Kent Island
Transportation Plan

Prepared for

Prepared by

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1. EXECUTIVE SUMMARY

Residents and visitors of Kent Island continue to experience increased traffic on the Island, particularly during the summer months when beach-bound vehicles increase along the US 50/301 Bay Bridge Corridor. Though Kent Island has experienced some growth due to new residential areas and retail and business-development, the majority of the congestion experienced on the Island is attributed to increasing traffic volumes on the Bay Bridge. This increase in traffic volumes from the Bay Bridge is mainly due to funneling and concentrating the traffic from Northern Virginia, DC, and Maryland residents traveling to the Eastern Shore to a single point of crossing the Chesapeake Bay, which is a regional issue. The combination of larger traffic volumes crossing the Bay Bridge (and through the Bay Bridge Corridor) and some local growth has required the County to focus their attention on the existing roadway network, potential traffic projections due to additional development, and the improvements that will be necessary to better serve existing traffic conditions and accommodate future demand.

The Bay Bridge plays a regional and strategic role in transportation for the State of Maryland and commerce in the Mid-Atlantic region as the only point to cross the Chesapeake Bay in Maryland. The US 50/301 corridor through Annapolis, over the Bay Bridge and across Kent Island is major truck route on the National Highway System. As a result, it is subject to the goals set forth in Section 1105: Nationally Significant Freight and Highway Projects, in the Fixing America's Surface Transportation (FAST) Act as well as the goals and policies in Section 1116: National Highway Freight Program. As traffic is concentrated to this single crossing of the bay, the ability to keep traffic flowing and limiting congestion in this corridor becomes essential while MDTA reviews options for additional capacity and the life cycle of the bridge facility, as recently documented in the Bay Bridge Lice Cycle Cost Analysis.[1]

Kimley-Horn was retained by Queen Anne's County to analyze the purpose and need for specific future transportation improvements on Kent Island based on an evaluation of the current and future traffic conditions. The study area is generally defined as US 50/301 from the eastern end of the Chesapeake Bay Bridge east to the Kent Narrows Bridge and Route 18 for its length along Kent Island to Kent Narrows Way South. The recommendations for improvements to future years 2020 and 2030 are based on growth in regional traffic and from potential developments on Kent Island.

Capacity analyses were performed for weekday AM and PM peak hours at approximately 10 key intersections (refer to the Study Area section of this document for specific locations) under various scenarios including:

- Existing 2015 conditions
- 2020 Future Conditions without Transportation Improvements
- 2020 Future Conditions with Transportation Improvements
- 2030 Future Conditions without Transportation Improvements
- 2030 Future Conditions with Transportation Improvements

These analyses took into account underlying historical growth in traffic volumes and forecasted peak hour traffic volumes generated by specific developments, consistent with the Comprehensive Plan, either already in the development process or anticipated within the study horizon.

The results of this study include recommendations to augment the transportation network based on analysis of future traffic volumes. The recommended improvements will provide additional capacity, network redundancy, and improve traffic operations in the study area under the future 2020 and 2030 scenarios beyond what would occur without any improvements to the transportation network. It is advised that the County monitor the

[1] *Bay Bridge Life Cycle Cost Analysis*, Maryland Transportation Authority, December 17, 2015

construction of approved developments to determine the phasing of the improvements. The recommended improvements are highlighted below and reflected in Figure 1. It is important to note that while these transportation improvements will ease weekday peak period congestion, they will not eliminate congestion at locations where right-of-way, environmental, or utility constraints exist that preclude more extensive improvements. The recommendations that provide network redundancy help relieve pressure points during normal, recurring periods of congestion, as well as during times when incidents on Kent Island or the Chesapeake Bay Bridge result in delays on US 50/301. None of the recommendations will provide complete relief to the congested traffic conditions on Kent Island when gridlock occurs on US 50/301, such as during summer traffic conditions.

The following improvement projects are listed in order from west to east and by horizon year priority.

2020 Improvement Recommendations:

Castle Marina Road and MD Route 18 Roundabout

- *Recommendation* - Widen the existing one lane traffic circle to a two lane modern roundabout and modify all four approaches to current roundabout design standards that will reduce speeds in the roundabout. Pedestrian and bicycle crossings should be considered, as the Cross Island Trail is located just north of the roundabout. This would be in addition to the bicycle/pedestrian trail along the west side of Castle Marina Road.
- *Result* – Improved safety and circulation through the circle, reduced queuing at all approaches, and better progression along MD Route 18.

Piney Creek Road and MD Route 18

- *Recommendation* - Install a traffic signal at the intersection to create gaps for traffic entering and exiting Piney Creek Road and the commercial driveway that serves the Kent Island Fire Station and the medical complex.
- *Result* – Better operations for minor street approaches and coordination of signals along MD Route 18 for better progression of traffic.

Postal Road and MD Route 18

- *Recommendation* - Install a full traffic signal at the intersection to create gaps for Postal Road traffic to access MD Route 18. The existing signal operates in flashing mode. It currently allows for free-flow operation along MD Route 18, and requires the Postal Road approach to stop and yield to traffic on MD Route 18.
- *Result* – Better operations for minor street approaches and coordination of signals along MD Route 18 for better progression of traffic.

Dominion Road and US 50/301 Off-Ramp

- *Recommendation* - Construct dual right-turn lanes at the off-ramp from US 50/301 onto Dominion Road.
- *Result* – Provide additional storage to reduce queuing onto US 50/301.

MD Route 18 and Dominion Road Intersection

Recommendations

- Restripe the northbound approach to accommodate one exclusive left-turn lane, one shared through and left-turn lane, and one exclusive right-turn lane.
- Widen MD Route 18 with an additional westbound lane between Dominion Road and Postal Road (to accept the northbound dual left-turns).
- Reconstruct the traffic signal at this intersection to accommodate these improvements

Results

- Reduced delay, better operations through the intersection, and better progression of traffic along MD Route 18.

MD Route 18 Traffic Signal Operations

- *Recommendation* - Install interconnect and communication between traffic signals on MD Route 18 so that they can operate actuated-coordinated. This includes the traffic signals on MD Route 18 at the intersections with Dominion Road, Postal Road, and Piney Creek Road.
- *Results* - Improve traffic progression along MD Route 18 and decrease unnecessary delay and queuing along the corridor. Actuated traffic signals use detectors to determine the presence (or absence) of vehicles on each intersection approach to monitor and assign the time intervals based on traffic demand.

Kent Narrows Roundabout

- *Recommendation* - Construct a new one lane roundabout at the existing intersection of Main Street and Kent Narrows Way South/Kent Narrows Way North. This includes a pedestrian path and sidewalk connecting Kent Narrows North with Kent Narrows South.
- *Result* – Improve safety and site distance from each approach of the existing skewed alignment of the intersection.

2030 Improvement Recommendations:

US 50/301 and MD Route 8 Interchange

- *Recommendation* - Reconstruct the existing diamond interchange to a diverging diamond interchange (DDI), with reserved right-of-way for pedestrian and bicycle facilities in the median of the interchange.
- *Result* – Improve operations through the interchange and reduce ramp queuing that could extend to US 50/301.

Thompson Creek Road Connector

- *Recommendation* - Construct a new two lane roadway connecting MD Route 8 with the commercial shopping area located along Thompson Creek Service Road.
- *Result* – Introduce additional connections between residential and retail land uses, and divert traffic from the intersection at MD Route 8 at Thompson Creek Service Road.

Pedestrian Bridge over US 50/301

- *Recommendation* - Construct a new pedestrian bridge to connect county owned parkland on the north side of US 50/301 with the shopping center located along Thompson Creek Service Road (south of US 50/301).

- *Result* – Introduce safe pedestrian crossings of US 50/301, independent of vehicular traffic.

Cox Neck Road Connector

- *Recommendation* - Construct a new two lane roadway from Thompson Creek Road to Cox Neck Road following the alignment of US 50/301. Connection options include tying into Ellicott Drive, Cecil Drive, or a new alignment connecting to Postal Road. Alternatively, construct a one-way westbound roadway in this same location. In either alternative, pedestrian and bicycle facilities should be considered to enhance connectivity on the south side of the Island.
- *Result* – Provide additional east-west connectivity between, particularly on the south side of US 50/301, where such connection does not exist.

MD Route 18 Improvements from Piney Creek Road to Kent Towne Market

- *Recommendation* - Widen MD Route 18 from two lanes to four lanes between Piney Creek Road and Kent Towne Market, including the widening of the MD Route 18 overpass of US 50/301.
- *Result* – Improve traffic flow along MD Route 18, a key connection for local traffic on the Island.

MD Route 18 Improvements from Kent Towne Market to Wharf Drive

- *Recommendation* - Widen MD Route 18 from two lanes to three lanes between Kent Towne Market and Wharf Drive. For sections where a third lane is not necessary, the remaining right-of-way should be reserved for pedestrian and bicycle facilities.
- *Result* – Improve traffic flow along MD Route 18 and introduce safe pedestrian and bicycle connections on the south side of US 50/301.

South Piney Road and MD Route 18

- *Recommendation* - Install a traffic signal or roundabout to accommodate increased traffic associated with the US 50/301 ramp. This study analyzed the intersection with a traffic signal, but further analysis is necessary to determine the best traffic control for this intersection, based on traffic associated with actual development changes in the area.

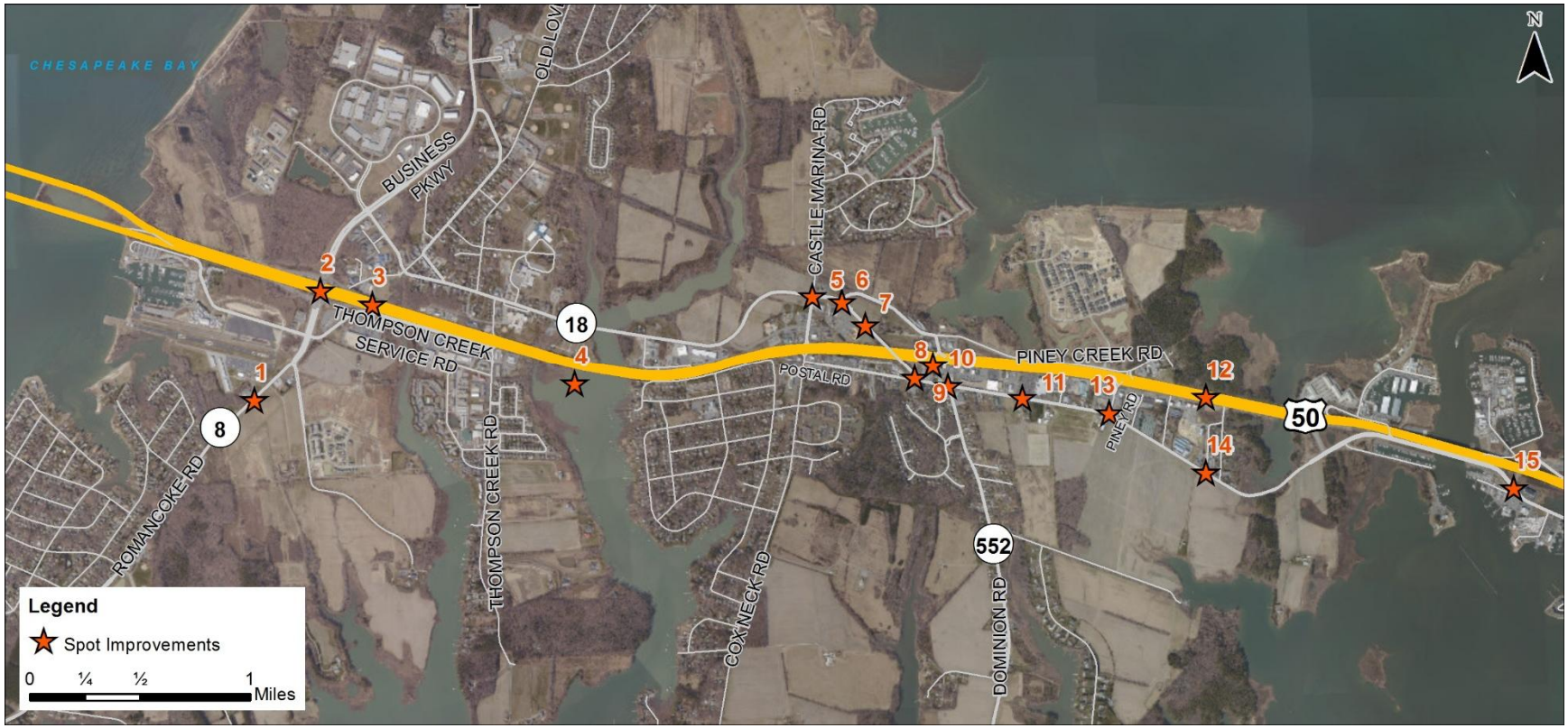
Shamrock Road Overpass

Recommendations

- Construct a new two lane roadway connecting Shamrock Road and Piney Creek Road over US 50/301. This construction will include a new pedestrian connection of the Cross Island Trail over US 50/301.
- Install a traffic signal at the intersection of Shamrock Road and MD Route 18.

Result – Provide network redundancy through additional crossings of US 50/301.

Figure 1: Transportation Improvements



Improvement Projects

1	Thompson Creek Connector	6	Install Signal	11	Main Street Improvements
2	Diverging Diamond Interchange	7	Overpass Widening	12	US 50/301 Overpass
3	Pedestrian Bridge	8	Install Signal	13	Install Signal
4	Cox Neck Connector	9	US 50/301 Ramp Widening	14	Install Signal
5	Widen Roundabout	10	Intersection Improvements	15	Install Roundabout

2. INTRODUCTION

The Kent Island area of Queen Anne's County is the gateway from the Western Shore of Maryland to points east, via the Chesapeake Bay Bridge, and is accessible from the east via the Kent Narrow Bridge. Its connection to the Bay Bridge not only facilitates heavy traffic between the Western and Eastern Shores, but also provides a north-south route for those who wish to avoid the I-95 corridor. This I-95 alternative north-south route travels from the Bay Bridge, through Kent Island, and north through Delaware to destinations in the northeast. A graphical representation of Kent Island's location in respect to some of the major regional routes is provided in Figure 2.

The Island is bisected north/south by US 50/301 from the eastern end of the Chesapeake Bay Bridge east to the Kent Narrows Bridge. This interstate facility is the only available access on or off the Island from the west. The north side of US 50/301 consists mostly of residential land use, while retail and commercial uses, serving both local and pass-by traffic, are located south of US 50/301. With only two crossings of US 50/301, one at the MD Route 8 interchange and the other over 2 miles away along MD Route 18 west of MD Route 552, the network lacks redundancy. Without redundancy, the network cannot adequately serve the Island's residents, businesses and visitors during high volume traffic conditions. A circuitous route on the eastern end of Kent Island provides a path for local traffic to get on and off Kent Island, but does not serve as a crossing of US 50/301.

MD Route 18 not only provides a connection between the north and south sides of the Island, but also serves as the only east-west connection other than US 50/301. Kent Island is in great need of more connections across US 50/301, along with parallel connections to the freeway for local use. Parallel connections are also extremely important when emergency incidents on the Chesapeake Bay Bridge cause back-ups resulting in gridlock on Kent Island.

There are several constraints to implementing transportation improvements on Kent Island, including limited right-of-way, existing utilities, environmental conditions, inability to re-route traffic due to the fact that Kent Island is an island, and cost. Many creeks and wetlands wind through the Island, creating obstacles for roadway construction. Many of the identified improvements require bridge structures that are costly and compete for funding with other transportation needs in the County. In addition, existing developments and the US 50/301 corridor create right-of-way constraints for intersection improvements.

This study analyzes both existing and future transportation conditions with anticipated growth in regional traffic and projected future developments in Years 2020 and 2030. Based on identified network deficiencies, the study includes recommendations to the roadways, intersections, and trail connections to better serve the transportation demands on Kent Island.

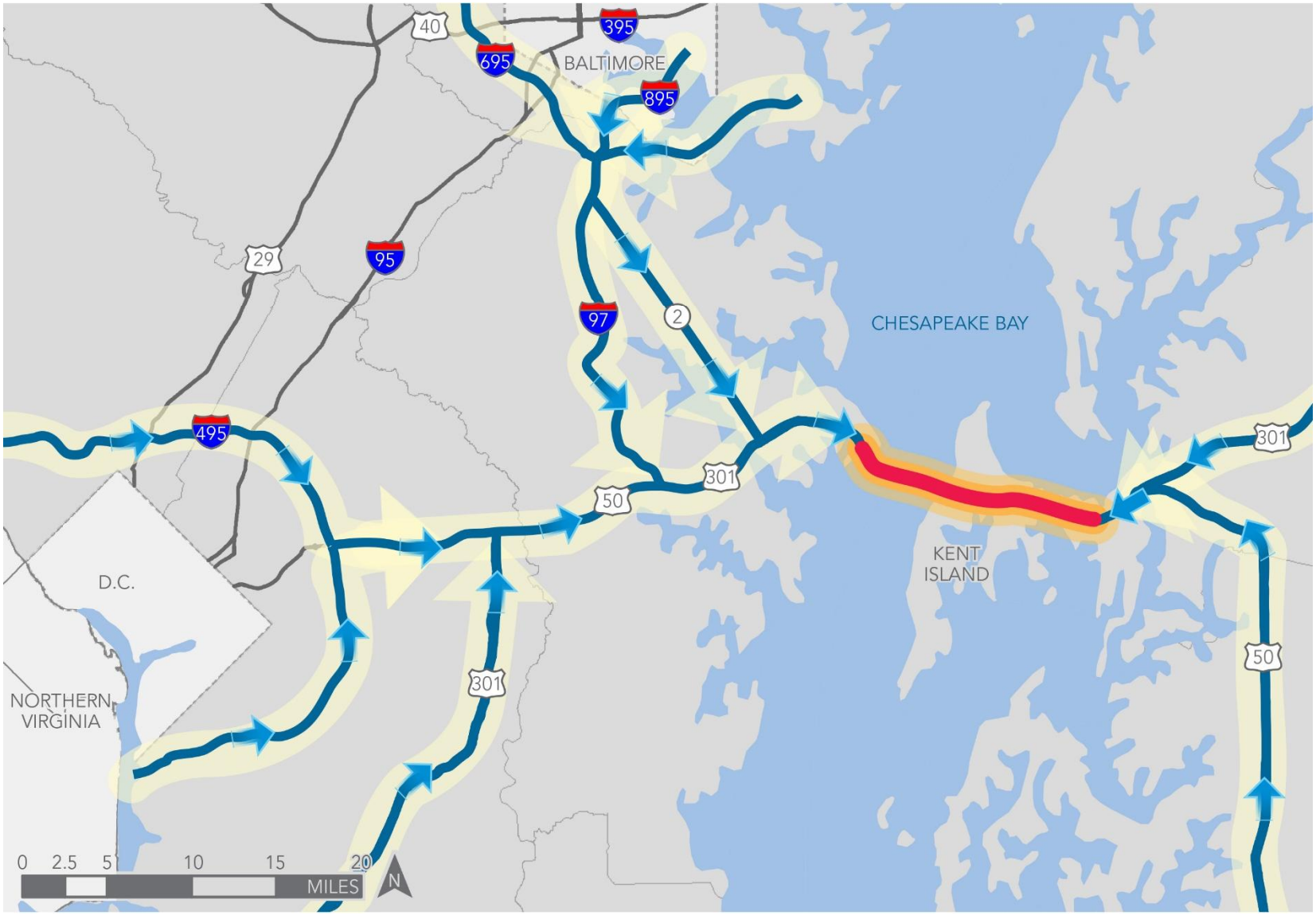


Figure 2: Regional Routes Converging on Kent Island

Study Purpose

The overall purpose of the study is to determine the necessary improvements for US 50/301, MD Route 8 and MD Route 18 that are essential to improve existing conditions on Kent Island as well as to address anticipated future changes in land uses and growth through Year 2030. The County and Maryland State Highway Administration (SHA) worked together to collect traffic data, obtain current digital mapping, and project future levels of development on Kent Island. Kimley-Horn was retained by the County to evaluate traffic conditions, to make improvement recommendations, and develop sketch-level concept plans for the various improvements.

