



Route 301—Port Royal Arterial Management Study

Caroline County, Virginia
October 2019



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TABLE OF CONTENTS

Chapter 1: Why Study Route 301 through Port Royal?	4
Chapter 2: What is Route 301 through Port Royal like today?	10
Chapter 3: Study Goals, Objectives, and Evaluation Criteria.....	31
Chapter 4: Transportation Options for Route 301 through Port Royal.....	41
Conclusion	73

Chapter 1

Why Study Route 301
through Port Royal?

EXECUTIVE SUMMARY

The Virginia Department of Transportation conducted this Arterial Management Study on Route 301 through the Town of Port Royal to develop a set of transportation improvement alternatives in cooperation with a team of local stakeholders. Through this process, multiple options have been vetted and compared, which will empower the stakeholders to make informed choices regarding future transportation plans. This study is a supplement to the earlier Route 301/207 Arterial Preservation Plan Study (June 2018, VDOT and Michael Baker, Int'l.).

The study sought to understand existing conditions and identify transportation options that will balance statewide mobility and safety goals with the town's historic character and natural resources. The final study produced six options able to meet the purpose and needs identified by the study. These options include: Route 301/Route 17 Intersection Modification, Route 301/Route 17 Quadrant Roadway, Market Street Extension, Route 301 through Town Two-Way Left-Turn Lane, Route 301 through Town Full Raised Median, and Route 301 through Town One-way Pair "Couplet".

Caroline County or the George Washington Regional Commission may submit any one or set of these options for VDOT funding. VDOT's SMART SCALE funding program was identified as most appropriate for the options identified in this study. Other potential funding sources include revenue sharing, VDOT Transportation Alternatives funding, VDOT Highway Safety Improvement Program Funding, and Virginia Land Conservation Grants.

This report summarizes information about the existing conditions analysis, goals and objectives, option development process, and option comparison process from the study.

ROUTE 301 - PORT ROYAL ARTERIAL MANAGEMENT STUDY

Route 301 through the Town of Port Royal serves two distinct functions: as a main street for town residents and as a National Highway System route that facilitates regional, state, and interstate travel.

QUESTIONS THIS CHAPTER ANSWERS >>>

- Why did VDOT conduct the Route 301 – Port Royal Arterial Management Study?
- Where did the study occur?
- How can VDOT and the Town of Port Royal balance the different roles of Route 301 in the future?

The Virginia Department of Transportation (VDOT) used the public engagement process and analysis of present conditions and future plans to provide a series of feasible transportation options aligned with local and state goals for an approximately one-mile section of Route 301 as it runs through the Town of Port Royal. This study follows VDOT's Route 301/207 Arterial Preservation Study of the forty-two miles of Route 301/207 from I-95 in Caroline County to Governor Nice Bridge in King George County. The Route 301/207 study sought to ensure the safety and preserve the capacity of this critical link in the Commonwealth's arterial highway network. Population growth and other factors, such as the Nice Bridge widening and planned construction on I-95 near Fredericksburg, were considered during the Route 301/207 study, which showed that long-term traffic volumes are projected to double along Route 301.

In addition to the anticipated long-term changes to traffic patterns and volumes on Route 301/Route 17, the unique natural, historical, and environmental assets within the Town of Port Royal—along with the town's role in local commerce and services as the crossroads points east—presented the opportunity to consider possible changes to Route 301 in greater detail.

The Route 301 – Port Royal Study was designed to engage community members, land and business owners, service providers, and jurisdictional entities (Town of Port Royal, Caroline County, George Washington Regional Commission) to focus on this unique section of the corridor, where the median separating opposing traffic is reduced to a 4-foot striped divider. Additionally, Route 301 conveys pedestrians from its town streets on the east side to businesses lining both sides of the highway. The study examined how the current alignment of Route 301 through the town could better balance and improve local circulation and access needs with the road's through-traffic function, including the 12-16% of peak period freight/truck traffic and particularly high weekend/seasonal demand at the Route 17 intersection.

Route 301 through the Town of Port Royal

The study area includes Route 301 (A.P. Hill Boulevard/Main Street) from 0.8 miles south of Route 17 (Tidewater Trail) to the Rappahannock River Bridge and Route 17 from 0.25 miles west of Route 301 to 0.60 miles east of Route 301 (**Figure 1**). VDOT classifies Route 301 as a principal arterial, so goals for the corridor include preserving speed, volumes, and safety. Route 301 also falls within the National Highway System and serves as an alternate route to I-95 between Baltimore and Richmond. Long-term traffic volumes are projected to grow along Route 301 due to population growth and other factors, such as the Nice Bridge widening and construction on I-95 near Fredericksburg. Route 301 in Port Royal crosses Route 17, which is also a principal arterial and part of the National Highway System. Route 17 also serves as an alternate route to I-64 between Fredericksburg and Newport News.

KEY TERMS >>>

- ▶ **Principal Arterial:** In rural areas, these roads facilitate substantial statewide or interstate travel and provide a connected network without dead ends.
- ▶ **National Highway System (NHS):** This is the network of strategic highways within the United States that serves major airports, ports, rail or truck terminals, railway stations, pipeline terminals, or other strategic transport facilities.

While most of the Route 301 corridor fits neatly into VDOT's principal arterial functional classification category, Route 301 passing through the Town of Port Royal welcomes a closer look. Port Royal is an historic Virginia town, with its transportation assets dating back to Colonial times. Route 301, itself, once served as a road of commerce linking farm products to warehouses and the port on the Rappahannock River. Today, Route 301 is the area's main street, providing access to local businesses and regional destinations for residents of Port Royal and neighboring communities. Town goals for the corridor include fostering the main street character of Route 301, improving roadway crossing safety for motorists and pedestrians, and providing safe access to and from local streets.

The Study

Through the Route 301 – Port Royal Arterial Management Study, VDOT and an independent consultant (Study Team) engaged the Town of Port Royal, Caroline County, and other stakeholders to develop a strategy to guide the Commonwealth's transportation investment along the Route 301 Corridor through the town.

Study Objectives

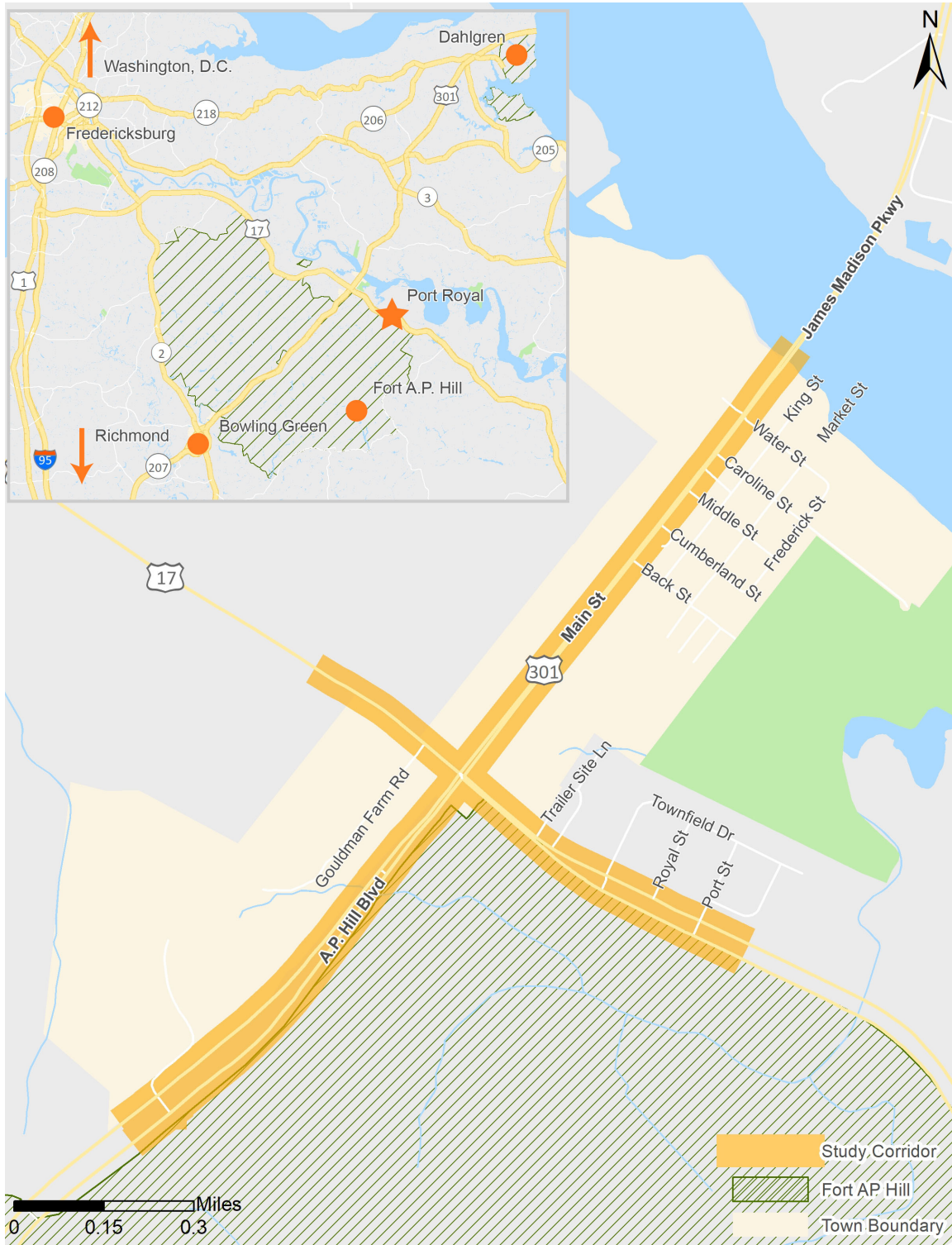
- Evaluate existing corridor conditions
- Establish study goals and objectives to serve as a foundation for evaluation criteria
- Develop and assess transportation options for the study area
- Inform the Town of Port Royal, Caroline County, and George Washington Regional Planning Commission of policy decision-making processes with data

This report summarizes the study's existing conditions, goals and objectives, evaluation criteria, and identified transportation options. More detailed documentation can be found in Appendices 1 through 5.

KEY TAKEAWAYS FROM THIS CHAPTER >>>

- Route 301 and Route 17 both serve key roles in the statewide transportation system as links in the National Highway System and principal arterial roadways offering relief to Interstates 95 and 64 respectively.
- As it runs through the Town of Port Royal, Route 301 serves a dual role as the town's main street, providing access to local businesses and regional destinations, especially for the residents of Port Royal and neighboring communities.
- This study seeks to identify a range of potential transportation options to balance the need for Route 301 to safely move regional traffic through Port Royal with local access and circulation needs within the Town of Port Royal.

Figure 1. Route 301 – Port Royal Arterial Management Project Area Map



Source: Kittelson and Associates, Inc., 2018

Chapter 2

What is Route 301
through Port Royal like
today?

EXISTING CONDITIONS

The Study Team assessed land use context, transportation context, and public opinion to understand the diverse purposes that Route 301 serves as it runs through the Town of Port Royal.

QUESTIONS THIS CHAPTER ANSWERS >>>

- What existing land uses adjoin Route 301 through the Town of Port Royal today? What are Caroline County's and the Town's visions and plans for future land use changes along the study corridor?
- How does the transportation system perform today?
- What can safety and speed data tell us about how people experience the study corridor?
- Based on a public opinion survey, how does the study corridor serve the needs of local and regional users?

Situated along the Rappahannock River and Route 301, the rural Town of Port Royal is a unique, historically significant community. Some of the earliest inhabitants of the New World lived in this area, located in today's Caroline County and within the area organized through the George Washington Regional Commission. While Route 301 runs north-to-south through Virginia, carrying regional traffic between Southern Maryland and Richmond to and from I-95 and I-64 as well as Routes 1, 207, 2, 17, and 3. It also serves as the Town of Port Royal's main street. Regional congestion and incident-impacted traffic conflicts with comfort, convenience, and safety for local travel within the town for its 200 residents. The Study Team conducted an analysis of existing conditions to help inform and refine the study's goals and objectives. The existing conditions analysis detailed in the following section includes an overview of land use context, transportation context, and public feedback.

Land Use Context: Economic, Environmental, and Historic Resources

The Town of Port Royal is primarily residential, except for mixed residential and commercial land uses along Route 301. The Town recently annexed many of the commercial lands along Route 301 to extend services in support of commercial activity and to provide space for growth. The annexation also provides the Town with additional revenue from the commercial use and businesses operating along Route 301. Outside of the existing street grid in the town, most land uses are heavy forest and agriculture,



Town of Port Royal Residences

Source: Kittelson & Associates, Inc., 2019

with a large area directly to the east in protected easement. This effectively limits the growth area directly adjacent to existing residential areas and confines it to the area between Back Street and Route 17. Caroline County's current plans call for Port Royal's growth to occur to the west of Route 301 between the Rappahannock River and across Route 17 to Fort A.P. Hill (**Figure 2**). A new Planned Development zoning category was introduced in the 2004 plan as an alternative to low to medium density. It replaces the seven units per acre density to a flexible density, which allows for traditional neighborhood design (TND) and more sustainable footprint clusters with a requirement for 50% of developable land as open space. At the time of this study, the Town was updating its Comprehensive Plan, potentially integrating findings and proposals of this study as guidance for both public and private investment.

Port Royal's history and urban form are a major source of pride for the town and are considered assets to Virginia's broader preservation community. The town is included in the Rappahannock Indigenous Cultural Landscape project and was used as a port for tobacco crops in the early colonial era. One of the first-known American businesswomen, Dorothy Roy, held a franchise to operate a tobacco warehouse in the Town of Port Royal, and multiple properties have been listed on the National Register of Historic Places since 1970. Used as a blueprint by the designers of the Restoration of Williamsburg in the 1930s, the Town is working to preserve its remaining historic buildings, many of which date back to its significant colonial and Civil War periods.

The Town also sees economic development and growth potential related to its unique character and location along the Rappahannock River. Several planned developments have been completed or are underway. The property on the northeast corner of Route 301/Route 17—and another at Main Street and Back Street—have seen activity related to commercial development. Residential growth is also planned, with a townhouse development partially completed at Back Street and Market Street as well as a recent land sale west of Route 301. Each new development presents an opportunity to advance the Town's economic and preservation goals, bringing about new investment and revitalization.

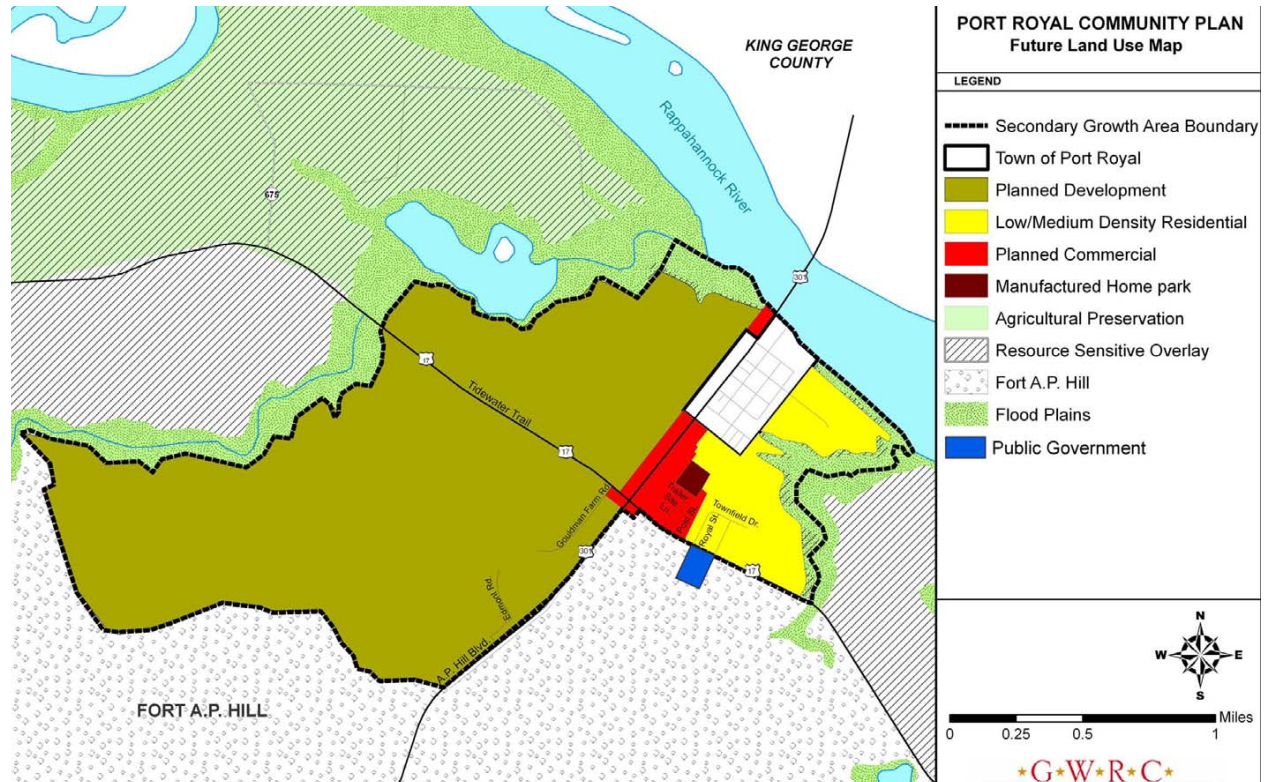


The Water Trail (top) and historic remains Dorothy Roy's Tobacco Warehouse (bottom) exemplify the Town's many natural and historic resources.

Source: Kittelson & Associates, Inc., 2019

Collaboration during this study has laid the groundwork for each partner to include transportation elements within its plans and guiding documents.

Figure 2. Port Royal Community Plan (2004)¹



Source: Caroline County, 2004

Transportation Context: Mobility/Access

Route 301 acts as the spine of Port Royal for approximately 1.7 miles, as most vehicles travel north or south through the town using this principal arterial. The town’s grid of local streets lies to the east of Route 301. King Street, Market Street, and Frederick Street sit parallel to Route 301. Besides many driveways directly on Route 301, the arterial intersects with five east-west local streets (from south to north): Back Street, Cumberland Street, Middle Street, Caroline Street, and Water Street. All of these intersections with Route 301 are minor stop controlled. A bridge over the Rappahannock River

¹ The Town of Port Royal’s boundaries have expanded since this 2004 plan was adopted. Refer to Figure 1 for the current Town Boundary.

is directly north of the town. South of the village area of Port Royal, Route 17 and Route 301 intersect at the only traffic signal.

Table 1 displays the major transportation facilities for this study.

Further beyond the immediate Port Royal area, I-95 and I-64 are within proximity, along with the Governor Harry W. Nice Memorial/Senator Thomas “Mac” Middleton Memorial Bridge (hereinafter referred to as the Nice Bridge) on Route 301, connecting Virginia commuters and travelers to the Washington, DC and Baltimore, Maryland regions. Widening and improvement projects that will double the number of lanes on the Nice Bridge are underway and projected to be open to traffic in 2023. Further information about the influence of the planned Nice Bridge widening on future traffic projections are considered in the transportation options for this study.

KEY TERMS >>>

- ▶ **Operations Analysis:** An evaluation of how a roadway or set of roadways function under existing and/or anticipated traffic and geometric conditions.

Table 1 Major Roadway Facilities

Roadway	Classification ¹	Number of Lanes	Speed Limit (mph)	Median	Sidewalks	Bicycle Lanes	On-Street Parking
Route 301	Other Principal Arterial	4	35 ³	Yes ⁴	No	No	No
Route 17	Other Principal Arterial	4 ²	35 ³	Yes ⁴	No	No	No

¹ Classifications based on VDOT’s 2014 Functional Classification Map.

² Route 17 is a two-lane roadway west of the Route 301/Route 17 intersection.

³ Route 301/Route 17 are only 35 MPH in the Town of Port Royal.

⁴ Route 301 has a median except for the town of Port Royal (between Route 17 and the bridge). Within the Town, the width of double yellow lines are approximately four feet.

⁵ Route 17 does not have a median west of the Route 301/Route 17 intersection.

Pedestrian and Bicycle Access

Due to commercial services and amenities on the west side of Route 301, residents in the Town of Port Royal walk along and across Route 301. The Post Office, located on the opposite side of Route 301 at Back Street, is a daily destination for many residents. Since the town does not have access to a US Postal Service mail truck for deliveries, residents on the east side cross Route 301 to send and retrieve mail, despite the lack of sidewalks and a crosswalk. The traffic signal at Route 301/ 17 does not include a pedestrian phase or marked crosswalks for walking or bicycling to local businesses.

Transportation Context: Existing Operations

Traffic counts were collected in November 2018. The weekday count represents the normal traffic that travels along the corridor. The weekend count was taken the Sunday after the Thanksgiving holiday and mimics the volumes of summer beach traffic that travels through Port Royal. During public outreach for the project, stakeholders and members of the public referenced summer beach

traffic as a contributing factor to congestion at the intersection of Route 301/Route 17. The Study Team was unable to collect traffic counts during the summer based on the study schedule, instead gathering traffic counts on the weekend following Thanksgiving as a substitute. The Study Team expected that more motorists would travel along Route 301 to regional destinations for the Thanksgiving holiday. As detailed in the following sections, the Study Team observed higher traffic volumes on Route 301/Route 17 during the Sunday data collection time period. Four intersections were counted along Route 301 and around Port Royal:

- Route 301/Route 17
- Route 301/Back Street
- Route 301/Caroline Street
- Route 301/Walsingham Road

Figure 3 shows the traffic count locations.

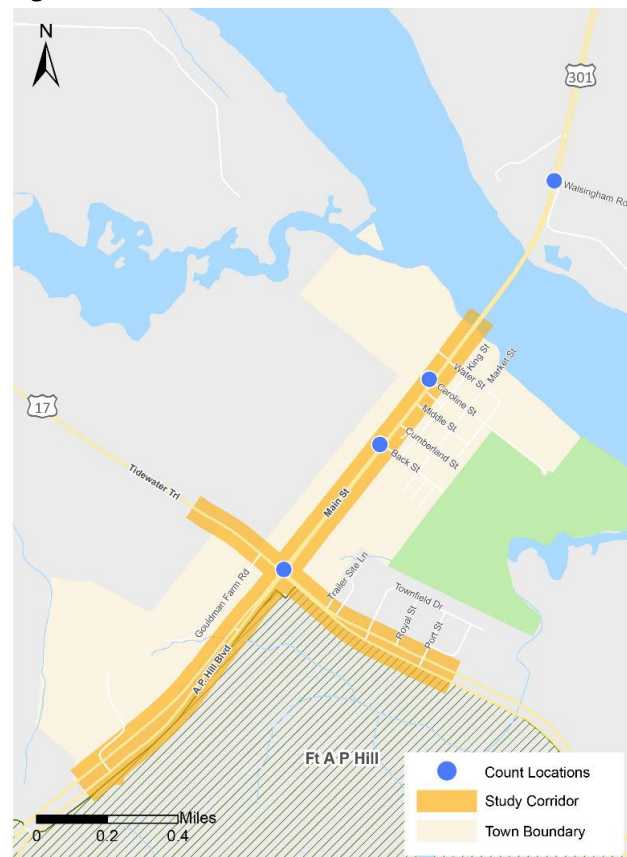
The system-wide AM and PM peak hours were found to occur between 6:30-7:30 AM and 4:15-5:15 PM, respectively. The Sunday worst-case peak hour occurred between 3:00-4:00 PM.

Traffic operations analyses were performed at study area intersections in accordance with the *2010 Highway Capacity Manual* using Synchro 9, except for Route 301/Route 17, which was analyzed in accordance with the *2000 Highway Capacity Manual*. Sim Traffic was also run for Route 301/Route 17 to simulate and report queuing. **Table 2** summarizes the operational analysis for the study intersections under the weekday AM, PM, and Sunday worst-case peak hour existing traffic conditions. The traffic counts can be found in **Appendix A**. The full analysis can be found in **Appendix B**.

KEY TERMS >>>

- ▶ **Peak Hour:** The time of day when demand for a transportation facility is highest and the ease with which vehicles can move through the transportation facility is most limited. Weekdays typically have two peak hours (AM and PM), while weekends have a single peak hour.

Figure 3. Traffic Count Locations



Most of the study intersections perform acceptably during each of the peak hours studied. Exceptions are described below:

- During the Sunday worst-case scenario, southbound vehicles turning left from Route 301 onto Route 17 exceed the length of the existing left-turn lane by around one vehicle.
- During the Sunday worst-case scenario, westbound vehicles waiting to turn left or right onto Route 301 from Back Street can wait as long as 97.4 seconds (over 1 minute) to turn onto Route 301. The number of vehicles waiting to turn onto Route 301 from Back street is very low.
- During the Sunday worst-case scenario, the westbound vehicles waiting to turn left or right onto Route 301 from Back Street can wait as long as 58.1 seconds (under 1 minute) to turn onto Route 301. The number of vehicles waiting to turn onto Route 301 from Caroline Street is very low.
- During the Sunday worst-case scenario, westbound vehicles waiting to turn left or right onto Route 301 from Walsingham Road may wait as long as 121.6 seconds (over 2 minutes) to turn onto Route 301. The number of vehicles waiting to turn onto Route 301 from Walsingham Road is very low.

KEY TERMS >>>

- ▶ **Delay:** The amount of time it takes vehicles to pass through an intersection (reported in seconds)
- ▶ **Level of Service:** A performance metric communicating quality of intersection service. LOS scores of A-D indicate acceptable quality (with A being the best), while LOS scores of E-F indicate poor quality.
- ▶ **Volume to capacity (v/c) ratio:** A ratio comparing the number of vehicles traveling through an intersection at a given point in time to the maximum capacity of the intersection. A v/c score of 1 or higher means that an intersection is at or above capacity. A v/c score below 1 means that an intersection is below capacity.
- ▶ **95th percentile queue length:** The worst-case queue length (number of vehicles waiting in a lane) during a given time period. These queues only have a five-percent probability of being exceeded.

Based on these findings, motorists traveling along or accessing Route 301 can do so at a reliable speed and without delay during most time periods, including the highest demand time periods on normal weekdays (i.e. AM and PM peak periods). On special event days, such as the Sunday after Thanksgiving or summer beach travel times, some motorists may experience less reliable travel times and increased delay on Route 301 through the Town of Port Royal. These include southbound motorists attempting to turn left onto Route 17 and proceed eastbound (towards Tappahannock) and motorists attempting to exit the Town of Port Royal from one of the five unsignalized intersections and from commercial access points located along Route 301 through town.

Table 2 Existing Conditions Operational Analysis

Intersection	peak Hour	Delay (sec)	Level of Service	v/c	95th Percentile Queues
Route 301 / Route 17	AM peak	24.4	C	0.44	No concerns*
	PM peak	25.2	C	0.53	No concerns*
	Sunday	42.6	D	0.84	SBL exceeds storage*
Route 301 / Back Street	AM peak	14.4	B	0.02	No concerns
	PM peak	13.5	B	0.01	No concerns
	Sunday	97.4	F	0.20	No concerns
Route 301 / Caroline Street	AM peak	0.0	A	0.00	No concerns
	PM peak	9.9	A	0.00	No concerns
	Sunday	58.1	F	0.03	No concerns
Route 301 / Walsingham Road	AM peak	10.1	B	0.00	No concerns
	PM peak	14.7	B	0.00	No concerns
	Sunday	121.6	F	0.12	No concerns

*95th percentile queues measured using SimTraffic 9

Transportation Context: Future Operations

In addition to considering existing traffic operations, the Study Team analyzed future traffic operations at the study area intersections. In coordination with VDOT, the Study Team identified a future design year and growth rates through which they could estimate and assess the influence of increased traffic volumes on the study intersections. The Study Team considered the following recent studies to develop the recommended design year and growth rate for the future operations analysis:

- US 301/Route 207 Arterial Preservation Plan (2018)
- Nice Bridge Improvement Project Study (2012)
- VDOT’s 2017 AADT Data for Caroline County
- VDOT’s 2045 AADT projections from the Statewide Planning System GIS dataset
- Weekday AM peak, PM peak, Friday afternoon, and Sunday afternoon traffic counts collected in Fall 2018 at the intersection of Route 301/Route 17

KEY TERMS >>>

- ▶ **Design Year:** Future year used to assess how existing traffic volumes will grow and influence a transportation network
- ▶ **Growth Rate:** Rate of growth applied to existing traffic counts to estimate how traffic volumes could increase in the future

The future operations analysis assumed a design year of 2035, a compound growth rate of 1.3% on Route 301, and a compound growth rate of 1% on Route 17. The analysis also assumed that no

changes would be made to the existing transportation network, providing an estimate of how the existing transportation network could operate in a “no build” scenario. **Appendix C** includes a full summary of the process to identify the future conditions design year and growth rate along with the results of the full future conditions analysis.

Traffic operations analyses were performed at study area intersections in accordance with the *2010 Highway Capacity Manual* using Synchro 9, with the exception of Route 301/Route 17, which was analyzed in accordance with the *2000 Highway Capacity Manual*. Sim Traffic was also run for Route 301/Route 17 to simulate and report queuing.

Table 3 summarizes the operational analysis for the study intersections under the weekday AM, PM, and Sunday worst-case peak hour future traffic conditions. The analysis was conducted assuming that no changes will be made to the current roadway network. The full analysis can be found in **Appendix C**.

Most of the intersections studied are forecast to perform acceptably during each of the peak hours studied with the few exceptions described below:

Route 301/Route 17

During the PM peak period, southbound vehicles turning left from Route 301 onto Route 17 are projected to exceed the length of the existing left-turn lane by around one vehicle.

During the Sunday worst-case scenario, southbound vehicles waiting to continue straight on Route 301 or turn right from Route 301 onto Route 17 are projected to wait in queues up to 3,000 feet long. These queues could extend along Route 301 into the historic portion of the Town of Port Royal, past the unsignalized intersection of Route 301/Cumberland Street. Due to these large queues, southbound vehicles waiting to turn left from Route 301 onto Route 17 are also projected to exceed the length of the existing left-turn lane. This lack of space for left turning vehicles causes vehicles traveling straight through the intersection to also experience delays, some exceeding four minutes (287.8 seconds). The intersection is also projected to operate over capacity (1.21 v/c ratio).

Route 301/Back Street

During the Sunday worst-case scenario, southbound vehicles waiting to continue straight on Route 301 are projected to wait in queues up to 1,300 feet long. These queues could extend farther north along Route 301 past the unsignalized intersection of Route 301/Caroline Street. The queues are likely exacerbated by projected delays and queuing at the signalized intersection of Route 301/Route 17. Due to large queues, westbound vehicles waiting to turn onto Route 301 from Back Street may not find a sufficient gap in traffic and could experience delays of over five minutes. The eastern leg of the intersection (Back Street) is also projected to operate over capacity (1.17 v/c ratio).

Route 301/Caroline Street

During the Sunday worst-case scenario, southbound vehicles waiting to continue straight on Route 301 are projected to wait in queues up to 800 feet long. These queues could extend farther north along Route 301 past Water Street to the Rappahannock River Bridge. The queues are likely exacerbated by projected delays and queueing at the signalized intersection of Route 301/Route 17. Due to large queues, westbound vehicles waiting to turn onto Route 301 from Caroline Street may experience delays of over five minutes.

Route 301/Walsingham Road

During the Sunday worst-case scenario, westbound vehicles waiting to turn from Walsingham Road onto Route 301 may experience delays of over five minutes.

Based on these findings, motorists traveling along or accessing Route 301 are projected to do so at a reliable speed and without delay during most time periods, including the highest demand time periods on normal weekdays (i.e. AM and PM peak Periods). On special event days, such as the Sunday after Thanksgiving or summer beach travel times, Route 301 through the Town of Port Royal is projected to experience long vehicle queues from Route 17 to the Rappahannock River Bridge. Without an alternative road to exit the Town of Port Royal's local roadway network, motorists attempting to exit the Town of Port Royal from one of the five unsignalized intersections or commercial access points located along Route 301 may experience delays of over five minutes.

Table 3 Year 2035 Future No Build Conditions Operational Analysis

Intersection	peak Hour	Delay (sec)	Level of Service	v/c	95th Percentile Queues
Route 301 / Route 17	AM peak	28.8	C	0.55	No concerns*
	PM peak	32.4	C	0.68	Southbound-left turn lane (SBL) exceeds storage*
	Sunday	157.8	F	1.21	SBL exceeds storage* Southbound through lane (SBT) and shared southbound through-right lane (SBTR) queues are projected to back up past Cumberland Street (~3,000 ft)*
Route 301 / Back Street	AM peak	21.7	C	0.03	No concerns*
	PM peak	20.7	C	0.01	No concerns*
	Sunday	**982.3	F	1.17	SBLT and SBT queues are projected to back up past Caroline Street*
Route 301 / Caroline Street	AM peak	0.0	A	0.00	No concerns*
	PM peak	11	B	0.00	No concerns*
	Sunday	**361.8	F	0.18	SBLT and SBT queues are projected to back up past Water Street*
Route 301 / Walsingham Road	AM peak	11.3	B	0.00	No concerns*
	PM peak	24.8	C	0.02	No concerns*
	Sunday	**1217.7	F	0.85	No concerns*

*95th percentile queues measured using SimTraffic 9

** Delay exceeds 300s

Transportation Context: Safety

The Study Team obtained and analyzed the most recent five years of complete crash data available for the Port Royal study area from VDOT's database. The crash data used were from January 1, 2013 to December 31, 2017; there were 56 reported crashes during this period.

Appendix D includes a full summary of the safety analysis along with the crash data used in the analysis.

Crash Trends

More than half (77%) of the crashes recorded resulted in property damage only, as shown in **Table 4**. No crashes resulted in a fatality, and only one (2%) crash resulted in a severe injury. Fewer fatal crashes (0%) and injury crashes (13%) occurred along the study corridor than statewide for roadways with the same functional classification as Route 301/Route 17 (Rural Other Principal Arterial—1% fatal crashes and 34% injury crashes).

Rear-end (29%), angle (29%), and fixed object–off road (16%) crashes represent the three largest proportions of crash types (**Figure 4**). Rear-end crashes accounted for 46% of all injury crashes on the corridor (**Figure 5**).

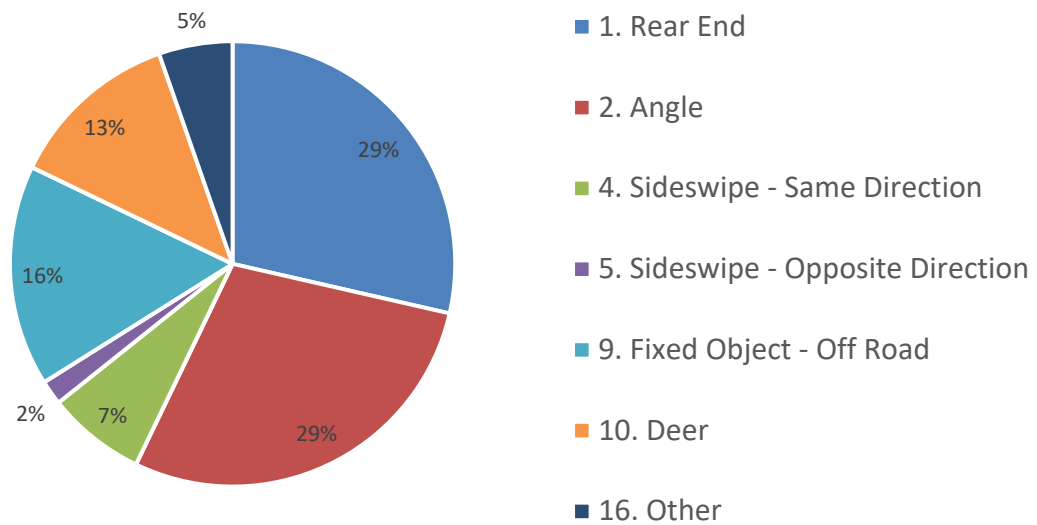
None of the study intersections were included in VDOT’s 2013-2017 Top 100 Potential for Safety Improvement (PSI) locations in the Fredericksburg District. Potential for Safety Improvement is a performance measure used by VDOT to prioritize statewide candidate intersections and roadway segments for safety funding. A high PSI score indicates that there are excess crashes compared to what is predicted under given similar conditions.

Table 4 Crash Severity, January 2013–January 2018

Crash Severity	Crash Count
Fatal	0 (0%)
Injury (Severe)	1 (2%)
Injury (Visible)	12 (21%)
Property Damage Only (PDO)	43 (77%)
Total Crashes	56 (100%)

Source: Virginia Department of Transportation, Kittelson and Associates, Inc., 2018.

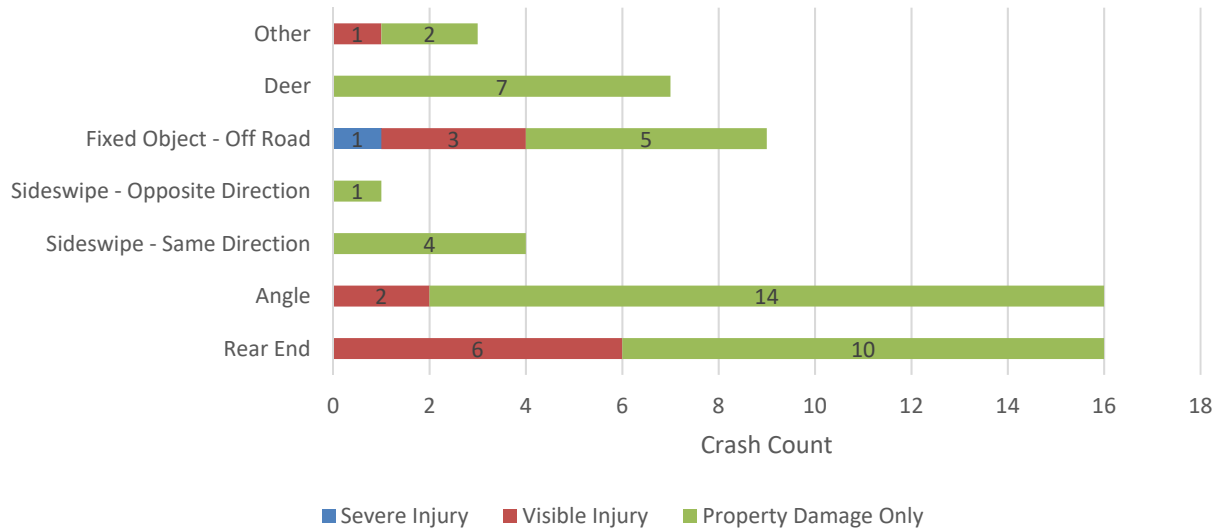
Figure 4 Vehicle Crash Types, January 2013-January 2018



*"Other" includes crash types that were categorized as "Other" or "Not Stated" in the data.

Source: Virginia Department of Transportation, Kittelson and Associates, Inc., 2018.

Figure 5 Reported Crashes by Crash Type and Severity, January 2013 - January 2018



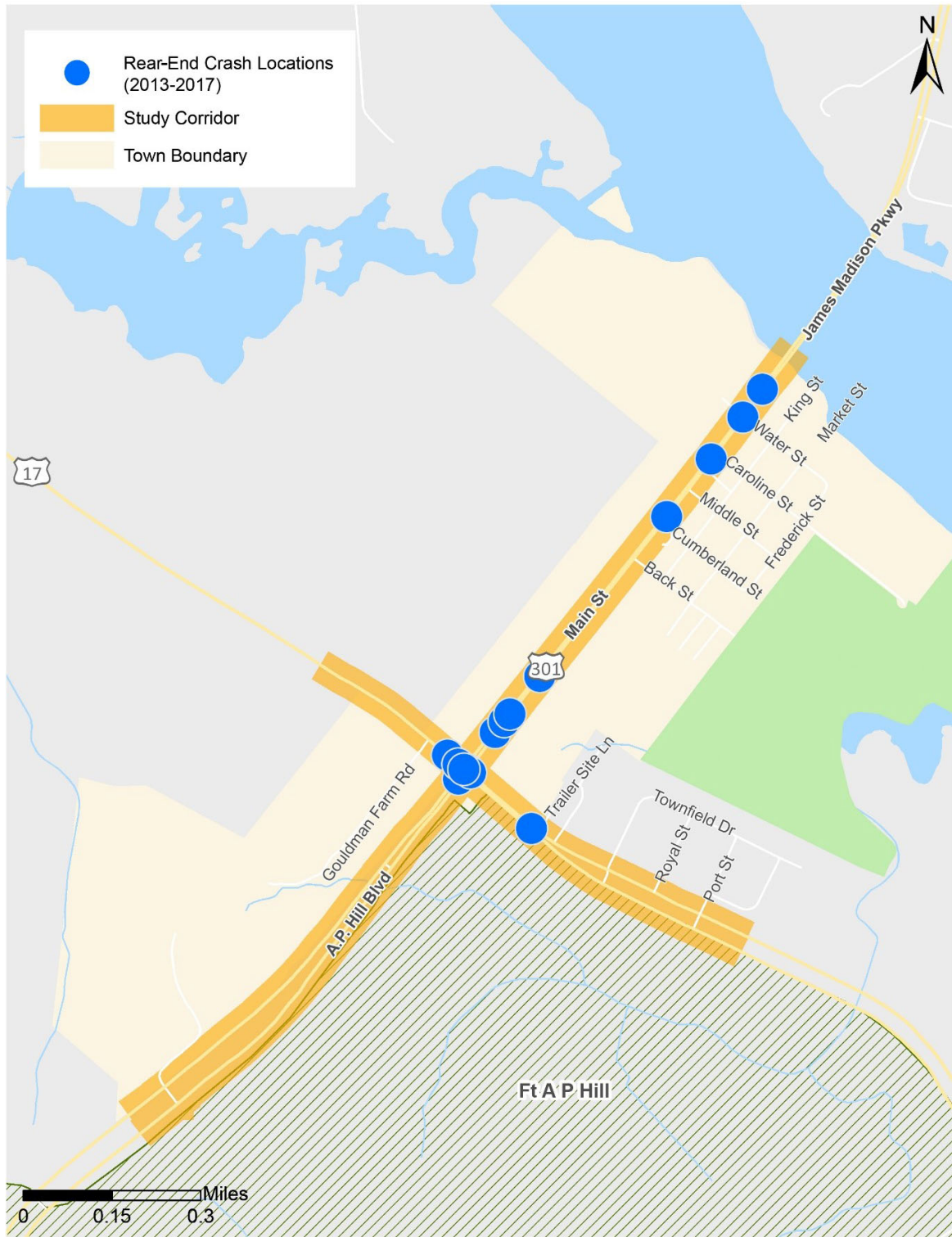
Source: Virginia Department of Transportation, Kittelson and Associates, Inc., 2018.

Crash Mapping

The Study Team mapped the crash types that represent the largest proportions or crash types on the study corridor: rear-end crashes and angle crashes. **Figure 6** illustrates rear-end crash locations, and **Figure 7** illustrates angle crash locations on the corridor.

Clusters of rear-end crashes occur at the intersection of Route 301/Route 17, just north of the intersection of Route 301/Route 17, and at historic Town of Port Royal access points. (Route 301/Water Street, Route 301/Caroline Street, and Route 301/Cumberland Street). Clusters of angle crashes occur at the intersection of Route 301/Route 17, on Route 17 east of Route 301, on Route 301 north of Route 17, and at the intersection of Route 301/Water Street (just south of the Rappahannock River Bridge). These clusters of rear-end and angle crashes may be related to queues at the intersection of Route 301/ Route 17 and/or to the speed differential between vehicles driving on Route 301 and vehicles turning onto and off of Route 301 to access local streets and businesses.

Figure 6 Rear-End Crashes, January 2013-January 2018



Source: Virginia Department of Transportation, Kittelson and Associates, Inc., 2018.

Figure 7 Angle Crashes, January 2013-January 2018



Source: Virginia Department of Transportation, Kittelson and Associates, Inc., 2018.

Transportation Context: Speed

VDOT conducted a 2015 speed study on a segment of Route 301 located 1,000 feet north of Route 17 and 1,320 feet south of Route 17. The results of the speed study are provided in **Table 5**. At the time the speed study was conducted, the posted speed in the speed study segment was 45 mph. The current posted speed through the Town of Port Royal is 35 mph. As shown in **Table 4**, the 85th percentile speed, median speed, mean speed, and pace speed all exceed the posted speed limit in the Town of Port Royal by 4 to 13 mph.

Since the 2015 speed study, VDOT has taken measures to increase motorist awareness of the reduced speed limit on Route 301 through the town of Port Royal. These measures include the addition of radar activated speed limit signs and optical speed bars (i.e. pavement markings) on Route 301 through the Town of Port Royal. These treatments were implemented in August 2018.



Radar-activated speed limit sign on Route 301 in the Town of Port Royal.

Source: Kittelson & Associates, Inc., 2019

Current speed data are needed to understand vehicle speeds through the Town of Port Royal under the current posted speed limit of 35 mph.

Table 5 VDOT Speed Study Results, April 2015

Speed Data	Results (mph)
85th Percentile Speed	47.4
Median Speed	42
Mean Speed	42.4
Pace Speed	39-48

Source: Virginia Department of Transportation, Kittelson and Associates, Inc., 2018.

Appendix E includes a full summary of the 2015 speed data analysis.

Community Context: Existing Conditions Public Outreach

The Study Team conducted an online public opinion survey about the study corridor in December 2018. The survey was made publicly available through VDOT social media accounts and was provided to participants in a Town of Port Royal listening session. 180 people responded to the survey. The

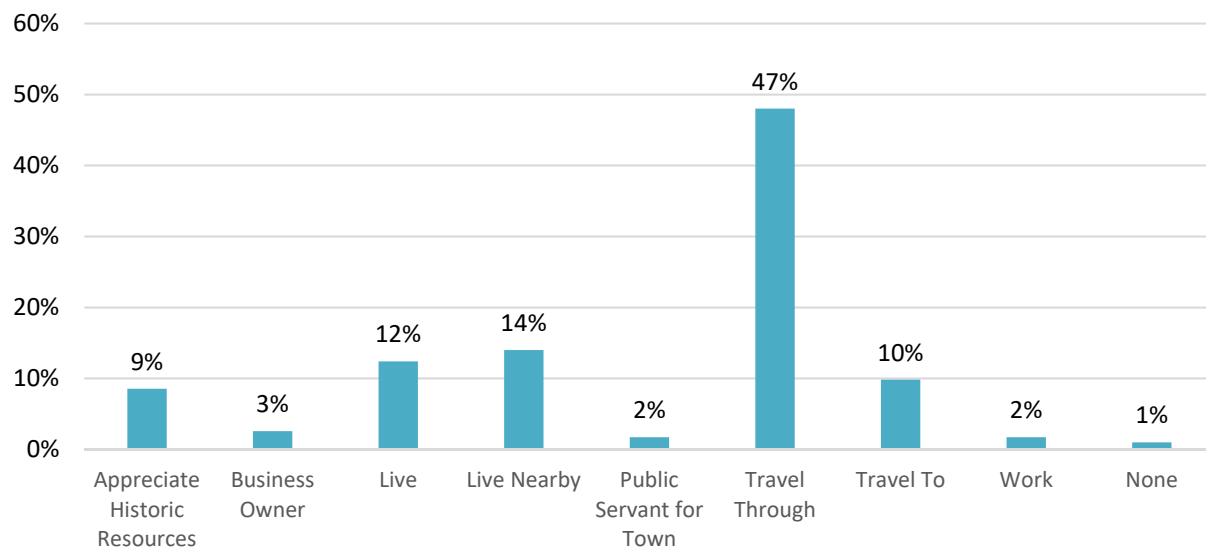
public opinion data allowed the Study Team to understand how survey participants feel about safety, access, and mobility on the Port Royal study corridor.

Appendix F includes a full summary of the December 2018 community outreach analysis.

Survey Findings

Nearly half (47%) of all survey participants self-reported that their primary relationship with Port Royal is that of a through traveler, while less than half (26%) of survey participants reported that they live in or near Port Royal (**Figure 8**).

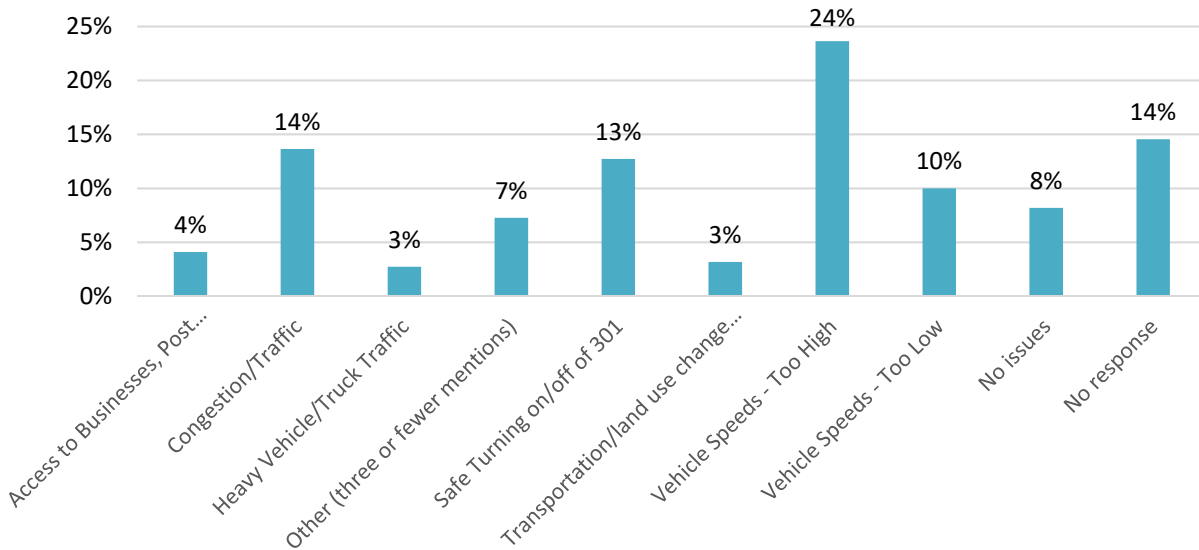
Figure 8 Relationship to Port Royal, December 2018



Source: Kittelson and Associates, Inc., 2019.

Of the options provided related to transportation concerns through Port Royal, high vehicle speeds (24%), congestion/traffic (14%), and safe turning on or off of Route 301 (13%) ranked highest (**Figure 9**).

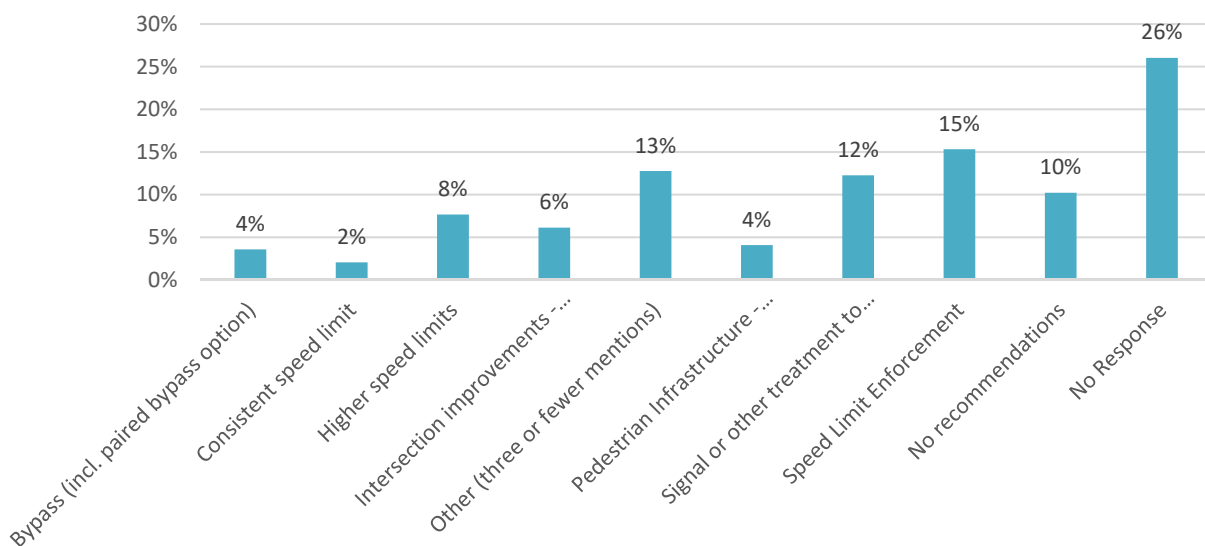
Figure 9 Biggest Transportation Concern about Route 301, December 2018



Source: Kittelson and Associates, Inc., 2019.

The highest percentage of responses to the survey question about desired improvements to Route 301 through the Town of Port Royal were non-respondents (26%). Speed limit enforcement (15%), treatments to allow safe turning onto and off of Route 301 (12%), and no recommended change (10%) represent the three largest proportions of desired improvements to Route 301 through the Town of Port Royal (**Figure 10**).

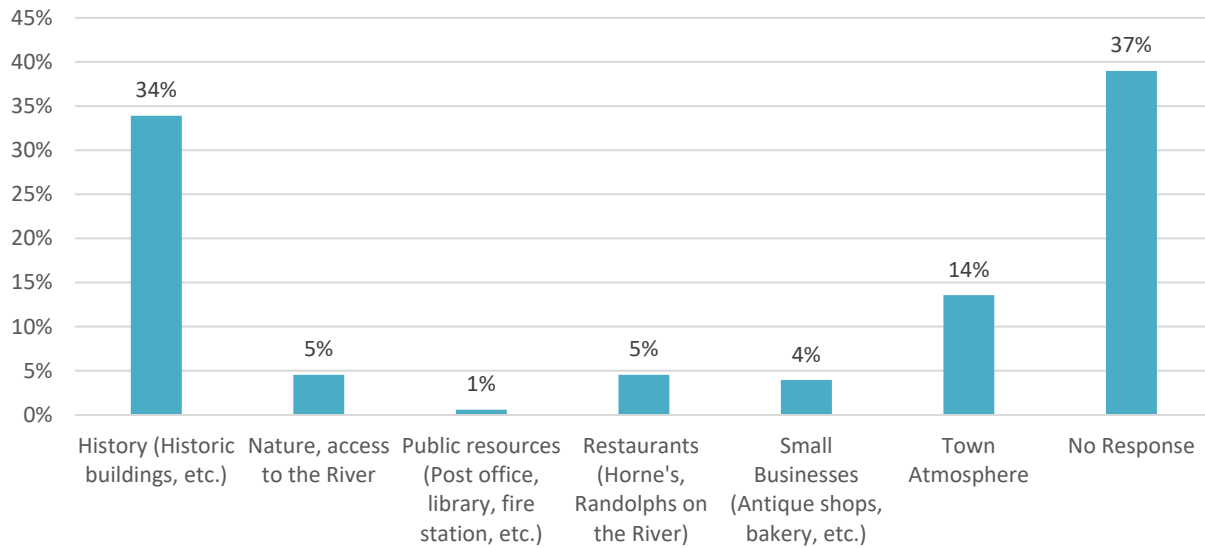
Figure 10 Desired Improvements to Route 301, December 2018



Source: Kittelson and Associates, Inc., 2019.

The highest percentage of responses to the survey question about the most valuable feature or features within the Town of Port Royal were non-respondents (37%). History (34%) and town atmosphere (14%) represent the two largest proportions of valued features within the Town of Port Royal (Figure 11).

Figure 11 Most valuable feature or features within the Town of Port Royal, December 2018



Source: Kittelson and Associates, Inc., 2019.

KEY TAKEAWAYS FROM THIS CHAPTER >>>

- The Town of Port Royal is an historic community with unique natural and cultural resources.
- Caroline County planning documents call for Port Royal's future growth to occur west of Route 301 between the Rappahannock River and across Route 17 to Fort A.P. Hill.
- An analysis of existing traffic operations at points along Route 301 show that Route 301 facilitates reliable travel through the town during most time periods.
- The existing traffic conditions analysis shows that travelers along Route 301 experience higher delays off-peak, during special event days (e.g. summer beach travel times). Delays are highest for southbound motorists turning left from Route 301 onto Route 17 and from local streets and businesses whose only access out is from Route 301 when queuing from the Route 17 blocks motorists attempting to turn left or right onto Route 301 from the Town of Port Royal.
- An analysis of future traffic operations at points along Route 301 is projected to facilitate reliable travel through the town during all but special event days (e.g. summer beach travel times, holiday weekends).
- The future traffic conditions analysis shows that during special event days (e.g. summer beach travel times), long queues and delays will influence travel for southbound motorists and motorists attempting to turn left or right onto Route 301 from the Town of Port Royal.
- 56 crashes occurred within the study area over the past five years, and over half of all crashes (77%) were property damage only crashes. The most common crash types that occurred within the study area were angle and rear-end crashes, which are likely related to vehicles turning onto and off of Route 301/Route 17 from lower speed roadways and commercial driveways. There were no fatal crashes.
- In 2018, VDOT lowered the speed limit on Route 301 through the Town of Port Royal from 45 mph to 35 mph and implemented radar-activated speed limit signs and optical speed bars to improve compliance with new posted speeds.
- Public interest in this study includes Town of Port Royal residents, Caroline County residents who live nearby, and motorists who regularly travel through Port Royal along Route 301.

Chapter 3

Study Goals, Objectives, and
Evaluation Criteria

CORRIDOR IMPROVEMENT GOALS, OBJECTIVES, AND EVALUATION CRITERIA

The existing conditions analysis and perspectives shared through the online survey and the December 2018 community meeting helped the Study Team identify issues along with a series of goals and objectives to address those issues.

QUESTIONS THIS CHAPTER ANSWERS >>>

- What goals and objectives emerged to meet the purpose and needs identified through the existing conditions analysis and preliminary round of public outreach?
- What evaluation criteria were established to evaluate and compare concepts developed through the study to meet goals and objectives.
- How do VDOT project evaluation criteria align with the study goals and objectives?

The Study Team identified issues associated with Route 301 through the Town of Port Royal through the existing conditions analysis and survey/community meeting participant perspectives. The following subsections summarize, at a high level, needs identified along the Route 301 Corridor that future investment in the corridor should address.

Purpose:

Route 301 is for most of its 42 miles a four-lane divided highway with long stretches of uncontrolled intersections. Its character changes substantially through the Town of Port Royal, where its four-lane cross-section is undivided, with businesses on shallow parcels whose driveways front directly onto Route 301. Route 301 provides the only point of access from the historic portion of town's perpendicular streets, all of which are stop controlled. Route 301 has no pedestrian or bicycle accommodation through the Town of Port Royal. Route 301's intersection with Route 17 is also critical to broader regional connectivity. Any improvements to the transportation system in general, and Route 301 in particular, must balance both the regional and local roles of the road and address the needs and deficiencies described in greater detail below.

Need: Mobility and Access

Congestion on the Route 301 corridor is focused around the intersection of Route 301/Route 17 during special event days (e.g. summer beach travel times, holiday weekends). In addition to conditions at Route 301/Route 17, motorists experience delay when attempting to turn onto or off Route 301 from the unsignalized intersections located along Route 301 through town. The lack of sidewalk or other curbside accommodation limits non-motorized users (i.e. bicyclists and pedestrians) travel along the Route 301 corridor.

Need: Safety

High speeds along the Route 301 corridor influence the perceived safety of motorists turning into and out of businesses on the Route 301 corridor through town. The difference in speeds between vehicles traveling on Route 301 and vehicles turning onto or off Route 301 from local streets or access driveways in the Town of Port Royal may contribute to the rear-end and angle crash clusters observed along the corridor. The lack of marked crossings at the Route 301/17 intersection and along Route 301 through town does not provide safe accommodation for pedestrians and other non-motorized traffic. Residents living in the historic portion of the Town of Port Royal reported living on one side of the highway and traveling to destinations on the other side on a daily basis.

Need: Community, Historic, and Natural Resources

Survey participants highlighted the importance of preserving and enhancing the Town of Port Royal's historic, community, and natural resources. Due to the few local options, residents within town and in neighboring communities expressed concern about losing area businesses and the Port Royal Post Office. Business owners on the Route 301 and Route 17 corridor expressed concerns about maintaining access to their properties.

Need: Economic Development

Community members, leaders, and stakeholders expressed a strong interest in advancing a cost-effective project that is likely to be funded and built using VDOT SMART SCALE funding.

The needs identified through the existing conditions analysis informed the project goals and objectives described in the following section.

Goals and Objectives

The Study Team used the issues identified through the existing conditions analysis and public outreach efforts as the foundation for the goals and objectives for the Port Royal Arterial Management Study:

- Goal 1: Enhance mobility for existing users and attract a wider range of potential users
- Goal 2: Promote safe travel options for all corridor users
- Goal 3: Invest in changes that build on existing community, historic, and natural resources

KEY TERMS >>>

- ▶ **SMART SCALE:** VDOT uses SMART SCALE to pick the right transportation projects for funding and ensuring the best use of limited tax dollars. Projects are selected for state funding based on an objective, outcome-based process.
- ▶ **Goal:** A desired result or outcome that an organization envisions, plans, and commits to achieve.
- ▶ **Objective:** A step an organization can take to achieve a goal. Effective objectives are specific, achievable, and measurable.

- Goal 4: Invest in multimodal improvements with a high return on investment

Goal 1: Enhance mobility for existing users and attract a wider range of potential users

This goal was selected based on an investigation of the town's existing and future transportation context. Motor vehicle mobility is projected to decline in a future no-build condition, particularly at the signalized intersection of Route 301/Route 17. Under current conditions, the motorized vehicle is the only transportation mode fully accommodated along Route 301 and Route 17, and through the Town of Port Royal. Route 301 is difficult to cross for all modes of travel, effectively dividing the Town of Port Royal into two halves.

In addition to the transportation context, community feedback included concerns about traffic backing up at Route 17/ Route 301 during summer beach travel days and being able to travel reliably and without delay along Route 301 to local and regional destinations.

Goal 1 Connections to SMART SCALE Scoring Criteria

While Goal 1 is aligned with the study area's unique characteristics, it also connects to VDOT SMART SCALE scoring criteria.

- Congestion Mitigation
 - Increase Person Throughput
 - Reduce Delay
- Accessibility
 - Increase Access to Multimodal Travel Choices
- Economic Development
 - Tons of Freight Goods Impacted
 - Improve Travel Time Reliability
- Environment
 - Potentially improve Air Quality

Goal 1 Objectives

The following objectives were established to meet Goal 1: Enhance mobility for existing users and attract a wider range of potential users:

- Reduce southbound left-turn backup at Route 301/Route 17 intersection
- Improve pedestrian curbside accommodation
- Reduce out of direction travel (driving and walking)

The study objectives directly relate to the evaluation criteria used during the transportation option development process. Since this study is the first step in the project development process, the Study Team used broad evaluation criteria to score identified transportation options at a high level. **Table 6** outlines the evaluation criteria for Goal 1.

KEY TERMS >>>

▶ **Reduces out of direction travel:** If an option “reduces out of direction travel,” it adds a link (road or sidewalk) to the transportation network that allows motorists or pedestrians to get to their destination more efficiently.

Table 6 Goal 1 Evaluation Criteria

Objective	Worse or ineffective	Moderate or little change	Better
Reduce southbound left-turn backup at Route 301/Route 17 intersection	Does not change southbound left-turn backup	Reduces southbound left-turn backup during most time periods	Reduces southbound left-turn backup during all time periods
Improve pedestrian curbside accommodation	Does not add pedestrian curbside accommodation	Adds pedestrian curbside accommodation on one side of Route 301 in project vicinity	Adds pedestrian curbside accommodation on both sides of Route 301
Reduce out of direction travel for residents (driving and walking)	Does not change existing travel patterns or increases out of direction travel	Decreases out of direction travel for one of two modes	Decreases out of direction travel for two of two modes

Goal 2: Promote safe travel options for all corridor users

This goal was selected based on an investigation of the town’s existing transportation context. Safety data highlights rear-end and angle crashes as the most common crash type on Route 301 through the town of Port Royal. Speed data from 2015 showed motorists traveling at higher 85th percentile speeds than the current 35 mph speed limit. Rear-end and angle crashes can be related to differences in speed when vehicles on higher order, higher speed streets (e.g. principal arterials, Route 301) interact with vehicles turning into or out from driveways and lower order, lower speed streets (e.g. local roads, Back Street, Caroline Street, Water Street).

In addition to the transportation context, community feedback included concerns about safely turning onto and off of Route 301 from the Town of Port Royal; safely accessing destinations across Route 301, such as the Post Office; and high motorist speeds on Route 301 through town.

Goal 2 Connections to SMART SCALE Scoring Criteria

While Goal 2 is aligned with the study area's unique characteristics, it also connects to VDOT SMART SCALE scoring criteria.

- Safety
 - Reduce Injury Crashes
 - Reduce Injury Crash Rate
- Accessibility
 - Increase Access to Multimodal Travel Choices
- Environment
 - Potentially improve Air Quality

Goal 2 Objectives

The following objectives have been established to meet Goal 2: Promote safe travel options for all corridor users:

- Improve safety for business egress, left turns on to Route 301
- Improve safety for business ingress from unprotected lefts
- Improve pedestrian/bicycle crossing safety
- Improve driver compliance with posted speeds between the Rappahannock River Bridge and Route 17

The study objectives directly relate to the evaluation criteria used during the transportation option development process. Since this study is the first step in the project development process, the Study Team used broad evaluation criteria to score identified transportation options at a high level. **Table 7** outlines the evaluation criteria for Goal 2.

Table 7 Goal 2 Evaluation Criteria

Objective	Worse or ineffective	Moderate or little change	Better
Improve safety for business egress, left turns (finding a safe gap)	Business egress left from businesses continues to require crossing traffic from both directions	Provides designated waiting places for business egress allowing two stage crossing	Provides designated and protected waiting places for business egress to enter traffic stream
Improve safety for business ingress from unprotected lefts	Left turning vehicles continue to use thru lanes to access businesses	Provides for right turns for most or all business ingress	Provides right turns and designated/protected waiting places for business ingress
Improve pedestrian/bicycle crossing safety	Does not provide designated safe pedestrian and bicycle crossing options	Adds designated bicycle and pedestrian crossing locations without sidewalk infrastructure	Adds designated bicycle and pedestrian crossing locations with sidewalk infrastructure
Improve driver compliance with posted speeds between the Rappahannock River Bridge and Route 17	Does not influence driver compliance with posted speeds	Modifies the roadway character to influence driver compliance	Significantly modifies the roadway character to influence driver compliance

Goal 3: Invest in changes that build on existing community, historic, and natural resources

This goal was selected based on an investigation of the town's land use context. The study area includes many unique community, historic, and natural resources. Community feedback included strong consensus on the historic and natural value of Port Royal and the surrounding environment. Local business owners expressed a strong desire to maintain access to existing businesses. Community members also expressed a desire for any changes to support the viability of Route 301 businesses and improve the function of drainage along Route 301 through town.

Goal 3 Connections to SMART SCALE Scoring Criteria

While Goal 3 is aligned with the study area's unique characteristics, it also connects to VDOT SMART SCALE scoring criteria.

- Economic Development
 - Increase Square Feet of Commercial/Industrial Uses
- Environment
 - Potential to Improve Air Quality
 - Reduce Potential to negatively impact Natural and Cultural Acreage

Goal 3 Objectives

The following objectives have been developed to address specific elements of Goal 3: Promote safe travel options for all corridor users:

- Enhance community character/maintain character defining features of the Natural Register Historic District (NRHD)
- Maintain access to local businesses
- Improve roadside drainage
- Enhance streetscapes (e.g. trees, landscaping)
- Private Property/Fiscal Value Benefit

The study objectives directly relate to the evaluation criteria used during the transportation option development process. Since this study is the first step in the project development process, the Study Team used broad evaluation criteria to score identified transportation options at a high level. **Table 8** outlines the evaluation criteria for Goal 3.

KEY TERMS >>>

- ▶ **Community Vision:**
Refers to community goals for the Town of Port Royal as defined in existing planning documents (e.g. Port Royal Community Plan). Community vision is one of the elements that the study team considered when evaluating transportation options based on the first objective for Goal 3: Enhance community character/maintain character defining features of the Natural Register Historic District (NRHD).

Table 8 Goal 3 Evaluation Criteria

Objective	Worse or ineffective	Moderate or little change	Better
Enhance community character/maintain character defining features of the Natural Register Historic District	Inconsistent with or alters existing community character, NRHD character defining features and community vision	Does not change existing community character/does not contribute to or detract from community vision or alter defining features of NRHD	Enhances existing community character, increases opportunities for preservation of NRHD character-defining features and advances community vision
Maintain access to local businesses	Reduces access to local businesses	Maintains or modest changes to local business access	Increases safe access to local businesses
Improve roadside drainage	Reduces drainage function	No change to drainage	Improves drainage in project area
Streetscape Enhancement (Trees, Landscaping)	Negatively impacts existing streetscape	Minor or no change to streetscape	Adds landscaping and streetscape amenities
Private Property/Fiscal Value Benefit	Reduces property access to highway	No or modest change to property access to highway	Increases property access to highway

Goal 4: Invest in multimodal improvements with a high return on investment

This goal was included to highlight cost-effective transportation options that are more likely to be funded through VDOT’s SMART SCALE program. Project funding is competitive and based on a high benefit to cost ratio. Transportation options in Goal 4 are defined as “multimodal improvements,” since the study goals could be met with options that affect a mix of transportation modes (e.g. motor vehicles, pedestrians).

Goal 4 Connections to SMART SCALE Scoring Criteria

While Goal 4 does not directly connect to VDOT SMART SCALE scoring criteria, it relates to VDOT’s method for ranking SMART SCALE projects. The SMART SCALE scoring criteria are used to help calculate a benefit score for transportation options. This benefit score is compared to the project cost to produce a benefit-cost ratio. Projects are ranked based on this ratio to identify transportation options that will ensure the best use of taxpayer dollars.

Goal 4 Objectives

The following objectives have been developed to address specific elements of Goal 4: Invest in multimodal improvements with a high return on investment:

- Implementation duration
- Project cost
- Private property impacts

The study objectives directly relate to the evaluation criteria used during the transportation option development process. Since this study is the first step in the project development process, the Study Team used broad evaluation criteria to score identified transportation options at a high level. **Table 9** outlines the evaluation criteria for Goal 4.

Table 9 Goal 4 Evaluation Criteria

Objective	Worse or ineffective	Moderate or little change	Better
Implementation Duration	Long Project Duration (7 + Years)	Moderate Project Duration (4-7 Years)	Short Project Duration (0-4 Years)
Project Cost	High Project Cost ^{1, 2}	Moderate Project Cost ^{1, 2}	Low Project Cost ^{1, 2}
Private Property Impacts	High Property Impacts ³	Moderate Property Impacts ³	Few Property Impacts ³

¹For intersection projects: High (> \$5M), Moderate (\$2M - \$5M), Low (\$0M - \$2M)

²For roadway segment projects: High (> \$40M), Moderate (\$10M - \$40M), Low (\$0M - \$10M)

³For intersection and roadway segment projects: High (> 50,000 square feet), Moderate (10,000 – 50,000 square feet), Low (0 – 10,000 square feet)

KEY TAKEAWAYS FROM THIS CHAPTER >>>

- The study team built on an existing conditions analysis and community outreach effort to identify key issues associated with Route 301 through the Town of Port Royal.
- Issues identified by the study team were used to develop four goals related to mobility and access; safety, community, historic, and natural resources; and economic development.
- Objectives and evaluation criteria related to each goal may be used to evaluate and rank the transportation options developed through this study.

Chapter 4

Transportation Options
for Route 301 through
Port Royal

TRANSPORTATION OPTIONS FOR ROUTE 301 THROUGH PORT ROYAL

With the study goals and objectives in mind, the Study Team developed several transportation options for Route 301 through the Town of Port Royal.

QUESTIONS THIS CHAPTER ANSWERS >>>

- What transportation options were developed through the Route 301 – Port Royal Arterial Management Study that are feasible and potential candidates for further development?
- How does each transportation option meet the goals and objectives of the study?
- How did community members from the Town of Port Royal respond to each transportation option?
- How could each transportation option score in the SMART SCALE funding process?

The Study Team identified and assessed six project options that, individually and grouped together, address study area needs and goals. They are organized according to the two specific areas of need. The first set of options focuses on the intersection of Route 301/Route 17, an important intersection along Route 301 for traffic movement to and from Virginia’s Tidewater areas as an alternative to I-64. The second set of options focuses on Route 301’s half-mile section through the Town of Port Royal’s historic street network and concentration of strip commercial businesses (restaurants, antique dealers, automotive services) and civic buildings (Museum, Fire House, Town Hall/Library, US Post Office). The options for each area of need include:

Intersection of Route 301/Route 17

- Intersection Modification
- Quadrant Roadway
- Market Street Extension

Route 301 through Town

- Two-Way Left-Turn Lane
- Full Raised Median
- One-way Pair “Couplet”

After developing each project option, the Study Team developed cost estimates and assessed their performance based on the study goals, objectives, and SMART SCALE criteria. The Study Team also collected community feedback on each option during public meetings that occurred in June 2019.

Appendix G includes the cost estimates for each option. **Appendix H** includes the traffic operational analysis for each option. **Appendix I** includes detailed community feedback from the June 2019 public meetings. **Appendix J** includes SMART SCALE summary sheets for each option.

Intersection of Route 301/Route 17

The following transportation options focus on the intersection of Route 301/Route 17:

- Intersection Modification
- Quadrant Roadway
- Market Street Extension

Intersection Modification

This option addresses concerns about future delays and queueing at the intersection of Route 301/Route 17 by optimizing the signal, adding an additional southbound left-turn lane on Route 301, providing a dedicated westbound left-turn lane on Route 17, and adding pedestrian accommodations (e.g. crosswalks and ADA-accessible curb ramps) at all four corners of the intersection. **Figure 12** shows a conceptual plan-view of the Intersection Modification option.

The following sections explain how this option relates to each of the study goals, objectives, and evaluation criteria.

Mobility

Future year traffic operations analyses were performed at the study area intersections to understand how the Intersection Modification option could influence the first mobility objective: reduce southbound left-turn back-up at the intersection of Route 301/Route 17. **Table 10** summarizes the operational analysis for the study intersections under the weekday AM, PM, and Sunday worst-case peak hour future traffic conditions. The full analysis can be found in **Appendix H**.

The intersection of Route 301/Route 17 is projected to perform acceptably during each of the peak hours studied. The Intersection Modification is projected to reduce the southbound left-turn backup during all time periods studied and to reduce southbound through and southbound through-right queues well before the nearest unsignalized intersection in the Town of Port Royal (Route 301/Back Street).

Table 10 Intersection Modification Future Year Operational Analysis

Intersection	Peak Hour	Delay (sec)	Level of Service	v/c	95th Percentile Queues
Route 301/Route 17	AM peak	23.4	C	0.49	No concerns*
	PM peak	23.6	C	0.57	No concerns*
	Sunday	48.8	D	0.96	No concerns*

*95th percentile queues measured using SimTraffic 9

The Intersection Modification project adds pedestrian curbside accommodation in a limited section of the study area (i.e., the intersection of Route 301/Route 17). By doing so, it decreases out of direction travel for one of two modes (i.e. pedestrians).

Safety

Since the Intersection Modification project focuses on a discrete part of the full study corridor, it is not projected to have a substantial effect on the following safety objectives:

- Improve safety for business egress, left turns (access management)
- Improve safety for business ingress from unprotected lefts
- Improve Route 301 pedestrian/bicycle crossing safety
- Improve driver compliance with posted speeds between the Rappahannock River Bridge and Route 17

Community/Historic/Natural/Civic/Economic Resources

The Intersection Modification will not change the Town of Port Royal's existing community character, contribute to or detract from the community vision, or alter defining features of the National Register Historic District. It will maintain access to local businesses, will not change the existing drainage function, will result in minor changes to existing streetscape, and will not change property access to adjoining highways (i.e. Route 301/Route 17).

Cost Effectiveness

The Intersection Modification option is estimated to be of short duration (0 to 4 years for preliminary engineering, right-of-way and utility relocation, and construction). It is estimated to have a moderate cost (\$3M to \$4M) and moderate right-of-way impacts (19,000 square feet). Estimated costs are reported in 2019 dollars and do not account for future inflation.

Community Feedback

During a June 2019 public meeting, citizens of the Town of Port Royal were provided with a chance to rank each transportation option based on whether they "like," "dislike," or have "no preference" about the transportation option. Eleven meeting participants liked the option, three meeting participants disliked the option, and one meeting participant had no preference about the option. Based on this community feedback, the Intersection Modification option received net positive feedback. **Appendix I** includes detailed community feedback from the June 2019 public meetings.

Figure 12 Intersection Modification – Conceptual Plan-View



JUNE 2019 PUBLIC MEETING FEEDBACK >>>

Participants liked the intersection modification because:

- *“Supports businesses: restaurant, antique stores, and museum traffic heading north and south”*
- *“Least disturbance, probably least expensive”*
- *“Anytime you improve an existing intersection traffic flows better and safer. This plan would cost less, it is safer and is best possible solution”*

Potential SMART SCALE Application

The Study Team developed SMART SCALE summary sheets for each transportation option to estimate how each transportation option could score under the current VDOT SMART SCALE criteria and benefit-cost ratio ranking process. The Intersection Modification option is predicted to achieve a high benefit-cost ratio based on the study criteria outlined in the preceding sections and the SMART SCALE summary sheet found in **Appendix J**.

Quadrant Roadway

This option addresses concerns about future delays and queueing at the intersection of Route 301/Route 17 by building a new connector “Quadrant Roadway” in the northeast corner of the Route 301/Route 17 intersection. The Quadrant Roadway would be designed to serve northbound and southbound left turns. This project diverts heavy southbound left-turn volumes prior to Route 301/Route 17, reduces the number of signal phases and cycle length at Route 301/Route 17, and provides two new coordinated signals at the secondary connections. It also adds pedestrian accommodations. **Figure 13** shows a conceptual plan-view of the Quadrant Roadway option.

The following sections explain how this option relates to each of the study goals, objectives, and evaluation criteria.

Mobility

The southbound left-turning movement on Route 301 was analyzed with two 250-foot turn lanes to accommodate summer seasonal traffic. The connector roadway was analyzed as a three-lane road with two inner loop (clockwise) lanes and one outer loop (counter-clockwise) lane. Three different alternatives were analyzed: (1) diverting only southbound lefts from Route 301, (2) diverting southbound and northbound lefts from Route 301, and (3) diverting all lefts at the intersection onto the Quadrant Roadway. Operational results determined the second alternative to be the most effective. A plan view showing how vehicles would navigate the second alternative is provided in **Figure 14**.

The Quadrant Roadway was analyzed in accordance to the VDOT *Traffic Operations and Safety Analysis Manual*, and traffic operations were performed in Synchro 10 using the *2000 Highway Capacity Manual*. To appropriately compare the network effects, the total delay for the diverted left movements were calculated by summing the delay through each intersection plus the extra distance travel time, seen in **Figure 14**. **Table 11** provides a summary of the analysis, and the full analysis can be found in **Appendix H**.

