - Special Treatment Area
 - Potential Displacement
 - Potential Stormwater Management Facility
 - Access Closure
 - Proposed Roadway
 - Proposed Sidewalk
 - Proposed Lane Lines
 - Proposed Median
 - Proposed Hiker-Biker Trail
 - Proposed Right-of-way Line
 - Existing Traffic Signal



MD 175 (Annapolis Road) Phase II

From MD 170 to School Lane

Proposed Alternative

 HUNT VALLEY, MARYLAND	DATE: July 2009	FIGURE: 8C
	SCALE: As noted	

Stormwater Management

In addition to roadway geometry, stormwater management (SWM) needs were identified throughout the study area. This effort was developed to assist in the identification of the potential right-of-way needed for this improvement. Working with new Maryland Department of the Environment (MDE) SWM guidelines, stormwater treatment areas were designed to be smaller and linear, where possible. Due to the lack of available land in the study area and the challenges of an urban environment, potential SWM pond locations were chosen based on existing low points and available land as part of the feasibility study. However, as new MDE SWM guidelines are still being interpreted for linear projects in urban areas, SWM design and potential locations should be revisited in the design phase.

SWM needs were developed to provide preliminary guidance as to the number and magnitude of facilities that will be required for the construction of the widening of MD 175. Potential SWM facility locations are shown on the Proposed Alternative mapping (**Figures 8A-C**). Significant surface area (2.6 acres) will be necessary to provide for surface SWM facilities for the project, due to the large amount of impervious surface area (22.8 acres) resulting from reconstruction and widening.

Preliminary concepts for SWM were developed for the widening of MD 175 based on the guidelines set forth in the April 2003 Draft by the Highway Hydraulics Department of the Maryland State Highway Administration, “*Guidelines for Preparing Stormwater Management Concept Reports*,” and the 2000 *Maryland Stormwater Design Manual*. The proposed highway construction will require both quantity and quality stormwater management facilities for both new and redeveloped pavement. Calculations for both Water Quality Volume (WQv) and Channel Protection Volume (CpV) are shown in **Table 13**, along with requirements for Overbank Protection (Qp). Qp may not be necessary for each of the drainage areas noted, but are included as part of the preliminary concepts.

The MD 175 Phase II study area was divided into six drainage areas and, for the purposes of the study, all MD 175 pavement was considered to be redevelopment or new impervious. All drainage areas other than the one closest to the intersection of MD 175 and MD 170 will require new SWM facilities – this area consists primarily of offsite drainage, which seems to be treated by an existing facility. Larger drainage areas could likely accommodate water quality with a micro pool constructed within an extended detention pond. Smaller drainage areas would more likely require a separate facility for water quality, such as a sand filter or bioretention area, and a pocket pond or pocket

MD 175 Phase II Feasibility Study

Findings Summary

wetland for CpV control. Although the table indicates bioretention for all of the smaller drainage areas, the feasibility of that particular type of facility will need to be determined at a later phase of study, once more detailed information is available. Another option incorporates bioretention facilities in the median, space permitting.

The preliminary ponds and bioretention facilities were sized assuming that the facilities would be located in the median and adjacent to the roadway. The possibility of joint use or off site facilities was not taken into consideration. Those alternatives could be taken into account during the next phase of study.

**Table 13
Stormwater Management Summary**

Drainage Area	Total Area (Ac)	Total Impervious (Ac)	WQv Req'd (Ac-Ft)	CpV Req'd (Ac-Ft)	10 Year Req'd (Ac-Ft)	Surface Area (Ac)	Type of Quality Facility
1*	2.7	0.6	0.1	n/a	0.0	-	n/a
2**	6.8	5.8	0.5	0.6	0.2	0.5	Bioretention plus micro pool/ED
3**	2.6	2.3	0.2	0.3	0.1	0.7	Bioretention plus micro pool/ED
4	6.2	5.3	0.4	0.6	0.2		
5	7.8	6.2	0.5	0.7	0.2	1.0	Bioretention plus ED
6	3.9	2.6	0.2	0.3	0.1	0.4	Bioretention plus pocket pond
<p>*Drainage area is primarily offsite, which passes through an existing facility. **Drainage areas 2 and 3 were combined to drain to one micro pool/ED</p> <p>Assumptions: WQv storage depth for DA 5 = 8" CpV storage depth = 1.5 ft Multiplied area by 1.25 grading factor</p>							

Feedback on Alternatives

Throughout the project, Study Team meetings were conducted to present progress and obtain feedback. Minutes from the Study Team meetings are provided in **Appendix D**, which can be found on the CD at the back of this report, and show the evolution of the project, as a result of Study Team suggestions and feedback.

