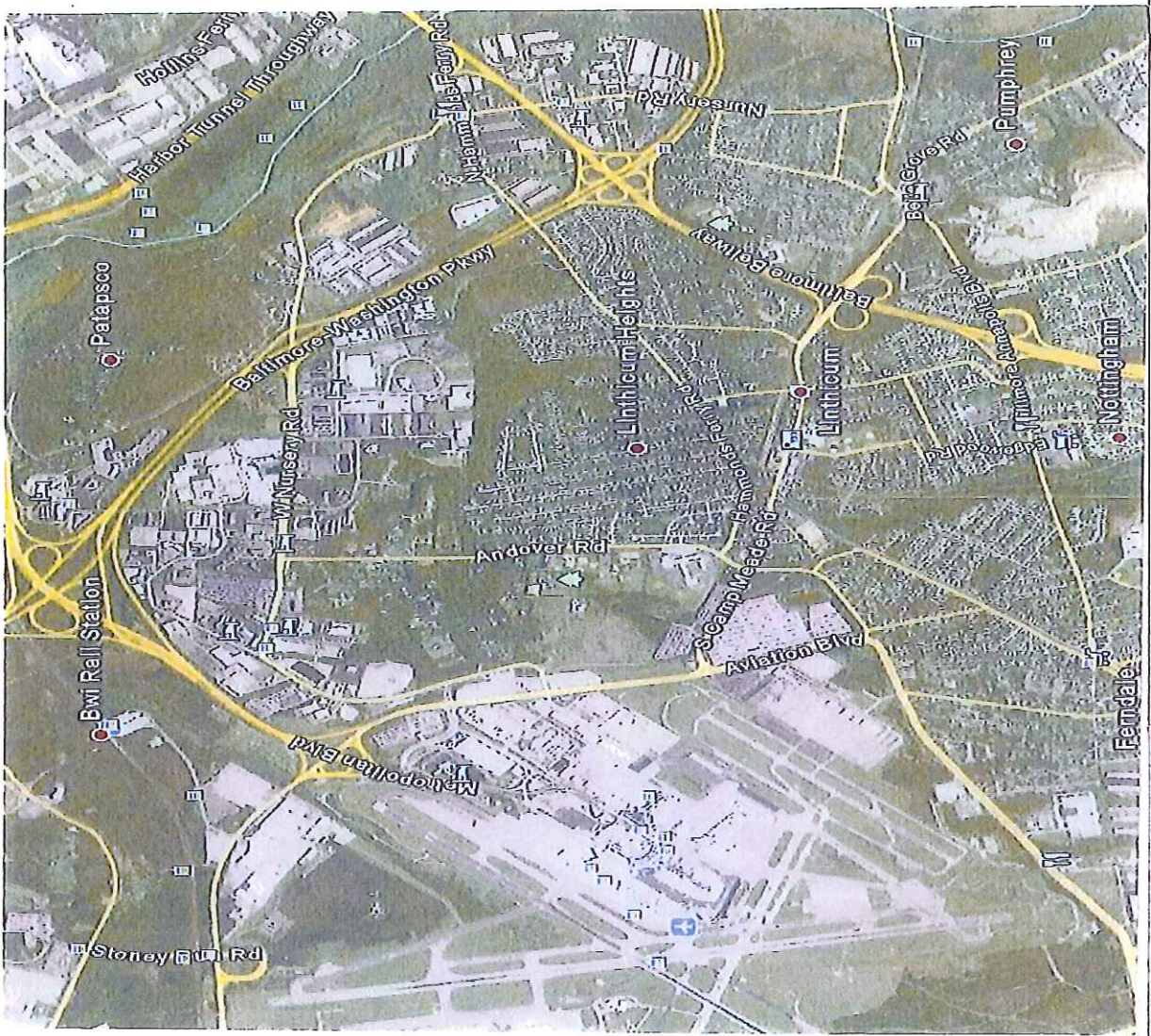


WEST NURSERY ROAD

From Hammonds Ferry Road to Elkridge Landing Road
Anne Arundel County, Maryland

Purpose and Need Statement

February 23, 2011



Anne Arundel County Maryland - Bureau of Engineering
2662 Riva Road, 3rd Floor Annapolis, Maryland 21401

PREPARED BY:

Anne Arundel County Office of Planning and Zoning / Transportation Division with
The Assistance of ATCS, PLC 45195 Business Court Suite 100 Dulles, Virginia 20166

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I. PROJECT LOCATION

The project study area is located south of the City of Baltimore in northern Anne Arundel County; approximately one mile north of the BWI Thurgood Marshall Airport (BWI Marshall Airport) and approximately 35 miles from Washington D.C. The study area extends along West Nursery Road from Hammonds Ferry Road to Elkridge Landing Road as shown on the Project Area Map (Figure 1). West Nursery Road is within Anne Arundel County's BWI/Linthicum Planning Area and is an important transportation corridor linking the BWI Thurgood Marshall Airport, Baltimore Washington Parkway (BW Parkway/MD295), Interstate 695 and Interstate 195.

II. PROJECT BACKGROUND

West Nursery Road's proximity to the BWI Thurgood Marshall Airport has influenced the development pattern in the corridor. Businesses that directly or indirectly service the Airport comprise a significant percentage of the development located in the corridor. These include hotels, long-term parking lots and restaurants. Large regional employers such as Northrop Grumman, the Maritime Institute of Technology and Graduate Studies; and various governmental agencies such as National Security Agency (NSA) and the Maryland Aviation Administration are also located in the corridor. There are also a significant number of office and technical parks in the corridor such as Airport Square Business Park, Airport Square Tech Park, Hock Business Park, Sachs Industrial Park and the BWI Technology Park.

The character of the West Nursery Road corridor changes significantly at the BW Parkway. From the BW Parkway north to River Road, the road transitions from three to five-lanes including a center left turn lane. From about six-tenths of a mile north of River Road to Hammonds Ferry Road the road section consists of two undivided lanes with one signalized intersection. From the BW Parkway south to Elkridge Landing Road the road is a four-lane divided facility.

The majority of the undeveloped land in the corridor is located north of the BW Parkway. The west side of West Nursery Road from River Road north to Hammonds Ferry Road has a limited development potential because of the Patapsco Valley State Park.

The BW Parkway plays a major role in the movement of highway traffic in the study area. It intersects West Nursery Road with an interchange around the middle of the study area. Construction of the facility began in 1942, but was delayed by the start of World War II and not completed until 1954. The BW Parkway was built to provide a link between the federal government facilities in Washington D.C. and numerous associated facilities to the northeast. It provides access to the BWI Marshall Airport. The BW Parkway is currently in the process of being upgraded to meet increasing traffic demands. The facility is being expanded from its

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present four lanes to six lanes from I-695 and I-195. This expansion is scheduled to be completed in 2012.

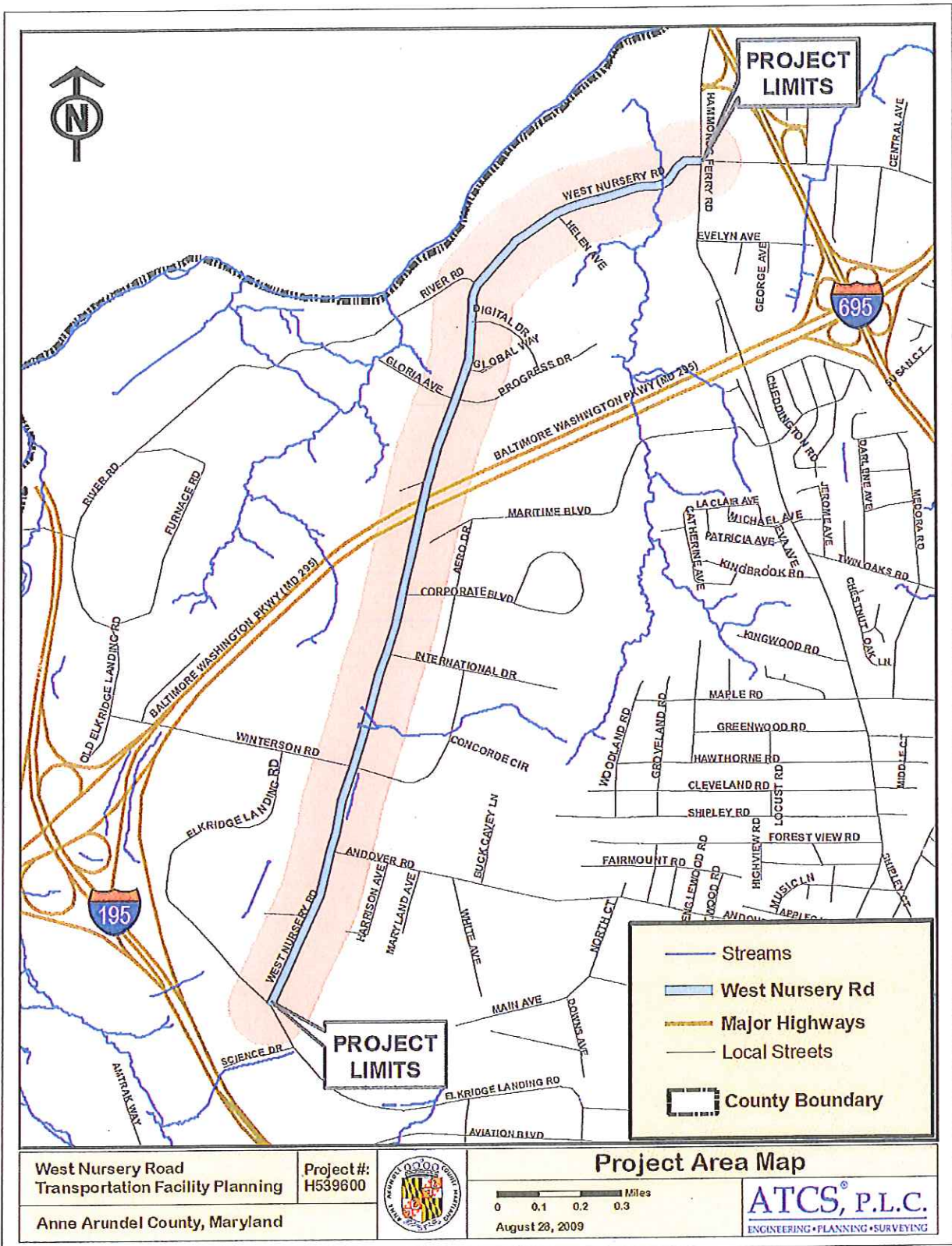


Figure 1: Project Area Map

A similar expansion from I-195 to MD 100 including an interchange at Hanover Road is in Project Planning by the Maryland State Highway Administration; however, due to State funding shortages, it is uncertain when this portion of the project can be constructed.

The Baltimore and Potomac Railroad, which is located just outside of the study, was constructed in 1868. This railroad was later incorporated as the Pennsylvania Railroad Line. Today this line is used by MARC and Amtrak to provide commuter service in the area with a major rail station located at the BWI Marshall Airport. Funding has been received to study the addition of a fourth track and station improvements.

In 1947 the State of Maryland began construction of the Friendship International Airport. In 1973 the facility was renamed the Baltimore Washington International Airport and in 2005 to the BWI Thurgood Marshall Airport. The Airport is owned and operated by the State of Maryland.

III. FUNCTIONAL CLASSIFICATION

West Nursery Road is classified as a Minor Arterial in Anne Arundel County's Functional Master Plan. Two other Minor Arterial roadways that intersect West Nursery Road within the study area are Elkridge Landing Road and Hammonds Ferry Road. Andover Road is the only Collector Road in the study area. Some of the significant local roads that intersect West Nursery Road include International Drive, Corporate Boulevard and Winterson Road. There is a full diamond interchange at the intersection of West Nursery Road and the BW Parkway (MD 295). Interstate 195 and Interstate 695 are two interstate routes near the study area and are shown on Figure 2.

Access control onto West Nursery Road from existing developments is adequate. This is consistent with the desired characteristics of a Minor Arterial road and will need to be maintained to continue the integrity of the road.

IV. PURPOSE OF THE PROJECT

The purpose of this study is to evaluate the existing and forecasted travel demand along West Nursery Road and to identify potential improvements to effectuate increased road capacity, traffic operations efficiency and safety and to provide pedestrian/bike facility improvements that will provide increased mobility and safety.

Improving West Nursery Road will facilitate the economic growth in the area, particularly those activities related to the airport and the state and federal agencies in the area. It will provide increased mobility and safety to the businesses along West Nursery Road, as well as improve their access to the BW Parkway. The result will be an improvement in safety and traffic flow on both West Nursery Road and the BW Parkway.