Table 11 Route 301/Route 17 Quadrant Roadway Operations Analysis – Northbound (NB)/Southbound (SB) Diverted Lefts

Intersection	Peak Hour	Delay (sec)	Level of Service	v/c	95th Percentile Queues
Route 301/Route 17	AM peak	20.8	C	0.29	No concerns
	PM peak	21.2	C	0.44	No concerns
	Sunday	21.6	C	0.71	No concerns
Route 301/Quadrant Roadway	AM peak	5.7	A	0.22	No concerns
	PM peak	3.8	A	0.32	No concerns
	Sunday	18.8	B	0.76	No concerns
Route 17/Quadrant Roadway	AM peak	10.0	A	0.14	No concerns
	PM peak	19.9	B	0.20	No concerns
	Sunday	10.3	B	0.36	No concerns

*95th percentile queues analyzed using SimTraffic 10

As seen in **Table 11**, the delay and level of service (LOS) for the quadrant road remains nearly the same for all peak hours. As seen in **Table 12** the signalized intersection delay and LOS degrade compared to the quadrant road during the Sunday peak hour but remain the same during the AM and PM peak hours. For the Quadrant Roadway, the queues at all approaches and at all intersections are serviced in one cycle and do not exceed the provided storage lengths.

As seen in **Table 12**, the quadrant road uses two additional intersections (seen in **Figure 14**) to consistently balance the delay at all approaches for all three analyzed peak hours, despite the traffic volume differences.

Table 12 Route 301/Route 17 Quadrant Roadway Operations Analysis – Northbound (NB)/Southbound (SB) Diverted Lefts

Movement	AM Peak Hour		PM Peak Hour		Sunday Peak Hour	
	Intersection Modification	Quadrant Roadway	Intersection Modification	Quadrant Roadway	Intersection Modification	Quadrant Roadway
NB Delay (sec)	26.2	6.8	25.2	7.8	61.2	10.8
SB Delay (sec)	19.5	15.1	20.8	20.7	36.1	25.5
EB Delay (sec)	21.0	42.8	26.6	43.2	54.7	46.0
WB Delay (sec)	28.8	30.2	31.4	30.2	45.7	31.6

As seen in **Table 12**, the delay for all approaches remains nearly the same for all peak hours when the intersection is a quadrant road, while the approach delay can vary depending on the peak hour when the intersection is a signalized intersection.

Note that the northbound left movement for the quadrant road takes approximately 120 seconds (including delay at four intersections plus travel time on three segments) for all analyzed time periods, while the traffic signal causes the same movement to experience approximately 100 seconds during the morning and evening peak hours and 75 seconds during the Sunday peak hour. The southbound left movement for the quadrant road takes approximately 70 seconds (including delay at two intersections plus travel time on one segment) for all analyzed periods, while the traffic signal causes the same movement to experience approximately 90 seconds of delay during the Sunday peak hour, 50 seconds during the PM peak hour, and 35 seconds during the AM peak hour. The consistent travel time shows that the Quadrant Roadway balances the delay for all movements while minimizing the overall corridor delay.

The quadrant is projected to reduce the southbound left-turn backup during all time periods studied and to reduce southbound through and southbound through-right queues well before the nearest unsignalized intersection in the Town of Port Royal (Route 301/Back Street). The Quadrant Roadway adds pedestrian curbside accommodation in a limited section of the study area (i.e., the intersection of Route 301/Route 17). By doing so, it decreases out of direction travel for one of two modes (i.e., pedestrians).

Safety

Since the Quadrant Roadway project focuses on a discrete part of the full study corridor, it is not projected to have a substantial effect on the following safety objectives:

- Improve safety for business egress, left turns (access management)
- Improve safety for business ingress from unprotected lefts
- Improve Route 301 pedestrian/bicycle crossing safety
- Improve driver compliance with posted speeds between the Rappahannock River Bridge and Route 17

Community/Historic/Natural/Civic/Economic Resources

The Quadrant Roadway will not change the Town of Port Royal's existing community character, contribute to or detract from the community vision, or alter defining features of the National Register Historic District. It will maintain access to local businesses, will not change the existing drainage function, will result in minor changes to existing streetscape, and will increase property access to adjoining highways (i.e. Route 301/Route 17).

Cost Effectiveness

The Quadrant Roadway option is estimated to be of moderate duration (4 to 7 years for preliminary engineering, right-of-way and utility relocation, and construction). It is estimated to have a high cost (\$6M to \$9M) and moderate right-of-way impacts (43,000 square feet). Estimated costs are reported in 2019 dollars and do not account for future inflation.

Community Feedback

During a June 2019 public meeting, citizens of the Town of Port Royal were provided with a chance to rank each transportation option based on whether they “like,” “dislike,” or have “no preference” about the transportation option. One meeting participant liked the option, ten meeting participants disliked the option, and four meeting participants had no preference about the option. Based on this community feedback, the Quadrant Roadway option received net negative feedback. **Appendix I** includes detailed community feedback from the June 2019 public meetings.

JUNE 2019 PUBLIC MEETING FEEDBACK >>>

Participants disliked the quadrant roadway because:

- *“Confusing to drivers”*
- *“This plan slows traffic and stops traffic with two additional traffic lights. It just does not work and is unsafe because of backups on Route 301. Costs more than improvement at existing intersection plan”*
- *“Against new “cut through” taking private property”*

Potential SMART SCALE Application

The Study Team developed SMART SCALE summary sheets for each transportation option to estimate how each transportation option could score under the current VDOT SMART SCALE criteria and benefit-cost ratio ranking process. The Quadrant Roadway option is predicted to achieve a moderate benefit-cost ratio based on the study criteria outlined in the preceding sections and the SMART SCALE summary sheet found in **Appendix J**.

Figure 13 Quadrant Roadway – Conceptual Plan-View

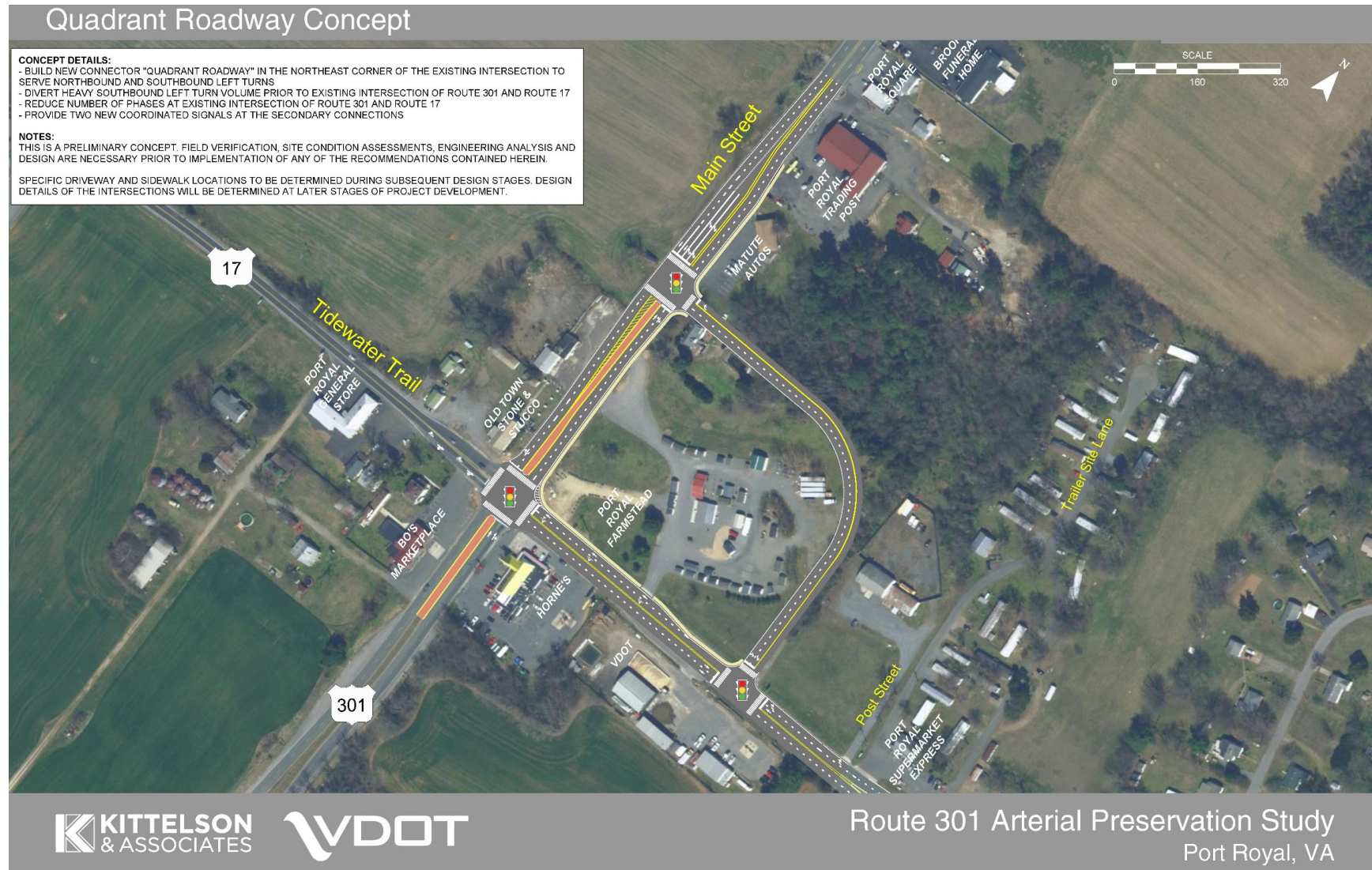
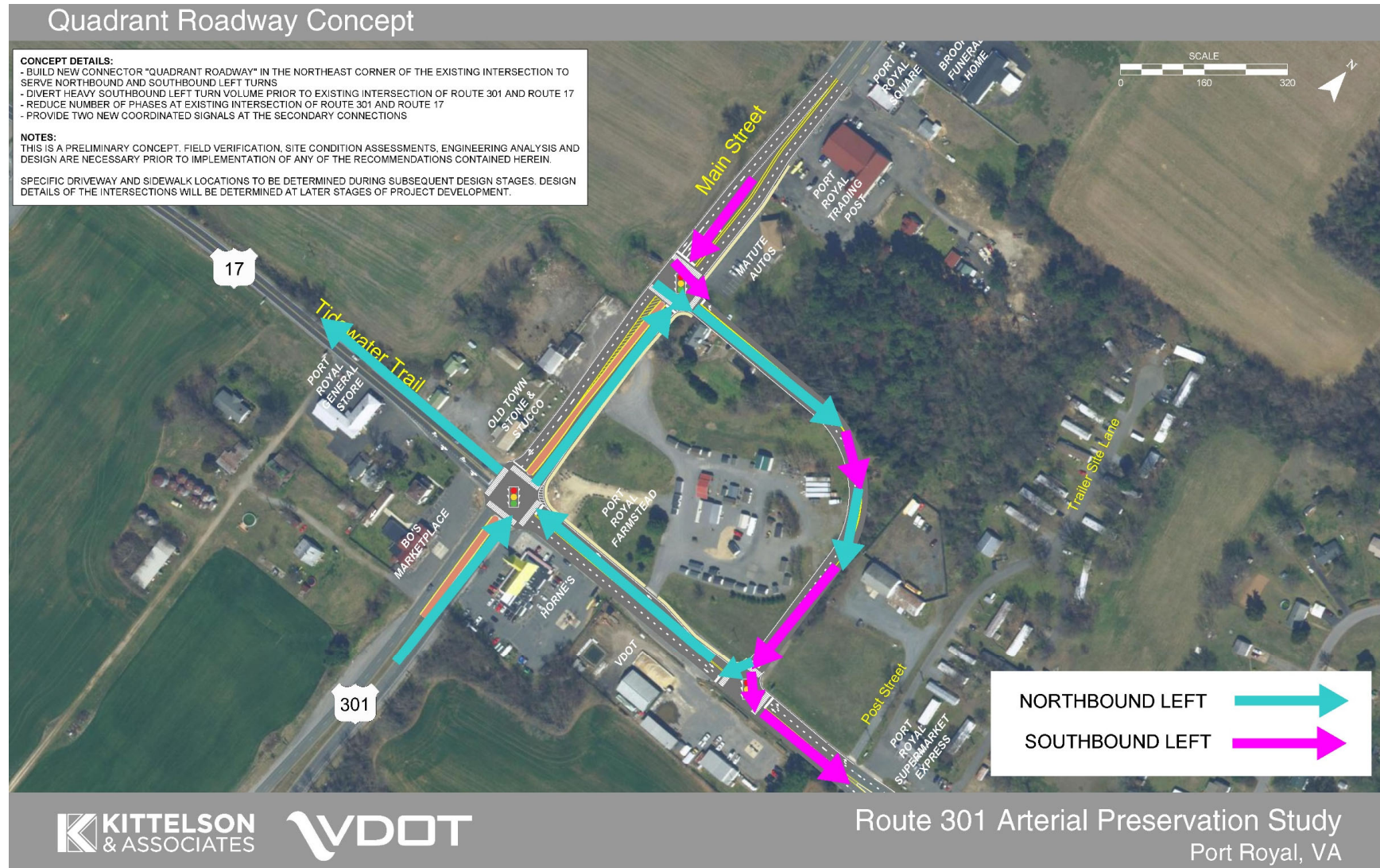


Figure 14 Navigating the Quadrant Roadway – Conceptual Plan-View



Market Street Extension

This option would extend Market Street south to Route 17, providing increased connectivity to the Town of Port Royal. **Figure 15** shows a conceptual plan-view of the Market Street Extension option connecting directly to Route 17. This option may also be combined with the Quadrant Roadway option, as shown in **Figure 16**.

The following sections explain how this option relates to each of the study goals, objectives, and evaluation criteria.

Mobility

The Market Street Extension will provide southbound motorists from the Town of Port Royal with an alternate means of accessing Route 17 and Route 301. Instead of waiting to turn on Route 301 from the Town of Port Royal, local travelers can use Market Street to turn onto Route 17 and travel to points south, east, and west. Diverting this local traffic would reduce southbound queuing at the intersection of Route 301/Route 17 during most time periods. Queues at the unsignalized intersections on Route 301 through the Town of Port Royal would also be reduced. The combined Market Street and Quadrant Roadway option would reduce southbound queuing at the intersection of Route 301/Route 17 during all time periods.

The Market Street Extension does not add pedestrian curbside accommodation. By creating a new link to Route 17, the Market Street Extension decreases out of direction travel for one of two modes (i.e., motorists).

The combined Market Street and Quadrant Roadway option adds pedestrian curbside accommodation in a limited section of the study area (i.e., the intersection of Route 301/17). Combined with the new Market Street link to Route 17, it decreases out of direction travel for two of two modes (i.e., pedestrians and motorists).

Safety

Since the Market Street Extension project does not include changes to Route 301, it is not projected to have a substantial effect on the following safety objectives:

- Improve safety for business ingress from unprotected lefts
- Improve Route 301 pedestrian/bicycle crossing safety
- Improve driver compliance with posted speeds between the Rappahannock River Bridge and Route 17

The Market Street Extension would allow residents the option of turning right onto Route 17 rather than left onto Route 301. This alternative would provide a safety benefit for business egress because

it provides motorists with an alternative to turning left onto Route 301 and crossing traffic from both directions at once.

Community/Historic/Natural/Civic/Economic Resources

The Market Street Extension will enhance the Town of Port Royal's existing community character, advance the community vision, and increase opportunities to preserve the National Register Historic District. It will increase safe access to local businesses, will not change the existing drainage function, will result in minor changes to existing streetscape, and will increase property access to adjoining highways (i.e. Route 301/Route 17).

Cost Effectiveness

The Market Street Extension is estimated to be of moderate duration (4 to 7 years for preliminary engineering, right-of-way and utility relocation, and construction). It is estimated to have a high cost (\$5M to \$7M) and high right-of-way impacts (87,000 square feet). Estimated costs are reported in 2019 dollars and do not account for future inflation.

Community Feedback

During a June 2019 public meeting, citizens of the Town of Port Royal were provided with a chance to rank each transportation option based on whether they "like," "dislike," or have "no preference" about the transportation option. Two meeting participants liked the option, eleven meeting participants disliked the option, and two meeting participants had no preference about the option. Based on this community feedback, the Market Street Extension option received net negative feedback. **Appendix I** includes detailed community feedback from the June 2019 public meetings.

JUNE 2019 PUBLIC MEETING FEEDBACK >>>

Participants disliked the Market Street Extension because:

- *"Leave historic town as is"*
- *"Does not solve anything"*
- *"Do not want Market Street extended due to cut through/increased traffic in residential area"*

Figure 15 Market Street Extension – Conceptual Plan-View

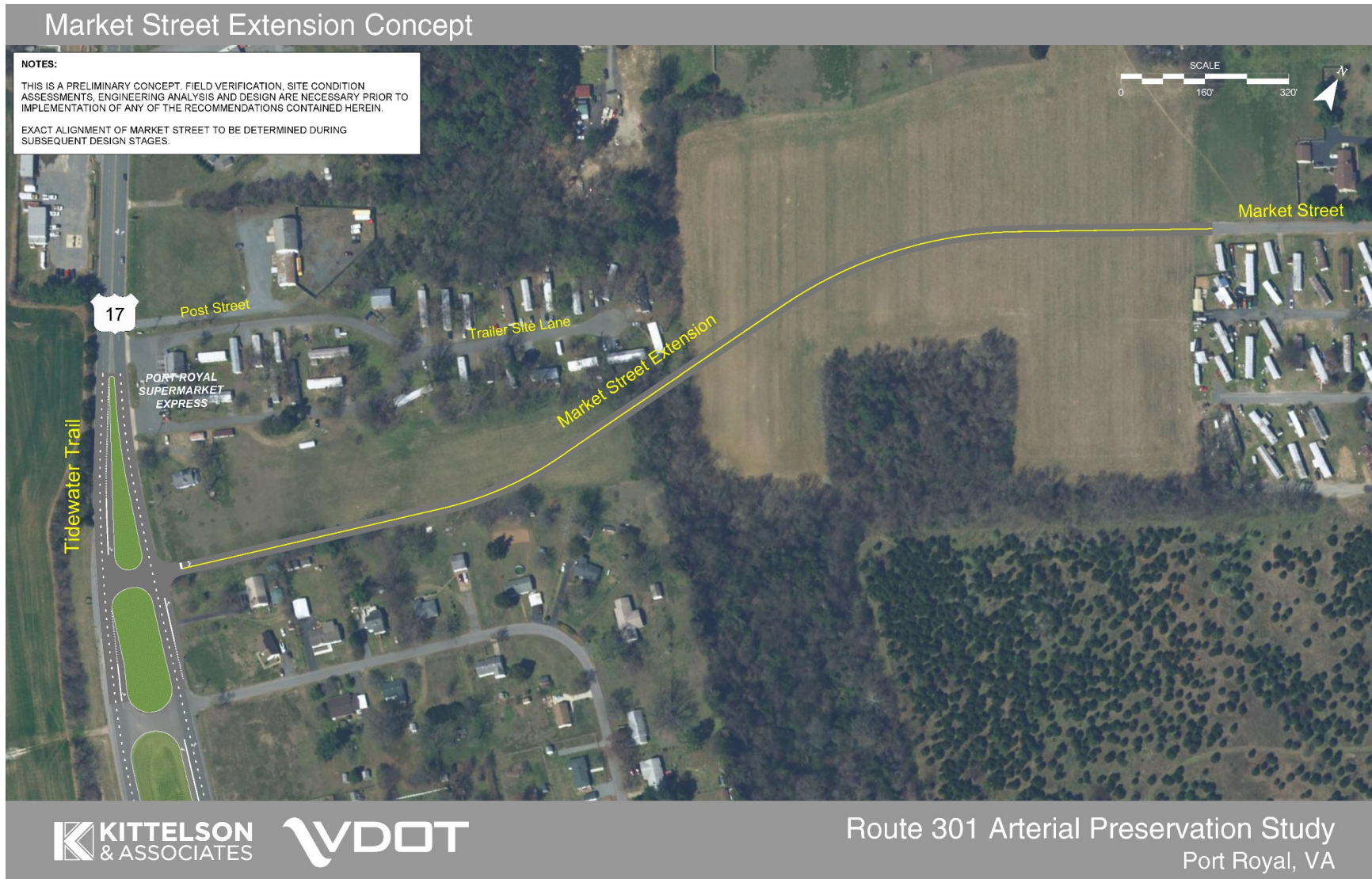
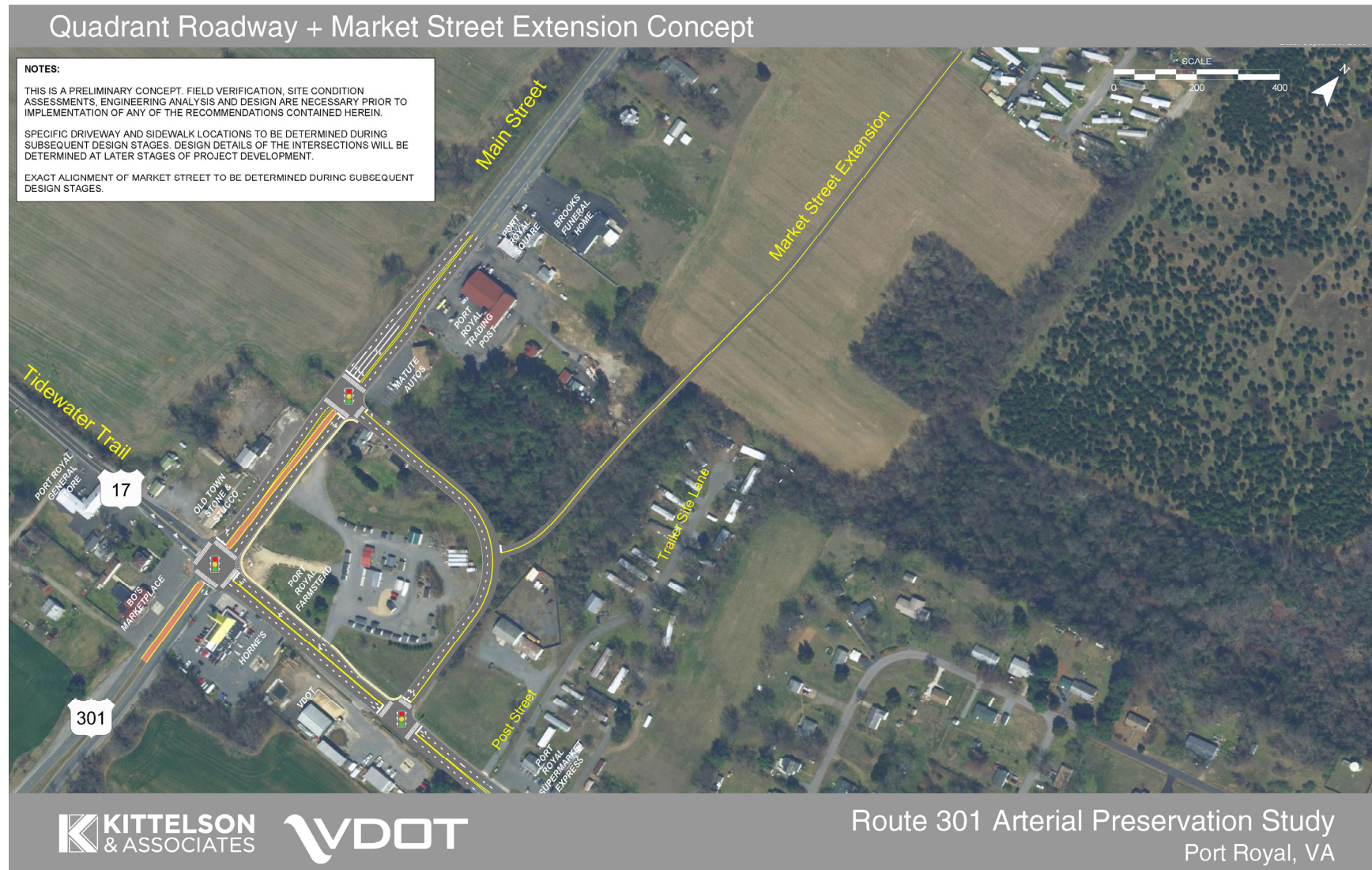


Figure 16 Market Street Extension with Quadrant Roadway – Conceptual Plan-View



Potential SMART SCALE Application

The Study Team developed SMART SCALE summary sheets for each transportation option to estimate how each transportation option could score under the current VDOT SMART SCALE criteria and benefit-cost ratio ranking process. The Market Street Extension option is predicted to achieve a moderate benefit-cost ratio based on the study criteria outlined in the preceding sections and the SMART SCALE summary sheet found in **Appendix J**.

Intersection of Route 301/Route 17 Summary

The Study Team created an options comparison table to summarize how each transportation option for the intersection of Route 301/Route 17 aligns with the study goals, objectives, and evaluation criteria. **Table 13** shows the summary table. A simple three-point scale is used to allow for a high-level comparison of the different options. Options that make the evaluation criteria better are green, options that make moderate or minor changes to the evaluation criteria are yellow, and options that make the evaluation criteria worse or ineffective are orange.

Table 13 Intersection of Route 301/Route 17 Options Comparison

Rating Criteria				Route 301/Route 17 Intersection			Combination	
				Existing	Short-Term	Mid-Term		
				No Build	Intersection Modification	Quadrant Intersection	Market Street Extension	Quadrant Intersection w/ Market Street Extension
<i>Length (miles)</i>				-	-	-	0.40	-
<i>Performance</i>	<i>Worse or ineffective</i>	<i>Moderate or little change</i>	<i>Better</i>					
Mobility								
Reduce southbound left-turn backup at Route 301/Route 17 intersection	Does not change southbound left-turn backup	Reduces southbound left-turn backup during most time periods	Reduces southbound left-turn backup during all time periods					
Improve pedestrian curbside accommodation along Route 301	Does not add pedestrian curbside accommodation	Adds pedestrian curbside accommodation on one side of Route 301 in project vicinity	Adds pedestrian curbside accommodation on both sides of Route 301					
Reduce out of direction travel (driving and walking)	Does not change existing travel patterns or increases out of direction travel	Decreases out of direction travel for one of two modes	Decreases out of direction travel for two of two modes					
Safety								
Improve safety for business egress, left turns (access management)	Business egress left from businesses continues to require crossing traffic from both directions	Provides designated waiting places for business egress allowing two stage crossing	Provides designated and protected waiting places for business egress to enter traffic stream					
Improve safety for business ingress from unprotected lefts	Left turning vehicles continue to use thru lanes to access businesses	Provides for right turns for most or all business ingress	Provides right turns and designated/protected waiting places for business ingress					
Improve Route 301 pedestrian/bicycle crossing safety	Does not provide designated safe pedestrian and bicycle crossing options	Adds designated bicycle and pedestrian crossing locations without sidewalk infrastructure	Adds designated bicycle and pedestrian crossing locations with sidewalk infrastructure					
Improve driver compliance with posted speeds between the Rappahannock River Bridge and Route 17	Does not influence driver compliance with posted speeds	Modifies the roadway character to influence driver compliance	Significantly modifies the roadway character to influence driver compliance					
Community/Historic/Natural/Civic/Economic Resources								
Enhance community character/Maintain Character Defining Features of the National Register Historic District	Inconsistent with or alters existing community character, NRHD character defining features and community vision	Does not change existing community character/does not contribute to or detract from community vision or alter defining features of NRHD	Enhances existing community character, increases opportunities for preservation of NRHD character-defining features and advances community vision					
Maintain access to local businesses	Reduces access to local businesses	Maintains or modest changes to local business access	Increases safe access to local businesses					
Improve roadside drainage	Reduces drainage function	No change to drainage	Improves drainage in project area					
Streetscape Enhancement (Trees, Landscaping)	Negatively impacts existing streetscape	Minor or no change to streetscape	Adds landscaping and streetscape amenities					
Private Property/Fiscal Value Benefit	Reduces property access to highway	No or modest change to property access to highway	Increases property access to highway					
Cost Effectiveness								
Implementation Duration	Long Project Duration (7+ years)	Moderate Project Duration (4-7 years)	Short Project Duration (0 -4 years)					
Project Cost	High Project Cost (\$5M+)	Moderate Cost (\$2M-\$5M)	Low Cost (\$0-\$2M)					
Private Property Impacts	High Property Impacts (50,000+ Square Feet)	Moderate Property Impacts (10,000 – 50,000 Square Feet)	Few Property Impacts (0 – 10,000 Square Feet)					

Route 301 through Town

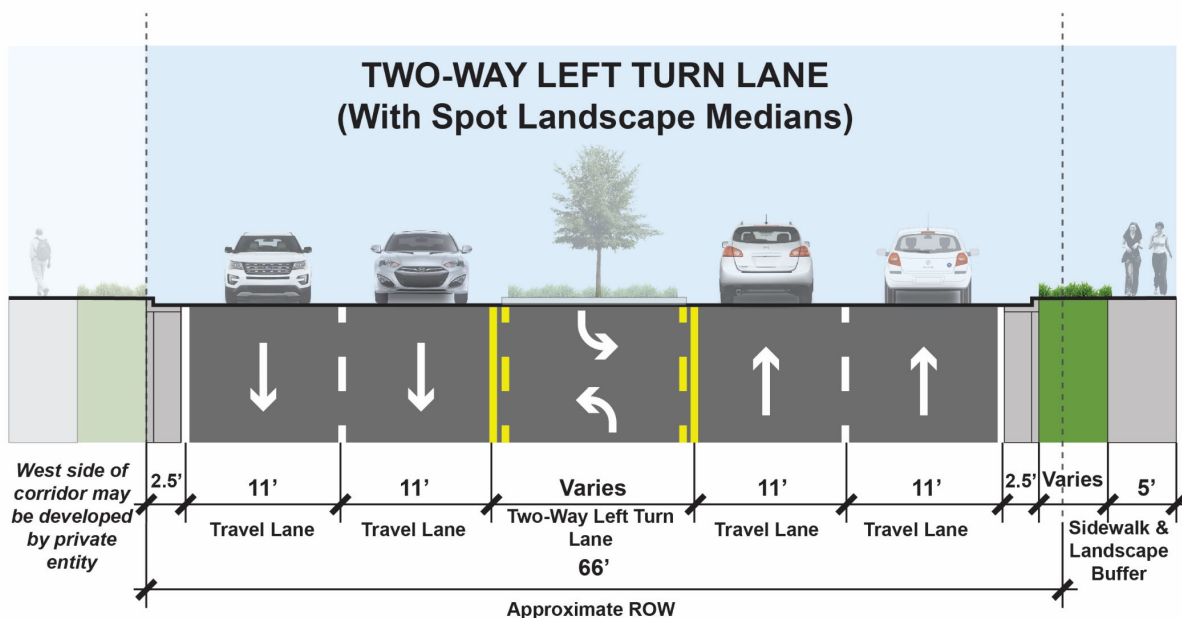
The following transportation options focus on the intersection of Route 301/Route 17:

- Two-Way Left-Turn Lane
- Full Raised Median
- One-way Pair “Couplet”

Two-Way Left-Turn Lane

This option provides a center turning lane for northbound and southbound left-turning movements on Route 301. It adds pedestrian accommodations with “spot-median” locations for crossing Route 301 and landscaping as a visual cue for motorists passing through town. Pedestrian accommodations include a sidewalk on the east side of Route 301 and two pedestrian crossings at Back Street and Caroline Street to facilitate pedestrian travel across Route 301. Pedestrian facilities on the west side of Route 301 may be developed by a private entity. **Figure 17** shows a sample cross-section, and **Figure 18** shows a conceptual plan-view of the Two-Way Left-Turn Lane option.

Figure 17 Two-Way Left-Turn Lane Sample Cross-Section



The following sections explain how this option relates to each of the study goals, objectives, and evaluation criteria.

Mobility

The Two-Way Left-Turn Lane option is not expected to influence southbound left-turn queues at the intersection of Route 301/Route 17. It will add pedestrian curbside accommodation on one side of Route 301. By providing a dedicated Two-Way Left-Turn Lane and adding pedestrian curbside accommodations, this option will decrease out of direction travel for two of two modes (i.e. pedestrians and motorists).

Safety

The Two-Way Left-Turn Lane option will provide designated waiting places (i.e., Two-Way Left-Turn Lane) for business egress, allowing motorists to make a two-stage crossing of Route 301. This will improve safety for business egress (i.e., left-turns out to Route 301), because motorists turning left onto Route 301 will not need to cross traffic from both directions at once. This option will also allow right turns for most or all business ingress points along Route 301 between Back Street and the Rappahannock River Bridge.

The pedestrian accommodations included in this option will contribute designated bicycle and pedestrian crossing locations with sidewalk infrastructure. Traffic calming features (i.e., “spot-median” treatments) will substantially modify the roadway character to influence driver compliance with posted speeds.

Community/Historic/Natural/Civic/Economic Resources

The Two-Way Left-Turn Lane will enhance existing community character, increase opportunities for preservation of National Register Historic District features, and advance the community vision. It will increase safe access to local businesses by enabling motorists to make a two-stage maneuver onto and off of Route 301. The addition of curb and gutter will improve drainage along Route 301, and the “spot-median” treatments and sidewalk will add landscaping and streetscape amenities.

This option will not change property access to Route 301.

Cost Effectiveness

The Two-Way Left-Turn Lane option is estimated to be of moderate duration (4 to 7 years for preliminary engineering, right-of-way and utility relocation, and construction). It is estimated to have a high cost (\$9M to \$12M) and moderate right-of-way impacts (25,000 square feet). Estimated costs are reported in 2019 dollars and do not account for future inflation.

Figure 18 Two-Way Left-Turn Lane – Conceptual Plan-View



Community Feedback

During a June 2019 public meeting, citizens of the Town of Port Royal were provided with a chance to rank each transportation option based on whether they “like,” “dislike,” or have “no preference” about the transportation option. Five meeting participants liked the option, four meeting participants disliked the option, and six meeting participant had no preference about the option. Based on this community feedback, the Two-Way Left-Turn Lane option received net positive feedback. **Appendix I** includes detailed community feedback from the June 2019 public meetings.

JUNE 2019 PUBLIC MEETING FEEDBACK >>>

Participants liked the Two-Way Left-Turn Lane because:

- *“The double left turn lane is the most needed. This would solve a problem area the quickest. Also, this is the low cost solution. This would qualify for VDOT SMART SCALE funding...”*
- *“Helps local business”*
- *“First choice. Least invasive; however impact to historic resources (NRHD-listed) needs to be minimized.”*

Potential SMART SCALE Application

The Study Team developed SMART SCALE summary sheets for each transportation option to estimate how each transportation option could score under the current VDOT SMART SCALE criteria and benefit-cost ratio ranking process. The Two-Way Left-Turn Lane option is predicted to achieve a moderate benefit-cost ratio based on the study criteria outlined in the preceding sections and the SMART SCALE summary sheet found in **Appendix J**.

Full Raised Median

This option provides a full raised median along Route 301 to reduce the number of turning conflict points and to provide protected left turns on Route 301. It provides an acceleration lane on Route 301 southbound from Caroline Street and adds pedestrian accommodation with crosswalk locations, including median refuge areas. Median landscaping may be added as a visual cue through town. Pedestrian accommodations include a sidewalk on the east side of Route 301 and two pedestrian crossings at Back Street and Caroline Street to facilitate pedestrian travel across Route 301. The Full Raised Median will be depressed at Cumberland Street to provide emergency vehicle access. Pedestrian facilities on the west side of Route 301 may be developed by a private entity.

Figure 19 shows a sample cross-section, **Figure 20** shows a conceptual rendering at Back Street, and **Figure 21** shows a conceptual plan-view of the Full Raised Median option.

Figure 19 Raised Median Sample Cross-Section

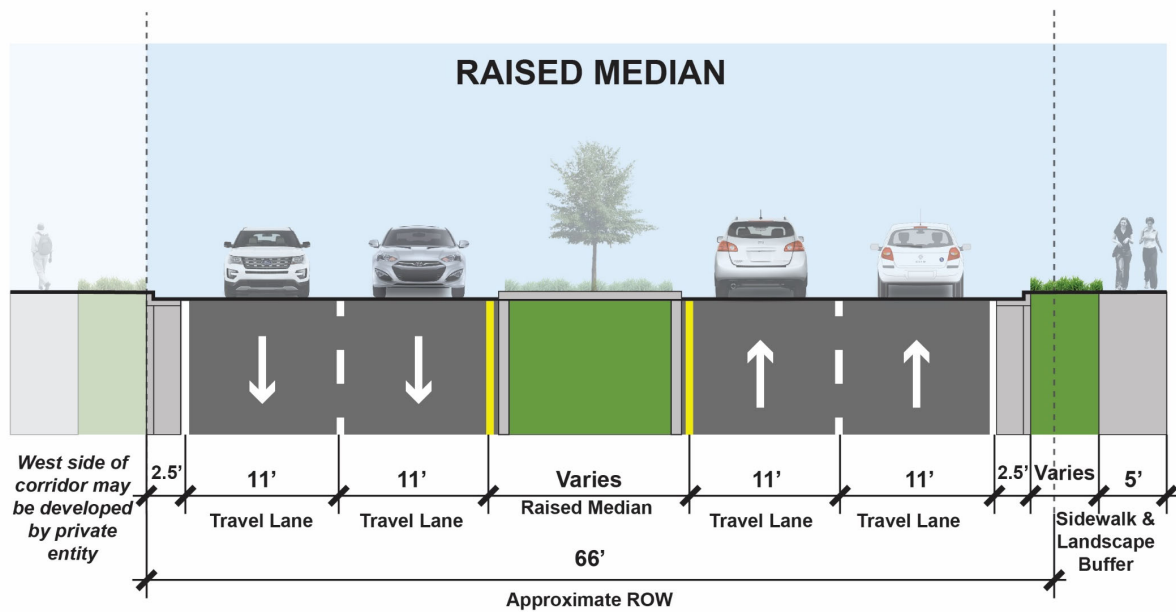


Figure 20 Raised Median at Back Street Rendering²

The following sections explain how this option relates to each of the study goals, objectives, and evaluation criteria.

Mobility

The Full Raised Median option is not expected to influence southbound left-turn queues at the intersection of Route 301/Route 17. It will add pedestrian curbside accommodation on one side of Route 301. By limiting the number of access points to Port Royal (i.e., Back Street, Caroline Street, Water Street) and adding pedestrian curbside accommodations, this option will decrease out of direction travel for just one of two modes (i.e. pedestrians).

Safety

The Full Raised Median option will provide designated and protected waiting places (i.e. protected left-turn lanes) for business egress, allowing motorists to wait before entering the main flow of traffic. This will improve safety for business egress (i.e., left turns out to Route 301), because motorists turning left onto Route 301 will not need to cross traffic from both directions at once. This option will also allow right turns and designated/protected waiting places for business ingress along Route 301 between Back Street and the Rappahannock River Bridge. The pedestrian accommodations included in this option will contribute designated bicycle and pedestrian crossing locations with sidewalk infrastructure. Traffic calming features (e.g. raised medians with landscaping treatments) will substantially modify the roadway character to influence driver compliance with posted speeds.

² Pedestrian facilities and landscaping (trees) shown on the west side of Route 301 may be developed and maintained by a private entity. Landscaping (Trees) shown on the east side of Route 301 may be developed and maintained by a private entity.

Figure 21 Raised Median – Conceptual Plan-View



Community/Historic/Natural/Civic/Economic Resources

The Full Raised Median option will enhance existing community character, increase opportunities for preservation of National Register Historic District features, and advance the community vision. It will make modest changes to local business access by providing limited, protected waiting spaces for motorists to turn onto and off of Route 301. The addition of curb and gutter will improve drainage along Route 301, and the Full Raised Median treatments and sidewalk will add landscaping and streetscape amenities. This option will make modest changes to property access to Route 301.

Cost Effectiveness

The Full Raised Median option is estimated to be of moderate duration (4 to 7 years for preliminary engineering, right-of-way and utility relocation, and construction). It is estimated to have a high cost (\$11M to \$16M) and moderate right-of-way impacts (25,000 square feet). Estimated costs are reported in 2019 dollars and do not account for future inflation.

Community Feedback

During a June 2019 public meeting, citizens of the Town of Port Royal were provided with a chance to rank each transportation option based on whether they “like,” “dislike,” or have “no preference” about the transportation option. Four meeting participants liked the option, seven meeting participants disliked the option, and four meeting participants had no preference about the option.

Based on this community feedback, the Full Raised Median option received net negative feedback. **Appendix I** includes detailed community feedback from the June 2019 public meetings.

JUNE 2019 PUBLIC MEETING FEEDBACK >>>

Participants disliked the Full Raised Median because:

- “...limits where turns are permitted”
- “Does little to address volumes”
- “Need lights to cross to get to post office”

Potential SMART SCALE Application

The Study Team developed SMART SCALE summary sheets for each transportation option to estimate how each transportation option could score under the current VDOT SMART SCALE criteria and benefit-cost ratio ranking process. The Full Raised Median option is predicted to achieve a moderate benefit-cost ratio based on the study criteria outlined in the preceding sections and the SMART SCALE summary sheet found in **Appendix J**.

One-Way Pair “Couplet”

This option constructs a new two-lane roadway, paralleling Route 301 to the west, for southbound traffic. It converts existing Route 301 to a two-lane roadway for northbound traffic. The One-Way Pair “Couplet” provides a future opportunity to expand the Town of Port Royal street grid pattern to the west side of Route 301. The current cost estimate and concept does not provide pedestrian accommodation, which may be developed by a private entity.

Figure 22 shows a conceptual plan-view of the One-Way Pair “Couplet” option.

The following sections explain how this option relates to each of the study goals, objectives, and evaluation criteria.

Mobility

The One-Way Pair “Couplet” option is not expected to influence southbound left-turn queues at the intersection of Route 301/Route 17, because it will relocate southbound traffic west of town. It will not add pedestrian curbside accommodation to Route 301. By diverting southbound traffic west of town, the One-Way Pair “Couplet” requires southbound vehicles to navigate two signalized intersections (Couplet/Route 17 and Route 301/Route 17). This increases out of direction travel.

Table 14 summarizes the operational analysis for the study intersections under the weekday AM, PM, and Sunday worst-case peak hour future traffic conditions. The full analysis can be found in **Appendix H**.

The intersection of Route 301/Route 17 is projected to perform acceptably during each of the peak hours studied with the following exceptions:

- During the Sunday worst-case scenario, vehicles waiting to turn right from Route 17 onto Route 301 are projected to wait in queues over 1,000 feet long. These vehicles are southbound vehicles that have been diverted from Route 301 to the couplet west of town and are attempting to continue south on Route 301.
- Vehicles traveling northbound on Route 301 are also projected to wait in queues over 1,000 feet long.
- Due to these large queues, vehicles waiting to turn right from Route 17 onto Route 301 may experience delays of over three minutes (192.1 seconds). Vehicles waiting to continue north on Route 301 may experience delays of up to three minutes (179.9 seconds).
- The intersection is projected to operate well over capacity (1.30 v/c ratio).

The intersection of Route 17 and the new One-Way Pair “Couplet” alignment is projected to perform acceptably during each of the peak hours studied with the following exceptions:

- During the Sunday worst-case scenario, vehicles waiting to turn left from the couplet onto Route 17 are projected to wait in queues over 500 feet long (over twenty vehicles). These vehicles are southbound vehicles that have been diverted from Route 301 to the couplet west of town and are attempting to continue south on Route 301.

Table 14 One-Way Pair “Couplet” Future Year Operational Analysis

Intersection	Peak Hour	Delay (sec)	Level of Service	v/c	95th Percentile Queues
Route 301 / Route 17	AM peak	32.5	C	0.44	No concerns
	PM peak	29.8	C	0.56	No concerns
	Sunday	164.4	F	0.96	95 th percentile queues for EBT, WBT, and NBT movements may exceed intersection capacity
Route 17/Couplet	AM peak	19.3	B	0.33	No concerns
	PM peak	19.7	B	0.50	No concerns
	Sunday	19.8	B	0.73	95 th percentile queues for SBL movement may exceed twenty vehicles

Safety

The One-Way Pair “Couplet” will improve safety for business egress and ingress by removing the opposing lane of traffic from both legs of the couplet. This option does not provide pedestrian accommodations or designated safe pedestrian crossing options. It will not modify the roadway character to influence driver compliance with posted speeds.

Community/Historic/Natural/Civic/Economic Resources

The One-Way Pair “Couplet” will not change the Town of Port Royal’s existing community character, contribute to or detract from the community vision, or alter defining features of the National Register Historic District. By converting Route 301 to a one-way northbound roadway, the One-Way Pair “Couplet” option reduces access to and visibility of local businesses. It makes no change to drainage function, adds no landscaping or streetscaping amenities, and reduces property access to Route 301.

Cost Effectiveness

The One-Way Pair “Couplet” option is estimated to be of long duration (7+ years for preliminary engineering, right-of-way and utility relocation, and construction). It is estimated to have a very high

cost (\$19M to \$27M) and high right-of-way impacts (300,000 square feet). Estimated costs are reported in 2019 dollars and do not account for future inflation.

Community Feedback

During a June 2019 public meeting, citizens of the Town of Port Royal were provided with a chance to rank each transportation option based on whether they “like,” “dislike,” or have “no preference” about the transportation option. Three meeting participants liked the option, 11 meeting participants disliked the option, and one meeting participant had no preference about the option. Based on this community feedback, the One-Way Pair “Couplet” option received net negative feedback. **Appendix I** includes detailed community feedback from the June 2019 public meetings.

JUNE 2019 PUBLIC MEETING FEEDBACK >>>

Participants disliked the One-Way Pair “Couplet” because:

- *“This is the most costly and it takes in the most private land. This plan should not be part of VDOT study...this plan would hurt the most people and separate crop and farmland. County and Town would have to apply for funding with high cost”*
- *“It will directly affect my home and my property and my life”*
- *“Land acquisition will get stuck in litigation; very invasive; negative impact to existing businesses; negative impact to waterfront homes, businesses, and historic resources (identified and unidentified archaeology)”*

Potential SMART SCALE Application

The Study Team developed SMART SCALE summary sheets for each transportation option to estimate how each transportation option could score under the current VDOT SMART SCALE criteria and benefit-cost ratio ranking process. The One-Way Pair “Couplet” option is predicted to achieve a low benefit-cost ratio based on the study criteria outlined in the preceding sections and the SMART SCALE summary sheet found in **Appendix J**.

Figure 22 One-Way Pair “Couplet” – Conceptual Plan-View



Route 301 through Town Summary

The Study Team created an options comparison table to summarize how each transportation option for Route 301 through town aligns with the study goals, objectives, and evaluation criteria. **Table 15** shows the summary table. A simple three-point scale is used to allow for a high-level comparison of the different options. Options that make the evaluation criteria better are green, options that make moderate or minor changes to the evaluation criteria are yellow, and options that make the evaluation criteria worse or ineffective are orange.

Table 15 Route 301 Through Town Options Comparison

Rating Criteria				Options			
				Route 301 through Town			
				Existing	Mid-Term		Long-Term
				No Build	Two-Way Left-Turn Lane	Raised Median	Couplet
<i>Length (miles)</i>				0.47	0.47	0.47	0.76
<i>Performance</i>	<i>Worse or ineffective</i>	<i>Moderate or little change</i>	<i>Better</i>				
Mobility							
Reduce southbound left-turn backup at Route 301/Route 17 intersection	Does not change southbound left-turn backup	Reduces southbound left-turn backup during most time periods	Reduces southbound left-turn backup during all time periods				
Improve pedestrian curbside accommodation	Does not add pedestrian curbside accommodation	Adds pedestrian curbside accommodation on one side of Route 301	Adds pedestrian curbside accommodation on both sides of Route 301				
Reduce out of direction travel (driving and walking)	Does not change existing travel patterns or increases out of direction travel	Decreases out of direction travel for one of two modes	Decreases out of direction travel for two of two modes				
Safety							
Improve safety for business egress, left turns out to Route 301 (access management)	Business egress left from businesses continues to require crossing traffic from both directions	Provides designated waiting places for business egress allowing two stage crossing	Provides designated and protected waiting places for business egress to enter traffic stream				
Improve safety for business ingress from unprotected lefts from Route 301	Left turning vehicles continue to use thru lanes to access businesses	Provides for right turns for most or all business ingress	Provides right turns and designated/protected waiting places for business ingress				
Improve Route 301 pedestrian/bicycle crossing safety	Does not provide designated safe pedestrian and bicycle crossing options	Adds designated bicycle and pedestrian crossing locations without sidewalk infrastructure	Adds designated bicycle and pedestrian crossing locations with sidewalk infrastructure				
Improve driver compliance with posted speeds between the Rappahannock River Bridge and Route 17 (Traffic calming potential)	Does not influence driver compliance with posted speeds	Modifies the roadway character to influence driver compliance	Significantly modifies the roadway character to influence driver compliance				
Community/Historic/Natural/Civic/Economic Resources							
Enhance community character/Maintain Character Defining Features of the National Register Historic District	Inconsistent with or alters existing community character, NRHD character defining features and community vision	Does not change existing community character/does not contribute to or detract from community vision or alter defining features of NRHD	Enhances existing community character, increases opportunities for preservation of NRHD character-defining features and advances community vision				
Maintain access to local businesses	Reduces access/visibility to local businesses	Maintains or modest changes to local business access/visibility	Increases [safe] access to local businesses				
Improve roadside drainage	Reduces drainage function	No change to drainage	Improves drainage along Route 301				
Streetscape Enhancement (Trees, Landscaping) along Route 301	No landscaping or streetscape amenity	Modest scale landscaping and streetscape amenities	Adds median trees, landscaping and streetscape amenities				
Private Property/Fiscal Value Benefit	Reduces property access to highway	No or modest change to property access to highway	Increases property access to highway				
Cost Effectiveness							
Implementation Duration	Long Project Duration (7+ years)	Moderate Project Duration (4-7 years)	Short Project Duration (0-4 years)				
Project Cost	Very High Cost (\$20M+)	High Cost (\$10M-\$20M)	No, Low or Moderate Cost (\$0-\$10M)				
Private Property Impacts	High or Very High Property Impacts (50,000+ Square Feet)	Moderate Property Impacts (10,000 – 50,000 Square Feet)	Few Property Impacts (0 – 10,000 Square Feet)				

CONCLUSION

The Study Team, in partnership with VDOT, George Washington Regional Commission, Caroline County, the Town of Port Royal, and the public identified a range of transportation options to treat existing and future transportation challenges facing the Town of Port Royal. Any one or set of these options may be submitted as a SMART SCALE application for VDOT funding. Other potential funding sources include revenue sharing, VDOT Transportation Alternatives funding, VDOT Highway Safety Improvement Program Funding, and Virginia Land Conservation Grants.

- An existing and future conditions assessment shows that the Town of Port Royal may face transportation challenges related to:
 - Mobility
 - The intersection of Route 301/Route 17 is a bottleneck on the otherwise free-flowing Route 301 on special event days (i.e. Sunday beach traffic)
 - Route 301 lacks safe, comfortable facilities for non-motorized users
 - Safety
 - Crashes along Route 301/Route 17 are primarily angle and rear-end crashes, likely related to the difference in speeds between vehicles traveling on Route 301 and vehicles turning onto and off of Route 301 from local streets or access driveways.
 - Community members have reported concerns about being able to safely turn onto and off of Route 301 due to high vehicle speeds on Route 301.
- To address these challenges, the Town of Port Royal should reach consensus on a transportation option that:
 - Preserves and enhances the town’s community, historic, natural, civic, and economic resources
 - Is cost effective, so that:
 - Applications for VDOT SMART SCALE funding are competitive with other projects put forward by the Fredericksburg District and by applicants Statewide;
 - Applications for other funding sources (e.g., VDOT Transportation Alternatives, VDOT Highway Safety Improvement Program, Virginia Land Conservation Grants) are competitive;
 - And, if necessary, the project could be funded through a mix of sources, including revenue sharing by the Town of Port Royal.
- VDOT identified and vetted six transportation options to address the Town of Port Royal’s transportation challenges:

- Intersection of Route 301/Route 17 Options: Intersection Modification, Quadrant Roadway, Market Street Extension
- Route 301 through Town Options: Two-way Left-Turn Lane, Raised Median, One-way Pair "Couplet"
- **Table 16** presents a high-level summary of public input gathered on the transportation options in June 2019 and an estimate of how each transportation option could score under the current VDOT SMART SCALE criteria and benefit-cost ratio ranking process.

Table 16 Route 301 Options Public Input and Benefit-Cost Ratio Comparison

Option	Public Feedback Gathered June 2019	Likely Benefit-Cost Ratio
Intersection Modification	Like	High
Quadrant Roadway	Dislike	Moderate
Market Street Extension	Dislike	Moderate
Two-Way Left-Turn Lane	Like	Moderate
Full Raised Median	Dislike	Moderate
One-Way Pair "Couplet"	Dislike	Low

- After reviewing the findings provided herein, VDOT recommends that the Town of Port Royal identify any one or set of these options that they would prefer to advance. Next steps include:
 - Incorporating preferred recommendations into Town of Port Royal Comprehensive Plan and Caroline County Comprehensive Plan;
 - Working with Caroline County and/or George Washington Regional Commission to develop and submit a SMART SCALE application for VDOT funding;
 - Applications due for next SMART SCALE funding cycle in 2020
 - And investigating and applying for other funding sources as needed.

APPENDIX A

Traffic Counts

Peggy Malone & Associates

(888) 247-8602

File Name : 1-US 301 & US 17 (Tidewater Trail) FRI
 Site Code :
 Start Date : 11/2/2018
 Page No : 1

Groups Printed- Car

Start Time	Rt 301 Southbound					US 17 Westbound					Rt 301 Northbound					US 17 Eastbound					Int. Total
	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	
03:00 PM	29	133	66	0	228	28	19	4	0	51	7	95	1	0	103	2	44	15	0	61	443
03:15 PM	49	113	58	0	220	44	26	2	0	72	8	92	6	0	106	0	41	20	0	61	459
03:30 PM	39	117	65	0	221	30	18	6	0	54	3	111	5	0	119	1	33	12	0	46	440
03:45 PM	33	96	78	0	207	22	17	5	0	44	2	88	7	0	97	3	34	20	0	57	405
Total	150	459	267	0	876	124	80	17	0	221	20	386	19	0	425	6	152	67	0	225	1747
04:00 PM	37	143	66	0	246	29	26	4	0	59	9	104	2	0	115	0	37	20	0	57	477
04:15 PM	39	98	73	0	210	28	17	4	0	49	1	105	3	0	109	0	34	25	0	59	427
04:30 PM	55	126	75	0	256	25	24	2	0	51	6	82	0	0	88	1	39	27	0	67	462
04:45 PM	41	124	67	0	232	39	22	5	0	66	5	96	3	0	104	2	42	27	0	71	473
Total	172	491	281	0	944	121	89	15	0	225	21	387	8	0	416	3	152	99	0	254	1839
05:00 PM	38	131	72	0	241	32	23	1	0	56	7	69	1	0	77	5	36	27	0	68	442
05:15 PM	42	126	65	0	233	29	27	6	0	62	7	87	4	0	98	1	26	23	0	50	443
05:30 PM	33	129	50	0	212	40	25	6	0	71	7	79	3	0	89	2	49	18	0	69	441
05:45 PM	26	116	59	0	201	24	24	6	0	54	7	64	8	0	79	0	30	19	0	49	383
Total	139	502	246	0	887	125	99	19	0	243	28	299	16	0	343	8	141	87	0	236	1709
06:00 PM	17	91	57	0	165	31	29	7	0	67	3	73	2	0	78	1	38	14	0	53	363
06:15 PM	17	74	42	0	133	21	16	4	0	41	3	58	2	0	63	0	38	15	0	53	290
06:30 PM	20	74	50	0	144	30	18	3	0	51	5	57	2	0	64	1	30	13	0	44	303
06:45 PM	13	76	33	0	122	21	21	5	0	47	1	69	2	0	72	0	36	9	0	45	286
Total	67	315	182	0	564	103	84	19	0	206	12	257	8	0	277	2	142	51	0	195	1242
Grand Total	528	1767	976	0	3271	473	352	70	0	895	81	1329	51	0	1461	19	587	304	0	910	6537
Apprch %	16.1	54	29.8	0		52.8	39.3	7.8	0		5.5	91	3.5	0		2.1	64.5	33.4	0		
Total %	8.1	27	14.9	0	50	7.2	5.4	1.1	0	13.7	1.2	20.3	0.8	0	22.3	0.3	9	4.7	0	13.9	

Start Time	Rt 301 Southbound				US 17 Westbound				Rt 301 Northbound				US 17 Eastbound				Int. Total
	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	
Peak Hour Analysis From 03:00 PM to 06:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 04:00 PM																	
04:00 PM	37	143	66	246	29	26	4	59	9	104	2	115	0	37	20	57	477
04:15 PM	39	98	73	210	28	17	4	49	1	105	3	109	0	34	25	59	427
04:30 PM	55	126	75	256	25	24	2	51	6	82	0	88	1	39	27	67	462
04:45 PM	41	124	67	232	39	22	5	66	5	96	3	104	2	42	27	71	473
Total Volume	172	491	281	944	121	89	15	225	21	387	8	416	3	152	99	254	1839
% App. Total	18.2	52	29.8		53.8	39.6	6.7		5	93	1.9		1.2	59.8	39		
PHF	.782	.858	.937	.922	.776	.856	.750	.852	.583	.921	.667	.904	.375	.905	.917	.894	.964

Peggy Malone & Associates

(888) 247-8602

File Name : 1-US 301 & US 17 (Tidewater Trail) FRI
 Site Code :
 Start Date : 11/2/2018
 Page No : 1

Groups Printed- Truck

Start Time	Rt 301 Southbound					US 17 Westbound					Rt 301 Northbound					US 17 Eastbound					Int. Total
	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	
03:00 PM	2	8	2	0	12	1	0	0	0	1	1	4	0	0	5	0	1	1	0	2	20
03:15 PM	0	7	4	0	11	2	2	1	0	5	0	12	1	0	13	1	1	1	0	3	32
03:30 PM	0	13	2	0	15	2	1	1	0	4	0	9	0	0	9	0	1	1	0	2	30
03:45 PM	0	7	2	0	9	1	3	1	0	5	0	9	1	0	10	0	0	4	0	4	28
Total	2	35	10	0	47	6	6	3	0	15	1	34	2	0	37	1	3	7	0	11	110
04:00 PM	0	13	1	0	14	3	1	0	0	4	0	5	0	0	5	0	0	0	0	0	23
04:15 PM	4	8	0	0	12	1	1	1	0	3	1	10	0	0	11	0	1	0	0	1	27
04:30 PM	1	8	1	0	10	3	2	0	0	5	0	5	0	0	5	0	0	2	0	2	22
04:45 PM	2	12	1	0	15	0	1	0	0	1	0	8	0	0	8	0	0	1	0	1	25
Total	7	41	3	0	51	7	5	1	0	13	1	28	0	0	29	0	1	3	0	4	97
05:00 PM	1	7	0	0	8	0	0	0	0	0	0	3	0	0	3	1	0	0	0	1	12
05:15 PM	0	11	1	0	12	2	1	0	0	3	1	8	0	0	9	0	0	0	0	0	24
05:30 PM	2	9	2	0	13	1	0	0	0	1	1	10	0	0	11	0	1	0	0	1	26
05:45 PM	1	10	1	0	12	0	0	0	0	0	0	4	0	0	4	0	0	0	0	0	16
Total	4	37	4	0	45	3	1	0	0	4	2	25	0	0	27	1	1	0	0	2	78
06:00 PM	0	4	3	0	7	1	0	0	0	1	1	3	0	0	4	0	0	0	0	0	12
06:15 PM	1	7	4	0	12	2	1	0	0	3	0	8	0	0	8	0	0	0	0	0	23
06:30 PM	0	4	3	0	7	0	1	0	0	1	1	0	0	0	1	0	2	0	0	2	11
06:45 PM	0	7	3	0	10	1	0	0	0	1	0	2	0	0	2	0	1	0	0	1	14
Total	1	22	13	0	36	4	2	0	0	6	2	13	0	0	15	0	3	0	0	3	60
Grand Total	14	135	30	0	179	20	14	4	0	38	6	100	2	0	108	2	8	10	0	20	345
Apprch %	7.8	75.4	16.8	0		52.6	36.8	10.5	0		5.6	92.6	1.9	0		10	40	50	0		
Total %	4.1	39.1	8.7	0	51.9	5.8	4.1	1.2	0	11	1.7	29	0.6	0	31.3	0.6	2.3	2.9	0	5.8	

Start Time	Rt 301 Southbound				US 17 Westbound				Rt 301 Northbound				US 17 Eastbound				Int. Total
	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	
Peak Hour Analysis From 03:00 PM to 06:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 03:15 PM																	
03:15 PM	0	7	4	11	2	2	1	5	0	12	1	13	1	1	1	3	32
03:30 PM	0	13	2	15	2	1	1	4	0	9	0	9	0	1	1	2	30
03:45 PM	0	7	2	9	1	3	1	5	0	9	1	10	0	0	4	4	28
04:00 PM	0	13	1	14	3	1	0	4	0	5	0	5	0	0	0	0	23
Total Volume	0	40	9	49	8	7	3	18	0	35	2	37	1	2	6	9	113
% App. Total	0	81.6	18.4		44.4	38.9	16.7		0	94.6	5.4		11.1	22.2	66.7		
PHF	.000	.769	.563	.817	.667	.583	.750	.900	.000	.729	.500	.712	.250	.500	.375	.563	.883

Peggy Malone & Associates

(888) 247-8602

File Name : 1-US 301 & US 17 (Tidewater Trail) FRI
 Site Code :
 Start Date : 11/2/2018
 Page No : 1

Groups Printed- Combined

Start Time	Rt 301 Southbound					US 17 Westbound					Rt 301 Northbound					US 17 Eastbound					Int. Total
	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	
03:00 PM	31	141	68	0	240	29	19	4	0	52	8	99	1	0	108	2	45	16	0	63	463
03:15 PM	49	120	62	0	231	46	28	3	0	77	8	104	7	0	119	1	42	21	0	64	491
03:30 PM	39	130	67	0	236	32	19	7	0	58	3	120	5	0	128	1	34	13	0	48	470
03:45 PM	33	103	80	0	216	23	20	6	0	49	2	97	8	0	107	3	34	24	0	61	433
Total	152	494	277	0	923	130	86	20	0	236	21	420	21	0	462	7	155	74	0	236	1857
04:00 PM	37	156	67	0	260	32	27	4	0	63	9	109	2	0	120	0	37	20	0	57	500
04:15 PM	43	106	73	0	222	29	18	5	0	52	2	115	3	0	120	0	35	25	0	60	454
04:30 PM	56	134	76	0	266	28	26	2	0	56	6	87	0	0	93	1	39	29	0	69	484
04:45 PM	43	136	68	0	247	39	23	5	0	67	5	104	3	0	112	2	42	28	0	72	498
Total	179	532	284	0	995	128	94	16	0	238	22	415	8	0	445	3	153	102	0	258	1936
05:00 PM	39	138	72	0	249	32	23	1	0	56	7	72	1	0	80	6	36	27	0	69	454
05:15 PM	42	137	66	0	245	31	28	6	0	65	8	95	4	0	107	1	26	23	0	50	467
05:30 PM	35	138	52	0	225	41	25	6	0	72	8	89	3	0	100	2	50	18	0	70	467
05:45 PM	27	126	60	0	213	24	24	6	0	54	7	68	8	0	83	0	30	19	0	49	399
Total	143	539	250	0	932	128	100	19	0	247	30	324	16	0	370	9	142	87	0	238	1787
06:00 PM	17	95	60	0	172	32	29	7	0	68	4	76	2	0	82	1	38	14	0	53	375
06:15 PM	18	81	46	0	145	23	17	4	0	44	3	66	2	0	71	0	38	15	0	53	313
06:30 PM	20	78	53	0	151	30	19	3	0	52	6	57	2	0	65	1	32	13	0	46	314
06:45 PM	13	83	36	0	132	22	21	5	0	48	1	71	2	0	74	0	37	9	0	46	300
Total	68	337	195	0	600	107	86	19	0	212	14	270	8	0	292	2	145	51	0	198	1302
Grand Total	542	1902	1006	0	3450	493	366	74	0	933	87	1429	53	0	1569	21	595	314	0	930	6882
Apprch %	15.7	55.1	29.2	0		52.8	39.2	7.9	0		5.5	91.1	3.4	0		2.3	64	33.8	0		
Total %	7.9	27.6	14.6	0	50.1	7.2	5.3	1.1	0	13.6	1.3	20.8	0.8	0	22.8	0.3	8.6	4.6	0	13.5	

Start Time	Rt 301 Southbound				US 17 Westbound				Rt 301 Northbound				US 17 Eastbound				Int. Total
	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	
Peak Hour Analysis From 03:00 PM to 06:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 04:00 PM																	
04:00 PM	37	156	67	260	32	27	4	63	9	109	2	120	0	37	20	57	500
04:15 PM	43	106	73	222	29	18	5	52	2	115	3	120	0	35	25	60	454
04:30 PM	56	134	76	266	28	26	2	56	6	87	0	93	1	39	29	69	484
04:45 PM	43	136	68	247	39	23	5	67	5	104	3	112	2	42	28	72	498
Total Volume	179	532	284	995	128	94	16	238	22	415	8	445	3	153	102	258	1936
% App. Total	18	53.5	28.5		53.8	39.5	6.7		4.9	93.3	1.8		1.2	59.3	39.5		
PHF	.799	.853	.934	.935	.821	.870	.800	.888	.611	.902	.667	.927	.375	.911	.879	.896	.968

Peggy Malone & Associates

(888) 247-8602

File Name : 1-US 301 & US 17 (Tidewater Trail) AM
 Site Code :
 Start Date : 11/1/2018
 Page No : 1

Groups Printed- Car

Start Time	US 301 Southbound					US 17 Westbound					US 301 Northbound					US 17 Eastbound					Int. Total
	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	
06:00 AM	11	27	3	0	41	23	17	5	0	45	3	39	1	0	43	0	9	18	0	27	156
06:15 AM	19	42	2	0	63	22	25	11	0	58	1	49	1	0	51	2	6	34	0	42	214
06:30 AM	17	62	14	0	93	29	18	13	0	60	3	70	3	0	76	9	11	34	0	54	283
06:45 AM	13	56	14	0	83	27	15	8	0	50	6	60	1	0	67	3	14	36	0	53	253
Total	60	187	33	0	280	101	75	37	0	213	13	218	6	0	237	14	40	122	0	176	906
07:00 AM	18	36	14	0	68	22	26	6	0	54	2	51	2	0	55	4	7	43	0	54	231
07:15 AM	19	54	11	0	84	26	38	9	0	73	6	47	0	0	53	2	17	34	0	53	263
07:30 AM	25	56	11	0	92	19	26	6	0	51	1	68	0	0	69	1	12	51	0	64	276
07:45 AM	16	35	13	0	64	24	17	6	0	47	2	56	0	0	58	3	13	31	0	47	216
Total	78	181	49	0	308	91	107	27	0	225	11	222	2	0	235	10	49	159	0	218	986
08:00 AM	21	52	20	0	93	13	13	2	0	28	1	41	2	0	44	2	15	49	0	66	231
08:15 AM	21	56	12	0	89	14	21	4	0	39	2	67	0	0	69	1	12	21	0	34	231
08:30 AM	14	52	14	0	80	19	19	5	0	43	3	54	1	0	58	0	18	27	0	45	226
08:45 AM	12	56	17	0	85	16	28	4	0	48	0	39	4	0	43	1	14	23	0	38	214
Total	68	216	63	0	347	62	81	15	0	158	6	201	7	0	214	4	59	120	0	183	902
Grand Total	206	584	145	0	935	254	263	79	0	596	30	641	15	0	686	28	148	401	0	577	2794
Apprch %	22	62.5	15.5	0		42.6	44.1	13.3	0		4.4	93.4	2.2	0		4.9	25.6	69.5	0		
Total %	7.4	20.9	5.2	0	33.5	9.1	9.4	2.8	0	21.3	1.1	22.9	0.5	0	24.6	1	5.3	14.4	0	20.7	

Start Time	US 301 Southbound				US 17 Westbound				US 301 Northbound				US 17 Eastbound				Int. Total
	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	
Peak Hour Analysis From 06:00 AM to 08:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 06:30 AM																	
06:30 AM	17	62	14	93	29	18	13	60	3	70	3	76	9	11	34	54	283
06:45 AM	13	56	14	83	27	15	8	50	6	60	1	67	3	14	36	53	253
07:00 AM	18	36	14	68	22	26	6	54	2	51	2	55	4	7	43	54	231
07:15 AM	19	54	11	84	26	38	9	73	6	47	0	53	2	17	34	53	263
Total Volume	67	208	53	328	104	97	36	237	17	228	6	251	18	49	147	214	1030
% App. Total	20.4	63.4	16.2		43.9	40.9	15.2		6.8	90.8	2.4		8.4	22.9	68.7		
PHF	.882	.839	.946	.882	.897	.638	.692	.812	.708	.814	.500	.826	.500	.721	.855	.991	.910

Peggy Malone & Associates

(888) 247-8602

File Name : 1-US 301 & US 17 (Tidewater Trail) AM
 Site Code :
 Start Date : 11/1/2018
 Page No : 1

Groups Printed- Truck

Start Time	US 301 Southbound					US 17 Westbound					US 301 Northbound					US 17 Eastbound					Int. Total
	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	
06:00 AM	1	6	2	0	9	1	1	1	0	3	0	4	1	0	5	0	6	0	0	6	23
06:15 AM	0	5	2	0	7	0	0	1	0	1	0	12	0	0	12	0	1	2	0	3	23
06:30 AM	0	9	2	0	11	4	0	0	0	4	0	11	0	0	11	1	4	3	0	8	34
06:45 AM	1	6	4	0	11	2	0	1	0	3	0	16	0	0	16	1	1	0	0	2	32
Total	2	26	10	0	38	7	1	3	0	11	0	43	1	0	44	2	12	5	0	19	112
07:00 AM	0	7	1	0	8	4	0	0	0	4	0	8	0	0	8	0	3	0	0	3	23
07:15 AM	0	7	0	0	7	0	1	1	0	2	1	8	1	0	10	1	1	3	0	5	24
07:30 AM	2	11	3	0	16	0	1	0	0	1	1	9	0	0	10	0	1	0	0	1	28
07:45 AM	0	5	5	0	10	3	1	1	0	5	1	9	0	0	10	0	4	3	0	7	32
Total	2	30	9	0	41	7	3	2	0	12	3	34	1	0	38	1	9	6	0	16	107
08:00 AM	1	6	1	0	8	2	2	1	0	5	1	10	2	0	13	0	4	1	0	5	31
08:15 AM	1	3	0	0	4	6	1	0	0	7	2	12	0	0	14	0	1	2	0	3	28
08:30 AM	0	11	0	0	11	4	2	1	0	7	1	10	0	0	11	1	3	2	0	6	35
08:45 AM	0	5	1	0	6	8	2	3	0	13	1	9	1	0	11	0	0	1	0	1	31
Total	2	25	2	0	29	20	7	5	0	32	5	41	3	0	49	1	8	6	0	15	125
Grand Total	6	81	21	0	108	34	11	10	0	55	8	118	5	0	131	4	29	17	0	50	344
Apprch %	5.6	75	19.4	0		61.8	20	18.2	0		6.1	90.1	3.8	0		8	58	34	0		
Total %	1.7	23.5	6.1	0	31.4	9.9	3.2	2.9	0	16	2.3	34.3	1.5	0	38.1	1.2	8.4	4.9	0	14.5	

Start Time	US 301 Southbound				US 17 Westbound				US 301 Northbound				US 17 Eastbound				Int. Total
	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	
Peak Hour Analysis From 06:00 AM to 08:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:45 AM																	
07:45 AM	0	5	5	10	3	1	1	5	1	9	0	10	0	4	3	7	32
08:00 AM	1	6	1	8	2	2	1	5	1	10	2	13	0	4	1	5	31
08:15 AM	1	3	0	4	6	1	0	7	2	12	0	14	0	1	2	3	28
08:30 AM	0	11	0	11	4	2	1	7	1	10	0	11	1	3	2	6	35
Total Volume	2	25	6	33	15	6	3	24	5	41	2	48	1	12	8	21	126
% App. Total	6.1	75.8	18.2		62.5	25	12.5		10.4	85.4	4.2		4.8	57.1	38.1		
PHF	.500	.568	.300	.750	.625	.750	.750	.857	.625	.854	.250	.857	.250	.750	.667	.750	.900

Peggy Malone & Associates

(888) 247-8602

File Name : 1-US 301 & US 17 (Tidewater Trail) AM
 Site Code :
 Start Date : 11/1/2018
 Page No : 1

Groups Printed- Combined

Start Time	US 301 Southbound					US 17 Westbound					US 301 Northbound					US 17 Eastbound					Int. Total
	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	
06:00 AM	12	33	5	0	50	24	18	6	0	48	3	43	2	0	48	0	15	18	0	33	179
06:15 AM	19	47	4	0	70	22	25	12	0	59	1	61	1	0	63	2	7	36	0	45	237
06:30 AM	17	71	16	0	104	33	18	13	0	64	3	81	3	0	87	10	15	37	0	62	317
06:45 AM	14	62	18	0	94	29	15	9	0	53	6	76	1	0	83	4	15	36	0	55	285
Total	62	213	43	0	318	108	76	40	0	224	13	261	7	0	281	16	52	127	0	195	1018
07:00 AM	18	43	15	0	76	26	26	6	0	58	2	59	2	0	63	4	10	43	0	57	254
07:15 AM	19	61	11	0	91	26	39	10	0	75	7	55	1	0	63	3	18	37	0	58	287
07:30 AM	27	67	14	0	108	19	27	6	0	52	2	77	0	0	79	1	13	51	0	65	304
07:45 AM	16	40	18	0	74	27	18	7	0	52	3	65	0	0	68	3	17	34	0	54	248
Total	80	211	58	0	349	98	110	29	0	237	14	256	3	0	273	11	58	165	0	234	1093
08:00 AM	22	58	21	0	101	15	15	3	0	33	2	51	4	0	57	2	19	50	0	71	262
08:15 AM	22	59	12	0	93	20	22	4	0	46	4	79	0	0	83	1	13	23	0	37	259
08:30 AM	14	63	14	0	91	23	21	6	0	50	4	64	1	0	69	1	21	29	0	51	261
08:45 AM	12	61	18	0	91	24	30	7	0	61	1	48	5	0	54	1	14	24	0	39	245
Total	70	241	65	0	376	82	88	20	0	190	11	242	10	0	263	5	67	126	0	198	1027
Grand Total	212	665	166	0	1043	288	274	89	0	651	38	759	20	0	817	32	177	418	0	627	3138
Apprch %	20.3	63.8	15.9	0		44.2	42.1	13.7	0		4.7	92.9	2.4	0		5.1	28.2	66.7	0		
Total %	6.8	21.2	5.3	0	33.2	9.2	8.7	2.8	0	20.7	1.2	24.2	0.6	0	26	1	5.6	13.3	0	20	

Start Time	US 301 Southbound				US 17 Westbound				US 301 Northbound				US 17 Eastbound				Int. Total
	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	
Peak Hour Analysis From 06:00 AM to 08:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 06:30 AM																	
06:30 AM	17	71	16	104	33	18	13	64	3	81	3	87	10	15	37	62	317
06:45 AM	14	62	18	94	29	15	9	53	6	76	1	83	4	15	36	55	285
07:00 AM	18	43	15	76	26	26	6	58	2	59	2	63	4	10	43	57	254
07:15 AM	19	61	11	91	26	39	10	75	7	55	1	63	3	18	37	58	287
Total Volume	68	237	60	365	114	98	38	250	18	271	7	296	21	58	153	232	1143
% App. Total	18.6	64.9	16.4		45.6	39.2	15.2		6.1	91.6	2.4		9.1	25	65.9		
PHF	.895	.835	.833	.877	.864	.628	.731	.833	.643	.836	.583	.851	.525	.806	.890	.935	.901

Peggy Malone & Associates

(888) 247-8602

File Name : 1-US 301 & US 17 (Tidewater Trail) PM
 Site Code :
 Start Date : 11/1/2018
 Page No : 1

Groups Printed- Car

Start Time	US 301 Southbound					US 17 Westbound					US 301 Northbound					US 17 Eastbound					Int. Total
	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	
04:00 PM	31	75	46	0	152	17	15	7	0	39	13	71	7	0	91	2	38	18	0	58	340
04:15 PM	36	87	50	0	173	17	26	7	0	50	4	72	1	0	77	3	31	21	0	55	355
04:30 PM	65	88	51	0	204	21	17	2	0	40	7	74	0	0	81	6	29	18	0	53	378
04:45 PM	56	99	37	0	192	15	22	4	0	41	6	70	5	0	81	0	31	25	0	56	370
Total	188	349	184	0	721	70	80	20	0	170	30	287	13	0	330	11	129	82	0	222	1443
05:00 PM	46	99	60	0	205	20	12	5	0	37	3	68	3	1	75	4	23	22	0	49	366
05:15 PM	32	97	45	0	174	24	18	2	0	44	4	72	1	1	78	2	30	28	0	60	356
05:30 PM	44	86	66	0	196	21	15	8	0	44	12	67	1	0	80	1	37	27	0	65	385
05:45 PM	28	96	50	0	174	20	20	8	0	48	11	56	3	0	70	2	29	23	0	54	346
Total	150	378	221	0	749	85	65	23	0	173	30	263	8	2	303	9	119	100	0	228	1453
06:00 PM	44	92	53	0	189	19	13	4	0	36	6	56	3	0	65	0	32	21	0	53	343
06:15 PM	23	69	32	0	124	17	16	2	0	35	5	48	4	0	57	2	32	17	0	51	267
06:30 PM	23	65	36	0	124	19	9	4	0	32	1	45	2	0	48	1	27	11	0	39	243
06:45 PM	15	52	33	0	100	7	13	0	0	20	7	54	4	0	65	1	21	10	0	32	217
Total	105	278	154	0	537	62	51	10	0	123	19	203	13	0	235	4	112	59	0	175	1070
Grand Total	443	1005	559	0	2007	217	196	53	0	466	79	753	34	2	868	24	360	241	0	625	3966
Apprch %	22.1	50.1	27.9	0		46.6	42.1	11.4	0		9.1	86.8	3.9	0.2		3.8	57.6	38.6	0		
Total %	11.2	25.3	14.1	0	50.6	5.5	4.9	1.3	0	11.7	2	19	0.9	0.1	21.9	0.6	9.1	6.1	0	15.8	

Start Time	US 301 Southbound				US 17 Westbound				US 301 Northbound				US 17 Eastbound				Int. Total
	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	
Peak Hour Analysis From 04:00 PM to 06:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 04:45 PM																	
04:45 PM	56	99	37	192	15	22	4	41	6	70	5	81	0	31	25	56	370
05:00 PM	46	99	60	205	20	12	5	37	3	68	3	74	4	23	22	49	365
05:15 PM	32	97	45	174	24	18	2	44	4	72	1	77	2	30	28	60	355
05:30 PM	44	86	66	196	21	15	8	44	12	67	1	80	1	37	27	65	385
Total Volume	178	381	208	767	80	67	19	166	25	277	10	312	7	121	102	230	1475
% App. Total	23.2	49.7	27.1		48.2	40.4	11.4		8	88.8	3.2		3	52.6	44.3		
PHF	.795	.962	.788	.935	.833	.761	.594	.943	.521	.962	.500	.963	.438	.818	.911	.885	.958