Consistency with 2010 Queen Anne's Comprehensive Plan and the 2007 Chester/Stevensville Community Plan

The Kent Island Transportation Plan is an implementation of the County's 2010 Comprehensive Plan which specifically recommended in the Community Facilities and Transportation section in Goal 1: Multi-Modal Transportation Network, Objective 1: [To] Plan, design, improve, manage, and expand infrastructure and community facilities and services to meet the needs of local residents and businesses. Under this first objective are a number of recommendations which address infrastructure needs including the following: Recommendation 3: Examine infrastructure within the Planning Areas [also known as Designated Growth Areas] and identify areas where infrastructure is deficient through the Comprehensive Water and Sewerage Plan (CWSP) and the Master Roadway and Transportation Plan … and 4. Create a strategic implementation plan and funding strategies to address infrastructure deficiencies in coordination with the Capital Improvement Program (CIP). The Kent Island Transportation Plan through its analysis of the Chester/Stevensville road network capacities, its list of improvements and the cost of those improvements is fulfilling the 2010 Comprehensive Plan's recommendations and those of the 2007 Chester/Stevensville Community Plan which in the Vision Statement for the Community states: "A place where traffic congestion has been reduced and more emphasis has been placed on local mobility." Additionally, Chapter 6 of the Chester/Stevensville Plan includes a Transportation Plan that identifies Planned Road System Improvements which mirrors those identified in the Kent Island Transportation Plan.

Study Area

The study area is defined as US 50/301 from MD Route 8 located at the eastern end of the Chesapeake Bay Bridge to the Kent Narrows Bridge, and MD Route 18 for its length along Kent Island to Kent Narrows Way South. A map of the study area is shown in Figure 3. The following intersections, also shown in Figure 3, have been identified as existing or future congested areas and were included in the analysis of the study area:

- US 50/301 interchange with MD Route 8
- US 50/301 entrance/exit roundabout at Thompson Creek Road
- MD Route 8 / MD Route 18 and Skipjack Parkway
- MD Route 18 and Castle Marina Road roundabout
- MD Route 18 and Piney Creek Road
- MD Route 18 and Postal Road
- Dominion Road and MD Route 18
- MD Route 18 and Shamrock Road
- MD Route 18 and Dundee Avenue
- Route 18 and Kent Narrows Way South

Intersection capacity analyses were performed at all intersections for existing and future Year 2020 and 2030 conditions. Future conditions are based upon an agreed upon growth rate factor developed from previous traffic studies and a seasonal adjustment factor. See Chapter 4 for further explanations of growth and seasonal factors.

Public Involvement

Queen Anne's County staff and SHA view the community as a vital asset and resource in developing the future transportation plans on Kent Island. The residents of the Island provide valuable insight into the daily peak hour operations and mobility of the existing network. They also experience the effects of summer vacation traffic on US 50/301 and impacts of Chesapeake Bay Bridge incidents on the circulation of local traffic.

Two public meetings were hosted on Kent Island to get the community's views on transportation deficiencies and to obtain feedback on the improvement projects developed in this study. In the first meeting, held on August 20, 2014, the public was invited to provide comments on existing issues and problem locations. Following an analysis of a combination of roadway improvements, the second public meeting was held on Tuesday, July 7, 2015 to present various options for addressing transportation network deficiencies. A question and answer session was held after the presentation to allow residents to express their comments and concerns. The comments from both meetings are contained in Appendix A.

Figure 3: Study Area and Intersections

3. EXISTING CONDITIONS

Existing Area Roadways

Key roadways in the study area are US 50/301, MD Route 8, Thompson Creek Road, MD Route 18, Skipjack Parkway, Castle Marina Road, Piney Creek Road, Postal Road, Dominion Road, Shamrock Road, Dundee Avenue, and Kent Narrows Way South. The following paragraphs describe each roadway.

US 50/301 This is a six-lane, divided highway that runs east-west extending from the Chesapeake Bay Bridge through Kent Narrows in the area of study, and acts as the only point of access on and off the Island from the west. This route serves as a major thoroughfare for commuters over the Chesapeake Bay Bridge to and from the Eastern Shore of Maryland. It also provides access to local businesses and residential areas via slip ramps. In the summer months, US 50/301 experiences increased volume due to vacationers travelling to Maryland and Delaware beaches. In the eastbound direction alone, traffic volumes coming onto Kent Island from the Chesapeake Bay Bridge increase from approximately 30,000 vehicles per day (vpd) to over 45,000 vpd in the summer. The interchange with US 50/301 and MD Route 8 is the only full-access interchange on Kent Island. The remaining entrance and exit ramps are generally short ramps that connect to local roads at intersections very close to US 50/301. The minimal distance between the exit ramps and local roadways results in limited storage for queuing at stop-controlled or signalized intersections.

This roadway is part of the National Highway System and provides regional north-south redundancy to the I-95 corridor. US 301 extends north from Southern Maryland, across the Chesapeake Bay Bridge, north to Route 1 and Route 896 in Delaware, and ultimately connects with I-95 to continue to destinations in the northeast. The US 50/301 corridor through this area is also a major truck route on the National Highway System.

MD Route 8 This north-south, rural major collector extends from Romancoke at the southern part of Kent Island to its terminus at the study intersection of MD Route 8, MD Route 18, and Skipjack Parkway. In the area of study, MD Route 8 has a four-lane, divided cross-section. There are several signalized intersections along MD Route 8 in the study area including intersections with: MD Route 18 / Skipjack Parkway at the Chesapeake Bay Business Park, the ramps at the interchange with US 50/301, and Thompson Creek Road. MD Route 8 serves the Bay Bridge Airport just south of US 50/301 as well as some commercial uses around the interchange with US 50/301. Matapeake Elementary School and several housing developments are located further to the south along MD Route 8. Construction of the Southern Kent Island Sanitation Sewer System will allow up to 560 homes to be built on existing lots along the southern area of MD Route 8 that were not previously able to be built due to percolation issues associated with septic service.

MD Route 18 This is an east-west, rural major collector that extends from the intersection of MD Route 8 and Skipjack Parkway east to Kent Narrows Way South in the study area. It is an undivided, two-lane roadway. The intersection at Castle Marina Road is a single-lane, unsignalized roundabout. The study intersections with Piney Creek Road, Shamrock Road, Dundee Avenue, and Kent Narrows Way South are unsignalized. The study intersections with Postal Road and Dominion Road are signalized. MD Route 18 serves a variety of uses along its length through the study area including residential, commercial, and institutional. The Kent Island Fire Company and Anne Arundel Medical Center Urgent Care Facility are located on MD Route 18 at the intersection with Piney Creek Road.

Dominion Road This is a two lane local collector that extends southward from US 50/301 to its terminus at Little Creek Road. Dominion Road serves as several retail establishments including a gas station and Kent Towne Market

between US 50/301 and the intersection with MD Route 18. The intersection of Dominion Road with MD 18 is fully developed with two pharmacies with drive-through windows and two retail stores. Large overhead transmission lines along the north side of MD Route 18 at this intersection and limited right-of-way constrain alternatives for transportation improvements, making improvements in this area very expensive.

Thompson Creek Road/Thompson Creek Service Road Thompson Creek Road is a local collector running north-south from US 50/301 to its terminus at a private driveway. This collector serves many retail locations near US 50/301, as well as businesses and residential developments further south. The ramp from US 50/301 eastbound intersects Thompson Creek Road at a roundabout. Thompson Creek Service Road extends east-west from MD Route 8 to the roundabout with Thompson Creek Road and the US 50/301 ramps. This two-lane roadway intersects MD Route 8 at a signalized intersection. This route provides access to multiple retail shopping centers, as well as access to a commuter park-and-ride lot with carpool and transit opportunities near MD Route 8.

Skipjack Parkway This is a two-lane, divided local roadway that extends from MD Route 8 to Log Canoe Circle, serving the Chesapeake Bay Business Park and County facilities.

Castle Marina Road This is a two-lane undivided rural major collector that runs north-south through the roundabout at MD Route 18 to US 50/301. Between the roundabout and US 50/301 westbound ramps, this roadway serves retail and business land uses. To the north, the roadway leads to residences and a marina.

Piney Creek Road This is a two-lane local roadway that runs east-west from MD Route 18 to its terminus at Piney Creek. The intersection of Piney Creek Road with MD Route 18 is unsignalized. The Gibson's Grant residential community has access along this roadway.

Postal Road This is a two-lane local roadway that runs east-west from Cox Neck Road to MD Route 18. It provides access to local businesses, as well as a route for residences along Cox Neck Road to access the retail developments along MD Route 18 to the east.

South Piney Road This is a two-lane local roadway that runs north-south from US 50/301 to MD Route 18, serving primarily commercial uses. It is accessed via a slip ramp from US 50/301 and a stop-controlled intersection at MD Route 18.

Shamrock Road This is a two lane roadway that runs from Dundee Avenue in the north to MD Route 18 in the south. There are mixed uses of residential and commercial properties along this roadway.

Dundee Avenue This is two-lane roadway that runs north-south from US 50/301 to MD Route 18, serving primarily residential units

Kent Narrows Way South This is a two lane roadway that runs north-south through MD Route 18, under US 50/301 and continues as Kent Narrows Way North. This connection provides access to marinas, restaurants, and other commercial properties on both sides of US 50/301.

Existing Pedestrian/Bicycle Facilities

This study reviews the connectivity of existing pedestrian and bicycle facilities along the study area roadways and the pedestrian and bicycle accommodations at each study intersection. Although there are no roadside bicycle lanes in the study area, several locations have share-the-road signage or on-road bicycle pavement markings. The following paragraphs describe the existing bicycle and pedestrian facilities within the study area.

The Cross Island Trail provides an exclusive path for both pedestrians and bicyclists to connect across the Island with the majority of the trail north of US 50/301. The trail begins at Terrapin Nature Park and terminates at Piney Narrows Road on the western side of the Kent Narrows. It is separated from roadways except in the vicinity of the Kent Narrows Draw Bridge, where it runs on the north side of the bridge, separated by a painted median. The only crossings of US 50/301 occur alongside the Piney Narrows Road underpass at the western end of the Kent Narrows drawbridge and along the Kent Narrows Way underpass at the eastern end of the Kent Narrows drawbridge.

Within the Stevensville area of the study, there are no bicycle or pedestrian facilities on MD Route 8 south of MD Route 18. There is a sidewalk along the westbound direction of MD Route 18 that runs from the bridge over Cox Creek to Love Point Road. The only crossing of MD Route 18 is a striped, unsignalized crosswalk at Elementary Way. There are no significant sidewalks east of the Cox Creek bridge until Postal Road in Chester. A sidewalk on the eastbound side of MD Route 18 travels from Postal Road to 300 feet east of Dominion Road. There is one unmarked crosswalk on the south leg of the intersection of Dominion Road and MD Route 18 with no pedestrian signal heads.

Within the Chester area of the study, there is a sidewalk on the westbound side of MD Route 18 from Country Day Road that extends approximately 800 feet west, along the frontage of commercially developed properties. Additional sidewalk is located on the westbound side of MD Route 18, extending approximately 600 feet west from Shamrock Road. There are no significant sidewalks or crosswalks travelling from Shamrock Road to the Kent Narrows.

Existing Traffic Volumes

SHA conducted a series of intersection turning movement counts throughout the study area in December, 2013 and January, 2014. A map of the study area intersections was provided in Figure 3. The counts were conducted on weekdays during the AM and PM peak periods. The network peak hours of study were identified as 8:00 AM to 9:00 AM for the morning peak and 4:30 PM to 5:30 PM for the afternoon peak.

Due to the lower level of activity on the Island in the months of December and January, seasonal adjustment factors were discussed to grow the volumes to a magnitude more representative of average Island traffic. The month of September was chosen, because it still contains residual beach traffic and the school year and associated activities have begun by this time. Seasonal growth factors, obtained from SHA, are based on data collected at four Automated Traffic Recording stations located along US 50/301 on the Eastern Shore. Using this information, a seasonal adjustment factor of 1.25 was applied to the December volumes.

Independent of the winter traffic counts, Wells & Associates performed counts in September 2013 for a traffic study on MD Route 18. A few of those counts overlapped with the intersections included in this study, which facilitated a comparison between September counts and the seasonally adjusted winter counts taken by SHA. This comparison showed that the seasonal adjustment factor was not sufficiently high enough to replicate peak hour intersection turning movement volumes. Based on these observations, the September counts were used where available, and the seasonally adjusted counts were incorporated at the remaining intersections. Volumes were then balanced between the study area intersections based on existing turning movement distributions. While this method for developing existing peak hour traffic volumes may slightly under-represent existing volumes, it is based on the data available at the time of this study. The final volumes used in the analysis of existing conditions are shown in Figure 4. Full data collection resources are provided in Appendix B.

Figure 4: Existing Turning Movement Counts

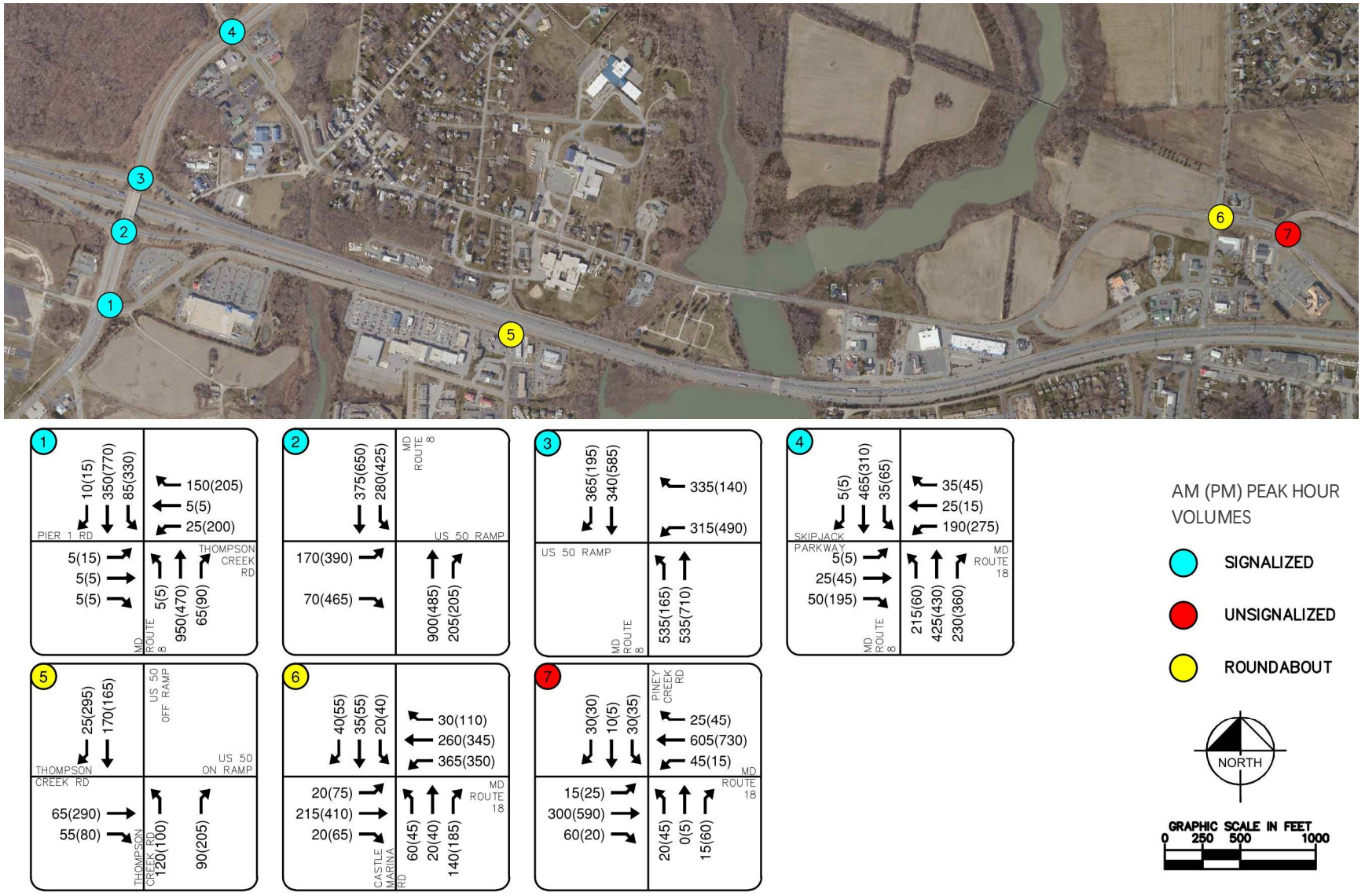
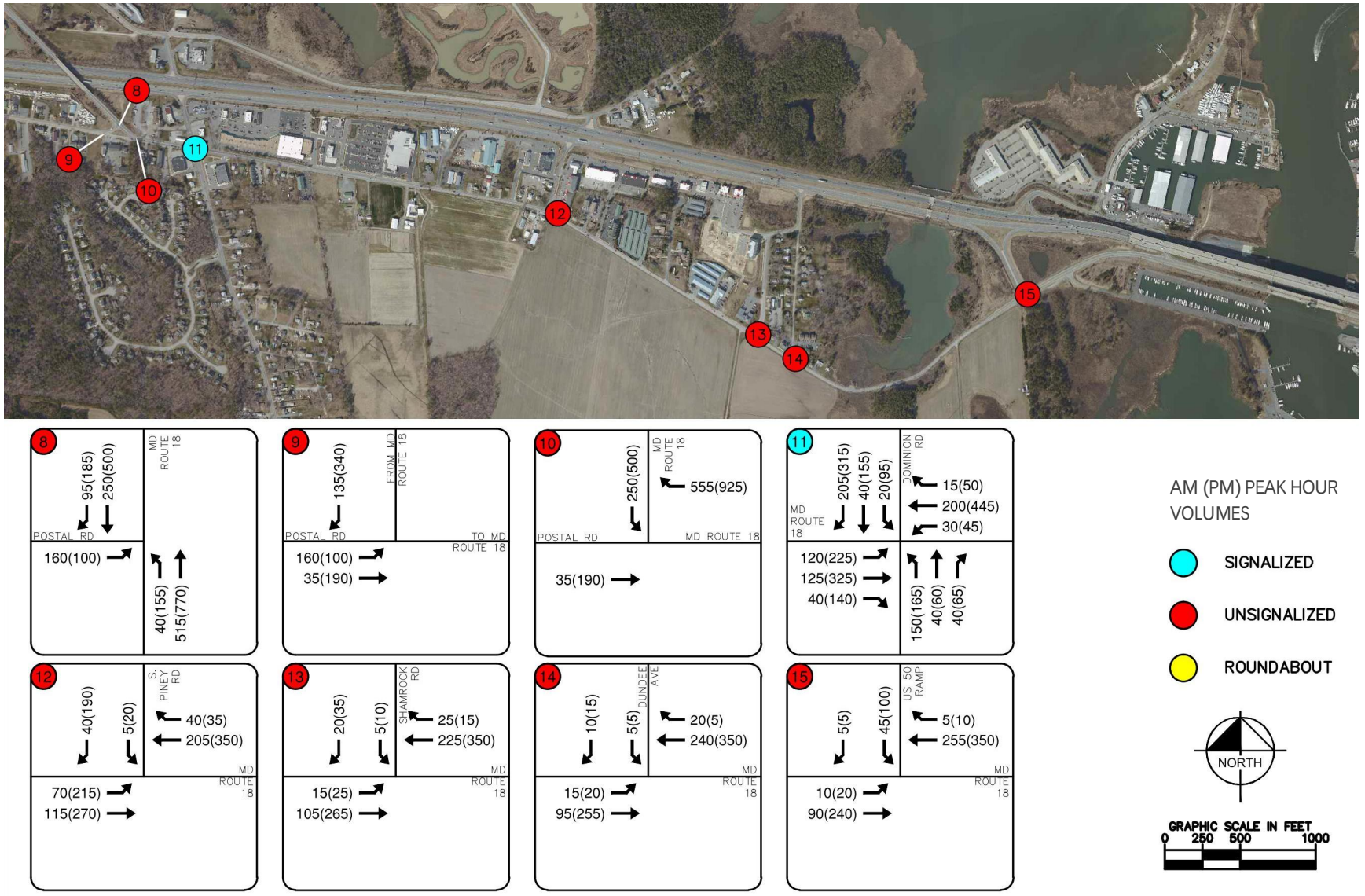


Figure 4: Existing Turning Movement Counts (Continued)



Existing Intersection Capacity Analysis

Intersection capacity analyses were conducted for the existing AM and PM peak hour turning movement volumes at the study intersections. The capacity analyses were conducted using Synchro, and based on methodologies contained in the *Highway Capacity Manual, 2000 Edition* (HCM) for signalized and unsignalized intersections. According to the HCM, capacity is defined as the maximum number of vehicles that can pass over a particular road segment or through a particular intersection within a fixed time duration. Operational conditions are described by a level of service (LOS), which is a qualitative measure that describes the operational conditions of an intersection or street and is an indicator of motorist perceptions within a traffic stream. The HCM defines six levels of service, LOS A through F, with A as the best and F the worst. Table 1 shows the level of service delay per vehicle for signalized and unsignalized intersections. Given that Kent Island is in a designated growth area, the County's Code allows for peak hour intersection LOS C. LOS D is permitted with an approved implementation plan (County Code Section 28-7.D.(1)(a)(1)).