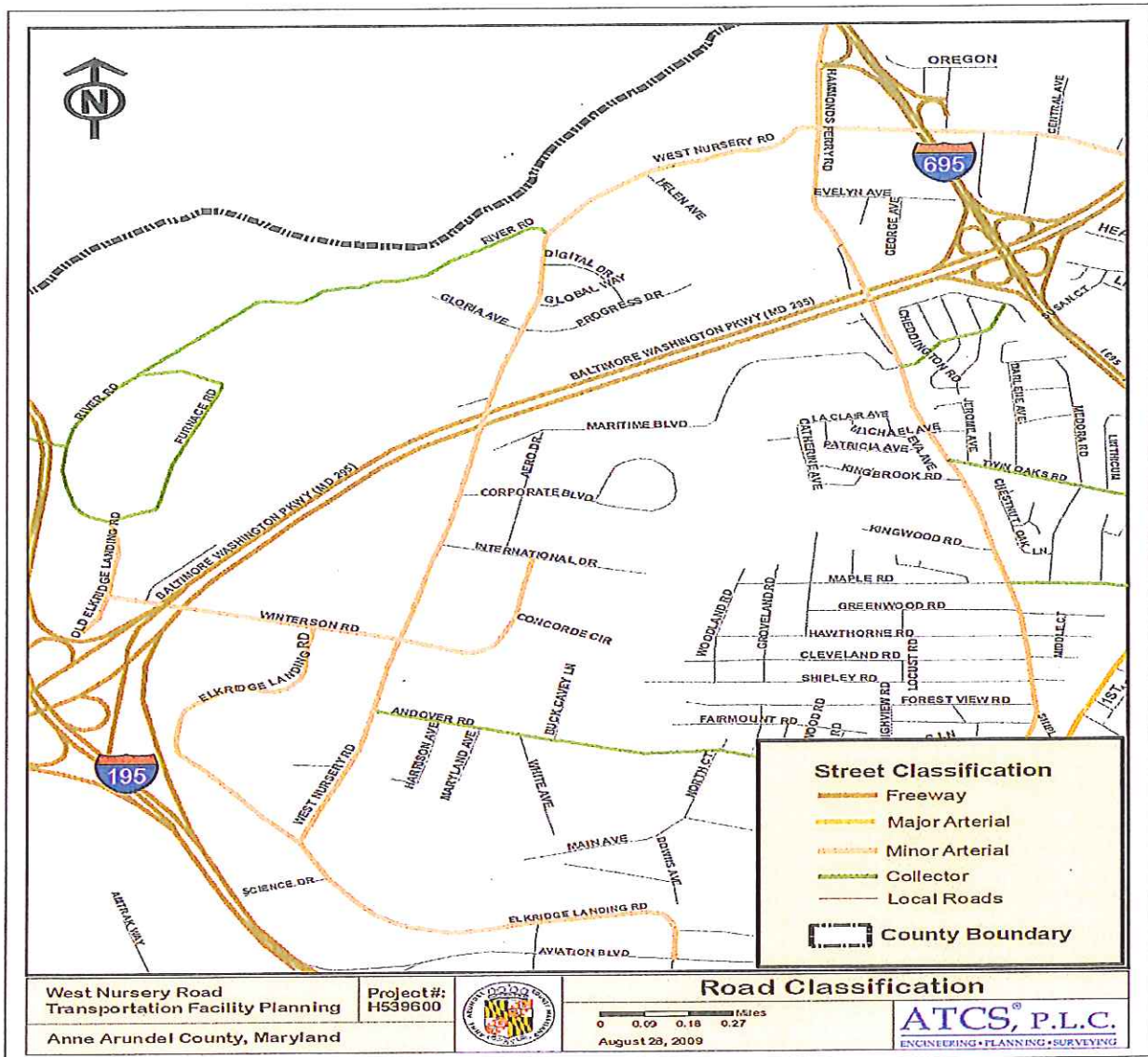


Figure 2: Roadway Classification

V. NEED FOR THE PROJECT

The study area is a growing employment center that includes several major businesses, government offices, support services and technology parks. This is due, in a large part, to its geographic proximity to the BWI Marshall Airport which is considered to be one of the key economic engines for the State of Maryland. The airport is responsible for about \$5.1 billion in business revenue a year and about 100,000 total direct/indirect jobs. BWI Airport is a secondary hub for Air Tran Airway and a focus city for Southwest Airlines. In 2009 the airport carried nearly 21 million passengers and was the twenty-fourth busiest airport in the United States. Many ancillary businesses associated with the airport are located on West Nursery Road

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including hotels, restaurants and airport passenger parking facilities. Major employers located in the study area include NSA and Northrop Grumman. Northrop Grumman employs about 3,300 people in the study area. The proximity of the airport to the corridor will continue to produce additional pressure on the road network as that facility expands. This connection can be seen in the number of major hotels and employers located in the corridor. Two Park and Go lots provide parking for travelers flying out of BWI Marshall Airport generating a steady stream of bus shuttles throughout the day on West Nursery Road.

Employment projections for the areas surrounding the West Nursery Road Corridor indicate that a significant rise in employment is expected over the next twenty years (2030). Current employment numbers (2005) for the five analysis zones that surround West Nursery Road show an increase in employment from about 33,400 jobs in 2005 to 43,350 jobs in 2030, an approximate 30 percent increase. The rise in employment and the additional development along West Nursery Road will increase the congestion on surrounding regional highway facilities such as I-195, I-695 and MD 295 that already experience periods of severe congestion.

A 2030 traffic forecast using Synchro/Sim Traffic modeling was performed along West Nursery Road. The results for the year 2030 indicate that the interchange of West Nursery Road and MD 295 will cease to operate efficiently. Other intersections south of MD 295 will also experience increased congestion and potentially fail during peak periods of the day.

There is little funding available at the State level to address highway construction needs. This can be seen by the flat funding levels for highway construction projects in the Consolidated Transportation Program in the past several years. Traffic congestion on I-695, the BW Parkway and other arterial roadways is increasing as is the duration of the recurring congestion. West Nursery Road, which provides a connection to these facilities, will suffer from increased traffic congestion not only from the additional traffic generated by development within the corridor, but from traffic diverting from these roadways to West Nursery Road to access the airport.

Level of service (LOS) is a scale measuring the 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 and LOS F represents failure with stop-and-go conditions. LOS D represents borderline congestion where traffic flow becomes unstable, however this level is considered acceptable during peak hours of traffic flow on streets and highways in urban and suburban areas. As a general traffic engineering practice, LOS E or worse indicates that the intersection's traffic operations are failing.

Traffic flow along West Nursery Road is currently considered to be in the acceptable range with the exception of both intersection crossings at International Drive and Hammonds Ferry Road. These intersections are already experiencing periods of congestion where the Level of Service (LOS) drops to "D." By the year 2030 it is projected, that five intersections will operate at LOS D or worse at peak periods during the day.

Traffic Operations

Traffic operations for both existing conditions (2006) and future conditions (2030) were studied using the Baltimore region's transportation model as a basis. The future conditions projection was modified to include traffic generated from BWI Technology Park II and III. Traffic operation analysis was performed for two scenarios to evaluate the adequacy of roadway capacity, the current year (2006) and the horizon year (2030). The analysis of 2006 Existing Scenario provides a baseline condition, while the results from 2030 No-Build Scenario analysis are used to identify potential future problematic locations in traffic operations. Level of Service is the key measure of effectiveness (MOE) at each signalized intersection for both AM and PM peak hours. Synchro models were developed and used to determine the LOS based on the Highway Capacity Manual (HCM). Vehicular delay and queue lengths were generated from Synchro analysis as a supplemental MOE to evaluate intersection operational performance. In addition to the Synchro analysis, critical lane volume (CLV) analysis was also performed to calculate LOS based on volume to capacity (V/C) ratios. LOS values derived by two methods tend to vary slightly from each other as Synchro generated outputs were based on delays and not critical volumes.

2006 Existing Conditions

The existing lane configurations of the study corridor are presented in Figure A-1 of Appendix A. Under the current traffic conditions, none of the signalized intersections within the study area operate at a failing LOS during the AM and PM peak hours. All signalized intersections currently operate at an acceptable level of service, with values ranging between "A" to "C" (Table 1) with the exception of two intersections. The first intersection is West Nursery Road at Hammonds Ferry Road which operates at a LOS "D" during both peak hours and is considered a "chokepoint" in the corridor. The availability of right-of-way at the intersection will limit the ability to improve its operation. The second intersection is West Nursery Road at International Drive which currently is operating at a LOS "D" during the PM peak.

All other intersections within the corridor run under "free" operation, except for the two ramp intersections at the MD 295 interchange. It should be noted that synchronization of the closely spaced intersections south of MD 295 will lead to fewer stops and improved traffic progression along West Nursery Road.

There were 61 vehicular crashes along West Nursery Road between Hammonds Ferry Road and Elkridge Landing Road from 2005 to 2007. These include 24 crashes with injuries and 37 with property damage. There were no fatalities. The segment of West Nursery Road from Elkridge Landing Road to the BW Parkway had a crash rate of 141 which is higher than the statewide average of 130.3 for an urban divided highway with partial access control containing four or more lanes. The overall crash locations within the study area from 2005 to 2007 are shown in Appendix B Figure B-1.

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Table 1: Traffic Operation Performance for 2006 Existing Conditions

No	Intersection	Time Period	Synchro HCM Output		Critical Lane Volume Method		
			Average Delay	LOS	CLV	LOS	V/C
1	West Nursery Rd & Elkridge Landing Rd	AM Peak	12.2	B	529	A	0.33
		PM Peak	8.3	A	731	A	0.46
2	West Nursery Rd & Andover Rd	AM Peak	7.7	A	339	A	0.21
		PM Peak	8.1	A	770	A	0.48
3	West Nursery Rd & Winterson Rd	AM Peak	18.2	B	738	A	0.46
		PM Peak	27.6	C	803	A	0.5
4	West Nursery Rd & International Dr	AM Peak	22.8	C	937	A	0.59
		PM Peak	38.8	D	1095	B	0.68
5	West Nursery Rd & Corporate Blvd	AM Peak	4.6	A	692	A	0.43
		PM Peak	14.4	B	894	A	0.56
6	West Nursery Rd & NB Ramp MD295	AM Peak	11.4	B	992	A	0.62
		PM Peak	14.1	B	958	A	0.6
7	West Nursery Rd & SB Ramp MD295	AM Peak	26.9	C	1036	B	0.65
		PM Peak	22.7	C	1106	B	0.69
8	West Nursery Rd & N Hammonds Ferry Rd	AM Peak	41.7	D	1205	D	0.75
		PM Peak	38	D	1343	D	0.84

2030 No-Build Conditions

The 2030 No-Build scenario includes two recently approved developments along West Nursery Road: BWI Tech Park II and BWI Tech Park III. These proposed developments were not included in the original 2030 demographic file. The lane configurations at several intersections will change with the openings of these developments to accommodate the new traffic patterns and increased traffic. The lane configurations in the 2030 No-Build scenario within the study area are presented in Appendix A Figure A-2.

Both the Synchro model analysis and CLV methods give a consistent projected LOS at the intersections along the study corridor, as shown in Table 2. Compared to the existing conditions, the traffic operations will deteriorate significantly. Specifically, traffic operations will be failing at the following intersections (LOS E or worse) under 2030 No-Build Conditions:

1. The intersection of West Nursery Road at International Drive is projected to operate at LOS "F" in the PM peak hour.
2. The intersection of West Nursery Road at MD 295 NB Ramp is projected to operate at LOS "F" in the AM peak hour.

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3. The intersection of West Nursery Road at MD 295 SB Ramp is projected to operate at LOS “E” in the AM peak hour and LOS “F” in the PM peak hour.
4. The intersection of West Nursery Road at Hammonds Ferry Road is projected to operate at LOS “E” in the PM peak hour.

There is a major concern about two of the intersections on the diamond interchange of West Nursery Road over MD 295. Under 2030 No-Build conditions, there are over 1800 right-turn vehicles projected from the MD 295 NB off-ramp to West Nursery Road SB in the AM peak hour. There are more than 2000 vehicles traveling southbound across the bridge including over 1600 left-turn vehicles from the MD 295 SB off-ramp. In the PM peak hour, there are nearly 1600 vehicles driving NB across the bridge of which over three-quarters (1260) turn left onto the MD 295 on-ramp. These heavy turning movements will require split signal phases and longer green times which will significantly increase the vehicle delays and queue lengths at the two interchange intersections. Improvements to facilitate a safer more efficient vehicular flow across the bridge need to be considered. The major contributing factors of the detailed crash types/patterns were identified and are summarized in Appendix B.