In addition, the Study Team attended two community meetings to share information and seek input on the MD 175 Phase II project:

- Economic Development Committee of the West Anne Arundel County Chamber of Commerce (February 5, 2009)
- Odenton Town Plan Oversight Committee (April 28, 2009)

At each of these community meetings, the project background was presented, along with the purpose, scope, and schedule. A Proposed Alternative map was shown and feedback on the alternative, including locations of potential displacements, was received from those in attendance. All feedback was taken into consideration as the Proposed Alternative was refined and potential displacements were minimized.

IMPACTS AND COSTS

Assessment of Impacts

The Study Team identified the preliminary impacts of the Proposed Alternative on the socioeconomic, cultural, and natural resources based on readily available information. Resources such as businesses, parking areas, and environmental and engineering features are identified on the mapping for the Proposed Alternative. A summary of impacts associated with the Proposed Alternative is shown in **Table 14**.

Table 14
Proposed Alternative Impacts Summary Table

Impact Type	Impact
Commercial Displacements	2
Residential Displacements	0
Properties Affected	93
Right-of-Way	36.72 acres *
Wetlands	0.02 acres
Forest	4.39 acres
Stream	718.3 linear feet
Floodplain	0 acres
Specimen Trees (DBH > 24")	11
Parkland	0 acres
Odenton Historic District	0.31 acres
Parking Spaces (Total)	223
High Tension Power Line Towers	2
Light/Signal/Utility Poles	64

* 2.14 acres of right-of-way is associated with stormwater management needs

Cost Estimates

Preliminary cost estimates were developed for the Proposed Alternative using the SHA Highway Cost Estimate System and are shown in **Table 15**. These costs are based on the assumption of total reconstruction of the segment of MD 175 under study. Preliminary engineering costs were estimated as 25 percent of the construction costs, based on SHA's

recent recommendations. Right-of-way costs were reviewed by SHA’s District 5 real estate professionals. The right-of-way land cost attributed to stormwater management needs is approximately \$1.4 million. A detailed cost estimate is provided in **Appendix E**, which can be found on the CD at the back of this report.

Table 15
Proposed Alternative Cost Estimate Summary

Category	Cost Estimate
Preliminary Engineering	\$11,500,000
Right-of-Way	\$11,700,000
Construction	\$45,900,000
Total	\$69,100,000

SUMMARY AND CONCLUSIONS

The purpose of this project is to improve travel safety and connectivity between Odenton and FGGM for all motorists (including pedestrians and bicyclists), improve management of access along MD 175 between the Phase II project limits, contribute to the revitalization of the North Odenton commercial district by enhancing the study area's aesthetic character, and accommodate future (2030) traffic volumes caused by planned development and BRAC activity in the Odenton area.

Improvements along MD 175 between MD 170 and School Lane are needed to address the following factors:

- Vehicular, bicyclist, and pedestrian safety (pedestrian refuge and separation of opposing traffic)
- Accommodating multi-modal transportation access and improved pedestrian access
- Compatibility with the proposed streetscape of the Odenton Town Center and other sections of MD 175
- Access management and consolidation opportunities
- Preserving and promoting the viability of the commercial district (economic development)
- Forecasted congestion resulting from future growth and development in the area.

Travel demand forecasts for the future design year 2030 were produced using provided traffic data and were examined to develop improvement concepts. Three conceptual alternatives were developed for the MD 175 Phase II Feasibility Study. Concept 1 was developed by applying a four-lane typical section to the existing centerline of MD 175 throughout the entire corridor. Concept 2 was developed by applying a five-lane typical section to the existing centerline of MD 175 throughout the entire corridor. No shifts to the alignment were considered under Concepts 1 and 2. Concept 3 was developed to identify access management measures along the corridor that consolidated and closed some of the numerous unsignalized access points that exist along MD 175. Based on feedback received from the Study Team, a single Proposed Alternative that combined aspects of Concepts 1, 2, and 3 was developed along the existing centerline. The Proposed Alternative assumes total reconstruction through the study area and includes bicycle, pedestrian, and right-of-way accommodations.

Impacts and cost estimates associated with the Proposed Alternative were calculated and a Draft Purpose and Need Statement was created to assist expedition of a SHA Planning Study, prior to funding being available. The Proposed Alternative is estimated at \$69.1 million – this includes \$11.5 million for preliminary engineering, \$11.7 million for right-of-way, and \$45.9 million for construction.

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