Table 1: Level of Service and Ranges of Delay

Level of Service (LOS)	Delay per Vehicle (seconds)	
	Signalized Intersection	Unsignalized Intersection
A	≤ 10	≤ 10
B	> 10 – 20	> 10 – 25
C	> 20 – 35	> 15 – 25
D	> 35 – 55	> 25 – 35
E	> 55 – 80	> 35 – 50
F	> 80	> 50
Source: Highway Capacity Manual, 2010 Edition		

Existing conditions analyses were based on the existing peak hour turning movement volumes, intersection geometry, peak hour factors, heavy vehicle percentages, and traffic control and signal timing at the study intersections. The weekday AM and PM peak periods were analyzed in this study. Results of the intersection capacity analyses for both peak hours are summarized in Table 2. All of the existing study area intersections operate at overall level of service D or better in both the AM and PM peak hours.

Table 2: Summary of Intersection Capacity Analysis Results – Existing Conditions

Level of Service (Delay, Seconds per Vehicle)				
Intersection	Existing AM		Existing PM	
	Delay	LOS	Delay	LOS
MD Route 8 at Pier 1 Road/ Thompson Creek Road (Signalized)	8.3	A	16.7	B
MD Route 8 at US 50/301 EB Ramps (Signalized)	13.3	B	15.8	B
MD Route 8 at US 50/301 WB Ramps (Signalized)	10.1	B	14.1	B
MD Route 8 at Skipjack Parkway/ MD 18 (Main Street) (Signalized)	16.6	B	18.4	B
MD Route 18 at Castle Marina Road (Roundabout)[1]	13.1	B	33.7	D
MD Route 18 at Piney Creek Rd (Two-Way Stop Controlled)	2.6	A	6.8	A
MD Route 18 at Postal Rd (Eastbound Stop Controlled)	5.5	A	19.6	C
Dominion Rd at MD Route 18 (Signalized)	17.7	B	29.8	C
MD Route 18 at South Piney Rd (Southbound Stop Controlled)	2.2	A	5.8	A
MD Route 18 at Shamrock Rd (Southbound Stop Controlled)	1.0	A	1.1	A
MD Route 18 at Dundee Ave (Southbound Stop Controlled)	0.7	A	0.7	A

[1] The roundabout was analyzed using SIDRA analysis software.

Regional Effects on Kent Island Transportation

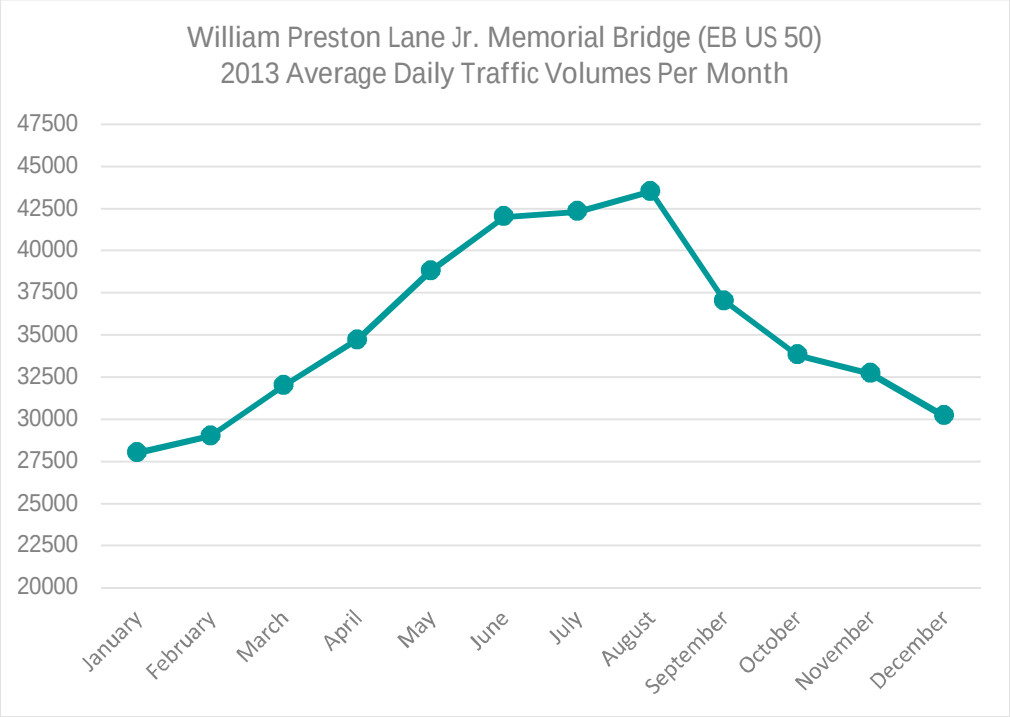
While the communities of Stevensville and Chester make up much of Kent Island, those communities share the US 50/301 transportation spine with regional traffic throughout Maryland, Washington, D.C., and northern Virginia. Traffic headed toward the Maryland and Delaware beaches as well as a portion of traffic destined for northern Delaware or southeast Virginia traverse across Kent Island throughout the year, with the heaviest traffic volumes occurring in the summer months, as shown in Figure 5.[2] The summer traffic is generally centered on weekend trips or Saturday-to-Saturday week-long rentals, therefore with the exception of Friday afternoon, the peak volumes generally occur outside the normal AM and PM weekday commuting periods. While this study did not focus on weekend conditions, it is important to note that for several months out of the year, the traffic on Kent Island is greater than that shown in this report. Peak period conditions mainly occur between Memorial Day and Labor Day, accounting for approximately three months, or a quarter of a year. This is a significant period of time during which local traffic is impacted by regional trips. This study was designed to identify short term recommendations to improve local traffic circulation on the Island. A parallel study by the Maryland Transportation Authority, The Bay Bridge Life Cycle Cost Analysis, was recently completed to evaluate the longevity of the existing bridge structure.[3] While the structure appears to be sound, improvements to the Bay Bridge and US 50/301 on both sides of the bridge are needed to handling the increasing traffic demand in this area. The report indicates that solutions to solving the capacity of the Bay Bridge and the associated congestion on both the eastern and western shores of Maryland are expensive and will have long lead times before any construction takes place. Because of the importance of this transportation network, several State and local agencies will need to work together to realize completion of short-term and long-term improvements.

The region's traffic that uses US 50/301 across Kent Island also uses the Chesapeake Bay Bridge. This 5–lane facility, operated by the Maryland Transportation Authority, consists of two separate bridge structures, each spanning approximately five miles across Chesapeake Bay. The original bridge carries two lanes of eastbound traffic. The newer, three lane bridge generally carries westbound-only traffic, however one lane is often changed to carry eastbound traffic during periods of peak eastbound traffic flow. Incidents on the Chesapeake Bay Bridge are not uncommon. While the occasional flat tire or object in the roadway create nuisance delays, major

[2] Maryland Transportation Authority 2013 Traffic Report – William Preston Lane Jr. Memorial Bridge, Dated 2/18/2014
[3] *Bay Bridge Life Cycle Cost Analysis*, Maryland Transportation Authority, December 17, 2015

breakdowns and crashes cause delays that back traffic onto Kent Island. When this occurs and traffic on US 50/301 is stopped, increased traffic often exits off the highway onto MD Route 18 and other local roadways causing congestion throughout Kent Island.

Figure 5: Chesapeake Bay Bridge Monthly Average Daily Traffic Volumes



MD Route 18 serves as the only east-west connector that traverses the entire Island. It also serves as the only crossing of US 50/301, other than the MD Route 8 interchange on the west side of the Island. This lack of network redundancy leaves the local travelers with very few routes to their various trip destinations from home to work, school, and shopping. When these minimal routes are then filled with US 50/301 overflow traffic, the capacity of the network is far exceeded, creating gridlock for all travelers.

The lack of redundancy in the network is not only an inconvenience to drivers, but it creates safety concerns as well. In a July 2015 letter from the County Commissioners to the Governor of Maryland and the Maryland Department of Transportation, the Commissioners emphasized the impediment of traffic on emergency vehicle access, the ability of citizens to leave and return to their homes, and the overall safety and well-being of the Island's residents. As stated in the letter, Queen Anne's County is one of two counties in Maryland that do not have a hospital. When incidents needing medical attention do happen on the Island, emergency vehicles have much longer distances to travel to hospital facilities. As a result, the importance of unimpeded emergency access and network redundancy is exacerbated. A letter written by the Queen Anne's County Department of Emergency Services (QACDES) in September 2015 describes the delay in service experienced by citizens and/or visitors, as well as the delay in return to service time for emergency units. Both the July letter to the Governor and the September letter from QACDES are contained in Appendix C.

Analysis of Incidents on the Chesapeake Bay Bridge

An analysis was performed to estimate the impacts of mobility from incidents on the Chesapeake Bay Bridge using records provided by the Maryland State Highway Administration (SHA and travel time and speed data came from Inrix, a company that acquires and estimates speeds on major roads from fleets of probe vehicles. The travel time and speed data is collected by using Bluetooth technology.

Using the travel time and speed data in the vicinity of the Chesapeake Bay Bridge, we estimated the effects of incidents on travel times. Figure 6 shows the study area from which travel times were calculated. This section, from just east of the MD 2 South (Parole) exit in Annapolis to US 50 east of the US 50/301 split in Queen Anne's County, is approximately 21 miles long.

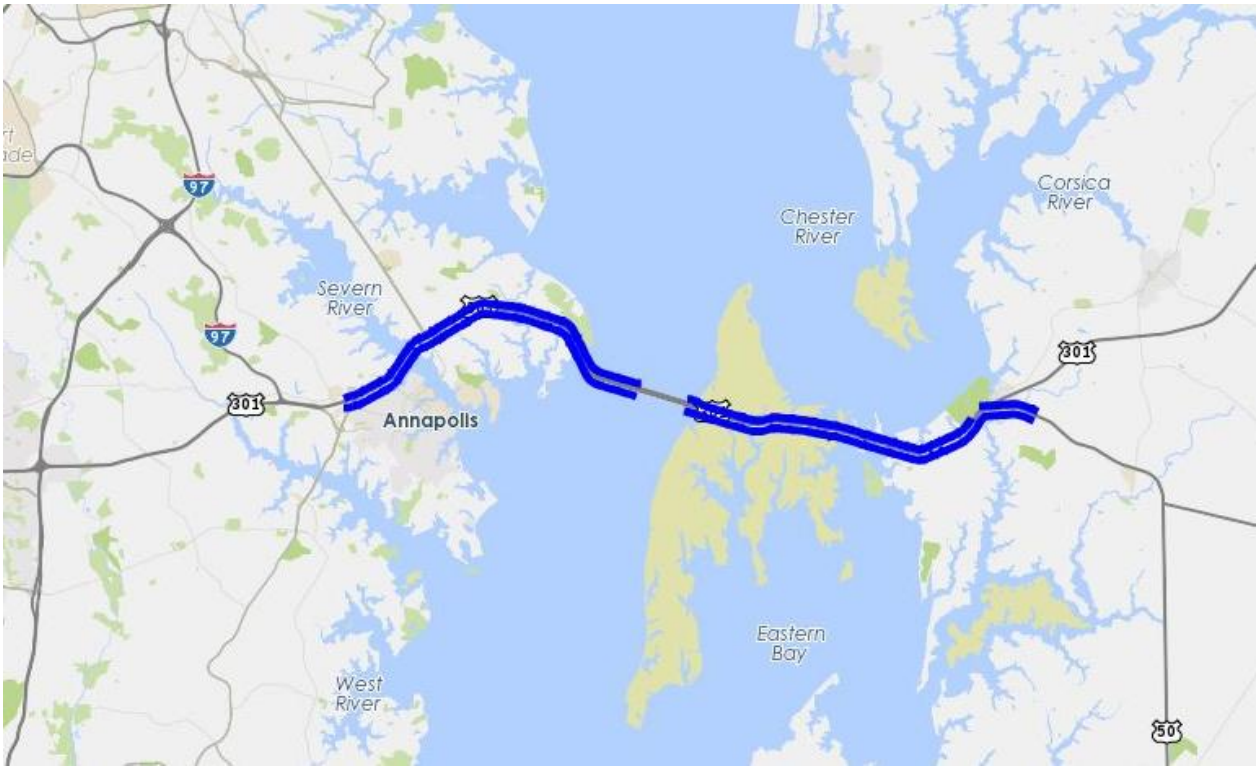
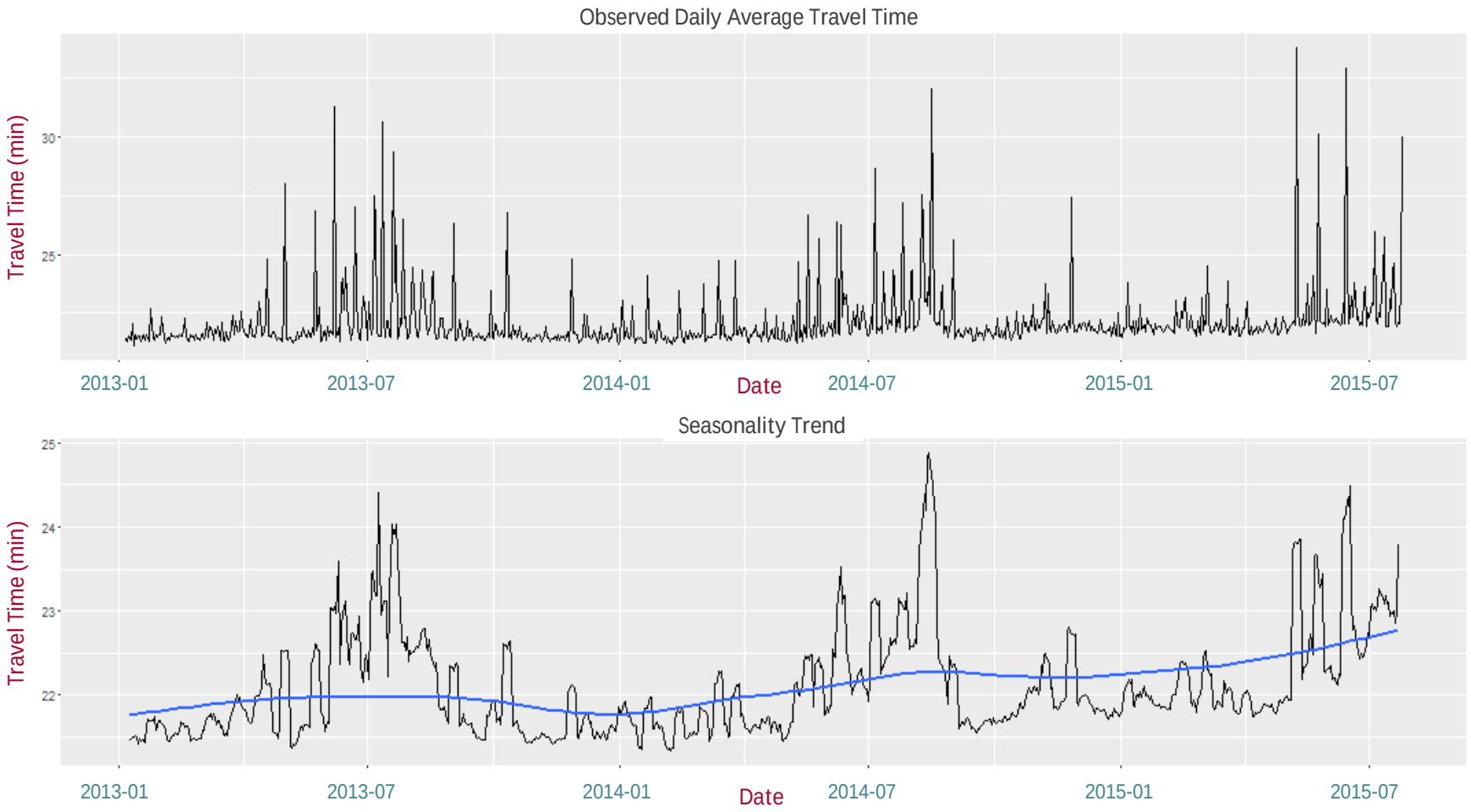


Figure 6: Incident Analysis Corridor Map

Incident data was reviewed over the period between January 5, 2013 and July 31, 2015. The incident data and the travel time and speed data were then analyzed over the same time period.

We first reviewed the data and applied a method to identify seasonality trends. The graph in Figure 7 shows the daily average travel time (each point on the horizontal axis is a day) and the seasonality. As expected, travel times increase every summer, but there is also a general increase in summer travel times from year to year over this period. It can also be seen that there are more spikes in daily travel time in the summer indicating a higher frequency of incidents or other delay-inducing events.

Figure 7: Observed Daily Travel Time and Seasonality Trend from January 5, 2013 through July 31, 2015



Using linear regression analysis, we estimated the effect of incidents on travel daily time in this area, controlling for various other factors including day of the week. Precipitation turned out to not have statistical significance so it was excluded it from the analysis.

As expected, Saturdays and Sundays have higher average travel times (0.32 minutes and 0.24 minutes higher, respectively) than other days of the week. Tuesday has the lowest average travel time, averaged over the entire 2½ year period. Note that these travel times are averages over the entire day. Most of the increase in travel time occurs during peak travel times.

The incident effect is the increase in average travel time per minute duration of the incident. Every minute an incident is active on the Bay Bridge, the average per-vehicle travel time increases by a small amount. If we take a representative incident on a typical summer weekend, we can illustrate the effects. A 15 minute incident causes a delay of approximately 90 seconds per vehicle. Based on 2013 traffic volume data from the Bay Bridge Life Cycle Cost Analysis (Figure 3.2), the peak hour occurs on Sunday afternoon at 7pm in the summer months where the total volume in both directions is 7,500 vehicles. The resulting total delay is then 90 seconds per vehicle over 7,500 vehicles, or approximately 188 total hours of delay.

If we consider only personal injury incidents, the effect is more than six times greater. A 15 minute personal injury incident causes a delay of approximately 9.6 minutes per vehicle. However, the median duration of a personal injury accident is 45 minutes. Therefore, with the same traffic volume (7,500 vehicles), the total hours of delay exceeds 1,200 hours.

In conclusion, especially on summer weekends, when traffic volumes are at their highest, there are significant mobility impacts for every minute lanes are blocked on the Bay Bridge. This has serious implications for mobility of all traffic, including emergency vehicles.

4. BACKGROUND TRAFFIC INFORMATION

The background traffic volumes were developed by applying an annual traffic growth rate to the volumes used in the existing conditions analysis. This annual growth rate is representative of through traffic resulting from development activity outside the study area, and is not related to the seasonal growth factor discussed previously in this document. Background traffic volumes represent the forecasted traffic on the study's roadway network in future years without any additional traffic from development activity on Kent Island.

Historic Traffic Growth Rate

The annual rate at which the region's traffic has grown in the past was calculated by reviewing historic traffic data from SHA along US 50/301 and MD Route 18 over the last ten years. Based on historic ADT traffic data along US 50/301 and along MD Route 18, it was determined that an annual growth rate of 1% would be applied to the existing traffic from the current year to 2020, and from the current year to 2030. This annual growth rate was not applied to the volumes along MD Route 8, because the future land development projects along this roadway, as provided by the County, encompass all potential growth opportunities for that area of the Island.

5. FUTURE CONDITIONS

Future Land Development

Queen Anne's County staff provided a list of planned and unbuilt developments to include in this study. Table 3 describes each of these developments, the planned land use, and the phasing of each of these projects over the analysis years of 2020 and 2030. Also included is the trip generation by land use for the AM and PM peak hours of adjacent street traffic. The location of each of these developments is shown on Figure 8.

Future Development Trip Assignment

The trips generated by the planned and unbuilt developments were assigned to the study area roadway network based on the existing land use on the Island and known commuter and residential driving patterns. Coordination with Queen Anne's County staff allowed for greater insight into these driving behaviors and potential origin-destination groupings. The ultimate trip distributions and assignments were reviewed and accepted by the County.