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Table 2: Traffic Operation Performance under 2030 No-Build Conditions

No	Intersection	Time Period	Synchro HCM Output		Critical Lane Volume Method		
			Average Delay	LOS	CLV	LOS	V/C
1	West Nursery Road & Elkridge Landing Road	AM Peak	15.4	B	589	A	0.37
		PM Peak	14	B	675	A	0.42
2	West Nursery Road & Andover Road	AM Peak	18.2	B	612	A	0.38
		PM Peak	9.3	A	885	A	0.55
3	West Nursery Road & Winterson Road	AM Peak	25	C	1096	B	0.69
		PM Peak	39.8	D	728	A	0.45
4	West Nursery Road & International Drive	AM Peak	34.6	C	1317	D	0.82
		PM Peak	87.2	F	1839	F	1.15
5	West Nursery Road & Corporate Boulevard	AM Peak	17.1	B	1424	D	0.89
		PM Peak	18	B	1420	D	0.89
6	West Nursery Road & NB Ramp MD 295	AM Peak	151.9	F	1392	D	0.87
		PM Peak	50.8	D	1541	E	0.96
7	West Nursery Road & SB Ramp MD 295	AM Peak	55.4	E	1518	E	0.95
		PM Peak	95.9	F	1832	F	1.14
8	West Nursery Road & BWI Tech Park II	AM Peak	7.3	A	728	A	0.45
		PM Peak	11.4	B	700	A	0.44
9	West Nursery Road & Gloria Avenue	AM Peak	9	A	521	A	0.33
		PM Peak	18.8	B	995	A	0.62
10	West Nursery Road & Hammonds Ferry Road	AM Peak	49.8	D	1461	E	0.91
		PM Peak	76.9	E	1676	F	1.05

Intermodal Connectivity

The West Nursery Road corridor currently provides few alternatives to travel by car. There are only a few sidewalks and crosswalks in the corridor and these are not connected. There are no street separated bike paths, trails or dedicated/shared bike lanes. This provides little opportunity for pedestrians to safely traverse between the businesses, hotels and restaurant facilities in the area.

The standard road section for West Nursery Road as a functionally classified Minor Arterial by the County should contain sidewalks (Appendix A Figure A-5). In areas where the right-of-way is adequate, the sidewalk should be detached from the back of the curb and contain a minimum of five (5) feet of planting area between the two. In areas where there may not be adequate right-of-way, a sidewalk that is attached to the back of the curb is acceptable. In both cases, the width of the sidewalk should not be less than five (5) feet. Likewise, the provision of bike lanes or paths should also be considered in this corridor.

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The corridor is served by one public transit line operated by the Maryland Transportation Administration (MTA). The #17 bus line provides service starting from Coca Cola Drive in Howard County stopping at the AMTRAK/MARC Station, BWI Light Rail Station, businesses in the area and ending at the Patapsco Light Rail Station.

The BWI Business Partnership runs a shuttle service called “THE LINK” that connects Fort Meade, the federal annexes on West Nursery Road, the BWI AMTRAK Station and BWI Light Rail Station.

Existing Bicycle and Pedestrian Condition

Level of Service (LOS) for bicyclists and pedestrians is measured as a level of comfort experienced by them in relation to the built environment and motor vehicle traffic. The ratings for motor vehicles and bicyclist and pedestrians are the same – LOS C and D are generally acceptable performance; LOS A and B are near perfect conditions, and E and F describe failure conditions. LOS of C and D are considered acceptable in most urban settings.

Most of the pedestrian intersections LOS in the study area are D or worse as shown in Table 3. This is due to the lack of pedestrian facilities in the study area.

There are no exclusive or shared bike lanes on West Nursery Road. Bicyclists in the corridors face moderate to high level of interaction with motorists. The traffic in the corridor is generally low-volume and low-speed, but is not considered bicycle friendly. West Nursery Road is estimated to perform at an overall Level of Service of ‘D’.

Table 3: Existing Bicycle and Pedestrian LOS

From	To	Pedestrian LOS	Bike LOS
Elkridge Landing	Andover Road	D	D
Andover Road	Winterson Road	F	D
Winterson Road	International Drive	E	C
International Drive	295 North Signal	E	D
295 Bridge	295 Bridge	D	E
295 south light	Progress Drive	C	D
Progress Drive	N. Hammonds	D	E

Land Use

The West Nursery Road Corridor consists primarily of industrial and commercial land uses. Though many of the properties are currently developed, there are still numerous locations that are either vacant or could potentially be redeveloped. There is a distinct change in the land use in the corridor with the BW Parkway as the division point as shown on Figure 3. The development south of the BW Parkway along West Nursery Road is primarily industrial and commercial with several hotel facilities, Northrop Grumman and restaurants located on West Nursery Road and the adjacent roads. To the north of the BW Parkway, the majority of the land is either natural open space or vacant. The Patapsco Valley State Park comprises most of this open space. Some industrial and commercial uses are also located in this area.

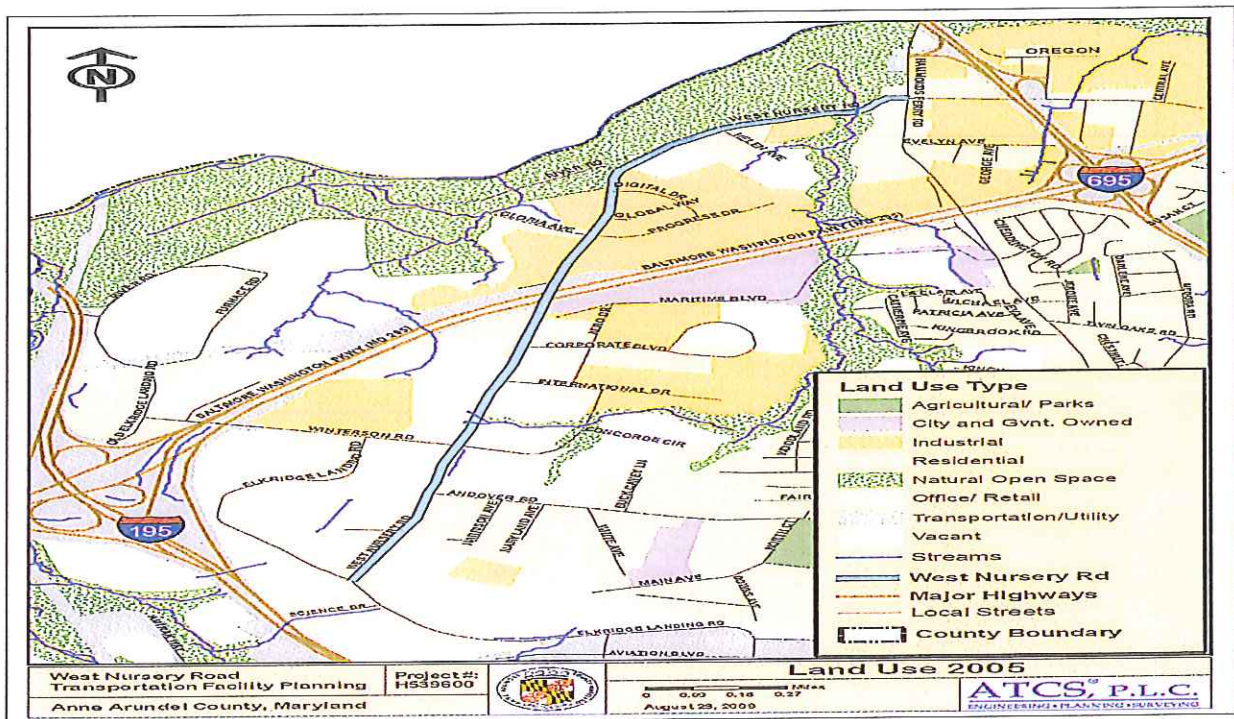


Figure 3: Land Use

Zoning

The predominant land use in the study area from BW Parkway South to Elkridge landing Road is W1 (Industrial Park) with only a small area of C1 (Commercial Neighborhood Retail) on the east side of West Nursery Road south of Andover Road. There is an area of C4 (Commercial-Heavy) on the west side of West Nursery Road from the area of Progress Drive to the BW Parkway. There is also a stretch of OS (Open Space) that extends on the west side of West Nursery Road from about Progress Drive to Hammonds Ferry Road (Patapsco Valley State Park) where the

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area around the intersection is zoned C3 (Commercial-General). To the south of the intersection on the east side of West Nursery Road is a swath of open space land that extends from the roadway to the rear of the industrial parks. The land use within the study area is depicted on Figure 4.

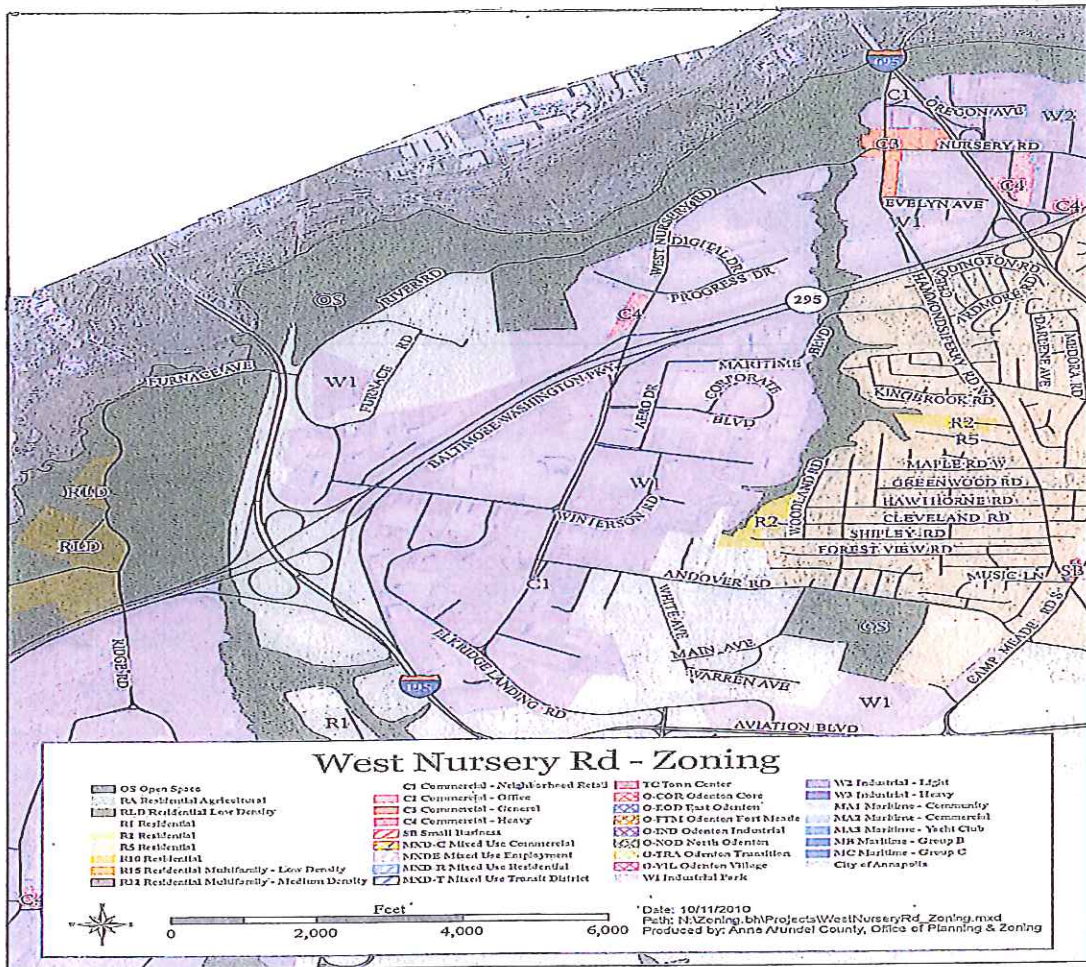


Figure 4: Zoning

Consistency with State and County Plans and Programs

STATE

➤ Priority Funding Area Program

The West Nursery Road corridor is within the area designated as a Priority Funding Area (PFA) by the State as noted in the 2009 General Development Plan. PFAs were described as “smart growth” areas in the 1992 Planning Act that are targeted for growth-related projects like highways and for economic development assistance, etc.

➤ Consolidated Transportation Program 2010-2015

The following projects are included in the Consolidated Transportation Program (CTP):

- MD 295 expansion from 4 lanes to 6 lanes from I-695 to I-195 is currently under construction and is expected to be completed by 2011.
- MD 295 expansion from 4 lanes to 6 lanes from I-195 to MD 100 including an interchange at Hanover Road is in Project Planning.
- The rehabilitation of the West Nursery Road Bridge deck over MD 295. The project is currently under design and is scheduled to be advertised in November 2011.