Peggy Malone & Associates

(888) 247-8602

File Name : 1-US 301 & US 17 (Tidewater Trail) PM
 Site Code :
 Start Date : 11/1/2018
 Page No : 1

Groups Printed- Truck

Start Time	US 301 Southbound					US 17 Westbound					US 301 Northbound					US 17 Eastbound					Int. Total
	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	
04:00 PM	1	12	0	0	13	2	0	0	0	2	0	11	0	0	11	0	1	0	0	1	27
04:15 PM	0	9	4	0	13	4	6	1	0	11	2	21	0	0	23	0	1	2	0	3	50
04:30 PM	0	9	4	0	13	6	4	0	0	10	1	11	0	0	12	0	0	1	0	1	36
04:45 PM	1	14	6	0	21	3	3	0	0	6	0	7	0	0	7	1	4	1	0	6	40
Total	2	44	14	0	60	15	13	1	0	29	3	50	0	0	53	1	6	4	0	11	153
05:00 PM	1	16	2	0	19	0	2	0	0	2	0	10	0	0	10	0	0	0	0	0	31
05:15 PM	2	6	3	0	11	1	4	0	0	5	0	6	0	0	6	0	3	1	0	4	26
05:30 PM	1	7	3	0	11	1	1	0	0	2	0	12	0	0	12	0	0	1	0	1	26
05:45 PM	2	12	2	0	16	2	0	0	0	2	0	9	0	0	9	0	2	0	0	2	29
Total	6	41	10	0	57	4	7	0	0	11	0	37	0	0	37	0	5	2	0	7	112
06:00 PM	2	6	2	0	10	1	1	1	0	3	2	5	0	0	7	0	2	0	0	2	22
06:15 PM	2	10	0	0	12	2	2	0	0	4	1	6	0	0	7	0	0	1	0	1	24
06:30 PM	0	15	1	0	16	3	1	0	0	4	1	4	0	0	5	0	1	0	0	1	26
06:45 PM	1	6	4	0	11	0	2	0	0	2	0	2	0	0	2	0	2	1	0	3	18
Total	5	37	7	0	49	6	6	1	0	13	4	17	0	0	21	0	5	2	0	7	90
Grand Total	13	122	31	0	166	25	26	2	0	53	7	104	0	0	111	1	16	8	0	25	355
Apprch %	7.8	73.5	18.7	0		47.2	49.1	3.8	0		6.3	93.7	0	0		4	64	32	0		
Total %	3.7	34.4	8.7	0	46.8	7	7.3	0.6	0	14.9	2	29.3	0	0	31.3	0.3	4.5	2.3	0	7	

Start Time	US 301 Southbound				US 17 Westbound				US 301 Northbound				US 17 Eastbound				Int. Total
	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	
Peak Hour Analysis From 04:00 PM to 06:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 04:15 PM																	
04:15 PM	0	9	4	13	4	6	1	11	2	21	0	23	0	1	2	3	50
04:30 PM	0	9	4	13	6	4	0	10	1	11	0	12	0	0	1	1	36
04:45 PM	1	14	6	21	3	3	0	6	0	7	0	7	1	4	1	6	40
05:00 PM	1	16	2	19	0	2	0	2	0	10	0	10	0	0	0	0	31
Total Volume	2	48	16	66	13	15	1	29	3	49	0	52	1	5	4	10	157
% App. Total	3	72.7	24.2		44.8	51.7	3.4		5.8	94.2	0		10	50	40		
PHF	.500	.750	.667	.786	.542	.625	.250	.659	.375	.583	.000	.565	.250	.313	.500	.417	.785

Peggy Malone & Associates

(888) 247-8602

File Name : 1-US 301 & US 17 (Tidewater Trail) PM
 Site Code :
 Start Date : 11/1/2018
 Page No : 1

Groups Printed- Combined

Start Time	US 301 Southbound					US 17 Westbound					US 301 Northbound					US 17 Eastbound					Int. Total
	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	
04:00 PM	32	87	46	0	165	19	15	7	0	41	13	82	7	0	102	2	39	18	0	59	367
04:15 PM	36	96	54	0	186	21	32	8	0	61	6	93	1	0	100	3	32	23	0	58	405
04:30 PM	65	97	55	0	217	27	21	2	0	50	8	85	0	0	93	6	29	19	0	54	414
04:45 PM	57	113	43	0	213	18	25	4	0	47	6	77	5	0	88	1	35	26	0	62	410
Total	190	393	198	0	781	85	93	21	0	199	33	337	13	0	383	12	135	86	0	233	1596
05:00 PM	47	115	62	0	224	20	14	5	0	39	3	78	3	1	85	4	23	22	0	49	397
05:15 PM	34	103	48	0	185	25	22	2	0	49	4	78	1	1	84	2	33	29	0	64	382
05:30 PM	45	93	69	0	207	22	16	8	0	46	12	79	1	0	92	1	37	28	0	66	411
05:45 PM	30	108	52	0	190	22	20	8	0	50	11	65	3	0	79	2	31	23	0	56	375
Total	156	419	231	0	806	89	72	23	0	184	30	300	8	2	340	9	124	102	0	235	1565
06:00 PM	46	98	55	0	199	20	14	5	0	39	8	61	3	0	72	0	34	21	0	55	365
06:15 PM	25	79	32	0	136	19	18	2	0	39	6	54	4	0	64	2	32	18	0	52	291
06:30 PM	23	80	37	0	140	22	10	4	0	36	2	49	2	0	53	1	28	11	0	40	269
06:45 PM	16	58	37	0	111	7	15	0	0	22	7	56	4	0	67	1	23	11	0	35	235
Total	110	315	161	0	586	68	57	11	0	136	23	220	13	0	256	4	117	61	0	182	1160
Grand Total	456	1127	590	0	2173	242	222	55	0	519	86	857	34	2	979	25	376	249	0	650	4321
Apprch %	21	51.9	27.2	0		46.6	42.8	10.6	0		8.8	87.5	3.5	0.2		3.8	57.8	38.3	0		
Total %	10.6	26.1	13.7	0	50.3	5.6	5.1	1.3	0	12	2	19.8	0.8	0	22.7	0.6	8.7	5.8	0	15	

Start Time	US 301 Southbound				US 17 Westbound				US 301 Northbound				US 17 Eastbound				Int. Total
	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	
Peak Hour Analysis From 04:00 PM to 06:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 04:15 PM																	
04:15 PM	36	96	54	186	21	32	8	61	6	93	1	100	3	32	23	58	405
04:30 PM	65	97	55	217	27	21	2	50	8	85	0	93	6	29	19	54	414
04:45 PM	57	113	43	213	18	25	4	47	6	77	5	88	1	35	26	62	410
05:00 PM	47	115	62	224	20	14	5	39	3	78	3	84	4	23	22	49	396
Total Volume	205	421	214	840	86	92	19	197	23	333	9	365	14	119	90	223	1625
% App. Total	24.4	50.1	25.5		43.7	46.7	9.6		6.3	91.2	2.5		6.3	53.4	40.4		
PHF	.788	.915	.863	.938	.796	.719	.594	.807	.719	.895	.450	.913	.583	.850	.865	.899	.981

Peggy Malone & Associates

(888) 247-8602

File Name : 1-US 301 and US 17 SUN
 Site Code :
 Start Date : 11/25/2018
 Page No : 1

Groups Printed- Car

Start Time	US 301 Southbound					US 17 Westbound					US 301 Northbound					US 17 Eastbound					Int. Total
	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	
03:00 PM	12	179	80	0	271	72	29	5	0	106	2	262	12	0	276	5	39	20	0	64	717
03:15 PM	15	204	102	0	321	84	35	2	0	121	2	284	3	0	289	1	20	13	0	34	765
03:30 PM	19	167	73	0	259	80	38	10	0	128	3	279	0	0	282	3	56	17	0	76	745
03:45 PM	12	173	62	0	247	59	26	2	0	87	8	268	3	0	279	1	39	15	0	55	668
Total	58	723	317	0	1098	295	128	19	0	442	15	1093	18	0	1126	10	154	65	0	229	2895
04:00 PM	10	171	88	0	269	86	47	4	0	137	1	191	1	0	193	1	47	12	0	60	659
04:15 PM	15	200	65	0	280	79	47	3	0	129	3	219	4	0	226	2	44	11	0	57	692
04:30 PM	12	216	82	0	310	76	35	3	0	114	5	264	2	0	271	4	29	20	0	53	748
04:45 PM	9	157	66	0	232	71	34	2	3	110	5	181	1	0	187	0	46	22	0	68	597
Total	46	744	301	0	1091	312	163	12	3	490	14	855	8	0	877	7	166	65	0	238	2696
05:00 PM	8	151	62	0	221	70	30	7	0	107	7	236	1	0	244	2	35	11	0	48	620
05:15 PM	14	161	66	0	241	69	34	7	0	110	4	224	4	0	232	1	26	7	0	34	617
05:30 PM	13	150	65	0	228	50	38	4	0	92	3	188	5	0	196	1	22	9	0	32	548
05:45 PM	12	162	71	0	245	63	35	7	0	105	1	134	3	0	138	1	23	9	0	33	521
Total	47	624	264	0	935	252	137	25	0	414	15	782	13	0	810	5	106	36	0	147	2306
06:00 PM	6	162	60	0	228	50	34	5	0	89	3	119	2	0	124	2	35	12	0	49	490
06:15 PM	11	143	49	0	203	49	23	2	0	74	2	220	3	0	225	1	31	12	0	44	546
06:30 PM	10	124	57	0	191	27	22	4	0	53	4	135	4	0	143	1	34	5	0	40	427
06:45 PM	9	139	35	0	183	38	18	4	0	60	0	182	3	0	185	2	24	6	0	32	460
Total	36	568	201	0	805	164	97	15	0	276	9	656	12	0	677	6	124	35	0	165	1923
Grand Total	187	2659	1083	0	3929	1023	525	71	3	1622	53	3386	51	0	3490	28	550	201	0	779	9820
Apprch %	4.8	67.7	27.6	0		63.1	32.4	4.4	0.2		1.5	97	1.5	0		3.6	70.6	25.8	0		
Total %	1.9	27.1	11	0	40	10.4	5.3	0.7	0	16.5	0.5	34.5	0.5	0	35.5	0.3	5.6	2	0	7.9	

Start Time	US 301 Southbound				US 17 Westbound				US 301 Northbound				US 17 Eastbound				Int. Total
	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	
Peak Hour Analysis From 03:00 PM to 06:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 03:00 PM																	
03:00 PM	12	179	80	271	72	29	5	106	2	262	12	276	5	39	20	64	717
03:15 PM	15	204	102	321	84	35	2	121	2	284	3	289	1	20	13	34	765
03:30 PM	19	167	73	259	80	38	10	128	3	279	0	282	3	56	17	76	745
03:45 PM	12	173	62	247	59	26	2	87	8	268	3	279	1	39	15	55	668
Total Volume	58	723	317	1098	295	128	19	442	15	1093	18	1126	10	154	65	229	2895
% App. Total	5.3	65.8	28.9		66.7	29	4.3		1.3	97.1	1.6		4.4	67.2	28.4		
PHF	.763	.886	.777	.855	.878	.842	.475	.863	.469	.962	.375	.974	.500	.688	.813	.753	.946

Peggy Malone & Associates

(888) 247-8602

File Name : 1-US 301 and US 17 SUN
 Site Code :
 Start Date : 11/25/2018
 Page No : 1

Groups Printed- Truck

Start Time	US 301 Southbound					US 17 Westbound					US 301 Northbound					US 17 Eastbound					Int. Total
	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	
03:00 PM	0	8	2	0	10	0	1	0	0	1	2	5	0	0	7	0	0	0	0	0	18
03:15 PM	0	5	0	0	5	1	0	0	0	1	0	9	0	0	9	0	1	0	0	1	16
03:30 PM	0	3	0	0	3	1	0	0	0	1	0	5	0	0	5	0	0	0	0	0	9
03:45 PM	0	8	0	0	8	1	1	0	0	2	0	9	0	0	9	0	0	0	0	0	19
Total	0	24	2	0	26	3	2	0	0	5	2	28	0	0	30	0	1	0	0	1	62
04:00 PM	0	3	1	0	4	0	0	0	0	0	0	7	0	0	7	0	0	0	0	0	11
04:15 PM	0	5	0	0	5	0	0	1	0	1	0	6	0	0	6	0	1	0	0	1	13
04:30 PM	0	1	0	0	1	1	0	0	0	1	0	4	0	0	4	0	2	0	0	2	8
04:45 PM	0	10	1	0	11	0	0	0	0	0	0	7	0	0	7	0	0	0	0	0	18
Total	0	19	2	0	21	1	0	1	0	2	0	24	0	0	24	0	3	0	0	3	50
05:00 PM	2	4	0	0	6	0	0	0	0	0	0	4	2	0	6	0	0	0	0	0	12
05:15 PM	0	7	2	0	9	0	0	0	0	0	0	6	0	0	6	0	0	2	0	2	17
05:30 PM	1	3	0	0	4	0	0	0	0	0	0	10	0	0	10	2	0	0	0	2	16
05:45 PM	0	6	1	0	7	0	0	1	0	1	0	3	0	0	3	0	1	0	0	1	12
Total	3	20	3	0	26	0	0	1	0	1	0	23	2	0	25	2	1	2	0	5	57
06:00 PM	1	3	1	0	5	0	0	0	0	0	0	5	1	0	6	1	0	1	0	2	13
06:15 PM	0	1	0	0	1	0	0	0	0	0	0	7	0	0	7	0	1	1	0	2	10
06:30 PM	0	3	3	0	6	0	0	0	0	0	0	4	0	0	4	0	0	1	0	1	11
06:45 PM	0	3	0	0	3	0	0	0	0	0	0	10	0	0	10	0	1	1	0	2	15
Total	1	10	4	0	15	0	0	0	0	0	0	26	1	0	27	1	2	4	0	7	49
Grand Total	4	73	11	0	88	4	2	2	0	8	2	101	3	0	106	3	7	6	0	16	218
Apprch %	4.5	83	12.5	0		50	25	25	0		1.9	95.3	2.8	0		18.8	43.8	37.5	0		
Total %	1.8	33.5	5	0	40.4	1.8	0.9	0.9	0	3.7	0.9	46.3	1.4	0	48.6	1.4	3.2	2.8	0	7.3	

Start Time	US 301 Southbound				US 17 Westbound				US 301 Northbound				US 17 Eastbound				Int. Total
	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	
Peak Hour Analysis From 03:00 PM to 06:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 04:45 PM																	
04:45 PM	0	10	1	11	0	0	0	0	0	7	0	7	0	0	0	0	18
05:00 PM	2	4	0	6	0	0	0	0	0	4	2	6	0	0	0	0	12
05:15 PM	0	7	2	9	0	0	0	0	0	6	0	6	0	0	2	2	17
05:30 PM	1	3	0	4	0	0	0	0	0	10	0	10	2	0	0	2	16
Total Volume	3	24	3	30	0	0	0	0	0	27	2	29	2	0	2	4	63
% App. Total	10	80	10		0	0	0		0	93.1	6.9		50	0	50		
PHF	.375	.600	.375	.682	.000	.000	.000	.000	.000	.675	.250	.725	.250	.000	.250	.500	.875

Peggy Malone & Associates

(888) 247-8602

File Name : 1-US 301 and US 17 SUN
 Site Code :
 Start Date : 11/25/2018
 Page No : 1

Groups Printed- Combined

Start Time	US 301 Southbound					US 17 Westbound					US 301 Northbound					US 17 Eastbound					Int. Total
	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	
03:00 PM	12	187	82	0	281	72	30	5	0	107	4	267	12	0	283	5	39	20	0	64	735
03:15 PM	15	209	102	0	326	85	35	2	0	122	2	293	3	0	298	1	21	13	0	35	781
03:30 PM	19	170	73	0	262	81	38	10	0	129	3	284	0	0	287	3	56	17	0	76	754
03:45 PM	12	181	62	0	255	60	27	2	0	89	8	277	3	0	288	1	39	15	0	55	687
Total	58	747	319	0	1124	298	130	19	0	447	17	1121	18	0	1156	10	155	65	0	230	2957
04:00 PM	10	174	89	0	273	86	47	4	0	137	1	198	1	0	200	1	47	12	0	60	670
04:15 PM	15	205	65	0	285	79	47	4	0	130	3	225	4	0	232	2	45	11	0	58	705
04:30 PM	12	217	82	0	311	77	35	3	0	115	5	268	2	0	275	4	31	20	0	55	756
04:45 PM	9	167	67	0	243	71	34	2	3	110	5	188	1	0	194	0	46	22	0	68	615
Total	46	763	303	0	1112	313	163	13	3	492	14	879	8	0	901	7	169	65	0	241	2746
05:00 PM	10	155	62	0	227	70	30	7	0	107	7	240	3	0	250	2	35	11	0	48	632
05:15 PM	14	168	68	0	250	69	34	7	0	110	4	230	4	0	238	1	26	9	0	36	634
05:30 PM	14	153	65	0	232	50	38	4	0	92	3	198	5	0	206	3	22	9	0	34	564
05:45 PM	12	168	72	0	252	63	35	8	0	106	1	137	3	0	141	1	24	9	0	34	533
Total	50	644	267	0	961	252	137	26	0	415	15	805	15	0	835	7	107	38	0	152	2363
06:00 PM	7	165	61	0	233	50	34	5	0	89	3	124	3	0	130	3	35	13	0	51	503
06:15 PM	11	144	49	0	204	49	23	2	0	74	2	227	3	0	232	1	32	13	0	46	556
06:30 PM	10	127	60	0	197	27	22	4	0	53	4	139	4	0	147	1	34	6	0	41	438
06:45 PM	9	142	35	0	186	38	18	4	0	60	0	192	3	0	195	2	25	7	0	34	475
Total	37	578	205	0	820	164	97	15	0	276	9	682	13	0	704	7	126	39	0	172	1972
Grand Total	191	2732	1094	0	4017	1027	527	73	3	1630	55	3487	54	0	3596	31	557	207	0	795	10038
Apprch %	4.8	68	27.2	0		63	32.3	4.5	0.2		1.5	97	1.5	0		3.9	70.1	26	0		
Total %	1.9	27.2	10.9	0	40	10.2	5.3	0.7	0	16.2	0.5	34.7	0.5	0	35.8	0.3	5.5	2.1	0	7.9	

Start Time	US 301 Southbound				US 17 Westbound				US 301 Northbound				US 17 Eastbound				Int. Total
	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	
Peak Hour Analysis From 03:00 PM to 06:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 03:00 PM																	
03:00 PM	12	187	82	281	72	30	5	107	4	267	12	283	5	39	20	64	735
03:15 PM	15	209	102	326	85	35	2	122	2	293	3	298	1	21	13	35	781
03:30 PM	19	170	73	262	81	38	10	129	3	284	0	287	3	56	17	76	754
03:45 PM	12	181	62	255	60	27	2	89	8	277	3	288	1	39	15	55	687
Total Volume	58	747	319	1124	298	130	19	447	17	1121	18	1156	10	155	65	230	2957
% App. Total	5.2	66.5	28.4		66.7	29.1	4.3		1.5	97	1.6		4.3	67.4	28.3		
PHF	.763	.894	.782	.862	.876	.855	.475	.866	.531	.956	.375	.970	.500	.692	.813	.757	.947

Peggy Malone & Associates

(888) 247-8602

File Name : 2-FRI-US 301 & Back St FRI
 Site Code :
 Start Date : 11/2/2018
 Page No : 1

Groups Printed- Car

Start Time	US 301 Southbound				Back St Westbound				US 301 Northbound				Int. Total
	Thru	Left	Peds	App. Total	Right	Left	Peds	App. Total	Right	Thru	Peds	App. Total	
03:00 PM	222	0	0	222	0	1	0	1	0	138	0	138	361
03:15 PM	203	0	0	203	0	1	0	1	2	151	0	153	357
03:30 PM	202	0	0	202	1	2	0	3	2	151	0	153	358
03:45 PM	219	0	0	219	0	0	0	0	0	140	0	140	359
Total	846	0	0	846	1	4	0	5	4	580	0	584	1435
04:00 PM	236	0	0	236	0	1	0	1	1	151	0	152	389
04:15 PM	223	2	0	225	0	2	0	2	3	161	0	164	391
04:30 PM	245	2	0	247	1	2	0	3	2	127	0	129	379
04:45 PM	244	0	0	244	1	1	0	2	3	157	0	160	406
Total	948	4	0	952	2	6	0	8	9	596	0	605	1565
05:00 PM	240	0	0	240	0	0	0	0	1	135	0	136	376
05:15 PM	227	3	0	230	0	2	0	2	0	133	0	133	365
05:30 PM	204	0	0	204	0	1	0	1	2	128	0	130	335
05:45 PM	202	1	0	203	0	0	0	0	0	118	0	118	321
Total	873	4	0	877	0	3	0	3	3	514	0	517	1397
06:00 PM	156	0	0	156	0	2	0	2	4	104	0	108	266
06:15 PM	128	1	0	129	2	3	0	5	2	103	0	105	239
06:30 PM	140	1	0	141	1	3	0	4	1	94	0	95	240
06:45 PM	119	0	0	119	0	2	0	2	4	100	0	104	225
Total	543	2	0	545	3	10	0	13	11	401	0	412	970
Grand Total	3210	10	0	3220	6	23	0	29	27	2091	0	2118	5367
Apprch %	99.7	0.3	0		20.7	79.3	0		1.3	98.7	0		
Total %	59.8	0.2	0	60	0.1	0.4	0	0.5	0.5	39	0	39.5	

Start Time	US 301 Southbound			Back St Westbound			US 301 Northbound			Int. Total
	Thru	Left	App. Total	Right	Left	App. Total	Right	Thru	App. Total	
Peak Hour Analysis From 03:00 PM to 06:45 PM - Peak 1 of 1										
Peak Hour for Entire Intersection Begins at 04:00 PM										
04:00 PM	236	0	236	0	1	1	1	151	152	389
04:15 PM	223	2	225	0	2	2	3	161	164	391
04:30 PM	245	2	247	1	2	3	2	127	129	379
04:45 PM	244	0	244	1	1	2	3	157	160	406
Total Volume	948	4	952	2	6	8	9	596	605	1565
% App. Total	99.6	0.4		25	75		1.5	98.5		
PHF	.967	.500	.964	.500	.750	.667	.750	.925	.922	.964

Peggy Malone & Associates

(888) 247-8602

File Name : 2-FRI-US 301 & Back St FRI
 Site Code :
 Start Date : 11/2/2018
 Page No : 1

Groups Printed- Truck

Start Time	US 301 Southbound				Back St Westbound				US 301 Northbound				Int. Total
	Thru	Left	Peds	App. Total	Right	Left	Peds	App. Total	Right	Thru	Peds	App. Total	
03:00 PM	15	0	0	15	0	0	0	0	0	7	0	7	22
03:15 PM	13	0	0	13	0	0	0	0	1	14	0	15	28
03:30 PM	9	0	0	9	0	0	0	0	0	15	0	15	24
03:45 PM	8	0	0	8	0	0	0	0	0	14	0	14	22
Total	45	0	0	45	0	0	0	0	1	50	0	51	96
04:00 PM	15	0	0	15	0	0	0	0	0	7	0	7	22
04:15 PM	11	0	0	11	0	0	0	0	0	12	0	12	23
04:30 PM	14	0	0	14	0	0	0	0	1	7	0	8	22
04:45 PM	10	0	0	10	0	0	0	0	0	10	0	10	20
Total	50	0	0	50	0	0	0	0	1	36	0	37	87
05:00 PM	10	0	0	10	0	0	0	0	0	3	0	3	13
05:15 PM	11	0	0	11	0	0	0	0	0	9	0	9	20
05:30 PM	12	0	0	12	0	0	0	0	0	11	0	11	23
05:45 PM	15	0	0	15	0	0	0	0	0	3	0	3	18
Total	48	0	0	48	0	0	0	0	0	26	0	26	74
06:00 PM	11	0	0	11	0	0	0	0	0	3	0	3	14
06:15 PM	9	0	0	9	0	0	0	0	0	10	0	10	19
06:30 PM	8	0	0	8	0	0	0	0	0	1	0	1	9
06:45 PM	9	0	0	9	0	0	0	0	0	4	0	4	13
Total	37	0	0	37	0	0	0	0	0	18	0	18	55
Grand Total	180	0	0	180	0	0	0	0	2	130	0	132	312
Apprch %	100	0	0		0	0	0		1.5	98.5	0		
Total %	57.7	0	0	57.7	0	0	0	0	0.6	41.7	0	42.3	

Start Time	US 301 Southbound			Back St Westbound			US 301 Northbound			Int. Total
	Thru	Left	App. Total	Right	Left	App. Total	Right	Thru	App. Total	
Peak Hour Analysis From 03:00 PM to 06:45 PM - Peak 1 of 1										
Peak Hour for Entire Intersection Begins at 03:00 PM										
03:00 PM	15	0	15	0	0	0	0	7	7	22
03:15 PM	13	0	13	0	0	0	1	14	15	28
03:30 PM	9	0	9	0	0	0	0	15	15	24
03:45 PM	8	0	8	0	0	0	0	14	14	22
Total Volume	45	0	45	0	0	0	1	50	51	96
% App. Total	100	0		0	0		2	98		
PHF	.750	.000	.750	.000	.000	.000	.250	.833	.850	.857

Peggy Malone & Associates

(888) 247-8602

File Name : 2-FRI-US 301 & Back St FRI
 Site Code :
 Start Date : 11/2/2018
 Page No : 1

Groups Printed- Combined

Start Time	US 301 Southbound				Back St Westbound				US 301 Northbound				Int. Total
	Thru	Left	Peds	App. Total	Right	Left	Peds	App. Total	Right	Thru	Peds	App. Total	
03:00 PM	237	0	0	237	0	1	0	1	0	145	0	145	383
03:15 PM	216	0	0	216	0	1	0	1	3	165	0	168	385
03:30 PM	211	0	0	211	1	2	0	3	2	166	0	168	382
03:45 PM	227	0	0	227	0	0	0	0	0	154	0	154	381
Total	891	0	0	891	1	4	0	5	5	630	0	635	1531
04:00 PM	251	0	0	251	0	1	0	1	1	158	0	159	411
04:15 PM	234	2	0	236	0	2	0	2	3	173	0	176	414
04:30 PM	259	2	0	261	1	2	0	3	3	134	0	137	401
04:45 PM	254	0	0	254	1	1	0	2	3	167	0	170	426
Total	998	4	0	1002	2	6	0	8	10	632	0	642	1652
05:00 PM	250	0	0	250	0	0	0	0	1	138	0	139	389
05:15 PM	238	3	0	241	0	2	0	2	0	142	0	142	385
05:30 PM	216	0	0	216	0	1	0	1	2	139	0	141	358
05:45 PM	217	1	0	218	0	0	0	0	0	121	0	121	339
Total	921	4	0	925	0	3	0	3	3	540	0	543	1471
06:00 PM	167	0	0	167	0	2	0	2	4	107	0	111	280
06:15 PM	137	1	0	138	2	3	0	5	2	113	0	115	258
06:30 PM	148	1	0	149	1	3	0	4	1	95	0	96	249
06:45 PM	128	0	0	128	0	2	0	2	4	104	0	108	238
Total	580	2	0	582	3	10	0	13	11	419	0	430	1025
Grand Total	3390	10	0	3400	6	23	0	29	29	2221	0	2250	5679
Apprch %	99.7	0.3	0		20.7	79.3	0		1.3	98.7	0		
Total %	59.7	0.2	0	59.9	0.1	0.4	0	0.5	0.5	39.1	0	39.6	

Start Time	US 301 Southbound			Back St Westbound			US 301 Northbound			Int. Total
	Thru	Left	App. Total	Right	Left	App. Total	Right	Thru	App. Total	
Peak Hour Analysis From 03:00 PM to 06:45 PM - Peak 1 of 1										
Peak Hour for Entire Intersection Begins at 04:00 PM										
04:00 PM	251	0	251	0	1	1	1	158	159	411
04:15 PM	234	2	236	0	2	2	3	173	176	414
04:30 PM	259	2	261	1	2	3	3	134	137	401
04:45 PM	254	0	254	1	1	2	3	167	170	426
Total Volume	998	4	1002	2	6	8	10	632	642	1652
% App. Total	99.6	0.4		25	75		1.6	98.4		
PHF	.963	.500	.960	.500	.750	.667	.833	.913	.912	.969

Peggy Malone & Associates

(888) 247-8602

File Name : 2-US 301 & Back St AM
 Site Code :
 Start Date : 11/1/2018
 Page No : 1

Groups Printed- Car

Start Time	US 301 Southbound				Back St Westbound				US 301 Northbound				Int. Total
	Thru	Left	Peds	App. Total	Right	Left	Peds	App. Total	Right	Thru	Peds	App. Total	
06:00 AM	38	1	0	39	0	2	0	2	2	79	0	81	122
06:15 AM	71	0	0	71	0	2	0	2	2	94	0	96	169
06:30 AM	83	1	0	84	2	1	0	3	0	141	0	141	228
06:45 AM	77	0	0	77	0	1	0	1	0	120	0	120	198
Total	269	2	0	271	2	6	0	8	4	434	0	438	717
07:00 AM	75	1	0	76	0	0	0	0	1	110	0	111	187
07:15 AM	91	0	0	91	0	2	0	2	1	117	0	118	211
07:30 AM	79	0	0	79	0	2	0	2	1	131	0	132	213
07:45 AM	65	1	0	66	1	2	0	3	1	125	0	126	195
Total	310	2	0	312	1	6	0	7	4	483	0	487	806
08:00 AM	88	0	0	88	1	2	0	3	0	103	0	103	194
08:15 AM	91	0	0	91	0	4	0	4	2	104	0	106	201
08:30 AM	84	0	0	84	0	1	0	1	1	98	0	99	184
08:45 AM	84	0	0	84	0	0	0	0	0	87	0	87	171
Total	347	0	0	347	1	7	0	8	3	392	0	395	750
Grand Total	926	4	0	930	4	19	0	23	11	1309	0	1320	2273
Apprch %	99.6	0.4	0		17.4	82.6	0		0.8	99.2	0		
Total %	40.7	0.2	0	40.9	0.2	0.8	0	1	0.5	57.6	0	58.1	

Start Time	US 301 Southbound			Back St Westbound			US 301 Northbound			Int. Total
	Thru	Left	App. Total	Right	Left	App. Total	Right	Thru	App. Total	
Peak Hour Analysis From 06:00 AM to 08:45 AM - Peak 1 of 1										
Peak Hour for Entire Intersection Begins at 06:30 AM										
06:30 AM	83	1	84	2	1	3	0	141	141	228
06:45 AM	77	0	77	0	1	1	0	120	120	198
07:00 AM	75	1	76	0	0	0	1	110	111	187
07:15 AM	91	0	91	0	2	2	1	117	118	211
Total Volume	326	2	328	2	4	6	2	488	490	824
% App. Total	99.4	0.6		33.3	66.7		0.4	99.6		
PHF	.896	.500	.901	.250	.500	.500	.500	.865	.869	.904

Peggy Malone & Associates

(888) 247-8602

File Name : 2-US 301 & Back St AM
 Site Code :
 Start Date : 11/1/2018
 Page No : 1

Groups Printed- Truck

Start Time	US 301 Southbound				Back St Westbound				US 301 Northbound				Int. Total	
	Thru	Left	Peds	App. Total	Right	Left	Peds	App. Total	Right	Thru	Peds	App. Total		
06:00 AM	9	0	0	9	0	0	0	0	0	4	0	4	13	
06:15 AM	11	0	0	11	0	0	0	0	0	12	0	13	24	
06:30 AM	7	0	0	7	0	0	0	0	0	18	0	18	25	
06:45 AM	10	0	0	10	0	0	0	0	0	18	0	18	28	
Total	37	0	0	37	0	0	0	0	0	1	52	0	53	90
07:00 AM	8	0	0	8	0	0	0	0	0	12	0	12	20	
07:15 AM	7	0	0	7	0	0	0	0	0	11	0	11	18	
07:30 AM	15	0	0	15	0	0	0	0	0	9	0	9	24	
07:45 AM	10	0	0	10	0	1	0	1	0	18	0	18	29	
Total	40	0	0	40	0	1	0	1	0	50	0	50	91	
08:00 AM	7	0	0	7	0	0	0	0	0	13	0	13	20	
08:15 AM	7	0	0	7	0	0	0	0	0	16	0	16	23	
08:30 AM	8	0	0	8	0	0	0	0	0	16	0	16	24	
08:45 AM	7	0	0	7	0	0	0	0	0	19	0	19	26	
Total	29	0	0	29	0	0	0	0	0	64	0	64	93	
Grand Total	106	0	0	106	0	1	0	1	1	166	0	167	274	
Apprch %	100	0	0		0	100	0		0.6	99.4	0			
Total %	38.7	0	0	38.7	0	0.4	0	0.4	0.4	60.6	0	60.9		

Start Time	US 301 Southbound			Back St Westbound			US 301 Northbound			Int. Total	
	Thru	Left	App. Total	Right	Left	App. Total	Right	Thru	App. Total		
Peak Hour Analysis From 06:00 AM to 08:45 AM - Peak 1 of 1											
Peak Hour for Entire Intersection Begins at 06:15 AM											
06:15 AM	11	0	11	0	0	0	0	1	12	13	24
06:30 AM	7	0	7	0	0	0	0	0	18	18	25
06:45 AM	10	0	10	0	0	0	0	0	18	18	28
07:00 AM	8	0	8	0	0	0	0	0	12	12	20
Total Volume	36	0	36	0	0	0	0	1	60	61	97
% App. Total	100	0	100	0	0	0	0	1.6	98.4	100	100
PHF	.818	.000	.818	.000	.000	.000	.000	.250	.833	.847	.866

Peggy Malone & Associates

(888) 247-8602

File Name : 2-US 301 & Back St AM
 Site Code :
 Start Date : 11/1/2018
 Page No : 1

Groups Printed- Combined

Start Time	US 301 Southbound				Back St Westbound				US 301 Northbound				Int. Total
	Thru	Left	Peds	App. Total	Right	Left	Peds	App. Total	Right	Thru	Peds	App. Total	
06:00 AM	47	1	0	48	0	2	0	2	2	83	0	85	135
06:15 AM	82	0	0	82	0	2	0	2	3	106	0	109	193
06:30 AM	90	1	0	91	2	1	0	3	0	159	0	159	253
06:45 AM	87	0	0	87	0	1	0	1	0	138	0	138	226
Total	306	2	0	308	2	6	0	8	5	486	0	491	807
07:00 AM	83	1	0	84	0	0	0	0	1	122	0	123	207
07:15 AM	98	0	0	98	0	2	0	2	1	128	0	129	229
07:30 AM	94	0	0	94	0	2	0	2	1	140	0	141	237
07:45 AM	75	1	0	76	1	3	0	4	1	143	0	144	224
Total	350	2	0	352	1	7	0	8	4	533	0	537	897
08:00 AM	95	0	0	95	1	2	0	3	0	116	0	116	214
08:15 AM	98	0	0	98	0	4	0	4	2	120	0	122	224
08:30 AM	92	0	0	92	0	1	0	1	1	114	0	115	208
08:45 AM	91	0	0	91	0	0	0	0	0	106	0	106	197
Total	376	0	0	376	1	7	0	8	3	456	0	459	843
Grand Total	1032	4	0	1036	4	20	0	24	12	1475	0	1487	2547
Apprch %	99.6	0.4	0		16.7	83.3	0		0.8	99.2	0		
Total %	40.5	0.2	0	40.7	0.2	0.8	0	0.9	0.5	57.9	0	58.4	

Start Time	US 301 Southbound			Back St Westbound			US 301 Northbound			Int. Total
	Thru	Left	App. Total	Right	Left	App. Total	Right	Thru	App. Total	
Peak Hour Analysis From 06:00 AM to 08:45 AM - Peak 1 of 1										
Peak Hour for Entire Intersection Begins at 06:30 AM										
06:30 AM	90	1	91	2	1	3	0	159	159	253
06:45 AM	87	0	87	0	1	1	0	138	138	226
07:00 AM	83	1	84	0	0	0	1	122	123	207
07:15 AM	98	0	98	0	2	2	1	128	129	229
Total Volume	358	2	360	2	4	6	2	547	549	915
% App. Total	99.4	0.6		33.3	66.7		0.4	99.6		
PHF	.913	.500	.918	.250	.500	.500	.500	.860	.863	.904

Peggy Malone & Associates

(888) 247-8602

File Name : 2-US 301 & Back St PM
 Site Code :
 Start Date : 11/1/2018
 Page No : 1

Groups Printed- Car

Start Time	US 301 Southbound				Back St Westbound				US 301 Northbound				Int. Total
	Thru	Left	Peds	App. Total	Right	Left	Peds	App. Total	Right	Thru	Peds	App. Total	
04:00 PM	151	0	0	151	0	2	0	2	2	97	0	99	252
04:15 PM	184	1	0	185	0	0	0	0	3	108	0	111	296
04:30 PM	210	0	0	210	0	1	0	1	2	124	0	126	337
04:45 PM	191	1	0	192	1	0	0	1	1	104	0	105	298
Total	736	2	0	738	1	3	0	4	8	433	0	441	1183
05:00 PM	217	0	0	217	1	0	0	1	1	112	0	113	331
05:15 PM	169	0	0	169	0	0	0	0	1	111	0	112	281
05:30 PM	193	0	0	193	0	0	0	0	0	116	0	116	309
05:45 PM	183	0	0	183	1	3	0	4	5	102	0	107	294
Total	762	0	0	762	2	3	0	5	7	441	0	448	1215
06:00 PM	176	2	0	178	0	1	0	1	5	90	0	95	274
06:15 PM	119	0	0	119	0	2	0	2	1	80	0	81	202
06:30 PM	123	1	0	124	0	0	0	0	2	72	0	74	198
06:45 PM	95	0	0	95	1	2	0	3	4	57	0	61	159
Total	513	3	0	516	1	5	0	6	12	299	0	311	833
Grand Total	2011	5	0	2016	4	11	0	15	27	1173	0	1200	3231
Apprch %	99.8	0.2	0		26.7	73.3	0		2.2	97.8	0		
Total %	62.2	0.2	0	62.4	0.1	0.3	0	0.5	0.8	36.3	0	37.1	

Start Time	US 301 Southbound			Back St Westbound			US 301 Northbound			Int. Total
	Thru	Left	App. Total	Right	Left	App. Total	Right	Thru	App. Total	
Peak Hour Analysis From 04:00 PM to 06:45 PM - Peak 1 of 1										
Peak Hour for Entire Intersection Begins at 04:15 PM										
04:15 PM	184	1	185	0	0	0	3	108	111	296
04:30 PM	210	0	210	0	1	1	2	124	126	337
04:45 PM	191	1	192	1	0	1	1	104	105	298
05:00 PM	217	0	217	1	0	1	1	112	113	331
Total Volume	802	2	804	2	1	3	7	448	455	1262
% App. Total	99.8	0.2		66.7	33.3		1.5	98.5		
PHF	.924	.500	.926	.500	.250	.750	.583	.903	.903	.936

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(888) 247-8602

File Name : 2-US 301 & Back St PM
 Site Code :
 Start Date : 11/1/2018
 Page No : 1

Groups Printed- Truck

Start Time	US 301 Southbound				Back St Westbound				US 301 Northbound				Int. Total
	Thru	Left	Peds	App. Total	Right	Left	Peds	App. Total	Right	Thru	Peds	App. Total	
04:00 PM	14	0	0	14	0	0	0	0	0	15	0	15	29
04:15 PM	13	0	0	13	0	0	0	0	0	23	0	23	36
04:30 PM	13	0	0	13	0	0	0	0	1	21	0	22	35
04:45 PM	21	0	0	21	0	0	0	0	0	11	0	11	32
Total	61	0	0	61	0	0	0	0	1	70	0	71	132
05:00 PM	15	0	0	15	0	0	0	0	0	10	0	10	25
05:15 PM	13	0	0	13	0	0	0	0	0	8	0	8	21
05:30 PM	10	0	0	10	0	0	0	0	0	13	0	13	23
05:45 PM	18	0	0	18	0	0	0	0	0	12	0	12	30
Total	56	0	0	56	0	0	0	0	0	43	0	43	99
06:00 PM	9	0	0	9	0	0	0	0	0	6	0	6	15
06:15 PM	11	0	0	11	0	0	0	0	0	9	0	9	20
06:30 PM	16	0	0	16	0	0	0	0	0	5	0	5	21
06:45 PM	12	0	0	12	0	0	0	0	0	4	0	4	16
Total	48	0	0	48	0	0	0	0	0	24	0	24	72
Grand Total	165	0	0	165	0	0	0	0	1	137	0	138	303
Apprch %	100	0	0		0	0	0		0.7	99.3	0		
Total %	54.5	0	0	54.5	0	0	0		0.3	45.2	0	45.5	

Start Time	US 301 Southbound			Back St Westbound			US 301 Northbound			Int. Total
	Thru	Left	App. Total	Right	Left	App. Total	Right	Thru	App. Total	
Peak Hour Analysis From 04:00 PM to 06:45 PM - Peak 1 of 1										
Peak Hour for Entire Intersection Begins at 04:00 PM										
04:00 PM	14	0	14	0	0	0	0	15	15	29
04:15 PM	13	0	13	0	0	0	0	23	23	36
04:30 PM	13	0	13	0	0	0	1	21	22	35
04:45 PM	21	0	21	0	0	0	0	11	11	32
Total Volume	61	0	61	0	0	0	1	70	71	132
% App. Total	100	0		0	0		1.4	98.6		
PHF	.726	.000	.726	.000	.000	.000	.250	.761	.772	.917

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(888) 247-8602

File Name : 2-US 301 & Back St PM
 Site Code :
 Start Date : 11/1/2018
 Page No : 1

Groups Printed- Combined

Start Time	US 301 Southbound				Back St Westbound				US 301 Northbound				Int. Total
	Thru	Left	Peds	App. Total	Right	Left	Peds	App. Total	Right	Thru	Peds	App. Total	
04:00 PM	165	0	0	165	0	2	0	2	2	112	0	114	281
04:15 PM	197	1	0	198	0	0	0	0	3	131	0	134	332
04:30 PM	223	0	0	223	0	1	0	1	3	145	0	148	372
04:45 PM	212	1	0	213	1	0	0	1	1	115	0	116	330
Total	797	2	0	799	1	3	0	4	9	503	0	512	1315
05:00 PM	232	0	0	232	1	0	0	1	1	122	0	123	356
05:15 PM	182	0	0	182	0	0	0	0	1	119	0	120	302
05:30 PM	203	0	0	203	0	0	0	0	0	129	0	129	332
05:45 PM	201	0	0	201	1	3	0	4	5	114	0	119	324
Total	818	0	0	818	2	3	0	5	7	484	0	491	1314
06:00 PM	185	2	0	187	0	1	0	1	5	96	0	101	289
06:15 PM	130	0	0	130	0	2	0	2	1	89	0	90	222
06:30 PM	139	1	0	140	0	0	0	0	2	77	0	79	219
06:45 PM	107	0	0	107	1	2	0	3	4	61	0	65	175
Total	561	3	0	564	1	5	0	6	12	323	0	335	905
Grand Total	2176	5	0	2181	4	11	0	15	28	1310	0	1338	3534
Apprch %	99.8	0.2	0		26.7	73.3	0		2.1	97.9	0		
Total %	61.6	0.1	0	61.7	0.1	0.3	0	0.4	0.8	37.1	0	37.9	

Start Time	US 301 Southbound			Back St Westbound			US 301 Northbound			Int. Total
	Thru	Left	App. Total	Right	Left	App. Total	Right	Thru	App. Total	
Peak Hour Analysis From 04:00 PM to 06:45 PM - Peak 1 of 1										
Peak Hour for Entire Intersection Begins at 04:15 PM										
04:15 PM	197	1	198	0	0	0	3	131	134	332
04:30 PM	223	0	223	0	1	1	3	145	148	372
04:45 PM	212	1	213	1	0	1	1	115	116	330
05:00 PM	232	0	232	1	0	1	1	122	123	356
Total Volume	864	2	866	2	1	3	8	513	521	1390
% App. Total	99.8	0.2		66.7	33.3		1.5	98.5		
PHF	.931	.500	.933	.500	.250	.750	.667	.884	.880	.934

Peggy Malone & Associates

(888) 247-8602

File Name : 2-US 301 and Back St SUN
 Site Code :
 Start Date : 11/25/2018
 Page No : 1

Groups Printed- Car

Start Time	US301 Southbound				Back St. Westbound				US301 Northbound				Int. Total
	Thru	Left	Peds	App. Total	Right	Left	Peds	App. Total	Right	Thru	Peds	App. Total	
03:00 PM	322	0	0	322	0	2	0	2	5	346	0	351	675
03:15 PM	262	0	0	262	1	1	0	2	1	370	0	371	635
03:30 PM	268	0	0	268	0	3	0	3	2	400	0	402	673
03:45 PM	252	0	0	252	0	2	0	2	2	337	0	339	593
Total	1104	0	0	1104	1	8	0	9	10	1453	0	1463	2576
04:00 PM	271	1	0	272	0	0	0	0	1	283	0	284	556
04:15 PM	298	0	0	298	3	3	0	6	1	319	0	320	624
04:30 PM	275	2	0	277	0	0	0	0	5	357	0	362	639
04:45 PM	224	1	0	225	2	2	0	4	3	275	0	278	507
Total	1068	4	0	1072	5	5	0	10	10	1234	0	1244	2326
05:00 PM	229	3	0	232	0	2	0	2	1	313	0	314	548
05:15 PM	242	0	0	242	2	1	0	3	2	283	0	285	530
05:30 PM	208	0	0	208	2	3	0	5	0	255	0	255	468
05:45 PM	237	0	0	237	0	0	0	0	0	222	0	222	459
Total	916	3	0	919	4	6	0	10	3	1073	0	1076	2005
06:00 PM	230	1	0	231	0	0	0	0	0	186	0	186	417
06:15 PM	195	1	0	196	0	0	0	0	0	268	0	268	464
06:30 PM	182	0	0	182	0	0	0	0	1	161	0	162	344
06:45 PM	185	0	0	185	0	0	0	0	0	196	0	196	381
Total	792	2	0	794	0	0	0	0	1	811	0	812	1606
Grand Total	3880	9	0	3889	10	19	0	29	24	4571	0	4595	8513
Apprch %	99.8	0.2	0		34.5	65.5	0		0.5	99.5	0		
Total %	45.6	0.1	0	45.7	0.1	0.2	0	0.3	0.3	53.7	0	54	

Start Time	US301 Southbound			Back St. Westbound			US301 Northbound			Int. Total
	Thru	Left	App. Total	Right	Left	App. Total	Right	Thru	App. Total	
Peak Hour Analysis From 03:00 PM to 06:45 PM - Peak 1 of 1										
Peak Hour for Entire Intersection Begins at 03:00 PM										
03:00 PM	322	0	322	0	2	2	5	346	351	675
03:15 PM	262	0	262	1	1	2	1	370	371	635
03:30 PM	268	0	268	0	3	3	2	400	402	673
03:45 PM	252	0	252	0	2	2	2	337	339	593
Total Volume	1104	0	1104	1	8	9	10	1453	1463	2576
% App. Total	100	0		11.1	88.9		0.7	99.3		
PHF	.857	.000	.857	.250	.667	.750	.500	.908	.910	.954

Peggy Malone & Associates

(888) 247-8602

File Name : 2-US 301 and Back St SUN
 Site Code :
 Start Date : 11/25/2018
 Page No : 1

Groups Printed- Truck

Start Time	US301 Southbound				Back St. Westbound				US301 Northbound				Int. Total
	Thru	Left	Peds	App. Total	Right	Left	Peds	App. Total	Right	Thru	Peds	App. Total	
03:00 PM	9	0	0	9	0	0	0	0	0	4	0	4	13
03:15 PM	6	0	0	6	0	0	0	0	0	10	0	10	16
03:30 PM	3	0	0	3	0	0	0	0	0	6	0	6	9
03:45 PM	9	0	0	9	0	0	0	0	0	10	0	10	19
Total	27	0	0	27	0	0	0	0	0	30	0	30	57
04:00 PM	3	0	0	3	0	0	0	0	0	7	0	7	10
04:15 PM	5	0	0	5	0	0	0	0	0	6	0	6	11
04:30 PM	3	0	0	3	0	0	0	0	0	5	0	5	8
04:45 PM	9	0	0	9	0	0	0	0	0	7	0	7	16
Total	20	0	0	20	0	0	0	0	0	25	0	25	45
05:00 PM	6	0	0	6	0	0	0	0	0	5	0	5	11
05:15 PM	10	0	0	10	0	0	0	0	0	8	0	8	18
05:30 PM	3	0	0	3	0	0	0	0	0	8	0	8	11
05:45 PM	9	0	0	9	0	0	0	0	0	4	0	4	13
Total	28	0	0	28	0	0	0	0	0	25	0	25	53
06:00 PM	5	0	0	5	0	0	0	0	0	9	0	9	14
06:15 PM	3	0	0	3	0	0	0	0	0	10	0	10	13
06:30 PM	5	0	0	5	0	0	0	0	0	6	0	6	11
06:45 PM	3	0	0	3	0	0	0	0	0	9	0	9	12
Total	16	0	0	16	0	0	0	0	0	34	0	34	50
Grand Total	91	0	0	91	0	0	0	0	0	114	0	114	205
Apprch %	100	0	0		0	0	0		0	100	0		
Total %	44.4	0	0	44.4	0	0	0	0	0	55.6	0	55.6	

Start Time	US301 Southbound			Back St. Westbound			US301 Northbound			Int. Total
	Thru	Left	App. Total	Right	Left	App. Total	Right	Thru	App. Total	
Peak Hour Analysis From 03:00 PM to 06:45 PM - Peak 1 of 1										
Peak Hour for Entire Intersection Begins at 03:00 PM										
03:00 PM	9	0	9	0	0	0	0	4	4	13
03:15 PM	6	0	6	0	0	0	0	10	10	16
03:30 PM	3	0	3	0	0	0	0	6	6	9
03:45 PM	9	0	9	0	0	0	0	10	10	19
Total Volume	27	0	27	0	0	0	0	30	30	57
% App. Total	100	0		0	0		0	100		
PHF	.750	.000	.750	.000	.000	.000	.000	.750	.750	.750

Peggy Malone & Associates

(888) 247-8602

File Name : 2-US 301 and Back St SUN
 Site Code :
 Start Date : 11/25/2018
 Page No : 1

Groups Printed- Combined

Start Time	US301 Southbound				Back St. Westbound				US301 Northbound				Int. Total
	Thru	Left	Peds	App. Total	Right	Left	Peds	App. Total	Right	Thru	Peds	App. Total	
03:00 PM	331	0	0	331	0	2	0	2	5	350	0	355	688
03:15 PM	268	0	0	268	1	1	0	2	1	380	0	381	651
03:30 PM	271	0	0	271	0	3	0	3	2	406	0	408	682
03:45 PM	261	0	0	261	0	2	0	2	2	347	0	349	612
Total	1131	0	0	1131	1	8	0	9	10	1483	0	1493	2633
04:00 PM	274	1	0	275	0	0	0	0	1	290	0	291	566
04:15 PM	303	0	0	303	3	3	0	6	1	325	0	326	635
04:30 PM	278	2	0	280	0	0	0	0	5	362	0	367	647
04:45 PM	233	1	0	234	2	2	0	4	3	282	0	285	523
Total	1088	4	0	1092	5	5	0	10	10	1259	0	1269	2371
05:00 PM	235	3	0	238	0	2	0	2	1	318	0	319	559
05:15 PM	252	0	0	252	2	1	0	3	2	291	0	293	548
05:30 PM	211	0	0	211	2	3	0	5	0	263	0	263	479
05:45 PM	246	0	0	246	0	0	0	0	0	226	0	226	472
Total	944	3	0	947	4	6	0	10	3	1098	0	1101	2058
06:00 PM	235	1	0	236	0	0	0	0	0	195	0	195	431
06:15 PM	198	1	0	199	0	0	0	0	0	278	0	278	477
06:30 PM	187	0	0	187	0	0	0	0	1	167	0	168	355
06:45 PM	188	0	0	188	0	0	0	0	0	205	0	205	393
Total	808	2	0	810	0	0	0	0	1	845	0	846	1656
Grand Total	3971	9	0	3980	10	19	0	29	24	4685	0	4709	8718
Apprch %	99.8	0.2	0		34.5	65.5	0		0.5	99.5	0		
Total %	45.5	0.1	0	45.7	0.1	0.2	0	0.3	0.3	53.7	0	54	

Start Time	US301 Southbound			Back St. Westbound			US301 Northbound			Int. Total
	Thru	Left	App. Total	Right	Left	App. Total	Right	Thru	App. Total	
Peak Hour Analysis From 03:00 PM to 06:45 PM - Peak 1 of 1										
Peak Hour for Entire Intersection Begins at 03:00 PM										
03:00 PM	331	0	331	0	2	2	5	350	355	688
03:15 PM	268	0	268	1	1	2	1	380	381	651
03:30 PM	271	0	271	0	3	3	2	406	408	682
03:45 PM	261	0	261	0	2	2	2	347	349	612
Total Volume	1131	0	1131	1	8	9	10	1483	1493	2633
% App. Total	100	0		11.1	88.9		0.7	99.3		
PHF	.854	.000	.854	.250	.667	.750	.500	.913	.915	.957

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(888) 247-8602

File Name : 3-FRI-US 301 & Caroline St FRI
 Site Code :
 Start Date : 11/2/2018
 Page No : 1

Groups Printed- Car

Start Time	US 301 Southbound				Caroline St Westbound				US 301 Northbound				Int. Total
	Thru	Left	Peds	App. Total	Right	Left	Peds	App. Total	Right	Thru	Peds	App. Total	
03:00 PM	224	0	0	224	1	0	0	1	1	137	0	138	363
03:15 PM	199	0	0	199	0	0	0	0	1	149	0	150	349
03:30 PM	238	0	0	238	0	0	0	0	0	150	0	150	388
03:45 PM	217	0	0	217	0	0	0	0	1	139	0	140	357
Total	878	0	0	878	1	0	0	1	3	575	0	578	1457
04:00 PM	234	1	0	235	0	0	0	0	0	144	0	144	379
04:15 PM	228	0	0	228	0	0	0	0	1	159	0	160	388
04:30 PM	245	1	0	246	1	0	0	1	1	129	0	130	377
04:45 PM	252	0	0	252	0	0	0	0	0	163	0	163	415
Total	959	2	0	961	1	0	0	1	2	595	0	597	1559
05:00 PM	237	0	0	237	1	0	0	1	0	135	0	135	373
05:15 PM	228	0	0	228	0	0	0	0	0	129	0	129	357
05:30 PM	216	0	0	216	1	0	0	1	1	131	0	132	349
05:45 PM	199	1	0	200	0	1	0	1	0	115	0	115	316
Total	880	1	0	881	2	1	0	3	1	510	0	511	1395
06:00 PM	156	0	0	156	0	0	0	0	0	112	0	112	268
06:15 PM	123	0	0	123	0	1	0	1	0	105	0	105	229
06:30 PM	140	0	0	140	1	0	0	1	0	91	0	91	232
06:45 PM	124	0	0	124	0	0	0	0	0	97	0	97	221
Total	543	0	0	543	1	1	0	2	0	405	0	405	950
Grand Total	3260	3	0	3263	5	2	0	7	6	2085	0	2091	5361
Apprch %	99.9	0.1	0		71.4	28.6	0		0.3	99.7	0		
Total %	60.8	0.1	0	60.9	0.1	0	0	0.1	0.1	38.9	0	39	

Start Time	US 301 Southbound			Caroline St Westbound			US 301 Northbound			Int. Total	
	Thru	Left	App. Total	Right	Left	App. Total	Right	Thru	App. Total		
Peak Hour Analysis From 03:00 PM to 06:45 PM - Peak 1 of 1											
Peak Hour for Entire Intersection Begins at 04:00 PM											
04:00 PM	234	1	235	0	0	0	0	0	144	144	379
04:15 PM	228	0	228	0	0	0	1	159	160	388	
04:30 PM	245	1	246	1	0	1	1	129	130	377	
04:45 PM	252	0	252	0	0	0	0	163	163	415	
Total Volume	959	2	961	1	0	1	2	595	597	1559	
% App. Total	99.8	0.2		100	0		0.3	99.7			
PHF	.951	.500	.953	.250	.000	.250	.500	.913	.916	.939	

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File Name : 3-FRI-US 301 & Caroline St FRI
 Site Code :
 Start Date : 11/2/2018
 Page No : 1

Groups Printed- Truck

Start Time	US 301 Southbound				Caroline St Westbound				US 301 Northbound				Int. Total
	Thru	Left	Peds	App. Total	Right	Left	Peds	App. Total	Right	Thru	Peds	App. Total	
03:00 PM	14	0	0	14	0	0	0	0	0	7	0	7	21
03:15 PM	11	0	0	11	0	1	0	1	0	14	0	14	26
03:30 PM	14	0	0	14	0	0	0	0	0	15	0	15	29
03:45 PM	9	0	0	9	0	0	0	0	0	14	0	14	23
Total	48	0	0	48	0	1	0	1	0	50	0	50	99
04:00 PM	15	0	0	15	0	0	0	0	0	7	0	7	22
04:15 PM	11	0	0	11	0	0	0	0	0	12	0	12	23
04:30 PM	13	0	0	13	0	0	0	0	0	7	0	7	20
04:45 PM	10	0	0	10	0	0	0	0	0	9	0	9	19
Total	49	0	0	49	0	0	0	0	0	35	0	35	84
05:00 PM	10	0	0	10	0	0	0	0	0	5	0	5	15
05:15 PM	11	0	0	11	0	0	0	0	0	8	0	8	19
05:30 PM	12	0	0	12	0	0	0	0	0	11	0	11	23
05:45 PM	14	0	0	14	0	0	0	0	0	4	0	4	18
Total	47	0	0	47	0	0	0	0	0	28	0	28	75
06:00 PM	11	0	0	11	0	0	0	0	0	3	0	3	14
06:15 PM	7	0	0	7	0	0	0	0	0	10	0	10	17
06:30 PM	8	0	0	8	0	0	0	0	0	1	0	1	9
06:45 PM	9	0	0	9	0	0	0	0	0	3	0	3	12
Total	35	0	0	35	0	0	0	0	0	17	0	17	52
Grand Total	179	0	0	179	0	1	0	1	0	130	0	130	310
Apprch %	100	0	0		0	100	0		0	100	0		
Total %	57.7	0	0	57.7	0	0.3	0	0.3	0	41.9	0	41.9	

Start Time	US 301 Southbound			Caroline St Westbound			US 301 Northbound			Int. Total
	Thru	Left	App. Total	Right	Left	App. Total	Right	Thru	App. Total	
Peak Hour Analysis From 03:00 PM to 06:45 PM - Peak 1 of 1										
Peak Hour for Entire Intersection Begins at 03:15 PM										
03:15 PM	11	0	11	0	1	1	0	14	14	26
03:30 PM	14	0	14	0	0	0	0	15	15	29
03:45 PM	9	0	9	0	0	0	0	14	14	23
04:00 PM	15	0	15	0	0	0	0	7	7	22
Total Volume	49	0	49	0	1	1	0	50	50	100
% App. Total	100	0		0	100		0	100		
PHF	.817	.000	.817	.000	.250	.250	.000	.833	.833	.862

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(888) 247-8602

File Name : 3-FRI-US 301 & Caroline St FRI
 Site Code :
 Start Date : 11/2/2018
 Page No : 1

Groups Printed- Combined

Start Time	US 301 Southbound				Caroline St Westbound				US 301 Northbound				Int. Total
	Thru	Left	Peds	App. Total	Right	Left	Peds	App. Total	Right	Thru	Peds	App. Total	
03:00 PM	238	0	0	238	1	0	0	1	1	144	0	145	384
03:15 PM	210	0	0	210	0	1	0	1	1	163	0	164	375
03:30 PM	252	0	0	252	0	0	0	0	0	165	0	165	417
03:45 PM	226	0	0	226	0	0	0	0	1	153	0	154	380
Total	926	0	0	926	1	1	0	2	3	625	0	628	1556
04:00 PM	249	1	0	250	0	0	0	0	0	151	0	151	401
04:15 PM	239	0	0	239	0	0	0	0	1	171	0	172	411
04:30 PM	258	1	0	259	1	0	0	1	1	136	0	137	397
04:45 PM	262	0	0	262	0	0	0	0	0	172	0	172	434
Total	1008	2	0	1010	1	0	0	1	2	630	0	632	1643
05:00 PM	247	0	0	247	1	0	0	1	0	140	0	140	388
05:15 PM	239	0	0	239	0	0	0	0	0	137	0	137	376
05:30 PM	228	0	0	228	1	0	0	1	1	142	0	143	372
05:45 PM	213	1	0	214	0	1	0	1	0	119	0	119	334
Total	927	1	0	928	2	1	0	3	1	538	0	539	1470
06:00 PM	167	0	0	167	0	0	0	0	0	115	0	115	282
06:15 PM	130	0	0	130	0	1	0	1	0	115	0	115	246
06:30 PM	148	0	0	148	1	0	0	1	0	92	0	92	241
06:45 PM	133	0	0	133	0	0	0	0	0	100	0	100	233
Total	578	0	0	578	1	1	0	2	0	422	0	422	1002
Grand Total	3439	3	0	3442	5	3	0	8	6	2215	0	2221	5671
Apprch %	99.9	0.1	0		62.5	37.5	0		0.3	99.7	0		
Total %	60.6	0.1	0	60.7	0.1	0.1	0	0.1	0.1	39.1	0	39.2	

Start Time	US 301 Southbound			Caroline St Westbound			US 301 Northbound			Int. Total	
	Thru	Left	App. Total	Right	Left	App. Total	Right	Thru	App. Total		
Peak Hour Analysis From 03:00 PM to 06:45 PM - Peak 1 of 1											
Peak Hour for Entire Intersection Begins at 04:00 PM											
04:00 PM	249	1	250	0	0	0	0	0	151	151	401
04:15 PM	239	0	239	0	0	0	0	1	171	172	411
04:30 PM	258	1	259	1	0	1	1	1	136	137	397
04:45 PM	262	0	262	0	0	0	0	0	172	172	434
Total Volume	1008	2	1010	1	0	1	2	2	630	632	1643
% App. Total	99.8	0.2		100	0		0.3	99.7			
PHF	.962	.500	.964	.250	.000	.250	.500	.916	.919	.946	

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(888) 247-8602

File Name : 3-US 301 & Caroline St AM
 Site Code :
 Start Date : 11/1/2018
 Page No : 1

Groups Printed- Car

Start Time	US 301 Southbound				Caroline St Westbound				US 301 Northbound				Int. Total
	Thru	Left	Peds	App. Total	Right	Left	Peds	App. Total	Right	Thru	Peds	App. Total	
06:00 AM	42	0	0	42	0	0	0	0	0	81	0	81	123
06:15 AM	72	0	0	72	0	0	0	0	0	95	0	95	167
06:30 AM	83	0	0	83	0	0	0	0	0	142	0	142	225
06:45 AM	75	0	0	75	0	0	0	0	0	119	0	119	194
Total	272	0	0	272	0	0	0	0	0	437	0	437	709
07:00 AM	76	0	0	76	0	0	0	0	0	118	0	118	194
07:15 AM	89	0	0	89	0	0	0	0	0	117	0	117	206
07:30 AM	75	0	0	75	0	0	0	0	0	125	0	125	200
07:45 AM	69	0	0	69	1	0	0	1	0	123	0	123	193
Total	309	0	0	309	1	0	0	1	0	483	0	483	793
08:00 AM	87	0	0	87	0	1	0	1	0	101	0	101	189
08:15 AM	87	1	0	88	0	1	0	1	0	105	0	105	194
08:30 AM	85	0	0	85	0	0	0	0	0	94	0	94	179
08:45 AM	84	0	0	84	0	2	0	2	0	89	0	89	175
Total	343	1	0	344	0	4	0	4	0	389	0	389	737
Grand Total	924	1	0	925	1	4	0	5	0	1309	0	1309	2239
Apprch %	99.9	0.1	0		20	80	0		0	100	0		
Total %	41.3	0	0	41.3	0	0.2	0	0.2	0	58.5	0	58.5	

Start Time	US 301 Southbound			Caroline St Westbound			US 301 Northbound			Int. Total
	Thru	Left	App. Total	Right	Left	App. Total	Right	Thru	App. Total	
Peak Hour Analysis From 06:00 AM to 08:45 AM - Peak 1 of 1										
Peak Hour for Entire Intersection Begins at 06:30 AM										
06:30 AM	83	0	83	0	0	0	0	142	142	225
06:45 AM	75	0	75	0	0	0	0	119	119	194
07:00 AM	76	0	76	0	0	0	0	118	118	194
07:15 AM	89	0	89	0	0	0	0	117	117	206
Total Volume	323	0	323	0	0	0	0	496	496	819
% App. Total	100	0		0	0		0	100		
PHF	.907	.000	.907	.000	.000	.000	.000	.873	.873	.910

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(888) 247-8602

File Name : 3-US 301 & Caroline St AM
 Site Code :
 Start Date : 11/1/2018
 Page No : 1

Groups Printed- Truck

Start Time	US 301 Southbound				Caroline St Westbound				US 301 Northbound				Int. Total
	Thru	Left	Peds	App. Total	Right	Left	Peds	App. Total	Right	Thru	Peds	App. Total	
06:00 AM	9	0	0	9	0	0	0	0	0	5	0	5	14
06:15 AM	10	0	0	10	0	0	0	0	0	11	0	11	21
06:30 AM	7	0	0	7	0	0	0	0	0	19	0	19	26
06:45 AM	10	0	0	10	0	0	0	0	0	18	0	18	28
Total	36	0	0	36	0	0	0	0	0	53	0	53	89
07:00 AM	10	0	0	10	0	0	0	0	0	11	0	11	21
07:15 AM	8	0	0	8	0	0	0	0	0	9	0	9	17
07:30 AM	14	0	0	14	0	0	0	0	0	8	0	8	22
07:45 AM	10	0	0	10	0	0	0	0	0	18	0	18	28
Total	42	0	0	42	0	0	0	0	0	46	0	46	88
08:00 AM	6	0	0	6	0	0	0	0	0	13	0	13	19
08:15 AM	7	0	0	7	0	0	0	0	0	16	0	16	23
08:30 AM	8	0	0	8	0	0	0	0	0	18	0	18	26
08:45 AM	7	0	0	7	0	0	0	0	0	19	0	19	26
Total	28	0	0	28	0	0	0	0	0	66	0	66	94
Grand Total	106	0	0	106	0	0	0	0	0	165	0	165	271
Apprch %	100	0	0		0	0	0		0	100	0		
Total %	39.1	0	0	39.1	0	0	0		0	60.9	0	60.9	

Start Time	US 301 Southbound			Caroline St Westbound			US 301 Northbound			Int. Total
	Thru	Left	App. Total	Right	Left	App. Total	Right	Thru	App. Total	
Peak Hour Analysis From 06:00 AM to 08:45 AM - Peak 1 of 1										
Peak Hour for Entire Intersection Begins at 06:15 AM										
06:15 AM	10	0	10	0	0	0	0	11	11	21
06:30 AM	7	0	7	0	0	0	0	19	19	26
06:45 AM	10	0	10	0	0	0	0	18	18	28
07:00 AM	10	0	10	0	0	0	0	11	11	21
Total Volume	37	0	37	0	0	0	0	59	59	96
% App. Total	100	0	100	0	0	0	0	100	100	100
PHF	.925	.000	.925	.000	.000	.000	.000	.776	.776	.857

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(888) 247-8602

File Name : 3-US 301 & Caroline St AM
 Site Code :
 Start Date : 11/1/2018
 Page No : 1

Groups Printed- Combined

Start Time	US 301 Southbound				Caroline St Westbound				US 301 Northbound				Int. Total
	Thru	Left	Peds	App. Total	Right	Left	Peds	App. Total	Right	Thru	Peds	App. Total	
06:00 AM	51	0	0	51	0	0	0	0	0	86	0	86	137
06:15 AM	82	0	0	82	0	0	0	0	0	106	0	106	188
06:30 AM	90	0	0	90	0	0	0	0	0	161	0	161	251
06:45 AM	85	0	0	85	0	0	0	0	0	137	0	137	222
Total	308	0	0	308	0	0	0	0	0	490	0	490	798
07:00 AM	86	0	0	86	0	0	0	0	0	129	0	129	215
07:15 AM	97	0	0	97	0	0	0	0	0	126	0	126	223
07:30 AM	89	0	0	89	0	0	0	0	0	133	0	133	222
07:45 AM	79	0	0	79	1	0	0	1	0	141	0	141	221
Total	351	0	0	351	1	0	0	1	0	529	0	529	881
08:00 AM	93	0	0	93	0	1	0	1	0	114	0	114	208
08:15 AM	94	1	0	95	0	1	0	1	0	121	0	121	217
08:30 AM	93	0	0	93	0	0	0	0	0	112	0	112	205
08:45 AM	91	0	0	91	0	2	0	2	0	108	0	108	201
Total	371	1	0	372	0	4	0	4	0	455	0	455	831
Grand Total	1030	1	0	1031	1	4	0	5	0	1474	0	1474	2510
Apprch %	99.9	0.1	0		20	80	0		0	100	0		
Total %	41	0	0	41.1	0	0.2	0	0.2	0	58.7	0	58.7	

Start Time	US 301 Southbound			Caroline St Westbound			US 301 Northbound			Int. Total
	Thru	Left	App. Total	Right	Left	App. Total	Right	Thru	App. Total	
Peak Hour Analysis From 06:00 AM to 08:45 AM - Peak 1 of 1										
Peak Hour for Entire Intersection Begins at 06:30 AM										
06:30 AM	90	0	90	0	0	0	0	161	161	251
06:45 AM	85	0	85	0	0	0	0	137	137	222
07:00 AM	86	0	86	0	0	0	0	129	129	215
07:15 AM	97	0	97	0	0	0	0	126	126	223
Total Volume	358	0	358	0	0	0	0	553	553	911
% App. Total	100	0		0	0		0	100		
PHF	.923	.000	.923	.000	.000	.000	.000	.859	.859	.907

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(888) 247-8602

File Name : 3-US 301 & Caroline St PM
 Site Code :
 Start Date : 11/1/2018
 Page No : 1

Groups Printed- Car

Start Time	US 301 Southbound				Caroline St Westbound				US 301 Northbound				Int. Total
	Thru	Left	Peds	App. Total	Right	Left	Peds	App. Total	Right	Thru	Peds	App. Total	
04:00 PM	167	0	0	167	0	0	0	0	0	99	0	99	266
04:15 PM	177	0	0	177	0	0	0	0	0	105	0	105	282
04:30 PM	212	0	0	212	0	0	0	0	0	117	0	117	329
04:45 PM	182	1	0	183	1	0	0	1	0	101	0	101	285
Total	738	1	0	739	1	0	0	1	0	422	0	422	1162
05:00 PM	216	0	0	216	1	0	0	1	1	110	0	111	328
05:15 PM	171	1	0	172	0	0	0	0	0	118	0	118	290
05:30 PM	187	1	0	188	0	0	0	0	0	114	0	114	302
05:45 PM	185	1	0	186	0	0	0	0	0	104	0	104	290
Total	759	3	0	762	1	0	0	1	1	446	0	447	1210
06:00 PM	173	1	0	174	0	0	0	0	0	93	0	93	267
06:15 PM	119	0	0	119	0	0	0	0	0	78	0	78	197
06:30 PM	120	0	0	120	0	1	0	1	0	76	0	76	197
06:45 PM	102	1	0	103	1	0	0	1	1	55	0	56	160
Total	514	2	0	516	1	1	0	2	1	302	0	303	821
Grand Total	2011	6	0	2017	3	1	0	4	2	1170	0	1172	3193
Apprch %	99.7	0.3	0		75	25	0		0.2	99.8	0		
Total %	63	0.2	0	63.2	0.1	0	0	0.1	0.1	36.6	0	36.7	

Start Time	US 301 Southbound			Caroline St Westbound			US 301 Northbound			Int. Total
	Thru	Left	App. Total	Right	Left	App. Total	Right	Thru	App. Total	
Peak Hour Analysis From 04:00 PM to 06:45 PM - Peak 1 of 1										
Peak Hour for Entire Intersection Begins at 04:30 PM										
04:30 PM	212	0	212	0	0	0	0	117	117	329
04:45 PM	182	1	183	1	0	1	0	101	101	285
05:00 PM	216	0	216	1	0	1	1	110	111	328
05:15 PM	171	1	172	0	0	0	0	118	118	290
Total Volume	781	2	783	2	0	2	1	446	447	1232
% App. Total	99.7	0.3		100	0		0.2	99.8		
PHF	.904	.500	.906	.500	.000	.500	.250	.945	.947	.936

Peggy Malone & Associates

(888) 247-8602

File Name : 3-US 301 & Caroline St PM
 Site Code :
 Start Date : 11/1/2018
 Page No : 1

Groups Printed- Truck

Start Time	US 301 Southbound				Caroline St Westbound				US 301 Northbound				Int. Total
	Thru	Left	Peds	App. Total	Right	Left	Peds	App. Total	Right	Thru	Peds	App. Total	
04:00 PM	14	0	0	14	0	0	0	0	0	15	0	15	29
04:15 PM	14	0	0	14	0	0	0	0	0	22	0	22	36
04:30 PM	13	0	0	13	0	0	0	0	0	20	0	20	33
04:45 PM	22	0	0	22	0	0	0	0	0	11	0	11	33
Total	63	0	0	63	0	0	0	0	0	68	0	68	131
05:00 PM	15	0	0	15	0	0	0	0	0	10	0	10	25
05:15 PM	11	0	0	11	0	0	0	0	0	8	0	8	19
05:30 PM	11	0	0	11	0	0	0	0	0	14	0	14	25
05:45 PM	18	0	0	18	0	0	0	0	0	11	0	11	29
Total	55	0	0	55	0	0	0	0	0	43	0	43	98
06:00 PM	9	0	0	9	0	0	0	0	0	6	0	6	15
06:15 PM	10	0	0	10	0	0	0	0	0	9	0	9	19
06:30 PM	17	0	0	17	0	0	0	0	0	5	0	5	22
06:45 PM	10	0	0	10	0	0	0	0	0	4	0	4	14
Total	46	0	0	46	0	0	0	0	0	24	0	24	70
Grand Total	164	0	0	164	0	0	0	0	0	135	0	135	299
Apprch %	100	0	0		0	0	0		0	100	0		
Total %	54.8	0	0	54.8	0	0	0		0	45.2	0	45.2	

Start Time	US 301 Southbound			Caroline St Westbound			US 301 Northbound			Int. Total
	Thru	Left	App. Total	Right	Left	App. Total	Right	Thru	App. Total	
Peak Hour Analysis From 04:00 PM to 06:45 PM - Peak 1 of 1										
Peak Hour for Entire Intersection Begins at 04:00 PM										
04:00 PM	14	0	14	0	0	0	0	15	15	29
04:15 PM	14	0	14	0	0	0	0	22	22	36
04:30 PM	13	0	13	0	0	0	0	20	20	33
04:45 PM	22	0	22	0	0	0	0	11	11	33
Total Volume	63	0	63	0	0	0	0	68	68	131
% App. Total	100	0		0	0		0	100		
PHF	.716	.000	.716	.000	.000	.000	.000	.773	.773	.910

Peggy Malone & Associates

(888) 247-8602

File Name : 3-US 301 & Caroline St PM
 Site Code :
 Start Date : 11/1/2018
 Page No : 1

Groups Printed- Combined

Start Time	US 301 Southbound				Caroline St Westbound				US 301 Northbound				Int. Total
	Thru	Left	Peds	App. Total	Right	Left	Peds	App. Total	Right	Thru	Peds	App. Total	
04:00 PM	181	0	0	181	0	0	0	0	0	114	0	114	295
04:15 PM	191	0	0	191	0	0	0	0	0	127	0	127	318
04:30 PM	225	0	0	225	0	0	0	0	0	137	0	137	362
04:45 PM	204	1	0	205	1	0	0	1	0	112	0	112	318
Total	801	1	0	802	1	0	0	1	0	490	0	490	1293
05:00 PM	231	0	0	231	1	0	0	1	1	120	0	121	353
05:15 PM	182	1	0	183	0	0	0	0	0	126	0	126	309
05:30 PM	198	1	0	199	0	0	0	0	0	128	0	128	327
05:45 PM	203	1	0	204	0	0	0	0	0	115	0	115	319
Total	814	3	0	817	1	0	0	1	1	489	0	490	1308
06:00 PM	182	1	0	183	0	0	0	0	0	99	0	99	282
06:15 PM	129	0	0	129	0	0	0	0	0	87	0	87	216
06:30 PM	137	0	0	137	0	1	0	1	0	81	0	81	219
06:45 PM	112	1	0	113	1	0	0	1	1	59	0	60	174
Total	560	2	0	562	1	1	0	2	1	326	0	327	891
Grand Total	2175	6	0	2181	3	1	0	4	2	1305	0	1307	3492
Apprch %	99.7	0.3	0		75	25	0		0.2	99.8	0		
Total %	62.3	0.2	0	62.5	0.1	0	0	0.1	0.1	37.4	0	37.4	

Start Time	US 301 Southbound			Caroline St Westbound			US 301 Northbound			Int. Total
	Thru	Left	App. Total	Right	Left	App. Total	Right	Thru	App. Total	
Peak Hour Analysis From 04:00 PM to 06:45 PM - Peak 1 of 1										
Peak Hour for Entire Intersection Begins at 04:15 PM										
04:15 PM	191	0	191	0	0	0	0	127	127	318
04:30 PM	225	0	225	0	0	0	0	137	137	362
04:45 PM	204	1	205	1	0	1	0	112	112	318
05:00 PM	231	0	231	1	0	1	1	120	121	353
Total Volume	851	1	852	2	0	2	1	496	497	1351
% App. Total	99.9	0.1		100	0		0.2	99.8		
PHF	.921	.250	.922	.500	.000	.500	.250	.905	.907	.933

Peggy Malone & Associates

(888) 247-8602

File Name : 3-US 301 and Caroline St SUN
 Site Code :
 Start Date : 11/25/2018
 Page No : 1

Groups Printed- Car

Start Time	US 301 Southbound				Caroline St Westbound				US 301 Northbound				Int. Total
	Thru	Left	Peds	App. Total	Right	Left	Peds	App. Total	Right	Thru	Peds	App. Total	
03:00 PM	334	1	0	335	1	0	0	1	1	354	0	355	691
03:15 PM	251	0	0	251	0	1	0	1	1	376	0	377	629
03:30 PM	269	0	0	269	0	0	0	0	0	399	0	399	668
03:45 PM	253	0	0	253	0	0	0	0	0	324	0	324	577
Total	1107	1	0	1108	1	1	0	2	2	1453	0	1455	2565
04:00 PM	281	1	0	282	0	0	0	0	0	288	0	288	570
04:15 PM	302	0	0	302	0	0	0	0	0	327	0	327	629
04:30 PM	274	0	0	274	0	1	0	1	0	338	0	338	613
04:45 PM	222	0	0	222	1	0	0	1	1	291	0	292	515
Total	1079	1	0	1080	1	1	0	2	1	1244	0	1245	2327
05:00 PM	236	0	0	236	0	1	0	1	0	310	0	310	547
05:15 PM	245	1	0	246	1	0	0	1	1	278	0	279	526
05:30 PM	218	0	0	218	0	0	0	0	0	249	0	249	467
05:45 PM	244	0	0	244	0	0	0	0	0	229	0	229	473
Total	943	1	0	944	1	1	0	2	1	1066	0	1067	2013
06:00 PM	226	1	0	227	0	0	0	0	2	178	0	180	407
06:15 PM	195	0	0	195	0	0	0	0	0	247	0	247	442
06:30 PM	184	0	0	184	0	0	0	0	1	160	0	161	345
06:45 PM	177	0	0	177	0	0	0	0	0	201	0	201	378
Total	782	1	0	783	0	0	0	0	3	786	0	789	1572
Grand Total	3911	4	0	3915	3	3	0	6	7	4549	0	4556	8477
Apprch %	99.9	0.1	0		50	50	0		0.2	99.8	0		
Total %	46.1	0	0	46.2	0	0	0	0.1	0.1	53.7	0	53.7	