Table 3: Planned and Unbuilt Developments

Peak Hour Trip Generation				
Development Description	Total Quantity	Units	Peak Hour of Adjacent Street	
			AM Total	PM Total
1. RVG/ Giant				
Grocery Store	63,000	SF	214	597
Gas Station	8	Pumps	97	111
Retail	1,440	SF	45	50
Fast Food Restaurant	5,525	SF	251	180
Total			*607*	*938*
2. Four Seasons				
Age Restricted Single Family (Future Phase)	106	Units	48	47
Age Restricted Multi-Family (Future Phase)	56	Units	11	15
Age Restricted Single-Family	824	Units	170	218
Age Restricted Multi-Family	364	Units	73	89
Assisted Living	88	Beds	12	19
Total			*314*	*388*
3. Cloisters				
Age Restricted Residential	273	Units	54	67
4. The Vineyards				
Restaurant	3,500	SF	3	26
Hotel	54	rooms	36	38
Future Hotel Addition	20	rooms	13	14
Banquet Facility	1,780	SF	20	6
Total			*72*	*96*
5. Ellendale				
Single Family Residential	66	Units	47	72
Townhomes	125	Units	62	72
Total			*109*	*144*
6. MD General Lands				
Apartments	100	Units	53	73
Commercial	20,400	SF	78	139
Total			*131*	*212*
7. Gibson's Grant				
Single Family Residential	88	Units	62	94
Townhomes	17	Units	13	14
Total			*75*	*108*
8. Fisherman's Inn (Village)				
Boat Sales	3,250	SF	3	60
Hotel (99 rooms) & Banquet	82,363	SF		
9. South MD 8 Vacant Lots				
Single Family Residential	560	Units	393	495
10. Lowery's				
Daycare	8,180	SF	100	101
Retail	438,660	SF	421	2,024
Single Family	340	Units	240	338
Community Center	7,500	SF	15	21
Total			*776*	*2484*

Figure 8: Planned and Unbuilt Developments

2020 Future Traffic Volumes

Traffic generated by the planned and unbuilt developments projected for completion by 2020, described above and listed below, were then added to these 2020 background volumes to obtain 2020 future condition volumes. The resulting traffic volumes are shown in Figure 9.

2020 Planned and Unbuilt Developments

- The Vineyards - Phase I
- Cloisters – Phase I
- Ellendale
- MD General Lands
- Gibson's Grant
- South MD Route 8 Vacant Lots – Phase I
- Lowery's – Phase I

2020 Future Capacity Analysis Without Transportation Improvements

Intersection capacity analysis was performed on the study area intersections for the 2020 future conditions without transportation improvements. The results of this analysis for the AM and PM peak hours are shown in Table 4 and Table 5, respectively. Full HCM analysis results and more detailed level of service tables are contained in Appendices D and E.

Table 4: Summary of Intersection Capacity Analysis Results – 2020 AM Without Transportation Improvements

Level of Service (Delay, Seconds per Vehicle)				
Intersection	Existing AM		2020 AM Without Improvements	
	Delay	LOS	Delay	LOS
MD Route 8 at Pier 1 Road/ Thompson Creek Road (Signalized)	8.3	A	10.0	A
MD Route 8 at US 50/301 EB Ramps (Signalized)	13.3	B	14.3	B
MD Route 8 at US 50/301 WB Ramps (Signalized)	10.1	B	13.4	B
MD Route 8 at Skipjack Parkway/ MD Route 18 (Signalized)	16.6	B	20.7	C
MD Route 18 at Castle Marina Road (Roundabout)[1]	13.1	A	32.1	D
MD Route 18 at Piney Creek Rd (Two-Way Stop Controlled)	2.6	A	12.3	B
MD Route 18 at Postal Rd (Eastbound Stop Controlled)	5.5	A	19.5	C
MD Route 18 at Dominion Road (Signalized)	17.7	B	24.6	C
MD Route 18 at South Piney Rd (Southbound Stop Controlled)	2.2	A	3.6	A
MD Route 18 at Shamrock Rd (Southbound Stop Controlled)	1.0	A	2.9	A
MD Route 18 at Dundee Ave (Southbound Stop Controlled)	0.7	A	1.3	A

[1] The roundabout was analyzed using SIDRA analysis software.

In the AM peak hour of 2020 future conditions without transportation improvements, all of the study area intersections continue to operate at LOS D or better (LOS D is acceptable within the growth area).

Figure 9: 2020 Traffic Volumes without Transportation Improvements

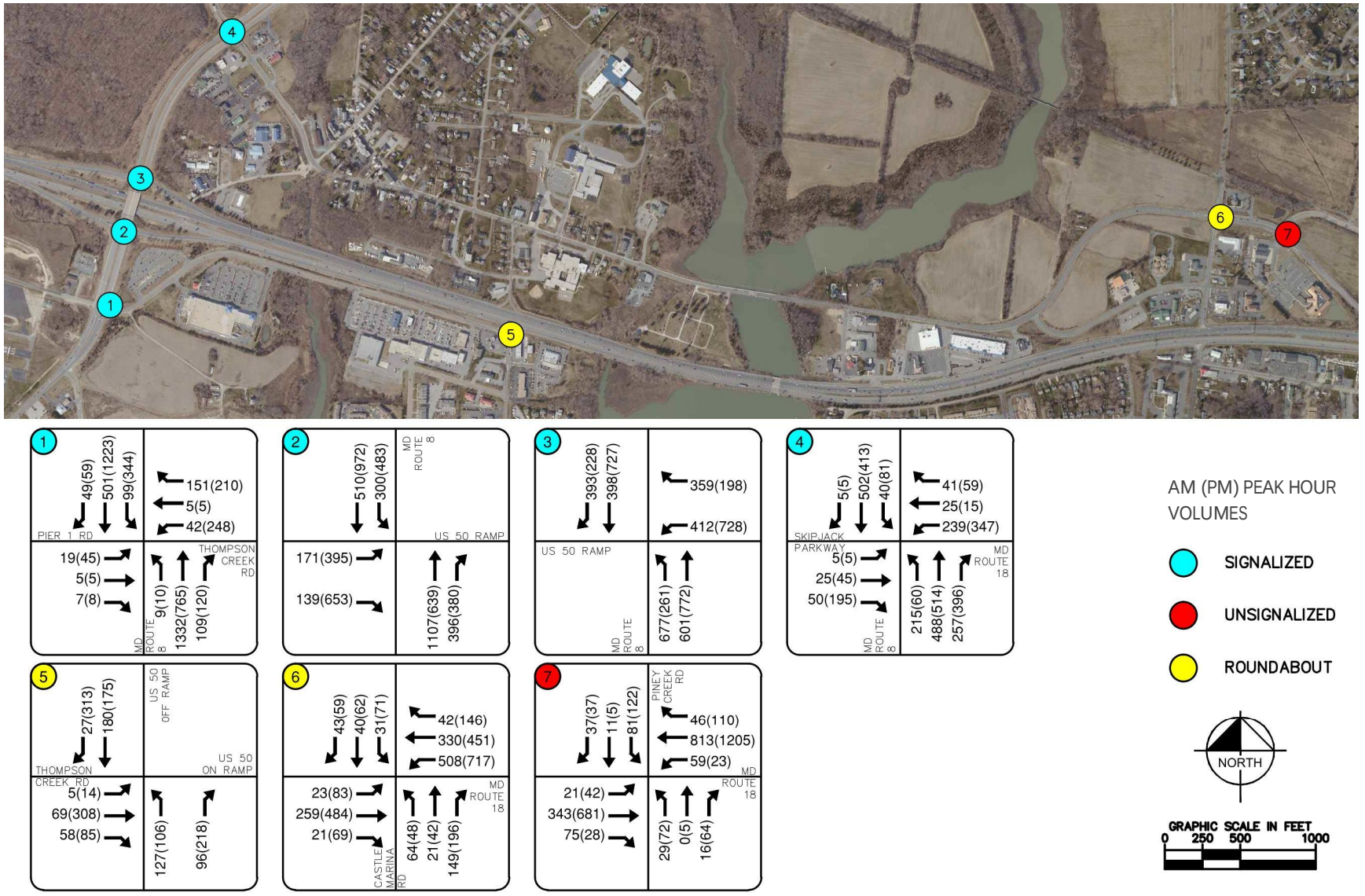


Figure 9: 2020 Traffic Volumes without Transportation Improvements (Continued)

Table 5: Summary of Intersection Capacity Analysis Results - 2020 PM Without Transportation Improvements

Level of Service (Delay, Seconds per Vehicle)				
Intersection	Existing PM		2020 PM Without Improvements	
	Delay	LOS	Delay	LOS
MD Route 8 at Pier 1 Road/ Thompson Creek Road (Signalized)	16.7	B	18.4	B
MD Route 8 at US 50/301 EB Ramps (Signalized)	15.8	B	9.0	A
MD Route 8 at US 50/301 WB Ramps (Signalized)	14.1	B	19.0	B
MD Route 8 at Skipjack Parkway/ MD Route 18 (Signalized)	18.4	B	25.5	C
MD Route 18 at Castle Marina Road (Roundabout)[1]	33.7	D	185.2	F
MD Route 18 at Piney Creek Rd (Two-Way Stop Controlled)	6.8	A	1272.3	F
MD Route 18 at Postal Rd (Eastbound Stop Controlled)	19.6	C	445.3	F
Dominion Rd at MD Route 18 (Signalized)	29.8	C	177.4	F
MD Route 18 at South Piney Rd (Southbound Stop Controlled)	5.8	A	159.3	F
MD Route 18 at Shamrock Rd (Southbound Stop Controlled)	1.1	A	4.3	A
MD Route 18 at Dundee Ave (Southbound Stop Controlled)	0.7	A	1.5	A

[1] The roundabout was analyzed using SIDRA analysis software.

In the PM peak hour of 2020 future conditions without transportation improvements, the following intersections operate at worse than overall LOS C (LOS D is acceptable within the growth area):

- MD Route 18 at Castle Marina Road (Roundabout)
- MD Route 18 at Piney Creek Road
- MD Route 18 at Postal Road
- Dominion Road at MD Route 18
- MD Route 18 at South Piney Road

All five of the aforementioned intersections will operate at LOS F in the PM peak hour, with delays ranging from 159.3 seconds to 1,272.3 seconds. Three of these five locations intersect MD Route 18 with stop control on the minor street approaches. These movements likely have the greatest impact on the intersection delay calculations. With increased growth along MD Route 18 from regional growth and projected development, the minor street approaches will not be able to find adequate gaps, and will wait for excessive lengths of time without any improvements to the existing transportation network.

2020 Improvement Projects

Based on the analysis results presented for the 2020 future conditions without transportation improvements, the following improvement projects are recommended for the year 2020. These projects, shown in Figure 10, are intended to reduce delay and improve the flow of traffic throughout the Island. It is recommended that the County monitor the construction of approved developments to determine the phasing of the improvements. The following improvements are listed in order from west to east, and are not prioritized at this time.

Castle Marina Road and MD Route 18 Roundabout

This improvement incorporates widening and upgrading the existing one lane traffic circle to a two-lane modern roundabout, including improvements to all four approaches. The existing roundabout has many operational deficiencies. The angle at which the approaches enter the roundabout is not sharp enough to encourage traffic to slow down when entering the circular driving pattern. As a result, traffic on MD Route 18 generally enters the circle at higher speeds without yielding to traffic in the circle. As a result, the side streets often experience delay. Additionally, the capacity of the circle is nearly exceeded today during the peak hours, and will be exceeded by 2020 due to the access it provides to westbound US 50/301. Any traffic from the Chester area that wants to access westbound US 50/301 either has to travel east to the Kent Narrows Bridge ramps or go over the MD Route 18 overpass to the Castle Marina roundabout. Widening of this roundabout will improve conditions both along MD Route 18 and Castle Marina Road.

Piney Creek Road and MD Route 18

Traffic at the currently unsignalized intersection will encounter significant minor street delays if the existing configuration remains. Installation of a traffic signal at this intersection will provide more gaps along MD Route 18 for traffic turning in and out of Piney Creek Road, as well as the commercial driveway that serves the Kent Island Fire Station and the medical complex. Signalizing this intersection will also meter traffic into the Castle Marina Road roundabout, and will allow for coordination with other signalized intersections on MD Route 18 which will permit vehicles to travel through the signalized corridor more smoothly.

Postal Road and MD Route 18

Similar to the intersection at Piney Creek Road, limited gaps will be available along MD Route 18 for traffic turning in and out of Postal Road. Installing a traffic signal at this location will improve the delay on Postal Road and will allow for coordination with other signalized intersections along MD Route 18.

Dominion Road and US 50/301 Off-Ramp

The combination of existing congestion at the Dominion Road (MD Route 552)/MD Route 18 intersection and future development on MD Route 18 east of Dominion Road necessitates adding a second lane to the eastbound US 50/301 off-ramp. Much of the future development traffic is projected exit US 50/301 at Dominion Road then make left turns at the intersection at MD Route 18. With a single-lane ramp, this left-turning traffic may spill back onto the ramp, restricting the through and right-turning traffic on this approach from accessing the intersection. The additional lane would allow the through and right turns to bypass any left-turning queue.

MD Route 18 and Dominion Road Intersection

The following improvements represent the initial phase of the ultimate recommendations for the intersection of MD Route 18 and Dominion Road. Given that 2020 is relatively soon, it is unrealistic to recommend the ultimate

condition improvements until further into the future when more information about potential new development is known.

- Restripe the northbound approach to accommodate one exclusive left-turn lane, one shared through and left-turn lane, and one exclusive right-turn lane will improve the capacity of the northbound approach without widening. The heaviest northbound movement is the left-turn. Restriping the center lane on the northbound approach will increase the capacity of this approach without widening or allocating more signal time to this phase.
- To accept the northbound dual left turns, MD Route 18 will need widening with an additional westbound lane between Postal Road and Dominion Road.
- Reconstruct the traffic signal at this intersection to accommodate the northbound left-turns along with the additional westbound through lane along MD Route 18.

MD Route 18 Traffic Signal Operations

It is recommended that the existing traffic signal at MD Route 18/Dominion Road and the proposed traffic signals at Postal Road/MD Route 18 and Piney Creek Road/MD Route 18 function as actuated-coordinated. The implementation of this recommendation will improve traffic progression along MD Route 18 and decrease unnecessary delay and queuing along the corridor.

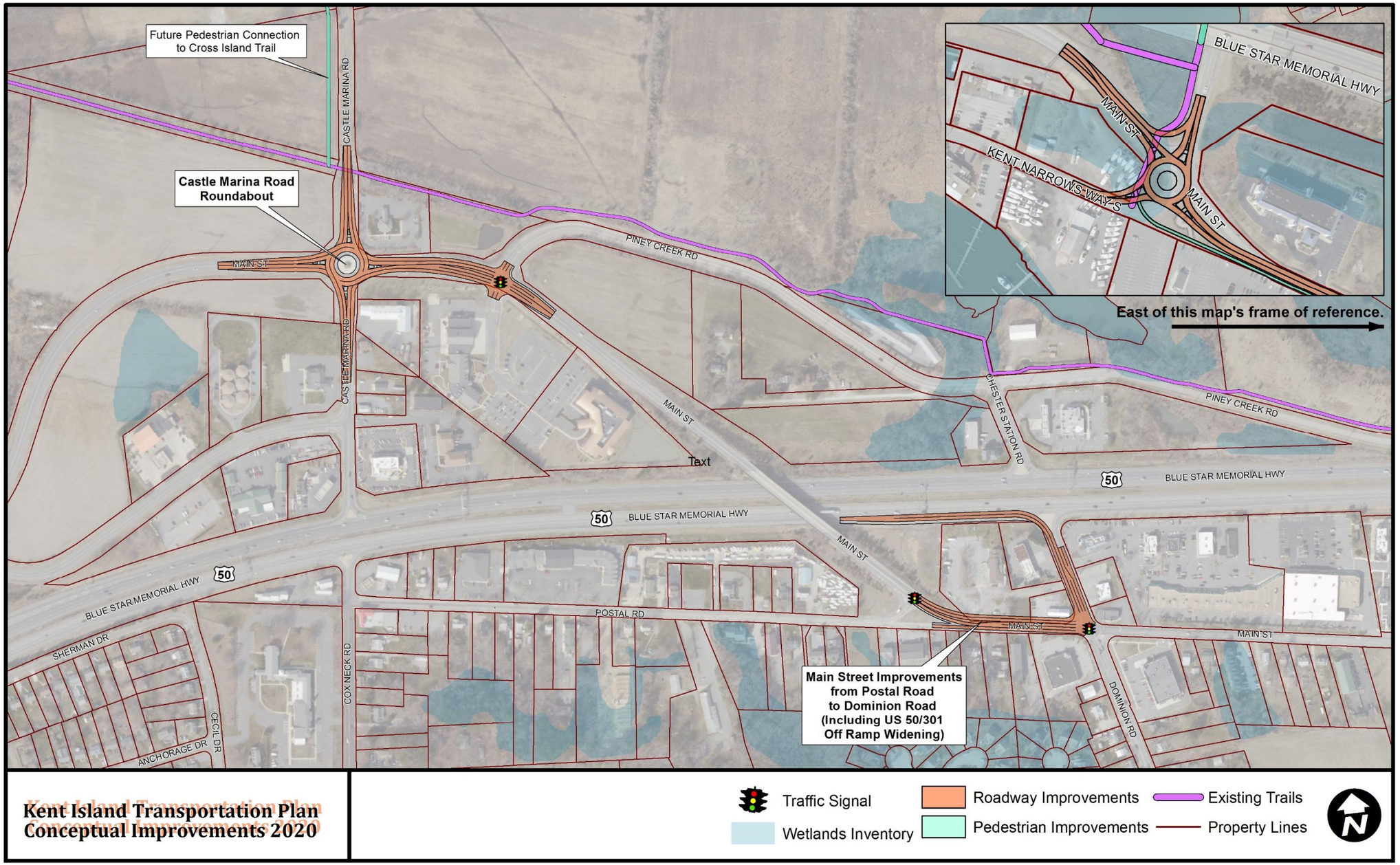
MD Route 18 at South Piney Road

Install a traffic signal or roundabout to accommodate increased traffic associated with the South Piney Road ramp from US 50/301. This study analyzed the intersection with a traffic signal, but further analysis is necessary to determine the best traffic control for this intersection, based on traffic associated with actual development changes in the area.

Kent Narrows Roundabout

Construct a new one lane roundabout at the existing intersection of Main Street and Kent Narrows Way South/Kent Narrows Way North. This includes a pedestrian path and sidewalk connecting Kent Narrows North with Kent Narrows South. This project will improve safety and site distance from each approach of the existing skewed alignment of the intersection.

Figure 10: 2020 Improvement Projects



2020 Future Capacity Analysis With Transportation Improvements

The same volumes as shown in Figure 9 were utilized in the analysis of 2020 future traffic with transportation improvements. Table 6 and Table 7 show the results of this analysis for the AM and PM peak hours, respectively. Full HCM analysis results and more detailed level of service tables are contained in Appendices D and E.

Table 6: Summary of Intersection Capacity Analysis Results– 2020 AM with Improvements

Level of Service (Delay, Seconds per Vehicle)						
Intersection	Existing AM		2020 AM Without Improvements		2020 AM With Improvements	
	Delay	LOS	Delay	LOS	Delay	LOS
MD Route 8 at Pier 1 Road/ Thompson Creek Road (Signalized)	8.3	A	10.0	A	10.0	A
MD Route 8 at US 50/301 EB Ramps (Signalized)	13.3	B	14.3	B	14.3	B
MD Route 8 at US 50/301 WB Ramps (Signalized)	10.1	B	13.4	B	13.4	B
MD Route 8 at Skipjack Parkway/ MD Route 18 (Signalized)	16.6	B	20.7	C	20.7	C
MD Route 18 at Castle Marina Road (Roundabout)[1]	13.1	B	32.1	D	8.6	A
MD Route 18 at Piney Creek Rd (Signalized With Improvements)	2.6	A	12.3	B	17.1	B
MD Route 18 at Postal Rd (Signalized With Improvements)	5.5	A	19.5	C	13.1	B
Dominion Rd at MD Route 18 (Signalized and reconfigured)	17.7	B	24.6	C	22.3	C
MD Route 18 at South Piney Rd (Signalized with Improvements)	2.2	A	3.6	A	14.9	B
MD Route 18 at Shamrock Rd (Southbound Stop Controlled)	1.0	A	2.9	A	2.9	A
MD Route 18 at Dundee Ave (Southbound Stop Controlled)	0.7	A	1.3	A	1.3	A

[1] The roundabout was analyzed using SIDRA analysis software.

With all of the transportation improvements in place, all of the study area intersections in 2020 will operate at LOS C or better in the AM peak hour. The intersection of MD Route 18 with South Piney Road experiences an increase in delay because the MD Route 18 approaches, which previously ran free flow, are proposed to be controlled by a signal. The signalization was proposed to alleviate queuing and delay on the minor street, stop controlled movements.