COUNTY

➤ General Development Plan

The 2009 General Development Plan (GDP) specifically addresses the Airport Square Business Park located on West Nursery Road at MD 295. This existing business park is planned for Employment Mixed Use which will allow redevelopment to create more live/work opportunities along this employment corridor. The GDP identifies a Targeted Growth Area surrounding the interchange of West Nursery Road and MD 295. A Targeted Growth Area is one where development and redevelopment is of the highest priority for economic growth in the County. Such an area is characterized by a mix of uses or a concentration of a single use, typically to serve a regional population. In this particular area there is a dense accumulation of industrial and commercial uses. It is recognized in the GDP that the public infrastructure exists but may need additional capacity to better accommodate future growth. The highest priority is given in the county’s Capital Improvement Program for public improvements in the Targeted Growth Areas. The GDP also contains a number of policies, goals and actions that specifically reflect upon the nature of improvements recommended in the West Nursery Road corridor. Particular examples include the following:

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- Promote and encourage a transportation system that adequately and safely serves the public, minimizes negative environmental impacts, and supports the county's land use goals.
- Improve transportation and utility infrastructure in the vicinity of BWI and Tipton airports.
- Improve vehicular and transit access to BWI and Tipton airports.
- Continue implementation of the Bicycle and Pedestrian Master Plan to provide an expanded bikeway and sidewalk network and greater overall support for biking and walking.
- Ensure an interconnected community that provides multi-modal access to all neighborhoods.
- Design and improve the road network to further land use, community preservation, environmental (both the natural and built environment) protection, public safety, and neighborhood compatibility goals.
- Monitor and manage Anne Arundel County's transportation system to reduce existing traffic congestion.

➤ BWI Linthicum Small Area Plan

The 2004 BWI/Linthicum Small Area Plan describes the BWI Airport complex, of which the West Nursery Road corridor is part, as being the economic engine of the State. West Nursery Road is an important component of the transportation system that serves this important area along with other significant regional roads, a light rail system, AMTRAK service, shuttle bus service and a hiker/biker trail. The BWI/Linthicum Small Area Plan recommends widening and straightening West Nursery Road from Hammonds Ferry Road to the MD 295 Bridge. It also recommends the extension of the light rail along West Nursery Road to connect to businesses, residential areas, Arundel Mills Mall and the Baltimore Metro Area.

The BWI/Linthicum Plan does identify several issues in the area which apply to the West Nursery Road corridor. These are as follows:

- *Traffic congestion and poor circulation:* As traffic has increased in the area over the past decade, so has congestion on many of the major roads serving the area, particularly the B&A Boulevard, the BW Parkway and Nursery Road. In addition, at-grade crossings of the Light Rail track on some area roads often hinder traffic circulation.

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- *Inadequate sidewalks:* Lack of sidewalks and/or poorly maintained sidewalks have been frequently cited as issues in the Linthicum and Ferndale communities.
- *Expanded hiker-biker trail network:* Nearly everyone in the area cites the BWI Trail as a wonderful asset to this area, and residents and employees alike would like to see the trail network extended to connect all of the area's natural features, employment centers, and residential communities.

There have been two comprehensive zoning changes at the intersection of West Nursery Road and MD 295 from business parks to mixed use. This area was designated a Priority Funding Area to encourage smart growth and neighborhood conservation. These actions will allow redevelopment to create live/work opportunities along this corridor. Improvements are needed to increase capacity and to provide realistic bicycle, pedestrian and transit alternatives. .

➤ 2003 Anne Arundel County Pedestrian and Bicycle Master Plan

The adopted 2003 Anne Arundel County Pedestrian and Bicycle Master Plan calls for an increased emphasis on providing bicycle and pedestrian improvements. West Nursery Road currently rates very low in meeting the needs of pedestrians and bicyclists. As mixed use developments start to come on line within this area the demand for non-motorized travel will increase. Identification of these improvement projects is necessary in order to be able to address these future needs. The Plan identifies the intersection of Hammonds Ferry Road and West Nursery Road as being a Pedestrian Improvement Zone. This designation indicates the area of the intersection is targeted for pedestrian-oriented redesign to improve pedestrian safety.

➤ Anne Arundel County Standard Detail for Construction

West Nursery Road is considered a Minor Arterial and should be constructed with a sidewalk (Appendix A Figure A5).

VI. ENVIRONMENTAL INVENTORY

The BWI/Linthicum Small Planning Area study indicates that there are nine historic sites and a preserved scenic route located within the study area. Two of the historic sites the Sachs Residences and the Summerfield-Benson House are adjacent to the West Nursery Road corridor. One of these sites is located in the southwest quadrant of the interchange with MD 295 and the other is located in the northeast quadrant. River Road from I-195 to West Nursery Road is a preserved scenic route.

The Patapsco River serves as the County's northern border. West Nursery Road is located within the river's non-tidal watershed. The Environmental Areas map in Figure 5 shows that the northern section of West Nursery Road passes through the Resource Conservation Area, 100-

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year floodplain and non-tidal wetlands which are ecologically significant. This section of the corridor also falls along and within the protected and proposed greenway along the river, Patapsco Valley State Park. Streams and stream buffers are currently protected through the County's floodplain and subdivision ordinances and the County's storm water design manual.

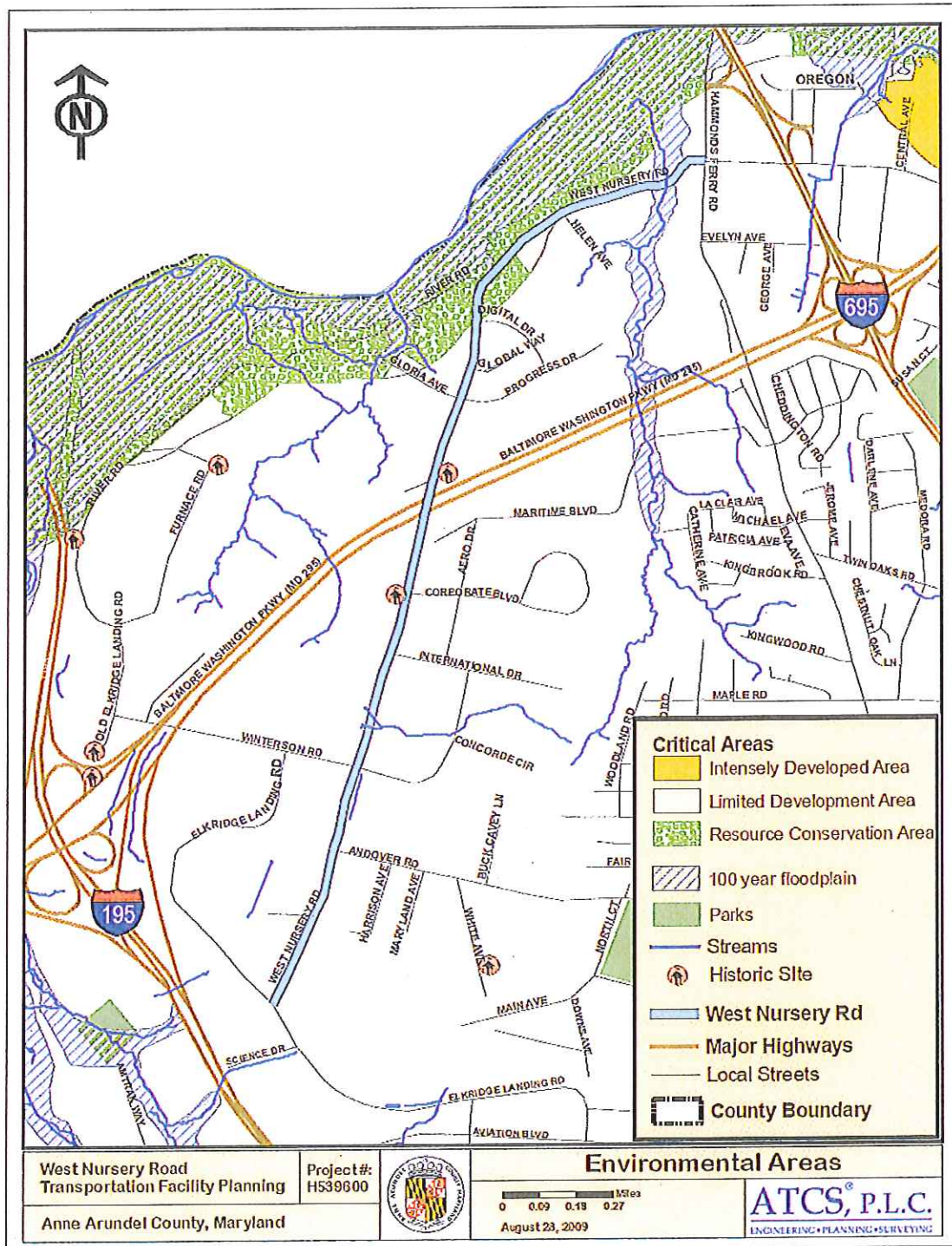


Figure 5: Environmental Areas

The study area is located outside of the BWI Thurgood Marshall Airport noise zone and is therefore not subject to any noise abatement restrictions. It is, however, within the BWI Four Mile District which has height restrictions imposed due to aircraft operations at and around the airport (Figure 6).

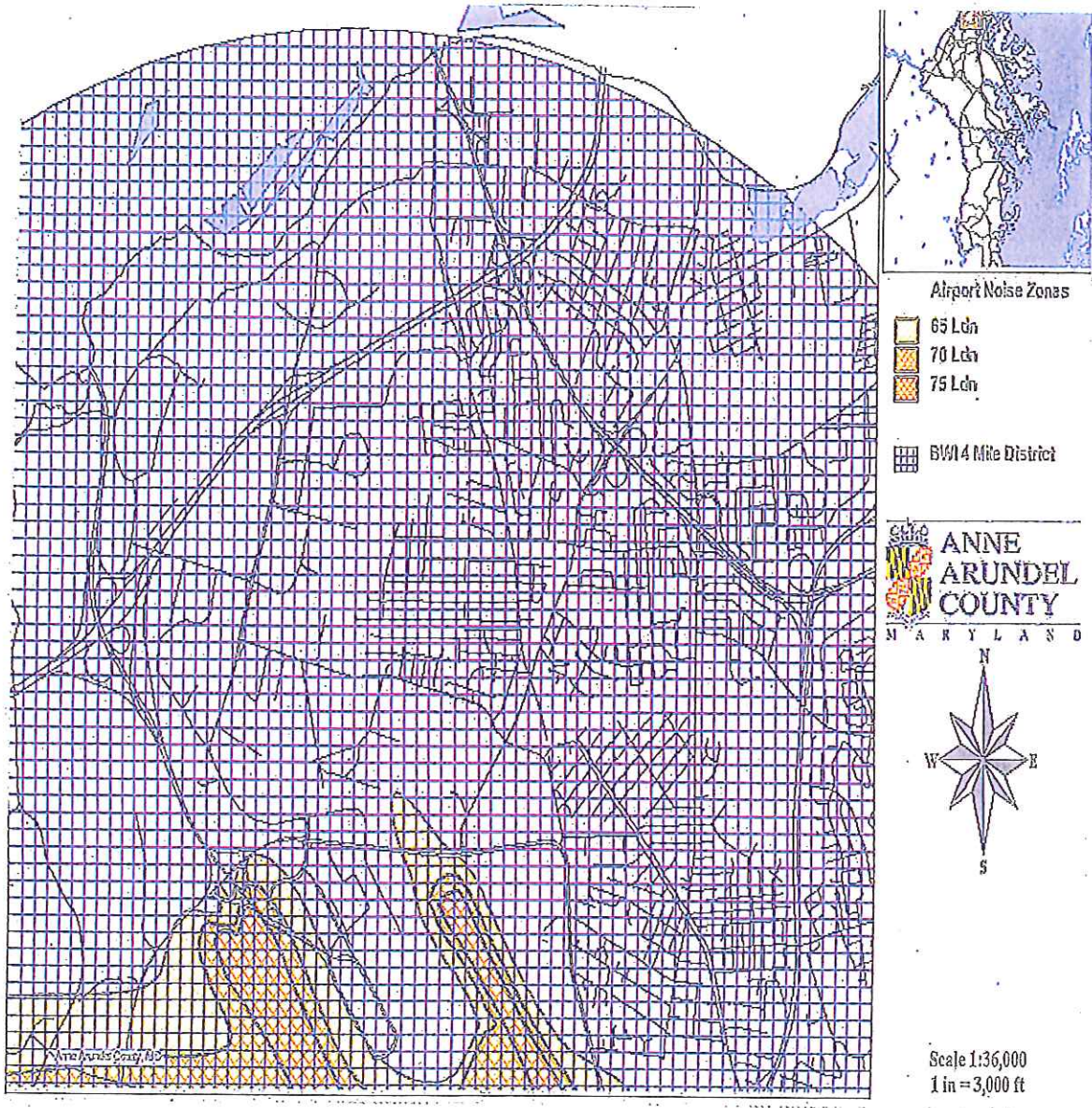


Figure 6 Airport Noise Zone

VII. CONCLUSION

The project is consistent with adopted County Plans and supports one of the State's key economic engines, the BWI Thurgood Marshall Airport. Improvements to the road corridor are needed to improve traffic flow, alleviate capacity problems and improve safety. The improvement will support the growth and expansion of the Airport and businesses in the area. Not addressing these issues could negatively impact the development in the area, particularly those businesses that are served by the BW Parkway and/or provide connections to the Airport.