Start Time	US 301 Southbound			Caroline St Westbound			US 301 Northbound			Int. Total
	Thru	Left	App. Total	Right	Left	App. Total	Right	Thru	App. Total	
Peak Hour Analysis From 03:00 PM to 06:45 PM - Peak 1 of 1										
Peak Hour for Entire Intersection Begins at 03:00 PM										
03:00 PM	334	1	335	1	0	1	1	354	355	691
03:15 PM	251	0	251	0	1	1	1	376	377	629
03:30 PM	269	0	269	0	0	0	0	399	399	668
03:45 PM	253	0	253	0	0	0	0	324	324	577
Total Volume	1107	1	1108	1	1	2	2	1453	1455	2565
% App. Total	99.9	0.1		50	50		0.1	99.9		
PHF	.829	.250	.827	.250	.250	.500	.500	.910	.912	.928

Peggy Malone & Associates

(888) 247-8602

File Name : 3-US 301 and Caroline St SUN
 Site Code :
 Start Date : 11/25/2018
 Page No : 1

Groups Printed- Truck

Start Time	US 301 Southbound				Caroline St Westbound				US 301 Northbound				Int. Total
	Thru	Left	Peds	App. Total	Right	Left	Peds	App. Total	Right	Thru	Peds	App. Total	
03:00 PM	9	0	0	9	0	0	0	0	0	4	0	4	13
03:15 PM	6	0	0	6	0	0	0	0	0	9	0	9	15
03:30 PM	3	0	0	3	0	0	0	0	0	6	0	6	9
03:45 PM	9	0	0	9	0	0	0	0	0	10	0	10	19
Total	27	0	0	27	0	0	0	0	0	29	0	29	56
04:00 PM	3	0	0	3	0	0	0	0	0	7	0	7	10
04:15 PM	5	0	0	5	0	0	0	0	0	6	0	6	11
04:30 PM	3	0	0	3	0	0	0	0	0	4	0	4	7
04:45 PM	9	0	0	9	0	0	0	0	0	8	0	8	17
Total	20	0	0	20	0	0	0	0	0	25	0	25	45
05:00 PM	5	0	0	5	0	0	0	0	0	6	0	6	11
05:15 PM	10	0	0	10	0	0	0	0	0	8	0	8	18
05:30 PM	3	0	0	3	0	0	0	0	0	8	0	8	11
05:45 PM	7	0	0	7	0	0	0	0	0	4	0	4	11
Total	25	0	0	25	0	0	0	0	0	26	0	26	51
06:00 PM	6	0	0	6	0	0	0	0	0	9	0	9	15
06:15 PM	2	0	0	2	0	0	0	0	0	10	0	10	12
06:30 PM	5	0	0	5	0	0	0	0	0	8	0	8	13
06:45 PM	3	0	0	3	0	0	0	0	0	10	0	10	13
Total	16	0	0	16	0	0	0	0	0	37	0	37	53
Grand Total	88	0	0	88	0	0	0	0	0	117	0	117	205
Apprch %	100	0	0		0	0	0		0	100	0		
Total %	42.9	0	0	42.9	0	0	0	0	0	57.1	0	57.1	

Start Time	US 301 Southbound			Caroline St Westbound			US 301 Northbound			Int. Total
	Thru	Left	App. Total	Right	Left	App. Total	Right	Thru	App. Total	
Peak Hour Analysis From 03:00 PM to 06:45 PM - Peak 1 of 1										
Peak Hour for Entire Intersection Begins at 04:45 PM										
04:45 PM	9	0	9	0	0	0	0	8	8	17
05:00 PM	5	0	5	0	0	0	0	6	6	11
05:15 PM	10	0	10	0	0	0	0	8	8	18
05:30 PM	3	0	3	0	0	0	0	8	8	11
Total Volume	27	0	27	0	0	0	0	30	30	57
% App. Total	100	0		0	0		0	100		
PHF	.675	.000	.675	.000	.000	.000	.000	.938	.938	.792

Peggy Malone & Associates

(888) 247-8602

File Name : 3-US 301 and Caroline St SUN
 Site Code :
 Start Date : 11/25/2018
 Page No : 1

Groups Printed- Combined

Start Time	US 301 Southbound				Caroline St Westbound				US 301 Northbound				Int. Total
	Thru	Left	Peds	App. Total	Right	Left	Peds	App. Total	Right	Thru	Peds	App. Total	
03:00 PM	343	1	0	344	1	0	0	1	1	358	0	359	704
03:15 PM	257	0	0	257	0	1	0	1	1	385	0	386	644
03:30 PM	272	0	0	272	0	0	0	0	0	405	0	405	677
03:45 PM	262	0	0	262	0	0	0	0	0	334	0	334	596
Total	1134	1	0	1135	1	1	0	2	2	1482	0	1484	2621
04:00 PM	284	1	0	285	0	0	0	0	0	295	0	295	580
04:15 PM	307	0	0	307	0	0	0	0	0	333	0	333	640
04:30 PM	277	0	0	277	0	1	0	1	0	342	0	342	620
04:45 PM	231	0	0	231	1	0	0	1	1	299	0	300	532
Total	1099	1	0	1100	1	1	0	2	1	1269	0	1270	2372
05:00 PM	241	0	0	241	0	1	0	1	0	316	0	316	558
05:15 PM	255	1	0	256	1	0	0	1	1	286	0	287	544
05:30 PM	221	0	0	221	0	0	0	0	0	257	0	257	478
05:45 PM	251	0	0	251	0	0	0	0	0	233	0	233	484
Total	968	1	0	969	1	1	0	2	1	1092	0	1093	2064
06:00 PM	232	1	0	233	0	0	0	0	2	187	0	189	422
06:15 PM	197	0	0	197	0	0	0	0	0	257	0	257	454
06:30 PM	189	0	0	189	0	0	0	0	1	168	0	169	358
06:45 PM	180	0	0	180	0	0	0	0	0	211	0	211	391
Total	798	1	0	799	0	0	0	0	3	823	0	826	1625
Grand Total	3999	4	0	4003	3	3	0	6	7	4666	0	4673	8682
Apprch %	99.9	0.1	0		50	50	0		0.1	99.9	0		
Total %	46.1	0	0	46.1	0	0	0	0.1	0.1	53.7	0	53.8	

Start Time	US 301 Southbound			Caroline St Westbound			US 301 Northbound			Int. Total
	Thru	Left	App. Total	Right	Left	App. Total	Right	Thru	App. Total	
Peak Hour Analysis From 03:00 PM to 06:45 PM - Peak 1 of 1										
Peak Hour for Entire Intersection Begins at 03:00 PM										
03:00 PM	343	1	344	1	0	1	1	358	359	704
03:15 PM	257	0	257	0	1	1	1	385	386	644
03:30 PM	272	0	272	0	0	0	0	405	405	677
03:45 PM	262	0	262	0	0	0	0	334	334	596
Total Volume	1134	1	1135	1	1	2	2	1482	1484	2621
% App. Total	99.9	0.1		50	50		0.1	99.9		
PHF	.827	.250	.825	.250	.250	.500	.500	.915	.916	.931

Peggy Malone & Associates

(888) 247-8602

File Name : 4-FRI-US 301 & Walsingham Rd FRI
 Site Code :
 Start Date : 11/2/2018
 Page No : 1

Groups Printed- Car

Start Time	US 301 Southbound					Walsingham Rd Westbound					US 301 Northbound					Driveway Eastbound					Int. Total
	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	
03:00 PM	0	213	0	0	213	1	0	1	0	2	0	135	0	0	135	0	0	0	0	0	350
03:15 PM	0	210	0	0	210	1	0	1	0	2	0	152	0	0	152	0	0	0	0	0	364
03:30 PM	0	243	1	0	244	0	0	0	0	0	0	142	0	0	142	0	0	0	0	0	386
03:45 PM	0	218	0	0	218	1	0	0	0	1	1	130	0	0	131	0	0	0	0	0	350
Total	0	884	1	0	885	3	0	2	0	5	1	559	0	0	560	0	0	0	0	0	1450
04:00 PM	0	223	0	0	223	1	0	0	0	1	0	145	1	0	146	0	0	0	0	0	370
04:15 PM	0	215	2	0	217	1	0	0	0	1	0	150	1	0	151	0	0	0	0	0	369
04:30 PM	0	273	2	0	275	0	0	0	0	0	0	134	3	0	137	0	0	0	0	0	412
04:45 PM	0	228	1	0	229	2	0	1	0	3	2	152	0	0	154	0	0	1	0	1	387
Total	0	939	5	0	944	4	0	1	0	5	2	581	5	0	588	0	0	1	0	1	1538
05:00 PM	0	238	2	0	240	0	0	0	0	0	0	150	0	0	150	0	0	0	0	0	390
05:15 PM	0	223	1	0	224	0	0	0	0	0	0	133	0	0	133	0	0	0	0	0	357
05:30 PM	0	231	0	0	231	0	0	0	0	0	1	136	0	0	137	0	0	0	0	0	368
05:45 PM	0	194	0	0	194	1	0	0	0	1	0	114	1	0	115	0	0	0	0	0	310
Total	0	886	3	0	889	1	0	0	0	1	1	533	1	0	535	0	0	0	0	0	1425
06:00 PM	0	165	0	0	165	0	0	0	0	0	0	110	0	0	110	0	0	0	0	0	275
06:15 PM	0	118	0	0	118	1	0	0	0	1	0	108	1	0	109	0	0	0	0	0	228
06:30 PM	0	148	1	0	149	1	0	1	0	2	1	90	0	0	91	0	0	0	0	0	242
06:45 PM	0	100	0	0	100	0	0	0	0	0	0	97	0	0	97	0	0	0	0	0	197
Total	0	531	1	0	532	2	0	1	0	3	1	405	1	0	407	0	0	0	0	0	942
Grand Total	0	3240	10	0	3250	10	0	4	0	14	5	2078	7	0	2090	0	0	1	0	1	5355
Apprch %	0	99.7	0.3	0		71.4	0	28.6	0		0.2	99.4	0.3	0		0	0	100	0		
Total %	0	60.5	0.2	0	60.7	0.2	0	0.1	0	0.3	0.1	38.8	0.1	0	39	0	0	0	0	0	

Start Time	US 301 Southbound				Walsingham Rd Westbound				US 301 Northbound				Driveway Eastbound				Int. Total
	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	
Peak Hour Analysis From 03:00 PM to 06:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 04:15 PM																	
04:15 PM	0	215	2	217	1	0	0	1	0	150	1	151	0	0	0	0	369
04:30 PM	0	273	2	275	0	0	0	0	0	134	3	137	0	0	0	0	412
04:45 PM	0	228	1	229	2	0	1	3	2	152	0	154	0	0	1	1	387
05:00 PM	0	238	2	240	0	0	0	0	0	150	0	150	0	0	0	0	390
Total Volume	0	954	7	961	3	0	1	4	2	586	4	592	0	0	1	1	1558
% App. Total	0	99.3	0.7		75	0	25		0.3	99	0.7		0	0	100		
PHF	.000	.874	.875	.874	.375	.000	.250	.333	.250	.964	.333	.961	.000	.000	.250	.250	.945

Peggy Malone & Associates

(888) 247-8602

File Name : 4-FRI-US 301 & Walsingham Rd FRI
 Site Code :
 Start Date : 11/2/2018
 Page No : 1

Groups Printed- Truck

Start Time	US 301 Southbound					Walsingham Rd Westbound					US 301 Northbound					Driveway Eastbound					Int. Total
	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	
03:00 PM	0	17	0	0	17	0	0	0	0	0	0	7	0	0	7	0	0	0	0	0	24
03:15 PM	0	9	0	0	9	0	0	0	0	0	0	14	0	0	14	0	0	0	0	0	23
03:30 PM	0	15	0	0	15	0	0	0	0	0	0	16	0	0	16	0	0	0	0	0	31
03:45 PM	0	10	1	0	11	0	0	0	0	0	0	14	0	0	14	0	0	0	0	0	25
Total	0	51	1	0	52	0	0	0	0	0	0	51	0	0	51	0	0	0	0	0	103
04:00 PM	0	11	0	0	11	0	0	1	0	1	0	7	0	0	7	0	0	0	0	0	19
04:15 PM	0	12	0	0	12	0	0	0	0	0	0	13	0	0	13	0	0	0	0	0	25
04:30 PM	0	13	0	0	13	0	0	0	0	0	0	8	0	0	8	0	0	0	0	0	21
04:45 PM	0	10	0	0	10	0	0	0	0	0	0	9	0	0	9	0	0	0	0	0	19
Total	0	46	0	0	46	0	0	1	0	1	0	37	0	0	37	0	0	0	0	0	84
05:00 PM	0	11	1	0	12	0	0	0	0	0	0	5	0	0	5	0	0	0	0	0	17
05:15 PM	0	9	0	0	9	0	0	0	0	0	0	9	0	0	9	0	0	0	0	0	18
05:30 PM	0	16	0	0	16	0	0	0	0	0	0	11	0	0	11	0	0	0	0	0	27
05:45 PM	0	11	0	0	11	0	0	0	0	0	0	4	0	0	4	0	0	0	0	0	15
Total	0	47	1	0	48	0	0	0	0	0	0	29	0	0	29	0	0	0	0	0	77
06:00 PM	0	9	0	0	9	0	0	0	0	0	0	2	0	0	2	0	0	0	0	0	11
06:15 PM	0	9	0	0	9	0	0	0	0	0	0	9	0	0	9	0	0	0	0	0	18
06:30 PM	0	7	0	0	7	0	0	0	0	0	0	2	0	0	2	0	0	0	0	0	9
06:45 PM	0	7	0	0	7	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	8
Total	0	32	0	0	32	0	0	0	0	0	0	14	0	0	14	0	0	0	0	0	46
Grand Total	0	176	2	0	178	0	0	1	0	1	0	131	0	0	131	0	0	0	0	0	310
Apprch %	0	98.9	1.1	0		0	0	100	0		0	100	0	0		0	0	0	0		
Total %	0	56.8	0.6	0	57.4	0	0	0.3	0	0.3	0	42.3	0	0	42.3	0	0	0	0	0	

Start Time	US 301 Southbound				Walsingham Rd Westbound				US 301 Northbound				Driveway Eastbound				Int. Total
	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	
Peak Hour Analysis From 03:00 PM to 06:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 03:00 PM																	
03:00 PM	0	17	0	17	0	0	0	0	0	7	0	7	0	0	0	0	24
03:15 PM	0	9	0	9	0	0	0	0	0	14	0	14	0	0	0	0	23
03:30 PM	0	15	0	15	0	0	0	0	0	16	0	16	0	0	0	0	31
03:45 PM	0	10	1	11	0	0	0	0	0	14	0	14	0	0	0	0	25
Total Volume	0	51	1	52	0	0	0	0	0	51	0	51	0	0	0	0	103
% App. Total	0	98.1	1.9		0	0	0		0	100	0		0	0	0		
PHF	.000	.750	.250	.765	.000	.000	.000	.000	.000	.797	.000	.797	.000	.000	.000	.000	.831

Peggy Malone & Associates

(888) 247-8602

File Name : 4-FRI-US 301 & Walsingham Rd FRI
 Site Code :
 Start Date : 11/2/2018
 Page No : 1

Groups Printed- Combined

Start Time	US 301 Southbound					Walsingham Rd Westbound					US 301 Northbound					Driveway Eastbound					Int. Total	
	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total		
03:00 PM	0	230	0	0	230	1	0	1	0	2	0	142	0	0	142	0	0	0	0	0	0	374
03:15 PM	0	219	0	0	219	1	0	1	0	2	0	166	0	0	166	0	0	0	0	0	0	387
03:30 PM	0	258	1	0	259	0	0	0	0	0	0	158	0	0	158	0	0	0	0	0	0	417
03:45 PM	0	228	1	0	229	1	0	0	0	1	1	144	0	0	145	0	0	0	0	0	0	375
Total	0	935	2	0	937	3	0	2	0	5	1	610	0	0	611	0	0	0	0	0	0	1553
04:00 PM	0	234	0	0	234	1	0	1	0	2	0	152	1	0	153	0	0	0	0	0	0	389
04:15 PM	0	227	2	0	229	1	0	0	0	1	0	163	1	0	164	0	0	0	0	0	0	394
04:30 PM	0	286	2	0	288	0	0	0	0	0	0	142	3	0	145	0	0	0	0	0	0	433
04:45 PM	0	238	1	0	239	2	0	1	0	3	2	161	0	0	163	0	0	1	0	1	1	406
Total	0	985	5	0	990	4	0	2	0	6	2	618	5	0	625	0	0	1	0	1	1	1622
05:00 PM	0	249	3	0	252	0	0	0	0	0	0	155	0	0	155	0	0	0	0	0	0	407
05:15 PM	0	232	1	0	233	0	0	0	0	0	0	142	0	0	142	0	0	0	0	0	0	375
05:30 PM	0	247	0	0	247	0	0	0	0	0	1	147	0	0	148	0	0	0	0	0	0	395
05:45 PM	0	205	0	0	205	1	0	0	0	1	0	118	1	0	119	0	0	0	0	0	0	325
Total	0	933	4	0	937	1	0	0	0	1	1	562	1	0	564	0	0	0	0	0	0	1502
06:00 PM	0	174	0	0	174	0	0	0	0	0	0	112	0	0	112	0	0	0	0	0	0	286
06:15 PM	0	127	0	0	127	1	0	0	0	1	0	117	1	0	118	0	0	0	0	0	0	246
06:30 PM	0	155	1	0	156	1	0	1	0	2	1	92	0	0	93	0	0	0	0	0	0	251
06:45 PM	0	107	0	0	107	0	0	0	0	0	0	98	0	0	98	0	0	0	0	0	0	205
Total	0	563	1	0	564	2	0	1	0	3	1	419	1	0	421	0	0	0	0	0	0	988
Grand Total	0	3416	12	0	3428	10	0	5	0	15	5	2209	7	0	2221	0	0	1	0	1	1	5665
Apprch %	0	99.6	0.4	0		66.7	0	33.3	0		0.2	99.5	0.3	0		0	0	100	0			
Total %	0	60.3	0.2	0	60.5	0.2	0	0.1	0	0.3	0.1	39	0.1	0	39.2	0	0	0	0	0	0	

Start Time	US 301 Southbound				Walsingham Rd Westbound				US 301 Northbound				Driveway Eastbound				Int. Total
	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	
Peak Hour Analysis From 03:00 PM to 06:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 04:15 PM																	
04:15 PM	0	227	2	229	1	0	0	1	0	163	1	164	0	0	0	0	394
04:30 PM	0	286	2	288	0	0	0	0	0	142	3	145	0	0	0	0	433
04:45 PM	0	238	1	239	2	0	1	3	2	161	0	163	0	0	1	1	406
05:00 PM	0	249	3	252	0	0	0	0	0	155	0	155	0	0	0	0	407
Total Volume	0	1000	8	1008	3	0	1	4	2	621	4	627	0	0	1	1	1640
% App. Total	0	99.2	0.8		75	0	25		0.3	99	0.6		0	0	100		
PHF	.000	.874	.667	.875	.375	.000	.250	.333	.250	.952	.333	.956	.000	.000	.250	.250	.947

Peggy Malone & Associates

(888) 247-8602

File Name : 4-US 301 & Walsingham Rd AM
 Site Code :
 Start Date : 11/1/2018
 Page No : 1

Groups Printed- Car

Start Time	US 301 Southbound					Walsingham Rd Westbound					US 301 Northbound					Ent/Exit Eastbound					Int. Total
	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	
06:00 AM	0	41	0	0	41	0	0	0	0	0	0	73	0	0	73	0	0	0	0	0	0
06:15 AM	0	88	0	0	88	0	0	0	0	0	0	98	0	0	98	0	0	0	0	0	0
06:30 AM	0	75	0	0	75	0	0	0	0	0	0	142	0	0	142	0	0	0	0	0	0
06:45 AM	0	85	0	0	85	0	0	0	0	0	0	118	0	0	118	0	0	0	0	0	0
Total	0	289	0	0	289	0	0	0	0	0	0	431	0	0	431	0	0	0	0	0	0
07:00 AM	0	78	0	0	78	1	0	0	0	1	1	112	0	0	113	0	0	0	0	0	0
07:15 AM	0	89	0	0	89	0	0	0	0	0	2	114	0	0	116	0	0	0	0	0	0
07:30 AM	0	75	0	0	75	0	0	1	0	1	1	128	0	0	129	0	0	0	0	0	0
07:45 AM	0	75	0	0	75	0	0	0	0	0	0	124	0	0	124	0	0	0	0	0	0
Total	0	317	0	0	317	1	0	1	0	2	4	478	0	0	482	0	0	0	0	0	0
08:00 AM	0	77	0	0	77	0	0	0	0	0	0	103	0	0	103	0	0	0	0	0	0
08:15 AM	0	90	0	0	90	1	0	1	0	2	0	102	0	0	102	0	0	0	0	0	0
08:30 AM	0	93	0	0	93	0	0	0	0	0	0	101	1	0	102	0	0	0	0	0	0
08:45 AM	0	81	1	0	82	1	0	1	0	2	0	90	2	0	92	0	0	0	0	0	0
Total	0	341	1	0	342	2	0	2	0	4	0	396	3	0	399	0	0	0	0	0	0
Grand Total	0	947	1	0	948	3	0	3	0	6	4	1305	3	0	1312	0	0	0	0	0	0
Apprch %	0	99.9	0.1	0		50	0	50	0		0.3	99.5	0.2	0		0	0	0	0		
Total %	0	41.8	0	0	41.8	0.1	0	0.1	0	0.3	0.2	57.6	0.1	0	57.9	0	0	0	0	0	

Start Time	US 301 Southbound					Walsingham Rd Westbound					US 301 Northbound					Ent/Exit Eastbound					Int. Total
	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	
Peak Hour Analysis From 06:00 AM to 08:45 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 06:30 AM																					
06:30 AM	0	75	0	0	75	0	0	0	0	0	0	142	0	0	142	0	0	0	0	0	0
06:45 AM	0	85	0	0	85	0	0	0	0	0	0	118	0	0	118	0	0	0	0	0	0
07:00 AM	0	78	0	0	78	1	0	0	0	1	1	112	0	0	113	0	0	0	0	0	0
07:15 AM	0	89	0	0	89	0	0	0	0	0	2	114	0	0	116	0	0	0	0	0	0
Total Volume	0	327	0	0	327	1	0	0	0	1	3	486	0	0	489	0	0	0	0	0	0
% App. Total	0	100	0	0		100	0	0	0		0.6	99.4	0	0		0	0	0	0		
PHF	.000	.919	.000	.000	.919	.250	.000	.000	.000	.250	.375	.856	.000	.000	.861	.000	.000	.000	.000	.000	.941

Peggy Malone & Associates

(888) 247-8602

File Name : 4-US 301 & Walsingham Rd AM
 Site Code :
 Start Date : 11/1/2018
 Page No : 1

Groups Printed- Truck

Start Time	US 301 Southbound					Walsingham Rd Westbound					US 301 Northbound					Ent/Exit Eastbound					Int. Total
	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	
06:00 AM	0	7	0	0	7	0	0	0	0	0	0	4	0	0	4	0	0	0	0	0	11
06:15 AM	0	9	0	0	9	0	0	0	0	0	0	13	0	0	13	0	0	0	0	0	22
06:30 AM	0	7	0	0	7	0	0	0	0	0	0	17	0	0	17	0	0	0	0	0	24
06:45 AM	0	8	0	0	8	0	0	0	0	0	0	18	0	0	18	0	0	0	0	0	26
Total	0	31	0	0	31	0	0	0	0	0	0	52	0	0	52	0	0	0	0	0	83
07:00 AM	0	11	0	0	11	0	0	0	0	0	0	11	0	0	11	0	0	0	0	0	22
07:15 AM	0	7	0	0	7	0	0	0	0	0	0	9	0	0	9	0	0	0	0	0	16
07:30 AM	0	16	0	0	16	0	0	0	0	0	0	9	0	0	9	0	0	0	0	0	25
07:45 AM	0	11	0	0	11	0	0	0	0	0	0	15	0	0	15	0	0	0	0	0	26
Total	0	45	0	0	45	0	0	0	0	0	0	44	0	0	44	0	0	0	0	0	89
08:00 AM	0	7	0	0	7	0	0	0	0	0	0	15	0	0	15	0	0	0	0	0	22
08:15 AM	0	7	0	0	7	0	0	0	0	0	0	19	0	0	19	0	0	0	0	0	26
08:30 AM	0	7	0	0	7	0	0	0	0	0	0	15	0	0	15	0	0	0	0	0	22
08:45 AM	0	7	0	0	7	0	0	0	0	0	0	17	0	0	17	0	0	0	0	0	24
Total	0	28	0	0	28	0	0	0	0	0	0	66	0	0	66	0	0	0	0	0	94
Grand Total	0	104	0	0	104	0	0	0	0	0	0	162	0	0	162	0	0	0	0	0	266
Apprch %	0	100	0	0		0	0	0	0		0	100	0	0		0	0	0	0		
Total %	0	39.1	0	0	39.1	0	0	0	0	0	0	60.9	0	0	60.9	0	0	0	0	0	

Start Time	US 301 Southbound				Walsingham Rd Westbound				US 301 Northbound				Ent/Exit Eastbound				Int. Total
	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	
Peak Hour Analysis From 06:00 AM to 08:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:30 AM																	
07:30 AM	0	16	0	16	0	0	0	0	0	9	0	9	0	0	0	0	25
07:45 AM	0	11	0	11	0	0	0	0	0	15	0	15	0	0	0	0	26
08:00 AM	0	7	0	7	0	0	0	0	0	15	0	15	0	0	0	0	22
08:15 AM	0	7	0	7	0	0	0	0	0	19	0	19	0	0	0	0	26
Total Volume	0	41	0	41	0	0	0	0	0	58	0	58	0	0	0	0	99
% App. Total	0	100	0		0	0	0		0	100	0		0	0	0		
PHF	.000	.641	.000	.641	.000	.000	.000	.000	.000	.763	.000	.763	.000	.000	.000	.000	.952

Peggy Malone & Associates

(888) 247-8602

File Name : 4-US 301 & Walsingham Rd AM
 Site Code :
 Start Date : 11/1/2018
 Page No : 1

Groups Printed- Combined

Start Time	US 301 Southbound					Walsingham Rd Westbound					US 301 Northbound					Ent/Exit Eastbound					Int. Total
	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	
06:00 AM	0	48	0	0	48	0	0	0	0	0	0	77	0	0	77	0	0	0	0	0	125
06:15 AM	0	97	0	0	97	0	0	0	0	0	0	111	0	0	111	0	0	0	0	0	208
06:30 AM	0	82	0	0	82	0	0	0	0	0	0	159	0	0	159	0	0	0	0	0	241
06:45 AM	0	93	0	0	93	0	0	0	0	0	0	136	0	0	136	0	0	0	0	0	229
Total	0	320	0	0	320	0	0	0	0	0	0	483	0	0	483	0	0	0	0	0	803
07:00 AM	0	89	0	0	89	1	0	0	0	1	1	123	0	0	124	0	0	0	0	0	214
07:15 AM	0	96	0	0	96	0	0	0	0	0	2	123	0	0	125	0	0	0	0	0	221
07:30 AM	0	91	0	0	91	0	0	1	0	1	1	137	0	0	138	0	0	0	0	0	230
07:45 AM	0	86	0	0	86	0	0	0	0	0	0	139	0	0	139	0	0	0	0	0	225
Total	0	362	0	0	362	1	0	1	0	2	4	522	0	0	526	0	0	0	0	0	890
08:00 AM	0	84	0	0	84	0	0	0	0	0	0	118	0	0	118	0	0	0	0	0	202
08:15 AM	0	97	0	0	97	1	0	1	0	2	0	121	0	0	121	0	0	0	0	0	220
08:30 AM	0	100	0	0	100	0	0	0	0	0	0	116	1	0	117	0	0	0	0	0	217
08:45 AM	0	88	1	0	89	1	0	1	0	2	0	107	2	0	109	0	0	0	0	0	200
Total	0	369	1	0	370	2	0	2	0	4	0	462	3	0	465	0	0	0	0	0	839
Grand Total	0	1051	1	0	1052	3	0	3	0	6	4	1467	3	0	1474	0	0	0	0	0	2532
Apprch %	0	99.9	0.1	0		50	0	50	0		0.3	99.5	0.2	0		0	0	0	0	0	
Total %	0	41.5	0	0	41.5	0.1	0	0.1	0	0.2	0.2	57.9	0.1	0	58.2	0	0	0	0	0	

Start Time	US 301 Southbound				Walsingham Rd Westbound				US 301 Northbound				Ent/Exit Eastbound				Int. Total
	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	
Peak Hour Analysis From 06:00 AM to 08:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 06:30 AM																	
06:30 AM	0	82	0	82	0	0	0	0	0	0	159	0	159	0	0	0	241
06:45 AM	0	93	0	93	0	0	0	0	0	0	136	0	136	0	0	0	229
07:00 AM	0	89	0	89	1	0	0	1	1	1	123	0	124	0	0	0	214
07:15 AM	0	96	0	96	0	0	0	0	2	2	123	0	125	0	0	0	221
Total Volume	0	360	0	360	1	0	0	1	3	3	541	0	544	0	0	0	905
% App. Total	0	100	0		100	0	0		0.6	0.6	99.4	0		0	0		
PHF	.000	.938	.000	.938	.250	.000	.000	.250	.375	.851	.000	.855	.000	.000	.000	.000	.939

Peggy Malone & Associates

(888) 247-8602

File Name : 4-US 301 & Walsingham Rd PM
 Site Code :
 Start Date : 11/1/2018
 Page No : 1

Groups Printed- Car

Start Time	US 301 Southbound					Walsingham Rd Westbound					US 301 Northbound					Ent/Exit Eastbound					Int. Total	
	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total		
04:00 PM	0	165	0	0	165	0	0	0	0	0	1	101	0	0	102	0	0	0	0	0	0	267
04:15 PM	0	171	1	0	172	1	0	0	0	1	0	97	0	0	97	0	0	0	0	0	0	270
04:30 PM	0	210	0	0	210	1	0	0	0	1	0	127	1	0	128	0	0	0	0	0	0	339
04:45 PM	0	202	1	0	203	0	0	1	0	1	1	94	3	0	98	0	0	0	0	0	0	302
Total	0	748	2	0	750	2	0	1	0	3	2	419	4	0	425	0	0	0	0	0	0	1178
05:00 PM	0	202	1	0	203	0	0	0	0	0	0	121	0	0	121	0	0	0	0	0	0	324
05:15 PM	0	178	0	0	178	2	0	0	0	2	0	116	0	0	116	0	0	0	0	0	0	296
05:30 PM	0	181	1	0	182	0	0	0	0	0	2	113	0	0	115	0	0	0	0	0	0	297
05:45 PM	0	195	0	0	195	0	0	0	0	0	1	102	0	0	103	0	0	0	0	0	0	298
Total	0	756	2	0	758	2	0	0	0	2	3	452	0	0	455	0	0	0	0	0	0	1215
06:00 PM	0	171	0	0	171	0	0	0	0	0	0	101	0	0	101	0	0	0	0	0	0	272
06:15 PM	0	121	1	0	122	1	0	0	0	1	0	77	0	0	77	0	0	0	0	0	0	200
06:30 PM	0	114	0	0	114	2	0	0	0	2	0	80	0	0	80	0	0	0	0	0	0	196
06:45 PM	0	100	2	0	102	1	0	0	0	1	0	58	0	0	58	0	0	0	0	0	0	161
Total	0	506	3	0	509	4	0	0	0	4	0	316	0	0	316	0	0	0	0	0	0	829
Grand Total	0	2010	7	0	2017	8	0	1	0	9	5	1187	4	0	1196	0	0	0	0	0	0	3222
Apprch %	0	99.7	0.3	0		88.9	0	11.1	0		0.4	99.2	0.3	0		0	0	0	0	0		
Total %	0	62.4	0.2	0	62.6	0.2	0	0	0	0.3	0.2	36.8	0.1	0	37.1	0	0	0	0	0		

Start Time	US 301 Southbound				Walsingham Rd Westbound				US 301 Northbound				Ent/Exit Eastbound				Int. Total	
	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total		
04:30 PM	0	210	0	210	1	0	0	1	0	127	1	128	0	0	0	0	0	339
04:45 PM	0	202	1	203	0	0	1	1	1	94	3	98	0	0	0	0	0	302
05:00 PM	0	202	1	203	0	0	0	0	0	121	0	121	0	0	0	0	0	324
05:15 PM	0	178	0	178	2	0	0	2	0	116	0	116	0	0	0	0	0	296
Total Volume	0	792	2	794	3	0	1	4	1	458	4	463	0	0	0	0	0	1261
% App. Total	0	99.7	0.3		75	0	25		0.2	98.9	0.9		0	0	0			
PHF	.000	.943	.500	.945	.375	.000	.250	.500	.250	.902	.333	.904	.000	.000	.000	.000		.930

Peak Hour Analysis From 04:00 PM to 06:45 PM - Peak 1 of 1
 Peak Hour for Entire Intersection Begins at 04:30 PM

Peggy Malone & Associates

(888) 247-8602

File Name : 4-US 301 & Walsingham Rd PM
 Site Code :
 Start Date : 11/1/2018
 Page No : 1

Groups Printed- Truck

Start Time	US 301 Southbound					Walsingham Rd Westbound					US 301 Northbound					Ent/Exit Eastbound					Int. Total
	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	
04:00 PM	0	14	0	0	14	0	0	0	0	0	0	15	0	0	15	0	0	0	0	0	29
04:15 PM	0	15	0	0	15	0	0	0	0	0	0	22	0	0	22	0	0	0	0	0	37
04:30 PM	0	14	0	0	14	0	0	0	0	0	0	21	0	0	21	0	0	0	0	0	35
04:45 PM	0	19	0	0	19	0	0	0	0	0	0	11	0	0	11	0	0	0	0	0	30
Total	0	62	0	0	62	0	0	0	0	0	0	69	0	0	69	0	0	0	0	0	131
05:00 PM	0	16	1	0	17	0	0	0	0	0	0	11	0	0	11	0	0	0	0	0	28
05:15 PM	0	12	0	0	12	0	0	0	0	0	0	8	0	0	8	0	0	0	0	0	20
05:30 PM	0	10	0	0	10	0	0	0	0	0	0	14	0	0	14	0	0	0	0	0	24
05:45 PM	0	18	0	0	18	0	0	0	0	0	0	10	0	0	10	0	0	0	0	0	28
Total	0	56	1	0	57	0	0	0	0	0	0	43	0	0	43	0	0	0	0	0	100
06:00 PM	0	8	0	0	8	0	0	0	0	0	0	6	0	0	6	0	0	0	0	0	14
06:15 PM	0	11	1	0	12	0	0	0	0	0	0	9	0	0	9	0	0	0	0	0	21
06:30 PM	0	18	0	0	18	0	0	0	0	0	1	4	0	0	5	0	0	0	0	0	23
06:45 PM	0	10	1	0	11	0	0	0	0	0	0	5	0	0	5	0	0	0	0	0	16
Total	0	47	2	0	49	0	0	0	0	0	1	24	0	0	25	0	0	0	0	0	74
Grand Total	0	165	3	0	168	0	0	0	0	0	1	136	0	0	137	0	0	0	0	0	305
Apprch %	0	98.2	1.8	0		0	0	0	0		0.7	99.3	0	0		0	0	0	0		
Total %	0	54.1	1	0	55.1	0	0	0	0	0	0.3	44.6	0	0	44.9	0	0	0	0	0	

Start Time	US 301 Southbound					Walsingham Rd Westbound					US 301 Northbound					Ent/Exit Eastbound					Int. Total
	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	
Peak Hour Analysis From 04:00 PM to 06:45 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 04:00 PM																					
04:00 PM	0	14	0	0	14	0	0	0	0	0	0	15	0	0	15	0	0	0	0	0	29
04:15 PM	0	15	0	0	15	0	0	0	0	0	0	22	0	0	22	0	0	0	0	0	37
04:30 PM	0	14	0	0	14	0	0	0	0	0	0	21	0	0	21	0	0	0	0	0	35
04:45 PM	0	19	0	0	19	0	0	0	0	0	0	11	0	0	11	0	0	0	0	0	30
Total Volume	0	62	0	0	62	0	0	0	0	0	0	69	0	0	69	0	0	0	0	0	131
% App. Total	0	100	0	0		0	0	0	0		0	100	0	0		0	0	0	0		
PHF	.000	.816	.000	.000	.816	.000	.000	.000	.000	.000	.000	.784	.000	.000	.784	.000	.000	.000	.000	.000	.885

Peggy Malone & Associates

(888) 247-8602

File Name : 4-US 301 & Walsingham Rd PM
 Site Code :
 Start Date : 11/1/2018
 Page No : 1

Groups Printed- Combined

Start Time	US 301 Southbound					Walsingham Rd Westbound					US 301 Northbound					Ent/Exit Eastbound					Int. Total
	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	
04:00 PM	0	179	0	0	179	0	0	0	0	0	1	116	0	0	117	0	0	0	0	0	296
04:15 PM	0	186	1	0	187	1	0	0	0	1	0	119	0	0	119	0	0	0	0	0	307
04:30 PM	0	224	0	0	224	1	0	0	0	1	0	148	1	0	149	0	0	0	0	0	374
04:45 PM	0	221	1	0	222	0	0	1	0	1	1	105	3	0	109	0	0	0	0	0	332
Total	0	810	2	0	812	2	0	1	0	3	2	488	4	0	494	0	0	0	0	0	1309
05:00 PM	0	218	2	0	220	0	0	0	0	0	0	132	0	0	132	0	0	0	0	0	352
05:15 PM	0	190	0	0	190	2	0	0	0	2	0	124	0	0	124	0	0	0	0	0	316
05:30 PM	0	191	1	0	192	0	0	0	0	0	2	127	0	0	129	0	0	0	0	0	321
05:45 PM	0	213	0	0	213	0	0	0	0	0	1	112	0	0	113	0	0	0	0	0	326
Total	0	812	3	0	815	2	0	0	0	2	3	495	0	0	498	0	0	0	0	0	1315
06:00 PM	0	179	0	0	179	0	0	0	0	0	0	107	0	0	107	0	0	0	0	0	286
06:15 PM	0	132	2	0	134	1	0	0	0	1	0	86	0	0	86	0	0	0	0	0	221
06:30 PM	0	132	0	0	132	2	0	0	0	2	1	84	0	0	85	0	0	0	0	0	219
06:45 PM	0	110	3	0	113	1	0	0	0	1	0	63	0	0	63	0	0	0	0	0	177
Total	0	553	5	0	558	4	0	0	0	4	1	340	0	0	341	0	0	0	0	0	903
Grand Total	0	2175	10	0	2185	8	0	1	0	9	6	1323	4	0	1333	0	0	0	0	0	3527
Apprch %	0	99.5	0.5	0		88.9	0	11.1	0		0.5	99.2	0.3	0		0	0	0	0		
Total %	0	61.7	0.3	0	62	0.2	0	0	0	0.3	0.2	37.5	0.1	0	37.8	0	0	0	0	0	

Start Time	US 301 Southbound				Walsingham Rd Westbound				US 301 Northbound				Ent/Exit Eastbound				Int. Total
	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	
Peak Hour Analysis From 04:00 PM to 06:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 04:30 PM																	
04:30 PM	0	224	0	224	1	0	0	1	0	148	1	149	0	0	0	0	374
04:45 PM	0	221	1	222	0	0	1	1	1	105	3	109	0	0	0	0	332
05:00 PM	0	218	2	220	0	0	0	0	0	132	0	132	0	0	0	0	352
05:15 PM	0	190	0	190	2	0	0	2	0	124	0	124	0	0	0	0	316
Total Volume	0	853	3	856	3	0	1	4	1	509	4	514	0	0	0	0	1374
% App. Total	0	99.6	0.4		75	0	25		0.2	99	0.8		0	0	0		
PHF	.000	.952	.375	.955	.375	.000	.250	.500	.250	.860	.333	.862	.000	.000	.000	.000	.918

Peggy Malone & Associates

(888) 247-8602

File Name : 4-US 301 and Walsingham Rd SUN
 Site Code :
 Start Date : 11/25/2018
 Page No : 1

Groups Printed- Car

Start Time	US 301 Southbound					Walsingham Rd Westbound					US 301 Northbound					Entrance/Exit Eastbound					Int. Total
	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	
03:00 PM	0	318	0	0	318	0	0	2	0	2	0	354	0	0	354	0	0	0	0	0	674
03:15 PM	0	253	1	0	254	1	0	0	0	1	0	382	0	0	382	0	0	0	0	0	637
03:30 PM	0	253	0	0	253	0	0	1	0	1	0	381	0	0	381	0	0	0	0	0	635
03:45 PM	0	256	0	0	256	0	0	0	0	0	0	334	1	0	335	0	0	0	0	0	591
Total	0	1080	1	0	1081	1	0	3	0	4	0	1451	1	0	1452	0	0	0	0	0	2537
04:00 PM	0	274	0	0	274	0	0	0	0	0	0	289	0	0	289	0	0	0	0	0	563
04:15 PM	0	316	0	0	316	0	0	0	0	0	0	333	0	0	333	0	0	0	0	0	649
04:30 PM	0	280	0	0	280	0	0	0	0	0	0	356	0	0	356	0	0	0	0	0	636
04:45 PM	0	223	0	0	223	0	0	0	0	0	0	305	1	0	306	0	0	0	0	0	529
Total	0	1093	0	0	1093	0	0	0	0	0	0	1283	1	0	1284	0	0	0	0	0	2377
05:00 PM	0	233	0	0	233	0	0	0	0	0	0	299	0	0	299	0	0	0	0	0	532
05:15 PM	0	235	0	0	235	0	0	0	0	0	0	289	0	0	289	2	0	0	0	2	526
05:30 PM	0	210	0	0	210	1	0	0	0	1	1	245	0	0	246	0	0	0	0	0	457
05:45 PM	0	265	0	0	265	0	0	0	0	0	0	212	0	0	212	0	0	0	0	0	477
Total	0	943	0	0	943	1	0	0	0	1	1	1045	0	0	1046	2	0	0	0	2	1992
06:00 PM	0	216	0	0	216	0	0	0	0	0	0	178	1	0	179	0	0	0	0	0	395
06:15 PM	0	204	0	0	204	0	0	0	0	0	0	244	0	0	244	0	0	0	0	0	448
06:30 PM	0	171	1	0	172	0	0	0	0	0	0	167	0	0	167	0	0	0	0	0	339
06:45 PM	0	189	0	0	189	0	0	0	0	0	0	200	0	0	200	0	0	0	0	0	389
Total	0	780	1	0	781	0	0	0	0	0	0	789	1	0	790	0	0	0	0	0	1571
Grand Total	0	3896	2	0	3898	2	0	3	0	5	1	4568	3	0	4572	2	0	0	0	2	8477
Apprch %	0	99.9	0.1	0		40	0	60	0		0	99.9	0.1	0		100	0	0	0		
Total %	0	46	0	0	46	0	0	0	0	0.1	0	53.9	0	0	53.9	0	0	0	0	0	

Start Time	US 301 Southbound				Walsingham Rd Westbound				US 301 Northbound				Entrance/Exit Eastbound				Int. Total
	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	
Peak Hour Analysis From 03:00 PM to 06:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 03:00 PM																	
03:00 PM	0	318	0	318	0	0	2	2	0	354	0	354	0	0	0	0	674
03:15 PM	0	253	1	254	1	0	0	1	0	382	0	382	0	0	0	0	637
03:30 PM	0	253	0	253	0	0	1	1	0	381	0	381	0	0	0	0	635
03:45 PM	0	256	0	256	0	0	0	0	0	334	1	335	0	0	0	0	591
Total Volume	0	1080	1	1081	1	0	3	4	0	1451	1	1452	0	0	0	0	2537
% App. Total	0	99.9	0.1		25	0	75		0	99.9	0.1		0	0	0		
PHF	.000	.849	.250	.850	.250	.000	.375	.500	.000	.950	.250	.950	.000	.000	.000	.000	.941

Peggy Malone & Associates

(888) 247-8602

File Name : 4-US 301 and Walsingham Rd SUN
 Site Code :
 Start Date : 11/25/2018
 Page No : 1

Groups Printed- Truck

Start Time	US 301 Southbound					Walsingham Rd Westbound					US 301 Northbound					Entrance/Exit Eastbound					Int. Total
	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	
03:00 PM	0	9	0	0	9	0	0	0	0	0	0	5	0	0	5	0	0	0	0	0	14
03:15 PM	0	7	0	0	7	0	0	0	0	0	0	9	0	0	9	0	0	0	0	0	16
03:30 PM	0	3	0	0	3	0	0	0	0	0	0	8	0	0	8	0	0	0	0	0	11
03:45 PM	0	8	0	0	8	0	0	0	0	0	0	8	0	0	8	0	0	0	0	0	16
Total	0	27	0	0	27	0	0	0	0	0	0	30	0	0	30	0	0	0	0	0	57
04:00 PM	0	4	0	0	4	0	0	0	0	0	0	8	0	0	8	0	0	0	0	0	12
04:15 PM	0	3	0	0	3	0	0	0	0	0	0	6	0	0	6	0	0	0	0	0	9
04:30 PM	0	3	0	0	3	0	0	0	0	0	0	2	0	0	2	0	0	0	0	0	5
04:45 PM	0	9	0	0	9	0	0	0	0	0	0	10	0	0	10	0	0	0	0	0	19
Total	0	19	0	0	19	0	0	0	0	0	0	26	0	0	26	0	0	0	0	0	45
05:00 PM	0	7	0	0	7	0	0	0	0	0	0	5	0	0	5	0	0	0	0	0	12
05:15 PM	0	8	0	0	8	0	0	0	0	0	0	7	0	0	7	0	0	0	0	0	15
05:30 PM	0	4	0	0	4	0	0	0	0	0	0	9	0	0	9	0	0	0	0	0	13
05:45 PM	0	8	0	0	8	0	0	0	0	0	0	5	0	0	5	0	0	0	0	0	13
Total	0	27	0	0	27	0	0	0	0	0	0	26	0	0	26	0	0	0	0	0	53
06:00 PM	0	7	0	0	7	0	1	0	0	1	0	9	0	0	9	0	0	0	0	0	17
06:15 PM	0	2	0	0	2	0	0	0	0	0	0	9	0	0	9	0	0	0	0	0	11
06:30 PM	0	5	0	0	5	0	0	0	0	0	0	7	0	0	7	0	0	0	0	0	12
06:45 PM	0	3	0	0	3	0	0	0	0	0	0	10	0	0	10	0	0	0	0	0	13
Total	0	17	0	0	17	0	1	0	0	1	0	35	0	0	35	0	0	0	0	0	53
Grand Total	0	90	0	0	90	0	1	0	0	1	0	117	0	0	117	0	0	0	0	0	208
Apprch %	0	100	0	0		0	100	0	0		0	100	0	0		0	0	0	0		
Total %	0	43.3	0	0	43.3	0	0.5	0	0	0.5	0	56.2	0	0	56.2	0	0	0	0	0	

Start Time	US 301 Southbound					Walsingham Rd Westbound					US 301 Northbound					Entrance/Exit Eastbound					Int. Total
	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	
Peak Hour Analysis From 03:00 PM to 06:45 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 04:45 PM																					
04:45 PM	0	9	0	0	9	0	0	0	0	0	0	10	0	0	10	0	0	0	0	0	19
05:00 PM	0	7	0	0	7	0	0	0	0	0	0	5	0	0	5	0	0	0	0	0	12
05:15 PM	0	8	0	0	8	0	0	0	0	0	0	7	0	0	7	0	0	0	0	0	15
05:30 PM	0	4	0	0	4	0	0	0	0	0	0	9	0	0	9	0	0	0	0	0	13
Total Volume	0	28	0	0	28	0	0	0	0	0	0	31	0	0	31	0	0	0	0	0	59
% App. Total	0	100	0	0		0	0	0	0		0	100	0	0		0	0	0	0		
PHF	.000	.778	.000	.000	.778	.000	.000	.000	.000	.000	.000	.775	.000	.775	.000	.000	.000	.000	.000	.776	

Peggy Malone & Associates

(888) 247-8602

File Name : 4-US 301 and Walsingham Rd SUN
 Site Code :
 Start Date : 11/25/2018
 Page No : 1

Groups Printed- Combined

Start Time	US 301 Southbound					Walsingham Rd Westbound					US 301 Northbound					Entrance/Exit Eastbound					Int. Total
	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	
03:00 PM	0	327	0	0	327	0	0	2	0	2	0	359	0	0	359	0	0	0	0	0	688
03:15 PM	0	260	1	0	261	1	0	0	0	1	0	391	0	0	391	0	0	0	0	0	653
03:30 PM	0	256	0	0	256	0	0	1	0	1	0	389	0	0	389	0	0	0	0	0	646
03:45 PM	0	264	0	0	264	0	0	0	0	0	0	342	1	0	343	0	0	0	0	0	607
Total	0	1107	1	0	1108	1	0	3	0	4	0	1481	1	0	1482	0	0	0	0	0	2594
04:00 PM	0	278	0	0	278	0	0	0	0	0	0	297	0	0	297	0	0	0	0	0	575
04:15 PM	0	319	0	0	319	0	0	0	0	0	0	339	0	0	339	0	0	0	0	0	658
04:30 PM	0	283	0	0	283	0	0	0	0	0	0	358	0	0	358	0	0	0	0	0	641
04:45 PM	0	232	0	0	232	0	0	0	0	0	0	315	1	0	316	0	0	0	0	0	548
Total	0	1112	0	0	1112	0	0	0	0	0	0	1309	1	0	1310	0	0	0	0	0	2422
05:00 PM	0	240	0	0	240	0	0	0	0	0	0	304	0	0	304	0	0	0	0	0	544
05:15 PM	0	243	0	0	243	0	0	0	0	0	0	296	0	0	296	2	0	0	0	2	541
05:30 PM	0	214	0	0	214	1	0	0	0	1	1	254	0	0	255	0	0	0	0	0	470
05:45 PM	0	273	0	0	273	0	0	0	0	0	0	217	0	0	217	0	0	0	0	0	490
Total	0	970	0	0	970	1	0	0	0	1	1	1071	0	0	1072	2	0	0	0	2	2045
06:00 PM	0	223	0	0	223	0	1	0	0	1	0	187	1	0	188	0	0	0	0	0	412
06:15 PM	0	206	0	0	206	0	0	0	0	0	0	253	0	0	253	0	0	0	0	0	459
06:30 PM	0	176	1	0	177	0	0	0	0	0	0	174	0	0	174	0	0	0	0	0	351
06:45 PM	0	192	0	0	192	0	0	0	0	0	0	210	0	0	210	0	0	0	0	0	402
Total	0	797	1	0	798	0	1	0	0	1	0	824	1	0	825	0	0	0	0	0	1624
Grand Total	0	3986	2	0	3988	2	1	3	0	6	1	4685	3	0	4689	2	0	0	0	2	8685
Apprch %	0	99.9	0.1	0		33.3	16.7	50	0		0	99.9	0.1	0		100	0	0	0		
Total %	0	45.9	0	0	45.9	0	0	0	0	0.1	0	53.9	0	0	54	0	0	0	0	0	

Start Time	US 301 Southbound				Walsingham Rd Westbound				US 301 Northbound				Entrance/Exit Eastbound				Int. Total
	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	
Peak Hour Analysis From 03:00 PM to 06:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 03:00 PM																	
03:00 PM	0	327	0	327	0	0	2	2	0	359	0	359	0	0	0	0	688
03:15 PM	0	260	1	261	1	0	0	1	0	391	0	391	0	0	0	0	653
03:30 PM	0	256	0	256	0	0	1	1	0	389	0	389	0	0	0	0	646
03:45 PM	0	264	0	264	0	0	0	0	0	342	1	343	0	0	0	0	607
Total Volume	0	1107	1	1108	1	0	3	4	0	1481	1	1482	0	0	0	0	2594
% App. Total	0	99.9	0.1		25	0	75		0	99.9	0.1		0	0	0		
PHF	.000	.846	.250	.847	.250	.000	.375	.500	.000	.947	.250	.948	.000	.000	.000	.000	.943

APPENDIX B
Existing Conditions Analysis

Weekday AM Peak

Queues

1: US 301 & US 17 (Tidewater Trail)

09/17/2019



Lane Group	EBT	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	257	151	127	8	321	67	339
v/c Ratio	0.50	0.51	0.20	0.06	0.47	0.32	0.26
Control Delay	33.0	36.7	4.5	38.1	28.5	37.4	15.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	33.0	36.7	4.5	38.1	28.5	37.4	15.7
Queue Length 50th (ft)	53	62	0	3	64	28	44
Queue Length 95th (ft)	109	140	34	19	125	77	109
Internal Link Dist (ft)	118	2711			1025		2313
Turn Bay Length (ft)				200		175	
Base Capacity (vph)	1072	610	905	337	1644	529	2133
Starvation Cap Reductn	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.24	0.25	0.14	0.02	0.20	0.13	0.16

Intersection Summary

HCM Signalized Intersection Capacity Analysis

1: US 301 & US 17 (Tidewater Trail)

09/17/2019



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations		↔↔			↕	↗	↖	↕↔		↖	↕↔		
Traffic Volume (vph)	153	58	21	38	98	114	7	271	18	60	237	68	
Future Volume (vph)	153	58	21	38	98	114	7	271	18	60	237	68	
Ideal Flow (vphp)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Total Lost time (s)		5.7			5.8	5.8	4.5	6.5		6.1	6.5		
Lane Util. Factor		0.95			1.00	1.00	1.00	0.95		1.00	0.95		
Frt		0.99			1.00	0.85	1.00	0.99		1.00	0.97		
Flt Protected		0.97			0.99	1.00	0.95	1.00		0.95	1.00		
Satd. Flow (prot)		3196			1835	1482	1583	3100		1612	3185		
Flt Permitted		0.97			0.99	1.00	0.95	1.00		0.95	1.00		
Satd. Flow (perm)		3196			1835	1482	1583	3100		1612	3185		
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	
Adj. Flow (vph)	170	64	23	42	109	127	8	301	20	67	263	76	
RTOR Reduction (vph)	0	6	0	0	0	82	0	4	0	0	19	0	
Lane Group Flow (vph)	0	251	0	0	151	45	8	317	0	67	320	0	
Heavy Vehicles (%)	4%	16%	14%	5%	1%	9%	14%	16%	6%	12%	12%	1%	
Turn Type	Split	NA		Split	NA	pt+ov	Prot	NA		Prot	NA		
Protected Phases	3	3		4	4	4	5	2		1	6		
Permitted Phases													
Actuated Green, G (s)		11.8			12.1	27.5	1.1	20.2		9.6	30.3		
Effective Green, g (s)		11.8			12.1	27.5	1.1	20.2		9.6	30.3		
Actuated g/C Ratio		0.15			0.16	0.35	0.01	0.26		0.12	0.39		
Clearance Time (s)		5.7			5.8		4.5	6.5		6.1	6.5		
Vehicle Extension (s)		3.0			3.0		3.0	5.5		3.0	5.5		
Lane Grp Cap (vph)		484			285	523	22	804		198	1240		
v/s Ratio Prot		c0.08			c0.08	0.03	0.01	c0.10		c0.04	0.10		
v/s Ratio Perm													
v/c Ratio		0.52			0.53	0.09	0.36	0.39		0.34	0.26		
Uniform Delay, d1		30.4			30.2	16.8	38.0	23.8		31.2	16.1		
Progression Factor		1.00			1.00	1.00	1.00	1.00		1.00	1.00		
Incremental Delay, d2		0.9			1.8	0.1	9.9	0.8		1.0	0.3		
Delay (s)		31.3			32.0	16.8	47.9	24.5		32.2	16.4		
Level of Service		C			C	B	D	C		C	B		
Approach Delay (s)		31.3			25.1			25.1			19.0		
Approach LOS		C			C			C			B		
Intersection Summary													
HCM 2000 Control Delay			24.4									HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio			0.44										
Actuated Cycle Length (s)			77.8									Sum of lost time (s)	24.1
Intersection Capacity Utilization			47.1%									ICU Level of Service	A
Analysis Period (min)			15										
c Critical Lane Group													

Intersection						
Int Delay, s/veh	0.1					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	4	2	547	2	2	358
Future Vol, veh/h	4	2	547	2	2	358
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	0	0	11	0	0	9
Mvmt Flow	4	2	608	2	2	398

Major/Minor	Minor1	Major1	Major2			
Conflicting Flow All	812	305	0	0	610	0
Stage 1	609	-	-	-	-	-
Stage 2	203	-	-	-	-	-
Critical Hdwy	6.8	6.9	-	-	4.1	-
Critical Hdwy Stg 1	5.8	-	-	-	-	-
Critical Hdwy Stg 2	5.8	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	-	-	2.2	-
Pot Cap-1 Maneuver	321	697	-	-	979	-
Stage 1	511	-	-	-	-	-
Stage 2	817	-	-	-	-	-
Platoon blocked, %			-	-		
Mov Cap-1 Maneuver	320	697	-	-	979	-
Mov Cap-2 Maneuver	320	-	-	-	-	-
Stage 1	511	-	-	-	-	-
Stage 2	815	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	14.4	0	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT
Capacity (veh/h)	-	-	390	979
HCM Lane V/C Ratio	-	-	0.017	0.002
HCM Control Delay (s)	-	-	14.4	8.7
HCM Lane LOS	-	-	B	A
HCM 95th %tile Q(veh)	-	-	0.1	0

Intersection						
Int Delay, s/veh	0					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	T		T		T	
Traffic Vol, veh/h	0	0	553	0	0	358
Future Vol, veh/h	0	0	553	0	0	358
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	91	91	91	91	91	91
Heavy Vehicles, %	0	0	10	0	0	10
Mvmt Flow	0	0	608	0	0	393

Major/Minor	Minor1	Major1	Major2			
Conflicting Flow All	805	304	0	0	608	0
Stage 1	608	-	-	-	-	-
Stage 2	197	-	-	-	-	-
Critical Hdwy	6.8	6.9	-	-	4.1	-
Critical Hdwy Stg 1	5.8	-	-	-	-	-
Critical Hdwy Stg 2	5.8	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	-	-	2.2	-
Pot Cap-1 Maneuver	324	698	-	-	980	-
Stage 1	512	-	-	-	-	-
Stage 2	823	-	-	-	-	-
Platoon blocked, %			-	-	-	-
Mov Cap-1 Maneuver	324	698	-	-	980	-
Mov Cap-2 Maneuver	324	-	-	-	-	-
Stage 1	512	-	-	-	-	-
Stage 2	823	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	0	0	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT
Capacity (veh/h)	-	-	980	-
HCM Lane V/C Ratio	-	-	-	-
HCM Control Delay (s)	-	-	0	0
HCM Lane LOS	-	-	A	A
HCM 95th %tile Q(veh)	-	-	0	0

HCM 2010 TWSC
4: US 301 & Walsingham Rd

09/17/2019

Intersection													
Int Delay, s/veh	0												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕		↕		↕		↕	↕	↕
Traffic Vol, veh/h	0	0	0	0	0	1	0	0	541	3	0	360	0
Future Vol, veh/h	0	0	0	0	0	1	0	0	541	3	0	360	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	350	-	-	315	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	-	0	-	-	0	-
Peak Hour Factor	94	94	94	94	94	94	92	94	94	94	94	94	94
Heavy Vehicles, %	0	0	0	0	0	0	2	0	10	0	0	9	0
Mvmt Flow	0	0	0	0	0	1	0	0	576	3	0	383	0

Major/Minor	Minor2		Minor1			Major1				Major2			
Conflicting Flow All	671	962	191	768	960	289	279	-	0	0	579	0	0
Stage 1	383	383	-	577	577	-	-	-	-	-	-	-	-
Stage 2	288	579	-	191	383	-	-	-	-	-	-	-	-
Critical Hdwy	7.5	6.5	6.9	7.5	6.5	6.9	6.44	-	-	-	4.1	-	-
Critical Hdwy Stg 1	6.5	5.5	-	6.5	5.5	-	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.5	5.5	-	6.5	5.5	-	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4	3.3	3.5	4	3.3	2.52	-	-	-	2.2	-	-
Pot Cap-1 Maneuver	346	258	825	295	259	714	955	0	-	-	1005	-	0
Stage 1	617	616	-	474	505	-	-	0	-	-	-	-	0
Stage 2	701	504	-	798	616	-	-	0	-	-	-	-	0
Platoon blocked, %													
Mov Cap-1 Maneuver	345	258	825	295	259	714	955	-	-	-	1005	-	-
Mov Cap-2 Maneuver	345	258	-	295	259	-	-	-	-	-	-	-	-
Stage 1	617	616	-	474	505	-	-	-	-	-	-	-	-
Stage 2	700	504	-	798	616	-	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	10.1	0	0
HCM LOS	A	B		

Minor Lane/Major Mvmt	NBU	NBT	NBR	EBLn1WBLn1	SBL	SBT
Capacity (veh/h)	955	-	-	-	714	1005
HCM Lane V/C Ratio	-	-	-	-	0.001	-
HCM Control Delay (s)	0	-	-	0	10.1	0
HCM Lane LOS	A	-	-	A	B	A
HCM 95th %tile Q(veh)	0	-	-	-	0	0

Queuing and Blocking Report
Existing AM Conditions

02/20/2019

Intersection: 1: US 301 & US 17 (Tidewater Trail)

Movement	EB	EB	WB	WB	NB	NB	NB	SB	SB	SB
Directions Served	LT	TR	LT	R	L	T	TR	L	T	TR
Maximum Queue (ft)	161	90	111	113	28	212	184	88	94	154
Average Queue (ft)	84	35	65	59	6	101	57	40	51	65
95th Queue (ft)	138	72	113	111	23	177	140	76	90	111
Link Distance (ft)	122	122	2737	2737		1058	1058		2319	2319
Upstream Blk Time (%)	2									
Queuing Penalty (veh)	0									
Storage Bay Dist (ft)					200			175		
Storage Blk Time (%)						0				
Queuing Penalty (veh)						0				

Intersection: 2: US 301 & Back St

Movement	WB	SB
Directions Served	LR	LT
Maximum Queue (ft)	31	53
Average Queue (ft)	3	2
95th Queue (ft)	19	18
Link Distance (ft)	1114	1146
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 3: US 301 & Caroline St

Movement
Directions Served
Maximum Queue (ft)
Average Queue (ft)
95th Queue (ft)
Link Distance (ft)
Upstream Blk Time (%)
Queuing Penalty (veh)
Storage Bay Dist (ft)
Storage Blk Time (%)
Queuing Penalty (veh)

Intersection: 4: US 301 & Walsingham Rd

Movement

- Directions Served
- Maximum Queue (ft)
- Average Queue (ft)
- 95th Queue (ft)
- Link Distance (ft)
- Upstream Blk Time (%)
- Queuing Penalty (veh)
- Storage Bay Dist (ft)
- Storage Blk Time (%)
- Queuing Penalty (veh)

Network Summary

Network wide Queuing Penalty: 0

Weekday PM Peak

Queues

1: US 301 & US 17 (Tidewater Trail)

01/16/2019



Lane Group	EBT	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	227	113	88	9	363	218	639
v/c Ratio	0.48	0.48	0.14	0.07	0.51	0.64	0.42
Control Delay	38.0	43.0	4.6	43.9	31.6	40.7	14.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	38.0	43.0	4.6	43.9	31.6	40.7	14.8
Queue Length 50th (ft)	55	53	0	4	82	101	88
Queue Length 95th (ft)	114	127	28	23	158	210	197
Internal Link Dist (ft)	118	2711			1025		2313
Turn Bay Length (ft)				200		175	
Base Capacity (vph)	1043	508	777	355	1526	547	1992
Starvation Cap Reductn	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.22	0.22	0.11	0.03	0.24	0.40	0.32

Intersection Summary

HCM Signalized Intersection Capacity Analysis

1: US 301 & US 17 (Tidewater Trail)

01/16/2019



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations		↕↕			↕	↕	↕	↕↕		↕	↕↕		
Traffic Volume (vph)	90	119	14	19	92	86	9	333	23	214	421	205	
Future Volume (vph)	90	119	14	19	92	86	9	333	23	214	421	205	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Total Lost time (s)		5.7			5.8	5.8	4.5	6.5		4.5	6.5		
Lane Util. Factor		0.95			1.00	1.00	1.00	0.95		1.00	0.95		
Frt		0.99			1.00	0.85	1.00	0.99		1.00	0.95		
Flt Protected		0.98			0.99	1.00	0.95	1.00		0.95	1.00		
Satd. Flow (prot)		3365			1651	1404	1805	3113		1687	3187		
Flt Permitted		0.98			0.99	1.00	0.95	1.00		0.95	1.00		
Satd. Flow (perm)		3365			1651	1404	1805	3113		1687	3187		
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	
Adj. Flow (vph)	92	121	14	19	94	88	9	340	23	218	430	209	
RTOR Reduction (vph)	0	3	0	0	0	53	0	4	0	0	37	0	
Lane Group Flow (vph)	0	224	0	0	113	35	9	359	0	218	602	0	
Heavy Vehicles (%)	4%	4%	7%	5%	16%	15%	0%	15%	13%	7%	11%	1%	
Turn Type	Split	NA		Split	NA	pt+ov	Prot	NA		Prot	NA		
Protected Phases	3	3		4	4	4	5	2		1	6		
Permitted Phases													
Actuated Green, G (s)		11.5			11.6	34.0	1.1	22.6		16.6	38.1		
Effective Green, g (s)		11.5			11.6	34.0	1.1	22.6		16.6	38.1		
Actuated g/C Ratio		0.14			0.14	0.40	0.01	0.27		0.20	0.45		
Clearance Time (s)		5.7			5.8		4.5	6.5		4.5	6.5		
Vehicle Extension (s)		3.0			3.0		3.0	5.5		3.0	5.5		
Lane Grp Cap (vph)		456			225	562	23	829		330	1431		
v/s Ratio Prot		c0.07			c0.07	0.03	0.00	0.12		c0.13	c0.19		
v/s Ratio Perm													
v/c Ratio		0.49			0.50	0.06	0.39	0.43		0.66	0.42		
Uniform Delay, d1		33.9			33.9	15.6	41.5	25.8		31.5	15.9		
Progression Factor		1.00			1.00	1.00	1.00	1.00		1.00	1.00		
Incremental Delay, d2		0.8			1.8	0.0	10.7	0.9		4.9	0.5		
Delay (s)		34.8			35.7	15.7	52.2	26.7		36.4	16.3		
Level of Service		C			D	B	D	C		D	B		
Approach Delay (s)		34.8			26.9			27.3			21.4		
Approach LOS		C			C			C			C		
Intersection Summary													
HCM 2000 Control Delay			25.2									HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio			0.53										
Actuated Cycle Length (s)			84.8									Sum of lost time (s)	22.5
Intersection Capacity Utilization			53.4%									ICU Level of Service	A
Analysis Period (min)			15										
c Critical Lane Group													

Intersection						
Int Delay, s/veh	0					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	1	2	513	8	2	864
Future Vol, veh/h	1	2	513	8	2	864
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	93	93	93	93	93	93
Heavy Vehicles, %	0	0	13	13	0	7
Mvmt Flow	1	2	552	9	2	929

Major/Minor	Minor1	Major1	Major2		
Conflicting Flow All	1025	280	0	0	560
Stage 1	556	-	-	-	-
Stage 2	469	-	-	-	-
Critical Hdwy	6.8	6.9	-	-	4.1
Critical Hdwy Stg 1	5.8	-	-	-	-
Critical Hdwy Stg 2	5.8	-	-	-	-
Follow-up Hdwy	3.5	3.3	-	-	2.2
Pot Cap-1 Maneuver	234	723	-	-	1021
Stage 1	544	-	-	-	-
Stage 2	602	-	-	-	-
Platoon blocked, %			-	-	-
Mov Cap-1 Maneuver	233	723	-	-	1021
Mov Cap-2 Maneuver	233	-	-	-	-
Stage 1	544	-	-	-	-
Stage 2	600	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	13.5	0	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT
Capacity (veh/h)	-	-	425	1021
HCM Lane V/C Ratio	-	-	0.008	0.002
HCM Control Delay (s)	-	-	13.5	8.5
HCM Lane LOS	-	-	B	A
HCM 95th %tile Q(veh)	-	-	0	0

Intersection						
Int Delay, s/veh	0					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	0	2	496	1	1	851
Future Vol, veh/h	0	2	496	1	1	851
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	93	93	93	93	93	93
Heavy Vehicles, %	0	0	13	0	0	8
Mvmt Flow	0	2	533	1	1	915

Major/Minor	Minor1	Major1	Major2		
Conflicting Flow All	994	267	0	0	534
Stage 1	534	-	-	-	-
Stage 2	460	-	-	-	-
Critical Hdwy	6.8	6.9	-	-	4.1
Critical Hdwy Stg 1	5.8	-	-	-	-
Critical Hdwy Stg 2	5.8	-	-	-	-
Follow-up Hdwy	3.5	3.3	-	-	2.2
Pot Cap-1 Maneuver	245	737	-	-	1044
Stage 1	558	-	-	-	-
Stage 2	608	-	-	-	-
Platoon blocked, %			-	-	-
Mov Cap-1 Maneuver	245	737	-	-	1044
Mov Cap-2 Maneuver	245	-	-	-	-
Stage 1	558	-	-	-	-
Stage 2	607	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	9.9	0	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT
Capacity (veh/h)	-	-	737	1044
HCM Lane V/C Ratio	-	-	0.003	0.001
HCM Control Delay (s)	-	-	9.9	8.5
HCM Lane LOS	-	-	A	A
HCM 95th %tile Q(veh)	-	-	0	0

HCM 2010 TWSC
4: US 301 & Walsingham Rd

01/16/2019

Intersection													
Int Delay, s/veh	0.1												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕		↕		↕		↕	↕	↕
Traffic Vol, veh/h	0	0	0	1	0	2	0	4	504	1	4	849	0
Future Vol, veh/h	0	0	0	1	0	2	0	4	504	1	4	849	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	350	-	-	315	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	0	0	0	0	0	0	2	0	13	0	25	8	0
Mvmt Flow	0	0	0	1	0	2	0	4	548	1	4	923	0

Major/Minor	Minor2		Minor1		Major1			Major2					
Conflicting Flow All	1215	1490	461	1027	1489	274	673	923	0	0	549	0	0
Stage 1	932	932	-	557	557	-	-	-	-	-	-	-	-
Stage 2	283	558	-	470	932	-	-	-	-	-	-	-	-
Critical Hdwy	7.5	6.5	6.9	7.5	6.5	6.9	6.44	4.1	-	-	4.6	-	-
Critical Hdwy Stg 1	6.5	5.5	-	6.5	5.5	-	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.5	5.5	-	6.5	5.5	-	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4	3.3	3.5	4	3.3	2.52	2.2	-	-	2.45	-	-
Pot Cap-1 Maneuver	139	125	553	191	125	730	537	748	-	-	873	-	0
Stage 1	291	348	-	487	515	-	-	-	-	-	-	-	0
Stage 2	706	515	-	548	348	-	-	-	-	-	-	-	0
Platoon blocked, %									-	-	-	-	-
Mov Cap-1 Maneuver	138	124	553	190	124	730	748	748	-	-	873	-	-
Mov Cap-2 Maneuver	138	124	-	190	124	-	-	-	-	-	-	-	-
Stage 1	291	346	-	487	515	-	-	-	-	-	-	-	-
Stage 2	704	515	-	545	346	-	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	14.7	0.1	0
HCM LOS	A	B		

Minor Lane/Major Mvmt	NBU	NBL	NBT	NBR	EBLn1WBLn1	SBL	SBT
Capacity (veh/h)	748	748	-	-	-	375	873
HCM Lane V/C Ratio	-	0.006	-	-	-	0.009	0.005
HCM Control Delay (s)	9.8	9.8	-	-	0	14.7	9.1
HCM Lane LOS	A	A	-	-	A	B	A
HCM 95th %tile Q(veh)	0	0	-	-	-	0	0

Queuing and Blocking Report
Existing PM Conditions

02/20/2019

Intersection: 1: US 301 & US 17 (Tidewater Trail)

Movement	EB	EB	WB	WB	NB	NB	NB	SB	SB	SB
Directions Served	LT	TR	LT	R	L	T	TR	L	T	TR
Maximum Queue (ft)	162	177	154	124	49	163	172	174	231	204
Average Queue (ft)	82	48	70	46	7	107	65	113	93	110
95th Queue (ft)	131	102	140	97	31	160	130	172	179	179
Link Distance (ft)	122	122	2737	2737		1058	1058		2319	2319
Upstream Blk Time (%)	2	1								
Queuing Penalty (veh)	0	0								
Storage Bay Dist (ft)					200			175		
Storage Blk Time (%)								2	1	
Queuing Penalty (veh)								5	2	

Intersection: 2: US 301 & Back St

Movement	WB
Directions Served	LR
Maximum Queue (ft)	30
Average Queue (ft)	4
95th Queue (ft)	21
Link Distance (ft)	1114
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 3: US 301 & Caroline St

Movement	WB
Directions Served	LR
Maximum Queue (ft)	31
Average Queue (ft)	2
95th Queue (ft)	15
Link Distance (ft)	1181
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Queuing and Blocking Report

Existing PM Conditions

02/20/2019

Intersection: 4: US 301 & Walsingham Rd

Movement	WB	NB	SB
Directions Served	LTR	LT	UL
Maximum Queue (ft)	30	25	47
Average Queue (ft)	3	3	2
95th Queue (ft)	18	15	18
Link Distance (ft)	1936	1070	
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)			315
Storage Blk Time (%)			
Queuing Penalty (veh)			

Network Summary

Network wide Queuing Penalty: 6

Sunday Worst-Case Scenario

Queues

1: US 301 & US 17 (Tidewater Trail)

01/16/2019



Lane Group	EBT	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	242	157	314	19	1198	336	847
v/c Ratio	0.60	0.64	0.40	0.18	1.01	0.85	0.44
Control Delay	55.0	59.7	6.5	57.8	68.5	64.6	18.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	55.0	59.7	6.5	57.8	68.5	64.6	18.2
Queue Length 50th (ft)	89	112	23	14	-471	239	162
Queue Length 95th (ft)	140	188	88	41	#732	#454	328
Internal Link Dist (ft)	118	2711			1025		2313
Turn Bay Length (ft)				200		175	
Base Capacity (vph)	744	390	781	243	1182	396	1931
Starvation Cap Reductn	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.33	0.40	0.40	0.08	1.01	0.85	0.44

Intersection Summary

- ~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
- # 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

HCM Signalized Intersection Capacity Analysis

1: US 301 & US 17 (Tidewater Trail)

01/16/2019



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations		↔↔			↕	↗	↖	↕↔		↖	↕↔		
Traffic Volume (vph)	65	155	10	19	130	298	18	1121	17	319	747	58	
Future Volume (vph)	65	155	10	19	130	298	18	1121	17	319	747	58	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Total Lost time (s)		5.7			5.8	5.8	4.5	6.5		4.5	6.5		
Lane Util. Factor		0.95			1.00	1.00	1.00	0.95		1.00	0.95		
Frt		0.99			1.00	0.85	1.00	1.00		1.00	0.99		
Flt Protected		0.99			0.99	1.00	0.95	1.00		0.95	1.00		
Satd. Flow (prot)		3512			1856	1599	1805	3526		1787	3474		
Flt Permitted		0.99			0.99	1.00	0.95	1.00		0.95	1.00		
Satd. Flow (perm)		3512			1856	1599	1805	3526		1787	3474		
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	
Adj. Flow (vph)	68	163	11	20	137	314	19	1180	18	336	786	61	
RTOR Reduction (vph)	0	3	0	0	0	159	0	1	0	0	3	0	
Lane Group Flow (vph)	0	239	0	0	157	155	19	1197	0	336	844	0	
Heavy Vehicles (%)	0%	1%	0%	0%	2%	1%	0%	2%	12%	1%	3%	0%	
Turn Type	Split	NA		Split	NA	pt+ov	Prot	NA		Prot	NA		
Protected Phases	3	3		4	4	4 1	5	2		1	6		
Permitted Phases													
Actuated Green, G (s)		13.2			15.3	46.7	3.1	41.5		25.6	64.0		
Effective Green, g (s)		13.2			15.3	46.7	3.1	41.5		25.6	64.0		
Actuated g/C Ratio		0.11			0.13	0.40	0.03	0.35		0.22	0.54		
Clearance Time (s)		5.7			5.8		4.5	6.5		4.5	6.5		
Vehicle Extension (s)		3.0			3.0		3.0	5.5		3.0	5.5		
Lane Grp Cap (vph)		392			240	632	47	1239		387	1882		
v/s Ratio Prot		c0.07			c0.08	0.10	0.01	c0.34		c0.19	0.24		
v/s Ratio Perm													
v/c Ratio		0.61			0.65	0.25	0.40	0.97		0.87	0.45		
Uniform Delay, d1		50.0			48.9	23.9	56.6	37.6		44.6	16.4		
Progression Factor		1.00			1.00	1.00	1.00	1.00		1.00	1.00		
Incremental Delay, d2		2.8			6.3	0.2	5.6	18.3		18.2	0.4		
Delay (s)		52.8			55.2	24.1	62.2	55.9		62.8	16.8		
Level of Service		D			E	C	E	E		E	B		
Approach Delay (s)		52.8			34.5			56.0			29.9		
Approach LOS		D			C			E			C		
Intersection Summary													
HCM 2000 Control Delay			42.6									HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio			0.84										
Actuated Cycle Length (s)			118.1									Sum of lost time (s)	22.5
Intersection Capacity Utilization			82.3%									ICU Level of Service	E
Analysis Period (min)			15										
c Critical Lane Group													

Intersection						
Int Delay, s/veh	0.3					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	8	1	1483	10	0	1131
Future Vol, veh/h	8	1	1483	10	0	1131
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	96	96	96	96	96	96
Heavy Vehicles, %	0	0	2	0	0	2
Mvmt Flow	8	1	1545	10	0	1178

Major/Minor	Minor1	Major1	Major2		
Conflicting Flow All	2139	778	0	0	1555
Stage 1	1550	-	-	-	-
Stage 2	589	-	-	-	-
Critical Hdwy	6.8	6.9	-	-	4.1
Critical Hdwy Stg 1	5.8	-	-	-	-
Critical Hdwy Stg 2	5.8	-	-	-	-
Follow-up Hdwy	3.5	3.3	-	-	2.2
Pot Cap-1 Maneuver	43	343	-	-	431
Stage 1	164	-	-	-	-
Stage 2	523	-	-	-	-
Platoon blocked, %			-	-	-
Mov Cap-1 Maneuver	43	343	-	-	431
Mov Cap-2 Maneuver	43	-	-	-	-
Stage 1	164	-	-	-	-
Stage 2	523	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	97.4	0	0
HCM LOS	F		

Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT
Capacity (veh/h)	-	-	48	431
HCM Lane V/C Ratio	-	-	0.195	-
HCM Control Delay (s)	-	-	97.4	0
HCM Lane LOS	-	-	F	A
HCM 95th %tile Q(veh)	-	-	0.6	0

Intersection						
Int Delay, s/veh	0					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↔		↑↓			↑↓
Traffic Vol, veh/h	1	1	1482	2	1	1134
Future Vol, veh/h	1	1	1482	2	1	1134
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	93	93	93	93	93	93
Heavy Vehicles, %	0	0	2	0	0	2
Mvmt Flow	1	1	1594	2	1	1219

Major/Minor	Minor1	Major1	Major2		
Conflicting Flow All	2207	798	0	0	1596
Stage 1	1595	-	-	-	-
Stage 2	612	-	-	-	-
Critical Hdwy	6.8	6.9	-	-	4.1
Critical Hdwy Stg 1	5.8	-	-	-	-
Critical Hdwy Stg 2	5.8	-	-	-	-
Follow-up Hdwy	3.5	3.3	-	-	2.2
Pot Cap-1 Maneuver	39	333	-	-	416
Stage 1	155	-	-	-	-
Stage 2	509	-	-	-	-
Platoon blocked, %			-	-	-
Mov Cap-1 Maneuver	39	333	-	-	416
Mov Cap-2 Maneuver	39	-	-	-	-
Stage 1	155	-	-	-	-
Stage 2	505	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	58.1	0	0
HCM LOS	F		

Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT
Capacity (veh/h)	-	-	70	416
HCM Lane V/C Ratio	-	-	0.031	0.003
HCM Control Delay (s)	-	-	58.1	13.7
HCM Lane LOS	-	-	F	B
HCM 95th %tile Q(veh)	-	-	0.1	0

HCM 2010 TWSC
4: US 301 & Walsingham Rd

01/16/2019

Intersection													
Int Delay, s/veh	0.2												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔		⊥		↕		↔	↕	
Traffic Vol, veh/h	0	0	0	3	0	1	0	1	1481	0	1	1107	0
Future Vol, veh/h	0	0	0	3	0	1	0	1	1481	0	1	1107	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	350	-	-	315	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	-	0	-	-	0	-
Peak Hour Factor	94	94	94	94	94	94	92	94	94	94	94	94	94
Heavy Vehicles, %	0	0	0	0	0	0	2	0	2	0	0	2	0
Mvmt Flow	0	0	0	3	0	1	0	1	1576	0	1	1178	0

Major/Minor	Minor2		Minor1		Major1			Major2					
Conflicting Flow All	1970	2758	589	2169	2758	788	859	1178	0	0	1576	0	0
Stage 1	1180	1180	-	1578	1578	-	-	-	-	-	-	-	-
Stage 2	790	1578	-	591	1180	-	-	-	-	-	-	-	-
Critical Hdwy	7.5	6.5	6.9	7.5	6.5	6.9	6.44	4.1	-	-	4.1	-	-
Critical Hdwy Stg 1	6.5	5.5	-	6.5	5.5	-	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.5	5.5	-	6.5	5.5	-	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4	3.3	3.5	4	3.3	2.52	2.2	-	-	2.2	-	-
Pot Cap-1 Maneuver	38	20	457	27	20	338	409	600	-	-	423	-	0
Stage 1	205	266	-	116	171	-	-	-	-	-	-	-	0
Stage 2	354	171	-	465	266	-	-	-	-	-	-	-	0
Platoon blocked, %									-	-			
Mov Cap-1 Maneuver	38	20	457	27	20	338	600	600	-	-	423	-	-
Mov Cap-2 Maneuver	38	20	-	27	20	-	-	-	-	-	-	-	-
Stage 1	205	265	-	116	171	-	-	-	-	-	-	-	-
Stage 2	353	171	-	464	265	-	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	121.6	0	0
HCM LOS	A	F		

Minor Lane/Major Mvmt	NBU	NBL	NBT	NBR	EBLn1WBLn1	SBL	SBT
Capacity (veh/h)	600	600	-	-	-	35	423
HCM Lane V/C Ratio	-	0.002	-	-	-	0.122	0.003
HCM Control Delay (s)	11	11	-	-	0	121.6	13.5
HCM Lane LOS	B	B	-	-	A	F	B
HCM 95th %tile Q(veh)	0	0	-	-	-	0.4	0

Queuing and Blocking Report
Existing Sunday Conditions

02/20/2019

Intersection: 1: US 301 & US 17 (Tidewater Trail)

Movement	EB	EB	WB	WB	NB	NB	NB	SB	SB	SB
Directions Served	LT	TR	LT	R	L	T	TR	L	T	TR
Maximum Queue (ft)	157	160	186	321	200	1110	1092	175	526	446
Average Queue (ft)	94	80	102	151	31	862	825	172	332	226
95th Queue (ft)	155	157	164	253	113	1236	1195	184	538	387
Link Distance (ft)	122	122	2737	2737		1058	1058		2319	2319
Upstream Blk Time (%)	8	4				11	6			
Queuing Penalty (veh)	0	0				0	0			
Storage Bay Dist (ft)					200			175		
Storage Blk Time (%)					0	69		47	30	
Queuing Penalty (veh)					0	13		177	97	

Intersection: 2: US 301 & Back St

Movement	WB
Directions Served	LR
Maximum Queue (ft)	53
Average Queue (ft)	10
95th Queue (ft)	35
Link Distance (ft)	1114
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 3: US 301 & Caroline St

Movement	WB
Directions Served	LR
Maximum Queue (ft)	31
Average Queue (ft)	3
95th Queue (ft)	19
Link Distance (ft)	1181
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Queuing and Blocking Report

Existing Sunday Conditions

02/20/2019

Intersection: 4: US 301 & Walsingham Rd

Movement	WB
Directions Served	LTR
Maximum Queue (ft)	31
Average Queue (ft)	3
95th Queue (ft)	16
Link Distance (ft)	1936
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Network Summary

Network wide Queuing Penalty: 287

APPENDIX C
Future No Build Conditions
Analysis

January 7, 2019

Project #: 23369

Stephen Haynes
VDOT Fredericksburg District
87 Deacon Road
Fredericksburg, Virginia 22405

RE: Task Order 18 - Port Royal Arterial Preservation Study - Future Conditions Growth Rate

Dear Stephen,

In accordance with Task 2 of the Study Scope for the Port Royal Arterial Preservation Study, Kittelson and Associates, Inc. (Kittelson) has identified a proposed growth rate to establish design year turning movement counts. The following materials were reviewed as part of this effort:

- US 301 / Route 207 Arterial Preservation Plan (2018)
- Nice Bridge Improvement Project Study (2012)
- VDOT's 2017 AADT Data for Caroline County
- VDOT's 2045 AADT projections from the Statewide Planning System GIS dataset
- Weekday a.m. peak, p.m. peak, Friday afternoon, and Sunday afternoon traffic counts collected in Fall 2018 at the intersection of Route 301 and Route 17

Kittelson recommends the following compound growth rates for use in the design year operational analysis for the Port Royal Arterial Preservation Study:

- Route 301: 1.3%
- Route 17: 1%

The following sections outline findings used to inform the proposed growth rates.