Table 7: Summary of Intersection Capacity Analysis Results – 2020 PM with Improvements

Level of Service (Delay, Seconds per Vehicle)						
Intersection	Existing PM		2020 PM Without Improvements		2020 PM With Improvements	
	Delay	LOS	Delay	LOS	Delay	LOS
MD Route 8 at Pier 1 Road/ Thompson Creek Road (Signalized)	16.7	B	18.4	B	17.7	B
MD Route 8 at US 50/301 EB Ramps (Signalized)	15.8	B	9.0	A	10.3	B
MD Route 8 at US 50/301 WB Ramps (Signalized)	14.1	B	19.0	B	15.6	B
MD Route 8 at Skipjack Parkway/ MD Route 18 (Signalized)	18.4	B	25.5	C	25.5	C
MD Route 18 at Castle Marina Road (Roundabout)[1]	33.7	D	185.2	F	17.5	C
MD Route 18 at Piney Creek Rd (Signalized With Improvements)	6.8	A	1272.3	F	42.3	D
MD Route 18 at Postal Rd (Signalized With Improvements)	19.6	C	445.3	F	27.6	C
Dominion Rd at MD Route 18 ((Signalized)	29.8	C	177.4	F	92.4	F
MD Route 18 at South Piney Rd (Signalized with Improvements)	5.8	A	159.3	F	91.9	F
MD Route 18 at Shamrock Rd (Southbound Stop Controlled)	1.1	A	4.3	A	4.3	A
MD Route 18 at Dundee Ave (Southbound Stop Controlled)	0.7	A	1.5	A	1.5	A

[1] The roundabout was analyzed using SIDRA analysis software

With all of the transportation improvements in place, all of the study area intersections in 2020 will operate at LOS D or better in the PM peak hour, with the exception of the following:

- *Dominion Road at MD Route 18* – This intersection still operates at LOS F; however the overall intersection delay is reduced from 177.4 to 92.4 seconds per vehicle.
- *MD Route 18 at South Piney Road* – This intersection still operates at LOS F, however, the overall intersection delay is reduced from 159.3 to 91.9 seconds per vehicle. The delay at this intersection is a result of the reduced gaps along MD Route 18 caused by planned development. The estimated development levels are conservative, and the plans for implementation are still being defined. Since the AM peak hour is forecasted to operate at LOS B, constructing improvements to address the PM peak hour are not recommended as soon as Year 2020, until a more refined understanding of the planned development is established.

2030 Future Traffic Volumes

Traffic generated by the planned and unbuilt developments projected for completion by 2030, described earlier in this chapter and listed below, added to the 2030 background volumes to obtain 2030 future condition volumes. The resulting 2030 AM and PM peak hour traffic volumes are shown in Figure 11.

2030 Planned and Unbuilt Developments

- RVG/ Giant
- Four Seasons
- Cloisters – Phase II
- The Vineyards – Phase II
- Fisherman's Village
- South MD Route 8 Vacant Lots – Phase II
- Lowery's – Phase II

2030 Future Capacity Analysis Without Transportation Improvements

Intersection capacity analysis was first performed on the study area intersections for the 2030 future conditions without transportation improvements. The results of this analysis for the overall intersection level of service for both AM and PM peak hours are shown in Table 8 and Table 9, respectively. Full HCM analysis results and more detailed level of service tables are contained in Appendices D and E.

Table 8: Summary of Intersection Capacity Analysis Results – 2030 AM Without Transportation Improvements

Level of Service (Delay, Seconds per Vehicle)						
Intersection	Existing AM		2020 AM Without Improvements		2030 AM Without Improvements	
	Delay	LOS	Delay	LOS	Delay	LOS
MD Route 8 at Pier 1 Road/ Thompson Creek Road (Signalized)	8.3	A	10.0	A	12.0	B
MD Route 8 at US 50/301 EB Ramps (Signalized)	13.3	B	14.3	B	14.8	B
MD Route 8 at US 50/301 WB Ramps (Signalized)	10.1	B	13.4	B	14.5	B
MD Route 8 at Skipjack Parkway/ MD Route 18 (Signalized)	16.6	B	20.7	C	21.9	C
MD Route 18 at Castle Marina Road (Roundabout)[1]	13.1	B	32.1	D	190.9	F
MD Route 18 at Piney Creek Rd (Two-Way Stop Controlled)	2.6	A	12.3	B	N/A[2]	N/A[2]
MD Route 18 at Postal Rd (Eastbound Stop Controlled)	5.5	A	19.5	C	1158.6	F
Dominion Rd at MD Route 18 (Signalized)	17.7	B	24.6	C	44.3	D
MD Route 18 at South Piney Rd (Southbound Stop Controlled)	2.3	A	3.6	A	4.6	A
MD Route 18 at Shamrock Rd (Southbound Stop Controlled)	1.0	A	2.9	A	2.8	A
MD Route 18 at Dundee Ave (Southbound Stop Controlled)	0.7	A	1.3	A	1.5	A

[1]The roundabout was analyzed using SIDRA analysis software.

[2]Intersection well exceeds capacity. Synchro is unable to calculate the delay. LOS F is implied

In the AM peak hour of 2030 future conditions without transportation improvements, all of the study area intersections continue to operate at overall LOS D or better, with the exception of the following intersections:

- MD Route 18 at Castle Marina Road – This intersection worsens from LOS D in 2020 to LOS F in 2030.
- MD Route 18 at Piney Creek Road – This intersection worsens from LOS B in 2020 to LOS F in 2030.
- MD Route 18 at Postal Road – This intersection worsens from LOS C in 2020 to LOS F in 2030.

Table 9: Summary of Intersection Capacity Analysis Results - 2030 PM Without Transportation Improvements

Level of Service (Delay, Seconds per Vehicle)						
Intersection	Existing PM		2020 PM Without Improvements		2030 PM Without Improvements	
	Delay	LOS	Delay	LOS	Delay	LOS
MD Route 8 at Pier 1 Road/ Thompson Creek Road (Signalized)	16.7	B	18.4	B	26.5	C
MD Route 8 at US 50/301EB Ramps (Signalized)	15.8	B	9.0	A[1]	19.2	B[1]
MD Route 8 at US 50/301WB Ramps (Signalized)	14.1	B	19.0	B[1]	20.8	C[1]
MD Route 8 at Skipjack Parkway/ MD Route 18 (Signalized)	18.4	B	25.5	C	27.6	C
MD Route 18 at Castle Marina Road (Roundabout)	33.7	D	185.2	F	630.2	F
MD Route 18 at Piney Creek Rd (Two-Way Stop Controlled)	6.8	A	1272.3	F	N/A[3]	N/A[3]
MD Route 18 at Postal Rd (Eastbound Stop Controlled)	19.6	C	445.3	F	477.7	F
Dominion Rd at MD Route 18 (Signalized)	29.8	C	177.4	F	415.0	F
MD Route 18 at South Piney Rd (Southbound Stop Controlled)	5.8	A	159.3	F	2079.4	F
MD Route 18 at Shamrock Rd (Southbound Stop Controlled)	1.1	A	4.3	A	6.5	A
MD Route 18 at Dundee Ave (Southbound Stop Controlled)	0.7	A	1.5	A	1.9	A

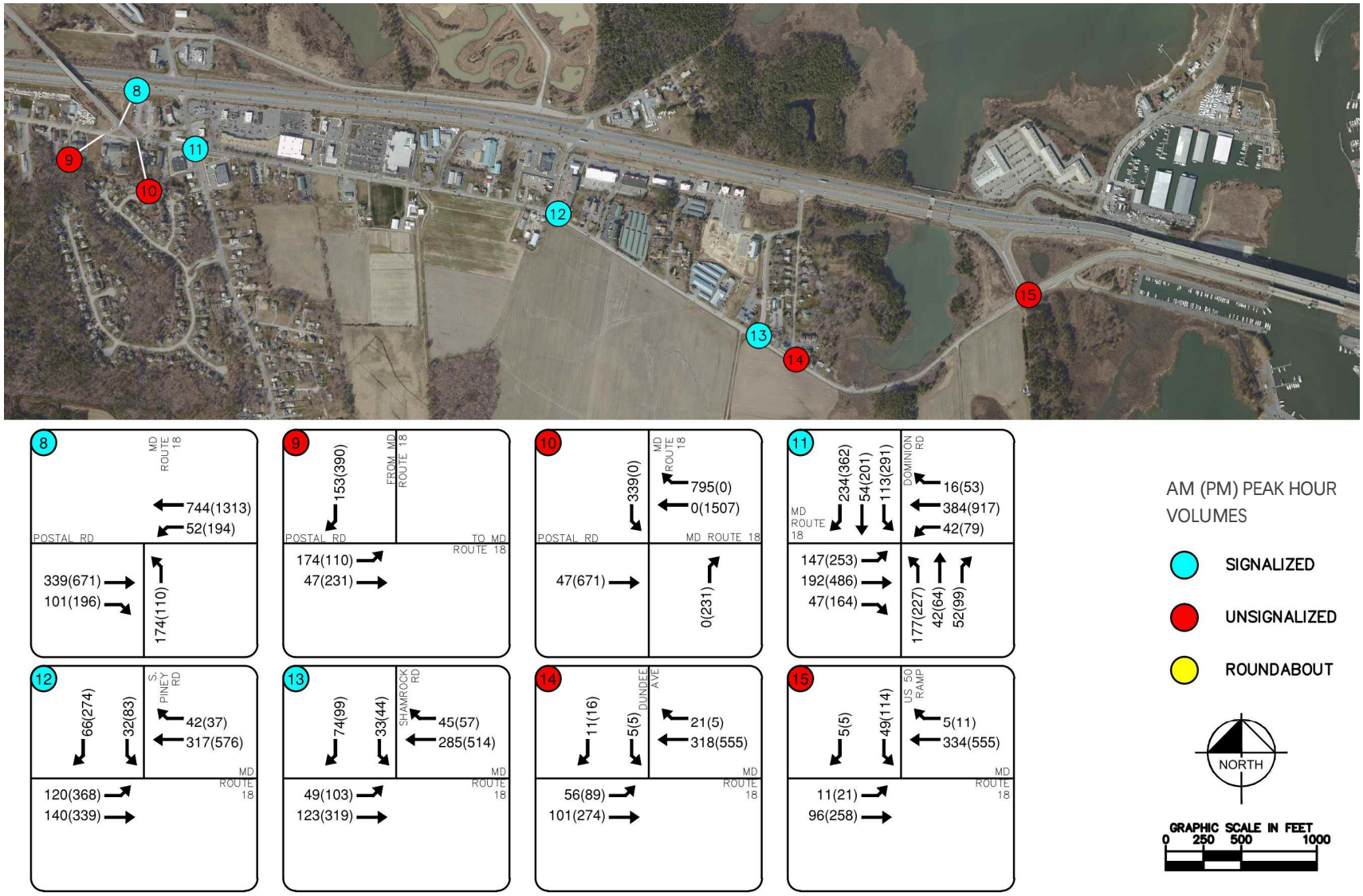
[1] Level of service results do not reflect queuing along MD 8 off-ramps onto US 50/301
[2] The roundabout was analyzed using SIDRA analysis software.
[3]Intersection well exceeds capacity. Synchro is unable to calculate the delay.

In the PM peak hour of 2030 future conditions without transportation improvements, all of the study area intersections continue to operate at overall LOS D or better, with the exception of the following intersections:

- MD Route 18 at Castle Marina Road – This intersection continues to operate at LOS F and the delay per vehicle increases to 630.2 seconds.
- MD Route 18 at Piney Creek Road – This intersection goes from LOS B in 2020 to LOS F in 2030.
- MD Route 18 at Postal Road – This intersection goes from LOS C in 2020 to LOS F in 2030.
- Dominion Road at MD Route 18 - This intersection continues to operate at LOS F and the delay per vehicle increases to 415.0 seconds. MD Route 18 at South Piney Road – This intersection continues to operate at LOS F with a delay increase to 2,079.4 seconds.

Figure 11: 2030 Future Traffic Volumes without Transportation Improvements

Figure 11: 2030 Future Traffic Volumes without Transportation Improvements (Continued)



2030 Improvement Projects

Based on the analysis results presented for the 2030 future conditions without transportation improvements, the following improvement projects are recommended for the year 2030. These are intended to reduce delay, improve progression throughout the Island, and create network redundancy. It is recommended that the County monitor the construction of approved developments to determine the phasing of the improvements. The following improvements are listed in order from west to east, and are not prioritized at this time.

US 50/301 and MD Route 8

Reconstruct the existing diamond interchange to a diverging diamond interchange. By 2030 future conditions, the capacity of the existing diamond interchange will be exceeded, and queuing will spill back to US 50/301 in the peak hours of traffic. This creates a significant safety issue for both local and regional traffic. The diverging diamond interchange configuration will reduce many of the existing conflict points, reduce delay, improve safety, and allow more vehicles to traverse through the interchange with each signal cycle.

Thompson Creek Road Connector

Construct a new two lane roadway connecting MD Route 8 with Thompson Creek Road. This improvement will provide an alternate route for residential traffic to access the retail shopping center on Thompson Creek Road from south on MD Route 8. Diverting trips from the shopping center to this road will reduce the volume of traffic at the intersection of MD Route 8 at Thompson Creek Road/ Pier One Road.

Pedestrian Bridge over US 50/301

Construct a new pedestrian bridge to connect a proposed park north of US 50/301 with the shopping center located along Thompson Creek Road (south of US 50/301). This pedestrian bridge will improve connectivity of the pedestrian network, will provide safer pedestrian access to retail developments, and will allow pedestrians to cross US 50/301 without conflict with vehicular traffic.

Cox Neck Road Connector

Construct a new two lane roadway from Thompson Creek Road to Cox Neck Road following the alignment of US 50/301. Connection options include tying into Ellicott Drive, Cecil Drive, or a new alignment connecting to Postal Road. This improvement will create an additional east-west connection for local residents south of US 50/301. Currently, MD Route 18 is the only east-west route that exists as a parallel route to the freeway and is located north of US 50/301 in this area of Kent Island, leaving no option for local traffic on the south side of the Island.

The Cox Neck Road Connector is also being considered as a one-way westbound facility to detract freeway traffic from using this local road as a cut-through to points east. The locals have eastbound connectivity via US 50/301, but currently the majority of westbound traffic utilizes the MD Route 18 overpass to continue on MD Route 18 west. If there is an incident on US 50/301 and traffic diverts onto local streets, local traffic south of US 50/301 heading westbound experiences major delays on MD Route 18.

MD Route 18 Improvements from Piney Creek Road to Kent Towne Market

Widen MD Route 18 from two lanes to four lanes between Piney Creek Road and Kent Towne Market. This improvement is designed to increase capacity along MD Route 18, especially in the westbound direction. This roadway is the main route utilized by traffic associated with the Chester area shopping center to access westbound US 50/301 and other points west. With anticipated regional and local growth, the volumes making this maneuver

are anticipated to increase significantly by 2030. This widening includes intersection improvements at Dominion Road and MD Route 18, as well as widening of the MD Route 18 Overpass from two lanes to four lanes.

MD Route 18 Improvements from Kent Towne Market to Wharf Drive

Widen MD Route 18 from two lanes to three lanes between Kent Towne Market and Wharf Drive. The third lane of this widening would act as a center turning lane to separate turning vehicles from the heavy through movements on MD Route 18.

Shamrock Road Overpass

Construct a new two-lane roadway over US 50/301 connecting Shamrock Road and Piney Creek Road. To account for the increase in traffic, also install a traffic signal at the intersection of Shamrock Road and MD Route 18. This improvement was not generated to meet a capacity demand, but to improve network redundancy and access throughout the Island. As previously discussed, the lack of connectivity throughout the Island and lack of US 50/301 crossings causes long delays at the existing crossing locations. This new connection will divert volume from heavily traveled links, as well as provide additional access for emergency vehicles to navigate the Island. The overpass could also incorporate a bike lane to connect the Cross Island Trail to areas south of US 50/301.

2030 Traffic Reassignment

Introducing new roadway network connections will affect the travel patterns of existing and future traffic. Based on existing counts and known travel patterns on the Island, portions of existing traffic were reassigned to area roadways based on the new transportation improvements. Traffic generated by future developments was also redistributed from the assignments developed for 2030 future conditions without transportation improvements. The resulting 2030 AM and PM traffic volumes are shown in Figure 12.

Figure 12: 2030 Future Traffic Volumes with Transportation Improvements

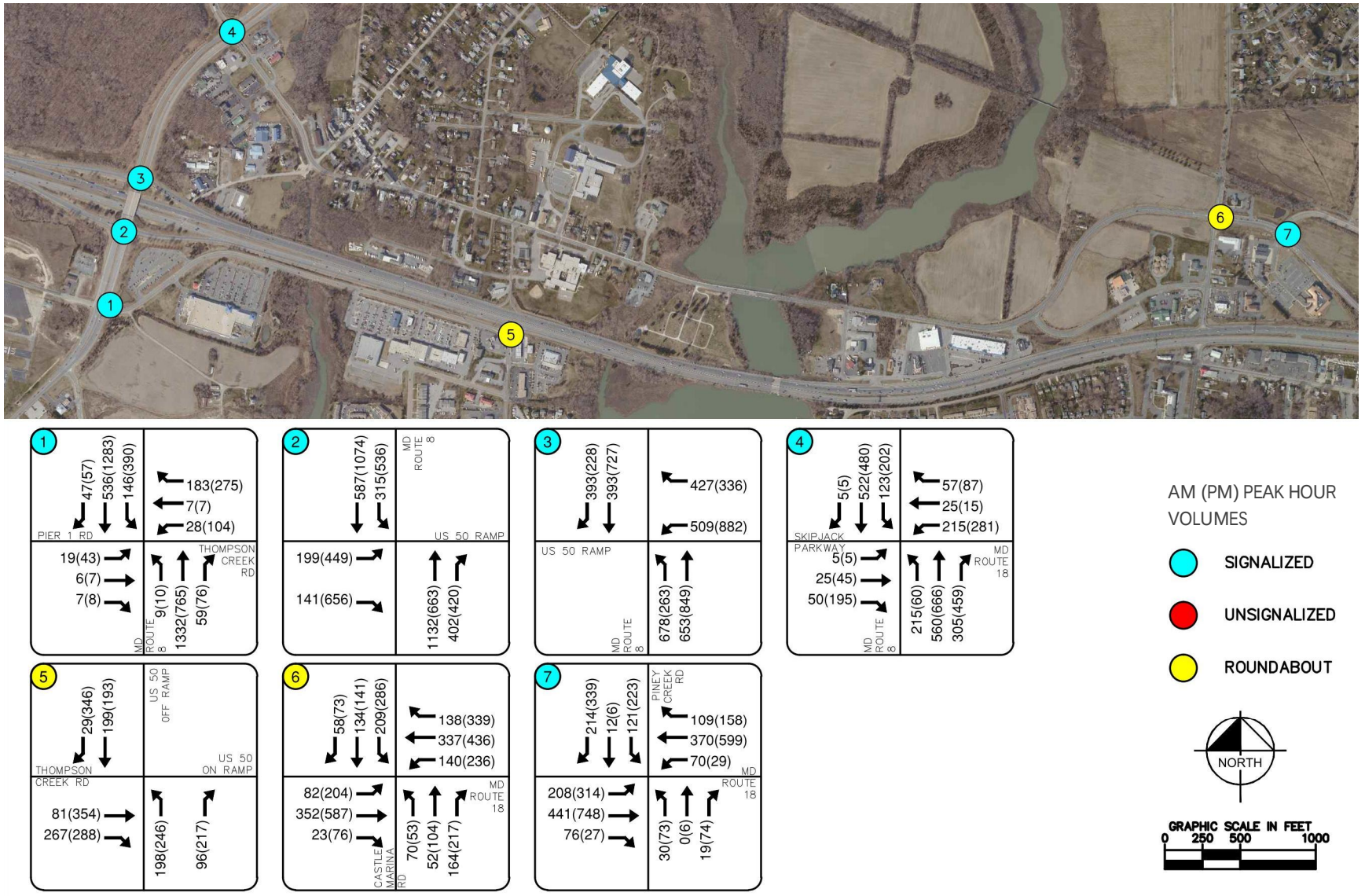
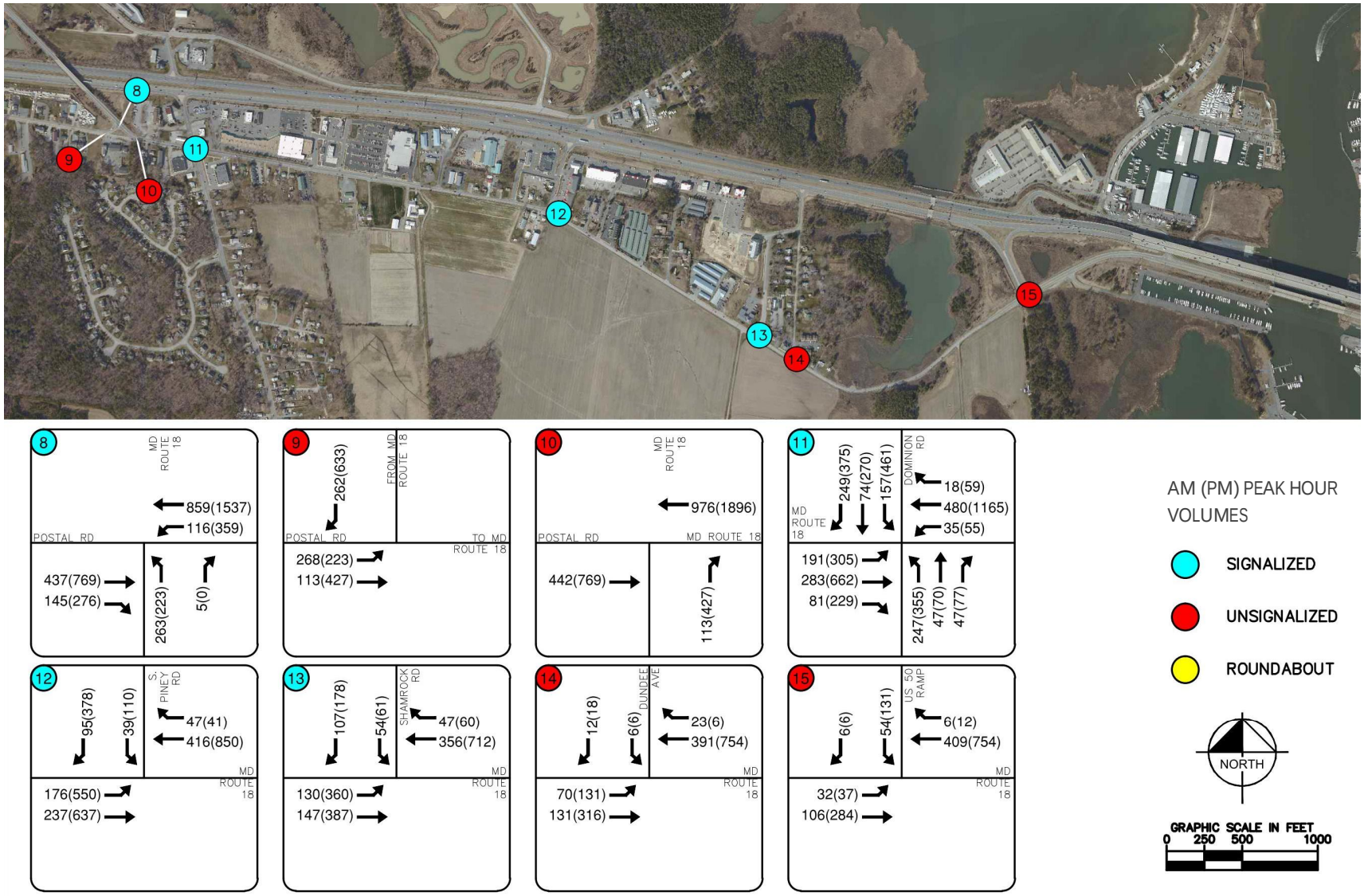