The existing and projected traffic volumes for the road would indicate that a three lane median divided section should be considered from MD 295 south to Elkridge Landing Road. From MD 295 north a two lane median divided section should be considered to MD 168 (Hammonds Ferry Road). The design of the intersections in the corridor should be determined at the time of construction. MD 295 and West Nursery Road should be given special consideration in light of the amount of traffic projected to be generated at the interchange. The accommodation of pedestrians and bicyclists should be a key consideration in the corridor.

APPENDIX A
TRAFFIC DATA

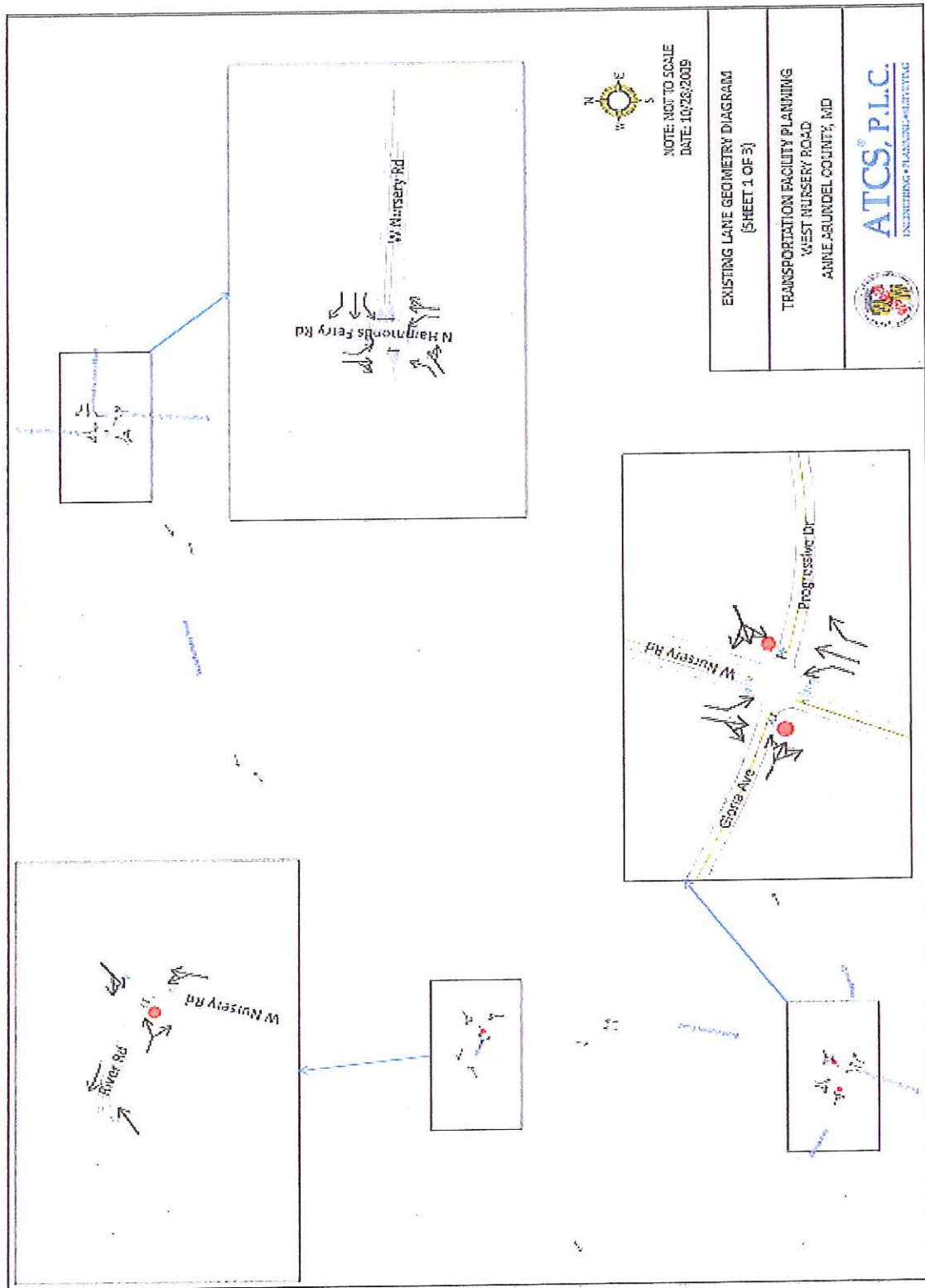


Figure A-1: Existing Lane Configurations (1 of 3)

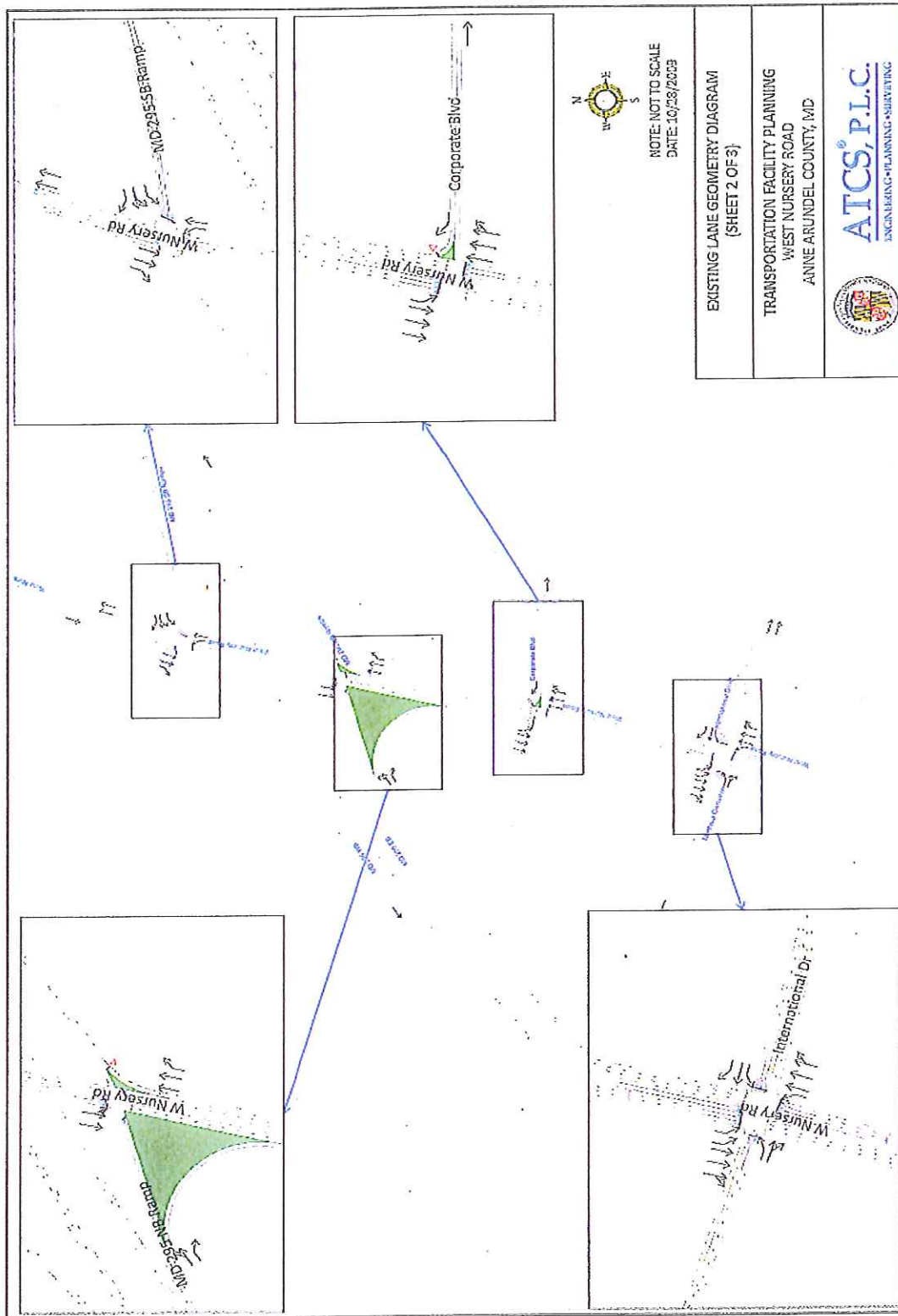


Figure A-1: Existing Lane Configurations (2 of 3)

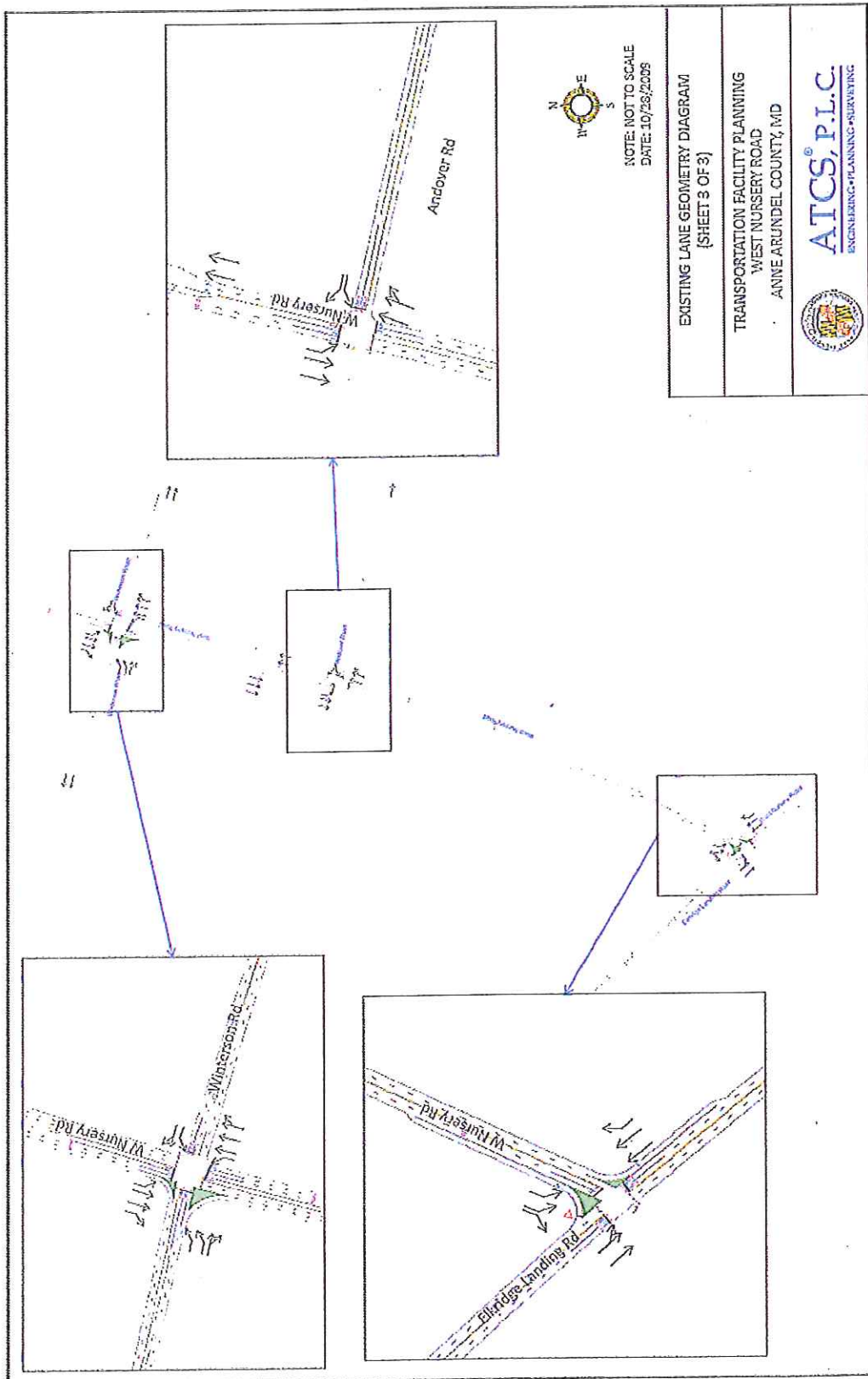


Figure A-1: Existing Lane Configurations (3 of 3)