Design Year

Consistent with the Study Scope for the Port Royal Arterial Preservation Study, a future year operational analysis of 2035 conditions will be conducted.

US 301 / Route 207 Arterial Preservation Plan

The US 301/ Route 207 Arterial Preservation Plan used an annualized background growth rate of 4% in a future year operational analysis of 2040 conditions. The growth rate was developed based on an assessment of historic annual average traffic volume estimates and travel patterns, the Fredericksburg

area travel demand model, socio-economic data, the Nice Bridge environmental assessment, and stakeholder feedback.

Nice Bridge Improvement Project Study

The Nice Bridge Improvement Project Study used an annualized background growth rate of approximately 3% in its future year operational analysis of 2030 conditions. The growth rate was developed using the regional Integrated Travel Demand Model developed for the Maryland Transportation Authority, which incorporates data from the Metropolitan Washington Council of Government Model (MWCOCG), Baltimore Metropolitan Council’s Regional Model (BMC), Delaware Department of Transportation’s Statewide Model (DeIDOT), and the Fredericksburg Area MPO model (FAMPO).

Results from the future conditions analysis show that in 2030, the Nice Bridge is expected to carry more than double the vehicle volume experienced in 2006.

Caroline County 2017 AADT Data

AADT data for Route 301 and Route 17 from VDOT’s 2017 AADT data for Caroline County was reviewed. Table 1 outlines the 2017 AADT data for the study corridor.

Table 1 Caroline County AADT Data (2017)

Roadway Segment	AADT	Proportion of Reported AADT
Route 301 north of Route 17	14,637	42%
Route 301 south of Route 17	9,313	27%
Route 17 east of Route 301	5,190	14%
Route 17 west of Route 301	5,883	17%

Caroline County 2045 AADT Data

2045 AADT estimates from VDOT’s Statewide Planning System Geographic Information System (GIS) dataset was also reviewed. Table 2 outlines the 2045 AADT data for the study corridor and shows how it differs from 2017 data.

Table 2 Caroline County Projected AADT Data (2045)

Roadway Segment	AADT	Proportion of Reported AADT	Annualized Growth Rate
Route 301 north of Route 17	16,115	40%	0.3%
Route 301 south of Route 17	10,205	24%	0.3%
Route 17 east of Route 301	6,327	16%	0.7%
Route 17 west of Route 301	8,040	20%	1.1%

As shown in Table 2, the annualized growth rates reported in VDOT’s Statewide Planning System differ from the annualized growth rates applied in the US 301 / Route 207 Arterial Preservation Plan and Nice Bridge Improvement Project Study.

Traffic Counts

Weekday a.m. peak, p.m. peak, Friday afternoon, and Sunday afternoon traffic counts were collected at the intersection of Route 301 and Route 17 in October and November 2018. The Sunday afternoon traffic counts were collected on the Sunday immediately following Thanksgiving to use holiday traffic as a proxy for summer beach traffic.¹ These counts were reviewed to see if there were any significant proportional differences in volume distribution across the four main time periods. Table 3 compares the proportional distribution of existing conditions volumes.

Table 3 Route 301 and Route 17 Traffic Count Distribution (2018)

Roadway Segment	Proportion of Reported Volumes			
	A.M. Peak Hour	P.M. Peak Hour	Friday Afternoon	Sunday Afternoon
Route 301 north of Route 17	40%	42%	42%	44%
Route 301 south of Route 17	26%	25%	26%	33%
Route 17 east of Route 301	17%	17%	18%	16%
Route 17 west of Route 301	17%	16%	14%	7%

¹ Summer beach traffic was anecdotally reported to constrain mobility and access on Route 301 at the Study kick-off meeting in October 2018 and Community Listening Session in November 2018.

As shown in Table 3, existing conditions volumes share a common proportional distribution across the A.M. peak hour, P.M. peak hour, and Friday afternoon time periods. Proportionally distributed volumes are 7 percent higher on Route 301 south of Route 17 and 7 percent lower on Route 17 west of Route 301 during the Sunday afternoon time period.

Volumes on Route 301 make up between 66 percent and 77 percent of volumes entering and exiting the Route 301 and Route 17 intersection. Volumes on Route 17 make up between 23 percent and 34 percent.

Growth Rate Recommendation

After considering the aggressive growth rates proposed in the US 301 / Route 207 Arterial Preservation Plan and Nice Bridge Study in contrast with the conservative growth rates reported in VDOT's Statewide Planning System data, Kittelson recommends moderate compound growth rates for Route 301 and Route 17. A slightly higher growth rate was assigned to Route 301 in proportion with the corridor's higher proportion of traffic volumes:

- Route 301: 1.3%
- Route 17: 1%

While the US 301 / Route 207 Arterial Preservation Plan developed a growth rate for a 42-mile corridor, the Port Royal Arterial Preservation Study focuses on one signalized intersection and approximately two miles of roadway on Route 301 and Route 17. The more targeted nature of the Port Royal Study merits more targeted growth rates that reflect average daily conditions (as opposed to periodic extremes).

These growth rates are proposed to be applied in the future operational analysis of 2035 conditions at the Port Royal Arterial Preservation Study intersections.

We trust this growth rate assessment provides the necessary information for VDOT to review and approve the proposed linear growth rates for the Port Royal Arterial Preservation Study. Please contact us at (410) 347-9610 with any questions.

Sincerely,
KITTELSON & ASSOCIATES, INC.



Yolanda Takesian
Associate Planner



Ed Myers, P.E.
Senior Principal Engineer

Weekday AM Peak

Queues

1: US 301 & US 17 (Tidewater Trail)

01/16/2019



Lane Group	EBT	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	306	179	150	12	488	101	515
v/c Ratio	0.59	0.59	0.23	0.10	0.60	0.47	0.36
Control Delay	41.3	46.0	4.8	49.4	33.5	48.0	18.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	41.3	46.0	4.8	49.4	33.5	48.0	18.0
Queue Length 50th (ft)	81	93	0	6	121	53	85
Queue Length 95th (ft)	160	199	41	29	224	129	194
Internal Link Dist (ft)	118	2711			1025		2313
Turn Bay Length (ft)				200		175	
Base Capacity (vph)	904	514	822	284	1386	446	1804
Starvation Cap Reductn	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.34	0.35	0.18	0.04	0.35	0.23	0.29

Intersection Summary

HCM Signalized Intersection Capacity Analysis

1: US 301 & US 17 (Tidewater Trail)

01/16/2019



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations		↔↔			↔	↔	↔	↔↔		↔	↔↔		
Traffic Volume (vph)	181	69	25	45	116	135	11	412	27	91	361	103	
Future Volume (vph)	181	69	25	45	116	135	11	412	27	91	361	103	
Ideal Flow (vphp)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Total Lost time (s)		5.7			5.8	5.8	4.5	6.5		6.1	6.5		
Lane Util. Factor		0.95			1.00	1.00	1.00	0.95		1.00	0.95		
Frt		0.99			1.00	0.85	1.00	0.99		1.00	0.97		
Flt Protected		0.97			0.99	1.00	0.95	1.00		0.95	1.00		
Satd. Flow (prot)		3194			1835	1482	1583	3100		1612	3185		
Flt Permitted		0.97			0.99	1.00	0.95	1.00		0.95	1.00		
Satd. Flow (perm)		3194			1835	1482	1583	3100		1612	3185		
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	
Adj. Flow (vph)	201	77	28	50	129	150	12	458	30	101	401	114	
RTOR Reduction (vph)	0	6	0	0	0	98	0	4	0	0	17	0	
Lane Group Flow (vph)	0	300	0	0	179	52	12	484	0	101	498	0	
Heavy Vehicles (%)	4%	16%	14%	5%	1%	9%	14%	16%	6%	12%	12%	1%	
Turn Type	Split	NA		Split	NA	pt+ov	Prot	NA		Prot	NA		
Protected Phases	3	3		4	4	4	5	2		1	6		
Permitted Phases													
Actuated Green, G (s)		14.5			14.8	32.5	1.2	27.7		11.9	40.0		
Effective Green, g (s)		14.5			14.8	32.5	1.2	27.7		11.9	40.0		
Actuated g/C Ratio		0.16			0.16	0.35	0.01	0.30		0.13	0.43		
Clearance Time (s)		5.7			5.8		4.5	6.5		6.1	6.5		
Vehicle Extension (s)		3.0			3.0		3.0	5.5		3.0	5.5		
Lane Grp Cap (vph)		497			292	517	20	923		206	1369		
v/s Ratio Prot		c0.09			c0.10	0.04	0.01	c0.16		c0.06	0.16		
v/s Ratio Perm													
v/c Ratio		0.60			0.61	0.10	0.60	0.52		0.49	0.36		
Uniform Delay, d1		36.6			36.4	20.4	45.7	27.2		37.7	17.9		
Progression Factor		1.00			1.00	1.00	1.00	1.00		1.00	1.00		
Incremental Delay, d2		2.1			3.8	0.1	40.2	1.2		1.8	0.4		
Delay (s)		38.6			40.2	20.5	85.8	28.4		39.6	18.3		
Level of Service		D			D	C	F	C		D	B		
Approach Delay (s)		38.6			31.2			29.7			21.8		
Approach LOS		D			C			C			C		
Intersection Summary													
HCM 2000 Control Delay			28.8									HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio			0.55										
Actuated Cycle Length (s)			93.0									Sum of lost time (s)	24.1
Intersection Capacity Utilization			50.9%									ICU Level of Service	A
Analysis Period (min)			15										
c Critical Lane Group													

Intersection						
Int Delay, s/veh	0.1					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↔		↑↓			↑↓
Traffic Vol, veh/h	4	2	832	2	2	545
Future Vol, veh/h	4	2	832	2	2	545
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	0	0	11	0	0	9
Mvmt Flow	4	2	924	2	2	606

Major/Minor	Minor1	Major1	Major2		
Conflicting Flow All	1233	463	0	0	927
Stage 1	926	-	-	-	-
Stage 2	307	-	-	-	-
Critical Hdwy	6.8	6.9	-	-	4.1
Critical Hdwy Stg 1	5.8	-	-	-	-
Critical Hdwy Stg 2	5.8	-	-	-	-
Follow-up Hdwy	3.5	3.3	-	-	2.2
Pot Cap-1 Maneuver	172	551	-	-	746
Stage 1	351	-	-	-	-
Stage 2	725	-	-	-	-
Platoon blocked, %			-	-	-
Mov Cap-1 Maneuver	171	551	-	-	746
Mov Cap-2 Maneuver	171	-	-	-	-
Stage 1	351	-	-	-	-
Stage 2	722	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	21.7	0	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT
Capacity (veh/h)	-	-	222	746
HCM Lane V/C Ratio	-	-	0.03	0.003
HCM Control Delay (s)	-	-	21.7	9.8
HCM Lane LOS	-	-	C	A
HCM 95th %tile Q(veh)	-	-	0.1	0

Intersection						
Int Delay, s/veh	0					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	0	0	841	0	0	545
Future Vol, veh/h	0	0	841	0	0	545
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	91	91	91	91	91	91
Heavy Vehicles, %	0	0	10	0	0	10
Mvmt Flow	0	0	924	0	0	599

Major/Minor	Minor1	Major1	Major2		
Conflicting Flow All	1223	462	0	0	924
Stage 1	924	-	-	-	-
Stage 2	299	-	-	-	-
Critical Hdwy	6.8	6.9	-	-	4.1
Critical Hdwy Stg 1	5.8	-	-	-	-
Critical Hdwy Stg 2	5.8	-	-	-	-
Follow-up Hdwy	3.5	3.3	-	-	2.2
Pot Cap-1 Maneuver	175	552	-	-	748
Stage 1	352	-	-	-	-
Stage 2	732	-	-	-	-
Platoon blocked, %			-	-	-
Mov Cap-1 Maneuver	175	552	-	-	748
Mov Cap-2 Maneuver	175	-	-	-	-
Stage 1	352	-	-	-	-
Stage 2	732	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	0	0	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT
Capacity (veh/h)	-	-	-	748
HCM Lane V/C Ratio	-	-	-	-
HCM Control Delay (s)	-	-	0	0
HCM Lane LOS	-	-	A	A
HCM 95th %tile Q(veh)	-	-	-	0

HCM 2010 TWSC
4: US 301 & Walsingham Rd

01/16/2019

Intersection													
Int Delay, s/veh	0												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕		⏏		↕		↕	↕	
Traffic Vol, veh/h	0	0	0	0	0	1	0	0	823	3	0	548	0
Future Vol, veh/h	0	0	0	0	0	1	0	0	823	3	0	548	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	350	-	-	315	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	-	0	-	-	0	-
Peak Hour Factor	94	94	94	94	94	94	92	94	94	94	94	94	94
Heavy Vehicles, %	0	0	0	0	0	0	2	0	10	0	0	9	0
Mvmt Flow	0	0	0	0	0	1	0	0	876	3	0	583	0

Major/Minor	Minor2		Minor1		Major1			Major2					
Conflicting Flow All	1021	1462	291	1168	1460	439	425	-	0	0	879	0	0
Stage 1	583	583	-	877	877	-	-	-	-	-	-	-	-
Stage 2	438	879	-	291	583	-	-	-	-	-	-	-	-
Critical Hdwy	7.5	6.5	6.9	7.5	6.5	6.9	6.44	-	-	-	4.1	-	-
Critical Hdwy Stg 1	6.5	5.5	-	6.5	5.5	-	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.5	5.5	-	6.5	5.5	-	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4	3.3	3.5	4	3.3	2.52	-	-	-	2.2	-	-
Pot Cap-1 Maneuver	193	130	712	151	130	571	772	0	-	-	777	-	0
Stage 1	470	502	-	314	369	-	-	0	-	-	-	-	0
Stage 2	573	368	-	698	502	-	-	0	-	-	-	-	0
Platoon blocked, %													
Mov Cap-1 Maneuver	193	130	712	151	130	571	772	-	-	-	777	-	-
Mov Cap-2 Maneuver	193	130	-	151	130	-	-	-	-	-	-	-	-
Stage 1	470	502	-	314	369	-	-	-	-	-	-	-	-
Stage 2	572	368	-	698	502	-	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	11.3	0	0
HCM LOS	A	B		

Minor Lane/Major Mvmt	NBU	NBT	NBR	EBLn1WBLn1	SBL	SBT
Capacity (veh/h)	772	-	-	-	571	777
HCM Lane V/C Ratio	-	-	-	-	0.002	-
HCM Control Delay (s)	0	-	-	0	11.3	0
HCM Lane LOS	A	-	-	A	B	A
HCM 95th %tile Q(veh)	0	-	-	-	0	0

Queuing and Blocking Report
 AM 2035 Conditions

02/20/2019

Intersection: 1: US 301 & US 17 (Tidewater Trail)

Movement	EB	EB	B14	WB	WB	NB	NB	NB	SB	SB	SB
Directions Served	LT	TR	T	LT	R	L	T	TR	L	T	TR
Maximum Queue (ft)	194	111	80	214	191	64	224	166	157	157	222
Average Queue (ft)	132	50	10	104	72	13	139	94	73	78	100
95th Queue (ft)	202	97	45	185	138	45	206	169	131	139	172
Link Distance (ft)	122	122	2207	2737	2737		1058	1058		2319	2319
Upstream Blk Time (%)	14	0									
Queuing Penalty (veh)	0	0									
Storage Bay Dist (ft)						200			175		
Storage Blk Time (%)							1		0	0	
Queuing Penalty (veh)							0		0	0	

Intersection: 2: US 301 & Back St

Movement	WB
Directions Served	LR
Maximum Queue (ft)	31
Average Queue (ft)	2
95th Queue (ft)	15
Link Distance (ft)	1114
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 3: US 301 & Caroline St

Movement
Directions Served
Maximum Queue (ft)
Average Queue (ft)
95th Queue (ft)
Link Distance (ft)
Upstream Blk Time (%)
Queuing Penalty (veh)
Storage Bay Dist (ft)
Storage Blk Time (%)
Queuing Penalty (veh)

Intersection: 4: US 301 & Walsingham Rd

Movement

Directions Served
Maximum Queue (ft)
Average Queue (ft)
95th Queue (ft)
Link Distance (ft)
Upstream Blk Time (%)
Queuing Penalty (veh)
Storage Bay Dist (ft)
Storage Blk Time (%)
Queuing Penalty (veh)

Network Summary

Network wide Queuing Penalty: 0

Weekday PM Peak

Queues

1: US 301 & US 17 (Tidewater Trail)

01/16/2019



Lane Group	EBT	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	270	134	104	14	553	333	972
v/c Ratio	0.60	0.60	0.16	0.12	0.67	0.79	0.58
Control Delay	49.3	56.0	4.9	54.3	39.2	54.4	20.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	49.3	56.0	4.9	54.3	39.2	54.4	20.1
Queue Length 50th (ft)	87	84	0	9	169	206	186
Queue Length 95th (ft)	152	166	36	33	263	#464	386
Internal Link Dist (ft)	118	2711			1025		2313
Turn Bay Length (ft)				200		175	
Base Capacity (vph)	801	390	654	273	1173	420	1674
Starvation Cap Reductn	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.34	0.34	0.16	0.05	0.47	0.79	0.58

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.

HCM Signalized Intersection Capacity Analysis

1: US 301 & US 17 (Tidewater Trail)

01/16/2019



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations		↔↔			↕	↗	↖	↕↔		↖	↕↔		
Traffic Volume (vph)	107	141	17	23	109	102	14	507	35	326	641	312	
Future Volume (vph)	107	141	17	23	109	102	14	507	35	326	641	312	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Total Lost time (s)		5.7			5.8	5.8	4.5	6.5		4.5	6.5		
Lane Util. Factor		0.95			1.00	1.00	1.00	0.95		1.00	0.95		
Frt		0.99			1.00	0.85	1.00	0.99		1.00	0.95		
Flt Protected		0.98			0.99	1.00	0.95	1.00		0.95	1.00		
Satd. Flow (prot)		3364			1651	1404	1805	3112		1687	3187		
Flt Permitted		0.98			0.99	1.00	0.95	1.00		0.95	1.00		
Satd. Flow (perm)		3364			1651	1404	1805	3112		1687	3187		
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	
Adj. Flow (vph)	109	144	17	23	111	104	14	517	36	333	654	318	
RTOR Reduction (vph)	0	3	0	0	0	59	0	4	0	0	34	0	
Lane Group Flow (vph)	0	267	0	0	134	45	14	549	0	333	938	0	
Heavy Vehicles (%)	4%	4%	7%	5%	16%	15%	0%	15%	13%	7%	11%	1%	
Turn Type	Split	NA		Split	NA	pt+ov	Prot	NA		Prot	NA		
Protected Phases	3	3		4	4	4 1	5	2		1	6		
Permitted Phases													
Actuated Green, G (s)		13.9			14.1	45.9	2.7	30.4		26.0	53.7		
Effective Green, g (s)		13.9			14.1	45.9	2.7	30.4		26.0	53.7		
Actuated g/C Ratio		0.13			0.13	0.43	0.03	0.28		0.24	0.50		
Clearance Time (s)		5.7			5.8		4.5	6.5		4.5	6.5		
Vehicle Extension (s)		3.0			3.0		3.0	5.5		3.0	5.5		
Lane Grp Cap (vph)		437			217	602	45	884		410	1600		
v/s Ratio Prot		c0.08			c0.08	0.03	0.01	0.18		c0.20	c0.29		
v/s Ratio Perm													
v/c Ratio		0.61			0.62	0.07	0.31	0.62		0.81	0.59		
Uniform Delay, d1		43.9			43.9	18.0	51.2	33.2		38.1	18.8		
Progression Factor		1.00			1.00	1.00	1.00	1.00		1.00	1.00		
Incremental Delay, d2		2.4			5.1	0.1	3.9	2.1		11.6	1.0		
Delay (s)		46.4			49.0	18.0	55.1	35.4		49.8	19.7		
Level of Service		D			D	B	E	D		D	B		
Approach Delay (s)		46.4			35.5			35.9			27.4		
Approach LOS		D			D			D			C		
Intersection Summary													
HCM 2000 Control Delay			32.4									HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio			0.68										
Actuated Cycle Length (s)			106.9									Sum of lost time (s)	22.5
Intersection Capacity Utilization			66.5%									ICU Level of Service	C
Analysis Period (min)			15										
c Critical Lane Group													

Intersection						
Int Delay, s/veh	0.1					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	W		T			T
Traffic Vol, veh/h	1	2	781	8	2	1315
Future Vol, veh/h	1	2	781	8	2	1315
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	93	93	93	93	93	93
Heavy Vehicles, %	0	0	13	13	0	7
Mvmt Flow	1	2	840	9	2	1414

Major/Minor	Minor1	Major1	Major2		
Conflicting Flow All	1555	424	0	0	848
Stage 1	844	-	-	-	-
Stage 2	711	-	-	-	-
Critical Hdwy	6.8	6.9	-	-	4.1
Critical Hdwy Stg 1	5.8	-	-	-	-
Critical Hdwy Stg 2	5.8	-	-	-	-
Follow-up Hdwy	3.5	3.3	-	-	2.2
Pot Cap-1 Maneuver	106	584	-	-	798
Stage 1	387	-	-	-	-
Stage 2	453	-	-	-	-
Platoon blocked, %			-	-	-
Mov Cap-1 Maneuver	105	584	-	-	798
Mov Cap-2 Maneuver	105	-	-	-	-
Stage 1	387	-	-	-	-
Stage 2	448	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	20.7	0	0.1
HCM LOS	C		

Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT
Capacity (veh/h)	-	-	232	798
HCM Lane V/C Ratio	-	-	0.014	0.003
HCM Control Delay (s)	-	-	20.7	9.5
HCM Lane LOS	-	-	C	A
HCM 95th %tile Q(veh)	-	-	0	0

Intersection						
Int Delay, s/veh	0					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	0	2	755	1	1	1295
Future Vol, veh/h	0	2	755	1	1	1295
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	93	93	93	93	93	93
Heavy Vehicles, %	0	0	13	0	0	8
Mvmt Flow	0	2	812	1	1	1392

Major/Minor	Minor1	Major1	Major2		
Conflicting Flow All	1510	406	0	0	813
Stage 1	812	-	-	-	-
Stage 2	698	-	-	-	-
Critical Hdwy	6.8	6.9	-	-	4.1
Critical Hdwy Stg 1	5.8	-	-	-	-
Critical Hdwy Stg 2	5.8	-	-	-	-
Follow-up Hdwy	3.5	3.3	-	-	2.2
Pot Cap-1 Maneuver	113	600	-	-	823
Stage 1	402	-	-	-	-
Stage 2	460	-	-	-	-
Platoon blocked, %			-	-	-
Mov Cap-1 Maneuver	112	600	-	-	823
Mov Cap-2 Maneuver	112	-	-	-	-
Stage 1	402	-	-	-	-
Stage 2	458	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	11	0	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT
Capacity (veh/h)	-	-	600	823
HCM Lane V/C Ratio	-	-	0.004	0.001
HCM Control Delay (s)	-	-	11	9.4
HCM Lane LOS	-	-	B	A
HCM 95th %tile Q(veh)	-	-	0	0

HCM 2010 TWSC
4: US 301 & Walsingham Rd

01/16/2019

Intersection													
Int Delay, s/veh	0.1												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔		⊥		↕		↔	↕	
Traffic Vol, veh/h	0	0	0	1	0	2	0	4	767	1	4	1292	0
Future Vol, veh/h	0	0	0	1	0	2	0	4	767	1	4	1292	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	350	-	-	315	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	0	0	0	0	0	0	2	0	13	0	25	8	0
Mvmt Flow	0	0	0	1	0	2	0	4	834	1	4	1404	0

Major/Minor	Minor2		Minor1		Major1				Major2				
Conflicting Flow All	1839	2256	702	1554	2256	417	1025	1404	0	0	835	0	0
Stage 1	1413	1413	-	843	843	-	-	-	-	-	-	-	-
Stage 2	426	843	-	711	1413	-	-	-	-	-	-	-	-
Critical Hdwy	7.5	6.5	6.9	7.5	6.5	6.9	6.44	4.1	-	-	4.6	-	-
Critical Hdwy Stg 1	6.5	5.5	-	6.5	5.5	-	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.5	5.5	-	6.5	5.5	-	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4	3.3	3.5	4	3.3	2.52	2.2	-	-	2.45	-	-
Pot Cap-1 Maneuver	48	42	385	78	42	590	320	493	-	-	663	-	0
Stage 1	148	206	-	329	382	-	-	-	-	-	-	-	0
Stage 2	582	382	-	395	206	-	-	-	-	-	-	-	0
Platoon blocked, %									-	-	-	-	-
Mov Cap-1 Maneuver	48	42	385	78	42	590	493	493	-	-	663	-	-
Mov Cap-2 Maneuver	48	42	-	78	42	-	-	-	-	-	-	-	-
Stage 1	148	205	-	329	382	-	-	-	-	-	-	-	-
Stage 2	580	382	-	393	205	-	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	24.8	0.1	0
HCM LOS	A	C		

Minor Lane/Major Mvmt	NBU	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT
Capacity (veh/h)	493	493	-	-	-	185	663	-
HCM Lane V/C Ratio	-	0.009	-	-	-	0.018	0.007	-
HCM Control Delay (s)	12.4	12.4	-	-	0	24.8	10.5	-
HCM Lane LOS	B	B	-	-	A	C	B	-
HCM 95th %tile Q(veh)	0	0	-	-	-	0.1	0	-

Queuing and Blocking Report
2035 PM Conditions

02/20/2019

Intersection: 1: US 301 & US 17 (Tidewater Trail)

Movement	EB	EB	B14	WB	WB	NB	NB	NB	SB	SB	SB
Directions Served	LT	TR	T	LT	R	L	T	TR	L	T	TR
Maximum Queue (ft)	194	160	88	212	147	199	390	408	175	598	600
Average Queue (ft)	98	70	6	99	49	26	186	148	169	355	284
95th Queue (ft)	158	129	42	177	121	109	304	273	191	574	511
Link Distance (ft)	122	122	2207	2737	2737		1058	1058		2319	2319
Upstream Blk Time (%)	8	1									
Queuing Penalty (veh)	0	0									
Storage Bay Dist (ft)						200			175		
Storage Blk Time (%)						0	6		44	20	
Queuing Penalty (veh)						0	1		143	65	

Intersection: 2: US 301 & Back St

Movement	WB	SB
Directions Served	LR	LT
Maximum Queue (ft)	31	74
Average Queue (ft)	2	3
95th Queue (ft)	15	25
Link Distance (ft)	1114	1146
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 3: US 301 & Caroline St

Movement	WB	SB
Directions Served	LR	LT
Maximum Queue (ft)	32	31
Average Queue (ft)	4	2
95th Queue (ft)	22	15
Link Distance (ft)	1181	1222
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Queuing and Blocking Report

2035 PM Conditions

02/20/2019

Intersection: 4: US 301 & Walsingham Rd

Movement	WB	NB	SB
Directions Served	LTR	LT	UL
Maximum Queue (ft)	30	26	24
Average Queue (ft)	1	1	3
95th Queue (ft)	10	9	16
Link Distance (ft)	1936	1070	
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)			315
Storage Blk Time (%)			
Queuing Penalty (veh)			

Network Summary

Network wide Queuing Penalty: 209

Sunday Worst-Case Scenario

Queues

1: US 301 & US 17 (Tidewater Trail)

01/16/2019



Lane Group	EBT	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	288	186	372	28	1823	511	1290
v/c Ratio	0.65	0.69	0.48	0.25	1.59	1.33	0.72
Control Delay	56.9	62.0	11.3	61.1	301.8	204.9	28.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	56.9	62.0	11.3	61.1	301.8	204.9	28.1
Queue Length 50th (ft)	112	137	67	21	~1070	~515	424
Queue Length 95th (ft)	167	224	160	55	#1357	#810	630
Internal Link Dist (ft)	118	2711			1025		2313
Turn Bay Length (ft)				200		175	
Base Capacity (vph)	720	377	774	235	1143	383	1789
Starvation Cap Reductn	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.40	0.49	0.48	0.12	1.59	1.33	0.72

Intersection Summary

- ~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
- # 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

HCM Signalized Intersection Capacity Analysis

1: US 301 & US 17 (Tidewater Trail)

01/16/2019



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR		
Lane Configurations		↔↔			↔	↔	↔	↔↔		↔	↔↔			
Traffic Volume (vph)	77	184	12	23	154	353	27	1706	26	485	1137	88		
Future Volume (vph)	77	184	12	23	154	353	27	1706	26	485	1137	88		
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900		
Total Lost time (s)		5.7			5.8	5.8	4.5	6.5		4.5	6.5			
Lane Util. Factor		0.95			1.00	1.00	1.00	0.95		1.00	0.95			
Frt		0.99			1.00	0.85	1.00	1.00		1.00	0.99			
Flt Protected		0.99			0.99	1.00	0.95	1.00		0.95	1.00			
Satd. Flow (prot)		3512			1855	1599	1805	3526		1787	3474			
Flt Permitted		0.99			0.99	1.00	0.95	1.00		0.95	1.00			
Satd. Flow (perm)		3512			1855	1599	1805	3526		1787	3474			
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95		
Adj. Flow (vph)	81	194	13	24	162	372	28	1796	27	511	1197	93		
RTOR Reduction (vph)	0	3	0	0	0	141	0	1	0	0	3	0		
Lane Group Flow (vph)	0	285	0	0	186	231	28	1822	0	511	1287	0		
Heavy Vehicles (%)	0%	1%	0%	0%	2%	1%	0%	2%	12%	1%	3%	0%		
Turn Type	Split	NA		Split	NA	pt+ov	Prot	NA		Prot	NA			
Protected Phases	3	3		4	4	4 1	5	2		1	6			
Permitted Phases														
Actuated Green, G (s)		15.0			17.5	48.9	4.9	40.7		25.6	61.4			
Effective Green, g (s)		15.0			17.5	48.9	4.9	40.7		25.6	61.4			
Actuated g/C Ratio		0.12			0.14	0.40	0.04	0.34		0.21	0.51			
Clearance Time (s)		5.7			5.8		4.5	6.5		4.5	6.5			
Vehicle Extension (s)		3.0			3.0		3.0	5.5		3.0	5.5			
Lane Grp Cap (vph)		434			267	644	72	1183		377	1758			
v/s Ratio Prot		c0.08			c0.10	0.14	0.02	c0.52		c0.29	0.37			
v/s Ratio Perm														
v/c Ratio		0.66			0.70	0.36	0.39	1.54		1.36	0.73			
Uniform Delay, d1		50.7			49.4	25.3	56.7	40.3		47.8	23.5			
Progression Factor		1.00			1.00	1.00	1.00	1.00		1.00	1.00			
Incremental Delay, d2		3.6			7.7	0.3	3.5	247.5		176.5	2.1			
Delay (s)		54.3			57.1	25.6	60.2	287.8		224.3	25.6			
Level of Service		D			E	C	E	F		F	C			
Approach Delay (s)		54.3			36.1			284.3			82.0			
Approach LOS		D			D			F			F			
Intersection Summary														
HCM 2000 Control Delay			157.8									HCM 2000 Level of Service	F	
HCM 2000 Volume to Capacity ratio			1.21											
Actuated Cycle Length (s)			121.3								22.5			
Intersection Capacity Utilization			110.7%										ICU Level of Service	H
Analysis Period (min)			15											
c Critical Lane Group														

Intersection

Int Delay, s/veh 2.2

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↘↗		↑↓			↘↗
Traffic Vol, veh/h	8	1	2257	10	0	1721
Future Vol, veh/h	8	1	2257	10	0	1721
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	96	96	96	96	96	96
Heavy Vehicles, %	0	0	2	0	0	2
Mvmt Flow	8	1	2351	10	0	1793

Major/Minor

	Minor1	Major1	Major2		
Conflicting Flow All	3252	1181	0	0	2361
Stage 1	2356	-	-	-	-
Stage 2	896	-	-	-	-
Critical Hdwy	6.8	6.9	-	-	4.1
Critical Hdwy Stg 1	5.8	-	-	-	-
Critical Hdwy Stg 2	5.8	-	-	-	-
Follow-up Hdwy	3.5	3.3	-	-	2.2
Pot Cap-1 Maneuver	~ 7	186	-	-	210
Stage 1	59	-	-	-	-
Stage 2	364	-	-	-	-
Platoon blocked, %			-	-	-
Mov Cap-1 Maneuver	~ 7	186	-	-	210
Mov Cap-2 Maneuver	~ 7	-	-	-	-
Stage 1	59	-	-	-	-
Stage 2	364	-	-	-	-

Approach

	WB	NB	SB
HCM Control Delay, s\$	982.3	0	0
HCM LOS	F		

Minor Lane/Major Mvmt

	NBT	NBRWBLn1	SBL	SBT
Capacity (veh/h)	-	-	8	210
HCM Lane V/C Ratio	-	-	1.172	-
HCM Control Delay (s)	-	-	\$ 982.3	0
HCM Lane LOS	-	-	F	A
HCM 95th %tile Q(veh)	-	-	2	0

Notes

-: Volume exceeds capacity \$: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon

Intersection

Int Delay, s/veh 0.2

Movement WBL WBR NBT NBR SBL SBT

Lane Configurations	W	R	T	R	T	T
Traffic Vol, veh/h	1	1	2255	2	1	1726
Future Vol, veh/h	1	1	2255	2	1	1726
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	93	93	93	93	93	93
Heavy Vehicles, %	0	0	2	0	0	2
Mvmt Flow	1	1	2425	2	1	1856

Major/Minor Minor1 Major1 Major2

Conflicting Flow All	3356	1213	0	0	2427	0
Stage 1	2426	-	-	-	-	-
Stage 2	930	-	-	-	-	-
Critical Hdwy	6.8	6.9	-	-	4.1	-
Critical Hdwy Stg 1	5.8	-	-	-	-	-
Critical Hdwy Stg 2	5.8	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	-	-	2.2	-
Pot Cap-1 Maneuver	6	177	-	-	198	-
Stage 1	54	-	-	-	-	-
Stage 2	349	-	-	-	-	-
Platoon blocked, %			-	-		
Mov Cap-1 Maneuver	6	177	-	-	198	-
Mov Cap-2 Maneuver	6	-	-	-	-	-
Stage 1	54	-	-	-	-	-
Stage 2	349	-	-	-	-	-

Approach WB NB SB

HCM Control Delay, s\$ 361.8 0 0
HCM LOS F

Minor Lane/Major Mvmt NBT NBRWBLn1 SBL SBT

Capacity (veh/h)	-	-	12	198	-
HCM Lane V/C Ratio	-	-	0.179	0.005	-
HCM Control Delay (s)	-	-	\$ 361.8	23.3	0
HCM Lane LOS	-	-	F	C	A
HCM 95th %tile Q(veh)	-	-	0.5	0	-

Notes

~: Volume exceeds capacity \$: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon

HCM 2010 TWSC
4: US 301 & Walsingham Rd

01/16/2019

Intersection													
Int Delay, s/veh	1.2												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕		↕		↕		↕	↕	↕
Traffic Vol, veh/h	0	0	0	3	0	1	0	1	2254	0	1	1684	0
Future Vol, veh/h	0	0	0	3	0	1	0	1	2254	0	1	1684	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	350	-	-	315	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	-	0	-	-	0	-
Peak Hour Factor	94	94	94	94	94	94	92	94	94	94	94	94	94
Heavy Vehicles, %	0	0	0	0	0	0	2	0	2	0	0	2	0
Mvmt Flow	0	0	0	3	0	1	0	1	2398	0	1	1791	0

Major/Minor	Minor2		Minor1		Major1				Major2				
Conflicting Flow All	2995	4194	896	3298	4194	1199	1307	1791	0	0	2398	0	0
Stage 1	1794	1794	-	2400	2400	-	-	-	-	-	-	-	-
Stage 2	1201	2400	-	898	1794	-	-	-	-	-	-	-	-
Critical Hdwy	7.5	6.5	6.9	7.5	6.5	6.9	6.44	4.1	-	-	4.1	-	-
Critical Hdwy Stg 1	6.5	5.5	-	6.5	5.5	-	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.5	5.5	-	6.5	5.5	-	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4	3.3	3.5	4	3.3	2.52	2.2	-	-	2.2	-	-
Pot Cap-1 Maneuver	6	2	287	4	2	181	210	350	-	-	203	-	0
Stage 1	85	134	-	35	66	-	-	-	-	-	-	-	0
Stage 2	199	66	-	305	134	-	-	-	-	-	-	-	0
Platoon blocked, %									-	-			
Mov Cap-1 Maneuver	6	2	287	4	2	181	350	350	-	-	203	-	-
Mov Cap-2 Maneuver	6	2	-	4	2	-	-	-	-	-	-	-	-
Stage 1	85	133	-	35	66	-	-	-	-	-	-	-	-
Stage 2	198	66	-	303	133	-	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	\$ 1217.7	0	0
HCM LOS	A	F		

Minor Lane/Major Mvmt	NBU	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT
Capacity (veh/h)	350	350	-	-	-	5	203	-
HCM Lane V/C Ratio	-	0.003	-	-	-	0.851	0.005	-
HCM Control Delay (s)	15.3	15.3	-	-	\$ 1217.7	22.8	-	-
HCM Lane LOS	C	C	-	-	A	F	C	-
HCM 95th %tile Q(veh)	0	0	-	-	-	1.2	0	-

Notes
 -: Volume exceeds capacity \$: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon

Queuing and Blocking Report
2035 Sunday Conditions

02/20/2019

Intersection: 1: US 301 & US 17 (Tidewater Trail)

Movement	EB	EB	B14	WB	WB	NB	NB	NB	SB	SB	SB
Directions Served	LT	TR	T	LT	R	L	T	TR	L	T	TR
Maximum Queue (ft)	192	158	56	246	292	200	1121	1121	175	2341	2358
Average Queue (ft)	115	95	2	119	176	43	1077	1071	174	1789	1750
95th Queue (ft)	165	144	19	204	270	151	1138	1154	176	2970	3017
Link Distance (ft)	122	122	2207	2737	2737		1058	1058		2319	2319
Upstream Blk Time (%)	14	4					83	78		12	12
Queuing Penalty (veh)	0	0					0	0		104	101
Storage Bay Dist (ft)						200			175		
Storage Blk Time (%)						0	71		72	68	
Queuing Penalty (veh)						1	19		412	332	

Intersection: 2: US 301 & Back St

Movement	WB	SB	SB
Directions Served	LR	LT	T
Maximum Queue (ft)	52	1154	1190
Average Queue (ft)	18	483	483
95th Queue (ft)	50	1332	1340
Link Distance (ft)	1114	1146	1146
Upstream Blk Time (%)		4	5
Queuing Penalty (veh)		37	43
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 3: US 301 & Caroline St

Movement	WB	SB	SB
Directions Served	LR	LT	T
Maximum Queue (ft)	31	1056	1100
Average Queue (ft)	3	204	209
95th Queue (ft)	18	787	807
Link Distance (ft)	1181	1222	1222
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Queuing and Blocking Report

2035 Sunday Conditions

02/20/2019

Intersection: 4: US 301 & Walsingham Rd

Movement	WB	SB
Directions Served	LTR	UL
Maximum Queue (ft)	52	23
Average Queue (ft)	10	1
95th Queue (ft)	36	10
Link Distance (ft)	1936	
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		315
Storage Blk Time (%)		
Queuing Penalty (veh)		

Network Summary

Network wide Queuing Penalty: 1049

APPENDIX D

Safety Analysis



Crash Map 2013-2017 Route 17 from 0.5 miles south/east of Route 301 to 0.3 miles north/west of Route 17



Crash Map 2013-2017 Route 301 from 0.8 miles s/o Route 17 to 0.9 miles n/o Route 17

Report Selection Criteria:

Route Common Name: US-17N

Include Both Sides of the Route: Y

Report Date Range: 1/1/2013 Through 12/31/2017

From: 152.41 To: 153.21

Distance in miles: 0.80

Collision Type: Not Provided

Commercial Endorsement Type: Not Provided

Commercial Motor Vehicle: Not Provided

Commercial Vehicle Configuration Type: Not Provided

Start Time: Not Provided

End Time: Not Provided

Days Of Week: Not Provided

Type of Driver Distraction: Not Provided

Driver Drinking Type: Not Provided

Driver Injury Type: Not Provided

Fatal Injury Type: Not Provided

First Crash Events: Not Provided

Location of First Harmful Events: Not Provided

Type of Intersection: Not Provided

Lighting Conditions: Not Provided

Most Harmful Events: Not Provided

Passenger Injury Type: Not Provided

Relation To Roadway: Not Provided

Roadway Surface Type: Not Provided

School Zones: Not Provided

Traffic Control Type: Not Provided

Damage is VDOT Property: Not Provided

Vehicle Body Type: Not Provided

Weather Condition: Not Provided

Workzone Related: Not Provided

Workzone Workers Present: Not Provided

Jurisdiction Code as supplied by TREDIS: Not Provided

Accident Summary Analysis

Date: 11/26/2018 15:08:36

Length In Miles: 0.80

DVMT: 4558.73

Crash Rate: 192.31

Death Rate: 0.00

Injury Rate: 132.22

	Total	2013	2014	2015	2016	2017
Total Crashes	16	4	1	4	2	5
Fatal Crashes	0	0	0	0	0	0
Injury Only Crashes	7	1	1	4	1	0
Prop. Damage Only Crashes	9	3	0	0	1	5
Property Damage Amount	81000	25500	1400	30000	12500	11600
Persons Killed	0	0	0	0	0	0
Persons Injured	11	1	1	8	1	0
Pedestrians Killed	0	0	0	0	0	0
Pedestrians Injured	0	0	0	0	0	0
Collision Type						
Not Provided	0	0	0	0	0	0
1. Rear End	6	1	0	2	1	2
2. Angle	7	1	1	2	1	2
3. Head On	0	0	0	0	0	0
4. Sideswipe - Same Direction	1	1	0	0	0	0
5. Sideswipe - Opposite Direction	0	0	0	0	0	0
6. Fixed Object in Road	0	0	0	0	0	0
7. Train	0	0	0	0	0	0
8. Non-Collision	0	0	0	0	0	0
9. Fixed Object - Off Road	0	0	0	0	0	0
10. Deer	2	1	0	0	0	1
11. Other Animal	0	0	0	0	0	0
12. Ped	0	0	0	0	0	0
13. Bicyclist	0	0	0	0	0	0
14. Motorcyclist	0	0	0	0	0	0
15. Backed Into	0	0	0	0	0	0
16. Other	0	0	0	0	0	0
Not Applicable	0	0	0	0	0	0
Total	16	4	1	4	2	5

Vehicle Type	Total	2013	2014	2015	2016	2017
Not Provided	0	0	0	0	0	0
1. Passenger car	17	3	1	4	3	6
2. Truck - Pick-up/Passenger Truck	7	2	0	2	0	3
3. Van	2	0	0	2	0	0
4. Truck - Single Unit Truck (2-Axles)	1	1	0	0	0	0
7. Motor Home, Recreational Vehicle	0	0	0	0	0	0
8. Special Vehicle - Oversized (Veh/Earthmover/Road Equip.)	0	0	0	0	0	0
9. Bicycle	0	0	0	0	0	0
10. Moped	0	0	0	0	0	0
11. Motorcycle	0	0	0	0	0	0
12. Emergency Vehicle (Regardless of Veh Type)	0	0	0	0	0	0
13. Bus - School Bus	0	0	0	0	0	0
14. Bus - City Transit Bus/Privatey Owned Church Bus	0	0	0	0	0	0
15. Bus - Commercial Bus	0	0	0	0	0	0
16. Other (Scooter, Go-cart, Hearse, Bookmobile, Golf Cart, etc.)	0	0	0	0	0	0
18. Special Vehicle - Farm Machinery	0	0	0	0	0	0
19. Special Vehicle - ATV	0	0	0	0	0	0
21. Special Vehicle - Low Speed Vehicle	0	0	0	0	0	0
22. Truck - Sport Utility Vehicle (SUV)	3	2	1	0	0	0
23. Truck - Single Unit Truck (3 Axles or More)	1	0	0	0	1	0
25. Truck - Truck Tractor (Bobtail-No Trailer)	0	0	0	0	0	0
Not Applicable	0	0	0	0	0	0
Total	31	8	2	8	4	9

	Total	2013	2014	2015	2016	2017
Fixed Object						
Not Provided	0	0	0	0	0	0
1. Bank Or Ledge	0	0	0	0	0	0
2. Trees	0	0	0	0	0	0
3. Utility Pole	0	0	0	0	0	0
4. Fence Or Post	0	0	0	0	0	0
5. Guard Rail	0	0	0	0	0	0
6. Parked Vehicle	0	0	0	0	0	0
7. Tunnel, Bridge, Underpass, Culvert, etc.	0	0	0	0	0	0
8. Sign, Traffic Signal	0	0	0	0	0	0
9. Impact Cushioning Device	0	0	0	0	0	0
10. Other	0	0	0	0	0	0
11. Jersey Wall	0	0	0	0	0	0
12. Building/Structure	0	0	0	0	0	0
13. Curb	0	0	0	0	0	0
14. Ditch	0	0	0	0	0	0
15. Other Fixed Object	0	0	0	0	0	0
16. Other Traffic Barrier	0	0	0	0	0	0
17. Traffic Sign Support	0	0	0	0	0	0
18. Mailbox	0	0	0	0	0	0
Total	0	0	0	0	0	0
Lighting						
Not Provided	0	0	0	0	0	0
1. Dawn	1	1	0	0	0	0
2. Daylight	14	3	1	4	2	4
3. Dusk	0	0	0	0	0	0
4. Darkness - Road Lighted	0	0	0	0	0	0
5. Darkness - Road Not Lighted	1	0	0	0	0	1
6. Darkness - Unknown Road Lighting	0	0	0	0	0	0
7. Unknown	0	0	0	0	0	0
Not Applicable	0	0	0	0	0	0
Total	16	4	1	4	2	5

	Total	2013	2014	2015	2016	2017
Surface Condition						
Not Provided	0	0	0	0	0	0
1. Dry	14	3	1	4	2	4
2. Wet	2	1	0	0	0	1
3. Snowy	0	0	0	0	0	0
4. Icy	0	0	0	0	0	0
5. Muddy	0	0	0	0	0	0
6. Oil/Other Fluids	0	0	0	0	0	0
7. Other	0	0	0	0	0	0
8. Natural Debris	0	0	0	0	0	0
9. Water (Standing, Moving)	0	0	0	0	0	0
10. Slush	0	0	0	0	0	0
11. Sand, Dirt, Gravel	0	0	0	0	0	0
Not Applicable	0	0	0	0	0	0
Total	16	4	1	4	2	5
Weather Condition						
Not Provided	0	0	0	0	0	0
1. No Adverse Condition (Clear/Cloudy)	13	3	1	3	2	4
3. Fog	0	0	0	0	0	0
4. Mist	1	0	0	1	0	0
5. Rain	2	1	0	0	0	1
6. Snow	0	0	0	0	0	0
7. Sleet/Hail	0	0	0	0	0	0
8. Smoke/Dust	0	0	0	0	0	0
9. Other	0	0	0	0	0	0
10. Blowing Sand, Soil, Dirt, or Snow	0	0	0	0	0	0
11. Severe Crosswinds	0	0	0	0	0	0
Not Applicable	0	0	0	0	0	0
Total	16	4	1	4	2	5

	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday	Unknown
00:00 - 00:59	0	0	0	0	0	0	0	0
01:00 - 01:59	0	0	0	0	0	0	0	0
02:00 - 02:59	0	0	0	0	0	0	0	0
03:00 - 03:59	0	0	0	0	0	0	0	0
04:00 - 04:59	0	0	0	0	0	0	0	0
05:00 - 05:59	0	0	0	0	0	0	0	0
06:00 - 06:59	0	0	0	0	0	0	0	0
07:00 - 07:59	0	0	0	1	0	0	0	0
08:00 - 08:59	0	0	0	0	0	0	0	0
09:00 - 09:59	0	0	0	0	1	0	0	0
10:00 - 10:59	0	0	0	0	0	1	0	0
11:00 - 11:59	0	1	0	0	1	0	1	0
12:00 - 12:59	0	0	0	0	1	0	0	0
13:00 - 13:59	0	0	0	0	0	1	0	0
14:00 - 14:59	1	0	0	0	0	0	1	0
15:00 - 15:59	0	0	0	0	1	0	0	0
16:00 - 16:59	0	0	0	0	2	0	0	0
17:00 - 17:59	0	0	0	0	1	0	1	0
18:00 - 18:59	0	0	0	0	0	0	0	0
19:00 - 19:59	0	0	0	0	0	0	0	0
20:00 - 20:59	0	0	0	0	0	1	0	0
21:00 - 21:59	0	0	0	0	0	0	0	0
22:00 - 22:59	0	0	0	0	0	0	0	0
23:00 - 23:59	0	0	0	0	0	0	0	0
Unknown	0	0	0	0	0	0	0	0
Total	1	1	0	1	7	3	3	0

Report Selection Criteria:

Route Common Name: US-301N

Include Both Sides of the Route: Y

Report Date Range: 1/1/2013 Through 12/31/2017

From: 123.75 To: 125.45

Distance in miles: 1.70

Collision Type: Not Provided

Commercial Endorsement Type: Not Provided

Commercial Motor Vehicle: Not Provided

Commercial Vehicle Configuration Type: Not Provided

Start Time: Not Provided

End Time: Not Provided

Days Of Week: Not Provided

Type of Driver Distraction: Not Provided

Driver Drinking Type: Not Provided

Driver Injury Type: Not Provided

Fatal Injury Type: Not Provided

First Crash Events: Not Provided

Location of First Harmful Events: Not Provided

Type of Intersection: Not Provided

Lighting Conditions: Not Provided

Most Harmful Events: Not Provided

Passenger Injury Type: Not Provided

Relation To Roadway: Not Provided

Roadway Surface Type: Not Provided

School Zones: Not Provided

Traffic Control Type: Not Provided

Damage is VDOT Property: Not Provided

Vehicle Body Type: Not Provided

Weather Condition: Not Provided

Workzone Related: Not Provided

Workzone Workers Present: Not Provided

Jurisdiction Code as supplied by TREDIS: Not Provided

Accident Summary Analysis

Date: 11/26/2018 14:51:39

Length In Miles: 1.70

DVMT: 19151.31

Crash Rate: 114.45

Death Rate: 0.00

Injury Rate: 31.47

	Total	2013	2014	2015	2016	2017
Total Crashes	40	13	6	10	6	5
Fatal Crashes	0	0	0	0	0	0
Injury Only Crashes	9	3	2	3	1	0
Prop. Damage Only Crashes	31	10	4	7	5	5
Property Damage Amount	210800	58500	40200	50000	50100	12000
Persons Killed	0	0	0	0	0	0
Persons Injured	11	5	2	3	1	0
Pedestrians Killed	0	0	0	0	0	0
Pedestrians Injured	0	0	0	0	0	0
Collision Type						
Not Provided	0	0	0	0	0	0
1. Rear End	10	1	2	4	2	1
2. Angle	9	3	0	2	2	2
3. Head On	0	0	0	0	0	0
4. Sideswipe - Same Direction	3	1	1	0	0	1
5. Sideswipe - Opposite Direction	1	1	0	0	0	0
6. Fixed Object in Road	0	0	0	0	0	0
7. Train	0	0	0	0	0	0
8. Non-Collision	0	0	0	0	0	0
9. Fixed Object - Off Road	9	4	1	2	1	1
10. Deer	5	3	1	0	1	0
11. Other Animal	0	0	0	0	0	0
12. Ped	0	0	0	0	0	0
13. Bicyclist	0	0	0	0	0	0
14. Motorcyclist	0	0	0	0	0	0
15. Backed Into	0	0	0	0	0	0
16. Other	3	0	1	2	0	0
Not Applicable	0	0	0	0	0	0
Total	40	13	6	10	6	5

Vehicle Type	Total	2013	2014	2015	2016	2017
Not Provided	0	0	0	0	0	0
1. Passenger car	29	11	5	7	3	3
2. Truck - Pick-up/Passenger Truck	8	4	0	1	2	1
3. Van	7	2	0	2	1	2
4. Truck - Single Unit Truck (2-Axles)	1	1	0	0	0	0
7. Motor Home, Recreational Vehicle	0	0	0	0	0	0
8. Special Vehicle - Oversized (Veh/Earthmover/Road Equip.)	0	0	0	0	0	0
9. Bicycle	0	0	0	0	0	0
10. Moped	0	0	0	0	0	0
11. Motorcycle	1	0	1	0	0	0
12. Emergency Vehicle (Regardless of Veh Type)	0	0	0	0	0	0
13. Bus - School Bus	0	0	0	0	0	0
14. Bus - City Transit Bus/Privatey Owned Church Bus	0	0	0	0	0	0
15. Bus - Commercial Bus	0	0	0	0	0	0
16. Other (Scooter, Go-cart, Hearse, Bookmobile, Golf Cart, etc.)	0	0	0	0	0	0
18. Special Vehicle - Farm Machinery	0	0	0	0	0	0
19. Special Vehicle - ATV	0	0	0	0	0	0
21. Special Vehicle - Low Speed Vehicle	0	0	0	0	0	0
22. Truck - Sport Utility Vehicle (SUV)	14	1	3	5	2	3
23. Truck - Single Unit Truck (3 Axles or More)	5	1	1	1	2	0
25. Truck - Truck Tractor (Bobtail-No Trailer)	0	0	0	0	0	0
Not Applicable	0	0	0	0	0	0
Total	65	20	10	16	10	9

	Total	2013	2014	2015	2016	2017
Fixed Object						
Not Provided	0	0	0	0	0	0
1. Bank Or Ledge	1	0	0	0	1	0
2. Trees	2	0	0	1	0	1
3. Utility Pole	0	0	0	0	0	0
4. Fence Or Post	1	1	0	0	0	0
5. Guard Rail	1	0	1	0	0	0
6. Parked Vehicle	0	0	0	0	0	0
7. Tunnel, Bridge, Underpass, Culvert, etc.	1	1	0	0	0	0
8. Sign, Traffic Signal	2	0	0	1	1	0
9. Impact Cushioning Device	0	0	0	0	0	0
10. Other	0	0	0	0	0	0
11. Jersey Wall	1	1	0	0	0	0
12. Building/Structure	2	0	0	2	0	0
13. Curb	2	0	0	2	0	0
14. Ditch	1	0	1	0	0	0
15. Other Fixed Object	0	0	0	0	0	0
16. Other Traffic Barrier	0	0	0	0	0	0
17. Traffic Sign Support	0	0	0	0	0	0
18. Mailbox	0	0	0	0	0	0
Total	14	3	2	6	2	1
Lighting						
Not Provided	0	0	0	0	0	0
1. Dawn	1	0	0	0	1	0
2. Daylight	21	7	3	5	3	3
3. Dusk	2	0	1	0	0	1
4. Darkness - Road Lighted	3	1	1	1	0	0
5. Darkness - Road Not Lighted	13	5	1	4	2	1
6. Darkness - Unknown Road Lighting	0	0	0	0	0	0
7. Unknown	0	0	0	0	0	0
Not Applicable	0	0	0	0	0	0
Total	40	13	6	10	6	5

	Total	2013	2014	2015	2016	2017
Surface Condition						
Not Provided	0	0	0	0	0	0
1. Dry	32	11	6	7	5	3
2. Wet	7	2	0	3	0	2
3. Snowy	1	0	0	0	1	0
4. Icy	0	0	0	0	0	0
5. Muddy	0	0	0	0	0	0
6. Oil/Other Fluids	0	0	0	0	0	0
7. Other	0	0	0	0	0	0
8. Natural Debris	0	0	0	0	0	0
9. Water (Standing, Moving)	0	0	0	0	0	0
10. Slush	0	0	0	0	0	0
11. Sand, Dirt, Gravel	0	0	0	0	0	0
Not Applicable	0	0	0	0	0	0
Total	40	13	6	10	6	5
Weather Condition						
Not Provided	0	0	0	0	0	0
1. No Adverse Condition (Clear/Cloudy)	34	11	6	9	5	3
3. Fog	0	0	0	0	0	0
4. Mist	1	0	0	0	0	1
5. Rain	4	2	0	1	0	1
6. Snow	1	0	0	0	1	0
7. Sleet/Hail	0	0	0	0	0	0
8. Smoke/Dust	0	0	0	0	0	0
9. Other	0	0	0	0	0	0
10. Blowing Sand, Soil, Dirt, or Snow	0	0	0	0	0	0
11. Severe Crosswinds	0	0	0	0	0	0
Not Applicable	0	0	0	0	0	0
Total	40	13	6	10	6	5

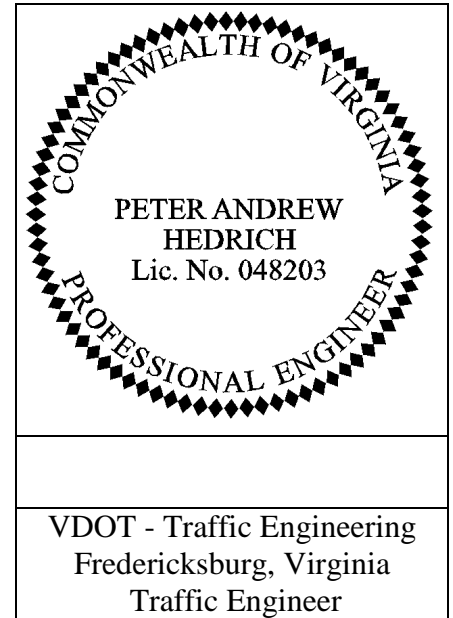
	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday	Unknown
00:00 - 00:59	1	0	0	0	0	0	0	0
01:00 - 01:59	0	0	1	0	0	0	0	0
02:00 - 02:59	0	0	0	0	0	0	0	0
03:00 - 03:59	0	0	0	0	0	0	0	0
04:00 - 04:59	0	0	0	0	1	0	0	0
05:00 - 05:59	0	0	0	1	1	0	0	0
06:00 - 06:59	0	0	2	0	0	0	0	0
07:00 - 07:59	1	0	0	0	0	0	0	0
08:00 - 08:59	1	0	0	0	1	0	0	0
09:00 - 09:59	0	0	0	0	0	0	0	0
10:00 - 10:59	0	0	0	0	0	0	0	0
11:00 - 11:59	0	0	0	0	0	0	0	0
12:00 - 12:59	1	1	0	1	0	2	0	0
13:00 - 13:59	2	0	0	0	0	0	1	0
14:00 - 14:59	0	0	0	1	0	0	0	0
15:00 - 15:59	0	0	0	2	0	0	1	0
16:00 - 16:59	0	1	0	0	1	0	1	0
17:00 - 17:59	1	0	0	0	0	0	0	0
18:00 - 18:59	0	2	0	1	3	0	1	0
19:00 - 19:59	0	0	0	0	1	0	0	0
20:00 - 20:59	0	0	0	0	0	0	1	0
21:00 - 21:59	0	0	0	0	0	0	0	0
22:00 - 22:59	0	1	0	1	0	1	0	0
23:00 - 23:59	0	0	0	1	0	1	0	0
Unknown	0	0	0	0	0	0	0	0
Total	7	5	3	8	8	4	5	0

APPENDIX E

Speed Data

VDOT Speed Limit Study
Central Region Traffic Engineering

Date 05/12/2015



Study area:

Route #: 301
Street name: AP Hill Boulevard
Jurisdiction: Caroline County
From: SCL (previous line)-Port Royal
To: 0.25 miles south of Route 17
Length: 0.64 miles

Functional Class/Volume: Rural Other Principal Arterial with 12,481 AADT in 2013.

Speed limit for study roadway: The studied section is posted 45 mph by resolution dated 10/04/2000. The adjoining section to the north is posted at 35 mph by resolution dated 10/04/2000 and 55 mph to the south by resolution dated 06/03/1968.

Origin and nature of request: Requested by Bill Wick, Town Manager of Port Royal.

Study results and recommendations: It is the recommendation of this report to retain the existing 45 mph speed limit on Route 301. This recommendation is based on the following factor(s):

- 85th percentile speed of 47.4 mph
- Pace speed of 39-48 mph
- The accident and injury rate is comparable to state and Fredericksburg District averages for Primary roads.
- There was no discernable pattern to the reported accidents that would have been mitigated by a reduced speed limit.

Study details:

A. Speed Data:

Date, location of speed samples: April 29, 2015, approximately 1000' north of Route 17.

85th percentile speed: 47.4 mph

Median speed: 42 mph

Mean speed: 42.4 mph

Pace speed: 39 to 48 mph

B. Road characteristics:

Physical roadway: This segment is a four-lane/two-way asphalt surface road that has a concrete/grassy median south of the Route 17 intersection and a wide centerline/ flush asphalt median north of the Route 17 intersection. The overall pavement width is 52' with variable width grassy and/or paved shoulders. Pavement markings consist of edge lines, lane lines and left turn lane designations.

Traffic Control Devices: There is a traffic signal at the intersection with Route 17, and signal ahead warning signs north and southbound. In addition, 45 mph speed limit signs are in place to the north and south of the intersection.

C. Roadside development and environment:

This area is primarily commercial in nature with seven commercial entrances, two private driveways and one entrance to a funeral home.

D. Parking practices and pedestrian activity:

On street parking is not prohibited but general lack of adequate shoulder width discourages this activity and this practice was not observed.

E. Reported crash experience for most recent three-year period:

Crash records obtained through RNS are for the period 1/1/2012 – 12/31/2014.

Note: Only crashes involving an injury or fatality or property damage exceeding \$1,500 are reportable and available through the Department of Motor Vehicles (DMV). Also, due to the time required for DMV to process and code reported crashes, data for the previous six (6) months may not be available.

According to our records, the total number of reported **crashes** for this section of highway is: 12.

And, the total number of reported **injuries** for this section of highway is: 4

And, the total number of reported **fatalities** for this section of highway is: 0

The **crash** rate for this section of highway is: 137

The **injury** rate for this section of highway is: 46

The **fatality** rate for this section of highway is: 0

For this type of roadway: Primary

The statewide average **crash rate** is: 104.94 per 100 million VMT.

The statewide average **injury rate** is: 59.93 per 100 million VMT.

The statewide average **fatality rate** is: 1.05 per 100 million VMT.

The district average **crash** rate is: 126.62 per 100 million VMT.

The district average **injury** rate is: 71.51 per 100 million VMT.

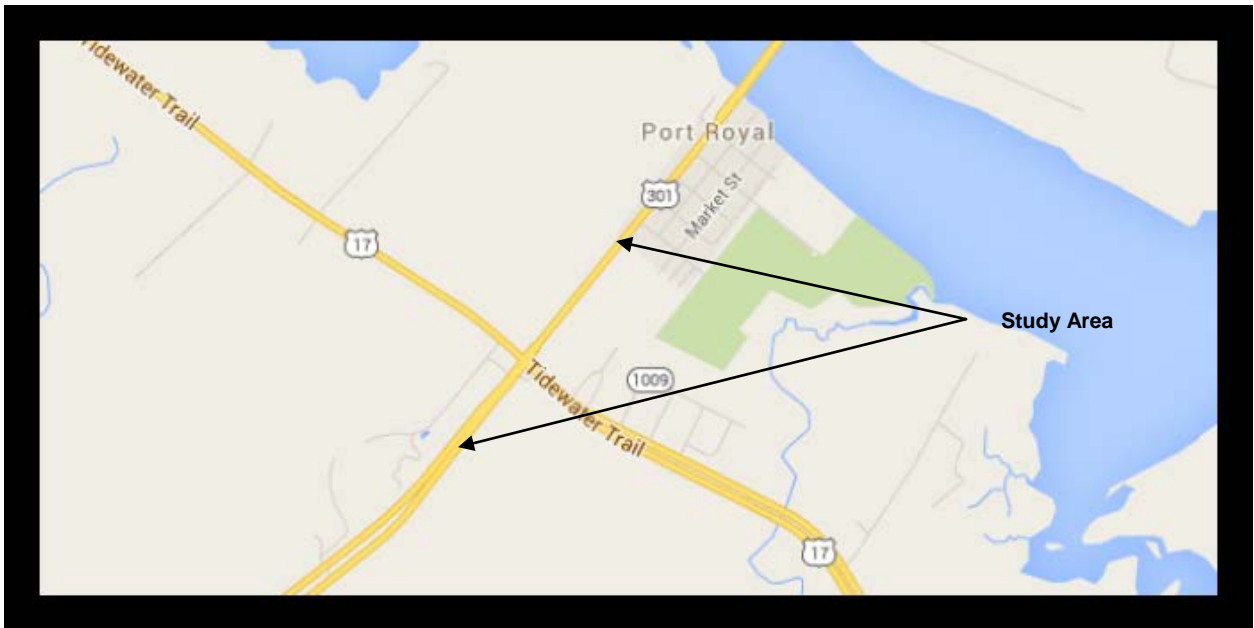
The district average **fatality** rate is: 1.32 per 100 million VMT.

Discussion of crash experience and relevant information: Of the reported twelve accidents, four were “Deer”, three “Angle”, two “Sideswipe Same Direction”, one “Rear End”, one Fixed Object off Road” and one “Other”. The crash rate is somewhat higher than the state and Fredericksburg District averages for primary roads whereas the injury rate is considerably less. There were no reported fatalities.

Study Area Map

NOTE: map is provided for illustrative purposes and may not accurately depict the most recent roadway conditions.

Route #: 301
Street name: AP Hill Boulevard
Jurisdiction: Caroline County
From: SCL (previous line)-Port Royal
To: 0.25 miles south of Route 17
Length: 0.64 miles



APPENDIX F
Existing Conditions Public
Outreach Data

File contains all data collected as of December-26-2018 23:00:00-UTC. Click the Refresh button in Data Center to download the latest dataset.