Figure 12: 2030 Future Traffic Volumes with Transportation Improvements (Continued)



2030 Future Capacity Analysis With Transportation Improvements

Intersection capacity analysis and reassignment was performed on the study area intersections for the 2030 future conditions with transportation improvements. All of the intersections other than those on MD Route 8 were analyzed using the previously described Synchro software. The intersections along MD Route 8 were analyzed using VISSIM simulation software due to the complexity of analyzing traffic at the diverging diamond interchange improvement proposed for the interchange at MD Route 8 and US 50/301. This software provides the ability to analyze non-standard intersection designs and is able to route traffic through the interchange. The results of the Synchro analysis for the AM and PM peak hours are shown in Table 10 and Table 11, respectively. The VISSIM results for the MD Route 8 and US 50/301 interchange will be described in greater detail following this section and in Table 12. Full HCM analysis results and more detailed level of service tables are contained in Appendices D and E.

Intersection Capacity Analysis Results

Table 10: Summary of Intersection Capacity Analysis Results – 2030 AM With Improvements

Level of Service (Delay, Seconds per Vehicle)										
Intersection	Existing AM		2020 AM Without Improvements		2020 AM With Improvements		2030 AM Without Improvements		2030 AM With Improvements	
	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS
MD Route 8 at Pier 1 Road/ Thompson Creek Road (Signalized)*	8.3	A	10.0	A	10.0	A	12.0	B	-[1]	-[1]
MD Route 8 at US 50/301 EB Ramps (Signalized)*	13.3	B	14.3	B	14.3	B	14.8	B	-[1]	-[1]
MD Route 8 at US 50/301 WB Ramps (Signalized)*	10.1	B	13.4	B	13.4	B	14.5	B	-[1]	-[1]
MD Route 8 at Skipjack Parkway/ MD Route 18 (Signalized)*	16.6	B	20.7	C	20.7	C	21.9	C	-[1]	-[1]
MD Route 18 at Castle Marina Road (Roundabout)[2]	13.1	B	32.1	D	8.6	A	190.9	A	8.5[4]	A[4]
MD Route 18 at Piney Creek Rd (Signalized With Improvements)	2.6	A	12.3	B	17.1	B	N/A[3]	N/A[3]	28.6[4]	C[4]
MD Route 18 at Postal Rd (Signalized With Improvements)	5.5	A	19.5	C	13.1	B	1158.6	N/A[3]	10.3	B
Dominion Rd at MD Route 18 (Signalized)	17.7	B	24.6	C	22.3	C	44.3	D	31.4	C
MD Route 18 at South Piney Rd (Signalized With Improvements)	2.2	A	3.6	A	14.9	B	4.6	A	10.7	B
MD Route 18 at Shamrock Rd (Signalized With Improvements)	1.0	A	2.9	A	2.9	A	2.8	A	16.7	B
MD Route 18 at Dundee Ave (Southbound Stop Controlled)	0.7	A	1.3	A	1.3	A	1.5	A	1.3	A

[1] See VISSIM analysis results for delay and level of service of 2030 AM With Improvements on Table 12.
[2] The roundabout was analyzed using SIDRA analysis software.
[3]Intersection well exceeds capacity. Synchro cannot calculate the delay or the level of service. LOS F is implied.
[4]These intersections were originally analyzed with a diversion of traffic to a proposed US 50 WB ramp. This improvement has since been removed from consideration due to potential development activity identified prior to publishing this final report.

With the 2030 improvements implemented in the AM peak hour, all of the study intersections will operate at LOS D or better in the AM peak hour. The added capacity and signalization of multiple intersections along MD Route 18 improves intersections from failing conditions. The intersections of MD Route 18 at South Piney Road and with Shamrock Road experience an increase in delay because the MD Route 18 approaches, which previously ran free flow, are now controlled by a traffic signal. The signalization was implemented to alleviate queuing and delay on the minor street, stop controlled movements.

Table 11: Summary of Intersection Capacity Analysis Results – 2030 PM With Improvements

Level of Service (Delay, Seconds per Vehicle)										
Intersection	Existing PM		2020 PM Without Improvements		2020 PM With Improvements		2030 PM Without Improvements		2030 PM With Improvements	
	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS
MD Route 8 at Pier 1 Road/ Thompson Creek Road (Signalized)*	16.7	B	18.4	B	17.7	B	26.5	C	-[1]	-[1]
MD Route 8 at US 50/301EB Ramps (Signalized)*	15.8	B	9.0	A	10.3	B	19.2	B	-[1]	-[1]
MD Route 8 at US 50/301WB Ramps (Signalized)*	14.1	B	19.0	B	15.6	B	20.8	C	-[1]	-[1]
MD Route 8 at Skipjack Parkway/ MD 18 (Main Street) (Signalized)*	18.4	B	25.5	C	25.5	C	27.6	C	-[1]	-[1]
MD Route 18 at Castle Marina Road (Roundabout)[2]	33.7	D	185.2	F	17.5	C	630.2	F	17.9[4]	C[4]
MD Route 18 at Piney Creek Rd (Signalized in With Improvements Condition)	6.8	A	1272.3	F	42.3	D	N/A[3]	-	30.2[4]	C[4]
MD Route 18 at Postal Rd (Signalized in With Improvements Condition)	19.6	C	445.3	F	27.6	C	477.7	F	21.2	C
Dominion Rd at MD Route 18 (Signalized)	29.8	C	177.4	F	92.4	F	415.0	F	62.4	E
MD Route 18 at South Piney Rd (Southbound Stop Controlled)	5.8	A	159.3	F	91.9	F	2079.4	F	53.1	D
MD Route 18 at Shamrock Rd (Southbound Stop Controlled)	1.1	A	4.3	A	4.3	A	6.5	A	31.4	C
MD Route 18 at Dundee Ave (Southbound Stop Controlled)	0.7	A	1.5	A	1.5	A	1.9	A	1.6	A

[1] See VISSIM analysis results for delay and level of service of 2030 AM With Improvements.
[2] The roundabout was analyzed using SIDRA analysis software.
[3] Intersection well exceeds capacity. Synchro cannot calculate the delay.
[4]These intersections were originally analyzed with a diversion of traffic to a proposed US 50 WB ramp. This improvement has since been removed from consideration due to potential development activity identified prior to publishing this final report.

With the 2030 improvements in the PM peak hour, all of the study area intersections will operate at LOS D or better, with the exception of MD Route 18 at Dominion Road. This intersection will operate at LOS E, however, this is a significant improvement from 2030 future without improvements, with a delay decrease of 352.6 seconds per vehicle.

Interchange Analysis Results

The deterministic analysis procedures outlined in the HCM 2010, and utilized in the Synchro capacity analysis, result in measures of effectiveness (MOEs) that are based on traffic flow theory. In contrast to deterministic tools, microsimulation models (stochastic tools) are based on the flow of vehicles along a roadway segment in accordance with principles of physics, vehicle attributes, rules of the road, and driver behavior. Intersection vehicle delay results generated by microsimulation models such as VISSIM are not HCM compliant. HCM calculations are based on control delay and stopped delay that directly contributes to the traffic control devices. VISSIM directly measures the total delay, which consists of control delay, stopped delay, and other delay incurred in the vicinity of the traffic control device, such as vehicles slowing down for turn movements. The differences between the two analysis methodologies are acknowledged. However, level of service is reported in both analyses, as it is the most relatable MOE and communicates the performance of the intersection to all readers. The results of the VISSIM analysis are shown in Table 12. Queuing analysis results will also be provided for better comparison between the two analysis methodologies.

Table 12: Summary of VISSIM Intersection Capacity Analysis Results

Level of Service (Delay, Seconds per Vehicle)				
Intersection	2030 AM With Improvements		2030 PM With Improvements	
	Delay	LOS	Delay	LOS
MD Route 8 at Pier 1 Road/ Thompson Creek Road (Signalized)	5.3	A	10.0	A
MD Route 8 at US 50/301 EB Ramps (Signalized)	17.4	B	18.2	B
MD Route 8 at US 50/301 WB Ramps (Signalized)	10.7	B	27.7	C
MD Route 8 at Skipjack Parkway/ MD Route 18 (Signalized)	12.7	B	19.0	B

With the diverging diamond interchange in place, all of the MD Route 8 intersections will operate at LOS C or better in the AM and PM peak hours.

Future Pedestrian Connectivity

Future plans exist to extend the trail system east as part of the American Discovery Trail system, as well as part of the East Coast Greenway trail network, and to eventually tie in with trails of neighboring counties on the eastern shore. Plans are in final stages of development review with State Highway Administration to extend the trail east from the Kent Narrows for approximately 6300 feet as the first segment of the Cross County Connector Trail. The Cross County Connector Trail will tie to a future trail head planned for Long Point Park in Grasonville.

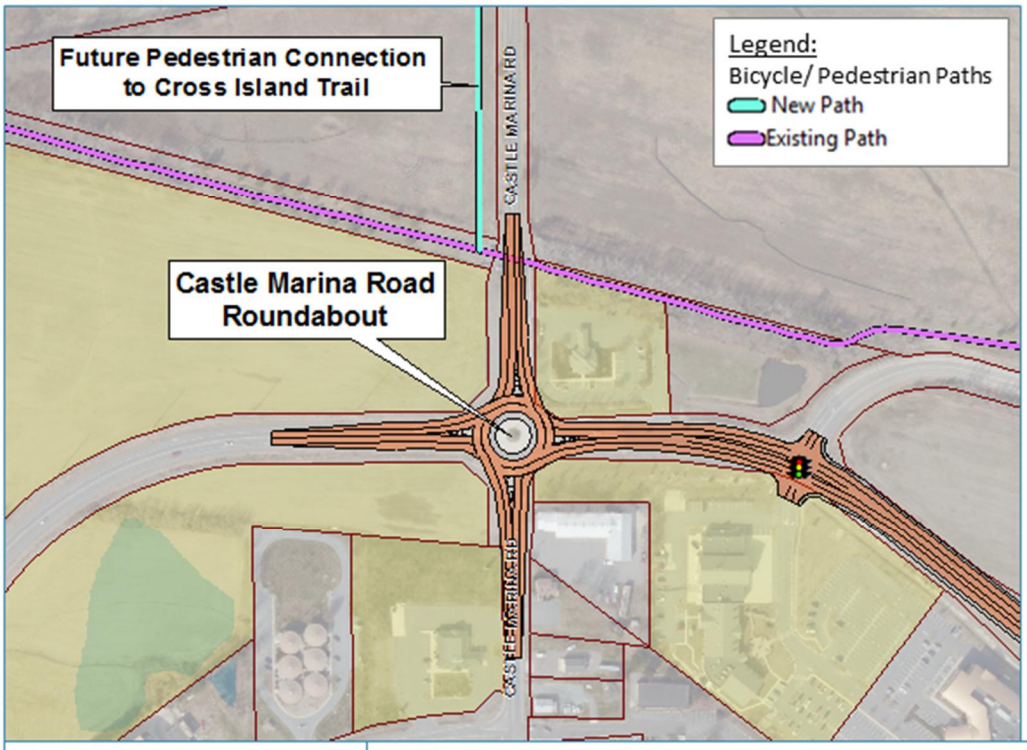
As infill development and plans for larger tracks along the MD Route 18 corridor come online, there exists the ability to connect existing segments of sidewalk with future segments, and possibly bicycle/pedestrian trail segments as well, to assist in the overall connectivity of this area.

In addition to these County-planned pedestrian connections, the following pedestrian and bicycle improvements are incorporated in the transportation improvements recommended in this study.

- MD Route 8 at US 50/301 Interchange – This interchange improvement incorporates a pedestrian/bicycle facility that runs through the median of the interchange to facilitate north-south pedestrian network connectivity.
- Pedestrian Bridge over US 50/301 – This bridge is in very preliminary planning stages to provide access for bicycles and pedestrians from county-owned parkland on the north side of US 50/301 to the commercial shopping center to the south side.
- Shamrock Road Overpass – This new crossing of US 50/301 would also provide a pedestrian/bicycle facility that will connect with the Cross Island Trail on the north side of US 50/301.
- Cox Neck Road Connector – In the event that this roadway is decided to be constructed as a one-way, westbound route, the remaining ROW would likely be dedicated for a shared use path to facilitate east-west pedestrian connectivity.

6. IMPROVEMENT PROJECT CONCEPT PLANS

Castle Marina Road Roundabout - 2020



Description:

Widening and upgrading of the existing one lane traffic circle to a two-lane roundabout including improvements at all four approaches.

Cost Estimate:

$4,900,000

Benefits

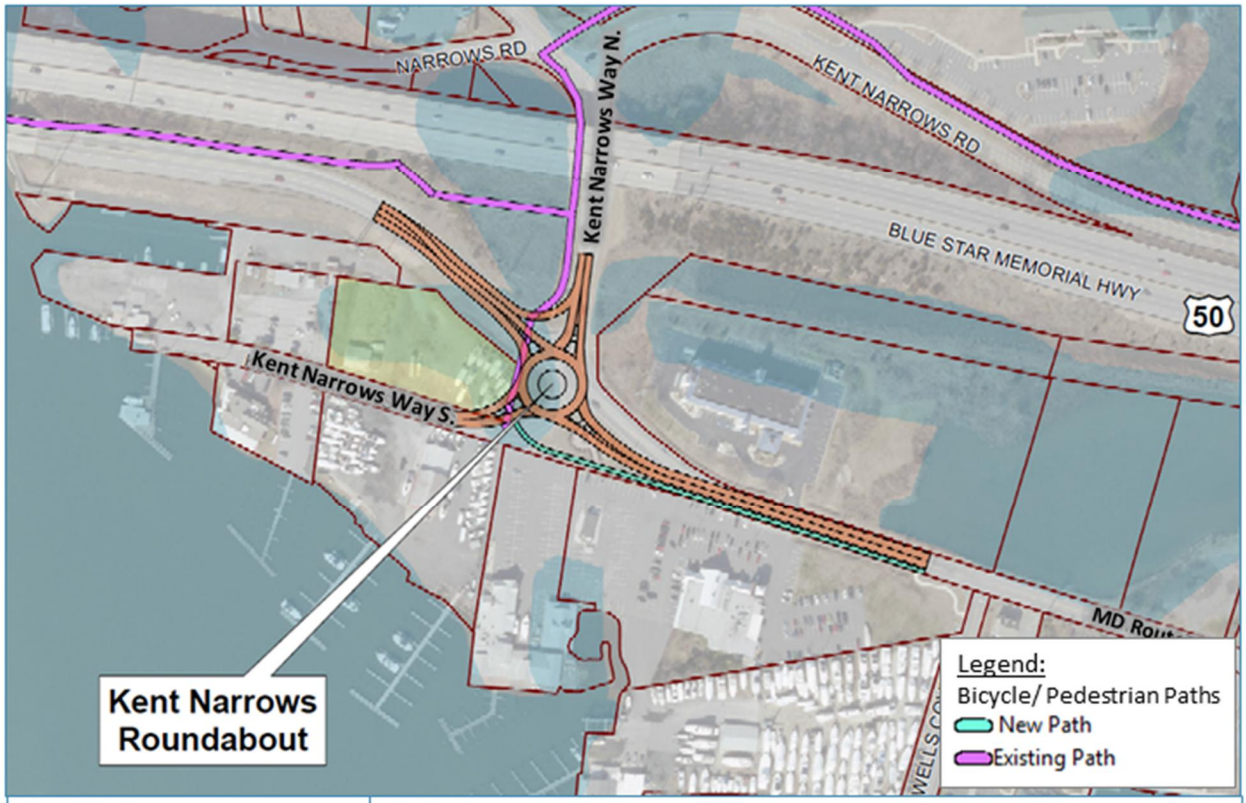
- Increases capacity at the roundabout
- New design incorporates a sharper turning radius at each approach, encouraging drivers to decelerate more as they enter the roundabout
- Reduced queuing on Castle Marina Road and MD Route 18

Traffic Impact Analysis

The widening of this roundabout is included in the Year 2020 analysis. Synchro SimTraffic simulation software shows improved operations at the roundabout, and queuing is significantly reduced with the added capacity. Additionally, the widening of MD Route 18 between Castle Marina Road and Piney Creek Road improves the traffic progression along MD Route 18. Delay and level of service analysis was performed using SIDRA 6.0 analysis tool, and a table summarizing the results is provided below.

MD Route 18 at Castle Marina Rd Level of Service (Delay, Seconds per Vehicle)		
Scenario	Delay (sec)	LOS
Existing AM	13.1	B
Existing PM	33.7	D
2020 Without Improvements AM	32.1	D
2020 Without Improvements PM	185.2	F
2020 With Improvements AM	8.6	A
2020 With Improvements PM	17.5	C
2030 Without Improvements AM	190.9	F
2030 Without Improvements PM	630.2	F
2030 With Improvements AM	8.5	A
2030 With Improvements PM	17.9	C

Kent Narrows Roundabout - 2020



Description:

Construction of a new one lane roundabout at the existing intersection of MD Route 18 and Kent Narrows Way South.