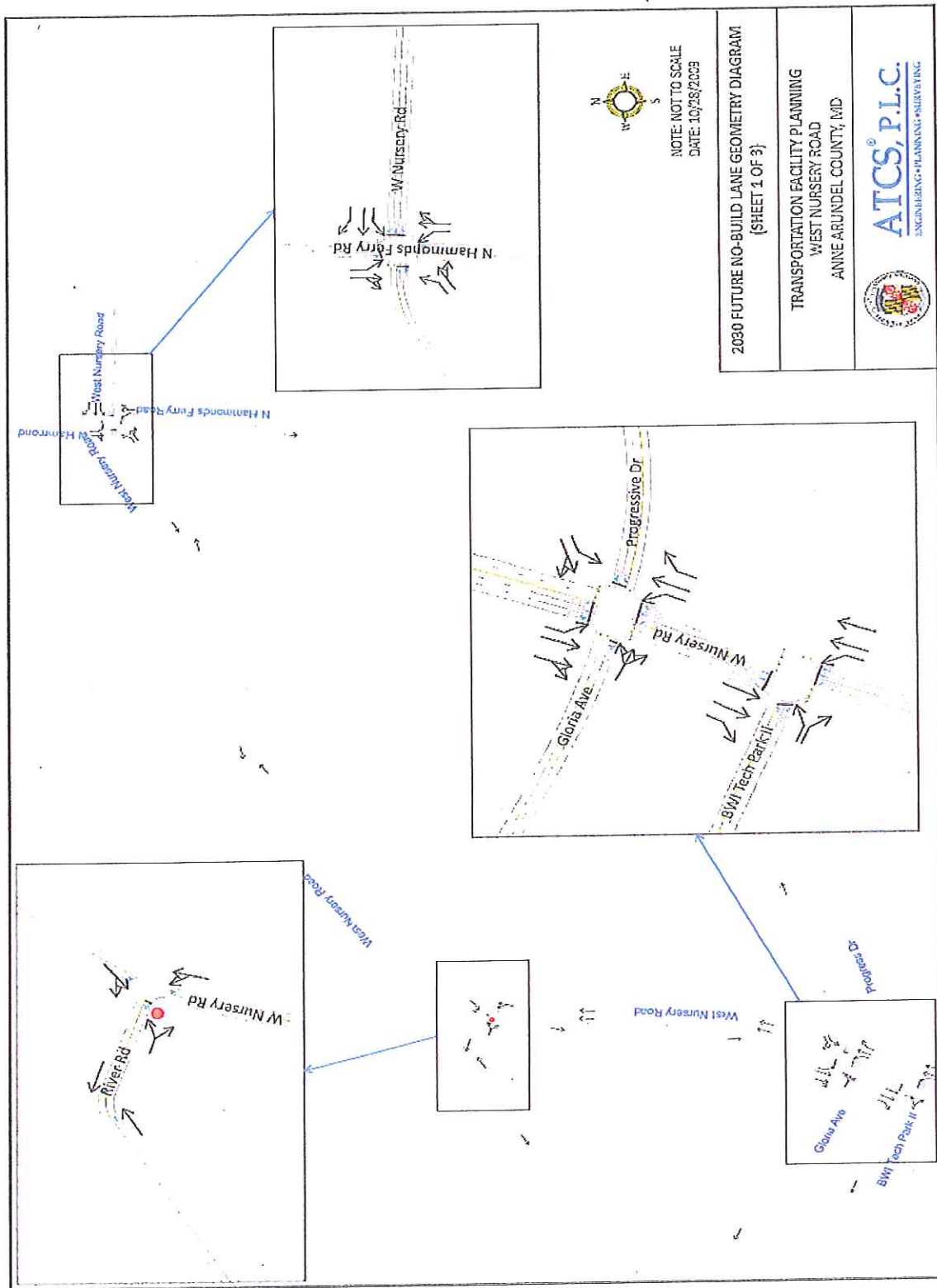


Figure A-2: Lane Configurations in 2030 No-Build Scenario (1 of 3)

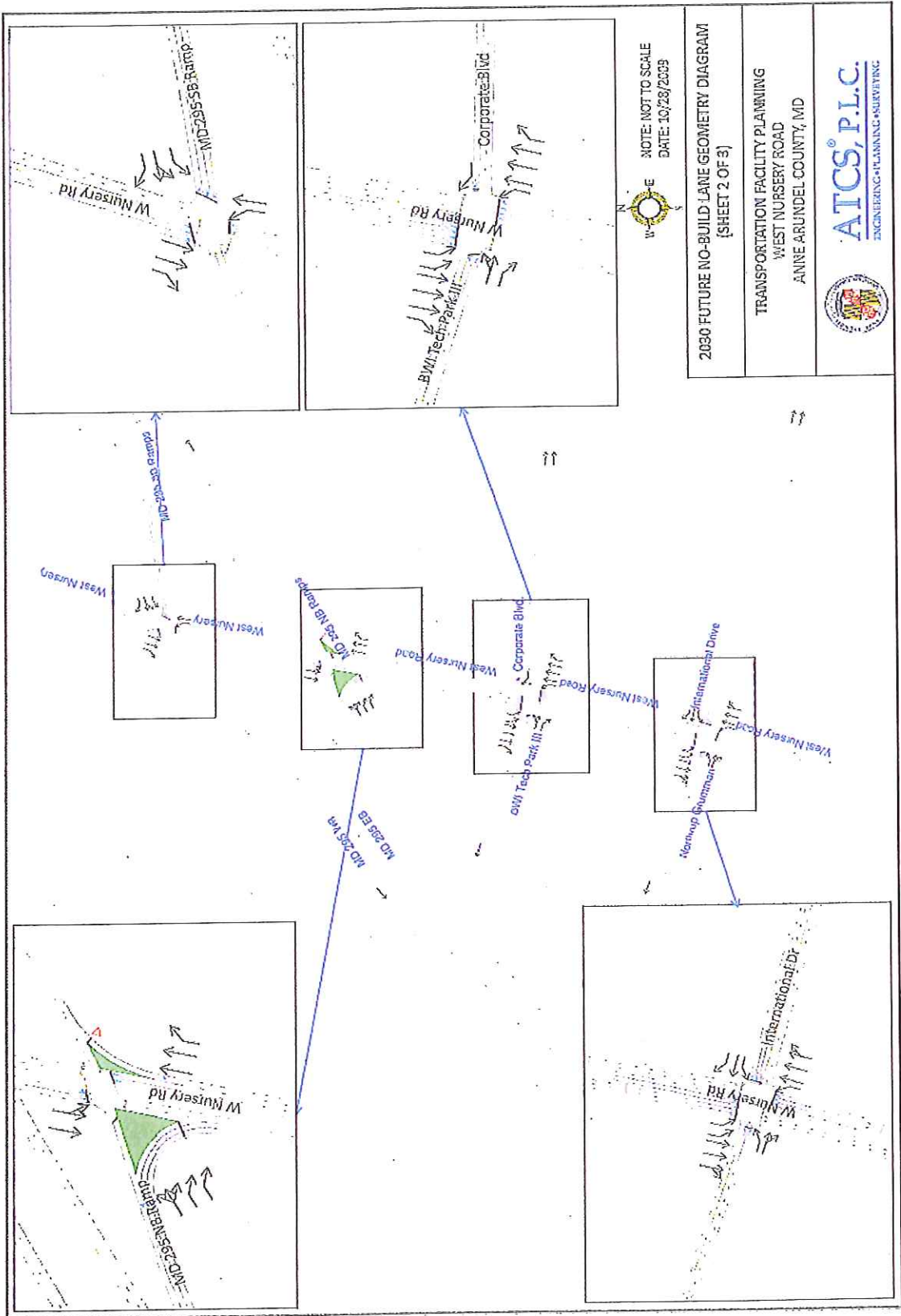


Figure A-2: Lane Configurations in 2030 No-Build Scenario (2 of 3)

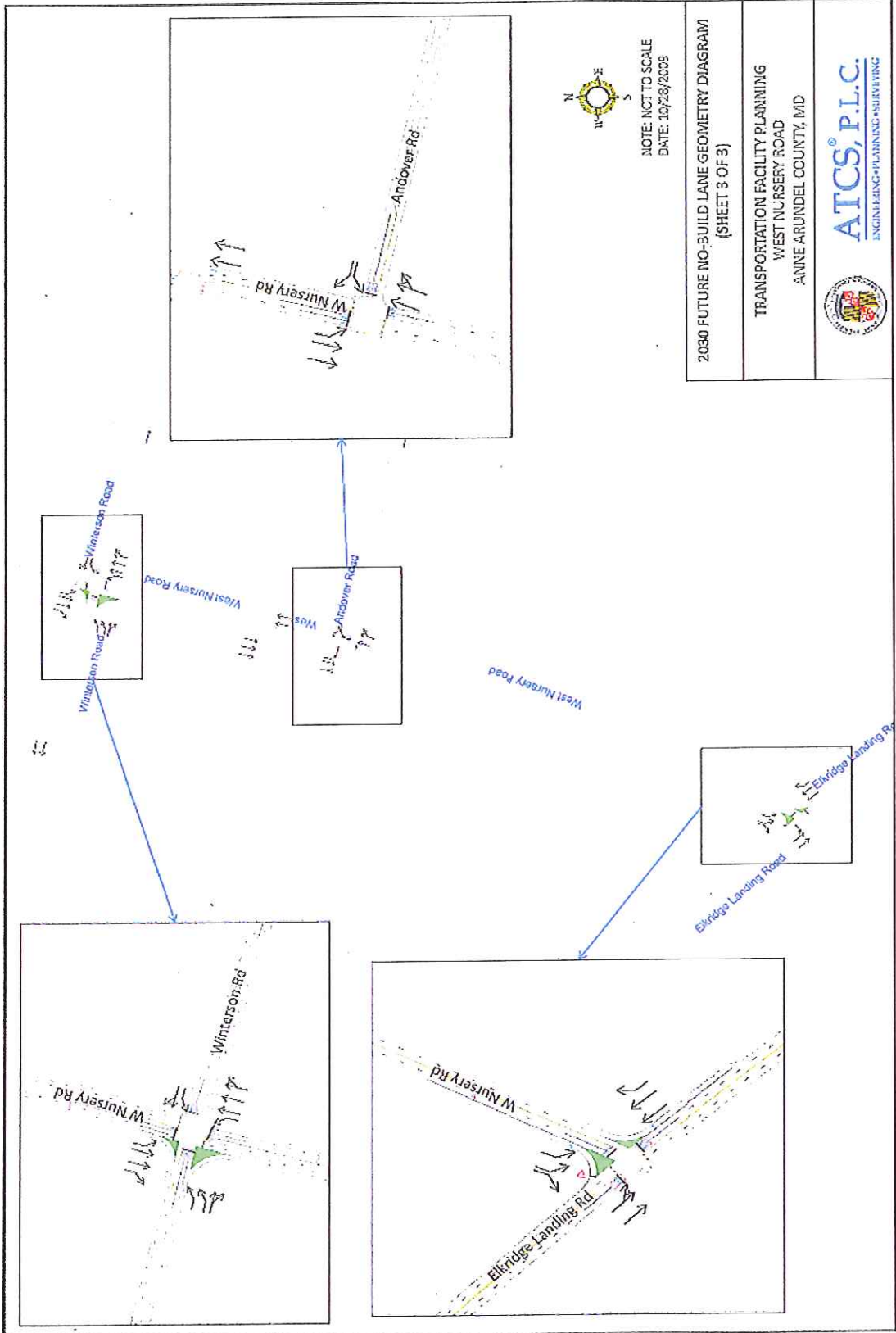


Figure A-2: Lane Configurations in 2030 No-Build Scenario (3 of 3)