SiteVisited	VisitId	VisitTime	_BROWSER	_IP	_PLATFORM	Q_Comment	Q_StandardAge	S2_P1_T0_Q1_Port_Roy	S2_P1_T0_Q2_Port_Roy	S2_P2_T0_Q1_Your_Con	S2_P2_T0_Q2_Your_Con	S2_P3_T0_Q1_Your_Ide	S2_P3_T0_Q2_Your_Ide	S2_P4_T0_Q1_Your_Visi	S2_P4_T0_Q2_Your_Visi	XIT_Custom1	XIT_Custom2	XIT_Custom4
SiteVisited	VisitId	VisitTime	Browser	IP	Platform	Additional Comments - Comment	Age	What is your relationship to Port Royal?	For what destinations do you use Route 301 within or beyond Port Royal?	What is your biggest transportation concern regarding the Port Royal Area?	Is there anything else you would like us to know about travel in the Port Royal area?	What about Route 301 would you like to see improved?	Are there specific locations where pedestrian or other improvements should be considered?	What feature or features within the Town of Port Royal do you most want to preserve?	If you could make one transportation improvement in Port Royal, what would it be?	Home Zip Code	Work or School ZIP Code	RaceEthnicity
paper - mail	paper - mail	paper - mail	paper - mail	paper - mail	paper - mail			I regularly travel through Port Royal	South to Richmond and North to Maryland. Travel to Post Office and restaurant and library	speed limit is enforced	most people turn left into the post office, left turns can be dangerous	Speed limit is enforced	Post office - for those living across the highway	Small town atmosphere	turn lanes for post office, and restaurant near the bridge			
paper - mail	paper - mail	paper - mail	paper - mail	paper - mail	paper - mail			I live in Port Royal, home 305 Market Street. I have lived here for 32 years. I enjoy the people in the town and my wife is very happy as well.	We go to Bowling Green a couple of times a month, we also go to Fredericksburg and Richmond for groceries that are ? ? ? Port Royal	When I ? 301, it tends to have an abundance of trucks at 7:30 AM - 8:30 AM, and it ? ? ? ? Houses	Probably not	Development and another ? ? Pass at center ? ? ?	Yes, in the area ? 301 without ? ? And the ? Section by 17	The town itself	Construct a ? ? Around the town to ? Traffic through ? Area, prevent accidents			
old-010319-portroyalstudy.metroqu est.com	3323383	24-11-2018 01:59:49	Chrome70	174.226.24.186	Web		41 to 60	I am a Business owner	Richmond, northern Neck	VDOT increasing of the speed limit from 35 MPH		The South bound 301 lanes need to have pedestrian sidewalks installed with substantial Highway STORMWATER MANAGEMENT improvements to stop the flooding of business and properties adjoining both sides of 301, located within the town. (The current Highway Stormwater system drainage piping was installed in 1965!!!!) Currently, the stormwater drainage system has broken, collapsed and undersized concrete piping to include 24' 18' and 15' culverts collection pipes.		The Speed limit for foot traffic use	Highway Stormwater management improvements.			
old-010319-portroyalstudy.metroqu est.com	3324609	25-11-2018 14:37:52	Safari12	24.153.39.6	Mobile		41 to 60	Resident	To Work in Dahlgren, travel to Frederickburg, Richmond and to see my sister in North Carolina	Speeding and congestion	I feel 301 and the bridge needs to be widened	Widened and speed control. Also make it possible for pedestrians to cross 301 in front of the Post Office	At the light, 301 in front of the Post Office	History	Pedestrian crossings at the post office and at the light	22535	22485	WhiteCaucasianNonHispanic
old-010319-portroyalstudy.metroqu est.com	3325630	26-11-2018 19:34:26	InternetExplorer11	23.31.100.121	Web	Thank you!	41 to 60	I am professionally associated with the Town through public service.	Antique shopping privately.	Traffic management that will allow Port Royal to benefit from its traffic flow while yet allowing for safe turn motions coming into the Town and exiting the town or to allow access to the Post Office.	Port Royal is a lovely town with great potential to grow while preserving its exciting historical context. Managing traffic is key to its survival as an incorporated Town and allowing economic development. In this regard, a bypass would take traffic away from Town commerce and kill the town's economy. The current Rt. 301 needs to flow through the town. However, a signal strategically placed will allow for greater access and egress in Port Royal while providing safe turning motions for locals.	A signal located to allow commercial traffic to safely exit Rt. 301 and to allow access to Rt. 301 from the Town. Preserving traffic flow to the Town is critical. Rt. 301 is like a river of money flowing through Port Royal. If able to dip into this flow of capital, Port Royal will thrive. If diverted, Rt. 301 and its revenue potential will cause the Town to perish.	Where traffic considerations demand the signal to go based on anticipated traffic patterns.	Historic dwelling and commerce.	Signalization.	22546	22546	WhiteCaucasianNonHispanic
old-010319-portroyalstudy.metroqu est.com	3325728	26-11-2018 20:17:48	InternetExplorer11	166.67.66.243	Web			I travel through Port Roay	Fredericksburg, Hampton Roads area, King George	Storage space and capacity in the area. Sunday afternoon driving back from the beach, it always seems to be a hot spot of traffic.	no							
old-010319-portroyalstudy.metroqu est.com	3326002	27-11-2018 00:55:33	Chrome70	162.223.181.237	Mobile			I travel through the 5 days a week for work and occasionally on the weekend headed to Massaponnax	King George at Windsor Dr to I64 job below Richmond	Traffic not obeying the posted speed limits	I wish there were more businesses	Street lights	Pedestrians should be considered at all times, and sidewalks should be put in place along the Port Royal corridor, as well as pedestrian crosswalks	The historical elements, i.e., houses, signage, churches, etc.	The light at 17 needs to be timed better			

old-010319-portroyalstudy.metroqu est.com	3326033	27-11-2018 01:24:55	Mozilla	98.183.251.235	Mobile		26 to 40	Regularly travel through the area	Maryland and Fredericksburg.	Speeders.	Speed limit is not being obeyed. Reduction to 2 lane traffic on 17 is a hassle.	4 lane from Port Royal to Route 1.		Horne's	Additional turn lane for 301 North to King George from 17	23061	23149	WhiteCaucasianNonHispanic
old-010319-portroyalstudy.metroqu est.com	3326053	27-11-2018 01:54:30	Chrome70	174.204.23.110	Mobile	Thank you!	41 to 60	I live four miles from Port Royal in King George and often travel through Port Royal.	Tappahannock, Massaponax, and Richmond	The speed limit change at the bridge has dramatically increased the noise in our yard in King George. We can hear trucks' air brakes on the bridge when they approach Port Royal, and cars speeding up when they leave the town. The noise really carries over the river in both directions.		Increase the speed limit going through Port Royal. There are four lanes if a vehicle needs to slow down to turn into a business.	Pedestrians shouldn't be encouraged to cross a four lane highway, no matter what the speed limit is.	Trees	Increase the speed limit so traffic doesn't need to make a drastic change.	22485	22485	WhiteCaucasianNonHispanic
old-010319-portroyalstudy.metroqu est.com	3326109	27-11-2018 02:40:10	Chrome70	24.245.107.15	Mobile			I live in King George County	Whenever we go to port Royal, restauant to eat. Richmond , Tappanock, traveling etc	I don't have any. The bridge is very nice.the speed limit is reasonable in that area.	A long road to travel before you get to a rest area if you need it.	No I think its okay	Need a rest stop along the area between port royal and AP Hill	Restaurants and Brooks Funeral home	I have no problem			
old-010319-portroyalstudy.metroqu est.com	3326127	27-11-2018 02:54:30	Chrome70	73.130.161.96	Mobile			I regularly travel through Port Royal	Fredericksburg or Maryland	Speed. Travelers go at high speeds.	N/A		Pedestrian crosswalks beginning at Horne's. Be nice to walk to the antique stores, etc.	Historical look				
old-010319-portroyalstudy.metroqu est.com	3326140	27-11-2018 03:14:25	Mozilla	74.214.45.174	Mobile		26 to 40	I drive thru port royal 4 times every day	King George and richmond	It's a speed trap	When are the speed limits along routes 3 and 301 going to be raised to 60?	Higher speed limit	No	Horne's	Higher speed limit	22485		
old-010319-portroyalstudy.metroqu est.com	3326149	27-11-2018 03:37:18	Firefox63	173.71.206.32	Web		41 to 60	Live in Fredericksburg. Work in King George. Visit family in Essex.	Dahlgren, Fredericksburg, Tappahannock, Richmond.	The two-lane portion of Route 17 north of Port Royal to Fredericksburg is dangerous, often backs up due to slow drivers, and needs to be expanded to 4 lanes to match Route 301 and Route 17 south of Port Royal.	Many people coming in to Port Royal ignore the lower speed limits.	Better signage and enforcement of the speed limits.	Longer turn lane from 301 South on to Route 17 south.	The small businesses.	Improve Route 17 north to 4 lanes.	22401	22448	
old-010319-portroyalstudy.metroqu est.com	3326366	27-11-2018 13:25:03	Chrome69	174.255.202.60	Mobile			I regularly travel this road everyday.	I travel 301 through Port Royal to 17 towards Tappahannock everyday	People speeding and bridge work everyday	When are they going to be done with bridge work? They work on it everyday and why	Speed limit should be at least 40 not 35			Change speed limit to 40			
old-010319-portroyalstudy.metroqu est.com	3327547	28-11-2018 02:14:39	Mozilla	174.226.28.95	Mobile		41 to 60	I regularly travel through Port Royal.	I travel route 17N to Port Royal and then cross route 301 to travel to work.	Drivers do not obey the speed limit. On 17N and 17S before and after crossing route 301,the speed limit changes from 45 mph to 35 mph. Most cars drive above the designated speed limit. Flashing lights are needed on the signs that display the speed limit. This will alert drivers of the changing speed limits.	There also isn't a designated turn lane for Horne's Restaurant after crossing 301 from 17N. Most cars do not display a turn signal prior to turning into Horne's Restaurant. Lastly, the right lane needs to be widened,so tractor trailers turning right at the intersection of route 17 and 301 have enough space to turn.	There needs to be improvements for drivers turning right on red on 301S to 17N.			Flashing lights on signs where the speed limit changes suddenly.	22572	22408	BlackAfrican American
old-010319-portroyalstudy.metroqu est.com	3327560	28-11-2018 02:36:01	Safari12	67.237.121.56	Web		41 to 60	I live in Port Royal.	To get home, to go to Fredericksburg, Maryland, to try 17 to go to Tappahannock and to connect to 95. I drive the corridor every day to work and to the Post office as we have no mail delivery and must go to the post office daily.	Safety! It is hard to pull in and out of our street due to speeding traffic. Vehicles always speed and are not concerned with traffic from the town residents trying to enter art 301.	I think if traffic was slowed down the residents could travel more safely, also the businesses in town would have more traffic.	I would like to see a bypass. That way the town could have a real Main Street.	A sidewalk would be nice and a crosswalk at the post office with a light. That could be remedied if USPS would start home mail delivery	Main Street and access to businesses and the historic district	Bypass in the field allowing travelers to enter 17 or continue on 301 south	22535	22301	WhiteCaucasianNonHispanic
old-010319-portroyalstudy.metroqu est.com	3327573	28-11-2018 02:55:44	Mozilla	71.244.213.8	Mobile		41 to 60	I live in Port Royal	King George, Bowling Green, Maryland	Increased tractor trailer traffic	What are plans for residential and commercial development?	Ensure additional development matches road capacity.	Road is not suitable for pedestrian traffic	Quite charm	Left turn lane on 301	22535	21202	WhiteCaucasianNonHispanic
old-010319-portroyalstudy.metroqu est.com	3327574	28-11-2018 02:56:25	Mozilla	209.42.143.93	Mobile		41 to 60	I regularly travel through Port Royal and used to live in town.	301 north from Bowling Green to King George	Speeding through town		Speed		The old homes		22427	22485	WhiteCaucasianNonHispanic

old-010319-portroyalstudy.metroqu est.com	3327577	28-11-2018 02:59:44	Mozilla	141.152.24.32	Mobile		26 to 40	I live in Port Royal.	Bowling Green, Richmond, Dahlgren, King George, Maryland	The traffic can be hectic in the summer and on Fridays/Sundays due to people traveling to or back from Virginia beach using 301. Especially at the light by Hornes when everyone is trying to turn left onto 17 from 301. The line gets backed up quite a ways. I have seen it backed up past the Port Royal Post Office many times!	No.	Better traffic flow - especially during the summer and weekends.	A crosswalk at the corner of 301 and 17 might be nice for those people who want to eat at Hornes and walk across the road to the antique shop or look at sheds and/or shop at Kermit's roadside food stand in the summer!	The history!	Better flow of traffic!	22535	22485	WhiteCaucasianNonHispanic
old-010319-portroyalstudy.metroqu est.com	3327580	28-11-2018 03:01:03	Chrome70	74.214.43.53	Mobile			Regularly travel to and through Port Royal	Restaurants, turn for 17, and through to 95 at Carmel Church	Coming down the bridge to enter and have to slow down so much	It's such a quaint and friendly town. Street signs could be more noticeable	Maybe a ped bridge	A ped bridge across at post office, and a sidewalk both sides of 301	The old Port Royal tavern, the fireplace structure	Bigger street signs			
old-010319-portroyalstudy.metroqu est.com	3327600	28-11-2018 03:18:41	Mozilla	73.99.144.139	Mobile		61 to 80	Travel there for stores and seafood	See above	It's heavily traveled by out of state and in state cars and trucks to, I guess, avoid 95	It's becoming very congested and difficult to from the right side to the left or make a turn to go the opposite direction. The traffic light doesn't help with traffic coming over the bridge into Port Royal	Maybe turn lanes	I wouldn't even try to be a pedestrian it's scary enough in a car	I can't speak for the Residents	Hate to say it, but additional lanes may be the only option. Weekends are especially bad.	22546	N/A	WhiteCaucasianNonHispanic
old-010319-portroyalstudy.metroqu est.com	3327602	28-11-2018 03:19:39	Safari11	174.204.8.185	Mobile			Travel thru port royal frequently	Fredericksburg, Richmond, king George and beyond	Route 17 north of port royal floods whenever it rains. This is a dangerous situation. It is an emergency evacuation route					Fix flooding issue			
old-010319-portroyalstudy.metroqu est.com	3327603	28-11-2018 03:20:19	Chrome70	107.77.203.203	Mobile			I drive through almost daily and I value historic resources	To drive to and from work	I don't really have any. Maybe the speeding vehicles and the bridge always being under construction	Heavily congested at the 301/17 intersection during holidays and peak traffic hours	Maybe improved parking for truckers rather than being parked on the side of the road, mostly by Horne's	Truckers walking from one side of the highway to the other, especially at Horne's area					
old-010319-portroyalstudy.metroqu est.com	3327606	28-11-2018 03:23:08	Chrome69	174.204.1.35	Mobile			I value Virginia's historic resources.	Fredericksburg					All of the buildings				
old-010319-portroyalstudy.metroqu est.com	3327612	28-11-2018 03:28:42	Mozilla	73.10.27.158	Mobile		61 to 80	Travel through. Value historical resources	To and from New Jersey to Milford, VA	Need a consistent speed limit from bridge to Rt 17 interchange.	Love the town.	Consistent speed limit	Not sure	Not sure	Consistent speed limit	08057	08057	WhiteCaucasianNonHispanic
old-010319-portroyalstudy.metroqu est.com	3327616	28-11-2018 03:34:05	Safari12	76.111.185.213	Web		41 to 60	I regularly visit Port Royal to eat at Horne's and shop at the local antique stores. I've been coming here since I was 5-6 years old...40+ years.	I occasionally have to travel to Baltimore to go to my company headquarters (from Ashland VA). I always use 301 to bypass Fredericksburg and DC. It's a beautiful drive.	I would hate to see this area expanded or developed in such a way as to destroy the charm and ruin the scenic byways.	I enjoy the local festivals, such as the Pirate festival, as well as the shops and restaurants.	I personally wouldn't change a thing...I love it just the way it is.	Not really. The restaurants and shops have ample parking and there doesn't really appear to be the need for pedestrian traffic areas. I imagine the land is privately owned, but a scenic area or lookout at the river (adjacent to the bridge) would be nice.	The small town feel, Horne's in particular, as well as the antique shops.	I wouldn't change anything really. The only added feature that would be handy id turn lanes for the restaurants/shops, but adding those would negatively impact the parking areas of those very businesses.	23005	23236	WhiteCaucasianNonHispanic
old-010319-portroyalstudy.metroqu est.com	3327625	28-11-2018 03:40:29	Mozilla	174.232.41.32	Mobile			Live in	Ap hill, bowling green, king George									
old-010319-portroyalstudy.metroqu est.com	3327627	28-11-2018 03:48:39	Chrome59	74.214.55.105	Mobile		26 to 40	I travel through Port Royal	Fredericksburg, Bowling Green	Serious need for public transportation in the entire region		Public transportation and protected bike lanes			Public transportation	22485	22485	WhiteCaucasianNonHispanic
old-010319-portroyalstudy.metroqu est.com	3327630	28-11-2018 03:54:58	Mozilla	174.226.21.209	Mobile		41 to 60	I travel through Port Royal	Vast majority would be south interstate 95. But occasional trips to antique shops and Horne's.	No one obeys the speed limit. I've been flipped off for doing the limit through Port Royal.		Sidewalks and/or bike lanes. Bike trails are great for bringing economic benefits as well as encouraging healthy activity				22443	22448	WhiteCaucasianNonHispanic
old-010319-portroyalstudy.metroqu est.com	3327644	28-11-2018 04:09:01	Chrome70	74.214.54.238	Mobile		25 and under	I live in Port Royal	To travel to and from work and to return home	The traffic back up.	Traffic does back up to the bridge on occasion, traveling through the intersection in the afternoon builds traffic and makes it hard for people to get onto 301 from the town.	I believe the speed limit does not need to be 35 to "reduce people flying through". The speed of 45 hasn't been an issue around the town. Installing a longer turn lane to turn left onto 17 southbound.	There is very little pedestrian traffic crossing 301, the most is people walking across the street to the post office. Instead of changing a road to accommodate a small population.	The town needs to expand, there is very little income in the town, a few antique stores does not constitute a booming economy.	A tollbooth at the bridge. Either coming in to town or out, a large income to the town.	22535	22551	WhiteCaucasianNonHispanic
old-010319-portroyalstudy.metroqu est.com	3327651	28-11-2018 04:24:42	Chrome58	174.255.202.58	Mobile			I value Virginia's historic resources. I also travel through.	When I go to King George, Colonial Beach and Tappahannick I go through Port Royal. Also have friends who live there.	Congestion at Hornes.	No	No	No	All of it	Nothing			

old-010319-portroyalstudy.metroqu est.com	3327660	28-11-2018 04:42:58	Chrome59	65.99.113.149	Mobile		26 to 40	I live in Port Royal	I drive many places within a 50-mile radius of Port Royal for work and entertainment etc.	I like that the speed limit is 35 miles an hour right now but if it were to ever increase the original town limits would need a stoplight for residents of Port Royal to exit and enter the town safely. It is already quite dangerous to enter 301 in either direction from the main town side. I.e. 301 north side. I would suggest that this stop light be placed near Back street if the speed limit were to increase.	I think I covered that well in my last answer	Possibly a stoplight near Back street if the speed limit ever increases	Cross walk from back street to post office.	Anything historical should be preserved by the Historical Society.	Stop light near back street for residents of the town to enter 301 more safely	22535	22401	WhiteCaucasianNonHispanic
old-010319-portroyalstudy.metroqu est.com	3327671	28-11-2018 05:08:12	Mozilla	174.226.29.190	Mobile	The green space by the library is beautiful and it would be nice to see that kept as green space for the wonderful town events and for the children to play.	41 to 60	I live in Port Royal. I value progressive movement while preserving and honoring the history of the are.	Travel in all directions. Near Daily travel to Bowling Green and Fredericksburg.	Speeding inside the town limits. The standing water on Route 17 close to the stoplight at the junction of 17 and 301. Also the dangerous no cell coverage area close to Rappahannock Academy that has accidents due to trees that frequently fall in the road. Lastly, but most importantly, there is no safe pedestrian crossing for those needing to cross to get to post office/other businesses on either side of 301.	The north bound route 17 is marked as a hurricane evacuation route and for the last 5+ years it has standing water and flooding which is very dangerous. I do not understand how it is an evacuation route when it floods so easily. In addition, the area by Rappahannock Academy is exceptionally dangerous in any type of weather due to falling tree limbs, dead trees that fall on the road. There is NO cell reception in that area either.	Speed traps Pedestrian crossings or a pedestrian bridge(that would be enclosed for safety) No bill boards Another stoplight for the most congested part of the town, perhaps at the post office or make a side road running parallel to post office side	YES, Pedestrian, and Bike lanes for the town would be lovely!!! A pedestrian/bike bridge would be great for safety.	Historical sites, Post Office, Library, Fire Station, Horne's,	Install speed traps that take pictures of speeders and auto mail tickets. Another stoplight or blinking yellow at the bridge and just as you come down hill near Horne's to alert cars to slow down.	22535	22535	WhiteCaucasianNonHispanic
old-010319-portroyalstudy.metroqu est.com	3327677	28-11-2018 05:30:54	Safari10	24.245.107.34	Web		41 to 60	I travel through Port Royal at least twice every two weeks.	Traveling from King George to Richmond or to the Virginia Beach area.	Volume of traffic passing through.		Whatever would make things easier for those who actually live there.				22485		WhiteCaucasianNonHispanic
old-010319-portroyalstudy.metroqu est.com	3327691	28-11-2018 06:13:30	Safari10	96.240.24.81	Web			I drive through Port Royal twice daily.	Rt. 301 to Rt. 17.	Drivers who do not obey the speed limit.	The speed limit needs to be enforced.	Sidewalks.		Historical landmarks.	Pedestrian walkways.	22538		WhiteCaucasianNonHispanic
old-010319-portroyalstudy.metroqu est.com	3327695	28-11-2018 06:57:42	Mozilla	24.153.35.173	Mobile			I travel through Port Royal on Rt 301.	Danville VA - Richmond VA - various destinations in NC, GA, and FL	No places along 301 to stop and take a break without searching for them.	It just seems isolated to an extent then you hit the Nice Bridge going North and it is not built to handle all the traffic.							
old-010319-portroyalstudy.metroqu est.com	3327710	28-11-2018 09:30:48	Chrome70	24.153.32.180	Mobile		41 to 60	Regularly travel through the town.	Williamsburg, Richmond, Carrollton, Hornes Restaurant, Tappahanock.	Speed limit feels like a trap.		Speed limit increased to 45 mph.		The historic buildings. Small town feel.	Increase speed limit.	22485	20664	WhiteCaucasianNonHispanic
old-010319-portroyalstudy.metroqu est.com	3327756	28-11-2018 12:01:14	Chrome70	216.10.186.175	Web			Travel thru Port Royal	King George and Maryland									
old-010319-portroyalstudy.metroqu est.com	3327759	28-11-2018 12:06:44	Mozilla	107.77.202.228	Mobile			I drive through Port Royal every day on my way to work in Essex County.	I drive between Stafford County and Essex County every day - 7 days a week.									
old-010319-portroyalstudy.metroqu est.com	3327764	28-11-2018 12:14:01	Chrome70	174.204.38.97	Mobile			I regularly travel through port royal	Bowling Green Va and King George	While traveling into to port royal on 17 south bound when you reach the light at 301 and attempt to turn right onto 301 south your view of oncoming traffic is blocked by multiple signs that are very close to the highway. This impedes the flow of traffic and creates a public safety cocern.			An emergency light for port royal volunteer fire department should be in place due to days when there are high volumes of traffic ,such as holiday weekends, it can become difficult for them to get across all lanes of travel safely					
old-010319-portroyalstudy.metroqu est.com	3327771	28-11-2018 12:23:32	Chrome70	107.77.203.110	Mobile			Travel through, live in Caroline County.	Restaurants and enjoy the town.									
old-010319-portroyalstudy.metroqu est.com	3327785	28-11-2018 12:47:59	Chrome70	174.204.13.178	Mobile			I drive through the area twice a day, 5 days a week	King George to Bowling Green	Speed changes too quickly coming over the bridge into Port Royal. Police seem to be there ready and waiting.	No		I never see people walking on the area when I pass through.	The most Historic places with more emphasis on what's there.				
old-010319-portroyalstudy.metroqu est.com	3327788	28-11-2018 12:49:33	Mozilla	100.7.200.9	Mobile			I regularly travel through Port Royal	Maryland, Tappahannock, local boat ramps	Heavy volume of traffic on weekends		Turn lanes	Entrance to Ranolph's		Turn lanes and increase speed back to 45			

old-010319-portroyalstudy.metroqu est.com	3328469	28-11-2018 21:27:00	Chrome70	70.106.138.206	Mobile			I travel through there to go from King George to Cosner's Corner via Route 301 and take Route 17 to Spotsylvania instead if taking Route 3 which is farther away. Also I was babysitting for about 2 years in Port Royal, but I'm no longer doing that.	To go back and forth from King George county to Spotsylvania or to go to Carmel Church. Rarely I do stop at Horne's restaurant to get a snack.	The sudden speed limit changes, its confusing because it drops so quickly especially coming off the bridge over the Rappahannock river.	Better signage of the speed limits because when I drive, I know it's slow and I have been beeped at because the person wants me to hurry up. This is true coming off the bridge, others dont believe the speed limit drops so quickly.	Cant think of anything except mb maybe keeping the speed limit the same from the bridge to you hit the traffic light at Route 17. Its not a huge distance but the speed limit changes can be confusing.	Not sure	The historic aspects of the town, not over commercial of the area	Not sure			
old-010319-portroyalstudy.metroqu est.com	3328495	28-11-2018 21:42:25	Chrome70	70.106.138.206	Mobile		41 to 60	Travel from King George county to Cosner's corner in spotsylvania	Cosner's corner in Spotsylvania or Ladysmith in Caroline county	The quick change of the speed limits, yo can be driving the proper speed limit and other drivers get mad at you not going faster	Maybe keeping the speed limit the same from the bridge over the Rappahannock River to the intersection of Route 17 by Horne's restaurant.	On speed limit throughout the town,	Not sure	The historic aspects, dont allow too much commercial companies	Keep it historical and a small community feel-	22485	22485	WhiteCaucasianNonHispanic
old-010319-portroyalstudy.metroqu est.com	3328520	28-11-2018 21:52:25	Chrome70	162.210.27.2	Mobile		41 to 60	I travel through regularly.	I use 301 to head south to get to I-95, we use it to reach the intersection with route 17 to go east for traveling towards the beach & we use west towards Spotsylvania for shopping/dining/campin g.	Traffic bottlenecks on 301 heading south, at the 301/17 intersection. The left turn lane is too short for the amount of cars that head south on 301 and turn east onto 17, especially during warmer months. Tractor trailers, plus people pulling RV's/utility trailers/etc take up too much space in the left lane. In the right lane, cars can turn right towards Spotsylvania county but it's also a straight through, causing a backup in that lane as well.y				History		22485	22485	WhiteCaucasianNonHispanic
old-010319-portroyalstudy.metroqu est.com	3328638	28-11-2018 23:09:40	Mozilla	174.226.24.108	Mobile		41 to 60	I live near Port Royal and go through light at intersection of 301 and 17 twice a day five days a week.	To go to and from home.	Speed limit on 301 crossing though AP Hill.		Nothing. Like the slower limit.		The speed limit.		22546	22546	WhiteCaucasianNonHispanic
old-010319-portroyalstudy.metroqu est.com	3328712	29-11-2018 00:04:56	Mozilla	73.147.77.108	Mobile			I travel regularly through port Royal	Maryland	Speeding and the light can take forever when busy								
old-010319-portroyalstudy.metroqu est.com	3328739	29-11-2018 00:24:56	Mozilla	64.134.102.32	Mobile			I value this town travel from Caroline to king George every day .	17			Reduce speed	Cross walks in port royal slow down traffic	Small town	Make interstate from Carmel church all to Baltimore create toll road			
old-010319-portroyalstudy.metroqu est.com	3328782	29-11-2018 00:52:18	Mozilla	174.204.11.195	Mobile	An engineer that works at Quantico, Pax River, and Aberdeen	26 to 40	I live just outside Port Royal and drive through regularly for work and personal business.	I pass through 301 to King George, Dahlgren, and Fort AP Hill. I go to Horne's, Port Royal Pizza and subs, and RiversHaven often.	Not being able to allow commuting traffic flow while allowing local traffic to stopnamd egress.	We need increased speed and less traffic stoppage for passthrough traffic but we also need local traffic to be able to stop and go. Maybe we need alternate routes in conjunction with an overpass for pass through traffic?	Options for overpass allowing pass through traffic with existing roads for local traffic.	The interesection of 17 and 301.	I want to preserve the local and historical aspects.	Increase in speed. Get rid of the speed trap dropping from 55 to 35.	22514	22134	WhiteCaucasianNonHispanic
old-010319-portroyalstudy.metroqu est.com	3328843	29-11-2018 02:04:01	Safari12	107.77.202.24	Mobile		41 to 60	I live close to Port Royal and drive through there, daily.	Traveling to and from work, etc.	35 MPH zone. This speed should be adjusted, up.	No	Increased speed limit	No	None	None	22535	22448	
old-010319-portroyalstudy.metroqu est.com	3328850	29-11-2018 02:15:07	Chrome70	162.223.181.213	Web			I live in King George County but regularly travel through Port Royal on Route 301.	Route 301 from King George to I-95 or to North/South on Route 17.									
old-010319-portroyalstudy.metroqu est.com	3328859	29-11-2018 02:32:53	Mozilla	74.214.55.123	Mobile		41 to 60	I live in King George and travel through and visit PR a lot.	Horne's, antique shops, access to art 17 south and to 95.	People drive too fast through there despite the limits.	No	25 mph	Going from each shop is scary - getting out onto 301.	Old buildings. Horne's!	Sidewalks between the small businesses.	22485	22486	WhiteCaucasianNonHispanic
old-010319-portroyalstudy.metroqu est.com	3328912	29-11-2018 03:46:57	Chrome70	174.226.20.141	Mobile			I drive through Port Royal 2 days a week	To spend the day with my grandsons in St. Mary's County Maryland.	The intersection of 301 and 17. A lot of driver's run the red light.		Lengthen the turn lanes		Center turn lane				
old-010319-portroyalstudy.metroqu est.com	3328913	29-11-2018 03:49:34	Mozilla	172.56.2.84	Mobile			I travel through port royal regularly	Dahlgren va	None	No	I do not have any issues with rt 301 through port royal	No					
old-010319-portroyalstudy.metroqu est.com	3328930	29-11-2018 04:30:34	Mozilla	70.106.143.13	Mobile			I regularly travel through Port Royal.	To frequent the businesses in Port Royal, to reach 17, to travel to Bowling Green, to travel to Carmel Church for access to 95 for traveling south	None	No	Nothing	No	The small town feel	Nothing			

old-010319-portroyalstudy.metroqu est.com	3332650	4-12-2018 23:59:47	Chrome70	184.21.46.46	Mobile			I live in central point and get my mail at post office in Port Royal. Plus I go to King George to visit my son.	King George and Maryland.	Speeding	No	Nothing	Leaving the post office parking lot needs a light.	Less car lots.	Nothing			
old-010319-portroyalstudy.metroqu est.com	3332729	5-12-2018 03:19:40	Mozilla	216.10.186.155	Mobile			I travel through Port Royal and live nearby.	Both	Volume within the community	Balance need for moving traffic with need to preserve town viability	Median separation between north and southbound traffic	Need improvement along entire path between 17 and king George county	History	Concrete median divider between north and southbound 301			
old-010319-portroyalstudy.metroqu est.com	3332752	5-12-2018 07:02:32	Chrome70	174.226.6.6	Web			I live in Port Royal.	Home, work, & shopping.	Thru traffic & Tractor Trailers-Garbage Trucks traveling at high speeds.	Horne's parking lot is an accident prone area. Travelers pulling in and out	Speed limit 35mph. Historical Marker Signs.	Horne's	The Historic Value & Small Town Rural Feel.	Less traffic.			
old-010319-portroyalstudy.metroqu est.com	3332795	5-12-2018 12:49:22	Safari11	174.204.21.248	Web	Thanks for considering Port Royal and asking for input!!	41 to 60	I live in Port Royal.	Dahlgren, Fredericksburg, Richmond, Yorktown.	Drivers speeding	I do not think crime is very high, but would like surveillance (cameras) if it is not already implemented.	Longer left turn lane at 301S and 17S intersection.	Cross walks with the button you push to activate it on 301 (parallel to Rt 17).	History and quaint shopping.	Safer turning (longer lanes).	22535	22448	WhiteCaucasianNonHispanic
old-010319-portroyalstudy.metroqu est.com	3332886	5-12-2018 15:35:56	Chrome70	174.226.13.13	Mobile			Visit Port Royal and live nearby	Visit friends/travel thru to Tappahannock.									
old-010319-portroyalstudy.metroqu est.com	3333516	6-12-2018 05:13:51	Mozilla	71.171.84.40	Web			Commute through it.	Tappahannock, bowling green, Fredericksburg, dahlgren	Being rear ended trying to turn onto 17north from 301 south.	Speed limit seems inappropriate.	dedicated turn lanes from 301 to 17. Longer storage for cars turning from 301 south to 17 south.		Historic sites.	Significant change would be a bypass. Minor change would be improved/longer or new turn lanes.			
old-010319-portroyalstudy.metroqu est.com	3333744	6-12-2018 16:06:08	Chrome64	198.0.16.229	Web			I value Virginia's mobility and small towns	King George, Bowling Green	Access Management, throughput		Raised median with left turn lanes at appropriate locations.	Funeral home	lower speed limit	sidewalk on the northbound side only			
old-010319-portroyalstudy.metroqu est.com	3336101	7-12-2018 20:13:48	Chrome70	50.246.114.209	Web			Church officer (Memorial baptist) traveling 3-4 times a week	Live in King George travel to Port Royal to Rt. 17 and in town destinations	Safety maintained speed not accelerated	many off streets to destinations	trees obstructing view up and down road	elderly are asking for pedestrian access to post office	small town	divert/reduce large truck traffic			
old-010319-portroyalstudy.metroqu est.com	3336103	7-12-2018 20:19:40	Chrome70	50.246.114.209	Web			Member of Memorial Baptist Church. I live in K.G.	From north across the bridge to MBC	Making a left turn off of 301 onto Water Street	Where are "the barriers" going to be placed and what provisions to make left turns.	It is fine with me as is.	?	?	?			
old-010319-portroyalstudy.metroqu est.com	3336110	7-12-2018 20:22:31	Chrome70	50.246.114.209	Web			I live in Portobago Bay, Port Royal. I regularly travel through P.R. I am concerned about the historic museums, historic homes, and businesses and residences in P.R.	To go to King George, Dahlgren, Fredericksburg, NOVA, Bowling Green, Richmond.	That through traffic not overwhelm the town. People need access to businesses to keep them in business. Need access to the post office, historic museum, historic houses, library, churches, fire house. This should take precedence over travelers passing through.		Speed signs be easily seen. Keep the radar posted speeds - very helpful.	To Post Office, to Town Center and Library and playground, to churches, museums and historic houses.	Port Royal is historic. Preserve its history. Residents and others have worked and are working so hard to improve Port Royal.	Make entrances more visible and easier to access to businesses etc. For example, it is hard now to turn into the post office. Hard to really determine entrance.			
old-010319-portroyalstudy.metroqu est.com	3336151	7-12-2018 21:17:20	Chrome70	50.246.114.209	Web			I'm very close to and involved in town and historic affairs	Shopping, visits, business	Heavy traffic and access to post office and businesses	No - I have been well informed	Speed control, access to businesses and safety for residents	Post office and restaurants.	Historic homes and character	Reroute through traffic			
old-010319-portroyalstudy.metroqu est.com	3336162	7-12-2018 21:38:54	Chrome70	50.246.114.209	Web			Historical society member, visitor	Fredericksburg, MD, Southern VA, Bowling Green	Speed of traffic passing through Port Royal, no pull offs for traffic entering businesses	-	Rumble strips, unmanned radar	The historic areas!!!	The historic areas!!!				
old-010319-portroyalstudy.metroqu est.com	3336163	7-12-2018 21:40:08	Chrome70	50.246.114.209	Web			I live in Port Royal and I value its historical resources.	I go south on 301 to get to work and I go north to visit family, go shopping and to other businesses.	Weekend and summer traffic causing back ups at the light. Cars speeding - I'm eventually going to get rear-ended when I stop to turn at businesses.	Need turn lanes and to elongate existing turn lane (L) on 301 and onto 17	Turn lane down center of 301. So afraid I'll get rear ended when I try to turn into post office or Randolph's.	Need crosswalks at stoplight and perhaps down by historic area across from Randolph's restaurant.	The Port Royal tavern and chimneys, historic homes	Maybe we need a commuter lot and commuter buses.			
old-010319-portroyalstudy.metroqu est.com	3336168	7-12-2018 21:50:26	Chrome70	50.246.114.209	Web			I do not live in Port Royal but I own businesses in Port Royal which I regularly visit. I also attend regularly Historic Port Royal events as well as antique shops.	I regularly use 301 to travel to Richmond and Southern Maryland.	Extreme high speeds, no turn off lanes, no trees or other beautification projects.	-	Install high speed cameras; install turn off lanes for those businesses who need them and also for historical events	Speed cameras in middle of 301 and also before bridge	Port Royal is a historic gem which must be preserved while allowing access	Install bumpers and high speed cameras and turn off lanes			
old-010319-portroyalstudy.metroqu est.com	3336170	7-12-2018 21:52:47	Chrome70	50.246.114.209	Web			I have a shop	I have a shop in Port Royal	Cars so fast		Put camera in because cars are speeding more rev.	Town needs to open more than 2 hours one day at least three days a week	Historical	Camera number 1			
old-010319-portroyalstudy.metroqu est.com	3336175	7-12-2018 21:56:02	Chrome70	50.246.114.209	Web			40 year resident, member of town council, president of port royal volunteer fire department	To meetings in town, port royal volunteer fire department	Too much traffic through town		One more stop light to slow traffic	In front of the post office	Peace and quiet	See #5 no engine breaking on tractor trailers			
old-010319-portroyalstudy.metroqu est.com	3336177	7-12-2018 21:59:03	Chrome70	50.246.114.209	Web			Firefighter EMT, training officer	Route 17, Route 635	Trying to turn off of Cumberland onto Main Street is hard with heavy traffic	Need a light emergency vehicles can trip at Cumberland or Back	A traffic control light in the Town at Back Street or Cumberland	Cross walk at Cumberland or Back Street with lights					

old-010319-portroyalstudy.metroqu est.com	3336188	7-12-2018 22:07:53	Chrome70	50.246.114.209	Web			Love going to flea marts and Hornes!	Bowling Green, King George	Turning lanes	Need turning lanes	Turning lanes	Thru the town where the shops and dealers need turning lanes	The river and historical areas	Turning lanes, lower speed			
old-010319-portroyalstudy.metroqu est.com	3336195	7-12-2018 22:10:49	Chrome70	50.246.114.209	Web		41 to 60	I was raised in Port Royal and love the historic's	King George	Stop lights need improvements	No	Nothing love the old buildings	Near Hornes should have a pedestrian walk way	The River	Turning lanes	22546		WhiteCaucasianNonHispanic
old-010319-portroyalstudy.metroqu est.com	3336717	8-12-2018 22:27:29	Chrome70	173.44.65.138	Web	Thank you for listening.	61 to 80	Resident of town since 1982; wife and three children. Chairman, planning commission for about 18+ years. Member Town Council about 2+ years.	My wife and I are oriented towards Fredericksburg; work, shopping, family. My wife is on the Caroline Board of Supervisors and goes to Bowling Green often. We use Rt. 301 to Port Conway Road, thence to Route 3 to go to Fredericksburg, since Rt. 17 is too congested in the am.	1) conflicting goals, strategies and operations as applied to Rt. 301 being an arterial corridor to move traffic vs. Main Street (the real name of the street, Rt. 301. Shutting down left turns will hurt business, frustrate residents, and just move the turn movements to up or down the road, not eliminate the hazards. Speed limits are also a function of the conflict between Main Street vs. Arterial Corridor. 2) Near term increase of traffic as VDOT directs traffic from I-95 due to projects from Stafford to Fredericksburg and long term impacts of opening of an upgraded Rt. 301 bridge over the Potomac.	As traffic picks up, increases, the conflicts between Main Street vs. Arterial Corridor will intensify to the detriment of all stakeholders. More accidents between cars and pedestrians will occur. Traffic is also a function of others, beyond town residents with linkages to the town. We have churches, a fire department and fire hall for social events, a fishing pier for the general public, a boat launch, and cultural assets such as the Port Royal Museum, signage for historic events, structures, and landscapes. The town is on both the state and	The paired bypass is a much better solution than the four lane bypass proposed by Alex Long. That paired bypass accomplishes many solutions, including addressing the left turn movements of people going east; IF a traffic circle is constructed on Rt. 17, allowing the southbound traffic to maneuver east without stopping. ALSO, it is necessary to have a linkage between the town and the two paired bypass routes; and Cumberland Street is best, and is where the fire department is located. A traffic circle should also be used at Cumberland and the southbound bypass to then also be a point of	The paired bypass allows Main Street to return to the town, sidewalks, landscaping, SWM, and other improvements for vitality of the community and functioning of Route 301. Different speed limits for Main Street and the bypass; 35 and 45-55, respectively.	Historic resources, a functioning Main Street as a transportation asset to the Virginia and the community. STAKEHOLDERS for this area include residents, nearby communities and residents, businesses, those traveling through the area, AND citizens of Virginia and the Nation as parties at law, through regulations and other laws protecting historic, cultural resources and the Rappahannock River Valley National Wildlife Refuge of the U.S. Department of Interior. All stakeholder interests must be addressed.	paired bypass with traffic circle at Rt. 17 and linkage from Cumberland Street to the southbound bypass, using a traffic circle and a "T" at the traffic circle, opposite the Cumberland St. linkage, to access the large land tracts.	22535	22401	WhiteCaucasianNonHispanic
old-010319-portroyalstudy.metroqu est.com	3336769	9-12-2018 00:39:42	Safari12	71.171.117.39	Web	thanks for asking	61 to 80	we live in Fredericksburg and have friends in and near Port Royal. We greatly value its historic character	friends in PR and then on toward Colonial beach	we have never really had a problem in that area	please give great consideration and respect to the historic character of the area.	we didn't realize that it needed much	not really able to give a thoughtful answer	all of the older buildings, the historic chimneys across the road, the open space	slower traffic	22401	22401	WhiteCaucasianNonHispanic
old-010319-portroyalstudy.metroqu est.com	3336812	9-12-2018 02:49:53	Safari12	71.171.100.240	Web			I value Port Royal's unique historic resources	North travel into Eastern Maryland. Travel to Williamsburg, Hampton Roads and Yorktown	Over development and preservation of its unique historic nature.	Not really	Reduces speed and lights to allow access to the community.		The unique nature of its historic structures.	Lower speeds on 301 and lights allowing safe access to and from the town along 301			
old-010319-portroyalstudy.metroqu est.com	3336869	9-12-2018 12:05:51	InternetExplorer11	74.214.49.217	Web	Thank you for taking the time to listen to people who will be affected by the plan to funnel more traffic through this historic town...1	61 to 80	I live in the town of Port Royal.	I use 301 to go to King George, Richmond, Bowling Green, Washington DC, Fredericksburg...everyw here!	Increased traffic	Route 301 is Port Royal's Main Street! Especially on weekends, 301 is already clogged. I hate to think how even more traffic will impact our little town!	Speed limit enforcement!	Sidewalks and wider lanes with a median strip where pedestrians could find safety when crossing 301 within the town boundaries,	access to the town pier access to the Wildlife Refuge potential to restore the colonial buildings in the historic part of the town	sidewalks along 301 to make it clear that Port Royal is a town, not just strip development	22535	22401	WhiteCaucasianNonHispanic
old-010319-portroyalstudy.metroqu est.com	3336967	9-12-2018 18:21:55	Safari12	172.243.128.62	Web		61 to 80	I live in the Port Royal area and go to/from Port Royal almost daily. I am also concerned about the historic buildings and roads in the area. The intersection at Hornes is dangerous because people turn into that parking lot with little or no notice all the time. Also people park on parking spaces right on the line of view from the traffic light toward Bowling Green. They should not be allowed to park there - only right next to the building.	Port Royal, Fredericksburg, King George, Bowling Green, Tappahannock	People drive too fast. You put your life at stake if you want to make a left turn off of Main Street when heading north. There is too much traffic on weekends, especially in the summer with travelers going to/from Virginia Beach and beyond. Put speed cameras on 301 in both directions.	How to slow drivers down when approaching the bridge from the North and how to slow drivers through town/Main Street when going North. How to handle traffic better and safer at the 301/17 intersection, especially going East.	Speed cameras and/or speed bumps.	Mentioned previously. Approaching the bridge from the King George side going into Port Royal. Allowing drivers to be better able to turn left off of Route 301 in Port Royal when heading North: Post Office especially, museum, Randolph's, etc. Get the highway department vehicles and equipment out of Randolph's driveway area - unsightly and clogs up getting in and out of the restaurant.	History, historic buildings, same streets as were there in the Colonial period.	Speed cameras.	22535	22535	WhiteCaucasianNonHispanic
old-010319-portroyalstudy.metroqu est.com	3337008	9-12-2018 20:34:26	Mozilla	74.214.48.66	Mobile			I live here	Route 17 301 going to bowling green and king George	People not doing speed limit	People need to slow down I've got hit almost numerous times	Speed	Gas stations post office and the new restruant					
old-010319-portroyalstudy.metroqu est.com	3337124	10-12-2018 01:29:30	Safari11	69.142.201.218	Mobile			I regularly travel through Port Royal and use to live here	From New Jersey via 301 to a bowling green									
old-010319-portroyalstudy.metroqu est.com	3337148	10-12-2018 02:39:15	Chrome64	174.204.37.177	Web			I regularly travel through Port Royal and live in Port Royal in Portobago Bay	weekly post office trips, visits to Maryland, other businesses in Port Royal, Ymca in King George	too many large commercial hauling trucks (semis) using that gateway and way too much traffic for such a sweet town.		find an alternative route for the heavy traffic.	intersection of 301 and 17 is not at all conducive for crossing the intersection by bike or foot.	It's historic charm...	Offer an alternative route for tractor trailers.	22535		

old-010319-portroyalstudy.metroqu est.com	3346326	21-12-2018 14:02:17	Chrome71	71.63.117.210	Mobile			Drive thru, appreciate the old buildings	Traveling to second home in Colonial Beach from Richmond	Keep the lower speed constant from 17 to Rapp bridge		It's fine, as long as everything drives posted speed				23233		WhiteCaucasianNonHispanic
old-010319-portroyalstudy.metroqu est.com	3346340	21-12-2018 14:15:39	Chrome71	74.214.53.56	Web		41 to 60	I travel through	Fredericksburg or King George	It's set up as a speed trap.	no	better signage for speed limit changes	I don't stop so a bypass is a great idea.	Bypass town		22485	22485	WhiteCaucasianNonHispanic
old-010319-portroyalstudy.metroqu est.com	3346361	21-12-2018 14:49:43	Chrome71	96.247.193.198	Mobile			Travel through Port Royal	Heading South and return	None	No	None	No	Historic sites	None			
old-010319-portroyalstudy.metroqu est.com	3346408	21-12-2018 15:31:37	Mozilla	174.254.70.101	Mobile			I regularly travel through port royal	King George									
old-010319-portroyalstudy.metroqu est.com	3346799	21-12-2018 20:14:05	Chrome71	173.44.67.166	Mobile			I regularly travel through port royal	Richmond	The speed limit into AP Hill is too slow to get up the hill.	The light should be smarter. Should cycle past if no one is there.	Turning lanes		Historic charm		22485	22485	
old-010319-portroyalstudy.metroqu est.com	3346865	21-12-2018 20:55:00	Mozilla	107.77.202.198	Mobile			I live in King George and drive there 1 to 2 times a month	Antique shop and Horne's	The speed limit drop								
old-010319-portroyalstudy.metroqu est.com	3347051	21-12-2018 23:38:51	Chrome71	24.153.33.162	Web		41 to 60	I regularly travel through Port Royal	Richmond to King George	Bottleneck when traveling south from King George at the bridge. Bottleneck at the light traveling north at 17	Speed limit is too low	Increase the speed limit, streamline the traffic signal, offer off highway options for local traffic	I don't see much pedestrian traffic but it should be considered as the area grows.	none specifically related to 301. most everything related to the town excluding the highway	Increase the speed limit on 301	22815	22485	WhiteCaucasianNonHispanic
old-010319-portroyalstudy.metroqu est.com	3347052	21-12-2018 23:49:47	Mozilla	173.44.66.127	Mobile		26 to 40	Live in King George but travel to and through Port Royal regularly.	Kings Dominion, 95, Rt17 to head to Norfolk	Needs speed cameras or a better way to enforce the lower speed limit.	The turning lane on 301 South, to make the left on Rt 17 needs a longer turning lane to ease traffic from backing up.	Clean up the abandoned buildings.	Not that I can think.			22485	22401	WhiteCaucasianNonHispanic
old-010319-portroyalstudy.metroqu est.com	3347098	22-12-2018 01:46:22	Chrome71	146.168.153.5	Mobile			Travel through Port Royal; enjoy some of the restaurants and shops in Port Royal	Richmond, Spotsylvania, Caroline County Public Schools	Speed traps by police	Speed limit drops seem drastic and 35 mph zone seems unnecessary	Less speed traps	N/A					
old-010319-portroyalstudy.metroqu est.com	3347103	22-12-2018 02:11:24	Mozilla	173.44.64.45	Mobile			I travel through PR	When we go to Fredericksburg we take Rt 17 from PR. Also pass through when we go to Florida	I have no concerns.	It's nice area	It's fine the way it is	Not sure	Not sure	Speed limit is confusing			
old-010319-portroyalstudy.metroqu est.com	3347136	22-12-2018 03:01:43	Chrome71	162.223.180.15	Mobile			I travel through PR 5 days a week on my way to work.	From Colonial Beach to Fredericksburg five days a week. Occasionally from Colonial Beach to Richmond.									
old-010319-portroyalstudy.metroqu est.com	3347152	22-12-2018 03:30:34	Chrome71	146.168.22.252	Web		41 to 60	I travel through Port Royal often and have friends there	Richmond, Fredericksburg	congestion	It's a quaint little place	I would like to see the speed limit improved from Rt 17 to the Rappahannock River Bridge	all through town by the Fire Station and the museums	the historic buildings need to be repaired not demolished	a by pass that would essentially leave the town intact	22485	22405	WhiteCaucasianNonHispanic
old-010319-portroyalstudy.metroqu est.com	3347161	22-12-2018 03:45:06	Chrome71	209.42.129.74	Mobile			Regularly travel through Port Royal from King George	Richmond	The area serves as a bottle neck for commercial, military, and other travelers. The speed limit is inconsistent the other roads in the area.	There area many areas that lack shoulders for disabled vehicles.	A long right turning Lane for South bound traffic at the intersections.	Perhaps a commuter lot or strategically placed shelter for pedestrians		Hyperloop to Richmond.	22485	22485	Hispanic
old-010319-portroyalstudy.metroqu est.com	3347189	22-12-2018 04:39:22	Chrome70	174.204.5.24	Mobile		41 to 60	I live in KG and go thru Port Royal often.	Richmond, Tappahanock and Fredericksburg	Speeding and aggressive drivers		Less traffic for citizens	The light	The old buildings	Re-route traffic	22485	22448	WhiteCaucasianNonHispanic
old-010319-portroyalstudy.metroqu est.com	3347193	22-12-2018 05:34:24	Mozilla	74.214.39.69	Mobile		26 to 40	Travel through regularly	King George, Fredericksburg, Richmond.	None	I think the current set up works well.	Nothing	I haven't noticed many pedestrians so I can't say that any improvements are needed	The scenic river views	Unsure	22443	22401	WhiteCaucasianNonHispanic
old-010319-portroyalstudy.metroqu est.com	3347200	22-12-2018 09:12:57	Chrome67	74.214.48.222	Mobile		41 to 60	I live in Port Royal.	I travel 301 from Port Royal to both King George to the north and Bowling Green to the south.	Trying to turn left onto 301 from Back Street.	I think the speed limit should be lowered to 30. There are still too many trucks and passenger vehicles doing over 35.	We need either more troopers and deputies patrolling for speeders, or Port Royal needs its own pd.	Turning southbound or northbound from the opposite side of the road.	The feel of a quiet fishing village.	Lower speed limit and increase police presence.	22535	22405	WhiteCaucasianNonHispanic
old-010319-portroyalstudy.metroqu est.com	3347204	22-12-2018 12:39:42	Chrome59	65.99.113.11	Mobile			Travel to and from work everyday thru town of port royal.	Work	Lines not visible enough. Especially when it rains.		Better visibility	There is not enough businesses to warrant a pedestrian crossing	Old buildings				
old-010319-portroyalstudy.metroqu est.com	3347218	22-12-2018 15:20:20	Chrome71	24.245.105.131	Mobile		26 to 40	I commute through Port Royal twice a day, everyday to work.	I drive through port royal to rt 17 to go to work in spotsylvania	Speeders. The speed limit is so low, very few people do the actual speed limit. The few that do, are slowing down the speeders and they weave dangerously around the slower cars. This is especially dangerous on the bridge.		Faster speed limit. Or a slower speed limit sooner				22443	22407	WhiteCaucasianNonHispanic
old-010319-portroyalstudy.metroqu est.com	3347224	22-12-2018 16:14:49	Chrome71	65.99.124.195	Mobile			Live nearby	Home, work	Cell phone usage	Add some fast food	Fewer speed limit changes	No. Not enough reasons to stop		Eliminate driver cell phone usage			

old-010319-portroyalstudy.metroqu est.com	3347263	23-12-2018 00:00:57	Chrome71	74.214.46.119	Web		61 to 80	I live in KG just across the bridge from PR.	Attend functions, parties and meetings in PR. Go through PR to get to places S on Rt 17 and Sw on 301.	Making sure I get through with out going to fast for the posted speed signs.....do not want a ticket! Watching the trafic coming into the main road 301.		fewer placed where people can enter into the highway		old buildings	ease of going to the fishing pier with parking	22485	22485	WhiteCaucasianNonHispanic		
old-010319-portroyalstudy.metroqu est.com	3347289	23-12-2018 16:33:31	Mozilla	174.204.14.216	Mobile			I use to live in Port Royal and still travel through Port Royal.	Bowling Green, Tappahanno, and											
old-010319-portroyalstudy.metroqu est.com	3347294	23-12-2018 17:57:06	Mozilla	24.153.32.215	Mobile			Travel through it frequently	Richmond or Fredericksburg	Slow to get through the stop light										
old-010319-portroyalstudy.metroqu est.com	3347305	24-12-2018 00:34:52	Chrome71	24.153.39.98	Mobile			I regularly travel through.	I go to Massaponx.											
old-010319-portroyalstudy.metroqu est.com	3347306	24-12-2018 00:41:18	Mozilla	174.223.147.10	Mobile			I regularly travel through Port Royal	King's Dominion, Richmond, Williamsburg, Belvedere Plantation, traveling to Alabama and other southern states	It's a speed trap.		Not be a speed trap	I never see pedestrians in Port Royal							
old-010319-portroyalstudy.metroqu est.com	3347308	24-12-2018 01:26:08	Chrome70	146.168.22.45	Mobile		41 to 60	I regularly travel through port Royal, and visit Horne's.	Horne's, Traveling through to Richmond	Rapid deceleration down hill when northbound.		Increase to 45mph. Northbound start 55 at bridge.	Crosswalks at Horne's		Improve Harry nice bridge so more people use the Eastern bypass	22485	22485			
old-010319-portroyalstudy.metroqu est.com	3347314	24-12-2018 02:17:35	Chrome71	174.204.3.98	Mobile		41 to 60	Regularly travel through Port Royal	Richmond primarily	None.	Speed signs are clear and the addition of the speed measuring sign was a good idea.	Seems ok to me.	Don't know where peds cross so those areas should be better marked. Add stop light with push button for pedestrian if need be.	Small town atmosphere	Sounds like pedestrians need a safer way/place to cross	22485		WhiteCaucasianNonHispanic		
old-010319-portroyalstudy.metroqu est.com	3347405	25-12-2018 13:07:31	Chrome70	174.226.8.204	Mobile			I travel through PR	Richmond and points south and southeast	Why the drastic speed enforcement	Road is good there, commerce not large	Nothing except bigger left turn lane heading south	Sidewalks in areas	IDont have any specific	Raise speed to 45 all through PR					
old-010319-portroyalstudy.metroqu est.com	3347421	26-12-2018 01:40:58	Chrome64	76.104.14.65	Web		61 to 80	As a member of Historic Port Royal and St. Peter's Episcopal Church in Port Royal, I value the town's cultural, historic and religious institutions.	I use Routes 307 and 207 to travel from Ladysmith (via SR 639) to Port Royal.	Speeding automobiles, particularly those crossing the Rappahannock River into Port Royal from the Port Conway area. The intersection at Horne's Restaurant can be dangerous, with cars from Route 17 running red lights.	At dusk and night, deer come out to the highway at Fort AP Hill.	Warning signs about entering a congested area and the drop in speed limits. I think I would post them further back than they now area.	Yes, driving into Port Royal from Port Conway and at Horne's restaurant at Routes 17 and 301. There should be warning of pedestrian crossings there.	Its history.	Strong speed limit warning signs entering the town from both directions.	22546	22546	WhiteCaucasianNonHispanic		
old-010319-portroyalstudy.metroqu est.com	3347422	26-12-2018 03:48:40	Chrome71	162.223.181.5	Mobile			I regularly travel through Port Royal.	To get to Masaponax											
portroyalstudy.metroqu est.com	3350521	4-1-2019 14:45:10	Mozilla	174.226.3.186	Mobile			My wife and I own a 60+ acre undeveloped tract within the town limits at the western terminus of Water Street. (Tax map parcel #13-A-8)	We travel north from Hanover County and turn left onto Water Street to access our property where we are planning to build a home.	Since the only current access to our 60+ acre property is via Route 301 and Water Street, we feel it is vital that our access is not jeopardized.	With Port Royal's valuable collection of 18th century structures and other historic resources, it's important that those irreplaceable resources be preserved and their integrity not compromised.	At this stage, I'm not prepared to offer specific ideas for improvement other than enforcement of a low speed limit.	I'm not prepared at this time to offer informed suggestion for pedestrian improvement, etc.	Each of the 18th & 19th century buildings warrant preservation. Additionally, the original 18th century street grid system with broad rights-of-way, along with the town green space should be preserved. Utilities serving the town should be placed underground.	Not sure. But as you're doing, I would listen to the advice of the town's public spirited property owners.					

APPENDIX G
Transportation Options:
Cost Estimates

Route 301 Arterial Preservation Study

Route 301: Intersection Modification

Project No. 23369



Engineer's Conceptual Estimate

Prepared by: Ed Myers, P.E., Kylie Caviness, & Meredith Sanders			Date: September 2019		
This Estimate has a Rating of: 2B (See rating scale guide below.)					
ITEM	UNIT	TOTAL QUANTITY	UNIT PRICE	TOTAL COST	
100	Mobilization	LS	ALL	\$105,000.00	\$105,000.00
	Traffic Control	LS	ALL	\$159,000.00	\$159,000.00
	Erosion Control	LS	ALL	\$7,000.00	\$7,000.00
	Removal of Structures and Obstructions	LS	ALL	\$15,000.00	\$15,000.00
	Clearing and Grubbing	LS	ALL	\$10,000.00	\$10,000.00
10628	FLEXIBLE PAVE.PLANING 0"-2"	SY	7,178	\$11.00	\$78,958.00
120	REGULAR EXCAVATION	CY	1,100	\$40.00	\$44,000.00
10100	AGGR. MATL. NO. 21B	TON	1,660	\$40.00	\$66,400.00
10635	ASPHALT CONC.TY. SM-9.5A	TON	800	\$257.00	\$205,600.00
12600	STD COMB CURB & GUTTER CG-6	LF	1,500	\$25.00	\$37,500.00
10417	TACK COAT	GAL	5,168	\$2.00	\$10,336.00
10635	ASPHALT CONC.TY. SM-9.5A	TON	420	\$257.00	\$107,940.00
10642	ASPHALT CONC. BASE COURSE TY. BM-25.0A	TON	630	\$140.00	\$88,200.00
13220	HYDR. CEMENT CONC. SIDEWALK 4"	SY	370	\$42.00	\$15,540.00
13108	CG-12 DETECTABLE WARNING SURFACE	SY	20	\$226.00	\$4,520.00
	New Signal Heads	LS	2	\$284.00	\$568.00
	Storm Water System, Complete	LS	ALL	\$208,000.00	\$208,000.00
	Pavement Markings, Complete	LS	ALL	\$ 10,050.00	\$10,050.00
	Signage, Complete	LS	ALL	\$6,000.00	\$6,000.00
	Utility Relocations	LS	ALL	\$ 140,000.00	\$140,000.00
TOTAL CONSTRUCTION COST				\$	1,319,612
ENGINEERING SUPPORT					
	Engineering (PS&E)	LS	10%	\$ 1,319,612.00	\$132,000.00
	Construction Management & Inspection	LS	20%	\$ 1,319,612.00	\$264,000.00
ENGINEERING SUPPORT SUBTOTAL				\$	396,000
Potential New Right-of-way Needed					
	Potential New Right-of-way Needed	SF	19,100	\$10.00	\$191,000.00
ENGINEERING PERMITS SUBTOTAL				\$	191,000
TOTAL ENGINEERING AND CONSTRUCTION SUBTOTAL				\$	1,906,612
				30% Contingency	\$ 571,990
				(2% per yr 2018-2035) Inflation	\$ 793,153
TOTAL ESTIMATED ENGINEERING AND CONSTRUCTION COST				\$	3,271,755
				85% Estimate	\$ 2,781,000
				120% Estimate	\$ 3,926,100

PROPERTY IMPACTS		
Potential New Right-of-way Needed	SF	19,100 approximate

Scope Accuracy:

Level 1: Project scope well understood and well defined.

Level 2: Project scope conceptual. Scope lacks detail due to potential permit requirements; Unknown project conditions; limited knowledge of external impacts.

Level 3: Project scope is a "vision" with limited detail.

Engineering Effort:

Level A: Preliminary engineering performed. Technical information is available, engineering calculations have been performed; clear understanding of the materials size and quantities needed to execute job. Schedule understood; staff and permitting is fairly clear, (however this element may still need refining). Project Development & Construction Contingencies ranges between 10%-20%.

Level B: Conceptual engineering performed. Technical information is available, rough engineering calculations may have been performed, or similar information from previous similar work is compared and used. Project Development Contingencies ranges between 15% to 25% and Construction Contingencies ranges between 20% to 30%.

Level C: No engineering performed. Educated guesstimating. Limited technical information available and/or analysis performed. Project Development and Construction Contingencies should be selected appropriately by Project Manager. Contingency may range up to 50%.

Route 301 Arterial Preservation Study

Route 301 and Route 17 Quadrant Roadway

Project No. 23369



Engineer's Conceptual Estimate

Prepared by: Ed Myers, P.E., Kylie Caviness, & Meredyth Sanders			Date: September 2019		
This Estimate has a Rating of:			2B (See rating scale guide below.)		
ITEM	UNIT	TOTAL QUANTITY	UNIT PRICE	TOTAL COST	
100	Mobilization	LS	ALL	\$245,000.00	\$245,000.00
	Traffic Control	LS	ALL	\$124,000.00	\$124,000.00
	Erosion Control	LS	ALL	\$18,000.00	\$18,000.00
	Removal of Structures and Obstructions	LS	ALL	\$34,000.00	\$34,000.00
	Clearing and Grubbing	LS	ALL	\$23,000.00	\$23,000.00
10628	FLEXIBLE PAVE.PLANING 0'-2"	SY	12,489	\$11.00	\$137,379.00
120	REGULAR EXCAVATION	CY	2,900	\$40.00	\$116,000.00
10100	AGGR. MATL. NO. 21B	TON	3,685	\$40.00	\$147,400.00
10635	ASPHALT CONC.TY. SM-9.5A	TON	1,390	\$257.00	\$357,230.00
	HYDR. CEMENT CONC. 7"	SY	910	\$75.00	\$68,250.00
12600	STD COMB CURB & GUTTER CG-6	LF	2,500	\$25.00	\$62,500.00
10417	TACK COAT	GAL	8,992	\$2.00	\$17,984.00
10635	ASPHALT CONC.TY. SM-9.5A	TON	1,290	\$257.00	\$331,530.00
10642	ASPHALT CONC. BASE COURSE TY. BM-25.0A	TON	1,935	\$140.00	\$270,900.00
13220	HYDR. CEMENT CONC. SIDEWALK 4"	SY	560	\$42.00	\$23,520.00
13108	CG-12 DETECTABLE WARNING SURFACE	SY	25	\$226.00	\$5,650.00
	Storm Water System, Complete	LS	ALL	\$355,000.00	\$355,000.00
	Pavement Markings, Complete	LS	ALL	\$16,620.00	\$16,620.00
	Signage, Complete	LS	ALL	\$18,000.00	\$18,000.00
	Total Traffic Signal System	LS	ALL	\$141,462.10	\$141,462.10
	Utility Relocations	LS	ALL	\$175,000.00	\$175,000.00
				TOTAL CONSTRUCTION COST	\$ 2,829,887
ENGINEERING SUPPORT					
	Engineering (PS&E)	LS	10%	\$ 2,829,887.20	\$283,000.00
	Construction Management & Inspection	LS	20%	\$ 2,829,887.20	\$566,000.00
ENGINEERING SUPPORT SUBTOTAL					\$ 849,000
Potential New Right-of-way Needed					
	Potential New Right-of-way Needed	SF	43,000	\$10.00	\$430,000.00
ENGINEERING PERMITS SUBTOTAL					\$ 430,000
TOTAL ENGINEERING AND CONSTRUCTION SUBTOTAL					\$ 4,108,887
				30% Contingency	\$ 1,232,670
				(2% per yr 2018-2035) Inflation	\$ 1,709,298
TOTAL ESTIMATED ENGINEERING AND CONSTRUCTION COST					\$ 7,050,900
				85% Estimate	\$ 5,993,300
				120% Estimate	\$ 8,461,100

Number of Commercial Properties	EA	3	approximate
Number of Residential Properties	EA	1	approximate
	SF	43,000	approximate

Scope Accuracy:

- Level 1:** Project scope well understood and well defined.
- Level 2:** Project scope conceptual. Scope lacks detail due to potential permit requirements; unknown project conditions; limited knowledge of external impacts.
- Level 3:** Project scope is a "vision" with limited detail.

Engineering Effort:

- Level A:** Preliminary engineering performed. Technical information is available, engineering calculations have been performed; clear understanding of the materials size and quantities needed to execute job. Schedule understood; staff and permitting is fairly clear, (however this element may still need refining).
- Level B:** Conceptual engineering performed. Technical information is available, rough engineering calculations may have been performed, or similar information
- Level C:** No engineering performed. Educated guesstimating. Limited technical information available and/or analysis performed. Project Development and

Route 301 Arterial Preservation Study

New Market Street

Project No. 23369



Engineer's Conceptual Estimate

Prepared by: Ed Myers, P.E., Kylie Caviness, & Meredith Sanders			Date: September 2019		
<i>This Estimate has a Rating of:</i>					
2B (See rating scale guide below.)					
ITEM	UNIT	TOTAL QUANTITY	UNIT PRICE	TOTAL COST	
100	Mobilization	LS	ALL	\$171,000.00	\$171,000.00
	Traffic Control	LS	ALL	\$87,000.00	\$87,000.00
	Erosion Control	LS	ALL	\$27,000.00	\$27,000.00
	Removal of Structures and Obstructions	LS	ALL	\$25,000.00	\$25,000.00
	Clearing and Grubbing	LS	ALL	\$17,000.00	\$17,000.00
10628	FLEXIBLE PAVE.PLANING 0"-2"	SY	2,023	\$11.00	\$22,253.00
120	REGULAR EXCAVATION	CY	4,500	\$40.00	\$180,000.00
10100	AGGR. MATL. NO. 21B	TON	5,410	\$40.00	\$216,400.00
10635	ASPHALT CONC.TY. SM-9.5A	TON	225	\$257.00	\$57,825.00
12600	STD COMB CURB & GUTTER CG-6	LF	200	\$25.00	\$5,000.00
10417	TACK COAT	GAL	1,456	\$2.00	\$2,912.00
10635	ASPHALT CONC.TY. SM-9.5A	TON	2,130	\$257.00	\$547,410.00
10642	ASPHALT CONC. BASE COURSE TY. BM-25.0A	TON	3,190	\$140.00	\$446,600.00
13108	CG-12 DETECTABLE WARNING SURFACE	SY	5	\$226.00	\$1,130.00
	Storm Water System, Complete	LS	ALL	\$62,000.00	\$62,000.00
	Landscaping, Complete	LS	ALL	\$77,100.00	\$77,100.00
	Pavement Markings, Complete	LS	ALL	\$ 6,655.00	\$6,655.00
	Signage, Complete	LS	ALL	\$ 4,500.00	\$4,500.00
	Utility Relocations	LS	ALL	\$ 35,000.00	\$ 35,000.00
TOTAL CONSTRUCTION COST					\$ 1,991,785
ENGINEERING SUPPORT					
	Engineering (PS&E)	LS	10%	\$ 1,991,785.00	\$199,200.00
	Construction Management & Inspection	LS	20%	\$ 1,991,785.00	\$398,400.00
ENGINEERING SUPPORT SUBTOTAL					\$ 597,600
Potential New Right-of-way Needed					
	Potential New Right-of-way Needed	SF	87,000	\$10.00	\$870,000.00
ENGINEERING PERMITS SUBTOTAL					\$ 870,000
TOTAL ENGINEERING AND CONSTRUCTION SUBTOTAL					\$ 3,459,385
30% Contingency					\$ 1,037,820
(2% per yr 2018-2035) Inflation					\$ 1,439,106
TOTAL ESTIMATED ENGINEERING AND CONSTRUCTION COST					\$ 5,936,300
85% Estimate					\$ 5,045,900
120% Estimate					\$ 7,123,600

PROPERTY IMPACTS		
Potential New Right-of-way Needed	SF	87,000 approximate

Scope Accuracy:

Level 1: Project scope well understood and well defined.

Level 2: Project scope conceptual. Scope lacks detail due to potential permit requirements; Unknown project conditions; limited knowledge of external impacts.

Level 3: Project scope is a "vision" with limited detail.

Engineering Effort:

Level A: Preliminary engineering performed. Technical information is available, engineering calculations have been performed; clear understanding of the materials size and quantities needed to execute job. Schedule understood; staff and permitting is fairly clear, (however this element may still need refining). Project Development & Construction Contingencies ranges between 10%-20%.

Level B: Conceptual engineering performed. Technical information is available, rough engineering calculations may have been performed, or similar information from previous similar work is compared and used. Project Development Contingencies ranges between 15% to 25% and Construction Contingencies ranges between 20% to 30%.

Level C: No engineering performed. Educated guesstimating. Limited technical information available and/or analysis performed. Project Development and Construction Contingencies should be selected appropriately by Project Manager. Contingency may range up to 50%.

Route 301 Arterial Preservation Study

Route 301 and Route 17 Quadrant Roadway with New Market Street

Project No. 23369



Engineer's Conceptual Estimate

Prepared by: Ed Myers, P.E., Kylie Caviness, & Meredyth Sanders			Date: September 2019		
This Estimate has a Rating of:			2B (See rating scale guide below.)		
ITEM	UNIT	TOTAL QUANTITY	UNIT PRICE	TOTAL COST	
100	Mobilization	LS	ALL	\$338,000.00	\$338,000.00
	Traffic Control	LS	ALL	\$171,000.00	\$171,000.00
	Erosion Control	LS	ALL	\$32,000.00	\$32,000.00
	Removal of Structures and Obstructions	LS	ALL	\$48,000.00	\$48,000.00
	Clearing and Grubbing	LS	ALL	\$32,000.00	\$32,000.00
10628	FLEXIBLE PAVE PLANING 0'-2"	SY	12,489	\$11.00	\$137,379.00
120	REGULAR EXCAVATION	CY	5,300	\$40.00	\$212,000.00
10100	AGGR. MATL. NO. 21B	TON	7,150	\$40.00	\$286,000.00
10635	ASPHALT CONC. TY. SM-9.5A	TON	1,390	\$257.00	\$357,230.00
	HYDR. CEMENT CONC. 7"	SY	910	\$75.00	\$68,250.00
12600	STD COMB CURB & GUTTER CG-6	LF	2,500	\$25.00	\$62,500.00
10417	TACK COAT	GAL	8,992	\$2.00	\$17,984.00
10635	ASPHALT CONC. TY. SM-9.5A	TON	2,640	\$257.00	\$678,480.00
10642	ASPHALT CONC. BASE COURSE TY. BM-25.0A	TON	3,960	\$140.00	\$554,400.00
13220	HYDR. CEMENT CONC. SIDEWALK 4"	SY	400	\$42.00	\$16,800.00
13108	CG-12 DETECTABLE WARNING SURFACE	SY	25	\$226.00	\$5,650.00
	Storm Water System, Complete	LS	ALL	\$376,000.00	\$376,000.00
	Pavement Markings, Complete	LS	ALL	\$ 18,325.00	\$18,325.00
	Signage, Complete	LS	ALL	\$ 12,000.00	\$12,000.00
	Total Traffic Signal System	LS	ALL	\$ 141,462.10	\$ 282,924.20
	Utility Relocations	LS	ALL	\$ 210,000.00	\$ 210,000.00
TOTAL CONSTRUCTION COST				\$	3,916,922
ENGINEERING SUPPORT					
	Engineering (PS&E)	LS	10%	\$ 3,916,922.20	\$391,700.00
	Construction Management & Inspection	LS	20%	\$ 3,916,922.20	\$783,400.00
ENGINEERING SUPPORT SUBTOTAL				\$	1,175,100
Potential New Right-of-way Needed					
	Potential New Right-of-way Needed	SF	113,000	\$10.00	\$1,130,000.00
ENGINEERING PERMITS SUBTOTAL				\$	1,130,000
TOTAL ENGINEERING AND CONSTRUCTION SUBTOTAL				\$	6,222,022
				30% Contingency	\$ 1,866,610
				(2% per yr 2018-2035) Inflation	\$ 2,588,362
TOTAL ESTIMATED ENGINEERING AND CONSTRUCTION COST				\$	10,676,995
				85% Estimate	\$ 9,075,400
				120% Estimate	\$ 12,812,400

PROPERTY IMPACTS		
Potential New Right-of-way Needed	SF	113,000 approximate

Scope Accuracy:

Level 1: Project scope well understood and well defined.

Level 2: Project scope conceptual. Scope lacks detail due to potential permit requirements; Unknown project conditions; limited knowledge of external impacts.

Level 3: Project scope is a "vision" with limited detail.

Engineering Effort:

Level A: Preliminary engineering performed. Technical information is available, engineering calculations have been performed; clear understanding of the materials size and quantities needed to execute job. Schedule understood; staff and permitting is fairly clear, (however this element may still need refining). Project Development & Construction Contingencies ranges between 10%-20%.

Level B: Conceptual engineering performed. Technical information is available, rough engineering calculations may have been performed, or similar information from previous similar work is compared and used. Project Development Contingencies ranges between 15% to 25% and Construction Contingencies ranges between 20% to 30%.

Level C: No engineering performed. Educated guesstimating. Limited technical information available and/or analysis performed. Project Development and Construction Contingencies should be selected appropriately by Project Manager. Contingency may range up to 50%.

Route 301 Arterial Preservation Study

Route 301: TWLTL Concept

Project No. 23369



Engineer's Conceptual Estimate

Prepared by: Ed Myers, P.E., Kylie Caviness, & Meredyth Sanders			Date: September 2019		
This Estimate has a Rating of:			2B (See rating scale guide below.)		
ITEM	UNIT	TOTAL QUANTITY	UNIT PRICE	TOTAL COST	
100	Mobilization	LS	ALL	\$352,000.00	\$352,000.00
	Traffic Control	LS	ALL	\$531,000.00	\$531,000.00
	Erosion Control	LS	ALL	\$23,000.00	\$23,000.00
	Removal of Structures and Obstructions	LS	ALL	\$49,000.00	\$49,000.00
	Clearing and Grubbing	LS	ALL	\$33,000.00	\$33,000.00
10628	FLEXIBLE PAVE.PLANING 0'-2"	SY	15,134	\$11.00	\$166,474.00
120	REGULAR EXCAVATION	CY	3,700	\$40.00	\$148,000.00
10100	AGGR. MATL. NO. 21B	TON	5,535	\$40.00	\$221,400.00
10635	ASPHALT CONC.TY. SM-9.5A	TON	1,685	\$257.00	\$433,045.00
	HYDR. CEMENT CONC. 7"	SY	240	\$75.00	\$18,000.00
12600	STD COMB CURB & GUTTER CG-6	LF	5,850	\$25.00	\$146,250.00
10417	TACK COAT	GAL	10,896	\$2.00	\$21,792.00
10635	ASPHALT CONC.TY. SM-9.5A	TON	1,400	\$257.00	\$359,800.00
10642	ASPHALT CONC. BASE COURSE TY. BM-25.0A	TON	2,095	\$140.00	\$293,300.00
13220	HYDR. CEMENT CONC. SIDEWALK 4"	SY	180	\$42.00	\$7,560.00
13108	CG-12 DETECTABLE WARNING SURFACE	SY	85	\$226.00	\$19,210.00
	Storm Water System, Complete	LS	ALL	\$1,158,000.00	\$1,158,000.00
	Landscaping, Complete	LS	ALL	\$149,600.00	\$149,600.00
	Pavement Markings, Complete	LS	ALL	\$ 22,865.00	\$22,865.00
	Signage, Complete	LS	ALL	\$ 4,500.00	\$4,500.00
	Rectangular Rapid Flashing Beacon	LS	4	\$4,500.00	\$18,000.00
	Utility Relocations	LS	ALL	\$ 245,000.00	\$245,000.00
TOTAL CONSTRUCTION COST				\$	4,420,796
ENGINEERING SUPPORT					
	Engineering (PS&E)	LS	10%	\$ 4,420,796.00	\$442,100.00
	Construction Management & Inspection	LS	20%	\$ 4,420,796.00	\$884,200.00
ENGINEERING SUPPORT SUBTOTAL				\$	1,326,300
Potential New Right-of-way Needed					
	Potential New Right-of-way Needed	SF	25,000	\$10.00	\$250,000.00
ENGINEERING PERMITS SUBTOTAL				\$	250,000
TOTAL ENGINEERING AND CONSTRUCTION SUBTOTAL				\$	5,997,096
				30% Contingency	\$ 1,799,130
				(2% per yr 2018-2035) Inflation	\$ 2,494,792
TOTAL ESTIMATED ENGINEERING AND CONSTRUCTION COST				\$	10,291,018
				85% Estimate	\$ 8,747,400
				120% Estimate	\$ 12,349,200

PROPERTY IMPACTS			
Potential New Right-of-way Needed	SF	25,000	approximate

Scope Accuracy:

Level 1: Project scope well understood and well defined.

Level 2: Project scope conceptual. Scope lacks detail due to potential permit requirements; Unknown project conditions; limited knowledge of external impacts.

Level 3: Project scope is a "vision" with limited detail.

Engineering Effort:

Level A: Preliminary engineering performed. Technical information is available, engineering calculations have been performed; clear understanding of the materials size and quantities needed to execute job. Schedule understood; staff and permitting is fairly clear, (however this element may still need refining). Project Development & Construction Contingencies ranges between 10%-20%.

Level B: Conceptual engineering performed. Technical information is available, rough engineering calculations may have been performed, or similar information from previous similar work is compared and used. Project Development Contingencies ranges between 15% to 25% and Construction Contingencies ranges between 20% to 30%.

Level C: No engineering performed. Educated guesstimating. Limited technical information available and/or analysis performed. Project Development and Construction Contingencies should be selected appropriately by Project Manager. Contingency may range up to 50%.

Route 301 Arterial Preservation Study

Route 301: Raised Median Concept

Project No. 23369



Engineer's Conceptual Estimate

Prepared by: Ed Myers, P.E., Kylie Caviness, & Meredyth Sanders			Date: September 2019		
This Estimate has a Rating of:			2B (See rating scale guide below.)		
ITEM	UNIT	TOTAL QUANTITY	UNIT PRICE	TOTAL COST	
100	Mobilization	LS	ALL	\$445,000.00	\$445,000.00
	Traffic Control	LS	ALL	\$674,000.00	\$674,000.00
	Erosion Control	LS	ALL	\$45,000.00	\$45,000.00
	Removal of Structures and Obstructions	LS	ALL	\$63,000.00	\$63,000.00
	Clearing and Grubbing	LS	ALL	\$42,000.00	\$42,000.00
10628	FLEXIBLE PAVE. PLANING 0"-2"	SY	15,134	\$11.00	\$166,474.00
120	REGULAR EXCAVATION	CY	7,500	\$40.00	\$300,000.00
10100	AGGR. MATL. NO. 21B	TON	10,505	\$40.00	\$420,200.00
10635	ASPHALT CONC.TY. SM-9.5A	TON	1,685	\$257.00	\$433,045.00
	HYDR. CEMENT CONC. 7"	SY	690	\$75.00	\$51,750.00
12600	STD COMB CURB & GUTTER CG-6	LF	25,200	\$25.00	\$630,000.00
10417	TACK COAT	GAL	10,896	\$2.00	\$21,792.00
10635	ASPHALT CONC.TY. SM-9.5A	TON	1,400	\$257.00	\$359,800.00
10642	ASPHALT CONC. BASE COURSE TY. BM-25.0A	TON	2,095	\$140.00	\$293,300.00
13220	HYDR. CEMENT CONC. SIDEWALK 4"	SY	180	\$42.00	\$7,560.00
13108	CG-12 DETECTABLE WARNING SURFACE	SY	85	\$226.00	\$19,210.00
	Storm Water System, Complete	LS	ALL	\$1,158,000.00	\$1,158,000.00
	Landscaping, Complete	LS	ALL	\$193,100.00	\$193,100.00
	Pavement Markings, Complete	LS	ALL	\$ 20,465.00	\$20,465.00
	Signage, Complete	LS	ALL	\$ 4,500.00	\$4,500.00
	Rectangular Rapid Flashing Beacon	LS	4	\$4,500.00	\$18,000.00
	Utility Relocations	LS	ALL	\$ 245,000.00	\$245,000.00
TOTAL CONSTRUCTION COST				\$	5,611,196
ENGINEERING SUPPORT					
	Engineering (PS&E)	LS	10%	\$ 5,611,196.00	\$561,200.00
	Construction Management & Inspection	LS	20%	\$ 5,611,196.00	\$1,122,300.00
ENGINEERING SUPPORT SUBTOTAL				\$	1,683,500
Potential New Right-of-way Needed					
	Potential New Right-of-way Needed	SF	25,000	\$10.00	\$250,000.00
ENGINEERING PERMITS SUBTOTAL				\$	250,000
TOTAL ENGINEERING AND CONSTRUCTION SUBTOTAL				\$	7,544,696
				30% Contingency	\$ 2,263,410
				(2% per yr 2018-2035) Inflation	\$ 3,138,594
TOTAL ESTIMATED ENGINEERING AND CONSTRUCTION COST				\$	12,946,700
				85% Estimate	\$ 11,004,700
				120% Estimate	\$ 15,536,000

PROPERTY IMPACTS			
Potential New Right-of-way Needed	SF	25,000	approximate

Scope Accuracy:

Level 1: Project scope well understood and well defined.

Level 2: Project scope conceptual. Scope lacks detail due to potential permit requirements; Unknown project conditions; limited knowledge of external impacts.

Level 3: Project scope is a "vision" with limited detail.

Engineering Effort:

Level A: Preliminary engineering performed. Technical information is available, engineering calculations have been performed; clear understanding of the materials size and quantities needed to execute job. Schedule understood; staff and permitting is fairly clear, (however this element may still need refining). Project Development & Construction Contingencies ranges between 10%-20%.

Level B: Conceptual engineering performed. Technical information is available, rough engineering calculations may have been performed, or similar information from previous similar work is compared and used. Project Development Contingencies ranges between 15% to 25% and Construction Contingencies ranges between 20% to 30%.

Level C: No engineering performed. Educated guesstimating. Limited technical information available and/or analysis performed. Project Development and Construction Contingencies should be selected appropriately by Project Manager. Contingency may range up to 50%.