Cost Estimate:

$3,200,000

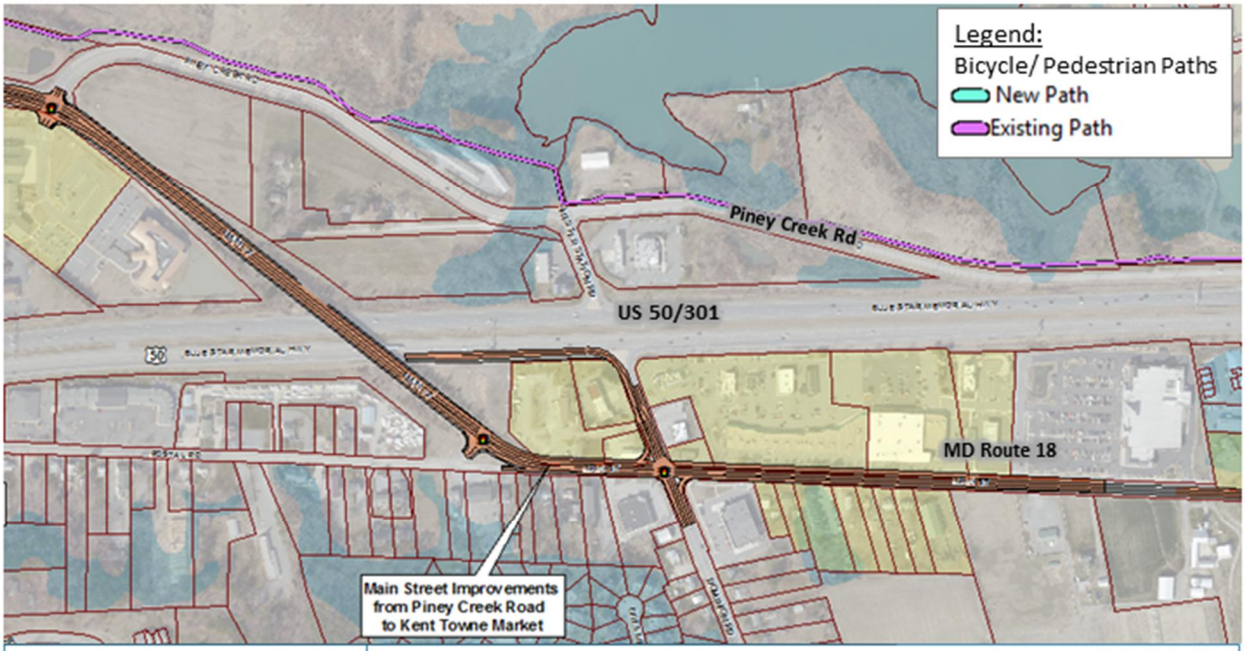
Benefits

- Reduces the amount of conflict points at the intersection
- Improves sight distance at the intersection that is currently skewed
- Reduces queuing for minor street approaches
- Improves ped/bike access

Traffic Impact Analysis

This improvement was not incorporated into the analysis, since it is outside of the traffic analysis study area. It is anticipated the roundabout will help the operations at this intersection.

MD Route 18 Improvements from Piney Creek Road to Kent Towne Market - 2020 and 2030



Description:

Widening of MD Route 18 from two lanes to four lanes between Piney Creek Road and Kent Towne Market. Includes a new traffic signal at Piney Creek Road and Postal Road and a reconstructed signal at Dominion Road. Also includes widening of the US 50 off ramp at Dominion Road to dual right-turn lanes.

Cost Estimate:

$37,500,000

Benefits

- More capacity available on MD Route 18.
- More gaps for minor street movements
- Better progression of traffic along MD Route 18
- Reduced queuing on US 50/301 ramp and on MD Route 18

Traffic Impact Analysis

These improvements are phased between Year 2020 and Year 2030. Year 2020 improvements include signalization of the Piney Creek Road and Postal Road intersections, widening of MD Route 18 between Postal Road and Dominion Road, restriping of the northbound approach of Dominion Road, and widening the US 50/301 off-ramp to two lanes. The remaining improvements are included in Year 2030 analysis.

MD Route 18 at Piney Creek Rd
Level of Service (Delay, Seconds per Vehicle)

Scenario	Delay (sec)	LOS
Existing AM	2.6	A
Existing PM	6.8	A
2020 Without Improvements AM	12.3	B
2020 Without Improvements PM	1272.3	F
2020 With Improvements AM	17.1	B
2020 With Improvements PM	42.3	D
2030 Without Improvements AM	Err*	N/A*
2030 Without Improvements PM	Err*	N/A*
2030 With Improvements AM	28.6	C
2030 With Improvements PM	30.2	C

MD Route 18 at Postal Rd
Level of Service (Delay, Seconds per Vehicle)

Scenario	Delay (sec)	LOS
Existing AM	5.5	A
Existing PM	19.6	C
2020 Without Improvements AM	19.5	C
2020 Without Improvements PM	445.3	F
2020 With Improvements AM	13.1	B
2020 With Improvements PM	27.6	C
2030 Without Improvements AM	1158.6	F
2030 Without Improvements PM	477.7	F
2030 With Improvements AM	10.3	B
2030 With Improvements PM	21.2	C

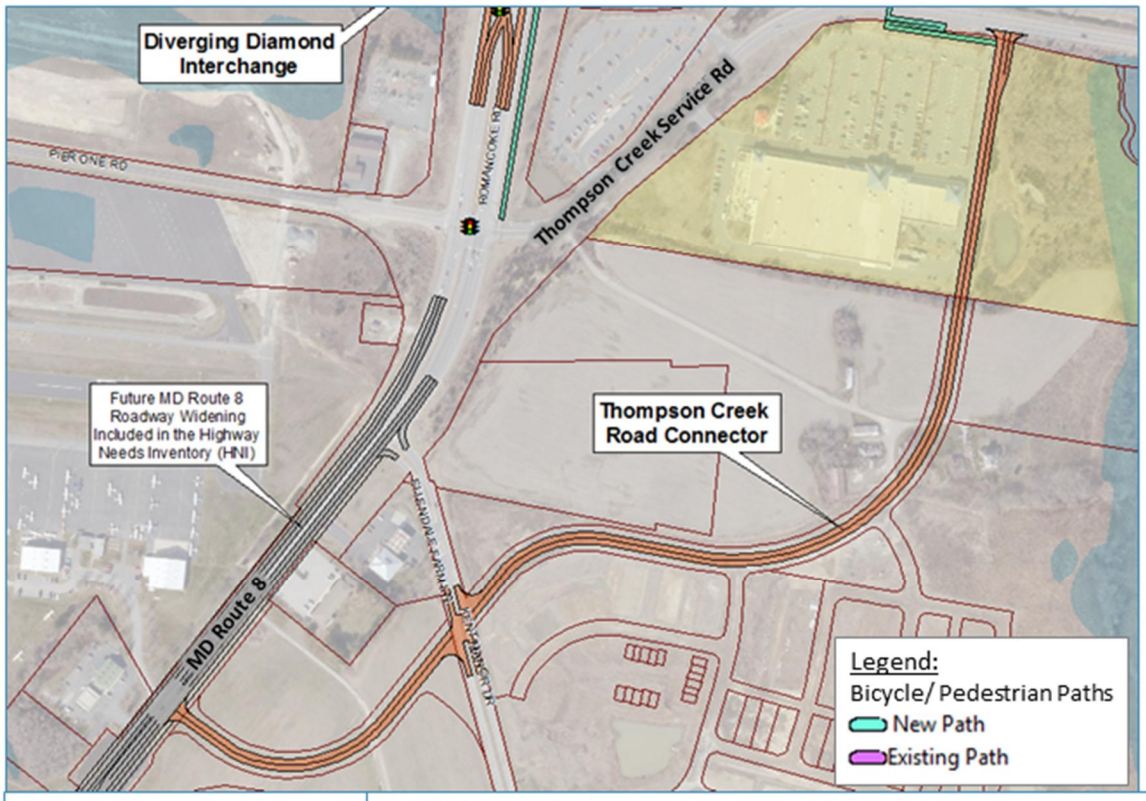
*Intersection well exceeds capacity. Synchro is unable to calculate the delay.

Dominion Rd at MD Route 18
Level of Service (Delay, Seconds per Vehicle)

Scenario	Delay (sec)	LOS
Existing AM	17.7	B
Existing PM	29.8	C
2020 Without Improvements AM	24.6	C
2020 Without Improvements PM	177.4	F
2020 With Improvements AM	22.3	C
2020 With Improvements PM	95.1	F
2030 Without Improvements AM	44.3	D
2030 Without Improvements PM	415.0	F
2030 With Improvements AM	31.4	C
2030 With Improvements PM	62.4	E

Traffic analysis is provided at the three MD Route 18 intersections with Piney Creek Road, Postal Road, and Dominion Road. With these improvements all three intersections have a decrease in delay. All operate at LOS D or better, with the exception of MD Route 18 at Dominion Road in the PM peak hour. This intersection will operate at LOS E, but the delay will be improved from all other analysis periods.

Thompson Creek Road Connector - 2030



Description:

Construction of a new two lane roadway connecting MD Route 8 with Thompson Creek Road.

Cost Estimate:

$8,500,000

Benefits

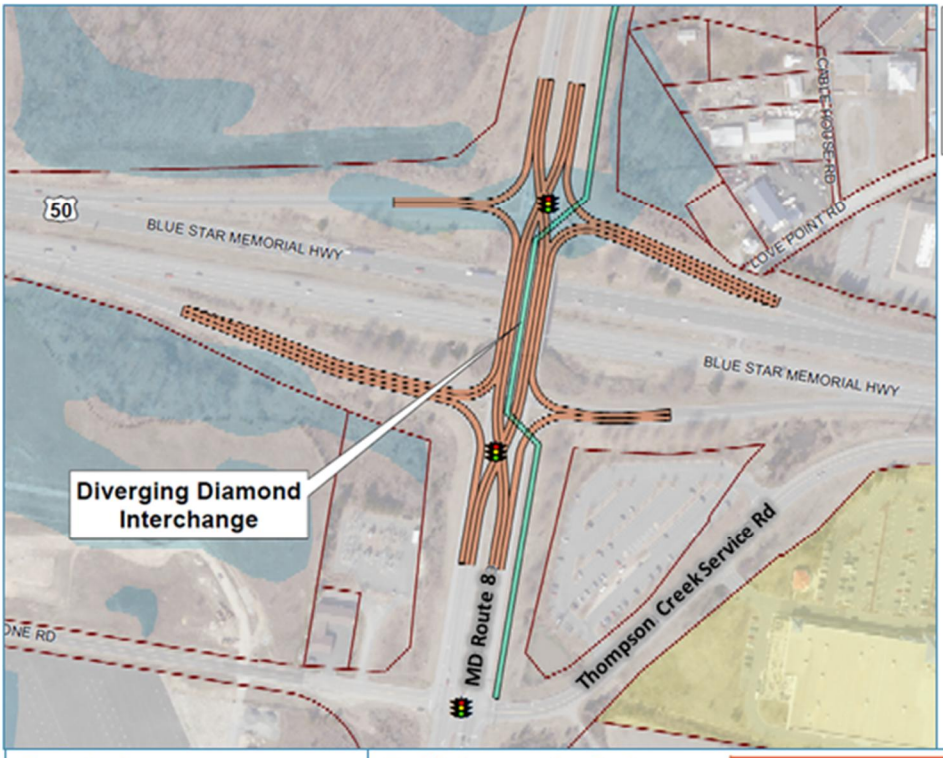
- Provides access to Thompson Creek Road away from the MD Route 8 & US 50/301 interchange
- Facilitates local travel to/from residential areas on southern MD Route 8 to commercial areas along Thompson Creek Road, including bikes/pedestrians

Traffic Impact Analysis

This improvement was incorporated into the 2030 analysis year. The traffic that would travel along this roadway would consist of future development trips, as well as trips that would currently turn off of MD Route 8 at Thompson Creek Service Road. Traffic analysis at the intersection of MD Route 8 and Thompson Creek Service Road shows that this improvement, in conjunction with others along MD Route 8 would decrease the delay at this intersection.

Thompson Creek Road at MD Route 8 Level of Service (Delay, Seconds per Vehicle)		
Scenario	Delay (sec)	LOS
Existing AM	8.3	A
Existing PM	16.7	B
2020 Without Improvements AM	10.0	A
2020 Without Improvements PM	18.4	B
2030 Without Improvements AM	12.0	B
2030 Without Improvements PM	26.5	C
2030 With Improvements AM	5.3	A
2030 With Improvements PM	10.0	A

Diverging Diamond Interchange at US 50/301 and MD Route 8 - 2030



Description:

Reconstruction of the existing US 50/301 and MD Route 8 standard diamond interchange to a diverging diamond interchange(DDI).

Cost Estimate:

$10,300,000

Benefits

- Increases capacity at the interchange without requiring additional right-of-way
- Concept design includes bike/pedestrian access through the interchange to connect with Cross Island Trail

Traffic Impact Analysis

This improvement was incorporated into the 2030 analysis year. Traffic analysis is provided at the ramp termini to and from US 50/301 along MD Route 8. In 2020, signal timings were adjusted to improve progression along MD Route 8. The LOS results for 2030 do not reflect the true operational benefits provided by this improvement. Without the diverging diamond interchange, queuing along the MD Route 8 off-ramps will extend to US 50/301. With the improvement in place, queuing is reduced significantly on the ramps and does not spill back to US 50/301.

MD Route 8 at US 50/301 EB Ramps Level of Service (Delay, Seconds per Vehicle)		
Scenario	Delay (sec)	LOS
Existing AM	13.3	B
Existing PM	15.8	B
2020 Without Improvements AM	14.3	B
2020 Without Improvements PM	9.0	A
2030 Without Improvements AM	14.8	B
2030 Without Improvements PM	19.2	B
2030 With Improvements AM	17.4	B
2030 With Improvements PM	18.2	B

MD Route 8 at US 50/301 WB Ramps Level of Service (Delay, Seconds per Vehicle)		
Scenario	Delay (sec)	LOS
Existing AM	10.1	B
Existing PM	14.1	B
2020 Without Improvements AM	13.4	B
2020 Without Improvements PM	19.0	B
2030 Without Improvements AM	14.5	B
2030 Without Improvements PM	20.8	C
2030 With Improvements AM	10.7	B
2030 With Improvements PM	27.7	C

Cox Neck Road Connector - 2030

Description:

Construction of a new two lane roadway from Thompson Creek Road to Cox Neck Road following the alignment of US 50/301. Connection options include tying into Ellicott Drive, Cecil Drive, or a new alignment connecting to Postal Road.

The Cox Neck Road Connector improvement was also reviewed as a one-way westbound facility to detract freeway through traffic from using this local road as a cut-through to points west. The locals have eastbound connectivity via US 50/301, but westbound travel today is much less direct.

Cost Estimate:

$17,500,000

Benefits

- Additional east-west connection for local residents
- Network redundancy and improved access for emergency vehicles
- Additional pedestrian/bicycle access and connection on the south side of US 50/301

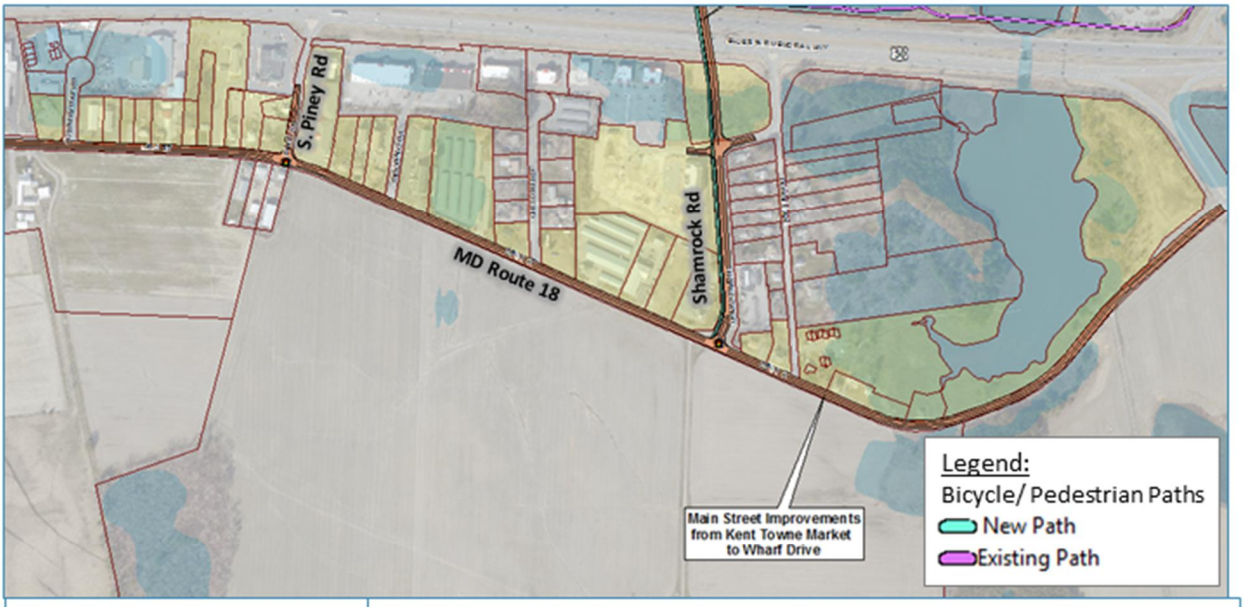
Traffic Impact Analysis

This improvement was incorporated into the 2030 analysis year. While traffic analysis was not performed directly in the vicinity of this improvement project, it does provide known benefits. Existing and future traffic can be diverted from parallel routes, such as MD Route 18, which will improve congestion in other areas of the network.

Pedestrian Connectivity

Pedestrian and bicycle facilities should be considered for inclusion in this improvement project, as there are minimal facilities along the south side of the Island.

MD Route 18 Improvements from Kent Towne Market to Wharf Drive - 2030



Description:

Widening of MD Route 18 from two lanes to three lanes between Kent Towne Market to Wharf Drive. Includes a new traffic signal at Shamrock Road.

Cost Estimate:

$24,200,000

Benefits

- Increases capacity along MD Route 18
- Signalization of intersections improves operations on the minor street approaches by providing gaps in the mainline
- Signal coordination between the new signals improves progression along MD Route 18
- Potential for a bike lane on the eastern end of the segment.

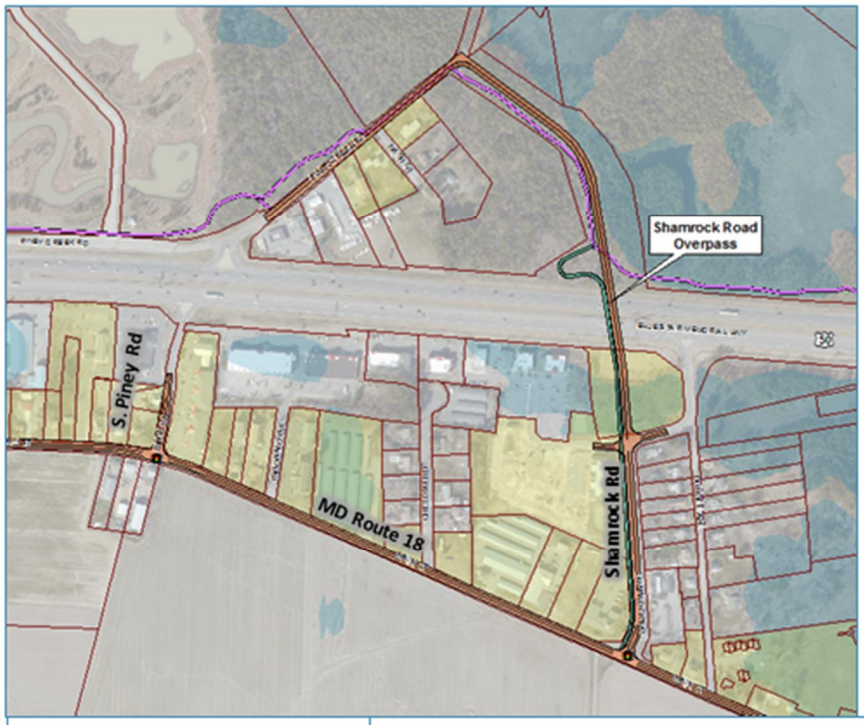
Traffic Impact Analysis

The widening of MD Route 18 from Kent Towne Market to Wharf Drive, and the signalization of Shamrock Road are included in the Year 2030 analysis. These improvements, in concurrence with other improvements, increase progression along MD Route 18. Traffic analysis is shown below for the intersections of MD Route 18 with South Piney Road and with Shamrock Road. Although not confirmed as part of this study, a roundabout at the intersection of MD Route 18 and South Piney road may be an appropriate alternative to a traffic signal, depending upon development activity in the area.

MD 18 at South Piney Rd Level of Service (Delay, Seconds per Vehicle)		
Scenario	Delay (sec)	LOS
Existing AM	2.2	A
Existing PM	5.8	A
2020 Without Improvements AM	3.6	A
2020 Without Improvements PM	159.3	F
2030 Without Improvements AM	4.6	A
2030 Without Improvements PM	2079.4	F
2030 With Improvements AM	10.7	B
2030 With Improvements PM	53.1	D

MD 18 at Shamrock Rd Level of Service (Delay, Seconds per Vehicle)		
Scenario	Delay (sec)	LOS
Existing AM	1.0	A
Existing PM	1.1	A
2020 Without Improvements AM	2.9	A
2020 Without Improvements PM	4.3	A
2030 Without Improvements AM	2.8	A
2030 Without Improvements PM	6.5	A
2030 With Improvements AM	16.7	B
2030 With Improvements PM	31.4	C

Shamrock Road Overpass - 2030



Legend:
Bicycle/ Pedestrian Paths
New Path
Existing Path

Description:

Construction of a new two lane roadway over US 50/301 connecting Shamrock Road and Piney Creek Road. Includes a new pedestrian connection over US 50/301 and a signal at Shamrock Road and MD Route 18.