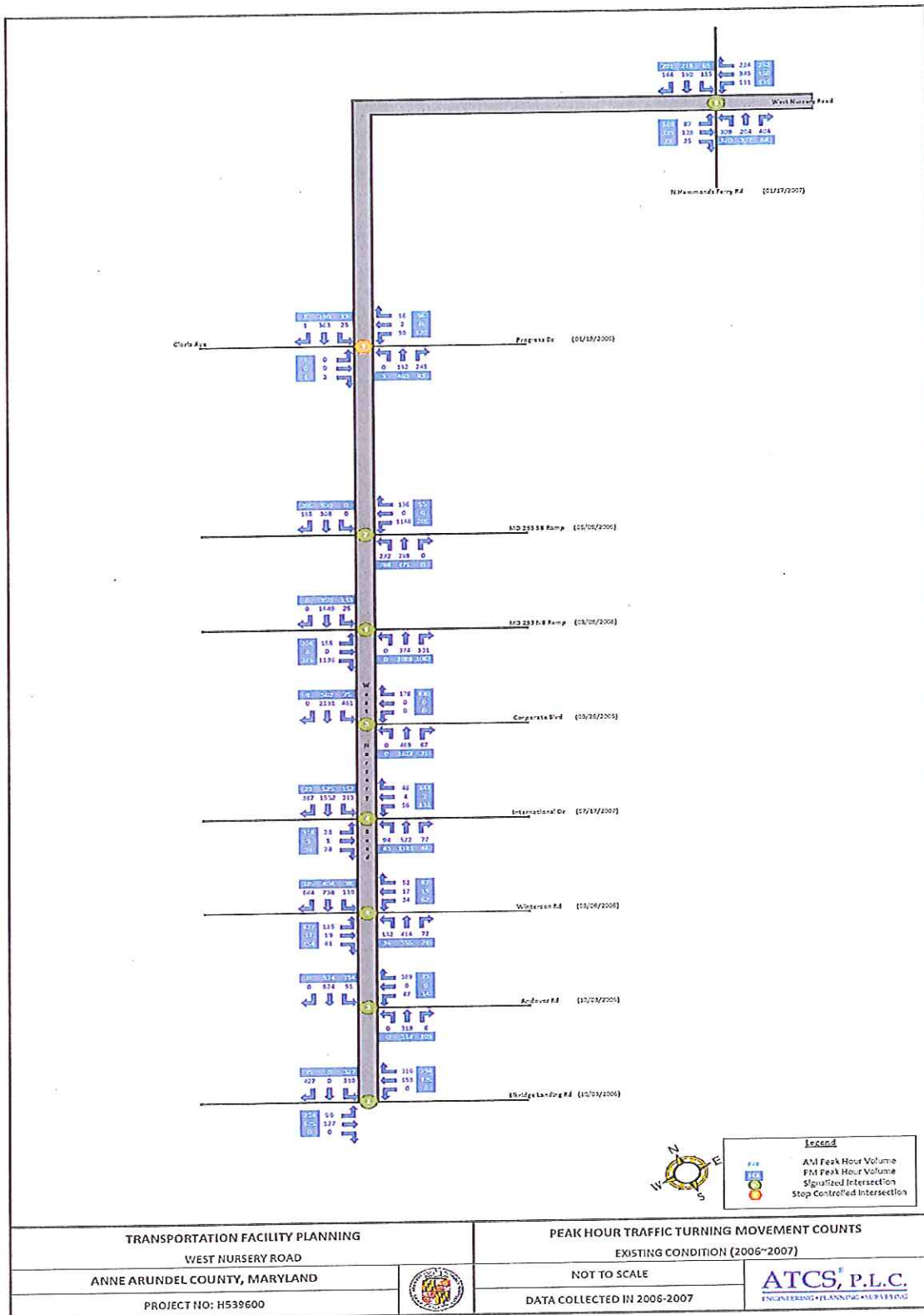
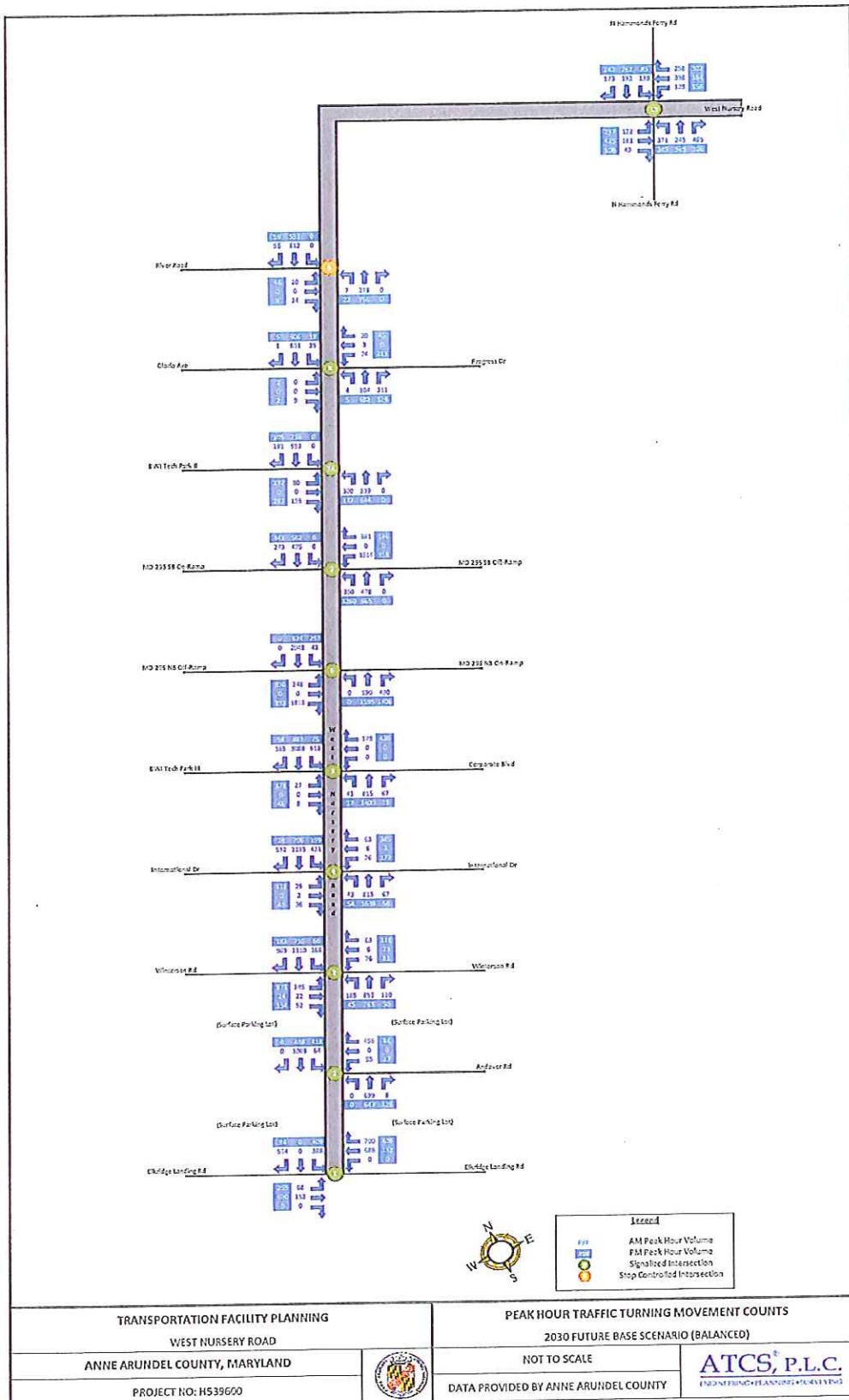
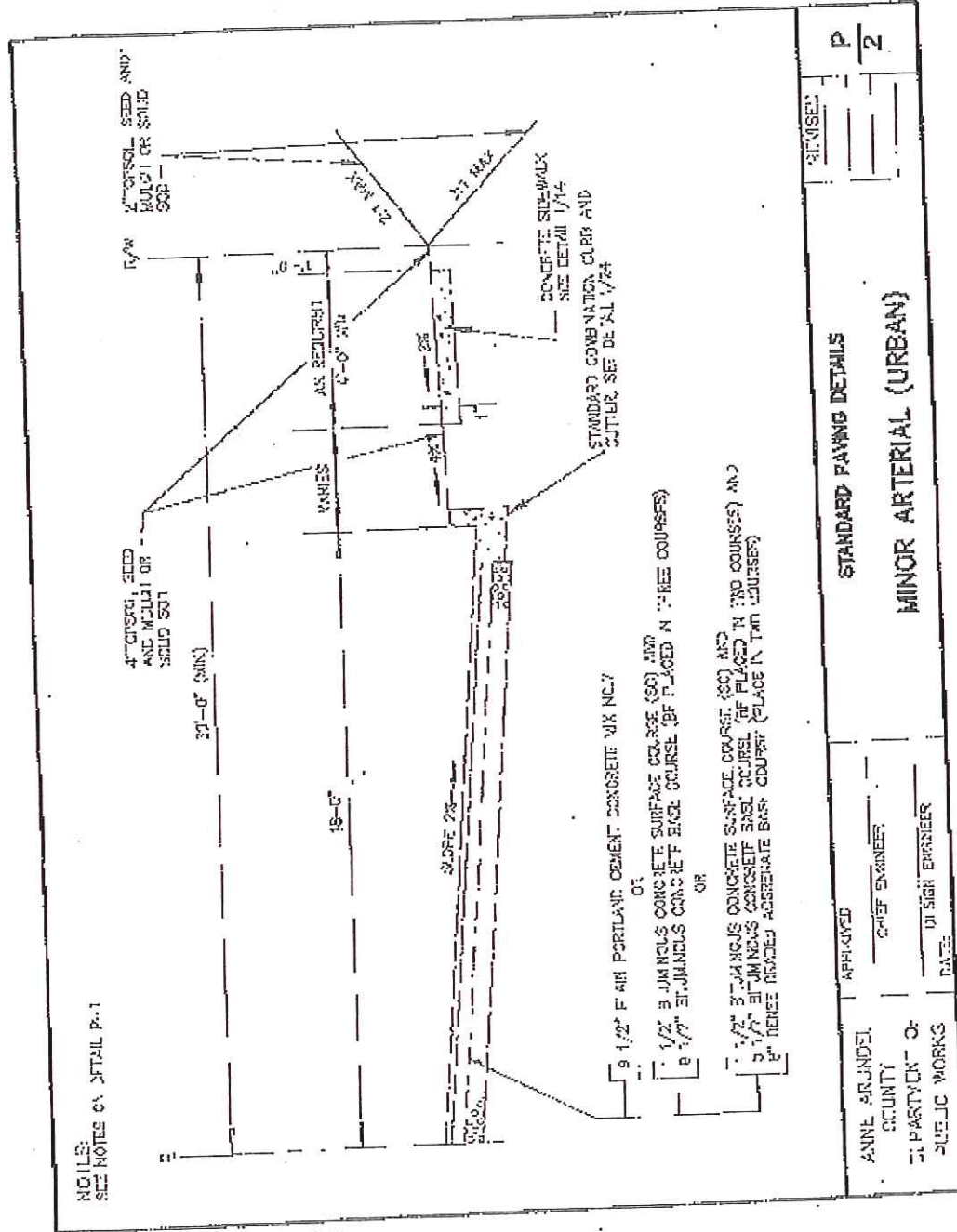


Figure A-3: Existing Peak Hour Traffic Volumes



Scenario Figure A-4: Peak Hour Traffic Volumes in 2030 No-Build



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Figure A-5: Minor Arterial Urban Standard Paving Detail

APPENDIX B

Anne Arundel County Safety Analysis

Introduction

This section documents the safety analysis of existing conditions along West Nursery Road from Hammonds Ferry Road to Elkridge Landing Road. The most recent available crash data was examined, in conjunction with an assessment of existing geometric and operational deficiencies, to incorporate safety improvements into the proposed improvements.

Data Collection and Methodology

Three-years of crash data, from January 1, 2005 to December 31, 2007, within the limits of the study area, were obtained from Anne Arundel County's Office of Traffic and Safety. The data included information on crash locations, date and time, types, severity levels and major contributing factors.

The analysis of existing safety conditions required that the crash locations be plotted in GIS and overlaid with streets and other related GIS layers. Crash rates were calculated for various road sections and compared with Maryland statewide average crash rates. West Nursery Road was divided into three segments, between Elkridge Landing Road and Baltimore Washington Parkway (MD-295), between Baltimore Washington Parkway (MD-295) and River Road, and from River Road to Hammonds Ferry Road. Crash rates were calculated for each roadway segment. Locations with high crash frequencies were identified on a GIS map and detailed crash types/patterns were then investigated at each location to identify contributing factors.

Crash History

There were 61 crashes along West Nursery Road between Hammonds Ferry Road and Elkridge Landing Road from 2005 to 2007. These include 24 crashes with injuries and 37 with property damage. There were no fatalities. The overall crash locations within the study area from 2005 to 2007 are shown in Figure B-1.