Route 301 Arterial Preservation Study

Route 301: Couplet

Project No. 23369



Engineer's Conceptual Estimate

Prepared by: Ed Myers, P.E., Kylie Caviness, & Meredyth Sanders			Date: September 2019		
<i>This Estimate has a Rating of:</i>					
2B (See rating scale guide below.)					
ITEM	UNIT	TOTAL QUANTITY	UNIT PRICE	TOTAL COST	
100	Mobilization	LS	ALL	\$680,000.00	\$680,000.00
	Traffic Control	LS	ALL	\$344,000.00	\$344,000.00
	Erosion Control	LS	ALL	\$71,000.00	\$71,000.00
	Removal of Structures and Obstructions	LS	ALL	\$97,000.00	\$97,000.00
	Clearing and Grubbing	LS	ALL	\$65,000.00	\$65,000.00
10628	FLEXIBLE PAVE.PLANING 0"-2"	SY	18,012	\$11.00	\$198,132.00
120	REGULAR EXCAVATION	CY	11,700	\$40.00	\$468,000.00
10100	AGGR. MATL. NO. 21B	TON	16,045	\$40.00	\$641,800.00
10635	ASPHALT CONC.TY. SM-9.5A	TON	2,005	\$257.00	\$515,285.00
12600	STD COMB CURB & GUTTER CG-6	LF	10,200	\$25.00	\$255,000.00
10417	TACK COAT	GAL	12,968	\$2.00	\$25,936.00
10635	ASPHALT CONC.TY. SM-9.5A	TON	5,330	\$257.00	\$1,369,810.00
10642	ASPHALT CONC. BASE COURSE TY. BM-25.0A	TON	7,995	\$140.00	\$1,119,300.00
13108	CG-12 DETECTABLE WARNING SURFACE	SY	65	\$226.00	\$14,690.00
	Storm Water System, Complete	LS	ALL	\$1,432,000.00	\$1,432,000.00
	Landscaping, Complete	LS	ALL	\$302,000.00	\$302,000.00
	Pavement Markings, Complete	LS	ALL	\$ 38,180.00	\$38,180.00
	Signage, Complete	LS	ALL	\$ 7,500.00	\$7,500.00
	Utility Relocations	LS	ALL	\$ 245,000.00	\$245,000.00
TOTAL CONSTRUCTION COST					\$ 7,889,633
ENGINEERING SUPPORT					
	Engineering (PS&E)	LS	10%	\$ 7,889,633.00	\$789,000.00
	Construction Management & Inspection	LS	20%	\$ 7,889,633.00	\$1,578,000.00
ENGINEERING SUPPORT SUBTOTAL					\$ 2,367,000
Potential New Right-of-way Needed					
	Potential New Right-of-way Needed	SF	300,000	\$10.00	\$3,000,000.00
ENGINEERING PERMITS SUBTOTAL					\$ 3,000,000
TOTAL ENGINEERING AND CONSTRUCTION SUBTOTAL					\$ 13,256,633
30% Contingency					\$ 3,976,990
(2% per yr 2018-2035) Inflation					\$ 5,514,759
TOTAL ESTIMATED ENGINEERING AND CONSTRUCTION COST					\$ 22,748,382
85% Estimate					\$ 19,336,100
120% Estimate					\$ 27,298,100

PROPERTY IMPACTS			
	Potential New Right-of-way Needed	SF	300,000 approximate

Scope Accuracy:

Level 1: Project scope well understood and well defined.

Level 2: Project scope conceptual. Scope lacks detail due to potential permit requirements; Unknown project conditions; limited knowledge of external impacts.

Level 3: Project scope is a "vision" with limited detail.

Engineering Effort:

Level A: Preliminary engineering performed. Technical information is available, engineering calculations have been performed; clear understanding of the materials size and quantities needed to execute job. Schedule understood; staff and permitting is fairly clear, (however this element may still need refining). Project Development & Construction Contingencies ranges between 10%-20%.

Level B: Conceptual engineering performed. Technical information is available, rough engineering calculations may have been performed, or similar information from previous similar work is compared and used. Project Development Contingencies ranges between 15% to 25% and Construction Contingencies ranges between 20% to 30%.

Level C: No engineering performed. Educated guesstimating. Limited technical information available and/or analysis performed. Project Development and Construction Contingencies should be selected appropriately by Project Manager. Contingency may range up to 50%.

APPENDIX H
Transportation Options:
Operational Analysis

APPENDIX H1

Transportation Options: Operational Analysis – Intersection Modification

Weekday AM Peak

Queues

1: US 301 & US 17 (Tidewater Trail)

09/12/2019



Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	201	105	50	129	150	12	488	101	515
v/c Ratio	0.44	0.25	0.15	0.49	0.25	0.10	0.59	0.28	0.36
Control Delay	20.6	22.4	18.1	40.1	5.3	41.6	28.7	37.8	16.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	20.6	22.4	18.1	40.1	5.3	41.6	28.7	37.8	16.2
Queue Length 50th (ft)	63	34	14	57	0	5	102	23	72
Queue Length 95th (ft)	132	83	41	132	42	25	187	56	169
Internal Link Dist (ft)		118		2711			1025		2313
Turn Bay Length (ft)					250	200		450	
Base Capacity (vph)	574	783	343	575	682	135	1617	572	2050
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.35	0.13	0.15	0.22	0.22	0.09	0.30	0.18	0.25

Intersection Summary

HCM Signalized Intersection Capacity Analysis

1: US 301 & US 17 (Tidewater Trail)

09/12/2019



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	181	69	25	45	116	135	11	412	27	91	361	103
Future Volume (vph)	181	69	25	45	116	135	11	412	27	91	361	103
Ideal Flow (vphp)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	5.8		4.5	5.8	6.1	4.5	6.5		6.1	6.5	
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00	1.00	0.95		0.97	0.95	
Frt	1.00	0.96		1.00	1.00	0.85	1.00	0.99		1.00	0.97	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1736	1580		1719	1881	1482	1583	3100		3127	3185	
Flt Permitted	0.48	1.00		0.69	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)	872	1580		1247	1881	1482	1583	3100		3127	3185	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	201	77	28	50	129	150	12	458	30	101	401	114
RTOR Reduction (vph)	0	12	0	0	0	113	0	4	0	0	21	0
Lane Group Flow (vph)	201	93	0	50	129	37	12	484	0	101	494	0
Heavy Vehicles (%)	4%	16%	14%	5%	1%	9%	14%	16%	6%	12%	12%	1%
Turn Type	pm+pt	NA		pm+pt	NA	pm+ov	Prot	NA		Prot	NA	
Protected Phases	7	4		3	8	1	5	2		1	6	
Permitted Phases	4			8		8						
Actuated Green, G (s)	29.4	21.3		14.5	10.9	19.8	1.0	24.6		8.9	34.1	
Effective Green, g (s)	29.4	21.3		14.5	10.9	19.8	1.0	24.6		8.9	34.1	
Actuated g/C Ratio	0.36	0.26		0.18	0.13	0.24	0.01	0.30		0.11	0.42	
Clearance Time (s)	4.5	5.8		4.5	5.8	6.1	4.5	6.5		6.1	6.5	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	5.5		3.0	5.5	
Lane Grp Cap (vph)	464	413		243	252	360	19	938		342	1335	
v/s Ratio Prot	c0.07	0.06		0.01	0.07	0.01	0.01	c0.16		c0.03	c0.15	
v/s Ratio Perm	c0.08			0.03		0.01						
v/c Ratio	0.43	0.23		0.21	0.51	0.10	0.63	0.52		0.30	0.37	
Uniform Delay, d1	18.9	23.5		28.3	32.7	23.9	40.0	23.4		33.3	16.2	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.7	0.3		0.4	1.8	0.1	52.7	1.1		0.5	0.4	
Delay (s)	19.5	23.8		28.7	34.5	24.0	92.7	24.5		33.8	16.6	
Level of Service	B	C		C	C	C	F	C		C	B	
Approach Delay (s)		21.0			28.8			26.2			19.5	
Approach LOS		C			C			C			B	

Intersection Summary

HCM 2000 Control Delay	23.4	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.49		
Actuated Cycle Length (s)	81.3	Sum of lost time (s)	22.9
Intersection Capacity Utilization	50.9%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Queuing and Blocking Report
 2035 AM Condition - Signal Modification with SB Double Lefts

02/20/2019

Intersection: 1: US 301 & US 17 (Tidewater Trail)

Movement	EB	EB	B14	WB	WB	WB	NB	NB	NB	SB	SB	SB
Directions Served	L	TR	T	L	T	R	L	T	TR	L	L	T
Maximum Queue (ft)	198	177	88	53	133	115	46	223	210	94	93	164
Average Queue (ft)	106	63	9	21	69	41	5	117	60	23	51	74
95th Queue (ft)	180	129	44	47	121	73	25	179	134	61	86	136
Link Distance (ft)	117	117	2207	2737	2737			1052	1052			2314
Upstream Blk Time (%)	8	3										
Queuing Penalty (veh)	0	0										
Storage Bay Dist (ft)						250	200			450	450	
Storage Blk Time (%)								0				
Queuing Penalty (veh)								0				

Intersection: 1: US 301 & US 17 (Tidewater Trail)

Movement	SB
Directions Served	TR
Maximum Queue (ft)	203
Average Queue (ft)	89
95th Queue (ft)	169
Link Distance (ft)	2314
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 2: US 301 & Back St

Movement	WB	SB
Directions Served	LR	LT
Maximum Queue (ft)	31	29
Average Queue (ft)	5	1
95th Queue (ft)	24	10
Link Distance (ft)	1114	1146
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 3: US 301 & Caroline St

Movement

Directions Served
Maximum Queue (ft)
Average Queue (ft)
95th Queue (ft)
Link Distance (ft)
Upstream Blk Time (%)
Queuing Penalty (veh)
Storage Bay Dist (ft)
Storage Blk Time (%)
Queuing Penalty (veh)

Intersection: 4: US 301 & Walsingham Rd

Movement	WB
Directions Served	LTR
Maximum Queue (ft)	31
Average Queue (ft)	1
95th Queue (ft)	10
Link Distance (ft)	1936
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Network Summary

Network wide Queuing Penalty: 0

Weekday PM Peak

Queues

1: US 301 & US 17 (Tidewater Trail)

09/12/2019



Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	109	161	23	111	104	14	553	333	972
v/c Ratio	0.30	0.38	0.07	0.46	0.31	0.10	0.57	0.57	0.56
Control Delay	24.5	31.4	22.7	41.5	4.3	42.8	26.0	35.8	13.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	24.5	31.4	22.7	41.5	4.3	42.8	26.0	35.8	13.8
Queue Length 50th (ft)	38	57	8	51	0	7	120	78	141
Queue Length 95th (ft)	96	157	29	121	16	29	202	147	286
Internal Link Dist (ft)		118		2711			1025		2313
Turn Bay Length (ft)					250	200		450	
Base Capacity (vph)	377	617	316	495	532	159	1844	1046	2505
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.29	0.26	0.07	0.22	0.20	0.09	0.30	0.32	0.39

Intersection Summary

HCM Signalized Intersection Capacity Analysis

1: US 301 & US 17 (Tidewater Trail)

09/12/2019



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	107	141	17	23	109	102	14	507	35	326	641	312
Future Volume (vph)	107	141	17	23	109	102	14	507	35	326	641	312
Ideal Flow (vphp)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	5.8		4.5	5.8	5.8	4.5	6.5		4.5	6.5	
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00	1.00	0.95		0.97	0.95	
Frt	1.00	0.98		1.00	1.00	0.85	1.00	0.99		1.00	0.95	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1736	1793		1719	1638	1404	1805	3112		3273	3187	
Flt Permitted	0.51	1.00		0.66	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)	936	1793		1185	1638	1404	1805	3112		3273	3187	
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	109	144	17	23	111	104	14	517	36	333	654	318
RTOR Reduction (vph)	0	3	0	0	0	88	0	5	0	0	50	0
Lane Group Flow (vph)	109	158	0	23	111	16	14	548	0	333	922	0
Heavy Vehicles (%)	4%	4%	7%	5%	16%	15%	0%	15%	13%	7%	11%	1%
Turn Type	pm+pt	NA		pm+pt	NA	Perm	Prot	NA		Prot	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4			8		8						
Actuated Green, G (s)	24.7	18.1		15.4	13.3	13.3	1.0	28.5		14.0	41.5	
Effective Green, g (s)	24.7	18.1		15.4	13.3	13.3	1.0	28.5		14.0	41.5	
Actuated g/C Ratio	0.29	0.22		0.18	0.16	0.16	0.01	0.34		0.17	0.49	
Clearance Time (s)	4.5	5.8		4.5	5.8	5.8	4.5	6.5		4.5	6.5	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	5.5		3.0	5.5	
Lane Grp Cap (vph)	340	386		230	259	222	21	1055		545	1574	
v/s Ratio Prot	c0.03	c0.09		0.00	0.07		0.01	0.18		c0.10	c0.29	
v/s Ratio Perm	0.07			0.02		0.01						
v/c Ratio	0.32	0.41		0.10	0.43	0.07	0.67	0.52		0.61	0.59	
Uniform Delay, d1	22.5	28.3		28.4	31.9	30.1	41.3	22.3		32.5	15.1	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.5	0.7		0.2	1.1	0.1	58.7	1.0		2.0	1.0	
Delay (s)	23.0	29.1		28.6	33.1	30.2	100.0	23.3		34.5	16.1	
Level of Service	C	C		C	C	C	F	C		C	B	
Approach Delay (s)		26.6			31.4			25.2			20.8	
Approach LOS		C			C			C			C	

Intersection Summary

HCM 2000 Control Delay	23.6	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.57		
Actuated Cycle Length (s)	84.0	Sum of lost time (s)	21.3
Intersection Capacity Utilization	62.2%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Queuing and Blocking Report
 2035 PM Condition - Signal Modification with SB Double Lefts

02/20/2019

Intersection: 1: US 301 & US 17 (Tidewater Trail)

Movement	EB	EB	B14	WB	WB	WB	NB	NB	NB	SB	SB	SB
Directions Served	L	TR	T	L	T	R	L	T	TR	L	L	T
Maximum Queue (ft)	93	190	84	70	152	114	46	214	200	172	188	263
Average Queue (ft)	59	92	5	19	82	35	10	142	120	98	110	131
95th Queue (ft)	98	166	33	51	138	70	30	214	199	155	166	225
Link Distance (ft)	117	117	2207	2737	2737			1052	1052			2314
Upstream Blk Time (%)		6										
Queuing Penalty (veh)		0										
Storage Bay Dist (ft)						250	200			450	450	
Storage Blk Time (%)								2				
Queuing Penalty (veh)								0				

Intersection: 1: US 301 & US 17 (Tidewater Trail)

Movement	SB
Directions Served	TR
Maximum Queue (ft)	289
Average Queue (ft)	167
95th Queue (ft)	277
Link Distance (ft)	2314
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 2: US 301 & Back St

Movement	WB	SB
Directions Served	LR	LT
Maximum Queue (ft)	31	28
Average Queue (ft)	5	1
95th Queue (ft)	23	9
Link Distance (ft)	1114	1146
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Queuing and Blocking Report
2035 PM Condition - Signal Modification with SB Double Lefts

02/20/2019

Intersection: 3: US 301 & Caroline St

Movement	WB
Directions Served	LR
Maximum Queue (ft)	31
Average Queue (ft)	2
95th Queue (ft)	15
Link Distance (ft)	1181
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 4: US 301 & Walsingham Rd

Movement	WB	NB	SB
Directions Served	LTR	LT	UL
Maximum Queue (ft)	30	50	24
Average Queue (ft)	1	3	1
95th Queue (ft)	10	21	8
Link Distance (ft)	1936	1070	
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)			315
Storage Blk Time (%)			
Queuing Penalty (veh)			

Network Summary

Network wide Queuing Penalty: 0

Sunday Worst-Case Scenario

Queues

1: US 301 & US 17 (Tidewater Trail)

02/20/2019



Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	81	207	24	162	372	28	1823	511	1290
v/c Ratio	0.39	0.72	0.13	0.64	0.63	0.33	1.04	0.97	0.58
Control Delay	42.6	62.0	36.6	60.0	31.4	65.7	60.9	82.6	14.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	42.6	62.0	36.6	60.0	31.4	65.7	60.9	82.6	14.9
Queue Length 50th (ft)	50	153	14	118	192	22	-830	-209	330
Queue Length 95th (ft)	93	#258	37	191	300	53	#972	#325	403
Internal Link Dist (ft)		118		2711			1025		2313
Turn Bay Length (ft)					250	200		450	
Base Capacity (vph)	210	311	186	294	588	86	1761	526	2227
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.39	0.67	0.13	0.55	0.63	0.33	1.04	0.97	0.58

Intersection Summary

- ~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
- # 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

HCM Signalized Intersection Capacity Analysis

1: US 301 & US 17 (Tidewater Trail)

02/20/2019



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	77	184	12	23	154	353	27	1706	26	485	1137	88
Future Volume (vph)	77	184	12	23	154	353	27	1706	26	485	1137	88
Ideal Flow (vphp)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	5.8		4.5	5.8	4.5	4.5	6.5		4.5	6.5	
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00	1.00	0.95		0.97	0.95	
Frt	1.00	0.99		1.00	1.00	0.85	1.00	1.00		1.00	0.99	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1805	1865		1805	1863	1599	1805	3526		3467	3474	
Flt Permitted	0.45	1.00		0.39	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)	859	1865		739	1863	1599	1805	3526		3467	3474	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	81	194	13	24	162	372	28	1796	27	511	1197	93
RTOR Reduction (vph)	0	2	0	0	0	52	0	1	0	0	4	0
Lane Group Flow (vph)	81	205	0	24	162	320	28	1822	0	511	1286	0
Heavy Vehicles (%)	0%	1%	0%	0%	2%	1%	0%	2%	12%	1%	3%	0%
Turn Type	pm+pt	NA		pm+pt	NA	pm+ov	Prot	NA		Prot	NA	
Protected Phases	7	4		3	8	1	5	2		1	6	
Permitted Phases	4			8		8						
Actuated Green, G (s)	22.0	17.7		19.8	16.6	34.2	3.2	59.6		17.6	74.0	
Effective Green, g (s)	22.0	17.7		19.8	16.6	34.2	3.2	59.6		17.6	74.0	
Actuated g/C Ratio	0.18	0.15		0.17	0.14	0.29	0.03	0.50		0.15	0.62	
Clearance Time (s)	4.5	5.8		4.5	5.8	4.5	4.5	6.5		4.5	6.5	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	5.5		3.0	5.5	
Lane Grp Cap (vph)	192	276		151	259	458	48	1760		511	2153	
v/s Ratio Prot	c0.02	c0.11		0.00	0.09	0.10	0.02	c0.52		c0.15	0.37	
v/s Ratio Perm	0.06			0.02		0.10						
v/c Ratio	0.42	0.74		0.16	0.63	0.70	0.58	1.04		1.00	0.60	
Uniform Delay, d1	42.0	48.7		42.3	48.5	38.0	57.4	29.9		50.9	13.7	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	1.5	10.4		0.5	4.7	4.6	16.8	31.1		39.8	0.8	
Delay (s)	43.5	59.0		42.8	53.1	42.6	74.2	61.0		90.7	14.5	
Level of Service	D	E		D	D	D	E	E		F	B	
Approach Delay (s)		54.7			45.7			61.2			36.1	
Approach LOS		D			D			E			D	

Intersection Summary

HCM 2000 Control Delay	48.8	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.96		
Actuated Cycle Length (s)	119.4	Sum of lost time (s)	21.3
Intersection Capacity Utilization	94.1%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

Queuing and Blocking Report
 2035 Sunday Condition - Signal Modification, Double SBL

02/20/2019

Intersection: 1: US 301 & US 17 (Tidewater Trail)

Movement	EB	EB	B14	WB	WB	WB	NB	NB	NB	SB	SB	SB
Directions Served	L	TR	T	L	T	R	L	T	TR	L	L	T
Maximum Queue (ft)	186	191	123	73	272	250	199	1091	1104	336	345	332
Average Queue (ft)	58	126	13	18	110	146	53	995	980	200	215	195
95th Queue (ft)	126	199	61	49	176	234	154	1331	1354	300	314	299
Link Distance (ft)	117	117	2207	2737	2737			1052	1052			2314
Upstream Blk Time (%)	3	23						56	55			
Queuing Penalty (veh)	0	0						0	0			
Storage Bay Dist (ft)						250	200			450	450	
Storage Blk Time (%)					0	0	0	51				
Queuing Penalty (veh)					0	1	0	14				

Intersection: 1: US 301 & US 17 (Tidewater Trail)

Movement	SB
Directions Served	TR
Maximum Queue (ft)	314
Average Queue (ft)	208
95th Queue (ft)	303
Link Distance (ft)	2314
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 2: US 301 & Back St

Movement	WB	NB	SB
Directions Served	LR	TR	LT
Maximum Queue (ft)	72	30	43
Average Queue (ft)	23	1	1
95th Queue (ft)	57	10	14
Link Distance (ft)	1114	2314	1146
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 3: US 301 & Caroline St

Movement	WB	NB
Directions Served	LR	T
Maximum Queue (ft)	32	39
Average Queue (ft)	2	1
95th Queue (ft)	15	13
Link Distance (ft)	1181	1146
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 4: US 301 & Walsingham Rd

Movement	WB	NB	SB
Directions Served	LTR	LT	UL
Maximum Queue (ft)	30	28	23
Average Queue (ft)	3	1	1
95th Queue (ft)	15	9	8
Link Distance (ft)	1936	1070	
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)			315
Storage Blk Time (%)			
Queuing Penalty (veh)			

Network Summary

Network wide Queuing Penalty: 15

APPENDIX H2
Transportation Options:
Operational Analysis –
Quadrant Roadway

Weekday AM Peak

HCM Signalized Intersection Capacity Analysis

1: US 301 & Route 17

09/30/2019



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔↔			↔↔			↔↔			↔↔	
Traffic Volume (vph)	181	69	25	45	127	0	0	423	27	0	361	103
Future Volume (vph)	181	69	25	45	127	0	0	423	27	0	361	103
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.8			5.8			6.5			6.5	
Lane Util. Factor		0.95			0.95			0.95			0.95	
Frt		0.99			1.00			0.99			0.97	
Flt Protected		0.97			0.99			1.00			1.00	
Satd. Flow (prot)		3439			3512			3488			3410	
Flt Permitted		0.71			0.74			1.00			1.00	
Satd. Flow (perm)		2514			2634			3488			3410	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	191	73	26	47	134	0	0	445	28	0	380	108
RTOR Reduction (vph)	0	11	0	0	0	0	0	3	0	0	14	0
Lane Group Flow (vph)	0	279	0	0	181	0	0	470	0	0	474	0
Heavy Vehicles (%)	0%	1%	0%	0%	2%	1%	0%	2%	12%	1%	3%	0%
Turn Type	Perm	NA		Perm	NA			NA			NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8								
Actuated Green, G (s)		16.8			16.8			70.9			70.9	
Effective Green, g (s)		16.8			16.8			70.9			70.9	
Actuated g/C Ratio		0.17			0.17			0.71			0.71	
Clearance Time (s)		5.8			5.8			6.5			6.5	
Vehicle Extension (s)		3.0			3.0			3.0			3.0	
Lane Grp Cap (vph)		422			442			2472			2417	
v/s Ratio Prot								0.13			c0.14	
v/s Ratio Perm		c0.11			0.07							
v/c Ratio		0.89dl			0.41			0.19			0.20	
Uniform Delay, d1		38.9			37.2			4.9			4.9	
Progression Factor		1.00			0.92			1.00			1.00	
Incremental Delay, d2		3.9			0.6			0.2			0.2	
Delay (s)		42.8			34.9			5.1			5.1	
Level of Service		D			C			A			A	
Approach Delay (s)		42.8			34.9			5.1			5.1	
Approach LOS		D			C			A			A	

Intersection Summary

HCM 2000 Control Delay	16.5	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.29		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	12.3
Intersection Capacity Utilization	43.4%	ICU Level of Service	A
Analysis Period (min)	15		

dl Defacto Left Lane. Recode with 1 though lane as a left lane.

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
 16: US 301 & Quadrant Roadway

09/30/2019



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	0	135	593	11	91	464
Future Volume (vph)	0	135	593	11	91	464
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.5	4.5		4.5	4.5
Lane Util. Factor		1.00	0.95		0.97	0.95
Frt		0.86	1.00		1.00	1.00
Flt Protected		1.00	1.00		0.95	1.00
Satd. Flow (prot)		1611	3530		3433	3539
Flt Permitted		1.00	1.00		0.38	1.00
Satd. Flow (perm)		1611	3530		1381	3539
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	147	645	12	99	504
RTOR Reduction (vph)	0	0	1	0	0	0
Lane Group Flow (vph)	0	147	656	0	99	504
Turn Type		Perm	NA		pm+pt	NA
Protected Phases			2		1	6
Permitted Phases		6			6	
Actuated Green, G (s)		100.0	86.6		95.5	100.0
Effective Green, g (s)		100.0	86.6		95.5	100.0
Actuated g/C Ratio		1.00	0.87		0.96	1.00
Clearance Time (s)		4.5	4.5		4.5	4.5
Vehicle Extension (s)		3.0	3.0		3.0	3.0
Lane Grp Cap (vph)		1611	3056		1409	3539
v/s Ratio Prot			c0.19		0.00	c0.14
v/s Ratio Perm		0.09			0.06	
v/c Ratio		0.09	0.21		0.07	0.14
Uniform Delay, d1		0.0	1.1		0.2	0.0
Progression Factor		1.00	0.52		1.00	1.00
Incremental Delay, d2		0.1	0.2		0.0	0.1
Delay (s)		0.1	0.7		0.2	0.1
Level of Service		A	A		A	A
Approach Delay (s)	0.1		0.7			0.1
Approach LOS	A		A			A

Intersection Summary			
HCM 2000 Control Delay	0.4	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.22		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	32.6%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
 17: Route 17/US 17 (Tidewater Trail) & Quadrant Roadway

09/30/2019



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↑↑	↑	↗	↘↘	
Traffic Volume (vph)	0	96	161	135	91	11
Future Volume (vph)	0	96	161	135	91	11
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.5	4.5	4.5	4.5	
Lane Util. Factor		0.95	1.00	1.00	0.97	
Frt		1.00	1.00	0.85	0.98	
Flt Protected		1.00	1.00	1.00	0.96	
Satd. Flow (prot)		3539	1863	1583	3403	
Flt Permitted		1.00	1.00	1.00	0.96	
Satd. Flow (perm)		3539	1863	1583	3403	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	104	175	147	99	12
RTOR Reduction (vph)	0	0	0	25	11	0
Lane Group Flow (vph)	0	104	175	122	100	0
Turn Type		NA	NA	Perm	Prot	
Protected Phases		4	8		1	
Permitted Phases				8		
Actuated Green, G (s)		82.7	82.7	82.7	8.3	
Effective Green, g (s)		82.7	82.7	82.7	8.3	
Actuated g/C Ratio		0.83	0.83	0.83	0.08	
Clearance Time (s)		4.5	4.5	4.5	4.5	
Vehicle Extension (s)		3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)		2926	1540	1309	282	
v/s Ratio Prot		0.03	c0.09		c0.03	
v/s Ratio Perm				0.08		
v/c Ratio		0.04	0.11	0.09	0.35	
Uniform Delay, d1		1.5	1.7	1.6	43.3	
Progression Factor		0.32	1.00	1.00	0.98	
Incremental Delay, d2		0.0	0.1	0.1	0.8	
Delay (s)		0.5	1.8	1.8	43.3	
Level of Service		A	A	A	D	
Approach Delay (s)		0.5	1.8		43.3	
Approach LOS		A	A		D	

Intersection Summary

HCM 2000 Control Delay	10.1	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.14		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	20.1%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

1: US 301 & Route 17 Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	NBT	NBR	SBT	SBR	All
Denied Del/Veh (s)	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.0	0.0	0.0
Total Del/Veh (s)	34.7	28.7	9.3	30.9	32.8	9.1	3.5	8.5	4.2	15.8

2: US 301 & Back St Performance by movement

Movement	NBT	All
Denied Del/Veh (s)	0.0	0.0
Total Del/Veh (s)	0.6	0.6

16: US 301 & Quadrant Roadway Performance by movement

Movement	WBR	NBT	NBR	SBL	SBT	All
Denied Del/Veh (s)	0.0	0.0	0.0	3.2	0.2	0.3
Total Del/Veh (s)	1.2	1.5	1.0	5.3	0.3	1.3

17: Route 17/US 17 (Tidewater Trail) & Quadrant Roadway Performance by movement

Movement	EBT	WBT	WBR	SBL	SBR	All
Denied Del/Veh (s)	0.0	0.1	0.1	0.0	0.0	0.1
Total Del/Veh (s)	2.6	1.8	1.3	45.5	26.5	10.6

Total Network Performance

Denied Del/Veh (s)	0.3
Total Del/Veh (s)	19.6

Queuing and Blocking Report
Baseline

09/30/2019

Intersection: 1: US 301 & Route 17

Movement	EB	EB	B14	WB	NB	NB	SB	SB
Directions Served	LT	TR	T	LT	T	TR	T	TR
Maximum Queue (ft)	189	130	67	174	153	116	144	131
Average Queue (ft)	111	38	4	86	70	36	61	55
95th Queue (ft)	175	89	35	149	129	87	117	110
Link Distance (ft)	121	121	2207	498	1062	1062	504	504
Upstream Blk Time (%)	11	0						
Queuing Penalty (veh)	0	0						
Storage Bay Dist (ft)								
Storage Blk Time (%)								
Queuing Penalty (veh)								

Intersection: 2: US 301 & Back St

Movement	NB
Directions Served	TR
Maximum Queue (ft)	179
Average Queue (ft)	6
95th Queue (ft)	183
Link Distance (ft)	1746
Upstream Blk Time (%)	0
Queuing Penalty (veh)	0
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 3: US 301 & Caroline St

Movement
Directions Served
Maximum Queue (ft)
Average Queue (ft)
95th Queue (ft)
Link Distance (ft)
Upstream Blk Time (%)
Queuing Penalty (veh)
Storage Bay Dist (ft)
Storage Blk Time (%)
Queuing Penalty (veh)

Intersection: 4: US 301 & Walsingham Rd

Movement

Directions Served
Maximum Queue (ft)
Average Queue (ft)
95th Queue (ft)
Link Distance (ft)
Upstream Blk Time (%)
Queuing Penalty (veh)
Storage Bay Dist (ft)
Storage Blk Time (%)
Queuing Penalty (veh)

Intersection: 16: US 301 & Quadrant Roadway

Movement	WB	NB	NB	SB	SB
Directions Served	R	T	TR	L	L
Maximum Queue (ft)	54	34	21	26	67
Average Queue (ft)	13	2	1	2	28
95th Queue (ft)	40	14	12	17	58
Link Distance (ft)	911	504	504		
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (ft)				250	250
Storage Blk Time (%)					
Queuing Penalty (veh)					

Intersection: 17: Route 17/US 17 (Tidewater Trail) & Quadrant Roadway

Movement	EB	EB	WB	WB	SB	SB
Directions Served	T	T	T	R	L	LR
Maximum Queue (ft)	18	27	61	53	80	98
Average Queue (ft)	1	1	14	15	26	58
95th Queue (ft)	7	12	45	43	63	93
Link Distance (ft)	498	498	2174	2174	911	911
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (ft)						
Storage Blk Time (%)						
Queuing Penalty (veh)						

Network Summary

















Network wide Queuing Penalty: 0

Weekday PM Peak

HCM Signalized Intersection Capacity Analysis

1: US 301 & Route 17

09/30/2019

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	107	141	17	23	123	0	0	521	35	0	641	312
Future Volume (vph)	107	141	17	23	123	0	0	521	35	0	641	312
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.8			5.8			6.5			6.5	
Lane Util. Factor		0.95			0.95			0.95			0.95	
Frt		0.99			1.00			0.99			0.95	
Flt Protected		0.98			0.99			1.00			1.00	
Satd. Flow (prot)		3486			3523			3484			3365	
Flt Permitted		0.78			0.86			1.00			1.00	
Satd. Flow (perm)		2771			3045			3484			3365	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	113	148	18	24	129	0	0	548	37	0	675	328
RTOR Reduction (vph)	0	6	0	0	0	0	0	3	0	0	41	0
Lane Group Flow (vph)	0	273	0	0	153	0	0	582	0	0	962	0
Heavy Vehicles (%)	0%	1%	0%	0%	2%	1%	0%	2%	12%	1%	3%	0%
Turn Type	Perm	NA		Perm	NA			NA			NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8								
Actuated Green, G (s)		15.3			15.3			72.4			72.4	
Effective Green, g (s)		15.3			15.3			72.4			72.4	
Actuated g/C Ratio		0.15			0.15			0.72			0.72	
Clearance Time (s)		5.8			5.8			6.5			6.5	
Vehicle Extension (s)		3.0			3.0			3.0			3.0	
Lane Grp Cap (vph)		423			465			2522			2436	
v/s Ratio Prot								0.17			c0.29	
v/s Ratio Perm		c0.10			0.05							
v/c Ratio		0.65			0.33			0.23			0.39	
Uniform Delay, d1		39.8			37.8			4.6			5.3	
Progression Factor		1.00			0.87			1.00			1.00	
Incremental Delay, d2		3.4			0.4			0.2			0.5	
Delay (s)		43.2			33.1			4.8			5.8	
Level of Service		D			C			A			A	
Approach Delay (s)		43.2			33.1			4.8			5.8	
Approach LOS		D			C			A			A	
Intersection Summary												
HCM 2000 Control Delay			12.7					HCM 2000 Level of Service			B	
HCM 2000 Volume to Capacity ratio			0.44									
Actuated Cycle Length (s)			100.0					Sum of lost time (s)		12.3		
Intersection Capacity Utilization			55.3%					ICU Level of Service			B	
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

16: US 301 & Quadrant Roadway

09/30/2019



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	0	102	614	14	326	953
Future Volume (vph)	0	102	614	14	326	953
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.5	4.5		4.5	4.5
Lane Util. Factor		1.00	0.95		0.97	0.95
Frt		0.86	1.00		1.00	1.00
Flt Protected		1.00	1.00		0.95	1.00
Satd. Flow (prot)		1611	3528		3433	3539
Flt Permitted		1.00	1.00		0.37	1.00
Satd. Flow (perm)		1611	3528		1347	3539
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	111	667	15	354	1036
RTOR Reduction (vph)	0	0	1	0	0	0
Lane Group Flow (vph)	0	111	681	0	354	1036
Turn Type		Perm	NA		pm+pt	NA
Protected Phases			2		1	6
Permitted Phases		6			6	
Actuated Green, G (s)		100.0	85.5		95.5	100.0
Effective Green, g (s)		100.0	85.5		95.5	100.0
Actuated g/C Ratio		1.00	0.86		0.96	1.00
Clearance Time (s)		4.5	4.5		4.5	4.5
Vehicle Extension (s)		3.0	3.0		3.0	3.0
Lane Grp Cap (vph)		1611	3016		1401	3539
v/s Ratio Prot			0.19		0.01	c0.29
v/s Ratio Perm		0.07			0.23	
v/c Ratio		0.07	0.23		0.25	0.29
Uniform Delay, d1		0.0	1.3		0.2	0.0
Progression Factor		1.00	0.57		1.00	1.00
Incremental Delay, d2		0.1	0.2		0.1	0.2
Delay (s)		0.1	0.9		0.3	0.2
Level of Service		A	A		A	A
Approach Delay (s)	0.1		0.9			0.2
Approach LOS	A		A			A

Intersection Summary

HCM 2000 Control Delay	0.4	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.32		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	34.2%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis

17: Route 17/US 17 (Tidewater Trail) & Quadrant Roadway

09/30/2019



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↔↑	↑	↔	↔↔↔	
Traffic Volume (vph)	0	176	132	102	326	14
Future Volume (vph)	0	176	132	102	326	14
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.5	4.5	4.5	4.5	
Lane Util. Factor		0.95	1.00	1.00	0.97	
Frt		1.00	1.00	0.85	0.99	
Flt Protected		1.00	1.00	1.00	0.95	
Satd. Flow (prot)		3539	1863	1583	3427	
Flt Permitted		1.00	1.00	1.00	0.95	
Satd. Flow (perm)		3539	1863	1583	3427	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	191	143	111	354	15
RTOR Reduction (vph)	0	0	0	28	5	0
Lane Group Flow (vph)	0	191	143	83	364	0
Turn Type		NA	NA	Perm	Prot	
Protected Phases		4	8		1	
Permitted Phases	4			8		
Actuated Green, G (s)		74.8	74.8	74.8	16.2	
Effective Green, g (s)		74.8	74.8	74.8	16.2	
Actuated g/C Ratio		0.75	0.75	0.75	0.16	
Clearance Time (s)		4.5	4.5	4.5	4.5	
Vehicle Extension (s)		3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)		2647	1393	1184	555	
v/s Ratio Prot		0.05	c0.08		c0.11	
v/s Ratio Perm				0.05		
v/c Ratio		0.07	0.10	0.07	0.66	
Uniform Delay, d1		3.4	3.4	3.4	39.3	
Progression Factor		0.23	1.00	1.00	0.99	
Incremental Delay, d2		0.1	0.1	0.1	2.8	
Delay (s)		0.8	3.6	3.5	41.7	
Level of Service		A	A	A	D	
Approach Delay (s)		0.8	3.5		41.7	
Approach LOS		A	A		D	

Intersection Summary

HCM 2000 Control Delay	20.2	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.20		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	24.2%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

1: US 301 & Route 17 Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	NBT	NBR	SBT	SBR	All
Denied Delay (hr)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay (hr)	1.2	1.2	0.1	0.2	1.2	1.1	0.0	1.4	0.6	7.0

2: US 301 & Back St Performance by movement

Movement	NBT	All
Denied Delay (hr)	0.0	0.0
Total Delay (hr)	0.1	0.1

16: US 301 & Quadrant Roadway Performance by movement

Movement	WBR	NBT	NBR	SBL	SBT	All
Denied Delay (hr)	0.0	0.0	0.0	0.2	0.1	0.3
Total Delay (hr)	0.0	0.3	0.0	0.8	0.2	1.3

17: Route 17/US 17 (Tidewater Trail) & Quadrant Roadway Performance by movement

Movement	EBT	WBT	WBR	SBL	SBR	All
Denied Delay (hr)	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay (hr)	0.2	0.1	0.0	3.7	0.1	4.2

Total Network Performance

Denied Delay (hr)	0.4
Total Delay (hr)	13.9

Queuing and Blocking Report

Baseline

09/30/2019

Intersection: 1: US 301 & Route 17

Movement	EB	EB	B14	WB	NB	NB	SB	SB
Directions Served	LT	TR	T	LT	T	TR	T	TR
Maximum Queue (ft)	165	137	16	161	143	120	201	222
Average Queue (ft)	92	60	1	77	72	39	89	110
95th Queue (ft)	144	112	11	138	130	91	158	193
Link Distance (ft)	121	121	2207	498	1062	1062	504	504
Upstream Blk Time (%)	5	1						
Queuing Penalty (veh)	0	0						
Storage Bay Dist (ft)								
Storage Blk Time (%)								
Queuing Penalty (veh)								

Intersection: 2: US 301 & Back St

Movement
Directions Served
Maximum Queue (ft)
Average Queue (ft)
95th Queue (ft)
Link Distance (ft)
Upstream Blk Time (%)
Queuing Penalty (veh)
Storage Bay Dist (ft)
Storage Blk Time (%)
Queuing Penalty (veh)

Intersection: 3: US 301 & Caroline St

Movement
Directions Served
Maximum Queue (ft)
Average Queue (ft)
95th Queue (ft)
Link Distance (ft)
Upstream Blk Time (%)
Queuing Penalty (veh)
Storage Bay Dist (ft)
Storage Blk Time (%)
Queuing Penalty (veh)

Intersection: 4: US 301 & Walsingham Rd

Movement

Directions Served
Maximum Queue (ft)
Average Queue (ft)
95th Queue (ft)
Link Distance (ft)
Upstream Blk Time (%)
Queuing Penalty (veh)
Storage Bay Dist (ft)
Storage Blk Time (%)
Queuing Penalty (veh)

Intersection: 16: US 301 & Quadrant Roadway

Movement	WB	NB	NB	SB	SB	SB
Directions Served	R	T	TR	L	L	T
Maximum Queue (ft)	59	49	52	111	149	86
Average Queue (ft)	9	9	6	22	63	3
95th Queue (ft)	36	34	29	69	113	88
Link Distance (ft)	911	504	504			
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (ft)				250	250	
Storage Blk Time (%)						
Queuing Penalty (veh)						

Intersection: 17: Route 17/US 17 (Tidewater Trail) & Quadrant Roadway

Movement	EB	EB	WB	WB	SB	SB
Directions Served	LT	T	T	R	L	LR
Maximum Queue (ft)	24	43	78	53	191	203
Average Queue (ft)	2	5	19	16	100	119
95th Queue (ft)	13	24	57	45	162	175
Link Distance (ft)	498	498	2174	2174	911	911
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (ft)						
Storage Blk Time (%)						
Queuing Penalty (veh)						

Network Summary

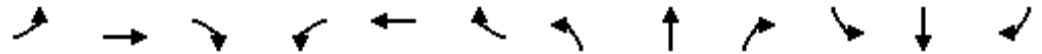
Network wide Queuing Penalty: 0

Sunday Worst-Case Scenario

HCM Signalized Intersection Capacity Analysis

1: US 301 & Route 17

09/30/2019



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔↔			↔↔			↔↔			↔↔	
Traffic Volume (vph)	77	184	12	23	181	0	0	1733	26	0	1137	88
Future Volume (vph)	77	184	12	23	181	0	0	1733	26	0	1137	88
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.8			5.8			6.5			6.5	
Lane Util. Factor		0.95			0.95			0.95			0.95	
Frt		0.99			1.00			1.00			0.99	
Flt Protected		0.99			0.99			1.00			1.00	
Satd. Flow (prot)		3512			3527			3526			3474	
Flt Permitted		0.80			0.86			1.00			1.00	
Satd. Flow (perm)		2848			3060			3526			3474	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	81	194	13	24	191	0	0	1824	27	0	1197	93
RTOR Reduction (vph)	0	3	0	0	0	0	0	1	0	0	5	0
Lane Group Flow (vph)	0	285	0	0	215	0	0	1850	0	0	1285	0
Heavy Vehicles (%)	0%	1%	0%	0%	2%	1%	0%	2%	12%	1%	3%	0%
Turn Type	Perm	NA		Perm	NA			NA			NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8							6	
Actuated Green, G (s)		14.3			14.3			73.4			73.4	
Effective Green, g (s)		14.3			14.3			73.4			73.4	
Actuated g/C Ratio		0.14			0.14			0.73			0.73	
Clearance Time (s)		5.8			5.8			6.5			6.5	
Vehicle Extension (s)		3.0			3.0			3.0			3.0	
Lane Grp Cap (vph)		407			437			2588			2549	
v/s Ratio Prot								c0.52			0.37	
v/s Ratio Perm		c0.10			0.07							
v/c Ratio		0.70			0.49			0.71			0.50	
Uniform Delay, d1		40.8			39.5			7.4			5.6	
Progression Factor		1.00			0.93			1.00			1.00	
Incremental Delay, d2		5.2			0.9			1.7			0.7	
Delay (s)		46.0			37.6			9.2			6.3	
Level of Service		D			D			A			A	
Approach Delay (s)		46.0			37.6			9.2			6.3	
Approach LOS		D			D			A			A	
Intersection Summary												
HCM 2000 Control Delay			12.7					HCM 2000 Level of Service			B	
HCM 2000 Volume to Capacity ratio			0.71									
Actuated Cycle Length (s)			100.0					Sum of lost time (s)		12.3		
Intersection Capacity Utilization			77.2%					ICU Level of Service			D	
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
 16: US 301 & Quadrant Roadway

09/30/2019



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	0	353	1783	27	485	1225
Future Volume (vph)	0	353	1783	27	485	1225
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.5	4.5		4.5	4.5
Lane Util. Factor		1.00	0.95		0.97	0.95
Frt		0.86	1.00		1.00	1.00
Flt Protected		1.00	1.00		0.95	1.00
Satd. Flow (prot)		1611	3531		3433	3539
Flt Permitted		1.00	1.00		0.06	1.00
Satd. Flow (perm)		1611	3531		228	3539
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	384	1938	29	527	1332
RTOR Reduction (vph)	0	0	1	0	0	0
Lane Group Flow (vph)	0	384	1966	0	527	1332
Turn Type		Perm	NA		pm+pt	NA
Protected Phases			2		1	6
Permitted Phases		6			6	
Actuated Green, G (s)		100.0	75.6		95.5	100.0
Effective Green, g (s)		100.0	75.6		95.5	100.0
Actuated g/C Ratio		1.00	0.76		0.96	1.00
Clearance Time (s)		4.5	4.5		4.5	4.5
Vehicle Extension (s)		3.0	3.0		3.0	3.0
Lane Grp Cap (vph)		1611	2669		711	3539
v/s Ratio Prot			0.56		0.11	0.38
v/s Ratio Perm		0.24			0.59	
v/c Ratio		0.24	0.74		0.74	0.38
Uniform Delay, d1		0.0	6.7		28.3	0.0
Progression Factor		1.00	0.21		1.00	1.00
Incremental Delay, d2		0.3	1.3		4.2	0.3
Delay (s)		0.3	2.7		32.5	0.3
Level of Service		A	A		C	A
Approach Delay (s)	0.3		2.7			9.4
Approach LOS	A		A			A

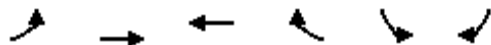
Intersection Summary			
HCM 2000 Control Delay	5.5	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.76		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	79.5%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis

17: Route 17/US 17 (Tidewater Trail) & Quadrant Roadway

09/30/2019



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↔↑	↑	↔	↔↔↔	
Traffic Volume (vph)	0	210	177	353	485	27
Future Volume (vph)	0	210	177	353	485	27
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.5	4.5	4.5	4.5	
Lane Util. Factor		0.95	1.00	1.00	0.97	
Frt		1.00	1.00	0.85	0.99	
Flt Protected		1.00	1.00	1.00	0.95	
Satd. Flow (prot)		3539	1863	1583	3423	
Flt Permitted		1.00	1.00	1.00	0.95	
Satd. Flow (perm)		3539	1863	1583	3423	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	228	192	384	527	29
RTOR Reduction (vph)	0	0	0	118	5	0
Lane Group Flow (vph)	0	228	192	266	551	0
Turn Type		NA	NA	Perm	Prot	
Protected Phases		4	8		1	
Permitted Phases	4			8		
Actuated Green, G (s)		69.2	69.2	69.2	21.8	
Effective Green, g (s)		69.2	69.2	69.2	21.8	
Actuated g/C Ratio		0.69	0.69	0.69	0.22	
Clearance Time (s)		4.5	4.5	4.5	4.5	
Vehicle Extension (s)		3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)		2448	1289	1095	746	
v/s Ratio Prot		0.06	0.10		c0.16	
v/s Ratio Perm				c0.17		
v/c Ratio		0.09	0.15	0.24	0.74	
Uniform Delay, d1		5.1	5.3	5.7	36.4	
Progression Factor		0.23	1.00	1.00	0.44	
Incremental Delay, d2		0.1	0.2	0.5	3.0	
Delay (s)		1.2	5.5	6.2	19.1	
Level of Service		A	A	A	B	
Approach Delay (s)		1.2	6.0		19.1	
Approach LOS		A	A		B	

Intersection Summary

HCM 2000 Control Delay	10.5	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.36		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	35.2%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

1: US 301 & Route 17 Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	NBT	NBR	SBT	SBR	All
Denied Delay (hr)	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.2
Total Delay (hr)	1.6	2.4	0.1	0.5	4.0	5.5	0.1	2.1	0.1	16.4

2: US 301 & Back St Performance by movement

Movement	NBT	All
Denied Delay (hr)	0.0	0.0
Total Delay (hr)	1.3	1.3

16: US 301 & Quadrant Roadway Performance by movement

Movement	WBR	NBT	NBR	SBL	SBT	All
Denied Delay (hr)	0.0	0.0	0.0	0.3	0.2	0.5
Total Delay (hr)	1.8	3.5	0.1	4.6	0.6	10.6

17: Route 17/US 17 (Tidewater Trail) & Quadrant Roadway Performance by movement

Movement	EBT	WBT	WBR	SBL	SBR	All
Denied Delay (hr)	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay (hr)	0.4	0.4	0.4	4.7	0.2	6.1

Total Network Performance

Denied Delay (hr)	0.7
Total Delay (hr)	36.8

Queuing and Blocking Report
Baseline

09/30/2019

Intersection: 1: US 301 & Route 17

Movement	EB	EB	B14	WB	WB	NB	NB	SB	SB
Directions Served	LT	TR	T	LT	T	T	TR	T	TR
Maximum Queue (ft)	186	183	135	375	52	239	257	195	214
Average Queue (ft)	106	89	15	177	3	149	152	107	121
95th Queue (ft)	169	159	100	330	64	225	234	178	192
Link Distance (ft)	121	121	2207	498	498	1956	1956	504	504
Upstream Blk Time (%)	14	5		0	0				
Queuing Penalty (veh)	0	0		0	0				
Storage Bay Dist (ft)									
Storage Blk Time (%)									
Queuing Penalty (veh)									

Intersection: 2: US 301 & Back St

Movement
Directions Served
Maximum Queue (ft)
Average Queue (ft)
95th Queue (ft)
Link Distance (ft)
Upstream Blk Time (%)
Queuing Penalty (veh)
Storage Bay Dist (ft)
Storage Blk Time (%)
Queuing Penalty (veh)

Intersection: 3: US 301 & Caroline St

Movement
Directions Served
Maximum Queue (ft)
Average Queue (ft)
95th Queue (ft)
Link Distance (ft)
Upstream Blk Time (%)
Queuing Penalty (veh)
Storage Bay Dist (ft)
Storage Blk Time (%)
Queuing Penalty (veh)

Intersection: 4: US 301 & Walsingham Rd

Movement

Directions Served
Maximum Queue (ft)
Average Queue (ft)
95th Queue (ft)
Link Distance (ft)
Upstream Blk Time (%)
Queuing Penalty (veh)
Storage Bay Dist (ft)
Storage Blk Time (%)
Queuing Penalty (veh)

Intersection: 16: US 301 & Quadrant Roadway

Movement	WB	NB	NB	SB	SB	SB	SB
Directions Served	R	T	TR	L	L	T	T
Maximum Queue (ft)	300	213	208	235	243	163	76
Average Queue (ft)	131	59	69	136	173	14	5
95th Queue (ft)	241	144	155	221	245	135	78
Link Distance (ft)	911	504	504				
Upstream Blk Time (%)							
Queuing Penalty (veh)							
Storage Bay Dist (ft)				250	250		
Storage Blk Time (%)				0	1	0	
Queuing Penalty (veh)				0	4	1	

Intersection: 17: Route 17/US 17 (Tidewater Trail) & Quadrant Roadway

Movement	EB	EB	WB	WB	SB	SB
Directions Served	LT	T	T	R	L	LR
Maximum Queue (ft)	68	70	127	115	270	291
Average Queue (ft)	12	19	42	49	119	139
95th Queue (ft)	44	53	99	92	231	251
Link Distance (ft)	498	498	2174	2174	911	911
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (ft)						
Storage Blk Time (%)						
Queuing Penalty (veh)						

Network Summary

Network wide Queuing Penalty: 5

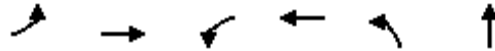
APPENDIX H3
Transportation Options:
Operational Analysis –
Couplet

Weekday AM Peak

Queues

1: US 301 & Route 17/US 17 (Tidewater Trail)

09/12/2019



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT
Lane Group Flow (vph)	215	526	46	256	11	448
v/c Ratio	0.61	0.47	0.18	0.80	0.01	0.27
Control Delay	30.0	12.2	23.5	53.7	18.2	17.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	30.0	12.2	23.5	53.7	18.2	17.8
Queue Length 50th (ft)	148	84	23	153	4	96
Queue Length 95th (ft)	160	115	40	228	17	163
Internal Link Dist (ft)		573		2711		1025
Turn Bay Length (ft)	175				200	
Base Capacity (vph)	413	1600	270	553	951	1643
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.52	0.33	0.17	0.46	0.01	0.27

Intersection Summary

HCM Signalized Intersection Capacity Analysis

1: US 301 & Route 17/US 17 (Tidewater Trail)

09/12/2019



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	211	160	356	45	116	135	11	412	27	0	0	0
Future Volume (vph)	211	160	356	45	116	135	11	412	27	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.8	5.7		5.8	5.8		6.5	6.5				
Lane Util. Factor	1.00	0.95		1.00	1.00		1.00	0.95				
Frt	1.00	0.90		1.00	0.92		1.00	0.99				
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00				
Satd. Flow (prot)	1736	3051		1719	1513		1805	3113				
Flt Permitted	0.27	1.00		0.46	1.00		0.95	1.00				
Satd. Flow (perm)	498	3051		827	1513		1805	3113				
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	215	163	363	46	118	138	11	420	28	0	0	0
RTOR Reduction (vph)	0	261	0	0	43	0	0	3	0	0	0	0
Lane Group Flow (vph)	215	265	0	46	213	0	11	445	0	0	0	0
Heavy Vehicles (%)	4%	4%	7%	5%	16%	15%	0%	15%	13%	7%	11%	1%
Turn Type	pm+pt	NA		pm+pt	NA		Split	NA				
Protected Phases	3	8		7	4		2	2				
Permitted Phases	8			4								
Actuated Green, G (s)	45.7	33.8		29.5	23.4		62.1	62.1				
Effective Green, g (s)	45.7	33.8		29.5	23.4		62.1	62.1				
Actuated g/C Ratio	0.38	0.28		0.25	0.19		0.52	0.52				
Clearance Time (s)	5.8	5.7		5.8	5.8		6.5	6.5				
Vehicle Extension (s)	3.0	3.0		3.0	3.0		5.5	5.5				
Lane Grp Cap (vph)	358	859		248	295		934	1610				
v/s Ratio Prot	c0.08	0.09		0.01	c0.14		0.01	c0.14				
v/s Ratio Perm	0.15			0.04								
v/c Ratio	0.60	0.31		0.19	0.72		0.01	0.28				
Uniform Delay, d1	27.6	33.9		35.1	45.3		14.1	16.3				
Progression Factor	0.89	1.11		1.00	1.00		1.00	1.00				
Incremental Delay, d2	2.7	0.2		0.4	8.5		0.0	0.4				
Delay (s)	27.3	37.9		35.4	53.7		14.1	16.7				
Level of Service	C	D		D	D		B	B				
Approach Delay (s)		34.8			51.0			16.7			0.0	
Approach LOS		C			D			B			A	

Intersection Summary

HCM 2000 Control Delay	32.5	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.44		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	18.1
Intersection Capacity Utilization	53.4%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Queues

5: Route 17 & Couplet

09/12/2019



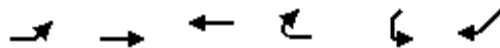
Lane Group	EBT	WBT	SWL	SWR
Lane Group Flow (vph)	299	135	491	112
v/c Ratio	0.32	0.15	0.33	0.15
Control Delay	19.4	5.6	23.6	4.2
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	19.4	5.6	23.6	4.2
Queue Length 50th (ft)	135	14	128	0
Queue Length 95th (ft)	199	19	170	34
Internal Link Dist (ft)	1702	573	620	
Turn Bay Length (ft)				
Base Capacity (vph)	923	923	1473	743
Starvation Cap Reductn	0	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.32	0.15	0.33	0.15

Intersection Summary

HCM Signalized Intersection Capacity Analysis

5: Route 17 & Couplet

09/12/2019



Movement	EBL	EBT	WBT	WBR	SWL	SWR
Lane Configurations		↑	↑		↖ ↗	↘
Traffic Volume (vph)	0	275	124	0	452	103
Future Volume (vph)	0	275	124	0	452	103
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.5	4.5		4.5	4.5
Lane Util. Factor		1.00	1.00		0.97	1.00
Frt		1.00	1.00		1.00	0.85
Flt Protected		1.00	1.00		0.95	1.00
Satd. Flow (prot)		1863	1863		3433	1583
Flt Permitted		1.00	1.00		0.95	1.00
Satd. Flow (perm)		1863	1863		3433	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	299	135	0	491	112
RTOR Reduction (vph)	0	0	0	0	0	64
Lane Group Flow (vph)	0	299	135	0	491	48
Turn Type		NA	NA		Prot	Perm
Protected Phases		4	8		2	
Permitted Phases						2
Actuated Green, G (s)		59.5	59.5		51.5	51.5
Effective Green, g (s)		59.5	59.5		51.5	51.5
Actuated g/C Ratio		0.50	0.50		0.43	0.43
Clearance Time (s)		4.5	4.5		4.5	4.5
Vehicle Extension (s)		3.0	3.0		3.0	3.0
Lane Grp Cap (vph)		923	923		1473	679
v/s Ratio Prot		c0.16	0.07		c0.14	
v/s Ratio Perm						0.03
v/c Ratio		0.32	0.15		0.33	0.07
Uniform Delay, d1		18.2	16.4		22.8	20.2
Progression Factor		1.00	0.32		1.00	1.00
Incremental Delay, d2		0.2	0.3		0.6	0.2
Delay (s)		18.4	5.5		23.4	20.4
Level of Service		B	A		C	C
Approach Delay (s)		18.4	5.5		22.9	
Approach LOS		B	A		C	

Intersection Summary

HCM 2000 Control Delay	19.3	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.33		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	34.9%	ICU Level of Service	A
Analysis Period (min)	15		

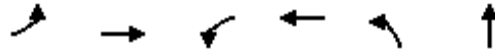
c Critical Lane Group

Weekday PM Peak

Queues

1: US 301 & US 17 (Tidewater Trail)

09/12/2019



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT
Lane Group Flow (vph)	126	1130	23	215	14	553
v/c Ratio	0.30	0.83	0.15	0.43	0.02	0.37
Control Delay	16.8	25.2	17.3	24.5	23.8	23.8
Queue Delay	0.0	0.1	0.0	0.0	0.0	0.0
Total Delay	16.8	25.3	17.3	24.5	23.8	23.8
Queue Length 50th (ft)	58	342	9	92	6	151
Queue Length 95th (ft)	96	388	20	135	22	235
Internal Link Dist (ft)		573		2711		1025
Turn Bay Length (ft)	175				200	
Base Capacity (vph)	416	1688	159	742	856	1478
Starvation Cap Reductn	0	33	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.30	0.68	0.14	0.29	0.02	0.37

Intersection Summary

HCM Signalized Intersection Capacity Analysis

1: US 301 & US 17 (Tidewater Trail)

09/12/2019



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↖↗		↖	↗		↖	↖↗				
Traffic Volume (vph)	123	480	627	23	109	102	14	507	35	0	0	0
Future Volume (vph)	123	480	627	23	109	102	14	507	35	0	0	0
Ideal Flow (vphp)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.8	5.7		5.8	5.8		6.5	6.5				
Lane Util. Factor	1.00	0.95		1.00	1.00		1.00	0.95				
Frt	1.00	0.92		1.00	0.93		1.00	0.99				
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00				
Satd. Flow (prot)	1736	3125		1719	1525		1805	3112				
Flt Permitted	0.49	1.00		0.10	1.00		0.95	1.00				
Satd. Flow (perm)	897	3125		185	1525		1805	3112				
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	126	490	640	23	111	104	14	517	36	0	0	0
RTOR Reduction (vph)	0	240	0	0	36	0	0	3	0	0	0	0
Lane Group Flow (vph)	126	890	0	23	179	0	14	550	0	0	0	0
Heavy Vehicles (%)	4%	4%	7%	5%	16%	15%	0%	15%	13%	7%	11%	1%
Turn Type	pm+pt	NA		pm+pt	NA		Split	NA				
Protected Phases	3	8		7	4		2	2				
Permitted Phases	8			4								
Actuated Green, G (s)	51.4	43.2		43.3	39.1		54.6	54.6				
Effective Green, g (s)	51.4	43.2		43.3	39.1		54.6	54.6				
Actuated g/C Ratio	0.43	0.36		0.36	0.33		0.46	0.46				
Clearance Time (s)	5.8	5.7		5.8	5.8		6.5	6.5				
Vehicle Extension (s)	3.0	3.0		3.0	3.0		5.5	5.5				
Lane Grp Cap (vph)	441	1125		120	496		821	1415				
v/s Ratio Prot	c0.02	c0.28		0.01	0.12		0.01	c0.18				
v/s Ratio Perm	0.10			0.06								
v/c Ratio	0.29	0.79		0.19	0.36		0.02	0.39				
Uniform Delay, d1	21.5	34.4		28.3	30.9		18.0	21.6				
Progression Factor	0.80	0.91		1.00	1.00		1.00	1.00				
Incremental Delay, d2	0.3	3.4		0.8	0.5		0.0	0.8				
Delay (s)	17.6	34.6		29.1	31.4		18.0	22.5				
Level of Service	B	C		C	C		B	C				
Approach Delay (s)		32.9			31.1			22.3			0.0	
Approach LOS		C			C			C			A	

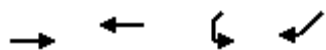
Intersection Summary

HCM 2000 Control Delay	29.8	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.56		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	18.1
Intersection Capacity Utilization	68.6%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Queues

5:

09/12/2019

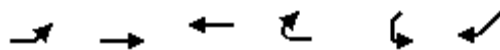


Lane Group	EBT	WBT	SWL	SWR
Lane Group Flow (vph)	287	265	1050	339
v/c Ratio	0.44	0.40	0.54	0.32
Control Delay	32.2	27.9	17.2	2.1
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	32.2	27.9	17.2	2.1
Queue Length 50th (ft)	169	163	246	0
Queue Length 95th (ft)	250	236	303	40
Internal Link Dist (ft)	1702	573	588	
Turn Bay Length (ft)				
Base Capacity (vph)	659	659	1959	1049
Starvation Cap Reductn	0	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.44	0.40	0.54	0.32
Intersection Summary				

HCM Signalized Intersection Capacity Analysis

5:

09/12/2019



Movement	EBL	EBT	WBT	WBR	SWL	SWR
Lane Configurations		↑	↑		↖ ↗	↖ ↗
Traffic Volume (vph)	0	264	244	0	966	312
Future Volume (vph)	0	264	244	0	966	312
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.5	4.5		4.5	4.5
Lane Util. Factor		1.00	1.00		0.97	1.00
Frt		1.00	1.00		1.00	0.85
Flt Protected		1.00	1.00		0.95	1.00
Satd. Flow (prot)		1863	1863		3433	1583
Flt Permitted		1.00	1.00		0.95	1.00
Satd. Flow (perm)		1863	1863		3433	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	287	265	0	1050	339
RTOR Reduction (vph)	0	0	0	0	0	145
Lane Group Flow (vph)	0	287	265	0	1050	194
Turn Type		NA	NA		Prot	Perm
Protected Phases		4	8		2	
Permitted Phases						2
Actuated Green, G (s)		42.5	42.5		68.5	68.5
Effective Green, g (s)		42.5	42.5		68.5	68.5
Actuated g/C Ratio		0.35	0.35		0.57	0.57
Clearance Time (s)		4.5	4.5		4.5	4.5
Vehicle Extension (s)		3.0	3.0		3.0	3.0
Lane Grp Cap (vph)		659	659		1959	903
v/s Ratio Prot		c0.15	0.14		c0.31	
v/s Ratio Perm						0.12
v/c Ratio		0.44	0.40		0.54	0.21
Uniform Delay, d1		29.6	29.2		15.9	12.6
Progression Factor		1.00	0.88		1.00	1.00
Incremental Delay, d2		0.5	1.8		1.1	0.5
Delay (s)		30.1	27.5		17.0	13.1
Level of Service		C	C		B	B
Approach Delay (s)		30.1	27.5		16.0	
Approach LOS		C	C		B	

Intersection Summary

HCM 2000 Control Delay	19.7	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.50		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	49.0%	ICU Level of Service	A
Analysis Period (min)	15		

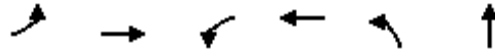
c Critical Lane Group

Sunday Worst-Case Scenario

Queues

1: US 301 & Route 17/US 17 (Tidewater Trail)

09/12/2019



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT
Lane Group Flow (vph)	97	1835	23	517	28	1768
v/c Ratio	0.44	1.37dr	0.16	0.95	0.03	1.26
Control Delay	22.5	156.8	20.1	63.0	19.9	151.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	22.5	156.8	20.1	63.0	19.9	151.5
Queue Length 50th (ft)	50	-882	9	350	12	-932
Queue Length 95th (ft)	m63	#1016	25	#566	31	#1073
Internal Link Dist (ft)		573		2711		1025
Turn Bay Length (ft)	175				200	
Base Capacity (vph)	221	1436	143	570	810	1408
Starvation Cap Reductn	0	14	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.44	1.29	0.16	0.91	0.03	1.26

Intersection Summary

- ~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
- # 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
- m Volume for 95th percentile queue is metered by upstream signal.
- dr Defacto Right Lane. Recode with 1 though lane as a right lane.

HCM Signalized Intersection Capacity Analysis

1: US 301 & Route 17/US 17 (Tidewater Trail)

09/12/2019



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↗	↗↘		↗	↘		↗	↗↘				
Traffic Volume (vph)	95	700	1099	23	154	353	27	1706	26	0	0	0
Future Volume (vph)	95	700	1099	23	154	353	27	1706	26	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.8	5.7		5.8	5.8		6.5	6.5				
Lane Util. Factor	1.00	0.95		1.00	1.00		1.00	0.95				
Frt	1.00	0.91		1.00	0.90		1.00	1.00				
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00				
Satd. Flow (prot)	1736	3098		1719	1476		1805	3133				
Flt Permitted	0.20	1.00		0.09	1.00		0.95	1.00				
Satd. Flow (perm)	358	3098		164	1476		1805	3133				
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	97	714	1121	23	157	360	28	1741	27	0	0	0
RTOR Reduction (vph)	0	229	0	0	29	0	0	1	0	0	0	0
Lane Group Flow (vph)	97	1606	0	23	488	0	28	1767	0	0	0	0
Heavy Vehicles (%)	4%	4%	7%	5%	16%	15%	0%	15%	13%	7%	11%	1%
Turn Type	pm+pt	NA		pm+pt	NA		Split	NA				
Protected Phases	3	8		7	4		2	2				
Permitted Phases	8			4								
Actuated Green, G (s)	53.0	46.8		47.7	44.1		51.6	51.6				
Effective Green, g (s)	53.0	46.8		47.7	44.1		51.6	51.6				
Actuated g/C Ratio	0.44	0.39		0.40	0.37		0.43	0.43				
Clearance Time (s)	5.8	5.7		5.8	5.8		6.5	6.5				
Vehicle Extension (s)	3.0	3.0		3.0	3.0		5.5	5.5				
Lane Grp Cap (vph)	229	1208		111	542		776	1347				
v/s Ratio Prot	c0.02	c0.52		0.01	0.33		0.02	c0.56				
v/s Ratio Perm	0.16			0.08								
v/c Ratio	0.42	1.37dr		0.21	0.90		0.04	1.31				
Uniform Delay, d1	23.3	36.6		28.9	35.9		19.8	34.2				
Progression Factor	0.96	1.09		1.00	1.00		1.00	1.00				
Incremental Delay, d2	0.8	152.1		0.9	18.0		0.1	145.7				
Delay (s)	23.3	192.1		29.8	53.8		19.9	179.9				
Level of Service	C	F		C	D		B	F				
Approach Delay (s)		183.6			52.8			177.4			0.0	
Approach LOS		F			D			F			A	

Intersection Summary

HCM 2000 Control Delay	164.4	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.30		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	18.1
Intersection Capacity Utilization	122.7%	ICU Level of Service	H
Analysis Period (min)	15		

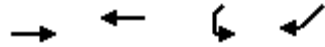
dr Defacto Right Lane. Recode with 1 though lane as a right lane.

c Critical Lane Group

Queues

5: Route 17 & Couplet

09/12/2019



Lane Group	EBT	WBT	SWL	SWR
Lane Group Flow (vph)	296	190	1763	96
v/c Ratio	0.61	0.39	0.78	0.09
Control Delay	44.9	22.4	17.1	1.6
Queue Delay	70.5	0.0	1.6	0.0
Total Delay	115.5	22.4	18.7	1.6
Queue Length 50th (ft)	202	54	448	0
Queue Length 95th (ft)	297	m81	543	18
Internal Link Dist (ft)	1702	573	587	
Turn Bay Length (ft)				
Base Capacity (vph)	489	489	2274	1081
Starvation Cap Reductn	0	0	0	0
Spillback Cap Reductn	353	0	318	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	2.18	0.39	0.90	0.09

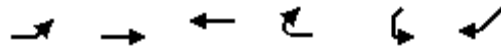
Intersection Summary

m Volume for 95th percentile queue is metered by upstream signal.

HCM Signalized Intersection Capacity Analysis

5: Route 17 & Couplet

09/12/2019



Movement	EBL	EBT	WBT	WBR	SWL	SWR
Lane Configurations		↑	↑		↗↘	↗
Traffic Volume (vph)	0	272	175	0	1622	88
Future Volume (vph)	0	272	175	0	1622	88
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.5	4.5		4.5	4.5
Lane Util. Factor		1.00	1.00		0.97	1.00
Frt		1.00	1.00		1.00	0.85
Flt Protected		1.00	1.00		0.95	1.00
Satd. Flow (prot)		1863	1863		3433	1583
Flt Permitted		1.00	1.00		0.95	1.00
Satd. Flow (perm)		1863	1863		3433	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	296	190	0	1763	96
RTOR Reduction (vph)	0	0	0	0	0	32
Lane Group Flow (vph)	0	296	190	0	1763	64
Turn Type		NA	NA		Prot	Perm
Protected Phases		4	8		2	
Permitted Phases						2
Actuated Green, G (s)		31.5	31.5		79.5	79.5
Effective Green, g (s)		31.5	31.5		79.5	79.5
Actuated g/C Ratio		0.26	0.26		0.66	0.66
Clearance Time (s)		4.5	4.5		4.5	4.5
Vehicle Extension (s)		3.0	3.0		3.0	3.0
Lane Grp Cap (vph)		489	489		2274	1048
v/s Ratio Prot		c0.16	0.10		c0.51	
v/s Ratio Perm						0.04
v/c Ratio		0.61	0.39		0.78	0.06
Uniform Delay, d1		38.8	36.3		14.1	7.1
Progression Factor		1.00	0.57		1.00	1.00
Incremental Delay, d2		2.1	1.5		2.7	0.1
Delay (s)		40.9	22.1		16.7	7.2
Level of Service		D	C		B	A
Approach Delay (s)		40.9	22.1		16.2	
Approach LOS		D	C		B	

Intersection Summary

HCM 2000 Control Delay	19.8	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.73		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	68.1%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

APPENDIX I
Transportation Options:
Public Outreach Data



Sign-in sheet

Route 301 Corridor Study - Town of Port Royal Community Meeting
Caroline County

Wednesday, August 28, 2019

Fredericksburg District

Name	Affiliation	Email Address
1 Bob Green	Port Royal Trading Post	B.GreenSidings@Comcast.net
2 John & Carolyn Davis	St. Peter's Church Historic Port Royal	cookiejfd@gmail.com
3 Alex Long	Town Port Royal	ALONG@CEIM-NET
4 Sharon Farmer	" "	SBF@S@aol.com
5 Bruce Lee	Randolphs on the River	WareCreech Rd@yahoo.com
6 Margaret Ayler	25710 AP Hill Blvd	
7 Susan / [unclear]	POB / 922 Port Royal	
8 Terri Harrison	Town Clerk	townofportroyal1744@gmail.com
9 Jim & Elizabeth Heimbach	923 Water St.	eheimbach@aol.com JH@JHEIMBACH.COM
10 TONY LIPPA	SHERIFF OF CAROLINE	TLIPPA@Co.CAROLINE.VA.US



Sign-in sheet

Route 301 Corridor Study - Town of Port Royal Community Meeting
Caroline County

Wednesday, August 28, 2019

Fredericksburg District

Name	Affiliation	Email Address
1 Carolyn Davis	Historic Port Royal	cookiejfd@gmail.com
2 Winnie Booher	Landowner	clerwin13booker@gmail.com
3 Doree J. Lee	Landowner	WARECREEK Rd@yahoo.com
4 Phyllis Carpenter	Landowner / planning commission	wcarpenter@msn.com
5 Donna Wilkerson	Town Council	dwprvalbe@gmail.com
6 CL FLORA	BUS OWNER	WA FLORA 01 @ AOL.COM
7 BERN MAHON	PROPERTY OWNER	bern.mahon@raymondjames.com
8 Mark McCaskill	measkill@gunregions	FAMG/GWR
9 Travis Presenberg	tg.bikes@aol.com	Port Royal
10 Jane M. Robinson	landowner	robins-prva@yahoo.com



Sign-in sheet

Route 301 Corridor Study - Town of Port Royal Community Meeting
Caroline County

Wednesday, August 28, 2019

Fredericksburg District

Name	Affiliation	Email Address
1 David Carpenter	Port Royal Resident	WCarpenterii@msn.com
2 Kerri Holland	Historic Port Royal Inc (501c3) Land owner	kholland265@gmail.com robins_puva@hotmail.com
3 Rob Robinson		
4 Tamaka Lockerr	Owner	
5 Holly Taylor	Owner	
6 William H. Booker	OWNER HOUSE IN TOWN & FARM 301 W17	1311 BookersTnAve.com
7 Tammy B. Goudna	Land owner	
8 Linda Millsaps	GWRC	millsaps@qwregion.org
9 Chris Meyer	Resident	
10 Linda LaSut	VDOT - F'burg	linda.lasut@vdot.virginia.gov



Sign-in sheet

Route 301 Corridor Study - Town of Port Royal Community Meeting
Caroline County

Wednesday, August 28, 2019

Fredericksburg District

	Name	Affiliation	Email Address
1	Paul Robinson	shop in PR	JUNKCARS4@AOL-COM
2	Tim Locken	Live in PR	
3	Nancy Long	Live in PR	long5long@aol.com
4	Denver Potter	Town Council	DTrain62691@Gmail
5	Bonnie Cannon	Historic Port Royal Museum	Concans
6	J. C. Hutchins	Land Owner	Jgoldman@ymail.com
7	Marie Partic Michelle Shropshire		
8	Kelly Hannon Stephen Hayes		
9	Yolanda Lakeshan Kylie Cariness		
10	Steve Crowther Peter Hechic Lynn Keenan		



Route 301 – Port Royal Arterial Management Study Comment Form

Please consider the options shown below for proposed changes to the intersection of Route 301 and Route 17 and thru town. You may use the space provided to share any impressions, concerns, and suggestions. Each option has the ability to advance into more detailed planning to be refined and pursue construction funding. Thank you for sharing your thoughts and suggestions!

Intersection of Route 301 and Route 17 Improvements to Existing Intersection



Quadrant Intersection



Quadrant Intersection with Market Street Extension



Donnell Perdue

Participant Information & Comments

Your Business or Neighborhood:

Ways you travel/use the corridor:

Your Name:

Your Email or phone:

Wish to stay involved (check all that apply)

Willing to participate in steering committee

Want to be informed of planning meetings

Will track progress through website and public media

Like Dislike No Preference

Why/Why not:

Like Dislike No Preference

Why/Why not:

Like Dislike No Preference

Why/Why not:

Market Street Extended



Route 301 through Town

One-Way Pair "Couplet"



Two-Way Left-Turn Lane



Full Raised Median



Additional comments you wish to share:

Participant Comments

Like Dislike No Preference

Why/Why not: *Does not solve anything*

Like Dislike No Preference

Why/Why not: *Best Plan*

Like Dislike No Preference

Why/Why not: *THIS IS MY HOUSE!*

Like Dislike No Preference

Why/Why not:



Route 301 – Port Royal Arterial Management Study Comment Form

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Intersection of Route 301 and Route 17 Improvements to Existing Intersection



Quadrant Intersection



Quadrant Intersection with Market Street Extension



Could you smart scale apply for funds

Participant Information & Comments

Your Business or Neighborhood:

Ways you travel/use the corridor:

Your Name:

Your Email or phone:

Wish to stay involved (check all that apply)

Willing to participate in steering committee

Want to be informed of planning meetings

Will track progress through website and public media

Like Dislike No Preference

Why/Why not: *supports businesses Restaurant, Antiques stores + museum traffic heading N. and S.*

Like Dislike No Preference

Why/Why not: *Takes away from Business. Town relies on Restaurant taxes*

Like Dislike No Preference

Why/Why not: *see above.*



Market Street Extended



Route 301 through Town

One-Way Pair "Couplet"



Two-Way Left-Turn Lane



Full Raised Median



Additional comments you wish to share:

Speed enforcement via road side camera; digital speed radar on North + South Bound; Beautification adds to environment change + unconsciously speed reduction

Participant Comments

Like Dislike No Preference

Why/Why not:

Like Dislike No Preference

Why/Why not: Land acquisition - will get stuck in litigation; very invasive. Negative impact to existing businesses. Negative impact to waterfront home + business and Historic Resources (identified + unidentified) - archaeology.

Like Dislike No Preference

Why/Why not: First choice. Least invasive; however impact to historic resources (NRHP-listed) needs to be minimized.

Like Dislike No Preference

Why/Why not:

But limits where turns are permitted



Route 301 – Port Royal Arterial Management Study Comment Form

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Intersection of Route 301 and Route 17 Improvements to Existing Intersection



Quadrant Intersection



Quadrant Intersection with Market Street Extension



Participant Information & Comments

Your Business or Neighborhood:

Ways you travel/use the corridor:

Your Name:

Your Email or phone:

Wish to stay involved (check all that apply)

Willing to participate in steering committee

Want to be informed of planning meetings

Will track progress through website and public media

Like Dislike No Preference

Why/Why not:

Like Dislike No Preference

Why/Why not:

Like Dislike No Preference

Why/Why not:

Market Street Extended



Route 301 through Town

One-Way Pair "Couplet"



Two-Way Left-Turn Lane



Full Raised Median



Additional comments you wish to share:

Participant Comments

Like Dislike No Preference

Why/Why not:

accomplishes little

Like Dislike No Preference

Why/Why not:

This SCENARIO with ALEG to Rt. 301 South would also fix intersection AND cheapest solution

Like Dislike No Preference

Why/Why not:

does little to address volumes

Like Dislike No Preference

Why/Why not:



Route 301 – Port Royal Arterial Management Study Comment Form

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Intersection of Route 301 and Route 17 Improvements to Existing Intersection



Quadrant Intersection



Quadrant Intersection with Market Street Extension



Participant Information & Comments

Your Business or Neighborhood:

Ways you travel/use the corridor:

Your Name:

Your Email or phone:

Wish to stay involved (check all that apply)

Willing to participate in steering committee

Want to be informed of planning meetings

Will track progress through website and public media

Like Dislike No Preference

Why/Why not: *won't solve problem*

Like Dislike No Preference

Why/Why not: *Comes in on our driveway and pool. Very dumb plan. Look into a road on other side of car lot.*

Like Dislike No Preference

Why/Why not: *doesn't solve problem*

Market Street Extended



Route 301 through Town

One-Way Pair "Couplet"



Two-Way Left-Turn Lane



Full Raised Median



Additional comments you wish to share:

Participant Comments

Like Dislike No Preference

Why/Why not: *does not allow right turn*

Like Dislike No Preference

Why/Why not: *diverts traffic out of town, esp. tractor trailers*

Like Dislike No Preference

Why/Why not: *too dangerous*

Like Dislike No Preference

Why/Why not: *too dangerous*



Route 301 – Port Royal Arterial Management Study Comment Form

Please consider the options shown below for proposed changes to the intersection of Route 301 and Route 17 and thru town. You may use the space provided to share any impressions, concerns, and suggestions. Each option has the ability to advance into more detailed planning to be refined and pursue construction funding. Thank you for sharing your thoughts and suggestions!