Cost Estimate:

$20,100,000

Benefits

- Alternate crossing of US 50/301 will alleviate strain on the MD Route 18 overpass
- Network redundancy and improved access for emergency response vehicles
- Access for existing and future residential development north of US 50/301 to commercial development south of the freeway.
- Additional bike/ped connection

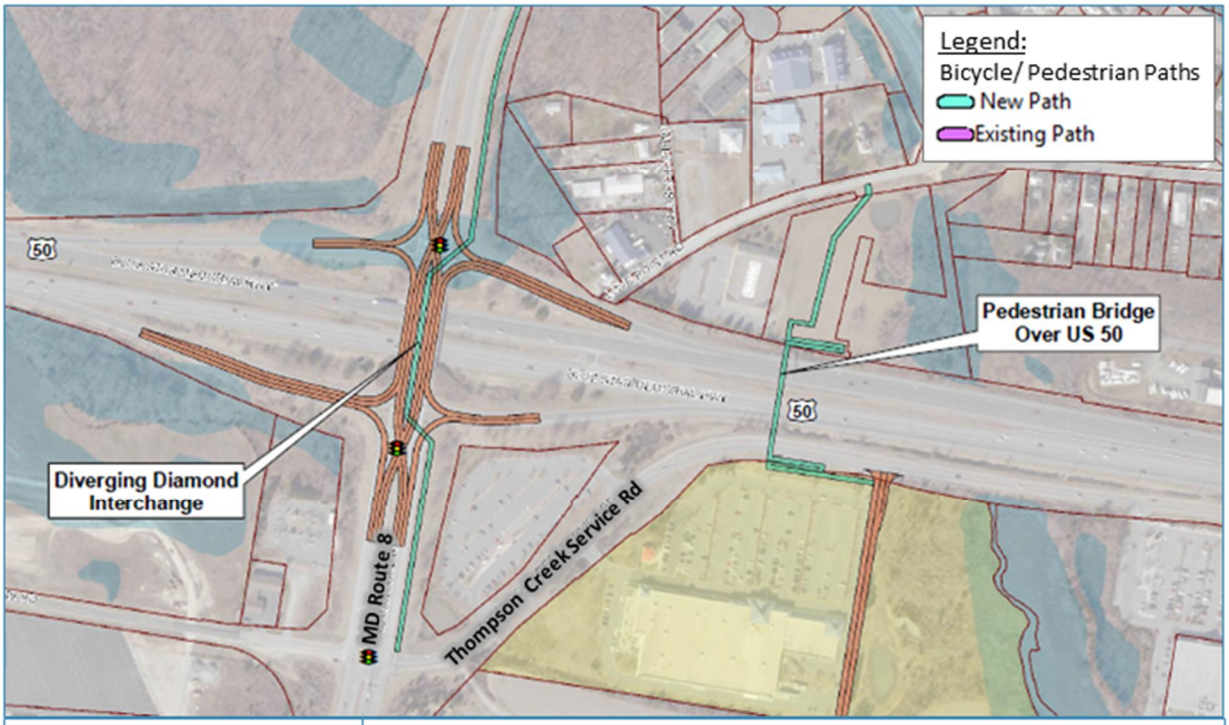
Traffic Impact Analysis

The Shamrock Road overpass and associated improvements are included in the Year 2030 analysis. Traffic analysis is provided for the intersection of MD Route 18 at Shamrock Road and the nearby intersection of MD Route 18 at South Piney Road. What is not shown in the table is the minor street delay and queuing in the scenarios without the signalized intersection. The overall intersection delay increases with the installation of traffic signals along MD Route 18 because the major street movements are now having to stop to allow for the minor streets to be able to experience less delay. The minor street delay and queuing is alleviated by the traffic signal installation.

MD 18 at Shamrock Rd Level of Service (Delay, Seconds per Vehicle)		
Scenario	Delay (sec)	LOS
Existing AM	1.0	A
Existing PM	1.1	A
2020 Without Improvements AM	2.9	A
2020 Without Improvements PM	4.3	A
2030 Without Improvements AM	2.8	A
2030 Without Improvements PM	6.5	A
2030 With Improvements AM	16.7	B
2030 With Improvements PM	31.4	C

MD Route 18 at South Piney Rd Level of Service (Delay, Seconds per Vehicle)		
Scenario	Delay (sec)	LOS
Existing AM	2.2	A
Existing PM	5.8	A
2020 Without Improvements AM	3.6	A
2020 Without Improvements PM	159.3	F
2030 Without Improvements AM	4.6	A
2030 Without Improvements PM	2079.4	F
2030 With Improvements AM	10.7	B
2030 With Improvements PM	53.1	D

Pedestrian Bridge Over US 50/301 - 2030



Description:

Construction of a new pedestrian bridge to connect a potential park with the shopping center south of US 50/301.

Cost Estimate:

$2,200,000

Benefits

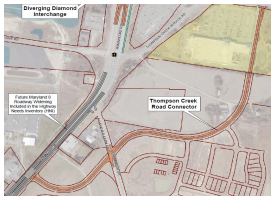
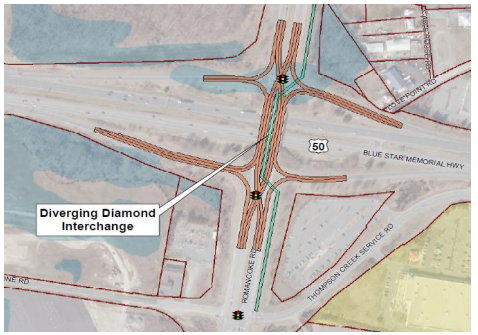
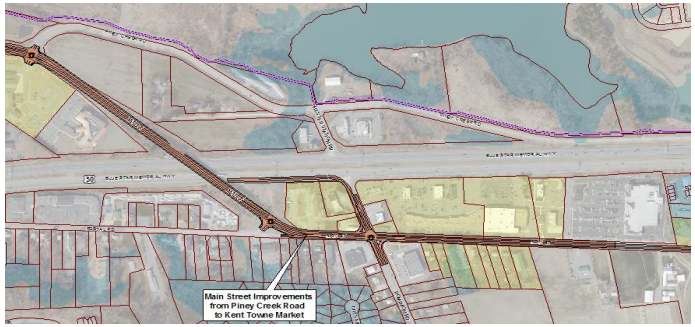
- Improves pedestrian network connectivity
- Provides access to commercial development without vehicular conflicts

Pedestrian Connectivity

This improvement is recommended for Year 2030 implementation. Currently, there aren't any designated pedestrian/ bicycle facilities that cross US 50/301. Introducing this connection will improve safety conditions for bicyclists and pedestrians looking to travel between the north and south sides of the Island. The pedestrian bridge will connect county-owned parkland on the north side of US 50/301 with the shopping center and park-and-ride lot on the south side of the freeway. The landing of the bridge on the south side will be within the commercial parking lot to reduce conflicts with vehicles traveling on Thompson Creek Road.

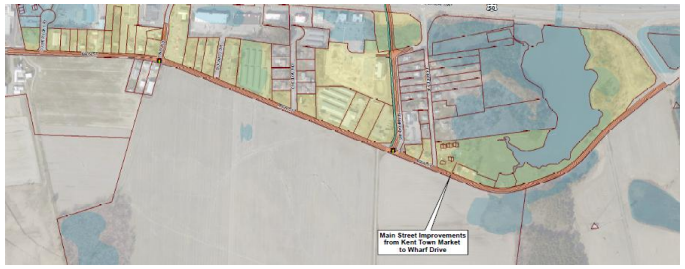
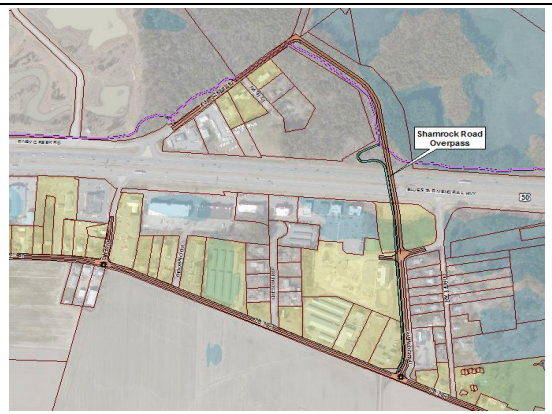
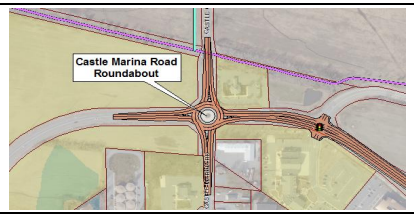
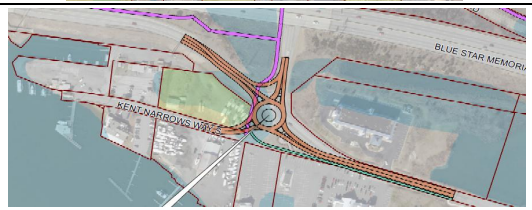
Kent Island Transportation Plan Conceptual Improvements - Preliminary Planning Level Cost Estimates

All cost are based on typical urban projects' unit costs, with a 2.5% inflation rate and a 2030 build out year. These unit costs account for all necessary items needed for construction with an additional 25% included for design and construction contingencies. Not included in this planning level cost estimate are costs associated with additional studies required for construction (NEPA, IJR, etc.).

Location/Description	Item	Quantity	Unit	Unit Cost	Total	Notes	Improvement
Thompson Creek Road Connector Construction of a new two lane roadway connecting Romancoke Road with Thompson Creek Road.	Roadway Construction (2 Lanes)	0.712	MI	$9,470,000	$6,743,788	2 - 16' lanes with 5' sidewalks	
	Right of Way	25	%	-	$1,685,947		
				Sub Total:	$8,500,000		
Diverging Diamond Interchange at US 50 and Route 8 (Romancoke Road) Reconstruction of the existing US 50 and MD 8 standard diamond interchange to a diverging diamon interchange.	Roadway Construction (3 Lanes)	0.520	MI	$11,840,000	$6,155,455	3 - 12' lanes	
	Roadway Construction (2 Lanes)	0.349	MI	$8,315,000	$2,905,526	2 - 12' lanes	
	Traffic Signal	2	EA	$305,000	$610,000	Route 8 at US 50 Ramps	
	Shared Use Path	0.492	MI	$1,210,000	$595,833	1 - 12' path	
				Sub Total:	$10,300,000		
Cox Neck Road Connector Construction of a new two lane roadway from Thompson Creek Road to Cox Neck Road following the alignment of US 50. Connection options include improvements along Ellicott Drive, Cecil Drive, or a new alignment connecting to Postal Road.	Roadway Construction (2 Lanes)	1.067	MI	$9,470,000	$10,106,714	2 - 16' lanes with 5' sidewalks	
	Bridge Construction	3100	SF	$500	$1,550,000	2 - Bridges	
	Right of Way	50	%	-	$5,828,357		
				Sub Total:	$17,500,000	+ $1,471,000 Ellicott Drive + $1,669,000 Cecil Drive + $1,790,000 Postal Road	
Main Street Improvements from Piney Creek Road to Kent Town Market Widening of Main Street from two lanes to four lanes between Piney Creek Road and Kent Town Market. Includes a new traffic signal at Piney Creek Road and Postal Road and a reconstructed signal at Dominion Road. Also includes widening of the US 50 off ramp at Dominion Road to dual right-turn lanes.	Roadway Construction (2 Lanes)	0.163	MI	$9,070,000	$1,477,311	2 - 12' lanes with 12' shoulder	
	Roadway Construction (4 Lanes)	0.491	MI	$19,670,000	$9,648,731	4 - 11' lanes with 5' sidewalks	
	Roadway Construction (5 Lanes)	0.466	MI	$21,390,000	$9,965,795	5 - 11' lanes with 5' sidewalks	
	Bridge Construction	6840	SF	$500	$3,420,000	Widen existing bridge 1 lane	
	Traffic Signal	3	EA	$305,000	$915,000	Main Street at Dominion Road	
	Right of Way	50	%	-	$11,974,763		
				Sub Total:	$37,500,000		

Kent Island Transportation Plan Conceptual Improvements - Preliminary Planning Level Cost Estimates

All cost are based on typical urban projects' unit costs, with a 2.5% inflation rate and a 2030 build out year. These unit costs account for all necessary items needed for construction with an additional 25% included for design and construction contingencies. Not included in this planning level cost estimate are costs associated with additional studies required for construction (NEPA, IJR, etc.).

Location/Description	Item	Quantity	Unit	Unit Cost	Total	Notes	Improvement
Main Street Improvements from Kent Town Market to Wharf Drive Widening of Main Street from two lanes to three lanes between Kent Town Market to Wharf Drive. Includes a new traffic signal at Shamrock Road.	Roadway Construction (3 Lanes)	1.222	MI	$12,930,000	$15,795,170	3 - 12' lanes	
	Traffic Signal	1	EA	$305,000	$305,000	Shamrock Rd at Main St	
	Right of Way	50	%	-	$8,050,085		
				Sub Total:	$24,200,000		
Shamrock Road Overpass Construction of a new two lane roadway connecting Shamrock Road and Piney Creek Road over US 50. Includes a new pedestrian connection over US 50.	Roadway Construction (2 Lanes)	0.738	MI	$9,070,000	$6,690,843	2 - 12' lanes	
	Shared Use Path	0.341	MI	$1,210,000	$412,500	1 - 12 lane	
	Bridge Construction	17330	SF	$500	$8,665,000		
	Traffic Signal	1	EA	$305,000	$305,000	Abruzzi Dr at Shamrock Rd	
	Right of Way	25	%	-	$4,018,336		
				Sub Total:	$20,100,000		
Castle Marina Road Roundabout Widening of the existing one lane roundabout to two lanes including improvements of all four approaches.	Roundabout (2 Lanes)	1	EA	$3,885,000	$3,885,000	2 - 16' lanes	
	Right of Way	25	%	-	$971,250		
				Sub Total:	$4,900,000		
Kent Narrows Roundabout Construction of a new one lane roundabout at the existing intersection of Main Street and Kent Narrows Way South.	Roundabout (1 Lane)	1	EA	$2,100,000	$2,100,000	1 - 16' lane	
	Right of Way	50	%	-	$1,050,000		
				Sub Total:	$3,200,000		
Pedestrian Bridge Over US 50 Construction of a new pedestrian bridge to connect a proposed park with the shopping center south of US 50.	Shared Use Path	0.334	MI	$1,210,000	$404,021	1 - 12' Path	
	Bridge Construction	3488	SF	$500	$1,744,000		
				Sub Total:	$2,200,000		

7. RECOMMENDATIONS AND CONCLUSION

The purpose of this study was to identify transportation improvements to address current and potential future conditions on Kent Island in Queen Anne's County. By understanding the nature and rationale for such projects, the County can incorporate these needs into their discussions with Maryland SHA and MdTA as they prepare for improving the transportation infrastructure on the Island. The County can also use the information from this study in the County's planning process and as they update planning documents, work with County residents and leaders, and with the development community. This plan should also be shared with the Baltimore Regional Transportation Board, the Bay Bridge Reconstruction Advisory Group, and adjacent counties as Queen Anne's County continues its coordination with local partners and stakeholders to improve the safe and efficient flow of traffic on Kent Island and to retain the quality of life and accessibility to services for residents and visitors.

Queen Anne's County, in particular Kent Island, is in a unique position due to its geography. Located on the eastern end of the Chesapeake Bay Bridge, Kent Island serves as the entry point to the Eastern Shore for thousands of visitors. In 2014, the Chesapeake Bay Bridge carried 25.6 million vehicles.[4] All of those vehicles passed through, entered, or exited Kent Island via US 50/301, which bisects the Kent Island communities of Stevensville and Chester. Kent Island is not just a throughway for US 50/301, though. As designated growth areas, the Stevensville and Chester communities on Kent Island thrive with residential developments and successful businesses. Many of the businesses serve County residents as well as travelers across Kent Island, and they contribute to the local economy. In addition to serving regional travelers and area residents, US 50/301 is part of the US 50/301 freight corridor on the National Highway System, an emergency evacuation route, and part of the Nation's Strategic Highway Network, which is critical to the Department of Defense's domestic operations.

The results of this study show that in some areas, existing intersections on the Island are being stretched beyond capacity and there are missing links in the bicycle and pedestrian network. As regional traffic grows and planned developments in the Chester and Stevensville growth areas occur, the transportation network will be stressed beyond its capacity in several locations on a normal basis during the weekday peak periods, primarily the PM peak hour. These locations, and the transportation network on the Island, are further impacted by incidents on the Chesapeake Bay Bridge that cause major delays on US 50/301. As a result of the incidents, traffic spills onto MD Route 18 and local roads making it very difficult for residential and business traffic to move around Kent Island. Without reducing the impacts of traffic associated with the Chesapeake Bay Bridge and building redundancy in the Island's transportation network, the businesses and residents of Kent Island will continue to experience gridlock conditions during the summer season and when there are incidents on the Chesapeake Bay Bridge that restrict the flow of traffic.

For the purpose of this study, the analyses and resulting recommendations were based on historical growth in background traffic volumes (regional traffic growth) and potential future developments on Kent Island that have already been approved or are in the planning process. As the County moves forward, it is important that this study be updated based on more refined development plans and actual changes in development. Based on the information present in this study, the following recommendations were prioritized by horizon years 2020 and 2030.

[4] MdTA Toll Facilities. Information can be found at: http://www.mdta.maryland.gov/toll_facilities/wpl.html.

2020 Recommendations

The following locations are deteriorating under existing conditions, and should be evaluated for improvements in the short term.

- Castle Marina Road and MD Route 18 – Traffic using the existing one-lane traffic circle experiences delays and queuing, particularly on Castle Marina Road, due to the speed of MD Route 18 traffic entering and exiting the intersection. This is, in part, due to the geometry of the traffic circle, which was designed and constructed prior to current, modern roundabout guidelines. Additional future traffic will exacerbate this issue, necessitating the reconstruction of this intersection to a modern, two-lane roundabout that will slow speeds through the intersection and increase the capacity.
- Dominion Road and MD Route 18 – This intersection will operate at level of service F in the PM peak hour by 2020 without improvements. Improvements at this intersection will be needed and any additional traffic beyond 2020 through this intersection will exacerbate the oor levels of service. Large poles carrying primary electrical power and location of businesses on all four corners of this intersection make it difficult to widen this intersection to improve capacity.
- MD Route 18 intersections with Piney Creek Road and with Postal Road – Traffic will continue to use these intersections for local trips along MD Route 18 as well as to access US 50/301. As traffic volumes increase along MD Route 18, these intersections will deteriorate as side street traffic experiences delays and queuing due to insufficient gaps in traffic along MD Route 18. As a result, traffic control improvements, such as full, actuated traffic signals and roundabouts, will be necessary. The County should work with the Maryland SHA to ensure coordination of traffic signals in this corridor to improve traffic progression.
- Kent Narrows Roundabout – Though the intersection of Kent Narrows Way South and Main Street was not analyzed in this study, safety and site distance issues were expressed by County staff and the public. Constructing a new one lane roundabout at this intersection, including a pedestrian path and sidewalk connecting Kent Narrows North with Kent Narrows South, will improve safety and site distance from each approach of the existing skewed alignment of the intersection.

2030 Recommendations

Based on the information provided for this study, the following existing locations should be readdressed in the long term for operational improvements.

- MD Route 8 and US 50/301 Interchange – The level of service at this interchange will continue to deteriorate in the future as regional traffic grows and additional development takes place. Queues at the existing traffic signals will extend down the MD Route 8 off-ramps to US 50/301 and congestion on the bridge and adjacent roadways will worsen. Converting the existing diamond interchange to a diverging diamond interchange (DDI) will alleviate these queues and associated congestion. The proposed DDI can be constructed within the existing right-of-way and designed to accommodate bicycle and pedestrian traffic, completing a missing link in the existing trail network.
- MD Route 18 intersections with South Piney Road, and Shamrock Road – Traffic will continue to use these intersections for local trips along MD Route 18 as well as to access US 50/301. As traffic volumes increase along MD Route 18, these intersections will deteriorate as side street traffic experiences delays and queuing due to insufficient gaps in traffic along MD Route 18. As a result, traffic control improvements, such as full, actuated traffic signals and roundabouts, will be necessary. The County should work with the Maryland SHA to ensure coordination of traffic signals in this corridor to improve traffic progression.

In addition to improvements to existing roadways and intersections on Kent Island, the County should continue to pursue improvements to the overall transportation network that will create redundancy in the network that will assist local residents and emergency responders. Those include:

- Cox Creek Road Connector – Connecting Chester and Stevensville on the south side of US 50/301 will provide a much-needed link for Island residents who travel between the two communities and cannot use US 50/301 due to congestion. Incorporating a multi-purpose path will also close a gap in the pedestrian and bicycle network.
- Shamrock Road Overpass – Constructing a crossing over US 50/301 on the eastern side of Kent Island will provide needed redundancy in the transportation network that will facilitate travel for Island residents, particularly during several months out of the year when US 50/301 is congested. This facility would also provide a missing link in pedestrian and bicycle access between the north and south sides of Kent Island.