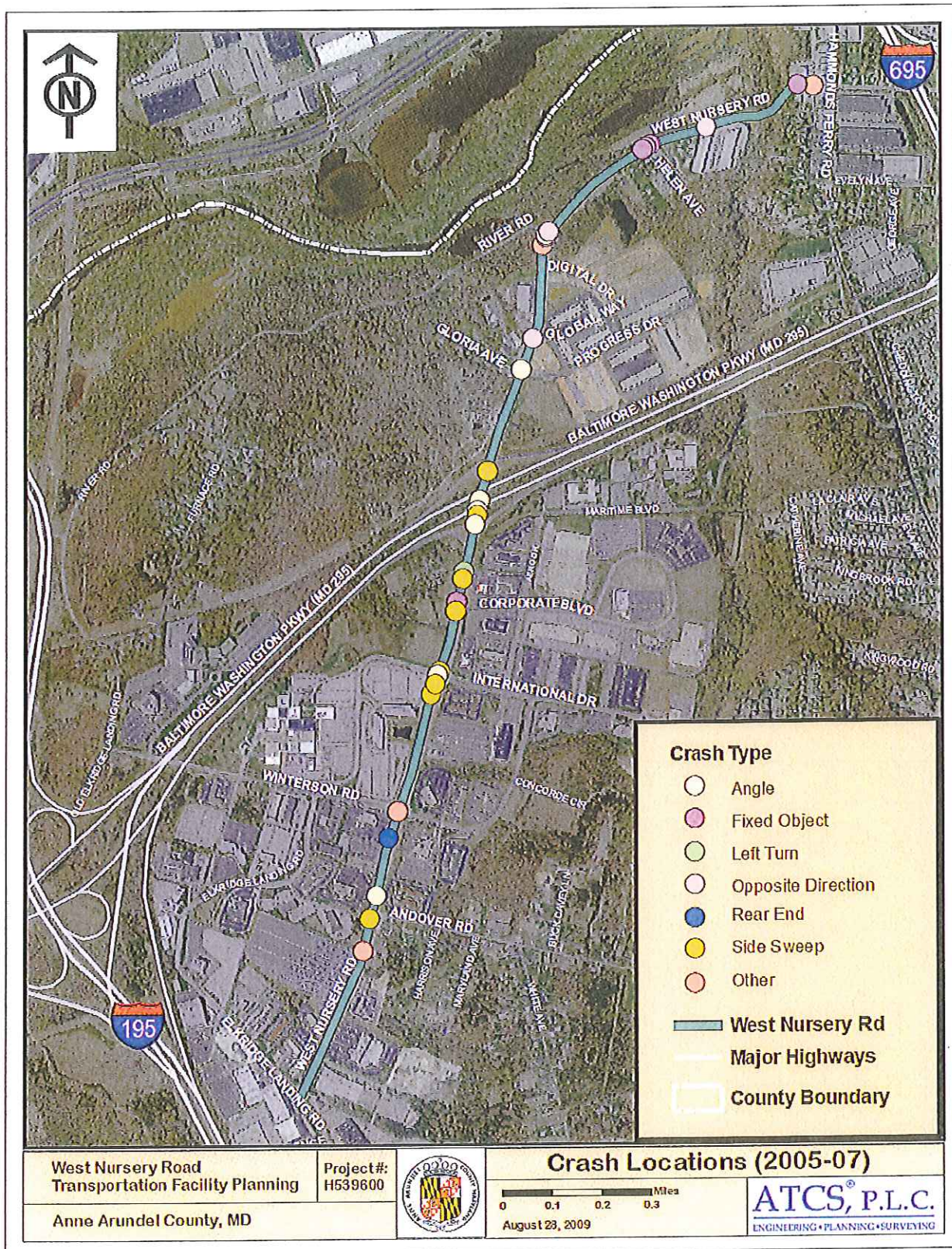


Figure B-1: Crash Locations in the Study Area (2005-2007)

The total number of annual crashes in the corridor doubled from year 2005 to 2007 (as shown in Figure B-2). Currently, the number of crashes is lower than the average number of crashes in the State of Maryland. However, in the future when the 60,000SF BWI Technology Park opens, about 600 additional daily trips will be generated. In addition, about 6 parcels in the study area were rezoned from residential and heavy industrial to retail, commercial and office space which would also generate more daily trips and in turn increase the crash rate.

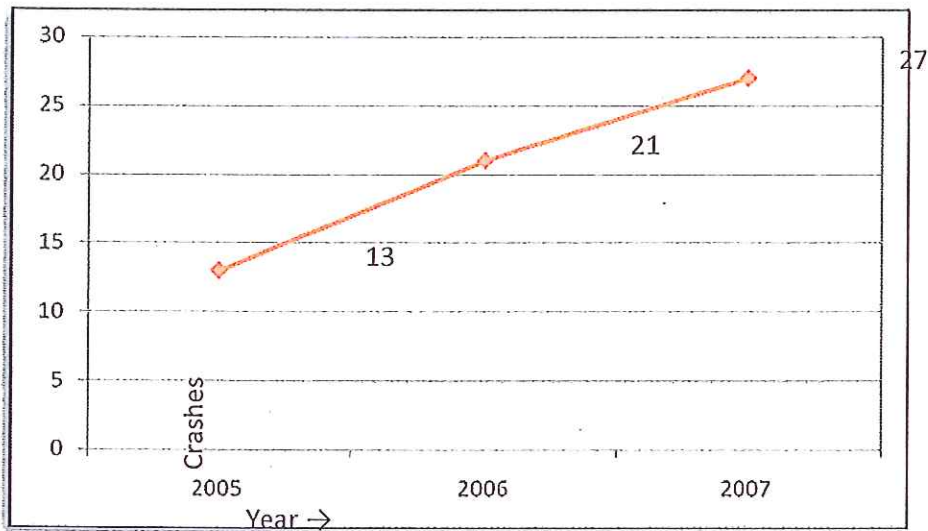


Figure B-2: Annual Crash Frequencies (2005 -2007)

Crash rates (number of crashes per hundred-million vehicle miles of travel) were calculated for each freeway segment based on the annual crash frequencies and Annual Average Daily Traffic (AADT) provided by Anne Arundel County. The calculated rates were compared with Maryland statewide average crash rates for the corresponding roadway classifications, as shown in Table B-1.

Segment on W Nursery Road	AADT	Crash Rate	Control Type	Maryland Statewide Average Crash Rate
Elkridge Landing Rd to Baltimore Washington Pkwy	20879	141	Urban, Divided Highway, Partial Control, 4 or more lanes	130.3
Baltimore Washington Pkwy to River Rd	8252	253	Urban, Non-Divided Highway, No Control, 5 lanes Center Left	294.6
River Rd to Hammonds Ferry Rd	7585	135	Urban, Non-Divided Highway, No Control, 2 lanes	170.5

Table B-1 Annual Crash Rates (2005-2007)

AADT – Annual Average Vehicles/day

Crash Rate = (Average # of crashes per year X 100,000,000) / (AADT X 365 X Segment length in miles)

Currently, the crash rate between Elkridge Landing Road and Baltimore Washington Parkway is slightly higher than the statewide average and the crash rate is close to the average rate north of BW Pkwy. Crash frequency by location is shown in Figure B-3.

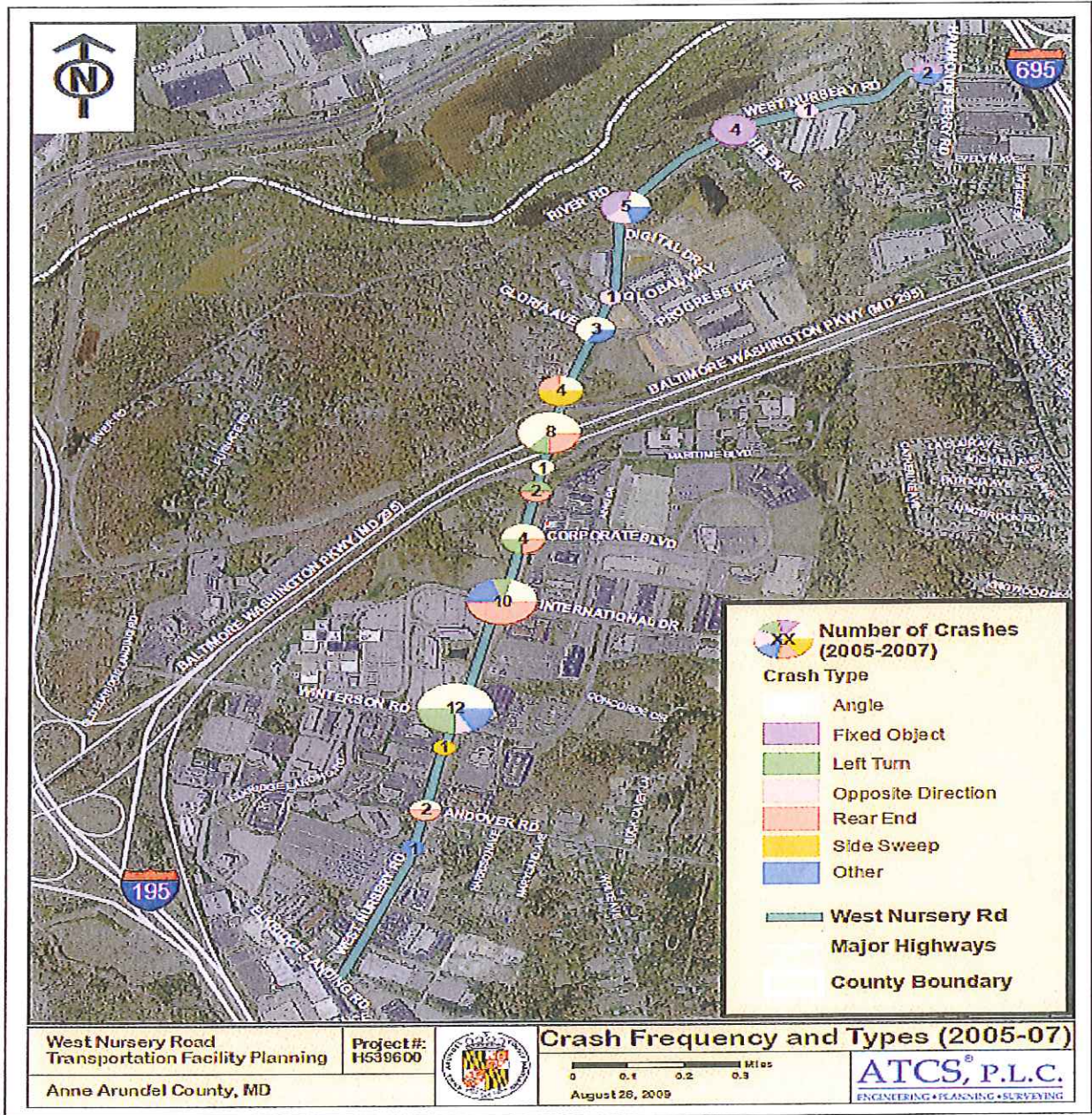


Figure B-3: 3-Year Crash Frequency at Each Intersection by Crash Types

Crash types are summarized in Table B-2. Angle crashes were the predominant type (34.4%) followed by rear end (18%) and fixed object (13.1%) crashes. It can be inferred from these results that primary reasons for crashes are failure to yield right-of-way, lack of signal coordination, and congestion.

Type	West Nursery Road			Total
	Elkridge Landing Road to Baltimore Washington Parkway	Baltimore Washington Parkway to River Road	River Road to Hammonds Ferry Road	
Angle	17	4	0	21 (34.4%)
Rear End	10	1	0	11 (18%)
Fixed Object	1	2	5	8 (13.1%)
Other	5	2	1	8 (13.1%)
Left Turn	6	0	0	6 (9.8%)
Opp. Direction	1	2	1	4 (6.6%)
Side Sweep	1	1	0	3 (4.9%)
Total	41	12	7	61

Table B-2: Summary of Crash Types in the Study Area during 2005-2007

The highest number of accidents occurred at the intersection of Winterson Road and West Nursery Road as shown in Figure B-3. These accidents primarily involved turning vehicles and failure to yield the right-of-way. The intersection of International Drive and West Nursery Road had the second highest number of accidents with a total of 10, half of which were rear end collisions. These could be attributed to the lack of signal coordination. The third highest number of crashes occurred near the Baltimore Washington Parkway (MD 295), with predominantly angle crashes, a similar situation with that at Winterson Road and West Nursery Road. At other intersections, the number of crashes is too low to indicate a specific pattern. However, at Helena Avenue and West Nursery Road, all the crashes are caused by a fixed object, implying sight distance issues.