Intersection of Route 301 and Route 17 Improvements to Existing Intersection



Quadrant Intersection



Quadrant Intersection with Market Street Extension



Participant Information & Comments

Your Business or Neighborhood:

Ways you travel/use the corridor:

Your Name:

Your Email or phone:

Wish to stay involved (check all that apply)

Willing to participate in steering committee

Want to be informed of planning meetings

Will track progress through website and public media

Like Dislike No Preference

Why/Why not:

Will help w/ traffic backups

Like Dislike No Preference

Why/Why not:

CONFUSING to drivers

Like Dislike No Preference

Why/Why not:

Too expensive



Market Street Extended



Route 301 through Town

One-Way Pair "Couplet"



Two-Way Left-Turn Lane



Full Raised Median



Additional comments you wish to share:

Participant Comments

Like Dislike No Preference

Why/Why not:

Like Dislike No Preference

Why/Why not:

Like Dislike No Preference

Why/Why not:

Like Dislike No Preference

Why/Why not:



Route 301 – Port Royal Arterial Management Study Comment Form

Please consider the options shown below for proposed changes to the intersection of Route 301 and Route 17 and thru town. You may use the space provided to share any impressions, concerns, and suggestions. Each option has the ability to advance into more detailed planning to be refined and pursue construction funding. Thank you for sharing your thoughts and suggestions!

Intersection of Route 301 and Route 17 Improvements to Existing Intersection



Quadrant Intersection



Quadrant Intersection with Market Street Extension



Participant Information & Comments

Your Business or Neighborhood:

Ways you travel/use the corridor:

Your Name:

Your Email or phone:

Wish to stay involved (check all that apply)

Willing to participate in steering committee

Want to be informed of planning meetings

Will track progress through website and public media

Like Dislike No Preference

Why/Why not:

*IT Doesnt Hurt Commer
Businesses*

Like Dislike No Preference

Why/Why not:

Like Dislike No Preference

Why/Why not:



Market Street Extended



Route 301 through Town

One-Way Pair "Couplet"



Two-Way Left-Turn Lane



Full Raised Median



Additional comments you wish to share:

Participant Comments

Like Dislike No Preference

Why/Why not:

Like Dislike No Preference

Why/Why not:

Like Dislike No Preference

Why/Why not: *Helps LOCAL BUSSINESS*

Like Dislike No Preference

Why/Why not: *Helps LOCAL BUSSINESS*



Route 301 – Port Royal Arterial Management Study Comment Form

Please consider the options shown below for proposed changes to the intersection of Route 301 and Route 17 and thru town. You may use the space provided to share any impressions, concerns, and suggestions. Each option has the ability to advance into more detailed planning to be refined and pursue construction funding. Thank you for sharing your thoughts and suggestions!

Intersection of Route 301 and Route 17 Improvements to Existing Intersection



Quadrant Intersection



Quadrant Intersection with Market Street Extension



Participant Information & Comments

Your Business or Neighborhood: *Caroline County*

Ways you travel/use the corridor: *17 TO 301*

Your Name: *E. DEERWIND BOOKER, JR*

Your Email or phone: *deerwindbooker@gmail.com*
804-435-9610

Wish to stay involved (check all that apply)

Willing to participate in steering committee

Want to be informed of planning meetings

Will track progress through website and public media

Like Dislike No Preference

Why/Why not: *LEAST DISTURBANCE,*
PROBABLY LEAST EXPENSIVE

Like Dislike No Preference

Why/Why not:

CLOSE TO INTERSECTION

Like Dislike No Preference

Why/Why not:

Market Street Extended



Route 301 through Town

One-Way Pair "Couplet"



Two-Way Left-Turn Lane



Full Raised Median



Additional comments you wish to share:

Participant Comments

Like Dislike No Preference

Why/Why not:

Farming operations

Like Dislike No Preference

Why/Why not:

Farming operations

Like Dislike No Preference

Why/Why not:

Like Dislike No Preference

Why/Why not:



Route 301 – Port Royal Arterial Management Study Comment Form

Please consider the options shown below for proposed changes to the intersection of Route 301 and Route 17 and thru town. You may use the space provided to share any impressions, concerns, and suggestions. Each option has the ability to advance into more detailed planning to be refined and pursue construction funding. Thank you for sharing your thoughts and suggestions!

Intersection of Route 301 and Route 17 Improvements to Existing Intersection



Quadrant Intersection



Quadrant Intersection with Market Street Extension



Participant Information & Comments

Your Business or Neighborhood: *Neighborhood*

Ways you travel/use the corridor:

Your Name: *Tammy B. Gouldman*

Your Email or phone: *804-761-2465*

Wish to stay involved (check all that apply)

Willing to participate in steering committee

Want to be informed of planning meetings

Will track progress through website and public media

Like Dislike No Preference

Why/Why not:

Like Dislike No Preference

Why/Why not:

Like Dislike No Preference

Why/Why not:



Market Street Extended



Route 301 through Town

One-Way Pair "Couplet"



Two-Way Left-Turn Lane



Full Raised Median



Additional comments you wish to share:

Participant Comments

Like Dislike No Preference

Why/Why not:

Like Dislike No Preference

Why/Why not:

Like Dislike No Preference

Why/Why not:

Like Dislike No Preference

Why/Why not:



Route 301 – Port Royal Arterial Management Study Comment Form

Please consider the options shown below for proposed changes to the intersection of Route 301 and Route 17 and thru town. You may use the space provided to share any impressions, concerns, and suggestions. Each option has the ability to advance into more detailed planning to be refined and pursue construction funding. Thank you for sharing your thoughts and suggestions!

Intersection of Route 301 and Route 17 Improvements to Existing Intersection



Quadrant Intersection



Quadrant Intersection with Market Street Extension



Participant Information & Comments

Your Business or Neighborhood: *Corner of 301+17*

Ways you travel/use the corridor: *Live here*

Your Name: *James E. Gouldman III*

Your Email or phone: *804-761-2466*

Wish to stay involved (check all that apply)

- Willing to participate in steering committee
- Want to be informed of planning meetings
- Will track progress through website and public media

Like Dislike No Preference

Why/Why not:

Like Dislike No Preference

Why/Why not:

Like Dislike No Preference

Why/Why not:

Market Street Extended



Route 301 through Town

One-Way Pair "Couplet"



Two-Way Left-Turn Lane



Full Raised Median



Additional comments you wish to share:

Participant Comments

Like Dislike No Preference

Why/Why not:

why not

Like Dislike No Preference

Why/Why not:

It will directly effect
my home my property
and my life

Like Dislike No Preference

Why/Why not:

Like Dislike No Preference

Why/Why not:

more maintaince



Route 301 – Port Royal Arterial Management Study Comment Form

Please consider the options shown below for proposed changes to the intersection of Route 301 and Route 17 and thru town. You may use the space provided to share any impressions, concerns, and suggestions. Each option has the ability to advance into more detailed planning to be refined and pursue construction funding. Thank you for sharing your thoughts and suggestions!

Intersection of Route 301 and Route 17 Improvements to Existing Intersection



Quadrant Intersection



Quadrant Intersection with Market Street Extension



Participant Information & Comments

Your Business or Neighborhood:

Ways you travel/use the corridor:

Your Name: *Lauren Goldman*

Your Email or phone: *(804) 994-8127*

Wish to stay involved (check all that apply)

Willing to participate in steering committee

Want to be informed of planning meetings

Will track progress through website and public media

Like Dislike No Preference

Why/Why not:

Like Dislike No Preference

Why/Why not:

Like Dislike No Preference

Why/Why not:



Market Street Extended



Route 301 through Town

One-Way Pair "Couplet"



Two-Way Left-Turn Lane



Full Raised Median



Additional comments you wish to share:

Participant Comments

Like Dislike No Preference

Why/Why not:

Like Dislike No Preference

Why/Why not:

Like Dislike No Preference

Why/Why not:

Like Dislike No Preference

Why/Why not:



Route 301 – Port Royal Arterial Management Study Comment Form

Please consider the options shown below for proposed changes to the intersection of Route 301 and Route 17 and thru town. You may use the space provided to share any impressions, concerns, and suggestions. Each option has the ability to advance into more detailed planning to be refined and pursue construction funding. Thank you for sharing your thoughts and suggestions!

Intersection of Route 301 and Route 17 Improvements to Existing Intersection



Quadrant Intersection



Quadrant Intersection with Market Street Extension



Participant Information & Comments

Your Business or Neighborhood: *Port Royal*

Ways you travel/use the corridor: *commute*

Your Name: *Jim Heimbach*

Your Email or phone: *JH@JHEIMBACH.COM*

Wish to stay involved (check all that apply)

Willing to participate in steering committee

Want to be informed of planning meetings

Will track progress through website and public media

Like Dislike No Preference

Why/Why not:

Like Dislike No Preference

Why/Why not:

Like Dislike No Preference

Why/Why not:



Market Street Extended



Route 301 through Town

One-Way Pair "Couplet"



Two-Way Left-Turn Lane



Full Raised Median



Additional comments you wish to share:

Participant Comments

Like Dislike No Preference

Why/Why not:

Like Dislike No Preference

Why/Why not:

Like Dislike No Preference

Why/Why not:

Like Dislike No Preference

Why/Why not:

Route 301 – Port Royal Arterial Management Study Comment Form

Please consider the options shown below for proposed changes to the intersection of Route 301 and Route 17 and thru town. You may use the space provided to share any impressions, concerns, and suggestions. Each option has the ability to advance into more detailed planning to be refined and pursue construction funding. Thank you for sharing your thoughts and suggestions!

Intersection of Route 301 and Route 17 Improvements to Existing Intersection



Quadrant Intersection



Quadrant Intersection with Market Street Extension



Participant Information & Comments

Your Business or Neighborhood: Co-owner of 120 Acres
 Port Royal Landowner - Farmer

Ways you travel/use the corridor:

Route 301 + Rt 17

Your Name:

C. B. Holloway

Your Email or phone:

307-382-8951

Wish to stay involved (check all that apply)

- Willing to participate ^{by phone or writing} in steering committee
- Want to be informed of planning meetings
- Will track progress through website and public media

Like Dislike No Preference

Why/Why not: Anytime you improve an existing ~~an~~ intersection traffic flows better and safer. This plan would cost less, it is safer and is best possible solution.

Like Dislike No Preference

Why/Why not:

This plan slows traffic and stops traffic with 2 additional traffic lights. If just does not work and is unsafe because of Backup on Rt. 301, cost more than improvement at existing intersection plan.

Like Dislike No Preference

Why/Why not:

This plan is too complex with stopped traffic with 2 additional traffic lights. May cause Backup on Rt 301 which would be unsafe. Cost more than improvements at existing intersection plan.

Market Street Extended



Route 301 through Town

One-Way Pair "Couplet"



Two-Way Left-Turn Lane



Full Raised Median



*
New
Additional Plan

Additional comments you wish to share:

For future plans or For Right now, you did not consider using the South Side of 301. There is a large tract of Federal Land owned by U.S. Fish and Wildlife Service. This is a vacant field that could connect from the Port Royal Bridge down Water Street to this existing field and connected to Route 17 south south of Port Royal similar to the proposed Market Street extended plan. But the road extension would start sooner. For future needs this road could go through A.P. Hill Land behind Hornes Restaurant and be the the main North Bound hand of 301 when the Traffic exceeds the Limits. Going through 2 Tracts of Federal Land would Not interfere with Private hand and reduce County Cost.

Participant Comments

Like Dislike No Preference

Why/Why not: This plan would work and would take some of the congestion away from the cross Roads and could be used if in an emergency if 301 was blocked by an accident.

Like Dislike No Preference

Why/Why not: This is the most costly and it takes in the most private hand. This plan should not be part of VDOT study Plan. This plan would hurt the most people and separate crop and farm land. County and Town would have to apply for funding with high cost.

Like Dislike No Preference

Why/Why not: The Double left turn lane is the most needed. This would solve the problem area the quickest. Also this is the low cost solution. This would qualify for VDOT smart scale funding. This is a safe way project.

Like Dislike No Preference

Why/Why not: This plan Also would qualify for VDOT smart scale funding. This is a low cost solution and would solve the problem and the best for safety.

Please return to Linda LaSut, VDOT, by Sept 11, 2019

email: linda.lasut@vdot.virginia.gov



Route 301 – Port Royal Arterial Management Study Comment Form

Please consider the options shown below for proposed changes to the intersection of Route 301 and Route 17 and thru town. You may use the space provided to share any impressions, concerns, and suggestions. Each option has the ability to advance into more detailed planning to be refined and pursue construction funding. Thank you for sharing your thoughts and suggestions!

Intersection of Route 301 and Route 17 Improvements to Existing Intersection



Quadrant Intersection



Quadrant Intersection with Market Street Extension



Participant Information & Comments

Your Business or Neighborhood:

Ways you travel/use the corridor:

Your Name: *Tim Locklear*

Your Email or phone:

Wish to stay involved (check all that apply)

Willing to participate in steering committee

Want to be informed of planning meetings

Will track progress through website and public media

Like Dislike No Preference

Why/Why not:

- possible least effect on private property

Like Dislike No Preference

Why/Why not:

- Against new "cut through" taking private property

Like Dislike No Preference

Why/Why not:

- Do not want Cut through, Increased traffic in Town Residential Area

Market Street Extended



Participant Comments

Like Dislike No Preference

Why/Why not:

- Do not want Market St. Extended due to Cut through/Increased traffic in Residential Area

Route 301 through Town



Like Dislike No Preference

Why/Why not:

- not in favor of "bypass"
- Don't want to lose Agriculture lands
- Don't want chance of increased Development

Two-Way Left-Turn Lane



Like Dislike No Preference

Why/Why not:

Full Raised Median



Like Dislike No Preference

Why/Why not:

Additional comments you wish to share:

- Do not see need for sidewalks along 301 (will just take more private property)
- ² - No one way streets in town
- would like lower speed limit & stoplights on 301

Locklerr
PO Box 22
Rappahannock Academy, VA 22538



Stephen Haynes
VDOT Fredericksburg District Planning Manager
87 Ocean Rd
Fredericksburg, VA 22405

22405\$2503 C017





Route 301 – Port Royal Arterial Management Study Comment Form

Please consider the options shown below for proposed changes to the intersection of Route 301 and Route 17 and thru town. You may use the space provided to share any impressions, concerns, and suggestions. Each option has the ability to advance into more detailed planning to be refined and pursue construction funding. Thank you for sharing your thoughts and suggestions!

Intersection of Route 301 and Route 17 Improvements to Existing Intersection



Quadrant Intersection



Quadrant Intersection with Market Street Extension



Participant Information & Comments

Your Business or Neighborhood: 25710 A.P. Hill Blvd.

Ways you travel/use the corridor: 301 North + South + 17 North + South

Your Name: Margaret Moberg

Your Email or phone: 540-645-4500

Wish to stay involved (check all that apply)

Willing to participate in steering committee

Want to be informed of planning meetings

Will track progress through website and public media

Like Dislike No Preference

Why/Why not:

It would help. The traffic does as it please

Like Dislike No Preference

Why/Why not:

Not a good idea, crossing two ways.

Like Dislike No Preference

Why/Why not:

Don't think you all should mess with the historic town!



Market Street Extended



Route 301 through Town

One-Way Pair "Couplet"



Two-Way Left-Turn Lane



Full Raised Median



Additional comments you wish to share:

Need ditches on 301 cleared so water will flow & not fill up & sit on main road.
2 Also gravel when driveway meets blacktop.

Participant Comments

Like Dislike No Preference

Why/Why not:

Leave his town town as is

Like Dislike No Preference

Why/Why not:

Not practical

Like Dislike No Preference

Why/Why not:

Not practical

Like Dislike No Preference

Why/Why not:

Need lights to cross to get to post office.

Town Council
Town of Port Royal, VIRGINIA

RESOLUTION

At a regular meeting of the Town of Port Royal Town Council (Town Council) held in the Port Royal Town Hall, 419 King Street, Port Royal, VA, on this the 10th day of September 2019

MEMBERS: VOTE:

VOTE

Alex Long, Mayor	Yes
Sharon Farmer, Vice Mayor	Yes
Bill Henderson	Yes
Gladys Fortune	Yes
J.P. Wilkerson	NO
Jeff Isaac	Yes
Donna Wilkerson	Yes

On motion of Jeff Isaacs, seconded by, Bill Henderson which carried by a vote of 6/1, the following was adopted:

A RESOLUTION to adopt and communicate to the Virginia Department of Transportation (VDOT) the attached document "Comments to VDOT Route 301 – Port Royal Arterial Management Study"; and

WHEREAS, the study "*US 301 / Route 207 Arterial Preservation Plan, King George & Caroline Counties*; June 15, 2018; Prepared for: Virginia Department of Transportation; Prepared by: Michael Baker International" presents compelling facts and analysis as to the Route 301 corridor becoming an 'Eastern Bypass' for I-95, north/south traffic; coupled with higher traffic volumes and impacts of an enlarged and modern Route 301 bridge over the Potomac River; and

WHEREAS, VDOT has presented materials and information featuring various scenarios of changes to Routes 301 (Main Street) and 17 in terms of (i) through traffic; and (ii) intersection improvements; and

WHEREAS, the Port Royal Town Council and Port Royal Planning Commission have studied the VDOT proposals, and other concepts; and have taken under consideration comments and testimony of citizens of Port Royal and the surrounding area, and other stakeholders; and

WHEREAS, Route 301 is “Main Street” for its entire length in the Town of Port Royal, and as such functions as much a means of local travel and commerce as an arterial for through traffic; and

WHEREAS, negative impacts from solutions proposed by VDOT are overwhelmingly deleterious to this community as well as the through traffic of local, regional, state, and interstate origins/destinations; and

WHEREAS, to promote the health, safety, and general welfare of the Town of Port Royal and related stakeholders to this corridor study; and

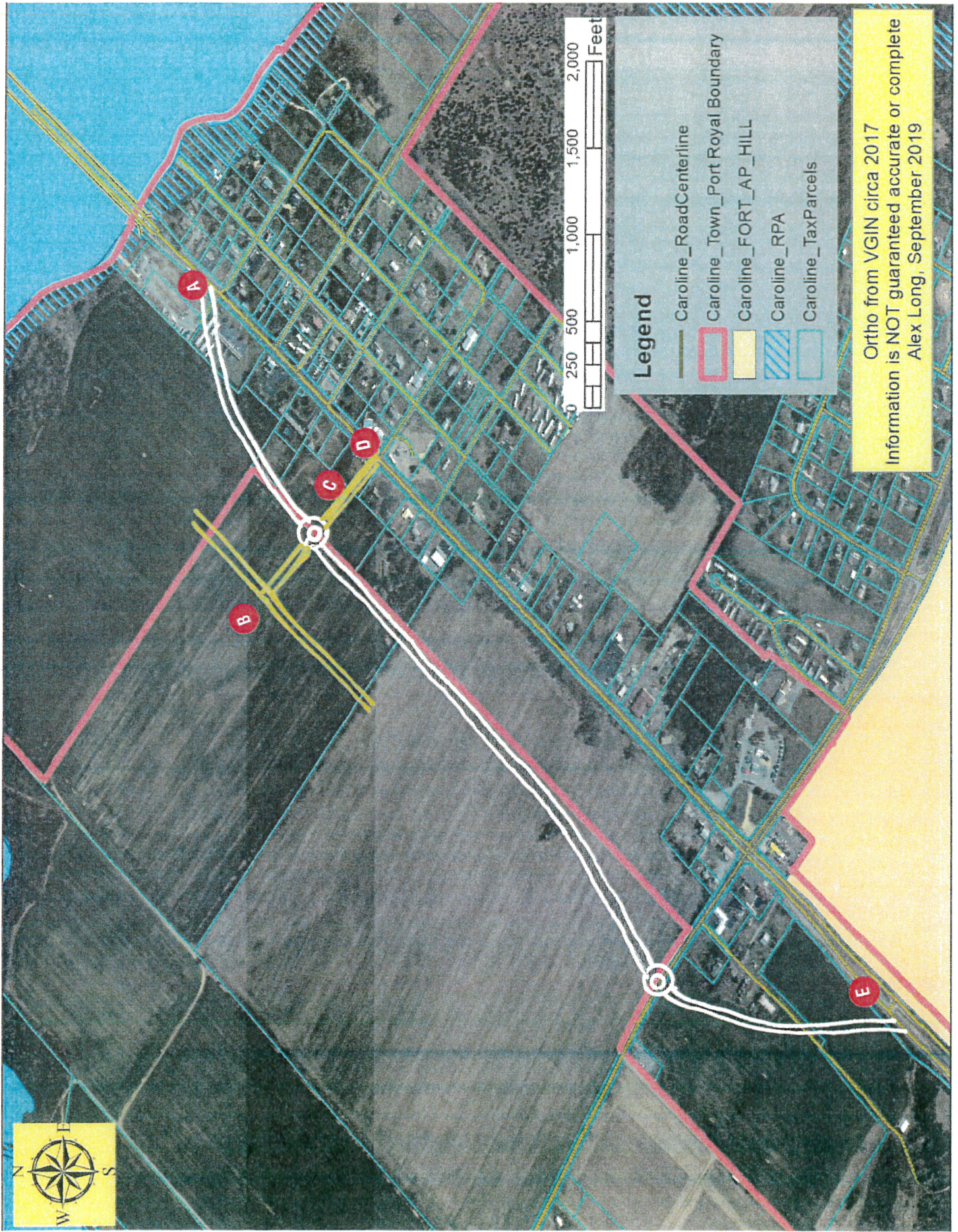
NOW, THEREFORE, BE IT RESOLVED by the Town Council of the Town of Port Royal on this the 10th day of September, 2019, that the attached document, “Comments to VDOT Route 301 – Port Royal Arterial Management Study” is hereby adopted as a general guide and basis to move forward in collaboration and cooperation with VDOT; and to be communicated to VDOT and entered into the formal VDOT record as an official comment from the Town of Port Royal to the VDOT “Route 301 – Port Royal Arterial Management Study”.

ATTEST

A handwritten signature in blue ink that reads "M. Therese Harrison". The signature is written in a cursive style and is positioned above a solid horizontal line.

M. Therese Harrison, Town Clerk,

Town of Port Royal, Virginia



GOALS

VDOT

Perceived goals of Virginia Department of Transportation (VDOT) are the safe and efficient movement of traffic at reasonable cost. Maintaining integrity of a network of arterial highways is a necessity to achieve efficiency and safety of traffic movements.

TOWN of PORT ROYAL

Safety is critical: reasonable access and movement (including left turns) of local vehicular, pedestrian and bicycle traffic is a major goal of the Town of Port Royal (Town). Equally important is the goal of *Main Street* (Town name for Route 301) which functions in its historical role as a gathering area for various public purposes such as post office, museums, historical context for structures and events, and commerce. Ability to perform traffic movements such as left turns is essential. Respecting the historic resources of the Town is essential.

COLLABORATION/COOPERATION

Recognizing shared interests between the parties is the first step to generate mutual benefits and arrive at a common solution. Differences must be resolved through the hard work of arriving at new concepts, built using portions of the VDOT study of the Rt. 301 corridor in a framework of mutual respect. Caroline County will also be a major stakeholder in creating functioning solutions.

SUMMARY

NEED AND IMPETUS

- Traffic volumes will increase as a result of the new Rt. 301 bridge over the Potomac River; from two lanes to four lanes with shoulders;

- Traffic volumes will increase as a result of traffic seeking a north/south alternative to Interstate 95 and promotion of the Route 301 corridor as an 'Eastern Bypass' for Washington, D.C.;
- Traffic volumes will increase as a result of organic growth of the background traffic volumes;
- Tables of anticipated traffic flows, follow; table data from *US 301 / Route 207 Arterial Preservation Plan King George & Caroline Counties*; June 15, 2018; Prepared by: Michael Baker International.

Travel volume across the bridge is expected to more than double from 2006 levels.

Average Summer Weekend Day Daily Traffic Volumes at the Nice Bridge						
Day	2006 (June through August)			2030		
	Northbound	Southbound	Total	Northbound	Southbound	Total
Saturday	10,024	10,776	20,800	20,528	22,072	42,600
Sunday	11,674	8,426	20,100	23,870	17,230	41,100

Average Weekday at the Nice Bridge					
2004 (October)			2030		
8,670	8,430	17,100	17,745	17,255	35,000

Source: Governor Harry W. Nice Memorial Bridge Improvement Project Environmental

Comments to VDOT Route 301 – Port Royal Arterial Management Study
Town of Port Royal, Virginia

Segment	From	To	2017	2040
VA 207	US 1 Jefferson Davis Hwy	I-95	8,100	15,900
	I-95	Route 601 S, Penola Rd	10,000	19,600
	Route 601 S, Penola Rd	Route 722 Milford	13,000	25,500
	Route 722 Milford	Bus SR 207	12,000	23,500
	Bus SR 207	US 301 Richmond Tpke	9,200	18,000
US 301	SR 207	Bus US 301, Bus SR 207 Broadus Ave	10,000	19,600
	Bus US 301, Bus SR 207 Broadus Ave	NCL Bowling Green; Route 608 Lakewood Rd	11,000	21,600
US 301	Route 608 Lakewood Rd	US 17 Tidewater Trail	9,300	18,200
	US 17 Tidewater Trail	SCL Port Royal	15,000	29,400
Bus US 301,	SCL Port Royal	NCL Port Royal	15,000	29,400
VA 2	NCL Port Royal	King George County Line	15,000	29,400
US 301	Caroline County Line	Route 623 Jersey Rd	14,000	27,400
	Route 623 Jersey Rd	SR 3 Kings Hwy	14,000	27,400
	SR 3 Kings Hwy	SR 205 Ridge Rd	14,000	27,400
	SR 205 Ridge Rd	SR 218 Windsor Dr	16,000	31,400
	SR 218 Windsor Dr	SR 206 Dahlgren Rd	21,000	41,200
	SR 206 Dahlgren Rd	Maryland State Line	26,000	51,000

Source, above and below: **US 301 / Route 207 Arterial Preservation Plan King George & Caroline Counties**; June 15, 2018

1.1.1. WHAT IS THE ARTERIAL PRESERVATION PROGRAM?

VDOT's Arterial Preservation Program is designed to preserve and enhance the capacity and safety of the critical transportation highways included in the Arterial Preservation Network. These major highways accommodate long-distance mobility of people and goods throughout the Commonwealth. Preserving mobility on these corridors is critical to the current and future economy. The Arterial Preservation Network includes segments of selected major highways that are part of the Corridors of Statewide Significance (CoSS) system or are functionally classified as principal or other principal arterials.

Within the framework of the Arterial Preservation Program, VDOT is developing methodologies to consistently and programmatically evaluate the corridors, creating a toolbox of preservation and enhancement strategies and identifying opportunities to implement these strategies. As an alternative to widening major highways to add capacity, preservation and enhancement strategies promote the use of innovative transportation solutions, minimizing delays for through traffic and improving safety, while incorporating local economic development goals. Developed in partnership with localities, the strategies will be used as tools to plan for infrastructure that supports future land use and development.

Town of Port Royal and its Main Street (Route 301) are unique and do not fit a cookie-cutter approach. The Town was there first, established in 1744.

A POSTIVE PATH FORWARD

Port Royal Town Council and Planning Commission joined in work sessions, each of which was open to the public. Stakeholders were provided the VDOT PowerPoint presentation and exhibits for the Rt. 301 study. Testimony of the public was received and considered by the Town Council and Planning Commission. The following are points which most, but not necessarily all, of the members agree to and/or can generate a general consensus:

A BYPASS SOLUTION

The most economical and comprehensive long term solution to the Town of Port Royal chokepoint on Route 301, Main Street, is a bypass for all four lanes of north/south traffic and all through truck traffic.

Existing Main Street would retain a lane of north and a lane of southbound traffic and a center turn lane. Fourth existing lane of Main Street would become sidewalks and landscaping.

Two very Different Stakeholder Groups

Two very different Stakeholder Groups: Those who want to be in classic Main Street local traffic pattern and those who just want to drive through as soon as possible.

Main Street in Port Royal will become a livable venue for citizens and a destination for travelers who want to experience an historic town on the Rappahannock River which is bounded by an outstanding United States Fish and Wildlife Refuge.

Stakeholders desiring or needing a fast, safe, and effective means of travel around the Town will have the bypass.

1. A rough sketch of the bypass ('Holloway Boulevard' from Point "A" to Route 17) is attached and made a part of this report;

a. Point "A" on the graphic is just north of Water Street to the west of Main Street.

i. The 'restaurant tract' at Main Street and the Rappahannock River is one of the very few public-commercial interactions on the river available and must be kept intact as much as possible in terms of keeping as much land as possible and access as immediate and easy as possible;

ii. The 'Roy' chimneys are historic and iconic of Port Royal history and must be preserved;

iii. A residence (Myers) on the Rappahannock River and Main Street and the small commercial lot next to that residence must have safe and easy access;

iv. The 61 acres fronting upon the Rappahannock River to the immediate west of the restaurant tract must retain an access which is as immediate and easy as possible;

a) The 61 acres might be master planned as a mixed-use development, as an Urban Development Area (UDA) to help with comportsing this project to requirements necessary for funding in the STARS program and as a result of the transportation improvements;

b) The 61 acres would also be accessed from the 'T' boulevard which will provide access to the three major land bays through which the bypass will traverse;

- b. Point “C” on the graphic denotes an extension of Cumberland Street to a roundabout which then links to the ‘T’ road, ‘Robinson Boulevard’ which will access the three major land bays as cited, above;
 - c. Point “D” is the location of a **traffic signal to be erected prior to the bypass** at the intersection of Cumberland and Main Street;
 - i. The traffic signal will function at a cycle of demand peak time periods (flashing yellow at non-peak; motion or sensors);
 - ii. The traffic signal will function at any time at the behest of the Fire and Rescue Department off Cumberland Street;
 - iii. Arguments of “no traffic signals” are superfluous due to the proposal of two (2) additional traffic signals for the proposed quadrant proposal by VDOT for the Rt. 301/17 intersection;
 - d. A leg of the bypass from Route 17 to Point “E” is Gouldin Boulevard and requires immediate and easy access to land bays on either side of Carpenter Boulevard. The area bounded by Route 17 and Main Street will probably be master planned for mixed use development, and as an UDA.
 - e. Land bays between the bypass, Holloway Boulevard and Main Street, will be accessed by Main Street. Larger land bay on the Holloway tract will be accessed by Route 17 and the new Robinson Boulevard. The large land bay and especially the area between Main Street and Holloway Boulevard will probably be master planned mixed-use development and an UDA.
2. **Existing Rt. 301, Main Street** will become a classic main street with one lane of southbound traffic, one lane of northbound traffic, a center lane for turn movements, and the fourth lane converted to sidewalks and landscaping.

- a. Grants will be sought for as much of this component of the project as possible.
 - b. Storm water management issues found at antiquated ditch and piping along Main Street which deliver waters directly to the Rappahannock will be addressed in an attempt to garner funds from mitigation of projects negatively impacting waters of the United States and/or water quality;
 - c. Main Street in Port Royal will become a desirable destination rather than a constricted funnel attempting to move high volumes of traffic with little opportunity for turn movements during peak demand.
3. Pedestrian and bicycle pathways and dedicated lanes are essential for the new Main Street and Cumberland Street extended as well as Robinson Boulevard. Interconnections between Main Street and other road networks are also essential. It is the Bypass which allows for Main Street to function as a multimodal transportation asset, by removing most of the through traffic and allowing local and destination traffic to dominate.
4. **Costs**
- a. Negative impacts of the bypass to citizens, businesses, historic and environmental resources are expected to be less than the other solutions proposed by VDOT which focus upon a combination of expansion of the existing Main Street rights of way and interchange 'improvements';
 - b. A combination of planning and zoning is designed to generate some of the rights of way for the bypass through proffers, as land areas are increased in value through a public/private partnership. Transportation improvements will become the impetus for 'Smart Growth'.

- c. A tract of land at Office Hall in King George County of 145 acres fronting upon both Route 3 and Route 301 sold for \$750,000 cash in 2018. In contrast, a small lot of a half-acre on Route 301 sold for \$40,000.
 - d. Acquisition of rights of way on Main Street for VDOT proposals will become very expensive as a consequence of the shallow lots and proximity of structures to Route 301 which are negative impacted by the combination of more traffic volumes and less buffer and/or usable lands along Main Street.
 - e. Costs of utility relocation along Main Street will be greater.
- 5. Probably minimize need for intersection ‘improvements’ as found in the VDOT presentation. Radical solutions proposed by VDOT would be unnecessary.**
- a. The bypass essentially moves traffic around the existing Rt. 301/17 intersection;
 - b. Drivers will have an opportunity to see Hornes and other businesses and take the existing Main Street or, if they desire, to go around the Town, take the bypass;
 - c. Negating costs of major or radical intersection “improvements” should feed-back as savings allocated to the bypass solution.

6. Implementation

- a. VDOT
 - i. Town will work with VDOT to flesh out a more specific proposal and details;
 - ii. Another goal of this plan is to arrive not at just a solution but a superlative example of how to accomplish a complex project

benefiting a wide range of stakeholders through a collaboration of many.

iii. Seek out other partners to help with costs and support;

b. Caroline County Board of Supervisor and Planning Commission

- i. Work with Caroline County to create a joint planning area for land use planning, future utilities, and revenue sharing to be applied to the land bays contiguous to the Town and impacted by the bypass;
- ii. Insert into the Capital Improvement Plan for the Town and Caroline County the bypass and link to proffer requirements;
- iii. Work with Caroline County to present the bypass project to various regional, state, and federal agencies/departments for funding and support within a matrix of land use, utilities, and revenue sharing between the Town and Caroline County.

7. Fort AP Hill

- a. Existing Main Street as a thorough fare, arterial highway, does not have any shoulders and is susceptible to failure if an accident occurs;
 - i. A text message was sent from Fort AP Hill, 05 September 2019, which stated: *“Fort AP Hill has been designated a staging area in support of recovery operations for area impacted by hurricane Dorian. Motorist should expect delays over the next several days on Route 301 and when accessing Fort AP Hill as FEMA trucks will be entering and exiting the facility.”*
 - ii. Safe, efficient, and reliable traffic movements on Main Street and Route 301 are essential to the many varied missions of Fort AP Hill. A bypass will negate the existing chokepoint found at a dysfunctional Main Street with no shoulders and propensity for traffic hazards;

8. NOISE

- a. Actions to accommodate greater traffic volumes on Main Street in Port Royal will negatively impact citizens and stakeholders, especially noise;
- b. Compliance with VDOT's "State Noise Abatement Policy", effective July 13, 2011, and updated July 2014 is sought if any other solutions are attempted by VDOT as a replacement for the bypass. VDOT guidelines are based on Title 23 of the Code of Federal Regulations, Part 772 and the Procedures for Abatement of Highway Traffic Noise and Construction Noise, (23 CFR 772).
- c. The bypass will be engineered and built to mitigate noise externalities.

9. Historic Resources

- a. Port Royal, 'old town' is listed on both the State and National Registers of Historic Places;
- b. That Register Nomination form is in the process of updating. Field work has been completed resulting in a change in geography (expanded) and an expansion of the time periods (expanded from 17th and 18th century to within about 50 years of age and greater provided other requirements are met;
- c. Beyond tangible physical assets are found intangible resources of landscape, function, and culture which collectively comprise a very real historic resource. Pursuit of other options as outlined by VDOT with regards its 'through traffic' and 'intersection improvements' will have a very real negative impact upon those cultural features, which are in and of themselves resources.

THANKSGIVING

Town of Port Royal is thankful to VDOT and its consultants for the time, energy and efforts to find solutions for the Main Street corridor in the Town. It is a complicated set of problems. Staff and consultants have been very professional and good to work with. We might disagree on some issues. We shall rely upon professionalism and good intentions to move us all forward.

ERRORS AND DEFICIENCIES

“RATING CRITERIA”

- a) The Town takes exception to and strongly disagrees with statements and conclusions as found in the documents providing a color-coded statement of conclusions as to various observations of effectiveness applied to the ‘through’ and ‘intersection’ plans. Time and lack of more information presently preclude amplification of this response. An opportunity for a more robust rebuttal is reserved by the Town.
- b) A request to formally presented to VDOT for data and analysis applied thereto used to arrive at the conclusions found in the RATING CRITERIA. As of 06 September, no response has been tendered forth.

MOVING FORWARD

The Town will earnestly work with VDOT, Caroline County, and others. The Town will actually rely upon VDOT for much help in developing the plans, documentation, and other actions necessary to perfect a bypass plan acceptable to the stakeholders and move expeditiously towards funding for a superlative solution.

Caroline County, Virginia

Board of Supervisors

Jeffrey S. Black
Western Caroline District

Clayton T. Forehand
Madison District

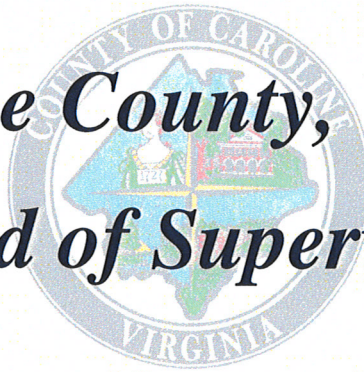
Nancy L. Long
Port Royal District

Jeffery M. Sili
Bowling Green District

Floyd W. Thomas
Mattaponi District

Reginald L. Underwood
Reedy Church District

Charles M. Culley, Jr.
County Administrator



Caroline County, VA



September 25, 2019

Mr. Stephen Haynes
District Planning Manager
VDOT Fredericksburg District
87 Deacon Road
Fredericksburg, Virginia 22405

Dear Mr. Haynes,

The Caroline County Board of Supervisors has been requested to provide comments to the recommendations from the Virginia Department of Transportation (VDOT) for improvements to the Route 301 corridor in the Town of Port Royal. The Board is well aware of the additional traffic anticipated on Route 301 once the Harry Nice Bridge improvements are completed. Route 301 already serves as a bypass to I-95 and usage of this route will only increase, as VDOT studies have validated. The Board is appreciative of the efforts by VDOT staff to work with the Town and its citizens to address their concerns about this additional traffic and identify ways to mitigate impacts without altering the Town's character.

VDOT provided four alternatives for consideration by the Town, with a cost-benefit analysis for each option. Several of the options provide a Main Street effect for Route 301 through Town. Town officials remain concerned about accommodating additional traffic increases along Route 301, while retaining a "Main Street" atmosphere. To that end, Town Council proposed an additional alternative for a two-way bypass to the west of the Town by resolution dated September 10, 2019.

There are pros and cons to a bypass around any town and care must be taken to ensure such a design does not negatively affect the economic viability of Port

"Committed To Service, Dedicated To The People"

212 North Main Street, P. O. Box 447, Bowling Green, Virginia 22427

(804)633-5380 – Telephone (804)633-4970 – Fax

www.co.caroline.va.us

Mr. Stephen Haynes
September 25, 2019
Page Two

Royal. Neither should such a concept serve as a road to open more land for speculative development, thereby defeating the intended purpose of a bypass.

While the Board of Supervisors is not yet ready to commit its support for a bypass through that portion of the County around the Town of Port Royal, the County does support further analysis of this option relative to the other alternatives identified.

Sincerely,

A handwritten signature in black ink, appearing to read "Clayton T. Forehand". The signature is fluid and cursive, with a large initial "C" and "F".

Clayton T. Forehand, Chairman
Caroline County Board of Supervisors

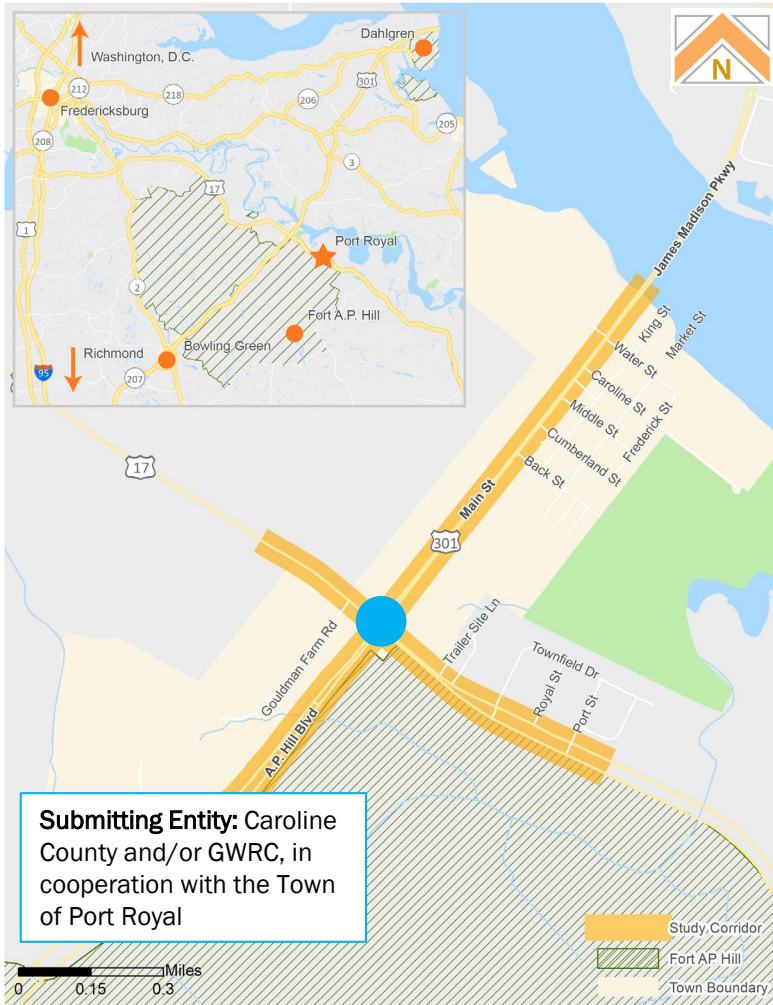
APPENDIX J

Transportation Options: SMART SCALE Summary Sheets

Intersection of Route 301/Route 17 Intersection Modification

Likely Benefit-Cost
Ratio:
High

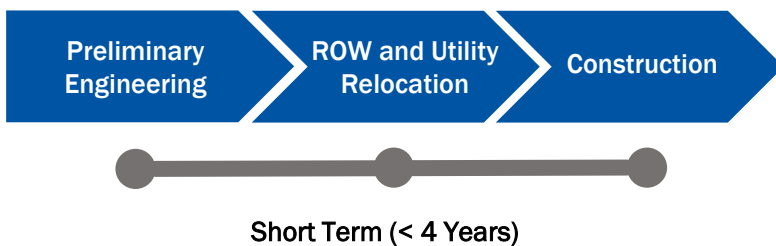
Project Map



Submitting Entity: Caroline County and/or GWRC, in cooperation with the Town of Port Royal

Project Extents

Typical VDOT Project Development Process



Planning Level Cost Estimate
Moderate (2.78M – 3.93M)

Right-of-Way Needed?
Moderate (10K – 50K SF)

Project Overview

Add the following enhancements to Route 301/Route 17: optimize signal, provide additional southbound left-turn lane on Route 301, provide a dedicated westbound left-turn lane on Route 17, and add pedestrian accommodations.

SMART SCALE Scoring Criteria

Congestion Mitigation	Increase Person Throughput	+
	Reduce Delay	+
Safety	Reduce Fatal and Injury Crashes	/
	Reduce Fatal and Injury Crash Rate	/
Accessibility	Increase Access to Jobs	/
	Increase Access to Jobs for Disadvantaged Populations	/
	Increase Access to Multimodal Travel Choices	+
Economic Development	Square Feet of Commercial/Industrial Uses	/
	Tons of Freight Goods Impacted	+
	Improvement to Travel Time Reliability	+
Environment	Potential to Improve Air Quality	/
	Potential Natural and Cultural Acreage Impacted	/

Likely Project Influence on Scoring Criteria

+ Improve / No Change - Worse

Intersection of Route 301/Route 17 Intersection Modification

Likely Benefit-Cost
Ratio:
High

Conceptual Plan



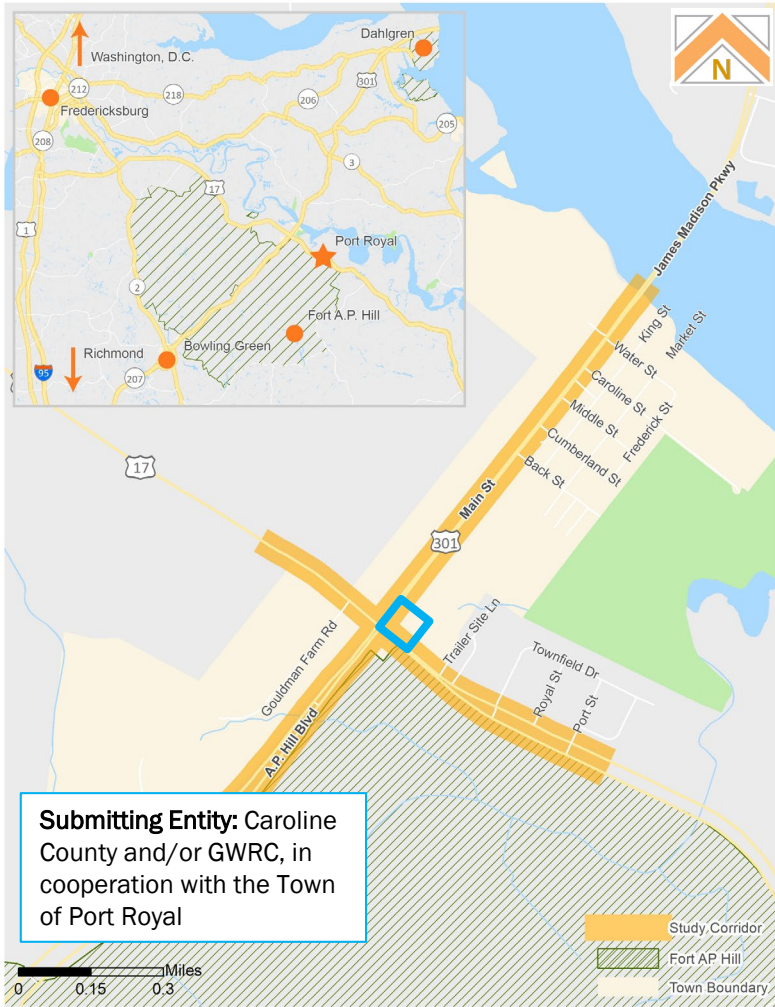
SMART SCALE Scoring Criteria - Justification

Congestion Mitigation	This project will increase the capacity of Route 301 and Route 17 (currently a bottleneck on the otherwise free-flowing Route 301 corridor), so it is likely to increase person throughput and reduce delay .
Safety	This project will not reduce the need for motorists to turn into and out of the Town of Port Royal from Route 301. This project is unlikely to reduce fatal and injury crashes and unlikely to reduce the fatal and injury crash rate .
Accessibility	This project will optimize operations at one intersection, which is unlikely to increase access to jobs or to increase access to jobs for disadvantaged populations . Since this project will add limited pedestrian accommodations, it is likely to increase access to multimodal travel choices .
Economic Development	Based on the existing land use plan for the Town of Port Royal, this project is unlikely to induce the construction of additional square feet of commercial/industrial uses . By reducing delay at Route 301/Route 17, this project will likely improve travel time reliability and have a positive impact on freight goods traveling along Route 301.
Environment	Since this project does not include alternate modes of transportation, it is unlikely to improve air quality . This project involves changes to an existing intersection within existing right-of-way and is unlikely to impact natural and cultural acreage .

Intersection of Route 301/Route 17 Quadrant Intersection

Likely Benefit-Cost Ratio:
Moderate

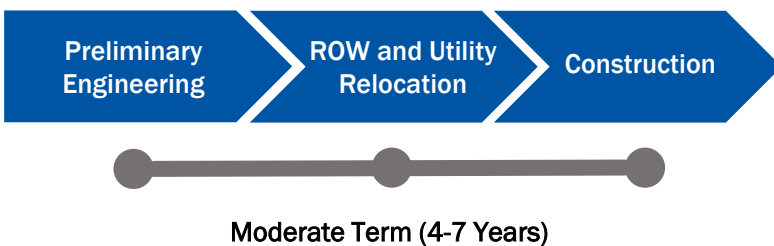
Project Map



Submitting Entity: Caroline County and/or GWRC, in cooperation with the Town of Port Royal

Project Extents

Typical VDOT Project Development Process



Planning Level Cost Estimate
High (5.99M – 8.46M)

Right-of-Way Needed?
Moderate (10K - 50K SF)

Project Overview

Build new connector “quadrant roadway” in the northeast corner of the Route 301/17 intersection to serve northbound and southbound left-turns. This project diverts heavy southbound left-turn volumes prior to Route 301/17, reduces the number of signal phases and cycle length at Route 301/17, and provides two new coordinated signals at the secondary connections. It also adds pedestrian accommodations.

SMART SCALE Scoring Criteria

Congestion Mitigation	Increase Person Throughput	+
	Reduce Delay	+
Safety	Reduce Fatal and Injury Crashes	/
	Reduce Fatal and Injury Crash Rate	/
Accessibility	Increase Access to Jobs	/
	Increase Access to Jobs for Disadvantaged Populations	/
	Increase Access to Multimodal Travel Choices	+
Economic Development	Square Feet of Commercial/Industrial Uses	/
	Tons of Freight Goods Impacted	+
	Improvement to Travel Time Reliability	+
Environment	Potential to Improve Air Quality	/
	Potential Natural and Cultural Acreage Impacted	-

Likely Project Influence on Scoring Criteria

+ Improve / No Change - Worse

Intersection of Route 301/Route 17 Quadrant Intersection

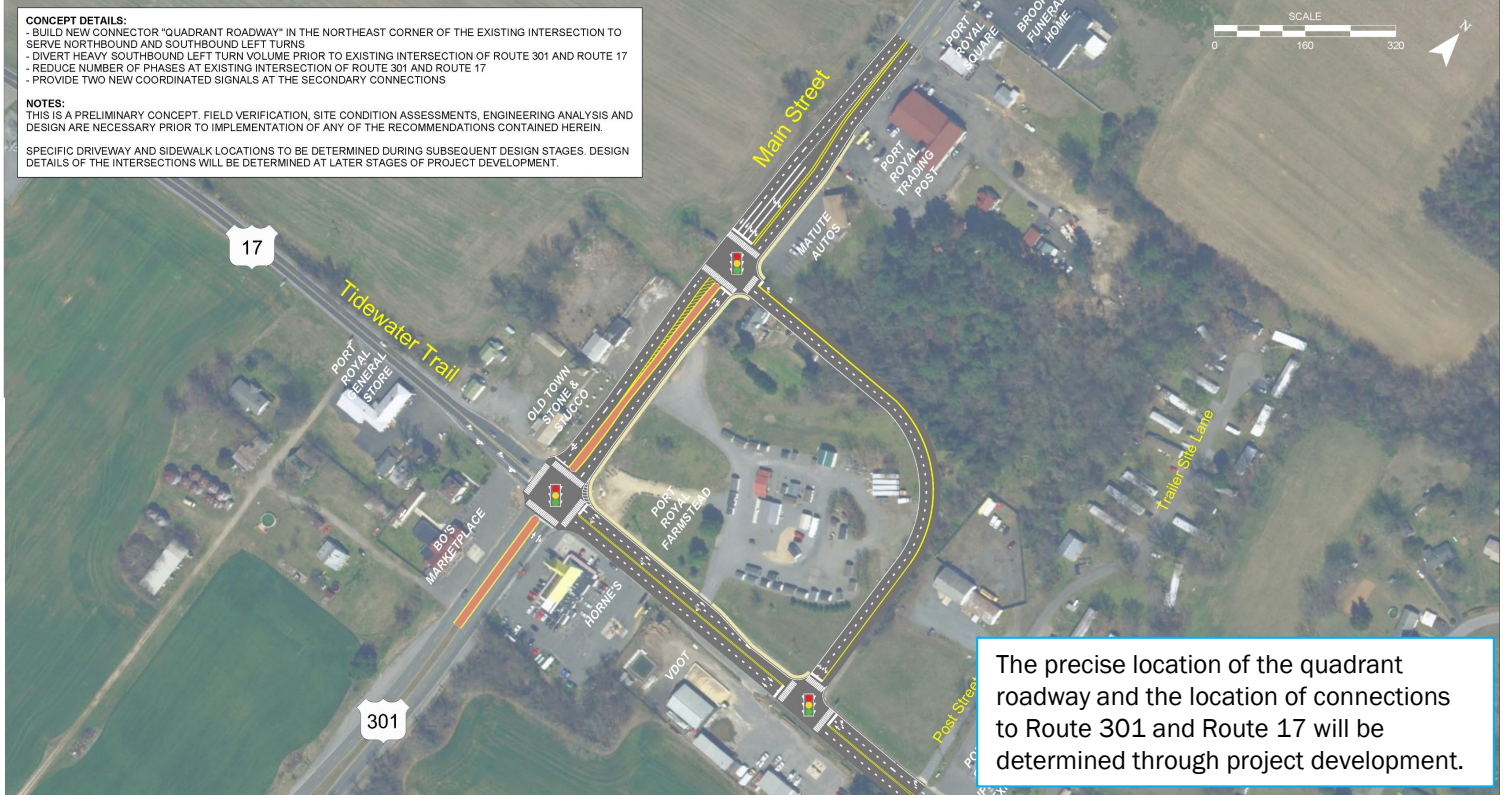
Likely Benefit-Cost
Ratio:
Moderate

Conceptual Plan

CONCEPT DETAILS:
 - BUILD NEW CONNECTOR "QUADRANT ROADWAY" IN THE NORTHEAST CORNER OF THE EXISTING INTERSECTION TO SERVE NORTHBOUND AND SOUTHBOUND LEFT TURNS
 - DIVERT HEAVY SOUTHBOUND LEFT TURN VOLUME PRIOR TO EXISTING INTERSECTION OF ROUTE 301 AND ROUTE 17
 - REDUCE NUMBER OF PHASES AT EXISTING INTERSECTION OF ROUTE 301 AND ROUTE 17
 - PROVIDE TWO NEW COORDINATED SIGNALS AT THE SECONDARY CONNECTIONS

NOTES:
 THIS IS A PRELIMINARY CONCEPT. FIELD VERIFICATION, SITE CONDITION ASSESSMENTS, ENGINEERING ANALYSIS AND DESIGN ARE NECESSARY PRIOR TO IMPLEMENTATION OF ANY OF THE RECOMMENDATIONS CONTAINED HEREIN.

SPECIFIC DRIVEWAY AND SIDEWALK LOCATIONS TO BE DETERMINED DURING SUBSEQUENT DESIGN STAGES. DESIGN DETAILS OF THE INTERSECTIONS WILL BE DETERMINED AT LATER STAGES OF PROJECT DEVELOPMENT.



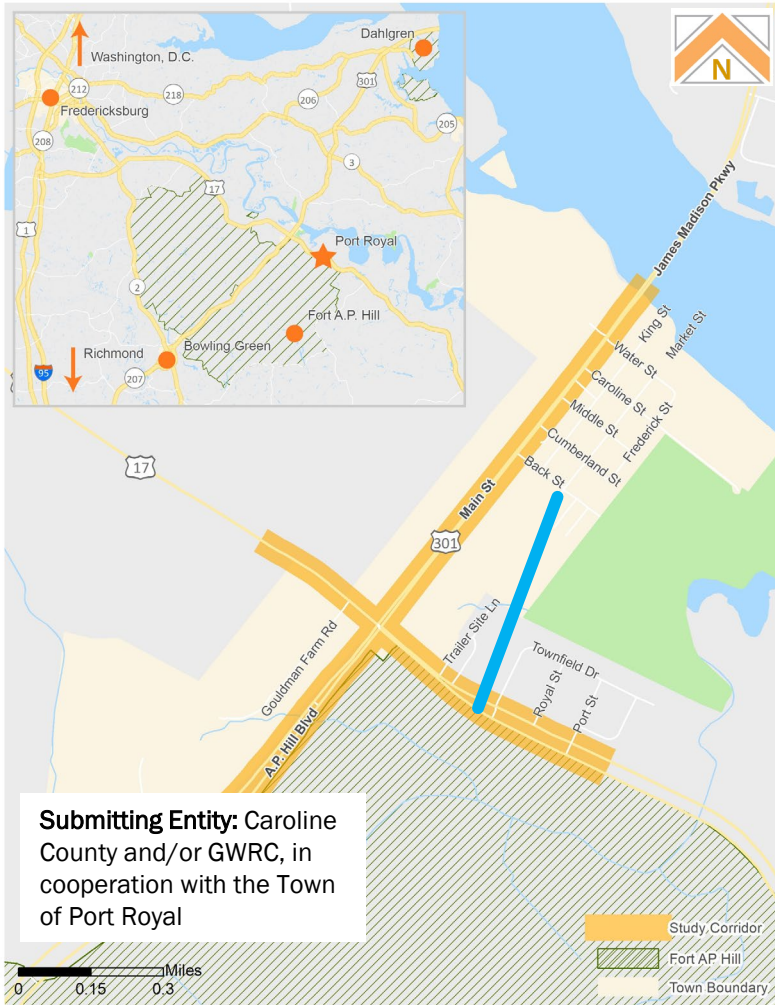
SMART SCALE Scoring Criteria - Justification

Congestion Mitigation	This project will increase the capacity of Route 301 and Route 17 (currently a bottleneck on the otherwise free-flowing Route 301 corridor), so it is likely to increase person throughput and reduce delay .
Safety	This project will not reduce the need for motorists to turn into and out of the Town of Port Royal from Route 301. This project is unlikely to reduce fatal and injury crashes and unlikely to reduce the fatal and injury crash rate .
Accessibility	This project will operations at one intersection, which is unlikely to increase access to jobs or to increase access to jobs for disadvantaged populations . Since this project will add limited pedestrian accommodations, it is likely to increase access to multimodal travel choices .
Economic Development	Based on the existing land use plan for the Town of Port Royal, this project is unlikely to induce the construction of additional square feet of commercial/industrial uses . It will improve access for the property located in the NE quadrant of the Route 301 and Route 17 intersection. By reducing delay at Route 301/Route 17, this project will likely improve travel time reliability and have a positive impact on freight goods traveling along Route 301.
Environment	Since this project does not include alternate modes of transportation, it is unlikely to improve air quality . This project will build a new road through previously undeveloped parcels and is likely to impact natural and cultural acreage .

Intersection of Route 301/Route 17 Market Street Extension

Likely Benefit-Cost Ratio:
Moderate

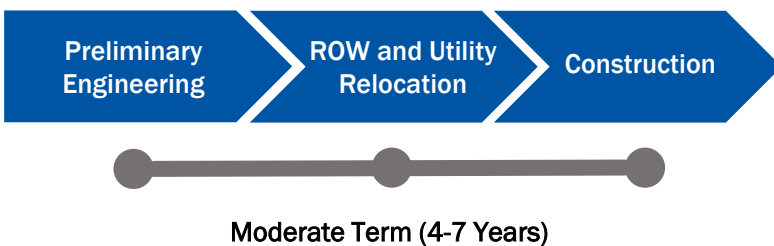
Project Map



Submitting Entity: Caroline County and/or GWRC, in cooperation with the Town of Port Royal

Project Extents

Typical VDOT Project Development Process



Planning Level Cost Estimate
High (5.05M – 7.12M)

Right-of-Way Needed?
High (> 50K SF)

Project Overview

Extend Market Street south to Route 17, providing increased connectivity to the Town of Port Royal. This option may be combined with the quadrant roadway option or may stand alone, connecting directly to Route 17.

SMART SCALE Scoring Criteria

Congestion Mitigation	Increase Person Throughput	/
	Reduce Delay	+
Safety	Reduce Fatal and Injury Crashes	+
	Reduce Fatal and Injury Crash Rate	+
Accessibility	Increase Access to Jobs	/
	Increase Access to Jobs for Disadvantaged Populations	/
	Increase Access to Multimodal Travel Choices	/
Economic Development	Square Feet of Commercial/Industrial Uses	/
	Tons of Freight Goods Impacted	+
	Improvement to Travel Time Reliability	+
Environment	Potential to Improve Air Quality	/
	Potential Natural and Cultural Acreage Impacted	-

Likely Project Influence on Scoring Criteria

+ Improve / No Change - Worse

Intersection of Route 301/Route 17 Market Street Extension

Likely Benefit-Cost
Ratio:
Moderate

Conceptual Plan

NOTES:

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EXACT ALIGNMENT OF MARKET STREET TO BE DETERMINED DURING SUBSEQUENT DESIGN STAGES.



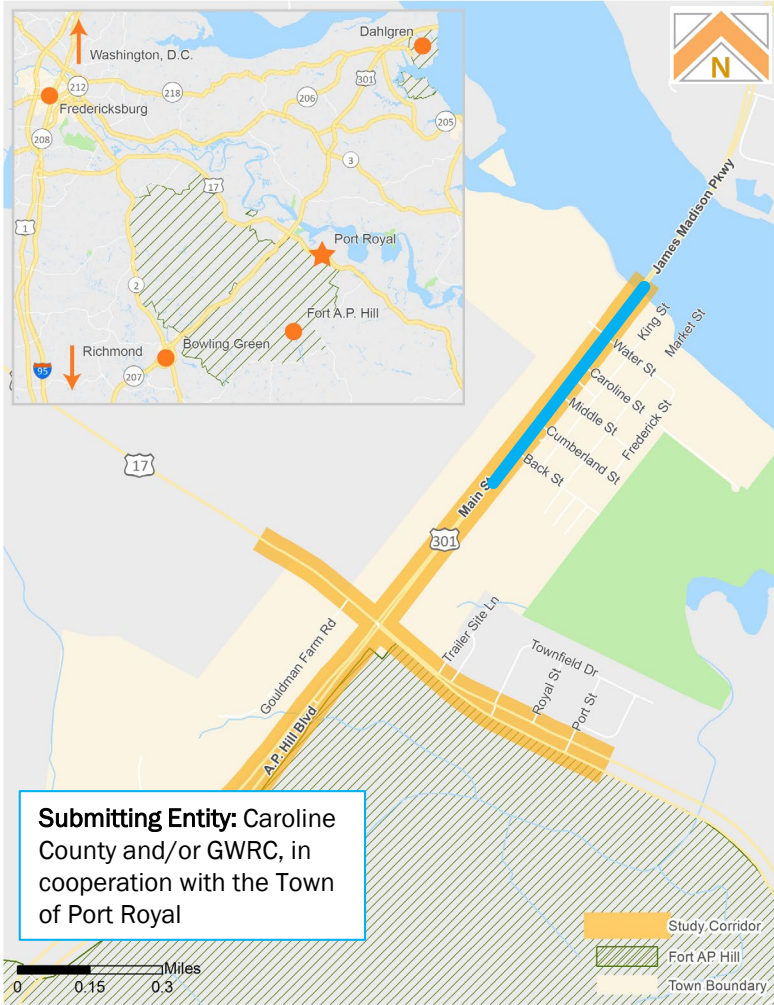
SMART SCALE Scoring Criteria - Justification

Congestion Mitigation	This project will increase local roadway network connectivity, so it is unlikely to increase person throughput . By providing local travelers with a means to circumvent the intersection of Route 301/Route 17, this project is likely to reduce delay .
Safety	This project will reduce the need for motorists to turn into and out of the Town of Port Royal from Route 301. By reducing the potential for crashes related to turning movements and differences in vehicle speeds, this project is likely to reduce fatal and injury crashes and to reduce the fatal and injury crash rate .
Accessibility	This project will increase local roadway network connectivity, which is unlikely to increase access to jobs or to increase access to jobs for disadvantaged populations . This project is unlikely to increase access to multimodal travel choices .
Economic Development	Based on the existing land use plan for the Town of Port Royal, this project is unlikely to induce the construction of additional square feet of commercial/industrial uses . By reducing delay at Route 301/Route 17, this project will likely improve travel time reliability and have a positive impact on freight goods traveling along Route 301.
Environment	Since this project does not include alternate modes of transportation, it is unlikely to improve air quality . This project will build a new road through previously undeveloped parcels and is likely to impact natural and cultural acreage .

Route 301 Through Town Two-Way Left-Turn Lane

Likely Benefit-Cost Ratio:
Moderate

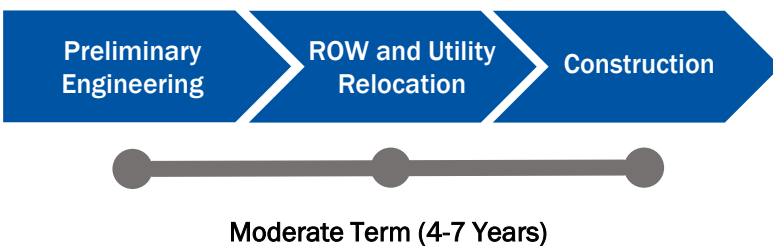
Project Map



Submitting Entity: Caroline County and/or GWRC, in cooperation with the Town of Port Royal

Project Extents

Typical VDOT Project Development Process



Planning Level Cost Estimate
Moderate (8.75M – 12.35M)

Right-of-Way Needed?
Moderate (10K - 50K SF)

Project Overview

Provides a center turning lane for northbound and southbound left-turning movements on Route 301. Adds pedestrian accommodations with “spot-median” locations for crossing Route 301 and landscaping as a visual cue for motorists passing through Town. Includes two pedestrian crossings at Back Street and Caroline Street to facilitate pedestrian travel across Route 301.

SMART SCALE Scoring Criteria

Congestion Mitigation	Increase Person Throughput	/
	Reduce Delay	+
Safety	Reduce Fatal and Injury Crashes	+
	Reduce Fatal and Injury Crash Rate	+
Accessibility	Increase Access to Jobs	/
	Increase Access to Jobs for Disadvantaged Populations	/
	Increase Access to Multimodal Travel Choices	+
Economic Development	Square Feet of Commercial/Industrial Uses	/
	Tons of Freight Goods Impacted	+
	Improvement to Travel Time Reliability	+
Environment	Potential to Improve Air Quality	+
	Potential Natural and Cultural Acreage Impacted	-

Likely Project Influence on Scoring Criteria

+ Improve / No Change - Worse

Route 301 Through Town Two-Way Left-Turn Lane

Likely Benefit-Cost
Ratio:
Moderate

Conceptual Plan

NOTES:

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SPECIFIC DRIVEWAY AND SIDEWALK LOCATIONS TO BE DETERMINED DURING SUBSEQUENT DESIGN STAGES. DESIGN DETAILS OF THE INTERSECTIONS WILL BE DETERMINED AT LATER STAGES OF PROJECT DEVELOPMENT.



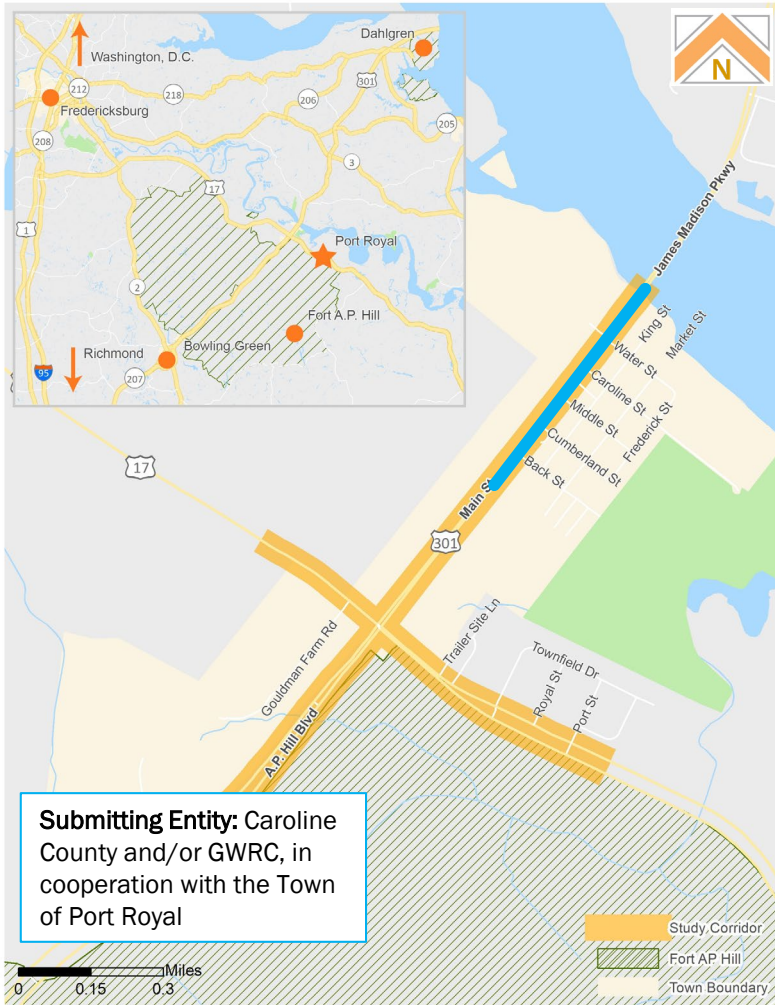
SMART SCALE Scoring Criteria - Justification

Congestion Mitigation	This project does not influence the capacity of Route 301 and Route 17, so it is unlikely to increase person throughput . This project makes it easier for vehicles to turn onto and off Route 301, so it may reduce delay for vehicles traveling through and to the Town of Port Royal on Route 301.
Safety	This project will make it easier for for motorists to turn into and out of the Town of Port Royal from Route 301. By reducing the potential for crashes related to turning movements and differences in vehicle speeds, this project is likely to reduce fatal and injury crashes and to reduce the fatal and injury crash rate .
Accessibility	This project will add turn-lanes to an existing corridor, which is unlikely to increase access to jobs or to increase access to jobs for disadvantaged populations . This project adds continuous pedestrian accommodations on the east side of Route 301, increasing access to multimodal travel choices .
Economic Development	Based on the existing land use plan for the Town of Port Royal, this project is unlikely to induce the construction of additional square feet of commercial/industrial uses . By reducing delay along Route 301, this project will likely improve travel time reliability and have a positive impact on freight goods traveling along Route 301.
Environment	Since this project adds accommodations for non-motorized modes of transportation, it is likely to improve air quality . This project involves changes to an existing roadway with some construction occurring outside of existing right-of-way and is likely to impact natural and cultural acreage .

Route 301 Through Town Full Raised Median

Likely Benefit-Cost Ratio:
Moderate

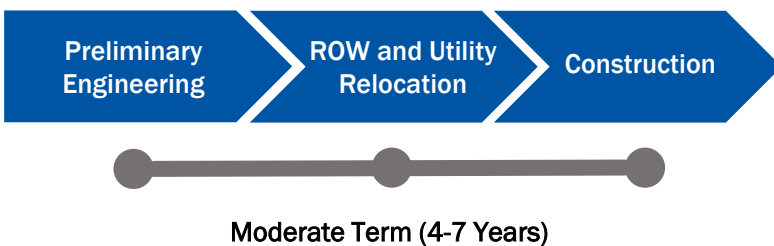
Project Map



Submitting Entity: Caroline County and/or GWRC, in cooperation with the Town of Port Royal

Project Extents

Typical VDOT Project Development Process



Planning Level Cost Estimate
Moderate (11M - 15.54M)

Right-of-Way Needed?
Moderate (10K - 50K SF)

Project Overview

Provides a full raised median along Route 301 to reduce the number of turning conflict points and provide protected left-turns on Route 301. Provides an acceleration lane on Route 301 SB from Caroline Street. Adds pedestrian accommodation with crosswalk locations, including median refuge areas. Median landscaping may be added as a visual cue through Town.

SMART SCALE Scoring Criteria

Congestion Mitigation	Increase Person Throughput	/
	Reduce Delay	+
Safety	Reduce Fatal and Injury Crashes	+
	Reduce Fatal and Injury Crash Rate	+
Accessibility	Increase Access to Jobs	/
	Increase Access to Jobs for Disadvantaged Populations	/
	Increase Access to Multimodal Travel Choices	+
Economic Development	Square Feet of Commercial/Industrial Uses	/
	Tons of Freight Goods Impacted	+
	Improvement to Travel Time Reliability	+
Environment	Potential to Improve Air Quality	+
	Potential Natural and Cultural Acreage Impacted	-

Likely Project Influence on Scoring Criteria

+ Improve / No Change - Worse

Route 301 Through Town Full Raised Median

Likely Benefit-Cost
Ratio:
Moderate

Conceptual Plan



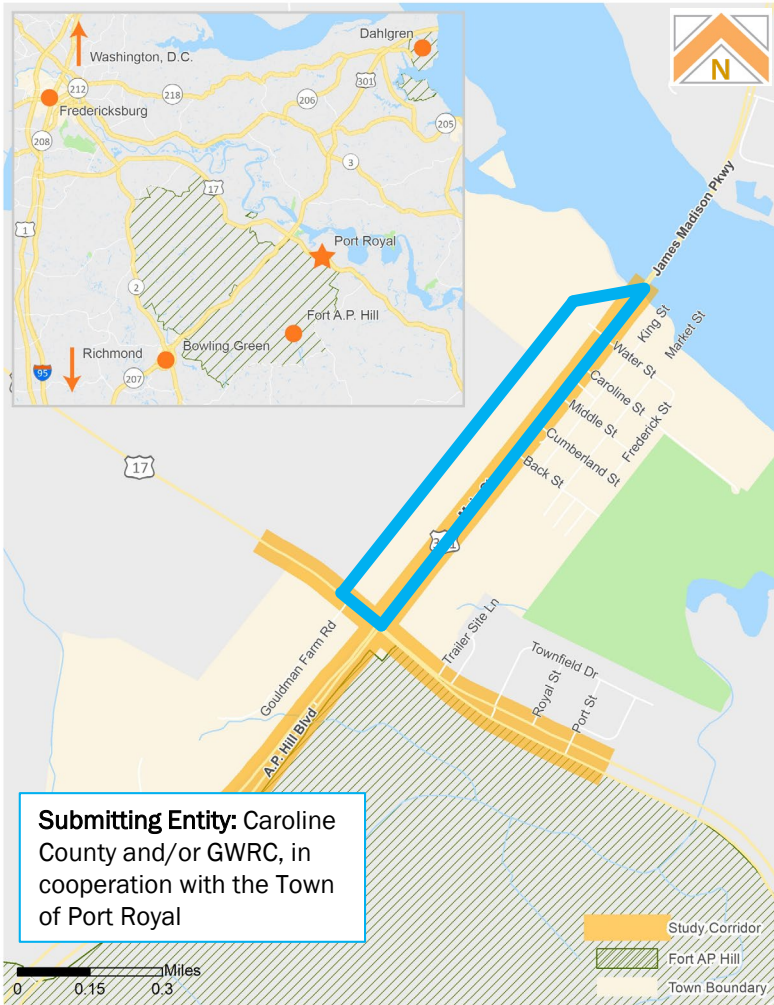
SMART SCALE Scoring Criteria - Justification

Congestion Mitigation	This project does not influence the capacity of Route 301 and Route 17, so it is unlikely to increase person throughput . This project limits the number of locations where vehicles can to turn onto and off Route 301, so it is likely to reduce delay for vehicles traveling through the Town of Port Royal on Route 301.
Safety	This project will make it easier for for motorists to turn into and out of the Town of Port Royal from Route 301. By reducing the potential for crashes related to turning movements and differences in vehicle speeds, this project is likely to reduce fatal and injury crashes and to reduce the fatal and injury crash rate .
Accessibility	This project will add turn-lanes to an existing corridor, which is unlikely to increase access to jobs or to increase access to jobs for disadvantaged populations . This project adds continuous pedestrian accommodations on the east side of Route 301, increasing access to multimodal travel choices .
Economic Development	Based on the existing land use plan for the Town of Port Royal, this project is unlikely to induce the construction of additional square feet of commercial/industrial uses . By reducing delay along Route 301, this project will likely improve travel time reliability and have a positive impact on freight goods traveling along Route 301.
Environment	Since this project adds accommodations for non-motorized modes of transportation, it is likely to improve air quality . This project involves changes to an existing roadway with some construction occurring outside of existing right-of-way and is likely to impact natural and cultural acreage .

Route 301 Through Town One-Way Pair “Couplet”

Likely Benefit-Cost
Ratio:
Low

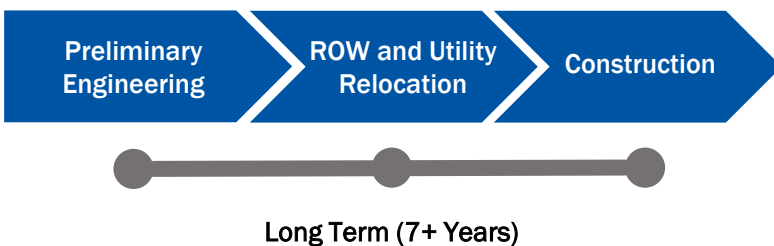
Project Map



Submitting Entity: Caroline County and/or GWRC, in cooperation with the Town of Port Royal

Project Extents

Typical VDOT Project Development Process



Planning Level Cost Estimate
High (19.34M – 27.3M)

Right-of-Way Needed?
High (> 50K SF)

Project Overview

Construct new two-lane roadway, paralleling Route 301 to the west, for southbound traffic. Convert existing Route 301 to a two-lane roadway for northbound traffic. Provides future opportunity to expand grid pattern to west side of Route 301. The current cost estimate and concept does not provide pedestrian accommodation, but it could be provided for a higher cost.

SMART SCALE Scoring Criteria

Congestion Mitigation	Increase Person Throughput	/
	Reduce Delay	/
Safety	Reduce Fatal and Injury Crashes	+
	Reduce Fatal and Injury Crash Rate	+
Accessibility	Increase Access to Jobs	/
	Increase Access to Jobs for Disadvantaged Populations	/
	Increase Access to Multimodal Travel Choices	/
Economic Development	Square Feet of Commercial/Industrial Uses	+
	Tons of Freight Goods Impacted	-
	Improvement to Travel Time Reliability	-
Environment	Potential to Improve Air Quality	/
	Potential Natural and Cultural Acreage Impacted	-

Likely Project Influence on Scoring Criteria

+ Improve / No Change - Worse

Route 301 Through Town One-Way Pair “Couplet”

Likely Benefit-Cost
Ratio:
Low

Conceptual Plan

NOTES:
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SMART SCALE Scoring Criteria - Justification

Congestion Mitigation	This project does not influence the capacity of Route 301 and Route 17, so it is unlikely to increase person throughput . This project increases out of direction travel for southbound motorists on Route 301 and for motorists trying to access businesses on the west side of Route 301, so it is unlikely to reduce delay .
Safety	This project will reduce turning conflicts for motorists turning into and out of the Town of Port Royal. By reducing the potential for crashes related to turning movements and differences in vehicle speeds, this project is likely to reduce fatal and injury crashes and to reduce the fatal and injury crash rate .
Accessibility	This project will convert an existing two-way facility to a one-way couplet, which is unlikely to increase access to jobs or to increase access to jobs for disadvantaged populations . Since this project will not add pedestrian accommodations, it is unlikely to increase access to multimodal travel choices .
Economic Development	Based on the existing land use plan for the Town of Port Royal, this project may induce the construction of additional square feet of commercial/industrial uses . By routing southbound motorists through two signalized intersections this project will likely reduce travel time reliability and have a negative impact on freight goods .
Environment	Since this project does not include alternate modes of transportation, it is unlikely to improve air quality . This project will build a new road through previously undeveloped parcels and is likely to impact natural and cultural acreage .